Hinkley Point C | Development Consent Order Application

Environmental Statement
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Environmental Statement - Annex 7

Transport Assessment

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ANNEX 7: TRANSPORT ASSESSMENT

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EXECUTIVE SUMMARY

This Transport Assessment (TA) considers the transport strategy for the construction and operation of the Hinkley Point C nuclear power station (HPC) including all associated developments.

POLICY

The starting point for considering the appropriate transport strategy for this project is government policy. This is set out within the National Policy Statement for Energy (EN-1) which advises, at paragraph 5.13.10, that:

> *"Water-borne or rail transport is preferred over road transport at all stages of the project, where cost-effective."*

And at paragraph 5.13.8:

> *"Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts."*

The policy is clear in preferring sea or rail transport to road and preferring demand management to provision of new inland transport infrastructure.

This policy is supported by other national transport policies which encourage demand management and the development of sustainable transport solutions over new road building.

There is also important policy advice in EN-1 covering the extent to which impacts need to be mitigated. Paragraph 5.13.7 states:

> "*Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG Transport Assessment, with attribution of costs calculated in accordance with the department of transports guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure"*

TRANSPORT OBJECTIVES

Building on this policy context, EDF Energy has developed a set of transport objectives as follows:

- minimise the volume of traffic associated with the development of the new power station as far as reasonably practical, at all times, but especially during peak hours;
- maximise the safe, efficient and sustainable movement of people (i.e. travel by non-car) and materials (i.e. delivery by non-road) required for the HPC Project as far as reasonably practicable;
- minimise the impacts both for the local community and visitors to the area using the road network as far as reasonably practicable;

- provide long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate;
- maximise the control of movements associated with the construction of the HPC Project so far as reasonably practicable;
- take all reasonable steps to ensure the resilience of the transport network in the event of an incident; and
- take all reasonable steps to protect the natural and built environment.

TRANSPORT STRATEGY

Taking account of these objectives, EDF examined a number of alternatives and consulted widely before developing their transport strategy. The preferred strategy comprises the following:

For construction workers:

- severe restrictions on parking on HPC development site;
- Park and Ride facilities close to Junction 23 and Junction 24 of the M5; at Cannington and at Williton. The sites at Junction 24 and Williton utilise previously developed land;
- direct bus services from locations where there are likely to be clusters of workers such as Bridgwater; Weston Super Mare and Minehead;
- accommodation campus bus services to serve those living at the Bridgwater A and C accommodation campuses;
- encouragement to use walking and cycling where practical for trips to the HPC development site, bus stops and Park and Ride sites and for non-work trips; and
- development of a comprehensive and deliverable Travel Plan to encourage the use of sustainable modes.

For freight movements a comprehensive **Freight Management Strategy** has been developed, the key elements of which are:

- the re-use and storage of excavated materials on-site to avoid exporting off-site;
- the use of water for delivery of materials and the largest AILs through the construction of a temporary jetty at HPC, the refurbishment and extension of Combwich Wharf and the construction of a new freight laydown facility at Combwich;
- introducing off-site freight management facilities at Junction 23 and Junction 24, to control incoming freight traffic flow and holding freight vehicles in case of an incident on the local network or on site;
- regulating traffic flow by using a project-wide delivery management system (DMS) to regulate flows and move away from peak time congestion;
- use of only designated routes through Bridgwater for Heavy Goods Vehicles (HGVs) to the HPC development site; and
- reducing small vehicle movements through consolidation of mail and courier deliveries at the Junction 23, and temporarily at the Junction 24, associated development sites.

MODAL SHARE

It is an essential element of the transport strategy that construction workers would be required rather than just encouraged to use the selected mode of transport. For example, if a worker lives close to a direct bus service they would be required to use that service and would not be allocated a parking space at a Park and Ride site. This prescription means that, at peak construction, the following approximate modal share for workers would be achieved in respect of daily journeys to and from the HPC development site:

- Direct Bus to Site (non-campus): 21%
- Campus Residents (Direct bus or already resident at the HPC accommodation campus):26%
- Park and Ride: 49%
- Car Driver to site: 4%

As can be seen 47% of workers do not use a car for any part of their journey and only 4% of workers drive to the HPC development site.

CONTROLS AND MONITORING

EDF propose to introduce a comprehensive set of controls and monitoring that would ensure that the transport strategy would be comprehensively implemented and enforced – including where applicable by passing on requirements to the contractors working on the HPC Project.

Application of these conditions and controls provides confidence that the transport impacts analysed represent a robust assessment of the maximum traffic impacts of the development at peak construction.

TRANSPORT IMPROVEMENTS

The effects of the traffic generated by HPC construction on the strategic and local highway network have been comprehensively assessed using a traffic model. The starting point in this assessment was to build a model of existing conditions. The outputs from the model were checked against surveys of traffic flows, queues and journey times and the two were found to correlate well. On this basis, the transport authorities agreed that the model was fit for purpose for the assessment of the effects of the HPC Project.

Initial modelling of the effects of the construction of HPC identified impacts on the road network. Therefore, EDF Energy has developed a comprehensive set of improvements that are considered an appropriate response to the additional traffic. The improvements address key existing constraints on the network whilst seeking to avoid negative impacts on the urban and rural fabric of the area. The highway improvements proposed by EDF do not result in the demolition of any properties and the majority are within the existing highway boundary.

In addition to addressing congestion issues, the improvements also enhance safety and improve the walking and cycling infrastructure. In addition to the core schemes to be implemented, contributions are proposed to assist Somerset County Council with their ongoing transport improvement programme.

After careful consideration and consultation EDF Energy decided that a bypass to Cannington should form part of their preferred proposals. This is in order to mitigate the impacts of additional traffic and in particular HGVs and buses through the village where there are only minor roads and relatively low traffic flows at present.

It was also concluded that a bypass of Bridgwater was not needed and would not be appropriate. This is for a number of reasons including:

- The assessments show that the highway improvements proposed by EDF within Bridgwater mitigate the impacts of HPC traffic on the local highway network to an acceptable level.
- HGVs travelling to and from HPC would use A roads within Bridgwater that already carry significant volumes of traffic.
- Only a limited volume of traffic within Bridgwater is through traffic and would be attracted to a bypass. Therefore, a bypass would attract a limited volume of traffic.
- Construction of a bypass would have environmental impacts in a rural area.

Further details of the reasoning behind not providing the bypass are provided in the **Bridgwater Bypass Study** which is appended to this TA. The full list of improvements and contributions proposed by EDF Energy is as follows:

PROPOSED MITIGATION PACKAGE

Topic	Highway Improvements	Location	Summary of Improvement	SCC or EDF to deliver
Highway Works (DCO)	Cannington bypass	Cannington	New bypass to Cannington from A39 to C182	EDF
	A38 Bristol Road/The Drove Junction	Bridgwater	Increase in width of highway to improve operation of the junction	
	A39 Broadway/A38 Taunton Road Junction	Bridgwater	Changes to signal arrangements, minor carriageway realignments to improve operation of the junction	
	A38 Bristol Road/Wylds Road Junction	Bridgwater	Increase in width of carriageway and right turn lane to assist right turns and reduce queuing	
	Wylds Road/The Drove Junction	Bridgwater	Provision of a left-turn slip road from Western Way into Wylds Road to improve operation of the junction	
	Huntworth Roundabout	Bridgwater	Increase in width of eastern arm of roundabout to reduce queuing	
	M5 Junction 23 Roundabout	Bridgwater	Changes to signal arrangements and minor carriageway widening on slip road to improve operation of roundabout	
Highway Works Contribution	Cross Rifles	Bridgwater	Provision of a contribution towards planned SCC scheme at Cross Rifles	SCC
Preliminary Works Highway	A39 New Road/B3339 Sandford Hill Roundabout	Approximately 1.4km south-east of Cannington	New roundabout to improve safety of junction	EDF

Topic	Highway Improvements	Location	Summary of Improvement	SCC or EDF to deliver
Works	Washford Cross Roundabout	Approximately 1.8km west of Williton	New roundabout to improve safety of junction	EDF
	Claylands Corner Junction	Approximately 2.3km east of Stogursey	Minor carriageway widening to improve operation of the junction	EDF
	C182 Farringdon Hill Lane, Horse Crossing	Approximately 250m south of Wick	Provision of horse crossing to improve safety for horses and riders	EDF
	Cannington Traffic Calming Measures	Cannington	Traffic management measures	EDF
Transport Contribution	Contribution towards SCC enhancement schemes	Bridgwater	SCC schemes include: • Traffic capacity schemes • Walking and cycling enhancements • Safety improvements at junctions.	SCC

ASSESSMENT

Assessments were undertaken with the highway improvements in place to determine the residual impacts on the strategic and local highway network. Several criteria have been used and agreed with the transport authorities. These are:

- Overall network delay, i.e. how average speeds through the local highway network, change.
- Junction capacity, i.e. how the queues at key junctions, change.
- Journey times, i.e. how journeys times change on key routes, including the two HGV routes.

The analysis compares the scenario with HPC traffic and the proposed highway improvements against the scenario with no HPC traffic and none of the improvements proposed by EDF, but with traffic growth from committed schemes in the area along with committed highway improvements (the Reference Case).

2013 is the period when construction of HPC has commenced. The Junction 24 park and ride, freight management facility and temporary induction centre are open, but all the other associated development sites are under construction. Certain highway improvements are in place: primarily safety and local community improvements in or near Cannington along with capacity enhancements at the Taunton Road/Broadway junction and Huntworth roundabout. However, EDF would endeavour to bring forward the other planned improvements as early as possible within the development programme.

Based on the analysis, the limited highway improvements assumed in the modelling in 2013 do not result in nil detriment by comparison with the Reference Case. However, the residual impacts do not have any significant knock on effects on the strategic or local "A" road network and are considered modest and acceptable - for example one aspect of the analysis considers speeds across the network and it is estimated that these are reduced by around 4% in 2013.

The one possible exception to this is the M5 Junction 23 where there is a desire to ensure any queuing traffic on the slip roads does not affect the motorway main line. Therefore, EDF

Energy would seek to bring forward their proposed improvements to this junction as early as possible.

2016 is the period of peak construction activity at HPC. By that time all of the proposed highway improvement package is in place. The analysis demonstrates that the highway improvement proposals would effectively mitigate the impacts of the HPC Project to the extent of achieving broadly nil detriment and bring forward improvements compared with the Reference Case in a number of instances.

In 2021, the two reactors at HPC are fully operational, but there is still some construction activity ongoing (primarily the intermediate spent fuel store). In addition some of the associated development sites are being decommissioned.

The analysis demonstrates that the highway network would operate better in 2021 with HPC and the proposed highway improvements than in the Reference Case. Average speeds increase by approximately 8%. Of the 18 junctions analysed, 12 show improved performance and four are neutral. Of the two junctions where there is a material worsening in queuing this does not have a knock on effect on other parts of the strategic or local "A" road system.

It is important to note that in 2021 there would still be construction and de-commissioning work ongoing as well as full operation of the power station. Once construction activity has ceased in 2021/2022 then journey times on the road network are likely to further improve. Therefore, the highway improvements would provide a lasting legacy benefit to the local community.

SUMMARY

The overall conclusion of the Transport Assessment is that EDF Energy's transport strategy and proposed highway mitigation package are appropriate and compliant with policy, mitigate the peak construction impacts, result in no unacceptable residual impacts in terms of the operation of the local road network and deliver a long-term legacy benefit whilst avoiding any property demolition.

1. INTRODUCTION

1.1.1 This Transport Assessment (TA) relates to EDF Energy's proposals for a new nuclear power station to be known as Hinkley Point C (HPC) and associated developments located in Somerset. It has been prepared by EDF Energy and forms part of the **Environmental Statement** (ES) submitted as part of this Development Consent Order (DCO) application to the Infrastructure Planning Commission (IPC) under the Planning Act 2008.

1.1.2 The TA deals with the construction and operational phases of the development along with the phase in which the temporary associated developments would be brought out of operation. There is a particular focus on the construction phase since this has a significantly greater impact than the operational phase.

1.1.3 The proposed HPC power station has an operational life-span of 60 years. Construction timescales are presented in detail at **Chapter 7** of this TA and for the purpose of assessment, construction is assumed to commence following a grant of DCO consent in Quarter 4 2012.

1.1.4 This TA has been prepared in accordance with the Guidelines for Transport Assessment (DfT March 2007). Paragraph 4.31 of the guidelines advises that a TA should adopt the principles of NATA by assessing the potential impacts of a development proposal within the framework of the five NATA objectives. The paragraph goes on to say that for most TAs the full methodology recommended in NATA would not be appropriate. The five NATA objectives are:

- accessibility;
- safety;
- economy;
- environment; and
- integration.

1.1.5 The TA deals with these objectives in the following way:

1.1.6 Accessibility**:** There is extensive consideration throughout this TA of the accessibility of the HPC development and associated development (AD sites) by all modes of transport including walking, cycling and public transport.

1.1.7 Safety**:** The Road Safety Chapter of this TA (**Chapter 14**) includes a detailed assessment of safety issues.

1.1.8 Economy**:** This aspect is of only partial relevance since EDF Energy would be funding all transport improvement measures either through direct funding and implementation of works or through a contribution to Somerset County Council (SCC) where appropriate. Journey times and congestion which could potentially affect the local economy are considered in the Traffic Analysis Chapter of this TA (**Chapter 15**) including an assessment of total network delay.

1.1.9 Environment: The environmental impacts of traffic arising from HPC are considered in the ES chapters that have been prepared for HPC and the associated development sites. Because of this, the TA focuses only on the traffic flow and congestion impact issues.

1.1.10 Integration: Issues of transport mode integration and the integration of EDF Energy's transport strategy with government and local policies is dealt with within this TA. Issues of severance and community integration are dealt with in the ES chapters.

1.1.11 In developing the transport strategy for the HPC Project and undertaking the assessments which feed into this Transport Assessment there has been extensive engagement with the relevant transport stakeholders. The principal stakeholders in this regard are Somerset County Council; Highways Agency; Sedgemoor District Council; and West Somerset District Council.

1.1.12 There has also been extensive consultation with the wider community through a Transport Forum, public exhibitions and meetings. This matter is dealt with in more detail in the Consultation chapter of this TA (**Chapter 2**) and the Consultation Report which forms part of the DCO submission.

1.1.13 EDF Energy's approach to the transport challenges posed by the HPC Project has been as described below.

1.1.14 The starting point has been to examine transport policy at a national, regional and local level to determine the correct approach to the movement of people and freight associated with HPC.

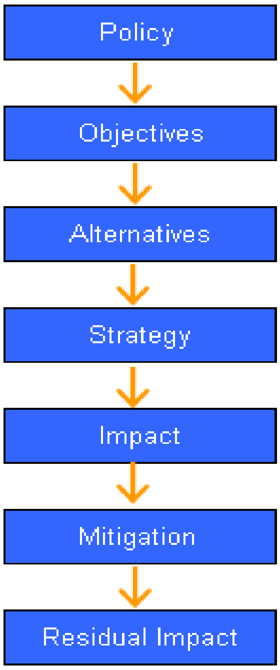
1.1.15 Building on this policy context, EDF Energy has developed a set of transport objectives for the HPC Project that have been agreed with the highways authorities.

1.1.16 These objectives, along with the characteristics of the workforce and freight movements have then been used to develop a transport strategy which addresses all modes of transport. A number of alternatives were considered in deriving the final strategy. The transport strategy considers how people and materials for construction can be moved in the most sustainable ways and contains a range of significant measures which would substantially reduce the traffic impacts of the development.

1.1.17 The transport impacts of the HPC proposals have then been assessed using a number of techniques, but primarily a Paramics microsimulation model (hereafter referred to as the model). The effects on the highway network have been determined after making appropriate estimates of the number of people who would use non-car modes and the scope for bringing materials to the HPC development site by non-HGV modes.

1.1.18 Based on these impacts a number of mitigation measures (in addition to the mitigation included within the transport strategy itself) have been developed and further testing undertaken. This led to the identification of a number of residual impacts on the transport networks. This methodology is illustrated in the flow diagram presented at **Figure 1.1**.

Figure 1.1: Methodology



1.1.19 The remainder of this TA deals with the following topics:

- **Chapter 2** covers the consultation undertaken with the primary stakeholders and the key themes that have been raised. A separate Consultation Report that forms part of the DCO application deals with the consultation responses in detail.
- **Chapter 3** describes the existing context concentrating on the transport infrastructure.
- **Chapter 4** summarises the policies against which the transport proposals should be judged.
- **Chapter 5** lists EDF Energy's objectives for the project. It then goes on to describe the transport strategy that has been developed in response to these objectives. A number of alternatives are considered.
- **Chapter 6** describes the development proposals concentrating on the transport aspects.
- **Chapter 7** explains the relevant characteristics of the HPC Project during the construction and operational phases which would impact on the Transport Assessment e.g. how many workers would be employed and which shift patterns they would follow. This covers the early years before most of the associated development is operational (2013), the year when construction activity is at its peak (2016) and the first full operational year (2021).
- **Chapter 8** builds on **Chapter 7** and derives the person trip generation i.e. the number and times of trips associated with the movement of people for the HPC Project, including workforce and visitors.
- **Chapter 9** derives an estimate of the freight trips i.e. the number and time of movements by goods vehicles. This is based on the **Freight Management Strategy** which is included as an appendix to this TA.

- **Chapter 10** describes the distribution and assignment of trips i.e. where would people be travelling from and which route would they use. This is based on a gravity model which draws on the **Accommodation Strategy**.
- **Chapter 11** sets out the parking strategy and how the numbers of spaces have been derived both at HPC and at the associated development sites.
- **Chapter 12** sets out the position on use of buses and rail. The bus strategy has been planned to get workers to and from site whether it be from where they live or from the proposed park and ride sites. The discussion of rail describes journeys that are feasible by rail and discusses the limitations on moving workers by rail.
- **Chapter 13** sets out the position on walking and cycling. This is based on a detailed investigation of the quality of existing routes and how they could be improved.
- **Chapter 14** reports on the assessment of road safety on road links and junctions. It then goes on to assess the potential impact of HPC construction and proposed improvements.
- **Chapter 15** examines the traffic impact of the proposals and the proposed mitigation. It describes the methodologies used to assess the impacts and summarises the results. A number of proposed highway improvements are included within the analysis.
- **Chapter 16** describes the proposed package of highway mitigation measures to be delivered as part of the HPC Project.
- **Chapter 17** describes the approach to travel planning. These are the measures that would be introduced to encourage use of non-car modes.
- **Chapter 18** describes the controls that EDF Energy is proposing. There are a range of controls including, for example, a limit on the number of HGV movements at certain times of the day. The section also describes how compliance with these controls would be monitored.
- **Chapter 19** summarises the assessment work.

2. CONSULTATION

2.1 Introduction

2.1.1 This chapter provides a summary of the transport-related aspects of the extensive consultation exercise that has been undertaken for the HPC Project.

2.2 Context

2.2.1 The Planning Act 2008, under which this DCO application is made, requires EDF Energy to undertake public consultation in advance of formal submission of the DCO application (this application) to the Infrastructure Planning Commission (IPC).

2.2.2 Therefore, in the lead up to this DCO submission, a comprehensive programme of consultation has been undertaken by EDF Energy. The **Consultation Report** submitted in support of this application describes the consultation EDF Energy has carried out and explains how responses to that consultation have been taken into account in developing the HPC Project proposals. This chapter summarises the key transport-related aspects of this consultation programme undertaken by EDF Energy.

2.3 Key Stakeholder Consultation

2.3.1 EDF Energy has focused a significant amount of time engaging with Somerset County Council and the Highways Agency, in addition to the District Councils, on transport issues. A Transport Workstream was set up to facilitate a level of joint working with the authorities and to agree as many aspects as possible of the transport analysis prior to preparation of this Transport Assessment.

2.3.2 The Transport Workstream comprises the following organisations:

- Somerset County Council.
- JMP Consultants working on behalf of Somerset County Council.
- The Highways Agency.
- JMP Consultants working on behalf of the Highways Agency.
- Arup Consultants acting on behalf of Sedgemoor District Council.
- Savell Bird and Axon consultants on behalf of EDF Energy.
- EDF Energy.

2.3.3 Since January 2011 EDF Energy has met on a fortnightly basis with the Transport Workstream in Somerset, to discuss all aspects of the transport analysis. An update telephone conference has been undertaken weekly with the Transport Workstream to discuss progress and any queries. In addition to the fortnightly meetings and weekly update calls, a number of modelling workshops and transport sessions have been held in between regular workstream meetings to discuss and work through the detailed points of the transport analysis, modelling and mitigation package developed for HPC.

2.3.4 In addition to the Transport Workstream sessions, monthly Joint Project Update (JPU) meetings have been held in Somerset. The JPU meetings include senior members of Somerset County Council and their consultants, JMP, the Highways Agency and their consultants, JMP, Sedgemoor District Council and their consultants, Arup, West Somerset Council, the Parish Councils, EDF Energy and Savell Bird and Axon. The meetings have focused on project progress and milestones for delivery. It should be noted that the JPU focused on all aspects of the HPC Project and not just transport.

2.4 Public Consultation (Transport)

2.4.1 EDF Energy has held four rounds of statutory public consultation relating to the proposed HPC Project. After analysing all comments received throughout the consultation process, the main themes that were apparent from stakeholders related to:

- the impact construction worker and HGV traffic would have on the capacity of the local road network;
- the perceived need for a Bridgwater bypass;
- the rationale behind the proposed Cannington bypass;
- the desire for as much freight as possible to be brought to the HPC development site by water; and
- the importance of promoting and facilitating non-car modes of transport.

2.4.2 With regard to the impact traffic would have on the local highway network, EDF Energy has proposed a number of measures in order to limit the impact of the development. These are described in full within this Transport Assessment and include:

- providing facilities to ensure as much freight as possible can travel by sea;
- the provision of freight management facilities to control freight movements on the local highway network;
- a postal/courier consolidation centre to reduce such movements on the local highway network;
- contractual limits on how many HGVs can travel during peak periods;
- setting HGV routes that keep to appropriate roads;
- the provision of a Cannington bypass;
- limiting the number of parking spaces for workers during construction on the HPC development site to 200;
- provision of four Park and Ride sites that the large majority of workers would have to use, greatly reducing the number of vehicles passing to/from the HPC development site;
- staggered worker shift start/end times away from peak periods; and
- improving the capacity and safety of key road junctions and promoting non-car modes of travel to all staff via the measures outlined in the **Framework Travel Plan**.

2.4.3 In addition, the residual impacts of traffic on the local highway network have been extensively assessed. The detailed assessment and analysis is contained within this Transport Assessment and supporting appendices.

2.4.4 A Preliminary Northern Bridgwater Bypass study, published as part of EDF Energy's Stage 2 Consultation, concluded that provision of such a bypass: would not be in accordance with government policy; could not be delivered in time to cater for peak construction demands; and was not necessary to mitigate the impacts of HPC. EDF Energy has also prepared a **Bridgwater Bypass Study**, which considers the requirement for a Bridgwater bypass as part of the HPC Project and is provided at **Appendix 2.1** of this report. The conclusion of this latest study supports that previously put forward: that this bypass is not justified in relation to HPC, is not in accordance with government policy and could not be provided in the same timescales as the mitigation package that is proposed as part of this application.

2.4.5 Although in capacity terms the highway network would be able to cope with the additional traffic in Cannington, the increase in traffic compared to the current traffic flow, particularly in respect of HGV movements, through the village is substantial and would have a significant impact on residents of Cannington. Therefore, EDF Energy is proposing a Cannington bypass as part of the HPC Project in order to route traffic away from the village centre. The rationale behind the route choice is provided in the **Alternative Site Assessment** appended to the **Planning Statement**.

2.4.6 The **Freight Management Strategy** details how a significant proportion of construction materials for the HPC development site, including an expected 80% of bulk materials for on-site concrete production, would be transported by sea via a temporary jetty at the HPC development site.

2.4.7 The **Framework Travel Plan** submitted as part of this DCO application describes the various measures that would be implemented in order to maximise the use of non-car modes of transport for travel to/from the HPC development site. In addition there are proposals to improve walking and cycle infrastructure in the local area, to encourage further the use of non-car modes of transport.

2.4.8 Overall the effect the HPC Project would have on the local highway network would be managed in order to reduce any negative impact to an acceptable level. This Transport Assessment demonstrates that with the mitigation measures proposed, the highway network has sufficient capacity to cater for traffic associated with the HPC Project.

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3. EXISTING CONTEXT

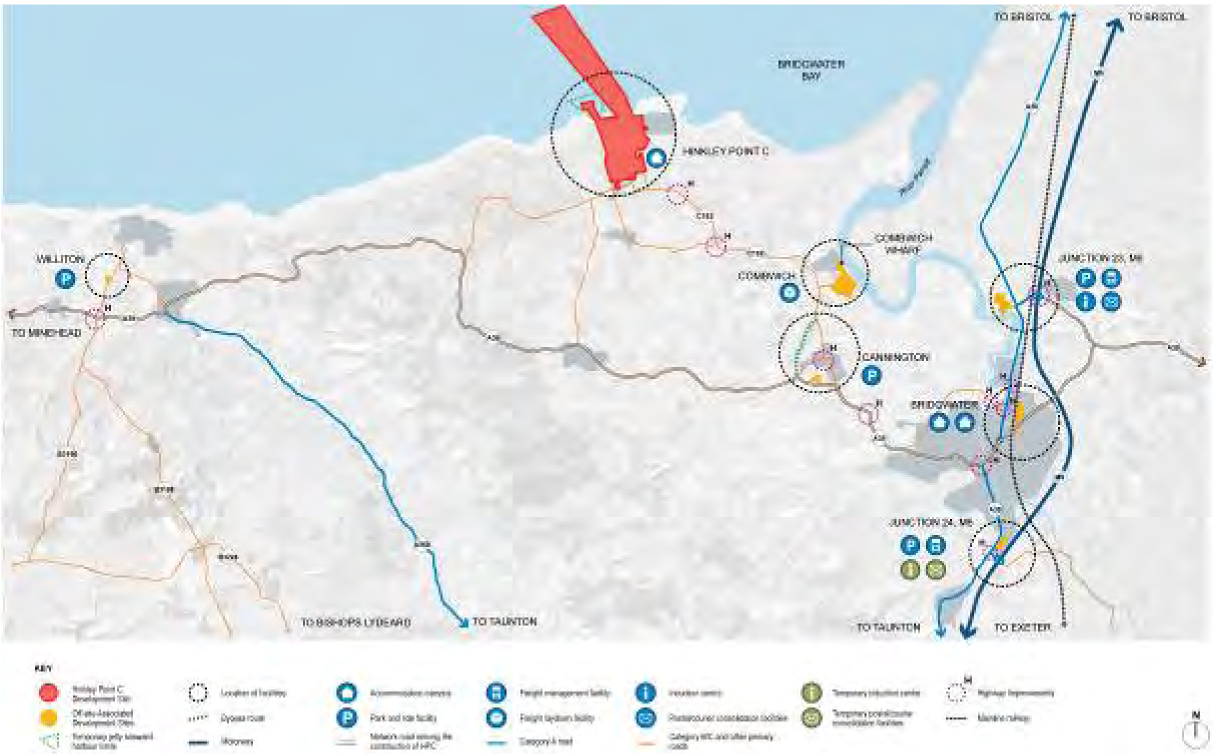
3.1 Introduction

3.1.1 This section provides a summary of the existing context of the HPC development site and associated development sites in terms of location, existing land use and surrounding transport networks.

3.2 Existing Site Context

3.2.1 The locations of the HPC development site and proposed off-site associated development sites are illustrated in **Figure 3.1** below.

Figure 3.1: HPC and Associated Development Site Plan



a) HPC Development Site

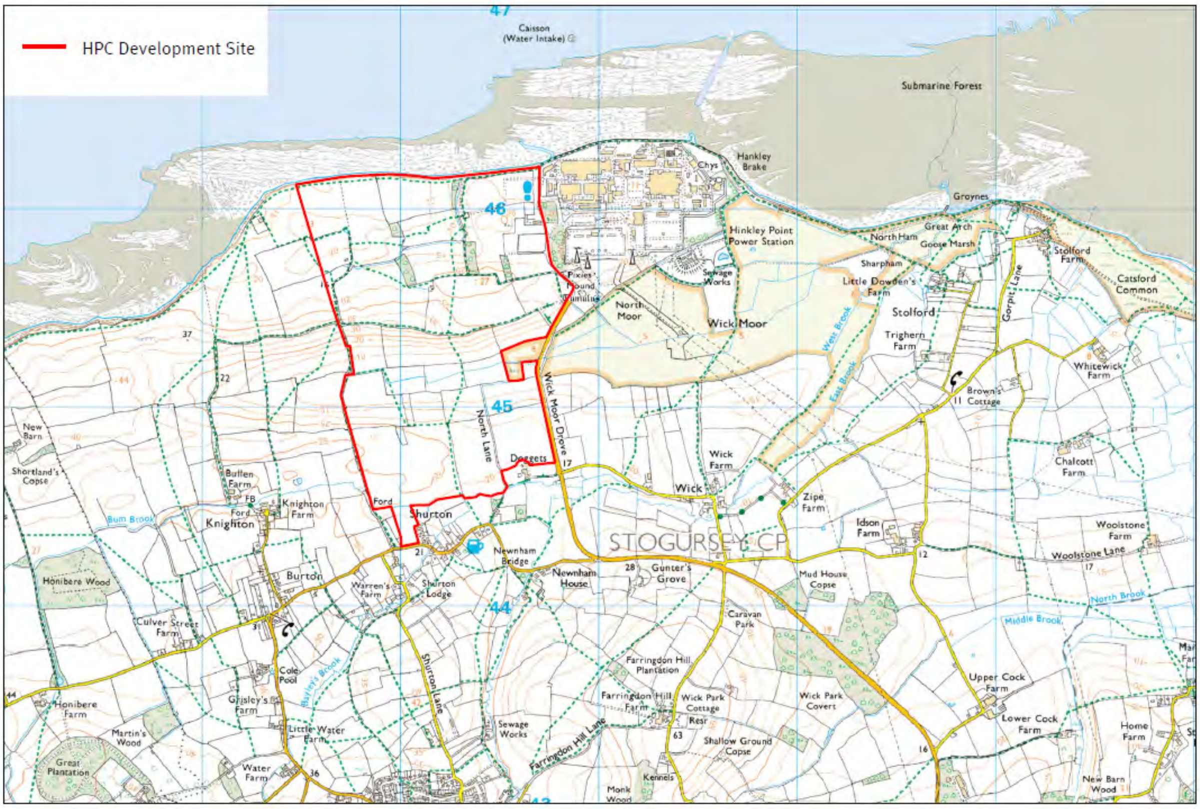
3.2.2 The HPC development site is located on the west Somerset coast, 25km to the east of Minehead and 12km to the north-west of Bridgwater. The site is bound to the north by Bridgwater Bay, to the west by agricultural land, to the south by the village of Shurton and to the east by two existing nuclear power stations, Hinkley Point A (HPA) and Hinkley Point B (HPB), referred to as the existing Hinkley Point Power Station Complex.

3.2.3 The HPC development site is primarily agricultural land with a few derelict farm buildings. The eastern part of the site includes a car park which is used by the existing Hinkley Point Power Station Complex.

3.2.4 The main access road serving the HPC development site is the C182, which runs from Hinkley Point to the village of Cannington. The C182 is an unlit, single carriageway rural road. It is generally subject to the national speed limit of 60mph with sections that are subject to 30 and 40mph speed limits. At the Cannington junction of C182 Rodway/High Street (referred to as the War Memorial junction) traffic can either head east along Main Road to access the A39 or head west along the High Street to access the A39.

3.2.5 **Figure 3.2** illustrates the boundary of the HPC development site.

Figure 3.2: HPC Development Site Boundary



3.2.6 The HPA power station was in operation for 35 years until electricity generation ceased in 1999. HPA, which is operated by Magnox South, is currently in the early stages of decommissioning. The 2009 workforce at the HPA power station comprises approximately 250 full time Magnox South employees, plus fluctuating numbers of agency and sub-contract staff.

3.2.7 The HPB power station has been in operation since 1976 and is operated by EDF Energy. The power station currently employs approximately 540 full time staff and 17 apprentices. There are also approximately 200 contract personnel based at the HPB station, giving a total of approximately 760 site-based personnel. It is EDF Energy policy that all operational permanent staff should live within 25 miles of the HPB station. Additional contract personnel are employed at the HPB power station during planned outages. Typically this involves an additional 800 contracting staff for a short duration of one to two months. It is currently anticipated that the HPB power station will remain operational until at least 2016.

b) Combwich Wharf

3.2.8 Combwich Wharf is a small roll-on roll-off facility located approximately 6.5km south-east of the HPC development site on the River Parrett. The location of the Combwich site is shown on **Figure 3.1**.

3.2.9 The Combwich Wharf facility is owned by EDF Energy and was mainly used during the construction of the existing Hinkley Point Power Station Complex. It is still used by EDF Energy and National Grid for the occasional import of Abnormal Indivisible Loads (AILs). As the use of the existing Combwich Wharf facility is infrequent, there is no current baseline with regard to transport movements originating from the wharf that can be quantified.

3.2.10 Combwich village is a small settlement with roads unsuitable for the passage of large vehicles. Therefore, in the early 1990s, the wharf facility was upgraded and a new private road linking it to the C182 bypassing Combwich village was constructed (Combwich Wharf access road).

c) M5 Junction 23 Site

3.2.11 It is proposed to develop a Park and Ride facility, a freight management facility, a consolidation facility for postal/courier deliveries and an induction centre in close proximity to Junction 23 of the M5 motorway. The site is proposed to be located to the west of the A38, off the Bridgwater Business Park arm of the A38 Dunball roundabout. The location of the Junction 23 associated development site is shown on **Figure 3.1**.

3.2.12 The site is bound to the north by a Vehicle Auction Centre, to the east by the A38, to the south-east by Bridgwater Business Park and to the south and west by fields and the River Parrett. The current use of the land proposed for the associated development site is agricultural grazing land. Access to the existing site is provided off the Bridgwater Business Park arm of the Dunball roundabout. Access to the site is also provided via Dunball Drove, a small track that enables vehicular access to the land from the A38. The track is for private use and there is a barrier where it joins the A38 which prevents public access.

3.2.13 The A38 Dunball roundabout is a four arm roundabout. The four arms of this roundabout are the A38 Bristol Road north, the A39 spur road east (i.e. the road between the A38 Dunball roundabout and the M5), the A38 Bristol Road south and the access road to the Bridgwater Business Park. The A38 north arm is a single carriageway subject to a 50mph speed limit. The A39 spur road is a dual carriageway with a speed limit of 60mph between the M5 Junction 23 and mid-link where it reduces to 50mph from mid-link to the A38 Dunball roundabout. The A38 approach from the south has two lanes and a speed limit of 50mph. The Bridgwater Business Park arm has a single lane access and egress arrangement.

3.2.14 M5 Junction 23 is a four arm, grade separated roundabout with the M5 motorway running north-south beneath the roundabout. The four arms of the roundabout are the M5 on and off-slip roads to the north and south, A39 Puriton Hill to the east and the A39 spur road to the west. The speed limits on the approach roads are 70mph for the motorway slip roads, and 60mph for the A39 spur road arm and the A39 Puriton Hill arm.

d) M5 Junction 24 Site

3.2.15 It is proposed to develop a Park and Ride facility, a freight management facility, a temporary consolidation facility for postal/courier deliveries and a temporary induction centre in close proximity to Junction 24 of the M5 motorway. The site is proposed to be located to the north-west of Junction 24 and east of the A38, off the Huntworth roundabout (i.e. junction of A38 Taunton Road/Bridgwater Motorway Service Area). The location of the Junction 24 associated development site is shown on **Figure 3.1**.

3.2.16 The site lies within the Huntworth Business Park and is bordered to the south-west by a hotel, service station and car-park and to the south-east and north-east by large commercial buildings. A band of trees border the north-west boundary of the site, beyond which is the A38 Taunton Road. The site comprises a storage/distribution facility and includes a large warehouse building with docking bays and separate tray wash and vehicle maintenance building. The site also comprises lorry parking and car parking spaces. Access to the site is provided from Huntworth Roundabout, via the Motorway Service Area and Huntworth Business Park access road. The site ceased operating as a storage/distribution facility in September 2011.

3.2.17 The Huntworth roundabout is a five arm roundabout to the west of the M5 Junction 24. The five arms are the A38 Taunton Road north, the Bridgwater Motorway Service Area access, the A38 spur road (i.e. road between A38 roundabout and M5), the A38 Taunton Road south and the access to the Stockmoor Village residential development to the west. The A38 Taunton Road north arm is a single carriageway subject to a 60mph speed limit. The A38 spur road is a dual carriageway with a speed limit of 60mph. The A38 Taunton Road south is a single carriageway with a speed limit of 40mph, increasing to 60mph on the approach to the roundabout.

3.2.18 M5 Junction 24 is a four arm, grade separated roundabout with the M5 motorway running north-south beneath the roundabout. The four arms of the roundabout are the M5 on and off-slip roads to the north and south, an unclassified road to the east and the A38 spur road to the west.

e) Cannington Park and Ride Facility

3.2.19 It is proposed to develop a park and ride facility to the south of Cannington. The proposed site is located to the north of the A39. Access to the proposed facility would be between the junctions of A39/Main Road and A39/High Street. The location of the Cannington park and ride site is shown on **Figure 3.1**.

3.2.20 The site is bound to the north and east by agricultural land, to the south by the A39 and to the west by an existing flood relief channel. The current use of the land is grazing land.

3.2.21 The A39 routes east-west providing a connection between Bridgwater, Cannington, Williton and Minehead. The section of A39 immediately to the south of Cannington, between the junctions with Main Road and High Street, was completed in 1994 to provide a southern bypass around Cannington.

f) Williton Park and Ride Facility

3.2.22 It is proposed to develop a park and ride facility to the west of Williton. The proposed site is located at the existing lorry park, depot and storage area on the B3190. The location of the Williton site is shown on **Figure 3.1**.

3.2.23 The site is located approximately 1.3km to the north-west of Williton and 300m from a group of houses called Five Bells. Access to the existing lorry park, depot and storage area is via a priority junction on the B3190.

3.2.24 The B3190 is generally rural in nature. The width of the B3190 carriageway that runs adjacent to the eastern part of the site is approximately 8m. The road is a single lane carriageway and vehicle speeds along the road are subject to the national speed limit. The priority junction of B3190/A39, to the south of the site, is referred to as Washford Cross.

g) Bridgwater Accommodation Campuses

3.2.25 It is proposed to develop two off-site accommodation campuses, referred to as the Bridgwater A and Bridgwater C accommodation campuses. The sites are located to the north-east of Bridgwater town centre, to the north and south of the A39 (Bath Road), respectively. The locations of the Bridgwater A and C accommodation campuses are shown on **Figure 3.1**.

3.2.26 The Bridgwater A site is located on land at the former Innovia Cellophane factory site. The northern part of the site is currently occupied by vacant industrial buildings, which are currently being demolished, and the southern part of the site is currently occupied by the Bridgwater Sports and Social Club. The site is accessed via a priority junction from the A39 (Bath Road).

3.2.27 The Bridgwater C site is located on a small surface car park, an existing sports pitch and highways land. A detailed description of the Bridgwater A and Bridgwater C sites is provided in **Volumes 3** and **4** of the Environmental Statement.

3.2.28 A39 (Bath Road) is in the vicinity of the proposed accommodation campus sites. It is a 7.3m single carriageway with street lighting. The speed limit on this road is 30mph until the approach to the bridge over the M5, where the speed limit increases to 40mph. There are waiting restrictions (double yellow lines) on A39 (Bath Road) in the vicinity of the proposed accommodation campuses. Immediately to the west of the proposed Bridgwater A and C accommodation campus sites is a bridge over the Bristol to Exeter (also known as the Bridgwater to Highbridge) railway line. The bridge carriageway has reduced width and there is signage advising that eastbound traffic has priority over westbound traffic over the bridge. The junction of A39 Bath Road/A38 Bristol Road/The Clink is referred to as the 'Cross Rifles' roundabout. This is a four arm roundabout with the A38 (Bristol Road) joining from the north, the A39 (Bath Road) joining from the east, the A39 (Broadway) joining from the south and the Clink joining from the west.

3.3 Existing Highway Network

a) Existing Traffic Flows

i. Local Highway Network

3.3.1 A selection of key road links on the local highway network has been chosen to provide a summary of the existing traffic flows on the road network. The selected links are intended to capture the key routes that would be used by development traffic to and from the HPC development site and the associated development sites. The selected links in Bridgwater and Cannington are illustrated in **Figure 3.3** and the selected links in Williton are illustrated in **Figure 3.4**. Diagrams with all of the link codes are included in **Appendix 3.1**.

Figure 3.3: Local Road Links in Bridgwater and Cannington

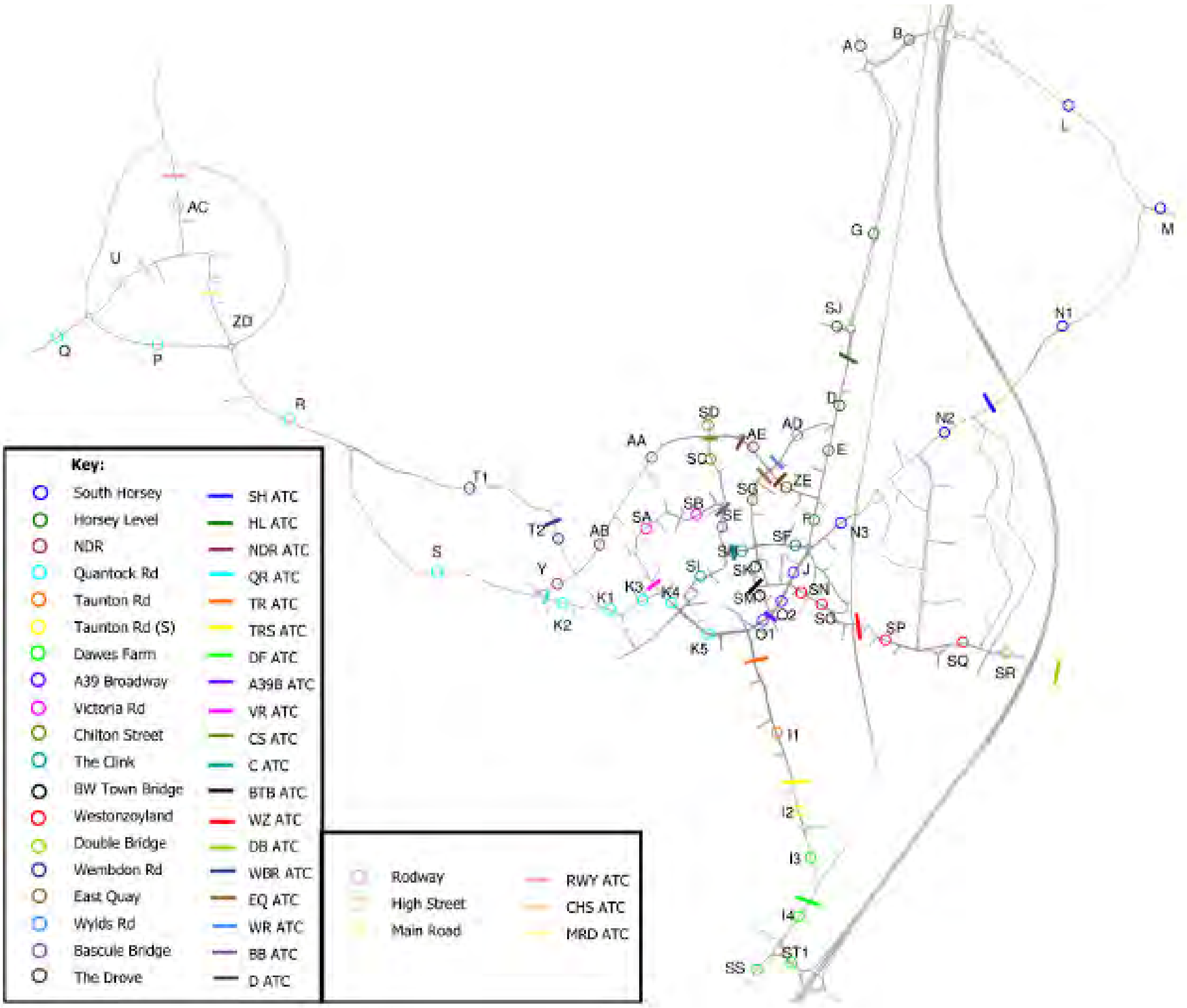
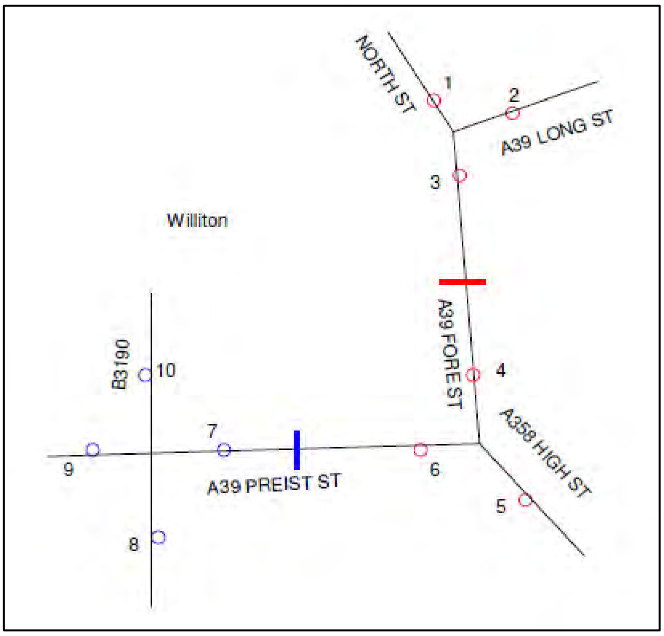


Figure 3.4: Local Road Links in Williton



3.3.2 **Table 3.1:** below summarises the existing AM (08:00-09:00) and PM (17:00-18:00) network peak hours and daily traffic flows for the selected links on the local road network as illustrated in **Figure 3.3** and **Figure 3.4** above. The percentage of heavy duty vehicles (HDV) within the 24 hour daily traffic is also provided. HDVs are defined as other goods vehicles type 1 (OGV1), other goods vehicles type 2 (OGV2) and public service vehicles (PSV).

Table 3.1: Existing Two-way Traffic Flows on the Local Road Network (2009)

Road	Link Ref	Network Peak Hours		24 hr AADT	
		AM Peak	PM Peak		
		Veh	Veh	Veh	% HDV
A38 Bristol Road	G	2,066	2,272	21,970	6.2%
	D	1,846	1,804	22,956	4.7%
	E	779	1,021	13,159	5.6%
A39 (Bath Road)	N3	1,564	1,688	17,124	3.7%
A39 Monmouth St	J	1,507	1,674	20,240	6.6%
Wylds Road	AD	898	895	10,323	5.5%
Northern Distributor Road	ZE	677	686	7,031	3.0%
	AE	1,187	1,443	15,891	1.7%
	AA	972	1,412	12,033	1.7%
	AB	1,061	1,268	10,396	2.5%
	Y	1,112	1,272	11,601	2.4%
A39 Quantock Road	S	1,233	1,508	12,959	3.3%
	R	1,391	1,565	14,468	3.0%

Road	Link Ref	Network Peak Hours		24 hr AADT	
		AM Peak	PM Peak		
		Veh	Veh	Veh	% HDV
	P	544	577	6,399	4.7%
Cannington	U	268	229	2,151	5.6%
	ZD	818	954	8,533	3.5%
	AC	598	582	6,706	2.1%
A38 Taunton Road	I4	1,877	1,937	21,217	1.9%
	I3	1,675	1,724	21,089	2.1%
	I2	1,796	1,848	21,644	2.7%
	I1	2,327	2,312	24,728	2.8%
A39	K5	1,941	1,945	20,410	1.5%
	K4	1,377	1,580	17,198	1.3%
	K3	1,277	1,379	15,442	1.8%
	K1	1,235	1,359	15,338	1.8%
	K2	1,299	1,457	14,028	2.0%
Williton	1	476	383	5,139	7.7%
	2	453	440	5,722	10.0%
	3	763	737	9,148	9.5%
	4	757	795	9,300	10.6%
	5	656	645	8,303	8.5%
	6	816	858	9,892	9.9%
	7	880	1,025	11,425	11.5%
	8	183	210	2,748	23.3%
	9	759	895	10,334	14.0%
	10	83	59	1,313	39.0%

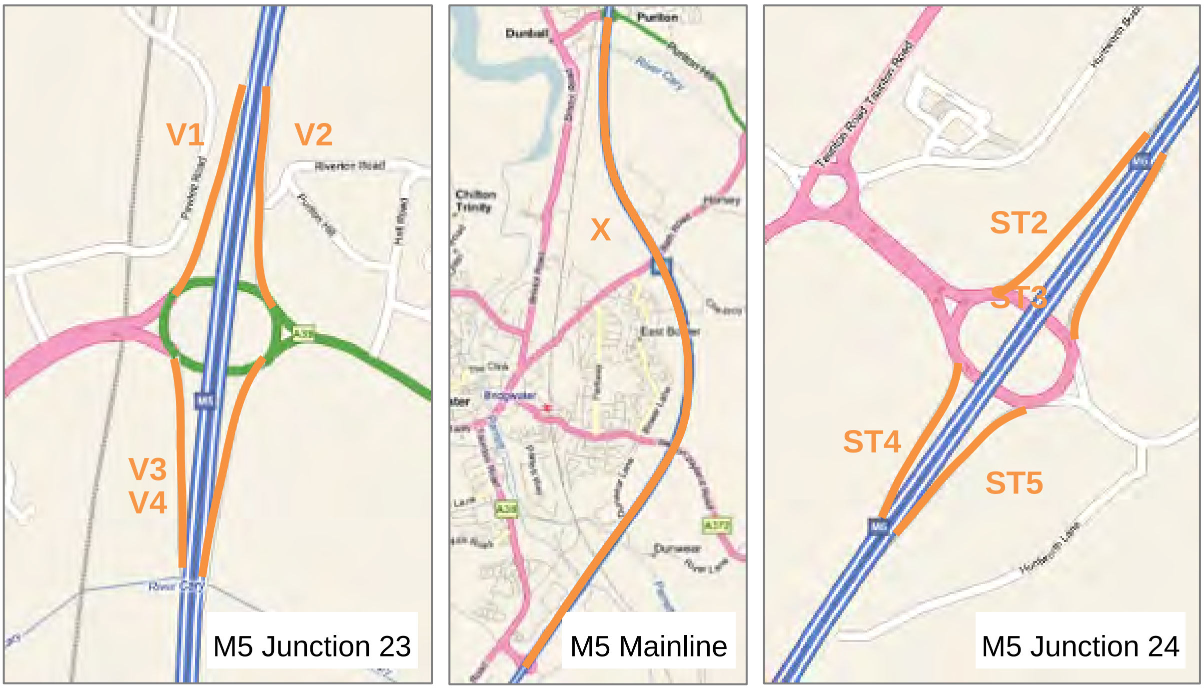
3.3.3 The traffic flow data for all links in the 2009 model is included in **Appendix 3.1**.

3.3.4 Turning count diagrams showing the existing morning (AM) and evening (PM) peak turning moments at key junctions in the network are provided in **Appendix 3.2**.

ii. Strategic Highway Network

3.3.5 **Figure 3.5** illustrates the road links on the strategic road network in the vicinity, which comprises the M5 motorway and Junction 23 and Junction 24.

Figure 3.5: Strategic Road Links



3.3.6 **Table 3.2** below summarises the existing AM (08:00-09:00) and PM (17:00-18:00) network peak hours and daily traffic flows for the selected links on the strategic road network as illustrated in **Figure 3.5** above.

Table 3.2: Existing Two-way Traffic Flows on the Strategic Road Network (2009)

Junction/Link	Link Ref	Network Peak Hours		24 hr AADT	
		AM Peak	PM Peak		
		Veh	Veh	Veh	% HDV
M5 Junction 23	V1	842	743	8,154	7.7%
	V2	763	919	7,754	7.4%
	V3	392	414	3,904	6.9%
	V4	538	618	4,091	5.8%
M5 mainline between J23 and J24	X	4,254	4,379	50,875	23.5%
M5 Junction 24	ST2	364	324	4,104	4.6%
	ST3	385	435	4,774	4.4%
	ST4	447	525	4,776	3.9%
	ST5	605	523	5,065	2.5%

b) Existing Network Operation

3.3.7 This section summarises the existing operation of the highway network with regard to queuing and journey times.

i. Queuing and Delay

3.3.8 **Appendix 3.3** provides the mean maximum queues at junctions taken from the 2009 base model. The data is broken down into mean maximum queue per lane of each junction. In addition, **Appendix 3.3** includes the observed queue length data collected at junctions in 2008 and 2009. The information has been assessed and those junctions that were observed to have average queues greater than 10 vehicles on one or more arm in the AM and/or PM network peak hours have been identified. This threshold has been adopted in consultation with SCC as a queue length that might suggest a trend towards diminished reserve capacity and therefore merits further consideration. Based on this analysis, observations have been made on the existing conditions of the highway network, and these are set out in the following two paragraphs.

3.3.9 In the AM network peak hour, the following junctions experience average queues of greater than 10 vehicles on one or more arm which might suggest a trend towards diminished reserve capacity:

- B3339/Wembdon Rise.
- A39 Broadway/West Street/Penel Orlieu.
- A39 Broadway/A38 Taunton Road.
- A39 Broadway/A372 St John Street.
- The Clink/A28 Bristol Road/A39 Bath Road (Cross Rifles).
- Wylds Road/The Drove.
- A38 Bristol Road/The Drove.
- A38 Bristol Road/Express Park.
- A39 Bath Road/A39 Puriton Hill.

3.3.10 In the PM network peak hour the following junctions experience average queues of greater than 10 vehicles on one or more arm which might suggest a trend towards diminished reserve capacity:

- A39 Broadway/West Street/Penel Orlieu.
- A39 Broadway/A38 Taunton Road.
- A39 Broadway/A372 St John Street.
- The Clink/A28 Bristol Road/A39 Bath Road (Cross Rifles).
- Wylds Road/The Drove.
- A38 Bristol Road/The Drove.
- A38 Bristol Road/Wylds Road.
- A38 Bristol Road/Express Park.
- M5 Junction 23.
- A39 Bath Road/A39 Puriton Hill.

ii. Journey Times

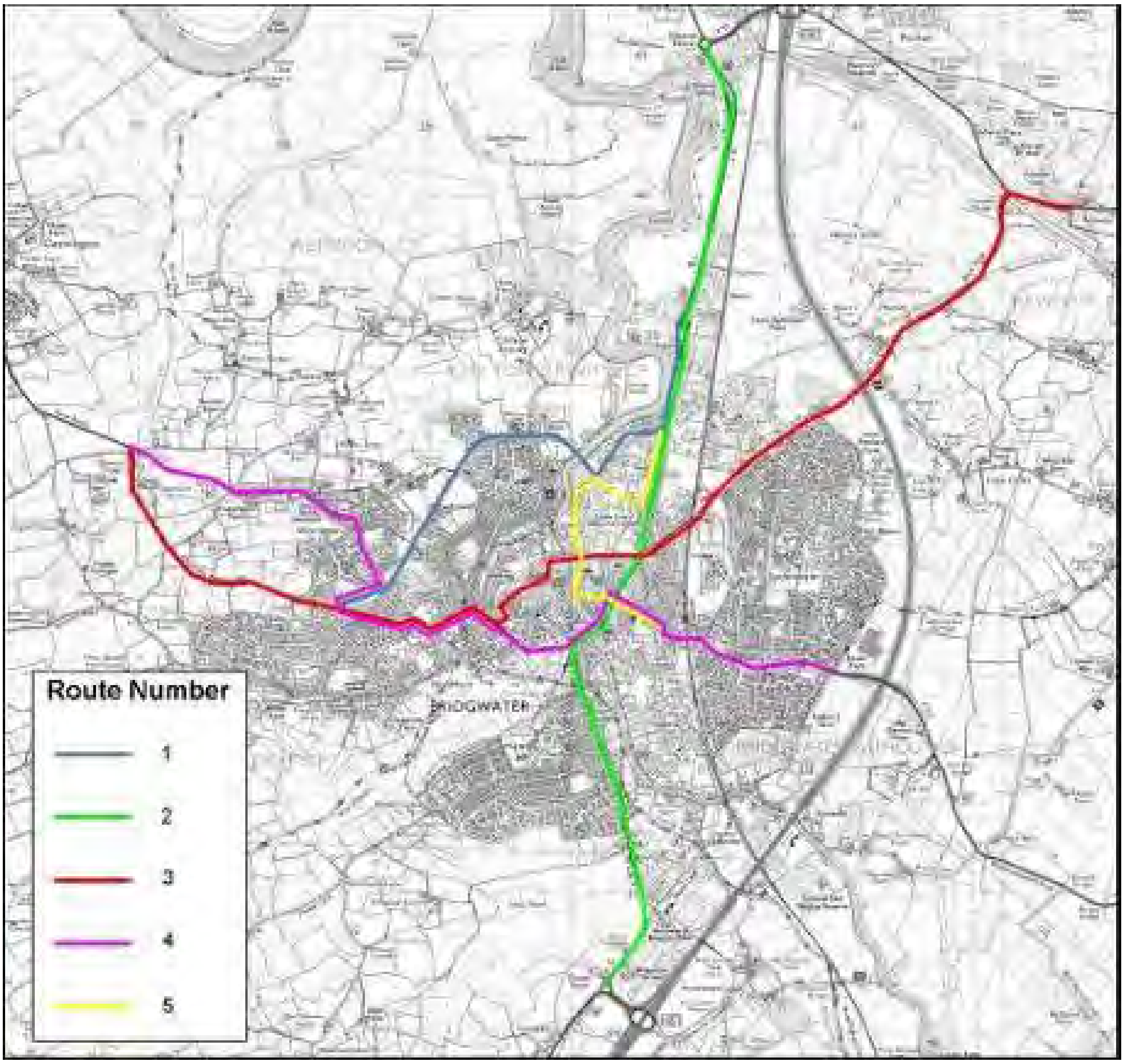
3.3.11 In June 2008, five journey time surveys were undertaken between the hours of 04:00 and 18:00. Along the same routes, additional journey time surveys were undertaken in March 2010 between the hours of 06:00 and 20:00. The journey time surveys were carried out in accordance with the 'Design Manual for Roads and Bridges'

(DMRB) moving observer methodology from stop line to stop line in both directions. The following routes were recorded:

- Journey Path 1 – Bristol Road/Express Way roundabout – Bristol Road – Wylds Road – Western Way – Quantock Road/Quantock Meadow roundabout.
- Journey Path 2 – A38/A39 roundabout – Bristol Road – Bristol Road/Bath Road/Monmouth Street roundabout – Broadway – Taunton Road – Taunton Road/Access to M5 roundabout.
- Journey Path 3 – Bath Road/Puriton– Bristol Road/Bath Road/Monmouth Street roundabout – The Clink – Northgate – North Street – Wembdon Road - Quantock Road/Quantock Meadow roundabout – Quantock Road – New Road/Sandford Hill.
- Journey Path 4 – Westonzoyland Road/Bower Lane – St John Street – Broadway – North St – Wembdon Rise – Quantock Road/Quantock Meadow roundabout - Wembdon Rise – New Road/Sandford Hill.
- Journey Path 5 – Bristol Road/Wylds Road – The Drove – East Quay – Eastover – St John Street/Westonzoyland Road.

3.3.12 The journey paths are illustrated in **Figure 3.6** below:

Figure 3.6: Journey Time Routes



3.3.13 The average journey times on the above routes are summarised in **Table 3.3** below:

Table 3.3: Average Journey Time Summary

Time Period	Time (Seconds)									
	1 SB	1 NB	2SB	2 NB	3 SB	3 NB	4 SB	4 NB	5 SB	5 NB
06:00-07:00	323	344	556	493	521	511	240	276	341	293
07:00-08:00	351	362	620	686	591	529	343	305	340	311
08:00-09:00	346	387	782	752	736	646	416	333	352	384
09:00-10:00	364	368	767	754	573	640	341	333	390	407
13:00-14:00	363	395	701	736	627	653	387	318	383	416
14:00-15:00	396	348	764	792	681	657	458	317	338	394
15:00-16:00	489	361	844	839	958	593	578	350	492	516
16:00-17:00	379	393	777	822	809	820	442	509	505	428

Time Period	Time (Seconds)									
	1 SB	1 NB	2SB	2 NB	3 SB	3 NB	4 SB	4 NB	5 SB	5 NB
17:00-18:00	489	423	1342	1107	743	693	478	529	736	483
18:00-19:00	343	319	689	886	559	525	432	310	388	282
19:00-20:00	325	326	636	685	501	572	371	322	347	374

3.3.14 The results of the journey time surveys indicate that Route 2 currently experiences an increase in journey time during the PM peak hour in both the northbound and southbound direction. Route 2 passes north-south along the A38 through Bridgwater. The journey time across the day remains at approximately 700-800 seconds apart from during the PM peak hour of 17:00-18:00 when journey times increase from 777 to 1,342 in the southbound direction and 822 to 1,107 in the northbound direction; a 73% increase and 38% increase, respectively. It can be seen that journey times are restored following the peak hour suggesting that congestion issues currently occur along Route 2 in the PM peak.

3.3.15 Route 5 southbound experiences a similar issue in the PM peak with the southbound flow increasing from 505 to 736 (46% increase) suggesting that there may be existing congestion issues along this route.

c) Seasonality

i. Local Highway Network

3.3.16 Traffic flow data for the local highway network for the months of April, August and October has been reviewed for key links to determine if there is any seasonal variation. The following Automatic Traffic Count (ATC) data in 2009 has been analysed:

- A38 Bristol Road, Bridgwater.
- A38 Taunton Road, Taunton.
- A39 at Holford, east of Williton.
- A39 east of Washford Cross.
- A358 at Bicknoller, southeast of Williton.

3.3.17 The seasonal graphs and ATC data are provided in **Appendix 3.4**.

3.3.18 The following conclusions have been drawn from the data:

- The traffic flows on the A38 Bristol Road, Bridgwater, follow a similar temporal profile throughout the year and are slightly higher in April and October than they are in August.
- The traffic flows on the A38 Taunton Road, Bridgwater, have a similar temporal profile throughout the year, but the traffic flows are higher in April than they are in August.
- The traffic flows on the A39 at Holford and to the east of Washford Cross both experience a rise in traffic flows, particularly westbound, around midday in August when compared with the traffic flows in April and October. This could be

attributed to tourist traffic generated by Butlins in Minehead and other tourist destinations in the area.

- The traffic flows on the A358 at Bicknoller, to the southeast of Williton, follow a similar temporal profile throughout the year and do not increase significantly in the summer peak of August.

3.3.19 From the analysis it is considered that there is no seasonality in Bridgwater and a negligible level of seasonality on the A358 between Williton and Taunton. However, the A39 between Williton and Bridgwater does experience seasonal variation in traffic flows, particularly westbound in the midday period.

ii. Strategic Highway Network

3.3.20 A seasonal comparison has been undertaken for the M5 motorway for the two junctions nearest to the HPC development site (i.e. Junction 23 and Junction 24). Weekday traffic flows have been extracted from the HA TRADS database for the months of April, August and October 2008. Figures from 2008 rather than a more recent year were used as the data from 2008 provided the most complete assessment. The seasonal graphs and ATC data are provided in **Appendix 3.4**.

3.3.21 The following conclusions have been drawn from the available data:

- Junction 23 Northbound Off-slip: The traffic flows on the northbound off-slip at Junction 23 show a similar temporal profile in April and October. The daily profile in August shows a lower volume of traffic during the AM peak hour and a similar volume of traffic in the PM peak hour. However, the data shows slightly higher traffic flows during the inter peak hours in August compared to April and October.
- Junction 23 Southbound Off-slip: The traffic flows on the southbound off-slip at Junction 23 show a similar level of traffic throughout the day for the months of April, August and October. August traffic flows are slightly lower than flows in April.
- Junction 23 Northbound On-slip: The traffic flows on the northbound on-slip at Junction 23 show a similar level of traffic throughout the day for the months of April, August and October. August traffic flows are slightly lower than flows in April.
- Junction 23 Southbound On-slip: There is no TRADS data available for April, August and October 2008 on the southbound on-slip at Junction 23.
- Junction 24 Northbound Off-slip: The traffic flows on the northbound off-slip at Junction 24 show a similar temporal profile for both April and October. There is no TRADS data available for August 2008 on the northbound off-slip at Junction 24.
- Junction 24 Southbound Off-slip: The traffic flows on the southbound off-slip at Junction 24 show a similar temporal profile in April and October. The daily profile in August shows a lower volume of traffic during the AM peak hour and a similar volume of traffic in the PM peak hour. However, the data shows slightly higher traffic flows during the inter peak hours in August compared to April and October.
- Junction 24 Northbound On-slip: There is no TRADS data available for April, August and October 2008 on the northbound on-slip at Junction 24.

- Junction 24 Southbound On-slip: The volume of traffic on the southbound on-slip at Junction 24 follows a similar temporal profile with generally higher flows throughout the day in April during the inter peak hours, but lower during the AM and PM network peak hours.
- Mainline M5 between Junction 23 and Junction 24: The traffic flows on the mainline, both north and southbound, are higher in the inter peak hours in August compared to the flows in April and October.

3.3.22 The data shows that there is very little seasonal variation in traffic flows on the slip roads over the course of the day. However, on the mainline there is an increase of flows in the summer months during the inter peak hours.

3.4 Accident History

3.4.1 This section provides a summary of the accident history for the local and strategic road networks within the study area.

a) Local Road Safety Assessment

i. Background

3.4.2 The Somerset Road Safety Partnership (SRSP) was formed in 2006 to bring together the experience from a number of organisations in co-ordinated campaigns to improve safety on roads in Somerset. The partners include SCC, Devon and Somerset Fire and Rescue Service, NHS Trusts, the HA, Avon and Somerset Constabulary and the Safety Camera Partnership (Safecam).

3.4.3 The SRSP established the Red Route Programme, which identified high accident routes in Somerset and developed a package of road safety improvements to reduce the number of accidents. In addition, as part of the programme, temporary information signs were installed along the Red Routes giving casualty information data and reminding drivers to take care. Each developed route had its own leaflet highlighting collisions, why they happen and giving information and advice to drivers.

3.4.4 Recently the Red Routes Programme has been replaced with the Urban and Rural Safety Management programmes.

ii. Accident Cluster Sites

3.4.5 The SRSP has developed a methodology to identify accident clusters on the local road network in Somerset for both urban and rural areas. Within the study area the only urban area is Bridgwater. All other areas are defined as rural. The methodology is as follows:

- An accident cluster on an urban road is where seven personal injury accidents (PIAs) have occurred in a five year period within 50m of each other.
- An accident cluster on a rural road is where seven PIAs have occurred in a five year period within 100m of each other.

3.4.6 The above methodology has been used to identify existing accident clusters. PIA data has been obtained from SRSP for the most recent five year period.

Urban Accident Clusters

3.4.7 A review of the PIA data for the urban roads within the study area shows that seven locations have been identified as having seven or more accidents within 50m of each other in the five year study period. The sites are listed below:

- A38 Taunton Road/A39 Broadway junction, Bridgwater (35 accidents).
- Cross Rifles roundabout, Bridgwater (21 accidents).
- The Drove/Wylds Road junction, Bridgwater (13 accidents).
- A38 Broadway/A372 St John Street, Bridgwater (11 accidents).
- A39 North Street/Albert Street, Bridgwater (10 accidents).
- A39 North Street/West Street, Bridgwater (10 accidents).
- A38 Taunton Road/Rhode Lane, Bridgwater (9 accidents).

3.4.8 The complete analysis of the urban accident clusters is included in the **Road Safety Strategy** discussed at **Chapter 14** of this report and included at **Appendix 14.1**.

Rural Accident Clusters

3.4.9 A review of the PIA data for the rural roads within the study area shows that 10 locations have been identified as having seven or more accidents within 100m of each other in the five and a half year study period. The sites are listed below:

- A39/B3141 Woolavington Hill junction (15 accidents).
- A38/A39 Dunball roundabout, Bridgwater (12 accidents).
- A38/B3190 Washford Cross junction (11 accidents).
- A38/M5 Junction 24 Huntworth roundabout (11 accidents).
- A39/B3339 Sandford Corner junction (10 accidents).
- Fore Street, Williton (9 accidents).
- A39/Hall Road junction, Puriton (7 accidents).
- A39/Pedwell Hill junction (7 accidents).
- Fore Street/Hyde Park junction, North Petherton (7 accidents).
- A38/Wills Road junction, Bridgwater (7 accidents).

3.4.10 The complete analysis of the rural accident clusters is included in the **Road Safety Strategy** discussed at **Chapter 14** of this report and included at **Appendix 14.1**.

iii. Route Accident Analysis

A39 Route Accident Analysis

3.4.11 **Table 3.4** details the existing collision numbers and accident rates (per million vehicle km) occurring on each A39 link when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been demonstrated.

3.4.12 The existing accident rates have been compared against the national average accident rate for that type of road. The accident rate is defined by the Royal Society for the Prevention of Accidents (RoSPA) 'Road Safety Engineering Manual' as a standard approach in route length accident analysis and is calculated as follows:

Table 3.4: Existing A39 Route Collision Conditions

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
Q4	1.45	7,703	2.2	53.96	0.6	14.72	Urban A Road: 56	Below
Q3	9.5		10.2	38.19	7.6	28.45	Rural A Road: 20	Above
Q2	0.32		0	0.00	0	0.00	Urban A Road: 56	Below
Q1	4.02		1.4	12.39	1.4	5.31	Rural A Road: 20	Below
Q	8.21		2.4	10.40	0.6	6.07	Rural A Road: 20	Below
P	1.1	6,399	1	38.92	0.6	23.35	Rural A Road: 20	Above
R	1.2	14,468	0.8	12.62	0.6	9.47	Rural A Road: 20	Below
S	2.1	12,959	2.8	28.19	0.6	6.04	Rural A Road: 20	Above
K2	0.5	14,028	1.2	46.87	0.2	7.81	Urban A Road: 56	Below
K1	0.2	15,338	0.6	53.59	0.6	53.59	Urban A Road: 56	Below
K3	0.35	15,441	0.6	30.42	0	0.00	Urban A Road: 56	Below
K4	0.2	17,198	1.8	143.37	0.6	47.79	Urban A Road: 56	Above
K5	0.6	20,410	5	111.86	1.4	31.32	Urban A Road: 56	Above
O1	0.2	22,608	3	181.78	1.2	72.71	Urban A Road: 56	Above
O2	0.3	18,821	3	145.57	1	48.52	Urban A Road: 56	Above
J	0.3	20,240	3	135.36	1.4	63.17	Urban A Road: 56	Above
N3	0.85	17,129	6.4	120.43	2.6	48.92	Urban A Road: 56	Above
N2	0.8	12,829	3	80.08	1.8	48.05	Urban A Road: 56	Above
N1	2.2	12,931	2.8	26.97	1.2	11.56	Rural A Road: 20	Above

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
L	2.1	14,061	12	111.34	4.4	40.82	Rural A Road: 20	Above
M	12	16,535	11	15.19	3.8	5.25	Rural A Road: 20	Below

3.4.13 Analysis of baseline A39 route collisions provided in **Table 3.4** shows that 12 of the 21 links indicate an accident rate in exceedance of the national average rate. All other links indicate accident rates within the national average rates identified by Road Casualties Great Britain (RCGB) 2009. The analysis also shows that the majority of accidents occur at junctions.

A38 Route Accident Analysis

3.4.14 **Table 3.5** details the existing collision numbers and accident rates (per million vehicle km) occurring on each A38 link when analysed against 2009 24-hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been carried out.

Table 3.5: Existing A38 Route Collision Conditions

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
SS	2.0	15,955	3.6	30.91	1	8.59	Rural A Road: 20	Above
I4	0.7	21,216	1	18.45	0.2	3.69	Rural A Road: 20	Below
I3	0.3	21,088	0.6	25.98	0.6	25.98	Rural A Road: 20	Above
I2	0.7	21,644	1.6	28.93	0.4	7.23	Urban A Road: 56	Below
I1	0.85	24,728	9.8	127.74	2.2	28.68	Urban A Road: 56	Above
O1	0.2	22,608	3	181.78	1.2	72.71	Urban A Road: 56	Above
O2	0.3	18,821	2.2	106.75	1	48.52	Urban A Road: 56	Above
J	0.3	20,240	3	135.36	1.4	63.17	Urban A Road: 56	Above
F	0.35	16,818	3	139.63	0.8	37.24	Urban A Road: 56	Above
E	0.55	13,159	2.4	90.85	1.2	45.43	Urban A Road: 56	Above
D	0.8	22,956	1.8	26.85	1.6	23.87	Urban A Road: 56	Below

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
G	2.0	21,971	5	31.17	3.4	21.20	Rural A Road: 20	Above
A	4.6	10,678	8.2	45.74	3.2	17.85	Rural A Road: 20	Above
ST1	0.45	18,510	0	0.00	0	0.00	Urban A Road: 56	Below

3.4.15 Analysis of baseline A39 route collisions provided in **Table 3.5** indicates that 10 of the 14 links indicate an accident rate in exceedance of the national average rate. All other links indicate accident rates within the national average rates identified by RCGB: 2009. The analysis also shows that the majority of accidents occur at junctions.

C182 Route Accident Analysis

3.4.16 **Table 3.6** details the existing collision numbers and accident rates (per million vehicle km) occurring on the C182 link when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been carried out.

Table 3.6: Existing C182 Route Collision Conditions

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
AC	9.3	6,706	3.6	15.8	2.2	9.66	Rural Other Roads: 35	Below

3.4.17 **Table 3.6** indicates that the C182 accident rate is well within the national average rates identified by RCGB: 2009.

Northern Distributor Road (NDR) Route Accident Analysis

3.4.18 **Table 3.7** details the existing collision numbers and accident rates (per million vehicle km) occurring on each NDR link when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been carried out.

Table 3.7: Existing NDR Route Collision Conditions

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
Y	0.3	11,601	3	236.2	0	0.00	Urban A Road:56	Below
AB	1	10,397	5	131.8	4	105.4	Urban A Road:56	Below
AA	0.6	12,033	4	151.8	3	113.8	Urban A Road:56	Below
AE	0.55	15,891	6	188.1	5	156.7	Urban A Road:56	Below
ZE	0.45	7,030	16	1385.7	3	259.8	Urban A Road:56	Above

3.4.19 **Table 3.7** shows that all NDR links, with the exception of The Drove (link ZE), indicate accident rates within the national average rates identified by RCGB: 2009.

b) Strategic Road Safety Assessment

3.4.20 This section summarises the road safety assessment of the M5 motorway for Junction 23 and Junction 24 and also the link between the junctions.

i. M5 Route Collision Analysis

3.4.21 **Table 3.8** details the existing collision numbers and accident rates (per million vehicle km) occurring on the M5 link between Junctions 23 and 24 when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been carried out.

Table 3.8: Existing M5 Route Collision Conditions

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type / National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
X	17.1	50,875	34.6	10.90	28.6	9.01	Motorways: 7	Above

3.4.22 **Table 3.8** indicates that the M5 accident rate slightly exceeds the national average rate for motorways identified by RCGB: 2009.

ii. M5 Junction 23

3.4.23 There have been a total of 22 Personal Injury Accidents (PIA) which have occurred at Junction 23 of the M5 motorway and its immediate approaches during the five-year study period, all resulting in slight injury. **Table 3.9** details the PIAs identified at Junction 23 over the studied five year period.

Table 3.9: Personal Injury Accidents Recorded at M5 Junction 23

Police Ref.	Date	Day	Time	Surface Conditions	Lighting Conditions	Location	Accident Type
40111155	17/08/04	Tue	18:55	Wet	Daylight	A39 Puriton Hill westbound approach to J23	Rear end shunt
50111201	23/08/05	Tue	23:16	Dry	Dark	Circulating J23 at eastbound exit to A39 Puriton Hill	Loss of control
50166243	10/12/05	Sat	17:40	Dry	Dark	A39 Puriton Hill westbound approach to J23	Rear end shunt
50137103	15/10/05	Sat	15:25	Dry	Daylight	A38 eastbound approach to J23	Rear end shunt
60004642	10/01/06	Tue	08:15	Dry	Daylight	A39 Puriton Hill westbound approach to J23	Rear end shunt
60024261	21/02/06	Tue	18:00	Dry	Dark	A38 eastbound approach to J23	Rear end shunt
60049107	24/04/06	Mon	13:40	Dry	Daylight	A39 Puriton Hill westbound approach to J23	Rear end shunt
60111708	10/09/06	Sun	21:10	Dry	Dark	A39 Puriton Hill westbound approach to J23	Rear end shunt
70007498	11/01/07	Thu	19:30	Dry	Dark	A39 Puriton Hill westbound approach to J23	Rear end shunt
70707920	14/06/07	Thu	14:10	Dry	Daylight	M5 northbound exit slip, entering J23 roundabout	Right of way violation
70708288	29/06/07	Fri	15:15	Dry	Daylight	M5 northbound entry slip, exiting J23 roundabout	Rear end shunt
7013315	30/10/07	Tue	17:45	Dry	Dark	M5 northbound exit slip approach to J23	Rear end shunt
70713448	31/10/07	Wed	20:40	Wet	Dark	A39 Puriton Hill westbound approach to J23	Loss of control
71801202	29/12/07	Sat	18:15	Wet	Dark	Circulating J23 between A39 westbound entry and M5 southbound entry slip	Rear end shunt
80802739	25/02/08	Mon	06:08	Wet	Dark	M5 northbound exit slip approach to J23	Loss of control
80804060	26/03/08	Wed	08:30	Dry	Daylight	A39 Puriton Hill westbound approach to J23	Rear end shunt
80804112	28/03/08	Fri	18:30	Dry	Daylight	A38 eastbound approach to J23	Rear end shunt
80804287	03/04/08	Thu	10:54	Dry	Daylight	A38 eastbound approach to J23	Rear end shunt
80808111	29/07/08	Tue	08:00	Dry	Daylight	M5 southbound exit slip, entering J23 roundabout	Rear end shunt
80808682	10/08/08	Sun	20:09	Wet	Daylight	A39 Puriton Hill westbound approach to J23	Rear end shunt
80810914	10/10/08	Mon	14:00	Dry	Daylight	M5 southbound exit slip, entering J23 roundabout	Rear end shunt

3.4.24 From the PIA data shown in **Table 3.9** the locations of the 22 collisions occurring at this junction and its approaches can be summarised as follows:

- M5 southbound off-slip approach: two PIA (two rear end shunts).
- A39 westbound approach: nine PIA (eight rear end shunts, one loss of control).
- M5 northbound off-slip approach: three PIA (one rear end shunt, one loss of control, one failure to give way).
- M5 northbound on-slip: one PIA (rear end shunt).
- A38 eastbound approach: four PIA (four rear end shunts).
- Circulating Junction 23 roundabout: three PIA (one rear end shunt, one loss of control, one changing lane).

3.4.25 The Design Manual for Roads and Bridges (Section 1, Volume 13, Chapter 5: The Valuation of Accidents at Junctions) states:

> *"Cost Benefit Analysis (COBA) can estimate the numbers and costs of accidents at junctions and on links separately. All new junctions should be coded for accident appraisal, as should all existing junctions where there are significant forecast traffic flow changes and where accidents are likely to occur."*

3.4.26 COBA uses models that relate accidents at junctions to given flow configurations. These allow forecasts of future accident numbers to be derived for existing and new junctions. The models are of the basic form:

$$A = a\,(f)b$$

Where:

- A is the annual number of accidents;
- f is a function of traffic flow; and
- a and b are coefficients that vary among junction types.

3.4.27 The above formula has been used to calculate the number of accidents per year for the 2009 base.

3.4.28 The 2009 base assessment shows that the predicted number of accidents per year at Junction 23 is three. The assessment shows that the existing accident rate recorded at Junction 23 (i.e. 4.4 accidents per year) is above the accident rate that would normally be expected at a junction of this type.

iii. M5 Junction 24

3.4.29 There have been a total of eight PIAs (1.6 PIAs per year) recorded at this junction and it's immediate approaches during the five year study period, all resulting in slight injury. **Table 3.10** details the PIAs recorded at Junction 24.

Table 3.10: Personal Injury Collisions Recorded at M5 Junction 24

Police Ref.	Date	Day	Time	Surface Conditions	Lighting Conditions	Location	Accident Type
50086606	01/07/05	Fri	13:10	Dry	Daylight	M5 northbound exit slip entering J24 roundabout	Loss of control
50123471	21/09/05	Wed	07:46	Dry	Daylight	M5 northbound exit slip entering J24 roundabout	Rear end shunt
60004576	13/04/06	Thu	12:00	Dry	Daylight	M5 northbound exit slip entering J24 roundabout	Rear end shunt
60009369	17/01/06	Tue	19:25	Wet	Dark	M5 northbound exit slip entering J24 roundabout	Rear end shunt
60012777	28/01/06	Sat	14:50	Dry	Daylight	M5 northbound exit slip entering J24 roundabout	Rear end shunt
70017604	02/02/07	Fri	18:50	Dry	Dark	M5 northbound exit slip entering J24 roundabout	Overtakin g
80807987	21/07/08	Mon	19:36	Dry	Daylight	Circulating J24 roundabout at M5 northbound exit slip	Loss of control
80808686	15/08/08	Fri	09:20	Dry	Daylight	A38 eastbound approach to J24	Rear end shunt

3.4.30 From the PIA data shown in **Table 3.10** the locations of the eight collisions occurring at this junction and its approaches can be summarised as follows:

- M5 northbound off-slip approach: six PIA (four rear end shunts, one loss of control, one overtaking).
- A38 eastbound approach: one PIA (rear end shunt).
- Circulating Junction 24 roundabout: one PIA (loss of control).

3.4.31 The COBA formula has been used to calculate the number of accidents per year for the 2009 base.

3.4.32 The 2009 base assessment shows that the predicted number of accidents per year at Junction 24 is two. The assessment shows that the existing accident rate recorded at Junction 24 (i.e. 1.6 accidents per year) corresponds to the rate that would typically be expected for a junction of this type and flow.

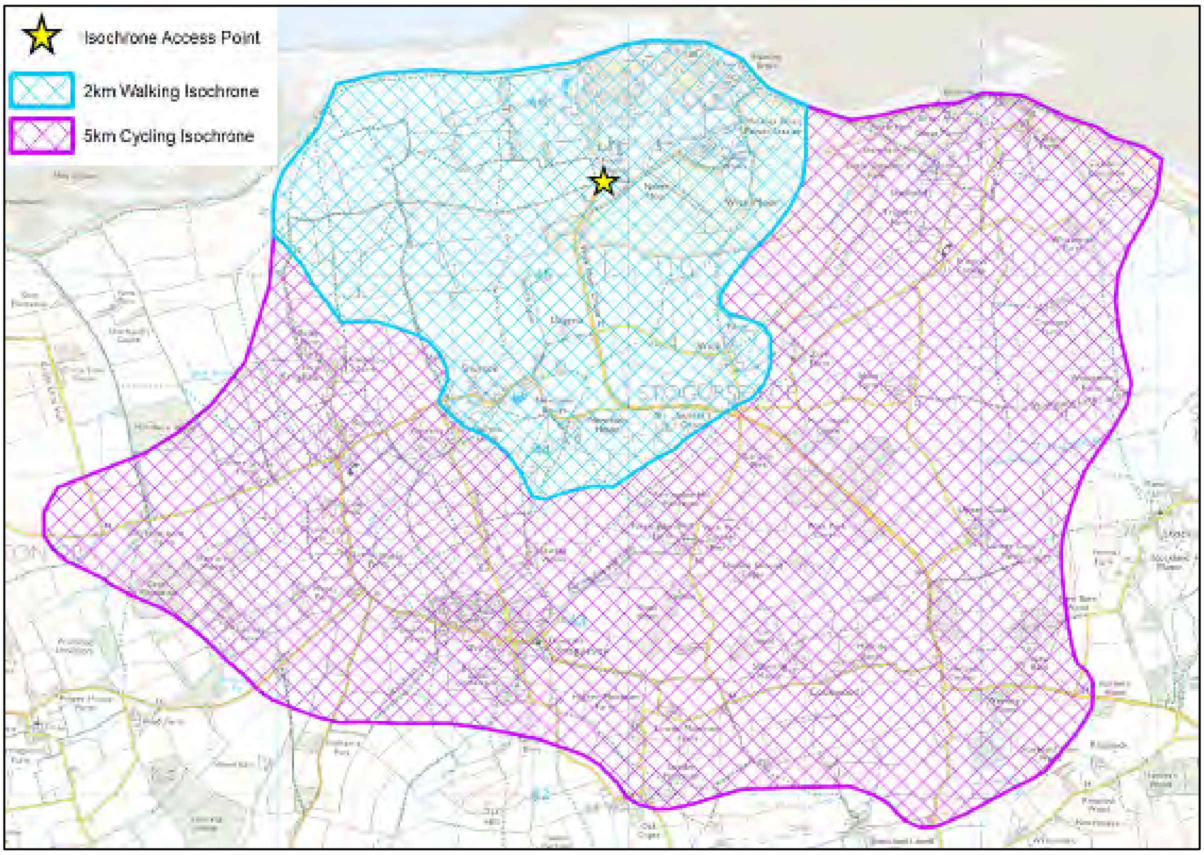
3.5 Pedestrian and Cycle Network

3.5.1 A walk and cycle audit has been undertaken for key routes for the HPC development site and each of the AD sites. This audit is included as **Appendix 3.5** and can be referred to for further details of the existing condition of the walk and cycle networks.

a) Hinkley Point C Development Site

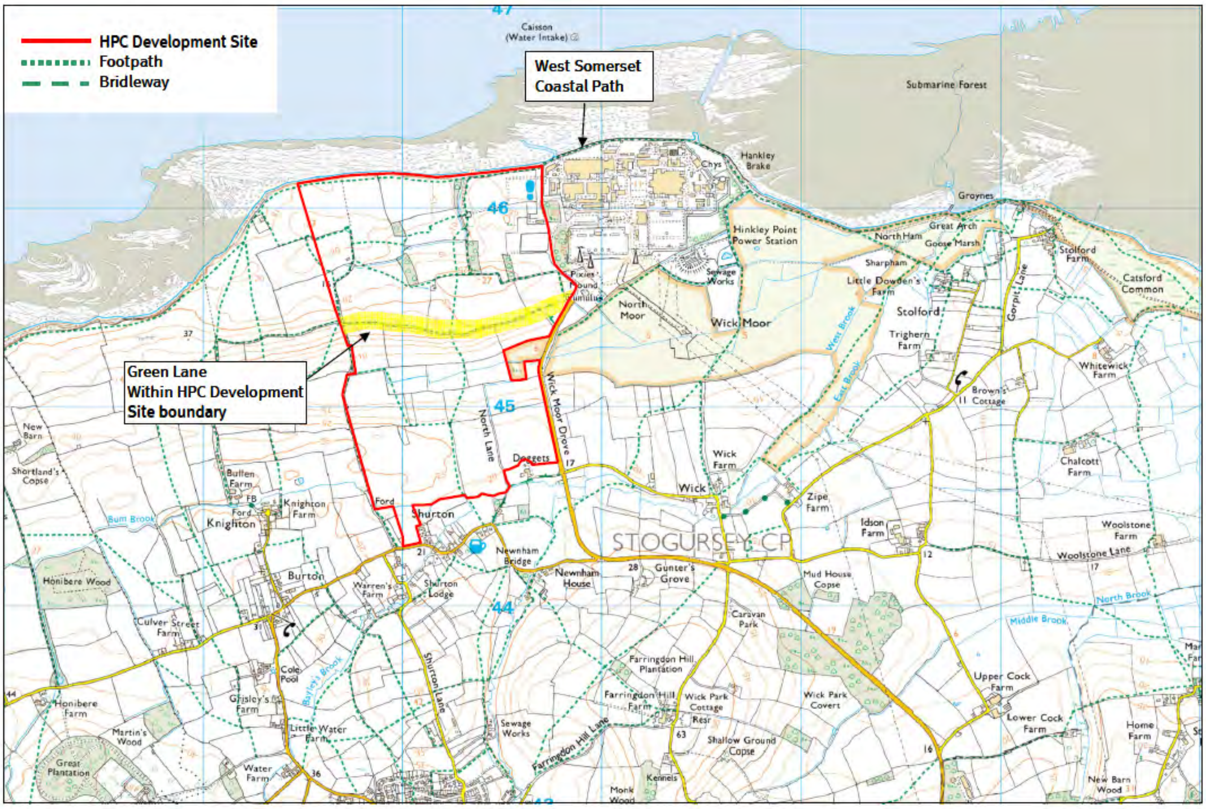
3.5.2 Paragraph 75 of Planning Policy Guidance 13 on Transport (PPG13), published in March 2001, advises that walking offers the greatest potential to replace short car trips, particularly those under 2km. **Figure 3.7** illustrates the 2km walking distance isochrone for the HPC development site.

Figure 3.7: Walking and Cycling Isochrones for Hinkley Point



3.5.3 Facilities and infrastructure for pedestrian movement in the immediate vicinity of the HPC development site are extremely limited. There are no pedestrian facilities adjacent to the local roads within the 2km isochrone, except within the village of Shurton. There is however, a network of public rights of way within the local area, as shown on **Figure 3.8**.

Figure 3.8: Hinkley Point C Public Rights of Way



3.5.4 Within the HPC development site itself the following public rights of way are located:

- a portion of the West Somerset Coast Path which links the River Parrett Trail at Steart in Bridgwater Bay with the South West Coast Path National Trail at Minehead;
- the Green Lane which is an east-west track that runs along the ridge through the middle of the HPC development site; and
- a number of smaller, interconnecting footpaths running north-south and east-west.

2.1.1 Paragraph 78 of PPG13 advises that cycling also has potential to substitute for short car trips, particularly those under 5km, and to form part of a longer journey by public transport. **Table 3.7** details the 5km cycle distance isochrone for the HPC development site.

3.5.5 There is no dedicated cycling infrastructure present within 5km of the HPC development site (the cycling catchment). The traffic levels on the roads within the cycle catchment are currently low. However, the roads within the cycle catchment are generally subject to the national speed limit of 60mph with the exception of sections through the local villages, where the speed limit reduces to 30mph. The roads are also unlit outside of the villages. It is considered that the existing local road network within the 5km cycle catchment is currently not favourable for cycling.

b) Combwich Wharf

3.5.6 A narrow footway with grass verges runs along the east side of the C182 between Cannington village and Brookside Road, the vehicular access road to Combwich village.

3.5.7 A footway runs along the southern side of Brookside Road from the C182 to the edge of Combwich village from which point footways are provided on both sides of the road throughout most of Combwich village.

c) M5 Junction 23 Site

3.5.8 There are no controlled pedestrian or cycle crossing facilities within the vicinity of the A38 Dunball roundabout. A narrow footway routes along the southern side of the A39 spur road arm of the roundabout. A footway routes along both sides of the A38 Bristol Road south arm and along the western side of the A38 Bristol Road north arm. A footway is also provided along the southern side of the Bridgwater Business Park arm.

3.5.9 There are no controlled pedestrian or cycle crossing facilities at Junction 23 of the M5 motorway. There is a narrow footway along the southern side of the A39 Puriton Hill arm which routes around the southern side of the M5 Junction 23 roundabout and extends along the southern side of the A39 spur road.

d) M5 Junction 24 Site

3.5.10 There are no controlled pedestrian or cycle crossing facilities at the Huntworth roundabout. A footway routes along the southern side of the A38 spur road arm, along the eastern side of A38 Taunton Road north and south arms and along the northern side of the Stockmoor Village residential access road and the Bridgwater Motorway Service Area access road.

3.5.11 There are no controlled pedestrian or cycle crossing facilities at the M5 Junction 24. A narrow footway runs along the southern side of the unclassified road and extends along the southern side of the M5 Junction 24 roundabout and the southern side of the A38 spur road.

e) Cannington Park and Ride

3.5.12 There are no controlled pedestrian or cycle crossings within the vicinity of the proposed Cannington park and ride facility.

3.5.13 There are no footways in the vicinity of the A39/High Street roundabout and no footways on either side of the A39 near to the proposed Cannington park and ride facility.

3.5.14 There is a public footpath from Denman's Farm, to the north-east of the site, which follows the north-west boundary of the site. A further footpath, also from Denman's Farm, bisects the site from north to south and continues on the opposite side of the A39.

f) Williton Park and Ride

3.5.15 There are no footways within the vicinity of the Williton park and ride facility.

3.5.16 On the A39 there is a footway on the northern side of A39 Priest Street between Mamsey House Nursing Home and the mini-roundabout junction with High Street. A footway on the southern side of the A39 Priest Street is provided between the junctions of Bridge Street and High Street. There are footways on all approaches to the A39 Priest Street/A358 High Street mini-roundabout and pedestrian refuge islands are provided on the A39 Priest Street and A358 High Street arms of the junction. A signal controlled pedestrian crossing is provided on the A39 Fore Street, 60m north of the mini-roundabout.

3.5.17 Smith Yard Lane, to the west of the site, is a signed cycle route providing a connection to Watchet to the north.

g) Bridgwater Accommodation Campuses

3.5.18 **Figure 3.9** and **Figure 3.10** illustrate the 2km walking distance and 5km cycling distance isochrones from the centre of the proposed Bridgwater A and C sites, respectively. The isochrones demonstrate that key destinations such as Bridgwater railway station, the bus and coach station, Sainsbury's and ASDA supermarkets, Bridgwater Retail Park and Bridgwater town centre are within a 2km walk of both proposed sites. The 5km isochrones demonstrate that occupants of these accommodation campuses would be able to access all of Bridgwater and some of the surrounding smaller settlements by bicycle. The existing cycle routes within Bridgwater are illustrated in **Figure 3.11**.

3.5.19 There are footways along both sides of the A39 Bath Road, approximately 2m in width. A zebra crossing is provided to the west of Union Street and a further zebra crossing is provided to the west of College Way. Over the railway bridge on the A39 (Bath Road) there is a footway on the northern side approximately 2m wide. A separate footbridge is provided on the southern side of Bath Road, which is approximately 3m wide.

3.5.20 There is a zebra crossing approximately 30m north of the Cross Rifles roundabout on the A38 (Bristol Road) that provides pedestrian access to the nearby Sainsbury's supermarket. There are footways on both sides of the A38 (Bristol Road) and two arms of the A38/Bristol Road/The Drove junction have signal controlled pedestrian crossing facilities (i.e. The Drove and A38 (Bristol Road) south arm).

Figure 3.9: Bridgwater A Accommodation Campus Walk and Cycle Isochrones

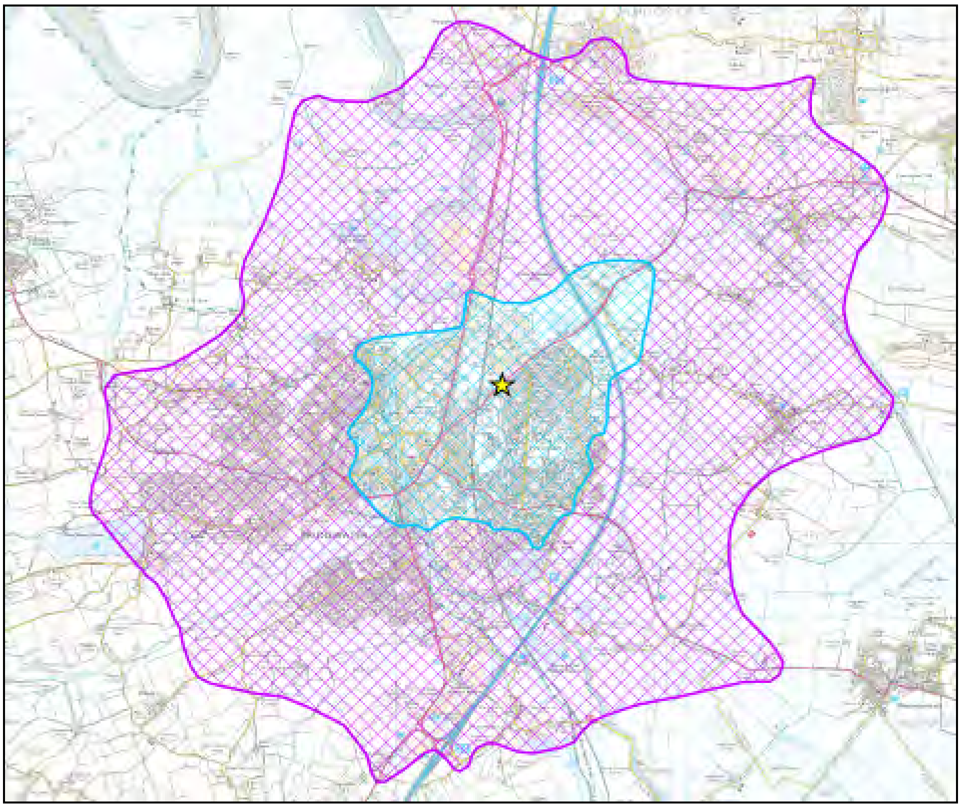


Figure 3.10: Bridgwater C Accommodation Campus Walk and Cycle Isochrones

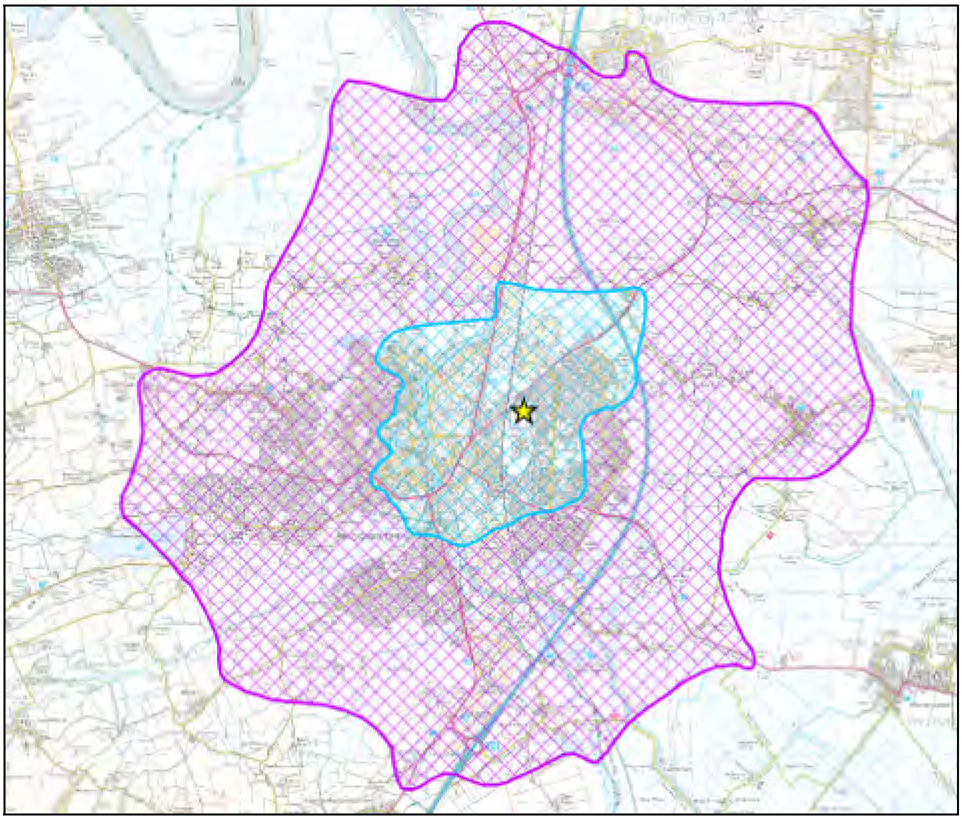
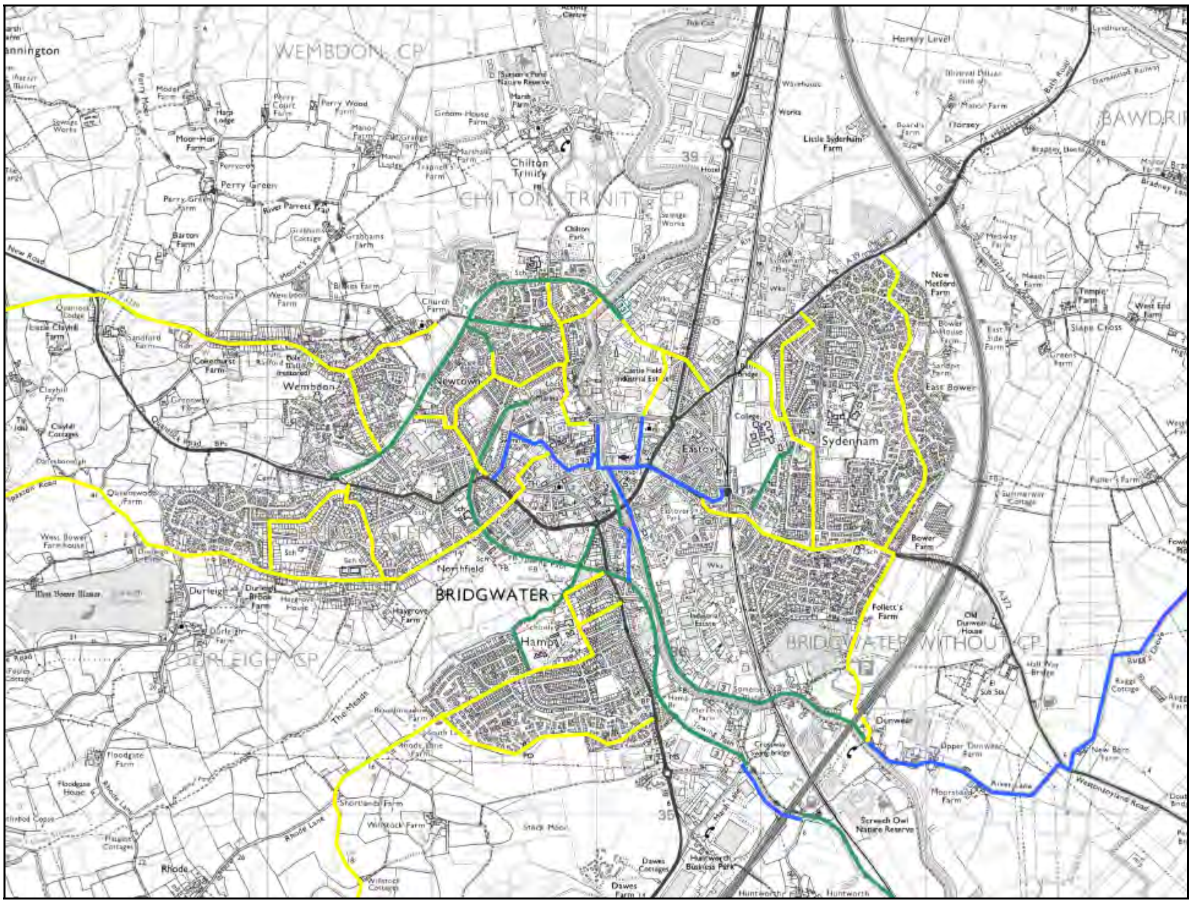


Figure 3.11: Bridgwater Existing Cycle Network



3.5.21 The existing cycle facilities within the 5km catchment include:

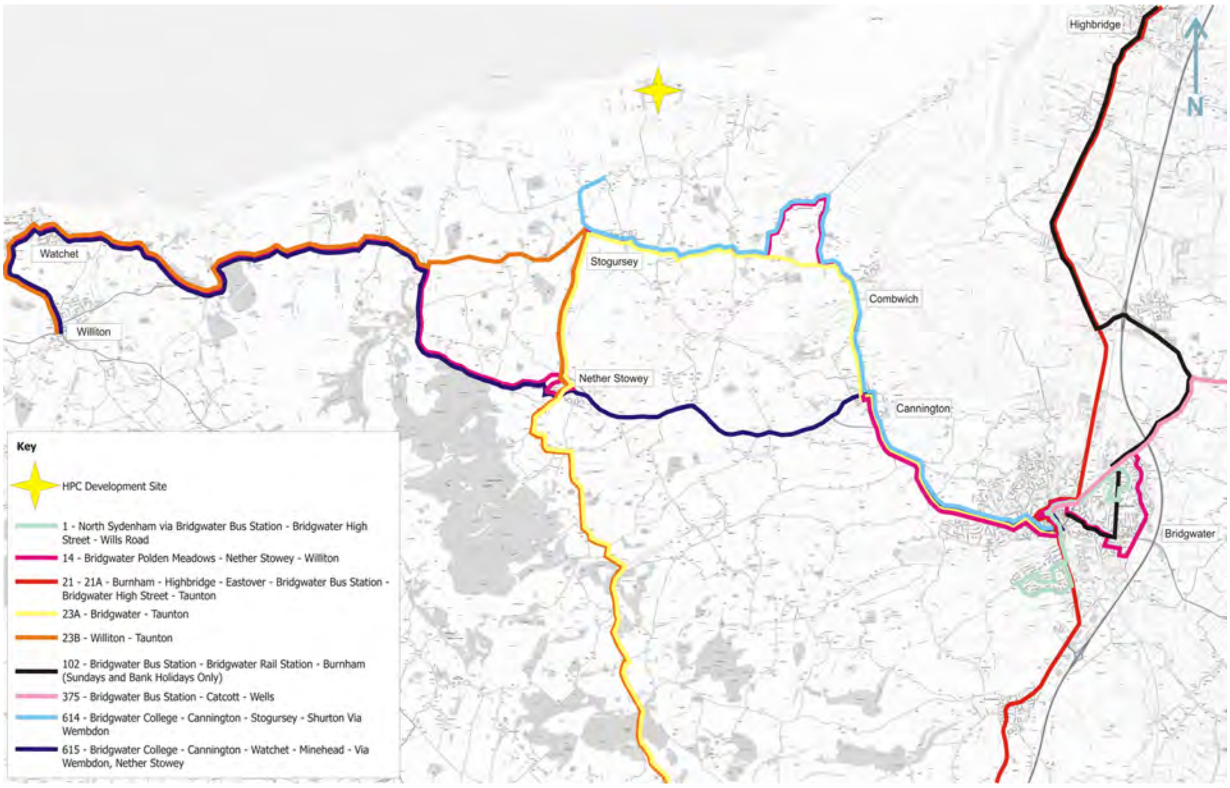
- A signed cycle route provides a connection between Bridgwater railway station and the town centre via St John Street and Eastover.
- A high quality segregated cycle/footpath along one side of the northern section of Feversham Road.
- A high quality off-road cycle route connecting the Northern Distributor Road (NDR) to Crowpill Lane.
- An off-road shared pedestrian and cycle route is provided in the Sydenham part of Bridgwater, connecting Redgate Street to Longstone Avenue.
- A high quality segregated cycle/footpath along at least one, but in parts on both sides of the NDR between A39 and the junction with Wylds Road.
- As the NDR segregated cycle/footpath approaches the River Parrett, it routes south to connect to Linham Road. The cycle route runs south along Linham Road and at the Marina the route divides in two with one route heading west along the Bridgwater to Taunton Canal to connect to Victoria Road. The other part of the route heads south off-road along the River Parrett, over the Clink (no formal crossing facilities provided) and then continues along West Quay and Binford Place. At the southern end of Binford Place the cycle route continues off-road through Blake Gardens, under the A39 (Broadway), connects to Old Taunton Road and then connects back onto the Canal towpath, which forms part of the River Parrett Trail (National Cycle Network Route 3).

3.6 Bus Network

a) Existing Bus Services

3.6.1 **Figure 3.12** below illustrates the existing bus routes that serve the local area

Figure 3.12: Local Bus Route Network



3.6.2 **Table 3.11** below shows the current timetable of bus routes in the area:

Table 3.11: Existing Local Bus Timetable

Service	Route	Weekday		Saturday	Sunday
		Daytime	Evening		
1	North Sydenham – Bridgwater – North Sydenham	15 mins	-	20 mins	-
2	Bridgwater – Durleigh - Bridgwater	30 mins	-	20 mins	-
6	Bridgwater – Newtown - Bridgwater	60 mins	-	60 mins	-
14	Bridgwater - Polden Meadows - Bridgwater	30 mins	-	30 mins	-
14	Bridgwater – Cannington - Bridgwater	60 mins	-	60 mins	-
14	Bridgwater – Williton - Bridgwater	120 mins	-	120 mins	120 mins
21/21A	Burnham - Bridgwater – Taunton return	30 mins	60 mins	20-60 mins	120 mins

NOT PROTECTIVELY MARKED

Service	Route	Weekday		Saturday	Sunday
		Daytime	Evening		
23A	Bridgwater - Nether Stowey – Taunton return	1 service (09:00)	-	-	-
23B	Williton – Taunton - Williton	1 service (07:15)	-	-	-
102	Bridgwater – Burnham - Bridgwater	-	-	-	120 mins
375	Wells - Catcott – Bridgwater return	60 mins	-	60 mins	180 mins
614	Bridgwater College – Shurton – Bridgwater College	1 service (16:40)	-	-	-
615	Bridgwater - Nether Stowey – Minehead return	1 service (16:40)	-	-	-

b) Existing Bus Stop Infrastructure

3.6.3 An audit of existing bus stop infrastructure in Bridgwater and Cannington was undertaken in March 2011. The exact areas covered and locations of the stops are shown in **Figure 3.13** and **Figure 3.14** below:

Figure 3.13: Bus Stop Audit Bridgwater

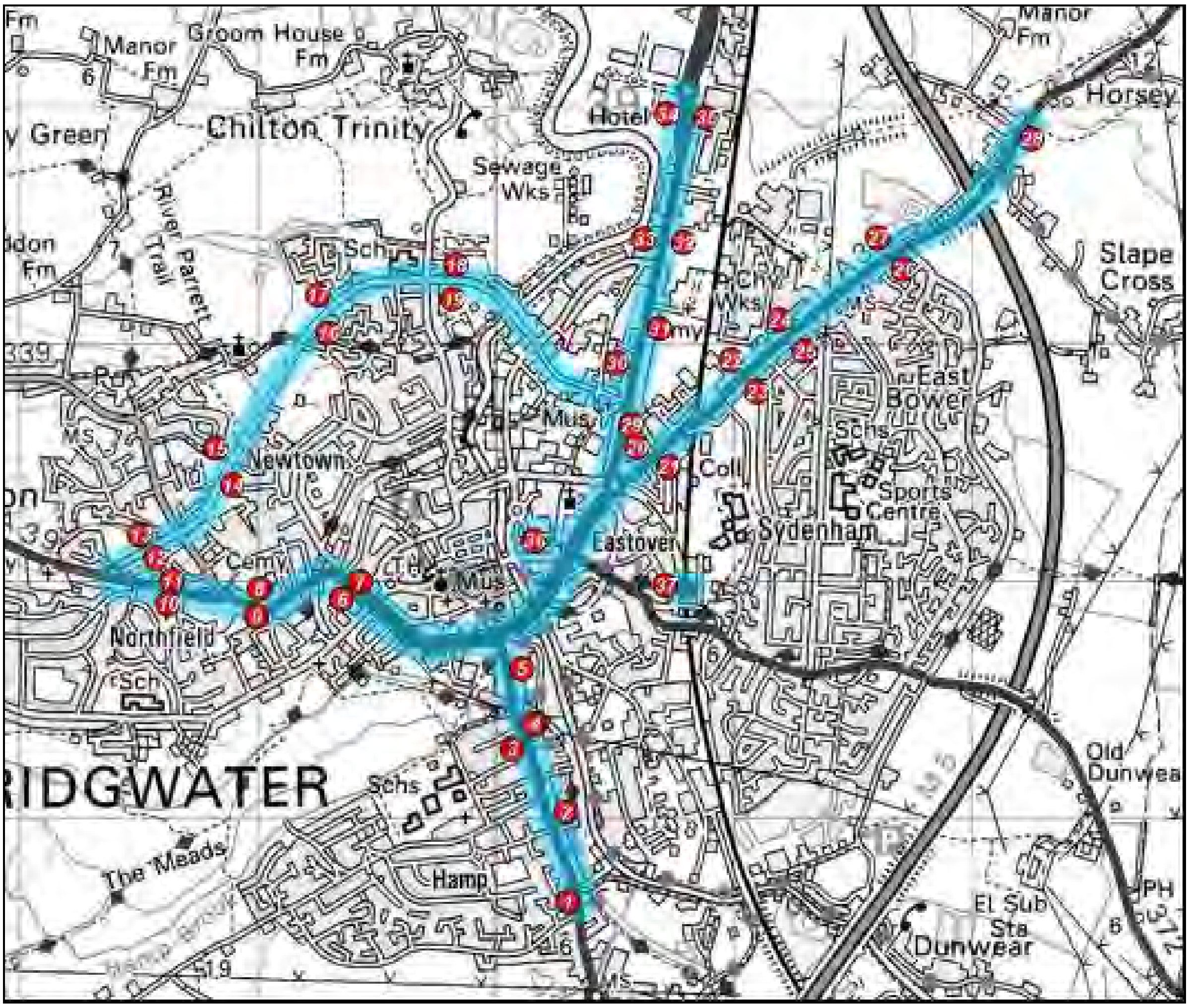
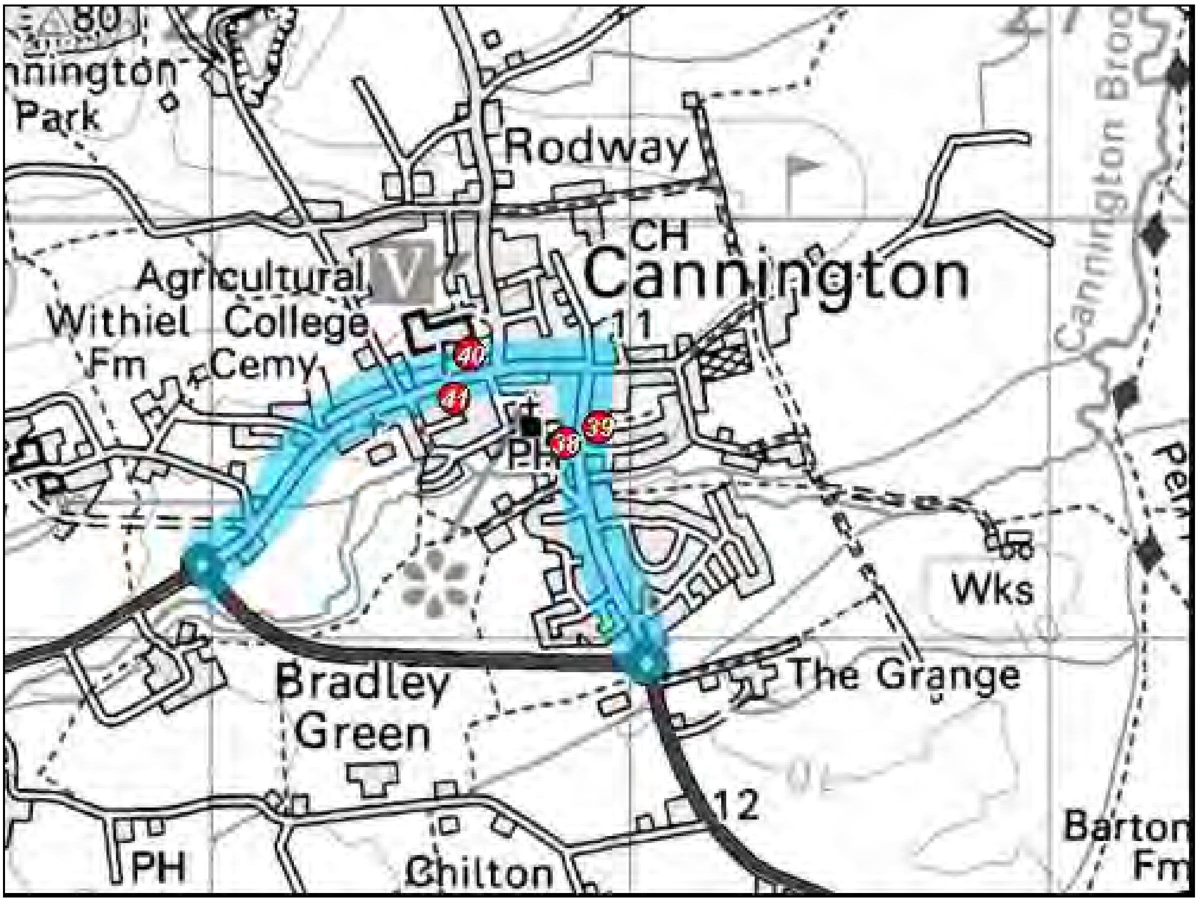


Figure 3.14: Bus Stop Audit Cannington



3.6.4 Each bus stop was assessed on the condition of the passenger waiting environment as well as the ease of access for vehicles, in order to determine whether the existing infrastructure provision was adequate. The following criteria were assessed at each stop:

- convenience (i.e. whether the stop well located for an origin or destination);
- connectivity (i.e. whether the stop is connected the surrounding footway network);
- approach and exit paths for buses (i.e. whether passenger service vehicles can enter and exit easily to/from the bus stop area);
- lighting;
- number of bays;
- adequacy of platform (i.e. how easy it is to get from roadside to bus and the quality of the surface);
- type and height of kerb;
- drainage;
- information provision at stop;
- street furniture near to stop;
- services served from stop;
- shelter;
- seats;

- surface markings;
- bus stop post; and
- flag.

3.6.5 The full results of the bus stop audit are located at **Appendix 3.6**.

3.6.6 Most of the bus stops within Bridgwater town centre, especially at the bus station, are of a high quality with lit waiting areas, shelters and timetable provision. However, outside of the town centre stops mainly consist of simple flags attached to lamp posts with no other information or shelter. A substantial number of stops have raised platforms in order to facilitate level boarding for less mobile passengers.

c) Local Bus Network

i. HPC Development Site

3.6.7 At present no bus services serve the HPC development site and there are no bus stops within the recommended 2km maximum walking distance. The existing bus routes that route nearest to the HPC development site are Routes 14, 23A and 614, both of which are operated by First Group.

3.6.8 Route 14 provides a two-hourly service during the day between Williton and Bridgwater via Watchet, Nether Stowey, Stogursey, Combwich and Cannington. It also provides a more regular hourly service between Cannington and Bridgwater.

3.6.9 Route 23A provides one service between Bridgwater and Taunton in the weekday morning and a return service in the weekday afternoons. It routes via Combwich, Stogursey and Nether Stowey.

3.6.10 Route 614 provides one service between Shurton and Bridgwater College in the weekday morning and a return service in the weekday evenings. It routes via Shurton, Stogursey, Combwich, Cannington and Bridgwater.

ii. Combwich Site

3.6.11 The nearest set of bus stops to Combwich Wharf is at the junction of C182/Brookside Road, approximately 400m to the north of the Combwich Wharf access road. The northbound bus stop is provided in a lay-by on the C182 and the southbound bus stop is provided off Brookside Road. The bus stops are served by Routes 14, 23A and 614.

iii. M5 Junction 23 Site

3.6.12 A set of bus stops is currently located on the A38 Bristol Road south arm, approximately 100m south of the A38 Dunball roundabout. There are dedicated bus lay-bys on both the north and southbound carriageways providing safe places for buses to stop without affecting the flow of traffic. These bus stops are served by Route 21/21A, the Taunton to Burnham-on-Sea service. There is also a set of bus stops on the A38 Bristol Road north arm, approximately 400m to the north of the A38 Dunball roundabout. These stops are served by Routes 21/21A and 102.

iv. M5 Junction 24 Site

3.6.13 The nearest bus stops to the site are a set of bus lay-bys located approximately 100m south of the Huntworth roundabout on the A38 Taunton Road south, which are served by Route 21/21A.

v. Cannington Park and Ride Site

3.6.14 The nearest set of bus stops to the proposed Cannington park and ride facility is located on Main Road approximately 100m north of the A39 roundabout, in the vicinity of Southbrook. These bus stops are served by Routes 14, 23A and 615.

vi. Williton Site

3.6.15 There is a set of bus stops on both sides of the B3190 immediately to the north of the entrance to the Tropiquaria activity centre. These bus stops are served by Routes 14, 28 and 105.

vii. Bridgwater Accommodation Campuses

3.6.16 Within Bridgwater there is a bus and coach station at Watsons Lane, near to the ASDA supermarket. The bus and coach station was opened in 2004 and is operated by First Group.

3.6.17 The bus stops nearest to the proposed accommodation campus sites in Bridgwater are a set immediately to the west of the A39 Bath Road/Union Street/Lower Bath Road junction, and these are served by Route 1, the Sydenham/Wyndham Road Circular and Routes X75, 614 and 615.

3.6.18 There is also a set of bus stops on A39 (Bath Road), adjacent to Frederick Road, which are served by Route 1, Route 102 to Burnham-on-Sea and Route 375 to Wells and Bristol and Route X75.

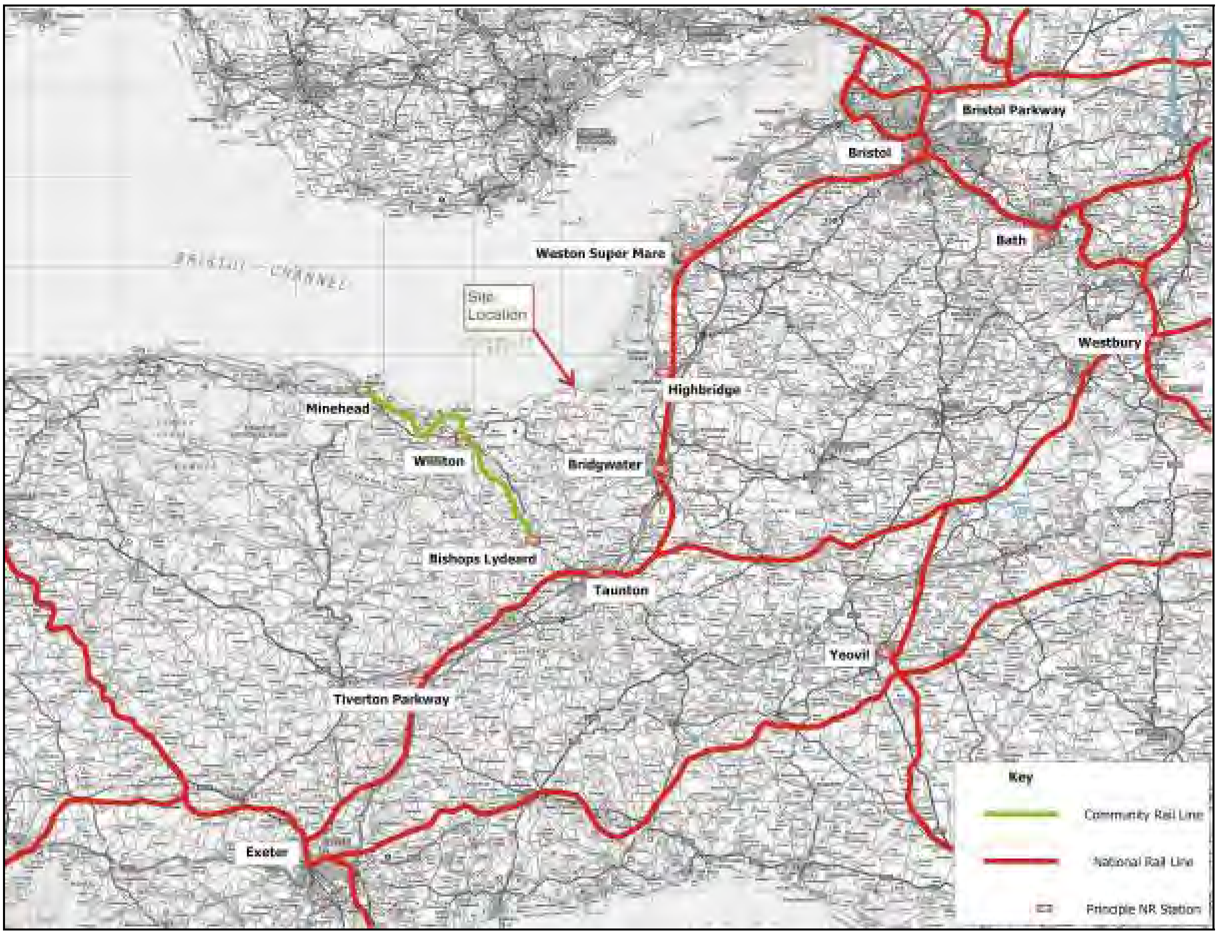
3.6.19 There are also a number of bus stops on the A38 (Bristol Road), the nearest of which to the accommodation campuses is a set of bus stops to the south of Union Road. These are served by Route 21/21A (Taunton to Burnham-on-Sea).

3.7 Rail Network

a) Existing Rail Network

3.7.1 The rail network in the local area is detailed in **Figure 3.15**.

Figure 3.15: Existing Rail Network



i. Bristol to Exeter Route

3.7.2 The nearest and principal main line rail route in the Hinkley Point area runs north-east to south-west between Bristol and Exeter and then continues to Penzance. It was originally built to serve the West of England with trains from London routed via Bristol. However, at Cogload junction to the east of Taunton the route to Exeter is now joined by the more direct 'Berks and Hants' route from London. The railway passes closest to the Hinkley Point site at Bridgwater.

3.7.3 The route between Bristol and Exeter is 75 miles long. Bridgwater is approximately equidistant between Bristol and Exeter. It is double track throughout with additional running lines on the approaches to Bristol, Taunton and Exeter. There is also a short loop line in and out of Weston Super Mare and loops at Yatton, Highbridge and Tiverton Junction where slower trains can be overtaken.

3.7.4 Once outside the approaches to Bristol and Exeter, where speed restrictions apply, the route has a line speed of 100mph with 110mph permitted for the seven miles between Uphill Junction where the loop line through Weston Super Mare rejoins the main route and Highbridge.

3.7.5 The route carries a mixture of both interregional express (Intercity), regional (limited stop) and local (all stations) passenger services operated by First Great Western (FGW) and interregional expresses operated by Arriva Cross Country. There are only a small number of freight services, particularly between Bristol and Cogload Junction.

ii. Minehead Branch of the West Somerset Railway

3.7.6 There is a 23 mile branch line which leaves the Bristol to Exeter route from Norton Fitzwarren Junction to the west of Taunton and runs north westwards to the coast at Minehead. The branch line is operated by the West Somerset Railway (WSR) who run a preserved or heritage style passenger rail service over the northern 19.5 miles of the branch between Bishops Lydeard and Minehead.

3.7.7 The branch line is single track with four passing loops at Bishops Lydeard, Crowcombe and Heathfield, Williton and Blue Anchor stations.

3.7.8 As a heritage railway line speed is normally limited to a maximum of 25mph. Lower local speed restrictions may also apply at stations and on the approach to the six open level crossings on the route. Journey times would also be extended by passing loops where single line tokens or train staffs are exchanged and trains may have to wait to pass trains running in the opposite direction.

b) Railway Stations

i. Bridgwater Station

3.7.9 The nearest railway station to the HPC development site and most of the associated development sites is at Bridgwater which is located 16km from the HPC development site.

3.7.10 Bridgwater railway station is located on the mainline rail network on the route between Bristol and Exeter. The route carries a mixture of both inter-regional express (Intercity), regional (limited stop) and local (all stations) passenger services. First Great Western and Cross Country provide services to and from Bridgwater.

3.7.11 **Table 3.12** summarises the existing frequency of rail services stopping at Bridgwater railway station.

Table 3.12: Existing Rail Timetable - Bridgwater

From	To	Weekday			Saturday Trains / Day	Sunday Trains / Day
		Trains / Hour	First Train	Last Train		
Bridgwater	Taunton	1	06:03	01:00	17	10
Taunton	Bridgwater	1	05:30	22:45	16	11
Bridgwater	Bristol	1	05:42	23:05	16	11
Bristol	Bridgwater	1	05:24	23:15	17	10
Bridgwater	Exeter	1	06:03	01:00	3	3
Bridgwater	Cardiff	3	06:14	23:24	13	0
Exeter	Bridgwater	1	05:58	21:12	2	4

3.7.12 Bridgwater station has two platforms which are accessed on foot via Wellington Road, Redgate Street and Clarks Road. The main entrance is located on Wellington Road and there is a taxi rank and bus stop located adjacent to the main entrance.

3.7.13 The station has a manned ticket office which is open Monday-Saturday 06:30-14:30. Toilet facilities are available within the ticket office. Outside of these times tickets can be purchased through the self service ticket machine located on Platform 2.

3.7.14 Both platforms are covered and have seating available. A vending machine is also available to purchase refreshments.

ii. Williton Station

3.7.15 The nearest railway station to the Williton site is Williton, which forms part of the West Somerset Railway, a heritage railway line. Williton station is located on Station Road, off the A39 to the east of Williton village centre. Trains run between Minehead and Bishops Lydeard, via Williton, daily during the late Spring and Summer and less frequently in the Winter months.

c) Rail Freight Facilities

3.7.16 The Network Rail Great Western Route Utilisation Strategy (RUS) indicates that there are existing freight terminals at Bridgwater for specialist freight and an aggregates terminal at Exeter. There is also a group of sidings at Fairwater Yard to the west of Taunton Station that is shown in rail atlases, but not listed as a freight terminal in the RUS. The West Somerset Railway has also been used recently to transport rock armour for strengthening coastal defences at Warren Point near Minehead.

3.7.17 The freight facilities at Bridgwater are just to the north of Bridgwater Station on the west (up) side of the running lines. They comprise a series of short sidings including a loop curving round to the west for 300m along the former route to Bridgwater Dock Basin. Two of the sidings enter a small (50 x 20m) fenced security compound where there is a 56 tonne capacity gantry crane over one track for transferring nuclear flasks between rail wagons and road vehicles. There are also three short sidings and one 350m long siding running parallel to the main line and into a warehouse yard.

3.7.18 Road access to the nuclear flask handling facility and the warehouse is from the corner of Bailey Avenue and Rosebery Avenue which are relatively narrow residential streets flanked with terraced housing many of which have front doors opening directly onto the pavement. A ‘tear drop’ access arrangement and two sets of gates allows road vehicles to drive through the flask handling compound without the need to reverse.

3.7.19 The aggregates terminal at Exeter is within Riverside Yard to the northwest of Exeter St. David’s station. There is road access via Waggoner’s Way from Station Road.

3.7.20 The sidings in Fairwater Yard in Taunton are currently used by Network Rail and their suppliers and contractors for holding rail mounted maintenance plant and engineering trains of civil engineering materials for internal use on the railway. The current yard layout is therefore suited to the storage of materials on rail wagons and does not appear to cater for the transfer of bulk materials between rail and road. The yard has good immediate road access via Silk Mills Road , but as the yard is situated to the west of Taunton all road traffic to the HPC development site would then have to pass through the town or use the route via the A358 and Williton.

3.7.21 Whilst a number of stations on the West Somerset line formerly had small goods yards there are no formal freight facilities at present and existing sidings are generally in use for other purposes. The recent deliveries of armour rock for coastal defence work at Warren Point near Minehead were therefore undertaken during the winter months between November 2010 and January 2011 on days when there were no scheduled passenger services on the line. It is reported that the deliveries were made to an unloading point on the running line just south of Minehead Station from where the rock was transported a short distance to the sea front by road. The rail wagons could therefore be unloaded while standing on the running line. The large armour rocks can typically be lifted out individually from the open rail wagons by an excavator fitted with a grab attachment so unloading operations do not adversely affect the track or require a substantial terminal facilities other than an adjacent hard standing or track for the transfer lorries. This option would not necessarily be suitable for other types of freight traffic or be available at other times of year.

3.8 Maritime

3.8.1 Combwich Wharf is located approximately 6.5km south-east of the HPC development site on the west bank of the River Parrett. It was constructed during the 1950's to support the construction of HPA and was later refurbished to support the construction of HPB. It was originally designed to accommodate a maximum gross load of 470 tonnes on a 14 axle girder trailer. The facility is currently used by National Grid and EDF Energy for the delivery of Abnormal Indivisible Loads (AILs).

4. POLICY CONTEXT

4.1 Introduction

4.1.1 This section summarises the relevant policy at a national, regional and local level.

4.1.2 The Overarching National Policy Statement (NPS) for Energy (NPS EN-1) (Ref. 4.1) when combined with the NPS for Nuclear Power Generation (NPS EN-6) (Ref. 4.2) provides the primary basis for decisions by the IPC on applications for nuclear power generation developments that fall within the scope of the NPSs.

4.1.3 Notwithstanding this, the IPC may consider other matters that are both important and relevant to its decision-making. This could include Planning Policy Statements (PPSs), Planning Policy Guidance Notes (PPGs), regional and local policy documents, although, if there is a conflict between these and the NPS, the NPS prevails for the purposes of IPC decision making.

4.1.4 Furthermore, the Planning Act 2008 provides that the IPC must, in making its decision on an application, have regard to any Local Impact Report (LIR) prepared by relevant local authorities. It is anticipated that the LIRs will rely in part on PPSs, PPGs, and regional and local policy to provide a context for their assessment. On this basis, regard has been given to these documents (where relevant to the technical assessment) since they are likely to inform the LIRs prepared by the relevant local authorities.

4.1.5 It is also noted that, on 25 July 2011, the Department for Communities and Local Government issued the consultation draft of the National Planning Policy Framework (NPPF) which is intended to replace PPSs, PPGs and some Circulars within a single consolidated document. This provides another reason to attach primary weight to the policies of the NPSs. The consultation period concludes on 17 October 2011 and it is expected that the final NPPF will be adopted in 2012. The draft NPPF (Ref. 4.3) sets out a presumption in favour of sustainable development, and the need to support economic growth through the planning system. The draft NPPF also states that Nationally Significant Infrastructure Projects (NSIPs) are determined by the decision-making framework set out in NPSs, which are part of the overall framework of planning policy (Paragraph 6). The weight to be attached to different policy documents is addressed in the Planning Statement. For the purposes of this Transport Assessment, however, greatest weight is attached to the tests and guidance set out in the NPSs. Other policy documents are reviewed, however, as they may be relied on by others, including the IPC.

a) National Policy

4.1.6 In July 2011, parliament adopted the Overarching National Policy Statement for Energy' (EN-1) (Ref. 4.1) which is the principal document for consideration of all new energy development and establishes the need for new energy infrastructure in the UK.

4.1.7 Paragraph 5.13.3 on Traffic and Transport Impacts sets out the requirement for a Transport Assessment in accordance with the NATA/WebTAG methodology stipulated in the Department for Transport's (DfT) 'Guidance on Transport

Assessment' (March 2007). Furthermore, clear direction is given on mitigation measures in paragraph 5.13.8 as follows:

"Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts."

4.1.8 Paragraph 5.13.10 states that:

"Water-borne or rail transport is preferred over road transport at all stages of the project, where cost-effective."

4.1.9 Managing travel demand in this context can be broadly defined as prioritising the use of alternatives to private car use and road borne freight movements.

4.1.10 When referring to transport impacts the policy states at paragraph 5.13.7:

"Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG Transport Assessment, with attribution of costs calculated in accordance with the Department for Transports guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure"

4.1.11 Paragraph 5.13.5 also introduces the possibility of cost sharing between the applicant and Government for any third party benefits i.e. where the improvements provided more than offset the impact of the proposal.

4.1.12 Therefore, the thrust of policy is that the applicant should take reasonable steps to provide mitigation so as to reduce impacts to an acceptable level, but that limited weight should be applied to residual impacts.

i. Draft National Planning Policy Framework (July 2011) (Ref. 4.3)

4.1.13 Within the Transport Chapter, at paragraph 86 the NPPF advises:

"All developments that generate significant amounts of movement, as determined by local criteria, should be supported by a Transport Statement or Transport Assessment. Planning policies and decisions should consider whether:

- *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *safe and suitable access to the site can be achieved for all people; and*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Subject to those considerations, development should not be prevented or refused on transport grounds unless the residual impacts of development are severe, and the need to encourage increased delivery of homes and sustainable economic development should be taken into account."*

ii. Planning Policy Statement 1: Delivering Sustainable Development (PPS1) 2005) (Ref. 4.4)

4.1.14 Planning Policy Statement 1 (PPS1) was published in January 2005 and sets out the Government's overarching planning policies on the delivery of sustainable development through the town and country planning system.

4.1.15 PPS1 includes a number of key principles relating to development plans including the formulation of an integrated approach to development and the formulation of access policies.

4.1.16 Paragraph 27 (Delivering Sustainable Development) sets out the general approach to delivering sustainable development. In preparing development plans, planning authorities should, amongst other things,:

> *"Provide improved access for all to jobs, health, education, shops, leisure and community facilities, open space, sport and recreation, by ensuring that new development is located where everyone can access services or facilities on foot, bicycle or public transport rather than having to rely on access by car, while recognising that this may be more difficult in rural areas."*

iii. Planning Policy Guidance 13: Transport (PPG13) (2011) (Ref. 4.5)

4.1.17 Originally published in March 2001 and revised in January 2011, Planning Policy Guidance 13 on Transport (PPG13) sets out the national context for planning for transport.

4.1.18 The objectives of PPG 13 are to integrate planning and transport at the national, regional, strategic and local level to:

- *"promote more sustainable transport choices for both people and for moving freight;*
- *promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling; and*
- *reduce the need to travel, especially by car."*

4.1.19 Paragraph 46 states:

> *"…Policies need to strike a balance between the interests of local residents and those of the wider community, including the need to protect the vitality of urban economies, local employment opportunities and the overall quality of life in towns and cities. Local authorities, freight operators, businesses and developers should work together, within the context of freight quality partnerships, to agree on lorry routes and loading and unloading facilities and on reducing vehicle emissions and vehicle and delivery noise levels, to enable a more efficient and sustainable approach to deliveries in such sensitive locations."*

4.1.20 Annex C of PPG13 relates to transport infrastructure. It states that care must be taken to minimise the environmental impact of any new transport infrastructure projects, including the impacts which may be caused during construction (paragraph C1). Annex C goes on to state that particular emphasis should be given to the need to explore a full range of alternative solutions to problems, including solutions other than road enhancement (paragraph C4).

4.1.21 In a number of locations the PPG advises on the preference for using rail or sea to transport bulk goods. For example, at paragraph 47, when discussing minerals, the PPG states "*Local authorities should seek to enable the carrying of materials by rail or water wherever possible…"*

b) National Guidance

i. Circular 2/07 - Planning and the Strategic Road Network (Ref. 4.6)

4.1.22 Circular 2/07 'Planning and the Strategic Road Network' published in 2007, details the Highways Agency's (HA) role and requirements in respect of the control of development in proximity to the Strategic Road Network (SRN), for which they are responsible. The Circular sets out:

- An approach adopted by the HA to encourage sustainable development while avoiding the potential for adverse effects on the SRN.
- A framework for collaborative working coordinating a number of organisations including Government Offices, regional and local planning authorities, local highway authorities, public transport providers and developers.
- How the HA will deal with planning applications. Although the Circular predates the Planning Act 2008, the collaborative approach which it advocates is firmly in line with the 'front loaded' approach to DCO applications.

4.1.23 The Circular draws on national policy and guidance and advocates the adoption of a demand management approach to development and promotes Travel Plans as an integral part of managing the capacity of the trunk road network.

ii. Department for Transport - Guidance on Transport Assessment (Ref. 4.7)

4.1.24 The DfT published its 'Guidance on Transport Assessment' (GTA) in March 2007. The guidance sets out the following principles:

- Reduce the need to travel, especially by car - thought should be given to reducing the need to travel; consider the types of uses (or mix of uses) and the scale of development in order to promote multi purpose or linked trips.
- Sustainable accessibility - promote accessibility by all modes of travel, in particular public transport, cycling and walking; assess the likely travel behaviour or travel pattern to and from the proposed site; and develop appropriate measures to influence travel behaviour.
- Mitigation measures - ensure as much as possible that the proposed mitigation measures avoid unnecessary physical improvements to highways and promote innovative and sustainable transport solutions.

iii. Highways Agency Protocol for Dealing with Planning Applications (Ref. 4.8)

4.1.25 The HA has produced a protocol to assist developers in working with them when submitting a planning application for a development which could have an impact on the SRN.

4.1.26 The section titled ‘Stage 2: Formal consultation by the Local Planning Authority’ states that:

“For developments generating more than 30 two-way trips to the network during any peak period, a Transport Assessment and Travel Plan *prepared in accordance with DfT and DCLG’s ‘Guidance on Transport Assessment’ and meeting the requirements of DfT Circular 02/2007.”*

4.1.27 This section also sets out the process that the HA requires regarding the consideration of mitigation measures:

- All reasonable steps shall be taken to minimise the level of physical mitigation required, through the use of measures such as Travel Plans, development phasing, heavy goods vehicle booking systems and encouraging flexible working.
- Physical measures on the local road network to minimise the impact on the strategic road network shall be utilised as far as is reasonably possible.
- Once all reasonable minimisation and off-network mitigation has been implemented, the HA will consider capacity improvements on the strategic road network. The HA will not accept local capacity improvements where they would overload the wider network.

4.2 Regional Planning Policy

4.2.1 On 27 May 2010 the Secretary of State advised of the Government's intention to abolish regional planning policy and that this should be a material consideration in planning decisions. On 6 July 2010 the Secretary of State for Communities and Local Government revoked all Regional Strategies with immediate effect under Section 79(6) of the Local Democracy, Economic Development and Construction Act 2009. This includes Regional Planning Guidance for the South West (RPG10). However, following the High Court judgement on 10 November 2010 in a case brought by Cala Homes the Secretary of State’s decision to revoke Regional Strategies was quashed.

4.2.2 As a result, on that same date, the Government wrote to the Chief Planning Officer to reiterate the Government’s intention to abolish Regional Strategies through the Localism Bill.

4.2.3 This letter was also challenged on the grounds that the Government’s intended revocation of Regional Strategies (including any Saved Structure Plan Policies) by the promotion of legislation for that purposes in the forthcoming Localism Bill was immaterial to the determination of planning applications and appeals prior to the revocation of Regional Strategies.

4.2.4 However, on 7 February 2011, the High Court held that the Government’s advice to local authorities that the proposed revocation of regional strategies was to be regarded as a material consideration in their planning development control decisions should stand. The decision of the High Court was upheld by the Court of Appeal on 27 May 2011. The Court of Appeal clarified that it would be unlawful to have regard to the Government’s intention to abolish regional strategies in the preparation and examination of Development Plan Documents. Therefore, the regional strategies remain in place, but in the case of a development control decision it is for planning decision makers to decide on the weight to attach to the strategies taking into account, as a material consideration, the Government's stated intention to revoke them.

a) Regional Planning Guidance 10 for the South West 2001 – 2016 (RPG10) (2001) (Ref. 4.9)

4.2.5 Regional Planning Guidance for the South West (RPG10) sets out a broad strategy for the South West up to 2016.

4.2.6 Section 8 relates specifically to Transport and sets out the Regional transport strategy (RTS). The role of the RTS is to support the spatial strategy, to provide the strategic transport framework for the Local Transport Plans (LTPs) and development plans and to provide a framework for the investment and operational plans for relevant transport agencies/operators.

4.2.7 The RTS has five key objectives:

- *"to support the spatial strategy of RPG and to service existing and new development efficiently and in an integrated fashion;*
- *to reduce the impact of transport on the environment, by reducing the need to travel, encouraging travel by more sustainable means (especially by walking and cycling) and locating development at accessible locations, particularly by public transport; and to achieve environmental improvements by directing investment to those locations where infrastructure is required to offset the damaging effects arising from the impacts of traffic and transport;*
- *to secure improved accessibility to work, shopping, leisure and services by public transport, walking and cycling;*
- *to create a modern, efficient and integrated transport system that will meet the demands of a dynamic regional economy, help overcome regional peripherality and meet all travel needs; and*
- *to ensure the safe use of regional transport network and its associated facilities." (Page 83).*

4.2.8 Policy TRAN 1 (Reducing the Need to Travel) states that local authorities, developers and other agencies should work towards reducing the need to travel by private motor vehicle through the appropriate location of new development.

4.2.9 Policy TRAN 6 (Movement of Goods) states that local authorities, the business community, transport operators and other agencies should work together to achieve more sustainable patterns of distribution. Amongst other things, they should aim to locate major freight generating development close to the regional rail and road networks.

4.2.10 Policy TRAN10 (Walking, Cycling and Public Transport) states that:

"Local authorities, transport operators and other agencies should aim to increase the share of total travel by these modes and ensure that they provide attractive and reliable alternatives to the private car by:

- *seeking Transport Assessments and* Travel Plan***s*** *for all new major developments and encouraging major organisations to prepare and* *implement such plans, having regard to sustainable transport objectives set by local authorities in the local transport plan; and*

- *ensuring that major new development delivers (or sets out a clear and realistic strategy to deliver) a realistic choice of access by public transport, walking and cycling."*

b) The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of 'States Proposed Changes 2008 – 2026 (July 2008) (Ref. 4.10)

4.2.11 The Draft Regional Spatial Strategy (RSS) for the South West (2006-2026) was published by the South West Regional Assembly in 2006. In 2008 the Secretary of State published proposed changes to the draft RSS for further consultation.

4.2.12 If adopted, this document would replace the existing RTS, published in RPG10. Chapter 5 sets out the strategy's regional approach to transport. The main aim of the RTS is to support the RSS and reduce the rate of road traffic growth by:

- *"supporting economic development (identified in the RES) by maintaining and improving the reliability and resilience of links from the region's Strategically Significant Cities and Towns (SSCTs) to other regions, international markets and connectivity within the region;*
- *addressing social exclusion by improving accessibility to jobs and services;*
- *making urban areas work effectively and creating attractive places to live by developing the transport network in support of the strategy to concentrate growth and development in the SSCTs; and*
- *reducing negative impacts of transport on the environment including climate change." (Page 139).*

4.2.13 Policy RTS1 (Corridor Management) states that, in order to improve the reliability and resilience of journey times, to develop opportunities to facilitate a modal shift and support growth at the Strategically Significant Cities and Towns (SSCTs), which include Bridgwater and Taunton, provision will be made to manage the demand for long distance journeys and reduce the impacts of local trips on corridors of national and regional importance.

4.2.14 Policy RTS2 (Demand Management and Sustainable Travel Measures at the SSCTs) states that demand management measures should be introduced progressively at the SSCTs to reduce the growth of road traffic levels and congestion. This should be accompanied by a 'step change' in the prioritisation of sustainable travel measures serving these places.

4.2.15 Policy RTS3 (Parking) states that parking measures should be implemented to reduce reliance on the car and encourage the use of sustainable transport modes.

c) Somerset and Exmoor National Park Joint Structure Plan Review 1991 - 2011 (2000) (Policies 'saved' from 27th September 2007) (Ref. 4.11)

4.2.16 The Somerset and Exmoor National Park Joint Structure Plan was adopted in 2000 with relevant policies saved from 27 September 2007. All policies have been saved with the exception of Policy 53 which related to the Department of the Environment, Transport and the Regions Road Schemes. The Plan provides a strategic base for all land use planning within the plan area for the period up to 2011.

4.2.17 The Structure Plan sets out a preferred strategy for development which includes the encouragement of a balanced and integrated transport system which emphasises alternatives to the private car, where practical (paragraph 3.8).

4.2.18 Policy STR1 (Sustainable Development) states that development should, amongst other things, develop a pattern of land use and transport which minimises the length of journeys and the need to travel and maximises the potential for the use of public transport, cycling and walking; and conserve biodiversity and environmental assets, particularly nationally and internationally designated areas.

4.2.19 Policy 39 (Transport and Development) states that proposals for development should be considered having regard to:

- the management of demand for transport;
- achieving a shift in transport modes to alternatives to the private car and lorry wherever possible; and
- the need for improvements to transport infrastructure.

4.2.20 Policy 45 (Bus) states that facilities for buses should be improved. This should include measures to give priority to buses and to introduce park and ride systems where these are the most sustainable option.

4.2.21 Policy 48 (Access and Parking) states that developments which generate significant transport movements should be located where provision may be made for access by walking, cycling and public transport. The level of parking provision in settlements should reflect their functions, the potential for the use of alternatives to the private car and the need to prevent harmful competitive provision of parking. The level of car parking provision associated with new development should first take account of the potential for access and provide for alternatives to the private car, and then, should be no more than is necessary to enable development to proceed.

4.2.22 Policy 49 (Transport Requirements of New Development) states that proposals for development should be compatible with the existing transport infrastructure, or, if not, provision should be made for improvements to infrastructure to enable development to proceed. In particular development should:

- provide access for pedestrians, people with disabilities, cyclists and public transport;
- provide safe access to roads of adequate standard within the route hierarchy and, unless the special need for and benefit of a particular development would warrant an exception, not derive access directly from a National Primary or County Route; and
- in the case of development that will generate significant freight traffic, be located close to rail facilities and/or National Primary Routes or suitable County Routes subject to satisfying other Structure Plan policy requirements.

4.2.23 Policy 50 (Traffic Management) states that traffic management schemes which improve safety, travel conditions and the environment should be implemented to make the best possible use of the highway network. Such schemes should remove or reduce heavy or unnecessary vehicles from settlements or sensitive environments and improve conditions for pedestrians, cyclists and public transport users.

4.2.24 Policy 52 (Freight Traffic (Lorries in the Environment)) states that traffic, and particularly lorries, should be encouraged to use National Primary Routes wherever possible through appropriate measures such as positive signing and by discouraging the use of unsuitable roads through traffic management schemes.

4.2.25 Policy 54 (Transport Proposals and the Environment) states that new transport proposals and improvements, particularly road schemes must take into account the need to: minimise the impact of proposals through mitigation and compensation measures; improve or conserve the natural and built environment; avoid the risk of pollution to the water environment, including water resources; minimise the consumption of resources both in construction and operation; and, minimise conflict with adjoining land uses.

4.2.26 Policy 58 (Ports and Wharves) states that existing port and wharf facilities should be safeguarded from development which would prejudice their potential in the transport network. Any proposals for new facilities should be within or related to settlements.

4.3 Local Policy and Guidance

a) Local Policy

i. West Somerset Council Local Plan (2006) (Policies 'saved' from 17 April 2009) (Ref. 4.12)

4.3.1 The West Somerset Local Plan forms part of the development plan for West Somerset. The Local Plan was adopted in 2006 (with relevant policies ‘saved’ from 17 April 2009). The key transport objectives of the West Somerset Local Plan are not saved as they are not policies , but were as follows:

- reduce the need to travel and the distances travelled;
- promote the best use of public transport routes and nodes, especially for journeys to work;
- reduce environmental damage and promote environmental improvement by traffic management and calming measures, particularly in town and village centres;
- promote the development of safe and convenient routes for cyclists and pedestrians;
- ensure that new development proposals have appropriate access to public transport services; and
- safeguard the implementation of major highway schemes in the Structure Plan.

4.3.2 Policy T/3 (Transport Requirements of New Development) states that:

> *“New roads and improvement schemes should be designed to minimise their environmental impact. As far as the Local Planning Authority’s powers permit, planning permission will only be permitted where the proposal:*

i) is of a design which both minimises the environmental impact and also the risk of accidents.

ii) has no adverse effects on the character of sensitive or distinctive landscapes, townscapes and areas of acknowledged historic or wildlife interest.

iii) uses materials and street furniture sympathetic to the locality.

iv) includes indigenous landscaping schemes to integrate into the surrounding area.

v) makes appropriate provision for pedestrians, cyclists the mobility impaired and for access to public transport.

vi) minimises the impact on the environment through mitigation and compensation measures where necessary; and

vii) conforms to national and county council design standards."

4.3.3 Policy T/7 (Non-Residential Development Car Parking) states that:

"Car parking at non-residential development shall be provided on the following basis:

i) Operational parking will be kept to the minimum necessary:

ii) Non-operational parking will be set at a maximum of the level shown in Appendix 4, Table 3, reduced according to the availability of public transport and facilities for walking and cycling, as shown in Appendix 4, Tables 1 and 2; and

iii) Where reduction in vehicle parking is appropriate, contributions will be sought for alternative modes of transport required to serve the development."

4.3.4 Policy T/9 (Existing Footpaths) states that:

"Any development affecting an existing footpath will be required to incorporate the footpath into its design. Care should be taken to ensure that the footpath is attractive to users and safe."

ii. West Somerset District Local Development Framework (LDF) Core Strategy (Options Paper) (January 2010) (Ref. 4.13)

4.3.5 In accordance with the Planning and Compulsory Purchase Act 2004, West Somerset Council is in the process of producing its LDF, which, once adopted, will replace the Local Plan.

4.3.6 In January 2010, WSC published its Core Strategy Options Paper which is a material consideration for determining planning applications, although the weight attached to this document will be limited, given that it is at a relatively early stage of preparation.

4.3.7 The Options Paper does not include any specific policies relating to transport. The paper does however identify the types of policy that WSC considers could be included in the Core Strategy. In relation to transport, these are as follows:

- *"Reduce the threshold for Travel Plans to require them for medium sized as well as large development.*
- *Require contributions from new development to improve cycling and walking infrastructure.*
- *Locate new developments likely to give rise to significant numbers of trips in locations which are served by a range of modes of transport.*
- *Explore the opportunity offered by the West Somerset Railway to connect sites within the District to the national rail network for freight traffic.*
- *Examine the potential for a commuter train service to be offered using the West Somerset Railway.*
- *Any new major development to be of an appropriate mix of uses and facilities to offer the opportunity to reduce transport demand."*

iii. Sedgemoor District Local Plan 1991 - 2011 (2004) (Policies 'saved' from 27 September 2007) (Ref. 4.14)

4.3.8 The Sedgemoor District Local Plan forms part of the Development Plan for Sedgemoor. The Local Plan was adopted in 2004 (with relevant policies 'saved' from 27 September 2007). The Transport and Movement chapter of the Local Plan states that an efficient transport system is vital to the economic and social well being of the District. It explains that policy on transport and movement will therefore support the Local Plan's strategy of balance between sustainability and controlled economic growth (paragraph 7.01).

4.3.9 Paragraph 7.05 states that the vision of the Local Plan is for an efficient, high quality and sustainable transport system, accessible to all sections of the community. This will be achieved by maintaining and improving transport infrastructure while reducing dependence on the private car.

4.3.10 Policy TM1 (Safe and Sustainable Transport) states:

"a) *development will not be permitted which would prejudice the construction of cycle and pedestrian routes and bus lanes defined on the Proposals Map, unless suitable alternative routes are provided by the developer;*

b) *development will not be permitted which would reduce the convenience and safety of existing rights-of-way, bridle paths and cycle paths unless suitable alternative routes are provided by the developer;*

c) *development will only be permitted if the design makes adequate and safe provision for access by foot, cycle, public transport and vehicles so long as it's appropriate to the scale of the development and in accordance with National and County Council design standards and Somerset County Council's Highway hierarchy;*

d) *the Developer shall provide the transport infrastructure required by the development to an agreed phased programme. Where off-site works are required, these shall be appropriate to the scale and nature of the development and shall be funded by the developer; and*

e) *development will not be permitted for proposals which would have a significant impact on the highway network without the prior submission of a Traffic Impact Assessment."*

4.3.11 The Local Plan states that current government guidance stresses the need to consider alternatives to building new roads. Proposals for construction of major new highways must therefore, meet the most rigorous levels of justification (paragraph 7.11).

iv. Sedgemoor Local Development Framework (LDF) Core Strategy (Proposed Submission) (September 2010) (Ref. 4.15)

4.3.12 The Sedgemoor LDF Core Strategy (Proposed Submission) was consulted on from September to November 2010. An addendum to the Core Strategy was subject to a further consultation from 23 November 2010 until 18 January 2011. Changes prior to submission, proposed as a result of the consultation process were reported and endorsed by SDC's Executive Committee on 9 February 2011. The Core Strategy Proposed Submission was submitted to the Secretary of State on 3 March 2011 and an Examination in Public (EiP) was held in May 2011. Once adopted, the Core Strategy will form part of the Development Plan for Sedgemoor.

4.3.13 EDF Energy submitted representations objecting to the Core Strategy (Proposed Submission), relating to Chapter 4 'Major Infrastructure Projects' (and policies MIP1, MIP2 and MIP3 contained in that chapter) and those sections relating to housing and Hinkley Point. EDF Energy also participated at the relevant EiP hearings.

4.3.14 At the close of the hearing sessions on 26 May 2011, the Inspector agreed with SDC and EDF Energy that, in an attempt to reach agreement on the disputed Chapter 4, SDC would re-draft Chapter 4 and EDF Energy would have the opportunity to respond. The position of both parties in relation to the re-drafted Chapter 4 was set out in correspondence between SDC, EDF Energy and the Inspector. As a result of the correspondence invited by the Inspector, SDC has agreed to further changes to the Core Strategy which make clear that the Core Strategy does not set any policies, tests or requirements for the IPC to apply in deciding whether any element of the development comprised in an application for development consent is acceptable, nor the basis on which any such application should be approved. Instead, the chapter is to set out those matters which SDC may take into account in preparing its LIR for the Hinkley Point C DCO application. These, therefore, represent aspirations of the Council, rather than formal planning policy for the Hinkley Point C DCO application. This status has now been confirmed in the Inspector's report on the examination of the Core Strategy, which was published on 27 September 2011.

4.3.15 Emerging policies MIP1, MIP2 and MIP3 relate specifically to the HPC Project, as set out in the re-drafted Chapter 4 (dated 29 July 2011):

4.3.16 Policy MIP1 (Major Infrastructure Proposals) explains that applications for major infrastructure development will be considered against the relevant national planning policy and the strategy and relevant policies of the development plan. The objective from the Council's perspective is that major infrastructure proposals should, where possible, contribute positively to the implementation of the spatial strategy and meet the underlying objectives of it.

4.3.17 Policy MIP2 (Hinkley Point C Associated and Ancillary Development) sets out the considerations that the Council will take into account in the preparation of a LIR in responding to proposals for development associated with, or ancillary or related to the HPC Project, where they are not the determining authority. Such considerations include: measures to avoid, minimise and then mitigate adverse impacts on the transport network; highway safety for all users should be maintained and where possible improved; investments that encourage travel by public transport, walking and cycling; and the delivery of investment in infrastructure, buildings and green infrastructure.

4.3.18 Policy MIP3 (Hinkley Point C: Planning Obligations and Mitigation) states that the Council will seek to ensure, wherever possible, that the proposals avoid, minimise and mitigate (including, where appropriate, compensate for) impacts during the construction, operation, decommissioning, and restoration phases.

4.3.19 In addition, the following emerging policies contained in the Core Strategy (Proposed Submission) are considered to be of potential relevance:

4.3.20 Policy S1 (Spatial Strategy for Sedgemoor) states that development proposals will be expected to support the delivery of required infrastructure, including such things as transport infrastructure.

4.3.21 Policy S2 (Infrastructure Delivery) states that all new development that generates a demand for infrastructure will only be permitted if the necessary on and off-site infrastructure required to support and mitigate the impact of the development site is either already in place or there is a reliable mechanism in place to ensure that it will be delivered at the time and in the location it is required.

4.3.22 Policy S3 (Sustainable Development Principles) states that development proposals will be expected to, amongst other things, be located to minimise the need to travel and to encourage any journeys that remain necessary to be possible by alternative modes of travel including maximising opportunities for walking, cycling and the use of public transport.

4.3.23 Policy S4 (Mitigating the Causes and Adapting to the Effects of Climate Change) states that development should mitigate the cause of climate change through, amongst other things, ensuring development encourages modes of transport other than the car.

4.3.24 Policy D2 (Promoting High Quality and Inclusive Design) states, amongst other things, that development will need to demonstrate that it is accessible to all potential users using a range of transport modes, be integrated into existing patterns of movement and be permeable. Its design should create good connections to wider areas with a clear network of routes for walking and cycling.

4.3.25 Policy D9 (Sustainable Transport and Movement) states, amongst other things, that travel management schemes and development proposals that reduce congestion, encourage an improved and integrated transport network and allow for a wide choice of modes of transport as a means of access to jobs, homes, leisure and recreation, services and facilities will be encouraged and supported.

4.3.26 Policy D10 (Managing the Transport Impacts of Development) states that development proposals that will have a significant transport impact should, amongst other things: be supported by an appropriate Transport Assessment and Travel Plan; ensure inclusive, safe and convenient access for all; provide safe access to roads; ensure that the expected nature and volume of traffic and parked vehicles generated would not compromise road safety and/ or function; comprehensively address the transport impact of development and appropriately contribute to the delivery of necessary transport infrastructure; not prejudice safeguarded transport infrastructure; and enhance and develop rights-of way.

b) Other Local Documents

i. Hinkley Point C Project Supplementary Planning Document Consultation Draft (February 2011) (Ref. 4.16)

4.3.27 SDC and West Somerset Council (WSC) have jointly prepared draft supplementary planning guidance in relation to the HPC Project. Public consultation on the Consultation Draft version of the Hinkley Point C Project Supplementary Planning Document ("the draft HPC SPD") commenced on 1 March 2011 and concluded on 12 April 2011. EDF Energy has submitted representations which object to the draft HPC SPD.

4.3.28 Following the Sedgemoor Core Strategy EiP and subsequent correspondence with the Inspector, it is clear that the SPD cannot set tests, policies or requirements for the IPC to apply to the consideration of the Hinkley Point C project. If the Councils continue with the SPD preparation, its text will need to be considered in this light and it could not carry any weight in the determination of the DCO application. As it may be relied upon by some stakeholders, however, the principal contents of the draft SPD as it relates to the site are summarised below. In relation to transport, Box 8 of the draft HPC SPD states that the County Council and District Councils will expect the HPC Project promoter to:

- *"Align the Transport/Freight Strategy with other Council plans and strategies. The transport proposals for the HPC Project during both the construction and operational phases of the power station should integrate with and contribute to the delivery of the approved transport strategies as set out in the Somerset Future Transport Plan and associated transport policies and implementation plan, the Bridgwater, Taunton and Wellington Future transport strategy, the Bridgwater Vision, Western Somerset Economic Development and Access Strategy and emerging Williton masterplan.*
- *Minimise the volume of road traffic associated with the development of the new power station at all times, but especially during peak hours and during the peak tourism season between the months of June, July and August. The efficient and safe functioning of key routes, including the M5, A38, A361, A370, A371 and A372 must be protected.*
- *Maximise the safe, efficient and sustainable movement of people and materials required for the proposed nuclear power station.*

- *Provide transport mitigation where additional traffic flows of the project exacerbate or cause highway congestion problems.*
- *Any new highway proposals are to be justified by a full New Approach to Appraisal (NATA) assessment. Appraisals should address potential impacts raised during consultation, such as the potential severance effect to Brymore School of the western by-pass option at Cannington.*
- *All proposed highway works are to be the subject of a full operational analysis and a road safety audit in accordance with then current guidance.*
- *Provide sustainable transport solutions for access to the site that workers and visitors will be required to use. This should include provision of public transport priority measures in the form of bus lanes and other bus priority measures on key routes from associated development sites to the HPC development site for construction and other vehicles, providing a beneficial transport legacy.*
- *Provide sustainable transport linkages to and from all associated development sites to provide access to employment, education, retail, leisure and healthcare facilities.*
- *Ensure the number of parking spaces provided at or near to the site during the construction phase is as close as possible to zero.*
- *Enable effective controls to be put in place to ensure workers and visitors do not park in inappropriate locations.*
- *Ensure as much construction material as possible is delivered by sea.*
- *Minimise the amount of waste materials, including topsoil, transported off-site.*
- *Provide necessary improvements to the transport network to mitigate against any adverse impacts on the community; including, but not limited to congestion, air quality and road safety impacts. For example, include safety improvements where the additional traffic flows of the project exacerbate existing road safety problems.*
- *Minimise traffic disruption both for the local community and visitors to the area.*
- *Control and manage the flow of any road freight movement associated with the development in order to ensure appropriate routes are used, avoid peak hour movement and to respond to incidents on the transport network.*
- *Agree and enable deployment of robust plans for managing unforeseen incidents on the transport network, including, but not limited to traffic management plans, diversionary routes and freight/ delivery management systems.*
- *Provide long-term, sustainable legacy benefits for the local community.*
- *Protect the natural and built environment and ensure the image of the area is not adversely affected.*

- *Ensure that public transport services are protected throughout the construction, operation and decommissioning of the Hinkley Point nuclear power stations.*
- *Ensure that the needs of cyclists and pedestrians are protected and enhanced throughout the construction and operation of the proposed nuclear power station. This should include enhanced pedestrian and cycle facilities from associated development sites to the centres of nearby towns and villages, including provision of the Bristol Road/Bath Road link and rail crossing in Bridgwater.*
- *Protect current Public Rights of Way (PRoW) in and around Hinkley Point and associated development sites, and where stop-ups are required, ensure that PRoW are implemented that do not result in significant diversion lengths.*
- *Develop and implement Travel Plans for the proposed power station and associated development that will be monitored during construction and operation of Hinkley Point C.*
- *Monitor all movement associated with the development to ensure agreed mode share targets and thresholds for traffic congestion, air quality and road safety are achieved during construction and operation.*
- *Fully mitigate against and compensate for the adverse environmental impact of development related traffic. This should involve providing sufficient funds through appropriate legal agreements to enable the relevant authorities and agencies to implement further mitigation measures should any unforeseen impacts occur during the construction of the development."*

ii. Somerset Future Transport Plan (Ref. 4.17)

4.3.29 Somerset's Future Transport Plan 2011 – 2026 (FTP) replaced Somerset County Council's (SCC) Second Local Transport Plan (LTP2) in April 2011 and sets out a long-term strategy for helping to deliver transport priorities up until 2026.

4.3.30 The FTP contains the following statements:

- *"Help communities help themselves with regard to transport improvements.*
- *Assisting people to make smarter travel choices.*
- *Assisting people in being more active by providing more opportunities to travel in a healthy way.*
- *Manage the effect transport-related noise has on communities.*
- *Work with developers to ensure they take in to account the way people travel, and how people travel to access services.*
- *We will help hauliers choose the most appropriate routes and work to improve communication between communities and the hauliers that serve them.*
- *Encourage people to cycle and make more trips on foot."*

4.3.31 This demonstrates that local transport policy supports the provision of sustainable travel measures above new road building and capacity improvements.

iii. Technical Note 4 – Somerset County Council Transport Policies: Transport and Development (Ref. 4.18)

4.3.32 The 'Technical Note 4 – Somerset County Council Transport Policies: Transport and Development – March 2010' document is a supporting Technical Document to the FTP.

4.3.33 Section 3 of the policy relates to Assessing Transport Impacts of Development.

4.3.34 Paragraph 3.19 states that:

"The Council will agree a suitable approach to determining the level of impact depending on the location and scale of the proposed development. In the main urban areas of Taunton, Bridgwater and Yeovil strategic traffic models are available and should be used in the first instance to identify potential development impacts. A useful starting point is to identify those junctions where the development traffic increases the modelled queue length by 5 or more vehicles on one or more arms of the junction. More detailed investigations into the impact of development traffic at these locations should then be undertaken using appropriate junction modelling tools. It should be noted that this is only a guideline value and the Case Officer may identify other junctions where detailed assessments will be required on a case–by-case basis."

4.3.35 Paragraph 3.21 states that:

"Once detailed investigations into the impact of development traffic have been undertaken at agreed locations, the Council will consider whether measures are required to mitigate the impacts of the development. In considering the assessment and subsequent mitigation, the Council will seek to achieve the following outcomes and will agree on a case by case basis how these will be assessed by the developer:

- *nil-detriment to junction capacity and delay from development traffic where junctions currently operate at greater than 85% ratio of flow to capacity (RFC) for non-signalised junctions, or 90% for signalised junctions;*
- *nil-detriment from development traffic on links where capacity is currently at 90% or more;*
- *nil-detriment to journey times for traffic on agreed routes;*
- *nil-detriment to journey times for public transport, walking or cycling;*
- *nil-detriment to accident rates at clusters along key routes; and*
- *agreed mode share targets for development related trips where Travel Plans are required (see Section 3.4)."*

4.3.36 Section 6 of this policy relates specifically to the proposed development at Hinkley. SCC should not seek to develop new planning policies to test a nationally significant infrastructure project (NSIP). NSIPs are subject to their own planning regime set out in the Planning Act 2008 and the primary consideration for NSIPs is the policy to be set out in the Energy and Nuclear National Policy Statement (NPS), in respect of both the HPC development site and the associated development.

4.3.37 Policy HIN 1: Transport requirements for new nuclear development states that Council will require the developer of new nuclear power stations in Somerset to:

- *"Minimise the volume of road traffic associated with the development of the new power station especially at peak hours.*
- *Provide sustainable transport solutions for access to the site that workers and visitors will be required to use.*
- *Provide sustainable transport linkages to and from all associated development sites.*
- *Ensure as close as possible to zero parking spaces are provided at or near to the site during the construction phase.*
- *Enable effective controls to be put in place to ensure workers and visitors do not park in inappropriate locations.*
- *Ensure as much construction material as possible is delivered by sea.*
- *Minimise the amount of waste materials transported off-site.*
- *Provide necessary improvements to the transport network to mitigate against any adverse impacts on the community; including, but not limited to congestion, air quality and road safety impacts.*
- *Minimise disruption both for the local community and visitors to the area.*
- *Control and manage the flow of any road freight movement associated with the development in order to ensure appropriate routes are used, avoid peak hour movement and to respond to incidents on the transport network.*
- *Agree and enable deployment of robust plans for managing unforeseen incidents on the transport network; including, but not limited to traffic management plans, diversionary routes and freight/delivery management systems.*
- *Provide long-term, sustainable legacy benefits for the local community.*
- *Protect the natural and built environment and ensure the image of the area is not adversely affected.*
- *Monitor all movement associated with the development to ensure agreed mode share targets and thresholds for traffic congestion, air quality and road safety are achieved during construction and operation.*
- *Provide sufficient funds through appropriate legal agreements to enable the relevant authorities and agencies to implement further mitigation measures should any unforeseen impacts occur during the construction of the development."*

4.3.38 Policy HIN 2 sets out the 'Requirement for an Evidence Based Approach' as follows:

"An evidence-based approach will be taken to determine the effectiveness of the proposed transport interventions for the implementation of the HPC transport/freight strategy. We will require the HPC Project promoter to adhere to performance criteria in relation to key parts of the transport network. It should be noted that as such, a transport strategy *package of measures will be expected to meet this approach, which would include:*

- *Highway improvements, including junction improvements and more strategic network improvements identified through the Transport Assessment process and associated evidence base.*
- *Public transport provision, including waiting facilities, support for existing and additional services, and priority measures that will ensure public transport journey time reliability.*
- *Intelligent Transport Systems (ITS) to promote and support the use of public transport facilities.*
- *Road Safety Improvements.*
- *Infrastructure needs associated with deploying a Traffic Management Plan.*
- *Pedestrian and cyclist facilities, including those which support the use of public transport and support the provision of a high quality public realm.*
- *Motorcycle parking.*
- *Park and ride facilities if demonstrated as necessary.*
- *Car parking management for the site, associated development and residential areas, including clearway provision.*
- *Coach and rail facilities.*
- *Provision and management of water-borne transport.*
- *Highways and bridge strengthening measures.*
- *Transport maintenance packages.*
- *Transport monitoring strategy to assess effectiveness of measures and identify further mitigation, where necessary."*

4.3.39 Policy HIN 3 summarises SCC's requirements for the 'Evidence for the Development Consent Application' as follows:

"Prior to the Development Consent Application to the IPC the Council will require the following evidence to be in place to enable the robust development of a Statement of Common Ground and a Local Impact Report:

- *A Transport Assessment to cover the construction and operation of the site and associated developments, including an assessment of the required access arrangements, likely impacts, appropriate mitigation and improvements to the transport system with completed technical audits.*
- *A transport strategy and associated evidential base for managing freight waste and people movements associated with the construction of the development.*
- *A Travel Plan for the construction phase; including mode share targets for access to and from the HPC development site and each associated development site.*
- *Directly linked to parking standards, provision of access infrastructure, provision of sustainable transport linkages and design of development layouts.*

- *Full Transport Assessments and Travel Plans for any other significant related development proposals that emerge such as induction facilities.*
- *A Travel Plan to manage access to the development in its operational phase.*
- *A Visitor Management Plan to manage visitor access to the site and maximise access by sustainable transport.*
- *Traffic Management Plans to manage unforeseen incidents on the transport network.*
- *Construction Management Plan for HGV and construction worker movements.*
- *Agreed monitoring, control and enforcement proposals for all aspects of movement."*

4.3.40 Finally, Policy HIN 4 summarises SCC's requirements for 'Arrangements Prior to Commencement of Construction' as follows:

"Prior to commencement of construction the Council will require the following to be agreed with the relevant authorities and agencies:

- *Site-specific Travel Plans for each associated development site.*
- *Final detailed freight management plans based on actual materials sourcing.*
- *Final detailed waste management plans.*
- *Implementation of agreed access arrangements and necessary controls.*
- *Implementation of an agreed transport mitigation package.*
- *Implementation of visitor management, traffic management, monitoring and enforcement arrangements.*
- *Any required financial contributions."*

iv. Bridgwater Vision (Ref. 4.19)

4.3.41 Whilst not forming part of the statutory development plan for Sedgemoor, the Bridgwater Vision (2009) sets out a regeneration framework for Bridgwater, comprising a 50 year vision and seven transformational themes for the town.

4.3.42 The document makes specific reference to Hinkley Point as a strategic project and acknowledges the opportunities and challenges such development will have on the area.

4.3.43 Bridgwater's overall vision is encapsulated in Vision V1, which states:

"In 2060 Bridgwater will be an energy conscious town known for its ambitious approach to sustainability and low carbon living. Bridgwater will be seen as a place that has been re-energised into a confident town through its strong, innovative architecture, its vibrant town centre and its revitalised neighbourhoods – encouraging a greater sense of local community, wellbeing and civic pride.

Bridgwater will have a reputation for successful, coordinated delivery of its ambitious place shaping programme. The town's people, businesses and agencies will continue to work in partnership to improve housing and transport, deliver its flooding solution; the Parrett barrier and provide outstanding health and recreation facilities. Bridgwater will continue to attract new investment, maintaining its new position as a regional centre of enterprise excellence. Its highly skilled workforce will be utilised by the many cutting edge employers in the town, encouraged by the focus on innovation and knowledge, offering quality job opportunities and training in new and emerging sectors."

4.3.44 Theme 5 of the Vision is 'An accessible and well connected Bridgwater'. The document explains that:

"This theme promotes measures to control traffic growth through improvements to public transport, improved facilities for pedestrians and cyclists, and creating better links to the wider network including Hinkley Point..." (page 38).

4.3.45 Section 4 (A New Direction for Bridgwater) gives further consideration to Hinkley Point:

"The planned construction of a new nuclear power station will not only bring many jobs, but also will require local businesses to improve their skills in order to prepare for future bidding, which in its own turn should contribute to the development of a knowledge economy.

It will also be essential to evaluate the environmental impact of proposals and the impact on local communities, both in construction and post construction. This may include for example, noise and disturbance from traffic and construction, the impact of abnormal loads, and the possible development of Combwich Wharf. It will also be important to assess the impact of the proposals on strong existing economic sectors such as tourism, where compensatory mitigation may be required to support the sector." (page 44)

4.3.46 The Strategic Spatial Diagram (pages 60-61) within the document identifies a potential new link road between Dunball roundabout and Hinkley Point.

4.3.47 The potential for road improvements to Hinkley from Junction 23 of the M5 motorway is identified as an opportunity, which may require a new link road running from the Dunball roundabout travelling west across the River Parrett towards Hinkley (page 106). The design principles for this include:

"Dunball roundabout provides a key gateway into the town from Junction 23 of the M5 motorway and potentially to Hinkley Point through a possible new link road.

The area will incorporate a possible new link road from the Dunball roundabout across the River Parrett connecting Hinkley Point to Junction 23 of the M5 motorway…"

4.3.48 The transport related design principles for the North Bridgwater character area (within which the Junction 23 associated development is located) are set out in the Vision as follows:

- Dunball roundabout provides a key gateway into the town from Junction 23 of the M5 motorway and potentially to Hinkley Point through a possible new link road.
- Bristol Road will be part of the key public transport corridor providing high frequency bus connections to the town centre from a sequence of bus stops along the route. The road corridor will also incorporate segregated pedestrian and cycle lanes providing safe, high quality connections to the town centre.
- A new link road into North East Bridgwater accessed directly from Bristol Road should be provided.
- A park and ride facility in conjunction with enhanced bus services will also provide connections from the North Bridgwater area to Bridgwater town centre (page 107).

4.3.49 The transport related design principles for North-East Bridgwater character area (within which the Bridgwater A accommodation campus is located) are set out in the Vision as follows:

- The dismantled railway line should be retained as a key pedestrian/cycle green link east-west across North-east Bridgwater.
- High quality cycle and pedestrian connections should be made to Sydenham, the town centre, the railway station, and the adjacent employment areas.
- A public transport route should be provided facilitating safe, easy and well-connected movement through and close to important amenities and high density areas of housing in particular (page 91).

4.3.50 The transport related design principles for the Sydenham and Bower character area (within which the Bridgwater C accommodation campus is located) are set out in the Vision as follows:

- Improved pedestrian and cycle routes will be promoted throughout the area to connect residents to local shops and services, community facilities, employment areas, the rail station and the town centre.
- The strategic role of Bower Lane will be strengthened as development occurs with connections between North East Bridgwater and South Bridgwater promoted (page 84).

4.3.51 The transport related design principles for the Huntworth character area (within which the Junction 24 associated development site is located) are set out in the Vision as follows:

- Taunton Road will be promoted as a key public transport corridor with high frequency bus services giving workers in the area direct and frequent access to the town centre.
- A park and ride site adjacent to the A38 Taunton Road in conjunction with enhanced bus services will also provide connections to Bridgwater town centre.
- High quality, safe and legible pedestrian and cycle routes will be created through the area strengthening links back to the town centre particularly along the Canal corridor.

- Consideration should be given to improving pedestrian and cycle connections to the footbridge over the M5 to connect new development on the eastern side of the motorway into Bridgwater.
- A Travel Plan would be critical to the options presented for the site, with the potential for a bespoke public transport service and connecting pedestrian and cycle infrastructure back to the town centre (page 88).

v. Bridgwater, Taunton and Wellington Transport Strategy (Ref. 4.20)

4.3.52 The transport strategy for Bridgwater, Taunton and Wellington for the period 2009 – 2026 was adopted by SCC in March 2010. The strategy indicates a number of infrastructure improvements that may be implemented during the strategy's lifespan in support of the draft Regional Spatial Strategy and will likely be a key component of the Third Somerset LTP.

4.3.53 At Section 5.1 on Bridgwater the strategy states that SCC:

> *"…..will further investigate the potential for introducing park and ride sites on the edges of the town to reduce town centre congestion. We will seek to improve sustainable links to the railway station, as well as increasing opportunities for walking and cycling in the town by removing physical barriers created by roads, by providing new infrastructure and by improving the pedestrian environment in the town centre."*

4.3.54 SCC's transport strategy document also indicates a number of improvements that may be implemented during their strategy's life-span. Some of the improvements that are listed are advised to be development-related and will only be implemented should the site-specific developments proceed.

4.4 Summary

4.4.1 This section has explained the various levels of planning policy that have informed the assessment and ultimately guided development of the transport strategy to be implemented by EDF Energy at Hinkley Point.

4.4.2 The key themes to draw from the policies are those set out in NPS EN-1 (Ref. 4.1) and EN-6 (Ref. 4.2). In particular, Policy EN-1 provides the overarching policy applicable to the DCO application. It puts the emphasis on sustainable modes of transport and the introduction of mitigation to reduce impacts to an acceptable level. Provided this is done development consent should not be withheld and limited weight should be applied to residual effects on the surrounding transport infrastructure.

4.4.3 The draft NPPF (Ref. 4.3) similarly advises that development should not be prevented or refused on transport grounds unless the residual impacts of development are severe. The draft is consistent in approach with the NPS, but it is only a draft document and is not intended to apply to NSIPs. It may indicate an up to date approach to transport policy, but it is at most of limited weight compared to the authoritative policy guidance set out in the NPSs.

4.4.4 Policies of West Somerset District Council and Sedgemoor District Council do not set out detailed transport development control policies, but do set out visions to enhance the fabric of their towns.

4.4.5 Whilst Somerset County Council have development control policies which set out what developments are required to achieve, their document (Tech Note 4) does not have the status of a Development Plan Document. Furthermore SCC should not seek to set criteria for nationally important infrastructure projects. The Hinkley Point C Project does comply with county policies by placing the emphasis on sustainable transport solutions and introducing certain appropriate improvements to the local highway network to mitigate adverse effects. It will be demonstrated that the residual impacts are temporary and modest and that there is a long-term legacy benefit from the transport improvements.

5. TRANSPORT OBJECTIVES AND STRATEGY

5.1 Introduction

5.1.1 Building on the policy context set out in the previous section, EDF Energy has developed a set of transport objectives. These objectives have been used to develop a transport strategy for the HPC Project taking into account the characteristics of the workforce and freight movements. In developing the strategy a number of alternatives were examined. This chapter defines the objectives and then describes the derivation of the transport strategy.

5.2 Transport Objectives

5.2.1 EDF Energy's principal transport objectives are to:

- minimise the volume of traffic associated with the development of the new power station as far as reasonably practical, at all times, but especially during peak hours;
- maximise the safe, efficient and sustainable movement of people (i.e. travel by non-car methods) and materials (i.e. delivery by non-road methods) required for the HPC Project as far as reasonably practicable;
- minimise the impacts both for the local community and visitors to the area using the road network as far as reasonably practicable;
- provide long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate;
- maximise the control of movements associated with the construction of the HPC Project so far as reasonably practicable;
- take all reasonable steps to ensure the resilience of the transport network in the event of an incident; and
- take all reasonable steps to protect the natural and built environment.

5.3 Transport Strategy Overview

5.3.1 This overview sets out the basic elements of the transport strategy with the detail being provided in individual chapters. The basic elements are:

- a strategy to get workers to HPC development site and associated development sites as sustainably as possible;
- a strategy for getting freight to site using the sea where possible and where HGVs do need to use local roads, minimising their impacts through control;
- a programme of highway interventions where they are deemed appropriate; and
- a strategy for the operational phase of the HPC power station which seeks to encourage use of non-car modes by workers.

a) Construction Phase

i. Workforce

5.3.2 In deriving the strategy for transporting the workforce, a number of factors have been considered. These are set out below.

5.3.3 The transport objectives to minimise the volume of traffic; maximise the use of sustainable modes of transport and minimise impacts on the local community.

5.3.4 The workforce characteristics. There will be up to 5600 workers at peak construction based in accommodation campuses, rented accommodation and at home. Of these approximately 34% (1,900) will be locally employed (home-based) workers who are already resident in the local area and approximately 66% (3,700) will be non-home-based workers who will move to the area for the period of their employment on the project. It is assumed that home-based workers will be within a catchment area of up to 90 minutes travel time and non-home-based workers will be within 60 minutes. Whilst some workers will be based in urban areas, others will be in more rural communities. These factors inevitably affect the transport strategy since a solution within an urban area where there are clusters of workers will not be the same as that for an area where there is a lower density of workers.

5.3.5 Sensitivities on the local road network. As set out in the objectives, EDF Energy aims to minimise the impacts on the local community. In practice this means reducing as far as is practicable traffic flows on the highway network, particularly through Bridgwater and Cannington. This is in order to reduce the impact on congestion and amenity.

5.3.6 In the light of the above characteristics, a number of alternatives were considered when the strategy was being developed. These were:

- unfettered use of the private car with large scale provision of parking on site;
- major infrastructure interventions in Bridgwater and Cannington;
- a public transport, walking and cycling strategy only i.e. with effectively minimal use of the private car;
- use of park and ride to intercept car trips with onward transport provided to the HPC development site by direct bus services; and
- a combination of the above.

5.3.7 Each of these is considered in turn below.

5.3.8 Unfettered car use: It has been concluded that an unfettered car-based strategy would not be appropriate. It would not accord with government policy or EDF Energy’s objectives; and would have a very significant impact on the local road network. In addition such a strategy would require substantial additional land take for extensive car parking within a construction area which is constrained.

5.3.9 Major infrastructure interventions: This matter was given careful consideration. It was concluded that a purely road-based solution would not accord with government policy where road building is not the preferred strategy to deal with increased traffic movements in urban areas. It would also not accord with EDF Energy’s objectives to minimise the volume of traffic and maximise use of sustainable modes where practicable. However, it was recognised that where there are particularly significant impacts that cannot be mitigated in another way then new highway infrastructure may be appropriate.

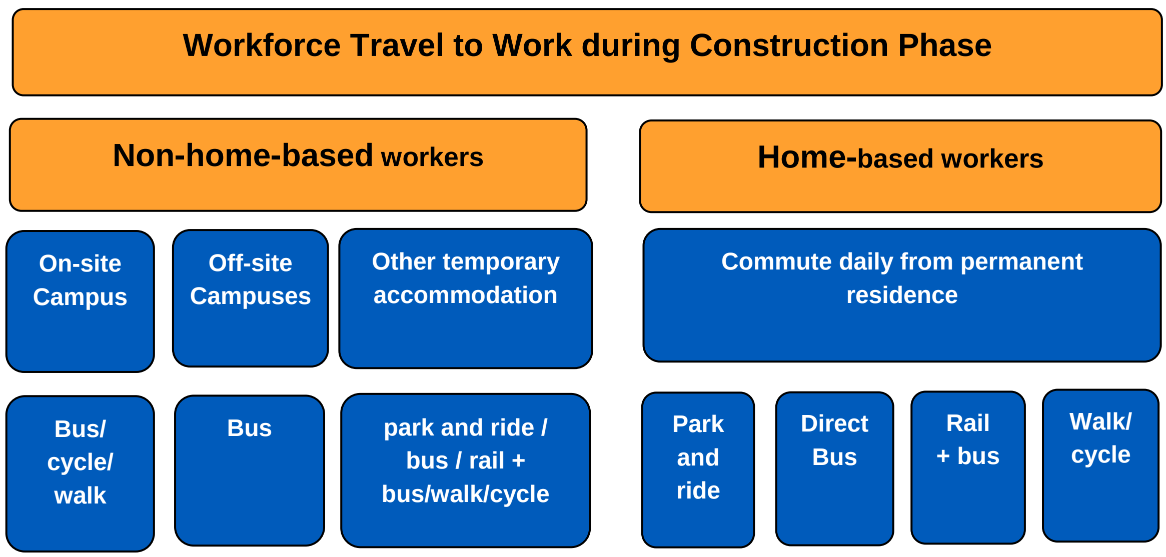
5.3.10 Sustainable modes: Whilst sustainable modes (public transport, walking and cycling) will form a component of the proposals, it is not considered that all trips could be made in this way. This is because the HPC development site is located in a relatively remote area some distance from significant urban centres and because the workforce will be living in a range of accommodation throughout the catchment area. Therefore, some people will be living in more remote areas with only a few fellow workers. These considerations will make it difficult to achieve very high levels of walking and cycling direct to the site or to provide direct bus services at a sufficient frequency to serve all workers on the various shifts.

5.3.11 Park and ride: Due to the issues set out in the paragraphs above, EDF Energy has developed a park and ride strategy to intercept workers at key locations on the network and then use buses to transport them the remainder of the way to the HPC development site. Significant use of park and ride represents a good balance between the practical constraints imposed by a geographically disbursed workforce and the transport strategy objectives to maximise the use of sustainable modes.

5.3.12 A combined approach: Other than unfettered use of the private car, it is considered that all of the above options have some part to play in the overall transport strategy.

5.3.13 Based on the considerations set out above, the proposed transport strategy for workers during the construction period is set out below and illustrated in **Figure 5.1 Travel to Work Mechanism for Workforce**. This applies to work trips to/from the HPC development site and also to non-work trips to/from accommodation campuses.

Figure 5.1: Travel to Work Mechanism for Workforce



5.3.14 In accordance with **Figure 5.1** the following travel to work strategy will be adopted for the workforce during the construction phase:

- Park and ride: park and ride facilities will be established near to Junction 23 and Junction 24 of the M5 motorway, and at Cannington and Williton. These will serve both home-based and non-home-based workers who will travel to the park and ride facilities and then be transferred by bus to the HPC development site. The location of proposed park and ride facilities and their sizing is discussed within the Parking Strategy Chapter of this TA, **Chapter 11**.
- Direct Bus services**:** stopping bus services will be provided to pick up workers on key routes to the HPC development site. The routes will need to align to the location of workers and will need to be reviewed on a regular basis in order to respond to changes in demand. The details of the strategy are included the bus and rail strategy Chapter of this TA, **Chapter 12**.
- Accommodation Campus Bus services**:** non-stopping bus services will be provided from Bridgwater A and Bridgwater C accommodation campuses direct to the main HPC development site to transport workers based in that campus accommodation. Details of the campus bus service are set out at **Chapter 12**.
- Walking and Cycling**:** Walking and cycling forms an element of the strategy for workers. The elements of this are: directly to HPC from suitable locations; to the park and ride sites; and to bus routes. In conjunction with SCC an audit of relevant cycling and walking routes has been undertaken and improved facilities have been developed. Further details are provided in the Walking and Cycling chapter of this report, **Chapter 13**.
- Travel Plans**:** The combination of the proposed transport strategy measures will secure very substantial modal shift with at least 90% of the workforce either already resident at the HPC accommodation campus or arriving at the site by bus on a daily basis – and a substantial proportion of these travelling the entire journey by bus. In addition the **Framework Travel Plan** will encourage further use of sustainable modes and seek to minimise use of the private car for any part of the journey where practicable. A Transport Review Group (TRG) will be formed to monitor the performance of the Travel Plan and amendments where appropriate. Further details are given in **Chapter 17**.

ii. Freight

5.3.15 The development of the new nuclear power station will require significant quantities of construction materials to be delivered to the HPC development site. EDF Energy has developed a **Freight Management Strategy** (FMS) attached at **Appendix 3.7** to this report, which seeks to fulfil its objectives set out above.

5.3.16 The proposed freight measures aim to reduce and control the use of road freight traffic during the construction phase, especially in the peak hours. As was the case for worker movements, a range of options was investigated. The only option to be rejected was direct rail to Bridgwater. This is because of the inadequacy of the facilities at the station and the fact that HGVs carrying goods offloaded from rail would still need to pass through the Bridgwater road system. Therefore, there would be few local benefits of using rail to Bridgwater.

5.3.17 A summary of the FMS is shown below:

- the re-use and storage of excavated materials on-site to avoid exporting off-site;
- the use of water-based transport for delivery of materials and the largest AILs through the construction of a temporary jetty at HPC, the refurbishment and extension of Combwich Wharf and the construction of a new freight laydown facility at Combwich;
- introducing off-site freight management facilities at Junction 23 and Junction 24, to control incoming freight traffic flow and holding freight vehicles in case of an incident on the local network or at the HPC development site;
- regulating traffic flow by using a project-wide delivery management system (DMS) to regulate flows and move away from peak time congestion;
- use of only designated HGV routes through Bridgwater;
- reducing small vehicle movements through consolidation of mail and courier deliveries at the Junction 23, and temporarily at the Junction 24, associated development sites; and
- reducing the impact of construction traffic by providing a package of highway improvements where required.

5.3.18 In accordance with EDF Energy's objectives it is proposed that at least 80% of the bulk materials required for concrete production on site will be delivered to the HPC development site by sea via the temporary jetty. This will avoid a very substantial volume of HGV movements – estimated at around 125,000 HGVs (250,000 movements) over the course of the construction programme.

iii. Infrastructure interventions to address residual impacts.

5.3.19 Even with the workforce transport strategy and **Freight Management Strategy**, there will inevitably be an increase in traffic movements (HGVs, LGVs; buses and cars) on the local network. These have been carefully examined and assessed as set out in detail in the relevant chapters of this assessment.

5.3.20 After careful consideration and consultation EDF Energy decided that a bypass to the west of Cannington should form part of the proposals. This is in order to mitigate the impacts of additional traffic and in particular HGVs and buses running through the village. However, it was also concluded that a bypass of Bridgwater was not needed and would not be appropriate. Further details of the proposals and reasoning are provided in the **Planning Statement** and the **Bridgwater Bypass Study** (attached at **Appendix 2.1**).

5.3.21 In addition a series of proposed highway improvements have been developed in conjunction with stakeholders and the local community. These measures include those that assist safety as well as capacity. Details are provided in **Chapter 14**, Road Safety, and **Chapter 16**, Transport Improvement Package. Overall these improvements are assessed to mitigate the remaining impacts of HPC related traffic on the local highway network – the detailed analysis to support this conclusion is contained in **Chapter 15**, Traffic Analysis.

b) Operational Phase

5.3.22 Once the HPC power station is operational, use of the accommodation campuses, park and ride and freight management facilities, consolidation centre for the postal/ courier deliveries and induction centre will cease.

5.3.23 A permanent car park at the HPC development site with 505 spaces will be provided for normal operations. However, due to the requirements of Hinkley Point B, only 430 spaces will be available to the 900 operational staff. This is a ratio of one parking space per 1.9 operational staff assuming 810 staff are on site on any one day. A further permanent car park with 508 spaces is proposed for the use of up to 1000 outage staff, for the training and simulator building and the Public Information Centre. This car park will not be available for the use of operational HPC or Hinkley Point B staff. A further 180 spaces would be provided to replace the existing Hinkley Point Power Station Complex overflow car park and would be available exclusively for Hinkley Point B staff and disabled visitors to the HPC development site.

5.3.24 The level of operational parking provides car parking restraint to encourage car share and alternative modes of travel to the HPC development site.

5.3.25 In addition to the restrained parking provision for the operational staff, the scope for operating bus services will be considered by EDF Energy as a means of improving access to the HPC development site. Given that the majority of the operational workforce are likely to originate from the three local districts of West Somerset, Sedgemoor and Taunton and Deane, any bus strategy would be likely to be focused on this local area. The details of any proposed bus services will be set out in the Travel Plan for the operation of HPC.

5.3.26 Through the Travel Plan, EDF Energy will encourage staff to use sustainable modes including walking and cycling as much as possible.

5.3.27 In the operational phase there will be no significant remaining requirement for the large scale movement of freight. The temporary jetty will therefore be dismantled and removed. Similarly, the freight laydown facility at Combwich Wharf will be removed. The refurbished Combwich Wharf will be retained as a facility to support the occasional requirement for delivery of abnormal loads to the HPC development site. Other freight deliveries will be brought to the HPC development site by road.

5.4 How the Strategy Fulfils the Objectives

5.4.1 **Table 5.1** below shows how the elements of the transport strategy would fulfil EDF Energy's objectives (set out in Section 5.2 of this TA).

Table 5.1: Objectives of Transport Strategy

Objectives	People Movement	Freight Movement
1. Minimise the volume of traffic associated with the development of the new power station so far as reasonably practicable, at all times, but especially during peak hours.	• Direct Bus Service • park and ride • Car Share • Walking and cycling improvements • Rail and Bus	• Retain materials on site • Use of the temporary jetty • Use of Combwich Wharf • Freight Management Facilities • Mail consolidation • Reduce peak hour flows
2. Maximise the safe, efficient and sustainable movement of people (i.e. travel by non-car) and materials (i.e. delivery by non-road) required for the HPC Project so far as reasonably practicable.	• Measures as in (1) above • Travel Plan • Safety improvements on highway network	• Measures as in (1) above • Seek to maximise use of the temporary jetty where practicable • Delivery Management System
3. Minimise the impact both for the local community and visitors to the area using the road network so far as reasonably predictable.	• Measures as in (1) above • Cannington bypass • Highways network improvements	• Measures as in (1) above • Cannington bypass • Highways network improvements
4. Provide long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate.	• Cannington bypass • Highways network improvements • Safety enhancements • Walking and cycling improvements	• Cannington bypass • Highways network improvements • Safety enhancements
5. Maximise the control of movement associated with the construction of the HPC Project so far as reasonably practicable.	• Travel Plan • Monitoring of movements • Transport Review Group	• Freight Management Facilities • Delivery Management System
6. Take all reasonable steps to ensure the resilience of the transport network in the event of an incident.	• Measures in (5) above • Traffic Incident Management Plan • Monitoring of highway and structural conditions	• Measures in (5) above • Traffic Incident Management Plan
7. Take all reasonable steps to Protect the natural and built environment.	• All above measures	• All above measures

5.4.2 As can be seen, the transport strategy accords with the objectives of EDF Energy. The measures contained in the transport strategy are a pragmatic response to the challenges that would be faced in building and operating a nuclear power station and provide an approach that maximises, as far as is practicable, the use of sustainable modes.

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6. DEVELOPMENT PROPOSALS

6.1 Introduction

6.1.1 This chapter summarises the development proposals at:

- The Hinkley Point C (HPC) development site; and
- The associated developments that will be implemented to facilitate construction at the HPC development site.

6.1.2 A full description of the proposed development, including the construction, operation and post-operational phases is provided in **Chapters 1** to **5** of **Volumes 2** to **10** of the **Environmental Statement**.

6.2 Hinkley Point C Development Site

a) Overview

6.2.1 The HPC development site development comprises a range of buildings above ground, on the sea bed and sub-surface structures and related facilities including:

- two permanent nuclear islands housing the UK EPR reactor buildings and other essential buildings;
- two conventional islands, including the turbine halls, located adjacent to the nuclear islands;
- a cooling water pumphouse for each UK EPR reactor unit with related infrastructure;
- sea bed cooling water intakes and outfall structures together with bored tunnels connecting these to the cooling water pumphouses and turbine halls;
- energy transmission infrastructure from the turbine halls and associated infrastructure, to the National Grid 400kV substation;
- fuel and waste management and storage facilities;
- ancillary office facilities and storage facilities;
- a Public Information Centre (PIC) to provide education and public facilities;
- a sea wall incorporating a public footpath;
- access and parking facilities for workers, visitors and deliveries for the main nuclear plant and the National Grid 400kV substation; and
- landscaped areas (including ecological features and public rights of way (PRoW)).

b) Proposed Access Arrangements

6.2.2 The existing access road into the Hinkley Point Power Station Complex would also be the main vehicle access for the proposed development. Two roundabouts are proposed along this route. The first to the east of the HPC development site would provide access to site personnel and some special deliveries. The second, to the south-east of the southern construction phase area would provide access for freight during the construction phase, and during the operational phase would provide an alternative means of access to HPC, including public access to the PIC.

6.2.3 In addition, it is proposed to construct an emergency access road from the south of the HPC development site as an alternative means of accessing HPC and which is only required for use in exceptional circumstances such as for the emergency services to respond to an incident at the power station. It is not intended to be used during the construction period and the requirement to use the road during the operational period is expected to be infrequent. The public highway route for this emergency access is proposed to be from Shurton to the A39 via Stogursey Lane.

6.2.4 There shall be locked gates at the end of the emergency access road where it connects to roads that are open to public use. The gates shall be sufficient to prevent unauthorised access of motor vehicles. Separate provision may be made for pedestrian access, where required.

c) Proposed On-Site Parking (Operational Phase)

6.2.5 A car park for operational staff would be located to the south-east of the HPC development site, adjacent to the substation. This would comprise 505 vehicle parking spaces.

6.2.6 In addition, a second permanent car park would be located to the south of the HPC development site (west of the National Grid substation) and would comprise a total of 508 parking spaces for additional workers who would be required during the planned 'outages' (i.e. maintenance periods), for staff and visitors to the training and simulator building and car and coach parking for visitors to the PIC.

6.2.7 A further smaller car park, comprising 180 spaces, would be provided to the east of the site to replace the existing Hinkley Point Power Station Complex overflow car park.

6.2.8 Further detail on these car parks is provided in **Chapter 11**.

d) HPC Accommodation Campus

6.2.9 The proposed HPC accommodation campus would provide accommodation, recreation and amenity facilities for up to 510 workers.

6.2.10 The proposed development would comprise:

- an accommodation campus including living space for 510 occupants within 15 accommodation buildings; two 5-a-side football pitches and associated changing facilities; 319 car parking spaces and motorcycle and bicycle parking spaces; an amenity building providing amongst other things administration, canteen, laundry, gymnasium and recreational facilities; bus drop-off point; and internal access roads;
- access off the C182 (Wick Moor Drove);
- landscaping within the site, including tree planting around the perimeter of the site; and
- other ancillary development including signage, fencing, lighting, CCTV and utilities.

6.2.11 Construction of the HPC accommodation campus would commence in Quarter 2 2013 for approximately 15 months. The accommodation campus would be operational between Quarter 3 2014 and Quarter 2 2020. Following completion of the HPC construction phase, the accommodation campus would be removed and the site landscaped in accordance with details set out in the Landscape Restoration Strategy appended to the **Environmental Statement**.

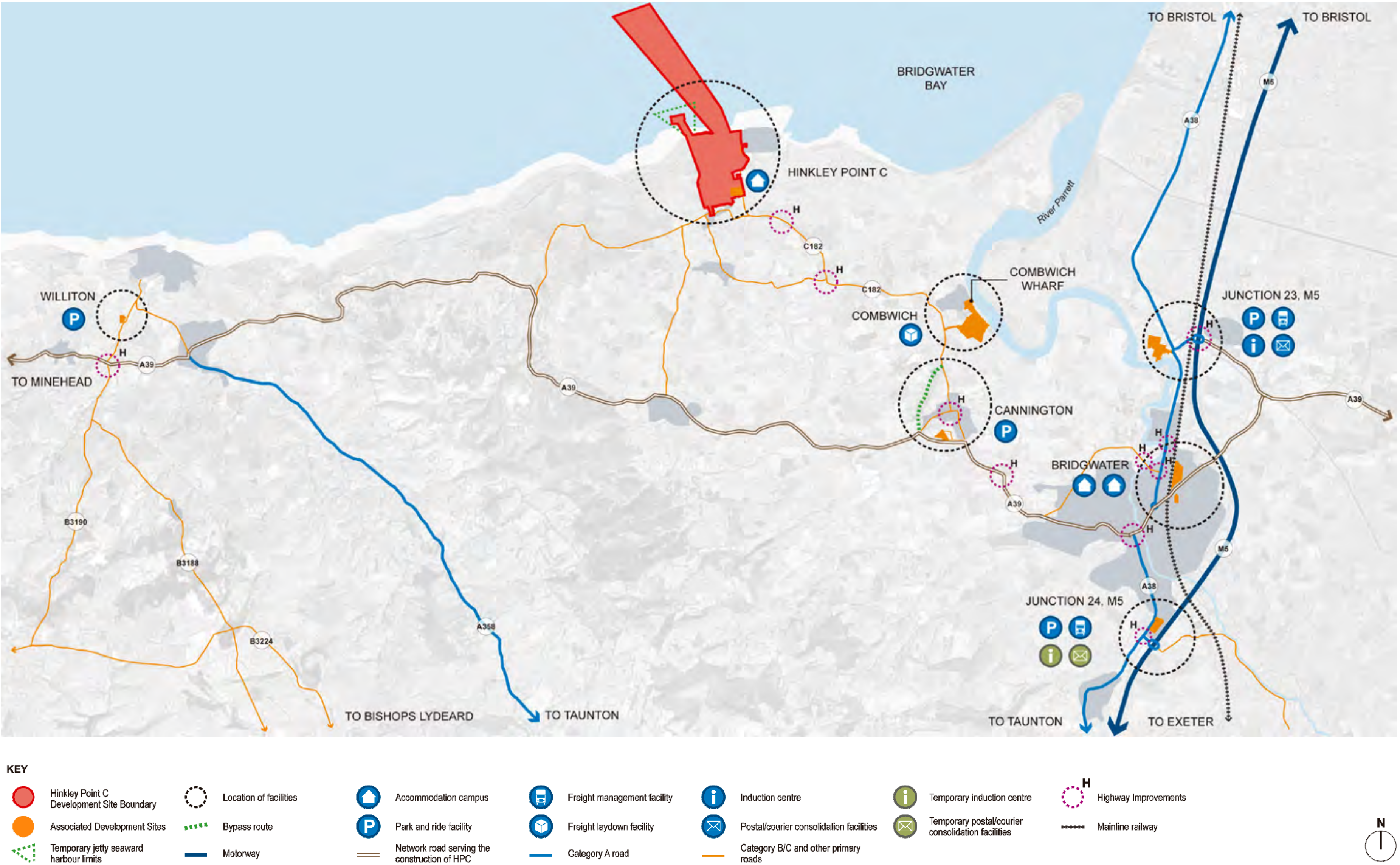
6.2.12 For a full description of the proposed development, refer to the **Environmental Statement (Volume 2).**

6.3 Descriptions of Off-Site Associated Developments

6.3.1 In conjunction with the HPC development site works, a number of off-site associated developments are proposed to facilitate the construction and in some instances operation of the HPC power station (see **Figure 3.1** for details of the context of the proposed off-site associated developments and HPC development site).

6.3.2 The locations, in the context of the wider HPC Project, of all of the associated development proposals, are shown in **Figure 6.1**.

Figure 6.1: Locations of Associated Developments



6.3.3 The proposed off-site associated developments comprise:

- Accommodation campuses for up to 1,000 construction workers, with ancillary facilities, across two sites in Bridgwater. These are in addition to the accommodation campus for 510 workers proposed within the HPC development site.
- park and ride facilities for 2,410 car parking spaces (including spaces for vans and mini-buses), 125 motorcycle spaces, 125 cycle spaces and 51 bus spaces, with ancillary facilities, across four sites.
- Freight management facilities for up to 140 heavy goods vehicles (HGV) parking spaces, with ancillary facilities, across two sites.
- A centre for the induction of staff to be employed on the HPC development site.
- A consolidation facility for postal/courier deliveries.
- A bypass around the west of Cannington.
- Refurbishment and extension of the existing Combwich Wharf and an associated freight laydown facility for the storage of Abnormal Indivisible Loads (AILs) and other construction goods principally being delivered via Combwich Wharf or by road before they are transferred to the HPC development site. A new goods wharf access road is proposed to link Combwich Wharf with the existing Combwich Wharf access road and the use of, and amendments to the existing Combwich Wharf access road and its junction with the C182.

a) Bridgwater A Accommodation Campus

6.3.4 The proposed Bridgwater A accommodation campus would provide accommodation, recreation and amenity facilities for up to 850 workers. Occupants of the Bridgwater C accommodation campus would use the recreational and amenity facilities at the Bridgwater A accommodation campus once available.

6.3.5 The proposed development would comprise:

- an accommodation campus, including living space for 850 occupants within 25 accommodation buildings; three football pitches (one full size and two 5-a-side pitches) and associated changing facilities; 543 car parking spaces and bus, motorcycle and bicycle parking spaces; and an amenity building providing amongst other things administration, canteen, laundry, gymnasium and recreational facilities; and internal access roads;
- access off the A39 (Bath Road), changes to the road markings along the A39 (Bath Road) and the stopping up of Fredrick Road;
- a new drainage rhyne;
- landscaping within the site, including tree planting around the perimeter of the site; and
- other ancillary development, including signage, fencing, lighting, CCTV and utilities.

6.3.6 Construction of the Bridgwater A accommodation campus would commence in Quarter 2 2013 for approximately 25 months, in two phases that would run concurrently. These works would include the demolition of existing buildings and structures and the remediation of the land. Phase 1 of the accommodation campus would be operational from Quarter 3 2014, with Phase 2 available from Quarter 2 2015. Following completion of the HPC construction phase in Quarter 3 2020, the accommodation campus would be removed with the exception of some infrastructure including the drainage rhyne and some landscaping. The site would be available by Quarter 4 2021 for redevelopment in connection with the North East Bridgwater development.

6.3.7 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to **Volume 3** of the **Environmental Statement**.

b) Bridgwater C Accommodation Campus

6.3.8 The proposed Bridgwater C accommodation campus would provide accommodation, recreation and temporary canteen facilities for up to 150 workers. Occupants of this accommodation campus would use the recreational and amenity facilities at the Bridgwater A accommodation campus once available.

6.3.9 The proposed development would comprise:

- an accommodation campus, including living space for 150 occupants within four accommodation buildings; an all weather 5-a-side football pitch; 66 car parking spaces and motorcycle and bicycle spaces; a temporary canteen building, for a period of six months, until the Bridgwater A accommodation campus becomes operational; and internal access roads;
- alterations to the existing gyratory on the A39 (Bath Road), including provision of a bus shelter and changes to the road markings;
- access road off College Way;
- landscaping within the site, including tree planting along College Way; and
- other ancillary development, including signage, fencing, lighting, CCTV and utilities.

6.3.10 Construction of the Bridgwater C accommodation campus would commence in Quarter 1 2013 for approximately 12 months. The accommodation campus would be operational between Quarter 1 2014 and Quarter 3 2020. Following completion of the HPC construction phase, the accommodation campus would be retained and used in connection with Bridgwater College as student accommodation or other alternative educational uses.

6.3.11 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to **Volume 4** of the **Environmental Statement**.

c) Cannington Bypass

6.3.12 The proposed Cannington bypass would link the existing A39 southern bypass to the C182 (Rodway).

6.3.13 The proposed development would comprise:

- a 1.5km single carriageway road, with a design speed of 40 miles per hour (mph) (70 kilometres per hour (kph)), 7.3m wide with a minimum 2.5m wide verge on the west side and a 3.5m wide cycle/footway on the eastern side;
- a new roundabout to join the C182 (Rodway) and alterations to the alignment of the existing side roads and accesses including the C182 (Rodway), Chad's Hill, Withiel Drive and Sandy Lane; and field accesses;
- environmental mitigation, including acoustic bunds, screen planting and an ecological underpass;
- drainage including culverts and balancing ponds; and
- associated signage, crossings, services and lighting.

6.3.14 It is envisaged that construction of the Cannington bypass would commence in Quarter 1 2013 for approximately 21 months. It would be constructed in three sections, comprising southern, northern and central sections, and it would be available from Quarter 4 2014 to support the construction and operational phases of the HPC power station as well as being available to the general public, as it would be adopted by the Highway Authority (Somerset County Council) as a public highway.

6.3.15 For a full description of the proposed development, including the construction and operational phases, refer to **Volume 5** of the **Environmental Statement**.

d) Cannington Park and Ride

6.3.16 The site comprises 5.2ha of land to the south of the village of Cannington, in the District of Sedgemoor. The site is bordered to the south by the A39, to the west by agricultural land and to the north and east by agricultural land and residential development, which forms the southern section of the village of Cannington. The site is currently used for agricultural purposes.

6.3.17 The provision of a site in Cannington is designed to serve traffic travelling from areas to the north, south and west of Bridgwater removing the need for any traffic to travel into Bridgwater.

6.3.18 The proposed Cannington park and ride facility would provide car parking spaces for the workforce and public visitors, in addition to space for motorcycles, bicycles, mini-buses and buses.

6.3.19 The proposed development would comprise:

- a park and ride facility comprising two separate car parks for workforce (132 car, disabled and van/mini-bus parking spaces) and public visitors (120 car parking spaces and van/mini bus spaces) and motorcycle, bicycle and bus parking spaces; ancillary structures including bus shelters and welfare and security buildings; and internal roads;
- a priority junction access off the A39 into the site;
- widening of the A39 and provision of a footway between site access and the A39 (Main Road) eastern roundabout;

- landscaping, screen planting and the provision of an earth bund for visual mitigation and spoil storage;
- surface water drainage infrastructure (including a detention pond); and
- other ancillary development, including fencing, lighting, CCTV and utilities.

6.3.20 Construction of the Cannington park and ride facility would commence in Quarter 1 2013 for approximately 11 months. The park and ride facility would be operational from Quarter 4 2013 to Quarter 4 2021. The facility would be removed and land restored to agriculture by Quarter 4 2022.

6.3.21 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to **Volume 6** of the **Environmental Statement**.

e) Combwich

6.3.22 The proposed development at Combwich would include the refurbishment and extension of the existing Combwich Wharf and an associated temporary freight laydown facility for the storage of AILs and other construction goods being delivered principally via Combwich Wharf before they are transferred to the HPC development site. A new goods wharf access road is proposed to link Combwich Wharf with the existing Combwich Wharf private access road. Improvements are also proposed to the Combwich Wharf access road and its junction with the C182.

6.3.23 The proposed development would comprise:

- Refurbishment and extension of Combwich Wharf to allow for water-borne deliveries of AILs and construction goods associated with the HPC power station. An access road would be constructed between the goods wharf and the Combwich Wharf access road to provide links to the freight laydown facility. This access road would cater for HGVs delivering general construction goods from Combwich Wharf to the freight laydown facility.
- A freight laydown facility for the handling and storage of AILs, construction equipment and materials. This would be principally used for the temporary storage of equipment and goods delivered via the Wharf destined for the HPC development site. Associated welfare, administration and security buildings would support the operation of the facility. Ancillary development is also proposed, including landscaping, car parking for 50 cars/light goods vehicles, internal access roads, a flood defence bund and associated retaining wall, earth bunds for acoustic and visual mitigation and spoil storage, surface water drainage infrastructure, including four balancing ponds, fencing, lighting, CCTV and utilities.
- Improvements to and the use of the existing Combwich Wharf access road.
- Minor alterations to the junction of the C182 and the existing Combwich Wharf access road.

6.3.24 The refurbishment and extension of Combwich Wharf would commence in Quarter 1 2013 for approximately 12 months. The facility would be operational from Quarter 1 2014 and would continue to be used by EDF Energy to support the construction and operational phase of the HPC Project. The Wharf would also continue to be used by National Grid and the Hinkley Point A and B power stations. Following construction of the HPC power station, the wharf would be retained in its refurbished state and would continue to be used, on an ad hoc basis, similar to the level of use currently for the occasional delivery of AILs.

6.3.25 Construction of the freight laydown facility would commence in Quarter 1 2014 for approximately 12 months with some site preparatory works starting in advance of this date. The facility would be operational from Quarter 1 2015. Following completion of the HPC construction phase, the facility would be removed entirely in 12 months and by Quarter 2 2022 and the land restored to agricultural land by Quarter 2 2025.

6.3.26 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to **Volume 7** of the **Environmental Statement**.

f) M5, Junction 23 Park and Ride Facility, Freight Management Facility, Consolidation Facilities for Postal/Courier Deliveries and Induction Centre

6.3.27 The site lies adjacent to Dunball roundabout, approximately 0.75km west of Junction 23 of the M5, immediately west of the A38 (Bristol Road). The centre of Bridgwater lies approximately 4km to the south of the site. The site is currently used for agricultural purposes.

6.3.28 Provision of a park and ride and freight management facility at Junction 23 of the M5 is designed to intercept traffic travelling from the north. The site at Junction 23 is ideally located with direct access to the motorway junction and can serve traffic travelling along the M5 from the north and also traffic travelling from the east along the A39, which passes through Junction 23.

6.3.29 The proposed development at Junction 23 would provide a park and ride, freight management facility and postal/courier consolidation facility and an induction centre for workers of the HPC construction phase.

6.3.30 The proposed development would comprise:

- a park and ride facility, including hardstandings for vehicle parking for 1,300 cars, minibuses and vans, and associated motorcycle, bicycle and bus parking spaces; bus terminus; and ancillary structures, including bus shelters and amenity/welfare and security buildings;
- a freight management facility, including hardstanding for vehicle parking for 85 heavy goods vehicles (HGVs) and other vehicles; a freight checking area; associated car parking and ancillary structures, including an administration/ amenity and security building;
- a consolidation facility for postal/courier deliveries comprising a consolidation facility building with associated parking area;
- a worker induction centre comprising induction space and welfare facilities; and 120 car parking spaces and motorcycle and bicycle spaces;
- new site access and site access improvements comprising realignment of the highway arrangements off the Dunball roundabout;
- internal roads and a roundabout;
- works to River Parrett flood defences;

- landscaping, screen planting, ecological mitigation area and the provision of earth bunds for visual mitigation and spoil storage;
- surface water drainage infrastructure (including detention pond); and
- other ancillary development, including fencing, lighting, CCTV, signage and utilities.

6.3.31 The induction centre would provide a secure facility for HPC workers to be processed through their induction requirements. This would include induction training, verification of required skills documentation, drug and alcohol testing and the collection of biometric data and photos. Passes (for example those for use of the park and ride facilities) would also be issued at the induction centre. This process would take place prior to construction workers commencing work at HPC and would be targeted at workers when they first arrive in Somerset. The induction centre is not a training facility, it would simply facilitate the induction requirements for each individual prior to commencing work. The entire process would be intended to be a full day for the majority of workers.

6.3.32 It is anticipated that the induction centre would cater for a maximum of 100 workers per day. The centre would be located at the Junction 23 associated development site, operated by EDF Energy, which would aid the necessary security controls to be implemented. Security is an important aspect of the induction centre since sensitive information on all workers would be stored there and the site would house biometric data records. The proposed building is of a bespoke nature to allow for efficient operation of the necessary security controls to be built in.

6.3.33 The induction centre’s location at Junction 23 of the M5 has also been considered in transport terms. The majority of workers would access the proposed induction centre when they first arrive in Somerset, and the majority are expected to travel by car since they would not have been allocated to designated park and ride sites, direct buses or campuses at this stage. The transport modelling, described later in this Transport Assessment, considers all workers arriving and departing the site by single occupancy vehicle for robustness. It is considered that since the majority of transport movements are likely to access the area from the north, along the M5, that Junction 23 provides the most suitable long-term location for the induction centre.

6.3.34 The consolidation facility for postal/courier deliveries would be a single point of delivery for all postal items for the HPC development site. On receipt at the facility all mail and courier packages would be security checked, sorted and consolidated into vans for transport to the HPC development site. Transfer to the HPC development site would likely occur twice each day. As such, no mail or courier deliveries would be delivered directly to the HPC development site. Outgoing HPC mail would be collected by the facilities organisation and taken by them to the consolidation facility for postal/courier deliveries. This would then be collected by Royal Mail or a courier company. These arrangements would further limit the number of vehicles that would require authorisation to drive to the HPC development site.

6.3.35 The consolidation facilities for postal/courier deliveries would be located in the long-term at the Junction 23 associated development site for the same reasons as the proposed induction centre. Some 75% of delivery movements are expected to travel from the north along the M5 and as such, Junction 23 provides the ideal location at which to intercept those movements on route to HPC.

6.3.36 Construction of the proposed development at Junction 23 would commence in Quarter 3 2013 for approximately 12 months. The facilities would be fully operational from Quarter 3 2014 with park and ride facilities being introduced in phases from Quarter 1 2014. It is estimated that the proposed development would be operated by EDF Energy until Quarter 4 2020. Following completion of the HPC construction phase the facility would either be removed and the land restored to green fields; or retained in part to allow for future use by third parties. Deconstruction of the site would take approximately 12 months.

6.3.37 For a full description of the proposed development, including the construction, operational and post-operational phases, refer to **Volume 8** of the **Environmental Statement**.

g) M5, Junction 24 Park and Ride Facility, Freight Management Facility and Temporary Consolidation Facility for Postal/Courier Deliveries and Temporary Induction Centre

6.3.38 The site is located approximately 300m north-west of Junction 24 of the M5, immediately east of the A38 (Taunton Road), and approximately 2.5km to the south of the centre of Bridgwater in the District of Sedgemoor. The site is currently occupied by a storage/distribution facility that ceased operating in September 2011.

6.3.39 An alternative site was previously considered for Junction 24, located to the west of the A38 Taunton Road. However, the previously considered site was a greenfield site and the use of the existing Somerfield Distribution centre is deemed more suitable as it is a previously developed site. In addition, the site is readily available and has the ability to come on line very early in the construction process. Junction 24 is ideally located to intercept traffic travelling from the South, both in terms of park and ride trips by workers and also freight movements.

6.3.40 The proposed development at Junction 24 would provide park and ride and freight management facilities for workers and deliveries of the HPC construction phase; and temporary postal/courier consolidation facilities and a temporary Induction Centre, until those facilities at Junction 23 become available.

6.3.41 The proposed development would comprise:

- a park and ride facility, including parking within existing warehouse building and externally for 1,300 cars, minibuses and vans, reducing to 698 spaces once the facilities at Junction 23 become available, and associated motorcycle, bicycle and bus parking spaces; bus terminus; and ancillary structures, including bus shelters and amenity/welfare and security areas/buildings;
- a freight management facility, including an area for vehicle parking for 140 heavy goods vehicles (HGVs), reducing to 55 spaces once the facilities at Junction 23 become available; a freight checking area; and ancillary structures, including administration/amenity and security areas/buildings;
- a temporary consolidation facility for postal/courier deliveries comprising a consolidation facility building with associated parking area, until the facilities at Junction 23 become available;
- a temporary worker induction centre located within an existing tray wash and vehicle maintenance building comprising induction space and welfare facilities;

and 75 car parking spaces and motorcycle and bicycle spaces, until the facilities at Junction 23 become available;

- internal roads;
- landscaping; and
- other ancillary development, including fencing, lighting, CCTV, signage and utilities.

6.3.42 A temporary induction centre would be provided at the Junction 24 associated development site. There is a defined need for a temporary induction centre to be provided, prior to completion of the bespoke facility at Junction 23, to cater for the early years construction workers. The facility would provide similar functions as the permanent facility, but on a smaller scale. It is anticipated that the temporary induction centre would cater for a maximum of 75 workers per day. The induction centre would still be subject to rigorous security controls due to the sensitive nature of the data collected during the induction process, but would be replaced by the bespoke facility at Junction 23.

6.3.43 The temporary postal/courier consolidation facility would also be provided at Junction 24. Like the induction centre, it is important that this facility be located close to the M5 to intercept deliveries on route to HPC and to reduce the number of vehicles on the local highway network between the M5 and the HPC development site. Therefore, until completion of the facility at Junction 23, the temporary facility would be located at Junction 24.

6.3.44 Construction of the proposed development at Junction 24 would commence in Quarter 1 2013 for approximately six months. The facilities would be partly operational from Quarter 1 2013. It is estimated that EDF Energy would operate the site until Quarter 1 2022, with the temporary facilities being removed when Junction 23 becomes fully operational. Following completion of the HPC construction phase, appropriate measures would be carried out to allow the site to be available for storage/distribution purposes.

6.3.45 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to **Volume 9** of the **Environmental Statement**.

h) Williton Park and Ride Site

6.3.46 The proposal site comprises 1.6ha of land 1.3km to the north-west of the village of Williton, in the District of West Somerset.

6.3.47 The provision of a site in Williton is designed to serve traffic travelling from areas to the west of HPC, removing the need for workers to travel on the local road network in the vicinity of Cannington or Bridgwater.

6.3.48 The proposed Williton park and ride facility would provide car parking for the workforce of the HPC development site, and motorcycle, bicycle and bus parking spaces. The site forms part of a small employment area, the remainder of which will continue to operate whilst EDF Energy occupies part of the site.

6.3.49 The proposed development would comprise:

- a park and ride facility, including parking for 160 cars, disability and van/mini-buses, and ancillary motorcycle, bicycle, mini-bus and bus parking spaces; internal roads; and ancillary structures including bus shelters and welfare and security building;
- landscaping and screen planting for visual mitigation;
- surface water drainage infrastructure; and
- other ancillary development, including fencing, lighting, CCTV and utilities.

6.3.50 Construction of the Williton park and ride facility would commence in Quarter 1 2013 for approximately nine months. The park and ride facility would be operational from Quarter 4 2013. Following completion of the HPC construction phase in Quarter 4 2020 the site would be available for continued use as a lorry park, depot and storage area facility by Quarter 2 2021.

6.3.51 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to **Volume 10** of the **Environmental Statement**.

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7. CONSTRUCTION AND OPERATION CHARACTERISTICS

7.1 Introduction

7.1.1 This chapter summarises the construction and operational characteristics of the HPC Project with regards to workforce profile and skills. The workforce details set out in this chapter have been used to inform the assessment of trip generation and distribution for the HPC Project and its associated development sites.

7.1.2 This chapter also identifies the assessment years used within the trip generation and modelling analysis for the HPC Project, described in later chapters of this report, and summarises the construction programme for the HPC Project providing clarity on the elements of the scheme included within each assessment year.

7.2 Construction Programme

7.2.1 It is anticipated that it would take nine years to build the HPC power station, including Site Preparation Works. Construction of the HPC development site is expected to commence in Quarter 1 of 2013, subject to development consent being granted, and satisfaction of any relevant requirements, and the power station is expected to be substantially complete by 2020. Construction of the spent fuel store would however continue into 2021.

7.2.2 **Table 7.1** summarises the overall construction programme for HPC and the associated development sites based on DCO consent being granted in Quarter 4 2012. It should be noted that this is an indicative programme and represents EDF Energy's best current estimate of the construction programme at the present time.

Table 7.1: Construction and Decommission Programme

Site	Start of Site Works	Commence Operation	Commence Post-operation	End of Post-operation
HPC (including Site Preparation Works)	Q4 2011	Unit 1 Q1 2019 Unit 2 Q3 2020	N/A	N/A
HPC Accommodation Campus	Q2 2013	Q3 2014	Q2 2020	Q1 2021
Bridgwater A Accommodation Campus (Phase 1)	Q2 2013	Q3 2014	Q1 2021	Q4 2021
Bridgwater A Accommodation Campus (Phase 2)	Q2 2013	Q2 2015	Q1 2021	Q4 2021
Bridgwater C Campus	Q1 2013	Q1 2014	N/A	N/A
Junction 23	Q3 2013	Q3 2014	Q4 2020	Q4 2021
Junction 24	Q1 2013	Q3 2013	Q1 2022	Q3 2022
Cannington Park and Ride	Q1 2013	Q4 2013	Q1 2022	Q4 2022
Williton	Q1 2013	Q4 2013	Q4 2020	Q2 2021
Cannington bypass	Q1 2013	Q4 2014	N/A	N/A

Site	Start of Site Works	Commence Operation	Commence Post-operation	End of Post-operation
Combwich Laydown Facility	Q1 2014	Q1 2015	Q3 2021	Q2 2022
Combwich Wharf	Q1 2013	Q1 2014	N/A	N/A
Induction Centre (J23)	Q3 2013	Q3 2014	Q4 2020	Q4 2021
Public Information Centre	Q2 2013	Q1 2014	N/A	N/A

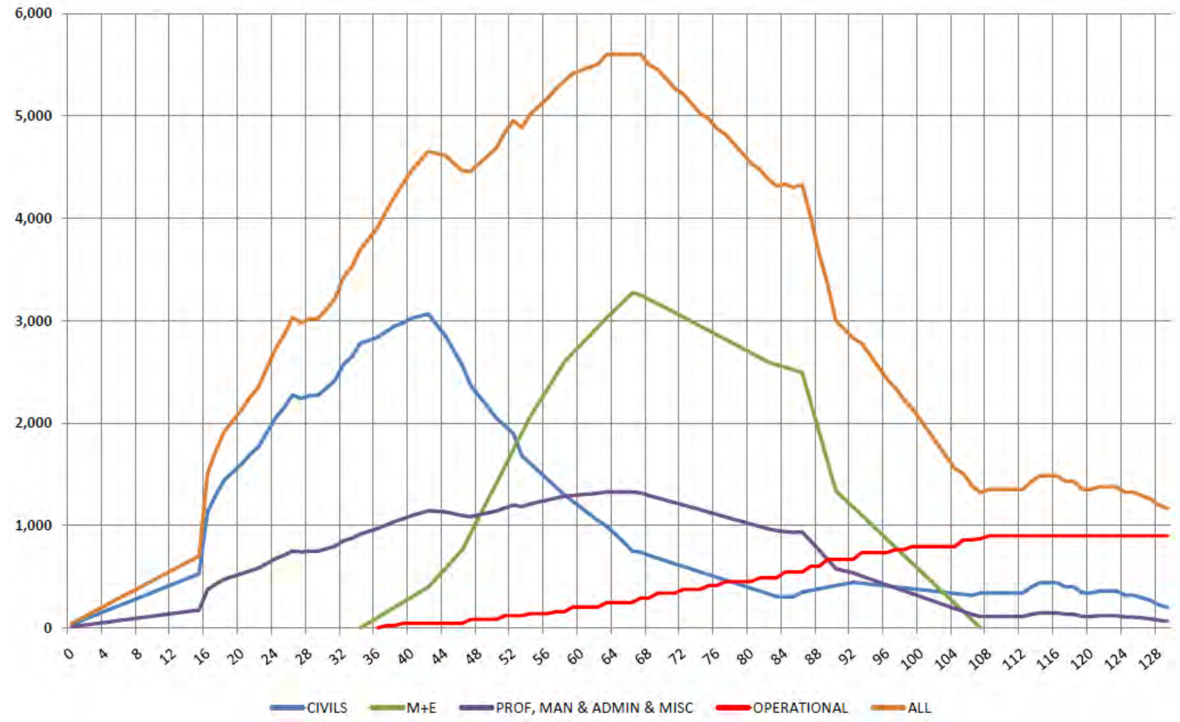
7.3 Workforce Profile

7.3.1 EDF Energy has defined the workforce profile for the full construction and operation phase of the HPC Project including the associated development sites and provided the construction workforce numbers as an input to this assessment.

7.3.2 During the construction phase of HPC the workforce, including that for Site Preparation Works, would gradually build up from Quarter 4 2011. It is forecast that the workforce would peak at 5,600 workers in late 2016 before subsequently decreasing until construction is substantially complete in 2020. The operational workforce is expected to gradually build up before the reactors at HPC are commissioned. Following commission of both reactors, it is anticipated that an operational workforce of 900 personnel would be required.

7.3.3 **Figure 7.1** below illustrates the workforce profile over the construction phase of the HPC Project for each of the main type of workers, including workers for the construction of associated development sites. For clarity, month 0 represents the start of Site Preparation Works, which are scheduled to commence in Quarter 4 2011.

Figure 7.1: Hinkley Point C Construction Workforce Numbers



7.3.4 In terms of skills, the workforce during the construction phase can be divided predominantly into civil operatives and mechanical and electrical operatives with the remaining workforce comprising supervisory, managerial and clerical staff, plus site services and security employees.

7.3.5 The existing skills profile in the local area does not fully meet the specialist requirements of the construction of the HPC Project and as such, there would be two types of construction workers:

- home-based workers, who would commute to and from work on a daily basis from their home address; and
- non-home-based workers who cannot feasibly commute to and from work on a daily basis from their home address and would, therefore, require temporary accommodation in the vicinity of the HPC development site.

7.3.6 Some non-home-based workers would occupy existing local accommodation, such as in the tourist and private rented markets, and some would be resident in dedicated accommodation campuses provided by EDF Energy.

7.3.7 The split of home-based and non-home-based workers is expected to change over the course of the construction period as the nature of the construction evolves. There would be a higher proportion of home-based workers at the outset, which would reduce as the project moves towards peak construction (and more workers with specialist skills are required) and will increase again towards completion as the permanent operational workforce grows, all of whom will ultimately live in the area.

7.3.8 Further detail on the assumptions made regarding where construction workers are likely to live is provided at **Chapter 10** of this report.

7.4 Assessment Years

7.4.1 Three assessment years have been defined for HPC for the purpose of assessing the transport impact of the proposed development. These three assessment years, which have been agreed with the reviewing authorities are:

- 2013 – the ‘early years’ of construction.
- 2016 – the ‘peak’ of construction.
- 2021 – the operational year (including final elements of construction).

7.4.2 The assessments undertaken for each of these three years, represent a weekday scenario (Monday to Friday).

7.4.3 The total number of workers and the estimated percentage split of home and non-home-based workers for 2013, 2016 and 2021 is shown in **Table 7.2**. These figures are for the total workforce and include all workers involved in the construction of associated developments.

Table 7.2: Total Workforce and Home-based Percentage Split

Year	Total Workforce (Maximum)	Home-based (% Split)	Non-home-based (% Split)
2013	3,026	46%	54%
2016	5,600	34%	66%
2021	1485	79%	21%
Operational Year	900	100%	0%

a) Early Years (2013)

7.4.4 All of the park and ride facilities are expected to be operational by Quarter 3 2014 and the Cannington bypass is expected to be operational by Quarter 4 2014. As a result there will be a time prior to completion of the park and ride sites and Cannington bypass when there is a significant proportion of the workforce present, but a lower level of supporting infrastructure in place. This time will also coincide with regular HGV deliveries to site, via the freight management facility at Junction 24. Therefore, in order to assess the impact of this stage in the construction process an ‘early years’ assessment has been undertaken.

7.4.5 Quarter 3 2013 has been selected for the ‘early years’ assessment since it represents the point in the project where the workforce is rising and HGV deliveries are at their peak, but when only Junction 24 of EDF Energy’s associated development sites are operational. Therefore, it represents the worst-case point in the early years of the project, prior to operation of all the associated development sites.

7.4.6 It should be noted that for the 2013 assessment it has been assumed that the highway improvement measures which have been committed to as part of the Site Preparation Works application have been implemented.

b) Peak Construction (2016)

7.4.7 The peak of the construction phase assessed is Quarter 4 2016 since this will be when there is the greatest numbers of construction workers present (5,600). All of the associated development sites will be operational by this year including all accommodation campuses, all four park and ride sites and the Cannington bypass.

c) Operational/ Final Construction Year (2021)

7.4.8 An assessment of the operation of the HPC power station has also been considered. The power station is expected to be operational by 2020, but an assessment year of 2021 has been used since this provides an assessment of 10 years from the application submission date, in accordance with the Department for Transport ‘Guidance on Transport Assessment’. Many of the associated development sites would be being decommissioned in this year, with the exception of Cannington park and ride and Junction 24. Also in 2021 there is ongoing construction work on the HPC development site (primarily on the intermediate spent fuel store).

7.4.9 **Table 7.3** summarises the differences between the three assessment years in terms of infrastructure and facilities that would be operational. A tick indicates that the site is operational.

Table 7.3: Assessment Scenarios

Infrastructure	Quarter 3 2013	Quarter 4 2016	Quarter 4 2021
Junction 23	× (Construction)	✓	× (Decommission)
Junction 24	✓	✓	✓
Williton park and ride	× (Construction)	✓	× (Decommission)
Cannington park and ride	× (Construction)	✓	✓
HPC On-site Campus	× (Construction)	✓	× (Decommission)
Bridgwater A Campus	× (Construction)	✓	× (Decommission)
Bridgwater C Campus	× (Construction)	✓	×
Cannington bypass	× (Construction)	✓	✓
Induction Centre	✓ (J24)	✓ (J23)	× (Decommission)
Postal/Courier Consolidation Centre	✓ (J24)	✓ (J23)	× (Decommission)
Public Information Centre	×	✓	✓

7.5 Shift Patterns

a) Construction Phase

7.5.1 During construction of the HPC Project all construction workers at the HPC development site would operate on a shift basis. A range of shifts would operate during construction of HPC including:

- First Shift (of a double shift operation).
- Second Shift (of a double shift operation).
- Night Shift.
- Single Shift.
- Office Shift.

7.5.2 Shift patterns have been derived by EDF Energy to provide defined windows within which contractors have the flexibility they need to adapt their organisation for the works to be delivered. Therefore, the shift patterns for HPC have each been allocated a start and end window within which workers could arrive at or depart from the HPC development site.

7.5.3 At weekends different shift patterns would apply. Some construction staff would be expected to work a Saturday morning shift with Saturday afternoon and Sunday off work. Other construction staff would be expected to work an alternating pattern (for example 11 days on, three days off, 12 days on, two days off) in which one weekend is worked as a full normal shift (operating on the same times as the weekday shift) and the following weekend is non-working. Overall the arrangements would ensure that every other weekend, aside from small scale maintenance or preparatory activity, there would be no construction activity on site on Saturday afternoons or all day on Sundays. The arrangement provides an opportunity for those non-home-based workers having the alternating shift pattern, to make use of the three day weekend once a month to return home.

7.6 Shift Start and End Windows

7.6.1 In addition to providing flexibility to the contractors and efficiency for the construction programme, the start and end windows for each shift have been developed with the aim of minimising development traffic coinciding with the morning (AM) and evening (PM) network peak hours of 08:00-09:00 and 17:00-18:00 respectively.

7.6.2 The start and end windows for each shift (Weekdays only) are shown at **Table 7.4**.

Table 7.4: Shift Start and End Windows (Monday to Friday)

Shift	Start Window	End Window
First Shift	From 06:00-07:30	From 14:00-16:00 or after 17:30
Second Shift	From 13:30-15:00	From 22:00-00:00
Night Shift	From 20:30-22:00	From 06:00-08:00
Single Shift	From 07:00-08:30	From 16:30-18:30
Office Shift	From 07:30-09:00	From 17:30-19:00

7.6.3 The above shift patterns show the entrance to and exit from the site windows and would apply for all HPC development site construction workers in 2013 and 2016. Hours for construction of the majority of associated developments would be 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays. In 2021 it is assumed that all construction workers would work the single shift.

a) Operational Phase

7.6.4 The operational staff at HPC would follow a similar working pattern to the existing operational staff at Hinkley Point B. **Table 7.5** summarises the weekday shift pattern for the typical operational staff as defined by EDF Energy.

Table 7.5: Operational Weekday Shift Pattern

Shift	Start Window	End Window
Day Workers / Contractors	08:00-08:30	16:30-17:00
Shift 1	08:00	20:00
Shift 2	20:00	08:00

7.7 Workers per Shift

a) Construction Phase

7.7.1 EDF Energy has confirmed that the construction personnel would be split between the different shifts. **Table 7.6** provides an estimate of the number of personnel expected to be working each shift at peak construction in 2016 during a week day.

Table 7.6: Personnel per Shift at 2016 Peak Construction

	Total	First Shift	Second Shift	Night Shift	Single Shift	Office Shift
Contractors Labour Force	4,000	1,200	1,200	300	1,300	0
Contractors Management	800	120	120	30	130	400
Services Team on Site	200	100	60	40	0	0
EDF Construction Management Team on site	300	60	60	10	30	140
Operation Team on site	300	0	0	0	0	300
Total Peak Personnel (max.)	**5,600**	**1,480**	**1,440**	**380**	**1,460**	**840**

7.7.2 **Table 7.7** provides an estimate of the number of personnel expected to be working each shift on a weekday at the peak of the early years construction in 2013.

Table 7.7: Personnel per Shift at 2013 Peak Construction

	Total	First Shift	Second Shift	Night Shift	Single Shift	Office Shift
Contractors Labour Force	2161	648	648	163	703	0
Contractors Management	432	65	65	16	70	216
Services Team on Site	108	54	32	22	0	0
EDF Construction Management Team on site	162	32	32	5	16	76
Operation Team on site	162	0	0	0	0	162
Total Peak Personnel (max.)	**3,026**	**799**	**778**	**206**	**790**	**454**

7.7.3 **Table 7.8** provides an estimate of the number of personnel expected to be working each shift on a weekday at the peak of the final construction in 2021.

Table 7.8: Personnel per Shift at 2021 Operational/ Final Construction Phase

	Total	First Shift	Second Shift	Night Shift	Single Shift	Office Shift
Spent Fuel Store	300	0	0	0	300	0
Contractor and EDF Management	145	0	0	0	145	0
AD Site Workers	140	0	0	0	140	0
Operation Team on site	810	35	35	0	740	0
Total Peak Personnel (max.)	**1395**	**35**	**35**	**0**	**1325**	**0**

b) Operational Phase

7.7.4 Of the 900 operational workers, approximately 810 workers would be on site over the course of any weekday. There would be 550 permanent staff and 190 contractors all working a single day shift. Of the 900 workers 160 would work shifts with 35 shift workers working Shift 1 and 35 workers working Shift 2 and the remainder not working. **Table 7.9** summarises the number of workers on site during a typical weekday working each shift.

Table 7.9: Number of Workers for each Shift During a Typical Weekday

Shift	Number of Workers Working On-site	Number of Workers Not Working On-site
Day Workers	550	0
Contractors	190	0
Shift 1	35	0
Shift 2	35	0
Day Off	0	90
Total	**810**	**90**

7.8 Arrival/Departure Profile

7.8.1 The HPC construction worker arrival and departure profile forms the basis of the trip generation analysis for HPC. The arrival and departure profile of workers at the HPC development site has been derived by EDF Energy for use in this assessment. The profile has subsequently been adapted to reflect the arrival and departure profile of workers to the park and ride sites, accounting for journey times to and from HPC.

7.8.2 The arrival and departure profile applied within the trip generation assessment is shown at **Table 7.10.** The construction workforce profile applies to both the 2013 ‘early years’ assessment and the 2016 ’peak construction’ assessment.

7.8.3 It should be noted that the current profile, as presented at **Table 7.10**, does not account for very small scale movements that are likely to take place outside of the main shift patterns, such as those movements associated with staff attending doctors/ dentist/ hospital appointments or for other similar reasons. It should be noted that there would be a limited bus timetable operating throughout the day to facilitate workers on these types of personal business trips. This is discussed in more detail later in this report.

7.8.4 The workforce profile displayed at **Table 7.10** indicates the time profile by which workers would depart their origin, i.e. their park and ride site or home for those using direct buses and includes journey time to HPC (for direct bus services and from park and ride sites) and wait time.

7.8.5 This profile has been used to estimate the trip generation for the HPC Project which is covered in the next chapter.

Table 7.10: Number of Workers for Each Shift during a Typical Weekday

Hour Commencing	Arrivals (% of total workforce at 2016 (5600 workers))	Departures
00:00	0%	19.8%
01:00	0%	3.1%
02:00	0%	0%
03:00	0%	0%
04:00	3.5%	0%
05:00	21.2%	0%
06:00	20.6%	0%
07:00	19.7%	4.8%
08:00	2.5%	0.3%
09:00	0%	0%
10:00	0%	0%
11:00	0%	0%
12:00	5.6%	0%
13:00	17.8%	0%
14:00	3.8%	0%
15:00	0%	2.7%
16:00	0%	21.5%
17:00	0%	17%
18:00	0%	18.6%
19:00	0.5%	8.3%
20:00	4.8%	0%
21:00	0%	0%
22:00	0%	0%
23:00	0%	4.1%

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8. PEOPLE TRIP GENERATION

8.1 Introduction

8.1.1 This chapter provides a detailed summary of the people trip generation analysis for HPC development site and the associated development sites. People trip generation refers to the trips (journeys) generated by all people associated with the proposed HPC Project including construction workforce (HPC development site and associated development sites), operational workforce, business visitors and visitors to the Public Information Centre (PIC).

8.1.2 The full trip generation analysis for the HPC Project is set out within a spreadsheet model developed for the HPC Project, the development of which has been discussed and largely agreed at the Transport Workstream meetings held over the nine month period leading up to the submission of the DCO application. The final spreadsheet model has been submitted electronically as part of the DCO application.

8.1.3 It should be noted that where vehicle trips are calculated within this chapter, the trips are presented for the AM peak hour (08:00-09:00) and the PM peak hour (17:00 to 18:00) since these are the critical peak hours for the highway network. Daily trip estimates have also been provided.

8.1.4 The bulk of this chapter describes the derivation of the 2016 trip estimate since this is the period of peak workforce. However, commentary is made on 2013 and 2021 assessments towards the end of the chapter. The assessments of these years are included within the spreadsheet model.

8.2 2016

a) The Workforce

8.2.1 The construction workforce associated with the HPC Project would gradually build up from the Site Preparation Works to the peak construction phase in 2016. There would be up to 5,600 workers at peak construction. Of these, approximately 34% (1,900) would be locally employed (home-based) workers who are already resident in the local area with the remaining 66% (3,700) being non-home-based workers who would move to the area for the period of their employment on the project. The split of home and non-home-based workers changes during the construction period as the workforce increases towards the peak. In 2013, the split is more even with 46% of the 3,026 workforce being home-based and 54% being non-home-based.

8.2.2 It has been assumed that home-based workers would be located within a catchment area of up to 90 minutes travel time from the HPC development site and that non-home-based workers would be within a catchment of 60 minutes. These assumptions reflect experience from other major construction projects and from Sizewell B – the last nuclear power station constructed in the UK.

8.2.3 Of the estimated 3,700 non-home-based workers at peak construction (2016) it is assumed that 1,450 would be located in EDF Energy provided campus accommodation (this assumes 96% occupancy of the total 1,510 spaces provided across the three accommodation campuses) and that the remaining 2,250 workers would be resident in a combination of private rented, tourist and owner occupied accommodation.

b) The Strategy

8.2.4 The transport strategy for the HPC Project considers a number of options for the movement of people associated with the HPC Project. The full strategy has already been described at **Chapter 5** of this Transport Assessment, but the key elements are to:

- Provide only limited parking at the HPC development site, to be allocated and controlled using a strict permit system allowing just 4% of the total workforce to drive on their journey to work.
- Adopt a comprehensive park and ride strategy, incorporating four park and ride sites by peak construction, which would facilitate the movement of around 50% of HPC workers by park and ride buses at the peak of construction.
- Provide a fleet of direct bus services, aligned to workers home locations, which pick up workers at designated stops and transport them direct to the HPC development site, facilitating the movement of around 21% of HPC workers at the peak of construction.
- Provide designated accommodation campus bus services from the accommodation campuses in Bridgwater to and from the HPC development site. Combined with the HPC accommodation campus in total around 26% of all the peak workforce would be either already resident at HPC or would make their daily journey to and from the HPC development site by a accommodation campus bus.
- Implement a comprehensive Travel Plan which supports the over-arching transport strategy and promotes and encourages further travel by sustainable modes and seeks to minimise journeys by private car wherever possible.
- Implement a series of highway network improvements, including capacity improvements and improvements to walking and cycling infrastructure to further minimise the impact of workforce and visitor travel on the local highway network, particularly in sensitive areas.

8.2.5 The analysis presented within this chapter builds on this transport strategy and estimates the resultant number of trips.

c) Inputs to the Analysis

8.2.6 As described within **Chapter 7**, a number of inputs to the analysis have been generated for the purpose of accurately assessing the people trip generation associated with HPC, including:

- workforce numbers;
- shift patterns;
- shift start/end times;
- split of workers per shift;
- workforce arrival/ departure profile; and
- business visitors and visitors to the Public Information Centre.

8.2.7 These six items have been developed by EDF Energy's construction team from its previous experience and working knowledge of the likely construction and operational requirements of HPC.

d) The Elements of Trip Generation

8.2.8 The key elements of the trip generation are as follows:

i. Park and Ride Site Trips

Park and ride site trips encompass two elements, the number of trips by workers to and from each park and ride site by mode, and the number of bus trips generated by each park and ride site (between the park and ride site and HPC).

The analysis of park and ride trips first considers the number of people trips to and from each park and ride site by mode, including trips by sustainable 'non-vehicular' modes and also vehicle trips including both single occupancy and car share trips. This analysis identifies the number of people requiring park and ride parking spaces by time of day for each site i.e. the 'demand'. Once demand is established, the number of buses required to transport workers between the park and ride site and HPC can be assessed; thus providing the park and ride bus trips.

ii. Direct to Site Trips

Direct to site car trips relate to those trips generated by workers direct from their home location to the limited designated parking on the HPC development site. It is assumed (as a robust assumption) that all of these trips take place by single occupancy cars.

iii. Direct Bus Trips

Trips generated by workers travelling direct to the HPC development site or AD site from their place of residence (be it their home or rented accommodation, but excluding accommodation campuses), on a designated bus service provided by EDF Energy.

iv. Accommodation Campus Trips

This analysis has two key elements: work related trips and non-work related trips. All work related trips to and from the HPC development site are by dedicated accommodation campus bus services. Non-work trips include those for personal business, leisure, visiting friends and would be by a variety of modes.

v. Induction Centre Trips

These trips relate to those workers accessing the Induction Centre before they commence work on the HPC Project. As a robust assumption all trips are envisaged to take place by car, since workers would not at that point have been allocated to park and ride sites or direct bus services.

vi. Public Information Centre Trips

These trips are associated with visitors to the Public Information Centre, via Cannington park and ride.

e) Park and Ride Site Trip Generation

8.2.9 As described within **Chapter 6**, a total of four park and ride sites are proposed as part of the HPC Project.

8.2.10 By 2016, all four park and ride sites would be in operation at Cannington, Williton and adjacent to Junction 23 and Junction 24 of the M5.

8.2.11 The parking provision for each park and ride site in 2016 is shown at **Table 8.1**.

Table 8.1: Park and Ride Parking Provision 2016

Park and Ride Facility	Car, Minibus and Van Parking Spaces
	2016
Junction 23	1,300
Junction 24	698
Williton	160
Cannington	132

8.2.12 The starting point in the analysis is the 5600 construction workers employed in 2016. Of these, 200 are expected to drive direct to the HPC development site; 1450 would live in accommodation campuses and therefore 3950 (5600-200-1450) are potential users of park and ride sites.

8.2.13 Taking the potential users of park and ride, the next stage is to establish the number of workers that are likely to use non-car modes i.e. walk, cycle, direct EDF bus, public bus and rail and thus do not need to use the park and ride sites. Once these trips have been established they are then subtraced to leave the number of workers who will use the park and ride sites.

8.2.14 The users of the park and ride sites are then analysed to determine their mode of access to the park and ride site (car driver, car share, walk, cycle) and therefore the parking demand and bus demand.

8.2.15 The analysis uses information obtained from the gravity model which is specific to the HPC Project and has been developed as a tool to assess the likely distribution of workers in the future. The gravity model is described in full at **Chapter 10**.

f) Non-vehicular Trip Generation

8.2.16 It should be noted that the non-car trips identified within this assessment represent the baseline level of workers that would travel by each non-car mode. This is before the implementation of proposed Travel Plan measures to further promote the use of sustainable non-car modes. This methodology therefore provides a robust assessment of car use to and from the park and ride facilities.

i. Walking

8.2.17 In order to establish the baseline proportion of staff that could walk to the HPC development site or to the park and ride sites, Travel to Work Census (2001) data has been applied to those areas within 2km walking distance of HPC and 800m walking distance of the park and ride sites.

8.2.18 A 2km walking distance has been set from the HPC development site in accordance with PPG13 which suggests that 2km is a suitable walking distance. It is considered reasonable for workers to walk up to 2km if walking is the single mode of transport to travel to work. However, if workers are walking to interchange onto another mode of transport (i.e. bus from the park and ride sites) then it is considered that workers would walk a shorter distance.

8.2.19 With regards to walking to a bus stop or park and ride site, current guidance recommends 400m as a maximum walk distance to a bus, for the average population. However, given that workers at HPC would generally be fit, active people (given the job requirements of working on a construction site) it is considered reasonable that a wider walking catchment could be achieved. Therefore, an 800m catchment around each park and ride site has been considered.

8.2.20 Based on the gravity model, it is expected that 481 workers, at the peak level of activity in 2016, would live within the closest wards to the HPC development site and each of the four park and ride sites. Of those, just two workers are expected to live within the 2km walk catchment of HPC.

8.2.21 A review of the 2001 census data for West Somerset shows that 21.6% of the resident population walk to work, of which 86% of trips are up to 2km. Therefore, as a baseline mode share without any Travel Plan measures, it is estimated that only two workers would walk to work at the HPC development site or to the four park and ride sites.

ii. Cycling

8.2.22 In order to establish the baseline proportion of staff that could cycle to the HPC development site or to the park and ride sites, Travel to Work Census (2001) data has been applied to those areas within an 8km cycle distance of the HPC development site and within a 5km cycle distance of the park and ride sites.

8.2.23 Paragraph 78 of PPG13 states that "cycling also has potential to substitute for short car trips, particularly those under 5km, and to form part of a longer journey by public transport." Paragraph 1.5.1 of Local Transport Note 2/08 states that "In common with other modes, many utility cycle journeys are less than three miles (ECF, 1998), although, for commuter journeys, a trip distance of over five miles is not uncommon." Based on this guidance and given that workers at HPC would generally be fit, active people it is considered reasonable that a wider cycle catchment could be achieved and an 8km cycle catchment for the HPC development site has been used.

8.2.24 With regards to cycling to a park and ride site, a catchment of 5km has been used as a reasonable catchment since the workers would then be required to interchange from bicycle to bus to travel the remainder of the journey to the HPC development site.

8.2.25 Based on the gravity model it is expected that 815 workers would live within 5km of the HPC development site or park and ride sites. In addition, a total of 1,082 workers are likely to live within the wider 8km cycle catchments.

8.2.26 A review of the 2001 census data for West Somerset shows that 4.1% of the resident population cycle to work, of which 93% of trips are up to 10km (Note, 10km is the standard distance applied within Census data and this cannot be adjusted to reflect 8km). Therefore, as a baseline mode share without any Travel Plan measures, it is estimated that 55 workers would cycle to work at the HPC development site or park and ride sites.

iii. Motorcycling

8.2.27 Similar to the cycling methodology, Travel to Work Census (2001) data for motorcycles has been used in order to understand the baseline mode share of motorcycling to work in the area prior to any Travel Plan measures being implemented to further promote this mode.

8.2.28 Workers would not be permitted to motorcycle direct to the HPC development site, but would be permitted to motorcycle to the park and ride sites and continue their journey to work by bus. Motorcycle parking would be provided at the park and ride sites, but no provision would be made at the main HPC development site.

8.2.29 To determine the baseline mode share of motorcycle trips without any Travel Plan measures, the number of workers, at peak, has been multiplied by the 2001 census data mode share for motorcycling to work (i.e. 1.1% daytime population for West Somerset). Therefore, as a baseline mode share without any Travel Plan measures, it is likely that 57 workers would travel by motorcycle to the four park and ride sites.

iv. Rail

8.2.30 It is clear from the gravity model mapping that clusters of people currently reside near to existing railway stations, running from Bristol in the north to Exeter in the south. A review of the rail timetable information suggest that rail travel could be an option for some workers taking account of the proposed HPC shift times.

8.2.31 A proportion of the total number of workers living within an 800m walking catchment of each of the rail stations has been assigned to rail travel. The proportion is based upon the Journey to Work Census (2001) data for rail travel.

8.2.32 Based on this methodology, the total number of workers estimated to travel to the HPC development site or park and ride sites by rail is just two workers (one to the HPC development site and one to Junction 23 park and ride), prior to any travel plan measures being implemented.

v. Direct Bus

8.2.33 EDF Energy proposes to provide a number of direct bus trips as part of their transport strategy, to transport workers direct to the HPC development site from areas where clusters of workers reside.

8.2.34 To estimate the number of workers who could feasibly access the HPC development site by direct bus, towns containing concentrated numbers of HPC workers have been identified from the 2016 gravity model. Workers travelling by direct bus would not use the park and ride facilities, but would be bussed direct to the HPC development site from a pick up point.

8.2.35 The proposed locations of the direct bus pick-up and drop-off points are sited to cover centres of population as far as possible, and are located at existing bus stops or rail stations. In addition, potential pick-up points have been identified for workers living in wards en-route to the HPC development site.

8.2.36 The proportion of workers within an 800m catchment of existing bus stop facilities in each ward has been estimated based on the density of settlements in the ward to show the estimated direct bus passenger demand.

8.2.37 **Table 8.2** shows the proposed routes and the number of workers assigned to each route for each shift to illustrate that there is sufficient passenger demand. This assumes that all workers within 800m of the designated stopping points for each direct bus route are assigned to this mode. The night shift has not been allocated any direct bus passengers due to the small demand.

Table 8.2: Forecast Direct Bus Journeys (2016)

	Shift 1	Shift 2	Shift 3	Single	Office	Total
Weston-Super-Mare – HPC	65	63	17	27	73	**245**
Brean Burnham – HPC	72	70	19	30	82	**273**
Taunton – HPC	37	36	10	16	42	**141**
Minehead and Williton/Watchet – HPC	34	33	8	15	39	**129**
Bridgwater 1,2 and 3 – HPC	80	78	20	33	91	**302**
Cannington and Nether Stowey – HPC	21	20	6	9	24	**79**
All Routes	309	300	80	130	351	**1,170**

8.2.38 **Table 8.2** shows a total of 1,170 workers accessing the HPC development site by direct bus.

vi. Public Bus

8.2.39 The Chartered Institute of Highways and Transportation (CIHT) 'Guidelines for Planning for Public Transport in Developments' (1999) recommends a maximum walking distance to bus stops of 400m. This has been extended to 800m given the workforce demographics. At present no bus services serve the Hinkley Power Station Complex and there are no bus stops within the recommended maximum walking distance of 400m or within 800m. Of the existing bus routes, routes 23A, 23B and 614 run the closest to the HPC development site, which are all school services and as such, no workers would be expected to use these services.

8.2.40 There are four bus routes which pass close to the four park and ride sites, including routes 21, 21a, 23a, 14 and 13. The total working population has been calculated within each of the wards through which these routes pass and is 1,059 workers. The proportion of those workers living within 800m of a bus stop along these routes has been calculated and a total of 12 workers are captured within this catchment. Therefore, prior to any travel plan measures being implemented it is envisaged that 12 workers may choose to travel by public bus to the park and ride sites.

vii. Summary of Non-Car Modes

8.2.41 The results of the assessment to determine the extent of travel by non-car modes for park and ride sites and the HPC development site are summarised at **Table 8.3**.

Table 8.3: Trips by Non-car Modes Peak Year (2016)

	J23	J24	Can	Wil	HPC	TOTAL
Walk	0	0	1	0	1	2
Cycle	9	24	17	5	0	55

	J23	J24	Can	Wil	HPC	TOTAL
Motorcycle	31	15	6	5	0	57
Rail then Bus	1	0	0	0	1	2
Direct Bus	0	0	0	0	1,170	1,170
Public Bus	5	4	1	2	0	12
Total	**46**	**43**	**25**	**12**	**1,172**	**1,298**

g) Vehicular Trip Generation

8.2.42 Once the non-vehicular trips have been removed from the total staff trips that potentially could be attracted to park and ride sites, the next stage is to examine car trips and split them between car driver and car share. The method for doing this has been agreed with the reviewing authorities and is set out below.

i. Car Trips - Single Occupancy Vehicles

HPC Development Site

8.2.43 On-site parking would be very heavily constrained throughout construction of HPC and the large majority of the workforce would be required to come to site by bus, either direct, park and ride or accommodation campus bus services.

8.2.44 However, there would for a range of operational reasons be a requirement for some personnel to be able to travel direct to and from the HPC development site by car. Therefore, 200 spaces have been allocated for this purpose to contractors and EDF Energy staff. Further information on how these spaces would be allocated is set out in **Chapter 11** of this Transport Assessment.

8.2.45 For the purpose of establishing the trip generation associated with these spaces, it has been assumed that the 200 on-site parking spaces at the HPC development site would attract only single occupancy car trips. Therefore, 200 single occupancy car trips are assumed in the analysis for the HPC development site.

8.2.46 To provide a robust assessment it has been assumed that there would be 200 arrival trips between 07:00 and 09:00, with 70% arriving between 07:00 and 08:00 and 30% arriving between 08:00 and 09:00. Similarly, in the PM peak, 200 trips would depart the site between 18:00 and 20:00 with 80% departing between 18:00 and 19:00 and 20% departing between 19:00 and 20:00. Therefore, it has been assumed that the car park would reach capacity during the AM peak and remain at capacity throughout the day until the departures in the PM peak. The assumed arrival and departure profile is shown at **Table 8.4**:

Table 8.4: Arrival/Departure Profile for Office Shift

Period	Time	Arrivals	Departures
AM Peak	07:00-08:00	70%	0%
	08:00-09:00	30%	0%
PM Peak	18:00-19:00	0%	80%
	19:00-20:00	0%	20%

8.2.47 Applying the profile in **Table 8.4** to the 200 trips in each peak period provides the trip generation presented in **Table 8.5**.

Table 8.5: Trip Generation for Direct Cars to HPC

Period	Time	Arrivals	Departures
AM Peak	07:00-08:00	140	0
	08:00-09:00	60	0
PM Peak	18:00-19:00	0	160
	19:00-20:00	0	40

Park and Ride Sites

8.2.48 To estimate the number of single occupancy car trips to the four park and ride sites, the 2016 gravity model has been used. The number of workers in each ward has been spread over the five shifts for the HPC construction, to account for workers living in the same ward, but working different shift patterns.

8.2.49 The workers, once separated into shift patterns, have been divided by the area of the ward to provide the number of workers per square mile.

8.2.50 The workers residing in a ward and working a shift with fewer than one worker per square mile have been identified as single occupancy car trips, as agreed with the transport workstream. The approach ensures that car sharing trips would be feasible for the full extent of the journey between a ward and the park and ride site to ensure workers are not only car sharing for the final stages of the commuting journey.

8.2.51 The workers identified as accessing the park and ride sites by single occupancy car trips have been assigned to their nearest park and ride site. **Table 8.6** shows estimated number of single occupancy car trips to each of the park and ride sites in 2016.

Table 8.6: Single Occupancy Car Trips to Park and ride Sites

Park and ride Site	Single Occupancy Car Trips
Junction 23	281
Junction 24	220
Cannington	115
Williton	84
Total	**700**

8.2.52 **Table 8.6** shows a total of 700 single occupancy car trips to the park and ride sites, with the Junction 23 park and ride site attracting the most trips, 281.

ii. Car Share Car Trips

8.2.53 To estimate the number of workers that would access the park and ride sites by shared occupancy car trips, the remaining number of workers (after excluding walking, cycling, motorcycle trips, bus trips, public bus trips and single occupancy car trips) have been assumed to have an average car occupancy of two per car, although in reality some cars would have no passengers and some would have more than one. Overall it is considered to be a robust assumption. There is, for example, evidence that car sharing during the construction of Sizewell B was above two people per car.

8.2.54 **Table 8.7** below shows the estimated number of shared occupancy car trips for each of the four park and ride sites. The shared occupancy car trips have been assigned to the nearest park and ride site to the ward in which they reside.

Table 8.7: Shared Occupancy Car (Driver and Passenger)

PandR Sites	Shared Occupancy
Junction 23	1,122
Junction 24	618
Williton	129
Cannington	78
Total	**1,947**

8.2.55 **Table 8.7** shows 1,947 workers car sharing to access the park and ride sites which would equate to 973 car trips assuming car occupancy of two workers per car.

iii. Summary of Car-Based Trips

8.2.56 The results of the assessment to determine the extent of travel by car modes, single occupancy and car share, for park and ride sites is summarised at **Table 8.8**.

Table 8.8: Person Trips by Car Peak Year (2016)

	J23	J24	Can	Wil	HPC	Total
SO Car	281	220	115	84	200	900
Car Share	1,122	618	129	78	0	1,947
Total	**1,403**	**838**	**244**	**162**	**200**	**2,847**

h) Summary of Journey to Work Trips

8.2.57 The trip generation analysis undertake within the preceding sections has determined the total number of worker trips by mode to be determined. These are summarised in **Table 8.9**. It should be noted that due to rounding in the analysis the total does not add up to exactly 5,600.

Table 8.9: Journey to Work Trips (2016)

	J23	J24	Can	Wil	HPC	TOTAL
Walk	0	0	1	0	1	2
Cycle	9	24	17	5	0	55
Motorcycle	31	15	6	5	0	57
Rail	1	0	0	0	1	2
Direct Bus	0	0	0	0	1,170	1,170
Campus Bus	0	0	0	0	1,450	1,450
Public Bus	5	4	1	2	0	12
SO Car	281	220	115	84	200	900
Car Share	1,122	618	129	78	0	1,947
Total	**1449**	**881**	**269**	**174**	**2,822**	**5,595**

8.2.58 The analysis indicates that an estimated total of 2,773 workers would use park and ride sites.

8.2.59 The total vehicles arriving at each park and ride site is determined by adding the single occupancy car trips (700) to the car sharing car trips (973) to give a total of 1,673 car trips.

i) Park and Ride Bus Numbers

8.2.60 Once the worker demand for each park and ride site has been calculated it is possible to determine the number of buses required to transport workers from each park and ride site to the HPC development site.

8.2.61 **Table 8.10:** shows the passenger capacity for the park and ride buses and the actual and profiled journey times to the HPC development site.

Table 8.10: Park and Ride Bus Capacity and Journey Time

Park and Ride Facility	Bus Capacity	Profiled Journey Time (Minutes)	Surveyed Journey Time (Minutes)
Junction 23	40	30	23
Junction 24	40	30	23
Williton	15	30	26
Cannington	25	15	10

8.2.62 The Cannington park and ride site would use around 25-seater buses to transport workers. This is because of the anticipated occupancy per bus which would be lower than the Junction 23 and Junction 24 sites, which use around 40-seater buses. It is proposed that buses from Williton would route via the A39, thus avoiding Stogursey, with the only exception to this being buses that pick up workers in Stogursey itself and these services would be restricted to around 15-seater mini-buses only. It is likely that all buses from Williton would be 15-seaters.

8.2.63 The demand for park and ride buses is based on the number of workers arriving and departing throughout the day in each shift (in accordance with the worker arrival/departure profile presented at **Chapter 7**) and the bus capacity. This has been used to derive an estimate of the frequency of service for different times of the day.

8.2.64 The full detailed analysis for park and ride bus demand is presented in the spreadsheet model that has been used in the assessment.

8.2.65 The number of buses during the AM, PM and Daily periods for each service in each assessment year is set out in **Table 8.11** and **Table 8.12**. These figures are two way bus movements, i.e. the sum of bus movements from the park and ride site to the HPC development site and from the HPC development site to the park and ride site.

Table 8.11: 2013 Park and Ride Bus Demand (Two-way)

Park and Ride Facility	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Daily (00:00-24:00)
Junction 24	10	20	224

Table 8.12: 2016 Park and Ride Bus Demand (Two-way)

Park and Ride Facility	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Daily (00:00-24:00)
Junction 23	6	16	176
Junction 24	6	12	128
Williton	6	12	124
Cannington	4	8	80

j) Direct Bus Trips

8.2.66 The total worker demand for direct bus services in the peak construction year of 2016 has been calculated and is presented in this chapter.

8.2.67 With regards to assessment years, it is envisaged that direct buses would also be provided in 2013, and 2021. However, the number of workers using the direct buses each year, and thus their viability, varies. **Table 8.13** provides a summary of the routes to be provided in 2016 and the number of workers assumed to use each route.

Table 8.13: Assessment Year Direct Bus Services (2016)

Route	Number of Workers
	2016
Weston-Super-Mare – HPC	244
Brean Burnham – HPC	273
Taunton – HPC	141
Minehead and Williton – HPC	129
Bridgwater 1 – HPC	83
Bridgwater 2 – HPC	133
Bridgwater 3 – HPC	87
Cannington and Nether Stowey – HPC	80

8.2.68 The hourly breakdown of bus demand is based on the number of workers arriving and departing throughout the day (the arrival and departure profile is presented in **Chapter 7**).

8.2.69 The number of buses during the AM peak (08:00-09:00), PM peak (17:00-18:00) for each service in 2016 is set out in **Table 8.14**.

Table 8.14: 2016 Direct Bus Demand

Route	Number of Buses (Two-way)	
	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)
Weston-Super-Mare – HPC	4	8
Brean Burnham – HPC	4	8
Taunton – HPC	4	8
Minehead and Williton – HPC	4	8
Bridgwater 1 – HPC	4	8
Bridgwater 2 – HPC	4	8
Bridgwater 3 – HPC	4	8
Cannington and Nether Stowey – HPC	4	8

8.2.70 At this stage of the planning process the bus routes and timetables described in this chapter are not fixed. Timetables and routes have been developed for modelling purposes to assess a worst case impact that provision of such services could have on the highway network. For modelling the assumption has been that workers would be provided with a choice of relatively frequent services. As the development progresses EDF Energy would refine the bus services, routes and timetables to best serve the actual distribution of workers. Workers living in appropriate locations would be allocated to a particular direct bus route and stop and there would be significant scope for allocating workers to a bus leaving at a particular time. Similar opportunities would arise in relation to some park and ride and accommodation campus buses. This should enable the number of bus trips to be significantly reduced.

8.2.71 The timetables are not fixed at this stage and will be finalised once an operator has been appointed to provide the bus services. Direct bus provision and timetables will also be regularly adjusted to match the changing patterns of demand. In practice the number of buses is likely to be significantly less. However, at this stage and for the purpose of providing a robust worst case assessment of the likely impact of bus services on the local transport network, the timetables have been used as an input to the modelling.

k) Campus Person Trips

8.2.72 Analysis of the people trip generation for each of the proposed accommodation campuses has been undertaken, including an assessment of work and non-work related trips. The accommodation campuses would not be operational until Quarter 1 2014.

l) Accommodation Campus Work Trips

8.2.73 All work related trips for occupants of the Bridgwater A and C accommodation campuses would be via direct buses to and from the HPC development site. Therefore, work related trip generation for the two Bridgwater accommodation campuses, by bus, has been derived using the shift patterns and the arrival and departure profile of staff by time of day supplied by EDF Energy. This is discussed in detail in **Chapter 7**.

8.2.74 Workers living at the HPC accommodation campus would walk from the accommodation campus through an internal security gate within the accommodation campus site to access a bus route that would route within the HPC construction area. As such, occupants would not travel on the public highway to get to and from work and have not been considered within this people trip generation exercise.

8.2.75 The total number of occupants present at Bridgwater A and C accommodation campus at any one time would be a maximum of 1,000. The workforce profile included at **Chapter 7** indicates that 20.6% of workers would arrive at HPC between 06:00 and 07:00 therefore, 206 accommodation campus based workers are likely to arrive at this time (20.6% of 1,000 workers). Given the journey time of 30 minutes between Bridgwater accommodation campuses and the HPC development site, a total of 206 workers would leave the Bridgwater accommodation campuses by bus between 05:30 and 06:30. This would require a total of six buses, based on a capacity of 40. This methodology has been repeated throughout the 24 hour period to determine the number of buses required each hour.

8.2.76 The total number of inbound and outbound bus trips generated by the proposed Bridgwater accommodation campuses is shown in **Table 8.15** for the AM peak, PM peak and Daily.

Table 8.15: 2016 Accommodation Campus Bus Trips

Route	Number of Buses (Two-way)		
	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Daily (00:00-24:00)
Bridgwater A + C Accommodation Campuses	6	12	128

m) Accommodation Campus Non-Work Trips

8.2.77 A number of daily non-work related trips would be undertaken by occupants of each of the proposed accommodation campuses. These types of trips would differ slightly from the non-work trips associated with an average household given the specific characteristics of the occupants of the accommodation campuses, since no children or families would live in these facilities.

8.2.78 The people trip generation analysis for the non-work trips considers TEMPRO v 5.4 statistics for Journey Purpose by Time of Day per Household (Bridgwater Area) and considers the following:

- Holiday/Day Trip.
- Personal Business.

- Recreation/Social.
- Shopping.
- Visiting Friends/Relatives.

8.2.79 The industry standard TRICS database has been used to identify a trip rate per dwelling for an average household located in an edge of town location in England, for all trips by all modes of transport (person trips). It should be noted that the 'Houses privately owned' category has been selected since this is likely to produce a higher trip rate than for rented flats or student accommodation ensuring the analysis is robust.

8.2.80 The arrival and departure profile, anticipated by EDF Energy, has been used to determine the number of occupants of the accommodation campuses that are not at work by time of day, since it is only these workers who would make non-work related trips.

8.2.81 The total number of non-work person trips by time of day is subsequently derived by applying the non-work related person trip rate to the number of workers present within each accommodation campus by time of day.

8.2.82 The analysis takes account of trips that are likely to be external to the accommodation campus and those that are likely to be internal, since both the Bridgwater A and the HPC accommodation campuses incorporate a number of facilities including sports facilities, a canteen, a lounge bar, internet services, a laundrette and small shop.

8.2.83 **Table 8.16** summarises the facilities that would be provided at the accommodation campuses. Residents at Bridgwater C would have access to facilities at the Bridgwater A accommodation campus and therefore it has been assumed that internal trips for the Bridgwater A and C accommodation would be the same.

Table 8.16: Accommodation Campus Facilities

Facility	Bridgwater A	Bridgwater C	HPC
Canteen	✓	x	✓
Shop	✓	x	✓
Laundry Room	✓	x	✓
Medical Room	X	x	✓
Games Room	✓	x	✓
Internet Room	✓	x	✓
Lounge Bar	✓	x	✓
TV Lounge	✓	x	✓
Gym	✓	x	✓
Sports Pitches	✓	✓	✓

8.2.84 **Table 8.17** identifies the assumptions that have been made regarding the proportion of non-work trips that would be internal and external to the proposed Bridgwater accommodation campuses.

Table 8.17: Split of Internal and External Accommodation Campus Person Trips BRI A and C

Journey Purpose	Proportion of Internal (On-campus) Trips	Proportion of External (Off-campus) Trips
Holiday/Day Trip	0%	100%
Personal Business	70%	30%
Recreation/Social	70%	30%
Shopping	50%	50%
Visiting Friends/Relatives	50%	50%

8.2.85 The HPC accommodation campus would have similar facilities to those on the Bridgwater A site with the addition of a medical room. **Table 8.18** identifies the assumptions that have been made regarding the proportion of accommodation campus non-work trips that would be internal and external to the HPC accommodation campus.

Table 8.18: Assumed Split of Internal and External Accommodation Campus Person Trips HPC

Journey Purpose	Proportion of Internal (On-campus) Trips	Proportion of External (Off-campus) Trips
Holiday/Day Trip	0%	100%
Personal Business	75%	25%
Recreation/Social	70%	30%
Shopping	50%	50%
Visiting Friends/Relatives	30%	70%

8.2.86 For the purpose of transport modelling, all trips that are considered to be internal to the three accommodation campuses have been removed from the analysis, since they would not impact upon any aspect of the local transport networks.

8.2.87 The proportion of external trips made within the local area and those made further afield has also been considered and the assumptions are shown at **Table 8.19**. These assumptions are applicable to all three proposed accommodation campuses.

Table 8.19: Assumed Split of External Campus Person Trips

Journey Purpose	Proportion of External Trips to Local Area (Bridgwater)	Proportion of External Trips Further Afield (Somerset and Beyond)
Holiday / Day Trip	0%	100%
Personal Business	80%	20%
Recreation/Social	30%	70%
Shopping	50%	50%
Visiting Friends/Relatives	11%	89%

8.2.88 Application of the local and non-local proportion of trips by journey purpose to the number of external trips by journey purpose allows the total person trips by journey purpose for each category to be determined for each accommodation campus. The full calculations are set out in the trip generation model for the HPC Project which is available in Excel spreadsheet format.

8.2.89 The final aspect considered in relation to non-work trips is the mode by which these trips would be undertaken. TEMPRO v 5.4 has been used to determine the mode share for trips in the Bridgwater area, for local trips; and for the Somerset area, for non-local trips. This is a conservative assumption since access to a car is likely to be significantly less for those living at the accommodation campuses than for the normal population.

8.2.90 Full mode share calculations are provided in the trip generation model which has been submitted electronically alongside this TA, and a summary of the estimated non-work related car driver trips for each accommodation campus is provided at **Table 8.20**. The figures set out within **Table 8.20** are calculated by applying the mode share statistics, from TEMPRO, to the total number of non-work trips generated by each accommodation campus by time of day.

Table 8.20: Local and Non-local Accommodation Campus Car Non-work Trips (Two-way) 2016

Time of Day	Bridgwater A		Bridgwater C		HPC	
	Local	Non-Local	Local	Non-Local	Local	Non-Local
07:00	3	4	0	0	1	3
08:00	4	5	0	0	4	4
09:00	2	2	0	0	2	2
10:00	3	5	0	0	4	5
11:00	4	6	0	0	4	6
12:00	3	6	0	0	4	6
13:00	2	5	0	0	2	2
14:00	2	4	0	0	3	4
15:00	2	3	1	3	11	16
16:00	5	8	1	2	10	15
17:00	7	12	2	3	13	21

Time of Day	Bridgwater A		Bridgwater C		HPC	
	Local	Non-Local	Local	Non-Local	Local	Non-Local
18:00	8	14	2	2	11	17
19:00	8	14	2	2	11	17
Total	**49**	**86**	**11**	**18**	**81**	**119**

8.2.91 It is anticipated that there would be an occasional bus service provided by EDF Energy between the HPC accommodation campus and Bridgwater centre to facilitate non-work recreation/social trips.

n) Campus Sports Pitch Trips

8.2.92 Three sports pitches are proposed at the Bridgwater A accommodation campus which would be available for both occupants of the Bridgwater accommodation campuses and local community. The 5-a-side pitch at the Bridgwater C accommodation campus would be available to the local community prior to the facilities at the Bridgwater A accommodation campus becoming available. Since the pitches would be available for public use, it is important the likely trip generation is considered.

8.2.93 In order to calculate the likely number of trips that would be generated by the three sports pitches in the northern section of the Bridgwater A site, the Trip Rate Information Computer System (TRICS) database has been used.

8.2.94 The TRICS database was investigated to identify analogous sites within the 'Leisure' category for 'Football (5-a-side)' sites. From this information a trip rate per sports pitch was derived which was then applied to the total number of proposed pitches (3) to calculate the total number of vehicle trips by time of day. When considering the impact upon the highway network the critical hours are the AM and PM peak hours, which are not likely to correspond to the busiest hours at which people are most likely to use the sports pitches. The total daily trips, together with the trips generated during the network peak hours are shown at **Table 8.21**.

Table 8.21: Bridgwater A Sports Pitch Trips (2016)

Direction	AM Peak	PM Peak	Daily
Inbound	3	10	84
Outbound	1	4	83
Total	**4**	**13**	**167**

8.2.95 In terms of trip distribution, the vehicle trips for both the AM and PM peak hour for both accommodation campus non-work trips and the sports pitch trips have been assigned to the highway network in proportion to the base flows recorded in 2009.

o) Induction Centre

8.2.96 To provide a robust assessment of trips to the Induction Centre, it has been assumed that all 120 parking spaces would be occupied at the start of the day and remain occupied until the end of the day. The trip profile therefore assumes that 100% of arrival trips to the Induction Centre would be between 08:00 and 09:00 and 100% of departures would be between 18:00 and 19:00. It may be that the Induction Centre opens earlier than 08:00 and closes after 19:00 however the profile of arrivals and departures provides a robust assessment.

8.2.97 The distribution of trips to the Induction Centre has been determined using the gravity model with the same methodology as for staff car trips to the park and ride sites.

Table 8.22: Induction Centre Car Trips (2016)

Direction	AM Peak	PM Peak	Total Daily
Inbound	120	0	120
Outbound	0	120	120
Total	**120**	**120**	**240**

p) VIP and Business Visitors to Site

8.2.98 Up to 60 car parking spaces would be provided on site for VIP and business visitors. It has been assumed that arrivals take place during the morning and afternoon with departures taking place from mid day till 18:00. The car park steadily fills till reaching capacity just before mid day and then emptying after 16:00. The assumed profile is shown in **Table 8.23.**

Table 8.23: Trip Generation for Visitor Trips Direct to HPC (2016)

Time	Arrivals	Departures
09:00	10	0
10:00	21	0
11:00	21	0
12:00	21	15
13:00	21	21
14:00	21	21
15:00	21	21
16:00	0	21
17:00	0	21
18:00	0	15
Total	**135**	**135**

q) Public Information Centre

8.2.99 The Public Information Centre (PIC) at the HPC development site is scheduled to open in Quarter 1 2014 and remain open during the operation of the HPC power station. During construction, no parking would be available on site and all visitors would go to the Cannington park and ride site for which 120 spaces have been provided. The assessment of the expected trips to the park and ride site is described below.

i. Car Trips

8.2.100 The assessment is based on two main assumptions:

- That there would be visitors travelling by car to the Cannington park and ride site continually throughout the day at a rate which would result in the car park being close to capacity (i.e. 120 spaces).
- That the people arriving by car must also be able to transfer to a viable bus service which can cater for the demand. This translates to approximately 40 people arriving by car and departing on one bus every 15 minutes.

8.2.101 The parking accumulation at Cannington park and ride facility, based on the above assumptions, is shown at **Table 8.24.**

8.2.102 A car occupancy of 2.5 people per vehicle has been assumed, based on evidence from the South West Tourist Board on the size of groups visiting tourist attractions in the area.

Table 8.24: Cannington Park and Ride - Visitor Car Park Parking Accumulation (2016)

Time	Visitors to Centre (People)	Total Visitors in Centre (People)	Visitors from Centre (People)	Cars Parked at Cannington Park and Ride Site
10:00	40	40		**16**
10:15	40	80		**32**
10:30	40	120		**48**
10:45	40	160		**64**
11:00	40	200		**80**
11:15	40	240		**96**
11:30	40	280		**112**
11:45	40	280	40	**112**
12:00	40	280	40	**112**
12:15	40	280	40	**112**
12:30	40	280	40	**112**
12:45	40	280	40	**112**
13:00	40	280	40	**112**
13:15	40	280	40	**112**
13:30	40	280	40	**112**
13:45	40	280	40	**112**
14:00	40	280	40	**112**
14:15	40	280	40	**112**
14:30	40	280	40	**112**
14:45	40	280	40	**112**
15:00	40	280	40	**112**
15:15	40	280	40	**112**

Time	Visitors to Centre (People)	Total Visitors in Centre (People)	Visitors from Centre (People)	Cars Parked at Cannington Park and Ride Site
15:30	40	280	40	**112**
15:45	40	280	40	**112**
16:00	40	280	40	**112**
16:15		280	40	**112**
16:30		240	40	**96**
16:45		200	40	**80**
17:00		160	40	**64**
17:15		120	40	**48**
17:30		80	40	**32**
17:45		40	40	**16**

8.2.103 To determine the profile that would be applied to the trip generation, the arrivals and departures in **Table 8.24** have been proportioned into an hourly format. Furthermore, an additional 30 minutes has been added to the journey time to allow for the journey time to the Park and Ride site from the surrounding area and provide the correct inputs to the traffic model. The hourly profile is shown at **Table 8.25**.

Table 8.25: Arrival/Departure Profile for Trip Generation (2016)

Time	Arrivals	Departures
09:00	3.8%	0%
10:00	15.4%	0%
11:00	15.4%	0%
12:00	15.4%	15.4%
13:00	15.4%	15.4%
14:00	15.4%	15.4%
15:00	15.4%	15.4%
16:00	3.8%	15.4%
17:00	0%	15.4%
18:00	0%	7.7%

8.2.104 By adding the arrivals for each hour from **Table 8.24** it is possible to establish the total number of people travelling by car for the day, which is 1,040, equating to 416 (830 two-way) car trips once car occupancy is taken into account.

8.2.105 The trip generation taken forward for the modelling assessment is based on the 416 car trips which are proportioned against the profile in **Table 8.25**. This is shown in **Table 8.26**

Table 8.26: Trip Generation for Visitor Trips to Cannington Park and Ride (2016)

Time	Arrivals	Departures
09:00	16	0
10:00	64	0
11:00	64	0
12:00	64	64
13:00	64	64
14:00	64	64
15:00	64	64
16:00	16	64
17:00	0	64
18:00	0	32
Total	**416**	**416**

8.2.106 In order to distribute this trip generation across the highway network, the gravity model has been used as this provides origin data in terms of where visitors from the wider area would be travelling from. The data used within the gravity model for visitors from the wider area is based on tourist information from tourist accommodation within the south west region.

ii. Bus Trips

8.2.107 As set out previously, visitor buses from Cannington park and ride have been assumed to run every 15 minutes when the centre is open.

8.2.108 The buses that serve Cannington park and ride site would start their journey at Bridgwater railway station, stop at Cannington park and ride and drop off at the HPC development site before undertaking the return journey.

8.2.109 Whilst a journey time of 15 minutes has already been assumed between Cannington and the HPC development site, a further 15 minutes has been added between Cannington and Bridgwater, equating to a total journey time of 30 minutes. The approximate timetable for visitor buses shown at **Table 8.27** therefore starts/ends 30 minutes before visitors would arrive/depart the Public Information Centre.

Table 8.27: Visitor Buses (2016)

Time	Visitors To PIC	Visitors From PIC	Buses To PIC	Buses From PIC
09:00				
09:15				
09:30	40		1	
09:45	40		1	
10:00	40		1	
10:15	40		1	
10:30	40		1	

Time	Visitors To PIC	Visitors From PIC	Buses To PIC	Buses From PIC
10:45	40		1	
11:00	40		1	
11:15	40		1	
11:30	40		1	
11:45	40		1	
12:00	40	40	1	1
12:15	40	40	1	1
12:30	40	40	1	1
12:45	40	40	1	1
13:00	40	40	1	1
13:15	40	40	1	1
13:30	40	40	1	1
13:45	40	40	1	1
14:00	40	40	1	1
14:15	40	40	1	1
14:30	40	40	1	1
14:45	40	40	1	1
15:00	40	40	1	1
15:15	40	40	1	1
15:30	40	40	1	1
15:45	40	40	1	1
16:00		40		1
16:15		40		1
16:30		40		1
16:45		40		1
17:00		40		1
17:15		40		1
17:30		40		1
17:45		40		1
18:00		40		1
18:15		40		1
Total	**1,040**	**1,040**	**26**	**26**

8.2.110 As can be seen from **Table 8.27**, 1,040 visitors travelling to the centre would require 26 buses across the day assuming 40 people per bus.

r) Elements not included in Analysis

8.2.111 It should be noted that a number of elements have not been included in the detailed traffic modelling and are therefore not considered in this chapter. These are as follows:

8.2.112 First, non-work trips from those living at home or living in rented (non-campus) accommodation. This is because these properties already have planning permission for residential or tourist development and as such the traffic impacts of these developments can be considered to be already accepted within the existing baseline.

8.2.113 Secondly, the construction workforce figures presented do not include workers employed at the HPC and Bridgwater accommodation campuses once operational (e.g. catering, bar staff, cleaning staff etc). The numbers of workers would be very low in the context of the overall construction workforce and these individuals are in the main likely to be home-based workers working on a shift or part-time basis – with much travel to and from work likely to occur outside peak hours.

8.2.114 Furthermore, many of these workers are likely to be Bridgwater based. Given this, it is expected that the many trips would be by non-car modes. As such these movements would not impact on the overall conclusions of the analysis presented in this Transport Assessment.

8.2.115 Thirdly, no allowance has been made for non-home-based workers travelling home at the weekends. This is for a number of reasons as follows:

- Due to the shift patterns, many workers would not be able to travel home every weekend.
- With the range of shift end times there would not be one time when all workers would travel home.
- Workers would seek to minimise delay and therefore travel home outside peak traffic periods.
- The traffic assessment has sought to assess the normal peak conditions in order to determine appropriate mitigation. It would not be appropriate to design mitigation for an infrequent occurrence.

8.3 2013 and 2021

8.3.1 The above analysis has been undertaken for Quarter 4 2016 when the worker numbers are predicted to be at their highest. The other years subject to detailed assessment are 2013 and 2016. The overall methodology applied to those years is the same as for 2016 and is not repeated here. However, the key differences from 2016 are different worker numbers and distribution:

- In 2013 none of the associated development sites are operational except Junction 24 which would accommodate the park and ride; freight management facility and temporary Induction Centre. Therefore, the worker trips have been adjusted to suit;
- In 2013 the associated development sites would be under construction and therefore workers have been assigned to these sites. For Cannington park and ride site and Cannington bypass it has been assumed that workers travel from the

park and ride sites or directly from their place of residence by one of the buses going to the HPC development site. Junction 23 workers would use a special bus service from Junction 24 park and ride or a direct bus service from the north or east that runs past the site. A small number of workers would drive to this site. Workers to the campuses in Bridgwater would use the bus from Junction 24 to Junction 23. For Williton park and ride it is likely that workers would either drive or come by bus from the west, but the predicted numbers are low.

- In 2021, all associated development sites except Junction 24 and Cannington park and ride would be being decommissioned.

8.4 Summary of Analysis for 2013 and 2021

8.4.1 The methodology described for 2016 has been applied to the assessment years of 2013 and 2021, but with the relevant workforce number for each year and the different assumptions outlined at Section 8.14. A summary of the results for the journey to work trips is provided at **Table 8.28** and **Table 8.29**.

2013

Table 8.28 Journey to Work Trips (2013)

	J24	HPC	TOTAL
Walk	1	0	1
Cycle	63	0	63
Motorcycle	40	0	40
Rail	0	0	0
Direct Bus	0	861	861
Campus Bus	0	0	0
Public Bus	12	0	12
SO Car	557	200	757
Car Share	1291	0	1,291
Total	**1,964**	**1,061**	**3,025**

2021

Table 8.29: Journey to Work Trips (2021)

	J24 and Cannington	HPC	TOTAL
Walk	0	0	0
Cycle	7	0	7
Motorcycle	8	0	8
Rail	0	0	0
Direct Bus	0	302	302
Campus Bus	0	0	0
Public Bus	4	0	4
SO Car	101	172	273
Car Share	250	258	508
Total	**370**	**732**	**1,102**

8.5 Summary

8.5.1 In summary, this chapter has described in detail the derivation of the people trip rates. It is considered that robust assumptions have been made particularly in relation to the likely number of bus movements.

9. FREIGHT TRIP GENERATION

9.1 Introduction

9.1.1 This chapter provides a detailed summary of the freight trip generation analysis for the HPC and associated development sites. The analysis considers both Heavy Goods Vehicle (HGV, which includes Medium Goods Vehicles) and Light Goods Vehicle (LGV) trips.

9.1.2 The chapter draws heavily on the **Freight Management Strategy (FMS)** which is included at **Appendix 3.7.**

9.1.3 A spreadsheet model has been developed to assess the freight trip generation and distribution in detail and this has been submitted to SCC and the HA to assist with the review process. The full freight trip generation analysis is set out within the Excel spreadsheet model which can be made available.

9.2 Freight Management Strategy

9.2.1 The constrained nature and relatively remote geographical location of the proposed HPC Development Site presents a number of challenges to the transportation of materials for the construction project. Therefore, a bespoke **FMS** has been prepared by EDF Energy.

9.2.2 The **FMS** sets out a range of measures which are designed to reduce and control the use of road freight traffic during the construction phase, particularly during the peak hours. A combination of measures is proposed, including:

- the use of water for delivery of materials and the largest AILs through the construction of a temporary jetty at HPC, the refurbishment and extension of Combwich Wharf and the construction of a new freight lay down area at Combwich;
- introducing off-site freight management facilities at Junction 23 and Junction 24, to control incoming Heavy Goods Vehicles (HGVs) and holding them in case of an incident on the local network or on site;
- regulating HGVs by using a project-wide delivery management system (DMS) to regulate and track flows and limit flows during the network peak times;
- reducing the impact of construction traffic by providing a package of road improvements where required;
- the re-use and storage of excavated materials on-site to avoid exporting off-site;
- reducing impact of construction traffic in Cannington by constructing a bypass around the western side of the village, linking the A39 directly to the C182; and
- reducing Light Goods Vehicles (LGVs) movement.

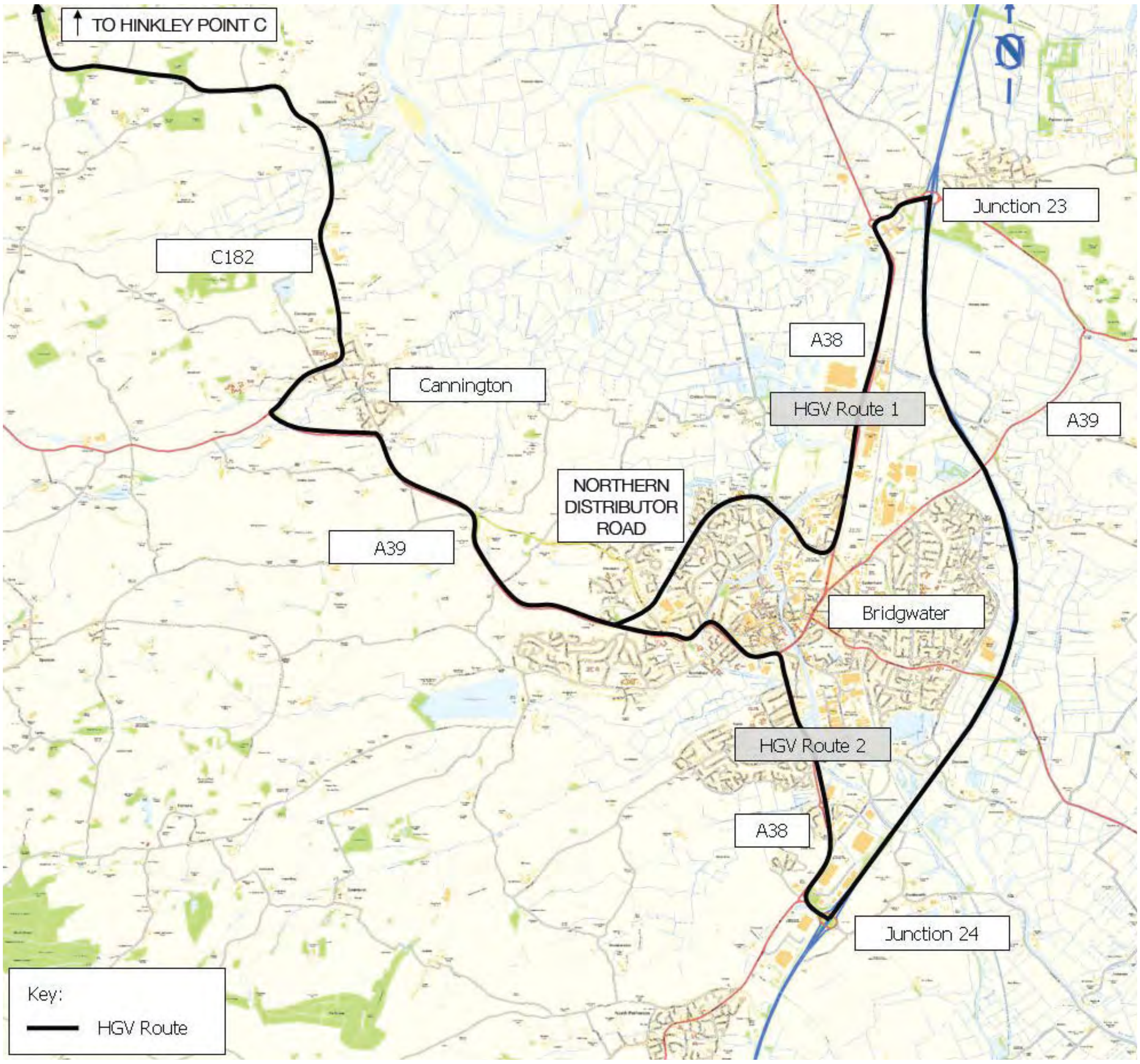
9.3 Freight Management Facilities

9.3.1 One of the key measures proposed to control road freight movements associated with the HPC development proposals is the provision of two freight management facilities designed to control incoming Heavy Goods Vehicles (HGVs) to the HPC development site and Combwich with the potential to also hold vehicles in case of an incident on the local highway network or on site.

9.3.2 The two freight management facilities would be located at Junction 23 and Junction 24 of the M5 motorway and would provide a physical control mechanism designed to regulate the flow of vehicles through Bridgwater to the HPC development site.

9.3.3 Between the freight management facilities and HPC two designated HGV routes have been identified and HPC HGVs would be monitored to ensure that only the designated HGV routes are used. The routes are shown at **Figure 9.1**.

Figure 9.1: Designated HGV Routes to HPC



9.3.4 In the 2013 assessment year there would only be one freight management facility, located at Junction 24. All HGVs bound for HPC in 2013 would route via the Junction 24 freight management facility and then via the two designated HGV routes upon leaving the Junction 24 freight management facility on route to HPC. To facilitate this some HGVs would travel from the Junction 24 freight management facility to Junction 23 via the M5. The purpose of this is to balance HGV movements across the two HGV routes through Bridgwater.

9.3.5 The freight routes have been selected based on the following:

- the appropriateness of the roads to carry heavy goods vehicles (HGVs); and
- the directness of routes.

9.3.6 It is proposed to route freight traffic from Junction 23 along the A38 Bristol Road, Bridgwater Northern Distributor Road (NDR – now classified as the A39), the A39 west of Quantock roundabout, Cannington High Street (prior to any bypass) or Cannington bypass (once it is constructed) and then along the C182. This is HGV Route 1.

9.3.7 It is proposed to route freight traffic from Junction 24 along the A38 Taunton Road, the A39, west of the Taunton Road/Broadway junction, Cannington High Street (prior to any bypass) and Cannington bypass, once it is constructed, and then along the C182. This is HGV Route 2.

9.3.8 It should be noted that the Cannington bypass is programmed to be completed in 2014 and therefore its use is not included in the 2013 assessment. In 2013 HGVs would be assigned along Cannington High Street. HGVs would be routed along the bypass for the 2016 and 2021 assessment years.

9.4 HGV Trips

9.4.1 EDF Energy's estimates of the number of HGV movements generated by the project during the construction phase have been carefully developed through an extensive analysis of the material quantities required for the project and all associated development. Details are provided in the **Freight Management Strategy**. They are based on an assumption that 80% of bulk materials for on site concrete production would be delivered by sea.

9.4.2 Because conservative assumptions on the payloads per HGV have been utilised throughout, and for the HGV movement hourly analysis the HGV movements which could be expected on the worst day in the peak quarter for the entire construction period have been utilised within the transport modelling, the estimates of HGV movements which have been modelled and assessed are therefore extremely robust and represent very much a worst case scenario. On the large majority of days during the construction period, flows would be lower.

a) HPC Development Site

9.4.3 For the purpose of quantifying freight traffic the freight vehicles associated with the construction of the HPC Project have been categorised as follows (see **Figure 9.2**):

- Heavy Goods Vehicles - HGVs: all vehicles exceeding a maximum gross weight of 3.5 tonnes (maximum allowable total weight when loaded). These include medium goods vehicles (maximum gross weight between 3.5 and 7.5 tonnes) and heavier 2, 3 or more axle lorries.

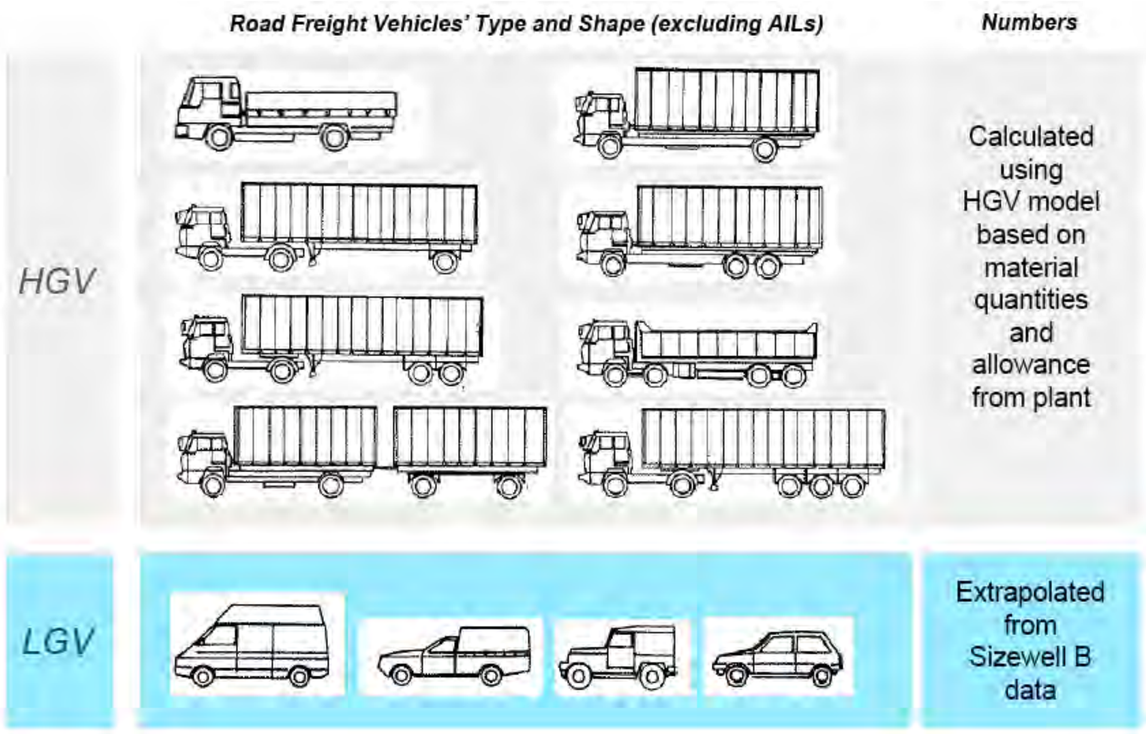
- Light Goods Vehicles - LGVs: vans, pickups, 4x4s and cars with a maximum gross weight of 3.5 tonnes.

9.4.4 It is therefore important to realise that when an HGV is referred to it includes medium goods vehicles. Furthermore that LGVs are only small goods vehicles and do not include medium goods vehicles.

9.4.5 It has been assumed that the construction materials, plant and equipment for the project would be transported by HGVs while LGVs would be used for transporting food and consumables, small items and specialist tools/equipment. LGVs would also include contractors' fleet vehicles.

9.4.6 The number of HGVs has been calculated using a bespoke model based on the quantities of construction materials needed for the project and on quantities of waste potentially produced, as presented in the FMS. As the number of LGVs is not directly dependent on the tonnage/volume of material usage for the project, an assumption has been made by extrapolating the number of LGVs required during the construction of the Sizewell B project.

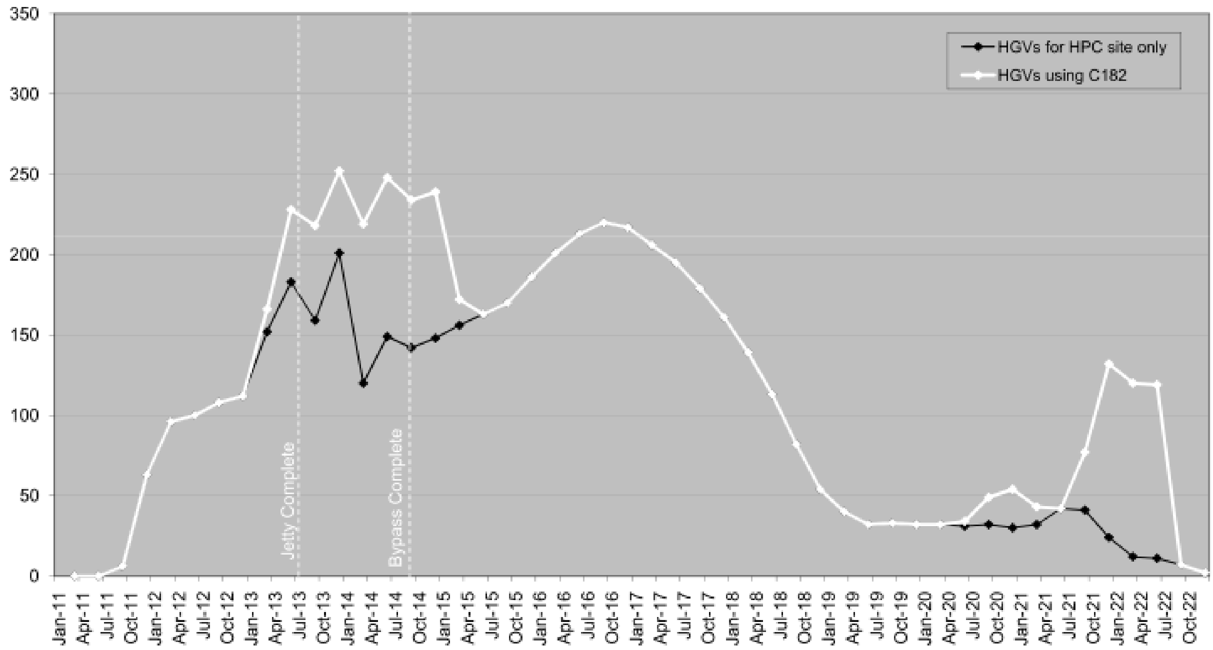
Figure 9.2: Road Freight Vehicles Summary Table (*)



(*) type of vehicles is illustrative only and do not include all type of freight vehicles available in market

9.4.7 As described in **Chapter 7**, analysis has been undertaken in Quarter 3 of 2013 and Quarter 4 of 2016. It is important to note that these are maximum quarters i.e. they are when the HGV flows are at their greatest, as shown in **the Freight Management Strategy** and summarised below.

Figure 9.3: Delivery Forecast Summary (average HGVs per day – one way)



9.4.8 As can be seen from **Figure 9.3**, in 2013 Quarter 3, the average daily flow of HGVs is 250 into HPC and 250 out of HPC i.e. 500 two way movements. In 2016 Quarter 4, the corresponding figures are 220 in, 220 out i.e. 440 two way movements.

9.4.9 During any quarter there would be variations in the daily flow. Some days the flows would be higher than the average and some days lower. It is envisaged that the maximum day within a quarter would have an HGV flow of 1.5 times the average. This would therefore be 750 two way movements in 2013 Quarter 3, 660 in 2016 Quarter 4 and 405 in 2021.

9.4.10 It is the maximum day within the maximum quarter that has been used in the traffic capacity analysis. This therefore gives a very robust analysis.

9.4.11 **Table 9.1** sets out the hourly profile of HGV movements through Cannington for the peak days in 2013 Quarter 3, 2016 Quarter 4 and 2021 Quarter 4. This profile has been taken from the **FMS**.

9.4.12 One of the key objectives of EDF Energy has been to minimise as far as is possible the movements of HGVs on the local road network during network peak periods and this is reflected in the figures below.

9.4.13 It is also important to note that EDF Energy propose normally only to permit HGV movements between the hours of 07:00-22:00 through Cannington and Bridgwater. There may be an occasional need for movements outside of these hours in exceptional circumstances. This is discussed in **Chapter 18**.

Table 9.1: HGVs to HPC

Hour Beginning	2013		2016		2021	
	In	Out	In	Out	In	Out
07:00	19	5	17	4	15	4
08:00	15	8	13	7	12	7
09:00	30	16	26	14	24	13
10:00	56	30	50	26	45	24
11:00	64	41	56	36	50	33
12:00	56	52	50	45	45	41
13:00	49	56	43	50	39	45
14:00	32	50	28	44	25	40
15:00	17	38	15	34	13	30
16:00	13	28	12	24	10	22
17:00	9	18	8	16	7	14
18:00	8	12	7	10	6	9
19:00	4	9	3	8	3	7
20:00	4	7	3	6	3	6
21:00	0	5	0	4	0	4
Total	**375**	**375**	**330**	**330**	**297**	**297**

9.4.14 In order to distribute freight movements between the two HGV routes through Bridgwater, the HGVs have been split so that 60% use the Junction 23 freight management facility and 40% use the Junction 24 freight management facility. This would be imposed through the Delivery Management System.

b) Associated Development Sites

9.4.15 In addition to HGVs travelling to the HPC development site, there would also be trips to the associated development sites in the 2013 and 2021 assessment years. In 2013 the associated development sites are under construction whilst in 2021 some of them are being decommissioned. There are no associated development freight trips in the 2016 assessment year.

9.4.16 The resultant associated development site trips are shown in **Table 9.2** and **Table 9.3**. The figures given are for the number of HGVs to or from the associated development sites in the worst day of the worst quarter of construction or deconstruction, so represent a robust assessment. Information on the material quantities required for the construction and de-construction of associated developments is contained in the Freight Management Strategy.

Table 9.2: HGVs to Associated Development Sites (2013)

Time	Junction 23		Bridgwater A		Cannington bypass		Bridgwater C	
	In	Out	In	Out	In	Out	In	Out
07:00	3	1	2	0	2	0	1	0
08:00	3	1	1	1	2	1	1	0
09:00	5	3	3	1	3	2	2	1
10:00	10	5	5	3	6	3	3	2
11:00	11	7	6	4	7	4	3	2
12:00	10	9	5	5	6	5	3	3
13:00	8	10	5	5	5	6	2	3
14:00	6	9	3	5	3	5	2	3
15:00	3	7	2	4	2	4	1	2
16:00	2	5	1	3	1	3	1	1
17:00	2	3	1	2	1	2	0	1
18:00	1	2	1	1	1	1	0	1
19:00	1	2	0	1	0	1	0	0
20:00	1	1	0	1	0	1	0	0
21:00	0	1	0	0	0	0	0	0
Total	**65**	**65**	**35**	**35**	**39**	**39**	**19**	**19**

9.4.17 HGVs travelling to the associated development sites would not be required to stop at the freight management facility at Junction 24. They would use the designated HGV routes to travel to Cannington park and ride site and the Cannington bypass site. For the associated development sites at Junction 23 and Junction 24 they would primarily arrive from and depart to the motorway. For the Bridgwater accommodation campus sites and Williton park and ride sites HGVs would use “A” roads where feasible and the B3190 for Williton.

9.4.18 **Table 9.3** shows modelled HGV movements associated with the de-construction of Junction 23 and Bridgwater A accommodation campus in the 2021 assessment.

Table 9.3: HGVs to Associated Development Sites (2021)

Time	Junction 23		Bridgwater A	
	In	Out	In	Out
07:00	7	2	8	2
08:00	5	3	6	3
09:00	10	6	12	6
10:00	20	10	23	12
11:00	22	14	26	17
12:00	20	18	23	21
13:00	17	20	20	23
14:00	11	17	13	20
15:00	6	13	7	16

Time	Junction 23		Bridgwater A	
	In	Out	In	Out
16:00	5	10	5	11
17:00	3	6	4	7
18:00	3	4	3	5
19:00	1	3	2	4
20:00	1	2	2	3
Total	**130**	**130**	**152**	**152**

This assumes full de-construction would occur in 2021. Please refer to Post-operational Strategy for details of post-operation scenarios.

9.5 LGV Trip Generation

a) HPC Development Site

9.5.1 As with HGVs, the number of LGVs has been based on the number of movements per day and per hour. For 2013 the number of LGV movements per day are estimated to be 75 in each direction (150). For 2016 the number of LGV movements are estimated to be 164 movements each way (328) and for 2021 they are estimated to be 83 movements each way (166).

9.5.2 The LGV movements have been profiled across the day (between 07:00 and 22:00).

9.5.3 The number of inbound and outbound LGV trips at the HPC development site for 2013, 2016 and 2021 are shown at **Table 9.4**.

Table 9.4: LGVs Direct to HPC

Hour Beginning	2013		2016		2021	
	In	Out	In	Out	In	Out
07:00	4	1	8	2	4	1
08:00	3	2	7	4	3	2
09:00	6	3	13	7	7	4
10:00	11	6	25	13	12	7
11:00	13	8	28	18	14	9
12:00	11	10	25	23	12	11
13:00	10	11	21	25	11	12
14:00	6	10	14	22	7	11
15:00	3	8	7	17	4	9
16:00	3	6	6	12	3	6
17:00	2	4	4	8	2	4
18:00	2	2	3	5	2	3
19:00	1	2	2	4	1	2
20:00	1	1	2	3	1	2
Total	**75**	**75**	**164**	**164**	**83**	**83**

9.5.4 It should be noted that LGVs would not be required to stop at the freight management facilities and would therefore proceed directly to the HPC development site.

9.5.5 LGVs would not be bound to defined vehicle routes like the HGVs and as such, LGVs have been modelled using dynamic assignment. The distribution of LGVs into the model has been derived from the base 2009 traffic flows.

b) Associated Development Sites

9.5.6 In addition to LGVs travelling direct to HPC, there would also be LGVs serving the associated development sites during the 2013 and 2021 assessment years associated with the construction and decommissioning of those sites.

9.5.7 The 2013 and 2021 trip analysis takes account of these trips, which are presented **Table 9.5** and **Table 9.6**.

Table 9.5: LGVs to Associated Development Sites (2013)

Time	Junction 23		Bridgwater A		Cannington bypass		Bridgwater C	
	In	Out	In	Out	In	Out	In	Out
07:00	3	1	2	0	2	0	1	0
08:00	3	1	1	1	2	1	1	0
09:00	5	3	3	1	3	2	2	1
10:00	10	5	5	3	6	3	3	2
11:00	11	7	6	4	7	4	3	2
12:00	10	9	5	5	6	5	3	3
13:00	8	10	5	5	5	6	2	3
14:00	6	9	3	5	3	5	2	3
15:00	3	7	2	4	2	4	1	2
16:00	2	5	1	3	1	3	1	1
17:00	2	3	1	2	1	2	0	1
18:00	1	2	1	1	1	1	0	1
19:00	1	2	0	1	0	1	0	0
20:00	1	1	0	1	0	1	0	0
Total	**65**	**65**	**35**	**35**	**39**	**39**	**19**	**19**

Table 9.6: LGVs to Associated Development Sites (2021)

Time	Junction 23		Bridgwater A	
	In	Out	In	Out
07:00	7	2	8	2
08:00	5	3	6	3
09:00	10	6	12	6
10:00	20	10	23	12
11:00	22	14	26	17
12:00	20	18	23	21
13:00	17	20	20	23
14:00	11	17	13	20
15:00	6	13	7	16
16:00	5	10	5	11
17:00	3	6	4	7
18:00	3	4	3	5
19:00	1	3	2	4
20:00	1	2	2	3
Total	**130**	**130**	**152**	**152**

This assumes full de-construction would occur in 2021. Please refer to Post-operational Strategy for details of post-operation scenarios.

9.5.8 As with LGVs direct to HPC development site, those travelling to the associated development sites have been modelled using dynamic assignment and distributed into the model using proportions obtained from the base 2009 traffic flows.

9.6 Consolidation Facility for Postal/Courier Deliveries

9.6.1 The postal/courier consolidation facility would receive all incoming postal deliveries intended for the HPC development site. The facility would consolidate post and courier deliveries into a small number of deliveries between the consolidation facility and the HPC development site. The postal/courier consolidation facility would be located at Junction 23 in 2016. However, since the Junction 23 facility would not be fully operational until Quarter 3 of 2014, a temporary facility would be provided at Junction 24 in the interim. It is anticipated that the postal/courier consolidation facility would no longer be operational by 2021 and it has therefore not been assessed for this period.

9.6.2 Based on experience at the Olympics construction site where a similar facility is operational, it has been assumed that the vast majority of postal deliveries to the postal consolidation centre would occur in the morning. It has been assumed that all deliveries would be by LGVs which would arrive at the consolidation facility, unload the post and depart immediately afterwards. There would be approximately two LGV deliveries between the postal/courier consolidation facility and the HPC development site per day and these have been accounted for in the LGV numbers for the HPC development site (**Table 9.5**).

9.6.3 The forecast numbers of LGV trips to and from the postal/courier consolidation facility are provided at **Table 9.7**.

Table 9.7: LGVs to Postal/courier Consolidation Facility in 2013 and 2016

Hour Beginning	LGVs	
	In	Out
08:00	25	25
09:00	25	25
10:00	25	25
11:00	25	25
12:00	25	25
13:00	25	25

9.7 Summary

9.7.1 This chapter has provided a summary of the freight trip generation which is based on the **Freight Management Strategy** produced by EDF Energy that seeks to minimise land based freight movements. Controls would be put in place on HGV movements that can be monitored in a transparent way – further information on proposed controls is contained in **Chapter 18**.

9.7.2 HGV and LGV trips have been derived for the peak quarters in 2013, 2016 and 2021. Furthermore the HGV flows on an average day during the peak quarters have been increased by 50% to assess a maximum day in a peak quarter. Therefore the trip estimates provide a very robust analysis and on the large majority of days during the construction period flows would be considerably lower.

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10. TRIP DISTRIBUTION AND ASSIGNMENT

10.1 Introduction

10.1.1 Having estimated the number of construction worker trips that would be generated by the HPC Project, the next stage is to consider their distribution. Therefore, this chapter sets out the methodology for estimating the distribution of construction worker trips during construction.

10.2 Gravity Model

10.2.1 The distribution of workers has been estimated using a gravity model developed specifically for HPC. The gravity model has a number of inputs, known as datasets and these are in part derived from the **Accommodation Strategy,** which is provided as part of the DCO application.

10.2.2 A gravity model is a tool which can be used to estimate the likely distribution of workers based on a range of considerations. Some of the key factors entered into the model developed for the HPC development construction phase are:

- the population density within the anticipated workforce catchment area;
- information on sources of available accommodation for the construction workforce; and
- information on journey times.

The gravity model has been used to provide the most accurate estimate of where the future workforce associated with the HPC construction phase are likely to live. As the distance from the HPC development site increases, the density of workers would tend to decrease. Further detail on key assumptions is provided in subsequent sections of this chapter.

10.2.3 It should be noted that the methodology applied in the development of the gravity model is not an exact science, but rather a theoretical approach designed to give the best estimate of the likely scenario and as such a degree of flexibility must be considered when assessing the outputs of the gravity model.

10.3 Background

10.3.1 The existing skills profile in the local area does not fully meet the specialised requirements for the construction of the HPC Project i.e. the existing local population cannot provide the necessary skills required for all aspects of HPC construction. As such, EDF Energy is required to bring in specialist skills from elsewhere in the UK and potentially abroad to complete the HPC Project. Therefore, there would be two types of workers associated with construction of the HPC Project. These are:

- home-based workers who would commute to and from work on a daily basis from their home address; and
- non-home-based workers who would not feasibly be able to commute to and from work on a daily basis from their home address (elsewhere in the UK or abroad) and would therefore require temporary accommodation in the vicinity of the HPC

development site. These workers are further split into those who would live at one of the purpose-built accommodation campuses and those who would live in private rented, tourist or owner occupied accommodation.

10.3.2 Oxford Brookes University (OBU) originally built the gravity model for the HPC Project. Refinements have subsequently been made to the model by Savell Bird and Axon (SBA) and Quod through consultation and discussions with both the transport and socio-economics stakeholders for HPC.

10.3.3 This chapter summarises the finalised gravity model prepared for the HPC Project. The finalised gravity model determines the distribution of home-based construction workers associated with the HPC development site and associated development sites and non-home-based construction workers who would be living in rented accommodation (i.e. not in the campus accommodation provided by EDF Energy).

10.3.4 Information provided at **Chapter 7** of this TA provides details on the estimated split of home and non-home-based workers for 2013, 2016 and 2021.

10.3.5 In 2013, there would be no campus accommodation available for use (as it would be in the process of being constructed). The proportion of non-home-based workers would be 54% of the total workforce of 3,026, equating to 1,641 workers.

10.3.6 In 2016, there would be three accommodation campuses available, described at **Chapter 6**. The proportion of non-home-based workers in 2016 is 66%, which equates to 3,696 out of the total workforce of 5,600. However, 1,450 workers would be housed within the three accommodation campuses and so 2,246 workers would be non-home-based and not resident within the campus accommodation.

10.3.7 In 2021, the accommodation campuses would be being taken out of operation. It is estimated that the number of non-home-based workers would have fallen to 295 workers.

10.4 Gravity Model Form

10.4.1 This section summarises the form of the gravity model and how it accords with latest guidance.

a) Model Form

10.4.2 There are two types of gravity model deterrence functions: power functions and exponential functions. The deterrence function, or distance decay factor, is standard practice in the development of gravity models such as the one for the HPC Project which assumes a negative exponential relationship with generalised cost.

10.4.3 The Department for Transport (DfT) WebTAGUnit 3.10.3 guidance on Variable Demand Modelling paragraph 1.7.14 states:

> *"In a true gravity model the deterrence functions are power functions (and originally interzonal distance was used instead of G), but it is standard now to use an exponential form."*

10.4.4 The deterrence used for the HPC Project gravity model is a function of cost using a negative exponential as shown below:

$$f(c) = e^{-\beta c}$$

Where: f(c) is the function of cost

ß is constant

C is cost (journey time in minutes)

10.4.5 The ß constant is used to calibrate the model and the methodology is set out in Section 10.6 of this chapter.

10.5 Travel Time Catchments

a) Introduction

10.5.1 Prior to the distribution of construction workers being estimated, it is important to establish a catchment area for the home-based and non-home-based workers.

10.5.2 This section summarises the travel time catchments used for the HPC gravity model and the reasons for using the travel times. It also provides the methodology and data used to estimate journey times in the gravity model.

b) Home-based Workforce

10.5.3 It is assumed that the home-based workforce would travel up to 90 minutes to work at the HPC development site.

10.5.4 The 90 minute travel time for home-based workers is based on survey evidence on journey to work distances for construction sector workers (IFF Research/University of Warwick, Workforce Mobility and Skills in the UK Construction Sector, February 2005). The IFF/Warwick University research shows that the vast majority of UK and South West construction workers travel 50 miles or less to their workplace, which has been equated to 90 minutes.

10.5.5 The 90 minute travel time catchment also relates to travel allowances for construction workers. The Construction Industry Joint Council (CJIC) agreement sets out national standards for pay and conditions for workers on major building and infrastructure sites in the UK. The agreement, which took effect in June 2008, sets out rates for daily travel and fare allowances. These are currently payable on a sliding scale based on the distance travelled, up to a maximum of 75km (c.47 miles). Workers can live beyond this distance, but would not be paid a travel allowance for any distance travelled in excess of 75km. As such the travel allowance acts as a real incentive for workers to live within 75km/47 miles of their workplace.

c) Non-home-based Workforce

10.5.6 It is considered that the non-home-based workers would tend to live closer to the HPC development site as they are moving into the area primarily for work and the travel time to work would be a material factor when choosing accommodation.

10.5.7 The gravity model assumes they would live in an area that is broadly defined by a 45 minute travel time to the site by direct buses and/or a 60 minute travel time using the park and ride sites.

10.5.8 This zone is appropriate for three reasons:

- Construction workers would travel up to 90 minutes for work – a 60 minute assumption therefore already reflects the fact that non-home-based workers would choose to live closer to the HPC development site.
- The gravity model is already weighted so that relatively few workers are expected to live as far as 60 minutes away, most would live much closer.
- EDF Energy is proposing to run buses from locations such as Weston-Super-Mare and Taunton direct to the HPC development site, without going through the park and ride sites. These locations would fall within a 45 minute journey catchment direct to the HPC development site and a 60 minute catchment via the park and ride sites.

10.6 Calibration and Validation

a) Introduction

10.6.1 This section summarises the gravity model calibration and validation. Calibration is the process by which parameter values are adjusted to predict future travel patterns with observed travel patterns and would determine whether the model output is realistic. Validation is the process by which the model's ability to predict future behaviour is tested. This is an iterative process which involves sense checks between model inputs and model outputs.

b) Road Network Calibration

10.6.2 The gravity model has been developed using GIS software. It is important to calibrate the GIS road network in order for the travel time catchment to be as realistic as possible.

i. Data Sources

10.6.3 There are a number of data sources available for developing a calibrated road network as follows:

- AA Vector Road network – a generalised road network containing all roads within the UK except for local residential streets.
- HATRIS data – a Highways Agency (HA) database that holds average journey time and traffic flow data collected for almost 2,500 junction to junction links across the Strategic Road Network (SRN).
- ITIS journey time data – ITIS supplied feeds of Global Positioning System (GPS) data for use in the HATRIS database from September 2002 until December 2007.
- ITIS link speed data – ITIS continually collect positional data from vehicles using Floating Vehicle Data (FVD) technology. Aggregation and analysis of this data allows the generation of average link speeds at different time periods of the day and by vehicle type.

- Observed journey time data – journey time surveys can be commissioned by survey companies for specific routes.

10.6.4 The HPC gravity model has been based on the AA Vector Road network with link speeds taken from 2010 ITIS data and observed journey time data, where it has been collected.

c) Road Network Calibration

10.6.5 The road speeds allocated to the road network within the gravity model are dependent on the area and road type. The three categories of area and road type used are provided below:

- Strategic Road Network.
- Bridgwater.
- Remaining local highway network.

i. Strategic Road Network (SRN)

10.6.6 The SRN link data from the HA Journey Time Database accessed through the HATRIS website has been compared against the ITIS data for the SRN. The ITIS motorway speeds are slower on the M5 than the HATRIS data for the 08:00-09:00 and 17:00-18:00 network peak hour average, so ITIS speeds have been used for the M5 as a worst case.

ii. Bridgwater Road Network

10.6.7 Within Bridgwater, journey time surveys were commissioned by EDF Energy to calibrate the model. The average of the AM (08:00-09:00) and PM (17:00-18:00) peak hour observed journey time speeds have been compared against ITIS data and the observed journey times have been used to provide a worst case journey time through Bridgwater.

iii. Remaining Road Network

10.6.8 The ITIS data has been compared against journey time data collected between Williton and the HPC development site and is considered to be comparable. As such, the ITIS data has been used. The remaining local highway network within the gravity model has been allocated with road speeds from ITIS.

10.7 Gravity Model Calibration

10.7.1 The statistic used to calibrate the β value for the gravity model is the statistic of 89% of journeys being within 50 miles of the HPC development site, which has been equated to a 90 minute journey time. This statistic is based upon the ‘Workforce Mobility and Skills in the UK Construction Sector’ (February 2005) report, which summarises research undertaken by IFF Research/University of Warwick on the travel habits of construction workers in the South West of the UK. A summary of the research is provided in **Table 10.1** below.

Table 10.1: Workforce Mobility and Skills in the UK Construction Sector

Travel Distance	South West Average	UK Average
Up to 10 miles	46%	42%
Up to 25 miles	66%	67%
Up to 50 miles	89%	85%
Over 50 miles	11%	15%
Total	**100%**	**100%**

10.7.2 The data provided by the IFF Research/University of Warwick is considered to be the most suitable data available to calibrate the model, and is regarded as more up to date than Census data. These statistics are considered suitable for both home-based and non-home-based workers as the research is representative of both types of workers.

10.7.3 From the data available, the statistic of 89% travelling up to 50 miles was considered the most appropriate to calibrate the gravity model against. The park and ride section of the journey imposed by the transport strategy creates a minimum journey time equivalent to the park and ride transfer and onward bus journey time. Therefore, the greatest journey length statistic is most suitable to use for calibration.

10.7.4 In order to calibrate the gravity model against the 89% statistic, first the catchment area has been widened to 110 minutes and the gravity model calibrated so that 89% of journeys fall with the 90 minute catchment area. The extension area allows the inclusion of a number of significant urban areas outside of the 90 minute catchment, therefore this extension is considered appropriate. The catchment area of 90 minutes and the calibrated deterrence function have been used for the gravity model.

10.8 Model Validation

10.8.1 It has not been possible to validate the gravity model and produce a ‘goodness of fit’ table as the only available data on the travel to work patterns of the construction sector (IFF Research) was used in the calibration of the gravity model.

10.8.2 It is not considered appropriate to validate the gravity model against Census journey-to-work data as it does not disaggregate the data by employment sector and therefore the datasets are not comparable and suitable for use.

10.9 Model Inputs

a) Introduction

10.9.1 Whilst the gravity model can be used as a tool to provide a distribution of the construction workforce during any stage of construction, the inputs would need to be altered (e.g. number of workers, split between home-based and non-home-based workers, number of accommodation campus bed spaces etc). The datasets would not change, but the distribution of the workforce may as a result of the changes to inputs.

10.9.2 The input information provided in this chapter is for the early years' assessment in 2013 and the peak construction assessment in 2016. The gravity model is not used for the 2021 assessment year for operational staff as data from the existing operations at Hinkley Point B is considered to be more appropriate to use to develop a workforce distribution.

b) 2013 Early Years Construction

10.9.3 In the 2013 Early Years Construction scenario there is expected to be 3,026 workers working at the HPC development site and associated developments, of which 46% are expected to be home-based and 54% non-home-based workers. The **Accommodation Strategy** submitted as part of the DCO application provides more details of the workforce profile and split of home-based and non-home-based workforce.

10.9.4 At this point in the construction phase there would not be any accommodation campus bedspaces available for the non-home-based construction workers. EDF Energy proposes to utilise spare capacity within the following accommodation sources:

- Tourist Accommodation – there is a substantial supply of tourist accommodation in the area consisting of serviced rooms, self catering, hostels, caravans and camping.
- Private Rented Sector (PRS) – there is also a substantial private rented market within the local area consisting of rented houses and flats.
- Owner Occupied – some, mainly professional and project management staff, would move to the area for a significant length of time and these individuals are more likely to seek permanent housing in the local area and to bring their families with them.
- Latent Accommodation – this is additional accommodation that has been offered to EDF Energy in response to adverts placed in local newspapers.

10.9.5 **Table 10.2** below summarises the number of non-home-based workers assumed to live in each type of accommodation within the gravity model. This is based on an assessment of the existing spare capacity across all sources of accommodation during the peak tourist period.

Table 10.2: Breakdown of Accommodation Utilisation at 2013 Early Years Construction

Accommodation Type	Percentage Split	Number of Non-home-based Workers
Campus	0%	0
Tourist	27%	435
Private Rented	33%	548
Owner Occupied	22%	365
Latent	18%	292
Total	**100%**	**1,641**

10.9.6 Finally, in the Early Years Construction scenario there would only be the Junction 24 park and ride facility available for the construction workers. However, it is envisaged that there would be eight direct bus routes that would cover the main urban areas within the 60 minute zone. These would enable workers to access a wide range of accommodation in those areas:

- Weston-Super-Mare to HPC.
- Brean/ Burnham to HPC.
- Taunton to HPC.
- Minehead and Williton to HPC.
- Cannington and Netherstowey to HPC.
- Three routes from Bridgwater to HPC.

c) 2016 Peak Construction

10.9.7 At the construction peak in 2016 there would be 5,600 people working on the HPC development site. At peak construction it is estimated that 34% of the 5,600 construction workforce would be home-based and that 66% of the workforce would be non-home-based and would require accommodation in the local area. This represents the maximum level of accommodation demand that the HPC Project is expected to generate. More details of the workforce profile and split of home-based and non-home-based workforce is provided within the **Accommodation Strategy** submitted as part of this DCO application.

10.9.8 EDF Energy proposes to utilise spare capacity within tourist accommodation, the private rented sector, owner occupied accommodation and latent accommodation. In addition to this existing accommodation, EDF Energy proposes to construct the following campus accommodation, which would all be operational by 2016:

- Bridgwater A accommodation campus: 850 bed spaces.
- Bridgwater C accommodation campus: 150 bed spaces.
- HPC accommodation campus: 510 bed spaces.

10.9.9 Of the 1,510 proposed accommodation campus bed spaces it has been assumed that 1,450 bed spaces would be utilised at any one time during the 2016 construction peak to allow for turnover and general maintenance of the accommodation campuses. The workers living in the Bridgwater accommodation campuses would be transported direct to the HPC development site by bus and would therefore not use the park and ride facilities. They have therefore not been included within the gravity model.

10.9.10 **Table 10.3** below summarises the number of non-home-based workers assumed to live in each type of accommodation within the gravity model. This is based on an assessment of the existing spare capacity across all sources of accommodation during the peak tourist period.

Table 10.3: Breakdown of Accommodation Utilisation at 2016 Construction Peak

Accommodation Type	Percentage Split	Number of Non-home-based Workers
Campus	39%	1,450
Tourist	16%	596
Private Rented	20%	750
Owner Occupied	14%	500
Latent	11%	400
Total	**100%**	**3,696**

10.9.11 During the peak construction phase, all four proposed park and ride facilities would be fully operational. The proposed park and ride facilities are at M5 Junction 23, M5 Junction 24, Cannington and Williton.

d) 2021

10.9.12 In the 2021 scenario there is expected to be 810 operational workers and 550 construction workers. All operational workers are expected to be home-based. For construction workers, 46% are expected to be home-based and 54% non-home-based. The **Accommodation Strategy** submitted as part of the DCO application provides more details of the workforce profile and split of home-based and non-home-based workforce.

10.9.13 At this point in the construction phase there would not be any accommodation campus bedspaces available for the non-home-based construction workers since the accommodation campus sites would have been taken out of operation. EDF Energy proposes to utilise spare capacity within the following accommodation sources:

- Tourist Accommodation – there is a substantial supply of tourist accommodation in the area consisting of serviced rooms, self catering, hostels, caravans and camping.
- Private Rented Sector (PRS) – there is also a substantial private rented market within the local area consisting of rented houses and flats.
- Owner Occupied – some, mainly professional and project management staff, would move to the area for a significant length of time and these individuals are more likely to seek permanent housing in the local area and to bring their families with them.
- Latent Accommodation – this is additional accommodation that has been offered to EDF Energy in response to adverts placed in local newspapers.

10.9.14 **Table 10.4** below summarises the number of non-home-based workers assumed to live in each type of accommodation within the gravity model. This is based on an assessment of the existing spare capacity across all sources of accommodation during the peak tourist period.

Table 10.4: Breakdown of Accommodation Utilisation in the 2021 Scenario

Accommodation Type	Percentage Split	Number of Non-home-based Workers
Tourist	27%	78
Private Rented	33%	99
Owner Occupied	22%	66
Latent	18%	53
Total	**100%**	**295**

10.9.15 Finally, in the 2021 scenario there would only be the Junction 24 and Cannington park and ride facilities available for the construction workers.

10.10 Home-Based Workforce Datasets

a) Introduction

10.10.1 This section summarises the datasets used for the home-based workforce element of the gravity model.

b) Population Data

10.10.2 The production/attraction value used for the home-based element of the gravity model is the 'Working Age Population'. The definition of 'Working Age' taken from the Office for National Statistics is 16-64 years for men and 16-59 years for women.

10.10.3 The gravity model uses the Working Age Population rather than just construction worker data as many of the home-based people who would work at the HPC development site would not currently be working in the construction industry. This is either because they would have more generic jobs (e.g. security, administration) or because they would be trained specifically for the HPC Project. Census data is considered the most appropriate data to use because it provides a spatial distribution of the workforce at a fine level (i.e. ward data). The use of Construction Skills Certificate Scheme (CSCS) data was considered but discounted because this information is covered by strict data protection rules at the small area level, is not fully comprehensive for the construction sector and does not include the many non-construction roles that would be part of the workforce for the HPC Project.

10.10.4 The 2001 Census Working Age Population data is available at ward level. In addition 2009 mid-year estimates are available for Working Age Population data at district level. **Table 10.5:** provides a comparison between the 2001 and 2009 Working Age Population Census data at district level.

Table 10.5: Comparison of 2001 and 2009 Working Age Population

District	2001 Working Age Population	2009 Mid-Year Estimate Working Age Population	Percentage Change
Bath and North East Somerset	103,790	111,300	+7%
Bristol	243,313	296,800	+22%
North Somerset	111,032	121,300	+9%

District	2001 Working Age Population	2009 Mid-Year Estimate Working Age Population	Percentage Change
South Gloucestershire	153,144	162,500	+6%
East Devon	66,926	69,400	+4%
Exeter	71,645	79,400	+11%
Mid Devon	40,975	43,600	+6%
North Devon	50,614	51,400	+2%
Teinbridge	68,420	71,200	+4%
North Dorset	35,614	34,700	-3%
West Dorset	50,469	50,200	-1%
Mendip	61,898	62,800	+1%
Sedgemoor	61,850	64,400	+4%
South Somerset	87,615	89,500	+2%
Taunton Deane	60,405	62,900	+4%
West Somerset	19,009	18,200	-4%

10.10.5 It can be seen from **Table 10.5:** that between 2001 and 2009 there was estimated to have been a 22% increase in Working Age Population in Bristol, an 11% increase in Exeter and a 9% increase in North Somerset. The other changes in Working Age Population range from -4% to +7%.

10.10.6 The gravity model has used the most up to date data (i.e. 2009 mid-year Working Age estimates) for Lower Super Output Areas (LSOA) and translated it into 2003 Census Area Statistics (CAS) wards.

c) Skills Data

10.10.7 The 2009 Working Age Population data for the home-based gravity model has been refined based on Census dataset UV30 - Occupation Groups (2001) which is set out in **Table 10.6** below. This data is not available for any more recent years.

Table 10.6: 2001 Census Occupation Groups

Census Skills Group		Census Skills Sub-Group	
1	Managers and Senior Officials	11	Corporate Managers
2	Professional Occupations	12	Managers and Proprietors in Agriculture and Services
		21	Science and Technology Professionals
		22	Health Professionals
		23	Teaching and Research Professionals
		24	Business and Public Service Professionals
3	Associate Professional and Technical Occupations	31	Science and Technology Associate Professionals
		32	Health and Social Welfare Associate Professionals
		33	Protective Service Occupations

Census Skills Group		Census Skills Sub-Group	
		34	Culture, Media and Sports Occupations
		35	Business and Public Service Associate Professionals
4	Administrative and Secretarial Occupations	41	Administrative Occupations
		42	Secretarial and Related Occupations
5	Skilled Trades Occupations	51	Skilled Agricultural Trades
		52	Skilled Metal and Electrical Trades
		53	Skilled Construction and Building Trades
		54	Textiles, Printing and Other Skilled Trades
6	Personal Service Occupations	61	Caring Personal Service Occupations
		62	Leisure and Other Personal Service Occupations
7	Sales and Customer Service Occupations	71	Sales Occupations
		72	Customer Service Occupations
8	Process, Plant and Machine Operatives	81	Process, Plant and Machine Operatives
		82	Transport and Mobile Machine Drivers and Operatives
9	Elementary Occupations	91	Elementary Trades, Plant and Storage Related Occupations
		92	Elementary Administration and Service Occupations

10.10.8 **Table 10.7** below summarises which of the Census skills would be required for the HPC Project.

Table 10.7: HPC Workforce Skills

HPC Construction Workforce Category	Census Skills Group		Census Skills Sub-Group	
Site Services, Security and Clerical	4	Administrative and Secretarial Occupations	42	Secretarial and Related Occupations
	9	Elementary Occupations	92	Elementary Administration and Service Occupations
Professional Staff	2	Professional Occupations	21	Science and Technology Professionals
	3	Associate Professional and Technical Occupations	31	Science and Technology Associate Professionals
Civil Operatives	5	Skilled Trades Occupations	53	Skilled Construction and Building Trades
	8	Process, Plant and Machine Operatives	81	Process, Plant and Machine Operatives
	9	Elementary Occupations	91	Elementary Trades, Plant and Storage Related Occupations
Mechanical and Electrical Operatives	5	Skilled Trades Occupations	52	Skilled Metal and Electrical Trades
Operational Staff	2	Professional Occupations	21	Science and Technology Professionals

HPC Construction Workforce Category	Census Skills Group		Census Skills Sub-Group	
	3	Associate Professional and Technical Occupations	31	Science and Technology Associate Professionals
	4	Administrative and Secretarial Occupations	42	Secretarial and Related Occupations
	5	Skilled Trades Occupations	52	Skilled Metal and Electrical Trades
	9	Elementary Occupations	92	Elementary Administration and Service Occupations

10.10.9 The production/attraction value used for the home-based gravity model is the Working Age Population (i.e. 2001 Census data at ward level factored to 2009 using the 2009 mid-year estimates at district level). Only the Working Age Population for those skills that would be required for the HPC Project identified in **Table 10.7** have been used. The gravity model has not been weighted further based on the proportion of workers likely to be employed at the HPC development site for each skill as this would need to be done for each ward and this level of detail is not known at this stage. The travel-to-work-study on which the model is based includes all occupants and therefore implicitly accounts for different propensities to travel.

d) Workforce Gender

10.10.10 Consideration has been given to whether it is reasonable to include women in the population statistics depending on the likely number of women who would be employed at HPC during the construction phase.

10.10.11 The proportion of women only becomes relevant for the gravity model if there is a different spatial distribution of women and men in the relevant occupations. The male/female population split for each of the relevant districts in the 90 minute travel time catchment has been identified. The variation between them is less than 1% for the main construction occupations and no more than 10% from the mean in any category. For the main occupations the breakdown is over 75% male, and in some cases 99%, and therefore, given that the HPC Project would have a high proportion of men in the labour force, this would be from a labour force that is overwhelmingly male. It is therefore considered that no changes should be made to the gravity model with regards to gender of worker as it already implicitly models a male-dominated labour force. **Table 10.8:** summarises the analysis on the ratio of men and women.

Table 10.8: Percentage of Male Population by Skills Group

District	% Male Population							
	Census Skills Sub-Group Working at HPC							
	21	31	42	52	53	81	91	92
Bath and North East Somerset	87%	74%	5%	98%	98%	80%	84%	43%
Bristol	85%	75%	5%	97%	99%	81%	85%	44%
North Somerset	90%	74%	5%	98%	98%	82%	82%	41%
South Gloucestershire	89%	78%	4%	97%	99%	81%	82%	40%

District	% Male Population							
	Census Skills Sub-Group Working at HPC							
	21	31	42	52	53	81	91	92
East Devon	85%	76%	5%	98%	99%	77%	80%	41%
Exeter	85%	78%	6%	98%	99%	82%	85%	46%
Mid Devon	83%	70%	3%	97%	99%	75%	72%	35%
North Devon	86%	77%	3%	98%	99%	73%	76%	38%
Teinbridge	88%	72%	3%	97%	98%	77%	82%	39%
West Dorset	86%	75%	4%	97%	98%	77%	83%	35%
Mendip	88%	70%	6%	97%	98%	78%	84%	32%
Sedgemoor	88%	75%	4%	98%	98%	80%	76%	34%
South Somerset	90%	72%	4%	97%	98%	74%	75%	32%
Taunton Deane	88%	67%	4%	97%	99%	72%	82%	42%
West Somerset	80%	72%	4%	99%	98%	81%	83%	44%
Average	**87%**	**74%**	**4%**	**98%**	**98%**	**78%**	**81%**	**39%**

10.11 Non-Home-Based Workforce Datasets

a) Introduction

10.11.1 This section summarises the datasets used for the non-home-based workforce element of the gravity model.

b) Tourist Accommodation

10.11.2 The gravity model uses the latest available database of existing tourist accommodation from the South West Tourist Board. The postcode for each accommodation establishment has been geocoded using OS Codepoint data.

10.11.3 All accommodation types except for educational establishment campus sites and holiday villages have been included in the gravity model. The educational campus sites have been excluded as they are not available for the full year. Given that it is uncertain whether workers would be able to use holiday villages, they have not been included in the gravity model, and therefore the only tourist accommodation that the gravity model considers is:

- serviced rooms (i.e. bed and breakfasts, hotels);
- self catering; and
- caravans.

10.11.4 **Table 10.9** below summarises the occupancy levels of tourist accommodation within Somerset. The information set out in **Table 10.9** is the most recent data available on spare capacity of tourist accommodation and no further data is available.

Table 10.9: Percentage Occupancy Levels in Tourist Accommodation in Somerset

Month	Serviced	Self Catering	Static Caravan	Touring Caravan	Camping and Caravan Pitches
January	33 (35)	30 (33)	--	--	(5)
February	47 (47)	38 (43)	--	--	(4)
March	51 (54)	39 (44)	--	--	(15)
April	53 (60)	65 (70)	46	--	(19)
May	64 (67)	66 (72)	63	--	(63)
June	67 (67)	76 (84)	70	--	(64)
July	78 (74)	81 (80)	89	52	(59)
August	76 (76)	93 (94)	97	89	(81)
September	74 (73)	83 (77)	77	32	(45)
October	67 (64)	67 (52)	66	--	(22)
November	53 (55)	44 (29)	--	--	(21)
December	46 (50)	42 (35)	--	--	(27)

Source: *South West Tourism, accommodation occupancy surveys. Figures for serviced rooms are for 2008; all other figures are for 2006. Figures for static caravans are for the South West region (excluding Devon), as separate figures for Somerset are not available. Blank cells indicate inadequate sample size or no results available. Figures in brackets are for 2009.*

10.11.5 To ensure that the HPC Project would have a minimal impact on tourism in the area, the gravity model uses the average spare capacity in the summer months of June, July and August. The spare capacity for the tourist accommodation applied to the gravity model is taken to be the average across the two sets of figures shown in **Table 10.6** above as follows:

- serviced rooms: 27% rounded down to 25%;
- self catering/hostel: 15%; and
- caravan and camping: 25%.

10.11.6 The size, quality and cost of tourist accommodation varies significantly. Assuming HPC workers receive the union-agreed nightly allowance they would be able to afford most forms of un-serviced accommodation including caravans. However, significant amounts of serviced accommodation would not be affordable or suitable (e.g. double or family rooms).

10.11.7 EDF Energy has been provided with a summary of a survey undertaken by Arup on behalf of Sedgemoor District and West Somerset Councils, which provides some broad costs of typical bed and breakfast and self-catering accommodation by room type. Overall the Arup survey estimates that only 40% of accommodation would be both suitable and accessible for HPC workers. This has been confirmed by EDF Energy's own research and by the accommodation providers registering their accommodation with EDF Energy's Accommodation Office.

10.11.8 Therefore, the following assumptions have been made to the gravity model to take account of affordability of accommodation:

- All un-serviced accommodation types (i.e. caravans and hostels) have been assumed to be affordable for the HPC workforce.
- Only 40% of the serviced and self catering accommodation has been assumed to be affordable for the HPC workforce. There is limited data on specific providers and therefore on whether there are spatial differences. The affordability has therefore been applied across the whole area of the gravity model.

c) Private Rented Sector

10.11.9 To provide a distribution of those HPC workers who would live in private rented accommodation, the number of rented dwellings within each CAS ward in the 2001 Census has been extracted from the dwelling stock by council tax band data series.

10.11.10 The Taunton and South Somerset Housing Market Areas Strategic Housing Market Assessments (SHMA) undertaken in February 2009 also sets out the number of private rented units within each district.

10.11.11 Therefore, the amount of private rented accommodation within the surrounding districts of Sedgemoor, West Somerset, Taunton Dean and North Somerset use the number of private rented dwellings listed in the SHMA. The remaining districts use the 2001 Census dataset KS18. The SHMA values were proportioned across the wards within the district based upon the distribution within the 2001 Census data for use within the gravity model.

10.11.12 The **Accommodation Strategy** sets out estimates of spare capacity in the sector. It states that at any one time 13.3% of PRS units are estimated to be vacant. This has therefore been used in the gravity model.

10.11.13 The occupancy rates for the private rented accommodation have been calculated using average number of bedrooms for the PRS in the 2001 Census and applied to the total number of PRS units identified in the SHMA. The average occupancy rates for private rented accommodation is summarised in **Table 10.10** below.

Table 10.10: Average Occupancy of Private Rented Accommodation

District	1 Bed	2 Bed	3 Bed	4 Bed	Average Occupancy (people per unit)
Sedgemoor	27.3%	32.1%	25.4%	15.2%	2.29
West Somerset	21.1%	28.5%	31.0%	19.4%	2.49
Taunton Deane	28.6%	29.7%	25.1%	16.6%	2.30
Other	24.9%	30.1%	27.7%	17.2%	2.26

d) Owner Occupied Accommodation

10.11.14 The gravity model includes workers moving into the area and living in owner occupied housing. This element of the gravity model is based on the total number of family sized owner-occupied units (defined as houses with three or more bedrooms) in each ward within the 60 minute travel time catchment. This is based on Census data.

e) Latent Accommodation

10.11.15 In late 2009 and again in the spring of 2011 an advertisement was placed in several local weekly papers (Bridgwater Mercury, West Somerset Free Press, Somerset County Gazetteer and Burnham and Highbridge Times) inviting people to register an interest in providing accommodation to HPC workers. In addition to tourist and private rented properties, this provided a source of 'latent' accommodation, i.e. property which had not previously been offered for rent and primarily comprising rooms within people's houses. As a consequence of these advertisements and ongoing calls to EDF Energy, over 1,500 bedspaces in private accommodation have been registered to date of which over 400 are rooms within people's houses.

10.11.16 The survey responses were interrogated to determine how many bed spaces would be available in each ward. The limited amount of latent accommodation that fell outside of the 60 minute catchment has not been considered in the gravity model.

10.12 Summary

a) Workforce Distribution

10.12.1 On the basis of the analysis described in this section, **Table 10.11** below summarises the estimated geographical distribution of the workforce.

Table 10.11: Distribution of HPC Workforce

District	All Workers		Non-home-based Only		
	2013 Distribution	2016 Distribution	2013 Distribution	2016 Distribution	2016 Distribution
Bath and North East Somerset	0.10%	0.53%	0.00%	0.00%	0.00%
Bristol	1.10%	3.96%	0.00%	0.00%	0.00%
North Somerset	8.60%	13.99%	3.78%	12.28%	20.20%
South Gloucestershire	0.00%	0.33%	0.00%	0.00%	0.00%
East Devon	0.80%	0.54%	0.00%	0.00%	0.00%
Exeter	1.60%	1.14%	0.00%	0.00%	0.00%
Mid Devon	1.70%	1.08%	0.00%	0.00%	0.00%
North Devon	0.00%	0.06%	0.00%	0.00%	0.00%
Teinbridge	0.10%	0.05%	0.00%	0.00%	0.00%
North Dorset	0.00%	0.00%	0.00%	0.00%	0.00%
West Dorset	0.10%	0.10%	0.00%	0.00%	0.00%
Mendip	1.60%	2.94%	0.00%	2.01%	3.31%
Sedgemoor	49.70%	45.15%	57.55%	53.18%	44.33%
South Somerset	3.60%	2.59%	0.01%	0.01%	0.01%
Taunton Deane	25.50%	12.01%	31.72%	11.63%	19.13%
West Somerset	5.40%	15.64%	6.94%	21.03%	13.01%
Salisbury	0.00%	0.00%	0.00%	0.00%	0.00%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

b) Assignment

10.12.2 The distribution of workers as derived in this chapter has been used to determine the travel mode of those workers as described in **Chapter 8**. The resultant vehicular trips have then been assigned to the road network in two ways as follows.

10.12.3 First, HGVs and buses to the HPC development site have been given a fixed assignment since their routes are known and would be controlled. As described in **Chapter 9**, HGVs would use one of two routes through Bridgwater, one from Junction 23 and one from Junction 24. Buses would use the routes prescribed to them depending on their origin and destination. The bus routes are described in **Chapter 12** and the gravity model has been used to inform the proposed routes at this stage.

10.12.4 Secondly, all other traffic (HGVs to the associated development sites; light goods vehicles and cars) has been assigned using the model. This is a dynamic assignment based on the lowest cost for the relevant journey and is described further in **Chapter 15**.

11. PARKING STRATEGY

11.1 Introduction

11.1.1 The approach to parking on the HPC Project is designed to support the over-arching transport strategy for HPC. This chapter sets out the detailed parking proposals for the HPC development site and each of the associated development sites.

11.1.2 The objectives guiding the approach to parking have been to:

- minimise the volume of traffic associated with the development of the new power station so far as reasonably practicable, at all times, but especially during peak hours;
- maximise the safe, efficient and sustainable movement of people, i.e. travel by non-car modes required for the HPC Project so far as reasonably practicable; and
- minimise the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable.

11.1.3 The strategy considers all development and associated development sites that form part of the Development Consent Order (DCO) to be submitted to the Infrastructure Planning Commission (IPC) i.e.:

- Hinkley Point C development site.
- Bridgwater A Accommodation campus.
- Bridgwater C Accommodation campus.
- M5 Junction 23.
- M5 Junction 24.
- Cannington park and ride site.
- Williton park and ride Site.
- Combwich Wharf and freight laydown facility.

11.2 HPC Development Site

i. Construction Phase

11.2.1 Provision of parking on the HPC development site would be heavily constrained in order to ensure that only a very small proportion of workers are able, and entitled to, travel by private car. The vast majority of HPC workers (more than 90% at peak construction) would either be resident at the HPC accommodation campus or be transported to and from the HPC development site by direct bus services, park and ride bus services and accommodation campus bus services.

11.2.2 During construction, the HPC development site would provide car parking spaces for site contractors and EDF Energy. Some replacement spaces for Hinkley Point A and B would also be provided on the HPC development site. However, these are not included in the analysis since they are simply replacement of existing facilities and would not be available to the HPC Project workforce.

11.2.3 A total of 200 car parking spaces would be provided throughout the construction phase for site contractors and EDF Energy. This provision is based on an allocation of three car parking spaces for each major site contractor, of which there are expected to be approximately 33 major contractors (hence 100 spaces) and an allocation of a further 100 spaces for contractors with more than 50 employees. The 200 is a maximum and would be available when the car park construction is sufficiently advanced.

11.2.4 A further 100 car parking spaces would be maintained throughout construction for a combination of business visitors, VIP visitors, disabled visitors to the Public Information Centre (PIC) and bus parking for the PIC.

11.2.5 Aside from provision for disabled visitors, on-site parking for the PIC would not be available until the end of construction. Until then, PIC visitors would use the park-and-ride at Cannington, for which 120 spaces have been provided.

11.2.6 No motorcycle parking would be provided at the HPC development site since workers would not be allowed to motorcycle direct to the HPC development site, this is in order to minimise noise disturbance on the local road network during sensitive hours, bearing in mind particularly the shift patterns of workers. Instead, motorcycle parking spaces would be provided at all four park and ride sites.

ii. Operational Phase

11.2.7 Three car parks are proposed at HPC once the power station is complete. These are shown below along with their proposed use:

- East: 180 spaces: HPB workers and HPC disabled worker spaces.
- South East: 505 spaces: 75 spaces for HPB workers and 430 spaces for HPC workers.
- South: 508 spaces: PIC/Training and Simulator Building/Outages.
- Total: 1,193 spaces.

11.2.8 It is predicted that the new power station would require 900 full-time operational staff, with approximately 810 staff being on site at any one time during a typical working day. The 430 car parking spaces proposed would therefore represent a 53% provision for staff, or one space per 1.9 employees. This would therefore act as a significant restraint on car use.

11.2.9 The operational Travel Plan for the HPC Project would consider the scope for appropriate improvements to sustainable transport services and facilities, including improvements to local bus services, to encourage travel to the HPC development site by sustainable modes. Census data for Sedgemoor indicates that the modal split for journey to work by car (driver) is currently 70% and therefore a parking ratio of 53% would encourage a modal shift towards more sustainable modes for travel to the HPC development site.

11.2.10 During the planned outages an additional 600 to 1,000 staff would be expected to be on the HPC development site at any one time. The south car park for outage staff would therefore provide a minimum of one parking space per two employees. This car park would not be available for the use of operational HPC or Hinkley Point B staff.

11.2.11 The south car park would also be allocated to cater for visitor parking to the proposed Public Information Centre (PIC) and training/ simulator building. It is estimated that approximately 40 spaces would be required for the PIC on an average day outside school holidays. The auditorium in the PIC would be capable of accommodating up to 120 visitors and would have a gross floor area of approximately 930sq.m. PIC parking would generally comprise buses during school term time. During school holidays, particularly in the summer, it is expected that up to 120 cars for PIC visitors would be parked in the south car park.

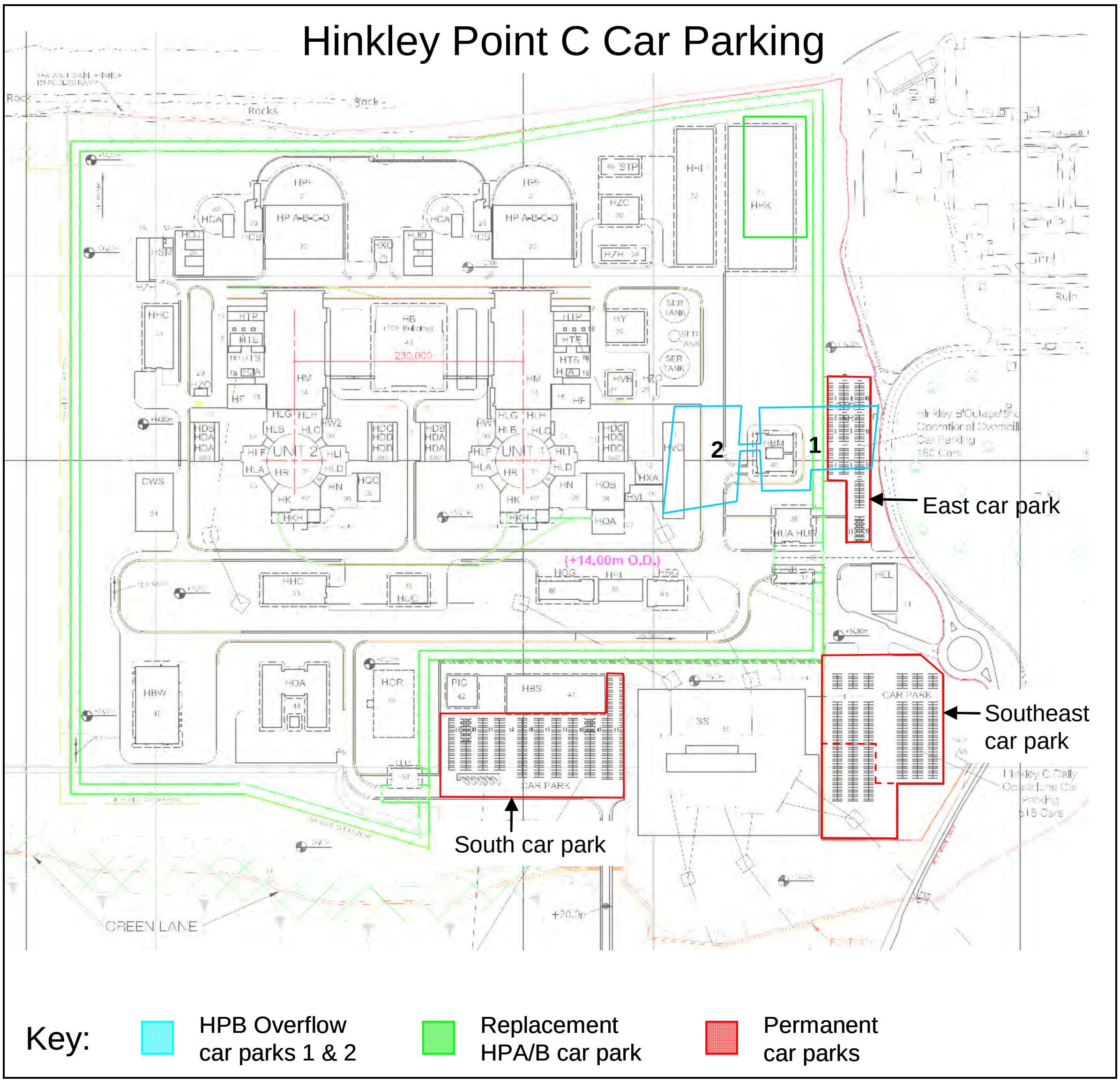
11.2.12 In terms of comparison of the proposed car parking numbers with local parking standards, the current parking standards for Somerset are set out in the document 'Somerset Local Transport Plan 2006-2011: Parking Strategy (March 2006)'. This states that a maximum parking standard of one space per 30sq.m is applicable for B1 office uses, with a maximum standard of one space per 50sq.m for B2-B7 general industrial uses.

11.2.13 The HPC development site includes for approximately 40,500m^2 of floor space for an operational service centre, auxiliary administration centre, EDF site offices and a simulator building/training centre. These buildings would have a mix of office and 'general business'/industrial use and therefore a maximum parking standard of between 810 and 1,350 spaces would be applicable using the local standards.

11.2.14 It is therefore considered that the 430 operational car parking spaces proposed for the HPC development site falls well within relevant local car parking standards.

11.2.15 The location of the existing, temporary and permanent car parks are shown below in **Figure 11.1**.

Figure 11.1:: Hinkley Point C Car Parking Layout



11.3 Campus Sites

a) HPC Accommodation Campus

11.3.1 A total of 319 car parking spaces would be provided during the construction phase at the accommodation campus (19 of which would be wheelchair accessible). A total of 510 bedspaces are proposed HPC accommodation campus, equating to a parking ratio of 63% (or one parking space per 1.6 bedspaces). In addition there would be 12 spaces for the facilities management team.

11.3.2 The Somerset Local Transport Plan 2006-2011: Parking Strategy (March 2006) recommends a maximum parking provision for hotels and hostels of one space per bedspace, which would equate to a maximum parking provision of 510 spaces for the proposed HPC accommodation campus. It can therefore be seen that the 319 car parking spaces proposed for occupants are within the maximum standard; and therefore accord with the relevant local parking policies.

b) Bridgwater A

11.3.3 531 car parking spaces are proposed at the Bridgwater A accommodation campus (comprising 850 bedspaces), of which 26 spaces are wheelchair accessible. This equates to a 63% provision for occupants, or one space per 1.6 bedspaces. The Somerset Local Transport Plan 2006-2011: Parking Strategy (March 2006) recommends a maximum parking provision for hotels and hostels of one space per bedspace, which would equate to a maximum parking provision of 850 spaces for the occupants. It can therefore be seen that the 531 car parking spaces proposed are within the maximum standard and therefore accord with the relevant local parking policies.

11.3.4 A full size and two 5-a-side football pitches are proposed at the Bridgwater A accommodation campus which would be available to the local community. It is therefore proposed that 30 spaces would be provided in close proximity to the sports pitches for use by the local community. Given that a maximum of 50-60 people would be using the three sports pitches at any one time, this provision is considered appropriate.

c) Bridgwater C

11.3.5 60 parking spaces are proposed at the Bridgwater C accommodation campus (comprising 150 bedspaces) of which five spaces would be wheelchair accessible. A further six car parking spaces are proposed for facilities management.

11.3.6 The 60 car parking spaces for occupants equates to a 40% parking provision or one space per 2.5 bedspaces. The Somerset Local Transport Plan 2006-2011: Parking Strategy (March 2006) recommends a maximum parking provision for hotels and hostels of one space per bedspace, which would equate to a maximum parking provision of 150 spaces. It can therefore be seen that the 60 car parking spaces proposed are within the maximum standard and therefore accord with the relevant local parking policies.

d) Campus Summary

11.3.7 A total of 922 car parking spaces are proposed across the three accommodation campus sites, which equates to an average provision of equivalent to one car parking space per 1.6 bed spaces. This is considered to be a restraint based provision and is designed to encourage the use of more sustainable transport modes by occupants of the accommodation campuses both on their journey to and from the accommodation campuses and also for non-work trips in the local area. The car parking provision for the three accommodation campuses is summarised at **Table 11.1**.

Table 11.1: Campus Bedspaces and Parking Provision

	BRI-A	BRI-C	HPC	Total
Bedspaces	850	150	510	1,510
Parking provision	531	60	319	922
Parking ratio	1 per 1.6 beds	1 per 2.5 beds	1 per 1.6 beds	1 per 1.6 beds

11.4 Park and Ride Sites

11.4.1 Four park and ride sites would be provided as part of the HPC and associated development proposals. These are located at:

- Junction 23.
- Junction 24.
- Cannington.
- Williton.

11.4.2 The paragraphs below set out the approach to determining the parking provision for each site. It is proposed that there would be no planned arrivals and departures to the park and ride sites from 01:30-05:00.

11.4.3 The assessment of demand for park and ride sites has been based on establishing the likely propensity of workers to travel to park and ride sites by more sustainable modes of travel including:

- walking;
- cycling;
- motorcycling;
- rail (and then bus from Bridgwater station);
- public bus; and
- car share.

11.4.4 The full trip assessment associated with each park and ride site is set out at **Chapter 8** of this Transport Assessment together with the resultant demand for park and ride buses. For clarity, the total car trips associated with each park and ride site are summarised at **Table 11.2**. It is assumed that all workers arrive at a park and ride site for the second shift of the day before any on the first shift depart.

Table 11.2: Total Car Trips to each PandR per day (2016)

Time of Day	J23	J24	Can.	Wil.	Total
Total Car Trips (Vehicles)	842	529	179	123	1,673

11.4.5 For the purposes of robustness a contingency of 10% has been added to the assessment this allows for some variability of the Gravity model and the inclusion of very low level staff parking at each site (8-10 operational staff). It is the figures including the 10% contingency that are given in the **Tables 11.6 to 11.9** below

11.4.6 **Table 11.3** to **Table 11.5** below show the proposed parking provision at each of the park and ride sites for 2013, 2016 and 2021. The number of spaces shown at Junction 23 and Junction 24 is greater than the parking accumulation shown in **Tables 11.6 and 11.7** for the reasons set out in paragraphs 11.4.19 to 11.4.21 below.

Table 11.3: Proposed Workforce Park and Ride Parking Provision 2013

Parking Bay	Junction 23	Junction 24	Cannington	Williton	Total
Car parking	0	1,300	0	0	1,300

Table 11.4: Proposed Workforce Park and Ride Parking Provision 2016

Parking Bay	Junction 23	Junction 24	Cannington	Williton	Total
Car parking	1,300	698	132	160	2,290

Table 11.5: Proposed Workforce Park and Ride Parking Provision 2021

Parking Bay	Junction 23	Junction 24	Cannington	Williton	Total
Car parking	0	698	132	0	1,432

a) Junction 23

11.4.7 The proposed park and ride site at Junction 23 would become fully operational in Quarter 3 2014 and have 1,300 parking spaces. It is EDF Energy's intention to manage the use of these spaces (and only workers with a permit for this site would be permitted to park). 32 spaces will be allocated for disabled use, and 25 for van/minibus use. Disabled provision represents a 3% proportion of all operational car parking at Junction 23.

11.4.8 Junction 23 would also accommodate a total of 65 motorcycle spaces and 65 cycle parking spaces.

11.4.9 The parking accumulation calculated for Junction 23 including 10% contingency is shown at **Table 11.6.**

Table 11.6: Junction 23 Parking Accumulation (2016)

Time of Day	Arrivals	Departures	Accumulation
00:00	0	183	28
01:00	0	28	0
02:00	0	0	0
03:00	0	0	0
04:00	33	0	33
05:00	196	0	229
06:00	191	0	419
07:00	182	45	557
08:00	23	2	578
09:00	0	0	578
10:00	0	0	578
11:00	0	0	578
12:00	51	0	630
13:00	165	0	794
14:00	35	0	830

Time of Day	Arrivals	Departures	Accumulation
15:00	0	25	805
16:00	0	199	606
17:00	0	157	448
18:00	0	172	276
19:00	5	77	205
20:00	45	0	249
21:00	0	0	249
22:00	0	0	249
23:00	0	38	211
Total	**926**	**926**	

b) Junction 24

11.4.10 The proposed park and ride site at Junction 24 would become operational in Quarter 1 2013 and would have 1,300 car parking spaces from Quarter 3 2013, of which 32 spaces would be allocated for disabled use and 25 for van/ minibus use. This represents a 1.3% proportion of all car parking at Junction 24.

11.4.11 The Junction 24 park and ride site would be the only site available for park and ride in the 'early years' phase of construction (2013 assessment year). It is EDF Energy's intention to manage the use of these spaces (and only workers with a permit for this site would be permitted to park. As the Junction 23 facility comes on line some workers would be given permits for the Junction 23 facility instead of this facility. The disabled parking provision at Junction 24 would be 17 spaces. Once Junction 23 is fully operational, car parking at Junction 24 would be reduced to 698 spaces.

11.4.12 The parking accumulation calculated for Junction 24 is shown at **Table 11.7**.

Table 11.7: Junction 24 Parking Accumulation (2013 and 2016)

Time of Day	2013			2016		
	Arrivals	Departures	Accumulation	Arrivals	Departures	Accumulation
00:00	0	233	36	0	115	18
01:00	0	36	0	0	18	0
02:00	0	0	0	0	0	0
03:00	0	0	0	0	0	0
04:00	0	0	0	20	0	20
05:00	290	0	291	123	0	144
06:00	243	0	533	120	0	264
07:00	232	57	708	115	28	350
08:00	30	3	735	15	1	363
09:00	0	0	735	0	0	363
10:00	0	0	735	0	0	363
11:00	0	0	735	0	0	363

Time of Day	2013			2016		
	Arrivals	Departures	Accumulation	Arrivals	Departures	Accumulation
12:00	65	0	800	32	0	396
13:00	209	0	1010	104	0	499
14:00	45	0	1054	22	0	521
15:00	0	31	1023	0	16	506
16:00	0	253	770	0	125	381
17:00	0	200	570	0	99	282
18:00	0	219	351	0	108	174
19:00	6	98	260	3	48	129
20:00	57	0	317	28	0	157
21:00	0	0	317	0	0	157
22:00	0	0	317	0	0	157
23:00	0	48	269	0	24	133
Total	**1,177**	**1,177**		**582**	**582**	

c) Cannington

11.4.13 The proposed park and ride site at Cannington would have 132 car parking spaces, of which four spaces would be allocated for disabled use and three for van/mini-bus use. This represents a 3% proportion of all car parking at Cannington. There is also provision for 120 spaces at Cannington for visitors to the PIC. The parking accumulation for this parking and associated trip generation is set out in **Chapter 8**.

11.4.14 The parking accumulation calculated for Cannington is shown at **Table 11.8.**

Table 11.8: Cannington Parking Accumulation (2016)

Time of Day	Arrivals	Departures	Accumulation
00:00	0	27	4
01:00	0	4	0
02:00	0	0	0
03:00	0	0	0
04:00	5	0	5
05:00	29	0	33
06:00	28	0	61
07:00	27	7	81
08:00	3	0	84
09:00	0	0	84
10:00	0	0	84
11:00	0	0	84
12:00	8	0	92
13:00	24	0	116

Time of Day	Arrivals	Departures	Accumulation
14:00	5	0	121
15:00	0	4	117
16:00	0	29	88
17:00	0	23	65
18:00	0	25	40
19:00	1	11	30
20:00	6	0	36
21:00	0	0	36
22:00	0	0	36
23:00	0	6	31
Total	**135**	**135**	

d) Williton

11.4.15 The proposed park and ride site at Williton would have 160 car parking spaces, of which four spaces would be allocated for disabled use and three would be for vans/mini-buses. This represents a 2.5% proportion of all car parking at Williton.

11.4.16 The parking accumulation calculated for Williton is shown at **Table 11.9**.

Table 11.9: Williton Parking Accumulation (2016)

Time of Day	Arrivals	Departures	Accumulation
00:00	0	39	6
01:00	0	6	0
02:00	0	0	0
03:00	0	0	0
04:00	7	0	7
05:00	42	0	49
06:00	41	0	90
07:00	39	10	119
08:00	5	1	124
09:00	0	0	124
10:00	0	0	124
11:00	0	0	124
12:00	11	0	135
13:00	35	0	170
14:00	8	0	177
15:00	0	5	172
16:00	0	43	129
17:00	0	34	96

Time of Day	Arrivals	Departures	Accumulation
18:00	0	37	59
19:00	1	16	44
20:00	10	0	53
21:00	0	0	53
22:00	0	0	53
23:00	0	8	45
Total	**198**	**198**	

11.4.17 It should be noted that a 10% contingency has been added to the car trips going to all park and ride sites. This was primarily to ensure adequate provision at Junction 23 and Junction 24. Whilst this theoretically shows an overprovision at Williton the actual number of spaces would only be what is being applied for (i.e. 160).

11.4.18 EDF Energy would control access to park and ride sites through allocation of parking spaces to employees and provision of security passes. EDF Energy would ensure that provision of parking permits does not exceed available capacity at park and ride sites and this would continually be monitored as part of the site Travel Plans.

e) Exceptional Circumstances

11.4.19 When considering the sizing of proposed park and ride sites, it is essential that EDF Energy consider what may happen in the event of a range of exceptional circumstances which could include an accident or incident that prevents access to, or use of, one or more of the park and ride sites. In addition contingency may be required if it proves necessary to dynamically adjust the balance between provision of direct buses and use of park and ride sites in the light of unexpected fluctuations in the patterns of workforce demand and location. .

11.4.20 Since the transportation of construction workforce to and from the HPC development site is heavily reliant on the use of park and ride sites, it is essential that contingency is built into the proposals in order to ensure that the HPC Project has the flexibility to respond most efficiently to a range of circumstances, to ensure the smooth transportation of the workforce and actively manage impacts on the road network.

11.4.21 For this reason, EDF Energy has allowed for an over-provision at both Junction 23 and Junction 24 as identified at **Table 11.3** to **Table 11.5.** The park and ride developments would not be accessible to any individuals or organisations other than authorised members of the HPC workforce and as such any parking provision not required at a given time could not be utilised for other purposes than those for which they are intended. In addition EDF Energy would monitor and manage the demand for parking at park and ride sites as part of the overall approach to travel planning to ensure optimum use of the facilities in line with the transport strategy and this TA.

11.5 Induction Centre

11.5.1 A site workers Induction Centre is proposed as part of the HPC proposed development. This would provide a facility for all site workers to be processed through their induction requirements. The function of the centre is to be a “one-stop shop” for the thousands of new workers that would be processed for employment at the construction sites. Every new worker, both locally and from abroad, would first visit this site before any work can commence.

11.5.2 A temporary Induction Centre would be provided at the Junction 24 associated development site and would be operational from Quarter 3 2013 (2013 assessment year). This facility would only be a temporary facility and would be replaced with a permanent facility at Junction 23 which would become operational in Quarter 3 2014 and would remain for the rest of the construction period.

11.5.3 A total of 120 car parking spaces are proposed for the induction centre. It is envisaged that a maximum of 147 workers and staff at the site at any one time. The 120 car parking spaces proposed therefore equate to an 82% parking provision or a provision of one space per 1.2 workers/employees.

11.5.4 Due to the nature of the use proposed, it is difficult to compare the Induction Centre with the land uses included in the Somerset Local Transport Plan 2006-2011: Parking Strategy (March 2006) document. The parking strategy document includes for parking standards for exhibition centres and public halls, which could be considered to be closest in terms of use to the proposed induction centre in transport terms, but in planning land use terms this is not equivalent. The maximum parking standard for exhibition centres is one space per 22sq.m, whilst the maximum standard for public halls is one space per 5sq.m. These standards, when applied to the proposed 1,300sq.m induction centre, provide a maximum parking standard of between 60 and 262 spaces. The 120 parking spaces proposed for the induction centre falls in the centre of this ‘range’ and is therefore considered to be appropriate.

11.5.5 Workers would not be formally employed on the project at the point at which they arrive at the Induction Centre and for many this may be the first time they arrive in Somerset. The majority are therefore expected to travel by car since they would not have been allocated to designated park and ride or direct bus services at this stage. Workers would only be required to attend the Induction Centre once and it would be here that they would be given full details of their travel arrangements and the controls that EDF Energy would implement on parking at the park and ride sites and the HPC development site. Workers would be allocated to either a designated park and ride site or to a designated direct bus route on their induction day and would be required to use their designated travel arrangements.

11.6 Public Information Centre

11.6.1 The Public Information Centre at HPC is scheduled to open in late 2014 and remain open during the operation of the HPC power station. Car parking would be provided for visitors, with a maximum of 40 parking spaces provided on site during the construction phase. These spaces would be restricted to the use of disabled visitors and for parking of buses. A maximum of 120 spaces would be provided for public visitors at the Cannington park and ride facility. A bespoke bus service would be provided for the PIC which would start in Bridgwater, stop at the Cannington park and ride facility and then route to the HPC development site.

11.6.2 During the operational phase all parking for the PIC would be provided at the HPC development site.

11.7 Combwich Wharf

11.7.1 A car parking area comprising 50 spaces (of which two would be reserved for accessible parking) is proposed at the freight laydown facility. This level of parking is proposed in connection with the workforce required at Combwich Wharf – in particular those who may be required to work unsocial hours in relation to deliveries and movements of abnormal indivisible loads.

11.8 Other Associated Development Sites

11.8.1 Limited parking would be available at the remaining associated development sites during construction and decommissioning, since it is expected that the majority of workers would use buses.

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12. BUS AND RAIL STRATEGY

12.1 Introduction

12.1.1 This chapter sets out the bus and rail strategies for the HPC Project. The bus strategy is a core element of the over-arching transport strategy for the HPC Project, particularly considering that over 90% of all workers at peak construction would either already be resident at the HPC accommodation campus or would travel to and from work by bus, including direct bus services, park and ride bus services and accommodation campus bus services (when workers travelling from the HPC accommodation campus to the HPC development site are included).

12.1.2 Rail does not form a significant element of the transport strategy for the HPC Project, largely because the closest railway station to the HPC and associated developments is located in Bridgwater, some 8km from the site. However, rail has been considered as a potentially viable means of travel if onward connections can be provided from Bridgwater. Encouraging use of rail would form part of the travel plans developed for the HPC Project.

12.2 Bus Strategy

12.2.1 The bus strategy incorporates the following aspects of workforce and visitor travel:

- park and ride workforce bus trips;
- direct to site workforce bus trips;
- accommodation campus workforce bus trips; and
- visitor park and ride bus trips.

12.2.2 The four park and ride sites are a key part of the sustainable travel initiatives provided by EDF Energy, designed to minimise the number of workforce related car trips on the local highway network to HPC. In addition, a series of direct bus routes have been identified which would transport members of the workforce who live in large clusters direct to the HPC development site.

12.2.3 The core objectives of the bus strategy for HPC are to:

- minimise the volume of traffic associated with the development of the new power station so far as reasonably practicable, at all times, but especially during peak hours;
- minimise the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable; and
- take all reasonable steps to protect the natural and built environment.

12.2.4 At this stage of the planning process the bus routes and timetables described in this chapter are not fixed. Timetables and routes have been developed for modelling purposes to assess a worst case impact that provision of such services could have on the highway network. For the modelling the assumption has been that workers will be provided with a choice of relatively frequent services. As the development progresses EDF Energy would refine the bus services, routes and timetables to best serve the actual distribution of workers. Workers living in appropriate locations would be allocated to a particular direct bus route and stop and there would be significant scope for allocating workers to a bus leaving at a particular time. Similar opportunities would arise in relation to some park and ride and accommodation campus buses. This should enable the number of bus trips to be significantly reduced.

12.2.5 The timetables are not fixed at this stage and will be refined once an operator has been appointed to provide the bus services. Direct bus provision and timetables will also be regularly adjusted to match the changing patterns of demand. As explained earlier, in practice the number of buses is likely to be significantly less. However, at this stage and for the purpose of providing a robust worst case assessment of the likely impact of bus services on the local transport network, the timetables have been used as an input to the modelling.

a) Direct Bus Services

12.2.6 Direct bus services would be provided by EDF Energy to facilitate the movement of workers direct to and from the HPC development site. The direct bus services would remove the need for workers using these services to travel by car at all.

12.2.7 Based on the existing gravity model, a total of eight direct bus services have been identified which would operate throughout the construction phase of HPC.

12.2.8 An assessment of demand for direct bus services has been undertaken for the 2013, 2016 and 2021 assessment years, this is described in detail within the People Trip Generation chapter (**Chapter 8**), but is summarised again here for clarity.

12.2.9 To estimate the number of workers who could feasibly access the HPC development site by direct bus, wards containing concentrated numbers of HPC workers were identified from the gravity model. Workers travelling by direct bus would not use the park and ride facilities, but would be bussed direct to the HPC development site from a designated pick up point.

12.2.10 The proposed location of the bus pick-up and drop-off points are sited to cover as much of the population as possible and are located at existing bus stops or rail stations. In addition, workers living in wards en-route to the HPC development site have been identified as potential pick-up/drop off points for buses.

12.2.11 In terms of the catchment areas for the pick up/drop off points along each route, 800m walk catchments have been assumed. All routes have been modelled with a 30 minute journey time.

12.2.12 With regards to assessment years, it is envisaged that direct buses would be provided in 2013 and 2016. However, the number of workers using the direct buses each year, and thus their viability varies. EDF would refine these bus services once the actual distribution of workers is known.

i. Bus Routes

12.2.13 The eight bus routes identified are shown at **Appendix 12-1**. These include:

- Weston-Super-Mare to HPC.

- Brean Burnham to HPC.
- Taunton to HPC.
- Minehead and Williton to HPC.
- Cannington and Netherstowey to HPC.
- Three routes from Bridgwater to HPC.

12.2.14 **Table 12.1** provides a summary of the routes to be provided for each assessment year and the number of workers assumed to use each route.

Table 12.1: Assessment Year Direct Bus Services

Route	Number of Workers		
	2013	2016	2021
Weston-Super-Mare – HPC	62	244	12
Brean Burnham – HPC	153	273	30
Taunton – HPC	147	141	29
Minehead and Williton – HPC	95	129	19
Bridgwater 1 – HPC	130	83	40
Bridgwater 2 – HPC	183	133	110
Bridgwater 3 – HPC	96	87	52
Cannington and Nether Stowey – HPC	58	80	11

12.2.15 The total workforce living within the catchments for each of these eight direct bus routes demonstrate that there are significant clusters of workers in these locations, based on the Gravity model.

12.2.16 In order to assess the demand for direct buses the number of workers arriving and departing throughout the day in each shift has been considered in tandem with the available vehicle capacity. This is described in more detail in **Chapter 8** and summarised in **Table 12.2**, **Table 12.3** for 2013, 2016 and 2021, respectively.

Table 12.2: 2013 Direct Bus Demand

Route	Number of Buses (two-way)		
	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Daily (00:00-24:00)
Weston-Super-Mare – HPC	2	4	56
Brean Burnham – HPC	4	8	76
Taunton – HPC	4	8	76
Minehead and Williton – HPC	4	8	72
Bridgwater 1 – HPC	4	8	72
Bridgwater 2 – HPC	3	8	76
Bridgwater 3 – HPC	4	8	72
Cannington and Nether Stowey – HPC	2	4	56

Table 12.3: 2016 Direct Bus Demand

Route	Number of Buses (two-way)		
	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Daily (00:00-24:00)
Weston-Super-Mare – HPC	4	8	76
Brean Burnham – HPC	4	8	80
Taunton – HPC	4	8	76
Minehead and Williton – HPC	4	8	72
Bridgwater 1 – HPC	4	8	72
Bridgwater 2 – HPC	4	8	76
Bridgwater 3 – HPC	4	8	72
Cannington and Nether Stowey – HPC	4	8	72

Table 12.4: 2021 Direct Bus Demand

Route	Number of Buses (two-way)		
	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Daily (00:00-24:00)
Weston-Super-Mare – HPC	1	4	14
Brean Burnham – HPC	1	4	18
Taunton – HPC	1	4	18
Minehead and Williton – HPC	1	4	18
Bridgwater 1 – HPC	1	4	18
Bridgwater 2 – HPC	1	4	18
Bridgwater 3 – HPC	1	4	18
Cannington and Nether Stowey – HPC	1	4	14

ii. Direct Bus Timetables

12.2.17 A series of indicative bus timetables have been developed for the purposes of modelling the impact of direct bus services on the local highway network. As stated earlier in this chapter, these would be refined once the actual distribution of workers is known.

12.2.18 The bus timetables have been developed using the workforce arrival/departure profile information supplied by EDF Energy and the profile of workforce demand for services, which has been informed by the Gravity model.

12.2.19 The timetables are not fixed at this stage and will be refined once an Operator has been appointed to provide the bus services. Direct bus provision and timetables will also be regularly adjusted to match the changing patterns of demand. As explained earlier, in practice the number of buses is likely to be significantly less. However, at this stage and for the purpose of providing a robust worst case assessment of the likely impact of bus services on the local transport network, the timetables have been used as an input to the modelling.

iii. Workforce Park and Ride Bus Services

12.2.20 Workers using the park and ride sites would be transported between their designated park and ride site and the HPC development site by bus.

12.2.21 In 2013 there would just be a single park and ride site at Junction 24 of the M5. By 2016 there would be a total of four park and ride sites at Junction 23 of the M5, Junction 24 of the M5, Cannington and Williton. In 2021 there would be two park and ride sites open, Cannington and Junction 24. For the purpose of modelling workers have only been assigned to the Junction 24 park and ride in 2021, since this provides a robust assessment for traffic movements in Bridgwater.

12.2.22 The total workforce using each park and ride site is shown at **Table 12.5**.

Table 12.5: Workforce Demand by Park and Ride Site

Park and Ride Site	Workforce Using Pand R (Workers)		
	2013	2016	2021
Junction 23	0	1,449	0
Junction 24	2,111	881	370
Cannington	0	269	0
Williton	0	174	0

12.2.23 The demand for park and ride buses is discussed in detail at **Chapter 8** of this report. However, in summary it is based on the number of workers arriving and departing throughout the day in each shift and the bus capacity. The number of bus movements during the AM, PM and daily periods for each park and ride site in each assessment year is set out in **Table 12.6** to **Table 12.7**.

Table 12.6: Bus Demand by Park and Ride Site (vehicles) 2013

Park and Ride Site	Bus movements		
	AM Peak	PM Peak	Daily (24hr)
Junction 24	10	20	224

Table 12.7: Bus Demand by Park and Ride Site (vehicles) 2016

Park and Ride Site	Bus movements		
	AM Peak	PM Peak	Daily (24hr)
Junction 23	6	16	176
Junction 24	6	12	128
Cannington	6	12	124
Williton	4	8	80

Table 12.8: Bus Demand by Park and Ride Site (vehicles) 2021

Park and Ride Site	Bus movements		
	AM Peak	PM Peak	Daily (24hr)
Junction 24	2	7	32

iv. Workforce Bus Timetables

12.2.24 As with the direct bus services a timetable has also been derived for park and ride bus services. The bus timetables have been developed using the workforce arrival/departure profile information supplied by EDF Energy and the profile of workforce demand for services, which has been informed by the Gravity model. The detailed analysis of workforce park and ride bus service demand is provided in a spreadsheet model which accompany this Transport Assessment.

v. Workforce Bus Routing

12.2.25 The buses generated by each of the proposed park and ride sites would follow specific routes. Route plans are included at **Appendix 12.1.** During sensitive hours some buses would be routed via Wylds Road rather than The Drove to reduce movements past residential properties in Bridgwater.

b) Campus Park and Ride Bus Services

12.2.26 Designated buses would transport the workforce from the accommodation campuses at Bridgwater A and Bridgwater C. Buses would also transport the workforce from the HPC development site accommodation campus, but all movements would occur internally within the HPC development site and would not impact upon the local highway network.

12.2.27 Both Bridgwater A and Bridgwater C accommodation campuses would be served by the same shuttle buses, with journeys from the accommodation campus to HPC originating at Bridgwater C before travelling on to Bridgwater A to collect more passengers. On the return journey from HPC shuttle buses would call at Bridgwater A accommodation campus first, before terminating at Bridgwater C accommodation campus.

Table 12.9: Workforce Bus Demand by Campus (vehicles) 2016

Park and Ride Site	Workforce Demand (Workers)		
	AM Peak	PM Peak	Daily (24hr)
Bridgwater A and C Accommodation Campuses	6	12	128

i. Campus Bus Timetables

- A timetable has also been derived for accommodation campus bus services. The bus timetables have been developed using the workforce arrival/departure profile information supplied by EDF Energy and the profile of workforce demand for services, which has been informed by the Gravity model.

ii. Campus Bus Routing

12.2.28 As with park and ride buses, accommodation campus buses would also follow designated route. Route plans are included at **Appendix 12.1**.

c) Visitor Park and Ride Bus Services

12.2.29 Designated buses would transport visitors from the Cannington park and ride site visitor parking to the Public Information Centre (PIC).

12.2.30 The likely demand for visitor buses has been derived using the projected visitor forecasts by time of day and bus capacity. The forecast demand for buses is shown at **Table 12.9**. It should be noted that due to the times of operation proposed for the visitor centre (09:30 to 16:30), no visitor buses would be required during the AM and PM peak hours.

Table 12.10: Visitor Bus Demand Cannington PandR (number of vehicles) 2016

Park and Ride Site	Visitor Demand (vehicles)		
	AM Peak	PM Peak	Daily (24hr)
Cannington PandR	0	0	52

12.2.31 The visitor centre would operate specific opening hours which are designed to remove the need for any visitors to travel at peak times.

i. Visitor Bus Timetables

12.2.32 Timetables have also been derived for park and ride bus services. The bus timetables have been developed through an assessment of visitor demand by time of day and consideration of journey times to and from the HPC development site. The detailed analysis of visitor park and ride bus service demand is provided in the spreadsheets which accompany this Transport Assessment.

ii. Visitor Bus Routing

12.2.33 Visitor bus services using Cannington park and ride would use the same designated route as workforce park and ride buses to and from Cannington. This bus would start at Bridgwater station to provide a regular link for rail users wishing to transfer onto a bus to HPC via Cannington park and ride.

12.3 Rail Strategy

12.3.1 EDF Energy has reviewed the role of rail transport in relation to HPC. This section provides a summary of the detailed study prepared by EDF Energy. The full report is included at **Appendix 12-2.**

12.3.2 Rail passenger transport could play a potential role in reducing or mitigating the transport effects arising from construction of HPC. It is considered that rail would only provide potential during the construction phase of works when significant numbers of workers would be relocating to and travelling to the Bridgwater area. The rail study undertaken concentrates on the rail route between Bristol Parkway and Exeter, since this links the major population centres in the region and is the nearest rail route to the site.

12.3.3 The Rail Study is informed by a previous report prepared by First Great Western (FGW) on behalf of EDF Energy entitled 'Options for Additional Services to Hinkley Point Power Station', January 2010. The report is included as **Appendix 1** to the full Rail Strategy Report **(Appendix 12.2).**

12.3.4 FGW operate the principal passenger train franchise in the area. The report assessed the spare capacity and timing of existing train services and the feasibility of additional services to suit the proposed construction shift times then under consideration. The additional services or service enhancements would have to be funded by EDF Energy.

a) Rail Infrastructure

12.3.5 The nearest and principal main line rail route in the Hinkley Point area runs north east to south west between Bristol and Exeter. It was originally built to serve the West of England with trains from London routed via Bristol. However, at Cogload junction to the east of Taunton the route to Exeter is now joined by the more direct 'Berks and Hants' route from London. The railway passes closest to the Hinkley Point site at Bridgwater

12.3.6 The route carries a mixture of both interregional express (Intercity), regional (limited stop) and local (all stations) passenger services operated by First Great Western (FGW) and interregional expresses operated by Arriva Cross Country. There are only a small number of freight services particularly between Bristol and Cogload Junction.

12.3.7 There is a 23 mile branch line which leaves the Bristol to Exeter route from Norton Fitzwarren Junction to the west of Taunton and runs north westwards to the coast at Minehead. The branch line is operated by the West Somerset Railway (WSR) who run a preserved or heritage style passenger rail service over the northern 19.5 miles of the branch between Bishops Lydeard and Minehead.

12.3.8 The nearest stations to Hinkley Point on the Bristol and Exeter route are at Highbridge (Highbridge and Burnham), Bridgwater and Taunton. Williton is the closest station on the West Somerset Railway.

12.3.9 There are existing interchange opportunities for rail passenger services on the Bristol and Exeter route at Bristol Parkway and Bristol Temple Meads to the north east and Taunton and Exeter to the south west. There are no interchange opportunities at Williton.

12.3.10 The Network Rail Great Western Route Utilisation Strategy indicates that there are existing freight terminals at Bridgwater for specialist freight and an aggregates terminal at Exeter. There is also a group of sidings at Fairwater Yard to the west of Taunton Station which are shown in rail atlases also, but not listed as a freight terminal in the RUS. The West Somerset Railway has also been used recently to transport rock armour for strengthening coastal defences at Warren Point near Minehead.

b) Passenger Railheads for Hinkley

12.3.11 A direct rail link was not constructed to serve the earlier power stations at Hinkley Point and historically there have been no railways closer to the Hinkley Point site than those remaining today.

12.3.12 Nuclear flask traffic from the earlier power stations at Hinkley Point has therefore been conveyed by road between the site and a railhead retained at Bridgwater.

12.3.13 Provision of a direct rail link into the Hinkley Point site would not be straight forward since:

- the site at Hinkley Point is at least 10km from the nearest point of the current rail network;
- a route from the north east of Bridgwater would need to cross the A38 and River Parrett at low level and then run across the low lying land bounded to the north and east by the river estuary before finding a way between numerous settlements and through rolling landscape to the Hinkley site;
- a route from the south west of Bridgwater would either need to find a way through a built up area or cross the M5 and the A38 and then run across the grain of numerous valleys and watercourses on the north east slope of the Quantock Hills to the Hinkley site; and
- a route from the Taunton area or the West Somerset Railway would need to find a way through the Quantock Hills or skirt along the coast.

12.3.14 Construction of such a route would be a major undertaking in its own right and likely to be highly contentious due to its environmental impact on the landscape and impact on third parties.

12.3.15 As well as cost it would also import additional planning and approval risks to the HPC Project and present a challenging programme if it was to gain the necessary approvals and be completed in time for HPC construction.

12.3.16 The likelihood of any legacy benefit as a railway would also be small since:

- freight flows to and from the site during operation would be very small relative to the construction phase;
- there is no obvious demand for other rail freight that would benefit from the connection;
- the number of workers required for operation of the plant would be much smaller than required for its construction and shift patterns would be dispersed throughout the day making it an uneconomic market to serve by rail on its own;
- there is very limited population en route and hence demand for a rail passenger service from the local population would be negligible; and
- in the West Somerset Railway, there is already a heritage railway in the area.

12.3.17 Thus as the potential rail use of such a connection is likely to be just for freight and passenger traffic during construction of HPC, the connection would be likely to have significantly greater adverse effects on the adjacent area than the construction related road traffic it was seeking to mitigate.

12.3.18 The option of a direct rail link into the Hinkley Point site has therefore been discounted in this report as unrealistic and so has not been considered further.

c) Existing Railheads

12.3.19 As a direct rail link to the HPC development site is not a realistic proposition, any rail freight or passenger service for the site would need to operate via a railhead on the existing rail network.

12.3.20 Sites identified as having potential to serve as passenger railheads for the Hinkley Point have been reviewed. Only existing station sites are considered as potential railheads as new station sites would offer minimal benefit in terms of reduced journey time to the HPC development site when compared to the available existing railheads. Based on the analysis stations at Bridgwater and Williton are taken forward for further assessment as potential railheads.

12.3.21 Williton and Bridgwater were taken forward and considered in more detail as they appeared the most promising, offering the shortest bus transfer and overall journey time and between them would test the merits of using the West Somerset Railway. This included commissioning an investigation and report by the incumbent train operator First Great Western (FGW) on the feasibility and cost of enhancement options for serving Bridgwater and Williton with additional or through trains for daily commuting using rail. The enhancement options identified are discussed in Section 7.2 and **Appendix 1** of the full Rail Strategy attached at **Appendix 12.2**.

12.3.22 **Table 12.11** below compares the rail journey times of these enhancement options.

Table 12.11: Rail Journey Times of Enhancement Options (Minutes)

Railhead	Bridgwater		Williton	
Origin Station	To Work	From Work	To Work	From Work
Single Shift				
Bristol Parkway	42	51	97	97
Exeter	48	47	77	81
Double Shift				
Bristol Parkway (am)	44	46	95	105
Bristol Parkway (pm)	45	46	99	96
Exeter (am)	47	48	75	79
Exeter (pm)	46	48	85	77

12.3.23 In addition to the above rail travel times, the journey time would also comprise:

- journey time between home and the origin station;
- interchange time at the origin station;
- interchange time at the local railhead; and
- transfer time between the railhead and the work site at Hinkley Point.

12.3.24 The principal reason for examining Williton in more detail as a passenger railhead was its closeness to the HPC development site and therefore the opportunity to minimise the bus transfer distance and time. However, the transfer time by bus is estimated to be 30 minutes from Bridgwater and 21 minutes from Williton, a saving of just nine minutes. In comparison the rail journey time to Williton is between 30 minutes and an hour longer than the equivalent rail journey time to Bridgwater.

12.3.25 The overall multi-modal journey times using Williton as a railhead would also exceed the overall journey time threshold for daily commuting of 90 minutes discussed below. This is due to the relative slow speed and additional mileage involved. Services to and from Exeter also have to reverse at Taunton in order to access the West Somerset Railway branch to Williton.

12.3.26 Williton would also be limited to, in effect, a single train service per shift from the Exeter and Bristol directions whereas Bridgwater has the benefit of numerous trains through the day.

12.3.27 The longer journey times, costs of using the West Somerset railway and the absence of other existing main line train services to Williton means that a railhead at Williton appears greatly inferior in comparison to a railhead at Bridgwater due to the journey times and frequency of service that could be provided.

12.3.28 On this basis it is concluded that Williton is unviable as a passenger railhead for Hinkley Point construction workers. It is therefore concluded that the passenger railhead should be at Bridgwater.

d) Bridgwater Railhead

12.3.29 Bridgwater Railhead is located some 16km from the HPC development site and some 4km from the nearest park and ride site in Bridgwater. Bridgwater station is located on the main rail network on the route between Bristol and Exeter.

12.3.30 The route carries a mixture of both inter-regional express (Intercity), regional (limited stop) and local (all stations) passenger services. First Great Western and Cross Country provide services to and from Bridgwater.

12.3.31 As set out in the Existing Context chapter of this report (**Chapter 3**), there are no bus services running in close proximity to the application site and therefore there would be no existing potential for workers to travel by rail and interchange with bus services to the HPC development site; however, there is some potential for works to travel by rail and then interchange to bus to access a park and ride site.

12.3.32 The railway station is also beyond the reasonable cycle catchment of 8km of HPC and as such it is unlikely that workers would travel by rail and then cycle to the HPC development site from Bridgwater railway station. However, there is again some scope for workers to travel by rail and then cycle on to one of the four park and ride sites.

12.3.33 There would be the option for workers to walk or cycle to a railway station, travel by rail to Bridgwater and then get collected by car by another worker and travel by car share to the application site or park and ride sites. The train timetables have been analysed to determine if this is a feasible option with the shift patterns proposed for HPC.

12.3.34 **Table 12.12** provides a rail timetable for each of the stations identified within a 90-minute journey time of the HPC development site and park and ride sites. A total journey time of up to 90 minutes is considered acceptable for travel to work.

Table 12.12: Mainline Rail Train Times

	Single Shift and Office Shift		Night Shift	
	Arrive Bridgwater	Depart Bridgwater	Arrive Bridgwater	Depart Bridgwater
Taunton	07:13	18:49	21:39	08:24
Bridgwater	07:22	19:03	21:29	08:08
Highbridge and Burnham	07:17	19:37	21:44	07:48
Weston-Super-Mare	07:06	19:49	21:33	08:00
Weston Milton	-	-	21:23	08:09
Worle	-	-	21:19	08:15
Yatton	-	-	21:13	08:21
Nailsea and Backwell	-	-	21:08	08:27
Bristol Templemead	-	-	21:55	08:46

12.3.35 **Table 12.12** shows that with the shift pattern for HPC and current train timetable, it would only be feasible for staff working the Single Shift, the Office Shift, and Night Shift to travel by rail in order to arrive at work on time. **Table 12.12** shows that staff working the Single Shift and Office Shift would only be able to access the HPC development site via Taunton, Highbridge and Burnham, and Weston-Super-Mare rail stations.

12.3.36 It has been assumed that workers would either walk up to 2km or cycle up to 5km to the nearest train station. For the rail assessment it is not considered that 8km is a feasible cycle distance for workers to cycle when combined with a rail journey and a car share connection.

12.3.37 A proportion of the total number of workers living within an 800m walking catchment or 2km cycle catchment, of each of the rail stations identified in **Table 7.1** has been assigned to rail travel. The proportion is based upon the 2001 Journey to Work Census data for rail travel in the districts of North Somerset, Bristol City, Sedgemoor, and Taunton Deane. The relevant rail mode travel from the 2001 Census data has been applied to the origin rail stations depending on the wards in which workers reside.

12.3.38 For Weston-Super-Mare it is expected that 49 workers, at peak, would live in the wards adjacent to the railway station. Of these 17 workers are expected to live within the 2km walk catchment and 32 workers are expected to live within the 5km cycle catchment.

12.3.39 A review of the 2001 census data for North Somerset shows that 1.7% of the resident population travel by train to work. Therefore, as a baseline mode share without any

Travel Plan measures, it is estimated that only one worker would travel by train from Weston-Super-Mare to work at the application site.

12.3.40 For Highbridge and Burnham it is expected that 32 workers, at peak, would live in the wards adjacent to the railway station. Of these 10 workers are expected to live within the 2km walk catchment and 26 workers are expected to live within the 5km cycle catchment.

12.3.41 A review of the 2001 census data for Sedgemoor shows that 0.4% of the resident population travel by train to work. Therefore, as a baseline mode share without any Travel Plan measures, it is estimated that no one would travel by train from Highbridge and Burnham to work at the application site.

12.3.42 For Taunton it is expected that 53 workers, at peak, would live in the wards adjacent to the railway station. Of these 25 workers are expected to live within the 2km walk catchment and 43 workers are expected to live within the 5km cycle catchment.

12.3.43 A review of the 2001 census data for Taunton Deane shows that 0.7% of the resident population travel by train to work. Therefore, as a baseline mode share without any Travel Plan measures, it is estimated that no one would travel by train from Taunton to work at the application site.

12.3.44 Based on this, the total number of workers estimated to travel to the HPC development site or PandR sites by rail is two workers (one to HPC and one to J23 PandR), prior to any Travel Plan measures being implemented. This would be subject to the workers being able to car share between Bridgwater railway station and the application site.

12.3.45 The analysis indicates that for workforce travel, on a daily basis, the use of rail is not likely to be significant. However, when more long distance journeys are considered rail can offer a much quicker journey than travelling by road.

12.3.46 It is considered that use of rail would be much higher for those accommodation campus residents who travel from elsewhere in the UK, or abroad, to work at HPC. It is likely that these journeys would take place once a fortnight at most, due to the shift arrangements in operation, and potentially once a month for the longest journeys.

12.4 Summary

12.4.1 The assessment of Rail infrastructure availability has demonstrated that although rail services do operate through Bridgwater station at times which coincide with the shift patterns of workers associated with the HPC Project, there are few onward connections available to access the HPC development site at Hinkley Point.

12.4.2 There is scope for workers travelling by rail to travel onwards to HPC through arranged car sharing and also to the closest park and ride site by bus.

12.4.3 For this reason and due to the comprehensive Bus Strategy proposed by EDF Energy, described in the first half of this Chapter, rail is not expected to form a significant element of the transport strategy for HPC, either for the movement of people or freight.

12.4.4 However, the Travel Plan implemented as part of the HPC Project, described in full at **Chapter 17** of this Transport Assessment, includes targets to increase rail travel particularly for those workers who travel from elsewhere in the UK to the accommodation campuses provided by EDF Energy.

12.4.5 In addition, a number of measures to encourage rail travel would be included such as:

- Provision of pool bikes to assist access to and from Bridgwater Station and the Bridgwater A and C accommodation campuses.
- Provision of cycle parking at Bridgwater Station.
- Provision of rail timetable information in the information pack provided to all employees.
- Provision of a shuttle bus service between Bridgewater station and the HPC development site subject to the use of rail generating sufficient demand.

13. WALK AND CYCLE

13.1 Introduction

13.1.1 This chapter provides a summary of the position on walking and cycling for the HPC Project.

13.1.2 The primary purpose of this chapter is to identify a number of physical improvements that can be made to the walking and cycling environment within the study area. These improvements would assist use of those modes within the Bridgwater area. It is proposed that these measures along with other measures that form part of SCC's ongoing walking and cycling improvement programme are partly funded by a contribution from EDF Energy, which is included within the S106 Agreement.

13.1.3 It is not the purpose of this chapter to consider other forms of encouragement towards walking and cycling. This is dealt within the **Framework Travel Plan** which is considered at **Chapter 17.**

13.2 Walking and Cycling

13.2.1 Walking and cycling are the most sustainable modes of transport and are particularly suited to shorter journeys within urban environments. National policy guidance within PPG13 stipulates that walking and cycling can replace shorter car trips; of under two kilometres in respect of walking and under five kilometres for cycling. Given this, there is potential for some journeys related to the HPC Project to be undertaken by walking and cycling modes.

13.2.2 When considering walking and cycling as viable modes of transport for the HPC Project it is important to consider the relatively remote location of the HPC development site, the hours during which workers are most likely to travel and the manual labour type work that would take place during construction. Once these aspects are considered it is evident that walking and cycling to the HPC development site on the journey to work is not likely to be a viable or attractive option for the majority of the construction workforce. Therefore, the walking and cycling strategy for the HPC Project is best focused on non-work trips, on walking and cycling to park and ride sites and to direct bus stops.

13.2.3 The walking and cycle strategy sets out a means by which walking and cycling can be encouraged. Consideration is not solely given to walking and cycling associated with the HPC Project, but also to background levels of walking and cycling in the local area and the impact that the proposed development may have on this.

13.2.4 Specifically the strategy focuses on:

- HPC walk and cycle strategy objectives.
- Existing walk and cycle context.
- Planned walk and cycle improvements.
- Impacts of the HPC development proposals on walking and cycling.
- Proposed HPC related physical walk and cycle improvements.

- Proposed walk and cycle Travel Plan measures.

13.3 Objectives

13.3.1 The approach to walking and cycling for the HPC Project has two key focuses. Primarily, it is focused on improving access for HPC workers to use sustainable modes of transport. Secondly, it is focused on encouraging walking and cycling in the local area.

13.3.2 The three core objectives informing this work are as follows:

- maximise the safe, efficient and sustainable movement of people (i.e. travel by non-car) required for the HPC Project so far as reasonably practicable;
- minimise the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable; and
- provide long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate.

13.3.3 The core aim of the work on walking and cycling is to promote the use of walking and cycling not only on the journey to work, but also for non-work trips and visitor trips. The people trip generation analysis set out at **Chapter 8** of this report concluded that the baseline mode share for walking is likely to be low, prior to the implementation of travel planning measures and walk and cycle improvements to encourage uptake of these modes.

13.4 Existing Context

13.4.1 The existing conditions, in respect of walking and cycling, around the HPC development site and associated development sites have been considered

a) Walking

13.4.2 A comprehensive pedestrian audit was undertaken to assess the quality of the existing environment. The pedestrian audit was undertaken using PERS (Pedestrian Environment Review System). PERS is a tool that measures the quality of the environment through subjective review, and provides an objective measure to pedestrian quality. The auditing process allows for an overall review of pedestrian accessibility between the origin and destination point.

13.4.3 Before the on-site survey procedure could begin, a number of key actions had to be performed at the desk-top level, one of which was the identification of the study area.

13.4.4 Paragraph 75 of PPG13 states that “walking is the most important mode of travel at the local level and offers the greatest potential to replace short car trips, particularly under two kilometres”. Therefore, the maximum walking distance for the pedestrian audit has been taken to be 2km.

13.4.5 The Pedestrian Audit for HPC was undertaken at a number of sites including the HPC development site and associated development sites, the sites are identified at **Table 13.1.**

13.4.6 The study area for each of the sites has been based on a 2km walking isochrone. The exception being the park and ride sites for which a maximum walk distance of 800 metres has been established. This is on the basis that the park and ride sites are essentially bus stops and as such there are recognised distances which people are typically prepared to walk to use a bus service.

13.4.7 Although DfT guidance (Inclusive Mobility) advises that people should not have to walk more than 400 metres to a bus stop from their home, this is on the basis that bus stops would be accessed by different user groups, such as the elderly. Given the expected demographics of the workforce using the park and ride sites, it is reasonable to assume that they would be able and willing to walk to bus stops positioned further than 400 metres from home. An 800 metre walk distance has therefore been adopted. The point from which the 800 metre and 2km distances have been measured for each site is set out below in **Table 13.1**:

Table 13.1: Walk Isochrone Points of Origin

Proposed Site	Point of Origin
HPC development site	Car park to the West of HPA site
On-site Campus	Northern point of Doggets
Cannington park and ride facility	Access junction on A39
Williton park and ride facility	Access junction of existing lorry park
Bridgwater A accommodation campus	Primary access on Bath Road
Bridgwater C accommodation campus	Northern point of site on College Way

13.4.8 A series of links and crossing within the study was identified. An on-site evaluation was undertaken for all the routes, links and crossings identified within the defined study area and the PERS methodology was applied.

13.4.9 The scores and comments from the on-site audits were gathered and input into PERS using the software programme 'Street Audit'. The output from the software identified links using a Red Amber Green or RAG Score. The scores for each Link are summarised in the following sections. The scoring is:

- Green: Good Quality.
- Yellow: Average Quality.
- Red: Poor Quality.

i. HPC

13.4.10 **Table 13.2** below summarises the RAG Scores for the agreed Links at Hinkley Point.

Table 13.2: Hinkley Point RAG Scores - Links

Link ID	Route	Link Name	RAG Score
L1	1	C182 – Wick Moor Drive	
L2	1	Doggets Bridleway	
L3	1	Shurton Road (East)	
L4	1	Shurton Road (West)	

ii. HPC Accommodation Campus

13.4.11 **Table 13.3** below summarises the RAG Scores for the agreed Links around the HPC Accommodation Campus.

Table 13.3: HPC Accommodation Campus RAG Scores – Links

Link ID	Route	Link Name	RAG Score
L5	1	C182 – Wick Moor Drive	
L6	1	Doggets Bridleway	
L7	1	Shurton Road (East)	
L8	1	Shurton Road (West)	

iii. Bridgwater

13.4.12 **Table 13.4** below summarises the RAG Scores for the agreed Links at and around Bridgwater.

Table 13.4: Bridgwater RAG Scores – Links

Link ID	Route	Link Name	RAG Score
L9	3	Bath Road (N)	
L10	1	Bath Road (S)	
L11	1	Frederick Road	
L12	1	Parkway	
L13	3	College Way	
L14	2	Footway/Cycleway (N)	
L15	2	Footway/Cycleway (S)	
L16	2	Clarks Road	
L17	2	Polden Street	
L18	2	Wellington Road	
L19	4	The Clink	
L20	4	East Quay	
L21	4	Carvers Road/New Road	
L22	4	Monmouth Street	
L23	4	Eastover	
L24	1	Fairfax	
L25	1	Weacombe Road	

13.4.13 **Table 13.5** below summarises the RAG Scores for the agreed Crossings in Bridgwater.

Table 13.5: Bridgwater RAG Scores – Crossings

Link ID	Route	Crossing Name	Crossing Type	RAG Score
C1	2	Bath Road/College Way	Zebra Crossing	
C2	4	Bath Road/Bailey Street	Zebra Crossing	
C3	4	Bath Road/Crossrifles	Zebra Crossing	
C4	4	Bristol Road/Crossrifles	Zebra Crossing	
C5	4	The Clink	Signalised Crossing	
C6	4	The Leggar	Signalised Crossing	
C7	4	The Clink	Signalised Crossing	
C8	4	East Quay	Signalised Crossing	
C9	4	East Quay	Informal Crossing (N)	
C10	4	East Quay	Informal Crossing (E)	
C11	4	East Quay	Informal Crossing (W)	
C12	4	Carvers Road	Zebra Crossing	
C13	4	East Quay	Zebra Crossing	
C14	4	Monmouth Street	Staggered Zebra Crossing	
C15	4	Eastover	Signalised Crossing	
C16	4	Eastover	Signalised Crossing	
C17	4	Broadway	Signalised Crossing	
C18	4	St John Street	Signalised Crossing	

iv. Cannington

13.4.14 **Table 13.6** below summarises the RAG Scores for the agreed Links at Cannington.

Table 13.6: Cannington RAG Scores – Links

Link ID	Route	Link Name	RAG Score
L26	1	Main Road	
L27	2	Lovers Walk	
L28	2	High Street	
L29	3	Rodway	
L30	3	Public Footpath (South of Denmans Lane)	
L31	3	Public Footpath (south of Mill Close)	
L32	3	Church Yard Path	
L33	1	Fore Street	
L34	1	Denmans Lane	

13.4.15 **Table 13.7** below summarises the RAG Scores for the agreed Crossings at Cannington.

Table 13.7: Cannington RAG Scores – Crossings

Link ID	Route	Crossing Name	Crossing Type	RAG Score
C1	2	High Street	Zebra Crossing	
C2	1	Main Road	Signalised Crossing	

v. Williton

13.4.16 **Table 13.8** below summarises the RAG Scores for the agreed Links at and around Williton.

Table 13.8: Williton RAG Scores – Links

Link ID	Route	Link Name	RAG Score
L35	1	B3190 Washford Hill	
L36	1	B3191 Five Bells	

b) Cycling

13.4.17 With regards to cycling, the DfT publication 'Cycle Infrastructure Design' states that:

"There are five core principles which summarise the desirable design requirements for pedestrians and cyclists. They have been derived from the requirements for pedestrians included in Guidelines for Providing for Journeys on Foot (IHT et al., 2000) (connectivity, conspicuity, convenience, comfort and conviviality) and requirements for cyclists included in Cycle Friendly Infrastructure (IHT, 1996) (coherence, directness, comfort, safety, and attractiveness). They are:

- *Convenience;*
- *Accessibility;*
- *Safety;*
- *Comfort; and*
- *Attractiveness".*

13.4.18 The document 'Guidelines for Cycle Audit and Cycle Review' published by the IHT in 1998 notes that the requirements of a good cycling infrastructure are typically summarised under the following five headings, which mirror those above.

- *"Coherence: The cycling infrastructure should form a coherent entity, linking all significant trip origins and destinations; routes should be continuous and consistent in standard.*
- *Directness: Routes should be as direct as possible, based on desire lines – detours and delays will deter use.*
- *Attractiveness: Routes must be attractive to cyclists on subjective as well as objective criteria: Lighting, personal safety, aesthetics, noise and integration with the surrounding area are important.*

- *Safety: Designs should minimise casualties and perceived danger for cyclists and other road users.*
- *Comfort: Cyclists need smooth, well-maintained surfaces, flush kerbs, regular sweeping, and gentle gradients; routes must be convenient to use and avoid complicated manoeuvres and interruptions."*

i. Guidelines for Cycle Audit and Cycle Review

13.4.19 Given that the Cycle Environment Review System (CERS) produced by TRL had not been released at the time of preparing the walk and cycle strategy, an alternative review/audit system was required. The document 'Guidelines for Cycle Audit and Cycle Review', as previously referred to, correlates with guidance from the DfT and has therefore been adopted as the basis for the cycle audit.

13.4.20 Within the document guidance is provided for both a cycle audit and a cycle review, which are defined as follows:

- Cycle Audit: A systematic process, applied to planned changes to the transport network, which is designed to ensure that opportunities to encourage cycling are considered comprehensively and that cycling conditions are not inadvertently made worse.
- Cycle Review: A systematic process, applied to existing transport networks, which is designed to identify their positive and negative attributes for cycling, and to assess ways in which those networks could be changed in order to encourage cycling.

13.4.21 Based on the above definitions of a cycle audit and cycle review, the latter was considered to be the most appropriate for the purposes of assessing the existing transport infrastructure with regards to cycling. The purpose of the cycle review is to:

- *"Systematically and comprehensively assess cycling conditions on a route, network or at a transport interchange.*
- *Identify, on a particular section of the network, those problems that most require attention.*
- *Enable the level of service for cyclists (the cycle-friendliness) of a route to be objectively assessed.*
- *Identify those measures that seem most feasible and useful for the route.*
- *Produce a framework for commissioning client briefs to design practical measures to improve conditions for cycling.*
- *To develop a wider understanding amongst professionals of the needs of cyclists and ways to improve cycling conditions."*

13.4.22 The document notes that a cycle review can be used 'in drawing up a local cycling strategy or action plan.' This therefore supports the approach in using the cycle review as part of the strategy for the HPC Project.

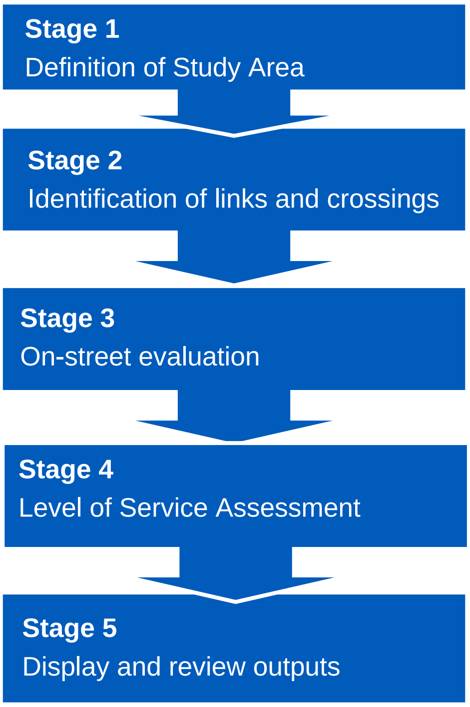
13.4.23 The document also states that *"the Cycle Audit and Cycle Review procedures described in these Guidelines do not themselves constitute design advice. This* *means that they can be adapted to accommodate local design standards or new guidance."*

13.4.24 Paragraph 6.4.1 of Manual for Streets states that *"Cyclists should generally be accommodated on the carriageway. In areas with low traffic volumes and speeds, there should not be any need for dedicated cycle lanes on the street."*

ii. Cycle Review Process

13.4.25 A summary of the proposed cycle review process is summarised in **Figure 13.1** below.

Figure 13.1: Cycle Review Process



13.4.26 Paragraph 78 of PPG13 states that

> *"cycling also has potential to substitute for short car trips, particularly those under 5km, and to form part of a longer journey by public transport."*

13.4.27 Paragraph 1.5.1 of Local Transport Note 2/08 states that

> *"In common with other modes, many utility cycle journeys are under three miles (ECF, 1998), although, for commuter journeys, a trip distance of over five miles is not uncommon."*

13.4.28 In order to determine what the most appropriate cycle catchment is, 2001 Census data has been interrogated to determine the distance cycled to work in the area. **Table 13.9** and **Table 13.10** below summarise the results:

Table 13.9: Distance Travelled and Travel to Work Census Data 2001 for Sedgemoor

Distance to Work	Cyclists
Sedgemoor (District average)	7.06%
Less than 2km	4.42%
2km to less than 5km	1.71%
5km to less than 10km	0.40%

Table 13.10: Distance Travelled and Travel to Work Census Data 2001 for West Somerset

Distance to Work	Cyclists
West Somerset (District average)	4.10%
Less than 2km	3.00%
2km to less than 5km	0.60%
5km to less than 10km	0.20%

Table 13.9 shows that 6.13% of journeys to work by bicycle are within 5km and only 0.40% are between 5km and 10km for the district of Sedgemoor. **Table 13.10** shows that 3.60% of journeys to work by bicycle are within 5km and only 0.20% are between 5km and 10km for the district of West Somerset. Whilst it is recognised that there may be some cycle trips made by HPC workers over 5km, it is considered that the majority of cycle trips would be within 5km. Therefore, it is considered to be appropriate to focus the cycle review on a 5km catchment of each study area.

13.4.30 The cycle review has been undertaken for the following proposed sites:

- HPC development site.
- HPC accommodation campus.
- Bridgwater A accommodation campus.
- Bridgwater C accommodation campus.
- J23 park and ride facility.
- J24 park and ride facility.
- Cannington park and ride facility.
- Williton park and ride facility.

13.4.31 The study area for each of the above sites has been taken to be a 5km cycle isochrone from each site.

13.4.32 As with the PERS study a number of defined routes and links were identified as the focus of the cycle study.

13.4.33 Stage 3 is to undertake on-site evaluation of the identified links and crossings. When reviewing each link or crossing, the auditors consider the context within which each link/crossing is set. For example, a residential road may not provide any formal cycle lanes, but this is not necessarily a deficiency if there are low traffic flows and vehicle speeds.

13.4.34 The cycle review parameters are set out below in **Table 13.11**.

Table 13.11: Cycle Review Parameters

Parameters
Traffic Flows
Vehicle Speeds
Junctions
Width
Convenience
Riding Surface
Social Security
Other

13.4.35 The total score combined from all the parameters assessed in Stage 3 is set within the scoring ranges provided in the Level of Service (LOS) assessment. Each scoring range is associated with a lettered category from A to F, with A being the highest grade attainable and representing optimal provision for cyclists, and F being the lowest grade and relating to unsatisfactory provision for cyclists. The scoring range for each grade for the LOS assessment is shown in **Table 13.12**:

Table 13.12: Level of Service – Scoring Characteristics

LOS	Score	Typical characteristics	Likely road/path type
A	81-100	Little or no motor traffic; low speeds good passing width; no significant conflicts; good riding surface; lit; good social safety	High quality cycle path; well surfaced minor rural road; 20mph limit urban road
B	61-80	Light/moderate traffic flows; good/adequate passing width; few conflicts; good riding surface	Minor road; well surfaced , but unlit cycle path
C	41-60	Moderate traffic flows; 85th percentile speeds around 30mph; adequate passing width; come conflicts (not major)	Minor road/local distributor
D	21-40	Busy traffic; HGV/buses; speeds around 40 mph	Urban single carriageway; poor quality cycle path
E	1-20	Heavy traffic flows > 40mph; HGVs	Dual c/w speed limit 40mph or higher, large roundabouts
F	≤ 0	Heavy traffic flows, HGVs; speeds >60mph, narrow lanes; unlit	Narrow rural single c/w or dual, grade separated junctions

13.4.36 It should be noted that the LOS assessment does not assume that either on-road or off-road provision for cyclists is necessarily superior. This is due to the fact that both types of routes can have many different properties that cannot always be compared directly. As set out previously, the parameter ‘Other’ means that adjustments can be made if there are special circumstances to account for.

13.4.37 The use of a variable scoring system for each parameter has been used to avoid the need to ‘weight’ certain criteria according to their perceived relevance. The scoring system is designed to be variable so that it can be adjusted as required by the relevant highway authority e.g. for different user groups.

13.4.38 The LOS assessment is important for the following reasons:

- It provides an objective assessment of the overall standard of cycling conditions on a route, network or in an area.
- It enables a comparison to be made between the levels of service of different sections of a route.
- It highlights which attributes are contributing, where, and to what extent, towards the quality of a route.
- It shows how, where, and to what extent, the level of service can be raised.
- It assists with determining priorities for action and investment.
- It provides a means of monitoring levels of service over time.

iii. Cycle Audit Results

13.4.39 The following section summarises the results of the cycle audit.

HPC Development Site

13.4.40 **Table 13.13** below summarises the LOS score for the one link present near the HPC development site. As mentioned above, the link extends between Hinkley Point Power Station and the proposed HPC accommodation campus.

Table 13.13: HPC Link Scores

Link Reference	From	To	Route	Score	Level
L1	Hinkley Point Power Station	North Lane	1	16	E

HPC Accommodation Campus

13.4.41 **Table 13.14** below summarises the LOS for the agreed links at or nearby the proposed HPC accommodation campus.

Table 13.14: HPC Accommodation Campus Link Scores

Link Reference	From	To	Route	Score	Level
L2	Hinkley Point Power Station	North Lane	1	16	E
L3	C182 Wick More Drive	Doggets Bridleway	2	47	C
L4	North Lane	Shurton	2	25	D
L5	Doggets Bridleway	Shurton Lane	2	49	C
L6	Shurton	High Street (Stogursey)	2	24	D

Bridgwater

13.4.42 **Table 13.15** below summarises the LOS for the agreed links at and around Bridgwater.

Table 13.15: On-site Campus Link Scores

Link Reference	From	To	Route	Score	Level
L7	Bath Road	Parkway	1	58	C
L8	Frederick Road	Fairfax Road	1	48	C
L9	The Parkway	Frederick Road	1	55	C
L10	Bath Road	End of College Way	2	61	B
L11	College Way (end)	Fairfax Road	2	66	B
L12	Elizabeth Way/Fairfax Road	Clarks Road	2	69	B
L13	Clipper Close	Bridgwater Station	2	65	B
L14	Bridgwater Station	Polden Street	2	41	C
L15	Wellington Road	Monmouth Street	2	58	C
L16	College Way	Crossrifles Roundabout	3	37	D
L17	Crossrifles Roundabout	East Quay	3	33	D
L18	The Clink	Eastover	3	48	C
L19	East Quay/Ropewalk Roundabout	Eastover	3	68	B
L20	East Quay	Broadway	3	63	B
L21	Eastover	The Clink	3	70	B
L22	Bath Road	Crossrifles Roundabout	3	35	D

Junction 23

13.4.43 **Table 13.16** below summarises the LOS for the agreed links at Junction 23.

Table 13.16: Junction 23 Site Link Scores

Link Reference	From	To	Route	Score	Level
L23	J23 Bristol Road	Bristol Road/Express Park	1	-1	F
L24	Bristol Road/Express Park	Bristol Road/Crossrifles RB	1	10	E

Junction 24

13.4.44 **Table 13.17** below summarises the LOS for the agreed links at Junction 24.

Table 13.17: Junction 24 Site Link Scores

Link Reference	From	To	Route	Score	Level
L25	J24 Rb	Stockmoor Drive Rb	1	31	D
L26	Rb Stockmoor Drive/Taunton Road	Marsh Lane/Showground Road	2	63	B
L27	Marsh NCN3	Old Taunton Road	2	54	C
L28	NCN 3/Old Taunton Road	Cycle Path NCN3	2	58	C
L29	Baymead Lane	Huntworth Lane	3	41	C
L30	J24	Huntworth Lane	3	36	D

iv. Cannington

13.4.45 **Table 13.18** below summarises the LOS for the agreed links at Cannington.

Table 13.18: Cannington Link Scores

Link Reference	From	To	Route	Score	Level
L31	A39 junction with Main Road	A39 junction with High Street	1	29	D
L32	A39 junction with Main Road	East Street	1	46	C
L33	A39 junction with High Street	East Street	2	30	D
L34	High Street/Rodway	Park Lane	½	33	D

v. Williton

13.4.46 **Table 13.19** below summarises the LOS for the agreed links at Williton.

Table 13.19: Williton Link Scores

Link Reference	From	To	Route	Score	Level
L35	North Street/Long Street	Five Bells/Washford Hill	1	31	D
L36	North Street/Long Street	Station Road	1	54	C
L37	North Street/Long Street	Bank Street/High Street	2	40	C
L38	Bank Street/High Street	Stampford Rocks	2	30	D

Link Reference	From	To	Route	Score	Level
L39	Liddymore Road	Entrance to Paper Mill	3	40	D
L40	Entrance to Paper Mill	Five Bells	3	21	E
L41	Five Bells	Williton park and ride	3	12	E
L42	Harbour Road/South Road	Esplanade Lane	4	61	B

13.5 Study Results

13.5.1 The pedestrian and cycle existing context review, undertaken using PERS methodology for pedestrians and a similar level of service review for cyclists, identified a number of locations on the network where the existing level of service was poor.

13.5.2 Therefore, EDF Energy has worked closely with Somerset County Council to develop a range of improvements that would facilitate and encourage a greater level of walking and cycling. These improvements would assist not only workers and visitors associated with the HPC Project, but the wider community of Bridgwater as a whole. The proposed improvements are designed to provide a long-term legacy to the people of Bridgwater to aid travel by sustainable modes both during construction of HPC and into the future. The improvements proposed compliment a number of improvements for which Somerset County Council is applying through the Local Sustainable Transport Fund.

a) Local Sustainable Transport Fund

13.5.3 Somerset County Council under the project name *Moving Bridgwater Forward* has applied for Department for Transport funding for various cycle improvements within Bridgwater.

13.5.4 The funding package would include contributions from a number of other partners. These contributors include; local developers through development related S106 contributions, the Somerset National Health Service and the councils Integrated Transport Programme.

13.5.5 The funding application would enable the following cycling improvements/measures:

- Infrastructure and Signage Improvements; Implementing cycling (and where appropriate shared use infrastructure from North Petherton to Bridgwater along the A38, via the canal and through Hamp to the town centre. This for instance would include works to tarmac and provide lighting to the cycle path (NCR3) that abuts the Bridgwater and Taunton Canal to the north of Marsh Lane.
- Delivering a package of walking and cycling signage throughout the town where gaps have been identified.
- DIY Streets; Community-led improvements.
- Area Travel Planning; Working with businesses in the south of Bridgwater to develop more effective Travel Planning.

- Focused Work with partners; supporting other partners in their work including the Sustrans ‘Bike It’ Officer, NHS Health Workers etc.
- Events and promotion; Including British Cycling ‘Sky Rides’, Cycle Challenges, Adult Cycle Training and Bike Repair Courses.
- Community Fund; Community fund of £50,000 to get local projects off the ground.
- Smarter Choices and Social Marketing; Social Marketing Campaign.

Developers S.106 Improvements

13.5.6 A number of developer lead cycle improvements are coming forward that form part of Section 106 transport mitigation packages for non HPC related planning permissions. These improvements include the Stockmoor Village development, which requires the developers to provide a network of on-site cycleways, along with a pedestrian/cycle link to the existing urban area to the north (via Evesham Drive).

13.6 Proposed Walking/Cycling Improvements

13.6.1 A number of walking and cycling improvements are proposed; both through a series of proposed highway mitigation measures and as stand-alone measures to aid walking and cycling in the local area. A plan showing proposed walk and cycle improvements is provided at **Appendix 13.1**.

a) Highway Improvements

13.6.2 A series of highway improvements are proposed as part of the HPC Project, designed not just to deliver highway capacity improvements, but also to improve the walking and cycling facilities in the local area. These are considered in the paragraphs below. For more detailed scheme descriptions and plans and a full list of proposed improvements, please refer to **Chapter 16**.

Cross Rifles

13.6.3 Whilst HPC has a very modest impact on the Cross Rifles junction, EDF Energy has developed an improvement scheme for the junction which significantly improves capacity. However, EDF Energy is aware that SCC are developing their own scheme for the junction and have obtained contributions from other developers. Therefore, EDF propose to make a contribution to SCC through the DCO S106 Agreement to allow them to implement their preferred scheme. However, it is likely that the facilities for pedestrians and cyclists would be similar in both schemes.

13.6.4 EDF Energy’s derived scheme at Cross Rifles incorporates a number of measures which would improve the pedestrian/ cycle environment in this area.

13.6.5 Improved pedestrian crossings would be provided on all arms of the junction with tactile paving to aid mobility impaired users. The junction would be signalised and as such, would incorporate designated pedestrian crossing phases to aid pedestrians wishing to cross on all arms.

Huntworth Roundabout

13.6.6 At Huntworth, there would be some improvements to pedestrian facilities within the scheme proposed as part of the DCO application to improve the access to/egress from the Huntworth Business Park. This includes provision of a footway along the service road access to the Huntworth Business Park and an improved pedestrian crossing island across the service road access.

Taunton Road/ Broadway

13.6.7 The proposed DCO highway improvements at A39 Broadway/A38 Taunton Road Junction incorporate a number of measures that would improve the pedestrian/ cycle environment in this area.

13.6.8 The proposed scheme includes improved crossing facilities for both pedestrians and cyclists including provision of tactile paving for mobility impaired users.

A38 Bristol Road/ The Drove Junction

13.6.9 The proposed highway mitigation works at Bristol Road/ The Drove include a widening of the carriageway along Bristol Road to the north of The Drove which would assist in accommodating improvements to the cycle route along Bristol Road, subject to approval from Somerset County Council.

A38 Bristol Road/ Wylds Road Junction

13.6.10 The proposed highway mitigation works at Bristol Road/ Wylds Road include a widening of the carriageway along Bristol Road to the north of Wylds Road which would assist in accommodating improvements to the cycle facilities along Bristol Road.

Cannington

13.6.11 A number of measures are proposed for Cannington, specifically these are:

- Installation of a puffin crossing to the west of Rodway on the High Street.
- Improvements to the uncontrolled crossing point (widened and improved tactile paving) at the north of Church Street.
- Existing footway to the east of Rodway on Fore Street to be widened;
- Proposed Zebra Crossing on Rodway, south of Toll House Road.
- Tactile paving introduced to correspond to the existing dropped kerbs on Toll House Road at the junction with Rodway.
- Traffic calming measures in and around Cannington. Reduced traffic speeds correspond to a safer cycling environment.
- Provision of cycle parking at bus stops in Cannington.

b) Other Schemes

13.6.12 EDF Energy also proposes to make a contribution to SCC through the DCO S106 to assist in the funding of a number of pedestrian and cycle improvements listed below. Each scheme plan is included at **Appendix 13.1.**

Frederick Road / Trevor Road

13.6.13 Improvements to the existing access road leading to Frederick Road and Trevor Road off Bath Road. This improvement facilitates cycling off, but immediately adjacent to Bath Road for approximately 400m.

The Clink / Church Street

13.6.14 The works would establish a link between The Clink and Church Street through a dropped kerb that would link to the existing cycle infrastructure on Church Street. Improved cycle signage is also proposed.

Pedestrian / Cycle route west of Fairfax Road / South East of College Way

13.6.15 The works would involve the improvement of the environment and removal of the barriers to facilitate use of the pedestrian / cycle route located to the west of Fairfax Road / south east of College Way.

c) Summary of Proposed Improvements

A full summary of the proposed walking and cycling improvements associated with delivery of the HPC Project is provided at **Table 13.20**.

Table 13.20: Proposed Walk and Cycle Improvements

Walk	Cycle
Bath Road, Bridgwater	
Crossrifles junction pedestrian environment improvements	
Improve existing access road north of Fredrick Road to Parkway to enable a better provision for all users	
	Provide a Toucan crossing at Bridgwater 'A' Campus access
	Consider providing a cycle route through Bridgwater 'A' Campus albeit this may be restricted due to security issues
Bristol Road, Bridgwater	
It is proposed to provide a cycle route with continuous on the ground provision for cyclists from The Clink to the J23 park and ride site.	
Crossrifles junction pedestrian environment improvements	
Convert the stretch of land between The Leggar and Quantock Terrace to a shared use cycle facility	
Bristol Road / Wylds Road Junction pedestrian environment improvements	
	Off-Road cycle path along Bristol Road from The Drove to the Express Park cycle path
The Clink, Bridgwater	
	Cycle link to Church Street from The Clink
Fairfax Road/Polden Street, Bridgwater	
	Improve the availability and quality of cycle signage along Fairfax Road and Polden Street

Walk	Cycle
J24/Taunton Road/North Petherton, Bridgwater	
Proposed Improvements to Huntworth roundabout at Junction 24. Improvements compatible with SCCs planned improvements to the area.	
Fairfax Cycle Path / College Way, Bridgwater	
	Cycle guttering on both railway bridges to allow cyclists to wheel their bicycles up and down the stairs
Improve street scene / environment	
Cannington	
A range of mitigation measures throughout Cannington including new pedestrian crossings and traffic calming measures.	

13.7 Travel Planning

13.7.1 A comprehensive set of Travel Plans would be implemented as part of the HPC Project. The approach to travel planning is summarised in **Chapter 17** of this Transport Assessment and a **Framework Travel Plan** is included within the DCO application. Site-specific Travel Plans would be developed for the main HPC development site and for each associated development during the construction phase, and for the HPC power station once operational.

13.7.2 The **Framework Travel Plan** includes further information on additional measures to encourage walking and cycling. These include provision of additional information and pool bicycles at the accommodation campuses.

13.8 Summary and Conclusions

13.8.1 The main objective of the walk and cycle strategy for the HPC Project is to promote the use of walking and cycling for non-work trips and for work trips to park and ride sites and direct bus stops. The people trip generation analysis set out at **Chapter 8** of this report concluded that the baseline mode share for walking is likely to be low, prior to the implementation of travel planning measures and walk and cycle improvements to encourage uptake of these modes.

13.8.2 This strategy has examined the existing walk and cycle context by giving agreed links and crossings a score based on a number of parameters to indicate the existing provision for walkers and cyclists, based on the standard methodology set out within PERS and a similar study for the cycle environment.

13.8.3 Giving each link and crossing a score has allowed weak areas in the existing provision to be identified and consequently allowed a number of proposed improvements to be recommended.

13.8.4 To guarantee a consistent approach with non-EDF Energy walk and cycle infrastructure improvements in the locality, all SCC and committed development improvements have also been researched and detailed in the strategy to ensure that the proposals add to and do not detract from the walk and cycle improvements that are already in the pipeline, subject to funding.

13.8.5 Where walking and cycling improvements are proposed as part of schemes to be implemented by EDF Energy then they would be incorporated into those schemes. Elsewhere EDF propose to make a contribution towards SCC's broader walking and cycling improvement strategy.

13.8.6 In addition, to eliminate non-infrastructure based barriers that potentially may stop EDF employees from utilising active modes a number of travel plan measures are proposed such as pooled bicycles at accommodation campuses.

14. ROAD SAFETY

14.1 Introduction

14.1.1 This chapter considers road safety issues related to the HPC Project. The purpose of the chapter is to:

- Report on the existing road safety situation in the area.
- Consider the impact of HPC traffic.
- Put forward proposals for how safety in the area can be improved.

14.1.2 The chapter draws heavily on the Road Safety Strategy that has been prepared and which is included at **Appendix 14.1**.

14.1.3 The Road Safety Study for the main works at the HPC development site has been produced to identify sites on the road network to Hinkley that currently have high accident rates, to assess the impact of the additional vehicle trips on road safety and to recommend measures that would help to mitigate the impact.

14.1.4 Personal injury accident (PIA) data has been obtained from the HA for the M5 Motorway and from Somerset County Council (SCC) for agreed routes for the period of January 2005 to June 2010.

14.1.5 The agreed routes comprise:

- The M5 motorway between Junctions 22 and 25.
- The A39 from its junction with A361 at Ashcott to the east of Bridgwater to its junction with the B3191 at Williton to the west of Bridgwater.
- The A38 from West Huntspill to the north of Bridgwater to North Petherton to the south.
- The B3339 at Wembdon.
- The Northern Distributor Road (NDR) in Bridgwater.
- The C182 between the village of Cannington and the HPC development site.
- Stogursey Lane between Stogursey and Nether Stowey.
- The road that runs from Kilve through Stringston, Stogursey, connecting with the C182 at Newham House and Claylands Corner.

14.1.6 To ensure a consistent approach, methodologies developed by the HA and the Somerset Road Safety Partnership (SRSP) have been used to identify locations that currently experience above average accident rates. These methodologies comprise first, a link-based approach and secondly, one that identifies accident clusters in urban and rural locations.

14.1.7 The link-based approach has identified a number of highway sections that currently have accident rates that exceed the national average for similar road types.

14.1.8 However, the analysis has also identified that most of the accidents that occur on these roads occur at junctions. When accidents at junctions are discounted, many of the links do not have particularly high accident rates.

14.1.9 When considering the future impact on road safety, it is important to consider the likely increase in traffic generated by the HPC Project, but also the natural increase in traffic that would result from permitted developments coming forward.

14.1.10 An assessment of growth between 2009 and 2016 has been undertaken which considers the additional traffic generated by a series of committed developments permitted by the Council in addition to natural background traffic growth that is also likely to occur by 2016.

14.1.11 Therefore, where any existing accident problem has been identified it is not appropriate to assume that any worsening in 2016 is directly attributable to the proposed HPC Project.

14.1.12 Furthermore, when the impact of the development related traffic is considered, the increase in the expected numbers of accidents along the routes to the site is expected to be small.

14.1.13 It should be noted that the methodology applied, adopted from standard methodologies used by the HA and SRSP, follows a statistical approach which assumes that where traffic flows increase there is a proportional increase in accidents.

14.2 Study Outcomes

14.2.1 The tables below show the results of the assessment of the likely changes in accidents on the key links within the study area affected by HPC traffic.

14.2.2 The tables show the existing accident rates; the predicted rates in the 2016 Reference Case (i.e. with traffic growth, but no HPC traffic) and the predicted rates with HPC traffic added.

14.2.3 It should be noted that the general trend of a reduction in accident rates is factored in which is why future predicted rates are sometimes lower than existing.

a) A39 Route Link Review

14.2.4 **Table 14.1** shows the existing accident rates and expected numbers of accidents for each link along the A39 for both traffic flow scenarios that have been modelled.

Table 14.1: A39 Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100 mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
Q4	7,703	2.2	53.96	47.70	7,969	2.01	8,634	2.17
Q3		10.2	38.19	33.76		9.32		10.1
Q2		0	0.00	0.00		0.00		0.00

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100 mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
Q1		1.4	12.39	10.95		1.28		1.38
Q		2.4	10.40	9.19		2.2		2.38
P	6,399	1	38.92	34.41	6,638	0.92	13,840	1.91
R	14,468	0.8	12.62	11.16	14,790	0.72	17,985	0.88
S	12,959	2.8	28.19	24.92	13,293	2.8	16,336	3.12
K2	14,028	1.2	46.87	43.59	14,297	1.13	15,873	1.26
K1	15,338	0.6	53.59	49.84	16,172	0.59	17,635	0.64
K3	15,441	0.6	30.42	28.29	16,329	0.59	17,760	0.64
K4	17,198	1.8	143.37	133.33	18,156	1.77	19,602	1.91
K5	20,410	5	111.86	104.03	22,114	5.04	23,481	5.35
O1	22,608	3	181.78	169.06	24,650	3.04	24,908	3.07
O2	18,821	3	145.57	135.38	20,802	3.08	21,025	3.12
J	20,240	3	135.36	125.88	22,485	3.10	22,783	3.14
N3	17,129	6.4	120.43	112.00	15,740	5.46	16,888	5.87
N2	12,829	3	80.08	74.47	11,206	2.43	12,738	2.77
N1	12,931	2.8	26.97	25.08	11,881	2.39	12,743	2.56
L	14,061	12	111.34	98.42	14,427	10.88	14,393	10.86
M	16,535	11	15.19	13.42	16,818	9.90	16,884	9.92

14.2.5 The table shows that, in the 2016 Base Case Scenario, there would be expected to be marginally fewer accidents on many of the links than currently is the case. This is primarily due to assumption of a general reduction in accident rates over time.

14.2.6 When the HPC traffic is added, the expected number of accidents on the links used by construction vehicles increase. However, the increase in expected accidents is small and results in numbers of accidents that are similar to those currently experienced.

b) A38 Route Link Review

14.2.7 **Table 14.2** shows the existing accident rates and expected numbers of accidents for each link along the A38 for both traffic flow scenarios that have been modelled.

Table 14.2: A38 Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100 mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
SS	15,955	3.6	30.91	27.32	17,566	3.5	17,807	3.55
I4	21,216	1.0	18.45	16.30	22,824	0.95	23,878	0.99
I3	21,088	0.6	25.98	22.96	23,318	0.59	23,234	0.58
I2	21,644	1.6	28.93	26.90	23,738	1.63	24,425	1.68
I1	24,728	9.8	127.74	118.80	26,962	9.94	27,704	10.2
O1	22,608	3	181.78	169.06	24,650	3.04	24,908	3.07
O2	18,821	2.2	106.75	135.38	20,802	3.08	21,025	3.12
J	20,240	3	135.36	125.88	22,485	3.10	22,783	3.14
F	16,818	3	139.63	129.86	18,764	3.11	18,792	3.12
E	13,159	2.4	90.85	84.49	15,904	2.71	16,031	2.72
D	22,956	1.8	26.85	26.64	26,716	2.08	27,025	2.10
G	21,971	5	31.17	27.55	24,935	5.01	25,570	5.14
A	10,678	8.2	45.74	40.43	10,772	7.31	10,789	7.32
ST1	18,510	0	0.00	0.00	20,018	0.00	21,739	0.00

14.2.8 The table shows that, as with the A39, the number of accidents expected to occur in the 2016 Base Case is lower than is currently the case. When HPC traffic is included the expected number of accidents returns to levels comparable with the existing situation.

c) Rodway, Cannington (south of bypass) Route Link Review

14.2.9 **Table 14.3** shows the existing accident rates and expected numbers of accidents for Rodway in Cannington, south of where the proposed Cannington bypass would join the C182 (link AC).

Table 14.3: C182 Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100 mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
AC	6,706	3.6	15.8	13.97	6,779	3.21	3,093	1.52

14.2.10 The table shows that, in the 2016 Base Case, the expected number of accident reduces marginally, which can be attributed to the reduction factor specified by COBA. When the development traffic is added, the expected number of accidents significantly reduces. This is because the two-way traffic flows have reduced by over 50% on this section of the C182 due to the construction of the bypass to the west of Cannington.

d) NDR Route Link Review

14.2.11 **Table 14.4** shows the existing accident rates and expected numbers of accidents for each link along the NDR for both traffic flow scenarios that have been modelled.

Table 14.4: NDR Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100 mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
Y	11,601	3	236.2	219.7	11,988	2.88	13,746	3.31
AB	10,397	5	131.8	122.6	10,853	4.86	12,653	5.66
AA	12,033	4	151.8	141.2	12,649	3.91	14,336	4.43
AE	15,891	6	188.1	174.9	16,796	5.90	18,164	6.37
ZE	7,030	16	1,385.7	1288.7	7,666	16.2	8,647	18.3

14.2.12 The table shows that, in the 2016 Base Case, the expected number of accidents would reduce. When the development traffic is added then the accidents expected on each link would return to levels similar to the existing.

e) Summary

14.2.13 The above analysis demonstrates that the effects of the HPC Project traffic are small. Furthermore even after the addition of background traffic growth and HPC traffic accident levels are very similar to existing levels.

14.2.14 Therefore, significant safety improvement works are not required as a result of the HPC Project. Notwithstanding that, EDF Energy has examined the network to see what improvements could be undertaken in conjunction with the HPC Project. This analysis has concentrated on junctions, since this is where the majority of accidents occur.

14.2.15 The proposed road safety mitigation strategy addresses the issues at junctions that have been identified using the cluster-based methodologies. It is important to note that these cluster junctions are not generated as a result of the HPC Project but are due to existing accident problems and existing traffic flows on the network. Such flows would increase naturally by 2016, without the HPC development, through implementation of already permitted developments and also background growth in traffic. Therefore, SCC is investigating a programme of safety improvements that are necessary as a result of existing and future non-HPC growth.

14.2.16 There are some accident cluster junctions where improvements are being proposed through the HPC Project to enhance capacity or safety and which would be delivered by EDF Energy.

14.2.17 It is also proposed to make a contribution to SCC through the DCO S106 Agreement to assist with their programme of safety enhancements.

14.2.18 The junctions that have been identified within the road safety strategy as likely to benefit from improvement are listed below, with the schemes proposed to be implemented by EDF Energy highlighted in bold:

- A39 Broadway/A38 Taunton Road Junction.
- A39 Broadway/A372 St John Street.
- A39 North Street/Albert Street.
- A39 North Street/West Street.
- A39/A38 Dunball Roundabout.
- A39 Sandford Corner.
- A38 Bristol Road/A39 Bath Road/The Clink (Cross Rifles Roundabout).
- A38 Taunton Road/Rhode Lane.
- The A38/M5 Junction 24 Huntworth Roundabout.
- The A38 Taunton Road/Wills Road Junction.
- Wylds Road/The Drove Junction.

14.2.19 The following mitigation measures are proposed at each:

A39 Broadway/A38 Taunton Road

14.2.20 As part of the measures proposed by EDF Energy to increase capacity of the road network in Bridgwater, a scheme has been developed that would significantly improve the operation and road safety at this junction.

14.2.21 This would include the introduction of two right turn lanes for vehicles turning from the eastbound carriageway of Broadway into Taunton Road. To facilitate this movement, the current arrangement of three lanes on the northbound Taunton Road approach has also been amended to remove the existing left turn lane, combining it with the straight ahead lane. The existing double right turn lane arrangement on this approach has also been removed to provide only a single lane.

14.2.22 In addition, all approaches would run separately so that there would be no conflicting turning movements. This should significantly reduce the occurrence of right turn accidents at the junction.

14.2.23 Improvements to the current pedestrian crossing facilities are also proposed. In addition, anti-skid surfacing would be provided on each approach, potentially reducing the number of rear-end shunt accidents at the junction.

14.2.24 As part of the detailed design process, a lighting audit would be undertaken to identify any issues relating to illumination in the vicinity of the site.

14.2.25 It is therefore, considered that the main causation factors of most of the accidents that have occurred at the junction in the study period would be addressed by the proposed scheme.

A39 Broadway/St John Street

14.2.26 Signal-controlled pedestrian crossing facilities are not provided across the A38 Monmouth Street approach. As the existing pedestrian facilities operate during an all-red stage in the traffic signal cycle, there could be an opportunity to introduce a similar facility across the northern arm.

14.2.27 The northern approach to the junction currently incorporates three lanes, including a short right turning lane for vehicles turning from the A38 Monmouth Street into Eastover. This precludes the introduction of a staggered pedestrian crossing across this arm. Therefore, if signal-controlled pedestrian crossing facilities are warranted across the northern approach, they would need to be provided straight across the carriageway.

14.2.28 If this facility is introduced then there could also be an opportunity to remove the staggered pedestrian crossing across the western arm as well and introduce a straight-across crossing, in line with current road safety and streetscape thinking.

14.2.29 Somerset County Council has developed a scheme that appears to contain a number of these suggestions and EDF Energy proposes to provide a contribution to SCC to assist in delivery of their proposed scheme.

A39 North Street/Albert Street

14.2.30 To improve the visibility splays at the junction it is possible to remove the pedestrian guardrail on the southeast and southwest corners of the junction or replace it with Visirail.

14.2.31 To prevent vehicles from turning right out of the junction, it might be possible to close the gap in the central median on the A39 North Street, effectively making the junction a left-in, left-out arrangement. Vehicles wishing to turn right into and out of Albert Street would then have to travel via St Matthew's Field and West Street.

14.2.32 The sightlines to the south of the West Street/St Matthew's Field junction would also need some improvement, which could possibly be achieved by cutting back the existing vegetation on the southwest corner of the junction. It appears that this vegetation is within the highway boundary, but this would need to be confirmed prior to implementation of the proposals.

14.2.33 Alternatively, Albert Street could be made one-way southbound, with all vehicles required to exit via St Matthew's Field on to West Street.

14.2.34 These measures do not form part of EDF Energy's planned highway improvements, but EDF Energy proposes provision of a contribution to SCC to assist in delivering these works under SCC's ongoing programme of road improvements.

A39 North Street/West Street

14.2.35 The accident data does not demonstrate any discernible trends, other than a moderate number of rear end shunt accidents. Both approaches on the A39 Broadway/North Street have been treated with anti-skid surfacing, while Penel Orlieu and West Street have not.

14.2.36 It is therefore, recommended that the West Street and Penel Orlieu approaches be treated with anti-skid surfacing.

14.2.37 This measure does not form part of EDF Energy's planned highway improvements, but EDF Energy proposes provision of a contribution to SCC to assist in delivering these works under SCC's ongoing programme of road improvements.

A39/A38 Dunball Roundabout

14.2.38 As part of the proposals to introduce park and ride and freight management facilities at this junction, EDF propose to amend the current road markings to increase capacity and improve lane discipline.

14.2.39 These measures are not expected to make a significant impact on accidents, but the detailed design would review the need to include additional measures such as anti skid surfacing and improved lighting.

A39 Sandford Corner Roundabout

14.2.40 This section of the A39 is also critical to network resilience as there are no other alternative routes available if the road is closed.

14.2.41 It is therefore, proposed to construct a new roundabout at the junction that is predicted to significantly reduce the number and severity of accidents at this location.

14.2.42 This measure is committed to be implemented by EDF Energy as part of the Site Preparation Works application.

A38 Bristol Road/The Clink (Cross Rifles Roundabout)

14.2.43 Somerset County Council has developed a scheme for the junction that aims to increase capacity and reduce congestion. As part of this scheme it is proposed to introduce traffic signals and improve pedestrian and cycle facilities around the junction to facilitate movements across each approach.

14.2.44 This junction does not form part of the proposed highway improvements to be delivered by EDF Energy as part of the proposed HPC Project, and the HPC Project has only a small effect on traffic flows through the junction. However, in order to assist traffic movements at this node and to improve road safety, particularly for pedestrians, EDF Energy proposes to make a contribution to SCC to assist the Council in delivery of their preferred scheme.

A38 Taunton Road/Rhode Lane

14.2.45 Four of the accidents at the junction involve vehicles turning right colliding with cyclists on the A38 Taunton Road. Therefore, there appears to be a road safety issue relating to the conspicuousness of cyclists at the junction. This could be addressed by providing an off-road cycle route across the junction.

14.2.46 SCC are currently developing such a scheme that would run along the western side of Taunton Road from the Huntworth Roundabout up to the junction of Taunton Road/Broadway.

14.2.47 Furthermore, Somerset County Council are also seeking to develop Route 33 of the National Cycle Network, which runs along Old Taunton Road and the Bridgwater to Taunton Canal towpath.

14.2.48 These measures do not form part of EDF Energy's planned highway improvements, but EDF Energy proposes provision of a contribution to SCC to assist in delivering these works under SCC's ongoing programme of road improvements should the Council decide that the works are desirable.

Huntworth Roundabout

14.2.49 A scheme is proposed by EDF Energy to improve the layout of this junction and facilitate movements into and out of the park and ride and freight management facility adjacent to this site. The proposed improvement includes improved carriageway markings and widening of the approach from the proposed park and ride site.

14.2.50 This measure is not expected to make a significant impact on accidents, but the detailed design would review the need to include additional measures such as anti skid surfacing and improved lighting.

A38 Taunton Road/Wills Road

14.2.51 The most prominent trend in the accident data is of vehicles turning into or out of Wills Road, often at the behest of other drivers, colliding with a motorcyclist overtaking the queuing traffic. A 'THINK BIKE' supplementary sign plate has already been erected to the south of the junction to inform drivers travelling northbound of the possibility of motorcyclists in the area.

14.2.52 Consideration could be given to the introduction of pedestrian refuges in the central hatching on the A38 Taunton Road on either side of the junction. This would reduce the carriageway width locally, lowering all vehicles speeds. They would also deter motorcyclists from travelling along the central hatching, encouraging them to rejoin the main queue of traffic to travel through the junction.

14.2.53 The refuges could be constructed to the south of Wills Road, north of the Stockmoor Close junction, and to the north of Wills Road immediately south of the northbound bus stop layby. Appropriate 'KEEP LEFT/RIGHT' illuminated bollards would need to be provided on the refuges to ensure that their conspicuousness is maximised.

14.2.54 The refuges would have the secondary benefit of providing pedestrian facilities across the A38 Taunton Road, connecting the residential area to the east with the northbound bus stop.

14.2.55 This junction does not form part of the proposed highway improvements to be delivered by EDF Energy as part of the proposed HPC Project. However, in order to improve road safety in this location, EDF Energy proposes to make a contribution to SCC to assist the Council in delivery of their ongoing programme of works, should the Council consider that works are required in this location.

Wylds Road/The Drove Junction

14.2.56 EDF Energy proposes to improve this junction. More space would be provided along with rationalised signal stages.

14.2.57 This would also significantly improve road safety at the junction, potentially reducing the numbers of right turning accidents.

14.3 Summary

14.3.1 In summary, there are a number of exiting accident clusters in the Bridgwater area and SCC has an ongoing programme to investigate and improve these junctions.

14.3.2 The impact on the accident rates as a result of the HPC Project is likely to be minimal. Notwithstanding that, EDF Energy has examined potential safety enhancements. Some of these would be delivered by EDF Energy as part of the DCO application highway improvements whilst others would be the subject of a contribution from EDF Energy to SCC through the DCO S106 Agreement. Therefore, EDF Energy's funding is likely to bring forward these safety improvements earlier than would be the case if SCC had to rely on their own funding.

15. TRAFFIC ANALYSIS

15.1 Introduction

15.1.1 This chapter describes the analysis of the impacts of the construction and operation of HPC on the local and strategic highway network.

15.1.2 There are a number of elements that make up this analysis as follows:

- the method of analysis including network of roads to be analysed;
- the assessment years, i.e. the years for which it is agreed traffic impacts of the HPC Project should be analysed;
- the Reference Case for the assessment years, i.e. what would occur on the network if HPC did not proceed. This includes traffic generated by developments that have been granted planning permission along with committed highway improvements;
- the With Development scenario for the assessment years, i.e. the traffic generated by the HPC Project;
- the highway improvements that would be introduced to mitigate the impact of the additional traffic generated by committed developments and HPC;
- the acceptance criteria, i.e. the level of mitigation EDF Energy should be required to provide; and
- the residual impacts after the application of EDF Energy's proposed mitigation package and whether these impacts are acceptable.

15.2 Method of Analysis

15.2.1 It has been agreed with the authorities (Highways Agency; Somerset County Council; Sedgmoor District Council and West Somerset Council) that the appropriate tool to use to assess the traffic impact of HPC is a model. This model simulates the movement of traffic on a network and gives an indication of journey times, queues at junctions, etc.

15.2.2 The network included within the model is shown at **Figure 15.3** and was agreed with the authorities. It includes the M5 Junction 23 and Junction 24; the Bridgwater road network and Cannington.

15.2.3 The starting point in any modelling exercise is to produce a validated Base Model. Validation means that the performance of the road network predicted by the model closely resembles what has been recorded as happening on the actual road network.

15.2.4 The HPC Base Model was based on 2009 traffic surveys and was validated against a number of criteria within Design Manual for Roads and Bridges (DMRB) including traffic flows, queue lengths and journey times. The validation was included in the Local Model Validation Report (LMVR) which was submitted to the authorities. This led to the Base Model being signed off as fit for purpose in September 2010. A copy of the LMVR is included at **Appendix 15.1.**

15.3 Assessment Years

15.3.1 The next stage in the process was to decide which future years would need to be assessed. It was agreed with the authorities that three years would be assessed as shown below. Further discussion on the selection of these periods is included in **Chapter 7**.

- 2013 Quarter 3. This is known as the "early years" and is before most of the off site associated developments are in place and operational.
- 2016 Quarter 4. This is when the traffic impacts of the HPC Project are expected to be at their maximum.
- 2021. This is when HPC would be fully operational but some construction activity would be continuing at the HPC development site along with the post-operational phase of some of the associated development sites.

15.4 Future Base Flows (Reference Case)

15.4.1 Having determined the future years to be assessed the next stage was to build the Reference Case models. These assume traffic flows from committed developments (i.e. those with planning permission) and other background growth as well as including committed highway improvements.

15.4.2 The derivation of the 2013, 2016 and 2021 Reference Case models is described in the Forecasting Report that is included in **Appendix 15.2**

15.4.3 It should be noted that certain highway improvements that are proposed by Somerset County Council (SCC) but are not committed (due to lack of funding, lack of the final details of the scheme etc) are not included in the Reference Case. These include improvements to Cross Rifles (Canon Roundabout) and Colley Lane Link.

15.5 Traffic Generation (With Development)

15.5.1 The estimate of the traffic generation from the HPC Project and distribution of the proposals is described in **Chapters 8, 9** and **10**. The resultant flows were converted to matrices within the model in order to produce with-development model runs (referred to as the With Development Case).

15.5.2 The estimate of traffic generation is considered to give a robust estimate of the traffic flows that are likely to be generated by the HPC Project for a number of reasons including:

- the 2016 analysis is for the quarter when it is estimated that construction flows are at their peak. During the adjacent years it is estimated that flows would be lower;
- car flows to the four park and ride sites have been increased by 10% compared with the base estimate;
- HGV flow estimates make conservative assumptions on payloads and the quantum of materials that would be delivered by sea;
- HGVs include HGVs and Medium Goods Vehicles;

- the HGV flows are for a peak day during the quarter in question. During the large majority of days HGV flows would be substantially less than those used in the assessment;
- no deductions have been made in the With Development Case for the fact that Bridgwater A accommodation campus is on land consented for residential development. Therefore flows for this site have been included in the Reference Case;
- no deductions have been made in the With Development Case for the fact that the Junction 24 facilities are located on the existing Somerfield site and flows to and from this site have been included in the Base and Reference Case models; and
- the traffic generation estimates allow for the basic transport strategy measures (e.g. park and ride, direct buses, walking and cycling) but do not include travel plan measures that reduce car movements.

15.6 Highway Improvements

15.6.1 In both the Reference Case and With-Development case some points of congestion were identified on the highway network. For example, at both the Taunton Road/Broadway and Cross Rifles junctions there are capacity issues in the Reference Case and With-Development scenarios.

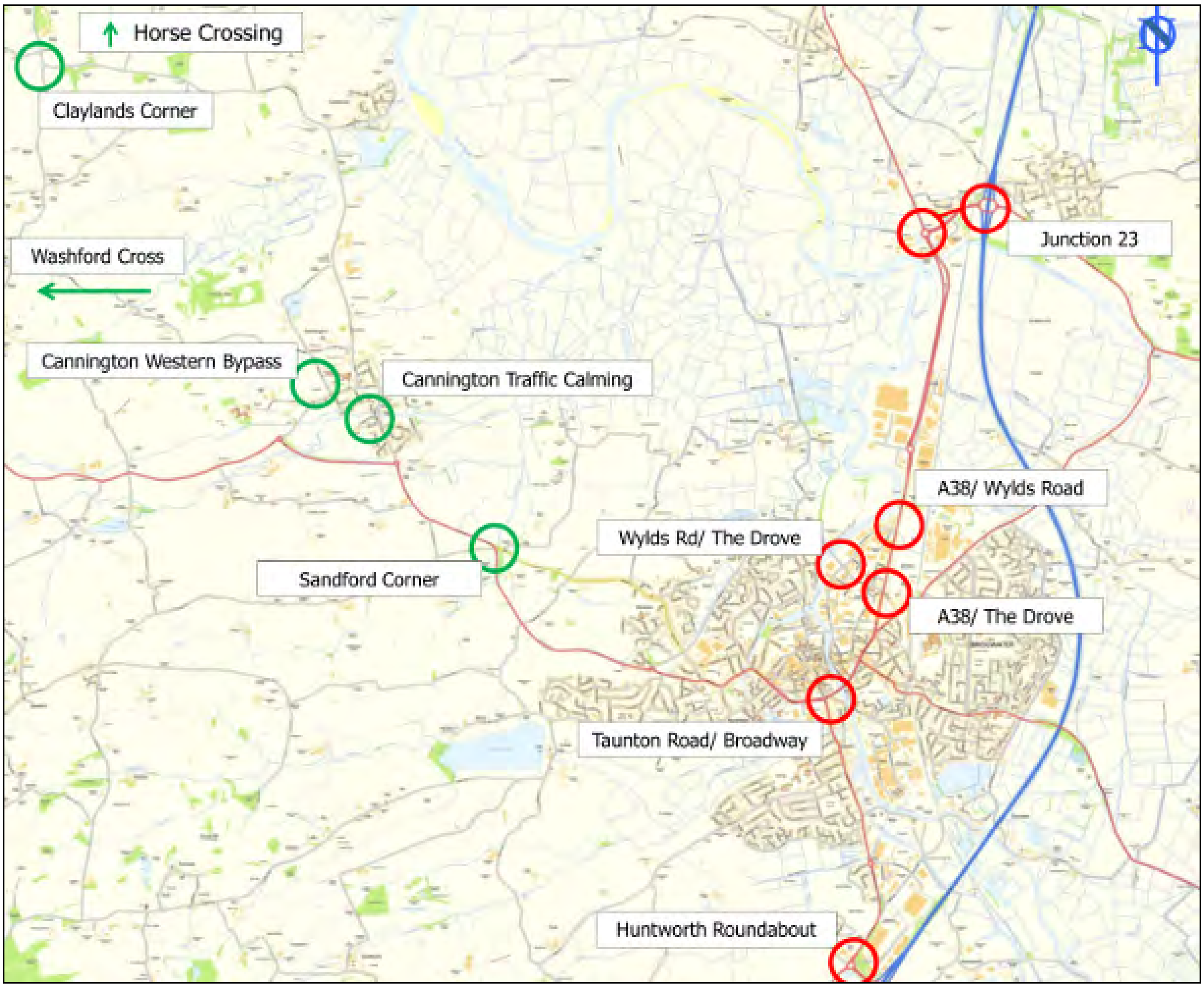
15.6.2 Therefore EDF Energy has investigated improvements to the highway network that would improve flow and reduce congestion. These would cater for both committed development flows and HPC traffic. A number of these improvements are for safety or community benefit purposes rather than to improve traffic flow.

15.6.3 Deriving the preferred improvement package has been an iterative process undertaken in consultation with the authorities and other local stakeholders such as Parish Councils. The preferred package is described in more detail in **Chapter 16** of this TA. However in summary the proposed works are as listed below and identified on **Figure 15.1.**

- M5 Junction 23: capacity improvements based on signalisation.
- Bristol Road (A38)/Wylds Road junction.
- Bristol Road/The Drove junction.
- Wylds Road/The Drove junction.
- Taunton Road/Broadway junction.
- Huntworth Roundabout junction.
- A39 New Road/B3339 Sandford Hill roundabout.
- Washford Cross Roundabout.
- Claylands Corner junction.
- Cannington traffic calming measures.
- C182 Farringdon Hill Lane horse crossing.
- Cross Rifles (contribution to SCC scheme).

- Dunball roundabout: revisions to road markings to accommodate access to the Junction 23 proposed development.
- The Cannington bypass proposed development.

Figure 15.1: Highway Improvement Location Plan



15.6.4 For Cross Rifles, the analysis demonstrates that HPC would have only a small impact on the junction since neither of the HGV routes or the main bus routes pass through the junction. Nevertheless, EDF Energy has developed a scheme within the highway boundary which the modelling demonstrates brings forward significant capacity benefits. However, EDF Energy is aware that SCC has proposals for an alternative improvement scheme and have funding available towards such a scheme. Therefore EDF Energy proposes to make a contribution to SCC to implement a scheme of their choosing.

15.7 Scenarios

15.7.1 The key comparison in assessing the impact and effect of HPC is between the Reference Case and the With-Development (plus highway improvements) case, referred to as the With Development plus Mitigation Case. The With-Development but no highway improvements scenario is also reported on in order to demonstrate where highway improvements are required. Therefore the scenarios reported are:

- Reference Case.
- With Development.
- With Development and Mitigation.

15.8 Assessment Criteria

15.8.1 Extensive discussions have taken place with the authorities on the best way to assess the impact of HPC on the highway network.

15.8.2 A number of criteria have been agreed, i.e:

- Overall network statistics, i.e. average speed across the network.
- Queuing at junctions including a commentary on unreleased vehicles.
- Journey times on specific routes.

15.8.3 Unreleased vehicles are those that cannot be accommodated on the highway network during the peak periods and therefore the model does not release them onto the network. When highway improvements are introduced the capacity of the overall network is improved which means more traffic can pass through the network in the peak periods. This additional traffic may mean that at certain locations there appears to be no improvement in journey time. However, in traffic flow terms there has been an improvement since more traffic can pass through the network. Therefore the measure of the number of unreleased vehicles is a material factor in assessing performance.

15.8.4 The nature of the model is that it is assessing a dynamic network where people change driving habits and routes every day. Therefore for any scenario 20 tests have been done. The range of the results from these 20 tests have been recorded along with the average. It has been agreed that if the variances in two scenarios overlap then it can be concluded that there is no statistically significant change in the element of network performance being assessed e.g. queue length or journey time.

15.8.5 For queue lengths the following criteria have been used:

- The model recognises a queue when a vehicle's speed drops below 4.5mph and the gap between the vehicle and the vehicle in front is less than 10m. Therefore what is recorded as queuing is not necessarily stationary traffic but may be slow moving traffic.
- It has been suggested by the authorities that a queue of 10 vehicles or more is a "cause for concern". Although further investigation may be appropriate judgement needs to be applied as to whether such a queue is a cause for concern in the particular circumstances, for example a 10 vehicle queue for five minutes in an hour would have a different significance to the same queue lasting 45 minutes.
- It has been suggested by the authorities that a change in queue of five vehicles or more may be considered material and worthy of further investigation.

15.8.6 The journey times shown at **Figure 15.2** have been analysed:

Figure 15.2: Journey Time Route Plan

15.8.7 Overall network statistics (average speeds) are presented for both the peak periods and overall modelled period.

15.8.8 It should be noted that the above criteria give a good indication of the effect of the HPC Project proposals on existing bus journey times as well as the effects on general traffic.

15.9 Acceptability Criteria

15.9.1 Having considered what measures have been used to assess the impact of HPC on the network, the next stage is to consider what is the necessary level of improvement that the HPC Project should provide in order to comply with government policy objectives.

15.9.2 The starting point is national policy and in particular EN-1 Overarching National Policy Statement for Energy. When referring to transport impacts EN-1 states at paragraph 5.13.7:

> *"Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG transport assessment, with attribution of costs calculated in accordance with the department of transports guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure"*

15.9.3 Paragraph 5.13.5 also introduces the possibility of cost sharing between the applicant and Government for any third party benefits i.e. where the improvements provided more than offset the impact of the proposal.

15.9.4 Volume 1 of En-6 the Nuclear Power Generation National Policy Statement states at paragraph 3.15.2 advises that:

> *"Applications should demonstrate that the proposed development would not have an unacceptable adverse impact on significant infrastructure."*

15.9.5 And at paragraph 3.15.3:

> *"In particular, the Nuclear AoS [Appraisal of sustainability] identified that there may be adverse effects during the construction and decommissioning phases on regional transport networks that may already be under stress, particularly where there are clusters of potentially suitable sites for nuclear power stations."*

15.9.6 Therefore the test is that the proposals should not have an unacceptable adverse impact. The applicant should be willing to provide appropriate infrastructure improvements. However, EN-6 acknowledges that during construction and decommissioning of nuclear power stations there may be some adverse effects.

15.9.7 In terms of the appropriate type, of mitigation, Paragraph 5.13.8 of EN-1 states:

> *"Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts."*

15.9.8 EDF Energy's transport strategy for the HPC Project is in accordance with this policy objective and includes key proposals for measures to enhance sustainable transport (which are covered in other chapters of this TA). The remaining issue to consider is therefore the provision of new infrastructure "to deal with" remaining impacts. It should be noted that there is no specific advice on the extent to which impacts need to be dealt with and there is no requirement for proposals to achieve nil-detriment, i.e. no worsening at all on every part of the road network.

15.9.9 Planning Policy Guidance 13: Transport (2011) continues the theme of concentrating on sustainable transport measures with improvements to highway infrastructure only being a preferred option when alternative strategies have been exhausted.

15.9.10 DFT's Guidance on Transport Assessments (GTA) sets out various criteria for assessing impacts and required mitigation. Key points to note are:

- Government policy is to wherever possible seek alternatives to new road building wherever possible (paragraph 4.85). Paragraph 1.19 states "It is considered good transport planning practice to demonstrate that the other opportunities above have been fully explored before considering the provision of additional road space such as new roads or major junction upgrades."
- The requirement to strive to achieve nil detriment only applies to the strategic road network (SRN) (paragraph 4.51) (and still needs to be considered in the light of EN-1 and EN-6).

- The mitigation package should focus on maximising sustainable accessibility.
- Mitigation on the SRN should provide capacity that is comparable to the general capacity of that part of the network.

15.9.11 Circular 2/07 Planning and the Strategic Road Network (2007) mirrors the requirements for the SRN contained in the GTA.

15.9.12 The Highways Agency Protocol for Dealing with Planning Applications advises on the process that the Highways Agency requires regarding the consideration of mitigation measures:

- all reasonable steps shall be taken to minimise the level of physical mitigation required, through the use of measures such as travel plans, development phasing, heavy goods vehicle booking systems and encouraging flexible working;
- physical measures on the local road network to minimise the impact on the strategic road network shall be utilised as far as is reasonably possible; and
- once all reasonable minimisation and off-network mitigation has been implemented, the Highways Agency will consider capacity improvements on the strategic road network. The Highways Agency will not accept local capacity improvements where they would overload the wider network.

15.9.13 Pulling all of the above threads together EDF Energy's approach to transport impact and mitigation has been as follows:

- To focus on a sustainable transport strategy that minimises as far as is possible travel by private car, whether it be direct to the site or to a park and ride site.
- To reduce freight movements by use of sea transport.
- To reduce movements during the network peak hours when congestion and delay are at their worst.
- To identify key constraints and impacts on the network and seek to bring forward improvements that are appropriate when taking into account other policies on urban realm, townscape etc. These measures address existing issues; issues that would be exacerbated by future developments in the Bridgwater area (excluding HPC) and the impacts of HPC itself.
- To check that, after the application of the mitigation measures proposed by EDF Energy, residual impacts, taken in the round, do not have an unacceptable adverse impact.

15.9.14 Based on the guidance set out above, it is not considered that EDF Energy is required to mitigate every impact of the HPC Project on the network. For example, an overall route may be improved and some junctions on that route may be improved beyond the direct impacts of HPC. However certain other junctions may suffer a small decrease in performance, partly because additional traffic has been released elsewhere on the network due to the overall highway improvement package. A balanced judgement is required to determine if, in overall terms, the impacts of HPC have been appropriately addressed.

15.10 Results of Analysis

15.10.1 The results of the analysis are presented in the following paragraphs and tables. It should be noted that there is a large amount of output from the models and a number of iterations have been undertaken to determine the preferred mitigation strategy. A summary of the outputs is presented within this TA with further details presented in appendices.

15.10.2 The 2016 analysis is presented first since this is the year of maximum construction activity.

15.11 2016

a) Traffic Flows

15.11.1 The tables below show the predicted changes in traffic flows on the key links within the study area (shown in **Figure 15.3**). Flows are shown for the whole day (24 hour Annual Average Daily Traffic) and the network peak periods.

15.11.2 The analysis starts by showing the comparison between the 2009 Base Case and the 2016 Reference Case. This shows changes in traffic flows that are predicted as a result of committed developments and general traffic growth in the area. These predicted changes are not due to HPC.

15.11.3 **Table 15.1** to **Table 15.3** show the comparison between 2009 Base Case and 2016 Reference Case flows. **Figure 15.3** identifies the link codes used in these tables.

Figure 15.3: Paramics Link Plan

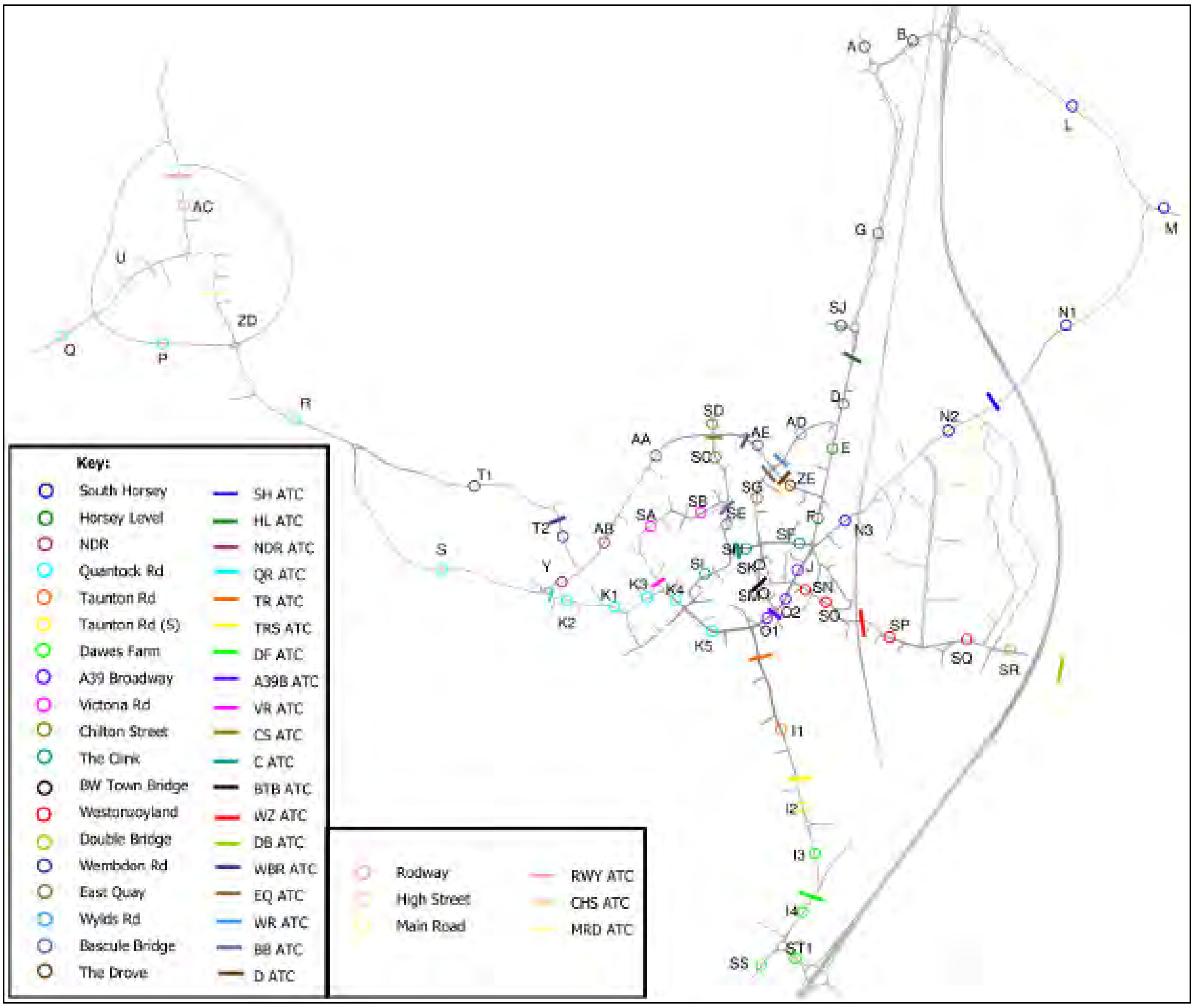


Table 15.1: 2009 Base vs. 2016 Reference Case Two-way Daily (24-Hour AADT) Vehicular Traffic Flows

Link	Link Ref.	2009 Base	2016 Ref Case	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	8,154	8,256	102	1%
M5 Junction 23 southbound off-slip	V2	7,754	8,057	303	4%
M5 Junction 23 northbound off-slip	V3	3,904	4,815	911	23%
M5 Junction 23 southbound on-slip	V4	4,091	4,701	610	15%
A39 Spur east of Dunball	B	19,361	21,422	2,061	11%
A39 East of J23	L	14,061	14,427	366	3%
A38 North of Dunball	A	10,678	10,772	94	1%
A38 South of Dunball	G	21,971	24,935	2,964	13%
A38 between Wylds Road and The Drove	E	13,159	15,904	2,745	21%
A38 between The Drove and Cross Rifles	F	16,818	18,764	1,946	12%
A38 between Cross Rifles and St. John St	J	20,240	22,485	2,245	11%
A38 between St John St and Taunton Road	O2	19,321	20,802	1,481	8%

Link	Link Ref.	2009 Base	2016 Ref Case	Increase (Numerical)	Increase (%)
A39 Bath Road NE of Cross Rifles	N3	17,129	15,740	-1,389	-8%
St. John Street	SN	11,549	12,638	1,089	9%
The Clink	SF	17,521	16,541	-980	-6%
Wylds Road	AD	10,323	11,145	822	8%
The Drove	ZE	7,030	7,666	636	9%
Western Way (West of Chilton Street)	AA	12,033	12,649	616	5%
B3339 Wembdon Hill	T1	1,518	1,523	5	0%
M5 J24 Northbound on-slip	ST2	4,104	4,600	496	12%
M5 Junction 24 southbound off-slip	ST3	4,774	5,202	428	9%
M5 Junction 24 northbound off-slip	ST4	4,776	5,034	258	5%
M5 Junction 24 southbound on-slip	ST5	5,065	5,364	299	6%
A38 spur east of Huntworth	ST1	18,510	20,018	1,508	8%
A38 Taunton Road south of Showground	I2	21,644	23,738	2,094	10%
A38 Taunton Road (south of Broadway)	I1	24,728	26,962	2,234	9%
A39 Broadway	K5	20,410	22,114	1,704	8%
A39 west of Quantock Roundabout	S	12,959	13,293	334	3%
A39 South-east of Cannington	R	14,468	14,790	322	2%
A39 South of Cannington	P	6,399	6,638	239	4%
A39 West of Cannington	Q	7,703	7,969	266	3%
High Street, Cannington	U	2,151	2,175	24	1%
Main Road, Cannington	ZD	8,533	8,558	25	0%
Rodway South of Bypass	AC	6,706	6,779	73	1%
Rodway North of Bypass	11	6,706	6,779	73	1%
Cannington bypass	Z1				
Williton	2	5,722	6,150	428	7%

Table 15.2: 2009 Base vs. 2016 Reference Case Two-way AM Network Peak Vehicular Traffic Flows

Link	Link Ref.	2009 Base	2016 Ref Case	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	842	821	-21	-2%
M5 Junction 23 southbound off-slip	V2	763	803	40	5%
M5 Junction 23 northbound off-slip	V3	392	442	50	13%
M5 Junction 23 southbound on-slip	V4	538	650	112	21%
A39 Spur east of Dunball	B	1,869	2089	220	12%
A39 East of J23	L	1,244	1288	44	4%
A38 North of Dunball	A	899	907	8	1%
A38 South of Dunball	G	1,998	2266	268	13%

Link	Link Ref.	2009 Base	2016 Ref Case	Increase (Numerical)	Increase (%)
A38 between Wylds Road and The Drove	E	1,159	1431	272	23%
A38 between The Drove and Cross Rifles	F	1,386	1481	95	7%
A38 between Cross Rifles and St. John St	J	1,507	1673	166	11%
A38 between St. John St and Taunton Road	O2	1,625	1712	87	5%
A39 Bath Road NE of Cross Rifles	N3	1,564	1481	-83	-5%
St. John Street	SN	950	1060	110	12%
The Clink	SF	1,199	1133	-66	-5%
Wylds Road	AD	899	990	91	10%
The Drove	ZE	508	617	109	22%
Western Way (West of Chilton Street)	AA	1,084	1198	114	11%
B3339 Wembdon Hill	T1	65	66	1	1%
M5 J24 Northbound on-slip	ST2	364	392	28	8%
M5 Junction 24 southbound off-slip	ST3	385	440	55	14%
M5 Junction 24 northbound off-slip	ST4	447	473	26	6%
M5 Junction 24 southbound on-slip	ST5	605	529	-76	-13%
A38 spur east of Huntworth	ST1	1,796	1845	49	3%
A38 Taunton Road south of Showground	I2	1,929	1915	-14	-1%
A38 Taunton Road (south of Broadway)	I1	1,996	1984	-13	-1%
A39 Broadway	K5	1,755	1844	89	5%
A39 west of Quantock Roundabout	S	1,267	1303	36	3%
A39 South-east of Cannington	R	1,339	1378	39	3%
A39 South of Cannington	P	579	602	23	4%
A39 West of Cannington	Q	694	728	34	5%
High Street, Cannington	U	206	212	6	3%
Main Road, Cannington	ZD	818	821	3	0%
Rodway South of bypass	AC	530	538	8	2%
Rodway North of bypass	11	530	538	8	2%
Cannington bypass	Z1				
Williton	2	453	485	32	7%

Table 15.3: 2009 Base vs. 2016 Reference Case Two-way PM Network Peak Vehicular Traffic Flows

Link	Link Ref.	2009 Base	2016 Ref Case	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	743	719	-24	-3%
M5 Junction 23 southbound off-slip	V2	919	857	-62	-7%
M5 Junction 23 northbound off-slip	V3	414	548	134	32%
M5 Junction 23 southbound on-slip	V4	618	634	16	3%
A39 Spur east of Dunball	B	2,071	2113	42	2%
A39 East of J23	L	1,317	1336	19	1%
A38 North of Dunball	A	914	869	-45	-5%
A38 South of Dunball	G	2,057	2153	96	5%
A38 between Wylds Road and The Drove	E	1,081	1423	342	32%
A38 between The Drove and Cross Rifles	F	1,162	1466	304	26%
A38 between Cross Rifles and St. John St	J	1,673	1841	168	10%
A38 between St. John St and Taunton Road	O2	1,531	1719	188	12%
A39 Bath Road NE of Cross Rifles	N3	1,688	1352	-336	-20%
St. John Street	SN	972	1169	197	20%
The Clink	SF	1,624	1413	-211	-13%
Wylds Road	AD	895	954	59	7%
The Drove	ZE	709	758	49	7%
Western Way (West of Chilton Street)	AA	1,309	1275	-34	-3%
B3339 Wembdon Hill	T1	87	80	-7	-8%
M5 J24 Northbound on-slip	ST2	324	437	113	35%
M5 Junction 24 southbound off-slip	ST3	435	496	61	14%
M5 Junction 24 northbound off-slip	ST4	525	511	-14	-3%
M5 Junction 24 southbound on-slip	ST5	523	562	39	7%
A38 spur east of Huntworth	ST1	1,833	2048	215	12%
A38 Taunton Road south of Showground	I2	1,965	2147	182	9%
A38 Taunton Road (south of Broadway)	I1	2,009	2188	179	9%
A39 Broadway	K5	1,925	2012	87	5%
A39 west of Quantock Roundabout	S	1,391	1375	-16	-1%
A39 South-east of Cannington	R	1,473	1447	-26	-2%
A39 South of Cannington	P	576	572	-4	-1%
A39 West of Cannington	Q	677	677	0	0%
High Street, Cannington	U	209	197	-12	-6%
Main Road, Cannington	ZD	954	919	-35	-4%
Rodway South of bypass	AC	772	749	-23	-3%
Rodway North of bypass	11	772	749	-23	-3%

Link	Link Ref.	2009 Base	2016 Ref Case	Increase (Numerical)	Increase (%)
Cannington bypass	Z1				
Williton	2	440	474	34	8%

15.11.4 As can be seen, flows increase on the main radials into Bridgwater from the motorway, i.e. A38 Bristol Road and A38 Taunton Road. However the flows on Bath Road and the Click reduce significantly particularly in the evening peak. These two reductions are likely to be due to increasing congestion at the Cross Rifles roundabout.

15.11.5 The effects on traffic flows of the HPC Project in 2016 are shown in **Table 15.4, Table 15.5** and **Table 15.6**. The comparison is shown between the 2016 Reference Case i.e. without HPC traffic and the 2016 With Development and Mitigation (which includes both HPC traffic and the proposed highway improvements as described earlier in this chapter). It is important to note that the predicted changes in flows are not only due to HPC traffic but also re-assignment of traffic due to the highway improvement. For example, flow increases on Bath Road and a reduction in flow on the A39 to the east of M5 Junction 23 are identified in the tables. This is likely to be due to a re-assignment of traffic due to the improvement at Cross Rifles.

Table 15.4: 2016 Reference Case vs. 2016 With Development and Mitigation Daily (24-Hour AADT) Two-Way All Vehicles Traffic Flows

Link	Link Ref.	2016 Ref Case	2016 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	8,256	9,794	1,538	18.6%
M5 Junction 23 southbound off-slip	V2	8,057	9,487	1,429	17.7%
M5 Junction 23 northbound off-slip	V3	4,815	4,650	-165	-3.4%
M5 Junction 23 southbound on-slip	V4	4,701	4,459	-241	-5.1%
A39 Spur east of Dunball	B	21,422	24,134	2,712	12.7%
A39 East of J23	L	14,427	13,165	-1,261	-8.7%
A38 North of Dunball	A	10,772	10,767	-5	0.0%
A38 South of Dunball	G	24,935	26,177	1,243	5.0%
A38 between Wylds Road and The Drove	E	15,904	14,807	-1,097	-6.9%
A38 between The Drove and Cross Rifles	F	18,764	18,361	-402	-2.1%
A38 between Cross Rifles and St. John St	J	22,485	24,208	1,722	7.7%
A38 between St. John St and Taunton Road	O2	20,802	22,124	1,322	6.4%
A39 Bath Road NE of Cross Rifles	N3	15,740	17,788	2,048	13.0%

Link	Link Ref.	2016 Ref Case	2016 With Dev	Increase (Numerical)	Increase (%)
St. John Street	SN	12,638	11,815	-823	-6.5%
The Clink	SF	16,541	16,704	163	1.0%
Wylds Road	AD	11,145	13,016	1,870	16.8%
The Drove	ZE	7,666	7,664	-2	0.0%
Western Way (West of Chilton Street)	AA	12,649	14,494	1,845	14.6%
B3339 Wembdon Hill	T1	1,523	1,271	-252	-16.5%
M5 J24 Northbound on-slip	ST2	4,600	4,514	-86	-1.9%
M5 Junction 24 southbound off-slip	ST3	5,202	4,980	-222	-4.3%
M5 Junction 24 northbound off-slip	ST4	5,034	5,850	816	16.2%
M5 Junction 24 southbound on-slip	ST5	5,364	6,281	917	17.1%
A38 spur east of Huntworth	ST1	20,018	21,399	1,381	6.9%
A38 Taunton Road south of Showground	I2	23,738	24,539	800	3.4%
A38 Taunton Road (south of Broadway)	I1	26,962	28,005	1,043	3.9%
A39 Broadway	K5	22,114	22,956	842	3.8%
A39 west of Quantock Roundabout	S	13,293	16,875	3,582	26.9%
A39 South-east of Cannington	R	14,790	18,080	3,291	22.2%
A39 South of Cannington	P	6,638	13,338	6,700	100.9%
A39 West of Cannington	Q	7,969	8,589	620	7.8%
High Street, Cannington	U	2,175	1,879	-296	-13.6%
Main Road, Cannington	ZD	8,558	5,567	-2,992	-35.0%
Rodway South of bypass	AC	6,779	3,446	-3,333	-49.2%
Rodway North of bypass	11	6,779	8,417	1,638	24.1%
Cannington bypass	Z1		6244	6,244	
B3190	10	1412	1619	207	14.7%
Williton	2	6150	6977	827	13.4%

Table 15.5: 2016 Reference Case vs. 2016 With Development and Mitigation Two-way AM Network Peak All Vehicles Traffic Flows

Link	Link Ref.	2016 Ref Case	2016 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	821	862	40	4.9%
M5 Junction 23 southbound off-slip	V2	803	935	132	16.4%
M5 Junction 23 northbound off-slip	V3	442	452	9	2.1%
M5 Junction 23 southbound on-slip	V4	650	627	-23	-3.6%
A39 Spur east of Dunball	B	2,089	2,208	119	5.7%
A39 East of J23	L	1,288	1,139	-150	-11.6%
A38 North of Dunball	A	907	912	5	0.6%
A38 South of Dunball	G	2,266	2,264	-2	-0.1%
A38 between Wylds Road and The Drove	E	1,431	1,362	-69	-4.8%
A38 between The Drove and Cross Rifles	F	1,481	1,617	136	9.2%
A38 between Cross Rifles and St. John St	J	1,673	1,959	286	17.1%
A38 between St. John St and Taunton Road	O2	1,712	1,936	225	13.1%
A39 Bath Road NE of Cross Rifles	N3	1,481	1,795	314	21.2%
St. John Street	SN	1,060	936	-124	-11.7%
The Clink	SF	1,133	1,244	111	9.8%
Wylds Road	AD	990	1,045	55	5.6%
The Drove	ZE	617	581	-37	-5.9%
Western Way (West of Chilton Street)	AA	1,198	1,294	96	8.0%
B3339 Wembdon Hill	T1	66	53	-13	-19.2%
M5 J24 Northbound on-slip	ST2	392	379	-13	-3.4%
M5 Junction 24 southbound off-slip	ST3	440	434	-7	-1.5%
M5 Junction 24 northbound off-slip	ST4	473	516	43	9.2%
M5 Junction 24 southbound on-slip	ST5	529	572	44	8.3%
A38 spur east of Huntworth	ST1	1,845	1,897	52	2.8%
A38 Taunton Road south of Showground	I2	1,915	2,031	116	6.1%
A38 Taunton Road (south of Broadway)	I1	1,984	2,123	139	7.0%
A39 Broadway	K5	1,844	1,941	98	5.3%
A39 west of Quantock Roundabout	S	1,303	1,499	196	15.0%
A39 South-east of Cannington	R	1,378	1,569	191	13.9%
A39 South of Cannington	P	602	1,046	443	73.6%
A39 West of Cannington	Q	728	770	42	5.8%
High Street, Cannington	U	212	198	-14	-6.6%
Main Road, Cannington	ZD	821	597	-224	-27.3%

Link	Link Ref.	2016 Ref Case	2016 With Dev	Increase (Numerical)	Increase (%)
Rodway South of bypass	AC	538	278	-260	-48.4%
Rodway North of bypass	11	538	747	209	38.9%
Cannington bypass	Z1		439	439	
B3190	10	97	121	24	24.7%
Williton	2	485	530	45	9.3%

Table 15.6: 2016 Reference Case vs. 2016 With Development and Mitigation Two-way PM Network Peak All Vehicles Traffic Flows

Link	Link Ref.	2016 Ref Case	2016 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	719	903	185	25.7%
M5 Junction 23 southbound off-slip	V2	857	910	53	6.1%
M5 Junction 23 northbound off-slip	V3	548	569	21	3.8%
M5 Junction 23 southbound on-slip	V4	634	631	-3	-0.5%
A39 Spur east of Dunball	B	2,113	2,332	218	10.3%
A39 East of J23	L	1,336	1,249	-87	-6.5%
A38 North of Dunball	A	869	883	14	1.6%
A38 South of Dunball	G	2,153	2,317	164	7.6%
A38 between Wylds Road and The Drove	E	1,423	1,308	-115	-8.1%
A38 between The Drove and Cross Rifles	F	1,466	1,356	-110	-7.5%
A38 between Cross Rifles and St. John St	J	1,841	2,032	190	10.3%
A38 between St. John St and Taunton Road	O2	1,719	1,812	93	5.4%
A39 Bath Road NE of Cross Rifles	N3	1,352	1,717	365	27.0%
St. John Street	SN	1,169	940	-229	-19.6%
The Clink	SF	1,413	1,582	169	12.0%
Wylds Road	AD	954	1,088	134	14.0%
The Drove	ZE	758	736	-22	-2.9%
Western Way (West of Chilton Street)	AA	1,275	1,456	181	14.2%
B3339 Wembdon Hill	T1	80	65	-15	-18.6%
M5 J24 Northbound on-slip	ST2	437	444	6	1.5%

Link	Link Ref.	2016 Ref Case	2016 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 24 southbound off-slip	ST3	496	436	-60	-12.1%
M5 Junction 24 northbound off-slip	ST4	511	538	27	5.3%
M5 Junction 24 southbound on-slip	ST5	562	678	116	20.7%
A38 spur east of Huntworth	ST1	2,048	2,129	81	3.9%
A38 Taunton Road south of Showground	I2	2,147	2,144	-2	-0.1%
A38 Taunton Road (south of Broadway)	I1	2,188	2,229	41	1.9%
A39 Broadway	K5	2,012	2,062	49	2.4%
A39 west of Quantock Roundabout	S	1,375	1,648	273	19.9%
A39 South-east of Cannington	R	1,447	1,707	260	18.0%
A39 South of Cannington	P	572	1,228	657	114.8%
A39 West of Cannington	Q	677	730	53	7.8%
High Street, Cannington	U	197	191	-6	-3.2%
Main Road, Cannington	ZD	919	507	-413	-44.9%
Rodway South of bypass	AC	749	334	-415	-55.5%
Rodway North of bypass	11	749	924	175	23.3%
Cannington bypass	Z1		622	622	
B3190	10	120	148	28	23.3%
Williton	2	474	519	45	9.4%

15.11.6 As can be seen, flows increase on the main routes from Junction 23 and Junction 24 to the HPC development site, i.e. the A38 South of Dunball (G), Western Way (AA), A39 Taunton Road (I1), A39 Broadway (K5), A39 west of Quantock Roundabout (S) and A39 south of Cannington (P). Flows then use the proposed Cannington bypass (Z1) with consequent reductions through Cannington on Main Road (ZD), High Street (U) and Rodway (AC). The decreases are predicted to be less on High Street partly because some buses would continue using this route.

15.11.7 However flows also increase on, for example, Bath Road (N3) even though little HPC traffic is expected to use this road. As noted above, this is likely to be due to re-assignment of traffic because of capacity improvements at Cross Rifles. This is further corroborated by the reduction in flow on the A39 east of M5 Junction 23 (Link L).

15.11.8 Overall the highway improvements package is predicted to increase capacity in Bridgwater. One consequence is that some traffic that is currently accessing M5

Junction 23 to travel south now passes through Bridgwater. This is shown in the reduction in flow on the Junction 23 southbound on slip (link V4).

b) Total Network Delay

15.11.9 The next set of results to be reported is the Total Network Delay. This records the total time taken by all vehicles to pass through the network and calculates the average speed per vehicle. The comparison between the 2016 Reference Case, the 2016 With Development Case, and the 2016 With Development plus Mitigation Case is shown in **Table 15.7**.

Table 15.7: 2016 Reference Case vs. 2016 With Development and Mitigation Daily Average Traffic Speeds (mph)

Time	Reference Case	With Development	With Development and Mitigation
0600-0700	38.4	37.6	36.6
0700-0800	36.2	35.2	34.9
0800-0900	25.5	24.0	25.8
0900-1000	25.5	24.7	26.0
AM Period	**31.4**	**30.4**	**30.8**
1300-1400	34.3	32.5	33.0
1400-1500	28.4	25.8	28.6
1500-1600	27.4	23.7	28.0
1600-1700	26.1	20.1	26.3
1700-1800	22.0	15.4	22.5
1800-1900	24.0	13.5	25.6
1900-2000	25.5	10.1	26.1
PM Period	**26.8**	**20.2**	**27.1**
OVERALL	**29.1**	**25.3**	**29.0**

15.11.10 The analysis shows that in the AM peak hour (08:00 to 09:00) the average speed decreases with the introduction of HPC without any mitigation; but with mitigation there is a small increase in the average speed. However, taken over the 4-hour morning period there is a marginal reduction in speed (30.4mph compared to 31.4 mph); but this equates to a 2% reduction in speed which indicates there is no significant difference between the Reference Case and the With Mitigation case.

15.11.11 In the PM peak hour (17:00 to 18:00) the average speed decreases noticeably with the introduction of HPC; but addition of the mitigation leads to a small increase in speeds compared with the Reference Case. For the afternoon modelled period there is a small overall increase in traffic speeds.

15.11.12 Taken over the whole modelled period the average speed remains broadly neutral at 29mph.

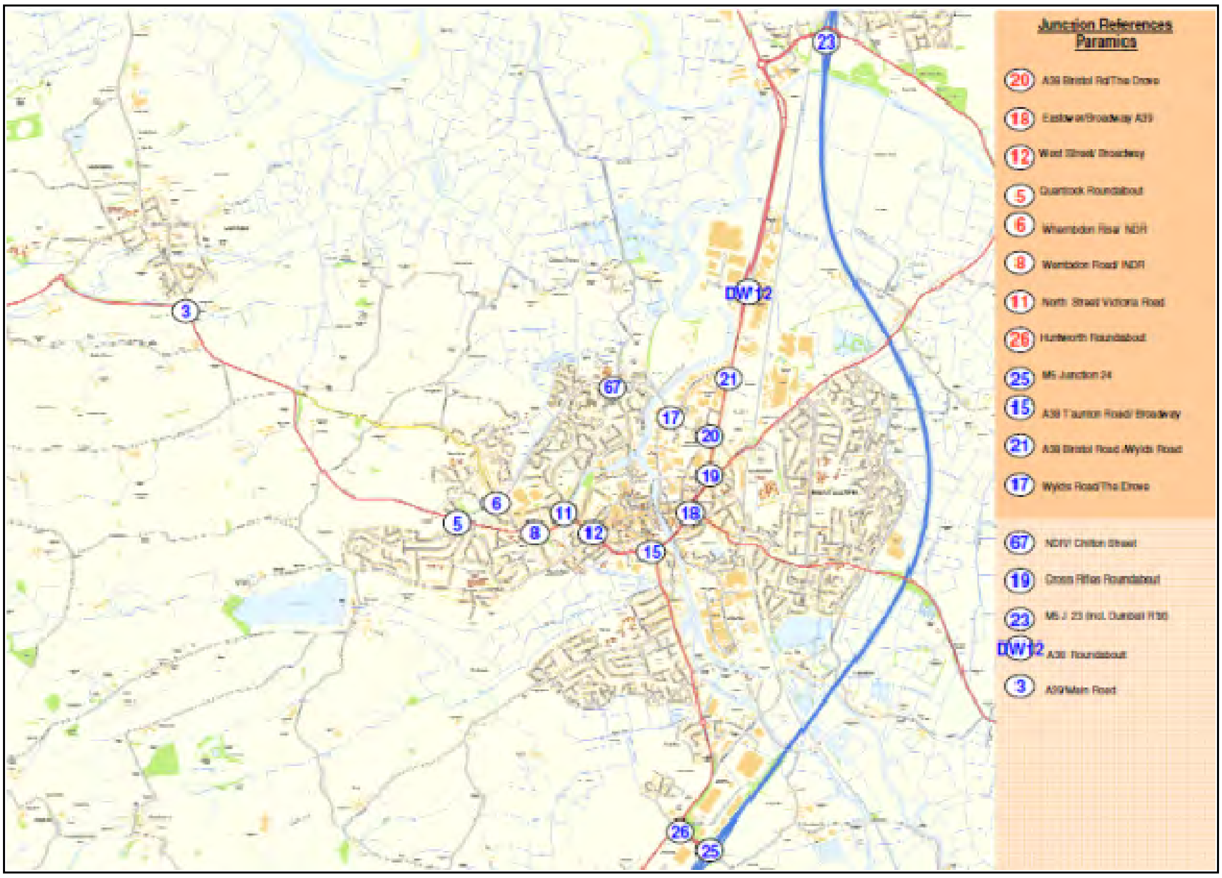
15.11.13 These statistics demonstrate that across the network the proposed highway improvements would mitigate the impact of HPC traffic to the extent of achieving broadly nil detriment and in the AM peak hour (no significant change in speeds) and in the PM peak hour (an improvement in average speeds).

c) Junction Performance

15.11.14 Having considered the overall network performance, the next stage is to examine the performance of individual junctions.

15.11.15 A location plan of the key junctions is shown at **Figure 15.4**.

Figure 15.4: Key Junctions



15.11.16 As agreed with the reviewing authorities (Highways Agency; Somerset County Council; Sedgemoor District Council; West Somerset Council), each of the key junctions has been examined to determine the change in queuing that occurs between the Reference Case and the With Development plus Mitigation Case. The model does not produce a performance indicator such as a Ratio of Flow to Capacity (RFC) that models such as Arcady do produce, and therefore the change in queue has been used as an initial indicator of junction performance.

15.11.17 **Table 15.8** below provides a summary of the results. Where a statistically significant increase in queuing occurs between the With Development plus Mitigation Case and Reference Case scenarios, the change is recorded as a worsening. Where a decrease in queuing occurs it is recorded as an improvement. Where no statistically significant change occurs it is recorded as neutral. The detailed analysis is included at **Appendix 15.6**.

Table 15.8: 2016 Queue Analysis Summary

Junction Ref	Name	AM Score	PM Score	Total Score
15	Broadway/Taunton Road	Improvement	Improvement	Improvement
17	Western Way/The Drove/Wylds Road			
20	Bristol Road/The Drove			
24	Huntworth Roundabout			
23	M5 Junction 23			
Dw12	A38/Express Way Roundabout	Neutral	Neutral	Neutral
25	M5 Junction 24			
12	West Street/Broadway			
21	Bristol Road/Wylds Road			
16	East Quay/The Clink			
67	Western Way/Chilton Street			
11	North Street/Victoria Road			
19	Crossrifles Roundabout	Worse	Worse	Worse
3	Main Rd Cannington/A39 Roundabout			
8	Wembdon Road/Northfield			
6	Wembdon Rise/Western Way			
5	Quantock Rd/Western Way			
18	St John Street/Broadway			

15.11.18 The following conclusions can be drawn from this table.

15.11.19 There are five junctions where there are improvements in queuing and a further seven junctions where there is no material change. There are six junctions where there is an increase in queuing and these junctions are considered in the paragraphs below.

i. Cross Rifles

15.11.20 An aerial image of Cross Rifles is shown at **Figure 15.5**.

Figure 15.5: Cross Rifles Aerial View

15.11.21 The HPC proposals have very little impact on this junction since it is not on an HGV route and few if any buses would pass through the junction since buses to and from Bridgwater A and C accommodation campuses can use the new link to the A38 being provided by the North-east Bridgwater development. This is demonstrated by the graphs included at **Appendix 15.6**. These show that the only times when the With Development (but no mitigation) scenario shows a statistically significant increase in queuing compared with the Reference Case is between 15:40 and 16:00 on Monmouth Street and after 18:00 on Bath Road.

15.11.22 The Clink and Monmouth Street experience some queue increase whilst Bath Road experiences a reduction. The unreleased vehicles analysis for this area shows that there are more vehicles released in the With Development plus Mitigation Case than the Reference Case, which demonstrates that the junction is accommodating more traffic. This is corroborated by the fact that more traffic is attracted to Bath Road as noted earlier in this report.

ii. Main Road Cannington/A39

15.11.23 An aerial image of Main Road Cannington/ A39 is shown at **Figure 15.6**.

Figure 15.6: Main Road Cannington/A39 Aerial View

15.11.24 There are no statistically significant changes in queuing on the A39 south arm. On the A39 west arm the queue increases to a maximum of 10 vehicles in the AM and PM peaks. It is at 10 vehicles that SCC consider that a queue is significant and a cause for concern. In the AM peak the queue increases by a maximum of four vehicles and in the PM peak by a maximum of six vehicles. The queues are relatively short-lived and have no effect on other junctions.

15.11.25 On Main Road, there is no statistically significant change in queuing in the AM peak. In the PM peak the queue increases are generally less than five vehicles which is the level at which SCC consider further investigation might be required. For only a short (approximately 10 minute) period does the queue exceed 10 vehicles. The queuing has no knock-on effect on other junctions.

15.11.26 It is therefore considered that the impact on this junction is acceptable.

iii. Wembdon Road/Northfield

15.11.27 An aerial image of Wembdon Road/ Northfield is shown at **Figure 15.7**.

Figure 15.7: Wembdon Road/Northfield Aerial View

15.11.28 The only arm that experiences a statistically significant increase in queue is Northfield where the increase is only 3 vehicles at the peak time. This is not considered a material change.

iv. Wembdon Rise/Western Way

15.11.29 An aerial image of Wembdon Rise/ Western Way is shown at **Figure 15.8**.

Figure 15.8: Wembdon Rise/Western Way

15.11.30 The only arm of the junction that experiences any statistically significant increase in queuing is the Wembdon Rise arm in the AM peak. However, this is partly as a result of assumptions in the modelling since in the model all the residential areas served off Wembdon Rise are connected using one link. By moving the notional link a little further west then the demand on this arm would reduce as the model would send drivers via Sandford Corner. In reality if there is delay at this junction people would be likely to use Sandford Corner.

15.11.31 In any case it would not be desirable to increase the capacity of the Wembdon Hill arm since this would encourage more through traffic to use the route through the village.

v. Quantock Road/Western Way

15.11.32 An aerial image of Quantock Road/ Western Way is shown at **Figure 15.9**.

Figure 15.9: St. Quantock Road/Western Way Aerial View

15.11.33 On Quantock Meadows and Quantock Road West the queues are all less than 10 vehicles and the changes in queuing are less than five vehicles. On Quantock

Road East, all queues are 10 vehicles or less and the changes in queuing are less than five vehicles.

15.11.34 On Western Way, in the AM peak the queue increases by eight vehicles. In the PM peak the queue is less than 10 vehicles except for one isolated 10 minute interval when it increases to 13 vehicles. These queues have no knock-on effect on other junctions and are spread over two lanes i.e. the queue per lane would be less than 10.

15.11.35 Given that most arms of the junction experience no material impact and the impact on Western Way is relatively short-lived in the peaks, this impact is considered acceptable.

vi. St John Street/Broadway:

15.11.36 An aerial image of St. John Street/ Broadway is shown at **Figure 15.10**.

Figure 15.10: St. John Street/Broadway Aerial View

15.11.37 Eastover is the only arm that experiences a statistically significant increase in queuing with an increase of approximately seven vehicles in the PM peak. Both Monmouth Street and Broadway experience a reduction in queuing.

15.11.38 It is likely that with more detailed individual junction modelling the green times would be adjusted to equalise the queuing.

15.11.39 In terms of unreleased vehicles, there is no material change in the AM peak period as a result of HPC. In the PM peak there are less unreleased vehicles at two zones on the network: the Friam Street area and the Morrisons zone. This is due to the improvements at the Taunton Road/Broadway junction. The only increase in unreleased vehicles is to the north of the Northern Distributor Road between Wylds Road and Chilton Street.

vii. Summary of Queue Analysis

15.11.40 On the basis of the individual queuing results it is concluded that the proposed highway improvement package mitigates the traffic impacts of the HPC Project to the extent of achieving broadly nil detriment to the road network with improvements at some junctions. **Table 15.8** demonstrates improvements at certain junctions and the overall assessment indicates a significant reduction in queuing. At the individual junctions where there are increases in queuing these are on isolated arms and for limited periods. It is not considered that these queue increases would have any knock-on effects elsewhere on the network.

viii. Journey Time Analysis

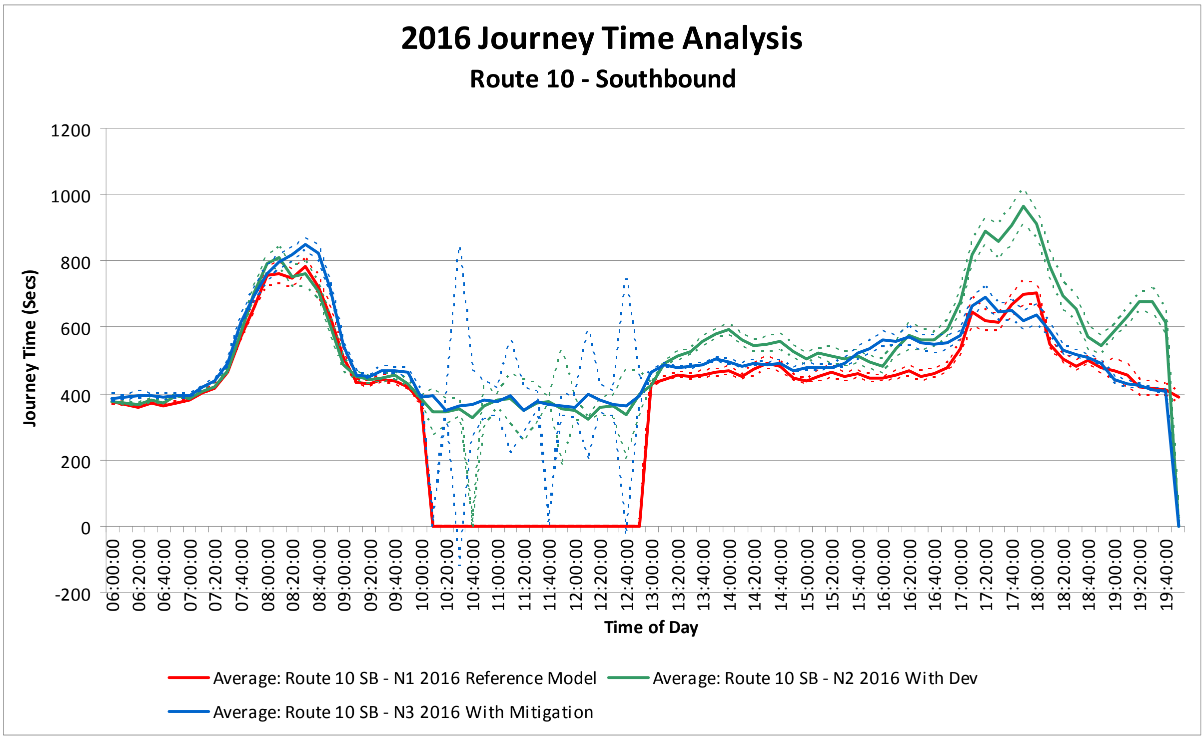
15.11.41 The next set of data is the journey times along various routes within Bridgwater. A number of journey time routes have been examined as indicated earlier in this Chapter. The results are included in **Appendix 15.3**.

15.11.42 The results for the two key routes are shown below. These are the two HGV routes from the M5 to the HPC development site which would take the great majority of HPC-generated traffic.

15.11.43 Journey Time Route 10 is the route from Huntworth Roundabout, via Taunton Road, Broadway, A39, to Quantock Roundabout, i.e. the HGV route from Junction 24. Route 1 is between A38/The Drove junction and Quantock Roundabout and Route 6 is between Junction 23 and Cross Rifles. Together these two routes broadly show the HGV route from Junction 23.

15.11.44 In **Figure 15.11** to **Figure 15.16** (below), the red line shows the 2016 Reference Case, i.e. what happens without HPC but with other growth. The green line shows the times if HPC traffic is added but with no highway improvements. The blue line shows the situation with HPC traffic but with the highway improvements added. The period between 10:00 and 13:00 hours has not been modelled (as agreed with the transport authorities) and therefore the graphs should be ignored for these periods.

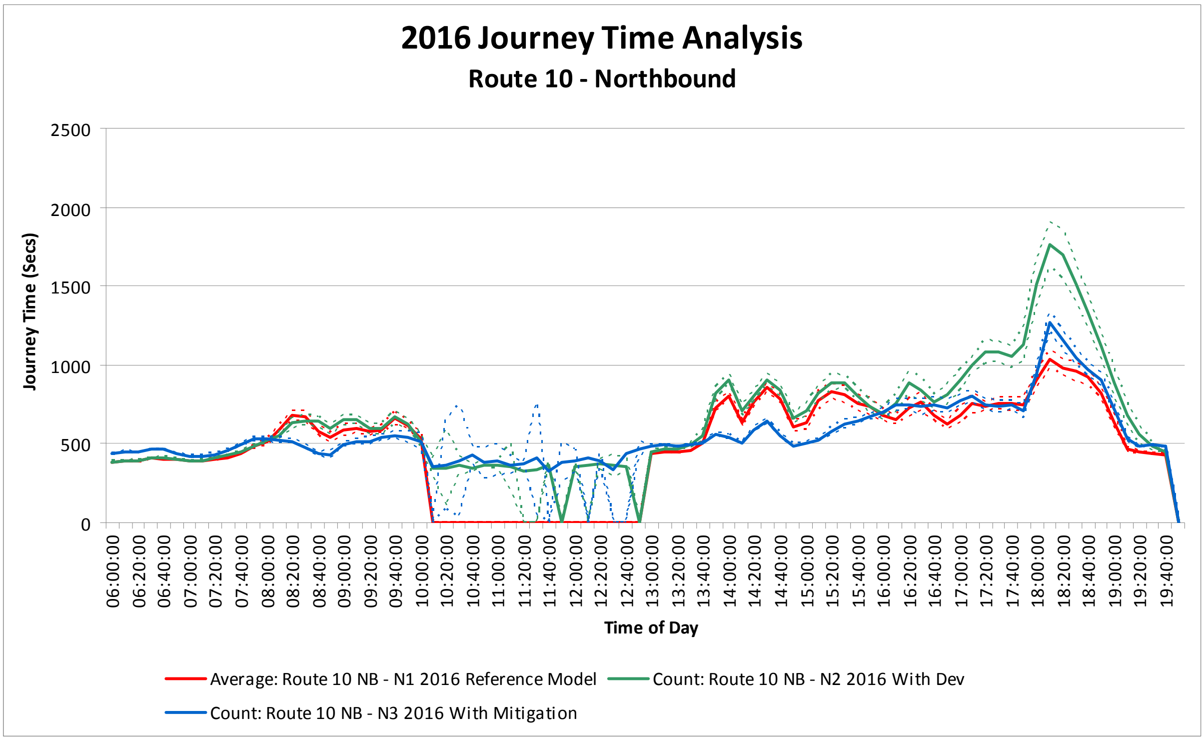
Figure 15.11: 2016 Journey Time Route 10 Southbound (seconds)



15.11.45 As can be seen from **Figure 15.11,** on Journey Time Route 10, in the southbound direction in the AM peak, the With Development but no mitigation scenario shows there is no change in journey time. Introduction of mitigation increases the journey time to a small degree probably because of more traffic attracted to the route due to the mitigation providing additional capacity.

15.11.46 In the PM peak there is a material detriment in journey time due to the introduction of HPC. However the mitigation package restores the journey times to approximately the Reference Case with broadly nil detriment overall.

Figure 15.12: 2016 Journey Time Route 10 Northbound (seconds)



15.11.47 In the northbound direction, in the AM peak HPC causes a small increase in journey time. However introduction of the mitigation leads to significant improvements when compared with the Reference Case. In the PM peak there would be a significant detriment in journey time without the mitigation. The mitigation package almost restores journey times to the Reference Case. Overall there is broadly nil detriment.

15.11.48 Shown below **Figure 15.13** to **Figure 15.16** are the journey times for Routes 6 and 1.

Figure 15.13: 2016 Journey Time Analysis: Route 6 – Southbound

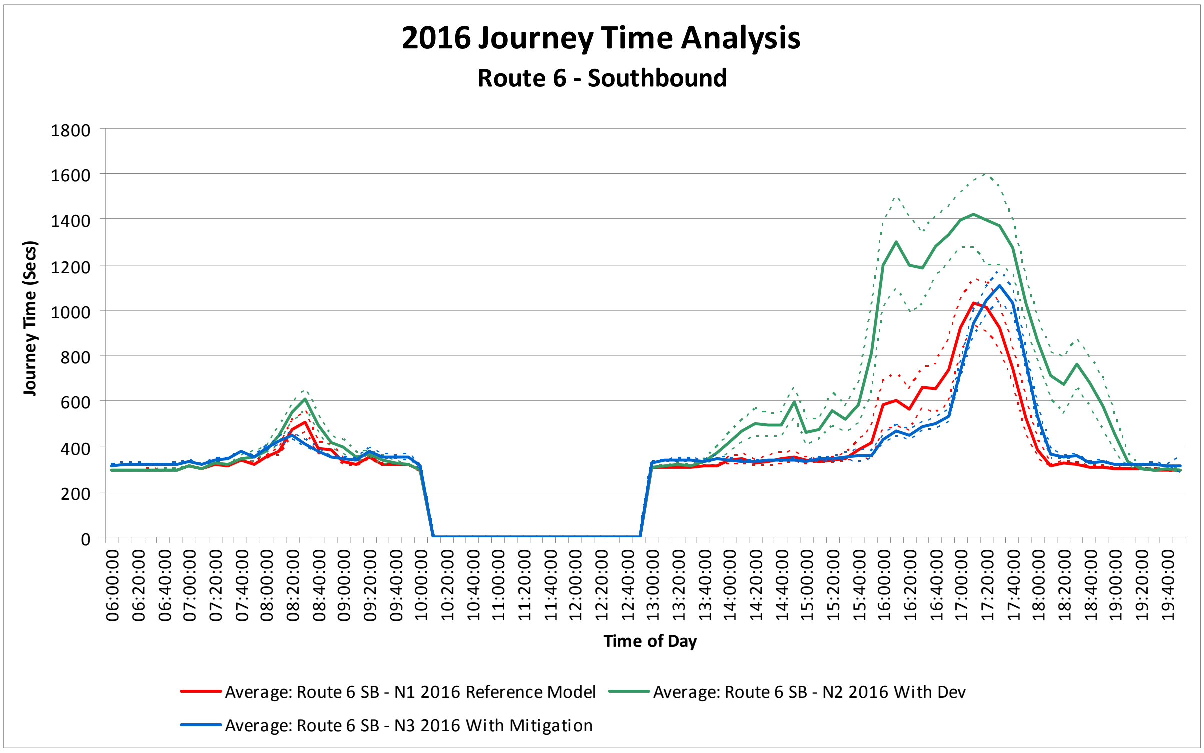


Figure 15.14: 2016 Journey Time Analysis: Route 6 – Northbound

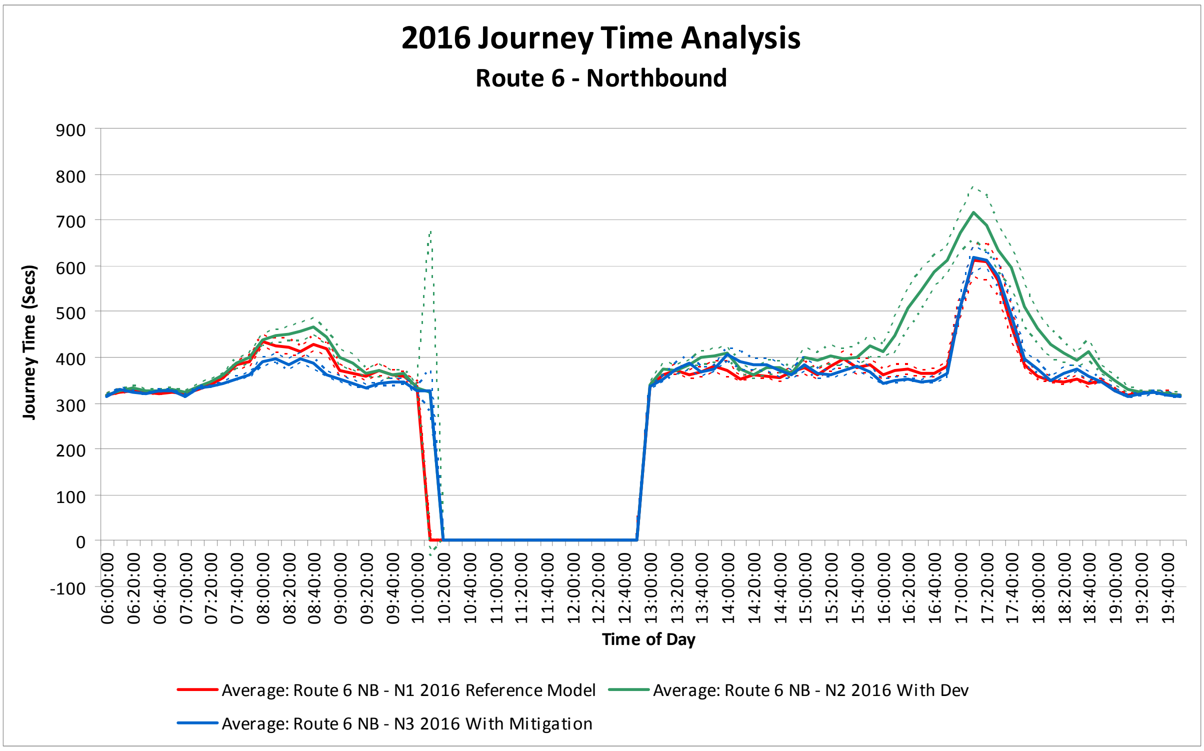


Figure 15.15: 2016 Journey Time Analysis: Route 1 – Eastbound

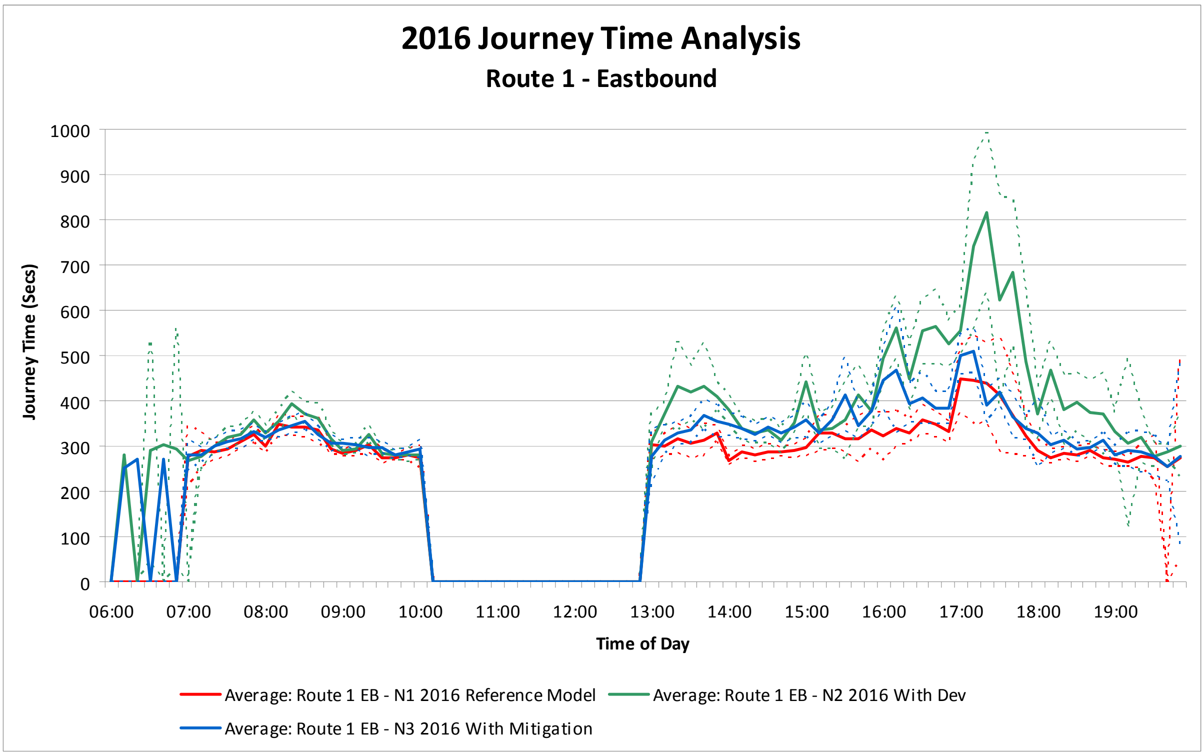
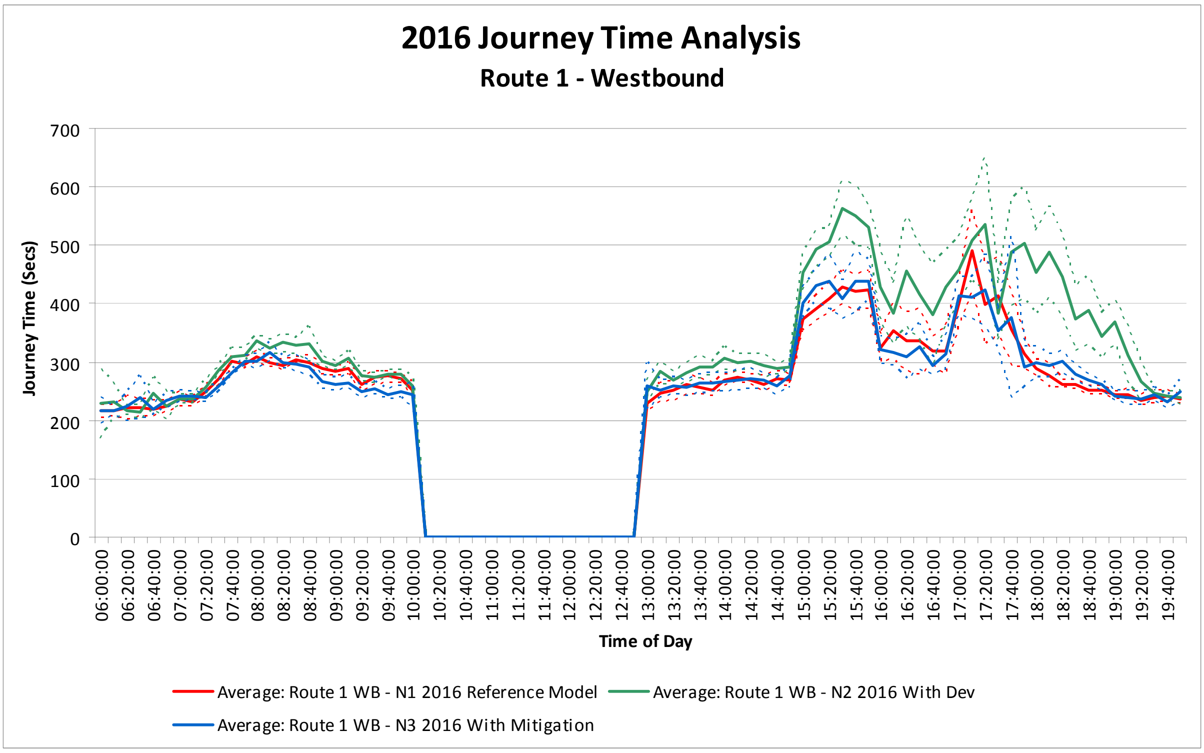


Table 15.9: 2016 Journey Time Analysis: Route 1 – Westbound



15.11.49 On Route 6 southbound, HPC traffic plus mitigation leads to a small improvement in journey time in the AM peak and a small increase in the PM peak. In the northbound direction there is a small improvement in the AM peak and no change in the PM peak.

15.11.50 On Route 1 detailed analysis of the graphs show there is no statistically significant change in journey times when the scenario with HPC traffic plus mitigation is compared with the Reference Case in either the eastbound or westbound directions.

15.11.51 On the basis of the above graphs and those contained in **Appendix 15.3**, it is concluded that without mitigation, there would be a material increase in journey times. However, the proposed highway improvements successfully mitigate the impact of HPC to the extent of broadly achieving nil detriment to journey times on the assessed road network.

ix. Summary for 2016

15.11.52 It is therefore concluded, based on the evidence from the agreed model, that in the peak construction quarter (in 2016), the highway improvement proposals would mitigate the traffic impacts of the HPC Project to the extent of achieving broadly nil detriment and would also bring forward improvements compared with the Reference Case in a number of instances.

15.12 2013

15.12.1 As noted earlier in this chapter, 2013 represents the early construction phase of the HPC Project before all the associated development sites are operational. There would be less traffic than in 2016 due to a smaller number of construction workers. There would be one park and ride facility, freight management facility and a temporary induction centre all located at the Somerfield site close to M5 Junction 24. However, some vehicles would still be routed from Junction 24 up the M5 to Junction 23 and then along the northern HGV route via the Northern Distributor Road.

15.12.2 As well as the construction of the main HPC development, the associated development sites would also be under construction in 2013 and these flows are taken into account in the analysis.

15.12.3 In terms of highway improvements, the analysis has been undertaken on the basis of only the site preparation works improvements plus Huntworth roundabout being in place. The proposed Cannington bypass would not be operational in 2013.

15.12.4 Therefore the highway improvements assessed in the 2013 scenario are:

- A39 Broadway/A38 Taunton Road junction improvement.
- A39 New Road/B3339 Sandford Hill Roundabout installation.
- Washford Cross Roundabout installation.
- Huntworth Roundabout improvement.
- Claylands Corner junction improvement.
- Cannington Traffic Calming Measures.
- C182 Farringdon Hill Lane Horse Crossing.

15.12.5 However, EDF Energy would seek to implement the entire highway improvement package as soon as possible and therefore some additional improvement measures may be in place before the assessment period of Quarter 3 2013.

15.12.6 The results of the analysis of traffic flow changes are shown below.

Table 15.10: 2013 Reference Case vs. 2013 With Development and Mitigation Daily (24 Hour AADT) Two-way All Vehicles Traffic Flows

Link	Link Ref.	2013 Ref Case	2013 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	8,338	8,683	345	4.1%
M5 Junction 23 southbound off-slip	V2	8,051	8,185	134	1.7%
M5 Junction 23 northbound off-slip	V3	4,115	4,321	206	5.0%
M5 Junction 23 southbound on-slip	V4	4,236	4,269	33	0.8%
A39 Spur east of Dunball	B	19,951	21,002	1,051	5.3%
A39 East of J23	L	14,994	15,306	312	2.1%
A38 North of Dunball	A	10,806	10,804	-3	0.0%
A38 South of Dunball	G	22,555	23,404	849	3.8%
A38 between Wylds Road and The Drove	E	14,299	14,807	508	3.6%
A38 between The Drove and Cross Rifles	F	18,017	18,032	14	0.1%
A38 between Cross Rifles and St. John St	J	21,539	21,932	393	1.8%
A38 between St. John St and Taunton Road	O2	19,876	20,278	402	2.0%
A39 Bath Road NE of Cross Rifles	N3	18,846	18,771	-74	-0.4%
St. John Street	SN	11,937	12,076	139	1.2%
The Clink	SF	17,718	17,893	174	1.0%
Wylds Road	AD	10,436	10,699	263	2.5%
The Drove	ZE	7,265	7,769	504	6.9%
Western Way (West of Chilton Street)	AA	12,302	13,129	827	6.7%
B3339 Wembdon Hill	T1	1,546	1,400	-146	-9.5%
M5 J24 Northbound on-slip	ST2	4,254	4,732	478	11.2%
M5 Junction 24 southbound off-slip	ST3	4,964	5,506	543	10.9%
M5 Junction 24 northbound off-slip	ST4	4,846	5,442	596	12.3%
M5 Junction 24 southbound on-slip	ST5	5,223	5,844	621	11.9%
A38 spur east of Huntworth	ST1	19,089	21,335	2,246	11.8%
A38 Taunton Road south of Showground	I2	22,482	23,676	1,194	5.3%
A38 Taunton Road (south of Broadway)	I1	25,593	26,994	1,401	5.5%
A39 Broadway	K5	21,246	22,128	882	4.2%
A39 west of Quantock Roundabout	S	13,150	15,238	2,089	15.9%
A39 South-east of Cannington	R	14,690	16,602	1,912	13.0%

Link	Link Ref.	2013 Ref Case	2013 With Dev	Increase (Numerical)	Increase (%)
A39 South of Cannington	P	6,505	7,990	1,485	22.8%
A39 West of Cannington	Q	7,845	8,225	380	4.8%
High Street, Cannington	U	2,186	3,577	1,391	63.6%
Main Road, Cannington	ZD	8,619	9,068	449	5.2%
Rodway South of bypass	AC	6,801	8,568	1,767	26.0%
Rodway North of bypass	11	6,801	8,568	1,767	26.0%
Cannington bypass	Z1				
B3190	10	1412	1,536	124	8.8%
Williton	2	6150	6189	39	0.6%

Table 15.11: 2013 Reference Case vs. 2013 With Development and Mitigation Two-way AM Network Peak All Vehicles Traffic Flows

Link	Link Ref.	2013 Ref Case	2013 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	851	856	5	0.6%
M5 Junction 23 southbound off-slip	V2	780	796	15	2.0%
M5 Junction 23 northbound off-slip	V3	397	395	-2	-0.4%
M5 Junction 23 southbound on-slip	V4	552	583	31	5.6%
A39 Spur east of Dunball	B	1,923	2,007	84	4.4%
A39 East of J23	L	1,316	1,370	53	4.1%
A38 North of Dunball	A	907	911	4	0.4%
A38 South of Dunball	G	2,054	2,124	70	3.4%
A38 between Wylds Road and The Drove	E	1,243	1,277	34	2.7%
A38 between The Drove and Cross Rifles	F	1,457	1,472	15	1.0%
A38 between Cross Rifles and St. John St	J	1,582	1,612	30	1.9%
A38 between St. John St and Taunton Road	O2	1,666	1,734	68	4.1%
A39 Bath Road NE of Cross Rifles	N3	1,643	1,613	-30	-1.8%
St. John Street	SN	959	987	27	2.9%
The Clink	SF	1,195	1,222	26	2.2%
Wylds Road	AD	924	951	27	2.9%
The Drove	ZE	513	543	30	5.8%
Western Way (West of Chilton Street)	AA	1,105	1,196	91	8.3%
B3339 Wembdon Hill	T1	69	53	-15	-22.2%
M5 J24 Northbound on-slip	ST2	367	375	8	2.1%

Link	Link Ref.	2013 Ref Case	2013 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 24 southbound off-slip	ST3	391	477	86	21.9%
M5 Junction 24 northbound off-slip	ST4	445	538	93	20.8%
M5 Junction 24 southbound on-slip	ST5	617	580	-37	-6.0%
A38 spur east of Huntworth	ST1	1,834	1,973	140	7.6%
A38 Taunton Road south of Showground	I2	1,986	2,057	71	3.6%
A38 Taunton Road (south of Broadway)	I1	2,059	2,147	88	4.3%
A39 Broadway	K5	1,790	1,847	57	3.2%
A39 west of Quantock Roundabout	S	1,282	1,466	184	14.3%
A39 South-east of Cannington	R	1,357	1,529	172	12.6%
A39 South of Cannington	P	584	624	40	6.9%
A39 West of Cannington	Q	706	738	32	4.5%
High Street, Cannington	U	210	276	66	31.3%
Main Road, Cannington	ZD	827	968	141	17.1%
Rodway South of bypass	AC	537	689	152	28.3%
Rodway North of bypass	11	537	689	152	28.3%
Cannington bypass	Z1				
B3190	10	97	147	50	51.3%
Williton	2	485	485	0	0.0%

Table 15.12: 2013 Reference Case vs. 2013 With Development and Mitigation Two-way PM Network Peak All Vehicles Traffic Flows

Link	Link Ref.	2013 Ref Case	2013 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	734	764	30	4.1%
M5 Junction 23 southbound off-slip	V2	913	879	-34	-3.7%
M5 Junction 23 northbound off-slip	V3	448	510	61	13.6%
M5 Junction 23 southbound on-slip	V4	630	627	-2	-0.4%
A39 Spur east of Dunball	B	2,084	2,160	76	3.7%
A39 East of J23	L	1,402	1,425	23	1.7%
A38 North of Dunball	A	911	917	6	0.7%
A38 South of Dunball	G	2,063	2,141	78	3.8%
A38 between Wylds Road and The Drove	E	1,187	1,215	28	2.3%
A38 between The Drove and Cross Rifles	F	1,289	1,288	-1	0.0%
A38 between Cross Rifles and St. John St	J	1,748	1,828	79	4.5%
A38 between St. John St and Taunton Road	O2	1,599	1,648	49	3.1%
A39 Bath Road NE of Cross Rifles	N3	1,770	1,782	12	0.7%

Link	Link Ref.	2013 Ref Case	2013 With Dev	Increase (Numerical)	Increase (%)
St. John Street	SN	1,022	991	-31	-3.0%
The Clink	SF	1,590	1,637	47	2.9%
Wylds Road	AD	887	909	22	2.5%
The Drove	ZE	708	737	30	4.2%
Western Way (West of Chilton Street)	AA	1,301	1,341	40	3.1%
B3339 Wembdon Hill	T1	86	68	-18	-20.8%
M5 J24 Northbound on-slip	ST2	357	459	102	28.5%
M5 Junction 24 southbound off-slip	ST3	453	468	14	3.1%
M5 Junction 24 northbound off-slip	ST4	508	490	-19	-3.7%
M5 Junction 24 southbound on-slip	ST5	549	652	103	18.8%
A38 spur east of Huntworth	ST1	1,900	2,100	200	10.5%
A38 Taunton Road south of Showground	I2	2,036	2,079	43	2.1%
A38 Taunton Road (south of Broadway)	I1	2,078	2,135	57	2.8%
A39 Broadway	K5	2,012	2,098	86	4.3%
A39 west of Quantock Roundabout	S	1,409	1,537	128	9.1%
A39 South-east of Cannington	R	1,489	1,599	110	7.4%
A39 South of Cannington	P	582	701	118	20.3%
A39 West of Cannington	Q	691	718	26	3.8%
High Street, Cannington	U	211	315	104	49.4%
Main Road, Cannington	ZD	953	949	-4	-0.4%
Rodway South of bypass	AC	776	870	94	12.1%
Rodway North of bypass	11	776	870	94	12.1%
Cannington bypass	Z1				
B3190	10	120	170	50	41.8%
Williton	2	474	474	0	0.0%

15.12.7 As can be seen the great majority of flow increases are predicted to be less than those predicted for 2016. For example, using 24 hour flows, on Western Way the increase in daily flows is 827 vehicles (6.7%) compared with 1,845 vehicles (14.6%) in 2016.

15.12.8 In Cannington, the proposed bypass would not be in place and therefore there would be increases in flows on roads through the village. On High Street the daily all-vehicles flow would increase by 1391 vehicles or 64% of the existing flow. This matter is considered in the Environmental Statement.

a) Total Network Delay

15.12.9 The average speeds in 2013 are shown in the **Table 15.13** below.

Table 15.13: 2013 Reference Case vs. 2013 With Development and Mitigation Daily Average Traffic Speeds (mph)

Time	Reference Case	With Development	With Mitigation
0600-0700	38.5	38.3	37.9
0700-0800	37.0	35.8	35.7
0800-0900	28.3	24.8	26.0
0900-1000	32.4	30.4	30.6
AM Period	**34.1**	**32.3**	**32.5**
1300-1400	35.7	34.8	34.5
1400-1500	30.8	30.0	30.6
1500-1600	29.5	28.9	29.8
1600-1700	27.9	25.9	27.6
1700-1800	23.8	20.2	22.7
1800-1900	26.6	18.7	25.6
1900-2000	27.8	14.6	26.4
PM Period	**28.9**	**24.7**	**28.2**
OVERALL	**31.5**	**28.5**	**30.3**

15.12.10 As can be seen there is a small reduction in speeds in both the AM and PM peak periods. In the AM peak period the average speed reduces by 5% whilst in the afternoon and PM period it decreases by 2.4%. This leads to an overall reduction in speed during the modelled period of 4%.

15.12.11 However, a comparison with the 2016 Reference Case indicates that average networks speeds in the AM peak period in the 2013 With Development and Mitigation will be 1.1mph faster than the 2016 Reference Case. The same pattern occurs in the PM peak period, with speeds 1.1mph faster and across the whole modelled period with speeds 1.3 mph faster than the Reference Case.

b) Junction Performance

15.12.12 Turning to junction performance, the table below sets out a summary of the changes in queues between the With Development plus Mitigation Case and Reference Case. More detailed assessment is included at **Appendix 15.7**.

Table 15.14: 2013 Queue Analysis Summary

Junction Ref	Name	AM Score	PM Score	Total Score
15	Broadway/ Taunton Road	Improvement	Improvement	Improvement
24	Huntworth Roundabout			
6	Wembdon Rise/Western Way	Neutral	Neutral	Neutral
16	East Quay/The Clink			
dw12	A38 Roundabout			
25	M5 Junction 24			
21	Bristol Road/Wylds Road			

Junction Ref	Name	AM Score	PM Score	Total Score
19	Crossrifles Roundabout			
67	Western Way/Chilton Street			
23	M5 Junction 23	Worse	Worse	Worse
11	North Street/Victoria Road			
8	Wembdon Road/Northfield			
3	Main Rd Cannington/A39 Roundabout			
12	West Street/Broadway			
18	St John Street/Broadway			
17	Western Way/The Drove			
5	Quantock Rd/Western Way			
20	Bristol Road/The Drove			

15.12.13 The table demonstrates that two junctions have enhanced performance with the With Development plus Mitigation Case when compared with the Reference Case. These are the two junctions within Bridgwater where capacity enhancements are assumed to be in place by Quarter 3 2013. There are seven junctions that are broadly neutral and nine junctions where there are increases in queues.

15.12.14 The paragraphs below examine the junctions where there are increases in queues.

i. M5 Junction 23

15.12.15 An aerial image of M5 Junction 23 is shown at **Figure 15.16.**

Figure 15.16: M5 Junction 23 Aerial View

15.12.16 The main increase in queuing at this junction is on the southbound off slip where there is an increase of around 15 vehicles in the PM peak period. There is a more minor increase in queuing on the northbound off slip at around 16.40

ii. North Street/Victoria Road

15.12.17 An aerial image of North Street/Victoria Road is shown at **Figure 15.17.**

Figure 15.17: North Street/Victoria Road Aerial View

15.12.18 At this junction the North Street and Wembdon Road arms i.e. the A39, both operate satisfactorily with no statistically significant increase in queues. The only increase is in the AM peak on the Victoria Road arm. However, the queue of 14 vehicles is slightly less than the Reference Case queue in 2016. Therefore HPC is in effect bringing forward 3 years an effect that would occur in any case with non-HPC traffic growth. The extent of queuing is contained within the residential area and does not affect the wider highway network.

iii. West Street/Broadway

15.12.19 An aerial image of West Street/ Broadway is shown at **Figure 15.18.**

Figure 15.18: West Street/ Broadway Aerial View

15.12.20 On North Street (A39) there is predicted to be no statistically significant change in queuing as a result of HPC. On Broadway in the AM peak the queuing increases by approximately 2 vehicles for a 45 minute period which is not considered material. On Penel Orlieu there is no change in queuing.

iv. Western Way/The Drove

15.12.21 An aerial image of Western Way/The Drove is shown at **Figure 15.19.**

Figure 15.19: Western Way/ The Drove

15.12.22 At this junction there are only minor changes to queues on a few occasions. For the vast majority of time there is no statistically significant change in queues.

v. Bristol Road/The Drove

15.12.23 An aerial image of Bristol Road/The Drove is shown at **Figure 15.20.**

Figure 15.20: Bristol Road/The Drove Aerial View

15.12.24 At this junction there is only one short period on the A38 North arm in the AM peak where the queue increases by six vehicles within one 10 minute interval at 08:30. The maximum queue at this point is 22 vehicles. However in the 2016 Reference Case scenario, the queue at 08:30 is 25 vehicles.

vi. Other Junctions

15.12.25 Main Road Cannington, Quantock Road/Western Way, Wembdon Road/Northfield and St John Street/Broadway all perform better or in a similar fashion to 2016.

15.12.26 The only material change is on West Street. On this arm there is an estimated increase of approximately 7 vehicles in the AM peak. The queue between 08:00 and 09:00 is around 25 vehicles with a short peak of 29 vehicles. However, by 2016 the

Reference Case queue is 25 vehicles so again HPC is effectively bringing forward the change by three years. The projected queues on this arm do not interact with other significant junctions.

15.12.27 In terms of unreleased vehicles, in the AM peak there is one location where the volume increases as a result of HPC and this is on Taunton Road between Broadway and the Showground Roundabout in the AM peak. There is also one location where the volume decreases: at the Morrisons supermarket.

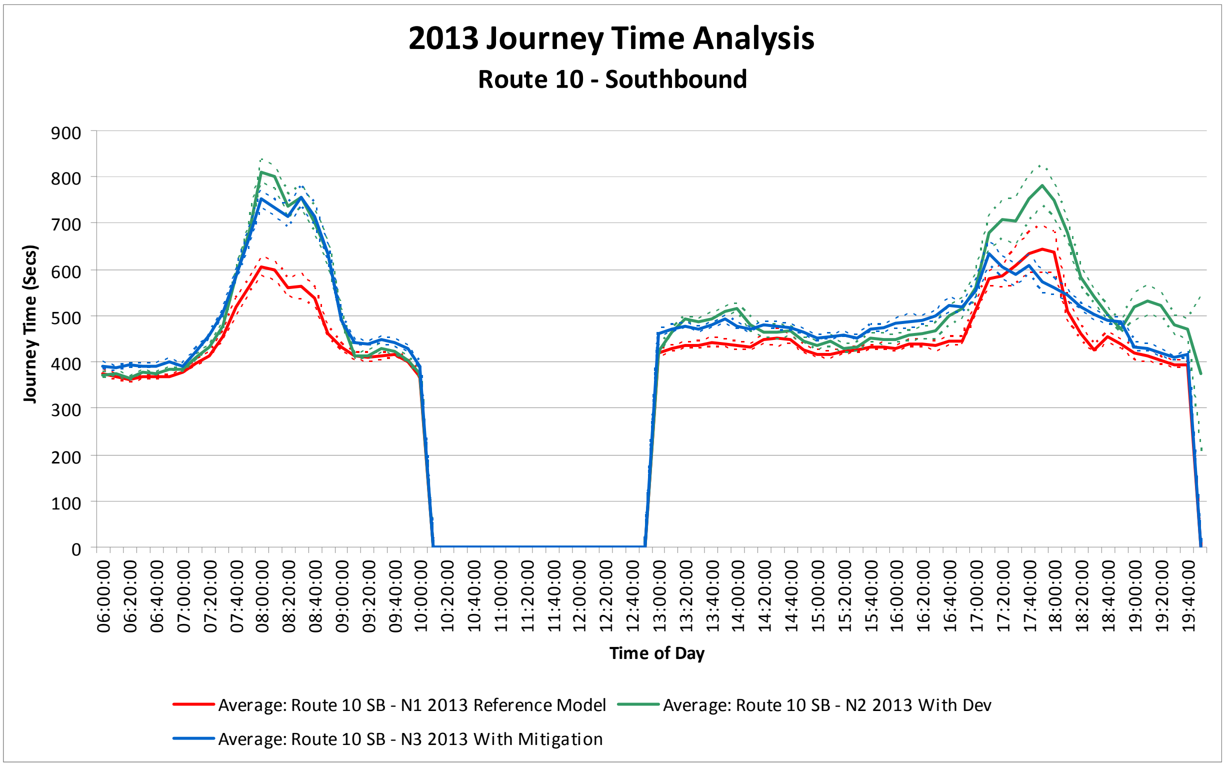
15.12.28 The conclusion from the queue analysis is that in a number of cases the effect of HPC in 2013 is likely to be similar to 2016. At the additional junctions considered there are unlikely to be any significant effects of the additional queuing since they do not affect other key junctions, it is considered that there is an acceptable impact.

15.12.29 The exception to this is Junction 23 where there would be concern if queuing on the slip roads were to affect the main line flows.

vii. Journey Times

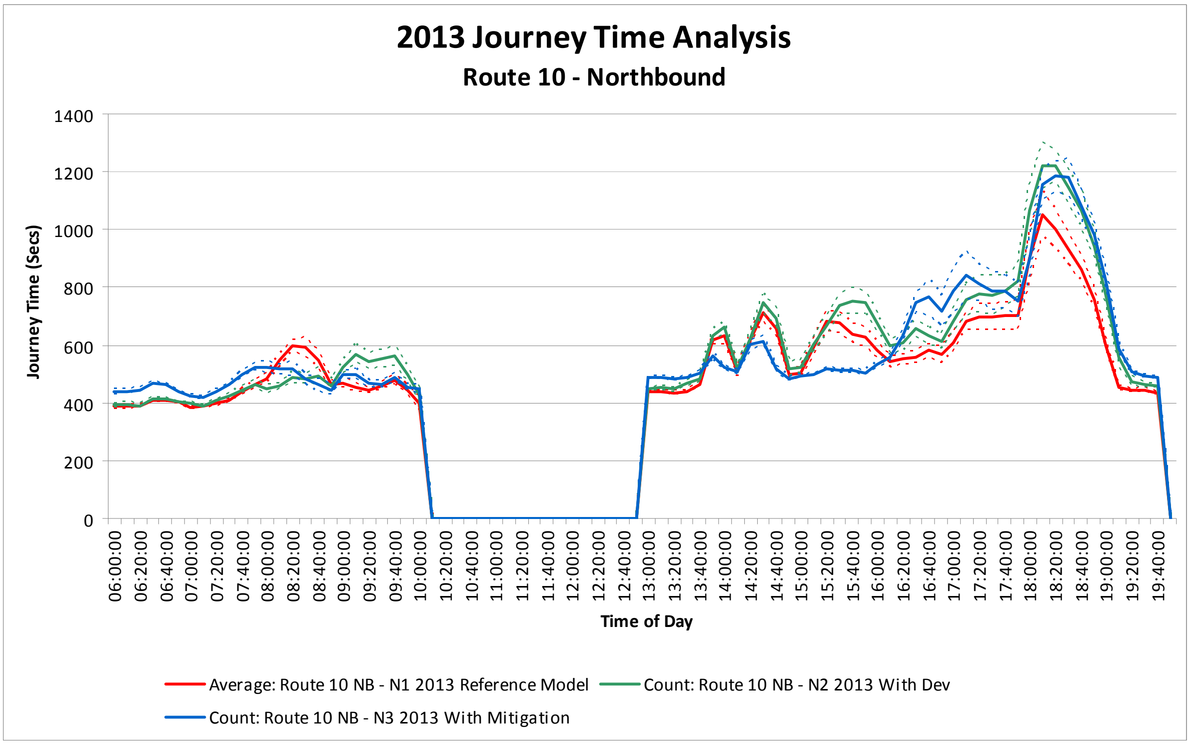
15.12.30 The results for the journey time analysis for Routes 10, 6 and 1 are shown in the graphs in **Figure 15.21** to **Figure 15.27** below. The full results are shown at **Appendix 15.4.**

Figure 15.21: 2013 Reference Case vs. 2013 With Development and Mitigation Journey Time Route 10 Southbound



15.12.31 As can be seen, southbound in the AM peak there is an increase in journey time whilst in the PM peak the mitigation proposals achieve broadly the same result as the Reference Case.

Figure 15.22: 2013 Reference Case vs. 2013 With Development and Mitigation Journey Time Route 10 Northbound



15.12.32 In the northbound direction, in the AM peak the HPC plus mitigation scenario leads to some improvements in journey times compared with the Reference Case. In the PM peak the journey times are broadly neutral during the peak hour but increase after 18:00. For Route; 6 and 1, the results of the journey time surveys are given below.

Figure 15.23: 2013 Journey Time Analysis: Route 6 - Southbound

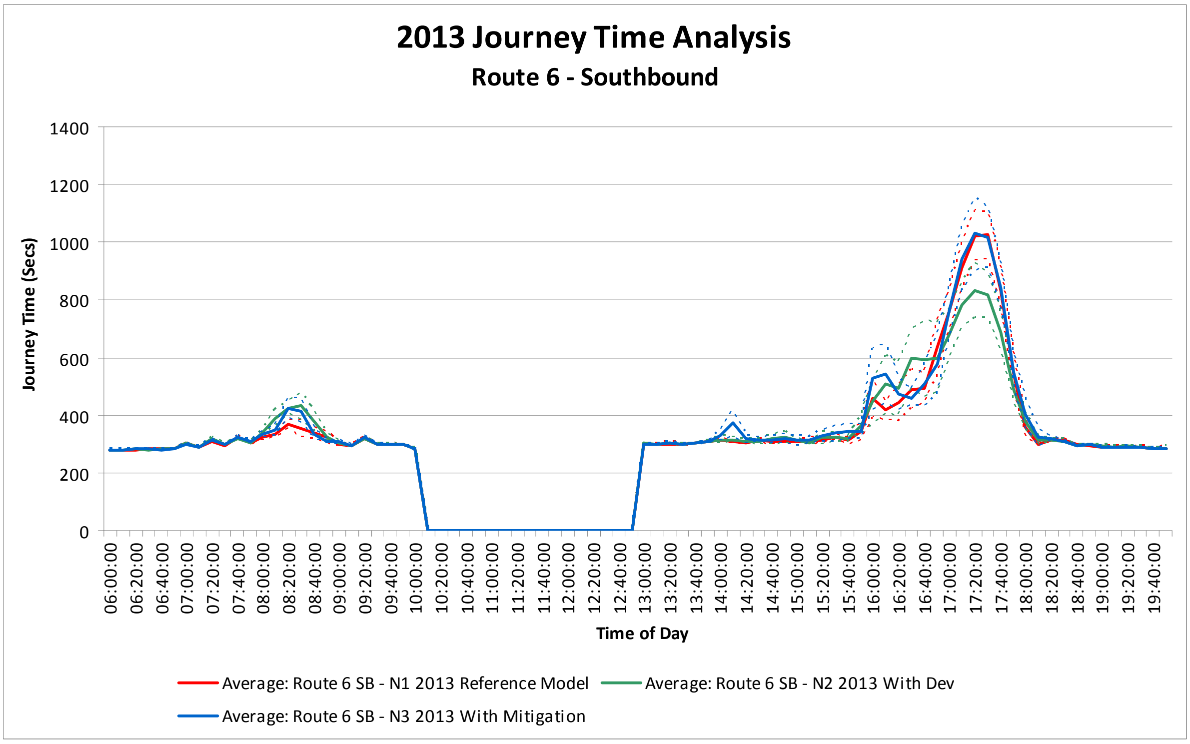


Figure 15.24: 2013 Journey Time Analysis: Route 6 – Northbound

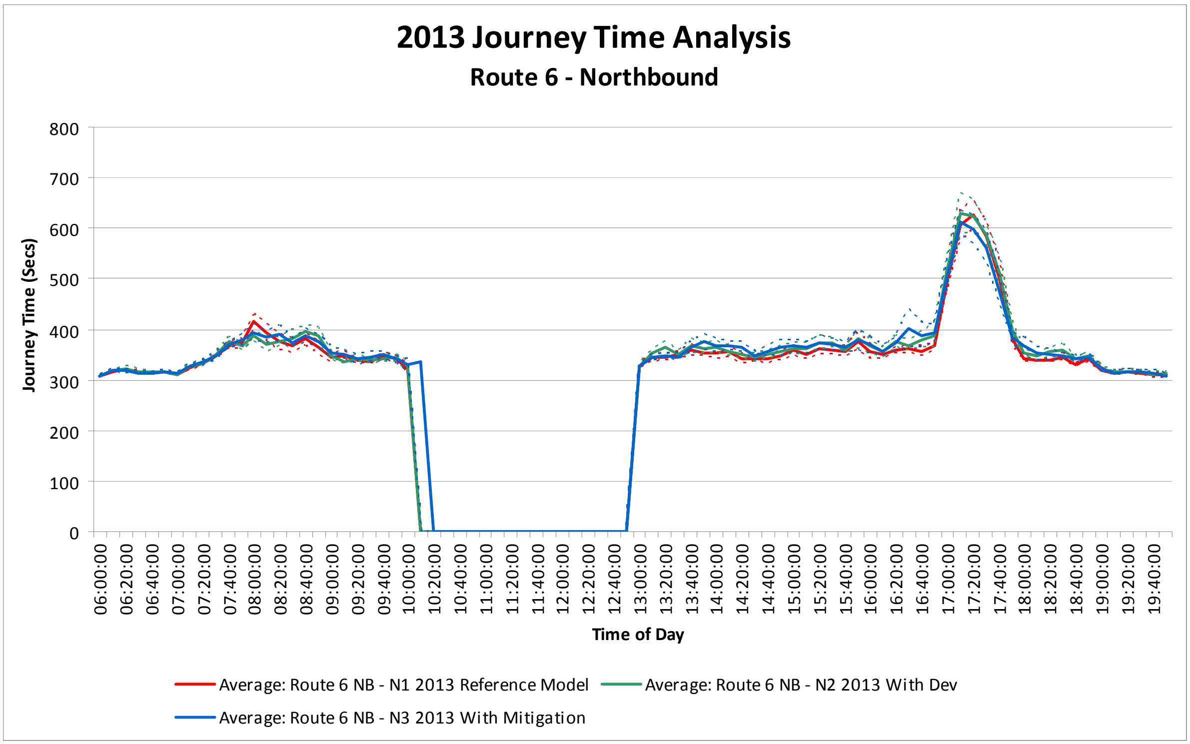


Figure 15.25: 2013 Journey Time Analysis: Route 1 - Eastbound

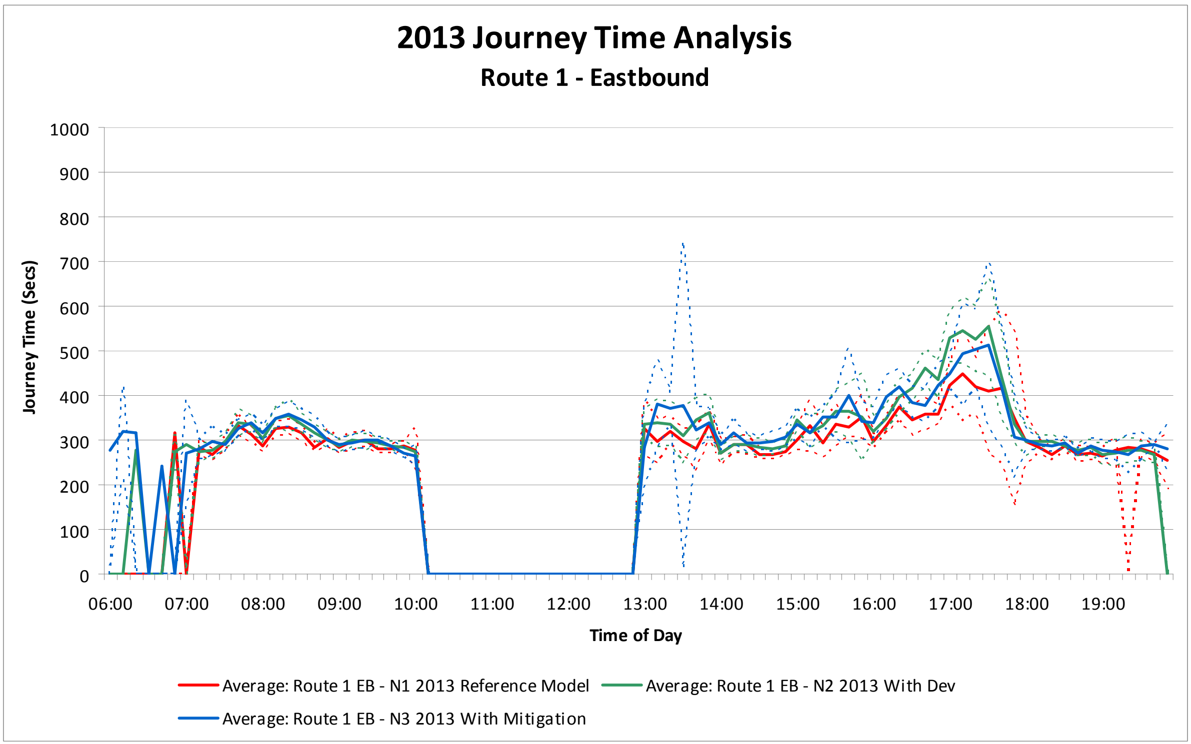
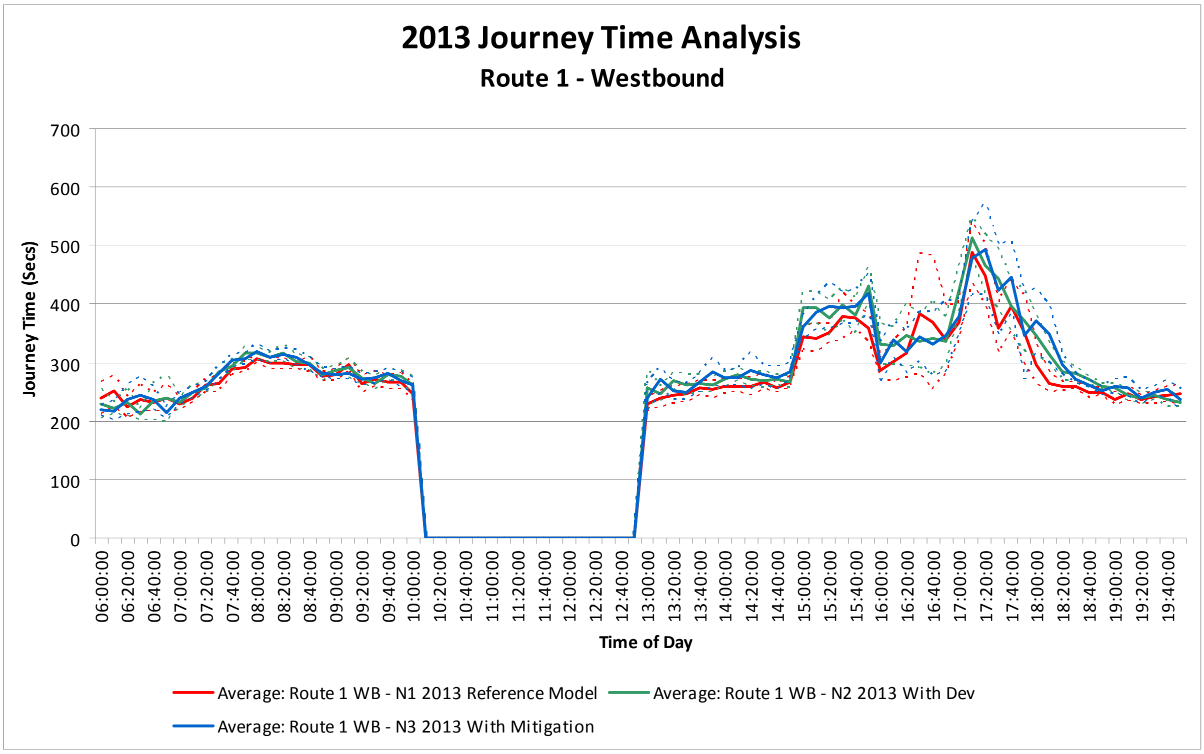


Figure 15.26: 2013 Journey Time Analysis: Route 1 - Westbound



15.12.33 On Routes 1 and 6 in both directions there are no statistically significant differences in journey times between the With Development plus Mitigation Case and the Reference Case. In all cases the confidence limits of the two scenarios overlap.

viii. Summary for 2013

15.12.34 Based on the above analysis, the limited highway improvements assumed in the modelling in Quarter 3 2013 would not result in nil detriment by comparison with the Reference Case. However, the residual impacts would not have any significant knock-on effects on the strategic or local "A" road network and are considered modest and acceptable. The one possible exception to this is M5 Junction 23 where there is a desire to ensure any queuing traffic on the slip roads does not affect the motorway main line. Therefore, EDF Energy would seek to bring forward its proposed improvements to this junction as early as possible within the development programme.

15.13 2021

15.13.1 In 2021 there would be a full compliment of operational staff at the HPC development site (900 personnel). In addition there would still be construction activity on site and some of the associated development sites would be undergoing de-construction. However, construction activity would be modest compared with 2016. The Junction 24 development would remain operational as would Cannington park and ride. The results of the modelling are shown in the tables below.

Table 15.15: 2021 Reference Case vs. 2021 With Development and Mitigation Daily (24 Hour AADT) Two-way All Vehicles Traffic Flows

Link	Link Ref.	2021 Ref Case	2021 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	8,483	8,874	391	4.6%
M5 Junction 23 southbound off-slip	V2	8,118	8,481	363	4.5%
M5 Junction 23 northbound off-slip	V3	5,250	4,729	-521	-9.9%
M5 Junction 23 southbound on-slip	V4	5,362	4,759	-603	-11.2%
A39 Spur east of Dunball	B	21,993	21,878	-115	-0.5%
A39 East of J23	L	16,061	14,224	-1,837	-11.4%
A38 North of Dunball	A	10,765	10,782	17	0.2%
A38 South of Dunball	G	24,864	25,309	445	1.8%
A38 between Wylds Road and The Drove	E	16,008	15,494	-514	-3.2%
A38 between The Drove and Cross Rifles	F	18,783	18,636	-148	-0.8%
A38 between Cross Rifles and St. John St	J	23,146	25,263	2,117	9.1%
A38 between St. John St and Taunton Road	O2	21,226	23,036	1,810	8.5%
A39 Bath Road NE of Cross Rifles	N3	18,265	19,967	1,702	9.3%
St. John Street	SN	12,439	12,055	-384	-3.1%
The Clink	SF	17,222	16,921	-301	-1.7%
Wylds Road	AD	11,533	12,485	953	8.3%
The Drove	ZE	7,889	7,534	-355	-4.5%
Western Way (West of Chilton Street)	AA	12,776	13,494	717	5.6%
B3339 Wembdon Hill	T1	1,518	1,362	-157	-10.3%
M5 J24 Northbound on-slip	ST2	4,899	4,673	-227	-4.6%
M5 Junction 24 southbound off-slip	ST3	5,877	5,550	-328	-5.6%
M5 Junction 24 northbound off-slip	ST4	5,026	5,512	487	9.7%
M5 Junction 24 southbound on-slip	ST5	5,453	5,981	528	9.7%
A38 spur east of Huntworth	ST1	21,045	21,498	453	2.2%
A38 Taunton Road south of Showground	I2	24,123	25,028	905	3.8%
A38 Taunton Road (south of Broadway)	I1	27,338	28,598	1,260	4.6%
A39 Broadway	K5	22,805	22,767	-37	-0.2%
A39 west of Quantock Roundabout	S	13,414	15,021	1,607	12.0%
A39 South-east of Cannington	R	14,928	16,377	1,450	9.7%
A39 South of Cannington	P	6,840	11,805	4,965	72.6%
A39 West of Cannington	Q	8,140	8,572	432	5.3%
High Street, Cannington	U	2,182	1,795	-387	-17.7%

Link	Link Ref.	2021 Ref Case	2021 With Dev	Increase (Numerical)	Increase (%)
Main Road, Cannington	ZD	8,521	5,032	-3,489	-40.9%
Rodway South of bypass	AC	6,832	2,880	-3,952	-57.8%
Rodway North of bypass	11	6,832	7,873	1,041	15.2%
Cannington bypass	Z1		5,765	5,765	
B3190	10	1412	1,413	1	0.1%
Williton	2	6150	6161	11	0.2%

Table 15.16: 2021 Reference Case vs. 2021 With Development and Mitigation Two-way AM Network Peak All Vehicles Traffic Flows

Link	Link Ref.	2021 Ref Case	2021 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	845	857	12	1.4%
M5 Junction 23 southbound off-slip	V2	837	844	7	0.9%
M5 Junction 23 northbound off-slip	V3	476	443	-33	-6.9%
M5 Junction 23 southbound on-slip	V4	673	679	6	0.9%
A39 Spur east of Dunball	B	2,099	2,058	-41	-2.0%
A39 East of J23	L	1,451	1,292	-159	-11.0%
A38 North of Dunball	A	930	931	1	0.1%
A38 South of Dunball	G	2,213	2,205	-8	-0.4%
A38 between Wylds Road and The Drove	E	1,414	1,566	152	10.7%
A38 between The Drove and Cross Rifles	F	1,490	1,639	149	10.0%
A38 between Cross Rifles and St. John St	J	1,665	2,006	341	20.5%
A38 between St. John St and Taunton Road	O2	1,712	1,968	256	15.0%
A39 Bath Road NE of Cross Rifles	N3	1,740	2,002	262	15.0%
St. John Street	SN	1,039	1,000	-39	-3.8%
The Clink	SF	1,253	1,275	22	1.8%
Wylds Road	AD	957	900	-58	-6.0%
The Drove	ZE	644	698	54	8.3%
Western Way (West of Chilton Street)	AA	1,235	1,302	67	5.4%
B3339 Wembdon Hill	T1	68	57	-11	-15.7%

Link	Link Ref.	2021 Ref Case	2021 With Dev	Increase (Numerical)	Increase (%)
M5 J24 Northbound on-slip	ST2	418	402	-16	-3.7%
M5 Junction 24 southbound off-slip	ST3	462	518	55	12.0%
M5 Junction 24 northbound off-slip	ST4	490	556	66	13.4%
M5 Junction 24 southbound on-slip	ST5	531	558	27	5.1%
A38 spur east of Huntworth	ST1	1,914	2,029	115	6.0%
A38 Taunton Road south of Showground	I2	1,966	2,107	141	7.2%
A38 Taunton Road (south of Broadway)	I1	2,026	2,197	171	8.4%
A39 Broadway	K5	1,882	2,008	125	6.7%
A39 west of Quantock Roundabout	S	1,323	1,504	181	13.7%
A39 South-east of Cannington	R	1,399	1,577	178	12.7%
A39 South of Cannington	P	626	1,054	428	68.4%
A39 West of Cannington	Q	745	802	57	7.7%
High Street, Cannington	U	209	200	-9	-4.5%
Main Road, Cannington	ZD	827	578	-249	-30.1%
Rodway South of bypass	AC	545	269	-276	-50.6%
Rodway North of bypass	11	545	770	226	41.4%
Cannington bypass	Z1		492		
B3190	10	97	97	0	-0.4%
Williton	2	485	485	0	0.0%

Table 15.17: 2021 Reference Case vs. 2021 With Development and Mitigation Two-way PM Network Peak All Vehicles Traffic Flows

Link	Link Ref.	2021 Ref Case	2021 With Dev	Increase (Numerical)	Increase (%)
M5 Junction 23 northbound on-slip	V1	728	771	42	5.8%
M5 Junction 23 southbound off-slip	V2	809	883	74	9.1%
M5 Junction 23 northbound off-slip	V3	546	528	-18	-3.2%
M5 Junction 23 southbound on-slip	V4	671	619	-52	-7.7%
A39 Spur east of Dunball	B	2,026	2,100	74	3.7%
A39 East of J23	L	1,398	1,315	-83	-6.0%
A38 North of Dunball	A	837	840	3	0.4%
A38 South of Dunball	G	2,057	2,157	101	4.9%
A38 between Wylds Road and The Drove	E	1,270	1,378	109	8.5%

Link	Link Ref.	2021 Ref Case	2021 With Dev	Increase (Numerical)	Increase (%)
A38 between The Drove and Cross Rifles	F	1,353	1,376	23	1.7%
A38 between Cross Rifles and St. John St	J	1,847	2,023	175	9.5%
A38 between St. John St and Taunton Road	O2	1,725	1,818	92	5.4%
A39 Bath Road NE of Cross Rifles	N3	1,686	1,833	146	8.7%
St. John Street	SN	1,106	908	-198	-17.9%
The Clink	SF	1,486	1,532	46	3.1%
Wylds Road	AD	977	1,063	86	8.8%
The Drove	ZE	674	720	46	6.8%
Western Way (West of Chilton Street)	AA	1,212	1,333	121	10.0%
B3339 Wembdon Hill	T1	76	64	-12	-15.8%
M5 J24 Northbound on-slip	ST2	400	418	18	4.5%
M5 Junction 24 southbound off-slip	ST3	591	464	-127	-21.5%
M5 Junction 24 northbound off-slip	ST4	456	469	14	3.0%
M5 Junction 24 southbound on-slip	ST5	525	638	113	21.6%
A38 spur east of Huntworth	ST1	2,008	2,034	26	1.3%
A38 Taunton Road south of Showground	I2	2,076	2,078	2	0.1%
A38 Taunton Road (south of Broadway)	I1	2,143	2,181	38	1.8%
A39 Broadway	K5	1,995	2,011	16	0.8%
A39 west of Quantock Roundabout	S	1,337	1,564	227	17.0%
A39 South-east of Cannington	R	1,405	1,627	222	15.8%
A39 South of Cannington	P	556	1,221	665	119.5%
A39 West of Cannington	Q	654	772	118	18.1%
High Street, Cannington	U	197	184	-13	-6.4%
Main Road, Cannington	ZD	895	449	-447	-49.9%
Rodway South of Bypass	AC	735	281	-453	-61.7%
Rodway North of Bypass	11	735	1026	292	39.7%
Cannington bypass	Z1		746		
B3190	10	120	120	0	0.4%
Williton	2	474	474	0	0.0%

15.13.2 As can be seen the flow increases are considerably less than in 2016. For example, on Western Way the increase in daily flows is 717 vehicles (5.6%) compared with 1,845 vehicles (14.6%) in 2016.

a) Total Network Delay

15.13.3 The average speed information for 2021 is shown in the **Table 15.18** below.

Table 15.18: 2021 Average Speed Comparison

Time	Reference Case	With Development	With Mitigation
0600-0700	38.7	38.5	37.4
0700-0800	36.0	35.3	35.0
0800-0900	22.5	21.7	23.5
0900-1000	20.0	20.1	22.7
AM Period	**29.3**	**28.9**	**29.6**
1300-1400	33.0	32.3	33.1
1400-1500	26.4	24.9	27.8
1500-1600	24.3	22.5	27.8
1600-1700	21.8	19.8	27.0
1700-1800	18.7	16.6	23.9
1800-1900	21.2	16.9	28.5
1900-2000	22.4	18.2	27.9
PM Period	**24.0**	**21.6**	**28.0**
OVERALL	**26.6**	**25.2**	**28.8**

15.13.4 As can be seen, in the AM peak hour (08:00 to 09:00) and AM peak 4 hour period the average speeds improve with HPC plus mitigation. In the PM peak hour (17:00 to 18:00) and afternoon/evening period the improvements in speeds are more significant. Between 13:00 and 20:00 the average speed increases by 20%.

b) Junction Performance

15.13.5 In relation to junction performance, the table below sets out a summary of the changes in queues between the With Development plus Mitigation Case and Reference Case. More detailed assessment is included at **Appendix 15.8.**

Table 15.19: 2021 Queue Analysis Summary

Junction Ref	Name	AM Score	PM Score	Total Score
15	Broadway/ Taunton Road	Improvement	Improvement	Improvement
17	Western Way/The Drove			
19	Crossrifles Roundabout			
20	Bristol Road/The Drove			
21	Bristol Road/Wylds Road			
23	M5 Junction 23			
18	St John Street/Broadway			
24	Huntworth Roundabout			
dw12	A38 Roundabout			
25	M5 Junction 24			

Junction Ref	Name	AM Score	PM Score	Total Score
16	East Quay/The Clink			
12	West Street/Broadway			
67	Western Way/Chilton Street	Neutral	Neutral	Neutral
6	Wembdon Rise/Western Way			
11	North Street/Victoria Road			
5	Quantock Rd/Western Way			
3	Main Rd Cannington/A39 Roundabout	Worse	Worse	Worse
8	Wembdon Road/Northfield			

15.13.6 As can be seen there are improvements in queuing at the majority of junctions. There are only two junctions with a worsening in queuing between the Reference Case and the With Development plus Mitigation Case. In both these cases the magnitude of the changes is less than in 2016. The two junctions are considered below.

i. Main Road Cannington/A39 Roundabout

15.13.7 An aerial view of this junction is included at **Figure 15.6.**

15.13.8 No queues increase by more than five vehicles. All queues remain at approximately 10 – 12 vehicles or less.

ii. Wembdon Road/Northfield

15.13.9 An aerial view of this junction is included at **Figure 15.7**.

15.13.10 The only statistically significant change in queuing is on Wembdon Road in the AM peak when the queue increases by approximately seven vehicles for a half-hour period.

15.13.11 In terms of unreleased vehicles, there are no significant changes as a result of HPC in the AM peak period. In the PM peak, the following locations have less unreleased vehicles as a result of HPC and the proposed mitigation:

- Friam Street.
- Morrisons.
- Northern Distributor Road between Wylds Road and Chilton Street.
- East Quay.
- Salmon Parade.

15.13.12 This further confirms that the proposed mitigation would improve the performance of the network by allowing more vehicles to pass through during the network peak periods.

iii. Journey Times

15.13.13 The journey times for Routes 10, 6 and 1 are shown below. Detailed journey time graphs for 2021 are provided at **Appendix 15.5**.

Figure 15.27: Journey Time Analysis: Route 10 – Southbound

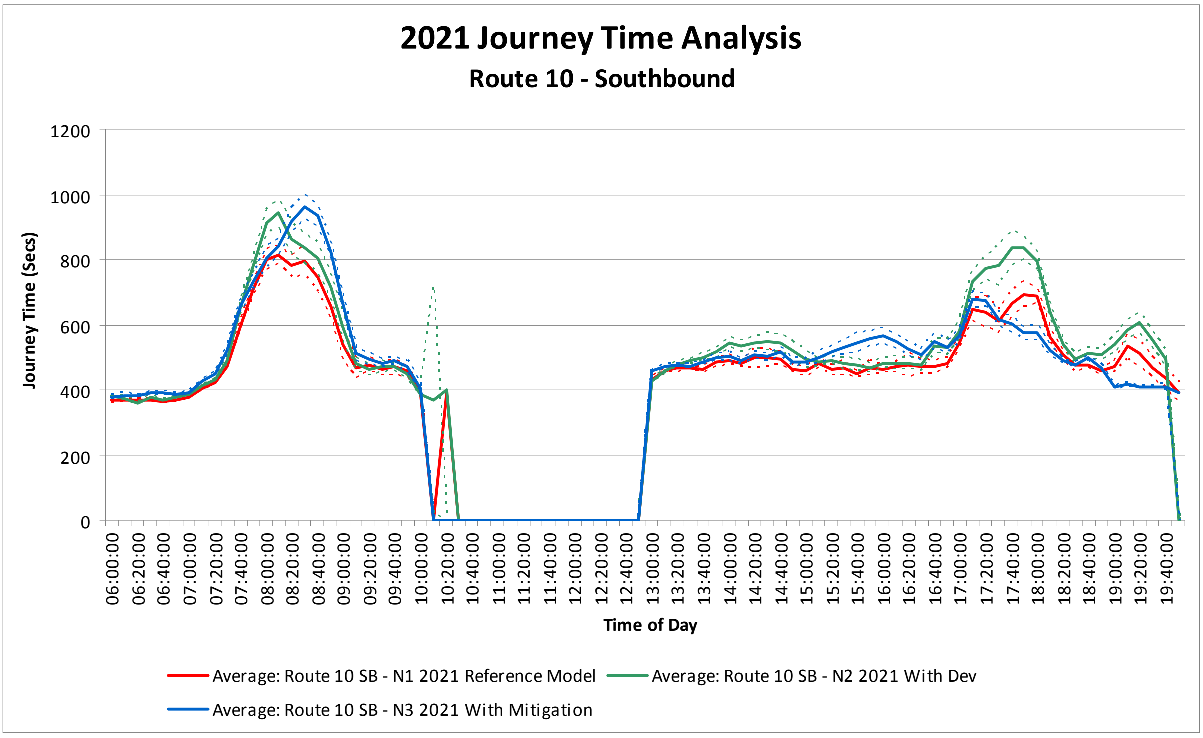
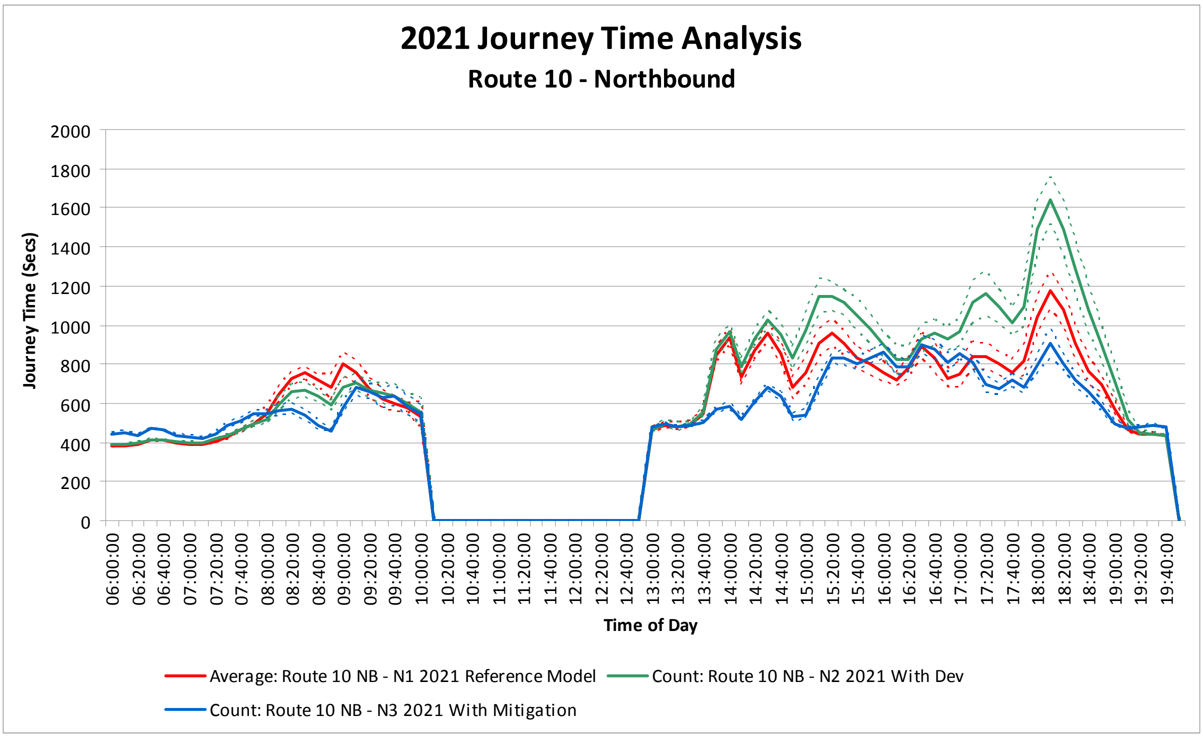


Figure 15.28: 2021 Journey Time Analysis: Route 10 – Northbound



15.13.14 As can be seen, on Route 10 in the southbound direction there are some minor increases in journey time in the AM peak period as a result of HPC plus mitigation whilst there is a small improvement in the PM peak.

15.13.15 In the northbound direction there are improvements in both the AM and PM peaks.

15.13.16 The graphs below show Routes 6 and 1.

Figure 15.29: 2021 Journey Time Analysis: Route 6 – Southbound

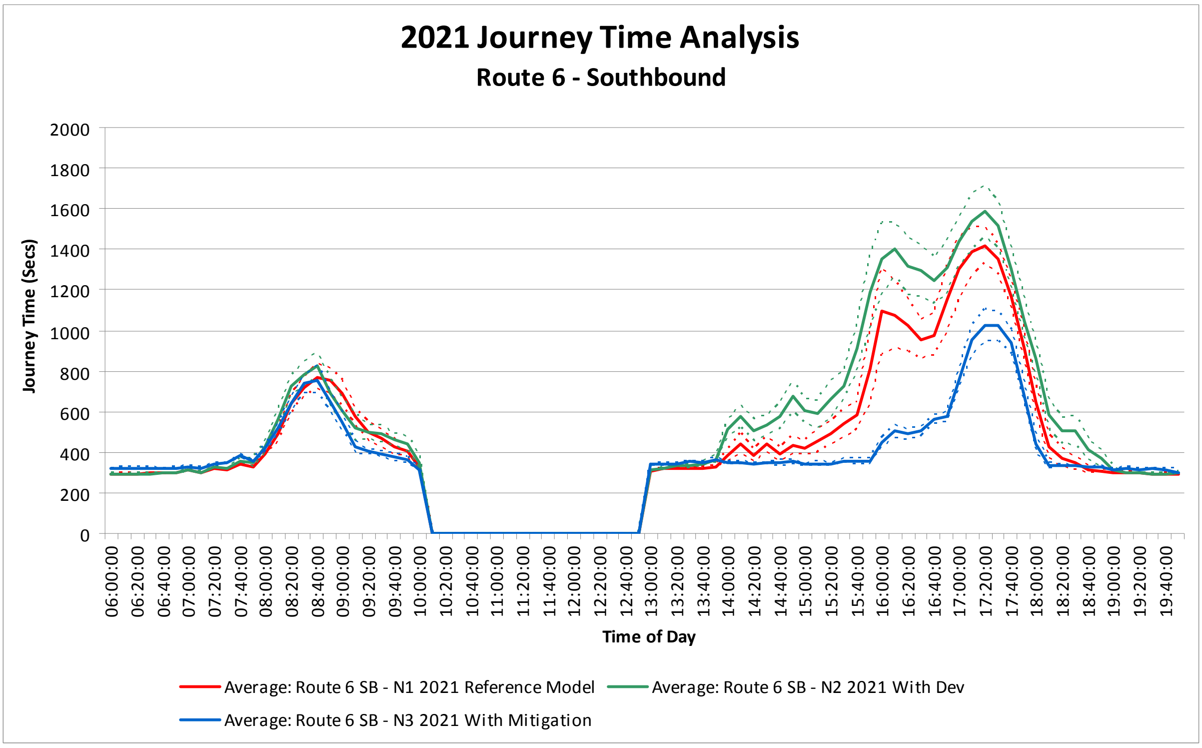


Figure 15.30: 2021 Journey Time Analysis: Route 6 – Northbound

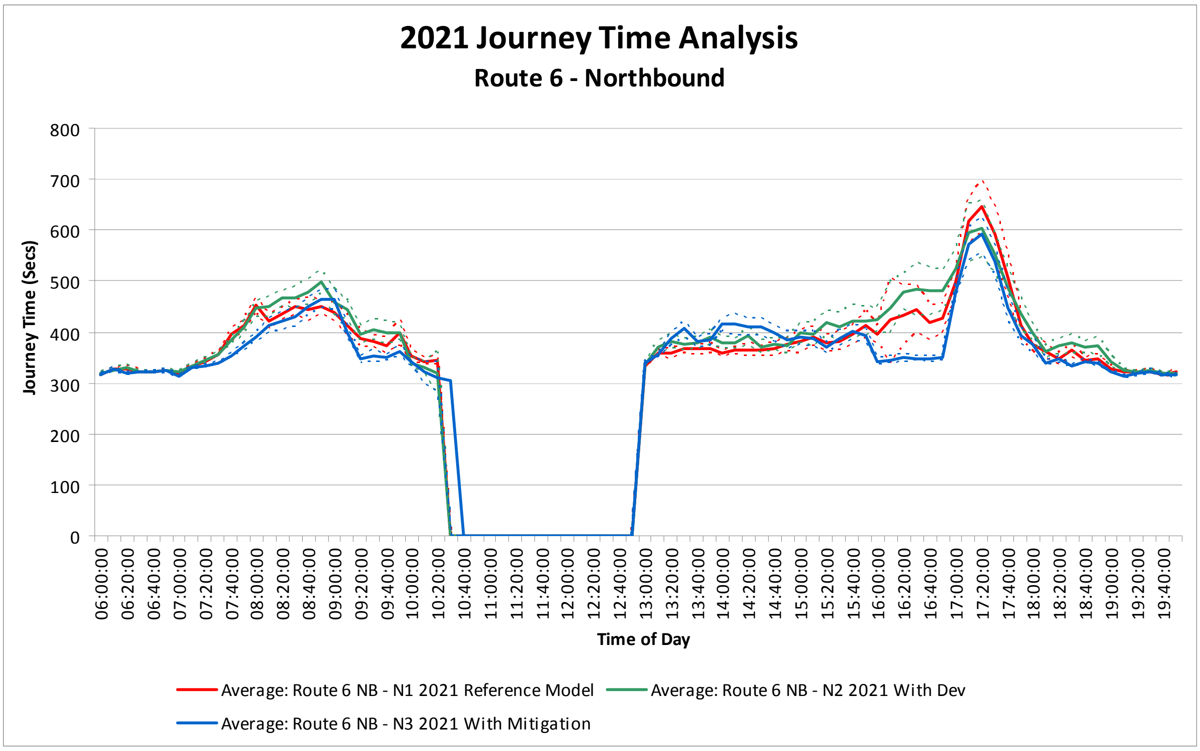


Figure 15.31: 2021 Journey Time Analysis: Route 1 – Eastbound

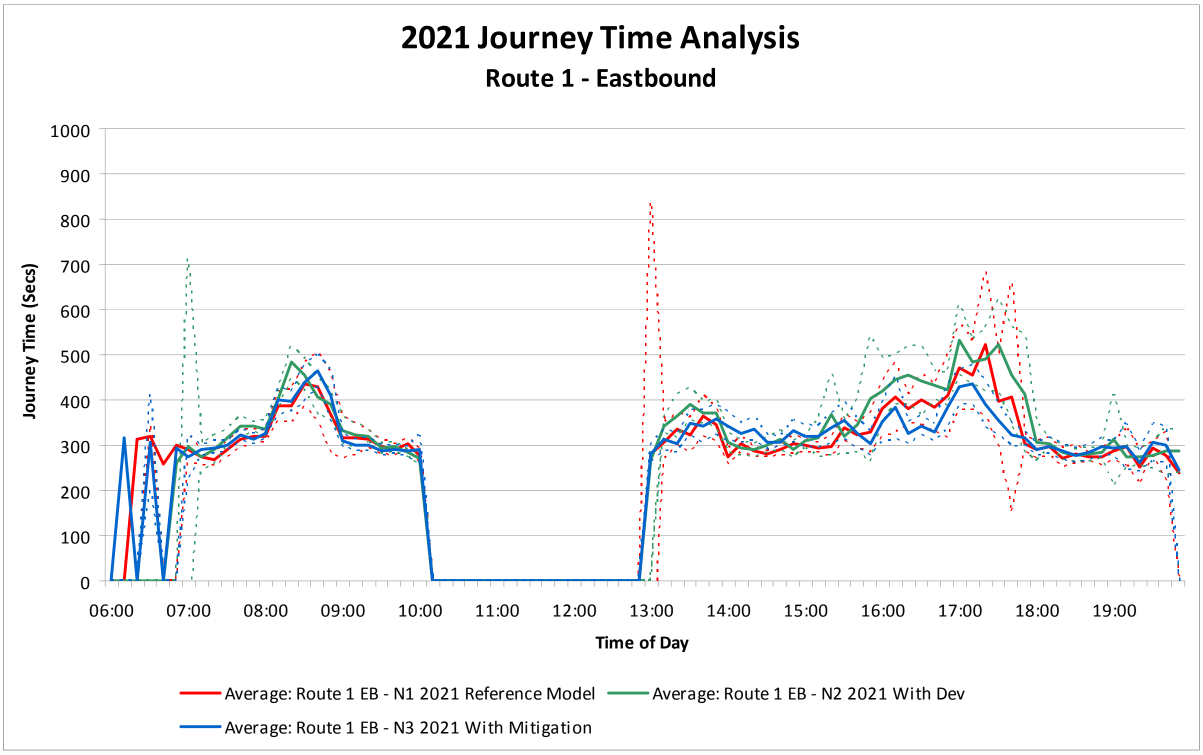
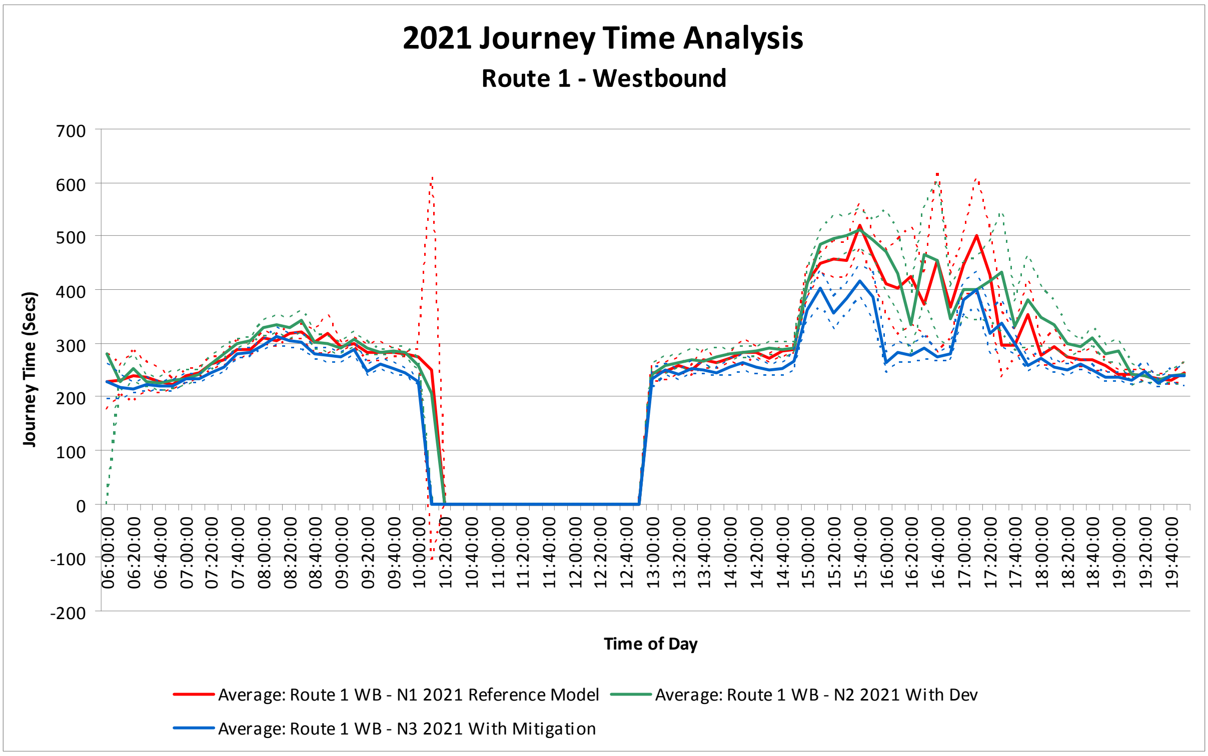


Figure 15.32: 2021 Journey Time Analysis: Route 1 – Westbound



15.13.17 On route Route 6 southbound, there is some improvement in the journey time around 09:00 for the With Development plus Mitigation Case compared with the Reference Case. In the PM peak there is a more significant improvement. In the northbound direction there are small improvements around 08:00 and 16:20 and no material change in the PM peak.

15.13.18 On Route 1 in the eastbound direction the comparison is neutral. In the westbound direction the comparison is neutral in the AM peak and there is a small improvement in journey time for the HPC plus mitigation scenario around 16:30.

iv. Summary for 2021

15.13.19 Based on the above analysis it can be concluded that the highway network would operate better in 2021 in the With Development plus Mitigation Case than in the Reference Case. Average speeds increase and there are no significant effects on junctions that are likely to have a knock-on effects on other parts of the strategic or local "A" road system. In general journey times on the two key HGV routes improve.

15.13.20 It is important to note that in 2021 there is still construction and for the associated developments, post-operational phase work proceeding as well as full operation of the HPC power station. Once the construction activity has ceased in 2021/2022 then journey times on the road network are likely to improve further.

15.14 Summary of Analysis

15.14.1 The following conclusions can be drawn from the analysis within this chapter.

15.14.2 The analysis makes a number of robust assumptions. In particular:

- the 2016 analysis is for the quarter when construction flows are at their peak. During the adjacent peaks flows would be lower;
- car flows to the four park and ride sites have been increased by 10% compared with the base estimate;
- the HGV flows are for a peak day during the relevant quarter under analysis. During the vast majority of days during that quarter HGV flows would be substantially less than those used in the assessment;
- HGV estimates make modest assumptions on the vehicle payload. Furthermore HGVs include Medium Goods Vehicles;
- no deductions have been made in the two With Development scenarios for the fact that Bridgwater A accommodation campus is on land consented for residential development. Therefore flows for this site have been included in the Reference Case;
- no deductions have been made the two With Development scenarios for the fact that the Junction 24 facilities are located on the existing Somerfield site and flows to and from this site have been included in the Base and Reference Case models; and
- the traffic generation estimates allow for the basic transport strategy measures (e.g. park and ride, direct buses, walking and cycling) but does not include for Travel Plan measures that would help reduce car movements.

15.14.3 Even with these robust assumptions the analysis shows that in 2016 for the With Development plus Mitigation Case:

- average speeds stay broadly neutral;
- overall junction queuing reduces; and

- journey times on the key HGV routes from the motorway junctions to the HPC development site are broadly neutral.

15.14.4 In 2013, there are some increases in average speed, journey times and queuing. This is because not all of the proposed highway mitigation package that would be in place by 2016 has been assumed to be in place in Quarter 3 2013. In fact, it has been assumed that only the highway improvements required under the site preparation works proposals and those at Huntworth roundabout would be in place in the 2013 scenario.

15.14.5 The most important junction that is subject to increased queuing in 2013 is M5 Junction 23. Therefore, efforts would be concentrated at that location and EDF Energy would seek to bring forward the proposed improvement as soon as possible after obtaining development consent. It is likely that such a scheme could be implemented within 6 months of consent being granted especially as the improvement is wholly within highway land.

15.14.6 A model run has been undertaken to assess the relief that would be provided if works to M5 Junction 23 (signalisation) could be brought forward. The results of this analysis indicate that the junction would operate well and there would be no adverse queuing on slip roads in either the northbound or southbound directions.

15.14.7 The 2021 analysis demonstrates that there would be material improvements in the average speeds across the network. In the With Development plus Mitigation Case, journey times on the HGV routes and queuing at junctions also improve compared with the Reference Case. These benefits would increase when construction activity (that was included within the analysis) ceases. Therefore there would be long term benefits to the local highway network as a result of the HPC Project.

15.14.8 Importantly no property demolition would be required as a result of the proposed highway mitigation package and therefore any detriment to the urban fabric of Bridgwater is minimised.

15.14.9 Therefore the overall conclusion is that EDF Energy's proposed highway mitigation package is appropriate and compliant with policy, mitigates the peak construction impacts, results in no unacceptable residual impacts of the HPC Project, and delivers a long term legacy benefit whilst avoiding any property demolition.

16. TRANSPORT IMPROVEMENT PACKAGE

16.1 Introduction

16.1.1 This chapter sets out the proposed highway improvement package to be implemented as part of the HPC Project in addition to the implementation of a wider transport strategy that includes provision of park and ride sites, freight management facilities and bus services. The improvement package has been formulated as a result of the analysis discussed in **Chapter 15**.

16.1.2 The package comprises a number of elements as follows:

- works to be undertaken by EDF Energy as part of the Site Preparation Works;
- contributions to be made by EDF Energy as part of the Site Preparation Works;
- works to be undertaken by EDF Energy as part of the DCO application; and
- contributions to be made by EDF Energy as part of the DCO application.

16.1.3 It should be noted that the improvements committed to as part of the Site Preparation Works application are also included in the DCO application for completeness.

16.1.4 The proposed DCO mitigation package is shown in **Table 16.1** below.

Table 16.1: Proposed Mitigation Package

Topic	Highway Improvements	Location	Summary of Improvement	SCC or EDF Energy to deliver
Highway Improvements (DCO)	A38 Bristol Road/The Drove Junction	Bridgwater	Increase in width of highway to improve operation of the junction	EDF Energy
	A39 Broadway/A38 Taunton Road Junction	Bridgwater	Changes to signal arrangements, minor carriageway realignments to improve operation of the junction	
	A38 Bristol Road/Wylds Road Junction	Bridgwater	Increase in width of carriageway and right turn lane to assist right turns and reduce queuing	
	Wylds Road/The Drove Junction	Bridgwater	Provision of a left-turn slip road from Western Way into Wylds Road and new left turn filter to improve operation of the junction	

Topic	Highway Improvements	Location	Summary of Improvement	SCC or EDF Energy to deliver
	Huntworth Roundabout	Bridgwater	Increase in width of eastern arm of roundabout to reduce queuing and improve lane use	
	M5 Junction 23 Roundabout	Bridgwater	Introduction of new traffic signals and minor carriageway widening on slip road to improve operation of roundabout	
Highway Improvements Contribution	Cross Rifles	Bridgwater	Provision of a contribution towards planned SCC scheme at Cross Rifles	SCC
Site Preparation Works Highway Improvements	A39 New Road/B3339 Sandford Hill Roundabout	Approximately 1.4km south-east of Cannington	New roundabout to improve safety of junction	EDF Energy
	Washford Cross Roundabout	Approximately 1.8km west of Williton	New roundabout to improve safety of junction	EDF Energy
	Claylands Corner Junction	Approximately 2.3km east of Stogursey	Minor carriageway widening to improve operation of the junction	EDF Energy
	C182 Farringdon Hill Lane, Horse Crossing	Approximately 250m south of Wick	Provision of horse crossing to improve safety for horses and riders	EDF Energy
	Cannington Traffic Calming Measures	Cannington	Traffic management measures	EDF Energy
Transport Contribution	Contribution towards SCC enhancement schemes	Bridgwater	SCC schemes include: Traffic capacity schemes Walking and cycling enhancements Safety improvements at junctions.	SCC
Traffic and Incident Management Plan	Agree a Traffic Incident Management Plan for the DCO	N/A	(to follow on from the TIMP agreed for the Preliminary Works)	EDF Energy

Topic	Highway Improvements	Location	Summary of Improvement	SCC or EDF Energy to deliver
Tavel Plan Implementation	Funding	N/A	for Council to be represented on the Transport Review Group (7 years)	SCC
Tavel Plan	N/A	N/A	Implementation of DCO **Tavel Plan**	EDF Energy
Tavel Plan Compliance Sum	N/A	N/A	Compliance with **Tavel Plan** Mode Share Targets	EDF Energy
Monitoring and Intervention	Implement a camera based ANPR system	N/A	(extension of Site Preparation Works system to cover DCO)	EDF Energy
	Intervention Fund	N/A	To undertake additional mitigation if unforeseen impacts transpire	EDF Energy

16.1.5 It should be noted that whilst the HPC Project has a very modest impact on the Cross Rifles junction, EDF Energy has developed an improvement scheme for the junction which significantly improves capacity. However, EDF Energy is aware that SCC are developing their own scheme for the junction and have obtained contributions from other developers. Therefore, EDF Energy proposes to make a contribution to SCC to allow them to implement their preferred scheme.

16.1.6 In the paragraphs below each of these improvements is described in turn. Plans are included at **Appendix 16.1.**

a) A38 Bristol Road/The Drove Junction

16.1.7 These works comprise a very small increase in the width of the highway to improve the operation of the junction, through increasing the width of the right turn lane from Bristol Road into the Drove.

b) A39 Broadway/A38 Taunton Junction

16.1.8 These works would comprise improvements in the operation of the signals and various improvements to pedestrian facilities at the junction of the A39 Broadway and the A38 Taunton Road to the north-east of the existing Morrisons store. The signal improvements would include very minor works including the modification and possible replacement of the traffic signals and their associated control equipment (to improve operation of the junction and reduce queuing) and the improvements to pedestrian facilities would comprise:

- various new tactile paving;
- minor carriageway realignment to the southern, western and eastern junction approaches;
- minor curb realignment; and
- minor changes to pedestrian islands.

c) A38 Bristol Road/Wylds Road Junction

16.1.9 These works comprise the introduction of a left turn filter, an increase in the width of the carriageway to increase the width of the right turn lane and provide for three lanes of 3.5m wide. The works also include an improvement to cycle routes along Bristol Road.

d) Wylds Road/The Drove Junction

16.1.10 These works relate to various improvements to improve the operation of this junction and would comprise:

- provision of a left-turn slip road from Western Way into Wylds Road;
- new tactile paving; and
- realignment of existing pedestrian islands.

e) A39 New Road/B3339 Sandford Hill Roundabout

16.1.11 This proposal is for a new four-arm roundabout at the junction of Quantock Road, Charlynch Lane, Sandford Hill and New Road, approximately 1km to the south-east of Cannington. This proposal would comprise:

- minor realignment of existing carriageway.
- provision of new 4-arm roundabout.
- some vegetation clearance to south west of Sandford Hill to achieve satisfactory visibility splays.
- provision of new signage and road markings.
- provision of new street lighting.
- surface to be tarmacked with new kerbing.

f) M5 Junction 23 Roundabout

16.1.12 These proposals relate to minor physical works required to facilitate partial signalisation of the junction. The proposals would be entirely within the existing carriageway and would comprise:

- minor carriageway widening.
- installation of traffic signals including signal control loops in approach carriageways.
- application of anti-skid coatings, road markings and additional signage.
- provision of new street lighting.

16.1.13 These works also include minor improvements to the lane markings at Dunball Roundabout which would improve links to J23 of the M5, although these do not comprise physical works and therefore are not included as part of the DCO application. They have however been assumed to be part of the package of highway improvements for the purposes of this Transport Assessment.

g) Washford Cross Roundabout

16.1.14 This proposal is for a new, four-arm roundabout at the existing junction of the B3190 and A39, approximately 1.5km to the west of Williton. These proposals would comprise:

- realignment of existing carriageway and creation of a new, four-arm roundabout.
- new full-depth carriageway constructed off the line of the existing road.
- existing carriageway to be broken out and area grassed or landscaped at eastern approach.
- existing carriageway at northern, southern and western approaches to be resurfaced.
- clearance of existing vegetation and removal of hedgerows.
- extension of field access to new boundary at northern approach.
- provision of new signage and road markings.
- provision of new street lighting.

h) Claylands Corner Junction

16.1.15 These works comprise minor junction realignment at Claylands Corner, approximately 500m east of Hillside Farm and 2km to the east of Stogursey. The works would comprise:

- minor widening at eastern edge of carriageway opposite junction.
- relocation of existing give-way line, approximately 2m to east.
- minor relocation of kerb line to western edge of carriageway by approximately 1m.
- widened carriageway strip to be finished in tarmac to match existing.
- finish with new edging strip.
- provision of various new signage.

i) C182 Farringdon Hill Lane, Horse Crossing

16.1.16 The proposal is for a new horse crossing at the junction of the C182 and Farringdon Hill Lane, to the east of Shurton, approximately 1.5km south of the Hinkley Point development site. The proposals would comprise the following works:

- existing trees and vegetation to be cleared to accommodate horse holding area.
- existing surfacing material to be removed within holding area and replaced with hard surfacing.
- push buttons to activate equestrian crossing warning sign to be located 10m back from the edge of the C182 to the north and south.
- equestrian crossing warning signs adjacent to each side of carriageway on C182, before approach to horse holding area.
- hedgerow to be removed or cut back along C182 to achieve necessary visibility splays.

j) Cannington Traffic Calming Measures

16.1.17 These proposals would include improvements to pedestrian facilities and minor physical works to implement highway safety improvements, including a 20mph speed restriction, within the existing highway.

16.1.18 The proposals would comprise the following works:

- a new footway to the northern edge of High Street, opposite Clifford Park.
- provision of skid-resistant surfacing.
- revised parking and waiting restrictions.
- a new puffin crossing at High Street.
- provision of tactile paving and widening of existing uncontrolled crossing at the junction of Church Street and High Street.
- new speed restriction signs enforcing existing speed restrictions.
- new zebra crossing on Rodway before the junction with Toll House Road.
- tactile paving at the junction of Rodway and Toll House Road.

16.1.19 In addition to these physical works, SCC are also considering implementing two Traffic Regulation Orders to enforce parking controls and speed limits on the C182. These do not comprise physical works, other than signage and white lining, and therefore are not included as part of the DCO application.

k) Huntworth Roundabout

16.1.20 These works comprise minor carriageway widening and revised signage to reduce queuing at the junction and improve pedestrian crossing facilities. The proposals would be entirely within the existing carriageway and would comprise:

- widening of carriageway at eastern arm of roundabout.
- removal of part of existing verge and trimming back vegetation as necessary.
- provision of 2m wide footway between the eastern and the southern arms of the roundabout.
- reconfiguration of existing traffic splitter island, including improved pedestrian crossing.
- adjustment of footway to north of eastern arm.
- revision of white lining as appropriate, to improve lane use and circulation.

16.2 Phasing

16.2.1 The analysis undertaken within **Chapter 15** indicates that the proposed DCO application highway improvement package broadly achieves nil detriment by comparison with the Reference Case in the peak construction period in 2016.

16.2.2 The mitigation package modelled for 2013 assumes that works committed to as part of the Site Preparation Works application are implemented together with the proposed works at Huntworth Roundabout, but excludes the other highway improvements listed in **Table 16.1**. The assessment indicates that in general terms the impact in 2013 is acceptable, since the majority of any increases in queuing are modest and do not have knock on effects elsewhere on the network.

16.2.3 The exception to this is M5 Junction 23, where queuing on the off slip roads is anticipated to increase. Given that there is concern regarding the operation of Junction 23, EDF Energy would commit to seeking to bring forward the proposed scheme at Junction 23 as soon as possible after a DCO is approved by the IPC or successor body. It is considered that the scheme could be implemented within approximately six to nine months from a DCO being granted.

16.2.4 Furthermore, as the scheme is wholly within the highway boundary, EDF Energy would discuss with the Highways Agency the possibility of implementing the scheme prior to granting of a DCO.

Table 16.2 shows EDF Energy's proposed phasing plan for the highway works. It includes for early implementation of improvements at Huntworth roundabout and Junction 23. A detailed phasing programme would be developed that would need to reflect the particular circumstances at the time.

Table 16.2: Phasing Programme

Stage	Works
Stage 1 (Site Preparation Works)	Sandford Corner roundabout. To be delivered as part of Site Preparation Works
	Washford Cross roundabout. To be delivered as part of Site Preparation Works
	Improvements on C182 including Claylands Corner and Horse Crossings. To be delivered as part of Site Preparation Works
	Cannington traffic calming measures
Stage 2 (DCO)	Huntworth Roundabout Improvements
	M5 Junction 23 Improvements
Stage 3 (DCO)	Bristol Road/Wylds Road Junction Improvements
	Wylds Road/The Drove Junction Improvements
	Bristol Road/The Drove Junction Improvements
	A39 Broadway/A38 Taunton Road Improvements

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17. TRAVEL PLAN

17.1 Introduction

17.1.1 This chapter provides a summary of the **Framework Travel Plan** that would be implemented for the HPC Project. The full **Framework Travel Plan** is in **Appendix 17.1** of this report.

17.1.2 The **Framework Travel Plan** has been prepared in support of the DCO application and considers the management and movement of people involved in the construction and operation of the proposed development. Site-specific Travel Plans would be prepared for the HPC development site, for the associated development sites and for the operational phase of the HPC power station.

17.2 Transport Strategy and Travel Plan

17.2.1 The HPC Project is not a conventional project. Rather than giving encouragement to use sustainable modes of transport, EDF Energy's transport strategy would require that workers use a prescribed mode of travel. Therefore, the transport strategy delivers a very high non-car mode share. The Travel Plan builds on this strategy and seeks to achieve further improvements in certain areas.

17.2.2 At peak construction, the transport strategy would deliver the following approximate modal share in respect of the daily journey to work of the construction workforce:

- direct bus to site (non-campus): 21%.
- accommodation campus buses (or already resident at the HPC accommodation campus): 26%.
- park and ride: 49%.
- car driver to site: 4%.

17.2.3 The **Framework Travel Plan** concentrates on areas where there could be further improvements as follows:

- walking and cycling;
- public bus to park and ride sites;
- car sharing; and
- rail use.

17.3 Management of the Travel Plans

17.3.1 Overall management and implementation of the Travel Plans would be the responsibility of EDF Energy.

17.3.2 A Transport Co-ordinator would be appointed by EDF Energy and be in place throughout the construction and early operational phases of HPC although the role would change and evolve over time. The Transport Co-ordinator would be responsible for the management, development and implementation of the Travel

Plans for the duration of the HPC Project. The key elements of this role would include:

- ensure effective implementation and enforcement of the transport strategy;
- develop and manage the implementation of the Travel Plans;
- promote the objectives and benefits of the Travel Plans;
- monitor the success of the implemented Travel Plans against the agreed targets;
- report on the performance of the Travel Plans to the Transport Review Group (TRG);
- report feedback from the Transport Forum to the TRG;
- update the Travel Plans as required in consultation with the TRG;
- resolve issues and problems through liaison with other parts of EDF Energy and its contractors; and
- act as a point of contact for contractors and the workforce.

17.3.3 A Transport Review Group (TRG) would be established with members of the key transport stakeholders and EDF. The purpose of the TRG is to review the performance of the Travel Plan and advise on potential revisions.

17.3.4 A separate Transport Forum, a body of town and parish councillors, which is responsible for representing the views of the local community, has already been established. The forum would continue to meet at regular intervals during the life of the HPC Project. The Transport Forum would be able to provide feedback to the TRG.

17.4 Travel Plan Measures

17.4.1 A range of measures have been developed to promote and facilitate the use of sustainable modes of travel wherever possible. Some of these measures are more prescriptive and would be delivered as part of the transport strategy for the HPC Project, whilst other softer measures are set out within the **Framework Travel Plan**. They include:

- a bus fleet funded by EDF Energy to transport workers to and from the HPC development site including direct bus services, park and ride bus services and accommodation campus bus services, the services would be free to workers (transport strategy);
- a strict requirement that workers would only use the mode of transport allocated to them be it direct bus, accommodation campus bus or park and ride bus (transport strategy);
- constraining and controlling on site parking to essential workers and visitors only (transport strategy); and
- the promotion of viable sustainable transport options such as walking, cycling, public bus and rail through encouragement, and provision of information and incentives as appropriate (Travel Plan).

17.5 Promotion of Sustainable Modes

17.5.1 The **Framework Travel Plan** sets out some of the measures that are anticipated to be taken to encourage greater use of sustainable modes during the construction phase of HPC and into operation. These include:

- Provision of maps showing the walking routes in the area, including public rights of way, to all workers that live within the 2km walking catchment of the HPC development site and the four park and ride sites.
- Provision of literature which sets out the benefits of walking or cycling to work including the health benefits.
- There would be shower, changing and storage facilities provided for workers at the HPC development site. Therefore, any worker that walks or cycles to work, or walks or cycles to a park and ride site, would be able to wash, change and store their clothes at work.
- Provision of maps showing the cycle routes in the area to all workers that live within the 8km cycle catchment of the site and the four park and ride sites.
- Promotion of car sharing and facilitation of identification of potential car sharers.
- Cycle parking at the HPC development site and at all the park and ride sites.
- A Travel Pack would be provided to all workers at induction. This would include specific information regarding their individual journey to work, information on walking and cycling options and bus and rail services in the local area.
- Contact details for enquiries; and information on key elements of the Travel Plans including monitoring and enforcement.
- During the course of the works subsequent to granting of the DCO, regular information would be sent to workers updating them on the results of monitoring of the Travel Plans; details of car sharing; updates on bus routes and pick up points and details on any other issues and how they are being addressed.

17.6 Monitoring

17.6.1 The Travel Plan would be monitored, reviewed and revised to ensure it remains effective. All monitoring would be the responsibility of EDF Energy and a monitoring strategy has been developed to ensure that the level of success in meeting identified performance targets can be measured for the duration of construction and operation of HPC. The strategy encompasses both the transport strategy and the Travel Plan.

17.6.2 The monitoring would follow best practice guidance as set out in the Somerset County Council Travel Plan Guidance documentation, 'Moving Forward: Manual for Travel Plan**s**' December 2008, and the DfT document, 'Good Practice Guidelines: Delivering Travel Plan**s** through the Planning Process' April 2009.

17.6.3 Given the level of prescription which would be placed on the how construction workers travel to work, and the very high levels of modal shift that this would achieve, it is not considered appropriate to set additional performance targets for the Travel Plan at this stage since appropriate targets would depend upon a range of factors including the actual locations where workers live. However, the **Framework Travel**

Plan identifies areas where additional targets would be set during the construction phase, which would include:

- walking and cycling to the HPC development site;
- public bus, rail, walking and cycling to the park and ride sites; and
- non-work trips of occupants of the accommodation campuses.

17.7 Funding

17.7.1 EDF Energy proposes to establish a joint fund for the Travel Plan within the Section 106 Agreement for the DCO application. This fund would be used to implement any additional measures in the event that the Travel Plan requirements fail to be met.

18. CONTROLS AND MONITORING

18.1 Introduction

18.1.1 As part of the overall transport strategy for the construction phase of the HPC Project, EDF Energy proposes that certain movements on the highway network are controlled and monitored. The purpose of these controls is to ensure that the key elements of the transport strategy as set out in this Transport Assessment are realised in practice. This chapter describes which aspects EDF Energy consider should be controlled and how this would be implemented.

18.1.2 During the construction phase, controls are proposed in relation to both the movement of freight and the movement of the construction workforce.

18.1.3 In relation to the movement of freight during the construction phase the main elements to be controlled are:

- HGV routes;
- HGV movements on a quarterly basis;
- HGV movements on a daily basis;
- HGV movements on a peak hour basis; and
- use of the temporary jetty for the delivery of bulk materials for concrete production and use of Combwich Wharf for the delivery of abnormal indivisible loads (AILs).

18.1.4 In relation to the movement of the construction workforce controls are proposed in relation to:

- parking provision at the HPC development site and at the associated developments;
- enforcement of the use of buses for movement of the construction workforce to the HPC development site; and
- shift patterns.

18.1.5 The following sections discuss the controls proposed in each area and how individual controls would be monitored and enforced.

18.2 Proposed Controls on the Movement of Freight during Construction

a) HGV Routes

18.2.1 It is proposed that all HGVs travelling to the HPC development site and Combwich would be required to use the two proposed HGV routes set out in **Chapter 9** and in the **Freight Management Strategy (Appendix 3.7)**. These are:

- From Junction 23 of the M5 to route along the A38 Bristol Road, Bridgwater Northern Distributor Road (NDR – now classified as the A39), the A39 west of Quantock roundabout, Cannington High Street (prior to any bypass) or Cannington bypass (once it is constructed) and then along the C182. This is HGV Route 1.

- From Junction 24 of the M5 along the A38 Taunton Road, the A39, west of the Taunton Road/Broadway junction, Cannington High Street (prior to any bypass) and Cannington bypass, once it is constructed, and then along the C182. This is HGV Route 2.

b) HGV Movements

18.2.2 EDF Energy would monitor and control the number of HGV movements relating to deliveries to the HPC development site and Combwich. It is proposed that these HGV movements would be subject to the following limits and constraints:

i. Limits on Daily Maximum HGV Movements

- A one day maximum limit of 750 HGV movements (Monday-Friday).
- A one day maximum limit of 375 HGV movements (Saturdays).

18.2.3 These limits would be applied to HGV movements on the C182 Rodway north of Cannington at the location of the junction of the C182 with the new Cannington bypass.

18.2.4 In addition it is proposed that HGV movements on the HGV Routes through Bridgwater would be the subject to the following limits:

- A one day maximum limit of 450 movements on HGV Route 1.
- A one day maximum limit of 300 HGV movements on HGV Route 2.

18.2.5 The effect of these proposed limits is to enforce a balanced use of the two HGV routes through Bridgwater. The limit for HGV Route 1 would be applied to movements on the Northern Distributor Road and the limit for HGV Route 2 would be applied on the A39, west of the Taunton Road/Broadway Junction.

18.2.6 HGV movements in this context represent a movement in either direction. Thus for example the one day maximum limit of 750 HGV movements set out above represents an effective limit of 375 HGV deliveries to the HPC development site and Combwich on a given day.

ii. Limits on Quarterly Average HGV Movements

18.2.7 HGV movements relating to deliveries to the HPC development site and Combwich would be subject to an additional limit that the number of HGV movements would not exceed an average of 500 movements per day in any given quarter. This limit would be applied to HGV movements on the C182 Rodway north of Cannington at the location of the junction of the C182 with the proposed Cannington bypass.

iii. Limits on the Timing of HGV Movements

18.2.8 In addition to the limits on the number of HGV movements set out above, it is proposed that the movement of HPC construction related HGVs would be subject to the following timing constraints:

- There would be no HGV movements on the local highway network between the hours of 22:00 and 07:00.

- Morning peak hour HGV movements on the local highway network to the HPC development site and Combwich would be limited to 30 movements (08:00-09:00) and evening peak hour movements would be limited to 45 movements (17:00-18:00). These limits would be applied Monday-Friday and at the point specified in paragraph 18.2.3 above.
- There would be no HPC construction related HGV movements on the local highway network on Sundays or on Bank Holidays.

c) Exceptional Circumstances

18.2.9 The combined effect of the proposed daily, quarterly average and timing limits set out above is that HGV movements to the HPC development site and the Combwich freight laydown facility would be no higher than have been assessed in this Transport Assessment.

18.2.10 In practice at most points in the construction programme and on the majority of days HGV movements would be lower than the limits proposed and which have been assessed.

18.2.11 There are a range of exceptional circumstances in which it may be necessary to disapply some of the limits proposed above. Such circumstances could include an emergency response requiring an HGV movement after 10pm or before 7am or a major traffic incident preventing use of the proposed HGV routes to the site.

18.2.12 It is proposed to address these exceptional circumstances through preparation of a Traffic Incident Management Plan. This would set out in more detail the kinds of circumstances in which it may be necessary to disapply any of the limits set out above and the mechanisms which may need to be in place to agree these with the relevant authority.

d) Monitoring and Enforcement of HGV Limits

18.2.13 The monitoring and enforcement of HGV movements to ensure compliance with the limits proposed is described in more detail in Section 6.6 of the **Freight Management Strategy**. A brief summary of the key elements is set out below:

- EDF Energy would establish a project delivery co-ordination team responsible for the overall management of the project site deliveries.
- An electronic Delivery Management System (DMS) would be implemented on the project to allow for effective and efficient planning, control and monitoring of HGV deliveries to the HPC development site and Combwich. The DMS would allow the collection of data which can be used for monitoring compliance with the planning constraints proposed.
- HGVs would be monitored and counted at the point of despatch/departure from the Freight Management Facilities and the HPC development site and Combwich to ensure compliance with the proposed limits. EDF Energy anticipates using an Automated Number Plate Recognition (ANPR) solution to monitor compliance with the HGV routes and this would include installation of ANPR cameras at HPC, at the Freight Management Facilities at Junction 23 and Junction 24, at Combwich and along the permitted HGV routes.

- Notices shall be erected throughout the period of construction at key locations indicating to drivers the required route to be used.

e) Use of Sea for the Delivery of Bulk Materials for Concrete and for the Delivery of the Large Abnormal Indivisible Loads

18.2.14 EDF Energy has committed to deliver a minimum of 80% (by weight) of materials for on-site concrete production via the jetty (once available) and 100% of the largest AILs to Combwich Wharf (around 180). These targets would be achieved by imposing them as constraints on the key contractors.

18.2.15 In practice it may be possible for additional deliveries of bulk or containerised construction materials to be delivered by sea. The **Freight Management Strategy** provides additional detail on this issue, describing both the potential opportunities for additional deliveries and the constraints which may apply. Any additional deliveries by sea above the 80% of materials for on-site concrete production would be likely to reduce the HGV movements by road relative to those which have been assessed.

18.3 Proposed Controls on the Movement of the Construction Workforce

18.3.1 EDF Energy's proposed transport strategy for the movement of the construction workforce would very significantly constrain use of the private car for journeys to and from the HPC development site and would require the large majority of the construction workforce to travel at least the latter part of their journey to and from the site by bus. This may be:

- bus from a park and ride site;
- bus from a Bridgwater accommodation campus; and
- direct bus from specified locations.

18.3.2 There would be only limited exceptions to the requirement to reach the HPC development site by bus. The exceptions would be:

- workers who are already resident at the HPC accommodation campus;
- workers who have been allocated one of the 200 on-site parking spaces; and
- workers who would walk or cycle direct to the HPC development site

18.3.3 The requirement for the large majority of the construction workforce to use the above bus services would be imposed as a condition of contract on all contractors appointed to work on the HPC development site, with a further requirement that this condition be imposed on any of their sub-contractors who would be employing individuals at the HPC development site.

18.3.4 Employees would be allocated to a specific bus service at induction based on the location of their home address (for home-based workers) or living accommodation (for non-home-based workers). Employees would be required to use this bus service for their regular journey to and from work. Monitoring and compliance would be facilitated by use of a smartcard system to gain access to park and ride sites and bus services. A process would be established to enable workers to amend their specified bus service as a result of a change in accommodation or other alteration of domestic circumstances.

18.3.5 In addition the following considerations would assist in the successful delivery of the transport strategy and enforcement of use of allocated bus services:

- Wherever possible employees would be allocated to the park and ride site or bus service which is closest to their home address/living accommodation.
- All park and ride car parks and bus services would be provided free of charge. Employees would therefore be financially incentivised to comply with the transport strategy rather than seek to circumvent it.
- Only employees living within a short distance of proposed pick up points would be allocated to direct bus services as opposed to park and ride sites. This would act to prevent agglomerations of un-managed car parking close to direct bus service pick up points.

18.3.6 The compliance with and effectiveness of the measures proposed would be subject to regular monitoring and review.

a) Travel Plan Monitoring

18.3.7 Site-specific Travel Plans would be prepared for the HPC development site and for all the associated developments in accordance with the principles set out above and in the **Framework Travel Plan**.

18.3.8 Performance of the detailed Travel Plans would be regularly monitored and the need or scope for remedial actions would be considered should any elements of the transport strategy or Travel Plans not be operating as planned.

18.3.9 The Travel Plans shall be implemented from the commencement of construction works and shall continue to be in place for the duration of construction works. Further information is contained in **Chapter 17** and in the **Framework Travel Plan**.

18.4 Controls on Parking during Construction

18.4.1 A range of controls would be applied to parking during the construction programme.

a) HPC Development Site

18.4.2 Only 200 parking spaces would be provided at the HPC development site during the construction phase for the use of EDF Energy staff and their contractors. Allocation of these parking spaces would be strictly controlled and provided only on the basis of need. Any construction worker seeking to access the HPC development site by private car without access to an approved pass for use of the on-site parking would be refused entry. A further 100 on-site parking spaces would be provided for business visitors, VIP visitors, disabled visitors and bus parking for the Public Information Centre. Access to these parking spaces would also be strictly controlled.

b) Campus Accommodation

18.4.3 Parking levels for the on-site HPC accommodation campus and the accommodation campuses in Bridgwater would be limited to the levels set out in **Chapter 11,** Parking Strategy. These levels provide parking restraint and encouragement for the use of sustainable modes. All accommodation campus parking provision would be strictly controlled with parking permits allocated only to occupants of each accommodation campus.

c) Park and Ride Developments

18.4.4 Park and ride developments form an essential part of the transport strategy for the movement of the construction workforce to the HPC development site on a daily basis – providing a mechanism to intercept private car journeys on the road network at strategic locations. The park and ride developments would not be accessible to any individuals or organisations other than authorised members of the HPC workforce and as such cannot be utilised for other purposes than those for which they are intended. EDF Energy would monitor and manage the demand for parking at park and ride sites as part of the overall approach to Travel Planning to ensure optimum use of the facilities and successful implementation of the transport strategy.

18.5 Shift Patterns

18.5.1 All contractors appointed to work at the HPC development site would be required as a condition of contract to work within the shift patterns set out for the construction phase of the development – which are as follows:

Table 18.1: HPC Shift patterns during construction (Monday-Friday)

Shift	Start Window	End Window
First Shift	From 06:00-07:30	From 14:00-16:00 or after 17:30
Second Shift	From 13:30-15:00	From 22:00-00:00
Night Shift	From 20:30-22:00	From 06:00-08:00
Single Shift	From 07:00-08:30	From 16:30-18:30
Office Shift	From 07:30-09:00	From 17:30-19:00

18.5.2 Contractors would be required to ensure that all bulk movements of their workforce comply with these shift start and finish windows. Exceptions would be allowed for part-time staff and there would need to be occasional movements of staff outside of shift windows for personal or business reasons. For these reasons a skeleton bus service would operate between the HPC development site and park and ride sites and other key locations outside of the main shift patterns.

18.6 Controls during the Operational Phase of HPC

a) Operational Travel Plans

18.6.1 An operational Travel Plan would be developed for the HPC development site. The HPC Power Station Travel Plan shall be prepared in accordance with the principles set out in the approved **Framework Travel Plan** and would include details of the expected means of travel to and from the site.

b) Operational Phase Parking

18.6.2 Following cessation of construction works at the HPC development site, the maximum number of car and minibus parking spaces would be as set out in the **Table 18.2** below.

Table 18.2: HPC Operational Car Parks

Type of Car Parking	Number of Parking Spaces
East Car Park	180 spaces
South-East Car Park	505 spaces
South Car Park	508 spaces (+ 6 spaces for visitor coaches to the PIC)
Total	1,193 spaces (+ 6 coach spaces)

18.6.3 In addition the following controls would be placed on access to these car parks:

- The East Car Park would be available exclusively for Hinkley Point B staff (as replacement for lost parking space arising from the construction of HPC) and disabled visitors to the HPC development site.
- The South-East Car Park would be available exclusively for Hinkley Point B staff (as replacement for lost parking space arising from the construction of the HPC development site) and Hinkley Point C operational staff.
- The South Car Park would be available exclusively for the use of business visitors to HPC, visitors to the PIC, staff and visitors to the training and simulator building and outage contractors for the HPC Project. Operational HPC and HPB staff would not be allowed to use this car park.

18.7 Summary

18.7.1 The above set of controls and approach to monitoring demonstrates that the transport strategy as set out in this assessment would be rigorously and comprehensively implemented and enforced – including where applicable by passing on requirements in contract to the contractors working at the HPC development site.

18.7.2 Application of these conditions and controls also provides confidence that the transport impacts analysed represent a robust assessment of the maximum traffic impacts of the development at peak construction.

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19. CONCLUSIONS

19.1 Introduction

19.1.1 This Chapter sets out the conclusions to this Transport Assessment. The information provided within this Chapter does not seek to repeat the information provided within the Executive Summary of this document, rather it seeks to draw conclusions to the study based on the five NATA objectives introduced at **Chapter 1**.

19.1.2 The Introduction to this Transport Assessment explained that DfT Guidelines advise that a Transport Assessment should adopt the principles of NATA by assessing the potential impacts of a development proposal within the framework of the five NATA objectives which are:

- accessibility;
- safety;
- economy;
- environment; and
- integration.

19.2 Accessibility

19.2.1 Accessibility refers to available access to the transport system by all modes, but in particular non-car modes i.e. walking, cycling, bus and rail.

19.2.2 The over-arching transport strategy for the HPC Project is driven by provision of a comprehensive package of EDF Energy funded bus services for the journey to work, including provision of park and ride, direct and accommodation campus bus services. In respect of their daily journey to and from work, over 90% of the peak workforce would either already be resident at the HPC accommodation campus or arrive at, and depart from, the HPC development site by bus. These bus services maximise accessibility by non-car modes to the HPC development site.

19.2.3 Consideration of walking and cycling modes has further been considered in the walking and cycling strategy, described in **Chapter 13** of this report. The analysis has indicated that whilst there are opportunities for walking and cycling on the journey to work, either to the HPC development site or associated development sites, these modes would not present a feasible option for many workers. However, the proposed Travel Plan and the proposed walking and cycling improvement measures provide a mechanism through which walking and cycling would be encouraged, particularly for access to off-site associated developments and in relation to non-work trips of occupants of the accommodation campuses.

19.2.4 Similarly, access to bus and rail services has been considered in the bus and rail strategy set out at **Chapter 12** of this report. Like walking and cycling, the analysis has shown that there are limited opportunities to use public bus or rail for journeys to and from the HPC development site, but that there are opportunities for some workers to use these modes to access off-site associated developments and in relation to non-work trips of occupants of the accommodation campuses.

19.2.5 The HPC Project is not a conventional project. Rather than giving encouragement to use sustainable modes of transport, EDF Energy's transport strategy would require that workers use a prescribed mode of travel. Therefore, the transport strategy delivers a very high non-car mode share.

19.2.6 At peak construction, EDF Energy's transport strategy would deliver the following approximate modal share in respect of the daily journey to work of the construction workforce:

- Direct bus to site (non-campus): 21%.
- Accommodation campus buses (or resident at the HPC accommodation campus): 6%.
- Park and ride: 49%.
- Car driver to site: 4%.

19.2.7 Furthermore, the proposed Travel Plans and package of walking and cycling improvements recommended within this Transport Assessment provide the opportunity to create an even greater mode shift towards more sustainable non-car modes than is achieved by EDF Energy's transport strategy.

19.2.8 Therefore, it has been demonstrated that through the transport strategy excellent accessibility for workers and operatives would be achieved.

19.3 Safety

19.3.1 Safety has been considered in detail at **Chapter 14** of this report. In the context of this Transport Assessment, safety relates to accidents on the highway network.

19.3.2 The road safety analysis included a detailed study of personal injury accidents on the highway network and an assessment to determine the likelihood of such accidents increasing in frequency in the future, as a result of the proposed HPC Project.

19.3.3 The assessment has demonstrated that when the impact of the development related traffic is considered, the expected increase in the number of accidents is small.

19.3.4 Notwithstanding this EDF Energy has examined a series of potential safety improvement schemes. These address existing accident issues at junctions on the local highway network and provides a package of recommended improvements to be delivered by EDF Energy or funded by EDF Energy as part of the SCC's ongoing road safety programme.

19.3.5 The package of road safety improvements put forward within this Transport Assessment would not only benefit the proposed HPC Project, but would provide a lasting legacy to residents of the local area.

19.4 Economy

19.4.1 As described at **Chapter 1** of this report, economy in the transport context is only of partial relevance to the proposed HPC Project since EDF Energy would be fully funding their proposed strategy as well as contributing to wider transport improvements.

19.4.2 However, this Transport Assessment has assessed economy in the context of journey times and congestion which both have the ability to affect the local economy.

19.4.3 When the full highway mitigation package is in place, the analysis shows that even in the peak construction period of 2016 average speeds during the peak hours remain broadly neutral and overall queuing at junctions falls. In 2021 when the HPC development site is fully operational, but there is still some construction activity and decommissioning work in progress there are improvements in average speeds and journey times. Whilst the interim improvement package assumed to be in place in 2013 does not achieve nil detriment the short term residual impacts are acceptable. EDF Energy would seek to bring forward the final improvements as soon as possible so that the benefits can be realised early in the construction programme.

19.4.4 Therefore, the highway improvements not only mitigate the effects of the HPC Project but also bring forward long-term benefits to the local community. This is achieved without the need for any property demolition thus minimising the effects on the urban fabric of Bridgwater.

19.5 Environment

19.5.1 The full environmental impact of the proposed development has been assessed in the Environmental Statement which this Transport Assessment forms part of. Transport is just one part of the full **Environmental Statement** which considers the HPC development site and each off-site associated development individually.

19.5.2 The assessment indicates that for the key impacts of severance and pedestrian amenity, the residual impacts of the HPC development site are moderate adverse and minor adverse in 2016. Furthermore, the effect on Accidents and Safety is negligible in the light of the safety enhancements being undertaken or contributed to by EDF Energy. By 2021 driver delay is improved due to the highway improvement strategy as concluded previously.

19.5.3 The **Environmental Statement** also concludes that in Cannington prior to construction of the bypass there are substantial adverse traffic related impacts. These impacts are mitigated to an extent in the immediate term by the traffic calming and management measures to be introduced in Cannington as part of the Site Preparation Works and then by the relief offered by the Cannington bypass, which delivers long-term permanent legacy benefits in terms of traffic reduction through Cannington.

19.6 Integration

19.6.1 This Transport Assessment has considered the issues of transport mode integration and the integration of EDF Energy's transport strategy with government and local policies.

19.6.2 An integrated transport strategy has been developed which minimises the impacts on the local community and accords with government policies. By minimising impacts and avoiding property demolition it is considered that the transport proposals assist in integrating the HPC Project to the local community.

19.7 Summary

19.7.1 In summary, this Transport Assessment demonstrates that EDF Energy's proposed transport strategy and highway improvement package is appropriate and compliant with government policy. It mitigates the peak construction impacts associated with the HPC Project and it delivers a long-term legacy benefit to the people of Bridgwater and Cannington whilst also avoiding the need for any property demolition.

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EXECUTIVE SUMMARY

EDF Energy is submitting an application for Development Consent to the Infrastructure Planning Commission (IPC) for a new nuclear power station at the Hinkley Point C (HPC) site near Bridgwater, Somerset.

As part of its proposals, EDF is proposing a comprehensive package of transport measures, in order to mitigate the impact of the project on the highway network. This includes:

- a comprehensive strategy to reduce trips on the local highway network, through strict control of parking on site, the provision of park and ride sites and direct bus services, freight management facilities and improvements at key junctions affected by traffic related to the HPC Project.
- a temporary jetty and enhanced facilities at Combwich to bring in materials by sea.
- the provision of a Travel Plan with a set of mode share targets to encourage more sustainable travel and increase shared journeys to work;
- a package of funds to enable the highway authority to carry out pedestrian and cycle improvements and to contribute towards other highway capacity and safety improvements in Bridgwater;
- controlled HGV routes which would be monitored through an Automated Number Plate Recognition (ANPR) system; and
- a bypass around Cannington.

The focus on sea delivery of bulk materials will result in approximately 250,000 less HGV movements on the local road network over the duration of the construction programme. EDF Energy's transport strategy for movement of the construction workforce will mean that, in respect of their daily journey to and from work, at least 90% of the peak workforce will either be already resident at the HPC on-site accommodation campus or will arrive at -and depart from - the HPC Development Site by bus.

EDF Energy's application for development consent (the DCO application) does not include a Bridgwater bypass.

National policy places significant emphasis on considering a full range of alternative solutions before considering new roads.

There is no national, regional or local policy requirement for a Bridgwater bypass, either as part of the HPC Project, or to support the level of growth envisaged to be delivered in Bridgwater through the Sedgemoor draft Core Strategy, which identifies 7,455 homes and 6,720 jobs to be delivered in Bridgwater by 2027.

A detailed **Transport Assessment** has been carried out and EDF Energy has been able to satisfy itself that a Bridgwater bypass is not necessary, as part of the HPC Project, which, with its sustainable transport strategy, is acceptable in transport terms. By adopting its transport strategy, EDF Energy would be successful in mitigating its impacts on the local highway network to an acceptable level and, indeed, it would leave behind an improved highway network once the peak construction period has passed.

Furthermore, there are no overriding environmental reasons which would justify the provision of a Bridgwater bypass. The **Environmental Statement** submitted with the application for

Development Consent shows that there would be no exceedances in European air quality objectives in Bridgwater. Some temporary noise impacts have been identified by the **Environmental Statement** for properties in Bridgwater which have been assessed to be of major significance; however, it is relevant that these impacts have only been identified during early morning and late evening periods, on ‘A’ roads which are recognised as the main corridors for traffic through Bridgwater and the assessment is based on robust, worst case assumptions. The absolute noise levels which would arise from HPC related traffic, in Bridgwater, are not predicted, at any point in the construction programme, to breach any statutory limits in relation to road traffic noise.

Notwithstanding this, there have been a significant number of comments received by members of the public during EDF Energy’s Stage 1, Stage 2, Stage 2 Update and M5 Junction 24 and Highway Improvements consultations which request a Bridgwater bypass as part of the HPC Project. The Council’s (Sedgemoor District Council, West Somerset Council and Somerset County Council) have also requested that a study be undertaken on the need for a Bridgwater bypass. On this basis, EDF Energy has prepared this report which considers the need for a bypass to the north of Bridgwater.

The initial analysis of the likely effect of a Bridgwater bypass is that it would take some through traffic off the Northern Distributor Road (NDR) in Bridgwater but would have relatively limited effect on the southern part of Bridgwater. In addition, relatively limited traffic would use the bypass, approximately 6,550 vehicles per day at peak construction, which is less than half the existing flow on the NDR, and only 1,775 of these would be diverted HPC traffic (approximately 27%). By 2021, the flow on the bypass reduces to 5,500 vehicles of which 740 are related to the HPC Project (just 13.5%) which will reduce further still once construction of the HPC power station ceases.

This report has also considered the difference in queuing and journey times as a result of introducing a Bridgwater bypass. The assessment carried out has assumed that the rest of the HPC Project is as proposed, with the exception of some of the additional highway improvements in Bridgwater. The assessment included improvements at Junction 23 of the M5 and at the Huntworth roundabout, as an initialling modelling exercise demonstrated that there would be significant queuing at these junctions with a Bridgwater bypass, if no further improvements were proposed. If EDF Energy were to propose a Bridgwater bypass as part of the HPC Project, the transport strategy would be likely to be different, primarily with regard to the location of the proposed freight management and consolidation facilities and park and ride sites at Junction 23 and 24 of the M5. Nevertheless, carrying out this exercise provides an initial indication of the issues that are likely to arise and suggests that the Bridgwater bypass option does not demonstrate significant benefits for journey times or queuing in Bridgwater over the proposed development included as part of the DCO application.

There would be environmental impacts associated with the provision of a Bridgwater bypass. A detailed environmental assessment is not necessary and has not been carried out as part of this study. If a Bridgwater bypass was to be proposed there would need to be a detailed analysis of the environmental issues associated with its provision; however an initial analysis has suggested that a Bridgwater bypass would:

- cross 5.2km of largely open countryside;
- cross 26 watercourses (including the River Parrett and Cannington Flood Relief Channel) with associated environmental impacts;
- be almost entirely within the tidal flood plain of the River Parrett;

- need to be raised a minimum of 3.5m above existing ground level, although this is anticipated to be more likely to be up to 5.8m, taking into account current guidance and standards; and
- be approximately 7.3m wide, with 1.0m hard strips and a minimum of 2.5m verges on both sides.

It is important to recognise that a Bridgwater bypass would be a major construction project in itself and would be a permanent feature on the landscape. Taking into account the size of the road and its elevation, in addition to the traffic that would be using it and probable street lighting of at least part of the road, it is likely to be prominent in the landscape and be visible from wide areas of the surrounding countryside.

The study conclusion is that it is not necessary or appropriate to provide a new Bridgwater bypass, on its own or as part of the HPC Project.

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1. INTRODUCTION

1.1 Background to and Objectives of the Bridgwater Bypass Study

1.1.1 EDF Energy is submitting an application for Development Consent to the Infrastructure Planning Commission (IPC) for a new nuclear power station at the Hinkley Point C (HPC) site near Bridgwater, Somerset, comprising two UK EPR reactor units with an expected output of approximately 1,630MW per unit. The Hinkley Point C site is to the west of the existing Hinkley Point power station complex.

1.1.2 NNB Generation Company Limited (Company Number 06937084), part of EDF Energy, is the Company that will lead the new nuclear programme in the United Kingdom. For the purpose of this application for Development Consent, NNB Generation Company Limited is referred to as EDF Energy.

1.1.3 EDF Energy has developed a project-specific transport strategy for the HPC Project and a DCO application that includes detailed measures to manage the flow of vehicles during the construction period and beyond, into the operational period. This strategy includes:

- Strict controls on on-site parking,
- Park and ride facilities to consolidate workforce and visitor trips and transport them to the HPC development site via bus
- Direct bus services for workers from accommodation campuses and other areas where there is a concentration of workers;
- Freight management facilities to consolidate and manage freight deliveries to the HPC development site.
- A consolidation facility for postal/courier deliveries.
- A bypass around the west of Cannington.
- Refurbishment and extension of the existing Combwich Wharf and an associated freight laydown facility for the storage of abnormal indivisible loads (AILs) and other construction goods being delivered via Combwich Wharf before they are transferred to the HPC development site.
- A temporary jetty at the HPC development site to receive bulk materials for concrete and other construction materials by sea.
- Highway improvements across the highway network to address safety or capacity issues that may arise, particularly during construction.
- Contributions towards pedestrian and cycle improvements and further highway capacity and safety improvements in the area;
- A comprehensive Travel Plan that requires the use of sustainable modes by construction workers and encourages a further shift to non-car modes

1.1.4 The **Transport Assessment** considers the sufficiency of these and other proposed measures to address the transport consequences of the HPC Project, within the context of relevant policy.

1.1.5 EDF Energy's proposals do not include a Bridgwater bypass.

1.1.6 Somerset's Future Transport Plan (2011-2026) (March 2011) (Ref. 1), however, sets out the County Council's expectations for the Hinkley Point C project and states in Policy HIN1:

> *"Any new major highway proposals are to be justified by a full New Approach to Appraisal (NATA) assessment. For example, the need for and (if required) route of a Bridgwater Northern Bypass should be established by a NATA type assessment, including an option based on the improvements needed in Bridgwater if the bypass were not provided."*

1.1.7 A similar expectation that the need for a Bridgwater bypass will be examined through a NATA assessment is also set out in the draft Hinkley Point C Joint Supplementary Planning Document prepared by West Somerset Council (WSC) and by Sedgemoor District Council (SDC) (Ref. 2). The **Planning Statement** considers the weight which should be attached to local planning and other policies – particularly policies which are not part of the adopted Development Plan. Such policies cannot set tests or requirements for the Project and the DCO application is to be considered on its own merits against the primary policy guidance provided in the National Policy Statements. The IPC and the Secretary of State will be obliged to consider whether the DCO application, as submitted, meets the statutory tests set for it in the Planning Act 2008, rather than whether a different application should have been submitted.

1.1.8 As a Bridgwater bypass does not form part of the DCO application, it is not assessed as part of the Project and there is no requirement for it to be the subject of the **Environmental Statement**, the **Transport Assessment** or other DCO application documents.

1.1.9 Nevertheless, this document addresses the merits of the case for including a Bridgwater bypass within the HPC Project in order to respond to the requests raised by the local authorities. Whilst the authorities have requested that a Bridgwater bypass study be undertaken based on the New Approach to Appraisal (NATA) method, it is not considered that this approach is necessary given that the Bridgwater bypass does not form part of EDF Energy's proposals; however this report includes a wider assessment of the practicality, appropriateness and necessity of a Bridgwater bypass. The requirement for a NATA appraisal is considered in Chapter 4 of this report.

1.2 The HPC Project

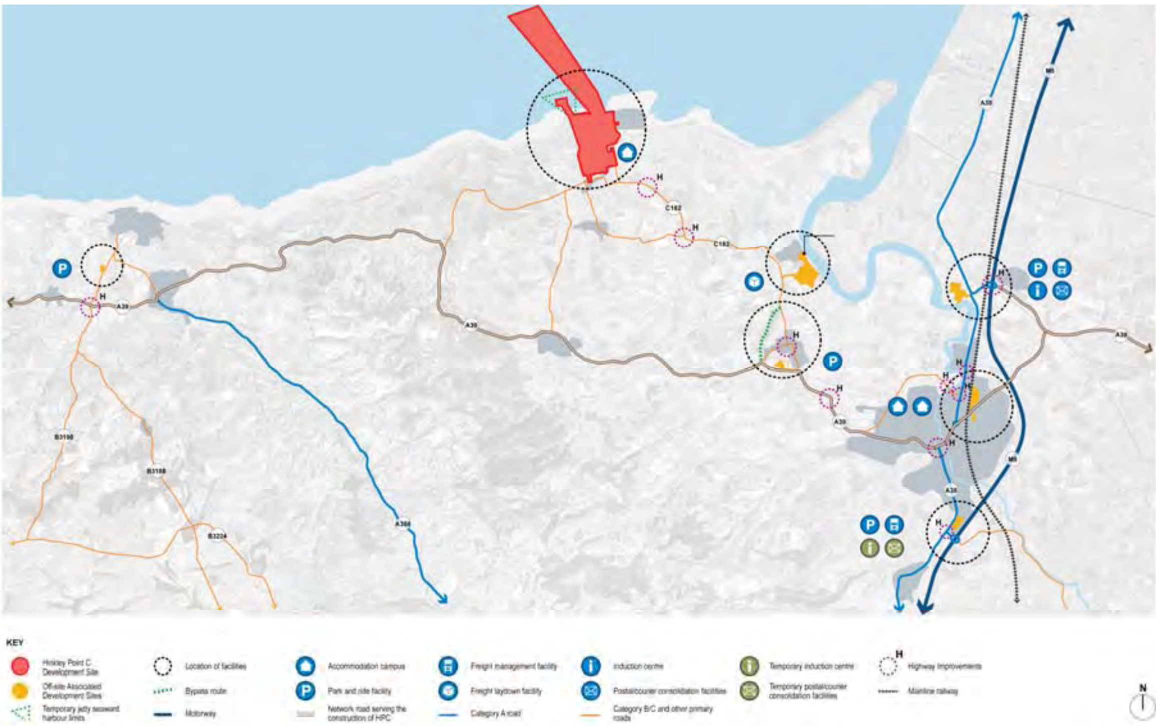
1.2.1 In addition to the new nuclear power station itself, the HPC application for Development Consent includes the following associated developments:

- Temporary jetty for the delivery of construction materials to the HPC development site, which is the subject of the DCO application and a separate application.

- Accommodation campuses for up to 1,000 construction workers, with ancillary facilities, across two sites in Bridgwater. These are in addition to an accommodation campus for 510 workers proposed within the HPC development site.
- Park and ride facilities for up to 2,361 car parking spaces, 49 mini-bus parking spaces, 125 motorcycle spaces, 125 bicycle spaces and 51 bus parking bays, with ancillary facilities, across four sites.
- Freight management facilities for up to 140 heavy goods vehicles (HGV) parking spaces, with ancillary facilities, across two sites.
- An induction centre for the training of staff in connection with the HPC construction phase.
- A consolidation facility for postal/courier deliveries.
- A bypass around the west of Cannington.
- Refurbishment and extension of the existing Combwich Wharf and an associated freight laydown facility for the storage of abnormal indivisible loads (AILs) and other construction goods. A new goods wharf access road is proposed to link Combwich Wharf with the existing Combwich Wharf access road, which will be altered.
- Highway improvements.

1.2.2 The general location of the associated developments in relation to the HPC development site is shown in **Figure 1.1**. Fuller descriptions of the location and nature of the main site development and each of the proposed associated developments are contained in the **Environmental Statement** and the **Design and Access Statements.**

Figure 1.1: Hinkley Point C Project Site Context Plan



1.2.3 A package of highway improvements is proposed in the DCO application for the urban areas of Bridgwater and Cannington and elsewhere on the local highway network to provide mitigation for the transportation impacts of the HPC Project. These improvements are proposed at points on the highway network where they are considered necessary for highway safety and/or highway capacity reasons. The works are described in detail in the **Transport Assessment** and comprise:

- A38 Bristol Road/The Drove Junction – small increase in the width of the highway to improve the operation of the junction, through increasing the width of the right turn lane from Bristol Road into the Drove to reduce queuing
- A39 Broadway/A38 Taunton Road Junction – changes to signal arrangements, minor carriageway realignments to improve operation of the junction and pedestrian facilities.
- A38 Bristol Road/Wylds Road Junction – increase in width of carriageway and right turn lane to assist right turns and reduce queuing.
- Wylds Road/The Drove Junction - carriageway widening to Wylds Road, The Drove and East Quay at approaches to the junction and provision of a left-turn slip road from Western Way into Wylds Road to improve operation of the junction.
- A39 New Road/B3339 Sandford Hill Roundabout – new four arm roundabout to improve safety of junction including minor realignment of existing carriageway.
- M5 Junction 23 Roundabout – provision of signalisation and minor carriageway alterations within highway land to improve operation of roundabout and minor improvements to road markings at Dunball roundabout.
- Washford Cross Roundabout – new four arm roundabout to improve safety of junction.
- Claylands Corner Junction – minor carriageway widening to improve operation of the junction.
- C182 Farringdon Hill Lane, Horse Crossing – provision of horse crossing to improve safety for horses and riders.
- Cannington Traffic Calming Measures – traffic management measures including skid resistant surfacing, 20 mph speed limit, new puffin crossing on High Street, new footway on High Street, new zebra crossing on Rodway and associated signage.
- Huntworth Roundabout – increase in width of eastern arm of roundabout to reduce queuing, amendments to white lining to improve circulation and provision of signage.

1.2.4 The principal purpose of the investment in the associated development sites is to mitigate impacts that would otherwise arise from the HPC Project's construction and to enable its efficient construction and delivery. The comprehensive transport strategy would achieve substantial reductions in the otherwise unmitigated impacts of the development. For instance, the strategy will mean that, in respect of their daily journey to and from work, at least 90% of the peak workforce would either be already resident at the HPC on-site accommodation campus or would arrive at and depart from the HPC Development Site by bus. This would minimise HPC related cars on the road network. It is estimated that the transport strategy would result in only about

33% of the peak construction workforce driving a car on any part of their daily journey to work, compared to the Somerset average of 65% using a car as the main mode of travel.

1.2.5 The DCO application is also accompanied by a **Framework Travel Plan** which Site Specific Travel Plans for the HPC development site, accommodation campuses, Public Information Centre, Induction Centre and Workplace Travel Plan for the operational HPC site, would have to adhere to. The Travel Plan provides a further set of measures aimed at encouraging more sustainable travel, with an emphasis on reducing single occupancy car use wherever possible.

1.2.6 In addition, EDF Energy is also proposing a package of funds to enable the highway authority to carry out pedestrian and cycling improvements and to contribute towards other highway capacity and safety improvements in Bridgwater. EDF Energy has also agreed to fund measures to address issues that arise through monitoring of transport impacts, up to a maximum sum to be agreed. EDF Energy is also proposing to provide funds for any required reinstatement of highways as a result of HPC traffic causing damage, following the undertaking of the highway condition surveys up to a maximum sum to be agreed.

1.2.7 It is also proposed that HGV routes to the HPC development site would be strictly monitored and controlled. HGVs leaving the proposed Freight Management Facilities at Junction 23 and Junction 24 of the M5 (inbound traffic to HPC) and HPC (outbound traffic) will be monitored to ensure compliance with the mandatory HGV routes and capping limits. EDF Energy is proposing an Automated Number Plate Recognition (ANPR) system to monitor compliance with the **Freight Management Strategy** appended to the **Transport Assessment**. This would include the installation of ANPR cameras at HPC first and subsequently along the permitted HGV routes. These proposals would integrate with a web-based booking system to provide control over HGV movements, limiting movements in peak hours and banning the use of unsuitable routes. The investment in the two freight management facilities at Junctions 23 and 24 of the M5 provides an essential platform for this operation.

1.2.8 To complement these interventions, the new temporary jetty at Hinkley Point C and the enhanced wharf facilities at Combwich will enable a significant amount of materials to be brought in by sea. The **Transport Assessment** estimates that the use of the jetty will result in approximately 250,000 less HGV movements over the duration of the construction programme.

1.2.9 In combination, therefore, the range of measures proposed in the draft DCO application would achieve substantial reductions in traffic flow on the local road network compared with the unmitigated position that might otherwise be expected to arise from the HPC Project.

1.2.10 These measures are complemented by highway safety and capacity improvements on the local network so that, overall, the HPC Project does not materially reduce average speeds across the network, at the peak of construction activity. After that peak, the project will leave the legacy of an enhanced transport network.

1.3 Consultation

a) Summary of Consultation undertaken by EDF Energy

1.3.1 EDF Energy have undertaken a series of consultations between November 2009 and August 2011 on the proposals for the HPC Project, which included consultation on the various components of the transport strategy and on a draft Bridgwater Bypass Study. The consultation included public exhibitions and meetings with relevant local authorities, statutory consultees, Parish and Town Councils and local organisations.

1.3.2 A Transport Steering Group was also set up, which included representatives from EDF Energy, Somerset County Council (SCC), SDC and WSC.

b) Stage 1 Consultation

1.3.3 At Stage 1, with specific regard to transport proposals, EDF Energy consulted on two potential routes for a Cannington bypass, to the east or west of Cannington, identifying the western route as the preferred option, and some highway improvements to accommodate heavy loads travelling between Cannington, Combwich Wharf and the HPC development site.

1.3.4 With regard to a Bridgwater bypass, the Stage 1 consultation stated at paragraph 4.2.9:

> *"It has been suggested that EDF Energy should construct a bypass around Bridgwater. EDF Energy is sympathetic to the concerns of local residents about the potential impacts of the development, and is giving this suggestion careful consideration. However, early results of traffic modelling, assuming Travel Plan measures are in place, indicate that the forecast impact of construction traffic does not justify the construction of a new bypass around Bridgwater."*

1.3.5 On this basis, the Stage 1 consultation stated that, as matters stand, EDF Energy would not be pursuing a Bridgwater bypass, but that further detailed assessment work was being carried out.

1.3.6 There were significant comments from members of the public at Stage 1 urging EDF Energy to consider the provision of a Bridgwater bypass between the Dunball roundabout and HPC. Some consultation comments felt that this would avoid the necessity for providing the park and ride and freight management facilities. Further details are provided in the **Consultation Report**.

c) Stage 2 Consultation

1.3.7 The Stage 2 Consultation included a study into potential options for bypasses at Bridgwater and Cannington, as potential options for mitigation for the proposed construction and operational effects of the new power station and associated development. The study was a high level appraisal to assess the need for a bypass at Cannington, Bridgwater or both and assessed a range of potential routes.

1.3.8 For Bridgwater, the study set out six potential route options. Five of these were discounted after a very high level environmental assessment. Route 1 was then taken forward for further assessment on the basis that it avoided a high level crossing of the River Parrett.

1.3.9 The study included a very high level environmental assessment with regard to noise and air quality; landscape, ecology; flooding; land use and deliverability. This concluded that there were likely to be landscape impacts as a result of the provision of a Bridgwater bypass on Route 1 and potential ecological impacts due to proximity to protected sites.

1.3.10 The study concluded that there was not a requirement for a Bridgwater bypass, on highway capacity, safety or environmental grounds, but that there was a requirement for a Cannington bypass, primarily because of environmental impacts in Cannington.

1.3.11 With particular regard to a Bridgwater bypass, comments received from the highway authorities and district council's principally related to their request for:

- the assessment to be in accordance with the Department of Transport approach of New Approach to Appraisal (NATA);
- appropriate justification for not taking forward a Bridgwater bypass option, to be provided, together with the assumptions that surround it;
- more detailed consultation in respect of long term sustainability benefits or impacts of the bypass options;
- examining the costs and benefits of the scheme over a period of 60 years;
- a more detailed quantitative assessment of road network capacities, to provide greater insight into the impact of the development trips on the road network;
- greater consideration of safety, local severance and user-non-user benefits;
- consideration of innovative and lower cost engineering options for direct access to the site; and
- a greater level of detail in order to justify the need, or otherwise, for the respective Cannington and Bridgwater bypass proposals; and
- an assessment of the total cumulative traffic impacts generated by the project, such as road closures, and the longer term resilience of the transport network and route options proposed by EDF Energy.

1.3.12 It is noticeable that the responses from the authorities tend to criticise the absence of a Bridgwater bypass study from the consultation material, rather than the absence of a Bridgwater bypass from the project.

1.3.13 Similar comments were received from members of the public at Stage 2 as those received at Stage 1. Some people commented that a Bridgwater bypass should be advanced because it would provide long term benefits after the construction of HPC. Further details are provided in the **Consultation Report**.

1.4 Scope of Study

1.4.1 This study only relates to a consideration of the need for the inclusion of a Bridgwater Bypass within the HPC Project. The Cannington bypass forms part of EDF Energy's proposals and, therefore, an assessment of its transport impacts and environmental impacts is provided within the **Transport Assessment** and **Environmental Statement**. As set out in the **Environmental Statement,** there are significant differences in the level of traffic related environmental effects identified in Cannington as a result of the HPC Project (without a bypass) compared to those identified in Bridgwater. As a result, EDF Energy has concluded that it would be appropriate to provide a bypass around Cannington. The reasons for providing a Cannington western bypass are considered further in the **Planning Statement**.

1.4.2 The purpose of this study is to provide a more detailed appraisal of the requirement for a Bridgwater bypass as part of the HPC Project, including an assessment of the likely benefit of including a Bridgwater bypass, if any; and to review its deliverability and implications for the HPC Project.

1.4.3 This report has been prepared with the consultation comments from the highway authorities, the District Councils and the public in mind.

1.5 Report Structure

1.5.1 This report is structured as follows:

- Chapter 2 – Policy requirement for Bridgwater bypass.
- Chapter 3 – Policy approach to new roads.
- Chapter 4 – Environmental and transport considerations.
- Chapter 5 – Planning analysis.
- Chapter 6 – Conclusions.

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2. POLICY REQUIREMENT FOR A BRIDGWATER BYPASS

2.1 Background

2.1.1 This section considers the extent to which the construction of a Bridgwater bypass is a requirement of, or would be consistent with, existing local planning policy. Strategic policy with regard to the provision of new roads generally is provided in Chapter 3.

2.2 Policy Background

2.2.1 The following regional and local policy documents and evidence base has been reviewed in order to understand the policy position in relation to a Bridgwater bypass:

- Regional Planning Guidance for the South West (RPG 10) 2001-2016 (2001) (Ref. 3);
- Draft Revised Regional Spatial Strategy (RSS) for the South West incorporating the Secretary of State's Proposed Changes 2006-2026 (July 2008) (Ref. 4);
- Somerset and Exmoor National Park Joint Structure Plan Review 1991-2001 (2000) (saved from 27 September 2007) (Ref. 5);
- Somerset's Future Transport Plan 2011-2026 (March 2011) (Ref. 1);
- Connect 3: DaSTS Taunton Gateway Study (May 2010) (Ref. 6);
- Bridgwater, Taunton and Wellington Future Transport Study, consultation version (October 2009) (Ref. 7);
- Sedgemoor District Local Plan (2004) (saved from 27 September 2007) (Ref. 8);
- Bridgwater Vision (July 2009) (Ref. 9);
- Sedgemoor Infrastructure and Delivery Study (June 2010) (Ref. 10);
- Sedgemoor Core Strategy (Proposed Submission draft incorporating Council's recommended changes) (March 2011) (Ref. 11);
- Consultation Draft Hinkley Point C Project Joint SPD (February 2011) (Ref. 2); and
- North East Bridgwater Design Principles (February 2009) (Ref. 12).

2.2.2 **Appendix 1** provides a table setting out any references to a Bridgwater bypass in the above documents.

2.2.3 The **Planning Statement** considers the weight which should be attached to local planning and other policies – particularly policies which are not part of the adopted Development Plan (see paragraph 1.1.7 of this report). In this context, the following provides a summary of the consideration of a Bridgwater bypass in various policy documents.

a) Regional Policy

i. Regional Planning Guidance for the South West (RPG 10) 2001-2016 (2001) (Ref. 3)

2.2.4 The status of RPG 10 is discussed in the **Planning Statement**. RPG10 provides a diagram showing the Regional Transport Strategy at page 86, which shows regional transport priorities. This is then accompanied by a Table (6) which shows infrastructure and investment for encouraging sustainable transport systems, within and between the Principal Urban Areas to support inter-regional movement to aid economic growth and regeneration and reduce peripherality. A Bridgwater bypass is not shown on the diagram or listed in the table.

ii. The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of States Proposed Changes 2008 – 2026 (July 2008) (Ref. 4)

2.2.5 The draft RSS for the South West sets out the regional approach to transport at Chapter 5 and the Sub-Regional Strategies for each sub-area at Chapter 4, which includes Taunton and Bridgwater. Policy SR21 identifies planned growth for Bridgwater and Taunton over the Plan period (2008-2026), which for Bridgwater is 6,200 new homes (310 per annum) and a share of 18,500 new jobs.

2.2.6 Paragraph 4.2.61 then states that key infrastructure required to deliver this growth will be identified through the Implementation Plan and lists what this will include. This list includes the provision of a Northern Inner Distributor Road for Taunton, but there is no mention of a Bridgwater bypass.

b) County Policy and Evidence Base

i. DaSTS Taunton Gateway Study Initial Options Report (May 2010) (Ref. 6)

2.2.7 The DaSTS Taunton Gateway Study Initial Options Report (May 2010) was published as the output of Stage 3 of the Taunton Gateway Study. This followed Stages 1 and 2, which were primarily stakeholder consultation and carrying out a baseline study and options assessment framework. It was commissioned by the County and funded by the Department of Transport to consider the interrelationship between transport movements in the Bridgwater/Taunton/Wellington and A358 corridors, and those on the national and inter-urban networks. The need for the study was initiated by significant planned economic and housing growth for the area set out in the Regional Spatial Strategy (RSS), and by associated concerns over the future reliability and resilience of the regional and national highway routes

2.2.8 Importantly, the study is not a policy document in itself but was commissioned to inform and complement the Future Transport Plan and Local Development Frameworks. In this context, it is noteworthy that the Somerset Future Transport Plan did not identify a need or requirement for a Bridgwater bypass.

2.2.9 The study concluded that traffic calming on the A38 was probably not feasible without an alternative route being provided due to potential impact on the M5 and other local roads and that “either a Northern Bypass or Eastern Bypass could provide a suitable alternative route” (paragraph 8.5.2). The study also commented in Table 8.2: Part 2

Feasibility and Deliverability – Assessment Results that the scale of option could be reduced to improved cycle and pedestrian crossing opportunities.

2.2.10 A Northern Bridgwater Bypass was assessed as part of a wider package of options known as the 'A38 corridor package'. This study concluded with regard to the Northern Bridgwater Bypass in Table 8.2:

> *"The scheme is likely to be expensive and probably only politically acceptable if it supports improvements to Bridgwater Town Centre. Saturn model tests show that it does provide a suitable alternative route to A38 through the town centre if this route is traffic calmed. The option could potentially be funded by Hinkley Power Station proposals as a legacy, but the case will need to be very strong. Without funding from Hinkley may not be affordable."*

2.2.11 The document states that the A38 option will be taken forward for further assessment as part of the development of a final implementation plan and strategy. This stage of the study was originally proposed for publication in March 2011, although it has not progressed to this stage, as no further funding was available.

ii. Bridgwater, Taunton and Wellington Future Transport Strategy (March 2010) (Ref. 7)

2.2.12 This document sets out the Transport Strategy for Bridgwater, Taunton and Wellington for the period 2009 to 2026. The strategy indicates a number of infrastructure improvements that may be implemented during the strategy's lifespan in support of the draft Regional Spatial Strategy and which will be likely to be a key component of the Third Somerset Local Transport Plan.

2.2.13 At section 5.1 on Bridgwater the strategy states that SCC:

> *"…..will further investigate the potential for introducing park and ride sites on the edges of the town to reduce town centre congestion. We will seek to improve sustainable links to the railway station, as well as increasing opportunities for walking and cycling in the town by removing physical barriers created by roads, by providing new infrastructure and by improving the pedestrian environment in the town centre."*

2.2.14 SCC's transport strategy document also indicates a number of improvements that may be implemented during their strategy's life-span. Some of the improvements that are listed are advised to be development-related and will only be implemented should the site specific developments proceed.

2.2.15 The document makes no specific reference to the requirement for a Bridgwater bypass, although it makes general reference to funding being secured for the 'A38 corridor package'.

iii. Somerset Future Transport Plan (March 2011) (Ref. 1)

2.2.16 Somerset's Future Transport Plan 2011 – 2026 (FTP) replaced Somerset County Council's (SCC) Second Local Transport Plan (LTP2) in April 2011 and sets out a long term strategy for helping to deliver transport priorities up until 2026.

2.2.17 The FTP contains, inter alia, transport policies which include HIN 1 – Transport Requirement for New Nuclear Development. Importantly, although the Transport Plan was subject to significant consultation with stakeholders, including Parish and District Councils and subject to public consultation, it is a non-statutory document which has not been subject to any independent examination. Policy HIN 1 states:

> *"Any new major highway proposals are to be justified by a full New Approach to Appraisal (NATA) assessment. For example, the need for and (if required) route of a Bridgwater Northern Bypass should be established by a NATA type assessment, including an option based on the improvements needed in Bridgwater if the bypass were not provided."*

2.2.18 The Future Transport Plan lists the current major transport schemes anticipated to be delivered in Somerset within the next 15 years. These include:

- A38 corridor package (Bridgwater to Taunton); and
- Delivery of infrastructure associated with Hinkley Point C.

2.2.19 A Bridgwater bypass scheme is not listed. The plan states that "at this time it is not intended to support the promotion of any other strategic road schemes" (paragraph 7.5).

c) Local Policy and Evidence Base

2.2.20 Whilst very limited local policy documents make reference to a Northern Bridgwater Bypass, none of them consider its necessity in relation to the level of growth identified to be delivered in Bridgwater through the existing Sedgemoor District Local Plan or emerging Core Strategy.

i. Sedgemoor District Local Plan (2004) (Ref. 8)

2.2.21 The Sedgemoor District Local Plan (2004) planned the expansion of Bridgwater and other towns in the district over the period 1991-2011, promoting growth of 9,200 homes. Its transport polices propose five new roads; Colley Lane Southern Access Road, Leggar Link Road, Stockmoor Link; Burnham-on-Sea Eastern Distributor Road and Ashcott bypass, but it does not include any reference to a Bridgwater bypass.

ii. Bridgwater Vision (July 2009) (Ref. 9)

2.2.22 The Vision and Strategic Framework for Bridgwater was prepared by SDC in partnership with the South West Regional Development Agency (RDA), the Environment Agency (EA), SCC, the Learning and Skills Council, Bridgwater College, Bridgwater Town Council and Bridgwater Chamber of Commerce.

2.2.23 The Bridgwater Vision and Strategic Framework Options report was published in June 2009 and sets out a strategic framework for the long term regeneration of Bridgwater. This document includes a transport strategy and support for new nuclear development at Hinkley Point and identifies the opportunities and challenges it would bring to the local area.

2.2.24 The overall Vision expressed for Bridgwater is encapsulated in Vision V1, which states:

"In 2060 Bridgwater will be an energy conscious town known for its ambitious approach to sustainability and low carbon living. Bridgwater will be seen as a place that has been re-energised into a confident town through its strong, innovative architecture, its vibrant town centre and its revitalised neighbourhoods – encouraging a greater sense of local community, wellbeing and civic pride.

Bridgwater will have a reputation for successful, coordinated delivery of its ambitious place shaping programme. The town's people, businesses and agencies will continue to work in partnership to improve housing and transport, deliver its flooding solution; the Parrett barrier and provide outstanding health and recreation facilities. Bridgwater will continue to attract new investment, maintaining its new position as a regional centre of enterprise excellence. Its highly skilled workforce will be utilised by the many cutting edge employers in the town, encouraged by the focus on innovation and knowledge, offering quality job opportunities and training in new and emerging sectors."

2.2.25 The Strategic Spatial Diagram (pages 60-61) identifies a potential new link road between Dunball roundabout and Hinkley Point.

2.2.26 The potential for road improvements to Hinkley from Junction 23 of the M5 motorway are identified as an opportunity, which may require a new link road running from the Dunball roundabout travelling west across the River Parrett towards Hinkley (page 106). The design principles for this include:

"Dunball roundabout provides a key gateway into the town from Junction 23 of the M5 motorway and potentially to Hinkley Point through a possible new link road.

The area will incorporate a possible new link road from the Dunball roundabout across the River Parrett connecting Hinkley Point to Junction 23 of the M5 motorway…"

2.2.27 Although the link road is identified as a potential opportunity, there is no assessment of its necessity, or otherwise.

iii. Sedgemoor Infrastructure and Delivery Study (June 2010) (Ref. 10)

2.2.28 Importantly, the Sedgemoor Infrastructure and Delivery Study (June 2010) which assesses the transport, utilities, social and green infrastructure that will be required to support housing and employment growth in Sedgemoor to 2026, as set out in the emerging Core Strategy, does not include a requirement for a Bridgwater bypass. The document states at page 28:

"Studies show that the transport network needs considerable improvement to accommodate growth at Taunton and Bridgwater and to avoid unacceptable increases in traffic on the M5. The A38 proposals involve the provision of a high capacity, high frequency public transport [link] between Bridgwater and Taunton, together with a series of junction improvements, bus priority measures and walking and cycling provision."

2.2.29 However, there is no reference to traffic calming on the A38 or the need for a Bridgwater bypass to facilitate the delivery of the transport corridor.

iv. Draft Sedgemoor Core Strategy (Proposed Submission draft incorporating Council's recommended changes) (2011) (Ref. 11)

2.2.30 The draft Sedgemoor Core Strategy has been prepared on the basis of a detailed evidence base including, but not limited to:

- Infrastructure Delivery Strategy (2010);
- Strategic Housing Land Availability Assessment (2009);
- Strategic Housing Market Assessments including Strategic Housing Land Viability Assessment (2009);
- Somerset Sustainable Community Strategy (2009);
- Annual Monitoring Reports; and
- Employment Land Review (2009).

2.2.31 On the basis of their detailed evidence base, the draft Core Strategy plans considerable growth and identifies 7,455 homes and 6,720 jobs to be delivered in Bridgwater by 2027. Taking into account completions since 2006, Bridgwater has a residual requirement to provide 4,826 homes by 2027.

2.2.32 The spatial strategy for Bridgwater, set out in Table 3.4, includes strategic and local transport improvements including enhancing movement and accessibility for all on the A38 corridor between Bridgwater and Taunton and delivering sustainable transport solutions.

2.2.33 The draft Sedgemoor Core Strategy did not refer to a Bridgwater bypass in any of its previous drafts, however, the Council's recommended changes of March 2011 included reference to a requirement for an assessment of the need for a Bridgwater bypass to be carried out in relation to Hinkley Point C (paragraph 4.36). This followed a request by Members at a Full Council meeting on 16 February 2011 and stated:

> *"The HPC promoter will also need to demonstrate that transport and highways proposals for Hinkley Point form part of a robust transport and logistics plan that prevents as far as possible adverse transport impacts arising from the movement of people, goods and services related to the project, and the proposals are shown to significantly contribute towards the delivery of Somerset's Future Transport Plan 2011-26 (including associated technical documents); the Bridgwater, Taunton and Wellington Future Transport Strategy; and the Bridgwater Vision. There should be an assessment of the need for a Bridgwater bypass."*

2.2.34 Notably, the draft Core Strategy does not include a requirement for a Bridgwater bypass, only for the assessment of the need for it, specifically in the context of HPC. There is no requirement for (or apparent consideration of) a Bridgwater bypass to deliver the level of growth identified in the Core Strategy.

2.2.35 The status and weight to be attached to the Core Strategy is considered in the **Planning Statement**.

v. Hinkley Point C Project Supplementary Planning Document Consultation Draft (February 2011) (Ref. 2)

2.2.36 West Somerset Council (WSC) and Sedgemoor District Council (SDC) have jointly prepared draft supplementary planning guidance in relation to the Hinkley Point C Project. Public consultation on the Consultation Draft Hinkley Point C Project Joint SPD commenced on 1 March 2011 and concluded on 12 April 2011. EDF Energy has submitted representations which object to the draft supplementary planning guidance (for further details refer to **Planning Statement**).

2.2.37 With regards to transport, paragraph 6.17 states that the County Council and District Councils will expect the HPC Project promoter to:

- *"Align the Transport/Freight Strategy with other Council plans and strategies. The transport proposals for the HPC project during both the construction and operational phases of the power station should integrate with and contribute to the delivery of the approved transport strategies as set out in the Somerset Future Transport Plan and associated transport policies and implementation plan, the Bridgwater, Taunton and Wellington Future Transport Strategy, the Bridgwater Vision, Western Somerset Economic Development and Access Strategy and emerging Williton master-plan.*
- *Minimise the volume of road traffic associated with the development of the new power station at all times, but especially during peak hours and during the peak tourism season between the months of June, July and August. The efficient and safe functioning of key routes, including the M5, A38, A361, A370, A371 and A372 must be protected.*
- *Maximise the safe, efficient and sustainable movement of people and materials required for the proposed nuclear power station.*
- *Provide transport mitigation where additional traffic flows of the project exacerbate or cause highway congestion problems.*
- *Any new highway proposals are to be justified by a full New Approach To Appraisal (NATA) assessment. Appraisals should address potential impacts raised during consultation, such as the potential severance effect to Brymore School of the western by-pass option at Cannington.*
- *All proposed highway works are to be the subject of a full operational analysis and a road safety audit in accordance with then current guidance*
- *Provide sustainable transport solutions for access to the site that workers and visitors will be required to use. This should include provision of public transport priority measures in the form of bus lanes and other bus priority measures on key routes from associated development sites to the main site for construction and other vehicles, providing a beneficial transport legacy.*
- *Provide sustainable transport linkages to and from all associated development sites to provide access to employment, education, retail, leisure and healthcare facilities.*

- *Ensure the number of parking spaces provided at or near to the site during the construction phase is as close as possible to zero.*
- *Enable effective controls to be put in place to ensure workers and visitors do not park in inappropriate locations.*
- *Ensure as much construction material as possible is delivered by sea.*
- *Minimise the amount of waste materials, including topsoil, transported off-site.*
- *Provide necessary improvements to the transport network to mitigate against any adverse impacts on the community; including but not limited to congestion, air quality and road safety impacts. For example, include safety improvements where the additional traffic flows of the project exacerbate existing road safety problems.*
- *Minimise traffic disruption both for the local community and visitors to the area.*
- *Control and manage the flow of any road freight movement associated with the development in order to ensure appropriate routes are used, avoid peak hour movement and to respond to incidents on the transport network.*
- *Agree and enable deployment of robust plans for managing unforeseen incidents on the transport network, including but not limited to traffic management plans, diversionary routes and freight/ delivery management systems.*
- *Provide long-term, sustainable legacy benefits for the local community.*
- *Protect the natural and built environment and ensure the image of the area is not adversely affected.*
- *Ensure that public transport services are protected throughout the construction, operation and decommissioning of the Hinkley Point nuclear power stations.*
- *Ensure that the needs of cyclists and pedestrians are protected and enhanced throughout the construction and operation of the proposed nuclear power station. This should include enhanced pedestrian and cycle facilities from associated development sites to the centres of nearby towns and villages, including provision of the Bristol Road / Bath Road link and rail crossing in Bridgwater.*
- *Protect current Public Rights of Way (PRoW) in and around Hinkley Point and associated development sites, and where stop-ups are required, ensure that PRoW are implemented that do not result in significant diversion lengths.*
- *Develop and implement Travel Plans for the proposed power station and associated development that will be monitored during construction and operation of Hinkley Point C.*
- *Monitor all movement associated with the development to ensure agreed mode share targets and thresholds for traffic congestion, air quality and road safety are achieved during construction and operation.*

- *Fully mitigate against and compensate for the adverse environmental impact of development related traffic. This should involve providing sufficient funds through appropriate legal agreements to enable the relevant authorities and agencies to implement further mitigation measures should any unforeseen impacts occur during the construction of the development."*

2.2.38 Notably, the draft SPD only required new highway proposals to be justified in terms of a NATA assessment and did not contain a requirement for the construction of or even the assessment of a Bridgwater bypass.

2.2.39 Sedgemoor District Council considered proposed changes to the SPD to take account of consultation responses on 5 October 2011. The Committee report recorded that respondents had noted the absence of any reference to the Bridgwater bypass in the draft SPD. Accordingly, the report recommended the insertion of new wording with regard to the Bridgwater Northern Bypass as follows:

> *Any new major highway proposals should be justified by a full New Approach To Appraisal (NATA) assessment. For example, the need for and (if required) route of a Bridgwater Northern Bypass should be established by a NATA type assessment, including an option based on the improvements needed in Bridgwater if the bypass were not provided. "*

2.2.40 Again, however, there was no appraisal of the actual need for the Bridgwater bypass.

1.2 Consideration in Strategic Planning Decisions

1.2.1 It is clear from the above that there is no planning policy requirement or proposal for the construction of a Bridgwater bypass either on its own or as part of the HPC Project. It is also instructive to consider whether the need for a Bridgwater bypass has featured in the consideration of other large scale development proposals in or around Bridgwater.

1.2.2 Two significant, strategic planning applications have recently been considered in Bridgwater by Sedgemoor District Council.

1.2.3 The North East Bridgwater masterplan outline planning application (ref. 09/08/00017) was approved on 2 July 2010 and comprises:

> *"Outline Planning Application to include: residential development of about 2,000 dwellings; a commercial services centre comprising up to 1200 square metres retail floorspace (Use Classes A1, A2 &A5), leisure (A3 and A4), community facilities (D1) and residential or B1 employment development; primary school; about 110,000 square metres of employment development (B1, B2, B8); sui generis trade units and car showrooms; sports and recreation facilities; strategic landscaping; transport network and access connections; and associated engineering works, infrastructure, drainage, and car parking; and Full Planning Application for the erection of part of the employment development comprising a Regional Distribution Centre (75,000 square metres of B8 warehousing and ancillary B1/B2 uses) and formation of access. Land off A38, Bristol Road and A39, Bath Road and bounded by M5 Motorway and railway line, Bristol Road, Bridgwater."*

1.2.4 The **Transport Assessment** submitted with the application concluded that, subject to a number of junction improvements, which included widening the A38 south approach to the Dunball Roundabout, signalisation and other junction improvements to Cross Rifles roundabout and modification of the Crandon Bridge junction, the development proposals were acceptable in transport terms. The assessment also assessed at what stage a third access linking the A38 and A39, via a railway bridge, would be required and suggested a development threshold of 75,000sqm B8, 1,500 dwellings and 35,000sqm of B1 floorspace (or 75,000sqm B8 and 1,800 dwellings) before the third access would be required.

1.2.5 It is relevant that the traffic generated by North East Bridgwater (NEB) will typically be local traffic travelling to and from central Bridgwater which would most likely have a relatively localised impact on the Bridgwater network. HPC generated traffic would be much more spread out across the network with a much lesser impact on central Bridgwater than would be expected from NEB (confined mainly to the designated HGV routes). In addition, NEB is a permanent development and the traffic generated will be consistent year on year into the future; whereas construction of HPC is only expected to last for nine years, with the peak occurring over just one year. Therefore, the overall impact of NEB traffic on the Bridgwater highway network is considered to be of much greater magnitude than the impact generated by the HPC Project.

1.2.6 This significant development includes no reference in the Officer's committee report for the need, or otherwise, for a Bridgwater bypass.

1.2.7 An application for the following mixed use development at a site known as Bridgwater Gateway (ref. 37/10/00116) was submitted on 23 December 2010,

> *"Outline Planning Application for mixed use development to include: employment floor space (Use Class B1), hotel (Use Class C1), freight staging facility (Sui Generis), petrol filling station (Sui Generis) and park and ride uses (Sui Generis), strategic landscaping, infrastructure including internal roads, drainage and car parking and including detailed drawings for a new vehicular and pedestrian access on to the A38 (amended proposal) at Land to the SW of Stockmoor Distributor Road and NW of, Taunton Road, North Petherton, Bridgwater for Bridgwater Gateway."*

1.2.8 The applicant was promoting a development comprising approximately 29,000sqm of employment floorspace and 10,000sqm of hotel floorspace and a petrol filling station on land previously proposed for an associated development site as part of EDF Energy's consultation. The applicant was promoting development of the Gateway site as a development which may be required to secure inward investment that may be generated by the HPC Project.

1.2.9 The application was considered at committee on the 19 July 2011 with a recommendation to grant consent, although the application was subsequently refused on the basis that insufficient evidence has been submitted to identify exceptional need for the proposed development sufficient to justify a departure from the adopted Local Plan Policies with regard to development outside settlement boundaries and green wedge, edge of strategic gap.

1.2.10 The Officer's updated report stated on page 5 that SCC had no objections to the application on the basis that a S106 agreement is entered into to secure improvements to the Huntworth roundabout, A38 corridor and a Travel Plan. The report goes on to state on page 10:

> *"In addition to the individual representations received to the application, neighbours have also put together a large petition in respect of wider development proposals relating to Hinkley Point. The core element of the petition is to seek support from the Council in providing a northern bypass around Bridgwater from Junction 23 of the M5 to connect up with the A39 west of Cannington. The petition then goes on to argue that with the development of the bypass taking place there won't be a need to release this the Gateway site for development.*
>
> *At the time of writing, the petition had reached 1,400 signatures. Although it has not been possible at the time of preparation of the report to confirm each of the names, it is recognised that this is a notable piece of work and carries weight accordingly."*

1.2.11 The report goes on to state on page 26:

> *"The submitted petition seeks to make the point that if a northern bypass was provided as part of HPC development then the need for this development would be negated. However at this time there is no certainty that a bypass will be provided and if it were, there is no certainty as to the implication for associated development in the Bridgwater area. Moreover it would remain the case that the Councils objective would be to achieve the maximum economic development locally. Consequently, the possibility of a northern Bridgwater bypass is no reason not to consider this application at this time."*

1.2.12 Although the application was subsequently refused, this was not on transport grounds and related to the lack of justification of exceptional need to develop outside of settlement boundaries.

1.2.13 The consideration of the above developments confirms that SDC have continued to promote growth in Bridgwater without a Bridgwater bypass, even where that growth is directly related to the HPC Project. The absence of a Bridgwater bypass has never been considered to be a reason to prevent substantial growth – either through the Core Strategy or through individual large scale applications.

1.3 Lessons Learned from the Barnes Inquiry

1.3.1 Some consultees have commented that a previous planning inquiry for a nuclear power station at Hinkley Point established the need for a Bridgwater bypass. This is considered below.

1.3.2 In 1987 the Central Electricity Generating Board (CEGB) applied to the Secretary of State for Energy for consent for an additional generating station to be known as Hinkley Point C.

1.3.3 Three public inquiries were held jointly between October 1988 and December 1989 in front of the Inspector Michael Barnes QC (the Barnes Inquiry). The Inspector's report into the principal application and the CPO was published on 4 June 1990 recommending approval of both the deemed planning application and the CPO. The Inspector recommended that the "benefits substantially outweigh the disadvantages". In letters dated 6 September 1990, the Secretary of State for Energy accepted the Inspector's recommendations, granted deemed planning permission for the power station but refused to confirm the CPO because of uncertainty about the implementation of the development.

1.3.4 In terms of the implications of the Barnes Inquiry for the requirement, or otherwise, for a bypass, the following are relevant issues:

- An agreement was reached between CEGB and Consortium of Opposing Legal Authorities (COLA) in relation to the bypass. Between 1986 and 1988 the CEGB funded the County Council up to £500,000 to meet the design cost of a new bypass and the purchase of land for its construction. In July 1988, the CEGB offered to contribute £10 million towards the construction of the bypasses and other minor road works, conditional on the County Council withdrawing objections to the construction of Hinkley Point C on transport grounds. As a result, no detailed transport evidence was heard at the inquiry and, in the light of the commitment given by the CEGB towards the bypass, the Inspector did not think it reasonable to impose a condition requested by SDC that the bypass should be in place before construction could commence (paragraph 62.13 of the Inspector's Report).

- Thus there was no assessment of the need, or otherwise, for a bypass to support the construction of HPC.

- The CEGB's case was that all traffic generated, with the exception of a few abnormal loads which would use the wharf at Combwich, would be carried entirely by road and that the existing road network would be adequate to carry the additional traffic. That case was not tested in view of the agreement reached with the authorities to fund a bypass.

- There was no alternative transport strategy in place, i.e. no park and ride sites and no apparent bus strategy and the scheme included 1,400 car parking spaces on site.

- There were no freight logistic sites holding back lorry movements and no apparent delivery management system.

- There was no jetty to take concrete making bulk materials and other goods.

- The Bridgwater Northern Distributor Road was not in place.

- National policy to favour sustainable modes and traffic management, rather than new road building was not as well developed as it is today.

1.3.5 EDF Energy's transport strategy, which is set out in Chapter 1 of this report, has a number of fundamental differences from that proposed in the previous planning inquiry, in particular it proposes:

- A temporary jetty for the delivery of construction materials to the HPC development site; it is assumed that 80% by weight of concrete materials will be delivered to the site by sea via the jetty once operational (with the jetty assumed to be in operation by 2013).

- Park and ride facilities to consolidate workforce vehicle trips and transport them to the construction site by bus.
- Freight management facilities to control HGV movements and a delivery management system to regulate delivery times and routes.
- A consolidation facility for postal/courier deliveries.
- Refurbishment and extension of the existing Combwich Wharf and an associated freight laydown facility for the storage of abnormal indivisible loads (AILs) and other construction goods being delivered via Combwich Wharf before they are transferred to the HPC development site. A new goods wharf access road is proposed to link Combwich Wharf with the existing Combwich Wharf access road, which will be altered.
- Only 200 car parking spaces on site during construction for site contractors and EDF Energy carrying heavy loads or required to have direct access to the site, with a further 100 spaces for business visitors, VIP visitors and disabled parking for the PIC.

1.3.6 On the basis of the above, there were very different circumstances in transport terms at the Barnes Inquiry and the outcome of that inquiry does not create a precedent for a Bridgwater bypass to support the construction of the HPC Project.

1.4 Conclusions

1.4.1 There is no policy requirement for a Bridgwater bypass in its own right or to support the growth of Bridgwater. Furthermore, there is no requirement set by precedent that would justify the need for a Bridgwater bypass. Even those documents which directly address the HPC Project, such as the draft Core Strategy, Hinkley Point C SPD and Somerset Future Transport Plan do not actually require a Bridgwater bypass.

1.4.2 Within this context, the following chapter sets out the national, regional and local policy approach with regard to new road building.

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2. POLICY APPROACH TO NEW ROADS

2.1 Introduction

2.1.1 This section provides an analysis of national, regional and local transport policy with regard to new road building. Regional and local policy approach with specific regard to a Bridgwater bypass is considered in Chapter 2 of this report.

2.2 National Policy and Guidance

a) Revised Draft Overarching National Policy Statement for Energy (Ref. 13)

2.2.1 The Planning Act 2008 introduced a new planning regime for Nationally Significant Infrastructure Projects (NSIPs) in England and Wales, including energy generation projects such as the HPC Project.

2.2.2 In October 2010, the Department of Energy and Climate Change published the 'Revised Draft Overarching National Policy Statement for Energy' (EN-1) which is the principal document for consideration of all new energy development and establishes the need for new energy infrastructure in the UK.

2.2.3 Paragraph 5.3.8 gives clear direction on mitigation measures as follows:

> *"Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts."* **(our emphasis)**

2.2.4 Paragraph 5.13.10 states that:

> *"Water-borne or rail transport is preferred over road transport at all stages of the project, where cost-effective."*

2.2.5 Managing travel demand in this context can be broadly defined as prioritising the use of alternatives to private car use and road borne freight movements.

b) Planning Policy Statement 1 (PPS1): Delivering Sustainable Development (January 2005) (Ref. 14)

2.2.6 Planning Policy Statement 1 (PPS1) was published in January 2005 and sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system.

2.2.7 PPS1 includes a number of key principles relating to development plans including the formulation of an integrated approach to development and the formulation of access policies.

2.2.8 Paragraph 27 (Delivering Sustainable Development) sets out the general approach to delivering sustainable development. In preparing development plans, planning authorities should, amongst other things,:

"Provide improved access for all to jobs, health, education, shops, leisure and community facilities, open space, sport and recreation, by ensuring that new development is located where everyone can access services or facilities on foot, bicycle or public transport rather than having to rely on access by car, while recognising that this may be more difficult in rural areas."

c) Planning Policy Guidance 13 (PPG13): Transport (January 2011) (Ref. 15)

2.2.9 Originally published in March 2001 and revised in January 2011, Planning Policy Guidance 13 on Transport (PPG13) sets out the national context for planning for transport.

2.2.10 The objectives of PPG 13 are to integrate planning and transport at the national, regional, strategic and local level to:

"Promote more sustainable transport choices for both people and for moving freight;

Promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling; and

Reduce the need to travel, especially by car."

2.2.11 Paragraph 46 states:

"…Policies need to strike a balance between the interests of local residents and those of the wider community, including the need to protect the vitality of urban economies, local employment opportunities and the overall quality of life in towns and cities. Local authorities, freight operators, businesses and developers should work together, within the context of freight quality partnerships, to agree on lorry routes and loading and unloading facilities and on reducing vehicle emissions and vehicle and delivery noise levels, to enable a more efficient and sustainable approach to deliveries in such sensitive locations."

2.2.12 Annex C of PPG13 relates to transport infrastructure. It states that care must be taken to minimise the environmental impact of any new transport infrastructure projects, including the impacts which may be caused during construction (paragraph C1). Annex C goes on to state that particular emphasis should be given to the need to explore a full range of alternative solutions to problems, including solutions other than road enhancement (paragraph C4).

d) Circular 2/07 - Planning and the Strategic Road Network (Ref. 16)

2.2.13 Circular 2/07 'Planning and the Strategic Road Network' published in 2007, details the Highways Agency's (HA) role and requirements in respect of the control of development in proximity to the Strategic Road Network (SRN), for which they are responsible. The Circular sets out:

- an approach adopted by the HA to encourage sustainable development while avoiding the potential for adverse effects on the SRN;

- a framework for collaborative working coordinating a number of organisations including Government Offices, regional and local planning authorities, local highway authorities, public transport providers and developers; and
- how the HA will deal with planning applications. Although the Circular predates Planning Act 2008, the collaborative approach to sustainable development which it advocates is firmly in line with the 'front loaded' approach to DCO applications.

2.2.14 The Circular draws on national policy and guidance and advocates the adoption of a demand management approach to development and promotes Travel Plans as an integral part of managing the capacity of the trunk road network.

e) Guidance on Transport Assessment, March 2007 (Ref. 17)

2.2.15 The DfT published its 'Guidance on Transport Assessment' (GTA) in March 2007. The guidance sets out the importance of the following principles:

- reduce the need to travel, especially by car - thought should be given to reducing the need to travel; consider the types of uses (or mix of uses) and the scale of development in order to promote multi-purpose or linked trips;
- sustainable accessibility - promote accessibility by all modes of travel, in particular public transport, cycling and walking; assess the likely travel behaviour or travel pattern to and from the proposed site; and develop appropriate measures to influence travel behaviour;
- mitigation measures - ensure as much as possible that the proposed mitigation measures avoid unnecessary physical improvements to highways and promote innovative and sustainable transport solutions.

f) Highways Agency Protocol for Dealing with Planning Applications (Ref. 18)

2.2.16 The HA has produced a protocol to assist developers in working with them when submitting a planning application for a development which could have an impact on the SRN.

2.2.17 The section titled 'Stage 2: Formal consultation by the Local Planning Authority' states that:

> *"For developments generating more than 30 two-way trips to the network during any peak period, a transport assessment and travel plan prepared in accordance with DfT and DCLG's 'Guidance on transport assessment' and meeting the requirements of DfT Circular 02/2007."*

2.2.18 The section also sets out the process that the HA requires regarding the consideration of mitigation measures:

> *All reasonable steps shall be taken to minimise the level of physical mitigation required, through the use of measures such as travel plans, development phasing, heavy goods vehicle booking systems and encouraging flexible working;*
>
> *Physical measures on the local road network to minimise the impact on the strategic road network shall be utilised as far as is reasonably possible;*

Once all reasonable minimisation and off-network mitigation has been implemented, the HA will consider capacity improvements on the strategic road network. The HA will not accept local capacity improvements where they would overload the wider network. (our emphasis)

g) Delivering a Sustainable Transport System (Ref. 19)

2.2.19 In November 2008 the Department for Transport published a White Paper titled 'Delivering a Sustainable Transport System.' This document sets out the Government's plan to tackle existing problems and to shape the future of the transport system.

2.2.20 A key focus of the document is on how to make best use of the existing network. Paragraph 9 of the Executive Summary states that "improving reliability and reducing congestion will be a priority." It also states:

"We will also want to consider improvements which enable people and freight to shift to lower carbon modes of transport such as the electrified railway. The need to increase capacity in some areas will require us to consider a range of solutions, for example whether any new rail lines, including high speed rail, or improved road capacity, may be needed along certain strategic transport corridors."

2.2.21 With regards to increasing road capacity, schemes which allow traffic to use the hard-shoulder on the busiest motorways are being promoted as opposed to building new roads.

2.2.22 Paragraphs 4.3 emphasises the need to reduce greenhouse gas emissions and the potential measures that could be used to achieve this. It states:

"We will look to make the best use of these overarching measures to reduce greenhouse gas emissions to achieve UK targets – for example through measures to improve engine emission standards, encourage investment in cleaner fuels and technologies, and promote smarter and more sustainable travel choices."

2.2.23 This indicates that national policy is centred on improving lower carbon modes such as rail, in order to reduce greenhouse gases and the need to travel. Constructing new roads to provide additional capacity is not set out as a priority and the clear approach of considering a full range of measures before considering new road infrastructure threads through national policy.

h) Roads – Delivering Choice and Reliability (Ref. 20)

2.2.24 In July 2008 the Government published a paper titled 'Roads – Delivering Choice and Reliability.' The document concentrates on the issues involved in getting the service required from the roads in England. It considers how road capacity can be increased in the most sustainable way.

2.2.25 The document concludes that there should be a focus on relieving pressure on the most overcrowded routes. Paragraph 6.2 states:

> *"with more than 80 per cent of all delay caused by congestion occurring in cities, and traffic levels growing fastest on motorways, it is clear these are our two most urgent priorities."*

2.2.26 The document also lends support to innovation, particularly in demand management. Traffic management schemes are given as an example of this, including use of the hard shoulder and options for reserving the new capacity created.

2.2.27 This demonstrates that national policy is concerned with prioritising demand management and reducing the level of vehicle trips, before exploring other transport interventions such as bypasses.

2.3 Regional Policy and Guidance

2.3.1 On 27 May 2010 the Secretary of State advised of the Government's intention to abolish regional planning policy and that this should be a material consideration in planning decisions. The status of regional policy is considered in the **Planning Statement.**

2.3.2 The relevant regional policy and guidance is summarised below:

a) Regional Planning Guidance for the South West (RPG 10) 2001-2016 (2001) (Ref. 3)

1.1.1 Regional Planning Guidance for the South West (RPG10) sets out a broad strategy for the South West up to 2016.

1.1.2 Policy TRAN 1 (Reducing the Need to Travel) states that local authorities, developers and other agencies should work towards reducing the need to travel by private motor vehicle through the appropriate location of new development.

1.1.3 Policy TRAN 6 (Movement of Goods) states that local authorities, the business community, transport operators and other agencies should work together to achieve more sustainable patterns of distribution. Amongst other things, they should aim to locate major freight generating development close to the regional rail and road networks.

1.1.4 Policy TRAN10 (Walking, Cycling and Public Transport) states that:

> *"Local authorities, transport operators and other agencies should aim to increase the share of total travel by these modes and ensure that they provide attractive and reliable alternatives to the private car by:*
>
> - *Seeking transport assessments and travel plans for all new major developments and encouraging major organisations to prepare and implement such plans, having regard to sustainable transport objectives set by local authorities in the local transport plan; and*
> - *Ensuring that major new development delivers (or sets out a clear and realistic strategy to deliver) a realistic choice of access by public*

transport, walking and cycling."

b) The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of States Proposed Changes 2008 – 2026 (July 2008) (Ref. 4)

1.1.5 The Draft Regional Spatial Strategy (RSS) for the South West (2006-2026) was published by the South West Regional Assembly in 2006. In 2008 the Secretary of State published proposed changes to the draft RSS for further consultation.

1.1.6 If adopted, this document would replace the existing RTS, published in RPG10. Chapter 5 sets out the strategy's regional approach to transport. The main aim of the RTS is to support the RSS and reduce the rate of road traffic growth by:

- *"Supporting economic development (identified in the RES) by maintaining and improving the reliability and resilience of links from the region's Strategically Significant Cities and Towns (SSCTs) to other regions, international markets and connectivity within the region;*
- *Addressing social exclusion by improving accessibility to jobs and services;*
- *Making urban areas work effectively and creating attractive places to live by developing the transport network in support of the strategy to concentrate growth and development in the SSCTs; and*
- *Reducing negative impacts of transport on the environment including climate change." (Page 139)*

1.1.7 Policy RTS1 (Corridor Management) states that, in order to improve the reliability and resilience of journey times, to develop opportunities to facilitate a modal shift and support growth at the Strategically Significant Cities and Towns (SSCTs), which include Bridgwater and Taunton, provision will be made to manage the demand for long distance journeys and reduce the impacts of local trips on corridors of national and regional importance.

1.1.8 Policy RTS2 (Demand Management and Sustainable Travel Measures at the SSCTs) states that demand management measures should be introduced progressively at the SSCTs to reduce the growth of road traffic levels and congestion. This should be accompanied by a 'step change' in the prioritisation of sustainable travel measures serving these places.

c) Somerset and Exmoor National Park Joint Structure Plan Review 1991-2011 (2000) (Saved Policies) (Ref. 5)

1.1.9 The Somerset and Exmoor National Park Joint Structure Plan was adopted in 2000 with relevant policies saved from 27 September 2007. All policies have been saved with the exception of Policy 53 which related to the Department of the Environment, Transport and the Regions Road Schemes. The Plan provides a strategic base for all land use planning within the plan area for the period up to 2011.

1.1.10 The Structure Plan sets out a preferred strategy for development which includes the encouragement of a balanced and integrated transport system which emphasises alternatives to the private car, where practical (paragraph 3.8).

1.1.11 Policy STR1 (Sustainable Development) states that development should, amongst other things, develop a pattern of land use and transport which minimises the length of journeys and the need to travel and maximises the potential for the use of public transport, cycling and walking; and conserve biodiversity and environmental assets, particularly nationally and internationally designated areas.

1.1.12 Policy 39 (Transport and Development) states that proposals for development should be considered having regard to:

- *"the management of demand for transport;*
- *achieving a shift in transport modes to alternatives to the private car and lorry wherever possible; and*
- *the need for improvements to transport infrastructure."*

1.1.13 Policy 45 (Bus) states that facilities for buses should be improved. This should include measures to give priority to buses and to introduce park and ride systems where these are the most sustainable option.

1.1.14 Policy 49 (Transport Requirements of New Development) states that proposals for development should be compatible with the existing transport infrastructure, or, if not, provision should be made for improvements to infrastructure to enable development to proceed. In particular development should:

- *provide access for pedestrians, people with disabilities, cyclists and public transport;*
- *provide safe access to roads of adequate standard within the route hierarchy and, unless the special need for and benefit of a particular development would warrant an exception, not derive access directly from a National Primary or County Route; and*
- *in the case of development which will generate significant freight traffic, be located close to rail facilities and/or National Primary Routes or suitable County Routes subject to satisfying other Structure Plan policy requirements.*

1.1.15 Policy 50 (Traffic Management) states that traffic management schemes which improve safety, travel conditions and the environment should be implemented to make the best possible use of the highway network. Such schemes should remove or reduce heavy or unnecessary vehicles from settlements or sensitive environments and improve conditions for pedestrians, cyclists and public transport users.

1.1.16 Policy 52 (Freight Traffic (Lorries in the Environment)) states that traffic, and particularly lorries, should be encouraged to use National Primary Routes wherever possible through appropriate measures such as positive signing and by discouraging the use of unsuitable roads through traffic management schemes.

1.1.17 Policy 54 (Transport Proposals and the Environment) states that new transport proposals and improvements, particularly road schemes must take into account the need to: minimise the impact of proposals through mitigation and compensation measures; improve or conserve the natural and built environment; avoid the risk of pollution to the water environment, including water resources; minimise the consumption of resources both in construction and operation; and, minimise conflict with adjoining land uses.

1.2 Local Policy and Guidance

1.2.1 Local policies and strategies are considered in Chapter 2, with regard to the Bridgwater bypass. Other relevant policies with regard to the consideration of new roads and transport infrastructure are briefly considered below.

b) West Somerset District Local Plan (Adopted April 2006) (Ref. 21)

1.2.2 The Local Plan was adopted in April 2006 with relevant policies saved from 17th April 2009. The key transport objectives of the West Somerset Local Plan are not saved as they are not policies, but were as follows:

- reduce the need to travel and the distances travelled;
- promote the best use of public transport routes and nodes, especially for journeys to work;
- reduce environmental damage and promote environmental improvement by traffic management and calming measures, particularly in town and village centres;
- promote the development of safe and convenient routes for cyclists and pedestrians;
- ensure that new development proposals have appropriate access to public transport services; and
- safeguard the implementation of major highway schemes in the Structure Plan.

1.2.3 Policy T/3 (Transport Requirements of New Development) states that:

New roads and improvement schemes should be designed to minimise their environmental impact. As far as the Local Planning Authority's powers permit, planning permission will only be permitted where the proposal:

i) is of a design which both minimises the environmental impact and also the risk of accidents.

ii) has no adverse effects on the character of sensitive or distinctive landscapes, townscapes and areas of acknowledged historic or wildlife interest.

iii) uses materials and street furniture sympathetic to the locality.

iv) includes indigenous landscaping schemes to integrate into the surrounding area.

v) makes appropriate provision for pedestrians, cyclists the mobility impaired and for access to public transport.

vi) minimizes the impact on the environment through mitigation and compensation measures where necessary; and

vii) conforms with national and county council design standards."

c) Sedgemoor District Local Plan (1991-2011 Adopted Version) (2004) (Ref. 8)

1.2.4 The Local Plan was adopted in 2004 with relevant policies saved from 27 September 2007.The Transport and Movement chapter of the Local Plan states that an efficient transport system is vital to the economic and social well-being of the District. It explains that policy on transport and movement will therefore support the Local Plan's strategy of balance between sustainability and controlled economic growth (paragraph 7.01).

1.2.5 Paragraph 7.05 states that the vision of the Local Plan is for an efficient, high quality and sustainable transport system, accessible to all sections of the community. This will be achieved by maintaining and improving transport infrastructure while reducing dependence on the private car.

1.2.6 Policy TM1 (Safe and Sustainable Transport) states:

"a) development will not be permitted which would prejudice the construction of cycle and pedestrian routes and bus lanes defined on the Proposals Map, unless suitable alternative routes are provided by the developer;

b) development will not be permitted which would reduce the convenience and safety of existing rights-of-way, bridle paths and cycle paths unless suitable alternative routes are provided by the developer;

c) development will only be permitted if the design makes adequate and safe provision for access by foot, cycle, public transport and vehicles so long as it's appropriate to the scale of the development and in accordance with National and County Council design standards and Somerset County Council's Highway hierarchy;

d) the Developer shall provide the transport infrastructure required by the development to an agreed phased programme. Where off-site works are required, these shall be appropriate to the scale and nature of the development and shall be funded by the developer; and

e) development will not be permitted for proposals which would have a significant impact on the highway network without the prior submission of a Traffic Impact Assessment."

1.2.7 The Local Plan states that current government guidance stresses the need to consider alternatives to building new roads. Proposals for construction of major new highways must therefore, meet the most rigorous levels of justification (paragraph 7.11).

d) Sedgemoor District Local Development Framework Core Strategy (Proposed Submission) (September 2010) (Ref. 11)

1.2.8 Policy D9 (Sustainable Transport and Movement) states, amongst other things, that travel management schemes and development proposals that reduce congestion, encourage an improved and integrated transport network and allow for a wide choice of modes of transport as a means of access to jobs, homes, leisure and recreation, services and facilities will be encouraged and supported.

1.3 Other Local Documents

a) Somerset Future Transport Plan (Ref. 1)

1.3.1 Somerset's Future Transport Plan 2011 – 2026 (FTP) replaced Somerset County Council's (SCC) Second Local Transport Plan (LTP2) in April 2011 and sets out a long term strategy for helping to deliver transport priorities up until 2026.

1.3.2 The FTP contains the following objectives:

"Help communities help themselves with regard to transport improvements;

Assisting people to make smarter travel choices;

Assisting people in being more active by providing more opportunities to travel in a healthy way;

Manage the effect transport-related noise has on communities;

Work with developers to ensure they take in to account the way people travel, and how people travel to access services;

We will help hauliers choose the most appropriate routes and work to improve communication between communities and the hauliers that serve them;

Encourage people to cycle and make more trips on foot."

1.3.3 This demonstrates an approach to transport management and to sustainable measures rather than new infrastructure which is consistent with EDF Energy's own transport strategy.

1.3.4 All levels of policy agree, therefore, that the first priority in transport planning should be reducing the need to travel, followed by measures to encourage mode shift and by measures to make the most of existing capacity through travel management. New road construction, with its consequential environmental impacts and its inherent tendency to increase rather than reduce motorised travel, is the last transport option.

2. ENVIRONMENTAL AND TRANSPORT CONSIDERATIONS

2.1 Summary of Transport Assessment

2.1.1 Before considering the likely transport implications of providing a Bridgwater bypass, it is necessary to consider the conclusions of the **Transport Assessment** for the DCO application.

2.1.2 Chapter 15 of the **Transport Assessment** sets out the acceptability criteria that should be applied to the impacts of the HPC Project.

2.1.3 Overarching National Policy Statement (NPS) for Energy (EN-1), when referring to transport impacts states at paragraph 5.13.7:

> *"Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG transport assessment, with attribution of costs calculated in accordance with the department of transport's guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure"*

2.1.4 Paragraph 5.13.5 also introduces the possibility of cost sharing between the applicant and Government for any third party benefits i.e. where the improvements provided more than offset the impact of the proposal.

2.1.5 EN-6 Nuclear Power Generation NPS Volume 1 at para 3.15.2 advises that:

> *"Applications should demonstrate that the proposed development would not have an unacceptable adverse impact on significant infrastructure."*

2.1.6 Therefore the test is that proposals should not have an unacceptable adverse impact on transport infrastructure. The applicant should be willing to provide appropriate infrastructure improvements but limited weight should be applied to residual impacts.

2.1.7 The results of the analysis of the impacts of the HPC Project as reported in the **Transport Assessment** are summarised below.

2.1.8 In 2013 when construction activity at HPC is underway but not all of the proposed mitigation strategy is in place, average speeds drop by approximately 4% and there is some detriment to journey times and queuing. The **Transport Assessment** concludes:

> *"Based on the above analysis, the limited highway improvements assumed in the modelling in Quarter 3 2013 do not result in nil detriment by comparison with the Reference Case. However, the residual impacts do not have any significant knock on effects on the strategic or local "A" road network and are considered modest and acceptable. The one possible exception to this is M5 Junction 23 where there is a desire to ensure any*

queuing traffic on the slip roads does not affect the motorway main line. Therefore, EDF Energy will seek to bring forward their proposed improvements to the junction as early as possible within the development programme."

2.1.9 The analysis shows that in 2016 with HPC traffic and EDF Energy's proposed DCO package of highway mitigation:

- journey times on the key HGV routes from the motorway junctions to HPC remain broadly neutral;
- overall junction queuing reduces for the junctions that have been modelled in Bridgwater; and
- average speeds on the modelled roads in Bridgwater stay broadly neutral.

2.1.10 The **Transport Assessment** concludes:

"It is therefore concluded, based on the evidence from the agreed Paramics model, that in the peak construction quarter, the highway improvement proposals would mitigate the traffic implications of HPC to the extent of achieving nil detriment and bring forward improvements compared with the Reference Case in a number of instances."

2.1.11 In 2021 the analysis shows that with HPC traffic and EDF Energy's proposed DCO application package of highway mitigation:

- material improvements in journey times on the key HGV routes from the motorway junctions to HPC are experienced;
- material improvements in overall junction queuing are achieved; and
- material improvements in average speeds across the network are achieved

2.1.12 The **Transport Assessment** concludes:

"Based on the above analysis it can be concluded that the highway network will operate better in 2021 with HPC and the mitigation package than in the Reference Case. Average speeds increase and there are no significant effects on junctions that are likely to have a knock on effect on other parts of the strategic or local "A" road system. In general journey times on the two key HGV routes improve.

It is important to note that in 2021 there is still construction and de-commissioning work proceeding as well as full operation of the power station. Once the construction activity has ceased in 2021/2022 then journey times on the road network are likely to further improve."

2.1.13 Thus, in terms of the tests in EN-1, the proposed DCO application package of highway mitigation:

- reduces the impact on the transport network to acceptable levels in 2013 and 2016; and

- provides some benefit to the highway network in 2021.

2.1.14 On the basis of the above, it is clear that the effects of the HPC Project on transport infrastructure in Bridgwater can be reduced to acceptable levels and therefore that a Bridgwater bypass is not necessary to address traffic capacity issues in Bridgwater and would be contrary to national policy on new roads.

2.2 Environmental Acceptability of the Proposed HPC Project Transport Strategy

2.2.1 It is also necessary to consider the environmental acceptability of the proposed transport strategy and whether there are any overriding environmental reasons for providing a Bridgwater bypass. The DCO application is accompanied by an **Environmental Statement** that assesses the likely significant environmental effects of the project.

2.2.2 The **Environmental Statement** submitted with the application for Development Consent shows that there would be no exceedances of European air quality objectives in Bridgwater. Some temporary noise impacts have been identified by the **Environmental Statement** for properties in Bridgwater which have been assessed to be of major significance; however, it is relevant that these impacts have only been identified during early morning and late evening periods on ‘A’ roads which are recognised as the main corridors for traffic through Bridgwater and the assessment is based on robust, worst case assumptions.

2.2.3 For example, the modelling of bus movements from which noise assessments have been undertaken has assumed that very regular timetables operate for all direct, campus and park and ride bus routes associated with the beginning and end of each construction shift. In practice bus provision and timetables will be refined to match the changing patterns of demand once workers locations are known and the actual number of buses on many routes is likely to be significantly less than has been modelled at many points in the construction programme. Further information on the transport modelling is provided in the **Transport Assessment** and on noise impacts in **Volume 2, Chapter 11** of the **Environmental Statement**.

2.2.4 The absolute noise levels which will arise from HPC related traffic, with the exception of four properties north of Cannington on the C182 Rodway, which would not be affected by the provision of a Bridgwater bypass, are not predicted, at any point in the construction programme, to breach any statutory limits in relation to road traffic noise.

2.2.5 On this basis, the proposed DCO application transport strategy is environmentally acceptable and there are no overriding environmental reasons for proposing a Bridgwater bypass.

2.2.6 Thus, there is no traffic or environmental reason which would necessitate building a Bridgwater bypass as part of the HPC Project. Notwithstanding this, further consideration has been given to the likely transport and environmental effects associated with the provision of a Bridgwater bypass.

2.3 Summary of Transport Effects with a Bridgwater Bypass

2.3.1 In order to provide a preferred route for a Bridgwater bypass for further transport analysis, a broad assessment of alternative routes was carried out. The detail of this assessment is provided in **Appendix 2**. The outcome of this assessment was that Route 4, a route which commences on the A38 to the south of the Dunball roundabout and heads south-west to connect with the A39/Main Road roundabout, Cannington, was taken forward for further transport analysis.

2.3.2 It is important to acknowledge that, if EDF Energy were to propose a Bridgwater bypass as part of the HPC Project, the transport strategy would be likely to be different, primarily with regard to the location of the proposed freight management facilities and park and ride sites at Junction 23 and 24 of the M5. The modelling exercise undertaken is therefore very broad at this stage and shows roughly what the impacts are likely to be with a Bridgwater bypass in place.

2.3.3 An assessment has therefore been undertaken on the basis of the transport strategy for the HPC Project remaining broadly as proposed in the DCO application. The exception to this is that some of the highway mitigation within Bridgwater is not included within the with-Bridgwater bypass scenario. The excluded improvements are:

- Cross Rifles.
- A38 Bristol Road/Wylds Road.
- A38 Bristol Road/The Drove.
- Wylds Road/The Drove.

2.3.4 The above improvements have been specifically excluded as they have not already been committed to as part of the Site Preparation or Preliminary Works applications. The assessment also included the DCO improvements at Junction 23 of the M5 and Huntworth roundabout, as the initial modelling exercise undertaken showed substantial queuing at these junctions in the with-Bridgwater bypass scenario. This provides a more realistic assessment of what the likely impacts would be with a Bridgwater bypass, albeit that these are unlikely to be completely reflective of the position with a bypass for the reasons explained above.

2.3.5 The assessment of network performance has been undertaken using the same criteria as in the DCO application and agreed in principle with SCC. The assessment involves examining:

- journey times on key routes;
- junction performance (queuing); and
- total network delay (average vehicle speeds).

2.3.6 The results of this assessment are provided at **Appendix 3** and summarised below:

2.3.7 The analysis in 2016 shows that the likely implications of providing a Bridgwater bypass on traffic in Bridgwater are:

- In relation to journey times on the three key HGV routes through Bridgwater, there are only three time periods when the bypass results in journey times which are the same as or better than the Reference Case, but the DCO improvements package does not;
- overall junction queuing in Bridgwater reduces with the bypass compared to the scenario with the DCO application highways improvements. Six junctions experience marginally increased queuing with the DCO package of improvements; whereas only one junction (Junction 23 of the M5) experiences increases in queuing in the bypass scenario. However with the DCO package there is still an overall reduction in queuing compared with the Reference Case (i.e. with no HPC traffic); and
- average speeds across the network improve by approximately 5% with the bypass compared with the Reference Case. With the DCO improvement package speeds remain broadly neutral on key routes in Bridgwater.

2.3.8 An assessment was also made of the likely changes in traffic flows as a result of provision of a bypass and concluded that:

- a Bridgwater bypass would attract approximately 6,550 vehicles per day at peak construction, which would be a very low flow for a new road (i.e. less than the flow on the A39 to the west of Cannington and less than half the baseline flow on the NDR). In addition only circa 1,775 of these vehicles would be generated by the HPC Project (just 27%). By 2021 this flow reduces to 5,500 vehicles per day, of which just 740 vehicles are related to the HPC Project (13%) which would reduce further still once construction of the HPC power station ceases.

2.2.41 The analysis for 2021 shows that the Bridgwater bypass option shows very marginal benefits over the DCO mitigation proposals as follows:

- improvements in journey times on the key HGV routes through Bridgwater from the motorway junctions to HPC but not to a significantly greater extent than with the proposed mitigation package;
- improvements in overall junction queuing in Bridgwater but not to a significantly greater extent than with the proposed mitigation package; and
- improvements in average speeds on the existing road network in Bridgwater to a slightly greater extent than with the DCO proposed mitigation package (8% improvement with proposed mitigation vs. 12.4% with Bridgwater bypass).

a) Summary

2.3.9 In summary, the likely effect of providing a Bridgwater bypass on existing traffic conditions in Bridgwater in 2016 would be as follows:

- journey times on the key HGV routes through Bridgwater would improve compared with the Reference Case but to only a limited degree;
- queuing at some junctions would improve compared with the Reference Case but the DCO package of improvements already leads to an overall improvement in junction queuing;

- overall average vehicle speeds across the local road network improve by 4.8% compared with the Reference Case. With the DCO package of improvements average speeds remain virtually unchanged;
- a Bridgwater bypass would take some traffic from the Northern Distributor Road (NDR) (approximately 25% reduction in flows at 2016), but would have relatively limited effects on the southern part of Bridgwater. The decreases in traffic experienced along the A38 to the south of Bridgwater is expected to be just 10%; and
- there would be relatively limited traffic using the Bridgwater bypass. The analysis undertaken indicates that approximately 5,400 vehicles per day, less than half the existing flow on the NDR This is significantly less than the level of traffic that would usually be required to justify building a new road.

2.4 The Requirement for NATA

2.4.1 This report has demonstrated that there is no necessity for a Bridgwater bypass, either in traffic capacity or safety terms, or as a policy requirement. On this basis, there is no requirement to carry out an environmental assessment of its route. Nevertheless, following the request of SDC, WSC and SCC, the need for a NATA has been considered.

2.4.2 Guidance by the Department for Transport on Transport Analysis Guidance (TAG) (2005) (Ref. 22) states:

> *“The Department’s Sustainable Development policy statement sets out the Department’s approach to the achievement of the Government’s overall sustainable development objectives. It has three criteria at its core: economic, social and environmental. The Policy requires decision-makers to take a balanced approach to ensure that all three are given equal consideration.” (paragraph 1.3.3). The Government introduced NATA in 1997 in order to look at road schemes under various criteria and to develop suitable solutions to particular capacity problems, but also to prioritise schemes in terms of funding.*

2.4.3 In this case, there would be no public funding of any infrastructure that goes forward for implementation.

2.4.4 On this basis, a NATA assessment has not been undertaken. Nonetheless some initial analysis of environmental issues has been undertaken and is summarised below.

2.5 Environmental Effects of a Bridgwater Bypass

2.5.1 It is important to recognise that a Bridgwater bypass would be a major construction project in itself, would be a permanent feature on the landscape and there would be environmental impacts associated with its provision. Although a detailed environmental assessment has not been carried out as it is not part of EDF Energy’s proposals, if a Bridgwater bypass was to be proposed there would need to be a detailed analysis of the environmental issues associated with its provision.

2.5.2 However, for the purposes of this assessment, a high level deliverability exercise has been carried out to provide an initial indication of likely effects and is provided at **Appendix 4**.

2.5.3 This initial analysis has suggested that a Bridgwater bypass, following the approximate line of Route 4, would:

- cross 5.2km of predominantly open farmland;
- result in the loss of land identified in the Local Plan as best and most versatile agricultural land (Grades 1, 2 and 3a).
- cross 26 watercourses (including the River Parrett and Cannington Flood Relief Channel) with associated environmental impacts;
- be almost entirely within the tidal flood plain of the River Parrett;
- as a result, be raised a minimum of 3.5m above existing ground level, although this is anticipated to be more likely to be up to 5.8m, taking into account current guidance and standards, particularly with regard to minimising flood risk; and
- be approximately 7.3m wide, with 1.0m hard strips and a minimum of 2.5m verges on both sides.

2.5.4 Taking into account the size of the road and its elevation, in addition to the traffic that would be using it and street lighting along at least part of the road, it is likely to be prominent in the landscape and be visible from wide areas of the surrounding countryside. The road would create a significant linear feature running perpendicular to the majority of the prominent features within the area within what is a relatively open and flat landscape.

2.5.5 There would also be other impacts associated with the construction of a Bridgwater bypass, including those related to noise, traffic and air quality over the construction period. The deliverability study (**Appendix 4**) estimates that the construction period would be a minimum of two years and eight months, assuming a shorter surcharge period was achievable. In reality the project would be dependent on favourable weather conditions, particularly when crossing watercourses and a more conservative estimate would result in a construction programme of three years and six months.

2.5.6 In conclusion, there would be significant environmental impacts from building a Bridgwater bypass which are not necessary given the acceptability of the proposed transport strategy.

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3. PLANNING ANALYSIS

3.1 Introduction

3.1.1 This chapter briefly examines the implications of providing a Bridgwater bypass, taking into account national policy with regard to the nuclear power stations and new roads.

3.1.2 It should be emphasised that the **Transport Assessment** has demonstrated that the proposed DCO package of mitigation measures results in the HPC Project having an overall acceptable transport impact and in some cases providing transport benefits over and above the existing position, assuming future growth, but no HPC Project. The environmental acceptability of the HPC Project is addressed in the **Environmental Statement** and **Planning Statement** and summarised in Chapter 4 of this report.

3.2 Comparison of Options

3.2.1 The analysis presented in Chapter 4 above, has shown that a Bridgwater bypass would generate some benefits to traffic conditions in Bridgwater in 2016 compared with the DCO package of improvements but these are not substantial. For example, average vehicle speeds through Bridgwater improve by only 1.5 MPH or 5% compared with the situation with the DCO application.

The analysis establishes two fundamentally important conclusions:

- the HPC Project, with its sustainable transport strategy, is acceptable in transport terms. It is successful in mitigating its impacts and, indeed, it would leave behind an improved highway network once the peak construction period has passed; and
- the Bridgwater bypass option does not demonstrate any significant benefits on existing roads in Bridgwater over the DCO application.

3.2.2 Of these two conclusions, the first is the most important. It means that there is no transport based reason to refuse consent for the HPC application. There is no need, therefore, to consider any alternative option – even if it were substantially beneficial, which the Bridgwater bypass option does not appear to be based on the analysis conducted. Against this background, the following passage considers the implications of adopting the Bridgwater bypass option at this stage in the HPC Project.

3.3 Impact on Deliverability of HPC Project

3.3.1 An assessment of the HPC Project in the context of national policy with regard to Nationally Significant Infrastructure Projects (NSIPs) is provided in the **Planning Statement**, an extract is provided below which draws out the urgency of delivering the HPC Project.

3.3.2 NPS EN-1 explains that there is an urgent need for new electricity NSIPs and Part 3 of EN-1 sets out the principal considerations which have informed this conclusion. The NPS should be consulted as a whole but the principles can be summarised briefly as follows:

1. in the UK at least 22 GW of existing electricity generating capacity will need to be replaced in the coming years, particularly by 2020. This amounts to about a quarter of the UK's current electricity generating capacity of 85 GW (para 3.3.7);

2. in addition, the overall demand for electricity is likely to increase as significant sectors of energy demand switch from being powered by fossil fuels to using electricity, so that total electricity consumption could double by 2050 (para 3.3.14);

3. forecasts suggest that a minimum need of 59 GW of new electricity capacity needs to be provided by 2025 to avoid the severe social and economic disruption that would be caused by insufficient electricity supply (para 3.3.19 and 3.3.23); and

4. stretching targets for renewable energy are set out in the NPS but, even if these are achieved, there is a balance of 18 GW to come forward from non-renewable capacity and it is Government policy that nuclear power should be free to contribute as much as possible towards meeting the need for around 18 GW of new non-renewable capacity by 2025 (para 3.3.22). Consequently, the NPS is in no doubt about the need for new electricity capacity and, in particular, low carbon capacity:

"3.3.15 In order to secure energy supplies that enable us to meet our obligations for 2050, there is an urgent need for new (and particularly low carbon) energy NSIPs to be brought forward as soon as possible, and certainly in the next 10 to 15 years, given the crucial role of electricity as the UK decarbonises its energy sector."

3.3.3 This brief summary defines both the scale and says something of the urgency of the need for new nuclear electricity generation. The NPS, however, provides more specific conclusions in relation to nuclear energy generation, as follows:

1. for the UK to meet its energy and climate change objectives, the Government believes there is an urgent need for new electricity generation plant, including new nuclear power. Nuclear power generation is a low carbon, proven technology, which is anticipated to play an increasingly important role as we move to diversify and decarbonise our sources of electricity (3.5.1); and

2. it is Government policy that new nuclear power should be able to contribute as much as possible to the UK's need for new capacity (para 3.5.2).

3.3.4 The NPS identifies a number of advantages of nuclear power generation including:

1. new nuclear will help to secure a diverse mix of technology and fuel sources, which will increase the resilience of the UK's energy system. It will reduce exposures to risk of supply interruptions and of sudden and large spikes in electricity prices (3.5.3).

2. nuclear fuel fabrication is a stable and mature industry with a separate supply chain from gas and coal; and

3. fluctuations in fuel prices do not significantly affect the cost of electricity from nuclear power stations and the relatively low generation costs of nuclear power means that it can place downward pressure on the long-run wholesale prices of electricity (3.5.4).

3.3.5 Consequently, the NPS confirms the urgency of the need for nuclear power in the following terms:-

"…3.5.9…it is important that new nuclear power stations are constructed and start generating as soon as possible and significantly earlier than 2025…The Government believes that it is realistic for new nuclear power stations to be operational in the UK from 2018, with deployment increasing as we move towards 2025"

"3.5.10…Nuclear power stations have an estimated design lifetime of 60 years so any new nuclear power stations operational by the end of 2025 will play a vitally important role in the decarbonisation of the electricity system and will therefore directly contribute towards our 2050 targets and objectives."

3.3.6 Further confirmation of the Government's policy is set out in NPS EN-6 which provides specific national policy for nuclear power generation. The NPS explains that, in order to be considered potentially suitable and therefore listed in the NPS, sites had to be shown as being capable of deployment by the end of 2025:

"2.2.2 However, given the urgent need to decarbonise our electricity supply and enhance the UK's energy security and diversity of supply, the Government believes that new nuclear power stations need to be developed significantly earlier than the end of 2025."

3.3.7 The application for Development Consent does not include a Bridgwater bypass, for the reasons explained in this report; it is not necessary as the transport impacts of the HPC Project can be mitigated through minor modifications to the existing highway network.

3.3.8 If EDF Energy were to now include proposals for a Bridgwater bypass in their application for Development Consent, this would generate significant delay to the HPC Project commencing operation. Just some of the implications are considered below:

1. the DCO application would need to be delayed – and withdrawn if it had been submitted;

2. detailed feasibility, engineering, transport, land ownership and environmental studies would need to be carried out to determine the effects of a Bridgwater bypass option;

3. option selections would need to be tested and it seems likely that there would need to be two rounds of public consultation – one to allow enough engagement

for the public to have a genuine input and one on detailed preferred proposals; it cannot be known at this stage whether the proposals would generate their own objections, although it would be unlikely that a new road of this scale could be built without controversy;

4. a revised Environmental Statement would need to be prepared and a revised DCO application prepared;

5. other consequential changes would need to be considered – for instance, would the highway improvements proposed in Bridgwater and Cannington still be the appropriate ones and would the Junction 23 and 24 associated development sites need to be reconsidered;

6. consideration would need to be given to the need to change the main site proposals – for instance would the restriction on car parking still make sense; and

7. a revised DCO application would need to be submitted, with a transport strategy dependent on the Bridgwater bypass meeting the environmental, planning and CPO tests. Satisfaction of those tests is far from guaranteed as the analysis shows that the benefits of the Bridgwater bypass are relatively marginal at best.

3.3.9 All this would be likely to add at least two years to the submission date for the DCO application and to put its success at greater risk. Any Grampian condition requiring a Bridgwater bypass to be in place before construction of the power station would add more years delay (the deliverability work provided at **Appendix 4** suggests between 2 years 8 months and 3 years 6 months). None of this is justified given the acceptability of the DCO application proposals as currently framed – and none of it can be justified in the light of the urgent national need to proceed with the development of Hinkley Point C.

4. CONCLUSIONS

4.1.1 This report is concluded as follows:

- There is no policy requirement to provide a Bridgwater bypass, either as part of the HPC Project, or to accommodate the substantial growth envisaged in Bridgwater over the Core Strategy period.
- National, regional and local guidance with regard to new road building emphasises the need to consider all other, more sustainable, mitigation measures before considering new road provision.
- EDF Energy has carried out a detailed Transport Assessment as part of its application for Development Consent which demonstrates that any additional traffic generated by the construction and operation of Hinkley Point C can be accommodated on the existing highway network, with some junction improvements, the provision of a Cannington western bypass and the implementation of a transport strategy focussed on consolidating and reducing trips on the local highway network. Furthermore, there are no overriding environmental reasons for providing a Bridgwater bypass.
- An initial assessment has been carried out which suggests that there would only be limited transport benefits in Bridgwater arising from a Bridgwater bypass, over and above the transport mitigation strategy proposed by EDF Energy as part of the DCO application.
- In conclusion, it is not necessary or appropriate to provide a new Bridgwater bypass, on its own or as part of the HPC Project.

References

Ref. 1 SCC. Somerset's Future Transport Plan (2011-2026). March 2011.
Ref. 2 SDC and WSC. Consultation Draft Hinkley Point C Project Joint Supplementary Planning Document (SPD).
Ref. 3 Government Office of the South West. Regional Planning Guidance (RPG 10) for the South West 2001-2016. HMSO, 2001.
Ref. 4 South West Regional Assembly. The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of State's Proposed Changes 2008-2026. July 2008.
Ref. 5 SCC. Somerset and Exmoor National Park Joint Structure Plan Review (1991-2011). 2000.
Ref. 6 SCC. Connect 3: DaSTS Taunton Gateway Study. May 2010.
Ref. 7 SCC. Bridgwater, Taunton and Wellington Future Transport Study (consultation version). October 2009.
Ref. 8 SDC. Sedgemoor District Local Plan (1991-2011 Adopted Version), 2004.
Ref. 9 Bridgwater Challenge Partnership. Bridgwater Vision – Delivering a Strategic Framework. 2009.
Ref. 10 SDC. Sedgemoor Infrastructure and Delivery Study. June 2010.
Ref. 11 SDC. Sedgemoor District Council Local Development Frameworks Core Strategy (Proposed Submission). September 2010.
Ref. 12 SDC. North East Bridgwater Design Principles. February 2009.
Ref. 13 DECC. Overarching National Policy Statement for Energy (EN-1). HMSO, 2010.
Ref. 14 ODPM. Planning Policy Statement 1: Delivering Sustainable Development. HMSO, 2005.
Ref. 15 CLG. Planning Policy Guidance 13: Transport. HMSO, 2011.
Ref. 16 DfT. Circular 2/07 - Planning and the Strategic Road Network. 2007.
Ref. 17 DfT. Guidance on Transport Assessment. March 2007.
Ref. 18 Highway Agency. Highways Agency Protocol for Dealing with Planning Applications. April 2011.
Ref. 19 DfT. Delivering a Sustainable Transport System. November 2008.
Ref. 20 DfT. Roads – Delivering Choice and Reliability. July 2008.
Ref. 21 WSC. West Somerset District Local Plan (2006-2009 Adopted Version). 2006.
Ref. 22 DfT. Transport Analysis Guidance (WebTag). HMSO, 2005.

APPENDIX 1: REFERENCES IN POLICY DOCUMENTS TO A BRIDGWATER BYPASS

NOT PROTECTIVELY MARKED

APPENDIX 1

Document	Reference to Bridgwater Bypass?
Regional Planning Policy	
Regional Planning Guidance for the South West (RPG 10) 2001-2016 (2001)	No reference – Not shown on Regional Transport Strategy diagram or listed in projects at Table 6.
The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of States Proposed Changes 2008 – 2026 (July 2008)	No reference – Not shown on Key Diagram Inset 6 Taunton Housing Market Area or Picture 5.1 Transport Map.
Somerset and Exmoor National Park Joint Structure Plan Review 1991-2001 (2000) (Saved Policies)	No reference.
County Level Documents	
Somerset's Future Transport Plan 2011 – 2026 (March 2011)	The document confirms that the 'A38 Corridor package (Bridgwater to Taunton)' is one of a number of major transport schemes anticipated within the next 15 years In addition, Policy HIN 1 (Transport Requirements for New Nuclear Development) in the 'Transport and Development' document states: *"Any new major highway proposals are to be justified by a full New Approach To Appraisal (NATA) assessment. For example, the need for and (if required) route of a Bridgwater Northern Bypass should be established by a NATA type assessment, including an option based on the improvements needed in Bridgwater if the bypass were not provided. The preferred route for the Cannington by-pass should also be justified through a NATA assessment. Appraisals should address potential impacts raised during consultation, such as the potential severance effect to Brymore School of the western bypass option at Cannington".*
Connect 3: DaSTS Taunton Gateway Study (May 2010)	The "Initial Option Assessment Report" is the output from Stage 3 of the Connect 3: DaSTS Taunton Gateway Study. The Connect 3 Study is concerned with the interrelationship between transport movements in the Bridgwater/Taunton/Wellington and A358 corridors, and those on the national and inter-urban networks. The "Initial Option Assessment" is tasked with identifying and developing effective value for money evidence based packages of transport and land-use interventions for the Study Area. A Northern Bridgwater Bypass (Option A1.3) was assessed as part of a wider package of options known as the 'A38 corridor package'. The study concluded:

Document	Reference to Bridgwater Bypass?
	"[The] Scheme is likely to be expensive and probably only politically acceptable if it supports improvements to Bridgwater Town Centre. Saturn model tests show that it does provide a suitable alternative route to A38 through the town centre if this route is traffic calmed (Option A1.2) *[The] Option could potentially be funded by Hinkley Power Station proposals as a legacy, but the case will need to be very strong. Without funding from Hinkley may not be affordable."* Capital costs of providing a Northern Bridgwater Bypass were estimated to be £20m. The bypass was also given a priority level of 'high to medium', to be implemented in the period 2019-2024. Option A1.3 is to be taken forward in the "Emerging Strategy" and will be appraised further in Stage 4 as part of the development of a final implementation plan and strategy.
Bridgwater, Taunton and Wellington Future Transport Study (March 2010)	No specific reference to a Northern Bridgwater Bypass, however the document confirms that funding has been secured through the Regional Funding Allocation for the 'A38 Corridor Package Bridgwater to Taunton' scheme.
Local Planning Policy	
Sedgemoor District Local Plan 1991-2011 (2004) (Policies 'saved' from 27 September 2007)	No reference – Not shown on Figure 7.3 which shows the transport proposals for Bridgwater.
Sedgemoor District Council Core Strategy – Proposed Submission (incorporating the Council's recommended changes) (March 2010)	Paragraph 4.36 states: *"The HPC promoter will also need to demonstrate that transport and highways proposals for Hinkley Point form part of a robust transport and logistics plan that prevents as far as possible adverse transport impacts arising from the movement of people, goods and services related to the project, and the proposals are shown to significantly contribute towards the delivery of Somerset's Future Transport Plan 2011-26 (including associated technical documents); the Bridgwater, Taunton and Wellington Future Transport Strategy; and the Bridgwater Vision. There should be an assessment of the need for a Bridgwater bypass."* Policy MIP2 states: *"…Transport services should be inclusive and accessible to the community and proposals will also need to make a significant positive contribution towards the delivery of Sustainable Community Strategies, Somerset's Future Transport Plan 2011-26 (including associated documents), the Future Transport Strategy for Bridgwater, Taunton and Wellington, the Sedgemoor Infrastructure Delivery Strategy and the Bridgwater Vision as an integral part of place shaping. There should be an assessment of the need for a Bridgwater bypass."*

Document	Reference to Bridgwater Bypass?
– Proposed Submission (September 2010)	No reference. Note: Reference to the requirement for "an assessment of the need for a Bridgwater bypass" does not appear in the Proposed Submission version of the Core Strategy (September 2010) presented to Sedgemoor District Council's Executive Committee on 9 February 2011 and the Full Council on 16 February 2011. The minutes of the Full Council meeting confirm that: *"Members raised concerns regarding the need to provide a bypass for Bridgwater as part of the Major Infrastructure Projects and agreed that although the provision of a bypass was preferred it was important that the core strategy should reflect the need for an assessment of the need for a Bridgwater bypass to be included in the text."*
– Preferred Options (September 2009)	No reference.
– Issues and Options Stage 2 (June 2007)	No reference.
– Issues and Options Stage 1 (November 2006)	No reference.
– Evidence Base – Infrastructure Delivery Strategy (June 2010)	No specific reference to a Northern Bridgwater Bypass, however the document confirms that the 'A38 Corridor Transport Package' is one of a number of key projects to form part of the preferred strategy. It states: *"Studies show that the transport network needs considerable improvement to accommodate growth at Taunton and Bridgwater and to avoid unacceptable increases of traffic on the M5. The A38 proposals involve the provision of a high capacity, high frequency public transport between Bridgwater and Taunton, together with a series of junction improvements, bus priority measures and walking and cycling provision. A Regional Funding Allocation (RFA) Expression of Interest has been submitted for £24m of the projected £55m capital cost. It is proposed that developer contributions should make up much of the shortfall, with an estimated £8-12m coming from sites in Sedgemoor."*
Bridgwater Vision (July 2009)	"The potential for road improvements to Hinkley from junction 23 which may require a new link road running from the Dunball roundabout travelling west across the River Parrett towards Hinkley." (page 106)
Consultation Draft Hinkley Point C Project Joint SPD (February 2011)	No reference.
North East Bridgwater Design Principles (February 2009)	No reference in text, however a caption is included on the Design Principles diagram of a potential link to HPC.

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APPENDIX 2: ROUTE OPTIONS ANALYSIS

2. ROUTE OPTIONS ANALYSIS

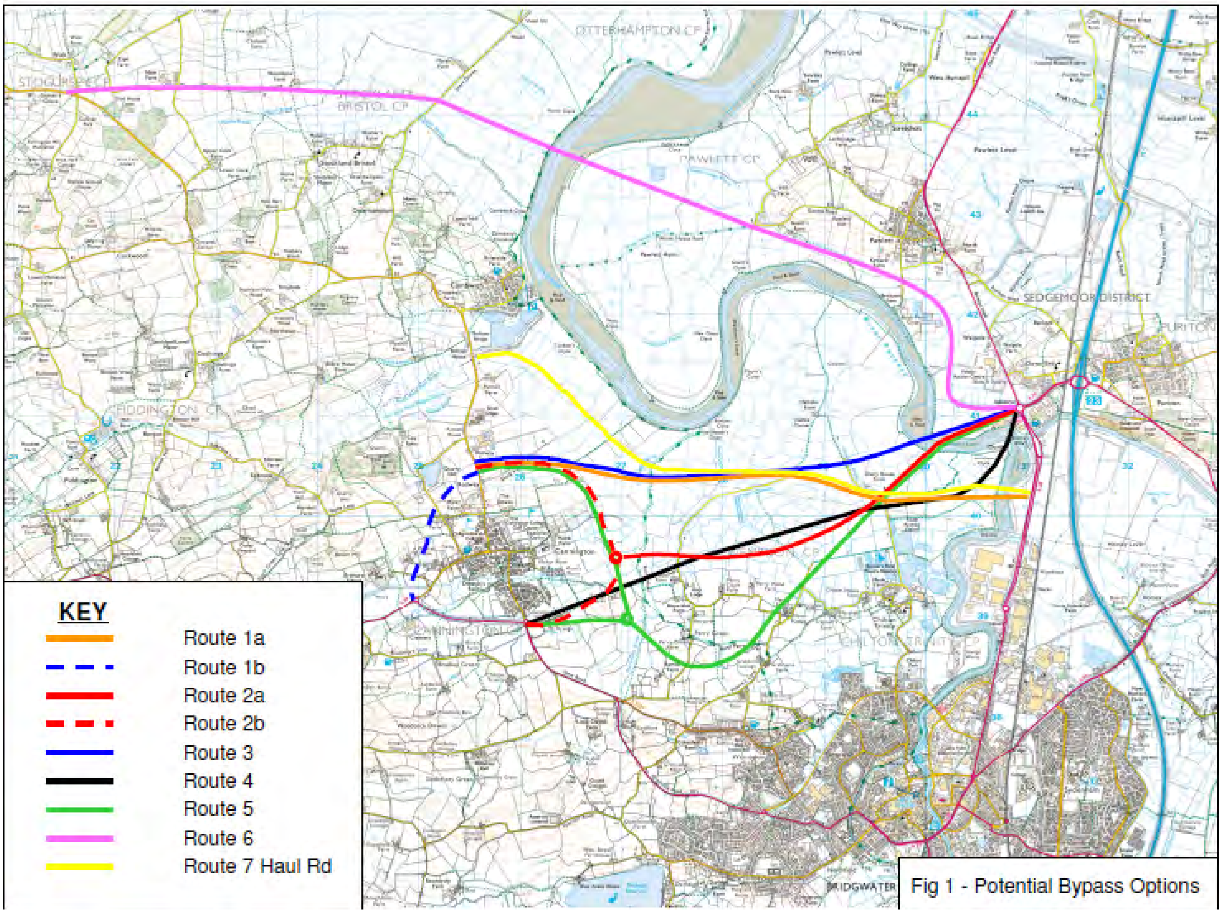
2.1 Consideration of Alternative Routes

2.1.1 The following paragraphs provide a broad analysis of potential alternative routes for a Bridgwater bypass. This broad assessment has been carried out in order to provide a preferred route for further transport analysis.

2.1.2 The Bypass Study presented at EDF Energy's Stage 2 consultation (provided at Appendix 6 of the Transport Appraisal presented at Stage 2) assessed seven potential route options for a Bridgwater bypass, six of which were identified by Somerset County Council (SCC) and one of which has been identified by Save Cannington Action Group (SCAG), namely Routes 1a, 2a, 3, 4, 5, 6 and 7.

2.1.3 The seven route options are shown at **Plate 2.1**. There are two additional routes shown at, Routes 1b and 2b (both as dashed route alignments). Route 1b is the Cannington Western Bypass which forms part of EDF Energy's proposed development. Route 2b identifies an alternative bypass of Cannington that would be required to accommodate some of the above route options.

Plate 2.1: Potential Bypass Options



2.1.4 The routes are also summarised as follows:

- **Route 1a:** Commences at a new roundabout on the A38 Bristol Road approximately 1km to the south of the A38 Dunball roundabout and heads west to connect with the C182 Rodway, to the north of Cannington. Here the route also connects with Route 1b (Cannington Western bypass shown in **Plate 2.1**).
- **Route 2a:** Commences at the A38 Dunball roundabout and heads southwest to the east side of Cannington. It continues north westwards to join the C182 Rodway.
- **Route 3:** Commences at the A38 Dunball roundabout and heads west to connect with the C182 Rodway, to the north of Cannington.
- **Route 4:** Commences at the A38 Dunball roundabout and heads southwest to connect with the A39/Main Road roundabout, Cannington. In order to provide a route to HPC a bypass to the west of Cannington would also be required (i.e. Route 1b shown in **Plate 2.1**).
- **Route 5:** Commences at the A38 Dunball roundabout and heads southwest passing to the south of Perry Green Farm before heading north to a new roundabout to the southeast of Cannington. From the new roundabout the bypass heads westwards to connect to the A39/Main Road roundabout, Cannington. From the new roundabout a new link road would bypass Cannington to the east to connect with C182 Rodway to the north of Cannington.
- **Route 6:** Commences from Junction 23 of the M5 motorway and heads northwest across the Pawlett Hams, crossing the River Parrett north of Combwich and connects to the road network just to the south of the HPC Development Site. This route is proposed by SCAG.
- **Route 7 Haul Road:** Follows the alignment of Route 4 from its origin at A38 Dunball roundabout but heads northwest from its mid-point to join the C182 Rodway, north of Cannington.

2.1.5 A high level assessment of the key differences between the above routes was carried out as part of the HPC Bypass Report – Appendix 6 to HPC Transport Appraisal (Ref. 3.1) published at EDF Energy's Stage 2 Consultation, to determine the most appropriate route to take forward for further assessment.

2.1.6 This reported that Route 6 is materially different from the other routes and that the key issues with this route are as follows:

- Transport effects: The route does not connect to the existing network near Cannington and would therefore have no benefit to non HPC traffic heading between M5 Junction 23 and the A39 west of Cannington.
- Compatibility with Scheme Proposals: A Cannington Western Bypass would most likely not be required if this route was to proceed.
- Environmental effects: Route 6 is distinct from other routes in that it passes through the Bridgwater Bay Site of Special Scientific Interest (SSSI) in two locations, at Pawlett Hams and the River Parrett, and also passes through the Severn Estuary Ramsar, SPA and SAC designated sites and has the potential to adversely affect the interest of these sites.
- Flooding effects: In terms of impact upon flood risk zones, Route 6 was identified as having the greatest route length that falls within fluvial and tidal Flood Zone 3a which is considered to be the greatest in terms of being at risk from flooding. Route 6 is also the only route to impact upon tidal and fluvial Flood Zone 2.

- Deliverability: the route is approximately twice as long as the other routes, at 10.5km. In addition it would require a high level connection over the navigable section of the River Parrett.

2.1.7 The report carried out for the Stage 2 consultation reported that it was considered that the environmental effects of the Route 6 option on the SSSI, Ramsar, SPA and SAC are overriding and outweigh any potential advantages of the route. It would also have virtually no benefit to through (non HPC) traffic and would be twice as long as the other routes.

2.1.8 On the basis that Route 6 was discounted at Stage 2 for the above reasons, this study has then considered the remaining six routes in terms of:

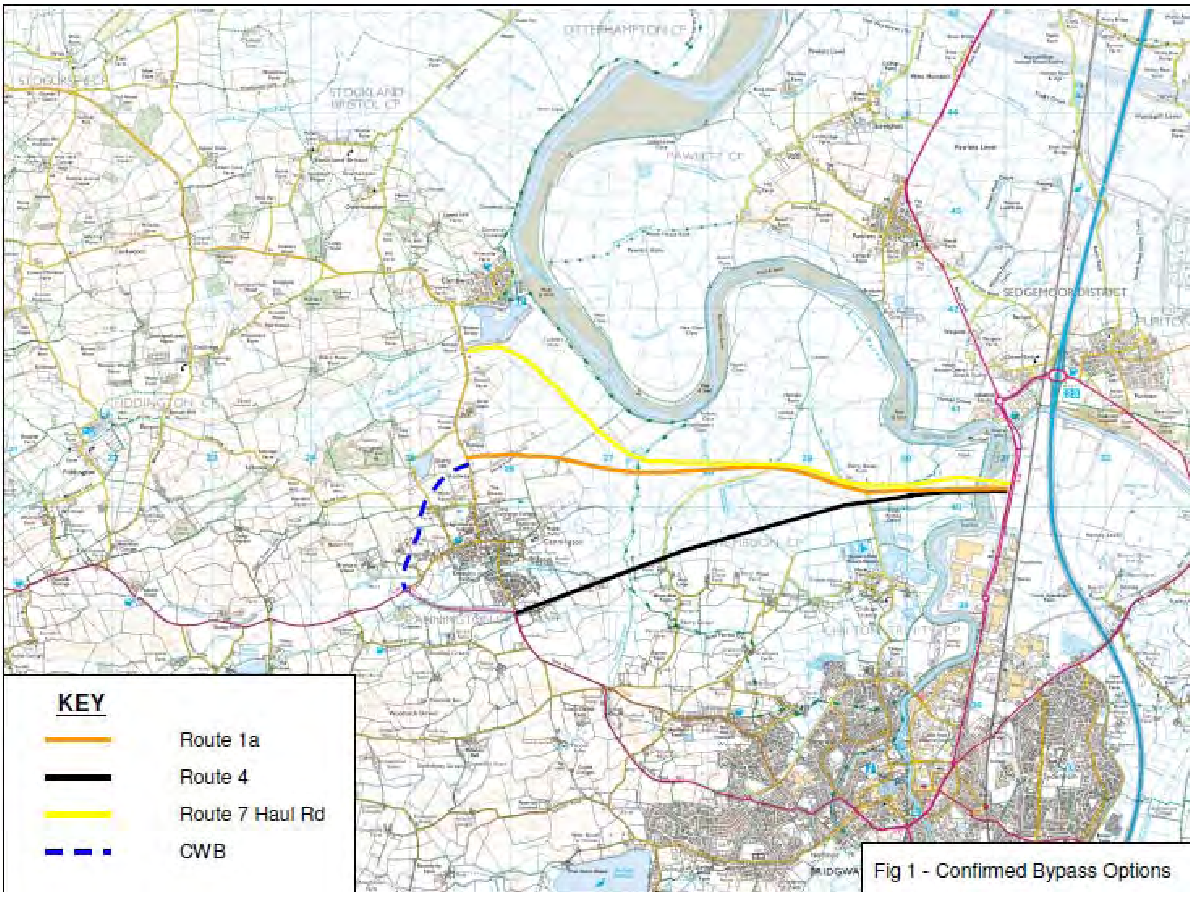
- likely transport effects (on a broad basis, rather than a detailed assessment of each route) and;
- compatibility with the EDF Energy scheme proposals (namely the Cannington Bypass).

2.1.9 It is clear from **Plate 2.1** that Routes 2a and 5 both require construction of a bypass to the east of Cannington. Therefore, both routes are incompatible with the proposed HPC Project which seeks to deliver the Cannington Western Bypass. The two routes have been discounted from the study.

2.1.10 Of the four remaining route options, Routes 1a and 7 originate at a new roundabout junction on the A38 south of the Dunball roundabout and Routes 3 and 4 originate at the Dunball roundabout. The Dunball roundabout is not considered to be the most suitable connection compared to the new junction south of Dunball since any route connecting to Dunball would require a high level bridge crossing across the navigable channel of the River Parrett. By moving the connection further south the navigable channel of the river is avoided and construction of a bridge becomes much more viable. Route 4 was therefore realigned to connect to a new junction to the south of the Dunball Roundabout. More information is provided in the deliverability section of this study.

2.1.11 On this basis, the potential route options were narrowed down to those identified at **Plate 2.2** .

Plate 2.2: Preferred Route Options



2.1.12 Although the principal mitigation that a Bridgwater bypass would provide for the HPC Project would only be over the construction period, the type of traffic using it, mainly heavy goods vehicles with large loads, would necessitate a road construction that would need to be of a standard similar to a permanent road. A road of any lighter construction would require significant maintenance and repair over the course of the construction period which would not be efficient or financially viable. These issues are elaborated further in **Appendix 4**. Furthermore, one of the key aspects of the public support for a Bridgwater bypass is the lasting benefit it could bring to residents of Bridgwater. A haul road would not be accessible to the general public and would only exist for the construction period of HPC and therefore there would be no lasting benefit to local residents. On this basis, the potential route chosen should be one which provides the most benefits as a permanent road, during and following the construction of the HPC power station and, therefore, Route 7 was discounted from the study.

2.1.13 The remaining two routes for consideration are Route 1a and Route 4. Both routes have the same origin and follow a very similar alignment but Route 1a connects with the Cannington Western Bypass north of Cannington and Route 4 connects with the Cannington Western Bypass south of Cannington.

2.1.14 Given that construction of a Bridgwater bypass would not simply provide a short term solution for EDF Energy traffic, it is considered that the long term benefit of a route alignment which better serves the through flow of traffic between Junction 23 of the M5 and the A39 is more suitable.

2.1.15 It is considered that Route 4 would have the most lasting benefits as a permanent route, for the following reasons:

- it better serves the through flow of traffic between Junction 23 of the M5 and the A39;
- it connects directly into the Main Road roundabout and A39 to the south of Cannington, onto the existing Cannington southern bypass and then onto the proposed Cannington western bypass; and
- it is the only option which would connect directly onto the A39 which would not necessitate a new roundabout and new road links to the east and north of Cannington, whereas Route 1a provides a more convoluted route, requiring traffic to travel to the north of Cannington and around the new Cannington Western Bypass and on to the A39.

2.1.16 On this basis, Route 4 was considered to be the most appropriate potential route for a Bridgwater bypass and was therefore taken forward for further assessment.

2.1.17 The Bypass Study carried out for Stage 2 concluded that Route 1a was the preferred route, largely on the basis that it avoided a high level crossing of the River Parrett. The realigned Route 4 avoids this high level crossing and is considered to provide more lasting benefits to Route 1a for the reasons explained above. It is Route 4 which is taken forward for assessment in this study.

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APPENDIX 3: JOURNEY TIMES, QUEUING ANALYSIS AND OVERALL NETWORK DELAY

3. JOURNEY TIMES, QUEUING ANALYSIS AND OVERALL NETWORK DELAY

3.1.1 Extensive discussions have taken place with the authorities (SCC and the HA) on the best way to assess the impact of HPC on the highway network. The agreed methodology has been used within the **Transport Assessment** for HPC and these same criteria have been used to assess the Bridgwater bypass option within this study (Route 4).

3.1.2 This allows for a valid comparison between the Bridgwater bypass option and the proposed DCO application option. The criteria for assessment include:

- journey times on specific routes;
- queuing at junctions;
- overall network statistics, i.e. average speed across the network; and
- unreleased vehicles.

3.1.3 This chapter should be read in conjunction with the **Transport Assessment** for further information on the methodology used.

3.1.4 The following scenarios have been tested for Bypass Route 4.

- 2016 with development and with Route 4
- 2021 with development and with Route 4.

3.1.5 In both scenarios during initial tests, the highway improvements committed to under the Site Preparation and Preliminary Works applications were assumed to have been provided (A39 Broadway/A38 Taunton Road Junction, A39 New Road/B3339 Sandford Hill Roundabout, Washford Cross Roundabout, Claylands Corner Junction, C182 Farringdon Hill Lane, Horse Crossing; Cannington Traffic Calming Measures, Huntworth Roundabout) but none of the additional highway improvements proposed as part of the application for Development Consent were included.

3.1.6 However, these tests showed that there were significant congestion problems at M5 Junction 23 and Huntworth roundabout which may have been affecting the overall assessment. Therefore further tests were undertaken that included the proposed improvements at those junctions that are included within the DCO. It is the results of these further tests that are reported in this appendix.

3.1.7 Both scenarios also assume that all other aspects of the HPC Project are the same, i.e. including the park and ride and freight management sites, as these would still be required even with a Bridgwater bypass. The DCO does not provide for car parking or freight management facilities on the HPC site and therefore it is still necessary to include these in the application.

3.1.8 The results of the ‘DCO application’ model and ‘with Bridgwater bypass’ model are then compared to the Reference Case model (i.e. what happens without HPC, but with other growth).

3.1.9 When considering the results presented in the following sections, reference should be made to the analysis set out within Chapter 15 of the **Transport Assessment** for HPC.

3.1.10 The 2016 analysis is presented first since this is the year of maximum construction activity, followed by 2021. Within the **Transport Assessment** 2013 was also tested, however, since the Bridgwater bypass option would take up to three years and eight months to construct (refer to **Appendix 4** for details) there is no possibility that a Bridgwater bypass could be in place by 2013 and this scenario is not therefore considered within this report. The analysis addresses the following:

- journey times;
- overall junction performance (queuing); and
- total network delay.

3.2 Results of Analysis

a) 2016

i. Journey Times

3.2.1 The first set of data to consider relates to journey times along various routes within Bridgwater. A number of journey time routes have been examined and the full results are included at **Appendix 5**. To allow a valid comparison between the DCO scenario and the alternative Bridgwater bypass option, the same journeys considered within the Transport Assessment for HPC have been assessed (Route 10, Route 1 and Route 6).

3.2.2 The results for the two key routes assessed within the **Transport Assessment** are shown below. These are the two HGV routes from the M5 to the HPC site since these take the great majority of HPC generated traffic.

3.2.3 On each graph the red line shows the 2016 Reference Case. The green line shows the times if HPC traffic is added but with no highway improvements. The blue line shows the situation when the proposed package of mitigation proposed in the DCO application is added. The purple line shows the situation when the Bridgwater bypass is added instead of proposed additional mitigation.

3.2.4 The period between 10:00 and 13:00 hours has not been modelled because it is not a critical time for the network (as agreed with the transport authorities) and therefore when reviewing the daily graphs the results should be ignored for this period.

Route 10

3.2.5 Journey Time Route 10 is the route from M25 Junction 24, via Taunton Road, Broadway, A39, Cannington Bypass and C182 to HPC

Plate 3.1: Journey Time Analysis, Route 10 Northbound (2016)

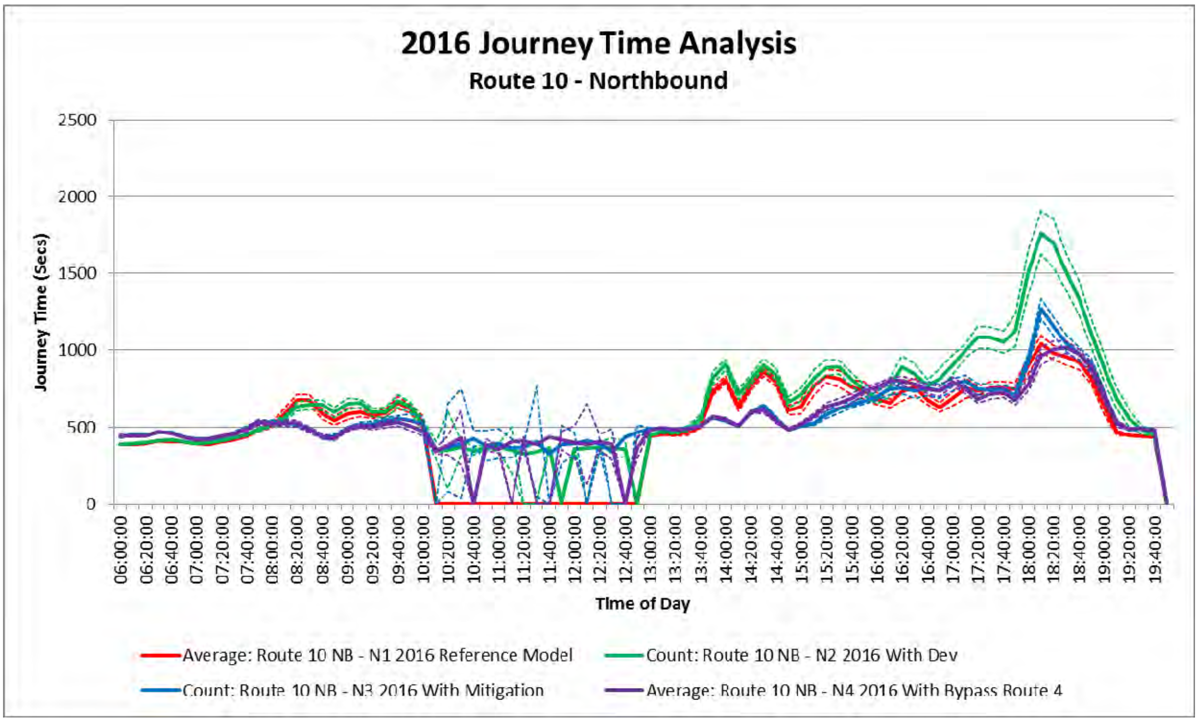
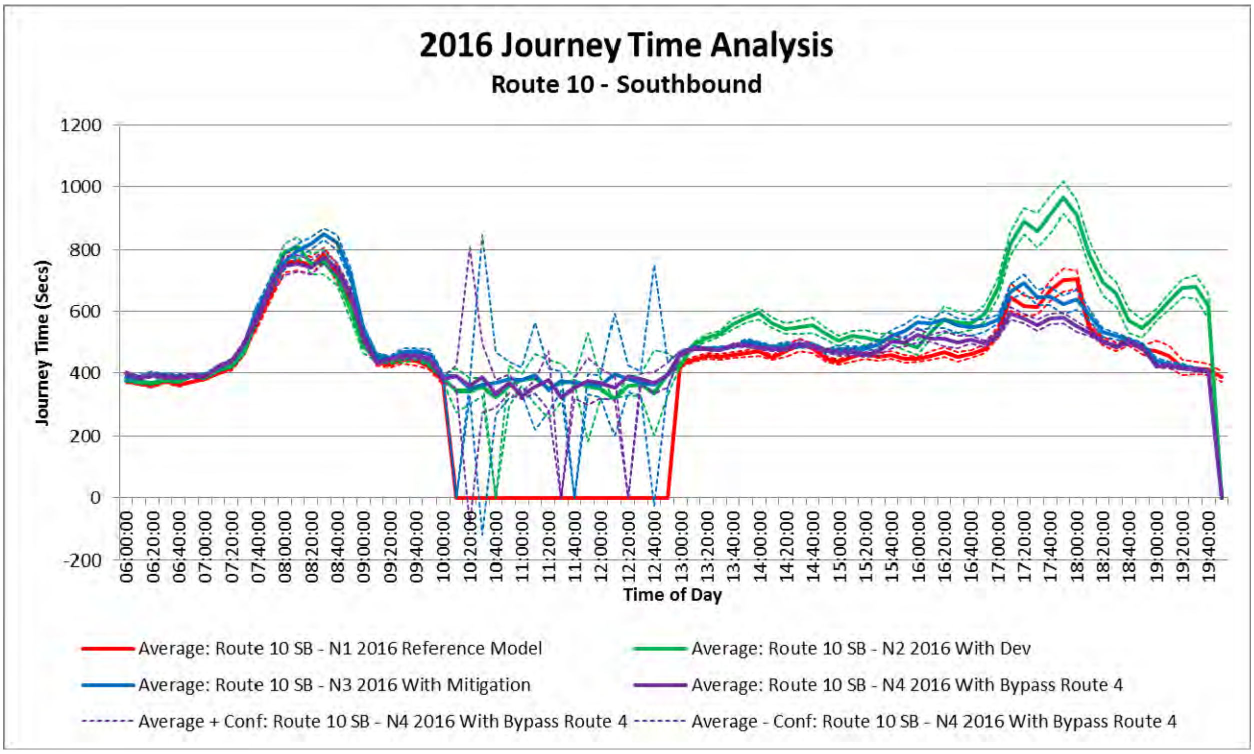


Plate 3.2: Journey Time Analysis, Route 10 Southbound (2016)



3.2.6 As can be seen on Journey Time Route 10, in the southbound direction there is some improvement with the bypass in the morning peak. There is also some improvement in the evening peak but the DCO proposals already mitigate or improve the situation compared with the Reference Case.

3.2.7 In the northbound direction, in the morning peak there is no change. In the evening peak there is some improvement due to the bypass.

3.2.8 The bypass leads to relatively small changes on Route 10. This is not surprising since one would not expect significant traffic using Route 10 (Taunton Road and Broadway) to be diverted onto the new bypass. It should also be remembered that the test assumes all the improvements on that route that will be included in the DCO application.

Route 1/Route 6

3.2.9 Journey Time Route 1 is the route between the junction of A38/The Drove and Quantock roundabout i.e. along Western Way. Route 6 is from Junction 23 to Cross Rifles roundabout on the A38.

Plate 3.3: Journey Time Analysis, Route 1 Eastbound (2016)

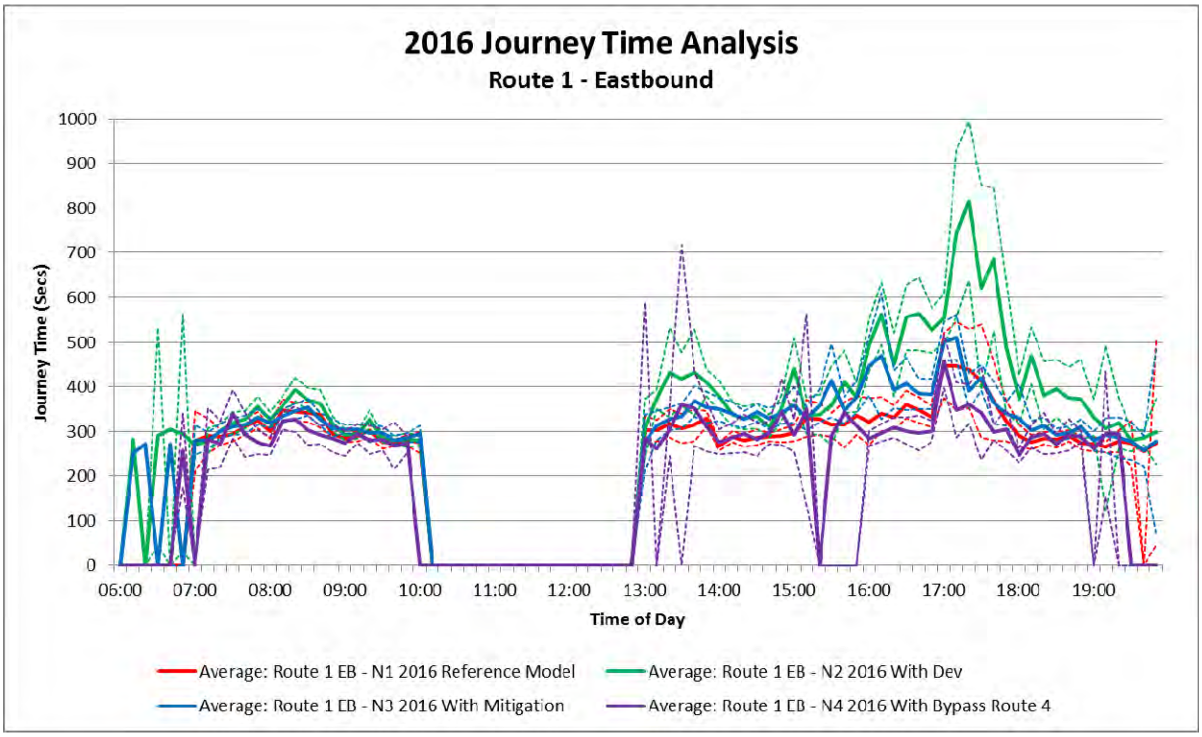
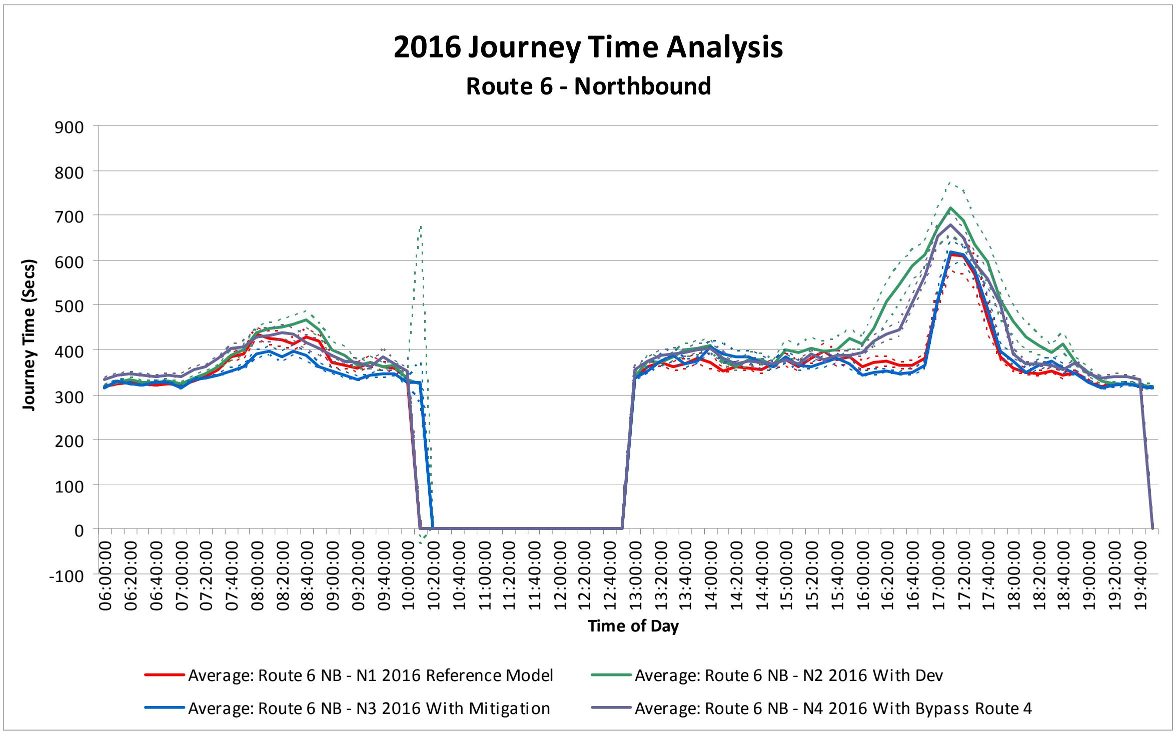


Plate 3.4: Journey Time Analysis, Route 6 Northbound (2016)



3.2.10 On Journey Time Route 1, in the eastbound direction there is no statistically significant change in journey time between the DCO package and the bypass in both the morning and evening peak periods.

3.2.11 In the westbound direction there is no change in the morning peak and a small improvement due to the bypass in the evening peak. However, the DCO package mitigates or improves the journey time compared with the Reference Case.

3.2.12 On Journey Time Route 6, in the southbound direction, in the morning peak there are some improvements due to the bypass but the DCO package mitigates the impact of HPC. In the evening peak there are some improvements due to the bypass.

3.2.13 In the northbound direction in the morning peak, the DCO package leads to reduced journey times compared with the bypass whilst in the evening there is no statistically significant difference between the bypass and the DCO package.

3.2.14 In summary, there are only three periods out of the twelve examined where the bypass leads to some improvements and the DCO package does not fully mitigate the impact of the HPC traffic.

Plate 3.5: Journey Time Analysis, Route 1 Westbound (2016)

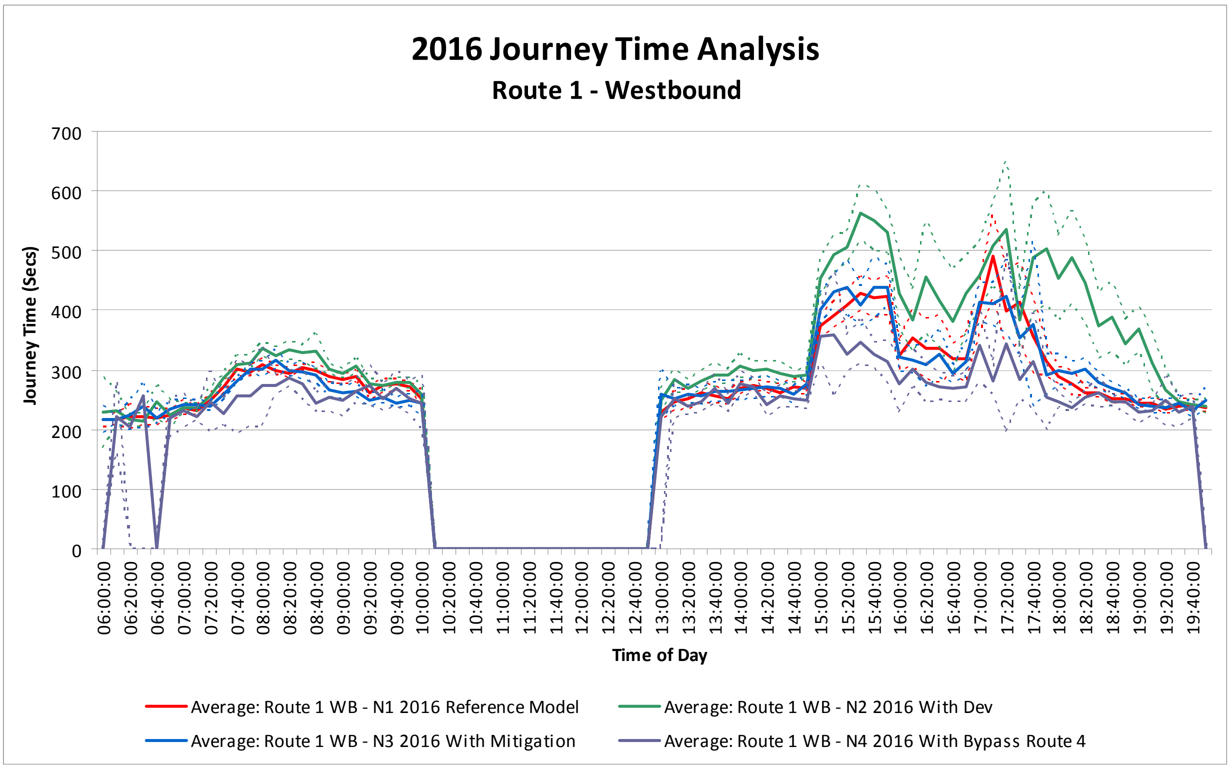
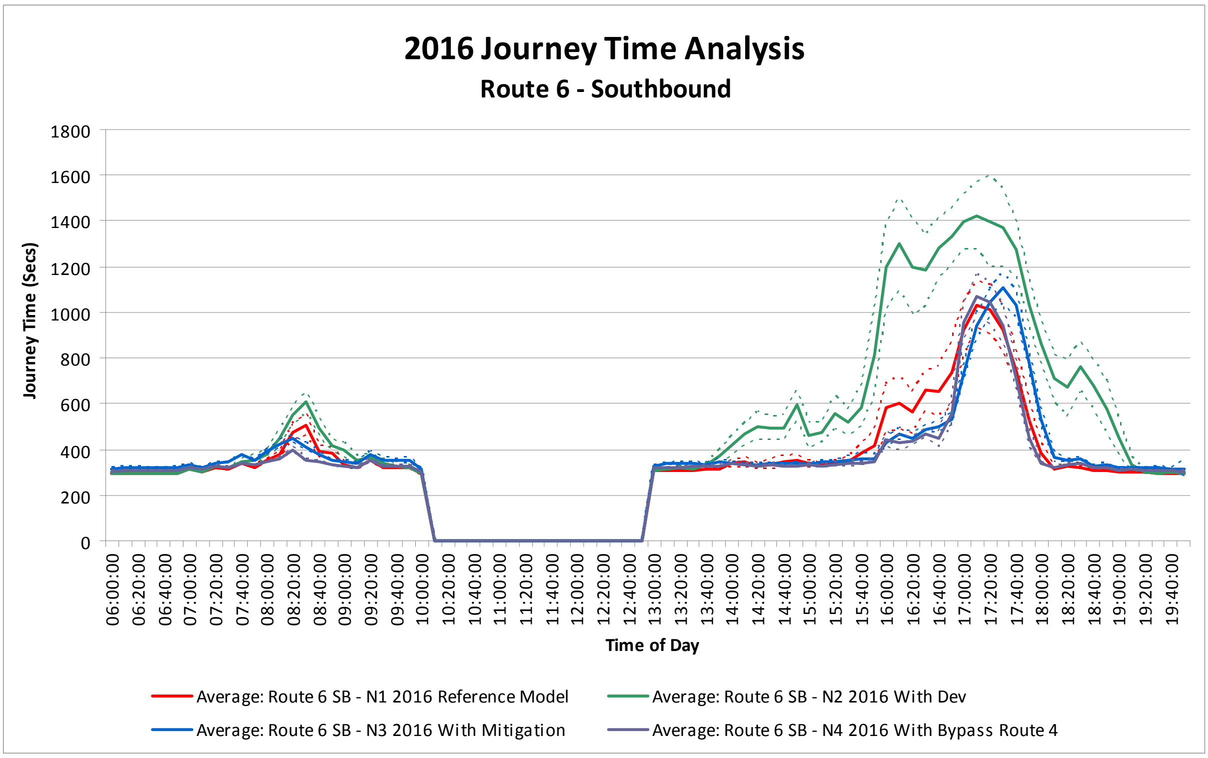


Plate 3.6: Journey Time Analysis, Route 6 Southbound (2016)



3.2.15 On Journey Time Route 1, in the westbound direction in the morning peak the situation is broadly neutral between the Reference Case and the case with HPC, but without mitigation, with no significant changes to journey times as a result of HPC. In the evening peak HPC traffic leads to a significant detriment in journey time.

3.2.16 However, once EDF Energy's proposed DCO package of mitigation is introduced it leads to a slight improvement compared with the Reference Case across the modelled period. When the Bridgwater bypass option is considered it can be seen that the Bridgwater bypass scenario also mitigates the development impact but to a slightly greater extent than the proposed mitigation package across the modelled period.

3.2.17 When Route 6 is considered in the southbound direction it is clear that HPC traffic generates an increase in journey times compared to the Reference Case in the evening period. However, once the proposed DCO application package of mitigation is implemented, journey times are restored to the Reference Case and for a large proportion of the evening peak period beyond the Reference Case.

3.2.18 When the Bridgwater bypass scenario is considered the results are broadly neutral with the proposed mitigation package, demonstrating that both options mitigate against the impact of HPC.

Summary of Key Routes

3.2.19 The above analysis is broadly summarised in **Table 1** below:

Table 1: Summary of Key Route Journey Time Analysis (2016)

Route	Direction	Does Bridgwater bypass provide any benefits over the proposed strategy?
Route 10	Southbound	Neutral in AM peak and marginal benefit in PM peak
	Northbound	Marginal benefit in AM peak and neutral in PM peak
Route 1	Eastbound	Marginal benefit in AM and PM peak
	Westbound	Marginal benefit in AM and PM peak
Route 6	Northbound	Neutral in AM and PM peak
	Southbound	Neutral in AM peak and marginal improvement in PM peak

3.2.20 The above analysis demonstrates that although some minor benefits are experienced on some routes, these are not of a significant magnitude compared to what is achieved through the proposed mitigation package.

Summary of Non-Key Routes

3.2.21 The two routes considered in the preceding sections are those which carry the majority of HPC traffic (Route 10 and Route 1 plus Route 6). The analysis considers the effectiveness of the proposed mitigation package against the Reference Case in 2016 and provides a comparison between the proposed DCO mitigation package and the Bridgwater bypass option. The conclusion of this analysis is that provision of a Bridgwater bypass does not provide any significant benefits compared with the proposed DCO mitigation.

3.2.22 It is important that routes other than these two key routes are considered and the full analysis is included at **Appendix 5. Table 2**, below provides a summary of the each of the remaining seven journey time routes by direction, in terms of how the proposed DCO mitigation package performs, how this compares to the Reference Case and how the Bridgwater bypass option performs. The final column in the table provides the conclusion of the analysis and whether the Bridgwater option would outweigh the benefits of the proposed mitigation, considering journey times only.

Table 2: Summary of Non-Key Route Journey Time Analysis (2016)

Route	Direction	Summary	Does Bridgwater bypass provide any benefits over the proposed strategy?
Route 2	Eastbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral.	No
	Westbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. However, the Bridgwater bypass option brings journey times in line the Reference Case to a greater extent than the proposed mitigation package in this location.	Marginal benefit
Route 3	Eastbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral and in line with the Reference Case. The Bridgwater bypass option brings a greater improvement in journey times for a small period in the PM peak hour.	Marginal benefit
	Westbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral and in line with the Reference Case. However, the proposed mitigation package improves journey times beyond the Reference Case for much of the day, to a slightly greater extent than with the bypass.	No
Route 4	Eastbound	The proposed mitigation package shows a very slight increase in journey time along this route compared to the Reference Case. The Bridgwater bypass option achieves similar results but provides a marginal improvement on the mitigation package in the PM peak.	Marginal benefit
	Westbound	The proposed mitigation package provides an improvement on the Reference Case across the day. The Bridgwater bypass option achieves broadly neutral results with the mitigation package.	No – performs worse
Route 5	Southbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral and in line with the Reference Case	No
	Northbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral and in line with the Reference Case	No
Route 7	Eastbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral in the AM peak. However, the Bridgwater bypass option brings journey times in line the Reference Case to a greater extent than the proposed mitigation package in the evening peak.	Marginal benefit
	Westbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. Both options mitigate the impact of HPC traffic. Both options improve journey times beyond the Reference Case to a very similar extent. The bypass achieves marginally better results in the PM peak.	Marginal benefit
Route 11	Southbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. Both options mitigate the impact of HPC traffic and bring journey times in line with the Reference Case	No
	Northbound	The proposed mitigation package and the Bridgwater results are broadly neutral. Both options mitigate the impact of HPC traffic and improve journey times slightly beyond the Reference Case	No

Summary of All Routes

3.2.23 On the basis of the graphs generated for key routes (Routes 10 and Route 1 plus Route6)), on which HPC generated traffic travels, it is concluded that the bypass option provides no significant benefit over and above EDF Energy's proposed mitigation package.

3.2.24 The results in relation other routes lead to a similar conclusion. In many cases the results are neutral and in some cases there is a small reduction in journey times over the DCO mitigation package scenario. Therefore; with regard to journey times it is considered that although the bypass delivers some marginal benefits in journey times these are not considered to be significant by comparison with the position with the proposed improvements.

3.2.25 The **Transport Assessment** demonstrates that there would either be improvements to, or a neutral impact on journey times, from the Reference Case (without HPC, but with other growth) with the HPC Project and the proposed DCO package of mitigation measures in place. There is no need to consider alternative options such as a bypass.

ii. Junction Performance (queuing)

3.2.26 Having considered journey times, the next stage is to examine the performance of individual junctions.

3.2.27 Within the **Transport Assessment** each of the key junctions within Bridgwater and Cannington has been examined to determine the change in queuing between the Reference Case and the DCO application mitigation package case for both 2016 and 2021. The **Transport Assessment** has acknowledged that Paramics does not produce a performance indicator such a Ratio of Flow to Capacity (RFC) that other modelling tools such as Arcady produce and therefore, the change in queue has been used as the appropriate measure of performance for HPC.

3.2.28 Within the **Transport Assessment** a summary of the queue results for each junction is provided as a comparison between the Reference and DCO application mitigation scenarios.

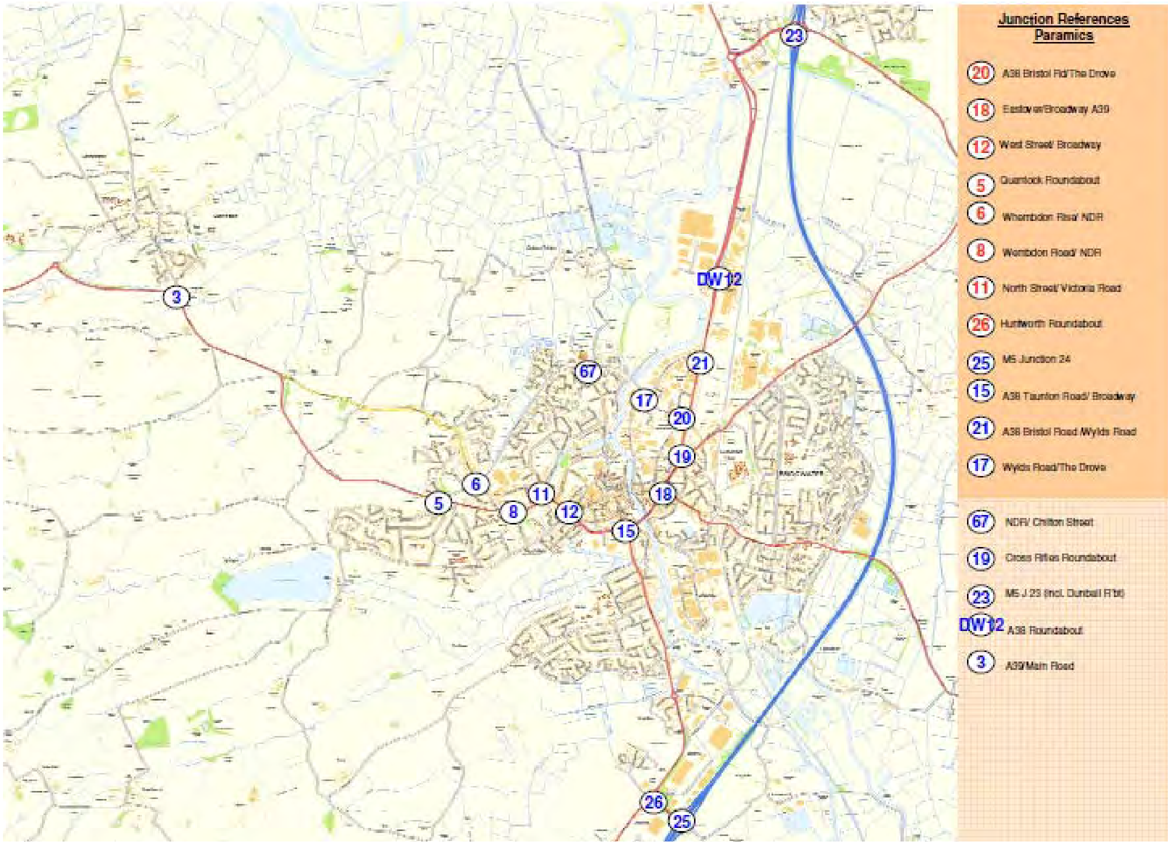
3.2.29 Where a statistically significant change in queuing occurs between the DCO Mitigation and Reference Case scenarios the change in queue is identified. The results show the total change in queue lengths (in number of cars) at each junction by summing the changes on each arm. The total for the morning (AM) and evening (PM) peaks are then added to give a junction score.

3.2.30 When reviewing the data it is important to understand that the queues shown are not actual queue lengths, they are the addition to queue lengths (above the Reference Case) over a period of time.

3.2.31 In order to provide a comparison between the proposed DCO application mitigation package and the Bridgwater bypass option, the same analysis has been repeated for the Bridgwater bypass versus the Reference Case. The results are described in the following sections.

3.2.32 A total of 18 junctions are assessed. A location plan of these key junctions is shown at **Plate 3.7**.

Plate 3.7: Reference Plan of Junctions



3.1.33 **Table 3**, below, provides the results of the queue analysis for the 2016 Reference Case.

Table 3: Summary of Queue Analysis Reference Case (2016)

Junction Ref	Junction Name	2016 Reference Case		
		AM Score	PM Score	Total Score
3	Main Rd Cannington/A39 Roundabout	0	50	50
5	Quantock Rd/Western Way	20	102	122
6	Wembdon Rise/Western Way	0	8	8
8	Wembdon Road/Northfield	19	267	286
11	North Street/Victoria Road	0	300	300
12	West Street/Broadway	0	271	271
15	Broadway/ Taunton Road	11	579	590
16	East Quay/The Clink	0	138	138
17	Western Way/The Drove	28	553	581
18	St John Street/Broadway	5	210	215
19	Crossrifles Roundabout	13	478	491
20	Bristol Road/The Drove	11	281	292
21	Bristol Road/Wylds Road	27	565	592
23	M5 Junction 23	85	312	397
24	Huntworth Roundabout	68	346	414
25	M5 Junction 24	134	142	276
67	Western Way/Chilton Street	0	141	141
dw12	A38 Roundabout	0	424	424
Total Score		421	5165	5586

3.2.34 Table 5.4, below provides a comparison between the results of the Reference Case, the results presented in the **Transport Assessment** for the proposed DCO mitigation scheme and the repeat assessment that has been undertaken for the Bridgwater bypass option.

3.2.35 Reductions in queuing (of more than 15) compared with the Reference Case are deemed to be an improvement and increases in queuing (of more than 15) are deemed to be a detriment. Any reductions or increases of 15 or less are not considered significant.

3.2.36 **Table 4** shows the additional queue (in number of vehicles) beyond the Reference Case, with additional queues shown as positive numbers and reductions in queues shown as negative numbers.

Table 4: Summary of Queue Analysis (2016)

Junction Ref	Junction Name	Priority Ranking Reference vs Proposed Mitigation				Priority Ranking Reference vs. Bridgwater bypass			
		AM Score	PM Score	Total Score	Rank	AM Score	PM Score	Total Score	Rank
3	Main Rd Cannington/A39 Roundabout	0	+55	+55	2	0	0	0	4
5	Quantock Rd/Western Way	+19	+9	+28	5	0	0	0	6
6	Wembdon Rise/Western Way	0	+39	+39	4	0	0	0	6
8	Wembdon Road/Northfield	+11	+36	+47	3	-7	-33	-40	9
11	North Street/Victoria Road	0	+12	+12	7	-29	0	-29	12
12	West Street/Broadway	0	0	0	11	0	-9	-9	11
15	Broadway/ Taunton Road	-164	-280	-444	18	-192	-389	-581	18
16	East Quay/The Clink	+7	-5	+3	9	0	-23	-23	10
17	Western Way/The Drove	-140	-183	-322	17	-103	-308	-411	17
18	St John Street/Broadway	0	+20	+20	6	-20	-48	-68	13
19	Crossrifles Roundabout	+20	+67	+86	1	-4	-137	-141	14
20	Bristol Road/The Drove	-84	-66	-150	16	-48	-181	-229	15
21	Bristol Road/Wylds Road	0	+5	+5	8	-36	-182	-218	16
23	M5 Junction 23	+25	-58	-34	14	65	-79	-14	2
24	Huntworth Roundabout	-38	-20	-58	15	-86	-65	-151	1
25	M5 Junction 24	-6	0	-6	12	-6	0	-6	3
67	Western Way/Chilton Street	+8	-6	+2	10	0	-5	-5	8
dw12	A38 Roundabout	0	-13	-13	13	0	-14	-14	5
Total Score		-342	-387	-729		-465	-1474	-1939	

3.2.37 The following conclusions can be drawn from this table.

3.2.38 In the proposed DCO mitigation scenario there are five junctions where there are improvements in queuing. There are seven junctions where there is no material change in queuing. There are six junctions where there is an increase in queuing. These junctions are considered in the paragraphs below.

3.2.39 The six junctions where queues increases are identified have been investigated in full in the **Transport Assessment**. A summary is provided as follows:

Cross Rifles:

3.2.40 The HPC proposals have very little impact on this junction since it is not on an HGV route and few if any buses will pass through the junction since buses to and from Bridgwater A and C campuses can use the new link to the A38 being provided by the NE Bridgwater development. This is demonstrated by close inspection of the graphs included at **Appendix 5**. These show that the only times when the with development but no mitigation scenario shows a statistically significant increase in queuing compared with the Reference case is between 15:40 and 16:00 on Monmouth Street and after 18:00 on Bath Road.

3.2.41 The Clink and Monmouth Street experience some queue increase whilst Bath Road experiences a reduction. The unreleased vehicles analysis for this area shows that there are more vehicles released in the 'DCO application' scenario than the Reference Case which demonstrates that the junction is accommodating more traffic. This is corroborated by the fact that more traffic is attracted to Bath Road as noted earlier in the **Transport Assessment**.

Main Road Cannington/A39

3.2.42 There are no statistically significant changes in queuing on the A39 south arm. On the A39 west arm the queue increases to a maximum of 10 vehicles in the morning and evening peaks. It is only at 10 vehicles that SCC consider that a queue is significant and worthy of further investigation. In the morning peak the queue increases by a maximum of four vehicles and in the evening peak by a maximum of six vehicles. The queues are relatively short lived and have no effect on other junctions.

3.2.43 On Main Road, there is no statistically significant change in queuing in the morning peak. In the evening peak the queue increases are generally less than five vehicles which is the level at which it is agreed with SCC further investigation might be required. For only a short approximately 10 minute period does the queue exceed 10 vehicles and an increase of five. The queuing has no knock on effect on other junctions.

3.2.44 It is therefore considered that the impact on this junction is acceptable.

Wembdon Road/ Northfield

3.2.45 The only arm that experiences a statistically significant increase in queue is Northfield where the increase is only three vehicles at the peak time. This is not considered a material change.

Wembdon Rise/ Western Way

3.1.46 The only arm of the junction that experiences any statistically significant increase in queuing is the Wembdon Rise Arm in the morning peak. However, this partly as a result of assumptions in the modelling since all the residential areas served off

Wembdon Rise are connected using one link. By moving the notional link a little further west then the demand on this arm would reduce as the model would send drivers via Sandford Corner. In reality if there is delay at this junction people will tend to use Sandford Corner. In any case it would not be desirable to increase the capacity of the Wembdon Hill arm since this would encourage more through traffic to use the route through the village.

Quantock Road/ Western Way:

3.2.47 On Quantock Meadows and Quantock Road West the queues are all less than 10 vehicles and the changes in queuing are less than five vehicles. On Quantock Road East, all queues are 10 vehicles or less and the changes in queuing are less than five vehicles. On Western Way, in the morning peak the queue increases by eight vehicles. In the evening peak the queue is less than 10 vehicles except for one isolated 10 minute interval when it increases to 13 vehicles. These queues have no knock on effect on other junctions and are spread over two lanes i.e. the queue per lane will be less than 10.Given that most arms of the junction operate experience no material impact and the impact on Western Way is relatively short lived in the peaks, this impact is considered acceptable.

St Johns Street/Broadway:

3.2.48 Eastover is the only arm that experiences a statistically significant increase in queuing with an increase of approx seven vehicles in the evening peak. Both Monmouth Street and Broadway experience a reduction in queuing.

3.2.49 It is likely that with more detailed individual junction modelling the green times will be adjusted to equalise the queuing.

3.2.50 The conclusion of the analysis, which considers the individual graphs contained at **Appendix 5,** is that the proposed highway improvement package mitigates the effects of HPC. Indeed **Table 4** demonstrates significant improvements at certain junctions and the overall scoring shows a significant reduction in queuing as a result of the proposed mitigation package.

3.2.51 In the Bridgwater bypass option there are 11 junctions where there are improvements in queuing. There are three junctions where there is no material change in queuing and there are four junctions where there is an increase in queuing.

3.2.52 Turning to the Bridgwater bypass option, the four junctions where queues increases are identified have been investigated in full. These are:

Main Road, Cannington

3.2.53 In the Bridgwater bypass option queuing increases on the A39 South Arm throughout the modelled period. The queuing is in excess of the Reference Case but the magnitude is not considered significant.

M5 Junction 23:

3.2.54 Significant increases in queuing occur on the western arm of Junction 23 in the evening peak hour. The Bridgwater bypass option exhibits queuing in excess of the Reference Case. In addition, the Bridgwater bypass option exhibits increased queuing on the northbound off-slip at Junction 23 in the morning peak, in excess of the Reference Case.

Huntworth Roundabout

3.2.55 Significant increases in queuing occur with the Bridgwater bypass option throughout the modelled period on the M5 link road arm of Huntworth Roundabout. The Bridgwater bypass option presents queuing in excess of the Reference Case for much of the modelled period.

M5 Junction 24:

3.2.56 In the morning peak, significant queuing occurs in the Bridgwater bypass scenario at M5 Junction 24, particularly on the northbound off-slip in the morning peak. Results are far in excess of the Reference Case.

3.2.57 When the Bridgwater bypass option is considered, although a greater number of junctions show reductions in queuing, all but one, there is still an increase in queuing of 65 vehicles beyond the Reference case at Junction 23 in the AM peak. This scenario includes signalisation works to Junction 23. This issue does not occur in the PM peak.

3.2.58 In conclusion, the queue analysis demonstrates that both the Bridgwater bypass and the proposed DCO application mitigation package benefit the highway network overall in achieving reduced queuing at a number of junctions through Bridgwater. The bypass scenario provides a slightly greater level of relief but the results of the analysis indicate that further works to Junction 2 would be required to alleviate additional queuing in the AM peak.

iii) Total Network Delay

3.2.59 The next set of results to be reported is the Total Network Delay. This records the total time taken by all vehicles to pass through the network and calculates the average speed per vehicle. The comparison between the 2016 Reference Case, the 2016 with DCO development and mitigation case and the 2016 with development and with Bridgwater bypass case is shown at **Table 5**.

Table 5: Comparison of Total Network Delay Statistics (Speeds in mph)

Time	Reference Case Model	With Development Only	With Development and Proposed Mitigation	With Development and Bridgwater bypass
0600-0700	38.4	37.6	36.6	37.1
0700-0800	36.2	35.2	34.9	36.0
0800-0900	25.5	23.8	25.8	27.1
0900-1000	25.5	24.6	26.0	26.6
AM Period	**31.4**	**30.3**	**30.8**	**31.7**
1300-1400	34.3	32.9	33.0	33.9
1400-1500	28.4	26.5	28.6	30.2
1500-1600	27.4	24.4	28.0	29.7
1600-1700	26.1	20.9	26.3	28.8
1700-1800	22.0	16.0	22.5	25.8

Time	Reference Case Model	With Development Only	With Development and Proposed Mitigation	With Development and Bridgwater bypass
1800-1900	24.0	14.5	25.6	29.2
1900-2000	25.5	11.3	26.1	27.4
PM Period	**26.8**	**20.9**	**27.1**	**29.3**
OVERALL	**29.1**	**25.6**	**29.0**	**30.5**

3.2.60 The analysis shows that in the morning peak hour (08:00 to 09:00) the average speed across the network decreases with introduction of HPC without any mitigation (a decrease from 25.5mph to 23.8mph). Once the proposed mitigation is implemented speeds increase marginally to 25.8mph, which means in this scenario speeds would be 0.3mph quicker than in the Reference Case, equivalent to a 1.2% change.

3.2.61 When the proposed mitigation package is removed and the Bridgwater bypass scenario is tested it can be see that with Bridgwater bypass speeds increase marginally to 27.1mph. In this scenario speeds would be 2.2mph quicker than in the Reference Case, a 8.6% increase.

3.2.62 Taken over the three hour morning period there is a marginal reduction in speed once HPC is implemented (31.4mph in the Reference case compared to 30.8mph in the proposed mitigation scenario and 31.7mph in the Bridgwater bypass scenario).

3.2.63 In the evening peak hour (17:00 to 18:00) the average speed decreases noticeably with introduction of HPC but addition of the proposed mitigation package leads to a small increase in speeds compared with the Reference Case, 22.5mph in the proposed mitigation scenario compared to 22.0mph in the Reference Case, an increase of 0.5mph. For the afternoon modelled period there is a small overall increase in journey time. However, for the Bridgwater bypass option, across the modelled period, speeds increase to 29.3mph, a 2.5mph improvement upon the reference case.

3.2.64 Taken over the whole modelled period the average speed remains broadly neutral. The proposed DCO mitigation package delivers a 0.3% improvement in speeds and the Bridgwater bypass option delivers a 4.8% improvement.

3.2.65 These statistics demonstrate that across the network the proposed highway improvements mitigate the impact of HPC traffic and in the key network peak hours lead to an improvement in average speeds. The bypass scenario delivers slightly improved journey times but the magnitude of the improvement over and above EDF Energy’s proposed mitigation package is not considered significant.

b) 2021

3.2.66 In 2021 there would be a full complement of operational staff on site (900 personnel). In addition there would still be construction activity on site and some of the associated development sites would potentially be being decommissioned. However, construction activity would be modest compared with 2016. Junction 24 park and ride and freight management facility would be operational as would Cannington park and ride. The results of the modelling are shown in the tables below.

i. Journey Times

3.2.67 The journey times for Routes 10, 1 and 6 are shown below.

Route 10

Plate 3.8: Journey Time Analysis, Route 10 Southbound (2021)

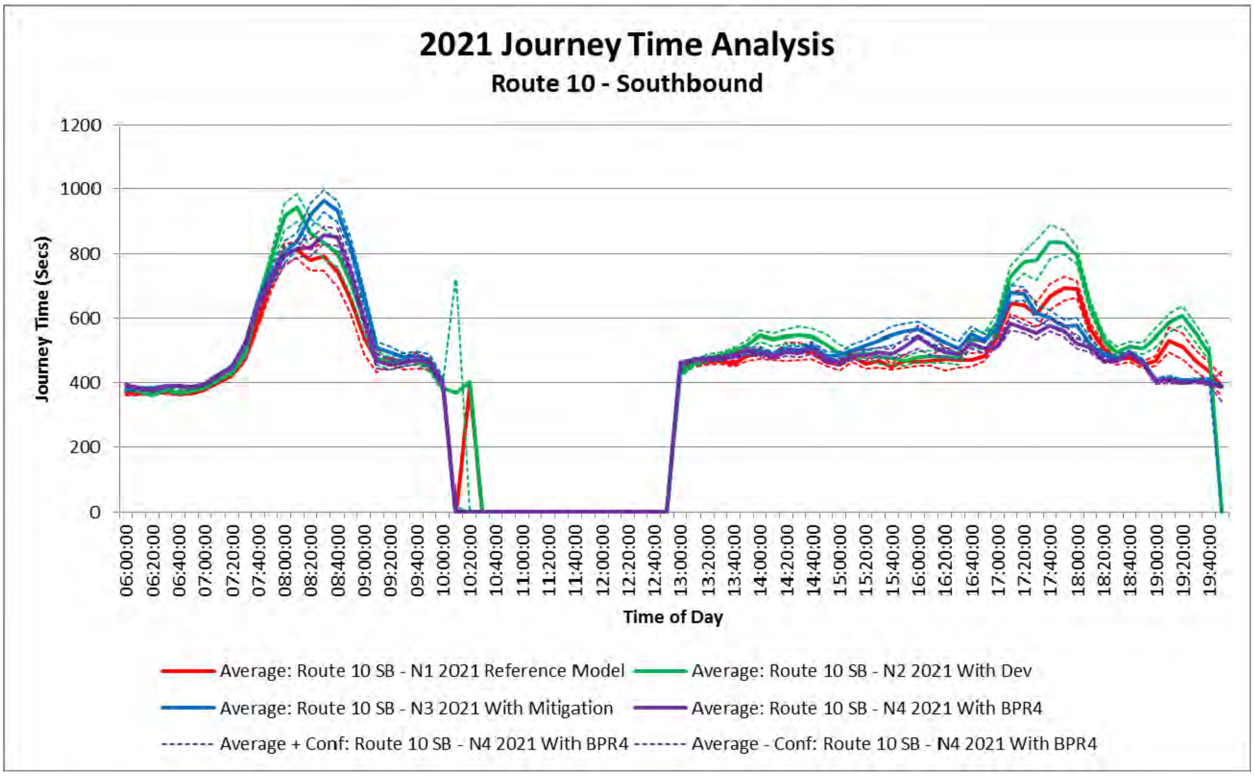
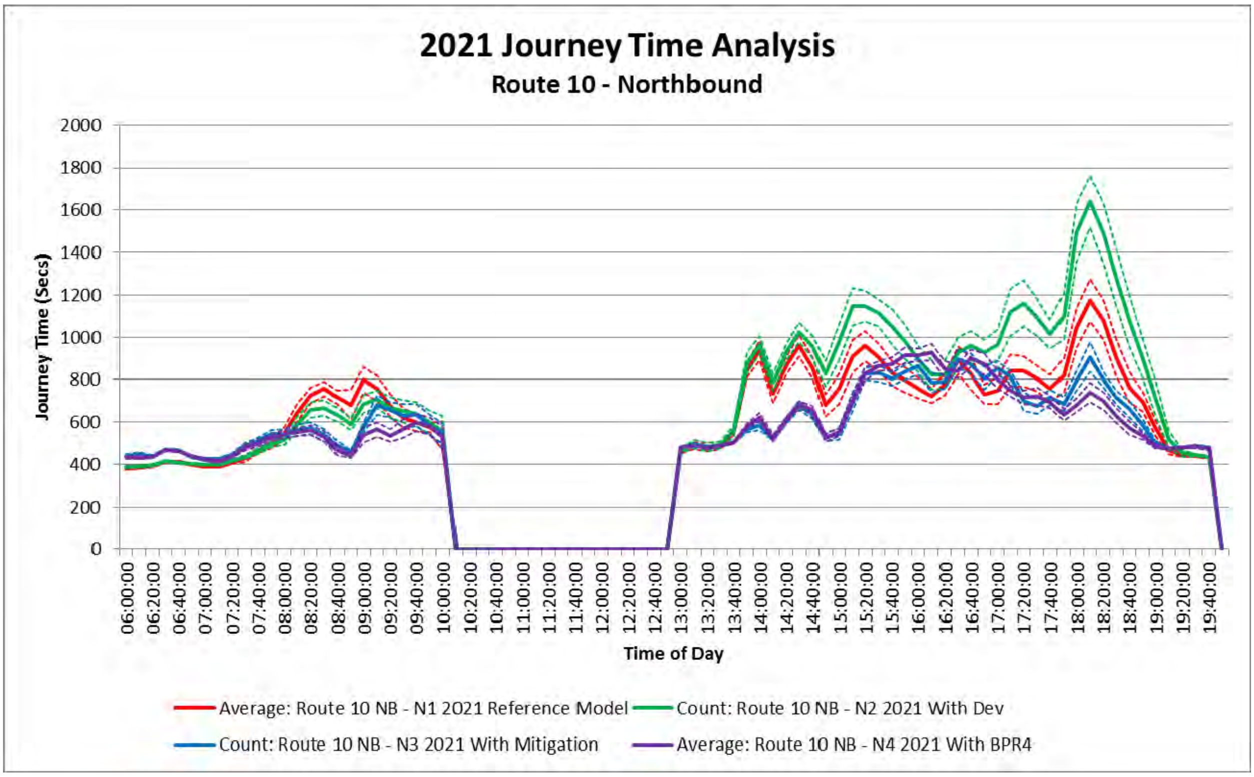


Plate 3.9: Journey Time Analysis, Route 10 Northbound (2021)



3.1.68 As can be seen on Journey Time Route 10, in the southbound direction in the morning peak, the with DCO development but no mitigation scenario shows there is a very slight increase in journey time (green line) for a short period. Introduction of the proposed mitigation package (blue line) shifts the journey time increase slightly later, but still for a short period and of the same magnitude as the with-development scenario. This is most likely due to more traffic being attracted to the route once the mitigation provides additional capacity. In comparison, when the Bridgwater bypass option is considered (grey line) the same effect occurs, but the journey times are very slightly closer to the Reference Case.

3.1.69 In the evening peak there is a material detriment to journey time, due to the introduction of HPC (green line). However the proposed mitigation package restores the journey times to approximately the Reference Case demonstrating that the proposed DCO mitigation is effective. When the Bridgwater bypass option is considered (grey line) the journey times are shown to be virtually the same as those generated by the proposed mitigation package.

3.1.70 In the northbound direction implementation of HPC without mitigation again exhibits an increase in journey times on the Reference Case in the evening period. However, once the proposed package of DCO mitigation is implemented, journey times are shown to improve beyond the Reference Case throughout the modelled period demonstrating that the proposed package not only mitigates the impact of HPC but also delivers an improvement. When the Bridgwater bypass option is considered, the results are broadly neutral with the proposed mitigation package and also deliver and improvement upon the Reference Case.

Route 1/Route 6

Plate 3.10: Journey Time Analysis, Route 1 Eastbound (2021)

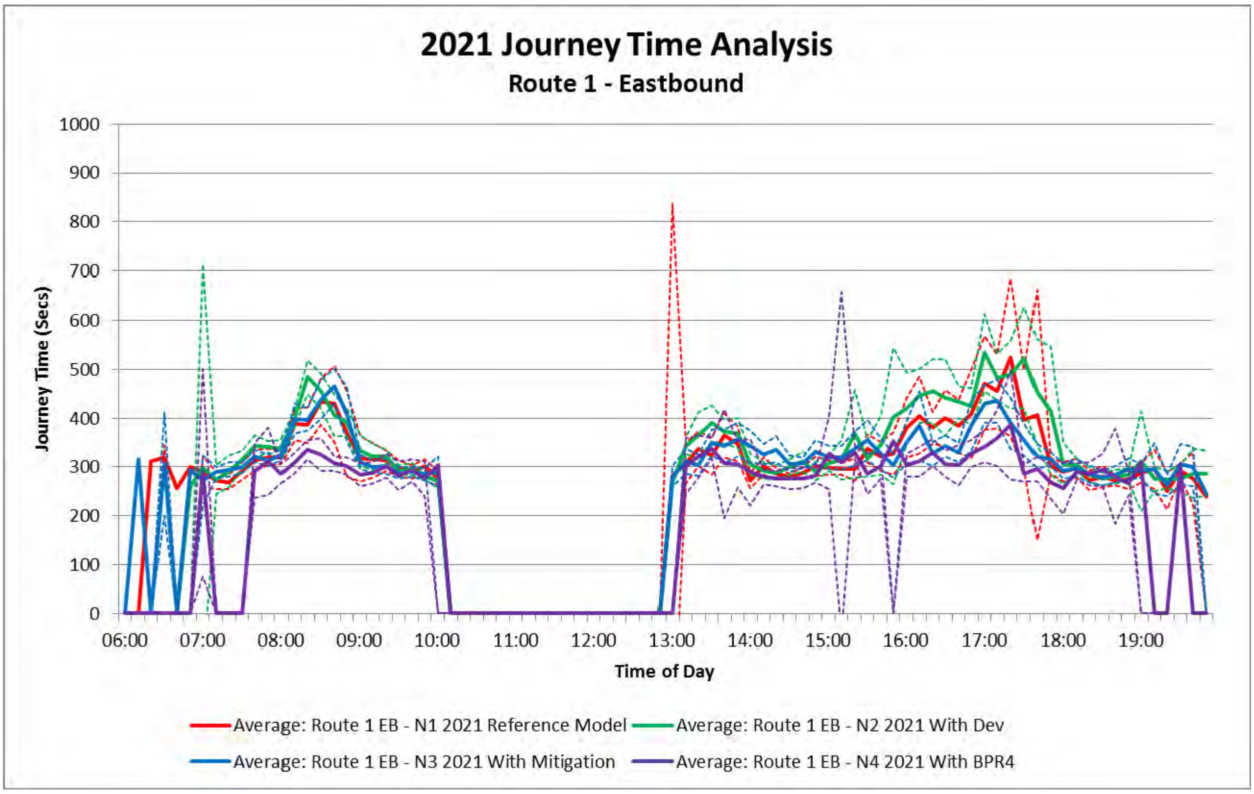


Plate 3.11: Journey Time Analysis, Route 6 Northbound (2021)

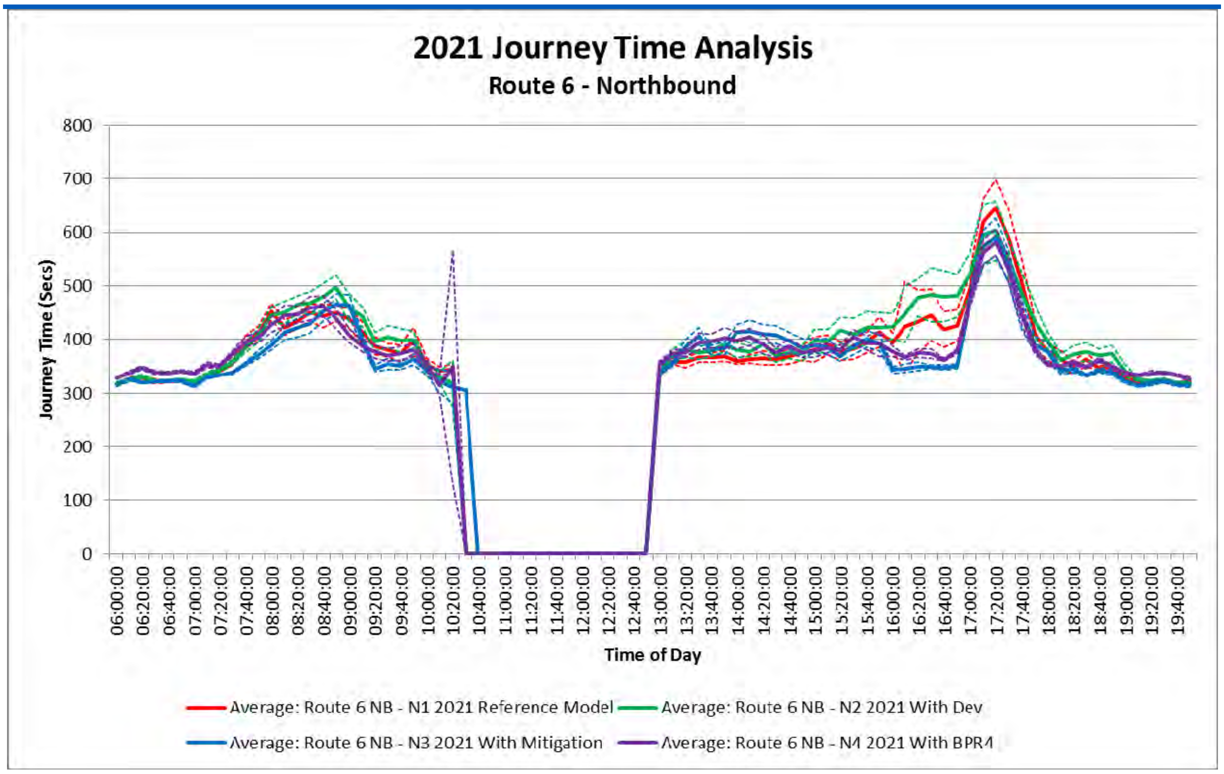


Plate 3.12: Journey Time Analysis, Route 1 Westbound (2021)

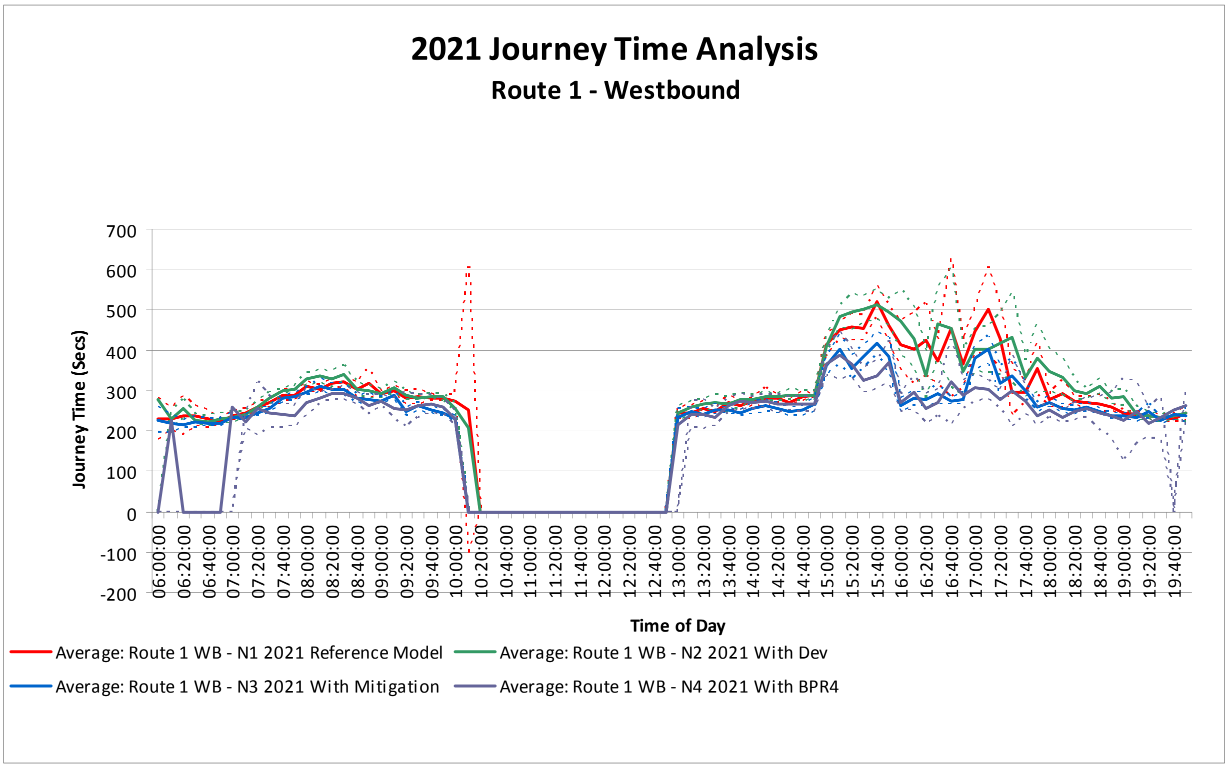
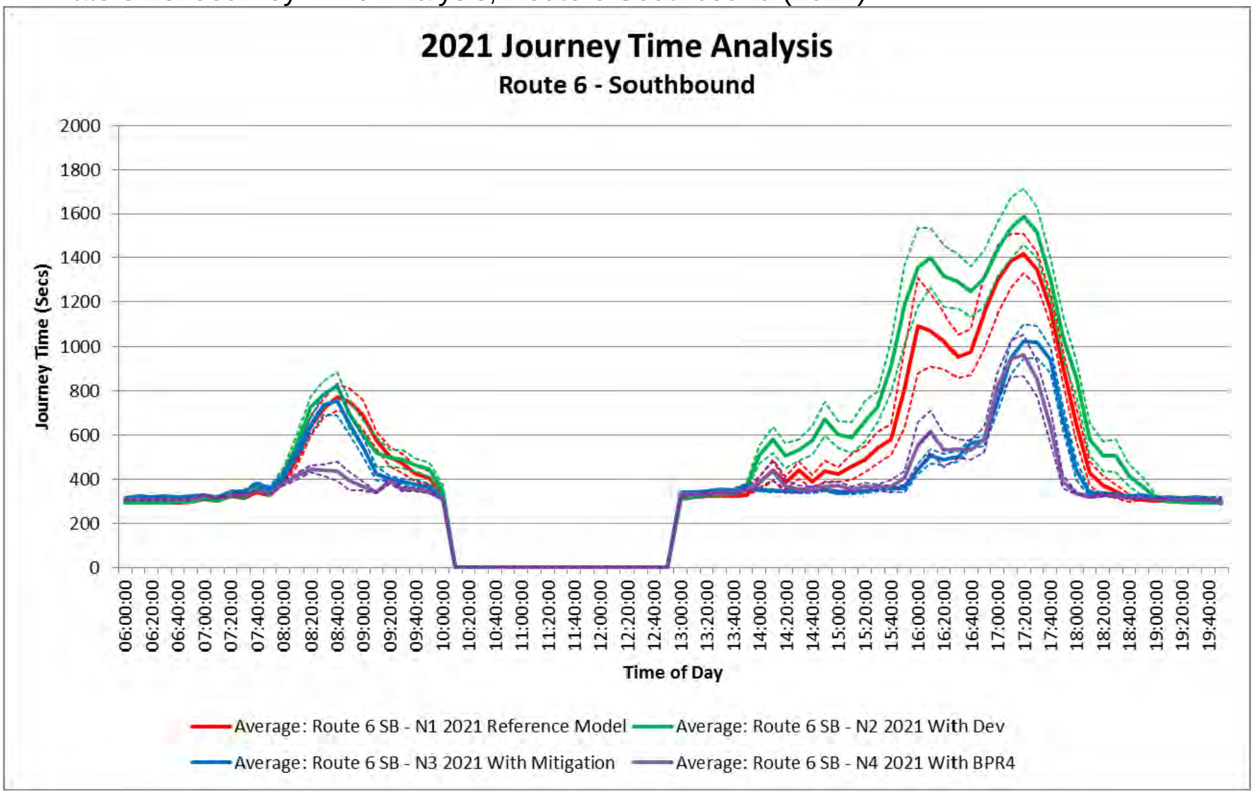


Plate 3.13: Journey Time Analysis, Route 6 Southbound (2021)



3.2.71 On Journey Time Route 1, in the eastbound direction the situation is broadly neutral between the Reference Case and the with-development case, with no significant changes to journey times as a result of HPC.

3.2.72 Once EDF Energy's proposed DCO package of mitigation is introduced it leads to a slight improvement compared with the Reference Case across the majority of the modelled period. When the Bridgwater bypass option is considered it can be seen that the Bridgwater bypass scenario also mitigates the development impact to almost the same extent as the proposed mitigation package and the results of the two options are neutral across the day apart from a short period in the morning peak when the Bridgwater bypass perform slightly better.

3.2.73 On Journey time, Route 6 in the northbound direction, the results again demonstrate that the with-development journey times are broadly neutral with the Reference Case, apart from a slight increase in the evening peak. Once the proposed package of DCO mitigation is implemented, journey times are retained across the modelled period with the exception of a short period in the evening peak when journey times improve beyond the Reference Case. The Bridgwater bypass option achieves the same results with journey times neutral to the proposed mitigation.

3.2.74 Route 1 in the westbound direction indicates that there is little change between the with-development and Reference Case. However, once the proposed mitigation is implemented journey times are improved beyond the Reference Case in the evening peak period. The same effect is achieved with implementation of the Bridgwater bypass

3.2.75 On Route 6 southbound it can be seen that HPC results in significant increases in journey time above the Reference Case. However, once the proposed package of DCO mitigation is implemented journey time significantly improve beyond the Reference Case. The Bridgwater bypass option achieves the same result with journey times between two options broadly neutral. The only exception is during the AM peak hour when the bypass option achieves slightly improved results.

3.2.76 The above analysis is broadly summarised in **Table 6** below:

Table 6: Summary of Key Route Journey Time Analysis (2021)

Route	Direction	Does Bridgwater bypass provide any benefits over the proposed strategy?
Route 10	Southbound	Neutral
	Northbound	Neutral
Route 1	Eastbound	Marginal benefit in AM peak, neutral in PM peak
	Westbound	Neutral
Route 6	Northbound	Neutral
	Southbound	Marginal benefit in AM peak, neutral in PM peak

3.2.77 The above analysis demonstrates that there is very little difference between the DCO proposed mitigation package and the Bridgwater bypass option in 2021.

Summary of Non-Key Routes

3.2.78 The analysis for key routes in 2021 has demonstrated that the results of the proposed mitigation package and the Bridgwater bypass option are broadly neutral across the full modelled period in both directions on both routes, which demonstrates that in terms of Journey times the Bridgwater bypass option does not significantly improve upon the proposed mitigation.

3.2.79 However, it is important to also consider other routes on the network, not just key routes. The full analysis of all routes is included at **Appendix 6.** **Table 7**, below, provides a summary of the each of the remaining seven journey time routes by direction in 2021. The final column in the table provides the conclusion of the analysis and whether the Bridgwater bypass option is considered to outweigh the benefits of the proposed mitigation, in respect of journey times.

Table 7: Summary of Non-Key Route Journey Time Analysis (2021)

Route	Direction	Summary	Does Bridgwater bypass provide any benefits over the proposed strategy?
Route 2	Eastbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral.	No
	Westbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. However, the Bridgwater bypass option brings journey times in line the Reference Case to a greater extent than the proposed mitigation package in this location.	Marginal benefit
Route 3	Eastbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral and in line with the Reference Case apart from during the AM peak hour when the mitigation provides a worse case than the Reference Case, this is the same for both the proposed mitigation and the Bridgwater bypass.	No
	Westbound	The proposed mitigation package and the Bridgwater bypass results both provide an improvement of the Reference Case. However, the proposed mitigation package performs better than the Bridgwater bypass option throughout the modelled period.	No
Route 4	Eastbound	The proposed mitigation package and Bridgwater bypass results are broadly neutral. Both options bring journey times in line with the Reference Case with the exception of the PM period when journey times slightly increase. However, this increase happens with both the proposed mitigation and the Bridgwater bypass option	No
	Westbound	The proposed mitigation package and the Bridgwater bypass option results are broadly neutral and both provide an improvement on the Reference Case across the day.	No
Route 5	Southbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. There is a slight increase upon the Reference Case in both cases in the AM peak hour. The Bridgwater bypass brings journey times slightly more in line with the Reference Case in the PM peak period.	No
	Northbound	The proposed mitigation package and Bridgwater bypass results are broadly neutral and both generate improved journey times in the morning and evening peak periods against the Reference Case.	No

Route 7	Eastbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral and both cases improve journey times beyond the reference case. However, the Bridgwater bypass option achieves marginally better results in the AM and PM peaks.	Marginal benefit
	Westbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. Both options mitigate the impact of HPC traffic. Both options improve journey times beyond the Reference Case to a very similar extent.	No
Route 11	Southbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. Both options mitigate the impact of HPC traffic. Both options improve journey times beyond the Reference Case to a very similar extent.	No
	Northbound	The proposed mitigation package and the Bridgwater bypass results are broadly neutral. Both options mitigate the impact of HPC traffic. Both options improve journey times beyond the Reference Case to a very similar extent.	No

Summary of All Routes

3.2.80 On the basis of the graphs generated for key routes (Routes 10, Route 1 and Route 6), on which HPC generated traffic travels, it is concluded that the Bridgwater bypass option presents no significant benefit compared to EDF Energy's proposed DCO mitigation package.

3.2.81 On the basis of the results generated for the remaining routes, set out at **Appendix 6** and summarised in the table above, there would only be marginal benefit to journey times of providing a Bridgwater bypass.

3.2.82 Therefore, with regard to journey times in 2021 it is considered that the proposed DCO mitigation package provides both an effective and suitable solution across the network which would not be significantly improved upon if the Bridgwater bypass were implemented.

3.2.83 Furthermore, the **Transport Assessment** demonstrates that there would either be improvements to, or a neutral impact on, journey times, from the Reference Case (current position) with the HPC Project and the proposed DCO package of mitigation measures in place. The building of a new road is not justified.

ii. Junction Performance

3.2.84 The equivalent analysis to 2016 has been undertaken for 2021. The queue scoring for the 2021 Reference Case is shown at **Table 8**.

Table 8: Summary of Queue Analysis Reference Case (2021)

Junction Ref	Junction Name	2016 Reference Case		
		AM Score	PM Score	Total Score
3	Main Rd Cannington/A39 Roundabout	5	6	11
5	Quantock Rd/Western Way	20	6	26
6	Wembdon Rise/Western Way	0	0	0
8	Wembdon Road/Northfield	17	30	47
11	North Street/Victoria Road	5	49	54
12	West Street/Broadway	0	43	43

Junction Ref	Junction Name	2016 Reference Case		
		AM Score	PM Score	Total Score
15	Broadway/ Taunton Road	9	60	70
16	East Quay/The Clink	0	7	7
17	Western Way/The Drove	0	105	105
18	St John Street/Broadway	0	38	38
19	Crossrifles Roundabout	0	5	5
20	Bristol Road/The Drove	16	39	55
21	Bristol Road/Wylds Road	93	37	131
23	M5 Junction 23	0	67	67
24	Huntworth Roundabout	91	393	484
25	M5 Junction 24	200	103	304
67	Western Way/Chilton Street	0	0	0
dw12	A38 Roundabout	56	350	406
Total Score		514	1338	1852

3.2.85 The queue change in 2021 at the reported junctions is shown in the table below.

Table 9: Summary of Queue Analysis (2021)

Junction Ref	Junction Name	Priority Ranking Reference vs Proposed Mitigation				Priority Ranking Reference vs. BRIDGWATER BYPASS			
		AM Score	PM Score	Total Score	Rank	AM Score	PM Score	Total Score	Rank
3	Main Rd Cannington/A39 Roundabout	0	+17	+17	2	0	0	0	1
5	Quantock Rd/Western Way	+9	+6	+15	3	-5	0	-5	3
6	Wembdon Rise/Western Way	0	+5	+5	5	0	0	0	1
8	Wembdon Road/Northfield	+25	+7	+32	1	-9	-11	-20	5
11	North Street/Victoria Road	0	+14	+14	4	-51	-5	-57	7
12	West Street/Broadway	-18	0	-18	7	-43	-29	-72	9
15	Broadway/ Taunton Road	-144	-551	-694	18	-205	-622	-826	18
16	East Quay/The Clink	-12	-43	-55	8	-6	-12	-18	4
17	Western Way/The Drove	-206	-416	-622	17	-153	-446	-599	17
18	St John Street/Broadway	-59	-132	-191	12	-54	-129	-184	11
19	Crossrifles Roundabout	-127	-194	-321	16	-17	-228	-245	13
20	Bristol Road/The Drove	-53	-252	-306	15	-75	-362	-438	15
21	Bristol Road/Wylds Road	27	-269	-242	14	-38	-420	-458	16
23	M5 Junction 23	-114	-122	-236	13	-70	-96	-166	10
24	Huntworth Roundabout	-40	-137	-177	11	-122	-169	-291	14
25	M5 Junction 24	-39	-32	-71	9	-39	-31	-70	8

67	Western Way/Chilton Street	-5	0	-5	6	-32	-6	-38	6
dw12	A38 Roundabout	+34	-207	-173	10	-6	-237	-243	12
Total Score		-722	-2305	-3028		-925	-2805	-3729	

3.2.86 As can be seen from **Table 9**, in the proposed mitigation scenario, there are three junctions which score higher than 15 for additional queuing. However, only one (Wembdon Road/Northfield) is considered of significance. However, when the model output is reviewed this junction operates effectively and as such, the increase in this location is not significant. The remaining network experiences material improvements upon the Reference Case demonstrating that the proposed mitigation works.

3.2.87 In the Bridgwater bypass scenario there are no queue increases experienced. For this reason, it is considered that both the bypass and the with-development scenario deliver improved conditions in Bridgwater but that the bypass offers marginally greater improvement. However, given the network wide results, the bypass option is not considered to offer significant improvement over and above EDF Energy's DCO proposed mitigation.

iii) Total Network Delay

3.2.88 The next set of results to be reported for 2021 is Total Network Delay. This records the total time taken by all vehicles to pass through the network and calculates the average speed per vehicle. The comparison between the 2021 Reference Case, the 2021 with-development and mitigation case and the 2021 with-development and with Bridgwater bypass case is shown at **Table 10**.

Table 10: Comparison of Total Network Delay Statistics (Speeds in mph) 2021

	Reference Case Model	With Development Only	With Development and Proposed Mitigation	With Development and BRIDGWATER BYPASS
0600-0700	38.7	38.5	37.4	38.1
0700-0800	36.0	35.3	35.0	36.3
0800-0900	22.5	21.7	23.5	25.2
0900-1000	20.0	20.1	22.7	23.7
AM Period	**29.3**	**28.9**	**29.6**	**30.8**
1300-1400	33.0	32.3	33.1	33.3
1400-1500	26.4	24.9	27.8	28.1
1500-1600	24.3	22.5	27.8	28.1
1600-1700	21.8	19.8	27.0	27.5
1700-1800	18.7	16.6	23.9	25.8
1800-1900	21.2	16.9	28.5	30.9
1900-2000	22.4	18.2	27.9	29.2
PM Period	**24.0**	**21.6**	**28.0**	**29.0**
OVERALL	**26.6**	**25.2**	**28.8**	**29.9**

3.2.89 The analysis for 2021 shows that in the morning peak hour (08:00 to 09:00) average speed across the network decreases with introduction of HPC without any mitigation (a decrease from 22.5mph to 21.7mph). However, once EDF Energy's proposed package of mitigation is implemented speeds increase to 23.5 mph, which means in this scenario speeds would be 1.0mph quicker than in the Reference Case (4.4%). This demonstrates that the proposed package of improvements not only mitigates the impact of HPC it actually improves the situation beyond the Reference Case.

3.2.90 When the proposed Bridgwater bypass scenario is tested it can be see that with Bridgwater bypass speeds in the morning peak hour increase to 25.2mph, which means that in this scenario speeds would be 2.7mph quicker than in the Reference Case (12.7%).

3.2.91 Taken over the three hour morning period the results are similar. Introduction of the proposed package of highway improvements achieves a reduction in speed from the Reference Case and the Bridgwater bypass achieves slightly improved speeds beyond the proposed mitigation package (29.3mph in the Reference Case compared to 29.6mph in the proposed DCO mitigation scenario and 30.8mph in the Bridgwater bypass scenario).

3.2.92 Turning to the evening peak hour, (17:00 to 18:00) average speed decreases noticeably with introduction of HPC but addition of the proposed DCO mitigation package leads to a noticeable increase in speeds (5.2mph) compared with the Reference Case (23.9 mph in the proposed mitigation scenario compared to 18.7mph in the Reference Case). Such an increase demonstrates how effectively the proposed DCO package of mitigation works, it not only mitigates the impact of HPC, it provides betterment to the highway network in the future.

3.2.93 The Bridgwater bypass scenario exhibits similar results but with the improvement beyond the Reference Case even greater, 7.1mph. Similarly over the evening peak period the proposed package of mitigation achieves an improvement of 4.0mph on the Reference Case and the Bridgwater bypass provides a 5.0mph improvement.

3.2.94 Taken over the whole modelled period the average speeds are shown to be 2.2mph faster than the Reference Case with the proposed mitigation package (8%) which demonstrates the improvements which are to be delivered as part of the HPC Project not only mitigate the impact of the proposed development, they also provide a betterment in terms of improved traffic speeds on the network.

3.2.95 As a comparison, the Bridgwater bypass achieves the same effect, but to a slightly greater extent (12.4%). Although the difference between the proposed mitigation package and the Bridgwater bypass is marginal at just 1.1mph across the modelled period.

3.2.96 In conclusion, it is considered that whilst the Bridgwater bypass option delivers slightly improved speeds in comparison to the proposed mitigation package, the additional benefit is only marginal, an additional 1.2mph in the morning peak period, 1.0mph in the evening peak period and 1.1mph across the full modelled period. Given that the proposed DCO mitigation package more than mitigates against the impact of HPC and provides a betterment against the Reference Case throughout the modelled period, it is not considered that the marginal additional benefits delivered through the Bridgwater bypass option are significant.

APPENDIX 4: DELIVERABILITY STUDY

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1. ROUTE OPTION 4

1.1 Introduction

1.1.1 The proposed Bridgwater Northern Bypass (BNB) (Route 4) would commence in the east at the A38 Taunton Road approximately one kilometre (km) to the south of the Dunball roundabout and would head west and south-west respectively to connect with the existing eastern roundabout at the A39 Cannington southern bypass. In order to provide a route to the Hinkley Point C construction site, a bypass to the west of Cannington would also be required connecting the existing western roundabout on the A39 southern bypass to the C182 Rodway road to the north of Cannington. The proposed Cannington western bypass will not be referred to further in this report.

1.1.2 The proposed Bridgwater Northern Bypass (herein after referred to as "bypass") would consist of a 7.3m wide single carriageway road with 1m wide hardstrips and minimum 2.5m wide verges on both sides. A footway or combined cycle/footway could be provided on one side of the carriageway. The bypass would be predominantly constructed on an embankment due to the area through which it would pass being part of the River Parrett floodplain and being susceptible to flooding.

1.1.3 Due to the issues of potential flooding the bypass carriageway would be on an embankment of at least 3.5 minimum height and due to the existing ground within the floodplain being generally of poor quality would require ground improvement works beneath it.

1.1.4 The bypass alignment would cross the River Parrett at the eastern end of the route and a major bridge crossing would be required. To the west numerous watercourses and streams, including the Cannington Brook Flood Relief Channel, would be crossed by the bypass and these would need to be bridged or culverted as appropriate. Local realignments of the watercourses may also be required to minimise the lengths passing beneath a bridge or passing through a culvert.

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2. THE BYPASS ROUTE AND DESIGN CRITERIA

2.1.1 The route would be approximately 5.2km in length between the A38 Taunton Road and eastern end of the A39 Cannington Southern bypass as shown in **Figure 01**.

2.1.2 The proposed alignment heads west from the A38 Bristol Road and crosses the River Parrett where it is approximately 115m wide. It then continues westwards across open fields crossing 'Straight Drove' and beneath the overhead high voltage power lines to the north of the Chiltern Trinity. The route then continues westwards across open fields before crossing an existing unnamed road alongside Pippins Rhyne to the north of Model Farm, the route then passes between Cannington Brook and the sewerage treatment works and to the north of Grange Farm before terminating at the existing eastern roundabout of the A39 Cannington southern bypass.

2.1.3 The proposed bypass would be rural in character conforming to a Rural All Purpose Single 2 lane (S2) carriageway based on Highways Agency standards with for the majority of its length a design speed of 100kph (speed limit of 60mph).

2.1.4 Due to the relatively short distance between the A38 Bristol Road and the proposed crossing of the River Parrett it would be necessary to design this section of the bypass to a lower design speed and therefore impose a lower speed limit. Subject to the road level at the river crossing, which would be dependent on both the required clearance to the river channel and depth of bridge structure, it is anticipated that a design speed of 85kph (50mph) could be achieved. This could require the existing 50mph speed limit at Dunball to be extended southwards to incorporate the proposed junction off the A38 Bristol Road.

2.1.5 The minimum road cross-section for a Rural All Purpose Single 2 lane (S2) carriageway road would comprise a 7.3m carriageway with 1.0m wide hardstrips and minimum 2.5m wide verges on both sides. This would be of a standard similar to the existing A39 Cannington southern bypass.

2.1.6 The route lies within the River Parrett floodplain as shown on **Figure 02** and the existing topography along this route is generally flat with limited change in ground level from start to end.

2.1.7 Hydraulic modelling has been carried out for the investigation of a bypass route around the village of Cannington and as part of this investigation water levels have been identified for key tidal events. Tidal water levels for the River Parrett identified for use in the modelling, were taken close to the confluence of the Cannington Brook with the River Parrett. Water levels for the River Parrett at Bridgwater may be slightly different; however for the purposes of this outline assessment it is assumed that those used within the hydraulic modelling are appropriate for comparison. Maximum water levels are predicted to be 8.24m AOD and 8.39m AOD for the 0.5% (1 in 200 year) and 0.1% (1 in 1,000 year) annual exceedance probability (AEP) events, respectively. An extra 0.5m then needs to be included for climate change, bringing the potential 0.5% (1 in 200 year) AEP water level up to 8.74m AOD and the potential 0.1% (1 in 1,000 year) AEP water level up to 8.89m AOD. As part of the hydraulic modelling it was identified that the crest level of the River Parrett defences around the Cannington Brook confluence vary between approximately 7.5m AOD and 8.0m AOD. Therefore, based on the likely maximum water levels, including an allowance for climate change, there is a risk of flooding to the route from either a breach failure or overtopping of the existing defences along the River Parrett both now and in the future.

2.1.8 Due to the extensive flat nature of the surrounding topography, in the event of overtopping or a breach in the defences, the maximum flood water level behind the defences is unlikely to reach the maximum water level in the River Parrett; however a precautionary approach can be adopted to understand the implication on the route. For the bypass to provide a safe dry route in the event of a tidal flood event in the future the bypass road level would need to be above the predicted maximum water level for the 0.1% AEP event. The difference between the maximum water level and the road level can be referred to as 'freeboard'. Where tidal flooding occurs, a typical freeboard allowance is 600mm, which usually takes into account wind and wave action. The existing ground level in the floodplain is typically 6m AOD and the bypass route would therefore need to be on an embankment. Based on the preceding information, it is assumed that for the extreme 0.1% AEP event, including climate change, the minimum road level would need to be approximately 9.5m AOD. Therefore the route would need to be on an embankment with a typical minimum height of 3.5m above the existing ground level. However between the low points the embankment height would increase as the new road would need to be provided with a minimum longitudinal gradient which allows surface water to drain freely off the bypass carriageway. Low points in the road alignment would be located to coincide with the crossing of existing watercourses. As the bypass intersects watercourses at short intervals the vertical alignment would be undulating from sag to crest to sag at frequent intervals.

2.1.9 Assuming a minimum longitudinal gradient of 1 in 150 (0.67%) and an average of 400m between high and low points the road level at the high point would be approximately 11.8m AOD, which would give a typical maximum embankment height of up to 5.8m above existing ground level. This would make the bypass embankment very visible to the surrounding area particularly with high sided vehicles on it.

2.1.10 To reduce the maximum embankment height, it would be necessary to use sub-standard longitudinal gradients which would require alternative drainage solutions, i.e. combined kerb and drainage channels. These solutions can be more expensive than traditional gully systems, provide less pollution control and may require greater maintenance.

2.1.11 From the geological mapping shown on **Figure 03** it can be seen that a significant length of the bypass route would be founded on Estuarine Alluvium which is likely to have low load bearing properties. It is therefore likely that the load imposed by an embankment which is typically 3.5m to 5.8 m high would cause the underlying soils to settle significantly and this would have a major impact on the construction of the bypass. To retain the integrity of the completed road after its construction it would be necessary to reduce the risk of post-construction settlements. The techniques that could be adopted to minimise post construction settlements have different cost and time implications i.e. cheaper cost/longer time or greater cost/shorter time. One method would be to construct the embankment in stages allowing time between each stage for construction settlements to occur. At the final stage, additional material would be added to the embankment in order for the final construction settlements to take place and to minimise post-construction settlements. This additional material would be removed to allow the road to be constructed. Dependent on the quality of the underlying soils this method could take a significant period for the construction settlements to occur. Alternatively the ground could be treated prior to starting the embankment construction which would allow the surcharged embankment to settle at a quicker rate. Other methods such as piling could be used to treat the ground in advance so that the weight of the embankment would not cause excessive settlements to occur. To determine the appropriate method to be adopted and timescales involved a geotechnical ground investigation would need to be undertaken with the recommendations detailed in a geotechnical interpretative report. However it is anticipated that a combination of techniques would be required where the ground is treated to minimise settlements at approaches to structures and elsewhere to accelerate the rate of settlement during surcharging.

2.1.12 Ground improvement along all sections of the alignment which overlay estuarine alluvium must be anticipated. Without GI data on which to assess the engineering properties of the alluvium, an indication of the pre-loading required can be found within the SDC and WSC response prepared by Arup.

2.1.13 To construct a road to DMRB specification, Arup assumed a maximum 2m high embankment and on this basis predicted 300mm to 400mm long term settlement. Arup also referred to their experience of "…highway and building projects in the general area suggests that up to 90% of primary consolidation of these soils tends to complete within nine to 18 months from the time of imposed loading".

2.1.14 The period of nine to 18 months is based on forming a 2m high embankment with no additional work to accelerate consolidation whereas the height of the embankment required for the bypass would be between 3.5m and 5.8m.

2.1.15 The rate of consolidation would be dictated to a degree by the dissipation of the pore pressure in the underlying soils. As suggested by Arup, a method to increase the dissipation of pore pressure would be to install wick drains. Arup experience would appear to be that a combination of the surcharge and wick drains could bring the settlement period down to three months. However this is based on the 2m height and not the increased level anticipated of up to 5.8 m.

2.1.16 This increased height would be likely to increase settlements to between 600 – 800mm. It may be necessary to build the embankment up in vertical stages to allow consolidation of the ground below the embankment to occur in increments, as constructing the embankment to its full height in one stage could lead to slope failures within the embankment.

2.1.17 Adopting a staged construction methodology for the embankments with heights of up to 5.8m would extend the construction period. The number of stages to reach the required embankment height would depend on the ground conditions, ground improvement method and target height. It has been assumed that two stages would be required to construct the embankment resulting in an estimated total embankment surcharging period of up to 12 months.

2.1.18 Dependent on existing ground conditions, the embankment slopes would be typically 1 in 2 to 1 in 3.

2.1.19 The bypass would in principle be designed so that the low points coincide with the existing watercourses as this would simplify the drainage for the road. Discussions would need to be held with the Environment Agency and Somerset Drainage Board Consortium about which existing watercourses surface water run-off can be discharged into.

2.1.20 At-grade simple priority junctions would be provided along the route to maintain access to existing minor roads intersected by the bypass. Due to the design speed of the bypass the junctions formed at intersections with minor roads are likely to be staggered as opposed to forming a crossroads. If the junction is likely to have a significant right turn movement then consideration would be given to providing a ghosted right turn lane.

2.1.21 Where the bypass severs fields, consideration would need to be given to the means of access to determine whether or not it is appropriate to have a field access off the bypass route or to provide an underpass. Given the speed of the road it would not be desirable to have significant numbers of slow moving agricultural vehicles crossing from one side of the road to the other. Where field accesses are provided it would be necessary to add accommodation roads, on both sides of the bypass, in the form of a ramp between the lower existing ground level and the raised bypass level.

2.1.22 Design of the major/minor priority junctions and the roundabouts would be carried out in accordance with TD42 “Geometric Design of Major/Minor Priority Junctions” and TD16 “Geometric Design of Roundabouts” respectively.

2.1.23 The existing features intersected along the proposed alignment are summarised in **Table 2.1** below.

Table 2.1: Bypass Route Existing Features

Chainages	Existing Features in Watercourses
0	A38 Dual Carriageway
185	Track
230 – 340	River Parrett
545 – 985	4 No watercourses
1435	Straight Drove inc 2 watercourses
1625	Watercourse (Pippins Rhyne)
1655	High Voltage Overhead Power Lines
1945 – 3475	12 No watercourses
3555	Unnamed Track inc 2 watercourses
3665 – 3960	3 No watercourses
4310	Track

Chainages	Existing Features in Watercourses
4615	Track
4800	Flood Relief Channel
5160	Existing Roundabout

2.1.24 It can been seen from **Table 2.1** that along its length the bypass would intersect with the River Parrett, 'Straight Drove' high voltage overhead power lines, four tracks, 24 watercourses and a flood relief channel

b) Accommodation Tracks

2.1.25 The number of formal tracks and side roads intersected by the bypass route is very limited and it may therefore be necessary to provide landowners with more frequent crossings of the bypass. This could be achieved by either creating new at-grade accesses onto the bypass or low headroom underpasses. Where an at-grade access is provided it would be necessary to provide an accommodation track on a ramped embankment which manages the difference in levels. Consolidating the number of field access points may be achieved by creating accommodation tracks running alongside the bottom of the road embankment.

2.1.26 Due to the likely embankment heights it would be necessary to raise the level of the existing minor roads and tracks intersected by the bypass route. Although dependent on level difference and layout the length of side road requiring alterations is likely to be in the range of 75 to150m from the edge of the bypass carriageway to a point where levels tie back into existing.

c) Drainage

2.1.27 The bypass passes through land which is permeable to varying degrees and is drained by a network of watercourses. Constructing a bypass would create a significant area of impermeable surface which if allowed to discharge at an unrestricted rate would have a flow in the order of 670l/s for a one in one year Return Period.

2.1.28 Whilst there may be a significant number of possible discharge points along the bypass it is likely that attenuation measures would be required to store surface water as the rate of discharge would be restricted based on green-field run-off. Attenuation measures can comprise one or more forms i.e. oversized pipes, concrete tanks, detention ponds etc. In order to prevent flooding of third party land, these attenuation measures would need to be designed to attenuate rainfall from a 1% annual exceedance probability rainfall event including allowance for climate change.

2.1.29 The proposed "flat" vertical alignment in conjunction with relatively flat existing ground and frequent watercourses means there are likely to be few restrictions on where the attenuation measures can be provided along the route.

2.1.30 Dependent on the permeability of the underlying soils it may be possible to use soakaways and/or infiltration systems to discharge surface water albeit at a restricted rate with attenuation measures provided. However where the bypass lies within the flood plain it is likely that the sub-soils would have low permeability making infiltration systems less viable.

d) Diversion of Watercourses

2.1.31 Due to the large cross section of the embankment it would be necessary to divert existing watercourses and it may be advantageous to combine some of these together, where they cross the footprint of the road embankment, to reduce the number of crossing points and highway/drainage structures required.

e) Flood Risk

2.1.32 The primary source for flood risk in the area affected by the bypasses is the River Parrett which is a tidal river. Tidal flooding would only occur in an extreme storm event and would be due to either the existing flood defence being breached or to overtopping.

2.1.33 At Cannington fluvial flooding could occur as result of Cannington Brook being in flood.

2.1.34 The extent of the potential flooding is shown on **Figure 03** which is based on the Environment Agency Flood Zone Map.

3. PRINCIPLE STRUCTURES REQUIRED

3.1 River Parrett

3.1.1 The proposed crossing of the River Parrett provides the greatest natural obstacle to the bypass. At the proposed crossing point, the river is within the port of Bridgwater area (controlled by Sedgemoor District Council) and at this location the tidal range is up to 6m. Limited dredging is carried out along the navigational channel due to the constantly changing river bed.

3.1.2 Both sides of the river have existing flood defence embankments approximately 2m in height above the surrounding ground level. The embankment to the east of the crossing has a vehicle track over it, whilst to the west the embankment has a public footpath (Parrett Trail) running along it.

3.1.3 The minimum bridge clearance is assumed to be approximately 5m to mirror that provided at the northern distributor road crossing (Western Way) upstream within Bridgwater, however this assumption would need to be confirmed by the relevant authorities.

3.1.4 In order to avoid impeding the flow within the river a central clear span of approximately 85m – 95m would be required and the overall bridge length would be of the order of 215m as shown in **Figure 04**. A bridge of this span could be in several structural forms one of which would be to use continuous fabricated steel box girders, haunched over intermediate piers, and a second option would be to use an extradosed bridge, which uses steel box girders supported over intermediate piers by tendons on pylons. In both options the bridge could be delivered to site in sub-assemblies but would have to be completed in situ, involving substantial temporary works.

3.1.5 On the eastern bank a span distance of approximately 70m would be required to bridge over the area up to and including the flood defence embankment and to provide a maintenance area in front of the bridge abutment.

3.1.6 On the western side of the central span a further span of up to 55m would be required which would pass over the area up to and including the flood defence, embankment and an area for maintenance access to the bridge abutment.

3.1.7 Both of the spans on the eastern and western banks could be made up of smaller spans, up to say 35m, and could be of a different construction to the main central clear span of the bridge.

3.2 Cannington Brook Flood Relief Channel and Other Significant Watercourses

3.2.1 Where the bypass route crosses Cannington Brook flood relief channel, Pippins Rye or other larger watercourses, a bridge structure with a much shorter span would be required and therefore a simple road bridge structure may be appropriate.

3.2.2 Where the bypass route intersects with any of the other existing watercourses along its route then some form of minor highway structure or culvert would be required as agreed with the Environment Agency and/or Somerset Drainage Board Consortium. The soffit level of the structure would be dependent on the required freeboard level to be provided above the critical water level. The form of structure would be dependent on the road level at the structure and the length to be spanned. Where there is a significant level difference between existing and proposed levels then some form of box culvert structure would generally suffice; if the level difference is not significant then it may be necessary to construct a bridge with a short span.

3.3 Other Highway Structures

3.3.1 If minor roads such as ‘Straight Drove’ and other tracks intersected by the bypass are not to have junctions onto the bypass then highway bridges would be required. If the standard headroom for a highway bridge of 5.3m is to be provided the bypass road level would need to be raised to a greater height than that required to provide a minimum longitudinal gradient.

3.3.2 Other highway structures that may be required are accommodation underpasses which would provide continuity of access between severed lands. Whilst standard headroom for a bridge over a highway is 5.3m, with accommodation bridges/underpasses it may be possible to relax the headroom requirement based on intended uses.

4. CONSIDERATION OF CONNECTIONS WITH EXISTING ROADS ALONG THE PROPOSED ROUTES

4.1.1 At the eastern end of the route a new junction would be required to link with the dual carriageway section of the A38 Bristol Road.

4.1.2 The new junction would consist of a four arm roundabout, as shown on **Figure 05**, which would be in keeping with the existing junction strategy between Dunball and Bridgwater. An at-grade priority junction has recently been constructed on the east side of the existing A38 in the vicinity of the proposed bypass connection and this junction would need to be incorporated in to the design of the new junction serving the bypass.

4.1.3 At the western end of the bypass, where it ties into the eastern roundabout of the existing Cannington southern bypass it would be necessary to reconfigure the existing roundabout to introduce a fourth arm as shown in **Figure 06**.

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5. BUILDABILITY

5.1 Construction Access

5.1.1 There are access difficulties with constructing the bypass as there are no significant road access points along the length of the proposed bypass between the existing roundabout at the eastern end of the Cannington southern Bypass and the western side of the River Parrett.

5.1.2 To the west the main access point to the bypass and to the main site compound would be from the roundabout at the eastern end of the A39 Cannington southern bypass.

5.1.3 There are two potential minor access points to the bypass from the unnamed road to the east of Model Farm at Wembdon which links to the A39 and at 'Straight Drove' at Chilton Trinity, however both of these are narrow roads and have sections of single track road which are unsuitable to be used by large numbers of construction vehicles.

5.1.4 To provide limited access to the western bank of the River Parrett, for the bridge construction, 'Straight Drove' could be linked to a temporary construction access road that would connect to the western river bank. The use of Straight Drove for access to the bridge construction area would only be for the very early stages of the works, until a full construction access road is provided from Cannington. The use of Straight Drove would be limited to those works necessary to progress the construction of the bridge.

5.1.5 As the main construction access to the bypass route would be via the eastern roundabout at Cannington it would be necessary to construct a temporary site access road (haul road) to the River Parrett western bank following the route of the bypass, but offset by approximately 25m. This haul road is essential as the new River Parrett bridge, which could provide access to the western bank, would not be operational for 18 – 20 months.

5.1.6 An additional site access road would also be provided from a temporary left in/left out junction at the A38 Bristol Road dual carriageway to provide access to the River Parrett eastern bank and to a smaller site compound. This access would initially be used for the construction of the bridge over the river and once the bridge is completed would provide a second main access to the bypass route.

5.1.7 To gain access to the area of the bridge works on the eastern bank a haul road would be provided following the route of the bypass and offset approximately 25 metres.

5.1.8 Both access roads would be built to ensure that the largest loads could be transported on them and that they could be operational in all but the severest weather conditions.

5.1.9 The major bridge works on the western bank would not commence until the construction access road from Cannington was operational. This would impact on the programme for the completion of the bridge construction and the time at which

NOT PROTECTIVELY MARKED

construction traffic could use the bridge to access the eastern end of the construction works.

5.1.10 The contractor would be encouraged to use the River Parrett to transport sections of the bridge structure in by barge and then lift them of into place by crane.

b) Embankment Construction

5.1.11 In addition to the River Parrett Bridge the other main difficulty with the construction works is the building of the 3.5 to 5.8m high embankment across the floodplain.

5.1.12 As previously mentioned approximately 4.4km of the overall 5.2km bypass route is founded on Estuarine Alluvium which is likely to have low bearing properties and due to the loading of the embankment the underlying soils would settle significantly.

5.1.13 The only section of the route not founded on this material is approximately 800m on the most westerly section, adjacent to Cannington where the bypass would be founded on Otter Sandstone or First Terrace River deposits which should provide acceptable conditions on which to build the embankment and road without special works to deal with settlements.

5.1.14 It is anticipated that for the majority of the route a combination of wick drains and surcharging of the embankment would be required to deal with these very poor ground conditions. Where structures are located there would need to be a transition zone where ground improvement in the form of piling or ground stabilisation is carried out.

5.1.15 The likely method of constructing the embankment would be to install wick drains at regular intervals across the whole width of the embankment. The embankment could then be constructed in two or three stages or lifts depending on the conclusions of the Ground Investigation Report.

5.1.16 Assuming a two stage construction, the embankment would be built up to a height of over half the full height of the embankment (first lift) then left to surcharge for between three to six months.

5.1.17 The second stage (second lift) would be to build up the embankment height to a level above the proposed finished road in order to provide surcharge loading of the embankment and again the embankment would be left to surcharge for between three to six months. After this period has been completed the additional surcharge would be removed to leave the embankment at the correct finished height and the road and drainage construction works would commence.

5.1.18 During the construction and surcharging of the embankment settlement monitoring would be undertaken so that should the settlements occur over a shorter period then anticipated the next stage of construction could be commenced subject to availability of materials and resources.

5.1.19 To minimise the import of earth to form the embankment the surcharge removed would be used in the construction of the next embankment section.

5.1.20 If a three stage option were chosen based on Ground Investigation advice the same procedures would follow but for three lifts instead of two.

5.1.21 As there is a sequential process to building the embankment it would be preferable to build the bypass in sections.

5.1.22 For this assessment the bypass has been divided into five sections of approximately 1.0km each. However different numbers or lengths of sections could be just as workable. The benefit of dividing the construction into sections is that the sequence of embankment construction and surcharging can be completed in discrete lengths allowing other construction activities, such as drainage works, carriageway construction etc, to be undertaken whilst embankment construction is taking place on other sections.

5.1.23 This process has been shown on the construction phasing drawings **Figures 07 - 13**.

5.2 The Bridge Works

5.2.1 The proposed bridge would be approximately 215m in length and could consist of three clear spans to bridge the main river channel and the flood defences on either side, a central span of 85-95m would be located so as not to impede the flow of the main river.

5.2.2 In both of the bridge structure options previously suggested, the bridge deck would comprise a continuously fabricated steel box girder construction that could be delivered to site in prefabricated sections which would then have to be assembled in-situ. The bridge abutments would be located clear of the river channel and behind the existing flood defences. The two supporting piers would be positioned on the mud flats just outside the main river channel; however these would need to be built within coffer dams to protect the works during construction.

5.2.3 It is envisaged any piling work for the bridge piers and cofferdams would be need to be undertaken either from a platform built on temporary piles extending out into the river or by using a piling rig located on a shallow draught marine barge. If a barge were to be used then some dredging of the banks may be required to allow the barge to be floated within close proximity to the pile locations. The distance from the barge would be governed by the capacity of the crane to lift, pitch and drive the piles against the extent of dredging deemed permissible. Further design would be required to define bridge loads, pile sizes and ultimately the optimum bridge spans to use the smallest practical plant.

5.2.4 The dredging area would be limited to that necessary to allow the piling barge access during installation of the piles. Once the piles are installed, the dredging channel would no longer be required and the natural build-up of fluvial silts on the mud flats would be allowed to accumulate and therefore in the medium to long term, the impact of the dredging operation would be minimal.

5.2.5 As previously mentioned access to the western bank would be very limited until the temporary site access route had been fully constructed and therefore progress on the western abutment and the associated embankment works would follow on behind the eastern bank works.

5.2.6 It may also be possible during the main bridge structure works to deliver some of the steel box girder assemblies by barge. Consideration should be given to using

Dunball Wharf for the off-loading and temporary storage of the girder assemblies. The use of the wharf could allow the optimum use of the limited high tide periods.

6. CONSTRUCTION PROGRAMME

6.1.1 From the above it is apparent that there are a number of variables which require investigation before certainty on the method of construction can be determined particularly in relation to the embankment construction and the requirements for minimising construction and post-construction settlements.

6.1.2 An indicative construction programme is included on **Figure 14** and shows a total duration of approximately three years and six months. The programme shows the bypass construction divided into five sections as described in Section 5 above. The durations for each activity within the sections are shown as being the same as they are intended to be average values. In practice the durations would vary dependent on the features within that section i.e. watercourse crossings. The rate of embankment construction would also be partially dependent on the number of delivery lorries permitted to access the site from the public highway network. The embankment construction durations are commensurate with approximately 175 one-way tipper lorry movements per day delivering material just for the embankment construction. Dependent on other construction activities, running concurrently with the embankment construction, the actual number of lorry movements could be significantly greater.

6.1.3 Consideration has also been given to the construction duration if a shorter surcharge period was achievable and a higher number of delivery vehicles permitted. Based on a surcharge period of approximately three months for each lift of the embankment and approximately 260 one-way lorry movements a day, delivering material for the embankment construction, then the overall construction period may be reduced to two years and eight months, a saving of 10 months. Whilst some inclement weather conditions would be anticipated during the construction of the bypass, if there were abnormal weather conditions then there could be a significant risk of delay due to the programme due to the likely poor ground conditions and the significant earthworks activity required.

6.1.4 If the results of the ground investigation showed longer settlement periods are required and/or the number of permitted lorry movements is reduced then the programme period would need to be extended accordingly.

6.1.5 Before construction of the bypass could commence there would be a significant period required for the following investigations, approvals and procedures:

- Habitats Regulations Assessments;
- Flood Risk Assessment;
- ground Investigation;
- consultation procedure;
- design of highways proposals;
- planning approval or IPC Approval for the road works;
- obtaining Section 278 Agreement with Somerset County Council for A38, A39, and other improvement work.

- diversion of Rights of Way procedures;
- consents to work within the River Parrett for the bridge crossing; and
- consents for dredging of the River Parrett.

6.1.6 This is not the full list of all approvals required but an indication of the main items. It is expected that these procedures would be lengthy.

7. CONSTRUCTION COST

7.1.1 A budget construction cost estimate undertaken for the proposals described above values the construction cost at approximately £95 million (2011 rates). A summary of the cost estimate is provided in **Table 7.1** below.

Table 7.1: Budget Construction Cost Estimate

SERIES	DESCRIPTION	COST (£) (Exc VAT)
100	Preliminaries	12,651,000
200	Site Clearance	47,000
300	Fencing	815,000
400	Guard Railing and Barriers	266,000
500	Drainage	1,016,000
600	Earthworks	42,030,000
700	Pavement Construction	4,095,000
1100	Kerb and Footways	1,347,000
1200	Signs and Markings	43,000
1300	Street Lighting	66,000
1700	Structures	16,769,000
	SUB TOTAL =	79,145,000
	CONTINGENCY (20%) =	15,828,000
	GRAND TOTAL =	94,973,000
	Exclusions: statutory undertakers plant costs, accommodation works, landscaping works, land purchase costs, compensation costs, local authority costs, legal costs, bonds, fees, S106 Agreement costs, commuted payments, inflation, VAT etc.	

7.1.2 The budget construction cost estimate has been produced based on the programme shown in **Figure 14** and assumes reuse of surcharge material in the construction of embankments in the proceeding sections. As the embankment construction process reaches an end, the surcharge material would be taken off site and disposed of. Should the surcharge periods change from that shown there would be a change in the quantities of material imported for the embankment construction and the amount of surcharge material disposed of which would result in changes in the estimated cost.

7.1.3 For costing purposes the River Parrett bridge crossing is assumed to be an extradosed bridge which uses steel box girders supported over intermediate piers by tendons on pylons. Two piers would be located just outside the main river channel and abutments located on the land side of the existing flood defence embankment. If the type of bridge or the spans proposed is altered the cost could significantly change.

7.1.4 Temporary works such as provision of a temporary haul road and bridges have been included to allow the works to progress while the crossings of main watercourses are under construction and also ensure that access can be maintained for embankment works.

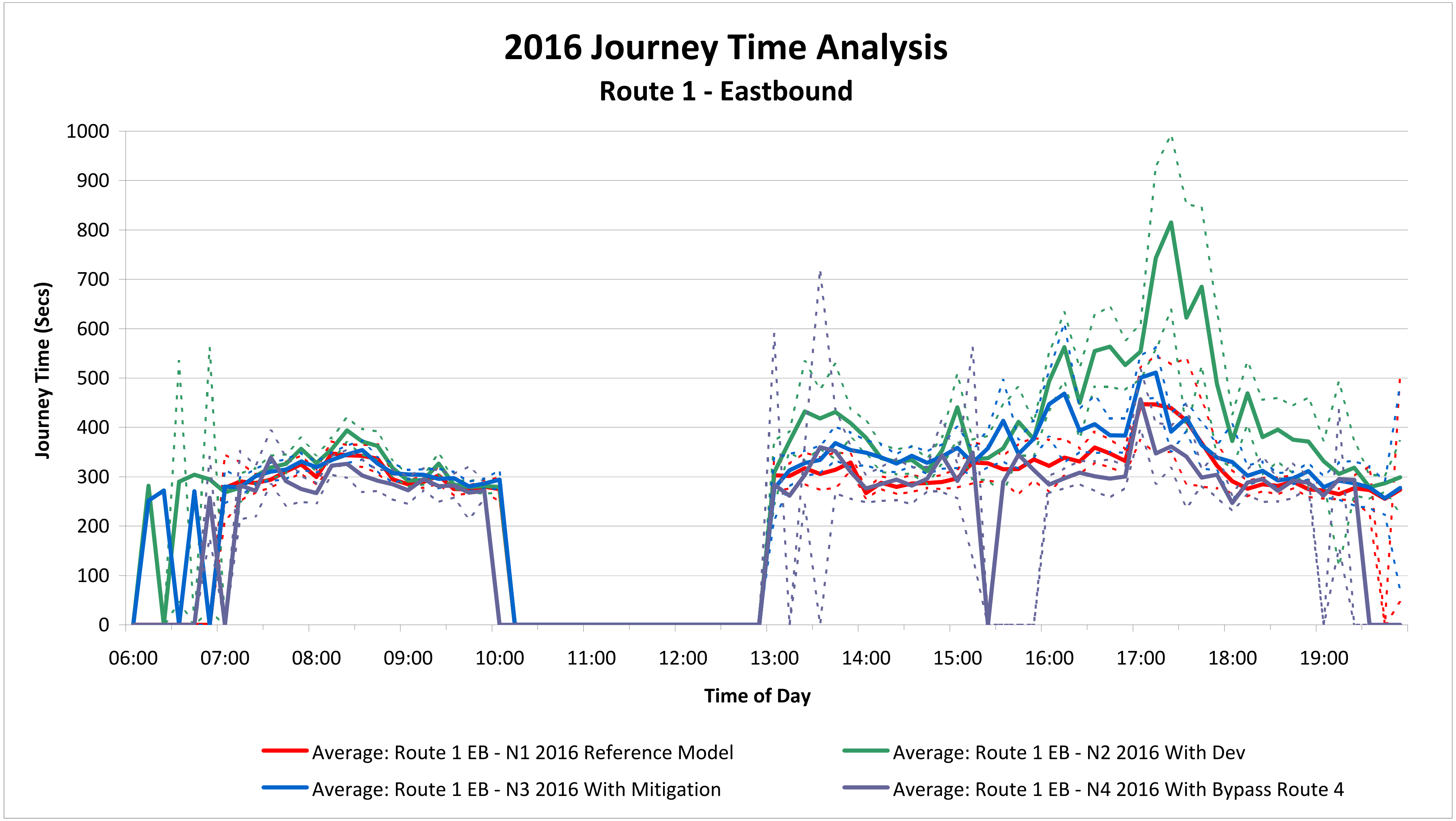
7.1.5 It has been assumed imported fill is brought to site from external sources outside any works connected with this project.

7.1.6 For cost purposes it has been assumed that a culvert or small bridge structure will be required at all crossings of existing watercourses.

7.1.7 It has been assumed that the additional height of surcharging would be 2.0m above the final height of the road and that this material will be used in the works except for the final section.

7.1.8 Main cost risks are with structures including the River Parrett bridge and crossing of watercourses, earthworks including ground improvement and surcharging and drainage.

APPENDIX 5: 2016 JT ANALYSIS ALL ROUTES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Journey Time (Secs)
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900
800
700
600
500
400
300
200
100
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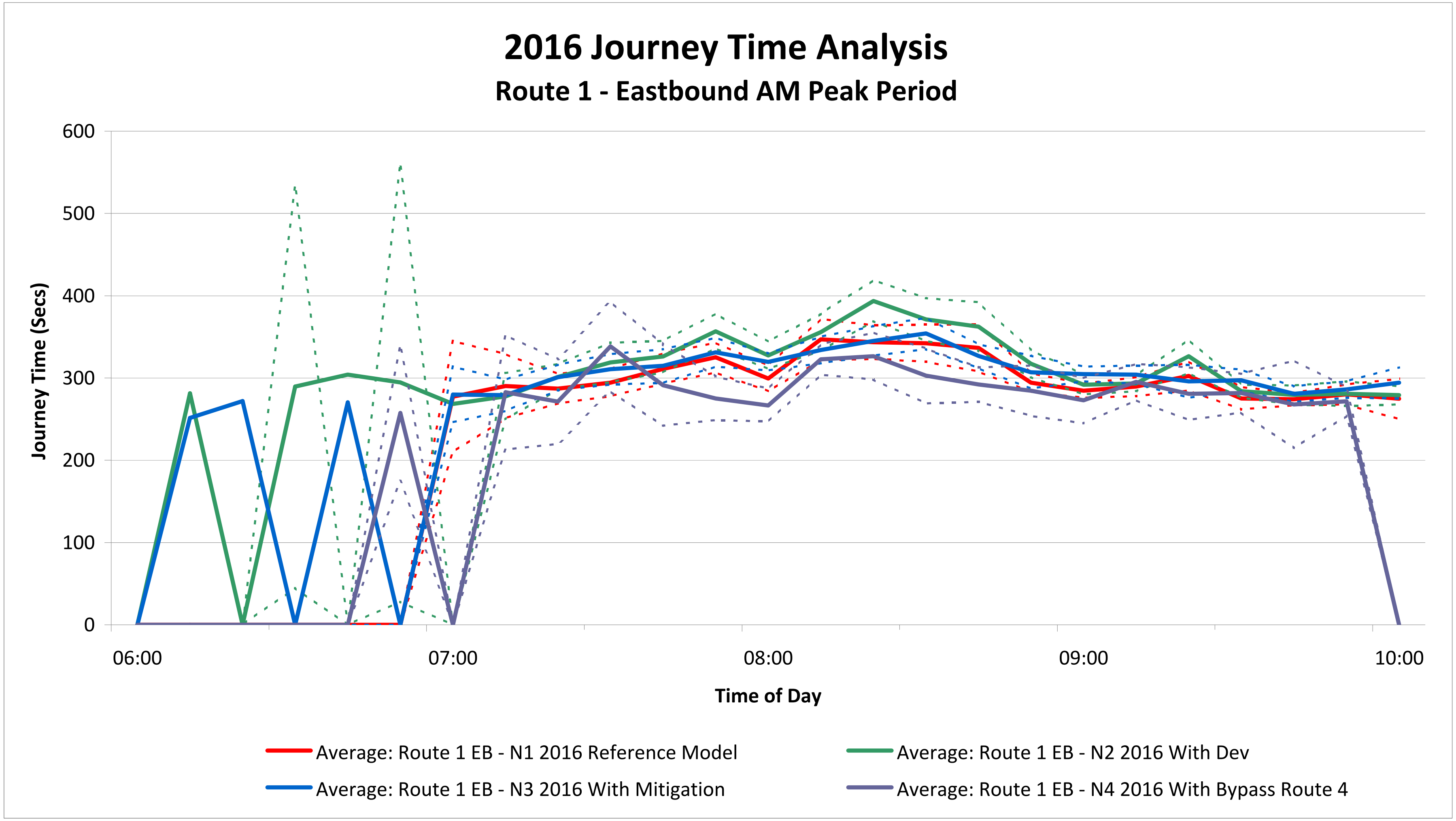
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 EB - N1 2016 Reference Model
Average: Route 1 EB - N2 2016 With Dev
Average: Route 1 EB - N3 2016 With Mitigation
Average: Route 1 EB - N4 2016 With Bypass Route 4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Route 1 - Eastbound AM Peak Period
Journey Time (Secs)
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500
400
300
200
100
0
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07:00
08:00
09:00
10:00
Time of Day
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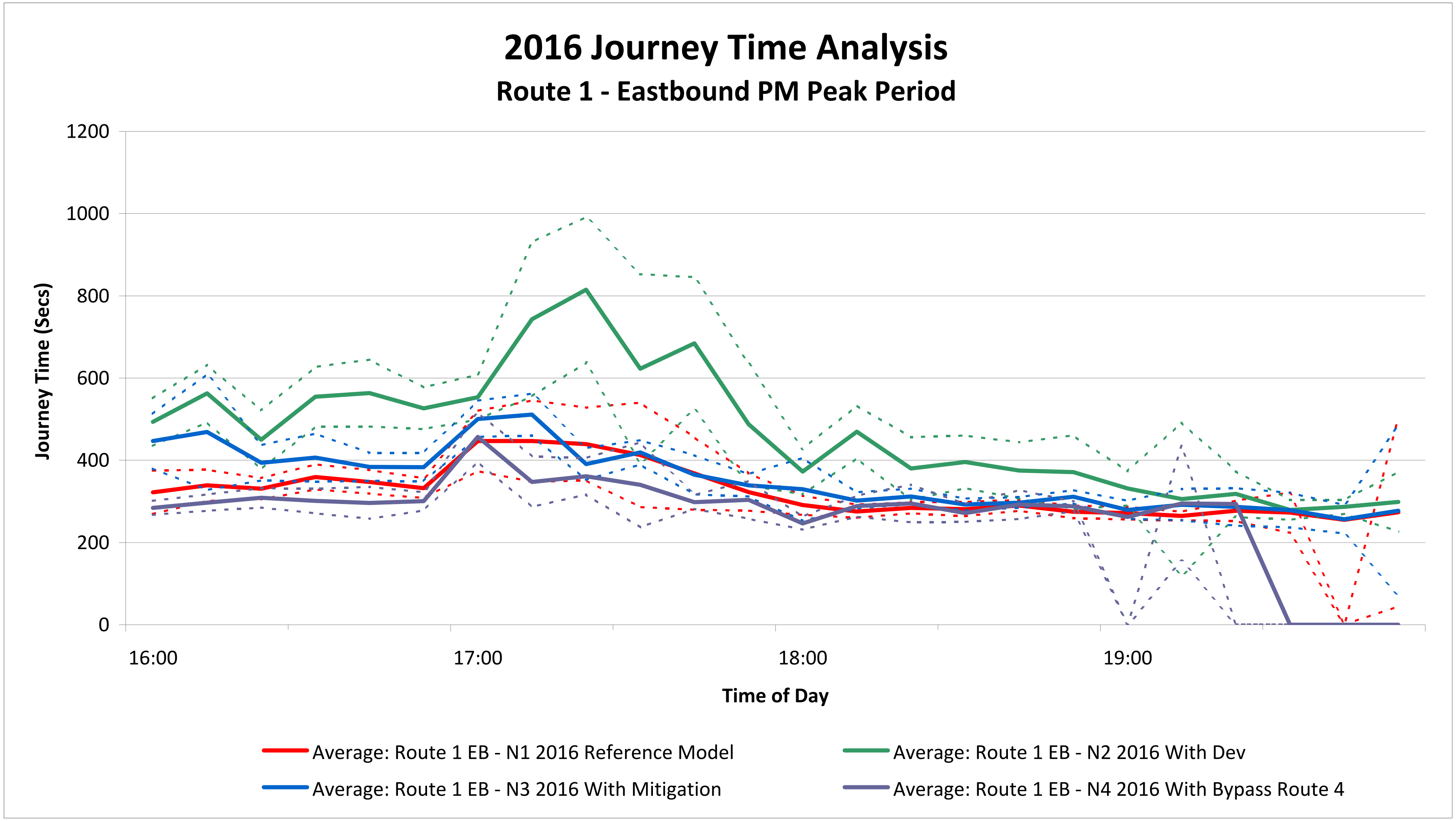
Average: Route 1 EB - N2 2016 With Dev
Average: Route 1 EB - N3 2016 With Mitigation
Average: Route 1 EB - N4 2016 With Bypass Route 4



2016 Journey Time Analysis
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1000
800
600
400
200
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
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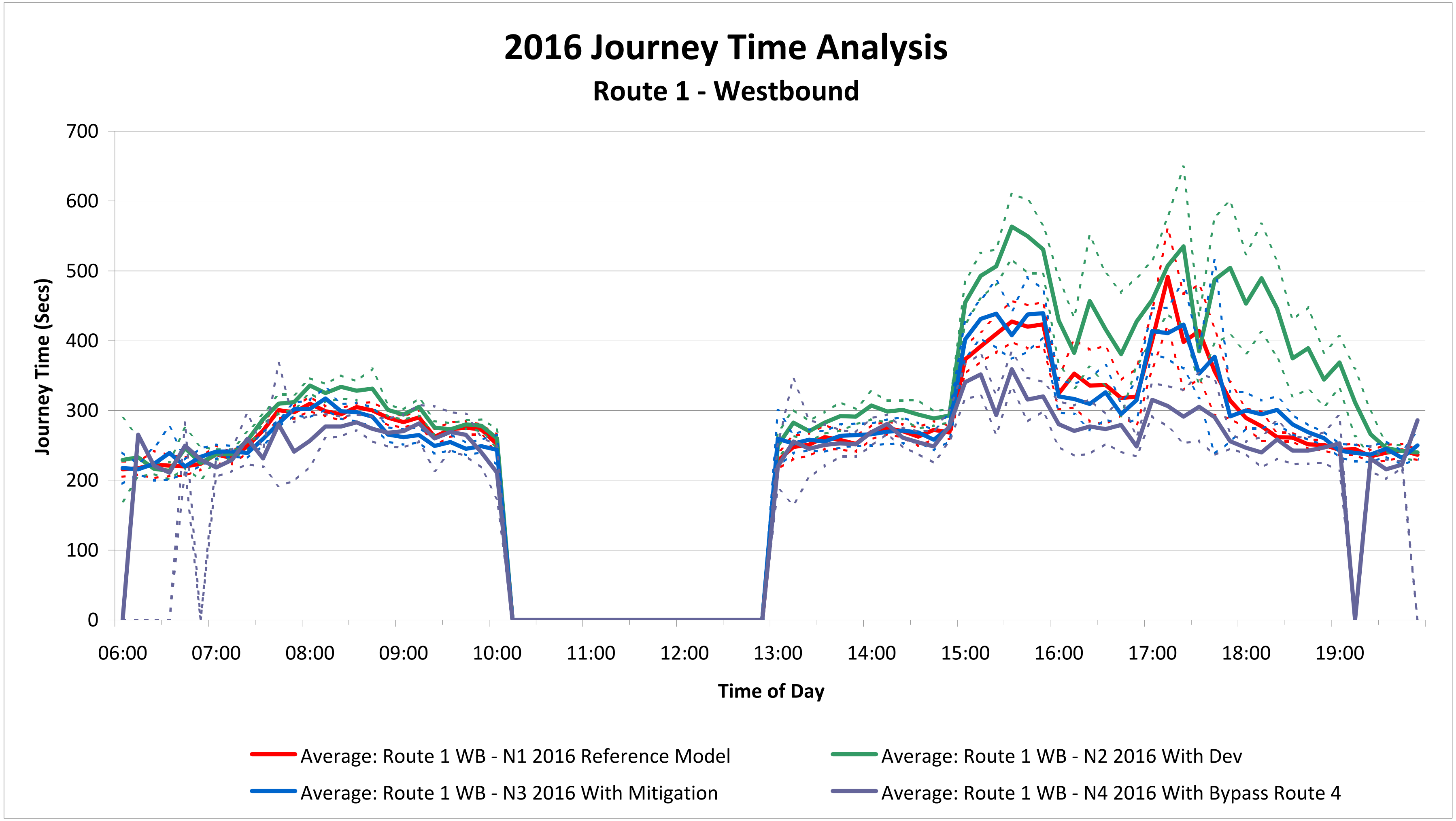
Average: Route 1 EB - N2 2016 With Dev
Average: Route 1 EB - N3 2016 With Mitigation
Average: Route 1 EB - N4 2016 With Bypass Route 4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Journey Time (Secs)
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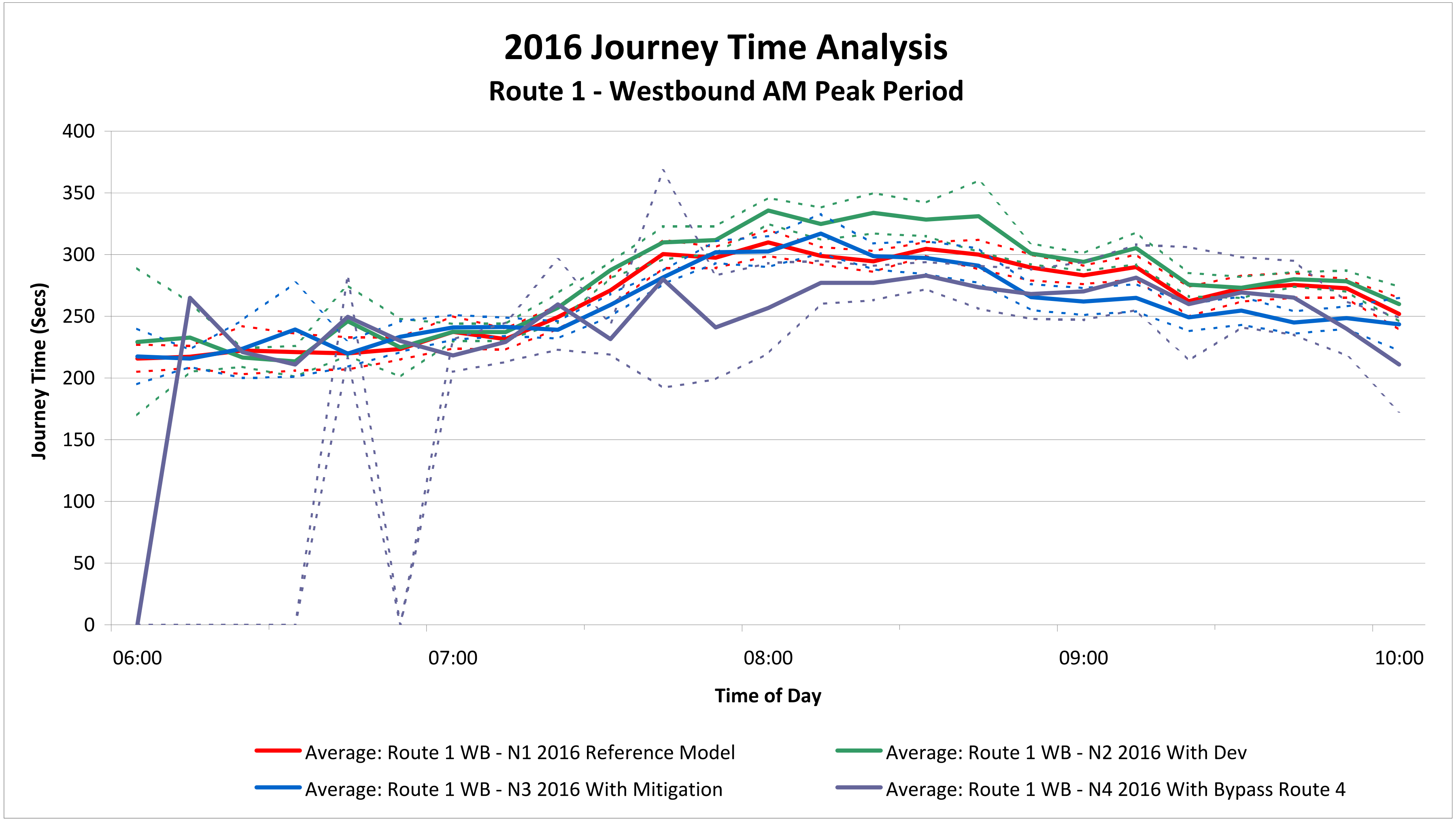
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 WB - N1 2016 Reference Model
Average: Route 1 WB - N2 2016 With Dev
Average: Route 1 WB - N3 2016 With Mitigation
Average: Route 1 WB - N4 2016 With Bypass Route 4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300
250
200
150
100
50
0
Journey Time (Secs)
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07:00
08:00
09:00
10:00
Time of Day
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Average: Route 1 WB - N2 2016 With Dev
Average: Route 1 WB - N3 2016 With Mitigation
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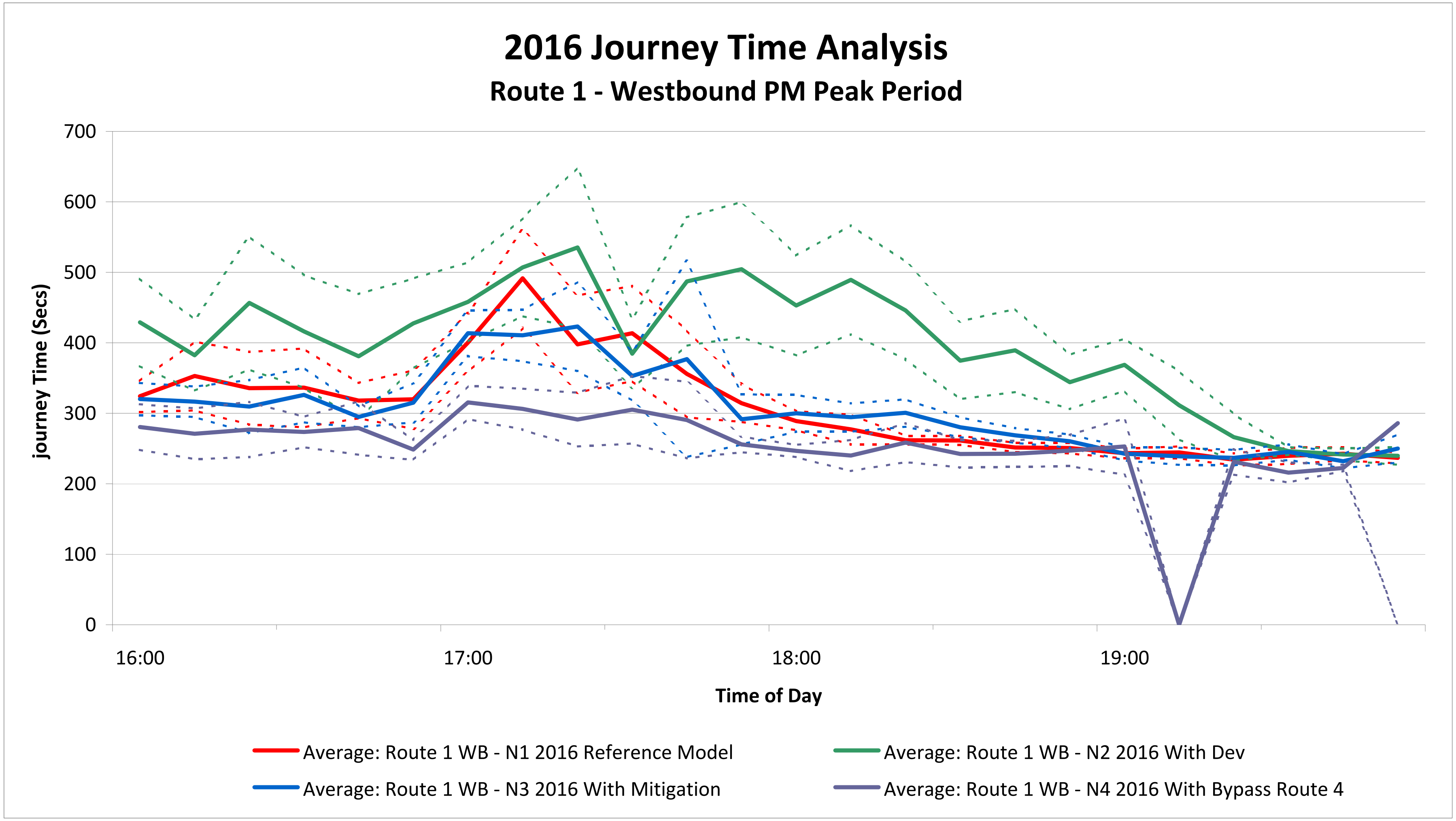

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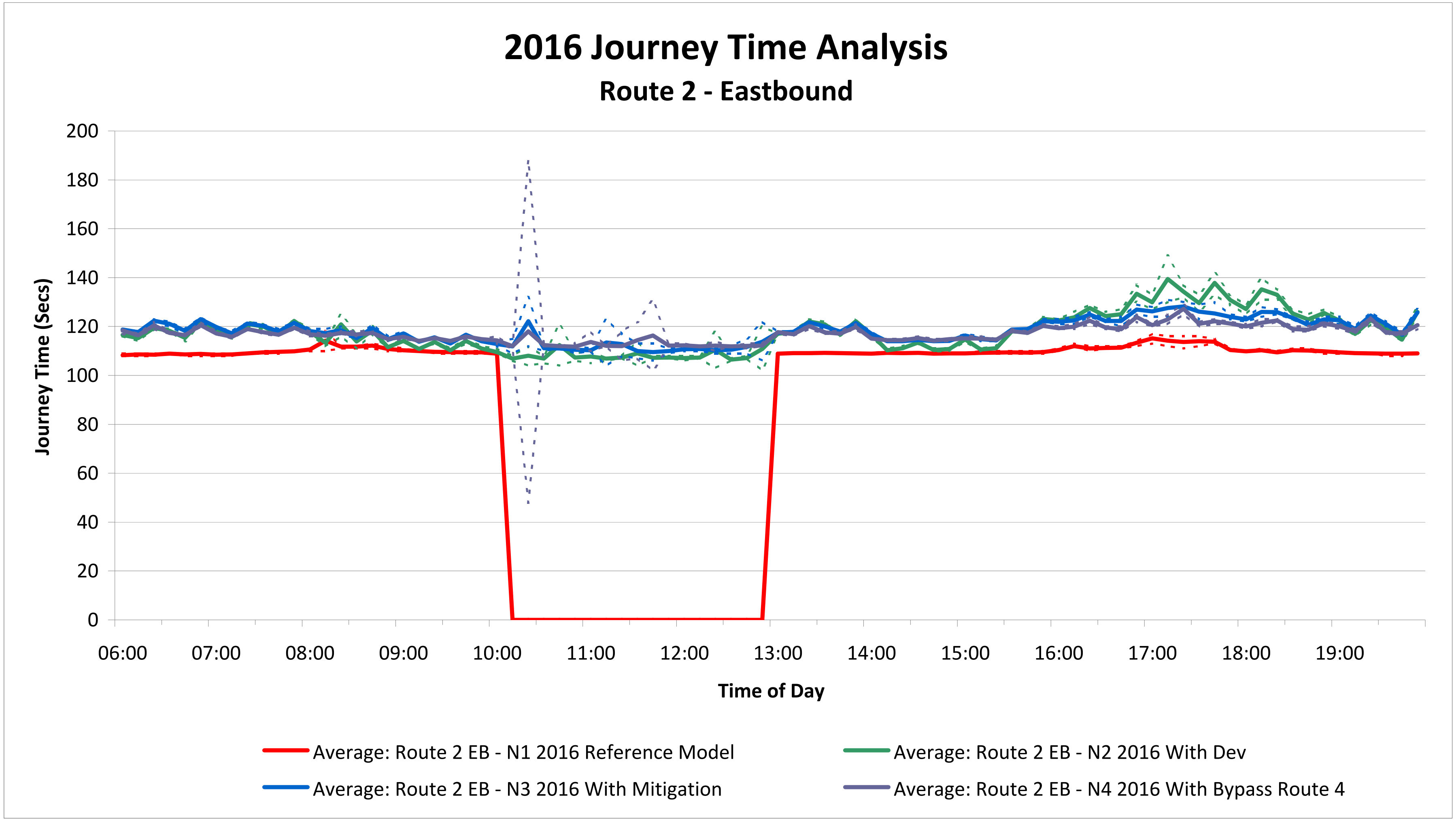
700
600
500
400
300
200
100
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 WB - N1 2016 Reference Model
Average: Route 1 WB - N2 2016 With Dev
Average: Route 1 WB - N3 2016 With Mitigation
Average: Route 1 WB - N4 2016 With Bypass Route 4



2016 Journey Time Analysis
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180
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140
120
100
80
60
40
20
0
Journey Time (Secs)
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07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
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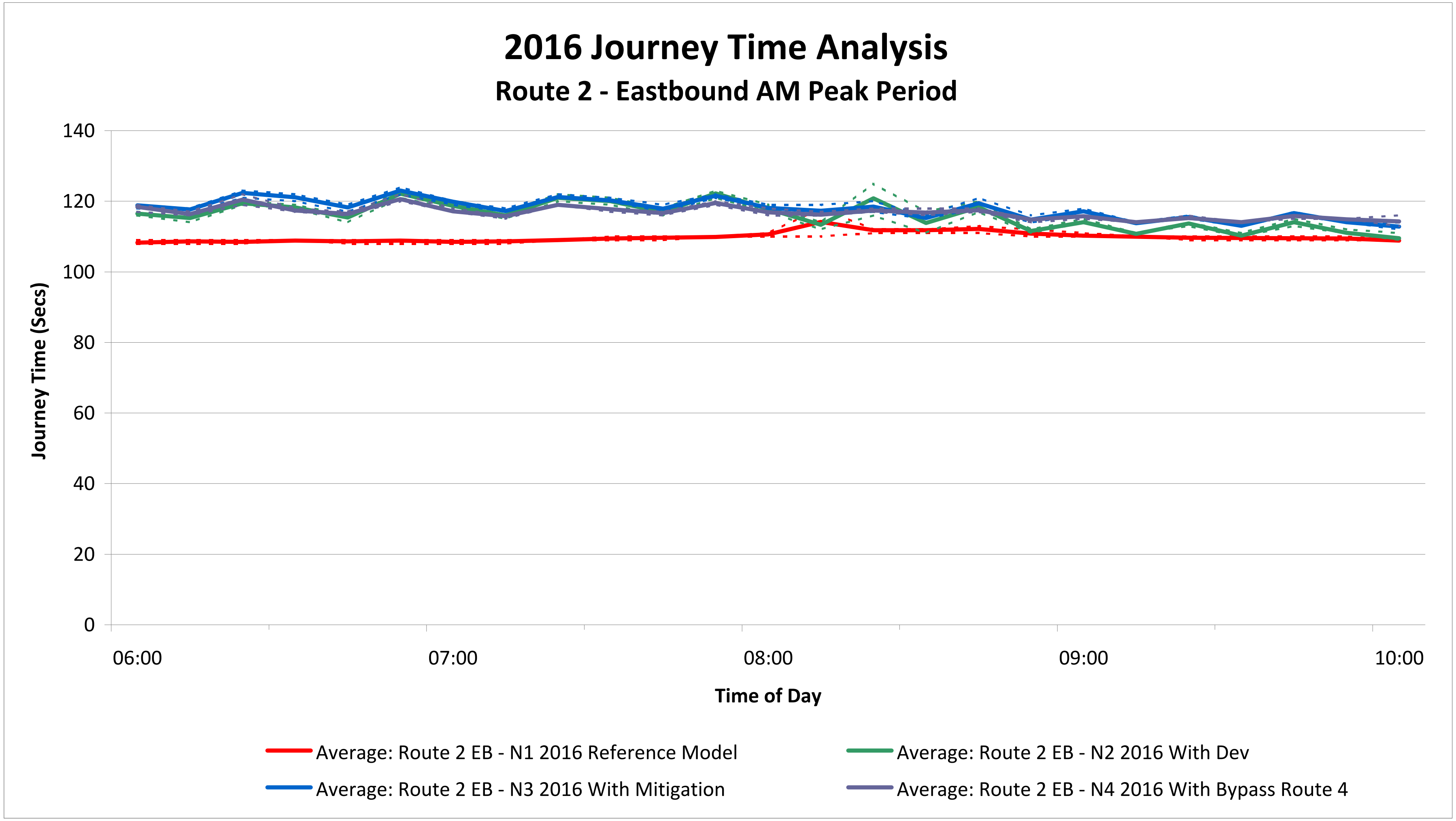
Average: Route 2 EB - N2 2016 With Dev
Average: Route 2 EB - N3 2016 With Mitigation
Average: Route 2 EB - N4 2016 With Bypass Route 4



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80
60
40
20
0
Journey Time (Secs)
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09:00
10:00
Time of Day
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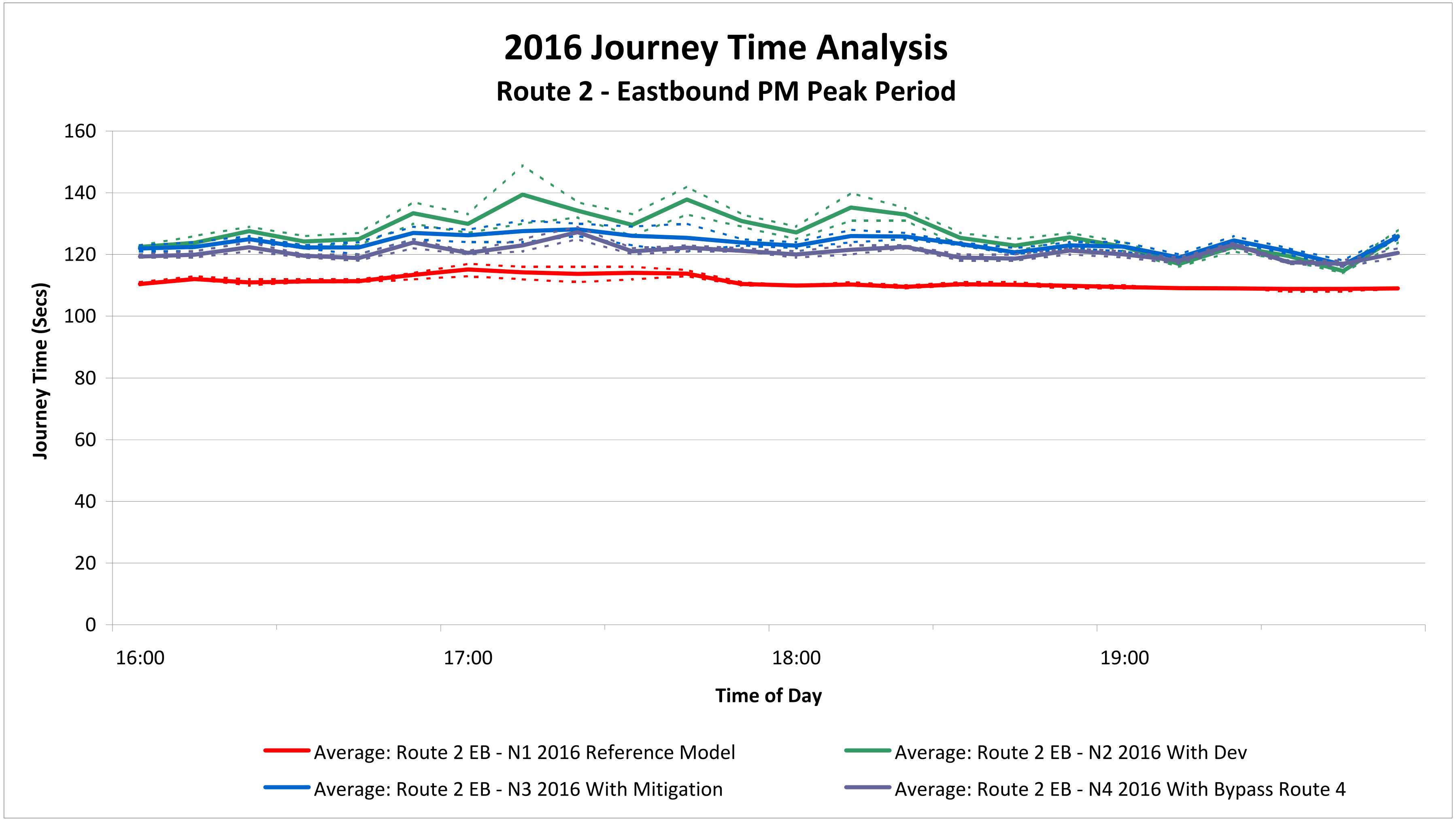
Average: Route 2 EB - N2 2016 With Dev
Average: Route 2 EB - N3 2016 With Mitigation
Average: Route 2 EB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 2 - Eastbound PM Peak Period
Journey Time (Secs)
160
140
120
100
80
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40
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0
16:00
17:00
18:00
19:00
Time of Day
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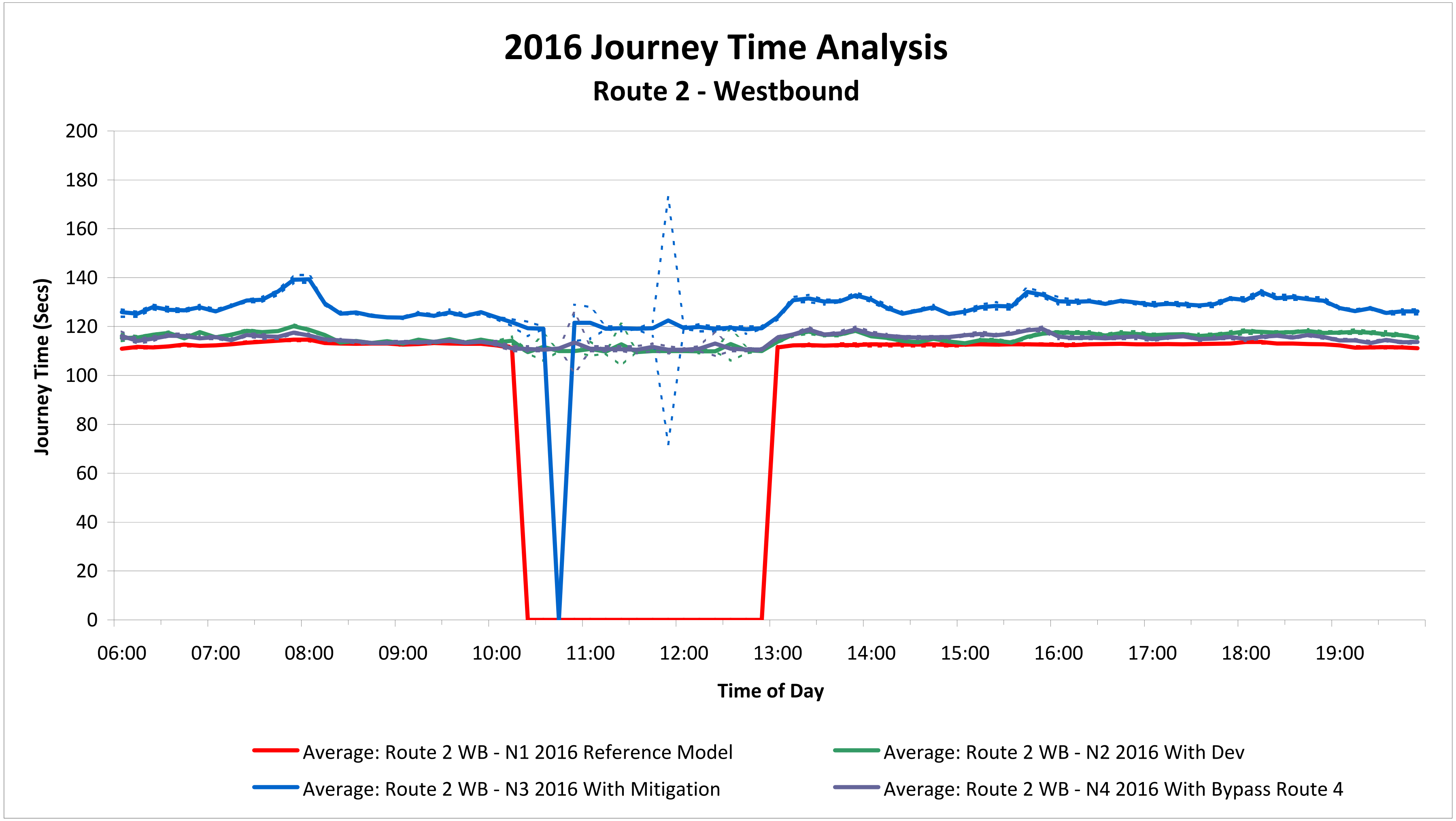
Average: Route 2 EB - N2 2016 With Dev
Average: Route 2 EB - N3 2016 With Mitigation
Average: Route 2 EB - N4 2016 With Bypass Route 4



2016 Journey Time Analysis
Route 2 - Westbound
Journey Time (Secs)
200
180
160
140
120
100
80
60
40
20
0
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07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
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16:00
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18:00
19:00
Time of Day
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Average: Route 2 WB - N2 2016 With Dev
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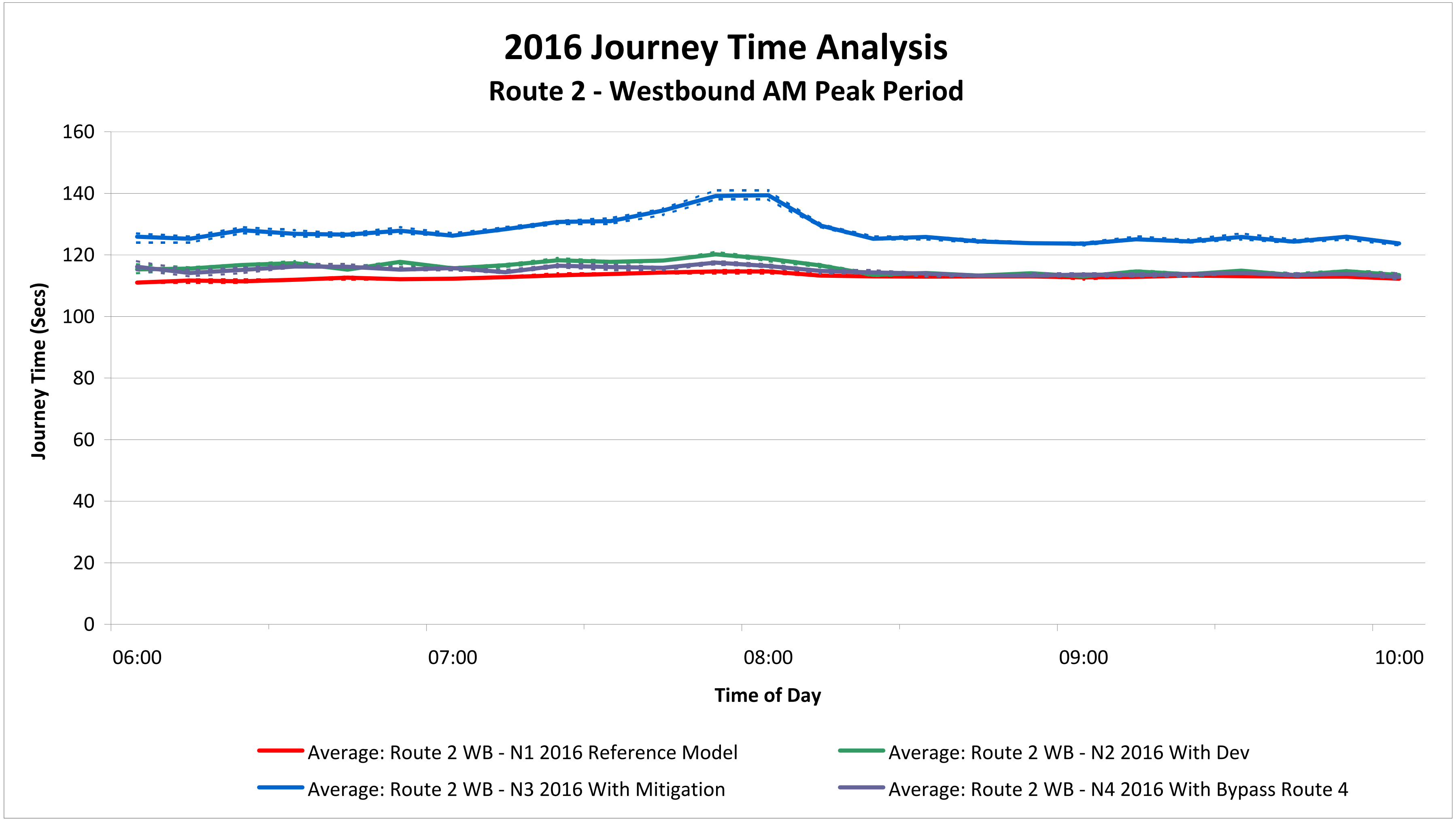
2016 Journey Time Analysis
Route 2 - Westbound AM Peak Period
Journey Time (Secs)
160
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10:00
Time of Day
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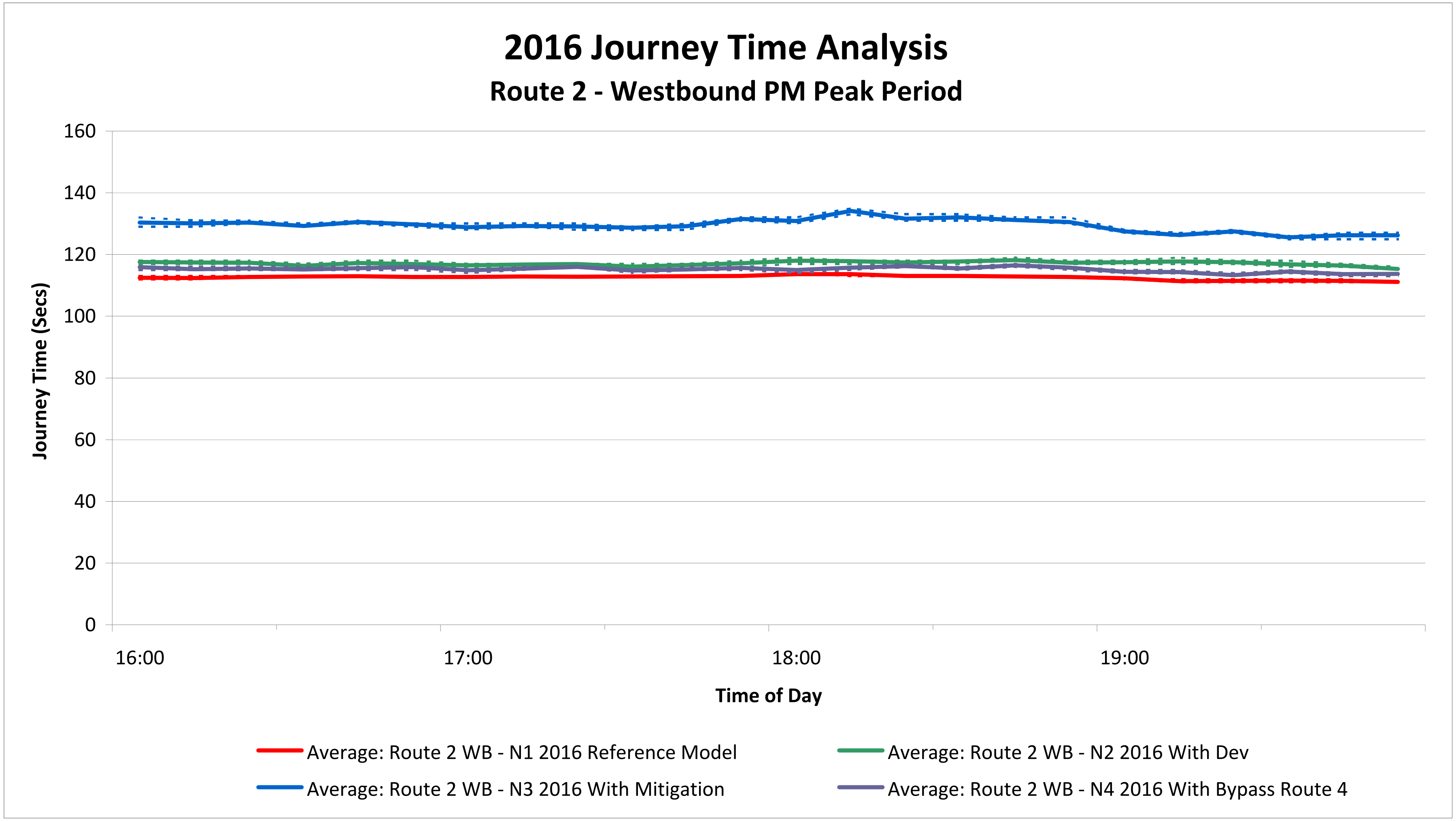
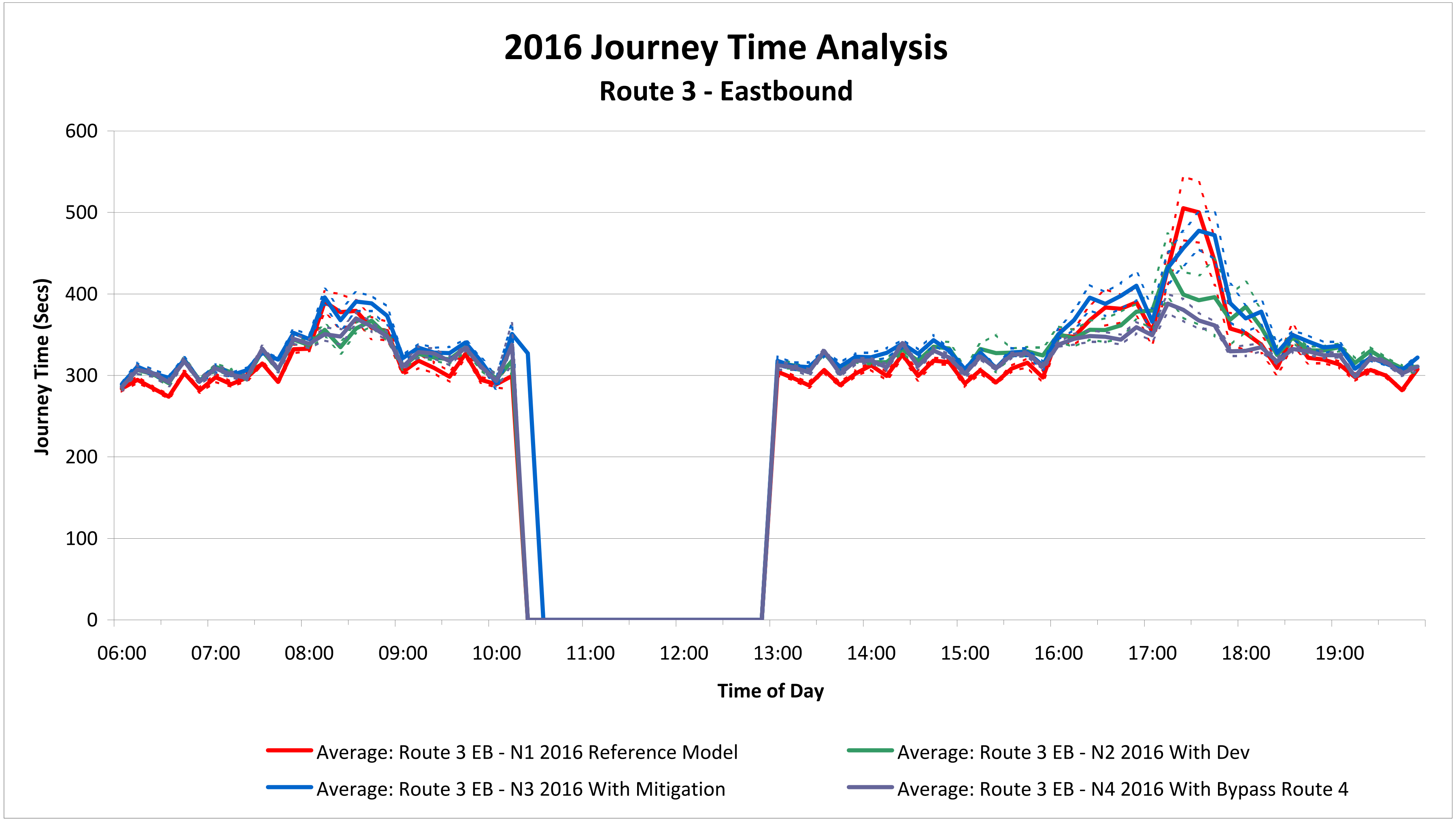
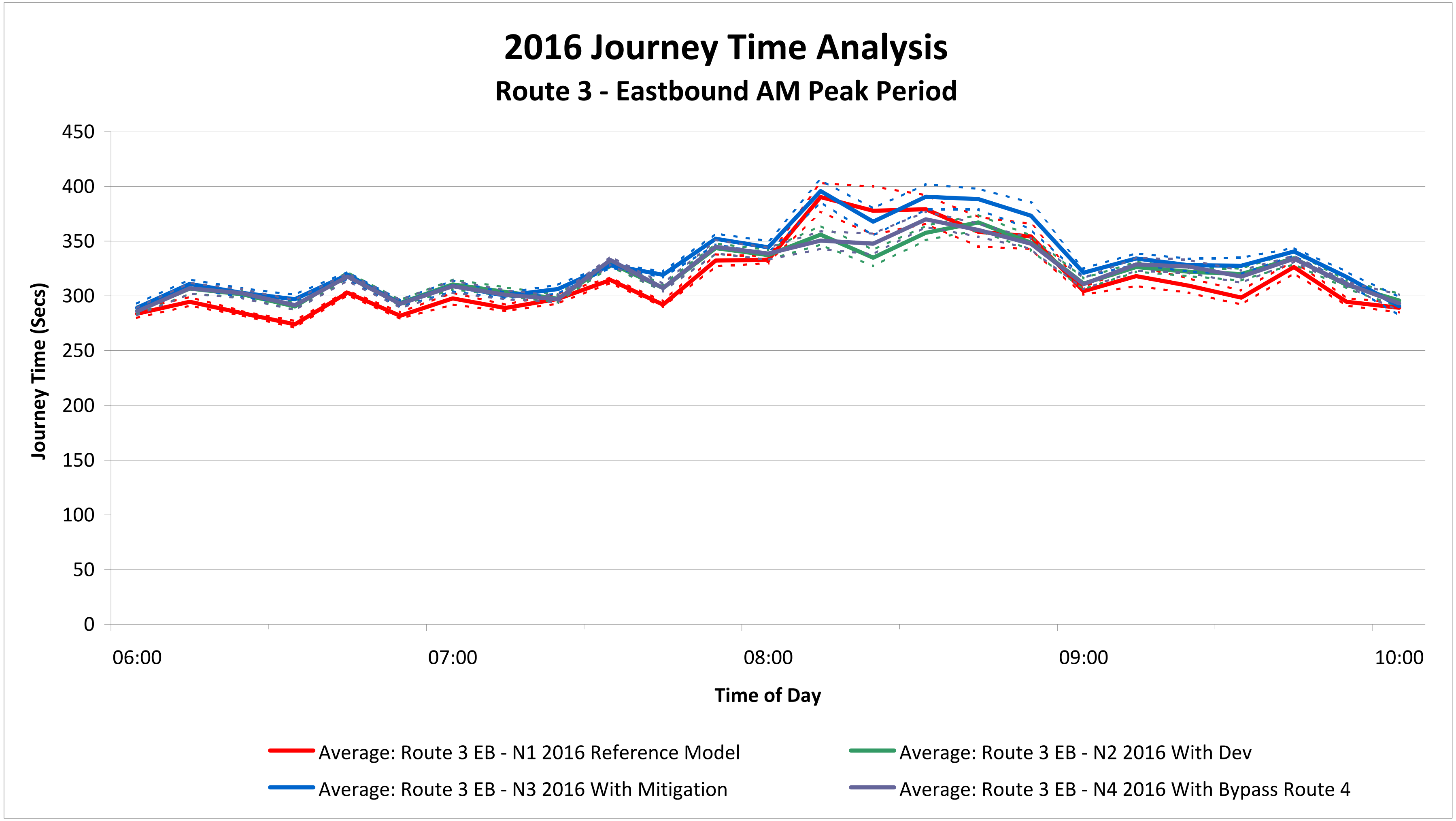
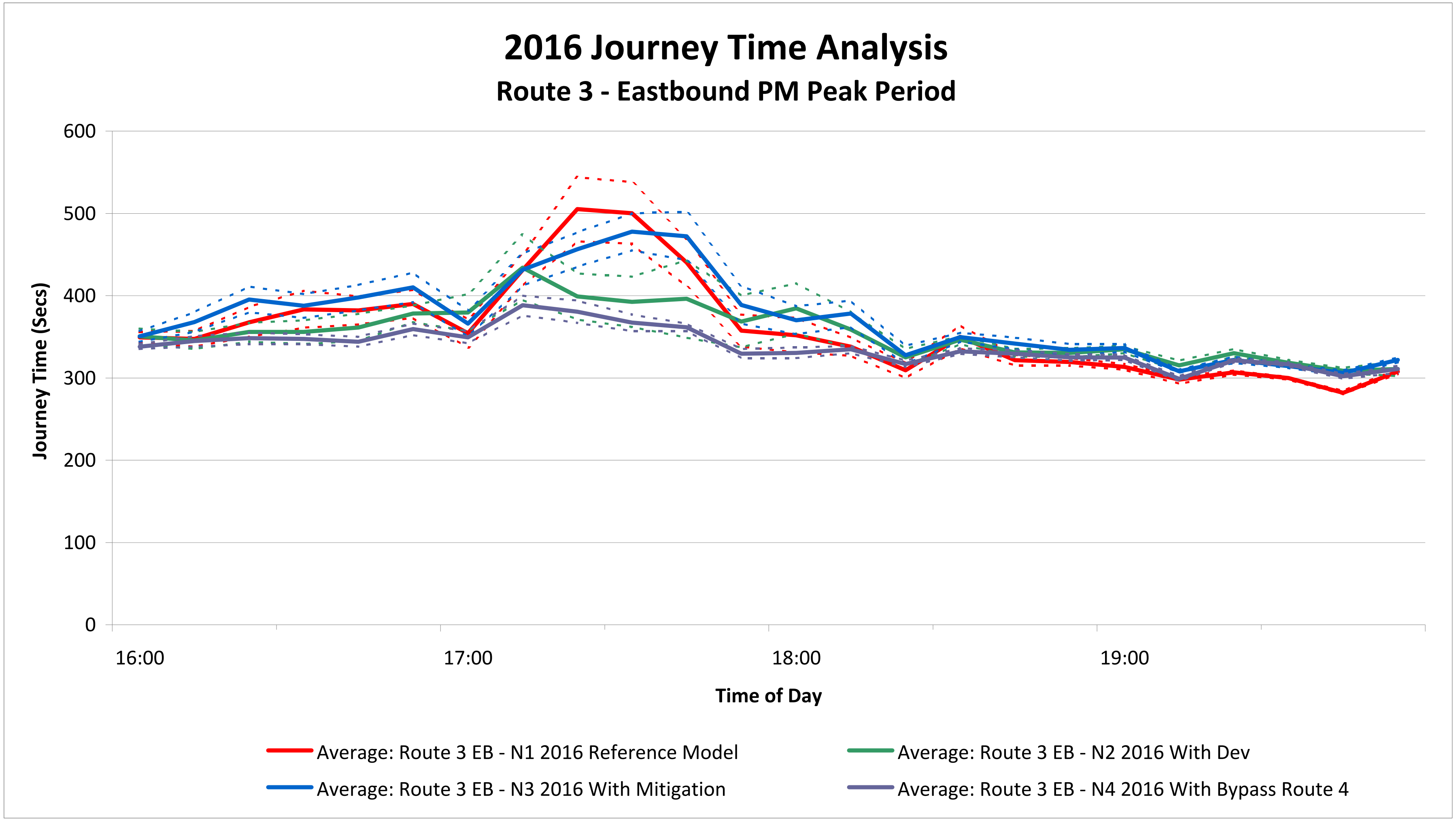

2016 Journey Time Analysis
Route 2 - Westbound PM Peak Period
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 2 WB - N1 2016 Reference Model
Average: Route 2 WB - N2 2016 With Dev
Average: Route 2 WB - N3 2016 With Mitigation
Average: Route 2 WB - N4 2016 With Bypass Route 4

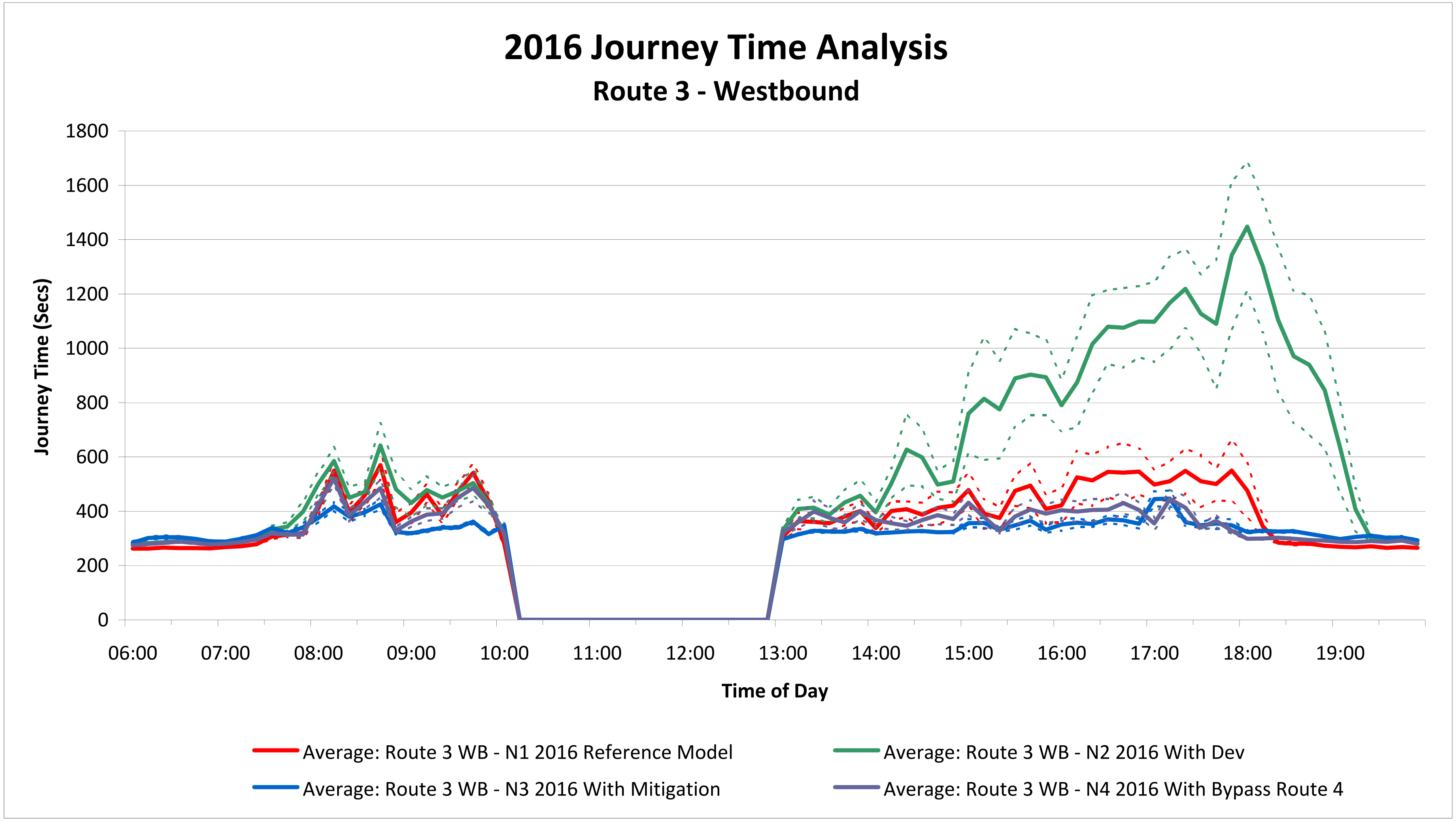

2016 Journey Time Analysis
Route 3 - Eastbound
Journey Time (Secs)
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 EB - N1 2016 Reference Model
Average: Route 3 EB - N2 2016 With Dev
Average: Route 3 EB - N3 2016 With Mitigation
Average: Route 3 EB - N4 2016 With Bypass Route 4



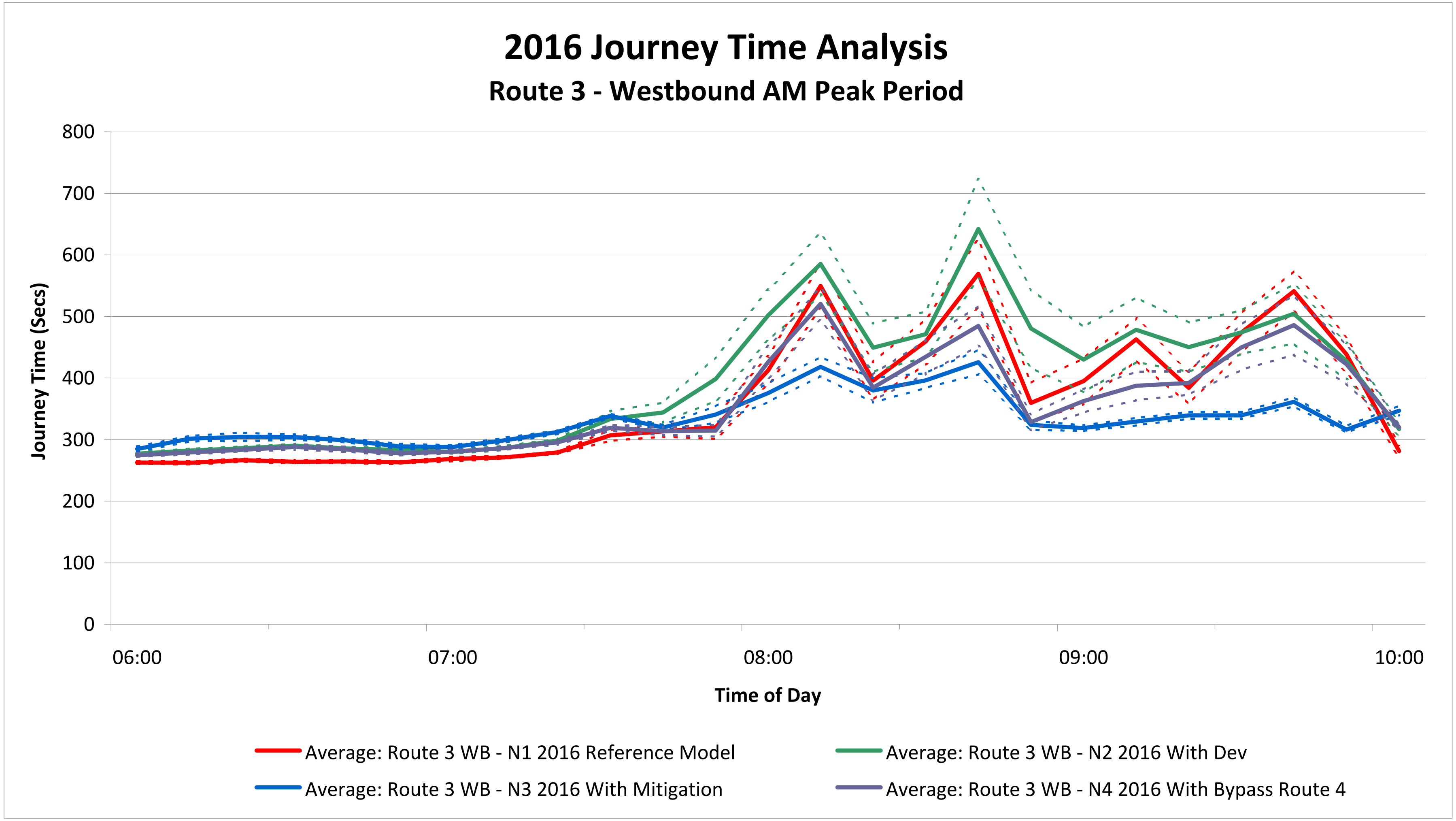
2016 Journey Time Analysis
Route 3 - Eastbound AM Peak Period
450
400
350
300
250
200
150
100
50
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 3 EB - N1 2016 Reference Model
Average: Route 3 EB - N2 2016 With Dev
Average: Route 3 EB - N3 2016 With Mitigation
Average: Route 3 EB - N4 2016 With Bypass Route 4

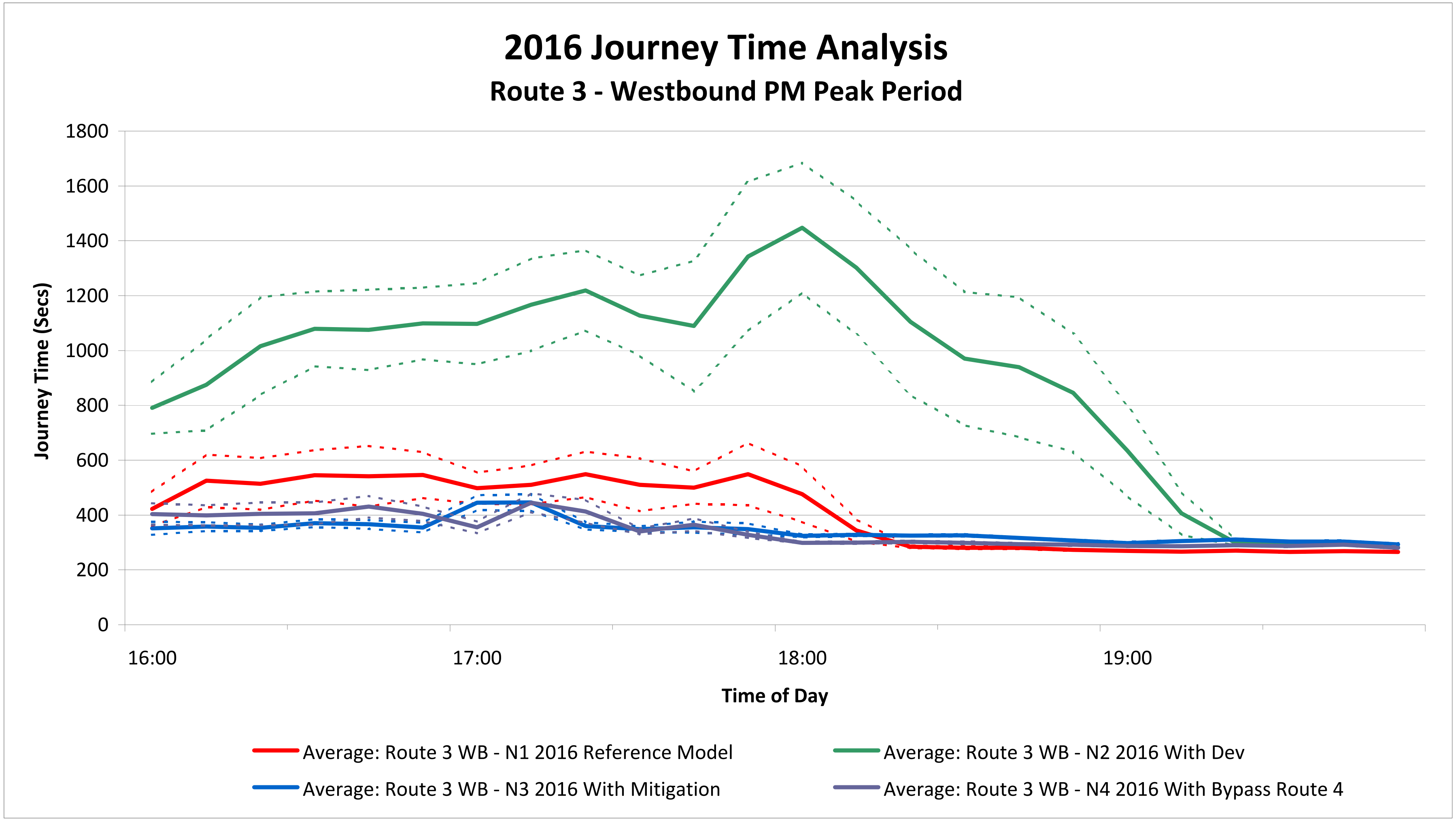


2016 Journey Time Analysis
Route 3 - Eastbound PM Peak Period
600
500
400
300
200
100
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 EB - N1 2016 Reference Model
Average: Route 3 EB - N2 2016 With Dev
Average: Route 3 EB - N3 2016 With Mitigation
Average: Route 3 EB - N4 2016 With Bypass Route 4

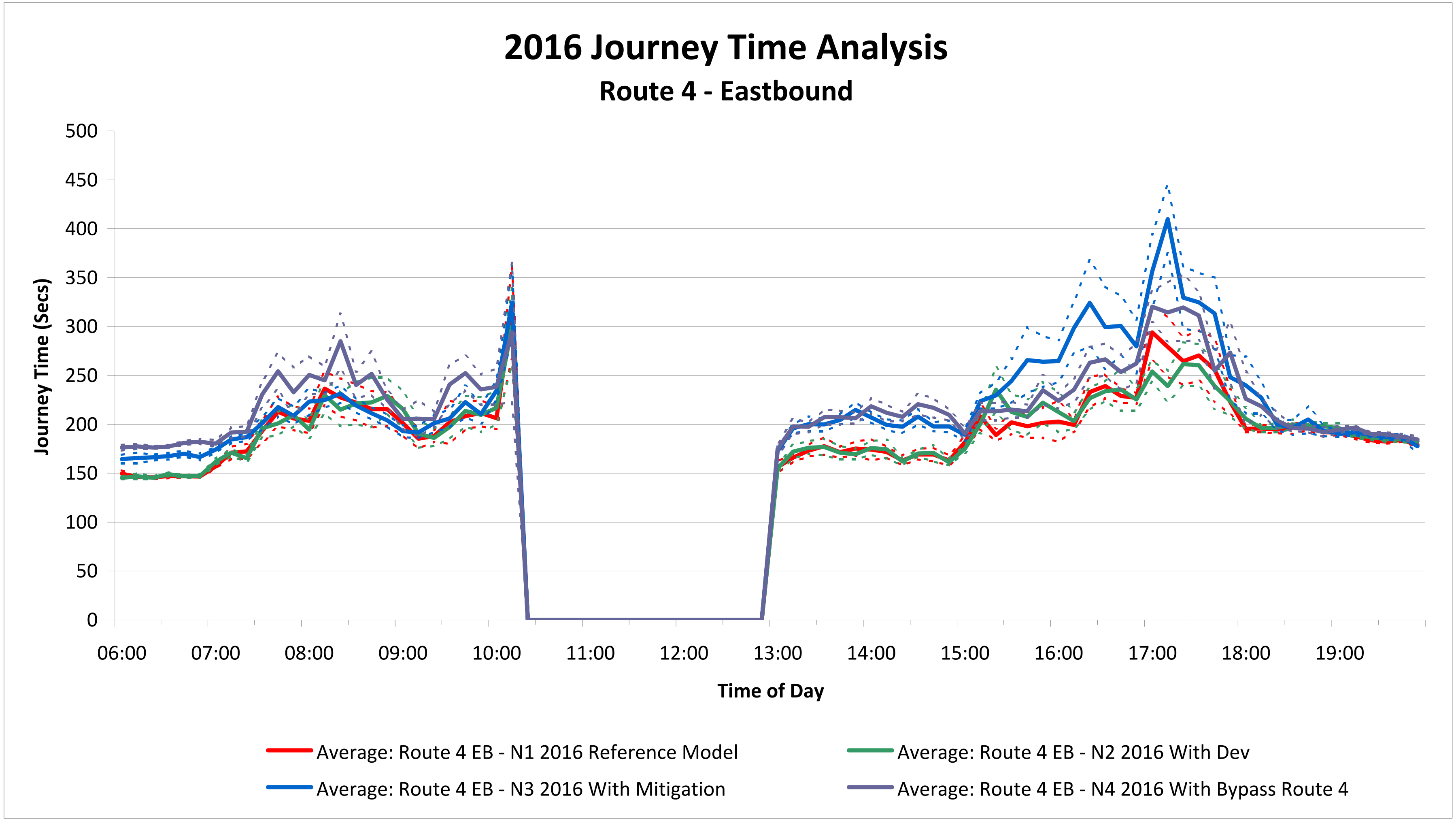


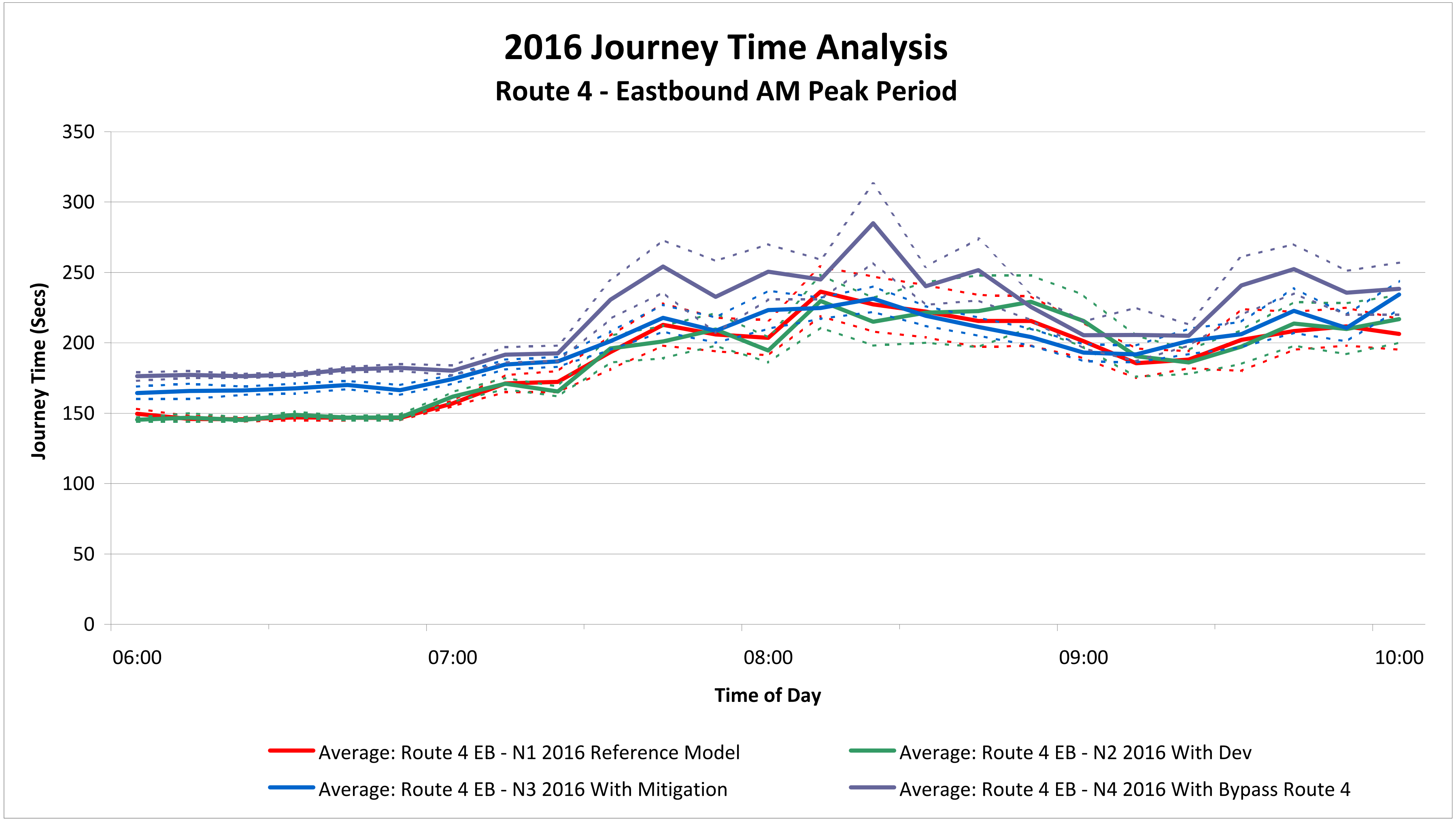
2016 Journey Time Analysis
Route 3 - Westbound
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 WB - N1 2016 Reference Model
Average: Route 3 WB - N2 2016 With Dev
Average: Route 3 WB - N3 2016 With Mitigation
Average: Route 3 WB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 3 - Westbound AM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 3 WB - N1 2016 Reference Model
Average: Route 3 WB - N2 2016 With Dev
Average: Route 3 WB - N3 2016 With Mitigation
Average: Route 3 WB - N4 2016 With Bypass Route 4

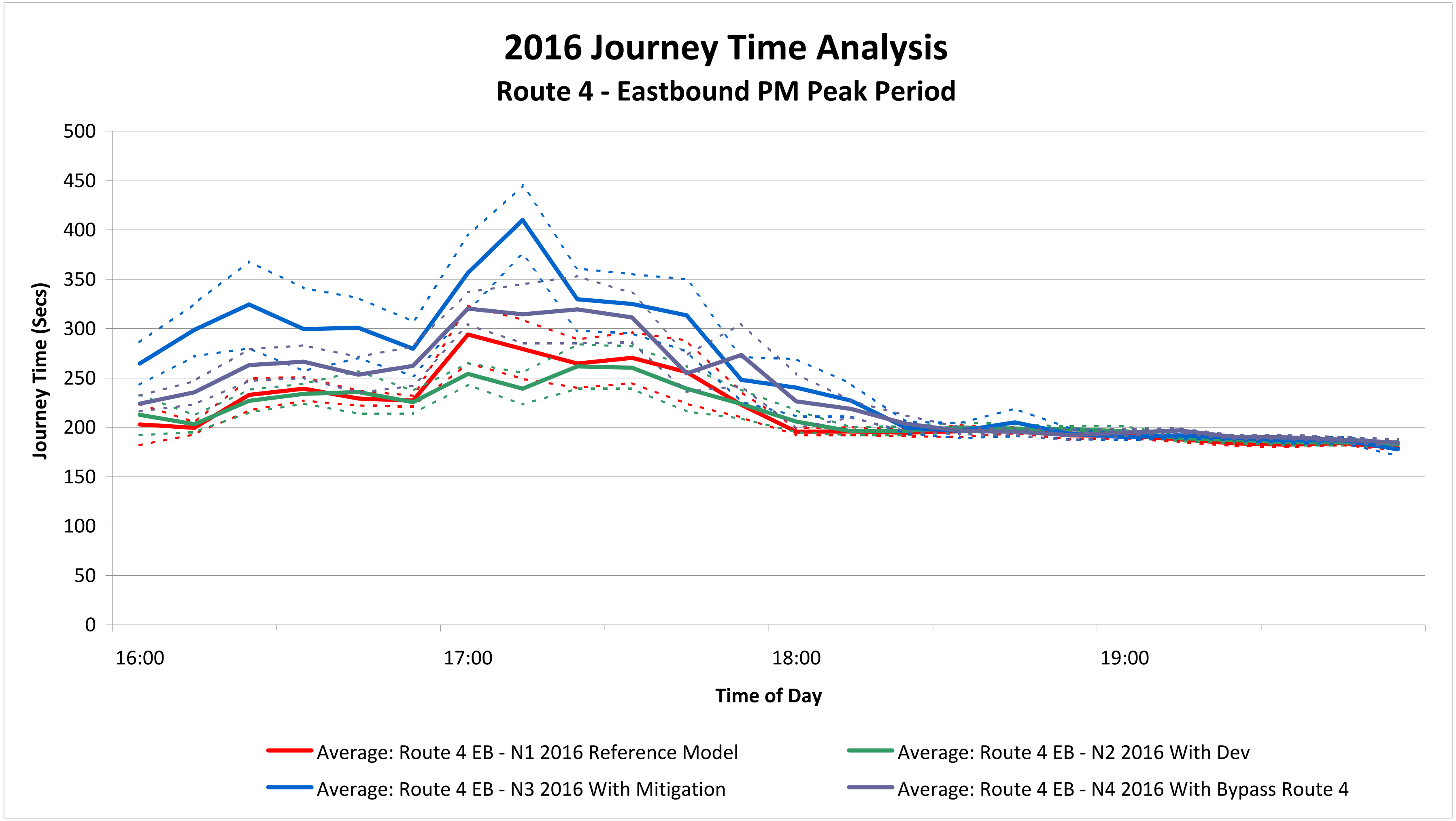


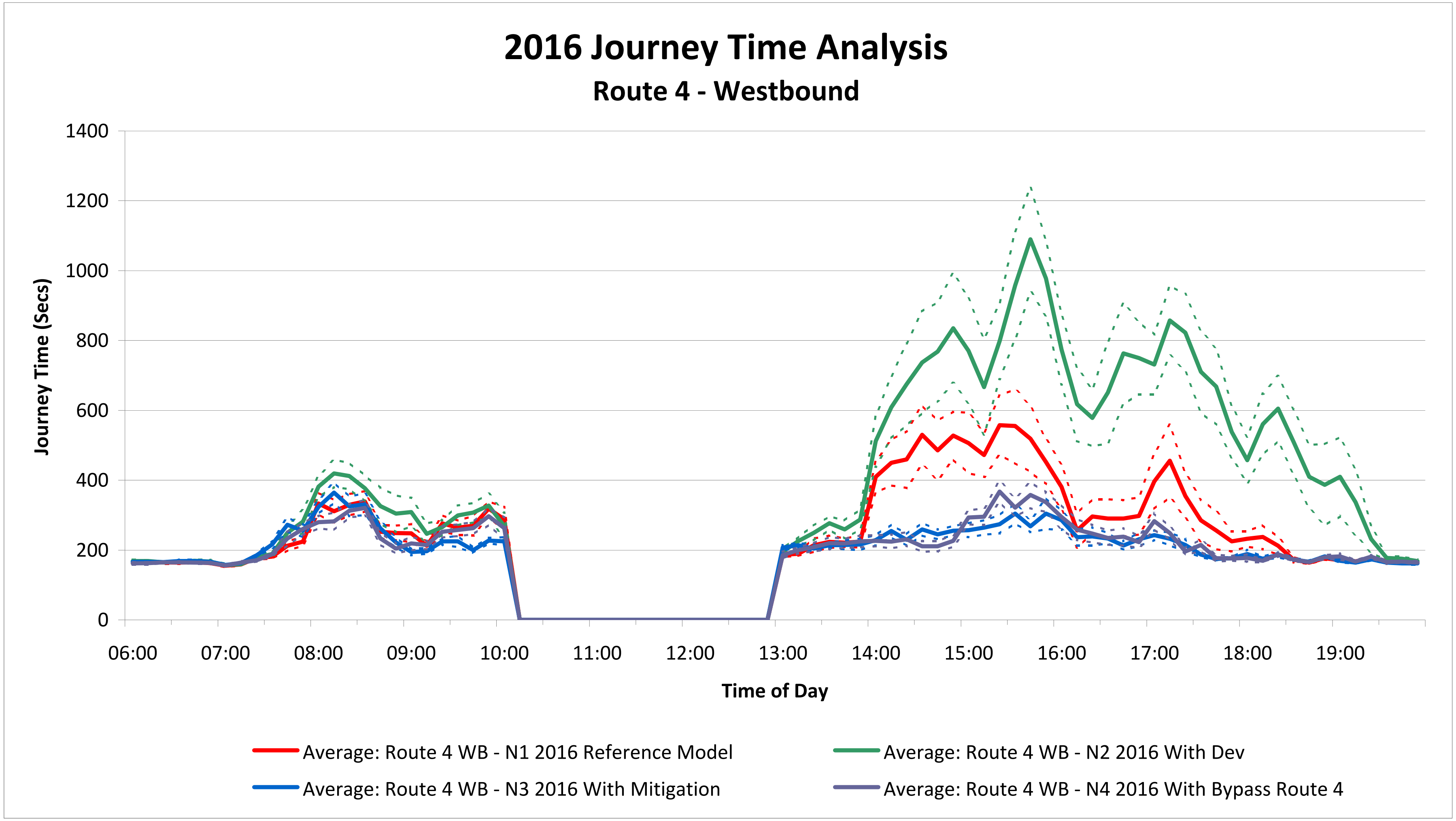
2016 Journey Time Analysis
Route 3 - Westbound PM Peak Period
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 WB - N1 2016 Reference Model
Average: Route 3 WB - N2 2016 With Dev
Average: Route 3 WB - N3 2016 With Mitigation
Average: Route 3 WB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 4 - Eastbound
Journey Time (Secs)
500
450
400
350
300
250
200
150
100
50
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 EB - N1 2016 Reference Model
Average: Route 4 EB - N2 2016 With Dev
Average: Route 4 EB - N3 2016 With Mitigation
Average: Route 4 EB - N4 2016 With Bypass Route 4

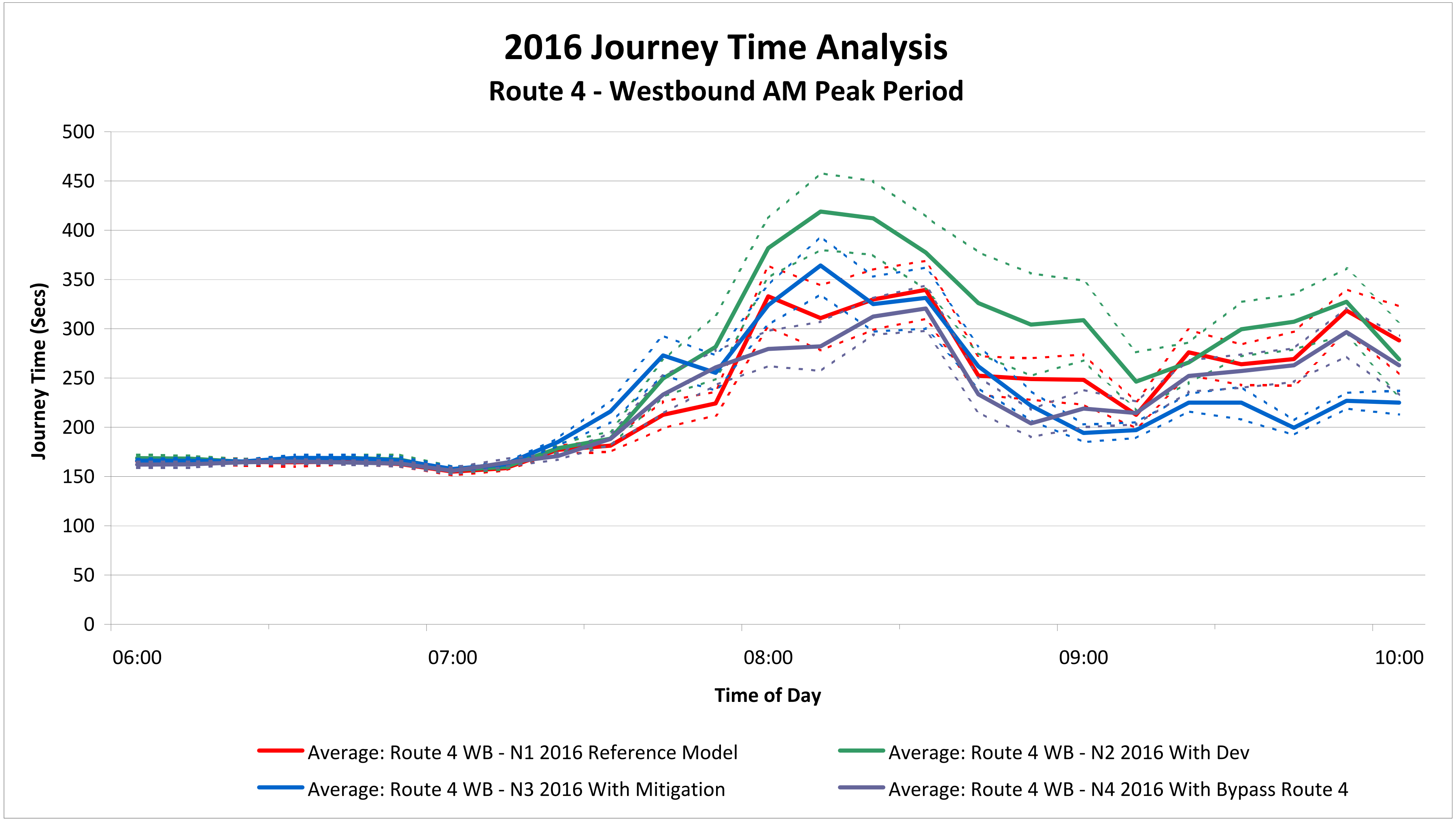


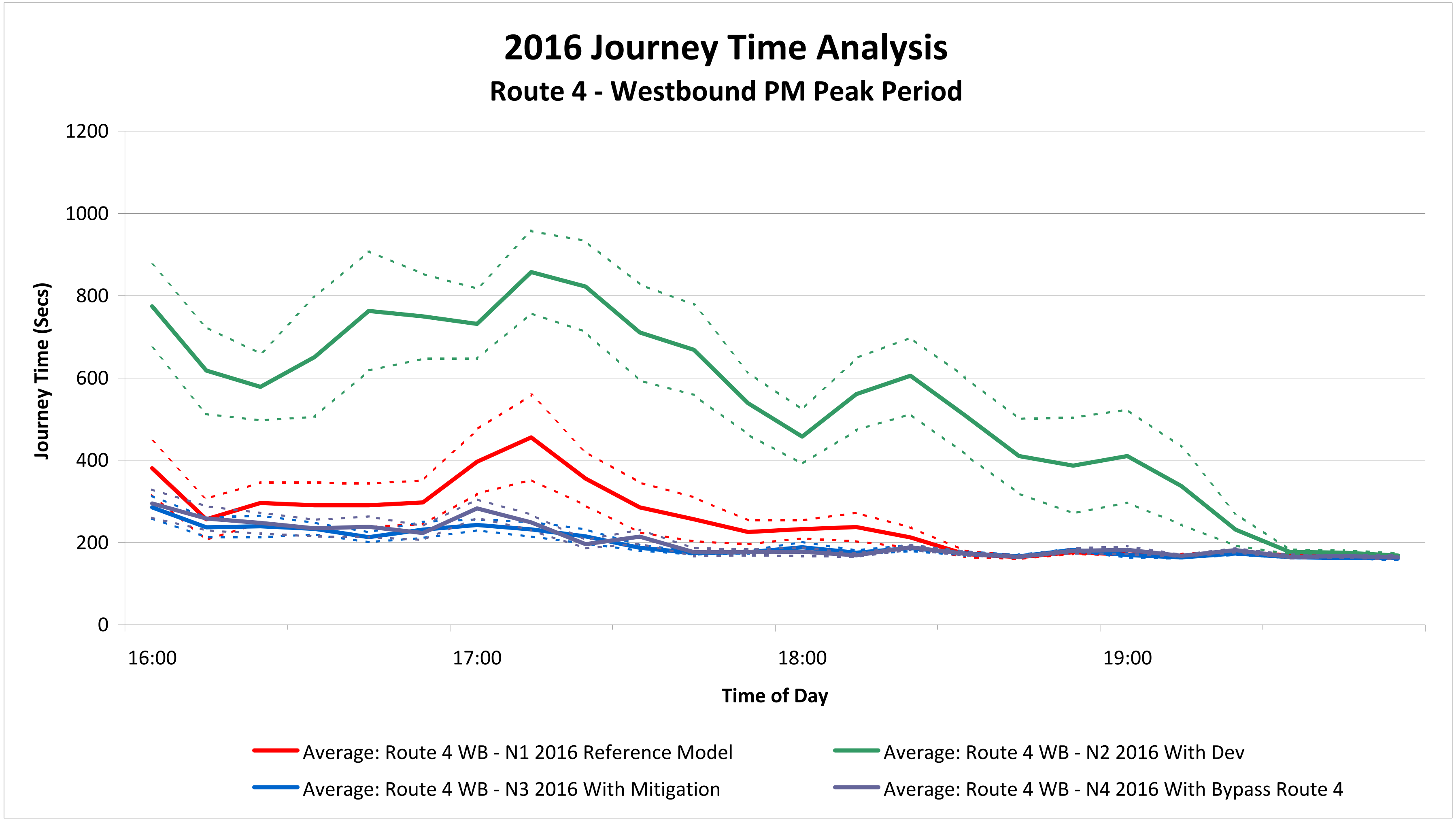
2016 Journey Time Analysis
Route 4 - Eastbound AM Peak Period
350
300
250
200
150
100
50
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 4 EB - N1 2016 Reference Model
Average: Route 4 EB - N2 2016 With Dev
Average: Route 4 EB - N3 2016 With Mitigation
Average: Route 4 EB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 4 - Eastbound PM Peak Period
Journey Time (Secs)
500
450
400
350
300
250
200
150
100
50
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 EB - N1 2016 Reference Model
Average: Route 4 EB - N2 2016 With Dev
Average: Route 4 EB - N3 2016 With Mitigation
Average: Route 4 EB - N4 2016 With Bypass Route 4

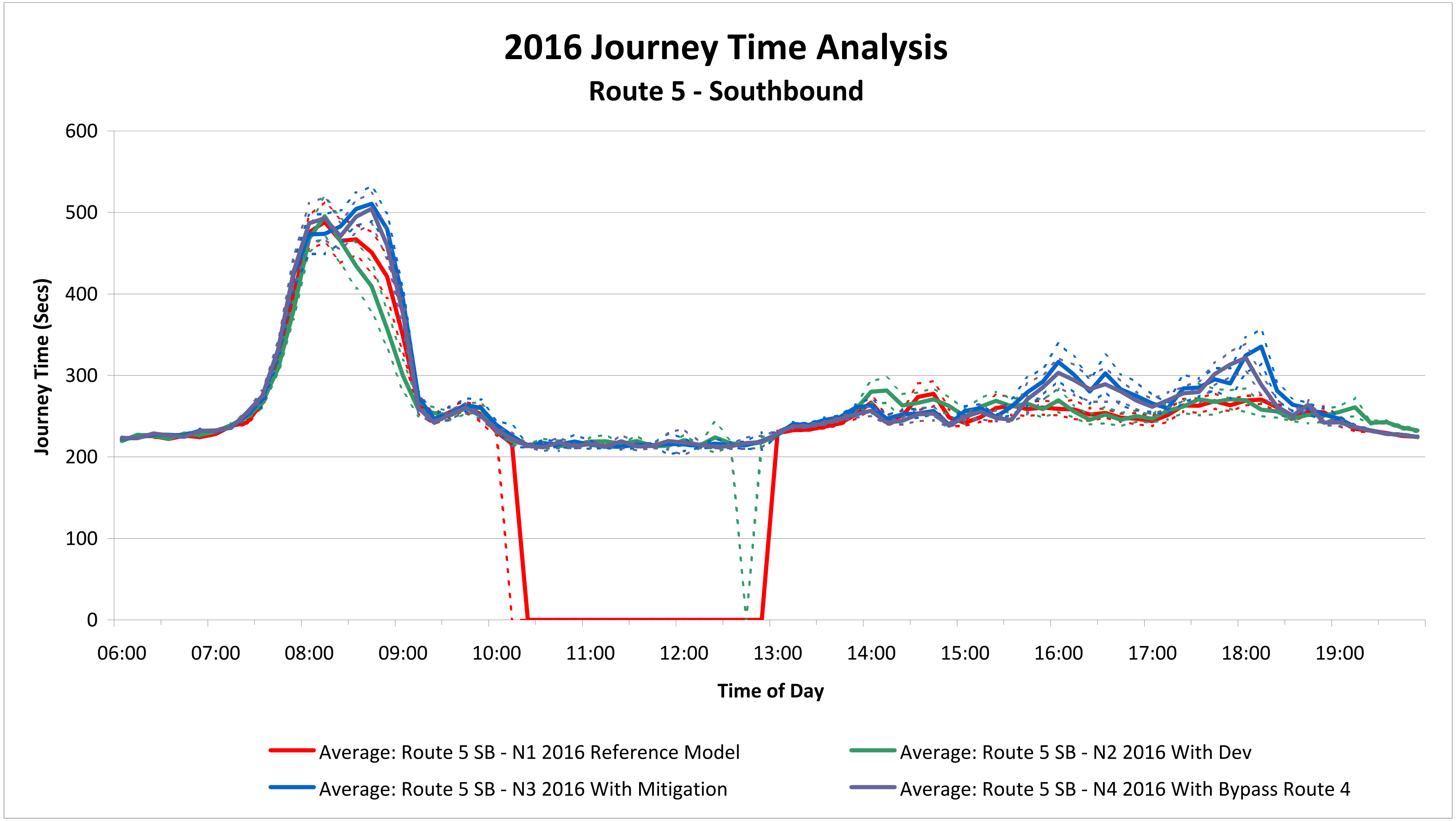


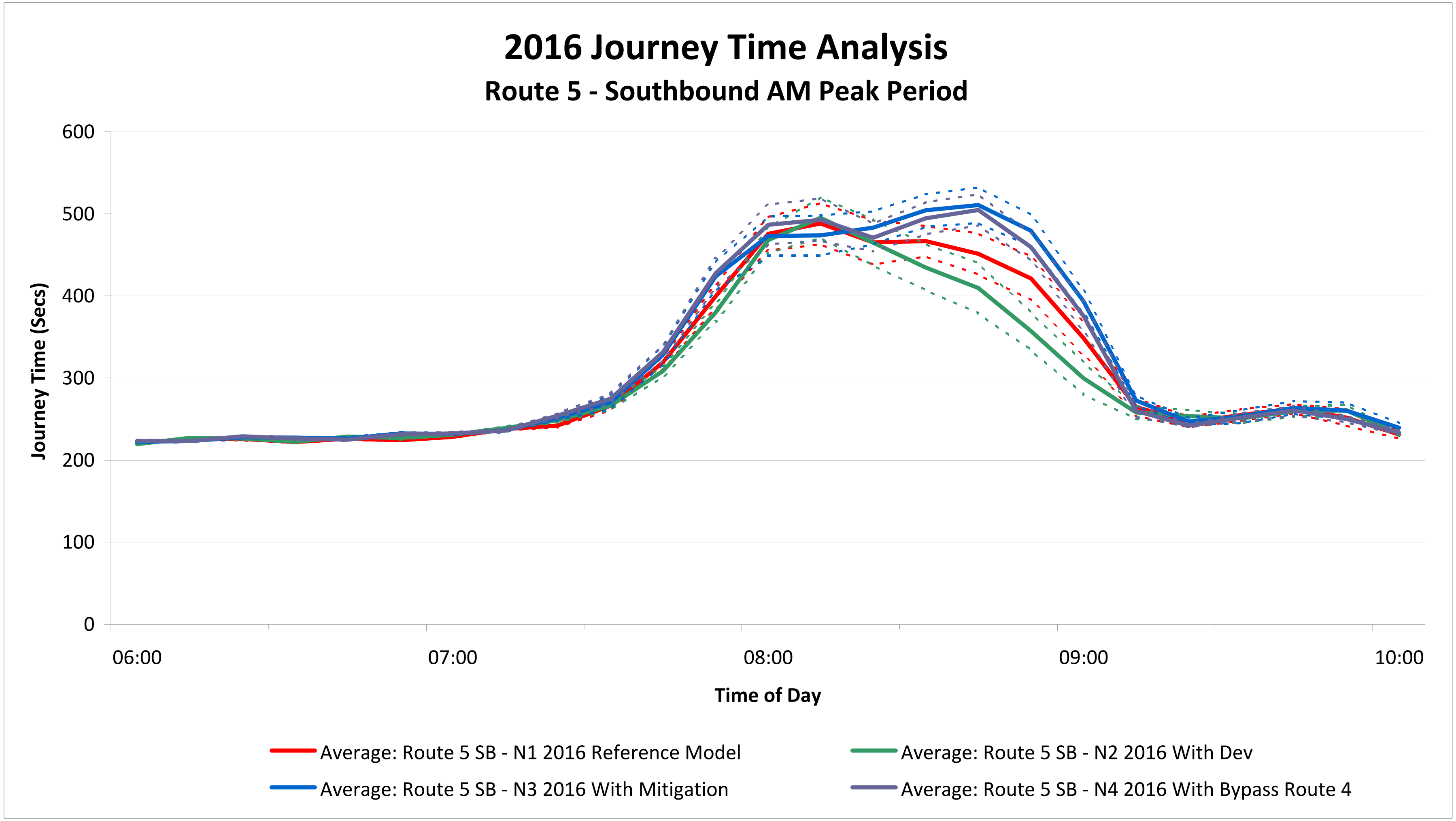
2016 Journey Time Analysis
Route 4 - Westbound
Journey Time (Secs)
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 WB - N1 2016 Reference Model
Average: Route 4 WB - N2 2016 With Dev
Average: Route 4 WB - N3 2016 With Mitigation
Average: Route 4 WB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 4 - Westbound AM Peak Period
Journey Time (Secs)
500
450
400
350
300
250
200
150
100
50
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 4 WB - N1 2016 Reference Model
Average: Route 4 WB - N2 2016 With Dev
Average: Route 4 WB - N3 2016 With Mitigation
Average: Route 4 WB - N4 2016 With Bypass Route 4

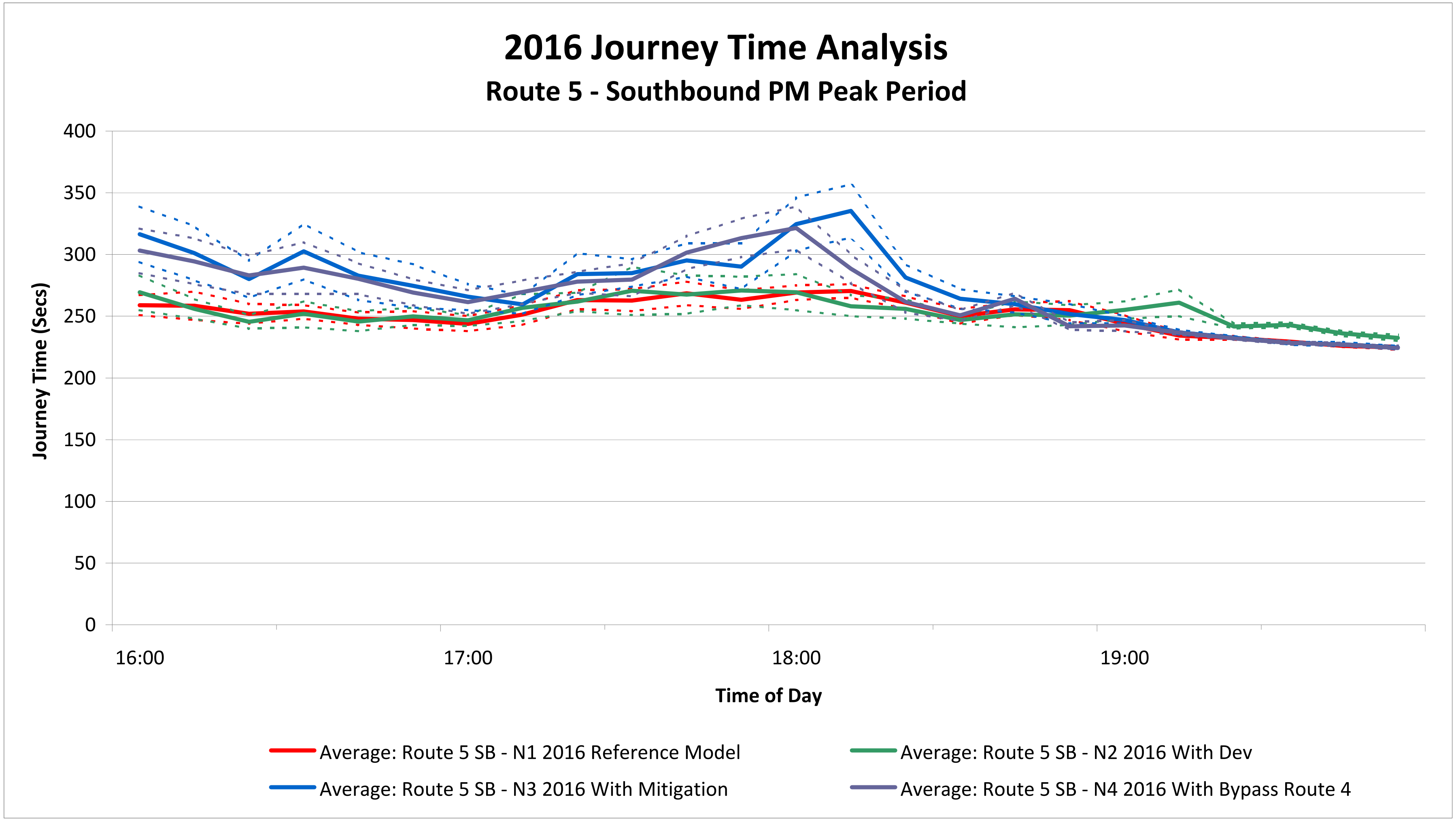


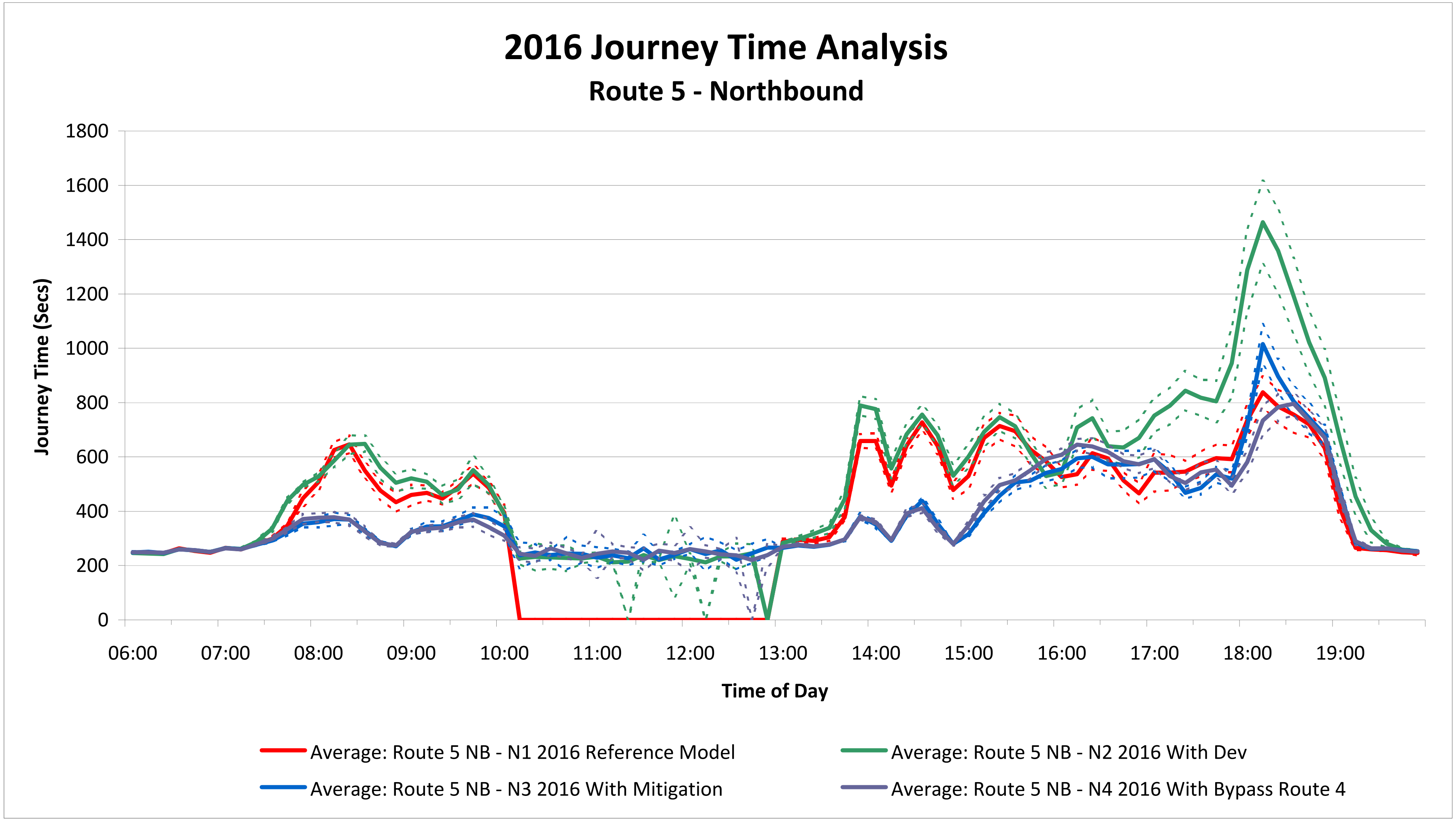
2016 Journey Time Analysis
Route 4 - Westbound PM Peak Period
1200
1000
800
600
400
200
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 WB - N1 2016 Reference Model
Average: Route 4 WB - N2 2016 With Dev
Average: Route 4 WB - N3 2016 With Mitigation
Average: Route 4 WB - N4 2016 With Bypass Route 4

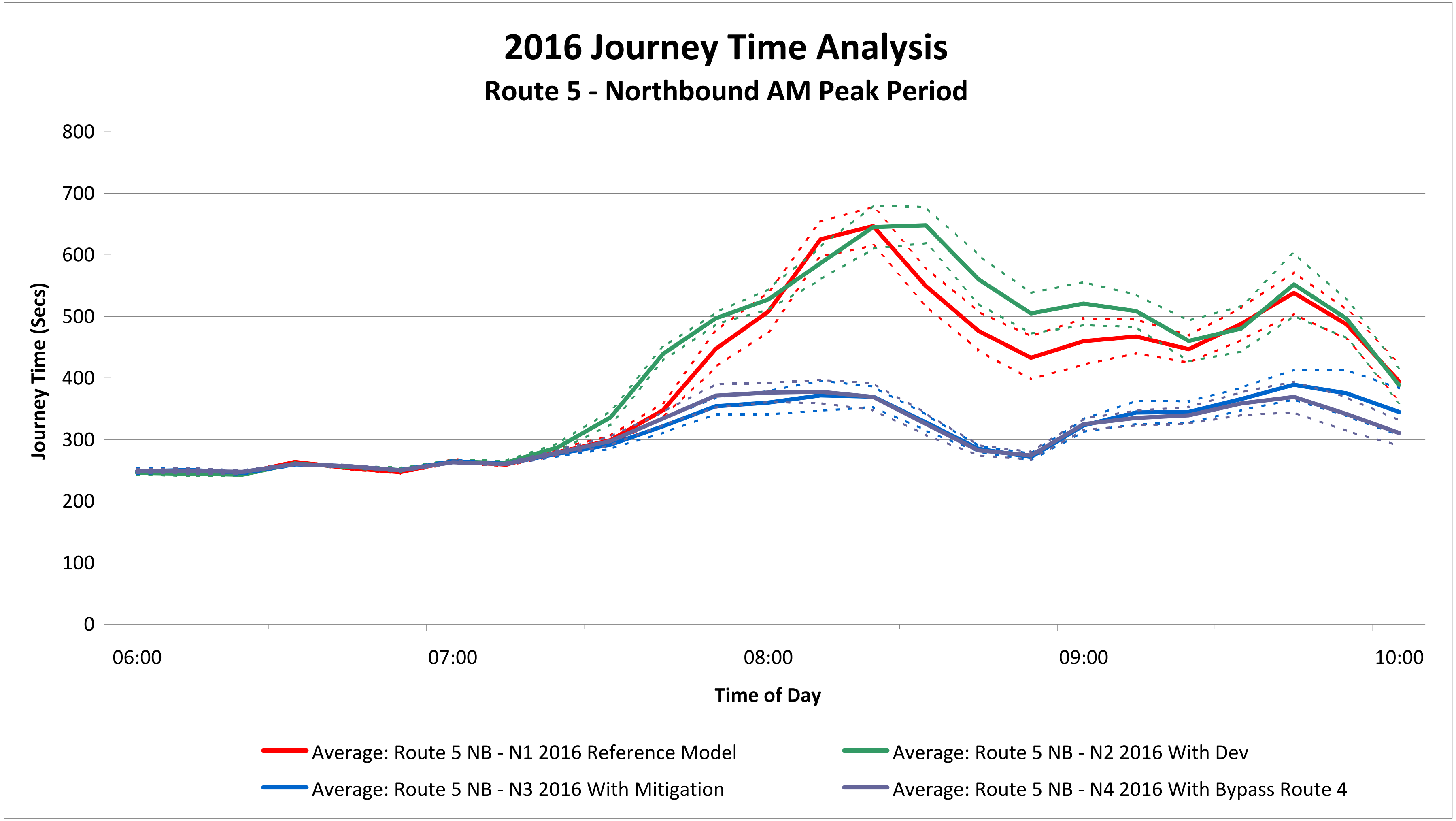

2016 Journey Time Analysis
Route 5 - Southbound
Journey Time (Secs)
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 SB - N1 2016 Reference Model
Average: Route 5 SB - N2 2016 With Dev
Average: Route 5 SB - N3 2016 With Mitigation
Average: Route 5 SB - N4 2016 With Bypass Route 4



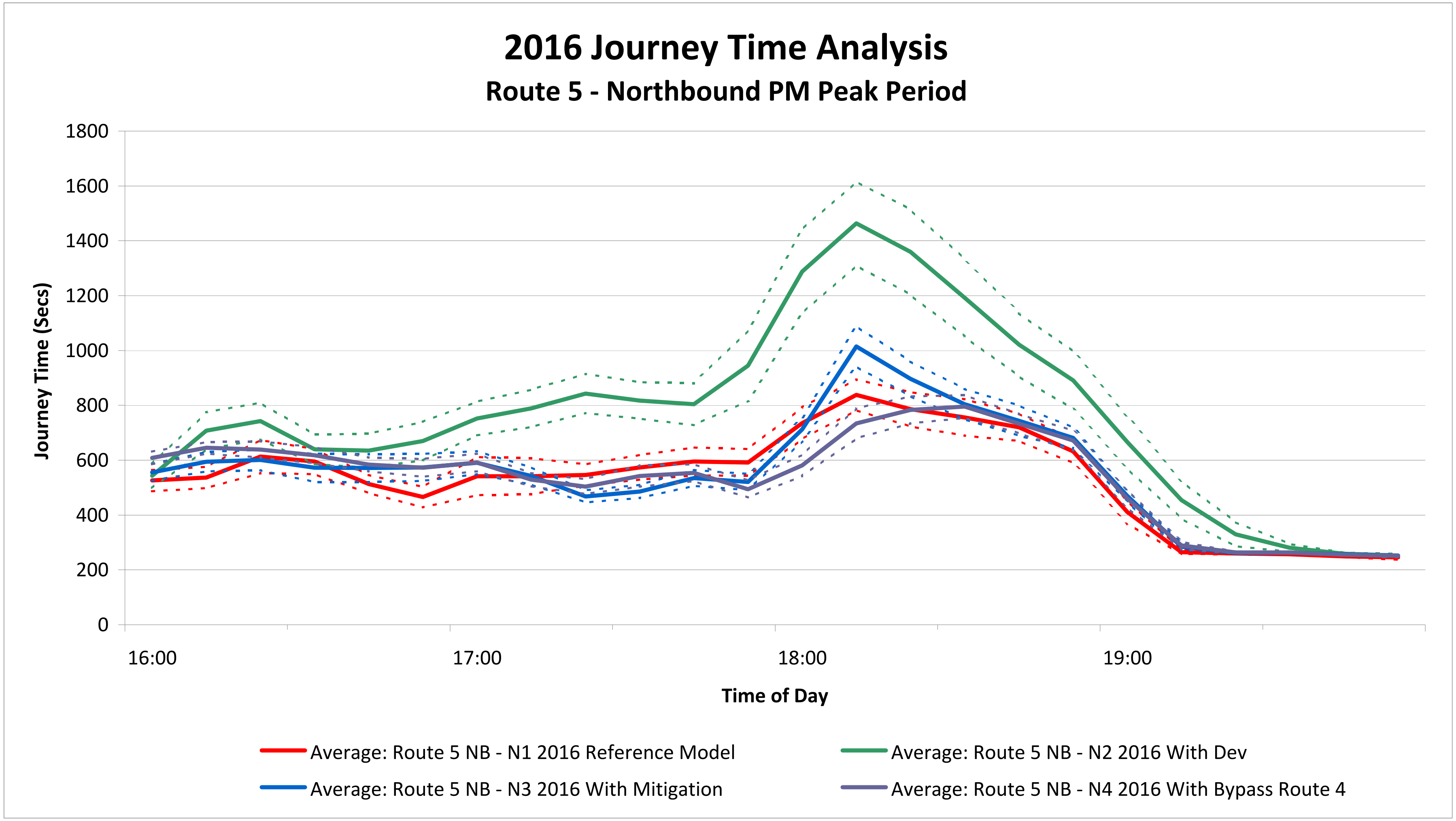
2016 Journey Time Analysis
Route 5 - Southbound AM Peak Period
Journey Time (Secs)
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 5 SB - N1 2016 Reference Model
Average: Route 5 SB - N2 2016 With Dev
Average: Route 5 SB - N3 2016 With Mitigation
Average: Route 5 SB - N4 2016 With Bypass Route 4

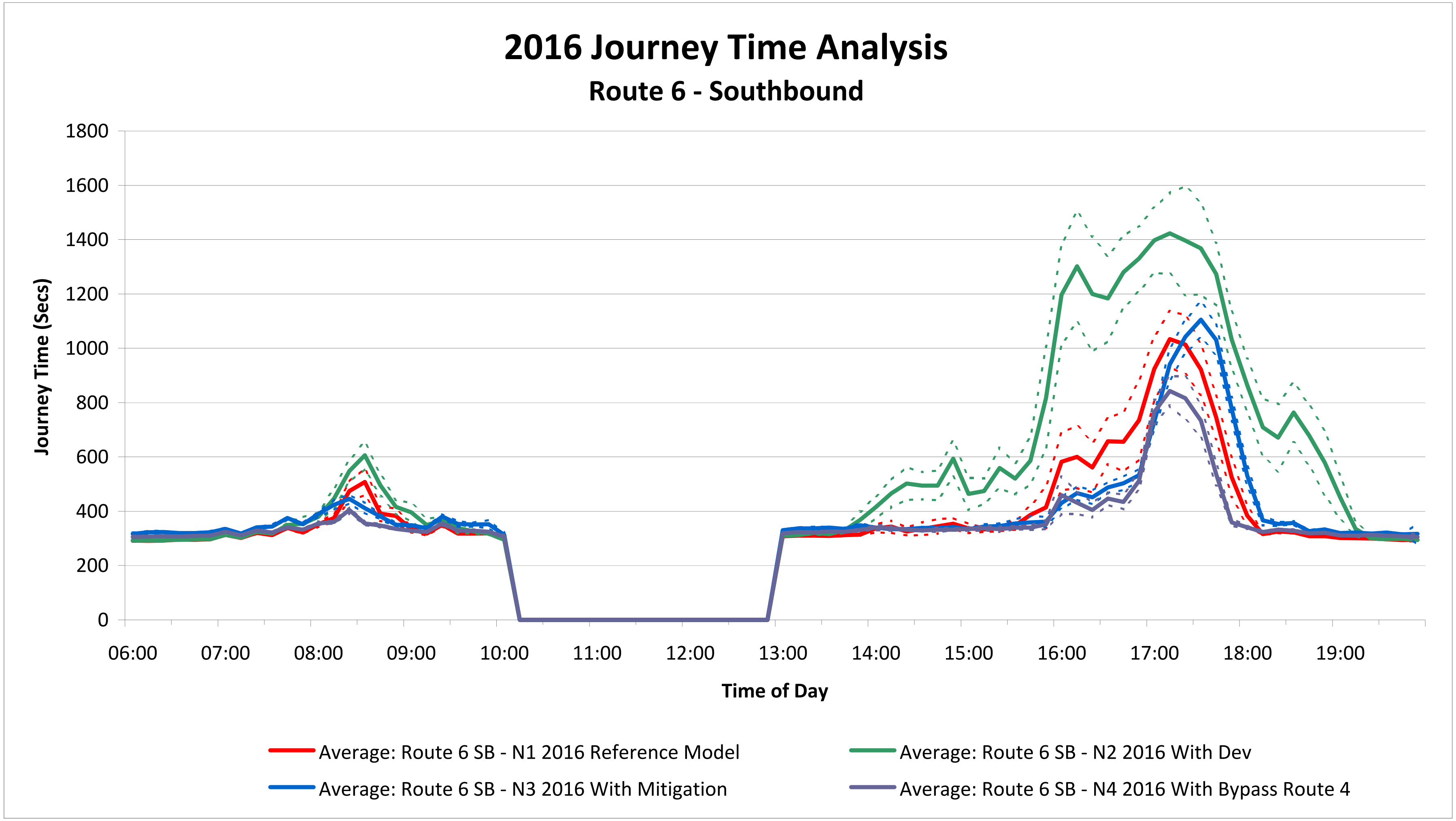

2016 Journey Time Analysis
Route 5 - Southbound PM Peak Period
400
350
300
250
200
150
100
50
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 SB - N1 2016 Reference Model
Average: Route 5 SB - N2 2016 With Dev
Average: Route 5 SB - N3 2016 With Mitigation
Average: Route 5 SB - N4 2016 With Bypass Route 4

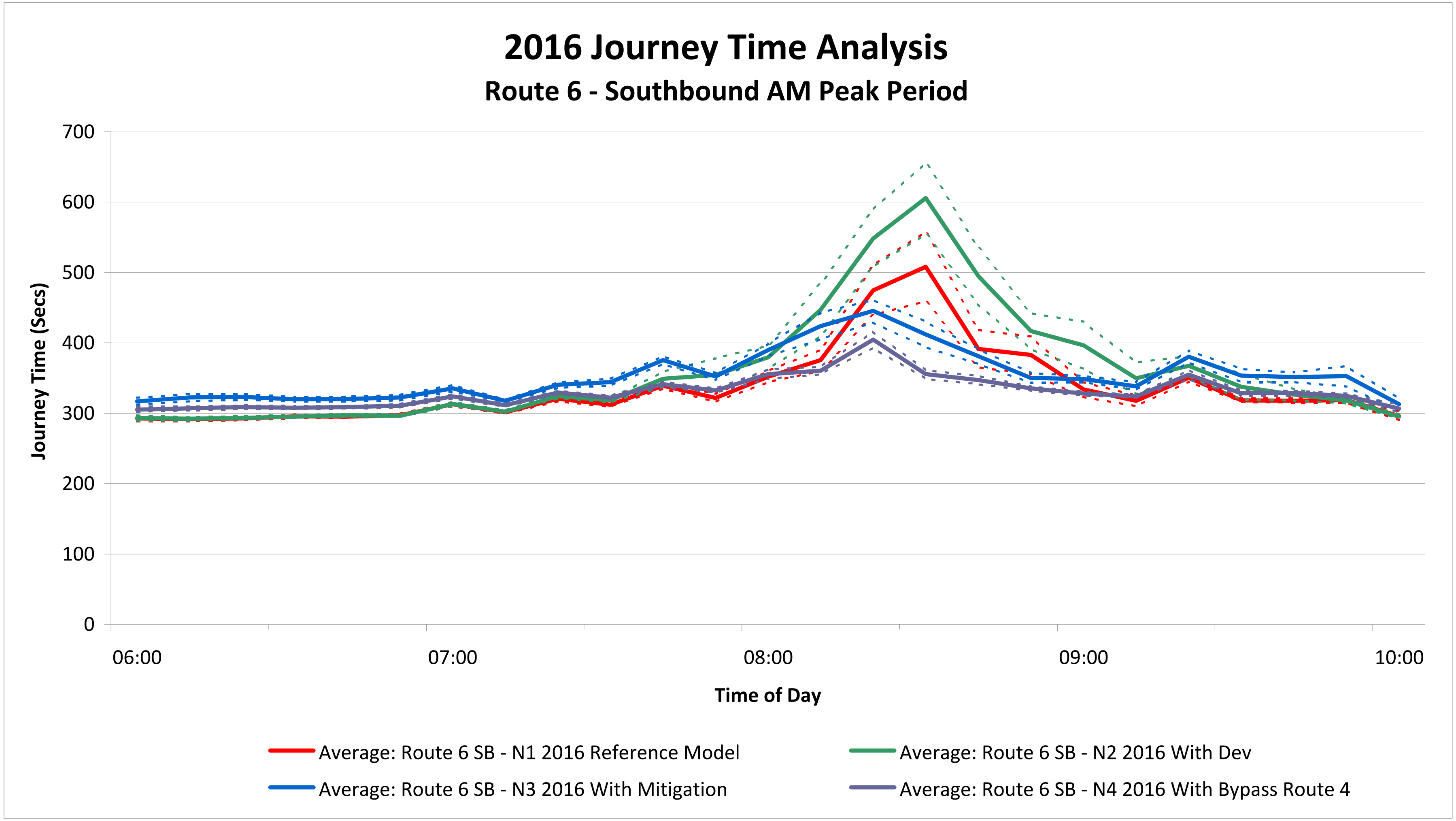

2016 Journey Time Analysis
Route 5 - Northbound
Journey Time (Secs)
0
200
400
600
800
1000
1200
1400
1600
1800
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 NB - N1 2016 Reference Model
Average: Route 5 NB - N2 2016 With Dev
Average: Route 5 NB - N3 2016 With Mitigation
Average: Route 5 NB - N4 2016 With Bypass Route 4

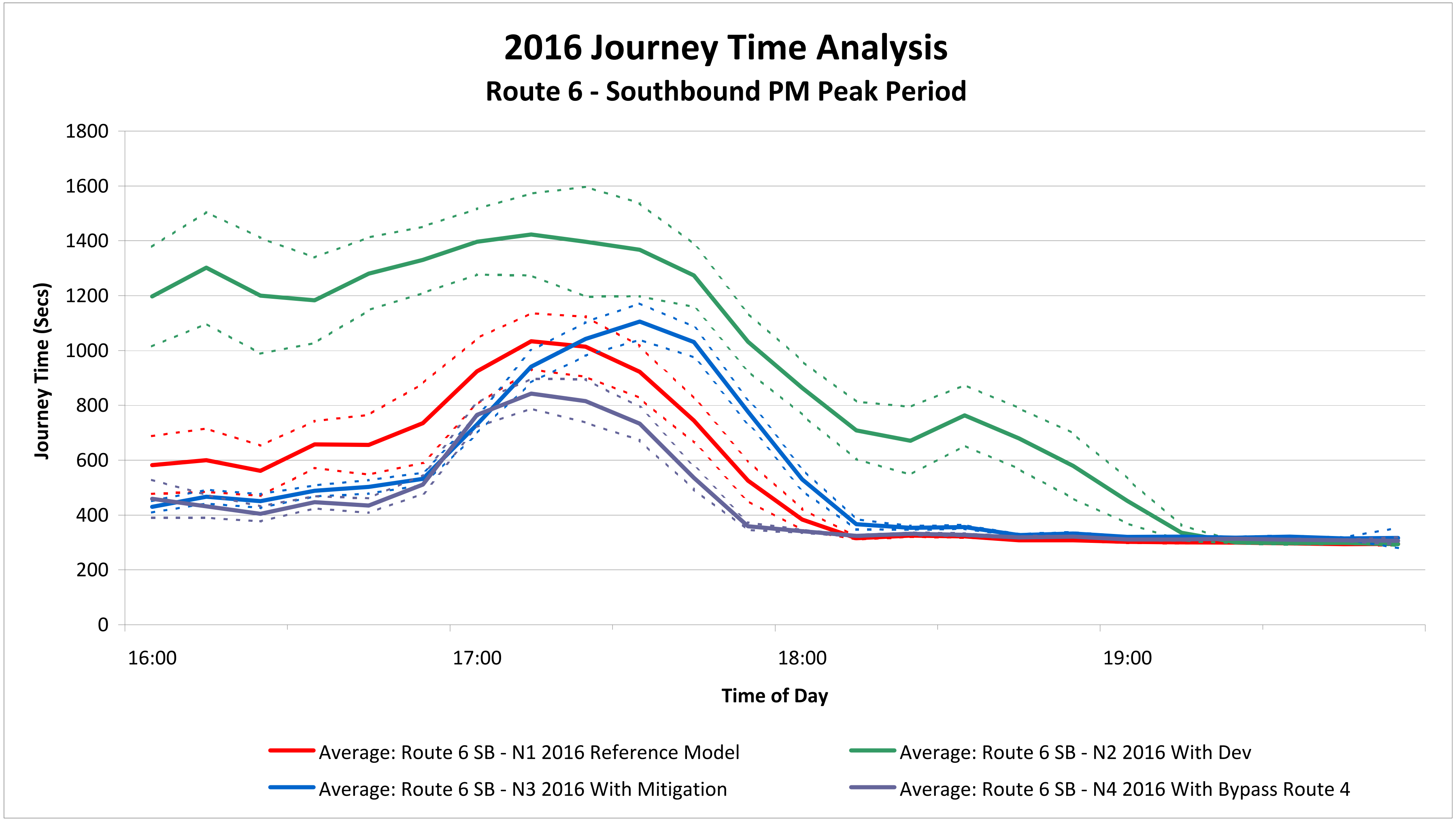


2016 Journey Time Analysis
Route 5 - Northbound AM Peak Period
800
700
600
500
400
300
200
100
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 5 NB - N1 2016 Reference Model
Average: Route 5 NB - N2 2016 With Dev
Average: Route 5 NB - N3 2016 With Mitigation
Average: Route 5 NB - N4 2016 With Bypass Route 4

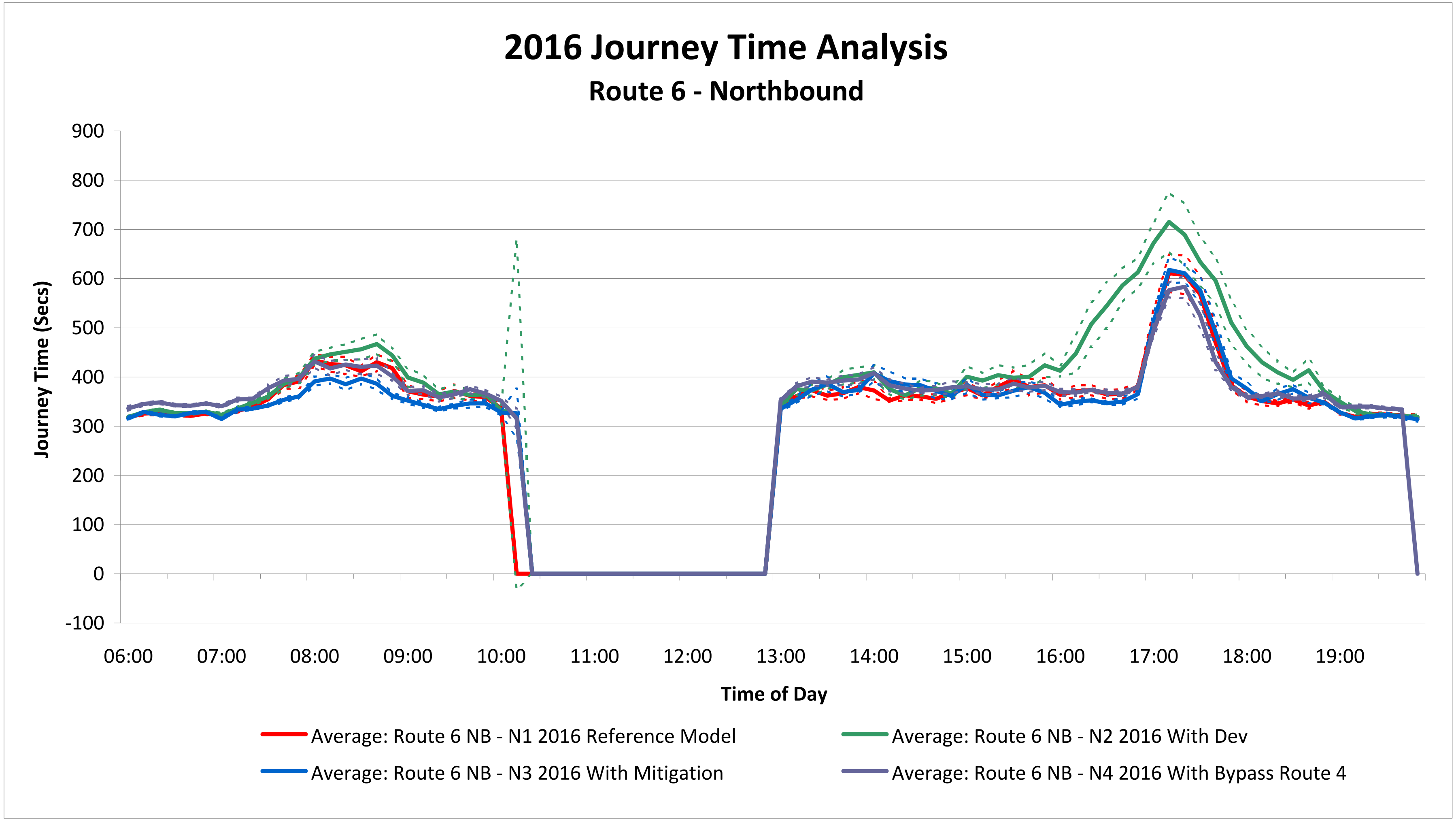

2016 Journey Time Analysis
Route 5 - Northbound PM Peak Period
1800
1600
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 NB - N1 2016 Reference Model
Average: Route 5 NB - N2 2016 With Dev
Average: Route 5 NB - N3 2016 With Mitigation
Average: Route 5 NB - N4 2016 With Bypass Route 4

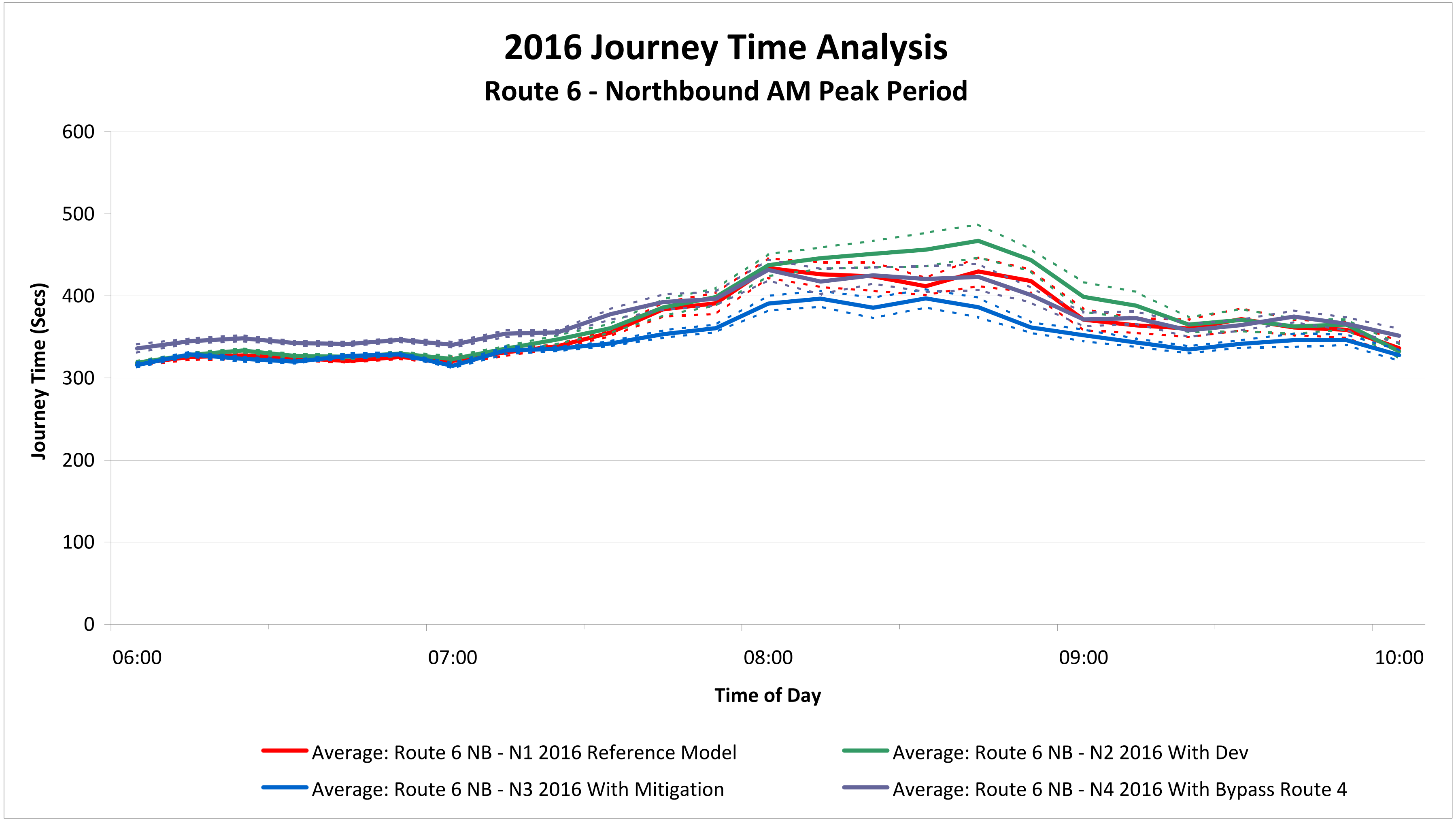

2016 Journey Time Analysis
Route 6 - Southbound
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 SB - N1 2016 Reference Model
Average: Route 6 SB - N2 2016 With Dev
Average: Route 6 SB - N3 2016 With Mitigation
Average: Route 6 SB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 6 - Southbound AM Peak Period
Journey Time (Secs)
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 6 SB - N1 2016 Reference Model
Average: Route 6 SB - N2 2016 With Dev
Average: Route 6 SB - N3 2016 With Mitigation
Average: Route 6 SB - N4 2016 With Bypass Route 4

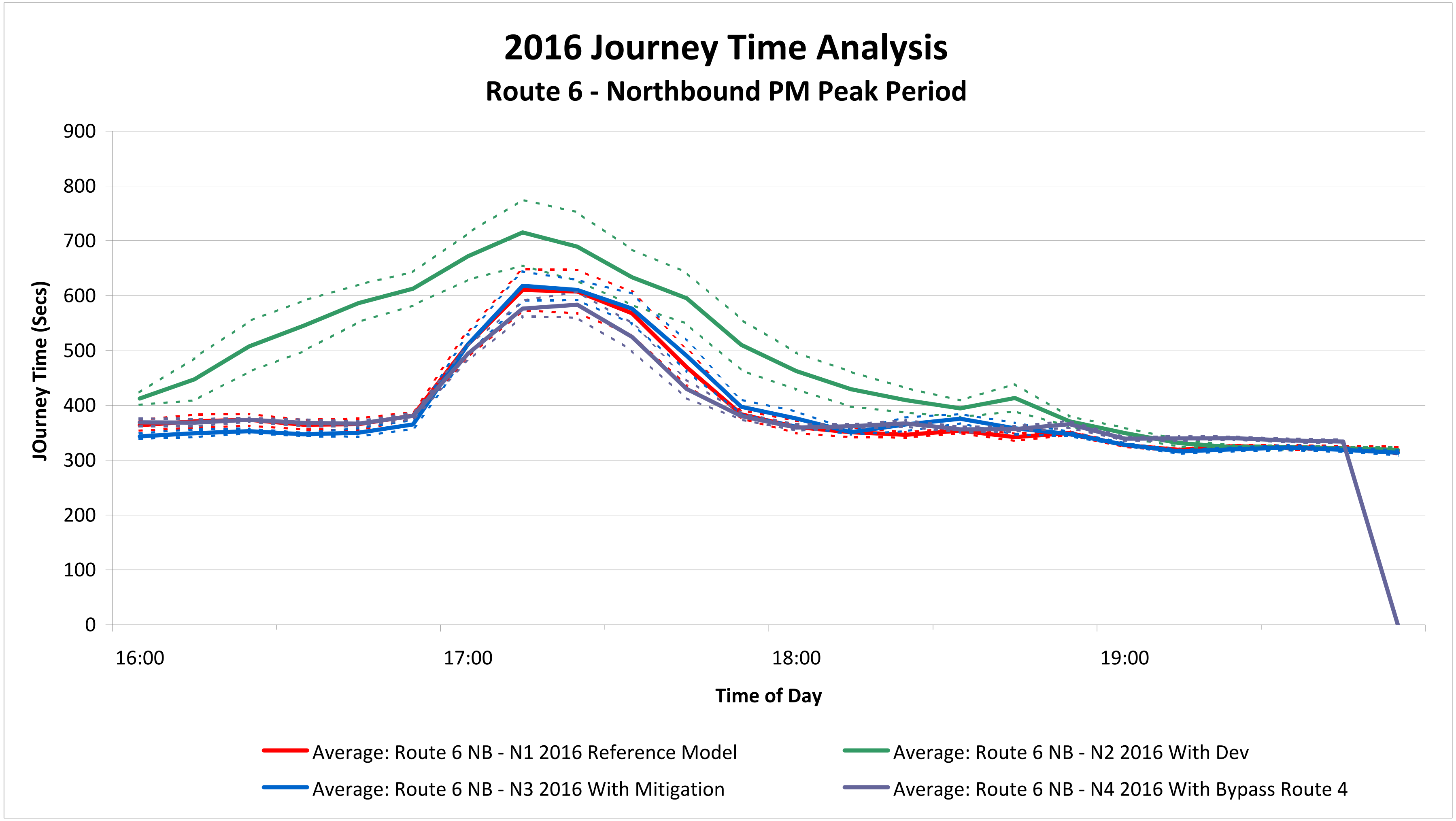


2016 Journey Time Analysis
Route 6 - Southbound PM Peak Period
1800
1600
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 SB - N1 2016 Reference Model
Average: Route 6 SB - N2 2016 With Dev
Average: Route 6 SB - N3 2016 With Mitigation
Average: Route 6 SB - N4 2016 With Bypass Route 4

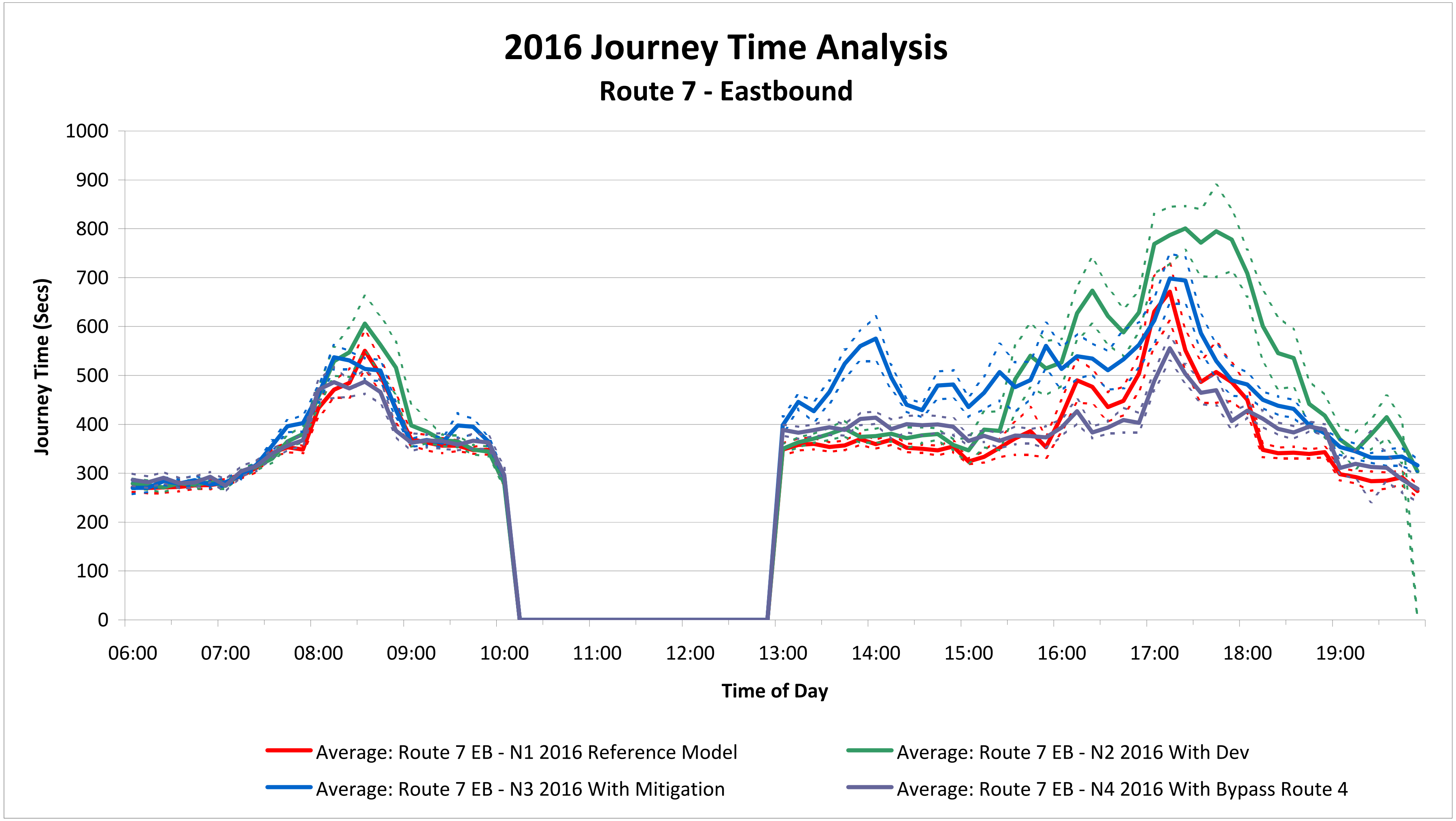

2016 Journey Time Analysis
Route 6 - Northbound
Journey Time (Secs)
900
800
700
600
500
400
300
200
100
0
-100
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 NB - N1 2016 Reference Model
Average: Route 6 NB - N2 2016 With Dev
Average: Route 6 NB - N3 2016 With Mitigation
Average: Route 6 NB - N4 2016 With Bypass Route 4



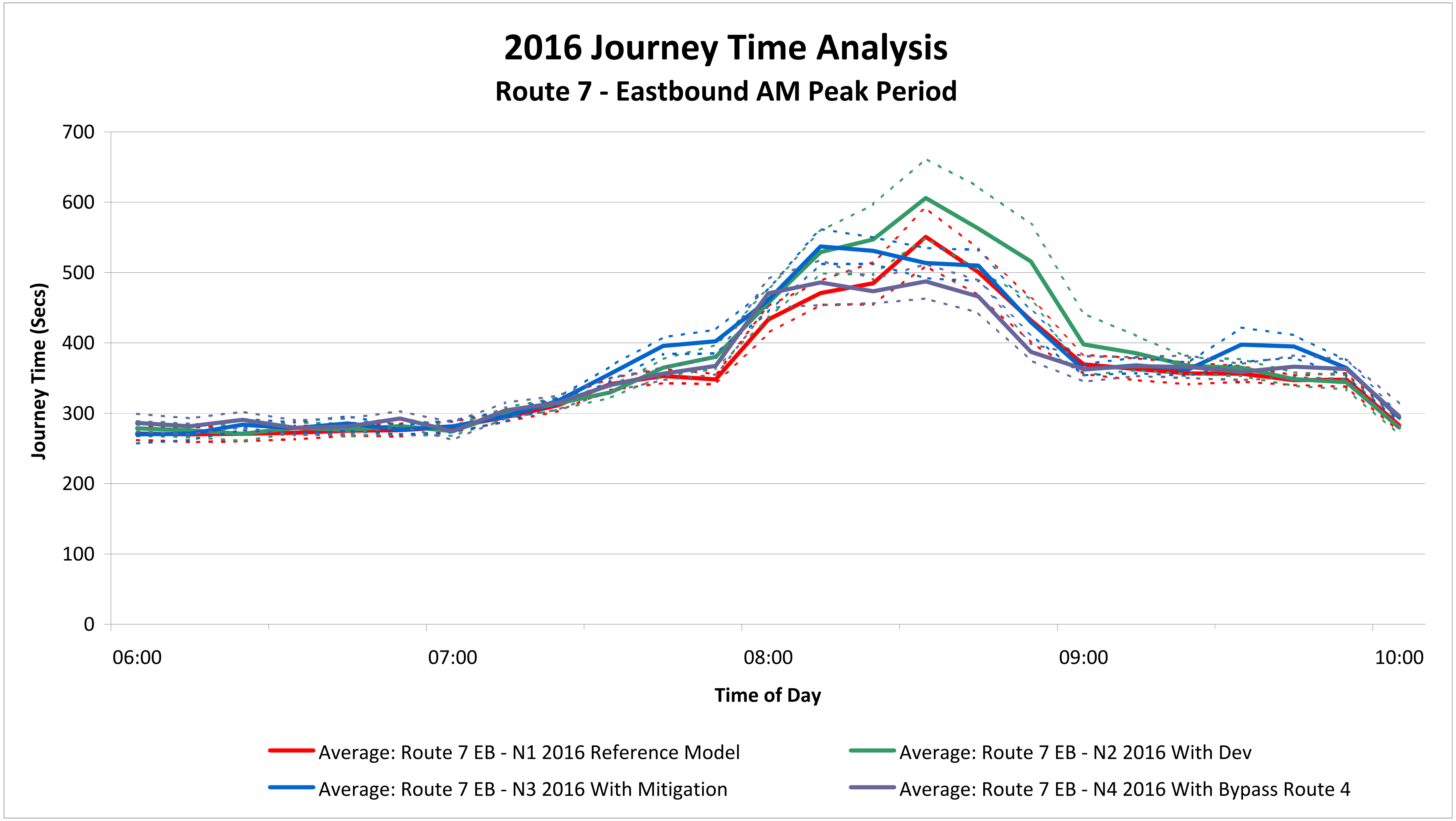
2016 Journey Time Analysis
Route 6 - Northbound AM Peak Period
600
500
400
300
200
100
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 6 NB - N1 2016 Reference Model
Average: Route 6 NB - N2 2016 With Dev
Average: Route 6 NB - N3 2016 With Mitigation
Average: Route 6 NB - N4 2016 With Bypass Route 4

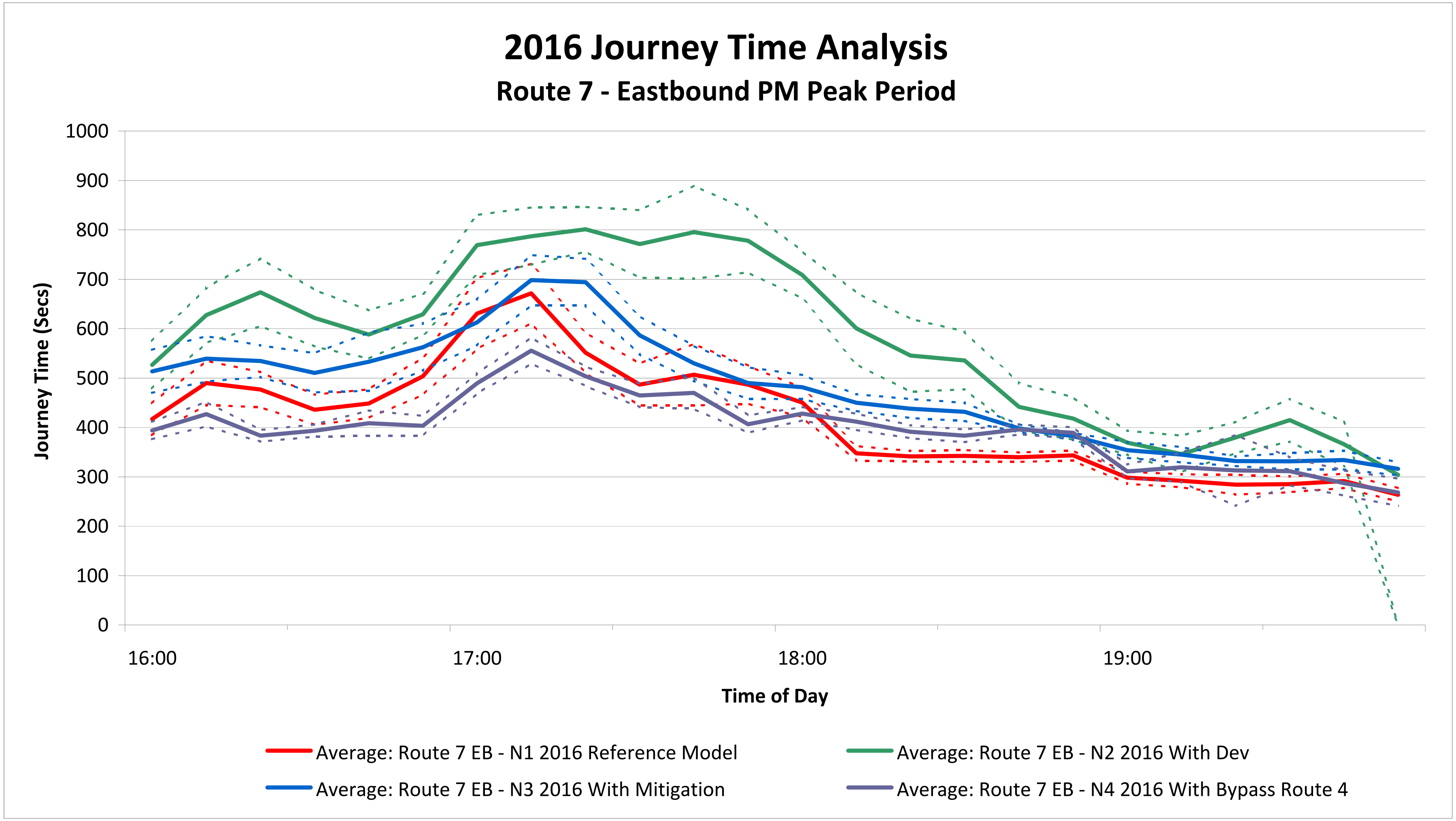


2016 Journey Time Analysis
Route 6 - Northbound PM Peak Period
JOurney Time (Secs)
900
800
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 NB - N1 2016 Reference Model
Average: Route 6 NB - N2 2016 With Dev
Average: Route 6 NB - N3 2016 With Mitigation
Average: Route 6 NB - N4 2016 With Bypass Route 4

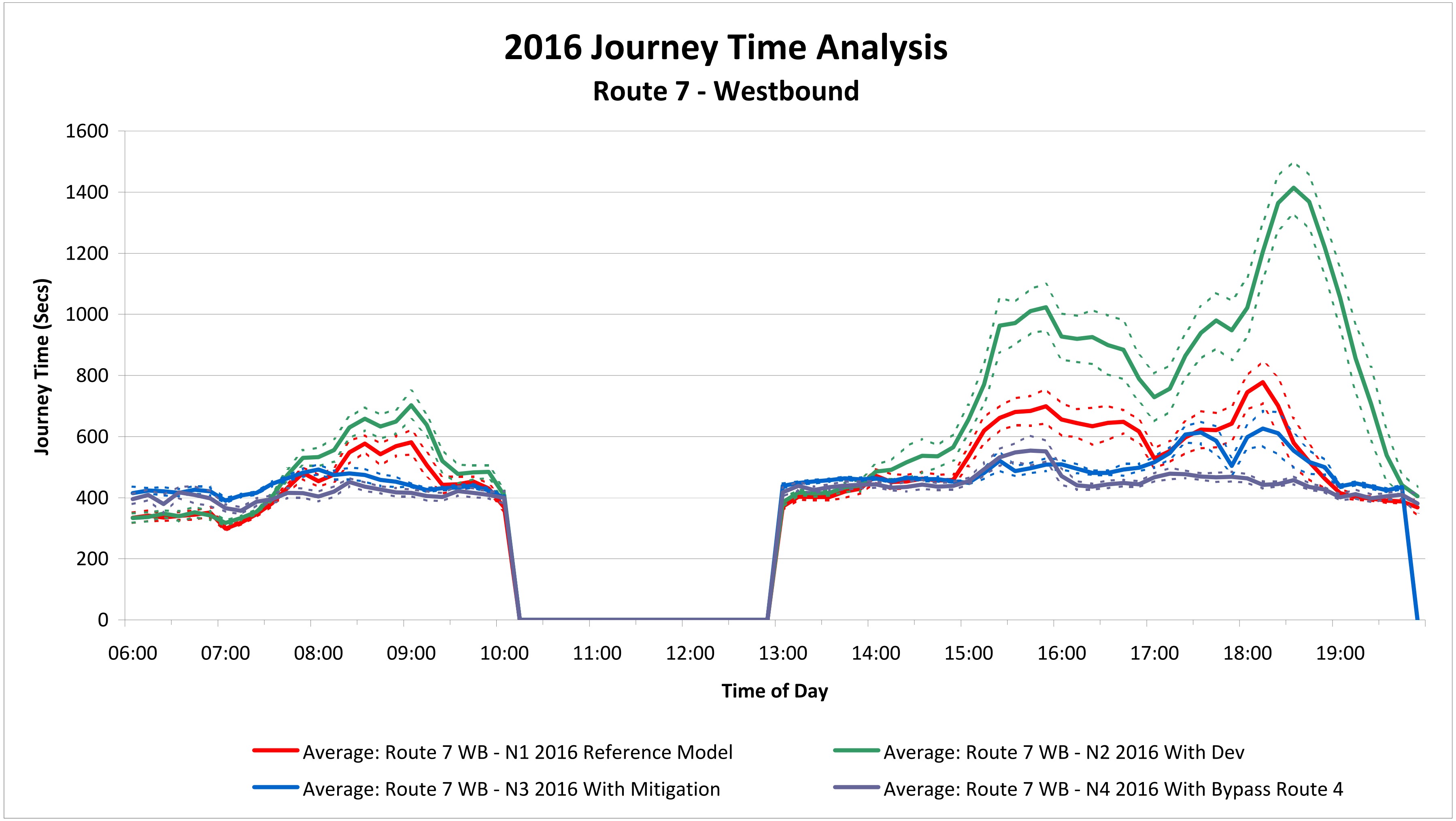


2016 Journey Time Analysis
Route 7 - Eastbound
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 EB - N1 2016 Reference Model
Average: Route 7 EB - N2 2016 With Dev
Average: Route 7 EB - N3 2016 With Mitigation
Average: Route 7 EB - N4 2016 With Bypass Route 4

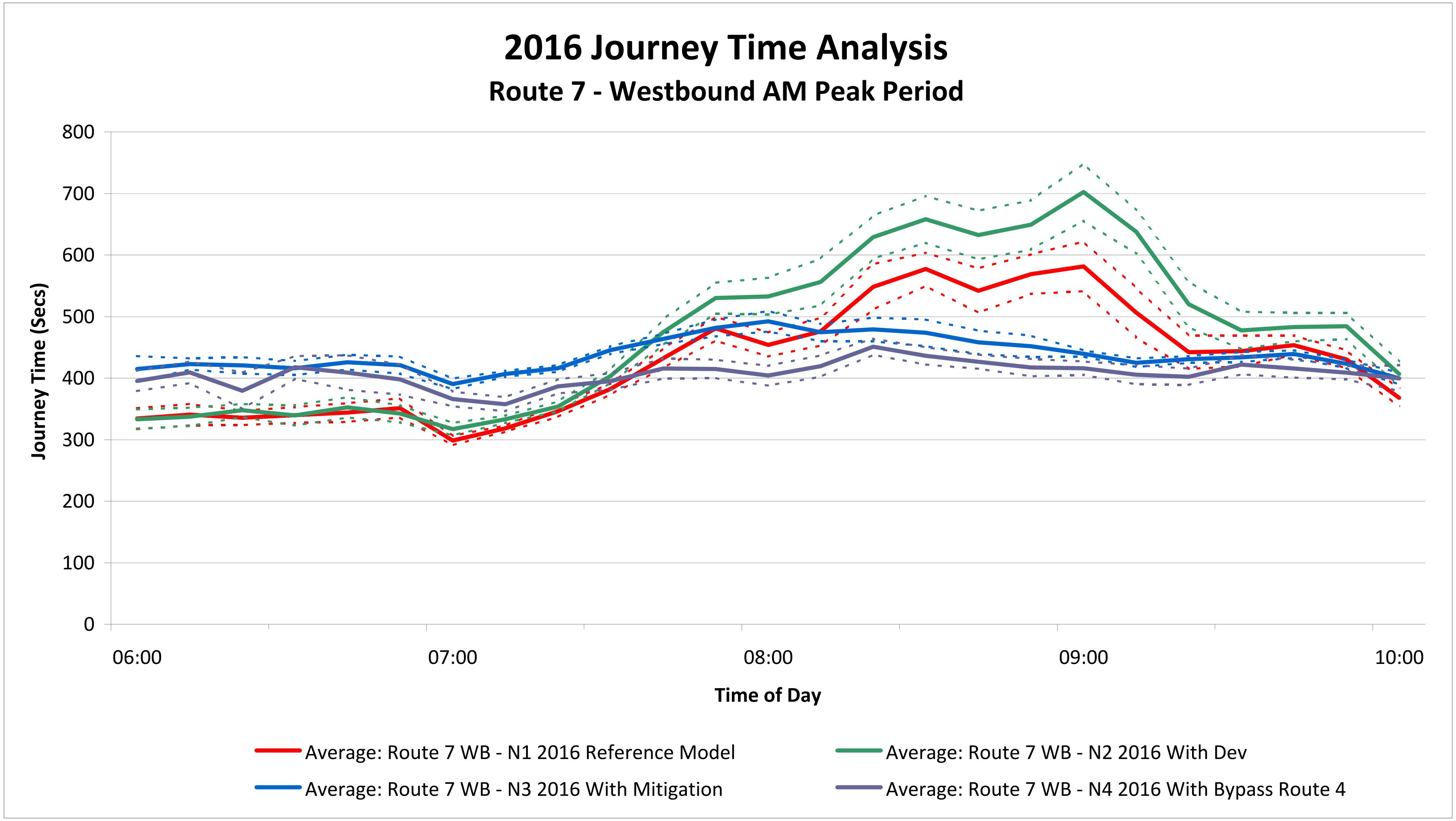

2016 Journey Time Analysis
Route 7 - Eastbound AM Peak Period
Journey Time (Secs)
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 7 EB - N1 2016 Reference Model
Average: Route 7 EB - N2 2016 With Dev
Average: Route 7 EB - N3 2016 With Mitigation
Average: Route 7 EB - N4 2016 With Bypass Route 4



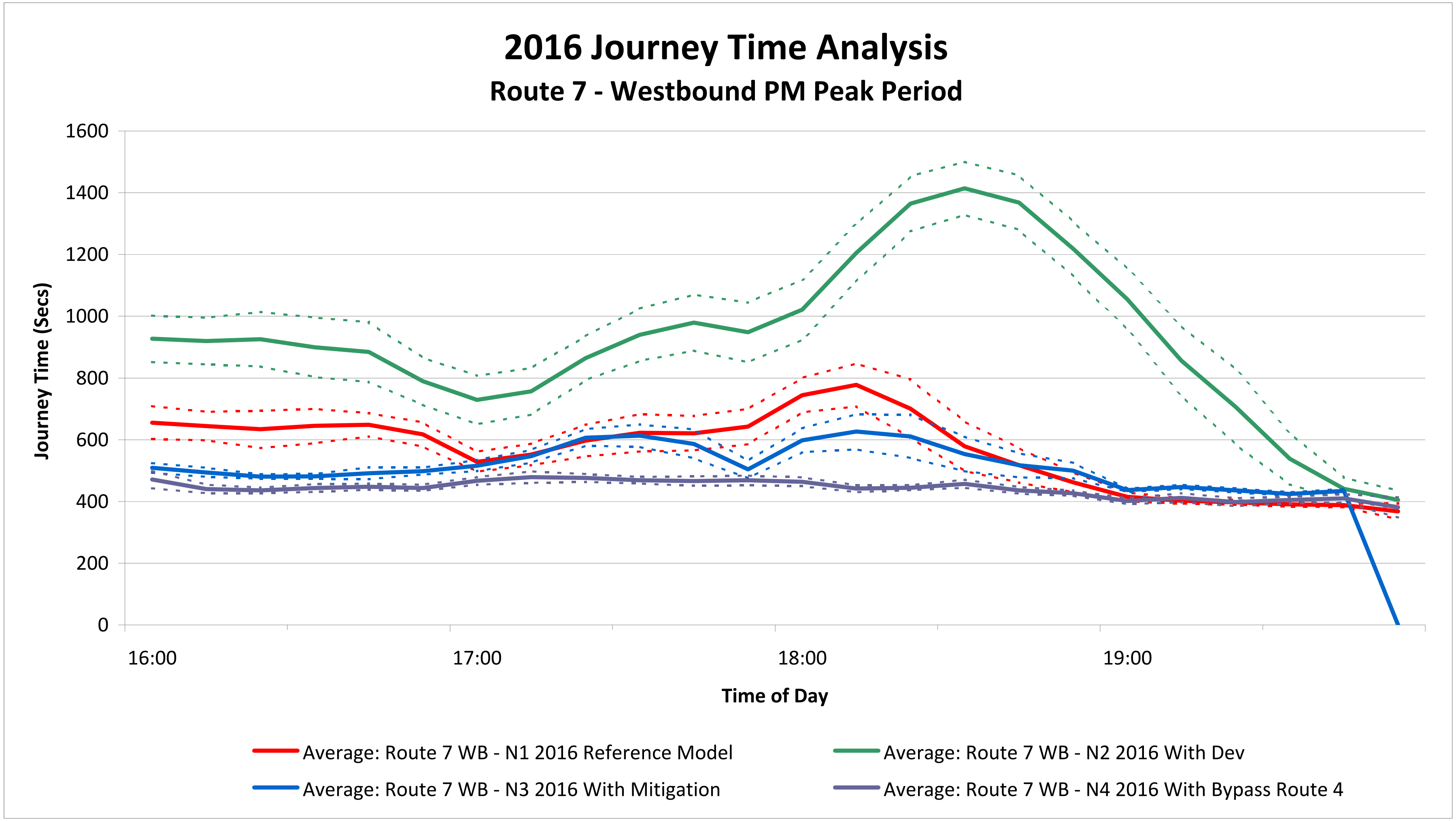
2016 Journey Time Analysis
Route 7 - Eastbound PM Peak Period
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 EB - N1 2016 Reference Model
Average: Route 7 EB - N2 2016 With Dev
Average: Route 7 EB - N3 2016 With Mitigation
Average: Route 7 EB - N4 2016 With Bypass Route 4



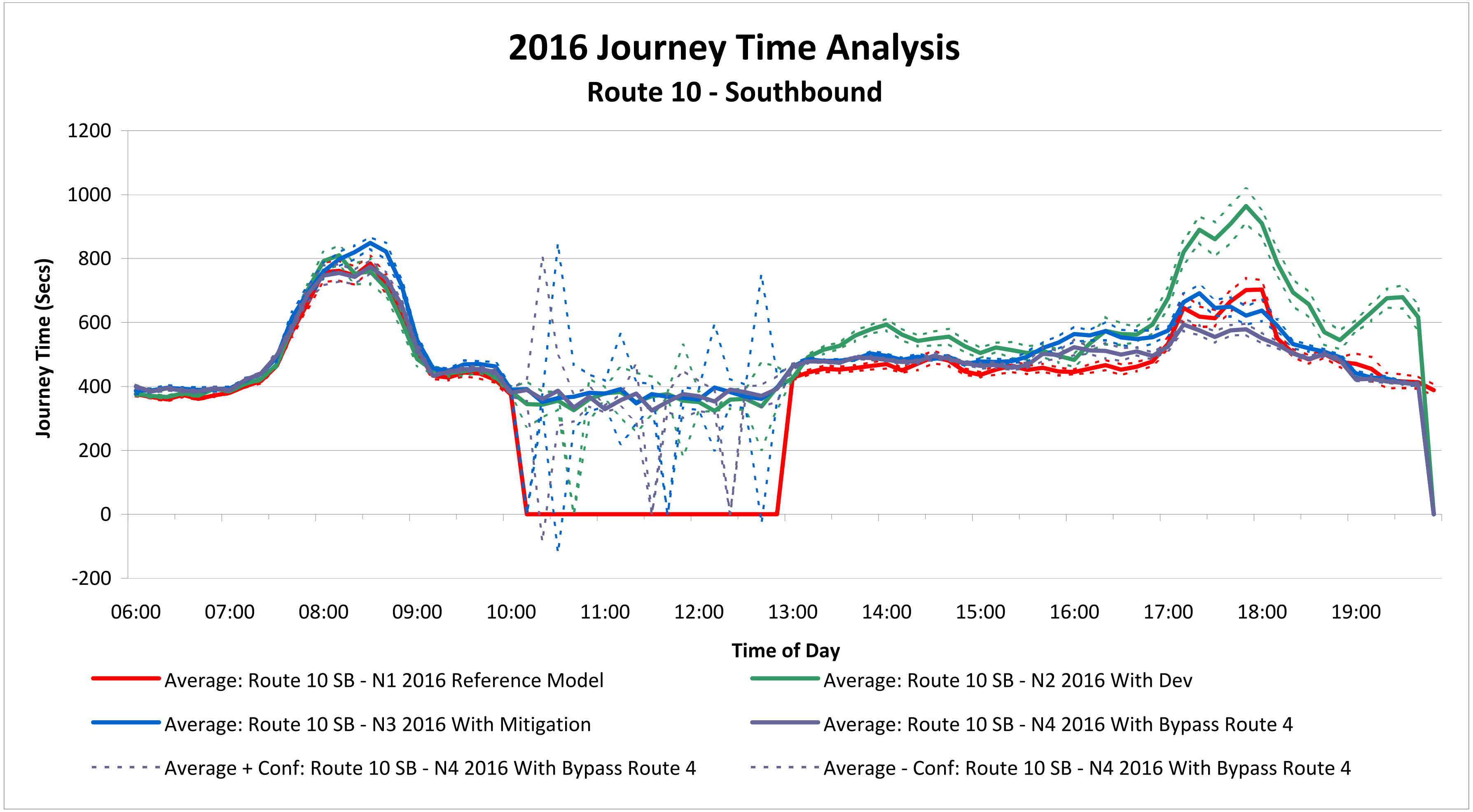
2016 Journey Time Analysis
Route 7 - Westbound
1600
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 WB - N1 2016 Reference Model
Average: Route 7 WB - N2 2016 With Dev
Average: Route 7 WB - N3 2016 With Mitigation
Average: Route 7 WB - N4 2016 With Bypass Route 4

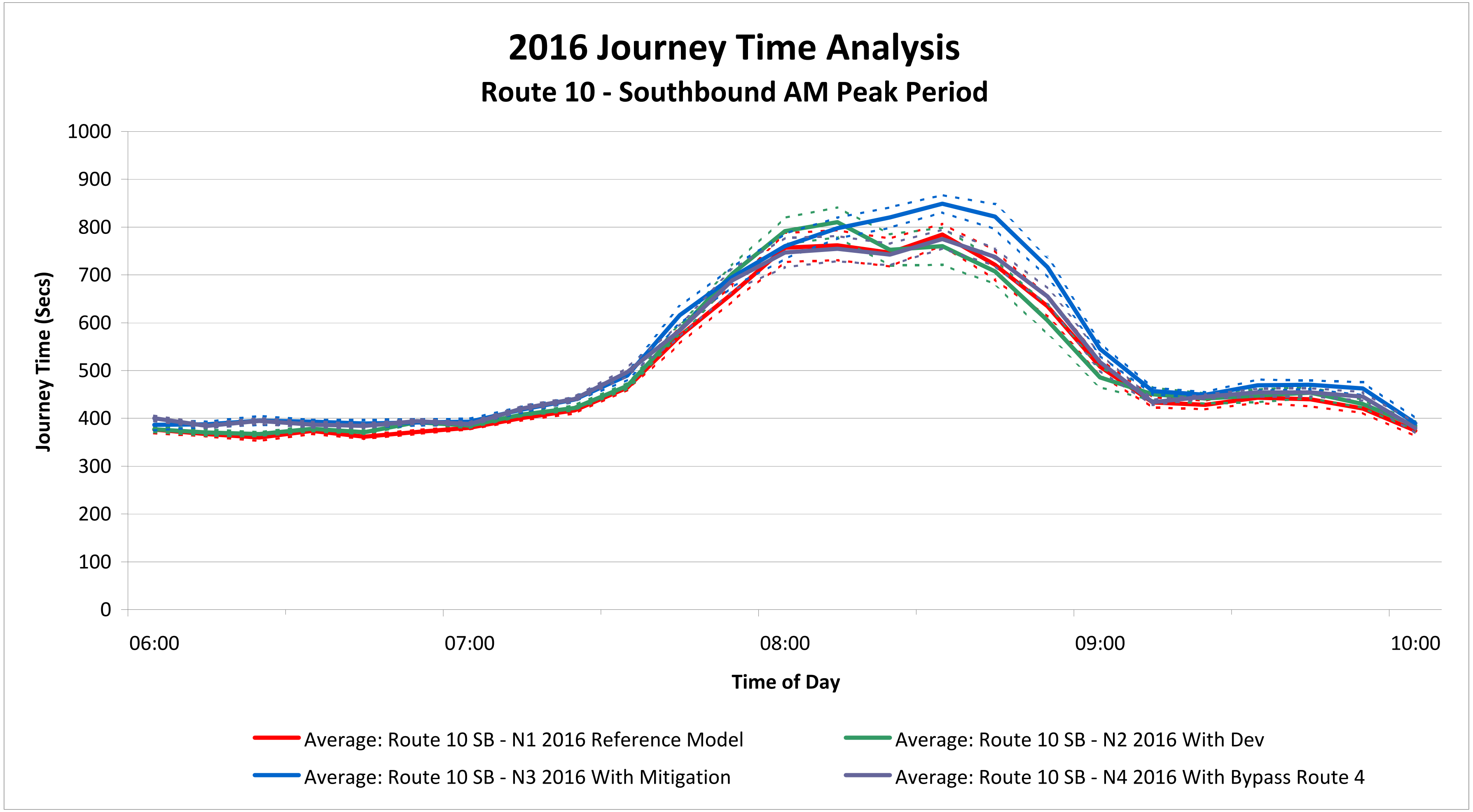


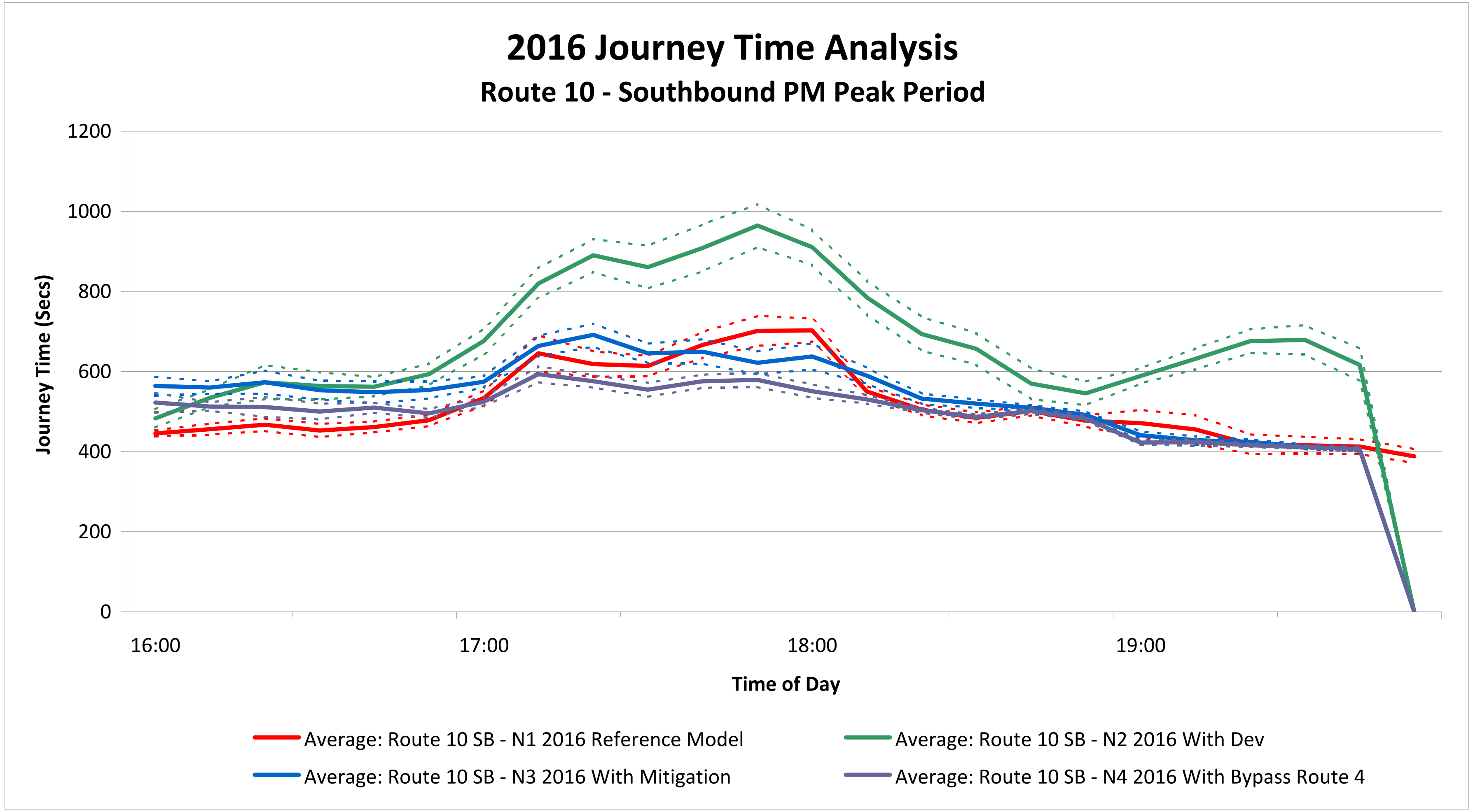
2016 Journey Time Analysis
Route 7 - Westbound AM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 7 WB - N1 2016 Reference Model
Average: Route 7 WB - N2 2016 With Dev
Average: Route 7 WB - N3 2016 With Mitigation
Average: Route 7 WB - N4 2016 With Bypass Route 4



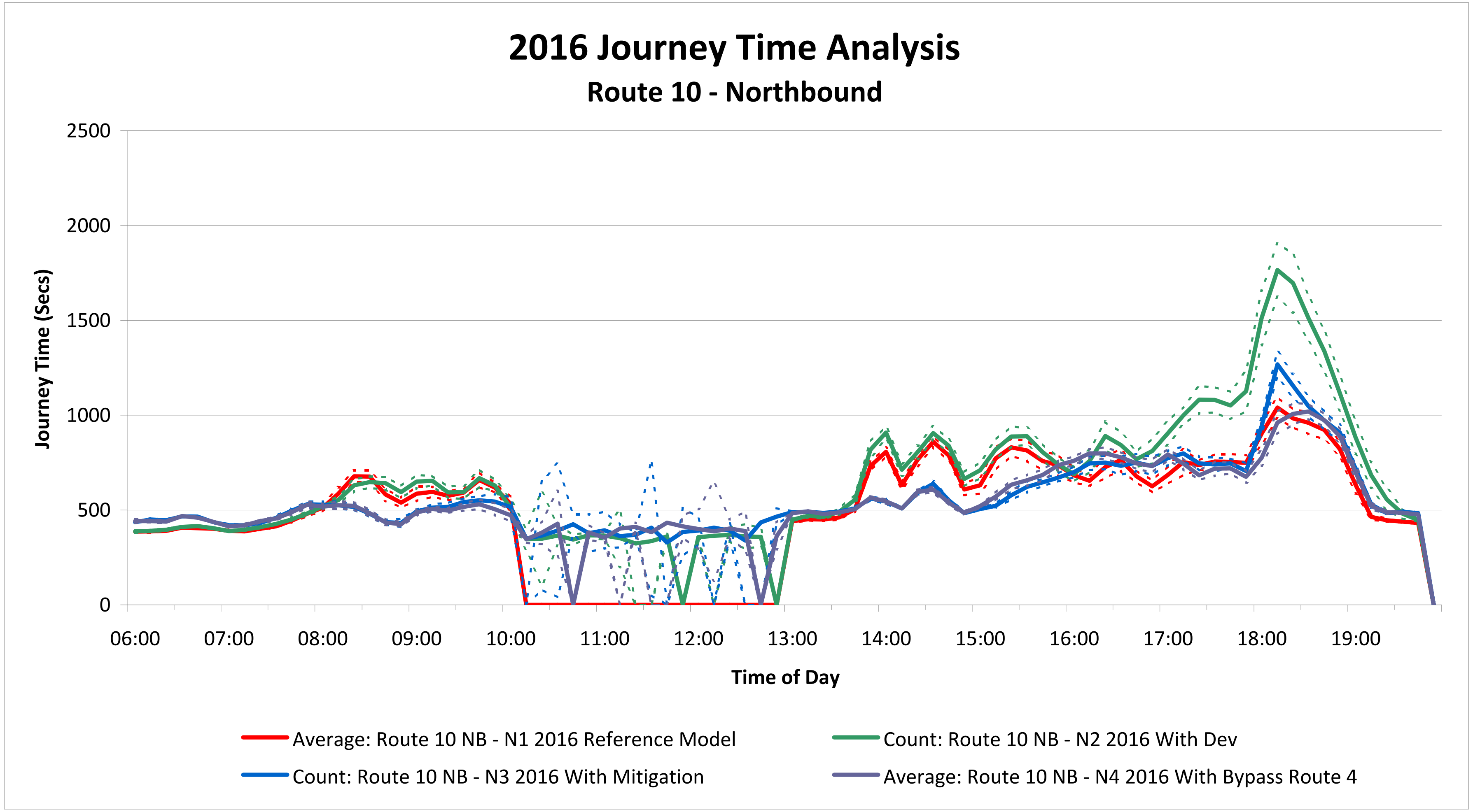
2016 Journey Time Analysis
Route 7 - Westbound PM Peak Period
Journey Time (Secs)
1600
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 WB - N1 2016 Reference Model
Average: Route 7 WB - N2 2016 With Dev
Average: Route 7 WB - N3 2016 With Mitigation
Average: Route 7 WB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 10 - Southbound
Journey Time (Secs)
1200
1000
800
600
400
200
0
-200
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 SB - N1 2016 Reference Model
Average: Route 10 SB - N2 2016 With Dev
Average: Route 10 SB - N3 2016 With Mitigation
Average: Route 10 SB - N4 2016 With Bypass Route 4
Average + Conf: Route 10 SB - N4 2016 With Bypass Route 4
Average - Conf: Route 10 SB - N4 2016 With Bypass Route 4

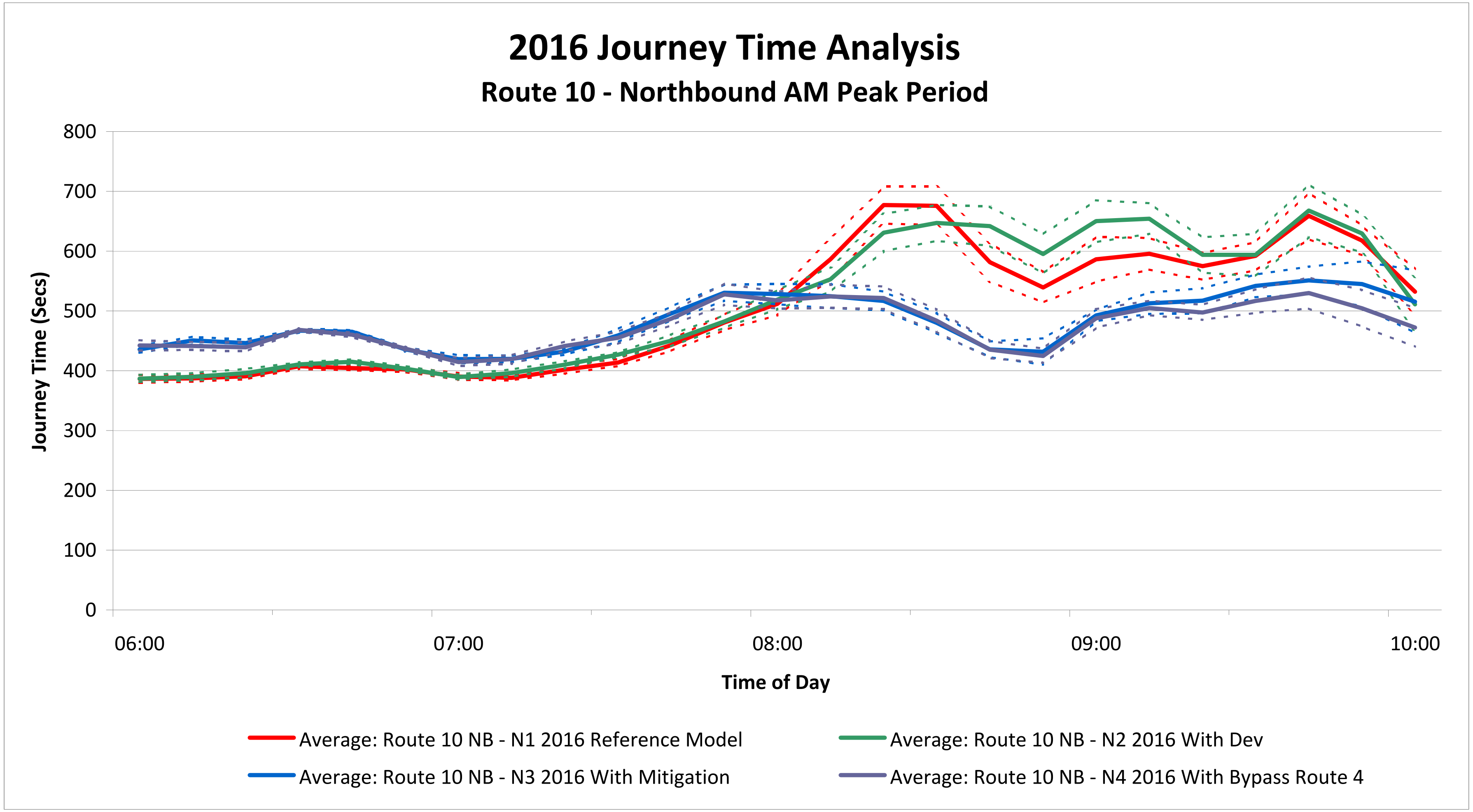

2016 Journey Time Analysis
Route 10 - Southbound AM Peak Period
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 10 SB - N1 2016 Reference Model
Average: Route 10 SB - N2 2016 With Dev
Average: Route 10 SB - N3 2016 With Mitigation
Average: Route 10 SB - N4 2016 With Bypass Route 4



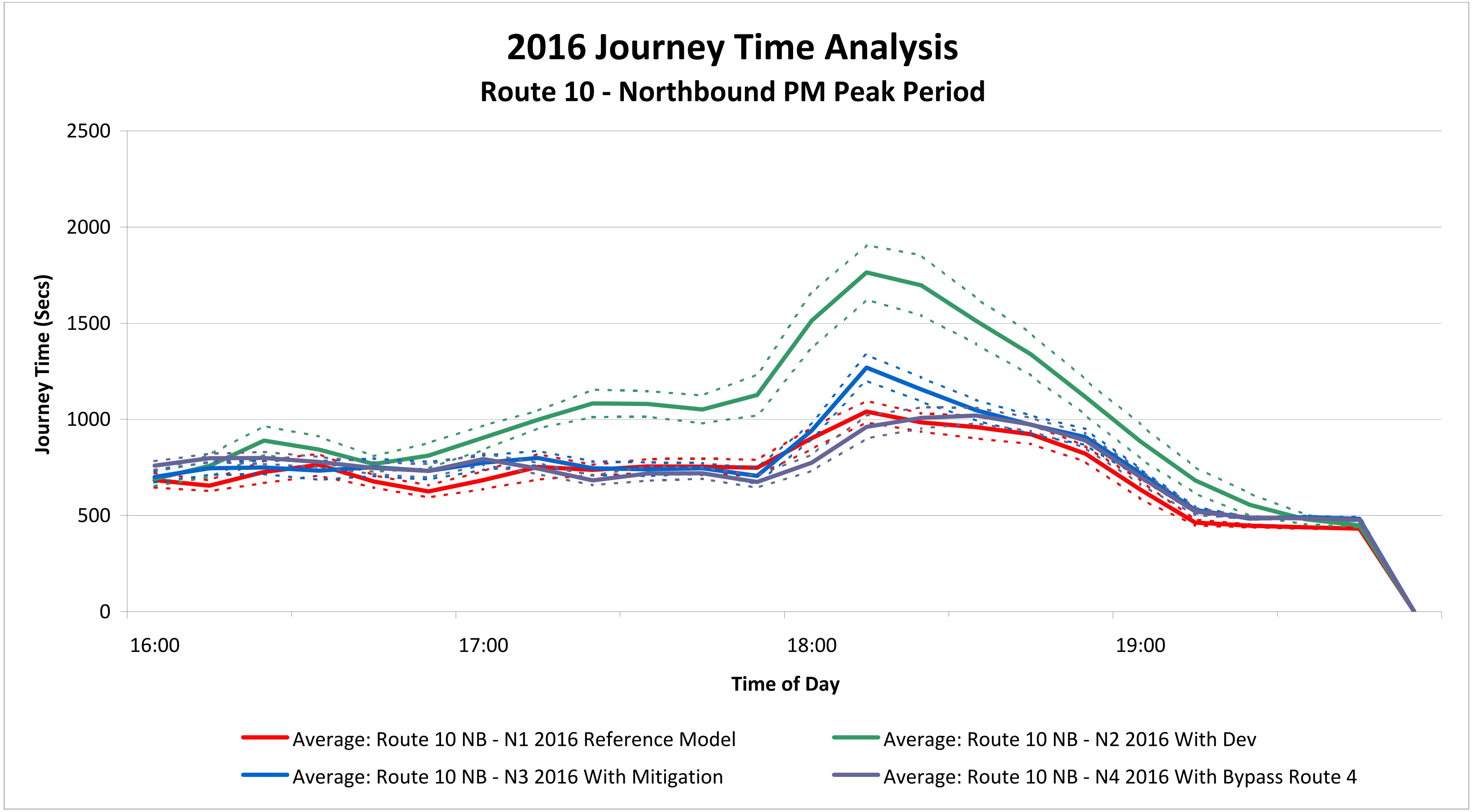
2016 Journey Time Analysis
Route 10 - Southbound PM Peak Period
Journey Time (Secs)
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 SB - N1 2016 Reference Model
Average: Route 10 SB - N2 2016 With Dev
Average: Route 10 SB - N3 2016 With Mitigation
Average: Route 10 SB - N4 2016 With Bypass Route 4



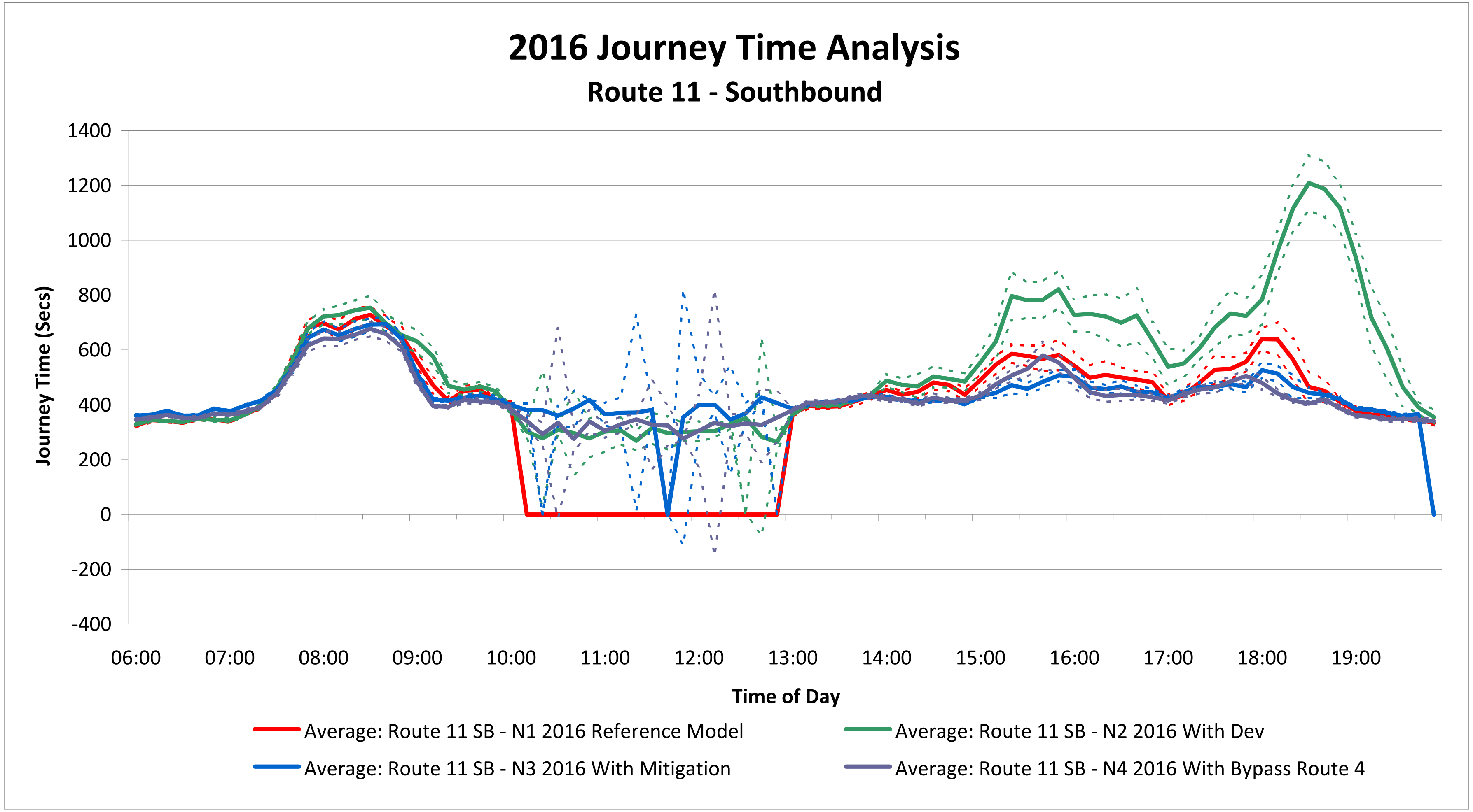
2016 Journey Time Analysis
Route 10 - Northbound
Journey Time (Secs)
2500
2000
1500
1000
500
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 NB - N1 2016 Reference Model
Count: Route 10 NB - N2 2016 With Dev
Count: Route 10 NB - N3 2016 With Mitigation
Average: Route 10 NB - N4 2016 With Bypass Route 4



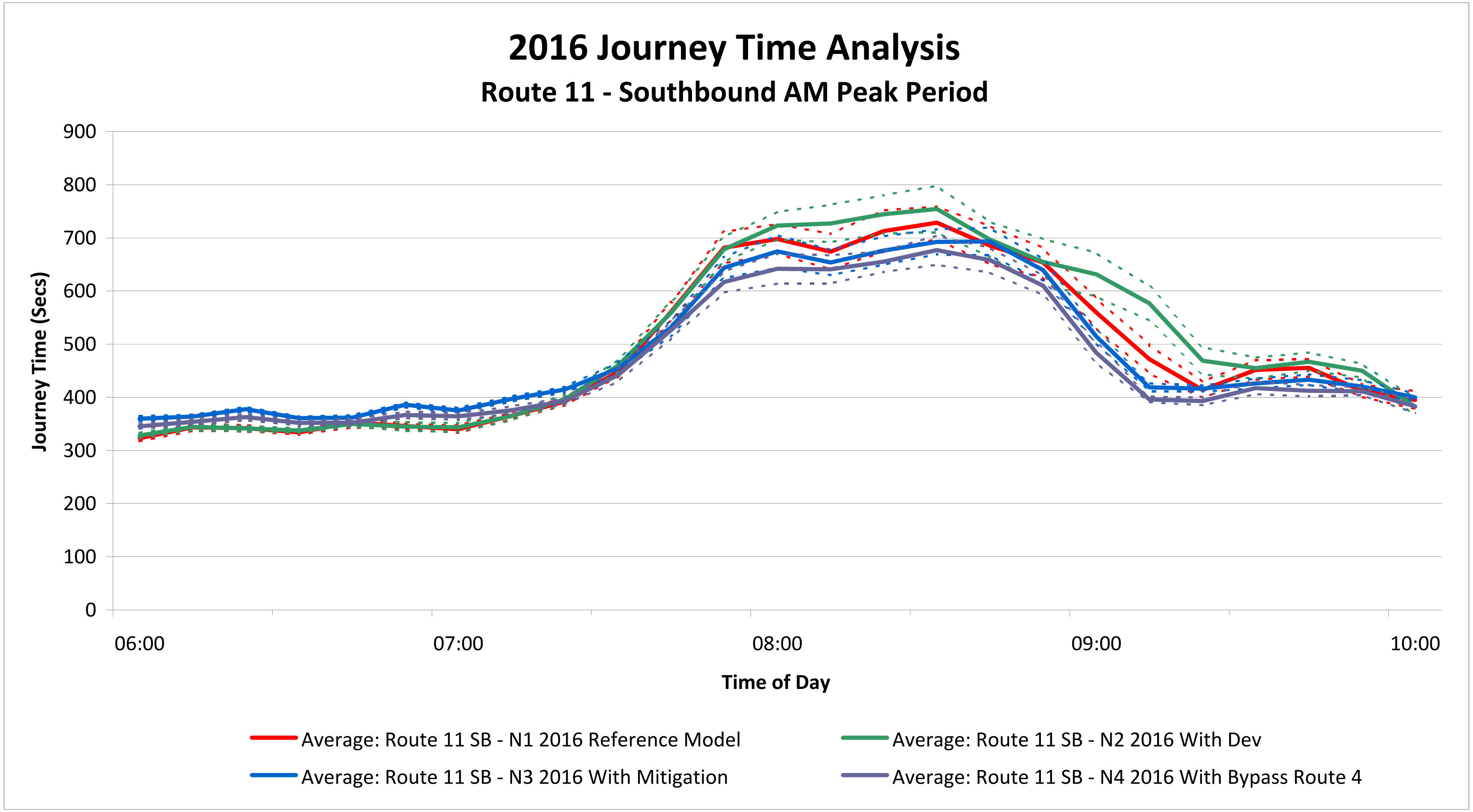
2016 Journey Time Analysis
Route 10 - Northbound AM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 10 NB - N1 2016 Reference Model
Average: Route 10 NB - N2 2016 With Dev
Average: Route 10 NB - N3 2016 With Mitigation
Average: Route 10 NB - N4 2016 With Bypass Route 4



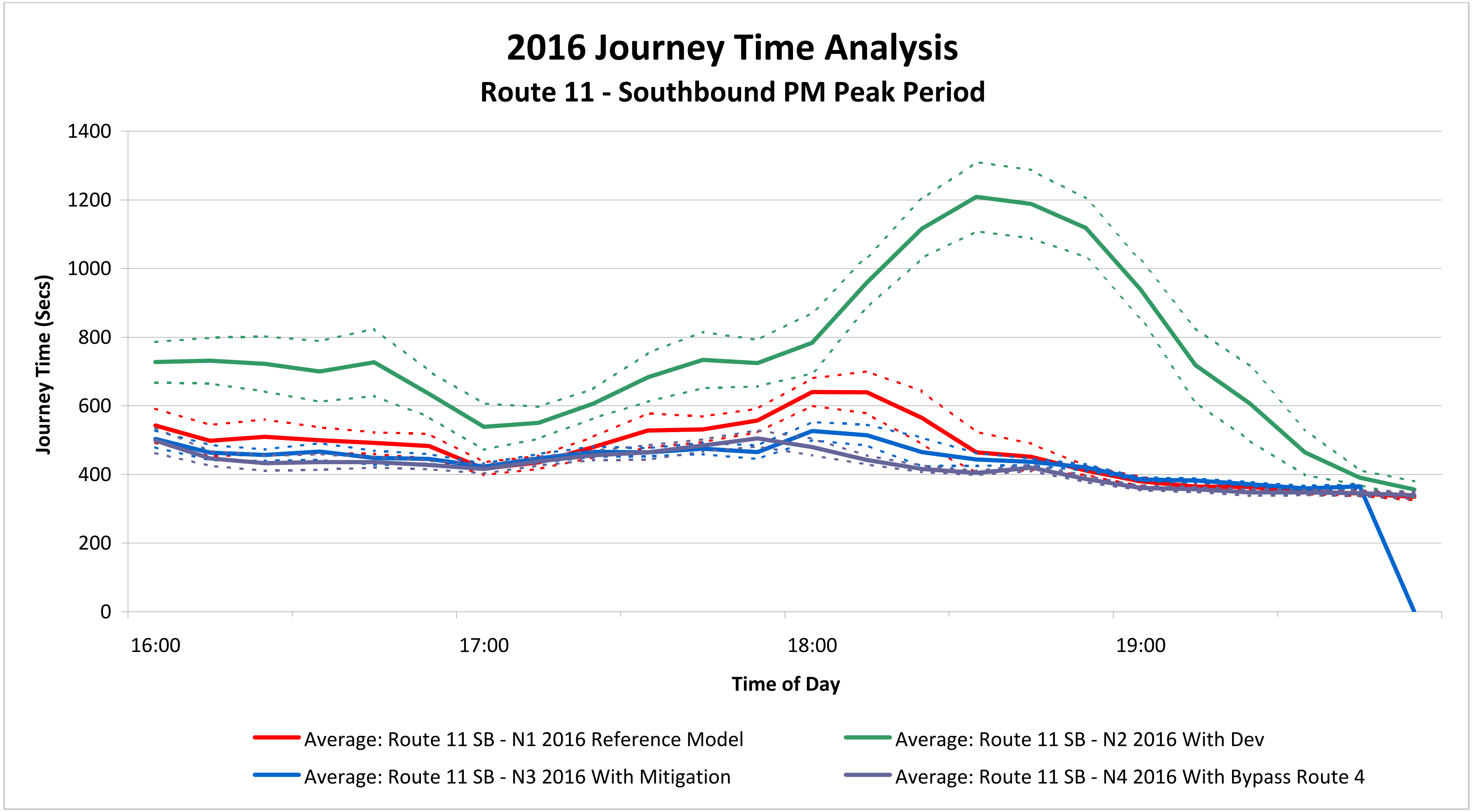
2016 Journey Time Analysis
Route 10 - Northbound PM Peak Period
Journey Time (Secs)
2500
2000
1500
1000
500
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 NB - N1 2016 Reference Model
Average: Route 10 NB - N2 2016 With Dev
Average: Route 10 NB - N3 2016 With Mitigation
Average: Route 10 NB - N4 2016 With Bypass Route 4

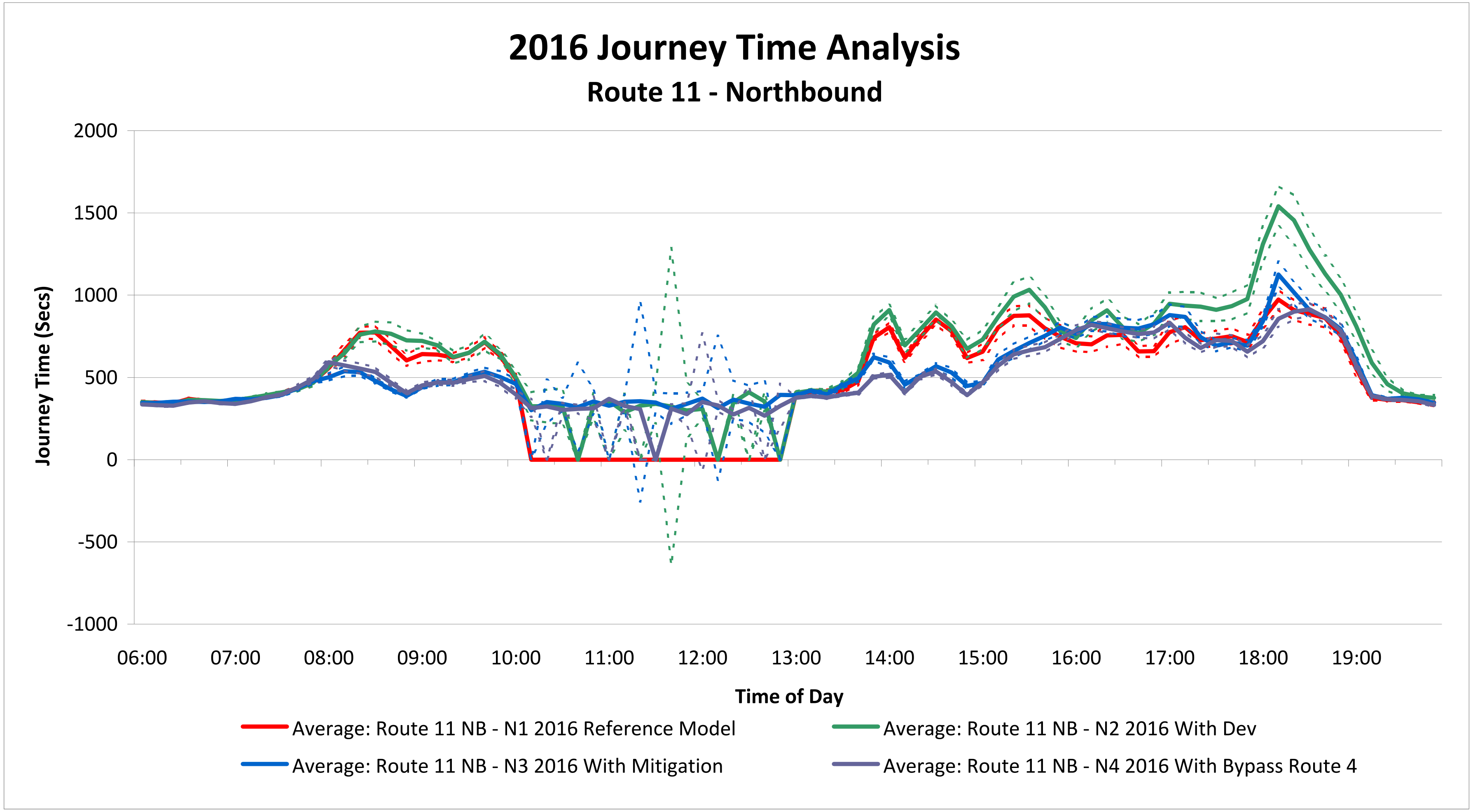


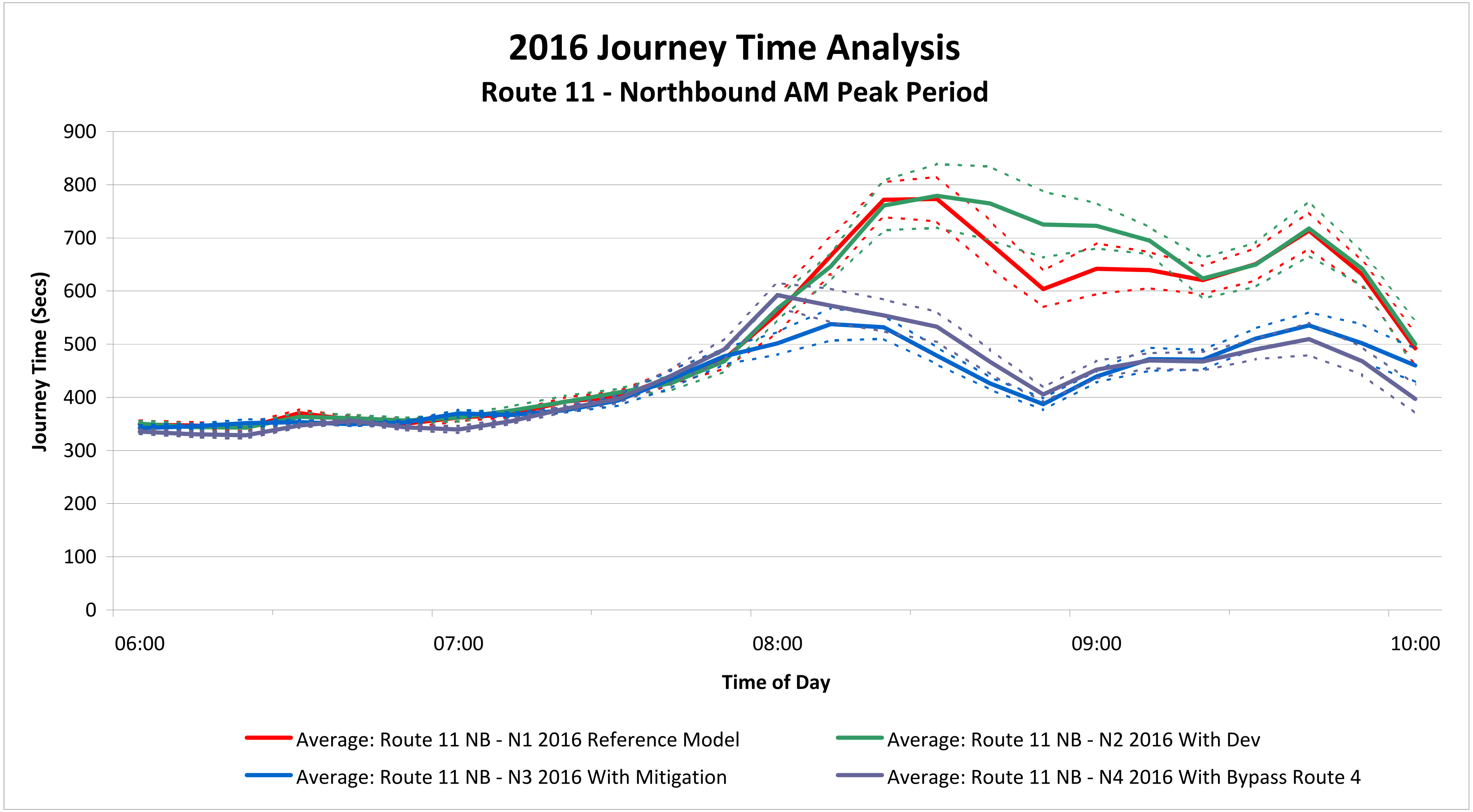
2016 Journey Time Analysis
Route 11 - Southbound
1400
1200
1000
800
600
400
200
0
-200
-400
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 SB - N1 2016 Reference Model
Average: Route 11 SB - N2 2016 With Dev
Average: Route 11 SB - N3 2016 With Mitigation
Average: Route 11 SB - N4 2016 With Bypass Route 4

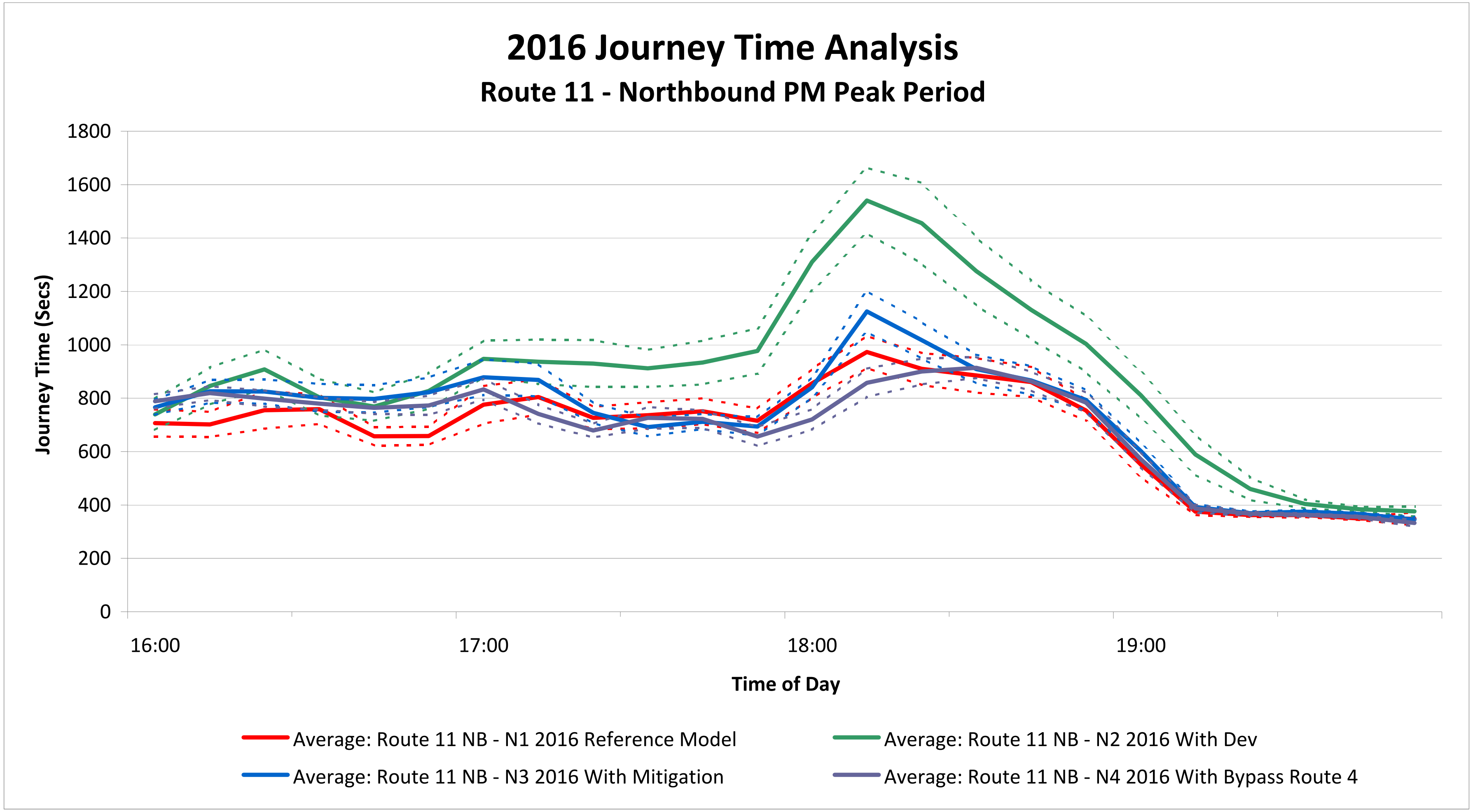


2016 Journey Time Analysis
Route 11 - Southbound AM Peak Period
Journey Time (Secs)
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 11 SB - N1 2016 Reference Model
Average: Route 11 SB - N2 2016 With Dev
Average: Route 11 SB - N3 2016 With Mitigation
Average: Route 11 SB - N4 2016 With Bypass Route 4

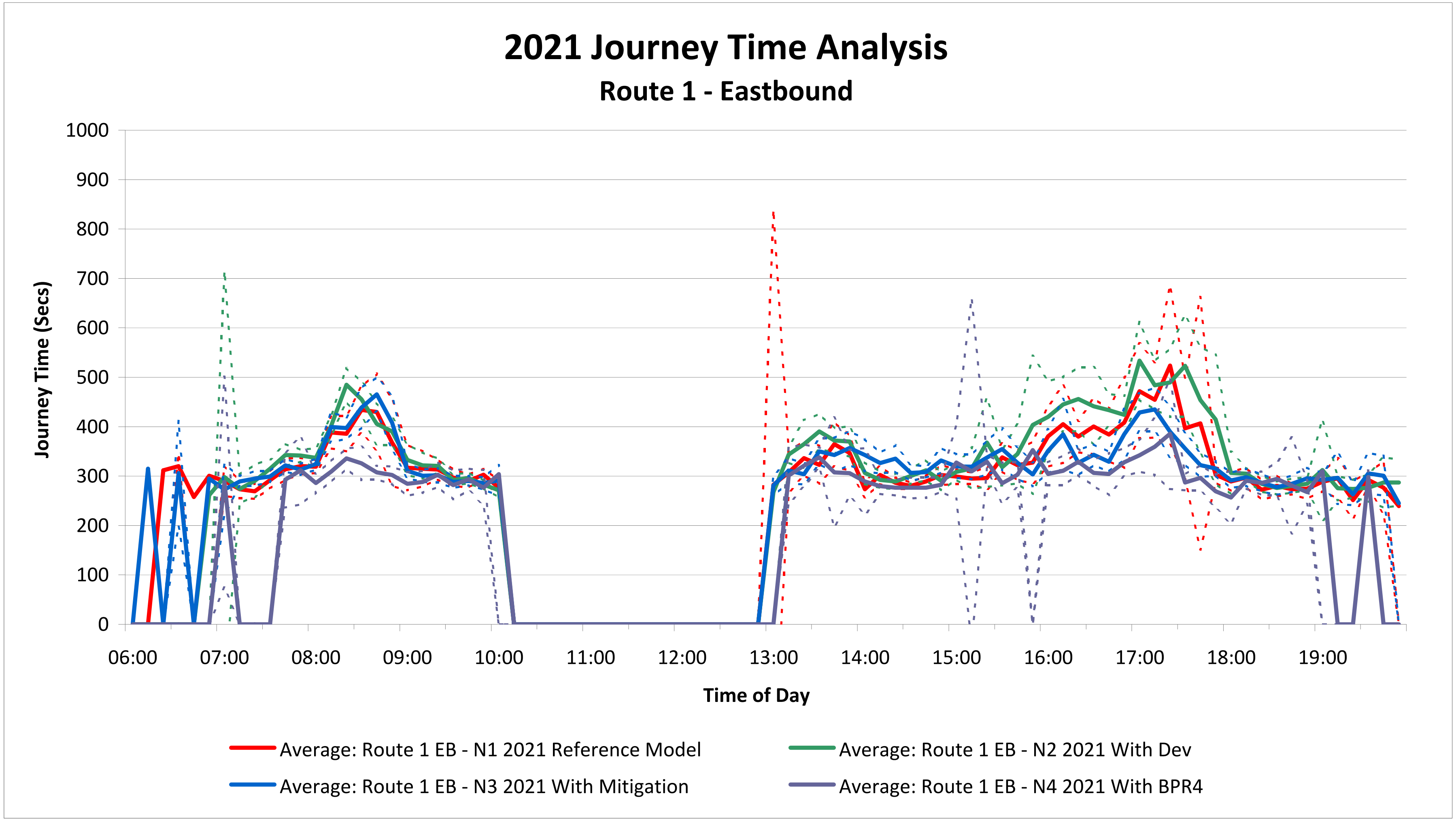

2016 Journey Time Analysis
Route 11 - Southbound PM Peak Period
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 SB - N1 2016 Reference Model
Average: Route 11 SB - N2 2016 With Dev
Average: Route 11 SB - N3 2016 With Mitigation
Average: Route 11 SB - N4 2016 With Bypass Route 4

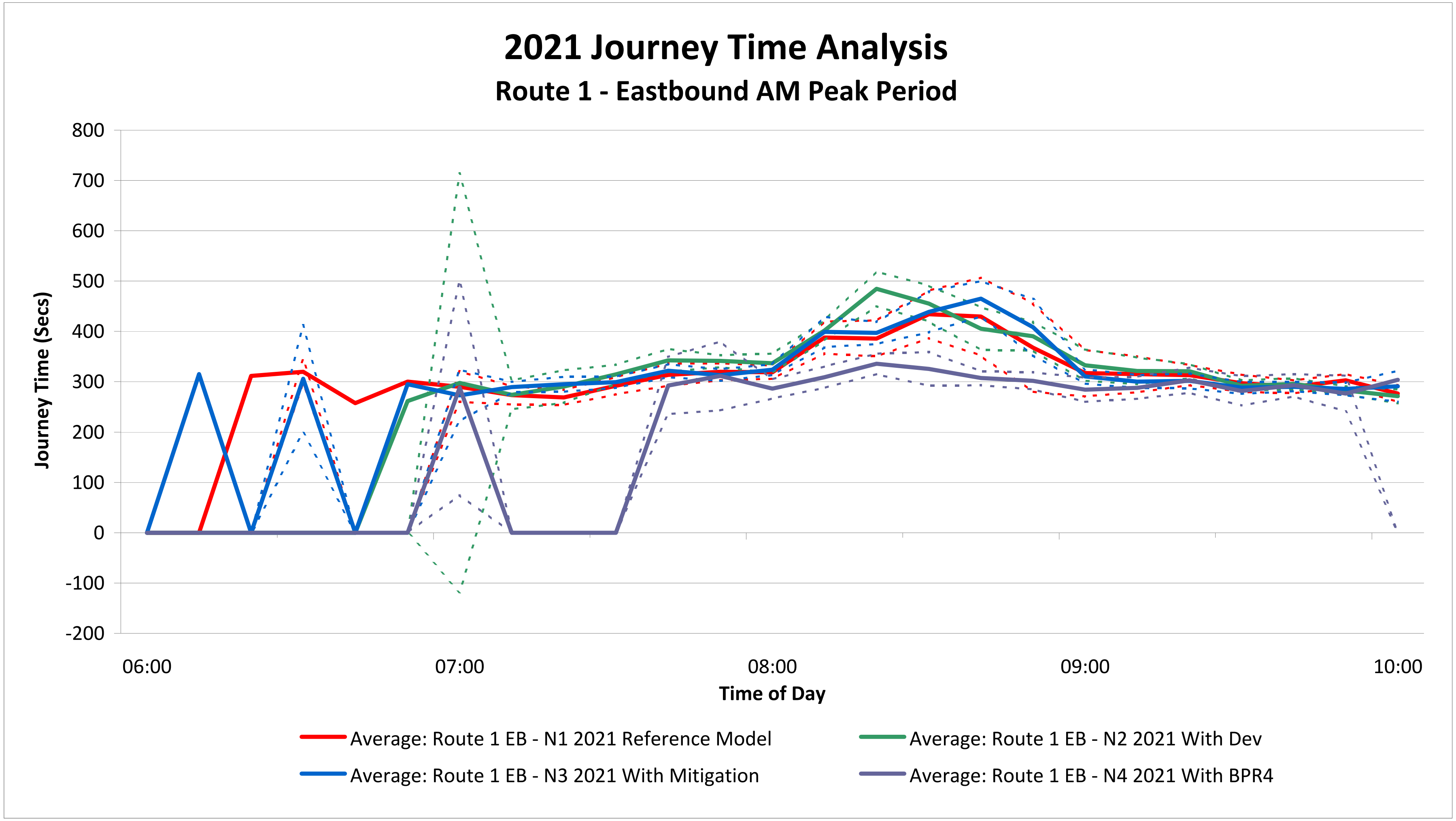

2016 Journey Time Analysis
Route 11 - Northbound
Journey Time (Secs)
2000
1500
1000
500
0
-500
-1000
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 NB - N1 2016 Reference Model
Average: Route 11 NB - N2 2016 With Dev
Average: Route 11 NB - N3 2016 With Mitigation
Average: Route 11 NB - N4 2016 With Bypass Route 4

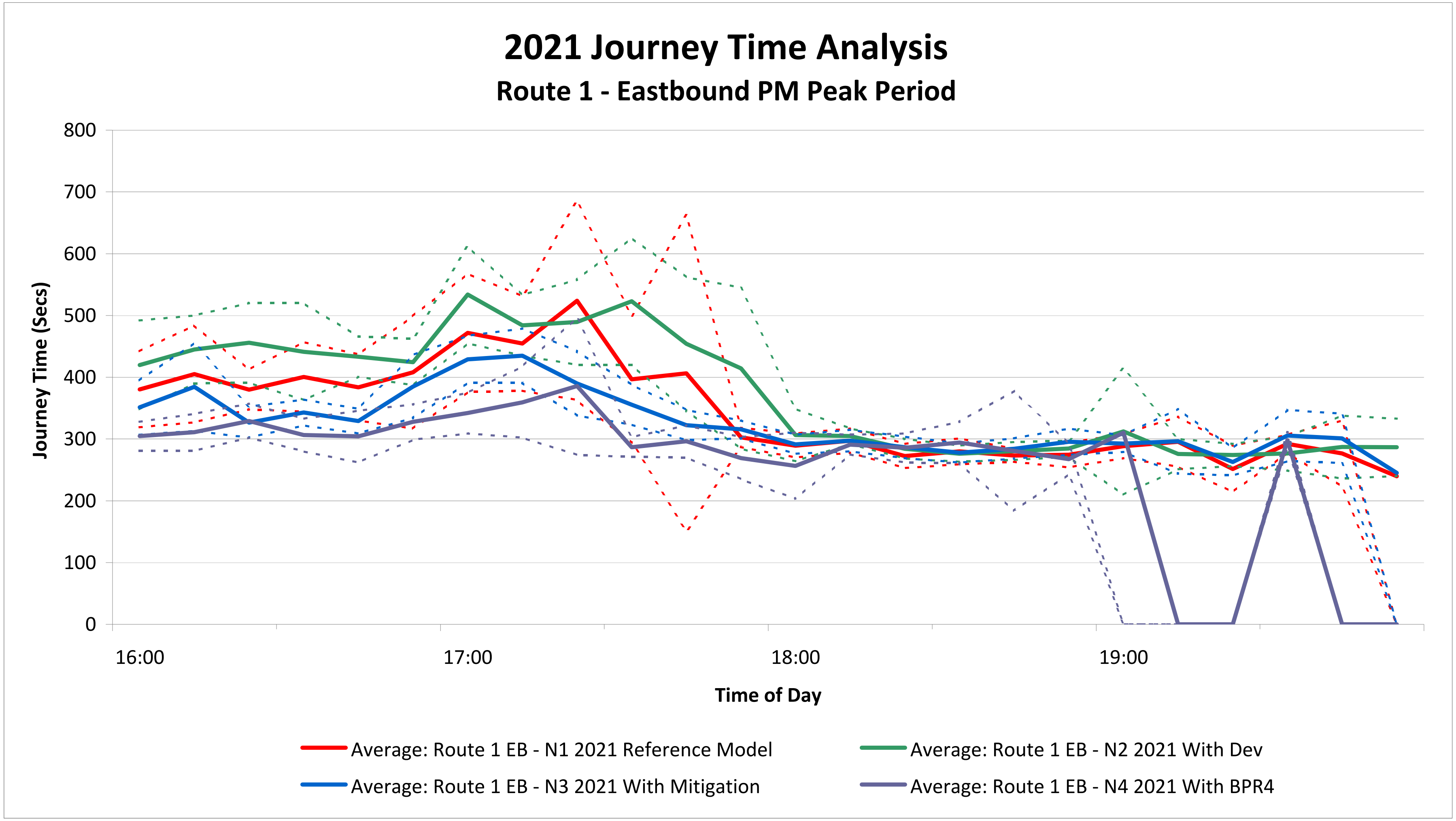

2016 Journey Time Analysis
Route 11 - Northbound AM Peak Period
900
800
700
600
500
400
300
200
100
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 11 NB - N1 2016 Reference Model
Average: Route 11 NB - N2 2016 With Dev
Average: Route 11 NB - N3 2016 With Mitigation
Average: Route 11 NB - N4 2016 With Bypass Route 4


2016 Journey Time Analysis
Route 11 - Northbound PM Peak Period
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 NB - N1 2016 Reference Model
Average: Route 11 NB - N2 2016 With Dev
Average: Route 11 NB - N3 2016 With Mitigation
Average: Route 11 NB - N4 2016 With Bypass Route 4

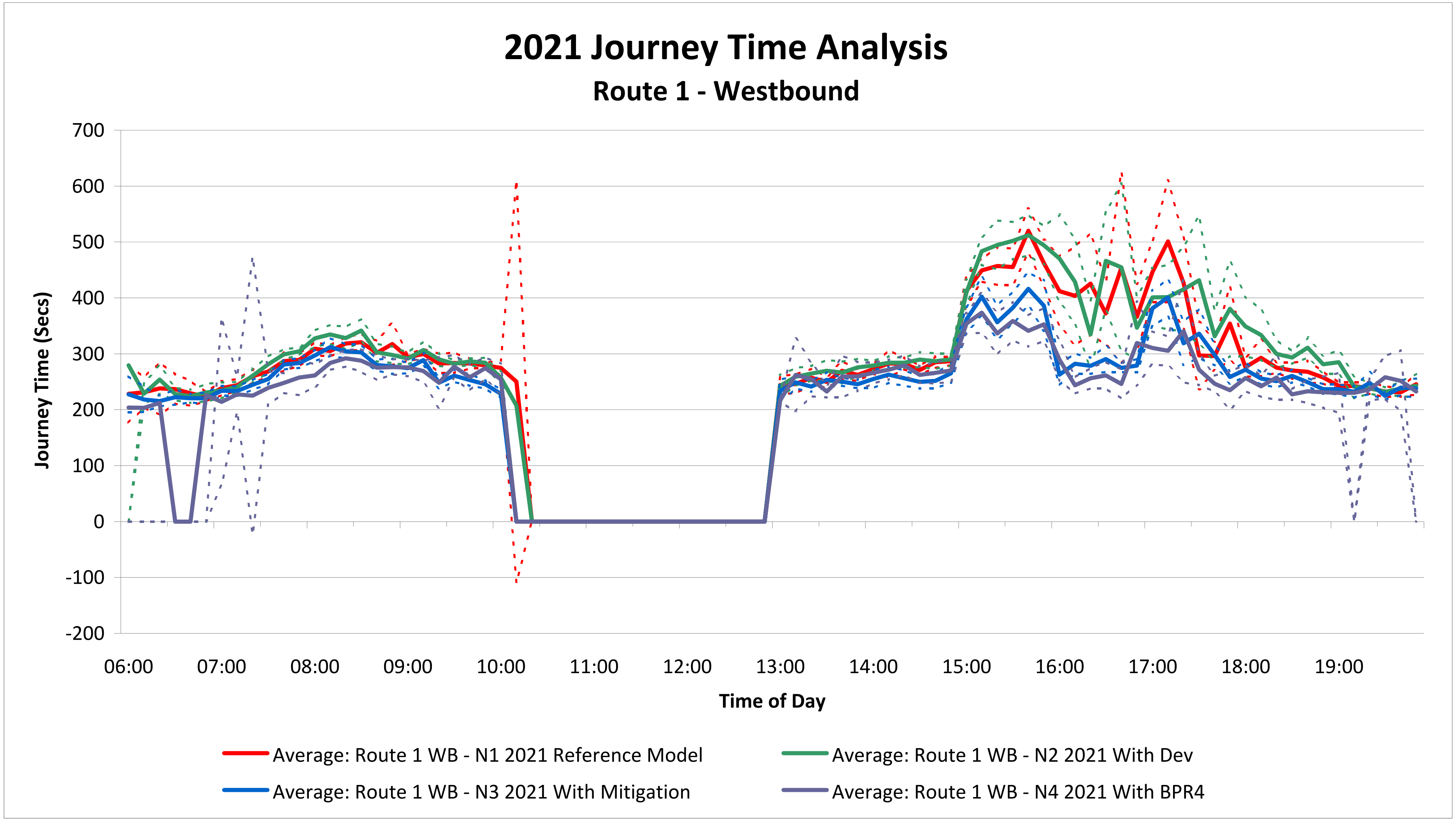
APPENDIX 6: 2021 JOURNEY TIMES RESULTS


2021 Journey Time Analysis
Route 1 - Eastbound
1000
900
800
700
600
500
400
300
200
100
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 EB - N1 2021 Reference Model
Average: Route 1 EB - N2 2021 With Dev
Average: Route 1 EB - N3 2021 With Mitigation
Average: Route 1 EB - N4 2021 With BPR4

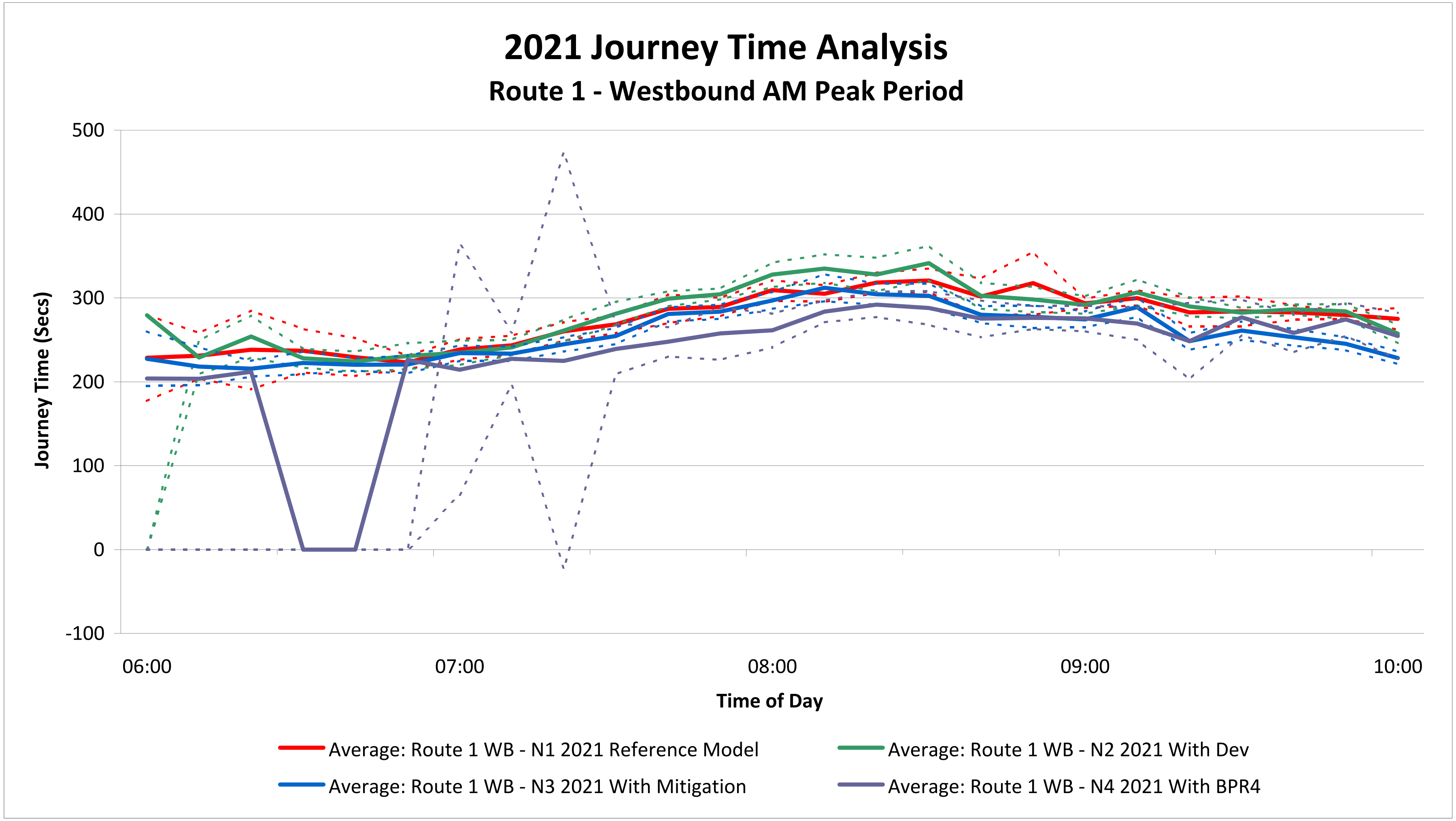

2021 Journey Time Analysis
Route 1 - Eastbound AM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
-100
-200
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 1 EB - N1 2021 Reference Model
Average: Route 1 EB - N2 2021 With Dev
Average: Route 1 EB - N3 2021 With Mitigation
Average: Route 1 EB - N4 2021 With BPR4

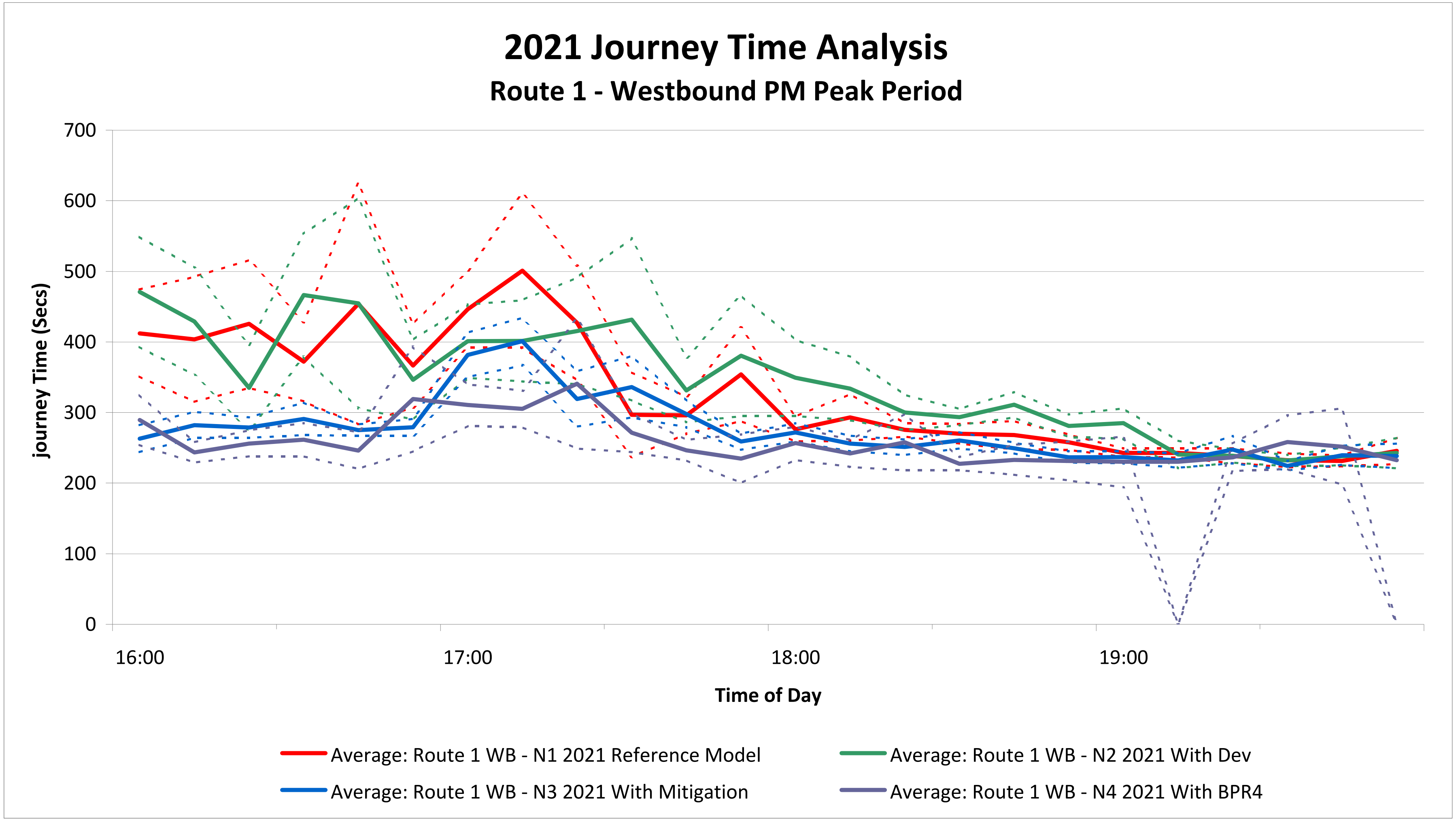


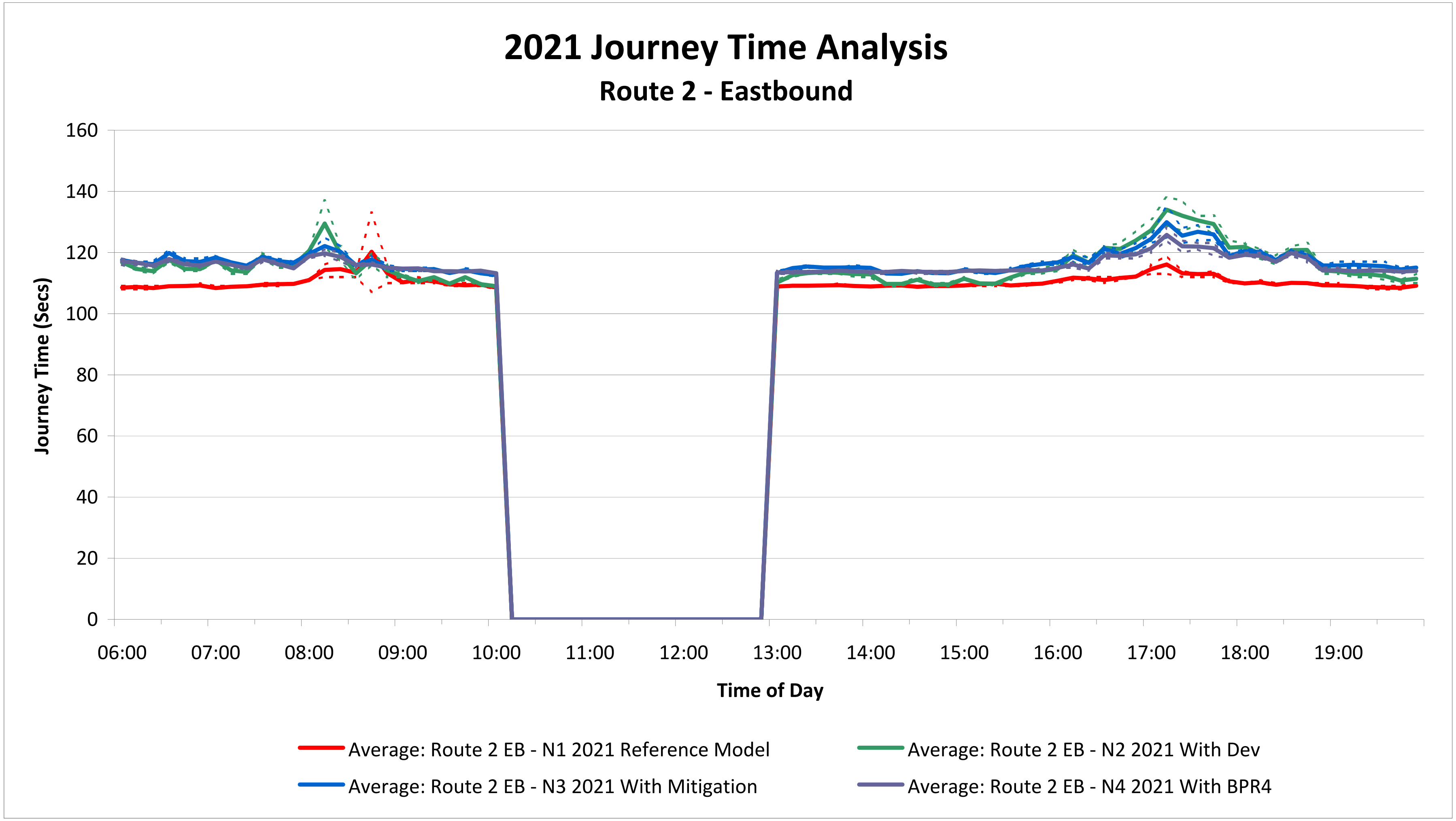
2021 Journey Time Analysis
Route 1 - Eastbound PM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 EB - N1 2021 Reference Model
Average: Route 1 EB - N2 2021 With Dev
Average: Route 1 EB - N3 2021 With Mitigation
Average: Route 1 EB - N4 2021 With BPR4



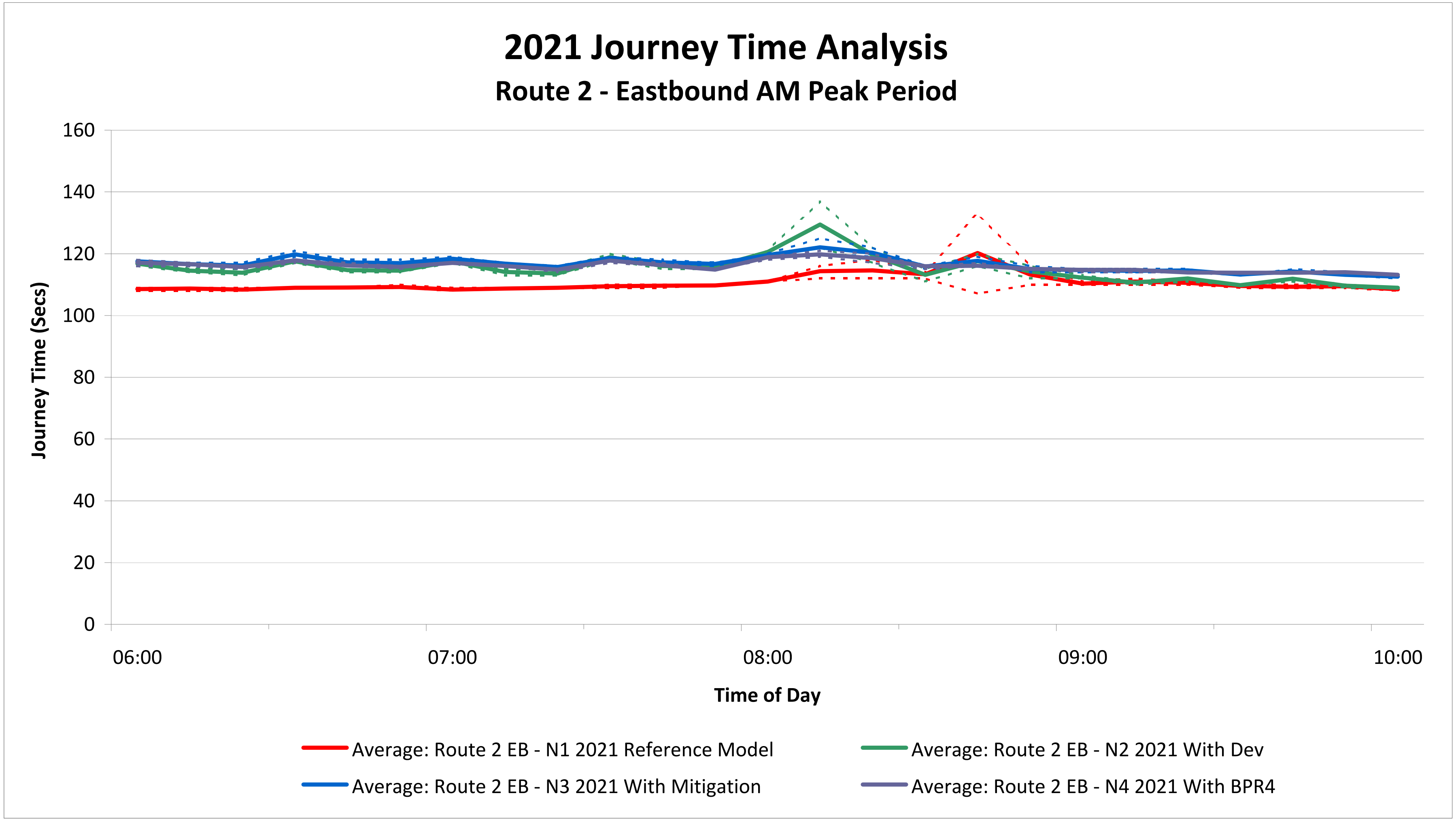
2021 Journey Time Analysis
Route 1 - Westbound
Journey Time (Secs)
700
600
500
400
300
200
100
0
-100
-200
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 WB - N1 2021 Reference Model
Average: Route 1 WB - N2 2021 With Dev
Average: Route 1 WB - N3 2021 With Mitigation
Average: Route 1 WB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 1 - Westbound AM Peak Period
Journey Time (Secs)
500
400
300
200
100
0
-100
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 1 WB - N1 2021 Reference Model
Average: Route 1 WB - N2 2021 With Dev
Average: Route 1 WB - N3 2021 With Mitigation
Average: Route 1 WB - N4 2021 With BPR4

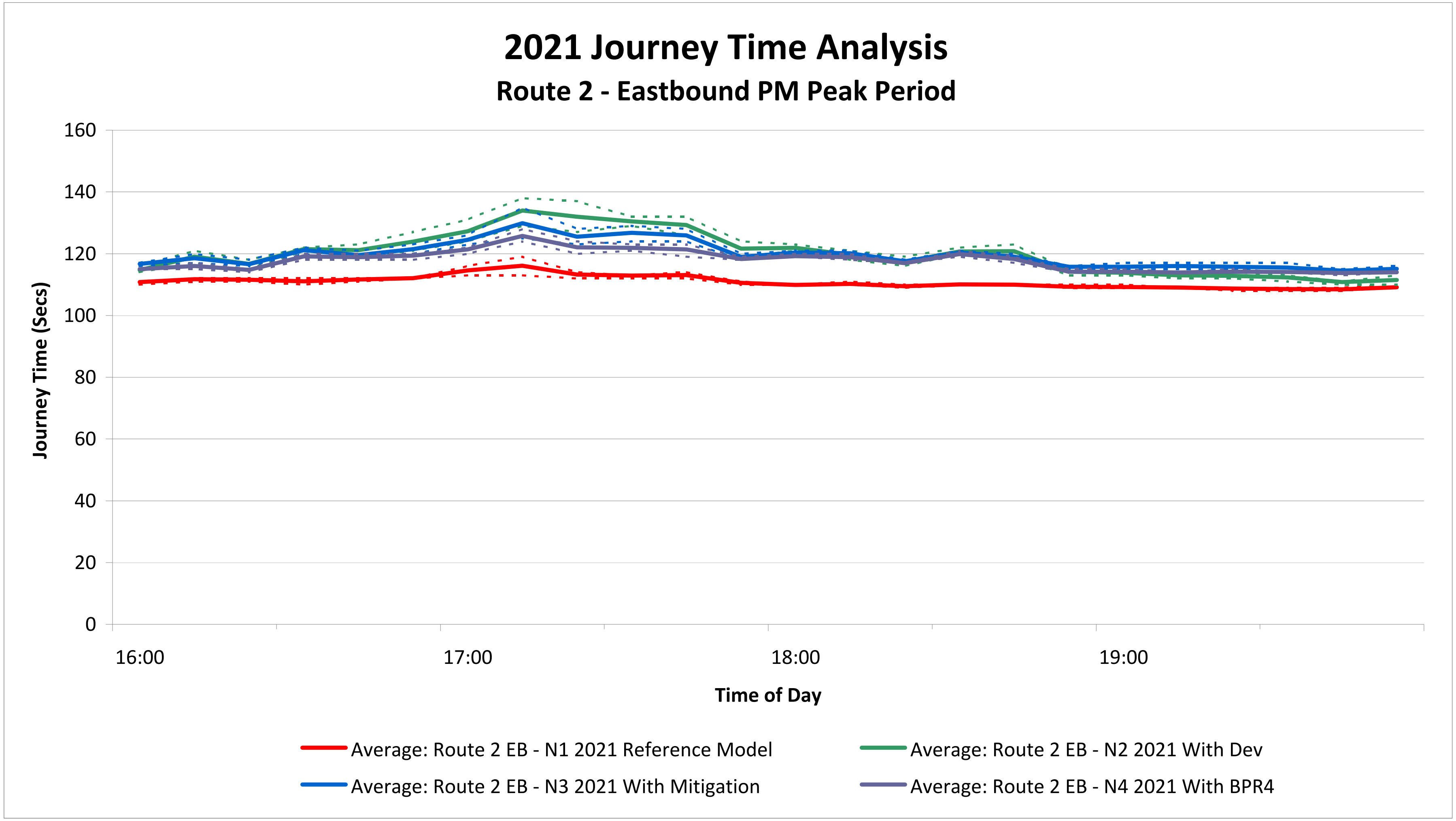

2021 Journey Time Analysis
Route 1 - Westbound PM Peak Period
journey Time (Secs)
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 WB - N1 2021 Reference Model
Average: Route 1 WB - N2 2021 With Dev
Average: Route 1 WB - N3 2021 With Mitigation
Average: Route 1 WB - N4 2021 With BPR4

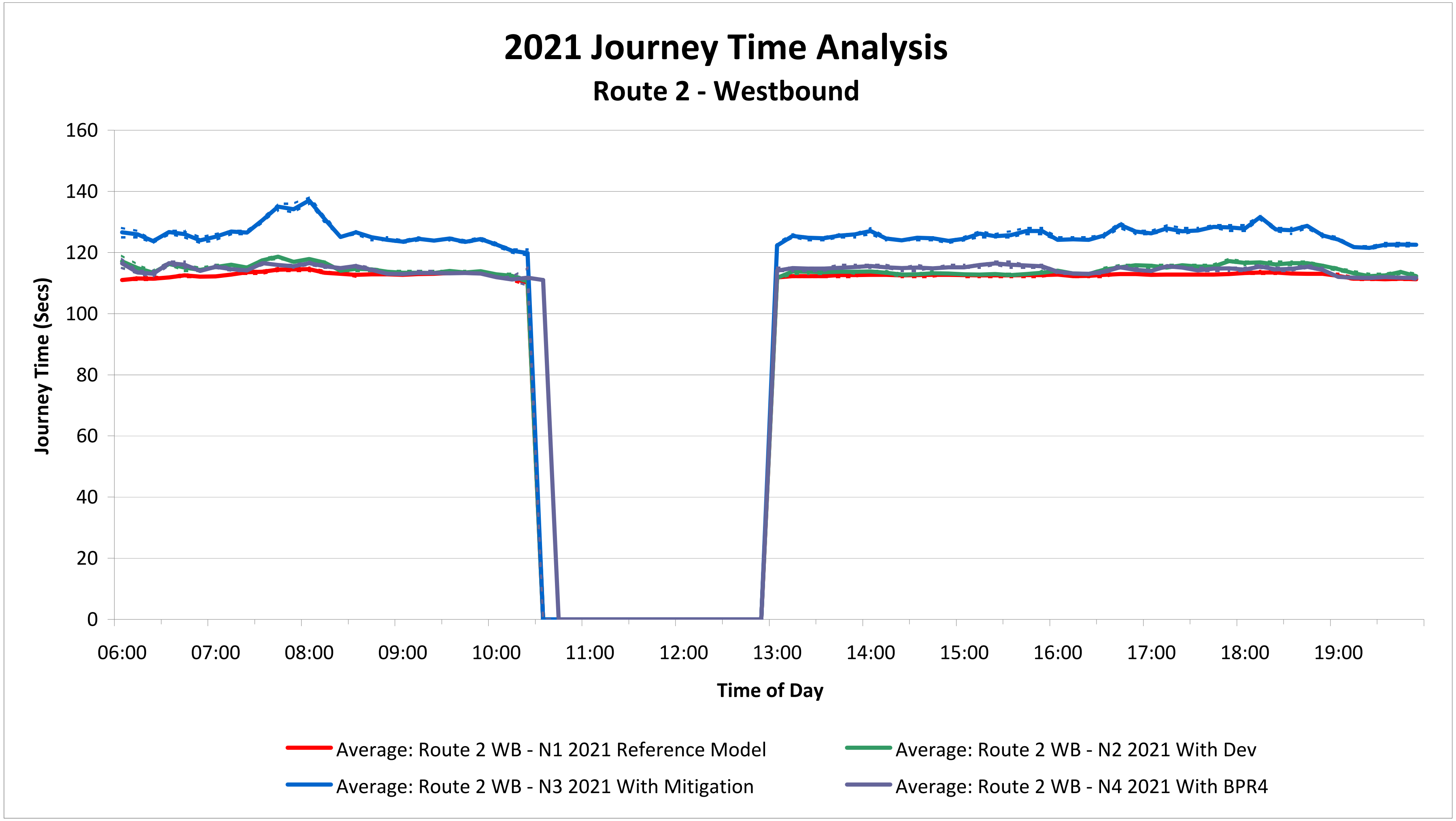


2021 Journey Time Analysis
Route 2 - Eastbound
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 2 EB - N1 2021 Reference Model
Average: Route 2 EB - N2 2021 With Dev
Average: Route 2 EB - N3 2021 With Mitigation
Average: Route 2 EB - N4 2021 With BPR4

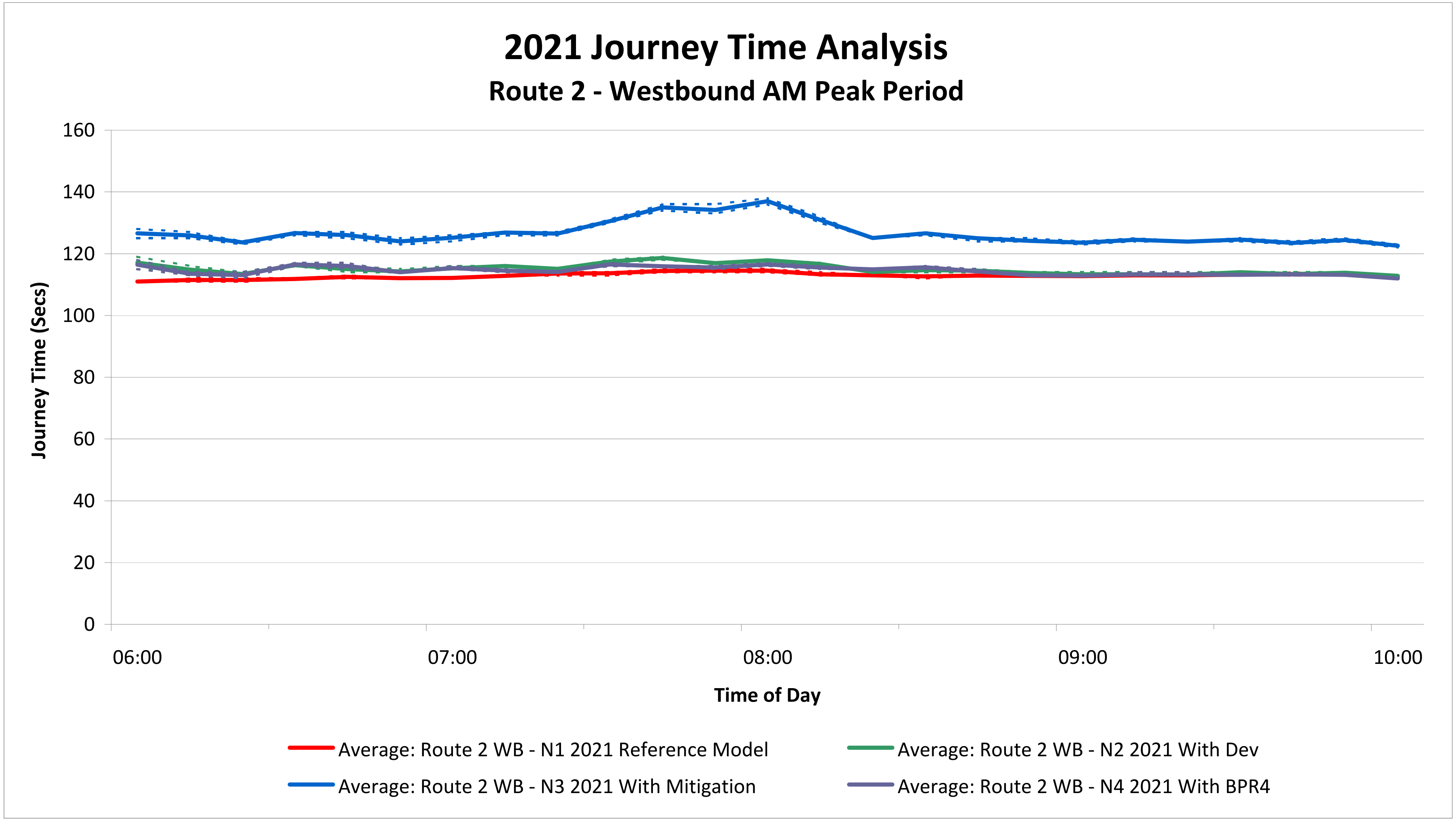


2021 Journey Time Analysis
Route 2 - Eastbound AM Peak Period
160
140
120
100
80
60
40
20
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 2 EB - N1 2021 Reference Model
Average: Route 2 EB - N2 2021 With Dev
Average: Route 2 EB - N3 2021 With Mitigation
Average: Route 2 EB - N4 2021 With BPR4

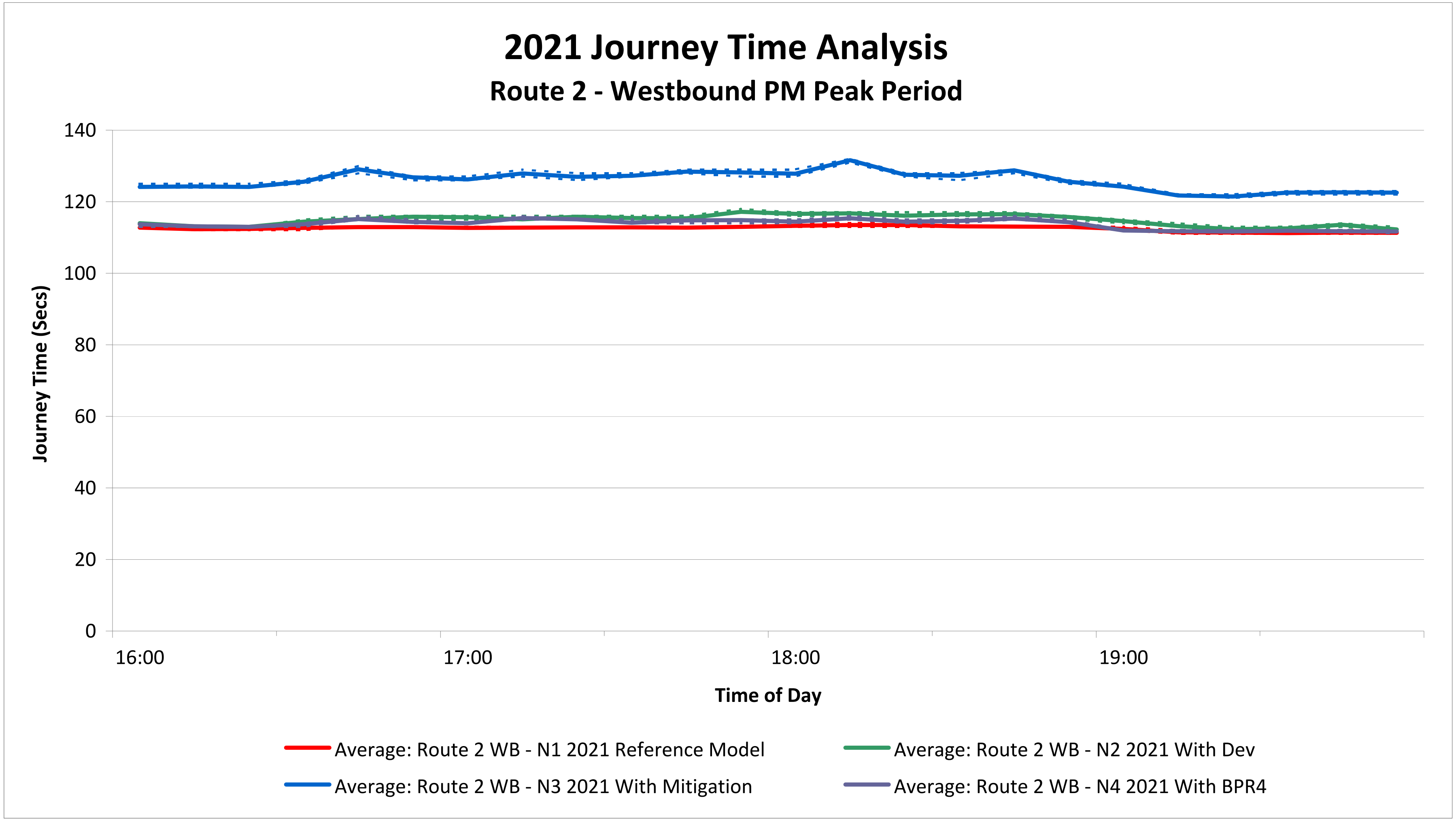

2021 Journey Time Analysis
Route 2 - Eastbound PM Peak Period
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 2 EB - N1 2021 Reference Model
Average: Route 2 EB - N2 2021 With Dev
Average: Route 2 EB - N3 2021 With Mitigation
Average: Route 2 EB - N4 2021 With BPR4

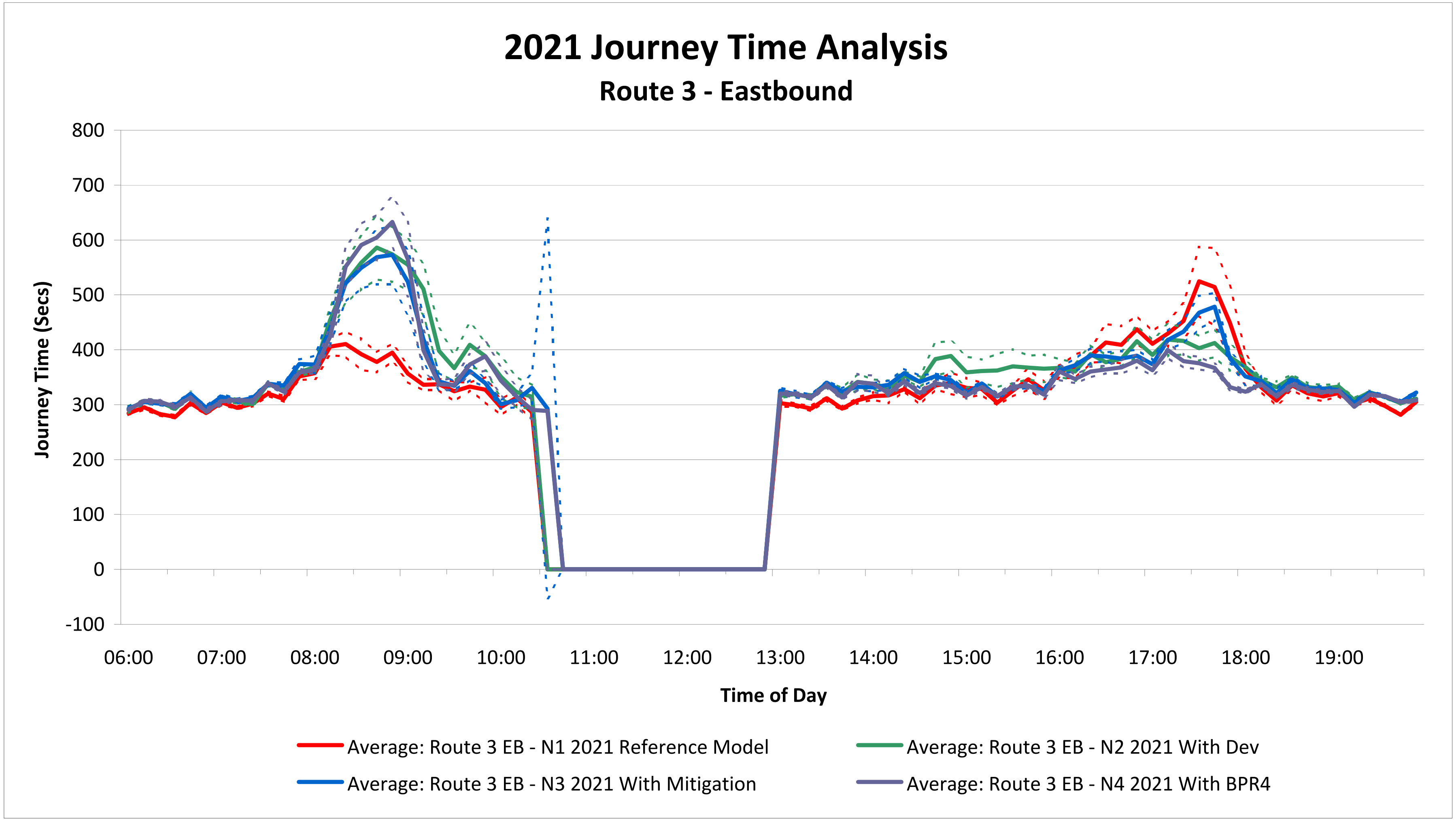


2021 Journey Time Analysis
Route 2 - Westbound
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 2 WB - N1 2021 Reference Model
Average: Route 2 WB - N2 2021 With Dev
Average: Route 2 WB - N3 2021 With Mitigation
Average: Route 2 WB - N4 2021 With BPR4

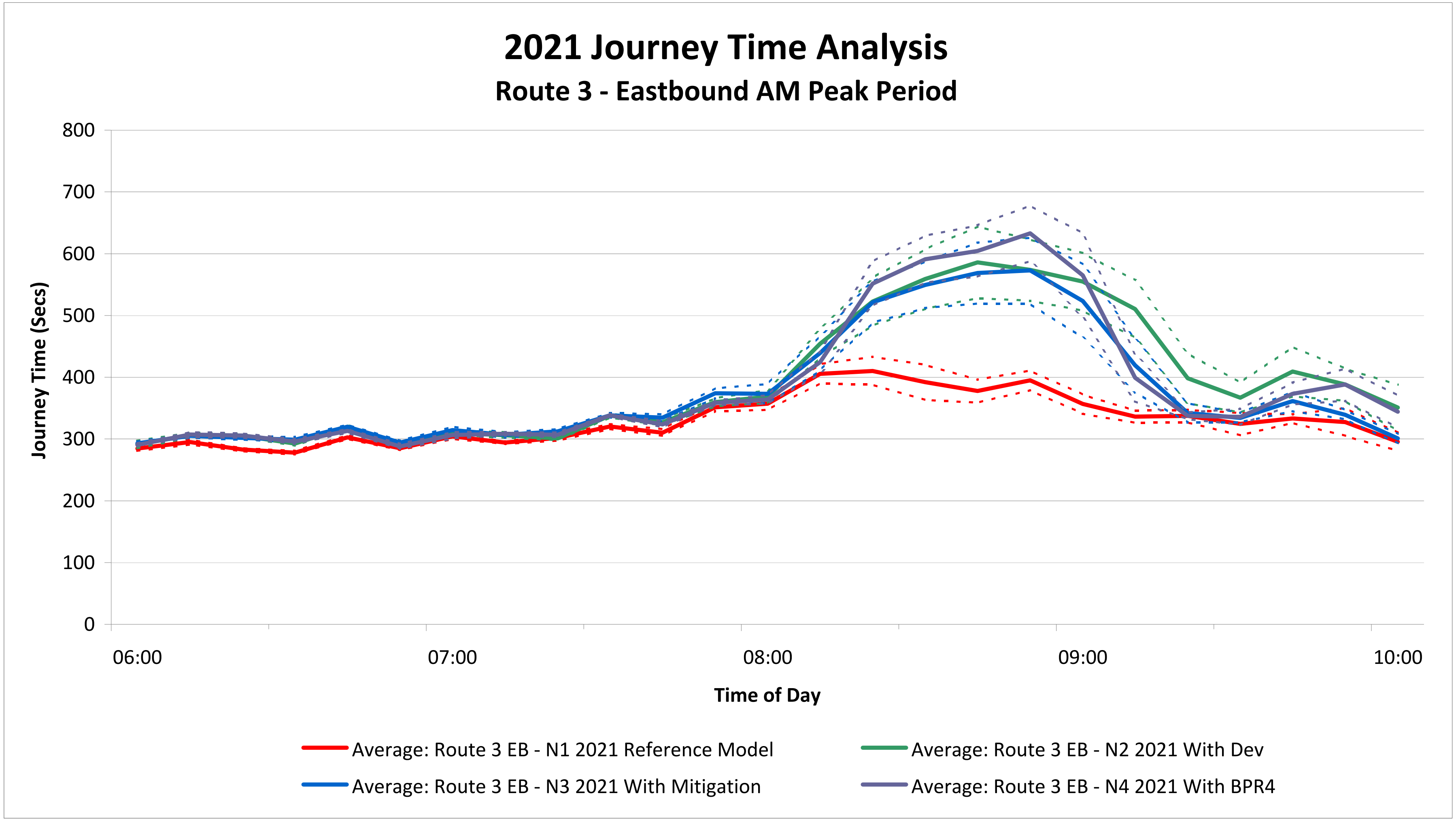


2021 Journey Time Analysis
Route 2 - Westbound AM Peak Period
Journey Time (Secs)
0
20
40
60
80
100
120
140
160
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 2 WB - N1 2021 Reference Model
Average: Route 2 WB - N2 2021 With Dev
Average: Route 2 WB - N3 2021 With Mitigation
Average: Route 2 WB - N4 2021 With BPR4

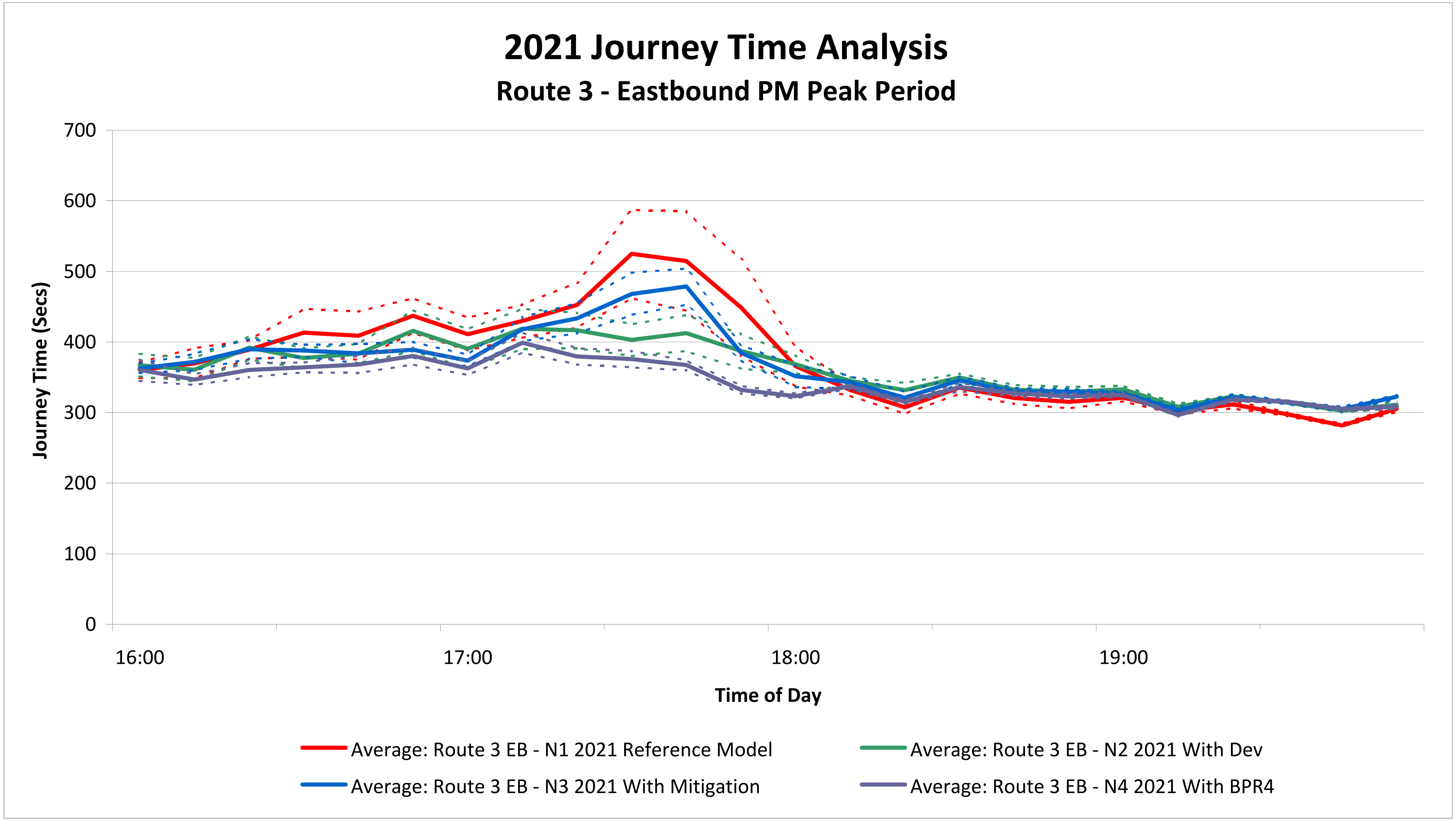

2021 Journey Time Analysis
Route 2 - Westbound PM Peak Period
Journey Time (Secs)
140
120
100
80
60
40
20
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 2 WB - N1 2021 Reference Model
Average: Route 2 WB - N2 2021 With Dev
Average: Route 2 WB - N3 2021 With Mitigation
Average: Route 2 WB - N4 2021 With BPR4

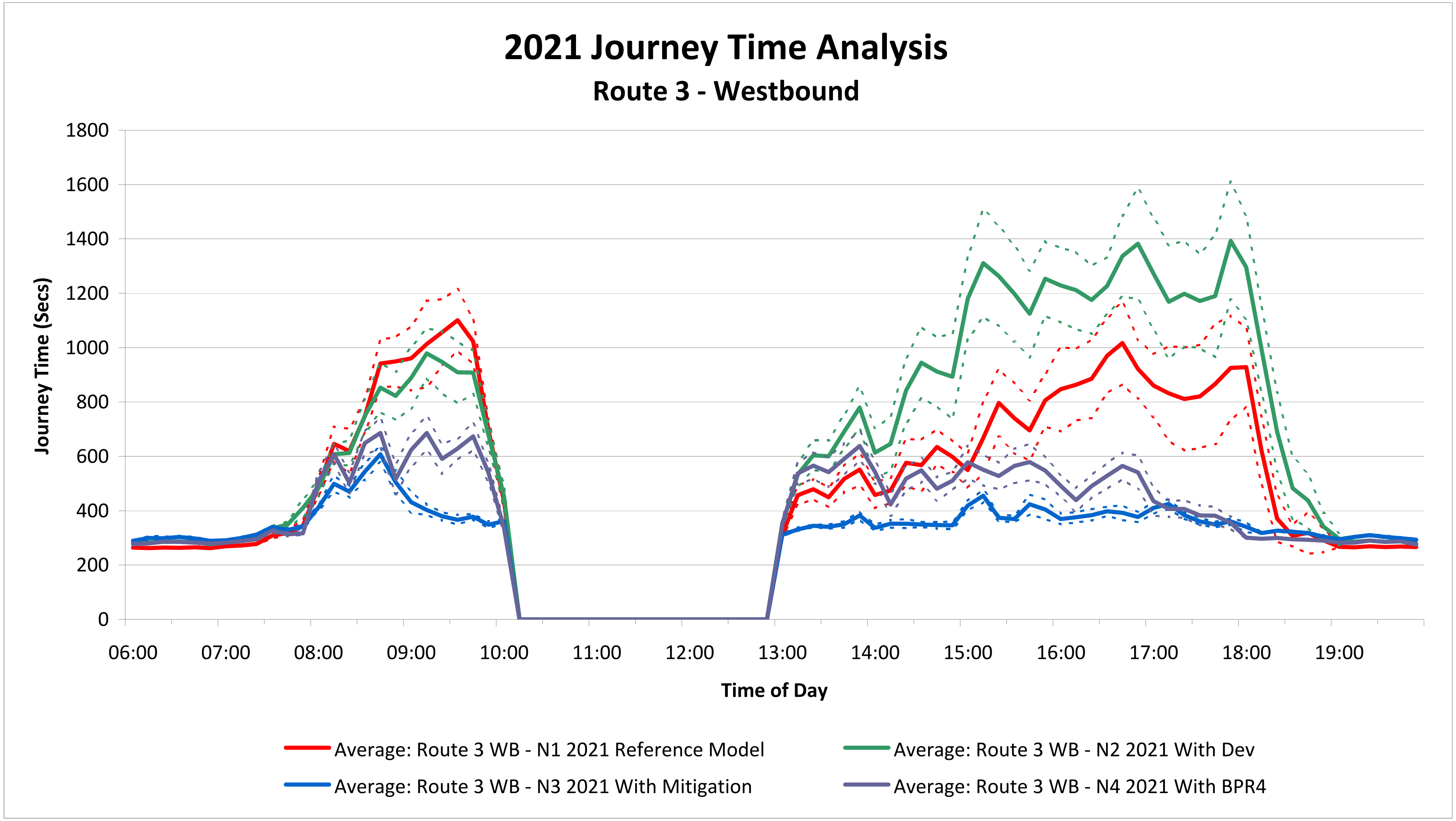


2021 Journey Time Analysis
Route 3 - Eastbound
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
-100
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 EB - N1 2021 Reference Model
Average: Route 3 EB - N2 2021 With Dev
Average: Route 3 EB - N3 2021 With Mitigation
Average: Route 3 EB - N4 2021 With BPR4

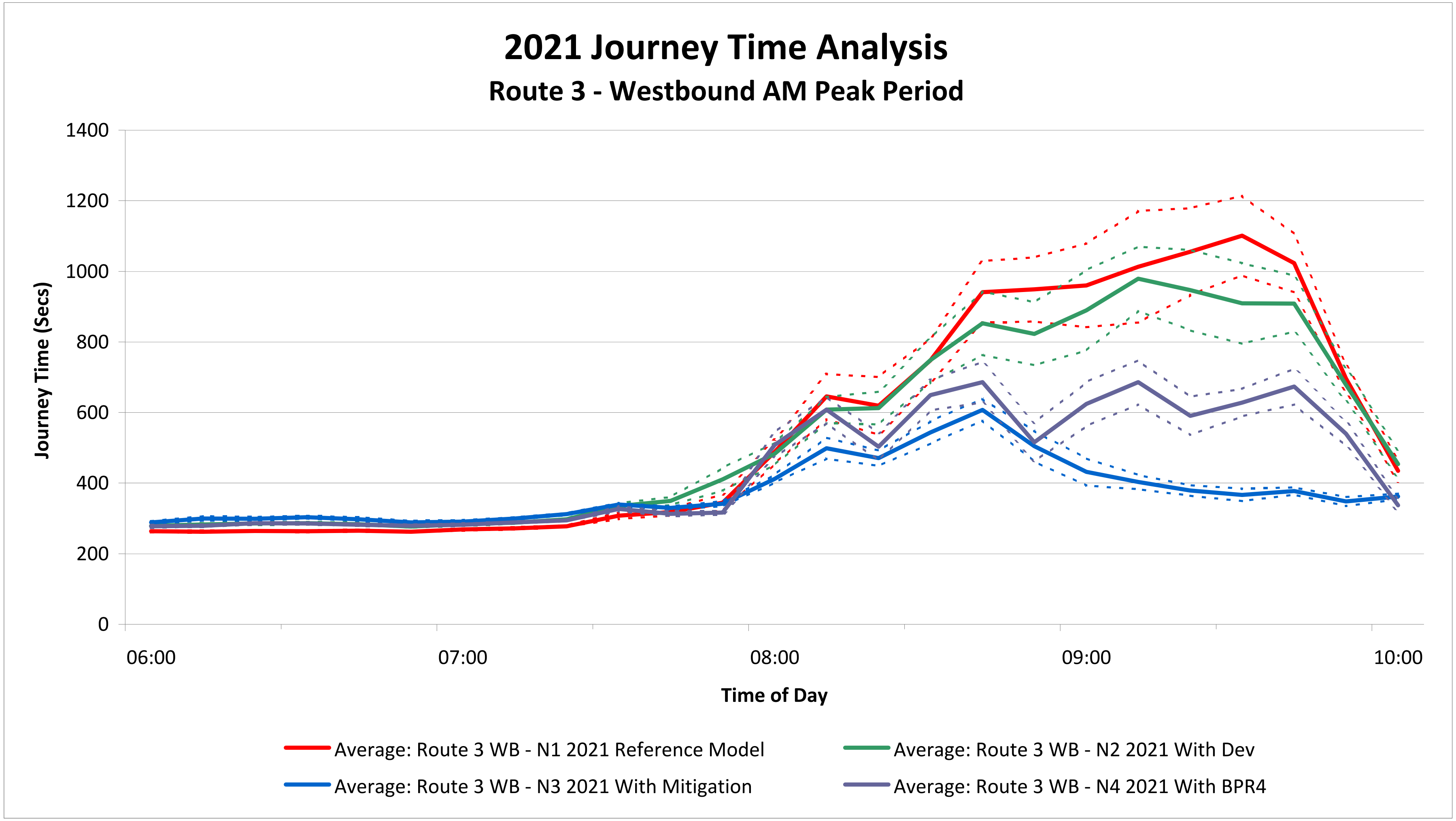


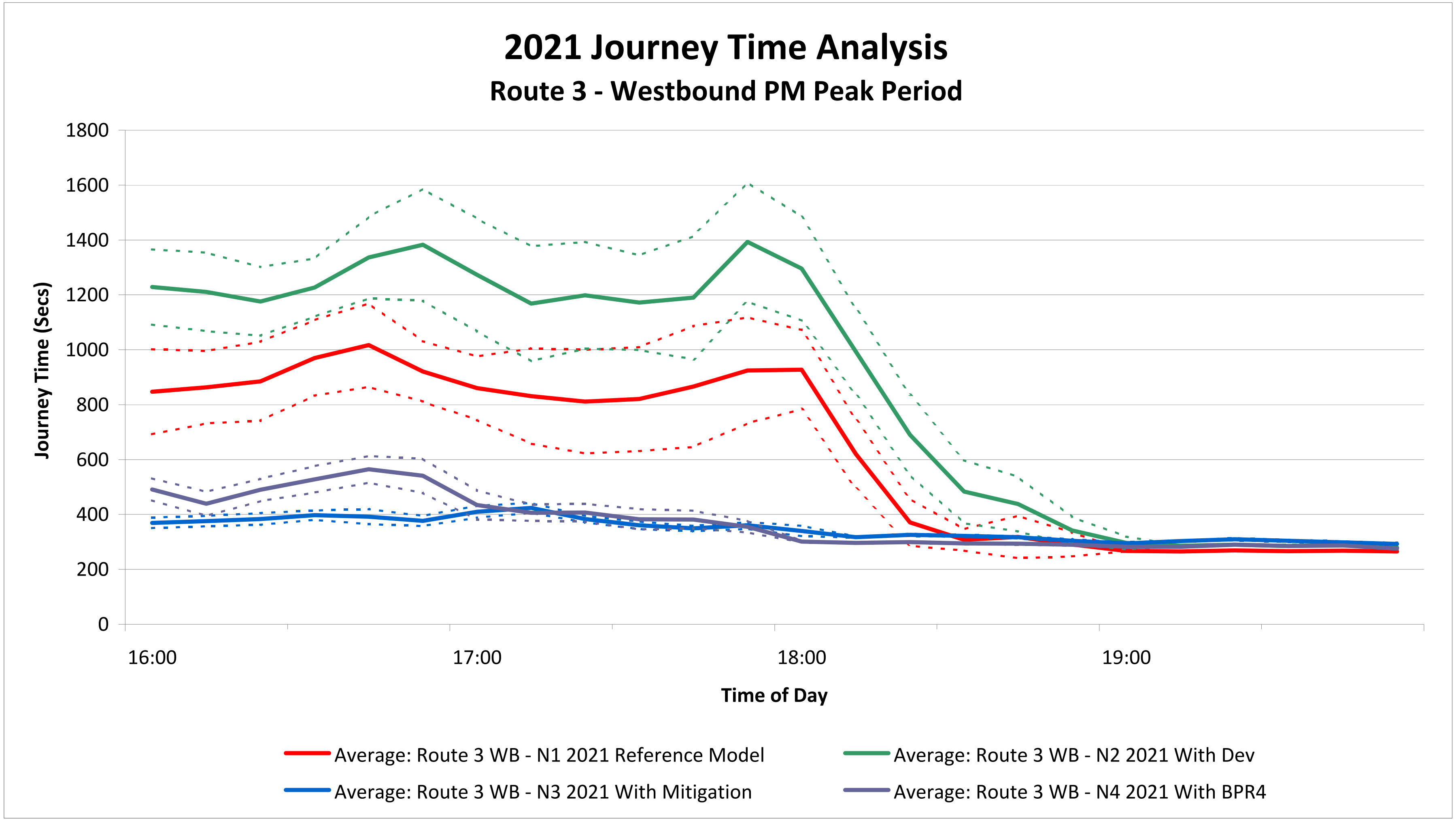
2021 Journey Time Analysis
Route 3 - Eastbound AM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 3 EB - N1 2021 Reference Model
Average: Route 3 EB - N2 2021 With Dev
Average: Route 3 EB - N3 2021 With Mitigation
Average: Route 3 EB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 3 - Eastbound PM Peak Period
Journey Time (Secs)
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 EB - N1 2021 Reference Model
Average: Route 3 EB - N2 2021 With Dev
Average: Route 3 EB - N3 2021 With Mitigation
Average: Route 3 EB - N4 2021 With BPR4

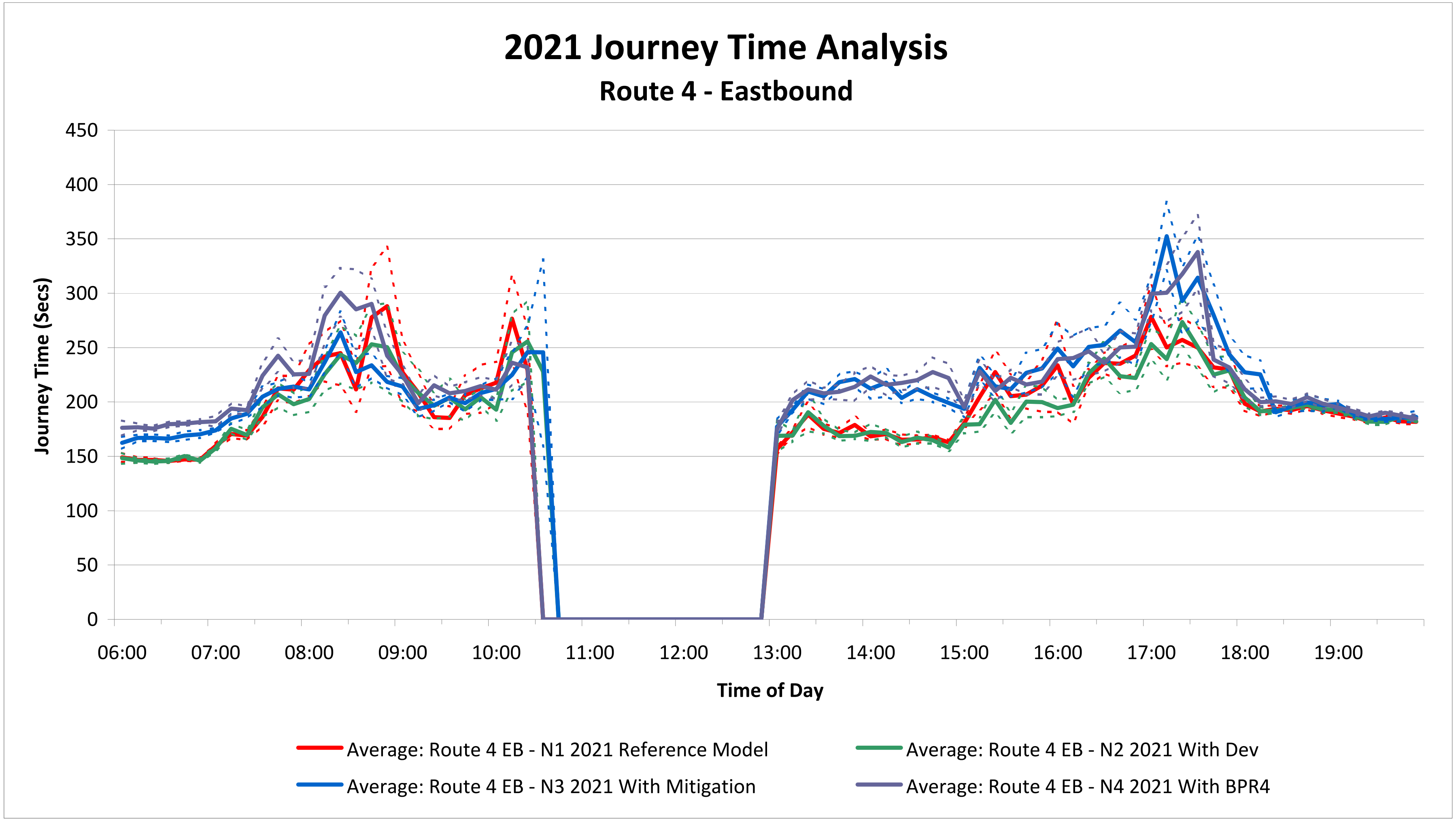


2021 Journey Time Analysis
Route 3 - Westbound
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 WB - N1 2021 Reference Model
Average: Route 3 WB - N2 2021 With Dev
Average: Route 3 WB - N3 2021 With Mitigation
Average: Route 3 WB - N4 2021 With BPR4

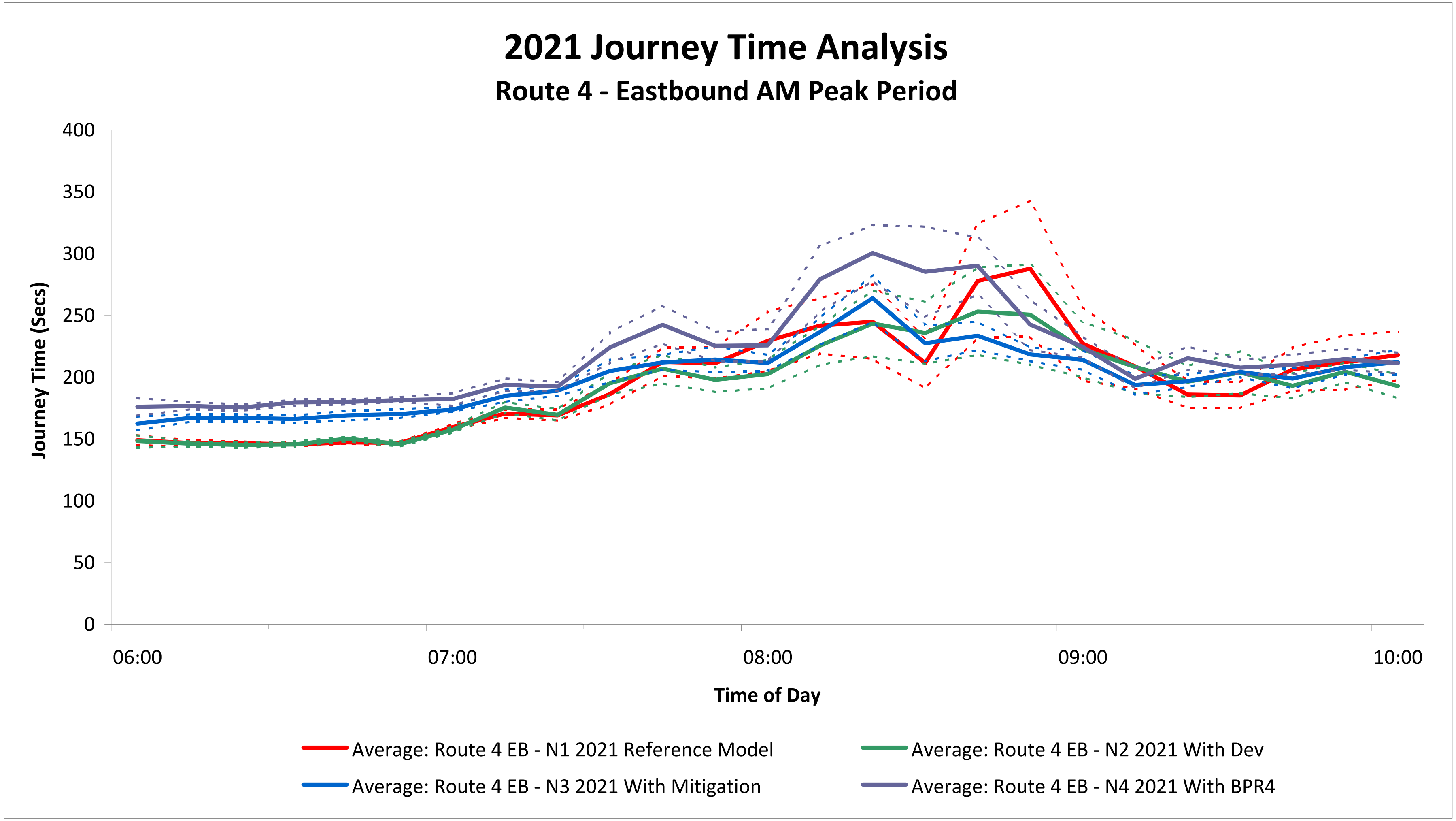

2021 Journey Time Analysis
Route 3 - Westbound AM Peak Period
Journey Time (Secs)
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 3 WB - N1 2021 Reference Model
Average: Route 3 WB - N2 2021 With Dev
Average: Route 3 WB - N3 2021 With Mitigation
Average: Route 3 WB - N4 2021 With BPR4

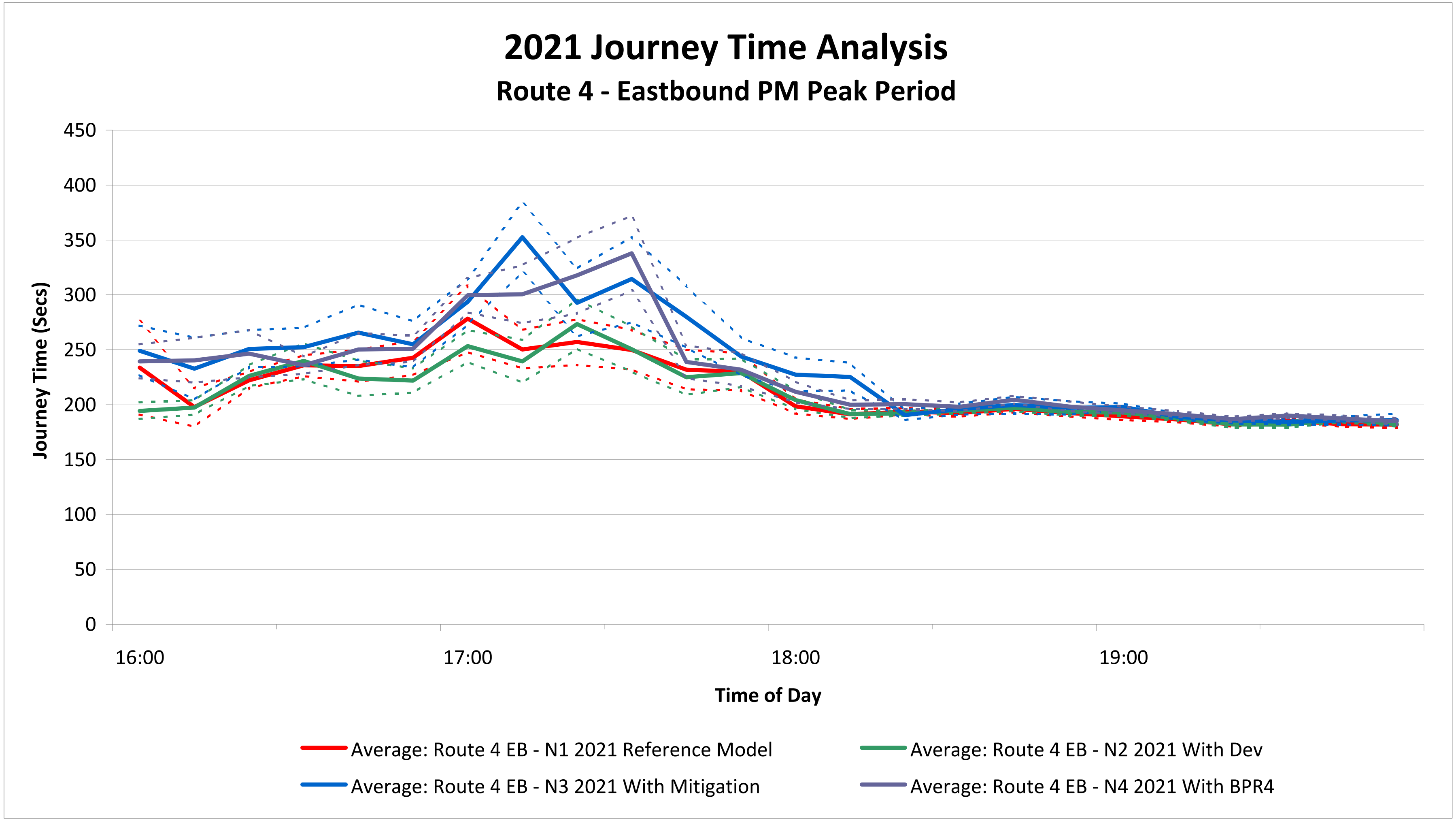


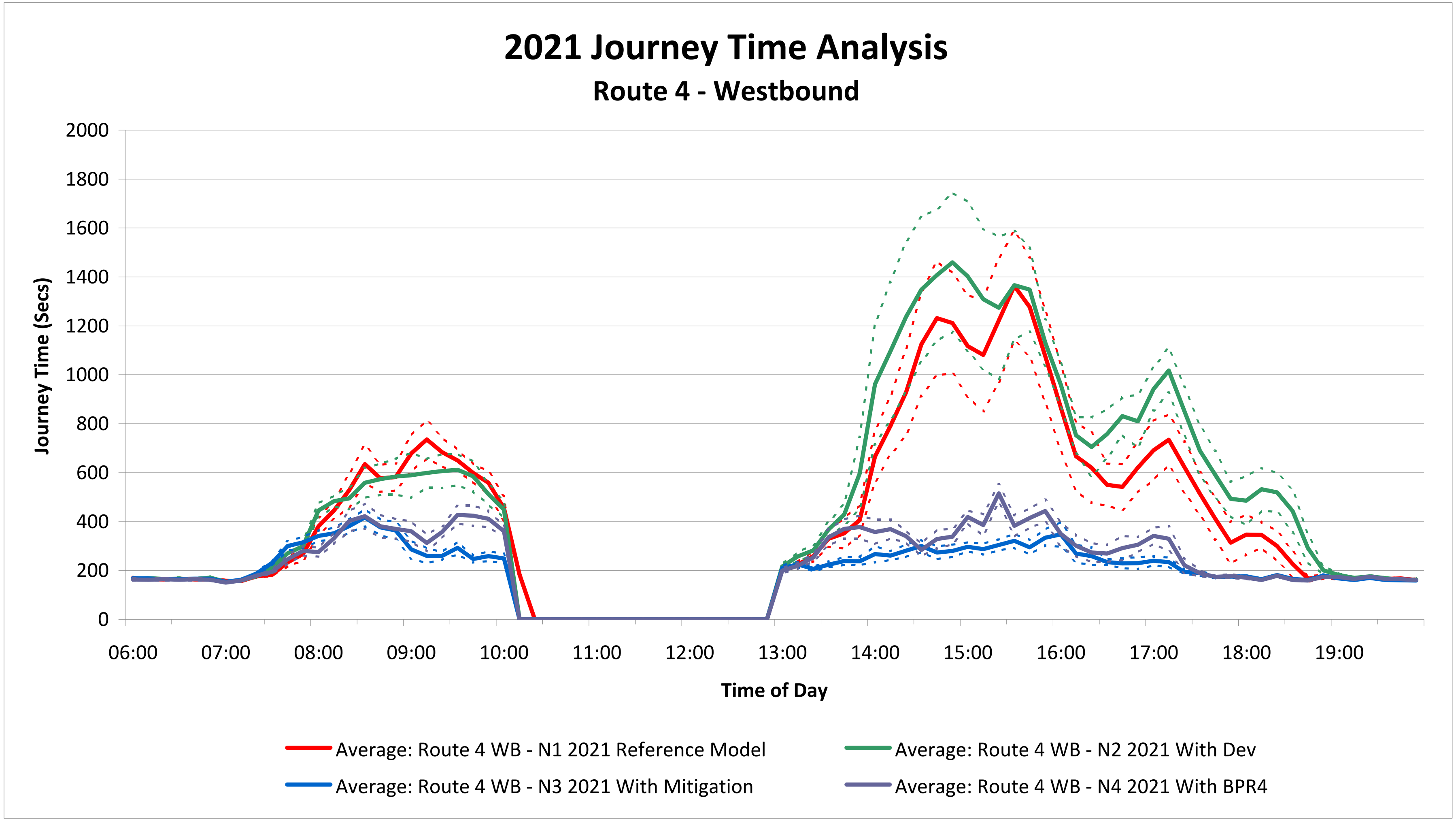
2021 Journey Time Analysis
Route 3 - Westbound PM Peak Period
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 3 WB - N1 2021 Reference Model
Average: Route 3 WB - N2 2021 With Dev
Average: Route 3 WB - N3 2021 With Mitigation
Average: Route 3 WB - N4 2021 With BPR4

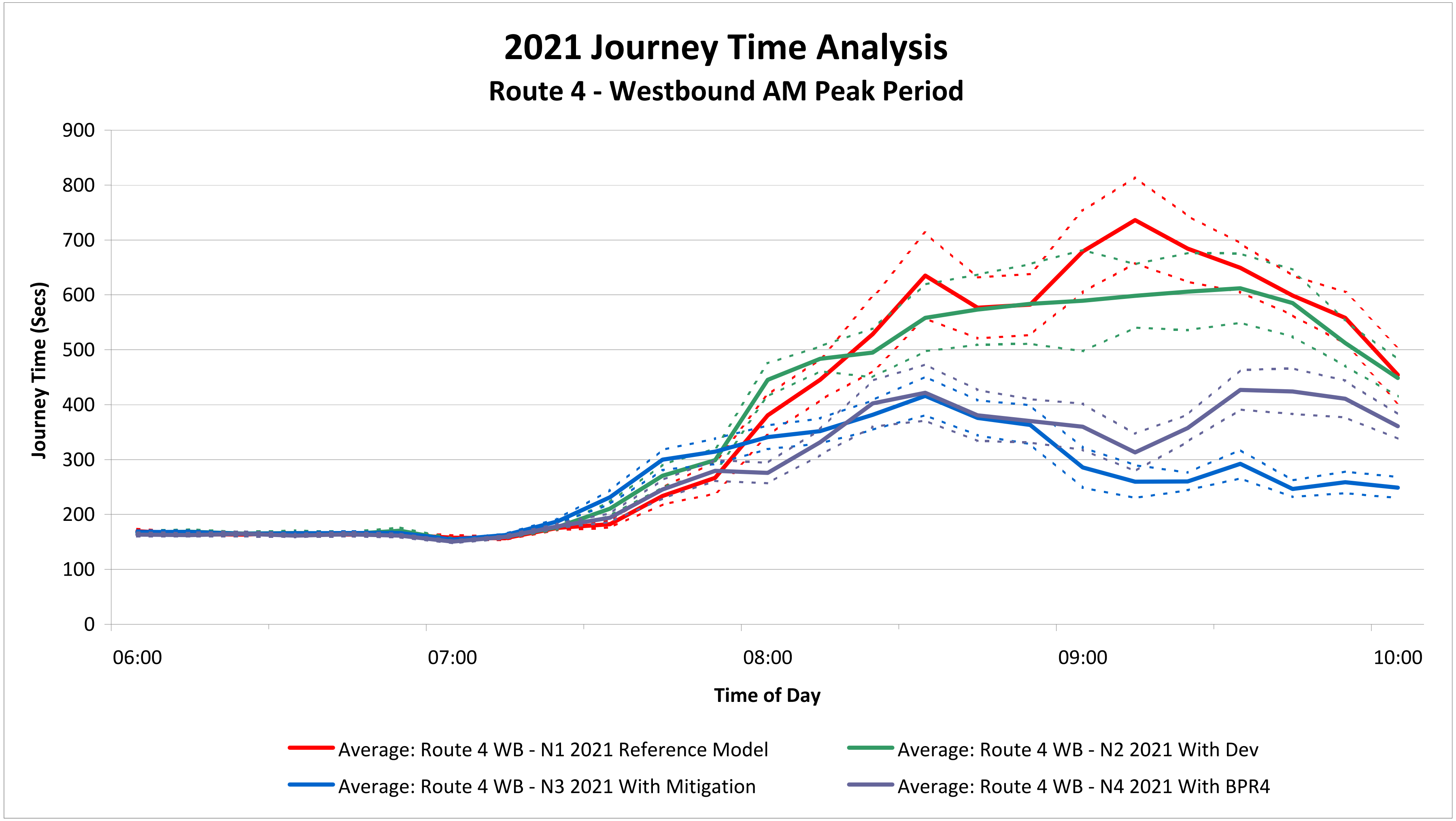


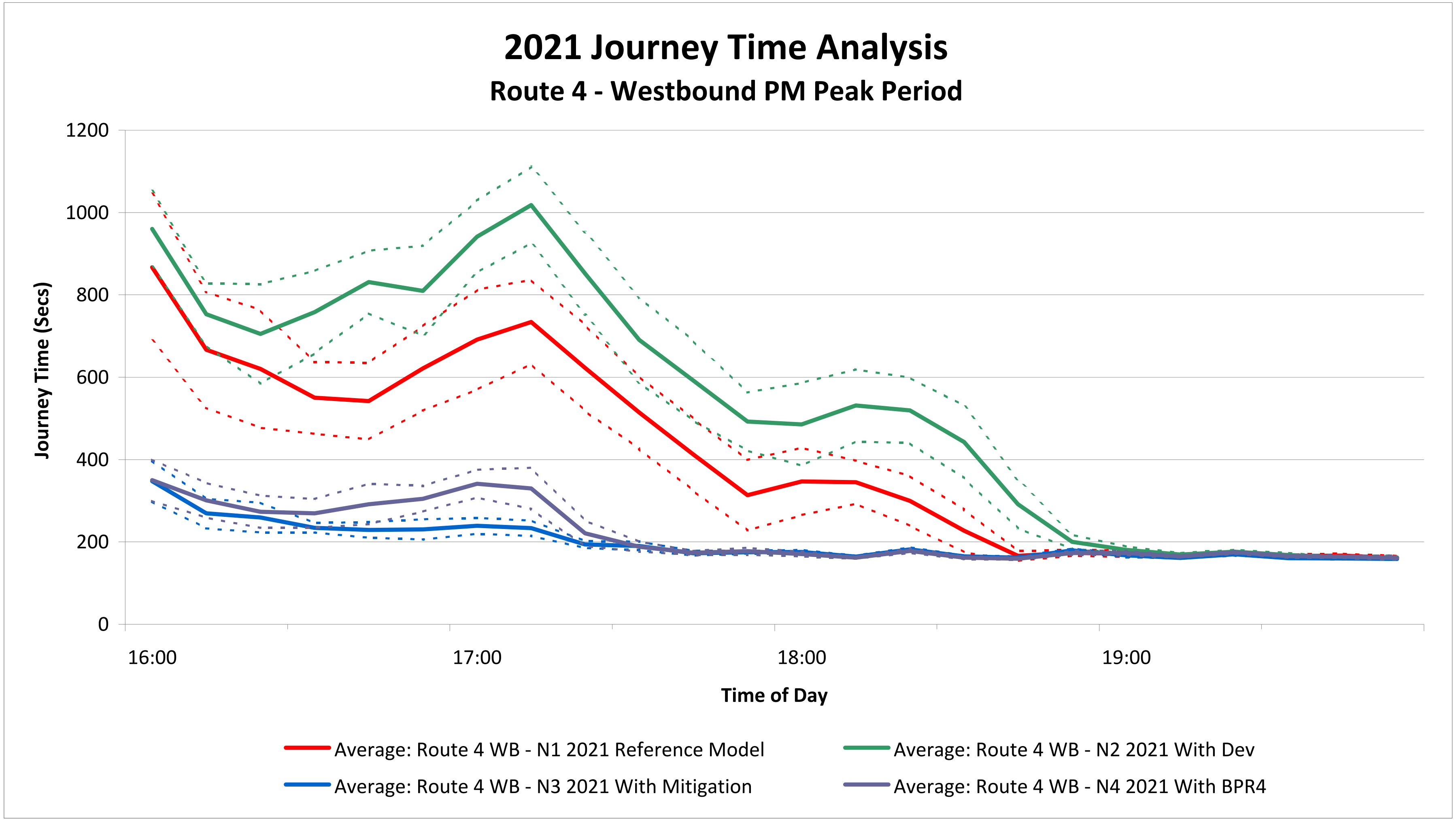
2021 Journey Time Analysis
Route 4 - Eastbound
Journey Time (Secs)
450
400
350
300
250
200
150
100
50
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 EB - N1 2021 Reference Model
Average: Route 4 EB - N2 2021 With Dev
Average: Route 4 EB - N3 2021 With Mitigation
Average: Route 4 EB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 4 - Eastbound AM Peak Period
Journey Time (Secs)
400
350
300
250
200
150
100
50
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 4 EB - N1 2021 Reference Model
Average: Route 4 EB - N2 2021 With Dev
Average: Route 4 EB - N3 2021 With Mitigation
Average: Route 4 EB - N4 2021 With BPR4

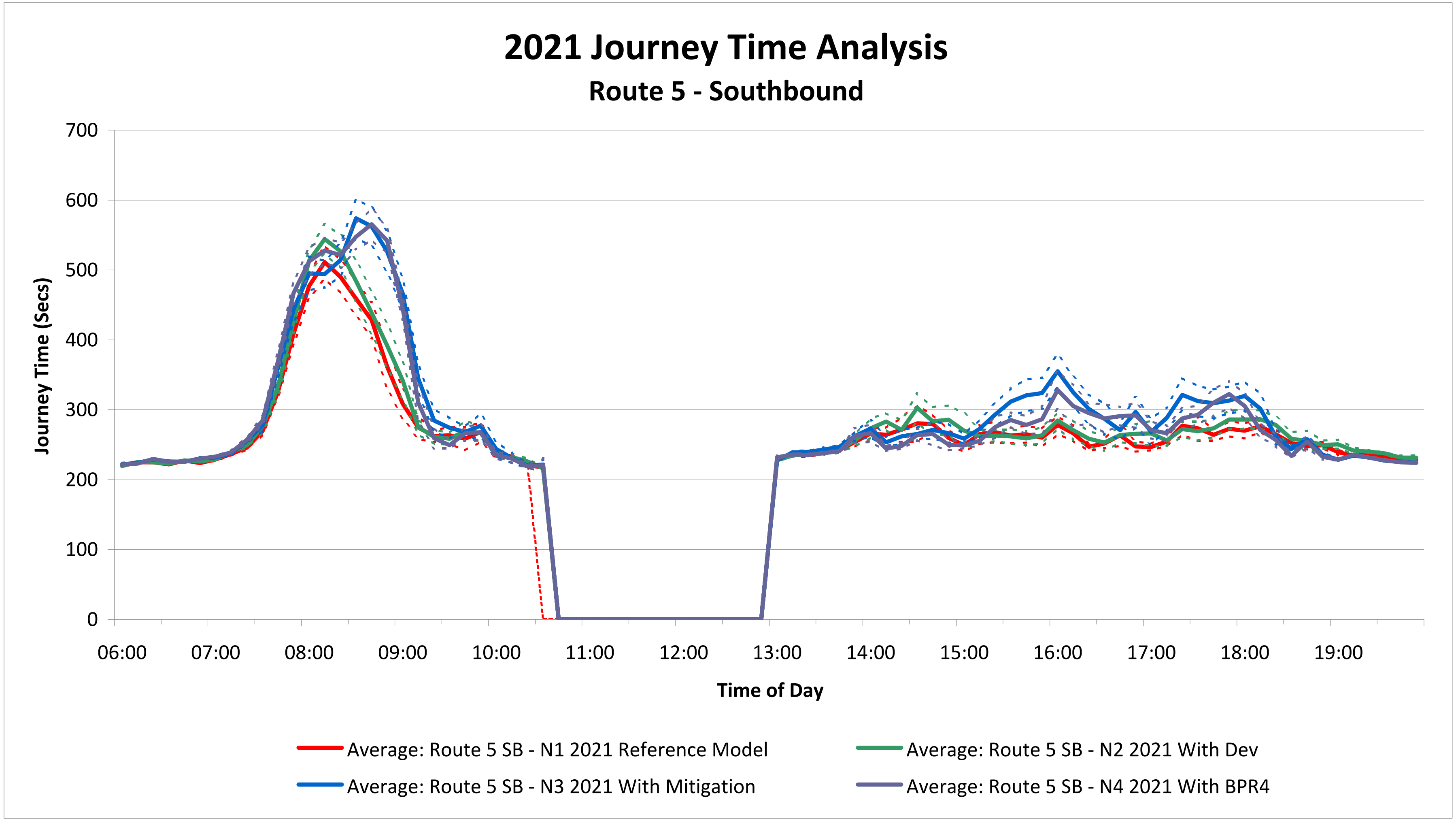

2021 Journey Time Analysis
Route 4 - Eastbound PM Peak Period
Journey Time (Secs)
450
400
350
300
250
200
150
100
50
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 EB - N1 2021 Reference Model
Average: Route 4 EB - N2 2021 With Dev
Average: Route 4 EB - N3 2021 With Mitigation
Average: Route 4 EB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 4 - Westbound
Journey Time (Secs)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 WB - N1 2021 Reference Model
Average: Route 4 WB - N2 2021 With Dev
Average: Route 4 WB - N3 2021 With Mitigation
Average: Route 4 WB - N4 2021 With BPR4

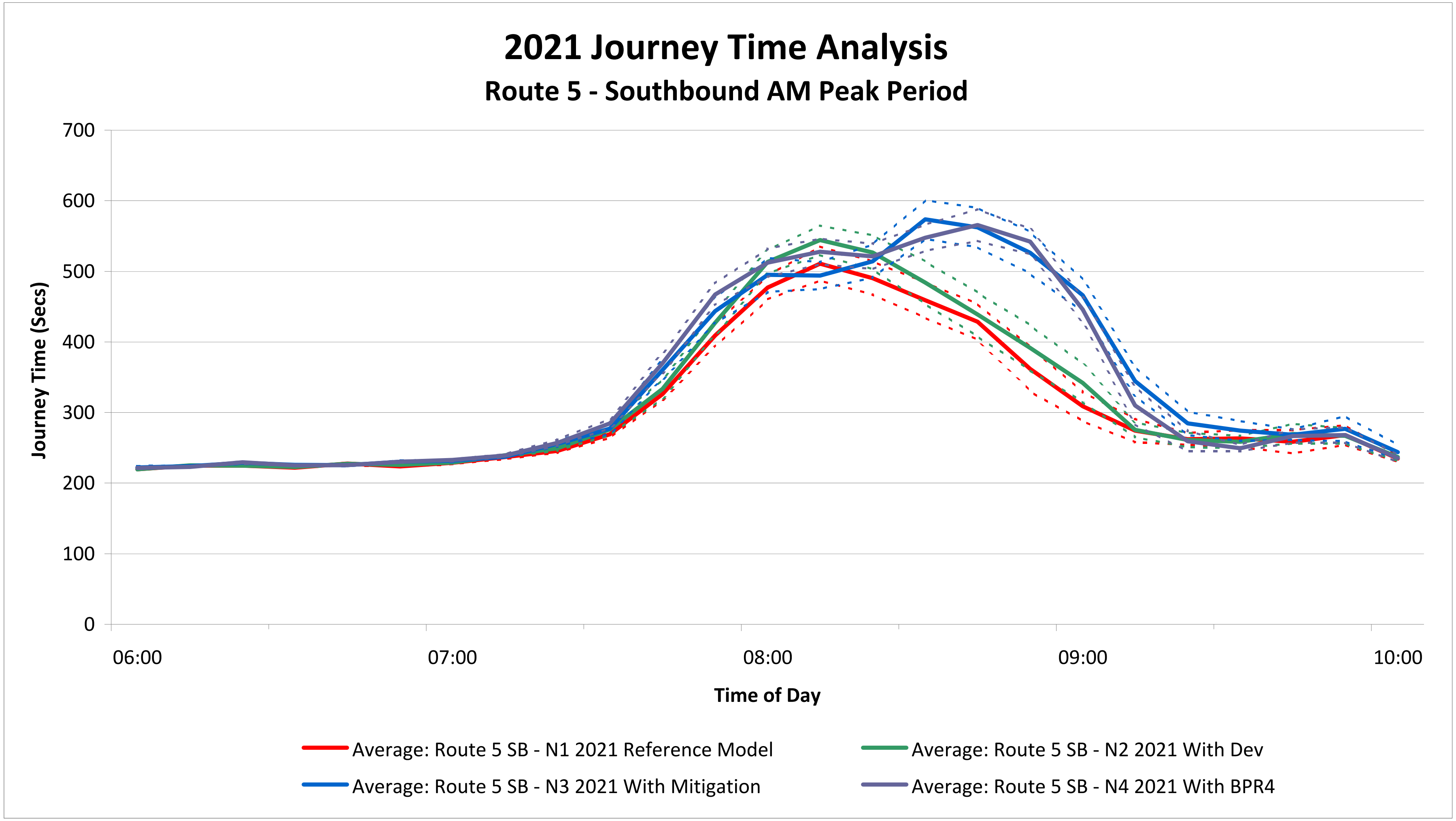

2021 Journey Time Analysis
Route 4 - Westbound AM Peak Period
900
800
700
600
500
400
300
200
100
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 4 WB - N1 2021 Reference Model
Average: Route 4 WB - N2 2021 With Dev
Average: Route 4 WB - N3 2021 With Mitigation
Average: Route 4 WB - N4 2021 With BPR4

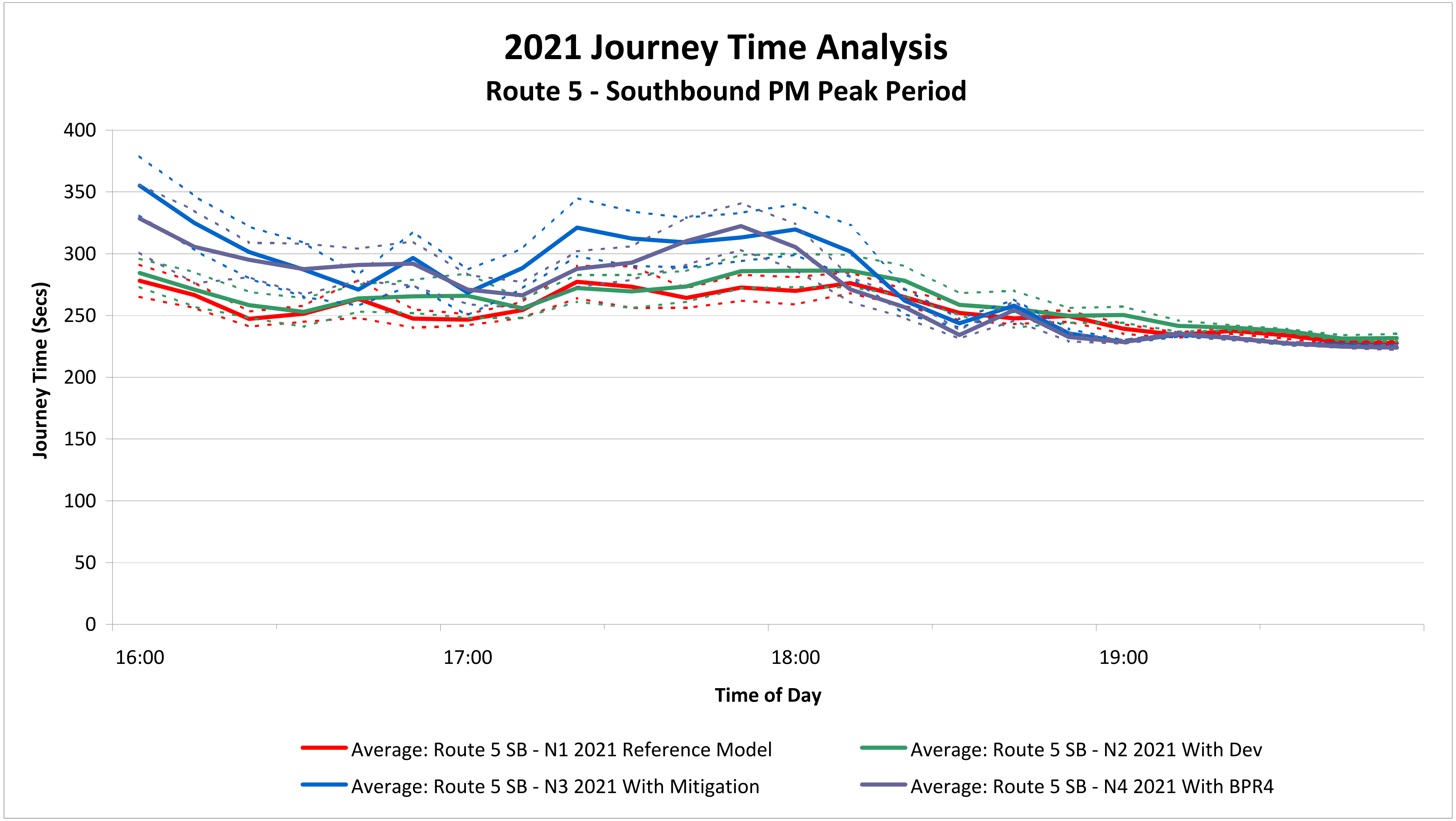


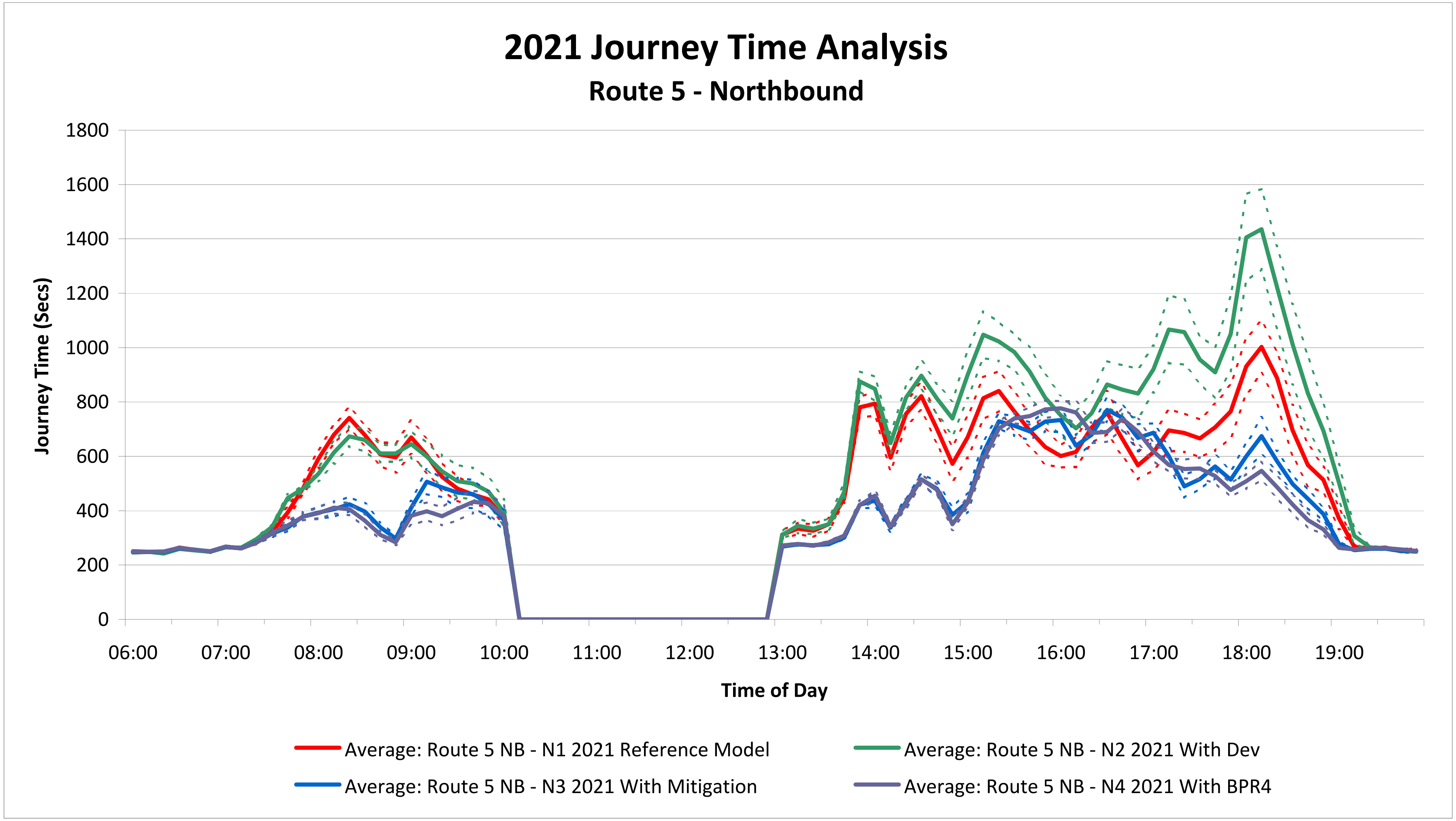
2021 Journey Time Analysis
Route 4 - Westbound PM Peak Period
Journey Time (Secs)
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 4 WB - N1 2021 Reference Model
Average: Route 4 WB - N2 2021 With Dev
Average: Route 4 WB - N3 2021 With Mitigation
Average: Route 4 WB - N4 2021 With BPR4

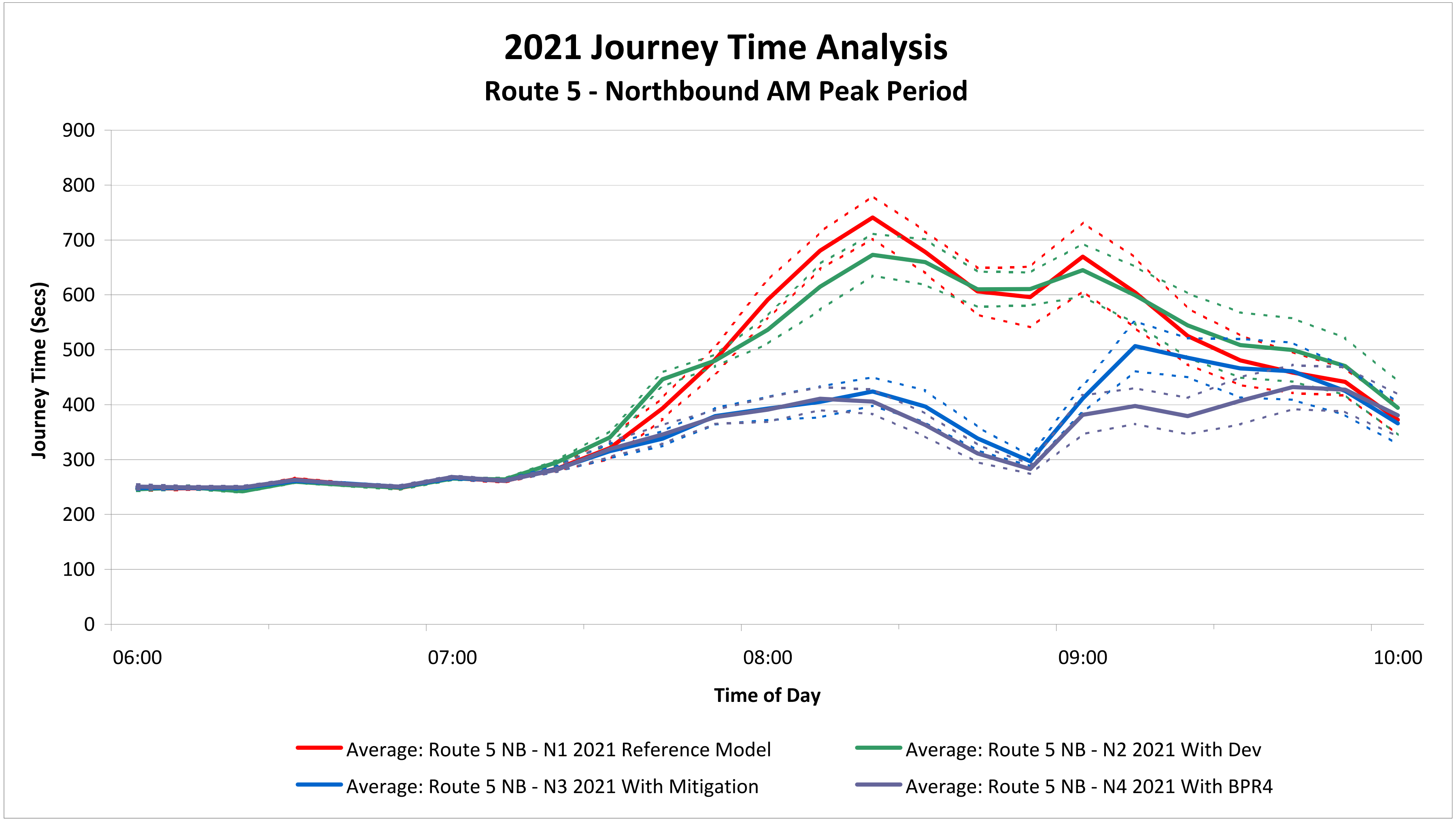


2021 Journey Time Analysis
Route 5 - Southbound
Journey Time (Secs)
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 SB - N1 2021 Reference Model
Average: Route 5 SB - N2 2021 With Dev
Average: Route 5 SB - N3 2021 With Mitigation
Average: Route 5 SB - N4 2021 With BPR4

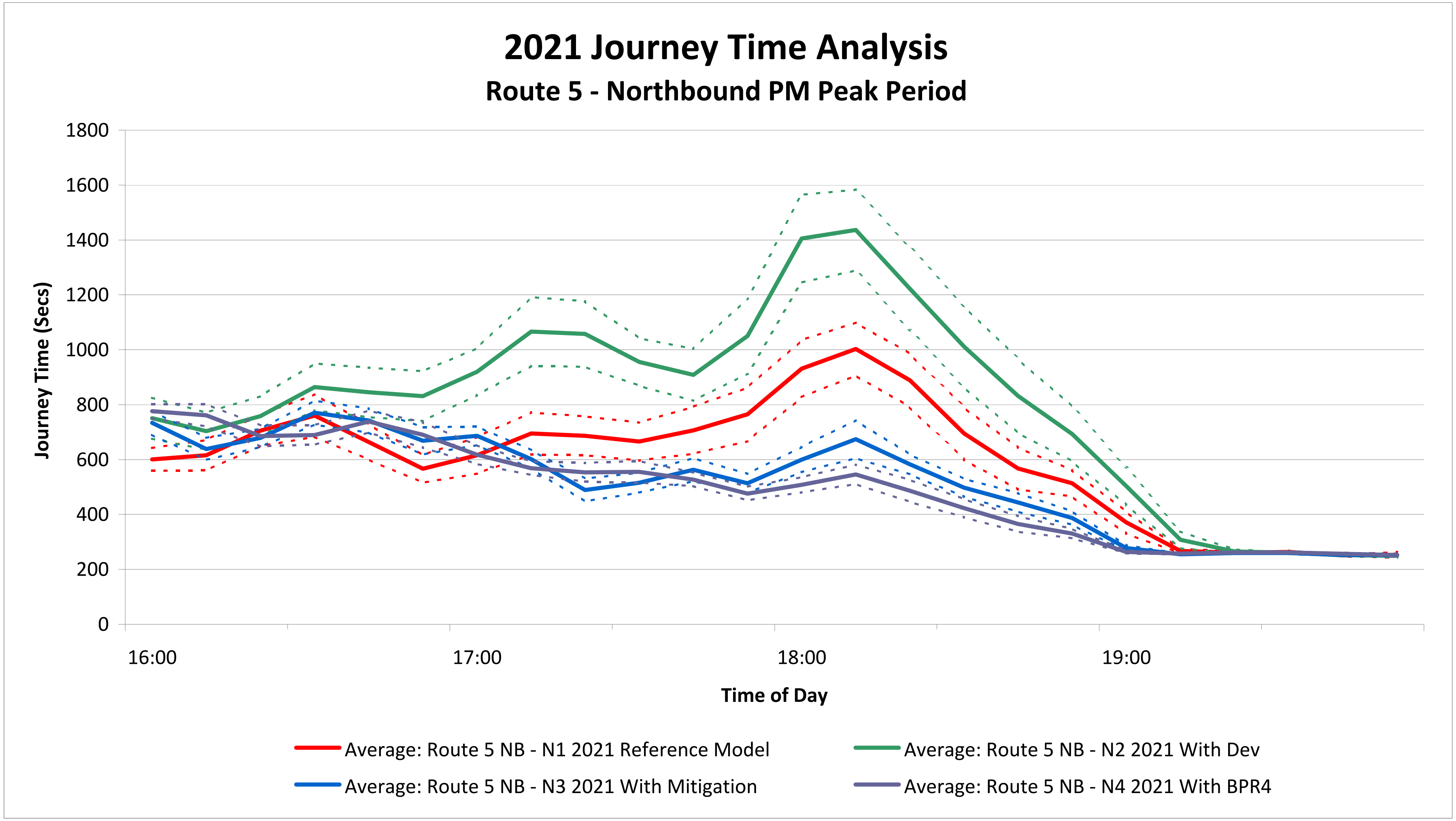

2021 Journey Time Analysis
Route 5 - Southbound AM Peak Period
Journey Time (Secs)
0
100
200
300
400
500
600
700
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 5 SB - N1 2021 Reference Model
Average: Route 5 SB - N2 2021 With Dev
Average: Route 5 SB - N3 2021 With Mitigation
Average: Route 5 SB - N4 2021 With BPR4

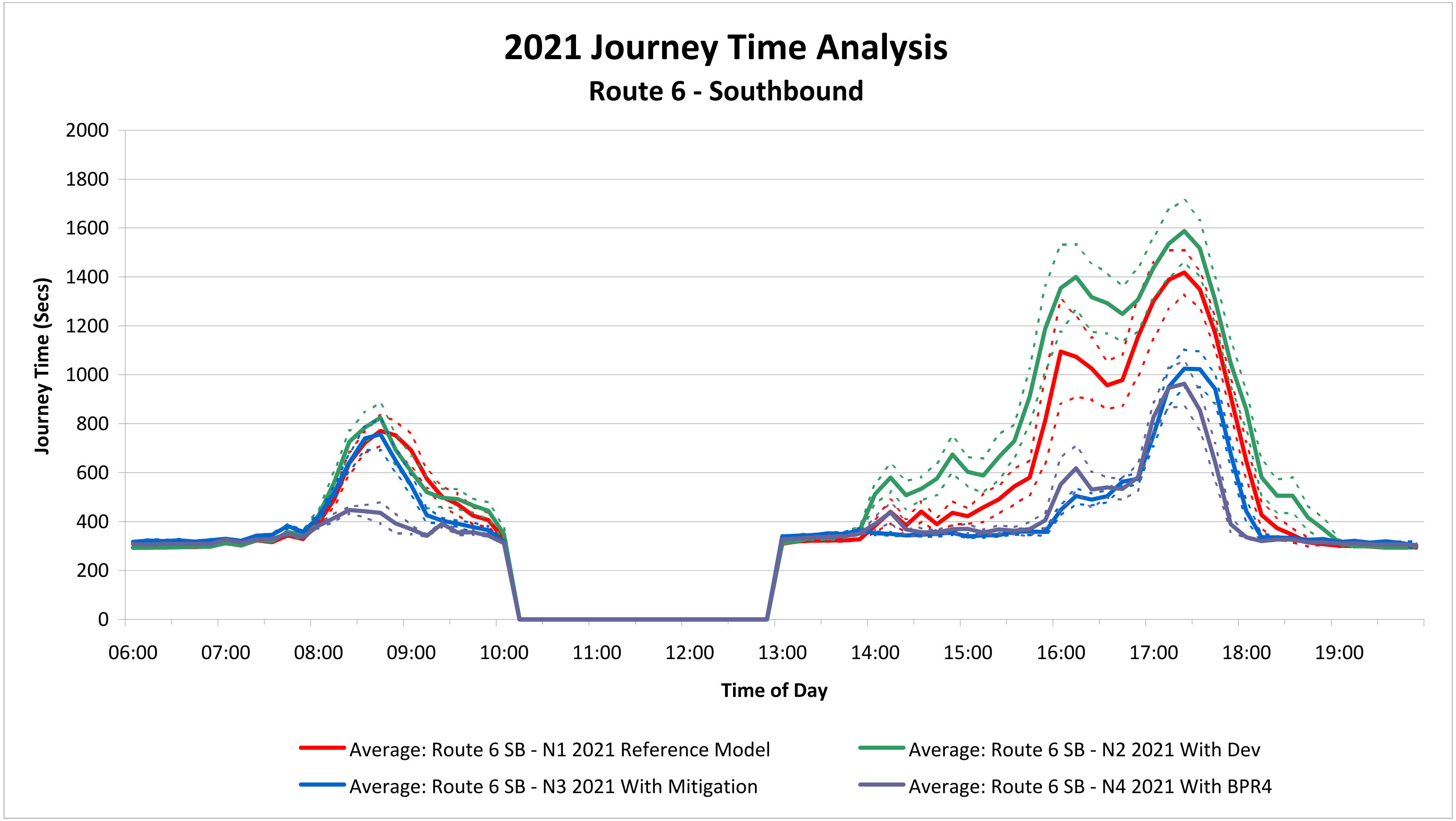

2021 Journey Time Analysis
Route 5 - Southbound PM Peak Period
Journey Time (Secs)
400
350
300
250
200
150
100
50
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 SB - N1 2021 Reference Model
Average: Route 5 SB - N2 2021 With Dev
Average: Route 5 SB - N3 2021 With Mitigation
Average: Route 5 SB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 5 - Northbound
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 NB - N1 2021 Reference Model
Average: Route 5 NB - N2 2021 With Dev
Average: Route 5 NB - N3 2021 With Mitigation
Average: Route 5 NB - N4 2021 With BPR4

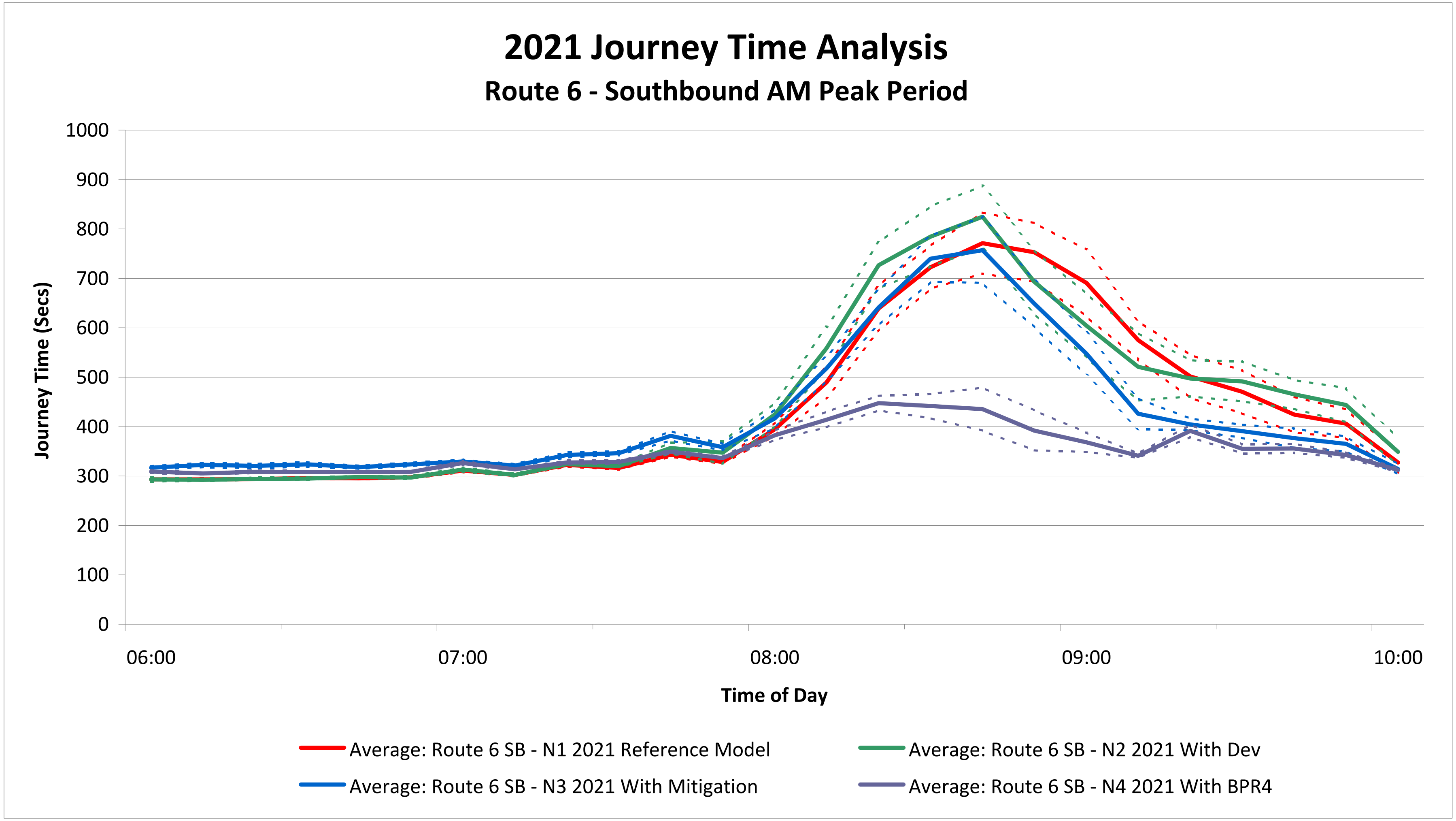


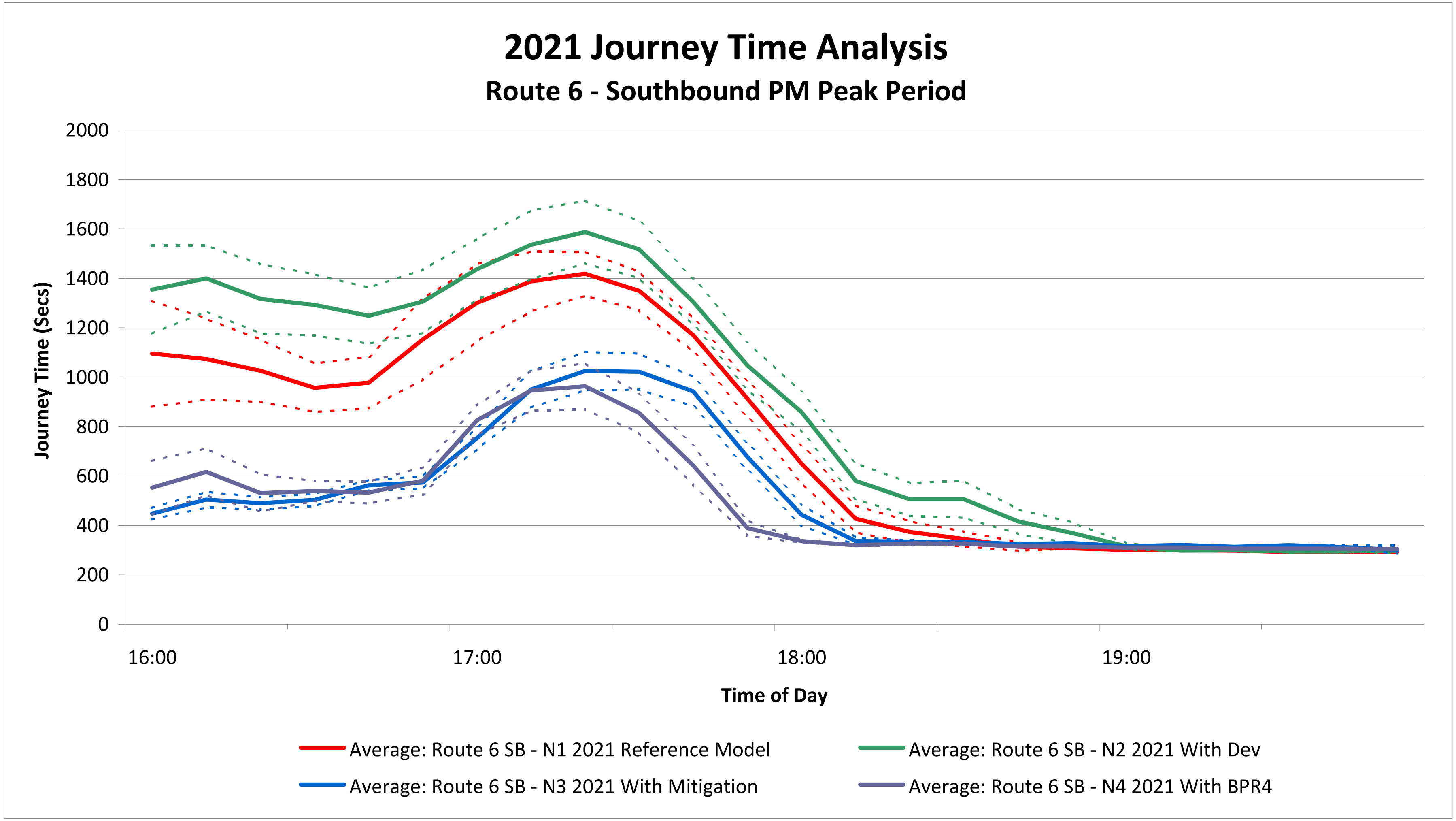
2021 Journey Time Analysis
Route 5 - Northbound AM Peak Period
Journey Time (Secs)
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 5 NB - N1 2021 Reference Model
Average: Route 5 NB - N2 2021 With Dev
Average: Route 5 NB - N3 2021 With Mitigation
Average: Route 5 NB - N4 2021 With BPR4

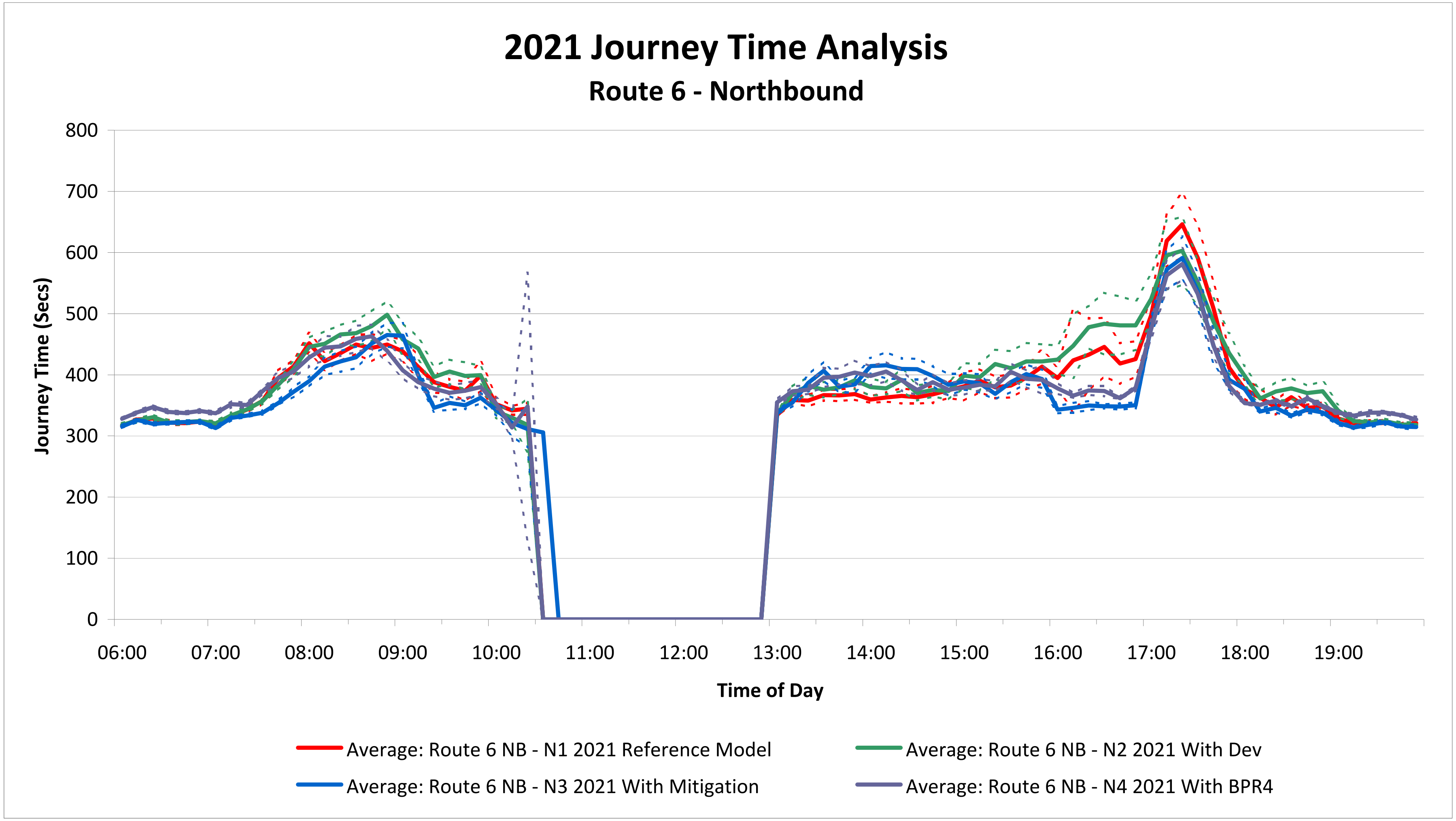

2021 Journey Time Analysis
Route 5 - Northbound PM Peak Period
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 5 NB - N1 2021 Reference Model
Average: Route 5 NB - N2 2021 With Dev
Average: Route 5 NB - N3 2021 With Mitigation
Average: Route 5 NB - N4 2021 With BPR4



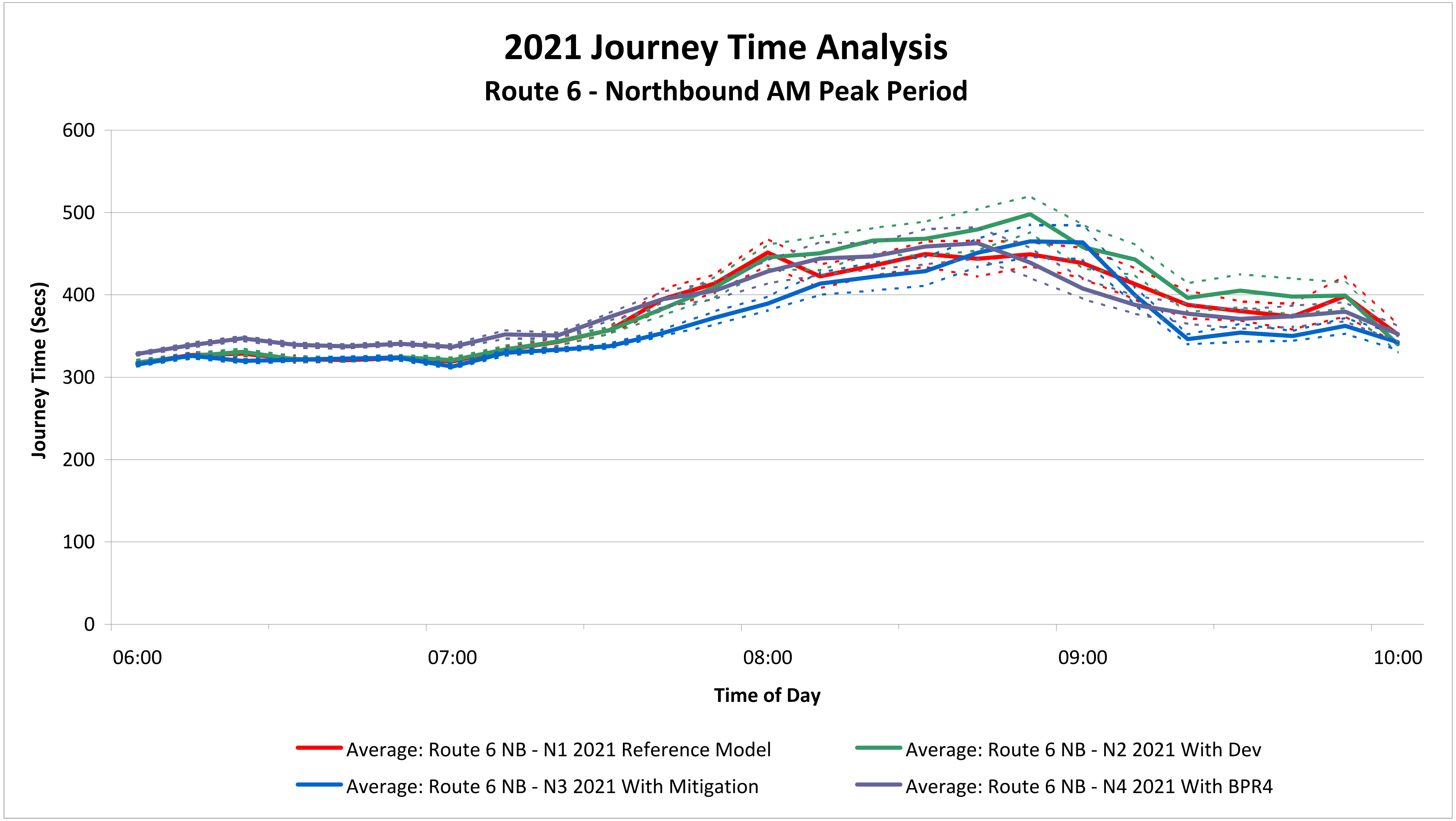
2021 Journey Time Analysis
Route 6 - Southbound
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 SB - N1 2021 Reference Model
Average: Route 6 SB - N2 2021 With Dev
Average: Route 6 SB - N3 2021 With Mitigation
Average: Route 6 SB - N4 2021 With BPR4

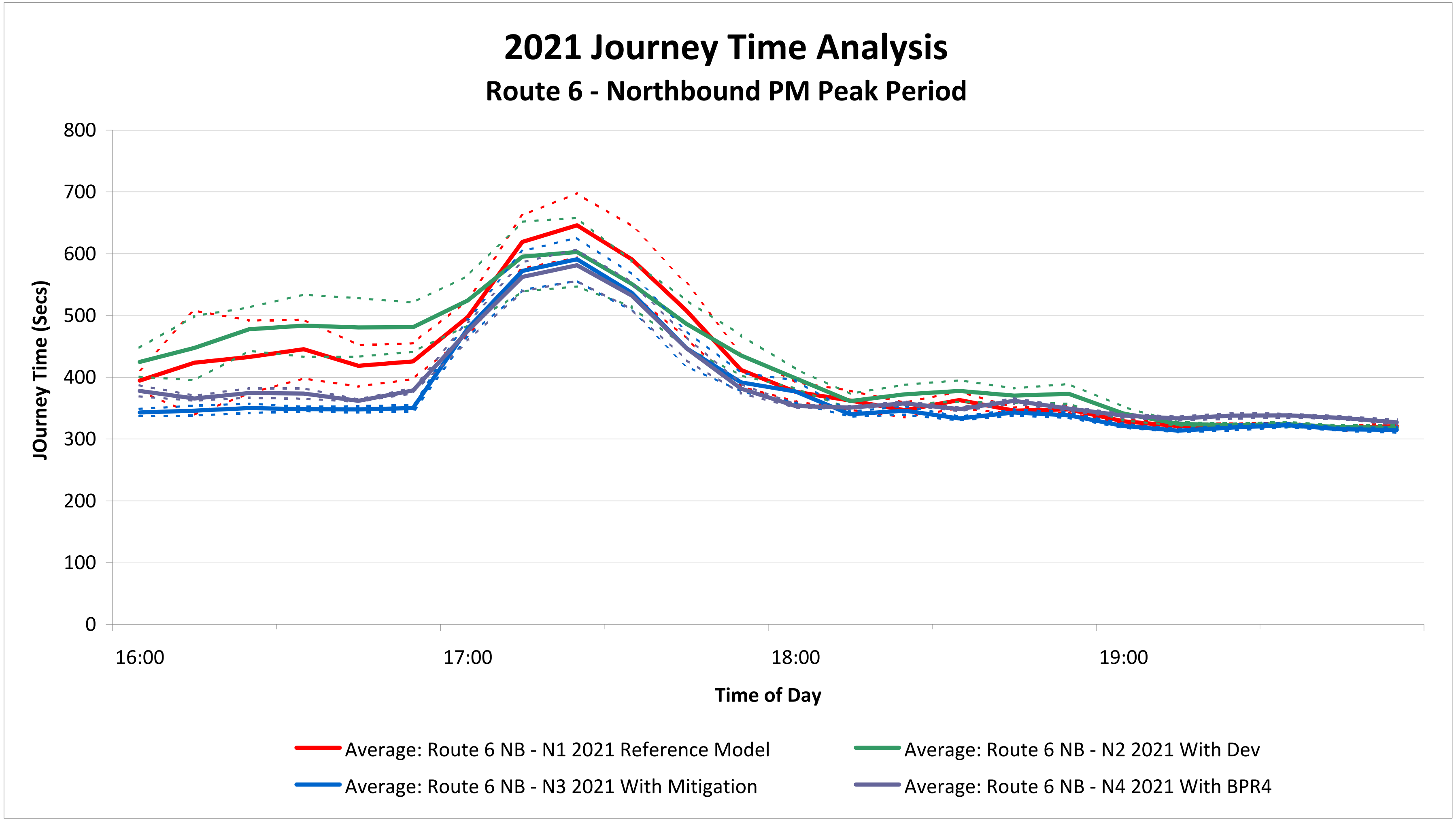

2021 Journey Time Analysis
Route 6 - Southbound AM Peak Period
1000
900
800
700
600
500
400
300
200
100
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 6 SB - N1 2021 Reference Model
Average: Route 6 SB - N2 2021 With Dev
Average: Route 6 SB - N3 2021 With Mitigation
Average: Route 6 SB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 6 - Southbound PM Peak Period
Journey Time (Secs)
0
200
400
600
800
1000
1200
1400
1600
1800
2000
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 SB - N1 2021 Reference Model
Average: Route 6 SB - N2 2021 With Dev
Average: Route 6 SB - N3 2021 With Mitigation
Average: Route 6 SB - N4 2021 With BPR4

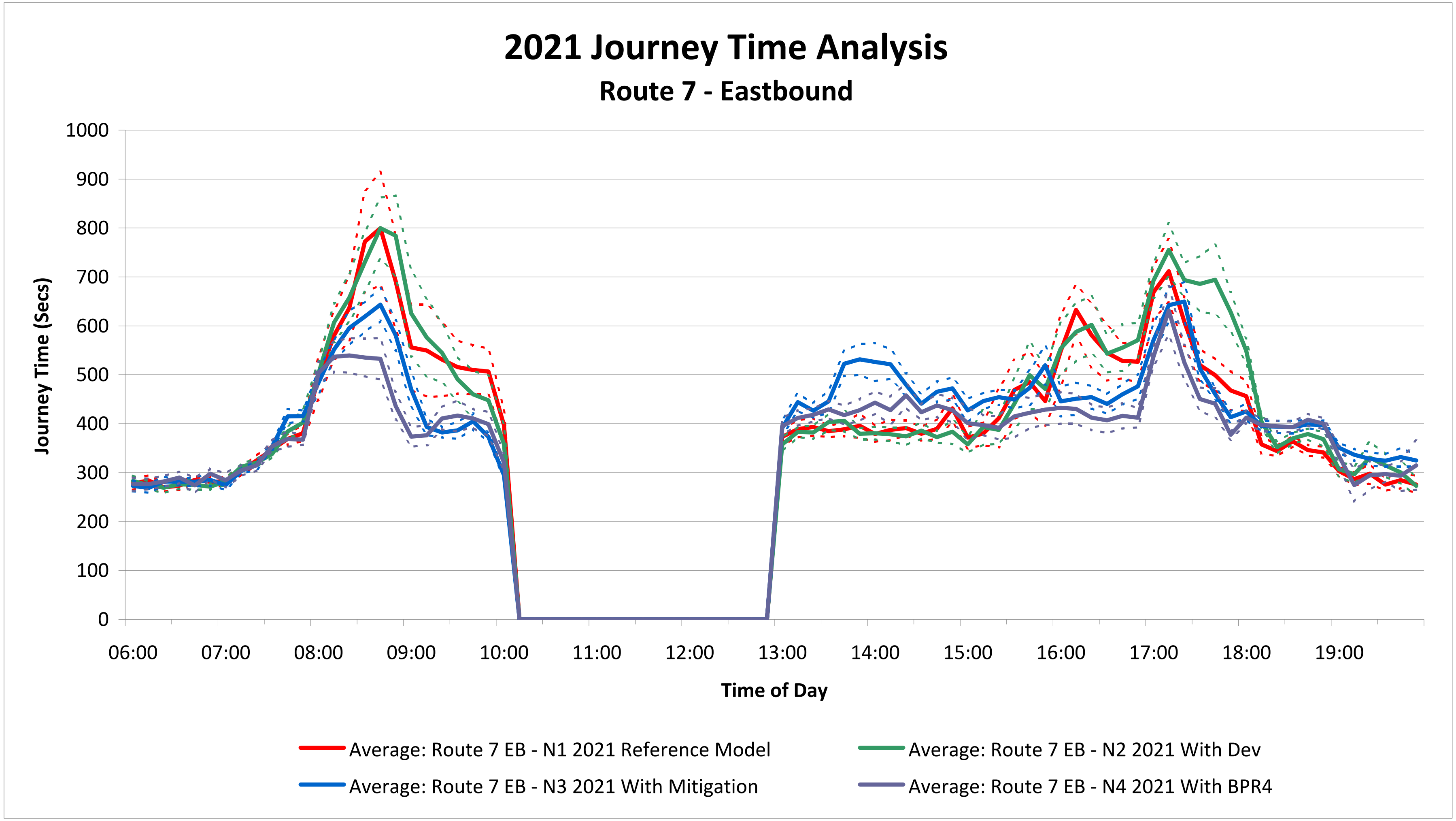


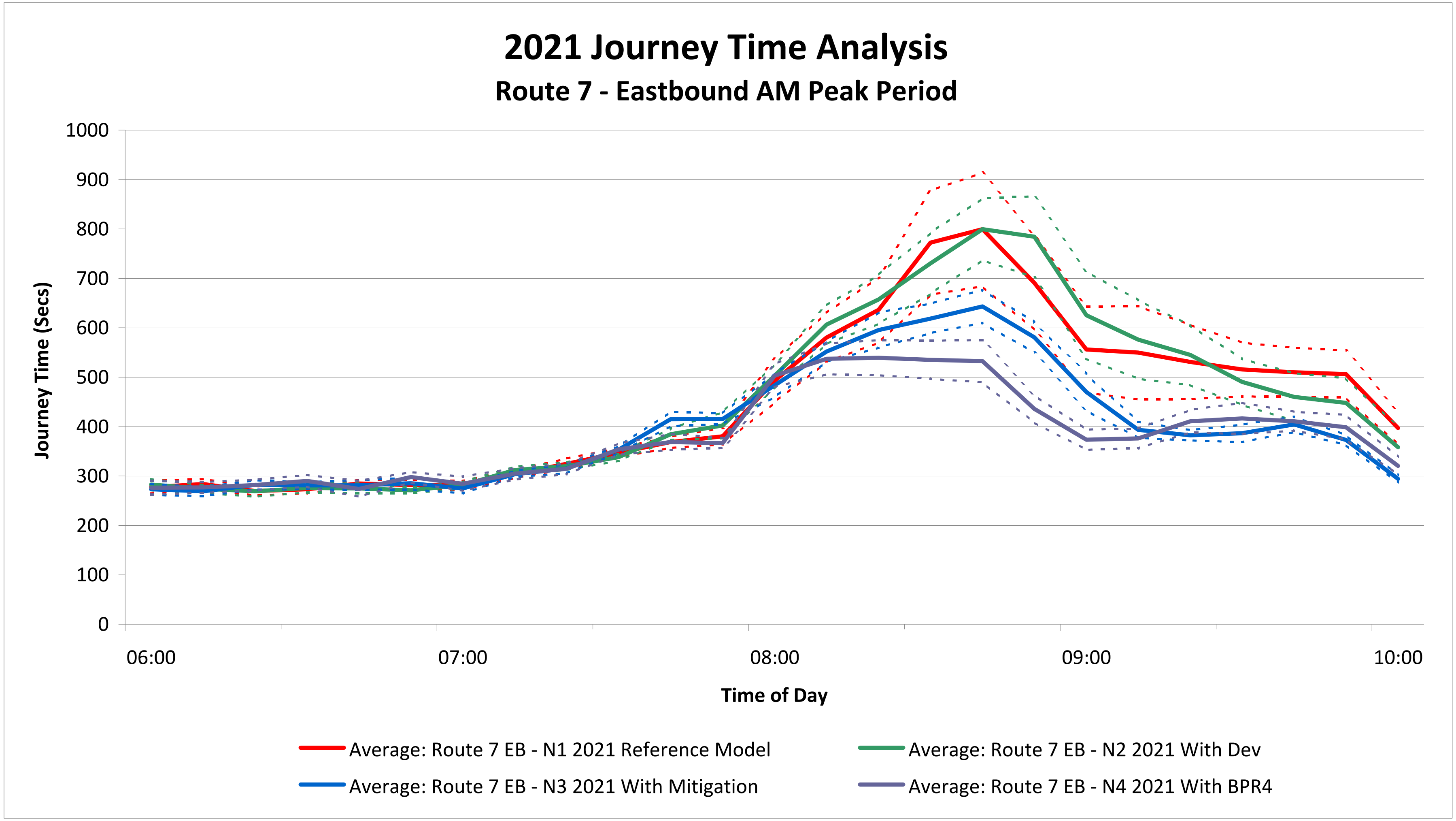
2021 Journey Time Analysis
Route 6 - Northbound
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 NB - N1 2021 Reference Model
Average: Route 6 NB - N2 2021 With Dev
Average: Route 6 NB - N3 2021 With Mitigation
Average: Route 6 NB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 6 - Northbound AM Peak Period
Journey Time (Secs)
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 6 NB - N1 2021 Reference Model
Average: Route 6 NB - N2 2021 With Dev
Average: Route 6 NB - N3 2021 With Mitigation
Average: Route 6 NB - N4 2021 With BPR4

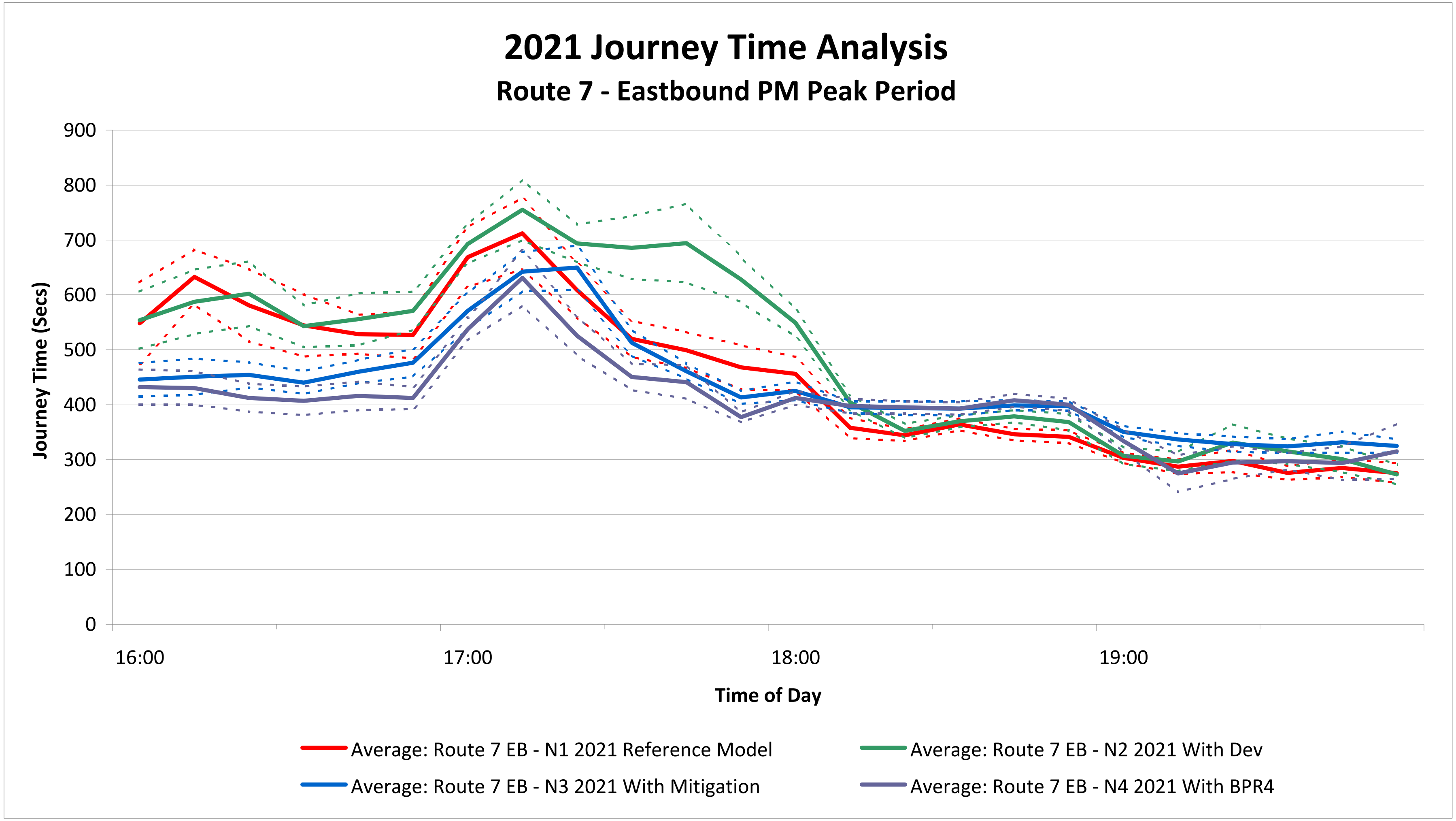


2021 Journey Time Analysis
Route 6 - Northbound PM Peak Period
800
700
600
500
400
300
200
100
0
JOurney Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 6 NB - N1 2021 Reference Model
Average: Route 6 NB - N2 2021 With Dev
Average: Route 6 NB - N3 2021 With Mitigation
Average: Route 6 NB - N4 2021 With BPR4

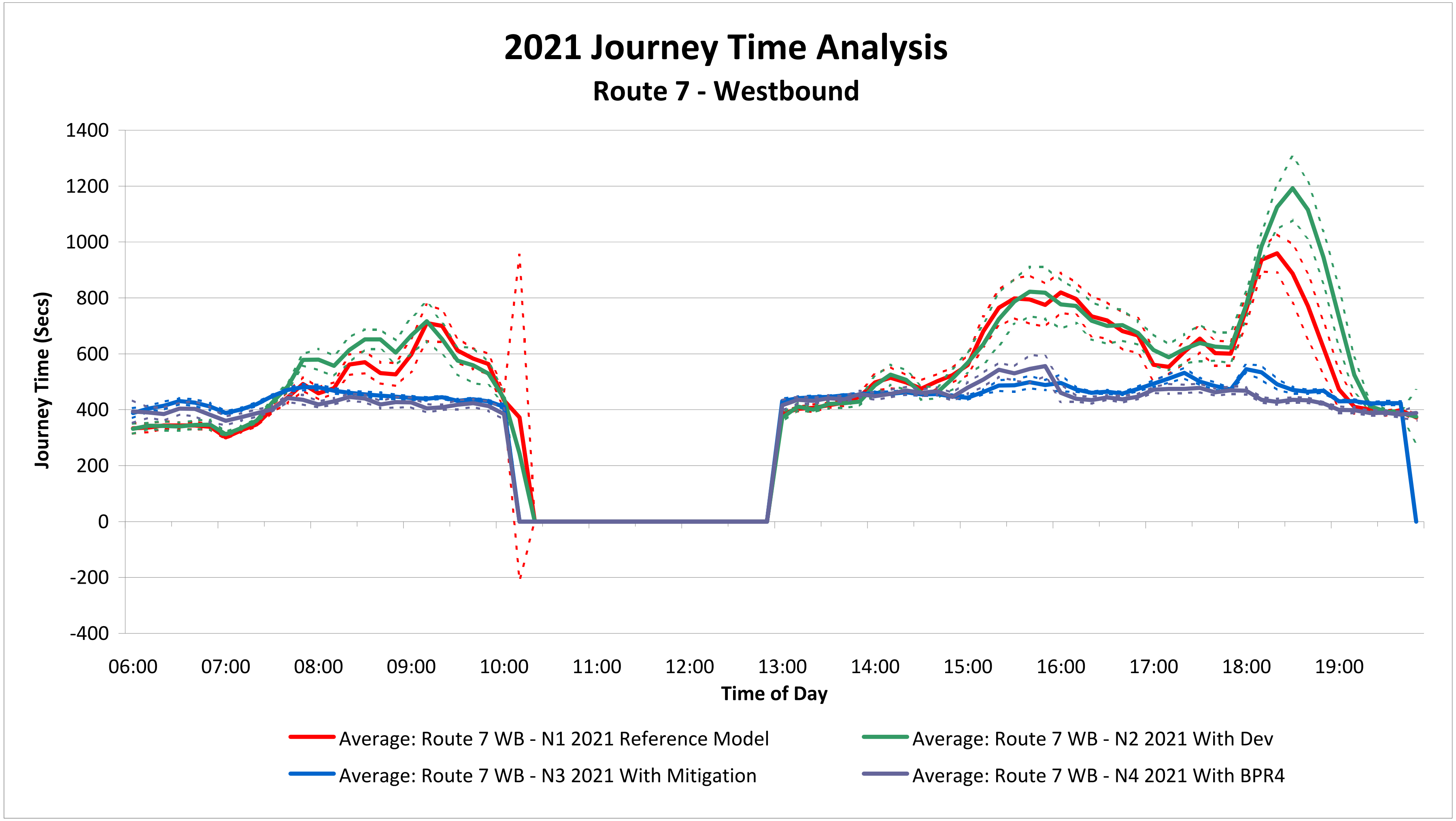

2021 Journey Time Analysis
Route 7 - Eastbound
Journey Time (Secs)
0
100
200
300
400
500
600
700
800
900
1000
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 EB - N1 2021 Reference Model
Average: Route 7 EB - N2 2021 With Dev
Average: Route 7 EB - N3 2021 With Mitigation
Average: Route 7 EB - N4 2021 With BPR4



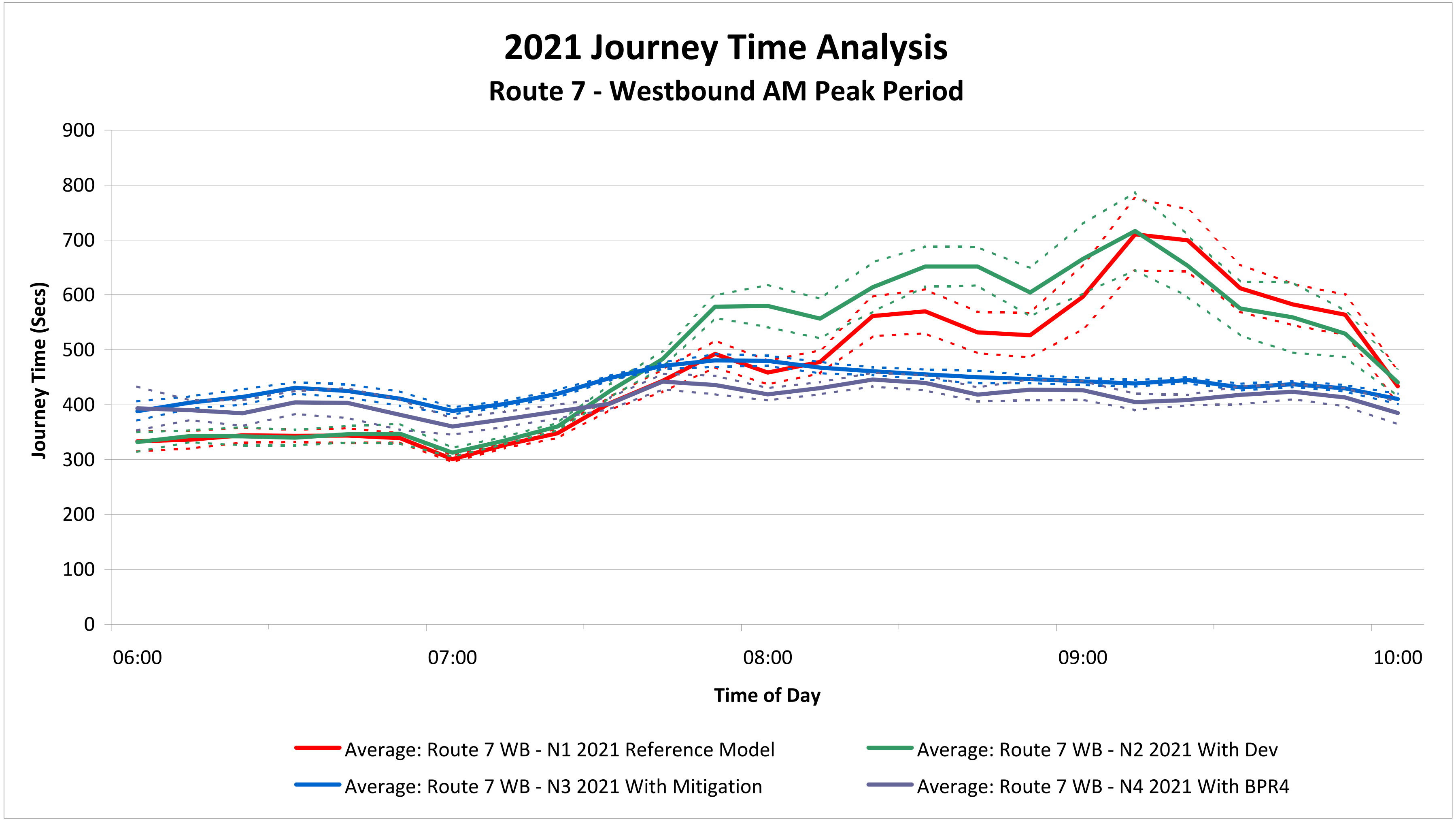
2021 Journey Time Analysis
Route 7 - Eastbound AM Peak Period
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 7 EB - N1 2021 Reference Model
Average: Route 7 EB - N2 2021 With Dev
Average: Route 7 EB - N3 2021 With Mitigation
Average: Route 7 EB - N4 2021 With BPR4

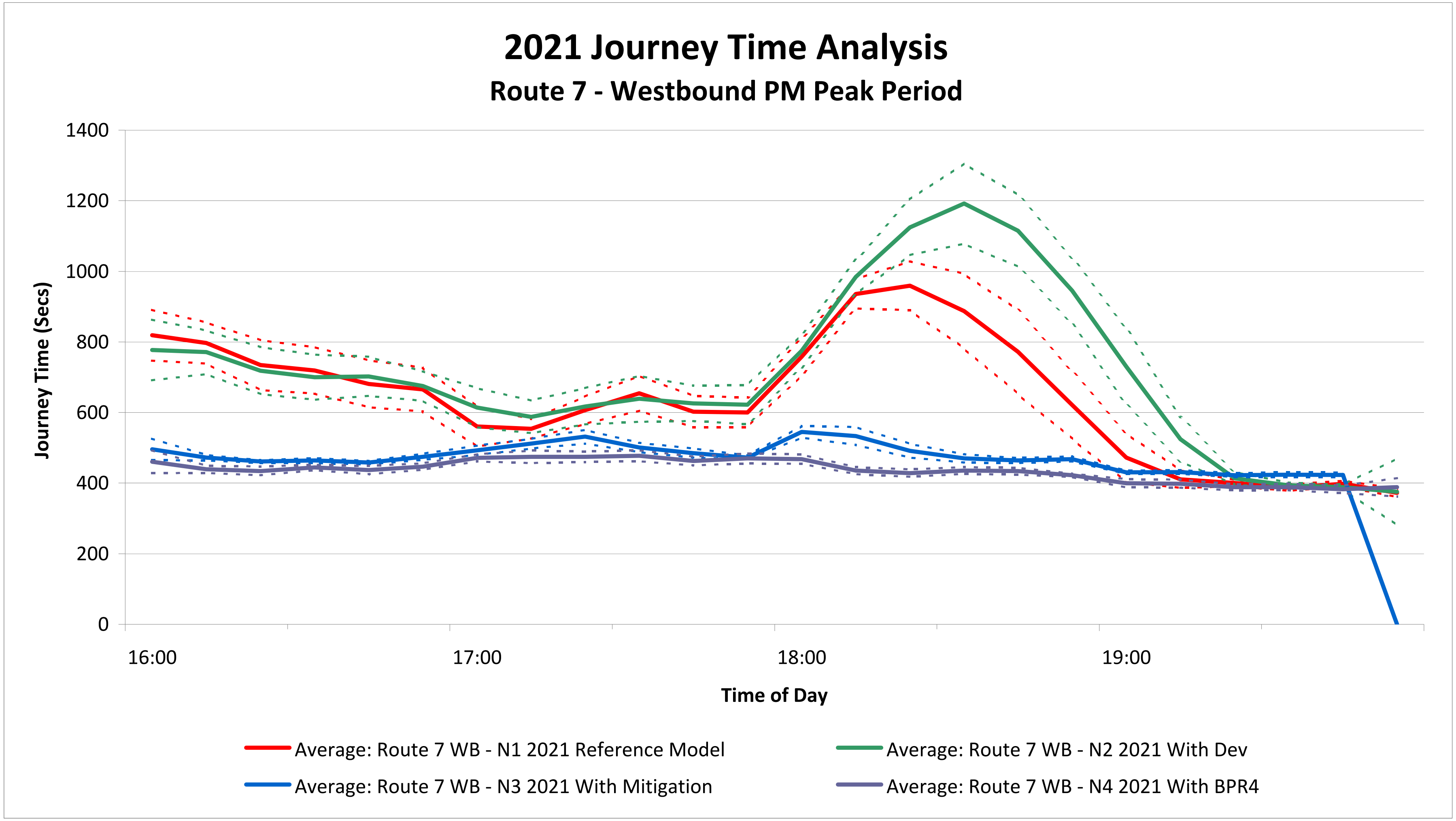


2021 Journey Time Analysis
Route 7 - Eastbound PM Peak Period
Journey Time (Secs)
900
800
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 EB - N1 2021 Reference Model
Average: Route 7 EB - N2 2021 With Dev
Average: Route 7 EB - N3 2021 With Mitigation
Average: Route 7 EB - N4 2021 With BPR4

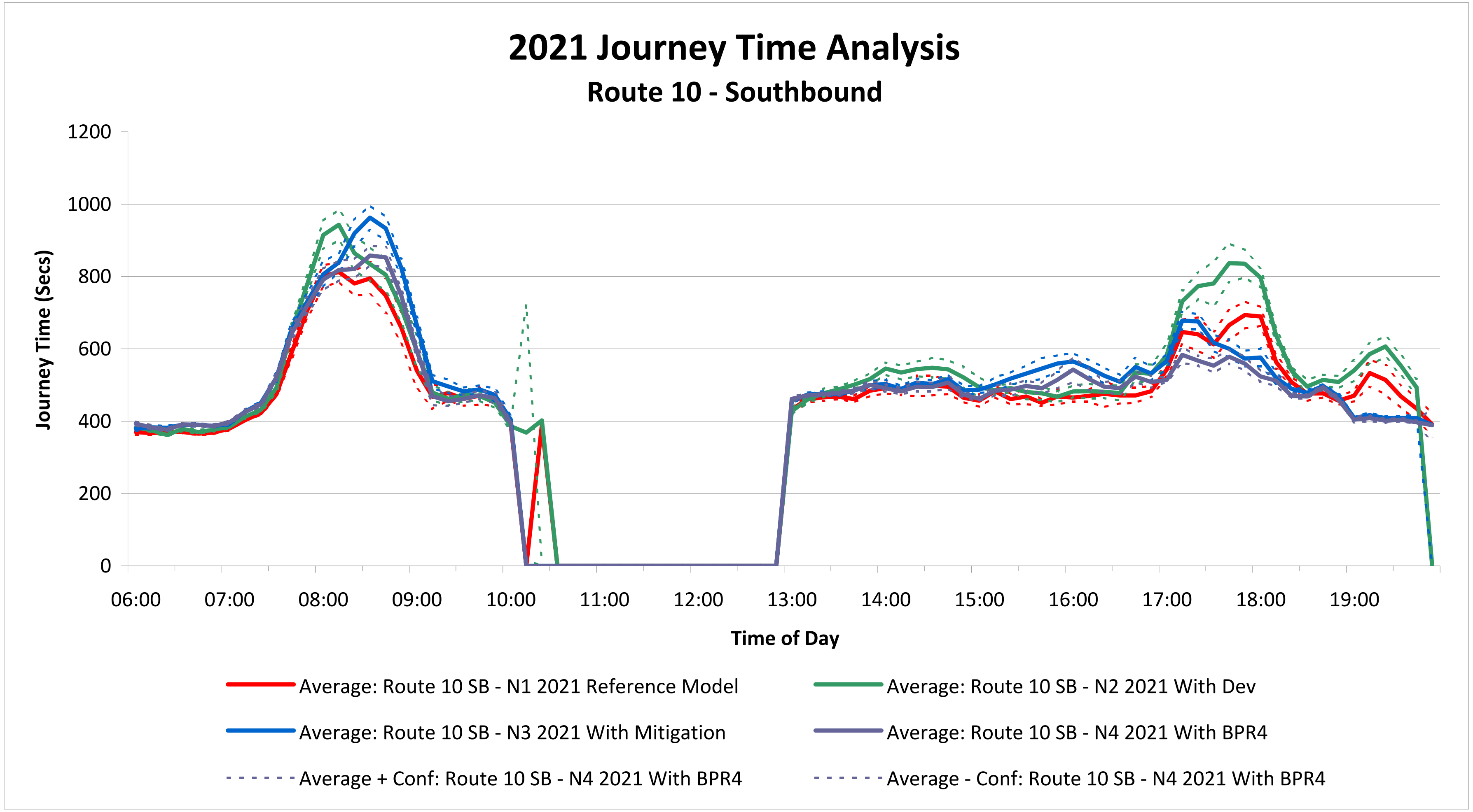


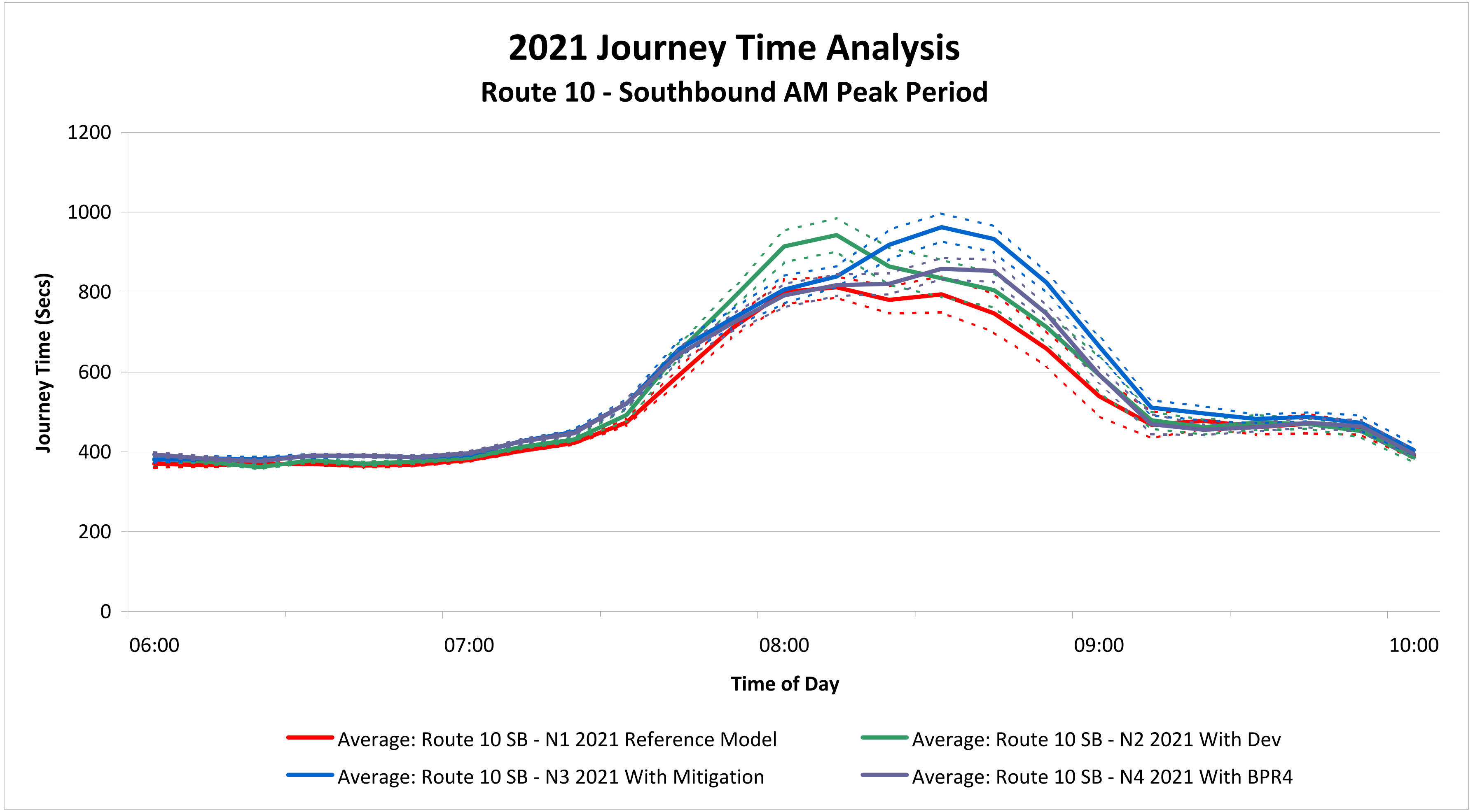
2021 Journey Time Analysis
Route 7 - Westbound
1400
1200
1000
800
600
400
200
0
-200
-400
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 WB - N1 2021 Reference Model
Average: Route 7 WB - N2 2021 With Dev
Average: Route 7 WB - N3 2021 With Mitigation
Average: Route 7 WB - N4 2021 With BPR4

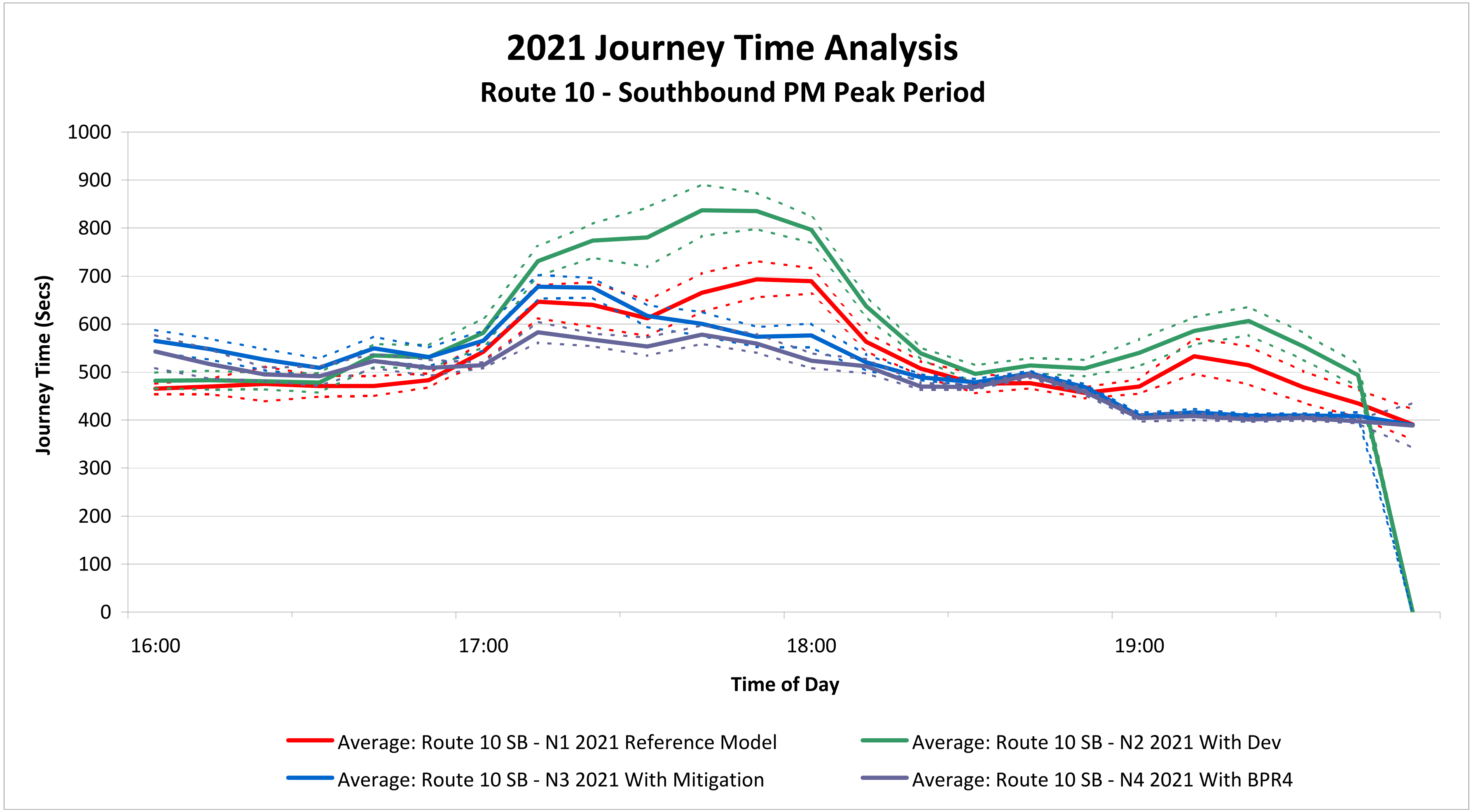

2021 Journey Time Analysis
Route 7 - Westbound AM Peak Period
Journey Time (Secs)
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 7 WB - N1 2021 Reference Model
Average: Route 7 WB - N2 2021 With Dev
Average: Route 7 WB - N3 2021 With Mitigation
Average: Route 7 WB - N4 2021 With BPR4

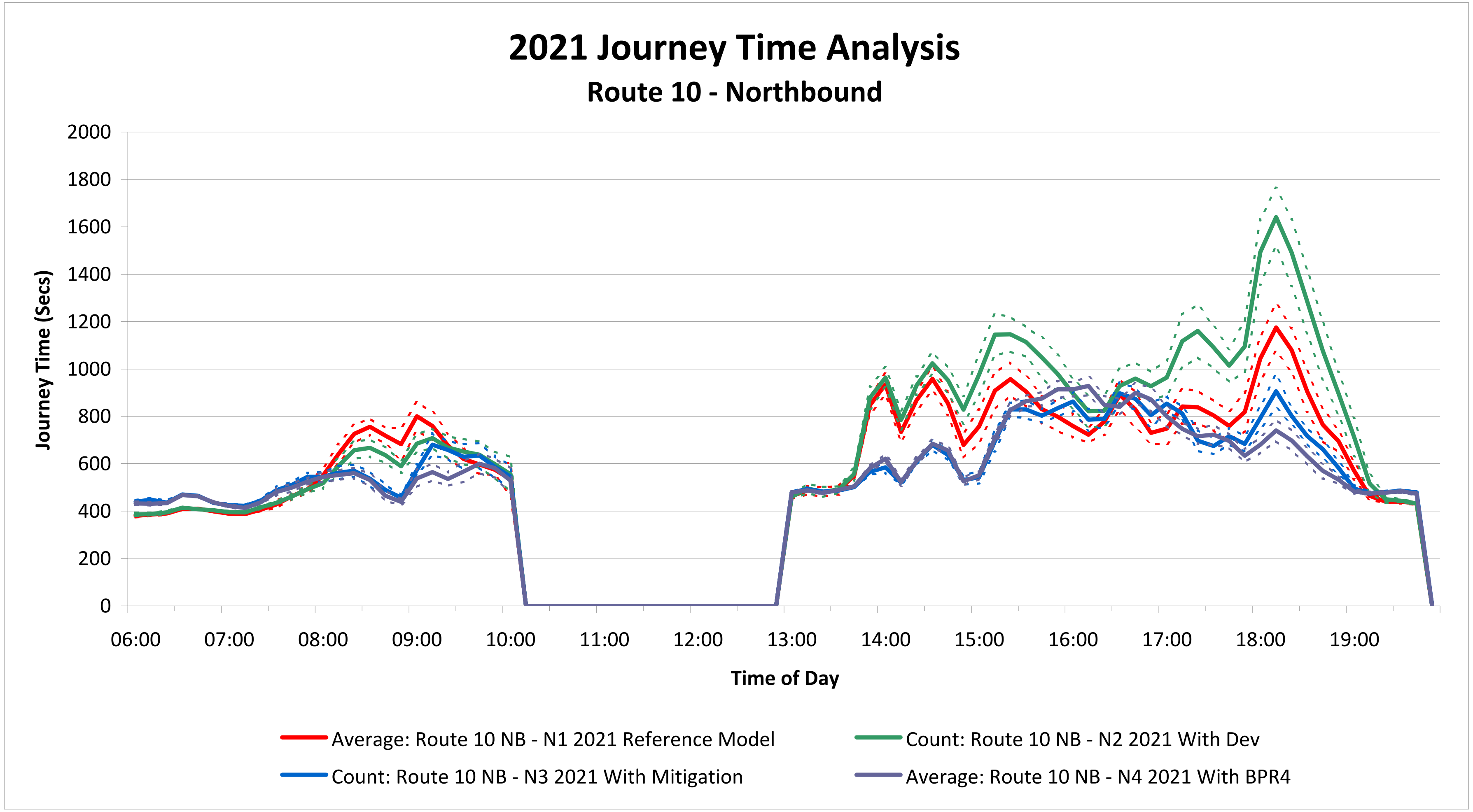


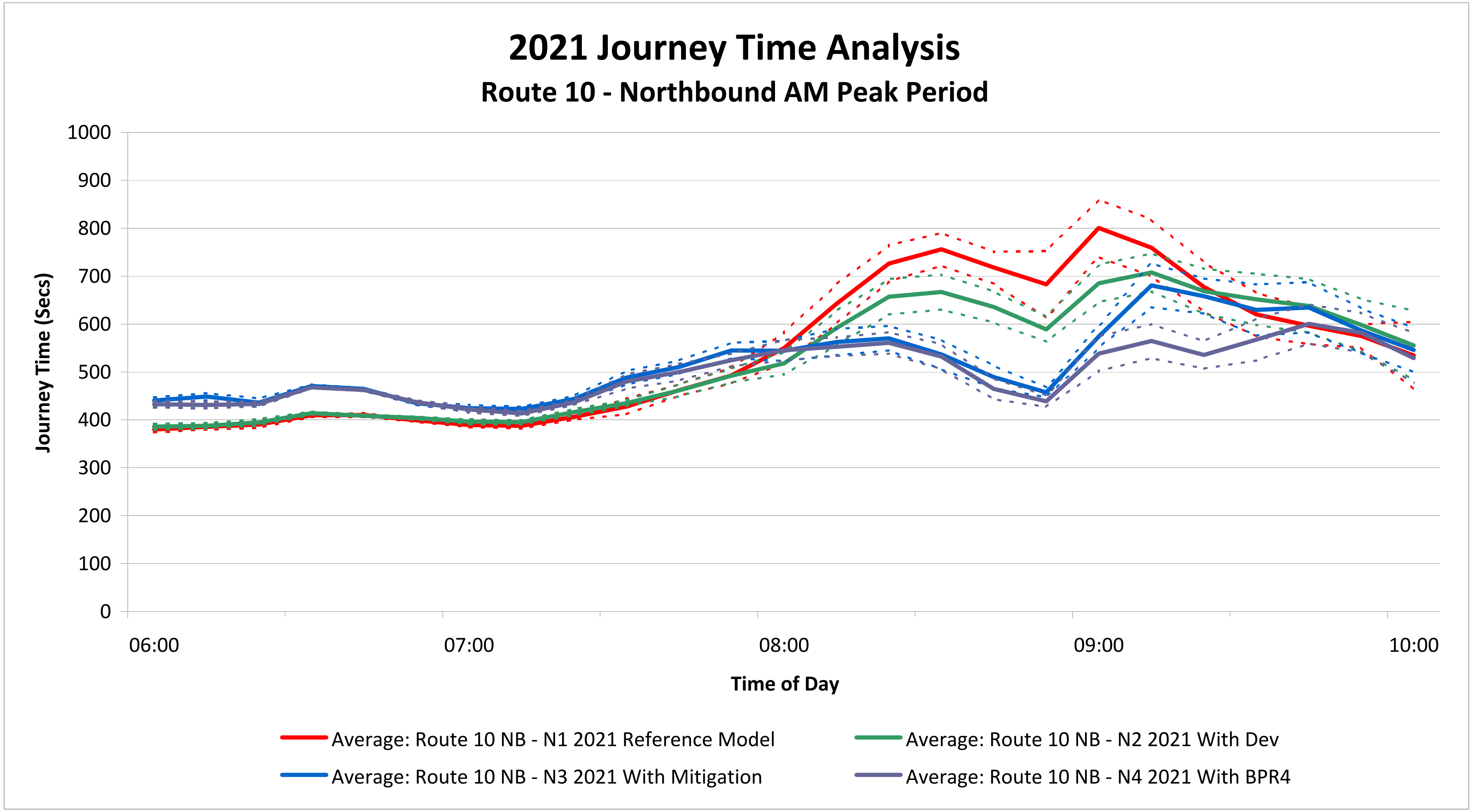
2021 Journey Time Analysis
Route 7 - Westbound PM Peak Period
Journey Time (Secs)
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 7 WB - N1 2021 Reference Model
Average: Route 7 WB - N2 2021 With Dev
Average: Route 7 WB - N3 2021 With Mitigation
Average: Route 7 WB - N4 2021 With BPR4

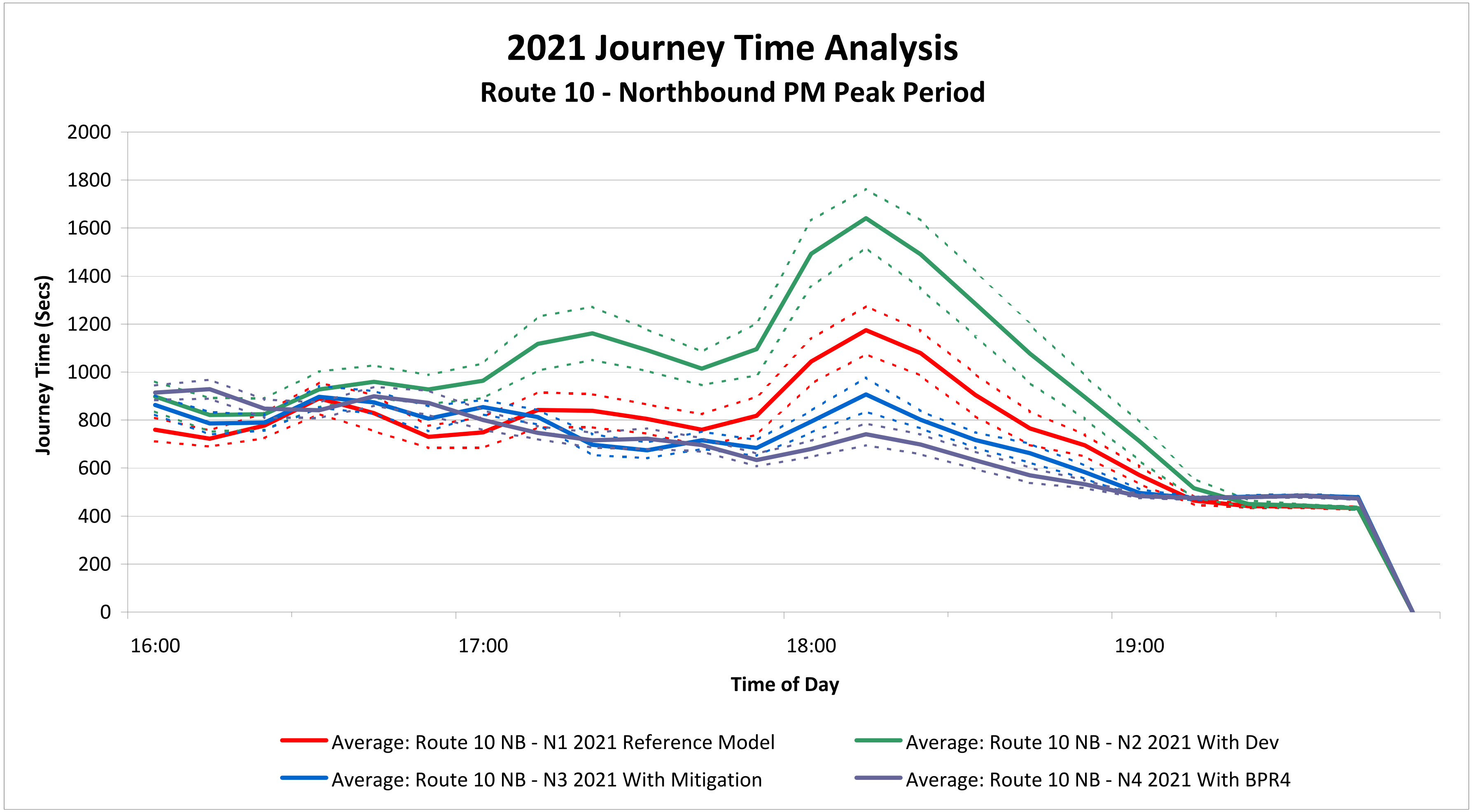

2021 Journey Time Analysis
Route 10 - Southbound
Journey Time (Secs)
0
200
400
600
800
1000
1200
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 SB - N1 2021 Reference Model
Average: Route 10 SB - N2 2021 With Dev
Average: Route 10 SB - N3 2021 With Mitigation
Average: Route 10 SB - N4 2021 With BPR4
Average + Conf: Route 10 SB - N4 2021 With BPR4
Average - Conf: Route 10 SB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 10 - Southbound AM Peak Period
1200
1000
800
600
400
200
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 10 SB - N1 2021 Reference Model
Average: Route 10 SB - N2 2021 With Dev
Average: Route 10 SB - N3 2021 With Mitigation
Average: Route 10 SB - N4 2021 With BPR4

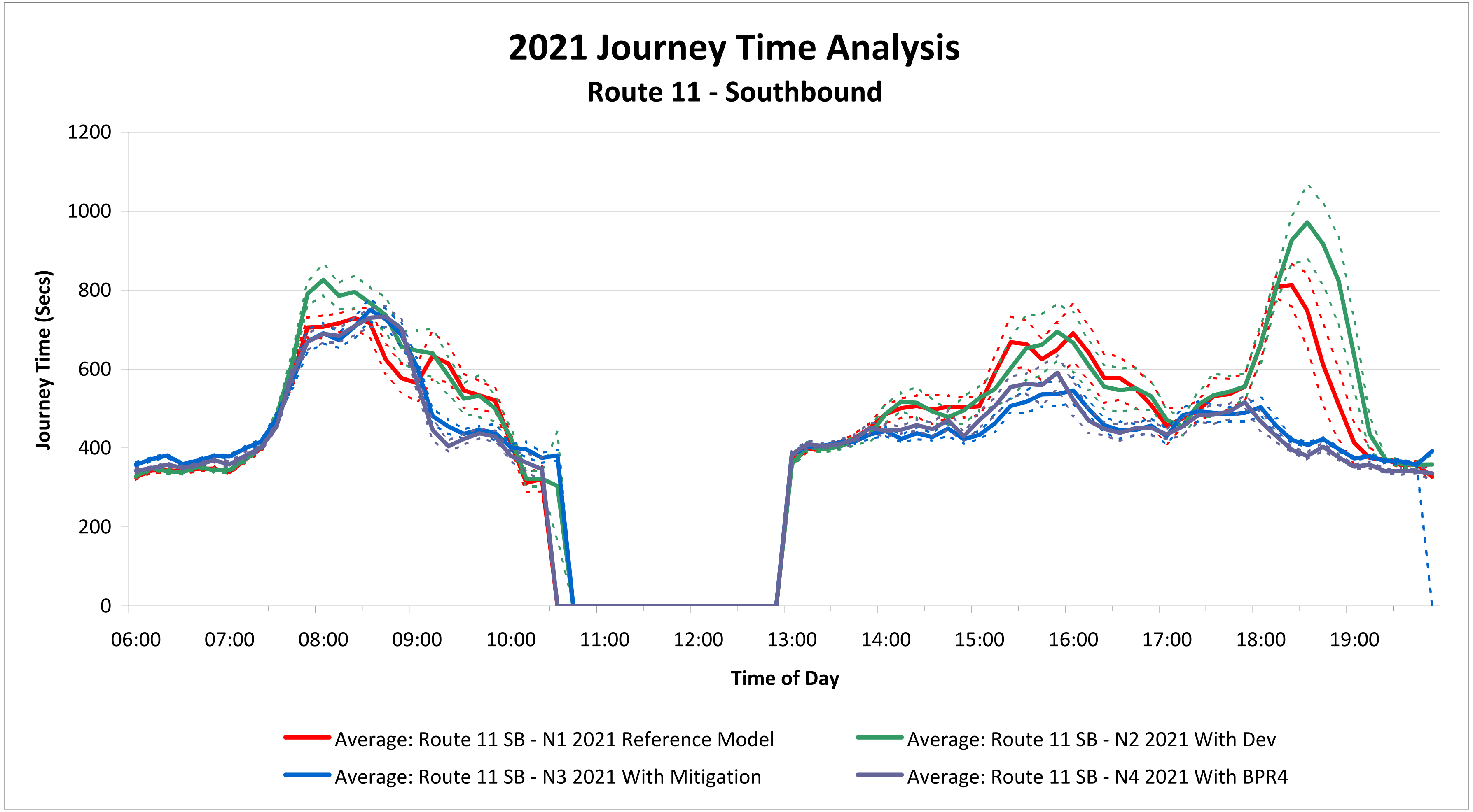

2021 Journey Time Analysis
Route 10 - Southbound PM Peak Period
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 SB - N1 2021 Reference Model
Average: Route 10 SB - N2 2021 With Dev
Average: Route 10 SB - N3 2021 With Mitigation
Average: Route 10 SB - N4 2021 With BPR4

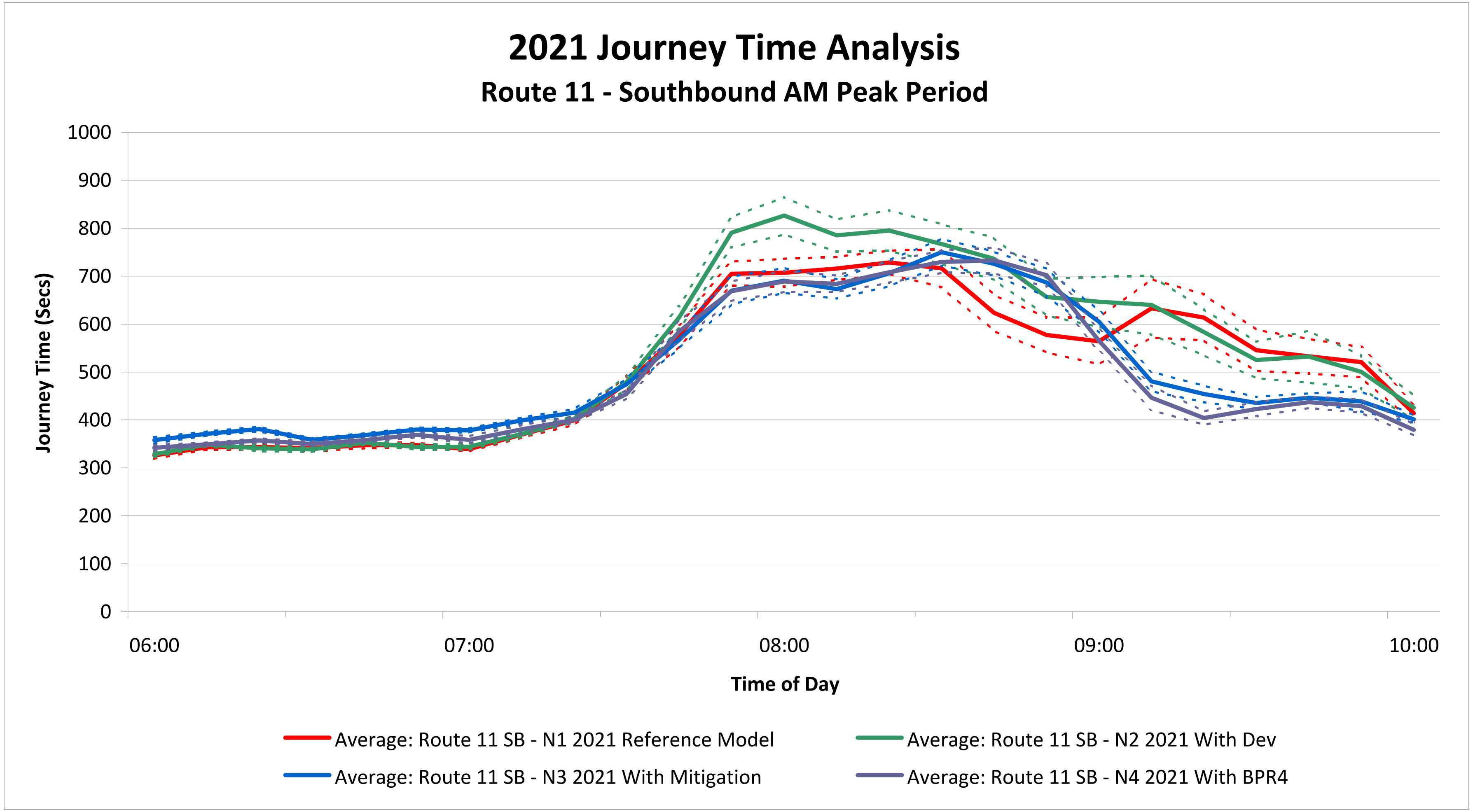

2021 Journey Time Analysis
Route 10 - Northbound
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 NB - N1 2021 Reference Model
Count: Route 10 NB - N2 2021 With Dev
Count: Route 10 NB - N3 2021 With Mitigation
Average: Route 10 NB - N4 2021 With BPR4

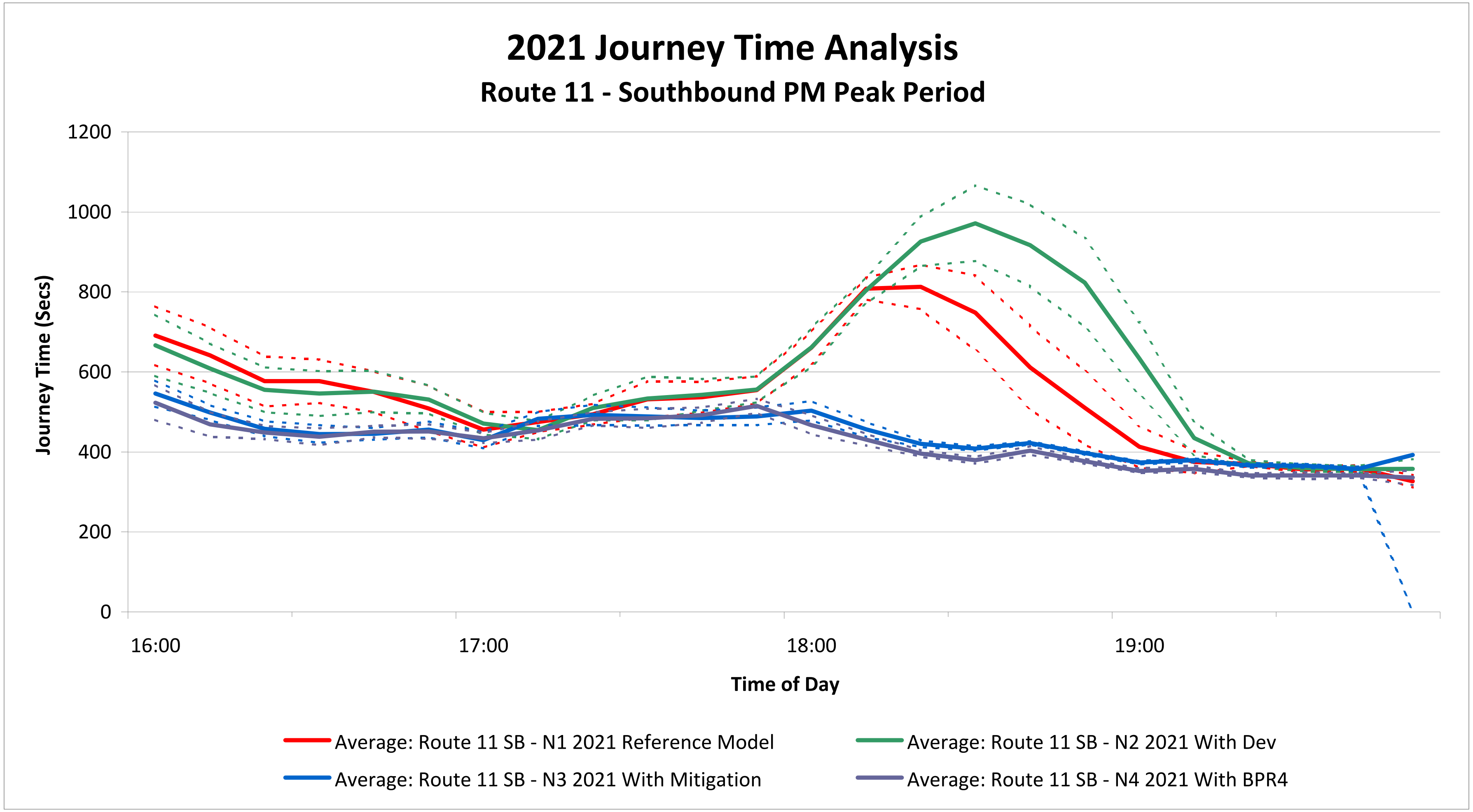

2021 Journey Time Analysis
Route 10 - Northbound AM Peak Period
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 10 NB - N1 2021 Reference Model
Average: Route 10 NB - N2 2021 With Dev
Average: Route 10 NB - N3 2021 With Mitigation
Average: Route 10 NB - N4 2021 With BPR4



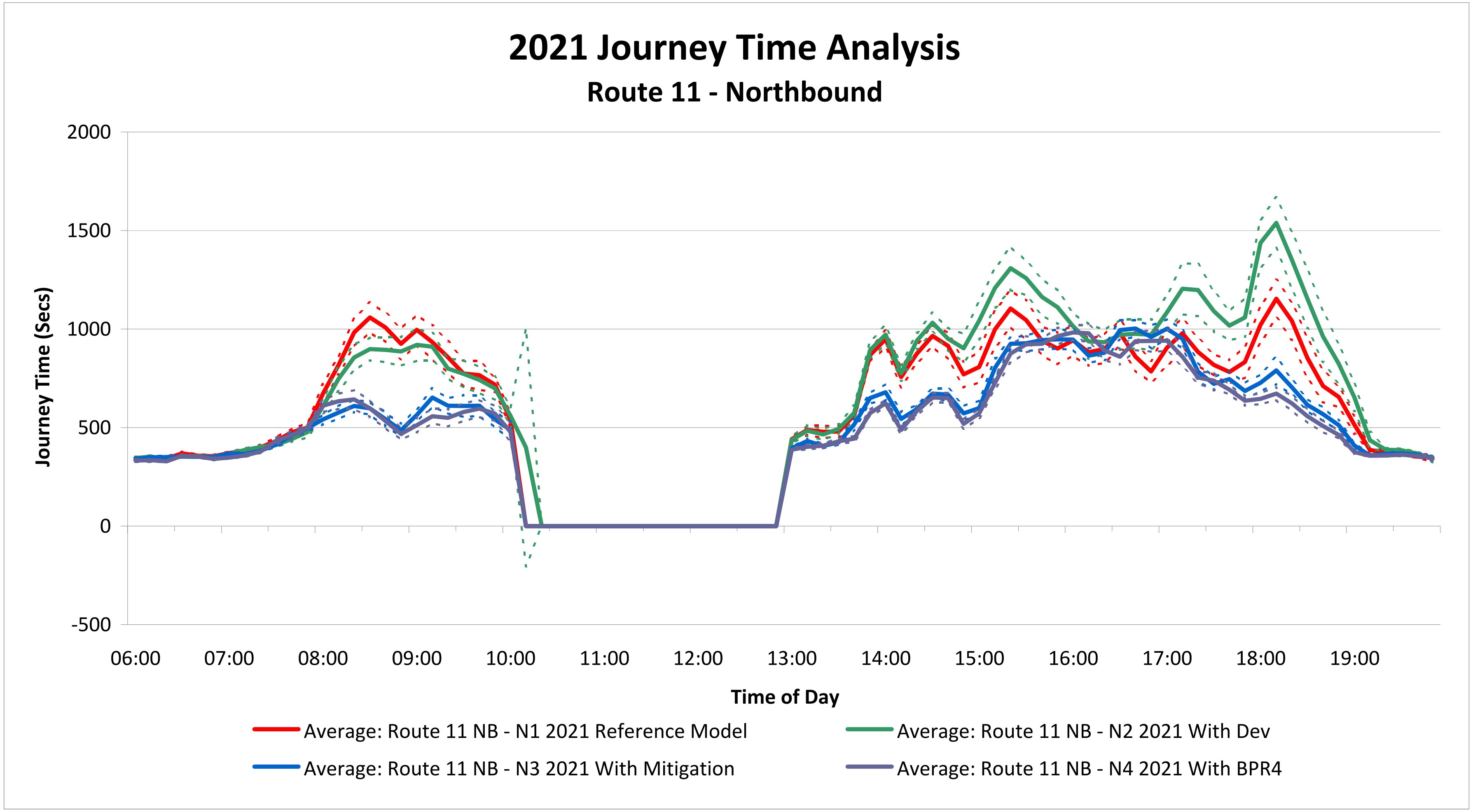
2021 Journey Time Analysis
Route 10 - Northbound PM Peak Period
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Journey Time (Secs)
16:00
17:00
18:00
19:00
Time of Day
Average: Route 10 NB - N1 2021 Reference Model
Average: Route 10 NB - N2 2021 With Dev
Average: Route 10 NB - N3 2021 With Mitigation
Average: Route 10 NB - N4 2021 With BPR4

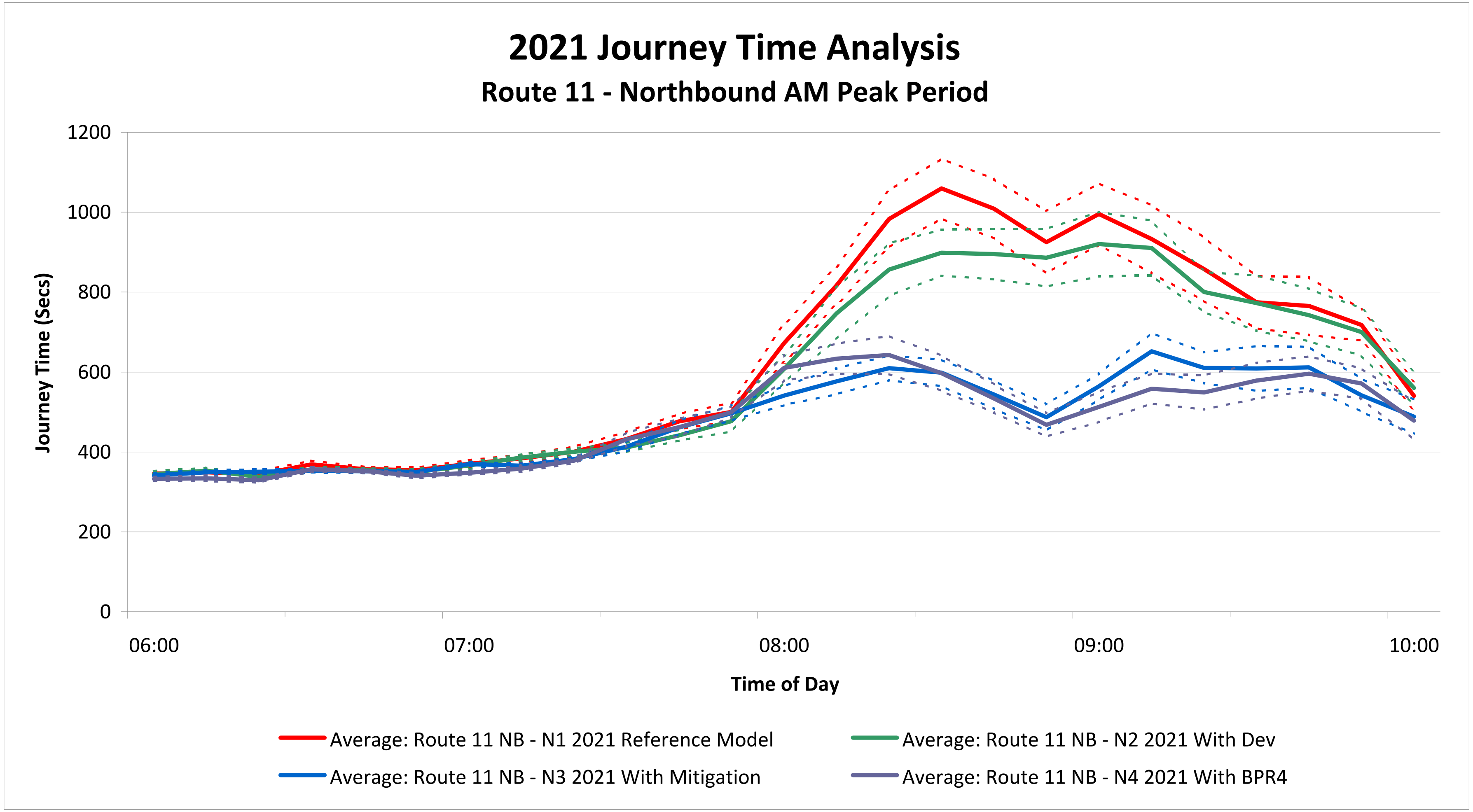

2021 Journey Time Analysis
Route 11 - Southbound
Journey Time (Secs)
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 SB - N1 2021 Reference Model
Average: Route 11 SB - N2 2021 With Dev
Average: Route 11 SB - N3 2021 With Mitigation
Average: Route 11 SB - N4 2021 With BPR4

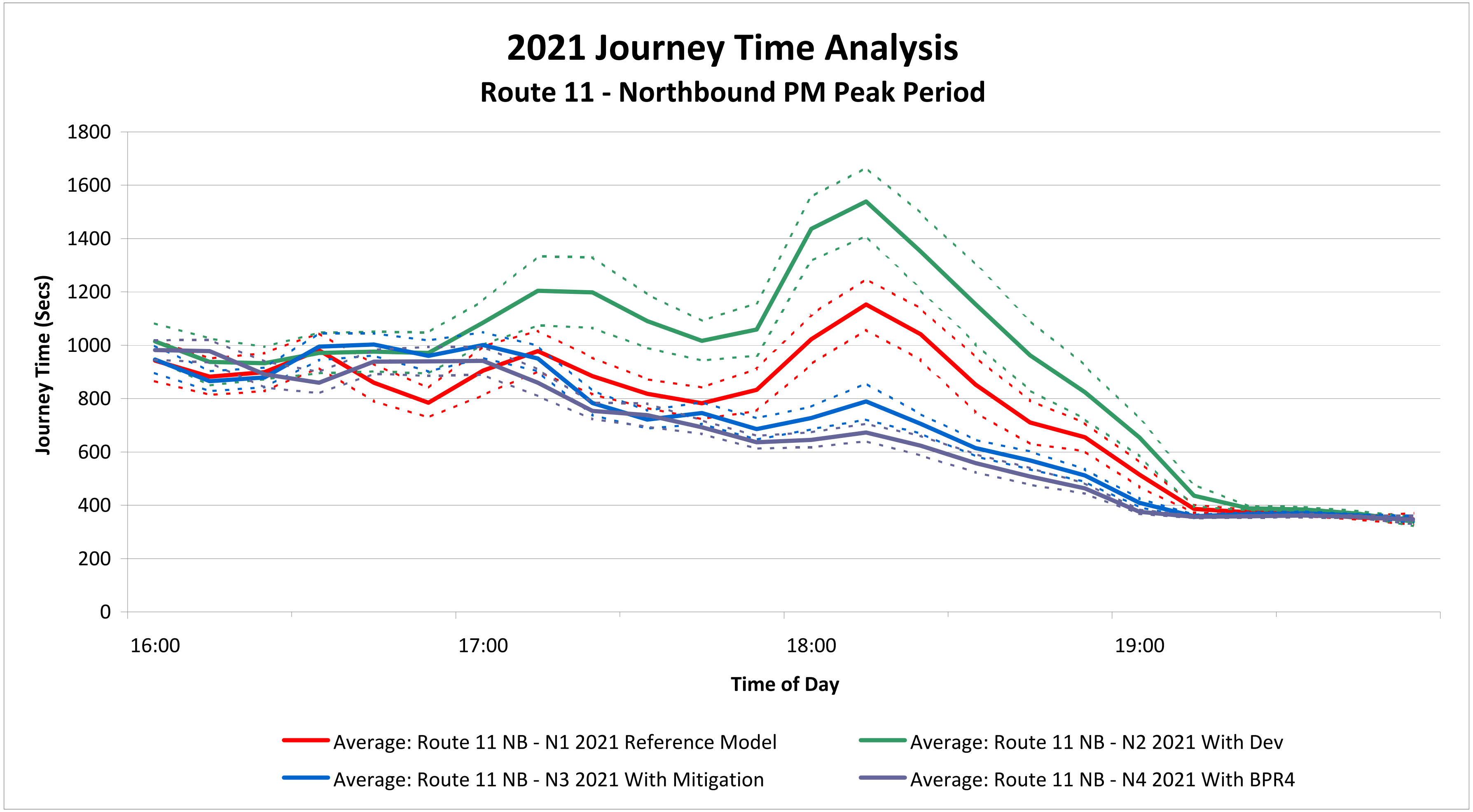

2021 Journey Time Analysis
Route 11 - Southbound AM Peak Period
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 11 SB - N1 2021 Reference Model
Average: Route 11 SB - N2 2021 With Dev
Average: Route 11 SB - N3 2021 With Mitigation
Average: Route 11 SB - N4 2021 With BPR4



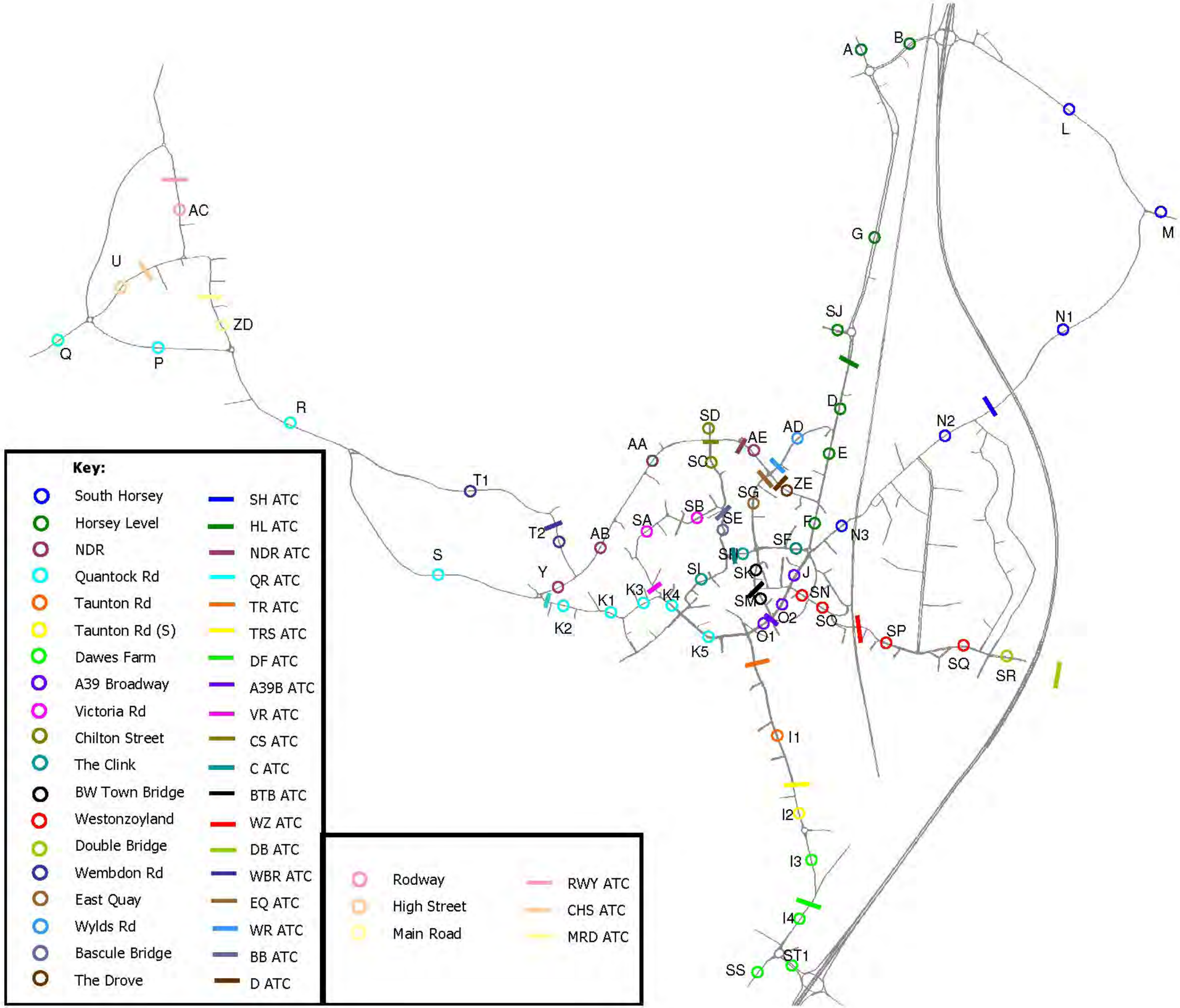
2021 Journey Time Analysis
Route 11 - Southbound PM Peak Period
Journey Time (Secs)
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 SB - N1 2021 Reference Model
Average: Route 11 SB - N2 2021 With Dev
Average: Route 11 SB - N3 2021 With Mitigation
Average: Route 11 SB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 11 - Northbound
Journey Time (Secs)
2000
1500
1000
500
0
-500
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 NB - N1 2021 Reference Model
Average: Route 11 NB - N2 2021 With Dev
Average: Route 11 NB - N3 2021 With Mitigation
Average: Route 11 NB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 11 - Northbound AM Peak Period
Journey Time (Secs)
1200
1000
800
600
400
200
0
06:00
07:00
08:00
09:00
10:00
Time of Day
Average: Route 11 NB - N1 2021 Reference Model
Average: Route 11 NB - N2 2021 With Dev
Average: Route 11 NB - N3 2021 With Mitigation
Average: Route 11 NB - N4 2021 With BPR4


2021 Journey Time Analysis
Route 11 - Northbound PM Peak Period
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
Time of Day
Average: Route 11 NB - N1 2021 Reference Model
Average: Route 11 NB - N2 2021 With Dev
Average: Route 11 NB - N3 2021 With Mitigation
Average: Route 11 NB - N4 2021 With BPR4

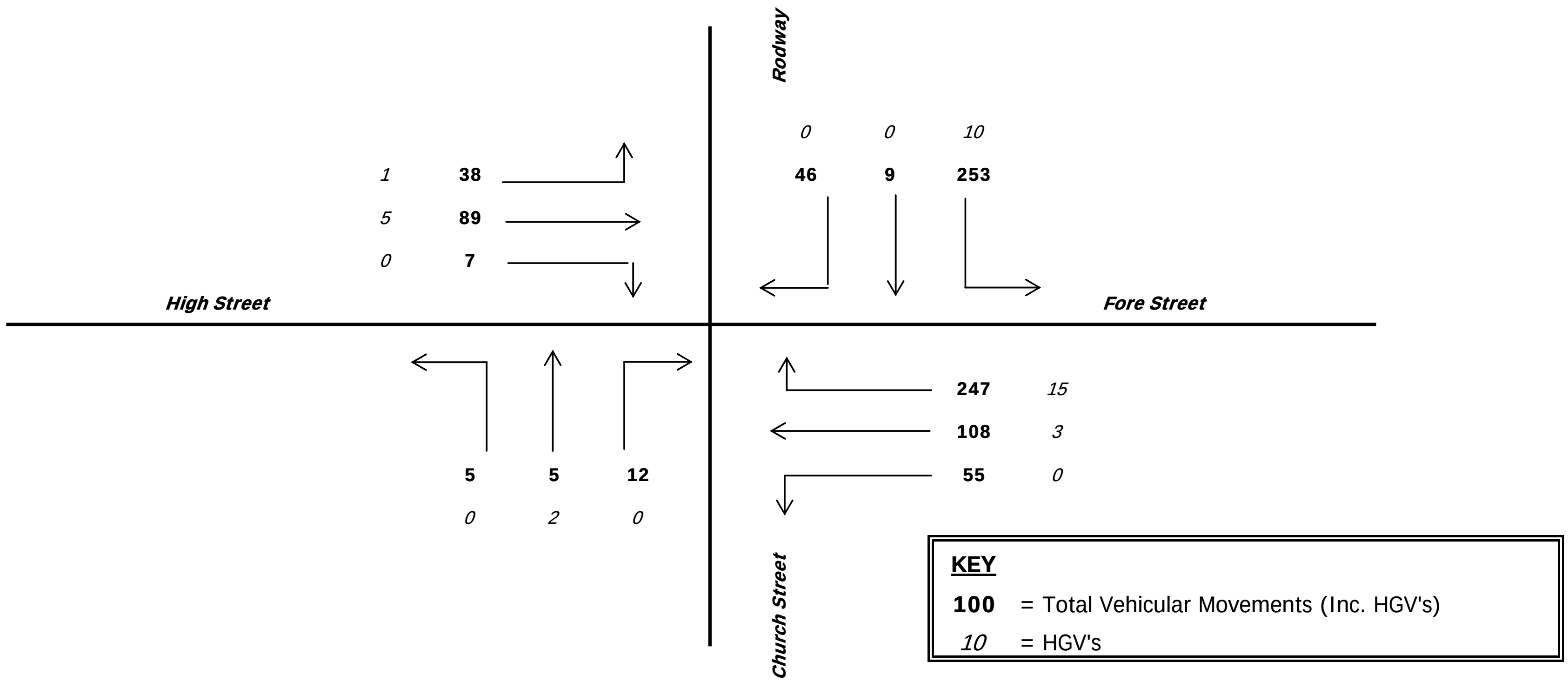
APPENDIX 3.1: PARAMICS LINK PLAN



Key:
South Horsey
Horsey Level
NDR
Quantock Rd
Taunton Rd
Taunton Rd (S)
Dawes Farm
A39 Broadway
Victoria Rd
Chilton Street
The Clink
BW Town Bridge
Westonzoyland
Double Bridge
Wembdon Rd
East Quay
Wylds Rd
Bascule Bridge
The Drove
SH ATC
HL ATC
NDR ATC
QR ATC
TR ATC
TRS ATC
DF ATC
A39B ATC
VR ATC
CS ATC
C ATC
BTB ATC
WZ ATC
DB ATC
WBR ATC
EQ ATC
WR ATC
BB ATC
D ATC
Rodway
High Street
Main Road
RWY ATC
CHS ATC
MRD ATC

APPENDIX 3.2: 2009 PARAMICS TURNING DIAGRAMS

Existing Turning Counts

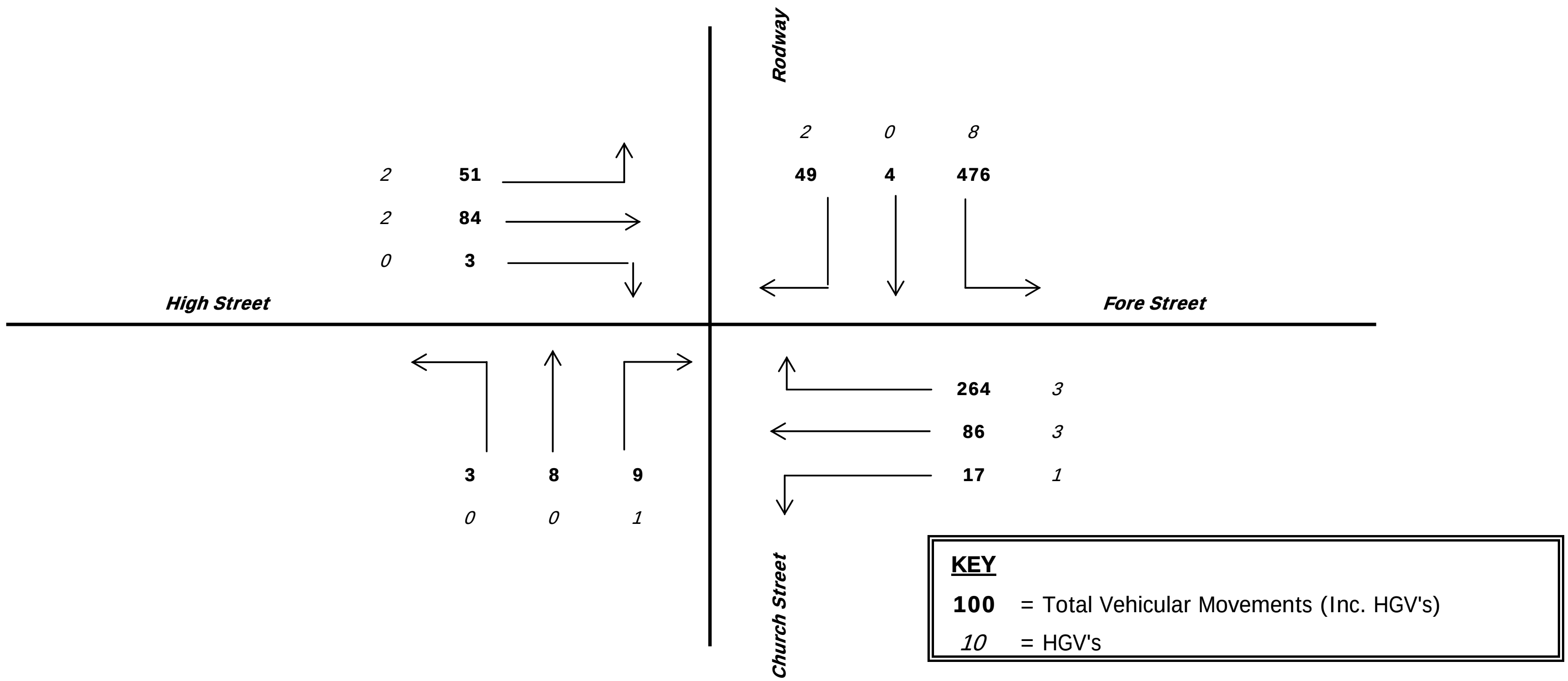


Existing Traffic Counts:

Rodway/Fore Street/High Street - Cannington

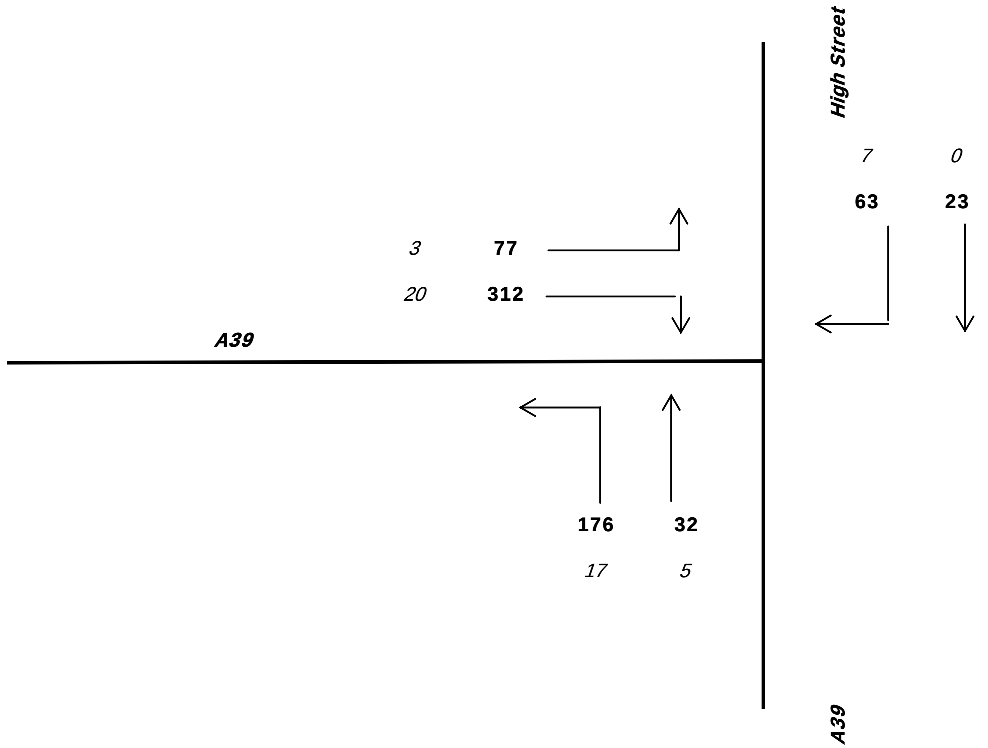
AM Peak 0800-0900 hrs

Existing Turning Counts



Existing Traffic Counts:
Rodway/Fore Street/High Street - Cannington
PM Peak 1700-1800 hrs

Existing Turning Counts



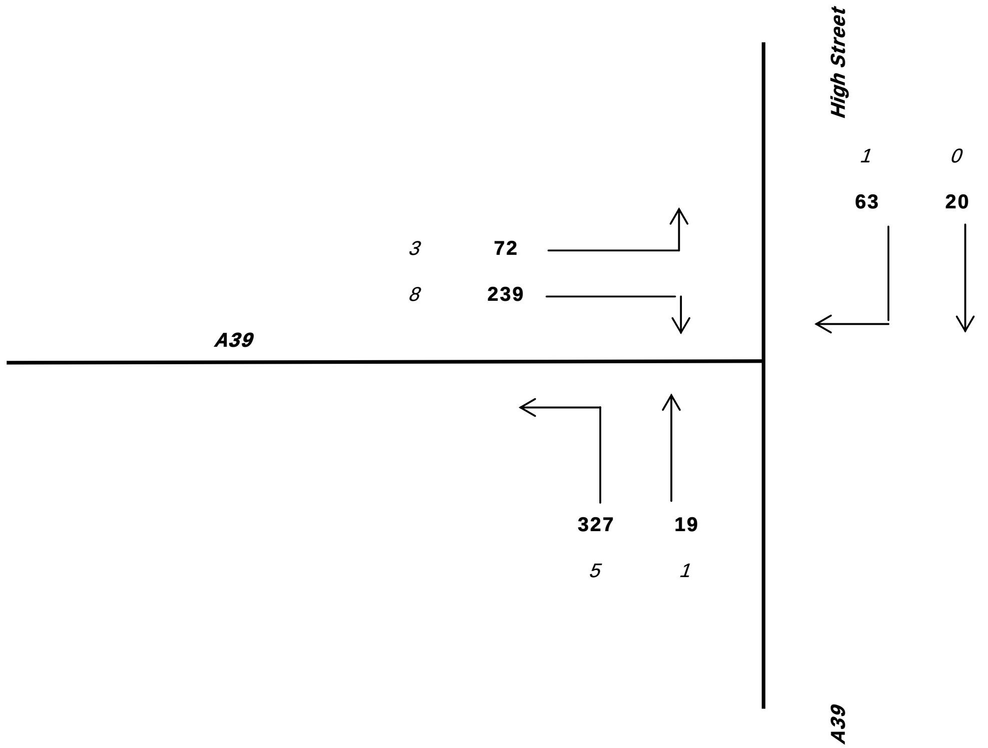
KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:
A39/High Street - Cannington
AM Peak 0800-0900 hrs

Existing Turning Counts



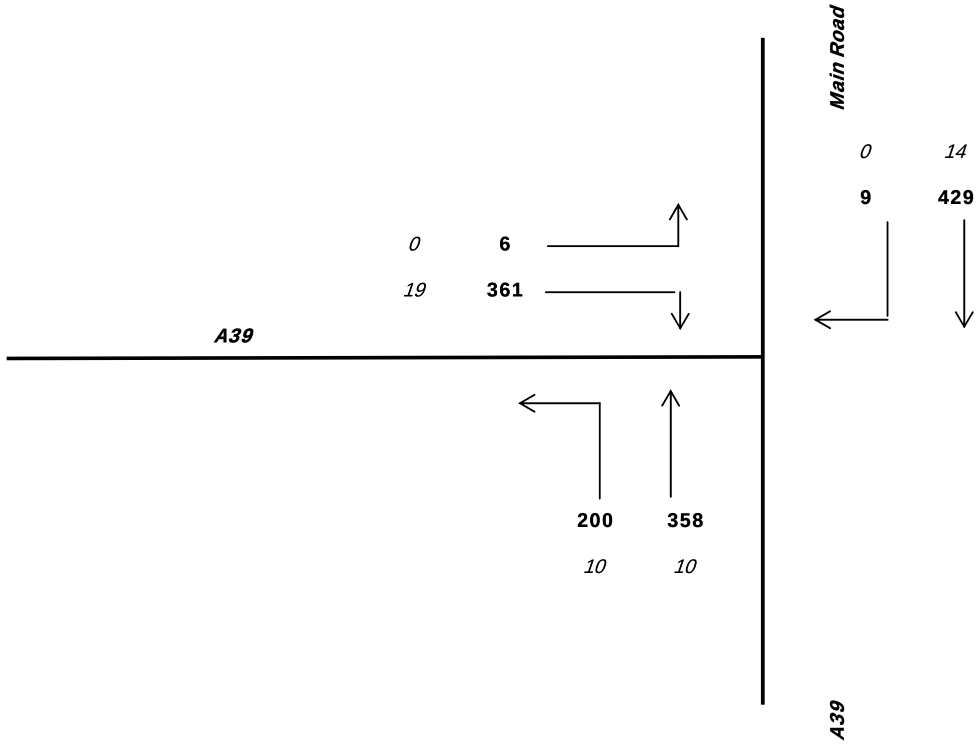
KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:
A39/High Street - Cannington
PM Peak 1700-1800 hrs

Existing Turning Counts



KEY

100 = Total Vehicular Movements (Inc. HGV's)

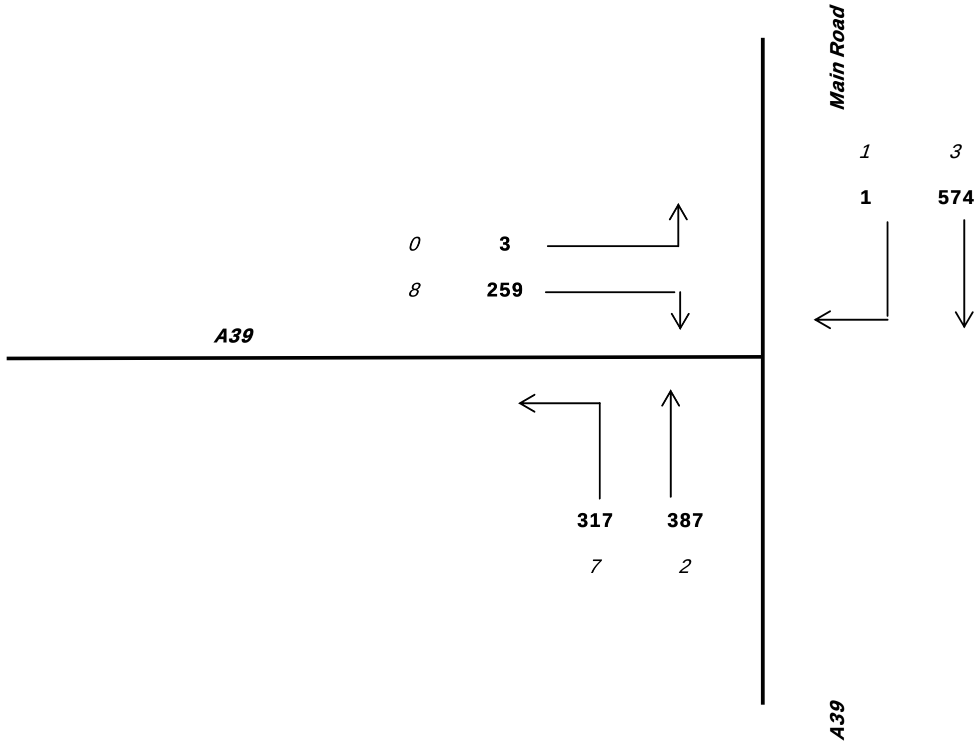
10 = HGV's

Existing Traffic Counts:

A39/Main Road - Cannington

AM Peak 0800-0900 hrs

Existing Turning Counts



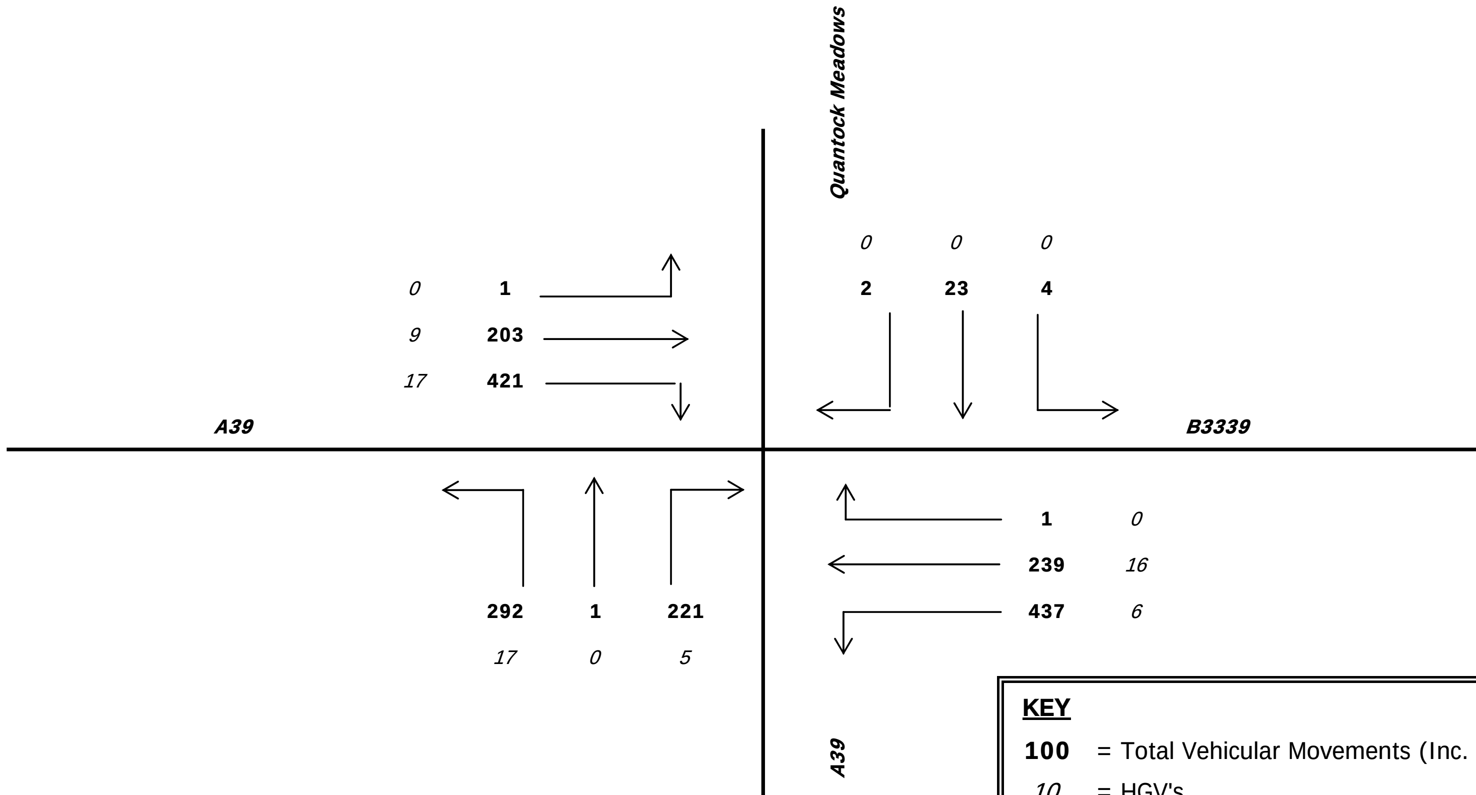
KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:
A39/Main Road - Cannington
PM Peak 1700-1800 hrs

Existing Turning Counts



KEY

100 = Total Vehicular Movements (Inc. HGV's)

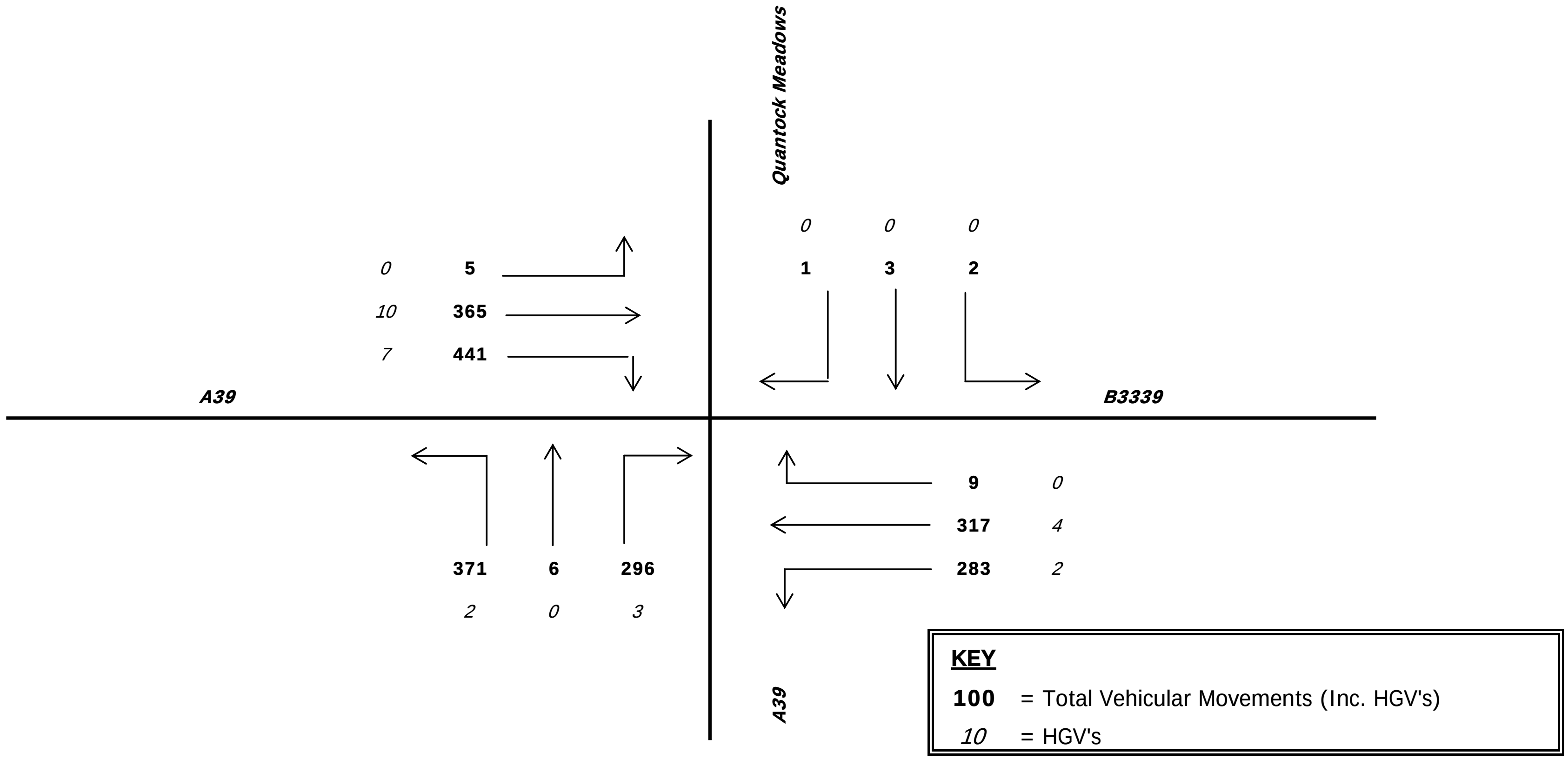
10 = HGV's

Existing Traffic Counts:

A39/B3339/Quantock Meadows - Bridgwater

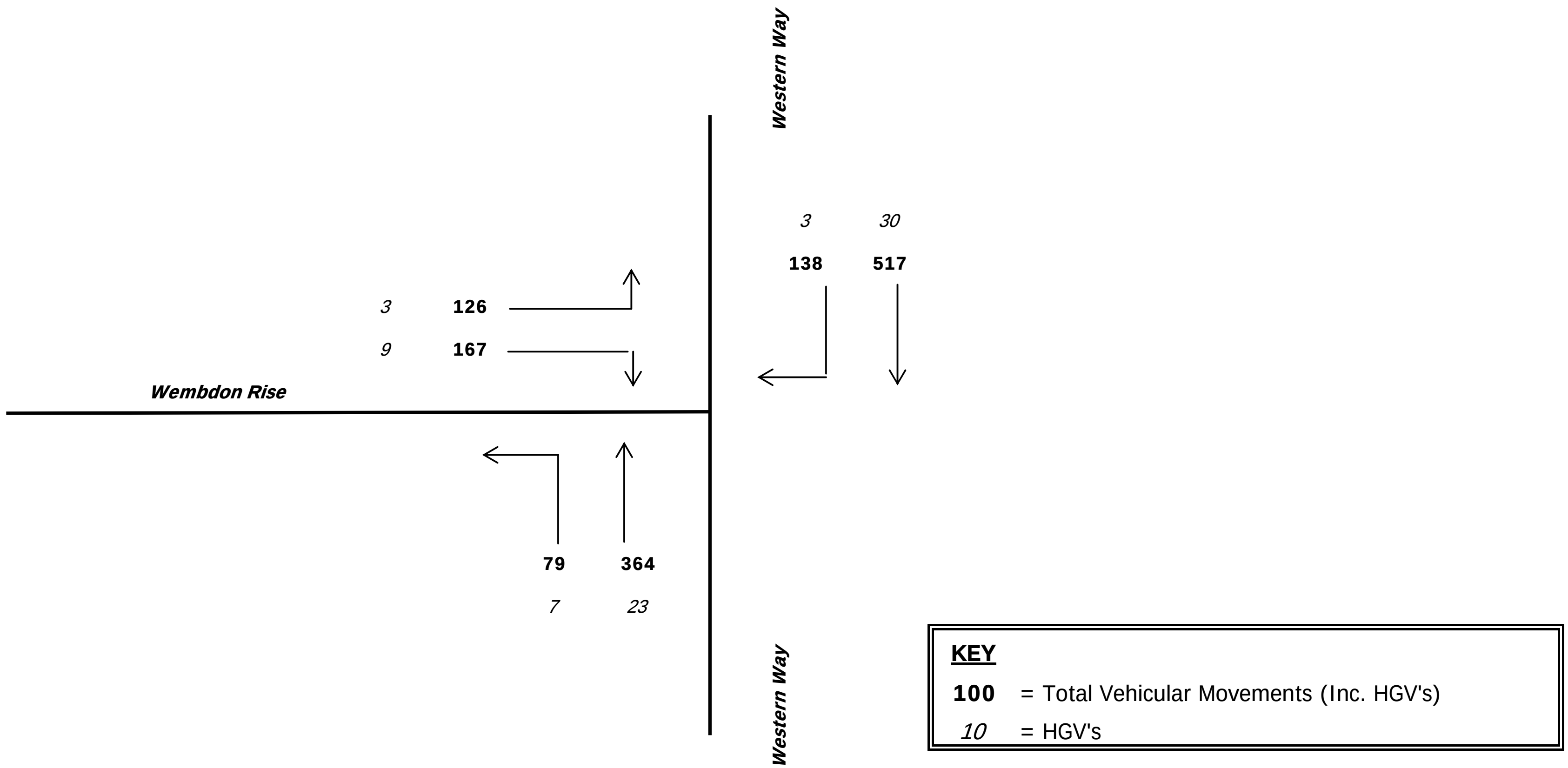
AM Peak 0800-0900 hrs

Existing Turning Counts



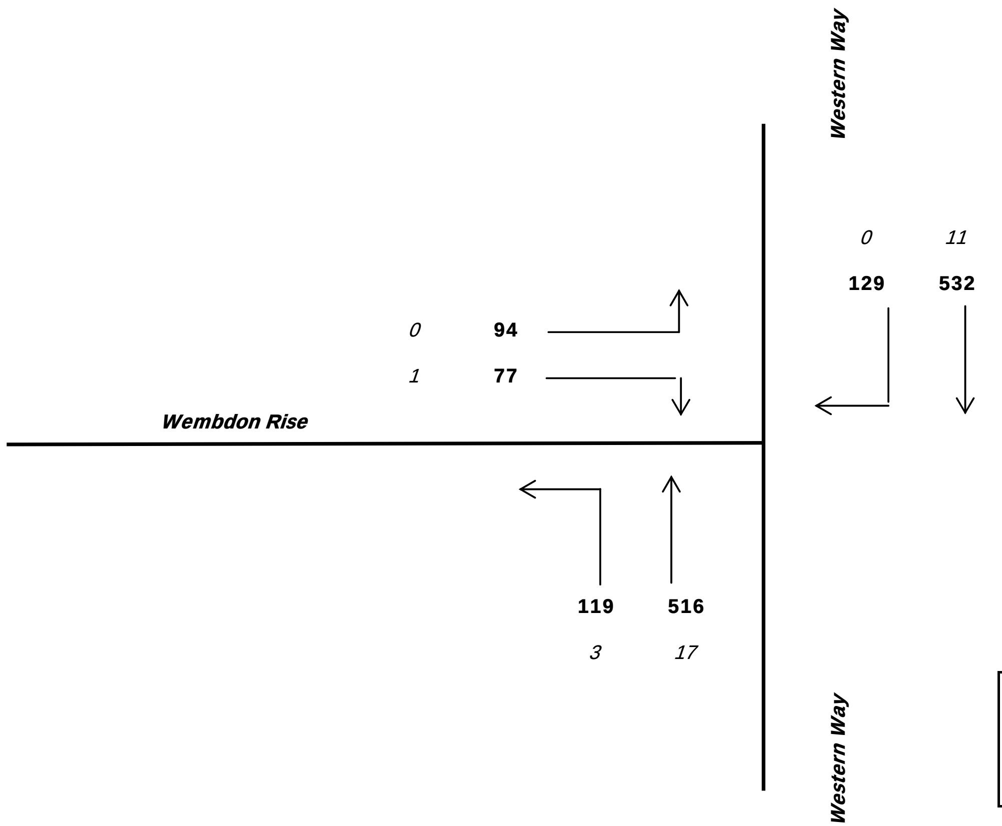
Existing Traffic Counts:
A39/B3339/Quantock Meadows - Bridgwater
PM Peak 1700-1800 hrs

Existing Turning Counts



Existing Traffic Counts:
Western Way/B3339/Wembdon Rise - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts



KEY

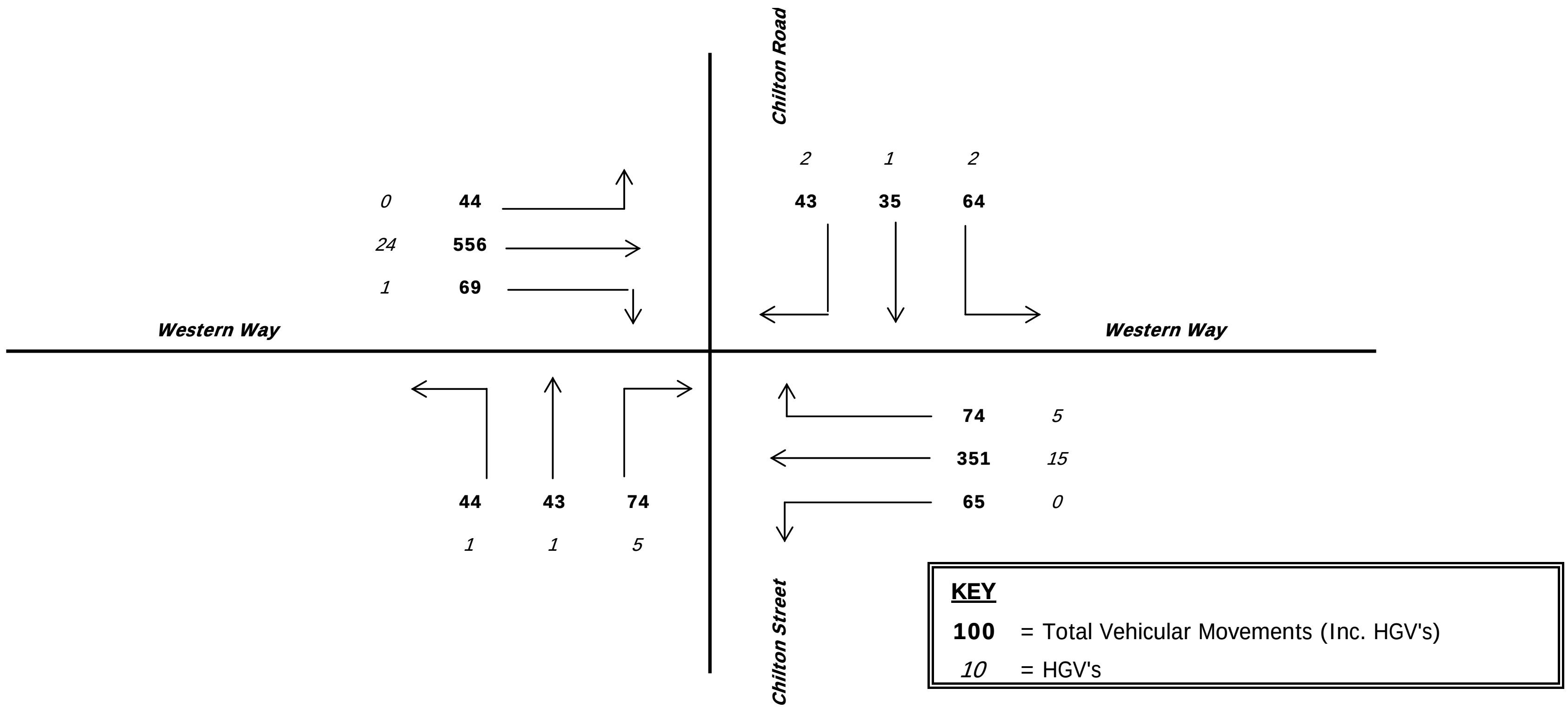
100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:

Western Way/B3339/Wembdon Rise - Bridgwater

PM Peak 1700-1800 hrs

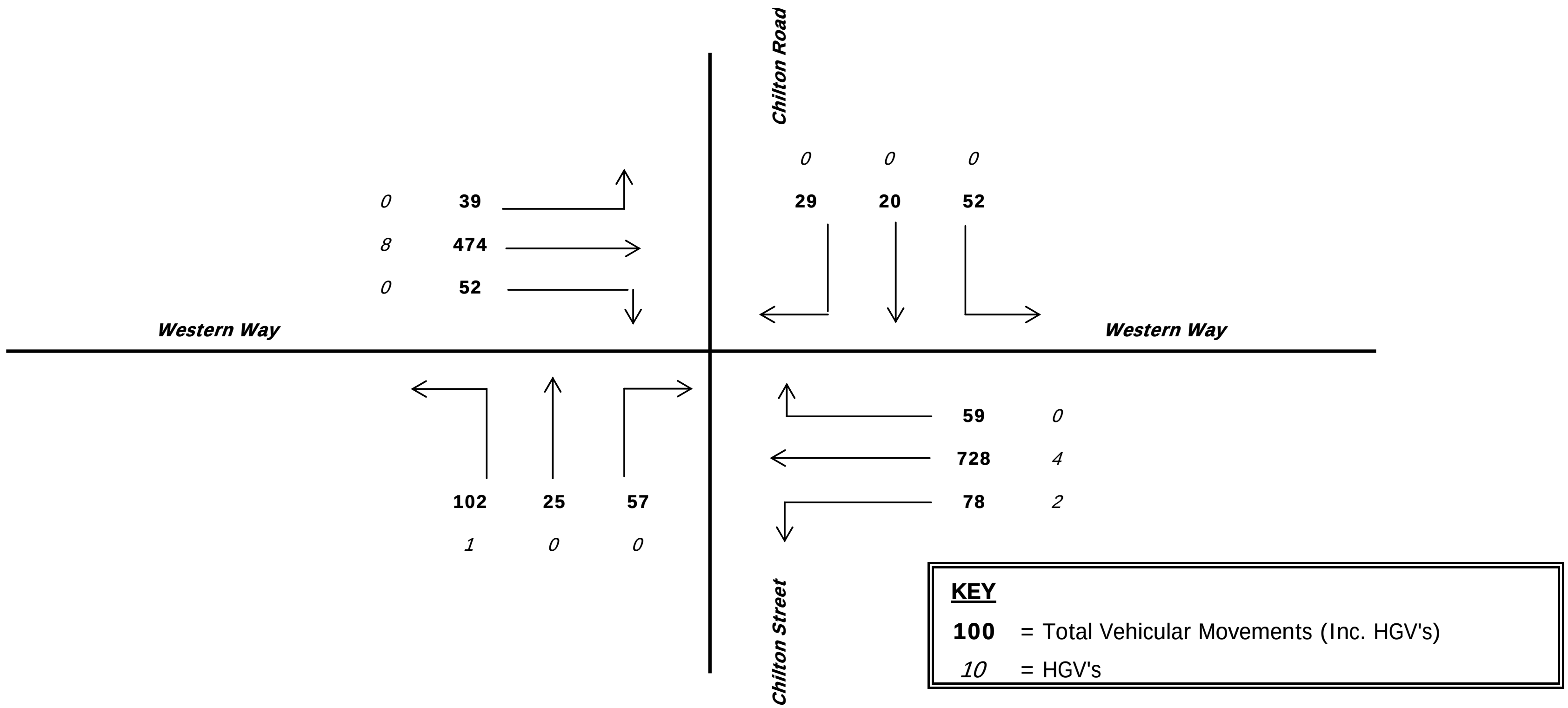


Existing Traffic Counts:

Western Way/ChilternRoad/Chiltern Street - Bridgwater

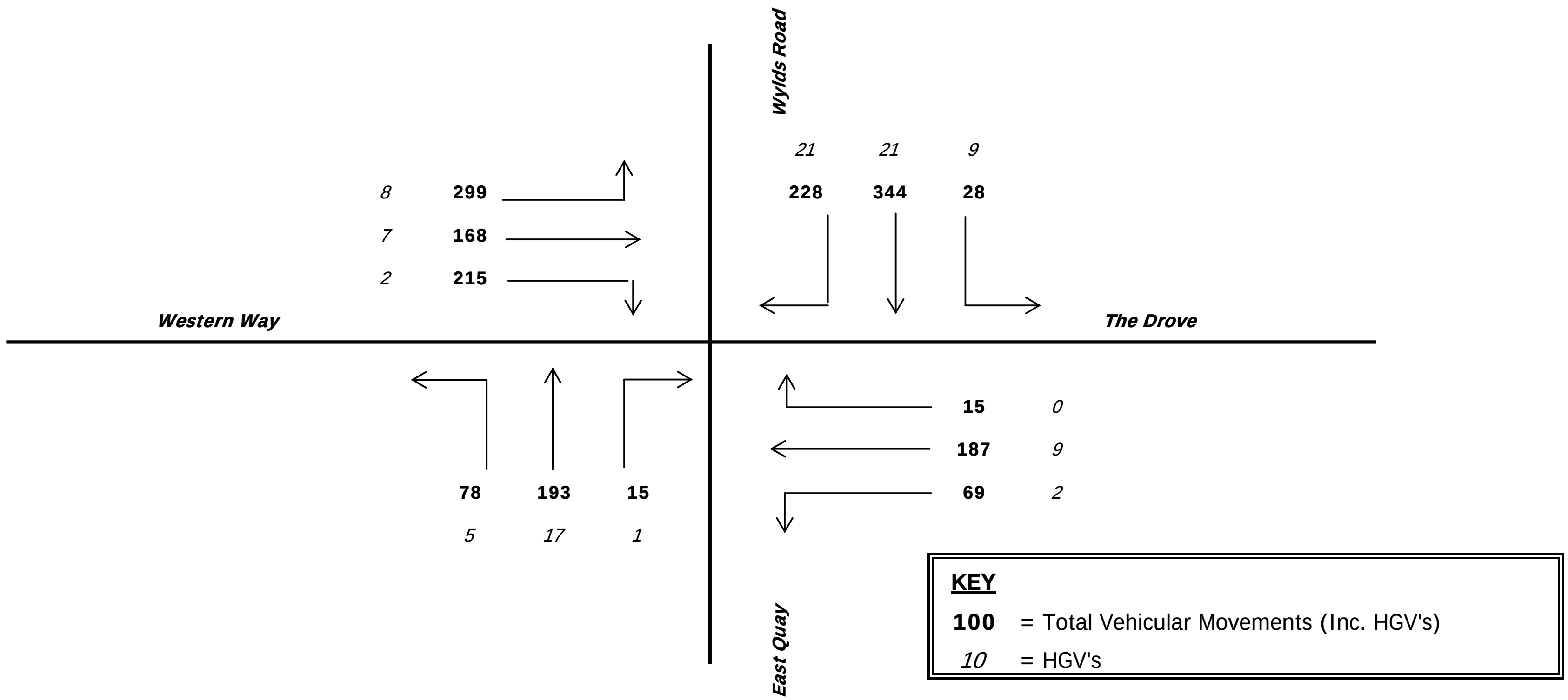
AM Peak 0800-0900 hrs

Existing Turning Counts



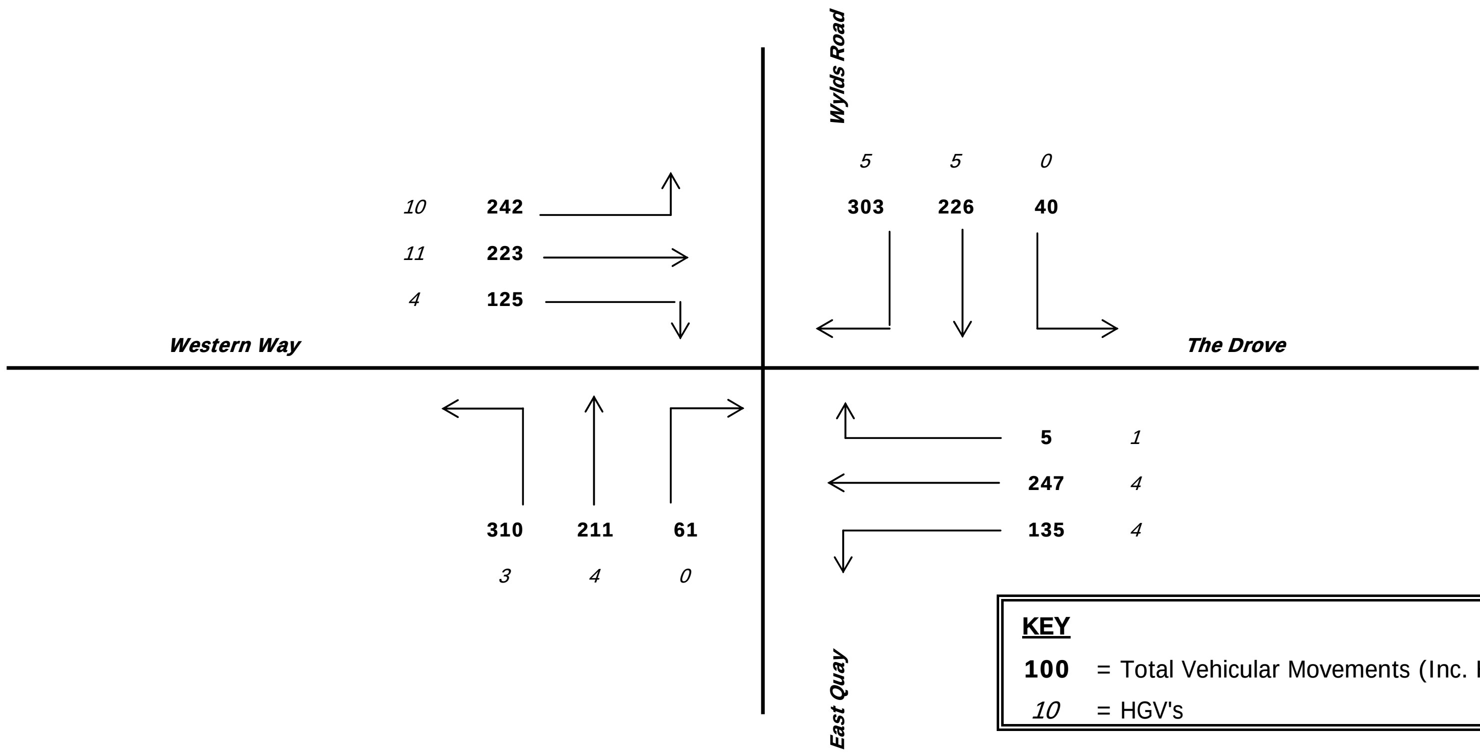
Existing Traffic Counts:
Western Way/ChilternRoad/Chiltern Street - Bridgwater
PM Peak 1700-1800 hrs

Existing Turning Counts



Existing Traffic Counts:
Western Way/Wylds Road/East Quay/The Drove - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts



KEY

100 = Total Vehicular Movements (Inc. HGV's)

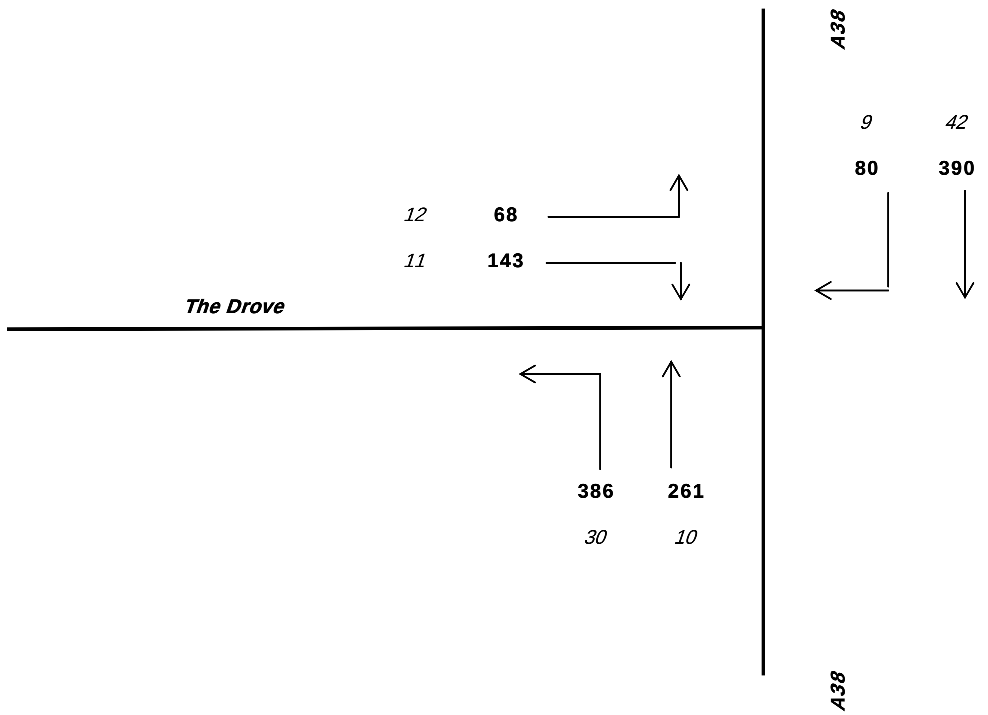
10 = HGV's

Existing Traffic Counts:

Western Way/Wylds Road/East Quay/The Drove - Bridgwater

PM Peak 1700-1800 hrs

Existing Turning Counts



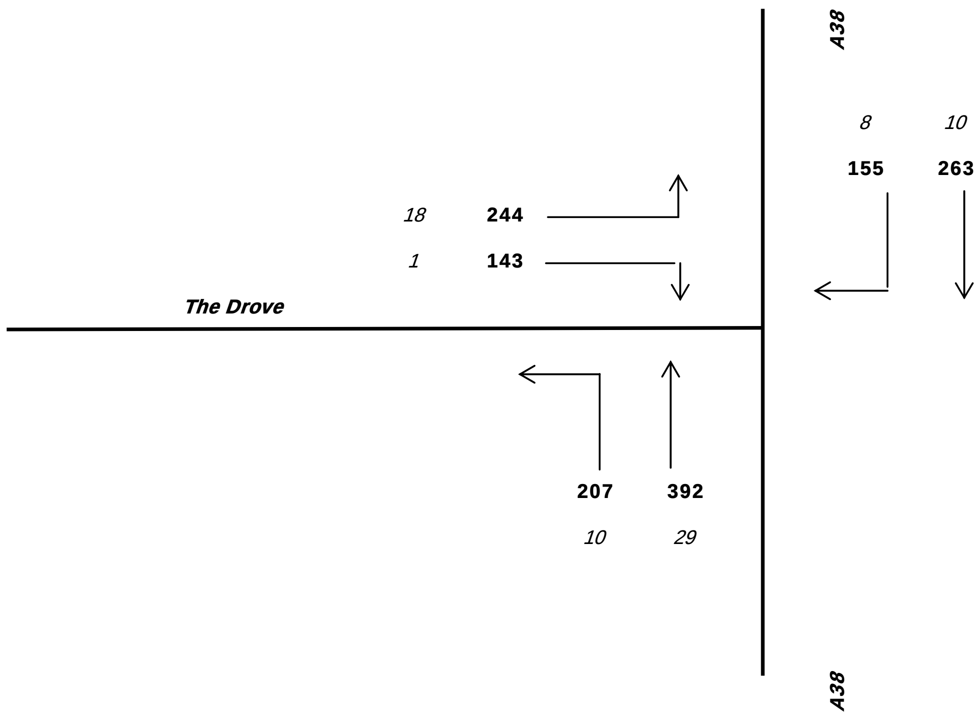
KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:
A38/The Drove - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts

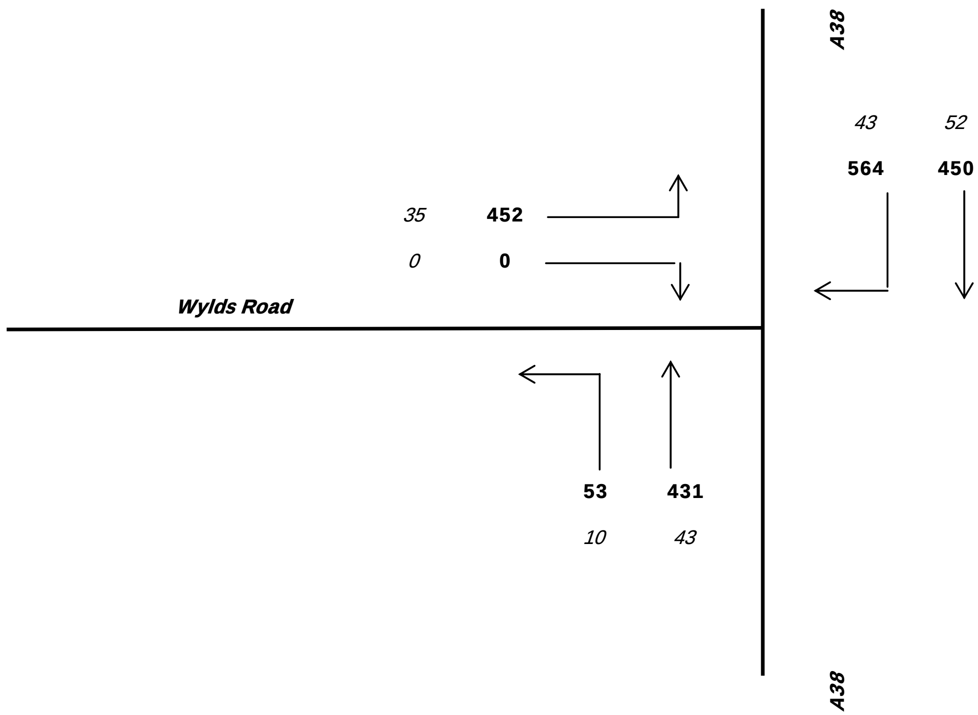


KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:
A38/The Drove - Bridgwater
PM Peak 1700-1800 hrs



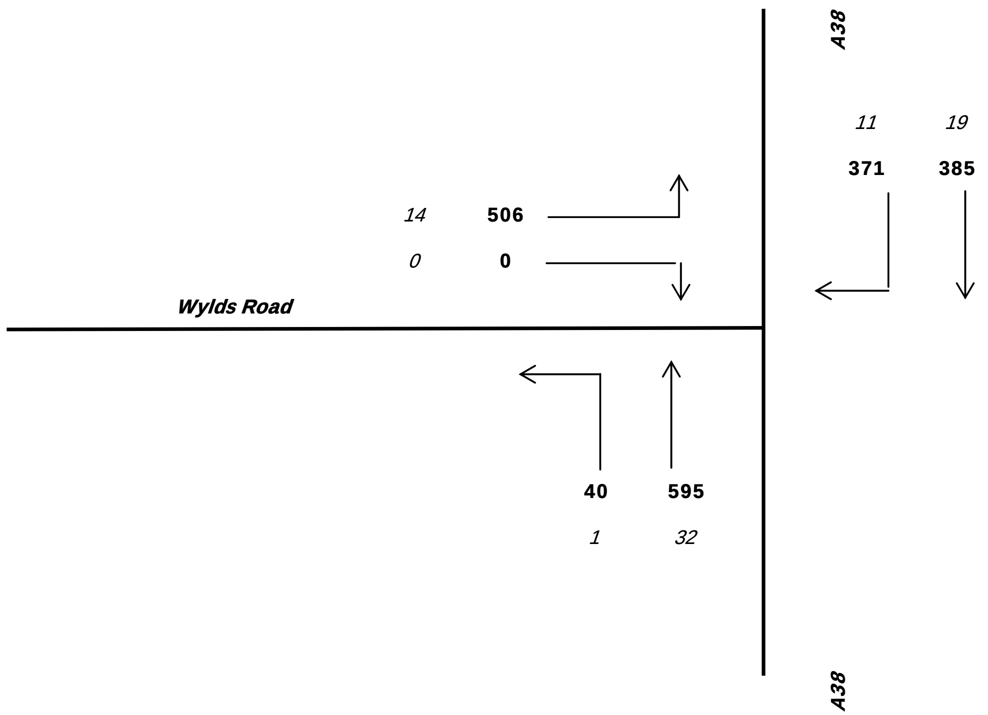
KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

Existing Traffic Counts:
A38/Wylds Road - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts



KEY

100 = Total Vehicular Movements (Inc. HGV's)

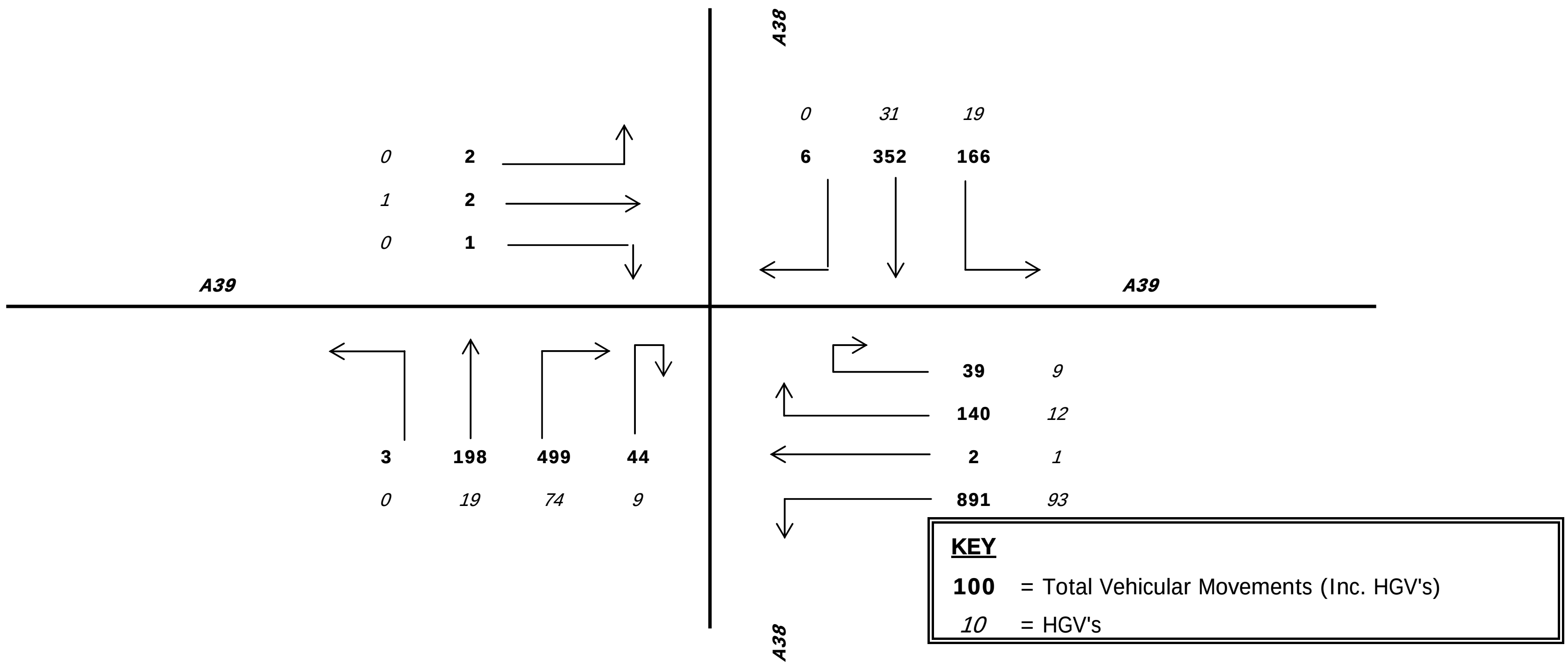
10 = HGV's

Existing Traffic Counts:

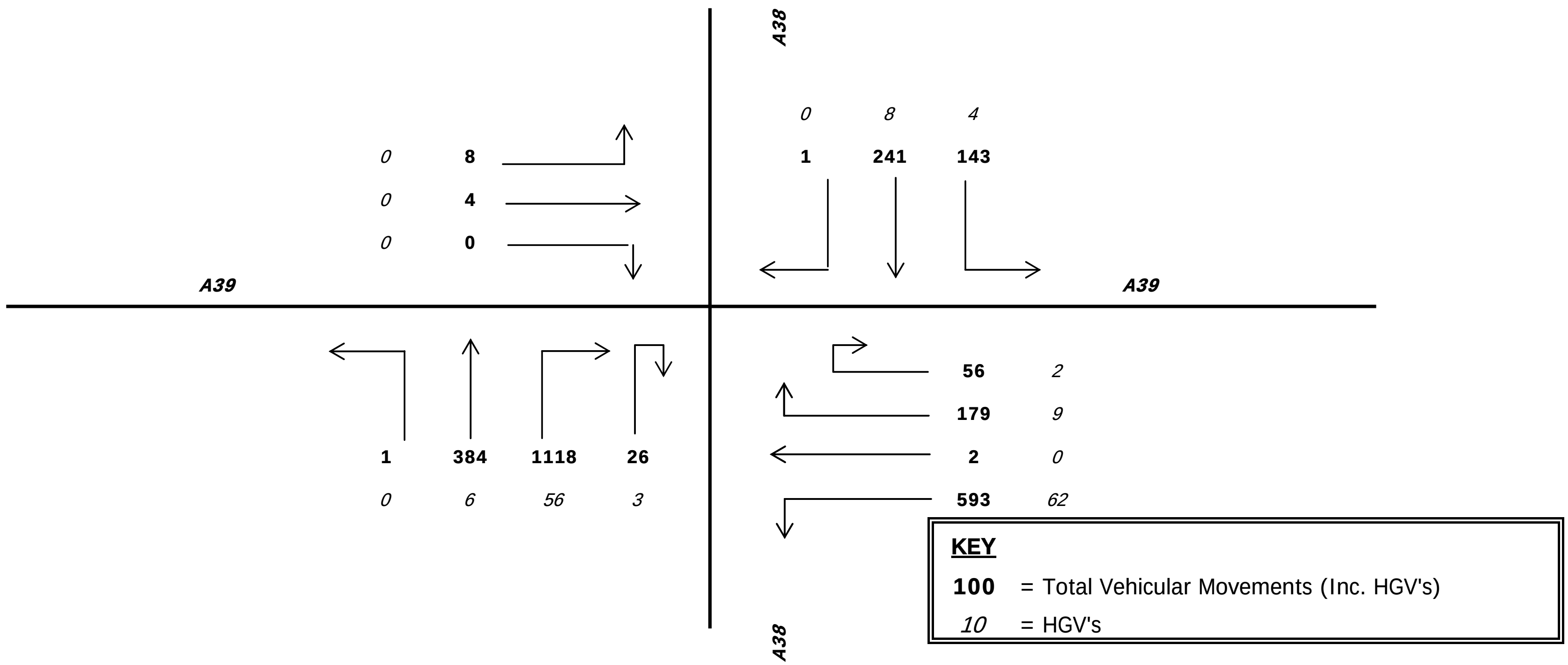
A38/Wylds Road - Bridgwater

PM Peak 1700-1800 hrs

Existing Turning Counts

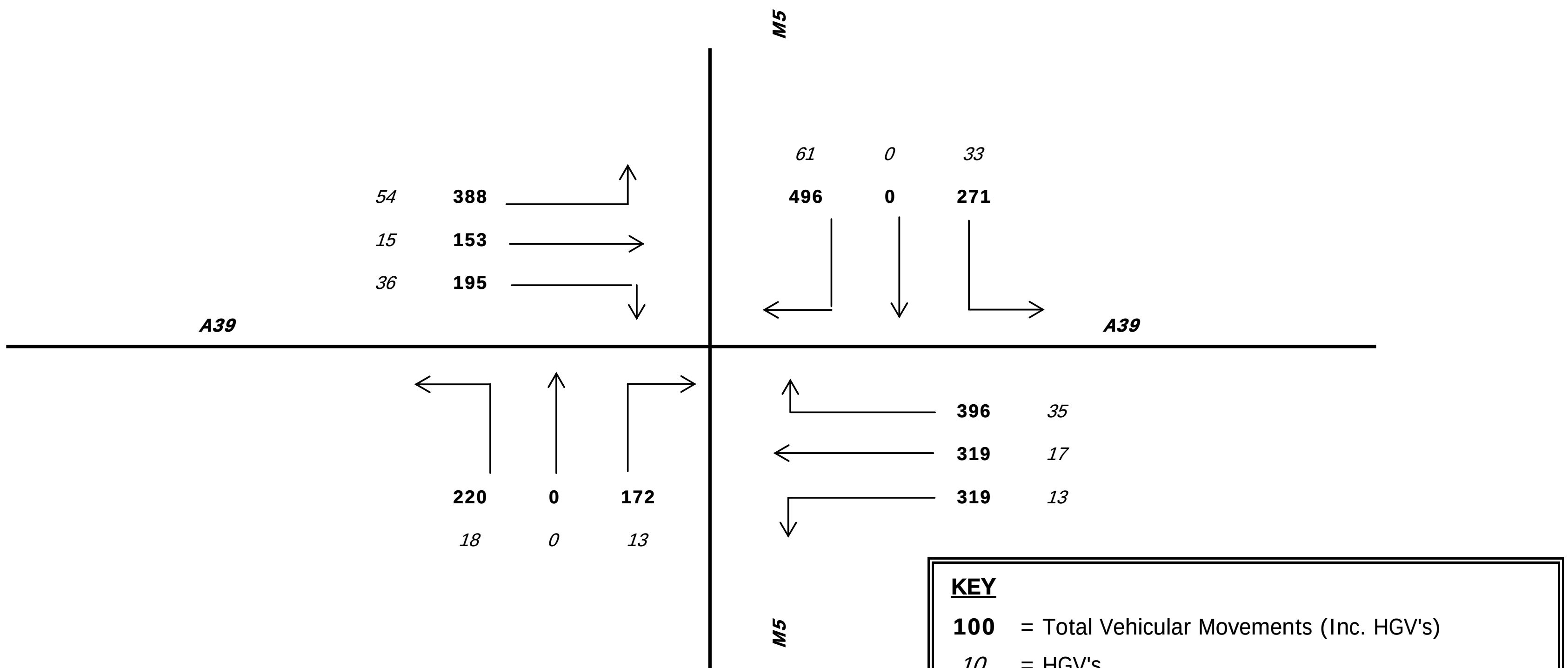


Existing Traffic Counts:
A38/A39 - Bridgwater
AM Peak 0800-0900 hrs



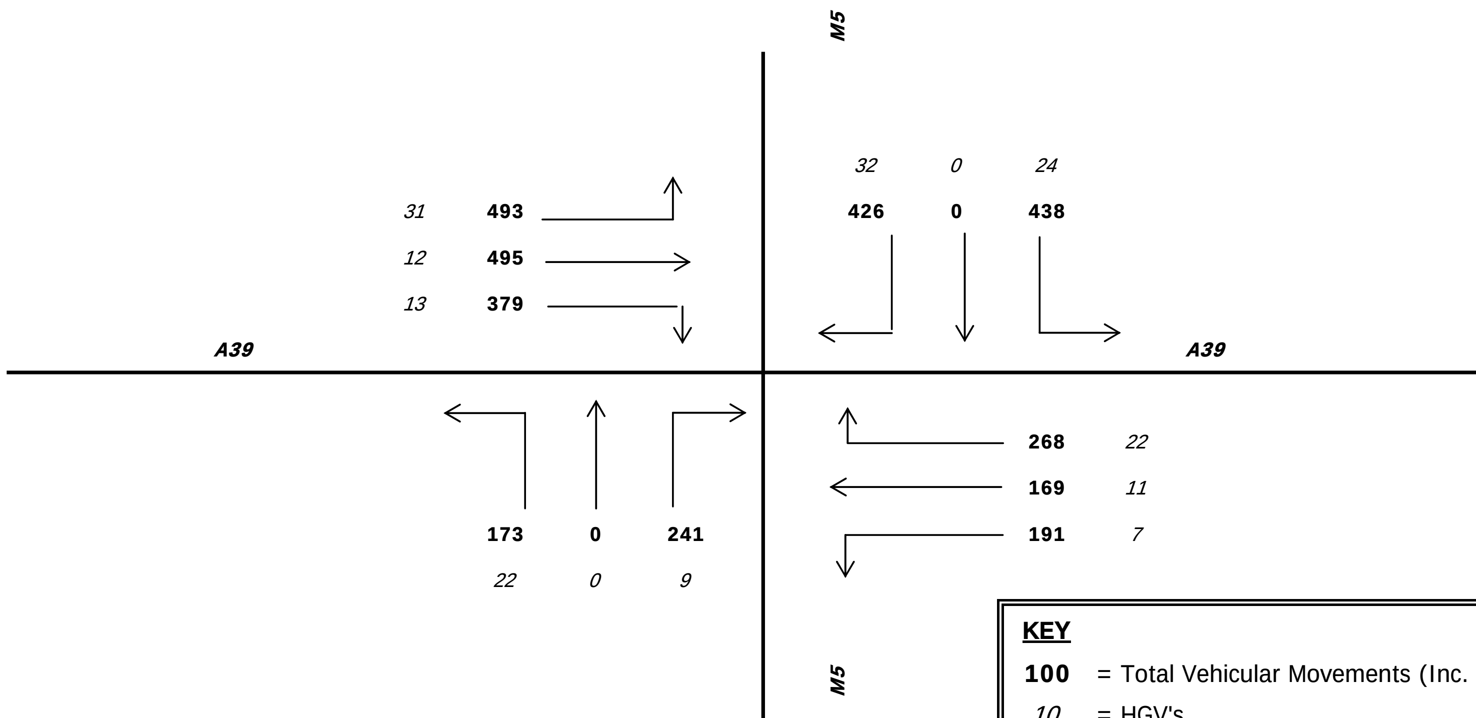
Existing Traffic Counts:
A38/A39 - Bridgwater
PM Peak 1700-1800 hrs

Existing Turning Counts



Existing Traffic Counts:
M5/A39 - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts



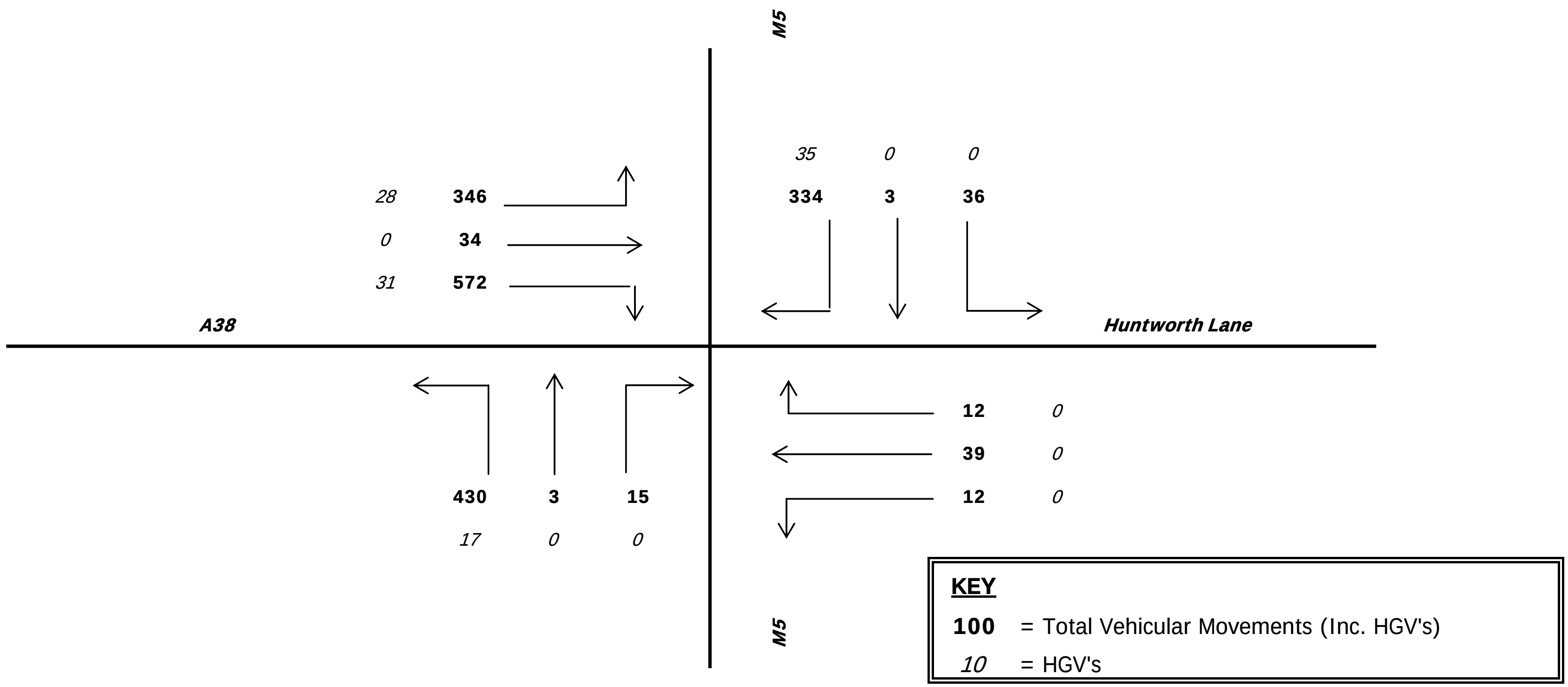
KEY

100 = Total Vehicular Movements (Inc. HGV's)

10 = HGV's

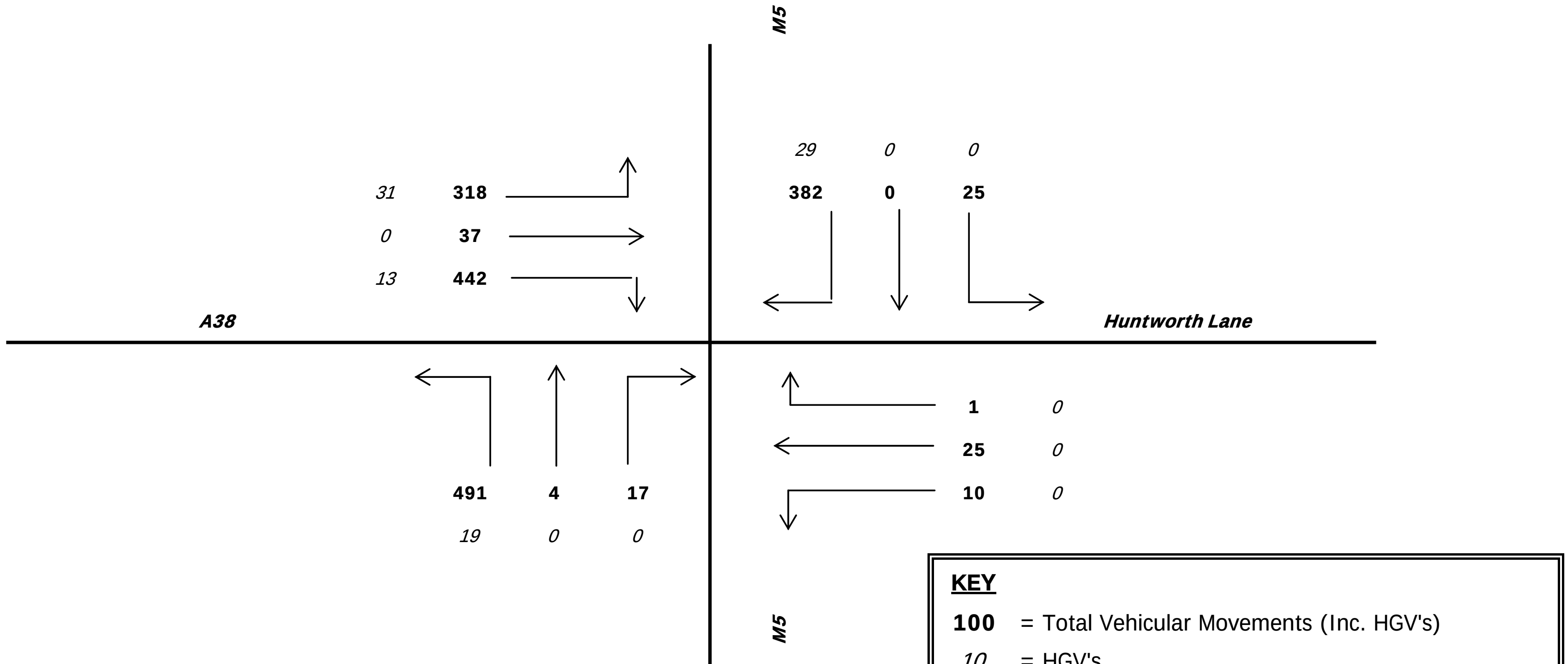
Existing Traffic Counts:
M5/A39 - Bridgwater
PM Peak 1700-1800 hrs

Existing Turning Counts

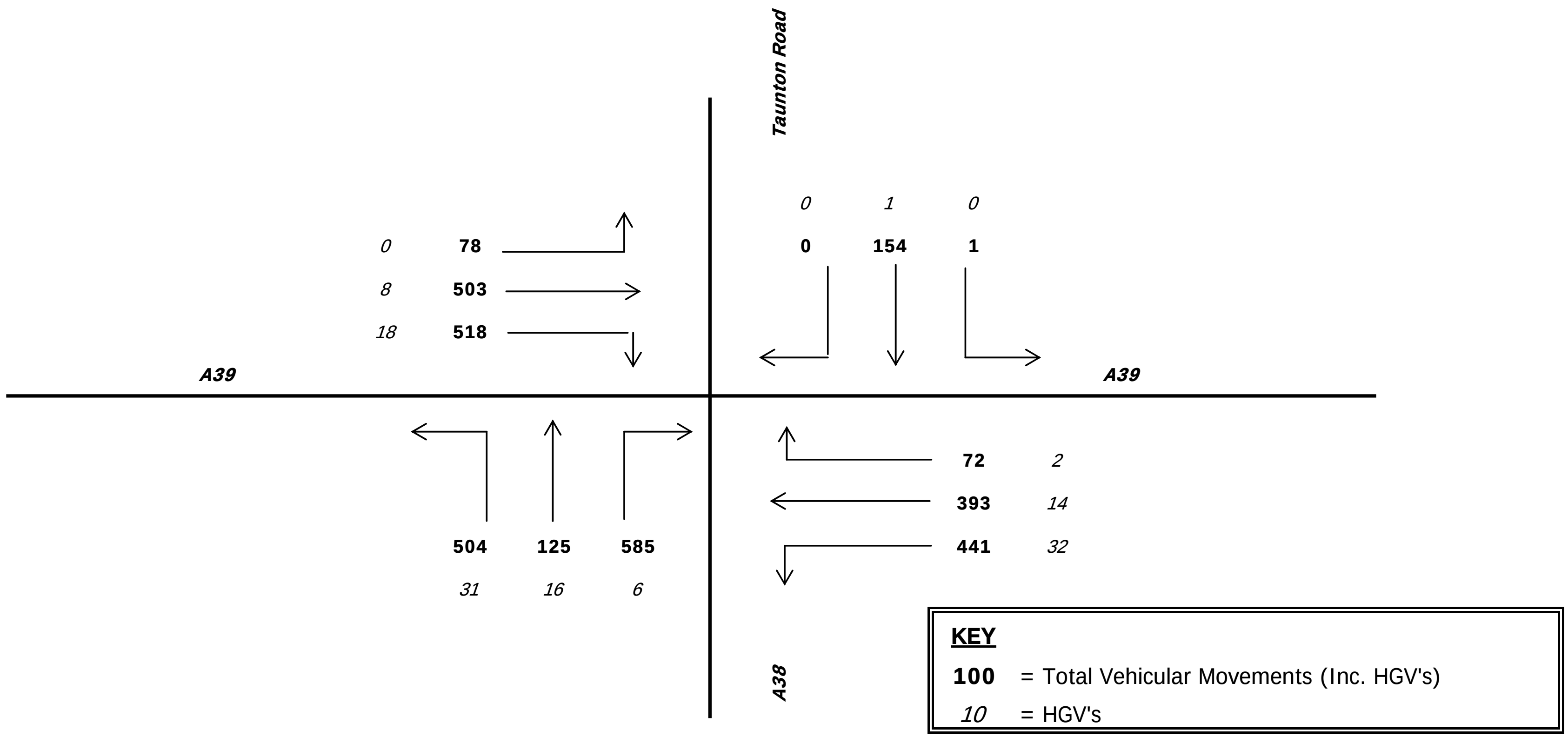


Existing Traffic Counts:
M5/A38/Huntworth - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts

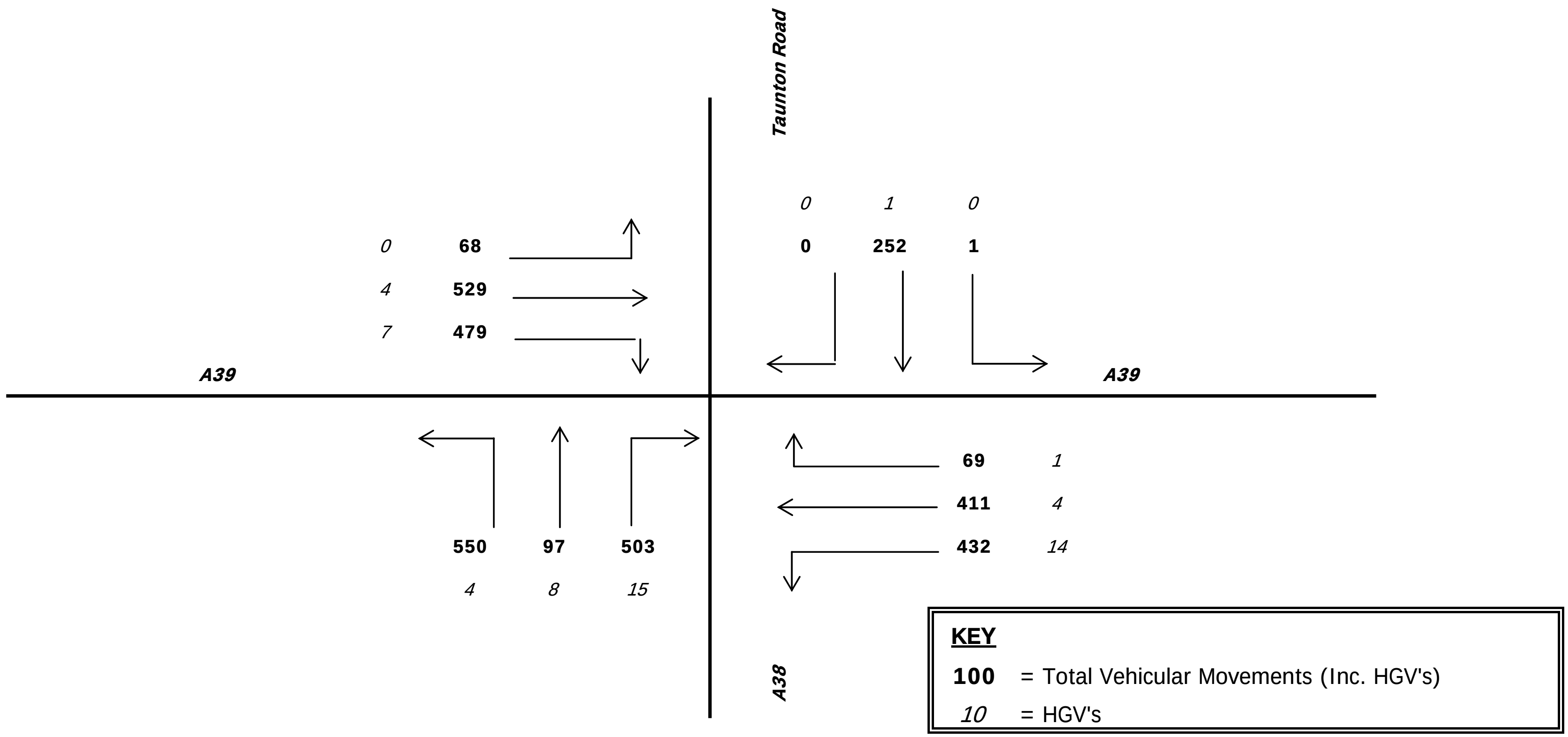


Existing Traffic Counts:
M5/A38 - Bridgwater
PM Peak 1700-1800 hrs



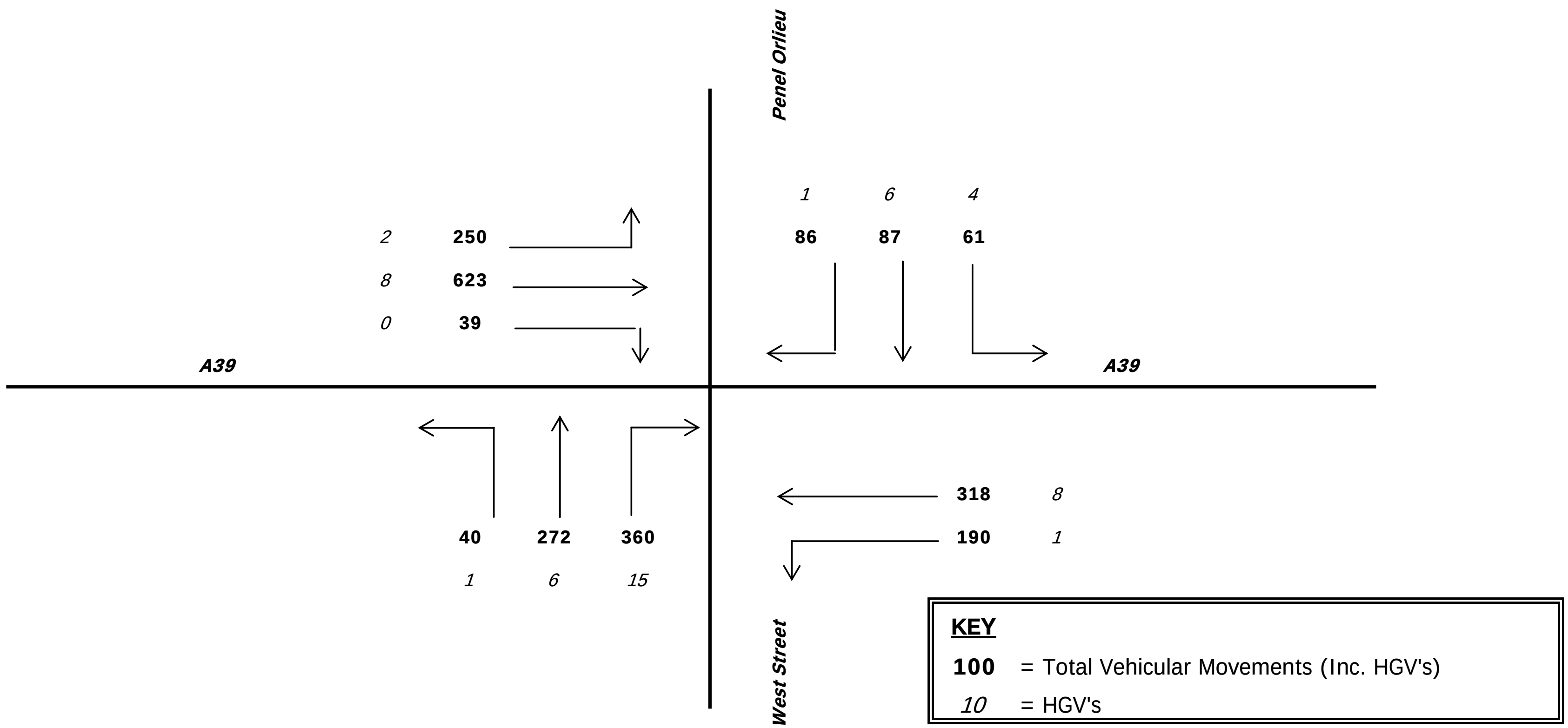
Existing Traffic Counts:
A38/A39/Taunton Road - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts



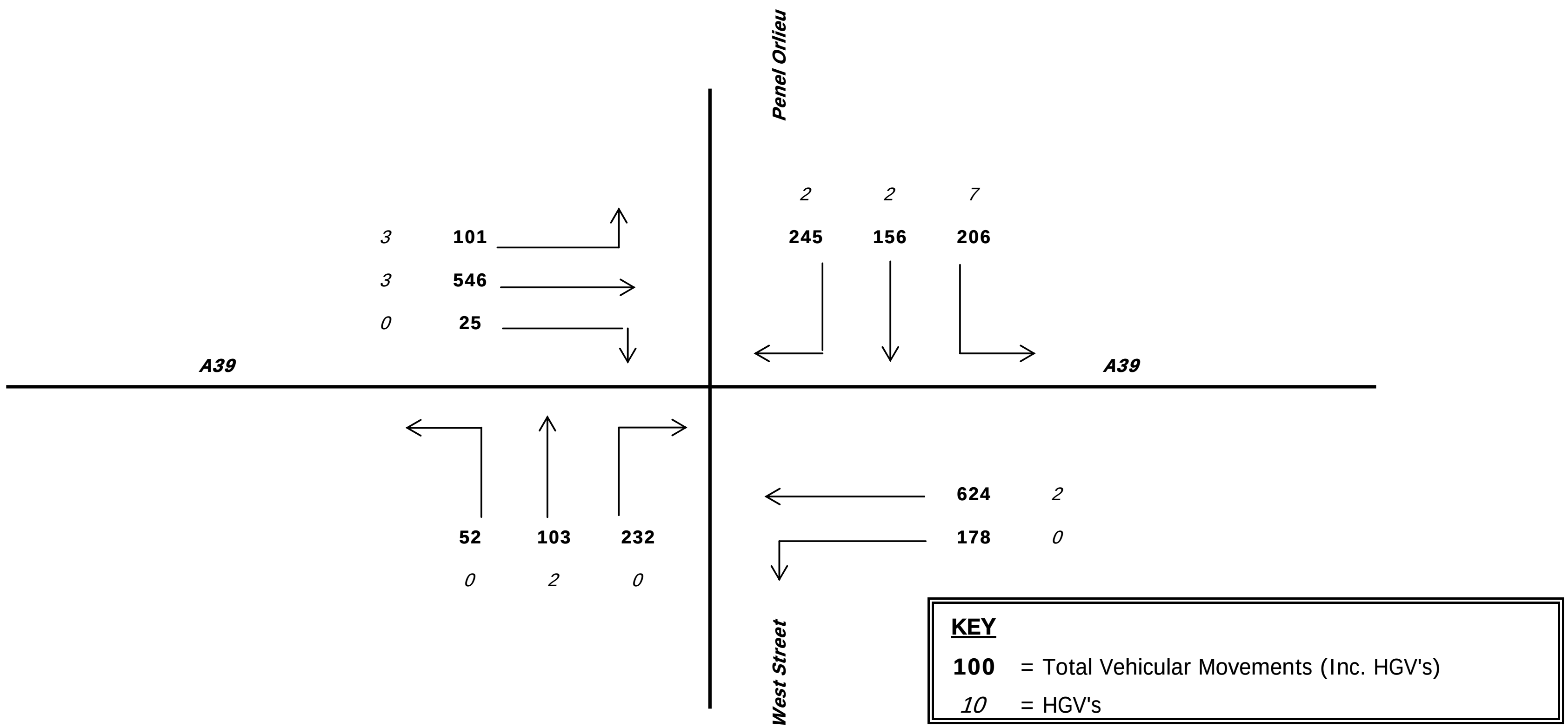
Existing Traffic Counts:
A38/A39/Taunton Road - Bridgwater
PM Peak 1700-1800 hrs

Existing Turning Counts



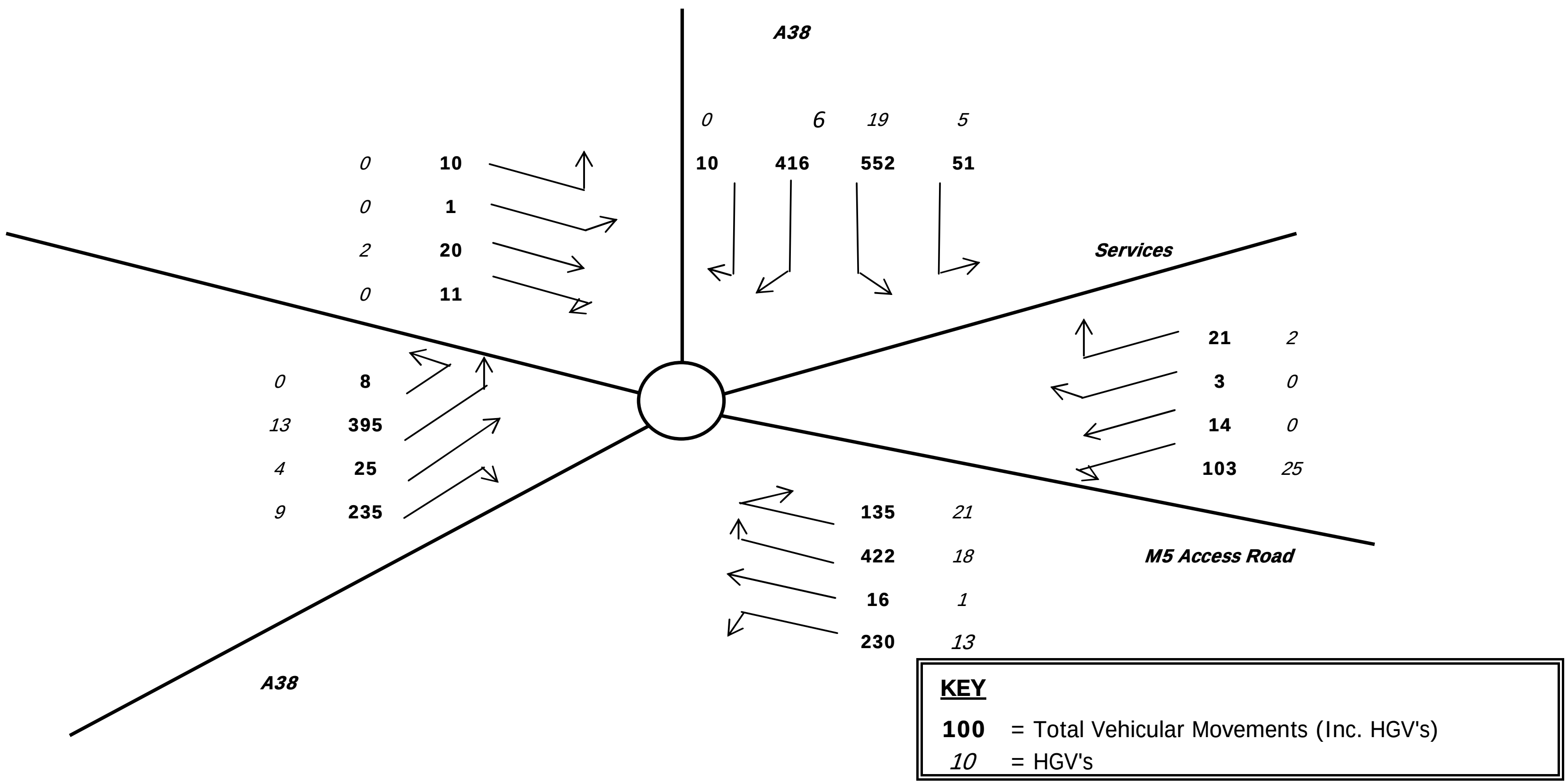
Existing Traffic Counts:
A39/Penel Orlieu/West Street - Bridgwater
AM Peak 0800-0900 hrs

Existing Turning Counts



Existing Traffic Counts:
A39/Penel Orlieu/West Street - Bridgwater
PM Peak 1700-1800 hrs

Existing Turning Counts

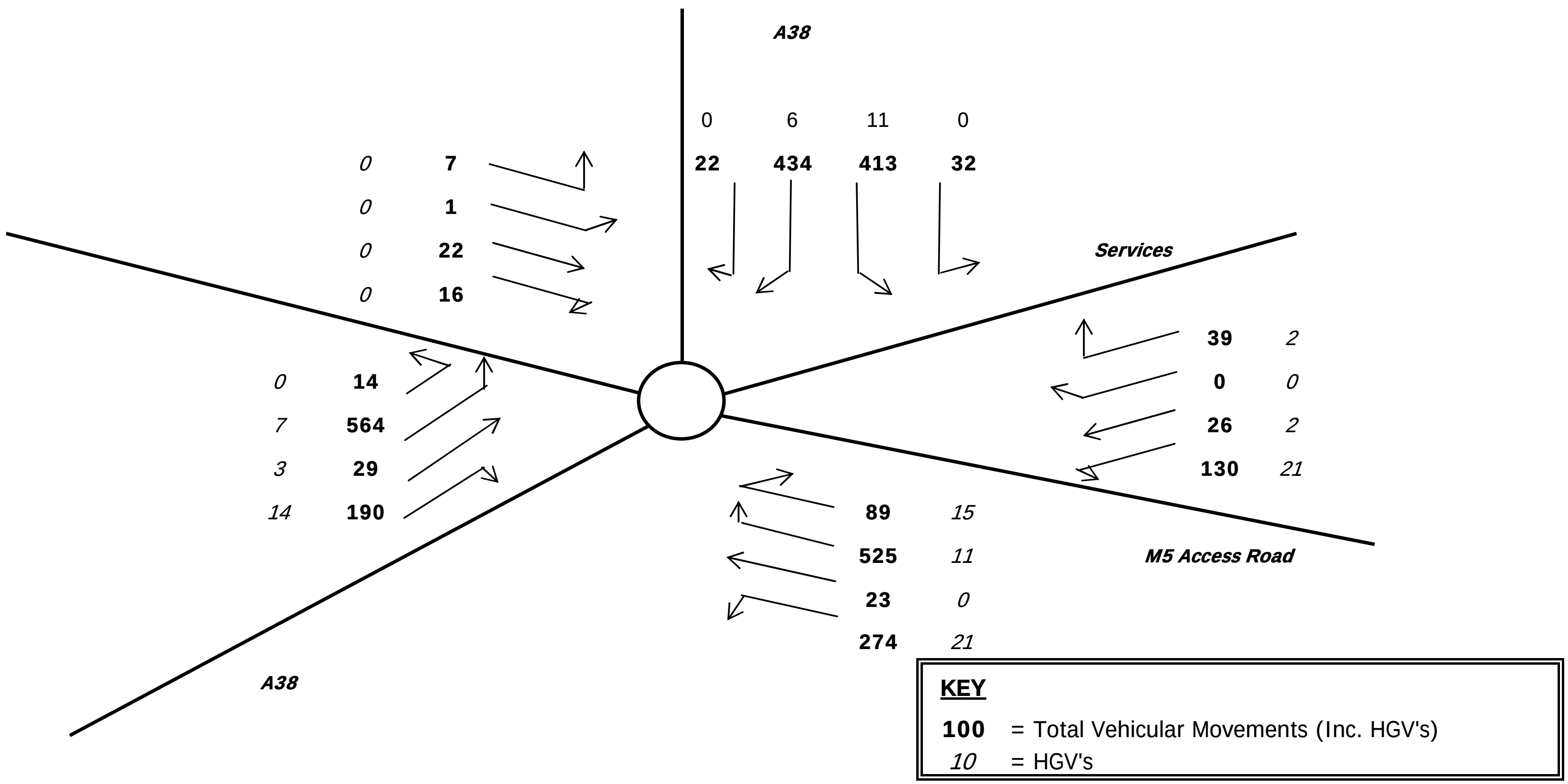


Existing Traffic Counts:

A38/ Services/M5 Access Road - Bridgwater

AM Peak 0800-0900 hrs

Existing Turning Counts



Existing Traffic Counts:

A38/Services/M5 Access Road - Bridgwater

PM Peak 1700-1800 hrs

APPENDIX 3.3: MAXIMUM MEAN OBSERVED QUEUES

Average Mean-Max Queues 2009 Base				Network Peaks		Development Peaks	
				AM 0800-0900 Model	PM 1700-1800 Model	AM 0600-0700 Model	PM 1800-1900 Model
Lane	Survey Code	Junction	Arm				
1	1a	A39 / High Street Cannington roundabout	From Cannington	0	0	0	0
2	1a		From Cannington	1	0	0	0
1	1b		A39 Eastbound	0	0	0	0
2	1b		A39 Eastbound	1	0	0	0
1	1c		A39 Westbound	0	0	0	0
2	1c		A39 Westbound	0	0	0	0
1	3a	A39 / Main Road, Cannington	Main Road	3	5	0	2
2	3a		Main Road	0	0	0	0
1	3b		A39 Eastbound	1	0	0	0
2	3b		A39 Eastbound	3	2	0	1
1	3c		A39 Westbound	0	0	0	0
2	3c		A39 Westbound	1	0	0	0
1	4c	A39 / B3339	A39 Northbound	0	0	0	0
1	4d		Sandford Hill Southbound	0	0	0	0
1	4e		Sandford hill Northbound	0	0	0	0
1	5a	A39 / Quantock Meadow / B3339 roundabout	Quantock Meadow	1	0	0	0
2	5a		Quantock Meadow	0	0	0	0
1	5b		A39 Eastbound	0	2	0	0
2	5b		A39 Eastbound	2	3	0	2
1	5c		A39 Westbound	3	6	0	5
2	5c		A39 Westbound	0	0	0	0
1	5d		B3339	6	4	0	2
2	5d		B3339	2	2	0	2
1	6a	B3339 / Wembdon Rise	Sandford Hill	8	5	2	11
1	6b		B3339	8	11	3	6
1	6c		Western Way	6	5	0	4
2	6c		Western Way	2	2	0	2
1	7b	A39 Wembdon Road / Northfield	A39 Westbound	0	0	0	0
1	7c		Wembdon Road	2	1	0	1
2	7c		Wembdon Road	0	0	0	0
1	8a	A39 / Northfield	A39 Eastbound	8	10	0	6
1	8b		Northfield	2	6	0	1
1	8c		A39 Westbound	0	0	0	0
1	9a	Durleigh Road / Northfield	West St	2	2	0	0
1	9b		Northfield	3	2	0	1
1	9c		Durliegh Road	0	0	0	0
1	10a	Western Way / Feversham Avenue	Western Way Southbound	0	0	0	0
1	10b		Western Way Northbound	0	0	0	0
1	10c		Feversham Avenue	2	4	0	1
1	11a	North Street / Alexandra Road	North Street	3	6	0	4
2	11a		North Street	1	1	0	0
1	11b		Alexandria Road	9	6	0	2
1	11c		A39 Eastbound	4	3	0	3
2	11c		A39 Eastbound	7	5	0	1
1	12a	Broadway / West Street / Penel Orlieu	A39 Eastbound	10	10	2	7
2	12a		A39 Eastbound	4	4	2	3
1	12b		West Street	14	8	5	6
2	12b		West Street	6	6	2	4
1	12c		A39 Westbound	7	13	1	8
2	12c		A39 Westbound	5	9	3	6
3	12c		A39 Westbound	5	2	2	2
1	12d		Penel Orlieu	9	11	3	9
2	12d		Penel Orlieu	4	5	0	4
1	14a	Kendale Road / Chilton Street	Chiltern Street	0	0	0	0
1	14b		Kendale Road	0	0	0	0
1	14c		Russell Place	0	2	0	0
1	15a	A39 Broadway junction with A38 Taunton Road	Taunton Road Southbound	3	11	0	5
1	15b		A39 Eastbound	8	15	2	4
2	15b		A39 Eastbound	0	11	0	3
3	15b		A39 Eastbound	12	11	11	16
1	15c		Taunton Road Northbound	20	26	3	18
2	15c		Taunton Road Northbound	26	28	6	21
3	15c		Taunton Road Northbound	4	5	4	4
1	15d		A39 Westbound	9	7	5	7
2	15d		A39 Westbound	15	13	2	14
3	15d		A39 Westbound	2	1	1	2
1	16a	East Quay / The Clink	East Quay Southbound	4	10	1	4
2	16a		East Quay Southbound	3	2	1	3
3	16a		East Quay Southbound	0	0	0	0
1	16b		The Clink Eastbound	8	17	1	7
2	16b		The Clink Eastbound	2	4	0	2
1	16c		East Quay Northbound	8	10	2	6
2	16c		East Quay Northbound	2	6	1	4
1	16d		The Clink Westbound	4	7	1	5
2	16d		The Clink Westbound	9	6	2	7
3	16d		The Clink Westbound	2	0	2	1

Average Mean-Max Queues 2009 Base				Network Peaks		Development Peaks	
				4	5	1	4
				6	10	1	6
Lane	Survey Code	Junction	Arm	1	1	0	0
1	17a	Wylds Road / East Quay / The Drove	Western Way Eastbound	9	18	5	5
2	17a		Western Way Eastbound	4	5	1	4
1	17b		Easy Quay Northbound	6	10	1	6
2	17b		Easy Quay Northbound	1	1	0	0
1	17c		The Drove	5	13	1	5
2	17c		The Drove	0	0	0	0
1	17d		Wylds Road	9	16	1	8
2	17d		Wylds Road	5	6	2	5
1	18a	A39 Broadway junction with A372 St John Street	Monmouth Street	9	8	3	12
2	18a		Monmouth Street	9	8	4	11
3	18a		Monmouth Street	4	2	4	4
1	18b		Eastover	4	14	2	6
1	18c		A39 Northbound	8	10	5	7
2	18c		A39 Northbound	8	10	4	7
1	18d		St John Street	13	8	4	7
2	18d		St John Street	5	6	5	4
1	19a	Clink / Bristol Road / Bath Road / Monmouth Street round	The Clink	0	1	0	0
2	19a		The Clink	3	6	0	2
3	19a		The Clink	2	2	1	2
1	19b		Monmouth Street	15	18	3	8
2	19b		Monmouth Street	12	16	1	6
1	19c		A39 Southbound	11	9	0	5
2	19c		A39 Southbound	10	10	0	8
1	19d		A38 Southbound	6	37	0	9
2	19d		A38 Southbound	7	20	1	8
1	20a	A38 / The Drove	A38 Southbound	8	32	2	9
2	20a		A38 Southbound	6	4	0	3
1	20b		The Drove	3	5	1	2
2	20b		The Drove	4	10	2	5
1	20c		A38 Northbound	15	12	5	9
2	20c		A38 Northbound	0	0	0	0
1	21a	A38 / Wylds Road	A38 Southbound	1	10	0	2
1	21b		Wylds Road	6	5	0	3
1	21c		A38 Northbound	1	1	0	1
1	23a	Junction 23 M5	M5 Southbound Off	3	9	0	3
2	23a		M5 Southbound Off	2	8	0	1
1	23b		A39 Eastbound	5	10	1	3
2	23b		A39 Eastbound	2	5	0	1
1	23c		M5 Northbound Off	4	2	0	1
2	23c		M5 Northbound Off	6	5	0	3
1	23d		A39 Westbound	4	2	0	0
2	23d		A39 Westbound	5	4	0	1
1	24a	Bridgwater Road / Taunton Road roundabout	Residential	1	1	0	0
2	24a		Residential	0	0	0	0
1	24b		A38 Northbound	3	4	0	2
2	24b		A38 Northbound	3	3	1	2
1	24c		M5 Junction 24 Access	2	3	0	1
2	24c		M5 Junction 24 Access	2	3	0	1
1	24d		Retail Area	2	3	1	2
1	24e		A38 Southbound	3	3	1	2
2	24e		A38 Southbound	5	5	1	4
1	25a	Junction 24 M5	Eastbound	0	0	0	0
2	25a		Eastbound	1	1	0	0
1	25b		M5 Northbound Off	1	1	0	0
2	25b		M5 Northbound Off	0	1	0	0
1	25c		Westbound	0	0	0	0
2	25c		Westbound	0	0	0	0
1	25d		M5 Southbound Off	0	0	0	0
2	25d		M5 Southbound Off	3	4	0	1
1	26a	Bath Rd / Puriton Hill	Bath Rd Westbound	0	0	0	0
2	26a		Bath Rd Westbound	0	0	0	0
1	26b		Puriton Hill	0	0	0	0
2	26b		Puriton Hill	3	35	0	7
1	26c		Bath Rd Eastbound	1	0	0	0
2	26c		Bath Rd Eastbound	9	6	1	2
1	dw12a	A38 roundabout with 'Express Park'	A38 Southbound	1	1	0	1
2	dw12a		A38 Southbound	1	1	0	0
1	dw12b		Express Way	0	12	0	0
2	dw12b		Express Way	1	5	0	1
1	dw12c		A38 Northbound	2	2	0	0
2	dw12c		A38 Northbound	3	3	0	2

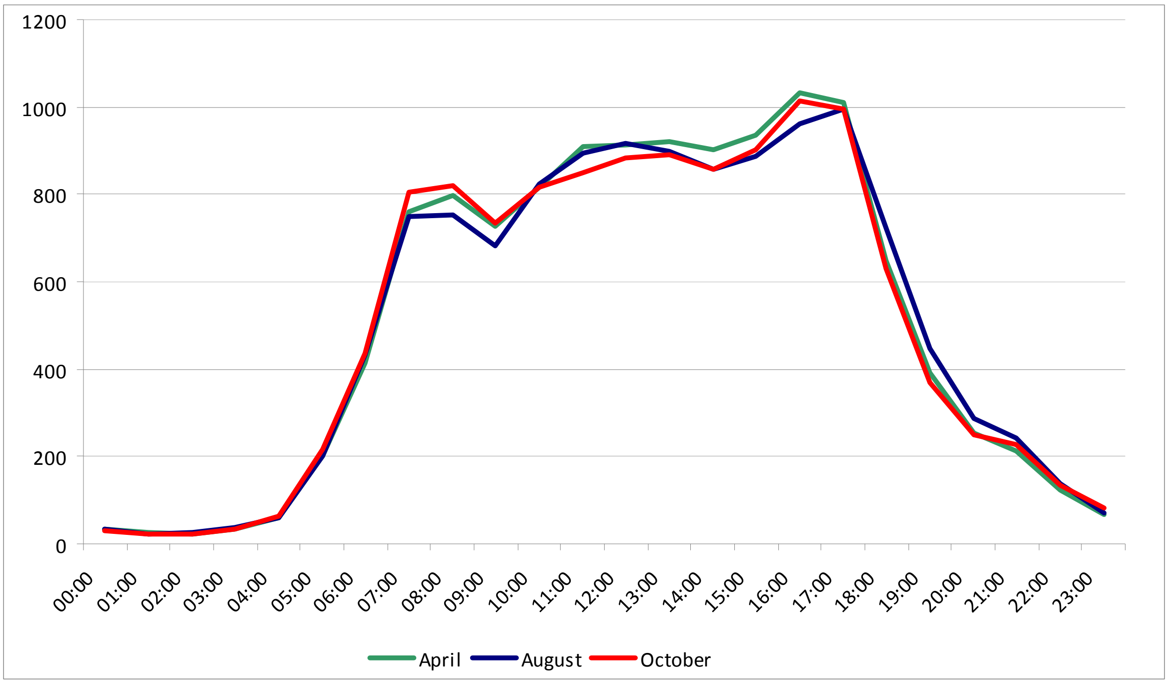
APPENDIX 3.4: SEASONAL ATC GRAPHS

Local Road Network - Seasonality Assessment

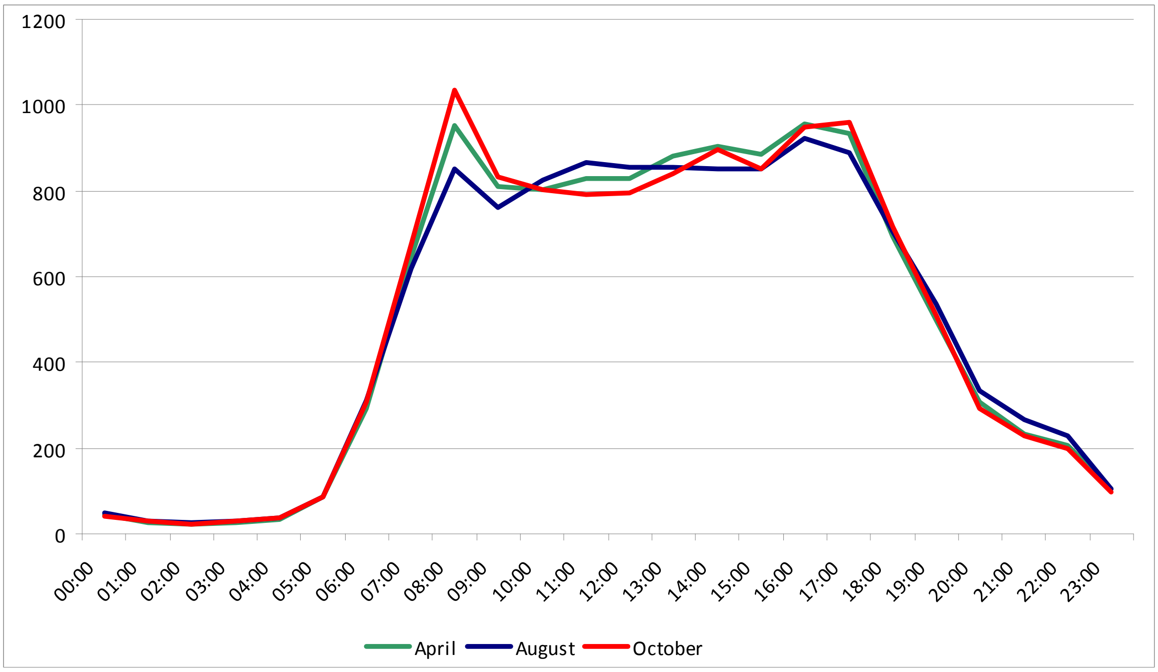
The map below illustrates where the traffic count data was collected to undertake the seasonality assessment.

1 - A38 Bristol Road

Northbound



Southbound



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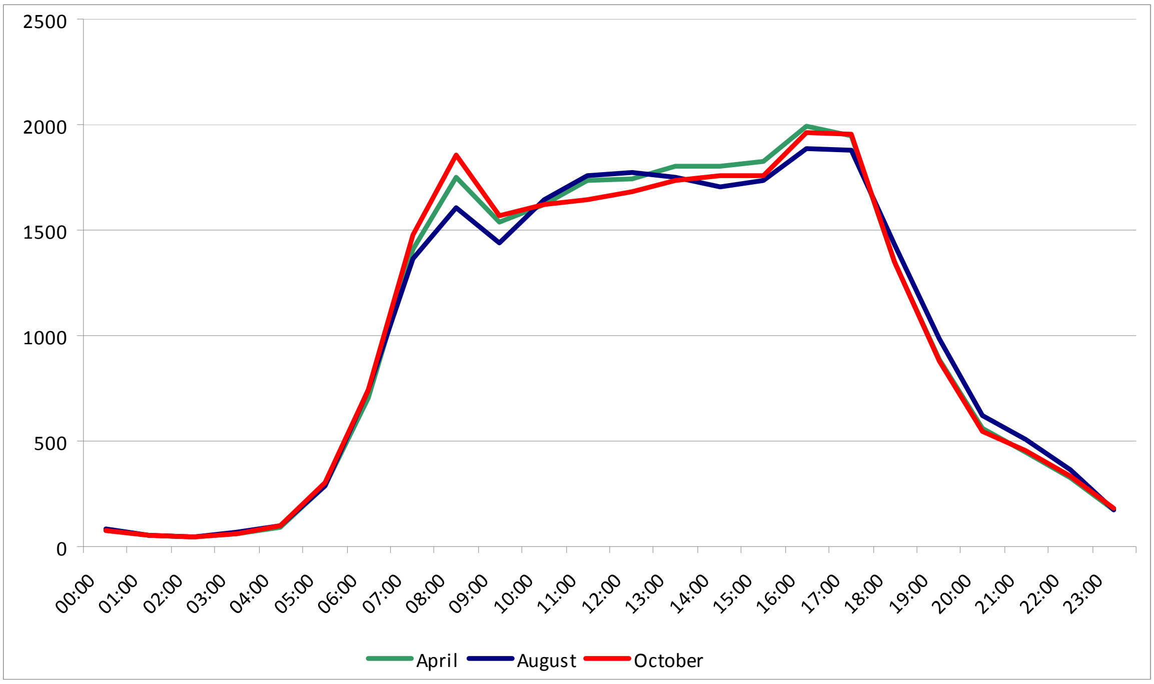

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April
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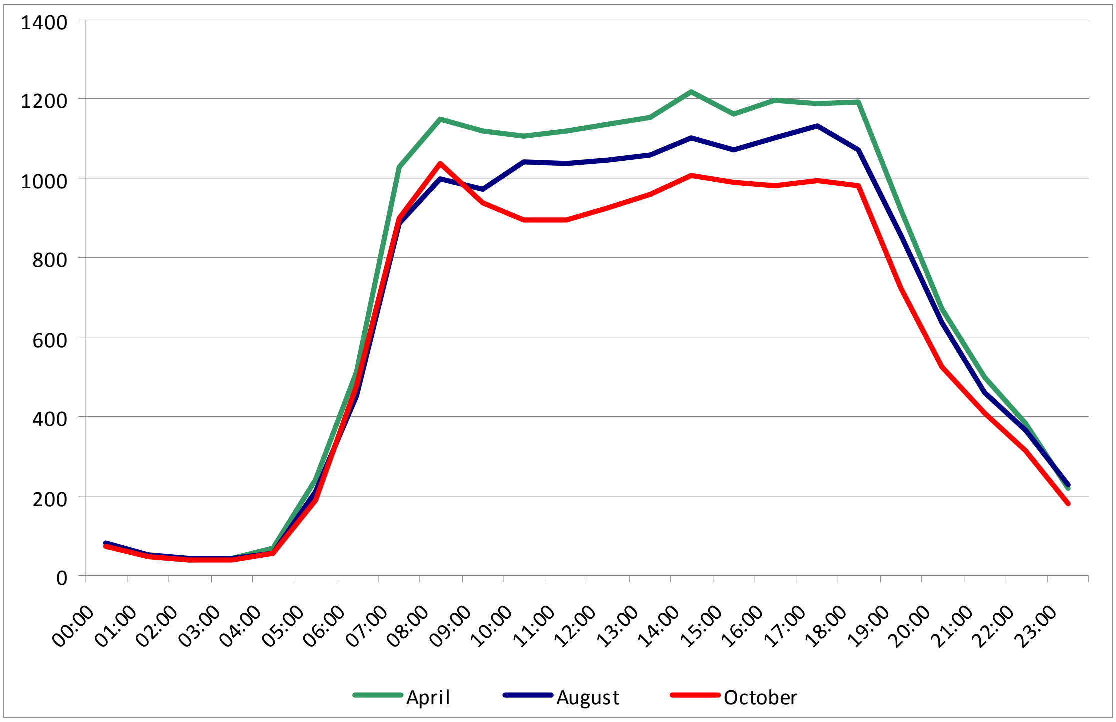
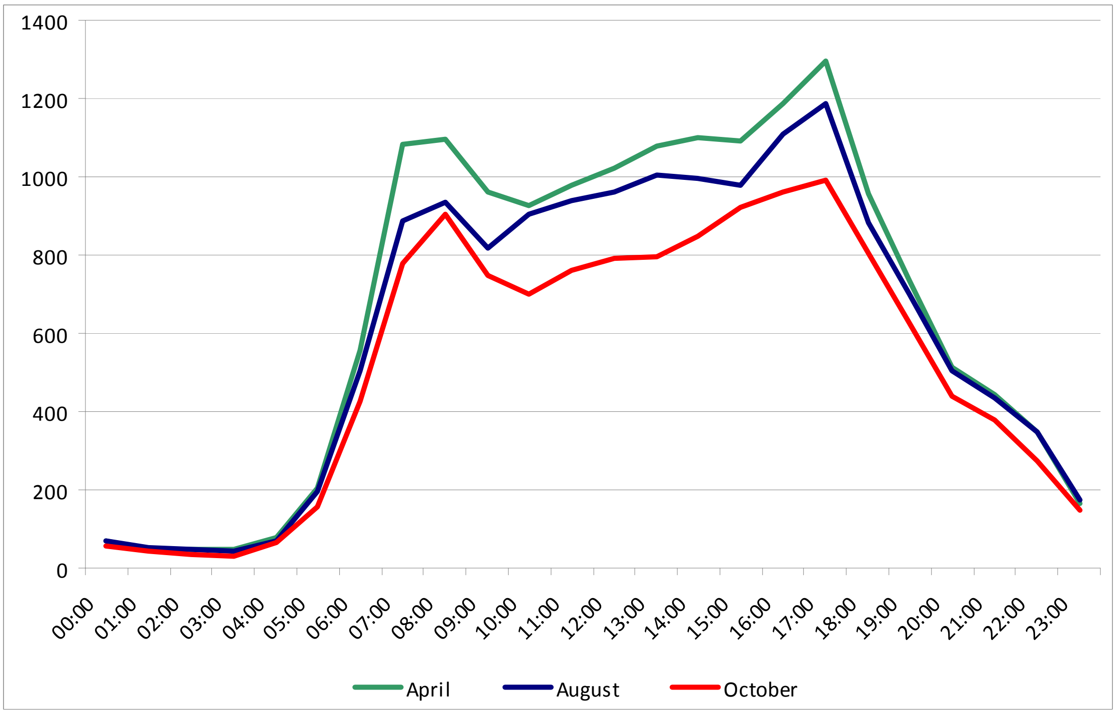
October

2 - A38 Taunton Road

Northbound



Southbound



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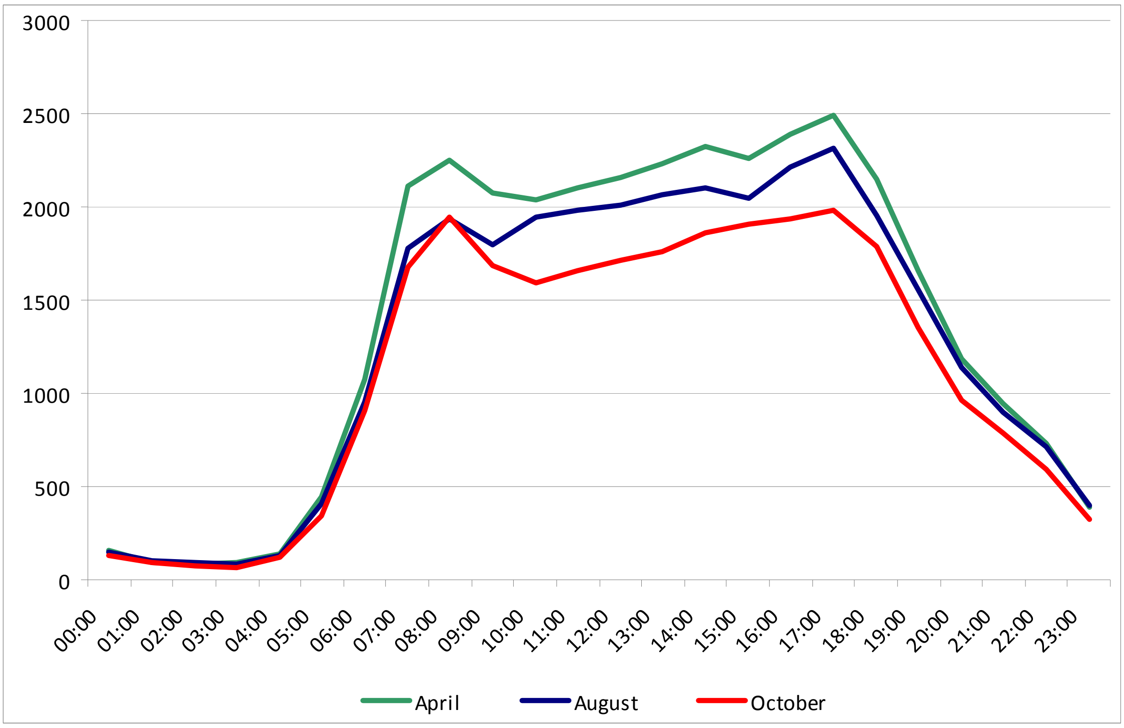

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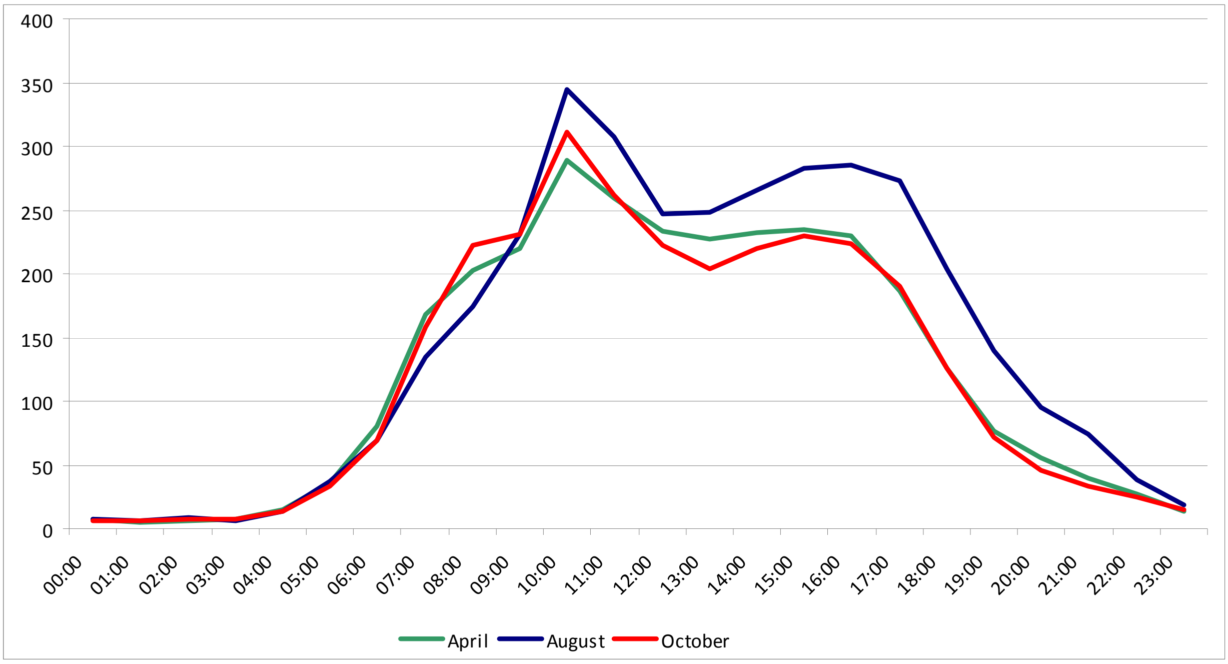
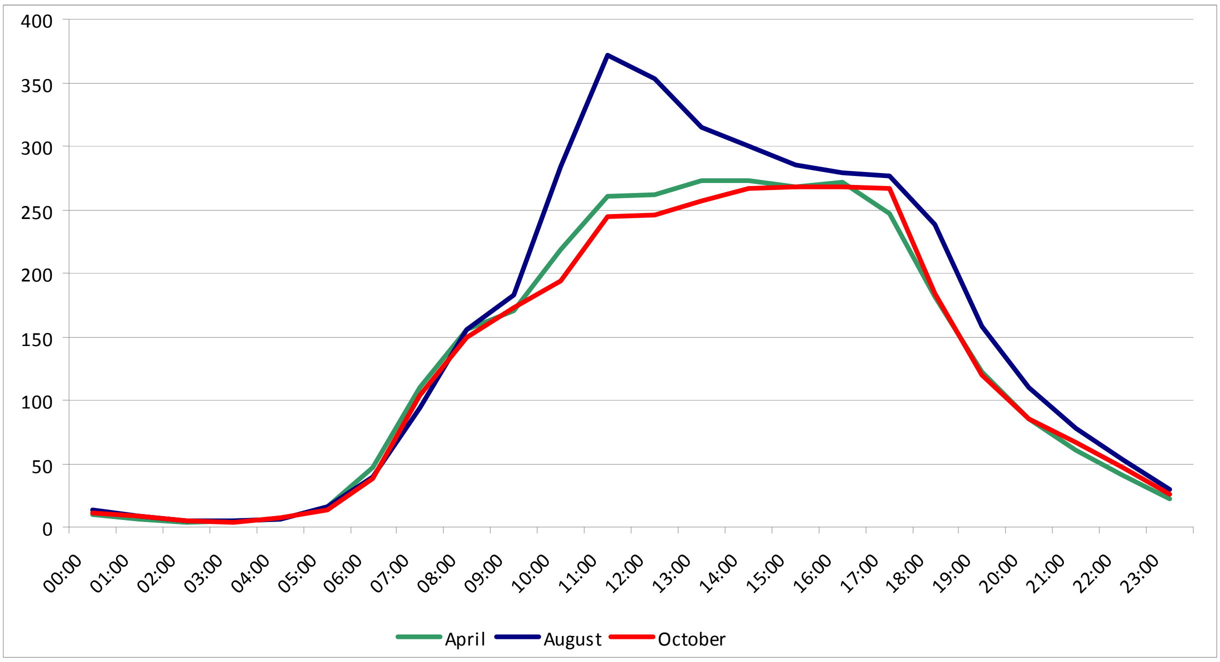
3 - A39 Holford

Eastbound



Westbound



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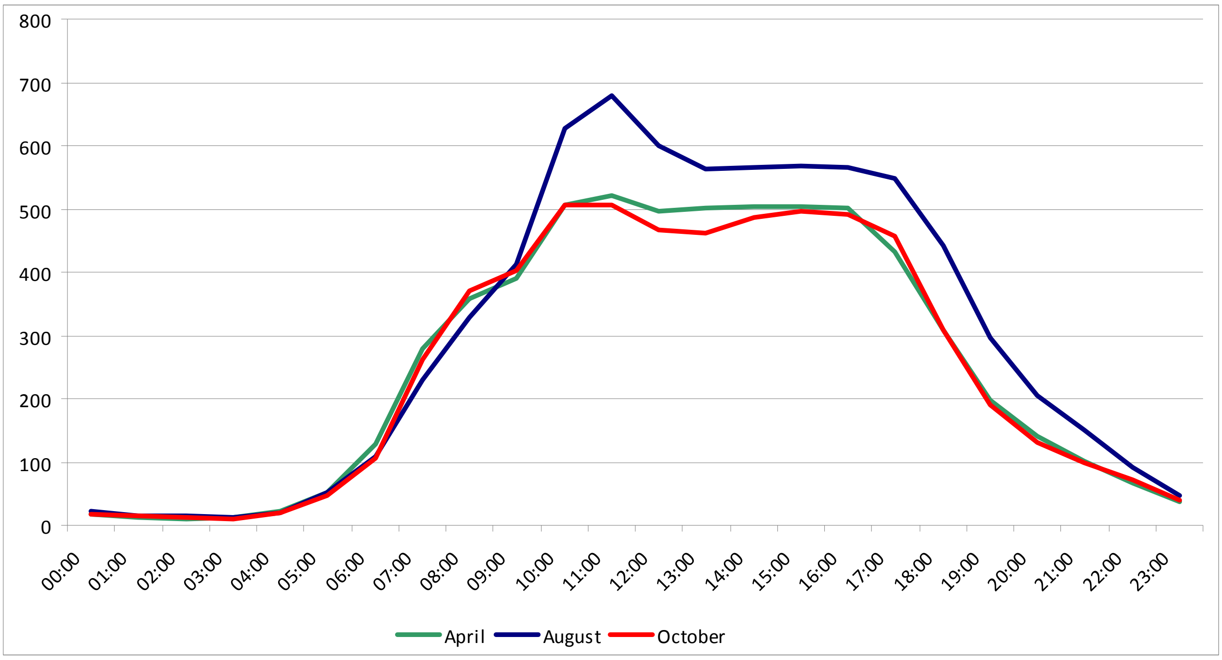

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April
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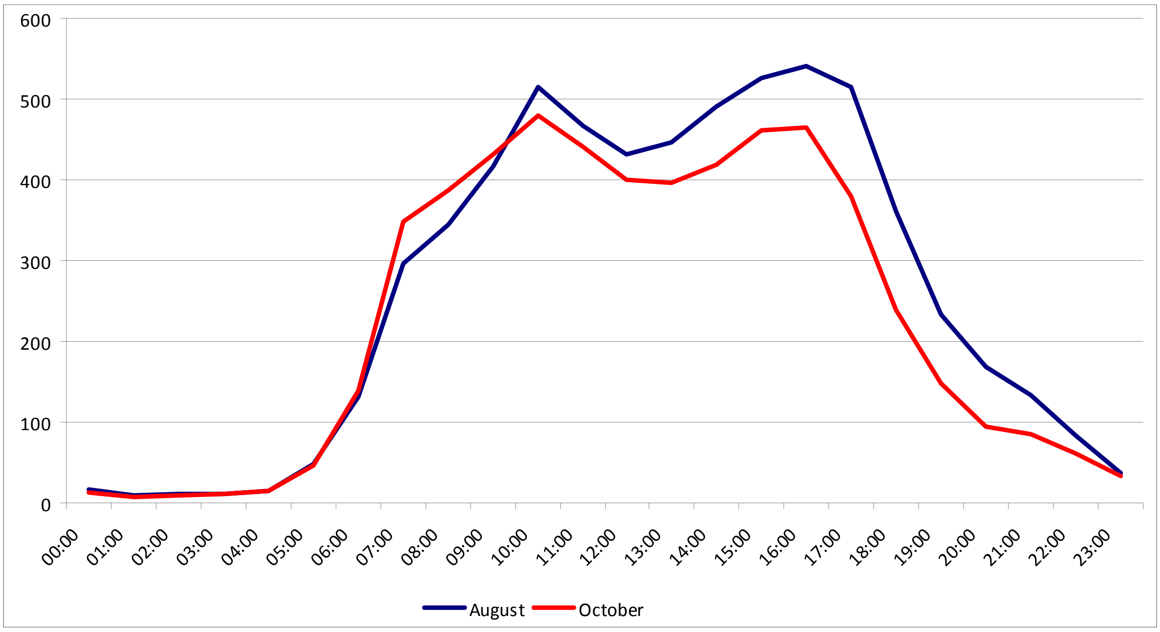
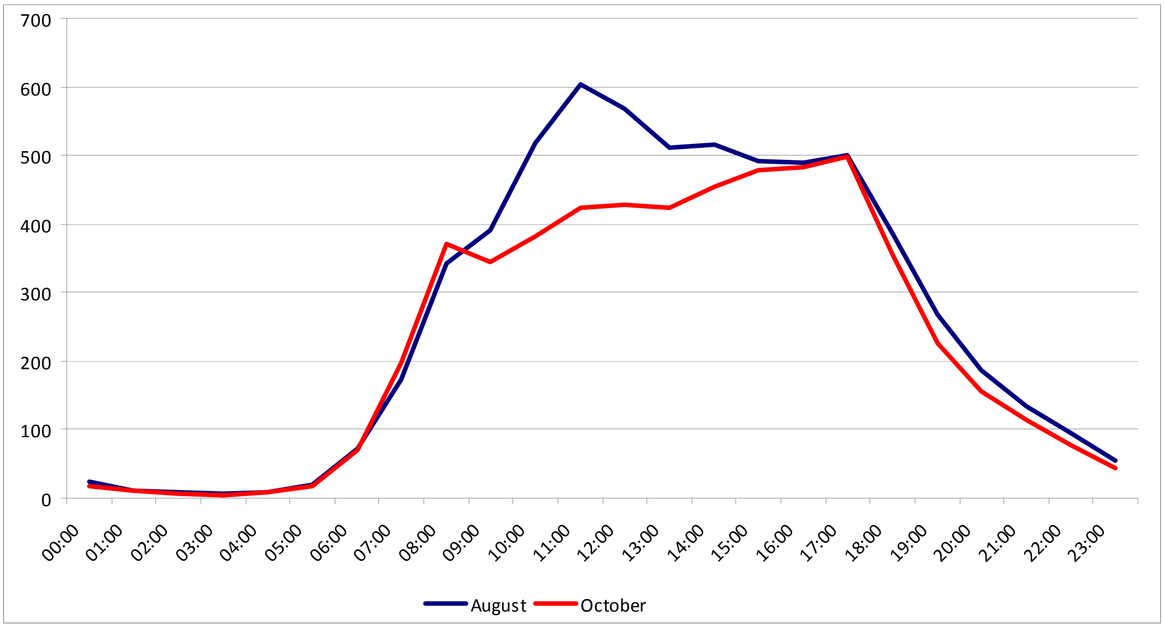
4 - A39 East of Washford Cross

Eastbound



Westbound



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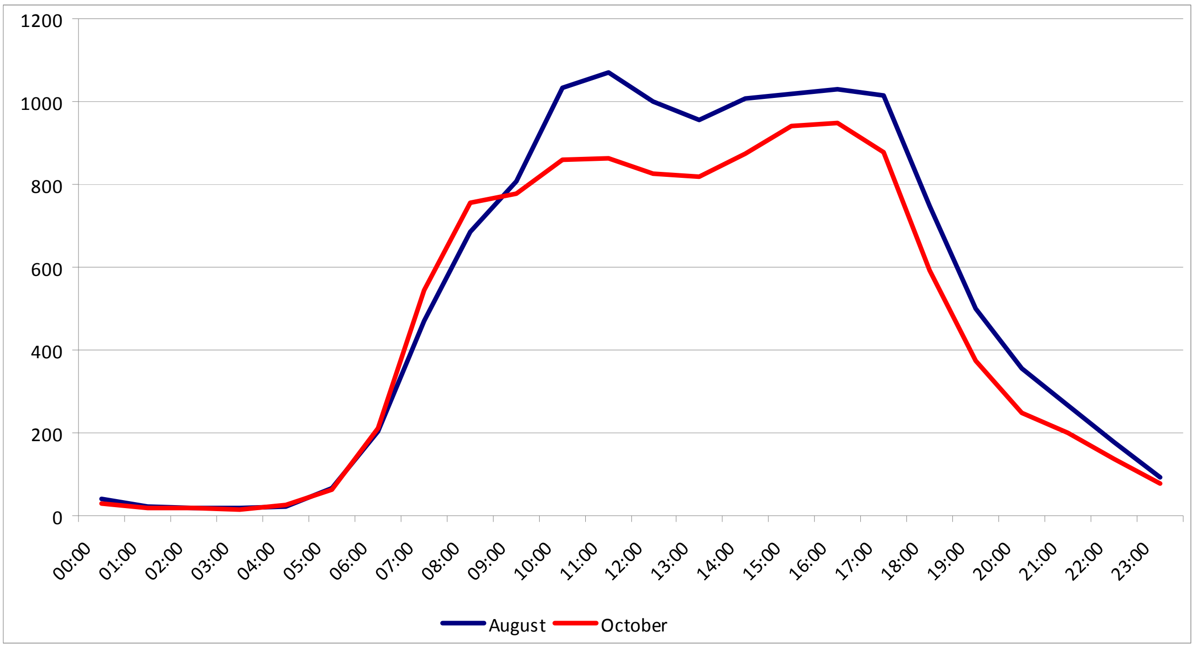

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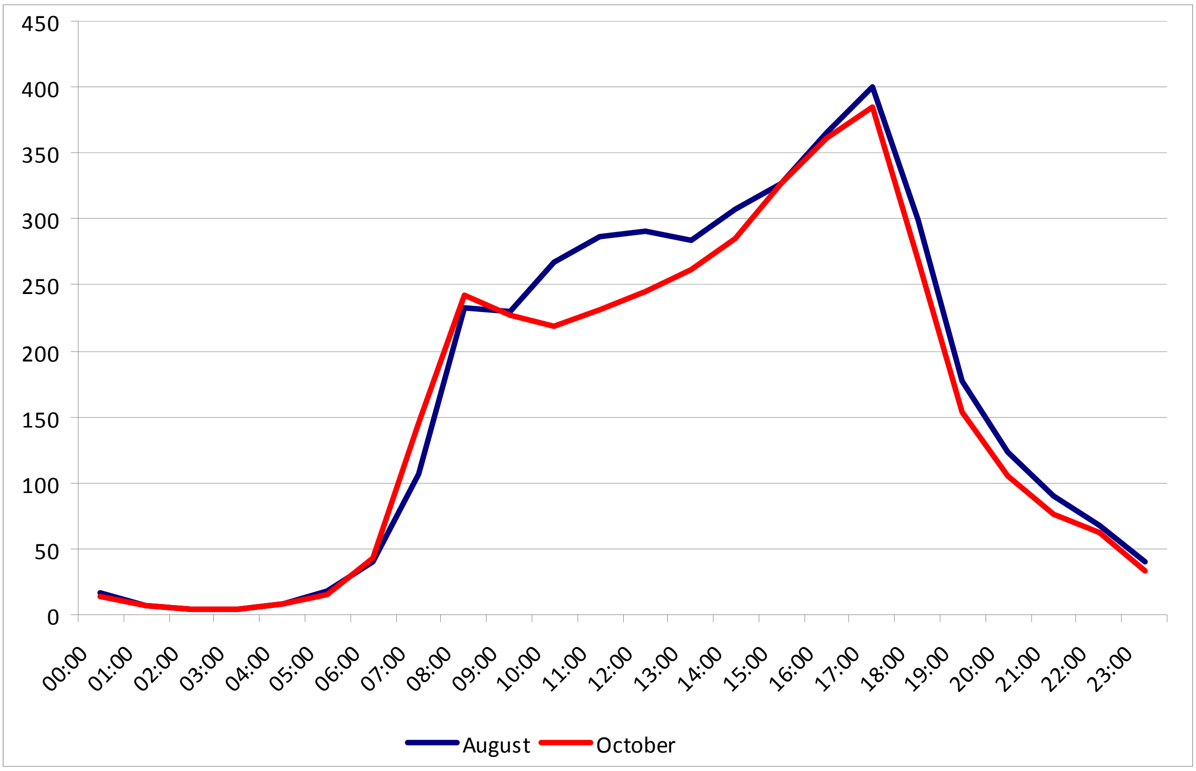
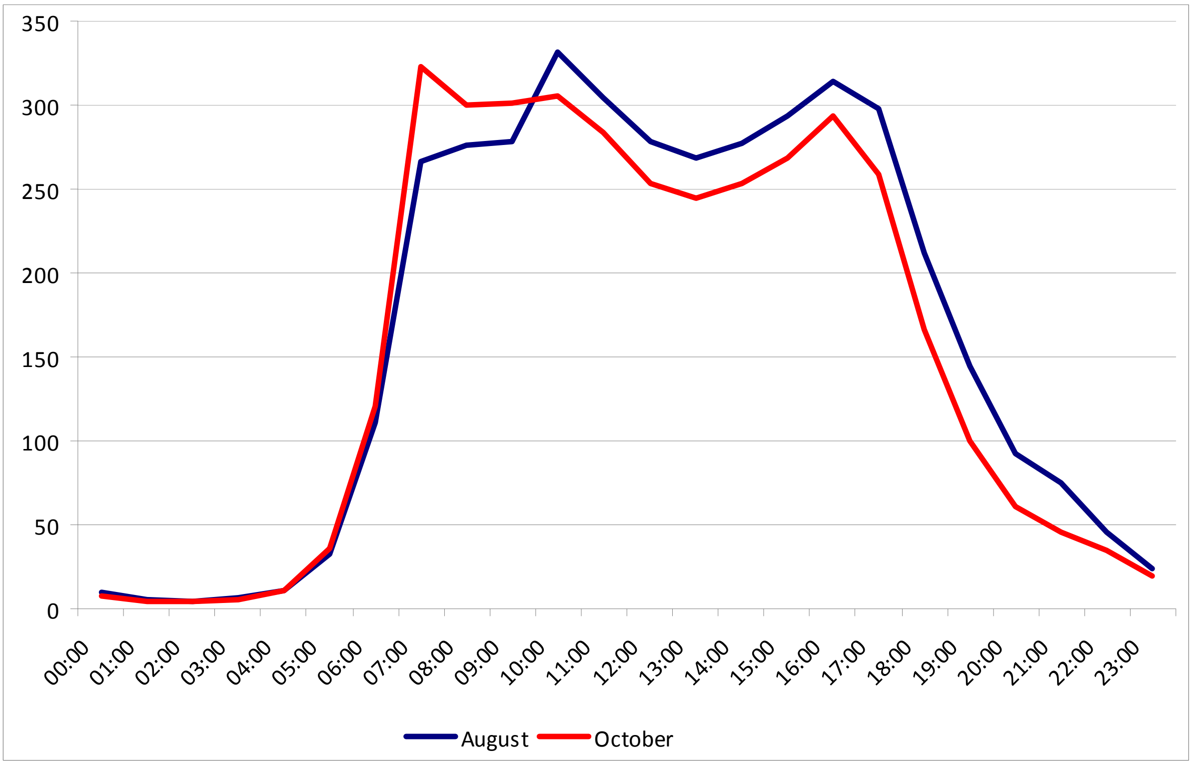
August
October

5 - A358 Bicknoller

Northbound



Southbound



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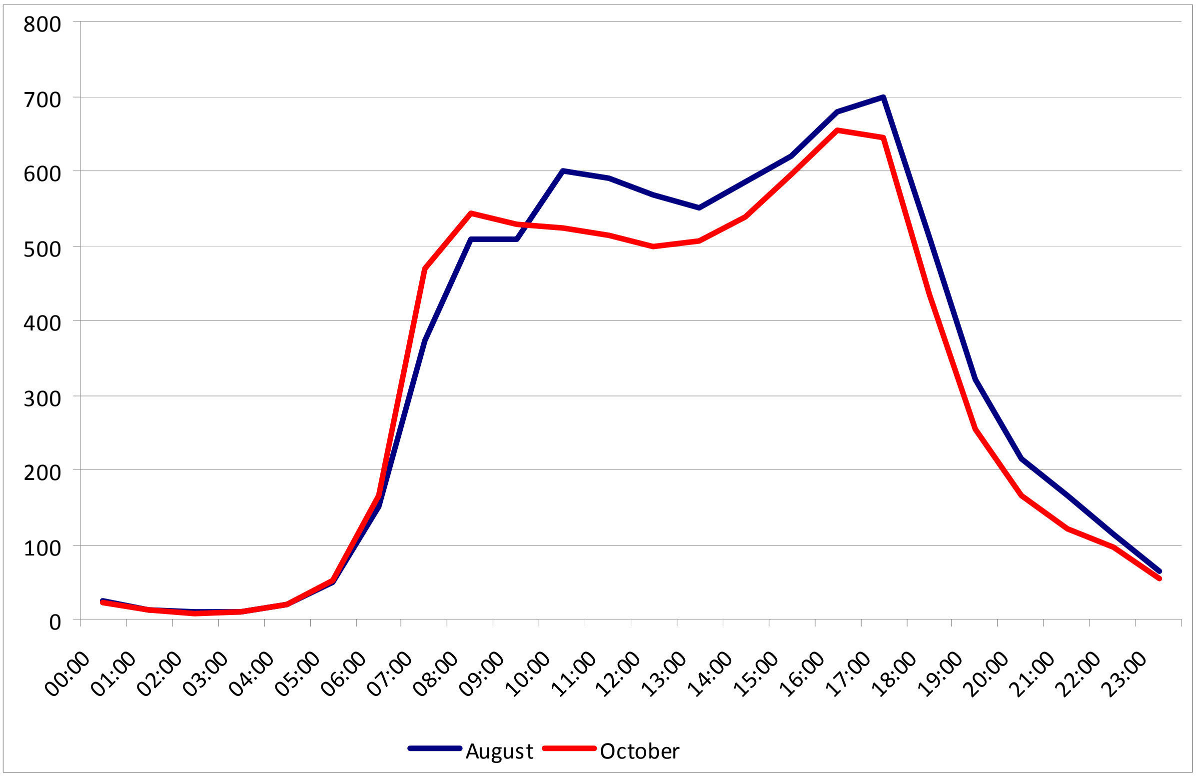

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August
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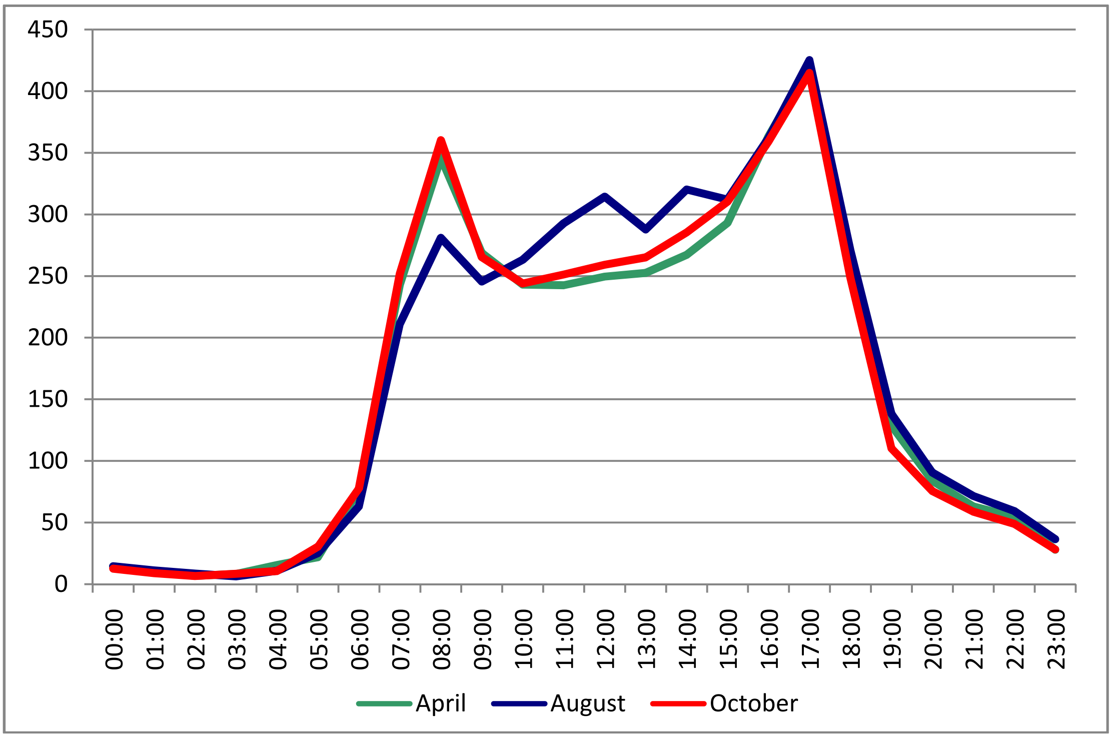
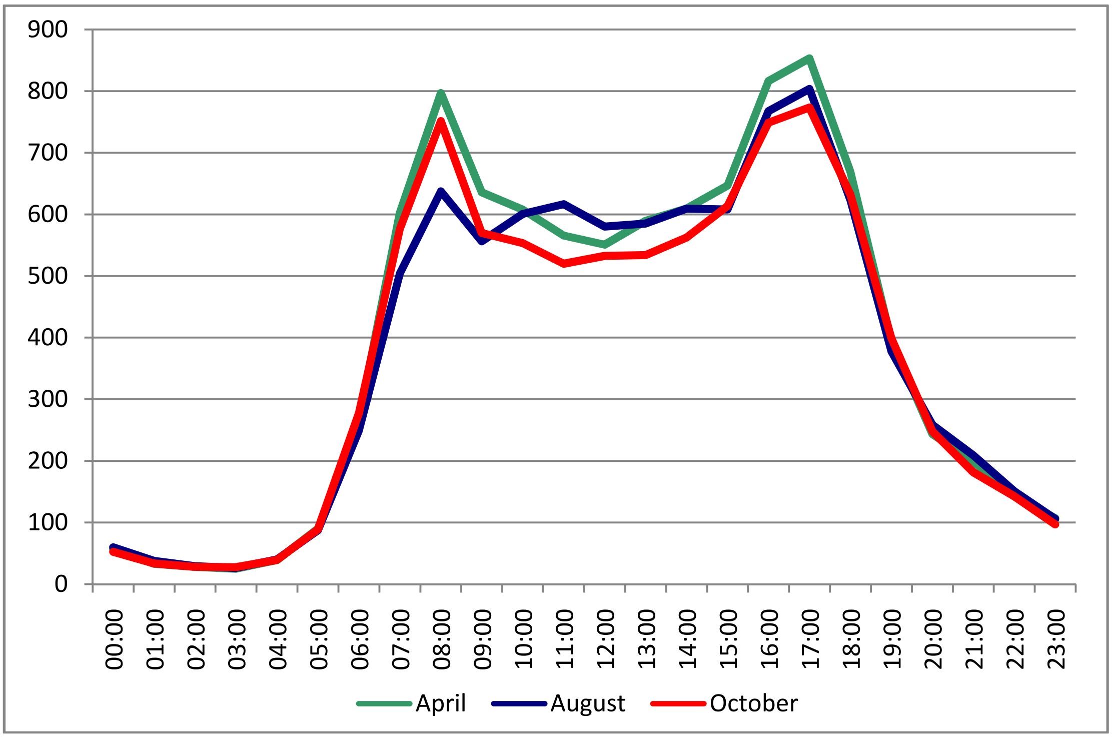
Strategic Road Network – Seasonality Assessment

1 – Junction 23 Off-Slips

Northbound (2008 Data)

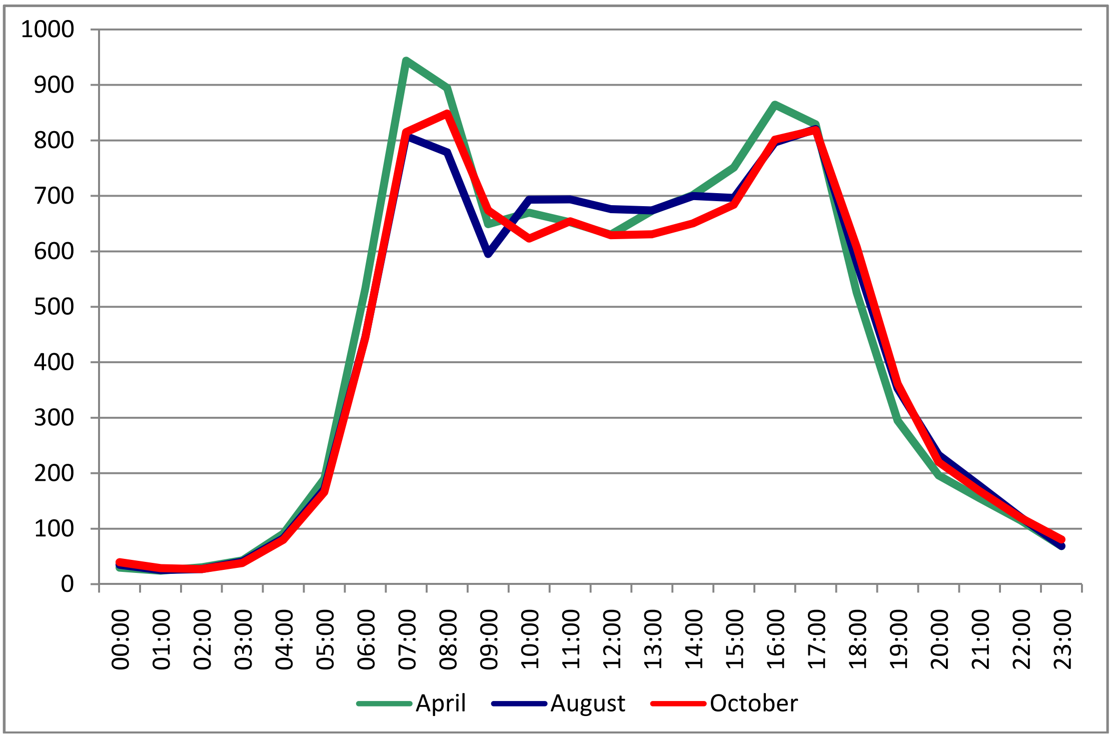


Southbound (2008 Data)



2 – Junction 23 On-Slips

Northbound (2008 Data)



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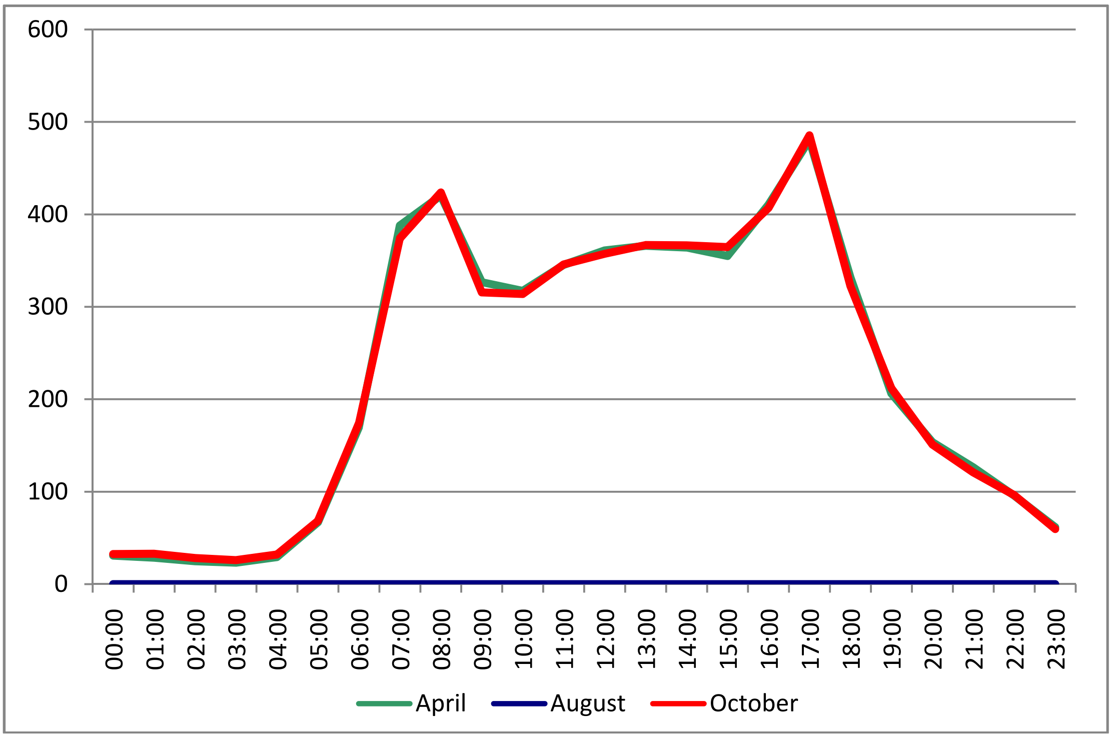
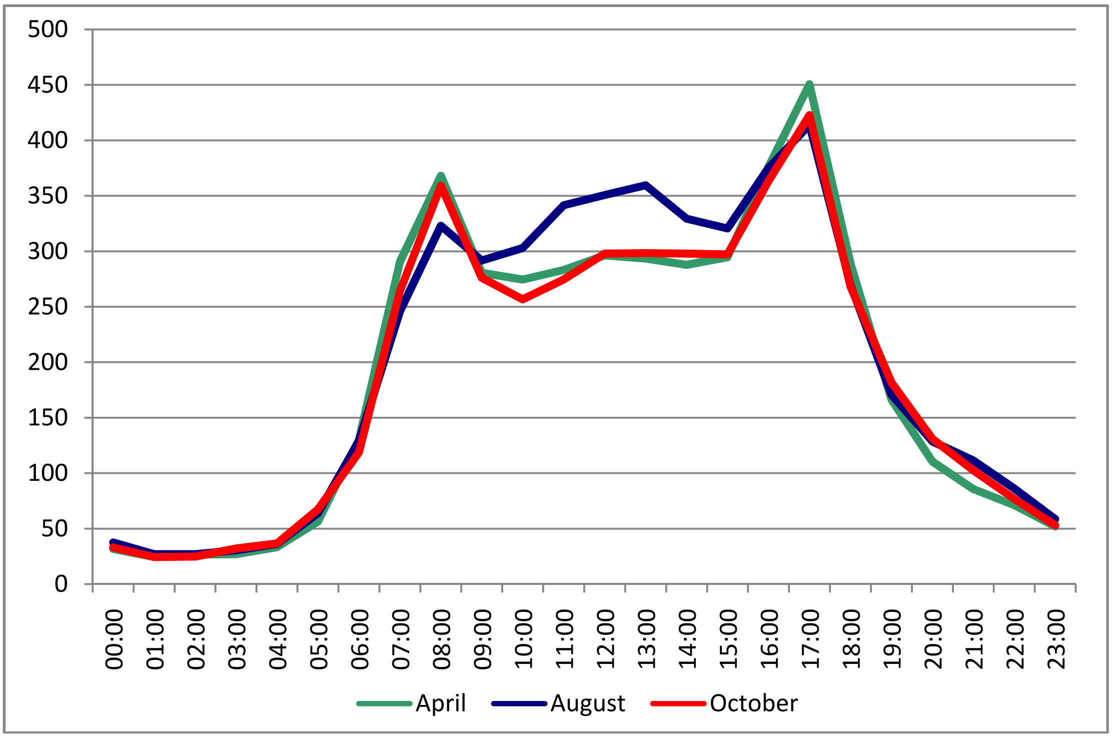
3 – Junction 24 Off-Slips

Northbound (2008 Data)



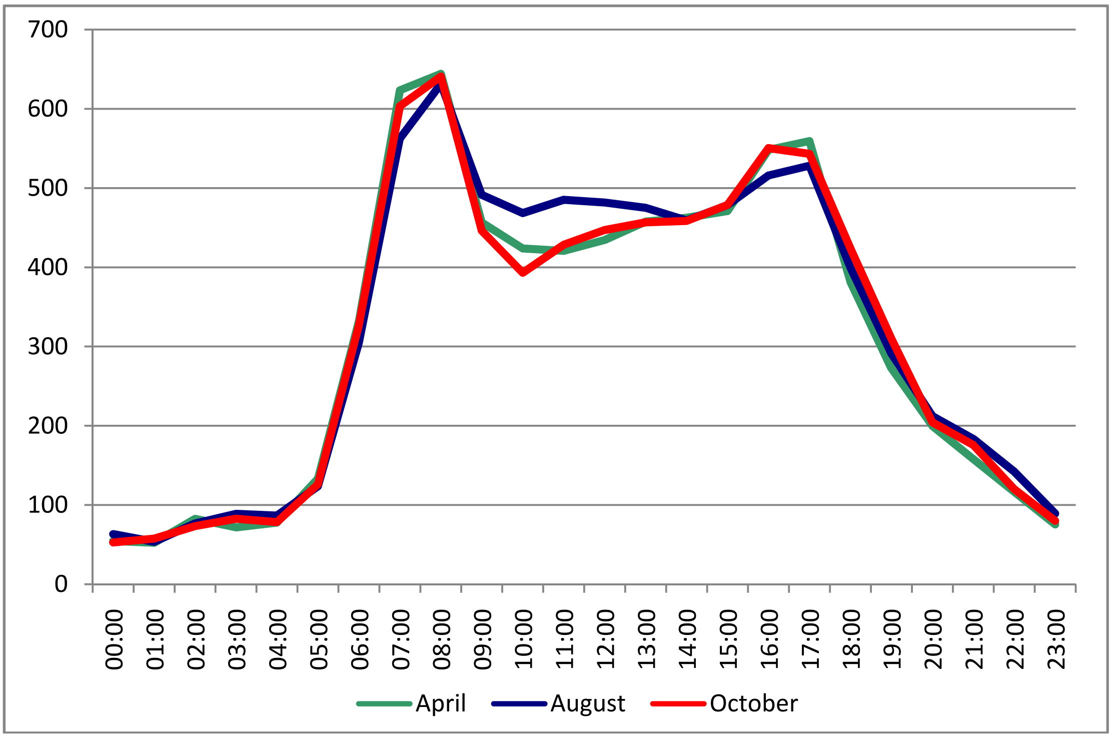
Southbound (2008 Data)



4 – Junction 24 On-Slips

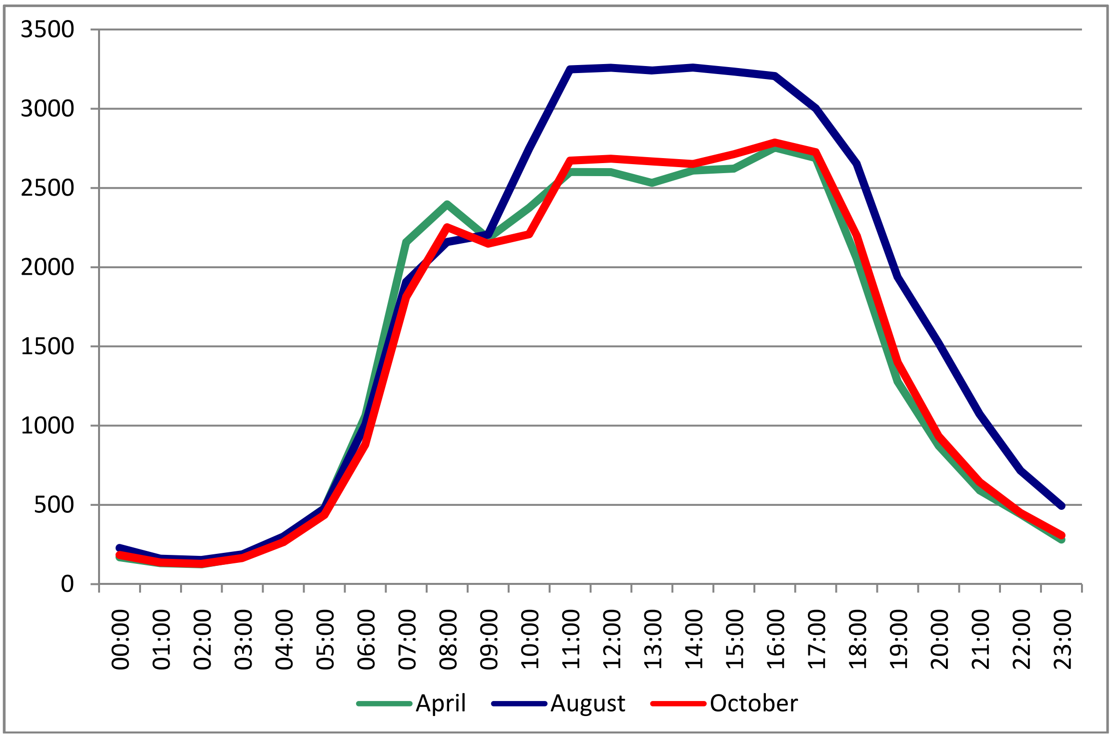
Northbound - No data available

Southbound (2008 Data)

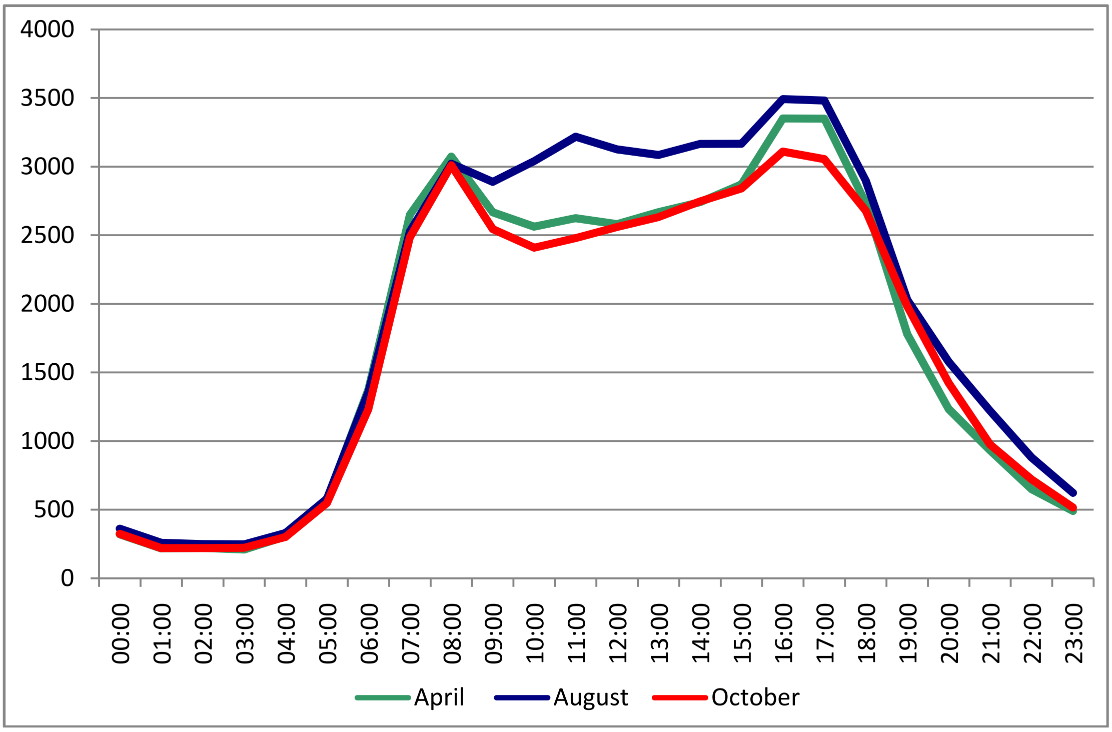


5 – M5 Mainline

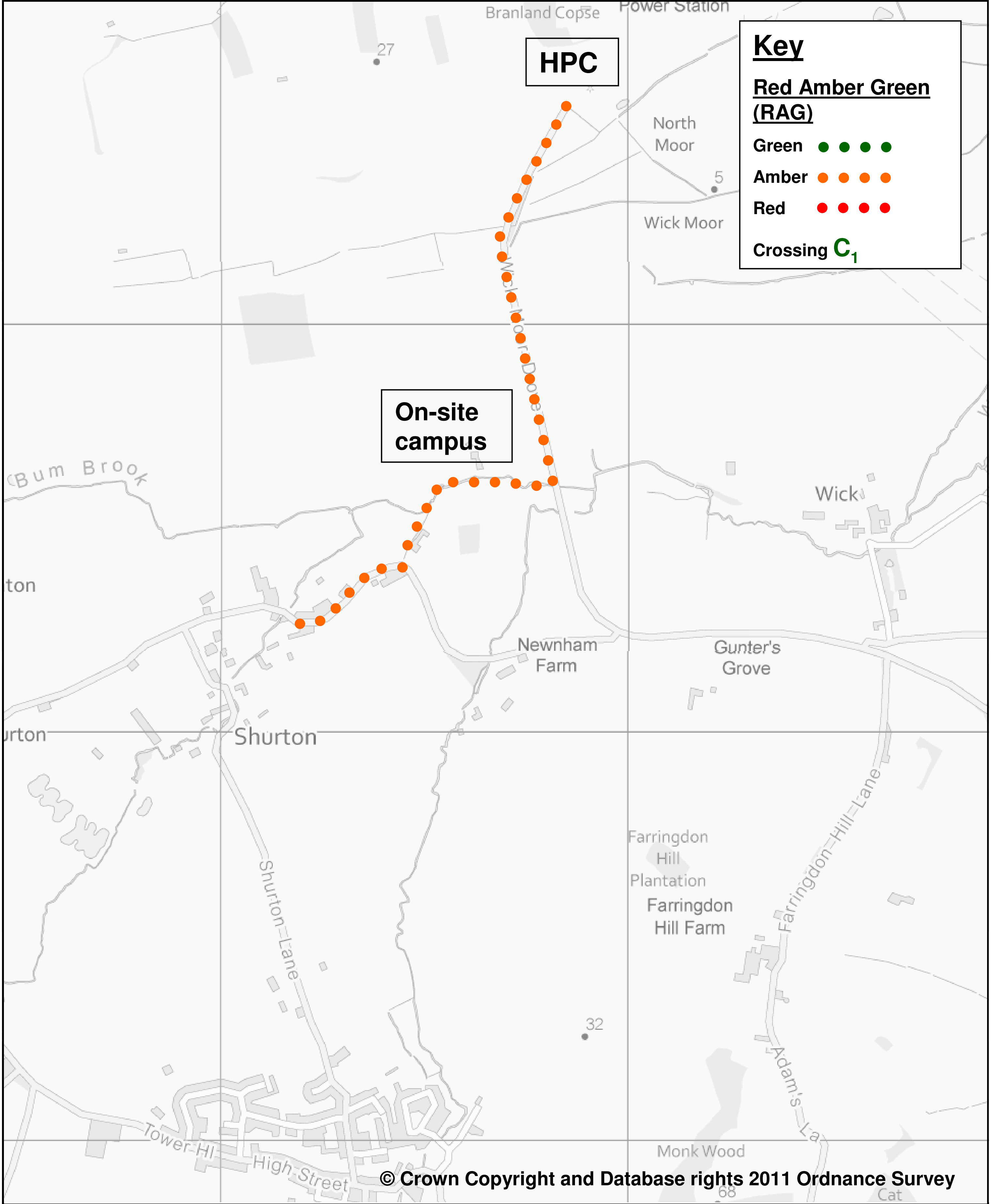
Northbound



Southbound



APPENDIX 3.5: WALK AND CYCLE AUDIT RESULTS



Walk Audit; Route, Crossings and RAG Score

EDF Energy

Hinkley Point Power Station and On-Site Campus

Savell Bird & Axon
part of the WYG group
Academy House, 36 Poland Street, London, W1F 7LU
Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818
Email: sba@sbax.co.uk www.sbax.co.uk
WYG Environment Planning Transport Ltd Registered in England Number: 3050297
Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

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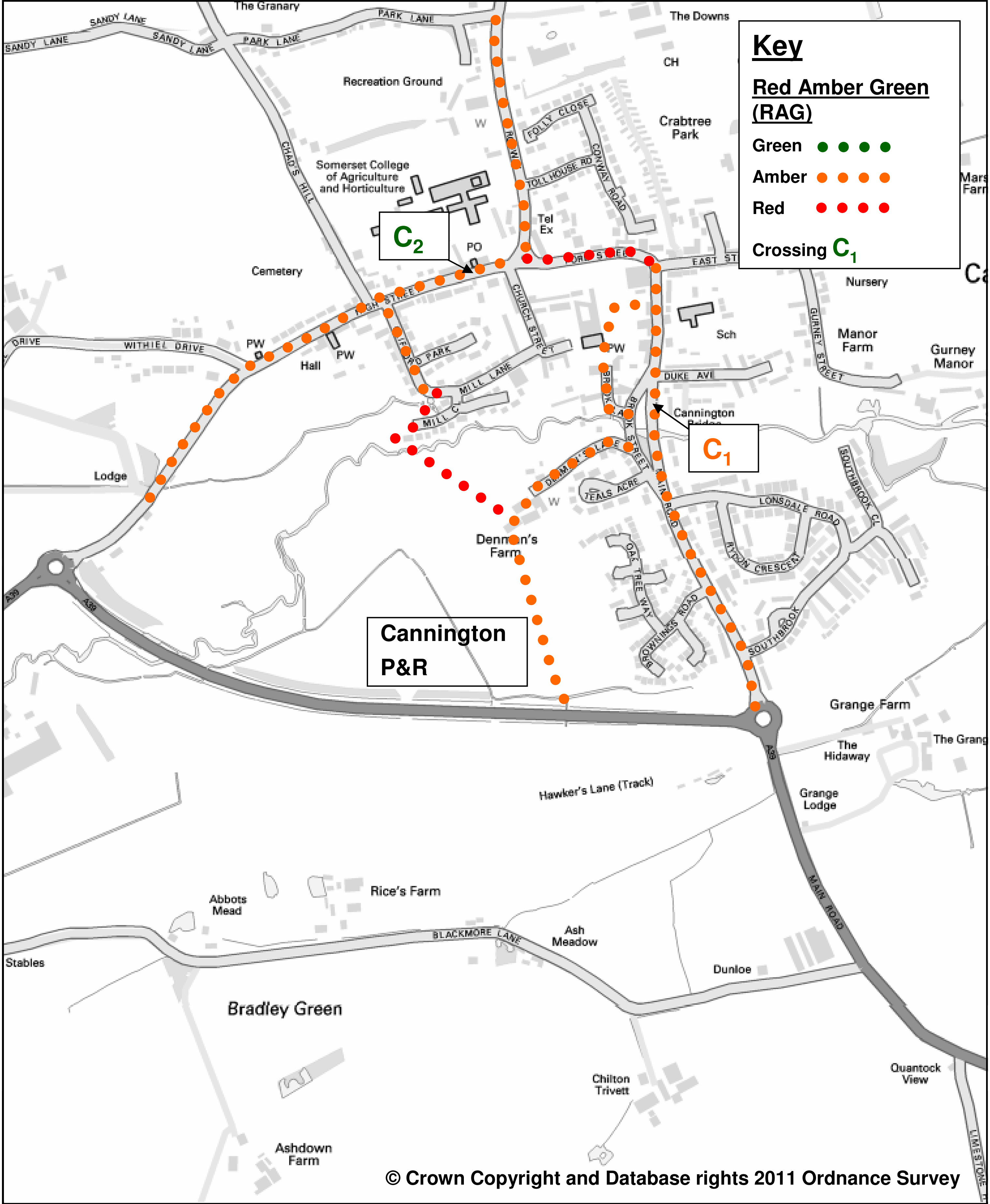
MWT	VR	31.05.11	NTS	Plan 1	



Walk Audit; Route, Crossings and RAG Score

EDF Energy

Cannington

Savell Bird & Axon
part of the WYG group
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DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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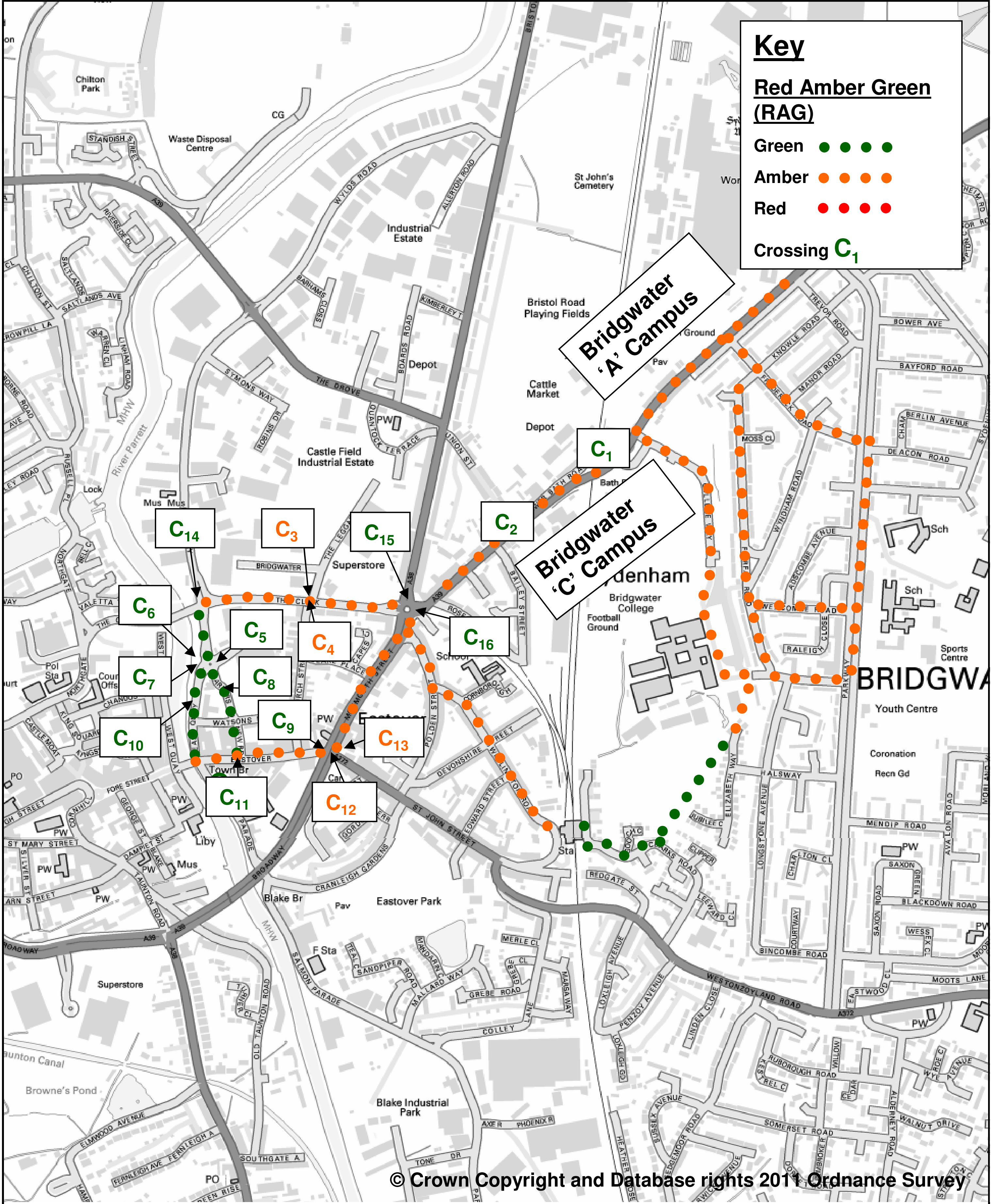

Walk Audit; Route, Crossings and RAG Score

EDF Energy

Central Bridgwater

Savell Bird & Axon

part of the WYG group

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DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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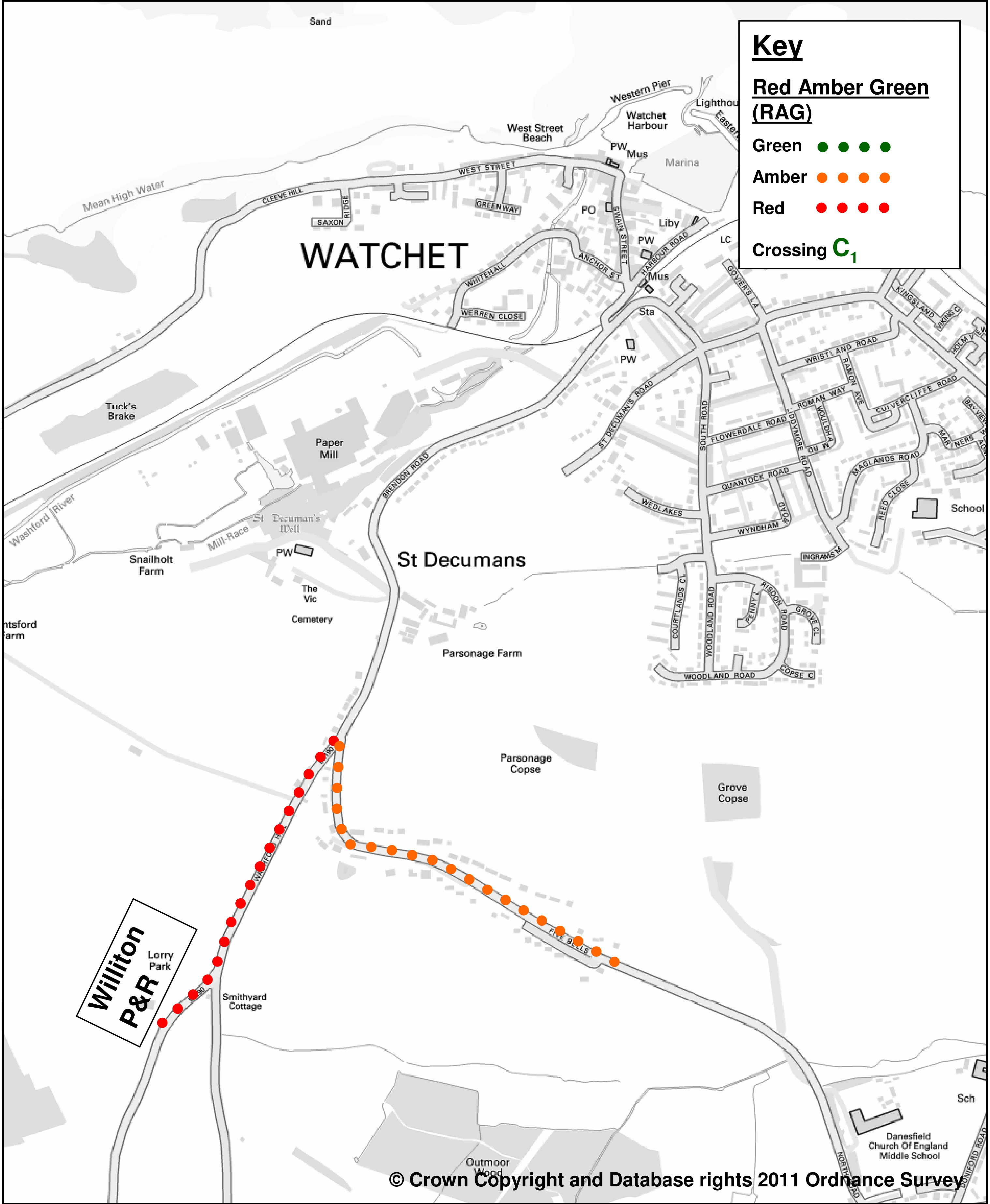

Walk Audit; Route, Crossings and RAG Score

EDF Energy

Watchet

Savell Bird & Axon
part of the WYG group
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Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818
Email: sba@sbax.co.uk www.sbax.co.uk
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DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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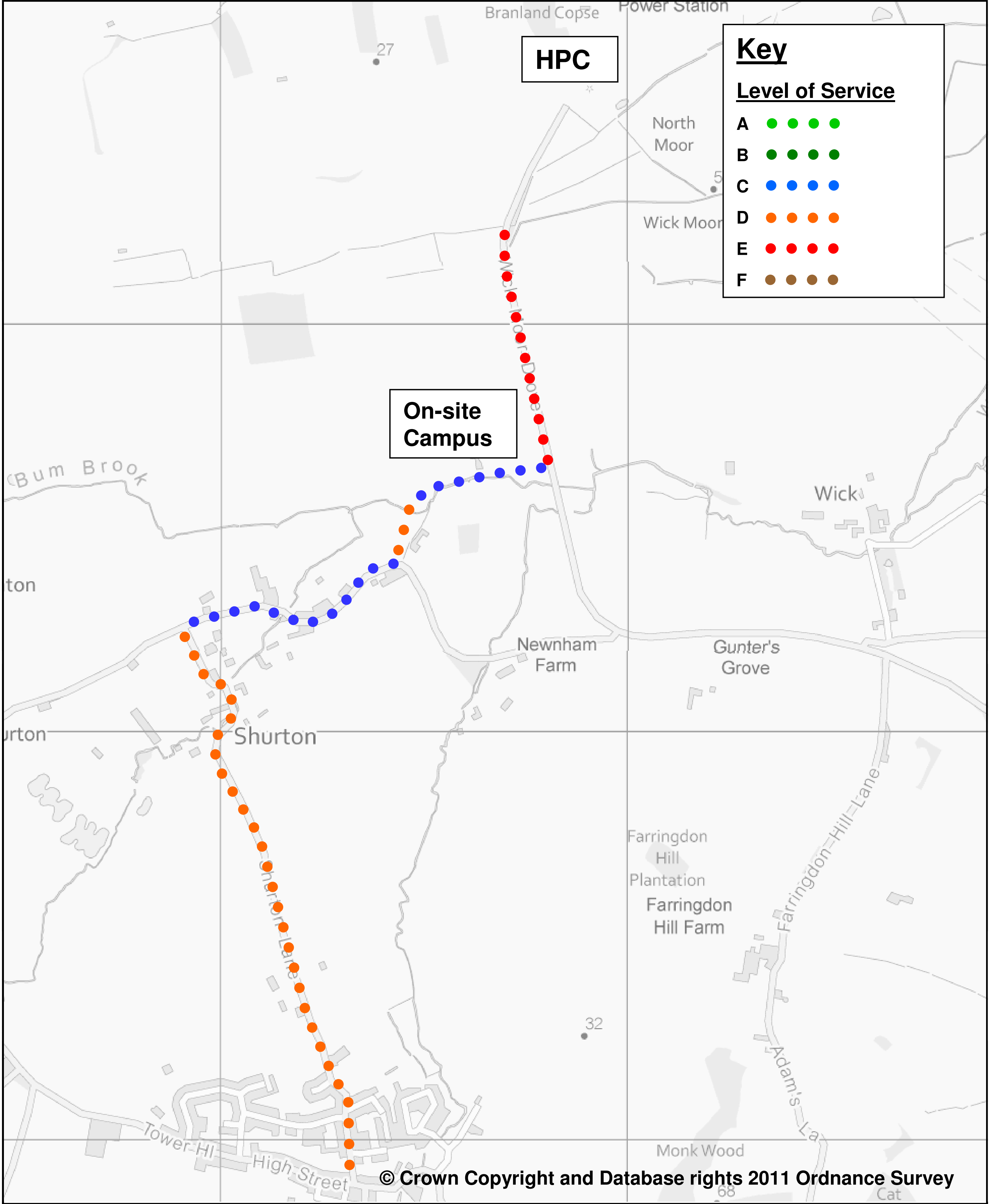

Cycle Audit; Route and Level of Service

EDF Energy

Hinkley Point Power Station and On-Site Campus

Savell Bird & Axon

part of the **WYG** group

Academy House, 36 Poland Street, London, W1F 7LU
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DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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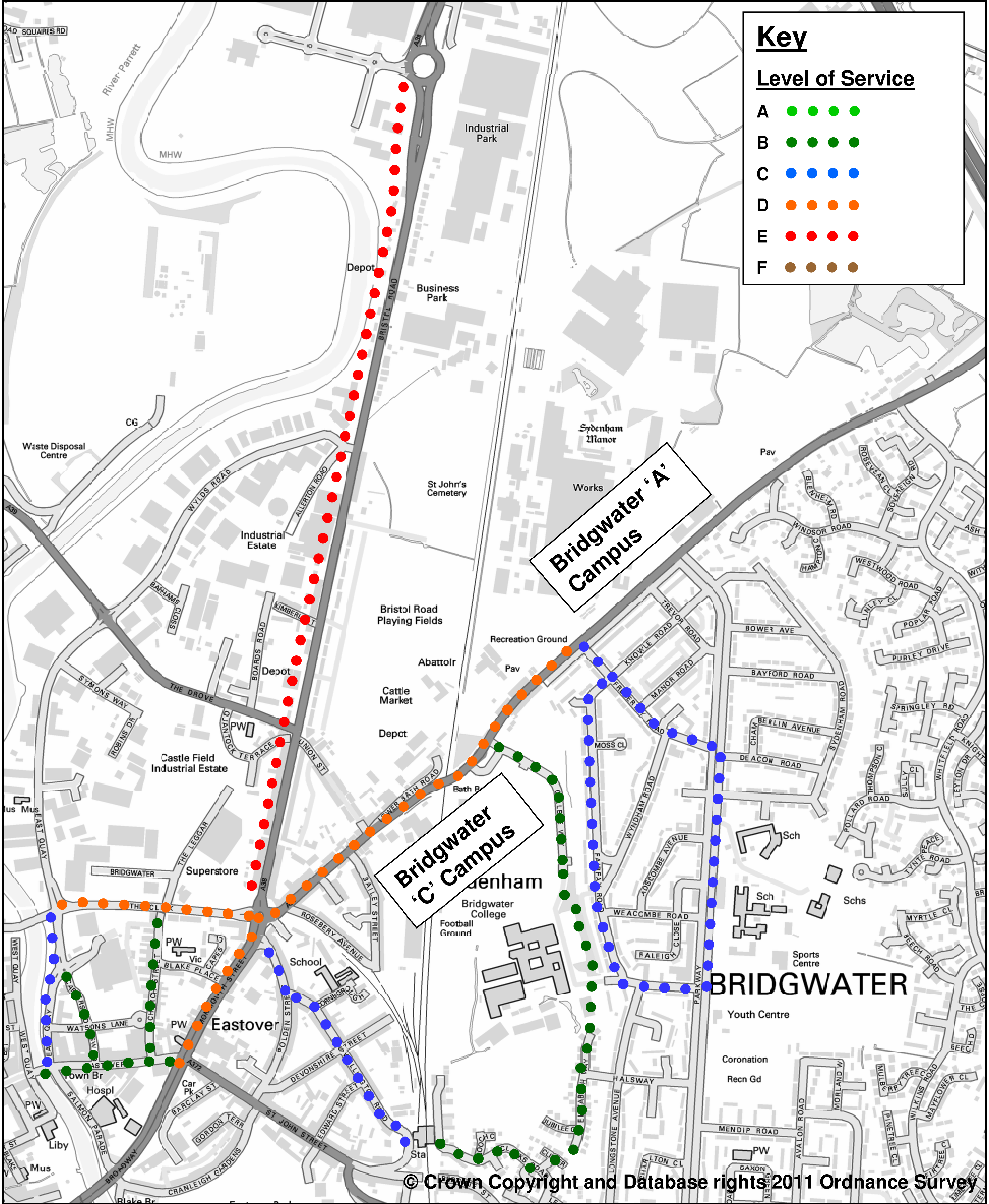

Cycle Audit; Route and Level of Service	EDF Energy
Bridgwater – J23 south and central Bridgwater	**Savell Bird & Axon** part of the **WYG** group Academy House, 36 Poland Street, London, W1F 7LU Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818 Email: sba@sbax.co.uk www.sbax.co.uk WYG Environment Planning Transport Ltd Registered in England Number: 3050297 Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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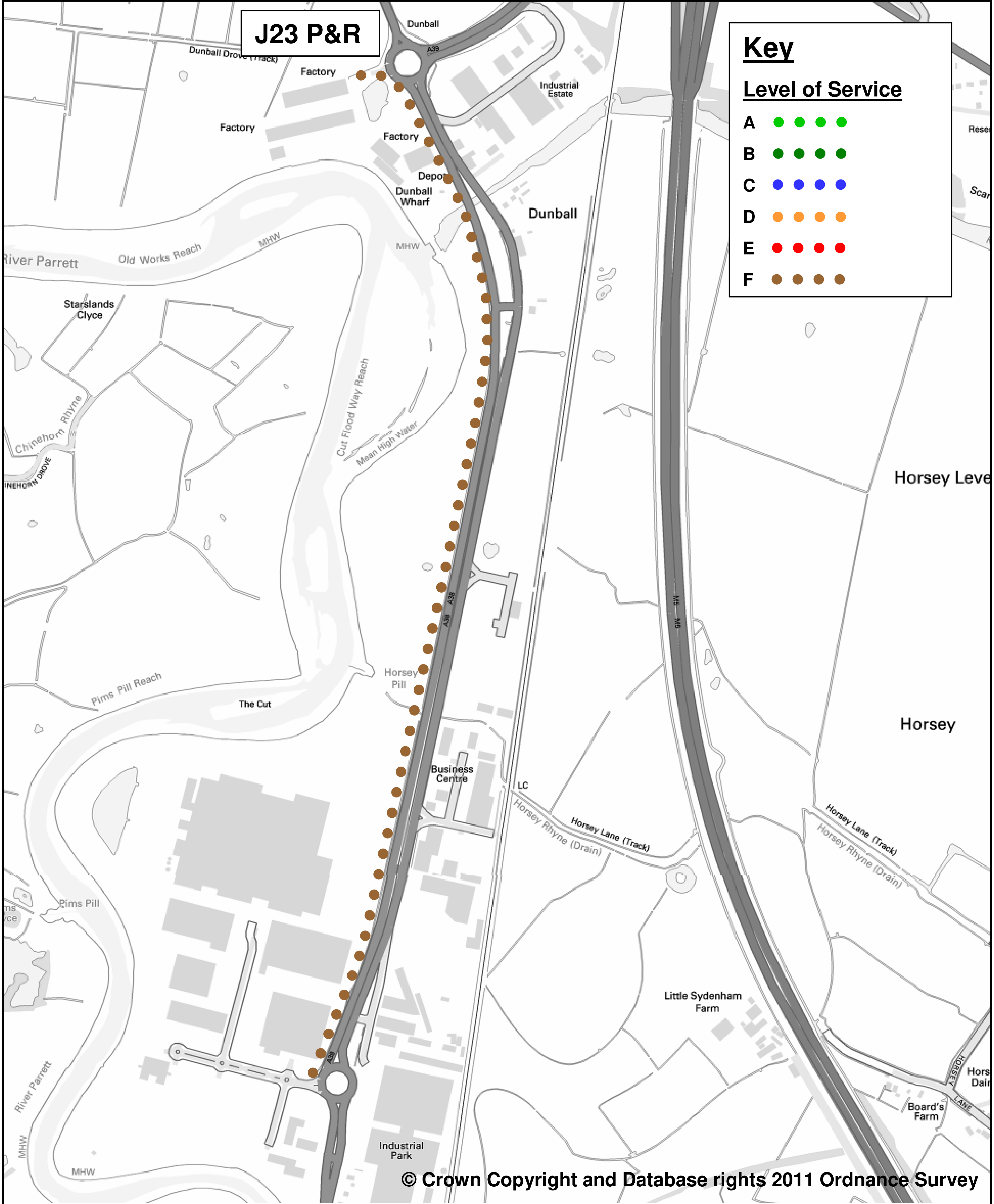

Cycle Audit; Route and Level of Service

EDF Energy

Bridgwater – J23, north

Savell Bird & Axon
part of the **WYG** group
Academy House, 36 Poland Street, London, W1F 7LU
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Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

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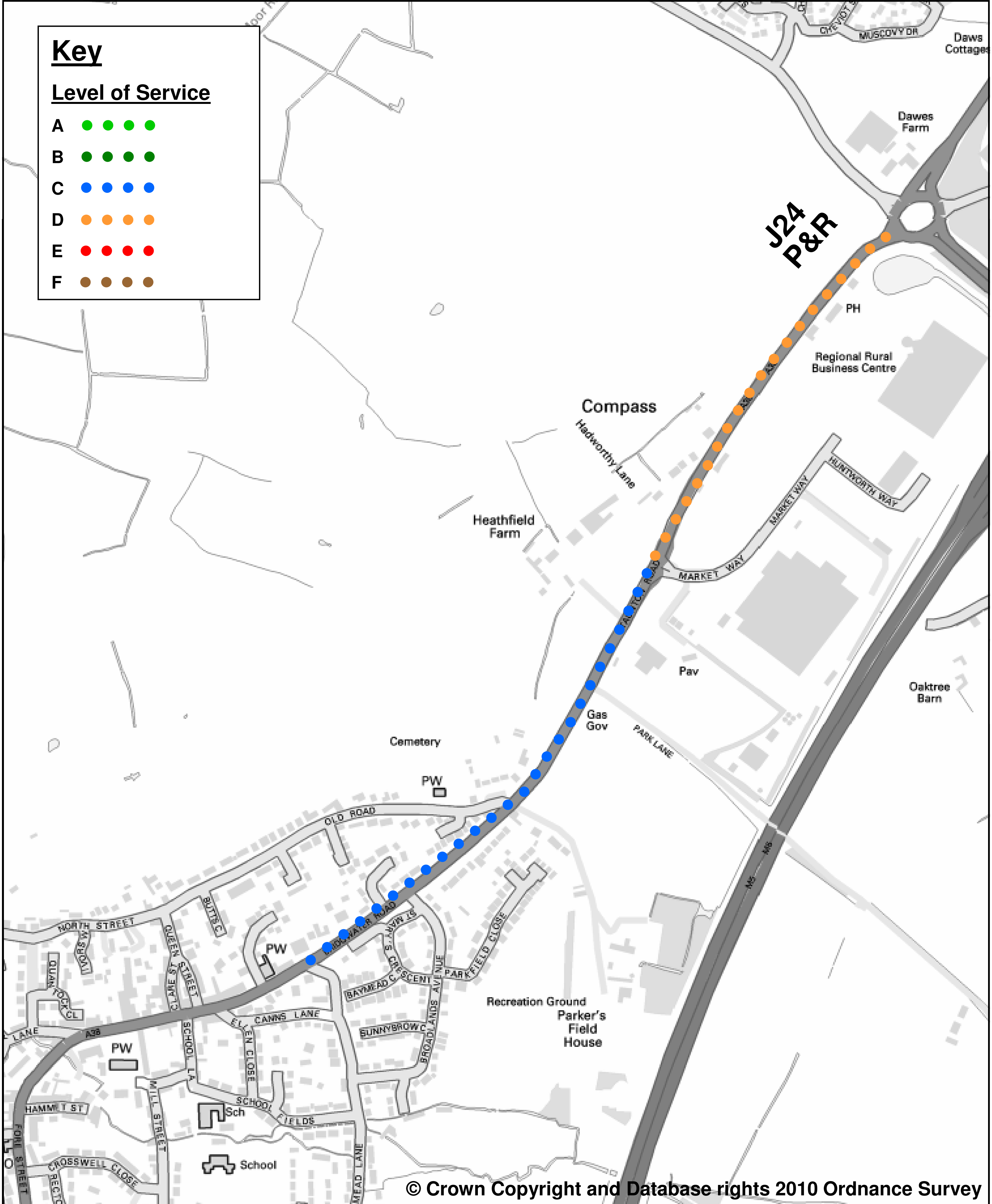

Cycle Audit; Route and Level of Service

EDF Energy

North Petherton

Savell Bird & Axon

part of the **WYG** group

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Email: sba@sbax.co.uk www.sbax.co.uk

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DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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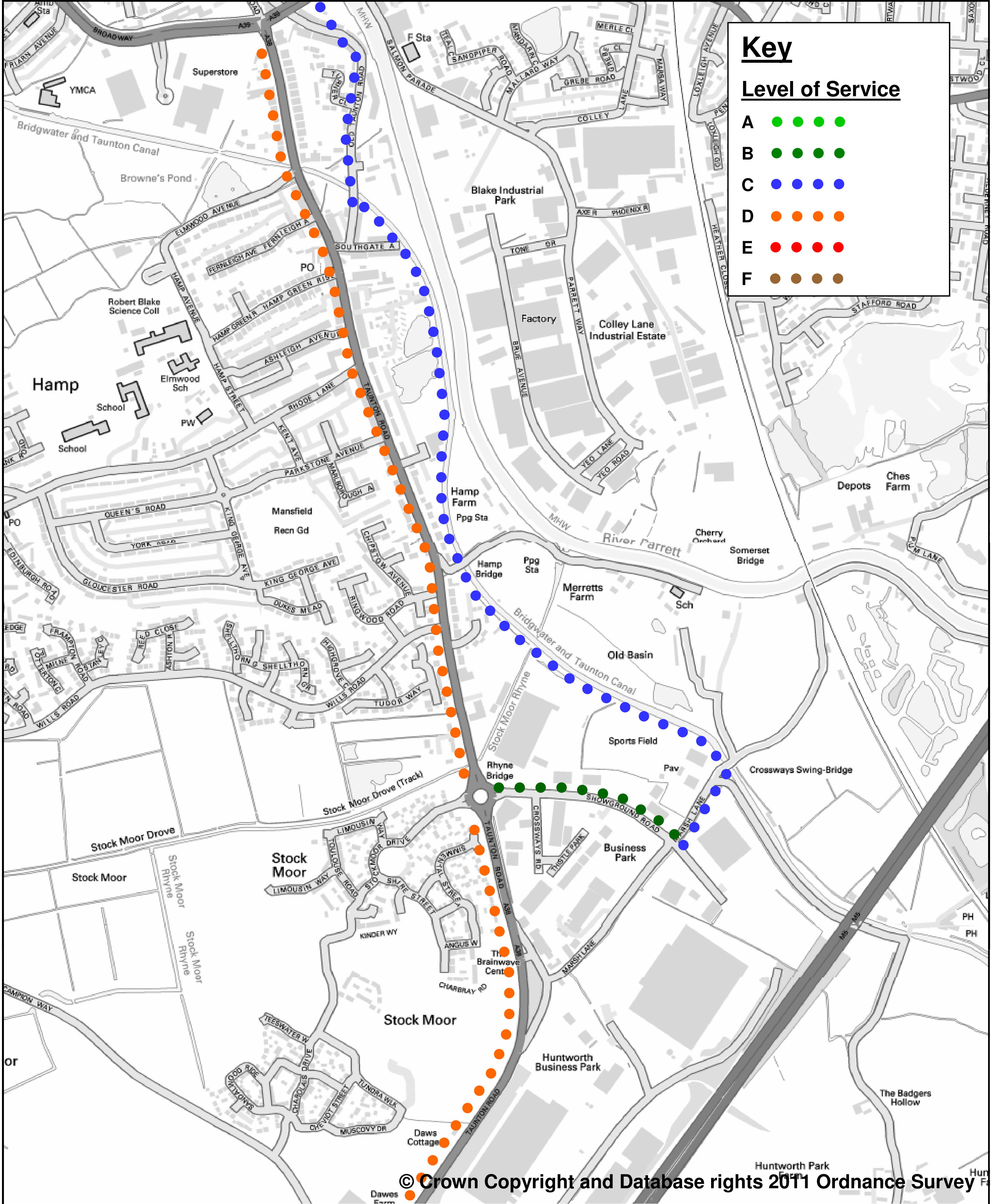

Cycle Audit; Route and Level of Service

EDF Energy

Bridgwater – J24

Savell Bird & Axon

part of the **WYG** group

Academy House, 36 Poland Street, London, W1F 7LU
Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818
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WYG Environment Planning Transport Ltd Registered in England Number: 3050297
Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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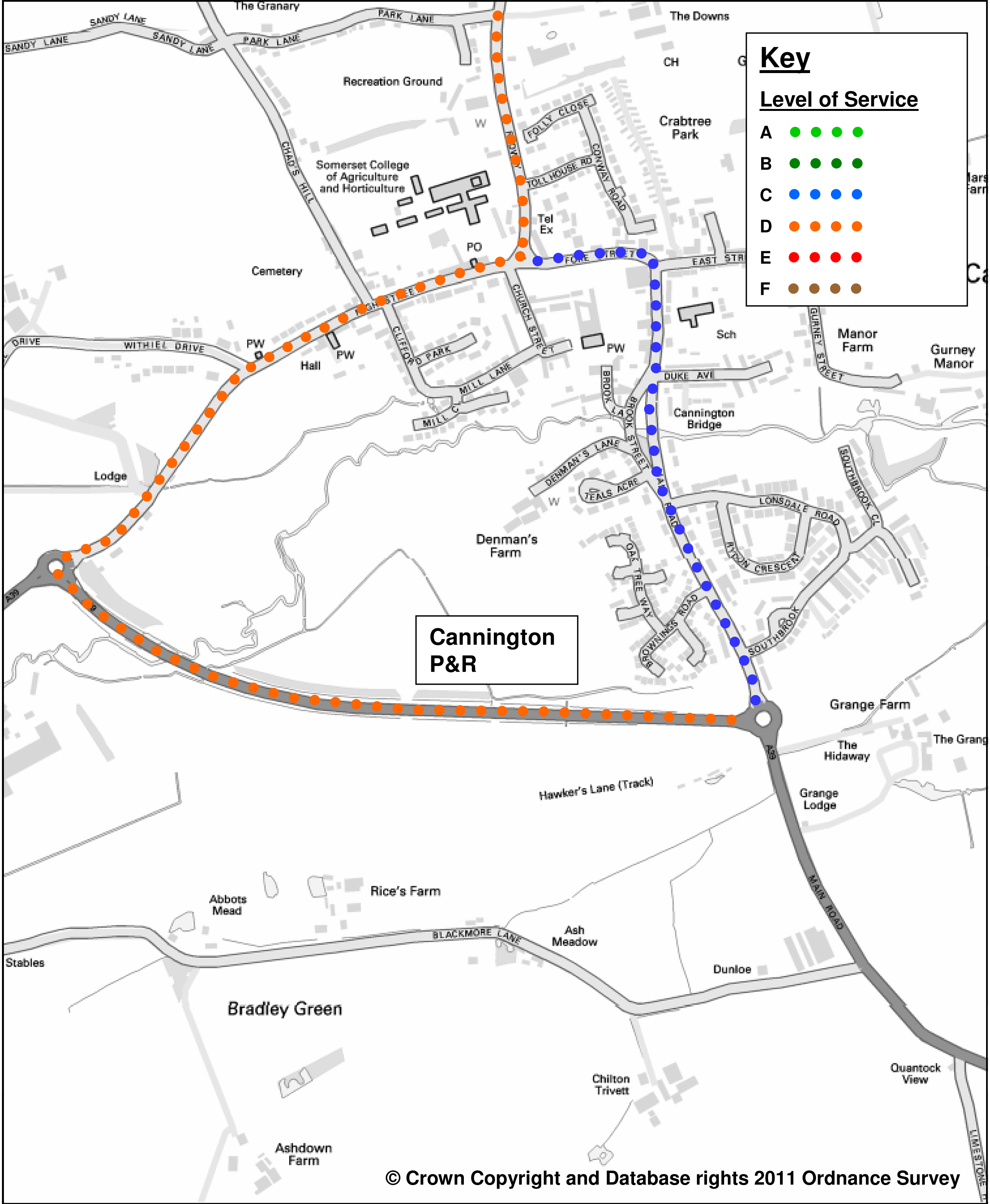

Cycle Audit; Route and Level of Service

EDF Energy

Cannington

Savell Bird & Axon

part of the **WYG** group

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WYG Environment Planning Transport Ltd Registered in England Number: 3050297
Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

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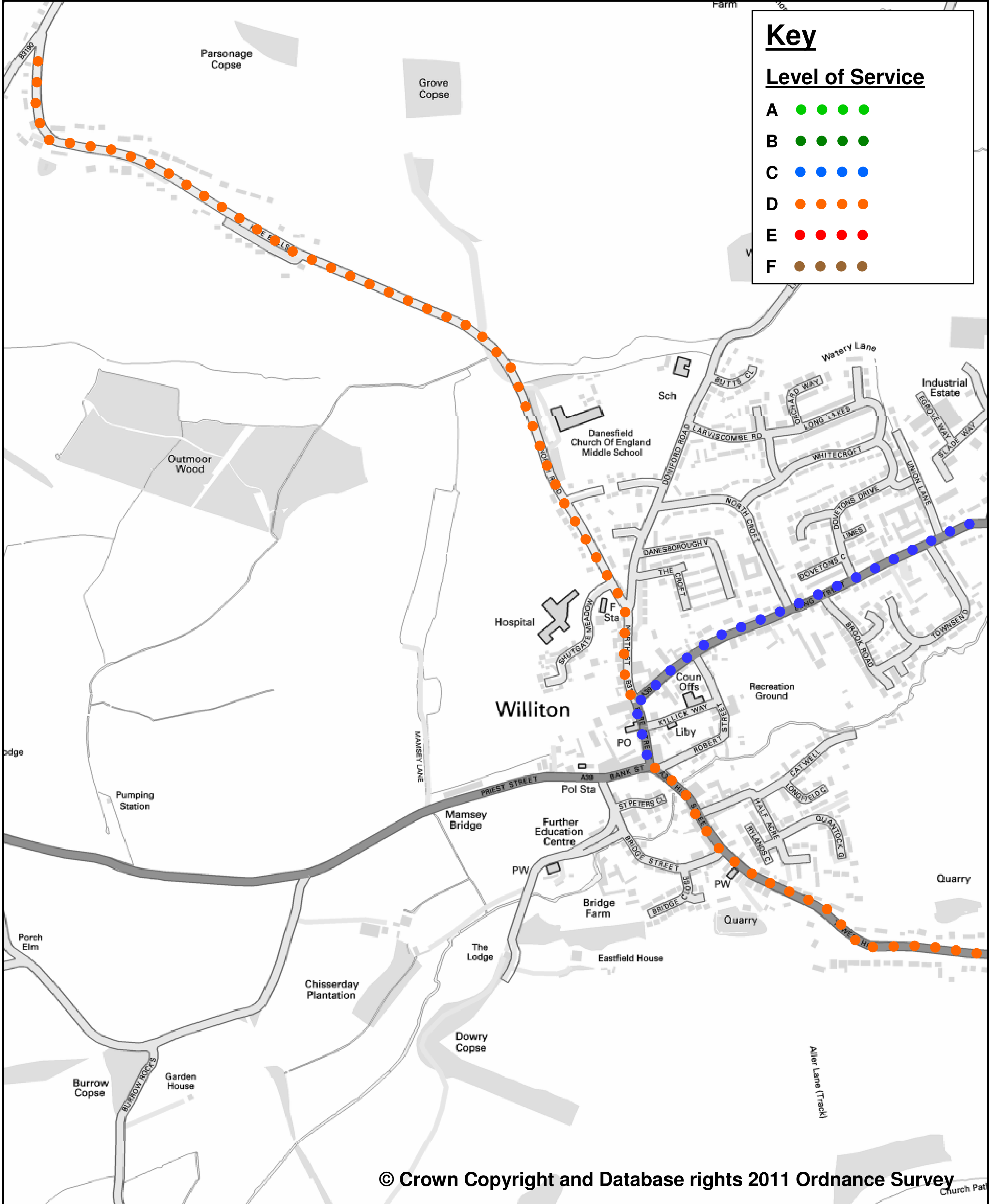

Cycle Audit; Route and Level of Service

EDF Energy

Williton

Savell Bird & Axon

part of the **WYG** group

Academy House, 36 Poland Street, London, W1F 7LU
Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818
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WYG Environment Planning Transport Ltd Registered in England Number: 3050297
Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

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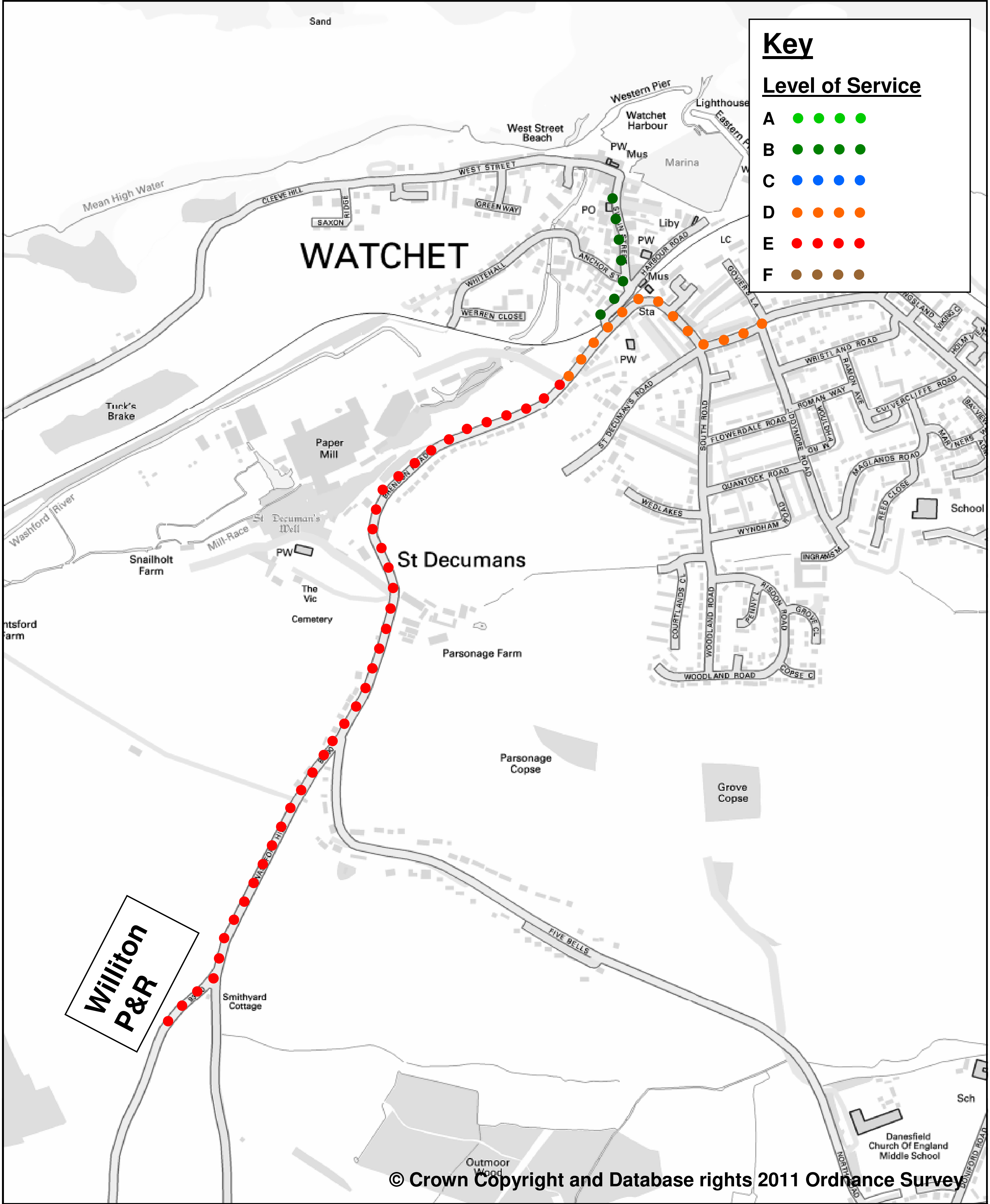

Cycle Audit; Route and Level of Service

EDF Energy

Watchet

Savell Bird & Axon

part of the **WYG** group

Academy House, 36 Poland Street, London, W1F 7LU
Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818
Email: sba@sbax.co.uk www.sbax.co.uk

WYG Environment Planning Transport Ltd Registered in England Number: 3050297
Registered office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
MWT	VR	31.05.11	NTS	Plan 12	

APPENDIX 3.6: BUS STOP AUDIT RESULTS

Bus Stop Audit - Bridgwater and Cannington - March 2011

Map Ref / Audit Element	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Name of Town	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater
Name of Road	A38 Taunton Road	A38 Taunton Road	A38 Taunton Road	A38 Taunton Road	A38 Taunton Road	A39 North Street	A39 North Street	A39 Wimbdon Road	A39 Wimbdon Road	A39 Quantock Road	A39 Quantock Road	B3339	B3339	Western Way
Name of Stop or Nearest Side Road	Wills Road (Stop Name)	Parkstone Avenue (Nearest Side Road)	Hope Inn (Stop Name)	Hope Inn (Stop Name)	Medical Centre (Stop Name)	Camden Road (Nearest Side Road)	Camden Road (Nearest Side Road)	Northfield Road (Nearest Side Road)	Northfield Road (Nearest Side Road)	Bouverie Road (Nearest Side Road)	Bouverie Road (Nearest Side Road)	Wembdon Road (Nearest Side Road)	Wembdon Road (Nearest Side Road)	Oak Apple Drive (Nearest Side Road)
Convenience for Pax	Good Near Residenital Area	Good Near Residenital Area	Good Near Residenital Area	Good Near Residenital Area	Good Near Residenital Area	Good Near Residenital Area and Shops	Good Near Residenital Area and Shops	Good Near Residenital Area and Shops	Good Near Residenital Area and Shops	Good Near Residential Area	Good Near Residential Area	Mediorce	Mediorce	Good - Near Estate and Footpaths
Connectivity with Footway	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Approach and Exit Paths for Buses	Good - Bay Provided	Good - Bay Provided	Good on Straight Section of Road	Good on Straight Section of Road	Good on Straight Section of Road	Average	Average - Some Parking Nearby	Good on Straight Section of Road	Good on Straight Section of Road	Good on Straight Section of Road	Good on Straight Section of Road	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided
Streetlighting?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Bays	One	One	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	One	One	One
Adequacy of Platform	Good	Good	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Good	Good	Good
Type and Height of Kerb	Raised	Raised	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Raised	Raised	Raised
Drainage	Curved Paltform area and Drained Bay	Curved Paltform area and Drained Bay	Good - On Slope	Good - On Slope	Good	Good	Good	Good	Good	Good	Good	Good - Curved Platform	Good - Curved Platform	Good - Curved Platform
Info Prov	Good - Timetable Display and Text for Next Bus Service Sign	Poor - Poster of Destinations only	Mediocre - Text for Next Service Sign	Mediocre - Text for Next Service Sign	Mediocre - Text for Next Service Sign	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Good - Timetable Provided	Poor - No Information
Street Furniture?	Post Box Adjacent to Stop	Litter Bin Adjacent to Stop	None	None	Bin on Pole	None	None	None	None	None	None	None	None	2 Bollards at Platform
Services	21 / 21A / 221	?	?	?	?	?	?	?	?	?	?	?	14 / 614 / 615	?
Shelter?	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Seats?	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Surface Markings?	Yes - Cage	Yes - Cage	No	No	Yes - Cage	No	No	No	No	No	No	Yes - Cage	Yes - Cage	Yes - Cage
Bus Stop Post	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes
Flag	Yes - on Lamp Post	No	Yes - on Lamp Post	Yes	Yes	Yes	No	Yes	No	No	Yes - On Lamp Post	Yes	Yes	Yes
Other	Zebra Crossing Nearby					Flag serves both directions			Flag serves both directions		Flag serves both directions			

Bus Stop Audit - Bridgwater and Cannington - March 2011

Map Ref / Audit Element	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Name of Town	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater
Name of Road	Western Way	Western Way	Western Way	Western Way	Western Way	A39 Bath Road	A39 Bath Road	A39 Bath Road	A39 Bath Road	A39 Bath Road	A39 Bath Road	A39 Bath Road	A39 Bath Road	A39 Bath Road
Name of Stop or Nearest Side Road	Oak Apple Drive (Nearest Side Road)	Trinity Way (Narest Side Road)	Reedmoor Gardens (Nearest Side Road)	Chilton Road	Chilton Road	Sportsman (Stop Name)	Sportsman (Stop Name)	Frederick Road (Stop Name)	Frederick Road (Stop Name)	Trevor Road	Trevor Road	Bower Lane	Bower Lane	Horsey Lane (Stop Name)
Convenience for Pax	Good - Near Estate and Footpaths	Good - Near Estate, Signalised X-ing and Footpaths	Mediocre	Good - Near Estate	Good - Near Estate	Good - Near Pedestrian Crossing	Good - Near Pedestrian Crossing	Mediocre	Good - Near Residential	Mediocre	Good - Near Residential	Mediocre	Mediocre	Mediocre
Connectivity with Footway	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Approach and Exit Paths for Buses	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided	Poor - Pedestrian Build Out Makes Entry Difficult	Mediocre - Parking in Front of Bus Stop	Good on Straight Section of Road	Good on Straight Section of Road	Good on Straight Section of Road	Good - Bay Provided	Good on Straight Section of Road	Good on Straight Section of Road	Good - Bay Provided
Streetlighting?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
No. Bays	One	One	One	One	One	One	n/a	n/a	n/a	n/a	One	n/a	n/a	One
Adequacy of Platform	Good	Good	Good	Good	Good	Poor - Drainage Channel Runs Through it	Poor - Located Across a Crossover	Good	Mediocre (On a Slope)	Good	Good	Good	Good	Good
Type and Height of Kerb	Raised	Raised	Raised	Raised	Raised	Level with Road	No Kerb - Level With Road	Standard	Standard	Standard	Standard	Raised	Raised	Raised
Drainage	Good - Curved Platform	Good - Curved Platform	Good - Curved Platform	Good - Curved Platform	Good - Curved Platform	Good	Good	Good	Good	Good	Good	Good	Good	Good
Info Prov	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Poor - No Information	Good - Timetable Provided	Poor - No Information	Good - Timetable Provided
Street Furniture?	3 Bollards at Platform	Guard Railing Adjacent to Stop	Guard Railing Adjacent to Stop	Guard Railing Adjacent to Stop	Guard Railing Adjacent to Stop	None	Bin Next to Stop	None	None	None	P.O Box Adjacent to Stop	Bin Adjacent to Shelter	None	None
Services	?	?	?	?	?	?	?	?	?	?	?	375	375	375 / X75
Shelter?	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes
Seats?	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
Surface Markings?	Yes - Cage	Yes - Cage	Yes - Cage	Yes - Cage	Yes - Cage	Yes - Cage	No	No	No	No	No	Yes - Cage	Yes - Cage	Yes - Cage
Bus Stop Post	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
Flag	Yes	Yes	Yes - On Lamp Post	Yes - On Lamp Post	No	Yes - On Lamp Post	Yes - On Lamp Post	Yes - On Lamp Post	No	Yes - On Lamp Post	No	Yes	Yes	Yes
Other				Flag is for Both Directions										

Bus Stop Audit - Bridgwater and Cannington - March 2011

Map Ref / Audit Element	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Name of Town	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Bridgwater	Cannington	Cannington	Cannington	Cannington	Cannington
Name of Road	A38 Bristol Road	A38 Bristol Road	A38 Bristol Road	A38 Bristol Road	A38 Bristol Road	A38 Bristol Road	A38 Bristol Road	Bus Station	Rail Station	Main Road	Main Road	High Street	High Street	High Street
Name of Stop or Nearest Side Road	Union Street (Stop Name)	Bradfords (Stop Name)	Premdor (Stop Name)	Wylds Road (Stop Name)	Wylds Road (Stop Name)	Express Park (Stop Name)	Express Park (Stop Name)	Bus Station	Rail Station (Nearest Landmark)	Duke Avenue (Nearest Side Road)	Brook Street (Name of Stop)	Rodway (Nearest Side Road)	Kings Head (Name of Stop)	Cannington Cemetry (Name of Stop)
Convenience for Pax	Good - Near Residential	Good - Near Residential	Good - Near Residential	Mediocre	Good - Near Estate	Good - Next to Hotel & Busiensss Park	Good - Next to Hotel & Busiensss Park	Excellent - Centre of Town Next to ASDA	Excellent - Next to Rail Station	Good - Near Pedestrian Crossing	Good - Near Pedestrian Crossing	Good	Good	Mediocre
Connectivity with Footway	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Poor - Near to Footway but on Grass	Good	Good	Good	Good	Good
Approach and Exit Paths for Buses	Good on Straight Section of Road	Good on Straight Section of Road	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided	Good - Bay Provided	Excellent - Bays and Turning Circle Provided	Poor	Good on Straight Section of Road	Good - Bay Provided	Good on Straight Section of Road	Mediocre - Potneital for Parking	Good on Straight Section of Road
Streetlighting?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Bays	n/a	n/a	One	One	One	One	One	Eight	n/a	n/a	One	n/a	n/a	n/a
Adequacy of Platform	Good	Mediocre - Uneven Surface	Good	Good	Good	Good	Good	Good	Poor - Grass	Mediocre	Good	Good	Good	Good
Type and Height of Kerb	Standard	Standard	Raised	Raised	Raised	Standard	Standard	Raised	Standard	Standard	Standard	Raised	Raised	Standard
Drainage	Good	Poor	Good	Good	Good	Good	Good	Good	Poor	Good	Mediocre	Good	Poor	Good
Info Prov	Text for Next Bus Service Sign	Text for Next Bus Service Sign	Good - Timetable Display and Text for Next Bus Service Sign	Good - Timetable Display and Text for Next Bus Service Sign	Good - Timetable Provided	Text for Next Bus Service Sign	Text for Next Bus Service Sign	Good - Timetables and Leaflets Available	Good - Timetables Provided	None	None	Good - Timetables Provided	Good - Timetables Provided	Good - Timetables Provided
Street Furniture?	None	Bin on a Post	None	Bin on a Post	None	None	None	Bins	Phone Box Adjacent	None	Bin & Bench Adjacent	Phone Box, Bin and Cycle Rack Adjacent	None	Bench Adjacent
Services	?	?	21 / 21A	21 / 21A	21 / 21A	?	?	1 / 2 / 6 / 14 / 15 / 16 / 17 / 18 / 19 / 21 / 21A / 21B / 23 / 23A / 23B / 102 / 375 / 613 / 614 / 615 / 753	?	?	?	14	14	14
Shelter?	No	No	Yes	Yes	Yes	No	No	Some Bays	No	No	Yes	Yes	No	No
Seats?	No	No	No	No	No	No	No	Some Bays	No	No	No	Yes	No	No
Surface Markings?	No	No	Yes - "Bus Stop" Markings	Yes - "Bus Stop" Markings	Yes - "Bus Stop" Markings	No	No	Yes - Cages	No	No	Yes - Cage	Yes - Cage	No	No
Bus Stop Post	No	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	No
Flag	Yes - On Lamp Post	Yes	Yes - On Lamp Post	Yes	Yes	Yes - On Lamp Post	Yes	Yes	Yes - On Lamp Post	Yes - On Lamp Post	Yes - On Lamp Post	Yes	Yes	No
Other								Computer Terminal in Travel Shop Present but Out of Use	Not Sure if Stop is in Use					

APPENDIX 3.7: FREIGHT MANAGEMENT STRATEGY

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1. INTRODUCTION

1.1.1 NNB Generation Company Limited (Company Number 06937084), part of EDF Energy, is the Company that will lead the nuclear programme in the United Kingdom. For the purpose of this application for Development Consent, NNB Generation Company Limited is referred to as EDF Energy.

1.1.2 EDF Energy is planning to build a new nuclear power station at Hinkley Point near Bridgwater, Somerset, comprising two UK EPR reactor units with an expected output of approximately 1,630MW per unit.

1.1.3 The new site, Hinkley Point C (HPC), is to the west of the existing Hinkley Point Power Station Complex. The new power station is based on replicating as much as possible the design for the Flamanville 3 unit in Normandy, France, currently under construction.

1.1.4 The Freight Management Strategy (FMS) accompanies EDF Energy's Development Consent Order (DCO) application to the Infrastructure Planning Commission (IPC) and is therefore focused on the movement of materials post DCO consent. It does not include the site preparation works freight plans, as these works were subject to a separate planning application to West Somerset Council and are accompanied by their own plans. It does include the total quantity of materials required to construct the HPC Project, including materials for site preparation works and construction of the jetty.

1.1.5 The FMS sets out the measures required for delivery from key freight management facilities in the local area to the point of use having regard to the objectives of the FMS (see 2.1.1).

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2. OBJECTIVES

2.1.1 The objectives of the FMS are to:

- minimise the volume of freight traffic associated with the development of the new power station so far as reasonably practicable, at all times but especially during peak hours;
- maximise the safe, efficient and sustainable movement of materials required for the HPC Project so far as reasonably practicable;
- minimise the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable;
- provide long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate;
- take all reasonable steps to ensure the resilience of the transport network in the event of an incident; and
- take all reasonable steps to protect the natural and built environment.

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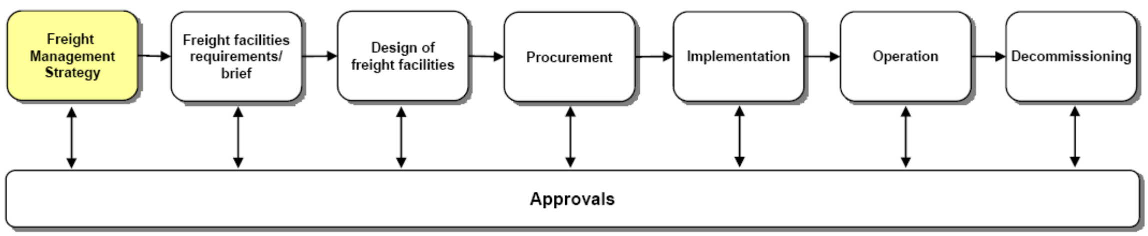
3. METHODOLOGY

3.1.1 The methodology adopted for the FMS is as follows:

- understand the scope, type and schedule of construction activities;
- assess existing infrastructure;
- propose measures to meet objectives;
- assess material requirements throughout the lifetime of the HPC Project; and
- assess the resultant road freight traffic.

3.1.2 The principles included in the FMS have been and will continue to be used to develop the design, procurement, delivery, operational and post-operational phase of the required freight management facilities and associated infrastructure, as illustrated in **Figure 3.1**.

Figure 3.1: Material Freight Implementation Process



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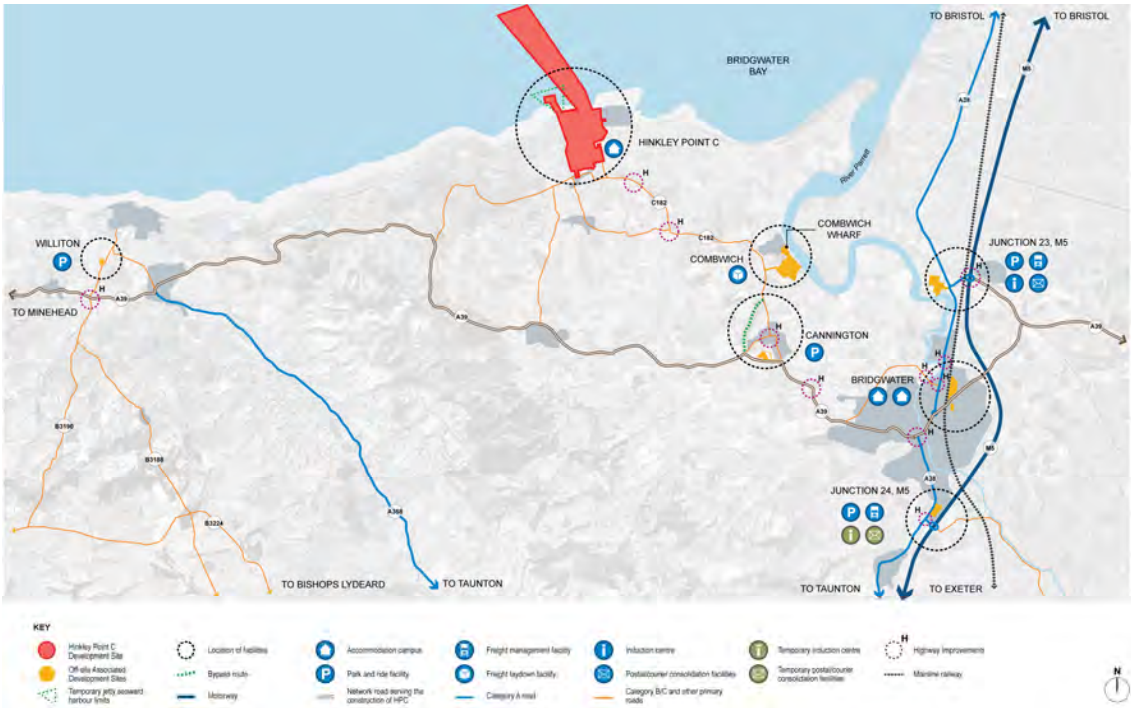
4. CONSTRUCTION SCOPE AND STRATEGIC PROGRAMME

4.1.1 For the purpose of this FMS, two main construction areas are considered:

- HPC related development**.** This includes:
  - Preliminary works (including temporary jetty).
  - Construction of two UK EPR reactor units, related infrastructure, temporary construction facilities and an accommodation campus for 510 workers proposed within the HPC construction site.
  - National Grid 400kV substation and overhead line modifications.
- Off-site associated developments. These include:
  - Accommodation campuses for up to 1,000 construction workers, with ancillary facilities, across two sites.
  - Park and ride facilities for up to 2,361 car parking spaces, 49 mini-bus/van parking spaces, 125 motorcycle spaces, 125 bicycle spaces and 51 bus parking spaces, with ancillary facilities, across four sites.
  - Freight management facilities for up to 140 heavy goods vehicles (HGV) parking spaces, with ancillary facilities, across two sites.
  - An induction centre for the induction of staff in connection with the HPC construction phase.
  - A consolidation facility for postal/courier deliveries.
  - A bypass to the west of Cannington.
  - Refurbishment and extension of the existing Combwich Wharf and provision of an associated temporary freight laydown facility for the storage of abnormal indivisible loads (AILs) and other construction goods being delivered via Combwich Wharf before they are transported to the HPC development site.

4.1.2 As the road freight traffic, which will be transported using the C182, is a measure of the impact on the key routes to HPC through Bridgwater and Cannington, the material quantities required for the refurbishment and extension of Combwich Wharf and construction of the new freight laydown facility have been included as part of the HPC related development (refer to Section 7).

Figure 4.1: Construction Sites Associated with the HPC Project



4.1.3 The overall programme for the construction at HPC, including the preliminary works, is anticipated to take approximately nine years to complete the main construction works for HPC when both units will be operational and includes:

- the site preparation works;
- construction and subsequent operation of the temporary jetty;
- construction of HPC, including the nuclear island, the conventional island, the balance of plant, ancillary buildings and structures, the National Grid 400kV substation and overhead line transmission infrastructure;
- construction of the cooling water infrastructure;
- construction of the HPC accommodation campus;
- dismantling and removal of the temporary jetty;
- removal of the HPC accommodation campus; and
- landscape restoration.

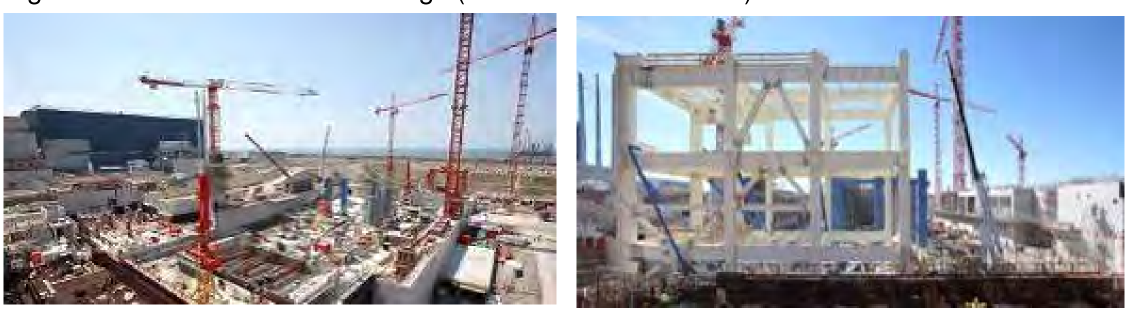
4.1.4 The first phase of works, involving preliminary works, includes site clearance, construction of access roads and roundabouts and main excavation. This phase includes the construction of the temporary jetty, completion of which is expected in mid 2013, to allow materials for on-site concrete production to be transported by water.

4.1.5 **Figure 4.2** and **Figure 4.3** show ongoing works at the Flamanville 3 site in Normandy, France. Illustrations from this site have been used to help visualise the likely construction activities at HPC.

Figure 4.2: Site Preparation Works (Flamanville 3 - France)

4.1.6 The civil works will follow the site preparation works, completing the deep excavations and ensuring the site is ready for the start of building construction, which includes the foundations, structural concrete, backfilling, galleries, construction of the reactor buildings, auxiliary buildings, control buildings, turbine halls, cooling water tunnels, ancillary buildings and associated infrastructure. Material requirements for these elements will be mainly sand, aggregate and cement, reinforced steel, pipework, structural steelwork and formwork.

Figure 4.3: Construction of Buildings (Flamanville 3 – France)



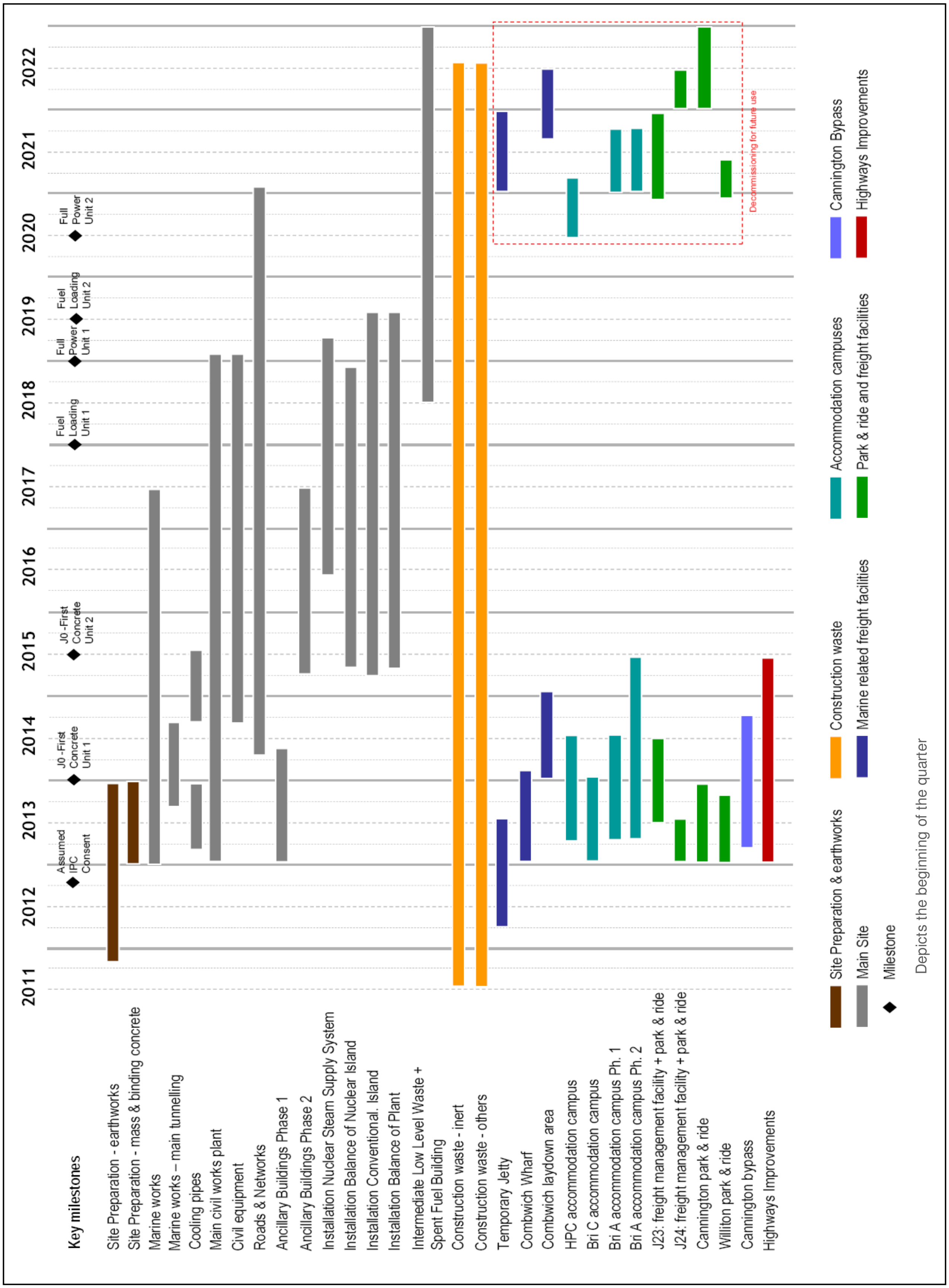
4.1.7 The mechanical and electrical plant installation phase will commence when the civil structures are sufficiently advanced to enable access, which will be in approximately 2015.

4.1.8 Approximately 180 mechanical and electrical plant items, e.g. the reactor pressure vessels, will be very large and/or heavy and will require special transport to site. These items are all classified as AILs and will be shipped to Combwich Wharf by sea and then taken to the HPC development site by road using special trailers.

4.1.9 Temporary components will be required throughout the construction period and will include construction plant, concrete batching plant, access and maintenance equipment (e.g. earthwork machinery, cranes, hoists, cherry pickers, man riders etc) as well as temporary site facilities (e.g. temporary offices, canteen, toilets etc).

4.1.10 **Figure 4.4** illustrates the HPC Project strategic programme, as described above. The first UK EPR reactor unit is planned to be operational in Quarter 1 2019 while the second in mid 2020.

Figure 4.4: HPC Project Strategic Programme



5. EXISTING TRANSPORT INFRASTRUCTURE

5.1 Road

5.1.1 **M5**: the M5 motorway bypasses Bridgwater to the east of the town with two interchanges at Junction 23 and Junction 24.

5.1.2 **A38**: the A38 runs from Wellington to Burnham-on-Sea via Taunton and Bridgwater.

5.1.3 **A39**: the A39 from Cannington runs westwards towards Williton and Minehead, southwards through Bridgwater and then eastwards to Glastonbury.

5.1.4 **NDR**: (now classified as A39): the Northern Distributor Road (NDR) was built to access and distribute traffic around new residential areas as well as routing some through traffic movements away from the town centre. It links the A38 with the A39 to the west of Bridgwater.

5.1.5 **C182**: the main access road serving Hinkley Point is the C182, which runs from Hinkley Point to the village of Cannington. The C182 routes through the centre of Cannington and then joins the A39.

Figure 5.1: Existing Transport/Freight Infrastructure in the Vicinity of HPC

5.2 Water

5.2.1 **Combwich Wharf**: the facility is located approximately 4km south-east of Hinkley Point. It was built to support the construction of the Hinkley Point A development and subsequently modified for Hinkley Point B.

5.2.2 The facility is currently used by EDF Energy for deliveries to Hinkley Point B, as well as National Grid, for the delivery of AILs.

5.2.3 **Dunball Wharf**: located on the A38, adjacent to Junction 23 of the M5 motorway, it hosts a wharf on the River Parrett. The key materials handled at Dunball include sand, aggregates and agricultural goods.

5.2.4 **Bristol Port**: comprises of two elements; Avonmouth and Royal Portbury Dock (RPD).

5.2.5 RPD can handle up to 130,000 dead weight tonne (dwt) vessels and deals primarily with dry bulk goods, oil, forest products and motor vehicles.

5.2.6 Avonmouth is smaller and can handle up to 35-39,000dwt vessels. Cargo handled at Avonmouth includes petroleum, fresh produce, gas, cement, scrap metals, containers, sand, gravel, grain, steel products and forest products.

5.2.7 The Avonmouth Container Terminal serves short sea container markets. The terminal has a large stockyard for coal storage and a railhead to the Portbury line and a totally enclosed conveyor link connecting the stockyard to another railhead in Avonmouth.

5.2.8 Other key ports in the Bristol Channel include Newport, Cardiff, Barry, Port Talbot and Swansea in South Wales.

5.3 Rail

5.3.1 The nearest railhead to the site is at Bridgwater, 10 miles from the HPC development site, on the route between Bristol and Penzance. This is a relatively small facility with limited scope for expansion and has road access via a residential area.

5.3.2 There is also an operational railhead at Taunton, 20 miles from the HPC development site, however it is currently a stabling area so no freight handling facilities exist.

5.3.3 A railway line, privately operated by West Somerset Railway, passes approximately 20 miles to the west of the HPC development site with an existing station at Williton. There are no existing handling facilities or railhead to cater for rail freight and possible line upgrades would be required if rail freight was considered. Also, third party ownership currently imposes operational and access constraints to the railway.

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6. PROPOSED FREIGHT MEASURES

6.1 Overview

6.1.1 The constrained nature and relatively remote geographical location of the proposed HPC development site presents a number of challenges to the transportation of materials for the HPC Project.

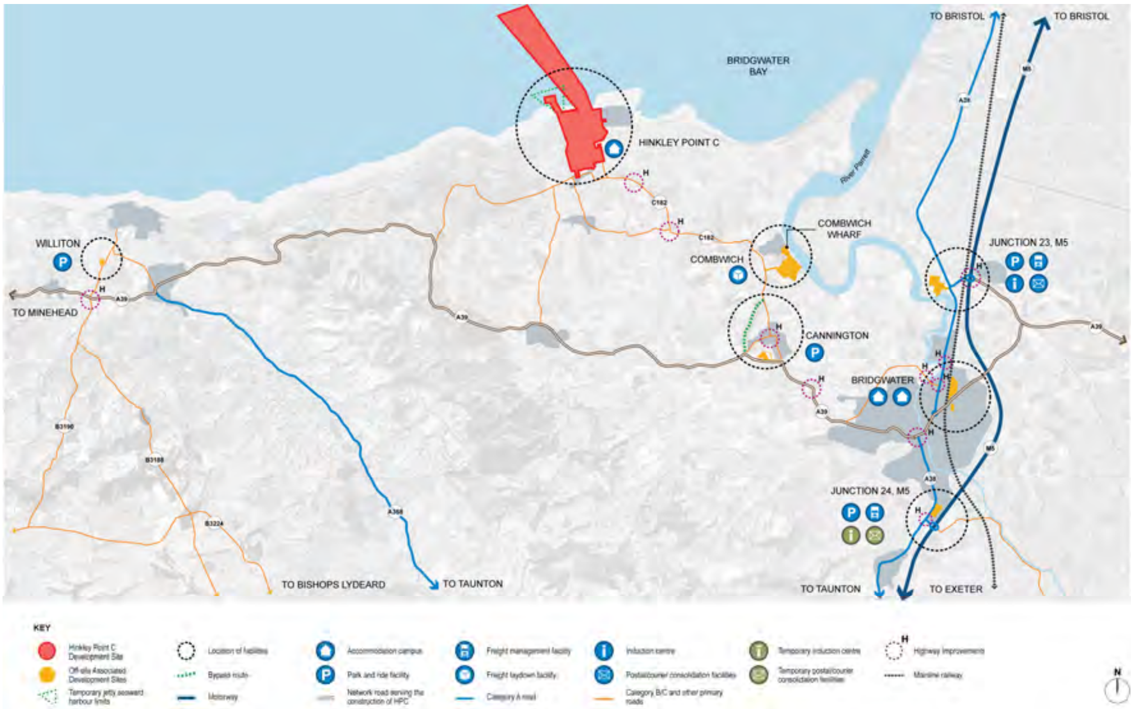
6.1.2 The local road infrastructure, for example, has a rural character and requires access through settlements such as Bridgwater and Cannington for traffic travelling between the M5 and Hinkley Point.

6.1.3 These characteristics require the development of a bespoke FMS if the HPC Project objectives are to be achieved in a sustainable and environmentally responsible manner.

6.1.4 The proposed freight measures aim to reduce and control the use of road freight traffic during the construction phase, especially in the peak hours. A number of measures are proposed, including (see **Figure 6.1**).

- the re-use and storage of excavated materials on-site to avoid exporting off-site;
- the use of water for delivery of materials and the largest AILs through the construction of a temporary jetty at the HPC site, the refurbishment and extension of Combwich Wharf and the construction of a new, temporary freight laydown facility at Combwich;
- reducing the impact of construction traffic in Cannington by constructing a bypass around the western side of the village, linking the A39 directly to the C182;
- reducing the impact of construction traffic by providing a package of highway improvements;
- introducing off-site freight management facilities close to Junction 23 and Junction 24 of the M5, to control incoming Heavy Goods Vehicles (HGVs) and holding them in case of an incident on the local network or at the HPC development site;
- regulating HGVs by using a project-wide delivery management system (DMS) to regulate and track flows and move away from network peak time congestion; and
- reducing Light Goods Vehicles (LGVs) movement.

Figure 6.1: HPC Development Site and Associated Developments



6.2 Re-use and Storage of Excavated Materials On-site

6.2.1 The site terracing, excavation and tunnelling works will involve the excavation of over 4 million cubic metres of soil and rock.

6.2.2 Apart from a small amount of waste that will be exported off-site to minimise construction traffic on the road, the remaining excavated materials will be kept on-site and re-used as follows:

- about 2 million cubic metres of the excavated material will be fresh rock, suitable for re-use as engineered fill material for the terracing of the main site and as backfill around the main buildings (so avoiding the import of an equivalent quantity of material from quarries;
- a large amount of the excavated soil will be used to re-profile the site topography whilst topsoil, overburden and weathered rock will also be used for the final landscaping; and
- a proportion of the fill material required to construct the main platform would be imported (the top layer in particular).

6.3 Delivery by Water

6.3.1 The purpose of providing the temporary jetty and refurbishing and extending Combwich Wharf is to maximise the use of water as a method for the delivery of materials to the HPC development site.

6.3.2 The temporary jetty has been designed with a conveyor bridge which is able to accommodate 100% (by weight) of aggregates, sand and cement for on-site concrete production and also includes a road bridge for the delivery of other construction materials.

6.3.3 The Combwich Wharf refurbishment and extension has been designed to accommodate up to 90x30m barges for the delivery of AILs and other construction materials, equipment and plant. This is by providing Roll-on/Roll-off and Lift-on/Lift-off facilities.

6.3.4 EDF Energy has committed to deliver a minimum of 80% (by weight) of materials for on-site concrete production via the temporary jetty (once available) and 100% of the largest AILs to Combwich Wharf (currently approximately 180 have been identified). These targets will be achieved by imposing them as constraints on contractors. This commitment to use the temporary jetty will avoid a very substantial volume of HGV movements on the local road network – estimated at around 125,000 HGVs (250,000 movements) over the length of the construction programme.

6.3.5 The assumed use of the temporary jetty and Combwich Wharf is conservative. It therefore allows for a conservative approach to the road freight movements generated during the construction period and ensures that the potential impact of the HPC Project on the local road network is not underestimated within the **Transport Assessment**.

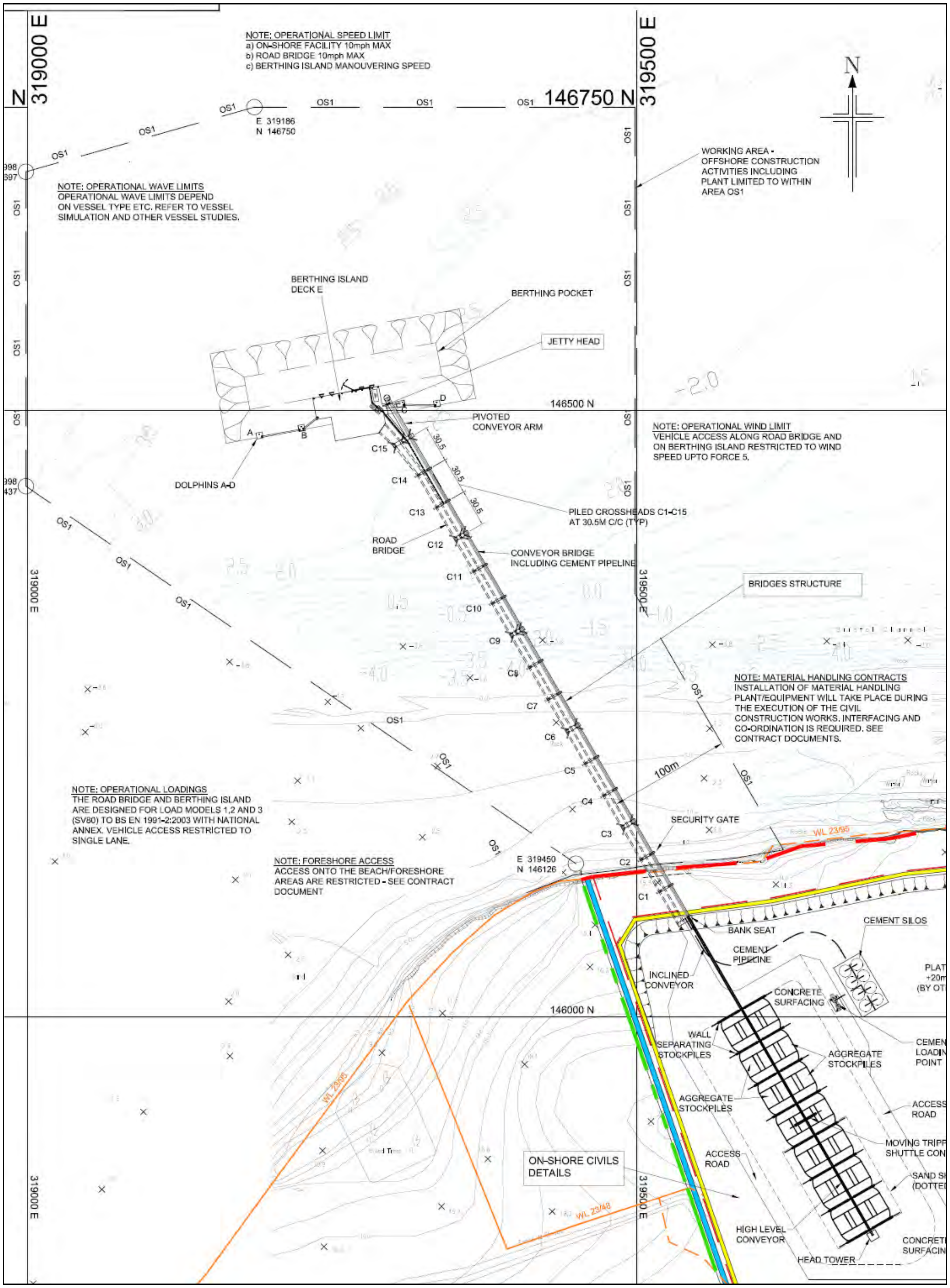
6.3.6 In practice there is potential scope for EDF Energy to bring additional construction materials to the HPC development site by sea. This includes the potential for both a higher proportion of bulk materials for concrete and other construction materials which could include structural steelwork, reinforcement bars, pipework, cabling, ducting, formwork and scaffolding. At the same time there is a range of weather, tidal and operational constraints which may act to limit the scope to achieve greater levels of sea deliveries.

a) Temporary Jetty at Hinkley Point C

6.3.7 The temporary jetty includes the following elements (see **Figure 6.2**):

- the jetty head to accommodate berthing of self-discharging vessels and cement carriers for offloading of sand/gravels, cement and pulverised fuel ash respectively;
- a conveyor bridge from the jetty head to shore, which will include a covered aggregate conveyor and a cement pipeline;
- a road bridge to accommodate vehicles. The jetty head can accommodate a mobile crane, one truck unloading and one truck on standby; and
- onshore facilities including conveyors and stockpiles/storage facilities.

Figure 6.2: Plans of the Temporary Jetty at HPC



6.3.8 The jetty head has been designed to accommodate two types of vessel for cement and aggregates. Cement carriers in the range of 2,500 to 4,500 dead weight tonne (dwt) and self-discharging dredgers up to a nominal 5,000 dead weight tonne may be used. The jetty will also be able to accommodate other cargo vessels provided that they fall within these parameters.

6.3.9 The aggregate vessels will be self-discharge type, e.g., self-discharge dredger. The vessel will approach the jetty at mid-water on a rising tide, berth and remain at the jetty until the tide falls to mid-water when it will depart. During this tidal window of approximately five to six hours, the vessel will discharge using its onboard conveyor. The aggregate conveyors on the jetty will transport the aggregates along the conveyor bridge to the onshore stock pile area.

6.3.10 The cement vessels will approach the jetty at or above mid-water on specific neap tides and berth. The jetty design would allow the cement vessel to remain afloat over a group of suitable neap tides, which is necessary as the offloading process for the cement vessel could take approximately 20 hours. The onboard pumps would blow cement to the jetty receiver, which would then pump the cement along the pipeline to site.

6.3.11 The jetty is designed to accommodate only one vessel at a time. At times of peak demand for aggregates and cement (and in combination with any extended bad weather) it is likely that the jetty berth would be almost fully occupied by these deliveries.

6.3.12 However, analysis indicates that during normal demand periods there will be opportunities for other bulk cargos to be imported via the jetty. Such cargos would require craneage for offloading and vehicles to transport the cargo to shore, which are proposed as part of the jetty design. Materials include unitised and pre-fabricated construction materials, such as concrete pipe units, steel reinforcing bars, cabling, ducting etc.

6.3.13 The jetty occupies a sensitive location within the European Designated SPA, SAC and SSSI. It also occupies a more exposed location than Combwich Wharf, which falls outside those designated areas. It is therefore not a suitable location to construct a more substantial facility capable of handling AILs.

6.3.14 The jetty has therefore been designed to be a lightweight structure in order to minimise any impact on these areas. It is considered that it would be more appropriate to refurbish and use the existing facilities at Combwich Wharf to import AILs.

6.3.15 The jetty, at this location, is relatively exposed with regard to wind and wave and there is expected to be a degree of downtime associated with periods when the aggregate and cement vessels cannot use the berth due to weather conditions. In addition, there may be other events such as disruption of supply, mechanical breakdown (vessels or conveyors/pipelines), service disruptions, etc, which may prevent the operational use of the jetty from time to time.

6.3.16 In order to mitigate such events as far as practical, it has been decided to provide onshore stock pile areas for aggregates and cement in order to store materials and thus provide a degree of contingency against supply disruption.

6.3.17 The jetty and associated facilities are anticipated to be operational from Quarter 3 2013, subject to receiving the appropriate permissions. An application for the jetty was submitted to the Marine Management Organisation (MMO) in December 2010.

b) Combwich Wharf Refurbishment and Extension

6.3.18 The proposed works at Combwich Wharf will require the partial demolition and removal of redundant features, such as the finger jetty and some berthing dolphins (independent structures for mooring boats). The existing wharf structure will remain behind a new sheet pile wall but will be partially broken down to allow installation of the new anchorage system. Its height will also be reduced and its western edge extended to allow for the increased turning circle of the trailers carrying the forecast AILs (see **Figure 6.3**).

Figure 6.3: Schematic of Upgraded Combwich Wharf

6.3.19 A new goods handling platform (Goods Wharf) will be built over the existing embankment to the east of the quay and will require the removal of the two inner berthing dolphins (the outer two dolphins shall remain as they do not affect the proposed works).

6.3.20 The existing berthing bed will be built up to a higher level and extended to the south – some bulk excavation and removal of soil/silt will be required in this area.

6.3.21 Finally, the wharf area and approach roads will be laid with a heavy duty industrial surface.

6.3.22 The primary function of Combwich Wharf is to serve the delivery of the largest AILs. These comprise a range of bespoke plant items manufactured off-site and delivered as complete packages for installation. As such, they are not geometrically suitable for long distance transport by road, being too large or heavy.

6.3.23 The type and number of AILs relating to the Nuclear Steam Supply System contract is certain as the information was derived from Flamanville and these items are replicated for the HPC Project. There are components associated with the main turbine generators, and other contracts, where the loads may differ from Flamanville; and detailed information on these will be collected as the design and procurement process progresses.

6.3.24 The facility would also be used for the import of other construction-related goods (in bulk or containers).

6.3.25 Delivery of AILs and other goods will originate from neighbouring commercial ports, most likely from Bristol or the south coast of Wales. These will serve as feeder ports to the receiving facilities at Combwich Wharf.

6.3.26 The facility provides a single-occupancy berth with two offloading options - Roll-on-Roll-off (RoRo) and Lift-on-Lift-off (LoLo). Due to the single-occupancy berth, it will only be possible to deliver either AILs or other goods at any one time (deliveries are mutually exclusive). The berth will operate on a NAABSA principle (not always afloat but safely aground). This allows the vessels to arrive and depart on suitable high-water. Unloading will generally be at low tide where operating hours permit. Where high tides occur during the day the vessels will take on negative ballast (water) so they ground and unloading can take place. The new base of the berth will be formed of concrete to provide support to the laden vessels.

6.3.27 The delivery schedule will be governed both by the weather and arrival/departure manoeuvres, which will be tidally restricted.

6.3.28 The capacity at the Wharf has been assessed on the basis of a worst case of 3 tides for each AIL delivery and is adequate to cater for unloading all of the largest AILs leaving capacity for unloading of other goods.

6.3.29 AILs are to be delivered by barge on a trailer system so that they can be driven off the barge onto the wharf. The design of the wharf recognises that the delivery barges are fitted with all necessary ramps for offloading.

6.3.30 The design ship for delivery of AILs has been proposed as a standard 90m x 30m flat-bottomed barge, as this is most compatible with the facilities at Combwich Wharf.

6.3.31 Deliveries to the Goods Wharf may make use of either a 90m x 30m or 60m x 30m flat-bottomed barge. General construction goods are to be unloaded using a mobile harbour crane that will either deposit directly onto a waiting vehicle or temporarily onto the quay for later handling.

6.3.32 The existing users of Combwich Wharf are EDF Energy and National Grid. However, EDF Energy recognises that there are many users of the adjacent Combwich Pill and adjoining land, and the proposals have been drawn up in the light of input from such users.

6.3.33 Recreational boats usually depart from Combwich Wharf on a rising tide, and return just after high tide, which would not conflict with an EDF Energy scheduled arrival or departure manoeuvre that requires exclusive use of the wharf area for the ~20min slack water period at high tide only (construction deliveries would be dependent upon a minimum tide level of 4.5m). Therefore it is feasible that a scheduled EDF Energy delivery would not preclude from using the same high tide for recreational purposes. In a "peak" month it has been estimated that the maximum number of possible deliveries to the wharf would be 15-16 therefore there will be days with no EDF Energy scheduled deliveries.

6.3.34 The majority of the wharf works will not affect the boats moored in the Combwich Pill. For health and safety purposes boat owners could be requested to move their boats for short periods and in this instance they will be provided with alternative secure boat storage.

c) Combwich Freight Laydown Facility

6.3.35 A new temporary freight laydown facility will be constructed in the vicinity of Combwich Wharf and will include the following functions/facilities:

i. Stand-by Area for AILs

6.3.36 The origin for many of the AILs means that they need to be transported long distances by sea, with sailings booked many months in advance and subject to fluctuation due to adverse weather conditions.

6.3.37 In recognition of these characteristics, and due to the constraints of the HPC development site, it is proposed to provide a temporary holding/storage area for AILs at Combwich. As there is no alternative to using Combwich Wharf for the largest AILs the stand by area would provide a degree of contingency against supply disruption before AILs are transported to the HPC development site.

6.3.38 At times when the stand-by area will not be used for AILs i.e. limited or no AILs delivered to Combwich in the short term, the available area will be used for storing other construction items.

ii. Laydown Area for Other Goods

6.3.39 Due to tide constraints and restricted unloading hours, the barges arriving at Combwich Wharf will be unloaded as quickly as possible, thus a laydown area close to the wharf is proposed to temporarily store goods (containers or bulk) before they are moved to the HPC development site.

6.3.40 The use of this area will be limited to weatherproof items (either containers or in bulk) that will not require covered facilities. The stacking of containers will be limited to two in height to limit the visual impact. Maximum container height would be approximately 2.6-2.8 metres each. Contractors' offices (if needed) will be limited to two-storey (maximum height of 4.5m).

6.3.41 Priority for the use of the freight laydown facility will be given to water borne deliveries. However, EDF Energy needs to preserve a degree of logistics flexibility and the freight laydown facility will also be used as a temporary store for road borne deliveries when there is a shortage of space at the HPC development site.

6.3.42 Parcel(s) of the freight laydown facility will be allocated to one or more contractors for a prescribed period of time to suit construction operations.

iii. Parking Facilities

6.3.43 A limited number of site vehicles (e.g. pickups, 4x4s) will be permitted for each contractor to allow for movement on the freight laydown facility or between Combwich and the HPC development site. Fifty parking spaces will be provided at the Combwich freight laydown facility to cater for these site vehicles and those associated with managing the delivery of the AILs and unloading of other goods at the wharf.

6.3.44 Workers at Combwich will be subject to the same park and ride/bussing regime as the other HPC workers, with the exception of those having special working hours not compatible with the normal bus services.

iv. Administration, Welfare and Security Facilities

6.3.45 Two buildings are proposed at the freight laydown facility; a security building and a welfare/amenity/administration building. They will both be single storey.

v. Operational Considerations

6.3.46 There will be the potential for boats to arrive at Combwich Wharf at night to suit the tidal nature of the River Parrett, however, unloading at the Wharf would be restricted to the operational hours of 07:30 to 18:30, seven days a week.

6.3.47 Activities in the freight laydown facility would be permitted between 07:00 and 20:00 Monday to Friday, and between 08:00 and 18:00 on Saturday, Sunday, Bank and Public Holidays.

6.3.48 Due to the over-sized nature of the AILs the timing of their transportation from Combwich to the HPC development site will be chosen to minimise impact (on residents along the route and other road users including HPA and HPB). For this reason, associated facilities may be open beyond normal hours to cater for this if necessary as agreed with the relevant Authorities. Local residents would be given prior notice to any such activity.

6.4 Use of Rail for Movement of Freight

6.4.1 Rail transport generally provides opportunities to transport bulk quantities of materials, thereby reducing road movements. However, local rail facilities currently present a limited opportunity for rail-borne freight to the HPC Project due to lack of capacity, limited access, limited possibility for expansion and other operational constraints. In addition, the use of local facilities would require an additional road trip to complete the journey from the railhead to the HPC development site and therefore would not reduce construction traffic on the local network.

6.4.2 In addition to these constraints, further investment would be necessary to secure rail freight capacity to support the construction works. This requirement to provide/upgrade rail facilities has been weighed against the likely usage and operational duration, and was not considered a viable option. The emphasis for materials delivery has, instead, been directed towards water-borne freight via the temporary jetty and Combwich Wharf.

6.4.3 The Port of Bristol, however, benefits from rail freight access and its use, coupled with the shipment of materials by water, will also be encouraged. Bulk materials/containers could be transferred to a coastal barge and delivered to the temporary jetty or Combwich Wharf.

6.4.4 Dunball Wharf has been discounted as a primary option as its location would not provide relief to road transport through Bridgwater. It could, however, be used as a short-term back-up for bulk materials in the event that either the jetty or Combwich Wharf becomes unavailable for any reason.

6.5 Cannington Bypass and Highway Improvements

a) HGV Routes

6.5.1 The HGV routes (see **Figure 6.4**) to the HPC development site have been selected based on the following:

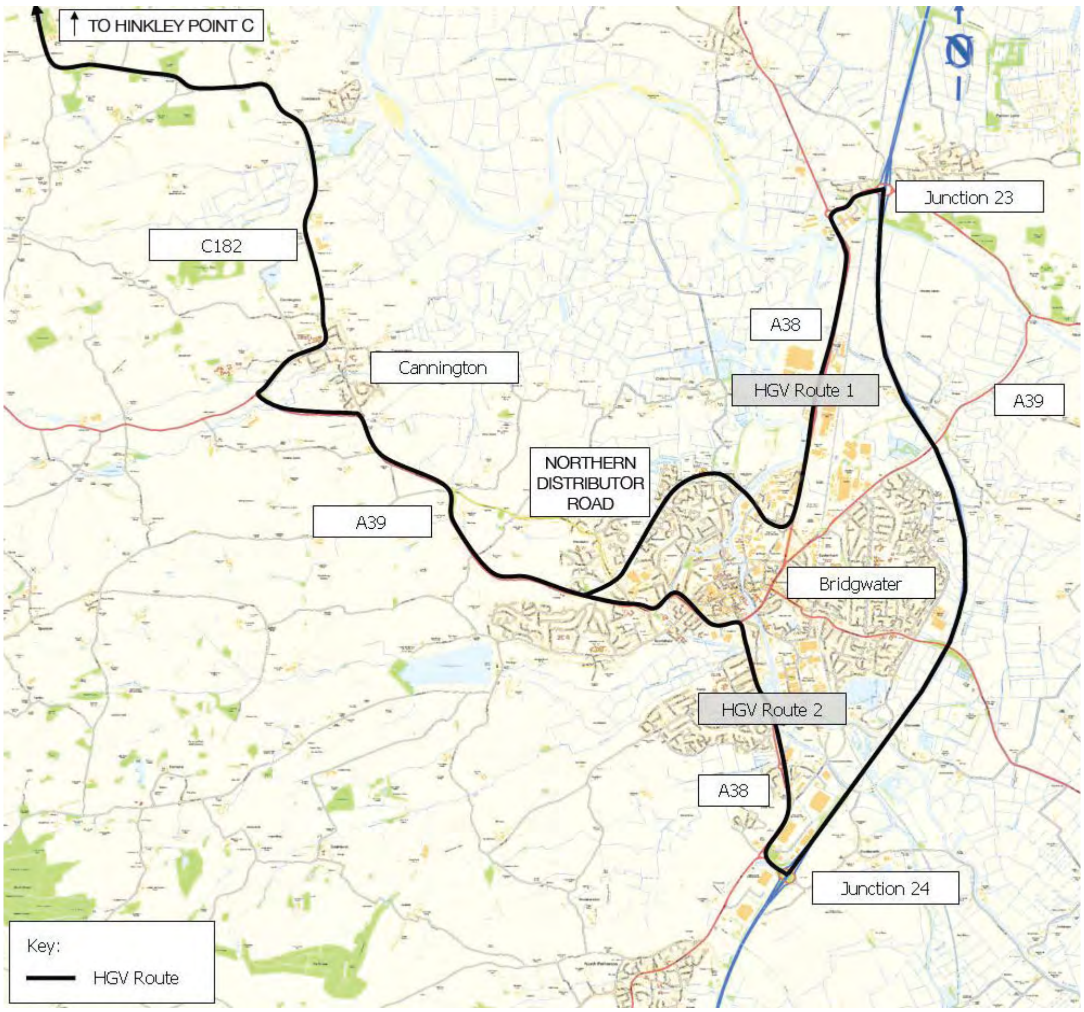
- the appropriateness of the roads to accommodate HGVs; and
- avoidance of congested areas of Bridgwater.

6.5.2 It is proposed to route HGVs from Junction 23 along the A38 Bristol Road, Northern Distributor Road (NDR – now re-classified as A39), the A39 west of Quantock roundabout, Cannington High Street (prior to any new bypass becoming operational) and Cannington bypass, once it is operational, and then along the C182.

6.5.3 It is proposed to route HGVs from Junction 24 along the A38 Taunton Road, the A39 west of the Taunton Road/Broadway junction, Cannington High Street (prior to any new bypass) and Cannington bypass, once it is operational, and then along the C182.

6.5.4 For transport modelling purposes it has been assumed that 75% of the HGVs will be coming from the north towards Junction 23 and 25% from the south towards Junction 24. In order to spread the traffic in Bridgwater between the selected HGV routes, of the 75% heading towards Junction 23 from the north, 15% will be diverted to the Junction 24 via the M5. The total proportion of HGVs at each Junction will therefore be 60% at Junction 23 and 40% at Junction 24.

Figure 6.4: Designated HGV Routes to the HPC Development Site



6.5.5 The NDR was built during 2001/02 to route traffic around and away from central Bridgwater to reduce congestion and freight flows, as well as acting as a distributor road for new housing.

6.5.6 HGVs will route along High Street, Cannington, rather than Main Road in order to avoid some of the main residential areas in Cannington. Once the Cannington bypass is operational, HGVs would route along the bypass.

6.5.7 The HGV routes have also been designed to avoid the most congested areas of Bridgwater as much as possible. No HGVs would route on the A39 stretch between Cross Rifles and the junction with the A38 Taunton Road.

6.5.8 The HGV routes have specifically been chosen because appropriate alternative routes are available nearby over most of their lengths in the event of a temporary closure on the network. Diversion routes will be set out in a Traffic Incident Management Plan.

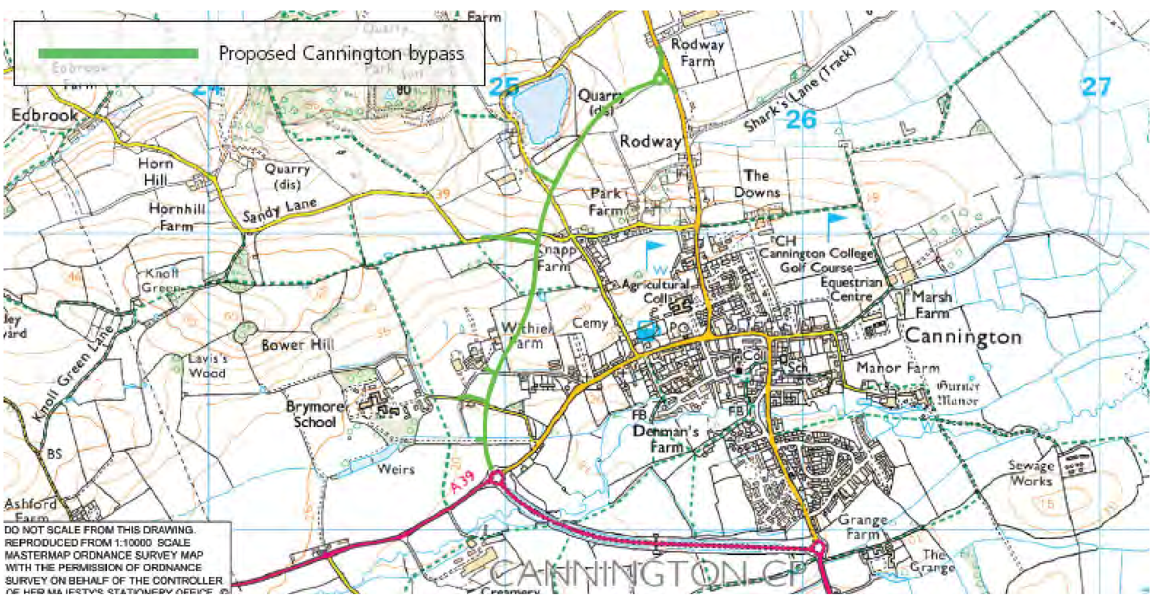
b) Cannington Bypass

6.5.9 Whilst the level of traffic anticipated through Cannington could be accommodated within the capacity of the existing road network, the increase in traffic levels above the current flows and the construction-related nature of that traffic would be more pronounced in Cannington than elsewhere. On this basis, a new bypass around the western side of Cannington is proposed, linking the A39 directly to the C182 Rodway, and is estimated to be operational in Quarter 4 2014 (see **Figure 6.5**).

6.5.10 Construction traffic would be diverted from the centre of Cannington to the new bypass for the remainder of the construction phase.

6.5.11 The bypass would be a permanent development available for use by the general public and would also absorb operational traffic to and from HPC during the operation of the power station.

Figure 6.5: Proposed Cannington Bypass



c) Highway Improvements

6.5.12 The following improvements to the road network have been identified:

- M5 Junction 23 - improvements including signals at the motorway roundabout along with some improvements to the southbound off-slip road (i.e. from the Bristol direction). In addition, minor improvements to the lane markings at Dunball roundabout will enhance the link to Junction 23.
- A39 New Road/B3339 Sandford Hill – constructing a roundabout that will improve safety and reduce vehicle speeds.
- Cannington Traffic Calming – introduction of traffic management features which will likely take the form of road markings and finishes; additional pedestrian crossing and planning restrictions.
- C182 Farringdon Hill Lane horse crossing – introduction of a formal horse crossing with associated warning signals and signage.
- Claylands Corner – introducing improvements which increase visibility for those using Adam's Lane and reduces vehicle speeds.
- A39 Broadway/A38 Taunton Road – widening of the highway and better signal arrangements to improve the operation of this junction, reduce queuing and improve pedestrian and cycle crossing facilities.
- A38 Bristol Road/Wylds Road – introduction of measures to discourage HGVs turning from Bristol Road into Wylds Road and to encourage through traffic.
- Wylds Road/The Drove – improvements to the operation of the signals and widening of the highway which will lead to more efficient operation and reduced queuing.
- A38 Bristol Road/The Drove – widening of the highway to improve the operation of this junction and reduce queuing.
- Huntworth roundabout – increase in width of eastern arm of roundabout to reduce queuing, provision of new pedestrian facilities and revision of white lining.
- Washford Cross – new roundabout to increase safety of junction.

6.5.13 The timing of the highway improvements will be coordinated with other highway works and HPC construction activities in order to minimise disruptions on the road network. Further information on the proposed highway improvements is included in the **Transport Assessment**.

6.6 Off-site Freight Management Facilities at Junction 23 and Junction 24

6.6.1 It is proposed to provide two freight management facilities close to Junction 23 (see **Figure 6.7** and **Figure 6.8**) and Junction 24 (see **Figure 6.9, Figure 6.10** and **Figure 6.11**) of the M5 motorway in order to manage HGV movements on the HGV routes. The purpose of the freight management facilities is twofold:

1. To control the flow of HGVs dispatched to HPC by holding them at the freight management facility in dedicated parking spaces until the appropriate delivery time.
2. To hold HGVs in the event of an incident requiring site deliveries to be temporarily suspended (e.g. an incident on the road network between the M5 and site, or a disruption on-site).

6.6.2 In addition to parking spaces for HGVs the freight management facilities will also include a building with administration areas and welfare facilities for drivers. Entrance/egress will be via a multi-entrance lane and booths for vehicle/paperwork checking (see **Figure 6.6**).

Figure 6.6: Examples of Holding Area

6.6.3 The freight management facilities would have security personnel present 24 hours seven days a week. The freight management facilities would be operational from Monday to Saturday and on each of these days from 05:30 to 21:30 to support the delivery window to HPC. During the construction of the freight management facilities HGVs will go directly to the HPC development site via the established HGV routes.

6.6.4 Until the Junction 23 development becomes fully operational, HGVs using the Somerfield (Junction 24) development would use two routes to travel to the HPC site. One route would be via the M5 motorway from Junction 24 to Junction 23 and then along HGV Route 1. The second route would be HGV Route 2.

6.6.5 In addition to HGVs travelling to the HPC development site, there will also be HGVs to the associated development sites mainly during the construction of these facilities. These would not be required to stop at the freight management facilities. They will therefore travel directly to the associated development sites.

Figure 6.7: Layout of Facilities at Junction 23

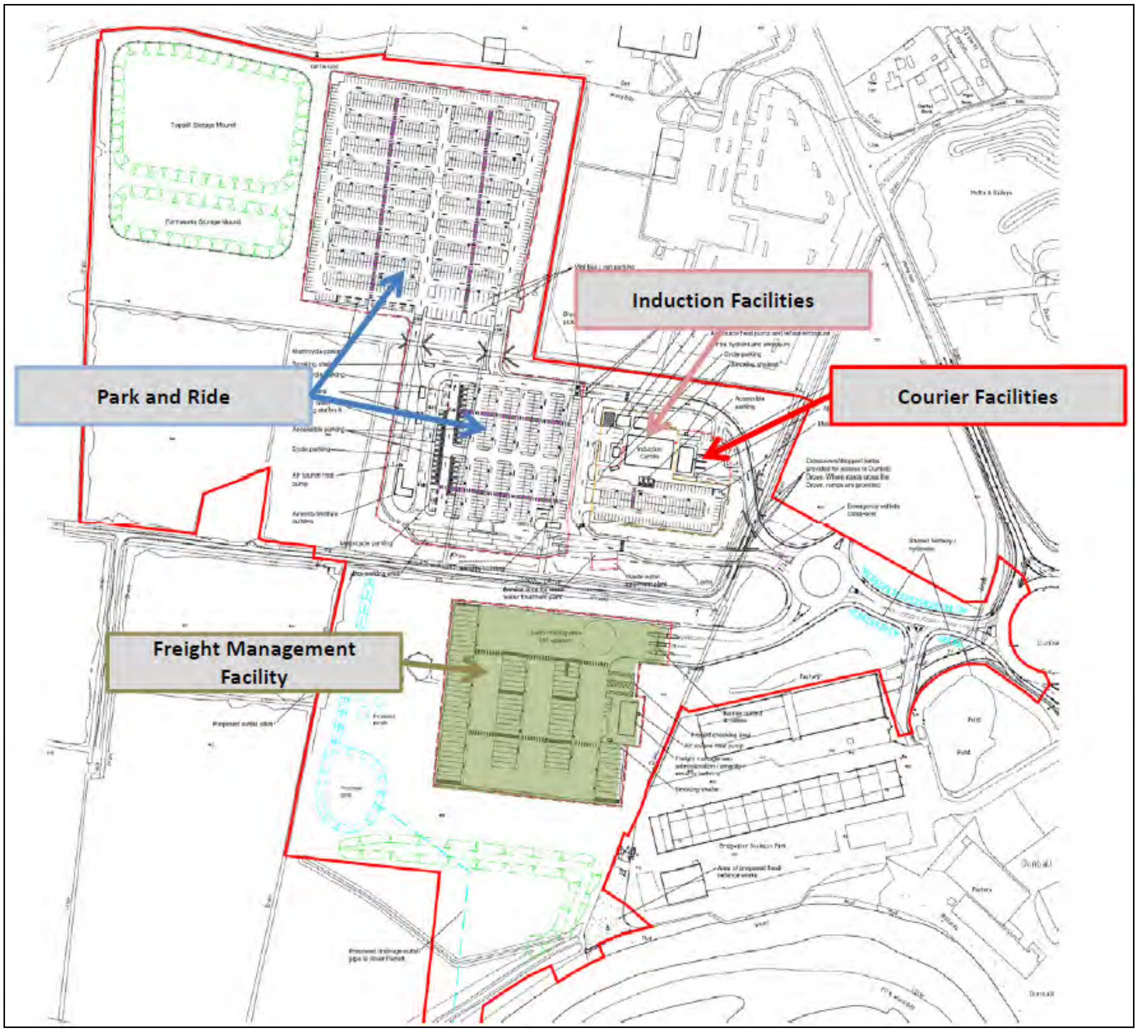


Figure 6.8: Layout of Freight Management Facility at Junction 23

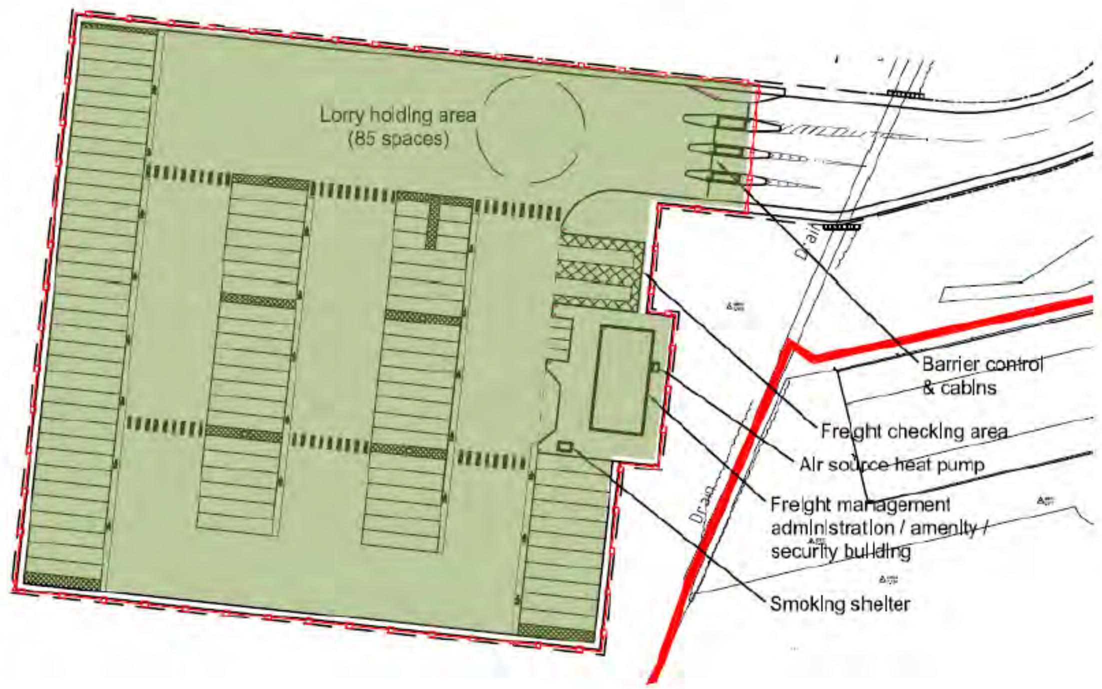


Figure 6.9: Layout of Facilities at Junction 24 (Phase 1 - prior to J23 being operational)

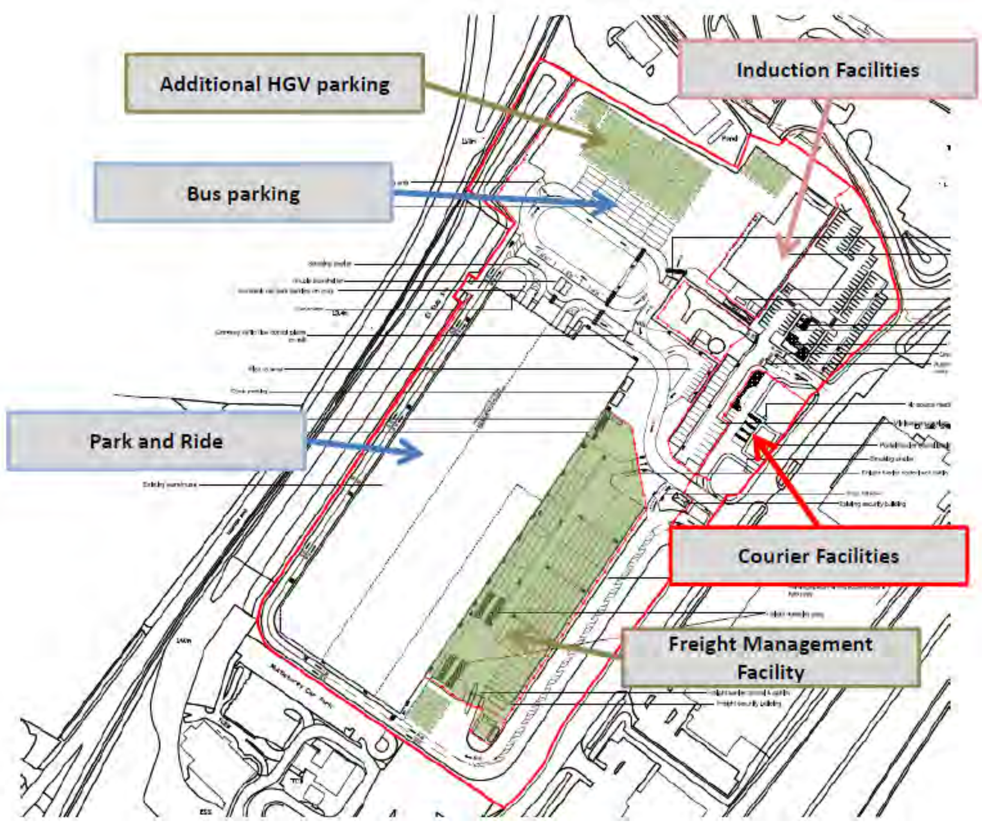


Figure 6.10: Layout of Facilities at Junction 24 (Phase 2 - after J23 operational)

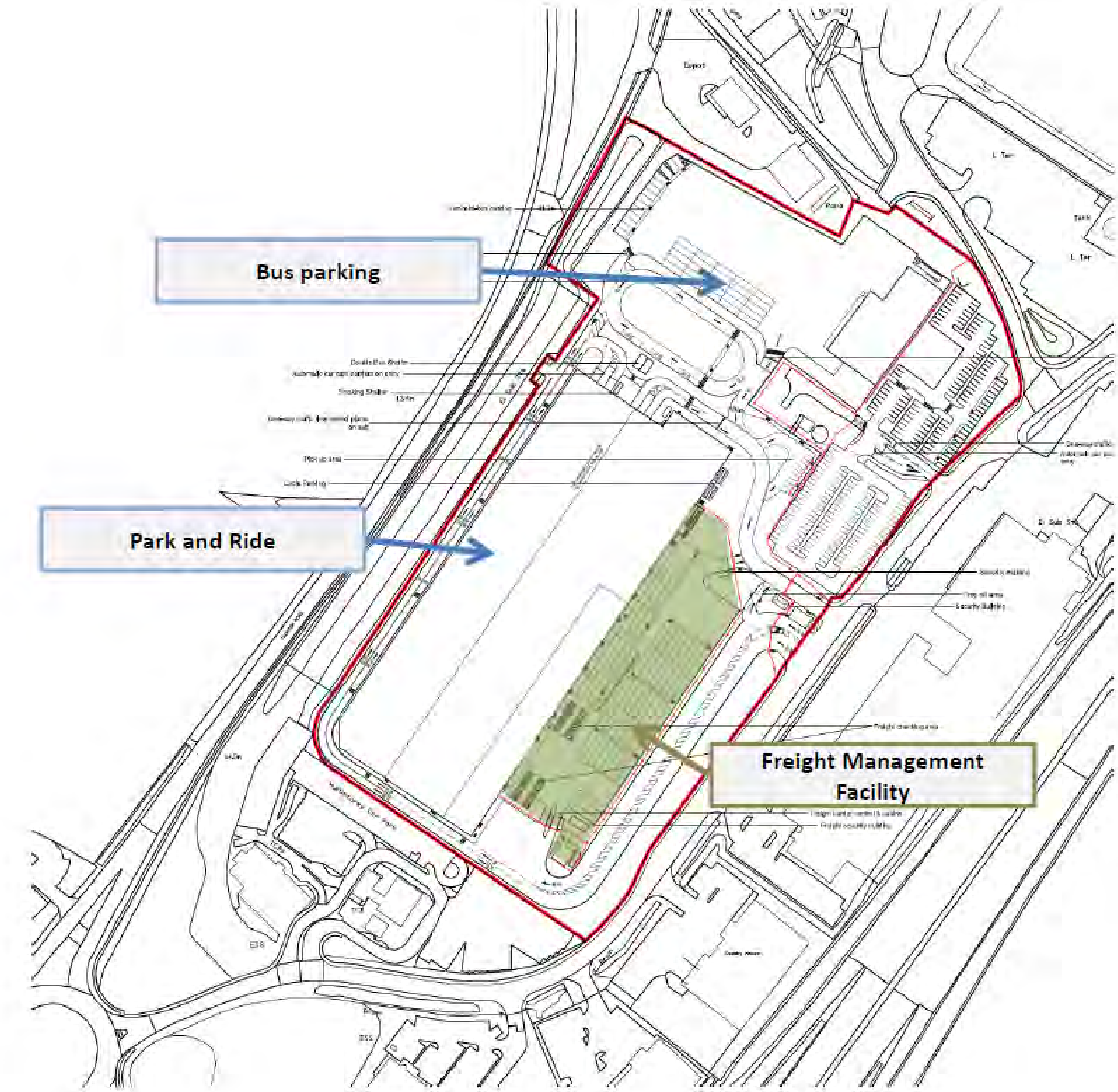
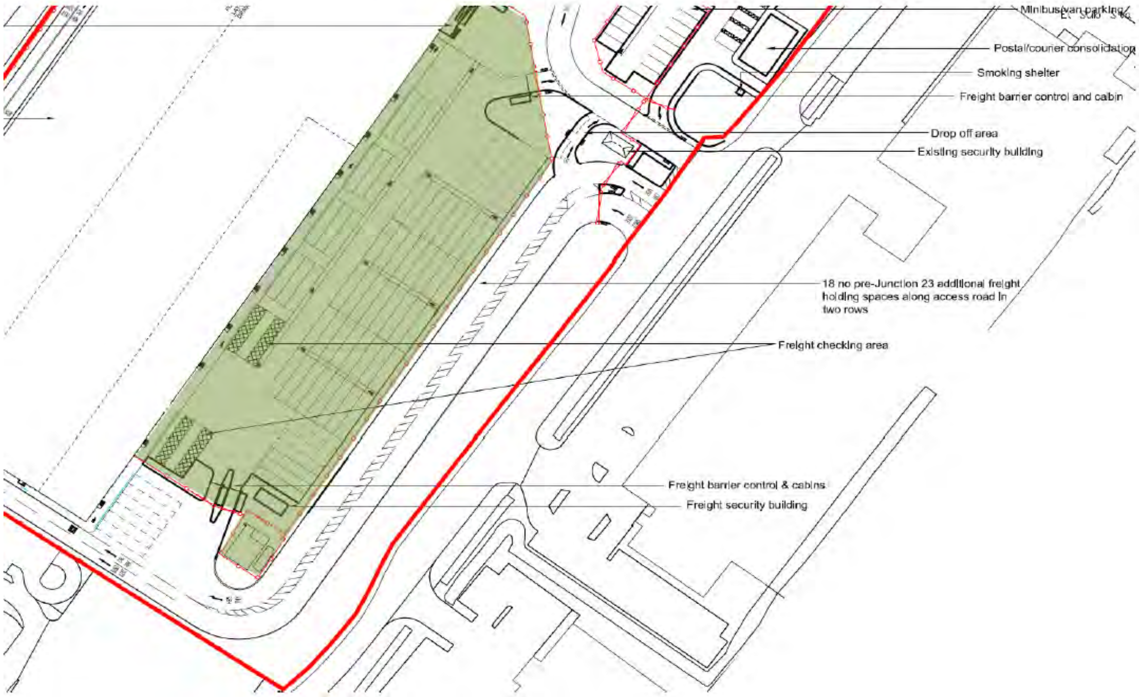


Figure 6.11: Layout of Freight Management Facility at Junction 24



6.6.6 In a typical day scenario (no incidents) the parking spaces within each freight management facility will not be fully utilised as the number of HGVs arriving and processed per hour will be lower than the number of parking spaces available.

6.6.7 The number of parking spaces is instead driven by the holding capacity of the freight management facility at the time of an incident. This will depend on:

- the rate at which vehicles are arriving; and
- the number of vehicles already within the facility at the time of the incident. This, in turn, will be a function of how early a vehicle will be allowed to arrive at the facility before its scheduled departure to site.

6.6.8 From experience on other projects it would be reasonable to expect that the holding capacity of the freight management facilities at Junctions 23 and 24, in the event of an incident, is sufficient to absorb approximately three hours of the peak daily traffic on an average day during the peak quarter. It is anticipated that this capacity will deal with most incidents and disruptions. It will allow sufficient time to communicate to upstream vehicles the requirement to hold at their origin or, if already en route, at existing truck stops until further notice.

6.6.9 The tolerance has been set so that, on average, vehicles will arrive up to 60 minutes before the allocated time slot for departure to the HPC development site. There will be a cluster of vehicles arriving near the scheduled departure time to site which will allow for a number of vehicles to be earlier than 60 minutes without impacting on the centre capacity. The tolerance to achieve this will vary with the demands of the HPC Project and can be set and adjusted to suit. It is likely that vehicles coming from abroad will be given a wider tolerance.

6.6.10 The flow of vehicles leaving the relevant freight management facility will be naturally regulated by having to pass through the security checkpoints at the site gates. It is envisaged that under normal circumstances no further control will be required. In the event of an incident, vehicles will be held on-site in accordance with the site procedures.

6.6.11 Taking all these factors into account, a total holding capacity of approximately 140 HGVs (with 85 at Junction 23 and 55 at Junction 24) would allow three hours of traffic to be accommodated.

6.6.12 In advance of the freight management facility becoming available at Junction 23, the Junction 24 development would provide 140 HGV holding spaces. Once Junction 23 becomes operational, the HGV holding spaces at Junction 24 would reduce to 55 (refer to Section 8 for HGV numbers).

6.7 Delivery Management System

6.7.1 A delivery management system (DMS) will be implemented on the project to allow for an effective and efficient planning, control and monitoring of road freight deliveries to the HPC development site and Combwich. The DMS will also allow the collection of data which can be used for monitoring compliance with the planning constraints and trend analysis.

6.7.2 The DMS will consist of 3 components:

- Booking.
- Control and Monitoring.
- Passes (for regular/frequent deliveries).

a) Booking

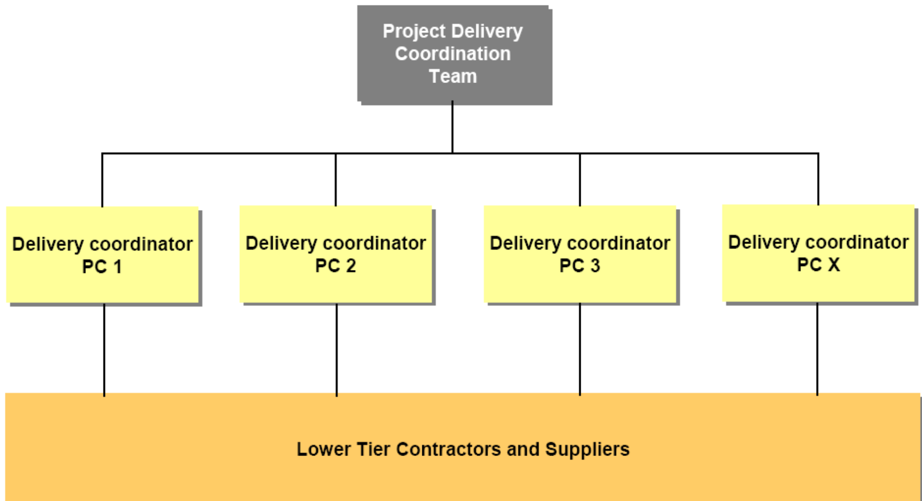
6.7.3 The booking component is web-based and allows Main Contractors (MC), sub-contractors, suppliers and other users to pre-book road freight deliveries to the project.

6.7.4 To obtain authorisation to make a delivery authorised users will request a delivery slot via the web. Aside from strategic exceptions bookings will generally be on a “first come first served” basis to encourage delivery requests to be made as far in advance as possible. The system will be interactive showing the delivery slots currently effectively available to book. The booking request will include the details of the load, the destination, the vehicle and the driver.

6.7.5 EDF Energy will establish a Project Delivery Coordination Team responsible for the overall management of the project site deliveries. Each MC will appoint a member of their staff to act as the delivery coordinator responsible for the coordination of their deliveries.

6.7.6 The MC's delivery coordinator will approve or reject the delivery request received from their sub-contractors by the authorisation cut off time. The approval will include confirmation of which freight management facility the HGV is required to pass through or note the exemption from this requirement as appropriate. Lower Tier Contractors and suppliers will be required to check the status of their delivery request in the system for any discrepancy. All bookings will be approved or rejected by the Project Delivery Coordination Team. This will carry out their final review and issue the collated "next day delivery schedule" for the entire HPC site and Combwich on a daily basis (see **Figure 6.12**).

Figure 6.12: Outline Project Delivery Coordination Structure



b) Control and Monitoring

6.7.7 The number of HGVs to/from HPC and Combwich will be controlled and monitored to ensure compliance with the booking schedule, agreed capping limits and permitted routes. Key control and monitoring points include:

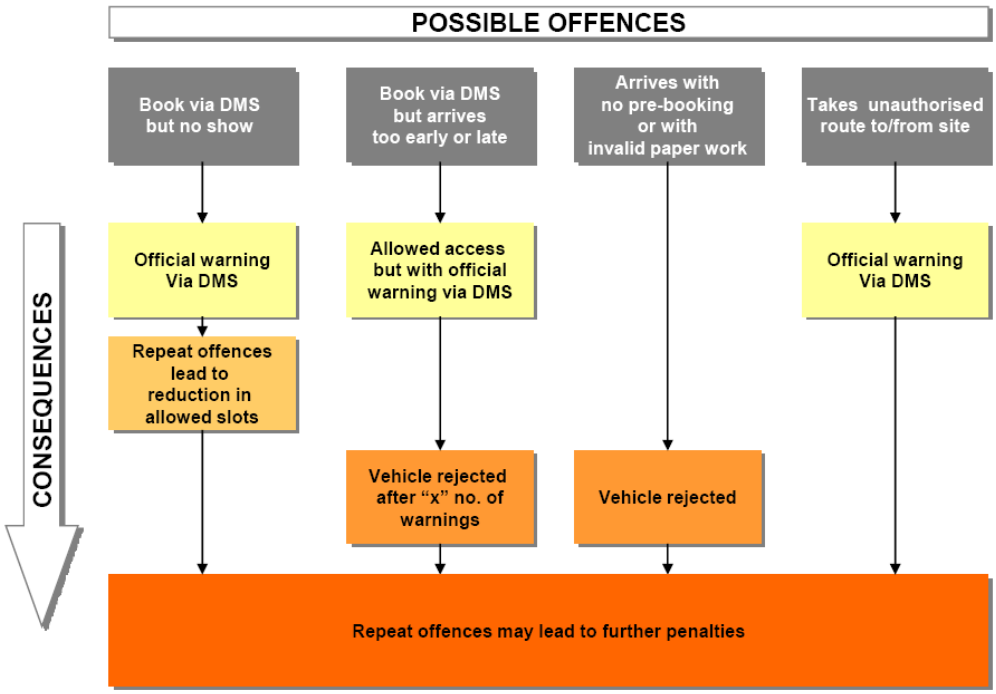
- Freight management facility (entrance and exit).
- Permitted HGV routes (for both HGVs arriving and leaving HPC).
- HPC development site and Combwich laydown (entrance and exit).

6.7.8 Upon arrival at the relevant freight management facility (earliest guaranteed control point) the delivery papers will be verified. Once identification has been confirmed, the freight vehicle will be allowed to enter the freight management facility and wait there until the established departure time to HPC or Combwich.

6.7.9 HGVs will be required to arrive at the freight management facility within a set time period prior to the agreed slot time for the relevant HGV. This is to ensure that the freight management facilities holding capacity is not eroded by vehicles arriving too early. The exact window of acceptable arrival time may vary and will be subject to review dependent on the phase of the HPC Project.

6.7.10 Vehicles arriving too early or too late will be penalised and may be rejected if necessary. Penalties will be designed to instil discipline and compliance with the system whilst at the same time minimising any consequential effect on the road network. An example of how this might work is given in **Figure 6.13**.

Figure 6.13: Indicative Penalties Approach



6.7.11 The consequences would escalate once the number of offences reaches a pre-set trigger level. There would be exceptions for the rejection of deliveries where practical reasons dictate e.g. ready -mix deliveries or where a driver's tachograph doesn't allow for an immediate turn around. Vehicles which are delayed owing to an incident which triggers (or would trigger) vehicles being held at the freight management facility will not be penalised and will be rescheduled as soon as practicable.

6.7.12 HGVs leaving the freight management facility (inbound traffic) and HPC (outbound traffic) will be monitored to ensure compliance with the mandatory HGV routes and capping limits. EDF Energy anticipates using an Automated Number Plate Recognition (ANPR) solution to monitor compliance with the HGV routes and this will include the installation of ANPR cameras at HPC, at the freight management facilities at Junction 23 and Junction 24, at Combwich and along the permitted HGV routes.

c) Passes

6.7.13 For suppliers making regular or frequent deliveries, applications will be allowed for a permanent or temporary pass.

6.7.14 An example of where a permanent pass may be issued is regular food deliveries from one supplier. In this case approval of the application would include agreeing the allocation of a regular slot with the supplier for the deliveries.

6.7.15 An example of a temporary pass may be for HGVs delivering aggregate several times a day for a period of time. In this case the supplier would agree a band of slots for each day the deliveries are required. In order to control the daily flow and monitor the actual number of journeys to/from the HPC development site at least the first delivery of the day will have to go to site via a freight management facility with subsequent trips being naturally controlled by the time between successive deliveries.

6.7.16 In all cases where passes are issued an analysis will be undertaken and appropriate slots will be blocked out on the booking systems to control the number of bookable slots remaining available.

6.8 Reducing Light Goods Vehicle Movements

6.8.1 Whilst the number of HGV movements generated by the tonnes/volume of materials delivered to the HPC development site is quantifiable, the number of movements generated by LGVs associated with the HPC Project (e.g. vans, 4x4s, pickups) is difficult to estimate as it is not directly dependent on the tonnage/volume of material usage for the HPC Project. The table below illustrates likely uses of LGVs and the measures proposed to reduce their numbers/movements.

Table 6.1: Summary of Measures to Reduce LGVs

Typical LGVs use on Construction Projects	Mitigation Measure
Irregular postal/courier deliveries to site	Use of a postal/courier consolidation facility - no post deliveries/couriers will be able to go directly to the HPC development site. Instead they will dispatch at an off-site facility at Junction 23 (temporarily at Junction 24 before Junction 23 is operational) where parcels will be scanned and consolidated into dedicated vans for delivery to HPC.
Workers carrying tools/equipment to site	Introducing an area for on-site storage of workers' tools*/equipment - workers will be required to dispatch/collect their tools at the start/end of their involvement on the HPC Project. **specialist tools where this is not practical may be exempted*
Multiple low volume deliveries (on part loads/small vehicles) e.g. items such as food, consumables, light fittings, ironmongery, fixings, concrete void formers, etc.	Upstream consolidation by the supplier to secure full load efficiencies. This will be achieved by: Providing storage space on site so that materials can be delivered in bulk and then split down as and when required.
Contractors' fleet vehicles (these vehicles will be largely used to support construction operations on site and between the HPC development site and Combwich)	Cap the number of contractors' vehicles on the HPC Project i.e. cars, 4x4, small vans. Staff will generally not be allowed to commute to/from work with these vehicles except for staff covering special operations (e.g. on-call site supervisors).

6.9 Construction Pre-fabrication

6.9.1 Pre-fabrication can be undertaken off-site, on-site or both. Off-site pre-fabrication may include structural steelwork, cladding and roofing panels, mechanical and electrical plant pre-assembly and tunnel lining segments. In addition there are a limited number of major components/assemblies which have been specifically considered and result in scheduled Abnormal Indivisible Loads (AILs). On-site pre-fabrication may include elements that cannot be transported over the road network or where the transport infrastructure would restrict the size of such prefabrications including steel liners and sections of the dome for the reactor building, reinforcement bar assemblies for piling, cut off walls, concrete walls and pre-cast elements such as piping and galleries.

6.9.2 Pre-fabrication has the advantage of improving quality, providing faster site installation with potentially less on-site labour required. However, it increases the physical volume of the material to be transported, resulting in an increase in the number of vehicles required, with further implications on larger craneage requirements because of higher unit weights and additional costs such as enhanced protection during transport.

6.9.3 EDF Energy will provide space and facilities which would allow at least the level of pre-fabrication adopted for Flamanville 3. Given the transport restrictions, it is envisaged that most pre-fabrication would take place at the HPC development site where transport to the final position would be most easily accomplished.

6.10 Freight Consolidation

6.10.1 EDF Energy has considered the possibility of consolidation of the construction materials in a dedicated off-site consolidation centre. This solution has not been adopted for the HPC Project for the following reasons:

- One of the key principles of consolidation is to significantly reduce the number of multiple part loads by combining them into complete load shipments in order to decrease the number of freight vehicles directed to and from a construction site. Due to the large quantities required for the majority of the material groups to construct the HPC Project it is anticipated that deliveries will be predominantly on a complete load basis hence limiting the need for further consolidation.
- Consolidation at dedicated off-site consolidation centres also promotes the efficient flow of construction goods from supply chains to actual points of use by allowing materials to be “called off” when needed. This is particularly efficient when storage space on site is limited (e.g. city centre sites). On the HPC Project contractors will be able to store materials at the HPC development site and Combwich and call it off when needed.
- Consolidation also requires the freight operator responsible for managing the consolidation centre to take ownership of the load from the supplier until this is collected/dispatched to the contractor. This is inconsistent with the general contracting approach for the HPC Project which is to order final structures, equipment or systems and to allow the contractor to manage its supply chain in

order to deliver the required quality and schedule at minimum cost with limited involvement from EDF Energy.

6.10.2 In addition it should be noted that the proposed limits on HGV movements set out in Section 8 will encourage the supply chain to deliver materials efficiently hence maximising full load deliveries.

6.10.3 EDF Energy will also provide postal/courier consolidation at Junction 23 (and temporarily at Junction 24 until Junction 23 is operational) as described in **Table 6.1**.

6.11 Modes of Transport Summary

6.11.1 **Table 6.2** provides a qualitative assessment of the transport capabilities for main material groups required for the HPC Project.

Table 6.2: Summary of Transport Capabilities for Main Material Groups

	Road via J23 and J24	Temporary Jetty	Combwich Wharf
Largest AILs			On RoRo trailers
Smaller AILs	Low loader via M5 or other main roads.		
Fill material	Via M5 or other main roads.	Conveyor for aggregate of a suitable size once the jetty is operational. This is only when slots are available after priority has been given to concrete materials.	
Bulk aggregates **Sand and cement used for concrete production**	By road before the jetty is operational. Possible limited amount (up to 20%) from local quarries delivered by road once the jetty is operational.	Once it is operational, at least 80% will be delivered via the jetty and then by conveyor, or pumped pneumatically, to site (with up to one month of stockpile being made available on-site in case the jetty is unavailable due to weather conditions, maintenance, etc.)	
Ready mixed concrete	A proportion of the concrete required before the jetty is operational may be from ready mixed plants in the local area.		
Reinforcement	Via M5 or other main roads.	Unload by crane into trailers	On LoLo trailers or unloaded by crane onto trailer.
Steelwork	Via M5 or other main roads.	Unload by crane into trailers	On LoLo trailers
Other materials (bulk)	Via M5 or other main roads.	Unload by crane into trailers	On LoLo trailers or unloaded by crane onto trailer.
Other materials (containers)	Via M5 or other main roads.	Unload by crane into trailers	On LoLo trailers or unloaded by crane onto trailer.

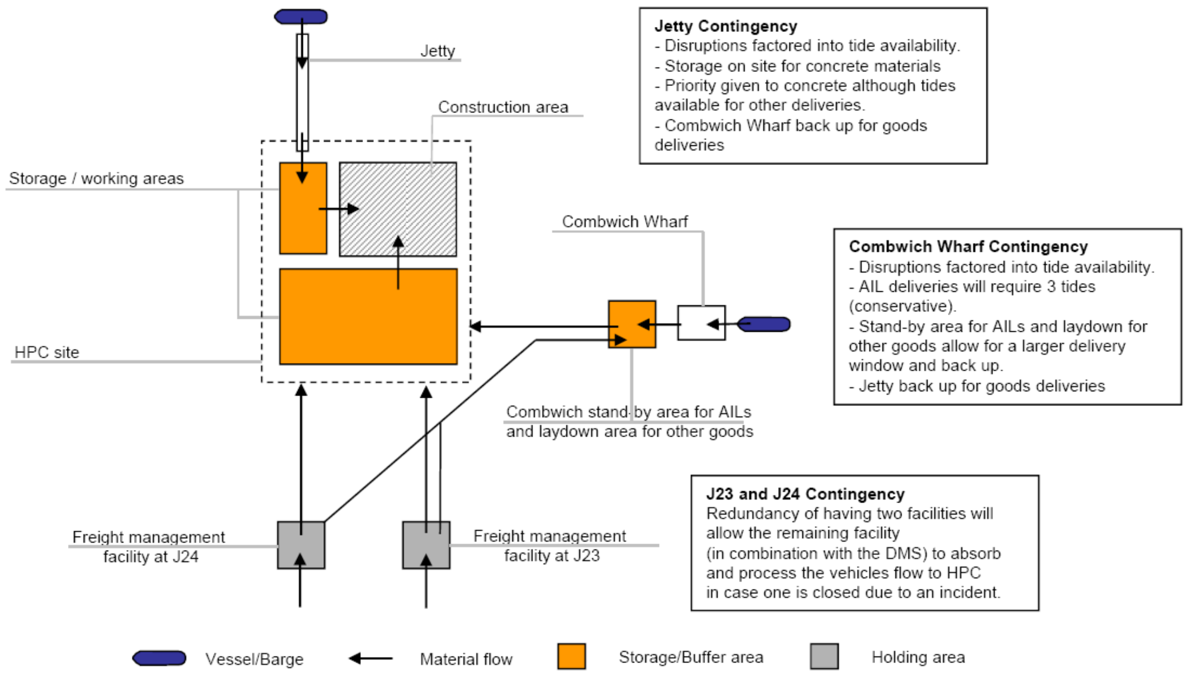
6.12 Contingency Plan

6.12.1 The FMS has been drafted with a number of contingency measures in place to allow for the possibility of delivery disruptions to HPC. **Table 6.3** illustrates key potential disruptions identified and the resulting mitigation measures incorporated in the strategy.

Table 6.3: Summary of Main Mitigation Measures

Potential disruption	Mitigation measures
Jetty: no deliveries of aggregate, sand and cement for <u>concrete production</u> due to bad weather, maintenance, repairs, etc.	Jetty downtime considered as follows: • Winter months = 12 tides unavailable/60 tides available per month. • Summer months = 6 tides unavailable/60 tides available per month. Provision of storage on-site for concrete materials to ensure in excess of one month's supply at peak concrete production is available as a contingency. Priority shall be given to the delivery of cement, aggregate and sand although a number of tides will be potentially available for other deliveries. Deliveries by road within the authorised 20% of total quantities for concrete materials (included in figures in Section 7).
Jetty: no deliveries of <u>goods</u> due to bad weather, maintenance, repairs, etc.	Provision of storage areas on-site to secure back up of supplies. Goods could be delivered to Combwich Wharf instead (depending on weather/tidal conditions and usage). Deliveries by road (included in figures in Section 7)
Combwich Wharf: no deliveries of <u>AILs</u> due to bad weather, maintenance, repairs, etc.	Wharf downtime considered in the calculation of the available tides to allow for disruption due to wind/weather. Conservatively assumed that all AIL deliveries will require a max of 3 tides. Provision of a stand-by area for AILs at Combwich to allow for a larger delivery window.
Combwich Wharf: no deliveries of <u>goods</u> due to bad weather, maintenance, repairs, etc.	Wharf downtime considered in the calculation of the available tides to allow for disruption due to wind/weather. Provision of a freight laydown facility for goods at Combwich to allow for a larger delivery window and secure back-up of supplies. Goods could be delivered to the jetty instead (depending on weather conditions and jetty usage). Deliveries by road (included in figures in Section 7).
Freight Management Facilities: Traffic incidents preventing smooth access of deliveries to the HPC development site or Combwich	Freight management facilities (in combination with the DMS) will provide control on HGV movements and the ability to hold HGVs prior to resolution of the incident.

Figure 6.14: Schematic Showing Contingency Plan



7. MATERIAL USAGE

7.1.1 EDF Energy estimates that **7.1 million** tonnes of materials will be transported to/from the HPC Project sites (HPC development site plus off-site associated development sites) during the construction phase.

7.1.2 This figure includes construction materials, waste and materials generated by the removal of some of the associated development facilities at the end of the HPC construction phase.

7.1.3 As the road freight traffic, which will be transported using the C182, is a measure of the impact on the key HGV routes to HPC through Bridgwater and Cannington, the total tonnes of materials have been split as follows:

- **6.4 million** tonnes for developments which affect traffic on the C182 - these include:
  - HPC development site.
  - On-site accommodation campus.
  - Combwich Wharf and freight laydown facility.
- **0.7 million** tonnes for developments which do not affect traffic on the C182 - these include:
  - Park and ride facilities at Junction 23, Junction 24, Cannington and Williton.
  - Freight management facilities, induction centres and postal/courier consolidation facilities at Junction 23 and Junction 24.
  - Accommodation campuses in Bridgwater.
  - Cannington bypass.
  - Highway improvements.

7.1.4 **Table 7.1** illustrates the breakdown of the above tonnages for key elements, together with the transport mode and assumed payload for each type of materials.

Table 7.1: Materials Quantities for the HPC Project

UNITS 1 and 2					
Site	**Weight (t)**	**Transport Mode**	**% by Road**	**Payload (t)**	**N. of veh**
Site Preparation – Earthworks (note 1)					
Bitumen	50,000	road	100	15	3,333
Imported fill material	450,000	road	100	18	25,000
Mass and blinding concrete	93,249	80% jetty/20% road once jetty available	20	18	3,108
Precast concrete (Sea wall block, pipes)	150,000	road	100	12	12,500
Miscellaneous	10,000	road	100	5	2,000
Total Site Preparation	**753,249**				**45,942**
Cooling Pipes					
Prefabricated elements	18,000	road	100	8	2,250
Miscellaneous	2,000	road	100	5	400
Total Cooling Pipes	**20,000**				**2,650**
Roads and Networks					
Drainage	40,000	road	100	5	8,000
Road and networks – plant area	100,000	road	100	15	6,667
Miscellaneous	10,000	road	100	5	2,000
Total Road and Networks	**150,000**				**16,667**
Marine Works (note 2)					
Tunnelling works	163,049	road	100	5 PC units/HGV	8,198
Ancillary works	32,000	80% jetty/20% road Once jetty available	100	18	559
Total Marine Works	**195,049**				**8,757**
Temporary Jetty					
Concrete on shore	28,349	road	100	18	1,576
Concrete precast on shore	1,155	road	100	10	116
Steelwork on shore	400	road	100	15	27
Piles on shore	1,508	road	100	5	302
Concrete off shore	10,500	6% road - 94% sea	6	18	35
Concrete precast off shore	2,363	road	100	10	236
Steelwork off shore	865	50% road - 50% sea	50	15	29
Piles off shore	2,577	5% road - 95% sea	5	5	26
Jetty Decommissioning					
Inert	37,707	road	100	15	2,514
Non hazardous	9,546	road	100	8	1,193
Hazardous	477	road	100	3	159
Total Jetty	**95,462**				**6,212**
Sub Total Site	**1,213,760**				**80,227**
Contingency (10%)	**121,376**	**road/sea**	**Varies**	**Varies**	**8,023**
Total Site	**1,335,136**				**88,250**

CIVIL CONSTRUCTION	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Main Civil Works					
Concrete	2,331,224	80% jetty/20% road Once jetty available	20	18	27,528
Reinforcing bars	230,000	road	100	18	12,778
Formwork and scaffolding	20,000	road	100	5	4,000
Plates and insert	10,000	road	100	5	2,000
Structural steelwork	30,000	road	100	15	2,000
Civil equipment – doors	10,000	road	100	3	3,333
Miscellaneous	300,000	road	100	5	60,000
Total Main Civil Works	**2,931,224**				**111,642**
Civil Equipment					
Civil works built-in mechanical equipment	2,000	road	100	10	200
Total Main Civil Works plant	**2,000**				**200**
Ancillary Buildings Phase 1					
Concrete	14,430	80% jetty/20% road Once jetty available	20	18	339
Precast concrete	100	road	100	10	10
Steelworks & reinforcement	1,620	road	100	15	108
Total Civil Ancillary Buildings Phase 1	**16,150**				**457**
Ancillary Buildings Phase 2					
Concrete - reinforcing bars - formwork and scaffolding	31,600	80% jetty/20% road	20	18	351
Miscellaneous	10,000	road	100	5	2,000
Total Civil Ancillary Buildings Phase 2	**41,600**				**2,351**
Sub Total Civil Construction	**2,990,974**				**114,650**
Contingency (5%)	**149,549**	**road/sea**	**Varies**	**Varies**	**5,733**
Total Civil Construction	**3,157,080**				**120,383**

INSTALLATION					
Nuclear Steam Supply System (NSSS)					
Heavy components	15,000	Sea to Combwich then by road to HPC	100	AILs	150
Equipment	2,000	road	100	10	200
Mechanical (Piping/Support/Valves/Insulation)	20,000	road	100	5	4,000
Electrical (I&C cabinets)	1,000	road	100	5	200
Miscellaneous	2,000	road	100	5	400
Total NSSS	**40,000**				**4,950**
Balance of Nuclear Island (BNI)					
Handling	2,000	road	100	10	200
Wastes process	10,000	road	100	10	1,000
Mechanical	40,000	road	100	5	8,000

INSTALLATION					
Nuclear Steam Supply System (NSSS)					
(Piping/Support/Valves/ Insulation)					
Diesels generators	10,000	road	100	10	1,000
Ventilation (HVAC for class. buildings)	20,000	road	100	3	6,667
Electrical (cables, switchyard)	10,000	road	100	5	2,000
Miscellaneous	10,000	road	100	5	2,000
Total BNI	**102,000**				**20,867**
Conventional Island (CI)					
Turbine – generator (Heavy components)	10,000	Sea to Combwich then road to HPC	100	AILs	100
Condenser – feed water plant (Heavy components)	8,000	Sea to Combwich then road to HPC	100	AILs	80
Equipment	4,000	road	100	10	400
Mechanical (Piping/Support/Valves/ Insulation)	10,000	road	100	5	2,000
Electrical erection - I&C	2,000	road	100	5	400
Steelwork - anchorages	5,000	road	100	15	333
Miscellaneous	4,000	road	100	5	800
Total CI	**43,000**				**4,113**
Balance of Plant (BOP)					
Pumphouse	10,000	road	100	10	1,000
Transformers platform	2,000	road	100	10	200
Miscellaneous	3,000	road	100	5	600
Total BOP	**15,000**				**1,800**
Sub Total Installation	**200,000**				**31,730**
Contingency (50%)	**100,000**	**road**	**100**	**Varies**	**15,865**
Total Installation	**300,000**				**47,595**

BUILDINGS "BASIC DESIGN STAGE"					
	Weight (t)	**Transport Mode**	**% by Road**	**Payload (t)**	**N. of veh**
(Spent Fuel Store & Intermediate Level Waste Store)					
Intermediate level waste store	31,391	60% jetty/ 40% road	40	18	698
Spent fuel store	255,559	60% jetty/ 40% road	40	18	5,679
Sub-total Buildings "basic design stage"	**286,951**				**6,377**
Contingency (30%)	**86,085**	**60% sea/ 40%road**	**40**	**18**	**1,913**
Total Buildings "basic design stage"	**373,036**				**8,290**

HPC SITE WASTES					
	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Inert	150,000	road	100	12	10,000
Non hazardous	68,000	road	100	4	8,500
Hazardous	2,000	road	100	3	667
Sub total Wastes	**220,000**				**19,167**
Contingency (10%)	**22,000**	**road**	**100**	**Varies**	**1,917**
Total Waste	**242,000**				**21,084**

Sub–Total Quantities Units 1 & 2	**5,390,694**	**road/jetty/wharf**	**varies**	**varies**	**285,600**
Construction Plant Equipment (5% allowance)					**14,280**
Total Quantities Units 1 & 2	**5,390,694**				**299,880**

OTHER OFF-SITE ASSOCIATED DEVELOPMENTS WHICH AFFECT TRAFFIC ON C182					
Combwich Wharf	**Weight (t)**	**Transport Mode**	**% by Road**	**Payload (t)**	**N. of veh**
Construction material generally	71,238	road	100	Varies	4,749
Inert waste	23,972	road	100	Varies	1,598
Non hazardous waste	6,392	road	100	Varies	426
Hazardous waste	1,589	road	100	Varies	107
Subtotal Combwich Wharf	**103,200**				**6,880**
Contingency (20%)	**20,640**	**road**	**100**	**Varies**	**1,376**
Total Combwich Wharf	**123,840**				**8,256**

Combwich Freight Laydown Facility	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction material generally	336,400	road	100	Varies	18,689
Inert waste	2,103	road	100	Varies	140
Non Hazardous waste	561	road	100	Varies	37
Hazardous waste	140	road	100	Varies	9
Decommissioning					
Inert waste	265,756	road	100	Varies	14,764
Non hazardous waste	67,280	road	100	Varies	3,738
Hazardous waste	3,364	road	100	Varies	187
Subtotal Combwich Freight Laydown Facility	**675,603**				**37,565**
Contingency (20%)	**135,121**	**road**	**100**	**Varies**	**7,513**
Total Combwich Freight Laydown Facility	**810,724**				**45,078**

HPC Accommodation Campus	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction material generally	37,653	road	100	Varies	3,170
Inert waste	1,767	road	100	Varies	118
Non hazardous waste	471	road	100	Varies	31
Hazardous waste	118	road	100	Varies	8
Decommissioning					
Inert waste	29,709	road	100	Varies	2,103
Non hazardous waste	7,521	road	100	Varies	532
Hazardous waste	376	road	100	Varies	27
Sub-total HPC Campus	**77,617**				**5,989**
Contingency (20%)	**15,523**	**road**	**100**	**Varies**	**1,198**
Total HPC Campus	**93,140**				**7,187**

National Grid	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	13,760	road	100	10	1,376
Subtotal National Grid	**13,760**				**1,376**
Contingency (10%)	**1,376**	**road**	**100**	**10**	**138**
Total National Grid	**15,136**				**1,514**

Sub-Total Other Developments Which Affect C182	**1,042,840**	**road/jetty**	**varies**	**varies**	**62,034**
Construction Plant Equipment (5% allowance)					3,101
Total Other Developments Which Affect C182	**1,042,840**				**65,135**

OTHER OFF-SITE ASSOCIATED DEVELOPMENT SWHICH DO NOT AFFECT TRAFFIC ON THE C182					
Bridgwater A Accommodation Campus	**Weight (t)**	**Transport Mode**	**% by Road**	**Payload (t)**	**N. of veh**
Construction	95,015	road	100	Varies	7,131
Remediation Materials	11,272	road	100	Varies	751
Inert waste	28,775	road	100	Varies	1,822
Non hazardous waste	7,673	road	100	Varies	486
Hazardous waste	1,918	road	100	Varies	80
Decommissioning					
Inert waste	61,523	road	100	Varies	4,409
Non Hazardous waste	15,576	road	100	Varies	1,116
Hazardous waste	778	road	100	Varies	56
Subtotal BRI A campus	**222,532**				**15,893**
Contingency (20%)	**44,506**	**road**	**100**	**Varies**	**3,179**
Total BRI A campus	**267,038**				**19,072**

Bridgwater C Accommodation Campus	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	14,251	road	100	Varies	1,694
Remediation Materials	1,845	road	100	Varies	123
Inert waste	1,591	road	100	Varies	106
Non hazardous waste	424	road	100	Varies	28
Hazardous waste	106	road	100	Varies	7
Subtotal BRI C Campus	**18,217**				**1,959**
Contingency (20%)	**3,643**	**road**	**100**	**Varies**	**392**
TOTAL BRI C Campus	**21,860**				**2,351**

Junction 23 Park and Ride/Freight Management Facility	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	103,478	road	100	Varies	5,936
Inert waste	4,295	road	100	Varies	286
Non hazardous waste	1,145	road	100	Varies	76
Hazardous waste	286	road	100	Varies	19
Decommissioning					
Inert waste	76,343	road	100	Varies	5,057
Non hazardous waste	19,327	road	100	Varies	1,280
Hazardous waste	966	road	100	Varies	64
Subtotal J23	**205,842**				**12,718**
Contingency (20%)	**41,168**	**road**	**100**	**Varies**	**2,544**
Total J23	**247,010**				**15,262**

Junction 24 Park and Ride/Freight Management Facility	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	6,020	road	100	Varies	685
Inert waste	2,577	road	100	Varies	283
Non hazardous waste	687	road	100	Varies	76
Hazardous waste	172	road	100	Varies	19
Decommissioning					
Inert waste	2,462	road	100	Varies	269
Non Hazardous waste	623	road	100	Varies	68
Hazardous waste	31	road	100	Varies	3
Subtotal J24	**12,572**				**1,403**
Contingency (20%)	**2,514**	**road**	**100**	**Varies**	**281**
Total J24	**15,086**				**1,684**

Cannington Park and Ride	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	19,139	road	100	Varies	1,124
Inert waste	2,099	road	100	Varies	140
Non hazardous waste	560	road	100	Varies	37
Hazardous waste	140	road	100	Varies	9
Decommissioning					
Inert waste	14,096	road	100	Varies	944
Non Hazardous waste	3,569	road	100	Varies	239
Hazardous waste	178	road	100	Varies	12
Subtotal Cannington	**39,781**				**2,505**
Contingency (20%)	**7,956**	**road**	**100**	**Varies**	**501**
Total Cannington	**47,738**				**3,006**

Williton Park and Ride	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	11,702	road	100	Varies	673
Inert waste	2,273	road	100	Varies	152
Non hazardous waste	606	road	100	Varies	40
Hazardous waste	152	road	100	Varies	10
Decommissioning					
Inert waste	815	road	100	Varies	57
Non Hazardous waste	206	road	100	Varies	15
Hazardous waste	10	road	100	Varies	1
Subtotal Williton	**15,764**				**948**
Contingency (20%)	**3,153**	**road**	**100**	**Varies**	**190**
Total Williton	**18,916**				**1,137**

Cannington Bypass	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	32,188	road	100	Varies	2,070
Inert waste	40,364	road	100	Varies	2,691
Non hazardous waste	10,764	road	100	Varies	718
Hazardous waste	2,691	road	100	Varies	179
Subtotal Bypass	**86,006**				**5,658**
Contingency (20%)	**17,201**	**road**	**100**	**Varies**	**1,132**
TOTAL Bypass	**103,208**				**6,790**

Road Improvements	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Construction	5,000	road	100	12	416
Subtotal Road Improvements	**5,000**				**416**
Contingency (20%)	**1,000**	**road**	**100**	**12**	**84**
Total Road Improvements	**6,000**				**500**

Sub- Total Other Off Site Developments Which Do Not Affect Traffic On C182	726,855	road	100	Varies	49,801
Construction Plant Equipment (5% Allowance)					2,490
Total Other Off Site Developments Which Do Not Affect Traffic On C182	726,855				52,291

Summary					
	Weight (t)	Transport Mode	% by Road	Payload (t)	N. of veh
Total Quantities Units 1 & 2	5,390,694	road/jetty/wharf	varies	varies	299,880
Total Other Developments Which Affect C182	1,042,840	road/jetty	varies	varies	65,135
Total Other Off Site Developments Which Do Not Affect Traffic On C182	726,855	road	100%	varies	52,291
Total	7,160,389				417,306

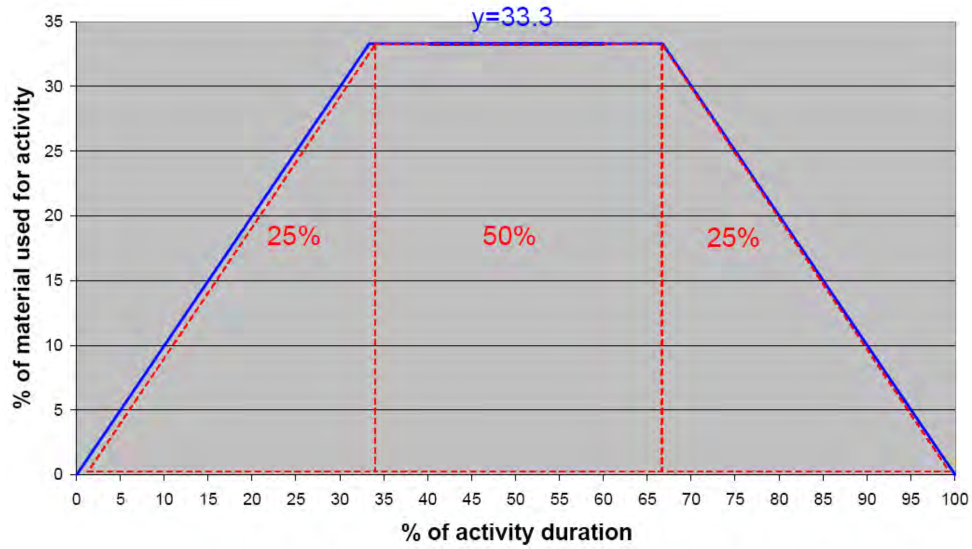
Note 1: All excavation materials being re-used on site either for backfilling around buildings, for preparing the platform or for landscaping are not included in this table

Note 2: All spoil materials of tunnels from tunnel excavation being stored on site are not included in this table.

7.1.5 An analysis of the material percentage usage for each of the key construction activities has been undertaken. The profiles used for the distribution of materials across the programme reflect the typical ramp up and down at the start and end of an activity while the output remains constant through the core period. A flat profile (constant output throughout the activity period) has been adopted for steady activities spanning for long periods (e.g. on-site road construction) or for shorter activities such as the construction of some of the off-site associated developments. The types of profile used for the distribution of materials across the programme activities are as follows:

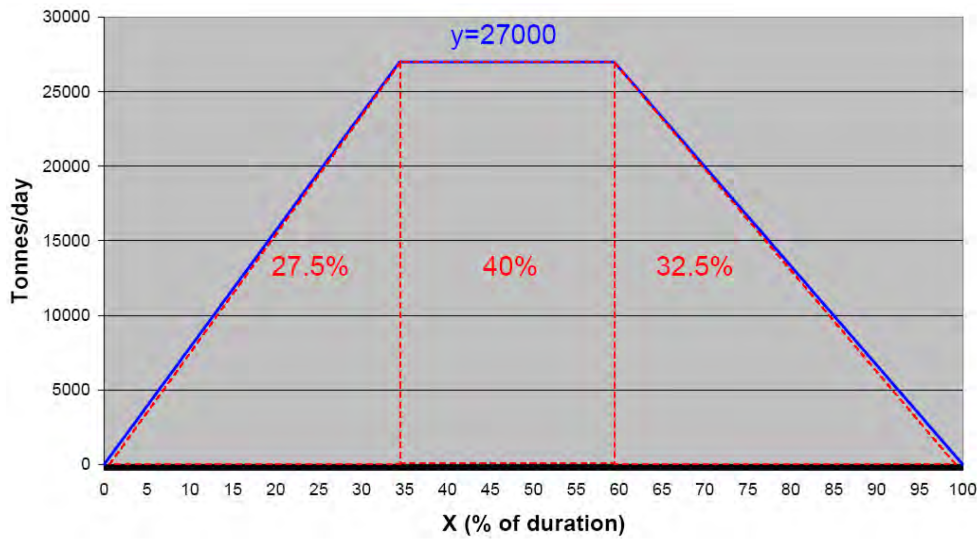
- **Figure 7.1** shows a general profile for material use that is used for a number of activities, such as cooling pipes and plant installation. The profile increases linearly for the initial third, remains constant through the middle third, and reduces linearly over the final third of the activity.

Figure 7.1: General Profile



- **Figure 7.2** is a similar profile based on information provided from bidders for the civil engineering works in relation to civil works activities.

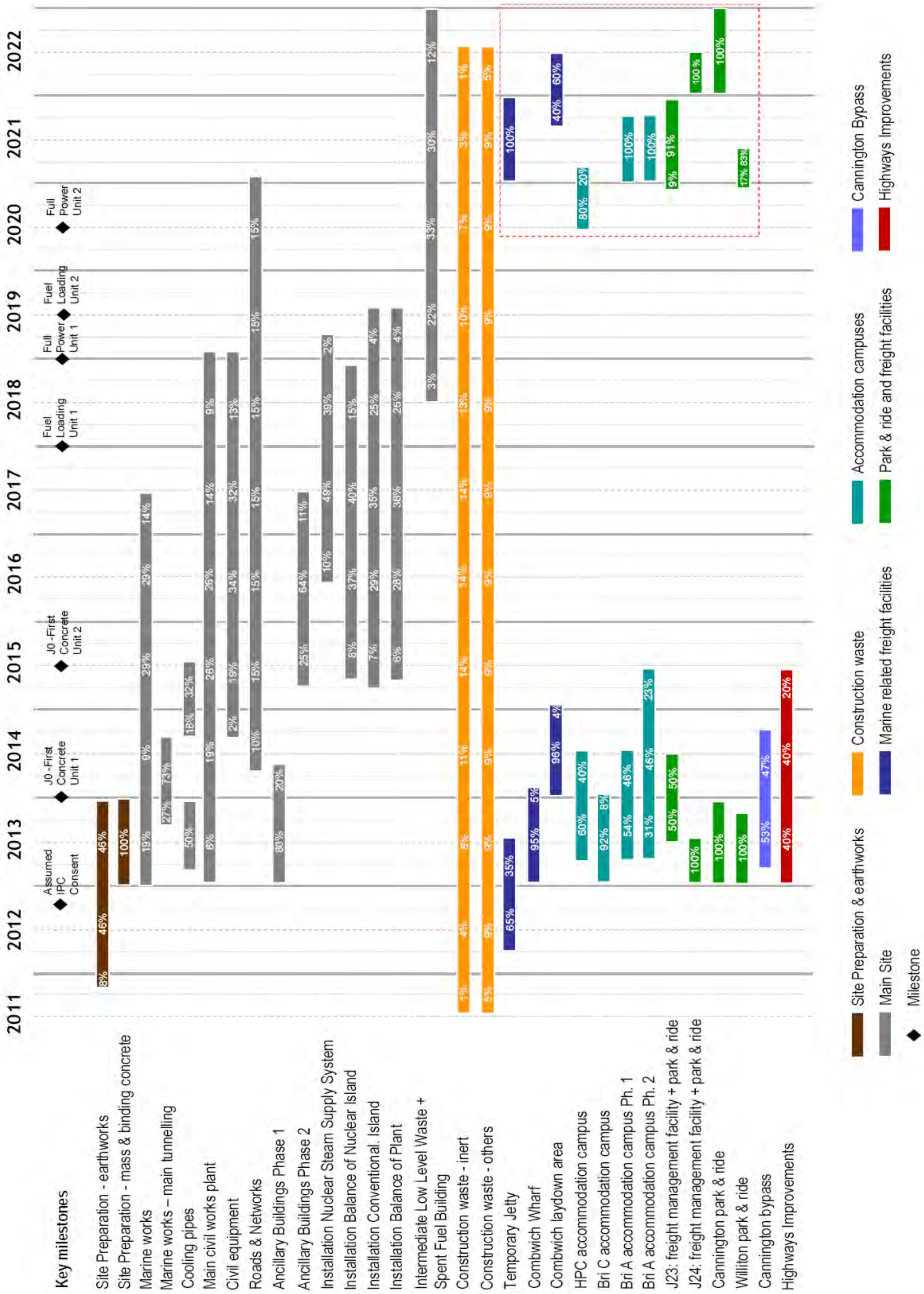
Figure 7.2: Civil Works Profile



- Flat profile for activities such as the Combwich laydown area and on-site road construction.

7.1.6 The strategic programme in **Figure 7.3** shows the results of an analysis of the material percentage usage for each of the key construction activities.

Figure 7.3: Strategic Programme Showing the Outline Material Percentage Use by Year for Key Activities



7.1.7 The materials usage profiles for the HPC development site and other off-site associated developments are shown in **Figure 7.4** and **Figure 7.5** (these include materials arising during the removal of the temporary associated developments).

Figure 7.4: Material Usage Profile (for developments which affect traffic on the C182)

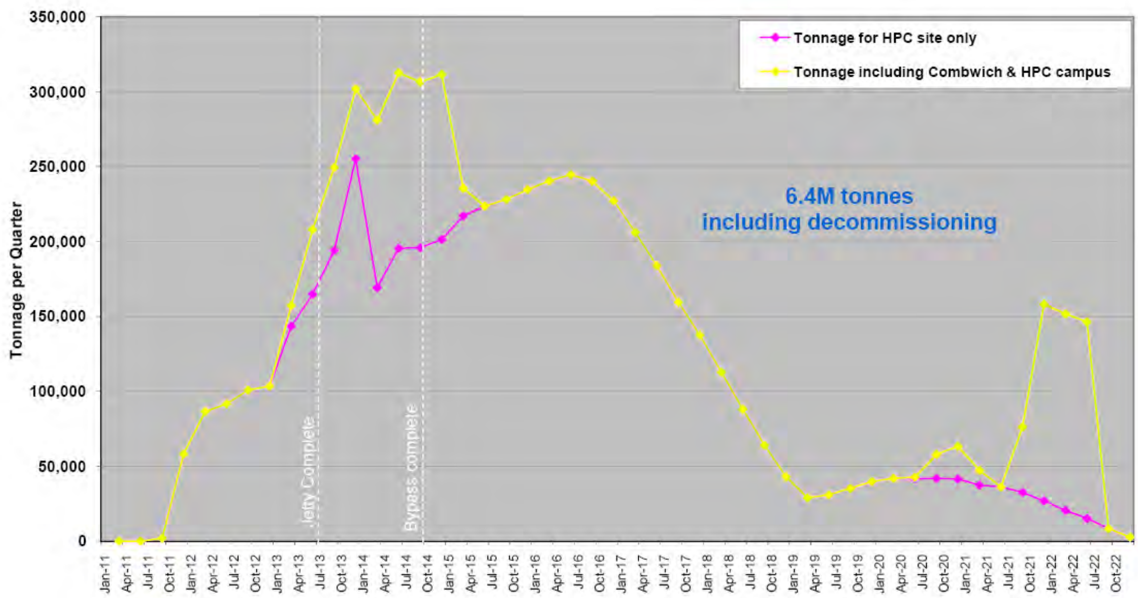
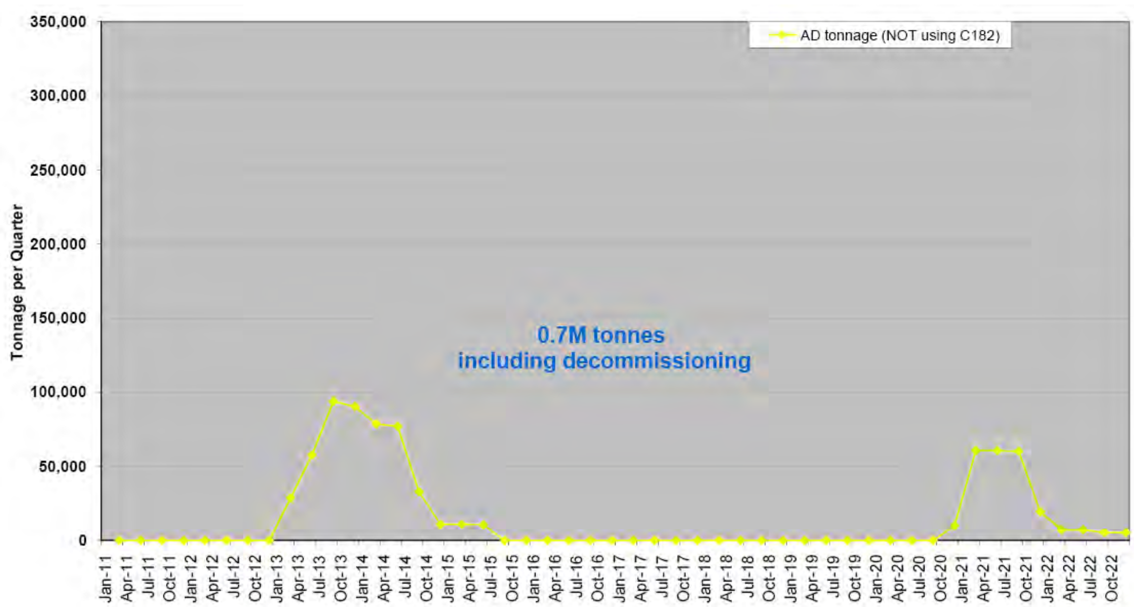


Figure 7.5: Material Usage Profile (for developments which do not affect traffic on the C182)



7.1.8 The road/water split for the **6.4 million** tonnes of materials required for the developments which affect traffic on the C182 is as follows (see **Figure 7.6** and **Figure 7.7**):

- **4.1 million** tonnes by road. For the reasons set out earlier, these are conservative assumptions for the purpose of transport modelling.
- **2.3 million** tonnes by water (deliveries by water would commence once the temporary jetty becomes operational in Quarter 3 2013).

7.1.9 The **0.7 million** tonnes for other developments which do not affect traffic on the C182 will be transported by road.

Figure 7.6: HPC Material Usage Profile (by road freight)

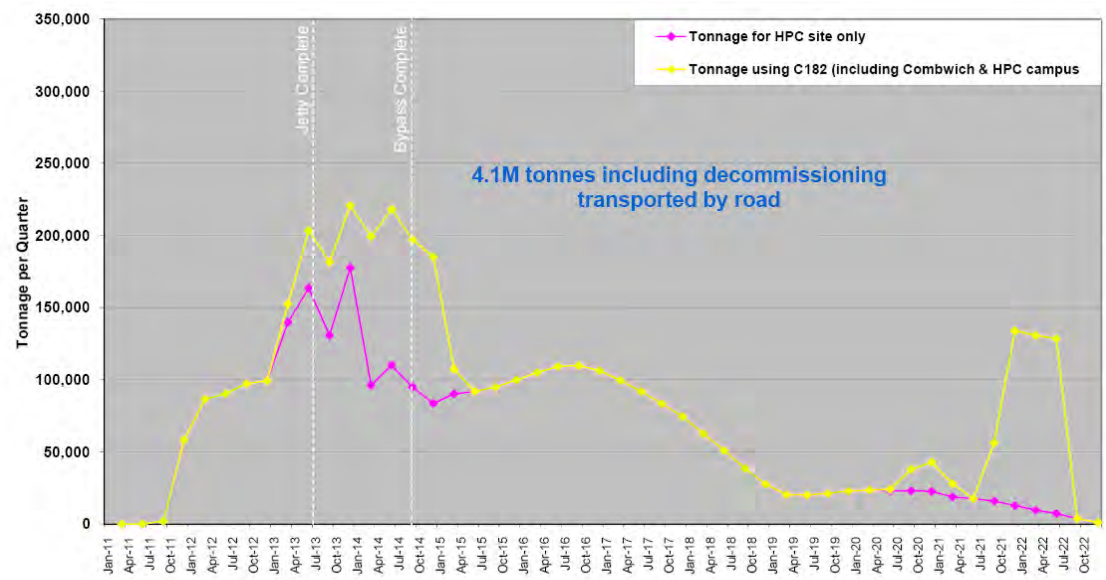
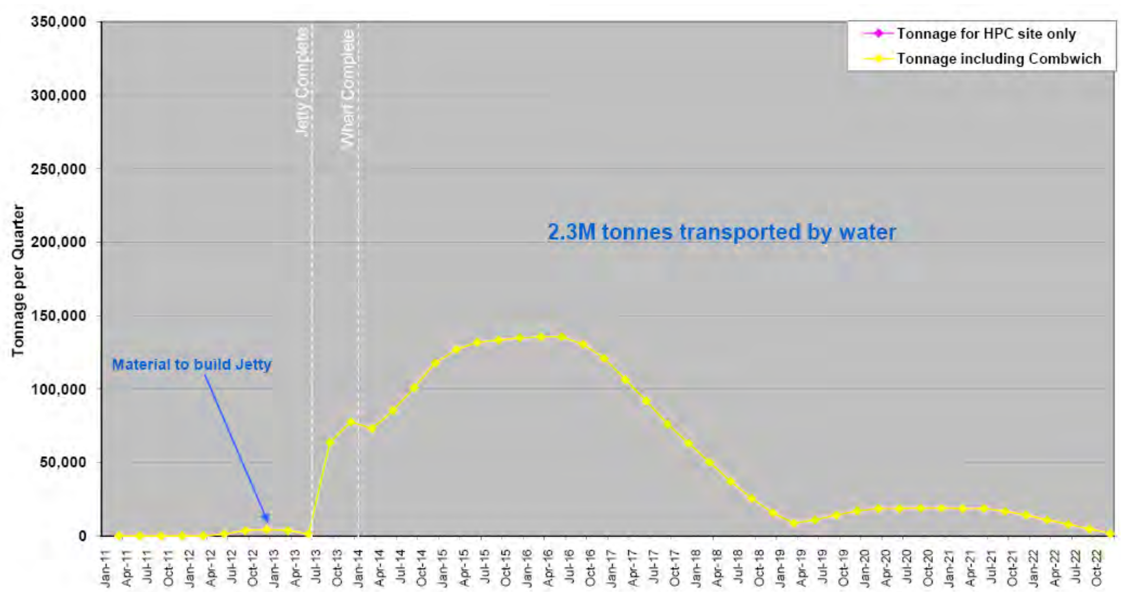


Figure 7.7: HPC Material Usage Profile (by water freight)



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8. FREIGHT TRAFFIC

8.1 Overview

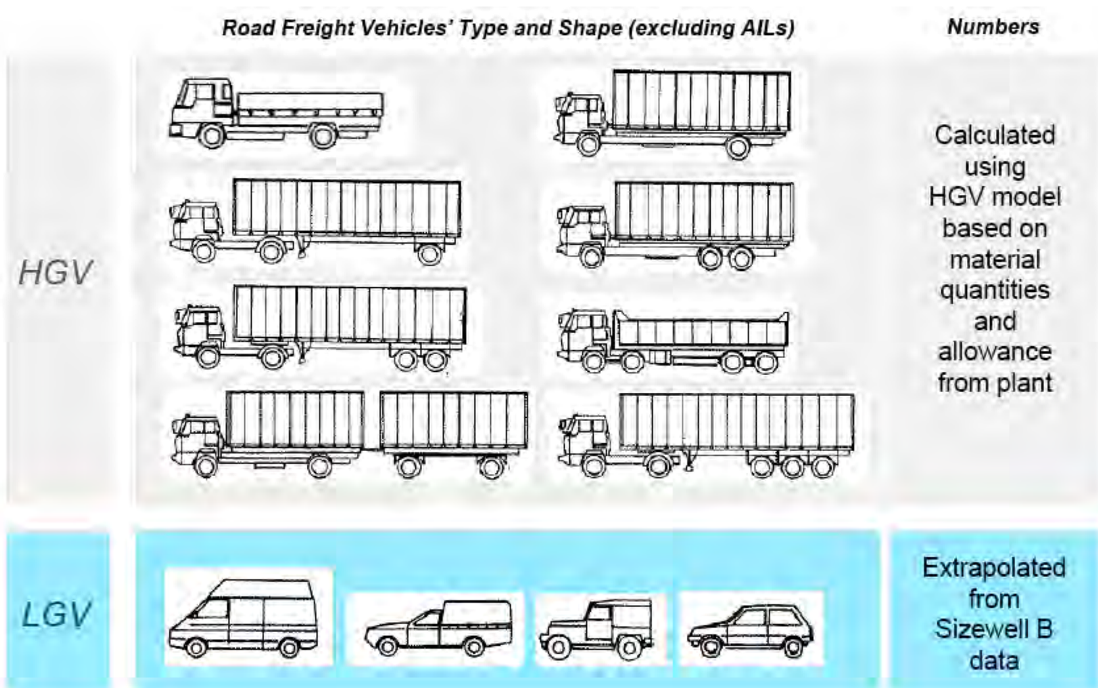
8.1.1 For the purpose of quantifying freight traffic for the HPC Project the freight vehicles associated with the construction of the HPC Project have been categorised as follows:

- HGVs: all vehicles exceeding a maximum gross weight of 3.5 tonnes (maximum allowable total weight when loaded). These include medium goods vehicles (maximum gross weight between 3.5 and 7.5 tonnes) and heavier with 2 or more axles.
- LGVs: vans, pickups, 4x4s and cars with a maximum gross weight of 3.5 tonnes.

8.1.2 It has been assumed that the construction materials, plant and equipment for the HPC Project will be transported by HGVs whilst LGVs will be used for transporting food and consumables, small items and specialist tools/equipment. LGVs will also include contractors' fleet vehicles.

8.1.3 The number of HGVs has been calculated using a bespoke model based on the estimated construction material and plant usage for the HPC Project. As the number of LGVs is not directly dependent on the tonnage/volume of material usage for the project, an assumption has been made by extrapolating the number of LGVs required to construct the Sizewell B project.

Figure 8.1: Road Freight Vehicles summary table (*)



(*) type of vehicles is illustrative only and do not include all type of freight vehicles available in market

8.2 Heavy Goods Vehicles (HGVs)

8.2.1 The model for assessing the number of HGVs to and from the HPC development site during the construction period is based on the material tonnage and distribution as shown in **Figure 7.6** (material usage profile by road freight), together with the average payload of each vehicle used to transport the material.

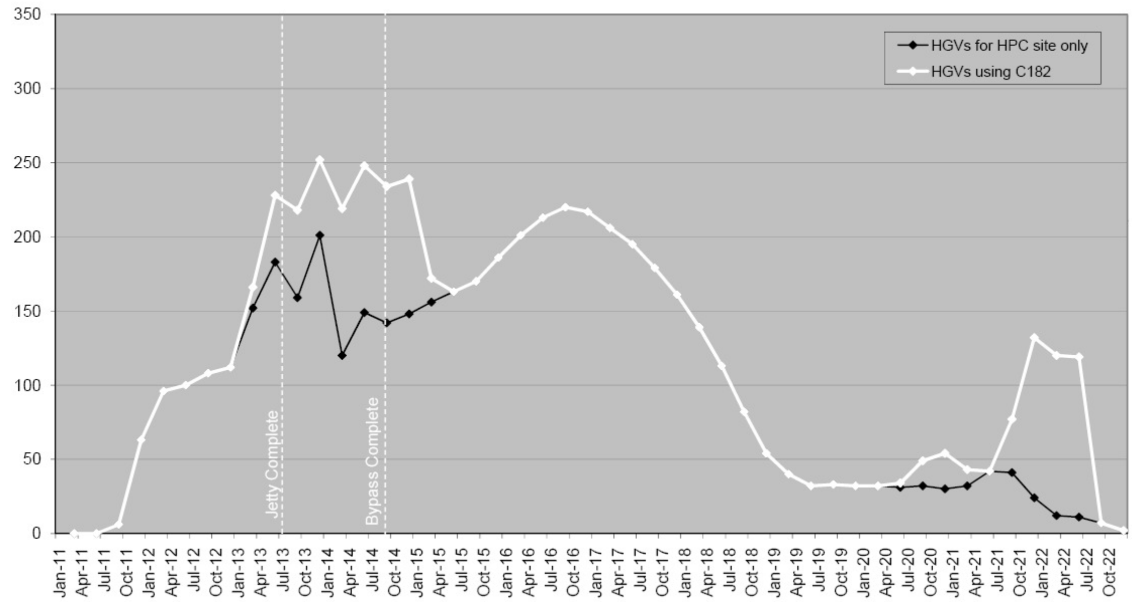
8.2.2 Most multi-axle HGVs have payloads ranging between 20-25 tonnes with some vehicles able to transport up to 30 tonnes or more. The average payloads considered in the model **(Table 8.1)** are based on experience on other projects and take into account of the possibility of "less than full" loads and low weight-high volume items therefore providing a conservative estimate of the road freight traffic (AILs generally require special vehicles with higher carrying capacity therefore are not included in the table).

Table 8.1: Average Payloads

Bitumen, road & networks	**15t**
Cement, aggregate, sand, PFA	**18t**
Precast concrete for sea wall	**12t**
Reinforcement	**18t**
Temporary jetty precast	**10t**
Prefabricated cooling pipe elements	**8t**
Scaffolding and formwork	**5t**
Civil equipment	**10t**
Ancillary building precast	**10t**
Plates & inserts	**5t**
Structural steelwork	**15t**
Steel piling	**8t**
Doors	**3t**
Drainage	**5t**
Water mains	**3t**
Pipework and support	**5t**
Ducting	**3t**
Cables	**5t**
Plant	**10t**
Civil waste	**12t**
Other waste	**4t**
Polluted waste	**3t**
Miscellaneous	**5t**

8.2.3 The number of HGVs increases at the start of the main civil works at the beginning of 2013 to reach approximately an average of 250 vehicles per day (500 movements) in Quarter 4 2013. The number of HGVs drops in 2015 then rises again in 2016/17 to an average of 220 vehicles per day (440 movements) as shown in **Figure 8.2**. This figure includes the AILs travelling from Combwich, together with an allowance for construction equipment and temporary facilities, assumed to be 5% of the total vehicle movements for construction plant.

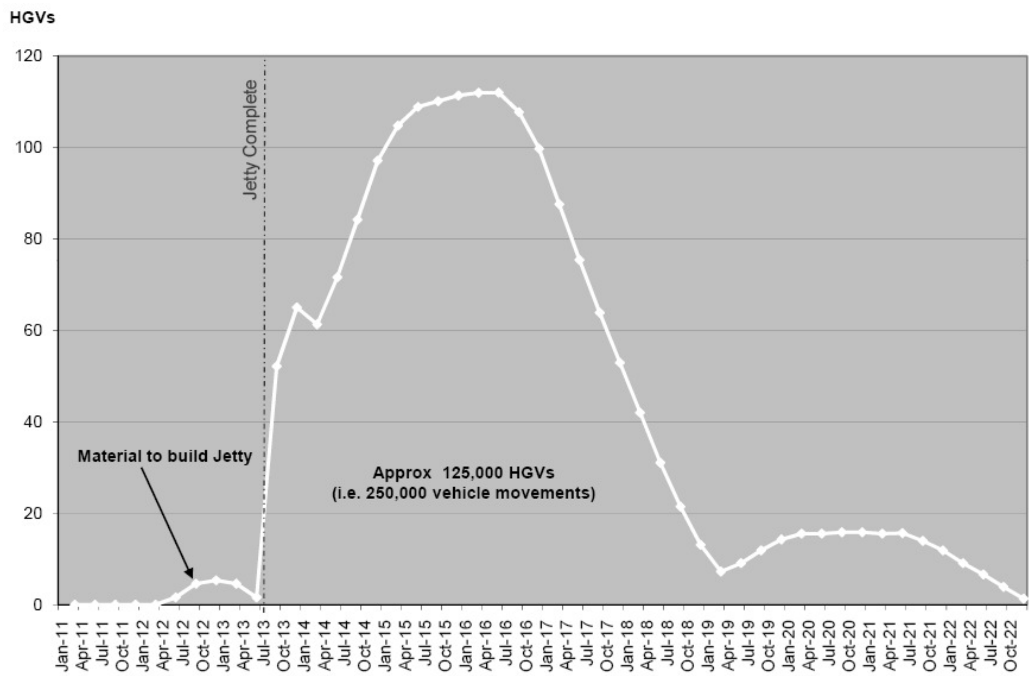
Figure 8.2: Delivery Forecast Summary (average HGVs per day – one way)



8.2.4 The numbers of HGVs shown in **Figure 8.2** represents the average number of HGVs per day over each period of three months. In reality the number of HGVs per day will fluctuate around the average figure depending on the type of on-site activities and delivery requirements. It is considered that a factor of ±50% applied to the average will provide an adequate range to cater for these variations e.g. an average of 250 HGVs per day(500 movements) over a quarter may result in a number of HGVs per day varying between 125 (250 movements) and 375 (750 movements).

8.2.5 **Figure 8.3** shows the number of HGVs taken off the road by using the temporary jetty. This equals a total of 125,000 HGVs throughout the entire construction phase (250,000 movements) and a potential "saving" of up to 110 HGVs per day (220 movements). The profile prior to July 2013 reflects the proportion of materials for construction of the jetty which are delivered by sea.

Figure 8.3: HGVs Taken Off the Road using the Temporary Jetty (one way)



8.2.6 The traffic flow of HGVs will vary throughout the day and the anticipated profile shown in **Table 8.2** and **Figure 8.4** below is based on:

- minimising the volume of construction traffic between 08:00 and 09:00 and 17:00 and 18:00 (network peak hours);
- no freight traffic on the local road network after 22:00 or before 07:00;
- arrival profile based on experience from other projects where the majority of goods is delivered in the morning and early afternoon with limited numbers after 15:00/16:00; and
- departure profile based on: 25% of HGVs leaving the HPC development site within an hour of arrival, 25% within two hours, 25% within three hours and 25% within four hours.

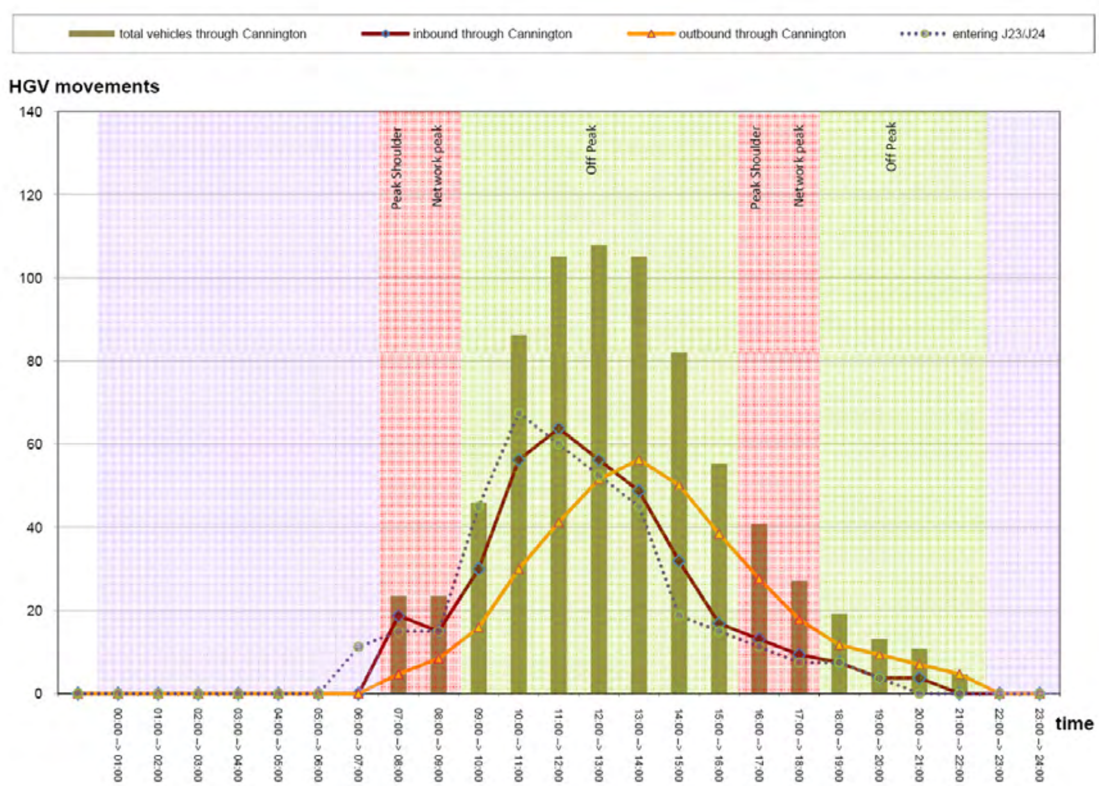
8.2.7 **Table 8.2** and **Figure 8.4** are based on 375 HGVs/day (750 movements) which represent the highest number of HGV movements anticipated during the busiest day of the peak quarter period (based on an average of 250 HGVs/day during the quarter). As noted earlier these HGV movements are also derived from conservative assumptions on the use of sea deliveries for construction materials and on payloads per HGV. As such the figures in these tables represent very much a worst case assessment and on the large majority of weekdays during the construction programme HGV flows will be lower. **Table 8.3** and **Figure 8.5** illustrate the assumed daily profile on a typical Saturday.

Table 8.2: Number of HGVs through Cannington/via the Bypass throughout the Day (peak day in the peak quarter)

Time	% of HGVs entering J23 or J24 per hour	cumulative	Number of HGVs entering J23 or J24 per hour	% of inbound HGVs through Cannington per hour	cumulative	Number of inbound HGVs through Cannington per hour	% of outbound HGVs through Cannington per hour	cumulative	Number of outbound HGVs through Cannington per hour	total number of inbound+outbound HGVs through Cannington per hour
00:00 --> 01:00	0%		0	0%		0	0%		0	0
01:00 --> 02:00	0%		0	0%		0	0%		0	0
02:00 --> 03:00	0%		0	0%		0	0%		0	0
03:00 --> 04:00	0%		0	0%		0	0%		0	0
04:00 --> 05:00	0%		0	0%		0	0%		0	0
05:00 --> 06:00	0%		0	0%		0	0%		0	0
06:00 --> 07:00	3%	3%	11	0%	0%	0	0%	0%	0	0
07:00 --> 08:00	4%	7%	15	5%	5%	19	1%	1%	5	23
08:00 --> 09:00	4%	11%	15	4%	9%	15	2%	4%	8	23
09:00 --> 10:00	12%	23%	45	8%	17%	30	4%	8%	16	46
10:00 --> 11:00	18%	41%	68	15%	32%	56	8%	16%	30	86
11:00 --> 12:00	16%	57%	60	17%	49%	64	11%	27%	41	105
12:00 --> 13:00	14%	71%	53	15%	64%	56	14%	41%	52	108
13:00 --> 14:00	12%	83%	45	13%	77%	49	15%	56%	56	105
14:00 --> 15:00	5%	88%	19	9%	86%	32	13%	69%	50	82
15:00 --> 16:00	4%	92%	15	5%	90%	17	10%	79%	38	55
16:00 --> 17:00	3%	95%	11	4%	94%	13	7%	87%	28	41
17:00 --> 18:00	2%	97%	8	3%	96%	9	5%	91%	18	27
18:00 --> 19:00	2%	99%	8	2%	98%	8	3%	94%	12	19
19:00 --> 20:00	1%	100%	4	1%	99%	4	3%	97%	9	13
20:00 --> 21:00	0%		0	1%	100%	4	2%	99%	7	11
21:00 --> 22:00	0%		0	0%		0	1%	100%	5	5
22:00 --> 23:00	0%		0	0%		0	0%		0	0
23:00 --> 24:00	0%		0	0%		0	0%		0	0
Totals	100%		375	100%		375	100%		375	750

Key (row colours):
- Off Peak
- Network Peak
- No traffic through Cannington

Figure 8.4: HGV Daily Profile (based on HGVs on the C182)



8.2.8 The number of HGVs per hour to/from HPC varies depending on whether they are counted at Junction 23/Junction 24, Cannington or at the HPC development site. HGVs will be allowed to arrive at the freight management facilities at Junction 23 and Junction 24 from 05:30 but they will not leave the facilities before 07:00. Between 07:00 and 09:00 the number of vehicles leaving the freight management facilities will be limited to minimise the impact on the road network. The large proportion of HGVs will be dispatched from the freight management facilities between 09:00 and 16:00 with the peak expected between 10:00 and 14:00. After 16:00 it is envisaged that the number of deliveries to HPC will be nominal.

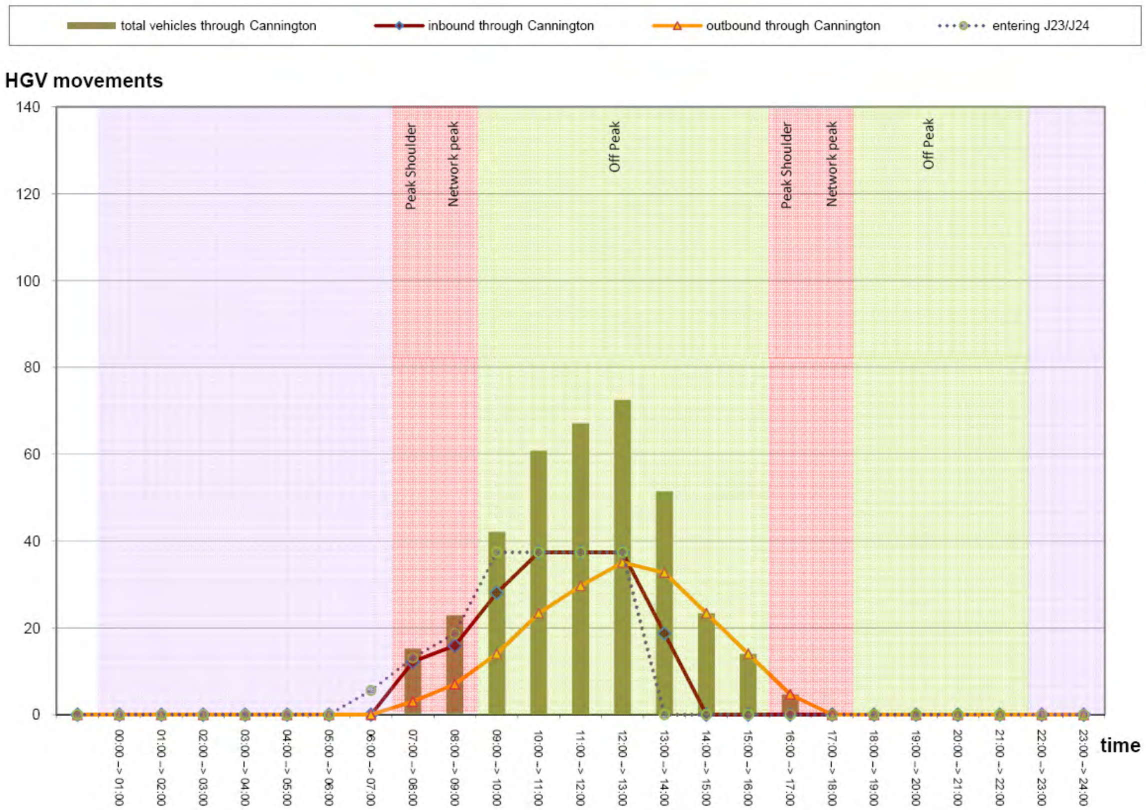
8.2.9 The number of HGVs leaving HPC is a function of the arrival profile and of the length of time that each HGV will be on site. HGVs arriving at HPC will exceed the HGVs leaving site up until 12:00-13:00 when the trend will reverse and the number of HGVs leaving will be higher than the ones arriving to site. The HGVs departure flow between 07:00 and 09:00 will be nominal as the number of HGVs arriving and leaving early is low. The number will increase between 09:00 and 12:00 peaking between 12:00 and 15:00. Between 16:00 and 18:00 the cumulative number of HGVs arriving/leaving site will be higher than the cumulative number of vehicles arriving/leaving between 07:00 and 09:00 making the afternoon flow more onerous on the network than the morning peak.

Table 8.3: Number of HGVs through Cannington via the C182/Bypass on Saturday

Time	% of HGVs entering J23 or J24 per hour	cumulative	Number of HGVs entering J23 or J24 per hour	% of inbound HGVs through Cannington per hour	cumulative	Number of inbound HGVs through Cannington per hour	% of outbound HGVs through Cannington per hour	cumulative	Number of outbound HGVs through Cannington per hour	total number of inbound+outbound HGVs through Cannington per hour
00:00 --> 01:00	0%		0	0%		0	0%		0	0
01:00 --> 02:00	0%		0	0%		0	0%		0	0
02:00 --> 03:00	0%		0	0%		0	0%		0	0
03:00 --> 04:00	0%		0	0%		0	0%		0	0
04:00 --> 05:00	0%		0	0%		0	0%		0	0
05:00 --> 06:00	0%		0	0%		0	0%		0	0
06:00 --> 07:00	3%	3%	6	0%	0%	0	0%	0%	0	0
07:00 --> 08:00	7%	10%	13	7%	7%	12	2%	2%	3	15
08:00 --> 09:00	10%	20%	19	9%	15%	16	4%	5%	7	23
09:00 --> 10:00	20%	40%	37	15%	30%	28	8%	13%	14	42
10:00 --> 11:00	20%	60%	37	20%	50%	37	13%	25%	23	61
11:00 --> 12:00	20%	80%	37	20%	70%	37	16%	41%	30	67
12:00 --> 13:00	20%	100%	37	20%	90%	37	19%	60%	35	72
13:00 --> 14:00	0%	100%	0	10%	100%	19	18%	78%	33	51
14:00 --> 15:00	0%	100%	0	0%	100%	0	13%	90%	23	23
15:00 --> 16:00	0%	100%	0	0%	100%	0	8%	98%	14	14
16:00 --> 17:00	0%	100%	0	0%	100%	0	3%	100%	5	5
17:00 --> 18:00	0%	100%	0	0%	100%	0	0%	100%	0	0
18:00 --> 19:00	0%	100%	0	0%	100%	0	0%	100%	0	0
19:00 --> 20:00	0%	100%	0	0%	100%	0	0%	100%	0	0
20:00 --> 21:00	0%		0	0%	100%	0	0%	100%	0	0
21:00 --> 22:00	0%		0	0%		0	0%	100%	0	0
22:00 --> 23:00	0%		0	0%		0	0%		0	0
23:00 --> 24:00	0%		0	0%		0	0%		0	0
Totals	100%		187	100%		187	100%		187	374

Off Peak
Network Peak
No traffic through Cannington

Figure 8.5: HGV Daily Profile on Saturday (based on HGVs on the C182)



8.2.10 In order to limit and control the number of HGVs relating to deliveries to the HPC development site and Combwich, EDF Energy proposes to cap the number of these movements as follows:

- a maximum limit of 750 HGV movements (Monday to Friday); and
- a maximum limit of 375 HGV movements (Saturdays).

8.2.11 These limits will be applied to HGV movements on the C182 Rodway north of Cannington and at the location of the junction of the C182 with the new Cannington bypass.

8.2.12 In addition it is proposed that the HGV movements on the HGV routes through Bridgwater will be subject to the following limits:

- a one day maximum limit of 450 movements on HGV Route 1 (Monday - Friday); and
- a one day maximum limit of 300 movements on HGV Route 2 (Monday – Friday).

The effect of these proposed limits is to enforce a balanced use of the two HGV routes through Bridgwater. The limit for HGV Route 1 will be applied to movements on the Northern Distributor Road and the limit for HGV Route 2 will be applied on the A39, west of the Taunton Road/Broadway Junction.

8.2.13 HGV movements will be subject to an additional limit that the number of HGV movements will not exceed an average of 500 movements per day in any given quarter. The HGVs calculation is based on 265 working days per year (66.25 working days per quarter). This includes weekdays plus Saturday (counted as half day in terms of productivity for the delivery of materials and goods) less industry Christmas and Easter breaks and other bank holidays. An average of 250 HGVs per day would therefore equal to a maximum of 16,562 HGVs per quarter (33,124 movements).

8.2.14 In addition to the limits on the number of HGV movements set out above, it is proposed that the movement of HGVs will be subject to the following timing constraints:

- There will be no HGV movements on the local highway network between the hours of 22:00 and 07:00.
- Morning peak hour HGV movements (08:00 – 09:00) on the local highway network to the HPC development site and Combwich will be limited to 30 movements and evening peak hour (17:00 - 18:00) movements will be limited to 45 movements. These limits will apply Monday to Friday and at the locations defined in paragraph 8.2.11 above.
- There will be no HPC construction-related HGV movements on the local highway network on Sundays or on Bank Holidays.

8.2.15 As noted in Section 6.6 it is proposed to monitor and report on the flow of HGVs: as they leave the freight management facilities at Junction 23 and Junction 24 for inbound traffic, at HPC for outbound traffic and along the permitted HGV routes to ensure compliance with these caps (See Section 6.7 on the DMS).

8.2.16 There are a range of exceptional circumstances in which it may be necessary to disapply some of the limits proposed above. Such circumstances could include an emergency response requiring an HGV movement after 22:00 or before 07:00 or a major traffic incident preventing use of the proposed HGV routes to the HPC development site.

8.2.17 It is proposed to address these exceptional circumstances through a Traffic Incident Management Plan. This will set out in more detail the kinds of circumstances in which it may be necessary to disapply any of the limits and the mechanisms which may need to be in place to agree these with the relevant authority.

8.3 Light Goods Vehicles (LGVs)

8.3.1 The potential number of LGV deliveries to the HPC development site throughout the construction period has been estimated at approximately 220,000 (440,000 movements).

8.3.2 This is based on data from the construction of the power station at Sizewell B (single unit), which has been adjusted to take into account the additional unit at HPC and different construction characteristics between the projects.

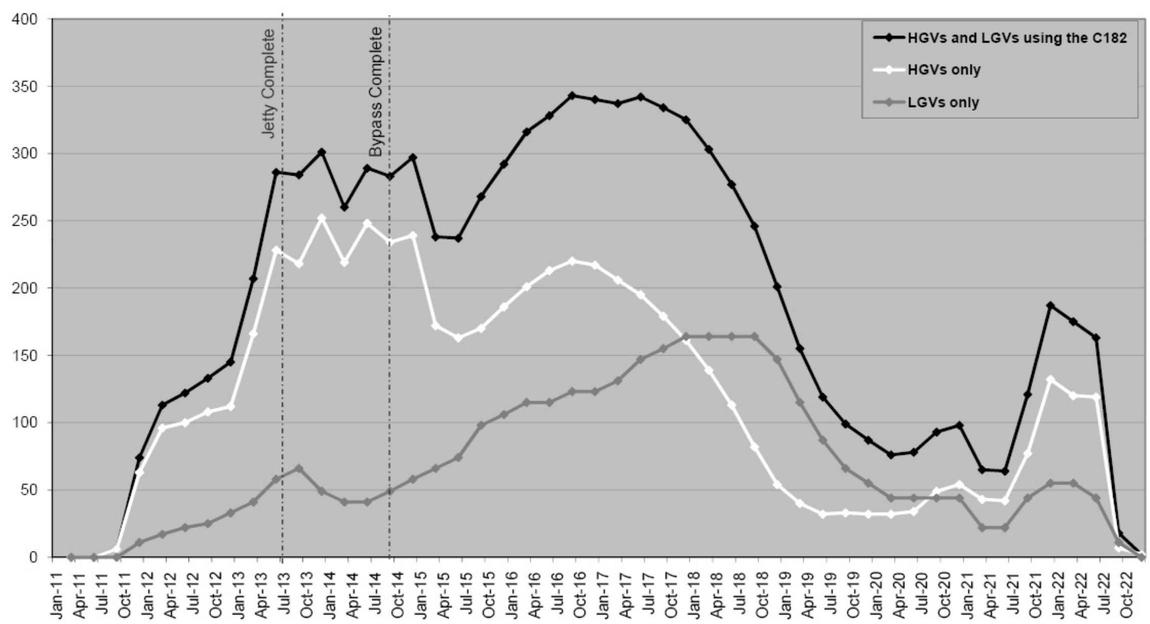
8.3.3 As it is understood that no specific measures were introduced at Sizewell B to reduce and control the number of LGVs to and from site, it is reasonable to assume that 220,000 is a conservative figure for the purpose of transport modelling.

8.3.4 The volume of LGV traffic will be minimised and monitored as noted in Section 6 although LGVs will not be required to: book deliveries via the DMS, transit at the freight management facilities or comply with HGV routes. The introduction of postal/courier consolidation at Junction 23 (temporarily at Junction 24 before Junction 23 becomes operational), which has been proven effective on other projects, is likely to considerably reduce the number of LGV journeys to the HPC development site.

8.3.5 The profile for LGVs shown in **Figure 8.5** is based on the activities included in the strategic programme (see **Figure 7.1**) together with experience of the associated LGV distribution on other large projects. The average LGVs per day over a quarter is estimated to reach approximately 170 (340) movements during the period 2018/19. The daily profile will generally follow the HGV profile shown in **Figure 8.4**.

8.3.6 The average number of HGVs plus LGVs deliveries per day to the HPC development site reaches approximately 350 (700 movements) in 2016/17.

Figure 8.6: Delivery Forecast Summary (average HGVs + LGVs per day – one way)



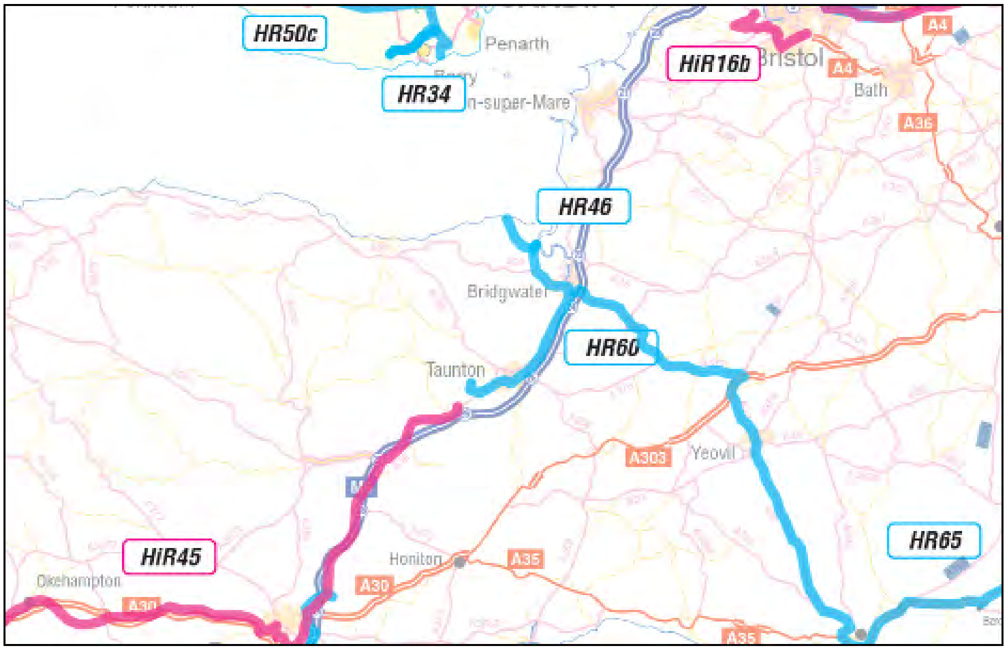
8.4 Abnormal Indivisible Loads (AILs)

8.4.1 As noted in Section 6.3, the largest AILs would be transported by water to Combwich Wharf. Freight traffic would also include a number of smaller AILs that will not be transported via Combwich Wharf but will be dispatched by road instead.

8.4.2 It is anticipated that these smaller AILs will be delivered to the HPC development site on low loader combinations, unescorted (as the maximum width, length and weight fall within limits prescribed by The Road Vehicles (Authorisation of Special Types) Order 2003 as requiring a police escort).

8.4.3 The Highways Agency, in partnership with local highway authorities and the police, has identified national routes that are suitable for heavy loads and classified them by weight capacity. **Figure 8.7** details the two routes that make up the passage from the HPC development site to the M5 motorway namely; Heavy Route 46 (HR46) from Combwich to the HPC development site and Heavy Route 60 (HR60) from Combwich to Taunton. Both routes were approved for AIL transport in 2006.

Figure 8.7: AILs Routes to HPC



8.4.4 HR46 from Combwich Wharf to the site has a weight group of B, which equates to a maximum 280T over 12 axles or 315T over 14 axles. HR60 from Combwich to Taunton has a weight group of E, which equates to a maximum 259T over 12 axles or 294T over 14 axles.

8.4.5 Hauliers are legally required to give a minimum of 2 full days notice to the police, highway authorities and Road and Bridge authorities before moving the load. It is proposed to use the HA's 'Electronic Service Delivery for Abnormal Loads' (ESDAL) system, an electronic service that simplifies the process of notifying abnormal load movements. ESDAL will be used by EDF Energy and its suppliers to deliver fully compliant notifications to the relevant organisations (i.e. HA, SCC and police) of the details of the AIL deliveries before the movements are made.

8.4.6 Currently a full listing for the smaller AILs is not available as the number and nature will depend on future choices of contractor. However, EDF Energy expects the road-borne AILs to be suitable for transport on the strategic road network, using ESDAL.

8.5 HGVs via Combwich Wharf and Freight Laydown Facility

a) HGVs Generated by Water Deliveries at Combwich Wharf

8.5.1 The vehicle movements generated by water deliveries at Combwich Wharf would depend on the type of materials and mode of transport. Three main scenarios have been identified:

1. Day with no deliveries to the Wharf therefore nil or very limited vehicle movements (e.g. only vehicles for maintenance, operatives, security, etc.).

2. Day with delivery of AIL – likely to be single movement per day of large component with special trailers plus limited vehicle movement for operatives. This includes temporarily stored at the freight laydown facility.

3. Day with delivery of other construction goods – the number of vehicle movements will vary depending on the vessel capacity and transport mode (RoRo or LoLo). For RoRo the determining factor will be the number of HGVs and construction plant that can be accommodated on each barge (e.g. 15 HGVs on a flat top 60x30 barge = 30 HGV movements - assuming that the HGVs will leave by barge). For LoLo the number of vehicles will depend on the tonnage and volume of materials transported (e.g. 500t of reinforcement bars would require 25 HGVs = 50 HGV movements in a day – assuming that HGVs return to the wharf after unloading at the freight laydown facility).

8.5.2 Depending on construction and space requirements, loaded vehicles leaving Combwich Wharf may dispatch either to the freight laydown facility or go directly to the HPC development site.

8.5.3 The HGV profile in **Figure 8.2** already includes the number of vehicle movements generated by water deliveries at Combwich Wharf as it is based on the conservative assumption that only the largest AILs will be delivered at the Wharf.

b) HGVs Generated by the Use of the Freight Laydown Facility

8.5.4 Materials stored at the freight laydown facility include water borne deliveries and potentially road deliveries via Junction 23 and Junction 24. Road deliveries will normally be dispatched directly to the HPC development site although the freight laydown facility may be used in cases of space shortage on site.

8.5.5 There is the possibility that some materials would be broken down into smaller deliveries at the freight laydown facility for contractor's collection as and when required. As a consequence one such HGV delivery to Combwich freight laydown facility would require multiple smaller vehicles to HPC. It has been estimated that an average of 150 vehicles per day will be required to dispatch materials from the freight laydown facility to HPC (with a daily peak of 200 vehicles). This is considered to be a conservative assumption as it would be more efficient for contractors to break down deliveries at HPC whilst only temporarily dispatching full loads at Combwich.

8.5.6 It should be noted that the HGV profile in **Figure 8.2** already includes all materials delivered via the C182. As a consequence only a proportion of the 150 vehicles per day are not accounted for in the HGV profile. This is due to the possibility to break down materials at the freight laydown facility into smaller deliveries as described above.

8.6 HGVs Generated by the Associated Developments.

8.6.1 The total number of HGVs generated by the construction and post-operation of the associated developments are shown in **Table 7.1**.

8.6.2 **Table 8.3** illustrates the average and peak number of HGVs per day required for each facility during the peak quarter. These are calculated by applying the general distribution illustrated in **Figure 7.1** and considering a ±50% factor for fluctuations around average values.

Table 8.3: HGV movements required for the construction of the associated developments (not affecting the C182)

SITE	Total HGVs From Table 7.1	20% Conting-ency From Table 7.1	Total HGVs Including Conting-ency	Timing in Quarters	Worst Quarters	Average HGV/ Day Worst Quarters	Average Mov./ Day Worst Quarters	Peak Mov./ Day Worst Quarters
Bridgwater A – Phase 1	4,302	860	5,162	5	Q3/Q4 2013	23	47	70
Bridgwater A – Phase 2	5,258	1,052	6,310	9	Q1/Q2 2014	16	32	48
Bridgwater C	1,836	367	2,203	4	Q2/Q3 2013	12	25	37
Junction 23 P&R and Freight	6,317	1,263	7,580	4	Q4 2013 Q1 2014	43	86	129
Junction 24 P&R and Freight	1,602	212	1,274	2	Q1/Q2 2013	14	29	43
Cannington P&R	1,310	262	1572	3.5	Q2/Q3 2013	10	20	31
Williton P&R	875	175	1,050	3	Q2/Q3 2013	8	16	24
Cannington Bypass	5,658	1,132	6,790	6	Q3/Q4 2013 Q1 2014	26	51	77

8.6.3 In addition it has been assumed that during the construction of the associated development sites, the number of LGVs will be the same as the number of HGVs each day.

9. CONCLUSIONS

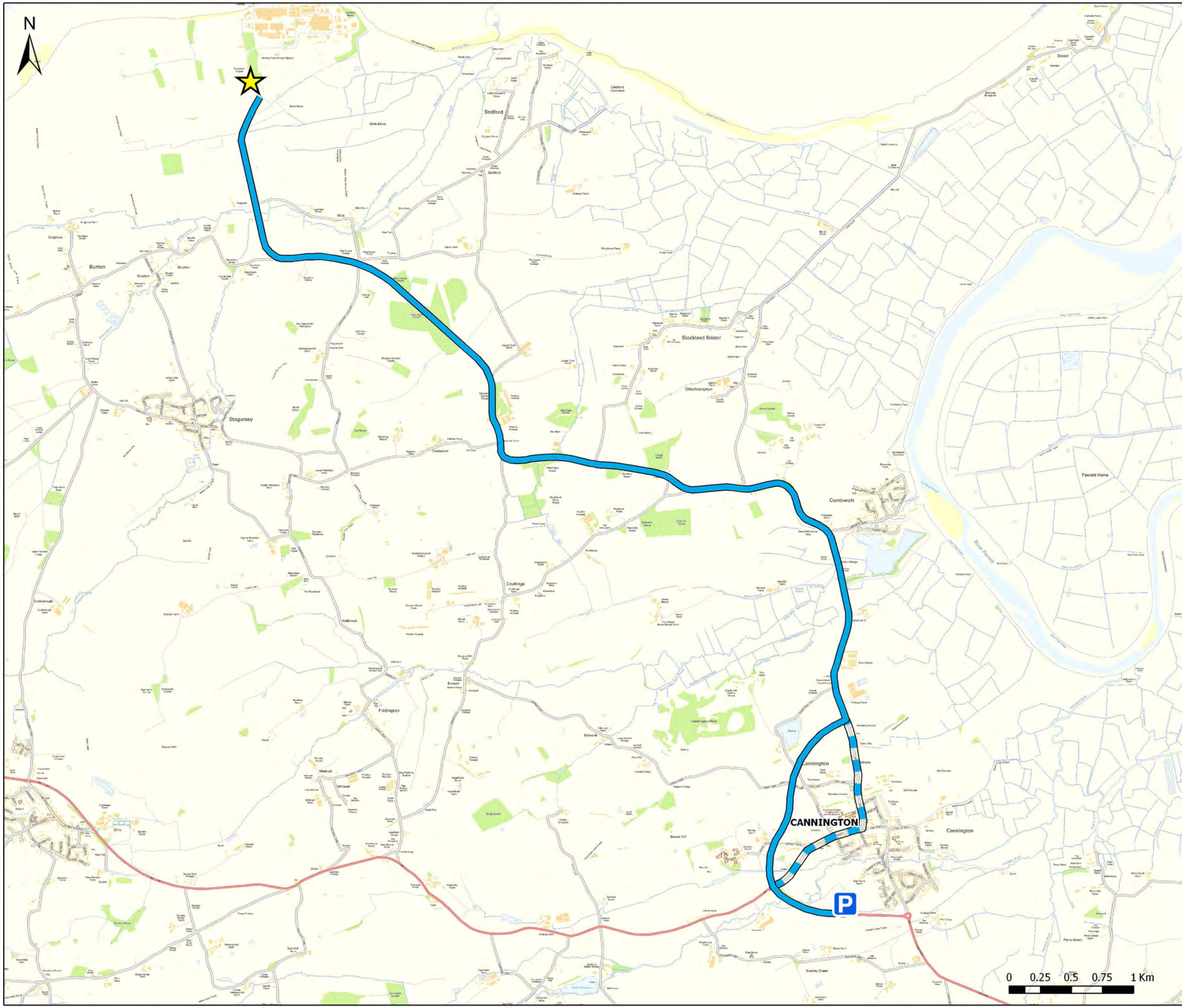
9.1.1 The FMS provides an overview of the proposed freight management measures and assesses material quantities, modes of transport and determines the resulting freight traffic.

9.1.2 The strategy shows that the use of water deliveries via the jetty and Combwich Wharf avoid a substantial volume of road freight traffic via Bridgwater and Cannington and that road freight deliveries will be efficiently managed via dedicated freight management facilities and a web-based delivery management system.

9.1.3 Road freight traffic is calculated on the basis of a conservative estimate of construction materials and payloads and on a “less than full” utilisation of the jetty and wharf. This approach offers robust HGV results and provides satisfactory margins to cope with the uncertainties typical of a project of this scale and duration.

9.1.4 This FMS is the result of a number of consultations and discussions with the relevant authorities and the public and the holistic effort between a number of stakeholders and disciplines. It proposes freight management measures that meet or exceed best practice solutions adopted on other large construction projects.

APPENDIX 12.1: BUS ROUTE PLANS



Legend

- ★ Site Location
- P Cannnington Park and Ride
- Bus Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Project:
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Drawing Title:
Cannington Park and Ride Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/04/10	KM	21/04/10	ASG	21/04/10

Project No.	Office	Type	Drawing No.	Revision
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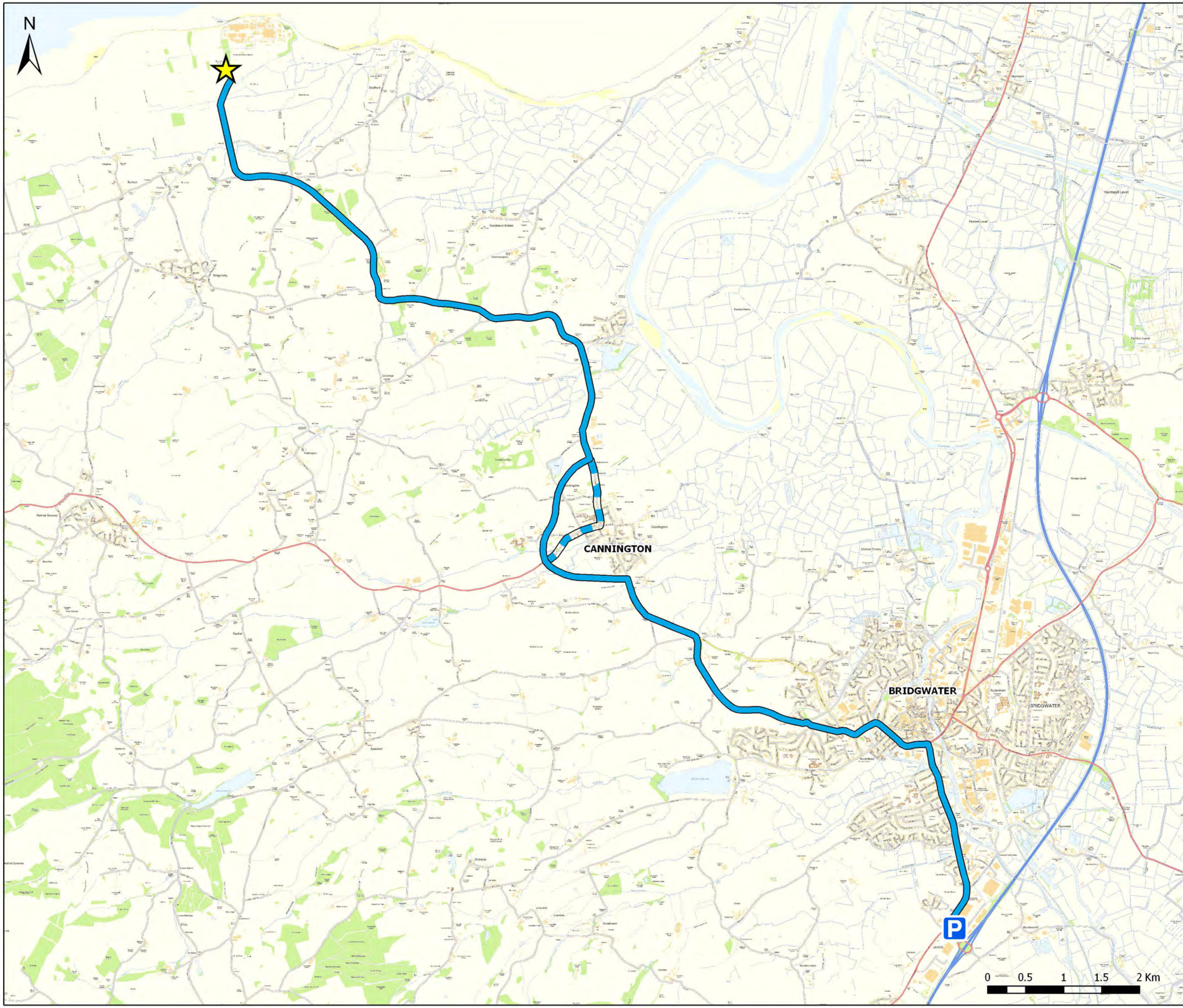

Legend

- Site Location
- J24 Park and Ride
- Bus Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Drawing Title:
J24 Park and Ride Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/04/10	KM	21/04/10	ASG	21/04/10

Project No.	Office	Type	Drawing No.	Revision
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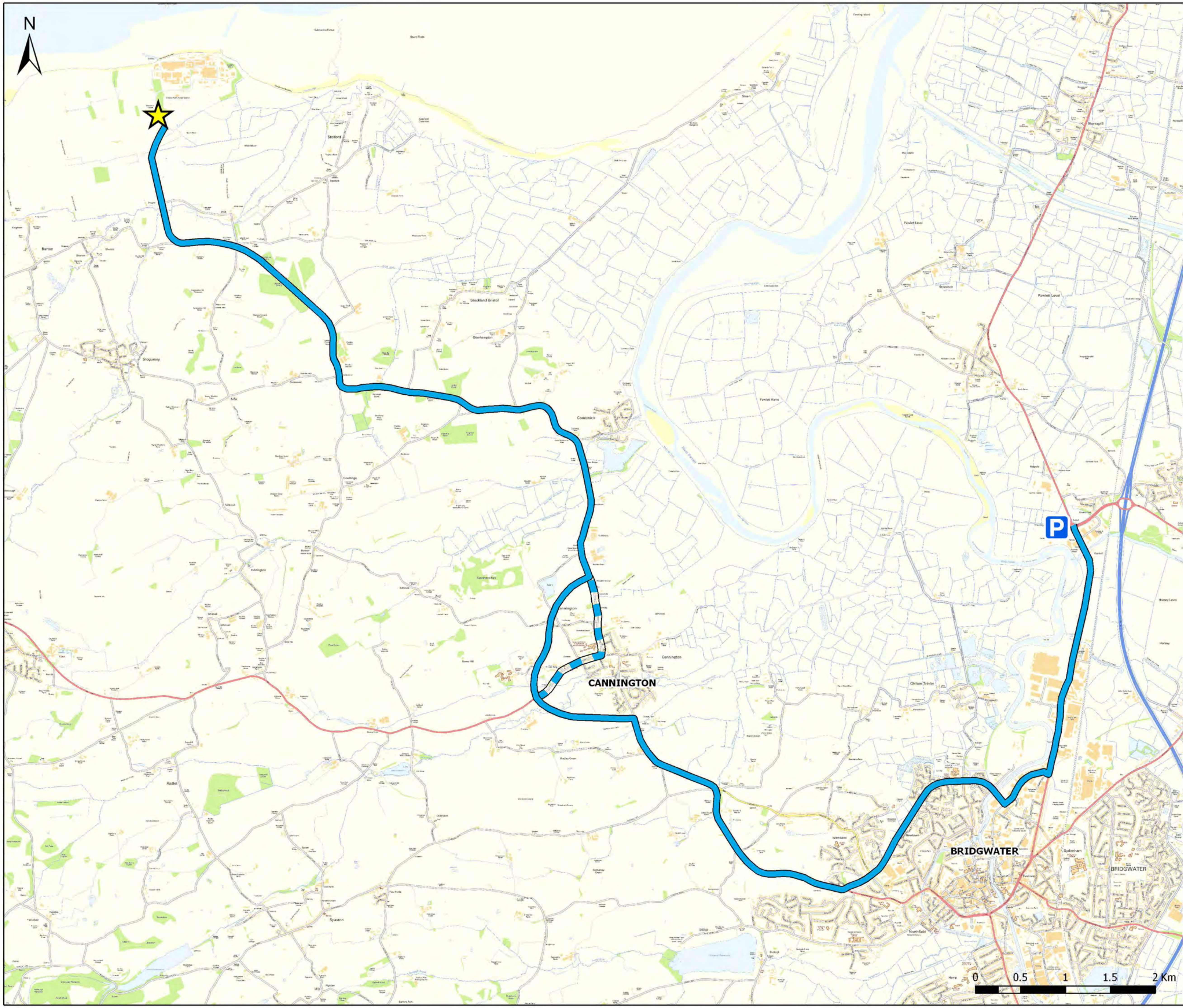

Legend

- Site Location
- J23 Park and Ride
- Bus Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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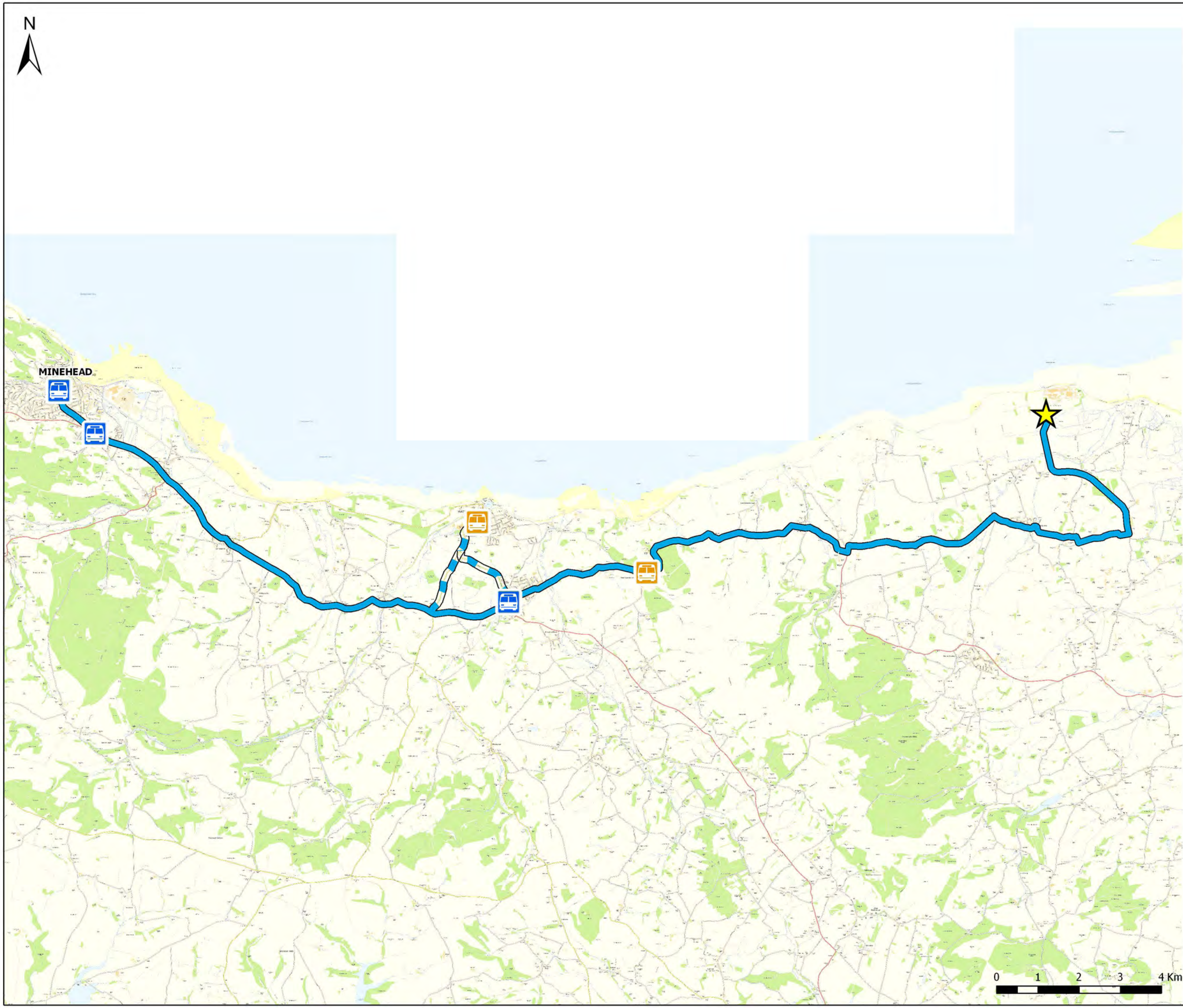
Drawing Title:
J23 Park and Ride Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/04/10	KM	21/04/10	ASG	21/04/10

Project No.	Office	Type	Drawing No.	Revision
A059108	35	18	A059108-35-18-017	A



Legend

- Site Location
- Bus Stop
- Bus Stop (2013 Only)
- Minehead Route
- 2013 Route Variation

Note:
The bus stops served by this route only in 2013 are served in 2016 by a different bus route.

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Project:
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Drawing Title:
Minehead Direct Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

Project No.	Office	Type	Drawing No.	Revision
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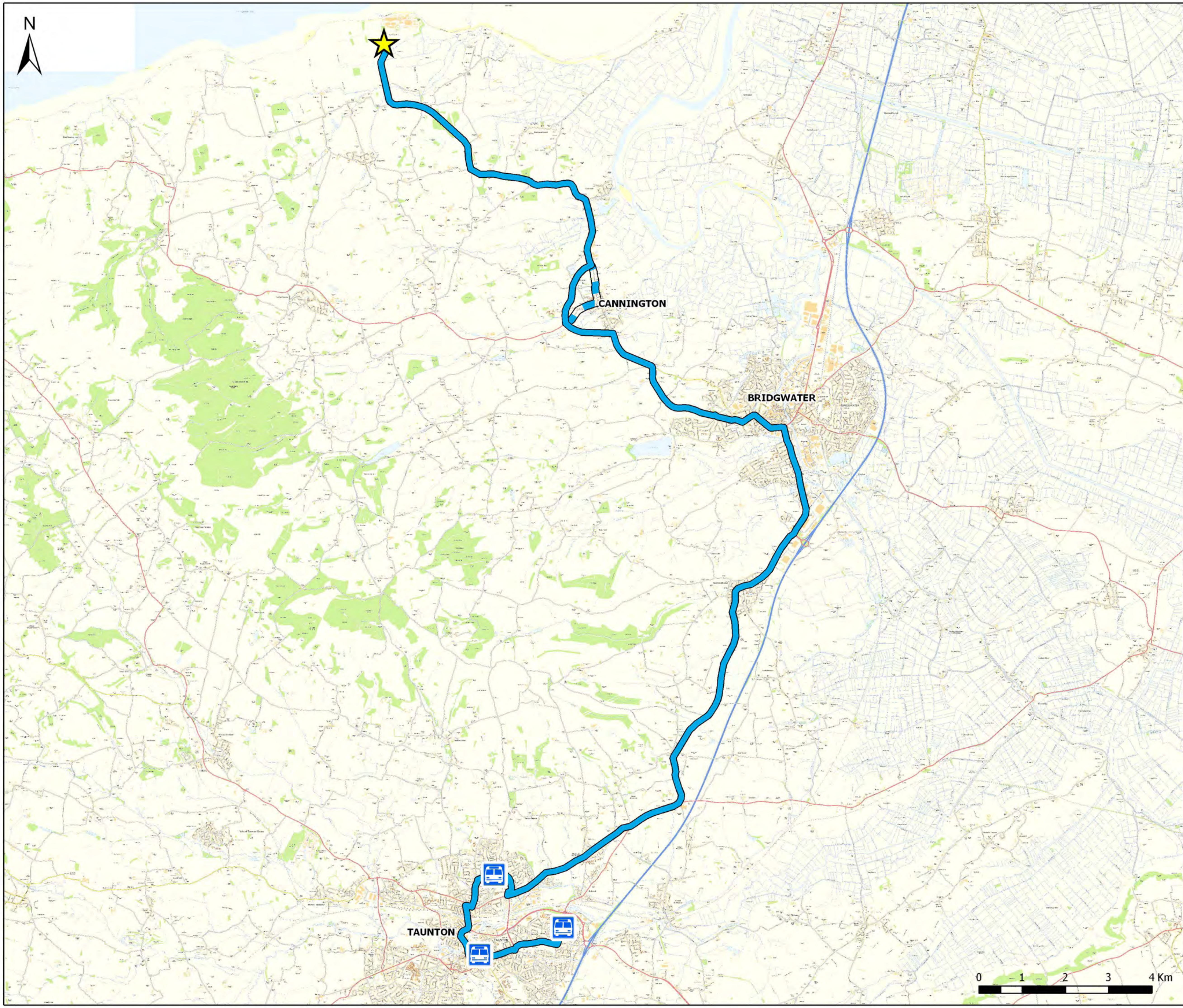

Legend

- Site Location
- Bus Stop
- Taunton Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Taunton Direct Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

Project No.	Office	Type	Drawing No.	Revision
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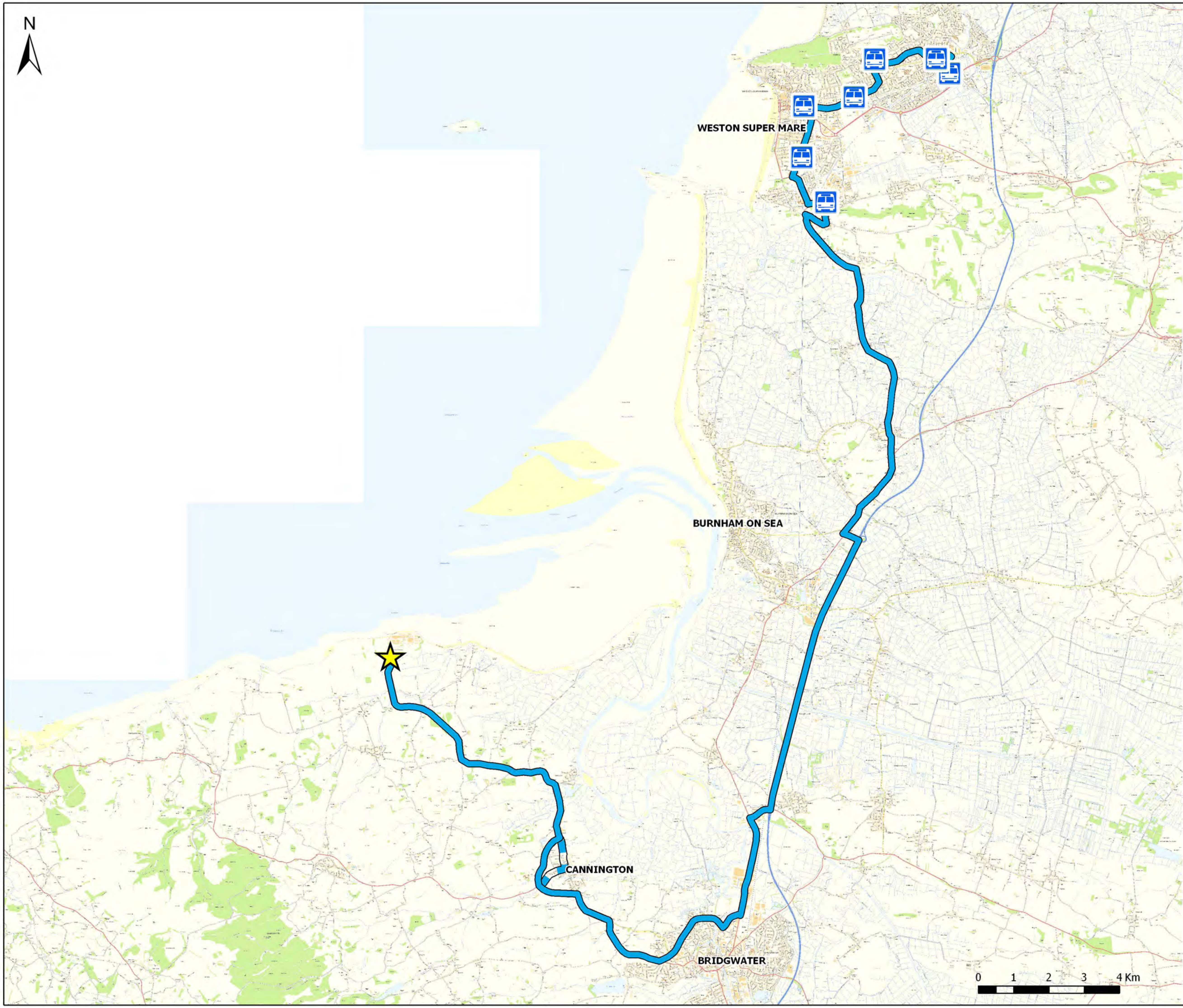

Legend

- Site Location
- Bus Stop
- Weston-Super-Mare Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Drawing Title:
Weston-Super-Mare Direct Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

Project No.	Office	Type	Drawing No.	Revision
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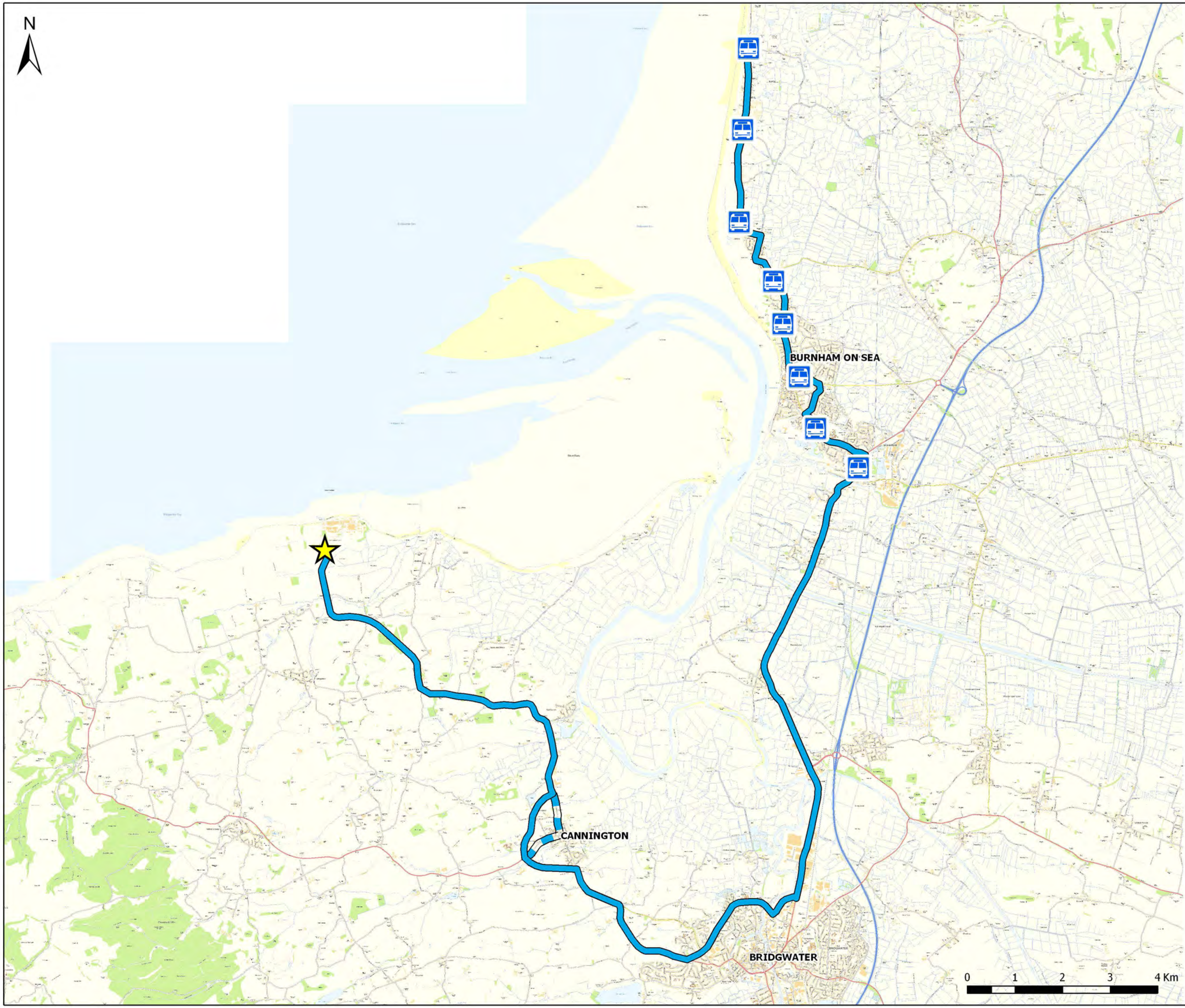

Legend

- Site Location
- Bus Stop
- Breen Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Drawing Title:
Breen Direct Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

Project No.	Office	Type	Drawing No.	Revision
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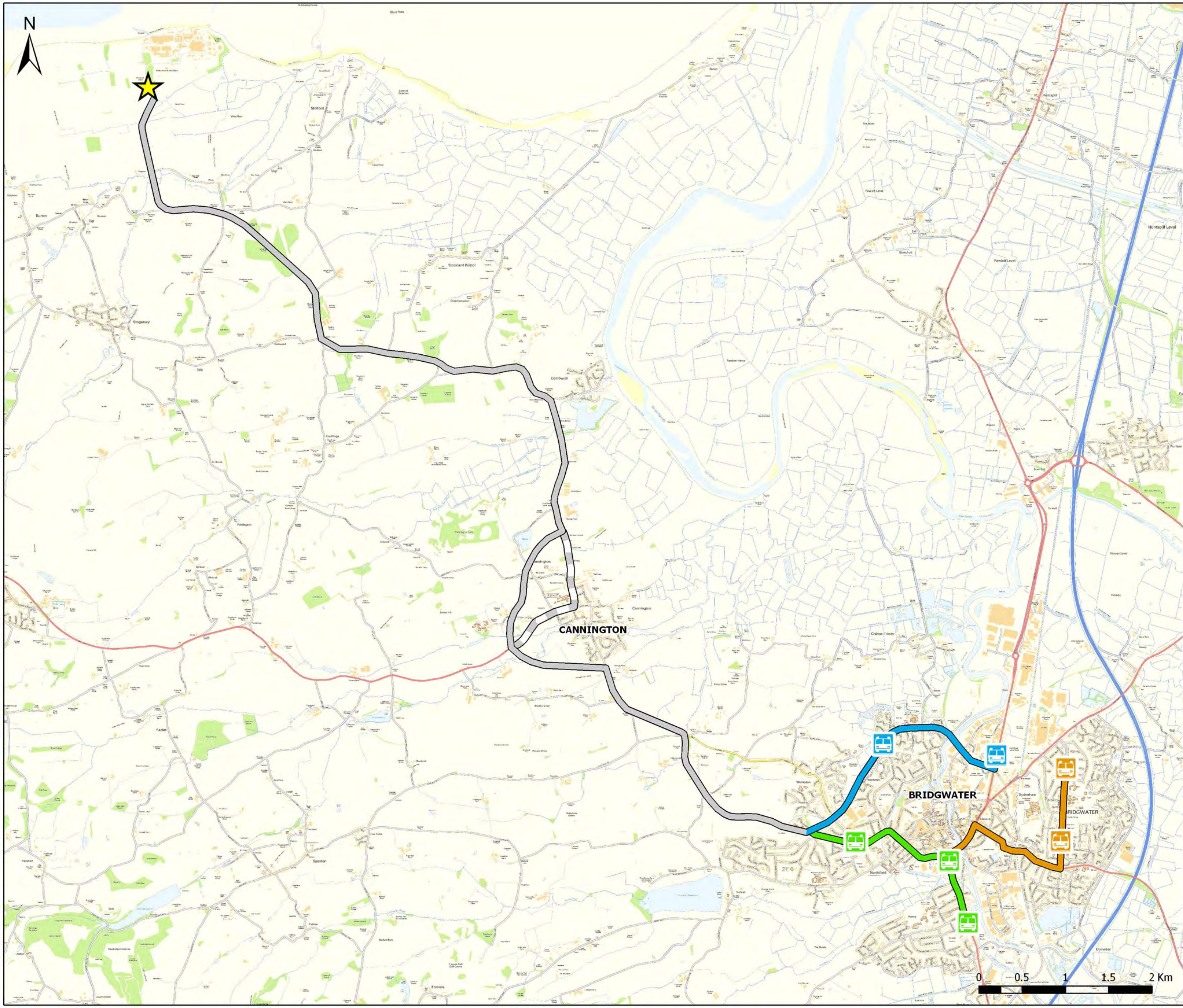

Legend

- ★ Site Location
- Route 1 Bus Stop
- Route 2 Bus Stop
- Route 3 Bus Stop
- Bridgwater Route 1
- Bridgwater Route 2
- Bridgwater Route 3
- Common Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Project:
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Drawing Title:
Bridgwater Direct Bus Routes 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

Project No.	Office	Type	Drawing No.	Revision
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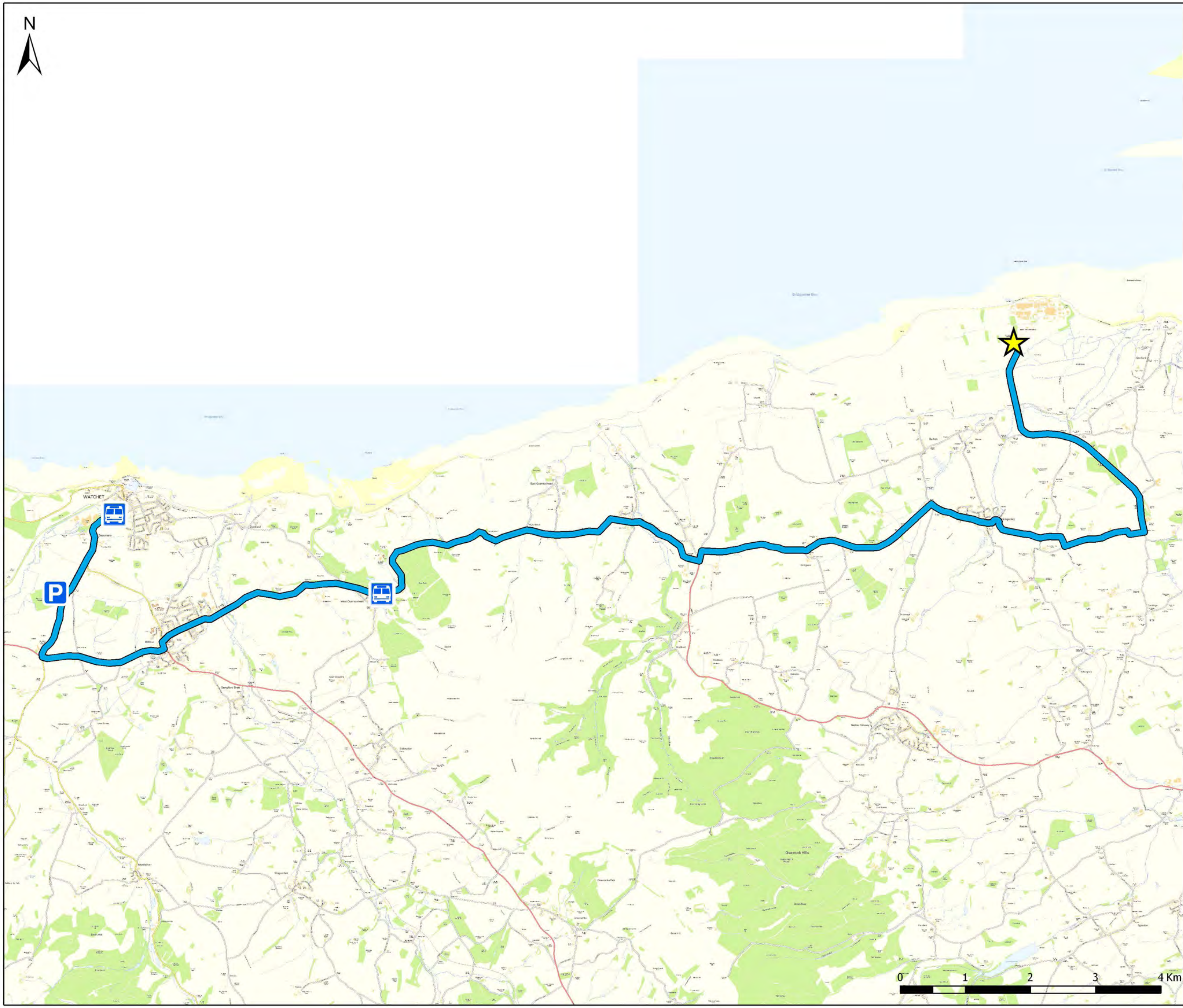

Legend

- Site Location
- Bus Stop
- Williton Park and Ride
- Watchet Route

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2016 route	JC	VR	ASG	08/08/11

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Project:
Hinkley Point C

Drawing Title:
Watchet Direct Bus Route 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

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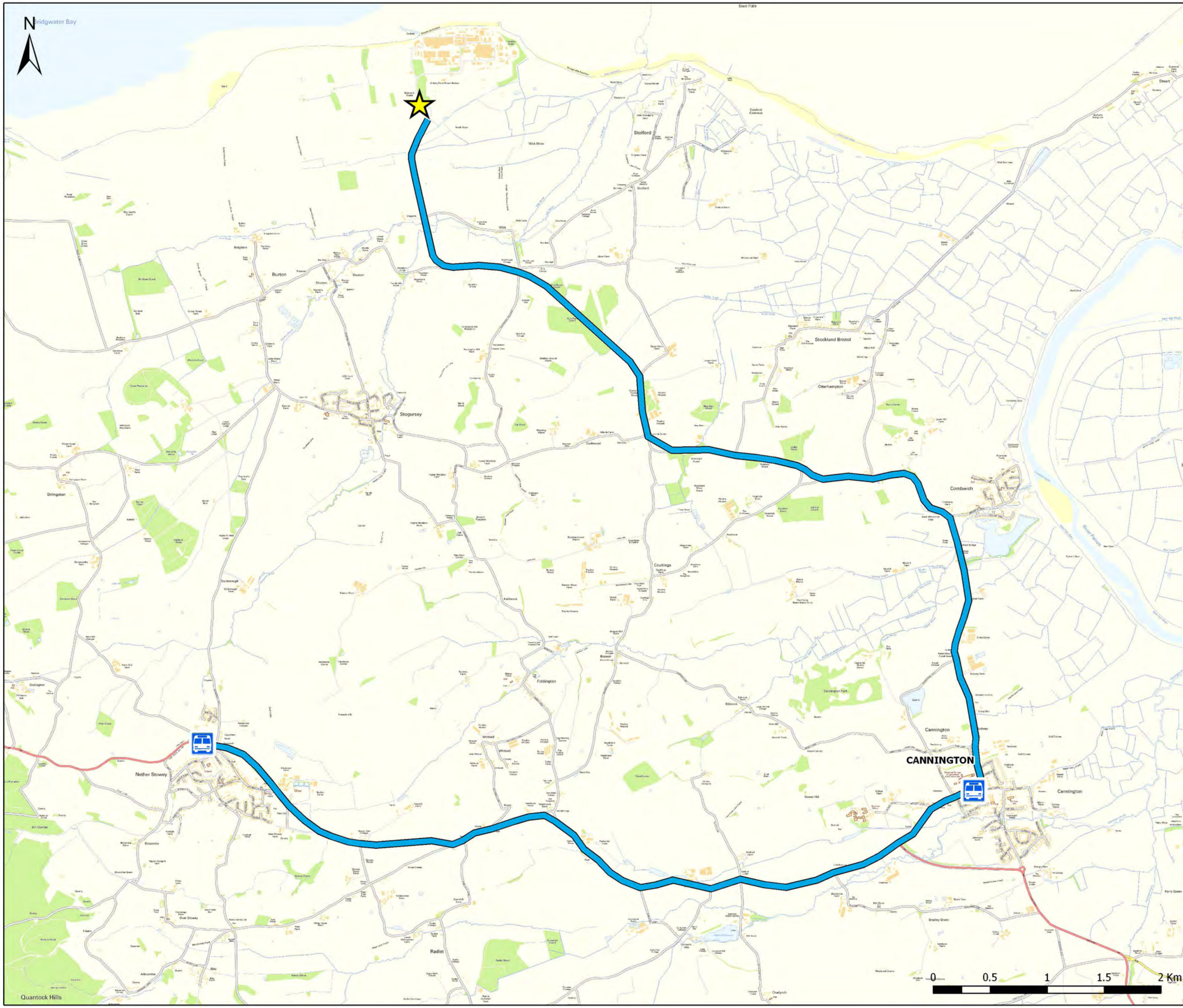

Legend

- Site Location
- Bus Stop
- Nether Stowey Route

REV	DESCRIPTION	BY	CHK	APP	DATE
A	Reflect 2013/2016 routes	JC	VR	ASG	08/08/11

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Project:
Hinkley Point C

Drawing Title:
Nether Stowey Direct Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	21/06/11	KM	21/06/11	ASG	21/06/11

Project No.	Office	Type	Drawing No.	Revision
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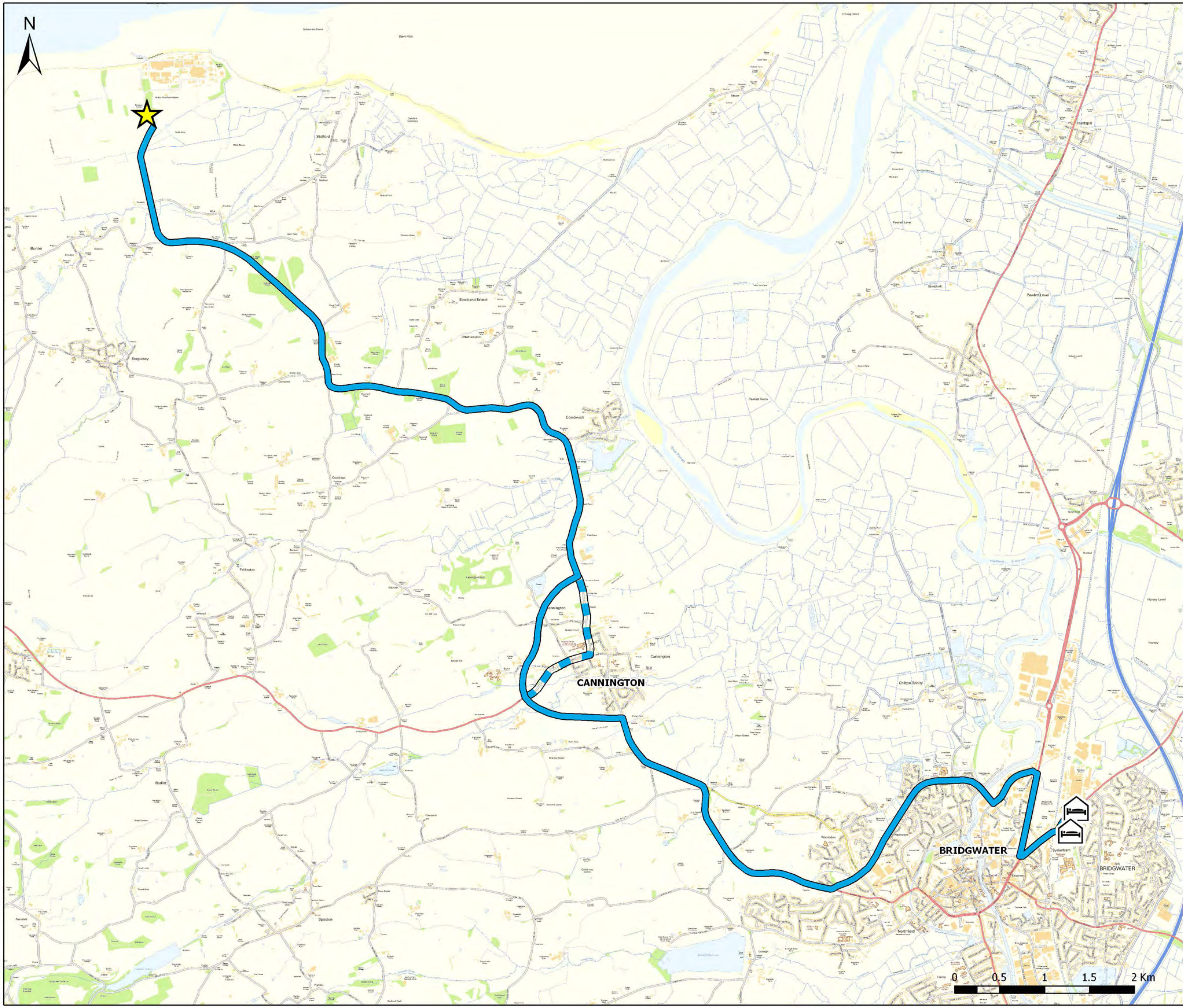

Legend

- Site Location
- Campus Location
- Bus Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE

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Drawing Title:
Bridgwater 'A' & 'C' Campus Bus Route
2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	08/08/11	VR	08/08/11	ASG	08/08/11

Project No.	Office	Type	Drawing No.	Revision
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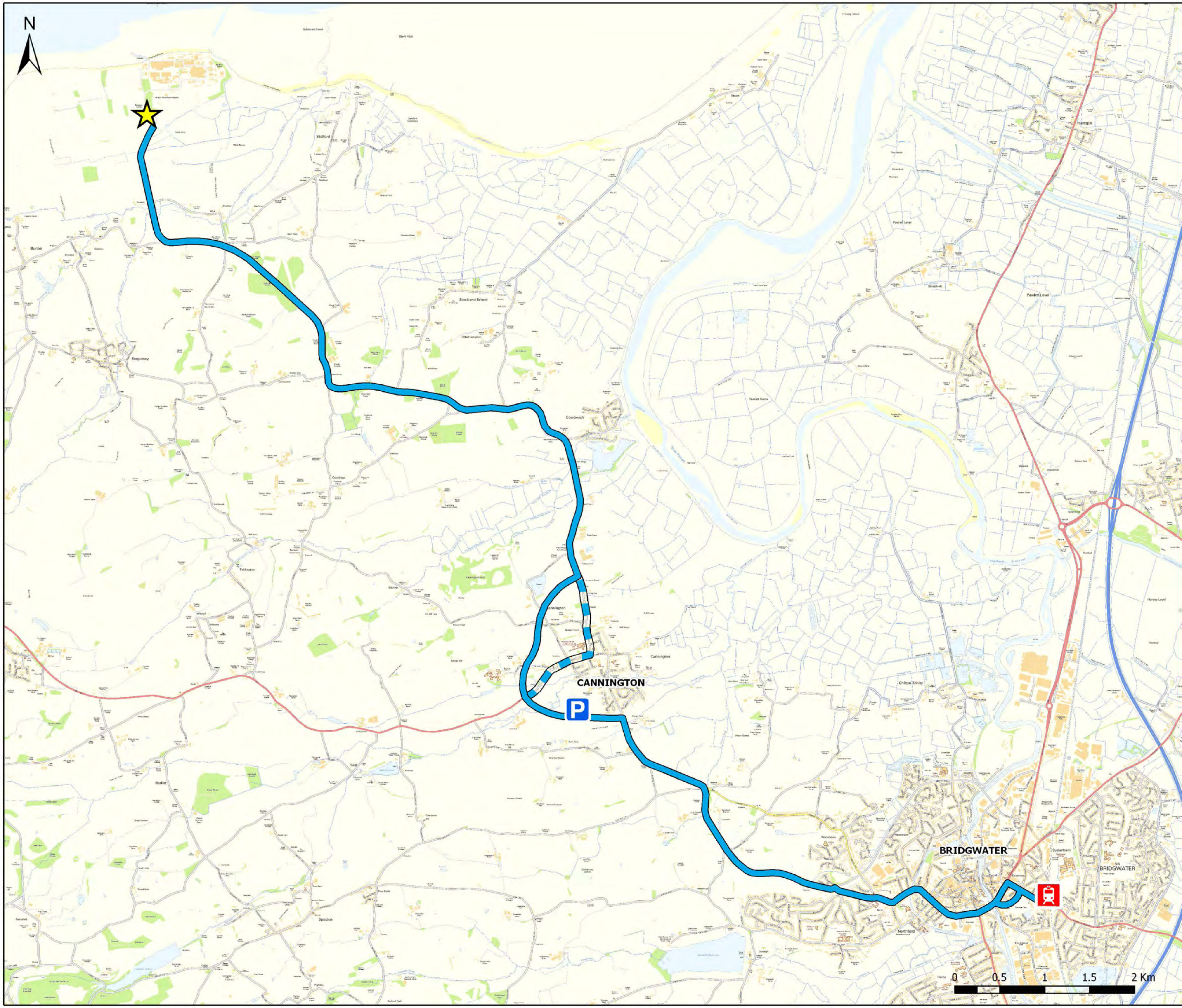

Legend

- Site Location
- Rail Station
- Cannnington Park and Ride
- Bus Route
- 2013 Route Variation

REV	DESCRIPTION	BY	CHK	APP	DATE

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Project:
Hinkley Point C

Drawing Title:
Visitor Bus Route 2013 & 2016

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	08/08/11	VR	08/08/11	ASG	08/08/11

Project No.	Office	Type	Drawing No.	Revision
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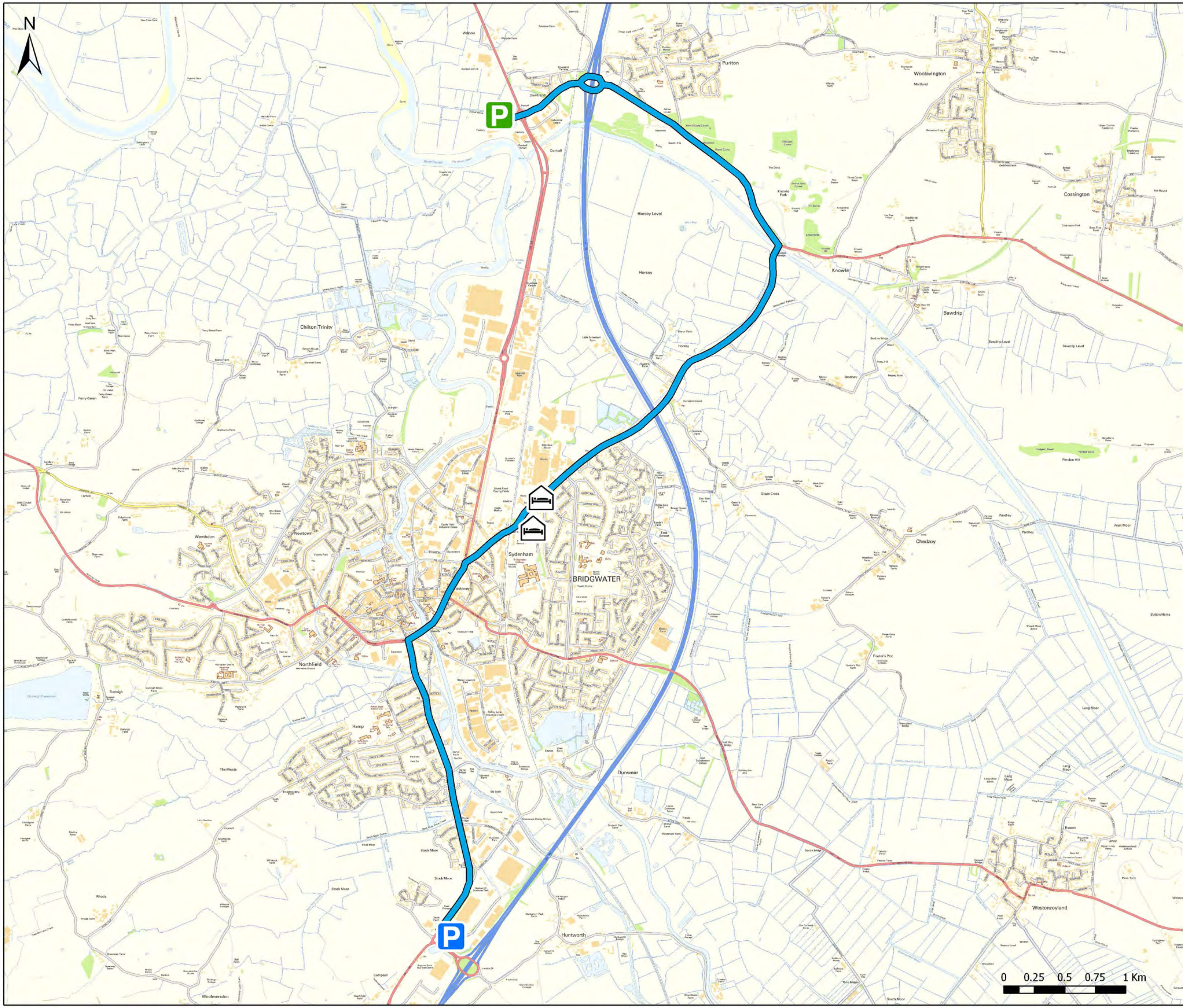

Legend

- P — M5 J24 P&R Site
- P — M5 J23 P&R Site
- Campus Location
- Bus Route

REV	DESCRIPTION	BY	CHK	APP	DATE

EXECUTIVE PARK
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Drawing Title:
J23 Park & Ride and Bridgwater 'A' & 'C' Campus Construction Bus Route 2013

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JC	13/09/11	VR	13/09/11	ASG	13/09/11

Project No.	Office	Type	Drawing No.	Revision
A059108	35	18	A059108-35-18-101	-

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1. INTRODUCTION AND SCOPE

1.1 Background

1.1.1 EDF Energy (EDFE) proposes to build alongside the existing Hinkley Point power station site a new twin reactor generator to be called Hinkley Point C (HPC).

1.1.2 The construction of HPC will require the transport of construction materials and equipment to the site. Construction of the power station will also generate substantial flows of construction workers to and from the site. A proportion of these construction workers are expected to be drawn from outside the immediate locality.

1.1.3 It is envisaged that construction will be complete and the new power station operational by the year 2020 with the workforce during construction peaking in 2016 with up to 5,600 employees.

1.1.4 The proposed development is to be the subject of a DCO application to the Infrastructure Planning Commission (IPC) under the Planning Act 2008.

1.1.5 This Technical Note on Passenger Rail Transport will inform the Transport Assessment that will support the DCO application.

1.2 Scope

1.2.1 This Technical Note considers the potential role rail passenger transport could play in reducing or mitigating the transport effects arising from construction of HPC.

1.2.2 It concentrates on the rail route between Bristol Parkway and Exeter since this links the major population centres in the region and is the nearest rail route to the site.

1.2.3 This Technical Note draws on a report prepared by First Great Western (FGW) on behalf of EDFE entitled 'Options for Additional Services to Hinkley Point Power Station', January 2010. The report is included as **Appendix 1** of this Technical Note. FGW operate the principal passenger train franchise in the area. The report assessed the spare capacity and timing of existing train services and the feasibility of additional services to suit the proposed construction shift times then under consideration. The additional services or service enhancements would have to be funded by EDFE.

1.2.4 Additional rail services and shuttle buses linking the railhead with the site could continue to be provided for the operational workforce after construction of the plant is completed. However the smaller numbers of up to 900 workers (1500 during planned outages) and the expected distribution of the workforce (i.e. local catchment) means that rail is not considered in this report during operation of the plant.

1.3 Report History

1.3.1 The First Issue of this report was made in April 2010, prior to the Stage 2 Consultation.

1.3.2 The 2nd and 3rd issues of this report were made in March and June respectively of 2011 but were only circulated internally in draft form. They built on the 1st issue as additional information became available and took account of:

- refined forecasts of construction workforce numbers and their residential distribution;
- revised shift timings for the construction workforce;
- other relevant refinements and changes set out in EDFE's Pre-Application Consultation document 'Consultation: Update on and Proposed Changes to 'Preferred Proposals';
- the 2011 Railway Timetable;
- further consultation with passenger train operators; and
- comments received by stakeholders in response to the 1st Issue.

1.3.3 The principal comments received from Stakeholders relate to the first issue of the report and were contained in an Email from JMP Consultants dated 7 May 2010 sent on behalf of Somerset County Council and the Highways Agency.

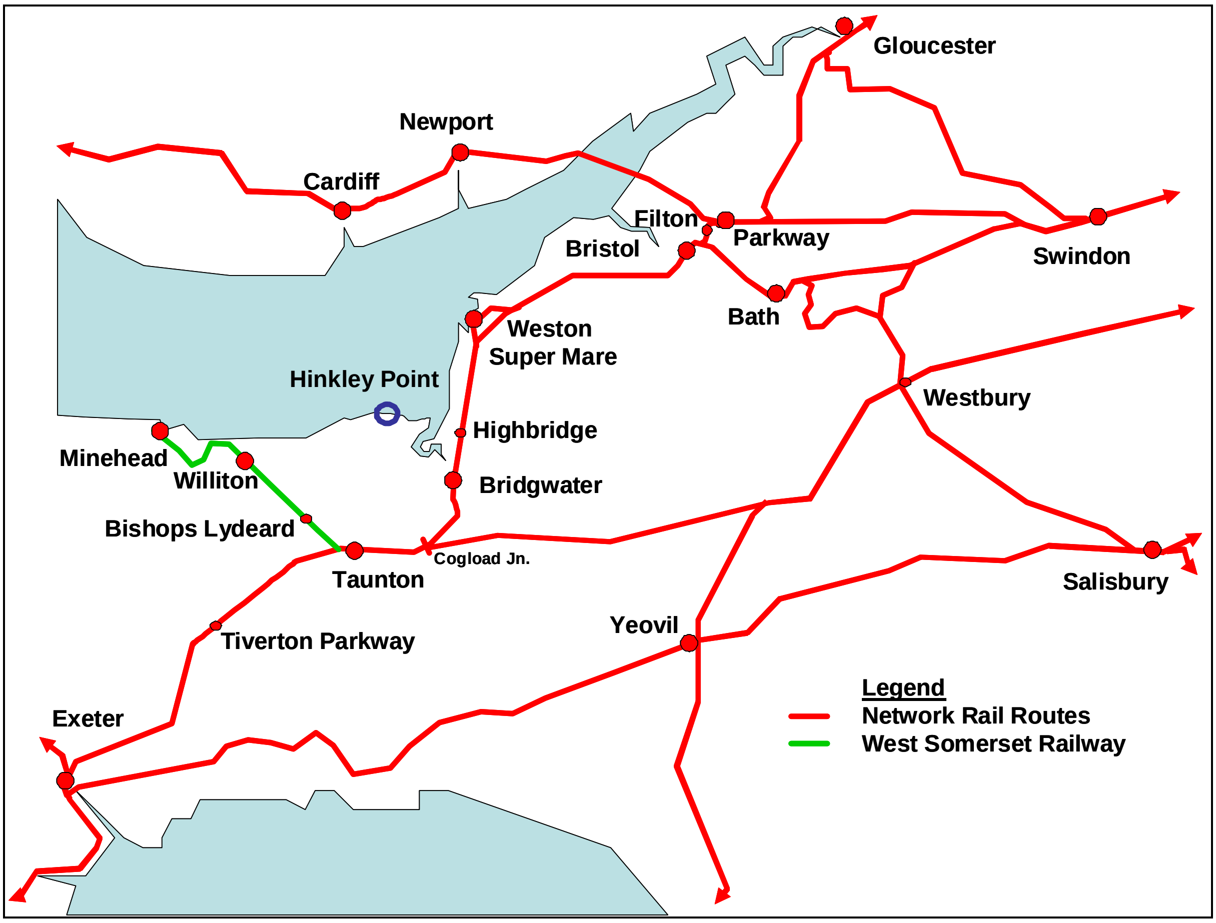
1.3.4 This the 4th issue of the report builds further on the earlier issue of the note on Rail Passenger Transport and sets out the baseline information currently available. In particular it includes analysis of the propensity of HPC workers to use rail as part of their daily commute to and from the HPC site and in the case of non home-based worker, journeys between their main homes and the region. The analysis reflects current thinking on shift times and patterns and the likely cycle of long weekend for non home-based workers.

2. THE LOCAL RAIL INFRASTRUCTURE

2.1 Rail Network

2.1.1 The existing rail network in the region around Hinkley Point is shown in **Figure 2.1** below.

Figure 2.1: Hinkley Point Relative to the Rail Network



a) Bristol to Exeter Route

2.1.2 The nearest and principal main line rail route in the Hinkley Point area runs north east to south west between Bristol and Exeter. It was originally built to serve the West of England with trains from London routed via Bristol. However at Cogload junction to the east of Taunton the route to Exeter is now joined by the more direct 'Berks and Hants' route from London. The railway passes closest to the Hinkley Point site at Bridgwater.

2.1.3 The route between Bristol and Exeter is 75 miles long. Bridgwater is approximately equidistant between Bristol and Exeter. It is double track throughout with additional running lines on the approaches to Bristol, Taunton and Exeter. There is also a short loop line in and out of Weston Super Mare and loops at Yatton, Highbridge and Tiverton Junction where slower trains can be overtaken.

2.1.4 Once outside the approaches to Bristol and Exeter, where speed restrictions apply, the route has a line speed of 100mph with 110mph permitted for the seven miles between Uphill Junction where the loop line through Weston Super Mare rejoins the main route and Highbridge.

2.1.5 The route carries a mixture of both interregional express (Intercity), regional (limited stop) and local (all stations) passenger services operated by First Great Western (FGW) and interregional expresses operated by Arriva Cross Country. There are only a small number of freight services particularly between Bristol and Cogload Junction.

b) Minehead Branch of the West Somerset Railway

2.1.6 There is a 23-mile branch line which leaves the Bristol to Exeter route from Norton Fitzwarren Junction to the west of Taunton and runs north westwards to the coast at Minehead. The branch line is operated by the West Somerset Railway (WSR) who run a preserved or heritage style passenger rail service over the northern 19.5 miles of the branch between Bishops Lydeard and Minehead.

2.1.7 The branch line is single track with four passing loops at Bishops Lydeard, Crowcombe and Heathfield, Williton and Blue Anchor stations.

2.1.8 As a heritage railway line speed is normally limited to a maximum of 25mph. Lower local speed restrictions may also apply at stations and on the approach to the six open level crossings on the route. Journey times will also be extended by passing loops where single line tokens or train staffs are exchanged and trains may have to wait to pass trains running in the opposite direction.

2.2 Stations in the Area

2.2.1 The nearest stations to Hinkley Point on the Bristol and Exeter route are at Highbridge (Highbridge and Burnham), Bridgwater and Taunton. Williton is the closest station on the West Somerset Railway.

2.2.2 The passenger facilities at potential railhead stations are described in Section 4.2.

2.3 Interchanges

2.3.1 There are existing interchange opportunities for rail passenger services on the Bristol and Exeter route at Bristol Parkway and Bristol Temple Meads to the north east and Taunton and Exeter to the south west. There are no interchange opportunities at Williton.

2.3.2 The existing interchange opportunities are set out in **Table 2.1**.

Table 2.1: Interchange Opportunities

Location	Interchange Opportunities
Bristol Parkway	• Local, Interurban and intercity trains on the route between London and South Wales. • Alternative interchange for services on the route to Gloucester and the Midlands. • Interchange with local bus routes.
Bristol Temple Meads	• FGW Intercity and interurban services on the London route via Bath and Swindon • FGW interurban and local services via Bath and Westbury to Portsmouth, Southampton and Weymouth to the south east and Cardiff, Gloucester and Great Malvern in the west and north. • Local FGW Bristol area services to Avonmouth and Severn Beach and additional Cardiff - Weston Super Mare services • Cross Country Services to the Midlands and north via Gloucester including additional starts/ terminations at Bristol to make a regular 30 minute interval frequency north of Bristol. • Bus link to Bristol Airport
Taunton	• FGW Intercity services on the direct “Berks and Hants” route via Westbury and Newbury to London • Additional FGW and Cross Country trains on the route westward to Exeter, Paignton, Plymouth and Penzance, most calling at Tiverton Parkway. • Bus link with Minehead and Dunster
Exeter	• FGW local services to Barnstaple, Paignton and Exmouth. • South West Trains Services on the route via Yeovil and Salisbury to London Waterloo • Bus Link with Oakhampton and Exeter Airport

2.4 Freight Facilities

2.4.1 The Network Rail Great Western Route Utilisation Strategy (see Section 2.5 below) indicates that there are existing freight terminals at Bridgwater for specialist freight and an aggregates terminal Exeter. There is also a group of sidings at Fairwater Yard to the west of Taunton Station which are shown in rail atlases also but not listed as a freight terminal in the RUS. The West Somerset Railway has also been used recently to transport rock armour for strengthening coastal defences at Warren Point near Minehead.

2.4.2 The freight facilities at Bridgewater are just to the north of Bridgwater Station on the west (up) side of the running lines.

2.4.3 They comprise a series of short sidings curving round to the west for 300m along the former route to Bridgwater Dock Basin and include a short loop. Two of the sidings enter a small (50 x 20m) fenced security compound where there is a 56 tonne capacity gantry crane over one track for transferring nuclear flasks between rail wagons and road vehicles. There are also three short sidings and one 350m long siding running parallel to the main line and into a warehouse yard. Rail atlases indicate that this yard was formerly used by UKF and then Thomas.

2.4.4 Both sets of sidings are accessed by a facing turnout in the up line using a ground frame worked by train crew. There is also a facing crossover in the running lines just to the north of the sidings which subject to signalling enables down trains arriving from the north to reverse into the sidings by using the up line as a headshunt.

2.4.5 Direct Rail Services (DRS) advise that:

- they own a 125 year lease on the nuclear flask transfer facility;
- that it is currently active and will remain in use for the long term;
- that it complies with all required safety and security standards;
- that it is fully approved by OCNS;
- they have reserved priority rights for freight train paths (in the current and future timetables) to the sidings at Bridgwater; and
- they have long-term access rights in and out of the facility.

2.4.6 Road access to the nuclear flask handling facility and the warehouse is from the corner of Bailey Avenue and Rosebery Avenue. These are relatively narrow residential streets flanked with terraced housing many of which have front doors opening directly onto the pavement. A ‘tear drop’ access arrangement and two sets of gates allows road vehicles to drive through the flask handling compound without the need to reverse.

2.4.7 The aggregates terminal at Exeter is within Riverside Yard to the north west of Exeter St. David’s station. There is road access via Waggoner’s Way from Station Road. A recent Rail Atlas records that the yard was operated by Hanson.

2.4.8 The sidings in Fairwater Yard in Taunton are currently used by Network Rail and their suppliers and contractors for holding rail mounted maintenance plant and engineering trains of civil engineering materials for internal use on the railway. The current yard layout is therefore suited to the storage of materials on rail wagons and does not appear to cater for the transfer of bulk materials between rail and road. The yard has good immediate road access via Silk Mills Road but as the yard is situated to the west of Taunton all road traffic to the Hinkley site would then have to pass through the town or use the route via the A358 and Williton.

2.4.9 Whilst a number of stations on the West Somerset formerly had small goods yards there are no formal freight facilities at present and existing sidings are generally in use for other purposes. However the line was used recently for the delivery of armour rock for coastal defence work at Warren Point near Minehead. It is reported that these deliveries were made to an unloading point on the running line just south of Minehead Station from where the rock was transported a short distance to the sea front by road. Deliveries were therefore undertaken during the winter months between November 2010 and January 2011 on days when there were no scheduled passenger services on the line.

2.4.10 The large armour rocks can typically be lifted out individually from the open rail wagons by an excavator fitted with a grab attachment so unloading operations do not adversely affect the track or require a substantial terminal facilities other than an adjacent hard standing or track for the transfer lorries. The rail wagons could therefore be unloaded while standing on the running line. This method would not necessarily be suitable for other types of freight traffic or be available at other times of year.

2.5 Planned Infrastructure Enhancements

2.5.1 A full list of proposed enhancements including those for additional or extended train services, and new rolling stock as well as infrastructure work is given in **Appendix 2** together with an explanation of their status and the implementation process followed by Network Rail when identifying enhancements. These are taken from Network Rail's Route Utilisation Strategy and Route Plan.

2.5.2 Infrastructure enhancements are tabulated in **Table 2.2**. Those that have a committed status have been authorised by the Department for Transport's High Level Output Statement for Control Period 4 (2009-2014) or currently have funding in place and are due to go ahead. Those that have recommended status have been demonstrated as offering a sufficiently positive benefit cost ratio but have yet to be authorised or have funding allocated. They may therefore be authorised as part of the Department for Transport's High Level Output Statement for Control Period 5 (2014-2019).

Table 2.2: Committed and Recommended Enhancement Schemes

Ref	Scheme	Status	Completion	Implications for Hinkley Point
RP P12, 94	Upgrading of Tracks west of Taunton Station	Recently completed as part of NRDF	2010	Improved timing/ capacity at former pinch point by increasing permitted speed over relief tracks
RP P17, 24, RUS P 93	Barnt Green to Westerleigh Jcn line Speed Improvements	Committed in 2008 Periodic review	2013/14	Raises the line speed up to 100mph and 110mph where possible. Reduced journey time for XC trains north of Bristol - might be used to compensate for additional stop at Bridgwater
RUS P 12	Line Speed Increases between Bristol Temple Meads and Bridgwater	Recommended by RUS	by 2019	Line speed increase to 125mph- improves inter-urban journey times of XC and FGW express trains but also increases time penalty (and cost) for additional stops at Bridgwater
RUS P 11	Bristol Temple Meads-Parson Street additional 4th track	Recommended by RUS	CP5 (by 2019)	Takes cognisance of proposed IEP service pattern and potential freight growth, to be implemented in conjunction with Bristol area re-signalling in Control Period 5
RUS P 11, 161	Three or four tracking Dr Days Junction - Filton Abbey Wood	Recommended by RUS	CP5 (by 2019)	Increases track capacity for cross Bristol services including XC, to be implemented in conjunction with Bristol area re-signalling in Control Period 5

Ref	Scheme	Status	Completion	Implications for Hinkley Point
RUS P14	Electrification Paddington-Bristol	Re-committed following Government Spending Review	After 2016	Re-confirmation of electrification to Bristol announced 1 March 2011 including route to Cardiff. Electrification of routes to Oxford and Newbury had previously been confirmed. Greater capacity and improved performance. Linked to purchase of IEP trains which will replace existing HST trains.
RUS P 90	ERTMS	Committed	From 2016	Will be applied to all major re-signalling schemes from 2014 with the Great Western Main Line re-signalling expected in 2016. Can provide reduced headways allowing increase speeds and capacity
RP P20, RUS P103	Reopening of the Portishead line	Under review	CP 5 (by 2019)	Being investigated as part of a bid to the Transport Innovation Fund. Would involve additional trains running from Parson Street on the western approach to Bristol Temple Meads which would reduce capacity available for additional or re-timed trains on the route from Bristol Temple Meads through Bridgwater. Current funding strategies suggest completion by 2019 in CP 5.

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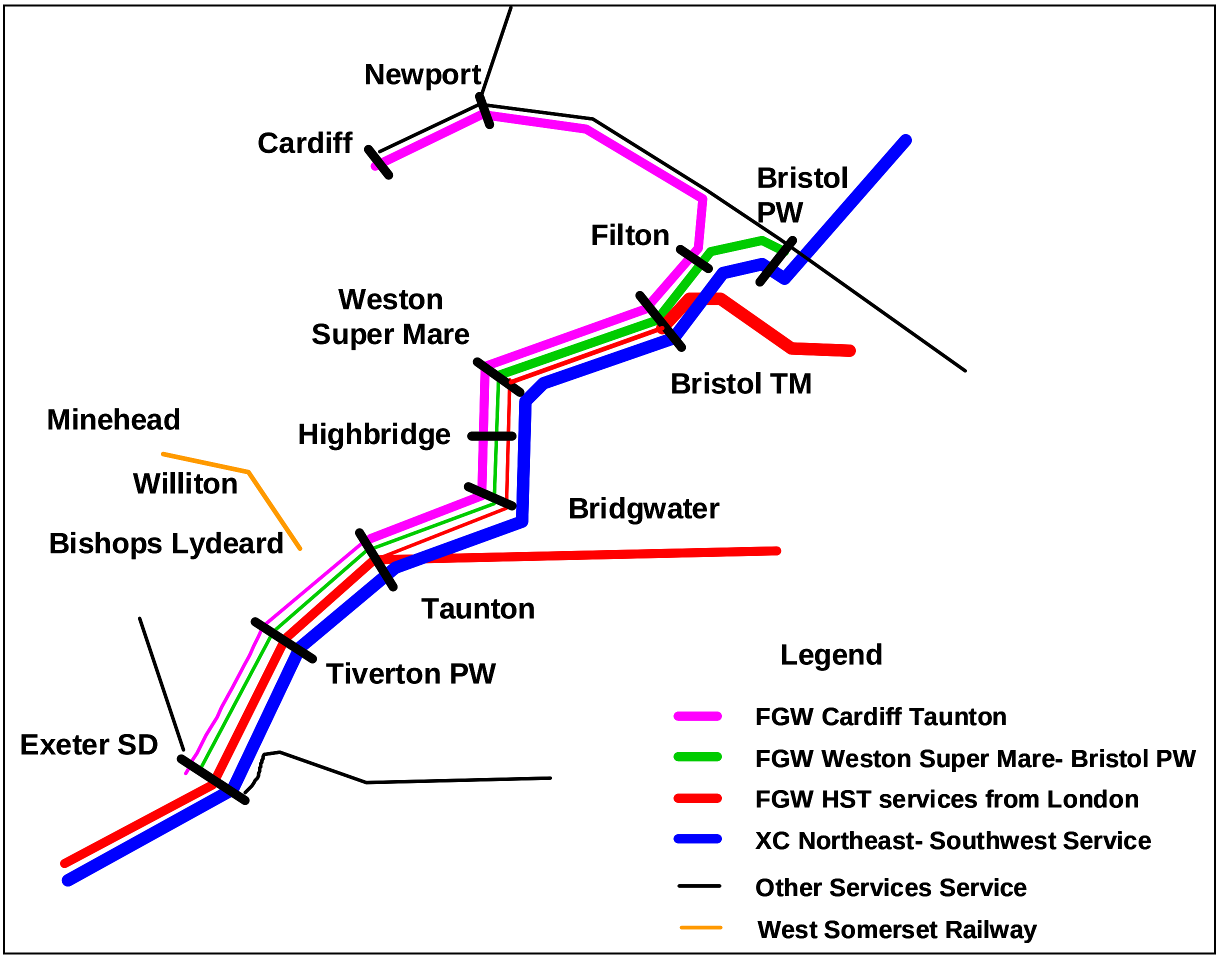
3. EXISTING TRAIN SERVICE PATTERN

3.1.1 The existing train service in the area is shown schematically and summarised in respectively **Figure 3.1** and in **Table 3.1** below. The passenger train operators are First Great Western (FGW), Arriva Cross Country (XC) and the West Somerset Railway. The full weekday train service on the Bristol Exeter route is also tabulated in **Appendix 3.**

Figure 3.1: Schematic Diagram of Passenger Train Services in Hinkley Point Area



3.1.2 First Great Western's franchise runs until 2013 with an option, subject to satisfactory performance, to extend it for a further three years to 31 March 2016. However FGW have recently indicated that they will not be applying for the franchise extension but fully intend to re-bid for the new franchise to run from 2013. This decision is understood to be due to the planned major investment work that may adversely affect performance of the franchise routes, Arriva Cross Country Trains franchise also runs until 31 March 2016, the last two years and five months of which are dependent on achieving agreed performance targets.

3.1.3 **Table 2.2** also lists committed or recommended changes (enhancements) to the current train services as given in the Route Utilisation Strategy and discussed in **Appendix 2**. These include additional services and changes in capacity due to new rolling stock or train lengths.

3.1.4 As with infrastructure enhancements those that have a committed status currently have funding in place and are due to go ahead. Those that have recommended status have been demonstrated as offering a sufficiently positive benefit cost ratio but have yet to be authorised or have funding allocated. They may therefore be authorised as part of the Department for Transport's High Level Output Statement for Control Period 5 (2014-2019). Enhancements involving additional rolling stock will be dependant on this rolling stock being available. This may in turn depend on other enhancements such as electrification or new rolling stock being introduced elsewhere on the network.

Table 3.1: Existing Train Service Pattern

Operator and Service	Frequency and Type	Journey Time between Bridgwater and		Journey Time between Taunton and		Comment
		Bristol TM	Exeter	Bristol TM	Exeter	
FGW London-West of England via Bristol	6 Up (Eastbound) and 5 (4 in 2010) Down (Westbound) Intercity trains per day. 3 Up and 2 down currently call at Bridgwater	Up 53-62 mins (Est 22 non-stop) Dn 50-54 mins (Est 22 non-stop)	Up 35-40mins Dn 42-55 mins	Up 33-72 mins (33 non-stop) Dn 33-67 mins (32 non-stop)	Up 24-30 mins Dn 26 mins	Services pass through Bridgwater and Bristol TM but not Bristol Parkway. There are also 4 trains each way between London and Weston Super Mare and 15 trains per day each way using the direct route from London to Taunton which give London -Bridgwater journey opportunities.
FGW Cardiff-Taunton Service	Hourly service during the Day after am peak, three Down (southbound) services extended to Paignton, Plymouth and Exeter, one Up (northbound) start from Paignton, two from Exeter	Up 48-63 mins Dn 47-57 mins	Up 46-52 mins Dn 45-51 mins*	Up 58-76 mins Dn 63-75 mins	Up 34 -40 mins Dn 31-34 mins	Unusually for this type of service some trains have been formed of locomotives and coaches rather than Multiple Units. Calls at Filton but not Bristol Parkway apart from 06:13 ex Bridgwater which does. Southbound calls at Bridgwater from 09:48 then hourly till 21:52, Northbound calls at 06:13 then hourly from 10:19 to 18:19.
FGW Bristol Parkway-Weston Super Mare	Hourly all stations during the day after am peak	N/A	N/A	N/A	N/A	Southbound Hourly from 09:12 to 18:12. Northbound Hourly from 11:10 to 17:16. Interworked with Cardiff Taunton services at other times.
FGW Bristol Parkway/ Bristol TM – Taunton/ Exeter/ Penzance / Paignton	6 southbound and 9 northbound in mornings and evenings only	Up 42-66 mins	Up 45-48 mins	Up 54- 78 mins	Up 34-37 mins	Run to irregular pattern and intervals at start and end of the day in effect instead of the hourly Cardiff -Taunton and Bristol PW- Weston Super Mare services, requires interworking of rolling stock used on the hourly services during the main part of the day.

Operator and Service	Frequency and Type	Journey Time between Bridgwater and		Journey Time between Taunton and		Comment
		Bristol TM	Exeter	Bristol TM	Exeter	
		Dn 39-54 mins	Dn 47-53 mins	Dn 54-68 mins	Dn 33-42mins	These services are the most relevant existing services for shift morning start and evening end times. Southbound trains call at Bridgwater at 06:03, 07:25, 08:08 and 09:19 then 22:48 and 00:09. Northbound departures at 05:42, 06:46, 07:40 and 08:48 and 09:49 and then 19:29, 20:42, 21:57/22:34 and 22:57/23:12.
XC North East South West Services	Hourly and sometimes half hourly Intercity Trains calling at Bristol PW, Bristol TM, Taunton Tiverton PW and Exeter SD	DNC	DNC	Up 33-36 mins Down 32-34mins	Up 28 -29 mins Down 26-28mins	Regular clock face but none currently call at Bridgwater. 20 down (south bound) calls at Taunton at 07:08 and 08:43 then hourly from 09:17 until 22:17 with additional trains at 12:02, 15:46, 17:46 and 21:46. 20 Up (north bound) services calling at Taunton at 06:51 then hourly until 19:51 with additional trains at 08:12, 11:17, 13:16, 15:12, 17:21 and 21:14. The 12:02 down and 08:12 Up also call at Weston Super Mare.
West Somerset Railway Bishops Lydeard-Minehead	Heritage service operating most weekends and 161 weekdays in 2011 with between 4 an 8 trains each way per day	N/A	N/A	N/A	N/A	Southbound arrivals at Bishops Lydeard from 11:31 until 19:08, - northbound departures generally from 10:25 but 09:00 on Gala days until 16:10 but 16:55 on some days.

Notes:
Information on main line services taken from published weekday Timetable for period 12 Dec 2010 – 21 May 2011
Information on WSR taken from 2011timetable

Table 3.2: Committed and Recommended Enhancement Schemes to Train Services

Ref	Scheme	Status	Completion	Implications for Hinkley Point
RP P16	Intercity Express Programme	Committed	2016/17	GW RUS forecasts long distance high speed services can be met with the introduction of IEP trains running to an enhanced timetable structure from 2016/17. This may involve hourly LDHS West of England Services running via Bristol (and Bridgwater) and a recast of local services. The RUS envisages that new IEP trains would replace all 54 HST train sets operated by FGW but the IEP procurement has been subject to repeated technical revisions and value reviews. Announcement of 1 March 2011 was that 308 vehicles would be provided for FGW services in a mixture of all electric and Bi-mode (Diesel / Electric) sets compared to the 378 vehicles in FGW's 54 HST train sets. It is not currently clear how the additional capacity will be provided.
RUS P 9, 13	Plymouth - Edinburgh and Manchester- Bristol / Paignton Train Lengthening	Recommended by RUS		Between 8 and 19 additional vehicles would be provided for XC trains including routes to south west to meet forecast increase in traffic to 2019
Rus P10	Additional hourly Cross Bristol services to and from Bath towards Avonmouth / Clifton Down	Recommended by RUS		Additional trains will use capacity reducing possibly critically flexibility to accommodate EDF requirements
RUS P159	Cardiff Portsmouth / Taunton Train Lengthening	Recommended by RUS		Provides additional capacity at Bridgwater, dependent on release and allocation of vehicles
RUS P 12	Additional hourly cross Exeter services between Paignton and St James park	Recommended by RUS	2016	Compliments existing hourly Barnstable and Exmouth and Paignton and Exmouth services. Can only reduce timetable flexibility at Exeter to accommodate more or re-timed services through Bridgwater
RUS P10, RP P17	Additional vehicles for peak cross Bristol Services	Committed	2010/2011	9 additional vehicles for strengthening 11 cross Bristol services in am and evening peaks to address current and predicted capacity issues at Bristol Temple Meads to 2019
RUS P10	Additional hourly service to Yate	Recommended by RUS in longer term		Extension of existing Weston Super Mare - Bristol Parkway service northwards to provide additional hourly service between Bristol Temple Meads and Yate. Requires further additional vehicles and is subject to third party funding

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4. PASSENGER RAILHEADS FOR HINKLEY

4.1 Direct Rail Link

4.1.1 A direct rail link was not constructed to serve the earlier power stations at Hinkley Point and historically there have been no railways closer to the Hinkley Point site than those remaining today.

4.1.2 Nuclear flask traffic from the earlier power stations at Hinkley Point has therefore been conveyed by road between the site and a railhead retained at Bridgwater.

4.1.3 Provision of a direct rail link into the Hinkley Point site would not be straight forward since:

- The site at Hinkley Point is at least 10km from the nearest point of the current rail network.
- A route from the north east of Bridgwater would need to cross the A38 and River Parrett at low level and then run across the low lying land bounded to the north and east by the river estuary before finding a way between numerous settlements and through rolling landscape to the Hinkley site.
- A route from the south west of Bridgwater would either need to find a way through a built up area or cross the M5 and the A38 and then run across the grain of numerous valleys and watercourses on the north east slope of the Quantock Hills to the Hinkley site.
- A route from the Taunton area or the West Somerset Railway would need to find a way through the Quantock Hills or skirt along the coast.

4.1.4 Construction of such a route would be a major undertaking in its own right and likely to be highly contentious due to its environmental impact on the landscape and impact on third parties.

4.1.5 As well as cost it would also import additional planning and approval risks to the HPC project and present a challenging programme if it was to gain the necessary approvals and be completed in time for HPC construction.

4.1.6 The likelihood of any legacy benefit as a railway will also be small since:

- Freight flows to and from the site during operation will be small.
- There is no obvious demand for other rail freight that would benefit from the connection.
- The number of workers required for operation of the plant will be much smaller than required for its construction and shift patterns will be dispersed throughout the day making it an uneconomic market to serve by rail on its own.
- There is very limited population en route and hence demand for a rail passenger service from the local population would be negligible.

- In the West Somerset Railway, there is already a heritage railway in the area.

4.1.7 Thus as the potential rail use of such a connection is likely to be just for freight and passenger traffic during construction of HPC, the connection would be likely to have significantly greater adverse effects on the adjacent area than the construction related road traffic it was seeking to mitigate.

4.1.8 The option of a direct rail link into the Hinkley Point site has therefore been discounted in this report as unrealistic and so has not been considered further.

4.2 Existing Railheads

4.2.1 As a direct rail link to the HPC site is not a realistic proposition, any rail freight or passenger service for the site would need to operate via a railhead on the existing rail network.

4.2.2 Sites identified as having potential to serve as passenger railheads for the Hinkley Point site are summarised and reviewed in **Table 4.1**. Only existing station sites are considered as potential railheads as new station sites would offer minimal benefit in terms of reduced journey time to the HPC site when compared to the available existing railheads.

4.2.3 Based **Table 4.1**, the stations at Bridgwater and Williton are taken forward for further assessment as potential railheads.

Table 4.1: Potential Passenger Railhead Locations For Hinkley Point

Location	Basis For Considering	Facilities (1)	Assumed Transfer Route to Site	Road Transfer (2)	Comment	Taken Forward
Highbridge Station	Nearest existing station as Crow flies to site.	Down (SW Bound) Platform 198m - 8Car. Up (NE Bound) Platform 153m - 6 Car.	Via A38 through Bridgwater to A39, then as for Bridgwater.	27km / 36mins	Road transfer would still be through Bridgwater though could potentially be routed round the Northern Distributer Road but would be 10km longer than for Bridgwater option. Station forecourt area and access relatively small and unsuitable for shuttle service.	No
Bridgwater Station (3)	Nearest main line station to site by road.	Down (SW Bound) Platform 198m - 8 car. Up (NE Bound) Platform 198m - 8 Car. Ticket Office currently open and station staffed 06:30 – 14:30 Mon- Sat Closed / un-staffed Sunday. Facilities in substantial station building on up Platform 2 on west side include Ticket Office, Waiting Room, male, female and disabled toilets (locked with key available from staff) ticket machine and vending machine. There is also a privately run café (Dave's Diner) and shop (Bridgewater Model Railways). The station building on down / east side largely unused. Main access is from Wellington Road the Up / west side where there is a taxi rank, drop off point and 50 space free car park. Access is also available to Platform 1 on the east side from Redgate Street. Platforms linked by footbridge. Currently there are no train announcements or live display panels.	Via A39 through Bridgwater and then Unclassified Roads from Cannington.	19km / 30 mins	Concerns about transfer shuttles running through town but these will be mainly before am peak and post pm peak. Potential Synergies with EDFE supported Training at Bridgwater College. Potential conflict between parked cars on Wellington Road and shuttle busses but initial review suggests space may be available adjacent to the station forecourt for a temporary or permanent bus turning and standing area for a number of buses accessed from St John Street which would avoid this conflict. Potential synergies with proposed Bridgwater accommodation Campuses A and C which are within 1.5km and therefore walking distance if accessed via exit from Platform 1 on the down east side.	Yes

Location	Basis For Considering	Facilities (1)	Assumed Transfer Route to Site	Road Transfer (2)	Comment	Taken Forward
Taunton Station	Nearest major station, more train services	Down (SW Bound) Platforms 336 & 260m – 14 & 11 Car. Up (NE Bound) Platforms 260 & 380m – 11 & 16 Car. Up Bay Platform 145m – 6 Car. Sidings at Fairwater yard.	Via A38 and Bridgwater and then Unclassified Roads from Cannington	36km 45mins	Longer transfer than Bridgwater. Increases journey time from Bristol direction further still. Better connections to south and west from FGW intercity and Cross Country trains and also to Bristol PW with trains.	No
Bishops Lydeard Station	First station on WSR. Minimises conflict with WSR services	Down (NW Bound) Platform 100m – 4 Car. Up (SE Bound) Platform 250m 10 Car. Passing loop in station and sidings and loco shed to the south of the station.	Via A39 to Williton and then A39 and Unclassified roads		Little benefit compared to Taunton. Not so near to site as Williton. Possibility of stabling EDFE sponsored trains unclear.	No
Williton Station	Nearest Station to Hinkley Point Possible location for Park and Ride facility for site	Down (NW Bound) Platform 110m -4 Car. Up (SE Bound) Platform 160m 7 Car. Passing loop in station, workshop sidings to north of the station.	Via A39 then Unclassified Roads	20km/ 21min	Tests issues arising from using WSR. Limited scope to stable EDFE sponsored trains.	Yes

Notes:
(1) Platform lengths taken from Sectional Appendix for Network Rail stations and scaled from aerial photographs for WSR Stations. Car or carriage length taken as 23m
(2) Road Transfer times taken from pre Stage 2 consultation work on Park and Ride sites
(3) Details of Bridgwater facilities from National Rail Enquiries Website.

4.3 Selection of Passenger Railhead

4.3.1 Of the potential passenger railheads for HPC reviewed in **Table 4.1** above the sites at Williton and Bridgwater were taken forward and considered in more detail as they appeared the most promising, offering the shortest bus transfer and overall journey time and between them would test the merits of using the West Somerset Railway. This included commissioning an investigation and report by the incumbent train operator First Great Western (FGW) on the feasibility and cost of enhancement options for serving Bridgwater and Williton with additional or through trains for daily commuting using rail. The enhancement options identified are discussed in Section 7.2 and the FGW Report is provided in **Appendix 1**.

4.3.2 **Table 4.2** below compares the rail journey times of these enhancement options.

Table 4.2: Rail Journey Times of Enhancement Options (Minutes)

Railhead	Bridgwater		Williton	
Origin Station	**To Work**	**From Work**	**To Work**	**From Work**
Single Shift				
Bristol Parkway	42	51	97	97
Exeter	48	47	77	81
Double Shift				
Bristol Parkway (am)	44	46	95	105
Bristol Parkway (pm)	45	46	99	96
Exeter (am)	47	48	75	79
Exeter (pm)	46	48	85	77

4.3.3 In addition to the above rail travel times, the journey time will also comprise:

- journey time between home and the origin station;
- interchange time at the origin station;
- interchange time at the local railhead; and
- transfer time between the railhead and the work site at Hinkley Point.

4.3.4 The principal reason for examining Williton in more detail as a passenger railhead was its closeness to the construction site and therefore the opportunity to minimise the bus transfer distance and time. However the transfer time by bus is estimated to be 30 minutes from Bridgwater and 21 minutes from Williton, a saving of just 9 minutes. In comparison the rail journey time to Williton is between 30 minutes and an hour longer than the equivalent rail journey time to Bridgwater.

4.3.5 The overall multi-modal journey times using Williton as a railhead will also exceed the overall journey time threshold for daily commuting of 90 minutes discussed in Section 5.5. This is due to the relative slow speed and additional mileage involved. Services to and from Exeter also have to reverse at Taunton in order to access the West Somerset Railway branch to Williton.

4.3.6 Williton would also be limited to in effect a single train service per shift from the Exeter and Bristol directions where as Bridgwater has the benefit of numerous trains through the day.

4.3.7 The longer journey times, costs of using the West Somerset railway and the absence of other existing main line train services to Williton means that a railhead at Williton appears greatly inferior in comparison to a railhead at Bridgwater due to the journey times and frequency of service that could be provided.

4.3.8 On this basis it is concluded that Williton is unviable as a passenger railhead for Hinkley Point construction workers. It is therefore concluded that the passenger railhead should be at Bridgwater.

5. IMPLICATIONS OF HPC CONSTRUCTION

5.1 Trip Generation

5.1.1 Construction of HPC will generate passenger rail journeys in a number of ways from:

1. the need for construction workers to reach the site on a daily basis;
2. non home-based construction workers getting to and from the area on a weekly, fortnightly or monthly basis;
3. visitors and suppliers agents or representatives visiting the site;
4. workers travelling to potential EDFE sponsored training courses at Bridgwater College; and
5. an increase in business activity to support the non home-based construction workforce who will use serviced and un-serviced accommodation in the area and to a lesser extent the daily commuting workforce.

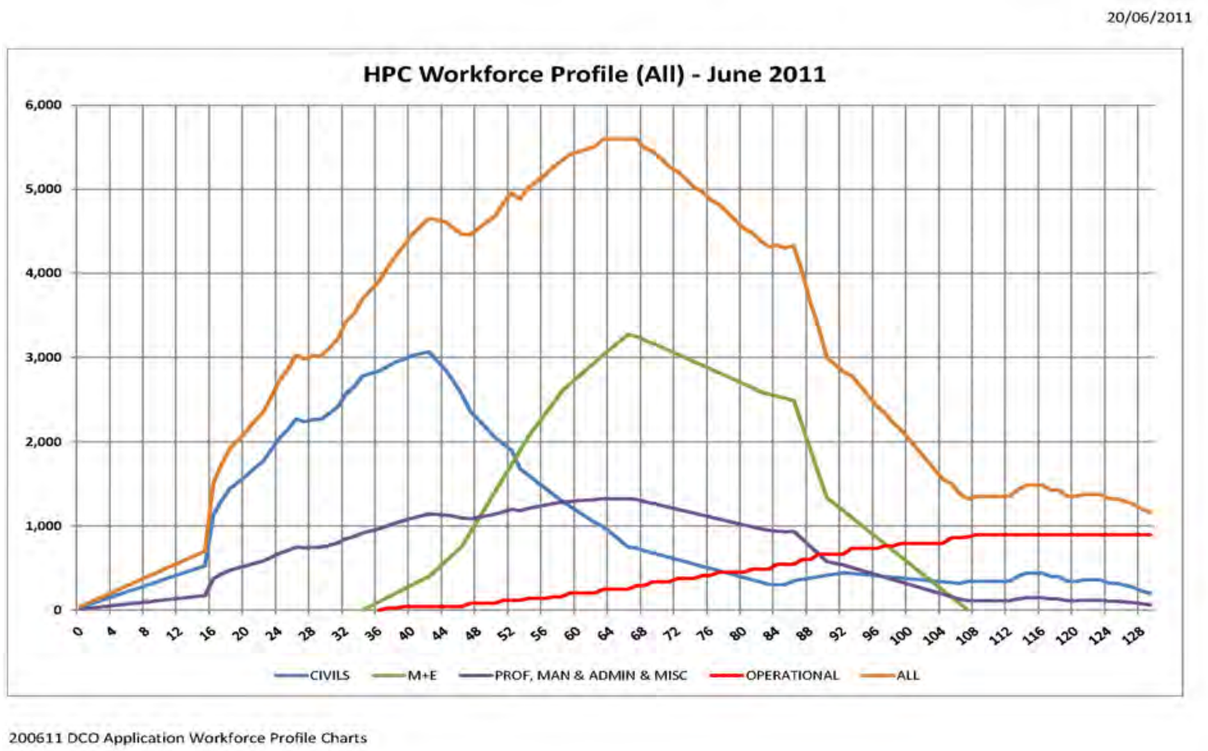
5.1.2 Of the five sources above the majority of numbers and principal concern is with **Source 1** and **Source 2**. The timing and magnitude of the peak flows of these construction workers is dictated by the timings for the start and end of construction work shifts and the distribution of the workforce within the various shifts. The timing and rota pattern of shifts and rest days will also influence the timing of peak demand for **Source 2** travel. **Sources 3** to **5** can be expected to be distributed to an extent throughout the day and are likely to reflect existing commercial and educational travel patterns.

5.1.3 This Technical Note is limited to considering the requirements stemming from the construction workers of **Source 1** and **Source 2** and the likely demand and requirements for rail travel they will generate. These are analysed and discussed in more detail in Section 8. However rail may also assist with **Sources 3** to **5**, particularly if shuttle bus networks are maintained between the railhead and site throughout the working day.

5.2 Construction Workforce

5.2.1 The current estimate of the number of workers required during construction of the plant is shown in **Figure 5.1** below. It peaks in month 64 (nominally October 2016) at 5600 workers of which 250 are operational staff.

Figure 5.1: Estimated Workforce Profile During Construction



5.3 Working Patterns

5.3.1 Subsequent to the first issue of this report and Stage 2 Consultation the planned construction shift timings have been refined in order to give a more gradual arrival and departure of workers to and from the construction site. The intention is now to adopt double shift working within the first year of securing consent for the new power station. It is also anticipated that a night shift will be necessary to prepare in advance for the main shifts thereby maximising their efficiency, for maintenance of construction plant and to recover from overruns.

5.3.2 On Mondays to Fridays the single shift will have onsite start times between 07:00 and 08:30 hours and onsite finish between 16:30 and 18:30 hours.

5.3.3 The double shift times on Mondays to Fridays would have onsite start times between 06:00 and 07:30 and onsite finish between 14:00 and 16:00 hours or after 17:30 for the first shift and an onsite start of 13:30 to 15:00 and onsite finish of between 22:00 and 24:00 for the second shift.

5.3.4 The construction workforce keeping Office Hours would be expected to arrive on site between 07:30 and 09:00 and depart between 17:30 and 19:00.

5.3.5 Night shift times will start between 20:30 and 22:00 and end between 06:00 and 08:00.

5.3.6 At weekends there will also be a Saturday morning shift with shift start times of 06:00 to 08:00 and finish times of 13:00 to 15:00. Certain contractors will also operate a rolling shift pattern in which every other weekend operates with a full shift pattern on Saturday and Sundays with no work on alternate weekends so that non home-based workers will have regular opportunities to return to their families. These will be coordinated so that (other than minor maintenance work) there will be no construction work on site on Saturday afternoon and Sundays on alternate weekends.

5.3.7 The revised shift times are summarised in **Table 5.1** below:

Table 5.1: Revised Shift Times

		Start Times		End Times	
		Earliest	**Latest**	**Earliest**	**Latest**
Normal Weekdays Monday to Friday (1)	Shift 1	06:00	07:30	14.00	16:00 (2)
	Shift 2	13:30	16:00	22:00	00:00
	Night Shift	20:30	22:00	06:00	08:00
	Single Shift	07:00	08:30	16:30	18:30
	Office	07:30	09:00	17:30	19:00
Weekends (1)	Saturday Morning Shift	06:00	08:00	13:00	15:00

Notes:

(1) Normal weekday shift times will also be worked on Saturday and Sunday on alternate weekends by some contactors with mainly non home-based workers

(2) or after 17.30

(3) Times taken from Worker Arrival/ Departure Patterns Rev1 05/05/2011

5.3.8 Current thinking is that the rolling shift patterns to be adopted by Contractors with predominantly non home-based workers will entail working 11 or 12 days consecutively between three day (long) and two day (short) ‘weekends’ when there is no working. This would allow workers on their long weekends to journey home on Thursday afternoon and evening or Friday morning and return on Sunday evening or Monday if returning to the second or night shift. Shift changeovers at the non working weekends between first, second and night shifts might also be utilised to effectively lengthen the long weekend and shorten the short weekend. **Table 5.2** details this alternative weekend shift pattern.

Table 5.2: Alternative Weekend Shift Pattern

Days		Working Day
Week 1	Monday – Friday	Yes
	Saturday – Sunday	Yes
Week 2	Monday – Thursday	Yes
	Friday – Sunday	No (3-day weekend)
Week 3	Monday – Friday	Yes
	Saturday – Sunday	Yes
Week 4	Monday – Friday	Yes
	Saturday – Sunday	No (2-day weekend)

5.3.9 In view of this the availability of trains between 14:30 and 20:30 on weekdays (predominantly Thursdays) for departing workers and between 17:00 and 22:30 for Sundays or returning workers are also of particular relevant for Source 2 passenger rail journeys.

5.4 Construction Workforce per Shift

5.4.1 The peak workforce is assumed to be split between the shifts as per **Table 5.3** below. This also gives the resulting expected numbers per shift for the peak workforce of 5600.

Table 5.3: Construction Workforce Per Shift

Shift Type	Shift Onsite Times		Proportion of Workforce	
	Start	Finish	% of Total	Peak Numbers in 2016
Weekday				
Shift 1	06:00 to 07:30	14:00 to 16:00	26.5	1480
Shift 2	13:30 to 16:00	22:00 to 23:00	25.5	1440
Night Shift	20:30 to 22:00	06:00 to 08:00	7.0	380
Single Shift	07:00 to 08:30	16:30 to 18:30	26.0	1460
Office	07:30 to 09:00	17:30 to 19:00	15.0	840
Weekend (Scenario A)				
Saturday				
Single Shift	06:00 to 08:00	13:00 to 15:00	15.7	880
Office	06:00 to 08:00	13:00 to 15:00	2.5	140
Sunday				
Single Shift	06:00 to 08:00	13:00 to 15:00	5.4	300
Weekend (Scenario B)				
Saturday				
Shift 1	06:00 to 07:30	14:00 to 16:00	13.2	740
Shift 2	13:30 to 16:00	22:00 to 23:00	12.9	720
Night Shift	20:30 to 22:00	06:00 to 08:00	3.4	190
Single Shift	07:00 to 08:30	16:30 to 18:30	17.5	980
Office	07:30 to 09:00	17:30 to 19:00	5.0	280
Sunday				
Shift 1	06:00 to 07:30	14:00 to 16:00	13.2	740
Shift 2	13:30 to 16:00	22:00 to 23:00	12.9	720
Night Shift	20:30 to 22:00	06:00 to 08:00	3.4	190
Single Shift	07:00 to 08:30	16:30 to 18:30	2.7	150
Office	07:30 to 09:00	17:30 to 19:00	1.5	85

5.5 Split of Home and Non Home-based Workforce

5.5.1 The Socio-Economic Studies on the likely source of the workforce indicate that construction workers will fall into two categories:

- Those recruited or living locally who would accept a journey time for daily commuting of up to 90 minutes;
- Non home-based workers recruited from outside the area who stay in local accommodation on a weekly/fortnightly/monthly basis and would accept a journey time for daily commuting of up to 60 minutes.

5.5.2 As part of the Socio-Economic and Transport Assessment work a Gravity Model was developed of where the construction workforce is expected to reside on a ward by ward basis for the region. Within the model workforce numbers are also divided into the likely numbers of home and non home-based workers for each ward.

5.5.3 The assessed split of the workforce in the Gravity Model is summarised in **Table 5.4** below with numbers for the peak workforce of 5600. The non home-based workforce is also subdivided by category of accommodation. Clearly workers living in the Campuses which are located either in Bridgwater or between Bridgwater and the site would not use rail as part of their daily journey to site. The split is predicted to vary over the construction period with proportionally more home-based workers in earlier and later months with the home-based workforce numbers peaking at 1907 in month number 45 (March 2015) and non home-based workers peaking at 3714 in month 66 (December 2016).

Table 5.4: Split of Workforce

Workforce Split	%	Peak Workforce Number
Home-based	34%	1910
Non Home-Based (Campus)	26%	1450
Non Home-Based (Other)	40%	2240
Total	100%	5600

Non Home-based (Other) includes Tourist Accommodation, Private Rented, Owner-Occupied and Latent Accommodation

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6. EXISTING CAPACITY

6.1 Existing Relevant Services and Capacity

6.1.1 As part of the FGW study, trains calling at Bridgwater at suitable times for the assumed construction shift start and end times and Source 1 passenger rail journeys were identified.

6.1.2 However since the FGW work the construction shift times have been refined and staggered starting and ending times are now envisaged.

6.1.3 A fresh view has therefore been taken as to which of the existing services are relevant to the staggered shift start and end times. The selection of trains included varies from that proposed by FGW so as to reflect:

- the spread in available start and end times of the staggered shift patterns now envisaged;
- the night time and ‘office hours’ shifts now envisaged; and
- the interchange time at the railhead and the transfer time between the railhead and the site.

6.1.4 The analysis was also extended to consider services relevant to Source 2 passenger rail journeys.

6.1.5 The December 2010 to May 2011 weekday, timetables for trains passing through Bridgwater are presented in tabular form in **Appendix 3**. The tables also include FGW and XC services which do not currently stop at Bridgwater and potential additional services for EDFE identified by FGW in their study report.

6.1.6 The non stopping services are of the long distance high speed (LDHS) type. Based on the timings of other LDHS services which stop at both Bridgwater and Taunton, it is assumed that these non stopping trains will pass through Bridgwater 11 minutes before or after their stop at Taunton.

6.1.7 The following analysis is based on the December 2010 to May 2011 timetable. Initial inspection of the current timetable (May 2011- December 2011) suggests that the only significant change are that two of the northbound LDHS (HST) type trains operated by FGW no longer call at Bridgwater at 07:05 and 07:23.

6.1.8 For Source 1 staggered shift times, trains are considered to be relevant for a shift start or end if, allowing for the station interchange and transfer time to site, they would:

- Give an early arrival time on site by no more than 30 minutes before the earliest shift start time or an arrival time on site no later than the last shift start time; and
- Require departure from the site by no earlier than the earliest shift end time or if leaving at the latest shift end time would not involve waiting for more than 30 minutes.

6.1.9 It is stressed that this is a first pass assessment of relevant trains for capacity evaluation of existing services. A more detailed assessment of train services aligned to shift patterns is contained in **Section 8 Assessment of Potential Usage**.

6.1.10 A transfer time of 30 minutes and an interchange time of eight minutes is assumed, a total of 38 minutes.

6.1.11 For Source 2 passenger rail journeys generated by non home-based workers making trips to and from their homes the relevant times are taken as 14:30 to 20:30 on weekdays (Thursdays) and 17:30 to 22:30 on Sundays

6.1.12 The resulting range of arrival and departure times at Bridgwater for relevant trains are tabulated in **Table 6.1** for each shift.

Table 6.1: Range of Arrival and Departure Times for Relevant Trains for Railhead at Bridgewater

		Start		End	
		Earliest	Latest	Earliest	Latest
Normal Weekdays Monday to Friday (1)	Shift 1	04:52	06:52	14:38	17:08
	Shift 2	12:22	14:22	22:38	01:08
	Night Shift	19:22	21:22	06:38	09:08
	Single Shift	05:52	07:52	17:08	19:38
	Office	06:22	08:22	18:08	20:08
Weekend Working (1)	Saturday Morning Shift	04:52	07:22	13:38	16:08
Weekend Trips Home (2)	Weekdays (Thursdays) Departure			14:30	20:30
	Sunday Arrival	17:30	22:30		

(1) Normal weekday shift times will also be worked on Saturday and Sunday on alternate weekends by some contactors with mainly non home-based workers

(2) By non home-based workers

6.1.13 The relevant trains identified are highlighted yellow in the Tables of train times in **Appendix 4.** These Tables also include XC trains which currently pass through Bridgwater without stopping and the potential additional services for EDFE identified by FGW in their report. The latter will need to be reconfirmed against future timetables as there have been a number of minor timetable changes during the day and some significant changes in the late evening since the FGW report.

6.1.14 The following sections consider the availability of relevant services in the existing weekday timetable.

6.2 Existing Relevant Services for First Shift of Double Shift Working (Weekdays)

6.2.1 For the first shift with double shift working there is only one suitable train arriving from the north at 06:03 which is from Bristol Temple Meads. The next train calls at 07:25 while the first southbound Cross Country train which passes through Bridgwater at about 06:57 both of which are too late.

6.2.2 In the afternoon there are two suitable northbound trains at 15:27 and 16:28 all of which run via Filton to Cardiff and have good connections to Bristol Parkway giving an arrival time eight minutes after that for Filton. However these trains are slow typically taking 63 minutes to reach Filton or 71 minutes to Bristol Parkway by changing at Bristol. There are also potentially four suitable Cross Country trains which pass through Bridgwater at 15:05, 15:23 16:02 and 17:05 and would give a much faster journey time of about 35 minutes to Bristol Parkway

6.2.3 Existing capacity from the Bristol direction is therefore likely to be limited by the single available southbound train in the morning which is shared with the single shift.

6.2.4 From the south there are three suitable trains. The first two from Taunton arriving at 05:42 and 06:13. The first possible arrival from Exeter is at 06:46. Only the first train is not shared with the single shift. The first northbound Cross Country train also passes through Bridgwater at about 07:02 which is just too late.

6.2.5 In the afternoon there are three suitable southbound trains calling at Bridgwater at 14:42, 15:45, and 16:45. There are also potentially suitable southbound Cross Country services passing through Bridgwater at 15:07, 15:35, 16:06 and 17:06.

6.3 Relevant Services for Second Shift of Double Shift Working (Weekdays)

6.3.1 For the second shift there are two suitable southbound arrivals at 12:40 and 13:42. Southbound Cross Country Trains are also estimated to pass through Bridgwater at 13:07and 14:06.

6.3.2 In the evening there is one available northbound service to Bristol Temple Meads but this is subject to a number of changes to running times throughout the year reflecting planned maintenance work due to call at Bridgewater at 22:57 or 23:12. The journey time of this service is extended taking up to 75 minutes to reach Bristol Temple Meads. There are no onward connections available to Filton or Bristol Parkway. The last northbound Cross Country train is estimated to pass through Bridgwater at 21:29 about 70 minutes too early.

6.3.3 From the Exeter direction there are two suitable trains calling at Bridgwater at 13:19 and 14:19. Only the 14:19 runs from Exeter, the 13:19 runs from Taunton with connections from Exeter. There are also Cross Country Trains passing through Bridgwater at 13:02, 13:27 and 14:05.

6.3.4 In the evening there are three suitable southbound trains from Bridgwater as far as Exeter at 22:48, 00:09 and 00:25. The last is an HST. The last southbound Cross Country Trains service is estimated to pass through Bridgwater at 21:35 which is 63 minutes too early.

6.4 Existing Relevant Services for Night Shift Working (Weekdays)

6.4.1 There are two relevant southbound FGW service for the start of the night shift arriving at Bridgewater at 19:48 and 20:49. A third could be provided if the FGW HST service passing through at 20:10 also stopped.

6.4.2 In the morning there are five available northbound trains at 06:48, 07:05, 07:23, 07:40 and 08:48.

6.4.3 There are two relevant northbound services for the start of the shift at 19:29, and 20:42. An HST service also passes through Bridgwater at an estimated time of 21:25 but does not currently stop.

6.4.4 There are two available southbound services at the end of the shift at 07:25 and 08:08 but the second terminates at Taunton.

6.5 Existing Relevant Services for Single Shift Working (Weekdays)

6.5.1 For the 07:00 to 08:30 on site start of the single shift there are two potential trains from Bristol and the north arriving at Bridgwater at 06:03 and 07:25. The first train only runs from Bristol Temple Meads. The second now runs from Bristol Parkway (in 2010 it was Bristol Temple Meads). There is also a Cross Country Trains service from Bristol Temple Meads estimated to pass through Bridgwater at 06:57. The first southbound Cross Country Train from Bristol Parkway would pass through Bridgwater at 08:32 which is too late.

6.5.2 In the evening there are three suitable FGW northbound services calling at Bridgwater at 17:17, 18:19 and 19:29. The first two run via Filton to Cardiff and give good connections to Bristol Parkway, the third runs only as far as Bristol Temple Meads. Alternatives would be available were northbound Cross Country services to stop at Bridgwater. These are estimated to pass through Bridgwater at 17:05, 17:32, 18:02 and 19:05.

6.5.3 From the south and Exeter direction there are three suitable trains arriving at Bridgwater at 06:13, 06:46 and 07:40, the first train only running and picking up from Taunton. Two HST services from Exeter to London also used to call at Bridgwater at 07:05 and 17:23 in previous timetables but no longer stop. There are also Cross Country Trains estimated to pass through at Bridgwater at 07:02, 08:02 and 08:23 which would be suitable were they to stop at Bridgwater.

6.5.4 In the evening there are three existing southbound trains at suitable times of 17:46, 18:49 and 19:15 but these only go as far as Taunton where onward connections are available into Cross Country trains giving arrival times in Exeter of 17:46, 18:49 and 20:10 respectively. The connection also extends journey time to Exeter to approximately one hour compared to 35 minutes for some through services. A better service would be available if some or all of the Cross Country trains which currently pass through Bridgwater at 17:06, 17:35, 18:07 and 19:06 were to call at Bridgwater.

6.6 Existing Relevant Services for Office Hours Working (Weekdays)

6.6.1 The relevant existing FGW services for Office Hours working all correspond with services relevant to single shift working with the exception of an additional 19:48 departure from Bridgwater to Taunton with connections beyond.

6.7 Existing Relevant Services for Weekend Working

6.7.1 A similar exercise was carried out for weekend working using the Saturday and Sunday timetables. This identified that journey opportunities were more limited on Saturdays whilst on Sundays there were no suitable existing trains for at least one leg of the first, second and single shifts.

6.8 Existing Relevant Services for Weekend Journeys Home

6.8.1 A similar exercise was carried out for weekend journeys home and Sunday timetables.

6.8.2 For departing workers (on Thursdays) there are five existing northbound and eight existing southbound trains while there are eight XC trains in each direction which do not currently stop at Bridgwater.

6.8.3 For returning workers (on Sundays) there are five existing northbound trains and five existing southbound trains while there are three to five northbound and six to seven southbound XC trains which do not currently stop at Bridgwater.

6.9 Existing Relevant Capacity

6.9.1 The current franchise holder FGW was approached in order to ascertain the rostered capacity and likely spare capacity on the relevant trains identified above. However in common with other Train Operators FGW consider details of their rolling stock rosters and passenger loadings to be commercially sensitive information. It has not therefore been possible to include specific details of all relevant trains in this report.

6.9.2 FGW where however able to indicate in broad terms a conservative assessment of the summation of spare capacity that is currently available (Spring 2011) for each of the proposed weekday shifts. In doing so FGW also advised that they have been experiencing strong growth in rail travel in the West Country so figures for current capacity would not necessarily apply in subsequent years.

6.9.3 The identified relevant trains for each shift and the indicated capacity for each shift is presented in **Appendix 4** and summarised in **Table 6.2** below.

6.9.4 There are overlaps in the relevant trains for shifts, principally between arrivals in the morning for single shift, first double shift and office hours and between departures in the evening of single shift and office hours workers. An overview of capacity must therefore be maintained to avoid double counting. However workers on the night shift will be travelling in the opposite direction (going home vs going to work) so they will use different legs of any train services also used by the daytime workers without double counting.

On this basis the overall available existing capacity for the key combination of single, first and office shifts requiring inbound arrivals in the morning would appear to be 600 HPC workers commuting from the Exeter and south west direction and 200 HPC workers commuting from the Bristol and north-west direction.

Table 6.2: Summary of Existing Spare Capacity

Shift	From Bristol and North to Bridgwater			From Exeter and South to Bridgwater		
	Inbound	Outbound	Limit	Inbound	Outbound	Limit
Single Shift	200	300	200	475	525	475
1st of 2 Shifts	125	175	125	450	300	300
2nd of 2 Shifts	225	200	200	225	525	225
Night Shift	250	450	250	350	150	150
Office Hours	150	250	150	250	500	250
Morning Combination Limit (1)						
Single Shift	200			475		
1st of 2 Shifts (2)	0			125		
Office Hours	0			0		
Total	**200**		**200**	**600**		**600**
Evening Combination Limit (1)						
Single Shift		300			525	
Office Hours (3)		0			100	
Total		**300**	**300**		**625**	**625**

(1) Relevant inbound services for Single Shift, 1st of 2 Shifts and Office hours and outbound services for Single Shift and Office Hours generally overlap

(2) Additional capacity from Northbound service calling at 05:42

(3) Additional Capacity from Southbound service calling at 19: 48

7. POTENTIAL SERVICE ENHANCEMENTS BY EDFE

7.1 General

7.1.1 Whilst the existing timetable of rail services offers the possibility of daily commuting to a railhead at Bridgwater, journey opportunities are limited and in some instances curtailed by trains which start or terminate at Bristol Temple Meads and Taunton. Journey times are also significantly extended on some trains particularly in the evening.

7.1.2 Service enhancement options for train services have therefore investigated. These could take the form of:

- additional trains to be provided by the local passenger franchise holder First Great Western (FGW);
- introducing stops at Bridgwater for selected Cross Country Trains (XC) long distance services which currently pass through but do not stop at Bridgwater;
- increasing capacity by adding additional vehicles to existing trains; and
- improving journey opportunities by extending existing train services for instance starting northbound trains for Cardiff or Bristol at Exeter rather than Taunton.

7.2 Feasibility of Service Enhancements

7.2.1 As part of the Study commissioned by EDFE from FGW, FGW were successful in identifying one appropriate train path per shift start or shift end between a railhead at Bridgwater or at Williton and both Bristol Parkway to the north or Exeter to the south for each of the three shift periods then under consideration (the single shift and each of the two double shifts).

7.2.2 The potential additional services identified by FGW are still broadly relevant and appropriate to the staggered shift times now envisaged with the exception of the night shift which was not considered. However the feasibility and timings will need to be re-confirmed for the current timetable as there have been minor time adjustments to FGW services in the morning and evening peaks and some major re-timings in the late evening since FGW study. Further optimisation for the revised shift pattern and demand may also be possible. It is likely that there will be greatest scope for adjustments with the early morning and late evening services as the network is less busy at these times.

7.2.3 The study commissioned from FGW did not specifically consider the feasibility of increasing the capacity of existing services by adding more vehicles. An advantage of lengthening trains when compared to the provision of additional trains is that lengthened trains can provide additional capacity by definition within the existing timetable, typically without requiring additional train crew. Long distance trains with up to eight vehicles already use the route and call at the principal stations under consideration (the exceptions being Bedminster, Parson Street and Filton Abbey Wood). However issues may arise including:

- the availability of additional suitable rolling stock;
- diagramming rolling stock such that the additional vehicles are in the right place for the appropriate trains at shift times;
- diagramming rolling stock with end corridor connections so that access is retained through the train;
- the existing local trains on the Bristol Exeter route generally consist of between two and four cars (vehicles);
- platform lengths at Filton Abbey Wood, Bedminster, Parson Street and Worle are four cars long (platforms at Bridgwater are eight cars long);
- available length of platforms at other stations used by those local services which run beyond the Bristol Exeter route;
- health and safety requirements for the provision for selective door opening on trains equipped with automatic doors when train length exceeds platform length; (Diesel Multiple Units (DMUs) used on local services have automatic doors, long distance HST services do not);
- the availability of stabling and layover sidings of sufficient length; and
- additional mileage if left attached to off peak services.

7.2.4 These issues should not preclude lengthening but can only be addressed with certainty at a more detailed stage.

7.2.5 The extension of services to improve overall journey opportunities is another possibility. To confirm the feasibility of extending a service would require detailed examination of the timetable and the affected rolling stock and crew rosters so has not been pursued at this stage.

7.2.6 XC trains have also confirmed that in principle they foresaw no reason why calls could not be introduced at Bridgwater on their long distance trains. They also advised that whilst they would need to put a station access agreement in place with FGW to use Bridgwater station this and other issues had not been an insurmountable problem where XC had introduced stops at other stations that were over and above XC's Franchise commitments. A decision would therefore be dependant on commercial considerations.

7.2.7 Outside receipts from the HPC workforce, commercial considerations are likely to include: station access costs; additional fuel costs; the impact of and agreements over fare abstraction and apportionment on and with other operators and the impact on XC revenues of additional journey time verses additional journey opportunities.

7.3 Enhancement Options with FGW

7.3.1 FGW also identified a number of options for the type and capacity of rolling stock to be used on these enhancement services. With the exception of the option for stopping additional HST (Intercity 125/ High Speed Train) services at Bridgwater, all options required additional rolling stock and or resources and incur costs for additional mileage. HST services making additional calls at Bridgwater would incur cost from using additional fuel and fare abstraction due to extended journey times.

7.3.2 The availability of additional rolling stock is however unclear at this stage. Shortages of suitable diesel multiple units (DMUs) have lead to FGW using locomotive hauled sets on some Cardiff-Taunton services in the recent past. However impending electrification and the delivery of new electric trains for other routes on the rail network can be expected to ease the situation.

7.3.3 An annual operating cost estimate was also provided including rolling stock leasing charges, crew and mileage related costs and one off costs for refurbishment (refreshing) of leased rolling stock. The fare box revenue from members of the general public using these additional services was also estimated offsetting the annual costs slightly.

7.3.4 Services for a railhead at Williton will also incur additional infrastructure and operational costs associated with using the West Somerset Railway. Infrastructure costs potentially comprise costs for lengthening platforms, new footbridges, extending existing and providing additional passing loops, modifications to signalling, upgrading level crossings and upgrading track work. Operational costs would be incurred for signalling, training track maintenance operatives and maintaining a higher level of certification.

7.3.5 Initial costing provided to FGW by the West Somerset Railway were Capital Expenditure £15.25m and Annual Operational Expenditure £276k. These costs would be in addition to the costs in **Table 7.1** but would only apply to the options that used the railhead at Williton on the West Somerset Railway.

7.3.6 These appear to be 'ball park' costs anticipating greater impact from the EDFE sponsored services than is apparent for the service options proposed by FGW. In our view the scope of the new infrastructure works in particular and hence the capital costs could be radically scaled back.

7.3.7 In view of the conclusions that the railhead should be at Bridgwater, this aspect is not examined further here.

The service enhancement options identified by FGW are summarised in **Table 7.1** below. Options 1.1 to 1.8 are for single shift working. Options 2.1 to 2.7 are for two shift working at the site.

Table 7.1: Summary of Service Enhancement Options

Option Ref.	Service	Origin	Railhead	Depart Origin	Arrive Railhead	Depart Railhead	Arrive Origin	Capacity	First Cost (£000)	Annual Fare Box Receipts (£000)	Annual Operational Cost [1] (£000)
1.1	4 Car Class 150	Bristol Parkway	Bridgwater	06:26	07:08	19:24	20:15	280	£90	£13	£421
1.2	3 Car Class 150	Bristol Parkway	Bridgwater	06:26	07:08	19:24	20:15	215	£0	£13	£185
1.3	8 Car Loco hauled	Bristol Parkway	Bridgwater	06:26	07:08	19:24	20:15	480	£0	£64	£2,102
1.4	Additional HST Stops at Bridgwater	Various	Bridgwater	Southbound (Down)calls at 09:35, 12:20 and 20:15, Northbound (Up) calls at 09:15,11:30 and 21:20				[2]	£0	£-186	£260
1.5	2 Car Class 150	Exeter	Bridgwater	06:06	06:54	18:50	19:37	140	£180	£8	£421
1.6	4 Car Class 150	Bristol Parkway	Williton	05:19	06:56	18:57	20:34	280	£360	£57	£773
1.7	2 Car Class 150	Bristol Parkway	Williton	05:19	06:56	18:57	20:34	140	£180	£57	£462
1.8	2 Car Class 150	Exeter	Williton	05:50	07:07	19:06	20:27	140	£180	£2	£458
2.1	8 Car Loco hauled	Bristol Parkway	Bridgwater	05:11	05:55	14:30	15:16	480	£0	£40	£2627
				13:01	13:46	22:04	22:50	480			
2.2	4 Car Class 150	Bristol Parkway	Bridgwater	05:11	05:55	14:30	15:16	280	£0	£8	£696
				13:01	13:46	22:04	22:50	280			
2.3	Additional HST Stops		Bridgwater	No more suitable times see Option 1:4							
2.4	2 Car Class 150	Exeter	Bridgwater	05:27	06:14	14:11	14:59	135/140 [4]	£0	£3	£227
				12:55	13:41	22:11	22:59	140			
2.5	4 Car Class 150	Bristol Parkway	Williton	04:30	06:05	14:00	15:45	280	£360	£28	£1084
				12:01	13:40	22:00	23:36	280			
2.6	2 Car Class 150	Bristol Parkway	Williton	04:30	06:05	14:00	15:45	140	£180	£28	£648
				12:01	13:40	22:00	23:36	140			
2.7	2 Car Class 150	Exeter	Williton	04:40	05:55	14:20	15:39	140	£180	£7	£568
				12:32	13:57	22:12	23:29	140			

Notes:

(1) Includes offset by Farebox receipts

(2) Current spare capacity is seasonal. FGW advise that sufficient capacity generally exists on these services for the carriage of a relatively small number of visitors but that in summer the loads on these services can be particularly heavy

(3) The costs of Options to serving a railhead at Williton do not include capital and operational costs from the West Somerset Railway

(4) Capacity of inbound am service limited to 135 since it replaces the existing 06:01 Taunton- Cardiff service.

7.4 Enhancement Options with XC

7.4.1 As discussed above XC trains run Long Distance High Speed ‘express’ services on the Bristol to Exeter route through Bridgwater. None of these services currently stop at Bridgwater but XC have confirmed that in principle stops could be introduced at Bridgwater to cater for HPC generated traffic, subject to necessary access agreements being in place and it being financially viable to them.

7.4.2 A response is awaited from XC trains as to which trains that are relevant to HPC commuting and journeys home by non home-based workers could stop at Bridgwater, what their spare capacity might be and indicative costs. In the interim, the FGW service improvements outlined in **Table 7.1** serve as a proxy for estimated costs.

8. ASSESSMENT OF POTENTIAL USAGE

8.1 Daily Commuting (Source 1)

8.1.1 In order to establish the number of employees that could feasibly use rail to access Bridgwater Station as part of their daily commute, the gravity model for employee distribution was utilised.

8.1.2 The gravity model shows the expected distribution and location of 4150 home and non home-based workers for the main works within a respective 90 and 60 minute commute of the main site. As explained in Section 5.4 it is expected that up to a further 1450 Non Home-based workers would be accommodated in the construction campuses providing a combined peak workforce of up to 5600. By definition however the Campus based workforce would not use rail for their daily commute.

8.1.3 The model was subjected to a number of sifts in order to identify the potential workforce usage of rail for commuting.

8.1.4 At this stage it is unknown what financial incentives (if any) will be provided by the Contractor to encourage travel by rail. Therefore, to enable a direct comparison with Bus Based park and ride the analysis has focused on journey time and therefore convenience as the determining factor when comparing travel choice.

8.1.5 The **first sift** removed all wards with no workers within them. Each ward was then assigned to it's nearest available train station based on distance.

8.1.6 The **second sift** was to remove all the train stations where the combined journey time on the train and connection time to the main site exceeded 90 minutes.

8.1.7 The rail journey leg time between the origin and Bridgwater Stations was taken as the shortest journey time for the slowest direction for existing services in the current timetable.

8.1.8 The connection time was set at 45 minutes and is made up from a predicted 30 minute bus transfer travel time from Bridgewater Station to the main HPC site and a combined 15 minute lag allowance for interchanges at Bridgwater Station and the origin station and assumed to include such activities as parking a car/bike arriving in time to allow for delays etc and walking. This first sift removed Bristol Parkway, Filton Abbey Wood Bedminster and Parson Street stations as overall journey times exceeded 90 minutes for these stations see **Table 8.1** below.

Table 8.1: Combined Journey Time with Existing FGW Rail Services

Origin Stations	Existing FGW Services					
	Journey Time of Rail Leg			Connection Time	Combined Journey Time	Use Rail
	To Bridgwater	From Bridgwater	Assumed			
Bristol Parkway	59-75	75 -85	75	45	120	No
Filton Abbey Wood	58-67	62-76	62	45	107	No
Bristol Temple Meads	39-54	46-66	46	45	91	Yes
Bedminster	51	49-58	51	45	96	No
Parson Street	49	47-58	49	45	94	No
Nailsea & Backwell	37-41	35-50	37	45	82	Yes
Yatton	32-36	29-41	32	45	77	Yes
Worle	26-29	23-35	26	45	71	Yes
Weston Milton	24-25	24-30	24	45	69	Yes
Weston Super Mare	18-21	18-21	18	45	63	Yes
Highbridge & Burnham	8	7-8	8	45	53	Yes
Bridgwater						
Taunton	10-13 (50)	14-19	14	45	59	Yes
Tiverton Parkway	25-30 (50)	29-(44)	29	45	74	Yes
Exeter St Davids	35-48 (64)	42-58	42	45	87	Yes

Notes
Journey times taken from December 2010 to May 2011 timetable

8.1.9 The **third sift** removed those wards where Bridgwater Station was the nearest station as it is considered that these employees would travel direct to the P & R sites.

8.1.10 The **fourth sift** utilised a route finder to generate the travel time by car from the centre of each ward to its nearest assigned train station. This journey time was then added to the minimum journey time leg on the train and the 45 minute connection time (formed of the 30 minute bus journey from Bridgwater Station to HPC and a lag time of 15 minutes to allow for the interchange). This generated a total journey time from each ward to site. Those wards with journey times over 90 minutes for home-based workers were removed and then those with journey times over 60 minutes for non home-based workers were removed.

8.1.11 This highlighted that if shifts and train times were fully aligned, up to 828 of the 4150 employees could travel by rail or 20% of the total non campus based workers. Of the 828 employees 744 were home-based and 84 were non home-based.

8.1.12 Breakdowns by origin station and shift are presented in **Appendix 5**. The breakdowns are summarised by origin station in **Table 8.2** below.

Table 8.2: Workforce with Potential to Commute by Rail

Stations	Home-based Workers	Non Home-based Workers	All Workers
Bristol Temple Meads	5	0	241
Nailsea & Backwell	25	0	25
Yatton	63	0	63
Worle	74	0	74
Weston Milton	52	0	52
Weston Super Mare	69	0	69
Highbridge & Burnham	158	84	242
Taunton	264	0	264
Tiverton Parkway	33	0	33
Exeter St Davids	0	0	0
Total	**744**	**84**	**828**

Notes
Remove all stations outside of a 90 minute commute
Remove all wards with zero workers
Remove all wards where Bridgwater is the nearest station
Remove all wards where the total journey time exceeds 90 minutes for home-based workers
Remove all wards where the total journey time exceeds 60 minutes for non home-based workers
Rail Journey time taken as Assumed value in Table 8.1

8.1.13 The **fifth sift** was to assign each of the five shift patterns with a train service from the weekday timetable for each station that would allow workers to arrive in time for the start of the shift. This sift removed a large number of the stations as the existing train services do not run early enough or the off peak services that had longer journey times.

8.1.14 Having assigned the workers an arrival time based on the arrival time of the most convenient train, the workers were then assigned a finishing time at site that corresponded with their start time. This allowed for an arrival time at Bridgwater Station for the return journey to be deduced and as such a suitable train service assigned. This **sixth sift** removed more stations as the connection times and delay at Bridgwater Station meant that there would not be a suitable return journey. **Appendix 6** details the analysis for the **fifth and sixth sift.**

8.1.15 This **sixth sift** highlighted that up to 239 employees could travel by rail taking into account journey times and the shift patterns. The 239 employees represent 5.8% of the total non campus based work force and is made up from 239 home-based workers only with no non home-based workers.

8.1.16 The resulting breakdowns by origin station and shift are presented in **Appendix 5**. The breakdowns are summarised by origin station in **Table 8.2** below.

Table 8.3: Workforce with Potential to Commute by Rail for Proposed Shifts

Stations	Home-based Workers	Non Home-based Workers	All Workers
Bristol Temple Meads	0	0	0
Nailsea & Backwell	0	0	0
Yatton	2	0	2
Worle	13	0	13
Weston Milton	3	0	3
Weston Super Mare	47	0	47
Highbridge & Burnham	109	0	109
Taunton	64	0	64
Tiverton Parkway	0	0	0
Exeter St Davids	0	0	0
Total	**239**	**0**	**239**

8.1.17 The **seventh sift** looked at the likelihood that employees would use rail rather than travel by car and via the P&R sites by comparing overall journey times.

8.1.18 To enable a comparison the same exercise has been undertaken for the journey time from the ward to the nearest P&R site (M5 Jcn 23 and 24, Cannington and Williton).

8.1.19 To establish the likely journey time via the Park and Ride (P&R) sites a similar GIS based assessment has been undertaken to that for the railway stations. The assessment assigned each ward to its nearest P&R site and then calculated drive time from the centre of the ward to the P&R site (using a route planner). The travel time by car between the ward centre and allocated P&R site was then added to the 30 minute connection from P&R sites (15 minutes for Cannington P&R) to HPC together with a lag time of 10 minutes to allow for the interchange, such as parking a car/bike and arriving in time to allow for delays etc.

8.1.20 The comparison removed those journeys where the total time by rail exceeded the total time by car and P&R (including transfers) allowing a five minute preference for rail; this revealed that there were 81 employees that would be likely to use rail or less than two percent of the 4150 workers.

8.1.21 The resulting breakdowns by origin station and shift are presented in **Appendix 5**. The breakdowns are summarised by origin station in **Table 8.4** below.

8.1.22 The origin station for half of these 80 employees was Highbridge & Burnham which is close to the P&R site at Junction 23. This suggests that that the analysis has over estimated rail's likely modal share as travelling by train via Bridgwater in these circumstances is unlikely unless employees had no option when initiating their journeys other than walking to the station.

Table 8.4: Workforce with Potential to Commute by Rail in preference to P&R

Stations	Home-based Workers	Non Home-based Workers	All Workers
Bristol Temple Meads	0	0	0
Nailsea & Backwell	0	0	0
Yatton	0	0	0
Worle	0	0	13
Weston Milton	0	0	3
Weston Super Mare	22	0	22
Highbridge & Burnham	40	0	40
Taunton	19	0	19
Tiverton Parkway	0	0	0
Exeter St Davids	0	0	0
Total	**81**	**0**	**81**

8.1.23 The above assessment takes no account of the preference of mode travel by the employees or the cost to the employee. Rail enhancements could also improve journey times and the alignment of journeys at the start and end of shifts such that a greater number of workers could commute using rail.

8.1.24 The potential for additional services to serve Bridgwater has therefore been investigated. Discussions with Cross Country trains revealed that it may be possible for their services on the Bristol and Exeter route to call at Bridgwater (these services currently do not call at Bridgwater).

8.1.25 For the purposes of testing the potential the proposed improvements have to increase the workforce able to commute by rail 40 additional XC services have been added to the timetable assuming they could stop at Bridgwater. They comprise of:

- twenty southbound services from Bristol Parkway to Exeter stopping at Bristol Temple Meads and Bridgwater before continuing to Taunton, Tiverton Parkway, Exeter St. David's and often beyond; and
- twenty northbound services between Exeter St. David's and Bristol Parkway stopping at Tiverton Parkway, Taunton and Bridgwater before continuing to Bristol Temple Meads and Bristol Parkway.

8.1.26 Potential rail improvement options have been investigated this revealed that potentially the 239 employees from **six sift** would increase to 364 with the proposed improvements, an increase of 125 employees (**Appendix 6** details this analysis). When the **seventh sift** is applied the improvement options increases the number of employees likely to travel by rail from 81 to 119, an increase of 38 employees. **Table** 8.5 summarises.

Table 8.5: Workforce with Potential to Commute by Rail in preference to P&R with improvements

Stations	Home-based Workers	Non Home-based Workers	All Workers
Bristol Temple Meads	14	0	14
Nailsea & Backwell	0	0	0
Yatton	0	0	0
Worle	0	0	0
Weston Milton	0	0	0
Weston Super Mare	34	0	34
Highbridge & Burnham	40	0	40
Taunton	31	0	31
Tiverton Parkway	0	0	0
Exeter St Davids	0	0	0
Total	**119**	**0**	**119**

8.1.27 To achieve the increase of 38 employees five trains additional trains are required to align with the shift patterns as summarised in **Table 8.6** below. Detailed analysis is presented in **Appendix 5**.

Table 8.6: Additional Train Services

Employee Direction	Train Time (Arrival/Departure)	Train Direction	No. of Employees
Time In	07:02	Northbound	12
Time Out	15:35	Southbound	
Time In	21:08	Southbound	10
Time Out	08:02	Northbound	
Time In	06:03 *	Southbound	16
Time Out	15:23	Northbound	
Total			**38**

** Denotes an existing train service*

8.1.28 In the work undertaken by FGW reported in Section 7.3 above the annual cost of providing and operating a two car diesel multiple unit (DMU) was put at in the range of £225 and £450k per year depending on diagramming and mileage covered. Assuming one such two car DMU could provide for all the additional service requirements this would equate to a cost of £6k to £12K per additional employee commuting by rail.

8.1.29 Similarly the cost of introducing stops at Bridgwater on six HST weekday services that do not currently stop at Bridgwater was put at £260k per year, an average of some £40k per service stopping 70% of which was due to loss of receipts due to the extended through journey times. The cost of stopping XC trains is likely to be of a similar order of magnitude implying an annual cost of £200k for the five XC trains identified as needing to stop (see **Table 8.6**). Again this would equate to some £5k per annum per additional employee commuting by rail.

8.1.30 In addition these costs would apply while provision is made but the numbers commuting can be expected to follow the workforce profile and so will generally be less than the 38 assessed for the peak workforce. Thus the cost per employee commuting will on average be greater still.

8.1.31 On this basis the necessary rail enhancements to attract the additional 38 employees appear unrealistically expensive for the benefit achieved.

8.1.32 It is considered that the assessment is robust and an upper estimate of the numbers likely to use rail for the following reasons:

- The travel time to the station has been calculated for a car based trip. If the assessment was based upon walking or cycling times the numbers would be lower.
- A 15 minute lag time has been allowed for rail and a 10 minute lag time for cars at the P&R even though rail time involves two connections and the P&R involves only one connection. Fifteen minutes is therefore considered to be a conservative estimate of lag time for rail.
- When comparing modes by overall journey time in rail passenger demand forecasting it is common to double the interchange time as a weighting factor to account for passengers dislike of interchange and the consequential waiting times. Factoring in this weighting would further reduce the numbers opting to use rail.
- The analysis has been undertaken using the weekday timetable. However as weekend working is planned using the weekday shift patterns for a proportion of he workforce, workers will also need to commute on Saturdays and Sundays when timetabled services are inferior. Travel by train will not be possible for some shifts particularly on Sundays. Therefore workers will need to make provision for travelling on days when rail is not an option. This is likely to further reduce numbers choosing rail as they will not then be reliant on rail.

8.1.33 Full analysis of worker travel options by ward is presented in **Appendix 7.**

8.2 Non Home-based Workers (Source 2)

8.2.1 It is expected that a proportion of non home-based workers will use rail for travel between their homes and the HPC Area. Prediction of these flows is complicated by a number of uncertainties including:

- the working patterns and whether home travel will be weekly, fortnightly or monthly;
- on which days of the week home travel will be made for instance if working consecutive days for two or more weeks, long weekends may be taken perhaps spreading travel times from Thursday to Tuesday;
- whether there is flexibility for the first shift back to start late and last shift before departure to finish early to allow for travel home. Workers may also transfer between shifts on a rolling basis to the same end;
- whether departing workers will travel home directly after their last shift or via their local accommodation to pick up luggage;

- whether their journey home can be completed that day by train after their shift end or they would have to travel overnight or wait until the following day;
- whether workers will be travelling singly or with co-workers to and from a region-single travel may favour rail, group travel may favour private vehicle shares;
- whether company road transport is available to them as might typically be the case with sub-contractors;
- whether their local accommodation is within easy reach of a rail station or if in a campus has suitable 'shuttle' connections available;
- the proportion of non home-based workers by total workforce and by shift pattern worked. For instance disproportionately more non home-based workers may work the fist second and night shifts while home-based workers may predominate in the single and office shifts; and
- a model of the origin (home) of the non home-based workforce is not available.

8.2.2 It is a requirement that construction work on Saturday afternoons and Sundays will generally only undertaken on alternate weekends so that there is no construction work other than light maintenance work on one weekend in two. It is therefore expected that some Contractors will adopt a rolling shift pattern working 11 or 12 consecutive days including Saturdays and Sundays typically separated by alternating short two day and long three day 'weekends' when no work will programmed (**Table** 5.2 refers)**.** This will enable non home-based workers to visit their families on the long weekends at typically four weekly intervals.

8.2.3 In order to make an upper bound estimate of these flows the following was assumed for the peak workforce:

- travel home would be every four weeks with half the workers travelling on each of the non working weekends;
- rail users would be resident in the Campuses as this is likely to comprise the majority of none home-based workers without access to road vehicles for journeys to and from home;
- the proportions of non home workers per shift would reflect the overall proportion of non home workers in the workforce except that Office staff are assumed not to be resident in the Campuses;
- travel home would be at shift end on Thursday except for Shift 2 and the Night Shift which would be on Friday morning, travel from home would be on Sunday afternoon / evening except for Shift 2 which would be on Monday morning and the night shift which would be later in the day on Monday;
- departures for home would be for a four hour period commencing 30 minutes after first end time of a shift; and
- arrivals from home would be for a four hour period up to 60 minutes before the last start time for that shift or for a five and a half hour period on Sunday evening.

8.2.4 The predicted flows are summarised in **Table 8.7** below.

Table 8.7: Upper Estimate of Non Home-based Workers Travelling by Rail (Source 2)

	%	Number		
Peak Workforce	100	5600		
Home-based	34	1904		
Non Home-based (not Campus)	40	2246		
Non Home-based (Campus)	26	1450		
Weeks per cycle for campus workers		2		
Campus workers travelling per fortnight		725		
	%	**Number**	**Departure**	**Arrival**
Single Shift	17.1	124	Thursday 17:00-21:00	Sunday 17:00-22:30
Shift 1	40.0	290	Thursday 14:30-18:30	Sunday 17:00-22:30
Shift 2	34.3	249	Friday 07:00-11:00	Monday 11:00-15:00
Night	8.6	62	Friday 07:00-11:00	Monday 17:00-21:00
Office	n/a	n/a	Thursday 18:00-22:00	Sunday 17:00-22:30
Peak Demand (Number per week)		414	Thursday 17:00-22:00	
		414		Sunday 17:00-22:30
		311	Friday 07:00-11:00	

Note
For Peak workforce 2016

8.2.5 From **Table 8.5** the required combined peak flow rate for both directions is approximately 100 per hour.

8.2.6 The proportion of these flows by direction (northeast or southwest) is not known but the greater proportion can be expected to be to and from the northwest were traditionally the greater concentrations of population providing migrant construction workers lie.

8.2.7 Comparison with the existing available spare capacity discussed in Section 6 suggests that there is likely to be sufficient existing capacity to cater for these flows. A key point is that the rolling shift pattern proposed will favour travel home on Thursday evening or Friday morning rather that the existing peak period for rail travel on Friday afternoon / evening. Should overloading occur it may also be possible to manage the distribution between available services by offering cheaper fares for a controlled number of pre-booked journeys per service. Alternatively particular services may be strengthened (lengthened) on particular days if dialogue is maintained with the local train service operator FGW.

8.2.8 The numbers may however warrant additional stops at Bridgwater by XC trains. This would also improve the journey time attractiveness and uptake of rail making faster through journeys possible to the many towns and cities served by the XC trains running through Bridgwater.

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9. CONCLUSIONS

9.1 Choice of Railhead

9.1.1 A railhead at Williton would add 30 to 40 minutes each way on the rail segment of a journey relative to a railhead at Bridgwater, taking most journeys over the 90 minute threshold. In consequence Williton is not considered to offer a viable railhead for HPC.

9.1.2 A Bridgwater railhead would also offer opportunities for rail travel throughout the day.

9.1.3 The railhead should be at Bridgwater.

9.2 Existing Capacity

9.2.1 The overall available existing capacity for the key combination of single, first and office shifts requiring inbound arrivals in the morning would appear to be 600 HPC workers commuting from the Exeter and south west direction and 275 HPC workers commuting from the Bristol and north west direction.

9.2.2 Reversing recent timetable changes whereby certain long distance (HST) services operated by FGW no longer stop at Bridgwater would improve capacity and journey options.

9.3 Potential for Commuting by Rail

9.3.1 Analysis by a series of sifts indicates that if shifts and train times were fully aligned, up to 828 of the 4150 employees could travel by rail or 20% of the total non campus based workers. Of the 828 employees 744 were home-based and 84 were non home-based.

9.3.2 A further sift highlighted that up to 239 employees could travel by rail taking into account current journey opportunities and the proposed shift patterns. The 239 employees represent 5.8% of the total non campus based work force and is made up from 239 home-based workers only with no non home-based workers.

9.3.3 A comparison of journey times against the alternative of going via P&R, further reduced the numbers of workers with the potential to use rail to just 81 home-based workers from Weston Super Mare, Highbridge & Burnham and Taunton.

9.3.4 An investigation of potential rail service enhancement options suggests that the number of worker that could travel by rail could be increased from 239 to 364, an increase of 125 employees. Where the journey time comparison with P&R is applied the improvement options increases the number of employees likely to travel by rail from 81 to 119, an increase of 38 employees.

9.3.5 To achieve the increase of 125 employees seven additional trains are required which results in an average of 18 employees per train. To achieve the increase of 39 employees five trains additional trains are required resulting in an average of eight employees per train.

9.3.6 The analysis has been undertaken using the weekday timetable. However as weekend working is planned using the weekday shift patterns for a proportion of he workforce, workers will also need to commute on Saturdays and Sundays when timetabled services are inferior. Travel by train will not be possible for some shifts particularly on Sundays. Therefore workers will need to make provision for travelling on days when rail is not an option. This is likely to further reduce numbers choosing rail as they will not then be reliant on rail.

9.3.7 On this basis it is concluded that even with service enhancements rail is unlikely to play a significant role in the daily commuting of the workforce.

9.4 Potential for Journeys by Non Home-based Workers

9.4.1 Only a high level analysis has been possible at this stage as there are many uncertainties over the expected rolling shift patterns to be adopted by contractors and a model of the likely origin of the non home-based workers is not available.

9.4.2 Based the assumption that Campus based workers would be those most likely to use rail for making journeys to and from their homes and an assumption that only half would travel on any given weekend the required combined peak flow rate was assessed as approximately 100 per hour via Bridgwater station, outward on Thursday afternoon and evenings and inward on Sunday evenings.

9.4.3 The proportion of these flows by direction (northeast or southwest) is not known but the greater proportion can be expected to be to and from the northwest were traditionally the greater concentrations of population providing migrant construction workers lie.

9.4.4 Comparison with the existing available spare capacity suggests that there is likely to be sufficient existing capacity to cater for these flows.

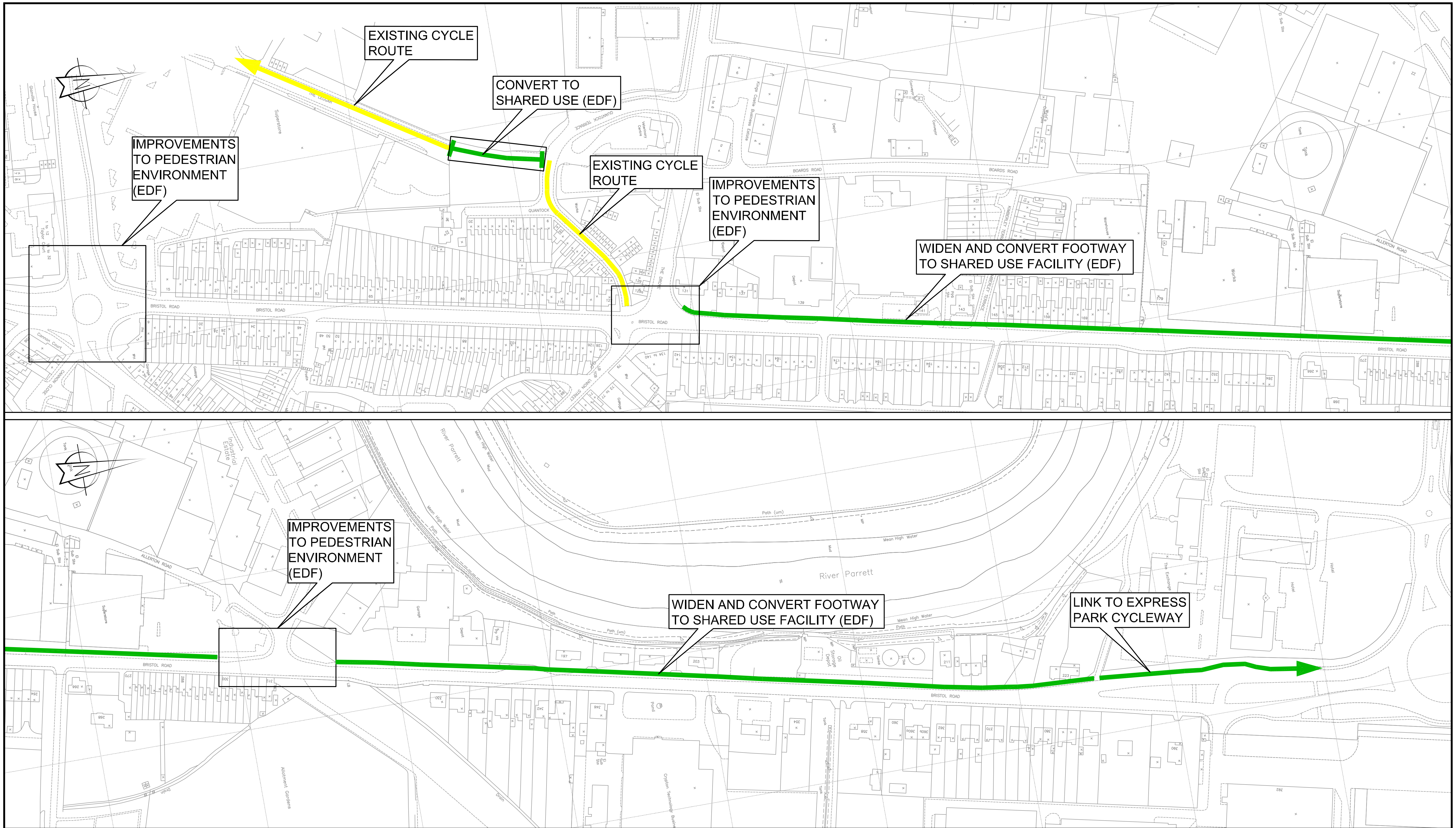
9.4.5 A key point is that the envisaged rolling shift patterns will favour travel home on Thursday evening or Friday morning rather that the existing peak period for rail travel on Friday afternoon / evening. Should overloading occur it may also be possible to manage the distribution between available services by offering cheaper fares for a controlled number of pre-booked journeys per service. Alternatively particular services may be strengthened (lengthened) on particular days if dialogue is maintained with the local train service operator FGW

9.4.6 The numbers may however warrant additional stops at Bridgwater by XC trains. This would also improve the journey time attractiveness and uptake of rail making faster through journeys possible to the many towns and cities served by the XC trains running through Bridgwater.

9.5 Other Rail Passenger Journeys

9.5.1 In addition to the workers commuting and journeys home by non home-based workers, construction of HPC is likely to stimulate additional rail journeys to Bridgwater for visitors (commercial and recreational/ educational) to the site and in connection with the increased local economic activity. This may warrant the provision of a bus link between the Bridgwater Station and the site.

APPENDIX 13.1: WALK & CYCLE IMPROVEMENT PLANS



REV.	DETAILS	DRAWN	CHECKED	DATE

Notes:

- EXISTING CYCLE ROUTE
- PROPOSED CYCLE ROUTE (EDF)

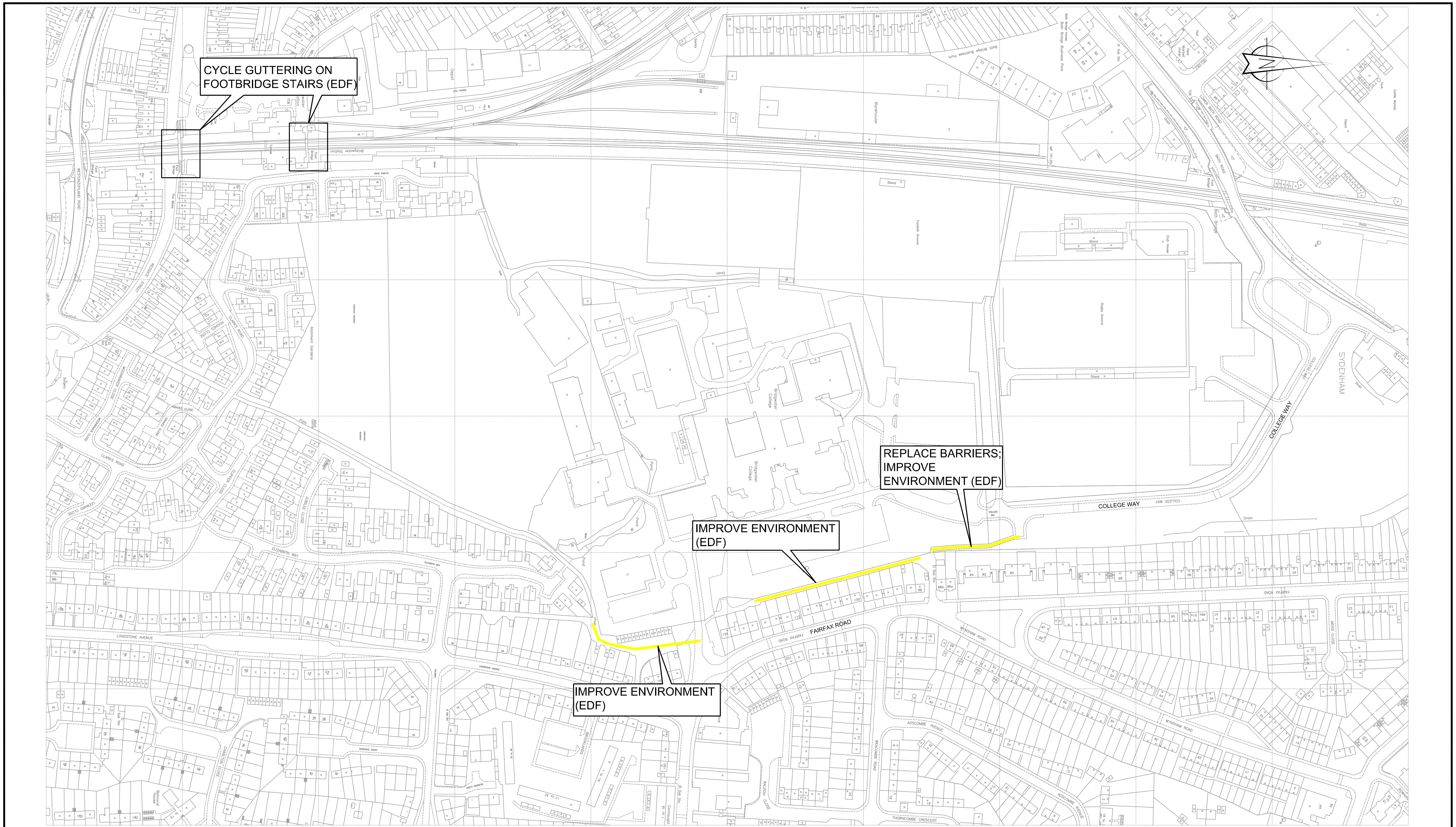
Hinkley Point Power Station

EDF Energy

Proposed Walk and Cycle Improvements (indicative); Bristol Road

Savell Bird & Axon
part of the WYG group
Academy House 36 Poland Street London W1F 7LU
t: 020 7580 8844 f: 020 7580 8818 e: sba@sbax.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
MBW	MT	15.06.2011	NTS at A3	83688-A-17	



REV.	DETAILS	DRAWN	CHECKED	DATE

Notes:

- CYCLE ROUTE (yellow line)

Hinkley Point Power Station

Proposed Walk and Cycle Improvements (indicative); Fairfax Cycle Path / College Way

EDF Energy

Savell Bird & Axon
part of the WYG group

Academy House 36 Poland Street London W1F 7LU
t: 020 7580 8844 f: 020 7580 8818 e: sba@sbax.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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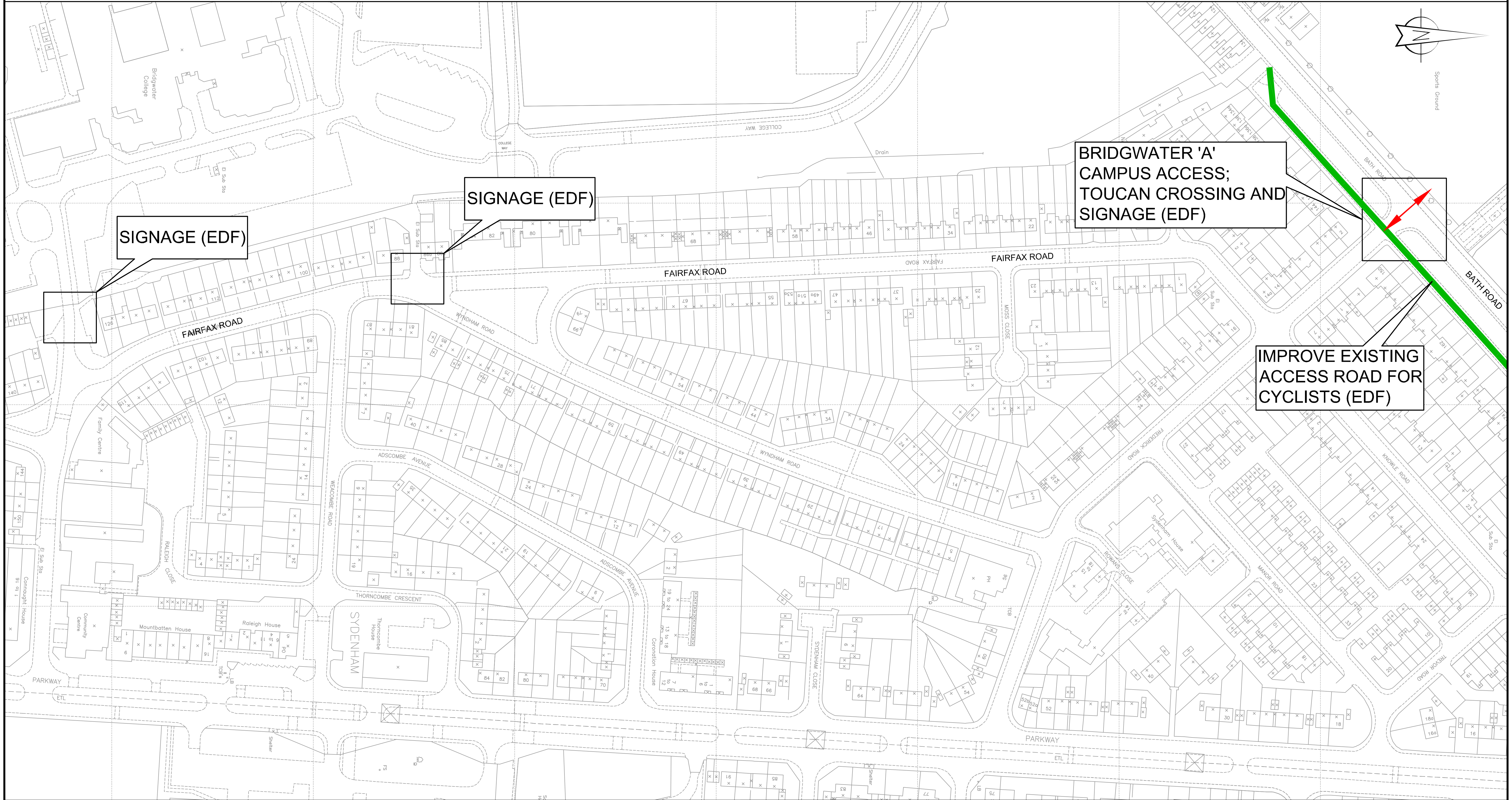

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Notes:

- PROPOSED CYCLE ROUTE (EDF)

- TOUCAN CROSSING

Hinkley Point Power Station

Proposed Walk and Cycle Improvement (indicative); Fairfax Road

EDF Energy

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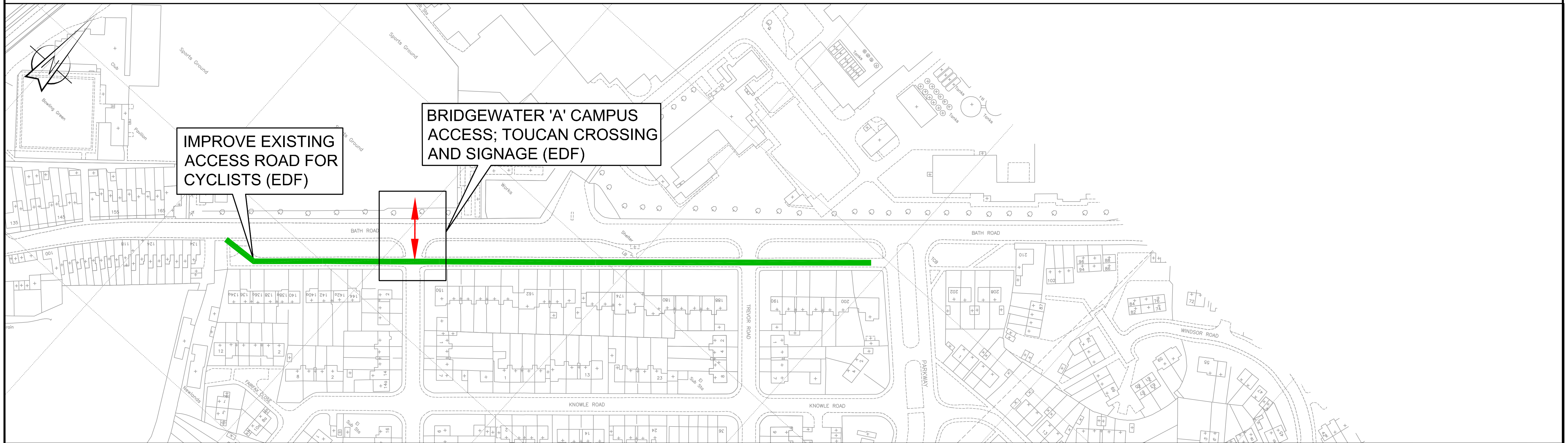

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Notes:

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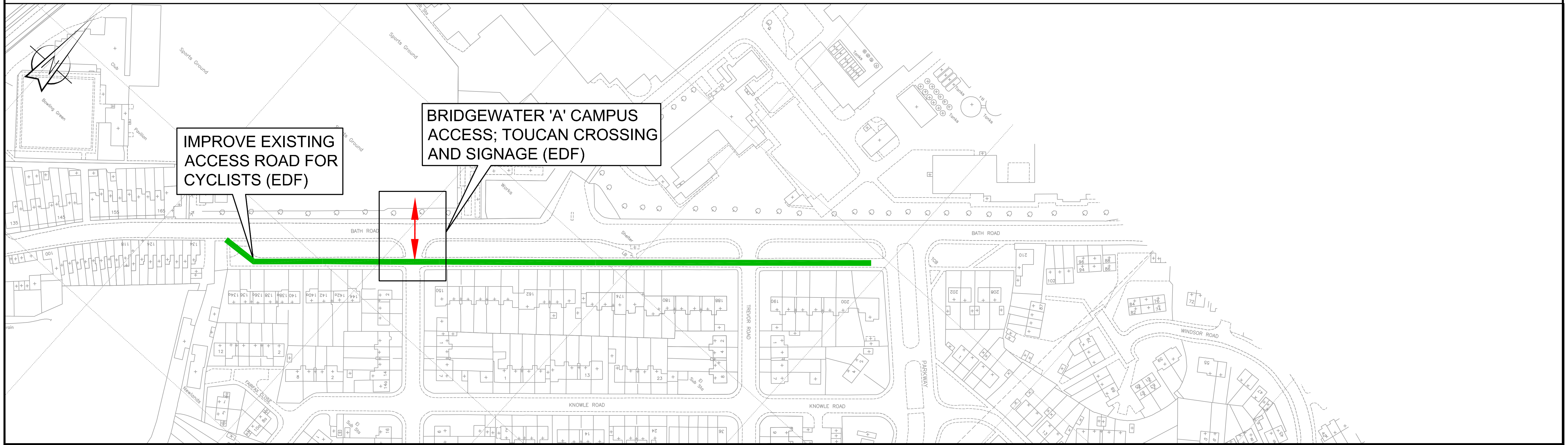

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- ZEBRA CROSSING

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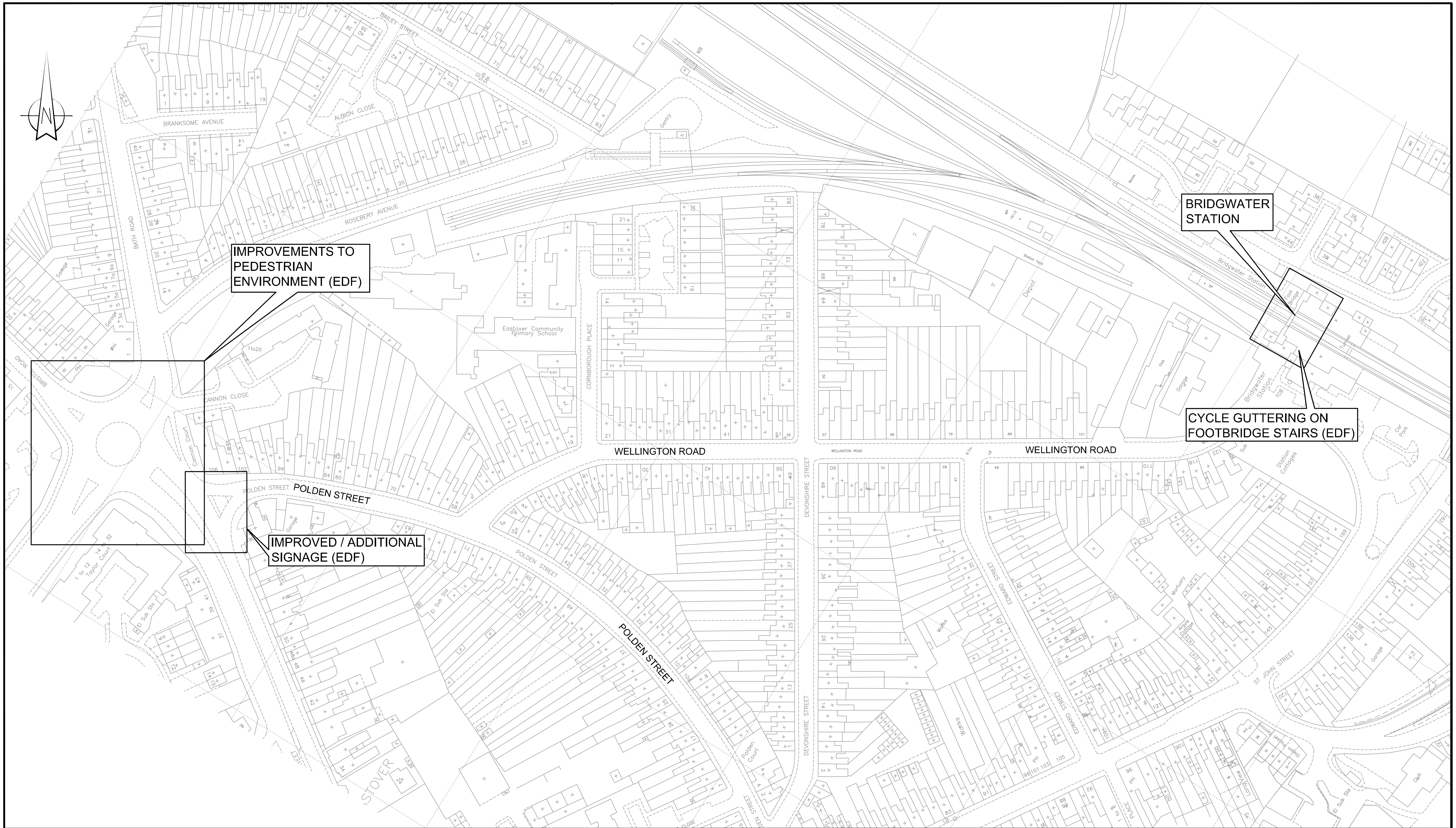

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Notes:

Hinkley Point Power Station

EDF Energy

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- TOUCAN CROSSING
- ZEBRA CROSSING

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CLIENT:

EDF ENERGY

PROJECT:

Hinkley Point Power Station

DRAWING TITLE:

Proposed Walk and Cycle Improvements

SCALES:

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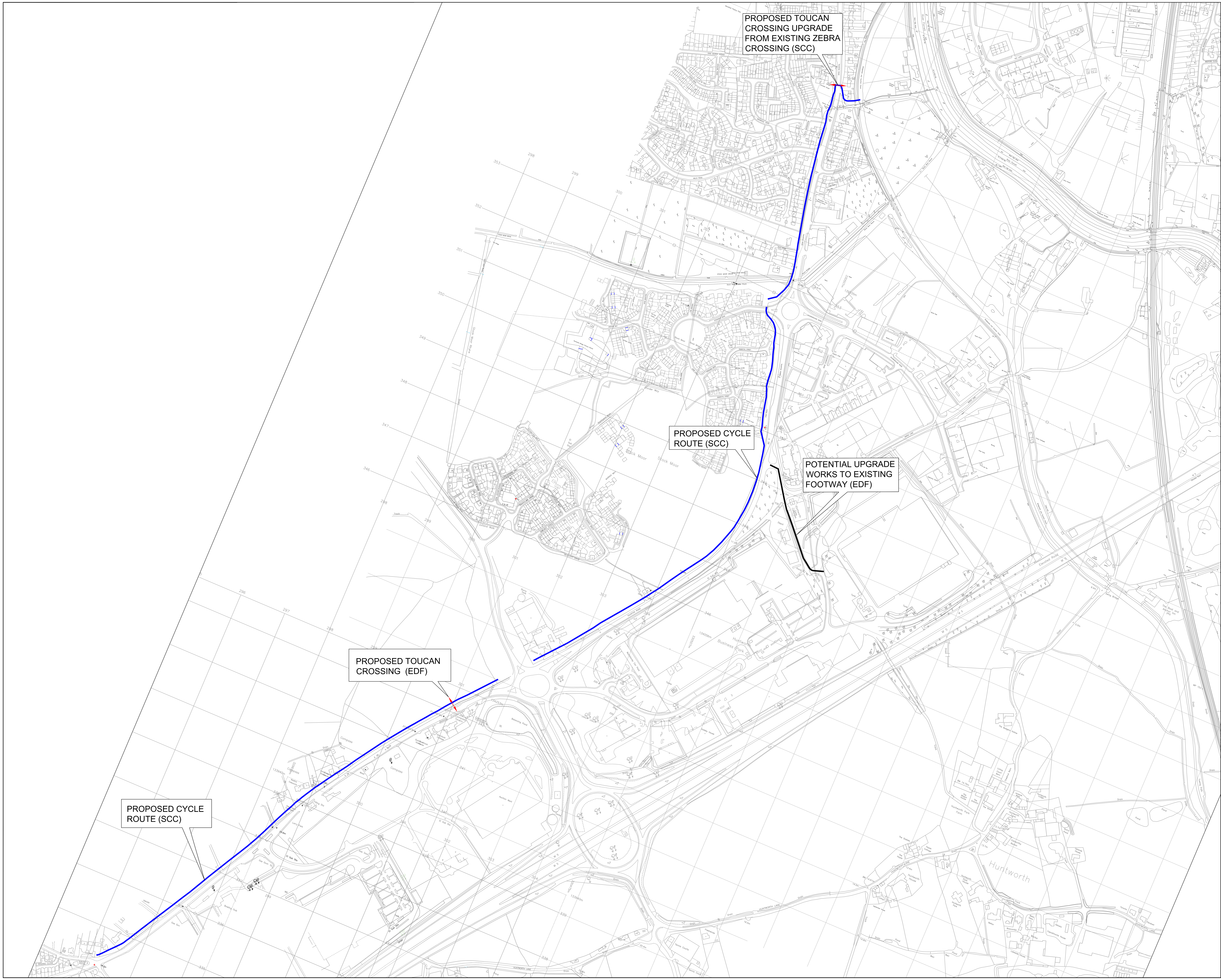

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- PROPOSED CYCLE ROUTE (EDF)
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EDF ENERGY

PROJECT:
Hinkley Point Power Station

DRAWING TITLE:
Proposed Walk and Cycle Improvements

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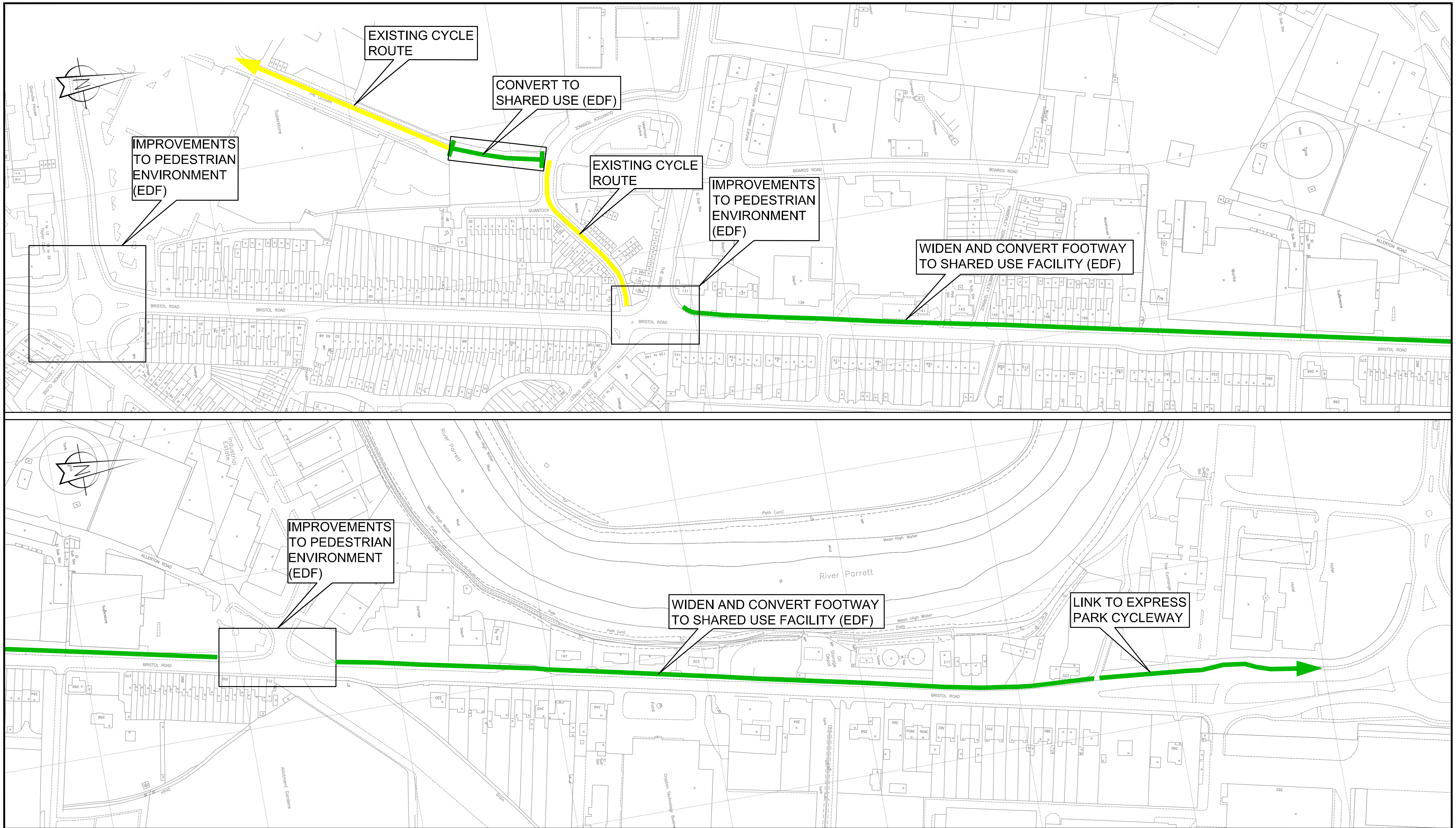

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- EXISTING CYCLE ROUTE
- PROPOSED CYCLE ROUTE (EDF)

Hinkley Point Power Station

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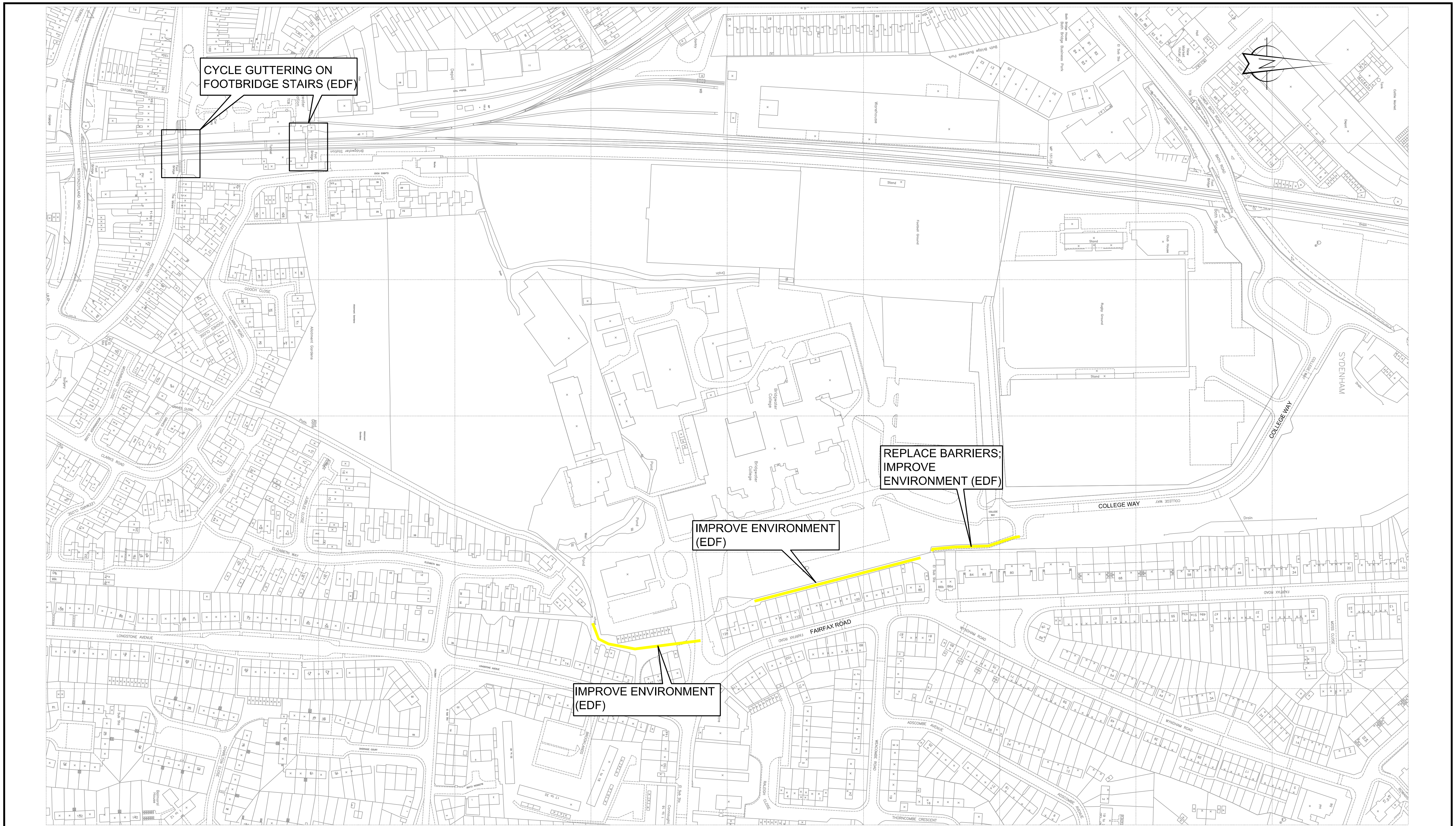

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Notes:

- CYCLE ROUTE

Hinkley Point Power Station

Proposed Walk and Cycle Improvements (indicative); Fairfax Cycle Path / College Way

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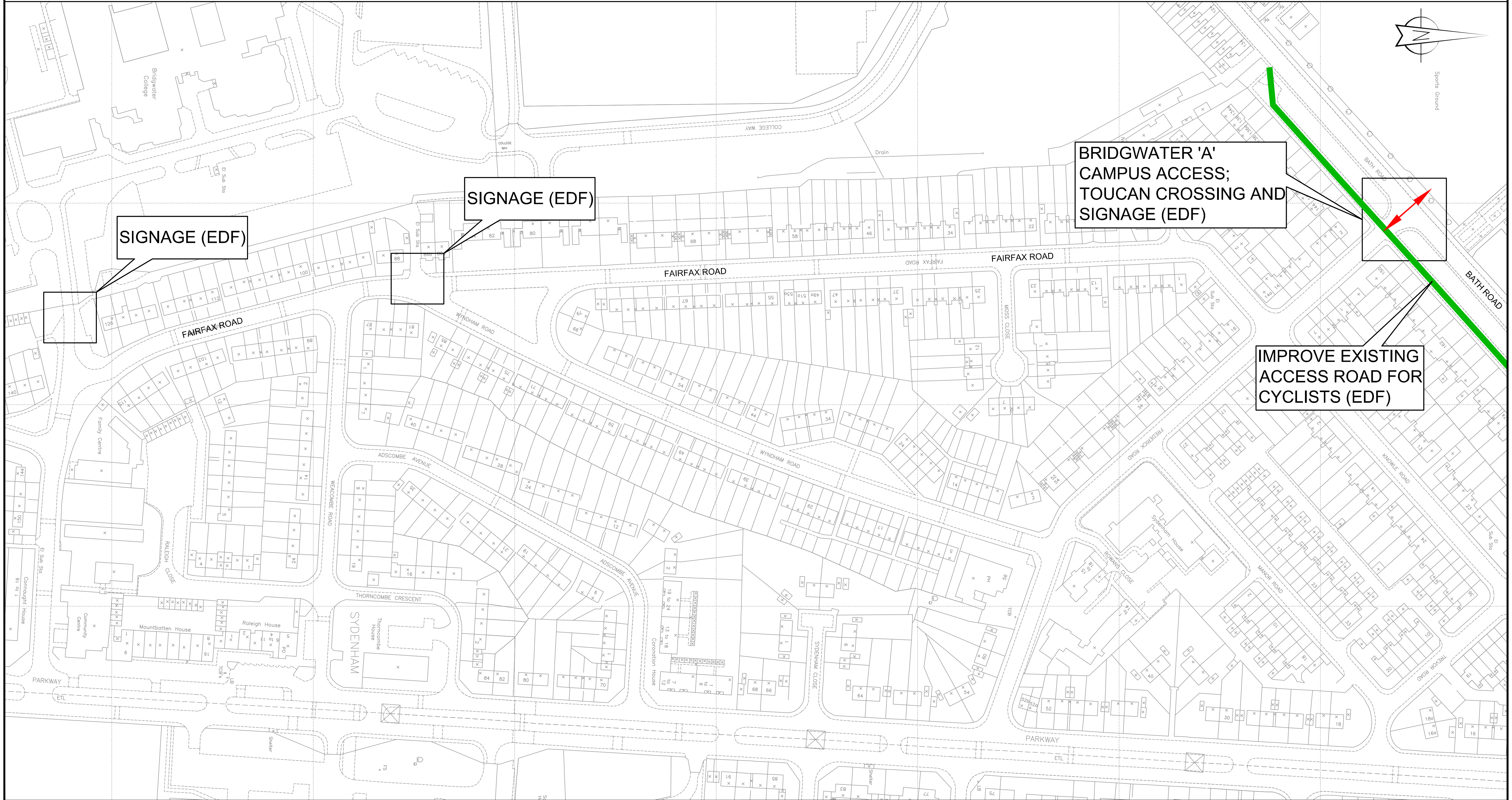

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Notes:

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- TOUCAN CROSSING

Hinkley Point Power Station

Proposed Walk and Cycle Improvement (indicative); Fairfax Road

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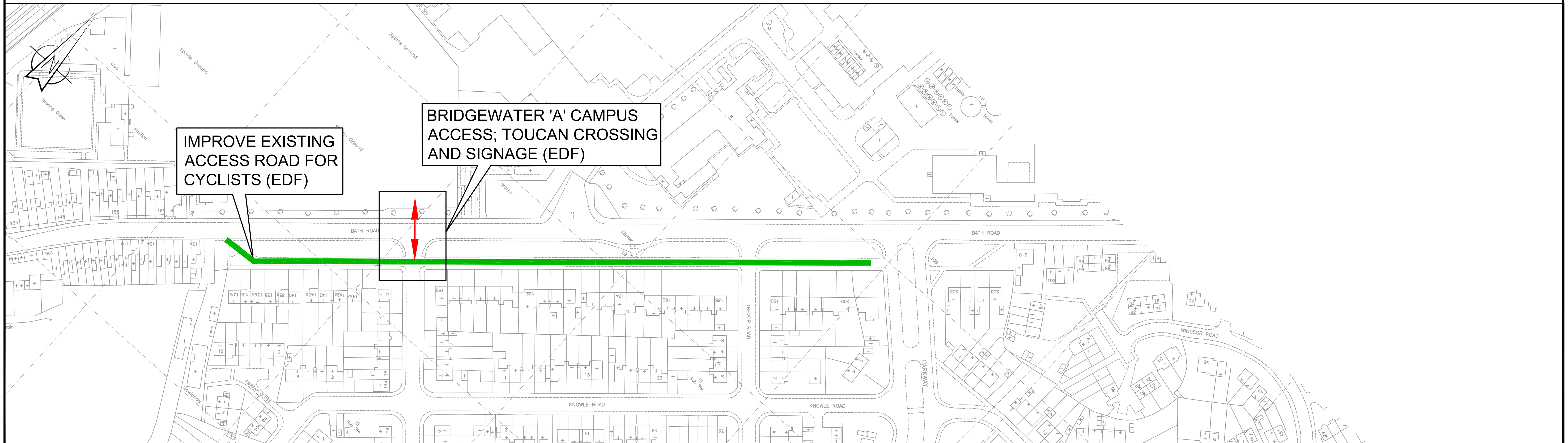

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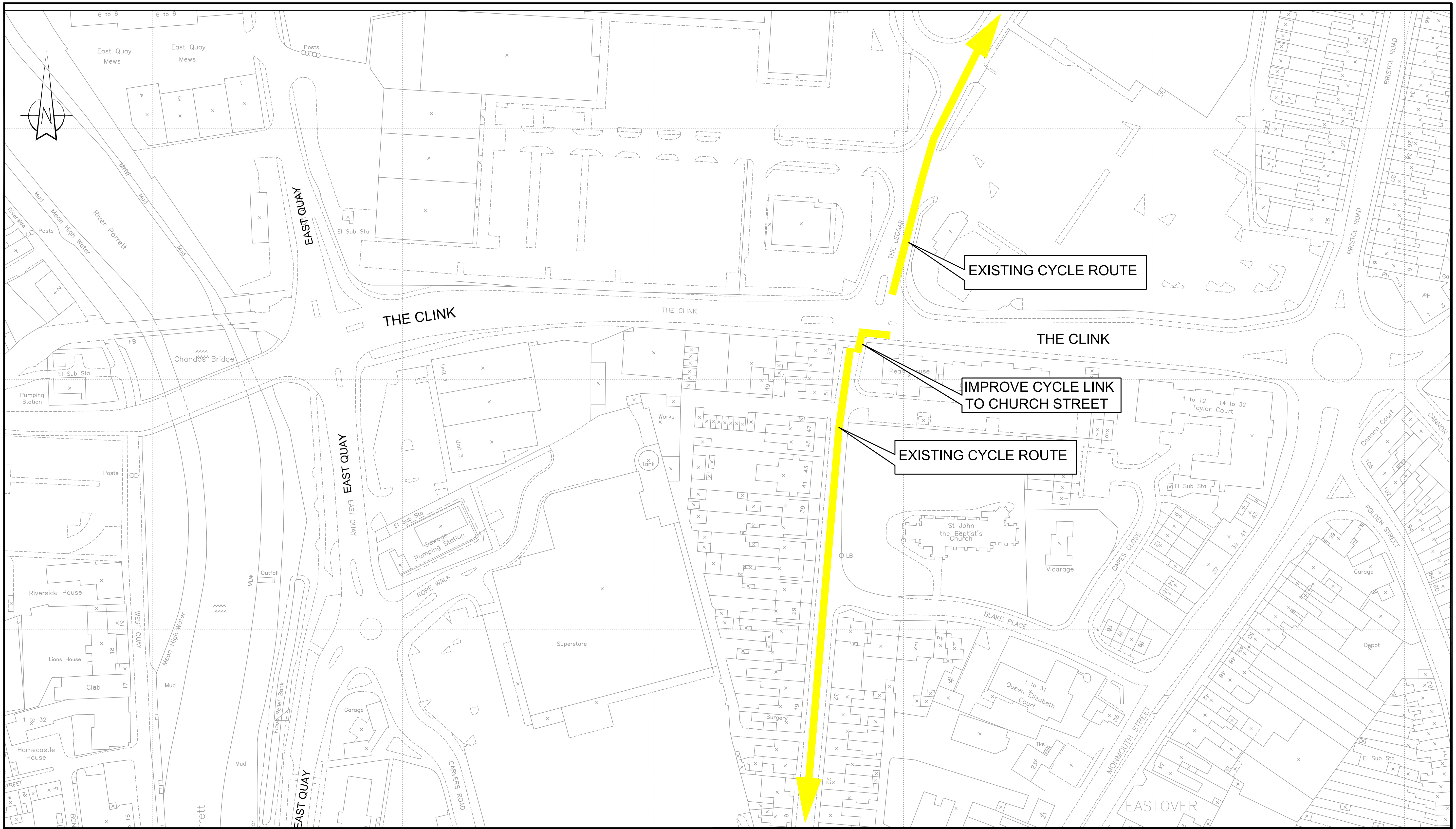

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Notes:

- EXISTING CYCLE ROUTE (SCC)

Hinkley Point Power Station

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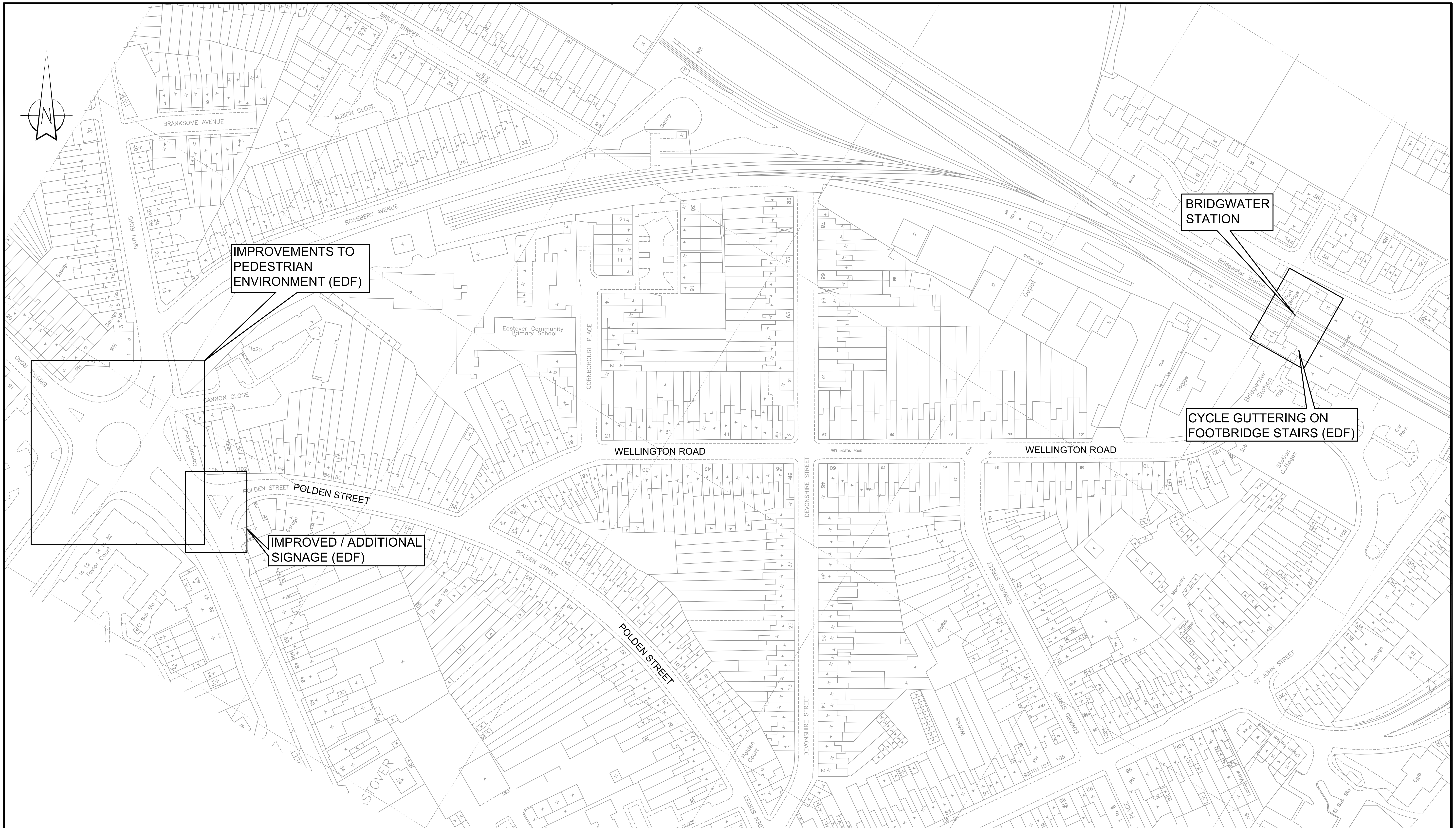

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Hinkley Point Power Station

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CLIENT: EDF ENERGY

PROJECT: Hinkley Point Power Station

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REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:
EDF ENERGY

PROJECT:
Hinkley Point Power Station

DRAWING TITLE:
Proposed Walk and Cycle Improvements

SCALES:
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APPENDIX 14.1: ROAD SAFETY STRATEGY

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PREAMBLE

This document is the Road Safety Strategy for the main works at the Hinkley Point C Development. It has been produced to identify sites on the road network to Hinkley that currently have high accident rate, assess the impact of the additional vehicle trips on road safety and recommend measures that will help to mitigate the impact.

EXECUTIVE SUMMARY

A preliminary study area has been agreed with the Somerset Road Safety partnership and the Highways Agency that comprises:

- the M5 motorway between Junctions 22 and 25;
- the A39 from its junction with A361 at Ashcott to the east of Bridgwater to its junction with the B3191 at Williton to the west of Bridgwater;
- the A38 from West Huntspill to the north of Bridgwater to North Petherton to the south;
- the B3339 at Wembdon;
- the Northern Distributor Road (NDR) in Bridgwater;
- the C182 between the village of Cannington and the HPC site;
- Stogursey Lane between Stogursey and Nether Stowey; and
- the road that runs from Kilve through Stringston, Stogursey, connecting with the C182 at Newham House and Claylands Corner.

Personal injury accident (PIA) data has been obtained from the HA for the M5 Motorway and from Somerset County Council (SCC) for the above routes for the period of January 2005 to June 2010.

To ensure a consistent approach, methodologies developed by the HA and the SRSP have been used to identify locations that currently experience high accident rates. These methodologies comprise a link-based approach and one that identifies accident clusters in urban and rural locations.

The link-based approach has identified a number of highway sections that currently have accident rates that exceed the national average for similar road types.

However, the analysis has also identified that most of the accidents that occur on these roads occur at junctions. When accidents at junctions are discounted, many of the links do not seem to have particularly high accident rates.

When considering the future impact on road safety it is important to consider the likely increase in traffic generated by the proposed HPC development, but also the natural increase in traffic that will result from permitted developments coming forward.

An assessment of growth between 2009 and 2016 has been undertaken which considers the additional traffic generated by a series of committed developments permitted by the Council in addition to natural background traffic growth that is also likely to occur by 2016.

Therefore, where any existing accident problem has been identified it is not appropriate to assume that any worsening in 2016 is directly attributable to the proposed HPC project.

Furthermore, when the impact of the development related traffic is considered, the increase in the expected numbers of accidents along the routes to the site is expected to be small.

The proposed road safety mitigation strategy addresses the issues at junctions that have been identified using the cluster-based methodologies. It is important to note that these cluster junctions are not generated as a result of HPC but are due to existing accident problems and existing traffic flows on the network. Such flows will increase naturally by 2016, without the HPC development, through implementation of already permitted developments and also background growth in traffic. Therefore, SCC is investigating a programme of safety improvements that are necessary as a result of existing and future non-HPC growth.

There are some cluster junctions where improvements are being proposed through the HPC project to enhance capacity or safety (delivered by EDF Energy). Where no improvements are being promoted by EDF Energy then it is proposed to make a contribution to SCC to assist with their programme of safety enhancements. The junctions that have been identified within the road safety strategy are listed below, with the scheme proposed by EDF Energy highlighted in bold:

- **A39 Broadway/A38 Taunton Road;**
- A39 Broadway/A372 St John Street;
- A39 North Street/Albert Street;
- A39 North Street/West Street;
- A39/A38 Dunball Roundabout;
- **A39 Sandford Corner;**
- **A38 Bristol Road/A39 Bath Road/The Clink (Cross Rifles Roundabout);**
- A38 Taunton Road/Rhode Lane;
- **The A38/M5 Junction 24 Huntworth Roundabout**;
- The A38 Taunton Road/Wills Road Junction; and
- **Wylds Road/The Drove.**

The following mitigation measures are proposed at each:

A39 Broadway/A38 Taunton Road

As part of the measures proposed by EDF Energy as part of the HPC project, to increase capacity of the road network in Bridgwater, a scheme has been developed that will significantly improve the operation and road safety at this junction.

This will include the introduction of two right turn lanes for vehicles turning from the eastbound carriageway of Broadway into Taunton Road. To facilitate this movement, the current arrangement of three lanes on the northbound Taunton Road approach has also been amended to remove the existing left turn lane, combining it with the straight ahead lane. The existing double right turn lane arrangement on this approach has also been removed to provide only a single lane.

In addition, all approaches will run separately so that there will be no conflicting turning movements. This should significantly reduce the occurrence of right turn accidents at the junction.

Improvements to the current pedestrian crossing facilities are also proposed. In addition, anti-skid surfacing will be provided on each approach, potentially reducing the number of rear-end shunt accidents at the junction.

As part of the detailed design process, a lighting audit will be undertaken to identify any issues relating to illumination in the vicinity of the site.

It is therefore, considered that the main causation factors of most of the accidents that have occurred at the junction in the study period will be addressed by the proposed scheme.

A39 Broadway/St John Street

Signal-controlled pedestrian crossing facilities are not provided across the A38 Monmouth Street approach. As the existing pedestrian facilities operate during an all-red stage in the traffic signal cycle, there could be an opportunity to introduce a similar facility across the northern arm.

The northern approach to the junction currently incorporates three lanes, including a short right turning lane for vehicles turning from the A38 Monmouth Street into Eastover. This precludes the introduction of a staggered pedestrian crossing across this arm. Therefore, if signal-controlled pedestrian crossing facilities are warranted across the northern approach, they will need to be provided straight across the carriageway.

If this facility is introduced then there could also be an opportunity to remove the staggered pedestrian crossing across the western arm as well and introduce a straight-across crossing, in line with current road safety and streetscape thinking.

Somerset County Council has developed a scheme that appears to contain a number of these suggestions and EDF Energy propose to provide a contribution to SCC to assist in delivery of their proposed scheme.

A39 North Street/Albert Street

To improve the visibility splays at the junction it is possible to remove the pedestrian guardrail on the southeast and southwest corners of the junction or replace it with Visirail.

To prevent vehicles from turning right out of the junction, it might be possible to close the gap in the central median on the A39 North Street, effectively making the junction a left-in, left-out arrangement. Vehicles wishing to turn right into and out of Albert Street would then have to travel via St Matthew’s Field and West Street.

The sightlines to the south of the West Street/St Matthew’s Field junction would also need some improvement, which could possibly be achieved by cutting back the existing vegetation on the southwest corner of the junction. It appears that this vegetation is within the highway boundary, but this would need to be confirmed prior to implementation of the proposals.

Alternatively, Albert Street could be made one-way southbound, with all vehicles required to exit via St Matthew’s Field on to West Street.

These measures do not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements.

A39 North Street/West Street

The accident data does not demonstrate any discernible trends, other than a moderate number of rear end shunt accidents. Both approaches on the A39 Broadway/North Street have been treated with anti-skid surfacing, while Penel Orlieu and West Street have not.

It is therefore, recommended that the West Street and Penel Orlieu approaches be treated with anti-skid surfacing.

This measure does not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements.

A39/A38 Dunball Roundabout

As part of the proposals to introduce a park and ride and freight management facilities at this junction it is proposed to review the current road markings to increase capacity and improve lane discipline.

The precise nature of these changes isn't yet known but further development could include the introduction of anti-skid surfacing on the approach.

This potential measure does not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements, if SCC considers the works are required.

A39 Sandford Corner

This section of the A39 is also critical to network resilience as there are no other alternative routes available if the road is closed.

It is therefore, proposed to construct a new roundabout at the junction that will significantly reduce the number and severity of accidents at this location.

This measure is proposed by EDF Energy as part of the HPC project to significantly improve the operation and road safety at this junction.

A38 Bristol Road/The Clink (Cross Rifles Roundabout)

Somerset County Council has developed a scheme for the junction that aims to increase capacity and reduce congestion. As part of this scheme it is proposed to improve pedestrian and cycle facilities around the junction to facilitate movements across each approach.

This junction does not form part of the proposed highway improvement works to be delivered by EDF Energy as part of the proposed HPC project. However, in order to assist traffic movements at this node and to improve road safety, particularly for pedestrians, EDF Energy proposed to make a contribution to SCC to assist the Council in delivery of their scheme.

A38 Taunton Road/Rhode Lane

Four of the accidents at the junction involve vehicles turning right colliding with cyclists on the A38 Taunton Road. Therefore, there appears to be a road safety issue relating to the conspicuousness of cyclists at the junction. This could be addressed by providing an off-road cycle route across the junction.

SCC are currently developing such a scheme that would run along the western side of Taunton Road from the Huntworth Roundabout up to the junction of Taunton Road/Broadway.

Furthermore, Somerset County Council are also seeking to develop Route 33 of the National Cycle Network, which runs along Old Taunton Road and the Bridgwater to Taunton Canal towpath.

These measures do not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements should the Council decide that the works are required.

Huntworth Roundabout

A scheme is currently proposed by EDF Energy to improve the layout of this junction and facilitate movements into and out of the park and ride and freight management facility adjacent to this site. The proposed improvement includes improved carriageway markings to improve lane discipline.

This measure is proposed by EDF Energy as part of the HPC project to significantly improve the operation and road safety at this junction.

A38 Taunton Road/Wills Road

The most prominent trend in the accident data is of vehicles turning into or out of Wills Road, often at the behest of other drivers, colliding with a motorcyclist overtaking the queuing traffic. A 'THINK BIKE' supplementary sign plate has already been erected to the south of the junction to inform drivers travelling northbound of the possibility of motorcyclists in the area.

Consideration could be given to the introduction of pedestrian refuges in the central hatching on the A38 Taunton Road on either side of the junction. This would reduce the carriageway width locally, lowering all vehicles speeds. They would also deter motorcyclists from travelling along the central hatching, encouraging them to rejoin the main queue of traffic to travel through the junction.

The refuges could be constructed to the south of Wills Road, north of the Stockmoor Close junction, and to the north of Wills Road immediately south of the northbound bus stop layby. Appropriate 'KEEP LEFT/RIGHT' illuminated bollards would need to be provided on the refuges to ensure that their conspicuousness is maximised.

The refuges would have the secondary benefit of providing pedestrian facilities across the A38 Taunton Road, connecting the residential area to the east with the northbound bus stop.

This junction does not form part of the proposed highway improvement works to be delivered by EDF Energy as part of the proposed HPC project. However, in order to improve road safety in this location, EDF Energy propose to make a contribution to SCC to assist the Council in delivery of their on-going programme of works, should the Council consider that works are required in this location.

Wylds Road/The Drove

A scheme is currently being developed to improve capacity at the junction by introducing signal controlled turning facilities for vehicles turning right from The Drove on to the Northern Distributor Road.

This will also significantly improve road safety at the junction, potentially reducing the numbers of right turning accidents.

This measure is proposed by EDF Energy as part of the HPC project to significantly improve the operation and road safety at this junction.

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1. INTRODUCTION

1.1.1 The construction-related traffic generated by the proposed development site is expected to increase traffic flows at locations that already experience road safety problems. This Strategy:

- identifies existing sites on the key construction traffic routes that currently have a history of accidents;
- determines the potential impact of the likely construction traffic generated by the HPC development on road safety; and
- recommends measures that mitigate any impact caused by the expected increase in trips to and from the site.

1.1.2 It is structured as follows:

- **Section 2** provides a brief description of the agreed preliminary study area;
- **Section 3** describes the approach and methodologies used to identify the sites that currently experience high accident rates;
- **Section 4** summarises the accident analysis for the M5 motorway in the study area;
- **Section 5** summarises the accident analysis for the local road network in the study area;
- **Section 6** summarises the impact of the HPC development on road safety along the routes to the site; and
- **Section 7** proposes measures that will mitigate the road safety impact caused by the proposed development.

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2. STUDY AREA

2.1.1 The Somerset Road Safety Partnership (SRSP) was formed in 2006 to bring together the experience from a number of organisations in co-ordinated campaigns to improve safety on roads in Somerset. The partners include SCC, Devon and Somerset Fire and Rescue Service, NHS Trusts, the Highways Agency (HA), Avon and Somerset Constabulary and the Safety Camera Partnership (Safecam).

2.1.2 At the onset of the production of this road safety report, the SRSP and the HA were contacted and a preliminary study area was agreed. The study area is shown in **Figure 2.1**.

Figure 2.1: Agreed Preliminary Study Area

2.1.3 It principally comprises:

- the M5 motorway between Junctions 22 and 25;
- the A39 from its junction with A361 at Ashcott to the east of Bridgwater to its junction with the B3191 at Williton to the west of Bridgwater;
- the A38 from West Huntspill to the north of Bridgwater to North Petherton to the south;
- the B3339 at Wembdon;
- the Northern Distributor Road (NDR) in Bridgwater;
- the C182 between the village of Cannington and the HPC site;
- Stogursey Lane between Stogursey and Nether Stowey; and
- the road that runs from Kilve through Stringston, Stogursey, connecting with the C182 at Newham House and Claylands Corner.

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3. APPROACH

3.1 Study Period

3.1.1 Personal injury accident (PIA) data has been obtained from the HA for the M5 Motorway and from Somerset County Council (SCC) for the local road network. The period under consideration, which has been agreed with the SRSP, is from January 2005 to June 2010, which is five and a half years.

3.2 Methodologies Used

3.2.1 The HA and SCC have developed their own methodologies to identify sites that have experienced a high numbers of accidents within a certain period of time. To ensure a consistent approach, these methodologies have been replicated, albeit for a five year and a half year period, and applied to the agreed study area to identify the sites to be assessed as part of this study.

3.2.2 This approach has been agreed with the SRSP and HA.

a) M5 Motorway (Junction 22 to Junction 25)

3.2.3 The following methodology has been developed from that used by the HA to identify existing road safety issues on the M5 motorway between Junction 22 and Junction 25:

- the locations of the accidents have been plotted using GIS;
- an overview of the entire accident data set along the Strategic Road Network (SRN) in the study area has been undertaken to identify any existing trends;
- the accident data along the links, on the slip roads and at the junction with the local road network has been analysed to determine if there are any localised trends that may be prevalent; and
- once any trends have been identified, they have been compared with national accident statistics for motorways to ascertain whether they correspond to those that would normally be expected.

b) Somerset County Council Road Network

3.2.4 Two methodologies have been developed by the SRSP to identify locations on the local road network that have existing issues relating to road safety.

3.2.5 The first methodology analyses the accident data on a link by link basis and compares the results to National road traffic accident statistics to identify locations that have higher than expected accident rates.

3.2.6 The second methodology replicates assessments that the SRSP has previously undertaken to identify accident clusters on the local road network in Somerset. Two versions exist, which differ slightly depending on whether clusters are being identified on rural or urban roads. Each is described below:

- an accident cluster on an urban road is where seven PIAs have occurred in a five year period within 50 metres of each other; and
- an accident cluster on a rural road is where seven PIAs have occurred in a five year period within 100 metres of each other.

3.2.7 Within the study area the only urban area is Bridgwater. All other areas are defined as rural.

4. M5 MOTORWAY ACCIDENT REVIEW

4.1 Overview

4.1.1 A summary of the accident data on the M5 motorway between Junctions 22 and 25 is provided in this section. This has been undertaken in three parts namely, an overview of the whole length in the study area (between Junction 22 and Junction 25), a review of the accidents on the links and slip roads, and an assessment of the accidents at the junctions with the local road network.

4.1.2 Unfortunately, the data provided by the HA does not contain detailed descriptions of the causes of the accidents. Therefore, the level of assessment possible has not been as detailed as is normally the case in these types of studies.

4.1.3 Nevertheless, it has been possible to determine overall trends in the accident data, which can be used to identify possible remedial measures.

4.2 Junction 22 to Junction 25

4.2.1 The accident data provided by the HA shows that there have been 199 PIAs on the main links, slip roads and junctions of the M5 motorway between Junction 22 and Junction 25 during the study period. The main trends are summarised below:

- there were four (2%) fatalities, while 19 (10%) resulted in a seriously injured casualty. The remaining accidents were all slight in nature;
- 107 (56%) of the accidents were on the northbound carriageway, whilst 83 (44%) were on the southbound carriageway. The vehicle direction of the remaining nine accidents is unknown;
- 162 (81%) of the accidents involved only cars, whilst 27 (14%) involved HGVs;
- 144 (72%) occurred on a dry road surface, while 53 (28%) occurred on a damp or wet road surface;
- 139 (70%) accidents occurred during day light hours whilst 49 (25%) accidents occurred in the hours of darkness (the data for 5% of accidents did not specify the lighting conditions);
- 19 (10%) occurred in the AM peak period (07:00 to 10:00), 27 (14%) occurred in the inter-peak period (Noon to 14:00) and 37 (19%) occurred in the PM peak period (16:00 to 19:00); and
- 134 (68%) of the accidents involved vehicles ‘going ahead’, 27 (14%) involved vehicles ‘slowing or stopping’ whilst eight (4%) involved vehicles ‘overtaking’.

4.2.2 An analysis of the accidents on the links and slip roads of the M5 has then been undertaken.

4.3 Junction 22 to Junction 23

4.3.1 On the link and slip roads between Junctions 22 and 23 there were 64 accidents. Of these:

- there were no fatalities, while four (6%) resulted in a seriously injured casualty. 60 (94%) of the accidents resulted in slight injuries;
- 25 (39%) of the accidents were on the northbound carriageway, whilst 36 (61%) were on the southbound carriageway;
- 54 (84%) of the accidents involved only cars, while five (8%) involved a HGV;
- 44 (69%) occurred on a dry road surface, while 20 (31%) occurred on a damp or wet road surface;
- 48 (75%) accidents occurred during day light hours while 16 (25%) accidents occurred in the hours of darkness;
- no accidents occurred in the AM peak period (07:00 to 10:00), 15 (23%) occurred in the inter-peak period (Noon to 14:00) and six (9%) occurred in the PM peak period (16:00 to 19:00); and
- 47 (73%) of the accidents involved vehicles 'going ahead'. Five (8%) involved vehicles 'slowing or stopping' whilst three (5%) involved vehicles 'overtaking'.

4.4 Junction 23 to Junction 24

4.4.1 On the link and slip roads between Junctions 23 and 24 there were 60 accidents. Of these:

- there were two (3%) accidents that resulted in fatalities, while four (7%) resulted in a seriously injured casualty. 54 (90%) of the accidents resulted in slight injuries;
- 26 (43%) of the accidents were on the northbound carriageway, whilst 34 (57%) were on the southbound carriageway;
- 44 (73%) of the accidents involved only cars, while 14 (23%) involved a HGV;
- 41 (68%) occurred on a dry road surface, while 19 (32%) occurred on a damp or wet road surface;
- 39 (65%) accidents occurred during day light hours while 21 (35%) accidents occurred in the hours of darkness;
- four (7%) accidents occurred in the AM peak period (07:00 to 10:00), 10 (17%) occurred in the inter-peak period (Noon to 14:00) and 12 (20%) occurred in the PM peak period (16:00 to 19:00); and
- 44 (73%) of the accidents involved vehicles 'going ahead'. Three involved vehicles 'slowing or stopping' whilst nine (15%) involved vehicles 'overtaking'.

4.5 Junction 24 to Junction 25

4.5.1 On the link and slip roads between junctions 24 and 25 there were 65 accidents. Of these:

- there were two (3%) accidents that resulted in fatalities, while 11 (18%) resulted in a seriously injured casualty. 52 (79%) of the accidents resulted in slight injuries;
- 33 (51%) of the accidents were on the northbound carriageway, whilst 29 (45%) were on the southbound carriageway. There was no information available on the remaining three accidents;
- 55 (86%) of the accidents involved only cars, while six (9%) involved a HGV;
- 53 (82%) occurred on a dry road surface, while 12 (18%) occurred on a damp or wet road surface;
- 47 (72%) accidents occurred during day light hours while 18 (28%) accidents occurred in the hours of darkness;
- six (9%) accidents occurred in the AM peak period (07:00 to 10:00), seven (10%) occurred in the inter-peak period (Noon to 14:00) and 11 (17%) occurred in the PM peak period (16:00 to 19:00); and
- 41 (64%) of the accidents involved vehicles ‘going ahead’ while 10 (16%) involved vehicles ‘slowing or stopping’.

4.6 Accidents at Junctions

4.6.1 An assessment of the accidents at the junctions with the local road network has also been undertaken. The analysis of the accidents at the junctions shows that there have been 12 during the study period. Of these:

- six occurred at Junction 24;
- five occurred at Junction 23;
- one occurred at Junction 25; and
- no accidents occurred at Junction 22.

a) Junction 24

4.6.2 Of the six accidents that occurred at Junction 24:

- all six accidents resulted in slight injuries;
- four (67%) of the accidents involved just cars, while two (33%) involved a HGV;
- five (83%) occurred on a dry road surface, while one (17%) accident occurred on a damp or wet road surface;
- five (83%) accidents occurred during day light hours while one (17%) accident occurred in the hours of darkness; and
- no accidents occurred in the AM peak period (07:00 to 10:00), two (34%) occurred in the inter-peak period (Noon to 14:00) while one (17%) occurred in the PM peak period (16:00 to 19:00);

- one (17%) of the accidents involved a 'waiting vehicle', one (17%) involved a vehicle 'slowing down', while three (50%) involved a vehicle 'going ahead'.

b) Junction 23

4.6.3 Of the five accidents at Junction 23:

- all five resulted in slight injuries;
- four (80%) of the accidents involved just cars, while one (20%) involved a bus/coach. There were no accidents involving an HGV;
- four (80%) occurred on a dry road surface, while one (20%) accident occurred on a damp or wet road surface;
- four (80%) accidents occurred during day light hours while one (20%) accident occurred in the hours of darkness;
- one (20%) accident occurred in the AM peak period (07:00 to 10:00), one (20%) occurred in the inter-peak period (Noon to 14:00) and one (20%) occurred in the PM peak period (16:00 to 19:00); and
- two (40%) of the accidents involved a waiting vehicle, one (20%) involved a vehicle 'moving off', one (20%) involved a vehicle 'slowing down', while one (20%) involved a vehicle 'going ahead'.

c) Junction 25

4.6.4 The one accident at Junction 25 involved only cars and occurred during the hours of darkness on a dry road surface. It resulted in a slight casualty. No other details were provided as to the cause of the accident.

4.7 National Motorway Accident Data

4.7.1 National data for traffic accidents on Motorways in the UK has been obtained from the Department for Transport (DfT) for 2009, the last full available year. A summary is shown below:

- 2% of all motorway accidents resulted in a fatality, 12% resulted in a seriously injured casualty and 86% were slightly injured;
- 70% of motorway accidents occurred during daylight hours, while 30% occurred in the dark;
- 16% of motorway accidents occurred in the dark when street lighting was switched on while 14% of accidents occurred in the dark with no street lighting present; and
- 65% of motorway accidents occurred on a dry road surface, while the remainder (35%) occurred when the road surface was damp, wet or icy.

4.8 Analysis of Accidents on the M5 Motorway

4.8.1 To analyse the accidents on the M5 Motorway between Junctions 22 and 25, a comparison of the accident data has been undertaken with that available nationally to determine if there are any apparent road safety issues that currently exist. The results are shown in **Table 4.1**:

Table 4.1: Comparison of M5 Motorway and National Accident Rates

	National Rates	Jcn 22 – 25	Jcn 22 – 23	Jcn 23 – 24	Jcn 24 – 25
Fatalities	2%	2%	0%	3%	3%
Serious	12%	10%	6%	7%	18%
Slight	86%	88%	94%	90%	79%
Daylight/Dark	70/30%	70/25%	75/25%	65/35%	72/28%
Dry/Wet	65/35%	72/28%	69/31%	68/32%	82/18%

4.8.2 The M5 accident data as a whole (between Junctions 22 and 25) shows that the proportion of accidents that resulted in killed or seriously injured (KSI) casualties is marginally below the national rates, although the section between Junctions 23 and 24 has a higher rate than the national motorway accident rates.

4.8.3 The rates for accidents that occur on a damp or wet road surface are significantly lower than the national rates, 27% compared to 35% nationally. No sections of the M5 motorway in the study area had rates for this category of accident higher than the national average.

4.8.4 Furthermore, the number of accidents involving HGVs along the whole section of the M5 under review is very small.

4.8.5 Taken as a whole, the accident rate for the M5 between Junctions 22 and 25 that have occurred during the hours of darkness is 26%. The national rate is 30% for all accidents, which indicates that the M5 in the study area has a lower rate than would otherwise be expected.

4.8.6 In summary, the accident analysis of the M5 Motorway shows that there are currently no significant road safety issues on the M5 Motorway main links or junctions that represent a major deviation or worsening relative to national trends

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5. SOMERSET COUNTY COUNCIL ROAD NETWORK ACCIDENT REVIEW

5.1 Overview

5.1.1 The analysis to identify road safety issues and accident sites on the local road network in the study area has been undertaken in two ways.

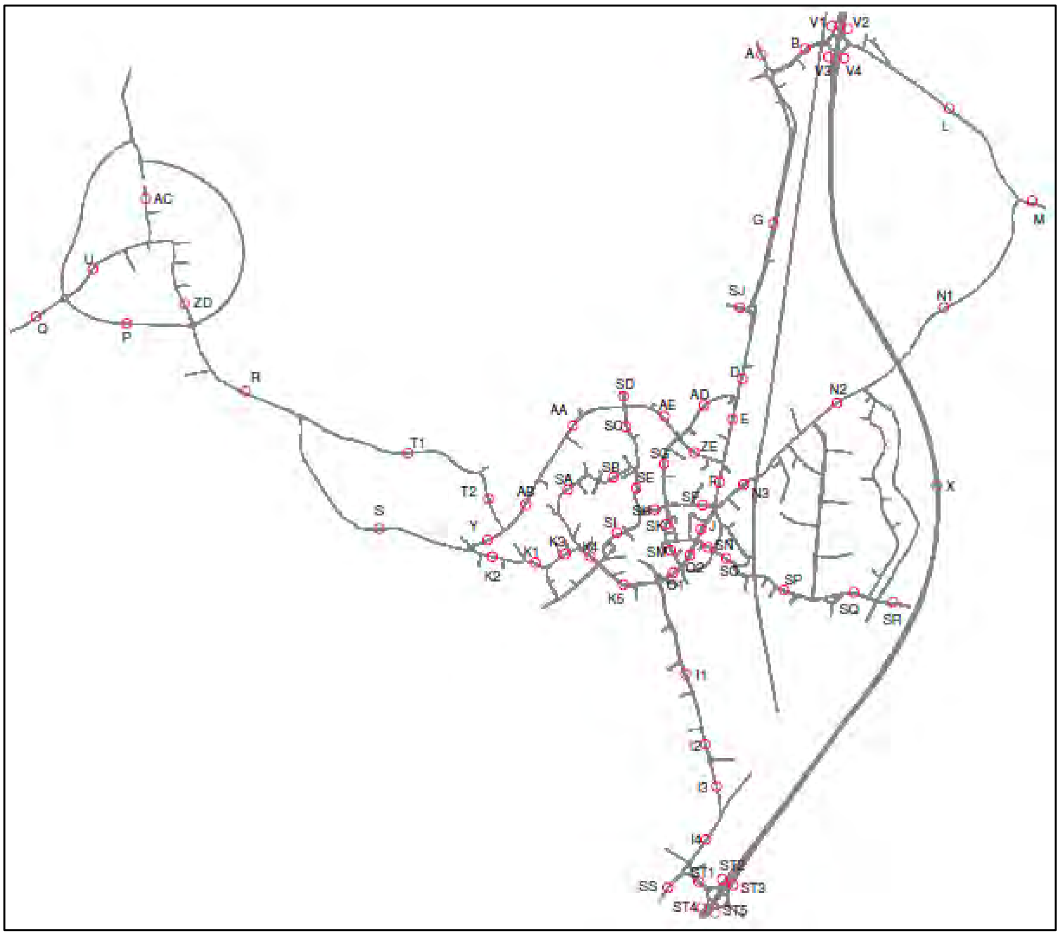
5.1.2 Firstly, a link-based methodology has been used whereby the accident data for all of the local road links in the study area is compared to national accident rates for roads of a similar nature.

5.1.3 Secondly, accident clusters have been identified using methodologies developed by the SRSP for urban and rural roads.

5.2 Link-Based Review

5.2.1 To undertake the link based review it has been necessary to determine appropriate link sections upon which to undertake the assessment. For consistency, it has been decided to retain the link convention used in the PARAMICS assessments. The selected links in Bridgwater and Cannington are illustrated in **Figure 5.1.**

Figure 5.1: Local Road Links in Bridgwater and Cannington



5.2.2 In addition to the above links, the section of the A39 between Cannington and Williton has been divided into four sections, and labelled Q1, Q2, Q3 and Q4.

A39 Link Accident Review

5.2.3 **Table 5.1** details the existing collision numbers and accident rates (per million vehicle km) occurring on each A39 link when analysed against 2009 24-hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been demonstrated.

5.2.4 The existing accident rates have been compared against the national average accident rate for that type of road. The accident rate is defined by the Royal Society for the Prevention of Accidents (RoSPA) 'Road Safety Engineering Manual' as a standard approach in route length accident analysis and is calculated as follows:

$$\text{Accident rate} = \left\{ \frac{\text{Number of accidents} \times 10^6}{\text{Number of days in period} \times \text{AADT} \times \text{link km length}} \right\} \times 100$$

Table 5.1: Existing A39 Route Collision Conditions

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type/National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
Q4	1.45	7703	2.2	53.96	0.6	14.72	Urban A Road: 56	Below
Q3	9.5		10.2	38.19	7.6	28.45	Rural A Road: 20	Above
Q2	0.32		0	0.00	0	0.00	Urban A Road: 56	Below
Q1	4.02		1.4	12.39	1.4	5.31	Rural A Road: 20	Below
Q	8.21		2.4	10.40	0.6	6.07	Rural A Road: 20	Below
P	1.1	6399	1	38.92	0.6	23.35	Rural A Road: 20	Above
R	1.2	14468	0.8	12.62	0.6	9.47	Rural A Road: 20	Below
S	2.1	12959	2.8	28.19	0.6	6.04	Rural A Road: 20	Above
K2	0.5	14028	1.2	46.87	0.2	7.81	Urban A Road: 56	Below
K1	0.2	15338	0.6	53.59	0.6	53.59	Urban A Road: 56	Below
K3	0.35	15441	0.6	30.42	0	0.00	Urban A Road: 56	Below
K4	0.2	17198	1.8	143.37	0.6	47.79	Urban A Road: 56	Above
K5	0.6	20410	5	111.86	1.4	31.32	Urban A Road: 56	Above
O1	0.2	22608	3	181.78	1.2	72.71	Urban A Road: 56	Above
O2	0.3	18821	3	145.57	1	48.52	Urban A Road: 56	Above
J	0.3	20240	3	135.36	1.4	63.17	Urban A Road: 56	Above
N3	0.85	17129	6.4	120.43	2.6	48.92	Urban A Road: 56	Above
N2	0.8	12829	3	80.08	1.8	48.05	Urban A Road: 56	Above

Link	Length (km)	2009 AADT (two-way flow)	Including Junctions		Excluding Junctions		Route Type/National Average Accident Rate (100 mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100 mvkm)	Recorded No. of Collisions per year	Accident Rate (100 mvkm)		
N1	2.2	12931	2.8	26.97	1.2	11.56	Rural A Road: 20	Above
L	2.1	14061	12	111.34	4.4	40.82	Rural A Road: 20	Above
M	12	16535	11	15.19	3.8	5.25	Rural A Road: 20	Below

5.2.5 Analysis of baseline A39 route collisions provided in **Table 5.1** shows that 12 of the 21 links indicate an accident rate above the national average rate. All other links indicate accident rates within the national average rates.

5.2.6 However, the analysis also shows that in most cases, the majority of accidents occur at junctions rather than along the links.

A38 Route Accident Analysis

5.2.7 **Table 5.2** details the existing collision numbers and accident rates (per million vehicle km) occurring on each A38 link when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been demonstrated.

Table 5.2: Existing A38 Route Collision Conditions

Link	Length (km)	2009 AADT (two way flow)	Including Junctions		Excluding Junctions		Route Type/National Average Accident Rate (100mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100mvkm)	Recorded No. of Collisions per year	Accident Rate (100mvkm)		
SS	2.0	15,955	3.6	30.91	1	8.59	Rural A Road: 20	Above
I4	0.7	21,216	1	18.45	0.2	3.69	Rural A Road: 20	Below
I3	0.3	21,088	0.6	25.98	0.6	25.98	Rural A Road: 20	Above
I2	0.7	21,644	1.6	28.93	0.4	7.23	Urban A Road: 56	Below
I1	0.85	24,728	9.8	127.74	2.2	28.68	Urban A Road: 56	Above
O1	0.2	22,608	3	181.78	1.2	72.71	Urban A Road: 56	Above
O2	0.3	18,821	2.2	106.75	1	48.52	Urban A Road: 56	Above
J	0.3	20,240	3	135.36	1.4	63.17	Urban A Road: 56	Above
F	0.35	16,818	3	139.63	0.8	37.24	Urban A Road: 56	Above
E	0.55	13,159	2.4	90.85	1.2	45.43	Urban A Road: 56	Above
D	0.8	22,956	1.8	26.85	1.6	23.87	Urban A Road: 56	Below
G	2.0	21,971	5	31.17	3.4	21.20	Rural A Road: 20	Above
A	4.6	10,678	8.2	45.74	3.2	17.85	Rural A Road: 20	Above
ST1	0.45	18,510	0	0.00	0	0.00	Urban A Road: 56	Below

5.2.8 Analysis of baseline A38 route collisions provided in **Table 5.2** indicates that 10 of the 14 links indicate an accident rate above the national average rate. All other links indicate accident rates within the national average rates.

5.2.9 Again, the analysis shows that, in most cases, the majority of accidents occur at the junctions rather along the links.

C182 Route Accident Analysis

5.2.10 **Table 5.3** details the existing collision numbers and accident rates (per million vehicle km) occurring on the C182 link when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been demonstrated.

Table 5.3: Existing C182 Route Collision Conditions

Link	Length (km)	2009 AADT (two way flow)	Including Junctions		Excluding Junctions		Route Type/National Average Accident Rate (100mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100mvkm)	Recorded No. of Collisions per year	Accident Rate (100mvkm)		
AC	9.3	6,706	3.6	15.8	2.2	9.66	Rural Other Roads: 35	Below

5.2.11 **Table 5.3** indicates that the C182 accident rate is significantly below the national average rates.

NDR(A39) Route Accident Analysis

5.2.12 **Table 5.4** details the existing collision numbers and accident rates (per million vehicle km) occurring on each NDR link when analysed against 2009 24 hour AADT flows. A comparison between scenarios with and without the inclusion of junctions has also been demonstrated.

Table 5.4: Existing NDR Route Collision Conditions

Link	Length (km)	2009 AADT (two way flow)	Including Junctions		Excluding Junctions		Route Type/National Average Accident Rate (100mvkm)	Relationship to National Average (including junctions)
			Recorded No. of Collisions per year	Accident Rate (100mvkm)	Recorded No. of Collisions per year	Accident Rate (100mvkm)		
Y	0.3	11,601	3	236.2	0	0.00	Urban A Road:56	Below
AB	1	10,397	5	131.8	4	105.4	Urban A Road:56	Below
AA	0.6	12,033	4	151.8	3	113.8	Urban A Road:56	Below
AE	0.55	15,891	6	188.1	5	156.7	Urban A Road:56	Below
ZE	0.45	7,030	16	1385.7	3	259.8	Urban A Road:56	Above

5.2.13 **Table 5.4** shows that all NDR links, with the exception of The Drove (link ZE), indicate accident rates within the national average rates identified by RCGB: 2009.

Summary

5.2.14 Tables 5.1 to 5.4 set out the existing context in terms of accident rates (including accidents at junctions) on the main routes that comprise the agreed study area. These rates have been obtained using the formula defined by the Royal Society for the Prevention of Accidents (RoSPA) 'Road Safety Engineering Manual'.

5.2.15 These rates have then been compared to national accident rates for roads of a similar nature. Assessing each route in turn:

- on the A39, 12 of the 21 links that comprise this route currently have accidents rates above the national average;
- on the A38, 10 of the 14 links that comprise this route currently have accident rates above the national average;
- the C182 has an existing accident rate below the national average; and
- all of the links on the Northern Distributor Road have accidents rates below the national average except The Drove between the A38 Bristol Road and Wylds Road.

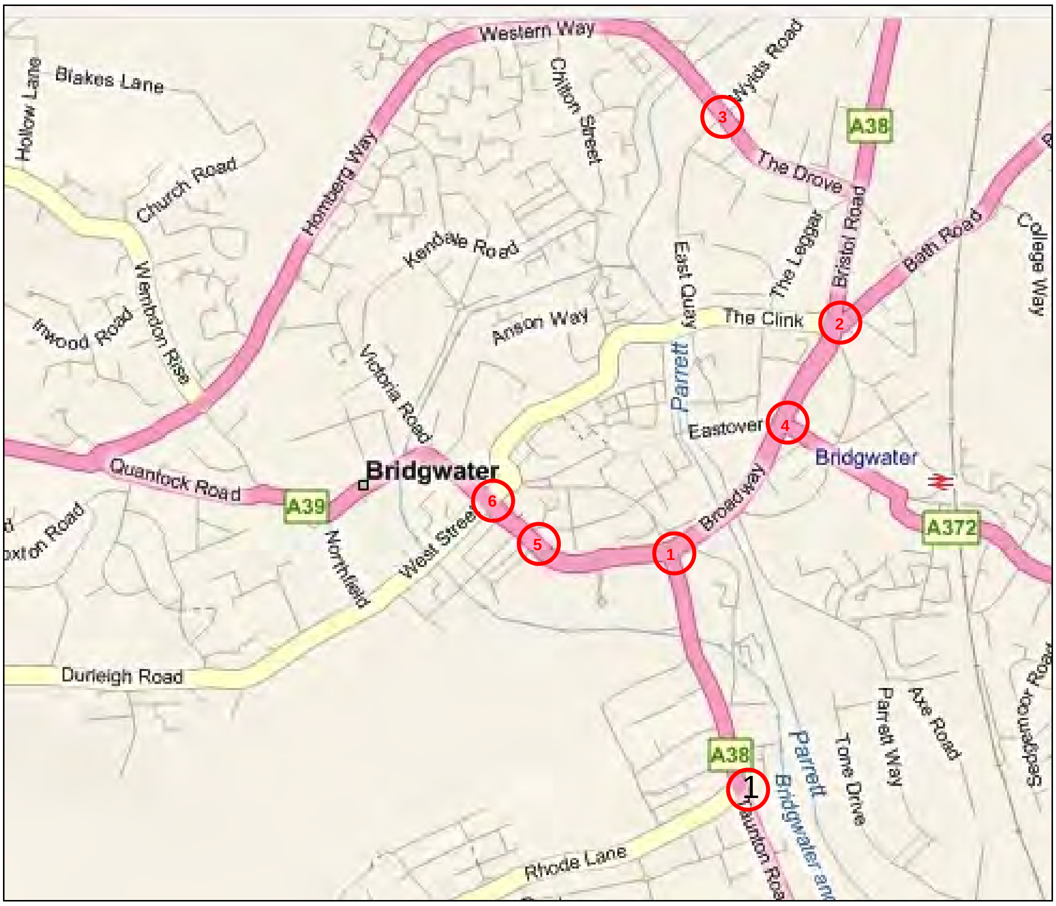
5.3 Urban Accident Cluster Review

5.3.1 Using the methodology identified by the SRSP, described in Section 3, a review of the personal injury accident data provided by Somerset County Council for the urban roads within the study area (those within Bridgwater) shows that seven locations have been identified as having seven or more accidents within 50 metres of each other in the five and a half year study period. The junctions are listed below:

1. A38 Taunton Road/A39 Broadway (35 accidents);
2. A38 Bristol Road/A39 Bath Road/ The Clink (Cross Rifles Roundabout) (21 accidents);
3. the Drove/Wylds Road (13 accidents);
4. A39 BroadwayA372 St. John Street (11 accidents);
5. A39 North Street/Albert Street (10 accidents);
6. A39 North Street/West Street (10 accidents); and
7. A38 Taunton Road/Rhode Lane (nine accidents).

5.3.2 The locations of these sites are shown in **Figure 5.2**.

Figure 5.2: Urban Accident Cluster Sites



5.3.3 A review of each site has been undertaken. Details of the existing junction layouts and summaries of the accident data at each location is provided in **Appendix A**.

a) A38 Taunton Road/A39 Broadway

5.3.4 In total, there were 35 accidents at the junction in the five and a half year study period. A review of the accident data has indicated that:

- there were no fatalities, while three (9%) resulted in a seriously injured casualty;
- 29 (83%) occurred on a dry road surface, while six (17%) occurred on a damp or wet road surface;
- three (9%) resulted in an injury to a pedestrian, while two (6%) resulted in an injury to a cyclist;
- 15 (43%) accidents occurred during the hours of darkness;
- two (6%) occurred in the AM peak period (07:00 to 10:00), six (17%) occurred in the inter-peak period (Noon to 14:00) and four (11%) occurred in the PM peak period (16:00 to 19:00);

- 12 (34%) involved a vehicle turning right from the A38 Taunton Road into the A39 Broadway colliding with a vehicle travelling straight ahead on the A38 Taunton Road;
- eight (22%) involved vehicles in rear-end shunts; and
- four (11%) were as a result of a driver disobeying a traffic signal.

5.3.5 The accident data shows that a significant number (34%) of the accidents at the junction were as a result of vehicles turning from the A38 Taunton Road into the A39 Broadway colliding with opposing traffic.

5.3.6 It is not always clear from the accident data in which direction the turning vehicles were travelling, but the majority seem to be travelling from the south to east. Vehicles making this turn do so in gaps in opposing traffic, assisted by an indicative green phase once the southbound phase on the A38 Taunton Road has been terminated.

5.3.7 Four of the right turn accidents were as a result of vehicles disobeying a traffic signal, although it is not clear from the description in which direction the vehicle that disobeyed the traffic signal was travelling.

5.3.8 At least two of the right turn accidents were as a result of vehicles travelling from the A38 Taunton Road southbound turning right to the A39 Broadway westbound. This movement is currently prohibited.

5.3.9 A substantial proportion of the accidents (22%) involved rear-end shunts at the junction. Most of these involved vehicles turning at the junction being struck from behind by other vehicles either travelling straight on or about to undertake the same movement themselves.

5.3.10 Neither approach on the A38 Taunton Road has been treated with anti-skid surfacing, while both approaches on the A39 Broadway have been. From the accident data, it is not always possible to determine in which direction the vehicles involved in the accidents were travelling but at least four occurred on the A38 Taunton Road approaches.

5.3.11 The accident data also indicates that a significant proportion (43%) of the accidents occurred during the hours of darkness. The junction is currently lit, with street lighting provided on all approaches.

b) Cross Rifles Roundabout

5.3.12 In total there were 21 accidents at this junction in the five and a half year study period. A review of the accidents has revealed that:

- all were slight in severity;
- 16 occurred on a dry road surface, while five (24%) occurred on a damp or wet road surface;
- three (14%) resulted in an injury to a pedestrian, while five (24%) resulted in an injury to a cyclist;
- seven (33%) accidents occurred during the hours of darkness;

- three (14%) occurred in the AM peak period (7AM to 10AM), one (5%) occurred in the inter-peak period (Noon to 2PM) and 10 (48%) occurred in the PM peak period (4PM to 7PM);
- 12 (34%) involved a vehicle turning right from the A38 Taunton Road into the A39 Broadway colliding with a vehicle travelling straight ahead on the A38 Taunton Road;
- eight (22%) involved vehicles in rear-end shunts; and
- four (11%) were as a result of a driver disobeying a traffic signal.

5.3.13 Five of the accidents resulting in pedestrians or cyclists casualties were as a result of a cyclist riding across a road in an east-west direction at a pedestrian crossing to the north of the roundabout.

5.3.14 This suggests that there is a demand for a cycle route in an east-west direction, possibly into the Sainsbury's Supermarket on the northwest corner of the junction. There is currently no apparent cycle infrastructure to facilitate this movement.

5.3.15 However, proposals do exist in the current Somerset Transport Strategy to improve connectivity for cyclists travelling between the A39 Bath Road and the A38 Bristol Road further to the north. This includes a new pedestrian/cycle bridge across the railway line.

5.3.16 Two of the accidents involved vehicles turning right from the A39 Bath Road into Rosebery Avenue being in collision with opposing traffic on travelling southbound on the A39 Bath Road.

c) Wylds Road/The Drove

5.3.17 There have been 13 accidents at this junction in the study period. The accident analysis has shown that:

- all were slight in severity;
- eight occurred on a dry road surface, while five (39%) occurred on a damp or wet road surface;
- six (47%) involved vehicles turning right at the junction colliding with oncoming vehicles.
- four (32%) resulted in an injury to a school age child;
- three (23%) resulted in an injury to a cyclist, two of which were children;
- there were no accidents that resulted in injuries to pedestrians;
- one (8%) accident occurred during the hours of darkness;
- five (40%) occurred between 14:30 and 15:30;
- four (32%) occurred in the AM peak period (07:00 to 10:00), one (8%) occurred in the inter-peak period (Noon to 14:00) and three (23%) occurred in the PM peak period (16:00 to 19:00);
- three (27%) were as a result of vehicles failing to stop at a red light; and
- three (27%) were rear-end shunts.

5.3.18 The accident data shows that nearly half of the accidents at this location involved vehicles turning right at the junction being in collision with oncoming vehicles. Currently, all right-turn manoeuvres at the junction are undertaken in gaps in traffic, rather than under traffic signal control.

5.3.19 There were also a significant number of accidents involving cyclists, the majority of which involved children of a school age. The junction currently has Toucan crossings across all arms and off-road cycle lanes on the northern and southern approaches.

5.3.20 A significant number of the accidents occurred in the period between 14:30 and 15:30, two of which involved children of a school age.

d) A39 Broadway/A372 St John Street

5.3.21 During the study period there were 11 accidents within 50m of this junction. The accident analysis has shown that:

- all were slight in severity;
- eight occurred on a dry road surface, while three (27%) occurred on a damp or wet road surface;
- three (27%) resulted in an injury to a pedestrian, while one (9%) resulted in an injury to a cyclist;
- five (46%) accidents occurred during the hours of darkness;
- one (9%) occurred in the AM peak period (07:00 to 10:00), two (18%) occurred in the inter-peak period (Noon to 14:00) and one (9%) occurred in the PM peak period (16:00 to 19:00);
- three (27%) were as a result of vehicles failing to stop at a red light; and
- three (27%) were rear-end shunts.

5.3.22 The summary of the accident data indicates that nearly half of the collisions occurred during the hours of darkness.

5.3.23 Nearly a third of the accidents were as a result of vehicles failing to stop at a red light, although these all occurred on different approaches to the junction.

5.3.24 Similarly, the three accidents that resulted in a pedestrian casualty all occurred on different approaches, with two being the result of the pedestrian crossing the road against a red signal.

e) A39 North Street/Albert Street

5.3.25 There have been 10 accidents within 50m of the junction within the study period. The accident analysis has shown that:

- one (10%) resulted in a seriously injured casualty while the remainder were all slight;
- six occurred on a dry road surface, while four (40%) occurred on a damp or wet road surface;

- one (10%) resulted in an injury to a pedestrian, while one (10%) resulted in an injury to a cyclist;
- two (20%) accidents occurred during the hours of darkness;
- two (20%) occurred in the AM peak period (07:00 to 10:00), one (10%) occurred in the inter-peak period (Noon to 14:00) and three (30%) occurred in the PM peak period (16:00 to 17:00); and
- seven (70%) involved a vehicle turning right out of Albert Street being in collision with another vehicle already on the A39 Broadway.

5.3.26 The accident data indicates that the vast majority of accidents result from vehicles turning right out of Albert Street colliding with vehicles travelling on the A39 Broadway.

5.3.27 Two of these accidents were as a result of vehicles stationery in the westbound nearside lane allowing vehicles from Albert Road out of the junction, who would then collide with vehicles travelling in the westbound offside lane. A yellow box-junction is marked across the eastbound and westbound carriageways.

5.3.28 Sightlines at the junction for vehicles turning out of Albert Street appear to be restricted by the presence of pedestrian guardrail at the front of the footway on both corners.

f) A39 North Street/West Street

5.3.29 There have been 10 accidents within 50m of this junction within the study period. The accident analysis has shown that:

- one (10%) resulted in a fatality and one (10%) resulted in a seriously injured casualty while the remainder were all slight;
- seven occurred on a dry road surface, while three (30%) occurred on a damp or wet road surface;
- there were no pedestrian casualties, while one (10%) resulted in an injury to a cyclist;
- three (30%) accidents occurred during the hours of darkness;
- two (20%) occurred in the AM peak period (07:00 to 10:00), one (10%) occurred in the inter-peak period (Noon to 14:00) and two (20%) occurred in the PM peak period (16:00 to 19:00); and
- three (30%) involved vehicles in a rear end shunt, two of which were when a vehicle was stationery at the traffic signals being struck from behind by a vehicle that failed to stop in time;
- two (20%) involved disabled road users in mobility scooters, one of which was hit by an HGV while crossing the road which resulted in the death of the mobility scooter driver.

5.3.30 The accident data does not demonstrate any discernible trends, other than a moderate number of rear end shunt accidents. Both approaches on the A39 Broadway/North Street have been treated with anti-skid surfacing, while Penel Orlieu and West Street have not.

g) A38 Taunton Road/Rhode Lane

5.3.31 There have been nine accidents at this junction within the study period. The accident analysis has indicated that:

- there were no fatalities, while one (11%) resulted in a seriously injured casualty;
- five occurred on a dry road surface, while four (44%) occurred on a damp or wet road surface;
- one (11%) resulted in an injury to a pedestrian, while four (44%) resulted in an injury to a cyclist;
- six (67%) accidents occurred during the hours of darkness;
- none occurred in the AM peak period (07:00 to 10:00), none occurred in the inter-peak period (Noon to 14:00) and two (22%) occurred in the PM peak period (16:00 to 19:00). Four (44%) accidents occurred between 19:00 and 20:30, all in the dark; and
- five (56%) involved a vehicle turning right into or out of Rhode Lane being in collision with another vehicle already on the A38 Taunton Road.

5.3.32 The accident data indicates that two-thirds of the accidents at the junction occurred during the hours of darkness, with four occurring during the early evening.

5.3.33 Five of the nine accidents were between vehicles turning right at the junction, with four resulting in injuries to a cyclist.

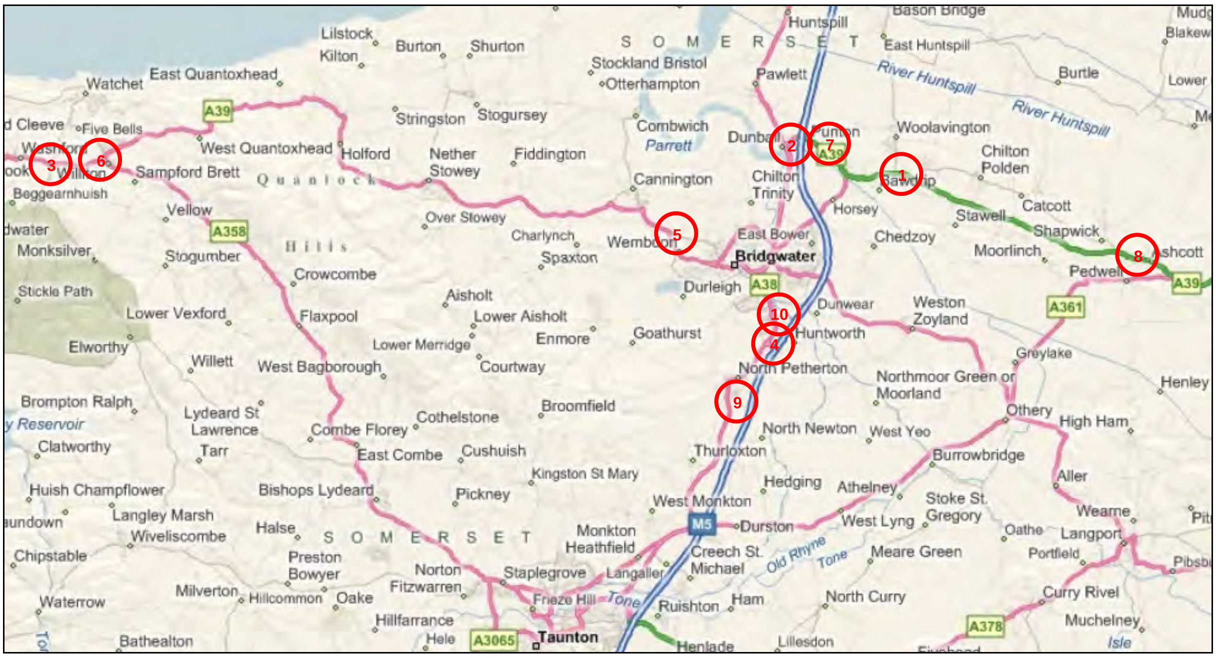
5.4 Rural Accident Cluster Review

5.4.1 A review of the personal injury accident data provided by Somerset County Council for the rural roads within the study area (those outside Bridgwater) shows that ten locations have been identified as having seven or more accidents within 100 metres of each other in the five and a half year study period. The sites are listed below:

1. the A39/B3141 Woolavington Hill Junction (15 accidents);
2. the A38/A39 Dunball Roundabout (12 accidents);
3. the A38/B3190 Washford Cross Junction (11 accidents);
4. the A38/M5 Junction 24 Huntworth Roundabout (11 accidents);
5. the A39/B3339 Sandford Corner Junction (10 accidents);
6. fore Street, Williton (nine accidents);
7. the A39/Hall Road junction (seven accidents);
8. the A39/Pedwell Hill Junction (seven accidents);
9. Fore Street/Hyde Park Junction (seven accidents); and
10. the A38 Taunton Road/Wills Road Junction (seven accidents).

5.4.2 The locations of these sites are shown in **Figure 5.3**, while a review of the accident data at each site is contained on the following pages.

Figure 5.3: Rural Accident Cluster Locations



5.4.3 A review of each site has been undertaken. Details of the existing junction layouts and summaries of the accident data at each location is provided in **Appendix B**.

a) A39/B3141 Woolavington Hill Junction

5.4.4 There were 15 accidents at this junction during the study period. A review of the accident data has shown that:

- one (7%) resulted in serious injuries, while the remainder all resulted in slight injuries;
- 13 (87%) of the accidents occurred in daylight hours, the remaining two in night time hours;
- 13 (87%) of the accidents occurred on a dry road surface, while two occurred on a wet/damp surface;
- There were no pedestrian or cyclist casualties;
- two (13%) accidents occurred in the AM peak period (07:00 to 10:00), one (7%) accident occurred in the inter-peak period (Noon to 14:00) while four (27%) occurred in the PM peak period (16:00M to 19:00); and
- 10 (67%) of the accidents were rear-end shunts resulting from drivers stopping in the road while waiting to turn. Seven of these involved vehicles turning at the junction of the A39 Bath Road/ Woolavington Hill.

5.4.5 A characteristic of this area is that a number of properties and their driveways face onto the A39 Bath Road.

5.4.6 The accident data indicates that two thirds (67%) of the accidents that occur in this area are a result of vehicles stopping on the A39 Bath Road in order to turn either into their drives or onto Woolavington Hill (B3141). Proceeding vehicles then fail to stop, resulting in rear-end shunts.

5.4.7 A significant proportion of accidents also occurred as a result of drivers pulling out of the junction whilst failing too look properly or judging oncoming traffic speed.

b) A38/A39 Dunball Roundabout

5.4.8 There have been 12 accidents at this junction in the study period. A review of the accident data has shown that:

- one (8%) resulted in serious injuries, while the remainder all resulted in slight injuries;
- 11 occurred on a dry road surface, while one (8%) occurred on a damp or wet road surface;
- there were no pedestrian or cyclist casualties;
- 10 (83%) of the accidents occurred during daylight hours, while two occurred in night time hours;
- two (17%) accidents occurred in the AM peak period (07:00 to 10:00), one (8%) occurred in the inter-peak period (Noon to 14:00) and four (33%) occurred in the PM peak period (16:00 to 19:00); and
- seven (58%) of the accidents were as a result of rear end collisions with a further two (17%) resulting from a driver losing control of a vehicle on one of the approaches to the roundabout.

5.4.9 The vast majority of accidents that occurred at this junction involved vehicles in rear-end shunts or drivers losing control of their vehicle on the approach to the roundabout, mainly on the northbound approach to the roundabout.

5.4.10 Two accidents were as a result of poor lane discipline on the circulatory carriageway.

c) A39/B3190 Washford Cross Junction

5.4.11 The have been 11 accidents at this junction in the study period. A review of the accident data shows that:

- one (9%) resulted in a seriously injured casualty while the remainder were all slight;
- eight occurred on a dry road surface, while three (27%) occurred on a damp or wet road surface;
- there were no pedestrian or cyclist casualties
- two (18%) accidents occurred during the hours of darkness;
- one (9%) occurred in the AM peak period (07:00 to 10:00), two (18%) occurred in the inter-peak period (Noon to 14:00) and one (9%) occurred in the PM peak period (16:00 to 19:00); and
- all accidents were put down to driver error. Of these nine (81%) involved rear end shunts, mainly involving drivers waiting to turn right from the A39 on to the B3190

being struck from behind. Two (19%) accidents were as a result of a vehicles turning into oncoming traffic.

5.4.12 A characteristic this cross-road junction is that vehicles turning right are required to stop and wait for on coming traffic to pass before completing their manoeuvre. Proceeding traffic will also have to stop and wait for this manoeuvre to be completed.

5.4.13 The most common accident type at the Washford Cross is rear-end shunts that have been caused by vehicles failing to stop quick enough when vehicles in front stop to turn right. There was also one accident that was a consequence of a driver failing to look properly and turning into oncoming traffic, whilst another was caused by a driver loosing control of their vehicle and swerving off the road.

d) A38/M5 Junction 24 Link Road – Huntworth Roundabout

5.4.14 There have been 11 accidents at this junction during the study period. A review of the accident data shows that:

- all accidents resulted in slight injuries;
- nine (82%) of the accidents occurred in daylight hours, with two occurring in night time hours;
- nine (82%) of the accidents occurred on a dry road surface, two occurred on a wet/damp surface;
- there were no pedestrian casualties, while there was one cyclist casualty
- five (45%) accidents occurred in the AM peak period (07:00 to 10:00), 0 (0%) accidents occurred in the inter-peak period (Noon to 14:00) while two (18%) occurred in the PM peak period (16:00 to 19:00);
- five (45%) of the accidents were rear end shuts, four (36%) of accidents occurred when vehicles entered the roundabout, and two (18%) of the accidents occurred when vehicles cut across the paths of other vehicles.

5.4.15 A high proportion of the accidents resulted in rear end collisions, although two of these were clearly as a result of driver error. The rear-end collision accidents are distributed across four of the five arms of the roundabout.

5.4.16 Two of the accidents involved poor lane discipline on the circulatory carriageway of the roundabout.

e) A39/B3339 Sandford Corner

5.4.17 There have been 10 accidents at this junction during the study period. A review of the accident data shows that:

- two (20%) resulted in a fatality, three (30%) resulted in serious injuries, while the remainder all resulted in slight injuries;
- nine occurred on a dry road surface, while one (10%) occurred on a damp or wet road surface;
- there were no pedestrian or cyclist casualties;

- eight (80%) of the accidents occurred during daylight hours, while two occurred in night time hours;
- one (10%) accident occurred in the AM peak period (07:00 to 10:00), one (10%) occurred in the inter-peak period (Noon to 14:00) and three (30%) occurred in the PM peak period (16:00 to 19:00);
- both fatalities were put down to a loss of control by the driver;
- two accidents were put down to a poor road layout, one of which resulted in a serious injury.

5.4.18 The accident summary shows that a relatively high proportion of accidents in this area resulted in either serious or, in two cases, fatal injuries. Both of the fatalities occurred when a driver travelling westbound failed to negotiate the left hand bend and collided head on with a vehicle travelling in the opposite direction.

5.4.19 Five of the ten accidents were as a result of collisions when a vehicle turned at the Sandford Hill Junction and collided with a vehicle on the A39 New Road.

5.4.20 Three of the ten accidents were as a result of a vehicle turning at the Charlynch Lane junction being in collision with a vehicle travelling on the A39 New Road.

f) Fore Street, Williton

5.4.21 There have been nine accidents at this site during the study period. A review of the accident data shows that:

- one (11%) resulted in a fatality, while the remainder all resulted in slight injuries;
- seven occurred on a dry road surface, while two (22%) occurred on a damp or wet road surface;
- there were five pedestrian and one cyclist casualties;
- all accidents occurred during daylight hours;
- two (22%) accidents occurred in the AM peak period (07:00 to 10:00), two (22%) occurred in the inter-peak period (Noon to 14:00) and one (11%) occurred in the PM peak period (16:00 to 19:00); and
- the fatality was a result of a pedestrian failing to look properly whilst crossing, and a lack of awareness from the driver, which resulted in the death of the pedestrian.

5.4.22 Fore Street is the location for a number of village shops as well as a garage. As a result, there is a high level of vehicular and pedestrian traffic in the area.

5.4.23 Five of the nine accidents involved pedestrians being struck by vehicles, one resulting in the death of the pedestrian. However, many of these were as a result of either driver error or pedestrians injudiciously crossing the road.

5.4.24 A cyclist was also injured after being knocked over by a vehicle pulling out of the garage.

5.4.25 The remaining accidents were vehicular collisions, often as a result vehicles driving in the middle of the road to avoid parked cars.

g) A39/ Hall Road Junction

5.4.26 There have been seven personal injury accidents at this location during the study period. A review of the accident data shows that:

- one (14%) resulted in serious injuries, while the remainder all resulted in slight injuries;
- all occurred on a dry road surface;
- there were no pedestrian or cyclist casualties;
- four (57%) of the accidents occurred during daylight hours, while three (43%) occurred in night time hours;
- one (14%) accident occurred in the AM peak period (07:00 to 10:00), no accidents occurred in the inter-peak period (Noon to 14:00) while two (29%) occurred in the PM peak period (16:00 to 19:00); and
- all accidents were put down to either driver error, the most common being a failure to judge the speed and path of others.

5.4.27 The accident data indicates that a large proportion of the accidents (43%) occurred during night time hours. There are no street lights at this junction, so it could be argued that poor visibility has contributed towards these accidents.

5.4.28 There is a lay-by in close proximity to the junction that can accommodate over twelve vehicles. One of the accident occurred when a vehicles turned across traffic into the lay-by, whilst another occurred when a vehicle hit a parked vehicle in the lay-by.

5.4.29 Two of the accidents involved vehicles turning into, or out of, the Hall Road junction.

h) A39/Pedwell Hill

5.4.30 There have been seven accidents at this junction during the study period. A review of the accident data shows that:

- two (29%) resulted in serious injuries, while the remainder all resulted in slight injuries;
- six (86%) of the accidents occurred in daylight hours, with one occurring in night time hours;
- all of the accidents occurred on a dry road surface;
- there were no pedestrian or cyclist casualties;
- one (14%) accident occurred in the AM peak period (07:00 to 10:00), one (14%) accident occurred in the inter-peak period (Noon to 14:00) while three (43%) occurred in the PM peak period (16:00 to 19:00); and
- six (86%) of the accidents were rear end shuts resulting from vehicles failing to stop in time colliding with vehicles waiting to turn right into Shapwick Hill and Pedwell Hill.

5.4.31 This stretch of road has two junctions in close proximity to each other. The accident data indicates that all but one of the accidents occurred as a result of vehicles having to stop on the A39 whilst waiting to right. These vehicles were then hit from behind from vehicles failing to stop.

i) Fore Street/Hyde Park Junction, North Petherton

5.4.32 There have been seven accidents at this junction in the study period. A review of the accident data shows that:

- all accidents resulted in slight injuries;
- six (86%) of the accidents occurred in daylight hours, with one occurring in night time hours;
- five (71%) of the accidents occurred on a dry road surface, two occurred on a wet/damp surface;
- there were no pedestrian or cyclist casualties;
- two (29%) accidents occurred in the AM peak period (07:00 to 10:00), one (14%) accident occurred in the inter-peak period (Noon to 14:00) while two (29%) occurred in the PM peak period (16:00 to 19:00); and
- five (71%) of the accidents were rear end shuns.

5.4.33 The accident data indicates that rear end shunts were the main type of accident on this stretch of road.

5.4.34 In the majority of cases, vehicles were hit from behind after they slowed down in preparation of a right turn.

5.4.35 One accident occurred when a vehicle pulled out of Newton Road into oncoming traffic, whilst a head on collision occurred when a vehicle overtook and misjudged another vehicle.

j) A38 Taunton Road /Wills Road

5.4.36 There have been seven accidents at this junction during the study period. A review of the accident data shows that:

- two (29%) resulted in a seriously injured casualty while the remainder were all slight;
- five occurred on a dry road surface, while three (29%) occurred on a damp or wet road surface;
- there was one pedestrian and one cyclist casualties;
- all accidents occurred during daylight hours;
- four (57%) occurred in the AM peak period (07:00 to 10:00), 0 accidents occurred in the inter-peak period (Noon to 14:00) and two (29%) occurred in the PM peak period (16:00 to 19:00);
- five (71%) of the accidents occurred as a result of vehicles pulling out of Wills Road and colliding with oncoming traffic. Four of these involved a collision with a motorcycle overtaking slow moving traffic.

5.4.37 The A38 Taunton Road is the main strategic connection between Junction 24 of the M5 and Bridgwater, as well as forming part of the main local route between Taunton and Bridgwater. During peak hours in particular, the road is known to experience high traffic flows, resulting in slow moving or queuing traffic at various locations along its length.

5.4.38 The accident data indicates that four out of the seven collisions occurred when vehicles travelling along the A38 in slow moving traffic have signalled to let other vehicles into or out of Wills Road. Motorcycles, overtaking on the outside of traffic, have then collided with the turning vehicles. Two of these accidents resulted in serious injuries.

5.4.39 A rear-end shunt also occurred in slow moving traffic, and a pedestrian was hit when crossing the A38 Taunton Road at the zebra crossing north of the junction by an overtaking motorcycle.

6. FUTURE IMPACT ON ROAD SAFETY

6.1.1 When considering the future impact on road safety it is important to consider the likely increase in traffic generated by the proposed HPC development, but also the natural increase in traffic that will result from permitted developments coming forward.

6.1.2 An assessment of growth between 2009 and 2016 has been undertaken which considers the additional traffic generated by a series of committed developments permitted by the Council in addition to natural background traffic growth that is also likely to occur by 2016.

6.1.3 Therefore, where any existing accident problem has been identified it is not appropriate to assume that any worsening in 2016 is directly attributable to the proposed HPC project.

6.1.4 To assess the impact of the proposed development, the methodology specified by RoSPA and described in Section 5 has been replicated. However, the additional traffic generated by the proposed development has been included in the link flows to determine what the impact on road safety will be on each route used by construction related traffic.

6.1.5 Furthermore, the COBA manual suggests that the prediction of accidents numbers in the future must take into account that accident rates in the UK are generally falling year-on-year.

6.1.6 Table 4/1 of the COBA manual gives yearly coefficients by which to reduce base accident rates to take into account this general annual reduction. The coefficients are based on the type of road and posted speed limit.

6.1.7 The coefficients for all (Non-motorway) road types are very similar for roads with posted speed limits of 30mph and 40mph.

6.1.8 Similarly, most road types with speed limits of 50mph, 60mph and 70mph also have the same reduction coefficient (older single carriageway roads have a marginally different coefficient but for ease of application it has been decided to apply the higher coefficient).

6.1.9 Assessments have shown that the reduction coefficient for roads with posted speed limits of 30mph and 40mph between the base year of 2009 and the assessment year of 2016 is 0.93. That is, between 2009 and 2016 accident rates are expected to fall by around 7%.

6.1.10 For roads with posted speed limits of 50mph, 60mph and 70mph (excluding Motorways) the coefficient for the period from 2009 to 2016 is 0.884, the equivalent of a 12% fall in accident rates during this time.

6.1.11 These coefficients have then been applied to the existing accident rate to obtain the expected accident rate in 2016 for each link on the identified routes.

6.1.12 This has allowed the number of accidents expected to occur in the agreed future assessment year to be obtained, based on the existing accident rate on that link.

6.1.13 Two scenarios have then been tested for each link:

- 2016 Base flows without development and without mitigation;
- 2016 Flows with development but without mitigation.

6.1.14 Typically this methodology is a statistical approach whereby it is assumed that additional traffic leads to additional accidents, with a proportional relationship i.e. 10% increase in traffic leads to a 10% increase in accidents.

a) A39 Route Link Review

6.1.15 **Table 6.1** shows the existing accident rates and expected numbers of accidents for each link along the A39 for both traffic flow scenarios that have been modelled.

Table 6.1: A39 Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
Q4	7703	2.2	53.96	47.70	7969	2.01	8634	2.17
Q3		10.2	38.19	33.76		9.32		10.1
Q2		0	0.00	0.00		0.00		0.00
Q1		1.4	12.39	10.95		1.28		1.38
Q		2.4	10.40	9.19		2.2		2.38
P	6399	1	38.92	34.41	6638	0.92	13840	1.91
R	14468	0.8	12.62	11.16	14790	0.72	17985	0.88
S	12959	2.8	28.19	24.92	13293	2.8	16336	3.12
K2	14028	1.2	46.87	43.59	14297	1.13	15873	1.26
K1	15338	0.6	53.59	49.84	16172	0.59	17635	0.64
K3	15441	0.6	30.42	28.29	16329	0.59	17760	0.64
K4	17198	1.8	143.37	133.33	18156	1.77	19602	1.91
K5	20410	5	111.86	104.03	22114	5.04	23481	5.35
O1	22608	3	181.78	169.06	24650	3.04	24908	3.07
O2	18821	3	145.57	135.38	20802	3.08	21025	3.12
J	20240	3	135.36	125.88	22485	3.10	22783	3.14
N3	17129	6.4	120.43	112.00	15740	5.46	16888	5.87

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
N2	12829	3	80.08	74.47	11206	2.43	12738	2.77
N1	12931	2.8	26.97	25.08	11881	2.39	12743	2.56
L	14061	12	111.34	98.42	14427	10.88	14393	10.86
M	16535	11	15.19	13.42	16818	9.90	16884	9.92

6.1.16 It shows that, in the 2016 Base Case Scenario, there would be expected to be marginally fewer accidents on many of the links than currently is the case. This is primarily due to the reduction in accident rates prescribed by COBA.

6.1.17 When the additional traffic is added, the expected number of accidents on the links used by construction vehicles increase. However, the increase in expected accidents is small and result in numbers of accidents that roughly correspond to those currently experienced.

b) A38 Route Link Review

6.1.18 **Table 6.2** shows the existing accident rates and expected numbers of accidents for each link along the A38 for both traffic flow scenarios that have been modelled.

Table 6.2: A38 Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
SS	15,955	3.6	30.91	27.32	17566	3.5	17807	3.55
I4	21,216	1.0	18.45	16.30	22824	0.95	23878	0.99
I3	21,088	0.6	25.98	22.96	23318	0.59	23234	0.58
I2	21,644	1.6	28.93	26.90	23738	1.63	24425	1.68
I1	24,728	9.8	127.74	118.80	26962	9.94	27704	10.2
O1	22,608	3	181.78	169.06	24650	3.04	24908	3.07

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
O2	18,821	2.2	106.75	135.38	20802	3.08	21025	3.12
J	20,240	3	135.36	125.88	22485	3.10	22783	3.14
F	16,818	3	139.63	129.86	18764	3.11	18792	3.12
E	13,159	2.4	90.85	84.49	15904	2.71	16031	2.72
D	22,956	1.8	26.85	26.64	26716	2.08	27025	2.10
G	21,971	5	31.17	27.55	24935	5.01	25570	5.14
A	10,678	8.2	45.74	40.43	10772	7.31	10789	7.32
ST1	18,510	0	0.00	0.00	20018	0.00	21739	0.00

6.1.19 The table shows that, as with the A39, the number of accidents expected to occur in the 2016 Base Case is lower than is currently the case. When the development traffic is included in the 2016 Base Case plus development scenario the expected number of accidents returns to comparable levels that occur at present.

c) C182 Route Link Review

6.1.20 **Table 6.3** shows the existing accident rates and expected numbers of accidents for the C182 route north of Cannington and south of the proposed new Bypass connection (link AC) for both traffic flow scenarios that have been modelled.

Table 6.3: C182 Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
AC	6,706	3.6	15.8	13.97	6779	3.21	3093	1.52

6.1.21 The table shows that, in the 2016 Base Case, the expected number of accident reduces marginally, which can be attributed to the reduction factor specified by

COBA. When the development traffic is added, the expected number of accidents significantly reduces. This is because the two-way traffic flows have reduced on this section of the C182 by over 50% due to the construction of the bypass to the west of Hinkley.

d) NDR Route Link Review

6.1.22 **Table 6.4**shows the existing accident rates and expected numbers of accidents for each link along the NDR for both traffic flow scenarios that have been modelled.

Table 6.4: NDR Route Accident Prediction

Link	2009 AADT (two-way flow)	Average Accident Rate per year (5 year period)	2009 Accident Rate (100 mvkm) (Incl junctions)	2016 Accident Rate (100mvkm) (reduction coefficient applied)	2016 AADT Base + No Dev + No Mit		2016 AADT Base + Dev + No Mit	
					Two-way flows	Expected number of Accidents in 2016	Two-way flows	Expected number of Accidents in 2016
Y	11,601	3	236.2	219.7	11988	2.88	13746	3.31
AB	10,397	5	131.8	122.6	10853	4.86	12653	5.66
AA	12,033	4	151.8	141.2	12649	3.91	14336	4.43
AE	15,891	6	188.1	174.9	16796	5.90	18164	6.37
ZE	7,030	16	1385.7	1288.7	7666	16.2	8647	18.3

6.1.23 The table shows that, in the 2016 Base Case, the expected number of accidents would reduce. When the development traffic is added then the accidents expected on each link will return to levels currently experienced. However, even then, the increase is nominal.

e) Summary

6.1.24 The analysis of the impact of the construction related traffic on the routes expected to used to the site has shown that there would be expected to be a small natural reduction in accident levels during the period up to 2016 if the development did not go ahead.

6.1.25 When the development traffic is added, the accident levels on the key links are expected to return to similar levels that are experienced at present. However, the increase is relatively small comparatively.

6.1.26 It is also worth noting that the link only accident rates are significantly lower than when the accidents at junctions are also considered. This indicates that most accidents on the key routes to the site occur at junctions.

Therefore, it is proposed that the road safety mitigation strategy proposed for this project is to address the issues that currently occur at the junctions along the route to the site.

7. MITIGATION

7.1 Overview

7.1.1 As stated in the previous section, the analysis undertaken considers the overall change in accidents likely to occur in 2016, not just through delivery of the HPC project but also through the realisation of other developments which have already been permitted by the Council and an element of natural background traffic growth.

7.1.2 The main impact on road safety resulting from the construction traffic generated by the proposed HPC development is expected to occur at those junctions on the A39, A38 and NDR that currently experience high accident rates. These are the routes which are designated as HGV routes and will carry the most HPC generated traffic.

7.1.3 Therefore, the mitigation measures that are proposed by EDF Energy primarily address the main causes of accidents at these locations.

7.1.4 The junctions that have been considered are listed as follows, where locations are shown in bold text these relate to schemes that are proposed by EDF Energy as part of the HPC project.

a) A39

- **A39 Broadway/A38 Taunton Road**;
- A39 Broadway/A372 St John Street;
- A39 North Street/Albert Street;
- A39 North Street/West Street;
- A39/A38 Dunball Roundabout; and
- **A39 Sandford Corner.**

b) A38

- **A38 Bristol Road/A39 Bath Road/The Clink (Cross Rifles Roundabout);**
- A38 Taunton Road/Rhode Lane;
- **the A38/M5 Junction 24 Huntworth Roundabout**; and
- the A38 Taunton Road/Wills Road Junction.

c) NDR

- **Wylds Road/The Drove.**

7.2 A39 Junctions

a) A39 Broadway/A38 Taunton Road

7.2.1 The key road safety issues that have been identified at the junction are:

- Nearly half of the accidents at the junction were as a result of vehicles turning from the A38 Taunton Road into the A39 Broadway colliding with opposing traffic.
- Four of the right turn accidents were as a result of vehicles disobeying a traffic signal, although it is not clear from the description in which direction the vehicle that disobeyed the traffic signal was travelling.
- A substantial proportion of the accidents involved of rear-end shunts at the junction.
- Nearly half of the accidents occurred during the hours of darkness. The junction is currently lit, with street lighting provided on all approaches.

7.2.2 As part of the measures proposed by EDF Energy as part of the HPC project, to increase capacity of the road network in Bridgwater, a scheme has been developed that will significantly improve the operation and road safety at this junction. The scheme is shown in **Drawing No.A059018-15-35-18-14A**.

7.2.3 This will include the introduction of two right turn lanes for vehicles turning from the eastbound carriageway of Broadway into Taunton Road. To facilitate this movement, the current arrangement of three lanes on the northbound Taunton Road approach has also been amended to remove the existing left turn lane, combining it with the straight ahead lane. The existing double right turn lane arrangement on this approach has also been removed to provide only a single lane.

7.2.4 In addition, all approaches will run separately so that there will be no conflicting turning movements. This should significantly reduce the occurrence of right turn accidents at the junction.

7.2.5 Improvements to the current pedestrian crossing facilities are also proposed. In addition, anti-skid surfacing will be provided on each approach, potentially reducing the number of rear-end shunt accidents at the junction.

7.2.6 As part of the detailed design process, a lighting audit will be undertaken to identify any issues relating illumination in the vicinity of the site.

7.2.7 It is therefore, considered that the main causation factors of most of the accidents that have occurred at the junction in the study period will be addressed by the proposed scheme.

b) A39 Broadway/St John Street

7.2.8 The key road safety issues at this junction are:

- nearly half of the collisions occurred during the hours of darkness;
- nearly a third of the accidents were as a result of vehicles failing to stop at a red light, although these all occurred on different approaches to the junction; and

- the three accidents that resulted in a pedestrian casualty all occurred on different approaches, with two being the result of the pedestrian crossing the road against a red signal.

7.2.9 Initial investigations suggest that the junction is well lit with street lighting provided on each approach. However, it could still be appropriate to undertake a street lighting review at the junction to ensure that the existing provision satisfies the current requirements.

7.2.10 It might also be appropriate to review the provision of pedestrian crossing facilities at the junction. There are currently signal controlled facilities across the A38 Broadway, St John Street and Eastover approaches.

7.2.11 However, signal-controlled pedestrian crossing facilities are not provided across the A38 Monmouth Street approach. As the existing pedestrian facilities operate during an all-red stage in the traffic signal cycle, there could be an opportunity to introduce a similar facility across the northern arm.

7.2.12 The northern approach to the junction currently incorporates three lanes, including a short right turning lane for vehicles turning from the A38 Monmouth Street into Eastover. This precludes the introduction of a staggered pedestrian crossing across this arm. Therefore, if signal-controlled pedestrian crossing facilities are warranted across the northern approach, they will need to be provided straight across the carriageway.

7.2.13 If this facility is introduced then there could also be an opportunity to remove the staggered pedestrian crossing across the western arm as well and introduce a straight-across crossing, in line with current road safety and streetscape thinking.

7.2.14 Somerset County Council has developed a scheme that appears to contain a number of these suggestions and EDF Energy propose to provide a contribution to SCC to assist in delivery of their proposed scheme.

c) A39 North Street/Albert Street

7.2.15 The key road safety issues at this junction are:

- The vast majority of accidents result from vehicles turning right out of Albert Street colliding with vehicles travelling on the A39 Broadway.
- Two of these accidents were as a result of vehicles stationery in the westbound nearside lane allowing vehicles from Albert Road out of the junction, who would then collide with vehicles travelling in the westbound offside lane. A yellow box-junction is marked across the eastbound and westbound carriageways.
- Sightlines at the junction for vehicles turning out of Albert Street appear to be restricted by the presence of pedestrian guardrail at the front of the footway on both corners.

7.2.16 To improve the visibility splays at the junction it is possible to remove the pedestrian guardrail on the southeast and southwest corners of the junction or replace it with Visirail.

7.2.17 To prevent vehicles from turning right out of the junction, it might be possible to close the gap in the central median on the A39 North Street, effectively making the junction a left-in, left-out arrangement. Vehicles wishing to turn right into and out of Albert Street would then have to travel via St Matthew's Field and West Street.

7.2.18 The sightlines to the south of the West Street/St Matthew's Field junction would also need some improvement, which could possibly be achieved by cutting back the existing vegetation on the southwest corner of the junction. It appears that this vegetation is within the highway boundary, but this would need to be confirmed prior to implementation of the proposals.

7.2.19 Alternatively, Albert Street could be made one-way southbound, with all vehicles required to exit via St Matthew's Field on to West Street.

7.2.20 These measures do not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements.

d) A39 North Street/West Street

7.2.21 The accident data does not demonstrate any discernible trends, other than a moderate number of rear end shunt accidents. Both approaches on the A39 Broadway/North Street have been treated with anti-skid surfacing, while Penel Orlieu and West Street have not.

7.2.22 It is therefore, recommended that the West Street and Penel Orlieu approaches be treated with anti-skid surfacing.

7.2.23 This measure does not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements.

e) A39/A38 Dunball Roundabout

7.2.24 The key road safety issues at this junction are:

- The vast majority of accidents that occurred at this junction involved vehicles in rear-end shunts or drivers losing control of their vehicle on the approach to the roundabout.
- Two accidents were as a result of poor lane discipline on the circulatory carriageway.

7.2.25 As part of the proposals to introduce a park and ride and freight management facilities at this junction it is proposed to review the current road markings to increase capacity and improve lane discipline.

7.2.26 The precise nature of these changes isn't yet known but further development could include the introduction of anti-skid surfacing on the approach.

7.2.27 This potential measure does not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements, if SCC considers the works are required.

f) A39 Sandford Corner

7.2.28 The key road safety issues at this junction are:

- A relatively high proportion of accidents in this area resulted in either serious or, in two cases, fatal injuries.
- Both of the fatalities occurred when a driver travelling westbound failed to negotiate the left hand bend and collided head on with a vehicle travelling in the opposite direction.
- Five of the ten accidents were as a result of collisions when a vehicle turned at the Sandford Hill Junction and collided with a vehicle on the A39 New Road.
- Three of the ten accidents were as a result of a vehicle turning at the Charlynch Lane junction being in collision with a vehicle travelling on the A39 New Road.

7.2.29 This section of the A39 is also critical to network resilience as there are no other alternative routes available if the road is closed.

7.2.30 It is therefore, proposed to construct a new roundabout at the junction that will significantly reduce the number and severity of accidents at this location. This is shown on **Drawing No.83688-A-016.**

7.2.31 This measure is proposed by EDF Energy as part of the HPC project to significantly improve the operation and road safety at this junction.

7.3 A38 Junctions

a) A38 Bristol Road/The Clink (Cross Rifles Roundabout)

7.3.1 The key road safety issues at this junction are:

- Five of the accidents resulting in pedestrians or cyclists casualties were as a result of a cyclist riding across a road in an east-west direction at a pedestrian crossing to the north of the roundabout.
- Two of the accidents involved vehicles turning right from the A39 Bath Road into Rosebery Avenue being in collision with opposing traffic on travelling southbound on the A39 Bath Road

7.3.2 This suggests that there is a demand for a cycle route in an east-west direction, possibly into the Sainsbury's Supermarket on the northwest corner of the junction. There is currently no cycle infrastructure to facilitate this movement.

7.3.3 However, proposals do exist in the current Somerset Transport Strategy to improve connectivity for cyclists travelling between the A39 Bath Road and the A38 Bristol Road further to the north. This includes a new pedestrian/cycle bridge across the railway line.

7.3.4 Somerset County Council has developed a scheme for the junction that aims to increase it capacity and reduce congestion. As part of this scheme it is proposed to improve pedestrian and cycle facilities around the junction to facilitate movements across each approach.

7.3.5 This junction does not form part of the proposed highway improvement works to be delivered by EDF Energy as part of the proposed HPC project. However, in order to assist traffic movements at this node and to improve road safety, particularly for pedestrians, EDF Energy proposed to make a contribution to SCC to assist the Council in delivery of their scheme.

b) A38 Taunton Road/Rhode Lane

7.3.6 The key road safety issues here are that:

- Two-thirds of the accidents at the junction occurred during the hours of darkness, with four occurring during the early evening.
- Five of the nine accidents were between vehicles turning right at the junction, with four resulting in injuries to a cyclist.

7.3.7 The junction appears to be well lit, with street lighting evident on all approaches. However, it might be appropriate to undertake a review of the lighting to ensure that it satisfies current requirements.

7.3.8 The existing junction layout incorporates a right-turning pocket on the A38 Taunton Road southbound carriageway for vehicles turning into Rhode Lane. A traffic island is also provided immediately to the south of the junction on the A38 Taunton Road to afford further protection to vehicles turning right at this location. It is therefore, unlikely that improvements could be made to the right turning facilities at this location.

7.3.9 Four of the accidents at the junction involve vehicles turning right colliding with cyclists on the A38 Taunton Road. Therefore, there appears to be a road safety issue relating to the conspicuousness of cyclists at the junction. This could be addressed by providing an off-road cycle route across the junction.

7.3.10 SCC are currently developing such a scheme that would run along the western side of Taunton Road from the Huntworth Roundabout up to the junction of Taunton Road/Broadway.

7.3.11 Furthermore, Somerset County Council are also seeking to develop Route 33 of the National Cycle Network, which runs along Old Taunton Road and the Bridgwater to Taunton Canal towpath.

7.3.12 These measures do not form part of EDF Energy's planned highway improvement works but EDF Energy propose provision of a contribution to SCC to assist in delivering these workers under SCC's on-going programme of road improvements should the Council decide that the works are required.

c) Huntworth Roundabout

7.3.13 The key road safety issues at this junction are that:

- A high proportion of the accidents resulted in rear end collisions, although two of these were clearly as a result of driver error. The rear-end collision accidents are distributed across four of the five arms of the roundabout;
- Two of the accidents involved poor lane discipline on the circulatory carriageway of the roundabout.

7.3.14 A scheme is currently proposed by EDF Energy to improve the layout of this junction and facilitate movements into and out of the park and ride and freight management facility adjacent to this site. The proposed improvement includes improved carriageway markings to improve lane discipline.

7.3.15 This measure is proposed by EDF Energy as part of the HPC project to significantly improve the operation and road safety at this junction.

d) A38 Taunton Road/Wills Road

7.3.16 The key road safety issues at this junction are:

- Four out of the seven collisions occurred when vehicles travelling along the A38 in slow moving traffic have signalled to let other vehicles into or out of Wills Road. Motorcycles, overtaking on the outside of traffic, have then collided with the turning vehicles.
- Two of these accidents resulted in serious injuries.
- A rear-end shunt also occurred in slow moving traffic, and a pedestrian was hit when crossing the A38 Taunton Road at the zebra crossing north of the junction by an overtaking motorcycle.

7.3.17 The A38 Taunton Road is the main strategic connection between Junction 24 of the M5 and Bridgwater, as well as forming part of the main local route between Taunton and Bridgwater.

7.3.18 During peak hours in particular, the road is known to experience high traffic flows, resulting in slow moving or queuing traffic at various locations along its length.

7.3.19 The junction is currently a three-arm priority arrangement with a right turn lane for vehicles turning into Wills Road from the A38 Taunton Road southbound. The right turn lane has been formed through the hatching of a central median along the section of the A38 Taunton Road between the zebra crossing to the north of the junction and the roundabout junction with Showground Road to the south. A 'KEEP CLEAR' road marking has also been provided across the northbound carriageway of the A38 Taunton Road at the junction, presumably to allow vehicles turning out of Wills Road, as it is known to experience congestion, particularly in the peak periods, with slow moving queues forming along its length.

7.3.20 The most prominent trend in the accident data is of vehicles turning into or out of Wills Road, often at the behest of other drivers, colliding with a motorcyclist overtaking the queuing traffic. A 'THINK BIKE' supplementary sign plate has already been erected to the south of the junction to inform drivers travelling northbound of the possibility of motorcyclists in the area.

7.3.21 Consideration could be given to the introduction of pedestrian refuges in the central hatching on the A38 Taunton Road on either side of the junction. This would reduce the carriageway width locally, lowering all vehicles speeds. They would also deter motorcyclists from travelling along the central hatching, encouraging them to rejoin the main queue of traffic to travel through the junction.

7.3.22 The refuges could be constructed to the south of Wills Road, north of the Stockmoor Close junction, and to the north of Wills Road immediately south of the northbound bus stop layby. Appropriate ‘KEEP LEFT/RIGHT’ illuminated bollards would need to be provided on the refuges to ensure that their conspicuousness is maximised.

7.3.23 The refuges would have the secondary benefit of providing pedestrian facilities across the A38 Taunton Road, connecting the residential area to the east with the northbound bus stop.

7.3.24 This junction does not form part of the proposed highway improvement works to be delivered by EDF Energy as part of the proposed HPC project. However, in order to improve road safety in this location, EDF Energy propose to make a contribution to SCC to assist the Council in delivery of their on-going programme of works, should the Council consider that works are required in this location.

7.4 Northern Distributor Road

a) Wylds Road/The Drove

7.4.1 The key road safety issues here are:

- Nearly half of the accidents at this location involved vehicles turning right at the junction being in collision with oncoming vehicles.
- There were also a significant number of accidents involving cyclists, the majority of which involved children of a school age.
- A significant number of the accidents occurred in the period between 2:30PM and 3:30PM, two of which involved children of a school age.

7.4.2 A scheme is currently being developed to improve capacity at the junction by introducing signal controlled turning facilities for vehicles turning right from The Drove on to the Northern Distributor Road. This is shown in **Drawing No.A059108-15-35-18-010**.

7.4.3 This will also significantly improve road safety at the junction, potentially reducing the numbers of right turning accidents.

7.4.4 This measure is proposed by EDF Energy as part of the HPC project to significantly improve the operation and road safety at this junction.

8. SUMMARY AND CONCLUSIONS

8.1.1 This Road Safety Strategy has been produced using methodologies agreed with the SRSP and Highways Agency that has identified a preliminary study area.

8.1.2 The impact of the development in terms of road safety along the key links up to the site is small.

8.1.3 The agreed methodologies have identified a number of junctions in the study area that currently experience high accident rates.

8.1.4 The proposed road safety mitigation strategy for the development is to address these existing issues at the junctions.

8.1.5 A number of these locations have already been identified for mitigation as part of network capacity improvements in Somerset and it is envisaged that these measures are also likely to have additional benefits in terms of road safety.

8.1.6 There are also several other locations where Somerset County Council has identified schemes that would be beneficial and EDF Energy has agreed to contribute funding towards these to assist the Council in delivery of their on-going programme of road safety improvements.

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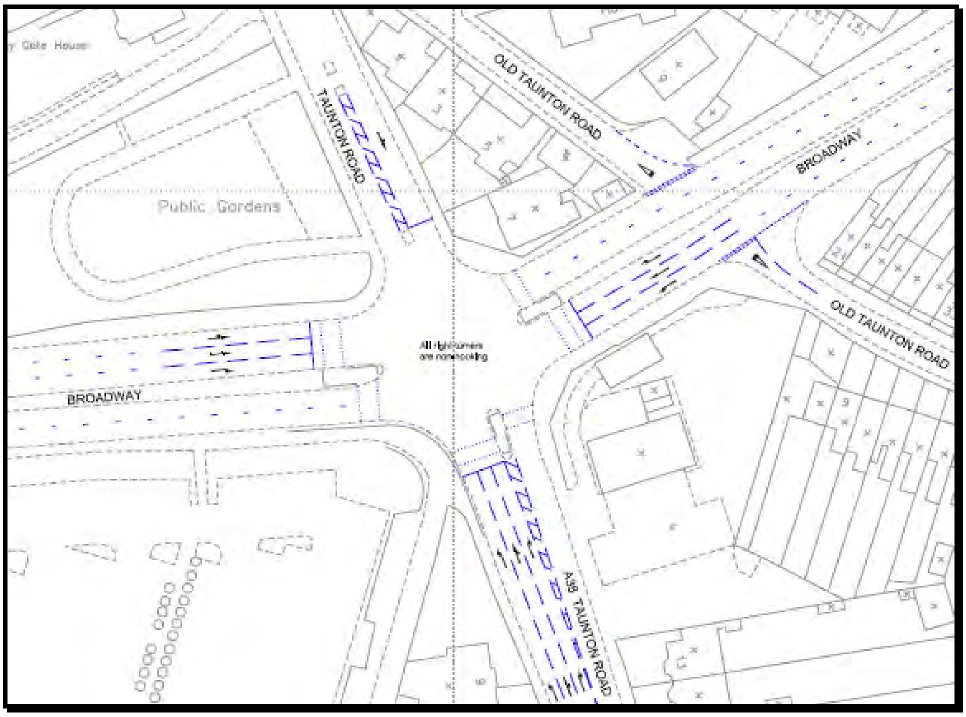
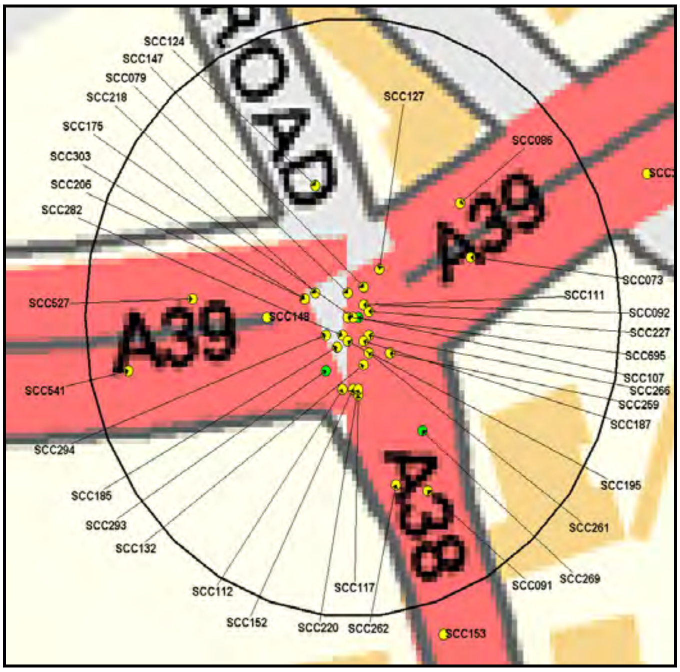
APPENDIX A: URBAN LOCATION ACCIDENT DETAILS

A38 Taunton Road/A39 Broadway

Existing Junction Layout



Accident Locations



Accident Descriptions

Ref	Date	Time	Severity	Description
SCC185	20050829	1215	3	V1 TRAV TAUNTON RD TO TURN RIGHT ONTO BROADWAY, STOPPED AT T/LTS AND WAS HIT IN REAR BY V2
SCC187	20050927	1735	3	V3 (POLICE)PASSING STATIONARY TRAFFIC ON A38 AND INTENDINGTO TURN RIGHT ONTO BROADWAY. V2 TURNED LEFT FROM BROADWAY ONTO A38, SAW V3 AND STOPPED. V2 HIT REAR OF V1. V3 NOT HIT
SCC195	20051116	2200	3	V1 TRAVELLING ALONG TAUNTON ROAD APPROACHED JUNCTION TO BROADWAY TO TURN RIGHT AT GREEN LIGHT. V2 CAME FROM TAUNTON ROAD TO GO STRAIGHT ON (POSSIBLY THROUGH RED LIGHT) V2 HIT V1 HEAD ON THEN F.T.S.
SCC124	20060208	2115	3	CASUALTY CROSSING ROAD WHEN V1 APPROACHED and STRUCK CAS ON REAR CAUSING HIM TO FALL ONTO BONNET AND INTO ROAD. V1 TRAV WRONG WAY IN ONE-WAY STREET
SCC127	20060303	1030	3	V1 NEGOTIATING T/LTS ON GREEN GOING STRAIGHT A/H. V2 TURNED RIGHT FROM OPP DIR and COLLIDED WITH F/N/S OF V1
SCC132	20060328	1440	3	V1 STOPPED AT T/LIGHTS ALLOWING PASSENGER TO ALIGHT. AS PASSENGER DID SO, V2 CAME ALONG AND HIT DOOR OF V1 CAUSING INJURY TO RIDER V2
SCC147	20060630	2310	3	V1 TRAV STRAIGHT AHEAD THROUGH GREEN T/LIGHT FROM ST MARYS STREET INTO TAUNTON RD. V2 TRAV FROM TAUNTON RD, STOPPED AT XROADS TO TURN RGT and CARRIED ON and COLLIDED WITH FRONT OF V1
SCC148	20060702	1300	3	V1 and V2 IN RGT SIDE LANE AT T/LIGHTS FROM DIRECTION OF MORRISONS. U/KNOWN VEH BEEPED HORN AT TRAFFIC AHEAD. V2 BRAKED and V1 COLLIDED WITH REAR OF V2
SCC152	20060721	2030	3	V1 WAITING AT RED LIGHT WITH V2 BEHIND IT. V3 HITS BACK OF V2 PUSHING IT INTO REAR OF V1
SCC527	20060923	1414	3	ALL 3 VEHS TURNING RIGHT FROM BROADWAY INTO TAUNTON ROAD WHEN TRAFFIC AHEAD STOPS. V1 STOPS, V2 STOPS. V3 HIT REAR OF V2 PUSHING IT INTO V1
SCC541	20061206	2115	3	VEHS TRAV ON BROADWAY. V2 STOPPED SUDDENLY, CAUSING V1, TRAV AT REAR, TO BRAKE HEAVILY. V1 (M/CYCLE) TOPPLED OVER CAUSING INJURY, AND DAMAGE TO V1
SCC175	20061214	752	3	V1 TURNED RGT AT T/LIGHTS FROM TAUNTON RD ONTO BROADWAY. V2 TRAV STRAIGHT AHEAD FROM TAUNTON RD ACROSS T/LIGHTS. VEHS COLLIDED
SCC079	20070127	2230	3	V1 TURNED RGT AT T/LIGHT CONTROLLED JUNCT WITHOUT GIVING WAY TO V2 WHICH WAS TRAV IN THE OPP DIRECTION. VEHS COLLIDED MID-JUNCTION
SCC086	20070318	2050	3	V1 MOVING OFF FROM T/LIGHT CONTROLLED JUNCT WHEN PED CAS JOGGED FROM PAVEMENT INTO PATH OF V1 CAUSING MINOR INJURY TO PED and DAMAGE TO WINDSCREEN OF V1

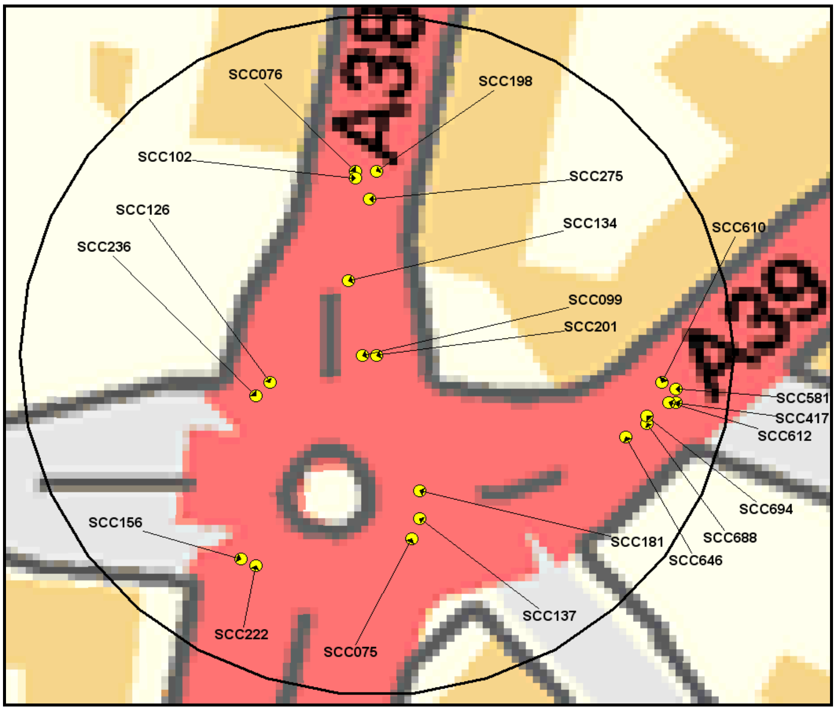
Ref	Date	Time	Severity	Description
SCC073	20070526	1100	3	V1 TRAV INTO BRIDGWATER IN 'LEFT ONLY' LANE, WENT STRAIGHT ON IN INCORRECT LANE. V1 THEN PULLED INTO CORRECT LANE, COLLIDING WITH V2 (P/CYCLE) WHICH WAS HEADING TWDS NORTH STREET
SCC092	20070709	1340	3	V1 STATIONARY IN MIDDLE OF JUNCTION WAITING TO TURN RIGHT ONTO BROADWAY. AS V2 APPROACHED FROM V1 NEARSIDE V1 STARTED TO MOVE OFF CAUSING V2 TO HIT V1
SCC091	20070709	1220	3	V1 HAD JUST TURNED RIGHT FROM BROADWAY ONTO TAUNTON RD WHEN V2 STOPPED IN FRONT and V1 STRUCK REAR OF V2. NO DAMAGE CAUSED BUT THERE WAS INJURY TO BUS PASSENGERS
SCC107	20071011	1940	2	V1 TURNED RIGHT, INTO BROADWAY, FROM TAUNTON ROAD ACROSS PATH OF V2 WHICH WAS TRAVELLING IN OPPOSITE DIRECTION. COLLISION OCCURRED
SCC111	20071103	1720	3	V1 CROSSING FROM TOWN ONTO TAUNTON ROAD. V2 CROSSING FROM TAUNTON RD ONTO BROADWAY. CONFUSION AROSE AS TO WHO HAD RIGHT OF WAY ON GREEN LIGHT. BOTH DRIVERS HAD GREEN LIGHT BUT QUESTION WHETHER THE FILTER ARROW WAS LIT
SCC117	20071106	1805	3	V1 STOPPED AT T/LIGHTS IN MIDDLE OF TAUNTON RD WAITING TO TURN RIGHT ONTO BROADWAY. V2 AT SAME T/LIGHTS TURNED LEFT, BUT AS IT DID SO THE BACK END SWUNG OUT and HIT V1. V2 FTS
SCC112	20071130	1430	3	V2 STATIONARY AT JUNCTION WHEN STRUCK FROM BEHIND BY V1.DRIVER AND PASSENGER OF V2 SUSTAINED WHIPLASH INJURIES.
SCC206	20080501	2155	3	V1, STATIONARY AT T/LIGHTS INDICATING TO TURN RIGHT, WAS STRUCK IN REAR BY V2
SCC218	20080903	1150	3	V1 TRAVELLING FROM TAUNTON TOWARDS BRIDGWATER TOWN CENTRE V1 JUMPED RED LIGHT AT JUNCTION OF TAUNTON ROAD AND BROADWAY V2 TRAVELLING FROM MINEHEAD INTENDING TO GO STRAIGHT AT JUNCTION COLLIDED WITH V1
SCC220	20080926	2336	3	V1 IN MIDDLE LANE OF TAUNTON ROAD INTENDING TO TURN RIGHT ONTO BROADWAY. WHEN LIGHTS CHANGE TO GREEN V1 MOVED OFF. AT THE SAME TIME V2 WAS TRAV FROM OPPOSITE DIRECTION INTENDING TO GO STRAIGHT ON, TRAFFIC LIGHTS ALSO ON GREEN. V1 and V2 COLLIDE HEAD ON
SCC227	20081118	1947	3	V1 TRAVELLING TAUNTON ROAD TOWARDS NORTH PETHERTON, V2 IN OPPOSITE DIRECTION. WHEN TRAFFIC LIGHTS TURNED GREEN AT JUNCTION, BOTH VEHICLES MOVED. V2 TURNED RIGHT, ONTO BROADWAY, HAVING MISREAD LIGHTS AND HIT V1
SCC259	20090707	1400	3	V1 WAS CROSSING BROADWAY AT THE TAUNTON RD LIGHTS, FROM ST MARY STREET TOWARDS TAUNTON. AS SHE WAS HALF WAY ACROSS THE JUNCTION, V2 TURNED TOWARDS MONMOUTH ST FROM TAUNTON RD, WITHOUT WAITING FOR THE FILTER ARROW AND STRUCK V1,

Ref	Date	Time	Severity	Description
SCC261	20090711	2114	3	DURING HEAVY RAIN V1 AND V2 APPROACHED TRAFFIC LIGHT JUNCTION.V1 DOES NOT STOP AT LIGHTS AND COLLIDES WITH V2.
SCC262	20090728	900	3	V1 IN CENTRE LANE APPROACHING JUNCTION WHEN V2 PULLED OUT ITO SIDE OF V1 WITHOUT INDICATING. RIDER OF V1 REMONSTRATED WITH DRIVER OF V2 WHO SWORE AT HIM AND THEN DROVE OVER LEFT FOOT OF R1
SCC266	20090811	2132	3	V1 STOPPED AT TRAFFIC LIGHTS. V2 AT OPP JUNCTION. V1 LIGHT TURNED GREEN AS DID V2. V2 HAD RIGHT OF WAY, V1 DID NOT GIVE WAY AS HE THOUGHT V2 HAD STOPPED TO LET HIM GO. V1 COLLIDED WITH V2.
SCC269	20090828	1959	2	V1 TRAVELLING ONTO TAUNTON ROAD WITH TRAFFIC LIGHTS ILLUMINATED GREEN FOR MOTORISTS. PEDESTRIAN RAN OUT INTO ROAD WITHOUT LOOKING AND COLLIDED WITH V1.
SCC279	20091108	1800	3	V1 TRAVELLING TAUNTON ROAD, FROM TOWN CENTRE, INTENDING TO GO STRAIGHT AHEAD ONTO A38 TAUNTON ROAD. V2, TRAVELLING FROM A38 TAUNTON ROAD, TURNED RIGHT ONTO A39 BROADWAY ACROSS PATH OF V1 AND COLLISION OCCURRED
SCC282	20091113	2045	3	V1 TRAVELLING ALONG TAUNTON ROAD AWAY FROM TOWN CENTRE INTENDING TO GO STRAIGHT ON ACROSS BRAODWAY ONTO THE A38. V2 WAS TRAVELLING ALONG THE A38 INTENDING TO T/RIGHT ONTO BROADWAY. TRAFFIC LIGHTS WERE GREEN FOR V1 BUT V2 T/RIGHT AND COLLISION OCCURRED
SCC293	20100313	1250	2	BOTH VEHICLES TRAVELLING A39. V1 LOST CONTROL, THROUGH AN ALLEGED THROTTLE DEFECT, ACCELERATED THROUGH A GROUP OF MOTORCYCLES AND CLIPPED V2 KNOCKING IT OVER. V1 MANAGED TO REMAIN UPRIGHT AND STOPPED
SCC294	20100405	2120	3	V1 and V2 AT TRAFFIC LIGHT JCT WAITING FOR LIGHTS TO CHANGE TO GREEN.V1 WAITING TO GO STRAIGHT ACROSS INTO TAUNTON ROAD. V2 WAITING TO T/RIGHT INTO BROADWAY . WHEN LIGHTS CHANGED, V2 TRIED TO FOLLOW ANOTHER VEHICLE ACROSS INTO BROADWAY and COLLIDED WITH V
SCC303	20100629	1515	3	V1 STATIONARY AT TRAFFIC LIGHTS ON BROADWAY THEN A PEDAL CYCLIST TRAV BEHIND, COLLIDED INTO REAR

Cross Rifles Roundabout

Existing Junction Layout

Accident Locations



Accident Descriptions

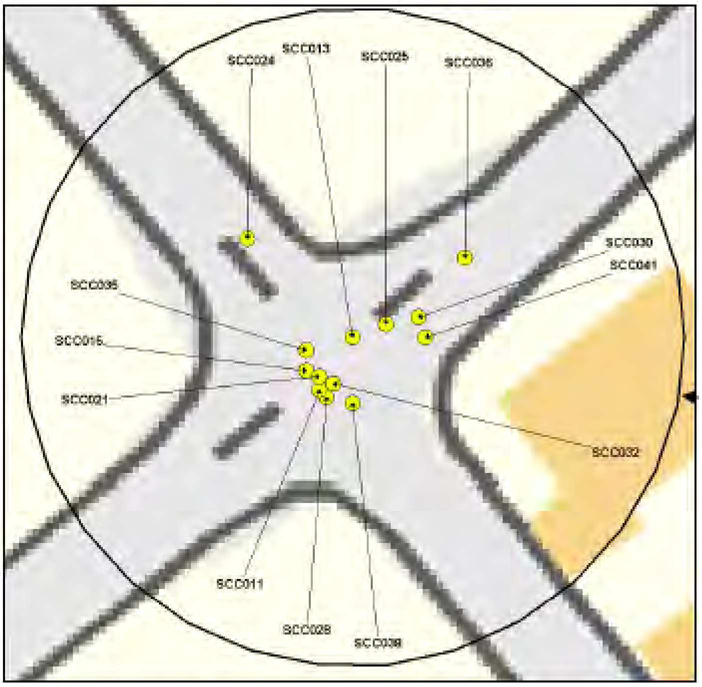
Ref	Date	Time	Severity	Description
SCC075	20070113	1400	3	V1 APPROACHED ROUNDABOUT, WENT TO TRAVEL AROUND ROUNDABOUT BUT HALFWAY AROUND COLLIDES WITH V2.
SCC076	20070118	0730	3	V1 TRAVELLING INBOUND TO BRIDGWATER, SLOWING DOWN APPROACHING PEDESTRIAN CROSSING AND ROUNDABOUT. PEDESTRIAN WEARING DARK CLOTHING WALKED ONTO CROSSING. V1 BRAKED BUT HIT PEDESTRIAN. V1 TOOK PEDESTRIAN TO HOSPITAL.
SCC099	20070822	1600	3	V1, TRAVELLING ALONG BRISTOL ROAD, STATIONARY AT ROUNDABOUT WHEN HIT IN REAR BY V2
SCC102	20070904	1800	3	V2 (P/CYCLE) CROSSING ROAD ON PEDESTRIAN CROSSING – V1 TRAVELLING ALONG BRISTOL ROAD, BRAKED ON SEEING V2 BUT COLLISION OCCURRED. V1 STOPPED BUT FAILED TO GIVE DETAILS AND THEN DROVE OFF
SCC126	20060218	2203	3	V1 CLIPPED R/BOUT AND LOST CONTROL WHICH RESULTED IN SKIDDING, MOUNTING PAVEMENT AND CRASHING THROUGH FENCE ENDING UP IN DITCH
SCC134	20060412	1510	3	V1 TRAVELLING A38 TOWARDS ROUNDABOUT IN O/SIDE LANE WHEN V2, TRAVELLING IN N/S LANE, CUT ACROSS IN FRONT OF V1 and COLLISION OCCURRED
SCC137	20060504	1730	3	V1 TRAV FROM BATH ROAD, NEG R/BOUT TO EXIT ONTO BRISTOL RD WHEN IN COLLISION WITH V2 WHICH ENTERED R/BOUT FROM BRISTOL RD
SCC156	20060827	1030	3	V1 NEGOTIATING R/ABOUT FROM A39, INDICATING TO EXIT ON TO THE CLINK. V2 ENTERED R/ABOUT FROM MONMOUTH STREET, FAILED TO GIVE WAY TO V1 and HIT V1
SCC181	20050725	2218	3	V2 STOPPED AT R/BOUT. V1 ALREADY ON R/BOUT AFTER ENTERING FROM BRISTOL ROAD. V3 CAME ONTO R/BOUT AT SPEED PUSHING V1 INTO STAT V2. V3 F.T.S.
SCC198	20051128	1115	3	V1 APPROACHING ROUNDABOUT ON A38 IN R/H LANE. AS V1 DROVE OVER PEDESTRIAN CROSSING IT WAS HIT ON NEARSIDE BY V2 (P/CYCLE) WHICH WAS USING THE CROSSING.
SCC201	20080116	1735	3	V1 AND V2 WAITING AT THE ROUNDABOUT. V1 SAW V2 MOVE FORWARDS AND LOOKED TO HIS RIGHT TO SEE IF HE COULD GO. ROAD TO RIGHT WAS CLEAR SO HE MOVED FORWARD BUT COLLIDED WITH REAR OF V2 WHO HADN'T MOVED ON
SCC222	20081016	1100	3	V1 TRAVELLING FROM A39 BATH RD; TOWARDS THE CLINK, WAS STRUCK ON THE F/N/S WING BY V2, WHICH EMERGED ONTO ROUNDABOUT FROM MONMOUTH ST; BRIDGWATER
SCC236	20090205	1645	3	V1 TURNING LEFT AT R/BOUT FROM THE CLINK ONTO THE A38 BRISTOL ROAD. V2 HIT REAR OF V1 D1 HAS NOW REPORTED INCIDENT AS SHE FEELS THAT D2 HAS NOT GOT ADEQUATE INSURANCE UNDER HIS MOTHERS INSURANCE POLICY AND V1 INSURERS HAVE ADVISED HER TO COME IN AND RE

Ref	Date	Time	Severity	Description
SCC275	20090814	0710	3	V1 WAS TRAVELLING ALONG BRISTOL ROAD TOWARDS THE CROSS RIFLES PUB. V2 WAS TRAVELLING ALONG THE PAVEMENT IN THE SAME DIRECTION ON V1 NEARSIDE. V2 WENT ONTO THE ROAD INTO THE PATH OF V1 AND COLLISION OCCURED
SCC417	20070504	1528	3	V1 APPROACH. ZEBRA CROSSING ON A39 BATH RD NR CROSS RIFLES R/ABOUT. V1 STOPPED TO ALLOW PEDS TO CROSS BUT MOVED FORWARD MAKING CONTACT WITH 2 CHILDREN CAUSING THEM TO FALL OVER. 1 CHILD RECEIVED INJURY
SCC581	20051202	1845	3	V1 STAT AT JCT WAITING TO TURN RIGHT. V2 APPROACHING JCT WITH MAIN BEAMS ON. V1 THOUGHT V2 FLASHED HIM TO CROSS, PULLED ACROSS V2 AND COLLISION OCCURRED
SCC610	20080606	800	3	V1 HAD COME FROM ROUNDABOUT AND WAS WAITING TO TURN RIGHT INTO ROSEBERRY AVENUE V2 TRAVELLING IN OPPOSITE DIRECTION TOWARDS ROUNDABOUT. V1 CROSSED CARRIAGEWAY TO TURN RIGHT AND COLLIDED WITH V2
SCC612	20080708	1745	3	V1, TRAVELLING ALONG BATH ROAD, APPROACHING PEDESTRIAN CROSSING IN NEARSIDE LANE WITH TRAFFIC IN OFFSIDE LANE STATIONARY. V1 DROVE ONTO PEDESTRIAN CROSSING AND WAS IN COLLISION WITH V2 (CYCLE) WHICH WAS BEING RIDDEN ACROSS CROSSING
SCC646	20090115	1645	3	V1 TRAVELLING BATH ROAD TOWARDS CROSS RIFLES ROUNDABOUT, V2 TRAV IN OPPOSITE DIRECTION, LOST CONTROL, MOUNTED PAVEMENT MINI ISLAND IN CENTRE OF CARRIAGEWAY AND THEN HIT V1 WHICH WAS STATIONARY IN HEAVY TRAFFIC
SCC688	20091013	1830	3	RIDER OF V1 (PEDAL CYCLE) WAS CROSSING ON THE PELICAN CROSSING WHEN V2 OVERTOOK A VEHCILE WHICH HAD STOPPED AT THE CROSSINH AND HIT V1 ON REAR WHEEL. RIDER FELL OFF AND WAS INJURED. V2 LEFT SCENE WITHOUT EXCHANGING DETAILS
SCC694	20091105	1645	3	PEDESTRIAN WAS ON PEDESTRIAN CROSSING FROM CROSS RIFLES PH TOWARDS ROSEBERRY AVENUE WHEN SHE WAS STRUCK BY CYCLIST WHO WAS CYCLING ACROSS THE CROSSING BEHIND HER.

Wylds Road/The Drove

Existing Junction Layout

Accident Locations

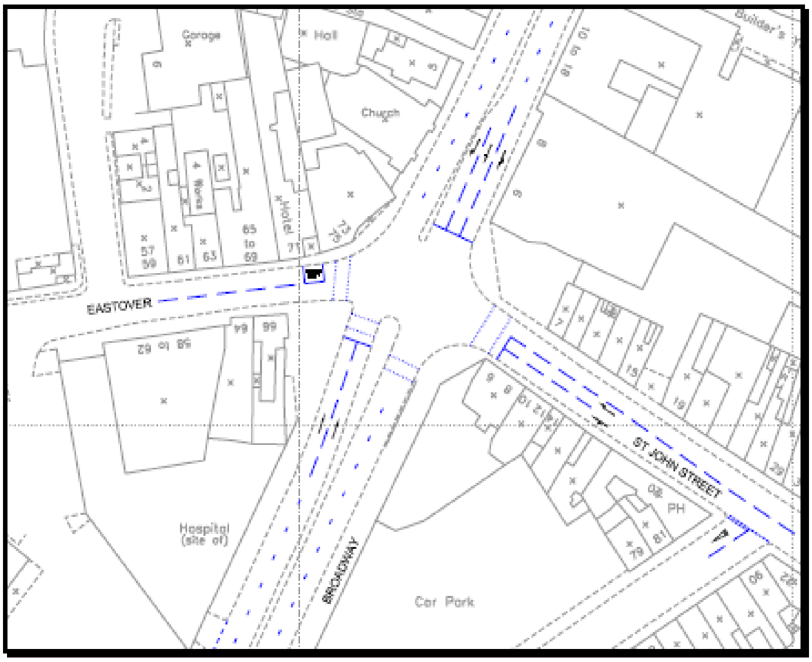


Accident Descriptions

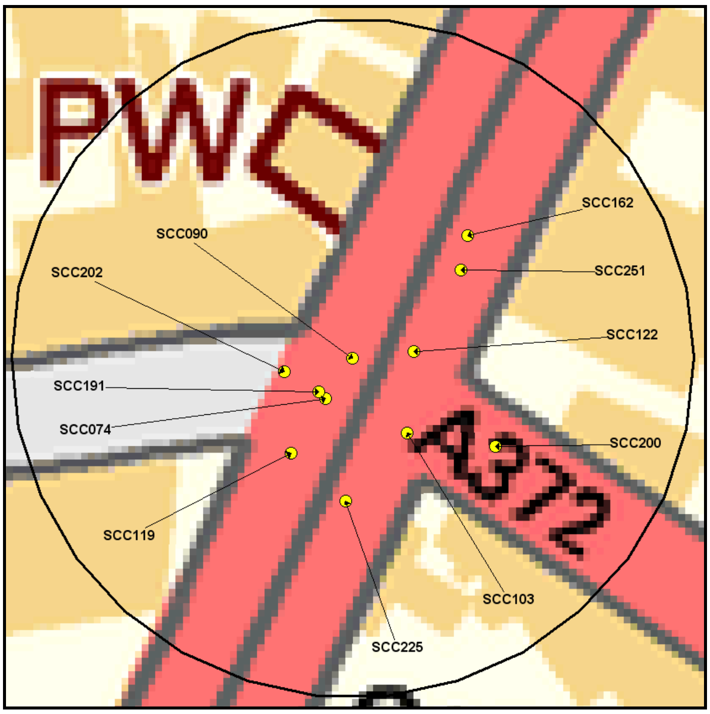
Ref	Date	Time	Severity	Description
SCC021	20050807	1450	3	V1 TRAVELLING ALONG WYLDS ROAD, WENT STRAIGHT AHEAD AT TRAFFIC LIGHTS. V2 TURNED RIGHT ACROSS PATH OF V1, CAUSING RIDER TO FALL FROM VEHICLE
SCC024	20050926	1525	3	V1 DOUBLE DECKER BUS HAS HAD TO BRAKE SUDDENLY FOLLOWING VEHICLE IN FRONT BRAKING SUDDENLY AT LIGHTS. V1 CONVEYING CHILDREN FROM CHILTON TRINITY SCHOOL. DRIVER DISTRACTED BY CHILD ASKING QUESTION
SCC025	20050928	1530	3	V1 TRAV ALONG WYLDS RD THROUGH T/LIGHT JUNCTION WITH NDR. 2 PEDAL CYCLES TRAV ON PAVEMENT ROUND CORNER FROM NDR. V2 (CYCLIST) DROPPED OFF KERB INTO V1
SCC015	20060318	0914	3	V1 TRAV TOWARDS CHILTON. V2 TRAV TOWARDS THE CLINK WENT THROUGH GREEN LIGHT AND HIT V1 WHO APPEARED TO HAVE GONE THROUGH RED T/LIGHT
SCC011	20070517	1300	3	V1 TRAV FROM THE DROVE INTO WESTERN WAY THROUGH GREEN LIGHT. V2 TRAV FROM WESTERN WAY, TURNED RIGHT INTO EAST QUAY ACROSS PATH OF V1 and COLLISION OCCURRED
SCC013	20071206	0848	3	V1 TURNED RIGHT FROM WYLDS ROAD ONTO THE DROVE INTO THE PATH OF V2 TRAVELLING IN OPPOSITE DIRECTION.
SCC028	20080108	0824	3	V1 TRAV ALONG WYLDS RD V2 TRAVELLING ALONG THE DROVE V3 STATIONARY ON NORTHERN DISTRIBUTOR JUNCTION V1 HIT V2 AS V1 TURNED FROM WYLDS RD INTO NORTHERN DISTRIBUTOR. V2 THEN HIT V3 WHO WAS STATIONARY AT THE JUNCTION
SCC030	20080701	1640	3	V1 WAS TRAVELLING SOUTH WEST ACROSS THE JUNCTION ON GREEN LIGHT WHEN V2 TURNED RIGHT INTO PATH OF V1. FRONT OF V1 HIT N/S DOOR OF V2
SCC032	20080805	1440	3	V1, TRAVELLING ALONG WYLDS ROAD, TURNED RIGHT ON WESTERN WAY ACROSS PATH OF V2 TRAVELLING IN OPPOSITE DIRECTION AND COLLISION OCCURRED
SCC035	20090116	1830	3	V1 WAS STATIONARY AT THE TRAFFIC LIGHTS AT THE JUNCTION, INTENDING TO TURN RIGHT. V2 WAS TRAVELLING THROUGH THE JUNCTION AS IT WAS HER RIGHT OF WAY. D1 SAID HE DID NOT SEE V2 AND PROCEEDED TO TURN RIGHT, WHICH IS WHEN COLLISION OCCURED
SCC036	20090929	1700	3	V1 and V2 WERE TRAVELLING ALONG WYLDS ROAD TOWARDS THE A38. V1 STOPPED BEHIND TRAFFIC ALLOWING A VEHICLE OUT FROM A JUNCTION ON THE OFFSIDE CARRIAGEWAY. V2 DID NOT STOP IN TIME AND HIT YHE REAR OF V1.
SCC038	20091016	0810	3	V2 RIDING ON PAVEMENT.V1 ENTERING TRAFFIC LIGHT JUNCTION. LIGHTS GREEN FOR V1. V2 CROSSED V1 PATH, COLLISION OCCURED.
SCC041	20100630	1525	3	V1 TRAVELLING SOUTH WEST THROUGH GREEN TRAFFIC LIGHT STRUCK V2 WHO WAS CYCLING AT SPEED FROM OFFSIDE HAVING CYCLED OVER THE BRIDGE AND THROUGH TRAFFIC LIGHTS NORTH WEST DIRECTION.

A39 Broadway/St Johns Street

Existing Junction Layout



Accident Locations

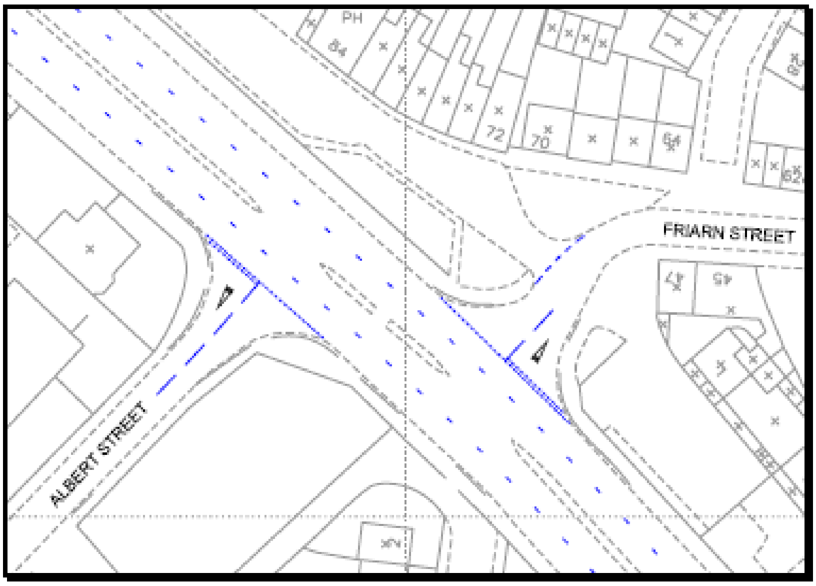


Accident Descriptions

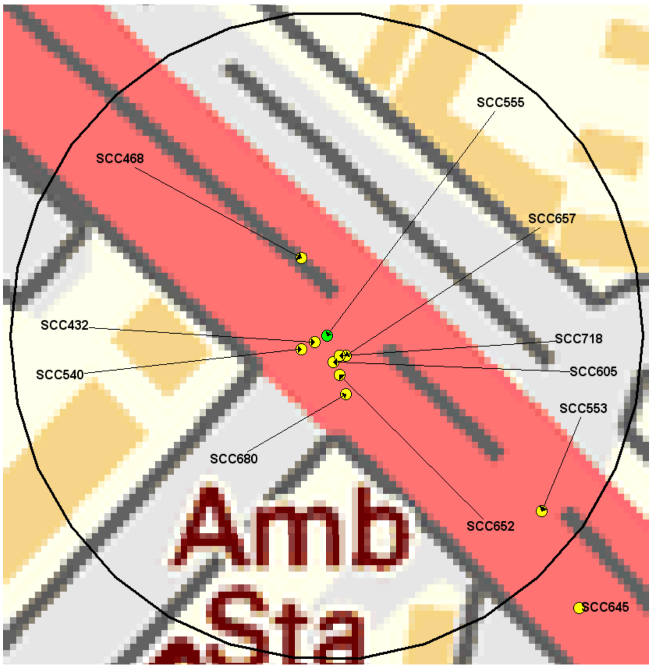
Ref	Date	Time	Severity	Description
SCC103	20070907	0815	3	V2 TRAVELLED THROUGH GREEN LIGHT ONTO YELLOW BOX WHEN LIGHTS CHANGED TO RED. V2 REVERSED BACK OUT OF YELLOW BOX INTO FRONT OF V1
SCC162	20061004	1030	3	V1 TRAV TWDS BRIDGWATER ON A39 WHEN DRIVER SAW PED. RUN INTO ROAD. V1 BRAKED BUT HIT PED WHO FELL ONTO BONNET. PED GOT UP, WAVED HIS HAND AT D1 THEN WALKED OFF. NO DETAILS EXCHANGED
SCC225	20081031	1100	3	V1 TURNING FROM ST JOHNS STREET INTO BROADWAY . TRAFFIC LIGHTS WERE ON GREEN FOR V1 TO PROCEED WHEN MALE PEDESTRIAN WALKED INTO THE ROAD AND INTO THE PATH OF V1. PEDESTRIAN WAS HIT BY V1 N/S WING MIRROR. PED TAKEN TO HOSPITAL
SCC202	20080208	1200	3	V1 TRAV FROM EASTOVER TOWARDS ST JOHN STREET, MOVED ON GREEN SIGNAL INTO T/ LIGHT CONTROLLED JUNC. V2 RODE HIS SCOOTER ACROSS PEDESTRIAN CROSSING AND HITS REAR OFFSIDE OF V1, CAUSING HIM TO FALL OFF
SCC200	20080101	1329	3	V1, TRAVELLING FROM EASTOVER, CROSSED MONMOUTH STREET AND ENTERED ST JOHNS STREET WHERE IT WAS IN COLLISION WITH A PEDESTRIAN WHO HAD RUN OUT INTO ITS PATH
SCC122	20060207	1745	3	V1 TRAV IN DIRECTION OF BROADWAY. V1 STATIONARY AT RED T/LIGHT, AS LIGHTS CHANGED V1 WAS SHUNTED FROM BEHIND BY V2
SCC251	20090531	1900	3	V1 STATIONARY AT RED TRAFFIC LIGHTS, WAS STRUCK IN THE REAR BY V2.
SCC090	20070704	1903	3	V1 TRAV FROM EASTOVER, T/LIGHTS GREEN. V2 TRAV FROM ST JOHNS STREET. V1 MID JUNCTION WHEN V2 BEGAN TO TURN RIGHT AND COLLIDED WITH V1.
SCC119	20060110	2200	3	V1 TRAV TWDS E/OVER, APPROACHED T/LTS. V1 HAD RT OF WAY, V1 CROSSED JUNCTION. V2 FROM MONMOUTH ST F.T.S. AT RED LIGHT AND HIT V1
SCC191	20051016	2253	3	V2 TRAV MONMOUTH ST, V1 TRAV ST JOHN ST/EASTOVER, V2 MISJUDGED T/LIGHTS AND WENT THROUGH RED LIGHT AND HIT V1
SCC074	20070527	2308	3	V1 TRAV FROM ST JOHNS ST ACROSS J/W BROADWAY TWDS EASTOVER. V2 TRAV ALONG BROADWAY, FAILED TO STOP AT T/LIGHTS and COLLIDED WITH V1 ACROSS JCT

A39 North Street/Albert Street

Existing Junction Layout



Accident Locations

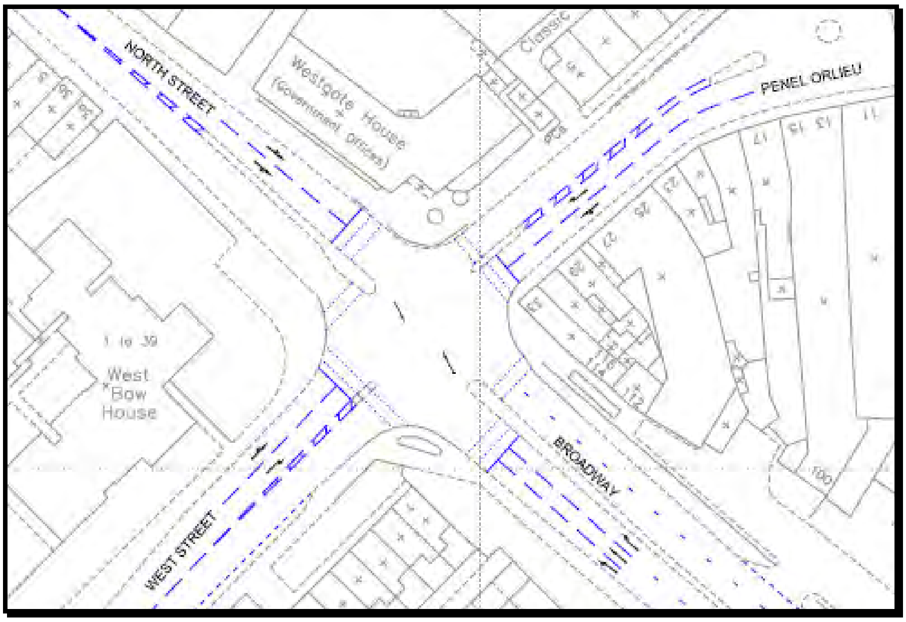


Accident Descriptions

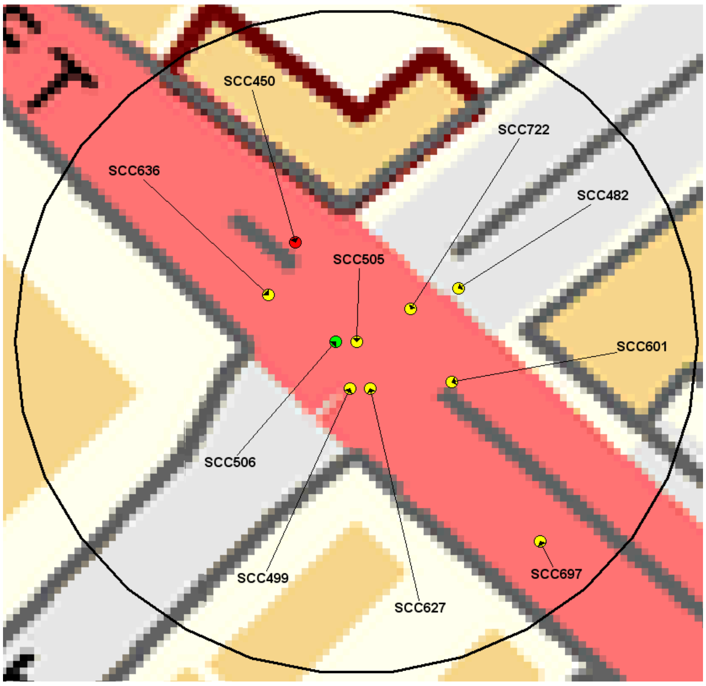
Ref	Date	Time	Severity	Description
SCC605	20080423	0840	3	V2 EXITED ALBERT ROAD BETWEEN STATIONARY CARS IN LH LANE AND PULLED IN FRONT OF V1 IN RH LANE.NEITHER COULD SEE EACH OTHER DUE TO TRAFFIC AND COLLISION OCCURED.
SCC468	20071211	0858	3	VEHICLES TRAVELLING A39 TOWARDS BRIDGWATER. V2 STATIONARY IN TRAFFIC WHEN HIT IN REAR BY V1
SCC680	20090824	1045	3	V3 TRAVELLING NORTH IN N/S LANE MOVED INTO O/S LANE COLLIDING WITH V1 WHICH WAS STATIONARY IN N/S LANE, AND WITH V2 WHICH WAS IN O/S LANE
SCC652	20090213	1137	3	V2 TRAVELLING ALONG BROADWAY. V1 TURNED RIGHT FROM ALBERT STREET ONTO BROADWAY ACROSS PATH OF V2 AND COLLISION OCCURRED
SCC555	20050825	1313	2	V1 TRAV ALONG BROADWAY IN O/S LANE. V2 PULLED OUT FROM ALBERT ST ACROSS TRAFFIC IN N/S LANE AND HIT V2
SCC657	20090521	1520	3	V1, TURNED RIGHT FROM ALBERT STREET ONTO BROADWAY HAVING BEEN WAVED OUT BY DSTATIONARY VEHICLE IN NEARSIDE LANE ON BROADWAY, V1 COLLIDED WITH V2 WHICH WAS TRAVELLING IN OFFSIDE LANE ALONG BROADWAY TOWARDS PENEL ORLIEU
SCC540	20061201	1620	3	V1 TRAV A39 IN DIRECTION NORTH ST APPROACH. JUNCT WITH ALBERT STREET, WHEN V2 PULLED OUT OF ALBERT STREET INTO PATH OF V1, CAUSING COLLISION
SCC432	20070203	1645	3	V1 PULLED OUT OF ALBERT STREET TURNING RIGHT ACROSS DUAL C/WAY. V2 TRAV TWDS BROADWAY AT SPEED and COLLIDED WITH FRONT O/SIDE OF V1
SCC718	20100504	1740	3	V1 EXITED FROM ALBERT STREET ONTO BROADWAY. V2 WAS BEING DRIVEN ALONG BROADWAY FROM THE DIRECTION OF TAUNTON ROAD TOWARDS PENEL ORLIEU. V1 COLLIDED WITH V2 AT THE JCT.
SCC553	20050812	2250	3	V1 TRAV BROADWAY IN LA 2. PED CROSSED FROM JNCT WITH FRIARN ST INTO LANE 1, CONTINUED INTO LANE 2. V1 UNABLE TO AVOID COLLISION. (CASUALTY INTOXICATED AND STEPPED INTO PATH OF V1)

A39 North Street/West Street

Existing Junction Layout



Accident Locations



NOT PROTECTIVELY MARKED

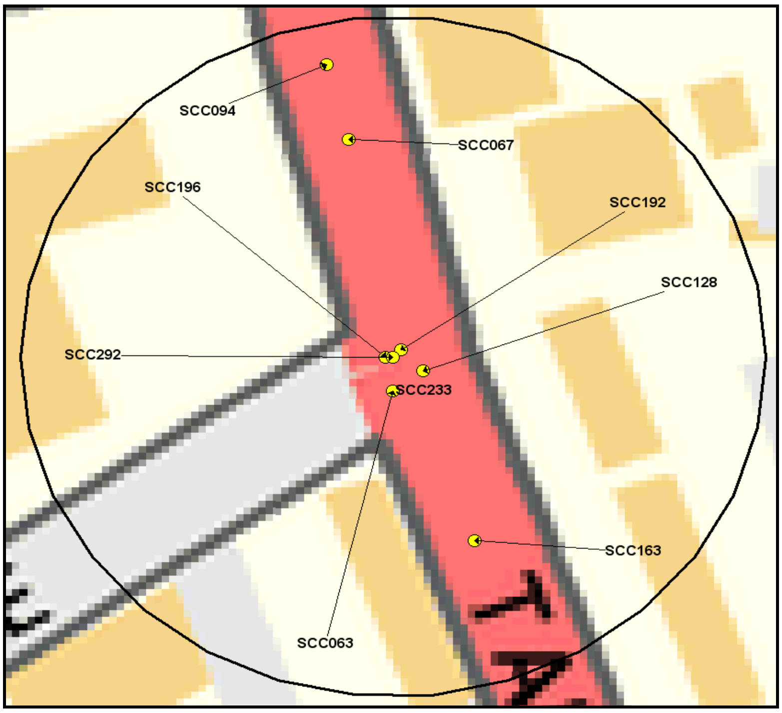
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC450	20070808	0958	1	MALE IN DISABLED BUGGY CROSSED IN FRONT OF V1 A LADEN HGV ON A TRAFFIC LIGHT CONTROLLED CROSSING. THE DISABLED BUGGY AND MALE OCCUPANT WENT UNDER THE FRONT NEARSIDE WHEEL OF THE HGV.
SCC627	20080930	1000	3	V1 WAS TRAVELLING ALONG BROADWAY TO GO STRAIGHT AHEAD INTO NORTH STREET. V2 TRAVELLING ALONG NORTH STREET INTENDING TO TURN RIGHT INTO WEST STREET. V2 TURNED RIGHT ACROSS PATH OF V1 AND COLLISION OCCURRED
SCC505	20060619	1004	3	BOTH VEHS MOVED PRIOR TO POLICE ARRIVAL. T/LIGHTS AT JUNCTION NOT WORKING. IT APPEARS BOTH V1 and V2 TRAV ACROSS C/WAY and COLLIDED. V2 NOT AWARE LIGHTS WERE OUT
SCC697	20091110	1030	3	V1 TRAV ALONG ROAD WHEN AN AMBULANCE COMING IN OPP DIRECTION WITH BLUES AND TWOS CAUSED V1 TO SLOW AND PULL OVER. V2 (LORRY)WAS UNABLE TO STOP IN TIME AND COLLIDED IN TO REAR OF V1
SCC601	20080219	1327	3	V1 TRAV FROM PENEL ORLIEU TURNING LEFT ONTO BROADWAY IN NEW MOTOBILITY VEH, CRASHED INTO CENTRAL RESERVATION. ARB REC'D 28/3/08!
SCC499	20060524	1720	3	V1 APPROACH. JNCT WITH T/LIGHTS IN HIS FAVOUR. V2 CAME FROM N/S and STRUCK V1 AS IT CROSSED THE ROAD
SCC636	20081117	1900	3	V1 STATIONARY AT TRAFFIC LIGHTS, V2 APPROACHED FROM BEHIND AND DID NOT BRAKE IN TIME, HITTING THE REAR OF V1
SCC722	20100615	1948	3	V1 WAS TURNING RIGHT INTO NORTH STREET FROM PENEL ORLIEU, WHEN DRIVER LOST CONTROL. V1 HIT NEARSIDE RAILINGS
SCC482	20060208	2330	3	V1 STOPPED AT TRAFFIC LIGHTS. V2 FAILED TO STOP IN TIME AT JUNCTION AND PROCEEDED TO DRIVE INTO REAR OF V1
SCC506	20060618	2358	2	D1 DRIVING DANGEROUSLY ALONG NORTH STREET FAILED TO STOP AT RED T/LIGHT AND COLLIDED WITH V2 WHICH WAS CROSSING FROM WEST STREET IN PENEL ORLIEU. V1 ENDED UP ON ITS ROOF

A38 Taunton Road/Rhode Lane

Existing Junction Layout

Accident Locations



Accident Descriptions

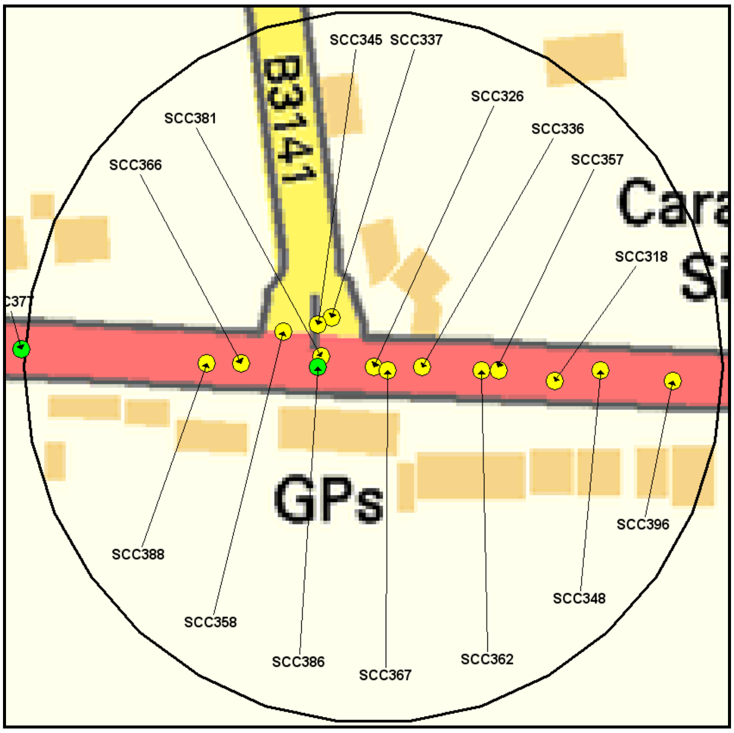
Ref	Date	Time	Severity	Description
SCC233	20090120	1116	3	V1 ON RHODE LANE BEHIND V2. V1 WAITING TO TURN RIGHT WHEN V2 HIT REAR OF V1
SCC063	20070104	1515	2	V1 TURNED RIGHT FROM TAUNTON ROAD INTO RHODE LANE THROUGH GAP IN ONCOMING TRAFFIC and WAS IN COLLISION WITH V2, TRAV ALONG TAUNTON ROAD
SCC163	20061005	1715	3	V2 TRAV IN HEAVY TRAFFIC. V1 TRAV IN OPP DIR, CROSSED OVER CENTRAL LINES, NARROWLY MISSING ONE CAR and HITTING V2. DRIVER CLAIMS SHE MAY HAVE BLACKED OUT
SCC094	20070729	0150	3	V1 TRAV TAUNTON RD WHEN DRIVER SAW LIGHTS OF ANOTHER UNKNOWN VEH HEADING STRAIGHT FOR HIM, 1 SWERVED TO THE RIGHT AND COLLIDED WITH SHOP FRONT BEFORE REVERSING AND FTS. LATER BROKE DOWN. D1 ARRESTED EX ALC ETC
SCC192	20051105	1750	3	V1 TRAV TAUNTON RD, V2 WAITING TO TURN RT INTO RHODE LANE. V1 GAVE WAY TO ANOTHER VEH TO TURN RT, V2 THOUGHT V1 GAVE WAY TO HER, PROCEEDED TO TURN RT AND COLLISION OCCURRED
SCC128	20060303	1940	3	V1 TRAV TAUNTON RD OUT OF BRIDGWATER APPROACHING JNCT OF RHODE LANE, WHEN V2 RODE OUT INTO V1'S PATH. V1 BRAKED BUT WAS UNABLE TO AVOID COLLISION
SCC292	20100224	2020	3	V1 AT JCTN OF RHODE LANE WITH A38, INTENDING TO T/ RIGHT. V1 WAS ALLOWED OUT BY ANOTHER VEHICLE. V2 (PED CYC) WAS OBSCURED FROM VIEW BY THE OTHER VEHICLE INTENDING TO TURN RIGHT INTO RHODE LANE. V1 HIT V2. D2 WAS IN DARK CLOTHING DISPLAY NO LIGHTS
SCC196	20051124	2025	3	V2, CYCLIST, TRAVELLING TAUNTON ROAD. V1 PULLED OUT OF RHODE LANE AND HIT V2.
SCC067	20070415	2030	3	PED WAS CROSSING ROAD WHEN HIT BY V1 WHICH WAS TRAVELLING TWDS BRIDGWATER

APPENDIX B: RURAL LOCATION ACCIDENT DETAILS

A39/B3141 Woolavington Hill Junction

Existing Junction Layout

Accident Locations



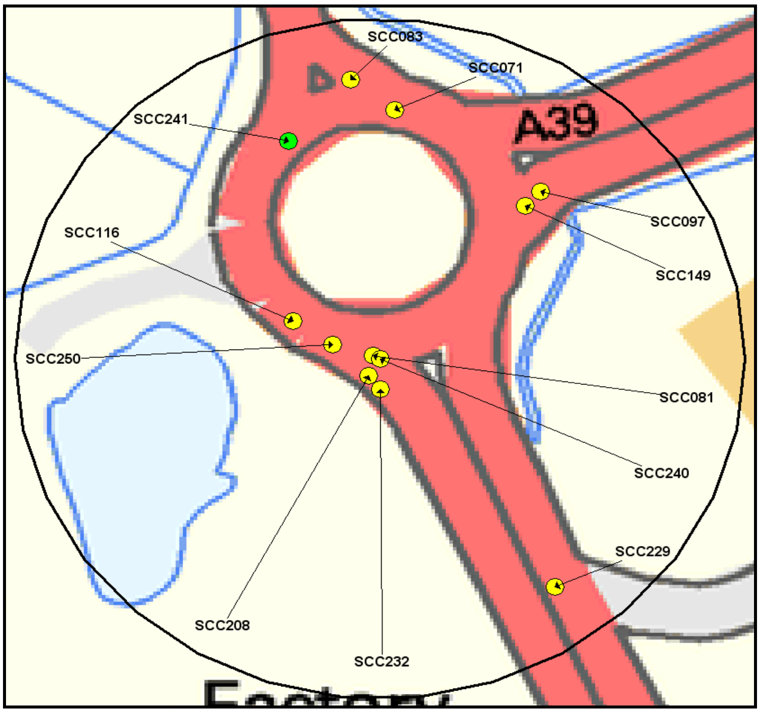
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC318	20070807	1146	3	APPEARS ALL VEHICLES WERE TRAVELLING IN SAME DIRECTION. DUE TO TEMPORARY TRAFFIC LIGHTS VS 1,2,3 and 4 STATIONARY. V5 CAME OVER BROW OF HILL WHERE HIT REAR OF V4 PUSHING IT INTO V3. V3 THEN HIT V2 PUSHING IT INTO V1
SCC326	20060329	0725	3	V1 TRAV A39 BATH RD TWDS STREET WHEN V2 PULLED OUT OF THE WOOLAVINGTON HILL JCT INTO PATH OF V1. V2 HIT N/S OF V1. V2 F.T.S BUT LATER REPORTED IT AT BWR P/STN
SCC336	20060909	1835	3	V1 STATIONARY, WAITING TO TURN RIGHT INTO DRIVEWAY. V2 and V3 TRAV SAME DIR. V3 HIT REAR OF V2 PUSHING IT INTO V1
SCC337	20060906	2102	3	V1 M/CYCLE TRAV B3141 STAT AT JCT WITH A39. V2 TRAV SAME DIR. HIT REAR OF V1 KNOCKING RIDER and PILLION OFF. V2 F.T.S. – NO DETAILS AVAILABLE
SCC345	20050717	1525	3	V1 STATIONARY WAITING TO TURN RIGHT. V2 FOLLOWING FAILED TO STOP AND HIT REAR OF V1
SCC348	20050802	1100	3	V3 WAITING ON MAIN ROAD TO TURN RIGHT INTO DRIVEWAY. TWO FOLLOWING VEHICLES HAD COLLISION AFTER ONE FAILING TO STOP
SCC357	20080310	1306	3	V3 TRAV WEST TO EAST STOPPED TO LET M/CYCLE TURN RIGHT INTO DRIVEWAY. V2 TRAV BEHIND V3, BRAKED AND SWERVED TO AVOID V3 AND HIT ONCOMING V1 THEN V3. V1 LEFT C/WAY ONTO SOUTH VERGE AND COLLIDED WITH STATIONARY/PARKED V4
SCC358	20080420	1430	3	V1 TRAVELLING ALONG A39 TOWARDS GLASTONBURY.V2 WAITING TO JOIN A39 FROM WOOLAVINGTON HILL.V2 PULLED OUT OF JUNCTION AND COLLIDED WITH V1.
SCC362	20080624	1720	3	ALL VEHICLES TRAVELLING A39 TOWARDS STREET. VEHICLES 3 AND 2 STATIONARY IN QUEUE OF TRAFFIC. V1 HIT REAR OF V2 PUSHING IT INTO REAR OF V3
SCC366	20080711	1533	3	ALL VEHICLES TRAVELLING A39 TOWARDS BRIDGWATER. VEHICLES 1, 2 and 3 STOPPED, WAITING FOR A VEHICLE AHEAD TO TURN RIGHT ONTO B3141. V4 HIT REAR OF V3 PUSHING IT INTO REAR OF V2 WHICH WAS THEN PUSHED INTO REAR OF V1
SCC367	20080725	0815	3	A VEHICLE WAS WAITING TO TURN RIGHT AT JUNCTION OF A39 WITH B3141. AND TRAFFIC WAS QUEUING BEHIND IT, V1 APPROACHED QUEUE AND PULLED ON TO OTHER SIDE OF ROAD ACROSS DOUBLE WHITE LINES INTO PATH OF ONCOMING V2
SCC381	20090327	1756	3	V1 TRAV ALONG A39 FROM BRIDGWATER BEHIND ANOTHER VEHICLE. VEHICLE IN FRONT TURNED LEFT ONTO WOOLAVINGTON HILL. V2 HAD BEEN WAITING AT JUNCT OF WOOLAVINGTON HILL WITH A39, TO TURN RIGHT AND DID SO AT THIS POINT, INTO THE PATH OF V1 and COLLISION OCCURRED
SCC386	20090531	1100	2	V1 and V2 TRAVELLING ALONG A39 TOWARDS BAWDRIP BEHIND A CARAVAN. THE CARAVAN STOPPED QUICKLY AS VEHICLE BROKEN DOWN AHEAD. V1 STOPPED BUT V2 WENT INTO REAR OF V1.
SCC388	20090712	1400	3	V1, V2 AND V3 TRAVELLING ON A39 IN SAME DIRECTION. V1 SLOWED AS TRAFFIC TURNING AHEAD. V3 SHUNTED V2 INTO V1.

Dunball Roundabout

Existing Junction Layout

Accident Locations



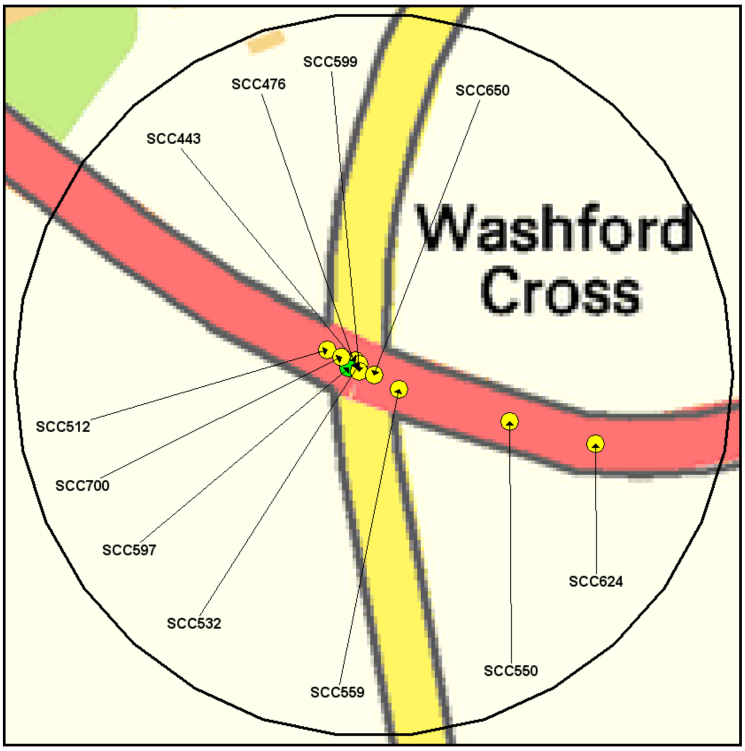
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC071	20070515	1300	3	BOTH VEHS TRAV FROM A38 ONTO A39 TWDS MOTORWAY. V1 (ARTICULATED) NEG R/ABOUT IN LA 1. V2, TRAV IN LA2, TRIED TO PASS V1 and COLLISION OCCURRED
SCC081	20070221	1615	3	V1 TRAV ALONG ROAD TWDS PAWLETT, APPROACHING R/ABOUT IN O/S LANE, BRAKED, WHEELS LOCKED, DRIVER LOST CONTROL FISHTAILING OVER ROAD THEN LEFT C/WAY HIT LAMP POST. VEH FLIPPED ONTO SIDE HITTING STEEL FENCE
SCC083	20070221	0830	3	V1 TRAV TWDS BRIDGWATER. V1 BRAKED BUT V2, AT REAR, FTS IN TIME and COLLIDED WITH REAR OF V1
SCC097	20070804	1130	3	V2 STATIONARY AT DUNBALL RAB WAITING TO TURN LEFT TOWARDS BRIDGWATER V1 COMING FROM BEHIND COLLIDED WITH REAR OF V2
SCC116	20071230	1000	3	BOTH VEHS ON R/ABOUT V2 CHANGED LANES CAUSING V1 TO SWERVE TO AVOID IMPACT.V1 HIT KERB AND SPUN INTO A DITCH.
SCC149	20060601	1030	3	V2 EXITED M5 MOTORWAY AT J23, STOPPED AT THE R/BOUT FOR ONCOMING TRAFFIC and WAS HIT FROM BEHIND BY V1 WHICH WAS TRAVELLING IN SAME DIRECTION
SCC208	20080609	1155	3	V1 SLOWED DOWN AT ROUNDABOUT. V2 FAILED TO STOP AND HIT REAR OF V1
SCC229	20081126	1300	3	V2 TRAVELLING FROM R/ABOUT .V1 PULLED OUT INTO A38, FROM UNCLASSIFIED ROAD. V2 TOOK EVASIVE ACTION AND LEFT ROAD, COMING TO REST IN A DITCH.
SCC232	20090125	1519	3	V2 WAS STOPPED AT THE DUNBALL ROUNDABOUT WAITING FOR ANOTHER VEHICLE TO PASS ON THE ROUNDABOUT V1 (TRAV BEHIND) DID NOT NOTICE V2 HAD STOPPED AND COLLIDED WITH THE REAR OF V2
SCC240	20090311	1815	3	V2 STOPPED AT ROUNDABOUT WITH V1 BEHIND. V1 ASSUMED V2 HAD PULLED AWAY AND HIT REAR OF V2
SCC241	20090322	1707	2	V1 (M/CYCLE) APPROACHING ROUNDABOUT, DID NOT STOP AND COLLIDED WITH REAR END OF V2 (ARTIC LORRY) . R1 WAS THROWN FROM M/CYCLE

Washford Cross Junction

Existing Junction Layout

Accident Locations



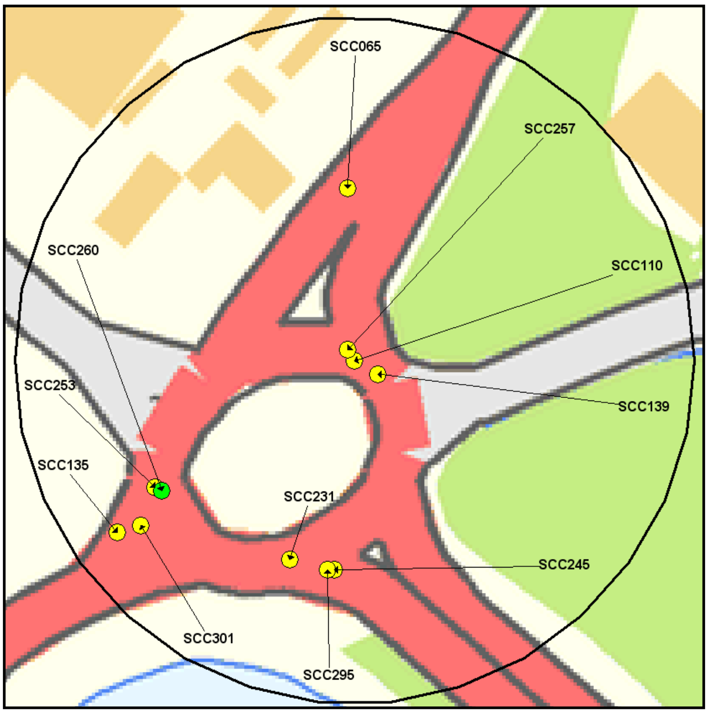
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC443	20070701	1530	3	V2 and V1 TRAV TWDS WASHFORD ON A39. V2 BRAKED SHARPLY TO AVOID IMPACT WITH VEHICLE IN FRONT WHICH HAD BRAKED SHARPLY. V1, TRAV BEHIND V2, BRAKED BUT HIT REAR V2.
SCC476	20060102	1420	3	V3 TRAV TWDS MINEHEAD ON A39 WHEN IT COLLIDED WITH REAR OF V1 WHO WAS WAITING TO TURN RIGHT TWDS WATCHET. V1 WAS PUSHED INTO V2 WHICH WAS TRAV IN OPP DIRECTION FROM MINEHEAD. V2 THEN HIT V4 WHICH WAS WAITING AT JUNCTION OF B3190
SCC512	20060715	2000	3	V1 STATIONARY TURNING RIGHT. V2 COLLIDES WITH REAR OF V1 (V2 DAZZLED BY SUN)
SCC532	20061026	1320	3	V1 TRAV FROM WATCHET DIR, WAITING TO CROSS THE A39 AT WASHFORD CROSS. V2 TRAV ALONG A39 TWDS MINEHEAD. V1 PULLED OUT INTO PATH OF V2, V2 HIT N/S V1
SCC550	20050728	0858	3	V1, V2 and V3 TRAV A39 TWDS WILLITON. V4 TURNED RIGHT FROM B3190 ONTO A39 ACROSS PATH OF V3. V3 BRAKED AND WAS HIT IN REAR BY V2. V2 WAS THEN HIT IN REAR BY V1. V4 F.T.S.
SCC559	20050928	1520	3	V2 STOPPED, WAITING TO TURN RIGHT WAS HIT FROM BEHIND BY V1 WHICH WAS FOLLOWING
SCC597	20080218	1235	2	BOTH VEHICLES TRAVELLING A39 FROM MINEHEAD. V2 STATIONARY, WAITING TO TURN RIGHT ONTO B3190 TOWARDS MONKSILVER. V1 HIT REAR OF V2
SCC599	20080309	1120	3	V1 TRAV ALONG B3190 AWAY FROM WATCHET TWDS A39. AT J/W A39 V1 DID NOT STOP AT GIVE WAY LINES and CONTINUED ONTO THE A39 HITTING V2 WHICH WAS TRAV TWDS WILLITON. V1 SPUN INTO THE OPPOSITE CARRIAGEWAY AND V2 LEFT ROAD TO O/SIDE and CAME TO REST IN HEDGE
SCC624	20080914	0249	3	V1, TRAVELLING TOWARDS WILLITON, LOST CONTROL ON BEND AND HIT V2 TRAVELLING IN OPPOSITE DIRECTION. V1 THEN HIT A LOW STONE WALL ON NEARSIDE, OVERTURNED AND SLID ALONG ROAD ON ITS ROOF
SCC650	20090219	1744	3	V1 STAT IN A LINE OF TRAFFIC TRAVELLING TOWARDS MINEHEAD. V2 BRAKED AND LOST CONTROL COLLIDING WITH REAR OFFSIDE OF V1

Huntworth Roundabout

Existing Junction Layout

Accident Locations



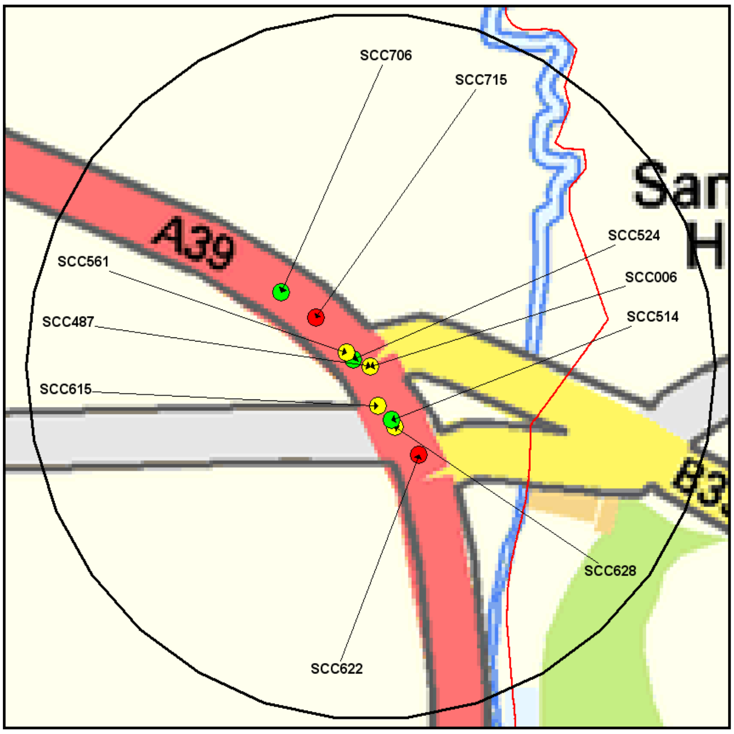
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC065	20070407	0830	3	BOTH VEHS TRAV FROM NORTH PETHERTON TO BRIDGWATER. V2 SLOWED TO ENTER DAWS FARM. V1 HIT REAR OF V2 PUSHING V2 INTO THE WALL
SCC110	20071031	0545	3	V1 WAS ON THE R/ABOUT HAVING ENTERED FROM A38 FROM TAUNTON INTENDING TO GO INTO EXPRESS PARK INDUSTRIAL ESTATE. V2 ENTERED THE R/AABOUT FROM THE DIRECTION OF BRIDGWATER AND HIT V1
SCC135	20060413	2020	3	V1 and V2 TRAVELLING A38 IN SAME DIRECTION. V2 STOPPED AT ROUNDABOUT TO ALLOW VEHICLES TO PASS. V1 BRAKED BUT DRIVERS FOOT SLIPPED. V1 HIT THE REAR OF V2
SCC139	20060513	1830	3	V1 NEG R/BOUT (FROM M/WAY) V2 ALSO ON R/BOUT (FROM A38) BOTH INTENDED TO GO INTO SERVICES BUT COLLISION OCCURRED
SCC231	20090114	0715	3	V1 TRAVELLING A38 TOWARDS NORTH PETHERTON. V2 ENTERED ROUNDABOUT FROM DIRECTION OF M5, AND HIT REAR WHEEL OF V1 CAUSING RIDER TO FALL
SCC245	20090416	0620	3	VEH 1 TRAV FROM JUNCTION 24 TO A38 RAB AT HUNTWORTH. WHILST DRIVER 1 WAS SLOWING DOWN TO STOP BEHIND VEH2 (STATIONARY) THEIR FOOT SLIPPED OFF THE BRAKE ONTO THE ACCELERATOR AND A VERY SLOW SPEED COLLISION TOOK PLACE. DETAILS EXCHANGED AND NO DAMAGE TO E
SCC253	20090527	1410	3	V1 LEFT M/WAY and TRAV AROUND R/ABOUT TWDS A38 BRIDGWATER. V2 TRAV FROM NORTH PETHERTON TWDS BRIDGWATER, APPROACHED R/ABOUT TO GO AHEAD. V1 COMING FROM THE RIGHT. V2 THOUGHT V1 WAS GOING TO CONTINUE. V1 PUSHED IN FRONT OF V2 and BRAKED SUDDENLY.V2 HIT V1
SCC257	20090609	0700	3	V1 APPROACHED THE ROUNDABOUT FROM BRIDGWATER INTENDING TO GO ACROSS TO THE NORTH PETHERTON ROAD. V2 IN THE OFFSIDE LANE CUT ACROSS IN FRONT OF V1 CAUSING COLLISION AND INJURY. V2 HIT THE ELBOW AND HAND OF V1 RIDER. R1 BANGED ON SIDE OF V2 WHICH FTS
SCC260	20090713	0700	2	V1 (MOTORCYCLE) HAD ENTERED THE ROUNDABOUT FROM THE A38 TAUNTON ROAD AND WAS TRAVELLING TOWARDS BRIDGWATER. V2 WAS ON THE R/ABOUT HAVING ENTERED FROM M5. V2 CUT ACROSS THE PATH OF V1 AND COLLISION OCCURRED
SCC295	20100419	1703	3	V1 WAS BEHIND V2 WAITING TO ENTER ROUNDABOUT V2 PULLED FORWARD V1 PULLED FORWARD AND COLLIDED WITH V2

Sandford Corner

Existing Junction Layout

Accident Locations



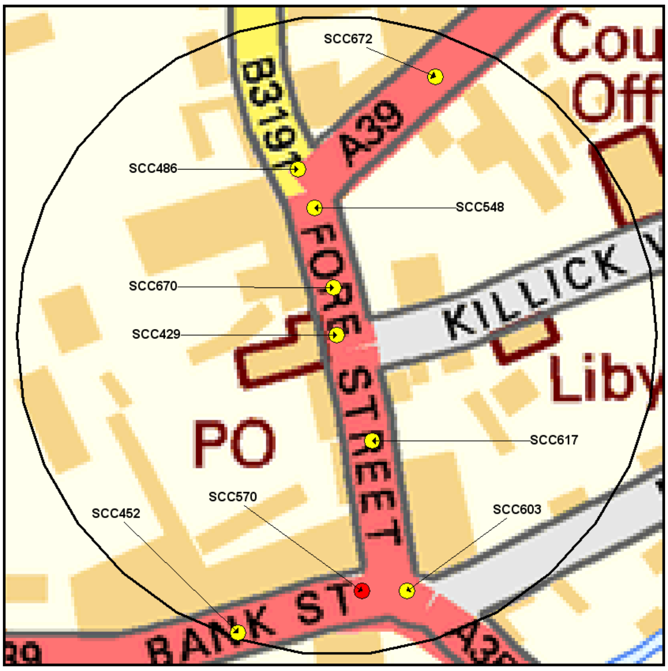
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC006	20060225	1510	3	V2 TRAV A39 TWDS BRIDGWATER WHEN V1 PULLED OUT FROM THE WEMBDON HILL JUNCTION TO TURN RIGHT TWDS CANNINGTON, INTO PATH OF V2 AND COLLISION OCCURRED
SCC487	20060225	1510	3	V2 TRAV A39 TWDS BRIDGWATER WHEN V1 PULLED OUT FROM THE WEMBDON HILL JUNCTION TO TURN RIGHT TWDS CANNINGTON, INTO PATH OF V2 AND COLLISION OCCURRED
SCC514	20060718	1816	2	V1 TURNED ONTO A39 FROM CHARLYNCH LANE AND WAS IN COLLISION WITH V2 WHICH WAS O/TAKING VEHICLES
SCC524	20060901	2018	2	V1 TURNED RIGHT FROM JUNCTION ONTO SINGLE C/WAY. V2 COLLIDED WITH V1 AS V1 TURNED RIGHT
SCC561	20051006	2009	3	V1 TRAV TOWARDS BRIDGWATER WHEN V2 PULLED STRAIGHT OUT OF JUNCTION ONTO MAIN C/WAY INTO PATH OF V1 CAUSING A COLLISION
SCC615	20080803	1700	3	V1, TRAVELLING TOWARDS CANNINGTON, MOVED TOWARDS CENTRE OF CARRIAGEWAY (TO AVOID MOTORCYCLES WHICH HAD TURNED LEFT WITHOUT INDICATING) AND CLIPPED V2 WHICH WAS TRAVELLING IN OPPOSITE DIRECTION
SCC622	20080919	1331	1	V1 TRAVELLING ALONG A39 TOWARDS MINEHEAD FAILED TO NEGOTIATE A LEFT HAND BEND AND CROSSED TO THE OTHER CARRIAGEWAY WHERE IT COLLIDED HEAD ON WITH V2
SCC628	20081003	1000	3	V1 WAS SLOWING DOWN AS IT WAS APPROACHING A DANGEROUS BEND. V2 DID NOT GIVE WAY AND PULLED OUT FROM V1 OFFSIDE. V1 SWERVED TO AVOID HITTING V2 BUT IT WAS TO LATE AND V2 HIT THE OFFSIDE OF V1.
SCC706	20100212	1610	2	V1 (MCY) TRAV FROM BRIDGWATER TO MINEHEAD. V2 TRAV IN OPP DIR. D1 LOST CONTROL ON L/ HAND BEND NEAR JUNCTION OF SANDFORD HILL AND TRAV ONTO OPP C/WAY FALLING TO GROUND AND SLIDING INTO ONCOMING V2
SCC715	20100425	1138	1	V1 TRAV THROUGH LONG OPEN L/H/BEND. V2 (TOWING HORSEBOX) WAS APPROACHING FROM OPPOSITE DIRECTION. FOR REASONS UNDER INVESTIGATION 2/3 OF THE WAY THROUGH THE BEND V1 (CARRYING RIDER and PILLION PASSENGER) MOVED TO ITS O/SIDE OF C/WAY and COLLIDED WITH V2

Fore Street, Williton

Existing Junction Layout

Accident Locations



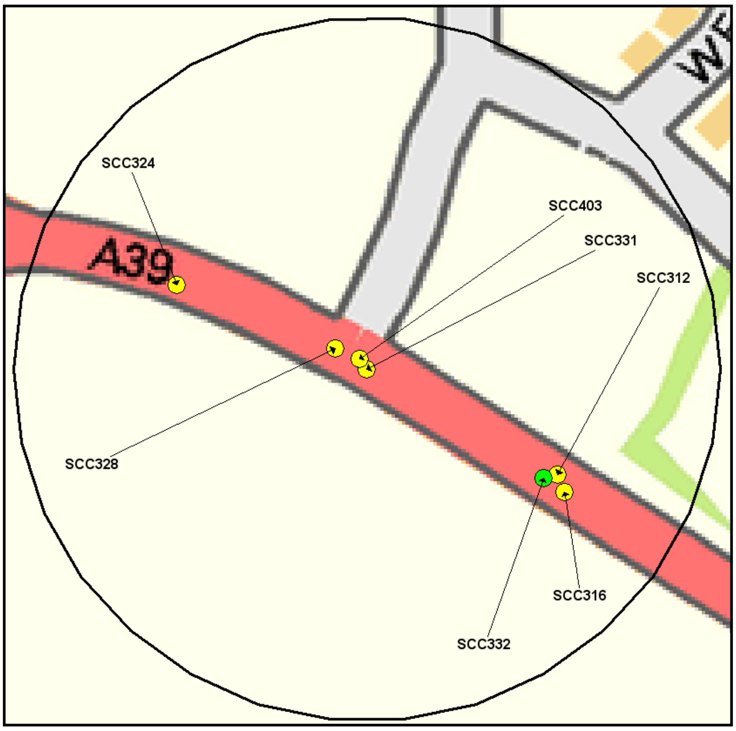
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC429	20070123	1357	3	PED STOOD LOOKING IN SHOP WINDOW, WAS STRUCK ON LEG BY ELDERLY FEMALE DRIVING/RIDING HER INVALID CARRIAGE
SCC452	20070823	1420	3	CAS (DRIVER) STOOD WAITING TO OPEN DOOR OF V2 TO GET IN WHEN V1 WENT BY STRIKING CAS UPPER ARM CAUSING MINOR INJURY. V1 THEN DROVE OFF (FTS)
SCC486	20060222	1235	3	V1 TRAVELLING ALONG NORTH RD TOWARDS LONG STREET. V2 TURNED FROM LONG STREET INTO NORTH ST AND COLISON OCCURRED. V2 HAD TO DRIVE DOWN CENTRE OF ROAD DUE TO PARKED VEHICLES
SCC548	20050726	1655	3	PEDESTRIAN WALKED ACROSS REAR OF V1 THAT WAS REVERSING FROM PRIVATE PARKING AREA ONTO ROAD
SCC570	20051111	945	1	V1 ON APPROACH TO MINI R/BOUT IN SLOW MOVING TRAFFIC, AS V1 MOVED TOWARDS R/BOUT-CONTACT SEEMS TO HAVE BEEN MADE WITH PED CROSSING RD. (NOT YET KNOWN WHAT MOVEMENTS PED. MADE), PED KNOCKED TO THE GROUND RECEIVING FATAL INJURIES
SCC603	20080408	804	3	V2 WAS TRAVELLING ALONG BANK STREET APPROACHING R/ABOUT INTENDING TO TAKE THE A358 TO TAUNTON. V2 ENTERED THE R/ABOUT AND WAS HIT BY V1 WHICH HAD ENTERED THE R/ABOUT FROM FORE STREET.
SCC617	20080824	1045	3	V1 (P/CYCLE) WAS PASSING ENTRANCE TO SHELL GARAGE AS V2 PULLED OUT OF FORECOURT ONTO FORE STREET. V2 STRUCK REAR WHEEL OF V1 CAUSING R1 TO BE THROWN OFF. V2 DROVE OVER BOTH WHEELS OF V1 THEN DROVE OFF AT SPEED TWDS BRIDGWATER
SCC670	20090722	1030	3	V1 REVERSED OUTSIDE POST OFFICE AFTER DROPPING HIS WIFE OFF. A WOMAN KNOCKED ON HIS WINDOW TO SAY HE HAD HIT A PEDESTRIAN. THE PEDESTRIAN DID NOT WANT MEDICAL ATTENTION
SCC672	20090730	1500	3	V1 TRAV ALONG ROAD TOWARDS MINEHEAD WHEN IT VEERED ACROSS ROAD AND COLLIDED WITH V2 (MINI BUS) TRAV IN OPPOSITE DIRECTION

A39/Hall Road Junction

Existing Junction Layout

Accident Location



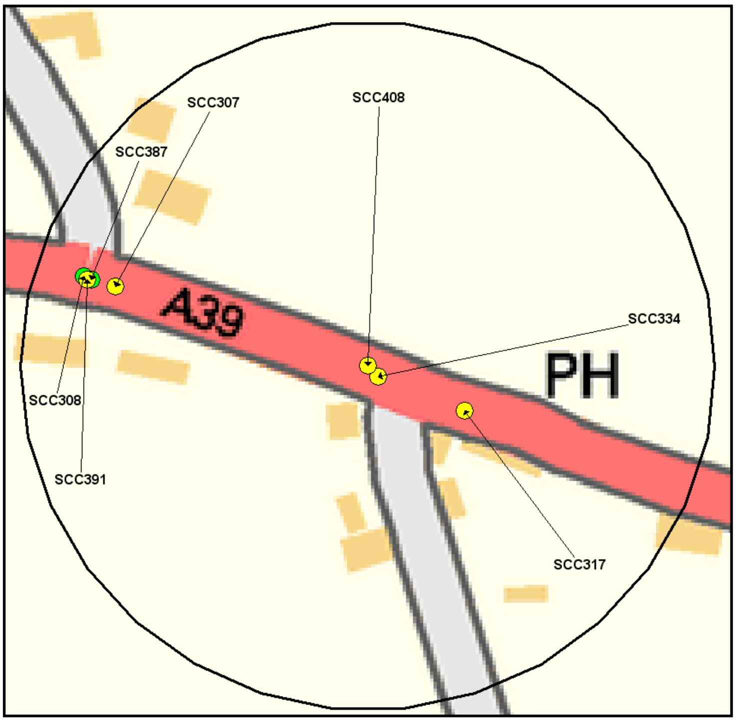
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC312	20070215	1745	3	V1 TRAV TWDS STREET, WAS STATIONARY INDICATING RIGHT INTO LAYBY, WHEN IT WAS HIT FROM BEHIND BY V2 (NO SKIDDING) WHICH ENDED UP IN HEDGE OF LAYBY
SCC316	20070707	1620	3	BOTH VEHS TRAV TWDS STREET. V1 PROCEEDED TO PULL INTO LAYBY ON O/SIDE AT SAME TIME AS V2 WENT TO O/TAKE IT and COLLISION OCCURRED
SCC324	20060106	0829	3	V1 TRAV A39 TWDS M/WAY BUT STOPPED IN QUEUE OF TRAFFIC. V2 TRAV BEHIND FAILED TO STOP IN TIME AND COLLIDED WITH REAR OF V1
SCC328	20060701	1549	3	BOTH VEHS TRAV SAME DIRECTION DOWNHILL. V1 STATIONARY TO TURN RIGHT INTO HALL ROAD, V2 O/TOOK V1 JUST AS V1 TURNED and COLLISION OCCURRED
SCC331	20060728	1435	3	V1 TRAV TWDS STREET, INDICATED TO TURN LEFT BY MISTAKE. V2 THEN PULLED OUT OF JUNCTION ONTO A39. V1 HIT R/O DOOR OF V2
SCC332	20060812	0034	2	V1 TRAV TWDS STREET. DRIVER and REAR PASS. CONFIRM CAR HAD A TYRE BLOW-OUT, CAREERED TWDS KERB and OVERTURNED
SCC403	20100309	0900	3	V1 STOPPED ON A39 BEHIND A VEHICLE WHICH WAS WAITING TO TURN RIGHT INTO RIVERTON ROAD, V2 WAS APPROACHING V1 AND STOPPED BEHIND IT. V3 FAILED TO NOTICE AND COLLIDED WITH THE REAR OF V2 PUSHING IT INTO V1

A39/Pedwell Hill

Existing Junction Layout

Accident Locations



Accident Descriptions

Ref	Date	Time	Severity	Description
SCC307	20070503	1745	3	V1 STOPPED AS VEH IN FRONT WAS TURNING RIGHT AT SHAPWICK HILL. AS V1 PULLED AWAY, V2 CAME FROM BEHIND and COLLIDED WITH REAR OF V1
SCC308	20070520	1140	2	V1 and V2 TRAV A39 FROM STREET. V3 and V4 TRAV IN OPP. DIR. V1 STAT, WAITING FOR VEH AHEAD TO TURN RIGHT INTO SHAPWICK HILL, WHEN IT WAS HIT IN REAR BY V2. V2 THEN HIT V3 ON O/SIDE , THEN V4 HEAD ON
SCC317	20070718	1800	3	V1 PULLED OUT ONTO A39 FROM ASHCOTT IN DIRECTION OF STREET, SLOWED DOWN TO TURN INTO PEDWELL HILL AND INDICATED. AS V1 TURNED V2 HIT V1, COMING TO REST AT THE ALBION INN, V1 CAUSED DAMAGE TO SCAFFOLDING ON BUILDING
SCC334	20060829	1850	3	V1 TRAV TWDS ASHCOTT ON A39, SLOWED AND STOPPED, WAITING FOR VEHICLE AHEAD TO TURN RIGHT, WHEN HIT IN REAR BY V2 (MCY)
SCC387	20090709	1210	2	V1 WAITING TO TURN RIGHT FROM A39 TO SHAPWICK. INDICATED AND WAS STATIONARY. V2 TRAVELLING ON A39 BEHIND V1, FTS AND COLLIDED WITH REAR OFV1 CAUSING V1 TO MOVE TO THE OTHER SIDE OF THE ROAD.
SCC391	20090821	0735	3	V1 INDICATED AND SLOWED TO TURN RIGHT .V2 AND V3 TRAVELLING IN SAME DIRECTION FAILED TO STOP IN TIME AND SHUNTED FORWARD INTO V1.
SCC408	20100606	141	3	V1, HEADING TOWARDS ASHCOTT, WAS TURNING RIGHT INTO PEDWELL HILL WHEN V2 COLLIDED WITH THE REAR OFFSIDE OF V1. IT WOULD APPEAR V2 FAILED TO STOP IN TIME

Fore Street/Hyde Park Junction, North Petherton

Existing Junction Layout

Accident Locations

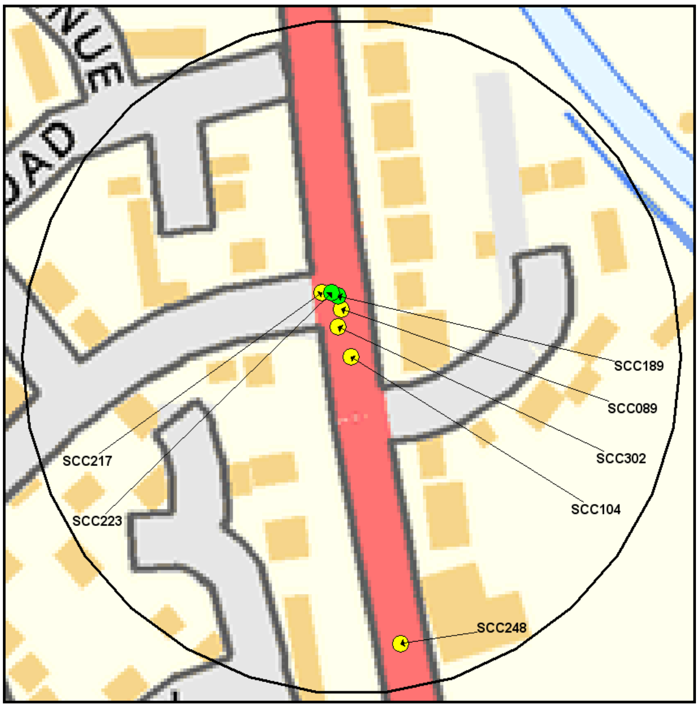
Accident Descriptions

Ref	Date	Time	Severity	Description
SCC105	20070927	846	3	V1 TRAVELLING BEHIND V2 IN LINE OF TRAFFIC. V2 STARTED BRAKING, V1 DID NOT REACT IN TIME AND HIT THE REAR OF V2.
SCC106	20071004	1227	3	BOTH VEHICLES TRAVELLING TOWARDS BRIDGWATER ON A38. V2 INDICATED AND SLOWED TO MAKE RIGHT TURN INTO NEWTON ROAD. V1 HIT REAR OF V2
SCC199	20051206	948	3	V1 TRAVELLING A38, STOPPED, WAITING TO TURN RIGHT INTO NEWTON ROAD. V2 TRAVELLING SAME DIRECTION, HIT REAR OF V1
SCC224	20081019	1523	3	V2 WAITING TO TURN RIGHT, FROM NEWTON ROAD, ONTO A38 TOWARDS BRIDGWATER. V1, TRAVELLING FROM BRIDGWATER ON A38, INDICATING TO TURN LEFT. V2 THOUGHT V1 WAS TURNING LEFT INTO NEWTON ROAD SO PULLED OUT. V1 CONTINUED STRAIGHT ON AND COLLISION OCCURRED
SCC230	20081127	1737	3	BOTH VEHICLES TRAVELLING TOWARDS BRIDGWATER. TRAFFIC AHEAD SLOWED DUE TO STATIONARY VEHICLE WAITING TO TURN RIGHT. V1 SLOWED AND WAS HIT IN REAR BY V2
SCC247	20090508	1700	3	V2 STATIONARY WITH DRIVER PRESENT. V1 APPROACHED FROM REAR TO OVERTAKE AND MISJUDGED SPACE BETWEEN V2 AND ONCOMING TRAFFIC AND COLLIDED
SCC254	20090602	1129	3	BOTH VEHICLES TRAVELLING A38 TOWARDS TAUNTON. V1 INDICATED AND SLOWED IN ORDER TO PULL OVER TO NEARSIDE AND STOP. V2 HIT REAR OF V1

A38 Taunton Road/Wills Road

Existing Junction Layout

Accident Locations



Accident Descriptions

Ref	Date	Time	Severity	Description
SCC089	20070624	0835	3	V2 TRAV ALONG TAUNTON RD TWDS BRIDGWATER APPROACHING J/W WILLS ROAD. V1 AT JUNCT OF WILLS ROAD, PULLED OUT INTO PATH OF V2, HITTING IT ON ITS N/SIDE
SCC104	20070921	1755	3	PEDESTRIAN CROSSING ROAD ON ZEBRA CROSSING. ALL CARS HAD STOPPED. V1 (MOTORCYCLE) TRAVELLING ON OFFSIDE OF STOPPED VEHICLES HAS COLLIDED WITH PEDESTRIAN. V1 LEFT SCENE WITHOUT EXCHANGING DETAILS.
SCC189	20051010	0819	2	V1 TURNING RIGHT INTO TAUNTON ROAD, FROM WILLS ROAD, WAS LET OUT BY A VEHICLE. V2 OVERTAKING STATIONARY VEHICLES AND VEHICLE THAT LET V1 OUT. COLLISION OCCURRED
SCC217	20080911	0832	3	V1 TRAV FROM WILLS ROAD TURNING RIGHT ONTO TAUNTON ROAD. SLOW MOVING TRAFFIC WAITED TO LET HIM OUT, BUT V2 (MOPED) PULLED AROUND STATIONARY TRAFFIC ON RIGHT HAND SIDE, COLLIDING INTO V1
SCC223	20081010	1529	2	V1 M/CYLCE TRAVELLING ALONG THE OUTSIDE OF TRAFFIC TWDS BRIDGWATER WHEN IT COLLIDED WITH V2 WHICH WAS TURNING RIGHT FROM WILLS ROAD HAVING BEEN FLASHED OUT BY OTHER DRIVERS
SCC248	20090519	1700	3	V1 TRAVELLING TOWARDS BRIDGWATER FROM NORTH PETHERTON, JOINED A QUEUE OF TRAFFIC. V2 FAILED TO SLOW DOWN AND COLLIDED WITH THE REAR OF V1.
SCC302	20100621	0850	3	V1 WAITING TO TURN RIGHT FROM WILLS ROAD ONTO A38. V2 (MOTORBIKE) TRAV NORTH ALONG A38. V1 WAS LET OUT OF JUNCTION BY ANOTHER VEH AND ON EMERGING COLLIDED WITH V2.

APPENDIX 15.1: LMVA

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APPENDICES

Appendix A.1 Journey Time Survey Data
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1. INTRODUCTION

1.1 Introduction

1.1.1 Savell Bird & Axon have been retained by EDF Energy to provide traffic and transport advice in relation to the development of a new nuclear power station with two European Pressurised Reactor (EPR) units at Hinkley Point C, Bridgwater, Somerset. These will be provided adjacent to the site of the existing A and B reactors at Hinkley Point.

1.1.2 To assist with the assessment of the impacts of the proposed development on the highway network in Bridgwater and the surrounding area, SBA has produced a PARAMICS micro-simulation model.

1.1.3 In order to undertake future year assessments, a calibrated and validated base model has been produced. The aim of this Local Modal Validation Report (LMVR) is to show that the PARAMICS micro-simulation model produced by SBA is accurately calibrated and validated.

1.1.4 The LMVR includes the methodology, assumptions and steps taken to produce a calibrated and validated PARAMICS base model.

1.1.5 The principle of building a PARAMICS model for this purpose has been discussed and the scope of surveys required was agreed with Somerset County Council (SCC) as the local highway authority.

1.1.6 The scope of the assessment was discussed with SCC and the Highways Agency (HA), at a series of pre-application meetings arranged to discuss the scheme, both with individual parties and the Strategic Officers Group Forum.

1.1.7 The validation of the base model and production of the LMVR has been produced according to the criteria as set out in the Department of Transport's Design Manual for Roads and Bridges (DMRB). Also, the model has been built in accordance with the micro-simulation good practice guide produced by SIAS (the consultancy which produces the PARAMICS software package) and guidelines for the use of Micro-simulation Software produced by the HA in 2007.

1.1.8 The traffic model covers 11 hours, the hours from 1300-1600 were added at a later date and therefore new surveys had to be commissioned in 2010.

1.1.9 The remainder of the report is structured as follows:

- Section 2 Study area and data sources.
- Section 3 Model Specification.
- Section 4 Model Calibration and Validation.
- Section 5 Summary and Conclusions.

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2. STUDY AREA AND DATA SOURCES

2.1 Introduction

2.1.10 The Hinkley Point C site (the site) is located approximately 8km to the north-west of Cannington on the western edge of Bridgwater, immediately south of the existing Hinkley Point A and B power stations.

2.1.11 The site itself lies in the District of West Somerset, though the bulk of the highway network assessed, which covers routes between the M5 and the site, are within the District of Sedgemoor.

2.1.12 The site and surrounding area are illustrated in Figure 1.

2.2 Local Road Network

2.2.13 The C182 provides access to the site from Cannington and is an unlit rural road. The C182 carriageway is approximately 6m width and has no footways. The speed limit along the C182 is 60 mph north of Cannington.

2.2.14 From Cannington the A39 runs west towards Williton and Minehead and south-east to Bridgwater. The A38 runs north-south through Bridgwater, providing access to Bristol to the north and Taunton to the south, and links to the M5 at Junction 23 to the north and Junction 24 to the south.

2.2.15 The northern distributor road (NDR) was built in 2002 to serve new residential development and to provide a bypass route for central Bridgwater. The NDR is clearly signed, therefore would be the main route to the site for traffic approaching from the north.

2.2.16 The vast majority of Bridgwater falls within a 30mph speed limit, although there are several 20mph zones adjacent to schools.

2.2.17 The base model itself covers the bulk of Bridgwater and extends up to and includes Cannington, and a section of the motorway from Junction 23 to Junction 24 of the M5.

2.3 2008/2009/2010 Traffic Surveys

2.3.18 In 2008, 17 classified turning count surveys were commissioned by Royal Haskoning. In 2009 SBA supplemented these with a further 10 count locations. Data from 24hr automatic traffic counts (ATC), collected by SCC in 2008 and 2009, and was also used to inform the base model.

2.3.19 The following junctions were surveyed by Royal Haskoning on Tuesday 21 October 2008 and Wednesday 22 October 2008:

- A39/High Street (Cannington).
- Rodway/High Street (Cannington).
- A39/Main Road (Cannington).

- A39/B3339 Sandford Hill.
- A39 Quantock Road/Quantock Meadow/B3339.
- B3339 Wembdon Rise/Western Way (NDR).
- Western Way (NDR)/Feversham Avenue.
- A38 Bristol Road/Express Park access.
- A39 Broadway/A38 Taunton Road.
- Wylds Road/East Quay/The Drove.
- A39 Broadway/A372 St John Street.
- A38 Bristol Road/The Drove.
- A38 Bristol Road/Wylds Road.
- A38 Bristol Road/Dunball roundabout.
- M5 Junction 23.
- Chilton Road/Western Way (NDR) (Wednesday 22 October 2008).
- Puriton Hill/A39 Bath Road (Wednesday 22 October 2008).

2.3.20 Surveys commissioned by SBA on Tuesday 28 April 2009 included:

- A39 Quantock Road/Wembdon Road.
- A39 Wembdon Road/Northfield.
- Durleigh Road/Northfield.
- A39 North Street/Victoria Road.
- A39 Broadway/West Street/Penel Orlieu.
- Kendale Road/Chilton Street.
- East Quay/The Clink.
- The Clink/A38 Bristol Road/A39 Bath Road/A39 Monmouth Street.
- A38 Taunton Road/Huntworth roundabout.
- M5 Junction 24.

2.3.21 Figure 2a shows a plan with the location of the manual turning movement surveys undertaken in October 2008 and April 2009.

2.3.22 MCC traffic surveys were undertaken on Tuesday 17 November 2009 for the hours of 06:00 to 10:00 and 16:00 to 20:00 at the following locations: • A38 Taunton Road/Huntworth roundabout

- M5 Junction 23.
- A38 Bristol Road/Dunball roundabout.
- A38 Bristol Road/Wylds Road.
- Rodway/High Street (Cannington).

- A39/Main Road (Cannington).
- A39/High Street (Cannington).

2.3.23 Traffic surveys were undertaken on Wednesday 18 November 2009 for the hours between 06:00 to 10:00 and 16:00 to 20:00 at the following locations:

- North Street/Long Street/Fore Street (Williton).
- Bank Street/High Street/Robert Street/Fore Street (Williton).
- M5 Junction 24.
- A39 Quantock Road/Quantock Meadow/B3339.

2.3.24 A set of traffic surveys were also undertaken in 2010 to cover the extended hours, the locations of which are set out below and shown on Figure 2b.

2.3.25 Traffic surveys were undertaken on Wednesday 31 March 2010 for the hours of 13:00 to 16:00 following locations;

- A39/Main Road (Cannington).
- A39 Quantock Road/Quantock Meadow/B3339.
- A39 Broadway/West Street/Penel Orlieu.
- Chilton Road/Western Way (NDR).
- A39 Broadway/A38 Taunton Road.
- East Quay/The Clink.
- Wylds Road/East Quay/The Drove.
- A39 Broadway/A372 St John Street.
- The Clink/A38 Bristol Road/A39 Bath Road/A39 Monmouth Street.
- A38 Bristol Road/The Drove.
- A38 Bristol Road/Wylds Road.
- A38 Bristol Road/Dunball roundabout.
- M5 Junction 23.
- A38 Taunton Road/Huntworth roundabout.
- M5 Junction 24.
- Puriton Hill/A38 Bath Road.

2.3.26 ATC counts were also obtained from Somerset County Council for the following locations, and between the dates shown:

- Westonzoyland Road (Double Bridge) (05 May 2009 – 12 May 2009).
- Wembdon Rise (02/2008; 06/2008; 12/2008; 01/2009; 04/2009).
- Quantock Road (26/01/2009 – 31/05/2009).
- Victoria Road (01/2008; 07/2008; 11/2008; 04/2009; 05/2009).

- Taunton Road (01/12/2008 – 21/12/2008).
- A39 Broadway (13 February 2008 – 27 May 2009).
- High Street Bridgwater (14 February 2008 – 25 June 2009).
- Bascule Bridge (02/2008; 06/2008; 10/2008; 03/2009; 04/2009; 06/2009).
- The Clink (01 January 2008 – 31 May 2009).
- Bridgwater Town Bridge (16 May 2008 – 31 August 2008).
- The Drove (03/2008; 06/2008; 07/2008; 03/2009; 06/2009).
- Chilton Street (02/2008; 06/2008; 11/2008; 05/2009; 06/2009).
- East Quay (01/2008; 05/2008; 06/2008; 10/2008; 03/2009; 05/2009).
- Wylds Road (17/01/2008 – 15/06/2008).
- NDR (01/01/2008 – 26/05/2009).
- South of Horsey (10/2008; 02/2009; 04/2009).
- A38 Horsey Level (07/01/2008 – 18/06/2009)
- Dawes Farm (10/04/2008 – 19/03/2009).
- Taunton Road South (19 May 2008 – 18 June 2009).
- Westonzoyland Road (A372) (30 June 2008 – 14 June 2009).
- Salmon Parade Salmon Parade (03 March 2008 – 08 June 2009).
- Showground Road (03 January 2008 – 14 June 2009).
- All Saints Terrace (03 March 2008 – 08 June 2009).

2.3.27 Figure 2c shows the location of the ATC surveys listed above.

2.3.28 Queue length surveys were carried out at the following junctions during October 2008 and April 2009. Queue length surveys were undertaken at the following junctions on Tuesday 21 October 2008:

- A39/High Street (Cannington).
- A39/Main Road (Cannington).
- A39/B3339 Sandford Hill.
- A39 Quantock Road/Quantock Meadow/B3339.
- B3339 Wembdon Rise/Western Way (NDR).
- Western Way (NDR)/Feversham Avenue.
- Chilton Street/Western Way (NDR).
- A38 Bristol Road/Express Park access.
- A39 Broadway/A38 Taunton Road.
- Wylds Road/East Quay/The Drove.
- A39 Broadway/A372 St John Street.
- A38 Bristol Road/The Drove.

- A38 Bristol Road/Wylds Road.
- Puriton Hill/A39 Bath Road.

2.3.29 Queue length surveys were undertaken at the following junctions on Tuesday 28 April 2009:

- A39 Quantock Road/Wembdon Road.
- A39 Wembdon Road/Northfield.
- Durleigh Road/Northfield.
- A39 North Street/Victoria Road.
- A39 Broadway/West Street/Penel Orlieu.
- Kendale Road/Chilton Street.
- East Quay/The Clink.
- The Clink/A38 Bristol Road/A39 Bath Road/A39 Monmouth Street.
- A38 Taunton Road/Huntworth roundabout.
- M5 J23 roundabout.

2.3.30 M5 J24 roundabout 2.3.13 Figure 2d shows the location of the queue length surveys undertaken in October 2008 and April 2009. 2.3.14 24 hour hourly classified link counts were available from the Highways Agency TRADS database along the M5 and its slip roads at junctions 23 and 24. 2.3.15 In June 2008 (see **Appendix A.1** for original data), five journey time surveys were undertaken along the journey paths listed below. Along the same journey paths, journey times were recorded and used in the validation of the PARAMICS model. The journey times were collected on Wednesday 31 March 2010 between 06:00 to 20:00, in three periods between 0600-1000; 10:00–16:00; and 16:00 – 20:00:

- Journey Path 1 – Bristol Road/Express Way roundabout – Bristol Road – Wylds Road – Western Way – Quantock Road/Quantock Meadow roundabout.
- Journey Path 2 – A38/A39 roundabout – Bristol Road – Bristol Road/Bath Road/Monmouth Street roundabout – Broadway – Taunton Road – Taunton Road/Access to M5 roundabout.
- Journey Path 3 – Bath Road/Puriton– Bristol Road/Bath Road/Monmouth Street roundabout – The Clink – Northgate – North Street – Wembdon Road – Quantock Road/Quantock Meadow roundabout – Quantock Road – New Road/Sandford Hill.
- Journey Path 4 – Westonzoyland Road/Bower Lane – St John Street – Broadway – North St – Wembdon Rise – Quantock Road/Quantock Meadow roundabout – Wembdon Rise – New Road/Sandford Hill.
- Journey Path 5 – Bristol Road/Wylds Road – The Drove – East Quay – Eastover – St John Street/Westonzoyland Road.

2.3.31 **Appendix A.1** provides the original journey time survey data from 2008 and 2010 for the five routes listed above.

2.4 SATURN Model

2.4.32 The recent SATURN model for the proposed Hinkley Point C development built by ATKINS, was used to derive origin and destination data for the PARAMICS model. The methodology is described in Section 3 of this report.

2.4.33 The Hinkley Point SATURN model was derived from an existing model known as the Taunton and Surrounding area Road Traffic model (TSRT2).

2.4.34 The first TSRT model was originally calibrated and validated for a 2001 base year and later updated for a 2006 base year (TSRT2 model). In 2009, EDF commissioned Atkins to develop a road traffic model for the proposed Hinkley Point C. It was agreed that the model would be developed from the TSRT2 model.

2.4.35 The Hinkley Point model covers Bridgwater and the surrounding area, particularly the corridor to Hinkley Point, to the west of Bridgwater.

2.4.36 The original TSRT2 model network has very little detail to the west of Bridgwater so it was necessary to adapt the network to better suit the purposes of this study.

2.4.37 The original TSRT2 model was developed using the SATURN suite of programs, so the same was used for the Hinkley Point model.

2.4.38 Light vehicles (cars, taxis and light vans) and heavy vehicles (good vehicles >30 cwt) are modelled separately.

2.4.39 Two time periods are modelled. These are:

- AM peak hour 0800-0900; and
- PM peak hour 1700-1800.

2.4.40 Modelled networks include all links carrying significant volumes of traffic within the study area as either simulation links or buffer links.

2.5 SATURN Model Data Sources

2.5.41 The types of data used within the SATURN model are:

- Roadside Interviews (RSIs) – the data from these was used to identify travel patterns at strategic locations in the model, and then used to form a section of the travel demand matrix, which represents origin – destination movements around the model;
- Journey Time Surveys – these were used to validate the model to ensure that traffic travelling along important sections of the model is moving at the correct speed, with any congestion that may exist being accurately represented; and
- Traffic Count Data – this data was used to calibrate and validate the model, to ensure that it provides a robust representation of actual traffic conditions.

2.5.42 The Hinkley Point SATURN prior matrices were constructed from observed Origin Destination data collected in roadside interviews (RSI). The existing matrices for the TSRT2 model were also utilised in the construction of the Hinkley Point matrices.

3. MODEL SPECIFICATION

3.1 Introduction

3.1.43 The purpose of building the PARAMICS model is to:

3.1.44 Understand the current pattern of movements within and through the Bridgwater area; and

3.1.45 Following agreement of the base mode, use the PARAMICS model as a tool for forecasting the transport impacts in relation to the proposed development.

3.2 Main Features of PARAMICS

3.2.46 Micro-simulation is based on the detailed physical description of the road network, and includes features such as bus operations, traffic signal settings/timings, driver behavioural characteristics and vehicle kinematics. This provides an accurate representation of the variable circumstances which could lead to congestion on all types of road network.

3.2.47 The main inputs required to develop a model are summarised below:

- OS plan or CAD (Computer Aided Design) drawings of model area (aerial photographs optional);
- Origin and Destination (OD) traffic flows, ATC/manual traffic counts;
- detailed site visits (used to determine network characteristics and driver behaviour); and
- existing traffic signal timings.

3.2.48 Once the base model(s) have been calibrated and validated, the PARAMICS micro-simulation can be used to test various scenarios including:

- increases in traffic flows (future year baseline scenarios);
- impact of the proposed development related traffic on the highway network;
- impact of new roads;
- public transport priority measures, such as bus priority;
- introduction of traffic calming or reduced speed limits;
- impact of incidents (accidents, cycle lanes etc.); and
- affects relating to road closures and road works .

3.2.49 PARAMICS also enables non experts to interactively test "What If" scenarios and immediately see the results in terms of the visualisation of real time traffic flows and congestion. Importantly, PARAMICS is unique in providing dynamic assignment over road networks of unlimited size, therefore is an appropriate tool for the extent of the Bridgwater highway network being modelled.

3.3 Network Construction

3.3.50 The model was constructed using OS mapping as a base overlay to provide the existing highway network.

3.3.51 Junctions have been coded using a combination of information obtained from site visits, local knowledge, OS data and aerial photography.

3.3.52 The traffic signal data was provided by SCC, which included staging and maximum cycle time information. The green times have been calibrated to match queuing and journey time survey data.

3.3.53 Link costs have been included on various links to hinder the amount of vehicles using certain links, and to model links that may be less attractive to motorists e.g. where there are parked cars, school drop offs, or where generally routes are unattractive. These were entered during the calibration phase of modelling and are described further in Section 4 of this report.

3.3.54 Gap acceptance has been altered on various links to enable vehicles to enter junctions more easily than the model was showing. Gap acceptance has been used where opposing traffic was felt to allow other movements to cross, and where no queuing was observed. Amendments to gap acceptance can also be justified when, in a congested network, vehicles are more willing to take smaller gaps than in an uncongested network. These were entered during the calibration phase of modelling, and are described in Section 4 of this report.

3.3.55 Mini roundabouts are coded as small 'true' roundabouts throughout the model. These roundabouts do not experience gridlock and appear to operate well. In accordance with Article 000039 SIAS, 'there are no official guidelines on the smallest roundabout, simply because it can be as small as you like' (Article 000039 SIAS).

3.4 Data Collection

3.4.56 An extensive traffic data collection exercise was undertaken. The traffic model has been built using 2008, 2009 and 2010 traffic survey data.

3.4.57 Origin and destination data was derived from the SATURN model, developed by Atkins. The methodology is described later in this section of the report.

3.4.58 The PARAMICS model has been updated to take account of amendments to the SATURN model as reported in the Hinkley Point Transport Model Validation Enhancement Technical note dated 8 January 2010.

3.4.59 Traffic signal timings were obtained from SCC in the form of plans of signalised junctions within Bridgewater showing stage and phase layouts. The cycle time and other timing information were taken from pie charts also provided by SCC.

3.4.60 Queue lengths were surveyed at many of the surveyed junctions as listed in Section 2 of this report.

3.4.61 Journey time information was collected on selected routes through the study area. The journey time information was collected in June 2008 (see **Appendix A.1** for original data) and March 2010 between 06:00 to 20:00 hours.

3.4.62 In addition, a number of detailed site visits have been undertaken within Bridgwater throughout the development of the PARAMICS model.

3.5 Model Zoning System

3.5.63 The model has a total of 61 zones covering the Bridgewater area. The zones were chosen by identifying the key links in the network and then key loading points into the modelled network. This included residential, industrial and commercial zones. A plan of the modelled network with zones is provided as Figure 3.

3.5.64 It was not deemed necessary to include a zone for housing linked to the Showground roundabout. This roundabout was modelled using available mapping, and did not include this link. No survey data was used directly at the roundabout, and residential trips would be accounted for from zone 30 (the Rhode Lane area) – between Broadway and the Showground roundabout. As junctions 15 and 24 (as shown on Figure 2a and 2b) have full classified surveys, it was felt that residential trips would be accounted for correctly between these two junctions, whether they are released from Rhode Lane or from the Showground roundabout.

3.6 Transport Modes

3.6.65 Separate matrices have been developed for different vehicle types, the proportions of which have been taken directly from the traffic survey data results. There is one matrix for cars and light goods vehicles and separate matrices for HGV's.

3.7 Time Periods

3.7.66 The model is split up into different time periods set out below;

- Period 1 – Shoulder Hour (0600-0700).
- Period 2 – AM pre peak (0700-0800).
- Period 3 – AM peak (0800-0900).
- Period 4 – AM post peak (0900-1000).
- Period 5 – (1000-1300).
- Period 6 – Afternoon hour (1300-1400).
- Period 7 – Afternoon hour (1400-1500).
- Period 8 – Afternoon hour (1500-1600).
- Period 9 – PM pre peak (1600-1700).
- Period 10 – PM peak (1700-1800).
- Period 11 – PM post peak (1800-1900).
- Period 12 – Shoulder hour (1900-2000).

3.7.67 The model starts at 06:00, when there is a very limited level of traffic experienced and therefore a warm-up period is not required. This is demonstrated in Figure 4 which shows total volumes of vehicles during the AM hours collated from ATC data at 23 sites.

3.7.68 The Hinkley Point C development will not generate a material amount of traffic during the hours of 10:00-1300 and therefore these hours have not been validated in the model. They merely act to provide a pre-loaded network for the afternoon hours. Therefore, during the period of 10:00-13:00 a demand of twice the PM peak hour of 17:00-18:00 was loaded to the model to allow for pre-loading for the 13:00-14:00 period.

3.7.69 The PARAMICS model's base year is 2009.

3.8 Matrix Development

3.8.70 The 2009 base matrices for the Hinkley Point PARAMICS model has been calculated using matrix estimation. The estimation process was informed with up-to-date surveys and origin destination data from the updated SATURN Hinkley Point traffic model.

3.8.71 Two matrices were calculated for each hour. One trip matrix was built for all cars, light good vehicles (LGVs) and medium good vehicles (MGVs) and one for heavy goods vehicles and public service vehicles (HGVs and PSVs).

3.8.72 The vehicle proportions used within each set of matrices was derived from the classified survey counts carried out in April 2009. These proportions are shown below in **Table 3.1**.

Table 3.1: Vehicle Type Proportions

Time	Matrix 1			Matrix 2	
	CAR	LGV	MGV	HGV	PSV
07:00	1614	498	125	84	16
07:15	2014	566	138	83	25
07:30	2524	600	178	93	48
07:45	3329	765	180	97	29
07:00-08:00	75.7%	19.4%	5.0%	75.2%	24.8%
08:00	3425	661	159	92	17
08:15	3747	530	158	87	29
08:30	3734	529	114	79	82
08:45	3364	494	124	89	82
08:00-09:00	83.7%	13.0%	3.3%	62.3%	37.7%
09:00	3232	509	163	87	72
09:15	2945	502	150	90	28
09:30	2553	498	126	96	31
09:45	2624	505	162	76	32
09:00-10:00	81.3%	14.4%	4.3%	68.2%	31.8%

Time	Matrix 1			Matrix 2	
	CAR	LGV	MGV	HGV	PSV
16:00	3348	523	138	80	62
16:15	3447	633	118	60	40
16:30	3706	603	90	63	40
16:45	3739	625	105	70	67
16:00-17:00	83.4%	14.0%	2.6%	56.6%	43.4%
17:00	4027	573	66	51	34
17:15	3983	562	66	65	32
17:30	3989	493	62	43	27
17:45	3539	402	61	67	37
17:00-18:00	87.2%	11.4%	1.4%	63.5%	36.5%
18:00	3383	384	36	56	39
18:15	3111	301	35	44	12
18:30	2863	291	36	38	26
18:45	2769	273	29	32	11
18:00-19:00	89.7%	9.2%	1.0%	65.9%	34.1%

3.8.73 Buses are included on specific bus routes. These were inputted with releases taken directly from timetables. The bus routes included are described below:

- 1: Rhode Lane – Bridgwater Town Centre – Parkway.
- 2: Woodbury Road – Bridgwater Town Centre – Mendip Road.
- 6: Bridgwater Town Centre – East Quay – Western Way.
- 14: Bridgwater Town Centre – Wembdon – Cannington.
- 21: North Petherton – Bridgwater Town Centre – Dunball.
- 23: Bridgwater Town Centre – Wembdon – Cannington.
- 375: Puriton – Bath Road – Bridgwater Town Centre.

3.8.74 Bus stops were inputted into the network as observed from timetables and information gathered from First Group Travel and Google Earth. A map of buses incorporated in the model is included in **Appendix A.2**.

3.8.75 Buses were removed directly from the HGV matrix (level 2) for each period, depending on the buses timetabled to be released during the period.

3.8.76 The methodology was to update the SATURN Hinkley Point matrices using the recently collected traffic surveys described in Section 2 of this report.

3.8.77 To output a matrix, survey data, highway network specifications, a cost matrix (Pija file) and a prior matrix is needed.

3.8.78 The model uses an iterative procedure similar to Wardrop's equilibrium to find a set of balancing factors for each counted link to ensure that the assigned flows match the surveyed counts within certain user defined limits.

3.9 Survey Files

3.9.79 The turning count and ATC data was used to produce two survey files for each period, and for light and heavy vehicles.

3.9.80 In total 357 separate turning movements and link counts were used in the survey file for each peak period.

3.10 Pija File

3.10.81 A cost matrix has been produced for the network.

3.10.82 A number of vehicles were released from each zone once the model was built. From this routing statistics were collected in the form of a Pija file. This was done on each iteration, every time the model was re-calibrated.

3.11 Prior Matrices

3.11.83 The PARAMICS prior matrix was constructed using the updated Hinkley Point SATURN model matrices. Each of the SATURN zones were allocated PARAMICS zones according to their geographic location in relation to Bridgewater and the modelled area. Two prior matrices were produced, for the AM and PM periods, for light and heavy vehicles. **Table 3.2** illustrates the allocation of zones in the PARAMICS model.

Table 3.2: Zone to Zone Allocation for Prior Matrices

SATURN	PARAMICS	SATURN	PARAMICS	SATURN	PARAMICS	SATURN	PARAMICS	SATURN	PARAMICS
67	25	126	21	174	20	318	43	616	61
69	25	127	21	175	20	319	43	617	8
70	25	128	21	176	20	320	43	618	7
71	25	129	21	177	20	321	43	619	65
72	25	130	21	178	20	322	43	621	10
73	25	131	21	179	20	323	41	622	41
74	25	132	25	180	20	324	41	623	11
76	25	133	25	181	22	325	41	625	11
79	25	134	26	182	20	326	65	626	11
85	25	135	29	183	20	327	65	628	21
87	25	136	25	184	20	328	65	630	63
89	25	137	25	186	29	329	10	633	9
90	25	138	1	187	29	330	30	634	23
91	25	139	1	189	29	331	30	635	29
92	25	140	1	190	29	332	30	636	23
93	25	142	1	191	29	333	40	637	29
95	25	143	22	192	29	334	56	638	29
96	25	144	25	193	25	335	38	639	29
97	25	145	25	201	25	336	34	655	101
98	25	146	25	202	26	337	5	657	8
99	25	147	25	203	25	338	4	732	41
100	25	148	25	204	25	339	3	733	9
101	25	149	22	205	25	340	5	734	19

SATURN	PARAMICS	SATURN	PARAMICS	SATURN	PARAMICS	SATURN	PARAMICS	SATURN	PARAMICS
102	25	150	25	206	25	341	5	736	29
103	25	151	25	207	25	342	58	737	29
104	25	152	25	208	25	343	57	738	29
105	25	153	25	209	25	344	36	739	21
106	25	154	25	210	25	345	104	749	57
107	29	155	25	211	25	346	45	750	45
108	25	156	25	301	12	347	32	751	61
109	25	157	25	302	7	348	61	752	24
110	25	158	25	303	11	349	61	800	1
111	29	159	22	304	8	350	24	801	2
112	29	160	22	305	101	351	23	802	48
113	29	161	22	306	102	352	14	803	49
114	26	162	20	307	16	353	56	804	2
115	22	163	20	308	17	354	44	805	25
116	22	164	20	309	52	355	33	806	1
117	21	165	20	310	54	356	14	807	1
118	103	167	20	311	19	357	13	808	25
119	21	168	20	312	63	358	40	809	25
120	51	169	22	313	55	359	9	810	25
121	9	170	25	314	18	415	25	811	25
123	27	171	51	315	59	613	8	812	25
124	105	172	20	316	64	614	36	813	2
125	20	173	20	317	43	615	59		

3.11.84 In Table 3.2 the highlighted PARAMICS zones 101 to 105 are dummy PARAMICS zones. These occur where a SATURN zone encompassed different areas of different land use, consequently, they were judged to have been required to split into several PARAMICS zones. These dummy PARAMICS zones were split during the process to formulate the prior matrices, and the proportions attributed to the relevant final PARAMICS zones are described in **Table 3.3** below.

Table 3.3: Proportion of SATURN Zone in New PARAMICS Zone

SATURN Zone	Dummy Zone	6	20	27	28	31	39	42	46	47	53	60
305	101	50%										50%
306	102					40%						60%
118	103				25%			62%	10%	3%		
345	104					50%					50%	
124	105		50%	50%								

3.11.85 The residential zones were highlighted within the PARAMICS model, and movements were zeroed for residential to residential movements. The prior matrix connected with HGVs contained no movements to or from residential zones.

3.11.86 Together the survey file, Pija file and prior matrix are inputted into the estimation module for each demand matrix in each period. The resulting estimated matrices are then validated and inputted into the base model for calibration and validation.

3.11.87 Constraints were used in the production of each demand matrix. When a zone was surveyed directly (for instance zone 20 – M5 southbound) the survey value was directly inputted as a value that the matrix estimation module should attain for its final zone demand (from and to the zone). A leeway of 75 light vehicles and 20 heavy vehicles, either way, was included during the matrix estimation procedure.

3.11.88 Where the SATURN zones represented closely the new PARAMICS zones, constraints were used in order to control the matrix estimation process by constraining to the prior matrix totals for the relevant zone. Constraints, using the prior matrix either side of the peak hour, used a factored prior matrix according to surveyed turning counts.

3.11.89 For periods 1,7,8, and 12, no SATURN data was available. The prior matrix was therefore created for each hour using existing prior matrices for AM and PM peak hours of 08:00-09:00 and 17:00-18:00 and factoring according to ATC surveys in close proximity. Constraints files were used to refine the matrix estimation process for each hour.

3.11.90 The final matrix validation statistics can be seen in Section 4 of this report.

3.12 Demand Profiles

3.12.91 In total, 34 profiles were produced – 17 for the light vehicles matrix, and 17 for the heavy goods matrix. Of these profiles, 16 for each matrix were calculated from the 15 minute surveyed turning counts and inputted directly. These profiles release vehicles from the relevant zones as they were surveyed.

3.12.92 Profiles were smoothed, if calculated as staggered, to ensure increase/decreases between five minute intervals were gradual.

3.12.93 The remaining profile, for each matrix, was left as flat and then calibrated to achieve an appropriate level of validation in queues, journey paths and turning counts. This is explained in more detail in Section 4 of this report.

3.13 Assignment

3.13.94 Stochastic dynamic feedback assignment has been used in this model. Stochastic assignment is referred to as all or nothing assignment, which is just a function of time, and distance with the addition of perturbation (some random route selection). The dynamic feedback responds to delay caused by congestion in the model, therefore as certain routes become more congested vehicles recognise this and change routes leading to more realistic route choice.

3.13.95 Vehicle release profiles were developed from 15 minute traffic surveys. This informed the model of when to release vehicles during the peaks. This profile had to be smoothed out to remove any large rises or falls, a normal process with this size of model.

3.14 Collecting Results and Outputs from the Model

3.14.96 One important parameter that can be altered in PARAMICS is the speed or rate of simulation. SIAS recommends that a PARAMICS model should be run at a simulation rate of 2 when recording data. This simulation rate is in fact a time-step, and a rate of 2 means there are two time steps per second. This means that the time step is equal to 0.5 seconds.

3.14.97 PARAMICS has been calibrated by SIAS with the default of 0.5 second time steps. A step longer than 0.5 seconds is effectively longer than a driver's reaction time and therefore can compromise the simulation. Therefore, when recording log runs the simulation rate was always set to 2 steps per second.

3.14.98 The other main parameters that govern vehicle behaviour, etc., have not been changed. The default characteristics have therefore been used throughout.

3.15 Multiple Model Runs

3.15.99 The model was run 10 times in both peaks with random vehicle release. Data was taken from each of these runs to verify the compliance and stability of the network. 3.16 Model Variance 3.16.1 In order to assess how may model runs where needed to make the results statistically significant a test was undertaken.

3.15.100 The calculation assumes that the model runs are normally distributed around a mean, this can be assumed because the model doesn't physically change during model runs and therefore is a constant. The calculation should be performed on the journey path that displayed the most variance i.e. path 2 SB and is as follows:

$$n_r = \frac{S^2 Z^2 \alpha / 2}{\varepsilon^2}$$

Mean delay = 1288 s
S2 of this data = 37332 s
s = 193 s
α = 0.05 (corresponds with 95% confidence)
α /2 = 0.025 (corresponds with 95% confidence)
Z = 1.96 from statistical table)
e =20 seconds (based on reasonable error of delay estimate

$$n_r = \frac{S^2 Z^2 \alpha / 2}{\varepsilon^2} = \frac{933.2*(1.96^2)}{400} = 8.96$$

3.15.101 In conclusion, it has been calculated that 8.96 runs were required in order to establish an estimate for journey time with a 20 second allowable error and a 95% level of confidence, this shows that 10 runs is robust. The detailed results are shown in **Table 3.4** and **Table 3.5**.

Table 3.4: Average Journey Time 2 Southbound in each run

Period	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10
Period 1	563	570	564	561	567	566	563	560	570	567
Period 2	675	676	690	689	694	696	675	679	664	671
Period 3	825	743	785	791	774	779	789	818	778	785
Period 4	678	649	651	647	647	650	646	651	651	655
Period 6	638	645	634	636	633	641	642	638	636	631
Period 7	663	669	652	646	662	662	660	649	662	653
Period 8	715	730	748	763	733	738	767	749	715	723
Period 9	868	857	775	847	784	864	874	820	852	891
Period 10	1363	1302	1333	1087	1436	1137	1071	1640	1069	1443
Period 11	774	784	801	704	864	762	695	810	771	800
Period 12	531	528	519	514	514	518	517	524	525	545

Table 3.5: Average Journey Time 2 Southbound in Each Run

Period	s^2 (Variance)	s (SD)	Mean	α (95% confidence level)	$\alpha/2$	Z (from statistics table)	ε (reasonable error margin seconds)	N (Number of runs required)
Period 1	12	3	565	0.050	0.025	1.96	20	0.00
Period 2	114	11	681	0.050	0.025	1.96	20	0.03
Period 3	520	23	787	0.050	0.025	1.96	20	0.12
Period 4	85	9	652	0.050	0.025	1.96	20	0.02
Period 6	20	4	637	0.050	0.025	1.96	20	0.00
Period 7	54	7	658	0.050	0.025	1.96	20	0.01
Period 8	339	18	738	0.050	0.025	1.96	20	0.08
Period 9	1472	38	843	0.050	0.025	1.96	20	0.35
Period10	37332	193	1288	0.050	0.025	1.96	20	8.96
Period 11	2458	50	777	0.050	0.025	1.96	20	0.59
Period 12	90	10	523	0.050	0.025	1.96	20	0.02

4. MODEL CALIBRATION AND VALIDATION

4.1 Introduction

4.1.102 This section summarises the network validation; the trip matrix validation; the modelled flows validation; and the calibration made to achieve acceptable levels of validation.

4.1.103 A CD accompanies the LMVR which contains all log runs, the validated model, and spreadsheets which include surveyed and modelled flow diagrams with queues and turning counts.

4.1.104 Three hours have been validated for both the AM and PM peaks. The modelled periods 6 to 8 cover the hours 16:00-19:00 and the periods 2 to 4 cover the hours of 07:00-10:00. Individual outputs are included later in this section of the report.

4.1.105 The Department for Transport sets various validation criteria that must be met before a transport model can be said to be representing base conditions to an acceptable standard. These criteria are set out in the Department's Design Manual for Roads and Bridges (DMRB). They key requirements are that a good comparison is achieved between observed and modelled flows across the study area. Volume 12 of the DMRB section 11.1.5 states:

> *'When presenting validation evidence, the estimated accuracy of the observations with which model estimates are compared should always be quoted, that of model estimates being included where available. The inclusion of the estimated accuracy will allow meaningful conclusions to be drawn (e.g. the mean of the model estimate lies within the 95% confidence interval of the independent observation). When two estimates of the same quantity are presented without any information on the accuracy of either, a meaningful conclusion may be impossible (e.g. if A = 10,000 and B = 11,000 then A and B are not equal but are not too different either and may well be valid estimates of the same quantity). To judge a model by its suitability for an intended use requires clear thinking about the intended use. The accuracy of any model, indeed even count data, cannot be expected to represent reality except within a range or tolerance. Moreover, in most cases it is not necessary to go to great lengths to reduce that range and seek greater precision. What is important is to ensure: i) that the degree of accuracy is adequate for the decisions which need to be taken; ii) that the decision makers understand the quality of the information with which they are working; and iii) that they take the inherent uncertainties into account in reaching decisions. The tailoring of a model to produce output for a specific purpose is a theme of this manual, together with the recognition that some elements of a model have little bearing on its intended use and their accuracy is almost irrelevant to any decision concerned with suitability.'*

4.1.106 This extract highlights the fact that it is important to achieve a good validation at key areas in the model and that it should be recognised that areas that are not key, i.e. on the outskirts of the model, may be immaterial in terms of appropriateness.

4.1.107 Model calibration is the process of tuning and refining the input data and parameters within the model in order to agree with real observed data, and thus provide a tool which is reliable for forecasting.

4.1.108 As part of the calibration process the comments raised in the JMP review as reported on 21 December 2010 has been taken into account. In addition, further comments received from JMP dated 04 December 2010 have been included within the LMVR.

4.1.109 Items raised that were considered, but not implemented, are described below:

- Mini roundabouts were continued to be modelled as 'true' roundabouts (see paragraph 3.12 for further explanation).
- The Showground roundabout was not altered to take account of access to Stockmoor Village (see paragraph 3.22 for explanation).

4.1.110 Model validation is the process of comparing the results of the model with independent observed data.

4.1.111 The turning counts and ATCs have been used in the calibration process, and queue lengths and journey paths have been used as independent data for validation.

4.1.112 It should be noted that all the validation outputs have been taken from an average of 10 runs. This means that the model was run five times for each period then the average was taken. Whilst this is time consuming it ensures that any variation between runs is taken into account. At the outset the model was run 10 times for each period to check if it had too much variation and it was found to be stable. All the results in this section bar the matrix estimation tables are taken from an average of five runs for each time period.

4.1.113 The 'validation' criteria used in the calibration is set out below.

4.2 Flow Criteria

4.2.114 For the match between observed and modelled flows to be considered acceptable the following criteria should be met:

- Over 85% of modelled flows are required to have a GEH value of less than 5. The GEH value is a form of the CHI squared test and shows the goodness of fit.

  It is defined as:

$$GEH = \sqrt{\frac{(M-O)^2}{(M+O)/2}}$$

Where - M is the modelled flow and
O is the observed flow

- At least 85% of modelled flows should meet the requirements in one of the following:
  - Individual flows within 100 vph for flows under 700 vph. **(low flows)**

- Individual flows within 15% for flows of 700-2700 vehicles per hour (vph).**(mid flows)**
- Individual flows within 400 vph for flows above 2700 vph.**(high flows)**

4.3 Network Calibration

4.3.115 The calibration and validation of the network was carried out using the following checks;

- Range checks – The characteristics of each link was checked to make sure that they fell within the ranges appropriate to that link's classification, e.g. speed etc.
- Link Length – The link lengths were validated as the model was being built, as a scale drawing of the town centre was used as a base input and overlay in the model build.
- Route checking – The route choice through the network was checked using the routeing display control dialog in PARAMICS. The routes observed were sensible and logical.

4.4 Network Coding Alterations

4.4.116 As mentioned in Section 3, there were coding alterations made in order to calibrate the network. Added link costs changes from default are highlighted in Table 4.1.

Table 4.1: Description of Link Costs

Location	Link	Cost factor	Justification
All Saints Terrace	677 763 677 452 763 677 452 677	2.0	Highly residential – less major access to Colley Lane than Salmon Parade
East Quay – ASDA and bus station	174 177 177 180 177 174 181 282 181 182 182 183 182 181 183 777 183 182 282z 180 282z 181 180c 282z 180d 177	2.0	Heavy retail area – preventing through routing

Location	Link	Cost factor	Justification
Northfield	87 96 87 517 96 97 96 87 97 98 97 96 98 210 98 97 210 98	2.0	Narrow, parked cars and slow moving traffic due to schools – prevent as through route
Northgate Bridge	127 128 128 127	2.0	Very narrow one lane at a time only bridge
St John's Road	452 784 784 452	2.0	Parked cars and bus stops
Salmon Parade	506 777 517 87 777 506 777 183	2.0	Parked cars and narrow road
Wellington Road Rail Station	565 452 452 565	2.0	Station car park
Wembdon Rise	43 486 470 471 470 490 471 472 471 470 472 473 472 471 473 474 473 472 474 475 474 473 475 476 475 474 476 477 476 475 477 478 477 476 478 479 478 477 479 480 479 478 480 481 480 479 481 482 481 480 482 645 482 483 482 481 483 484 483 482 484 483	1.5	Highly residential area. Compared to Quantock Road, clearly not a through route

Location	Link	Cost factor	Justification
	484 485 485 486 485 484 486 43 486 485 487 538 488 490 490 470 490 488 645 482 646 645 538 487		

4.5 Matrix Estimation Results

4.5.117 The following is a summary of the matrix estimation results for the AM and PM peaks. The tables cover each of the modelled periods. Tables 4.2 to 4.13 shows the validation statistics for each matrix (two matrices for each peak).

Table 4.2:Period 2 Lights -07:00-08:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	97%	97%	93%	-	98%	99%	100%	-
Fail	12	11	1	0	6	6	0	0
Pass	345	332	13	0	351	337	14	0
Total	357	343	14	0	357	343	14	0

Table 4.3: Period 2 Heavies -07:00-08:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	0	0	0	0	0	0	0	0
Pass	357	357	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.4: Period 3 Lights -08:00-09:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	98%	98%	100%	-	99%	99%	100%	-
Fail	7	7	0	0	4	4	0	0
Pass	350	330	20	0	353	333	20	0
Total	357	337	20	0	357	337	20	0

Table 4.5: Period 3 Heavies -08:00-09:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	100%	100%	-	-	
Fail	0	0	0	0	0	0	0	0
Pass	357	357	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.6: Period 4 Lights -09:00-10:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	99%	99%	-	-	100%	100%	-	-
Fail	2	2	0	0	0	0	0	0
Pass	355	355	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.7: Period 4 Heavies -09:00-10:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	99%	99%	-	-	100%	100%	-	-
Fail	2	2	0	0	0	0	0	0
Pass	355	355	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.8: Period 9 Lights -16:00-17:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	98%	98%	100%	-	99%	99%	100%	-
Fail	6	6	0	0	2	2	0	0
Pass	351	333	18	0	355	337	18	0
Total	357	339	18	0	357	339	18	0

Table 4.9: Period 9 Heavies -16:00-17:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	0	0	0	0	0	0	0	0
Pass	357	357	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.10: Period 10 Lights -17:00-18:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	95%	95%	96%	-	96%	96%	100%	-
Fail	19	18	1	0	13	13	0	0
Pass	338	313	25	0	344	318	26	0
Total	357	331	26	0	357	331	26	0

Table 4.11: Period 10 Heavies -17:00-18:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	99%	99%	-	-	100%	100%	-	-
Fail	2	2	0	0	0	0	0	0
Pass	355	355	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.12: Period 11 Lights -18:00-19:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	99%	99%	100%	-	100%	100%	100%	-
Fail	5	5	0	0	1	1	0	0
Pass	352	339	13	0	356	343	13	0
Total	357	344	13	0	357	344	13	0

Table 4.13: Period 11 Heavies -18:00-19:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	1	1	0	0	0	0	0	0
Pass	356	356	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

4.5.118 **Table 4.2** to **Table 4.13** show that all periods meet the DMRB criteria for matrix estimation, with period 4 lights scoring the lowest validation of 97%.

4.5.119 The spreadsheet outputs, which show the full-calculated validation output for matrix estimation, are shown at **Appendix A.3**.

4.6 Comparison of observed and modelled flows

4.6.120 The estimated matrices were input into the model and then the observed surveyed flows were compared to the new modelled output. The DMRB validation criteria was used to analyse the closeness of fit between the two data sets.

4.6.121 **Table 4.14** to **Table 4.24** provide a summary of the comparison between the observed counts and the modelled counts for all periods.

4.6.122 The three columns on the left of each table summarise the GEH results for the different flow groups, low being less than 700vph and mid being between 700vph and 2500vph and high being over 2500vph.

4.6.123 The three columns on the right of the table show the DMRB values test results summary for the same three flow groups. The DMRB value criterion requests flows to be within 100vph for low values, within 15% for mid values, no values fall within the high flow group for this model.

Table 4.14: Period 1 All Vehicles -06:00-07:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	97%	98%	80%	-	98%	98%	80%	-
Fail	5	4	1	0	4	3	1	0
Pass	171	167	4	0	172	168	4	0
Total	176	171	5	0	176	171	5	0

Table 4.15: Period 2 All Vehicles -07:00-08:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	96%	96%	88%	-	98%	99%	94%	-
Fail	16	14	2	0	6	5	1	0
Pass	341	327	14	0	351	336	15	0
Total	357	341	16	0	357	341	16	0

Table 4.16: Period 3 All Vehicles -08:00-09:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	93%	93%	96%	-	96%	96%	96%	-
Fail	25	24	1	0	13	12	1	0
Pass	332	310	22	0	344	322	22	0
Total	357	334	23	0	357	334	23	0

Table 4.17: Period 4 All Vehicles -09:00-10:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	93%	93%	100%	-	97%	97%	100%	-
Fail	24	24	0	0	12	12	0	0
Pass	333	319	14	0	345	331	14	0
Total	357	343	14	0	357	343	14	0

Table 4.18: Period 6 All Vehicles -13:00-14:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	95%	96%	94%	-	97%	98%	81%	-
Fail	11	10	1	0	8	5	3	0
Pass	232	217	15	0	235	222	13	0
Total	243	227	16	0	243	227	16	0

Table 4.19: Period 7 All Vehicles -14:00-15:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	95%	95%	93%	-	98%	98%	93%	-
Fail	13	12	1	0	5	4	1	0
Pass	230	216	14	0	238	224	14	0
Total	243	228	15	0	243	228	15	0

Table 4.20: Period 8 All Vehicles -15:00-16:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	87%	88%	76%	-	91%	92%	76%	-
Fail	31	27	4	0	23	19	4	0
Pass	212	199	13	0	220	207	13	0
Total	243	226	17	0	243	226	17	0

Table 4.21: Period 9 All Vehicles -16:00-17:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	91%	91%	86%	-	94%	94%	100%	-
Fail	33	30	3	0	20	20	0	0
Pass	324	305	19	0	337	315	22	0
Total	357	335	22	0	357	335	22	0

Table 4.22: Period 10 All Vehicles -17:00-18:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	91%	91%	100%	-	96%	96%	93%	-
Fail	28	28	0	0	14	13	1	0
Pass	288	273	15	0	302	288	14	0
Total	316	301	15	0	316	301	15	0

Table 4.23: Period 11 All Vehicles -18:00-19:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	94%	94%	92%	-	96%	96%	100%	-
Fail	21	20	1	0	14	14	0	0
Pass	336	324	12	0	343	330	13	0
Total	357	344	13	0	357	344	13	0

Table 4.24: Period 12 All Vehicles -19:00-20:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	97%	96%	100%	-	100%	100%	100%	-
Fail	6	6	0	0	0	0	0	0
Pass	170	161	9	0	176	167	9	0
Total	176	167	9	0	176	167	9	0

4.6.124 Overall the model validates to a high degree over all periods with the lowest validation percentage occurring in period 8, 15:00-16:00 hours of 87% GEH less than 5.

4.6.125 **Appendix A.4** shows all modelled and surveyed turn and link counts for each period along with the absolute difference, percentage difference and whether it passes the GEH test and values test (mainly being within 100 for low flows or within 15% for mid flows).

4.7 Journey Time Validation

4.7.126 The modelled journey times were compared with observed journey times and validated against the DMRB criteria. DMRB states that modelled journey times should all be within 15% or if not then within one minute of the observed journey times.

4.7.127 The journey paths are described below and shown at Figure 5:

- Journey Path 1 – Bristol Road/Express Way roundabout – Bristol Road – Wylds Road – Western Way – Quantock Road/Quantock Meadow roundabout.
- Journey Path 2 – A38/A39 roundabout – Bristol Road – Bristol Road/Bath Road/Monmouth Street roundabout – Broadway – Taunton Road – Taunton Road/Access to M5 roundabout.
- Journey Path 3 – Bath Road/Puriton– Bristol Road/Bath Road/Monmouth Street roundabout – The Clink – Northgate – North Street – Wembdon Road – Quantock Road/Quantock Meadow roundabout – Quantock Road – New Road/Sandford Hill.

- Journey Path 4 – Westonzoyland Road/Bower Lane – St John Street – Broadway – North St – Wembdon Rise – Quantock Road/Quantock Meadow roundabout – Wembdon Rise – New Road/Sandford Hill.
- Journey Path 5 – Bristol Road/Wylds Road – The Drove – East Quay – Eastover – St John Street/Westonzoyland Road.

4.7.128 Journey time surveys were carried out in accordance with the DMRB moving observer methodology from stop line to stop line. The journey time information for 07:00 to 10:00 hours and 16:00 to 18:00 hours was collected in June 2008 (see **Appendix A.1** for original data). Journey time data was also collected from 0600 to 2000 hrs in March 2010. Where possible both sets of journey path times have been used to create the observed timings.

4.7.129 All sections of each journey path have a varied number of surveyed runs within each period. As many runs were done as physically possible during the surveyed periods.

4.8 Journey Time Graphs

4.8.130 **Appendix A.5** shows graphs for each journey path with the x-axis as distance in metres and the y-axis as time in seconds. The graphs have four lines; dark blue is the model output, pink is the survey output, light blue is the lower confidence limit, and yellow is the higher confidence limit. The points on each line refer to the journey path points shown below.

Journey Path Points

4.8.131 The graphs show a good fit between modelled and observed journey time profiles.

4.8.132 **Table 4.25** and **Table 4.26** summarise the am and pm period journey times for all five paths, comparing modelled journey times to observed journey times using DMRB criteria.

Table 4.25: Journey Time Paths Modelled and Observed Average Times (Secs)

	Period	Time	1SB	1NB	2SB	2NB	3WB	3EB	4WB	4EB	5SB	5NB
Observed	1	0600-0700	323	344	556	493	521	511	240	276	341	293
	2	0700-0800	351	362	620	686	591	529	343	305	340	311
	3	0800-0900	346	387	782	752	736	646	416	333	352	384
	4	0900-1000	364	368	767	754	573	640	341	333	390	407
	6	1300-1400	363	395	701	736	627	653	387	318	383	416
	7	1400-1500	396	348	764	792	681	657	458	317	338	394
	8	1500-1600	489	361	844	839	958	593	578	350	492	516
	9	1600-1700	379	393	777	822	809	820	442	509	505	428
	10	1700-1800	489	423	1342	1107	743	693	478	529	736	483
	11	1800-1900	343	319	689	886	559	525	432	310	388	282
	12	1900-2000	325	326	636	685	501	572	371	322	347	374

	Period	Time	1SB	1NB	2SB	2NB	3WB	3EB	4WB	4EB	5SB	5NB
Modelled	1	0600-0700	297	336	564	563	503	505	326	252	297	319
	2	0700-0800	325	353	677	644	570	537	344	285	326	331
	3	0800-0900	361	391	785	805	777	651	445	325	364	387
	4	0900-1000	327	348	661	675	620	582	397	284	352	378
	6	1300-1400	321	356	637	653	575	559	396	293	325	390
	7	1400-1500	364	336	658	730	612	568	461	305	338	404
	8	1500-1600	448	370	758	867	722	579	575	327	498	514
	9	1600-1700	374	393	808	828	774	804	506	413	580	410
	10	1700-1800	473	463	1352	1009	742	795	470	536	767	534
	11	1800-1900	355	338	785	916	590	589	472	328	387	336
	12	1900-2000	300	332	589	590	521	532	370	267	315	321

4.8.133 The modelled journey times are an average over ten log runs, whereas the surveyed journey times are taken on one day. The DMRB states that over 85% of journey times should be within 15% or one minute.

Table 4.26: Journey Time Paths Summary Observed Minus Modelled

	Period	Time	1SB	1NB	2SB	2NB	3WB	3EB	4WB	4EB	5SB	5NB
ABS difference	1	0600-0700	26	8	-9	-71	18	6	-86	24	44	-26
	2	0700-0800	25	9	-57	41	22	-8	-1	20	14	-20
	3	0800-0900	-15	-4	-3	-53	-41	-6	-29	7	-12	-2
	4	0900-1000	37	20	106	79	-47	58	-56	49	39	29
	6	1300-1400	42	39	64	83	52	94	-9	25	58	27
	7	1400-1500	32	12	106	61	68	89	-2	12	0	-9
	8	1500-1600	40	-9	86	-28	236	14	4	24	-6	2
	9	1600-1700	4	-1	-31	-6	35	16	-64	96	-75	18
	10	1700-1800	16	-41	-10	98	1	-102	7	-7	-31	-51
	11	1800-1900	-12	-19	-96	-30	-31	-64	-40	-17	1	-54
	12	1900-2000	25	-6	47	95	-20	40	1	56	32	53
% difference	1	0600-0700	8%	2%	-2%	-14%	3%	1%	-36%	9%	13%	-9%
	2	0700-0800	7%	2%	-9%	6%	4%	-2%	0%	7%	4%	-6%
	3	0800-0900	-4%	-1%	0%	-7%	-6%	-1%	-7%	2%	-3%	-1%
	4	0900-1000	10%	6%	14%	10%	-8%	9%	-17%	15%	10%	7%
	6	1300-1400	12%	10%	9%	11%	8%	14%	-2%	8%	15%	6%
	7	1400-1500	8%	3%	14%	8%	10%	14%	-1%	4%	0%	-2%
	8	1500-1600	8%	-3%	10%	-3%	25%	2%	1%	7%	-1%	0%
	9	1600-1700	1%	0%	-4%	-1%	4%	2%	-14%	19%	-15%	4%
	10	1700-1800	3%	-10%	-1%	9%	0%	-15%	1%	-1%	-4%	-11%
	11	1800-1900	-3%	-6%	-14%	-3%	-5%	-12%	-9%	-6%	0%	-19%
	12	1900-2000	8%	-2%	7%	14%	-4%	7%	0%	17%	9%	14%

4.8.134 The highlighted cells show the three cells that failed the DMRB criteria.

4.8.135 The results show that all 11 periods pass the DMRB validation criteria with the lowest score being 90% validation and 8 out of 11 periods scoring 100% validation.

4.8.136 Out of 110 journey path measurements across the whole model timeframe (from 0600-2000) only 3 fail the DMRB criteria and 97% of the measurements pass.

4.8.137 Whilst 97% of the measurements pass the criteria, further investigation into the 3% that fail has been undertaken and is set out below.

4.9 Route 3 Westbound 15:00-16:00 hours

4.9.138 Journey path route 3 westbound fails in period 8, 15:00-16:00hrs. This path has a modelled time that is 25% less than the observed time during 15:00-16:00hrs, a total difference of 236 seconds or three minutes.

4.9.139 **Table 4.27** examines the journey times for each segment of the route 3 westbound during 15:00-16:00hrs. **Table 4.27** clearly shows the sections of route where the model is underestimating.

4.9.140 During this period, the model underestimates how long it takes to get from point 23 to point 15 and from point 32 to point 35 (refer to para 4.30 for timing point reference).

4.9.141 One observed journey time run was used in the analysis for this particular path and time period. It was taken at 15:26 in March 2010 as the June 2008 surveys did not cover the hour of 15:00-16:00 hours.

Table 4.27: Route 3 Westbound 1500-1600hrs

From	To	Modelled Times(s)	Observed Times(s)	Difference(s)
A39 Bath Rd/Crancombe Lane	A39 Bath Rd/A39 Puriton Hill, Knowle	38	37	-1
A39 Bath Rd/ A39 Puriton Hill, Knowle	A39 Bath Rd/Bower Lane	120	139	19
A39 Bath Rd/ Parkway	A39 Bath Rd/ A38 Bristol Rd/The Clink	170	292	122
A39 Bath Rd/ A38 Bristol Rd/ The Clink	The Clink/ The Leggar (Retail Park Access)	29	27	-2
The Clink/ The Leggar (Retail Park Access)	The Clink/East Quay	142	76	-66
The Clink/ East Quay	The Clink/Northgate	36	67	31
The Clink/ Northgate	Mount Street/ Northgate/ Castle Moat	17	20	3
Mount Street/ Northgate/ Castle Moat	Mount Street/ Northgate/ Penel Orlieu Rdbt	34	138	104
Mount Street/ Northgate/ Penel Orlieu Rdbt	Penel Orlieu/ North St/ Broadway/West St	58	62	3
Penel Orlieu/ North St/ Broadway/West St	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	18	19	1
North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	A39 Quantock Rd/ Wembdon Rd	25	42	16

4.10 Route 4 Westbound 06:00-07:00 Hours

4.10.142 Journey path route 4 westbound fails in period 1, 06:00-07:00hrs. This path has a modelled time that is 36% more than the observed time in this period, a total difference of 86 seconds or 1.45 minutes.

4.10.143 **Table 4.28** examines the journey times for each segment of the route 4 westbound during 06:00-07:00hrs. The table clearly shows the sections of route where the model is overestimating.

4.10.144 Again, only one observed journey time run was used in the analysis for this particular path and time period. It was taken at 06:43 in March 2010 as the June 2008 surveys did not cover the hour of 06:00-07:00 hours.

4.10.145 During this period, the largest overestimation of journey time occurs from point 6 to point 36, a total of 28 seconds.

Table 4.28: Route 4 Westbound 0600-0700hrs

From	To	Modelled Times(s)	Observed Times(s)	Difference(s)
A372 Westonzoyland/ Saints Terrace (Colley Lane)	A372 St John Street/ Polden St/Cranleigh Gardens	32	26	-6
A372 St John Street/ Polden St/Cranleigh Gardens	A38 Monmouth St/ A372 St John Street	38	39	1
A38 Monmouth St/ A372 St John Street	A38 Broadway/ Salmon Parade/Cranleigh Gardens	40	30	-11
A38 Broadway/Salmon Parade/Cranleigh Gardens	A38 Broadway/ Taunton Rd	38	22	-16
A38 Broadway/ Taunton Rd	Broadway/ Safeway + B&Q Access	31	19	-12
Broadway/ Safeway + B&Q Access	North St/West St/ Broadway/ Penel Orlieu	60	36	-24
North St/West St/Broadway/ Penel Orlieu	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/North St Rdbt	14	22	8
A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	A39 Wembdon Rd/Northfield	73	47	-26

4.11 Route 4 Eastbound 16:00—17:00 Hours

4.11.146 Journey path route 4 eastbound fails in period 9, 1600-1700hrs. This path has a modelled time that is 23% less than the observed time in this period, a total difference of 96 seconds or 1.6 minutes.

4.11.147 Table 4.29 examines the journey times for each segment of the route 4 eastbound during 16:00-17:00hrs. Table 4.29 clearly shows the sections of route where the model is underestimating.

4.11.148 In total five observed journey time runs were used in the analysis for this particular, path and time period. The observed runs were taken at 16:59, 16:14, 16:42 and 16:27 in June 2008 (see **Appendix A.1** for original data).

4.11.149 During this period, the largest underestimation of journey time occurs from point 27 to point 14, a total of 45 seconds. This model is therefore underestimating the delay on the western arm of the A372 Westonzoyland/Parkway junction during 1600-1700.

Table 4.29: Route 4 Eastbound 1600-1700hrs

From	To	Modelled Times(s)	Observed Times(s)	Difference(s)
Wembdon Rd/ A39 Quantock Rd	A39 Wembdon Rd/Northfield	30	42	12
A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/North St Rdbt	North St/ West St/ Broadway/Penel Orlieu	39	61	22
North St/ West St/ Broadway/Penel Orlieu	Broadway/ Safeway + B&Q Access	54	35	-19
Broadway/ Safeway + B&Q Access	A38 Broadway/ Taunton Rd	64	70	6
A38 Broadway/ Taunton Rd	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	69	92	23
A38 Broadway/ Salmon Parade/ Cranleigh Gardens	A372 St John Street/ Polden St/ Cranleigh Gardens	98	95	-3
A372 St John Street/ Polden St/ Cranleigh Gardens	A372 Westonzoyland/ Saints Terrace (Colley Lane)	32	43	11
A372 Westonzoyland/ Saints Terrace (Colley Lane)	A372 Westonzoyland/ Parkway	26	71	45

4.12 Queue Length Validation

4.12.150 Each log run output from PARAMICS contains route queue summary information. The queue information contains maximum queues per lane in five minute time segments. The maximum queues in each 5 minutes time segment has been averaged for each hour.

4.12.151 PARAMICS recognises a queue when the following characteristics are satisfied:

- A vehicle is queued when its speed drops below 4.5 mph and the gap in front drop below 10m.
- A vehicle is no longer queued when either its speed rises above 7 mph or the gap in front rises above 15m.

4.12.152 The observed queues were counted using the same parameters as above. The observed maximum queues for each 5 minute time segment have been averaged over each hour and compared to the modelled average maximum queues for each hour. The results are shown in **Table 4.30** and **Table 4.31**. The modelled and observed queues can be seen on the CD accompanying this report.

4.12.153 Only queues observed in the model and recorded are shown in the results. Where an observed average queue was not able to be determined due to queues that extended beyond the sightline of the queue surveyor, an ‘X’ is recorded.

4.12.154 As key junctions of interest the results for the M5 junctions 23 and 24 have been highlighted in yellow for easy reference.

Table 4.30: Queue Survey Results for AM Peak 0800-0900, Observed versus Modelled

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	1a	A39/High Street Cannington roundabout	From Cannington	1	0	2	-1
2	1a		From Cannington	1	1	0	0
1	1b		A39 Eastbound	1	0	2	-1
2	1b		A39 Eastbound	2	1	1	-1
1	1c		A39 Westbound	0	0	1	0
2	1c		A39 Westbound	1	0	1	-1
1	3a	A39/Main Road, Cannington	Main Road	2	3	1	1
2	3a		Main Road	0	0	0	0
1	3b		A39 Eastbound	0	1	2	1
2	3b		A39 Eastbound	4	3	1	-1
1	3c		A39 Westbound	0	0	0	0
2	3c		A39 Westbound	0	1	1	1
1	4c	A39/B3339	A39 Northbound	0	0	0	0
1	4d		Sandford Hill Southbound	1	0	1	-1
1	4e		Sandford Hill Northbound	2	0	2	-2
1	5a	A39/Quantock Meadow/ B3339 roundabout	Quantock Meadow	1	1	0	0
2	5a		Quantock Meadow	0	0	0	0
1	5b		A39 Eastbound	3	0	2	-2
2	5b		A39 Eastbound	4	2	1	-1
1	5c		A39 Westbound	2	3	1	2
2	5c		A39 Westbound	2	0	2	-2
1	5d		B3339	6	6	0	0
2	5d		B3339	5	2	1	-2
1	6a	B3339/Wembdon Rise	Sandford Hill	9	8	0	-1
1	6b		B3339	11	8	1	-3
1	6c		Western Way	14	6	3	-8
2	6c		Western Way	5	2	2	-4
1	7b	A39 Wembdon Road/Northfield	A39 Westbound	0	0	1	0
1	7c		Wembdon Road	1	2	0	1
2	7c		Wembdon Road	0	0	1	0

Lane	Survey Code	Junction	Arm	AM			
				AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	8a	A39/Northfield	A39 Eastbound	3	8	2	5
1	8b		Northfield	1	2	0	0
1	8c		A39 Westbound	0	0	0	0
1	9a	Durleigh Road/ Northfield	West St	1	2	1	1
1	9b		Northfield	2	3	1	1
1	9c		Durliegh Road	1	0	2	-1
1	10a	Western Way/ Feversham Avenue	Western Way Southbound	0	0	0	0
1	10b		Western Way Northbound	0	0	1	0
1	10c		Feversham Avenue	1	2	0	0
1	11a	North Street/ Alexandra Road	North Street	0	3	2	2
2	11a		North Street	1	1	0	0
1	11b		Alexandria Road	5	9	2	4
1	11c		A39 Eastbound	1	4	2	3
2	11c		A39 Eastbound	9	7	1	-2
1	12a	Broadway/ WestStreet/ Penel Orlieu	A39 Eastbound	15	10	1	-5
2	12a		A39 Eastbound	14	4	3	-10
1	12b		West Street	8	14	2	6
2	12b		West Street	15	6	3	-9
1	12c		A39 Westbound	4	7	1	2
2	12c		A39 Westbound	10	5	2	-5
3	12c		A39 Westbound	6	5	0	-1
1	12d		Penel Orlieu	7	9	1	3
2	12d		Penel Orlieu	3	4	1	1
1	14a	Kendale Road/ Chilton Street	Chiltern Street	0	0	1	0
1	14b		Kendale Road	1	0	1	-1
1	14c		Russell Place	1	0	1	-1

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	15a	A39 Broadway junction with A38 Taunton Road	Taunton Road Southbound	7	3	2	-4
1	15b		A39 Eastbound	12	8	1	-4
2	15b		A39 Eastbound	7	0	4	-7
3	15b		A39 Eastbound	20	14	2	-6
1	15c		Taunton Road Northbound	X	20	0	X
2	15c		Taunton Road Northbound	X	26	0	X
3	15c		Taunton Road Northbound	X	5	0	X
1	15d		A39 Westbound	8	9	0	1
2	15d		A39 Westbound	8	15	2	7
3	15d		A39 Westbound	2	3	0	1
1	16a	East Quay/The Clink	East Quay Southbound	0	4	3	4
2	16a		East Quay Southbound	4	3	1	-1
3	16a		East Quay Southbound	5	0	3	-5
1	16b		The Clink Eastbound	12	8	1	-4
2	16b		The Clink Eastbound	2	2	0	-1
1	16c		East Quay Northbound	6	8	1	2
2	16c		East Quay Northbound	2	2	0	0
1	16d		The Clink Westbound	2	4	1	2
2	16d		The Clink Westbound	6	9	1	3
3	16d		The Clink Westbound	3	4	0	1

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	17a	Wylds Road/ East Quay The Drove	Western Way Eastbound	15	9	2	-6
2	17a		Western Way Eastbound	1	4	2	3
1	17b		Easy Quay Northbound	14	6	3	-8
2	17b		Easy Quay Northbound	0	1	1	1
1	17c		The Drove	13	5	3	-8
2	17c		The Drove	6	0	3	-6
1	17d		Wylds Road	9	9	0	-1
2	17d		Wylds Road	6	5	1	-1
1	18a	A39 Broadway junction with A372 St John Street	Monmouth Street	9	9	0	0
2	18a		Monmouth Street	6	9	1	3
3	18a		Monmouth Street	4	5	1	1
1	18b		Eastover	3	4	0	1
1	18c		A39 Northbound	8	8	0	0
2	18c		A39 Northbound	15	8	2	-7
1	18d		St John Street	12	13	0	1
2	18d		St John Street	5	5	0	0
1	19a	The Clink/Bristol Road/Bath Road/Monmouth Street roundabout	The Clink	2	0	1	-1
2	19a		The Clink	9	3	3	-6
3	19a		The Clink	5	3	1	-2
1	19b		Monmouth Street	6	15	3	9
2	19b		Monmouth Street	13	12	0	-1
1	19c		A39 Southbound	30	11	4	-19
2	19c		A39 Southbound	10	10	0	1
1	19d		A38 Southbound	22	6	4	-17
2	19d		A38 Southbound	8	7	0	0
1	20a	A38/The Drove	A38 Southbound	12	8	1	-3
2	20a		A38 Southbound	2	6	2	4
1	20b		The Drove	3	3	0	0
2	20b		The Drove	3	4	1	2
1	20c		A38 Northbound	13	15	0	2
2	20c		A38 Northbound	1	0	1	-1

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	21a	A38/Wylds Road	A38 Southbound	6	1	3	-6
1	21b		Wylds Road	8	6	1	-2
1	21c		A38 Northbound	0	1	2	1
1	23a	Junction 23 M5	M5 Southbound Off	3	3	0	-1
2	23a		M5 Southbound Off	7	2	2	-4
1	23b		A39 Eastbound	5	5	0	0
2	23b		A39 Eastbound	3	2	0	-1
1	23c		M5 Northbound Off	2	4	1	2
2	23c		M5 Northbound Off	5	6	1	1
1	23d		A39 Westbound	4	4	0	0
2	23d		A39 Westbound	8	5	1	-4
1	24a	Bridgwater Road/ Taunton Road roundabout	Residential	0	1	1	1
2	24a		Residential	0	0	0	0
1	24b		A38 Northbound	4	3	1	-2
2	24b		A38 Northbound	4	3	1	-1
1	24c		M5 Junction 24 Access	1	2	1	1
2	24c		M5 Junction 24 Access	4	2	1	-2
1	24d		Retail Area	3	2	0	0
1	24e		A38 Southbound	7	3	2	-4
2	24e		A38 Southbound	4	5	1	1
1	25a	Junction 24 M5	Eastbound	1	0	1	-1
2	25a		Eastbound	0	0	0	0
1	25b		M5 Northbound Off	5	1	2	-4
2	25b		M5 Northbound Off	0	0	0	0
1	25c		Westbound	0	0	0	0
2	25c		Westbound	0	0	0	0
1	25d		M5 Southbound Off	1	0	1	-1
2	25d		M5 Southbound Off	3	3	0	0

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	26a	Bath Road/ Puriton Hill	Bath Rd Westbund	0	0	1	0
2	26a		Bath Rd Westbund	11	0	5	-11
1	26b		Puriton Hill	8	0	4	-8
2	26b		Puriton Hill	X	3	0	X
1	26c		Bath Rd Eastbound	0	1	1	1
2	26c		Bath Rd Eastbound	0	9	4	9
1	dw12a	A38 roundabout with 'Express Park'	A38 Southbound	X	1	0	X
2	dw12a		A38 Southbound	1	1	0	0
1	dw12b		Express Way	1	0	1	-1
2	dw12b		Express Way	1	1	0	0
1	dw12c		A38 Northbound	2	2	0	0
2	dw12c		A38 Northbound	1	3	2	2

4.12.155 The PM period model queues show a good correlation with the surveys. Again the two M5 junctions validate very well.

Table 4.31: Queue Results PM Peak 17:00-18:00, Observed versus Modelled

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	1a	A39/High Street Cannington roundabout	From Cannington	0	0	1	0
2	1a		From Cannington	1	0	1	0
1	1b		A39 Eastbound	0	0	1	0
2	1b		A39 Eastbound	1	0	1	-1
1	1c		A39 Westbound	1	0	2	-1
2	1c		A39 Westbound	0	0	1	0
1	3a	A39/Main Road, Cannington	Main Road	5	5	0	0
2	3a		Main Road	0	0	0	0
1	3b		A39 Eastbound	0	0	0	0
2	3b		A39 Eastbound	5	2	2	-3
1	3c		A39 Westbound	0	0	0	0
2	3c		A39 Westbound	0	0	0	0

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	4c	A39/B3339	A39 Northbound	0	0	0	0
1	4d		Sandford Hill Southbound	1	0	1	-1
1	4e		Sandford Hill Southbound	2	0	1	-1
1	5a	A39/Quantock Meadow/ B3339 roundabout	Quantock Meadow	0	0	0	0
2	5a		Quantock Meadow	0	0	0	0
1	5b		A39 Eastbound	3	2	1	-1
2	5b		A39 Eastbound	3	3	0	-1
1	5c		A39 Westbound	3	6	1	3
2	5c		A39 Westbound	3	0	2	-3
1	5d		B3339	4	4	0	-1
2	5d		B3339	3	2	1	-1
1	6a	B3339/ Wembdon Rise	Sandford Hill	4	5	0	1
1	6b		B3339	4	11	3	7
1	6c		Western Way	6	5	0	-1
2	6c		Western Way	2	2	0	0
1	6a	B3339/ Wembdon Rise	Sandford Hill	4	5	0	1
1	6b		B3339	4	11	3	7
1	6c		Western Way	6	5	0	-1
2	6c		Western Way	2	2	0	0
1	7b	A39 Wembdon Road/Northfield	A39 Westbound	1	0	1	-1
1	7c		Wembdon Road	1	1	0	0
2	7c		Wembdon Road	1	0	1	-1
1	8a	A39/Northfield	A39 Eastbound	1	10	4	9
1	8b		Northfield	2	6	2	4
1	8c		A39 Westbound	0	0	0	0
1	9a	Durleigh Road/ Northfield	West Street	1	2	1	1
1	9b		Northfield	1	2	0	1
1	9c		Durleigh Road	0	0	0	0
1	10a	Western Way/ Feversham Avenue	Western Way Southbound	0	0	0	0
1	10b		Western Way Northbound	1	0	1	-1
1	10c		Feversham Avenue	2	4	1	2

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	11a	North Street/ Alexandra Road	North Street	1	6	3	5
2	11a		North Street	0	1	1	1
1	11b		Alexandra Road	2	6	2	4
1	11b		A39 Eastbound	0	3	2	3
2	11c		A39 Eastbound	3	5	1	2
1	12a	Broadway/ West Street/ Penel Orlieu	A39 Eastbound	10	10	0	0
2	12a		A39 Eastbound	9	4	2	-5
1	12b		West Street	5	8	1	3
2	12b		West Street	10	6	1	-3
1	12c		A39 Westbound	3	13	4	10
2	12c		A39 Westbound	19	9	3	-10
3	12c		A39 Westbound	3	3	0	0
1	12d		Penel Orlieu	11	11	0	0
2	12d		Penel Orlieu	7	5	1	-2
1	14a	Kendale Road/ Chilton Street	Chiltern Street	0	0	1	0
1	14b		Kendale Road	0	0	0	0
1	14c		Russell Place	4	2	1	-2
1	15a	A39 Broadway junction with A38 Taunton Road	Taunton Road Southbound	11	11	0	0
1	15b		A39 Eastbound	10	15	1	5
2	15b		A39 Eastbound	5	11	2	6
3	15b		A39 Eastbound	21	21	0	0
1	15c		Taunton Road Northbound	X	26	0	X
2	15c		Taunton Road Northbound	X	28	0	X
3	15c		Taunton Road Northbound	X	6	0	X
1	15d		A39 Westbound	9	7	1	-2
2	15d		A39 Westbound	12	13	0	1
3	15d		A39 Westbound	2	2	0	0

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	16a	East Quay/ The Clink	East Quay Southbound	1	10	4	9
2	16a		East Quay Southbound	6	2	2	-4
3	16a		East Quay Southbound	4	0	3	-4
1	16b		The Clink Eastbound	14	17	1	4
2	16b		The Clink Eastbound	3	4	0	1
1	16c		East Quay Northbound	9	10	0	1
2	16c		East Quay Northbound	4	6	1	2
1	16d		The Clink Westbound	5	7	1	1
2	16d		The Clink Westbound	6	6	0	0
3	16d		The Clink Westbound	4	2	1	-1
2	17a	Wylds Road/ East Quay/ The Drove	Western Way Eastbound	21	18	1	-3
2	17a		Western Way Eastbound	2	5	2	3
1	17b		East Quay Northbound	27	10	4	-17
2	17b		East Quay Northbound	0	1	2	1
1	17c		The Drove	17	13	1	-5
2	17c		The Drove	7	0	4	-7
1	17d		Wylds Road	8	16	2	8
2	17d		Wylds Road	13	6	2	-7

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	18a	A39 Broadway junction with A372 St John Street	Monmouth Street	9	8	0	-1
2	18a		Monmouth Street	5	8	1	3
3	18a		Monmouth Street	2	5	1	2
1	18b		Eastover	13	14	0	0
1	18c		A39 Northbound	13	10	1	-3
2	18c		A39 Northbound	23	10	3	-14
1	18d		St John Street	11	8	1	-2
2	18d		St John Street	5	6	0	0
1	19a	The Clink/ Bristol Road/ Bath Road/ Monmouth Street roundabout	The Clink	1	1	0	0
2	19a		The Clink	8	6	1	-2
3	19a		The Clink	6	5	1	-1
1	19b		Monmouth Street	7	8	3	11
2	19b		Monmouth Street	10	16	2	6
1	19c		A39 Southbound	4	9	2	5
2	19c		A39 Southbound	7	10	1	3
1	19d		A38 Southbound	19	37	3	18
2	19d		A38 Southbound	6	20	4	14
1	20a	A38/The Drove	A38 Southbound	23	32	2	9
2	20a		A38 Southbound	3	4	1	1
1	20b		The Drove	6	5	0	-1
2	20b		The Drove	4	10	2	6
1	20c		A38 Northbound	8	12	1	4
2	20c		A38 Northbound	2	0	2	-2
1	21a	A38/Wylds Road	A38 Southbound	10	10	0	0
2	21b		Wylds Road	11	5	2	-6
1	21c		A38 Northbound	2	1	1	-1

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	23a	Junction 23 M5	M5 Southbound Off	9	9	0	0
2	23a		M5 Southbound Off	9	8	0	-1
1	23b		A39 Eastbound	10	10	0	1
2	23b		A39 Eastbound	5	5	0	0
1	23c		M5 Northbound Off	2	2	0	0
2	23c		M5 Northbound Off	4	5	1	1
1	23d		A39 Westbound	3	2	0	0
2	23d		A39 Westbound	3	4	1	1
1	24a	Bridgwater Road/ Taunton Road roundabout	Residential	0	1	2	1
2	24a		Residential	0	0	0	0
1	24b		A38 Northbound	6	4	1	-2
2	24b		A38 Northbound	2	3	0	1
1	24c		M5 Junction 24 Access	2	3	0	1
2	24c		M5 Junction 24 Access	6	3	2	-3
1	24d		Retail Area	3	3	0	0
1	24e		A38 Southbound	3	3	0	0
2	24e		A38 Southbound	4	5	0	1
1	25a	Junction 24 M5	Eastbound	0	0	1	0
2	25a		Eastbound	0	1	1	0
1	25b		M5 Northbound Off	4	1	2	-4
2	25b		M5 Northbound Off	0	1	0	0
1	25c		Westbound	0	0	0	0
2	25c		Westbound	0	0	0	0
1	25d		M5 Southbound Off	0	0	1	0
2	25d		M5 Southbound Off	3	4	0	1
1	26a	Bath Rd/ Puriton Hill	Bath Rd Westbound	0	0	0	0
2	26a		Bath Rd Westbound	5	0	3	-5
1	26b		Puriton Hill	6	0	4	-6
2	26b		Puriton Hill	X	35	0	X
1	26c		Bath Rd Eastbound	0	0	1	0
2	26c		Bath Rd Eastbound	0	6	4	6

Lane	Survey Code	Junction	Arm	AM			
				Average maximum queue in the hour (vehs)			
				Observed	Model	GEH	Difference
1	dw12a	A38 roundabout with 'Express Park'	A38 Southbound	X	1	0	X
2	dw12a		A38 Southbound	7	1	3	-6
1	dw12b		Express Way	4	12	3	8
2	dw12b		Express Way	X	5	0	X
1	dw12c		A38 Northbound	2	2	0	0
2	dw12c		A38 Northbound	0	3	2	3

5. SUMMARY AND CONCLUSION

5.1.156 A PARAMICS model has been created using matrices from the updated Hinkley Point SATURN model; (as reported in the 8 January 2010 Atkins Technical note) turning count queue surveys; and journey time surveys.

5.1.157 The model has been produced to aid in the assessment of the potential traffic impacts of the proposed development at the Hinkley Point power station site and the associated development proposals.

5.1.158 The PARAMICS model has also been amended where necessary to take account of the subsequent comments raised in the JMP PARAMICS reviews.

5.1.159 A variance test was undertaken using statistical test assuming that the model runs form a normal distribution around mean. It was calculated that 8.96 runs were required in order to establish an estimate for journey time with a 20 second allowable error and a 95% level of confidence, Therefore, to be robust the model has been assessed using 10 log runs.

5.1.160 In total 11 hours have been assessed, over the course of a weekday (06:00-10:00 hours and 13:00-20:00 hours). Each hour has two matrices. All time periods have been calibrated and validated and the results are contained within this report.

5.1.161 This model issue compares favourably with the previous issue on 10 December 2009, with no significant change in the level of validation achieved.

5.1.162 The matrix estimation results show a high degree of validation with the percentage of flows validating during 08:00-09:00 hours, at around 91-96%, and during 17:00-18:00 hours, around 95-96%.

5.1.163 Each of the 11 hours modelled has passed the DMRB validation criteria.

5.1.164 The comparison between the modelled flows and surveyed flows show a high degree of validation.

5.1.165 Five journey paths were recorded and validated for the am and pm peaks. Overall 8 of the 11 paths validated to 100% and the other 3 validated to 90%. All hours therefore exceeding the DMRB criteria by at least 5% and in most cases 15%, showing a high level of validation.

5.1.166 Queue surveys validate well, especially at the motorway junctions. All motorway junction queues validate well (all queues are within four vehicles), and the adjacent Bridgwater Road/Taunton Road roundabout junction compares well.

5.1.167 The model has been calibrated and validated in accordance with DMRB criteria and the latest modelling guidelines and is considered fit for purpose as a representative base model to act as the foundation for development testing.

FIGURE 1: SITE LOCATION PLAN

Hinkley Point	EDF
Site Location Plan	**Savell Bird & Axon** part of the WYG group Ariel House, 74a Charlotte Street, London, W1T 4QJ Tel: +44(0)20 7580 8844 Fax: +44(0)20 7580 8818 Email: sba@sbax.co.uk www.sbax.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
G.S	N.B	10.12.09	NTS	Figure 1	.

FIGURE 2A: MANUAL CLASSIFIED COUNT SURVEY 2008/09

KEY

= Network links

= MCC survey locations

Survey locations

1 = A39/High St/A39
2 = High St/ Rodway/Fore St
3 = A39/Main Rd
4 = New Rd/ Sandford Hill/Quantock Rd
5 = Quantock Rd/B3339
6 = B3339/ Wembdon Rd/Western Way
7 = Quantock Rd/ Wembdon Rd
8 = Wembdon Rd/Northfield
9 = Northfield/Durleigh Rd
10 = Western Way/Duke St
11 = North St/Victoria Rd
12 = Broadway/Market St
13 = Chilton Rd/ Westen Way
14 = Chilton St/Kendale Rd
15 = Broadway/Taunton Rd
16 = The Clink/E Quay
17 = E Quay/The Drove
18 = Eastover/Monmouth St/St Johns St
19 = The Clink/Bath Rd/ Bristol Rd
20 = The Drove/ Bristol Rd/Union St
21 = Bristol Rd/Wylds Rd
22 = Bristol Rd/A38
23 = M5 Jct 23
24 = Taunton Rd to M5
25 = M5 Jct 24
26 = Puriton Hall/Bath Road
12DW = Express Way/Bristol Rd

REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:

Hinkley Power Station

PROJECT:

Power Station Site

DRAWING TITLE:

MCC Turning Movement Survey Location Plan

October 2008 and April 2009

SCALES: NTS

DRAWN:	CHECKED:	DATE:
JD	NB	07/01/09

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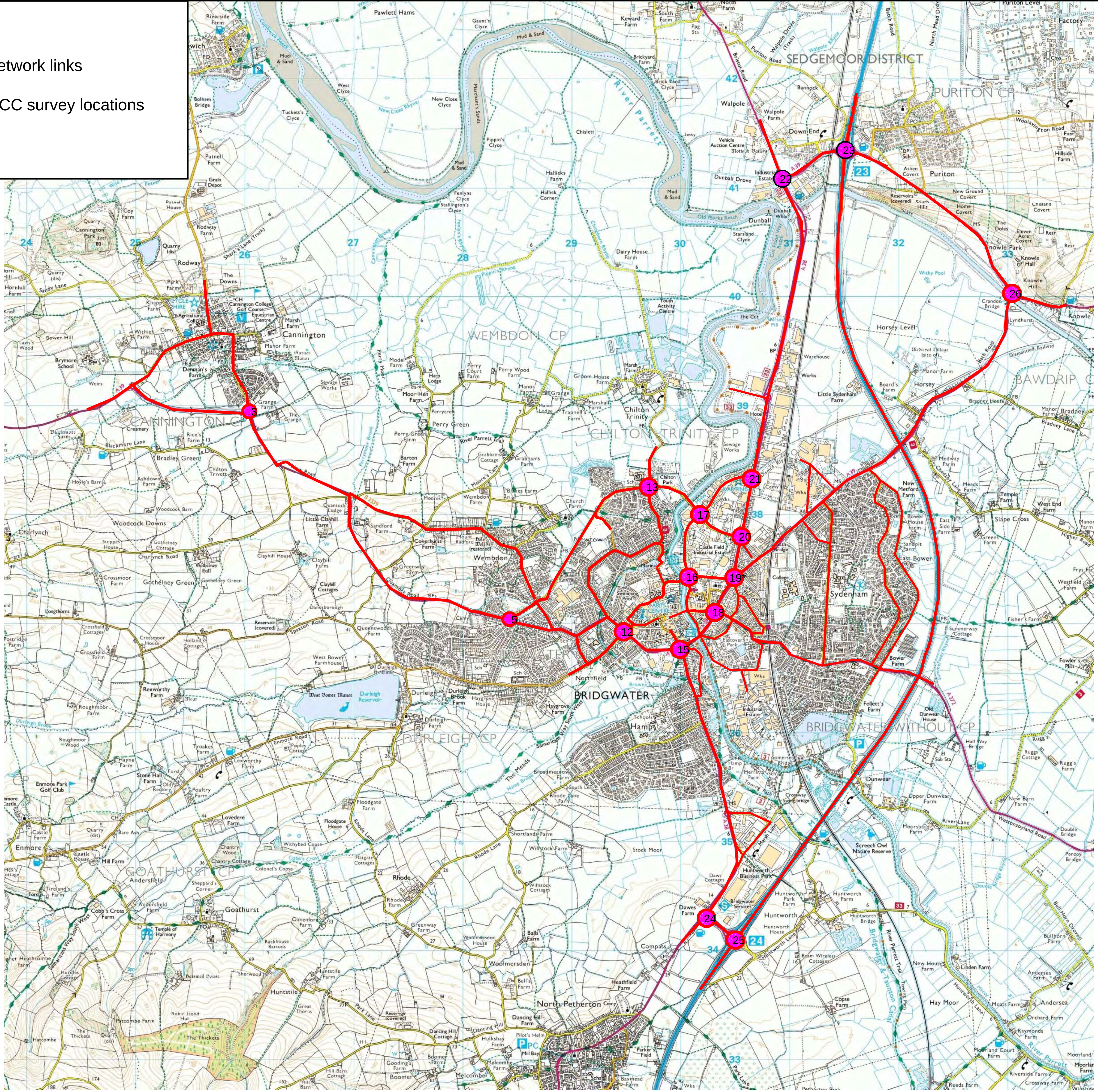
DRAWING NUMBER: **Figure 2a**

FIGURE 2B: MANUAL CLASSIFIED COUNT SURVEY 2010

KEY

= Network links

= MCC survey locations



N

Survey locations

3 = A39 / Main Rd (Cannington)
5 = Quantock Rd / B3339 / Quantock Meadow
12 = A39 Broadway / West Street / Market St
13 = Chilton Rd / Western Way (NDR)
15 = A39 Broadway / A38 Taunton Rd
16 = The Clink / E Quay
17 = E Quay / The Drove / Wylds Road
18 = A39 Broadway / St Johns St
19 = The Clink / A39 Bath Rd / A38 Bristol Rd
20 = The Drove / A38 Bristol Rd
21 = A38 Bristol Rd / Wylds Rd
22 = A38 Bristol Rd / Dunball roundabout
23 = M5 Junction 23
24 = A38 Taunton Rd / Huntworth roundabout
25 = M5 Junction 24
26 = Puriton Hall/Bath Road

REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:

Hinkley Power Station

PROJECT:

Power Station Site

DRAWING TITLE:

MCC Turning Movement Survey Location Plan

March 2010

SCALES: NTS

DRAWN:	CHECKED:	DATE:
JD	NB	07/01/09

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DRAWING NUMBER:

Figure 2b

FIGURE 2C: AUTOMATED TRAFFIC COUNT SURVEY 2008/09

KEY

= Network links

= ATC survey locations

N

Survey locations

A = High St
B = Bridgwater town centre bridge
C = Broadway
D = Salmon Parade
E = All Saints Terrace
F = Westonzoyland Rd
G = A372
H = Taunton Rd
I = Showground Rd
J = The Drove
K = Chilton St
L = Victoria Rd
M = Wembdon Rise
N = Wylds Rd
O = The Clink
P = Northern Distributor Rd
Q = East Quay
R = South of Horsey
S = Quantock Road
T = Taunton Road South
U = Bascule Bridge
V = A38 Horsey Level
W = Dawes farm

REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:

Hinkley Power Station

PROJECT:

Power Station Site

DRAWING TITLE:

ATC Survey Location Plan 2008 and 2009

SCALES: NTS

DRAWN:	CHECKED:	DATE:
HR	KM	10/05/10

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DRAWING NUMBER: **Figure 2c**

FIGURE 2D: QUEUE LENGTH SURVEY 2008/09

KEY

= Network links

= MCC survey locations

Survey locations

1 = A39/High St/A39
3 = A39/Main Rd
4 = New Rd/ Sandford Hill/Quantock Rd
5 = Quantock Rd/B3339
6 = B3339/ Wembdon Rd/Western Way
7 = Quantock Rd/ Wembdon Rd
8 = Wembdon Rd/Northfield
9 = Northfield/Durleigh Rd
10 = Western Way/Feversham Avenue
11 = North St/Victoria Rd
12 = Broadway/ West Street/Market St
13 = Chilton Rd/ Westen Way (NDR)
14 = Chilton St / Kendale Rd
15 = A39 Broadway / A38 Taunton Rd
16 = The Clink / E Quay
17 = Wylds Road / E Quay / The Drove
18 = A39 Broadway / St Johns St
19 = The Clink / A39 Bath Rd / A38 Bristol Rd
20 = The Drove / A38 Bristol Rd
21 = A38 Bristol Rd / Wylds Rd
23 = M5 Junction 23
24 = A38 Taunton Rd / Huntworth roundabout
25 = M5 Junction 24
26 = Puriton Hall/Bath Road
12DW = Express Way/Bristol Rd

REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:

Hinkley Power Station

PROJECT:

Power Station Site

DRAWING TITLE:

Queue Length Survey Location Plan

October 2008 and April 2009

SCALES:

NTS

DRAWN:	CHECKED:	DATE:
JD	NB	07/01/09

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DRAWING NUMBER:

Figure 2d

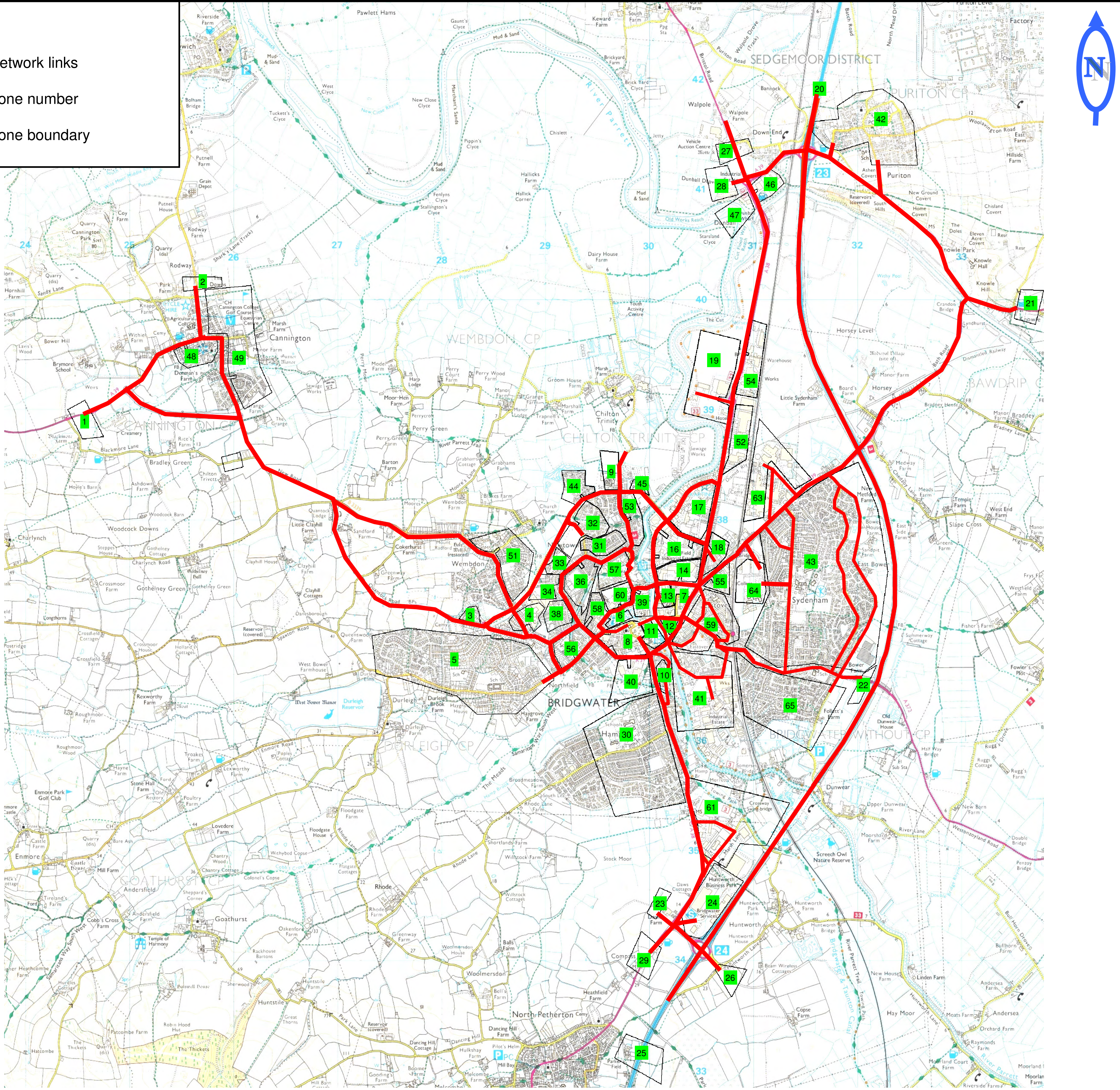
FIGURE 3: MODELLED NETWORK ZONES

KEY

= Network links

= Zone number

= Zone boundary



Zone locations

1. A39 (W)
2. Towards Hinkley
3. Quantock Meadow
4. Wembdon Rd
5. Durleigh
6. Town centre (W)
7. Sainsbury's
8. Taunton Rd (N)
9. Chilton Rd
10. Old Taunton Rd
11. Town centre (E)
12. Salmon Parade (N)
13. ASDA
14. Sainsbury's
16. Castle Field Ind. Est.
18. Union St
19. Express Park (W)
20. M5 (N)
21. A39 (E)
22. A372 (E)
23. Dawes Cottages
24. Huntworth Bus. Park
25. M5 (S)
26. Huntworth Lane
27. Bristol Rd (N)
28. Dunball Ind. Est.
29. A38 (S)
30. Hamp
31. Feversham Av. (S)
32. Feversham Av. (N)
33. Newtown
34. Church Path
36. Chatham Av.
38. Coronation Rd
39. W. Quay Close Parking
40. Safeway and Morrisons
41. Salmon Parade (S)
42. Puriton
43. Sydenham
44. Church Farm
45. Sewage works and residential
46. Dunball Industrial (E)
47. Dunball Industrial (W)
48. Cannington (W)
49. Cannington (E)
51. Wembdon
52. Express Park (S)
53. Chilton St
54. Express Park (E)
55. Bailey St
56. West St
57. Marina
58. Camden Rd
59. Saint John St
60. Northgate
61. Showground Rd
63. Sydenham Manor
64. Bridgwater College
65. Sydenham (S)

REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:
Hinkley Power Station

PROJECT:
Power Station Site

DRAWING TITLE:
Model network and zone plan

SCALES:
NTS

DRAWN:	CHECKED:	DATE:
JD	NB	07/01/09

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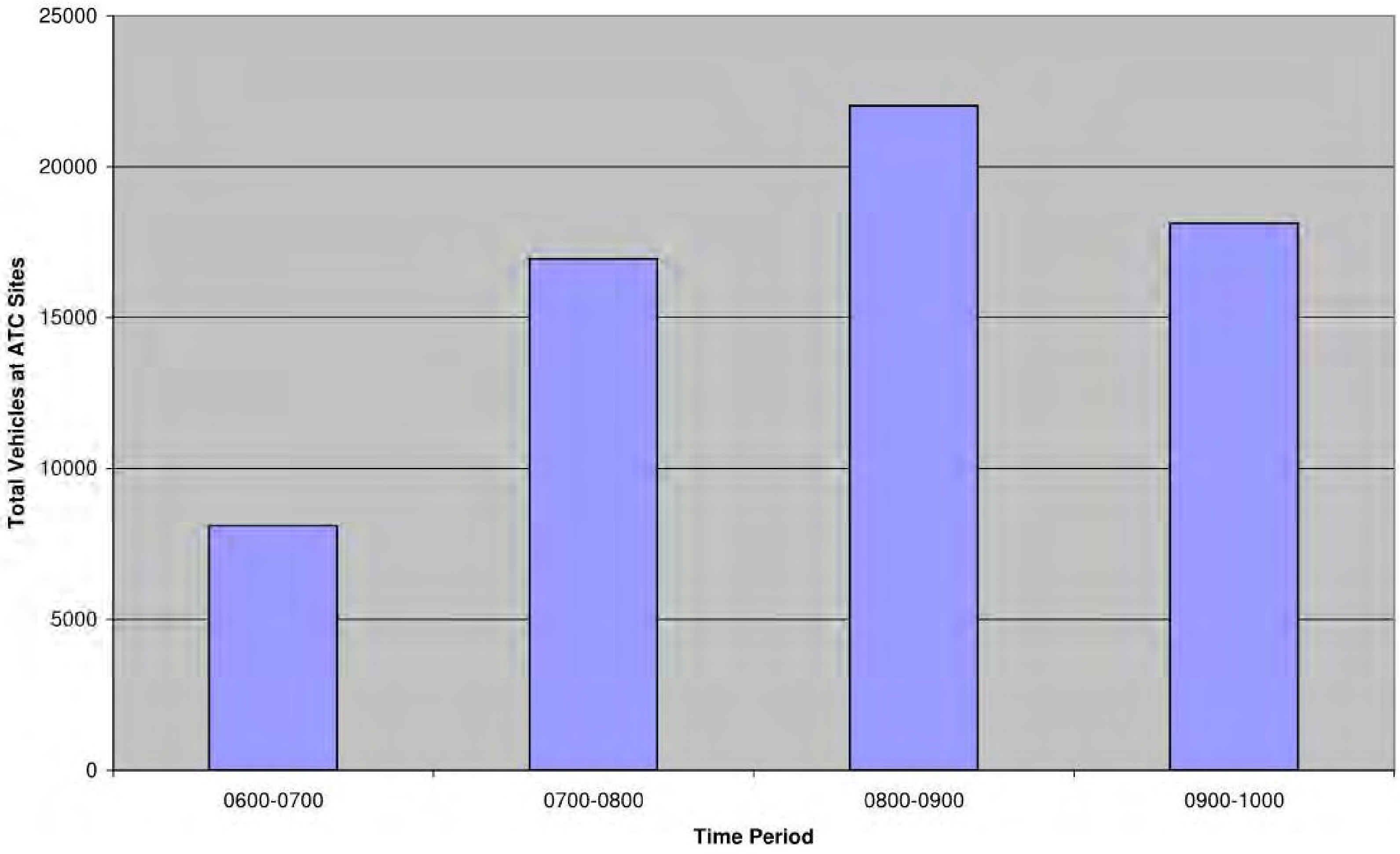
DRAWING NUMBER: **Figure 3**

FIGURE 4: AUTOMATED TRAFFIC COUNT PROFILES



REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:
Hinkley Power Station

PROJECT:
Power Station Site

DRAWING TITLE:
ATC Flow Profile

SCALES: NTS

DRAWN: JD | CHECKED: NB | DATE: 23/03/09

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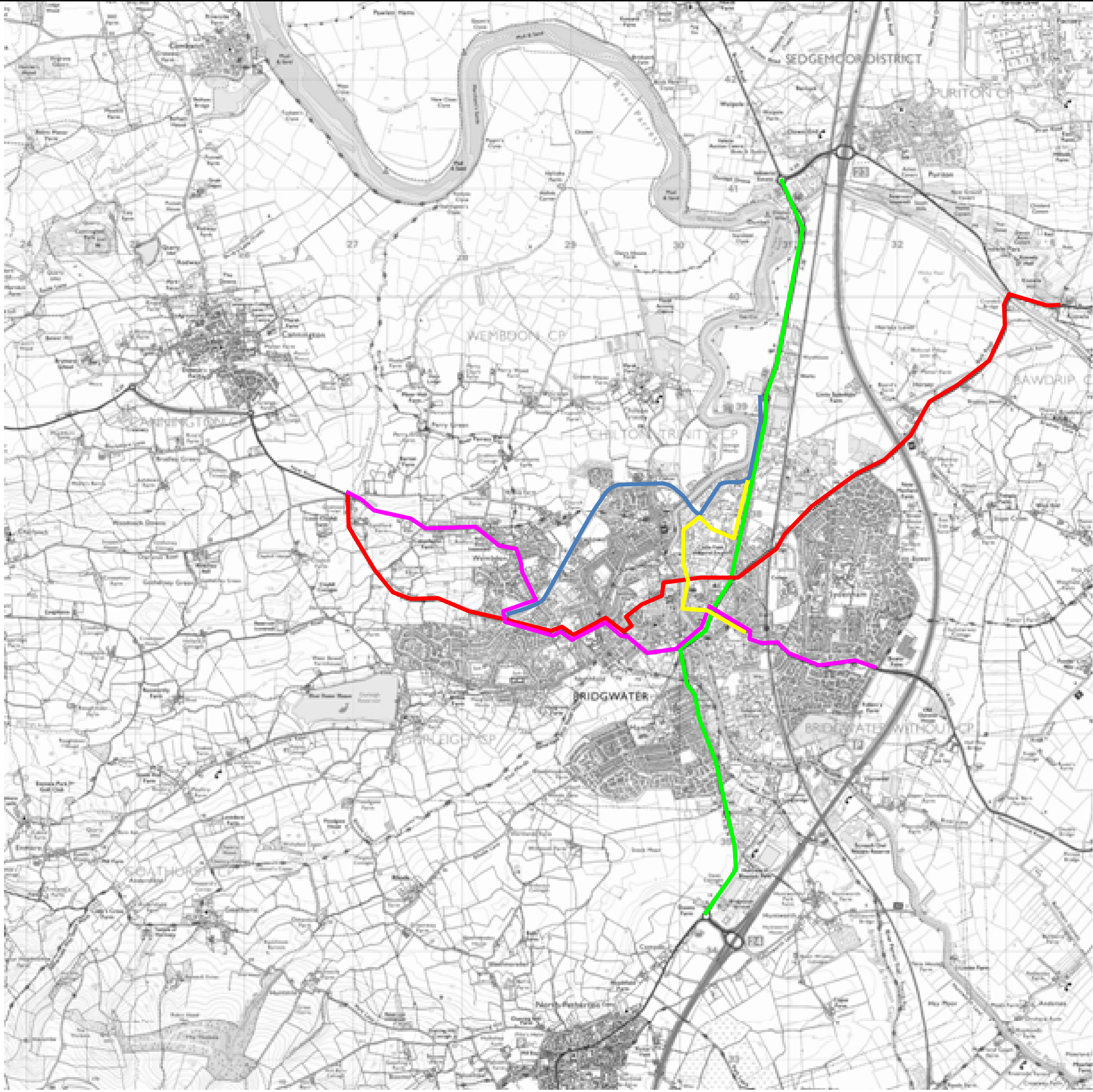
DRAWING NUMBER:
Figure 4

FIGURE 5: JOURNEY PATH PLAN



N

Route Number

Blue line	1
Green line	2
Red line	3
Magenta line	4
Yellow line	5

REV	DETAILS	DRAWN	CHECKED	DATE

CLIENT:
Hinkley Power Station

PROJECT:
Power Station Site

DRAWING TITLE:
Journey Paths

SCALES:
NTS

DRAWN:	CHECKED:	DATE:
JD	NB	07/01/09

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DRAWING NUMBER:
Figure 5

APPENDIX A.1: JOURNEY TIME SURVEY DATA

Route 1: Bridgwater - Northern Distributor Road

	04:00 - 05:00	Run 1	Run 2
	Date:	05/06/2008	05/06/2008
	Start Time:	04:49	04:59
Ref	Description	Timing Point	Timing Point
	Southbound		
1	A38 Roundabout (N) of Wylds Road	00:00:00	00:00:00
2	A38 Bristol Rd/ Wylds Road	00:00:40	00:00:57
3	Wylds Road/ The Drove	00:01:28	00:01:46
4	Chilton Street/ Western Way/ The Drove	00:02:05	00:02:27
5	Northern Distributor Road/ Wembdon Rise	00:03:44	00:04:07
6	A39 Quantock Road roundabout	00:04:06	00:04:28
	Northbound		
7	A39 Quantock Road roundabout	00:00:00	00:00:00
8	Northern Distributor Road/ Wembdon Rise	00:00:34	00:00:24
9	Chilton Street/ Western Way/ The Drove	00:01:56	00:02:02
10	Wylds Road/ The Drove	00:02:52	00:02:44
11	A38 Bristol Rd/ Wylds Road	00:03:41	00:03:40
12	A38 Roundabout (N) of Wylds Road	00:04:29	00:04:27
	Date:	05/06/2008	05/06/2008
	Start Time:	04:44	04:54

Route 1: Bridgwater - Northern Distributor Road

	07:30 - 09:00	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	18/06/2008	18/06/2008	18/06/2008	18/06/2008	19/06/2008	25/06/2008	25/06/2008	25/06/2008
	Start Time:	07:23	07:35	07:49	08:08	08:40	07:29	07:41	07:58
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Roundabout (N) of Wylds Road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ Wylds Road	00:01:10	00:01:13	00:05:33	00:02:09	00:01:48	00:01:06	00:02:30	00:02:35
3	Wylds Road/ The Drove	00:02:56	00:02:16	00:08:40	00:04:12	00:03:02	00:02:20	00:04:20	00:03:58
4	Chilton Street/ Western Way/ The Drove	00:04:07	00:03:09	00:09:33	00:05:32	00:04:07	00:03:08	00:05:32	00:04:59
5	Northern Distributor Road/ Wembdon Rise	00:06:09	00:05:22	00:11:20	00:07:56	00:06:30	00:05:02	00:07:32	00:07:03
6	A39 Quantock Road roundabout	00:06:43	00:05:54	00:11:50	00:08:32	00:07:07	00:05:29	00:08:01	00:07:33
	Northbound								
7	A39 Quantock Road roundabout	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8	Northern Distributor Road/ Wembdon Rise	00:00:30	00:00:42	00:00:29	00:00:56	00:00:29	00:00:52	00:00:25	00:00:28
9	Chilton Street/ Western Way/ The Drove	00:02:21	00:02:53	00:03:34	00:02:55	00:03:31	00:02:46	00:02:59	00:05:18
10	Wylds Road/ The Drove	00:03:12	00:04:15	00:04:50	00:05:02	00:04:16	00:03:47	00:04:12	00:06:59
11	A38 Bristol Rd/ Wylds Road	00:04:33	00:06:16	00:05:58	00:06:31	00:05:36	00:05:01	00:06:44	00:07:21
12	A38 Roundabout (N) of Wylds Road	00:05:26	00:07:18	00:06:58	00:07:29	00:06:57	00:06:26	00:07:42	00:08:01
	Start Time:	07:30	07:42	08:01	08:31	08:48	07:35	07:50	08:56
	Date:	18/06/2008	18/06/2008	18/06/2008	18/06/2008	19/06/2008	25/06/2008	25/06/2008	25/06/2008

Route 1: Bridgwater - Northern Distributor Road

	10:00 - 12:00	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	19/06/2008
	Start Time:	09:50	10:02	10:14	09:57	10:07	10:12	10:24	11:02
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Roundabout (N) of Wylds Road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ Wylds Road	00:01:12	00:01:46	00:01:33	00:00:54	00:01:07	00:01:30	00:01:09	00:01:21
3	Wylds Road/ The Drove	00:02:07	00:03:39	00:02:39	00:02:06	00:02:32	00:02:45	00:02:04	00:02:42
4	Chilton Street/ Western Way/ The Drove	00:02:58	00:04:54	00:03:32	00:03:04	00:03:19	00:03:46	00:02:58	00:04:14
5	Northern Distributor Road/ Wembdon Rise	00:04:53	00:06:38	00:05:20	00:05:01	00:04:59	00:05:42	00:05:14	00:06:05
6	A39 Quantock Road roundabout	00:05:22	00:07:09	00:04:45	00:05:31	00:05:24	00:06:06	00:05:48	00:06:29
	Northbound								
7	A39 Quantock Road roundabout	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8	Northern Distributor Road/ Wembdon Rise	00:00:42	00:00:32	00:00:42	00:00:23	00:00:23	00:00:33	00:00:27	00:00:30
9	Chilton Street/ Western Way/ The Drove	00:02:48	00:02:15	00:02:49	00:02:23	00:02:23	00:02:15	00:02:14	00:02:35
10	Wylds Road/ The Drove	00:03:48	00:03:00	00:05:33	00:03:10	00:03:28	00:03:32	00:03:21	00:03:34
11	A38 Bristol Rd/ Wylds Road	00:04:49	00:04:03	00:07:59	00:04:16	00:04:19	00:04:41	00:04:39	00:04:44
12	A38 Roundabout (N) of Wylds Road	00:05:44	00:04:52	00:08:53	00:05:08	00:05:06	00:05:33	00:05:36	00:05:42
	Start Time:	09:56	10:08	10:20	10:02	10:13	10:18	10:30	11:10
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	19/06/2008

Route 1: Bridgwater - Northern Distributor Road

	13:00 - 15:00	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	18/06/2008	19/06/2008	19/06/2008
	Start Time:	12:59	13:15	13:27	12:57	13:08	14:00	13:17	13:29
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Roundabout (N) of Wylds Road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ Wylds Road	00:01:50	00:01:02	00:00:59	00:01:01	00:02:07	00:01:40	00:01:26	00:01:10
3	Wylds Road/ The Drove	00:04:50	00:02:12	00:02:01	00:02:11	00:03:32	00:03:24	00:02:49	00:02:17
4	Chilton Street/ Western Way/ The Drove	00:05:57	00:03:16	00:03:40	00:02:55	00:04:58	00:04:18	00:03:46	00:03:03
5	Northern Distributor Road/ Wembdon Rise	00:07:54	00:05:07	00:05:30	00:04:38	00:07:39	00:06:06	00:05:41	00:05:02
6	A39 Quantock Road roundabout	00:08:29	00:05:40	00:05:58	00:05:17	00:08:24	00:06:31	00:06:05	00:05:32
	Northbound								
7	A39 Quantock Road roundabout	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8	Northern Distributor Road/ Wembdon Rise	00:00:29	00:00:35	00:00:22	00:00:22	00:00:32	00:00:33	00:00:42	00:00:33
9	Chilton Street/ Western Way/ The Drove	00:02:20	00:02:36	00:02:13	00:02:40	00:02:41	00:02:50	00:03:02	00:02:50
10	Wylds Road/ The Drove	00:03:56	00:03:32	00:03:10	00:03:28	00:03:47	00:04:10	00:03:46	00:03:57
11	A38 Bristol Rd/ Wylds Road	00:05:01	00:05:48	00:04:21	00:04:31	00:05:03	00:05:54	00:05:19	00:04:59
12	A38 Roundabout (N) of Wylds Road	00:06:01	00:06:46	00:05:14	00:05:20	00:05:54	00:06:46	00:06:14	00:05:57
	Start Time:	13:07	13:20	13:33	13:02	13:17	14:07	13:23	13:35
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	18/06/2008	19/06/2008	19/06/2008

Route 1: Bridgwater - Northern Distributor Road

	16:00 - 18:00	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	19/06/2008	19/06/2008
	Start Time:	15:57	16:11	16:00	16:13	17:12	17:30	17:02	17:21
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Roundabout (N) of Wylds Road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ Wylds Road	00:01:37	00:01:09	00:01:05	00:01:10	00:02:24	00:01:29	00:01:11	00:01:39
3	Wylds Road/ The Drove	00:03:03	00:02:54	00:02:32	00:02:14	00:03:44	00:03:08	00:05:19	00:04:38
4	Chilton Street/ Western Way/ The Drove	00:04:22	00:04:22	00:03:31	00:03:03	00:04:59	00:04:34	00:06:47	00:07:40
5	Northern Distributor Road/ Wembdon Rise	00:05:59	00:06:18	00:05:24	00:05:12	00:07:13	00:06:23	00:08:48	00:10:11
6	A39 Quantock Road roundabout	00:06:24	00:06:45	00:05:50	00:05:41	00:07:39	00:06:51	00:09:31	00:10:35

	Northbound								
7	A39 Quantock Road roundabout	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8	Northern Distributor Road/ Wembdon Rise	00:00:27	00:00:46	00:00:32	00:00:43	00:00:35	00:00:28	00:00:45	00:00:32
9	Chilton Street/ Western Way/ The Drove	00:01:58	00:02:38	00:02:27	00:03:24	00:02:32	00:02:56	00:02:45	00:02:24
10	Wylds Road/ The Drove	00:03:30	00:03:27	00:03:52	00:04:23	00:04:07	00:04:20	00:07:17	00:03:19
11	A38 Bristol Rd/ Wylds Road	00:05:08	00:04:47	00:04:52	00:05:58	00:05:16	00:06:06	00:08:52	00:04:17
12	A38 Roundabout (N) of Wylds Road	00:06:17	00:05:43	00:05:45	00:06:54	00:06:14	00:07:02	00:09:43	00:05:11
	Start Time:	**16:04**	**16:17**	**16:06**	**16:19**	**17:22**	**17:39**	**17:12**	**17:32**
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**

Route 2: A38 Bridgwater to Taunton & return

04:00 - 05:00

		Run 1	Run 2
	Date:	**03/06/2008**	**03/06/2008**
	Start Time:	**04:10**	**04:28**
Ref	**Description**	Timing Point	Timing Point
	Southbound - Bridgwater to Taunton		
1	A38 Dunball / M5 J23 spur road Rdbt	00:00:00	00:00:00
2	A38 Rdbt (N of Wylds Rd)	00:01:52	00:01:54
3	A38 Bristol Rd/ Wylds Rd	00:02:52	00:02:54
4	A38 Bristol Rd/ The Drove	00:03:37	00:03:41
5	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:04:10	00:04:15
6	A38 Monmouth St/ A372 St John Street	00:04:44	00:04:51
7	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:05:10	00:05:15
8	A38 Broadway/ Taunton Rd	00:05:29	00:05:51
9	A38 Taunton Rd/ Rhode Lane	00:06:26	00:06:58
10	A38 Taunton Rd/ Showground Rd Rdbt	00:07:31	00:07:52
11	A38 Taunton Rd/ M5 J24 spur road	00:08:38	00:08:51
	Northbound - Taunton to Bridgwate		
20	A38 Taunton Rd/ M5 J24 spur road	00:00:00	00:00:00
21	A38 Taunton Rd/ Showground Rd Rdbt	00:01:07	00:01:06
22	A38 Taunton Rd/ Rhode Lane	00:02:18	00:02:17
23	A38 Broadway/ Taunton Rd	00:03:55	00:03:53
24	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:04:20	00:04:17
25	A38 Monmouth St/ A372 St John Street	00:04:50	00:04:36
26	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:05:25	00:05:02
27	A38 Bristol Rd/ The Drove	00:06:01	00:05:31
28	A38 Bristol Rd/ Wylds Rd	00:06:47	00:06:20
29	A38 Rdbt (N of Wylds Rd)	00:07:45	00:07:16
30	A38 Dunball / M5 J23 spur road Rdbt	00:09:32	00:09:05
	Start Time:	**04:00**	**04:19**
	Date:	**03/06/2008**	**03/06/2008**

Note: single lane (roadworks) on Taunton Rd Northbound starting opp. AcornLodge Hotel towards junction with Broadwa

Route 2: A38 Bridgwater to Taunton & return

07:30-09:00

		Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**18/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**	**24/06/2008**	**25/06/2008**	**01/07/2008**
	Start Time:	**07:27**	**07:53**	**08:31**	**07:37**	**08:08**	**08:50**	**08:25**	**08:39**
Ref	**Description**	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound - Bridgwater to Taunton								
1	A38 Dunball / M5 J23 spur road Rdbt	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Rdbt (N of Wylds Rd)	00:02:06	00:03:57	00:03:05	00:01:44	00:02:17	00:01:44	00:05:27	00:01:44
3	A38 Bristol Rd/ Wylds Rd	00:03:04	00:08:24	00:05:18	00:02:44	00:04:11	00:03:05	00:07:47	00:02:46
4	A38 Bristol Rd/ The Drove	00:04:02	00:09:16	00:06:06	00:03:47	00:05:01	00:04:04	00:09:06	00:03:54
5	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:04:41	00:09:49	00:07:43	00:04:51	00:05:55	00:04:41	00:10:44	00:05:29
6	A38 Monmouth St/ A372 St John Street	00:05:30	00:10:42	00:08:44	00:06:01	00:09:00	00:06:01	00:11:23	00:06:03
7	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:07:05	00:11:18	00:09:18	00:10:08	00:11:52	00:06:22	00:12:42	00:08:24
8	A38 Broadway/ Taunton Rd	00:08:58	00:13:21	00:11:23	00:12:41	00:13:39	00:06:41	00:14:54	00:09:56
9	A38 Taunton Rd/ Rhode Lane	00:09:59	00:14:34	00:12:32	00:14:04	00:15:06	00:07:46	00:16:05	00:11:20
10	A38 Taunton Rd/ Showground Rd Rdbt	00:11:25	00:15:55	00:14:47	00:15:14	00:16:38	00:09:21	00:18:45	00:12:29
11	A38 Taunton Rd/ M5 J24 spur road	00:12:36	00:17:17	00:15:29	00:16:15	00:17:49	00:10:41	00:20:11	00:13:23
	Northbound - Taunton to Bridgwate								
20	A38 Taunton Rd/ M5 J24 spur road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
21	A38 Taunton Rd/ Showground Rd Rdbt	00:01:29	00:02:14	00:08:44	00:00:56	00:00:59	00:05:02	00:01:16	00:07:34
22	A38 Taunton Rd/ Rhode Lane	00:02:55	00:09:17	00:12:14	00:02:09	00:04:17	00:10:08	00:07:02	00:15:22
23	A38 Broadway/ Taunton Rd	00:05:29	00:12:58	00:13:55	00:03:37	00:07:52	00:13:10	00:12:34	00:20:10
24	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:05:48	00:13:44	00:14:13	00:04:03	00:08:13	00:13:32	00:13:17	00:20:43
25	A38 Monmouth St/ A372 St John Street	00:07:00	00:14:45	00:15:43	00:04:52	00:09:23	00:14:41	00:14:24	00:21:57
26	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:07:46	00:15:49	00:16:26	00:05:30	00:10:06	00:15:10	00:14:56	00:22:44
27	A38 Bristol Rd/ The Drove	00:08:58	00:16:48	00:17:31	00:06:35	00:10:59	00:16:21	00:16:26	00:23:39
28	A38 Bristol Rd/ Wylds Rd	00:09:58	00:17:39	00:18:20	00:07:40	00:11:46	00:17:11	00:17:13	00:24:32
29	A38 Rdbt (N of Wylds Rd)	00:10:57	00:18:31	00:19:12	00:08:56	00:12:41	00:18:05	00:18:04	00:25:33
30	A38 Dunball / M5 J23 spur road Rdbt	00:12:38	00:20:14	00:20:52	00:10:37	00:14:21	00:19:44	00:19:52	00:27:03
	Start Time:	**07:40**	**08:10**	**08:48**	**07:26**	**07:53**	**08:26**	**08:05**	**08:45**
	Date:	**18/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**	**19/06/2008**	**25/06/2008**	**25/06/2008**

Route 2: A38 Bridgwater to Taunton & return

10:00 - 12:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**
	Start Time:	**10:12**	**11:19**	**10:30**	**10:52**	**11:38**	**10:10**	**11:46**	**10:58**
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound - Bridgwater to Tauntor								
1	A38 Dunball / M5 J23 spur road Rdbt	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Rdbt (N of Wylds Rd)	00:01:45	00:01:54	00:01:55	00:01:53	00:01:48	00:01:51	00:01:44	00:01:46
3	A38 Bristol Rd/ Wylds Rd	00:02:54	00:03:35	00:02:55	00:03:01	00:02:49	00:03:34	00:02:48	00:02:49
4	A38 Bristol Rd/ The Drove	00:03:43	00:04:43	00:03:41	00:03:46	00:03:33	00:04:25	00:03:56	00:03:39
5	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:04:50	00:05:22	00:04:22	00:04:18	00:04:09	00:05:00	00:05:15	00:04:41
6	A38 Monmouth St/ A372 St John Street	00:05:22	00:06:37	00:05:06	00:05:53	00:05:04	00:06:41	00:06:17	00:06:29
7	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:07:04	00:07:02	00:05:31	00:06:21	00:05:26	00:07:05	00:06:41	00:06:52
8	A38 Broadway/ Taunton Rd	00:09:24	00:08:42	00:06:58	00:08:02	00:07:02	00:07:30	00:08:17	00:07:11
9	A38 Taunton Rd/ Rhode Lane	00:10:32	00:09:41	00:07:55	00:09:06	00:08:00	00:08:42	00:09:11	00:08:16
10	A38 Taunton Rd/ Showground Rd Rdbt	00:12:09	00:10:48	00:09:07	00:10:13	00:09:07	00:09:48	00:10:17	00:09:29
11	A38 Taunton Rd/ M5 J24 spur road	00:13:55	00:11:51	00:10:08	00:11:14	00:10:08	00:10:44	00:11:15	00:10:44
	Northbound - Taunton to Bridgwate								
20	A38 Taunton Rd/ M5 J24 spur road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
21	A38 Taunton Rd/ Showground Rd Rdbt	00:01:46	00:01:42	00:00:53	00:01:03	00:00:56	00:00:52	00:01:02	00:01:04
22	A38 Taunton Rd/ Rhode Lane	00:03:11	00:03:02	00:02:20	00:02:47	00:02:09	00:05:30	00:02:22	00:02:40
23	A38 Broadway/ Taunton Rd	00:05:00	00:04:55	00:05:08	00:05:07	00:03:14	00:09:17	00:05:15	00:07:38
24	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:05:37	00:05:21	00:06:31	00:05:26	00:03:48	00:09:40	00:05:37	00:08:11
25	A38 Monmouth St/ A372 St John Street	00:06:54	00:06:36	00:07:57	00:05:47	00:04:43	00:10:54	00:06:56	00:09:30
26	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:07:37	00:07:20	00:08:36	00:06:40	00:05:40	00:11:32	00:07:35	00:10:04
27	A38 Bristol Rd/ The Drove	00:08:31	00:08:24	00:09:51	00:07:50	00:06:44	00:12:08	00:08:30	00:11:14
28	A38 Bristol Rd/ Wylds Rd	00:09:21	00:09:21	00:10:38	00:08:36	00:07:32	00:12:54	00:09:22	00:12:03
29	A38 Rdbt (N of Wylds Rd)	00:10:17	00:10:13	00:11:34	00:09:29	00:08:25	00:13:50	00:10:19	00:12:57
30	A38 Dunball / M5 J23 spur road Rdbt	00:11:51	00:11:50	00:13:13	00:11:09	00:10:07	00:15:31	00:11:59	00:14:39
	Start Time:	**10:00**	**10:24**	**11:31**	**10:41**	**11:03**	**10:55**	**11:14**	**11:45**
	Dat:	**16/06/2008**	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**

Lorry Unloading

Note: 16/06/08: single file traffic on Taunton Rd approaching lights, & roadworks between junction 24 Spur Rd and Showground roundabout at 10am, removed by 11:19 am r.

Route 2: A38 Bridgwater to Taunton & return

13:00 - 15:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**16/06/2008**	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**
	Start Time:	**13:17**	**13:40**	**14:38**	**13:52**	**14:15**	**12:59**	**14:02**	**14:44**
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound - Bridgwater to Tauntor								
1	A38 Dunball / M5 J23 spur road Rdbt	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Rdbt (N of Wylds Rd)	00:01:48	00:01:49	00:01:48	00:01:51	00:01:42	00:01:46	00:01:44	00:01:50
3	A38 Bristol Rd/ Wylds Rd	00:03:08	00:04:11	00:02:58	00:02:53	00:02:41	00:02:48	00:03:06	00:02:55
4	A38 Bristol Rd/ The Drove	00:03:52	00:05:21	00:03:44	00:03:39	00:03:39	00:04:01	00:04:21	00:03:56
5	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:04:30	00:06:23	00:05:45	00:04:33	00:04:13	00:04:43	00:05:17	00:04:55
6	A38 Monmouth St/ A372 St John Street	00:05:00	00:07:19	00:06:26	00:05:40	00:04:54	00:05:20	00:05:48	00:06:06
7	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:06:35	00:08:45	00:08:05	00:07:37	00:05:36	00:06:57	00:06:11	00:06:31
8	A38 Broadway/ Taunton Rd	00:08:40	00:10:01	00:10:26	00:08:10	00:07:37	00:07:15	00:07:54	00:08:26
9	A38 Taunton Rd/ Rhode Lane	00:09:59	00:11:00	00:11:35	00:09:23	00:08:43	00:08:17	00:09:15	00:10:41
10	A38 Taunton Rd/ Showground Rd Rdbt	00:11:12	00:12:09	00:12:58	00:10:36	00:10:05	00:09:43	00:10:21	00:12:22
11	A38 Taunton Rd/ M5 J24 spur road	00:12:18	00:12:57	00:14:25	00:11:50	00:11:09	00:10:56	00:11:47	00:13:36
	Northbound - Taunton to Bridgwate								
20	A38 Taunton Rd/ M5 J24 spur road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
21	A38 Taunton Rd/ Showground Rd Rdbt	00:01:03	00:01:57	00:01:05	00:01:10	00:00:58	00:01:05	00:00:56	00:01:06
22	A38 Taunton Rd/ Rhode Lane	00:02:27	00:02:39	00:02:25	00:02:28	00:02:11	00:02:29	00:02:14	00:02:30
23	A38 Broadway/ Taunton Rd	00:03:51	00:06:33	00:04:10	00:03:45	00:03:35	00:04:18	00:05:22	00:04:29
24	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:04:37	00:06:57	00:04:31	00:04:17	00:04:11	00:04:45	00:05:46	00:05:15
25	A38 Monmouth St/ A372 St John Street	00:05:35	00:07:17	00:05:38	00:05:14	00:05:22	00:06:07	00:07:04	00:06:32
26	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:06:17	00:07:44	00:06:11	00:05:50	00:05:54	00:06:41	00:07:38	00:07:26
27	A38 Bristol Rd/ The Drove	00:07:15	00:08:20	00:07:08	00:06:44	00:06:49	00:07:30	00:08:41	00:08:20
28	A38 Bristol Rd/ Wylds Rd	00:08:05	00:09:09	00:07:55	00:07:37	00:07:55	00:08:24	00:09:30	00:09:10
29	A38 Rdbt (N of Wylds Rd)	00:08:59	00:10:07	00:08:54	00:08:34	00:08:54	00:09:19	00:10:28	00:10:10
30	A38 Dunball / M5 J23 spur road Rdbt	00:10:35	00:11:52	00:10:32	00:10:11	00:10:32	00:10:59	00:12:10	00:11:15
	Start Time:	**13:30**	**13:52**	**13:02**	**14:04**	**14:26**	**13:17**	**14:14**	**14:33**
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**18/06/2008**

Note 16/06/08 traffic bad- queing for petrol at garage on Broadway/ Taunton Rd junction

Route 2: A38 Bridgwater to Taunton & return

16:00 - 18:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**
	Start Time:	**16:22**	**17:31**	**16:00**	**16:28**	**16:54**	**17:22**	**16:45**	**17:06**
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound - Bridgwater to Tauntor								
1	A38 Dunball / M5 J23 spur road Rdbt	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Rdbt (N of Wylds Rd)	00:01:42	00:01:42	00:01:58	00:01:58	00:01:37	00:03:51	00:01:45	00:01:43
3	A38 Bristol Rd/ Wylds Rd	00:03:13	00:03:07	00:03:05	00:03:17	00:02:37	00:06:47	00:03:05	00:04:24
4	A38 Bristol Rd/ The Drove	00:04:08	00:04:49	00:03:59	00:04:25	00:03:29	00:11:08	00:04:05	00:10:31
5	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:04:55	00:06:23	00:05:17	00:05:05	00:04:33	00:13:55	00:05:26	00:16:54
6	A38 Monmouth St/ A372 St John Street	00:05:30	00:12:06	00:05:46	00:05:46	00:05:01	00:14:26	00:06:55	00:17:56
7	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:07:05	00:14:31	00:07:12	00:07:23	00:06:42	00:16:22	00:07:16	00:18:20
8	A38 Broadway/ Taunton Rd	00:11:40	00:16:58	00:09:20	00:09:40	00:08:57	00:18:32	00:09:14	00:20:27
9	A38 Taunton Rd/ Rhode Lane	00:13:05	00:18:22	00:10:29	00:10:41	00:10:13	00:19:36	00:10:51	00:21:59
10	A38 Taunton Rd/ Showground Rd Rdbt	00:14:10	00:19:27	00:11:37	00:11:46	00:11:26	00:21:03	00:11:59	00:23:15
11	A38 Taunton Rd/ M5 J24 spur road	00:15:06	00:20:33	00:12:56	00:12:48	00:13:25	00:22:21	00:13:01	00:24:12
	Northbound - Taunton to Bridgwate								
20	A38 Taunton Rd/ M5 J24 spur road	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
21	A38 Taunton Rd/ Showground Rd Rdbt	00:06:07	00:04:01	00:01:04	00:01:49	00:00:59	00:07:14	00:03:06	00:01:43
22	A38 Taunton Rd/ Rhode Lane	00:12:47	00:10:23	00:04:40	00:03:58	00:04:29	00:11:52	00:06:53	00:06:17
23	A38 Broadway/ Taunton Rd	00:16:34	00:15:57	00:07:50	00:06:27	00:08:30	00:15:26	00:09:39	00:09:34
24	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:17:05	00:16:28	00:08:20	00:06:48	00:09:12	00:16:05	00:10:03	00:10:02
25	A38 Monmouth St/ A372 St John Street	00:18:22	00:17:27	00:09:31	00:07:46	00:10:29	00:17:24	00:11:16	00:11:15
26	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	00:19:08	00:18:15	00:10:02	00:08:48	00:11:45	00:18:02	00:11:51	00:11:56
27	A38 Bristol Rd/ The Drove	00:20:02	00:19:53	00:11:05	00:09:34	00:13:58	00:19:47	00:12:45	00:13:14
28	A38 Bristol Rd/ Wylds Rd	00:20:48	00:20:40	00:11:55	00:10:19	00:14:45	00:20:39	00:13:50	00:14:03
29	A38 Rdbt (N of Wylds Rd)	00:21:41	00:21:40	00:12:48	00:11:18	00:15:40	00:21:33	00:14:49	00:14:59
30	A38 Dunball / M5 J23 spur road Rdbt	00:23:18	00:23:22	00:14:31	00:13:09	00:17:26	00:23:18	00:16:30	00:16:35
	Start Time:	**15:59**	**16:38**	**16:13**	**16:40**	**17:08**	**16:58**	**17:44**	**17:31**
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**

Route 3: A39 Bridgwater

04:00 - 05:00

Ref	Description	Run 1	Run 2
	Date:	**05/06/2008**	**05/06/2008**
	Start Time:	**04:11**	**04:30**
Ref	**Description**	Timing Point	Timing Point
	Westbound		
1	A39 Bath Rd/ Crancombe Lane	00:00:00	00:00:00
2	A39 Bath Rd/ A39 Puriton Hill, Knowle	00:00:34	00:00:40
3	A39 Bath Rd/ Bower Lane	00:02:32	00:02:07
4	A39 Bath Rd/ Parkway	00:03:03	00:02:35
5	A39 Bath Rd/ A38 Bristol Rd/ The Clink	00:04:19	00:03:09
6	The Clink/ The Leggar (Retail Park Access)	00:04:34	00:04:24
7	The Clink/ East Quay	00:05:07	00:05:03
8	The Clink/ Northgate	00:05:30	00:05:27
9	Mount Street/ Northgate/ Castle Moat	00:05:53	00:06:06
10	Mount Street/ Northgate/ Penel Orlieu Rdbt	00:06:23	00:06:37
11	Penel Orlieu/ North St/ Broadway/ West St	00:06:36	00:06:50
12	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:06:55	00:07:08
13	A39 Quantock Rd/ Wembdon Rd	00:07:33	00:07:48
14	A39 Quantock Rd/ Quantock Meadow Rdbt	00:08:05	00:08:21
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:09:55	00:10:12
	Eastbound		
16	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00
17	A39 Quantock Rd/ Quantock Meadow Rdbt	00:01:58	00:02:35
18	A39 Quantock Rd/ Wembdon Rd	00:02:39	00:03:13
19	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:03:16	00:03:29
20	North St/ West St/ Broadway/ Penel Orlieu	00:03:33	00:03:41
21	Mount St/ High St/ Penel Orlieu Rdbt	00:03:45	00:04:21
22	Mount Street/ Northgate/ Castle Moat	00:04:18	00:04:35
23	The Clink/ Northgate	00:04:38	00:04:55
24	The Clink/ East Quay	00:05:12	00:05:12
25	The Clink/ The Leggar (Retail Park Access)	00:05:34	00:05:27
26	A39 Bath Rd/ A38 Bristol Rd/ The Clink	00:05:59	00:06:42
27	A39 Bath Rd/ Parkway	00:07:04	00:07:14
28	A39 Bath Rd/ Bower Lane	00:07:38	00:09:16
29	A39 Bath Rd/ A39 Puriton Hill, Knowle	00:09:35	00:09:48
30	A39 Bath Rd/ Crancombe Lane	00:10:08	00:04:20
	Start Time:	**04:00**	**04:20**
	Date:	**05/06/2008**	**05/06/2008**

Route 3: A39 Bridgwater

07:30 - 09:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**	**19/06/2008**	**25/06/2008**
	Start Time:	**07:28**	**07:54**	**08:31**	**08:34**	**07:24**	**07:50**	**08:17**	**08:24**
Ref	**Description**	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A39 Bath Rd/ Crancombe Lane	00:00:00	00:00:00		00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A39 Bath Rd/ A39 Puriton Hill, Knowle	00:00:33	00:00:45		00:00:36	00:00:38	00:00:37	00:00:33	00:00:48
3	A39 Bath Rd/ Bower Lane	00:02:40	00:03:07		00:02:38	00:02:46	00:02:42	00:02:43	00:02:57
4	A39 Bath Rd/ Parkway	00:03:27	00:04:16		00:04:21	00:03:18	00:03:32	00:03:26	00:03:35
5	A39 Bath Rd/ A38 Bristol Rd/ The Clink	00:04:42	00:07:59		00:11:19	00:04:40	00:05:21	00:05:30	00:06:16
6	The Clink/ The Leggar (Retail Park Access)	00:05:08	00:10:41		00:11:54	00:06:26	00:05:41	00:05:52	00:06:57
7	The Clink/ East Quay	00:06:27	00:12:44		00:13:04	00:06:48	00:06:29	00:06:35	00:07:17
8	The Clink/ Northgate	00:06:47	00:13:03		00:13:27	00:07:10	00:07:02	00:07:23	00:07:39
9	Mount Street/ Northgate/ Castle Moat	00:07:11	00:13:28		00:13:55	00:07:35	00:07:27	00:07:54	00:08:08
10	Mount Street/ Northgate/ Penel Orlieu Rdbt	00:07:53	00:14:08		00:14:36	00:08:12	00:08:00	00:08:24	00:08:43
11	Penel Orlieu/ North St/ Broadway/ West St	00:08:21	00:16:00		00:16:19	00:09:26	00:09:09	00:10:00	00:10:59
12	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:08:41	00:16:20		00:16:48	00:09:47	00:09:30	00:10:20	00:11:23
13	A39 Quantock Rd/ Wembdon Rd	00:09:19	00:17:02		00:17:54	00:10:46	00:10:22	00:11:02	00:12:10
14	A39 Quantock Rd/ Quantock Meadow Rdbt	00:10:07	00:17:43		00:18:38	00:11:23	00:10:57	00:11:38	00:12:49
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:12:14	00:21:19		00:21:39	00:13:26	00:13:02	00:13:37	00:15:03
	Eastbound								
16	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
17	A39 Quantock Rd/ Quantock Meadow Rdbt	00:02:11	00:02:26	00:02:03	00:02:08	00:02:04	00:02:01	00:02:06	00:02:29
18	A39 Quantock Rd/ Wembdon Rd	00:02:52	00:03:33	00:02:58	00:02:52	00:02:52	00:02:48	00:03:09	00:03:16
19	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:03:44	00:04:22	00:04:03	00:03:39	00:03:40	00:03:33	00:04:03	00:04:00
20	North St/ West St/ Broadway/ Penel Orlieu	00:04:38	00:05:16	00:04:57	00:05:12	00:04:55	00:04:29	00:04:46	00:05:06
21	Mount St/ High St/ Penel Orlieu Rdbt	00:04:50	00:05:33	00:05:10	00:05:25	00:05:11	00:04:41	00:05:01	00:05:22
22	Mount Street/ Northgate/ Castle Moat	00:05:30	00:06:28	00:05:44	00:06:05	00:05:56	00:05:58	00:05:41	00:06:10
23	The Clink/ Northgate	00:06:10	00:07:03	00:06:20	00:06:31	00:06:25	00:06:27	00:06:14	00:06:33
24	The Clink/ East Quay	00:07:07	00:08:26	00:07:47	00:07:19	00:07:08	00:07:13	00:06:53	00:06:53
25	The Clink/ The Leggar (Retail Park Access)	00:07:39	00:08:48	00:08:08	00:08:27	00:07:39	00:07:36	00:07:22	00:07:32
26	A39 Bath Rd/ A38 Bristol Rd/ The Clink	00:08:02	00:09:03	00:08:58	00:09:00	00:08:06	00:08:09	00:08:04	00:07:57
27	A39 Bath Rd/ Parkway	00:10:01	00:10:48	00:11:36	00:11:04	00:09:52	00:09:41	00:10:24	00:09:48
28	A39 Bath Rd/ Bower Lane	00:10:42	00:11:35	00:12:10	00:11:40	00:10:30	00:10:18	00:11:01	00:10:29
29	A39 Bath Rd/ A39 Puriton Hill, Knowle	00:12:51	00:13:44	00:14:10	00:13:46	00:12:36	00:12:29	00:13:13	00:12:46
30	A39 Bath Rd/ Crancombe Lane	00:13:25	00:14:16	00:14:44	00:14:23	00:13:13	00:13:07	00:13:52	00:13:24
	Start Time:	**07:40**	**08:16**	**08:19**	**08:57**	**07:37**	**08:03**	**08:40**	**09:10**
	Date:	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**	**19/06/2008**	**25/06/2008**

Route 3: A39 Bridgwater

10:00 - 12:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**16/06/2008**	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**
	Start Time:	**10:34**	**11:01**	**11:28**	**10:24**	**11:03**	**10:40**	**10:03**	**10:30**
Ref	**Description**	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A39 Bath Rd/ Crancombe Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A39 Bath Rd/ A39 Puriton Hill, Knowle	00:00:37	00:00:37	00:00:33	00:00:33	00:00:38	00:00:36	00:00:38	00:00:42
3	A39 Bath Rd/ Bower Lane	00:02:41	00:02:38	00:02:35	00:02:54	00:02:46	00:02:48	00:02:49	00:02:57
4	A39 Bath Rd/ Parkway	00:03:18	00:03:15	00:03:17	00:03:32	00:03:22	00:04:16	00:03:25	00:03:39
5	A39 Bath Rd/ A38 Bristol Rd/ The Clink	00:05:01	00:05:00	00:04:51	00:05:18	00:06:03	00:06:06	00:05:14	00:05:14
6	The Clink/ The Leggar (Retail Park Access)	00:05:27	00:05:19	00:05:28	00:05:40	00:06:37	00:06:28	00:05:41	00:06:09
7	The Clink/ East Quay	00:06:06	00:05:57	00:06:05	00:06:08	00:07:23	00:07:41	00:06:38	00:07:10
8	The Clink/ Northgate	00:06:40	00:06:21	00:06:32	00:06:31	00:07:45	00:08:08	00:07:01	00:07:45
9	Mount Street/ Northgate/ Castle Moat	00:07:10	00:07:31	00:07:03	00:06:59	00:08:12	00:08:40	00:07:27	00:08:22
10	Mount Street/ Northgate/ Penel Orlieu Rdbt	00:07:45	00:08:12	00:07:46	00:05:05	00:08:46	00:09:32	00:08:03	00:09:52
11	Penel Orlieu/ North St/ Broadway/ West St	00:07:57	00:08:53	00:09:08	00:18:32	00:09:58	00:11:11	00:09:46	00:11:18
12	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:08:18	00:09:18	00:09:29	00:18:55	00:10:24	00:11:35	00:10:08	00:11:42
13	A39 Quantock Rd/ Wembdon Rd	00:08:59	00:10:02	00:10:14	00:19:36	00:11:03	00:12:16	00:10:50	00:12:29
14	A39 Quantock Rd/ Quantock Meadow Rdbt	00:09:34	00:10:42	00:10:55	00:20:16	00:11:42	00:12:52	00:11:26	00:13:16
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:11:28	00:13:09	00:13:27	00:22:23	00:13:40	00:14:48	00:14:04	00:15:40
	Eastbound								
16	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
17	A39 Quantock Rd/ Quantock Meadow Rdbt	00:02:00	00:01:55	00:02:05	00:02:12	00:01:53	00:01:58	00:02:06	00:02:32
18	A39 Quantock Rd/ Wembdon Rd	00:03:12	00:02:39	00:02:57	00:02:59	00:02:43	00:02:55	00:02:50	00:03:24
19	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:03:55	00:03:20	00:03:50	00:03:40	00:03:52	00:03:40	00:03:32	00:04:13
20	North St/ West St/ Broadway/ Penel Orlieu	00:04:21	00:04:23	00:04:26	00:04:58	00:04:46	00:04:57	00:04:14	00:05:14
21	Mount St/ High St/ Penel Orlieu Rdbt	00:04:33	00:04:36	00:04:38	00:05:11	00:04:58	00:05:11	00:04:24	00:05:30
22	Mount Street/ Northgate/ Castle Moat	00:05:10	00:05:15	00:05:20	00:05:49	00:05:47	00:05:46	00:05:00	00:06:13
23	The Clink/ Northgate	00:05:35	00:05:34	00:06:19	00:06:13	00:06:18	00:06:29	00:05:34	00:06:36
24	The Clink/ East Quay	00:06:28	00:06:48	00:06:42	00:07:19	00:07:15	00:07:43	00:06:02	00:07:54
25	The Clink/ The Leggar (Retail Park Access)	00:07:03	00:07:10	00:07:07	00:07:42	00:08:09	00:08:10	00:06:43	00:08:23
26	A39 Bath Rd/ A38 Bristol Rd/ The Clink	00:07:38	00:08:07	00:07:32	00:08:14	00:08:43	00:08:56	00:07:01	00:08:46
27	A39 Bath Rd/ Parkway	00:09:36	00:09:54	00:09:22	00:09:50	00:10:19	00:10:34	00:08:26	00:10:39
28	A39 Bath Rd/ Bower Lane	00:10:17	00:10:26	00:10:02	00:10:25	00:10:53	00:11:10	00:08:59	00:11:24
29	A39 Bath Rd/ A39 Puriton Hill, Knowle	00:12:14	00:12:50	00:12:01	00:12:46	00:12:55	00:13:19	00:11:07	00:13:42
30	A39 Bath Rd/ Crancombe Lane	00:12:47	00:13:26	00:12:33	00:13:18	00:13:25	00:13:53	00:11:40	00:14:22
	Start Time:	**10:46**	**11:15**	**11:42**	**10:46**	**11:23**	**10:56**	**10:17**	**10:43**
	Date:	**16/06/2008**	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**

Route 3: A39 Bridgwater

13:00 - 15:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**
	Start Time:	**13:45**	**14:20**	**13:28**	**13:56**	**14:22**	**13:00**	**13:27**	**13:48**
Ref	**Description**	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A39 Bath Rd / Crancombe Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A39 Bath Rd / A39 Puriton Hill, Knowle	00:00:35	00:00:40	00:00:34	00:00:34	00:00:33	00:00:37	00:00:37	00:00:41
3	A39 Bath Rd / Bower Lane	00:02:45	00:02:44	00:02:34	00:02:32	00:02:27	00:02:36	00:02:52	00:02:42
4	A39 Bath Rd / Parkway	00:04:03	00:03:46	00:03:15	00:03:06	00:03:13	00:03:12	00:03:27	00:03:15
5	A39 Bath Rd / A38 Bristol Rd/ The Clink	00:05:51	00:05:38	00:04:51	00:04:40	00:05:04	00:04:44	00:05:14	00:06:03
6	The Clink/ The Leggar (Retail Park Access)	00:06:31	00:06:12	00:05:08	00:05:00	00:05:26	00:05:13	00:05:33	00:06:29
7	The Clink/ East Quay	00:07:01	00:06:37	00:05:48	00:05:50	00:05:53	00:05:54	00:06:04	00:07:32
8	The Clink/ Northgate	00:07:35	00:06:59	00:06:14	00:06:12	00:06:22	00:06:13	00:06:34	00:07:55
9	Mount Street/ Northgate/ Castle Moat	00:08:06	00:07:28	00:06:42	00:06:38	00:06:48	00:06:41	00:07:04	00:08:20
10	Mount Street/ Northgate/ Penel Orlieu Rdbt	00:08:46	00:10:07	00:07:14	00:07:25	00:07:22	00:07:29	00:07:46	00:08:54
11	Penel Orlieu/ North St/ Broadway/ West St	00:10:27	00:11:50	00:08:23	00:09:00	00:09:05	00:07:48	00:09:02	00:09:50
12	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:10:49	00:12:13	00:08:55	00:09:23	00:09:28	00:08:14	00:09:26	00:10:12
13	A39 Quantock Rd/ Wembdon Rd	00:11:35	00:12:57	00:09:39	00:10:03	00:10:08	00:09:03	00:10:18	00:10:54
14	A39 Quantock Rd/ Quantock Meadow Rdbt	00:12:10	00:13:36	00:10:19	00:10:37	00:10:48	00:09:41	00:11:04	00:11:33
15	A39 Quantock Rd/ B3339 Sandford Hill / A39 New Rd	00:14:12	00:15:51	00:12:22	00:12:29	00:12:48	00:12:48	00:13:09	00:13:46
	Eastbound								
16	A39 Quantock Rd/ B3339 Sandford Hill / A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
17	A39 Quantock Rd/ Quantock Meadow Rdbt	00:02:00	00:02:02	00:01:57	00:02:34	00:01:48	00:02:10	00:01:57	00:02:07
18	A39 Quantock Rd/ Wembdon Rd	00:02:55	00:02:44	00:02:39	00:03:22	00:02:35	00:02:54	00:02:40	00:02:53
19	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:03:38	00:03:25	00:03:21	00:04:07	00:03:21	00:03:35	00:03:24	00:03:40
20	North St/ West St/ Broadway/ Penel Orlieu	00:04:58	00:03:58	00:04:30	00:04:25	00:03:38	00:04:06	00:04:26	00:04:44
21	Mount St/ High St/ Penel Orlieu Rdbt	00:05:14	00:04:27	00:04:42	00:04:37	00:03:51	00:05:43	00:04:38	00:05:01
22	Mount Street/ Northgate/ Castle Moat	00:05:50	00:05:30	00:05:22	00:05:07	00:04:39	00:06:38	00:05:29	00:05:38
23	The Clink/ Northgate	00:06:28	00:06:07	00:05:58	00:05:33	00:05:00	00:07:04	00:05:53	00:06:04
24	The Clink/ East Quay	00:07:11	00:07:19	00:06:55	00:05:57	00:05:34	00:07:43	00:06:24	00:06:33
25	The Clink/ The Leggar (Retail Park Access)	00:07:55	00:08:09	00:07:19	00:06:18	00:05:57	00:08:02	00:06:49	00:06:52
26	A39 Bath Rd / A38 Bristol Rd/ The Clink	00:08:35	00:08:34	00:07:43	00:07:05	00:06:30	00:08:24	00:07:32	00:08:05
27	A39 Bath Rd / Parkway	00:10:34	00:10:25	00:09:48	00:08:25	00:08:12	00:09:57	00:09:05	00:09:53
28	A39 Bath Rd / Bower Lane	00:11:52	00:11:09	00:10:22	00:08:55	00:08:53	00:10:37	00:09:44	00:10:34
29	A39 Bath Rd / A39 Puriton Hill, Knowle	00:14:02	00:13:16	00:12:12	00:10:43	00:11:10	00:12:42	00:11:47	00:12:52
30	A39 Bath Rd / Crancombe Lane	00:14:38	00:13:52	00:12:42	00:11:19	00:11:43	00:13:18	00:12:22	00:13:30
	Start Time:	**14:01**	**15:36**	**13:42**	**14:09**	**14:35**	**13:13**	**13:41**	**14:02**
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**

Route 3: A39 Bridgwater

16:00 - 18:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**
	Start Time:	**16:29**	**17:02**	**16:32**	**17:14**	**16:00**	**16:30**	**15:58**	**16:54**
Ref	**Description**	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A39 Bath Rd / Crancombe Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A39 Bath Rd / A39 Puriton Hill, Knowle	00:00:36	00:00:40	00:00:34	00:00:37	00:00:38	00:00:45	00:00:37	00:00:33
3	A39 Bath Rd / Bower Lane	00:02:55	00:02:45	00:02:35	00:02:42	00:02:36	00:02:54	00:02:50	00:02:36
4	A39 Bath Rd / Parkway	00:03:36	00:03:22	00:03:11	00:03:22	00:03:15	00:03:34	00:03:25	00:03:14
5	A39 Bath Rd / A38 Bristol Rd/ The Clink	00:05:40	00:09:19	00:05:11	00:05:44	00:04:57	00:06:09	00:05:12	00:04:57
6	The Clink/ The Leggar (Retail Park Access)	00:06:04	00:09:40	00:05:37	00:06:03	00:05:19	00:06:48	00:05:29	00:05:14
7	The Clink/ East Quay	00:06:28	00:11:02	00:06:28	00:06:22	00:06:13	00:07:26	00:05:52	00:06:03
8	The Clink/ Northgate	00:06:55	00:11:29	00:07:00	00:06:43	00:06:50	00:07:50	00:06:15	00:06:28
9	Mount Street/ Northgate/ Castle Moat	00:07:20	00:12:02	00:07:28	00:07:07	00:07:25	00:08:17	00:06:50	00:06:55
10	Mount Street/ Northgate/ Penel Orlieu Rdbt	00:07:52	00:13:16	00:08:03	00:08:45	00:07:58	00:09:06	00:07:37	00:07:28
11	Penel Orlieu/ North St/ Broadway/ West St	00:09:29	00:16:40	00:09:01	00:09:11	00:09:20	00:10:34	00:08:57	00:08:12
12	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:09:55	00:16:59	00:09:29	00:09:31	00:09:44	00:10:57	00:09:19	00:08:41
13	A39 Quantock Rd/ Wembdon Rd	00:10:41	00:17:40	00:10:13	00:10:02	00:10:34	00:11:40	00:10:12	00:09:27
14	A39 Quantock Rd/ Quantock Meadow Rdbt	00:11:21	00:18:20	00:10:49	00:10:40	00:11:16	00:12:19	00:10:40	00:10:09
15	A39 Quantock Rd/ B3339 Sandford Hill / A39 New Rd	00:13:19	00:20:26	00:13:19	00:12:56	00:13:29	00:14:24	00:12:39	00:12:21
	Eastbound								
16	A39 Quantock Rd/ B3339 Sandford Hill / A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
17	A39 Quantock Rd/ Quantock Meadow Rdbt	00:02:22	00:01:47	00:02:19	00:02:10	00:01:57	00:02:06	00:01:55	00:02:14
18	A39 Quantock Rd/ Wembdon Rd	00:03:33	00:02:48	00:03:24	00:03:13	00:02:38	00:02:52	00:02:34	00:03:07
19	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	00:04:43	00:03:37	00:04:08	00:03:57	00:03:21	00:03:32	00:03:13	00:03:52
20	North St/ West St/ Broadway/ Penel Orlieu	00:06:45	00:04:44	00:04:27	00:04:20	00:03:37	00:04:26	00:03:43	00:04:33
21	Mount St/ High St/ Penel Orlieu Rdbt	00:06:59	00:04:57	00:04:41	00:04:31	00:03:50	00:04:41	00:03:57	00:04:52
22	Mount Street/ Northgate/ Castle Moat	00:07:36	00:05:34	00:05:27	00:05:07	00:04:28	00:05:20	00:04:43	00:05:42
23	The Clink/ Northgate	00:08:00	00:06:13	00:05:49	00:05:32	00:05:05	00:05:49	00:05:07	00:06:21
24	The Clink/ East Quay	00:10:04	00:06:49	00:07:29	00:06:36	00:06:08	00:07:03	00:06:18	00:08:33
25	The Clink/ The Leggar (Retail Park Access)	00:10:54	00:07:18	00:07:53	00:09:23	00:06:30	00:07:40	00:06:38	00:09:02
26	A39 Bath Rd / A38 Bristol Rd/ The Clink	00:11:12	00:07:39	00:08:16	00:10:19	00:06:50	00:08:03	00:07:10	00:10:17
27	A39 Bath Rd / Parkway	00:13:24	00:09:36	00:10:39	00:12:33	00:08:33	00:09:49	00:09:12	00:12:35
28	A39 Bath Rd / Bower Lane	00:14:01	00:10:18	00:11:25	00:13:15	00:09:14	00:10:35	00:09:43	00:13:17
29	A39 Bath Rd / A39 Puriton Hill, Knowle	00:16:05	00:12:31	00:13:20	00:15:30	00:11:23	00:13:29	00:11:34	00:15:25
30	A39 Bath Rd / Crancombe Lane	00:16:37	00:13:07	00:13:50	00:16:00	00:11:59	00:14:07	00:12:10	00:15:59
	Start Time:	**16:43**	**17:23**	**16:46**	**17:30**	**16:16**	**16:47**	**16:12**	**16:39**
	Date:	**16/06/2008**	**16/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**

Route 4: A372/ B3339 Bridgwater

04:00 - 05:00

Ref	Description	Run 1	Run 2
	Date:	**06/06/2008**	**06/06/2008**
	Start Time:	**04:07**	**04:27**
		Timing Point	Timing Point
	Westbound		
1	A372 Westonzoyland/ Bower Lane	00:00:00	00:00:00
2	A372 Westonzoyland/ Parkway	00:00:53	00:00:50
3	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:02:00	00:01:47
4	A372 St John Street/ Polden St/ Cranleigh Gardens	00:02:33	00:02:18
5	A38 Monmouth St/ A372 St John Street	00:02:56	00:02:53
6	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:03:25	00:03:34
7	A38 Broadway/ Taunton Rd	00:03:45	00:04:00
8	Broadway/ Safeway + B&Q Access	00:04:03	00:04:17
9	North St/ West St/ Broadway/ Penel Orlieu	00:04:32	00:04:43
10	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:04:52	00:05:01
11	A39 Wembdon Rd/ Northfield	00:05:23	00:05:29
12	Wembdon Rd/ A39 Quantock Rd	00:05:39	00:05:42
12a	A39 Quantock Rd Roundabout	00:06:20	00:06:21
12b	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:06:57	00:06:54
13	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:07:48	00:07:52
14	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:09:52	00:09:45
	Eastbound		
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00
16	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:02:07	00:02:07
16a	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:02:51	00:02:55
16b	A39 Quantock Rd Roundabout	00:03:21	00:03:21
17	Wembdon Rd/ A39 Quantock Rd	00:04:01	00:04:06
18	A39 Wembdon Rd/ Northfield	00:04:16	00:04:22
19	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:04:44	00:04:54
20	North St/ West St/ Broadway/ Penel Orlieu	00:05:01	00:05:12
21	Broadway/ Safeway + B&Q Access	00:05:30	00:05:44
22	A38 Broadway/ Taunton Rd	00:05:47	00:06:15
23	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:06:10	00:06:40
24	A372 St John Street/ Polden St/ Cranleigh Gardens	00:07:00	00:07:28
25	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:07:39	00:07:58
26	A372 Westonzoyland/ Parkway	00:08:36	00:08:58
27	A372 Westonzoyland/ Bower Lane	00:09:37	00:09:55
	Start Time:	**03:58**	**04:18**
	Date:	**06/06/2008**	**06/06/2008**

Route 4: A372/ B3339 Bridgwater

07:30 - 09:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**	**19/06/2008**	**24/06/2008**
	Start Time:	**07:30**	**07:57**	**08:21**	**08:26**	**07:26**	**07:51**	**08:15**	**07:42**
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A372 Westonzoyland/ Bower Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A372 Westonzoyland/ Parkway	00:00:49	00:00:42	00:00:57	00:00:49	00:00:40	00:00:46	00:00:55	00:00:52
3	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:01:58	00:01:35	00:02:26	00:02:56	00:01:23	00:01:59	00:02:27	00:01:53
4	A372 St John Street/ Polden St/ Cranleigh Gardens	00:03:15	00:02:19	00:04:00	00:04:27	00:02:33	00:03:20	00:04:43	00:02:24
5	A38 Monmouth St/ A372 St John Street	00:03:50	00:02:41	00:04:27	00:04:50	00:03:00	00:03:42	00:05:06	00:02:42
6	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:04:53	00:03:33	00:05:39	00:05:50	00:03:51	00:04:33	00:05:43	00:03:23
7	A38 Broadway/ Taunton Rd	00:05:29	00:04:08	00:06:21	00:07:55	00:04:16	00:05:01	00:06:10	00:05:59
8	Broadway/ Safeway + B&Q Access	00:05:49	00:04:24	00:06:41	00:08:06	00:04:51	00:05:31	00:06:27	00:06:21
9	North St/ West St/ Broadway/ Penel Orlieu	00:06:18	00:04:56	00:07:14	00:08:36	00:05:25	00:06:08	00:06:56	00:06:50
10	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:06:34	00:05:16	00:07:30	00:08:57	00:05:40	00:06:23	00:07:13	00:07:10
11	A39 Wembdon Rd/ Northfield	00:06:59	00:05:47	00:07:57	00:09:26	00:06:09	00:06:55	00:07:46	00:07:40
12	Wembdon Rd/ A39 Quantock Rd	00:07:15	00:06:01	00:08:13	00:09:41	00:06:26	00:07:10	00:08:03	00:07:55
12a	A39 Quantock Rd Roundabout	00:07:52	00:06:53	00:08:53	00:10:23	00:07:02	00:07:46	00:08:46	00:08:37
12b	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:08:22	00:07:27	00:09:22	00:10:57	00:07:36	00:08:14	00:09:15	00:09:31
13	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:09:06	00:08:11	00:10:05	00:11:52	00:08:21	00:08:59	00:10:08	00:10:29
14	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:11:18	00:10:41	00:12:49	00:13:37	00:10:17	00:10:57	00:12:32	00:12:55
	Eastbound								
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
16	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:02:38	00:02:53	00:02:02	00:02:03	00:02:16	00:02:09	00:02:26	00:02:26
16a	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:03:44	00:03:47	00:02:57	00:03:48	00:02:56	00:03:03	00:03:29	00:03:28
16b	A39 Quantock Rd Roundabout	00:04:19	00:04:16	00:03:26	00:04:12	00:03:29	00:03:31	00:03:59	00:03:58
17	Wembdon Rd/ A39 Quantock Rd	00:05:02	00:04:56	00:04:20	00:05:25	00:04:09	00:04:12	00:04:41	00:04:39
18	A39 Wembdon Rd/ Northfield	00:06:12	00:05:13	00:04:37	00:05:42	00:04:25	00:04:27	00:04:57	00:04:53
19	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:06:48	00:05:40	00:05:24	00:06:14	00:04:57	00:05:00	00:05:30	00:05:27
20	North St/ West St/ Broadway/ Penel Orlieu	00:07:52	00:05:58	00:06:01	00:07:05	00:05:55	00:06:14	00:06:17	00:05:44
21	Broadway/ Safeway + B&Q Access	00:08:20	00:06:42	00:06:27	00:07:32	00:06:23	00:06:44	00:06:50	00:06:22
22	A38 Broadway/ Taunton Rd	00:09:36	00:07:15	00:07:02	00:08:25	00:07:34	00:07:48	00:07:07	00:06:46
23	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:10:33	00:08:11	00:07:51	00:09:09	00:08:23	00:10:36	00:07:47	00:07:28
24	A372 St John Street/ Polden St/ Cranleigh Gardens	00:12:45	00:10:21	00:10:15	00:11:40	00:10:24	00:11:09	00:09:11	00:09:41
25	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:13:27	00:10:59	00:10:53	00:12:38	00:10:52	00:11:50	00:09:48	00:10:11
26	A372 Westonzoyland/ Parkway	00:14:27	00:11:53	00:12:00	00:13:37	00:11:41	00:12:42	00:10:49	00:11:16
27	A372 Westonzoyland/ Bower Lane	00:15:25	00:12:32	00:12:51	00:14:28	00:12:18	00:13:20	00:11:40	00:11:57
	Start Time:	**07:42**	**08:08**	**08:34**	**08:40**	**07:38**	**08:02**	**07:30**	**07:56**
	Date:	**17/06/2008**	**17/06/2008**	**17/06/2008**	**18/06/2008**	**19/06/2008**	**19/06/2008**	**24/06/2008**	**24/06/2008**

Route 4: A372/ B3339 Bridgwater

10:00 - 12:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	18/06/2008
	Start Time:	10:00	10:28	10:57	11:08	11:37	10:53	09:59	10:25
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A372 Westonzoyland/ Bower Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A372 Westonzoyland/ Parkway	00:00:42	00:00:44	00:00:41	00:00:44	00:00:43	00:00:51	00:00:45	00:00:47
3	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:01:33	00:01:45	00:01:39	00:01:53	00:01:49	00:01:47	00:01:38	00:01:49
4	A372 St John Street/ Polden St/ Cranleigh Gardens	00:02:54	00:03:10	00:02:20	00:02:40	00:03:01	00:02:48	00:02:43	00:02:31
5	A38 Monmouth St/ A372 St John Street	00:03:26	00:03:36	00:03:52	00:03:09	00:03:29	00:03:12	00:03:05	00:03:01
6	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:04:33	00:04:45	00:05:03	00:04:17	00:04:20	00:04:50	00:04:09	00:03:50
7	A38 Broadway/ Taunton Rd	00:04:58	00:05:10	00:05:32	00:04:39	00:04:52	00:04:26	00:04:46	00:04:25
8	Broadway/ Safeway + B&Q Access	00:05:47	00:06:59	00:06:19	00:05:13	00:05:32	00:04:55	00:05:15	00:05:54
9	North St/ West St/ Broadway/ Penel Orlieu	00:07:23	00:08:18	00:06:49	00:05:45	00:06:23	00:05:56	00:06:49	00:06:48
10	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:07:44	00:08:40	00:07:06	00:06:04	00:06:45	00:06:45	00:07:08	00:07:10
11	A39 Wembdon Rd/ Northfield	00:08:33	00:09:13	00:07:34	00:06:57	00:07:22	00:07:08	00:07:37	00:07:42
12	Wembdon Rd/ A39 Quantock Rd	00:08:47	00:09:32	00:07:50	00:07:15	00:07:43	00:07:38	00:07:52	00:08:00
12a	A39 Quantock Rd Roundabout	00:09:11	00:10:12	00:08:38	00:08:05	00:08:36	00:08:36	00:08:37	00:08:45
12b	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:09:43	00:10:59	00:09:05	00:08:56	00:09:07	00:09:07	00:09:23	00:09:21
13	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:10:34	00:11:45	00:09:50	00:09:42	00:09:54	00:09:55	00:10:11	00:10:07
14	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:12:24	00:13:48	00:11:58	00:12:01	00:12:08	00:12:01	00:12:10	00:12:10
	Eastbound								
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
16	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:02:28	00:02:12	00:02:24	00:02:16	00:02:30	00:02:06	00:02:09	00:02:14
16a	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:03:37	00:03:10	00:03:20	00:03:04	00:03:21	00:03:01	00:02:58	00:03:14
16b	A39 Quantock Rd Roundabout	00:04:05	00:03:41	00:03:46	00:03:32	00:03:50	00:03:30	00:03:33	00:03:46
17	Wembdon Rd/ A39 Quantock Rd	00:04:59	00:04:21	00:04:27	00:04:19	00:04:29	00:04:04	00:04:15	00:04:30
18	A39 Wembdon Rd/ Northfield	00:05:19	00:04:37	00:04:41	00:04:36	00:04:44	00:04:18	00:04:32	00:04:47
19	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:05:56	00:05:05	00:05:13	00:05:10	00:05:13	00:04:46	00:05:03	00:05:18
20	North St/ West St/ Broadway/ Penel Orlieu	00:06:45	00:06:07	00:06:12	00:06:16	00:05:44	00:05:11	00:06:12	00:06:53
21	Broadway/ Safeway + B&Q Access	00:07:15	00:07:15	00:06:41	00:06:42	00:06:23	00:05:35	00:07:08	00:07:34
22	A38 Broadway/ Taunton Rd	00:08:23	00:09:09	00:07:36	00:07:27	00:08:04	00:07:12	00:07:36	00:08:35
23	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:08:47	00:09:40	00:08:03	00:08:06	00:08:31	00:07:54	00:08:22	00:09:19
24	A372 St John Street/ Polden St/ Cranleigh Gardens	00:11:50	00:12:54	00:11:25	00:10:11	00:10:04	00:08:31	00:10:32	00:11:34
25	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:12:27	00:13:33	00:11:55	00:10:50	00:10:31	00:09:06	00:11:04	00:12:07
26	A372 Westonzoyland/ Parkway	00:13:31	00:14:40	00:12:51	00:11:46	00:11:31	00:10:02	00:12:15	00:13:10
27	A372 Westonzoyland/ Bower Lane	00:14:16	00:15:17	00:13:27	00:12:35	00:12:22	00:10:44	00:13:08	00:14:01
	Start Time:	10:13	10:42	11:09	10:55	11:25	11:49	10:12	10:39
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008

Route 4: A372/ B3339 Bridgwater

13:00 - 15:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008
	Start Time:	13:47	14:13	14:43	13:02	13:25	13:49	13:54	14:19
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A372 Westonzoyland/ Bower Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A372 Westonzoyland/ Parkway	00:00:46	00:00:44	00:00:44	00:00:50	00:00:42	00:00:46	00:00:45	00:00:41
3	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:01:45	00:01:46	00:01:43	00:01:52	00:01:36	00:01:43	00:01:42	00:01:36
4	A372 St John Street/ Polden St/ Cranleigh Gardens	00:02:17	00:03:26	00:03:33	00:02:39	00:02:11	00:02:59	00:02:43	00:03:47
5	A38 Monmouth St/ A372 St John Street	00:02:33	00:03:53	00:04:11	00:02:58	00:02:31	00:04:31	00:03:23	00:04:31
6	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:03:09	00:05:20	00:05:13	00:03:32	00:03:33	00:05:48	00:04:04	00:05:42
7	A38 Broadway/ Taunton Rd	00:03:51	00:05:49	00:05:44	00:05:21	00:03:57	00:06:22	00:06:02	00:06:08
8	Broadway/ Safeway + B&Q Access	00:04:36	00:06:33	00:06:38	00:06:05	00:04:53	00:07:04	00:06:20	00:06:55
9	North St/ West St/ Broadway/ Penel Orlieu	00:05:38	00:07:25	00:07:36	00:06:42	00:05:32	00:07:56	00:07:37	00:07:54
10	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:06:02	00:07:59	00:07:55	00:07:02	00:05:56	00:08:17	00:08:02	00:08:17
11	A39 Wembdon Rd/ Northfield	00:06:28	00:08:31	00:08:22	00:07:31	00:06:20	00:08:43	00:08:27	00:08:41
12	Wembdon Rd/ A39 Quantock Rd	00:06:44	00:08:48	00:08:39	00:07:48	00:06:37	00:09:00	00:08:47	00:09:03
12a	A39 Quantock Rd Roundabout	00:07:27	00:09:27	00:09:16	00:08:27	00:07:14	00:09:39	00:09:28	00:09:45
12b	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:07:58	00:10:01	00:09:49	00:09:14	00:07:45	00:10:14	00:10:34	00:10:26
13	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:08:48	00:10:48	00:10:34	00:10:03	00:08:32	00:11:16	00:11:19	00:11:10
14	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:11:05	00:13:16	00:13:00	00:12:27	00:10:48	00:13:34	00:13:16	00:13:04
	Eastbound								
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
16	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:02:23	00:02:31	00:02:08	00:02:10	00:02:25	00:02:21	00:02:11	00:02:04
16a	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:03:04	00:03:39	00:02:56	00:03:03	00:03:12	00:03:19	00:02:57	00:03:12
16b	A39 Quantock Rd Roundabout	00:03:33	00:04:07	00:03:26	00:03:29	00:03:40	00:03:57	00:03:25	00:03:42
17	Wembdon Rd/ A39 Quantock Rd	00:04:11	00:04:43	00:04:08	00:04:07	00:04:17	00:04:43	00:04:03	00:04:24
18	A39 Wembdon Rd/ Northfield	00:04:25	00:04:56	00:04:21	00:04:20	00:04:33	00:04:59	00:04:17	00:04:39
19	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:05:02	00:05:23	00:04:55	00:04:47	00:05:02	00:05:29	00:04:44	00:05:08
20	North St/ West St/ Broadway/ Penel Orlieu	00:06:18	00:06:08	00:05:16	00:05:28	00:06:39	00:06:12	00:06:00	00:06:15
21	Broadway/ Safeway + B&Q Access	00:07:13	00:07:05	00:05:44	00:06:01	00:07:03	00:06:41	00:06:40	00:06:45
22	A38 Broadway/ Taunton Rd	00:08:23	00:07:59	00:07:21	00:06:20	00:07:16	00:06:54	00:06:55	00:07:02
23	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:08:49	00:08:29	00:08:22	00:07:01	00:07:39	00:09:01	00:07:35	00:07:49
24	A372 St John Street/ Polden St/ Cranleigh Gardens	00:12:26	00:14:03	00:10:34	00:07:44	00:09:56	00:09:46	00:08:20	00:11:47
25	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:13:06	00:14:43	00:11:19	00:08:22	00:10:36	00:10:24	00:09:03	00:12:25
26	A372 Westonzoyland/ Parkway	00:14:05	00:15:43	00:12:13	00:09:32	00:11:51	00:11:25	00:09:59	00:13:31
27	A372 Westonzoyland/ Bower Lane	00:14:44	00:16:26	00:12:57	00:10:13	00:12:26	00:12:07	00:10:43	00:14:24
	Start Time:	13:58	14:26	13:41	13:15	13:36	14:02	14:08	14:32
	Date:	16/06/2008	16/06/2008	18/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008

Route 4: A372/ B3339 Bridgwater

16:00 - 18:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	19/06/2008
	Start Time:	16:44	17:17	16:01	16:27	16:59	16:53	17:29	16:12
		Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Westbound								
1	A372 Westonzoyland/ Bower Lane	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A372 Westonzoyland/ Parkway	00:00:44	00:00:43	00:00:40	00:01:14	00:00:40	00:00:48	00:00:47	00:00:45
3	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:01:42	00:02:12	00:01:39	00:02:25	00:01:36	00:02:00	00:01:44	00:01:48
4	A372 St John Street/ Polden St/ Cranleigh Gardens	00:03:42	00:05:32	0:03:04	00:04:20	00:03:20	00:03:38	00:03:45	00:03:02
5	A38 Monmouth St/ A372 St John Street	00:04:38	00:06:09	00:03:29	00:04:44	00:03:50	00:04:02	00:04:03	00:03:50
6	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:06:16	00:07:49	00:04:43	00:05:46	00:04:48	00:05:11	00:05:19	00:04:21
7	A38 Broadway/ Taunton Rd	00:08:07	00:09:49	00:05:08	00:06:31	00:06:58	00:07:42	00:05:59	00:06:45
8	Broadway/ Safeway + B&Q Access	00:08:30	00:10:33	00:05:33	00:07:28	00:08:16	00:08:32	00:06:35	00:07:34
9	North St/ West St/ Broadway/ Penel Orlieu	00:09:03	00:12:06	00:06:22	00:08:59	00:09:57	00:09:23	00:07:18	00:08:14
10	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:09:21	00:12:26	00:06:45	00:09:22	00:10:18	00:09:55	00:07:45	00:08:37
11	A39 Wembdon Rd/ Northfield	00:09:23	00:12:57	00:07:19	00:09:49	00:10:57	00:10:40	00:08:18	00:09:10
12	Wembdon Rd/ A39 Quantock Rd	00:10:09	00:13:14	00:07:35	00:10:05	00:11:14	00:10:56	00:08:36	00:09:27
12a	A39 Quantock Rd Roundabout	00:10:59	00:13:54	00:08:24	00:10:42	00:11:54	00:11:50	00:09:22	00:10:19
12b	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:11:28	00:14:36	00:09:01	00:11:26	00:13:12	00:12:25	00:10:09	00:11:10
13	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:12:12	00:15:25	00:09:48	00:12:09	00:13:57	00:13:10	00:10:58	00:12:04
14	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:14:33	00:17:59	00:12:26	00:14:23	00:15:59	00:15:28	00:13:13	00:14:24
	Eastbound								
15	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
16	B3339 Wembdon Hill/ Church Rd/ B3339 Wembdon Rise	00:02:33	00:02:21	00:02:25	00:02:04	00:01:58	00:02:26	00:02:04	00:02:18
16a	B3339 Wembdon Rise/ Northern Distributor Rd Traffic Signal Junction	00:03:30	00:03:45	00:03:53	00:03:15	00:03:03	00:03:23	00:02:59	00:03:24
16b	A39 Quantock Rd Roundabout	00:03:57	00:04:09	00:04:20	00:03:51	00:03:46	00:04:07	00:03:35	00:03:56
17	Wembdon Rd/ A39 Quantock Rd	00:04:50	00:04:47	00:05:05	00:04:34	00:04:44	00:05:04	00:04:20	00:05:05
18	A39 Wembdon Rd/ Northfield	00:05:13	00:05:00	00:05:22	00:04:51	00:04:58	00:05:21	00:04:38	00:05:20
19	A39 Wembdon Rd/ Alexandra Rd (Victoria Rd)/ North St Rdbt	00:06:12	00:05:37	00:05:52	00:05:24	00:05:26	00:05:58	00:05:16	00:06:03
20	North St/ West St/ Broadway/ Penel Orlieu	00:07:30	00:06:11	00:07:17	00:06:06	00:05:51	00:07:09	00:06:21	00:07:21
21	Broadway/ Safeway + B&Q Access	00:07:55	00:06:37	00:07:46	00:06:32	00:06:30	00:07:46	00:06:52	00:08:08
22	A38 Broadway/ Taunton Rd	00:08:57	00:07:20	00:08:32	00:07:24	00:07:01	00:09:42	00:07:25	00:10:00
23	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	00:11:51	00:08:26	00:09:32	00:09:43	00:07:38	00:12:18	00:07:52	00:10:48
24	A372 St John Street/ Polden St/ Cranleigh Gardens	00:14:30	00:10:40	00:11:24	00:10:38	00:09:45	00:14:42	00:08:33	00:12:54
25	A372 Westonzoyland/ Saints Terrace (Colley Lane)	00:15:27	00:11:36	00:12:04	00:11:29	00:10:52	00:16:09	00:09:10	00:13:38
26	A372 Westonzoyland/ Parkway	00:16:26	00:12:47	00:13:08	00:12:49	00:11:49	00:17:06	00:10:20	00:14:56
27	A372 Westonzoyland/ Bower Lane	00:17:14	00:13:40	00:13:54	00:13:34	00:12:31	00:17:50	00:11:12	00:15:39

Route 5: Bridgwater - A38 Bristol Rd/ Wylds Rd to St John St/ Westonzoyland

04:00 - 05:00

Ref	Description	Run 1	Run 2
	Date:	03/06/2008	03/06/2008
	Start Time:	04:46	04:48
Ref	Description	Timing Point	Timing Point
	Southbound		
1	A38 Bristol Rd/ Wylds Rd	00:00:00	00:00:00
2	A38 Bristol Rd/ The Drove	00:00:45	00:00:44
3	Wylds Rd/ The Drove	00:01:24	00:01:28
4	The Clink/ East Quay	00:02:27	00:02:36
5	East Quay/ Eastover	00:03:12	00:03:20
6	Eastover/ Monmouth St	00:03:52	00:04:17
6a	St John Street/ Polden Street	00:04:11	00:04:46
7	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:04:35	00:05:10
	Northbound		
8	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:00:00	00:00:00
8a	St John Street/ Cranleigh Gardens	00:00:20	00:00:19
9	St John Street/ Monmouth Street	00:00:35	00:00:39
10	East Quay/ Eastover	00:01:02	00:01:07
11	The Clink/ East Quay	00:01:53	00:02:06
12	Wylds Rd/ The Drove	00:02:42	00:03:04
13	A38 Bristol Rd/ The Drove	00:03:38	00:03:46
14	A38 Bristol Rd/ Wylds Rd	00:04:23	00:04:32
	Start Time:	04:41	04:52
	Date:	03/06/2008	03/06/2008

Route 5: Bridgwater - A38 Bristol Rd/ Wylds Rd to St John St/ Westonzoyland

07:30 - 09:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	19/06/2008	19/06/2008	24/06/2008	24/06/2008	24/06/2008	24/06/2008	25/06/2008	25/06/2008
	Start Time:	08:49	09:07	07:46	08:02	08:20	08:36	07:30	07:43
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Bristol Rd/ Wylds Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ The Drove	00:01:08	00:01:09	00:01:20	00:01:07	00:01:11	00:00:45	00:00:49	00:01:12
3	Wylds Rd/ The Drove	00:01:58	00:02:20	00:02:12	00:02:34	00:01:48	00:01:24	00:01:39	00:02:15
4	The Clink/ East Quay	00:03:52	00:03:30	00:03:36	00:04:09	00:02:57	00:02:30	00:03:05	00:03:37
5	East Quay/ Eastover	00:04:37	00:04:23	00:04:11	00:04:46	00:03:59	00:03:17	00:03:41	00:04:12
6	Eastover/ Monmouth St	00:06:10	00:05:59	00:04:50	00:06:31	00:04:59	00:03:42	00:04:03	00:04:49
6a	St John Street/ Polden Street	00:06:39	00:06:20	00:05:14	00:06:52	00:05:28	00:03:56	00:04:19	00:05:05
7	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:07:00	00:06:40	00:05:48	00:07:10	00:05:58	00:04:16	00:04:37	00:05:26
	Northbound								
8	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8a	St John Street/ Cranleigh Gardens	00:02:30	00:00:24	00:00:28	00:00:49	00:00:59	00:01:20	00:01:00	00:00:58
9	St John Street/ Monmouth Street	00:02:47	00:01:22	00:00:43	00:02:33	00:02:42	00:02:44	00:01:18	00:01:30
10	East Quay/ Eastover	00:03:19	00:01:48	00:01:07	00:03:01	00:03:09	00:03:16	00:01:43	00:01:55
11	The Clink/ East Quay	00:04:28	00:02:38	00:02:29	00:04:30	00:04:32	00:04:07	00:03:04	00:02:28
12	Wylds Rd/ The Drove	00:05:26	00:04:00	00:03:38	00:05:24	00:05:22	00:05:36	00:04:42	00:03:40
13	A38 Bristol Rd/ The Drove	00:06:58	00:05:31	00:05:07	00:06:03	00:06:43	00:06:46	00:05:53	00:05:26
14	A38 Bristol Rd/ Wylds Rd	00:07:45	00:06:19	00:05:54	00:06:50	00:07:30	00:07:32	00:06:41	00:06:17
	Start Time:	08:57	07:36	07:52	08:10	08:26	08:40	07:35	07:49
	Date:	19/06/2008	24/06/2008	24/06/2008	24/06/2008	24/06/2008	24/06/2008	25/06/2008	25/06/2008

Route 5: Bridgwater - A38 Bristol Rd/ Wylds Rd to St John St/ Westonzoyland

10:00 - 12:00

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	Date:	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	18/06/2008
	Start Time:	10:45	11:03	10:00	10:14	11:20	10:39	11:13	11:29
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Bristol Rd/ Wylds Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ The Drove	00:01:21	00:01:01	00:00:46	00:00:42	00:01:04	00:02:16	00:01:07	00:00:57
3	Wylds Rd/ The Drove	00:01:58	00:02:17	00:01:25	00:01:20	00:02:02	00:03:03	00:01:55	00:01:45
4	The Clink/ East Quay	00:03:51	00:03:12	00:03:22	00:02:25	00:03:39	00:04:22	00:03:13	00:02:55
5	East Quay/ Eastover	00:04:47	00:04:15	00:04:06	00:03:40	00:05:07	00:05:17	00:03:57	00:03:49
6	Eastover/ Monmouth St	00:05:22	00:04:47	00:05:18	00:04:09	00:06:12	00:05:50	00:05:24	00:04:24
6a	St John Street/ Polden Street	00:05:43	00:05:15	00:05:36	00:05:20	00:07:13	00:06:11	00:05:41	00:05:36
7	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:06:10	00:05:38	00:05:55	00:05:42	00:07:44	00:06:42	00:06:03	00:06:23
	Northbound								
8	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8a	St John Street/ Cranleigh Gardens	00:01:52	00:00:30	00:00:30	00:01:28	00:00:42	00:00:25	00:00:37	00:00:32
9	St John Street/ Monmouth Street	00:02:08	00:00:49	00:00:53	00:01:48	00:01:18	00:01:53	00:01:08	00:01:55
10	East Quay/ Eastover	00:02:35	00:01:22	00:01:40	00:02:24	00:01:50	00:02:25	00:01:39	00:02:37
11	The Clink/ East Quay	00:05:11	00:02:09	00:02:32	00:03:49	00:02:46	00:03:03	00:02:48	00:03:09
12	Wylds Rd/ The Drove	00:06:45	00:03:07	00:03:30	00:04:44	00:04:00	00:04:37	00:03:45	00:04:05
13	A38 Bristol Rd/ The Drove	00:08:00	00:04:29	00:04:52	00:05:56	00:05:32	00:05:27	00:04:26	00:05:22
14	A38 Bristol Rd/ Wylds Rd	00:08:47	00:05:12	00:05:49	00:06:44	00:06:30	00:04:13	00:05:22	00:06:14
	Start Time:	10:52	11:09	10:06	10:21	11:28	10:31	11:20	11:37
	Date:	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	18/06/2008

Route 5: Bridgwater - A38 Bristol Rd/ Wylds Rd to St John St/ Westonzoyland

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	13:00 - 15:00								
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008
	Start Time:	13:00	14:06	14:23	13:16	13:32	14:40	13:46	14:49
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Bristol Rd/ Wylds Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ The Drove	00:02:29	00:01:14	00:00:50	00:00:45	00:02:25	00:00:48	00:00:47	00:00:44
3	Wylds Rd/ The Drove	00:03:08	00:02:01	00:01:29	00:01:38	00:03:35	00:01:51	00:01:28	00:01:32
4	The Clink/ East Quay	00:04:21	00:03:05	00:03:30	00:03:03	00:05:03	00:03:04	00:02:57	00:03:03
5	East Quay/ Eastover	00:05:19	00:03:43	00:04:06	00:04:01	00:05:52	00:04:02	00:03:42	00:03:55
6	Eastover/ Monmouth St	00:06:01	00:04:39	00:05:46	00:04:54	00:06:27	00:04:30	00:04:51	00:04:19
6a	St John Street/ Polden Street	00:06:24	00:05:00	00:06:06	00:06:40	00:08:06	00:05:55	00:05:11	00:04:39
7	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:06:50	00:05:21	00:06:28	00:07:04	00:08:40	00:06:26	00:05:32	00:05:01
	Northbound								
8	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8a	St John Street/ Cranleigh Gardens	00:00:37	00:00:27	00:00:57	00:01:01	00:00:44	00:01:19	00:00:30	00:01:53
9	St John Street/ Monmouth Street	00:00:54	00:01:02	00:01:16	00:01:29	00:01:04	00:01:38	00:00:50	00:02:14
10	East Quay/ Eastover	00:01:20	00:01:47	00:01:52	00:02:06	00:01:43	00:02:12	00:01:22	00:02:48
11	The Clink/ East Quay	00:02:46	00:02:20	00:02:25	00:03:36	00:04:04	00:03:34	00:03:23	00:03:38
12	Wylds Rd/ The Drove	00:04:39	00:03:14	00:03:23	00:04:52	00:05:10	00:05:05	00:04:38	00:05:00
13	A38 Bristol Rd/ The Drove	00:05:40	00:04:41	00:04:12	00:05:44	00:06:23	00:06:15	00:06:29	00:06:02
14	A38 Bristol Rd/ Wylds Rd	00:06:27	00:05:34	00:05:04	00:06:34	00:07:15	00:07:03	00:07:15	00:06:54
	Start Time:	13:08	14:16	14:30	13:24	13:42	14:47	13:52	14:55
	Date:	16/06/2008	16/06/2008	16/06/2008	17/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008

Route 5: Bridgwater - A38 Bristol Rd/ Wylds Rd to St John St/ Westonzoyland

Ref	Description	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8
	16:00 - 18:00								
	Date:	16/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	18/06/2008	19/06/2008	19/06/2008
	Start Time:	17:05	17:30	17:49	16:05	16:23	16:40	16:10	16:26
Ref	Description	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point	Timing Point
	Southbound								
1	A38 Bristol Rd/ Wylds Rd	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
2	A38 Bristol Rd/ The Drove	00:02:22	00:01:27	00:00:56	00:01:05	00:01:37	00:01:09	00:01:08	00:01:53
3	Wylds Rd/ The Drove	00:03:24	00:03:12	00:01:48	00:01:51	00:02:48	00:02:11	00:01:48	00:02:36
4	The Clink/ East Quay	00:05:03	00:04:58	00:03:17	00:03:48	00:04:46	00:03:08	00:03:18	00:03:55
5	East Quay/ Eastover	00:08:37	00:05:37	00:03:56	00:04:52	00:05:28	00:04:16	00:04:18	00:06:08
6	Eastover/ Monmouth St	00:10:09	00:07:20	00:04:24	00:05:27	00:05:50	00:04:57	00:04:42	00:06:45
6a	St John Street/ Polden Street	00:11:44	00:09:09	00:05:56	00:05:46	00:07:27	00:06:11	00:06:01	00:08:13
7	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:12:16	00:09:35	00:06:37	00:06:11	00:08:07	00:06:41	00:06:37	00:08:55
	Northbound								
8	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
8a	St John Street/ Cranleigh Gardens	00:02:59	00:00:54	00:01:21	00:01:27	00:00:52	00:01:59	00:01:23	00:00:39
9	St John Street/ Monmouth Street	00:03:20	00:01:25	00:01:55	00:01:53	00:01:11	00:02:19	00:01:58	00:01:01
10	East Quay/ Eastover	00:03:48	00:01:54	00:02:26	00:02:23	00:01:38	00:03:05	00:02:27	00:01:32
11	The Clink/ East Quay	00:06:21	00:02:41	00:03:13	00:04:49	00:02:53	00:04:21	00:03:33	00:02:12
12	Wylds Rd/ The Drove	00:07:20	00:04:12	00:04:30	00:05:57	00:03:50	00:05:33	00:04:27	00:03:37
13	A38 Bristol Rd/ The Drove	00:08:52	00:05:33	00:05:14	00:06:55	00:04:35	00:06:13	00:05:40	00:05:00
14	A38 Bristol Rd/ Wylds Rd	00:09:43	00:06:23	00:06:06	00:07:46	00:05:22	00:07:03	00:06:28	00:05:50
	Start Time:	17:19	17:40	15:57	16:13	16:32	16:01	16:18	16:37
	Date:	16/06/2008	17/06/2008	17/06/2008	18/06/2008	18/06/2008	18/06/2008	19/06/2008	19/06/2008

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route : Route 1 Northbound

Time at	OSGR Points	A39 Quantock Road roundabout	Northern Distributor Road/ Wembdon Rise	Chilton Street/ Western Way/ The Drove	Wylds Road/ The Drove	A38 Bristol Rd/ Wylds Road	A38 Roundabout (N) of Wylds Road	Survey Date	JTS
		TP1	TP2	TP3	TP4	TP5	TP6		
Run 1	AM (06:00- 10:00)	06:18:10	06:18:36	06:20:37	06:21:23	06:22:29	06:23:39	31/03/2010	00:05:29
Run 2		06:35:44	06:36:09	06:38:29	06:39:17	06:40:23	06:41:29	31/03/2010	00:05:45
Run 3		06:50:31	06:50:58	06:53:19	06:54:12	06:55:23	06:56:30	31/03/2010	00:05:59
Run 4		07:06:44	07:07:13	07:09:10	07:10:08	07:11:05	07:12:03	31/03/2010	00:05:20
Run 5		07:24:51	07:25:19	07:27:20	07:28:10	07:29:19	07:30:25	31/03/2010	00:05:33
Run 6		07:49:49	07:50:27	07:52:37	07:53:39	07:55:50	07:57:03	31/03/2010	00:07:14
Run 7		08:16:41	08:17:22	08:25:04	08:26:32	08:27:30	08:28:35	31/03/2010	00:11:54
Run 8		08:47:15	08:47:46	08:49:52	08:50:46	08:52:07	08:53:16	31/03/2010	00:06:01
Run 9		09:07:02	09:07:46	09:09:58	09:10:55	09:12:10	09:13:13	31/03/2010	00:06:11
Run 10		09:26:55	09:27:21	09:29:27	09:30:31	09:31:42	09:32:45	31/03/2010	00:05:50
Run 11		09:42:09	09:42:53	09:45:18	09:46:26	09:47:26	09:48:31	31/03/2010	00:06:22
Run 12	INTER (10:00 - 16:00)	10:03:46	10:04:28	10:06:31	10:07:20	10:09:31	10:10:30	31/03/2010	00:06:44
Run 13		10:28:31	10:28:59	10:31:30	10:32:12	10:33:47	10:34:50	31/03/2010	00:06:19
Run 14		10:47:27	10:48:13	10:50:13	10:51:12	10:52:20	10:53:36	31/03/2010	00:06:09
Run 15		11:06:32	11:06:56	11:09:05	11:09:51	11:10:57	11:11:54	31/03/2010	00:05:22
Run 16		11:22:35	11:23:06	11:25:17	11:26:23	11:27:24	11:28:26	31/03/2010	00:05:51
Run 17		12:36:16	12:36:42	12:38:47	12:39:49	12:40:54	12:42:05	31/03/2010	00:05:49
Run 18		12:52:44	12:53:21	12:55:30	12:56:21	12:57:23	12:58:25	31/03/2010	00:05:41
Run 19		13:12:51	13:13:17	13:16:01	13:17:03	13:18:26	13:19:31	31/03/2010	00:06:40
Run 20		13:37:33	13:38:06	13:40:31	13:41:41	13:42:50	13:43:55	31/03/2010	00:06:22
Run 21		13:56:04	13:56:40	13:59:07	14:00:23	14:01:48	14:02:48	31/03/2010	00:06:44
Run 22		14:14:17	14:15:18	14:17:22	14:18:08	14:19:13	14:20:34	31/03/2010	00:06:17
Run 23		14:32:56	14:33:26	14:35:26	14:36:23	14:37:35	14:38:36	31/03/2010	00:05:41
Run 24		14:49:12	14:49:49	14:51:54	14:52:36	14:53:37	14:54:37	31/03/2010	00:05:26
Run 25		15:15:36	15:16:10	15:18:43	15:19:44	15:20:41	15:21:47	31/03/2010	00:06:12
Run 26		15:42:26	15:43:11	15:45:25	15:46:11	15:47:20	15:48:16	31/03/2010	00:05:50
Run 27	PM (16:00 - 20:00)	16:12:15	16:12:41	16:14:47	16:16:20	16:18:23	16:19:40	31/03/2010	00:07:25
Run 28		16:33:34	16:34:20	16:36:53	16:37:49	16:39:40	16:40:42	31/03/2010	00:07:09
Run 29		16:55:14	16:55:41	16:58:06	16:59:05	17:00:46	17:01:50	31/03/2010	00:06:36
Run 30		17:30:04	17:30:26	17:32:23	17:34:58	17:36:06	17:37:03	31/03/2010	00:07:00
Run 31		17:56:22	17:56:45	17:58:47	18:00:04	18:01:26	18:02:29	31/03/2010	00:06:07
Run 32		18:12:56	18:13:18	18:15:11	18:16:09	18:17:18	18:18:23	31/03/2010	00:05:27
Run 33		18:32:44	18:33:15	18:35:15	18:35:57	18:37:13	18:38:09	31/03/2010	00:05:25
Run 34		18:52:11	18:52:36	18:54:34	18:55:26	18:56:19	18:57:16	31/03/2010	00:05:05
Run 35		19:09:19	19:09:57	19:11:41	19:12:47	19:13:50	19:14:47	31/03/2010	00:05:28
Run 36		19:24:01	19:24:28	19:26:25	19:27:14	19:28:23	19:29:21	31/03/2010	00:05:20
Run 37		19:40:01	19:40:40	19:42:30	19:43:26	19:44:28	19:45:31	31/03/2010	00:05:30
Cumulative Distance (		0.000	0.193	1.160	1.510	1.905	2.366		

		Journey Times between Timing Points (hh:mm:ss)					
Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	JTS
Run 1	AM (06:00- 10:00)	00:00:26	00:02:01	00:00:47	00:01:05	00:01:10	00:05:29
Run 2		00:00:26	00:02:20	00:00:48	00:01:05	00:01:06	00:05:45
Run 3		00:00:27	00:02:21	00:00:53	00:01:11	00:01:07	00:05:59
Run 4		00:00:30	00:01:57	00:00:58	00:00:56	00:00:59	00:05:20
Run 5		00:00:27	00:02:02	00:00:50	00:01:08	00:01:06	00:05:33
Run 6		00:00:38	00:02:11	00:01:02	00:02:11	00:01:13	00:07:14
Run 7		00:00:41	00:07:42	00:01:28	00:00:58	00:01:05	00:11:54
Run 8		00:00:31	00:02:06	00:00:54	00:01:21	00:01:09	00:06:01
Run 9		00:00:44	00:02:11	00:00:57	00:01:15	00:01:03	00:06:11
Run 10		00:00:26	00:02:06	00:01:04	00:01:12	00:01:03	00:05:50
Run 11		00:00:44	00:02:26	00:01:07	00:01:01	00:01:04	00:06:22
Run 12	INTER (10:00 - 16:00)	00:00:42	00:02:03	00:00:48	00:02:11	00:01:00	00:06:44
Run 13		00:00:28	00:02:31	00:00:43	00:01:35	00:01:03	00:06:19
Run 14		00:00:46	00:02:00	00:00:59	00:01:07	00:01:17	00:06:09
Run 15		00:00:24	00:02:09	00:00:46	00:01:05	00:00:58	00:05:22
Run 16		00:00:31	00:02:11	00:01:06	00:01:01	00:01:02	00:05:51
Run 17		00:00:25	00:02:06	00:01:02	00:01:05	00:01:11	00:05:49
Run 18		00:00:38	00:02:09	00:00:51	00:01:02	00:01:02	00:05:41
Run 19		00:00:26	00:02:44	00:01:02	00:01:23	00:01:05	00:06:40
Run 20		00:00:33	00:02:24	00:01:11	00:01:09	00:01:05	00:06:22
Run 21		00:00:36	00:02:27	00:01:16	00:01:24	00:01:01	00:06:44
Run 22		00:01:01	00:02:04	00:00:46	00:01:05	00:01:21	00:06:17
Run 23		00:00:30	00:02:00	00:00:57	00:01:12	00:01:01	00:05:41
Run 24		00:00:37	00:02:05	00:00:42	00:01:01	00:01:01	00:05:26
Run 25		00:00:34	00:02:33	00:01:02	00:00:56	00:01:07	00:06:12
Run 26		00:00:44	00:02:14	00:00:46	00:01:08	00:00:57	00:05:50
Run 27	PM (16:00 - 20:00)	00:00:26	00:02:06	00:01:32	00:02:03	00:01:17	00:07:25
Run 28		00:00:46	00:02:34	00:00:56	00:01:51	00:01:02	00:07:09
Run 29		00:00:27	00:02:24	00:01:00	00:01:41	00:01:04	00:06:36
Run 30		00:00:22	00:01:57	00:02:36	00:01:08	00:00:57	00:07:00
Run 31		00:00:23	00:02:01	00:01:17	00:01:22	00:01:03	00:06:07
Run 32		00:00:22	00:01:53	00:00:58	00:01:09	00:01:04	00:05:27
Run 33		00:00:31	00:02:00	00:00:42	00:01:16	00:00:56	00:05:25
Run 34		00:00:25	00:01:59	00:00:51	00:00:54	00:00:56	00:05:05
Run 35		00:00:38	00:01:44	00:01:06	00:01:03	00:00:57	00:05:28
Run 36		00:00:27	00:01:56	00:00:49	00:01:09	00:00:58	00:05:20
Run 37		00:00:39	00:01:50	00:00:55	00:01:02	00:01:03	00:05:30

		Journey Times between Timing Points (hh:mm:ss)				
	Run	TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6
AM	Min	00:00:26	00:01:57	00:00:47	00:00:56	00:00:59
	Average	00:00:33	00:02:40	00:00:59	00:01:13	00:01:06
	Max	00:00:44	00:07:42	00:01:28	00:02:11	00:01:13
	Std Dev	00:00:08	00:01:41	00:00:11	00:00:20	00:00:04
INTER	Min	00:00:24	00:02:00	00:00:42	00:00:56	00:00:57
	Average	00:00:36	00:02:15	00:00:56	00:01:14	00:01:04
	Max	00:01:01	00:02:44	00:01:16	00:02:11	00:01:21
	Std Dev	00:00:10	00:00:14	00:00:11	00:00:19	00:00:07
PM	Min	00:00:22	00:01:44	00:00:42	00:00:54	00:00:56
	Average	00:00:30	00:02:02	00:01:09	00:01:20	00:01:02
	Max	00:00:46	00:02:34	00:02:36	00:02:03	00:01:17
	Std Dev	00:00:08	00:00:15	00:00:32	00:00:22	00:00:06

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route : Route 1 Southbound

Time at	OSGR Points	A38 Roundabout (N) of Wylds Road TP1	A38 Bristol Rd/ Wylds Road TP2	Wylds Road/ The Drove TP3	Chilton Street/ Western Way/ The Drove TP4	Northern Distributor Road/ Wembdon Rise TP5	A39 Quantock Road roundabout TP6	Survey Date	JTS
Run 1	AM (06:00- 10:00)	06:05:36	06:06:53	06:08:11	06:08:59	06:11:01	06:12:33	31/03/2010	00:06:57
Run 2		06:23:39	06:24:56	06:26:16	06:27:02	06:29:02	06:30:19	31/03/2010	00:06:40
Run 3		06:41:29	06:42:44	06:43:44	06:44:42	06:46:49	06:47:16	31/03/2010	00:05:47
Run 4		06:56:30	06:57:52	06:59:05	06:59:56	07:01:53	07:03:10	31/03/2010	00:06:40
Run 5		07:12:03	07:13:17	07:14:32	07:15:22	07:17:15	07:21:07	31/03/2010	00:09:03
Run 6		07:34:58	07:36:16	07:37:27	07:38:22	07:40:32	07:41:14	31/03/2010	00:06:16
Run 7		07:57:03	07:58:40	07:59:51	08:01:15	08:03:49	08:06:40	31/03/2010	00:09:38
Run 8		08:31:22	08:33:41	08:35:21	08:36:19	08:38:47	08:43:42	31/03/2010	00:12:20
Run 9		08:53:16	08:54:40	08:56:40	08:57:35	09:00:26	09:04:20	31/03/2010	00:11:04
Run 10		09:13:13	09:14:32	09:16:08	09:17:04	09:19:20	09:22:23	31/03/2010	00:09:10
Run 11		09:32:45	09:34:17	09:35:48	09:36:53	09:38:49	09:39:14	31/03/2010	00:06:28
Run 12		09:48:31	09:50:01	09:51:25	09:52:14	09:54:32	09:56:04	31/03/2010	00:07:33
Run 13	INTER (10:00 - 16:00)	10:10:30	10:12:19	10:13:54	10:14:52	10:17:05	10:20:31	31/03/2010	00:10:01
Run 14		10:34:50	10:36:11	10:37:28	10:38:18	10:40:26	10:44:13	31/03/2010	00:09:24
Run 15		10:53:36	10:55:05	10:56:22	10:57:28	10:59:53	11:03:13	31/03/2010	00:09:37
Run 16		11:11:54	11:13:12	11:14:45	11:15:49	11:17:55	11:19:01	31/03/2010	00:07:07
Run 17		12:42:05	12:43:33	12:45:02	12:45:53	12:48:19	12:50:37	31/03/2010	00:08:33
Run 18		12:58:25	12:59:43	13:01:16	13:02:22	13:04:31	13:06:58	31/03/2010	00:08:33
Run 19		13:19:31	13:20:51	13:22:18	13:23:17	13:25:33	13:26:23	31/03/2010	00:06:52
Run 20		13:43:55	13:45:23	13:46:54	13:47:53	13:49:54	13:52:02	31/03/2010	00:08:08
Run 21		14:02:48	14:04:32	14:06:02	14:07:03	14:09:06	14:11:03	31/03/2010	00:08:15
Run 22		14:20:34	14:22:29	14:24:30	14:25:45	14:27:52	14:29:50	31/03/2010	00:09:16
Run 23		14:38:36	14:40:10	14:41:43	14:42:31	14:45:05	14:46:05	31/03/2010	00:07:29
Run 24		14:54:37	14:56:47	14:58:25	14:59:17	15:01:27	15:07:02	31/03/2010	00:12:24
Run 25		15:21:47	15:23:06	15:25:10	15:27:04	15:29:56	15:33:00	31/03/2010	00:11:12
Run 26	PM (16:00 - 20:00)	16:00:13	16:01:40	16:03:01	16:03:51	16:05:57	16:06:33	31/03/2010	00:06:20
Run 27		16:19:40	16:21:34	16:23:12	16:24:07	16:26:31	16:27:27	31/03/2010	00:07:47
Run 28		16:40:42	16:42:02	16:43:55	16:44:57	16:47:03	16:49:08	31/03/2010	00:08:26
Run 29		17:01:50	17:05:13	17:07:12	17:10:05	17:12:31	17:17:40	31/03/2010	00:15:50
Run 30		17:37:03	17:38:20	17:40:00	17:41:44	17:44:09	17:52:26	31/03/2010	00:15:23
Run 31		18:02:29	18:04:01	18:05:38	18:06:38	18:08:51	18:09:17	31/03/2010	00:06:49
Run 32		18:18:23	18:19:46	18:21:10	18:22:03	18:24:26	18:29:04	31/03/2010	00:10:42
Run 33		18:38:09	18:39:20	18:40:18	18:41:01	18:42:53	18:43:43	31/03/2010	00:05:34
Run 34		18:57:16	18:58:32	18:59:37	19:00:36	19:02:39	19:06:07	31/03/2010	00:08:52
Run 35		19:14:47	19:16:10	19:17:32	19:18:32	19:20:25	19:20:57	31/03/2010	00:06:10
Run 36		19:29:21	19:30:37	19:31:32	19:32:21	19:34:33	19:37:08	31/03/2010	00:07:47
Cumulative Distance (M		0.000	0.544	0.945	1.298	2.265	2.457		

		Journey Times between Timing Points (hh:mm:ss)					
Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	JTS
Run 1	AM (06:00- 10:00)	00:01:17	00:01:18	00:00:48	00:02:01	00:01:32	00:06:57
Run 2		00:01:17	00:01:20	00:00:47	00:01:59	00:01:17	00:06:40
Run 3		00:01:15	00:01:00	00:00:58	00:02:07	00:00:27	00:05:47
Run 4		00:01:22	00:01:13	00:00:51	00:01:57	00:01:17	00:06:40
Run 5		00:01:13	00:01:16	00:00:50	00:01:53	00:03:51	00:09:03
Run 6		00:01:18	00:01:11	00:00:55	00:02:10	00:00:42	00:06:16
Run 7		00:01:37	00:01:12	00:01:23	00:02:35	00:02:51	00:09:38
Run 8		00:02:19	00:01:40	00:00:59	00:02:28	00:04:55	00:12:20
Run 9		00:01:24	00:02:01	00:00:55	00:02:51	00:03:53	00:11:04
Run 10		00:01:18	00:01:37	00:00:56	00:02:16	00:03:03	00:09:10
Run 11		00:01:31	00:01:31	00:01:05	00:01:57	00:00:25	00:06:28
Run 12		00:01:30	00:01:24	00:00:49	00:02:18	00:01:32	00:07:33
Run 13	INTER (10:00 - 16:00)	00:01:49	00:01:35	00:00:57	00:02:13	00:03:26	00:10:01
Run 14		00:01:21	00:01:17	00:00:51	00:02:07	00:03:48	00:09:24
Run 15		00:01:28	00:01:18	00:01:06	00:02:25	00:03:20	00:09:37
Run 16		00:01:18	00:01:34	00:01:04	00:02:06	00:01:06	00:07:07
Run 17		00:01:29	00:01:29	00:00:51	00:02:25	00:02:19	00:08:33
Run 18		00:01:19	00:01:32	00:01:06	00:02:09	00:02:27	00:08:33
Run 19		00:01:20	00:01:27	00:00:59	00:02:16	00:00:49	00:06:52
Run 20		00:01:28	00:01:31	00:00:59	00:02:00	00:02:09	00:08:08
Run 21		00:01:44	00:01:31	00:01:01	00:02:03	00:01:57	00:08:15
Run 22		00:01:55	00:02:01	00:01:15	00:02:07	00:01:59	00:09:16
Run 23		00:01:34	00:01:33	00:00:48	00:02:35	00:01:00	00:07:29
Run 24		00:02:09	00:01:38	00:00:52	00:02:10	00:05:35	00:12:24
Run 25		00:01:19	00:02:04	00:01:53	00:02:52	00:03:04	00:11:12
Run 26	PM (16:00 - 20:00)	00:01:27	00:01:22	00:00:50	00:02:06	00:00:36	00:06:20
Run 27		00:01:54	00:01:38	00:00:55	00:02:24	00:00:56	00:07:47
Run 28		00:01:19	00:01:53	00:01:02	00:02:06	00:02:06	00:08:26
Run 29		00:03:23	00:01:59	00:02:53	00:02:26	00:05:09	00:15:50
Run 30		00:01:17	00:01:40	00:01:44	00:02:25	00:08:18	00:15:23
Run 31		00:01:32	00:01:37	00:01:00	00:02:13	00:00:27	00:06:49
Run 32		00:01:23	00:01:24	00:00:54	00:02:22	00:04:39	00:10:42
Run 33		00:01:11	00:00:58	00:00:43	00:01:51	00:00:50	00:05:34
Run 34		00:01:16	00:01:05	00:00:59	00:02:02	00:03:29	00:08:52
Run 35		00:01:23	00:01:22	00:01:00	00:01:53	00:00:32	00:06:10
Run 36		00:01:16	00:00:55	00:00:49	00:02:12	00:02:35	00:07:47

		Journey Times between Timing Points (hh:mm:ss)				
	Run	**TP1 - TP2**	**TP2 - TP3**	**TP3 - TP4**	**TP4 - TP5**	**TP5 - TP6**
AM	**Min**	00:01:13	00:01:00	00:00:47	00:01:53	00:00:25
	Average	00:01:27	00:01:23	00:00:56	00:02:13	00:02:09
	Max	00:02:19	00:02:01	00:01:23	00:02:51	00:04:55
	Std Dev	00:00:18	00:00:16	00:00:10	00:00:18	00:01:31
INTER	**Min**	00:01:18	00:01:17	00:00:48	00:02:00	00:00:49
	Average	00:01:33	00:01:35	00:01:03	00:02:16	00:02:32
	Max	00:02:09	00:02:04	00:01:53	00:02:52	00:05:35
	Std Dev	00:00:16	00:00:14	00:00:17	00:00:15	00:01:19
PM	**Min**	00:01:11	00:00:55	00:00:43	00:01:51	00:00:27
	Average	00:01:35	00:01:27	00:01:10	00:02:11	00:02:41
	Max	00:03:23	00:01:59	00:02:53	00:02:26	00:08:18
	Std Dev	00:00:38	00:00:21	00:00:38	00:00:12	00:02:30

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route : Route 2 Northbound

Time at	OSGR Points	A38 Taunton Rd/ M5 J24 spur road	A38 Taunton Rd/ Showground Rd Rdbt	A38 Taunton Rd/ Rhode Lane	wb A38 Broadway/ Taunton Rd	wb North St/ West St/ Broadway/ Penel Orlieu	wb Penel Orlieu/ North St/ Broadway/ West St	wb North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	EB Penel Orlieu/ North St/ Broadway/ West St	EB North St/ West St/ Broadway/ Penel Orlieu	EB A38 Broadway/ Taunton Rd	EB A38 Broadway/ Salmon Parade/ Cranleigh Gardens	EB A38 Monmouth St/ A372 St John Street	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	A38 Bristol Rd/ The Drove	A38 Bristol Rd/ Wylds Rd	A38 Rdbt (N of Wylds Rd)	A38 Dunball / M5 J23 spur road Rdbt	Survey Date	JTS
Time at		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15	TP16	TP17		
Run 1	AM (06:00-10:00)	06:19:54	06:21:16	06:22:16	06:22:59	06:23:16	06:23:54	06:24:19	06:24:40	06:25:11	06:25:43	06:26:02	06:26:47	06:27:12	06:27:40	06:28:19	06:29:02	06:30:51	31/03/2010	00:10:57
Run 2		07:20:02	07:21:27	07:22:46	07:23:47	07:24:35	07:25:11	07:25:33	07:26:25	07:26:58	07:27:50	07:28:13	07:29:12	07:29:43	07:31:03	07:31:54	07:33:00	07:35:05	31/03/2010	00:15:03
Run 3		07:46:47	07:48:21	07:51:07	07:54:11	07:54:32	07:55:43	07:56:06	07:57:30	07:58:06	07:59:14	07:59:47	08:00:31	08:01:09	08:03:12	08:04:03	08:05:03	08:06:58	31/03/2010	00:20:11
Run 4		08:22:43	08:38:45	08:44:29	08:46:07	08:48:08	08:48:45	08:50:07	08:51:03	08:51:38	08:52:28	08:52:57	08:54:06	08:54:41	08:55:28	08:56:35	08:57:36	08:59:29	31/03/2010	00:36:47
Run 5		09:12:37	09:17:06	09:19:41	09:23:13	09:23:59	09:24:52	09:25:16	09:26:23	09:27:07	09:27:49	09:28:25	09:29:48	09:30:24	09:31:07	09:32:23	09:33:22	09:35:19	31/03/2010	00:22:42
Run 6		09:47:46	09:49:08	09:50:28	09:53:02	09:53:30	09:54:06	09:54:31	09:55:52	09:56:39	09:57:39	09:58:07	09:59:27	10:00:03	10:00:49	10:01:38	10:02:39	10:04:34	31/03/2010	00:16:49
Run 7	INTER (10:00 - 16:00)	10:16:41	10:18:02	10:19:20	10:22:29	10:23:58	10:25:01	10:25:25	10:26:57	10:27:57	10:29:04	10:29:39	10:30:56	10:31:46	10:32:54	10:33:42	10:34:40	10:36:31	31/03/2010	00:19:50
Run 8		10:46:13	10:48:30	10:50:47	10:51:57	10:52:32	10:54:38	10:55:01	10:56:26	10:57:00	10:58:34	10:59:00	11:00:07	11:00:41	11:01:26	11:02:14	11:03:12	11:05:05	31/03/2010	00:16:52
Run 9		11:15:50	11:17:09	11:18:25	11:21:16	11:21:59	11:22:37	11:23:03	11:23:57	11:25:00	11:26:19	11:27:04	11:27:47	11:28:38	11:29:20	11:30:16	11:31:16	11:33:14	31/03/2010	00:17:24
Run 10		12:54:25	12:55:36	12:57:11	12:59:30	12:59:51	13:00:22	13:00:47	13:02:07	13:02:42	13:04:08	13:04:58	13:05:53	13:06:48	13:07:48	13:08:33	13:09:39	13:11:12	31/03/2010	00:16:47
Run 11		13:30:23	13:31:49	13:33:33	13:36:26	13:36:55	13:39:57	13:40:29	13:41:59	13:43:00	13:43:32	13:43:56	13:45:01	13:45:39	13:46:27	13:47:16	13:48:26	13:50:18	31/03/2010	00:19:55
Run 12		14:04:34	14:06:02	14:09:50	14:12:17	14:12:46	14:13:25	14:13:48	14:15:12	14:15:52	14:17:06	14:17:46	14:18:24	14:19:25	14:20:26	14:21:17	14:22:16	14:24:15	31/03/2010	00:19:41
Run 13		14:38:23	14:43:01	14:46:24	14:49:38	14:51:11	14:52:59	14:53:23	14:54:55	14:55:27	14:56:22	14:57:03	14:58:04	14:58:44	14:59:56	15:00:46	15:02:25	15:04:36	31/03/2010	00:26:13
Run 14		15:19:04	15:20:43	15:24:25	15:27:33	15:28:01	15:28:56	15:29:19	15:30:32	15:31:05	15:32:04	15:32:30	15:33:29	15:34:31	15:36:09	15:36:58	15:38:06	15:40:03	31/03/2010	00:20:58
Run 15		15:53:42	15:55:06	15:56:38	15:59:44	16:00:37	16:01:47	16:02:08	16:03:50	16:04:24	16:05:11	16:05:58	16:06:45	16:07:54	16:09:04	16:09:54	16:10:50	16:12:44	31/03/2010	00:19:03
Run 16	PM (16:00 - 20:00)	16:21:31	16:25:42	16:28:59	16:30:17	16:31:20	16:32:35	16:32:59	16:34:17	16:35:21	16:37:28	16:38:10	16:39:08	16:41:19	16:42:13	16:42:51	16:43:45	16:45:41	31/03/2010	00:24:10
Run 17		17:28:17	17:29:39	17:31:25	17:33:32	17:34:02	17:35:09	17:35:37	17:36:45	17:37:42	17:39:38	17:40:01	17:41:17	17:41:50	17:42:32	17:43:21	17:44:27	17:46:27	31/03/2010	00:18:10
Run 18		18:01:47	18:03:22	18:05:23	18:08:50	18:10:54	18:12:03	18:12:28	18:13:42	18:14:48	18:15:14	18:15:39	18:16:48	18:17:18	18:17:58	18:18:45	18:19:42	18:21:38	31/03/2010	00:19:51
Run 19		18:34:05	18:35:32	18:36:58	18:40:19	18:42:35	18:43:41	18:44:04	18:45:20	18:45:54	18:46:38	18:47:16	18:48:30	18:49:04	18:49:38	18:50:22	18:51:19	18:53:12	31/03/2010	00:19:08
Run 20		19:03:44	19:05:05	19:06:37	19:07:43	19:09:12	19:10:49	19:11:11	19:11:35	19:12:06	19:12:27	19:12:49	19:13:57	19:14:43	19:15:33	19:16:20	19:17:17	19:19:13	31/03/2010	00:15:29
Run 21		19:29:58	19:31:21	19:32:49	19:35:06	19:35:53	19:36:49	19:37:16	19:38:39	19:39:13	19:39:51	19:40:15	19:41:29	19:42:03	19:42:46	19:43:31	19:44:28	19:46:20	31/03/2010	00:16:22
Run 22		19:56:48	19:58:06	19:59:21	20:00:37	20:01:21	20:02:15	20:02:39	20:04:07	20:04:39	20:05:24	20:05:50	20:07:00	20:07:32	20:08:10	20:08:57	20:09:52	20:11:42	31/03/2010	00:14:54
Cumulative Distance (		0.000	0.705	1.271	1.695	1.816	2.065	2.187	2.318	2.550	2.673	2.814	2.980	3.171	3.410	3.764	4.222	5.516		

Journey Times between Timing Points (hh:mm:ss)

Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	TP11 - TP12	TP12 - TP13	TP13 - TP14	TP14 - TP15	TP15 - TP16	TP16 - TP17	JTS
Run 1	AM (06:00-10:00)	00:01:24	00:00:59	00:00:43	00:00:19	00:00:36	00:00:25	00:00:21	00:00:31	00:00:33	00:00:19	00:00:45	00:00:25	00:00:28	00:00:38	00:00:43	00:01:49	00:10:57
Run 2		00:01:25	00:01:19	00:01:01	00:00:48	00:00:36	00:00:22	00:00:52	00:00:34	00:00:51	00:00:24	00:00:59	00:00:31	00:01:19	00:00:52	00:01:05	00:02:06	00:15:03
Run 3		00:01:34	00:02:46	00:03:04	00:00:21	00:01:11	00:00:26	00:01:22	00:00:36	00:01:08	00:00:32	00:00:44	00:00:38	00:02:03	00:00:51	00:01:01	00:01:54	00:20:11
Run 4		00:16:03	00:05:44	00:03:38	00:01:01	00:00:37	00:00:22	00:00:56	00:00:34	00:00:50	00:00:29	00:01:09	00:00:35	00:00:47	00:01:07	00:01:01	00:01:53	00:36:47
Run 5		00:04:29	00:02:35	00:03:33	00:00:46	00:00:53	00:00:24	00:01:07	00:00:44	00:00:42	00:00:36	00:01:23	00:00:37	00:00:43	00:01:16	00:00:59	00:01:57	00:22:42
Run 6		00:01:23	00:01:20	00:02:34	00:00:28	00:00:36	00:00:25	00:01:22	00:00:46	00:01:00	00:00:28	00:01:19	00:00:36	00:00:46	00:00:49	00:01:01	00:01:56	00:16:49
Run 7	INTER (10:00 - 16:00)	00:01:21	00:01:18	00:03:10	00:01:28	00:01:03	00:00:25	00:01:32	00:01:00	00:01:07	00:00:35	00:01:18	00:00:50	00:01:07	00:00:48	00:00:58	00:01:51	00:19:50
Run 8		00:01:17	00:01:16	00:01:10	00:00:35	00:02:06	00:00:23	00:01:25	00:00:34	00:01:34	00:00:26	00:01:07	00:00:34	00:00:45	00:00:48	00:00:58	00:01:53	00:16:52
Run 9		00:01:18	00:01:17	00:02:51	00:00:43	00:00:38	00:00:26	00:00:54	00:01:03	00:01:18	00:00:45	00:00:44	00:00:51	00:00:42	00:00:56	00:00:59	00:01:58	00:17:24
Run 10		00:01:11	00:01:35	00:02:19	00:00:21	00:00:32	00:00:25	00:01:20	00:00:36	00:01:26	00:00:50	00:00:55	00:00:55	00:01:00	00:00:45	00:01:05	00:01:33	00:16:47
Run 11		00:01:25	00:01:45	00:02:53	00:00:29	00:03:03	00:00:32	00:01:29	00:01:02	00:00:32	00:00:24	00:01:05	00:00:37	00:00:49	00:00:49	00:01:10	00:01:53	00:19:55
Run 12		00:01:28	00:03:48	00:02:26	00:00:30	00:00:38	00:00:24	00:01:24	00:00:39	00:01:15	00:00:39	00:00:38	00:01:01	00:01:01	00:00:51	00:00:59	00:01:59	00:19:41
Run 13		00:04:38	00:03:23	00:03:14	00:01:33	00:01:48	00:00:25	00:01:32	00:00:32	00:00:55	00:00:40	00:01:01	00:00:41	00:01:11	00:00:50	00:01:40	00:02:10	00:26:13
Run 14		00:01:39	00:03:42	00:03:08	00:00:28	00:00:55	00:00:24	00:01:13	00:00:32	00:01:00	00:00:26	00:00:59	00:01:02	00:01:38	00:00:49	00:01:08	00:01:57	00:20:58
Run 15		00:01:26	00:01:30	00:03:07	00:00:53	00:01:10	00:00:21	00:01:42	00:00:34	00:00:47	00:00:48	00:00:47	00:01:09	00:01:11	00:00:49	00:00:56	00:01:54	00:19:03
Run 16	PM (16:00 - 20:00)	00:04:11	00:03:17	00:01:18	00:01:03	00:01:15	00:00:24	00:01:18	00:01:04	00:02:07	00:00:42	00:00:58	00:02:11	00:00:54	00:00:38	00:00:53	00:01:56	00:24:10
Run 17		00:01:23	00:01:46	00:02:07	00:00:30	00:01:06	00:00:29	00:01:08	00:00:57	00:01:57	00:00:23	00:01:16	00:00:33	00:00:42	00:00:49	00:01:06	00:01:59	00:18:10
Run 18		00:01:36	00:02:01	00:03:27	00:02:04	00:01:09	00:00:25	00:01:14	00:01:06	00:00:26	00:00:25	00:01:06	00:00:30	00:00:40	00:00:47	00:00:57	00:01:55	00:19:51
Run 19		00:01:28	00:01:26	00:03:21	00:02:16	00:01:07	00:00:22	00:01:16	00:00:34	00:00:44	00:00:38	00:01:14	00:00:34	00:00:34	00:00:44	00:00:57	00:01:53	00:19:08
Run 20		00:01:21	00:01:32	00:01:06	00:01:29	00:01:36	00:00:22	00:00:24	00:00:32	00:00:21	00:00:22	00:01:08	00:00:46	00:00:50	00:00:47	00:00:57	00:01:56	00:15:29
Run 21		00:01:23	00:01:28	00:02:17	00:00:47	00:00:57	00:00:27	00:01:23	00:00:33	00:00:38	00:00:25	00:01:14	00:00:34	00:00:43	00:00:45	00:00:57	00:01:52	00:16:22
Run 22		00:01:18	00:01:15	00:01:16	00:00:44	00:00:54	00:00:23	00:01:29	00:00:32	00:00:45	00:00:27	00:01:10	00:00:32	00:00:38	00:00:47	00:00:55	00:01:50	00:14:54

Journey Times between Timing Points (hh:mm:ss)

	Run	TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	TP11 - TP12	TP12 - TP13	TP13 - TP14	TP14 - TP15	TP15 - TP16	TP16 - TP17
AM	**Min**	00:01:23	00:00:59	00:00:43	00:00:19	00:00:36	00:00:22	00:00:21	00:00:31	00:00:33	00:00:19	00:00:44	00:00:25	00:00:28	00:00:38	00:00:43	00:01:49
	Average	00:04:23	00:02:27	00:02:25	00:00:37	00:00:45	00:00:24	00:01:00	00:00:38	00:00:51	00:00:28	00:01:03	00:00:34	00:01:01	00:00:55	00:00:58	00:01:56
	Max	00:16:03	00:05:44	00:03:38	00:01:01	00:01:11	00:00:26	00:01:22	00:00:46	00:01:08	00:00:36	00:01:23	00:00:38	00:02:03	00:01:16	00:01:05	00:02:06
	Std Dev	00:05:51	00:01:46	00:01:16	00:00:17	00:00:15	00:00:02	00:00:23	00:00:06	00:00:13	00:00:06	00:00:17	00:00:05	00:00:35	00:00:14	00:00:08	00:00:06
INTER	**Min**	00:01:11	00:01:16	00:01:10	00:00:21	00:00:32	00:00:21	00:00:54	00:00:32	00:00:32	00:00:24	00:00:38	00:00:34	00:00:42	00:00:45	00:00:56	00:01:33
	Average	00:01:45	00:02:10	00:02:42	00:00:47	00:01:19	00:00:25	00:01:23	00:00:44	00:01:06	00:00:37	00:00:57	00:00:51	00:01:03	00:00:49	00:01:06	00:01:54
	Max	00:04:38	00:03:48	00:03:14	00:01:33	00:03:03	00:00:32	00:01:42	00:01:03	00:01:34	00:00:50	00:01:18	00:01:09	00:01:38	00:00:56	00:01:40	00:02:10
	Std Dev	00:01:05	00:01:07	00:00:39	00:00:27	00:00:50	00:00:03	00:00:14	00:00:14	00:00:20	00:00:10	00:00:12	00:00:12	00:00:17	00:00:03	00:00:13	00:00:10
PM	**Min**	00:01:18	00:01:15	00:01:06	00:00:30	00:00:54	00:00:22	00:00:24	00:00:32	00:00:21	00:00:22	00:00:58	00:00:30	00:00:34	00:00:38	00:00:53	00:01:50
	Average	00:01:48	00:01:49	00:02:07	00:01:16	00:01:09	00:00:25	00:01:10	00:00:45	00:01:00	00:00:29	00:01:10	00:00:49	00:00:43	00:00:45	00:00:58	00:01:54
	Max	00:04:11	00:03:17	00:03:27	00:02:16	00:01:36	00:00:29	00:01:29	00:01:06	00:02:07	00:00:42	00:01:16	00:02:11	00:00:54	00:00:49	00:01:06	00:01:59
	Std Dev	00:01:03	00:00:41	00:00:59	00:00:41	00:00:14	00:00:02	00:00:22	00:00:16	00:00:44	00:00:08	00:00:06	00:00:37	00:00:07	00:00:04	00:00:04	00:00:03

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route : Route 2 Southbound

	OSGR Points	A38 Dunball / M5 J23 spur road Rdbt	A38 Rdbt (N of Wylds Rd)	A38 Bristol Rd/ Wylds Rd	A38 Bristol Rd/ The Drove	A38 Bristol Rd/ The Clink/ A39 Bath Rd Rdbt	A38 Monmouth St/ A372 St John Street	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	A38 Broadway/ Taunton Rd	A38 Taunton Rd/ Rhode Lane	A38 Taunton Rd/ Showground Rd Rdbt	A38 Taunton Rd/ M5 J24 spur road	Survey Date	JTS
Time at		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11		
Run 1	AM (06:00- 10:00)	06:10:47	06:13:02	06:13:57	06:14:34	06:14:57	06:15:46	06:16:15	06:16:37	06:17:33	06:18:45	06:19:54	31/03/2010	00:09:07
Run 2		06:30:51	06:32:55	06:33:49	06:34:27	06:34:51	06:35:18	06:35:42	06:36:58	06:37:49	06:38:53	06:40:34	31/03/2010	00:09:43
Run 3		06:59:06	07:01:15	07:02:05	07:02:46	07:03:23	07:03:54	07:04:35	07:04:58	07:06:01	07:07:01	07:08:03	31/03/2010	00:08:57
Run 4		07:35:05	07:37:33	07:38:39	07:39:27	07:40:06	07:40:40	07:41:15	07:42:50	07:44:18	07:45:32	07:46:47	31/03/2010	00:11:42
Run 5		08:06:58	08:09:18	08:10:22	08:11:31	08:12:19	08:12:54	08:15:20	08:18:41	08:20:13	08:21:31	08:22:43	31/03/2010	00:15:45
Run 6		08:59:29	09:01:53	09:03:07	09:04:04	09:05:03	09:06:08	09:06:53	09:08:37	09:10:08	09:11:26	09:12:37	31/03/2010	00:13:08
Run 7		09:35:19	09:37:40	09:39:00	09:40:03	09:40:44	09:42:09	09:43:54	09:44:20	09:45:24	09:46:36	09:47:46	31/03/2010	00:12:26
Run 8	INTER (10:00 - 16:00)	10:04:34	10:06:55	10:08:01	10:08:50	10:09:22	10:11:05	10:11:33	10:13:14	10:14:17	10:15:33	10:16:41	31/03/2010	00:12:06
Run 9		10:36:31	10:38:43	10:39:48	10:40:35	10:41:33	10:42:48	10:43:17	10:44:56	10:45:56	10:47:07	10:48:13	31/03/2010	00:11:42
Run 10		11:05:05	11:07:22	11:08:27	11:09:18	11:09:54	11:10:31	11:12:03	11:12:30	11:13:38	11:14:47	11:15:50	31/03/2010	00:10:45
Run 11		11:46:46	11:48:59	11:50:03	11:50:49	11:51:22	11:52:43	11:53:08	11:54:40	11:55:57	11:57:10	11:58:16	31/03/2010	00:11:30
Run 12		12:05:38	12:07:33	12:09:14	12:10:26	12:11:18	12:12:51	12:13:16	12:14:52	12:15:57	12:17:13	12:18:32	31/03/2010	00:12:54
Run 13		12:43:54	12:46:00	12:47:01	12:47:44	12:48:22	12:48:52	12:49:14	12:50:53	12:52:00	12:53:13	12:54:25	31/03/2010	00:10:32
Run 14		13:11:12	13:13:15	13:14:19	13:15:16	13:16:25	13:16:58	13:17:47	13:18:07	13:19:18	13:20:24	13:21:49	31/03/2010	00:10:37
Run 15		13:50:18	13:52:32	13:53:36	13:54:23	13:55:02	13:56:43	13:59:00	14:00:58	14:02:18	14:03:29	14:04:34	31/03/2010	00:14:16
Run 16		14:24:15	14:26:29	14:27:35	14:28:23	14:29:27	14:32:11	14:34:23	14:34:49	14:36:07	14:37:18	14:38:23	31/03/2010	00:14:08
Run 17		15:04:36	15:06:50	15:08:20	15:09:29	15:10:11	15:11:47	15:13:56	15:15:39	15:16:37	15:17:54	15:19:04	31/03/2010	00:14:29
Run 18		15:40:03	15:42:13	15:43:15	15:44:02	15:45:09	15:46:33	15:48:07	15:49:37	15:50:52	15:52:18	15:53:42	31/03/2010	00:13:39
Run 19	PM (16:00 - 20:00)	16:08:58	16:10:50	16:12:44	16:13:32	16:14:19	16:15:57	16:16:22	16:17:57	16:19:01	16:20:15	16:21:31	31/03/2010	00:12:33
Run 20		17:01:59	17:04:12	17:06:59	17:08:08	17:13:22	17:17:30	17:22:35	17:24:29	17:25:45	17:27:05	17:28:17	31/03/2010	00:26:18
Run 21		17:46:27	17:48:43	17:49:50	17:50:38	17:52:00	17:52:59	17:55:38	17:57:40	17:58:55	18:00:29	18:01:47	31/03/2010	00:15:20
Run 22		18:21:38	18:23:52	18:24:57	18:26:15	18:27:00	18:28:31	18:29:09	18:30:48	18:31:48	18:32:58	18:34:05	31/03/2010	00:12:27
Run 23		18:53:12	18:55:32	18:56:39	18:57:28	18:58:02	18:58:46	18:59:10	19:00:30	19:01:31	19:02:41	19:03:44	31/03/2010	00:10:32
Run 24		19:19:13	19:21:30	19:22:43	19:23:32	19:24:05	19:25:30	19:26:07	19:26:35	19:27:39	19:28:53	19:29:58	31/03/2010	00:10:45
Run 25		19:46:20	19:48:33	19:49:35	19:50:29	19:51:04	19:51:37	19:51:58	19:53:34	19:54:36	19:55:45	19:56:48	31/03/2010	00:10:28
Cumulative Distance (		0.000	1.362	1.863	2.217	2.435	2.648	2.821	2.955	3.384	3.921	4.553		

		Journey Times between Timing Points (hh:mm:ss)										
Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	JTS
Run 1	AM (06:00- 10:00)	00:02:15	00:00:54	00:00:37	00:00:23	00:00:49	00:00:30	00:00:22	00:00:56	00:01:12	00:01:10	00:09:07
Run 2		00:02:04	00:00:54	00:00:38	00:00:25	00:00:27	00:00:24	00:01:16	00:00:51	00:01:04	00:01:40	00:09:43
Run 3		00:02:09	00:00:50	00:00:41	00:00:36	00:00:32	00:00:41	00:00:23	00:01:03	00:01:00	00:01:02	00:08:57
Run 4		00:02:28	00:01:06	00:00:49	00:00:38	00:00:35	00:00:34	00:01:35	00:01:28	00:01:14	00:01:15	00:11:42
Run 5		00:02:21	00:01:03	00:01:09	00:00:49	00:00:35	00:02:26	00:03:21	00:01:33	00:01:18	00:01:12	00:15:45
Run 6		00:02:24	00:01:13	00:00:57	00:00:59	00:01:05	00:00:44	00:01:45	00:01:31	00:01:17	00:01:12	00:13:08
Run 7		00:02:21	00:01:20	00:01:04	00:00:41	00:01:25	00:01:45	00:00:26	00:01:03	00:01:13	00:01:09	00:12:26
Run 8	INTER (10:00 - 16:00)	00:02:21	00:01:06	00:00:49	00:00:32	00:01:44	00:00:28	00:01:41	00:01:03	00:01:15	00:01:08	00:12:06
Run 9		00:02:12	00:01:05	00:00:47	00:00:58	00:01:15	00:00:28	00:01:39	00:01:01	00:01:11	00:01:05	00:11:42
Run 10		00:02:16	00:01:05	00:00:51	00:00:36	00:00:38	00:01:32	00:00:27	00:01:08	00:01:09	00:01:03	00:10:45
Run 11		00:02:12	00:01:04	00:00:46	00:00:33	00:01:22	00:00:25	00:01:32	00:01:17	00:01:13	00:01:06	00:11:30
Run 12		00:01:54	00:01:42	00:01:12	00:00:52	00:01:34	00:00:24	00:01:36	00:01:05	00:01:16	00:01:19	00:12:54
Run 13		00:02:07	00:01:01	00:00:43	00:00:38	00:00:30	00:00:22	00:01:39	00:01:07	00:01:13	00:01:12	00:10:32
Run 14		00:02:03	00:01:03	00:00:57	00:01:09	00:00:33	00:00:49	00:00:19	00:01:11	00:01:06	00:01:25	00:10:37
Run 15		00:02:14	00:01:03	00:00:48	00:00:38	00:01:41	00:02:17	00:01:57	00:01:20	00:01:11	00:01:05	00:14:16
Run 16		00:02:15	00:01:06	00:00:47	00:01:05	00:02:44	00:02:13	00:00:26	00:01:18	00:01:11	00:01:05	00:14:08
Run 17		00:02:15	00:01:30	00:01:08	00:00:43	00:01:36	00:02:09	00:01:42	00:00:58	00:01:18	00:01:10	00:14:29
Run 18		00:02:10	00:01:02	00:00:47	00:01:06	00:01:25	00:01:34	00:01:30	00:01:15	00:01:26	00:01:24	00:13:39
Run 19	PM (16:00 - 20:00)	00:01:52	00:01:54	00:00:48	00:00:47	00:01:38	00:00:24	00:01:35	00:01:04	00:01:14	00:01:16	00:12:33
Run 20		00:02:13	00:02:47	00:01:08	00:05:14	00:04:08	00:05:04	00:01:55	00:01:16	00:01:20	00:01:12	00:26:18
Run 21		00:02:17	00:01:07	00:00:48	00:01:22	00:00:59	00:02:39	00:02:02	00:01:15	00:01:34	00:01:18	00:15:20
Run 22		00:02:14	00:01:05	00:01:18	00:00:45	00:01:31	00:00:37	00:01:40	00:01:00	00:01:10	00:01:07	00:12:27
Run 23		00:02:20	00:01:07	00:00:49	00:00:34	00:00:44	00:00:24	00:01:20	00:01:01	00:01:10	00:01:03	00:10:32
Run 24		00:02:17	00:01:13	00:00:49	00:00:33	00:01:25	00:00:36	00:00:28	00:01:05	00:01:14	00:01:05	00:10:45
Run 25		00:02:13	00:01:03	00:00:54	00:00:35	00:00:33	00:00:22	00:01:36	00:01:02	00:01:09	00:01:02	00:10:28

		Journey Times between Timing Points (hh:mm:ss)									
	Run	**TP1 - TP2**	**TP2 - TP3**	**TP3 - TP4**	**TP4 - TP5**	**TP5 - TP6**	**TP6 - TP7**	**TP7 - TP8**	**TP8 - TP9**	**TP9 - TP10**	**TP10 - TP11**
AM	**Min**	00:02:04	00:00:50	00:00:37	00:00:23	00:00:27	00:00:24	00:00:22	00:00:51	00:01:00	00:01:02
	Average	00:02:17	00:01:03	00:00:51	00:00:39	00:00:47	00:01:01	00:01:18	00:01:12	00:01:11	00:01:14
	Max	00:02:28	00:01:20	00:01:09	00:00:59	00:01:25	00:02:26	00:03:21	00:01:33	00:01:18	00:01:40
	Std Dev	00:00:08	00:00:11	00:00:13	00:00:13	00:00:21	00:00:46	00:01:05	00:00:18	00:00:07	00:00:12
INTER	**Min**	00:01:54	00:01:01	00:00:43	00:00:32	00:00:30	00:00:22	00:00:19	00:00:58	00:01:06	00:01:03
	Average	00:02:11	00:01:10	00:00:52	00:00:48	00:01:22	00:01:09	00:01:19	00:01:09	00:01:14	00:01:11
	Max	00:02:21	00:01:42	00:01:12	00:01:09	00:02:44	00:02:17	00:01:57	00:01:20	00:01:26	00:01:25
	Std Dev	00:00:07	00:00:13	00:00:10	00:00:14	00:00:39	00:00:48	00:00:36	00:00:07	00:00:05	00:00:08
PM	**Min**	00:01:52	00:01:03	00:00:48	00:00:33	00:00:33	00:00:22	00:00:28	00:01:00	00:01:09	00:01:02
	Average	00:02:12	00:01:28	00:00:56	00:01:24	00:01:34	00:01:27	00:01:31	00:01:06	00:01:16	00:01:09
	Max	00:02:20	00:02:47	00:01:18	00:05:14	00:04:08	00:05:04	00:02:02	00:01:16	00:01:34	00:01:18
	Std Dev	00:00:09	00:00:39	00:00:12	00:01:43	00:01:12	00:01:48	00:00:31	00:00:07	00:00:09	00:00:06

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route : Route 3 Eastbound

Time at	OSGR Points	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	A39 Quantock Rd/ Quantock Meadow Rdbt	A39 Quantock Rd/ Wembdon Rd	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	North St/ West St/ Broadway/ Penel Orlieu	Mount St/ High St/ Penel Orlieu Rdbt	Mount Street/ Northgate/ Castle Moat	The Clink/ Northgate	The Clink/ East Quay	The Clink/ The Leggar (Retail Park Access)	A39 Bath Rd/ A38 Bristol Rd/ The Clink	A39 Bath Rd/ Parkway	A39 Bath Rd/ Bower Lane	A39 Bath Rd/ A39 Puriton Hill, Knowle	A39 Bath Rd/ Crancombe Lane	Survey Date	JTS
		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15		
Run 1	AM (06:00- 10:00)	06:08:41	06:11:26	06:12:04	06:12:51	06:13:13	06:13:26	06:14:01	06:14:22	06:14:48	06:15:06	06:15:22	06:16:53	06:17:29	06:19:39	06:20:13	31/03/2010	00:11:31
Run 2		06:34:59	06:38:03	06:38:44	06:39:39	06:40:29	06:40:44	06:41:20	06:41:39	06:42:04	06:42:22	06:42:39	06:44:09	06:44:48	06:47:00	06:47:37	31/03/2010	00:12:37
Run 3		07:01:52	07:06:36	07:07:16	07:08:01	07:08:21	07:08:33	07:09:08	07:09:29	07:09:54	07:10:25	07:10:43	07:12:16	07:13:03	07:15:17	07:15:52	31/03/2010	00:14:00
Run 4		07:31:18	07:37:00	07:37:41	07:38:25	07:39:13	07:39:25	07:39:58	07:40:29	07:40:58	07:41:24	07:41:50	07:43:23	07:43:57	07:46:06	07:46:42	31/03/2010	00:15:24
Run 5		08:05:57	08:13:11	08:13:49	08:14:36	08:15:37	08:15:48	08:16:34	08:16:53	08:17:44	08:19:04	08:20:02	08:22:12	08:22:47	08:24:51	08:25:25	31/03/2010	00:19:28
Run 6		08:47:23	08:50:08	08:51:00	08:52:30	08:53:44	08:53:58	08:54:40	08:55:00	08:56:25	08:56:48	08:58:54	09:01:02	09:01:47	09:03:56	09:04:30	31/03/2010	00:17:06
Run 7		09:44:57	09:48:33	09:49:08	09:49:56	09:50:27	09:50:43	09:51:40	09:51:56	09:53:01	09:54:10	09:54:30	09:56:37	09:57:15	09:59:27	09:59:49	31/03/2010	00:14:51
Run 8	INTER (10:00 - 16:00)	10:21:32	10:24:30	10:25:13	10:26:01	10:26:32	10:26:49	10:27:44	10:28:10	10:29:37	10:30:47	10:31:23	10:32:51	10:33:25	10:35:49	10:36:26	31/03/2010	00:14:54
Run 9		10:55:18	10:57:36	10:58:17	10:59:15	11:00:36	11:00:49	11:01:35	11:02:39	11:03:51	11:04:49	11:05:24	11:07:13	11:07:49	11:09:59	11:10:36	31/03/2010	00:15:18
Run 10		11:29:45	11:33:56	11:34:38	11:35:23	11:36:48	11:37:03	11:37:53	11:38:52	11:40:47	11:41:52	11:42:10	11:43:33	11:44:09	11:46:26	11:47:04	31/03/2010	00:17:19
Run 11		12:04:50	12:08:14	12:08:52	12:09:42	12:10:54	12:11:15	12:12:06	12:12:43	12:13:24	12:14:34	12:14:58	12:16:52	12:17:37	12:18:46	12:20:22	31/03/2010	00:15:33
Run 12		12:41:06	12:44:41	12:45:17	12:46:03	12:47:08	12:47:20	12:48:17	12:48:47	12:50:00	12:50:23	12:50:54	12:52:45	12:53:21	12:55:25	12:56:02	31/03/2010	00:14:56
Run 13		13:16:57	13:21:09	13:22:01	13:22:47	13:23:45	13:24:00	13:24:45	13:25:06	13:26:04	13:27:01	13:27:35	13:29:15	13:29:56	13:32:23	13:33:02	31/03/2010	00:16:05
Run 14		13:49:48	13:55:36	13:56:08	13:56:55	13:58:11	13:58:22	13:59:00	14:00:42	14:03:00	14:04:25	14:04:46	14:06:14	14:06:53	14:08:52	14:09:27	31/03/2010	00:19:38
Run 15		14:16:48	14:27:21	14:27:51	14:28:28	14:30:18	14:30:32	14:31:04	14:31:27	14:32:33	14:33:42	14:34:14	14:35:35	14:36:11	14:38:14	14:38:45	31/03/2010	00:21:56
Run 16		14:58:03	15:01:26	15:02:07	15:02:45	15:03:08	15:03:17	15:04:35	15:04:57	15:05:59	15:06:48	15:07:05	15:09:02	15:09:53	15:11:58	15:13:07	31/03/2010	00:15:03
Run 17		15:50:45	15:54:15	15:55:12	15:55:58	15:56:31	15:56:46	15:57:22	15:57:52	15:59:04	16:00:13	16:00:37	16:02:14	16:02:56	16:05:11	16:05:47	31/03/2010	00:15:03
Run 18	PM (16:00 - 20:00)	16:27:10	16:31:13	16:32:05	16:32:50	16:33:13	16:33:23	16:34:09	16:34:27	16:37:06	16:37:26	16:39:32	16:42:13	16:42:56	16:45:10	16:45:44	31/03/2010	00:18:34
Run 19		17:09:30	17:14:38	17:15:25	17:16:25	17:17:04	17:17:14	17:17:45	17:18:04	17:18:41	17:19:28	17:19:49	17:21:39	17:22:19	17:24:20	17:24:57	31/03/2010	00:15:27
Run 20		17:51:21	17:56:49	17:57:29	17:58:07	17:58:51	17:59:12	17:59:39	17:59:55	18:00:28	18:01:39	18:02:04	18:03:51	18:04:26	18:06:33	18:07:04	31/03/2010	00:15:43
Run 21		18:45:24	18:47:32	18:48:08	18:48:51	18:49:24	18:49:36	18:50:06	18:50:43	18:51:19	18:51:43	18:52:01	18:53:48	18:54:25	18:56:21	18:56:53	31/03/2010	00:11:29
Run 22		19:11:25	19:14:39	19:15:20	19:16:16	19:17:17	19:17:27	19:18:03	19:18:26	19:19:46	19:20:06	19:20:27	19:21:58	19:22:37	19:24:45	19:25:18	31/03/2010	00:13:53
Run 23		19:39:04	19:43:45	19:44:21	19:45:00	19:45:50	19:46:01	19:46:37	19:46:56	19:47:36	19:48:03	19:48:21	19:50:03	19:50:43	19:52:52	19:53:27	31/03/2010	00:14:23
Cumulative Distance (f		0.000	1.299	1.591	1.915	2.034	2.085	2.293	2.414	2.578	2.714	2.823	3.511	3.841	5.187	5.473		

Journey Times between Timing Points (hh:mm:ss)

Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	TP11 - TP12	TP12 - TP13	TP13 - TP14	TP14 - TP15	JTS
Run 1	AM (06:00- 10:00)	00:02:44	00:00:38	00:00:47	00:00:22	00:00:13	00:00:36	00:00:20	00:00:26	00:00:18	00:00:17	00:01:31	00:00:36	00:02:10	00:00:34	00:11:31
Run 2		00:03:03	00:00:41	00:00:55	00:00:50	00:00:15	00:00:37	00:00:19	00:00:25	00:00:17	00:00:18	00:01:30	00:00:39	00:02:13	00:00:36	00:12:37
Run 3		00:04:45	00:00:39	00:00:45	00:00:20	00:00:13	00:00:35	00:00:20	00:00:26	00:00:31	00:00:18	00:01:33	00:00:47	00:02:14	00:00:34	00:14:00
Run 4		00:05:42	00:00:41	00:00:44	00:00:47	00:00:12	00:00:33	00:00:31	00:00:30	00:00:26	00:00:26	00:01:33	00:00:34	00:02:09	00:00:36	00:15:24
Run 5		00:05:42	00:00:41	00:00:44	00:00:47	00:00:12	00:00:33	00:00:31	00:00:30	00:00:26	00:00:26	00:01:33	00:00:34	00:02:09	00:00:36	00:15:24
Run 6		00:07:14	00:00:38	00:00:46	00:01:01	00:00:11	00:00:46	00:00:19	00:00:51	00:01:20	00:00:58	00:02:10	00:00:36	00:02:03	00:00:34	00:19:28
Run 7		00:03:36	00:00:35	00:00:48	00:00:30	00:00:17	00:00:57	00:00:16	00:01:04	00:01:09	00:00:20	00:02:07	00:00:38	00:02:12	00:00:22	00:14:51
Run 8	INTER (10:00 - 16:00)	00:02:58	00:00:43	00:00:47	00:00:32	00:00:17	00:00:55	00:00:26	00:01:27	00:01:10	00:00:36	00:01:28	00:00:34	00:02:25	00:00:37	00:14:54
Run 9		00:02:18	00:00:41	00:00:58	00:01:21	00:00:14	00:00:45	00:01:04	00:01:13	00:00:58	00:00:34	00:01:49	00:00:36	00:02:10	00:00:37	00:15:18
Run 10		00:04:11	00:00:42	00:00:46	00:01:24	00:00:16	00:00:50	00:00:58	00:01:55	00:01:05	00:00:18	00:01:22	00:00:36	00:02:17	00:00:38	00:17:19
Run 11		00:03:24	00:00:38	00:00:50	00:01:13	00:00:21	00:00:51	00:00:37	00:00:41	00:01:10	00:00:24	00:01:54	00:00:45	00:02:10	00:00:36	00:15:33
Run 12		00:03:34	00:00:37	00:00:46	00:01:04	00:00:13	00:00:57	00:00:30	00:01:13	00:00:23	00:00:31	00:01:51	00:00:36	00:02:03	00:00:38	00:14:56
Run 13		00:03:34	00:00:37	00:00:46	00:01:04	00:00:13	00:00:57	00:00:30	00:01:13	00:00:23	00:00:31	00:01:51	00:00:36	00:02:03	00:00:38	00:14:56
Run 14		00:04:12	00:00:52	00:00:46	00:00:58	00:00:15	00:00:45	00:00:21	00:00:58	00:00:57	00:00:33	00:01:40	00:00:41	00:02:27	00:00:38	00:16:05
Run 15		00:10:32	00:00:31	00:00:37	00:01:50	00:00:14	00:00:32	00:00:23	00:01:07	00:01:09	00:00:32	00:01:21	00:00:35	00:02:04	00:00:30	00:21:56
Run 16		00:03:22	00:00:41	00:00:38	00:00:23	00:00:09	00:01:18	00:00:22	00:01:02	00:00:49	00:00:18	00:01:56	00:00:51	00:02:05	00:01:08	00:15:03
Run 17		00:03:31	00:00:56	00:00:46	00:00:33	00:00:15	00:00:36	00:00:30	00:01:13	00:01:09	00:00:24	00:01:37	00:00:42	00:02:15	00:00:36	00:15:03
Run 18	PM (16:00 - 20:00)	00:04:03	00:00:52	00:00:46	00:00:22	00:00:10	00:00:46	00:00:19	00:02:38	00:00:21	00:02:06	00:02:41	00:00:43	00:02:15	00:00:34	00:18:34
Run 19		00:05:08	00:00:47	00:01:00	00:00:39	00:00:09	00:00:32	00:00:19	00:00:37	00:00:47	00:00:21	00:01:49	00:00:41	00:02:01	00:00:37	00:15:27
Run 20		00:05:29	00:00:40	00:00:37	00:00:44	00:00:21	00:00:27	00:00:16	00:00:33	00:01:11	00:00:25	00:01:46	00:00:36	00:02:07	00:00:31	00:15:43
Run 21		00:02:08	00:00:36	00:00:43	00:00:33	00:00:13	00:00:30	00:00:36	00:00:37	00:00:24	00:00:18	00:01:47	00:00:37	00:01:56	00:00:32	00:11:29
Run 22		00:03:14	00:00:41	00:00:56	00:01:01	00:00:11	00:00:35	00:00:23	00:01:20	00:00:20	00:00:21	00:01:31	00:00:39	00:02:08	00:00:33	00:13:53
Run 23		00:04:42	00:00:35	00:00:39	00:00:50	00:00:11	00:00:37	00:00:19	00:00:40	00:00:27	00:00:18	00:01:42	00:00:40	00:02:09	00:00:35	00:14:23

Journey Times between Timing Points (hh:mm:ss)

	Run	TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	TP11 - TP12	TP12 - TP13	TP13 - TP14	TP14 - TP15
AM	**Min**	00:02:44	00:00:35	00:00:44	00:00:20	00:00:11	00:00:33	00:00:16	00:00:25	00:00:17	00:00:17	00:01:30	00:00:34	00:02:03	00:00:22
	Average	00:04:41	00:00:39	00:00:47	00:00:40	00:00:13	00:00:39	00:00:22	00:00:36	00:00:38	00:00:26	00:01:42	00:00:38	00:02:10	00:00:33
	Max	00:07:14	00:00:41	00:00:55	00:01:01	00:00:17	00:00:57	00:00:31	00:01:04	00:01:20	00:00:58	00:02:10	00:00:47	00:02:14	00:00:36
	Std Dev	00:01:39	00:00:02	00:00:04	00:00:16	00:00:02	00:00:09	00:00:06	00:00:15	00:00:26	00:00:15	00:00:18	00:00:05	00:00:03	00:00:05
INTER	**Min**	00:02:18	00:00:31	00:00:37	00:00:23	00:00:09	00:00:32	00:00:21	00:00:41	00:00:23	00:00:18	00:01:21	00:00:34	00:02:03	00:00:30
	Average	00:04:10	00:00:42	00:00:46	00:01:02	00:00:15	00:00:51	00:00:34	00:01:12	00:00:55	00:00:28	00:01:41	00:00:39	00:02:12	00:00:40
	Max	00:10:32	00:00:56	00:00:58	00:01:50	00:00:21	00:01:18	00:01:04	00:01:55	00:01:10	00:00:36	00:01:56	00:00:51	00:02:27	00:01:08
	Std Dev	00:02:18	00:00:08	00:00:06	00:00:27	00:00:03	00:00:13	00:00:15	00:00:19	00:00:18	00:00:07	00:00:13	00:00:05	00:00:09	00:00:10
PM	**Min**	00:02:08	00:00:35	00:00:37	00:00:22	00:00:09	00:00:27	00:00:16	00:00:33	00:00:20	00:00:18	00:01:31	00:00:36	00:01:56	00:00:31
	Average	00:04:07	00:00:42	00:00:47	00:00:42	00:00:12	00:00:35	00:00:22	00:01:04	00:00:35	00:00:38	00:01:53	00:00:39	00:02:06	00:00:33
	Max	00:05:29	00:00:52	00:01:00	00:01:01	00:00:21	00:00:46	00:00:36	00:02:38	00:01:11	00:02:06	00:02:41	00:00:43	00:02:15	00:00:37
	Std Dev	00:01:16	00:00:07	00:00:09	00:00:13	00:00:04	00:00:07	00:00:07	00:00:49	00:00:20	00:00:43	00:00:25	00:00:03	00:00:07	00:00:02

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route : Route 3 Westbound

	OSGR Points	A39 Bath Rd/ Crancombe Lane	A39 Bath Rd/ A39 Puriton Hill, Knowle	A39 Bath Rd/ Bower Lane	A39 Bath Rd/ Parkway	A39 Bath Rd/ A38 Bristol Rd/ The Clink	The Clink/ The Leggar (Retail Park Access)	The Clink/ East Quay	The Clink/ Northgate	Mount Street/ Northgate/ Castle Moat	Mount Street/ Northgate/ Penel Orlieu Rdbt	Penel Orlieu/ North St/ Broadway/ West St	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	A39 Quantock Rd/ Wembdon Rd	A39 Quantock Rd/ Quantock Meadow Rdbt	A39 Quantock Rd/ B3339 Sandford Hill/ A39 New Rd	Survey Date	JTS
Time at		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15		
Run 1	AM (06:00- 10:00)	05:55:03	05:55:37	05:57:58	05:58:37	06:00:12	06:00:31	06:00:49	06:01:14	06:01:33	06:02:11	06:02:45	06:03:07	06:03:51	06:04:31	06:06:37	31/03/2010	00:11:34
Run 2		06:21:03	06:21:38	06:23:52	06:24:35	06:26:07	06:26:25	06:26:43	06:27:07	06:27:27	06:28:03	06:28:34	06:28:56	06:29:42	06:30:28	06:32:38	31/03/2010	00:11:35
Run 3		06:48:02	06:48:39	06:51:04	06:51:43	06:53:14	06:53:33	06:53:51	06:54:17	06:54:36	06:55:15	06:55:28	06:55:50	06:56:37	06:57:20	06:59:39	31/03/2010	00:11:37
Run 4		07:16:22	07:16:58	07:19:14	07:19:51	07:21:22	07:21:59	07:22:24	07:22:50	07:23:09	07:23:43	07:24:48	07:25:08	07:25:50	07:27:06	07:29:16	31/03/2010	00:12:53
Run 5		07:47:06	07:47:42	07:49:57	07:50:35	07:52:24	07:53:03	07:54:17	07:54:56	07:55:17	07:55:53	07:56:19	07:56:39	07:57:21	08:00:44	08:03:17	31/03/2010	00:16:12
Run 6		08:26:20	08:26:55	08:29:15	08:30:00	08:32:40	08:32:58	08:33:57	08:34:34	08:34:53	08:35:30	08:36:38	08:37:01	08:37:56	08:42:56	08:45:03	31/03/2010	00:18:43
Run 7		08:48:22	08:48:53	08:51:00	08:51:40	08:56:13	08:56:33	08:56:50	08:58:12	08:58:30	08:59:04	08:59:19	08:59:40	09:00:39	09:01:34	09:03:37	31/03/2010	00:15:15
Run 8		09:28:30	09:29:01	09:31:00	09:31:38	09:33:15	09:33:39	09:34:19	09:34:45	09:35:03	09:35:50	09:37:03	09:37:21	09:38:03	09:40:21	09:42:23	31/03/2010	00:13:53
Run 9	INTER (10:00 - 16:00)	10:05:18	10:05:54	10:08:04	10:08:42	10:10:16	10:11:20	10:11:42	10:12:12	10:12:34	10:13:34	10:13:44	10:14:03	10:14:43	10:16:56	10:19:16	31/03/2010	00:13:59
Run 10		10:40:10	10:40:45	10:42:57	10:43:38	10:45:16	10:45:46	10:46:12	10:46:51	10:47:10	10:47:50	10:49:22	10:49:41	10:50:22	10:50:59	10:53:11	31/03/2010	00:13:01
Run 11		11:11:26	11:12:04	11:14:18	11:14:51	11:16:47	11:17:46	11:18:07	11:18:52	11:19:13	11:19:52	11:21:19	11:21:39	11:22:18	11:25:24	11:27:31	31/03/2010	00:16:05
Run 12		11:47:30	11:48:06	11:50:17	11:50:55	11:52:44	11:53:41	11:54:12	11:55:42	11:56:09	11:56:52	11:57:44	11:58:06	11:58:47	12:00:27	12:02:43	31/03/2010	00:15:13
Run 13		12:22:19	12:22:53	12:24:56	12:25:29	12:27:29	12:28:08	12:29:05	12:29:37	12:30:02	12:30:43	12:31:46	12:32:07	12:32:47	12:36:30	12:38:38	31/03/2010	00:16:19
Run 14		12:57:13	12:57:49	12:59:58	13:00:33	13:02:05	13:02:34	13:03:30	13:04:11	13:04:41	13:05:25	13:06:15	13:06:37	13:07:40	13:12:46	13:14:51	31/03/2010	00:17:38
Run 15		13:33:41	13:34:14	13:36:11	13:36:47	13:39:10	13:39:40	13:39:59	13:40:25	13:40:45	13:41:50	13:42:52	13:43:16	13:44:10	13:45:15	13:47:49	31/03/2010	00:14:08
Run 16		13:57:40	13:58:11	14:00:21	14:01:01	14:03:07	14:03:29	14:04:40	14:06:33	14:06:57	14:07:52	14:08:52	14:09:14	14:10:01	14:12:17	14:14:21	31/03/2010	00:16:42
Run 17		14:40:20	14:40:52	14:42:45	14:43:16	14:45:22	14:45:58	14:46:32	14:47:59	14:48:23	14:49:01	14:49:35	14:49:56	14:50:40	14:53:22	14:55:24	31/03/2010	00:15:04
Run 18		15:26:16	15:26:53	15:29:11	15:29:52	15:34:44	15:35:10	15:36:27	15:37:33	15:37:53	15:40:11	15:41:13	15:41:32	15:42:14	15:45:41	15:47:54	31/03/2010	00:21:38
Run 19	PM (16:00 - 20:00)	16:06:08	16:06:41	16:09:01	16:09:48	16:11:49	16:12:10	16:13:22	16:14:43	16:15:04	16:15:44	16:17:28	16:17:49	16:18:31	16:23:08	16:25:22	31/03/2010	00:19:14
Run 20		16:46:15	16:46:54	16:49:09	16:49:54	16:53:38	16:54:07	16:54:28	16:56:07	16:56:34	16:58:23	16:59:53	17:00:11	17:00:50	17:05:38	17:07:37	31/03/2010	00:21:22
Run 21		17:29:48	17:30:21	17:32:31	17:33:09	17:35:30	17:36:44	17:37:02	17:37:45	17:38:04	17:38:44	17:39:55	17:40:15	17:40:53	17:45:34	17:47:45	31/03/2010	00:17:57
Run 22		18:07:37	18:08:08	18:10:08	18:10:41	18:12:17	18:12:40	18:12:59	18:14:19	18:14:46	18:15:22	18:15:44	18:16:14	18:17:05	18:20:24	18:22:23	31/03/2010	00:14:47
Run 23		18:26:22	18:26:59	18:29:19	18:32:28	18:34:11	18:34:47	18:35:08	18:35:32	18:35:50	18:36:29	18:38:02	18:38:23	18:39:04	18:41:11	18:43:22	31/03/2010	00:17:01
Run 24		18:57:15	18:57:47	18:59:48	19:00:25	19:02:35	19:03:02	19:03:22	19:03:43	19:04:01	19:04:33	19:04:42	19:04:59	19:05:37	19:07:20	19:09:23	31/03/2010	00:12:07
Run 25		19:25:42	19:26:15	19:28:18	19:28:56	19:30:28	19:31:02	19:31:39	19:32:05	19:32:25	19:32:55	19:33:06	19:33:24	19:34:03	19:35:15	19:37:17	31/03/2010	00:11:35
Cumulative Distance (I		0.000	0.285	1.631	1.960	2.638	2.762	2.898	3.057	3.180	3.393	3.447	3.568	3.891	4.184	5.485		

		Journey Times between Timing Points (hh:mm:ss)														
Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	TP11 - TP12	TP12 - TP13	TP13 - TP14	TP14 - TP15	JTS
Run 1	AM (06:00- 10:00)	00:00:34	00:02:21	00:00:38	00:01:35	00:00:19	00:00:18	00:00:24	00:00:20	00:00:38	00:00:34	00:00:22	00:00:43	00:00:40	00:02:06	00:11:34
Run 2		00:00:35	00:02:14	00:00:43	00:01:32	00:00:18	00:00:18	00:00:24	00:00:19	00:00:36	00:00:31	00:00:22	00:00:46	00:00:46	00:02:10	00:11:35
Run 3		00:00:37	00:02:25	00:00:39	00:01:31	00:00:19	00:00:18	00:00:26	00:00:19	00:00:38	00:00:14	00:00:21	00:00:47	00:00:43	00:02:20	00:11:37
Run 4		00:00:36	00:02:16	00:00:38	00:01:31	00:00:37	00:00:25	00:00:25	00:00:19	00:00:35	00:01:04	00:00:20	00:00:42	00:01:16	00:02:10	00:12:53
Run 5		00:00:36	00:02:15	00:00:38	00:01:49	00:00:39	00:01:13	00:00:40	00:00:21	00:00:35	00:00:26	00:00:20	00:00:43	00:03:22	00:02:34	00:16:12
Run 6		00:00:36	00:02:15	00:00:38	00:01:49	00:00:39	00:01:13	00:00:40	00:00:21	00:00:35	00:00:26	00:00:20	00:00:43	00:03:22	00:02:34	00:16:12
Run 7		00:00:35	00:02:20	00:00:45	00:02:40	00:00:18	00:00:59	00:00:36	00:00:20	00:00:36	00:01:09	00:00:22	00:00:56	00:04:59	00:02:08	00:18:43
Run 8		00:00:31	00:01:59	00:00:38	00:01:36	00:00:24	00:00:40	00:00:26	00:00:18	00:00:47	00:01:13	00:00:18	00:00:42	00:02:18	00:02:02	00:13:53
Run 9	INTER (10:00 - 16:00)	00:00:36	00:02:10	00:00:37	00:01:34	00:01:04	00:00:22	00:00:30	00:00:22	00:00:59	00:00:11	00:00:19	00:00:40	00:02:12	00:02:21	00:13:59
Run 10		00:00:35	00:02:12	00:00:41	00:01:38	00:00:30	00:00:26	00:00:39	00:00:19	00:00:39	00:01:32	00:00:19	00:00:41	00:00:37	00:02:12	00:13:01
Run 11		00:00:38	00:02:14	00:00:33	00:01:56	00:01:00	00:00:21	00:00:45	00:00:21	00:00:39	00:01:27	00:00:19	00:00:39	00:03:07	00:02:07	00:16:05
Run 12		00:00:36	00:02:11	00:00:39	00:01:49	00:00:57	00:00:31	00:01:30	00:00:27	00:00:42	00:00:52	00:00:22	00:00:42	00:01:40	00:02:16	00:15:13
Run 13		00:00:33	00:02:03	00:00:33	00:02:00	00:00:39	00:00:57	00:00:32	00:00:25	00:00:41	00:01:03	00:00:21	00:00:40	00:03:43	00:02:08	00:16:19
Run 14		00:00:33	00:02:03	00:00:33	00:02:00	00:00:39	00:00:57	00:00:32	00:00:25	00:00:41	00:01:03	00:00:21	00:00:40	00:03:43	00:02:08	00:16:19
Run 15		00:00:36	00:02:09	00:00:35	00:01:31	00:00:30	00:00:56	00:00:41	00:00:30	00:00:44	00:00:50	00:00:21	00:01:04	00:05:06	00:02:05	00:17:38
Run 16		00:00:31	00:02:10	00:00:40	00:02:06	00:00:21	00:01:11	00:01:54	00:00:24	00:00:55	00:01:00	00:00:22	00:00:46	00:02:16	00:02:04	00:16:42
Run 17		00:00:32	00:01:53	00:00:31	00:02:06	00:00:36	00:00:34	00:01:26	00:00:24	00:00:38	00:00:34	00:00:21	00:00:44	00:02:42	00:02:03	00:15:04
Run 18		00:00:37	00:02:19	00:00:41	00:04:52	00:00:27	00:01:16	00:01:07	00:00:20	00:02:18	00:01:02	00:00:19	00:00:42	00:03:27	00:02:13	00:21:38
Run 19	PM (16:00 - 20:00)	00:00:34	00:02:19	00:00:47	00:02:02	00:00:21	00:01:12	00:01:21	00:00:21	00:00:40	00:01:44	00:00:21	00:00:42	00:04:37	00:02:14	00:19:14
Run 20		00:00:39	00:02:15	00:00:46	00:03:44	00:00:29	00:00:21	00:01:40	00:00:26	00:01:49	00:01:31	00:00:18	00:00:39	00:04:49	00:01:59	00:21:22
Run 21		00:00:32	00:02:10	00:00:38	00:02:21	00:01:14	00:00:18	00:00:43	00:00:19	00:00:40	00:01:11	00:00:19	00:00:39	00:04:40	00:02:12	00:17:57
Run 22		00:00:31	00:01:59	00:00:33	00:01:36	00:00:23	00:00:19	00:01:20	00:00:27	00:00:37	00:00:22	00:00:30	00:00:51	00:03:19	00:01:59	00:14:47
Run 23		00:00:37	00:02:20	00:03:09	00:01:42	00:00:36	00:00:20	00:00:24	00:00:19	00:00:38	00:01:34	00:00:20	00:00:41	00:02:07	00:02:12	00:17:01
Run 24		00:00:32	00:02:01	00:00:37	00:02:10	00:00:27	00:00:20	00:00:21	00:00:18	00:00:32	00:00:09	00:00:17	00:00:38	00:01:43	00:02:03	00:12:07
Run 25		00:00:33	00:02:03	00:00:38	00:01:32	00:00:34	00:00:37	00:00:26	00:00:21	00:00:30	00:00:11	00:00:17	00:00:40	00:01:11	00:02:02	00:11:35

		Journey Times between Timing Points (hh:mm:ss)													
	Run	TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	TP8 - TP9	TP9 - TP10	TP10 - TP11	TP11 - TP12	TP12 - TP13	TP13 - TP14	TP14 - TP15
AM	**Min**	00:00:31	00:01:59	00:00:38	00:01:31	00:00:18	00:00:18	00:00:24	00:00:18	00:00:35	00:00:14	00:00:18	00:00:42	00:00:40	00:02:02
	Average	00:00:35	00:02:16	00:00:40	00:01:45	00:00:27	00:00:41	00:00:30	00:00:20	00:00:38	00:00:42	00:00:21	00:00:45	00:02:11	00:02:15
	Max	00:00:37	00:02:25	00:00:45	00:02:40	00:00:39	00:01:13	00:00:40	00:00:21	00:00:47	00:01:13	00:00:22	00:00:56	00:04:59	00:02:34
	Std Dev	00:00:02	00:00:08	00:00:03	00:00:23	00:00:10	00:00:25	00:00:07	00:00:01	00:00:04	00:00:23	00:00:01	00:00:05	00:01:36	00:00:12
INTER	**Min**	00:00:31	00:01:53	00:00:31	00:01:31	00:00:21	00:00:21	00:00:30	00:00:19	00:00:38	00:00:11	00:00:19	00:00:39	00:00:37	00:02:03
	Average	00:00:35	00:02:09	00:00:36	00:02:09	00:00:40	00:00:45	00:00:58	00:00:24	00:00:54	00:00:57	00:00:20	00:00:44	00:02:51	00:02:10
	Max	00:00:38	00:02:19	00:00:41	00:04:52	00:01:04	00:01:16	00:01:54	00:00:30	00:02:18	00:01:32	00:00:22	00:01:04	00:05:06	00:02:21
	Std Dev	00:00:02	00:00:07	00:00:04	00:00:59	00:00:15	00:00:21	00:00:30	00:00:03	00:00:30	00:00:24	00:00:01	00:00:07	00:01:15	00:00:06
PM	**Min**	00:00:31	00:01:59	00:00:33	00:01:32	00:00:21	00:00:18	00:00:21	00:00:18	00:00:30	00:00:09	00:00:17	00:00:38	00:01:11	00:01:59
	Average	00:00:34	00:02:10	00:01:01	00:02:10	00:00:35	00:00:30	00:00:53	00:00:22	00:00:46	00:00:57	00:00:20	00:00:41	00:03:12	00:02:06
	Max	00:00:39	00:02:20	00:03:09	00:03:44	00:01:14	00:01:12	00:01:40	00:00:27	00:01:49	00:01:44	00:00:30	00:00:51	00:04:49	00:02:14
	Std Dev	00:00:03	00:00:09	00:00:57	00:00:45	00:00:18	00:00:20	00:00:33	00:00:04	00:00:28	00:00:42	00:00:05	00:00:05	00:01:32	00:00:08

Count On Us

Route : Route 4 Eastbound

OSGR Points		A39 Quantock Rd/ Wembdon Rd	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	North St/ West St/ Broadway/ Penel Orlieu	Penel Orlieu/ North St/ Broadway/ West St	North St/ West St/ Broadway/ Penel Orlieu	A38 Broadway/ Taunton Rd	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	A38 Monmouth St/ A372 St John Street	Eastover/ Monmouth St	St John Street/ Polden Street	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)
		TP3	TP4	TP5	TP8	TP9	TP10	TP11	TP12	TP6	TP7	TP11
AM (06:00- 10:00)		06:12:04	06:12:51	06:13:13	06:24:40	06:25:11	06:25:43	06:26:02	06:26:47	06:04:33	06:04:53	06:05:16
		06:38:44	06:39:39	06:40:29						06:40:52	06:41:25	06:41:59
										06:59:39	07:00:29	07:00:54
		07:07:16	07:08:01	07:08:21	07:26:25	07:26:58	07:27:50	07:28:13	07:29:12	07:15:36	07:15:56	07:16:19
		07:37:41	07:38:25	07:39:13	07:57:30	07:58:06	07:59:14	07:59:47	08:00:31	07:30:03	07:30:22	07:30:43
										07:45:33	07:45:51	07:46:12
		08:13:49	08:14:36	08:15:37	08:51:03	08:51:38	08:52:28	08:52:57	08:54:06	08:01:56	08:02:18	08:02:45
		08:51:00	08:52:30	08:53:44						08:19:53	08:20:13	08:20:45
										08:38:23	08:38:44	08:39:15
										08:58:41	08:59:46	09:00:39
		09:49:08	09:49:56	09:50:27	09:26:23	09:27:07	09:27:49	09:28:25	09:29:48	09:26:35	09:26:55	09:27:18
					09:55:52	09:56:39	09:57:39	09:58:07	09:59:27	09:42:41	09:42:57	09:43:17
INTER (10:00 - 16:00)		10:25:13	10:26:01	10:26:32	10:26:57	10:27:57	10:29:04	10:29:39	10:30:56	09:58:57	09:59:19	09:59:54
		10:58:17	10:59:15	11:00:36	10:56:26	10:57:00	10:58:34	10:59:00	11:00:07	10:20:50	10:21:10	10:21:35
										10:34:56	10:35:16	10:35:37
										10:49:17	10:49:37	10:50:06
										11:05:16	11:05:37	11:06:07
		11:34:38	11:35:23	11:36:48	11:23:57	11:25:00	11:26:19	11:27:04	11:27:47	11:21:22	11:21:46	11:22:29
										11:51:22	11:51:41	11:52:06
										12:05:51	12:06:07	12:06:30
		12:08:52	12:09:42	12:10:54						12:23:41	12:24:00	12:24:23
										12:41:52	12:42:12	12:42:42
		12:45:17	12:46:03	12:47:08						12:57:43	12:58:04	13:01:33
										13:19:46	13:20:07	13:20:28
		13:22:01	13:22:47	13:23:45	13:02:07	13:02:42	13:04:08	13:04:58	13:05:53	13:36:12	13:36:33	13:37:05
		13:56:08	13:56:55	13:58:11	13:41:59	13:43:00	13:43:32	13:43:56	13:45:01	13:59:51	14:00:08	14:00:32
										14:16:23	14:16:42	14:19:52
		14:27:51	14:28:28	14:30:18	14:15:12	14:15:52	14:17:06	14:17:46	14:18:24	14:40:31	14:40:47	14:41:10
					14:54:55	14:55:27	14:56:22	14:57:03	14:58:04	14:56:25	14:56:42	14:57:17
										15:14:39	15:16:24	15:16:50
		15:02:07	15:02:45	15:03:08	15:30:32	15:31:05	15:32:04	15:32:30	15:33:29	15:41:03	15:41:41	15:42:38
		15:55:12	15:55:58	15:56:31								
PM (16:00 - 20:00)		16:32:05	16:32:50	16:33:13	16:03:50	16:04:24	16:05:11	16:05:58	16:06:45	16:04:39	16:05:00	16:05:24
					16:34:17	16:35:21	16:37:28	16:38:10	16:39:08	16:24:56	16:25:15	16:25:39
										17:01:19	17:02:22	17:03:53
		17:15:25	17:16:25	17:17:04	17:36:45	17:37:42	17:39:38	17:40:01	17:41:17	17:29:13	17:30:54	17:31:18
		17:57:29	17:58:07	17:58:51						17:54:50	17:55:13	17:55:44
					18:13:42	18:14:48	18:15:14	18:15:39	18:16:48	18:12:53	18:13:17	18:13:39
		18:48:08	18:48:51	18:49:24	18:45:20	18:45:54	18:46:38	18:47:16	18:48:30	18:27:07	18:27:28	18:27:53
										18:47:13	18:47:39	18:48:02
										19:01:18	19:01:55	19:02:20
		19:15:20	19:16:16	19:17:17	19:11:35	19:12:06	19:12:27	19:12:49	19:13:57	19:17:26	19:17:49	19:21:55
		19:44:21	19:45:00	19:45:50	19:38:39	19:39:13	19:39:51	19:40:15	19:41:29	19:35:38	19:35:56	19:36:19

Count On Us

Route : Route 4 Westbound

Time at	OSGR Points	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	St John Street/ Cranleigh Gardens	St John Street/ Monmouth Street	A38 Monmouth St/ A372 St John Street	A38 Broadway/ Salmon Parade/ Cranleigh Gardens	A38 Broadway/ Taunton Rd	A38 Broadway/ Taunton Rd	North St/ West St/ Broadway/ Penel Orlieu	Penel Orlieu/ North St/ Broadway/ West St	Penel Orlieu/ North St/ Broadway/ West St	North St/ Alexandra Rd (Victoria Rd)/ A39 Wembdon Rd Rdbt	A39 Quantock Rd/ Wembdon Rd
		TP1	TP2	TP3	TP6	TP7	TP8	TP4	TP5	TP6	TP11	TP12	TP13
Run 1	AM (06:00- 10:00)	06:43:40	06:44:06	06:44:45	06:15:46	06:16:15	06:16:37	06:22:59	06:23:18	06:23:54	06:02:45	06:03:07	06:03:51
Run 2		07:01:58	07:02:54	07:03:17	06:35:18	06:35:42	06:36:58	07:23:47	07:24:35	07:25:11	06:28:34	06:28:56	06:29:42
Run 3		07:17:36	07:18:28	07:18:49	07:03:54	07:04:35	07:04:58	07:54:11	07:54:32	07:55:43	06:55:28	06:55:50	06:56:37
Run 4		07:31:41	07:32:06	07:32:23	07:40:40	07:41:15	07:42:50	08:48:07	08:49:08	08:49:45	07:24:48	07:25:08	07:25:50
Run 5		07:47:32	07:47:58	07:48:15	08:12:54	08:15:20	08:18:41	09:23:13	09:23:59	09:24:52	07:56:19	07:56:39	07:57:21
Run 6		08:03:41	08:04:38	08:06:06	09:06:08	09:06:53	09:08:37	09:53:02	09:53:30	09:54:06	08:36:38	08:37:01	08:37:56
Run 7		08:21:39	08:22:28	08:24:33	09:42:09	09:43:54	09:44:20				08:59:19	08:59:40	09:00:39
Run 8		08:40:35	08:41:42	08:42:14							09:37:03	09:37:21	09:38:03
Run 9		09:01:26	09:04:01	09:04:28									
Run 10		09:29:11	09:30:38	09:30:57									
Run 11		09:44:14	09:44:43	09:45:06									
Run 12	INTER (10:00 - 16:00)	10:00:45	10:01:09	10:01:36	10:11:05	10:11:33	10:13:14	10:22:29	10:23:58	10:25:01	10:13:44	10:14:03	10:14:43
Run 13		10:22:48	10:23:12	10:23:28	10:42:48	10:43:17	10:44:56	10:51:57	10:52:32	10:54:38	10:49:22	10:49:41	10:50:22
Run 14		10:36:24	10:36:48	10:37:18	11:10:31	11:12:03	11:12:30	11:21:16	11:21:59	11:22:37	11:21:19	11:21:39	11:22:18
Run 15		10:51:02	10:51:25	10:52:56	11:52:43	11:53:08	11:54:40	12:59:30	12:59:51	13:00:22	11:57:44	11:58:06	11:58:47
Run 16		11:07:21	11:07:52	11:09:09	12:12:51	12:13:16	12:14:52	13:36:26	13:36:55	13:39:57	12:31:46	12:32:07	12:32:47
Run 17		11:23:40	11:24:52	11:25:30	12:48:52	12:49:14	12:50:53	14:12:17	14:12:46	14:13:25	13:06:15	13:06:37	13:07:40
Run 18		11:52:56	11:53:21	11:53:41	13:16:58	13:17:47	13:18:07	14:49:38	14:51:11	14:52:59	13:42:52	13:43:16	13:44:10
Run 19		12:07:38	12:08:02	12:09:36	13:56:43	13:59:00	14:00:58	15:27:33	15:28:01	15:28:56	14:08:52	14:09:14	14:10:01
Run 20		12:25:25	12:26:00	12:27:43	14:32:11	14:34:23	14:34:49	15:59:44	16:00:37	16:01:47	14:49:35	14:49:56	14:50:40
Run 21		12:43:28	12:43:52	12:44:10	15:11:47	15:13:56	15:15:39				15:41:13	15:41:32	15:42:14
Run 22		13:02:27	13:03:38	13:04:08	15:46:33	15:48:07	15:49:37						
Run 23		13:21:28	13:21:53	13:22:11									
Run 24		13:37:57	13:38:31	13:39:56									
Run 25		14:01:26	14:01:53	14:02:17									
Run 26		14:21:55	14:22:53	14:24:28									
Run 27		14:42:01	14:42:59	14:44:26									
Run 28		14:57:59	15:00:08	15:00:36									
Run 29		15:18:18	15:20:25	15:20:49									
Run 30		15:45:15	15:47:17	15:49:26									
Run 31	PM (16:00 - 20:00)	16:06:40	16:08:16	16:09:15	16:15:57	16:16:22	16:17:57	16:30:17	16:31:20	16:32:35	16:17:28	16:17:49	16:18:31
Run 32		16:27:39	16:28:13	16:29:10	17:17:30	17:22:35	17:24:29	17:33:32	17:34:02	17:35:09	16:59:53	17:00:11	17:00:50
Run 33		16:46:53	16:48:27	16:49:09	17:52:59	17:55:38	17:57:40	18:08:50	18:10:54	18:12:03	17:39:55	17:40:15	17:40:53
Run 34		17:06:02	17:10:35	17:11:16	18:28:31	18:29:09	18:30:48	18:40:19	18:42:35	18:43:41	18:15:44	18:16:14	18:17:05
Run 35		17:31:52	17:33:20	17:35:02	18:58:46	18:59:10	19:00:30	19:07:43	19:09:12	19:10:49	18:38:02	18:38:23	18:39:04
Run 36		17:56:52	17:59:05	17:59:38	19:25:30	19:26:07	19:26:35	19:35:06	19:35:53	19:36:49	19:04:42	19:04:59	19:05:37
Run 37		18:14:40	18:15:07	18:15:26	19:51:37	19:51:58	19:53:34	20:00:37	20:01:21	20:02:15	19:33:06	19:33:24	19:34:03
Run 38		18:28:48	18:29:11	18:29:28	2.648	2.821	2.955				3.447	3.568	3.891
Run 39		18:49:04	18:49:31	18:49:51									
Run 40		19:03:29	19:03:56	19:05:19									
Run 41		19:23:18	19:23:45	19:24:05									
Run 42		19:37:47	19:39:27	19:39:49									
Cumulative Distance (Mi)													

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route Route 5 Northbound

Time at	OSGR Points	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	St John Street/ Cranleigh Gardens	St John Street/ Monmouth Street	East Quay/ Eastover	The Clink/ East Quay	Wylds Rd/ The Drive	A38 Bristol Rd/ The Drive	A38 Bristol Rd/ Wylds Rd	Survey Date	JTS
		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP11		
Run 1	AM (06:00- 10:00)	06:43:40	06:44:06	06:44:45	06:45:12	06:46:08	06:47:06	06:47:46	06:48:34	31/03/2010	00:04:53
Run 2		07:01:58	07:02:54	07:03:17	07:03:44	07:04:20	07:05:29	07:06:22	07:07:09	31/03/2010	00:05:12
Run 3		07:17:36	07:18:28	07:18:49	07:19:17	07:19:53	07:20:53	07:21:43	07:22:40	31/03/2010	00:05:05
Run 4		07:31:41	07:32:06	07:32:20	07:32:52	07:33:55	07:35:17	07:36:17	07:37:07	31/03/2010	00:05:26
Run 5		07:47:32	07:47:58	07:48:15	07:48:49	07:49:53	07:51:01	07:51:44	07:52:35	31/03/2010	00:05:03
Run 6		08:03:41	08:04:38	08:06:06	08:06:33	08:07:38	08:09:23	08:10:09	08:10:59	31/03/2010	00:07:19
Run 7		08:21:39	08:22:28	08:24:30	08:25:04	08:26:17	08:27:59	08:29:04	08:30:01	31/03/2010	00:08:22
Run 8		08:40:35	08:41:42	08:42:14	08:42:42	08:43:37	08:45:29	08:46:40	08:47:29	31/03/2010	00:06:54
Run 9		09:01:26	09:04:01	09:04:28	09:05:00	09:06:38	09:07:47	09:08:44	09:09:29	31/03/2010	00:08:03
Run 10		09:29:11	09:30:38	09:30:57	09:31:25	09:32:59	09:34:06	09:35:02	09:35:50	31/03/2010	00:06:39
Run 11		09:44:14	09:44:43	09:45:06	09:45:33	09:46:48	09:47:53	09:49:04	09:49:52	31/03/2010	00:05:38
Run 12	INTER (10:00 - 16:00)	10:00:45	10:01:09	10:01:36	10:02:13	10:03:28	10:04:57	10:05:43	10:06:27	31/03/2010	00:05:42
Run 13		10:22:40	10:23:12	10:23:28	10:23:54	10:24:46	10:26:02	10:26:56	10:27:42	31/03/2010	00:04:55
Run 14		10:36:24	10:36:40	10:37:18	10:38:15	10:39:43	10:40:55	10:41:53	10:42:40	31/03/2010	00:06:17
Run 15		10:51:02	10:51:25	10:52:56	10:53:28	10:54:42	10:55:52	10:56:38	10:57:24	31/03/2010	00:06:23
Run 16		11:07:21	11:07:52	11:09:09	11:09:46	11:10:50	11:12:04	11:13:20	11:14:06	31/03/2010	00:06:45
Run 17		11:23:40	11:24:57	11:25:30	11:26:06	11:27:22	11:28:32	11:29:21	11:30:11	31/03/2010	00:06:31
Run 18		11:52:56	11:53:21	11:53:41	11:54:27	11:55:15	11:56:17	11:57:32	11:58:20	31/03/2010	00:05:24
Run 19		12:07:38	12:08:02	12:09:36	12:10:08	12:11:16	12:12:50	12:14:27	12:15:13	31/03/2010	00:07:35
Run 20		12:25:25	12:26:00	12:27:43	12:28:30	12:29:53	12:31:00	12:31:50	12:32:37	31/03/2010	00:07:12
Run 21		12:43:28	12:43:52	12:44:10	12:44:42	12:45:27	12:46:57	12:47:42	12:48:26	31/03/2010	00:04:58
Run 22		13:02:27	13:03:38	13:04:08	13:05:01	13:07:01	13:08:54	13:10:18	13:11:06	31/03/2010	00:08:36
Run 23		13:21:28	13:21:53	13:22:11	13:22:49	13:25:22	13:26:45	13:28:07	13:28:55	31/03/2010	00:07:27
Run 24		13:37:57	13:38:31	13:39:56	13:40:30	13:41:24	13:42:49	13:44:08	13:44:55	31/03/2010	00:06:58
Run 25		14:01:26	14:01:53	14:02:17	14:02:46	14:04:14	14:05:35	14:06:25	14:07:13	31/03/2010	00:05:47
Run 26		14:21:55	14:22:58	14:24:28	14:24:57	14:25:33	14:27:09	14:28:17	14:29:03	31/03/2010	00:07:08
Run 27		14:42:01	14:42:59	14:44:26	14:44:58	14:46:04	14:46:58	14:48:01	14:48:48	31/03/2010	00:06:47
Run 28		14:57:58	15:00:08	15:00:36	15:01:05	15:02:22	15:03:44	15:05:08	15:05:55	31/03/2010	00:07:57
Run 29		15:18:18	15:20:25	15:20:49	15:21:22	15:22:37	15:24:15	15:25:16	15:26:02	31/03/2010	00:07:44
Run 30		15:45:15	15:47:17	15:49:26	15:50:03	15:52:07	15:53:30	15:54:16	15:55:03	31/03/2010	00:09:48
Run 31	PM (16:00 - 20:00)	16:06:40	16:08:16	16:09:15	16:09:45	16:11:19	16:12:29	16:14:01	16:14:45	31/03/2010	00:08:05
Run 32		16:27:39	16:28:13	16:29:10	16:29:50	16:30:52	16:32:01	16:33:42	16:34:28	31/03/2010	00:06:49
Run 33		16:46:53	16:48:27	16:49:09	16:49:45	16:50:59	16:51:58	16:52:39	16:53:23	31/03/2010	00:06:30
Run 34		17:06:02	17:10:35	17:11:16	17:11:54	17:13:05	17:14:30	17:16:30	17:17:26	31/03/2010	00:11:24
Run 35		17:31:52	17:33:20	17:35:02	17:35:29	17:38:03	17:39:00	17:39:35	17:40:19	31/03/2010	00:08:26
Run 36		17:56:52	17:59:05	17:59:38	18:00:03	18:01:34	18:02:32	18:03:16	18:04:05	31/03/2010	00:07:13
Run 37		18:14:40	18:15:07	18:15:26	18:15:58	18:16:30	18:17:25	18:18:12	18:18:59	31/03/2010	00:04:18
Run 38		18:28:48	18:29:11	18:29:28	18:29:55	18:31:00	18:31:59	18:33:06	18:33:55	31/03/2010	00:05:06
Run 39		18:49:04	18:49:31	18:49:51	18:50:21	18:51:01	18:52:10	18:52:57	18:53:45	31/03/2010	00:04:41
Run 40		19:03:29	19:03:56	19:05:19	19:05:55	19:06:37	19:07:50	19:09:03	19:09:52	31/03/2010	00:06:23
Run 41		19:23:18	19:23:45	19:24:06	19:24:36	19:25:38	19:26:46	19:27:54	19:28:42	31/03/2010	00:05:24
Run 42		19:37:47	19:39:27	19:39:49	19:40:24	19:41:32	19:42:39	19:43:45	19:44:43	31/03/2010	00:06:56
Cumulative Distance (		0.000	0.136	0.244	0.406	0.594	0.980	1.259	1.603		

Time at		Journey Times between Timing Points (hh:mm:ss)							
		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	JTS
Run 1	AM (06:00- 10:00)	00:00:25	00:00:39	00:00:28	00:00:56	00:00:58	00:00:40	00:00:48	00:04:53
Run 2		00:00:57	00:00:23	00:00:27	00:00:35	00:01:10	00:00:52	00:00:47	00:05:12
Run 3		00:00:52	00:00:22	00:00:28	00:00:36	00:01:01	00:00:49	00:00:58	00:05:05
Run 4		00:00:24	00:00:17	00:00:29	00:01:04	00:01:21	00:01:01	00:00:50	00:05:26
Run 5		00:00:26	00:00:17	00:00:34	00:01:04	00:01:08	00:00:44	00:00:51	00:05:03
Run 6		00:00:57	00:01:28	00:00:28	00:01:04	00:01:46	00:00:46	00:00:50	00:07:19
Run 7		00:00:49	00:02:05	00:00:31	00:01:13	00:01:42	00:01:06	00:00:56	00:08:22
Run 8		00:01:06	00:00:33	00:00:28	00:00:54	00:01:52	00:01:11	00:00:49	00:06:54
Run 9		00:02:35	00:00:27	00:00:32	00:01:38	00:01:09	00:00:58	00:00:44	00:08:03
Run 10		00:01:27	00:00:19	00:00:28	00:01:34	00:01:06	00:00:57	00:00:48	00:06:39
Run 11		00:00:30	00:00:23	00:00:27	00:01:15	00:01:04	00:01:12	00:00:48	00:05:38
Run 12	INTER (10:00 - 15:00)	00:00:24	00:00:28	00:00:37	00:01:15	00:01:28	00:00:46	00:00:44	00:05:42
Run 13		00:00:24	00:00:16	00:00:27	00:00:51	00:01:16	00:00:54	00:00:46	00:04:55
Run 14		00:00:25	00:00:29	00:00:57	00:01:28	00:01:12	00:00:58	00:00:47	00:06:17
Run 15		00:00:24	00:01:31	00:00:32	00:01:14	00:01:10	00:00:46	00:00:46	00:06:23
Run 16		00:00:31	00:01:17	00:00:39	00:01:04	00:01:13	00:01:16	00:00:46	00:06:45
Run 17		00:01:11	00:00:39	00:00:36	00:01:16	00:01:10	00:00:49	00:00:50	00:06:31
Run 18		00:00:25	00:00:21	00:00:45	00:00:48	00:01:02	00:01:15	00:00:48	00:05:24
Run 19		00:00:25	00:01:34	00:00:32	00:01:08	00:01:35	00:01:37	00:00:46	00:07:35
Run 20		00:00:35	00:01:43	00:00:47	00:01:23	00:01:07	00:00:50	00:00:47	00:07:12
Run 21		00:00:25	00:00:18	00:00:32	00:00:45	00:01:30	00:00:45	00:00:44	00:04:58
Run 22		00:01:11	00:00:30	00:00:53	00:02:00	00:01:53	00:01:24	00:00:48	00:08:38
Run 23		00:00:26	00:00:18	00:00:38	00:02:33	00:01:23	00:01:22	00:00:47	00:07:27
Run 24		00:00:34	00:01:25	00:00:34	00:00:54	00:01:25	00:01:19	00:00:47	00:06:58
Run 25		00:00:27	00:00:24	00:00:29	00:01:28	00:01:21	00:00:50	00:00:48	00:05:47
Run 26		00:00:58	00:01:35	00:00:29	00:00:36	00:01:36	00:01:08	00:00:46	00:07:08
Run 27		00:00:58	00:01:27	00:00:32	00:01:06	00:00:55	00:01:02	00:00:47	00:06:47
Run 28		00:02:10	00:00:27	00:00:29	00:01:17	00:01:23	00:01:24	00:00:47	00:07:57
Run 29		00:02:06	00:00:24	00:00:33	00:01:15	00:01:38	00:01:01	00:00:46	00:07:44
Run 30		00:02:02	00:02:09	00:00:37	00:02:04	00:01:23	00:00:46	00:00:46	00:09:48
Run 31	PM (16:00 - 20:00)	00:01:36	00:00:59	00:00:29	00:01:34	00:01:10	00:01:32	00:00:45	00:08:05
Run 32		00:00:34	00:00:57	00:00:40	00:01:02	00:01:09	00:01:41	00:00:46	00:06:49
Run 33		00:01:34	00:00:42	00:00:40	00:01:11	00:00:59	00:00:41	00:00:44	00:06:30
Run 34		00:04:33	00:00:41	00:00:39	00:01:10	00:01:25	00:02:00	00:00:57	00:11:24
Run 35		00:01:28	00:01:42	00:00:27	00:02:35	00:00:56	00:00:35	00:00:45	00:08:26
Run 36		00:02:13	00:00:33	00:00:31	00:01:25	00:00:58	00:00:44	00:00:49	00:07:13
Run 37		00:00:27	00:00:19	00:00:31	00:00:33	00:00:55	00:00:47	00:00:46	00:04:18
Run 38		00:00:23	00:00:17	00:00:27	00:01:05	00:00:58	00:01:08	00:00:49	00:05:06
Run 39		00:00:27	00:00:19	00:00:30	00:00:40	00:01:09	00:00:47	00:00:48	00:04:41
Run 40		00:00:27	00:01:23	00:00:36	00:00:42	00:01:13	00:01:13	00:00:49	00:06:23
Run 41		00:00:27	00:00:20	00:00:31	00:01:02	00:01:07	00:01:08	00:00:48	00:05:24
Run 42		00:01:41	00:00:22	00:00:35	00:01:08	00:01:06	00:01:06	00:00:58	00:06:56

		Journey Times between Timing Points (hh:mm:ss)						
	Run	TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP10 - TP11
AM	Min	00:00:24	00:00:17	00:00:27	00:00:35	00:00:58	00:00:40	00:00:44
	Average	00:00:57	00:00:39	00:00:23	00:01:05	00:01:18	00:00:56	00:00:50
	Max	00:02:35	00:02:05	00:00:34	00:01:38	00:01:52	00:01:12	00:00:58
	Std Dev	00:00:38	00:00:36	00:00:02	00:00:20	00:00:20	00:00:11	00:00:04
INTER	Min	00:00:24	00:00:16	00:00:27	00:00:36	00:00:55	00:00:45	00:00:44
	Average	00:00:51	00:00:54	00:00:37	00:01:17	00:01:21	00:01:04	00:00:47
	Max	00:02:10	00:02:09	00:00:57	00:02:33	00:01:53	00:01:37	00:00:50
	Std Dev	00:00:37	00:00:37	00:00:08	00:00:29	00:00:14	00:00:16	00:00:01
PM	Min	00:00:23	00:00:17	00:00:27	00:00:33	00:00:56	00:00:35	00:00:44
	Average	00:01:19	00:00:43	00:00:33	00:01:10	00:01:06	00:01:07	00:00:49
	Max	00:04:33	00:01:42	00:00:40	00:02:35	00:01:25	00:02:00	00:00:58
	Std Dev	00:01:12	00:00:28	00:00:05	00:00:32	00:00:09	00:00:26	00:00:04

Appendix A - Journey Time Survey Data
BridgewaterJTs 5NB

Count On Us

39292-BRIDGEWATER
MARCH 2010
CAR JOURNEY TIME SURVEY

Route   Route 5 Southbound

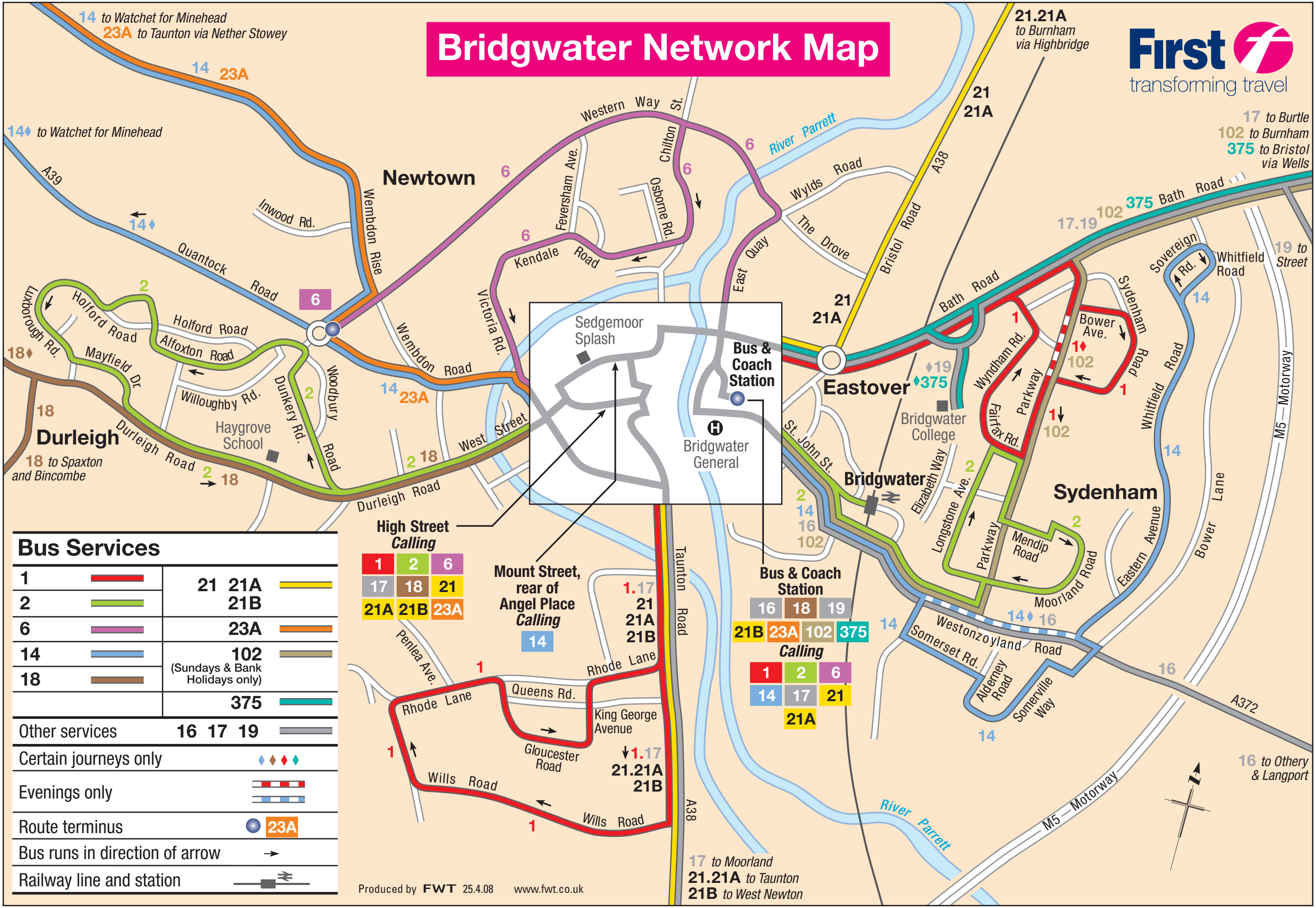
Time at	OSGR Points	A38 Bristol Rd/ Wylds Rd	A38 Bristol Rd/ The Drive	Wylds Rd/ The Drive	The Clink/ East Quay	East Quay/ Eastover	Eastover/ Monmouth St	St John Street/ Polden Street	St John Street/ Westonzoyland/ Wellington Rd (mini roundabout)	Survey Date	JTS
		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP11		
Run 1	AM (06:00 - 10:00)	06:00:30	06:01:18	06:02:01	06:03:07	06:03:47	06:04:33	06:04:53	06:05:16	31/03/2010	00:04:46
Run 2		06:35:58	06:36:55	06:38:01	06:39:12	06:39:58	06:40:52	06:41:25	06:41:59	31/03/2010	00:06:01
Run 3		06:54:37	06:55:31	06:56:32	06:57:46	06:58:26	06:59:39	07:00:29	07:00:54	31/03/2010	00:06:17
Run 4		07:11:22	07:12:29	07:13:10	07:14:11	07:14:50	07:15:36	07:15:56	07:16:19	31/03/2010	00:04:57
Run 5		07:25:43	07:26:33	07:27:16	07:28:16	07:28:55	07:30:03	07:30:22	07:30:43	31/03/2010	00:05:00
Run 6		07:39:45	07:41:41	07:42:34	07:43:33	07:44:13	07:45:33	07:45:51	07:46:12	31/03/2010	00:06:27
Run 7		07:55:41	07:57:36	07:58:21	07:59:49	08:00:34	08:01:56	08:02:10	08:02:45	31/03/2010	00:07:05
Run 8		08:13:40	08:14:32	08:15:53	08:17:29	08:18:10	08:19:53	08:20:13	08:20:45	31/03/2010	00:07:05
Run 9		08:33:49	08:35:17	08:35:58	08:36:55	08:37:40	08:38:23	08:38:44	08:39:15	31/03/2010	00:05:25
Run 10		08:51:25	08:53:28	08:54:34	08:57:23	08:58:13	08:50:41	08:59:46	09:00:39	31/03/2010	00:09:14
Run 11		09:20:10	09:21:24	09:22:08	09:24:00	09:24:58	09:26:35	09:26:55	09:27:10	31/03/2010	00:07:09
Run 12		09:38:24	09:39:12	09:40:10	09:41:00	09:41:53	09:42:41	09:42:57	09:43:17	31/03/2010	00:04:54
Run 13	INTER (10:00 - 15:00)	09:52:25	09:53:35	09:54:17	09:56:42	09:57:26	09:58:57	09:59:19	09:59:54	31/03/2010	00:07:29
Run 14		10:14:30	10:15:37	10:16:19	10:18:31	10:19:13	10:20:50	10:21:10	10:21:35	31/03/2010	00:07:05
Run 15		10:29:54	10:31:00	10:31:40	10:33:02	10:34:01	10:34:56	10:35:16	10:35:37	31/03/2010	00:05:43
Run 16		10:44:54	10:45:43	10:46:33	10:47:42	10:48:43	10:49:17	10:49:37	10:50:06	31/03/2010	00:05:12
Run 17		10:59:24	11:00:37	11:01:30	11:03:10	11:04:06	11:05:16	11:05:37	11:06:07	31/03/2010	00:06:42
Run 18		11:16:19	11:17:34	11:18:52	11:20:01	11:20:49	11:21:22	11:21:46	11:22:29	31/03/2010	00:06:10
Run 19		11:44:31	11:45:30	11:46:14	11:48:34	11:49:29	11:51:22	11:51:41	11:52:06	31/03/2010	00:07:35
Run 20		12:00:32	12:01:49	12:02:50	12:04:31	12:05:14	12:05:51	12:06:07	12:06:30	31/03/2010	00:05:58
Run 21		12:17:31	12:19:03	12:19:50	12:21:57	12:22:40	12:23:41	12:24:00	12:24:23	31/03/2010	00:06:52
Run 22		12:34:43	12:35:54	12:37:28	12:38:35	12:39:54	12:41:50	12:42:12	12:42:42	31/03/2010	00:07:59
Run 23		12:51:19	12:52:15	12:53:14	12:54:47	12:56:36	12:57:43	12:58:04	13:01:33	31/03/2010	00:10:15
Run 24		13:13:25	13:14:47	13:16:29	13:17:16	13:18:03	13:19:46	13:20:07	13:20:28	31/03/2010	00:07:03
Run 25		13:31:06	13:32:22	13:32:59	13:34:05	13:35:38	13:36:12	13:36:33	13:37:05	31/03/2010	00:05:59
Run 26		13:54:24	13:55:35	13:56:23	13:57:40	13:58:36	13:59:51	14:00:08	14:00:32	31/03/2010	00:06:08
Run 27		14:09:57	14:11:48	14:12:56	14:15:00	14:15:48	14:16:28	14:16:42	14:19:52	31/03/2010	00:09:55
Run 28		14:35:58	14:37:33	14:38:18	14:39:15	14:40:01	14:40:31	14:40:47	14:41:10	31/03/2010	00:06:11
Run 29		14:51:13	14:52:27	14:53:23	14:54:48	14:55:37	14:56:25	14:56:42	14:57:17	31/03/2010	00:06:04
Run 30		15:09:16	15:10:31	15:11:12	15:13:00	15:13:58	15:14:39	15:16:24	15:16:50	31/03/2010	00:07:34
Run 31		15:33:25	15:34:09	15:34:48	15:37:02	15:38:42	15:41:03	15:41:41	15:42:38	31/03/2010	00:09:13
Run 32	PM (16:00 - 20:00)	15:57:12	15:58:22	15:59:23	16:01:11	16:02:33	16:04:39	16:05:00	16:05:24	31/03/2010	00:08:13
Run 33		16:17:04	16:18:32	16:20:16	16:22:27	16:23:30	16:24:56	16:25:15	16:25:39	31/03/2010	00:08:36
Run 34		16:55:25	16:56:11	16:57:59	16:59:15	17:00:08	17:01:19	17:02:22	17:03:53	31/03/2010	00:08:28
Run 35		17:22:56	17:24:21	17:25:24	17:26:53	17:27:37	17:29:13	17:30:54	17:31:18	31/03/2010	00:08:22
Run 36		17:45:55	17:46:49	17:48:00	17:50:19	17:52:41	17:54:50	17:55:13	17:55:44	31/03/2010	00:09:49
Run 37		18:06:49	18:08:14	18:09:17	18:10:14	18:10:56	18:12:53	18:13:17	18:13:39	31/03/2010	00:06:50
Run 38		18:21:33	18:22:19	18:23:16	18:24:55	18:25:33	18:27:07	18:27:26	18:27:53	31/03/2010	00:06:20
Run 39		18:41:44	18:42:47	18:43:44	18:44:53	18:45:51	18:47:13	18:47:39	18:48:02	31/03/2010	00:06:18
Run 40		18:55:55	18:56:47	18:57:30	18:58:35	18:59:27	19:01:18	19:01:55	19:02:20	31/03/2010	00:06:25
Run 41		19:12:00	19:12:54	19:13:38	19:14:39	19:15:24	19:17:26	19:17:49	19:21:55	31/03/2010	00:09:55
Run 42		19:30:57	19:32:10	19:33:17	19:34:16	19:34:53	19:35:38	19:35:56	19:36:19	31/03/2010	00:05:22
Cumulative Distance (		0.000	0.349	0.620	1.006	1.201	1.363	1.472	1.607		

		Journey Times between Timing Points (hh:mm:ss)							
Time at		TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP7 - TP8	JTS
Run 1	AM (06:00 - 10:00)	00:00:48	00:00:43	00:01:06	00:00:39	00:00:46	00:00:21	00:00:23	00:04:46
Run 2		00:00:56	00:01:07	00:01:11	00:00:46	00:00:54	00:00:33	00:00:34	00:06:01
Run 3		00:00:54	00:01:01	00:01:14	00:00:40	00:01:13	00:00:50	00:00:25	00:06:17
Run 4		00:00:54	00:01:01	00:01:14	00:00:40	00:01:13	00:00:50	00:00:25	00:06:17
Run 5		00:01:07	00:00:41	00:01:01	00:00:39	00:00:46	00:00:21	00:00:23	00:04:57
Run 6		00:00:50	00:00:44	00:00:59	00:00:39	00:01:08	00:00:19	00:00:21	00:05:00
Run 7		00:01:55	00:00:53	00:01:00	00:00:39	00:01:20	00:00:18	00:00:21	00:06:27
Run 8		00:01:58	00:00:43	00:01:20	00:00:45	00:01:21	00:00:22	00:00:27	00:07:05
Run 9		00:00:53	00:01:21	00:01:36	00:00:41	00:01:43	00:00:20	00:00:32	00:07:05
Run 10		00:02:03	00:01:06	00:02:49	00:00:50	00:00:28	00:01:05	00:00:53	00:09:14
Run 11		00:01:14	00:00:44	00:01:52	00:00:57	00:01:37	00:00:20	00:00:23	00:07:09
Run 12		00:00:49	00:00:58	00:00:50	00:00:45	00:00:48	00:00:16	00:00:20	00:04:54
Run 13	INTER (10:00 - 16:00)	00:01:10	00:00:42	00:02:25	00:00:44	00:01:30	00:00:33	00:00:34	00:07:29
Run 14		00:01:07	00:00:42	00:02:12	00:00:42	00:01:37	00:00:20	00:00:25	00:07:05
Run 15		00:01:05	00:00:40	00:01:22	00:00:59	00:00:55	00:00:20	00:00:21	00:05:43
Run 16		00:00:50	00:00:50	00:01:09	00:01:01	00:00:34	00:00:20	00:00:29	00:05:12
Run 17		00:01:13	00:00:53	00:01:50	00:00:48	00:01:10	00:00:21	00:00:29	00:06:42
Run 18		00:01:15	00:01:18	00:01:09	00:00:49	00:00:33	00:00:23	00:00:44	00:06:10
Run 19		00:00:59	00:00:43	00:02:20	00:00:56	00:01:52	00:00:20	00:00:25	00:07:35
Run 20		00:01:17	00:01:01	00:01:42	00:00:42	00:00:37	00:00:15	00:00:24	00:05:58
Run 21		00:01:32	00:00:48	00:02:07	00:00:46	00:00:58	00:00:19	00:00:23	00:06:52
Run 22		00:01:12	00:01:28	00:01:12	00:01:18	00:01:56	00:00:20	00:00:29	00:07:59
Run 23		00:00:56	00:01:00	00:01:39	00:01:49	00:01:07	00:00:21	00:03:30	00:10:15
Run 24		00:01:22	00:00:41	00:01:48	00:00:47	00:01:43	00:00:20	00:00:22	00:07:03
Run 25		00:01:16	00:00:38	00:01:06	00:01:33	00:00:33	00:00:21	00:00:32	00:05:59
Run 26		00:01:11	00:00:48	00:01:17	00:00:55	00:01:16	00:00:17	00:00:24	00:06:08
Run 27		00:01:51	00:01:06	00:02:05	00:00:47	00:00:36	00:00:19	00:03:10	00:09:55
Run 28		00:01:35	00:00:45	00:00:57	00:00:45	00:00:30	00:00:16	00:00:23	00:05:11
Run 29		00:01:13	00:00:56	00:01:25	00:00:49	00:00:49	00:00:17	00:00:35	00:06:04
Run 30		00:01:15	00:00:41	00:01:48	00:00:58	00:00:41	00:01:44	00:00:27	00:07:34
Run 31		00:00:45	00:00:39	00:02:14	00:01:40	00:02:21	00:00:38	00:00:57	00:09:13
Run 32	PM (16:00 - 20:00)	00:01:10	00:01:02	00:01:47	00:01:23	00:02:05	00:00:21	00:00:24	00:08:13
Run 33		00:01:29	00:01:43	00:02:12	00:01:02	00:01:26	00:00:19	00:00:25	00:08:36
Run 34		00:00:47	00:01:40	00:01:16	00:00:54	00:01:11	00:01:03	00:01:30	00:08:28
Run 35		00:01:25	00:01:03	00:01:29	00:00:44	00:01:36	00:01:40	00:00:24	00:08:22
Run 36		00:00:53	00:01:12	00:02:19	00:02:22	00:02:09	00:00:23	00:00:31	00:09:49
Run 37		00:01:25	00:01:03	00:00:58	00:00:42	00:01:57	00:00:24	00:00:22	00:06:50
Run 38		00:00:46	00:00:57	00:01:39	00:00:38	00:01:34	00:00:22	00:00:25	00:06:20
Run 39		00:01:03	00:00:57	00:01:09	00:00:59	00:01:22	00:00:26	00:00:23	00:06:18
Run 40		00:00:51	00:00:44	00:01:04	00:00:52	00:01:51	00:00:37	00:00:25	00:06:25
Run 41		00:00:54	00:00:44	00:01:01	00:00:45	00:02:02	00:00:23	00:04:06	00:09:55
Run 42		00:01:13	00:01:07	00:00:59	00:00:38	00:00:45	00:00:17	00:00:23	00:05:22

		Journey Times between Timing Points (hh:min:ss)						
	Run	TP1 - TP2	TP2 - TP3	TP3 - TP4	TP4 - TP5	TP5 - TP6	TP6 - TP7	TP10 - TP11
AM	Min	00:00:48	00:00:41	00:00:58	00:00:39	00:00:28	00:00:16	00:00:20
	Average	00:01:12	00:00:55	00:01:22	00:00:43	00:01:06	00:00:30	00:00:27
	Max	00:02:03	00:01:21	00:02:49	00:00:57	00:01:43	00:01:05	00:00:53
	Std Dev	00:00:29	00:00:13	00:00:32	00:00:06	00:00:22	00:00:16	00:00:09
INTER	Min	00:00:45	00:00:38	00:00:57	00:00:42	00:00:30	00:00:15	00:00:21
	Average	00:01:13	00:00:51	00:01:40	00:00:59	00:01:07	00:00:25	00:00:47
	Max	00:01:51	00:01:28	00:02:25	00:01:49	00:02:21	00:01:44	00:03:30
	Std Dev	00:00:15	00:00:14	00:00:28	00:00:20	00:00:34	00:00:20	00:00:54
PM	Min	00:00:46	00:00:44	00:00:58	00:00:38	00:00:45	00:00:17	00:00:22
	Average	00:01:05	00:01:07	00:01:27	00:01:00	00:01:38	00:00:34	00:00:51
	Max	00:01:29	00:01:48	00:02:19	00:02:22	00:02:09	00:01:40	00:04:06
	Std Dev	00:00:16	00:00:21	00:00:29	00:00:30	00:00:26	00:00:25	00:01:08

Appendix A - Journey Time Survey Data
BridgewaterJTs.SSD

APPENDIX A.2: BRIDGWATER BUS ROUTE MAP



Bridgwater Network Map
First transforming travel
14 to Watchet for Minehead
23A to Taunton via Nether Stowey
14♦ to Watchet for Minehead
21.21A to Burnham via Highbridge
17 to Burtle
102 to Burnham
375 to Bristol via Wells
19 to Street
18♦
18 to Spaxton and Bincombe
16 to Othery & Langport
17 to Moorland
21.21A to Taunton
21B to West Newton
Newtown
Durleigh
Eastover
Sydenham
Bridgwater
River Parrett
Sedgemoor Splash
Bus & Coach Station
Bridgwater General
Bridgwater College
Haygrove School
Western Way
Chilton St.
Osborne Rd.
Feversham Ave.
Kendale Road
Victoria Rd.
Wembdon Rise
Wembdon Road
Inwood Rd.
Quantock Road
A39
Holford Road
Alfoxton Road
Mayfield Dr.
Luxborough Rd.
Willoughby Rd.
Dunkery Rd.
Woodbury Road
Durleigh Road
West Street
Wylds Road
The Drove
East Quay
Bristol Road
A38
Bath Road
Sovereign Rd.
Whitfield Road
Sydenham Road
Bower Ave.
Wyndham Rd.
Parkway
Fairfax Rd.
Whitfield Road
Bower Lane
M5 — Motorway
St. John St.
Elizabeth Way
Longstone Ave.
Mendip Road
Moorland Road
Eastern Avenue
Westonzoyland Road
Somerset Rd.
Alderney Road
Somerville Way
A372
Taunton Road
Penlea Ave.
Rhode Lane
Queens Rd.
King George Avenue
Gloucester Road
Wills Road
High Street Calling
1 2 6 17 18 21 21A 21B 23A
Mount Street, rear of Angel Place Calling
14
Bus & Coach Station
16 18 19 21B 23A 102 375
Calling
1 2 6 14 17 21 21A
Bus Services
1
2
6
14
18
21 21A 21B
23A
102 (Sundays & Bank Holidays only)
375
Other services 16 17 19
Certain journeys only
Evenings only
Route terminus 23A
Bus runs in direction of arrow
Railway line and station
Produced by FWT 25.4.08 www.fwt.co.uk

APPENDIX A.3: VALIDATED OUTPUTS FOR MATRIX

Appendix B: Validation output matrix estimation period 2 HGV

Survey 0700-0800 HGV

Count type	Count location		Survey	Output	Difference	GEH
turncount	4:3a	3b:262	1	2	-1	1
turncount	4:3a	3c:2	1	4	-3	2
turncount	15:13	13:462	8	6	2	1
turncount	15:13	13:463	12	14	-2	1
turncount	462:13	13:15	5	5	0	0
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	3	11	-8	3
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	22	19	3	1
turncount	26:25a	25c:24	9	17	-8	2
turncount	38:36a	36b:39	4	4	0	0
turncount	38:36a	36c:35	13	19	-6	1
turncount	38:36a	36d:37	0	0	0	1
turncount	42:43	43:44	16	20	-4	1
turncount	42:43	43:486	2	2	0	0
turncount	44:43	43:42	20	18	2	0
turncount	44:43	43:486	3	2	1	1
turncount	486:43	43:44	1	3	-2	1
turncount	486:43	43:42	1	5	-4	2
turncount	57:58	58:59	6	19	-13	4
turncount	57:58	58:579	0	0	0	1
turncount	59:58	58:579	0	0	0	1
turncount	59:58	58:57	19	17	2	0
turncount	579:58	58:59	1	0	1	1
turncount	579:58	58:57	0	0	0	1
turncount	135:67	67:616	2	2	0	1
turncount	135:67	67:615	1	1	0	0
turncount	135:67	67:521	0	0	0	1
turncount	521:67	67:616	2	1	1	1
turncount	521:67	67:135	0	0	0	1
turncount	521:67	67:615	0	0	0	1
turncount	615:67	67:616	18	16	2	1
turncount	615:67	67:135	0	0	0	1
turncount	615:67	67:521	0	0	0	1
turncount	616:67	67:135	0	2	-2	2
turncount	616:67	67:615	23	20	3	1
turncount	616:67	67:521	0	1	-1	1
turncount	74:75	75:78	20	10	10	3
turncount	74:75	75:76	6	13	-7	2
turncount	74:75	75:77	5	8	-3	1
turncount	76:75	75:78	2	5	-3	2
turncount	76:75	75:77	10	4	6	2
turncount	76:75	75:74	8	11	-3	1
turncount	77:75	75:78	9	13	-4	1
turncount	77:75	75:76	2	3	-1	1
turncount	77:75	75:74	2	5	-3	2
turncount	78:75	75:76	4	6	-2	1
turncount	78:75	75:77	10	10	0	0
turncount	78:75	75:74	15	16	-1	0
turncount	81:82	82:83	5	11	-6	2
turncount	81:82	82:594	0	1	-1	1
turncount	83:82	82:81	14	14	0	1
turncount	83:82	82:594	0	0	0	1
turncount	594:82	82:83	0	0	0	1
turncount	594:82	82:81	0	0	0	1
turncount	105:91a	91b:99	0	4	-4	3
turncount	105:91a	91c:90	0	0	0	1
turncount	101:102	102:104	1	2	-1	1
turncount	101:102	102:954z	4	6	-2	1
turncount	101:102	102:103	0	0	0	1
turncount	103:102	102:104	0	2	-2	2
turncount	103:102	102:954z	3	2	1	1
turncount	103:102	102:101	0	1	-1	1
turncount	104:102	102:954z	4	4	0	0
turncount	104:102	102:103	2	2	0	0
turncount	104:102	102:101	1	1	0	1
turncount	954z:102	102:104	0	3	-3	2
turncount	954z:102	102:103	5	1	5	3
turncount	954z:102	102:101	18	9	9	2
turncount	130:124	124:665	0	0	0	1
turncount	130:124	124:761	0	1	-1	1
turncount	665:124	124:130	0	0	0	1
turncount	665:124	124:761	0	0	0	1
turncount	761:124	124:130	2	0	2	2
turncount	761:124	124:665	0	0	0	1
turncount	157:139	139:654	38	33	5	1
turncount	157:139	139:619	5	12	-7	2
turncount	619:139	139:157	14	21	-7	2
turncount	619:139	139:654	7	9	-2	1
turncount	654:139	139:157	35	21	14	3
turncount	654:139	139:619	6	19	-13	4
turncount	148:149	149:220	26	29	-3	1
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	45	36	9	1
turncount	150:149	149:148	3	4	-1	1

turncount	220:149	149:150	43	44	-1	0
turncount	220:149	149:148	26	31	-5	1
turncount	160:161a	161b:163	3	4	-1	0
turncount	160:161a	161c:164	13	33	-20	4
turncount	160:161a	161d:162	3	5	-2	1
turncount	172:173	173:491	0	5	-5	3
turncount	172:173	173:174	8	4	4	2
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	3	12	-9	3
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	8	4	4	2
turncount	173:174	174:178	1	0	1	1
turncount	176:174	174:177	5	7	-2	1
turncount	176:174	174:178	2	0	2	2
turncount	176:174	174:173	0	3	-3	2
turncount	177:174	174:176	6	6	0	0
turncount	177:174	174:178	10	10	0	0
turncount	177:174	174:173	3	7	-4	2
turncount	178:174	174:176	0	0	0	1
turncount	178:174	174:177	5	12	-7	2
turncount	178:174	174:173	0	2	-2	2
turncount	174:176	176:955z	6	6	0	0
turncount	491:176	176:955z	0	5	-5	3
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	7	10	-3	1
turncount	185:186	186:507	1	2	-1	1
turncount	185:186	186:450	2	5	-3	1
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	67	35	32	4
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	3	8	-5	2
turncount	450:186	186:187	5	16	-11	3
turncount	450:186	186:185	2	4	-2	1
turncount	507:186	186:450	6	3	3	1
turncount	507:186	186:187	40	37	3	1
turncount	507:186	186:185	0	1	-1	1
turncount	193:192	192:511	8	14	-6	2
turncount	193:192	192:216	14	23	-9	2
turncount	193:192	192:514	0	0	0	1
turncount	216:192	192:511	19	28	-9	2
turncount	216:192	192:193	19	21	-2	0
turncount	216:192	192:514	6	7	-1	0
turncount	511:192	192:216	39	30	9	2
turncount	511:192	192:193	12	12	0	0
turncount	511:192	192:514	4	5	-1	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	2	0	2	2
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	0	0	0	1
turncount	98:210	210:211	0	1	-1	1
turncount	211:210	210:212	2	4	-2	1
turncount	211:210	210:98	0	2	-2	2
turncount	212:210	210:211	5	4	1	1
turncount	212:210	210:98	0	0	0	1
turncount	222:223	223:224	70	68	2	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	70	55	16	2
turncount	224:225	288:227	7	4	3	1
turncount	224:225	285:289	63	64	-1	0
turncount	224:225	287:284z	0	0	0	1
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	29	38	-9	2
turncount	562:241	241:349	39	36	3	1
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	1	1	0	1
turncount	563:242	242:346	1	0	1	1
turncount	247:248	373:361	48	46	2	0
turncount	247:248	360:334	8	11	-3	1
turncount	247:248	378:375	22	20	2	0
turncount	290:286	287:284z	63	42	21	3
turncount	290:286	288:227	6	16	-10	3
turncount	290:286	285:289	6	7	-1	0
turncount	227:288	285:289	8	12	-4	1
turncount	227:288	287:284z	7	12	-5	2
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	0	0	0	1
turncount	239:303	348:241	18	25	-7	2
turncount	239:303	350:243	52	58	-6	1
turncount	239:303	240:302	7	2	5	2
turncount	324:325	325:345	15	14	1	0
turncount	324:325	325:326	10	9	1	0
turncount	326:325	325:345	41	55	-14	2
turncount	326:325	325:324	10	15	-5	1
turncount	345:325	325:324	6	15	-9	3
turncount	345:325	325:326	28	54	-26	4
turncount	242:346	348:241	0	0	0	1
turncount	242:346	350:243	1	0	1	1
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	14	13	1	0
turncount	241:349	240:302	25	22	3	1
turncount	241:349	347:242	0	1	-1	1
turncount	352:351	240:302	52	56	-4	1

turncount	352:351	347:242	1	0	1	1
turncount	352:351	348:241	11	13	-2	1
turncount	352:351	350:243	13	7	6	2
turncount	334:359	378:375	19	11	8	2
turncount	334:359	358:357	9	7	2	1
turncount	334:359	373:361	19	31	-12	2
turncount	383:364	364:371	23	33	-10	2
turncount	381:374	360:334	27	32	-5	1
turncount	381:374	378:375	0	0	0	0
turncount	381:374	358:357	40	37	4	1
turncount	372:377	358:357	9	18	-9	2
turncount	372:377	373:361	0	0	0	1
turncount	372:377	360:334	14	15	-1	0
turncount	413:412	412:952z	67	69	-2	0
turncount	415:416	419:429	33	40	-7	1
turncount	415:416	435:425	0	0	0	1
turncount	415:416	449:433	33	25	9	2
turncount	427:417	418:342	24	35	-11	2
turncount	427:417	419:429	0	0	0	0
turncount	427:417	435:425	0	0	0	1
turncount	425:423	449:433	0	0	0	1
turncount	425:423	418:342	1	0	1	1
turncount	425:423	419:429	0	0	0	1
turncount	435:425	425:448	0	0	0	1
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	1	0	1	1
turncount	436:434	435:425	0	0	0	1
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	37	39	-2	0
turncount	407:437	437:431	37	39	-2	0
turncount	445:444	444:428	24	35	-11	2
turncount	343:336b	336c:339	13	33	-20	4
turncount	343:336b	336e:337	0	1	-1	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	1	2	-1	1
turncount	447:336d	336e:337	22	23	-1	0
turncount	447:336d	973:974	0	1	-1	1
turncount	447:336d	336a:335	24	21	3	1
turncount	447:336d	336b:343	12	28	-16	4
turncount	337:336e	973:974	1	0	1	1
turncount	337:336e	336a:335	7	7	1	0
turncount	337:336e	336b:343	0	2	-2	2
turncount	337:336e	336c:339	30	15	15	3
turncount	12:462	462:463	1	1	0	1
turncount	12:462	462:13	5	4	1	1
turncount	12:462	462:675z	0	0	0	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	0	2	-2	2
turncount	13:462	462:12	8	4	4	1
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	0	1	-1	2
turncount	463:462	462:12	1	4	-3	2
turncount	675z:462	462:463	0	0	0	1
turncount	675z:462	462:13	0	2	-2	2
turncount	675z:462	462:12	1	0	1	1
turncount	13:463	463:901	12	14	-2	1
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	1	1	0	1
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	3	11	-8	3
turncount	901:463	463:462	1	5	-4	2
turncount	262:3b	3c:2	18	19	-1	0
turncount	262:3b	3a:4	2	1	1	1
turncount	2:3c	3a:4	0	3	-3	3
turncount	2:3c	3b:262	4	22	-18	5
turncount	264:25b	25c:24	2	1	1	1
turncount	264:25b	25a:26	7	23	-16	4
turncount	24:25c	25a:26	2	16	-14	5
turncount	24:25c	25b:264	0	1	-1	1
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	2	1	1	1
turncount	490:470	470:471	1	1	0	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	37	35	2	0
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	13	38	-25	5
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	1	1	0	0
turncount	271:488	488:487	13	38	-25	5
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	37	35	2	0
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	2	1	1	1
turncount	163:161b	161c:164	6	4	2	1
turncount	163:161b	161d:162	4	6	-2	1
turncount	163:161b	161a:160	2	11	-9	3
turncount	162:161d	161a:160	3	6	-3	1
turncount	162:161d	161b:163	4	6	-2	1
turncount	162:161d	161c:164	0	3	-3	2

turncount	192:511	511:191	27	43	-16	3
turncount	514:511	511:191	0	1	-1	1
turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	10	12	-2	1
turncount	513:514	514:511	0	1	-1	1
turncount	513:514	514:192	2	0	2	2
turncount	99:91b	91c:90	13	11	2	1
turncount	99:91b	91a:105	1	1	0	1
turncount	99:91b	91b:99	0	0	0	1
turncount	90:91c	91a:105	0	1	-1	1
turncount	90:91c	91b:99	8	10	-2	1
turncount	84:517	517:86	6	11	-5	2
turncount	84:517	517:87	0	0	0	1
turncount	86:517	517:87	0	0	0	1
turncount	86:517	517:84	15	12	3	1
turncount	87:517	517:86	0	0	0	1
turncount	87:517	517:84	0	3	-3	2
turncount	39:36b	36c:35	20	16	4	1
turncount	39:36b	36d:37	0	0	0	1
turncount	39:36b	36a:38	7	2	5	2
turncount	35:36c	36d:37	1	0	1	1
turncount	35:36c	36a:38	3	20	-17	5
turncount	35:36c	36b:39	2	18	-16	5
turncount	37:36d	36a:38	0	0	0	1
turncount	37:36d	36b:39	1	0	1	1
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	2	9	-7	3
turncount	618:617	617:70	9	12	-3	1
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	45	42	3	0
turncount	158:654	654:139	41	40	1	0
turncount	335:959	336b:343	3	2	1	0
turncount	335:959	336c:339	21	15	6	1
turncount	335:959	336e:337	10	10	0	0
turncount	335:959	973:974	0	0	0	1
turncount	165:971	161d:162	1	2	-1	1
turncount	165:971	161a:160	7	23	-16	4
turncount	165:971	161b:163	4	9	-5	2
turncount	165:971	161c:164	0	1	-1	1
turncount	974:973	336a:335	0	0	0	1
turncount	974:973	336b:343	0	0	0	1
turncount	974:973	336c:339	2	1	1	1
turncount	974:973	336e:337	0	0	0	1
linkcount	688:763		0	5	-5	3
linkcount	763:688		0	3	-3	3
linkcount	678:764		12	29	-17	4
linkcount	764:678		46	32	14	2
linkcount	614:779		22	11	11	3
linkcount	779:614		12	7	5	1
linkcount	198:197a		0	1	-1	1
linkcount	255:256		62	40	21	3
linkcount	256:255		42	46	-4	1
linkcount	675:676		3	5	-2	1
linkcount	676:675		10	8	2	1
linkcount	183:503		0	0	0	1
linkcount	503:183		0	0	0	1
linkcount	955y:208		13	11	3	1
linkcount	208:955y		5	13	-8	3
linkcount	900:867z		39	15	25	5
linkcount	867z:900		6	13	-7	2
linkcount	303z:759		1	0	1	1
linkcount	361:362		67	77	-10	1
linkcount	367:368		168	273	-105	7
linkcount	370:556		235	351	-116	7
linkcount	371:372		23	33	-10	2
linkcount	375:382z		41	31	10	2
linkcount	384:387		422	304	119	6
linkcount	404:402		191	306	-115	7
linkcount	412:952z		67	69	-2	0
linkcount	412:411		381	273	109	6
linkcount	413:412		448	342	107	5
linkcount	428:427		24	35	-11	2
linkcount	429:430		33	40	-7	1
linkcount	431:436		37	39	-2	0
linkcount	433:432		33	25	9	2
linkcount	440:449z		385	265	120	7
linkcount	441:438		158	267	-109	7
linkcount	443:560		418	290	129	7
linkcount	445:444		182	301	-119	8
linkcount	651:653		1	0	1	1
linkcount	901:902		13	15	-2	1
linkcount	902:901		4	17	-13	4
linkcount	759:303z		1	0	1	1

Appendix B: Validation output matrix estimation period 3 LGV

Survey 0800-0900 LGV

Count type	Count location		Survey	Output	Difference	GEH
turncount	4:3a	3b:262	23	15	8	2
turncount	4:3a	3c:2	56	65	-9	1
turncount	15:13	13:462	105	131	-26	2
turncount	15:13	13:463	232	236	-4	0
turncount	462:13	13:15	96	89	7	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	243	254	-11	1
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	190	182	8	1
turncount	26:25a	25c:24	348	349	-1	0
turncount	38:36a	36b:39	431	366	65	3
turncount	38:36a	36c:35	223	246	-23	1
turncount	38:36a	36d:37	1	1	0	0
turncount	42:43	43:44	341	333	8	0
turncount	42:43	43:486	72	73	-1	0
turncount	44:43	43:42	487	463	25	1
turncount	44:43	43:486	135	138	-3	0
turncount	486:43	43:44	123	119	4	0
turncount	486:43	43:42	158	150	8	1
turncount	57:58	58:59	439	436	3	0
turncount	57:58	58:579	20	20	0	1
turncount	59:58	58:579	21	21	0	1
turncount	59:58	58:57	453	453	0	0
turncount	579:58	58:59	93	92	1	0
turncount	579:58	58:57	94	95	-1	0
turncount	135:67	67:616	69	70	-1	0
turncount	135:67	67:615	43	44	-1	0
turncount	135:67	67:521	42	42	0	1
turncount	521:67	67:616	62	64	-2	0
turncount	521:67	67:135	34	35	-1	0
turncount	521:67	67:615	41	41	0	0
turncount	615:67	67:616	532	547	-15	1
turncount	615:67	67:135	68	69	-1	0
turncount	615:67	67:521	44	44	0	0
turncount	616:67	67:135	65	69	-4	0
turncount	616:67	67:615	326	347	-21	1
turncount	616:67	67:521	69	75	-6	1
turncount	74:75	75:78	291	303	-12	1
turncount	74:75	75:76	161	152	9	1
turncount	74:75	75:77	213	228	-15	1
turncount	76:75	75:78	15	37	-22	4
turncount	76:75	75:77	67	52	15	2
turncount	76:75	75:74	178	179	-1	0
turncount	77:75	75:78	176	125	51	4
turncount	77:75	75:76	14	20	-6	1
turncount	77:75	75:74	73	91	-18	2
turncount	78:75	75:76	19	18	2	0
turncount	78:75	75:77	323	232	92	5
turncount	78:75	75:74	207	219	-12	1
turncount	81:82	82:83	746	801	-55	2
turncount	81:82	82:594	8	8	0	1
turncount	83:82	82:81	393	423	-30	1
turncount	83:82	82:594	18	17	1	0
turncount	594:82	82:83	38	34	4	1
turncount	594:82	82:81	17	19	-2	1
turncount	105:91a	91b:99	123	123	0	1
turncount	105:91a	91c:90	91	92	-1	0
turncount	101:102	102:104	248	249	-1	0
turncount	101:102	102:954z	615	615	0	0
turncount	101:102	102:103	39	51	-12	2
turncount	103:102	102:104	266	270	-4	0
turncount	103:102	102:954z	345	368	-23	1
turncount	103:102	102:101	39	38	1	0
turncount	104:102	102:954z	57	106	-49	5
turncount	104:102	102:103	81	88	-7	1
turncount	104:102	102:101	85	86	-1	0
turncount	954z:102	102:104	153	153	0	1
turncount	954z:102	102:103	189	195	-6	0
turncount	954z:102	102:101	310	310	0	0
turncount	130:124	124:665	140	140	0	1
turncount	130:124	124:761	72	72	0	1
turncount	665:124	124:130	60	63	-3	0
turncount	665:124	124:761	51	51	0	1
turncount	761:124	124:130	93	93	0	1
turncount	761:124	124:665	81	81	0	1
turncount	157:139	139:654	348	333	15	1
turncount	157:139	139:619	71	128	-57	6
turncount	619:139	139:157	56	57	-1	0
turncount	619:139	139:654	132	153	-21	2
turncount	654:139	139:157	251	343	-92	5
turncount	654:139	139:619	356	331	25	1
turncount	148:149	149:220	417	409	8	0
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	388	307	81	4
turncount	150:149	149:148	43	43	0	0

NOT PROTECTIVELY MARKED

turncount	220:149	149:150	398	453	-55	3
turncount	220:149	149:148	521	446	75	3
turncount	160:161a	161b:163	190	160	30	2
turncount	160:161a	161c:164	278	246	32	2
turncount	160:161a	161d:162	83	112	-29	3
turncount	172:173	173:491	226	211	15	1
turncount	172:173	173:174	163	234	-71	5
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	381	316	65	4
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	163	111	53	4
turncount	173:174	174:178	180	123	57	5
turncount	176:174	174:177	109	104	5	0
turncount	176:174	174:178	311	332	-21	1
turncount	176:174	174:173	90	73	18	2
turncount	177:174	174:176	37	50	-13	2
turncount	177:174	174:178	79	84	-5	1
turncount	177:174	174:173	133	122	11	1
turncount	178:174	174:176	294	307	-13	1
turncount	178:174	174:177	66	70	-4	0
turncount	178:174	174:173	158	122	37	3
turncount	174:176	176:955z	331	357	-26	1
turncount	491:176	176:955z	226	211	15	1
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	510	508	2	0
turncount	185:186	186:507	20	25	-5	1
turncount	185:186	186:450	55	56	-1	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	626	655	-29	1
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	184	183	1	0
turncount	450:186	186:187	263	262	1	0
turncount	450:186	186:185	144	145	-1	0
turncount	507:186	186:450	32	44	-12	2
turncount	507:186	186:187	546	607	-61	3
turncount	507:186	186:185	78	102	-24	3
turncount	193:192	192:511	495	498	-3	0
turncount	193:192	192:216	500	500	0	1
turncount	193:192	192:514	78	78	0	1
turncount	216:192	192:511	579	579	0	0
turncount	216:192	192:193	473	473	0	1
turncount	216:192	192:514	109	109	0	0
turncount	511:192	192:216	409	411	-2	0
turncount	511:192	192:193	379	382	-3	0
turncount	511:192	192:514	70	70	0	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	153	132	21	2
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	52	14	38	7
turncount	98:210	210:211	27	51	-24	4
turncount	211:210	210:212	602	505	97	4
turncount	211:210	210:98	37	42	-5	1
turncount	212:210	210:211	325	294	31	2
turncount	212:210	210:98	25	26	-1	0
turncount	222:223	223:224	742	737	6	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	886	888	-2	0
turncount	224:225	288:227	129	127	2	0
turncount	224:225	285:289	613	608	5	0
turncount	224:225	287:284z	0	2	-2	2
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	309	310	-1	0
turncount	562:241	241:349	474	476	-2	0
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	10	10	0	1
turncount	563:242	242:346	4	3	1	1
turncount	247:248	373:361	334	330	4	0
turncount	247:248	360:334	138	134	4	0
turncount	247:248	378:375	159	155	4	0
turncount	290:286	287:284z	818	817	1	0
turncount	290:286	288:227	208	208	0	1
turncount	290:286	285:289	27	27	0	1
turncount	227:288	285:289	41	41	0	1
turncount	227:288	287:284z	68	69	-1	0
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	3	3	0	1
turncount	239:303	348:241	179	179	0	0
turncount	239:303	350:243	425	437	-12	1
turncount	239:303	240:302	35	35	0	0
turncount	324:325	325:345	301	320	-19	1
turncount	324:325	325:326	317	317	0	0
turncount	326:325	325:345	204	204	0	0
turncount	326:325	325:324	145	144	1	0
turncount	345:325	325:324	440	440	0	0
turncount	345:325	325:326	399	399	0	1
turncount	242:346	348:241	2	0	2	1
turncount	242:346	350:243	1	1	0	0
turncount	242:346	240:302	1	1	0	0
turncount	241:349	350:243	147	151	-4	0
turncount	241:349	240:302	321	320	1	0
turncount	241:349	347:242	6	6	0	1
turncount	352:351	240:302	798	823	-25	1

turncount	352:351	347:242	1	1	0	1
turncount	352:351	348:241	128	131	-3	0
turncount	352:351	350:243	30	31	-1	0
turncount	334:359	378:375	306	308	-2	0
turncount	334:359	358:357	302	293	9	1
turncount	334:359	373:361	361	362	-1	0
turncount	383:364	364:371	361	360	1	0
turncount	381:374	360:334	238	242	-4	0
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	435	427	8	0
turncount	372:377	358:357	202	198	4	0
turncount	372:377	373:361	0	2	-2	2
turncount	372:377	360:334	159	160	-1	0
turncount	413:412	412:952z	673	669	4	0
turncount	415:416	419:429	318	315	3	0
turncount	415:416	435:425	34	33	1	0
turncount	415:416	449:433	541	539	2	0
turncount	427:417	418:342	413	412	1	0
turncount	427:417	419:429	3	1	2	1
turncount	427:417	435:425	15	15	0	0
turncount	425:423	449:433	12	12	0	0
turncount	425:423	418:342	39	39	1	0
turncount	425:423	419:429	12	12	0	0
turncount	435:425	425:448	85	85	0	0
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	63	63	0	0
turncount	436:434	435:425	36	37	-1	0
turncount	436:434	449:433	3	0	3	1
turncount	436:434	418:342	299	299	0	0
turncount	407:437	437:431	338	335	3	0
turncount	445:444	444:428	431	428	3	0
turncount	343:336b	336c:339	78	79	-1	0
turncount	343:336b	336e:337	14	14	0	1
turncount	343:336b	973:974	3	3	0	1
turncount	343:336b	336a:335	19	18	1	0
turncount	447:336d	336e:337	217	220	-3	0
turncount	447:336d	973:974	15	15	0	0
turncount	447:336d	336a:335	404	398	6	0
turncount	447:336d	336b:343	114	116	-2	0
turncount	337:336e	973:974	8	8	0	1
turncount	337:336e	336a:335	382	371	11	1
turncount	337:336e	336b:343	21	21	0	1
turncount	337:336e	336c:339	226	230	-4	0
turncount	12:462	462:463	37	33	4	1
turncount	12:462	462:13	84	65	19	2
turncount	12:462	462:675z	7	5	2	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	55	59	-4	1
turncount	13:462	462:12	105	72	33	4
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	9	11	-2	1
turncount	463:462	462:12	46	41	5	1
turncount	675z:462	462:463	3	4	-1	1
turncount	675z:462	462:13	12	24	-12	3
turncount	675z:462	462:12	5	4	1	1
turncount	13:463	463:901	232	236	-4	0
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	40	37	3	0
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	243	254	-11	1
turncount	901:463	463:462	55	52	3	0
turncount	262:3b	3c:2	159	172	-13	1
turncount	262:3b	3a:4	27	20	7	1
turncount	2:3c	3a:4	74	87	-13	1
turncount	2:3c	3b:262	292	312	-20	1
turncount	264:25b	25c:24	6	13	-7	2
turncount	264:25b	25a:26	342	314	29	2
turncount	24:25c	25a:26	415	361	54	3
turncount	24:25c	25b:264	9	10	-1	0
turncount	471:470	470:538	1	0	1	1
turncount	471:470	470:490	27	27	0	0
turncount	490:470	470:471	40	40	0	1
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	526	504	22	1
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	642	635	7	0
turncount	538:487	487:272	1	0	1	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	40	40	0	1
turncount	271:488	488:487	642	635	7	0
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	526	504	22	1
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	27	27	0	0
turncount	163:161b	161c:164	409	367	42	2
turncount	163:161b	161d:162	316	315	1	0
turncount	163:161b	161a:160	243	221	22	1
turncount	162:161d	161a:160	131	179	-48	4
turncount	162:161d	161b:163	240	234	6	0
turncount	162:161d	161c:164	167	132	35	3

turncount	192:511	511:191	1074	1077	-3	0
turncount	514:511	511:191	1	3	-2	1
turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	257	257	0	1
turncount	513:514	514:511	1	3	-2	1
turncount	513:514	514:192	153	132	21	2
turncount	99:91b	91c:90	336	350	-14	1
turncount	99:91b	91a:105	93	94	-1	0
turncount	99:91b	91b:99	3	3	0	0
turncount	90:91c	91a:105	50	51	-1	0
turncount	90:91c	91b:99	758	798	-40	1
turncount	84:517	517:86	735	802	-67	2
turncount	84:517	517:87	47	33	14	2
turncount	86:517	517:87	31	25	6	1
turncount	86:517	517:84	388	404	-16	1
turncount	87:517	517:86	35	38	-3	0
turncount	87:517	517:84	34	36	-2	0
turncount	39:36b	36c:35	275	256	19	1
turncount	39:36b	36d:37	1	1	0	0
turncount	39:36b	36a:38	216	190	26	2
turncount	35:36c	36d:37	1	1	0	1
turncount	35:36c	36a:38	194	212	-18	1
turncount	35:36c	36b:39	404	422	-18	1
turncount	37:36d	36a:38	4	4	0	1
turncount	37:36d	36b:39	23	19	4	1
turncount	37:36d	36c:35	2	2	0	0
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	0	0	0	1
turncount	618:617	617:70	2	2	0	1
turncount	618:617	617:69	2	2	0	0
turncount	139:654	654:158	480	487	-7	0
turncount	158:654	654:139	607	674	-67	3
turncount	335:959	336b:343	46	48	-2	0
turncount	335:959	336c:339	533	561	-28	1
turncount	335:959	336e:337	410	423	-13	1
turncount	335:959	973:974	10	10	0	0
turncount	165:971	161d:162	137	134	3	0
turncount	165:971	161a:160	300	275	25	1
turncount	165:971	161b:163	421	401	20	1
turncount	165:971	161c:164	48	38	10	1
turncount	974:973	336a:335	10	10	0	0
turncount	974:973	336b:343	1	1	0	1
turncount	974:973	336c:339	18	18	0	0
turncount	974:973	336e:337	11	11	0	1
linkcount	688:763		51	74	-23	3
linkcount	763:688		163	124	39	3
linkcount	678:764		646	641	5	0
linkcount	764:678		332	328	3	0
linkcount	614:779		223	196	27	2
linkcount	779:614		203	240	-37	2
linkcount	198:197a		117	103	14	1
linkcount	255:256		1069	1037	32	1
linkcount	256:255		701	724	-23	1
linkcount	675:676		67	74	-7	1
linkcount	676:675		72	67	5	1
linkcount	183:503		321	320	1	0
linkcount	503:183		112	112	0	1
linkcount	955y:208		569	539	30	1
linkcount	208:955y		527	499	28	1
linkcount	900:867z		193	193	0	0
linkcount	867z:900		463	465	-2	0
linkcount	303z:759		3	3	0	0
linkcount	361:362		695	694	1	0
linkcount	367:368		1220	1219	1	0
linkcount	370:556		1915	1913	2	0
linkcount	371:372		361	360	1	0
linkcount	375:382z		465	463	2	0
linkcount	384:387		2060	2060	1	0
linkcount	404:402		1581	1579	2	0
linkcount	412:952z		673	669	4	0
linkcount	412:411		1595	1597	-1	0
linkcount	413:412		2268	2266	3	0
linkcount	428:427		431	428	3	0
linkcount	429:430		333	329	5	0
linkcount	431:436		338	335	3	0
linkcount	433:432		556	552	4	0
linkcount	440:449z		1722	1724	-2	0
linkcount	441:438		1248	1251	-3	0
linkcount	443:560		2278	2276	3	0
linkcount	445:444		1679	1679	0	0
linkcount	651:653		29	33	-4	1
linkcount	901:902		272	273	-1	0
linkcount	902:901		298	306	-8	0
linkcount	759:303z		29	29	0	0

Appendix B: Validation output matrix estimation period 3 HGV

Survey 0800-0900 HGV

Count type	Count location		Survey	Output	Difference	GEH
turncount	4:3a	3b:262	0	0	0	0
turncount	4:3a	3c:2	7	3	4	2
turncount	15:13	13:462	3	5	-2	1
turncount	15:13	13:463	15	15	0	1
turncount	462:13	13:15	5	4	1	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	10	10	0	1
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	10	17	-7	2
turncount	26:25a	25c:24	10	17	-7	2
turncount	38:36a	36b:39	6	6	0	0
turncount	38:36a	36c:35	16	24	-8	2
turncount	38:36a	36d:37	0	0	0	1
turncount	42:43	43:44	23	17	6	1
turncount	42:43	43:486	7	4	3	1
turncount	44:43	43:42	30	24	6	1
turncount	44:43	43:486	3	3	0	0
turncount	486:43	43:44	3	3	0	0
turncount	486:43	43:42	9	6	3	1
turncount	57:58	58:59	12	13	-1	0
turncount	57:58	58:579	0	0	0	1
turncount	59:58	58:579	0	0	0	1
turncount	59:58	58:57	24	23	1	0
turncount	579:58	58:59	0	0	0	1
turncount	579:58	58:57	0	0	0	1
turncount	135:67	67:616	5	5	0	0
turncount	135:67	67:615	1	1	0	1
turncount	135:67	67:521	1	1	1	1
turncount	521:67	67:616	2	2	0	1
turncount	521:67	67:135	1	1	0	0
turncount	521:67	67:615	2	2	0	0
turncount	615:67	67:616	24	24	0	0
turncount	615:67	67:135	1	1	0	0
turncount	615:67	67:521	0	0	0	1
turncount	616:67	67:135	0	0	0	1
turncount	616:67	67:615	15	16	-1	0
turncount	616:67	67:521	5	5	0	0
turncount	74:75	75:78	8	9	-1	0
turncount	74:75	75:76	7	7	1	0
turncount	74:75	75:77	2	2	0	0
turncount	76:75	75:78	0	3	-3	2
turncount	76:75	75:77	2	4	-2	1
turncount	76:75	75:74	9	13	-4	1
turncount	77:75	75:78	17	16	1	0
turncount	77:75	75:76	1	1	0	1
turncount	77:75	75:74	5	3	2	1
turncount	78:75	75:76	9	5	4	1
turncount	78:75	75:77	21	16	5	1
turncount	78:75	75:74	21	22	-1	0
turncount	81:82	82:83	18	18	0	0
turncount	81:82	82:594	0	0	0	1
turncount	83:82	82:81	8	13	-5	2
turncount	83:82	82:594	0	0	0	1
turncount	594:82	82:83	0	0	0	1
turncount	594:82	82:81	0	0	0	1
turncount	105:91a	91b:99	1	1	0	1
turncount	105:91a	91c:90	4	4	0	1
turncount	101:102	102:104	2	3	-1	1
turncount	101:102	102:954z	8	8	0	0
turncount	101:102	102:103	0	0	0	1
turncount	103:102	102:104	6	8	-2	1
turncount	103:102	102:954z	15	13	2	0
turncount	103:102	102:101	1	1	0	0
turncount	104:102	102:954z	4	4	0	1
turncount	104:102	102:103	6	4	2	1
turncount	104:102	102:101	1	1	0	0
turncount	954z:102	102:104	1	1	0	0
turncount	954z:102	102:103	1	2	-1	1
turncount	954z:102	102:101	8	10	-2	1
turncount	130:124	124:665	0	0	0	0
turncount	130:124	124:761	1	1	0	0
turncount	665:124	124:130	0	1	-1	1
turncount	665:124	124:761	0	0	0	1
turncount	761:124	124:130	0	0	0	1
turncount	761:124	124:665	1	1	0	1
turncount	157:139	139:654	42	34	8	1
turncount	157:139	139:619	9	16	-7	2
turncount	619:139	139:157	12	20	-8	2
turncount	619:139	139:654	11	8	3	1
turncount	654:139	139:157	10	16	-6	2
turncount	654:139	139:619	30	18	12	2
turncount	148:149	149:220	35	33	2	0
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	43	32	11	2
turncount	150:149	149:148	10	4	6	2

turncount	220:149	149:150	52	47	5	1
turncount	220:149	149:148	43	38	5	1
turncount	160:161a	161b:163	8	14	-6	2
turncount	160:161a	161c:164	6	21	-15	4
turncount	160:161a	161d:162	4	8	-4	1
turncount	172:173	173:491	3	3	0	0
turncount	172:173	173:174	3	4	-1	1
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	5	7	-2	1
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	3	2	1	1
turncount	173:174	174:178	2	2	0	0
turncount	176:174	174:177	15	14	1	0
turncount	176:174	174:178	2	2	0	0
turncount	176:174	174:173	2	2	0	0
turncount	177:174	174:176	11	11	0	1
turncount	177:174	174:178	8	8	0	0
turncount	177:174	174:173	2	2	0	0
turncount	178:174	174:176	3	3	0	0
turncount	178:174	174:177	7	6	1	0
turncount	178:174	174:173	1	3	-2	1
turncount	174:176	176:955z	14	14	0	1
turncount	491:176	176:955z	3	3	0	0
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	19	18	1	0
turncount	185:186	186:507	1	4	-3	2
turncount	185:186	186:450	4	5	-1	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	44	32	12	2
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	9	8	1	0
turncount	450:186	186:187	6	8	-2	1
turncount	450:186	186:185	7	7	0	0
turncount	507:186	186:450	4	4	0	0
turncount	507:186	186:187	35	30	5	1
turncount	507:186	186:185	0	0	0	1
turncount	193:192	192:511	8	10	-2	1
turncount	193:192	192:216	18	18	0	1
turncount	193:192	192:514	0	0	0	1
turncount	216:192	192:511	6	7	-1	0
turncount	216:192	192:193	31	23	9	2
turncount	216:192	192:514	16	16	0	0
turncount	511:192	192:216	32	26	6	1
turncount	511:192	192:193	14	10	4	1
turncount	511:192	192:514	2	2	0	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	1	0	1	1
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	1	0	1	1
turncount	98:210	210:211	0	1	-1	1
turncount	211:210	210:212	17	16	1	0
turncount	211:210	210:98	0	0	0	1
turncount	212:210	210:211	4	3	1	0
turncount	212:210	210:98	0	0	0	1
turncount	222:223	223:224	77	75	2	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	77	77	0	0
turncount	224:225	288:227	7	7	0	0
turncount	224:225	285:289	70	68	2	0
turncount	224:225	287:284z	0	0	0	1
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	31	31	0	0
turncount	562:241	241:349	50	50	0	0
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	1	1	0	1
turncount	563:242	242:346	1	1	0	1
turncount	247:248	373:361	54	53	1	0
turncount	247:248	360:334	15	16	-1	0
turncount	247:248	378:375	36	35	1	0
turncount	290:286	287:284z	69	69	0	0
turncount	290:286	288:227	17	17	0	1
turncount	290:286	285:289	14	14	0	0
turncount	227:288	285:289	13	13	0	0
turncount	227:288	287:284z	8	8	0	0
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	0	0	0	1
turncount	239:303	348:241	19	19	0	0
turncount	239:303	350:243	74	75	-1	0
turncount	239:303	240:302	9	9	0	0
turncount	324:325	325:345	24	24	0	1
turncount	324:325	325:326	21	21	0	0
turncount	326:325	325:345	38	39	-1	0
turncount	326:325	325:324	20	21	-1	0
turncount	345:325	325:324	15	15	0	1
turncount	345:325	325:326	47	47	0	0
turncount	242:346	348:241	0	0	0	1
turncount	242:346	350:243	1	1	0	1
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	19	19	0	0
turncount	241:349	240:302	31	31	0	0
turncount	241:349	347:242	0	0	0	1
turncount	352:351	240:302	93	93	0	1

turncount	352:351	347:242	1	1	0	1
turncount	352:351	348:241	12	12	0	0
turncount	352:351	350:243	9	9	0	0
turncount	334:359	378:375	13	13	0	0
turncount	334:359	358:357	17	17	0	0
turncount	334:359	373:361	35	35	0	0
turncount	383:364	364:371	31	31	0	0
turncount	381:374	360:334	33	32	1	0
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	61	61	0	0
turncount	372:377	358:357	18	18	0	0
turncount	372:377	373:361	0	0	0	1
turncount	372:377	360:334	13	13	0	0
turncount	413:412	412:952z	94	94	0	0
turncount	415:416	419:429	28	28	0	0
turncount	415:416	435:425	0	0	0	1
turncount	415:416	449:433	31	31	0	0
turncount	427:417	418:342	17	17	0	0
turncount	427:417	419:429	0	0	0	1
turncount	427:417	435:425	0	0	0	1
turncount	425:423	449:433	0	0	0	1
turncount	425:423	418:342	0	0	0	1
turncount	425:423	419:429	0	0	0	1
turncount	435:425	425:448	0	0	0	1
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	0	0	0	1
turncount	436:434	435:425	0	0	0	1
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	35	35	0	0
turncount	407:437	437:431	35	35	0	0
turncount	445:444	444:428	17	17	0	0
turncount	343:336b	336c:339	25	25	0	0
turncount	343:336b	336e:337	0	0	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	2	2	0	0
turncount	447:336d	336e:337	13	13	0	0
turncount	447:336d	973:974	1	1	0	1
turncount	447:336d	336a:335	18	15	3	1
turncount	447:336d	336b:343	21	22	-1	0
turncount	337:336e	973:974	0	0	0	1
turncount	337:336e	336a:335	13	13	0	0
turncount	337:336e	336b:343	4	4	0	1
turncount	337:336e	336c:339	9	9	0	1
turncount	12:462	462:463	1	1	0	0
turncount	12:462	462:13	5	4	1	1
turncount	12:462	462:675z	0	0	0	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	0	1	-1	2
turncount	13:462	462:12	3	4	-1	0
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	0	0	0	1
turncount	463:462	462:12	0	0	0	0
turncount	675z:462	462:463	2	2	0	0
turncount	675z:462	462:13	0	0	0	1
turncount	675z:462	462:12	0	0	0	0
turncount	13:463	463:901	15	15	0	1
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	3	3	0	1
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	10	10	0	1
turncount	901:463	463:462	0	0	0	0
turncount	262:3b	3c:2	17	17	0	0
turncount	262:3b	3a:4	5	1	4	2
turncount	2:3c	3a:4	3	4	-1	0
turncount	2:3c	3b:262	20	23	-3	1
turncount	264:25b	25c:24	0	1	-1	2
turncount	264:25b	25a:26	19	21	-2	1
turncount	24:25c	25a:26	14	17	-3	1
turncount	24:25c	25b:264	0	1	-1	1
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	0	0	0	1
turncount	490:470	470:471	2	2	0	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	48	34	14	2
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	47	36	11	2
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	2	2	0	0
turncount	271:488	488:487	47	36	11	2
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	48	34	14	2
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	0	0	0	1
turncount	163:161b	161c:164	4	6	-2	1
turncount	163:161b	161d:162	16	16	0	0
turncount	163:161b	161a:160	5	7	-2	1
turncount	162:161d	161a:160	4	6	-2	1
turncount	162:161d	161b:163	12	12	0	1
turncount	162:161d	161c:164	3	4	-1	1

turncount	192:511	511:191	14	17	-3	1
turncount	514:511	511:191	0	0	0	1
turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	18	18	0	0
turncount	513:514	514:511	0	0	0	1
turncount	513:514	514:192	1	0	1	1
turncount	99:91b	91c:90	10	11	-1	0
turncount	99:91b	91a:105	1	1	0	0
turncount	99:91b	91b:99	0	0	0	0
turncount	90:91c	91a:105	3	3	0	0
turncount	90:91c	91b:99	11	14	-3	1
turncount	84:517	517:86	16	18	-2	1
turncount	84:517	517:87	0	0	0	0
turncount	86:517	517:87	1	1	0	1
turncount	86:517	517:84	11	13	-2	1
turncount	87:517	517:86	0	1	-1	2
turncount	87:517	517:84	0	0	0	1
turncount	39:36b	36c:35	17	10	7	2
turncount	39:36b	36d:37	0	0	0	1
turncount	39:36b	36a:38	5	5	0	0
turncount	35:36c	36d:37	0	0	0	1
turncount	35:36c	36a:38	9	16	-7	2
turncount	35:36c	36b:39	17	20	-3	1
turncount	37:36d	36a:38	0	0	0	1
turncount	37:36d	36b:39	0	0	0	1
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	14	14	0	0
turncount	70:617	617:618	15	16	-1	0
turncount	618:617	617:70	0	0	0	1
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	53	42	11	2
turncount	158:654	654:139	40	34	6	1
turncount	335:959	336b:343	5	6	-1	0
turncount	335:959	336c:339	19	23	-4	1
turncount	335:959	336e:337	6	7	-1	0
turncount	335:959	973:974	0	0	0	1
turncount	165:971	161d:162	1	2	-1	1
turncount	165:971	161a:160	15	21	-6	2
turncount	165:971	161b:163	9	10	-1	0
turncount	165:971	161c:164	1	2	-1	1
turncount	974:973	336a:335	0	0	0	1
turncount	974:973	336b:343	0	0	0	1
turncount	974:973	336c:339	2	2	0	1
turncount	974:973	336e:337	0	0	0	1
linkcount	688:763		0	5	-5	3
linkcount	763:688		0	1	-1	2
linkcount	678:764		24	25	0	0
linkcount	764:678		30	26	5	1
linkcount	614:779		14	10	4	1
linkcount	779:614		6	3	3	1
linkcount	198:197a		0	0	0	1
linkcount	255:256		51	43	8	1
linkcount	256:255		32	33	-1	0
linkcount	675:676		2	5	-2	1
linkcount	676:675		5	5	0	0
linkcount	183:503		0	0	0	1
linkcount	503:183		0	0	0	1
linkcount	955y:208		12	12	0	0
linkcount	208:955y		11	12	-1	0
linkcount	900:867z		18	18	0	0
linkcount	867z:900		17	17	0	0
linkcount	303z:759		0	0	0	1
linkcount	361:362		89	89	0	0
linkcount	367:368		174	174	0	0
linkcount	370:556		263	263	0	0
linkcount	371:372		31	31	0	0
linkcount	375:382z		49	49	0	0
linkcount	384:387		366	366	0	0
linkcount	404:402		205	205	0	0
linkcount	412:952z		94	94	0	0
linkcount	412:411		317	317	0	0
linkcount	413:412		411	411	0	0
linkcount	428:427		17	17	0	0
linkcount	429:430		28	28	0	0
linkcount	431:436		35	35	0	0
linkcount	433:432		31	31	0	0
linkcount	440:449z		331	331	0	0
linkcount	441:438		177	177	0	0
linkcount	443:560		362	362	0	0
linkcount	445:444		194	194	0	0
linkcount	651:653		0	0	0	1
linkcount	901:902		18	18	0	1
linkcount	902:901		10	10	0	0
linkcount	759:303z		0	0	0	1

Appendix B: Validation output matrix estimation period 4 LGV

Survey 0900-1000 LGV

Count type	Count location		Survey	Output	Difference	GEH
turncount	4:3a	3b:262	13	12	1	0
turncount	4:3a	3c:2	48	59	-11	2
turncount	15:13	13:462	95	105	-10	1
turncount	15:13	13:463	187	189	-2	0
turncount	462:13	13:15	74	64	10	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	190	197	-7	1
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	187	175	12	1
turncount	26:25a	25c:24	294	273	21	1
turncount	38:36a	36b:39	212	181	31	2
turncount	38:36a	36c:35	188	202	-14	1
turncount	38:36a	36d:37	6	4	2	1
turncount	42:43	43:44	320	310	10	1
turncount	42:43	43:486	55	54	1	0
turncount	44:43	43:42	271	276	-5	0
turncount	44:43	43:486	55	54	1	0
turncount	486:43	43:44	124	115	9	1
turncount	486:43	43:42	109	111	-2	0
turncount	57:58	58:59	415	412	4	0
turncount	57:58	58:579	31	31	0	0
turncount	59:58	58:579	34	35	-1	0
turncount	59:58	58:57	286	285	1	0
turncount	579:58	58:59	65	64	1	0
turncount	579:58	58:57	21	21	0	0
turncount	135:67	67:616	30	30	0	1
turncount	135:67	67:615	30	32	-2	0
turncount	135:67	67:521	17	17	0	0
turncount	521:67	67:616	23	23	0	0
turncount	521:67	67:135	23	23	0	1
turncount	521:67	67:615	10	10	0	1
turncount	615:67	67:616	409	412	-3	0
turncount	615:67	67:135	43	43	0	0
turncount	615:67	67:521	19	19	0	0
turncount	616:67	67:135	41	42	-1	0
turncount	616:67	67:615	299	299	0	0
turncount	616:67	67:521	33	34	-1	0
turncount	74:75	75:78	225	221	4	0
turncount	74:75	75:76	103	133	-30	3
turncount	74:75	75:77	186	167	19	1
turncount	76:75	75:78	22	29	-7	1
turncount	76:75	75:77	65	43	22	3
turncount	76:75	75:74	128	144	-16	1
turncount	77:75	75:78	162	146	16	1
turncount	77:75	75:76	20	16	4	1
turncount	77:75	75:74	120	109	11	1
turncount	78:75	75:76	25	9	16	4
turncount	78:75	75:77	263	225	38	2
turncount	78:75	75:74	142	145	-3	0
turncount	81:82	82:83	526	540	-14	1
turncount	81:82	82:594	10	10	0	1
turncount	83:82	82:81	359	379	-20	1
turncount	83:82	82:594	17	16	1	0
turncount	594:82	82:83	19	19	0	0
turncount	594:82	82:81	10	11	-1	0
turncount	105:91a	91b:99	98	98	0	0
turncount	105:91a	91c:90	32	32	0	0
turncount	101:102	102:104	181	181	0	0
turncount	101:102	102:954z	432	435	-3	0
turncount	101:102	102:103	16	26	-10	2
turncount	103:102	102:104	163	177	-14	1
turncount	103:102	102:954z	222	230	-8	0
turncount	103:102	102:101	31	36	-5	1
turncount	104:102	102:954z	136	137	-1	0
turncount	104:102	102:103	88	97	-9	1
turncount	104:102	102:101	114	111	3	0
turncount	954z:102	102:104	170	170	0	1
turncount	954z:102	102:103	123	132	-9	1
turncount	954z:102	102:101	314	310	4	0
turncount	130:124	124:665	85	85	0	1
turncount	130:124	124:761	52	52	0	1
turncount	665:124	124:130	60	60	0	1
turncount	665:124	124:761	44	45	-1	0
turncount	761:124	124:130	66	66	0	1
turncount	761:124	124:665	36	36	0	1
turncount	157:139	139:654	308	313	-5	0
turncount	157:139	139:619	64	97	-33	4
turncount	619:139	139:157	54	58	-4	1
turncount	619:139	139:654	101	122	-21	2
turncount	654:139	139:157	174	277	-103	7
turncount	654:139	139:619	350	268	82	5
turncount	148:149	149:220	346	357	-11	1
turncount	148:149	149:150	1	0	1	1
turncount	150:149	149:220	306	255	51	3
turncount	150:149	149:148	45	43	2	0

turncount	220:149	149:150	348	401	-53	3
turncount	220:149	149:148	386	362	24	1
turncount	160:161a	161b:163	140	113	27	2
turncount	160:161a	161c:164	301	242	59	4
turncount	160:161a	161d:162	116	88	29	3
turncount	172:173	173:491	220	176	45	3
turncount	172:173	173:174	150	229	-79	6
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	373	363	10	1
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	150	91	59	5
turncount	173:174	174:178	162	138	24	2
turncount	176:174	174:177	154	150	4	0
turncount	176:174	174:178	327	356	-29	2
turncount	176:174	174:173	106	86	20	2
turncount	177:174	174:176	78	77	1	0
turncount	177:174	174:178	89	91	-2	0
turncount	177:174	174:173	124	129	-5	0
turncount	178:174	174:176	222	229	-7	0
turncount	178:174	174:177	77	72	5	1
turncount	178:174	174:173	143	148	-5	0
turncount	174:176	176:955z	300	306	-6	0
turncount	491:176	176:955z	220	176	45	3
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	587	592	-5	0
turncount	185:186	186:507	26	58	-32	5
turncount	185:186	186:450	50	77	-27	3
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	495	501	-6	0
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	187	209	-22	2
turncount	450:186	186:187	204	217	-13	1
turncount	450:186	186:185	142	143	-1	0
turncount	507:186	186:450	50	75	-25	3
turncount	507:186	186:187	522	544	-22	1
turncount	507:186	186:185	81	90	-9	1
turncount	193:192	192:511	374	387	-13	1
turncount	193:192	192:216	402	402	0	0
turncount	193:192	192:514	74	76	-2	0
turncount	216:192	192:511	427	411	16	1
turncount	216:192	192:193	330	330	0	1
turncount	216:192	192:514	102	97	5	1
turncount	511:192	192:216	329	316	13	1
turncount	511:192	192:193	340	334	6	0
turncount	511:192	192:514	51	50	1	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	88	123	-35	3
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	26	9	17	4
turncount	98:210	210:211	7	13	-6	2
turncount	211:210	210:212	349	295	54	3
turncount	211:210	210:98	20	19	1	0
turncount	212:210	210:211	232	202	30	2
turncount	212:210	210:98	24	18	6	1
turncount	222:223	223:224	621	619	2	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	716	718	-2	0
turncount	224:225	288:227	100	99	2	0
turncount	224:225	285:289	520	519	1	0
turncount	224:225	287:284z	1	1	0	0
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	290	289	1	0
turncount	562:241	241:349	315	311	4	0
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	10	9	1	0
turncount	563:242	242:346	7	7	0	0
turncount	247:248	373:361	253	183	70	5
turncount	247:248	360:334	110	124	-14	1
turncount	247:248	378:375	78	87	-9	1
turncount	290:286	287:284z	654	655	-1	0
turncount	290:286	288:227	102	102	0	1
turncount	290:286	285:289	28	28	0	0
turncount	227:288	285:289	30	30	0	0
turncount	227:288	287:284z	61	61	0	0
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	2	2	0	0
turncount	239:303	348:241	164	162	2	0
turncount	239:303	350:243	332	297	35	2
turncount	239:303	240:302	32	37	-5	1
turncount	324:325	325:345	190	179	11	1
turncount	324:325	325:326	176	165	11	1
turncount	326:325	325:345	293	271	22	1
turncount	326:325	325:324	117	117	0	1
turncount	345:325	325:324	323	305	18	1
turncount	345:325	325:326	318	270	48	3
turncount	242:346	348:241	4	4	0	0
turncount	242:346	350:243	2	2	0	0
turncount	242:346	240:302	1	1	0	1
turncount	241:349	350:243	85	83	2	0
turncount	241:349	240:302	226	225	1	0
turncount	241:349	347:242	4	3	1	1
turncount	352:351	240:302	515	516	-1	0

turncount	352:351	347:242	4	4	0	0
turncount	352:351	348:241	122	123	-1	0
turncount	352:351	350:243	13	12	1	0
turncount	334:359	378:375	164	162	2	0
turncount	334:359	358:357	210	210	0	0
turncount	334:359	373:361	234	260	-26	2
turncount	383:364	364:371	239	224	15	1
turncount	381:374	360:334	194	226	-32	2
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	307	183	124	8
turncount	372:377	358:357	124	110	14	1
turncount	372:377	373:361	0	0	0	1
turncount	372:377	360:334	115	114	2	0
turncount	413:412	412:952z	501	409	92	4
turncount	415:416	419:429	243	275	-32	2
turncount	415:416	435:425	44	48	-4	1
turncount	415:416	449:433	318	222	96	6
turncount	427:417	418:342	336	291	45	3
turncount	427:417	419:429	1	0	1	1
turncount	427:417	435:425	6	4	2	1
turncount	425:423	449:433	7	5	2	1
turncount	425:423	418:342	22	23	-1	0
turncount	425:423	419:429	10	12	-2	1
turncount	435:425	425:448	57	59	-2	0
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	39	40	-1	0
turncount	436:434	435:425	7	7	0	0
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	246	255	-9	1
turncount	407:437	437:431	253	261	-8	1
turncount	445:444	444:428	343	295	48	3
turncount	343:336b	336c:339	70	76	-6	1
turncount	343:336b	336e:337	8	8	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	13	13	0	0
turncount	447:336d	336e:337	206	165	41	3
turncount	447:336d	973:974	5	5	0	1
turncount	447:336d	336a:335	317	310	7	0
turncount	447:336d	336b:343	92	88	4	0
turncount	337:336e	973:974	12	12	0	1
turncount	337:336e	336a:335	395	358	38	2
turncount	337:336e	336b:343	24	23	1	0
turncount	337:336e	336c:339	167	148	20	2
turncount	12:462	462:463	37	29	8	1
turncount	12:462	462:13	65	46	19	3
turncount	12:462	462:675z	9	5	4	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	29	37	-8	1
turncount	13:462	462:12	95	68	27	3
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	6	8	-2	1
turncount	463:462	462:12	30	26	5	1
turncount	675z:462	462:463	7	11	-4	1
turncount	675z:462	462:13	9	18	-9	2
turncount	675z:462	462:12	8	6	2	1
turncount	13:463	463:901	187	189	-2	0
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	44	40	4	1
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	190	197	-7	1
turncount	901:463	463:462	36	34	2	0
turncount	262:3b	3c:2	169	169	0	0
turncount	262:3b	3a:4	19	13	6	2
turncount	2:3c	3a:4	50	64	-14	2
turncount	2:3c	3b:262	235	224	11	1
turncount	264:25b	25c:24	6	10	-4	1
turncount	264:25b	25a:26	239	226	13	1
turncount	24:25c	25a:26	298	289	10	1
turncount	24:25c	25b:264	6	7	-1	1
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	23	24	-1	0
turncount	490:470	470:471	24	23	1	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	428	424	4	0
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	485	491	-6	0
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	24	23	1	0
turncount	271:488	488:487	485	491	-6	0
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	428	424	4	0
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	23	24	-1	0
turncount	163:161b	161c:164	356	337	19	1
turncount	163:161b	161d:162	378	347	31	2
turncount	163:161b	161a:160	171	126	45	4
turncount	162:161d	161a:160	123	121	2	0
turncount	162:161d	161b:163	193	180	13	1
turncount	162:161d	161c:164	163	145	18	1

turncount	192:511	511:191	801	798	3	0
turncount	514:511	511:191	7	13	-6	2
turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	227	222	5	0
turncount	513:514	514:511	7	13	-6	2
turncount	513:514	514:192	88	123	-35	3
turncount	99:91b	91c:90	330	348	-18	1
turncount	99:91b	91a:105	99	100	-1	0
turncount	99:91b	91b:99	7	8	-1	0
turncount	90:91c	91a:105	49	46	3	0
turncount	90:91c	91b:99	518	542	-24	1
turncount	84:517	517:86	512	550	-38	2
turncount	84:517	517:87	21	9	12	3
turncount	86:517	517:87	10	8	2	1
turncount	86:517	517:84	345	362	-17	1
turncount	87:517	517:86	18	20	-2	0
turncount	87:517	517:84	26	33	-7	1
turncount	39:36b	36c:35	223	220	3	0
turncount	39:36b	36d:37	2	3	-1	1
turncount	39:36b	36a:38	167	150	17	1
turncount	35:36c	36d:37	3	3	0	0
turncount	35:36c	36a:38	218	209	10	1
turncount	35:36c	36b:39	305	280	25	1
turncount	37:36d	36a:38	6	5	1	1
turncount	37:36d	36b:39	3	5	-2	1
turncount	37:36d	36c:35	2	2	0	0
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	17	23	-6	1
turncount	618:617	617:70	52	55	-3	0
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	409	431	-22	1
turncount	158:654	654:139	524	545	-21	1
turncount	335:959	336b:343	35	37	-2	0
turncount	335:959	336c:339	324	308	16	1
turncount	335:959	336e:337	364	346	18	1
turncount	335:959	973:974	10	10	0	0
turncount	165:971	161d:162	230	187	43	3
turncount	165:971	161a:160	297	303	-6	0
turncount	165:971	161b:163	260	231	29	2
turncount	165:971	161c:164	56	42	14	2
turncount	974:973	336a:335	20	21	-1	0
turncount	974:973	336b:343	1	1	0	1
turncount	974:973	336c:339	12	13	-1	0
turncount	974:973	336e:337	7	7	0	1
linkcount	688:763		40	77	-37	5
linkcount	763:688		70	73	-3	0
linkcount	678:764		556	549	7	0
linkcount	764:678		364	312	52	3
linkcount	614:779		188	156	32	2
linkcount	779:614		175	169	6	0
linkcount	198:197a		228	108	120	9
linkcount	255:256		747	749	-2	0
linkcount	256:255		753	785	-32	1
linkcount	675:676		58	65	-8	1
linkcount	676:675		70	75	-5	1
linkcount	183:503		306	304	2	0
linkcount	503:183		91	89	2	0
linkcount	955y:208		582	585	-3	0
linkcount	208:955y		456	449	6	0
linkcount	900:867z		162	161	1	0
linkcount	867z:900		249	250	-1	0
linkcount	303z:759		11	12	-1	0
linkcount	361:362		487	443	44	2
linkcount	367:368		1148	1069	78	2
linkcount	370:556		1635	1512	123	3
linkcount	371:372		239	224	15	1
linkcount	375:382z		242	249	-7	0
linkcount	384:387		1500	1401	99	3
linkcount	404:402		1387	1293	94	3
linkcount	412:952z		501	409	92	4
linkcount	412:411		1258	1152	106	3
linkcount	413:412		1759	1561	198	5
linkcount	428:427		343	295	48	3
linkcount	429:430		254	287	-33	2
linkcount	431:436		253	261	-8	1
linkcount	433:432		325	227	98	6
linkcount	440:449z		1247	1140	107	3
linkcount	441:438		1133	1006	127	4
linkcount	443:560		1572	1367	205	5
linkcount	445:444		1476	1301	175	5
linkcount	651:653		11	13	-2	1
linkcount	901:902		231	229	2	0
linkcount	902:901		226	231	-5	0
linkcount	759:303z		11	12	-1	0

Appendix B: Validation output matrix estimation period 4 HGV

Survey 0900-1000 HGV

Count type	Count location		Survey	Output	Difference
turncount	4:3a	3b:262	4	2	2
turncount	4:3a	3c:2	6	4	2
turncount	15:13	13:462	5	6	-1
turncount	15:13	13:463	14	14	0
turncount	462:13	13:15	6	5	1
turncount	462:13	13:463	0	0	0
turncount	463:13	13:15	11	11	0
turncount	463:13	13:462	0	0	0
turncount	26:25a	25b:264	24	19	5
turncount	26:25a	25c:24	18	17	1
turncount	38:36a	36b:39	4	4	0
turncount	38:36a	36c:35	10	19	-9
turncount	38:36a	36d:37	0	0	0
turncount	42:43	43:44	26	20	6
turncount	42:43	43:486	2	2	0
turncount	44:43	43:42	15	18	-3
turncount	44:43	43:486	2	2	0
turncount	486:43	43:44	3	3	0
turncount	486:43	43:42	5	5	0
turncount	57:58	58:59	19	19	0
turncount	57:58	58:579	0	0	0
turncount	59:58	58:579	0	0	0
turncount	59:58	58:57	15	17	-2
turncount	579:58	58:59	0	0	0
turncount	579:58	58:57	0	0	0
turncount	135:67	67:616	2	2	0
turncount	135:67	67:615	1	1	0
turncount	135:67	67:521	0	0	0
turncount	521:67	67:616	1	1	0
turncount	521:67	67:135	0	0	0
turncount	521:67	67:615	0	0	0
turncount	615:67	67:616	16	16	0
turncount	615:67	67:135	0	0	0
turncount	615:67	67:521	0	0	0
turncount	616:67	67:135	2	2	0
turncount	616:67	67:615	19	20	-1
turncount	616:67	67:521	1	1	0
turncount	74:75	75:78	10	10	0
turncount	74:75	75:76	14	13	1
turncount	74:75	75:77	7	8	-1
turncount	76:75	75:78	6	5	1
turncount	76:75	75:77	5	4	1
turncount	76:75	75:74	9	11	-2
turncount	77:75	75:78	12	13	-1
turncount	77:75	75:76	4	3	1
turncount	77:75	75:74	6	5	1
turncount	78:75	75:76	7	6	1
turncount	78:75	75:77	14	10	4
turncount	78:75	75:74	15	16	-1
turncount	81:82	82:83	10	11	-1
turncount	81:82	82:594	1	1	0
turncount	83:82	82:81	5	14	-9
turncount	83:82	82:594	0	0	0
turncount	594:82	82:83	0	0	0
turncount	594:82	82:81	0	0	0
turncount	105:91a	91b:99	4	4	0
turncount	105:91a	91c:90	0	0	0
turncount	101:102	102:104	2	2	0
turncount	101:102	102:954z	4	6	-2
turncount	101:102	102:103	0	0	0
turncount	103:102	102:104	2	2	0
turncount	103:102	102:954z	1	2	-1
turncount	103:102	102:101	0	1	-1
turncount	104:102	102:954z	4	4	0
turncount	104:102	102:103	2	2	0
turncount	104:102	102:101	1	1	0
turncount	954z:102	102:104	2	3	-1
turncount	954z:102	102:103	0	1	-1
turncount	954z:102	102:101	4	9	-5
turncount	130:124	124:665	0	0	0
turncount	130:124	124:761	1	1	0
turncount	665:124	124:130	0	0	0
turncount	665:124	124:761	0	0	0
turncount	761:124	124:130	0	0	0
turncount	761:124	124:665	0	0	0
turncount	157:139	139:654	42	33	9
turncount	157:139	139:619	6	12	-6
turncount	619:139	139:157	15	21	-6
turncount	619:139	139:654	12	9	3
turncount	654:139	139:157	18	21	-3
turncount	654:139	139:619	37	19	18
turncount	148:149	149:220	28	29	-1
turncount	148:149	149:150	0	0	0
turncount	150:149	149:220	52	36	16
turncount	150:149	149:148	6	4	2

turncount	220:149	149:150	45	44	1
turncount	220:149	149:148	36	31	5
turncount	160:161a	161b:163	2	4	-2
turncount	160:161a	161c:164	10	33	-23
turncount	160:161a	161d:162	3	5	-2
turncount	172:173	173:491	4	5	-1
turncount	172:173	173:174	3	4	-1
turncount	174:173	173:491	0	0	0
turncount	174:173	173:172	10	12	-2
turncount	173:174	174:176	0	0	0
turncount	173:174	174:177	3	4	-1
turncount	173:174	174:178	0	0	0
turncount	176:174	174:177	7	7	0
turncount	176:174	174:178	0	0	0
turncount	176:174	174:173	2	3	-1
turncount	177:174	174:176	8	6	2
turncount	177:174	174:178	11	10	1
turncount	177:174	174:173	7	7	0
turncount	178:174	174:176	0	0	0
turncount	178:174	174:177	12	12	1
turncount	178:174	174:173	1	2	-1
turncount	174:176	176:955z	8	6	2
turncount	491:176	176:955z	4	5	-1
turncount	491:176	176:174	0	0	0
turncount	955z:176	176:174	9	10	-1
turncount	185:186	186:507	2	2	0
turncount	185:186	186:450	5	5	0
turncount	185:186	186:187	0	0	0
turncount	187:186	186:507	49	35	14
turncount	187:186	186:450	0	0	0
turncount	187:186	186:185	0	0	0
turncount	450:186	186:507	9	8	1
turncount	450:186	186:187	15	16	-1
turncount	450:186	186:185	4	4	0
turncount	507:186	186:450	4	3	1
turncount	507:186	186:187	55	37	18
turncount	507:186	186:185	1	1	0
turncount	193:192	192:511	13	14	-1
turncount	193:192	192:216	23	23	0
turncount	193:192	192:514	0	0	0
turncount	216:192	192:511	26	28	-2
turncount	216:192	192:193	24	21	4
turncount	216:192	192:514	7	7	0
turncount	511:192	192:216	31	30	1
turncount	511:192	192:193	18	12	6
turncount	511:192	192:514	5	5	0
turncount	514:192	192:511	0	0	0
turncount	514:192	192:216	0	0	0
turncount	514:192	192:193	0	0	0
turncount	98:210	210:212	1	0	1
turncount	98:210	210:211	0	1	-1
turncount	211:210	210:212	4	4	1
turncount	211:210	210:98	1	2	-1
turncount	212:210	210:211	5	4	1
turncount	212:210	210:98	2	0	2
turncount	222:223	223:224	68	68	0
turncount	564:223	223:224	0	0	0
turncount	564:223	223:222	55	55	1
turncount	224:225	288:227	4	4	0
turncount	224:225	285:289	63	64	-1
turncount	224:225	287:284z	1	0	1
turncount	348:241	241:349	0	0	0
turncount	348:241	241:562	38	38	0
turncount	562:241	241:349	36	36	0
turncount	347:242	242:346	0	0	0
turncount	347:242	242:563	1	1	0
turncount	563:242	242:346	0	0	0
turncount	247:248	373:361	46	46	0
turncount	247:248	360:334	11	11	0
turncount	247:248	378:375	20	20	0
turncount	290:286	287:284z	42	42	0
turncount	290:286	288:227	16	16	0
turncount	290:286	285:289	7	7	0
turncount	227:288	285:289	12	12	0
turncount	227:288	287:284z	12	12	0
turncount	227:288	288:227	0	0	0
turncount	239:303	347:242	0	0	0
turncount	239:303	348:241	25	25	0
turncount	239:303	350:243	59	58	1
turncount	239:303	240:302	2	2	0
turncount	324:325	325:345	14	14	0
turncount	324:325	325:326	9	9	0
turncount	326:325	325:345	55	55	0
turncount	326:325	325:324	15	15	0
turncount	345:325	325:324	15	15	0
turncount	345:325	325:326	54	54	0
turncount	242:346	348:241	0	0	0
turncount	242:346	350:243	0	0	0
turncount	242:346	240:302	0	0	0
turncount	241:349	350:243	13	13	0
turncount	241:349	240:302	22	22	0
turncount	241:349	347:242	1	1	0
turncount	352:351	240:302	55	56	-1

turncount	352:351	347:242	0	0	0
turncount	352:351	348:241	13	13	0
turncount	352:351	350:243	7	7	0
turncount	334:359	378:375	11	11	0
turncount	334:359	358:357	7	7	0
turncount	334:359	373:361	31	31	0
turncount	383:364	364:371	33	33	0
turncount	381:374	360:334	32	32	0
turncount	381:374	378:375	0	0	0
turncount	381:374	358:357	37	37	1
turncount	372:377	358:357	18	18	0
turncount	372:377	373:361	0	0	0
turncount	372:377	360:334	15	15	0
turncount	413:412	412:952z	69	69	0
turncount	415:416	419:429	39	40	-1
turncount	415:416	435:425	0	0	0
turncount	415:416	449:433	24	25	-1
turncount	427:417	418:342	35	35	1
turncount	427:417	419:429	0	0	0
turncount	427:417	435:425	0	0	0
turncount	425:423	449:433	0	0	0
turncount	425:423	418:342	0	0	0
turncount	425:423	419:429	0	0	0
turncount	435:425	425:448	0	0	0
turncount	435:425	425:423	0	0	0
turncount	448:425	425:423	0	0	0
turncount	436:434	435:425	0	0	0
turncount	436:434	449:433	0	0	0
turncount	436:434	418:342	39	39	0
turncount	407:437	437:431	39	39	0
turncount	445:444	444:428	35	35	0
turncount	343:336b	336c:339	34	33	1
turncount	343:336b	336e:337	1	1	0
turncount	343:336b	973:974	0	0	0
turncount	343:336b	336a:335	2	2	0
turncount	447:336d	336e:337	22	23	-1
turncount	447:336d	973:974	1	1	0
turncount	447:336d	336a:335	21	21	0
turncount	447:336d	336b:343	27	28	-1
turncount	337:336e	973:974	0	0	0
turncount	337:336e	336a:335	6	7	-1
turncount	337:336e	336b:343	2	2	0
turncount	337:336e	336c:339	16	15	1
turncount	12:462	462:463	1	1	0
turncount	12:462	462:13	6	4	2
turncount	12:462	462:675z	0	0	0
turncount	13:462	462:463	0	0	0
turncount	13:462	462:675z	0	2	-2
turncount	13:462	462:12	5	4	1
turncount	463:462	462:13	0	0	0
turncount	463:462	462:675z	2	1	1
turncount	463:462	462:12	3	4	-1
turncount	675z:462	462:463	0	0	0
turncount	675z:462	462:13	0	2	-2
turncount	675z:462	462:12	0	0	0
turncount	13:463	463:901	14	14	0
turncount	13:463	463:462	0	0	0
turncount	462:463	463:901	1	1	0
turncount	462:463	463:13	0	0	0
turncount	901:463	463:13	11	11	0
turncount	901:463	463:462	5	5	0
turncount	262:3b	3c:2	16	19	-3
turncount	262:3b	3a:4	5	1	4
turncount	2:3c	3a:4	3	3	0
turncount	2:3c	3b:262	15	22	-7
turncount	264:25b	25c:24	0	1	-1
turncount	264:25b	25a:26	18	23	-5
turncount	24:25c	25a:26	9	16	-7
turncount	24:25c	25b:264	0	1	-1
turncount	471:470	470:538	0	0	0
turncount	471:470	470:490	1	1	0
turncount	490:470	470:471	1	1	0
turncount	490:470	470:538	0	0	0
turncount	538:470	470:471	0	0	0
turncount	538:470	470:490	0	0	0
turncount	272:487	487:538	0	0	0
turncount	272:487	487:488	51	35	16
turncount	488:487	487:538	0	0	0
turncount	488:487	487:272	55	38	17
turncount	538:487	487:272	0	0	0
turncount	538:487	487:488	0	0	0
turncount	271:488	488:490	1	1	0
turncount	271:488	488:487	55	38	17
turncount	487:488	488:490	0	0	0
turncount	487:488	488:271	51	35	16
turncount	490:488	488:487	0	0	0
turncount	490:488	488:271	1	1	0
turncount	163:161b	161c:164	2	4	-2
turncount	163:161b	161d:162	6	6	0
turncount	163:161b	161a:160	4	11	-7
turncount	162:161d	161a:160	3	6	-3
turncount	162:161d	161b:163	6	6	0
turncount	162:161d	161c:164	2	3	-1

turncount	192:511	511:191	39	43	-4
turncount	514:511	511:191	1	1	0
turncount	514:511	511:192	0	0	0
turncount	192:514	514:511	0	0	0
turncount	192:514	514:513	12	12	0
turncount	513:514	514:511	1	1	0
turncount	513:514	514:192	0	0	0
turncount	99:91b	91c:90	11	11	0
turncount	99:91b	91a:105	1	1	0
turncount	99:91b	91b:99	0	0	0
turncount	90:91c	91a:105	1	1	0
turncount	90:91c	91b:99	10	10	0
turncount	84:517	517:86	10	11	-1
turncount	84:517	517:87	0	0	0
turncount	86:517	517:87	0	0	0
turncount	86:517	517:84	10	12	-2
turncount	87:517	517:86	0	0	0
turncount	87:517	517:84	0	3	-3
turncount	39:36b	36c:35	23	16	7
turncount	39:36b	36d:37	0	0	0
turncount	39:36b	36a:38	4	2	2
turncount	35:36c	36d:37	0	0	0
turncount	35:36c	36a:38	14	20	-6
turncount	35:36c	36b:39	16	18	-2
turncount	37:36d	36a:38	0	0	0
turncount	37:36d	36b:39	0	0	0
turncount	37:36d	36c:35	0	0	0
turncount	69:617	617:618	0	0	0
turncount	70:617	617:618	8	9	-1
turncount	618:617	617:70	12	12	0
turncount	618:617	617:69	0	0	0
turncount	139:654	654:158	54	42	12
turncount	158:654	654:139	55	40	15
turncount	335:959	336b:343	2	2	0
turncount	335:959	336c:339	13	15	-2
turncount	335:959	336e:337	8	10	-2
turncount	335:959	973:974	0	0	0
turncount	165:971	161d:162	1	2	-1
turncount	165:971	161a:160	7	23	-16
turncount	165:971	161b:163	7	9	-2
turncount	165:971	161c:164	0	1	-1
turncount	974:973	336a:335	0	0	0
turncount	974:973	336b:343	0	0	0
turncount	974:973	336c:339	1	1	0
turncount	974:973	336e:337	0	0	0
linkcount	688:763		0	5	-5
linkcount	763:688		0	3	-3
linkcount	678:764		29	29	0
linkcount	764:678		33	32	1
linkcount	614:779		16	11	5
linkcount	779:614		13	7	5
linkcount	198:197a		0	1	-1
linkcount	255:256		49	40	9
linkcount	256:255		50	46	4
linkcount	675:676		2	5	-3
linkcount	676:675		6	8	-2
linkcount	183:503		0	0	0
linkcount	503:183		0	0	0
linkcount	955y:208		11	11	1
linkcount	208:955y		13	13	0
linkcount	900:867z		15	15	0
linkcount	867z:900		13	13	0
linkcount	303z:759		0	0	0
linkcount	361:362		77	77	0
linkcount	367:368		273	273	0
linkcount	370:556		350	351	0
linkcount	371:372		33	33	0
linkcount	375:382z		31	31	0
linkcount	384:387		304	304	0
linkcount	404:402		306	306	0
linkcount	412:952z		69	69	0
linkcount	412:411		273	273	0
linkcount	413:412		342	342	0
linkcount	428:427		35	35	0
linkcount	429:430		39	40	-1
linkcount	431:436		39	39	0
linkcount	433:432		24	25	-1
linkcount	440:449z		265	265	-1
linkcount	441:438		267	267	1
linkcount	443:560		289	290	-1
linkcount	445:444		302	301	1
linkcount	651:653		0	0	0
linkcount	901:902		15	15	0
linkcount	902:901		16	17	-1
linkcount	759:303z		0	0	0

Appendix B: Validation output matrix estimation period 6 LGV

Survey 1600-1700 LGV

Count type	Count numbers		Model	Output	Difference	GEH
turncount	4:3a	3b:262	37	29	8	1
turncount	4:3a	3c:2	63	75	-12	1
turncount	15:13	13:462	92	87	5	1
turncount	15:13	13:463	171	173	-2	0
turncount	462:13	13:15	133	123	10	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	315	316	-1	0
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	291	283	8	0
turncount	26:25a	25c:24	298	291	7	0
turncount	38:36a	36b:39	262	235	27	2
turncount	38:36a	36c:35	241	236	5	0
turncount	38:36a	36d:37	6	6	0	1
turncount	42:43	43:44	436	434	2	0
turncount	42:43	43:486	104	102	2	0
turncount	44:43	43:42	393	397	-4	0
turncount	44:43	43:486	97	99	-2	0
turncount	486:43	43:44	85	75	10	1
turncount	486:43	43:42	79	80	-1	0
turncount	57:58	58:59	453	455	-2	0
turncount	57:58	58:579	49	49	0	0
turncount	59:58	58:579	95	95	0	0
turncount	59:58	58:57	480	480	0	0
turncount	579:58	58:59	47	46	1	0
turncount	579:58	58:57	20	20	0	1
turncount	135:67	67:616	47	44	3	0
turncount	135:67	67:615	77	77	0	0
turncount	135:67	67:521	22	22	0	1
turncount	521:67	67:616	78	73	5	1
turncount	521:67	67:135	21	21	0	1
turncount	521:67	67:615	31	31	0	0
turncount	615:67	67:616	438	430	9	0
turncount	615:67	67:135	30	30	0	0
turncount	615:67	67:521	25	25	0	0
turncount	616:67	67:135	63	64	-1	0
turncount	616:67	67:615	535	550	-15	1
turncount	616:67	67:521	50	51	-1	0
turncount	74:75	75:78	254	263	-9	1
turncount	74:75	75:76	211	187	24	2
turncount	74:75	75:77	161	156	5	0
turncount	76:75	75:78	20	39	-19	3
turncount	76:75	75:77	98	85	14	1
turncount	76:75	75:74	205	209	-4	0
turncount	77:75	75:78	247	233	14	1
turncount	77:75	75:76	24	26	-2	0
turncount	77:75	75:74	218	229	-11	1
turncount	78:75	75:76	41	38	4	1
turncount	78:75	75:77	223	216	7	0
turncount	78:75	75:74	271	275	-4	0
turncount	81:82	82:83	512	525	-13	1
turncount	81:82	82:594	25	25	0	1
turncount	83:82	82:81	577	631	-54	2
turncount	83:82	82:594	37	35	2	0
turncount	594:82	82:83	47	44	3	1
turncount	594:82	82:81	15	18	-3	1
turncount	101:102	102:104	129	129	0	0
turncount	101:102	102:954z	488	488	0	0
turncount	101:102	102:103	21	26	-5	1
turncount	103:102	102:104	118	138	-20	2
turncount	103:102	102:954z	254	204	50	3
turncount	103:102	102:101	34	29	5	1
turncount	104:102	102:954z	243	241	2	0
turncount	104:102	102:103	141	150	-9	1
turncount	104:102	102:101	216	215	1	0
turncount	954z:102	102:104	114	114	0	0
turncount	954z:102	102:103	169	178	-9	1
turncount	954z:102	102:101	541	525	16	1
turncount	130:124	124:665	61	62	-1	0
turncount	130:124	124:761	75	75	0	1
turncount	665:124	124:130	116	116	0	1
turncount	665:124	124:761	94	94	0	0
turncount	761:124	124:130	76	76	0	1
turncount	761:124	124:665	47	47	0	0
turncount	157:139	139:654	291	341	-50	3
turncount	157:139	139:619	80	68	12	1
turncount	619:139	139:157	100	89	11	1
turncount	619:139	139:654	162	205	-43	3
turncount	654:139	139:157	409	416	-7	0
turncount	654:139	139:619	216	212	5	0
turncount	148:149	149:220	492	524	-32	1
turncount	148:149	149:150	1	0	1	1
turncount	150:149	149:220	448	451	-3	0
turncount	150:149	149:148	40	27	13	2
turncount	220:149	149:150	409	364	45	2
turncount	220:149	149:148	426	448	-22	1

turncount	160:161a	161b:163	163	142	21	2
turncount	160:161a	161c:164	336	271	65	4
turncount	160:161a	161d:162	122	113	9	1
turncount	172:173	173:491	247	229	19	1
turncount	172:173	173:174	196	262	-66	4
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	458	440	18	1
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	196	164	32	2
turncount	173:174	174:178	117	98	19	2
turncount	176:174	174:177	162	164	-2	0
turncount	176:174	174:178	293	299	-6	0
turncount	176:174	174:173	97	93	4	0
turncount	177:174	174:176	120	120	0	0
turncount	177:174	174:178	81	85	-4	0
turncount	177:174	174:173	188	166	22	2
turncount	178:174	174:176	348	345	3	0
turncount	178:174	174:177	92	94	-2	0
turncount	178:174	174:173	173	182	-9	1
turncount	174:176	176:955z	468	465	3	0
turncount	491:176	176:955z	247	229	19	1
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	552	556	-4	0
turncount	185:186	186:507	81	90	-9	1
turncount	185:186	186:450	162	168	-6	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	590	636	-46	2
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	207	219	-12	1
turncount	450:186	186:187	225	233	-8	1
turncount	450:186	186:185	103	119	-16	2
turncount	507:186	186:450	37	64	-27	4
turncount	507:186	186:187	547	618	-71	3
turncount	507:186	186:185	52	62	-10	1
turncount	193:192	192:511	523	534	-11	0
turncount	193:192	192:216	485	485	0	1
turncount	193:192	192:514	100	100	0	1
turncount	216:192	192:511	501	508	-7	0
turncount	216:192	192:193	436	436	0	0
turncount	216:192	192:514	93	93	0	1
turncount	511:192	192:216	365	364	1	0
turncount	511:192	192:193	338	338	0	0
turncount	511:192	192:514	70	70	0	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	185	92	93	8
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	22	19	3	1
turncount	98:210	210:211	19	30	-11	2
turncount	211:210	210:212	336	285	51	3
turncount	211:210	210:98	16	26	-10	2
turncount	212:210	210:211	366	320	46	2
turncount	212:210	210:98	25	28	-3	1
turncount	222:223	223:224	951	953	-2	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	881	851	30	1
turncount	224:225	288:227	78	80	-2	0
turncount	224:225	285:289	868	869	-1	0
turncount	224:225	287:284z	5	4	1	1
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	451	451	0	0
turncount	562:241	241:349	390	390	0	0
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	2	2	0	1
turncount	563:242	242:346	13	13	0	1
turncount	247:248	373:361	375	373	2	0
turncount	247:248	360:334	308	308	0	0
turncount	247:248	378:375	157	157	0	0
turncount	290:286	287:284z	755	729	26	1
turncount	290:286	288:227	47	47	0	1
turncount	290:286	285:289	32	32	0	0
turncount	227:288	285:289	112	113	-1	0
turncount	227:288	287:284z	121	118	3	0
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	1	1	0	1
turncount	239:303	348:241	305	305	0	0
turncount	239:303	350:243	654	652	2	0
turncount	239:303	240:302	19	19	0	0
turncount	324:325	325:345	365	377	-12	1
turncount	324:325	325:326	254	252	3	0
turncount	326:325	325:345	274	274	0	0
turncount	326:325	325:324	176	174	2	0
turncount	345:325	325:324	336	336	0	0
turncount	345:325	325:326	300	300	0	0
turncount	242:346	348:241	1	1	0	1
turncount	242:346	350:243	9	9	0	1
turncount	242:346	240:302	3	3	0	1
turncount	241:349	350:243	137	137	0	0
turncount	241:349	240:302	253	253	0	0
turncount	241:349	347:242	0	0	0	1
turncount	352:351	240:302	485	488	-3	0
turncount	352:351	347:242	1	1	0	1
turncount	352:351	348:241	145	146	-1	0

turncount	352:351	350:243	41	41	0	1
turncount	334:359	378:375	154	154	0	0
turncount	334:359	358:357	176	175	1	0
turncount	334:359	373:361	304	304	0	0
turncount	383:364	364:371	298	299	-1	0
turncount	381:374	360:334	342	343	-1	0
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	319	317	2	0
turncount	372:377	358:357	102	102	0	0
turncount	372:377	373:361	0	1	-1	1
turncount	372:377	360:334	196	196	0	0
turncount	413:412	412:952z	661	660	1	0
turncount	415:416	419:429	303	299	4	0
turncount	415:416	435:425	36	40	-4	1
turncount	415:416	449:433	410	407	3	0
turncount	427:417	418:342	400	401	-1	0
turncount	427:417	419:429	1	0	1	1
turncount	427:417	435:425	7	7	0	0
turncount	425:423	449:433	7	7	0	0
turncount	425:423	418:342	25	25	0	1
turncount	425:423	419:429	3	3	0	1
turncount	435:425	425:448	66	69	-3	0
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	35	35	0	0
turncount	436:434	435:425	23	22	1	0
turncount	436:434	449:433	1	0	1	1
turncount	436:434	418:342	327	329	-2	0
turncount	407:437	437:431	351	351	0	0
turncount	445:444	444:428	408	408	0	0
turncount	343:336b	336c:339	131	133	-2	0
turncount	343:336b	336e:337	27	27	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	66	67	-1	0
turncount	447:336d	336e:337	245	244	1	0
turncount	447:336d	973:974	10	10	0	1
turncount	447:336d	336a:335	406	410	-4	0
turncount	447:336d	336b:343	91	91	0	0
turncount	337:336e	973:974	12	12	0	1
turncount	337:336e	336a:335	442	448	-6	0
turncount	337:336e	336b:343	28	28	0	1
turncount	337:336e	336c:339	198	202	-4	0
turncount	12:462	462:463	46	41	5	1
turncount	12:462	462:13	92	72	20	2
turncount	12:462	462:675z	3	2	1	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	16	24	-8	2
turncount	13:462	462:12	92	63	29	3
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	8	10	-2	1
turncount	463:462	462:12	45	40	5	1
turncount	675z:462	462:463	10	13	-3	1
turncount	675z:462	462:13	41	51	-10	2
turncount	675z:462	462:12	8	8	0	0
turncount	13:463	463:901	171	173	-2	0
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	56	54	2	0
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	315	316	-1	0
turncount	901:463	463:462	53	50	3	0
turncount	262:3b	3c:2	282	288	-6	0
turncount	262:3b	3a:4	12	12	0	0
turncount	2:3c	3a:4	54	63	-9	1
turncount	2:3c	3b:262	253	254	-1	0
turncount	264:25b	25c:24	6	12	-6	2
turncount	264:25b	25a:26	287	272	15	1
turncount	24:25c	25a:26	442	420	22	1
turncount	24:25c	25b:264	3	16	-13	4
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	16	16	0	1
turncount	490:470	470:471	36	37	-1	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	1	0	1	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	1	0	1	1
turncount	272:487	487:488	552	558	-6	0
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	631	655	-24	1
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	36	37	-1	0
turncount	271:488	488:487	631	655	-24	1
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	552	558	-6	0
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	16	16	0	1
turncount	163:161b	161c:164	315	279	36	2
turncount	163:161b	161d:162	310	309	1	0
turncount	163:161b	161a:160	170	165	5	0
turncount	162:161d	161a:160	175	172	3	0
turncount	162:161d	161b:163	353	342	11	1
turncount	162:161d	161c:164	273	245	28	2
turncount	192:511	511:191	1024	1042	-18	1
turncount	514:511	511:191	7	108	-101	13

NOT PROTECTIVELY MARKED

turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	263	263	0	0
turncount	513:514	514:511	7	108	-101	13
turncount	513:514	514:192	185	92	93	8
turncount	90:91c	91c:105	35	37	-2	0
turncount	90:91c	91c:99	523	551	-28	1
turncount	99:91c	91c:105	117	121	-4	0
turncount	99:91c	91c:90	635	653	-18	1
turncount	105:91c	91c:99	103	103	0	1
turncount	105:91c	91c:90	40	40	0	0
turncount	84:517	517:86	530	541	-11	0
turncount	84:517	517:87	25	27	-2	0
turncount	86:517	517:87	23	15	9	2
turncount	86:517	517:84	606	641	-35	1
turncount	87:517	517:86	16	44	-28	5
turncount	87:517	517:84	25	24	1	0
turncount	39:36b	36c:35	380	322	58	3
turncount	39:36b	36d:37	11	9	2	1
turncount	39:36b	36a:38	279	239	40	2
turncount	35:36c	36d:37	10	10	0	0
turncount	35:36c	36a:38	301	296	5	0
turncount	35:36c	36b:39	358	349	9	0
turncount	37:36d	36a:38	1	1	0	0
turncount	37:36d	36b:39	5	5	1	0
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	46	47	-1	0
turncount	618:617	617:70	63	60	3	0
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	453	521	-68	3
turncount	158:654	654:139	625	628	-3	0
turncount	335:959	336b:343	17	17	0	0
turncount	335:959	336c:339	379	382	-3	0
turncount	335:959	336e:337	414	410	4	0
turncount	335:959	973:974	11	11	0	0
turncount	165:971	161d:162	206	189	17	1
turncount	165:971	161a:160	287	293	-6	0
turncount	165:971	161b:163	483	439	44	2
turncount	165:971	161c:164	59	53	6	1
turncount	974:973	336a:335	7	7	0	0
turncount	974:973	336b:343	1	1	0	1
turncount	974:973	336c:339	28	29	-1	0
turncount	974:973	336e:337	13	13	0	1
linkcount	688:763		153	152	1	0
linkcount	763:688		104	98	6	1
linkcount	678:764		466	466	0	0
linkcount	764:678		764	737	27	1
linkcount	614:779		346	344	2	0
linkcount	779:614		186	187	-1	0
linkcount	198:197a		241	155	86	6
linkcount	255:256		827	836	-8	0
linkcount	256:255		1009	996	12	0
linkcount	675:676		78	75	3	0
linkcount	676:675		113	116	-3	0
linkcount	183:503		406	392	14	1
linkcount	503:183		163	163	0	0
linkcount	955y:208		494	482	12	1
linkcount	208:955y		613	621	-8	0
linkcount	900:867z		314	314	0	0
linkcount	867z:900		245	245	0	0
linkcount	303z:759		27	28	-1	0
linkcount	361:362		679	679	0	0
linkcount	367:368		1461	1459	3	0
linkcount	370:556		2140	2137	3	0
linkcount	371:372		298	299	-1	0
linkcount	375:382z		311	311	0	0
linkcount	384:387		1809	1810	-1	0
linkcount	404:402		1759	1757	2	0
linkcount	412:952z		661	660	1	0
linkcount	412:411		1498	1499	-1	0
linkcount	413:412		2159	2159	0	0
linkcount	428:427		408	408	0	0
linkcount	429:430		307	302	5	0
linkcount	431:436		351	351	0	0
linkcount	433:432		418	414	4	0
linkcount	440:449z		1458	1459	-1	0
linkcount	441:438		1452	1455	-3	0
linkcount	443:560		1876	1873	3	0
linkcount	445:444		1860	1863	-3	0
linkcount	651:653		6	7	-1	0
linkcount	653:651		27	28	-1	0
linkcount	901:902		227	226	1	0
linkcount	902:901		368	367	1	0
linkcount	759:303z		6	6	0	1

Appendix B: Validation output matrix estimation period 6 HGV

Survey 1600-1700 HGV

Count type	Count numbers		Model	Output	Difference	GEH
turncount	4:3a	3b:262	0	1	-1	1
turncount	4:3a	3c:2	0	0	0	1
turncount	15:13	13:462	2	2	0	0
turncount	15:13	13:463	6	6	0	1
turncount	462:13	13:15	5	3	2	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	20	20	0	0
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	11	12	-1	0
turncount	26:25a	25c:24	8	10	-2	1
turncount	38:36a	36b:39	1	1	0	0
turncount	38:36a	36c:35	8	11	-3	1
turncount	38:36a	36d:37	0	0	0	1
turncount	42:43	43:44	22	18	4	1
turncount	42:43	43:486	4	3	2	1
turncount	44:43	43:42	11	10	1	0
turncount	44:43	43:486	1	1	0	0
turncount	486:43	43:44	4	3	1	1
turncount	486:43	43:42	2	3	-1	0
turncount	57:58	58:59	14	14	0	1
turncount	57:58	58:579	1	1	0	1
turncount	59:58	58:579	0	0	0	1
turncount	59:58	58:57	8	8	0	1
turncount	579:58	58:59	3	3	0	1
turncount	579:58	58:57	0	0	0	1
turncount	135:67	67:616	5	5	0	0
turncount	135:67	67:615	0	0	0	1
turncount	135:67	67:521	0	0	0	1
turncount	521:67	67:616	2	2	0	0
turncount	521:67	67:135	1	0	1	1
turncount	521:67	67:615	0	0	0	1
turncount	615:67	67:616	15	15	0	0
turncount	615:67	67:135	1	1	0	1
turncount	615:67	67:521	0	0	0	1
turncount	616:67	67:135	2	2	0	1
turncount	616:67	67:615	3	4	-1	0
turncount	616:67	67:521	1	1	0	1
turncount	74:75	75:78	9	9	0	1
turncount	74:75	75:76	16	15	1	0
turncount	74:75	75:77	5	6	-1	0
turncount	76:75	75:78	1	3	-2	1
turncount	76:75	75:77	3	3	0	0
turncount	76:75	75:74	7	7	0	0
turncount	77:75	75:78	8	5	3	1
turncount	77:75	75:76	1	2	-1	0
turncount	77:75	75:74	2	2	0	0
turncount	78:75	75:76	5	5	1	0
turncount	78:75	75:77	8	9	-1	0
turncount	78:75	75:74	11	11	0	0
turncount	81:82	82:83	12	12	0	0
turncount	81:82	82:594	2	2	0	1
turncount	83:82	82:81	6	11	-5	2
turncount	83:82	82:594	0	0	0	1
turncount	594:82	82:83	1	1	0	1
turncount	594:82	82:81	0	0	0	1
turncount	101:102	102:104	4	4	0	1
turncount	101:102	102:954z	10	10	0	0
turncount	101:102	102:103	2	2	0	0
turncount	103:102	102:104	4	3	1	0
turncount	103:102	102:954z	1	1	0	0
turncount	103:102	102:101	0	0	0	0
turncount	104:102	102:954z	9	9	0	1
turncount	104:102	102:103	3	3	1	0
turncount	104:102	102:101	4	4	0	1
turncount	954z:102	102:104	0	0	0	0
turncount	954z:102	102:103	0	0	0	1
turncount	954z:102	102:101	3	4	-1	0
turncount	130:124	124:665	0	0	0	1
turncount	130:124	124:761	0	0	0	0
turncount	665:124	124:130	0	0	0	1
turncount	665:124	124:761	0	0	0	1
turncount	761:124	124:130	0	0	0	1
turncount	761:124	124:665	0	0	0	1
turncount	157:139	139:654	21	20	1	0
turncount	157:139	139:619	9	10	-1	0
turncount	619:139	139:157	8	12	-4	1
turncount	619:139	139:654	8	6	2	1
turncount	654:139	139:157	21	21	0	1
turncount	654:139	139:619	6	6	1	0
turncount	148:149	149:220	19	23	-4	1
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	45	32	13	2
turncount	150:149	149:148	10	3	7	3
turncount	220:149	149:150	38	30	8	1
turncount	220:149	149:148	24	25	-1	0

turncount	160:161a	161b:163	4	5	-1	1
turncount	160:161a	161c:164	9	16	-7	2
turncount	160:161a	161d:162	4	4	0	0
turncount	172:173	173:491	1	2	-1	0
turncount	172:173	173:174	5	5	0	0
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	2	2	0	0
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	5	5	0	0
turncount	173:174	174:178	0	0	0	1
turncount	176:174	174:177	9	9	0	0
turncount	176:174	174:178	1	1	0	0
turncount	176:174	174:173	0	0	0	1
turncount	177:174	174:176	13	12	1	0
turncount	177:174	174:178	12	10	2	1
turncount	177:174	174:173	2	2	1	0
turncount	178:174	174:176	2	2	0	0
turncount	178:174	174:177	9	9	0	0
turncount	178:174	174:173	0	0	0	0
turncount	174:176	176:955z	15	14	1	0
turncount	491:176	176:955z	1	2	-1	0
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	10	10	0	0
turncount	185:186	186:507	0	2	-2	2
turncount	185:186	186:450	4	4	0	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	46	28	18	3
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	11	8	4	1
turncount	450:186	186:187	11	11	0	0
turncount	450:186	186:185	7	7	0	0
turncount	507:186	186:450	3	3	0	0
turncount	507:186	186:187	23	21	2	0
turncount	507:186	186:185	0	0	0	1
turncount	193:192	192:511	10	10	0	0
turncount	193:192	192:216	9	9	0	1
turncount	193:192	192:514	0	0	0	1
turncount	216:192	192:511	12	13	-1	0
turncount	216:192	192:193	17	17	0	1
turncount	216:192	192:514	5	5	0	1
turncount	511:192	192:216	20	21	-1	0
turncount	511:192	192:193	8	8	0	1
turncount	511:192	192:514	0	0	0	1
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	1	0	1	1
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	0	0	0	1
turncount	98:210	210:211	0	0	0	1
turncount	211:210	210:212	3	4	-1	0
turncount	211:210	210:98	1	1	0	0
turncount	212:210	210:211	2	2	0	0
turncount	212:210	210:98	0	1	-1	1
turncount	222:223	223:224	55	55	0	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	56	57	-1	0
turncount	224:225	288:227	9	9	0	1
turncount	224:225	285:289	46	46	1	0
turncount	224:225	287:284z	0	0	0	1
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	28	28	0	0
turncount	562:241	241:349	32	31	1	0
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	0	0	0	1
turncount	563:242	242:346	0	0	0	1
turncount	247:248	373:361	47	48	-1	0
turncount	247:248	360:334	8	9	-1	0
turncount	247:248	378:375	19	19	0	0
turncount	290:286	287:284z	46	47	-1	0
turncount	290:286	288:227	25	26	-1	0
turncount	290:286	285:289	9	10	-1	0
turncount	227:288	285:289	27	27	0	1
turncount	227:288	287:284z	10	10	0	0
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	0	0	0	1
turncount	239:303	348:241	14	14	0	1
turncount	239:303	350:243	64	62	2	0
turncount	239:303	240:302	6	6	0	0
turncount	324:325	325:345	15	16	-1	0
turncount	324:325	325:326	20	21	-1	0
turncount	326:325	325:345	29	29	0	0
turncount	326:325	325:324	15	15	1	0
turncount	345:325	325:324	19	19	0	1
turncount	345:325	325:326	42	42	0	0
turncount	242:346	348:241	0	0	0	1
turncount	242:346	350:243	0	0	0	1
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	8	8	0	0
turncount	241:349	240:302	24	23	1	0
turncount	241:349	347:242	0	0	0	1
turncount	352:351	240:302	94	94	0	0
turncount	352:351	347:242	0	0	0	1
turncount	352:351	348:241	14	14	0	0

turncount	352:351	350:243	6	6	0	0
turncount	334:359	378:375	14	14	0	0
turncount	334:359	358:357	20	20	0	0
turncount	334:359	373:361	41	41	1	0
turncount	383:364	364:371	34	34	0	0
turncount	381:374	360:334	26	27	-1	0
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	63	61	2	0
turncount	372:377	358:357	25	25	0	1
turncount	372:377	373:361	0	0	0	1
turncount	372:377	360:334	9	9	0	0
turncount	413:412	412:952z	89	88	1	0
turncount	415:416	419:429	33	33	1	0
turncount	415:416	435:425	0	0	0	1
turncount	415:416	449:433	10	10	0	0
turncount	427:417	418:342	38	38	0	0
turncount	427:417	419:429	0	0	0	1
turncount	427:417	435:425	0	0	0	1
turncount	425:423	449:433	0	0	0	1
turncount	425:423	418:342	0	0	0	1
turncount	425:423	419:429	0	0	0	1
turncount	435:425	425:448	0	0	0	1
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	0	0	0	1
turncount	436:434	435:425	0	0	0	1
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	29	29	0	0
turncount	407:437	437:431	29	29	0	0
turncount	445:444	444:428	38	38	0	0
turncount	343:336b	336c:339	19	19	0	0
turncount	343:336b	336e:337	1	1	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	0	0	0	1
turncount	447:336d	336e:337	22	21	1	0
turncount	447:336d	973:974	0	0	0	1
turncount	447:336d	336a:335	23	23	0	0
turncount	447:336d	336b:343	23	23	0	0
turncount	337:336e	973:974	0	0	0	1
turncount	337:336e	336a:335	9	9	0	0
turncount	337:336e	336b:343	2	2	0	1
turncount	337:336e	336c:339	19	19	0	0
turncount	12:462	462:463	1	1	0	0
turncount	12:462	462:13	5	3	2	1
turncount	12:462	462:675z	0	0	0	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	0	1	-1	1
turncount	13:462	462:12	2	1	1	1
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	0	0	0	1
turncount	463:462	462:12	1	1	0	0
turncount	675z:462	462:463	0	0	0	1
turncount	675z:462	462:13	0	0	0	0
turncount	675z:462	462:12	0	0	0	1
turncount	13:463	463:901	6	6	0	1
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	1	1	0	0
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	20	20	0	0
turncount	901:463	463:462	1	1	0	0
turncount	262:3b	3c:2	10	12	-2	1
turncount	262:3b	3a:4	0	1	-1	1
turncount	2:3c	3a:4	2	4	-2	1
turncount	2:3c	3b:262	6	9	-3	1
turncount	264:25b	25c:24	0	1	-1	1
turncount	264:25b	25a:26	8	9	-1	0
turncount	24:25c	25a:26	14	22	-8	2
turncount	24:25c	25b:264	0	0	0	1
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	2	2	0	0
turncount	490:470	470:471	1	1	0	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	26	21	5	1
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	41	30	12	2
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	1	1	0	0
turncount	271:488	488:487	41	30	12	2
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	26	21	5	1
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	2	2	0	0
turncount	163:161b	161c:164	3	4	-1	0
turncount	163:161b	161d:162	7	7	0	1
turncount	163:161b	161a:160	3	5	-2	1
turncount	162:161d	161a:160	3	4	-1	1
turncount	162:161d	161b:163	14	14	1	0
turncount	162:161d	161c:164	5	6	-1	0
turncount	192:511	511:191	22	23	-1	0
turncount	514:511	511:191	0	0	0	1

turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	5	5	0	1
turncount	513:514	514:511	0	0	0	1
turncount	513:514	514:192	1	0	1	1
turncount	90:91c	91c:105	0	0	0	1
turncount	90:91c	91c:99	17	17	0	1
turncount	99:91c	91c:105	0	0	0	1
turncount	99:91c	91c:90	9	9	0	1
turncount	105:91c	91c:99	0	0	0	0
turncount	105:91c	91c:90	0	0	0	1
turncount	84:517	517:86	13	13	0	0
turncount	84:517	517:87	0	0	0	1
turncount	86:517	517:87	0	1	-1	1
turncount	86:517	517:84	8	10	-2	1
turncount	87:517	517:86	0	0	0	0
turncount	87:517	517:84	0	1	-1	1
turncount	39:36b	36c:35	20	10	10	3
turncount	39:36b	36d:37	0	0	0	1
turncount	39:36b	36a:38	3	2	1	1
turncount	35:36c	36d:37	0	0	0	1
turncount	35:36c	36a:38	12	18	-6	2
turncount	35:36c	36b:39	9	11	-2	1
turncount	37:36d	36a:38	0	0	0	1
turncount	37:36d	36b:39	0	0	0	1
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	14	14	0	0
turncount	618:617	617:70	8	8	0	0
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	29	26	4	1
turncount	158:654	654:139	27	27	1	0
turncount	335:959	336b:343	1	1	0	1
turncount	335:959	336c:339	4	4	0	0
turncount	335:959	336e:337	9	9	0	0
turncount	335:959	973:974	0	0	0	1
turncount	165:971	161d:162	2	4	-2	1
turncount	165:971	161a:160	6	18	-12	3
turncount	165:971	161b:163	11	16	-5	1
turncount	165:971	161c:164	0	0	0	1
turncount	974:973	336a:335	0	0	0	1
turncount	974:973	336b:343	0	0	0	1
turncount	974:973	336c:339	0	0	0	1
turncount	974:973	336e:337	0	0	0	1
linkcount	688:763		0	5	-5	3
linkcount	763:688		0	2	-2	2
linkcount	678:764		25	25	1	0
linkcount	764:678		27	27	0	0
linkcount	614:779		20	13	6	2
linkcount	779:614		6	4	2	1
linkcount	198:197a		0	0	0	1
linkcount	255:256		24	24	0	0
linkcount	256:255		33	32	1	0
linkcount	675:676		10	10	1	0
linkcount	676:675		6	6	0	0
linkcount	183:503		0	0	0	1
linkcount	503:183		0	0	0	1
linkcount	955y:208		13	11	2	1
linkcount	208:955y		11	11	0	0
linkcount	900:867z		11	11	0	0
linkcount	867z:900		13	13	0	0
linkcount	303z:759		0	0	0	1
linkcount	361:362		88	89	-1	0
linkcount	367:368		259	259	0	0
linkcount	370:556		347	347	-1	0
linkcount	371:372		34	34	0	0
linkcount	375:382z		33	33	0	0
linkcount	384:387		198	198	0	0
linkcount	404:402		293	293	0	0
linkcount	412:952z		89	88	1	0
linkcount	412:411		165	165	0	0
linkcount	413:412		254	253	1	0
linkcount	428:427		38	38	0	0
linkcount	429:430		33	33	1	0
linkcount	431:436		29	29	0	0
linkcount	433:432		10	10	0	0
linkcount	440:449z		169	169	0	0
linkcount	441:438		260	260	-1	0
linkcount	443:560		179	179	0	0
linkcount	445:444		298	298	-1	0
linkcount	651:653		0	0	0	1
linkcount	653:651		0	0	0	1
linkcount	901:902		7	7	0	0
linkcount	902:901		21	21	0	0
linkcount	759:303z		0	0	0	1

Appendix B: Validation output matrix estimation period 7 LGV

Survey 1700-1800 LGV

Count type	Count numbers		Model	Output	Difference	GEH
turncount	4:3a	3b:262	20	26	-6	1
turncount	4:3a	3c:2	56	65	-9	1
turncount	15:13	13:462	83	79	4	0
turncount	15:13	13:463	249	251	-2	0
turncount	462:13	13:15	88	75	13	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	466	493	-27	1
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	307	312	-5	0
turncount	26:25a	25c:24	377	372	5	0
turncount	38:36a	36b:39	277	230	47	3
turncount	38:36a	36c:35	301	317	-16	1
turncount	38:36a	36d:37	9	9	0	0
turncount	42:43	43:44	493	498	-5	0
turncount	42:43	43:486	112	113	-1	0
turncount	44:43	43:42	502	485	17	1
turncount	44:43	43:486	126	127	-1	0
turncount	486:43	43:44	91	85	6	1
turncount	486:43	43:42	68	71	-3	0
turncount	57:58	58:59	490	492	-2	0
turncount	57:58	58:579	50	50	0	0
turncount	59:58	58:579	138	138	0	0
turncount	59:58	58:57	594	596	-2	0
turncount	579:58	58:59	51	74	-23	3
turncount	579:58	58:57	40	107	-67	8
turncount	135:67	67:616	52	55	-3	0
turncount	135:67	67:615	101	101	0	0
turncount	135:67	67:521	24	24	0	1
turncount	521:67	67:616	50	54	-4	1
turncount	521:67	67:135	19	19	0	1
turncount	521:67	67:615	27	27	0	0
turncount	615:67	67:616	450	476	-26	1
turncount	615:67	67:135	51	50	1	0
turncount	615:67	67:521	39	39	0	0
turncount	616:67	67:135	78	78	0	0
turncount	616:67	67:615	713	717	-4	0
turncount	616:67	67:521	54	54	0	0
turncount	74:75	75:78	234	255	-21	1
turncount	74:75	75:76	216	212	4	0
turncount	74:75	75:77	123	141	-18	2
turncount	76:75	75:78	5	45	-40	8
turncount	76:75	75:77	133	125	8	1
turncount	76:75	75:74	238	251	-13	1
turncount	77:75	75:78	194	211	-17	1
turncount	77:75	75:76	60	45	15	2
turncount	77:75	75:74	305	284	21	1
turncount	78:75	75:76	31	47	-16	3
turncount	78:75	75:77	205	196	9	1
turncount	78:75	75:74	282	296	-14	1
turncount	81:82	82:83	514	570	-56	2
turncount	81:82	82:594	26	26	0	1
turncount	83:82	82:81	711	733	-22	1
turncount	83:82	82:594	50	49	1	0
turncount	594:82	82:83	37	37	0	0
turncount	594:82	82:81	11	12	-1	0
turncount	101:102	102:104	99	99	0	0
turncount	101:102	102:954z	538	542	-4	0
turncount	101:102	102:103	25	32	-7	1
turncount	103:102	102:104	97	128	-31	3
turncount	103:102	102:954z	217	172	46	3
turncount	103:102	102:101	51	45	6	1
turncount	104:102	102:954z	202	212	-10	1
turncount	104:102	102:103	150	164	-14	1
turncount	104:102	102:101	244	244	0	0
turncount	954z:102	102:104	90	90	0	1
turncount	954z:102	102:103	177	195	-18	1
turncount	954z:102	102:101	616	604	12	0
turncount	130:124	124:665	44	47	-3	0
turncount	130:124	124:761	71	71	0	1
turncount	665:124	124:130	164	164	0	1
turncount	665:124	124:761	100	100	0	1
turncount	761:124	124:130	76	76	0	1
turncount	761:124	124:665	54	55	-1	0
turncount	157:139	139:654	221	385	-164	9
turncount	157:139	139:619	146	90	56	5
turncount	619:139	139:157	232	174	58	4
turncount	619:139	139:654	132	227	-95	7
turncount	654:139	139:157	382	431	-49	2
turncount	654:139	139:619	177	175	2	0
turncount	148:149	149:220	471	459	12	1
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	552	541	11	0
turncount	150:149	149:148	30	20	10	2
turncount	220:149	149:150	333	369	-36	2
turncount	220:149	149:148	328	332	-4	0

turncount	160:161a	161b:163	176	76	100	9
turncount	160:161a	161c:164	271	448	-177	9
turncount	160:161a	161d:162	104	92	12	1
turncount	172:173	173:491	272	246	26	2
turncount	172:173	173:174	224	267	-43	3
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	403	410	-7	0
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	224	174	50	4
turncount	173:174	174:178	115	93	22	2
turncount	176:174	174:177	169	170	-1	0
turncount	176:174	174:178	218	223	-5	0
turncount	176:174	174:173	93	96	-3	0
turncount	177:174	174:176	125	123	2	0
turncount	177:174	174:178	90	89	1	0
turncount	177:174	174:173	187	182	5	0
turncount	178:174	174:176	349	345	5	0
turncount	178:174	174:177	101	102	-1	0
turncount	178:174	174:173	123	132	-9	1
turncount	174:176	176:955z	474	467	7	0
turncount	491:176	176:955z	272	246	26	2
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	480	489	-9	0
turncount	185:186	186:507	112	103	9	1
turncount	185:186	186:450	212	208	5	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	770	714	57	2
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	195	194	1	0
turncount	450:186	186:187	259	277	-18	1
turncount	450:186	186:185	99	110	-11	1
turncount	507:186	186:450	36	89	-53	7
turncount	507:186	186:187	514	664	-150	6
turncount	507:186	186:185	60	79	-19	2
turncount	193:192	192:511	521	531	-10	0
turncount	193:192	192:216	461	481	-20	1
turncount	193:192	192:514	68	68	0	0
turncount	216:192	192:511	497	505	-8	0
turncount	216:192	192:193	519	519	0	1
turncount	216:192	192:514	81	81	0	0
turncount	511:192	192:216	400	428	-28	1
turncount	511:192	192:193	397	396	1	0
turncount	511:192	192:514	67	66	1	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	251	95	156	12
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	25	20	5	1
turncount	98:210	210:211	23	34	-11	2
turncount	211:210	210:212	322	258	64	4
turncount	211:210	210:98	21	21	0	0
turncount	212:210	210:211	424	377	47	2
turncount	212:210	210:98	36	40	-4	1
turncount	222:223	223:224	1073	1056	17	1
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	626	663	-37	1
turncount	224:225	288:227	66	64	2	0
turncount	224:225	285:289	1001	989	12	0
turncount	224:225	287:284z	6	2	4	2
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	540	544	-4	0
turncount	562:241	241:349	335	347	-12	1
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	3	3	1	0
turncount	563:242	242:346	11	11	0	0
turncount	247:248	373:361	439	420	19	1
turncount	247:248	360:334	480	450	30	1
turncount	247:248	378:375	343	389	-46	2
turncount	290:286	287:284z	484	496	-12	1
turncount	290:286	288:227	51	51	0	1
turncount	290:286	285:289	105	110	-5	1
turncount	227:288	285:289	209	229	-20	1
turncount	227:288	287:284z	136	165	-29	2
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	1	1	0	0
turncount	239:303	348:241	365	350	15	1
turncount	239:303	350:243	1044	1060	-16	1
turncount	239:303	240:302	17	17	1	0
turncount	324:325	325:345	361	371	-10	1
turncount	324:325	325:326	202	204	-2	0
turncount	326:325	325:345	284	284	0	0
turncount	326:325	325:324	277	366	-89	5
turncount	345:325	325:324	426	425	1	0
turncount	345:325	325:326	321	321	0	1
turncount	242:346	348:241	8	8	0	0
turncount	242:346	350:243	3	3	0	0
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	124	144	-20	2
turncount	241:349	240:302	210	203	7	0
turncount	241:349	347:242	1	0	1	1
turncount	352:351	240:302	500	564	-64	3
turncount	352:351	347:242	1	1	0	0
turncount	352:351	348:241	167	186	-19	1

turncount	352:351	350:243	49	52	-3	0
turncount	334:359	378:375	178	222	-44	3
turncount	334:359	358:357	152	136	16	1
turncount	334:359	373:361	233	239	-6	0
turncount	383:364	364:371	383	378	5	0
turncount	381:374	360:334	405	404	1	0
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	365	472	-107	5
turncount	372:377	358:357	155	143	12	1
turncount	372:377	373:361	0	1	-1	1
turncount	372:377	360:334	228	234	-6	0
turncount	413:412	412:952z	770	876	-106	4
turncount	415:416	419:429	290	282	8	0
turncount	415:416	435:425	37	38	-1	0
turncount	415:416	449:433	411	647	-236	10
turncount	427:417	418:342	474	487	-13	1
turncount	427:417	419:429	4	1	3	2
turncount	427:417	435:425	17	18	-1	0
turncount	425:423	449:433	10	9	1	0
turncount	425:423	418:342	25	27	-2	0
turncount	425:423	419:429	1	1	0	1
turncount	435:425	425:448	79	72	7	1
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	36	37	-1	0
turncount	436:434	435:425	25	17	8	2
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	347	375	-28	1
turncount	407:437	437:431	372	392	-20	1
turncount	445:444	444:428	495	506	-11	0
turncount	343:336b	336c:339	105	112	-7	1
turncount	343:336b	336e:337	26	26	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	37	40	-3	0
turncount	447:336d	336e:337	261	287	-26	2
turncount	447:336d	973:974	22	20	2	0
turncount	447:336d	336a:335	507	508	-1	0
turncount	447:336d	336b:343	68	74	-6	1
turncount	337:336e	973:974	14	14	0	1
turncount	337:336e	336a:335	452	491	-39	2
turncount	337:336e	336b:343	25	25	0	1
turncount	337:336e	336c:339	181	193	-12	1
turncount	12:462	462:463	50	45	5	1
turncount	12:462	462:13	79	57	22	3
turncount	12:462	462:675z	3	2	1	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	17	24	-7	2
turncount	13:462	462:12	83	55	28	3
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	4	5	-1	0
turncount	463:462	462:12	49	44	5	1
turncount	675z:462	462:463	6	8	-2	1
turncount	675z:462	462:13	9	17	-8	2
turncount	675z:462	462:12	3	3	0	0
turncount	13:463	463:901	249	251	-2	0
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	56	53	3	0
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	466	493	-27	1
turncount	901:463	463:462	53	49	4	1
turncount	262:3b	3c:2	310	313	-3	0
turncount	262:3b	3a:4	14	13	1	0
turncount	2:3c	3a:4	69	83	-14	2
turncount	2:3c	3b:262	219	240	-21	1
turncount	264:25b	25c:24	3	15	-12	4
turncount	264:25b	25a:26	240	251	-11	1
turncount	24:25c	25a:26	560	547	13	1
turncount	24:25c	25b:264	1	14	-13	5
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	27	26	1	0
turncount	490:470	470:471	61	57	4	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	4	0	4	3
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	4	0	4	3
turncount	272:487	487:488	657	657	0	1
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	772	741	31	1
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	61	57	4	0
turncount	271:488	488:487	772	741	31	1
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	657	657	0	1
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	27	26	1	0
turncount	163:161b	161c:164	346	274	72	4
turncount	163:161b	161d:162	282	283	-1	0
turncount	163:161b	161a:160	185	165	20	2
turncount	162:161d	161a:160	183	165	18	1
turncount	162:161d	161b:163	383	374	9	0
turncount	162:161d	161c:164	282	233	49	3
turncount	192:511	511:191	1018	1036	-18	1
turncount	514:511	511:191	1	115	-114	15

turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	216	215	1	0
turncount	513:514	514:511	1	115	-114	15
turncount	513:514	514:192	251	95	156	12
turncount	90:91c	91c:105	49	46	3	0
turncount	90:91c	91c:99	517	568	-51	2
turncount	99:91c	91c:105	154	157	-3	0
turncount	99:91c	91c:90	750	763	-13	0
turncount	105:91c	91c:99	130	130	0	0
turncount	105:91c	91c:90	45	46	-1	0
turncount	84:517	517:86	538	576	-38	2
turncount	84:517	517:87	25	30	-5	1
turncount	86:517	517:87	25	14	12	3
turncount	86:517	517:84	738	741	-3	0
turncount	87:517	517:86	16	37	-21	4
turncount	87:517	517:84	41	41	1	0
turncount	39:36b	36c:35	354	339	15	1
turncount	39:36b	36d:37	6	6	0	0
turncount	39:36b	36a:38	291	274	17	1
turncount	35:36c	36d:37	5	5	0	0
turncount	35:36c	36a:38	356	334	22	1
turncount	35:36c	36b:39	424	402	22	1
turncount	37:36d	36a:38	2	2	0	1
turncount	37:36d	36b:39	3	2	1	0
turncount	37:36d	36c:35	1	1	0	1
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	0	0	0	1
turncount	618:617	617:70	21	23	-2	0
turncount	618:617	617:69	20	20	0	0
turncount	139:654	654:158	353	609	-256	12
turncount	158:654	654:139	559	606	-47	2
turncount	335:959	336b:343	27	25	2	0
turncount	335:959	336c:339	394	641	-247	11
turncount	335:959	336e:337	428	399	29	1
turncount	335:959	973:974	22	20	2	0
turncount	165:971	161d:162	169	178	-9	1
turncount	165:971	161a:160	309	296	13	1
turncount	165:971	161b:163	503	520	-17	1
turncount	165:971	161c:164	48	48	0	0
turncount	974:973	336a:335	7	8	-1	0
turncount	974:973	336b:343	1	1	0	1
turncount	974:973	336c:339	20	21	-1	0
turncount	974:973	336e:337	16	16	0	1
linkcount	688:763		128	128	0	0
linkcount	763:688		89	92	-3	0
linkcount	678:764		479	457	22	1
linkcount	764:678		839	819	20	1
linkcount	614:779		278	280	-2	0
linkcount	779:614		155	154	1	0
linkcount	198:197a		226	157	69	5
linkcount	255:256		845	991	-145	5
linkcount	256:255		1119	1030	89	3
linkcount	675:676		47	39	8	1
linkcount	676:675		55	68	-13	2
linkcount	183:503		368	355	13	1
linkcount	503:183		144	152	-8	1
linkcount	955y:208		422	405	17	1
linkcount	208:955y		566	579	-13	1
linkcount	900:867z		314	312	2	0
linkcount	867z:900		251	251	0	0
linkcount	303z:759		20	20	0	0
linkcount	361:362		672	660	13	0
linkcount	367:368		1557	1556	1	0
linkcount	370:556		2229	2215	13	0
linkcount	371:372		383	378	5	0
linkcount	375:382z		521	611	-90	4
linkcount	384:387		1974	2023	-49	1
linkcount	404:402		1940	1934	6	0
linkcount	412:952z		770	876	-106	4
linkcount	412:411		1453	1412	41	1
linkcount	413:412		2223	2288	-65	1
linkcount	428:427		495	506	-11	0
linkcount	429:430		295	284	11	1
linkcount	431:436		372	392	-20	1
linkcount	433:432		421	656	-235	10
linkcount	440:449z		1602	1631	-29	1
linkcount	441:438		1645	1650	-5	0
linkcount	443:560		2023	2287	-264	6
linkcount	445:444		2140	2156	-16	0
linkcount	651:653		6	7	-1	0
linkcount	653:651		20	23	-3	1
linkcount	901:902		305	303	2	0
linkcount	902:901		519	541	-22	1
linkcount	759:303z		6	6	0	0

Appendix B: Validation output matrix estimation period 7 HGV

Survey 1700-1800 HGV

Count type	Count numbers		Model	Output	Difference	GEH
turncount	4:3a	3b:262	0	1	-1	1
turncount	4:3a	3c:2	1	0	1	1
turncount	15:13	13:462	3	1	2	2
turncount	15:13	13:463	3	6	-3	1
turncount	462:13	13:15	3	4	-1	0
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	8	3	5	2
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	7	6	1	0
turncount	26:25a	25c:24	2	7	-5	2
turncount	38:36a	36b:39	2	1	1	1
turncount	38:36a	36c:35	4	8	-4	1
turncount	38:36a	36d:37	0	0	0	0
turncount	42:43	43:44	17	5	12	4
turncount	42:43	43:486	3	2	1	1
turncount	44:43	43:42	11	6	5	2
turncount	44:43	43:486	0	2	-2	2
turncount	486:43	43:44	0	0	0	1
turncount	486:43	43:42	1	2	-1	1
turncount	57:58	58:59	12	4	8	3
turncount	57:58	58:579	0	0	0	1
turncount	59:58	58:579	0	0	0	1
turncount	59:58	58:57	8	8	0	0
turncount	579:58	58:59	0	0	0	1
turncount	579:58	58:57	0	0	0	1
turncount	135:67	67:616	0	1	-1	1
turncount	135:67	67:615	1	0	1	1
turncount	135:67	67:521	0	0	0	1
turncount	521:67	67:616	0	0	0	1
turncount	521:67	67:135	0	0	0	1
turncount	521:67	67:615	0	0	0	1
turncount	615:67	67:616	8	8	0	0
turncount	615:67	67:135	0	0	0	1
turncount	615:67	67:521	0	0	0	1
turncount	616:67	67:135	2	1	1	1
turncount	616:67	67:615	4	3	1	0
turncount	616:67	67:521	0	1	-1	1
turncount	74:75	75:78	10	4	6	2
turncount	74:75	75:76	11	3	8	3
turncount	74:75	75:77	4	0	4	3
turncount	76:75	75:78	1	1	0	1
turncount	76:75	75:77	4	2	2	1
turncount	76:75	75:74	4	6	-2	1
turncount	77:75	75:78	4	4	1	0
turncount	77:75	75:76	0	3	-3	3
turncount	77:75	75:74	3	0	3	2
turncount	78:75	75:76	0	4	-4	3
turncount	78:75	75:77	5	9	-4	1
turncount	78:75	75:74	5	7	-2	1
turncount	81:82	82:83	5	4	1	1
turncount	81:82	82:594	0	1	-1	1
turncount	83:82	82:81	4	5	-1	0
turncount	83:82	82:594	0	0	0	1
turncount	594:82	82:83	1	0	1	1
turncount	594:82	82:81	0	0	0	1
turncount	101:102	102:104	3	12	-9	3
turncount	101:102	102:954z	3	14	-11	4
turncount	101:102	102:103	0	0	0	1
turncount	103:102	102:104	2	13	-11	4
turncount	103:102	102:954z	0	6	-6	3
turncount	103:102	102:101	0	0	0	1
turncount	104:102	102:954z	7	24	-17	4
turncount	104:102	102:103	2	13	-11	4
turncount	104:102	102:101	2	3	-1	1
turncount	954z:102	102:104	0	5	-5	3
turncount	954z:102	102:103	0	4	-4	3
turncount	954z:102	102:101	2	10	-8	3
turncount	130:124	124:665	0	0	0	1
turncount	130:124	124:761	0	1	-1	1
turncount	665:124	124:130	0	0	0	1
turncount	665:124	124:761	0	1	-1	2
turncount	761:124	124:130	0	1	-1	1
turncount	761:124	124:665	0	0	0	1
turncount	157:139	139:654	10	12	-2	1
turncount	157:139	139:619	8	8	0	0
turncount	619:139	139:157	18	5	13	4
turncount	619:139	139:654	1	1	0	0
turncount	654:139	139:157	29	20	9	2
turncount	654:139	139:619	10	6	4	1
turncount	148:149	149:220	14	9	5	1
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	32	23	9	2
turncount	150:149	149:148	1	1	0	0
turncount	220:149	149:150	19	20	-1	0
turncount	220:149	149:148	11	20	-9	2

NOT PROTECTIVELY MARKED

turncount	160:161a	161b:163	1	5	-4	2
turncount	160:161a	161c:164	2	5	-3	1
turncount	160:161a	161d:162	3	3	0	0
turncount	172:173	173:491	0	0	0	1
turncount	172:173	173:174	2	5	-3	2
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	2	11	-9	4
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	2	3	-1	1
turncount	173:174	174:178	0	2	-2	2
turncount	176:174	174:177	10	3	7	3
turncount	176:174	174:178	0	3	-3	2
turncount	176:174	174:173	0	1	-1	1
turncount	177:174	174:176	10	4	6	2
turncount	177:174	174:178	11	1	10	4
turncount	177:174	174:173	2	7	-5	2
turncount	178:174	174:176	0	1	-1	1
turncount	178:174	174:177	12	3	9	3
turncount	178:174	174:173	0	3	-3	3
turncount	174:176	176:955z	10	5	5	2
turncount	491:176	176:955z	0	0	0	1
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	10	7	3	1
turncount	185:186	186:507	0	1	-1	1
turncount	185:186	186:450	5	2	3	1
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	29	22	7	1
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	6	2	4	2
turncount	450:186	186:187	5	2	3	2
turncount	450:186	186:185	5	5	0	0
turncount	507:186	186:450	4	2	2	1
turncount	507:186	186:187	12	8	4	1
turncount	507:186	186:185	1	0	1	1
turncount	193:192	192:511	4	11	-7	2
turncount	193:192	192:216	7	14	-7	2
turncount	193:192	192:514	0	0	0	1
turncount	216:192	192:511	15	20	-5	1
turncount	216:192	192:193	4	5	-1	1
turncount	216:192	192:514	8	6	2	1
turncount	511:192	192:216	14	5	9	3
turncount	511:192	192:193	4	6	-2	1
turncount	511:192	192:514	1	0	1	1
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	1	0	1	1
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	0	0	0	1
turncount	98:210	210:211	0	0	0	1
turncount	211:210	210:212	2	4	-2	1
turncount	211:210	210:98	0	0	0	0
turncount	212:210	210:211	3	1	2	2
turncount	212:210	210:98	0	2	-2	2
turncount	222:223	223:224	45	32	13	2
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	25	35	-10	2
turncount	224:225	288:227	8	8	0	0
turncount	224:225	285:289	37	25	13	2
turncount	224:225	287:284z	0	0	0	0
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	15	15	0	1
turncount	562:241	241:349	12	8	4	1
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	0	0	0	1
turncount	563:242	242:346	0	0	0	1
turncount	247:248	373:361	31	23	8	2
turncount	247:248	360:334	12	4	9	3
turncount	247:248	378:375	13	8	5	1
turncount	290:286	287:284z	25	25	0	1
turncount	290:286	288:227	16	11	5	1
turncount	290:286	285:289	5	5	0	1
turncount	227:288	285:289	20	17	3	1
turncount	227:288	287:284z	0	10	-10	4
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	0	0	0	1
turncount	239:303	348:241	6	9	-3	1
turncount	239:303	350:243	56	31	26	4
turncount	239:303	240:302	3	1	2	1
turncount	324:325	325:345	10	5	5	2
turncount	324:325	325:326	12	6	6	2
turncount	326:325	325:345	18	17	1	0
turncount	326:325	325:324	10	4	6	2
turncount	345:325	325:324	15	6	9	3
turncount	345:325	325:326	34	14	20	4
turncount	242:346	348:241	0	0	0	1
turncount	242:346	350:243	0	0	0	1
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	4	1	3	2
turncount	241:349	240:302	8	7	1	0
turncount	241:349	347:242	0	0	0	1
turncount	352:351	240:302	62	32	30	4
turncount	352:351	347:242	0	0	0	1
turncount	352:351	348:241	9	6	3	1

turncount	352:351	350:243	2	3	-1	1
turncount	334:359	378:375	7	5	2	1
turncount	334:359	358:357	11	2	9	3
turncount	334:359	373:361	22	9	13	3
turncount	383:364	364:371	31	19	12	2
turncount	381:374	360:334	24	17	7	2
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	32	13	19	4
turncount	372:377	358:357	22	10	12	3
turncount	372:377	373:361	0	0	0	1
turncount	372:377	360:334	9	9	0	0
turncount	413:412	412:952z	56	30	26	4
turncount	415:416	419:429	31	22	9	2
turncount	415:416	435:425	0	0	0	1
turncount	415:416	449:433	13	14	-1	0
turncount	427:417	418:342	19	12	7	2
turncount	427:417	419:429	0	0	0	1
turncount	427:417	435:425	0	0	0	1
turncount	425:423	449:433	0	0	0	1
turncount	425:423	418:342	0	0	0	1
turncount	425:423	419:429	0	0	0	1
turncount	435:425	425:448	0	0	0	1
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	0	0	0	1
turncount	436:434	435:425	0	0	0	1
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	29	20	9	2
turncount	407:437	437:431	29	20	9	2
turncount	445:444	444:428	19	12	7	2
turncount	343:336b	336c:339	21	20	1	0
turncount	343:336b	336e:337	2	0	2	2
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	2	0	2	2
turncount	447:336d	336e:337	21	8	13	3
turncount	447:336d	973:974	0	0	0	1
turncount	447:336d	336a:335	11	7	4	1
turncount	447:336d	336b:343	15	17	-2	1
turncount	337:336e	973:974	0	0	0	1
turncount	337:336e	336a:335	7	7	0	0
turncount	337:336e	336b:343	3	0	3	2
turncount	337:336e	336c:339	14	11	3	1
turncount	12:462	462:463	2	1	1	1
turncount	12:462	462:13	2	2	0	0
turncount	12:462	462:675z	0	0	0	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	1	1	1	1
turncount	13:462	462:12	3	0	3	2
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	0	0	0	1
turncount	463:462	462:12	2	0	2	2
turncount	675z:462	462:463	0	0	0	1
turncount	675z:462	462:13	1	2	-1	1
turncount	675z:462	462:12	0	0	0	0
turncount	13:463	463:901	3	6	-3	1
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	2	1	1	1
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	8	3	5	2
turncount	901:463	463:462	2	0	2	2
turncount	262:3b	3c:2	5	6	-1	0
turncount	262:3b	3a:4	1	0	1	1
turncount	2:3c	3a:4	3	2	1	1
turncount	2:3c	3b:262	8	5	3	1
turncount	264:25b	25c:24	0	0	0	1
turncount	264:25b	25a:26	8	5	3	1
turncount	24:25c	25a:26	3	5	-2	1
turncount	24:25c	25b:264	1	0	1	1
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	2	2	0	0
turncount	490:470	470:471	1	2	-1	1
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	16	10	6	2
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	29	9	20	5
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	1	2	-1	1
turncount	271:488	488:487	29	9	20	5
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	16	10	6	2
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	2	2	0	0
turncount	163:161b	161c:164	5	4	1	0
turncount	163:161b	161d:162	11	3	9	3
turncount	163:161b	161a:160	1	3	-2	1
turncount	162:161d	161a:160	4	4	0	0
turncount	162:161d	161b:163	7	4	3	1
turncount	162:161d	161c:164	3	3	1	0
turncount	192:511	511:191	19	30	-11	2
turncount	514:511	511:191	0	0	0	1

turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	9	6	3	1
turncount	513:514	514:511	0	0	0	1
turncount	513:514	514:192	1	g data*	#VALUE!	#VALUE!
turncount	90:91c	91c:105	0	0	0	1
turncount	90:91c	91c:99	4	8	-4	1
turncount	99:91c	91c:105	0	1	-1	2
turncount	99:91c	91c:90	2	12	-10	4
turncount	105:91c	91c:99	0	0	0	1
turncount	105:91c	91c:90	0	0	0	0
turncount	84:517	517:86	5	4	1	1
turncount	84:517	517:87	0	0	0	1
turncount	86:517	517:87	0	2	-2	2
turncount	86:517	517:84	4	5	-1	0
turncount	87:517	517:86	0	4	-4	3
turncount	87:517	517:84	0	0	0	1
turncount	39:36b	36c:35	2	3	-1	0
turncount	39:36b	36d:37	0	1	-1	1
turncount	39:36b	36a:38	3	2	1	0
turncount	35:36c	36d:37	0	0	0	1
turncount	35:36c	36a:38	10	5	6	2
turncount	35:36c	36b:39	7	4	3	1
turncount	37:36d	36a:38	0	0	0	1
turncount	37:36d	36b:39	0	0	0	1
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	0	2	-2	2
turncount	70:617	617:618	6	9	-3	1
turncount	618:617	617:70	17	0	17	6
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	11	13	-2	1
turncount	158:654	654:139	39	26	13	2
turncount	335:959	336b:343	0	1	-1	1
turncount	335:959	336c:339	11	5	6	2
turncount	335:959	336e:337	6	6	0	0
turncount	335:959	973:974	0	0	0	1
turncount	165:971	161d:162	1	1	0	0
turncount	165:971	161a:160	12	20	-8	2
turncount	165:971	161b:163	1	3	-2	1
turncount	165:971	161c:164	0	1	-1	2
turncount	974:973	336a:335	0	0	0	1
turncount	974:973	336b:343	0	0	0	1
turncount	974:973	336c:339	0	0	0	1
turncount	974:973	336e:337	0	0	0	1
linkcount	688:763		0	1	-1	2
linkcount	763:688		0	1	-1	1
linkcount	678:764		14	9	5	2
linkcount	764:678		30	8	23	5
linkcount	614:779		8	3	5	2
linkcount	779:614		3	1	2	1
linkcount	198:197a		0	0	0	1
linkcount	255:256		17	11	5	1
linkcount	256:255		28	19	9	2
linkcount	675:676		3	2	2	1
linkcount	676:675		2	4	-2	1
linkcount	183:503		0	0	0	1
linkcount	503:183		0	0	0	1
linkcount	955y:208		11	7	4	1
linkcount	208:955y		12	7	5	1
linkcount	900:867z		11	6	5	2
linkcount	867z:900		7	4	3	1
linkcount	303z:759		0	0	0	1
linkcount	361:362		53	32	21	3
linkcount	367:368		223	181	42	3
linkcount	370:556		276	213	63	4
linkcount	371:372		31	19	12	2
linkcount	375:382z		20	13	7	2
linkcount	384:387		182	155	27	2
linkcount	404:402		254	200	54	4
linkcount	412:952z		56	30	26	4
linkcount	412:411		162	142	20	2
linkcount	413:412		218	172	46	3
linkcount	428:427		19	12	7	2
linkcount	429:430		31	22	9	2
linkcount	431:436		29	20	9	2
linkcount	433:432		13	14	-1	0
linkcount	440:449z		153	135	18	2
linkcount	441:438		223	178	45	3
linkcount	443:560		166	149	17	1
linkcount	445:444		242	190	52	4
linkcount	651:653		0	0	0	1
linkcount	653:651		0	0	0	1
linkcount	901:902		5	7	-2	1
linkcount	902:901		10	3	7	3
linkcount	759:303z		0	0	0	1

Appendix B: Validation output matrix estimation period 8 LGV

Survey 1800-1900 LGV

Count type	Count numbers		Model	Output	Difference	GEH
turncount	4:3a	3b:262	9	14	-5	2
turncount	4:3a	3c:2	32	42	-10	2
turncount	15:13	13:462	61	64	-3	0
turncount	15:13	13:463	218	221	-3	0
turncount	462:13	13:15	76	66	10	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	292	305	-13	1
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	285	275	10	1
turncount	26:25a	25c:24	345	330	15	1
turncount	38:36a	36b:39	243	218	25	2
turncount	38:36a	36c:35	271	296	-25	1
turncount	38:36a	36d:37	14	10	4	1
turncount	42:43	43:44	352	340	12	1
turncount	42:43	43:486	102	97	6	1
turncount	44:43	43:42	427	427	0	0
turncount	44:43	43:486	105	107	-2	0
turncount	486:43	43:44	73	68	6	1
turncount	486:43	43:42	96	96	0	1
turncount	57:58	58:59	346	344	2	0
turncount	57:58	58:579	51	51	0	0
turncount	59:58	58:579	121	121	0	0
turncount	59:58	58:57	519	517	2	0
turncount	579:58	58:59	76	75	1	0
turncount	579:58	58:57	40	40	0	0
turncount	135:67	67:616	42	40	2	0
turncount	135:67	67:615	64	63	1	0
turncount	135:67	67:521	32	32	0	1
turncount	521:67	67:616	34	33	1	0
turncount	521:67	67:135	15	15	0	1
turncount	521:67	67:615	20	20	0	0
turncount	615:67	67:616	405	392	14	1
turncount	615:67	67:135	31	31	0	1
turncount	615:67	67:521	23	23	0	1
turncount	616:67	67:135	63	64	-1	0
turncount	616:67	67:615	531	542	-11	0
turncount	616:67	67:521	46	47	-1	0
turncount	74:75	75:78	166	185	-19	1
turncount	74:75	75:76	175	145	30	2
turncount	74:75	75:77	146	141	6	0
turncount	76:75	75:78	5	18	-13	4
turncount	76:75	75:77	85	70	15	2
turncount	76:75	75:74	194	228	-34	2
turncount	77:75	75:78	109	108	1	0
turncount	77:75	75:76	12	18	-6	1
turncount	77:75	75:74	207	213	-6	0
turncount	78:75	75:76	12	30	-18	4
turncount	78:75	75:77	166	137	29	2
turncount	78:75	75:74	327	301	26	1
turncount	81:82	82:83	434	454	-20	1
turncount	81:82	82:594	21	21	0	1
turncount	83:82	82:81	499	561	-62	3
turncount	83:82	82:594	29	26	4	1
turncount	594:82	82:83	25	25	0	0
turncount	594:82	82:81	13	16	-3	1
turncount	101:102	102:104	128	127	1	0
turncount	101:102	102:954z	446	440	6	0
turncount	101:102	102:103	36	39	-3	1
turncount	103:102	102:104	82	106	-24	2
turncount	103:102	102:954z	172	133	39	3
turncount	103:102	102:101	34	28	6	1
turncount	104:102	102:954z	134	155	-21	2
turncount	104:102	102:103	120	124	-4	0
turncount	104:102	102:101	164	164	0	0
turncount	954z:102	102:104	64	64	0	1
turncount	954z:102	102:103	164	166	-2	0
turncount	954z:102	102:101	443	417	26	1
turncount	130:124	124:665	68	68	0	0
turncount	130:124	124:761	61	61	0	1
turncount	665:124	124:130	84	84	0	0
turncount	665:124	124:761	75	75	0	1
turncount	761:124	124:130	70	70	0	1
turncount	761:124	124:665	58	58	0	0
turncount	157:139	139:654	293	300	-7	0
turncount	157:139	139:619	107	95	12	1
turncount	619:139	139:157	50	51	-1	0
turncount	619:139	139:654	144	160	-16	1
turncount	654:139	139:157	311	338	-27	2
turncount	654:139	139:619	161	150	11	1
turncount	148:149	149:220	314	303	11	1
turncount	148:149	149:150	2	0	2	2
turncount	150:149	149:220	352	364	-12	1
turncount	150:149	149:148	21	13	8	2
turncount	220:149	149:150	374	365	9	0
turncount	220:149	149:148	393	412	-19	1

turncount	160:161a	161b:163	164	133	31	3
turncount	160:161a	161c:164	259	249	10	1
turncount	160:161a	161d:162	93	87	6	1
turncount	172:173	173:491	169	174	-5	0
turncount	172:173	173:174	132	189	-57	4
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	279	276	3	0
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	132	120	12	1
turncount	173:174	174:178	63	68	-5	1
turncount	176:174	174:177	162	164	-2	0
turncount	176:174	174:178	206	205	1	0
turncount	176:174	174:173	88	85	3	0
turncount	177:174	174:176	126	125	1	0
turncount	177:174	174:178	86	86	0	0
turncount	177:174	174:173	124	109	16	1
turncount	178:174	174:176	250	243	7	0
turncount	178:174	174:177	69	69	0	0
turncount	178:174	174:173	67	83	-16	2
turncount	174:176	176:955z	376	368	8	0
turncount	491:176	176:955z	169	174	-5	0
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	456	454	2	0
turncount	185:186	186:507	21	29	-8	2
turncount	185:186	186:450	96	97	-1	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	541	572	-31	1
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	199	180	19	1
turncount	450:186	186:187	222	219	3	0
turncount	450:186	186:185	92	96	-4	0
turncount	507:186	186:450	41	80	-39	5
turncount	507:186	186:187	534	556	-22	1
turncount	507:186	186:185	44	49	-5	1
turncount	193:192	192:511	421	436	-15	1
turncount	193:192	192:216	422	422	0	1
turncount	193:192	192:514	75	75	0	0
turncount	216:192	192:511	479	478	1	0
turncount	216:192	192:193	423	423	0	1
turncount	216:192	192:514	68	66	2	0
turncount	511:192	192:216	334	336	-2	0
turncount	511:192	192:193	345	355	-10	1
turncount	511:192	192:514	53	54	-1	0
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	116	64	52	5
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	25	18	7	2
turncount	98:210	210:211	13	21	-8	2
turncount	211:210	210:212	242	204	38	3
turncount	211:210	210:98	15	20	-5	1
turncount	212:210	210:211	314	272	42	2
turncount	212:210	210:98	30	34	-4	1
turncount	222:223	223:224	620	617	3	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	709	715	-6	0
turncount	224:225	288:227	99	99	0	1
turncount	224:225	285:289	517	515	2	0
turncount	224:225	287:284z	4	3	1	0
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	291	291	0	0
turncount	562:241	241:349	282	280	2	0
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	1	0	1	1
turncount	563:242	242:346	2	2	0	0
turncount	247:248	373:361	246	209	37	2
turncount	247:248	360:334	246	261	-15	1
turncount	247:248	378:375	124	114	10	1
turncount	290:286	287:284z	594	598	-4	0
turncount	290:286	288:227	50	50	0	1
turncount	290:286	285:289	25	25	0	0
turncount	227:288	285:289	99	99	0	0
turncount	227:288	287:284z	111	114	-3	0
turncount	227:288	288:227	1	0	1	1
turncount	239:303	347:242	0	0	0	0
turncount	239:303	348:241	197	197	0	0
turncount	239:303	350:243	472	444	28	1
turncount	239:303	240:302	12	12	0	1
turncount	324:325	325:345	272	261	11	1
turncount	324:325	325:326	146	149	-3	0
turncount	326:325	325:345	349	335	14	1
turncount	326:325	325:324	229	216	13	1
turncount	345:325	325:324	270	259	11	1
turncount	345:325	325:326	194	206	-12	1
turncount	242:346	348:241	1	1	0	1
turncount	242:346	350:243	1	1	0	0
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	106	104	2	0
turncount	241:349	240:302	175	176	-1	0
turncount	241:349	347:242	1	0	1	1
turncount	352:351	240:302	402	402	0	1
turncount	352:351	347:242	0	0	0	0
turncount	352:351	348:241	93	93	0	1

turncount	352:351	350:243	31	34	-3	1
turncount	334:359	378:375	88	89	-1	0
turncount	334:359	358:357	129	129	0	1
turncount	334:359	373:361	177	170	7	1
turncount	383:364	364:371	232	228	4	0
turncount	381:374	360:334	306	324	-18	1
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	284	216	68	4
turncount	372:377	358:357	83	78	5	1
turncount	372:377	373:361	0	2	-2	2
turncount	372:377	360:334	149	148	1	0
turncount	413:412	412:952z	590	540	50	2
turncount	415:416	419:429	211	219	-8	1
turncount	415:416	435:425	24	30	-6	1
turncount	415:416	449:433	265	233	32	2
turncount	427:417	418:342	344	328	17	1
turncount	427:417	419:429	4	0	4	3
turncount	427:417	435:425	11	8	3	1
turncount	425:423	449:433	5	4	1	0
turncount	425:423	418:342	13	14	-1	0
turncount	425:423	419:429	7	8	-1	0
turncount	435:425	425:448	56	59	-3	0
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	25	26	-1	0
turncount	436:434	435:425	21	20	1	0
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	216	224	-8	1
turncount	407:437	437:431	237	244	-7	0
turncount	445:444	444:428	359	336	24	1
turncount	343:336b	336c:339	90	98	-8	1
turncount	343:336b	336e:337	9	9	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	25	27	-2	0
turncount	447:336d	336e:337	157	132	25	2
turncount	447:336d	973:974	15	15	0	0
turncount	447:336d	336a:335	350	339	11	1
turncount	447:336d	336b:343	81	79	2	0
turncount	337:336e	973:974	7	7	0	1
turncount	337:336e	336a:335	388	386	2	0
turncount	337:336e	336b:343	14	14	0	1
turncount	337:336e	336c:339	131	120	11	1
turncount	12:462	462:463	44	35	9	1
turncount	12:462	462:13	60	44	16	2
turncount	12:462	462:675z	2	1	1	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	16	24	-8	2
turncount	13:462	462:12	61	40	21	3
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	4	6	-2	1
turncount	463:462	462:12	30	25	5	1
turncount	675z:462	462:463	6	11	-5	2
turncount	675z:462	462:13	16	22	-6	1
turncount	675z:462	462:12	2	2	0	1
turncount	13:463	463:901	218	221	-3	0
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	50	46	4	1
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	292	305	-13	1
turncount	901:463	463:462	34	31	3	1
turncount	262:3b	3c:2	273	273	0	0
turncount	262:3b	3a:4	15	12	3	1
turncount	2:3c	3a:4	39	54	-15	2
turncount	2:3c	3b:262	162	173	-11	1
turncount	264:25b	25c:24	6	10	-4	2
turncount	264:25b	25a:26	171	176	-5	0
turncount	24:25c	25a:26	372	364	8	0
turncount	24:25c	25b:264	5	9	-4	2
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	27	28	-1	0
turncount	490:470	470:471	23	22	1	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	1	0	1	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	1	0	1	1
turncount	272:487	487:488	598	578	20	1
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	524	518	6	0
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	23	22	1	0
turncount	271:488	488:487	524	518	6	0
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	598	578	20	1
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	27	28	-1	0
turncount	163:161b	161c:164	322	299	23	1
turncount	163:161b	161d:162	262	261	1	0
turncount	163:161b	161a:160	120	104	16	2
turncount	162:161d	161a:160	122	110	12	1
turncount	162:161d	161b:163	259	249	10	1
turncount	162:161d	161c:164	184	176	8	1
turncount	192:511	511:191	900	914	-14	0
turncount	514:511	511:191	2	80	-78	12

turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	196	195	1	0
turncount	513:514	514:511	2	80	-78	12
turncount	513:514	514:192	116	64	52	5
turncount	90:91c	91c:105	39	37	2	0
turncount	90:91c	91c:99	443	456	-13	1
turncount	99:91c	91c:105	107	114	-7	1
turncount	99:91c	91c:90	505	529	-24	1
turncount	105:91c	91c:99	111	112	-1	0
turncount	105:91c	91c:90	34	35	-1	0
turncount	84:517	517:86	435	454	-19	1
turncount	84:517	517:87	19	25	-6	1
turncount	86:517	517:87	19	15	5	1
turncount	86:517	517:84	500	554	-54	2
turncount	87:517	517:86	10	33	-23	5
turncount	87:517	517:84	29	32	-3	1
turncount	39:36b	36c:35	326	282	44	2
turncount	39:36b	36d:37	5	8	-3	1
turncount	39:36b	36a:38	257	212	45	3
turncount	35:36c	36d:37	4	4	0	0
turncount	35:36c	36a:38	226	219	7	0
turncount	35:36c	36b:39	317	295	22	1
turncount	37:36d	36a:38	6	6	0	0
turncount	37:36d	36b:39	8	7	1	0
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	0	0	0	1
turncount	70:617	617:618	88	90	-2	0
turncount	618:617	617:70	6	6	0	0
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	437	459	-22	1
turncount	158:654	654:139	472	488	-16	1
turncount	335:959	336b:343	15	16	-1	0
turncount	335:959	336c:339	266	258	8	0
turncount	335:959	336e:337	305	326	-21	1
turncount	335:959	973:974	10	11	-1	0
turncount	165:971	161d:162	136	149	-13	1
turncount	165:971	161a:160	308	294	14	1
turncount	165:971	161b:163	355	303	52	3
turncount	165:971	161c:164	44	46	-2	0
turncount	974:973	336a:335	8	9	-1	0
turncount	974:973	336b:343	1	1	0	1
turncount	974:973	336c:339	6	7	-1	0
turncount	974:973	336e:337	7	7	0	1
linkcount	688:763		65	64	1	0
linkcount	763:688		50	48	3	0
linkcount	678:764		485	486	-2	0
linkcount	764:678		567	567	0	0
linkcount	614:779		157	157	0	0
linkcount	779:614		104	108	-4	0
linkcount	198:197a		251	112	139	10
linkcount	255:256		657	628	30	1
linkcount	256:255		789	761	28	1
linkcount	675:676		32	40	-8	1
linkcount	676:675		28	34	-6	1
linkcount	183:503		276	273	4	0
linkcount	503:183		86	86	0	1
linkcount	955y:208		356	359	-3	0
linkcount	208:955y		392	395	-3	0
linkcount	900:867z		320	315	5	0
linkcount	867z:900		254	254	0	0
linkcount	303z:759		23	26	-3	1
linkcount	361:362		423	381	42	2
linkcount	367:368		1058	1018	40	1
linkcount	370:556		1481	1399	82	2
linkcount	371:372		232	228	4	0
linkcount	375:382z		212	203	9	1
linkcount	384:387		1217	1180	37	1
linkcount	404:402		1290	1246	44	1
linkcount	412:952z		590	540	50	2
linkcount	412:411		1005	977	28	1
linkcount	413:412		1595	1517	78	2
linkcount	428:427		359	336	24	1
linkcount	429:430		222	227	-5	0
linkcount	431:436		237	244	-7	0
linkcount	433:432		270	237	33	2
linkcount	440:449z		980	936	44	1
linkcount	441:438		1068	1020	48	1
linkcount	443:560		1250	1173	77	2
linkcount	445:444		1427	1355	72	2
linkcount	651:653		14	15	-1	0
linkcount	653:651		23	27	-4	1
linkcount	901:902		268	267	1	0
linkcount	902:901		326	335	-9	1
linkcount	759:303z		14	14	0	0

Appendix B: Validation output matrix estimation period 8 HGV

Survey 1800-1900 HGV

Count type	Count numbers		Model	Output	Difference	GEH
turncount	4:3a	3b:262	1	1	0	0
turncount	4:3a	3c:2	0	0	0	1
turncount	15:13	13:462	1	1	0	0
turncount	15:13	13:463	6	6	0	0
turncount	462:13	13:15	5	4	1	1
turncount	462:13	13:463	0	0	0	1
turncount	463:13	13:15	2	3	-1	0
turncount	463:13	13:462	0	0	0	1
turncount	26:25a	25b:264	5	6	-1	0
turncount	26:25a	25c:24	4	7	-3	1
turncount	38:36a	36b:39	4	1	3	2
turncount	38:36a	36c:35	5	8	-3	1
turncount	38:36a	36d:37	0	0	0	0
turncount	42:43	43:44	4	5	-1	0
turncount	42:43	43:486	4	2	2	1
turncount	44:43	43:42	12	6	6	2
turncount	44:43	43:486	2	2	1	0
turncount	486:43	43:44	0	0	0	1
turncount	486:43	43:42	3	2	1	1
turncount	57:58	58:59	2	4	-2	1
turncount	57:58	58:579	0	0	0	1
turncount	59:58	58:579	0	0	0	1
turncount	59:58	58:57	8	8	0	0
turncount	579:58	58:59	0	0	0	1
turncount	579:58	58:57	0	0	0	1
turncount	135:67	67:616	0	1	-1	1
turncount	135:67	67:615	0	0	0	1
turncount	135:67	67:521	0	0	0	1
turncount	521:67	67:616	0	0	0	1
turncount	521:67	67:135	0	0	0	1
turncount	521:67	67:615	0	0	0	1
turncount	615:67	67:616	9	8	1	0
turncount	615:67	67:135	0	0	0	1
turncount	615:67	67:521	0	0	0	1
turncount	616:67	67:135	0	1	-1	1
turncount	616:67	67:615	3	3	0	0
turncount	616:67	67:521	1	1	0	1
turncount	74:75	75:78	3	4	-1	1
turncount	74:75	75:76	4	3	1	1
turncount	74:75	75:77	0	0	0	0
turncount	76:75	75:78	2	1	1	1
turncount	76:75	75:77	3	2	1	1
turncount	76:75	75:74	5	6	-1	0
turncount	77:75	75:78	3	4	-1	0
turncount	77:75	75:76	4	3	1	0
turncount	77:75	75:74	0	0	0	1
turncount	78:75	75:76	1	4	-3	2
turncount	78:75	75:77	8	9	-1	0
turncount	78:75	75:74	8	7	1	0
turncount	81:82	82:83	1	4	-3	2
turncount	81:82	82:594	1	1	0	1
turncount	83:82	82:81	2	5	-3	2
turncount	83:82	82:594	0	0	0	1
turncount	594:82	82:83	0	0	0	1
turncount	594:82	82:81	0	0	0	1
turncount	101:102	102:104	17	12	5	1
turncount	101:102	102:954z	38	14	25	5
turncount	101:102	102:103	2	0	2	2
turncount	103:102	102:104	20	13	8	2
turncount	103:102	102:954z	21	6	16	4
turncount	103:102	102:101	1	0	1	1
turncount	104:102	102:954z	41	24	17	3
turncount	104:102	102:103	17	13	4	1
turncount	104:102	102:101	12	3	9	3
turncount	954z:102	102:104	5	5	0	1
turncount	954z:102	102:103	8	4	4	2
turncount	954z:102	102:101	41	10	31	6
turncount	130:124	124:665	0	0	0	1
turncount	130:124	124:761	0	1	-1	1
turncount	665:124	124:130	0	0	0	1
turncount	665:124	124:761	0	1	-1	2
turncount	761:124	124:130	0	1	-1	1
turncount	761:124	124:665	0	0	0	1
turncount	157:139	139:654	13	12	1	0
turncount	157:139	139:619	9	8	1	0
turncount	619:139	139:157	4	5	-1	0
turncount	619:139	139:654	0	1	-1	1
turncount	654:139	139:157	25	20	5	1
turncount	654:139	139:619	10	6	4	1
turncount	148:149	149:220	8	9	-1	0
turncount	148:149	149:150	0	0	0	1
turncount	150:149	149:220	25	23	2	0
turncount	150:149	149:148	0	1	-1	1
turncount	220:149	149:150	24	20	4	1
turncount	220:149	149:148	18	20	-2	1

turncount	160:161a	161b:163	4	5	-1	1
turncount	160:161a	161c:164	2	5	-3	1
turncount	160:161a	161d:162	5	3	2	1
turncount	172:173	173:491	0	0	0	1
turncount	172:173	173:174	3	5	-2	1
turncount	174:173	173:491	0	0	0	1
turncount	174:173	173:172	10	11	-1	0
turncount	173:174	174:176	0	0	0	1
turncount	173:174	174:177	3	3	0	0
turncount	173:174	174:178	0	2	-2	2
turncount	176:174	174:177	4	3	1	1
turncount	176:174	174:178	0	3	-3	2
turncount	176:174	174:173	1	1	0	1
turncount	177:174	174:176	7	4	3	1
turncount	177:174	174:178	5	1	4	2
turncount	177:174	174:173	5	7	-2	1
turncount	178:174	174:176	0	1	-1	1
turncount	178:174	174:177	5	3	2	1
turncount	178:174	174:173	4	3	1	0
turncount	174:176	176:955z	7	5	2	1
turncount	491:176	176:955z	0	0	0	1
turncount	491:176	176:174	0	0	0	1
turncount	955z:176	176:174	5	7	-2	1
turncount	185:186	186:507	0	1	-1	1
turncount	185:186	186:450	2	2	0	0
turncount	185:186	186:187	0	0	0	1
turncount	187:186	186:507	27	22	5	1
turncount	187:186	186:450	0	0	0	1
turncount	187:186	186:185	0	0	0	1
turncount	450:186	186:507	2	2	0	0
turncount	450:186	186:187	2	2	0	0
turncount	450:186	186:185	5	5	0	0
turncount	507:186	186:450	0	2	-2	2
turncount	507:186	186:187	7	8	-1	0
turncount	507:186	186:185	0	0	0	0
turncount	193:192	192:511	7	11	-4	1
turncount	193:192	192:216	8	14	-6	2
turncount	193:192	192:514	0	0	0	1
turncount	216:192	192:511	21	20	2	0
turncount	216:192	192:193	5	5	0	0
turncount	216:192	192:514	6	6	0	1
turncount	511:192	192:216	5	5	0	1
turncount	511:192	192:193	3	6	-3	1
turncount	511:192	192:514	0	0	0	1
turncount	514:192	192:511	0	0	0	1
turncount	514:192	192:216	1	0	1	1
turncount	514:192	192:193	0	0	0	1
turncount	98:210	210:212	0	0	0	1
turncount	98:210	210:211	0	0	0	1
turncount	211:210	210:212	2	4	-2	1
turncount	211:210	210:98	0	0	0	0
turncount	212:210	210:211	0	1	-1	1
turncount	212:210	210:98	0	2	-2	2
turncount	222:223	223:224	33	32	1	0
turncount	564:223	223:224	0	0	0	1
turncount	564:223	223:222	35	35	0	1
turncount	224:225	288:227	8	8	0	0
turncount	224:225	285:289	25	25	1	0
turncount	224:225	287:284z	0	0	0	0
turncount	348:241	241:349	0	0	0	1
turncount	348:241	241:562	15	15	0	1
turncount	562:241	241:349	8	8	0	1
turncount	347:242	242:346	0	0	0	1
turncount	347:242	242:563	0	0	0	1
turncount	563:242	242:346	0	0	0	1
turncount	247:248	373:361	32	23	9	2
turncount	247:248	360:334	3	4	-1	0
turncount	247:248	378:375	6	8	-2	1
turncount	290:286	287:284z	25	25	0	1
turncount	290:286	288:227	11	11	0	1
turncount	290:286	285:289	5	5	0	1
turncount	227:288	285:289	17	17	0	1
turncount	227:288	287:284z	10	10	0	1
turncount	227:288	288:227	0	0	0	1
turncount	239:303	347:242	0	0	0	1
turncount	239:303	348:241	9	9	0	1
turncount	239:303	350:243	36	31	6	1
turncount	239:303	240:302	1	1	0	1
turncount	324:325	325:345	5	5	0	1
turncount	324:325	325:326	6	6	0	0
turncount	326:325	325:345	16	17	-1	0
turncount	326:325	325:324	4	4	0	0
turncount	345:325	325:324	6	6	0	1
turncount	345:325	325:326	15	14	1	0
turncount	242:346	348:241	0	0	0	1
turncount	242:346	350:243	0	0	0	1
turncount	242:346	240:302	0	0	0	1
turncount	241:349	350:243	1	1	0	1
turncount	241:349	240:302	7	7	0	1
turncount	241:349	347:242	0	0	0	1
turncount	352:351	240:302	32	32	0	1
turncount	352:351	347:242	0	0	0	1
turncount	352:351	348:241	6	6	0	1

turncount	352:351	350:243	4	3	1	0
turncount	334:359	378:375	4	5	-1	0
turncount	334:359	358:357	2	2	0	0
turncount	334:359	373:361	9	9	0	0
turncount	383:364	364:371	21	19	2	0
turncount	381:374	360:334	14	17	-3	1
turncount	381:374	378:375	0	0	0	1
turncount	381:374	358:357	20	13	7	2
turncount	372:377	358:357	11	10	1	0
turncount	372:377	373:361	0	0	0	1
turncount	372:377	360:334	10	9	1	0
turncount	413:412	412:952z	34	30	4	1
turncount	415:416	419:429	19	22	-3	1
turncount	415:416	435:425	0	0	0	1
turncount	415:416	449:433	18	14	4	1
turncount	427:417	418:342	13	12	1	0
turncount	427:417	419:429	0	0	0	1
turncount	427:417	435:425	0	0	0	1
turncount	425:423	449:433	0	0	0	1
turncount	425:423	418:342	0	0	0	1
turncount	425:423	419:429	0	0	0	1
turncount	435:425	425:448	0	0	0	1
turncount	435:425	425:423	0	0	0	1
turncount	448:425	425:423	0	0	0	1
turncount	436:434	435:425	0	0	0	1
turncount	436:434	449:433	0	0	0	1
turncount	436:434	418:342	22	20	2	0
turncount	407:437	437:431	22	20	2	0
turncount	445:444	444:428	13	12	1	0
turncount	343:336b	336c:339	20	20	0	0
turncount	343:336b	336e:337	0	0	0	1
turncount	343:336b	973:974	0	0	0	1
turncount	343:336b	336a:335	0	0	0	1
turncount	447:336d	336e:337	7	8	-1	0
turncount	447:336d	973:974	0	0	0	1
turncount	447:336d	336a:335	9	7	2	1
turncount	447:336d	336b:343	20	17	3	1
turncount	337:336e	973:974	0	0	0	1
turncount	337:336e	336a:335	5	7	-2	1
turncount	337:336e	336b:343	0	0	0	1
turncount	337:336e	336c:339	11	11	0	1
turncount	12:462	462:463	0	1	-1	1
turncount	12:462	462:13	5	2	3	1
turncount	12:462	462:675z	0	0	0	1
turncount	13:462	462:463	0	0	0	1
turncount	13:462	462:675z	0	1	-1	1
turncount	13:462	462:12	1	0	1	1
turncount	463:462	462:13	0	0	0	1
turncount	463:462	462:675z	0	0	0	1
turncount	463:462	462:12	0	0	0	1
turncount	675z:462	462:463	1	0	1	1
turncount	675z:462	462:13	0	2	-2	2
turncount	675z:462	462:12	0	0	0	0
turncount	13:463	463:901	6	6	0	0
turncount	13:463	463:462	0	0	0	1
turncount	462:463	463:901	1	1	0	0
turncount	462:463	463:13	0	0	0	1
turncount	901:463	463:13	2	3	-1	0
turncount	901:463	463:462	0	0	0	1
turncount	262:3b	3c:2	4	6	-2	1
turncount	262:3b	3a:4	0	0	0	1
turncount	2:3c	3a:4	2	2	0	1
turncount	2:3c	3b:262	2	5	-3	2
turncount	264:25b	25c:24	0	0	0	1
turncount	264:25b	25a:26	5	5	0	0
turncount	24:25c	25a:26	5	5	0	0
turncount	24:25c	25b:264	0	0	0	1
turncount	471:470	470:538	0	0	0	1
turncount	471:470	470:490	3	2	1	0
turncount	490:470	470:471	2	2	0	0
turncount	490:470	470:538	0	0	0	1
turncount	538:470	470:471	0	0	0	1
turncount	538:470	470:490	0	0	0	1
turncount	272:487	487:538	0	0	0	1
turncount	272:487	487:488	12	10	2	1
turncount	488:487	487:538	0	0	0	1
turncount	488:487	487:272	15	9	6	2
turncount	538:487	487:272	0	0	0	1
turncount	538:487	487:488	0	0	0	1
turncount	271:488	488:490	2	2	0	0
turncount	271:488	488:487	15	9	6	2
turncount	487:488	488:490	0	0	0	1
turncount	487:488	488:271	12	10	2	1
turncount	490:488	488:487	0	0	0	1
turncount	490:488	488:271	3	2	1	0
turncount	163:161b	161c:164	2	4	-2	1
turncount	163:161b	161d:162	2	3	-1	0
turncount	163:161b	161a:160	1	3	-2	1
turncount	162:161d	161a:160	2	4	-2	1
turncount	162:161d	161b:163	4	4	0	1
turncount	162:161d	161c:164	3	3	1	0
turncount	192:511	511:191	28	30	-2	0
turncount	514:511	511:191	0	0	0	1

turncount	514:511	511:192	0	0	0	1
turncount	192:514	514:511	0	0	0	1
turncount	192:514	514:513	6	6	0	1
turncount	513:514	514:511	0	0	0	1
turncount	513:514	514:192	1	0	1	1
turncount	90:91c	91c:105	0	0	0	1
turncount	90:91c	91c:99	2	8	-6	3
turncount	99:91c	91c:105	0	1	-1	2
turncount	99:91c	91c:90	3	12	-9	3
turncount	105:91c	91c:99	0	0	0	1
turncount	105:91c	91c:90	0	0	0	0
turncount	84:517	517:86	2	4	-2	1
turncount	84:517	517:87	0	0	0	1
turncount	86:517	517:87	0	2	-2	2
turncount	86:517	517:84	3	5	-2	1
turncount	87:517	517:86	0	4	-4	3
turncount	87:517	517:84	0	0	0	1
turncount	39:36b	36c:35	2	3	-1	0
turncount	39:36b	36d:37	0	1	-1	1
turncount	39:36b	36a:38	2	2	0	0
turncount	35:36c	36d:37	0	0	0	1
turncount	35:36c	36a:38	5	5	1	0
turncount	35:36c	36b:39	4	4	0	0
turncount	37:36d	36a:38	0	0	0	1
turncount	37:36d	36b:39	0	0	0	1
turncount	37:36d	36c:35	0	0	0	1
turncount	69:617	617:618	2	2	0	0
turncount	70:617	617:618	9	9	0	0
turncount	618:617	617:70	0	0	0	1
turncount	618:617	617:69	0	0	0	1
turncount	139:654	654:158	13	13	0	0
turncount	158:654	654:139	35	26	9	2
turncount	335:959	336b:343	1	1	0	1
turncount	335:959	336c:339	5	5	0	0
turncount	335:959	336e:337	6	6	0	0
turncount	335:959	973:974	0	0	0	1
turncount	165:971	161d:162	1	1	0	0
turncount	165:971	161a:160	8	20	-12	3
turncount	165:971	161b:163	2	3	-1	0
turncount	165:971	161c:164	0	1	-1	2
turncount	974:973	336a:335	0	0	0	1
turncount	974:973	336b:343	0	0	0	1
turncount	974:973	336c:339	0	0	0	1
turncount	974:973	336e:337	0	0	0	1
linkcount	688:763		0	1	-1	2
linkcount	763:688		0	1	-1	1
linkcount	678:764		9	9	0	0
linkcount	764:678		8	8	0	0
linkcount	614:779		5	3	1	1
linkcount	779:614		2	1	1	1
linkcount	198:197a		0	0	0	1
linkcount	255:256		11	11	-1	0
linkcount	256:255		26	19	7	1
linkcount	675:676		2	2	0	0
linkcount	676:675		1	4	-3	2
linkcount	183:503		0	0	0	1
linkcount	503:183		0	0	0	1
linkcount	955y:208		5	7	-2	1
linkcount	208:955y		9	7	2	1
linkcount	900:867z		5	6	-1	1
linkcount	867z:900		4	4	0	0
linkcount	303z:759		0	0	0	1
linkcount	361:362		41	32	9	1
linkcount	367:368		188	181	7	1
linkcount	370:556		229	213	16	1
linkcount	371:372		21	19	2	0
linkcount	375:382z		10	13	-3	1
linkcount	384:387		158	155	3	0
linkcount	404:402		209	200	9	1
linkcount	412:952z		34	30	4	1
linkcount	412:411		148	142	6	0
linkcount	413:412		182	172	10	1
linkcount	428:427		13	12	1	0
linkcount	429:430		19	22	-3	1
linkcount	431:436		22	20	2	0
linkcount	433:432		18	14	4	1
linkcount	440:449z		136	135	1	0
linkcount	441:438		190	178	12	1
linkcount	443:560		154	149	5	0
linkcount	445:444		203	190	13	1
linkcount	651:653		0	0	0	1
linkcount	653:651		0	0	0	1
linkcount	901:902		7	7	0	0
linkcount	902:901		2	3	-1	0
linkcount	759:303z		0	0	0	1

APPENDIX A.4: MODELLED AND SURVEYED LINK COUNTS

Table 4.2:- Period 2 Lights -07:00-08:00								
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	97%	97%	100%	-	99%	99%	100%	-
Fail	12	12	0	0	3	3	0	0
Pass	345	331	14	0	354	336	14	0
Total	357	343	14	0	357	339	14	0

Table 4.3:- Period 2 Heavies -07:00-08:00								
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	0	0	0	0	0	0	0	0
Pass	357	357	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.4:- Period 3 Lights -08:00-09:00								
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	98%	98%	100%	-	99%	99%	100%	-
Fail	7	7	0	0	4	4	0	0
Pass	350	330	20	0	353	333	20	0
Total	357	337	20	0	357	337	20	0

Table 4.5:- Period 3 Heavies -08:00-09:00								
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	0	0	0	0	0	0	0	0
Pass	357	357	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.6:- Period 4 Lights -09:00-10:00								
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	97%	97%	93%	-	98%	99%	100%	-
Fail	12	11	1	0	6	6	0	0
Pass	345	332	13	0	351	337	14	0
Total	357	343	14	0	357	343	14	0

Table 4.7:- Period 4 Heavies -09:00-10:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	99%	99%	-	-	100%	100%	-	-
Fail	2	2	0	0	0	0	0	0
Pass	355	355	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.8:- Period 9 Lights -16:00-17:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	98%	98%	100%	-	99%	99%	100%	-
Fail	6	6	0	0	2	2	0	0
Pass	351	333	18	0	355	337	18	0
Total	357	339	18	0	357	339	18	0

Table 4.9:- Period 9 Heavies -16:00-17:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	0	0	0	0	0	0	0	0
Pass	357	357	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

Table 4.10:- Period 10 Lights -17:00-18:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	95%	95%	96%	-	96%	96%	100%	-
Fail	19	18	1	0	13	13	0	0
Pass	338	313	25	0	344	318	26	0
Total	357	331	26	0	357	331	26	0

Table 4.11:- Period 10 Heavies -17:00-18:00

Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	99%	99%	-	-	100%	100%	-	-
Fail	2	2	0	0	0	0	0	0
Pass	355	355	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

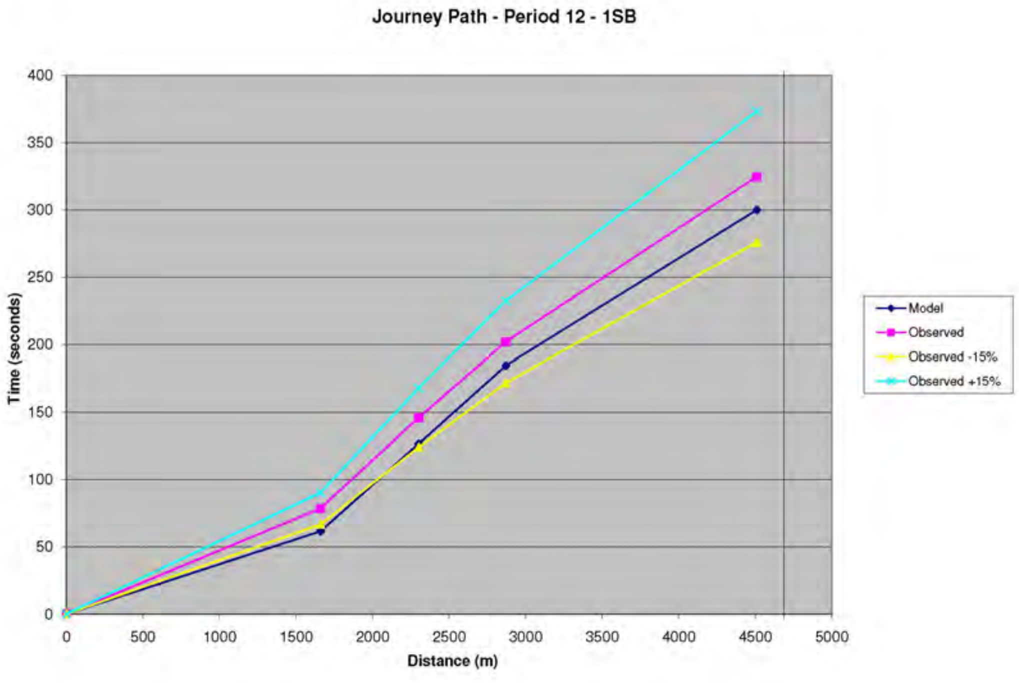
Table 4.12:- Period 11 Lights -18:00-19:00

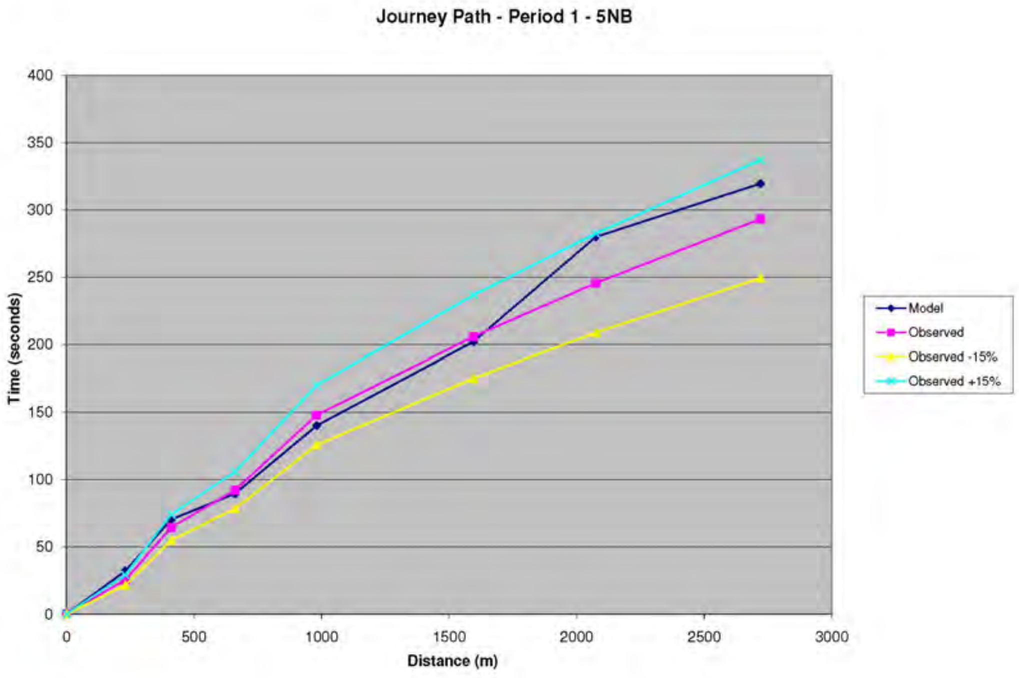
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High

% Pass	99%	99%	100%	-	100%	100%	100%	-
Fail	5	5	0	0	1	1	0	0
Pass	352	339	13	0	356	343	13	0
Total	357	344	13	0	357	344	13	0

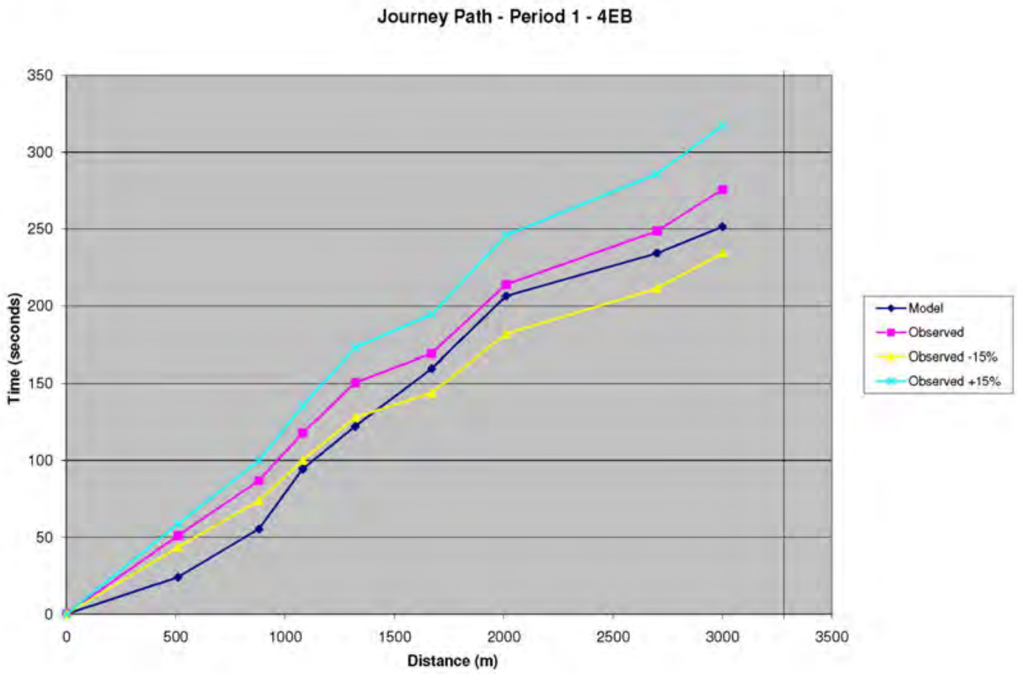
Table 4.13:- Period 11 Heavies -18:00-19:00								
Validation Stats	GEH				Values			
	Overall	Low	Mid	High	Overall	Low	Mid	High
% Pass	100%	100%	-	-	100%	100%	-	-
Fail	1	1	0	0	0	0	0	0
Pass	356	356	0	0	357	357	0	0
Total	357	357	0	0	357	357	0	0

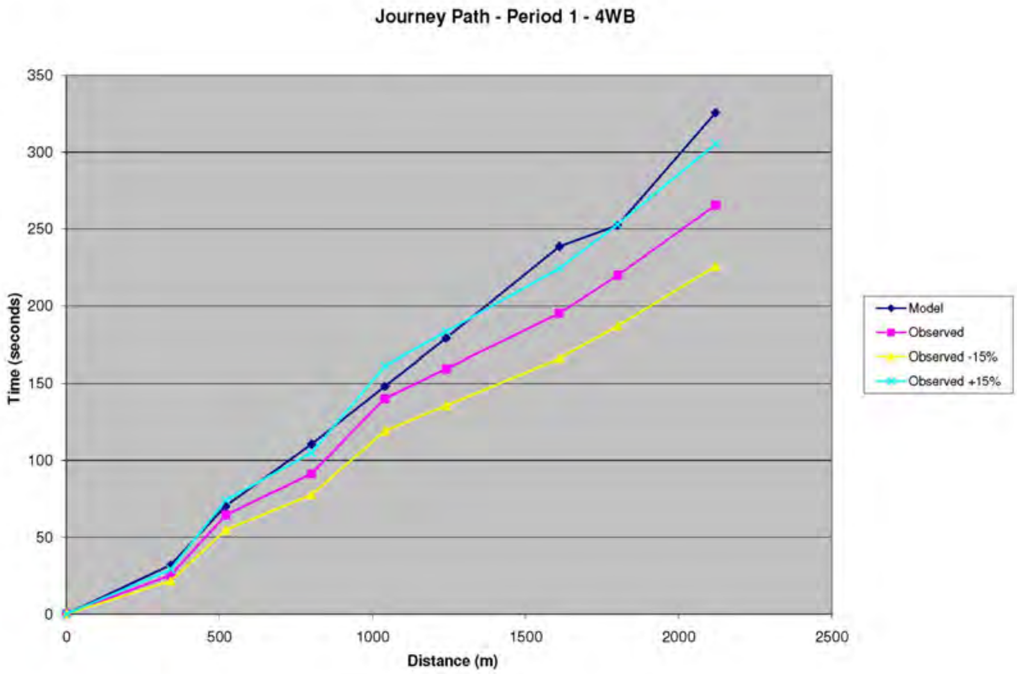
APPENDIX A.5: GRAPHS FOR JOURNEY TIME PATHS

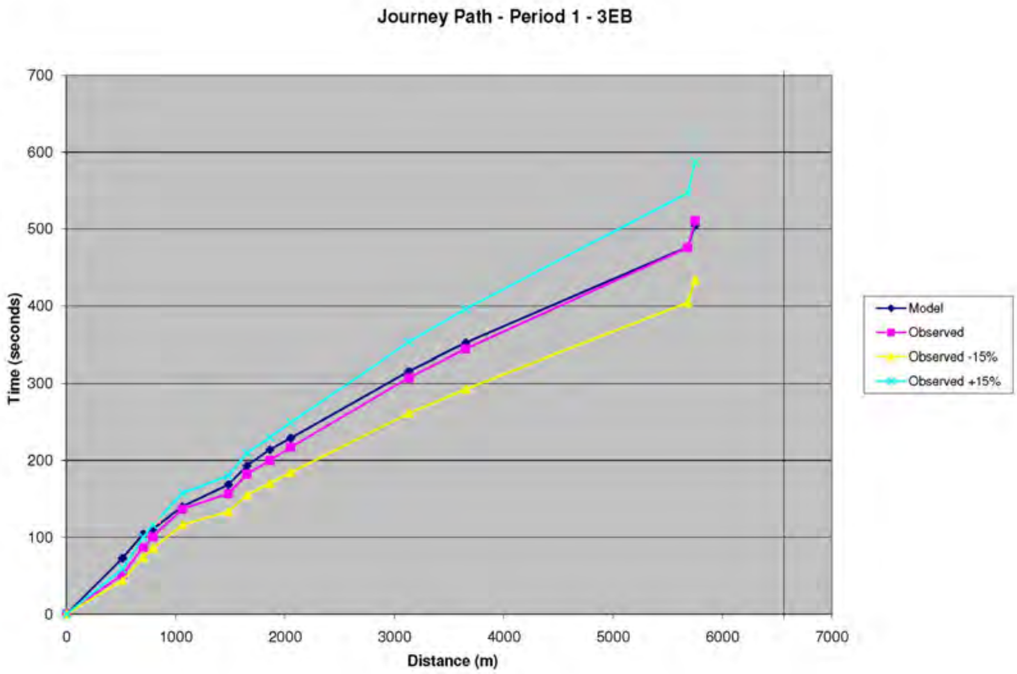

Journey Path - Period 12 - 1SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

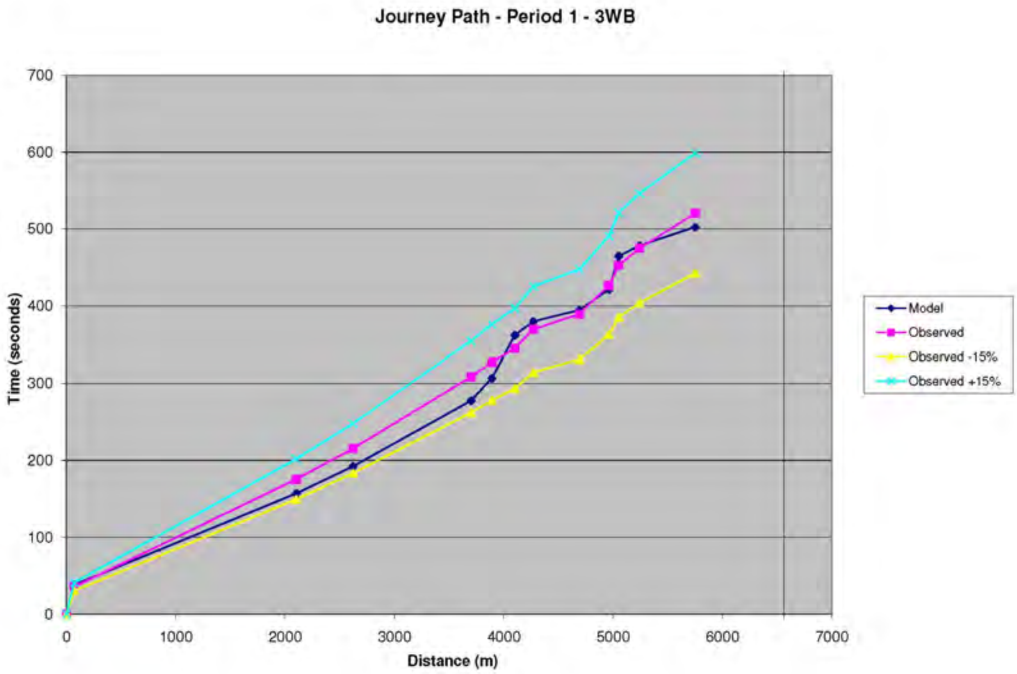

Journey Path - Period 1 - 5NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

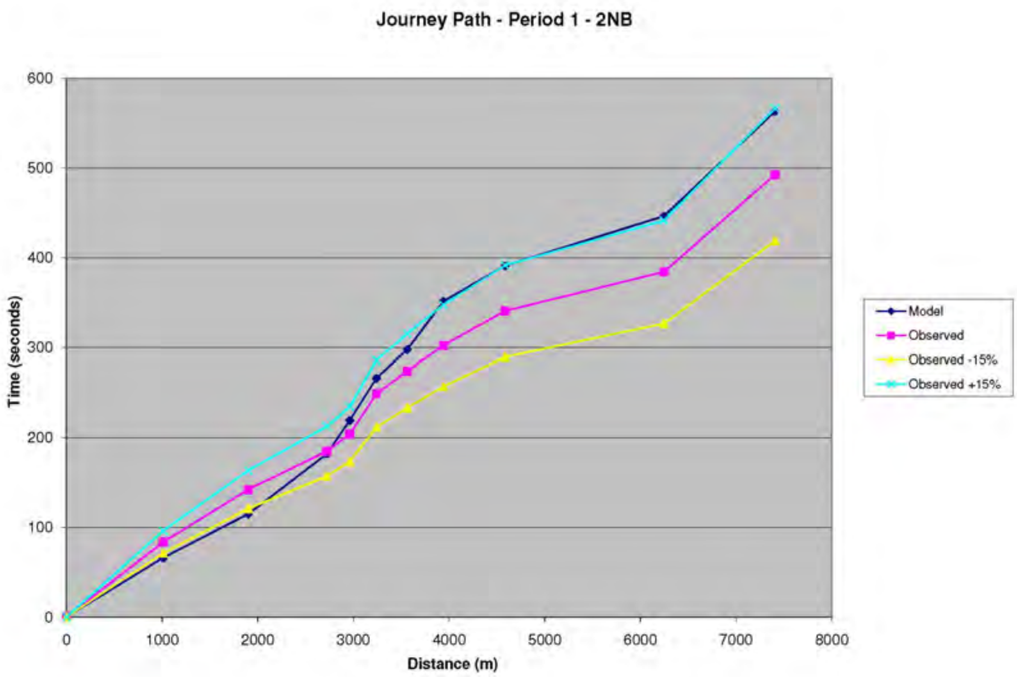

Journey Path - Period 1 - 5SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 1 - 4EB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
0
500
1000
1500
2000
2500
3000
3500
Model
Observed
Observed -15%
Observed +15%

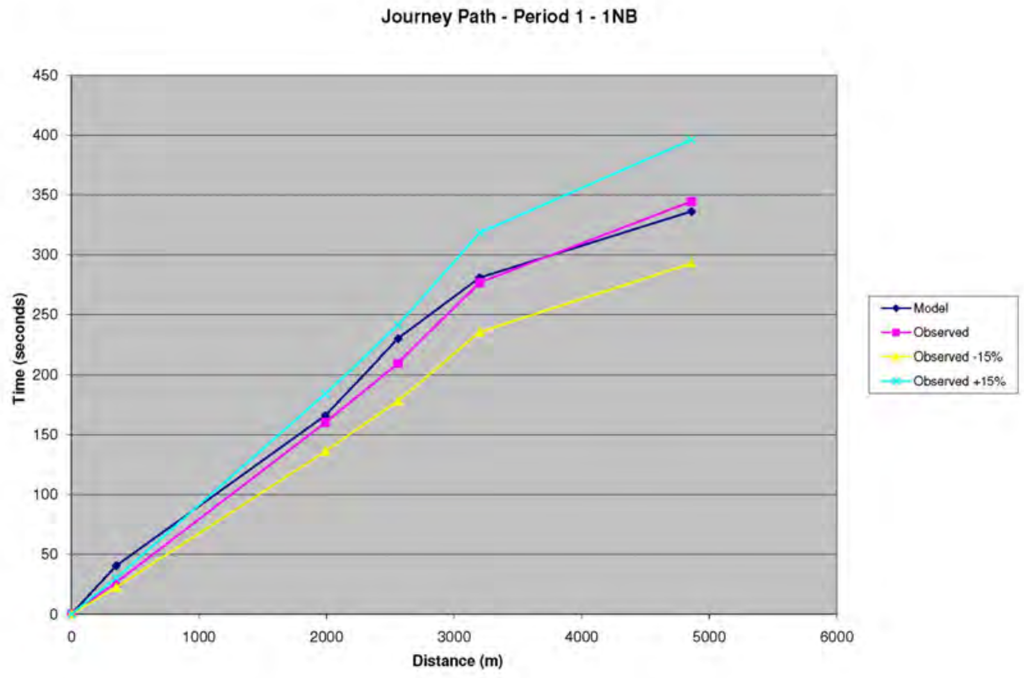

Journey Path - Period 1 - 4WB
Time (seconds)
Distance (m)
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

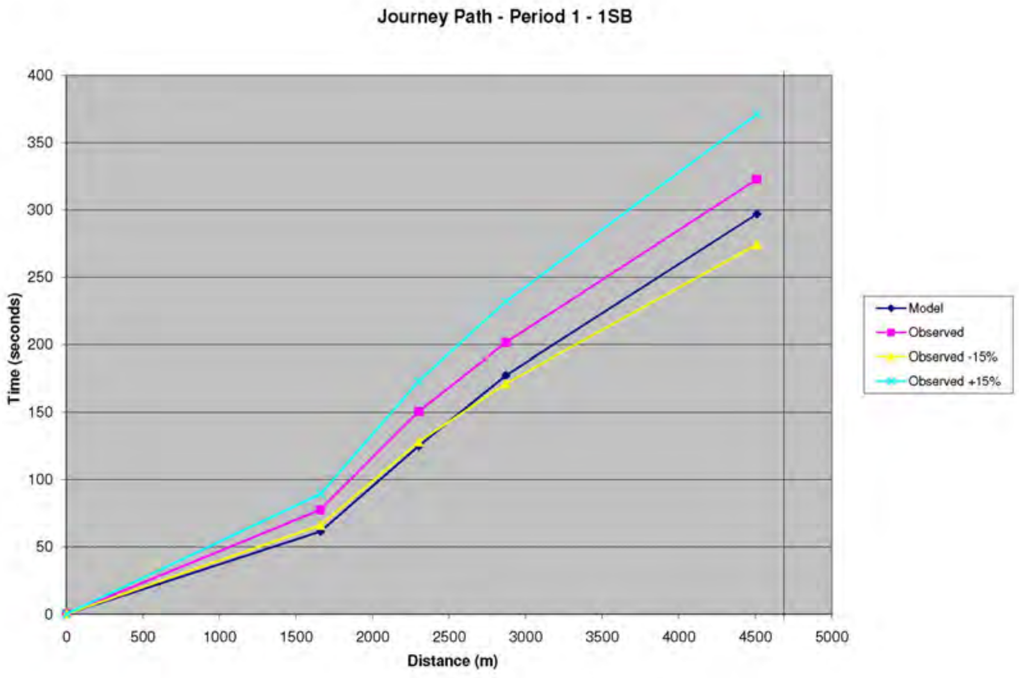

Journey Path - Period 1 - 3EB
Time (seconds)
Distance (m)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

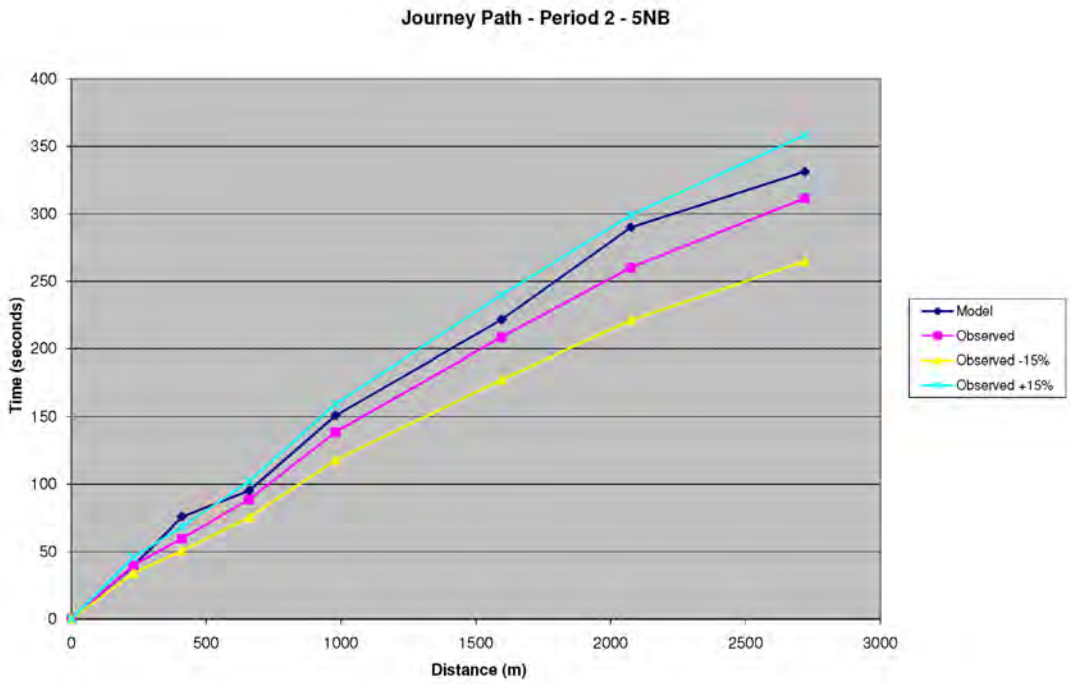

Journey Path - Period 1 - 3WB
Time (seconds)
Distance (m)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

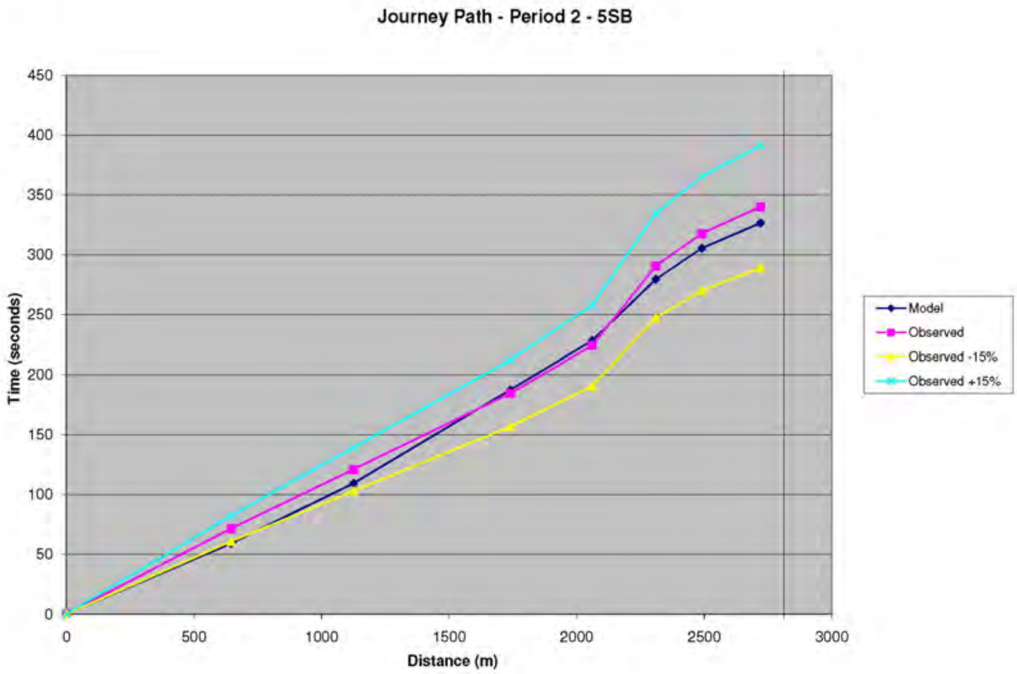

Journey Path - Period 1 - 2NB
Time (seconds)
Distance (m)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

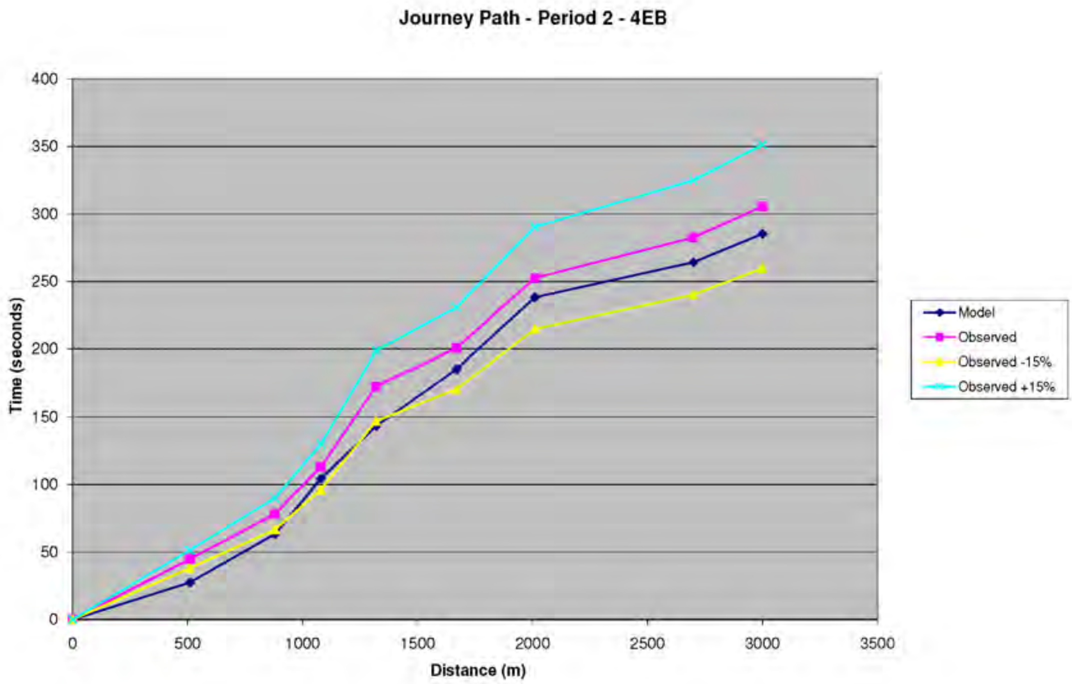

Journey Path - Period 1 - 2SB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

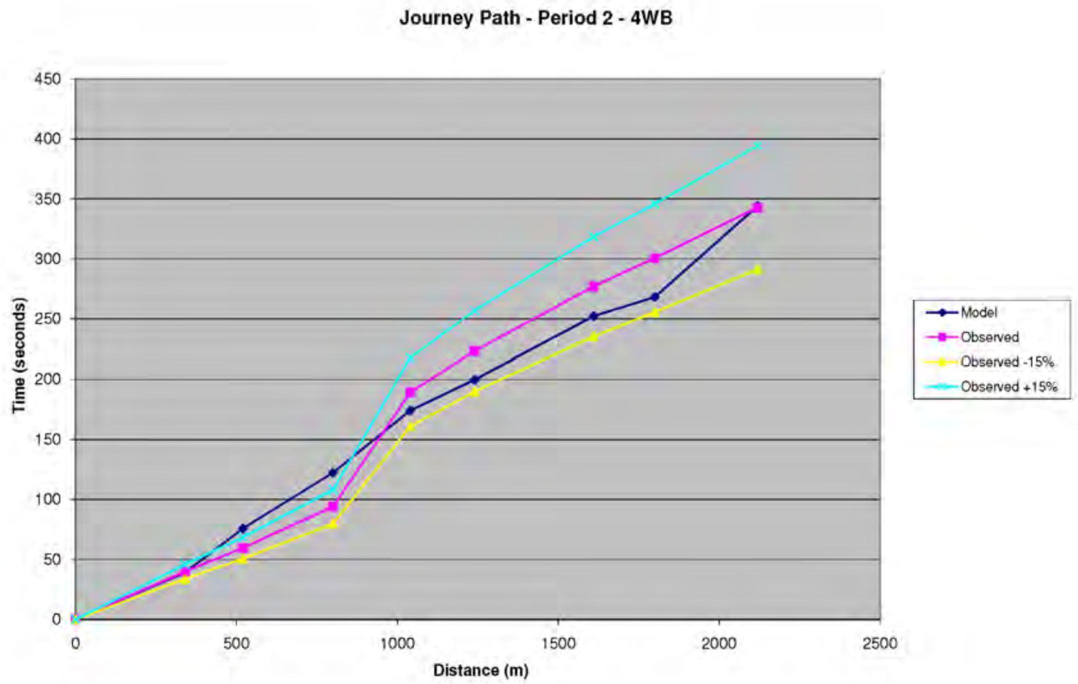

Journey Path - Period 1 - 1NB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
1000
2000
3000
4000
5000
6000
Model
Observed
Observed -15%
Observed +15%

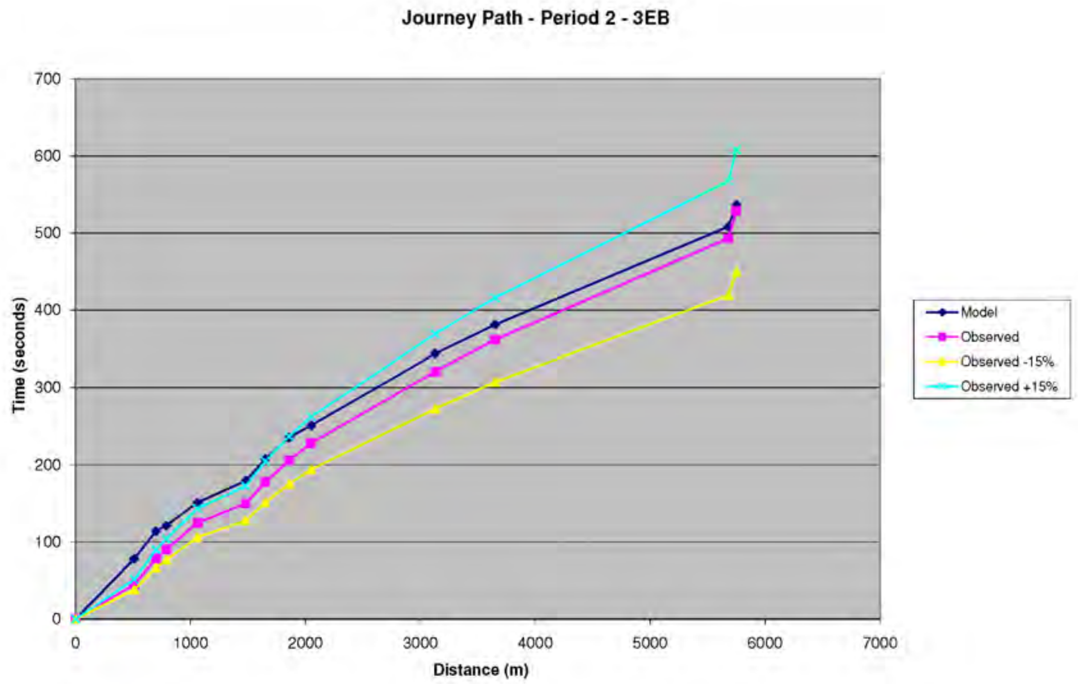

Journey Path - Period 1 - 1SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Model
Observed
Observed -15%
Observed +15%

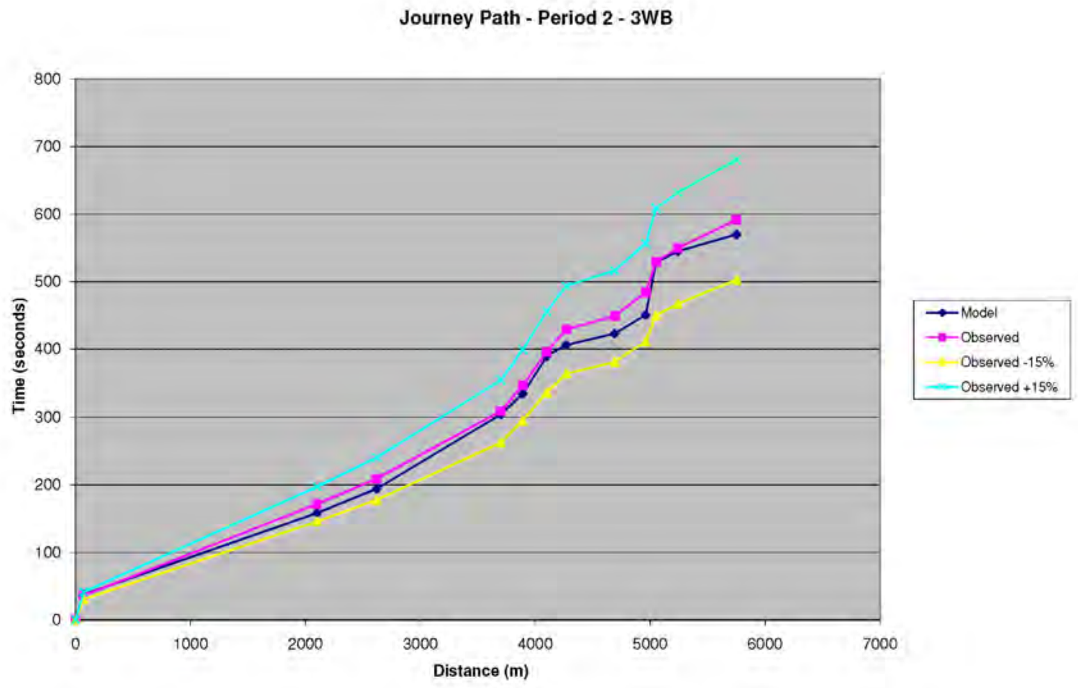

Journey Path - Period 2 - 5NB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%

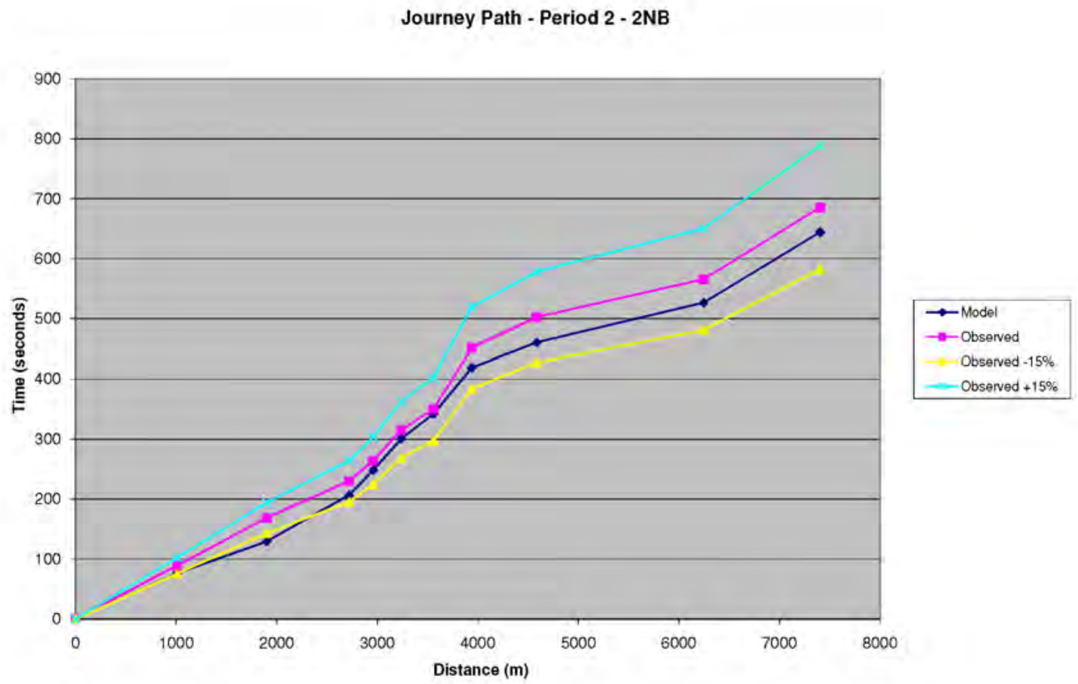

Journey Path - Period 2 - 5SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%

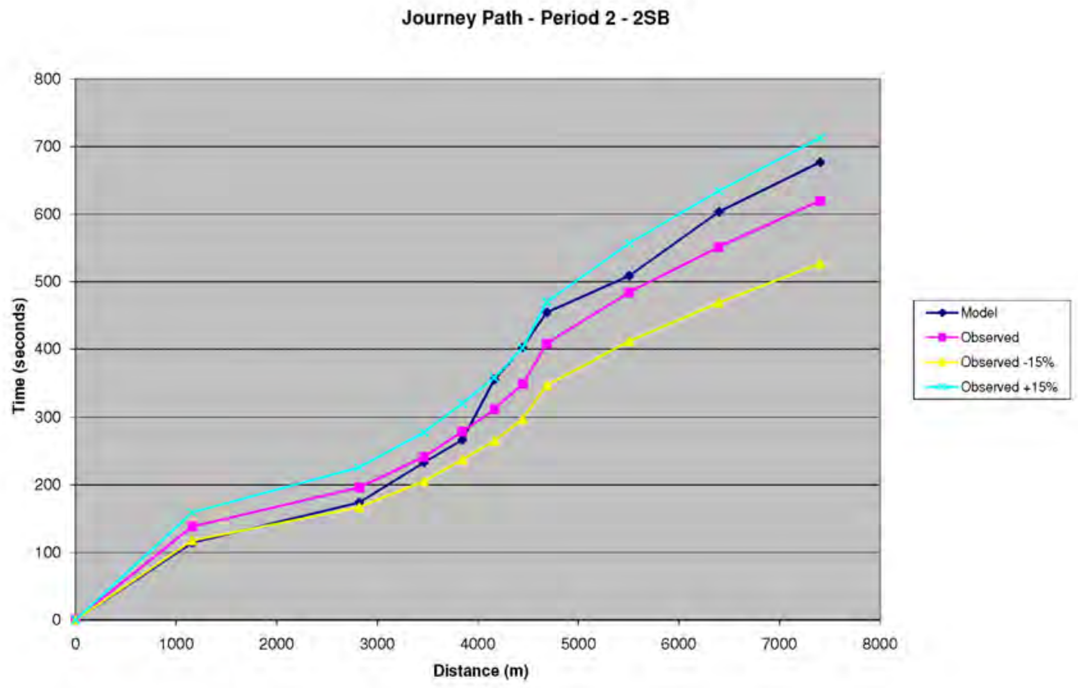

Journey Path - Period 2 - 4EB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
0
500
1000
1500
2000
2500
3000
3500
Model
Observed
Observed -15%
Observed +15%

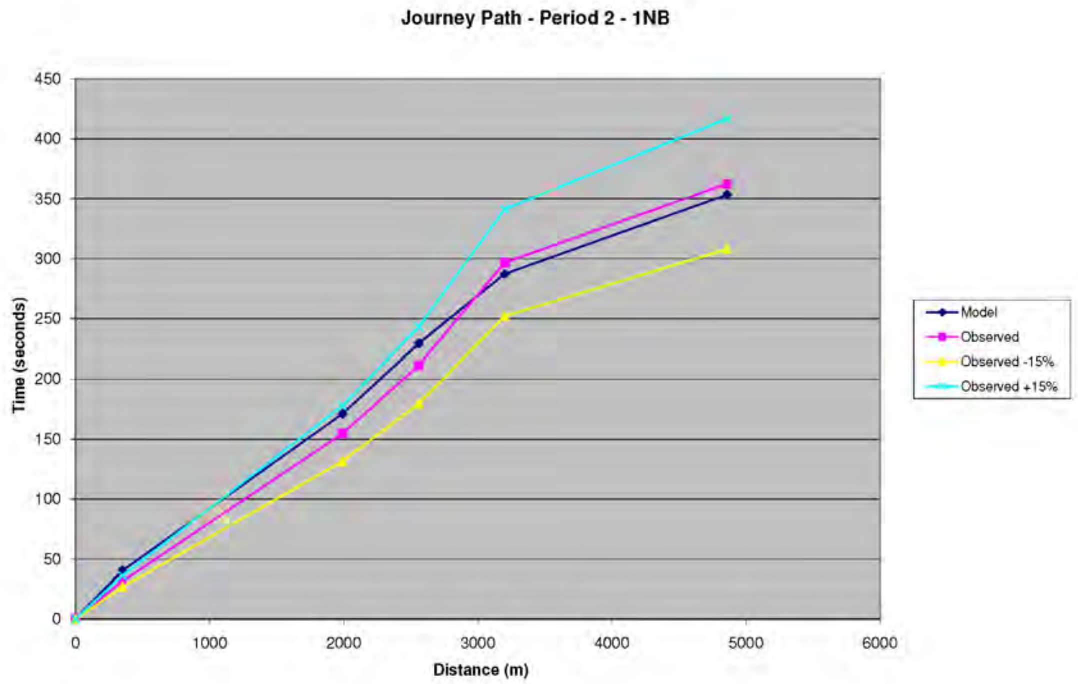

Journey Path - Period 2 - 4WB
Time (seconds)
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
Distance (m)
Model
Observed
Observed -15%
Observed +15%

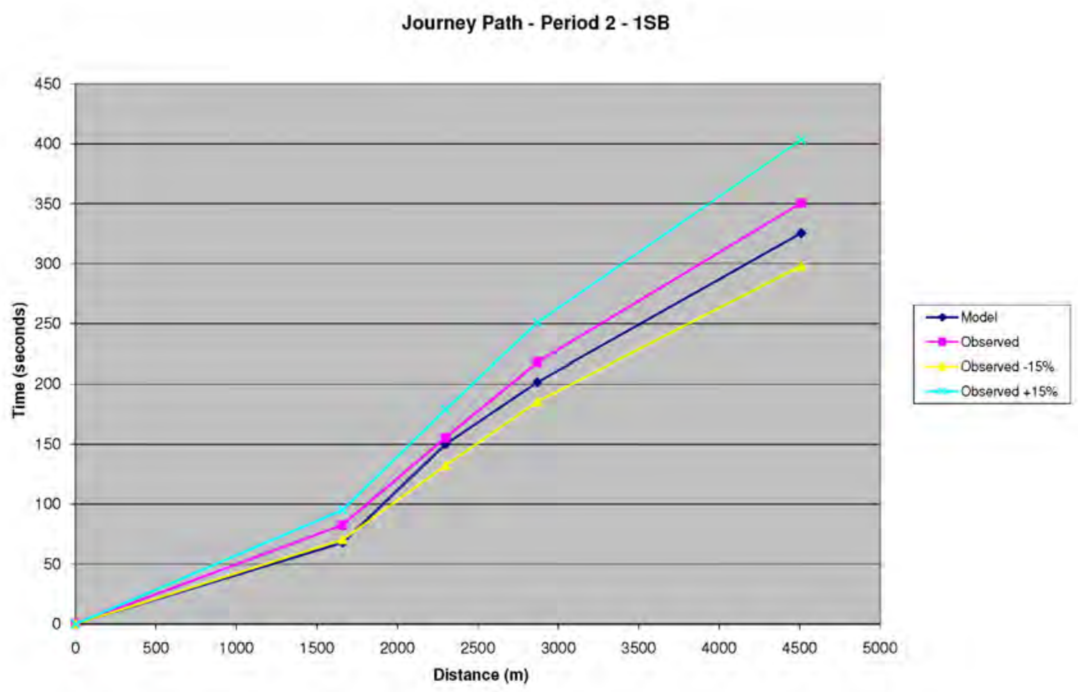

Journey Path - Period 2 - 3EB
Time (seconds)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 2 - 3WB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

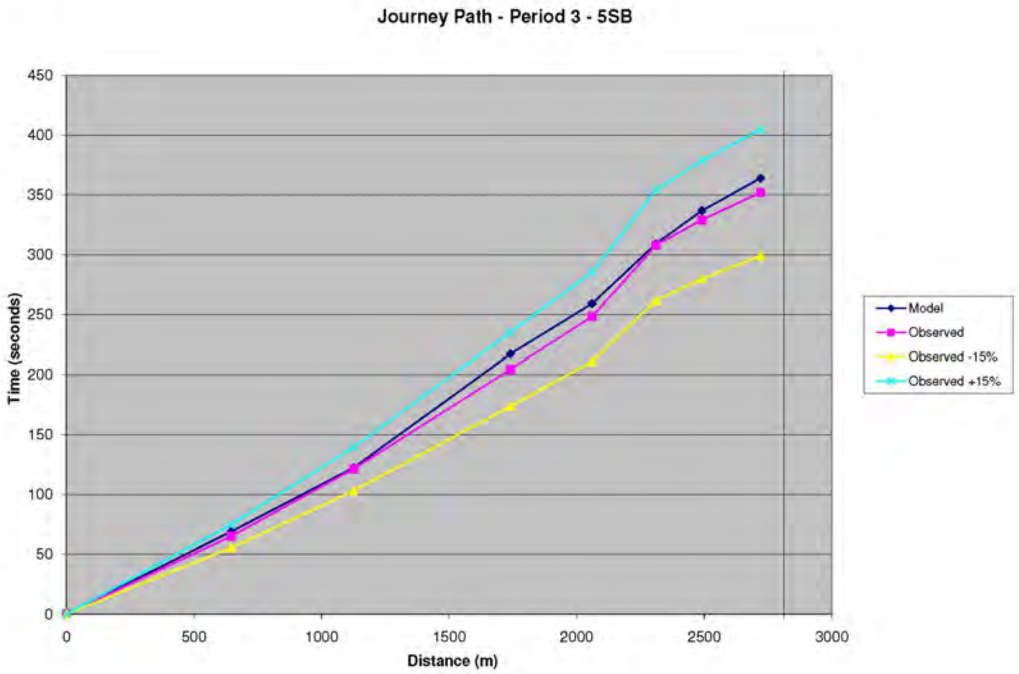

Journey Path - Period 2 - 2NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

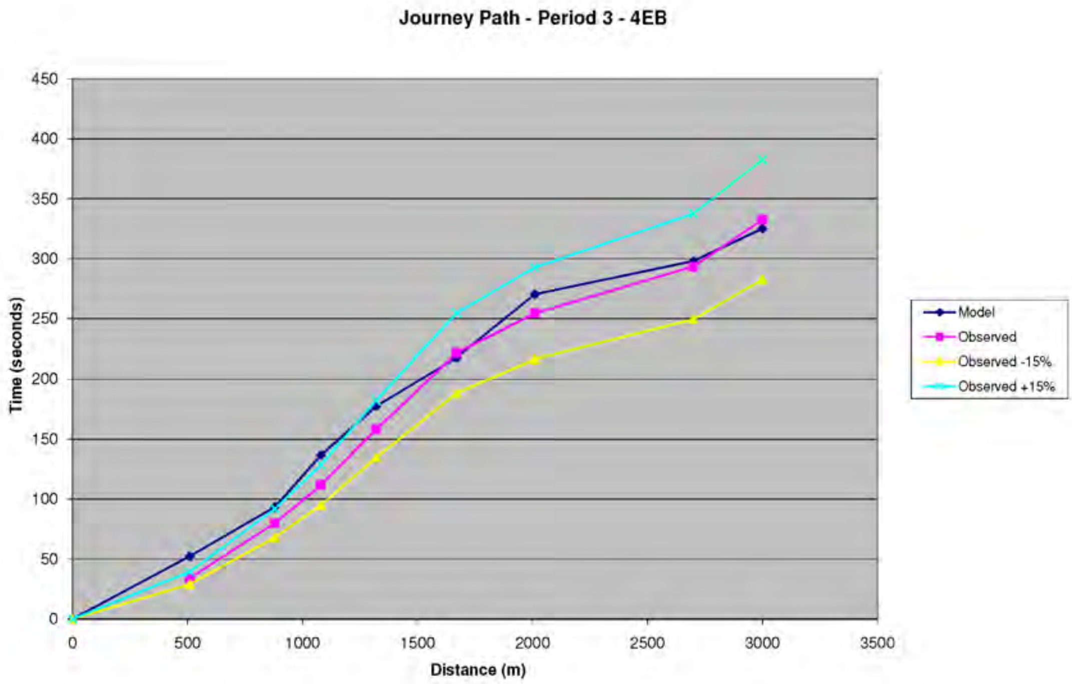

Journey Path - Period 2 - 2SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 2 - 1NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

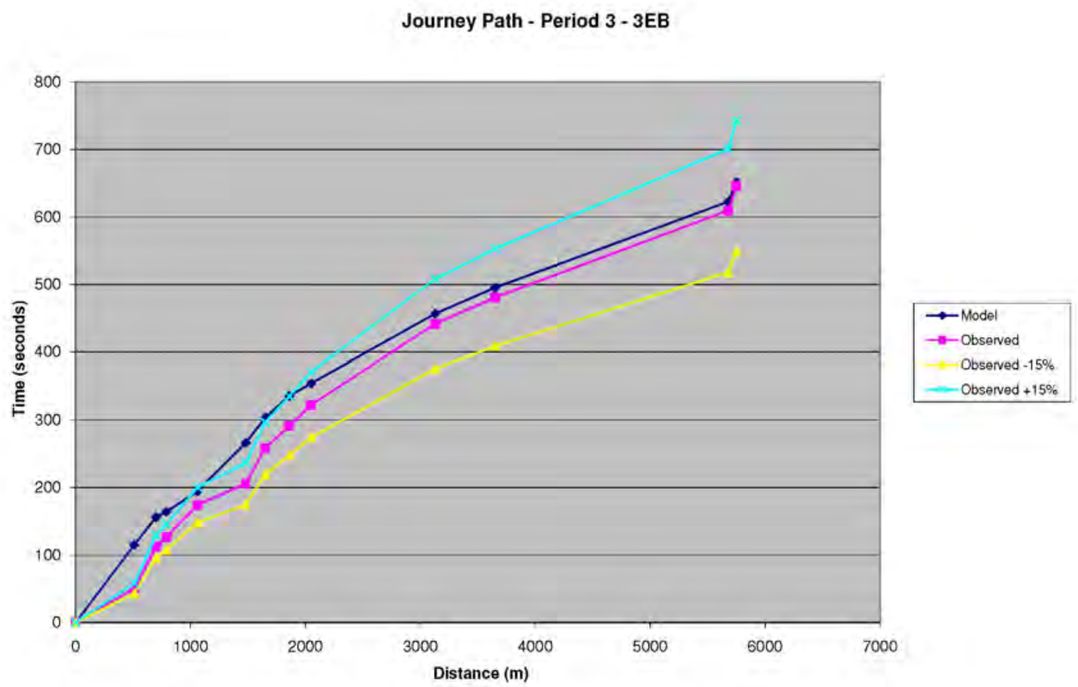

Journey Path - Period 2 - 1SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

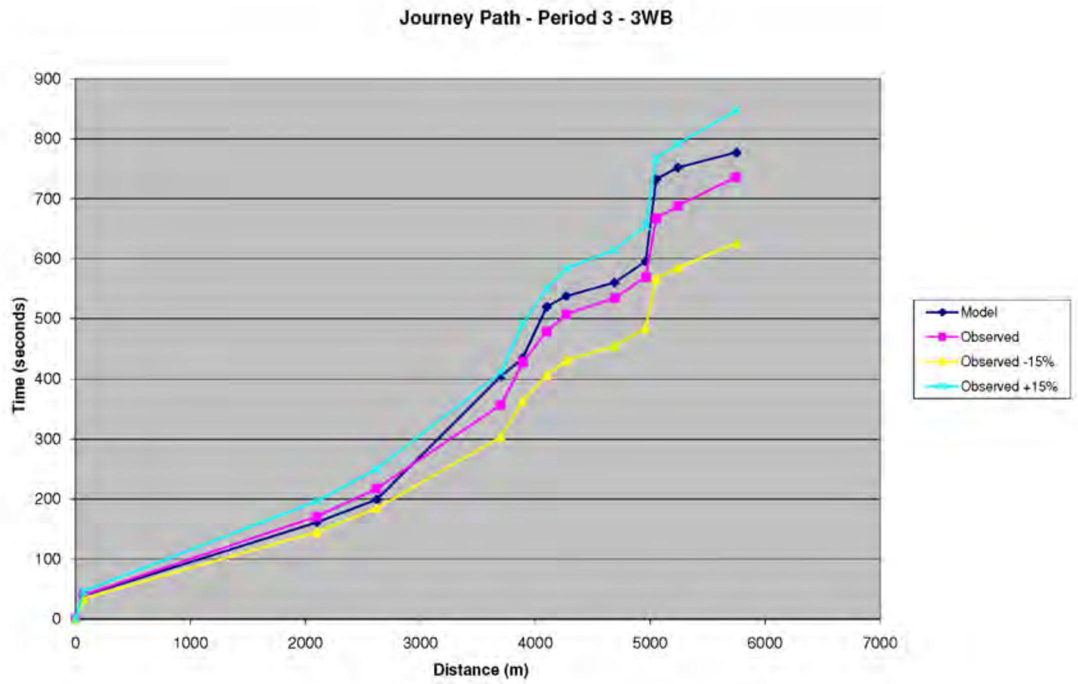

Journey Path - Period 3 - 5NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 3 - 5SB
Time (seconds)
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Model
Observed
Observed -15%
Observed +15%

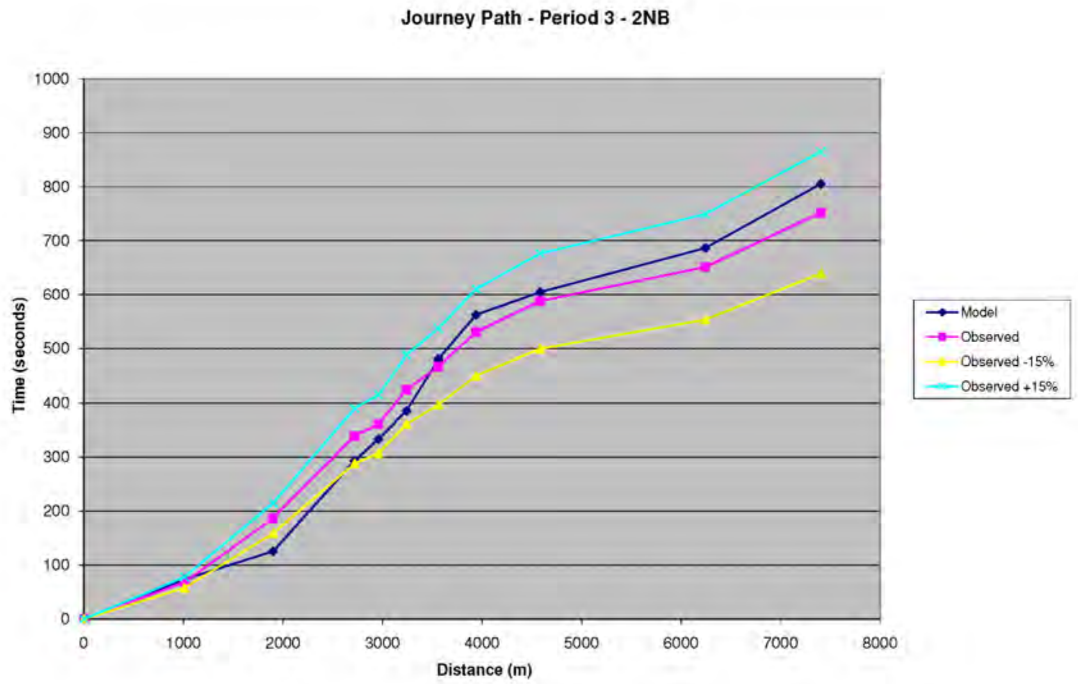

Journey Path - Period 3 - 4EB
Time (seconds)
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
3500
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 3 - 4WB
Time (seconds)
Distance (m)
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

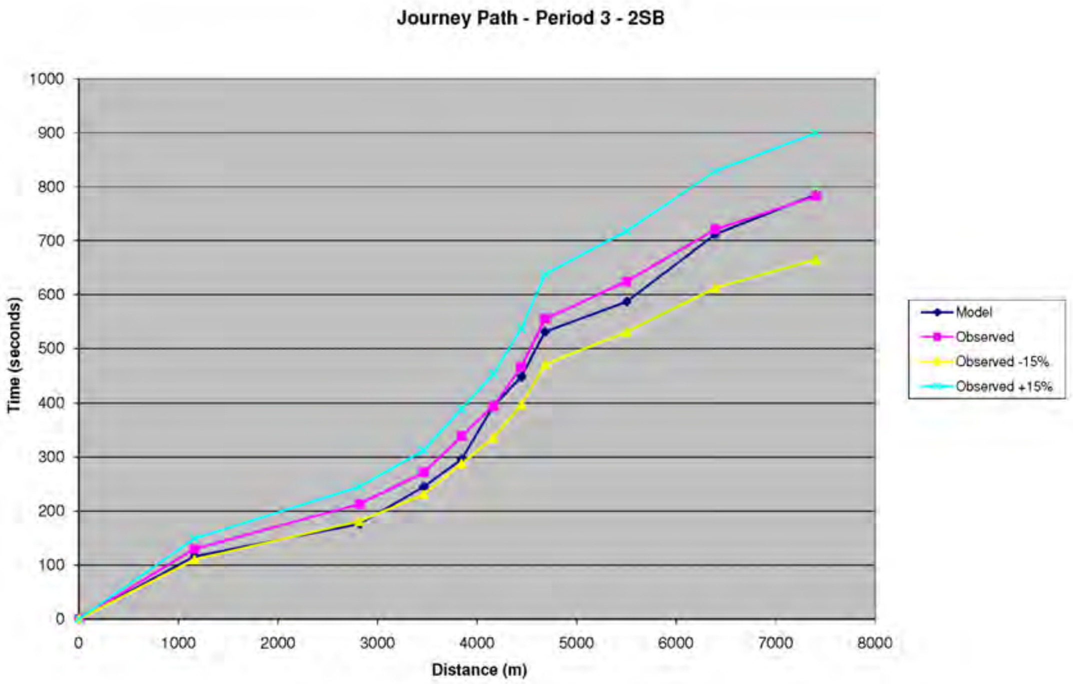

Journey Path - Period 3 - 3EB
Time (seconds)
Distance (m)
800
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

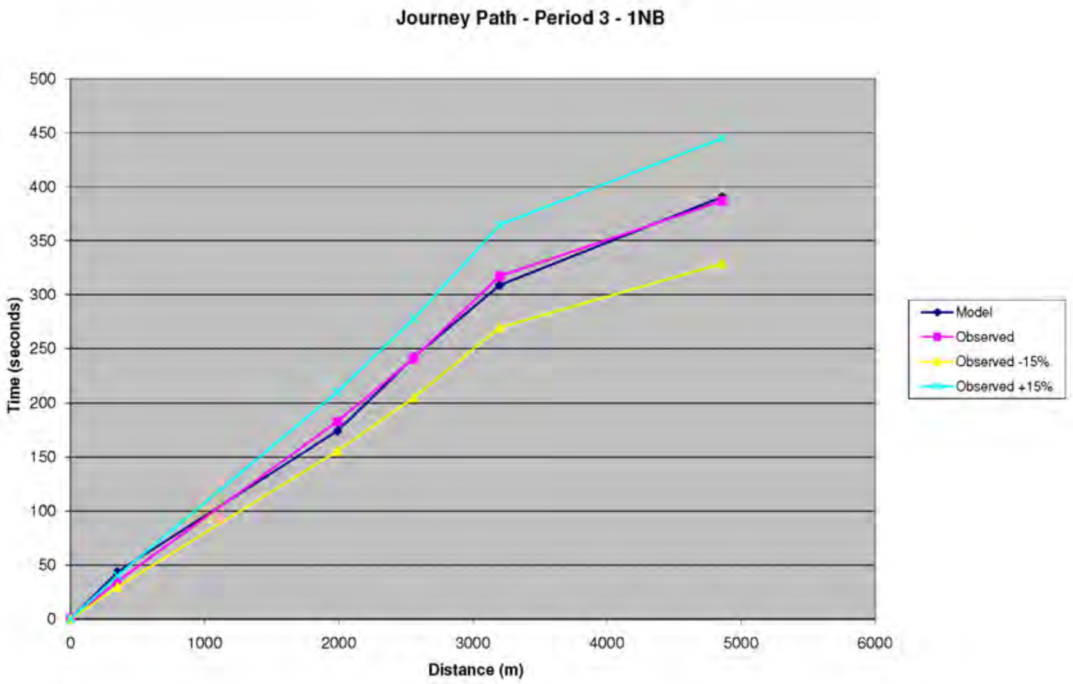


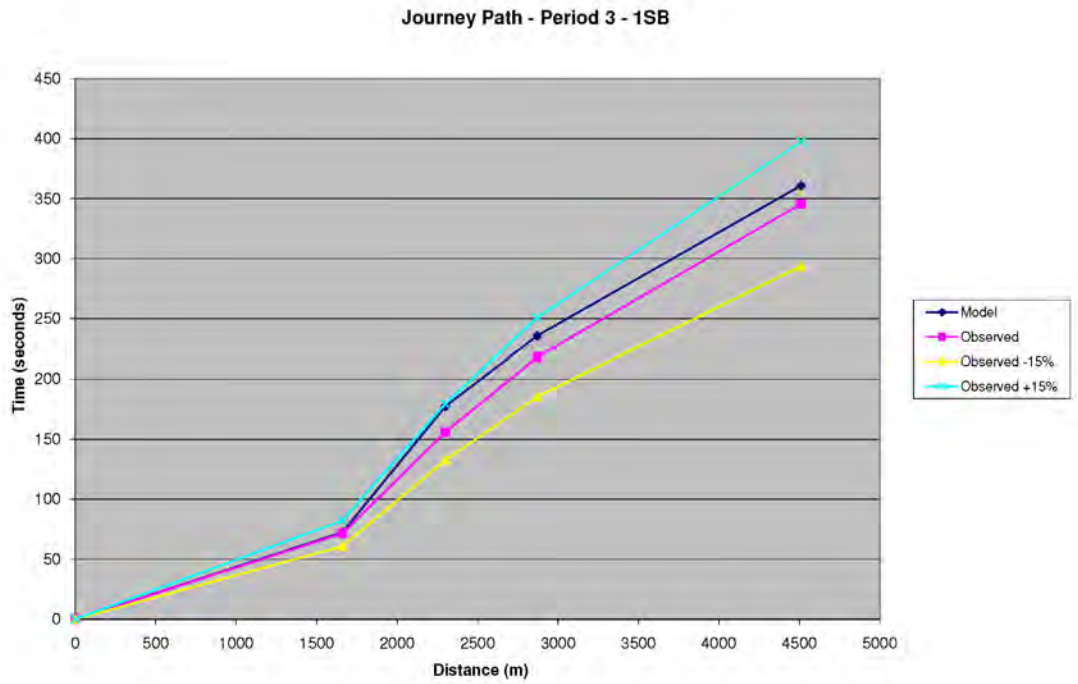
Journey Path - Period 3 - 3WB
Time (seconds)
0
100
200
300
400
500
600
700
800
900
Distance (m)
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

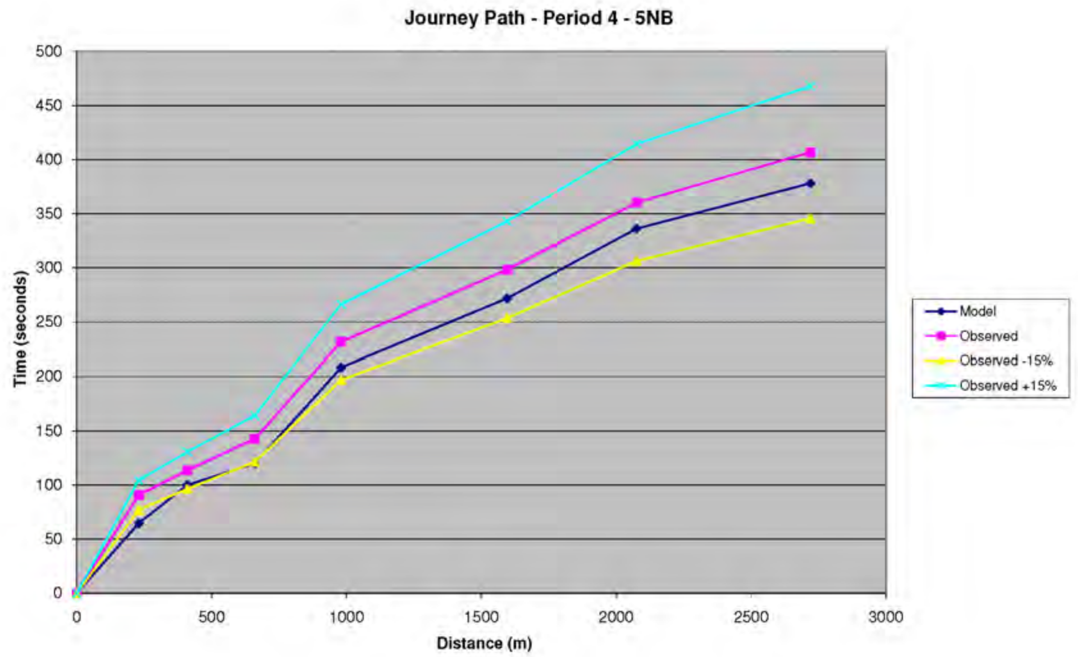


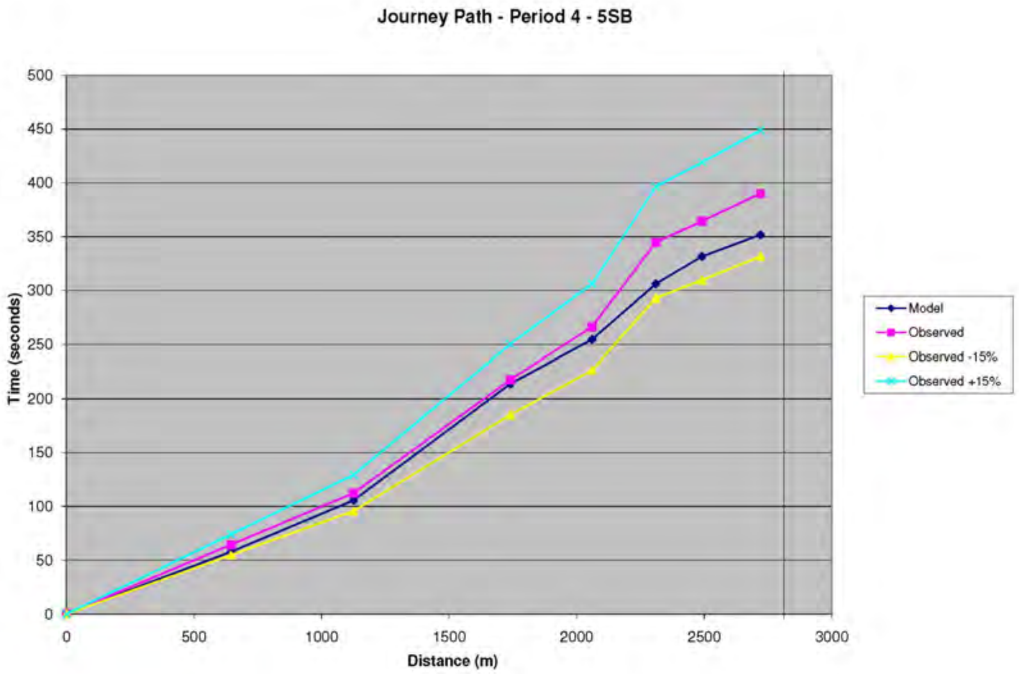
Journey Path - Period 3 - 2NB
Time (seconds)
0
100
200
300
400
500
600
700
800
900
1000
Distance (m)
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

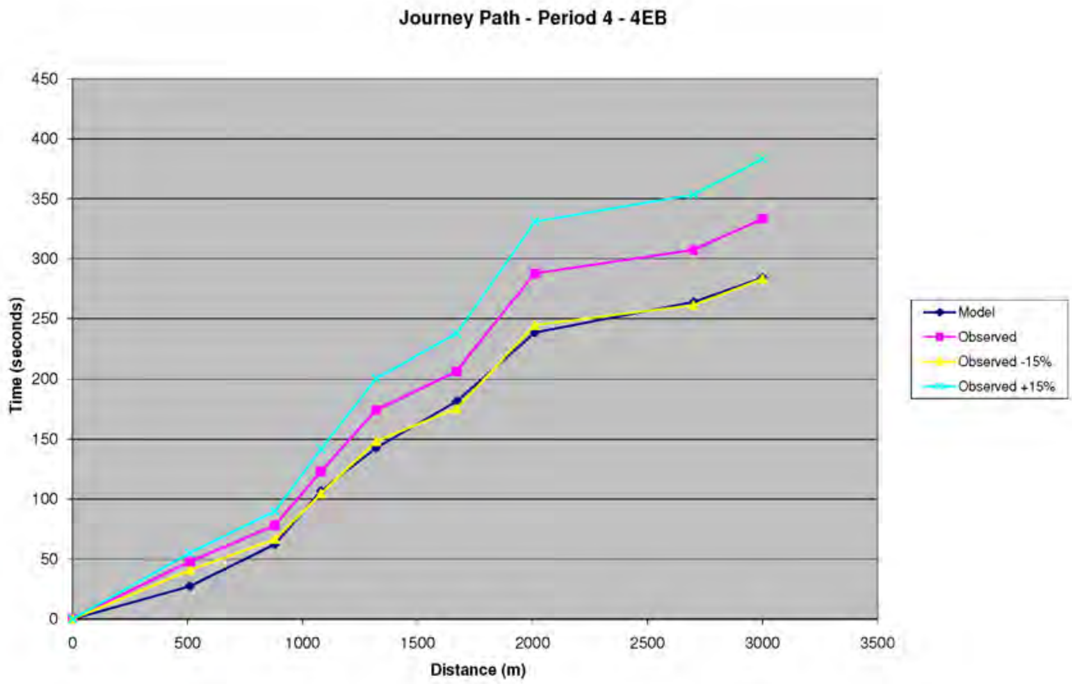

Journey Path - Period 3 - 2SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

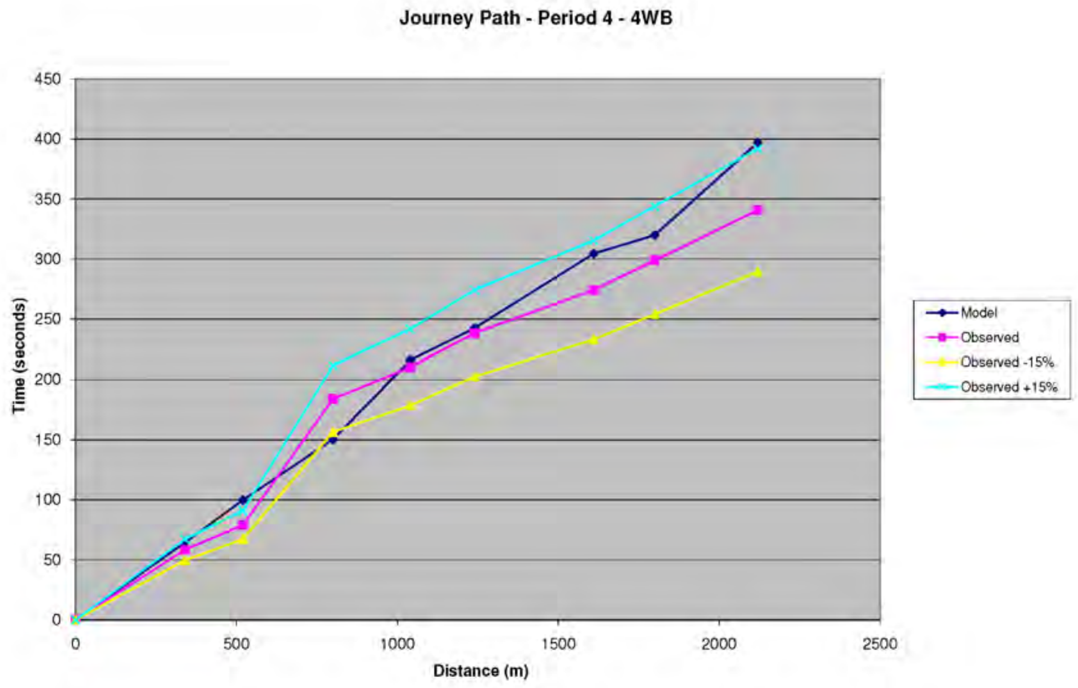

Journey Path - Period 3 - 1NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 3 - 1SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Model
Observed
Observed -15%
Observed +15%

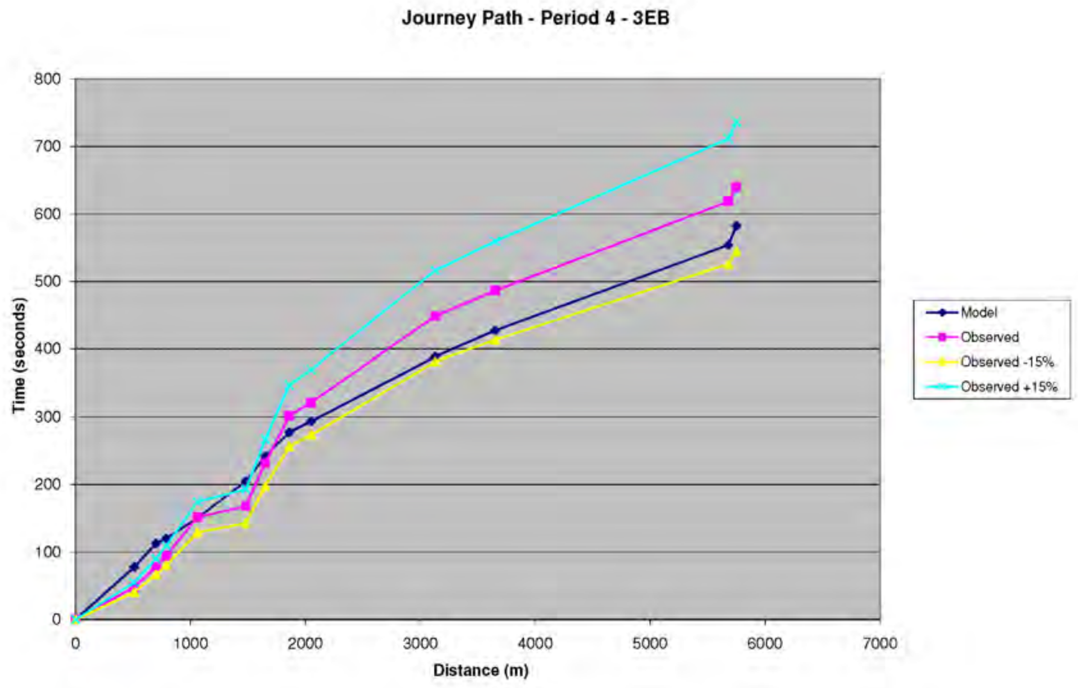

Journey Path - Period 4 - 5NB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
500
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 4 - 5SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
500
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%

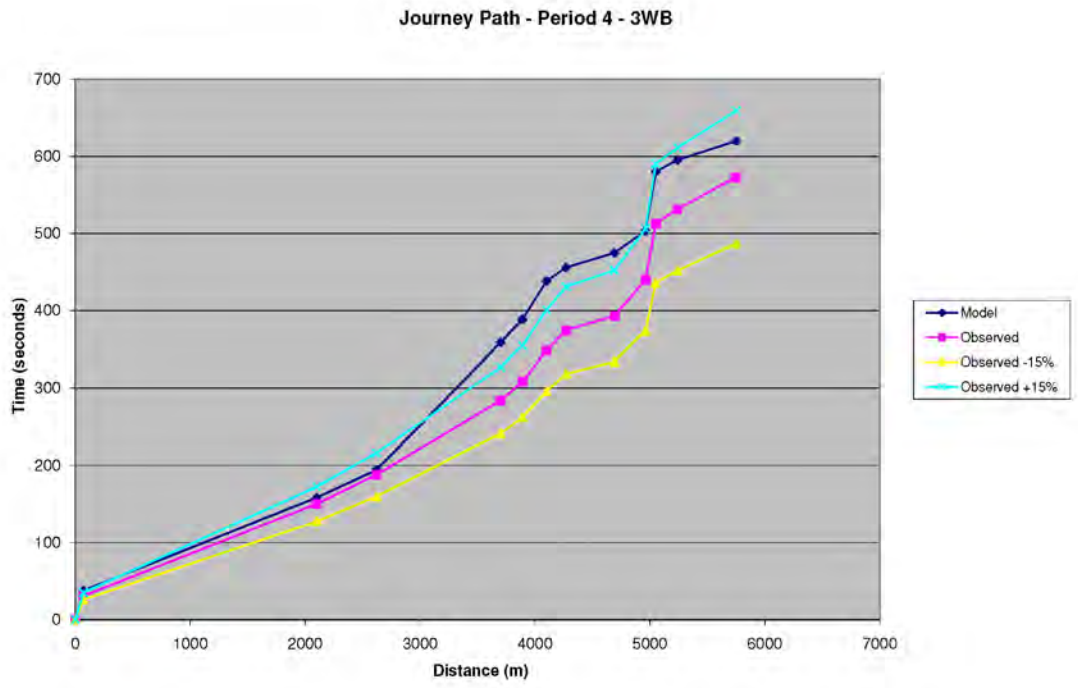

Journey Path - Period 4 - 4EB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
3500
Model
Observed
Observed -15%
Observed +15%

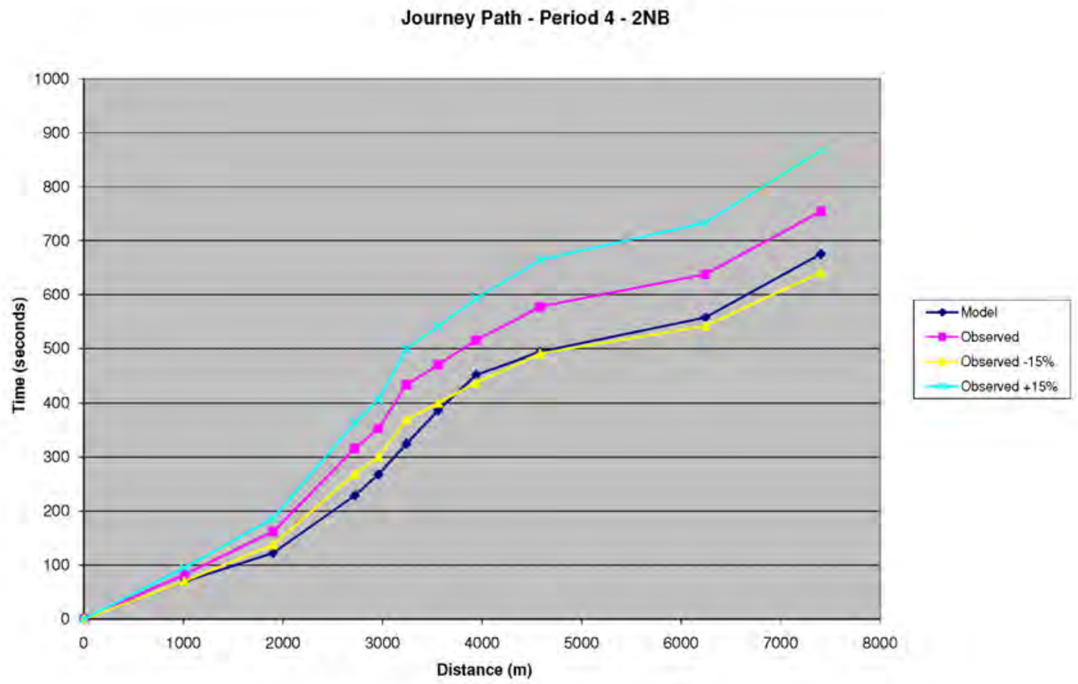


Journey Path - Period 4 - 4WB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

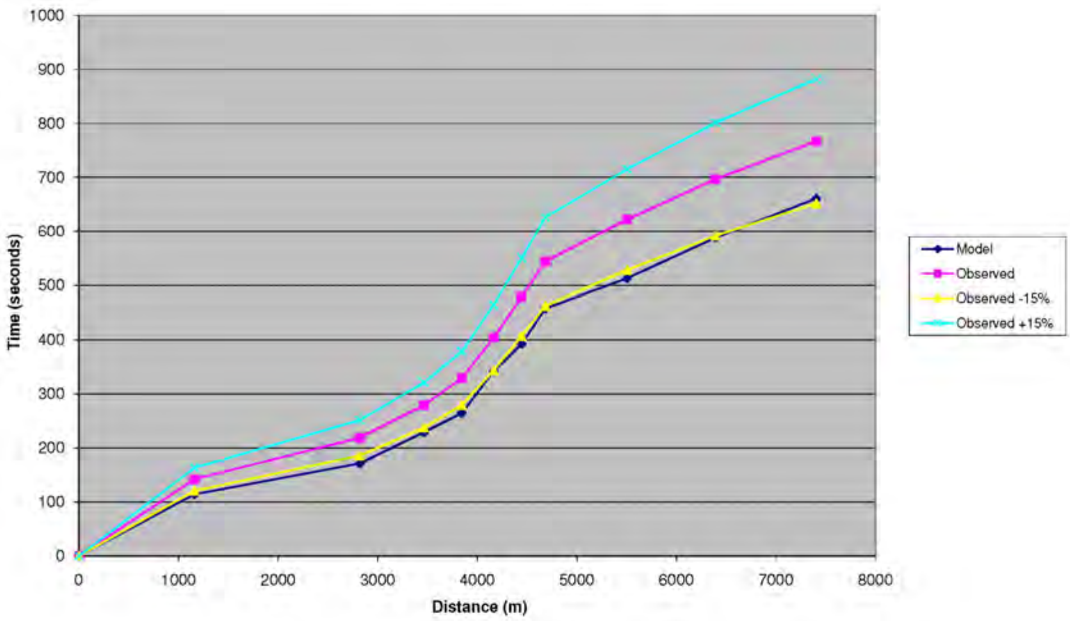


Journey Path - Period 4 - 3EB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

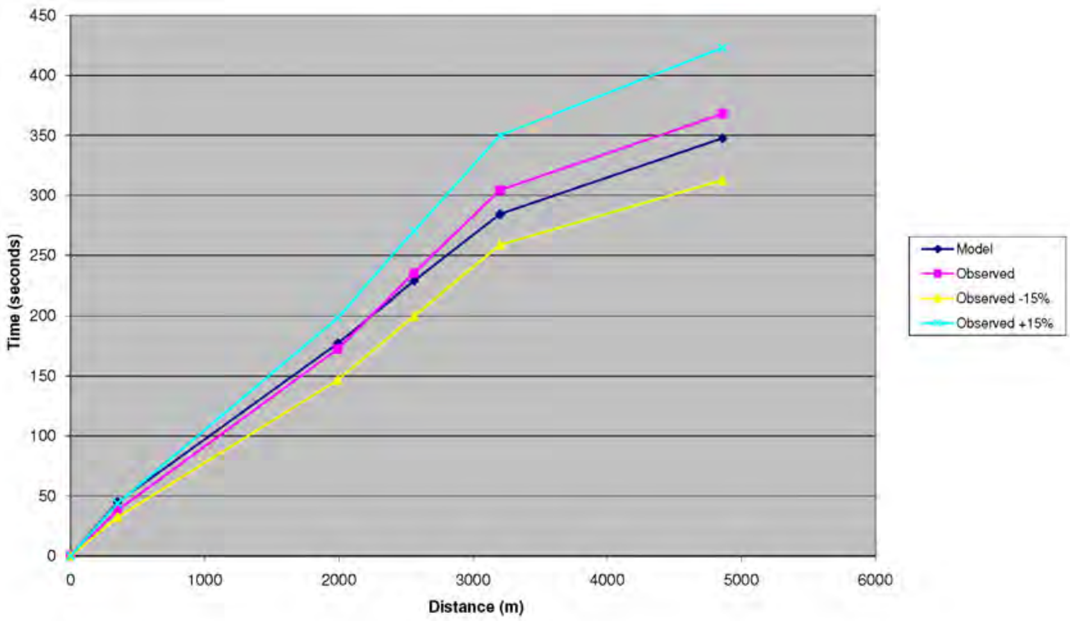

Journey Path - Period 4 - 3WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

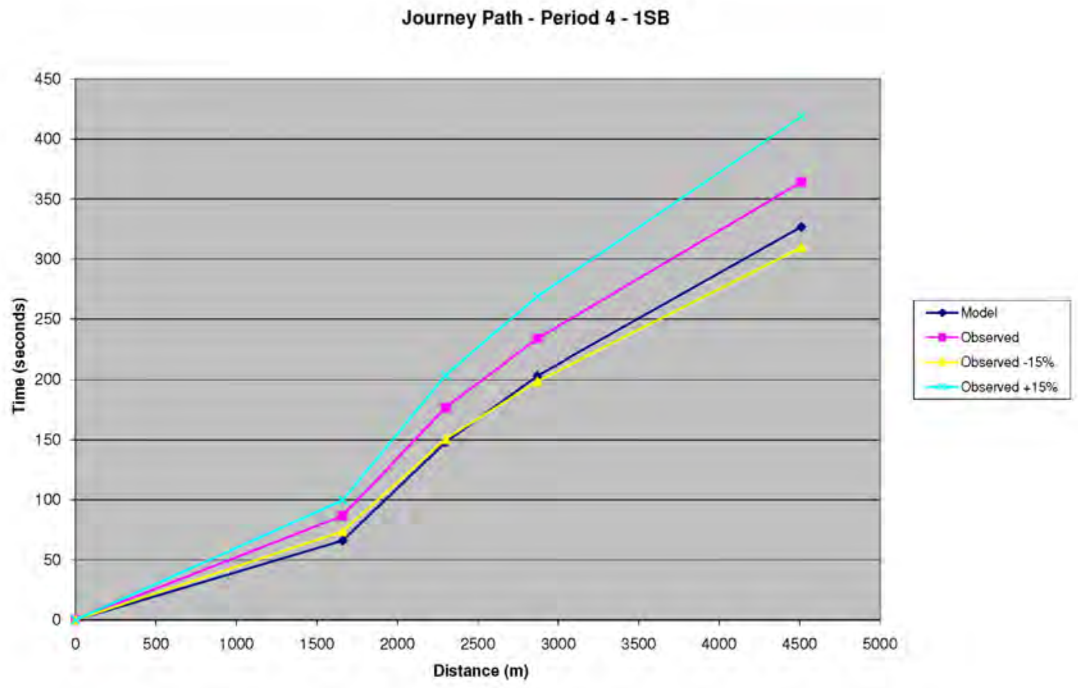

Journey Path - Period 4 - 2NB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
900
1000
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

Journey Path - Period 4 - 2SB

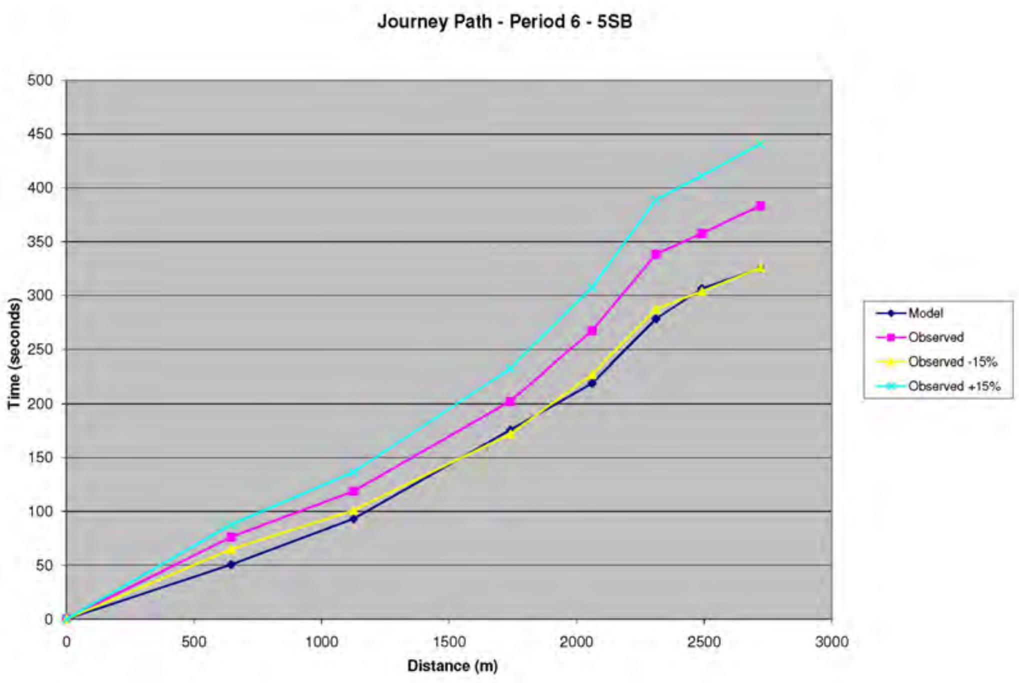


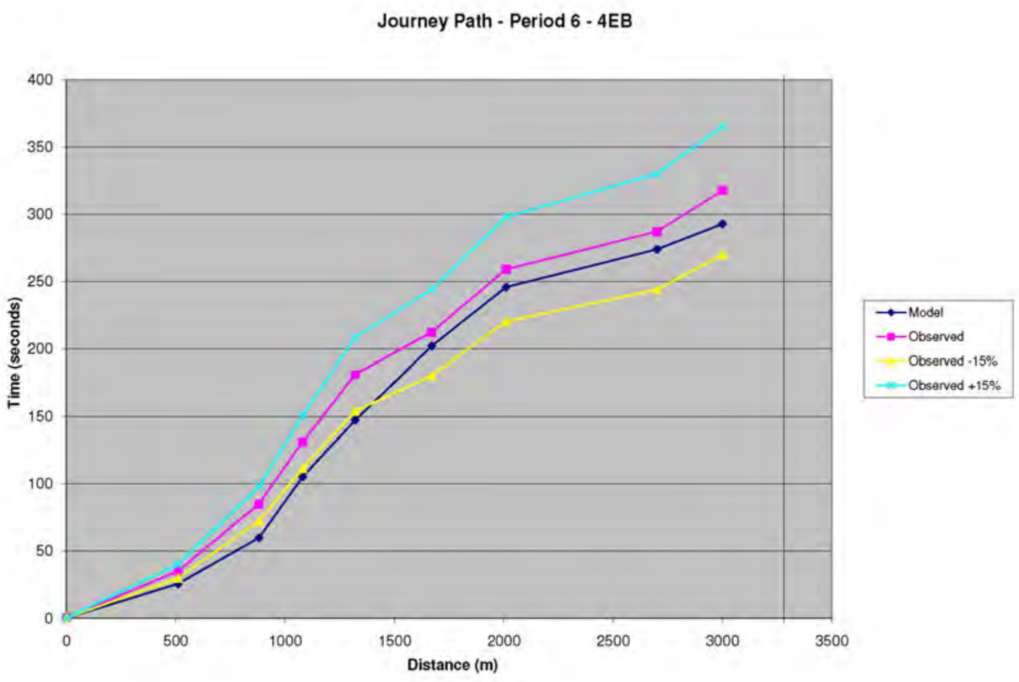
Journey Path - Period 4 - 1NB

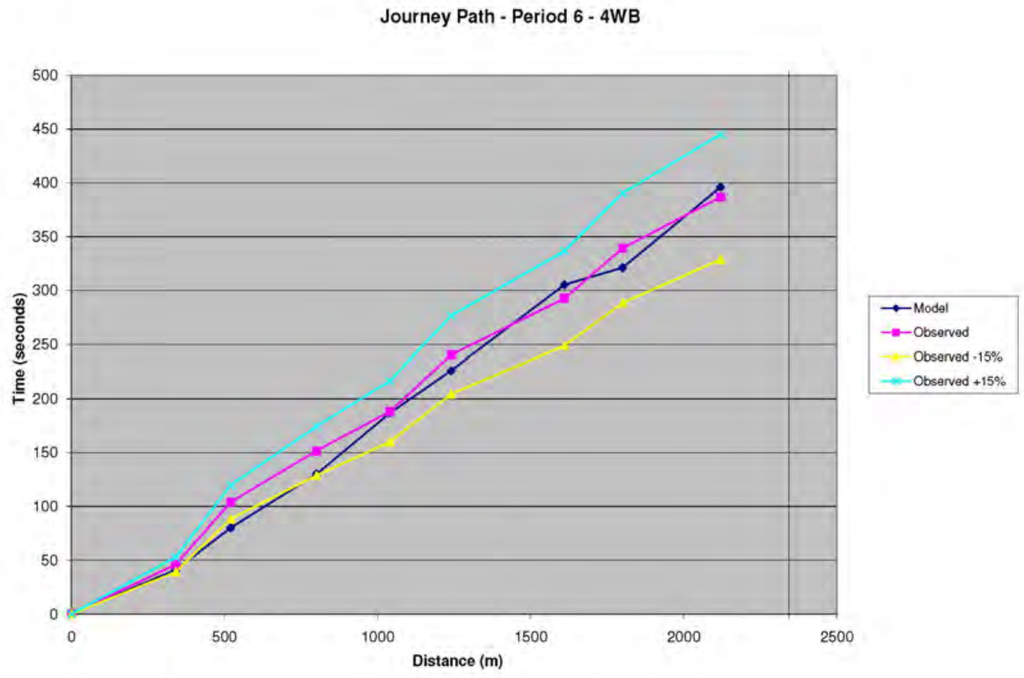


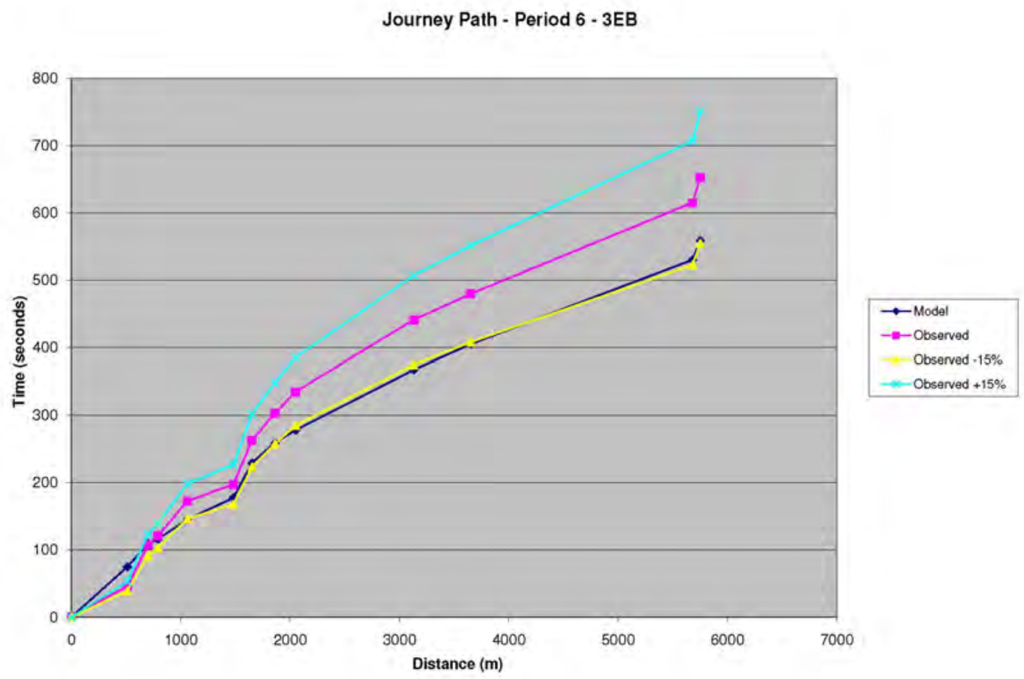

Journey Path - Period 4 - 1SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Model
Observed
Observed -15%
Observed +15%

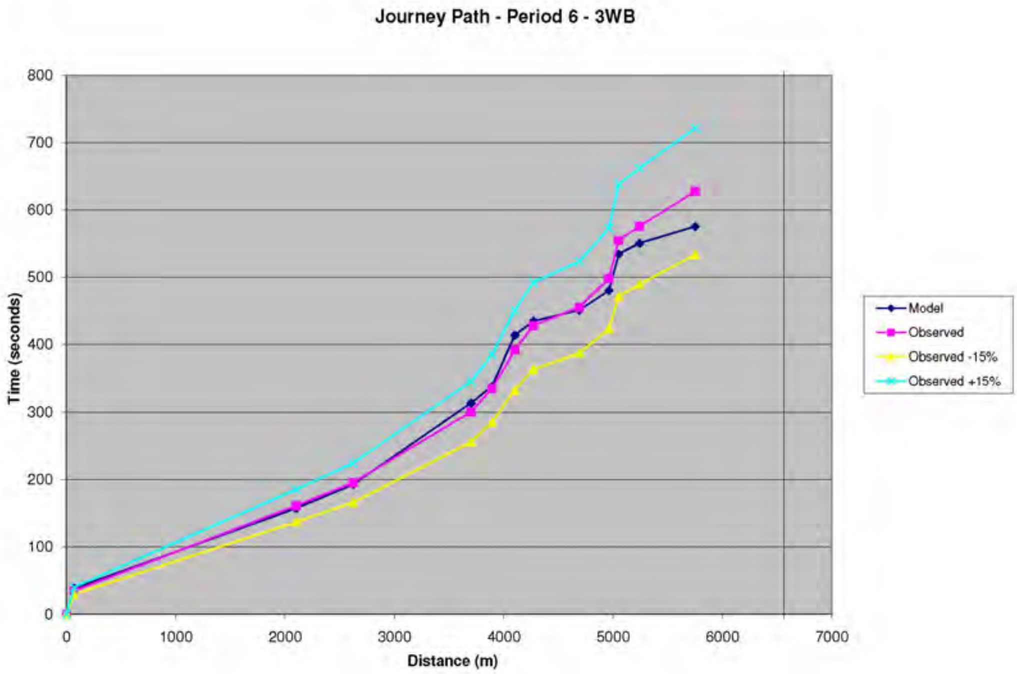

Journey Path - Period 6 - 5NB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%

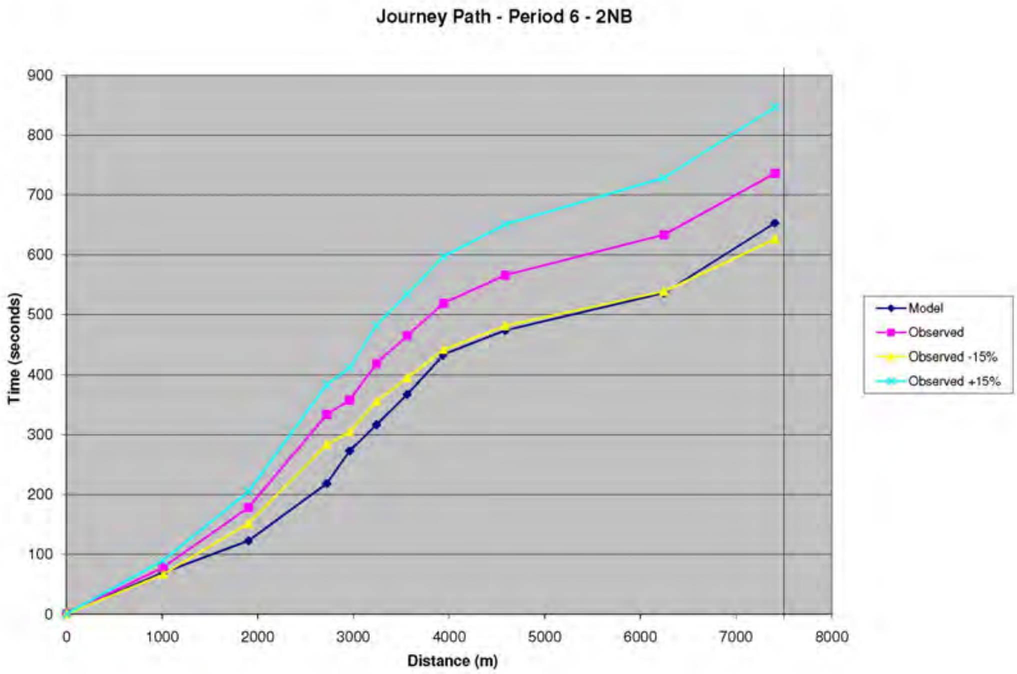

Journey Path - Period 6 - 5SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

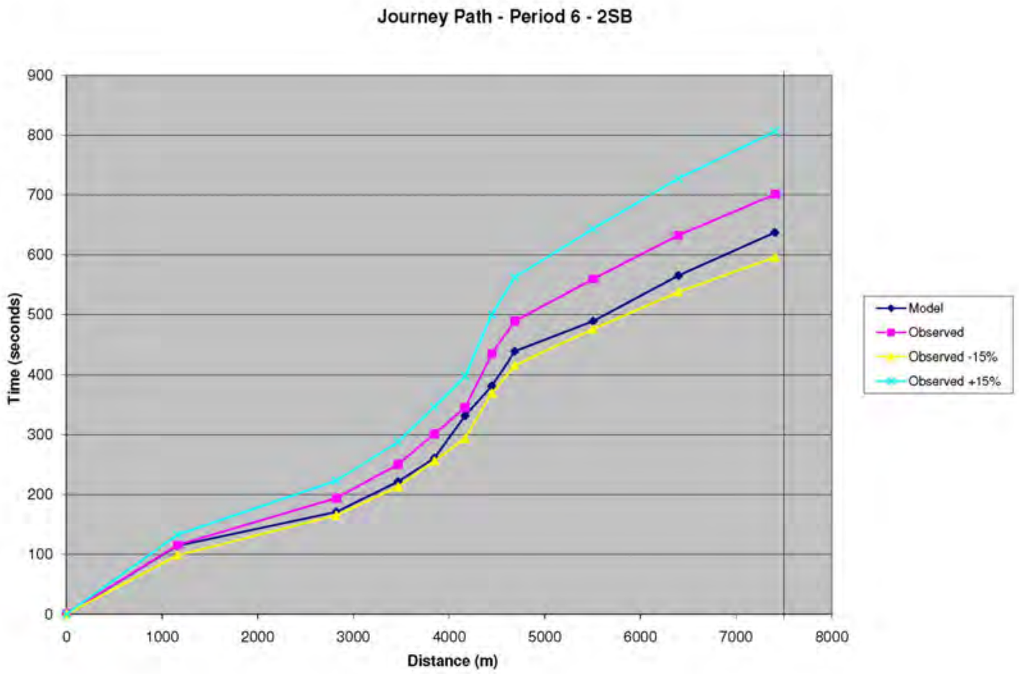

Journey Path - Period 6 - 4EB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

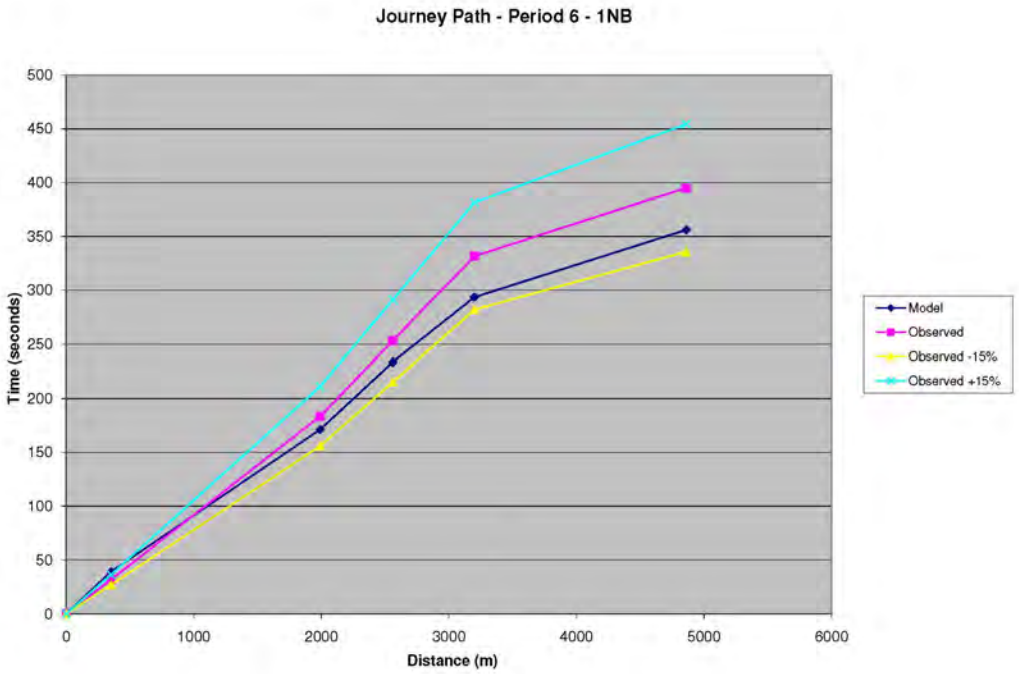

Journey Path - Period 6 - 4WB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
500
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

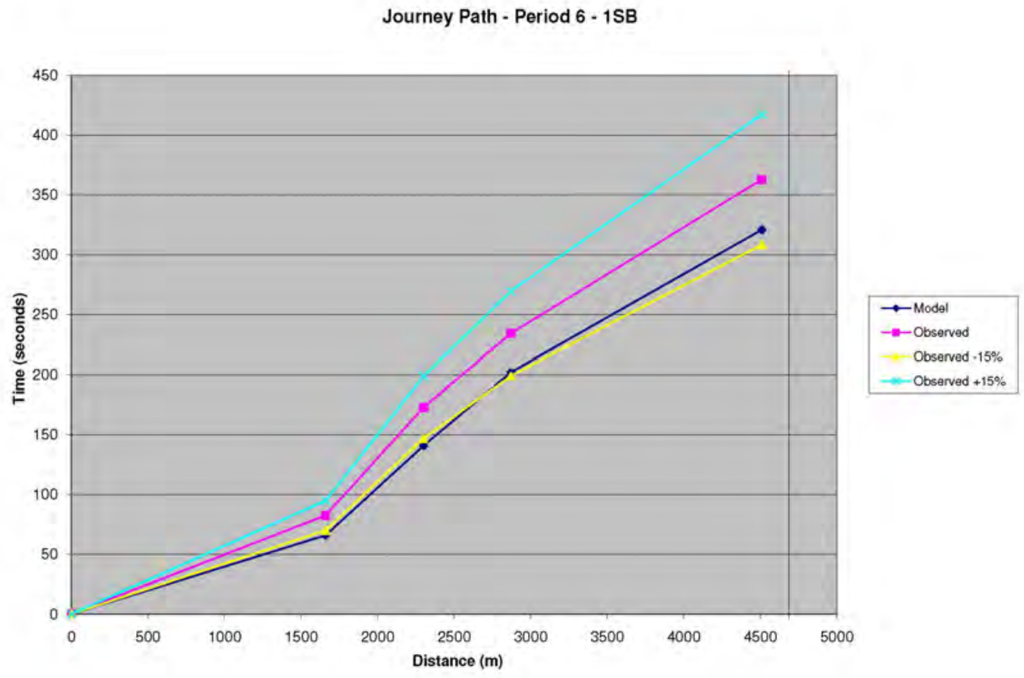

Journey Path - Period 6 - 3EB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 6 - 3WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

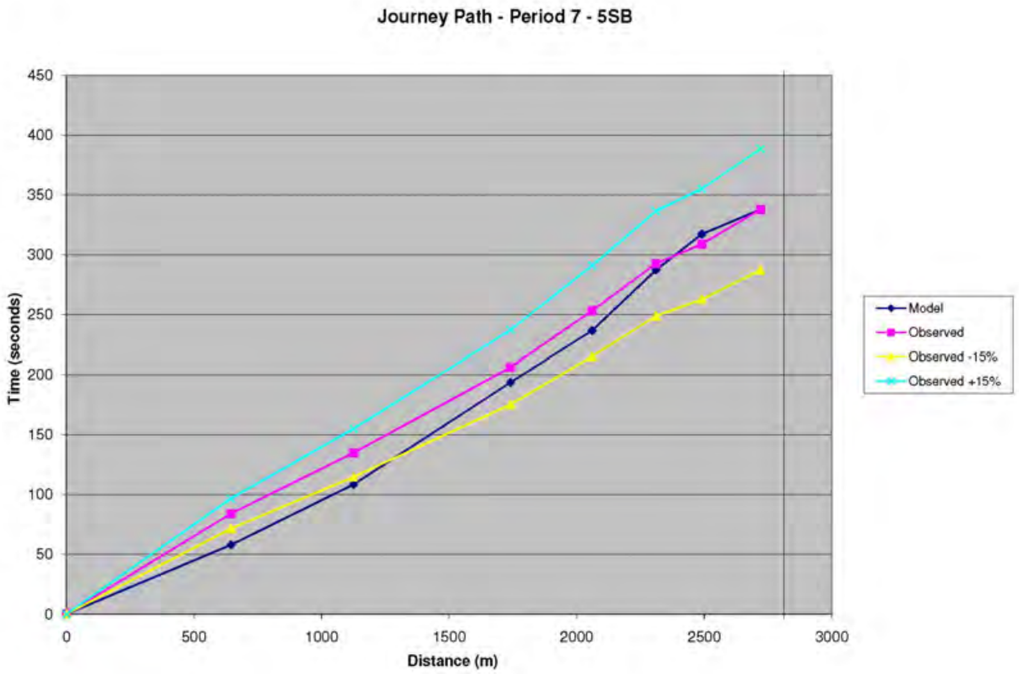

Journey Path - Period 6 - 2NB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
900
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

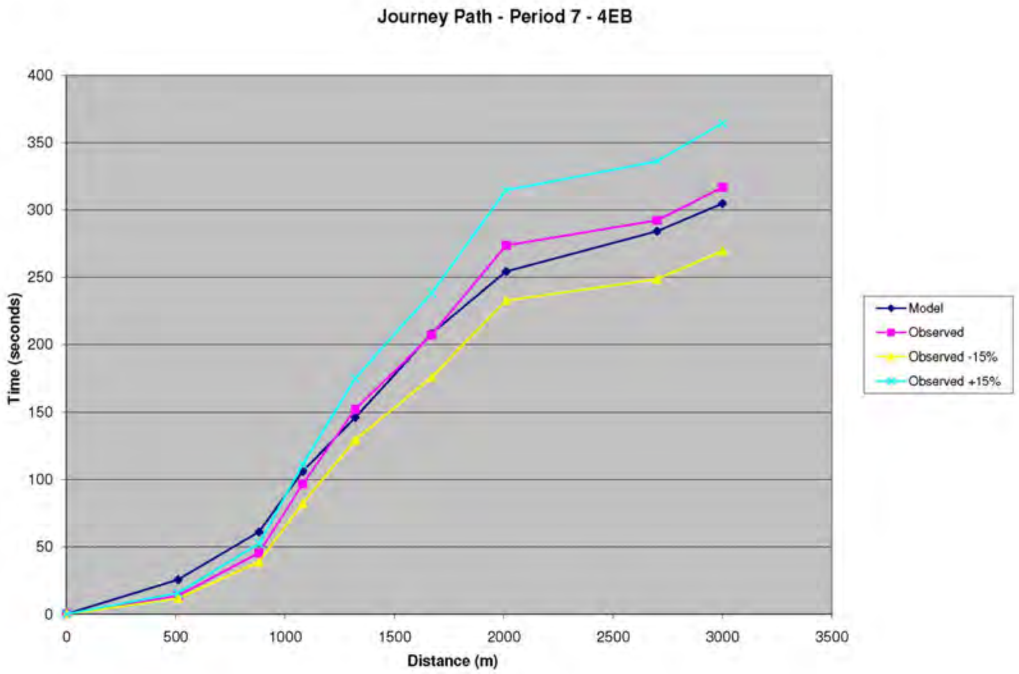

Journey Path - Period 6 - 2SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
100
200
300
400
500
600
700
800
900
0
1000
2000
3000
4000
5000
6000
7000
8000

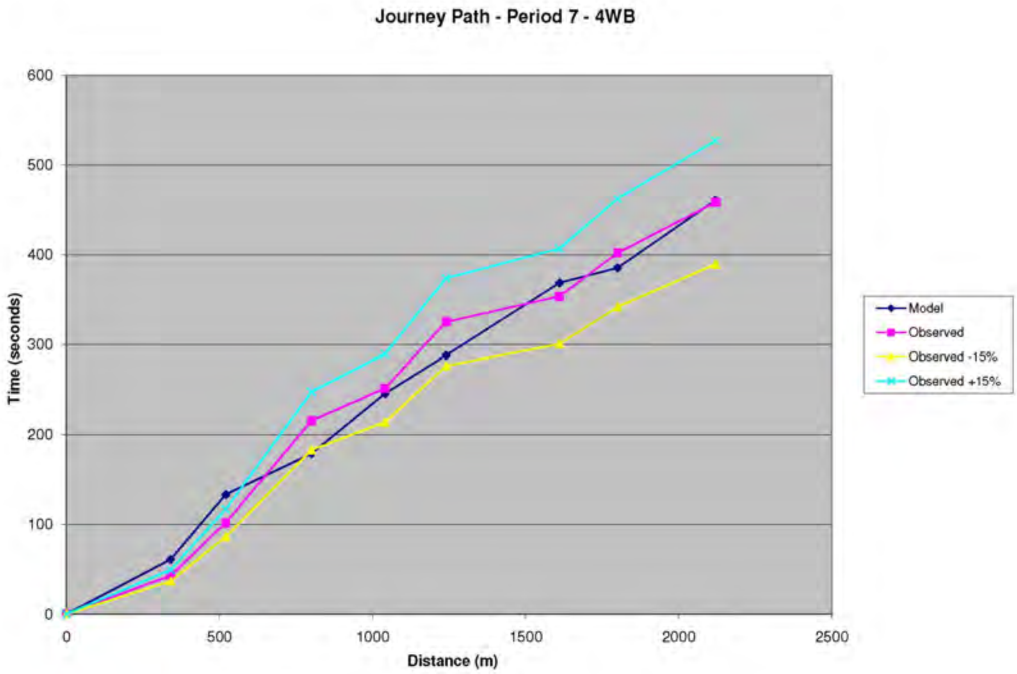

Journey Path - Period 6 - 1NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
50
100
150
200
250
300
350
400
450
500
0
1000
2000
3000
4000
5000
6000

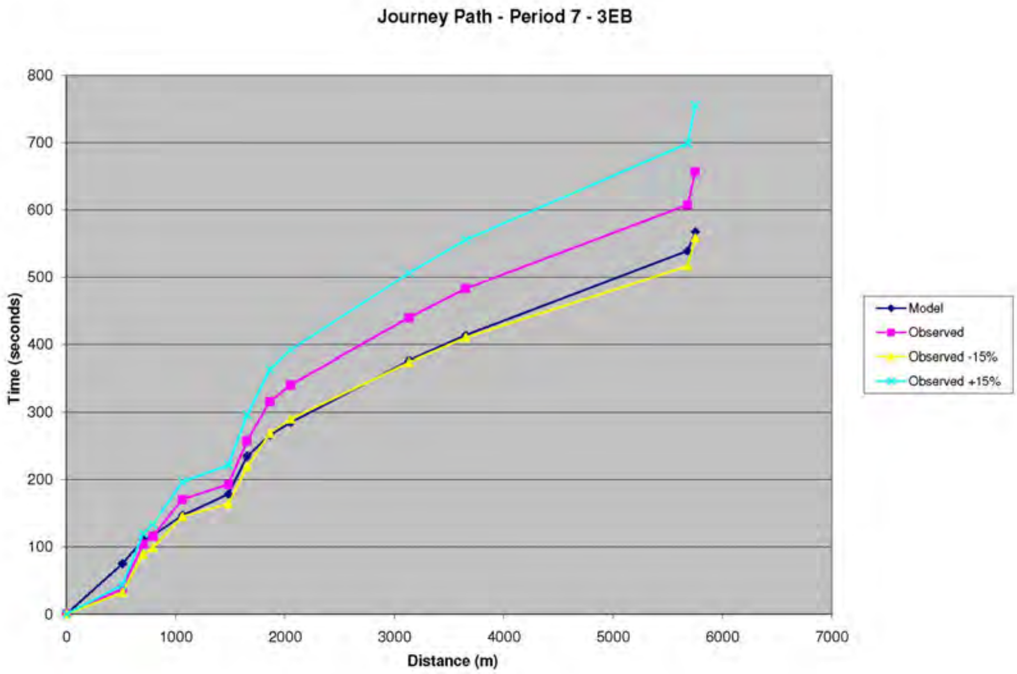

Journey Path - Period 6 - 1SB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Model
Observed
Observed -15%
Observed +15%

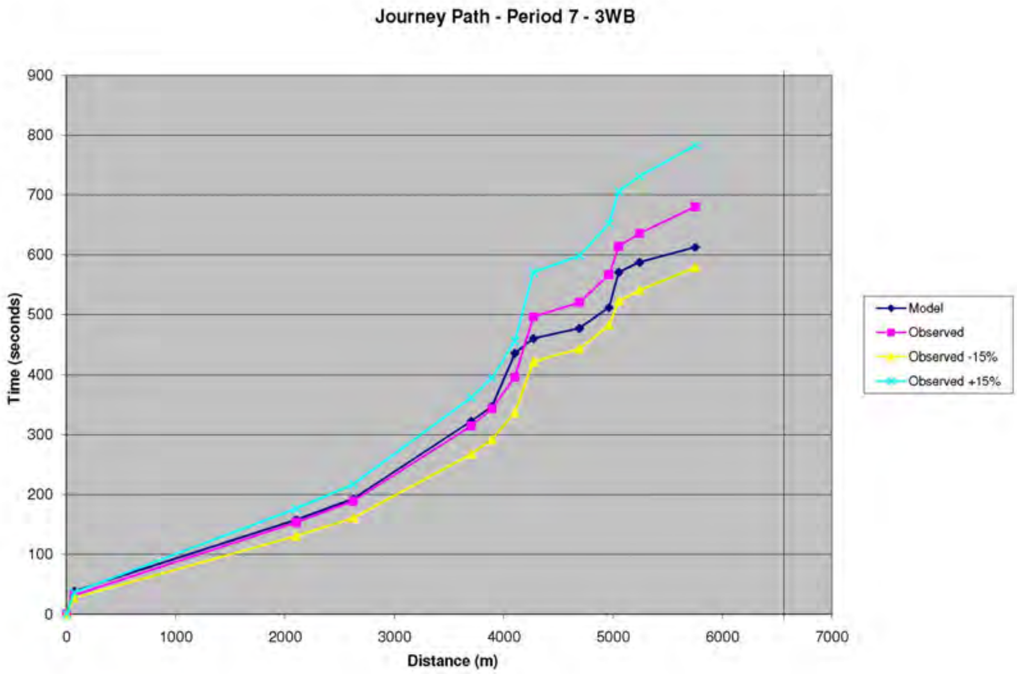

Journey Path - Period 7 - 5NB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
500
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%

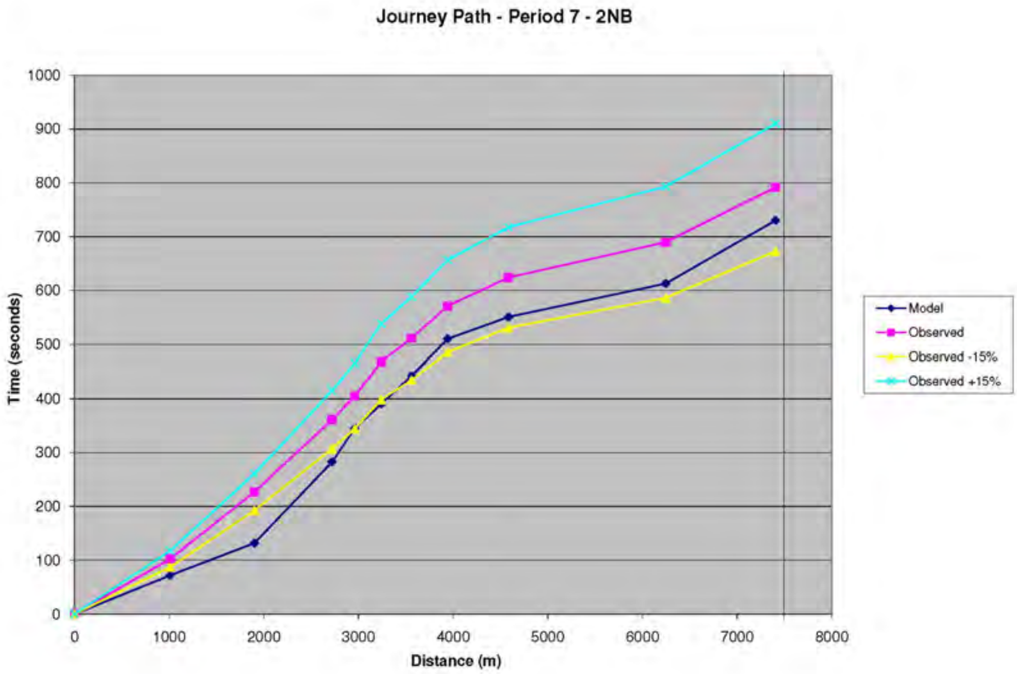

Journey Path - Period 7 - 5SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000


Journey Path - Period 7 - 4EB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
50
100
150
200
250
300
350
400
0
500
1000
1500
2000
2500
3000
3500


Journey Path - Period 7 - 4WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

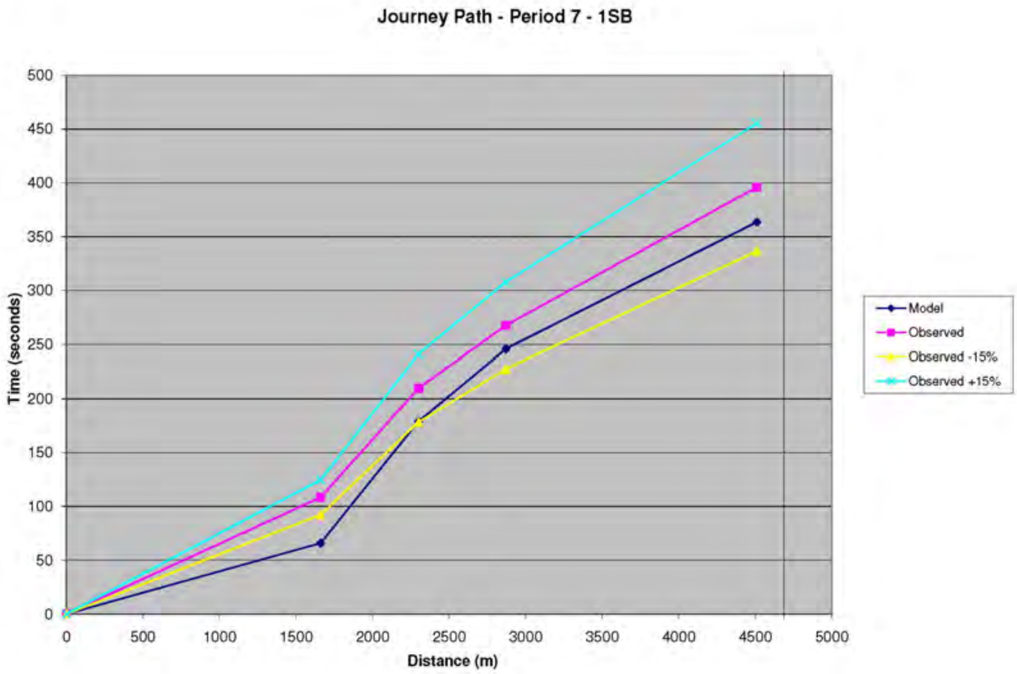

Journey Path - Period 7 - 3EB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%

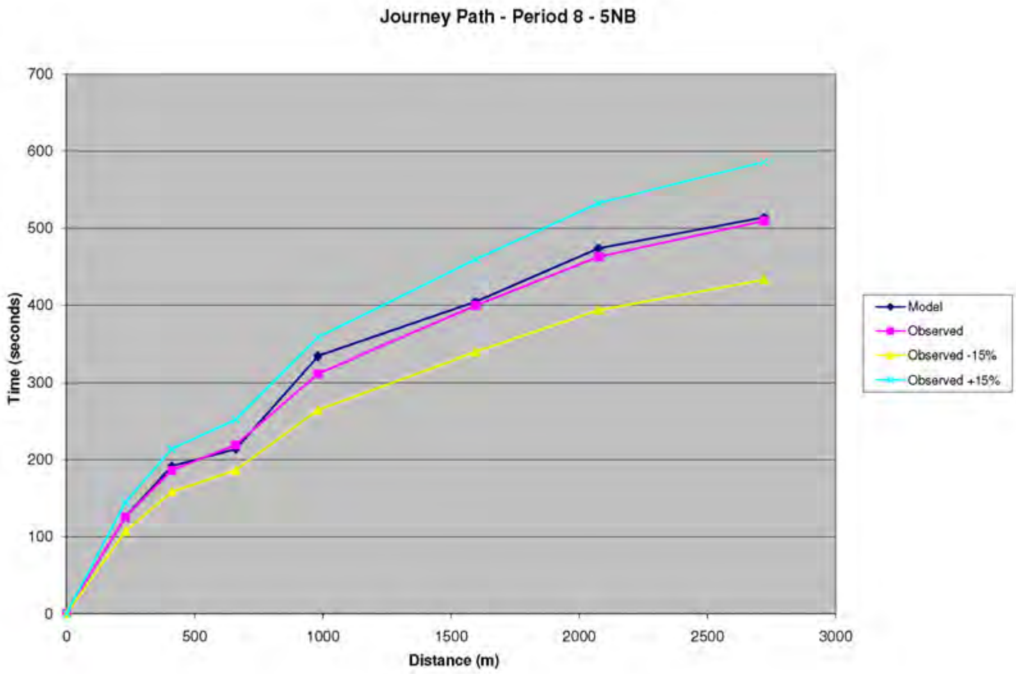

Journey Path - Period 7 - 3WB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

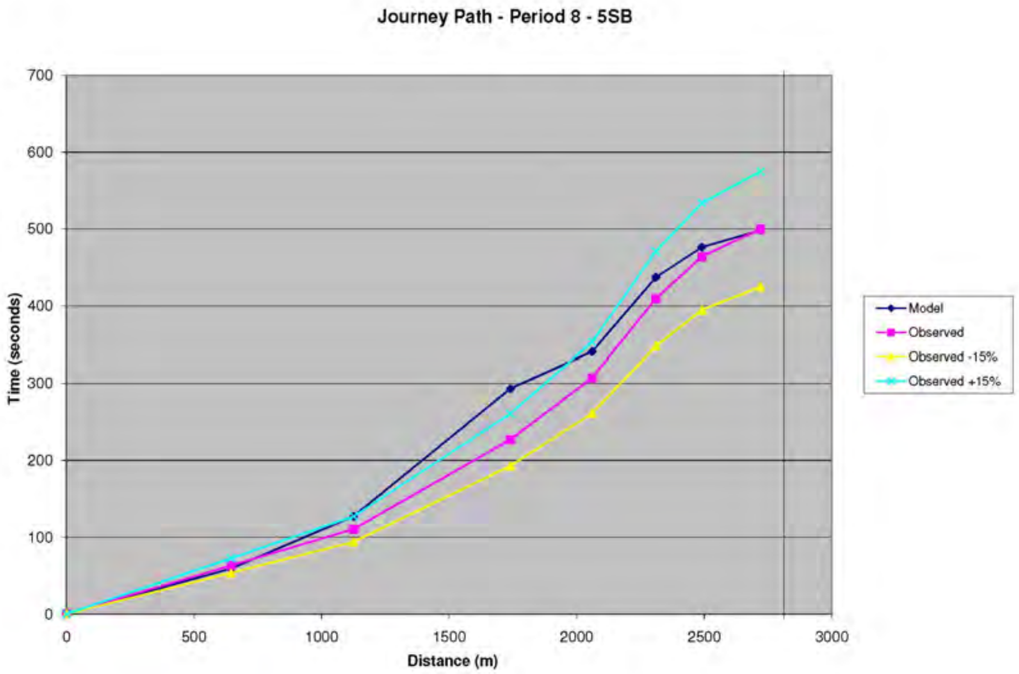

Journey Path - Period 7 - 2NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

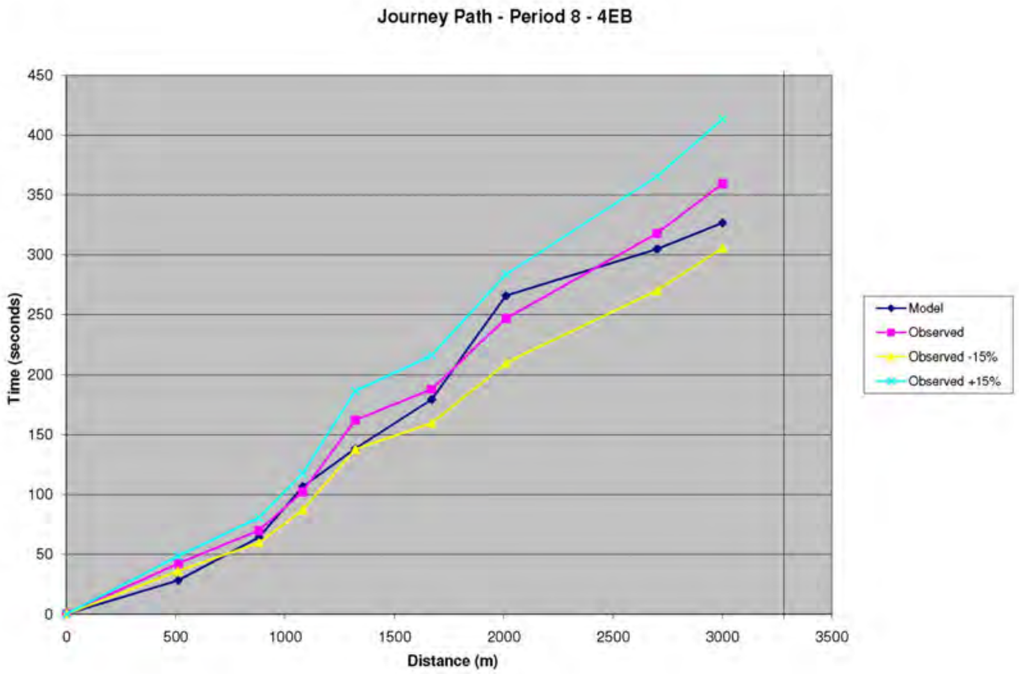

Journey Path - Period 7 - 2SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 7 - 1NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 7 - 1SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

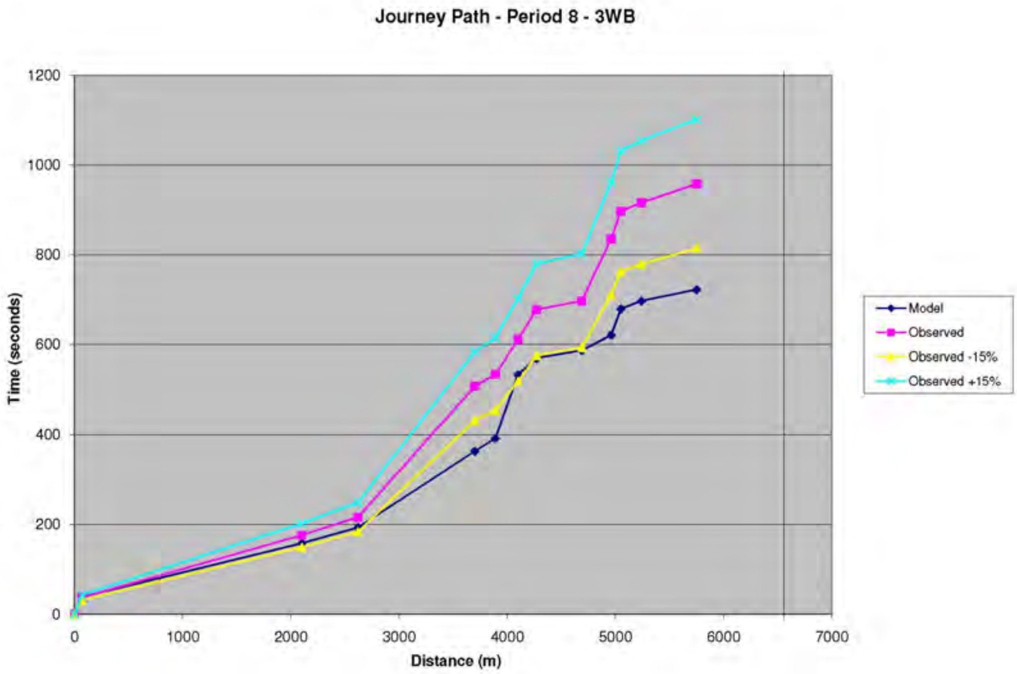

Journey Path - Period 8 - 5NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

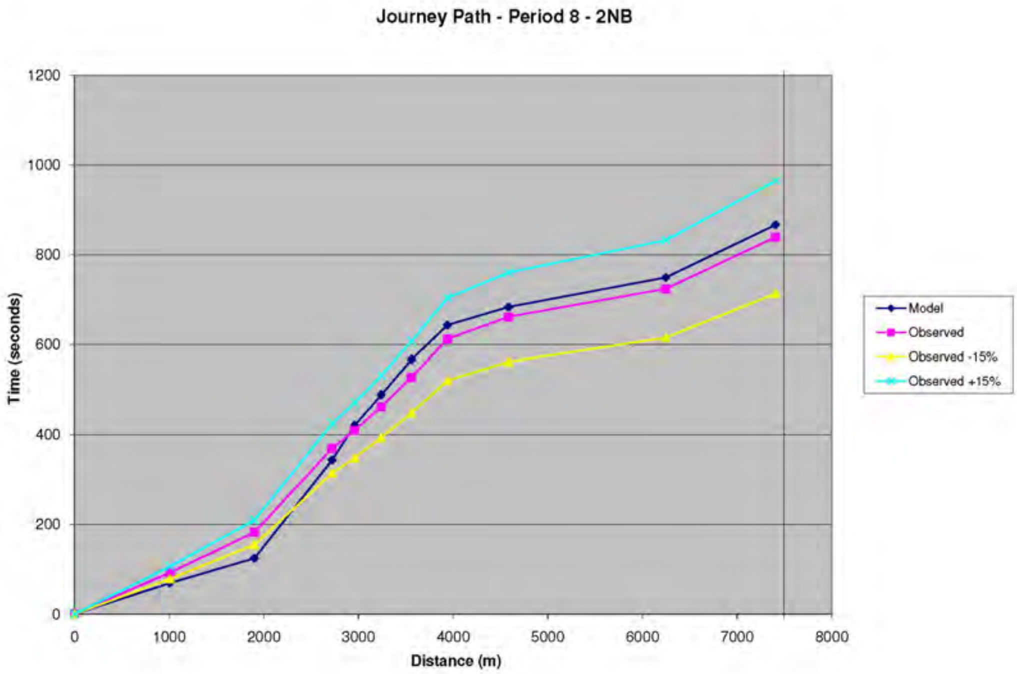

Journey Path - Period 8 - 5SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 8 - 4EB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

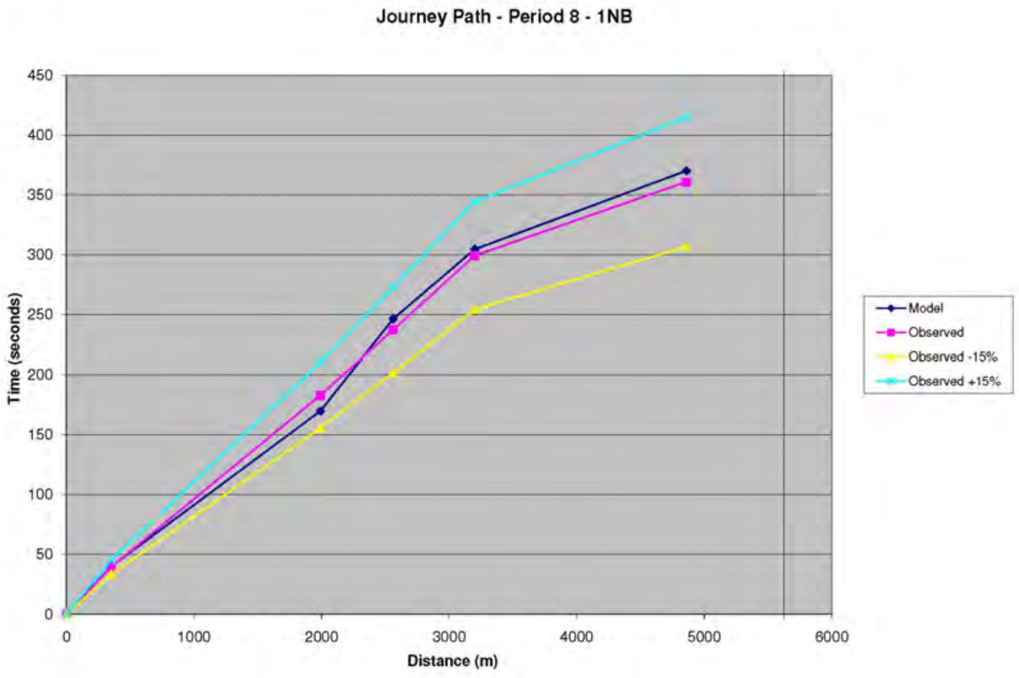

Journey Path - Period 8 - 4WB
Time (seconds)
Distance (m)
700
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

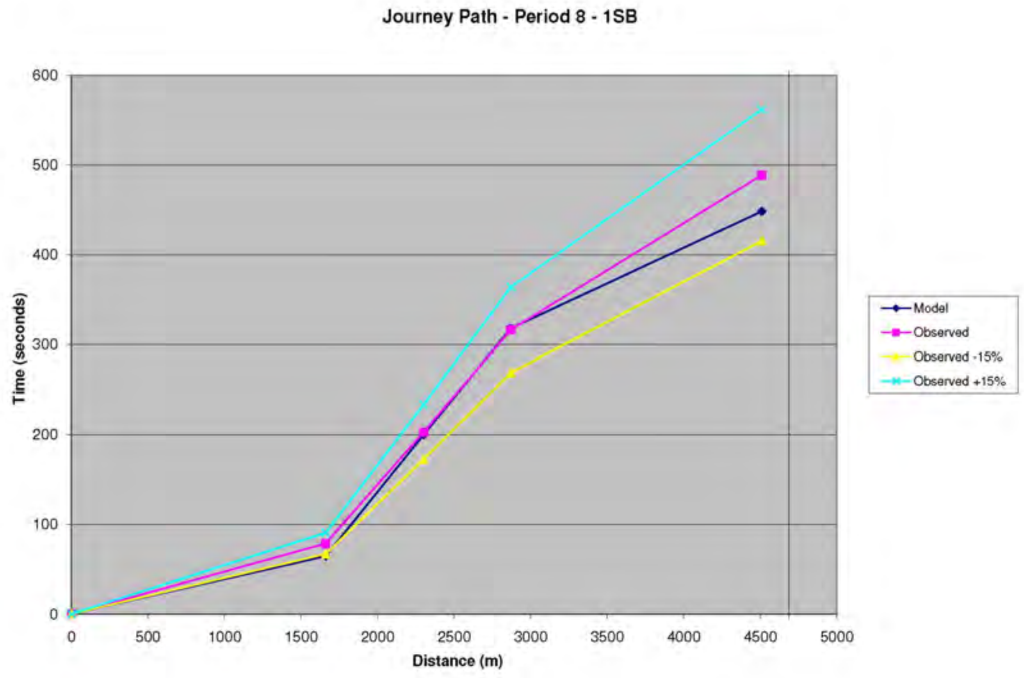

Journey Path - Period 8 - 3EB
Time (seconds)
Distance (m)
800
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 8 - 3WB
Time (seconds)
Distance (m)
0
200
400
600
800
1000
1200
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 8 - 2NB
Time (seconds)
Distance (m)
0
200
400
600
800
1000
1200
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 8 - 2SB
Time (seconds)
Distance (m)
0
200
400
600
800
1000
1200
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

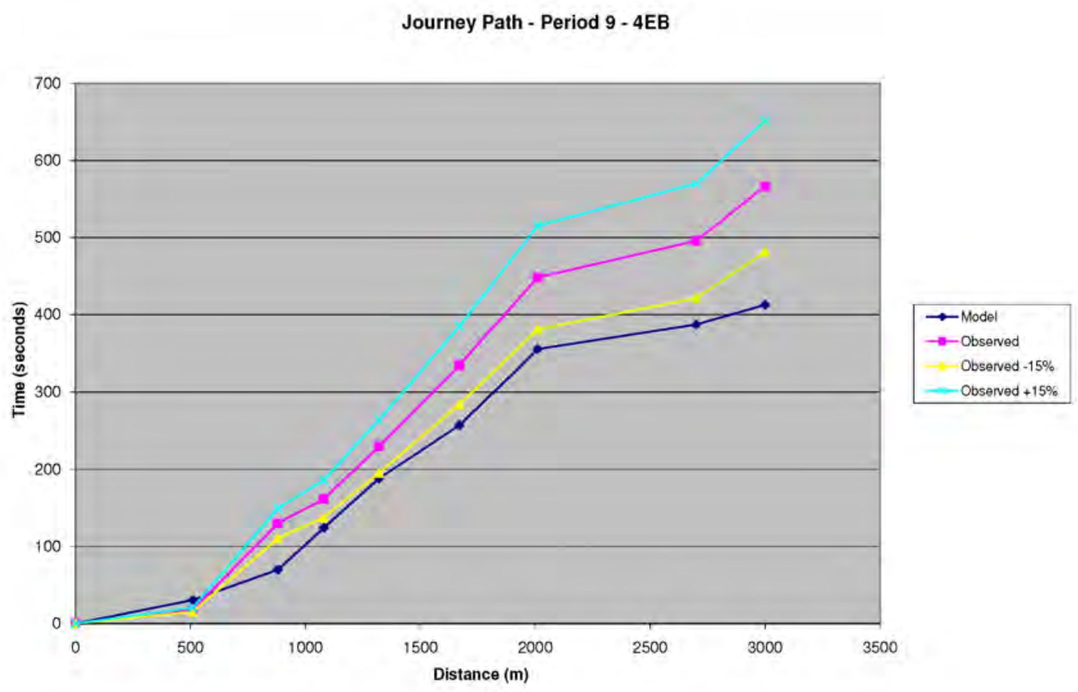

Journey Path - Period 8 - 1NB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
450
0
1000
2000
3000
4000
5000
6000
Model
Observed
Observed -15%
Observed +15%



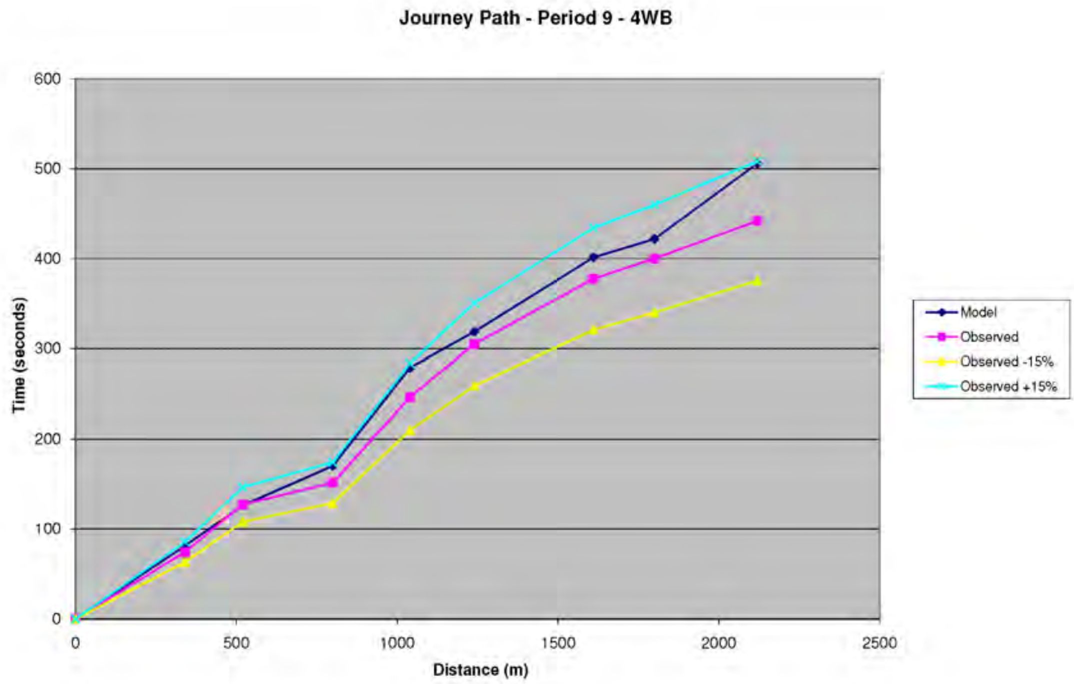
Journey Path - Period 8 - 1SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

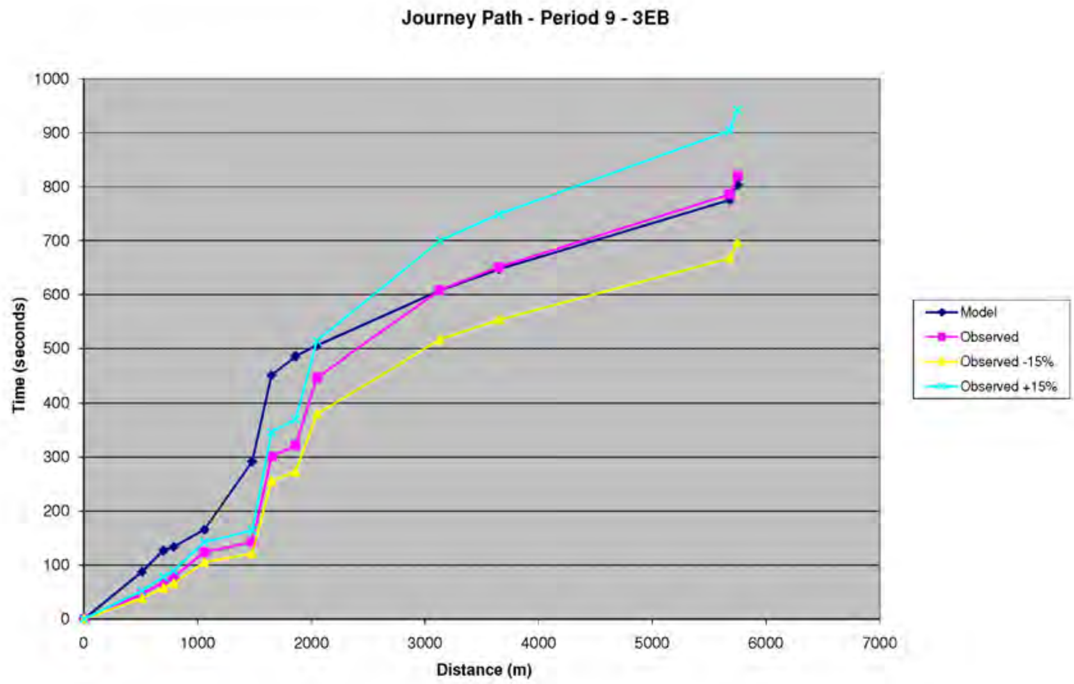
Journey Path - Period 9 - 5NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

Journey Path - Period 9 - 5SB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%



Journey Path - Period 9 - 4EB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
0
500
1000
1500
2000
2500
3000
3500
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 9 - 4WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 9 - 3EB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
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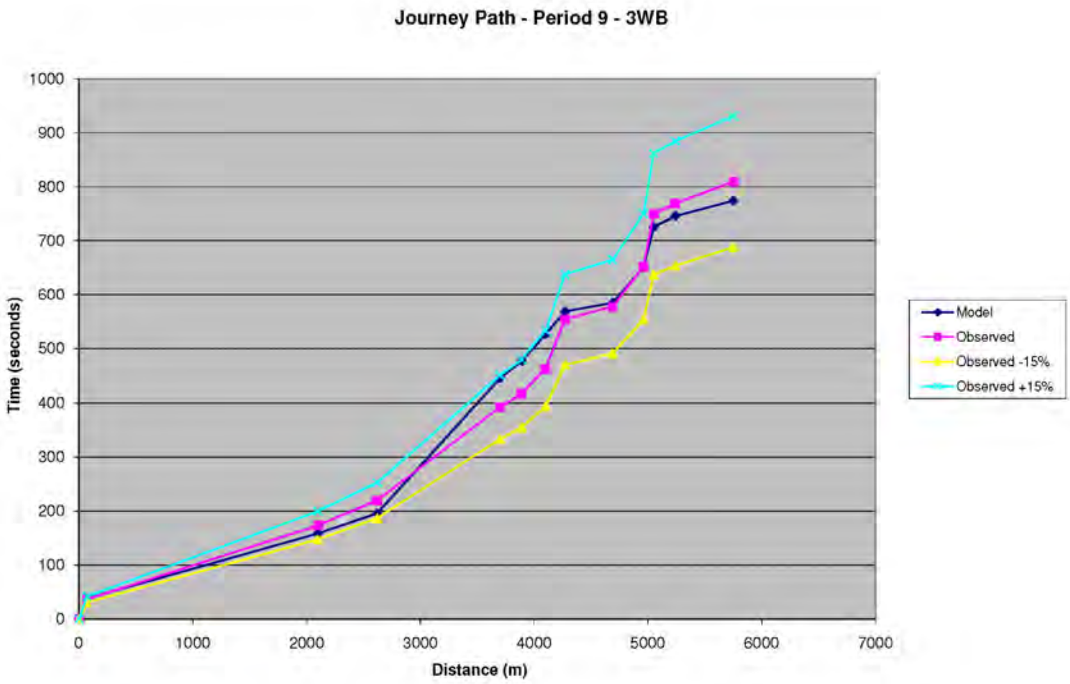
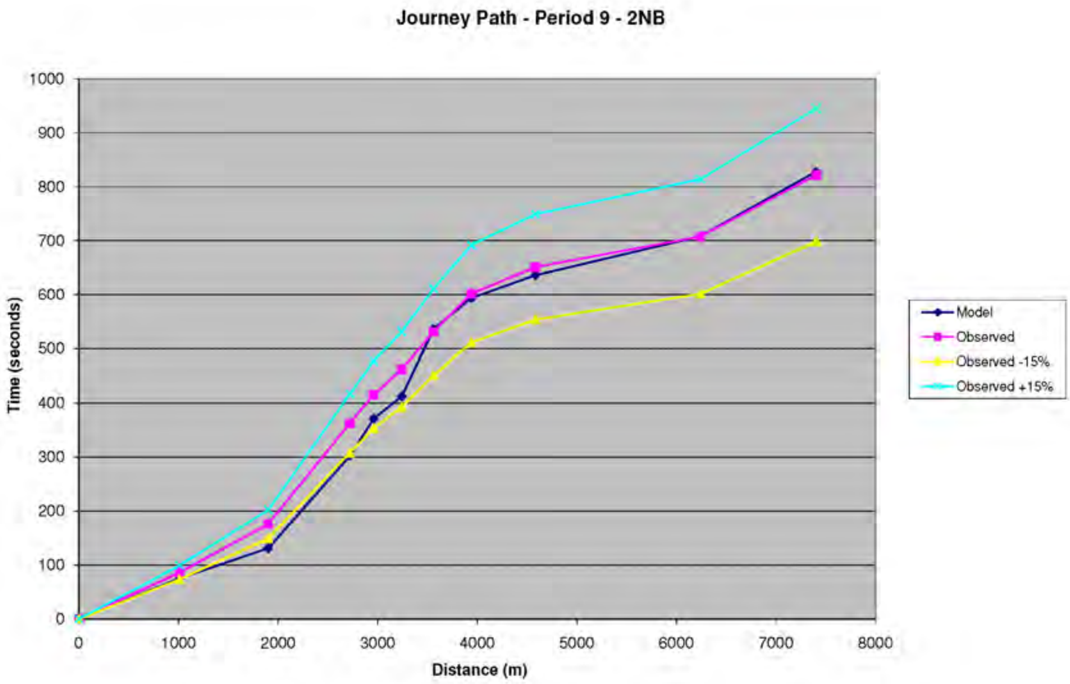
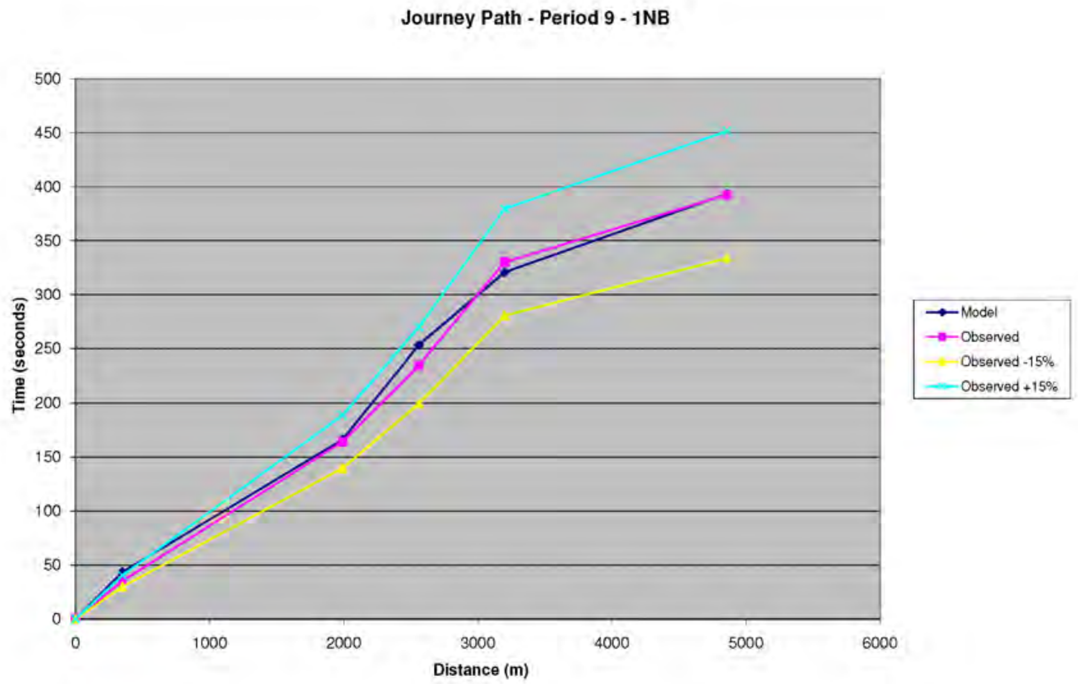
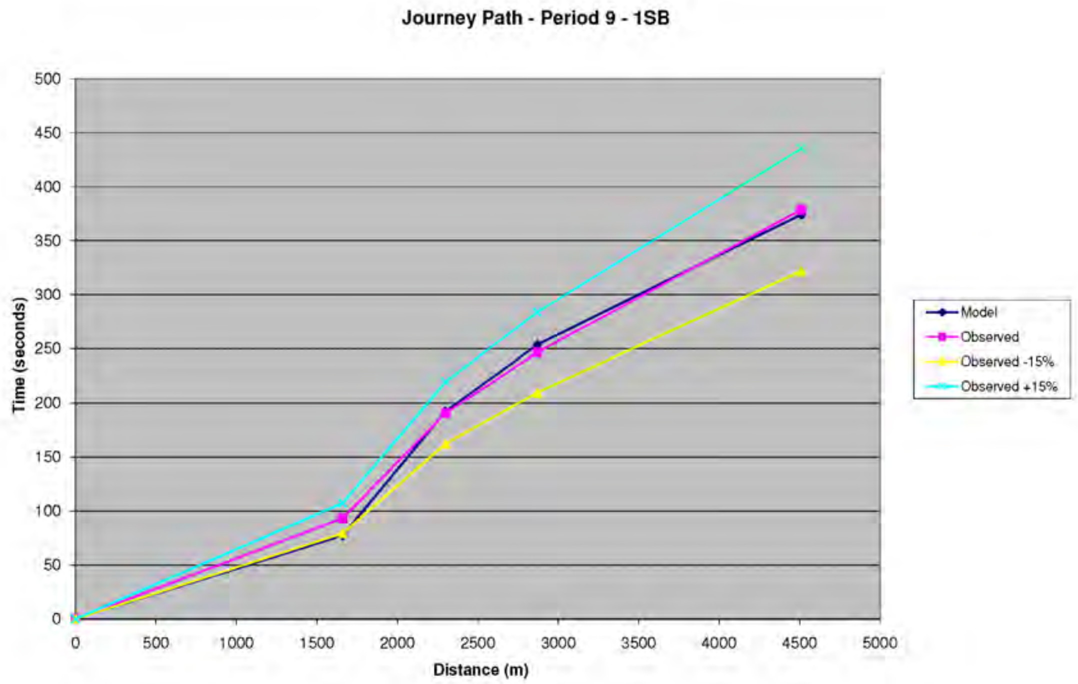
1000
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 9 - 3WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
900
1000
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 9 - 2NB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
900
1000
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

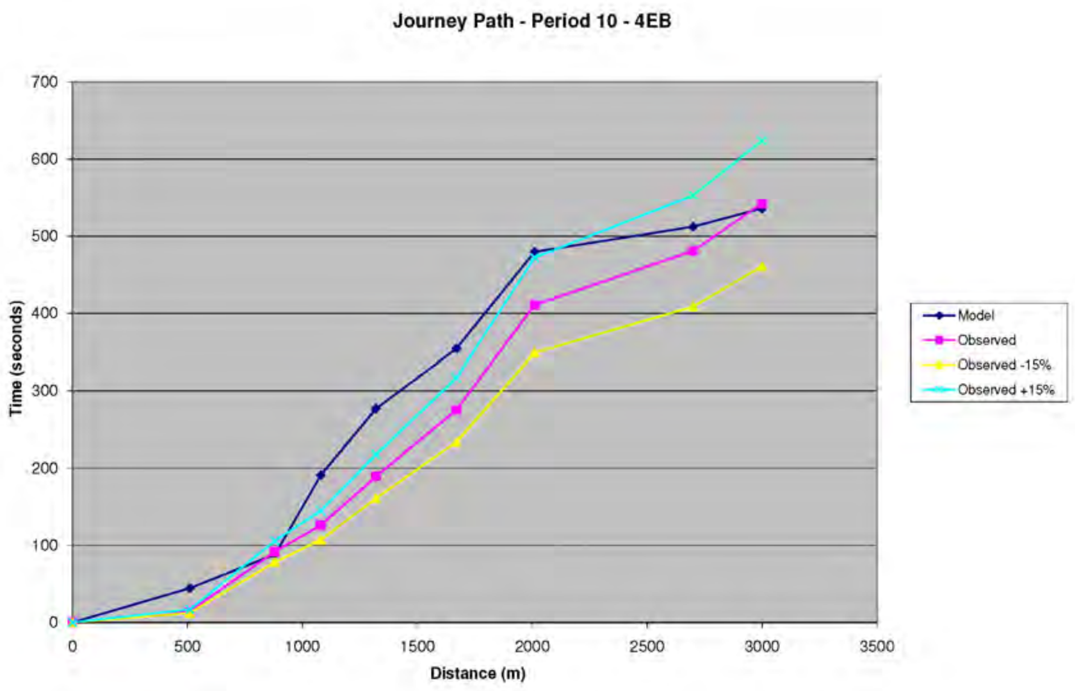

Journey Path - Period 9 - 2SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
100
200
300
400
500
600
700
800
900
1000
0
1000
2000
3000
4000
5000
6000
7000
8000

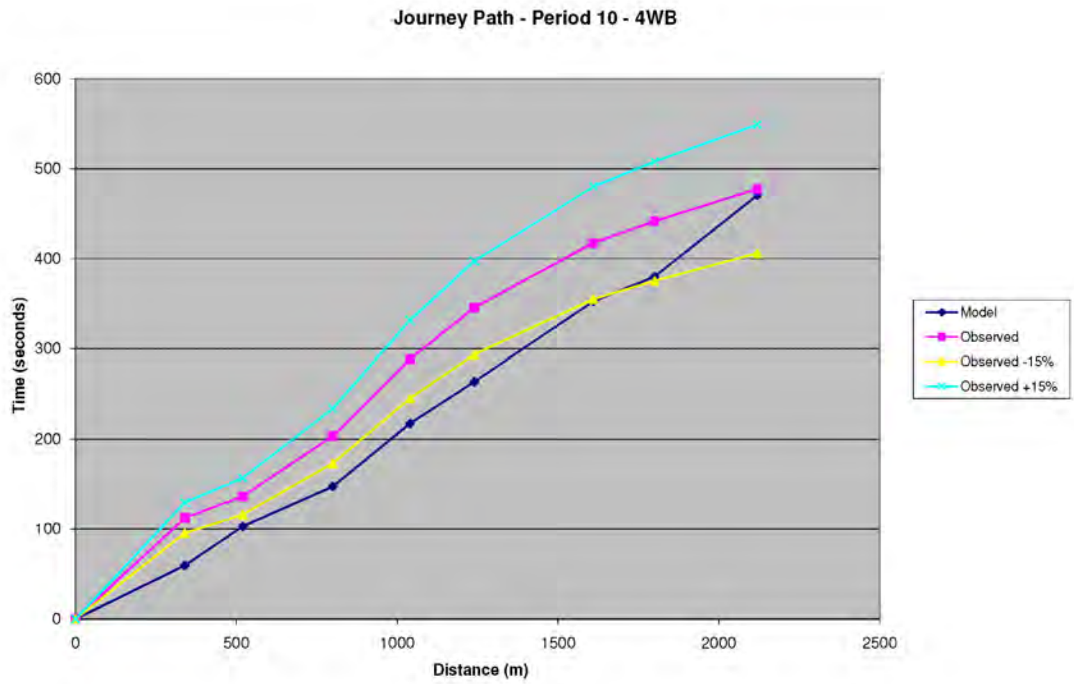

Journey Path - Period 9 - 1NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
50
100
150
200
250
300
350
400
450
500
0
1000
2000
3000
4000
5000
6000


Journey Path - Period 9 - 1SB
Time (seconds)
500
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Distance (m)
Model
Observed
Observed -15%
Observed +15%

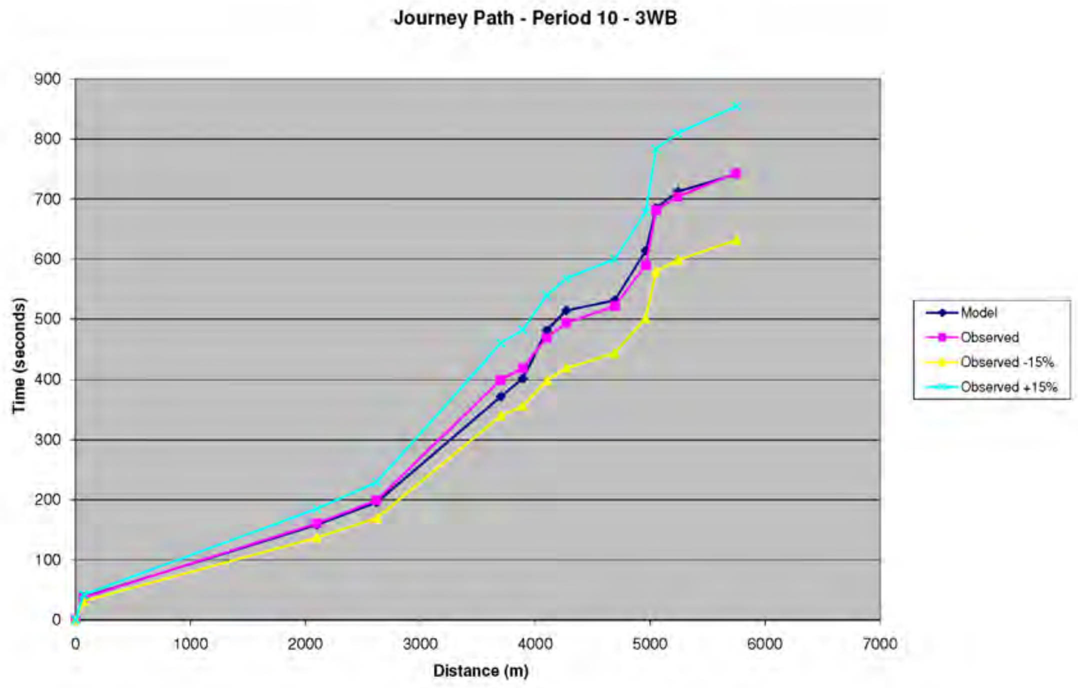

Journey Path - Period 10 - 5NB
Time (seconds)
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 10 - 5SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
100
200
300
400
500
600
700
800
900
0
500
1000
1500
2000
2500
3000

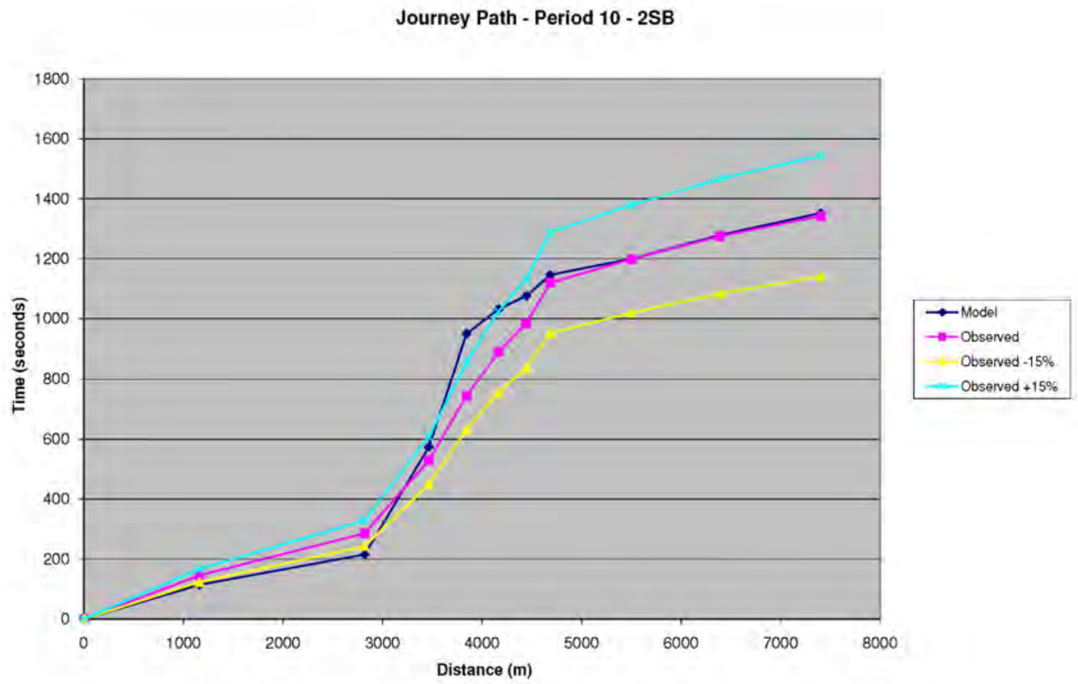

Journey Path - Period 10 - 4EB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
100
200
300
400
500
600
700
0
500
1000
1500
2000
2500
3000
3500


Journey Path - Period 10 - 4WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
0
500
1000
1500
2000
2500
Model
Observed
Observed -15%
Observed +15%

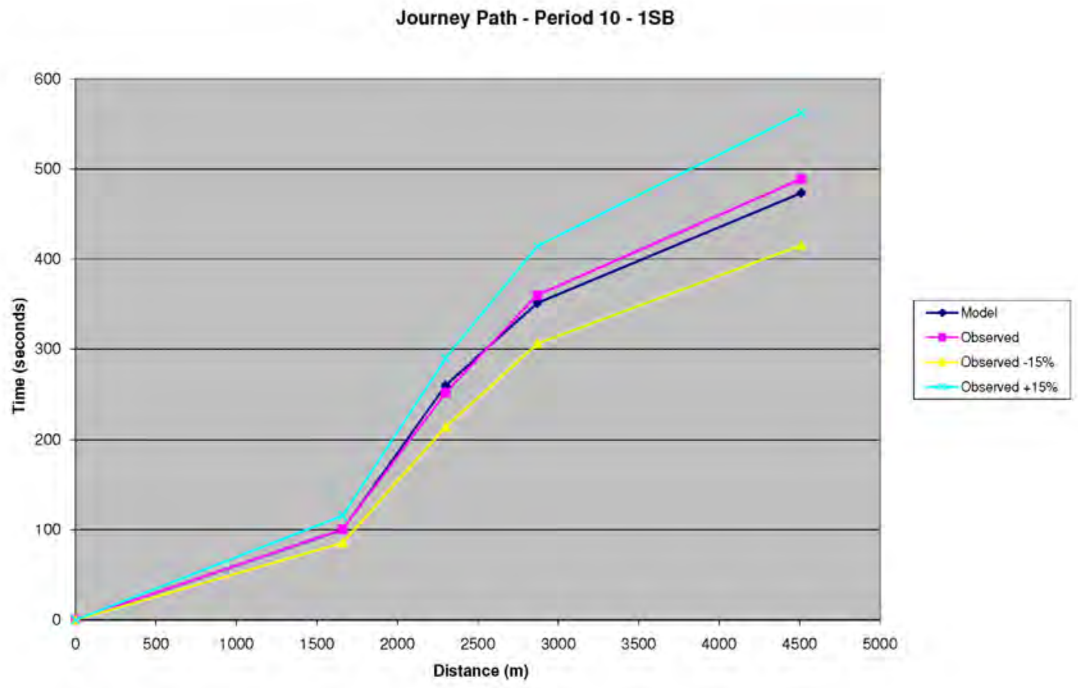

Journey Path - Period 10 - 3EB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
900
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 10 - 3WB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 10 - 2NB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

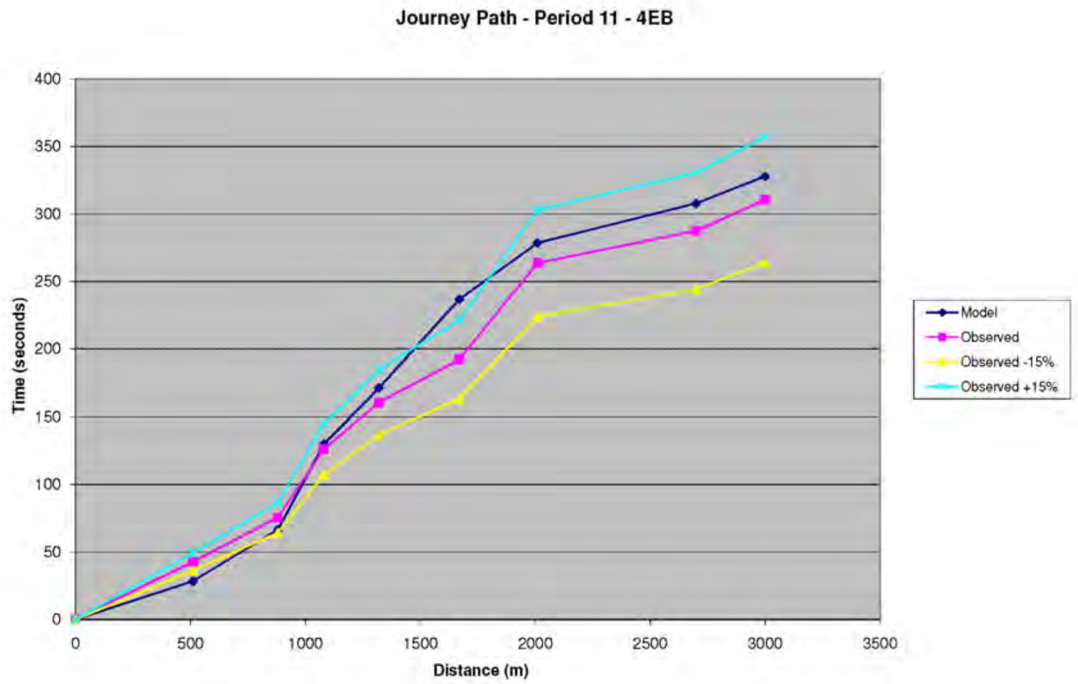

Journey Path - Period 10 - 2SB
Time (seconds)
Distance (m)
0
200
400
600
800
1000
1200
1400
1600
1800
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%

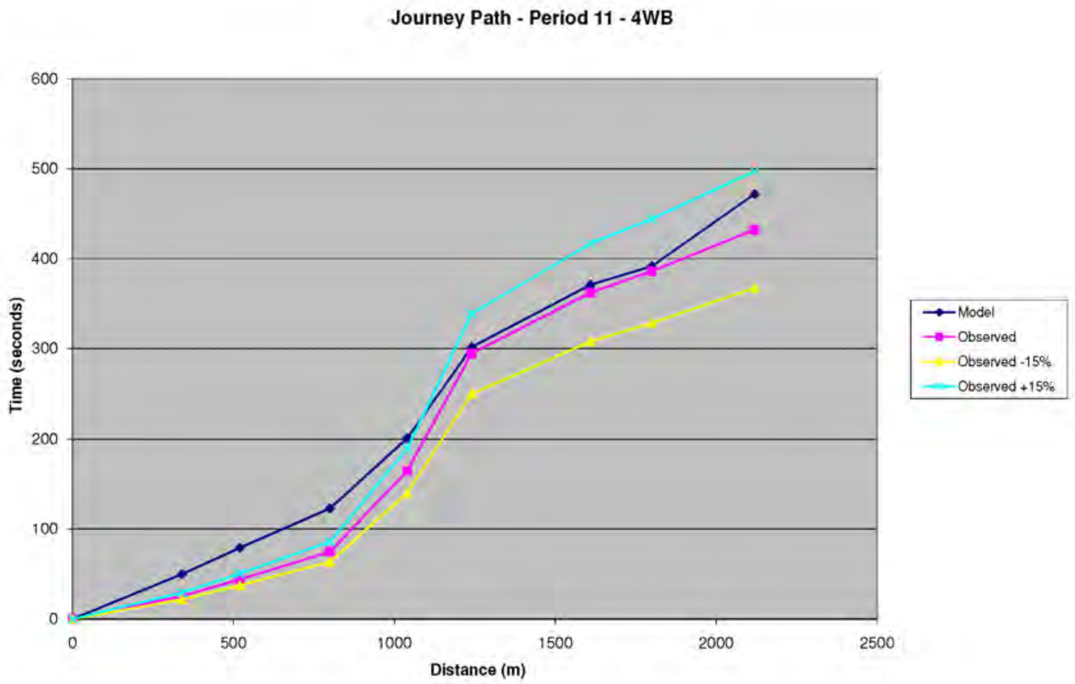

Journey Path - Period 10 - 1NB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
0
1000
2000
3000
4000
5000
6000
Model
Observed
Observed -15%
Observed +15%

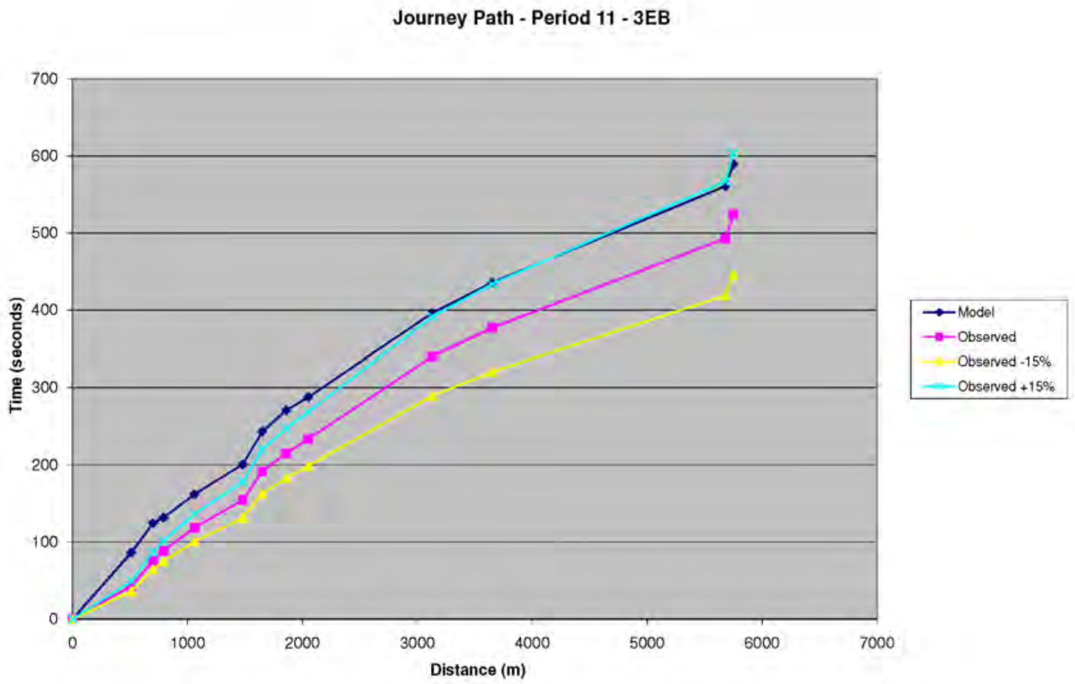

Journey Path - Period 10 - 1SB
600
500
400
300
200
100
0
Time (seconds)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Distance (m)
Model
Observed
Observed -15%
Observed +15%

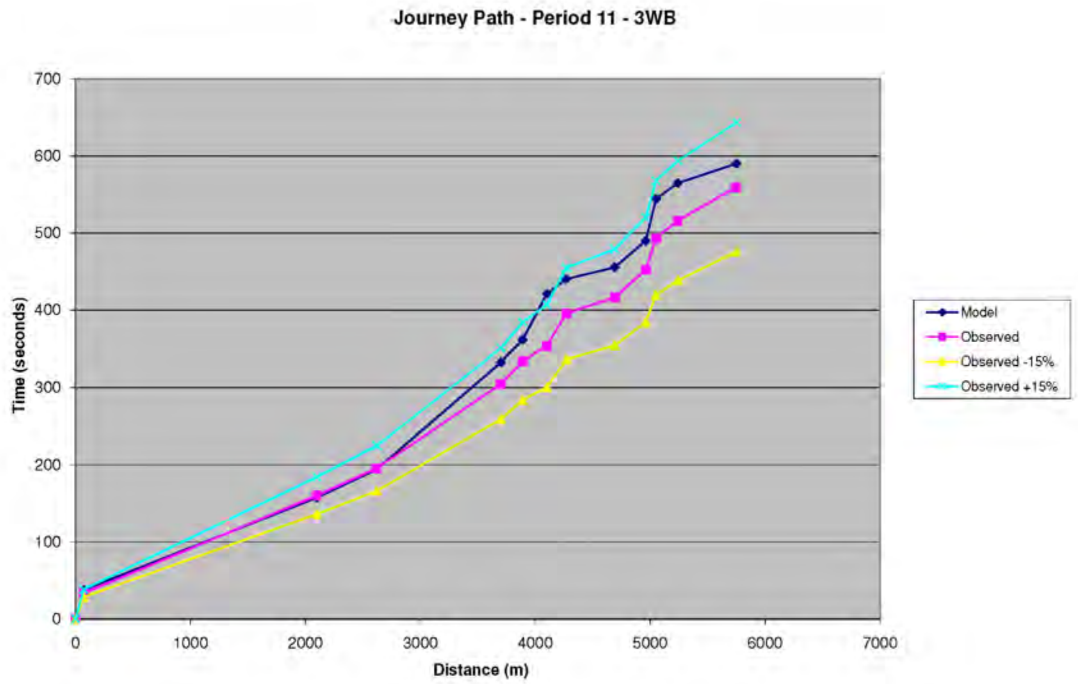

Journey Path - Period 11 - 5NB
400
350
300
250
200
150
100
50
0
Time (seconds)
0
500
1000
1500
2000
2500
3000
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 11 - 5SB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
50
100
150
200
250
300
350
400
450
500
500
1000
1500
2000
2500
3000

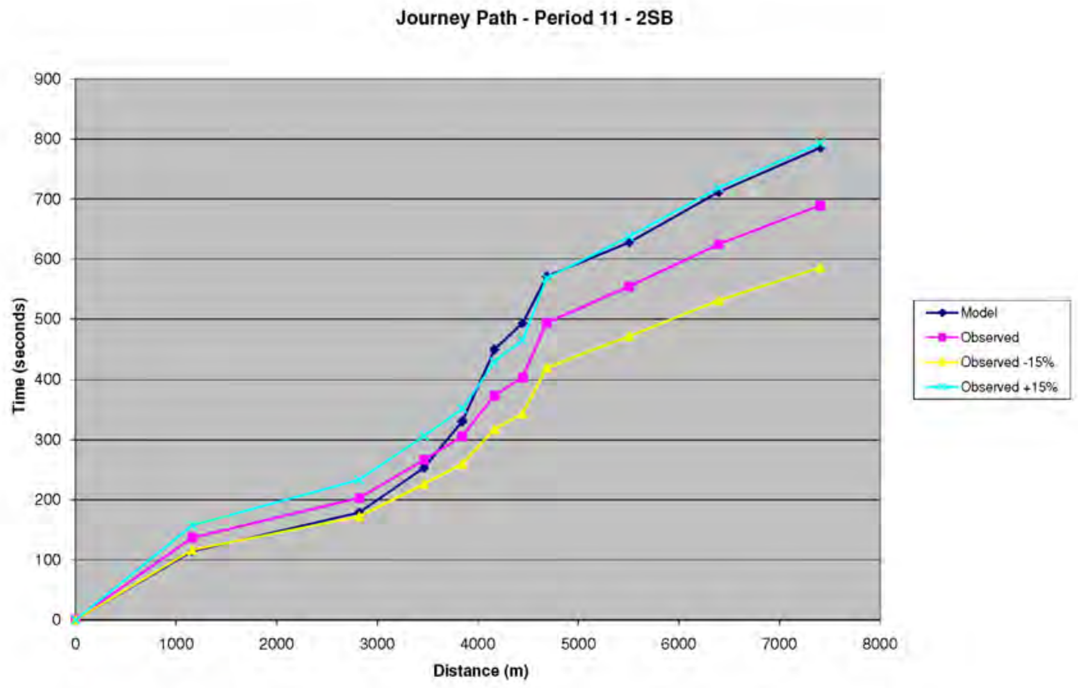

Journey Path - Period 11 - 4EB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%
0
50
100
150
200
250
300
350
400
500
1000
1500
2000
2500
3000
3500


Journey Path - Period 11 - 4WB
Time (seconds)
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 11 - 3EB
Time (seconds)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 11 - 3WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 11 - 2NB
Time (seconds)
Distance (m)
0
200
400
600
800
1000
1200
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 11 - 2SB
Time (seconds)
Distance (m)
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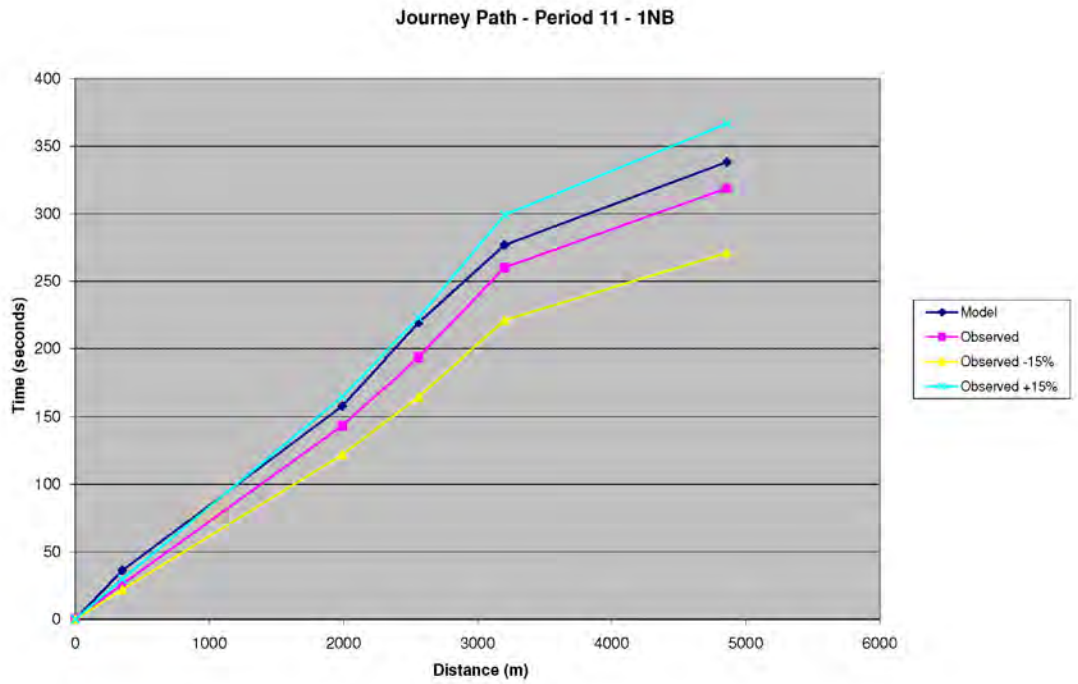
100
200
300
400
500
600
700
800
900
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%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Time (seconds)
Distance (m)
0
50
100
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200
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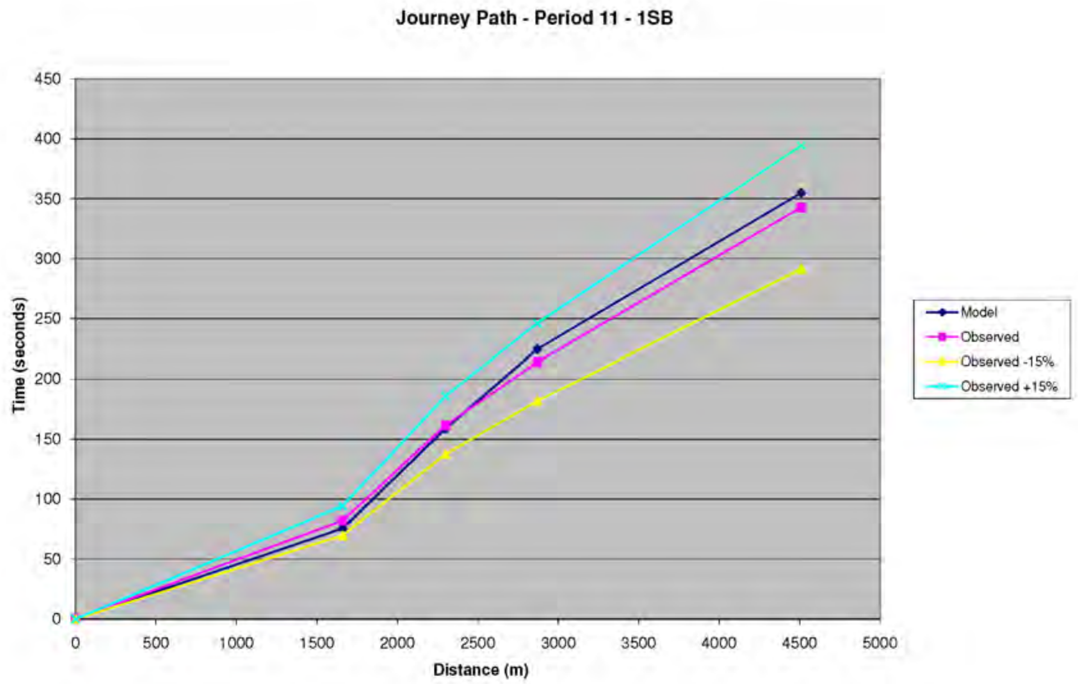
300
350
400
0
1000
2000
3000
4000
5000
6000
Model
Observed
Observed -15%
Observed +15%



Journey Path - Period 11 - 1SB
Time (seconds)
Distance (m)
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50
100
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200
250
300
350
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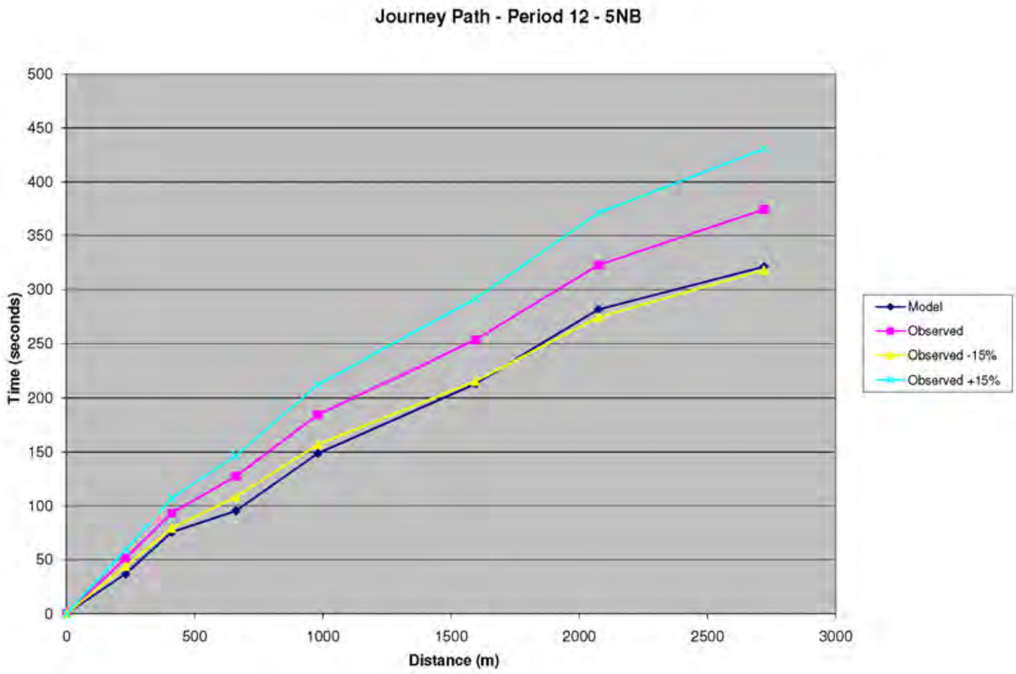
1000
1500
2000
2500
3000
3500
4000
4500
5000
Model
Observed
Observed -15%
Observed +15%



Journey Path - Period 12 - 5NB
Time (seconds)
Distance (m)
0
50
100
150
200
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300
350
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450
500
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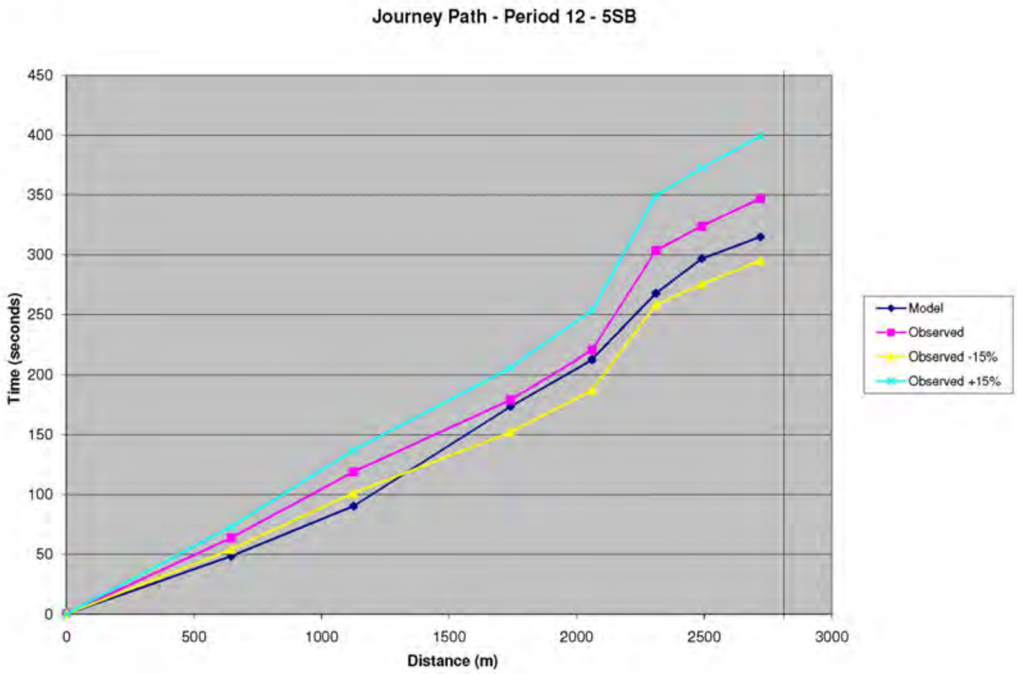
Model
Observed
Observed -15%
Observed +15%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Distance (m)
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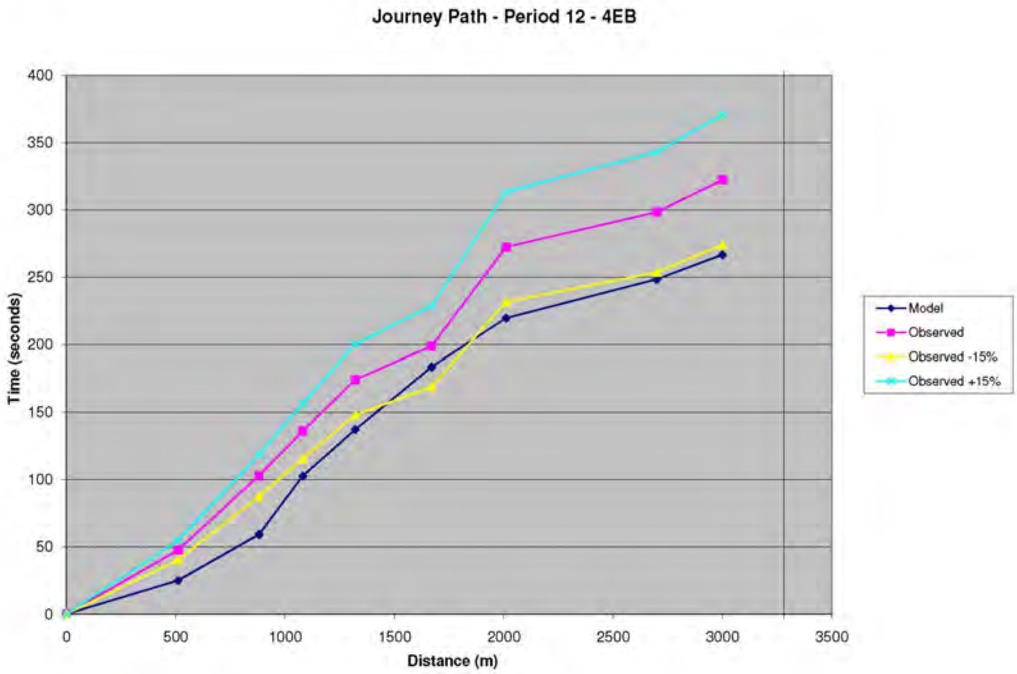
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 12 - 4EB
Time (seconds)
Distance (m)
0
50
100
150
200
250
300
350
400
0
500
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1500
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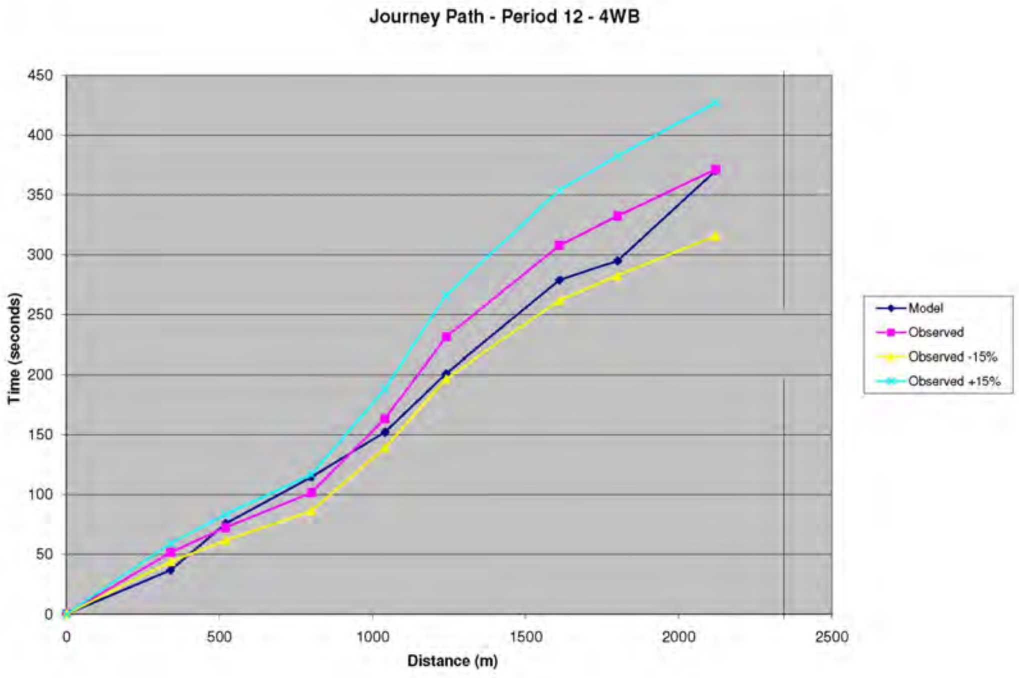
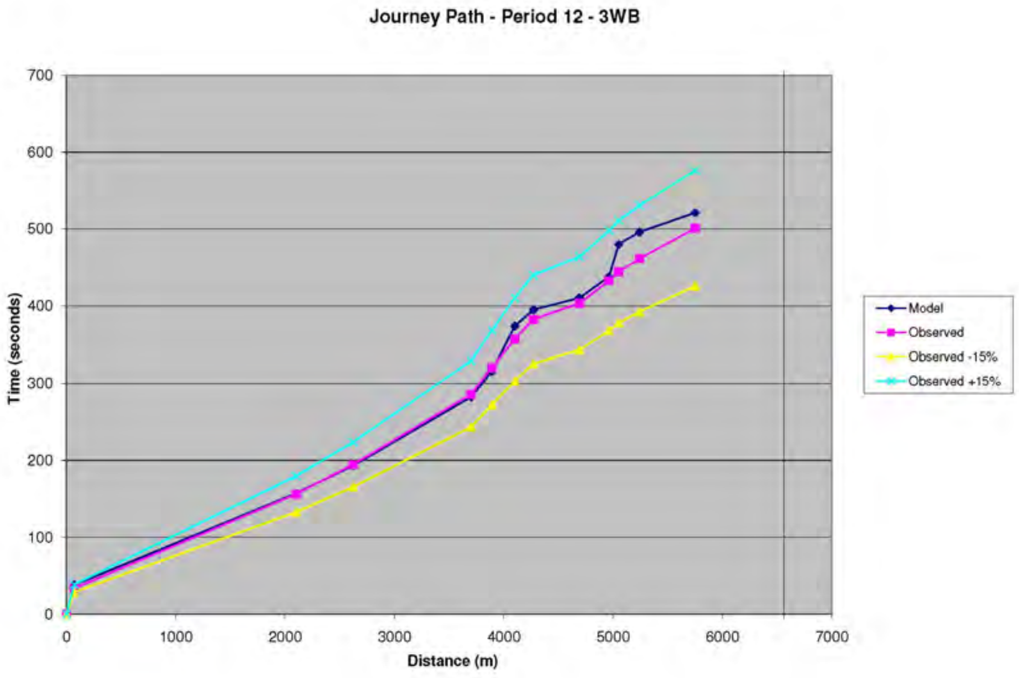
2500
3000
3500
Model
Observed
Observed -15%
Observed +15%



Journey Path - Period 12 - 4WB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%

Journey Path - Period 12 - 3EB
Time (seconds)
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 12 - 3WB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
0
1000
2000
3000
4000
5000
6000
7000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 12 - 2NB
Time (seconds)
Distance (m)
0
100
200
300
400
500
600
700
800
900
0
1000
2000
3000
4000
5000
6000
7000
8000
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 12 - 2SB
800
700
600
500
400
300
200
100
0
Time (seconds)
0
1000
2000
3000
4000
5000
6000
7000
8000
Distance (m)
Model
Observed
Observed -15%
Observed +15%


Journey Path - Period 12 - 1NB
400
350
300
250
200
150
100
50
0
Time (seconds)
0
1000
2000
3000
4000
5000
6000
Distance (m)
Model
Observed
Observed -15%
Observed +15%

APPENDIX 15.2: FORECASTING REPORT

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15.2 INTRODUCTION

15.2.1.1 Savell Bird & Axon has been retained by EDF to provide traffic and transportation advice in relation to the development of two new European Pressurised Reactor (EPR) nuclear power stations at Hinkley Point.

15.2.1.2 These will be provided adjacent to the site of the existing A and B Reactors.

15.2.1.3 To allow the assessment of the impacts of the proposed development on the highway network in Bridgwater and the surrounding area, SBA has produced a PARAMICS micro-simulation model.

15.2.1.4 In order to undertake an assessment of the future year scenario a calibrated and validated base model has been produced.

15.2.1.5 In September 2010, the validated 2009 baseline model containing 11 time periods was signed off by SCC Somerset County Council (SCC), as the local highway authority, and the Highways Agency (HA) and is therefore deemed acceptable for future use.

15.2.1.6 This report includes the methodology, assumptions and steps taken to produce future year 'Do Nothing' scenarios. Where possible the methodology has already been agreed with SCC's and the HA's highways consultants.

15.2.1.7 Future year 'Do nothing' models have been produced for 2013, 2016 and 2021. These models were submitted to the HA and SCC in March 2011 and in July 2011 they were signed off in lieu of this forecasting report.

15.2.1.8 In February 2011, SBA was asked to submit the future year models without any optimisation. In response, SCC's and the HA's consultants provided feedback, and as such these comments have been integrated into the 'Do Nothing' scenarios presented in this report.

15.2.2 Assessment Years

15.2.2.1 The agreed years of assessment are 2013, 2016 and 2021.

15.2.2.2 Therefore, 2013, 2016 and 2021 'Do Nothing' scenarios have been produced, each with the inclusion of 11 time periods.

a) Matrix Levels

15.2.2.3 The Future year 'Do Nothing' scenarios each contain 10 matrix levels per period. This is a change to the 2009 baseline model which only contains 2 matrix levels.

15.2.2.4 The 'Do Nothing' matrix levels are set out below:

- Matrix level 1 – Baseline Light Vehicle flows.
- Matrix level 2 – Baseline Heavy Vehicle flows.
- Matrix level 3 – Committed Development Light Vehicles.

- Matrix level 4 – Committed Development Heavy Vehicles.
- Matrix level 5 – Growth Matrix Light Vehicles.
- Matrix level 6 – Growth Matrix Heavy Vehicles.
- Matrix level 7 – Development Vehicles.
- Matrix level 8 – Development Vehicles.
- Matrix level 9 – Development Vehicles.
- Matrix level 10 – Development Vehicles.

15.2.2.5 Matrix levels 7 to 10 are all zeroed since they are included to provide matrix levels for the future year development case models.

15.2.3 Background Growth

15.2.3.1 The methodology for applying growth has been developed in partnership with SCC's and HA's consultants and is set out below.

15.2.3.2 In order to determine the background growth it has been agreed with SCC and the HA that the following datasets will be used:

- NTEM 2009.
- TEMPRO 5.4.

15.2.3.3 NTEM factors, dependant on the origin and destination zone's road classification, are used to factor External trips (external to external zones).

15.2.3.4 TEMPRO 5.4 factors, dependant on period and the origin and destination locations, are used to factor Internal trips (any trip originating and/or ending in an internal zone). The process is summarised below:

- Each Zone within the model is categorised as being either internal or external (i.e. a cordon or loading zone).
- Each zone is then assigned a relative TEMPRO factor based on its location within the model area.
- Each external zone is assigned an NTEM factors based on the road type, flow and an understanding of the local area.
- Trips between external to external zones are factored by the external NTEM factor associated with the zone's road classification.
- Trips associated with internal zones are factored by the respective TEMPRO factor.
- O-D's are then factored by both origin and destination and a furnessing procedure applied to reconcile the differences. This is carried out for each modelled hour.

15.2.3.5 As full TEMPRO/NTEM growth has been applied to the base matrix it was agreed that an element of committed development allocations will already be included within these factors. To prevent double counting the following agreed methodology was derived;

15.2.3.6 If internal growth exceeds the committed development matrices only the finessed difference is then included as the ‘background’ growth, and the full committed development matrix included as the ‘committed development’ matrix. If the committed development matrices exceed the internal growth derived from the growth factors then only the committed development matrix will be included; the assumption being that all growth has been captured within the committed development inclusions.

15.2.3.7 It should be noted that in carrying out the above process the growth and committed development matrices should be grouped together where possible to match the periods defined within TEMPRO (i.e. 07:00 to 10:00 and 16:00 to 19:00). TEMPRO provides periodic growth as opposed to hourly growth so by combining the hours we insure that the level of growth included in the calculation is not restricted to a specific hour.

15.2.4 Committed Developments

15.2.4.1 A list of committed developments to be included in the future year models was agreed with SCC.

15.2.4.2 Sedgemoor council provided build out times for each of the committed developments. This enabled the quantum of development to be estimated at the point of the 2009 survey. The tables below list the committed developments and their build out in 2009 and the growth from 2009 to 2013, 2016 and 2021.

15.2.4.3 They are shown in **Table 15.1** below;

Table 15.1: Committed Development Housing

Housing Locations	Zone	2009	2013 Growth	2016 Growth	2021 Growth
42-44 St John's Street	59	0	0	0	0
Land at Horsepond	8	24	0	0	0
Monmouth Trading Estate	7	0	26	53	53
Land east of Colley Lane	41	0	0	0	0
Land at Old Taunton Road Industrial Estate	10	37	39	39	39
MOT Garage, All saints Terrace	41	0	0	0	0
The Old Armoury, Blake Street	8	0	0	0	0
Wemdon Road	4	0	0	212	212
George Street	8	14	0	0	0
St Mary Street/George Street	8	0	0	31	31
NDR	44	344	0	0	0
South Bridgwater	23	452	450	1,008	1,008
North east Bridgwater	63	0	350	750	1750
Bigwood & Staple, The Clink	7	0	0	0	0
Federal Mogul, Colley Lane	41	0	0	126	126
Crypton Technologies, Bristol Rd	18	0	0	40	40
Bridgwater Rugby Club, Bath Rd	64	0	0	0	0

15.2.4.4 The end column in **Table 15.1** and **Table** 15.2 therefore details the quantum of committed development that has been added into the 2021 scenarios.

Table 15.2: Committed Development Employment

		GFA in 100 sq m - 2009				GFA in 100 sq m - 2013 Growth				GFA in 100 sq m - 2016 Growth				GFA in 100 sq m - 2021 Growth			
Employment Locations	**Zone**	**B1**	**B2**	**B8**	**A1**	**B1**	**B2**	**B8**	**A1**	**B1**	**B2**	**B8**	**A1**	**B1**	**B2**	**B8**	**A1**
Land at Somerset Bridge (B8)	61			0				0				0				0	
Land at Salmon Parade (B1/B2)	41	0	0			0	0			0	0			0	0		
Express Park	19	0	0			0	0			70	0			70	0		
Land North of Express Park B1/B8	19	0		0		0		0		0		0		0		0	
Regional agricultural Business Centre, J.24	29	0	0	0	0	0	0	0	0	5	0	44	9	10	0	87	17
Bristol Road, B1/B8	54	0		0		0		0		70		25		70		25	
Little Sydenham Farm/Innovia	63	0	0	0	0	0	0	720	0	180	0	720	0	360	0	720	0
Town Centre (including Northgate)	60			0				0				0				0	
Land at East Quay	53		14				0				0				0		
Show Ground	61		151				0				0				0		
Huntworth	61		0				0				0				0		

15.2.5 Trip Generation

15.2.5.1 The trip rate methodology was agreed at modelling workshops with JMP. It was agreed that the TRICS database would be used to produce average trip rates for the committed developments.

15.2.5.2 The committed development land uses are set out below:

- Residential.
- B1 Offices.
- B2 Industry.
- B8 Distribution.

- A1 Retail.

15.2.5.3 The details of the trip generation are taken from a note produced by JMP on the 7th October 2010 and are set out below;

15.2.5.4 All vehicle trip rates were generated for all uses with the exception of B8. In each case the TRICS sites used to derive the trip rates were limited to sites of the same classification. A development category was selected from within TRICS that best reflected the committed development sites. In each case the TRICS sites used to derive the trip rates were limited to sites of the same classification.

a) Residential

15.2.5.5 Sedgemoor Policy H30 states:

15.2.5.6 On suitable allocated and windfall housing sites, new residential development will be required to provide an element of affordable housing, as defined in the Plan. Based on demonstrated needs, the district-wide target for the overall amount of affordable housing to be provided in Sedgemoor during the remaining Plan period (2004-2011) is 880 units. That represents about 35 % of the total amount of housing to be built on allocated sites above this threshold. Based on the above statement it has been assumed that all residential committed developments will consist of 35% affordable. The number of dwellings has therefore been split into the two components before being applied to the trip rates. ‘Private’ and ‘Non-private’ trip rates have been used to reflect this. Based on the above statement it has been assumed that all residential committed developments will consist of 35% affordable. The number of dwellings has therefore been split into the two components before being applied to the trip rates. ‘Private’ and ‘Non-private’ trip rates have been used to reflect this.

15.2.5.7 Without the specific details for each residential development it is not possible to know the dwelling type mix. As such, the trip rates from TRICS have been based on mixed residential sites, including varying numbers of houses and flats. The above assumptions have resulted in a set of two different trip rates for use on all residential developments. The TRICS categories are as follows:

- Land Use 03 - RESIDENTIAL/L - MIXED NON-PRIVATE HOUSING.
- Land Use 03 - RESIDENTIAL/K - MIXED PRIVATE HOUSING.

b) B1 Offices

15.2.5.8 The following TRICS category was used to determine the trip rate for office developments:

- Land Use 02 - EMPLOYMENT/A – OFFICE.

c) B2 Industry

15.2.5.9 The following TRICS category was used to determine the trip rate for industrial developments:

- Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE.

d) B8 Distribution

15.2.5.10 The following TRICS category was used to determine the trip rate for distribution developments:

- Land Use 02 - EMPLOYMENT/F – WAREHOUSING (COMMERCIAL).

15.2.5.11 As distribution can include a relatively high proportion of 'heavies' it is suggested that the trip rates are split by 'Lights' and 'heavies' and applied to the GFA of the distribution developments. This will also help to refine the HGV growth that otherwise is derived by using the 'all roads' NTEM factor on all ODs in the base model HGV matrix (level 2).

e) A1 Retail

15.2.5.12 The following TRICS category was used to determine the trip rate for retail developments:

- Land Use 01 - RETAIL/I - SHOPPING CENTRE - LOCAL SHOPS

f) TRICS Settings

15.2.5.13 TRICS settings were kept consistent when filtering sites within each development categories. The settings are summarised below:

- Regional filter – excluded Greater London, Northern Ireland and the Republic of Ireland.
- For residential trip rates 'Number of Dwellings' was used as the main selection. For all other developments, Gross Floor Area (GFA) was used.
- Where possible the minimum range was set to half the size of the smallest development in its class, and the maximum set to twice the size of the largest development.
- Saturday and Sundays were excluded.
- Sites described as 'free standing' have been excluded. However, all other location types (e.g. edge of town, town centre etc) have been included as the developments are in various locations. This is intended to provide a fairer average trip rate to be used as our proxy.
- Where possible 'Population < 1mile' was set to exclude 50,000 or greater. 'Population < 5 miles' was set to exclude sites with 100,000 or more.
- Where the above criteria reduced the sample surveys to less than 4 sites the criteria was loosened slightly.

15.2.5.14 The final set of trip rates are presented in **Table 15.3** below:

Table 15.3: Committed Development Employment

	P1		P2		P3		P4		P6		P7		P8		P9		P10		P11		P12	
Periods	**06 – 07:00**		**07 – 08:00**		**08 – 09:00**		**09 – 10:00**		**13 – 14:00**		**14 – 15:00**		**15 – 16:00**		**16 – 17:00**		**17 – 18:00**		**18 – 19:00**		**19 – 20:00**	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Resi mix Non-Private	0	0	0.05	0.09	0.12	0.22	0.14	0.14	0.16	0.14	0.23	0.22	0.19	0.2	0.2	0.2	0.28	0.17	0.18	0.11	0.05	0
Resi Mix Private	0	0	0.03	0.17	0.11	0.32	0.13	0.26	0.15	0.16	0.19	0.15	0.23	0.17	0.27	0.19	0.26	0.18	0.16	0.12	0	0
B1 Offices	0.18	0.03	0.63	0.09	1.75	0.23	0.91	0.3	0.55	0.53	0.38	0.4	0.32	0.46	0.26	0.99	0.19	1.3	0.09	0.46	0	0
B2 Industry Estate	0	0	0.24	0.12	0.32	0.14	0.19	0.16	0.21	0.21	0.15	0.21	0.16	0.21	0.15	0.26	0.09	0.26	0.05	0.1	0	0
A1 Retail	0	0	4.02	3.53	5.08	4.85	6.25	5.72	5.97	5.36	6.05	6.23	6.56	6.56	6.73	6.99	6.68	7.19	5.46	4.91	3.3	3.79
B8 Warehouse: OGV	0.15	0.11	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.01	0.02	0.04	0.04
B8 Warehouse: Lights	0.12	0.11	0.06	0.01	0.04	0.02	0.05	0.02	0.09	0.07	0.02	0.06	0.01	0.05	0.02	0.05	0.02	0.06	0.02	0.03	0	0.03

15.2.6 Distribution

15.2.6.1 It was agreed that the committed distributions be based on census data and gravity modelling assumptions.

15.2.6.2 This approach allows a land use specific distribution whereby residential and employment zones can use census journey to work data and retail can use gravity assumptions.

15.2.6.3 It was agreed that JMP's CITEware software would be the most appropriate tool to combine census and gravity data.

15.2.6.4 A summary of the CITEware software follows;

15.2.6.5 CITEware is a national GIS-derived gravity type model, using census Journey to Work data, OS road information and postcode information. The procedure followed by CITEware is similar to the method of producing a spreadsheet model through working out possible routings and looking at journey times and distances to various possible destinations. The difference is that CITEware automates over 800 processes that are run in minutes whereas a person would likely take days to calculate the equivalent in a spreadsheet.

15.2.6.6 The conceptual basis of the modelling technique used in CITEware was developed by JMP for Warwickshire County Council and the Highways Agency in order to provide a robust strategic modelling tool to allow the authority to measure the impact of planned developments on the strategic road network.

15.2.6.7 The concept of a model utilising journey time and distance to predict strategic journey routing has been evolved over time to incorporate a number of routing behaviour rules, and a finer grade of initial distribution has been achieved, however the basic principles remains the same;

- distribution of trips to and from a destination using census data; and
- route choice determined by a combination of travel time and distance to the destination.

15.2.6.8 The model runs using data taken from GIS and other sources. Any GIS can be used to display the output results (produced in spreadsheet format) on a GIS representation of the road network. In this case, the outputs would be provided in the form of distribution proportions for each of the committed development zones (inbound and outbound). Depending on the land use, the distribution would either be based on journey to work data or gravitational attraction. At this stage the distributions can be further refined to eliminate all elements of double counting (inter-zonal trips), restrict certain ODs that are deemed unrealistic, or allow for internal trips dependant on likelihood.

15.2.6.9 The key features of CITEware are;

- National coverage across Great Britain's mainland, down to minor road level.
- Detailed routing based on both journey distance and time.
- Distribution can be based on gravitational attraction or journey to work census data.

- Runs in a modest timeframe, many options can be tested without a huge budget.
- Numerous sites can be tested at once and will interact and alter the attraction between zones.
- Provides a sound evidence base to go into a microsimulation model.

a) Inter-zonal Trips

15.2.6.10 Suggested method to avoid double counting – once individual development trip matrices are built, assessment of trips between committed development sites should be highlighted. Where an OD trip from one zone to another is present in both matrices the smaller OD should be ‘zeroed’ to avoid double counting.

b) Internal Trips and Trip Divergence

15.2.6.11 Internal trips - For large committed development sites that include various land uses a methodology for discounting the trip generations to reflect the internal trips will be necessary e.g. North East Bridgwater.

15.2.6.12 Trip divergence - The new committed developments are likely to result in a change in existing trip patterns e.g. a trip originally travelling from home to shops may now travel to the new development instead. A methodology to account for this and avoid double counting may be considered at a later stage.

c) B8 Distribution Trips

15.2.6.13 It is likely that the distribution of the ‘heavies’ element of the B8 sites will not follow the distribution patterns as indicated from either of the 2 methods. It is suggested that these trips are distributed between the major external zones based on the proportions taken from the base model’s HGV matrix.

15.2.7 Committed Development Related Highway Schemes

15.2.7.1 Highway schemes were supplied by SCC for inclusion into

15.2.7.2 The committed development Highway schemes along with which year they should be included are set out in **Table 15.4** below;

Table 15.4: Committed Highway Schemes

Location	Details	Models
Stockmoor Village Access Road	Road connecting Huntworth Roundabout Western arm to Showground Road	All ‘Do Nothing’ models
Huntworth Roundabout	Part Signalisation of Huntworth Roundabout	No ‘Do Nothing’ models
Silverfish Junction	Signalisation A39 Puriton Hill/Bath Road	All ‘Do Nothing’ models
Colley Lane Access Road	Road connecting Showground Road to Colley Lane	No ‘Do Nothing’ models
North East Bridgewater	Link Road connecting A38 Bristol road to Bath road	2016 and 2021 ‘Do Nothing’ models
Dunball Roundabout	Southbound exit has been widened to accommodate 2 lanes	2021 ‘Do Nothing’ model

15.2.8 Network Changes from 2009 Base

15.2.8.1 The general approach to network changes has been to minimise them and keep the coding exactly the same as the 2009 baseline model. Therefore, not many changes to the network have been applied in the 'Do nothing scenario. Any changes from the baseline are set out below;

15.2.8.2 Gap acceptance – Where possible GAP acceptance parameters have been kept at baseline levels

15.2.8.3 Passing lanes – a passing lane has been put in at link 1000z:221 to allow vehicles to pass right turning vehicles.

15.2.8.4 Signal Timings – the timings have been changed

15.2.8.5 Discount zone 63 trips – trips at zone 63 have been taken off matrix level 1 as the leisure centre will be replaced by NE Bridgwater committed development trips in 2016 and 2021, in 2013 the land would be cleared.

15.2.9 Future Year 'Do Nothing' Matrix Assumptions

a) Variable Demand

15.2.9.1 Where area wide traffic models have been used to assess the effects of additional traffic generated by proposed development, the traditional practice has been to use a fixed trip matrix approach. Where the volume of new traffic is relatively small and the road network is relatively uncongested and likely to remain so then this approach will be adequate.

15.2.9.2 However, where this is not the case, as in Bridgwater, the effect of additional trips on existing trips e.g. suppression, spreading, redistribution, mode shift, is not adequately modelled. This change in demand is known as Variable demand.

15.2.9.3 In a Fixed Trip appraisal of a development's transport impact, it is assumed that any additional traffic resulting from the development has no effect on the travel patterns of the existing 'background' traffic. This could, in some cases, result in forecasts of considerable congestion in the absence of mitigating works. In the real world, it is likely that there would be changes, such as drivers amending their journey mode, destinations, journey times and/or frequency. These changes would tend to result in lower congestion than forecast but a possible spread of traffic effects over a wider area. Some effects, such as redistribution and trip suppression, despite their limiting effects on congestion, do impose some cost on the affected users. A Variable Demand appraisal would therefore allow the provision of more appropriate mitigating measures.

15.2.9.4 The Standing Advisory Committee on Trunk Road Assessment (SACTRA) report of 1994 led to DfT publishing in June 2006, after considerable study and consultation, its Variable Demand Modelling (VDM) Advice as part of WebTAG.

15.2.9.5 It has been observed that when the future year growth is added into the network it quickly becomes congested to the point that the network becomes 'non-operational' or gridlocked.

15.2.9.6 It is reasonable, therefore, to expect some sort of variable demand effect in all future year scenarios.

b) Trip Suppression

15.2.9.7 It is not currently possible to apply VDM to PARAMICS automatically and as such a manual methodology must be utilised.

15.2.9.8 Three forms of manual VDM were looked at, peak spreading, trip redistribution and trip suppression.

15.2.9.9 To try to predict future peak spreading, an analysis was undertaken of traffic surveys over ten years pre-base year. The intent was to create a graph showing a linear relationship between time and amount of spreading. This could then be used to extrapolate forward into future years to enable the user to predict the level of peak spreading in any future year.

15.2.9.10 Unfortunately, the traffic surveys did not display any useful trend to enable any future prediction of peak spreading. One possible reason for this is that growth in Bridgwater has remained fairly low year on year over the surveyed periods.

15.2.9.11 Trip redistribution and trip suppression was then looked at as an alternative.

15.2.9.12 The trip suppression methodology was then taken forward and applied to 2013, 2016 and 2021.

15.2.9.13 This following methodology provides an overview of the process adopted to modify and suppress the demands within the 2013, 2016 and 2021 Hinkley Point PARAMICS models.

i. Methodology

15.2.9.14 Following a review of the reference case models it was revealed that the 2021 network is prone to ‘locking up’ and, as a result of this instability, may not yield sensible results when used for assessment purposes. Furthermore, visual interrogation of the 2016 model revealed the presence of severe congestion within the network, particularly during the PM model period.

15.2.9.15 The level of congestion was such that frequently it appeared at or close to capacity, a degree of queued vehicles present on most junction approaches within the urban areas in particular as well as suffering from a significant number of unreleased vehicles (vehicles not yet able to enter the network). With the network appearing to be so close to capacity during 2016 reference conditions it is highly plausible that including additional demand on the network (in the form of development associated demand) would simply increase model instability to such a point that the network ‘locks up’, similar to 2021 conditions. Again, using such a model for assessment would be unlikely to yield sensible results.

15.2.9.16 Initially it was understood that analysis of the pattern of growth in local traffic patterns was to be assessed to see if it could be used to inform the application of growth within the model (i.e. peak spreading). Unfortunately analysis of the observed data revealed no discernible growth patterns which could be used to derive peak spreading assumptions. As a result it was decided that an approach which derived trip suppression based on the principles of demand elasticity would be adopted.

15.2.9.17 The objective of this approach was to 'dampen' future year traffic demand, to account for the assumption that increasing journey costs in future year scenarios would act as deterrent to traffic demand growth (trip suppression). The methodology relies upon modelling the inverse relationship between travel demand and travel cost.

15.2.9.18 Elastic assignment is used to represent changes in time of travel, road type, destination, or trip frequency in response to congestion. This technique attempts to capture all the likely demand responses (for example, mode-choice, destination-choice, trip re-timing) in a simplified algorithm. The technique is permitted under WebTAG guidance for certain schemes. An elastic demand model was used to calculate the reductions in traffic due to a relative increase in costs.

15.2.9.19 In this methodology, 'costs' are defined as the composite value of time and financial costs when making a journey. For information the following formula is used in the PARAMICS model to calculate generalised cost:

$$GJC = a \times T + (60 \times b \times D) + c \times P$$

Where:

a is the time coefficient

b is the distance coefficient

c is the toll cost coefficient

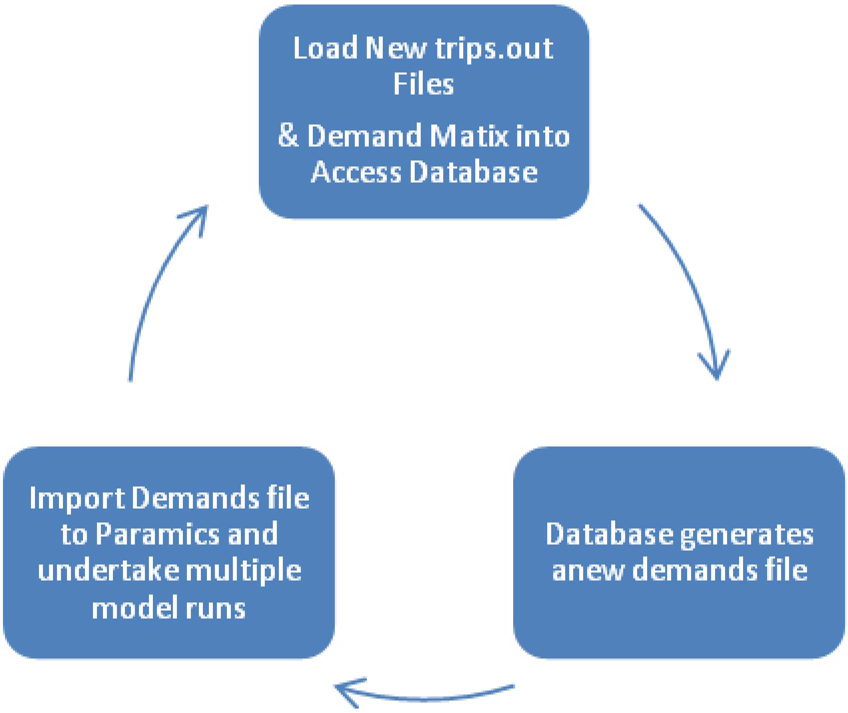
T is the travel time in minutes

D is the distance in miles

P is the price of the toll in £

15.2.9.20 An iterative process was used to reduce demand in the future year models. A Microsoft Access database was developed for this purpose to aid with the handling of files, aggregation, and calculation. **Figure 15.1** (flow chart) illustrates the basic process which was employed for achieving convergence in generalised cost:

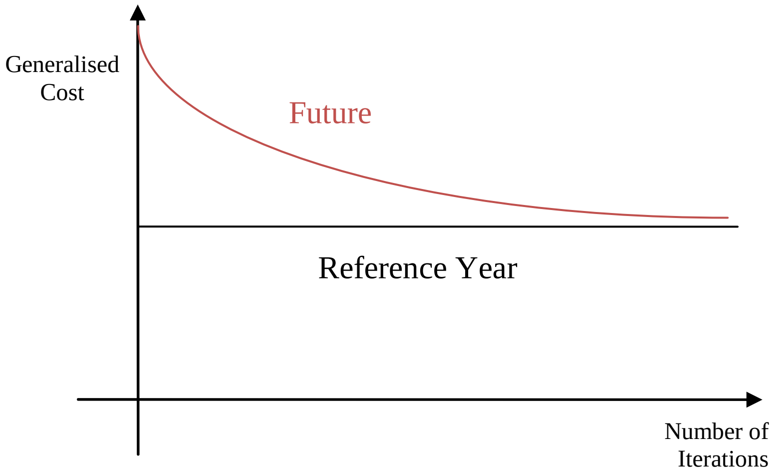
Figure 15.1: Iterative Process



15.2.9.21 The process was run iteratively so that the declining demand, within each iteration run of the suppression algorithm, would reflect the falling generalised cost in the network. Due to the stochastic nature of modelling in S-PARAMICS several model runs were executed to inform each iteration, to ensure that some account of the inherent variability within PARAMICS could be taken. Reducing the variability within the PARAMICS model results in a smoother convergence process and ensures that the difference between each iteration is reduced by saturating the effect of potential outliers within each individual run.

15.2.9.22 After several iterations of the process, the future year generalised cost for each origin-destination (OD) pair should converge upon the reference year cost to within a reasonable tolerance. Only background (matrix level 1) traffic was modified in the process. The objective of this process is illustrated by the following graph in **Figure 15.2**:

Figure 15.2: Generalised Cost Convergence



15.2.9.23 The criterion chosen for measuring acceptable levels of convergence is an overall change in demand of less than 1% in every hourly period compared with the previous iteration. The reference year that was chosen was the previous 'most stable' version of the model. I.e. 2013 was suppressed in response to the change in cost between 2013 and 2009, 2016 in response to a change in cost between 2016 and the suppressed 2013 and 2021 in response to a change in cost between 2021 and the suppressed 2016. This is in line with Webtag guidance.

15.2.9.24 The demand profile should follow a similar relationship to cost convergence. However, the extent of convergence towards the base year demand will be dependent on the degree of congestion in each period, with the most congested periods expected to receive the largest reduction in demand. In order to calculate the future year demand matrix the following formula employing exponential elasticity was applied for each OD pair:

$$T_{ij} = B_{ij} \times \left(\frac{nC_{ij}}{oC_{ij}}\right)^{\beta}$$

Where:

T_{ij} = *New Trip Matrix*

B_{ij} = *Base Trips Matrix*

nC_{ij} = *New Cost Matrix*

oC_{ij} = *Old Cost Matrix*

β = *Value Chosen for Exponential Curve*

15.2.9.25 The value of the elasticity β was calculated with the following method. First, a value for journey time elasticity was obtained. WebTAG Unit 3.10.3 provides derived long-term journey time elasticities for different uses. The value for Home-Based-Work, High Modal Competition was chosen as a reasonable value for representing traffic most likely to be affected by this methodology (peak hour background traffic).

Secondly, the following formula was applied to the time elasticity to derive an generalised cost elasticity:

$$E_{GJC} = E_T(1 + \frac{7.86}{11.62}v)$$

15.2.9.26 Where v is the average base network speed, derived from the model, of 32 mph expressed in terms of kilometres per minute (0.86). In this instance the generalised cost elasticity of -0.34 is calculated as follows:

$$-0.22\left(1 + \frac{7.86}{11.62}0.86\right) = -0.34$$

c) Results

15.2.9.27 **Table 15.5** shows the initial and final output total demands for each time period. In the original model the AM peak hour is between 0800 and 0900, and the PM peak hour is between 1700 and 1800.

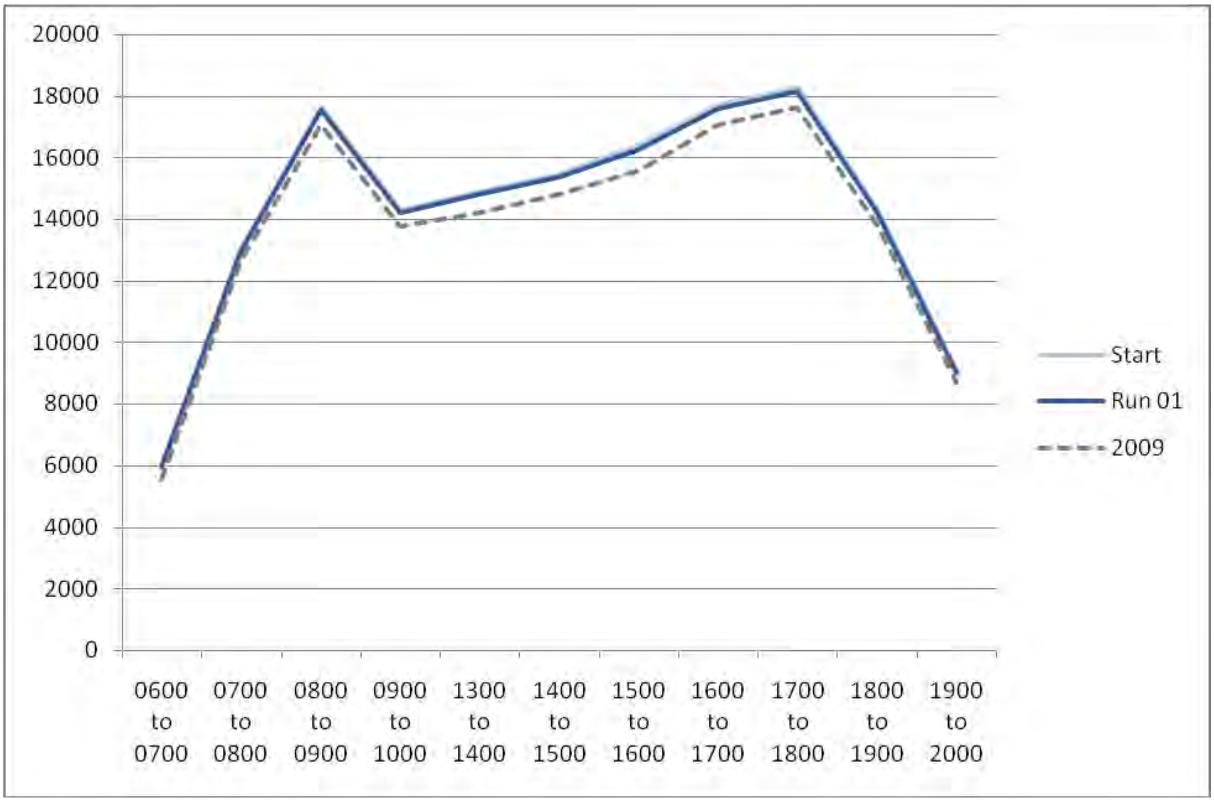
Table 15.5: 2013 Demand Comparison

Hour	Total Input Demand	Total Output Demand	Total Change in Demand
0600 to 0700	5,951	5,942	-0.2%
0700 to 0800	12,987	12,950	-0.3%
0800 to 0900	17,636	17,563	-0.4%
0900 to 1000	14,282	14,209	-0.5%
1300 to 1400	14,896	14,830	-0.4%
1400 to 1500	15,468	15,375	-0.6%
1500 to 1600	16,416	16,281	-0.8%
1600 to 1700	17703	17,600	-0.6%
1700 to 1800	18,273	18,163	-0.6%
1800 to 1900	14246	14,220	-0.2%
1900 to 2000	9,027	9,026	0.0%

15.2.9.28 Overall, across all time periods there is a 0.5% reduction in traffic compared to the original model. The AM peak hour remains between 0800 and 0900 and the PM peak hour remains between 1700 and 1800.

15.2.9.29 **Figure 15.3** shows the model convergence over the single run. It can be observed that there is no significant change in any time period. The y-axis represents the change in demand from the previous iteration. In the first iteration demand in all periods is within 1% difference of the original. Due to a lack of increased congestion in 2013 compared to 2009, the model met the convergence criterion after a single iteration.

Figure 15.3: Demand Summary Graph



15.2.9.30 In the original model, the AM peak hour is between 0800 and 0900, and the PM peak hour is between 1700 and 1800 as shown in the table of total demands by time period below. **Table 15.6** shows an overview of output demands and how these compare to the original demand set.

Table 15.6: 2016 Demand Comparison

Hour	Total Input Demand	Total Output Demand	Total Change in Demand
0600 to 0700	6,094	6,001	-1.5%
0700 to 0800	13,584	13,388	-1.4%
0800 to 0900	18,966	18,708	-1.4%
0900 to 1000	15,311	15,072	-1.6%
1300 to 1400	15,781	15,441	-2.2%
1400 to 1500	16,361	15,865	-3.0%
1500 to 1600	17,336	16,881	-2.6%
1600 to 1700	18,705	18,191	-2.7%
1700 to 1800	18,793	18,368	-2.3%
1800 to 1900	15,314	14,672	-4.2%
1900 to 2000	9,235	8,790	-4.8%

15.2.9.31 Overall there is a 2.5% reduction in traffic demand across all time periods. The AM peak hour remains between 0800 and 0900, and the PM peak hour remains between

1700 and 1800. In any one single hourly period, the maximum reduction in demand was 4.8% between 1900 and 2000.

15.2.9.32 The model met the convergence criteria after three iterations. **Figure 15.4** show how the model converged over the three runs. The y-axis represents the change in demand from the previous iteration. By the third run, all time periods in the model are within 1% of the previous iteration. **Figure 15.5** provides the demand summary graph.

Figure 15.4: 2016 Model Convergence

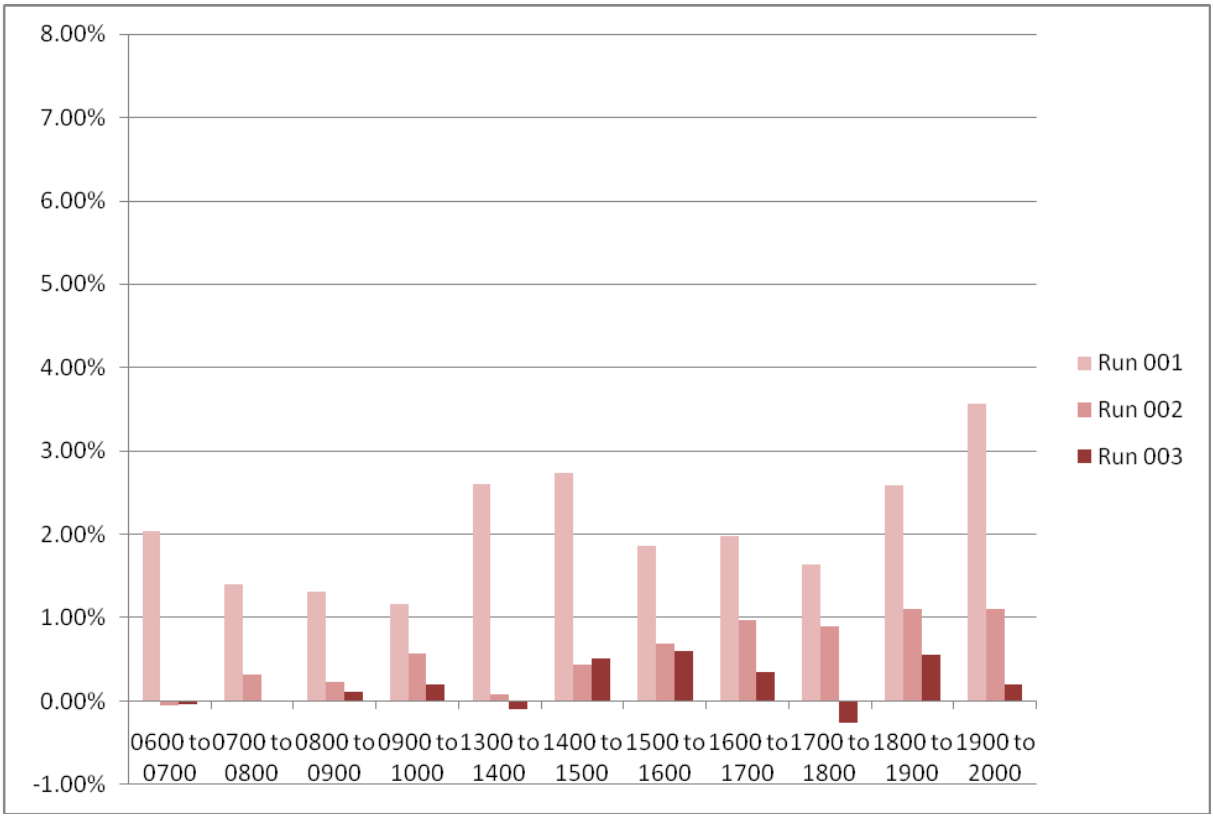
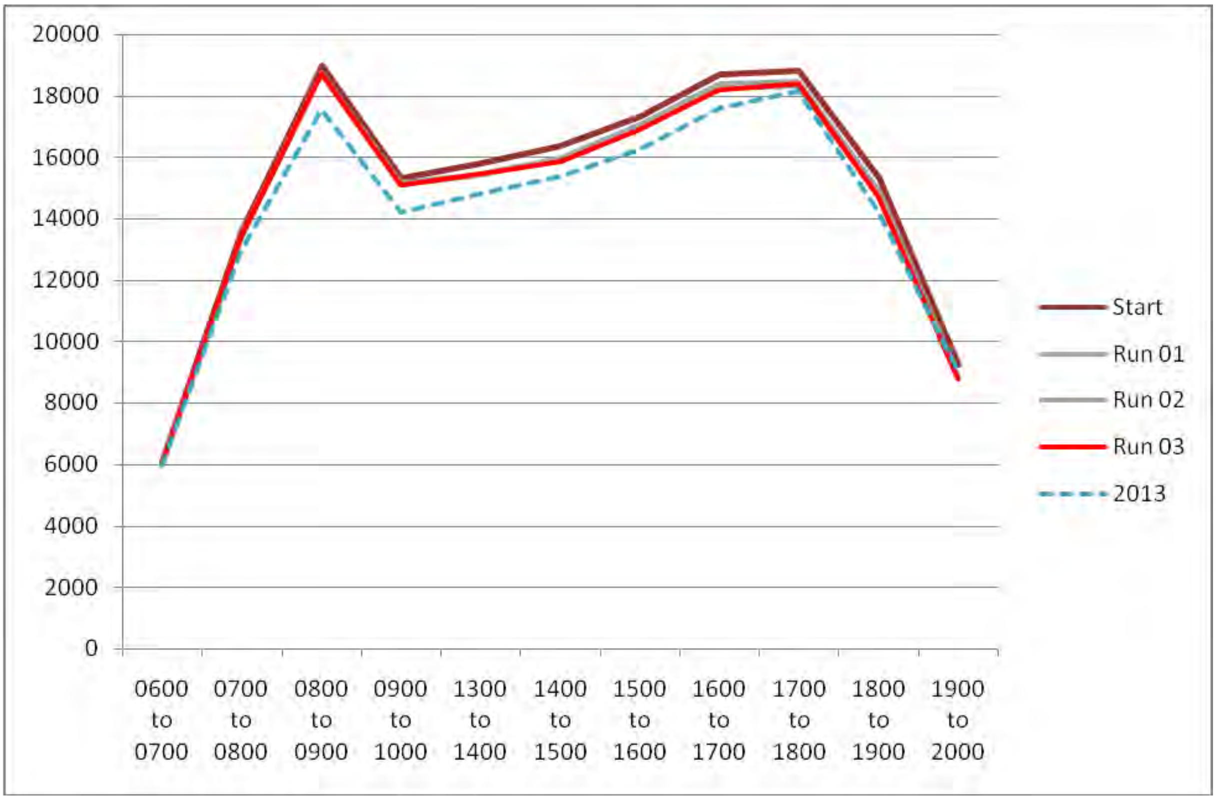


Figure 15.5: Demand Summary Graph



15.2.9.33 The initial demands per time period are given in **Table 15.7** below. The AM peak hour is between 0800 and 0900, and the PM peak hour is between 1700 and 1800. The table gives an overview of output demands on the fourth and final iteration.

Table 15.7: 2021 Demand Comparison

Hour	Total Input Demand	Total Output Demand	Total Change in Demand
0600 to 0700	6,246	6,268	0.4%
0700 to 0800	14,201	14,140	-0.4%
0800 to 0900	20,110	20,054	-0.3%
0900 to 1000	16,235	16,109	-0.8%
1300 to 1400	16,441	16,454	0.1%
1400 to 1500	17,102	16,852	-1.5%
1500 to 1600	18,241	17,781	-2.5%
1600 to 1700	19,965	18,839	-5.6%
1700 to 1800	20,065	18,313	-8.7%
1800 to 1900	16,144	14,364	-11.0%
1900 to 2000	9,457	8,737	-7.6%

15.2.9.34 Overall, across all time periods there is a 3.6% reduction in traffic demand. The AM peak hour remains between 0800 and 0900, however the PM peak hour has now shifted to between 1600 and 1700. The largest impact is in the 1800 to 1900 scenario.

15.2.9.35 For the 2021 model, four iterations were required to achieve convergence. **Figure 15.6** shows how the model converged over the four runs. The y-axis represents the change in demand from the previous iteration. All periods apart from 1600 to 1700 achieve convergence by the third run. By the fourth run, all time periods in the model are within 1% of the previous iteration. **Figure 15.7** provides the demand summary graph.

Figure 15.6: 2021 Model Convergence

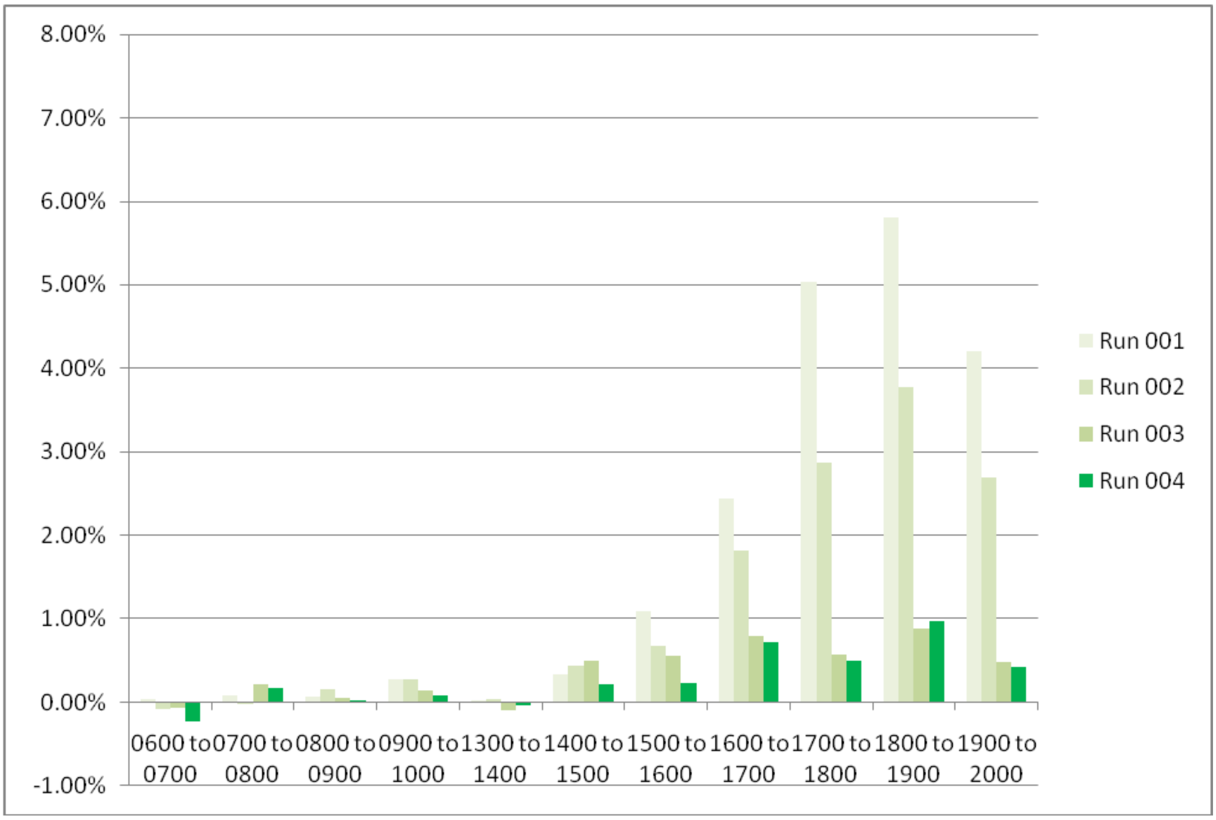
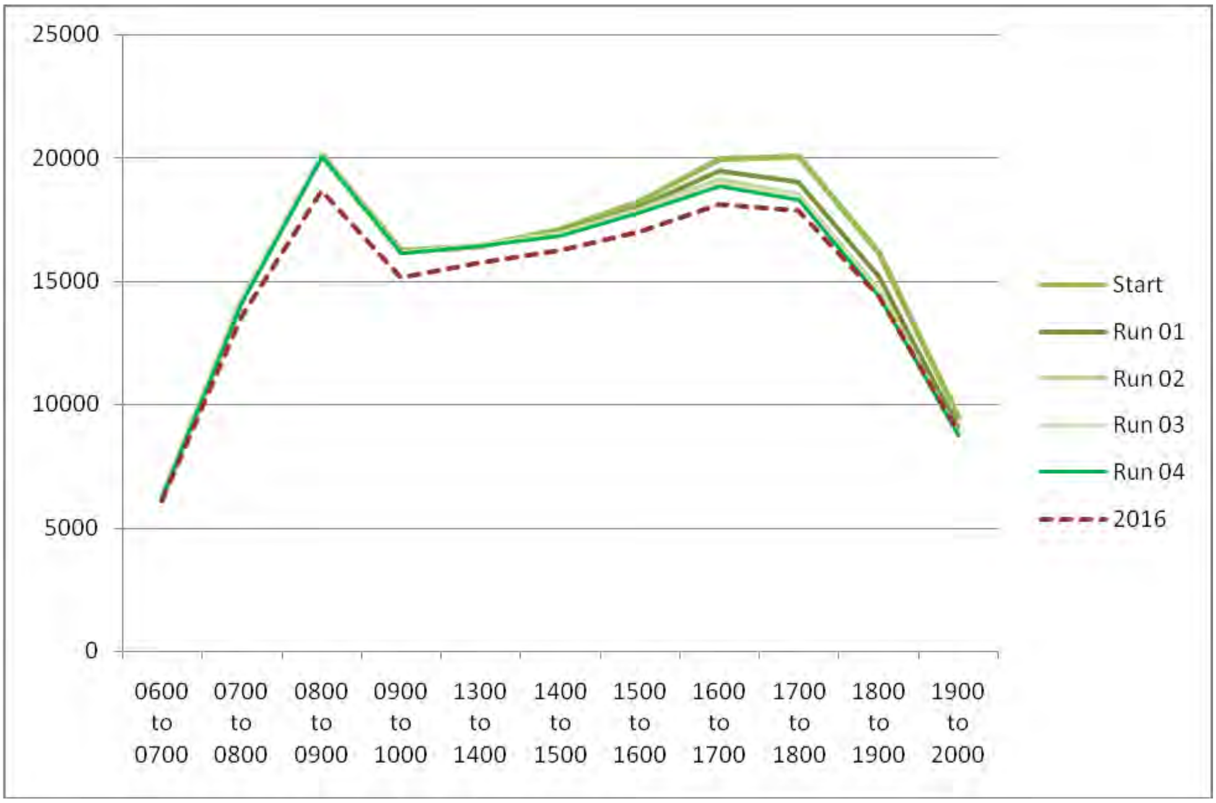


Figure 15.7: 2021 Demand Summary



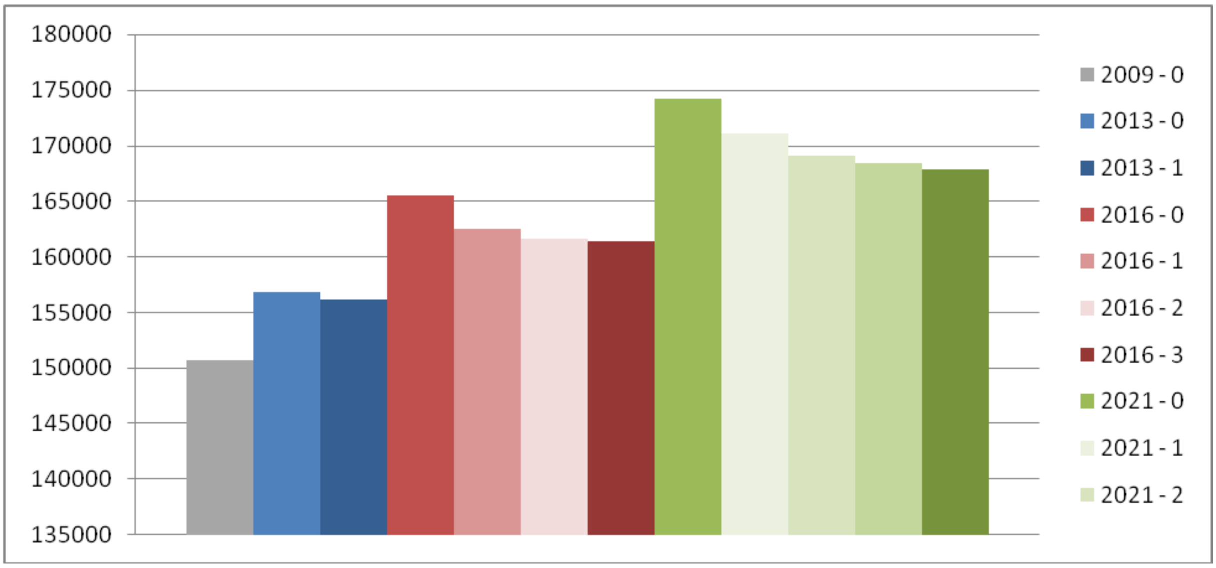
15.2.9.36 The process has worked as expected, with the most congested 2021 model responding the strongest to the elastic demand modelling. The overall reduction in traffic demand in the suppressed models compared to the original is as follows:

- 2013: a 0.5% reduction in total vehicle demand;
- 2016: a 2.5% reduction in total vehicle demand; and
- 2021: a 3.6% reduction in total vehicle demand.

15.2.9.37 The largest impact by far on the future year models is in the PM peak time period, with the AM peak remaining relatively unaffected. The effect in the 2016 and 2021 models has been to further spread the PM peak over two hours with 1600-1700 becoming the hour with the most vehicular demand present in 2021.

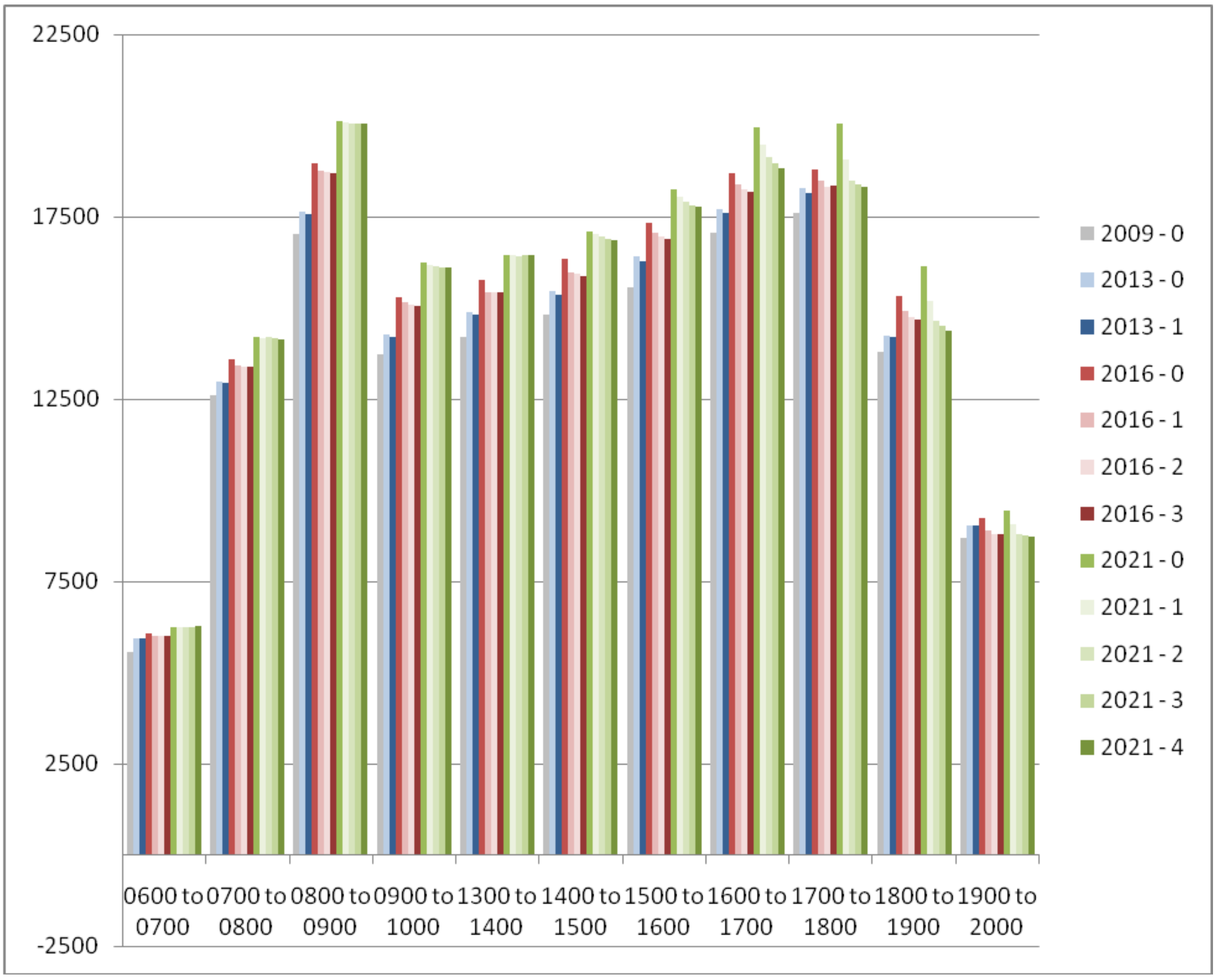
15.2.9.38 **Figure 15.8** shows a summary of demand in each of the future year models after running the iterative elastic demand process. It can be seen that even after applying the demand suppression process that there is still substantial growth in traffic between 2013 to 2016 and 2016 to 2021.

Figure 15.8: 2021 Total Model Demand (Year - Iteration)



15.2.9.39 **Figure 15.9** shows the hourly demand in each iteration of each model. It can be seen that the greatest impacts are in the 2016 and 2021 in the late afternoon / early evening period.

Figure 15.9: Hourly Model Demand by Model Iteration



a) Model Stability

Table 15.8: Model Performance Summary

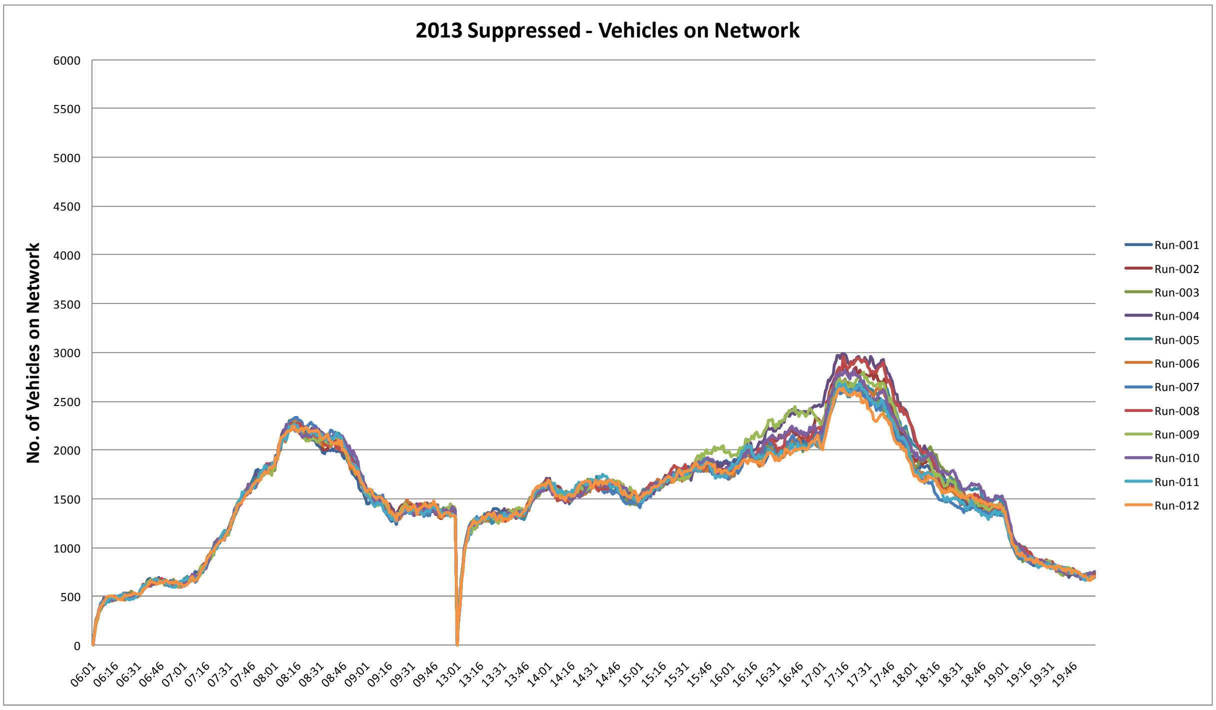
	2013 Original	2013 Suppressed	2016 Original	2016 Suppressed	2021 Original	2021 Suppressed
Runs	10	12	10	12	10	12
Successful Runs	10	12	9	12	3	12
Success Rate	100%	100%	90%	100%	30%	100%
Peak (veh): Max	2,889	2,990	4,189	3,435	5,742	3,847
Peak (veh): Ave Max	2,715	2,771	3,826	2,998	5,279	3,405
Peak range	17:10 – 17:19	17:11 – 17:27	17:25 – 17:41	17:11 – 17:40	17:41 – 18:54	17:10 – 17:25
AM End of Period (@ 09:59) (veh): Max	1,401	1,389	1,615	1,600	2,092	1,804
AM End of Period (@ 09:59) (veh): Ave	1,355	1,353	1,551	1,558	1,873	1,711
PM End of Period (@ 19:59) (veh): Max	718	755	1,035	720	4,344	831
PM End of Period (@ 19:59) (veh): Ave	699	722	967	695	3,211	718

b) 2013 Model Performance

15.2.9.40 In the 2013 original model, the peak vehicle maximum was 2,889, and in the suppressed model it was 2,990, which is 3.5% higher.

15.2.9.41 The peak range for the suppressed model is slightly longer (16 minutes) between 17:11 – 17:27. The average maximum was 2,715 in 2013 original and 2,771 in 2013 suppressed. The model appeared stable in both cases, with 100% of runs completing successfully. Overall there was not a substantive change in operation in the suppressed model performance over the original. **Figure 15.10** shows the number of vehicles on the network, in the 2013 suppressed scenario.

Figure 15.10: 2013 (Suppressed) - Vehicles on Network



c) 2016 Model Performance

15.2.9.42 In the 2016 original model, the peak vehicle maximum was 4,189 but in the suppressed model it was 3,435, 18% lower. The average maximum number of vehicles was 3,826 in the original model. In the suppressed model it was 2,998 which was 22% lower.

15.2.9.43 In the original 2016 model one of the 10 runs did not complete, however all of the runs in the suppressed model completed successfully. **Figure 15.11** provides a comparison of 2016 original and 2016 suppressed scenario (average number of vehicles) and **Figure 15.12** shows the number of vehicles on the network, in the 2016 suppressed scenario.

Figure 15.11: 2016 Average Vehicles on Network - Comparison

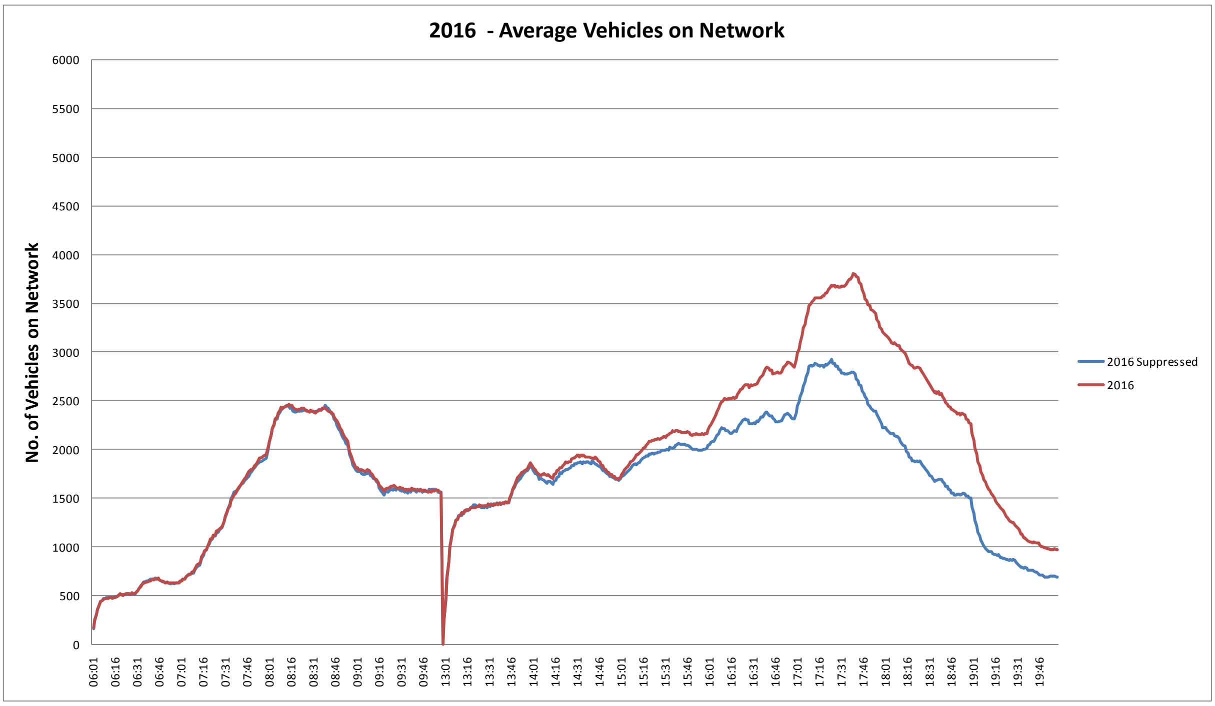
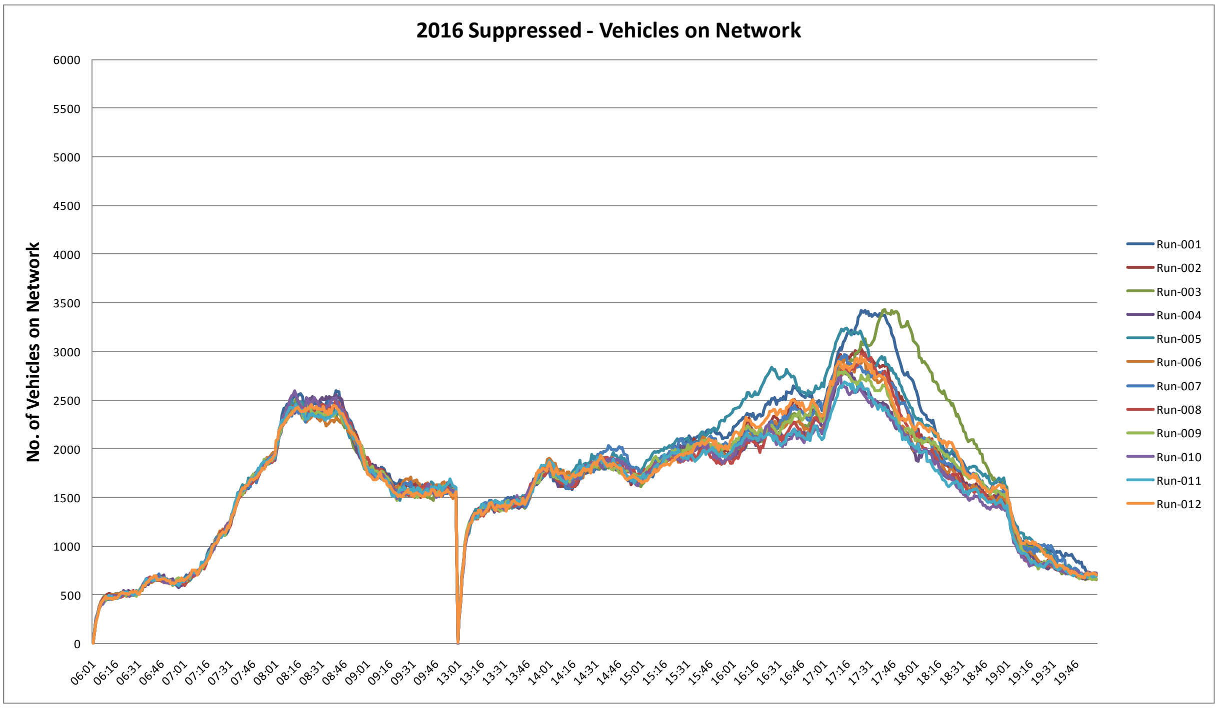


Figure 15.12: 2016 (Suppressed) - Vehicles on Network



d) 2021 Model Performance

15.2.9.44 Trip suppression had the largest impact on the stability of the 2021 model. Only 30% of runs completed with the original model, however 100% of the suppressed model runs completed successfully.

15.2.9.45 The peak range for the suppressed model has shortened considerably, and shifted earlier from 17:41 – 18:54 to 17:10 – 17:25. The average maximum was 5,279 in 2021 original and 3,405 in 2021 suppressed. **Figure 15.13** shows the considerable difference in the number of vehicles on the network in the suppressed 2021 model compared with the original and **Figure 15.14** shows the number of vehicles on the network, in the 2021 suppressed scenario.

15.2.9.46 Overall, there is a considerable improvement in the stability of 2021 model compared to the original.

Figure 15.13: 2021 Average Vehicles on Network - Comparison

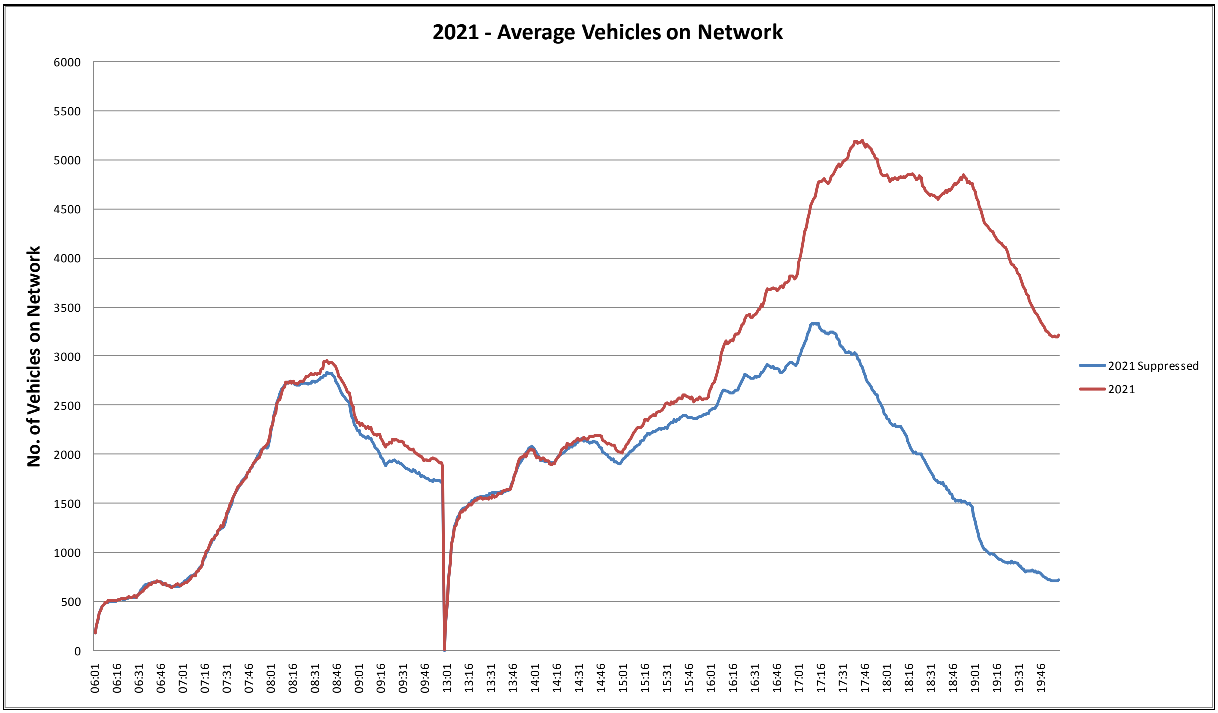
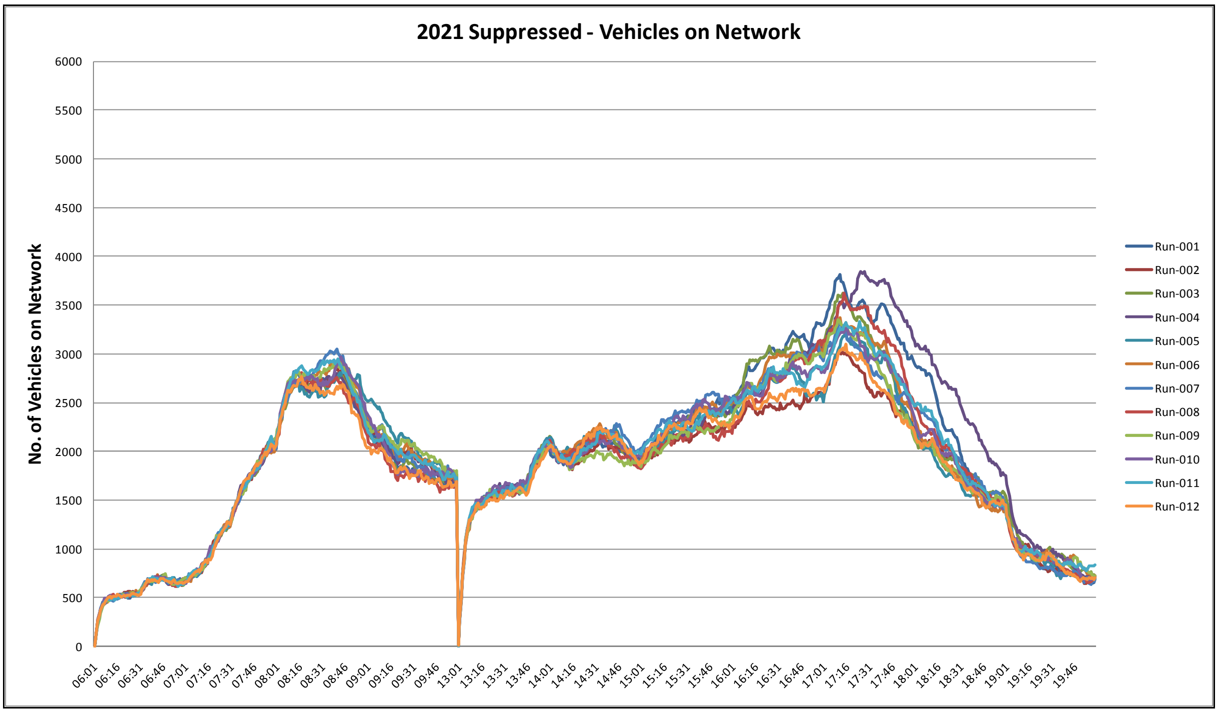


Figure 15.14: 2021 (Suppressed) - Vehicles on Network



15.2.10 Matrix Totals

15.2.10.1 The resultant matrix totals for the 'Do Nothing' scenarios and 2009 are set out in **Table 15.9** to **Table 15.12**.

Table 15.9: 2009 Baseline Matrix Totals

Matrix Level	Model time period										
	1	2	3	4	6	7	8	9	10	11	12
	6-7	7-8	8-9	9-10	13-14	14-15	15-16	16-17	17-18	18-19	19-20
1	4,821	11,491	15,731	12,469	13,083	13,576	14,602	15,891	16,730	13,070	8,210
2	744	1,124	1,303	1,279	1,203	1,262	1,176	1,165	884	736	477

Table 15.10: 2013 'Do Nothing' Matrix Totals

Matrix Level	Model time period										
	1	2	3	4	6	7	8	9	10	11	12
	6-7	7-8	8-9	9-10	13-14	14-15	15-16	16-17	17-18	18-19	19-20
1	4,812	11,454	15,658	12,396	13,017	13,483	14,468	15,788	16620	13,044	8,209
2	744	1,124	1,303	1,279	1,203	1,262	1,176	1,165	884	736	477
3	166	205	388	354	380	385	386	430	441	281	37
4	187	29	36	36	36	43	36	36	29	22	58
5	22	126	167	131	180	188	201	171	181	130	240
6	11	12	11	13	14	14	14	10	8	7	6
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0

Table 15.11: 2016 'Do Nothing' Matrix Totals

Matrix Level	Model time period										
	1	2	3	4	6	7	8	9	10	11	12
	6-7	7-8	8-9	9-10	13-14	14-15	15-16	16-17	17-18	18-19	19-20
1	4,727	11,295	15,473	12,230	12,743	13,079	14,147	15,212	15627	12,771	7,765
2	744	1,124	1,303	1,279	1,203	1,262	1,176	1,143	866	720	477
3	250	755	1,668	1,339	1,261	1,271	1,303	1,565	1,612	994	123
4	205	31	39	39	39	47	39	39	31	24	63
5	51	155	200	157	163	174	184	209	214	148	348
6	24	27	25	28	31	31	32	22	18	16	14
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0

	Model time period										
10	0	0	0	0	0	0	0	0	0	0	0

Table 15.12: 2021 'Do Nothing' Matrix Totals

Matrix Level	Model time period										
	1	2	3	4	6	7	8	9	10	11	12
	6-7	7-8	8-9	9-10	13-14	14-15	15-16	16-17	17-18	18-19	19-20
1	4,749	11,313	15,523	12,223	12,785	13,054	13,994	14,599	14,299	11,632	7,351
2	744	1,124	1,303	1,275	1,203	1,262	1,176	1,165	884	736	477
3	298	1,134	2,520	2,019	1,871	1,902	1,958	2,354	2,427	1,494	202
4	216	33	41	41	41	50	41	41	33	25	66
5	194	431	555	436	453	482	510	582	594	413	603
6	66	104	111	114	101	103	101	96	75	63	38
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0

Job No:	83688
File Ref:	X/83688/Word/N51-NC-Split Ward Paramics Zone_2011_01_05_Updated
Date:	05 August 2011
Job Title:	Hinkley Point C

Subject: Transfer of data from Gravity Model to Paramics Model

Introduction

1. This technical note has been prepared by Savell Bird & Axon (SBA), on behalf of EDF Energy, to establish how the data from the gravity model (i.e. workers per ward) is transferred to the Paramics model (i.e. workers per Paramics zone).

2. SBA met with the highway authorities on 25th November 2010 to discuss the methodology and the following was agreed:

   - JMP to use their CITEware software to assign trip origins from the gravity model to the external Paramics zones. CITEware provides detailed routing based on a combination of travel time and distance to the destination.

   - SBA to provide a methodology for assigning the trip origins in the gravity model to the internal Paramics zones. It should be noted that the gravity model only includes the HPC workers who will not be living in the campus.

Methodology

3. In consultation with Somerset County Council, the internal Paramics zones have been divided by land use into residential, employment and mixed use zones as summarised in **Table 1** and illustrated at **Appendix A**.

Table 1: Paramics Zone Land Uses

Paramics Zone	Land Use
1	External
2	External
3	Residential
4	Residential
5	Residential
6	Employment
7	Residential
8	Mixed Use

9	Mixed Use
10	Residential
11	Employment
12	Employment
13	Employment
14	Employment
15	-*
16	Mixed Use
17	Employment
18	Mixed Use
19	Employment
20	External
21	External
22	External
23	Residential
24	Employment
25	External
26	External
27	External
28	Employment
29	External
30	Residential
31	Residential
32	Residential
33	Residential
34	Employment
35	-
36	Mixed Use
37	-
38	Residential
39	Employment
40	Employment
41	Employment
42	Residential
43	Residential
44	Residential
45	Employment
46	Employment
47	Employment
48	Residential
49	Residential
50	-
51	Residential
52	Employment
53	Residential
54	Employment
55	Residential
56	Residential
57	Residential

58	Residential
59	Residential
60	Employment
61	Employment
62	-
63	Employment
64	Employment
65	Residential

** '-' indicates no Paramics zone exists for this number*

4. Only those zones that are residential have been assumed to generate trips by the HPC workforce as highlighted in **Table 1** above.

5. The Paramics zones have been overlayed on the ward boundaries using GIS software to show the relationship between them.

6. Finally, the occupancy rate for each ward has been identified from the census ward data to ensure only occupied dwellings are included within the estimate. The numbers of occupied households and unoccupied Households have been extracted from the Census database, the raw data of which is shown within the spreadsheet in the "Original Data" worksheet, and is summarised in **Table 2.**

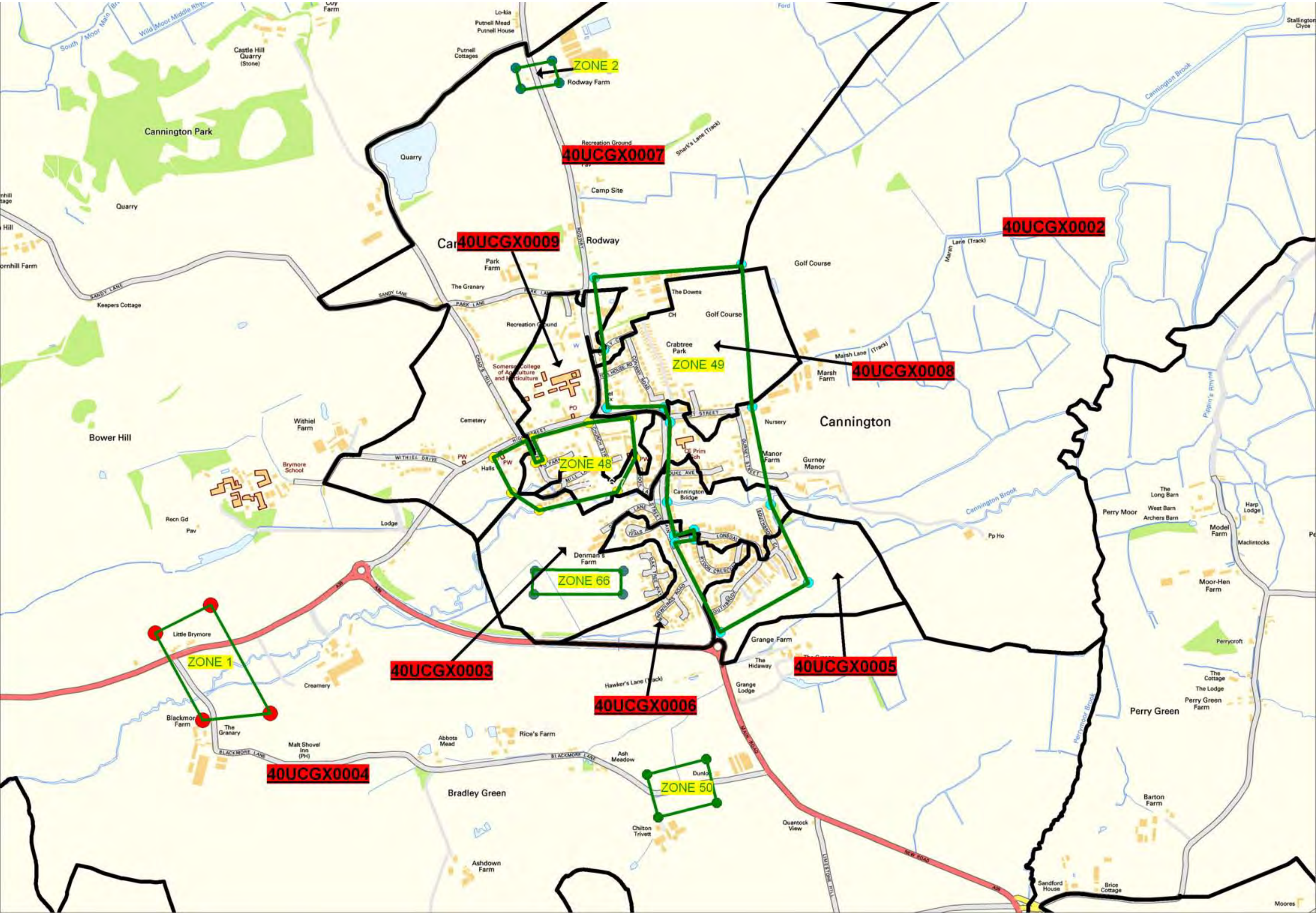
7. The results of the exercise are summarised in Table 3 in the 'results' worksheet of the Split Ward Paramics Zone spreadsheet and shows the number of occupied households and unoccupied households in each of the Paramics zones. The results are summarised below in **Table 2.**

Table 2: Number of Occupied Households within Paramics Zones Identified

Paramics Zone number	Total number of households
3	57
4	53
5	1589
7	186
10	146
23	142
29	1266
30	2452
31	146
32	183
38	208
41	150
42	236
43	4154
44	41
48	42

49	848
51	656
53	448
55	265
56	497
57	656
58	80
59	658
65	1203
Total	**16362**

APPENDIX A



ZONE 2
ZONE 49
ZONE 48
ZONE 66
ZONE 1
ZONE 50
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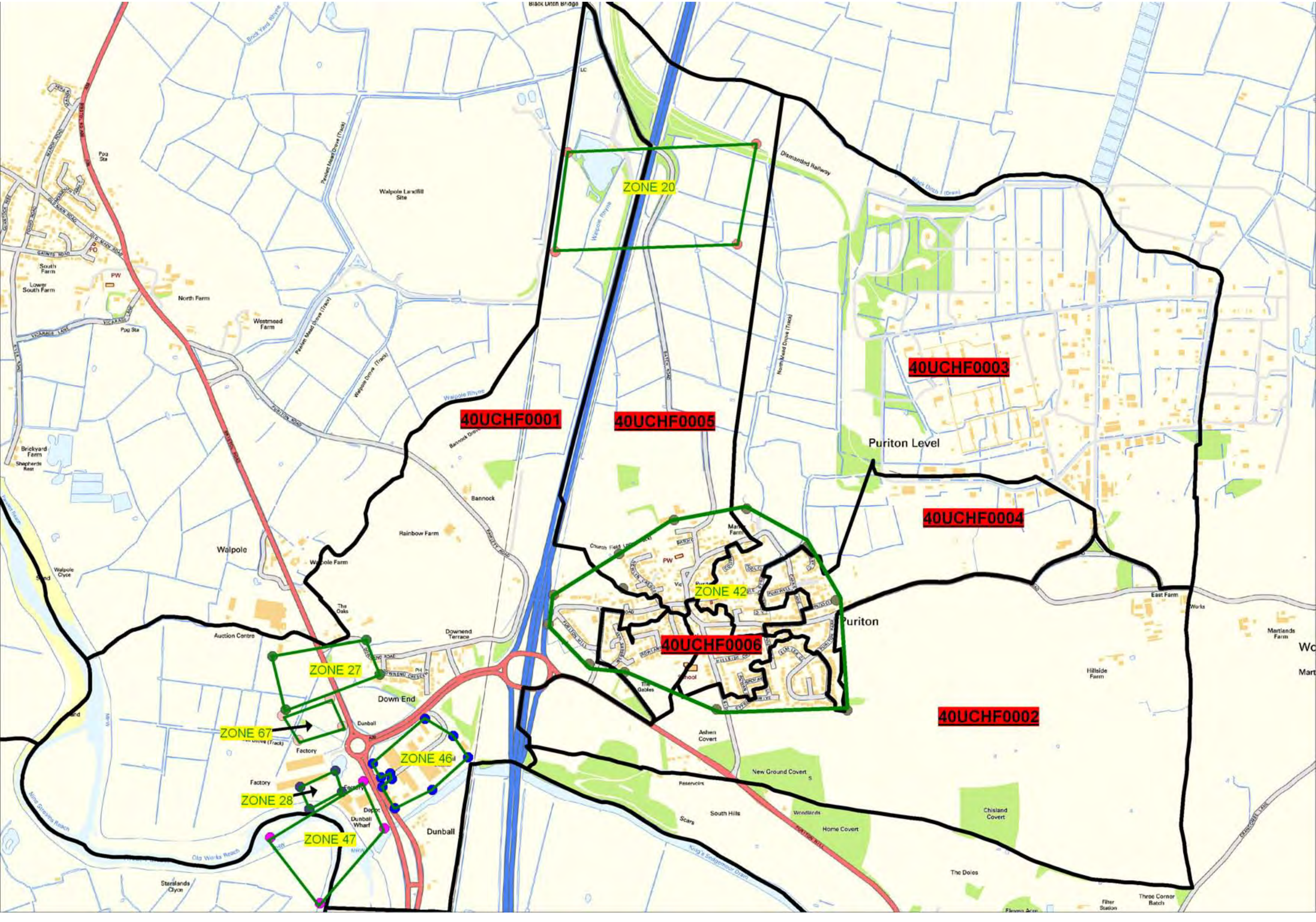
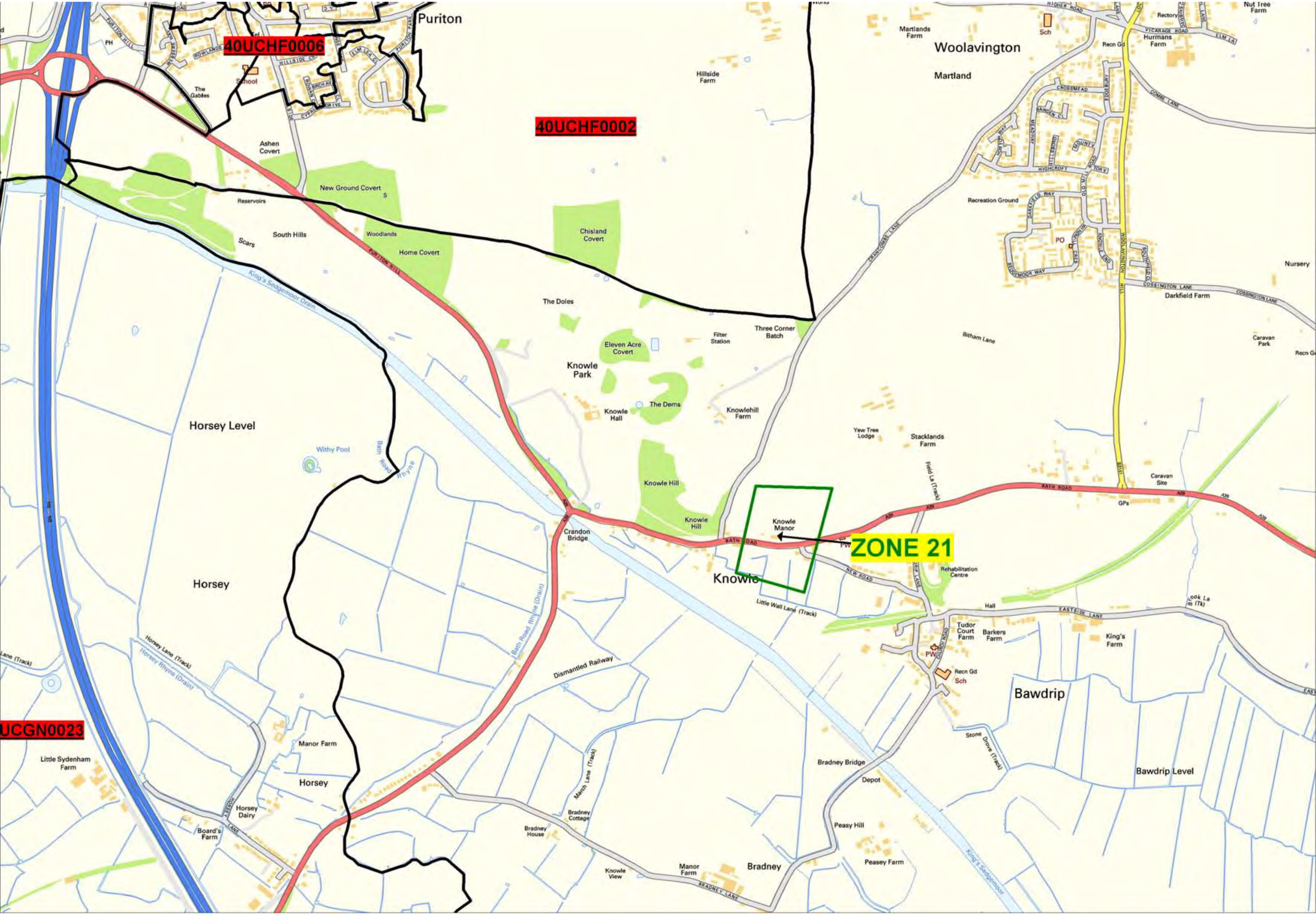
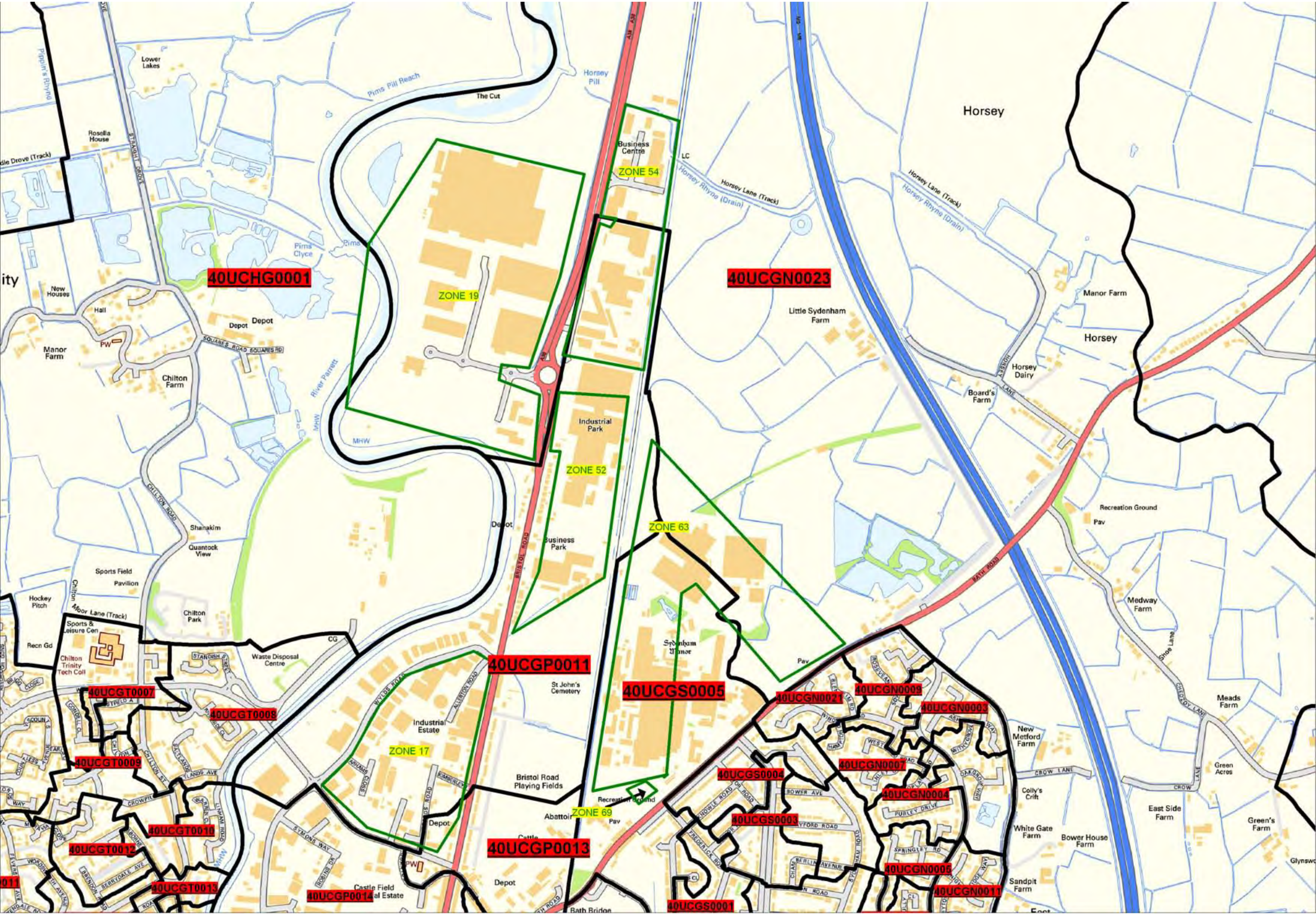
40UCGX0002
40UCGX0008
40UCGX0003
40UCGX0005
40UCGX0006
40UCGX0004
Cannington Park
Quarry
Castle Hill Quarry (Stone)
Putnell Mead
Putnell House
Putnell Cottages
Rodway Farm
Recreation Ground
Shark's Lane (Track)
Camp Site
Rodway
Park Farm
The Granary
Sandy Lane
Park Lane
Keepers Cottage
Recreation Ground
Somerset College of Agriculture and Horticulture
Golf Course
The Downs
Crabtree Park
Marsh Lane (Track)
Marsh Farm
Cannington
Nursery
Manor Farm
Gurney Manor
Cemetery
Withiel Farm
Withiel Drive
Bower Hill
Brymore School
Halls
Cannington Bridge
Cannington Brook
Recn Gd
Pav
Lodge
Denman's Farm
Little Brymore
Creamery
Blackmore Farm
The Granary
Blackmore Lane
Malt Shovel Inn (PH)
Abbots Mead
Rice's Farm
Ash Meadow
Bradley Green
Hawker's Lane (Track)
Grange Farm
The Hidaway
Grange Lodge
Main Road
Chilton Trivett
Quantock View
Ashdown Farm
New Road
Perry Moor
The Long Barn
West Barn
Archers Barn
Harp Lodge
Model Farm
Maclintocks
Moor-Hen Farm
Perrycroft
The Cottage
The Lodge
Perry Green Farm
Perry Green
Perrymoor Brook
Barton Farm
Sandford House
Brice Cottage
Moores
Pippin's Rhyne
Stallington Clyce
Pp Ho



ZONE 20
ZONE 27
ZONE 67
ZONE 28
ZONE 47
ZONE 46
ZONE 42
40UCHF0001
40UCHF0005
40UCHF0003
40UCHF0004
40UCHF0006
40UCHF0002
Puriton Level
Puriton
Walpole
Down End
Dunball
Walpole Landfill Site
Dismantled Railway
North Farm
Westmead Farm
Rainbow Farm
Bannock
Auction Centre
Downend Terrace
Black Ditch Bridge
South Farm
Lower South Farm
Brickyard Farm
Walpole Clyce
The Oaks
Factory
Dunball Wharf
Ashen Covert
New Ground Covert
South Hills
Woodlands
Home Covert
Chisland Covert
The Doles
Hillside Farm
East Farm
Martlands Farm
Starslands Clyce
Three Corner Batch
Filter Station
Old Works Reach
King's Sedgemoor Drain



40UCHF0006
40UCHF0002
UCGN0023
ZONE 21
Puriton
Woolavington
Martland
Knowle Manor
Knowle
Knowle Park
Horsey Level
Horsey
Bawdrip
Bawdrip Level
Bradney
King's Sedgemoor Drain
Bath Road
Puriton Hill
Chisland Covert
Eleven Acre Covert
Knowle Hill
Knowle Hall
The Doles
New Ground Covert
Home Covert
South Hills
Reservoirs
Ashen Covert
Hillside Farm
Three Corner Batch
Filter Station
Knowlehill Farm
The Dems
Withy Pool
Crandon Bridge
Dismantled Railway
Manor Farm
Little Sydenham Farm
Horsey Dairy
Board's Farm
Bradney Bridge
Peasy Hill
Peasey Farm
Depot
Tudor Court Farm
Barkers Farm
King's Farm
Rehabilitation Centre
Stacklands Farm
Yew Tree Lodge
Darkfield Farm
Caravan Site
Caravan Park
Nursery
Martlands Farm
Hurmans Farm
Recreation Ground



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40UCGT0012
40UCGT0013
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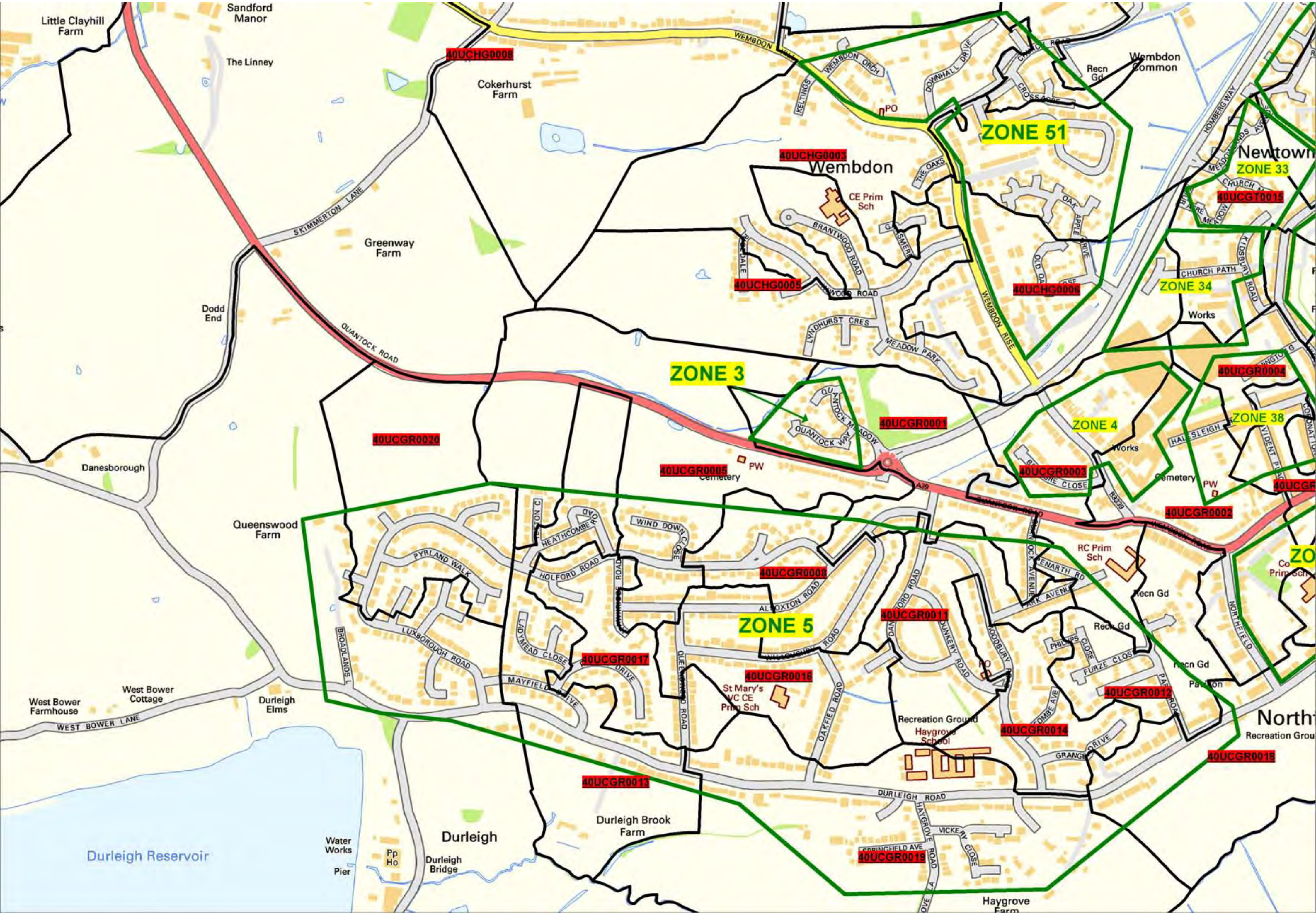
40UCGN0009
40UCGN0003
40UCGN0007
40UCGN0004
40UCGN0005
40UCGN0011
40UCGS0004
40UCGS0003
40UCGS0001
ZONE 19
ZONE 54
ZONE 52
ZONE 63
ZONE 17
ZONE 69
Horsey
Horsey Pill
Pims Pill Reach
The Cut
Lower Lakes
Rosella House
Business Centre
Horsey Lane (Track)
Horsey Rhyne (Drain)
Pims Clyce
River Parrett
MHW
New Houses
Hall
Depot
Manor Farm
Chilton Farm
Squares Road
Little Sydenham Farm
Manor Farm
Horsey Dairy
Board's Farm
Industrial Park
Business Park
Shanakim
Quantock View
Sports Field
Pavilion
Hockey Pitch
Chilton Park
Moor Lane (Track)
Sports & Leisure Cen
Recn Gd
Chilton Trinity Tech Coll
Waste Disposal Centre
Recreation Ground
Pav
Medway Farm
Sydenham Manor
St John's Cemetery
Industrial Estate
Bristol Road
Bristol Road Playing Fields
Bath Road
Recreation Ground
Abattoir
Depot
Castle Field Industrial Estate
Meads Farm
New Metford Farm
Green Acres
Crow Lane
Colly's Croft
East Side Farm
Green's Farm
White Gate Farm
Bower House Farm
Sandpit Farm
Bath Bridge
Shoe Lane



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ZONE 3
ZONE 5
ZONE 4
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40UCGR0008
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40UCGR0017
40UCGR0016
40UCGR0012
40UCGR0014
40UCGR0018
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40UCGR0019
Little Clayhill Farm
Sandford Manor
The Linney
Cokerhurst Farm
Wembdon
Wembdon Common
Newtown
Greenway Farm
Dodd End
Danesborough
Queenswood Farm
West Bower Farmhouse
West Bower Cottage
Durleigh Elms
Durleigh
Durleigh Reservoir
Durleigh Brook Farm
Durleigh Bridge
Water Works
Pier
Haygrove Farm
Haygrove School
Recreation Ground
St Mary's VC CE Prim Sch
CE Prim Sch
RC Prim Sch
Cemetery
Works
North
QUANTOCK ROAD
SKIMMERTON LANE
WEMBDON ROAD
WEMBDON RISE
WEST BOWER LANE
DURLEIGH ROAD
MAYFIELD DRIVE
LUXBOROUGH ROAD
PYRLAND WALK
BROADLANDS
HOLFORD ROAD
HEATHCOMBE ROAD
WIND DOWN CLOSE
LADYMEAD CLOSE
ALFOXTON ROAD
MEADOW PARK
LYNDHURST CRES
BRANTWOOD ROAD
QUANTOCK WAY
QUANTOCK MEADOW
OAKFIELD ROAD
PENARTH RD
FURZE CLOSE
PHILLIPS CLOSE
GRANGE DRIVE
SPRINGFIELD AVE
VICKERY CLOSE
HAYGROVE ROAD
CHURCH PATH
NORTHFIELD
HALESLEIGH

Shanakim
Quantock View
Sports Field
Pavilion
ZONE 9
Chilton Moor Lane (Track)
Reedmoor Rhyne
Hockey Pitch
Sports & Leisure Cen
Chilton Park
Recn Gd
Chilton Trinity Tech Col
CG
Waste Disposal Centre
ZONE 44
ZONE 45
STANDISH STREET
DOVAI DRIVE
HALYARD DRIVE
REEDMOOR GDNS
BRIGG CLOSE
NAPLES VIEW
SAVIANO
WESTERN WAY
40UCGT0007
CRESTFIELD A
CONDELL CL
RIVERSIDE CL
40UCGT0008
TURIN PATH
VERONA
FLORENCE C
VISCOUNT S
COUNTLESS AVENUE
EARLS C
DUKE STREET
CARLTON DRIVE
CHILTON CL
40UCGT0009
CHILTON ST
ZONE 53
TLANDS AVE
40UCHG0002
Church Farm
40UCHG0004
BLAKES ROAD
PW
Com Cen
ZONE 32
LORDS WAY
TRINITY WAY
CROWPILL LA
WARREN CL
LINHAM ROAD
BARHAMS CLOSE
MORAVIA CLOSE
OSBORNE ROAD
40UCGT0012
40UCGT0010
SYMONS WAY
Wembdon Common
Recn Gd
RAMBLER WAY
FEVERSHAM AVE
WORDSWORTH AVENUE
ZONE 31
BERRYDALE AVE
BRENDON ROAD
ROBINS DR
ZONE 16
40UCGT0011
GRIFFEN CLOSE
40UCGT0013
40UCGP0014
HOMBERG WAY
MEADOWLANDS AVENUE
Newtown
KENDALE ROAD
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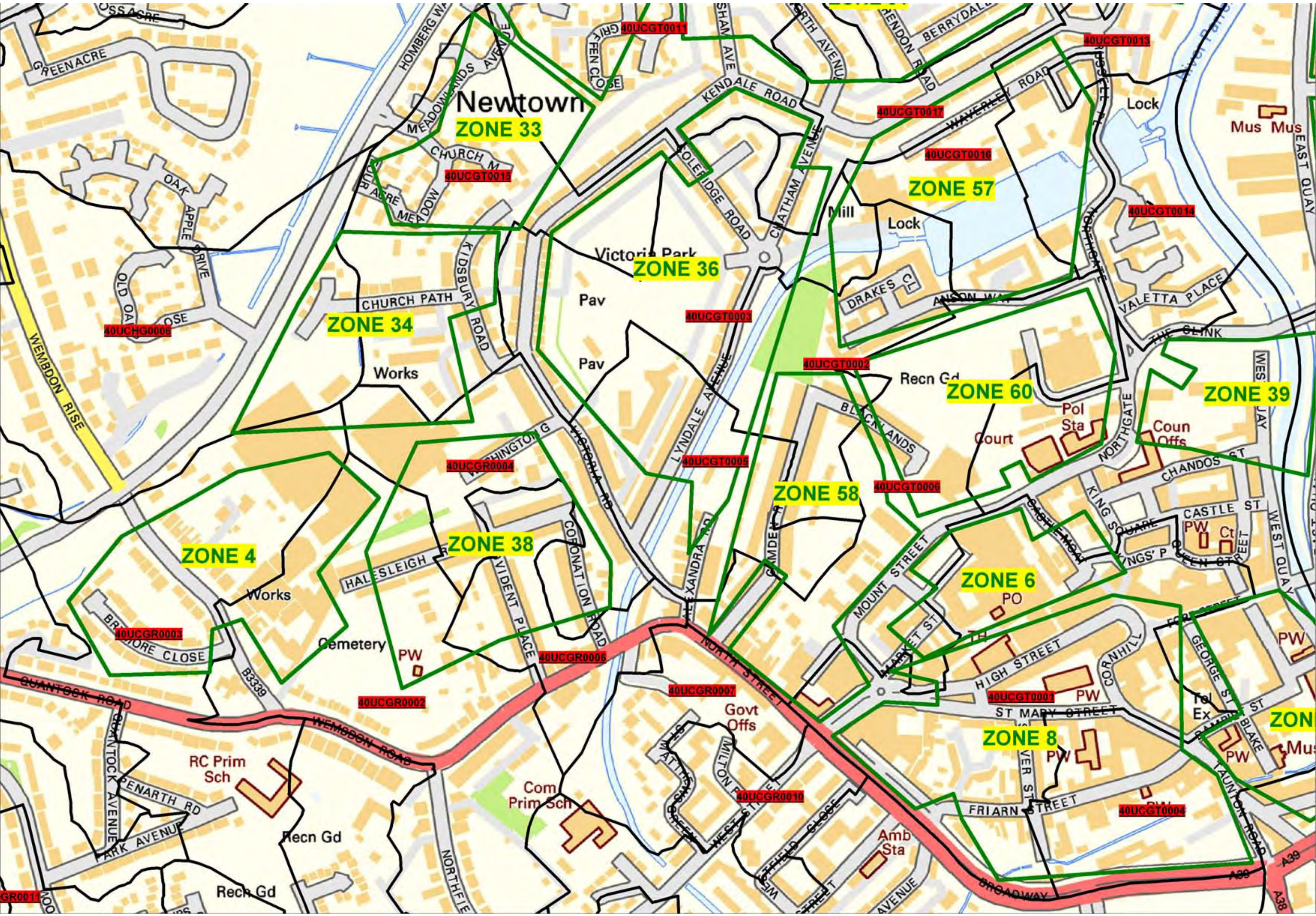
WAVERLEY ROAD
Lock
River Parrett
Mus



Newtown
ZONE 33
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ZONE 36
ZONE 57
ZONE 60
ZONE 39
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ZONE 4
ZONE 38
ZONE 6
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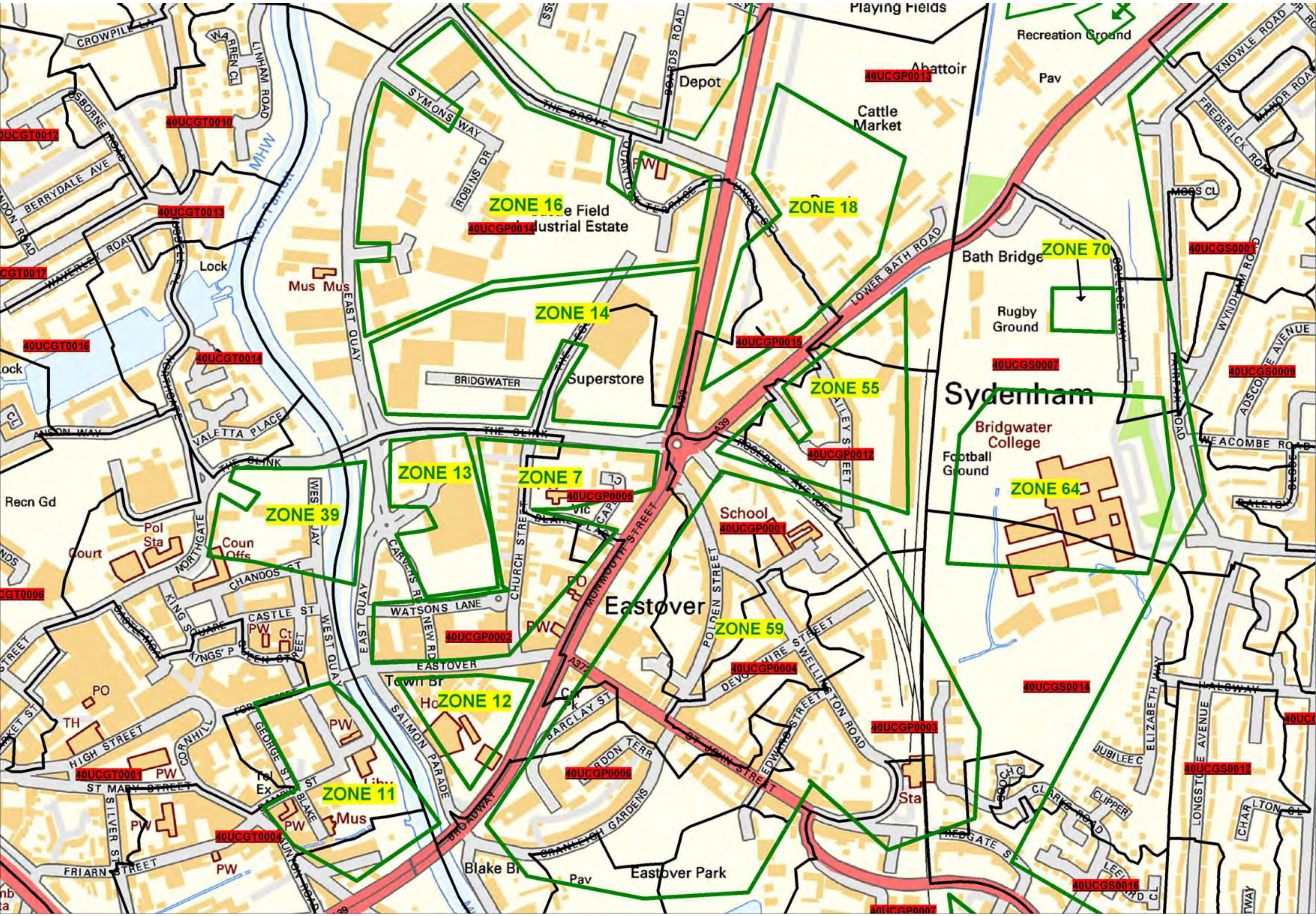
40UCGT0004
GREENACRE
WEMBDON RISE
OAK
APPLE DRIVE
CHURCH PATH
KIDSBURY ROAD
MEADOWLANDS AVENUE
HOMBERG WAY
KENDALE ROAD
COLERIDGE ROAD
CHATHAM AVENUE
BERRYDALE
WAVERLEY ROAD
DRAKES CL
ANSON WAY
VALETTA PLACE
THE CLINK
NORTHGATE
BLACKLANDS
CHANDOS ST
CASTLE ST
KING SQUARE
WEST QUAY
EAST QUAY
LYNDALE AVENUE
VICTORIA RD
ALEXANDRA RD
CORONATION ROAD
PROVIDENT PLACE
HALESLEIGH
MOUNT STREET
MARKET ST
HIGH STREET
CORNHILL
ST MARY STREET
FRIARN STREET
NORTH STREET
GEORGE ST
BLAKE ST
TAUNTON ROAD
BROADWAY
QUANTOCK ROAD
QUANTOCK AVENUE
WEMBDON ROAD
PENARTH RD
PARK AVENUE
B3339
A39
A38
Victoria Park
Pav
Pav
Works
Works
Cemetery
PW
PW
PW
PW
PW
Mill
Lock
Lock
Mus
Mus
Recn Gd
Recn Gd
Recn Gd
Court
Pol Sta
Coun Offs
Ct
PO
TH
Tel Ex
Govt Offs
RC Prim Sch
Com Prim Sch
Amb Sta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40UCGS0001
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40UCGS0016
Playing Fields
Recreation Ground
Abattoir
Pav
Depot
Cattle Market
Castle Field Industrial Estate
Bath Bridge
Rugby Ground
Superstore
Sydenham
Bridgwater College
Football Ground
School
Eastover
Eastover Park
Blake Br
Town Br
Lock
Mus
Recn Gd
Court
Pol Sta
Coun Offs
PO
TH
PW
Sta
Liby
THE DROVE
SYMONS WAY
ROBINS DR
EAST QUAY
WEST QUAY
BRIDGWATER
THE CLINK
MONMOUTH STREET
LOWER BATH ROAD
ROSEBERY AVENUE
BAILEY STREET
CHURCH STREET
WATSONS LANE
EASTOVER
SALMON PARADE
BROADWAY
ST JOHN STREET
POLDEN STREET
WELLINGTON ROAD
DEVONSHIRE STREET
EDWARD STREET
BARCLAY ST
CRANLEIGH GARDENS
REDGATE ST
CLARKS ROAD
JUBILEE C
ELIZABETH WAY
LONGSTONE AVENUE
HALSWAY
WYNDHAM ROAD
FREDERICK ROAD
KNOWLE ROAD
MOSS CL
ADSCOMBE AVENUE
WEACOMBE ROAD
HIGH STREET
ST MARY STREET
FRIARN STREET
CORNHILL
NORTHGATE
CHANDOS ST
CASTLE ST
KING SQUARE
QUEEN STREET
VALETTA PLACE
ANSON WAY
WAVERLEY ROAD
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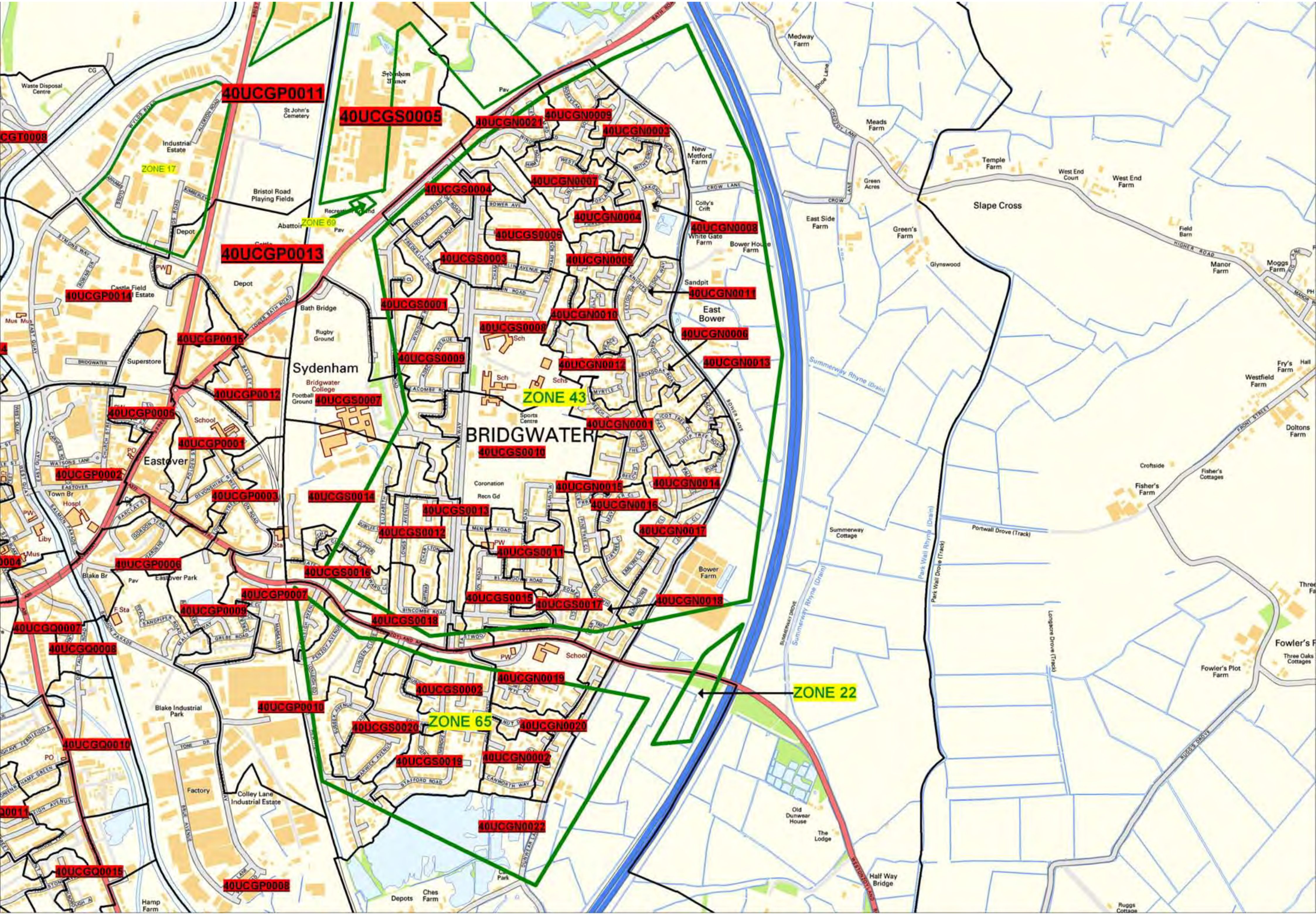
LINHAM ROAD
RIVER PARRETT
MHW
A39
A372



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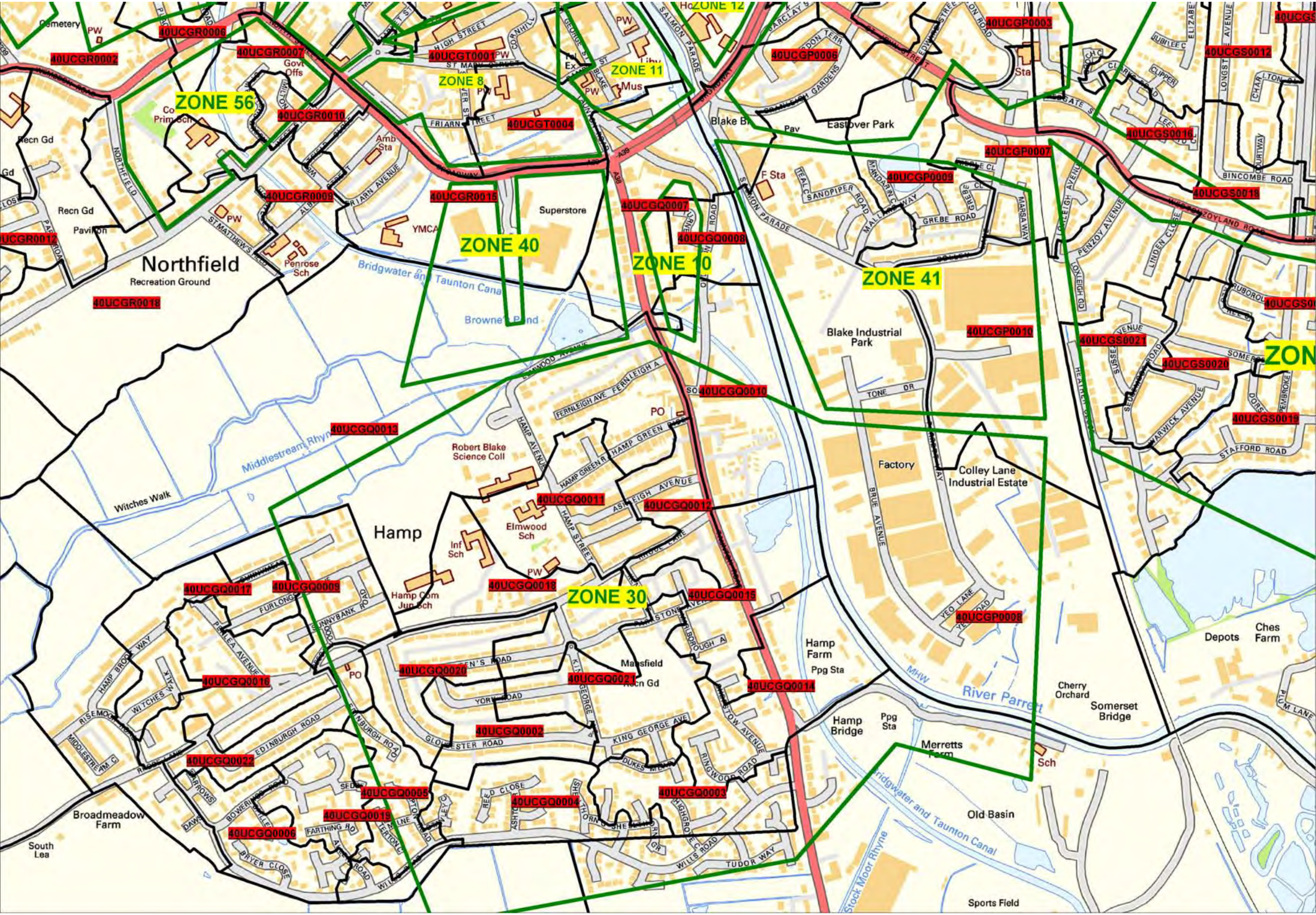
40UCGS0015
40UCGS0017
40UCGS0018
40UCGS0002
40UCGS0020
40UCGS0019
ZONE 43
ZONE 65
ZONE 22
BRIDGWATER
Sydenham
Eastover
Slape Cross
East Bower
Waste Disposal Centre
Industrial Estate
St John's Cemetery
Sydenham Manor
Bristol Road Playing Fields
Abattoir
Depot
Castle Field Ind Estate
Bath Bridge
Rugby Ground
Superstore
Bridgwater College
Football Ground
Sports Centre
Coronation Recn Gd
Town Br
Hospl
Blake Br
Eastover Park
Blake Industrial Park
Factory
Colley Lane Industrial Estate
Hamp Farm
Depots
Ches Farm
Car Park
Medway Farm
Meads Farm
New Metford Farm
Temple Farm
West End Court
West End Farm
Green Acres
Colly's Croft
East Side Farm
Green's Farm
White Gate Farm
Bower House Farm
Glynswood
Field Barn
Manor Farm
Moggs Farm
Sandpit
Summerway Rhyne (Drain)
Fry's Farm
Westfield Farm
Doltons Farm
Croftside
Fisher's Cottages
Fisher's Farm
Summerway Cottage
Portwall Drove (Track)
Park Wall Rhyne (Drain)
Park Wall Drove (Track)
Bower Farm
Longacre Drove (Track)
Fowler's Plot Farm
Three Oaks Cottages
Summerway Drove
Old Dunwear House
The Lodge
Half Way Bridge
Ruggs Drove
Ruggs Cottage
School
Bower Lane
Crow Lane
Higher Road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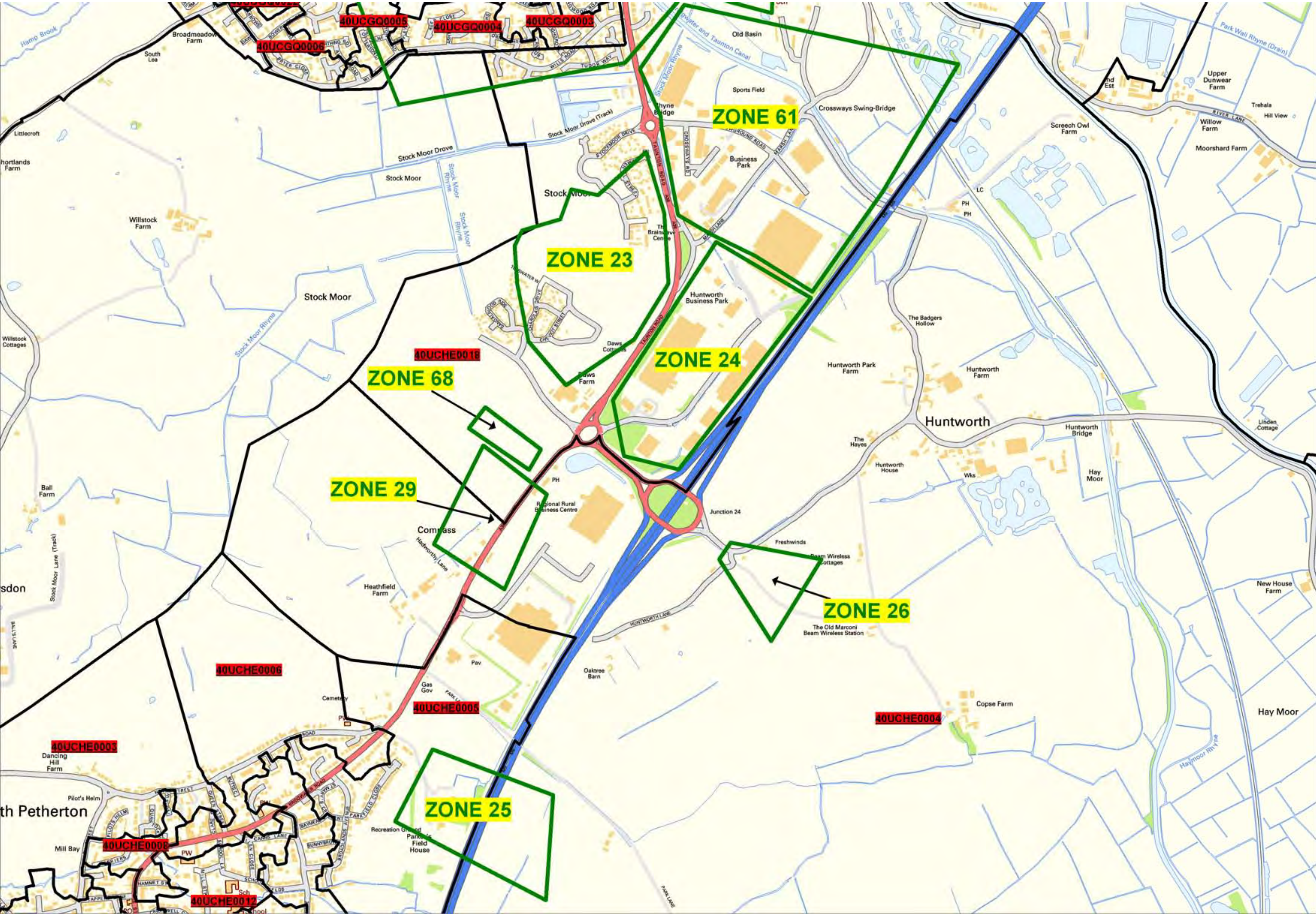
Northfield
Recreation Ground
Bridgwater and Taunton Canal
Browne's Pond
Superstore
YMCA
Blake Industrial Park
Eastover Park
Factory
Colley Lane Industrial Estate
Robert Blake Science Coll
Middlestream Rhyne
Witches Walk
Hamp
Elmwood Sch
Inf Sch
Hamp Com Jun Sch
Mansfield
Hamp Farm
Ppg Sta
Hamp Bridge
Merretts Farm
River Parrett
Cherry Orchard
Somerset Bridge
Depots
Ches Farm
Broadmeadow Farm
South Lea
Old Basin
Sports Field
Stock Moor Rhyne



ZONE 61
ZONE 23
ZONE 24
ZONE 68
ZONE 29
ZONE 26
ZONE 25
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40UCHE0006
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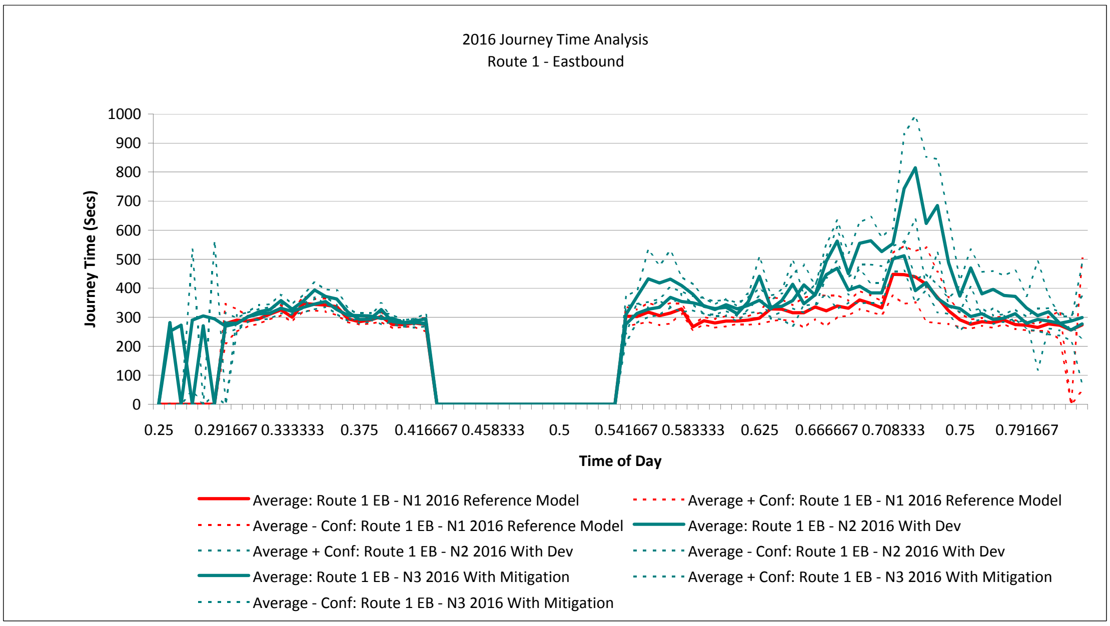
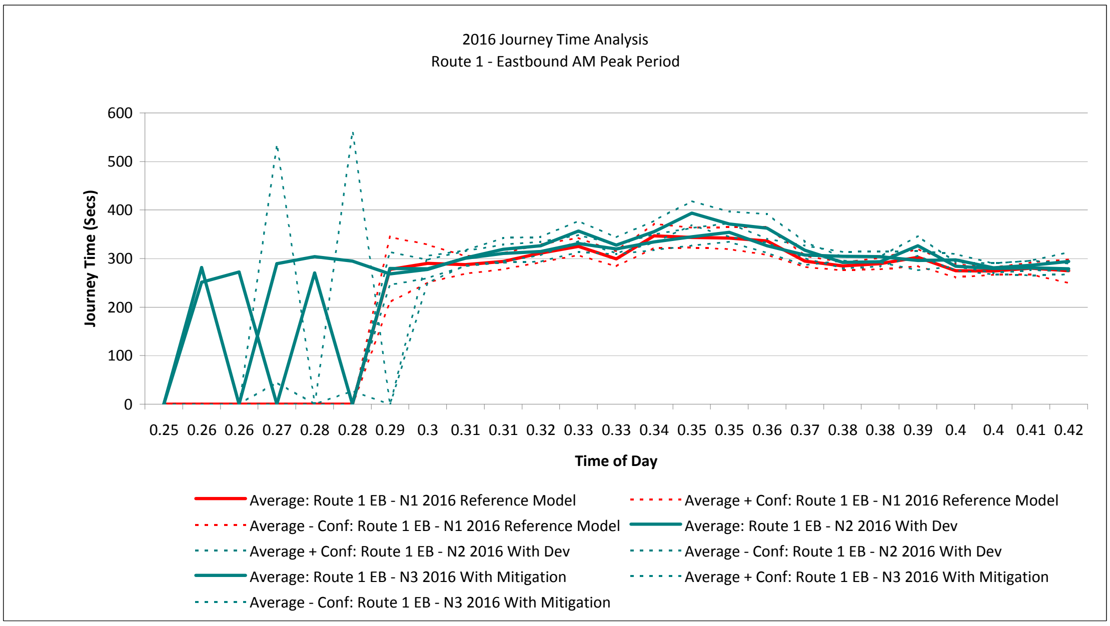
Broadmeadow Farm
South Lea
Old Basin
Sports Field
Crossways Swing-Bridge
Business Park
Stock Moor Drove
Stock Moor
Willstock Farm
Huntworth Business Park
Huntworth Park Farm
Huntworth Farm
Huntworth
Huntworth Bridge
Junction 24
Freshwinds
Beam Wireless Cottages
The Old Marconi Beam Wireless Station
Heathfield Farm
Compass
Regional Rural Business Centre
Cemetery
Copse Farm
Hay Moor
New House Farm
Oaktree Barn
Recreation Ground
Parkfield House
Mill Bay
Pilot's Helm
Dancing Hill Farm
Ball Farm
The Badgers Hollow
Screech Owl Farm
Willow Farm
Moorshard Farm
Upper Dunwear Farm
Trehala
Hill View
Linden Cottage
Hay Moor
The Hayes
Huntworth House
Littlecroft
Willstock Cottages
Daws Farm

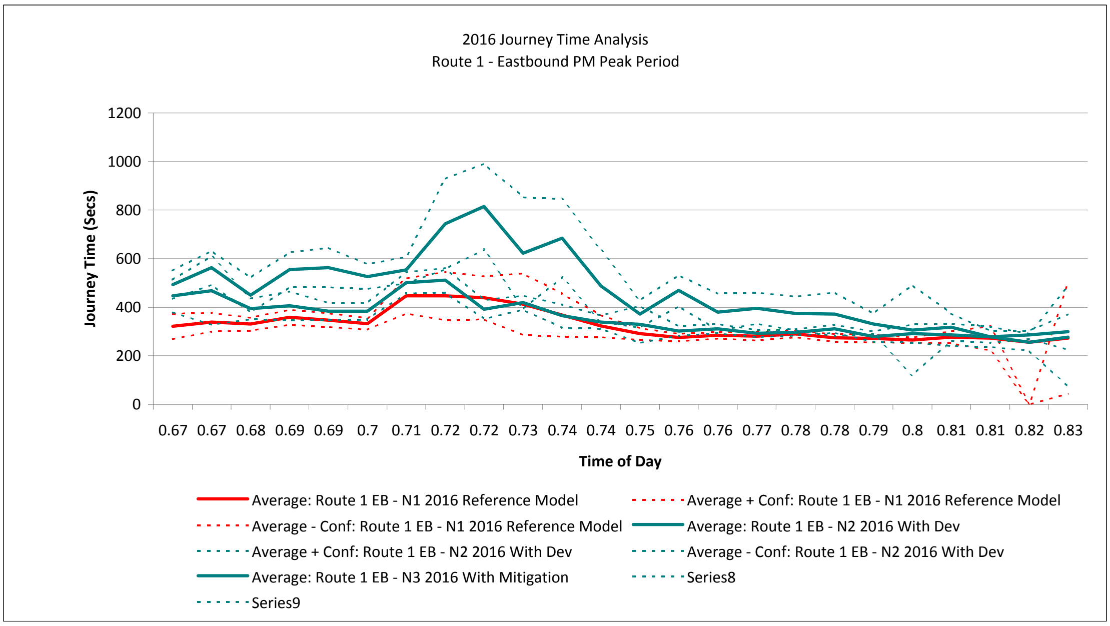
APPENDIX 15.3: 2016 REFERENCE v WITH DEVELOPMENT v WITH MITIGATION JOURNEY TIME GRAPHS



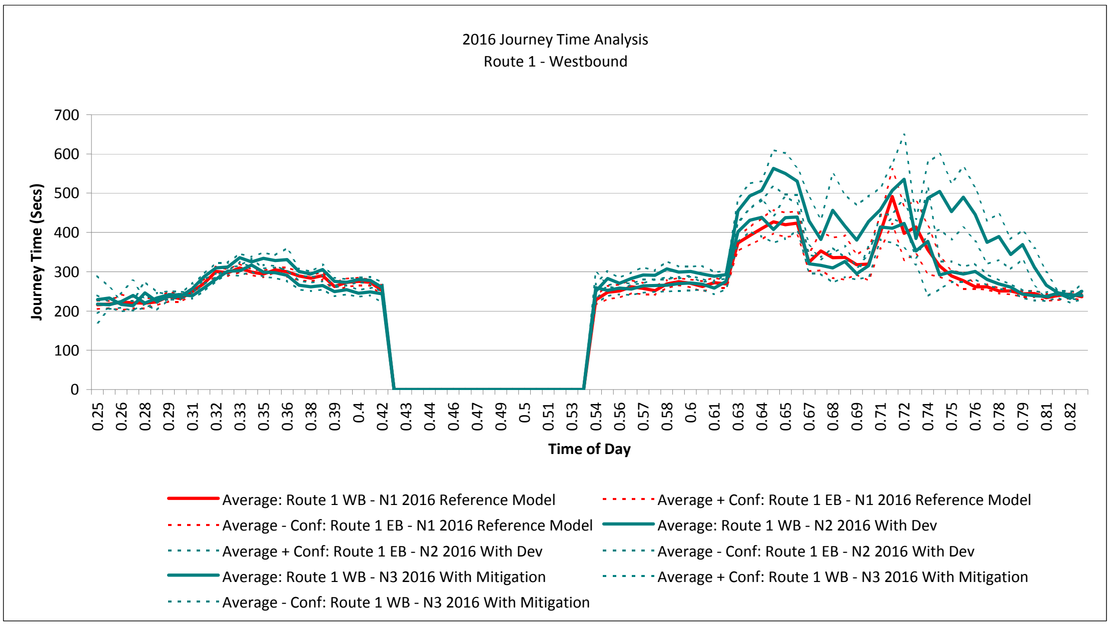
2016 Journey Time Analysis
Route 1 - Eastbound
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
0.25
0.291667
0.333333
0.375
0.416667
0.458333
0.5
0.541667
0.583333
0.625
0.666667
0.708333
0.75
0.791667
Time of Day
Average: Route 1 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 1 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 1 EB - N3 2016 With Mitigation
Average + Conf: Route 1 EB - N3 2016 With Mitigation
Average - Conf: Route 1 EB - N3 2016 With Mitigation

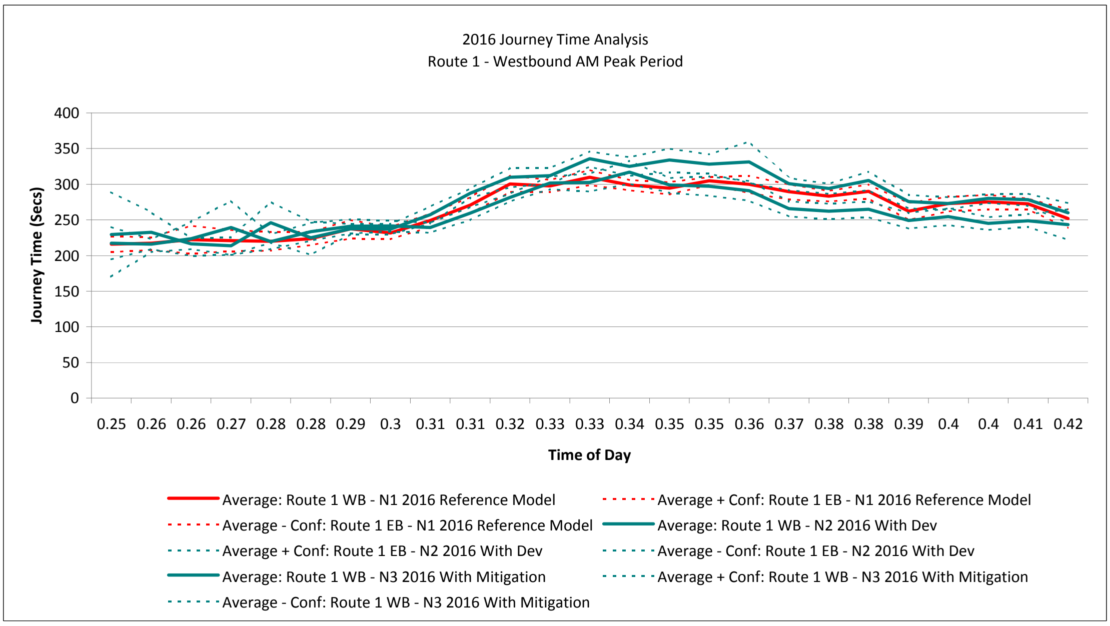


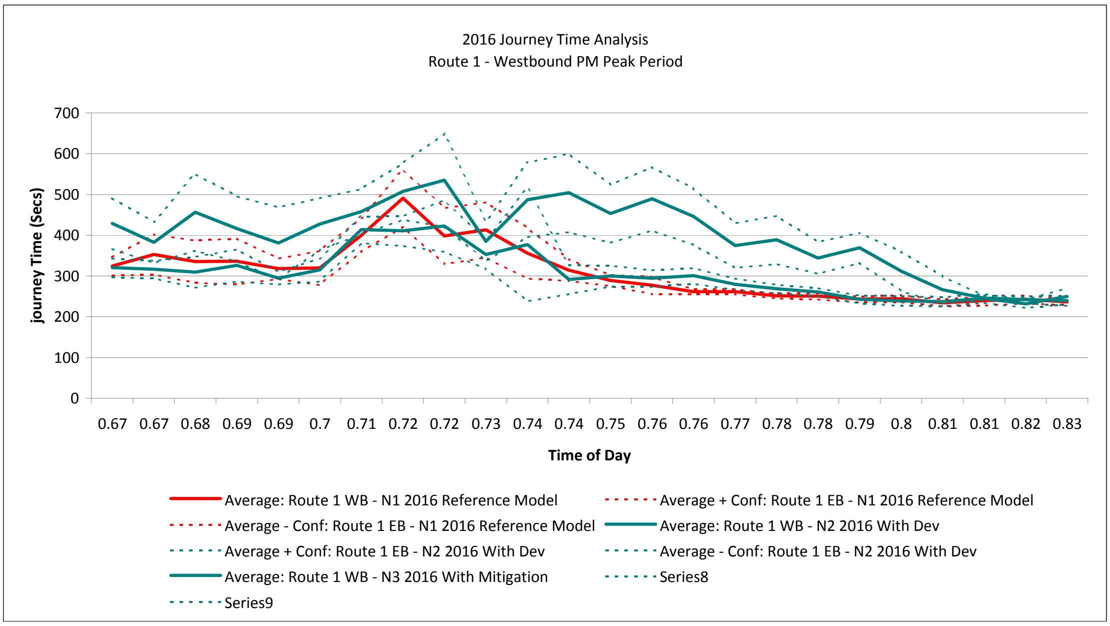
2016 Journey Time Analysis
Route 1 - Eastbound AM Peak Period
Journey Time (Secs)
600
500
400
300
200
100
0
0.25 0.26 0.26 0.27 0.28 0.28 0.29 0.3 0.31 0.31 0.32 0.33 0.33 0.34 0.35 0.35 0.36 0.37 0.38 0.38 0.39 0.4 0.4 0.41 0.42
Time of Day
Average: Route 1 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 1 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 1 EB - N3 2016 With Mitigation
Average + Conf: Route 1 EB - N3 2016 With Mitigation
Average - Conf: Route 1 EB - N3 2016 With Mitigation

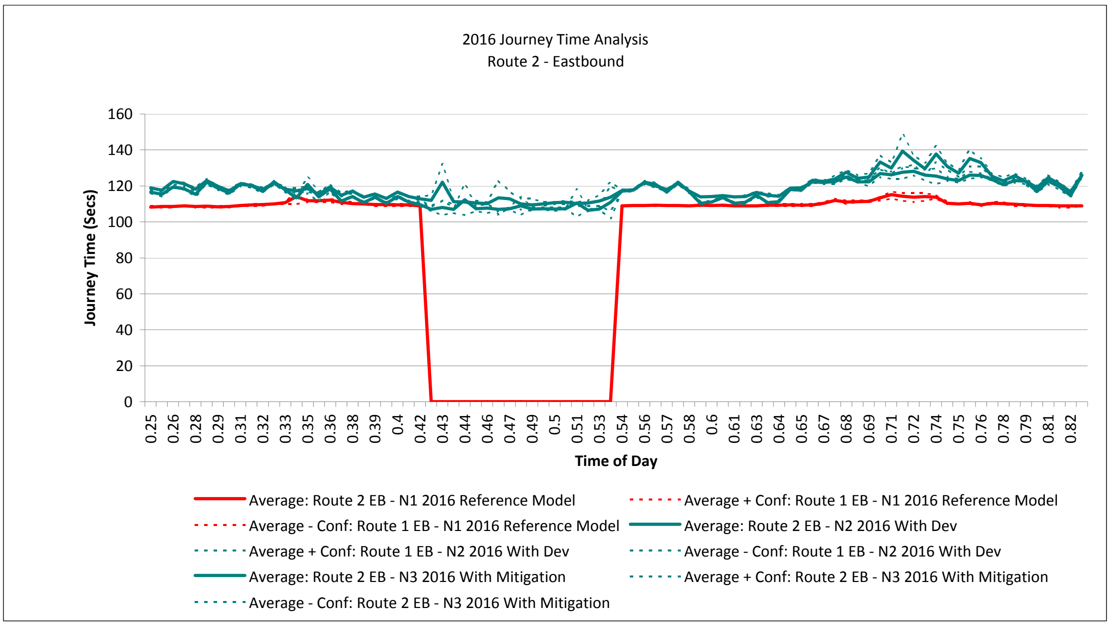


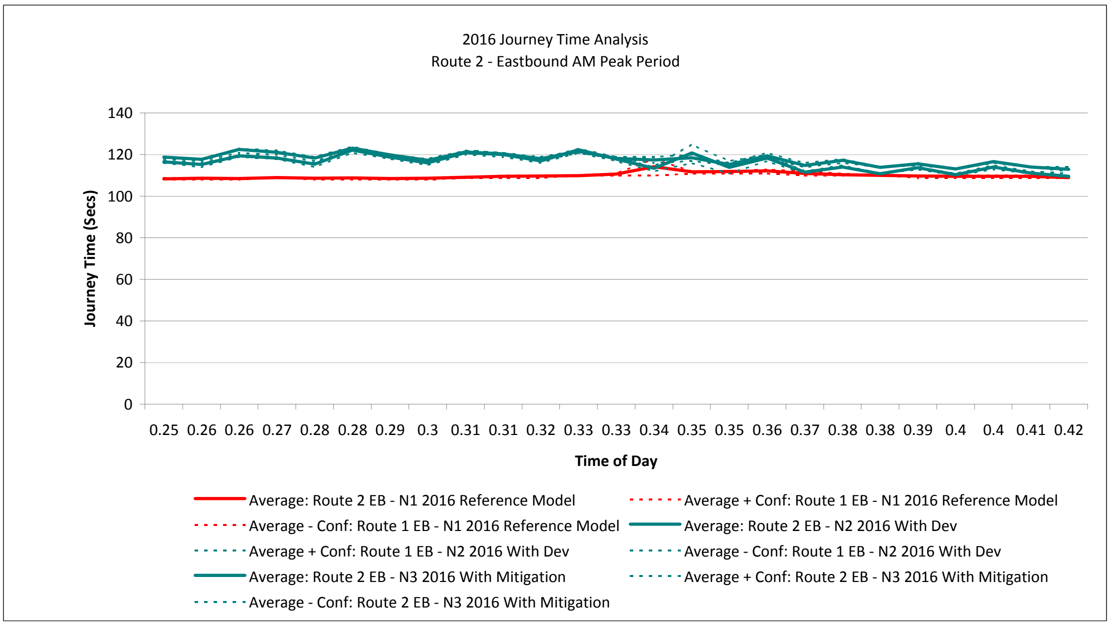
2016 Journey Time Analysis
Route 1 - Eastbound PM Peak Period
Journey Time (Secs)
1200
1000
800
600
400
200
0
0.67 0.67 0.68 0.69 0.69 0.7 0.71 0.72 0.72 0.73 0.74 0.74 0.75 0.76 0.76 0.77 0.78 0.78 0.79 0.8 0.81 0.81 0.82 0.83
Time of Day
Average: Route 1 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 1 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 1 EB - N3 2016 With Mitigation
Series8
Series9

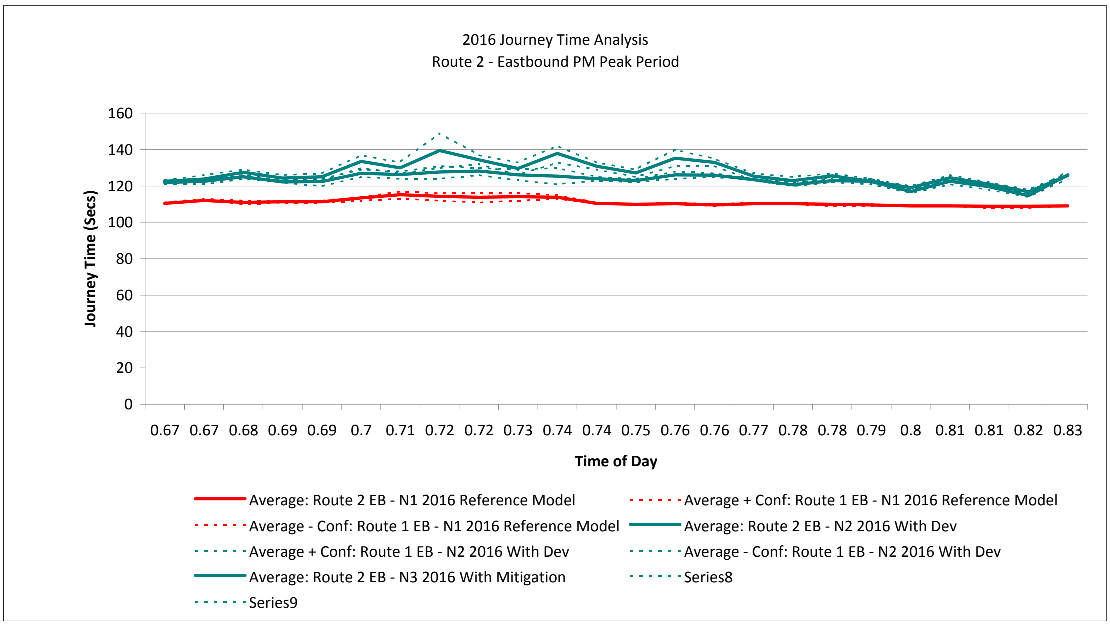

2016 Journey Time Analysis
Route 1 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 1 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 1 WB - N3 2016 With Mitigation
Average + Conf: Route 1 WB - N3 2016 With Mitigation
Average - Conf: Route 1 WB - N3 2016 With Mitigation

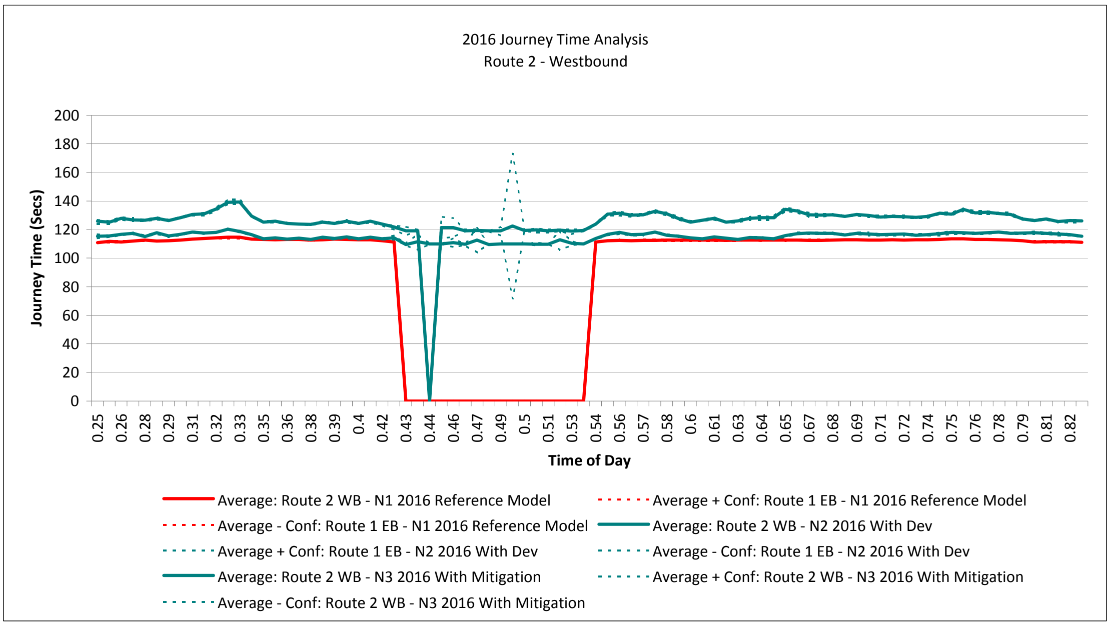

2016 Journey Time Analysis
Route 1 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 1 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 1 WB - N3 2016 With Mitigation
Average + Conf: Route 1 WB - N3 2016 With Mitigation
Average - Conf: Route 1 WB - N3 2016 With Mitigation

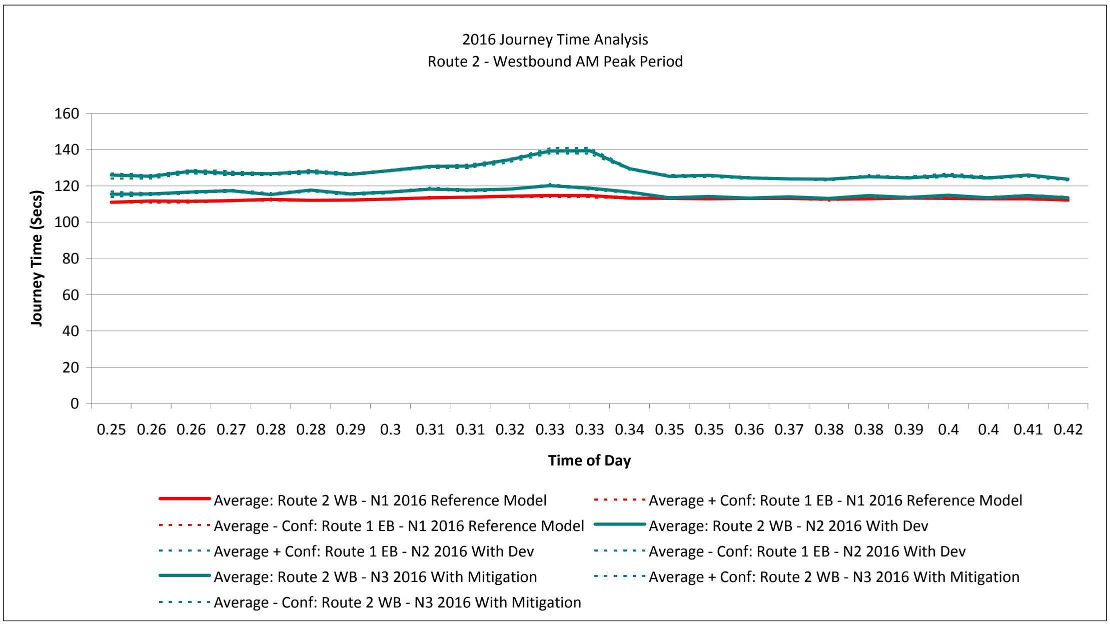

2016 Journey Time Analysis
Route 1 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 1 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 1 WB - N3 2016 With Mitigation
Series8
Series9

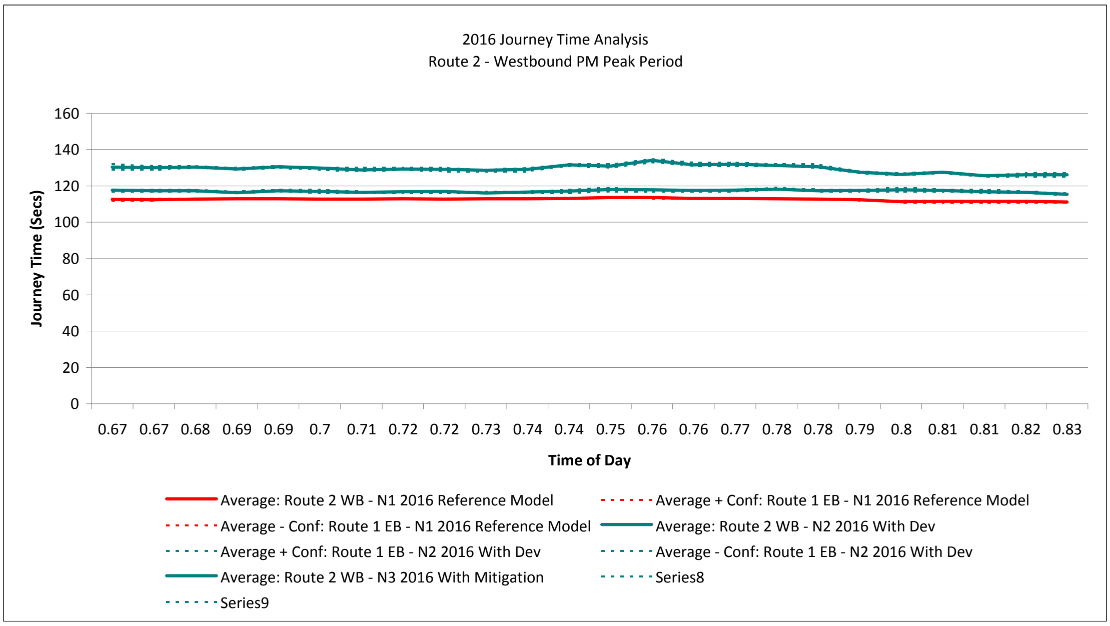

2016 Journey Time Analysis
Route 2 - Eastbound
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
0.25 0.26 0.28 0.29 0.31 0.32 0.33 0.35 0.36 0.38 0.39 0.4 0.42 0.43 0.44 0.46 0.47 0.49 0.5 0.51 0.53 0.54 0.56 0.57 0.58 0.6 0.61 0.63 0.64 0.65 0.67 0.68 0.69 0.71 0.72 0.74 0.75 0.76 0.78 0.79 0.81 0.82
Time of Day
Average: Route 2 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 2 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 2 EB - N3 2016 With Mitigation
Average + Conf: Route 2 EB - N3 2016 With Mitigation
Average - Conf: Route 2 EB - N3 2016 With Mitigation

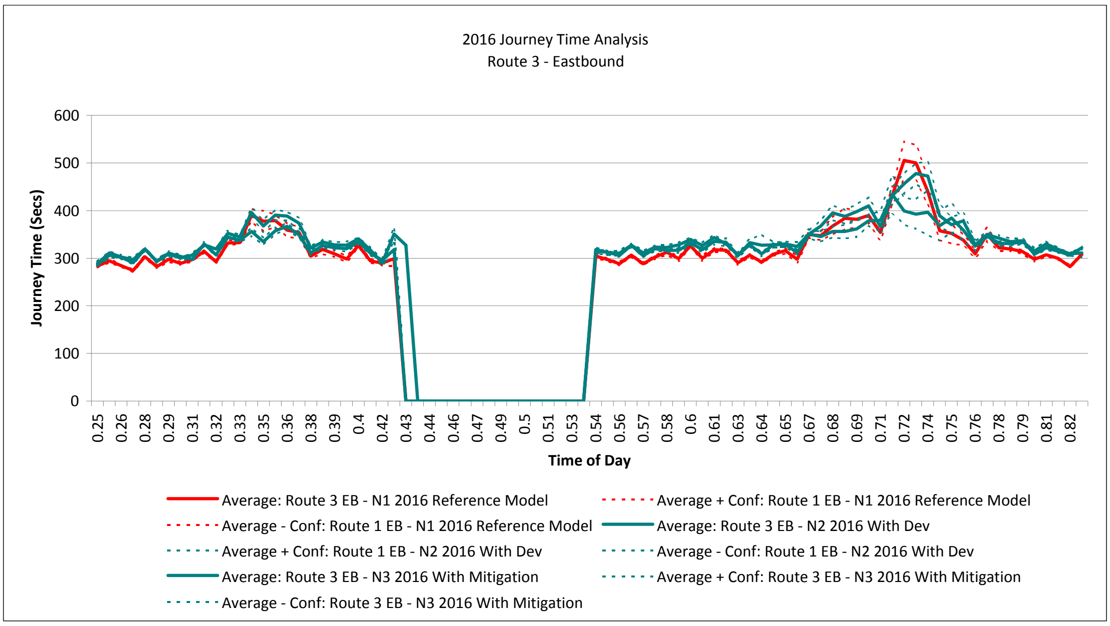

2016 Journey Time Analysis
Route 2 - Eastbound AM Peak Period
Journey Time (Secs)
140
120
100
80
60
40
20
0
0.25 0.26 0.26 0.27 0.28 0.28 0.29 0.3 0.31 0.31 0.32 0.33 0.33 0.34 0.35 0.35 0.36 0.37 0.38 0.38 0.39 0.4 0.4 0.41 0.42
Time of Day
Average: Route 2 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 2 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 2 EB - N3 2016 With Mitigation
Average + Conf: Route 2 EB - N3 2016 With Mitigation
Average - Conf: Route 2 EB - N3 2016 With Mitigation

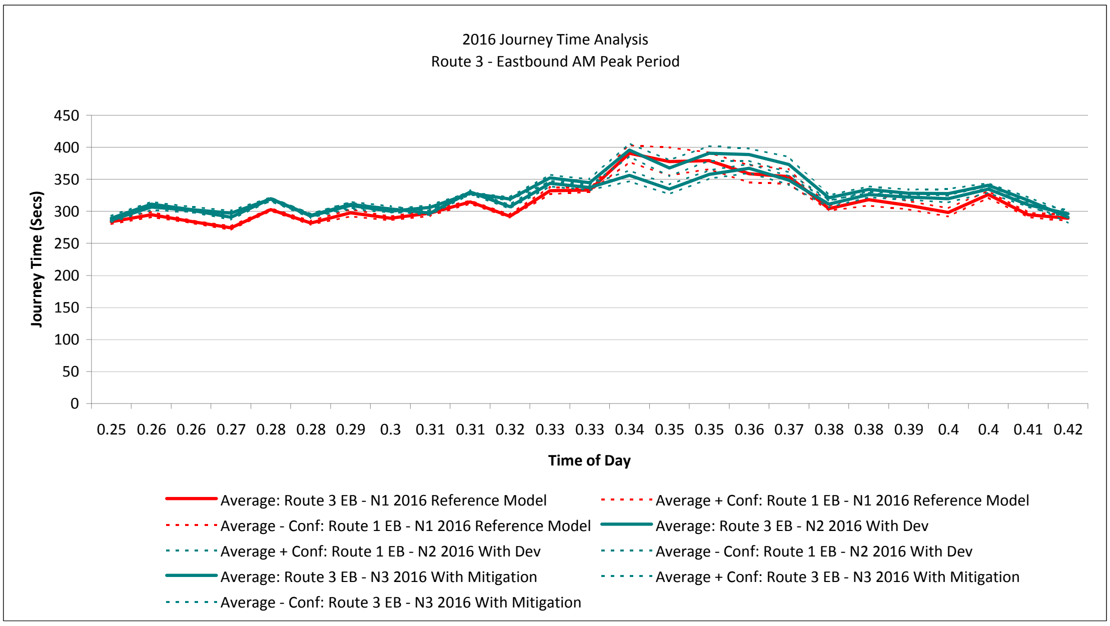

2016 Journey Time Analysis
Route 2 - Eastbound PM Peak Period
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
0.67 0.67 0.68 0.69 0.69 0.7 0.71 0.72 0.72 0.73 0.74 0.74 0.75 0.76 0.76 0.77 0.78 0.78 0.79 0.8 0.81 0.81 0.82 0.83
Time of Day
Average: Route 2 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 2 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 2 EB - N3 2016 With Mitigation
Series8
Series9

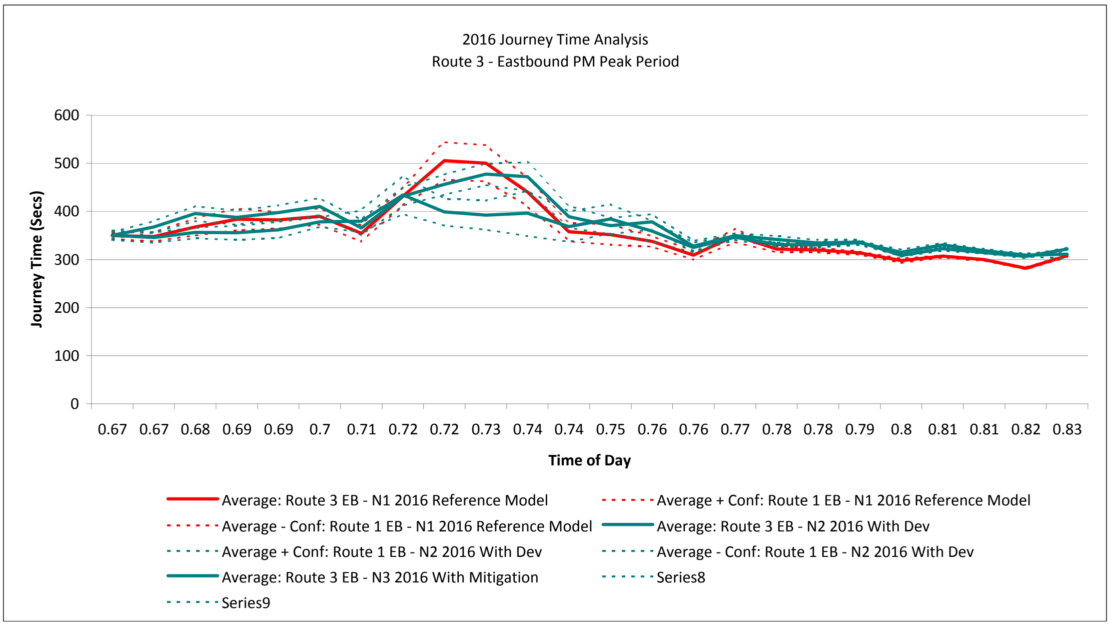

2016 Journey Time Analysis
Route 2 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 2 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 2 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 2 WB - N3 2016 With Mitigation
Average + Conf: Route 2 WB - N3 2016 With Mitigation
Average - Conf: Route 2 WB - N3 2016 With Mitigation

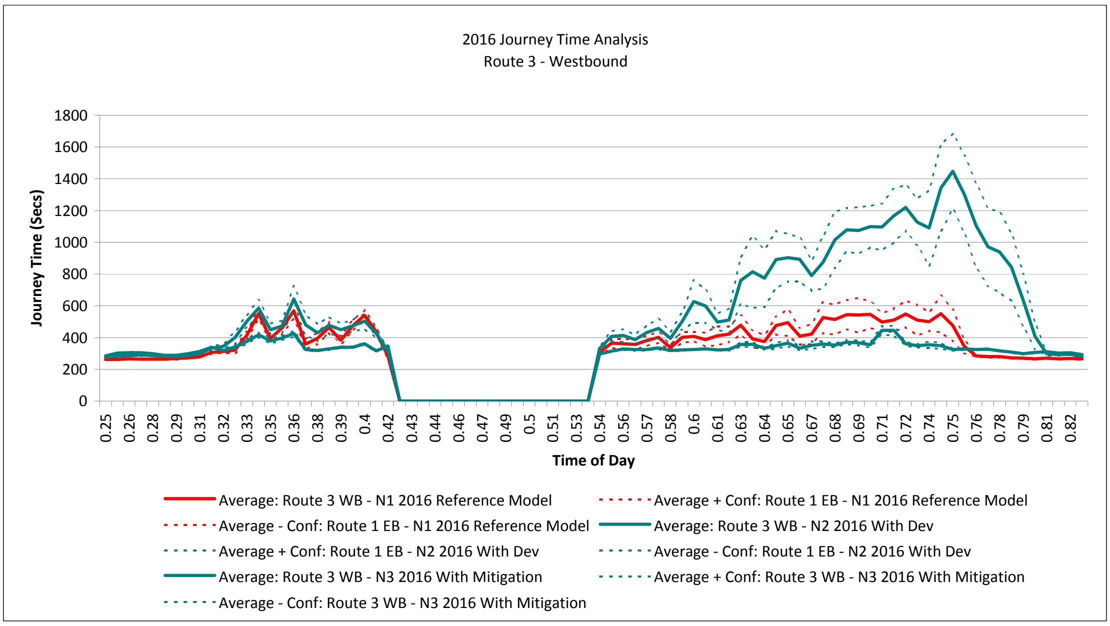

2016 Journey Time Analysis
Route 2 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 2 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 2 WB - N3 2016 With Mitigation
Average + Conf: Route 2 WB - N3 2016 With Mitigation
Average - Conf: Route 2 WB - N3 2016 With Mitigation

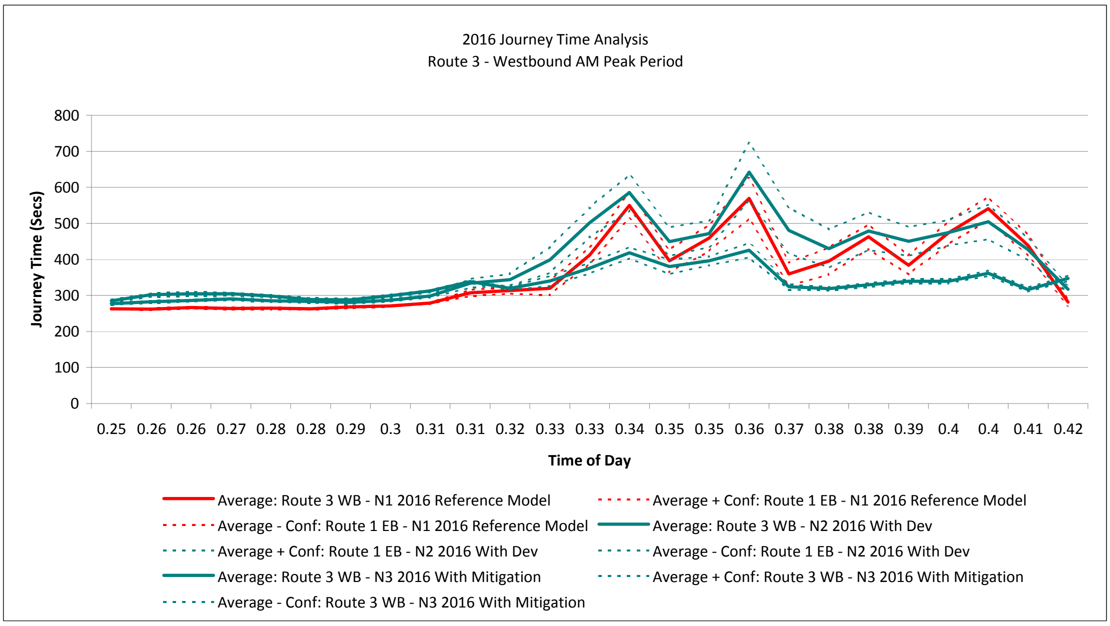

2016 Journey Time Analysis
Route 2 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 2 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 2 WB - N3 2016 With Mitigation
Series8
Series9

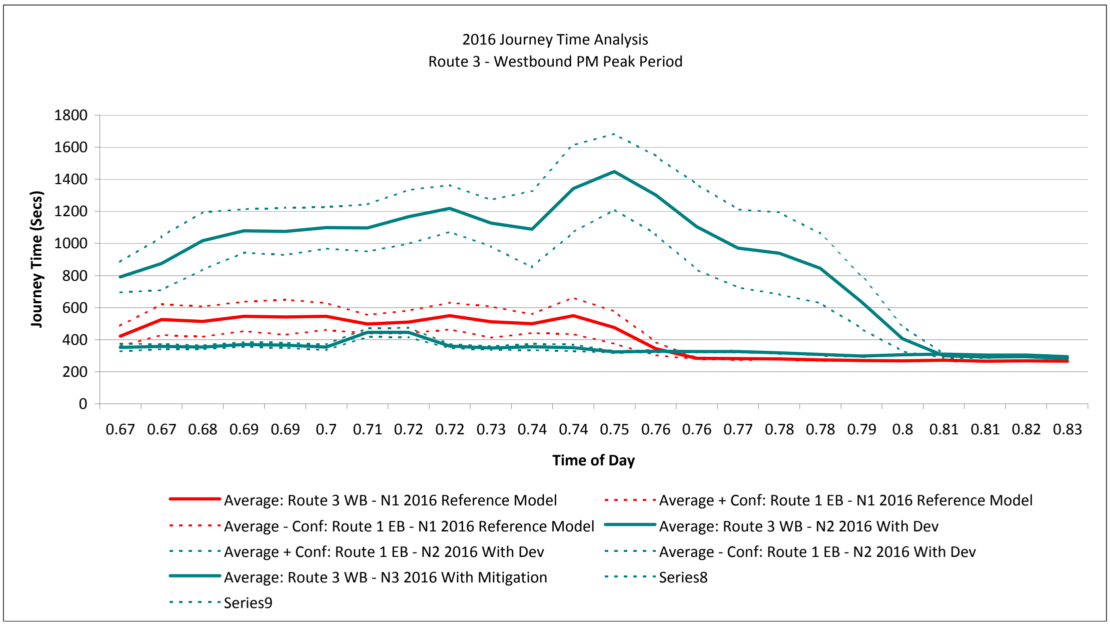

2016 Journey Time Analysis
Route 3 - Eastbound
Journey Time (Secs)
600
500
400
300
200
100
0
0.25
0.26
0.28
0.29
0.31
0.32
0.33
0.35
0.36
0.38
0.39
0.4
0.42
0.43
0.44
0.46
0.47
0.49
0.5
0.51
0.53
0.54
0.56
0.57
0.58
0.6
0.61
0.63
0.64
0.65
0.67
0.68
0.69
0.71
0.72
0.74
0.75
0.76
0.78
0.79
0.81
0.82
Time of Day
Average: Route 3 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 3 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 3 EB - N3 2016 With Mitigation
Average + Conf: Route 3 EB - N3 2016 With Mitigation
Average - Conf: Route 3 EB - N3 2016 With Mitigation

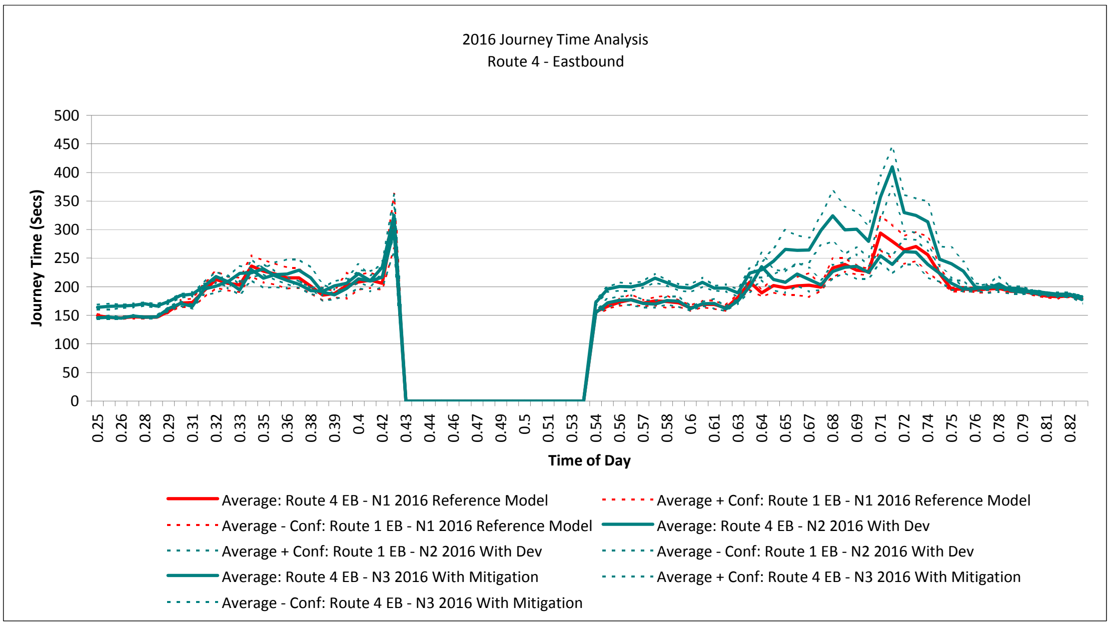

2016 Journey Time Analysis
Route 3 - Eastbound AM Peak Period
Journey Time (Secs)
450
400
350
300
250
200
150
100
50
0
0.25
0.26
0.26
0.27
0.28
0.28
0.29
0.3
0.31
0.31
0.32
0.33
0.33
0.34
0.35
0.35
0.36
0.37
0.38
0.38
0.39
0.4
0.4
0.41
0.42
Time of Day
Average: Route 3 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 3 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 3 EB - N3 2016 With Mitigation
Average + Conf: Route 3 EB - N3 2016 With Mitigation
Average - Conf: Route 3 EB - N3 2016 With Mitigation

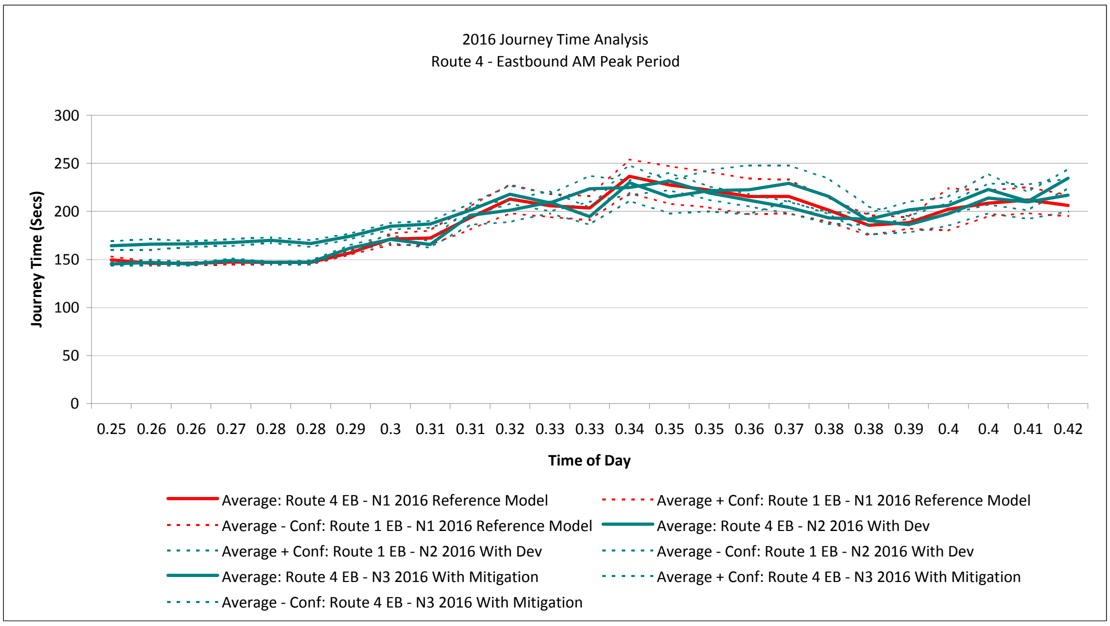

2016 Journey Time Analysis
Route 3 - Eastbound PM Peak Period
Journey Time (Secs)
600
500
400
300
200
100
0
0.67
0.67
0.68
0.69
0.69
0.7
0.71
0.72
0.72
0.73
0.74
0.74
0.75
0.76
0.76
0.77
0.78
0.78
0.79
0.8
0.81
0.81
0.82
0.83
Time of Day
Average: Route 3 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 3 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 3 EB - N3 2016 With Mitigation
Series8
Series9

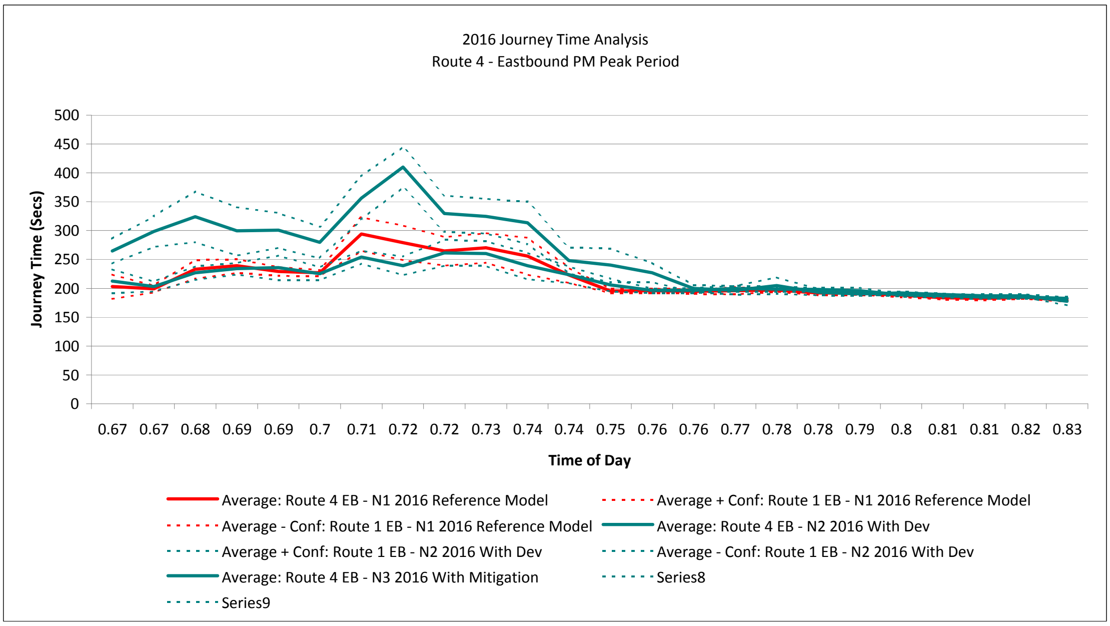

2016 Journey Time Analysis
Route 3 - Westbound
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
Time of Day
Average: Route 3 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 3 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 3 WB - N3 2016 With Mitigation
Average + Conf: Route 3 WB - N3 2016 With Mitigation
Average - Conf: Route 3 WB - N3 2016 With Mitigation

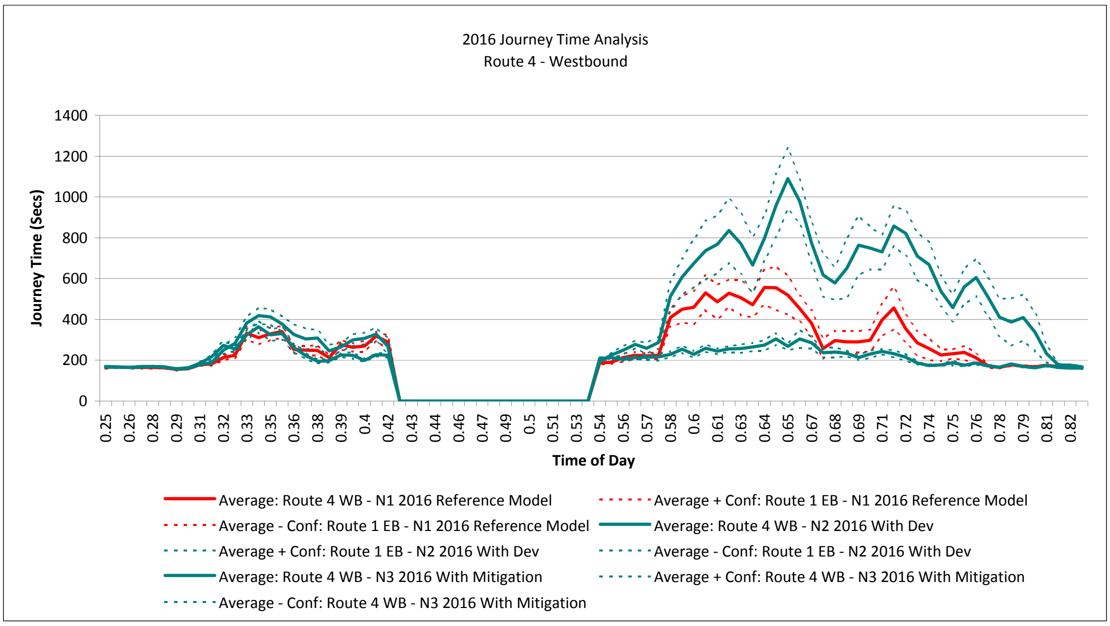

2016 Journey Time Analysis
Route 3 - Westbound AM Peak Period
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
0.25 0.26 0.26 0.27 0.28 0.28 0.29 0.3 0.31 0.31 0.32 0.33 0.33 0.34 0.35 0.35 0.36 0.37 0.38 0.38 0.39 0.4 0.4 0.41 0.42
Time of Day
Average: Route 3 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 3 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 3 WB - N3 2016 With Mitigation
Average + Conf: Route 3 WB - N3 2016 With Mitigation
Average - Conf: Route 3 WB - N3 2016 With Mitigation

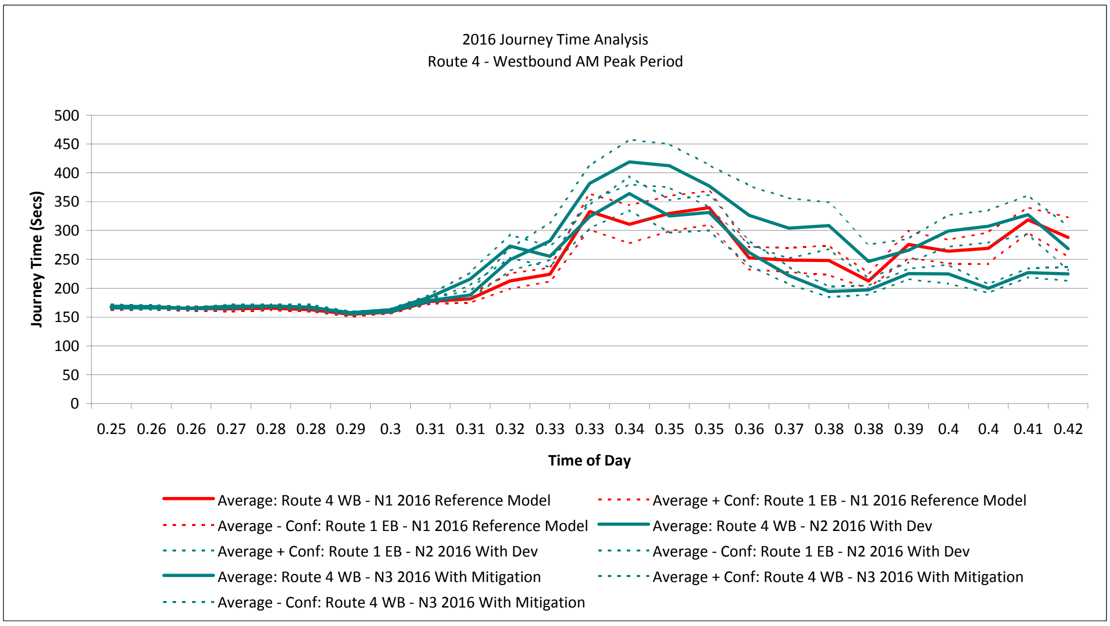

2016 Journey Time Analysis
Route 3 - Westbound PM Peak Period
Journey Time (Secs)
1800
1600
1400
1200
1000
800
600
400
200
0
0.67 0.67 0.68 0.69 0.69 0.7 0.71 0.72 0.72 0.73 0.74 0.74 0.75 0.76 0.76 0.77 0.78 0.78 0.79 0.8 0.81 0.81 0.82 0.83
Time of Day
Average: Route 3 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 3 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 3 WB - N3 2016 With Mitigation
Series8
Series9

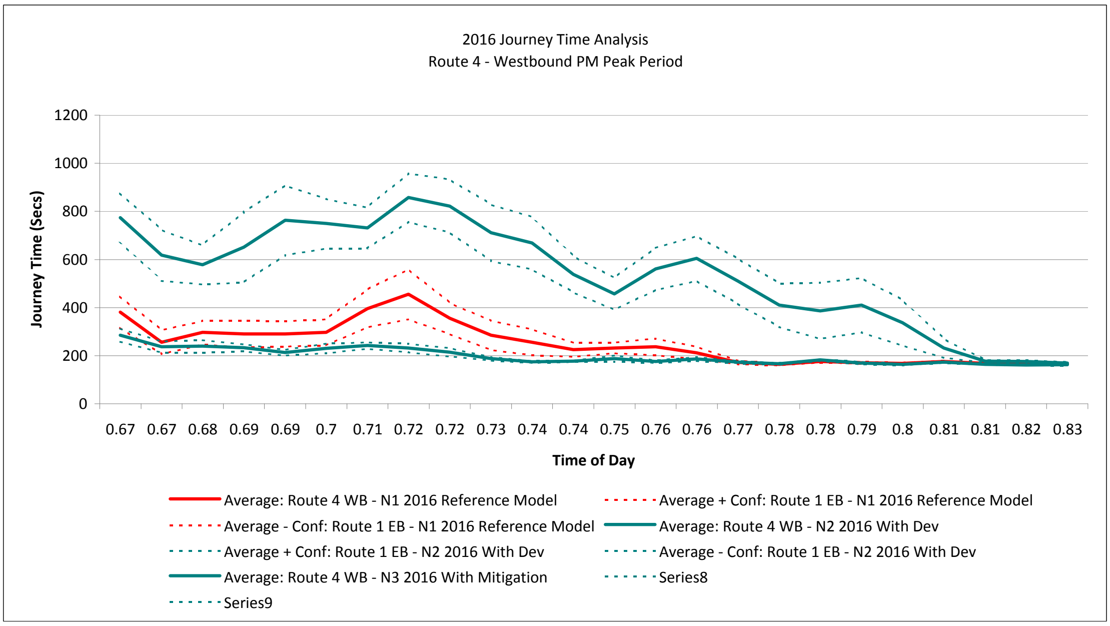

2016 Journey Time Analysis
Route 4 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 4 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 4 EB - N3 2016 With Mitigation
Average + Conf: Route 4 EB - N3 2016 With Mitigation
Average - Conf: Route 4 EB - N3 2016 With Mitigation

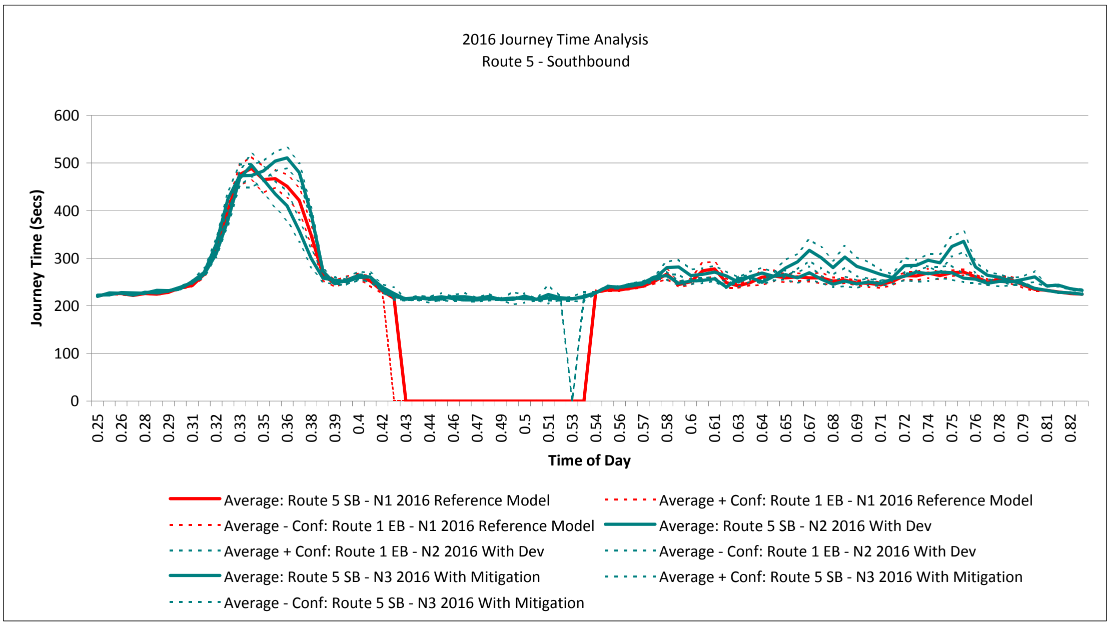

2016 Journey Time Analysis
Route 4 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 4 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 4 EB - N3 2016 With Mitigation
Average + Conf: Route 4 EB - N3 2016 With Mitigation
Average - Conf: Route 4 EB - N3 2016 With Mitigation

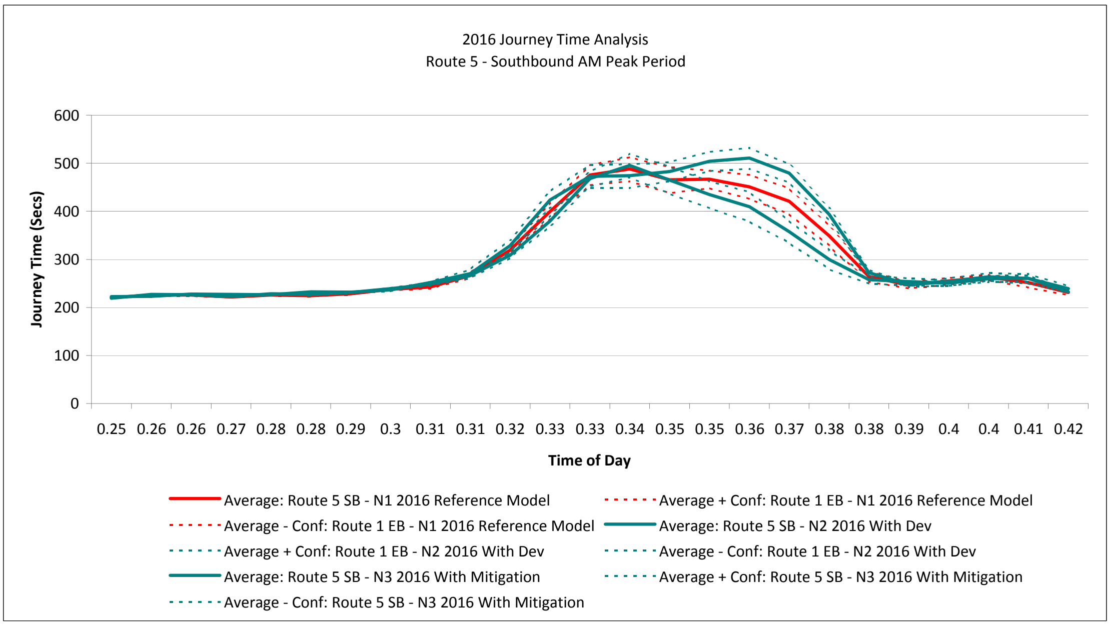

2016 Journey Time Analysis
Route 4 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 4 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 4 EB - N3 2016 With Mitigation
Series8
Series9

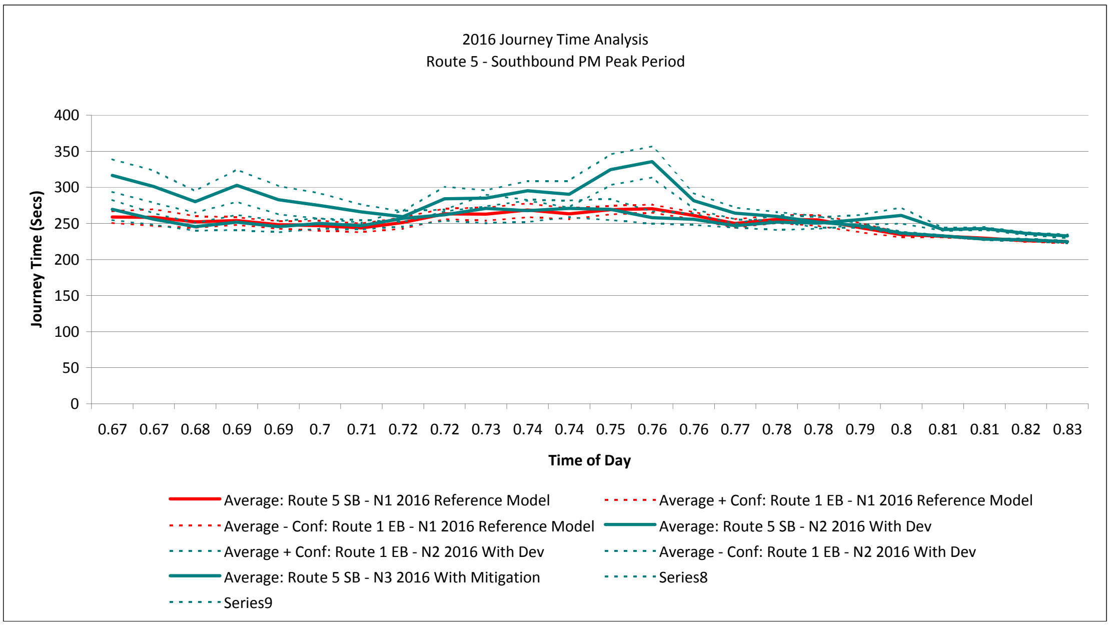

2016 Journey Time Analysis
Route 4 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 4 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 4 WB - N3 2016 With Mitigation
Average + Conf: Route 4 WB - N3 2016 With Mitigation
Average - Conf: Route 4 WB - N3 2016 With Mitigation

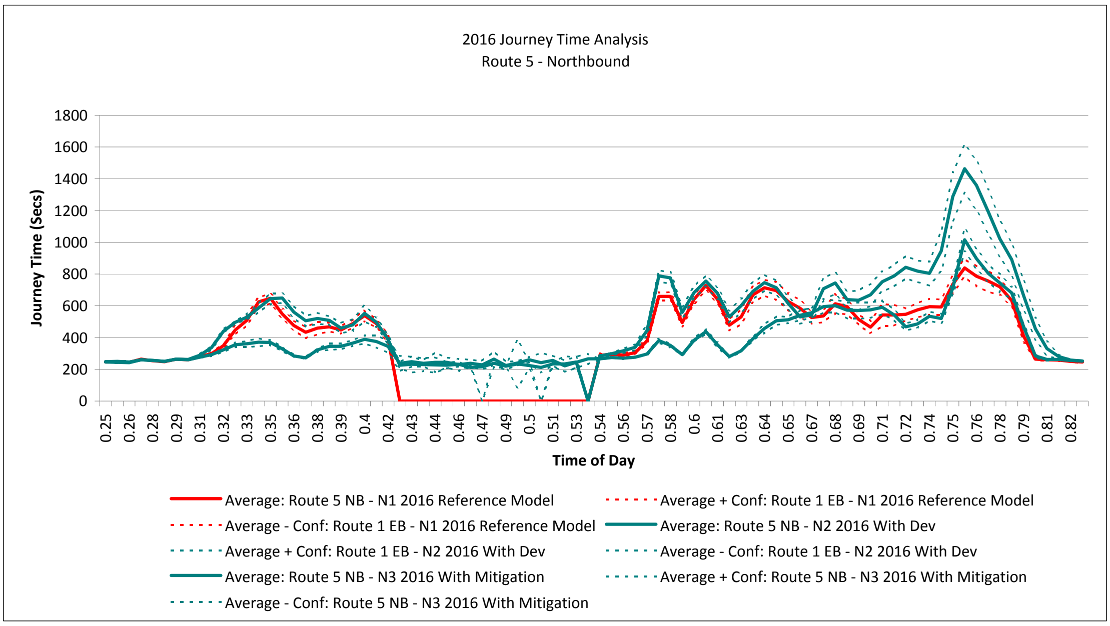

2016 Journey Time Analysis
Route 4 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 4 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 4 WB - N3 2016 With Mitigation
Average + Conf: Route 4 WB - N3 2016 With Mitigation
Average - Conf: Route 4 WB - N3 2016 With Mitigation


2016 Journey Time Analysis
Route 4 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 4 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 4 WB - N3 2016 With Mitigation
Series8
Series9

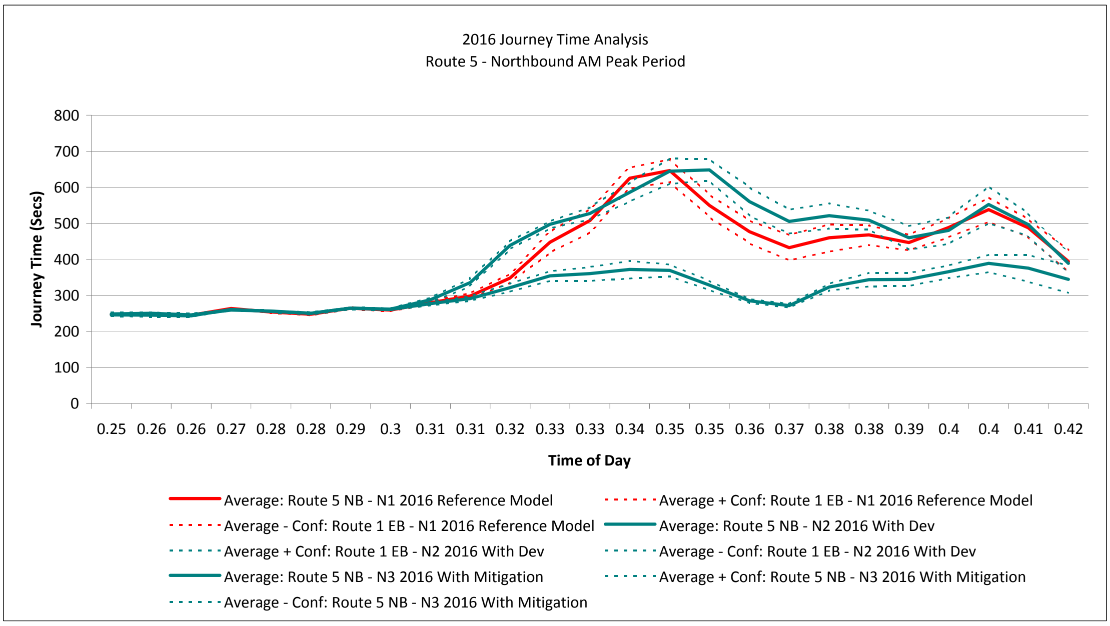

2016 Journey Time Analysis
Route 5 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 5 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 5 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 5 SB - N3 2016 With Mitigation
Average + Conf: Route 5 SB - N3 2016 With Mitigation
Average - Conf: Route 5 SB - N3 2016 With Mitigation


2016 Journey Time Analysis
Route 5 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 5 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 5 SB - N3 2016 With Mitigation
Average + Conf: Route 5 SB - N3 2016 With Mitigation
Average - Conf: Route 5 SB - N3 2016 With Mitigation

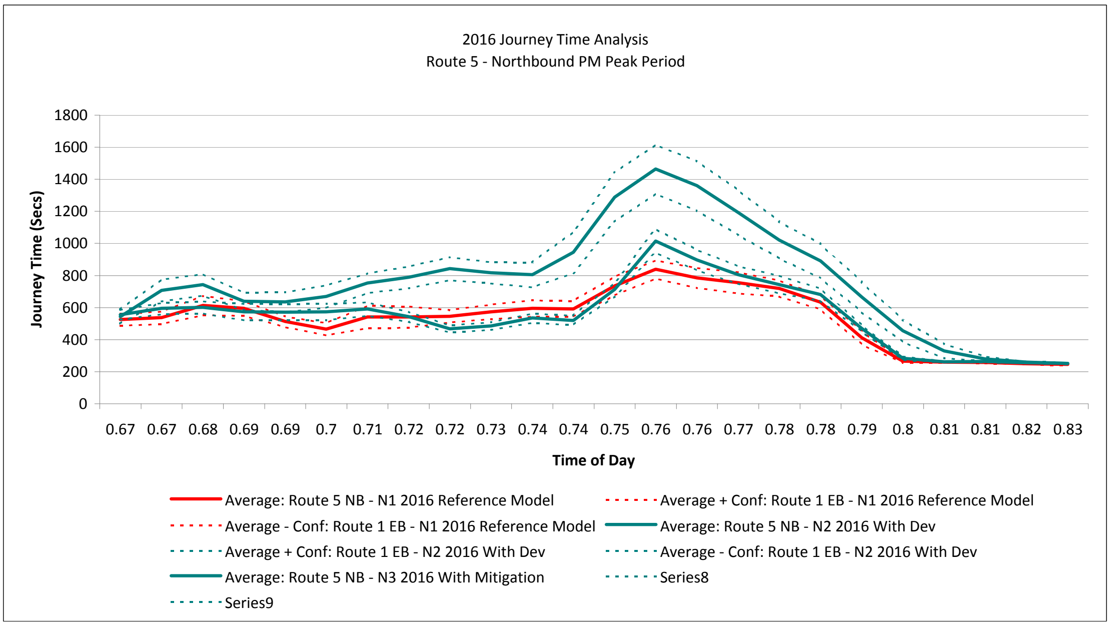

2016 Journey Time Analysis
Route 5 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 5 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 5 SB - N3 2016 With Mitigation
Series8
Series9



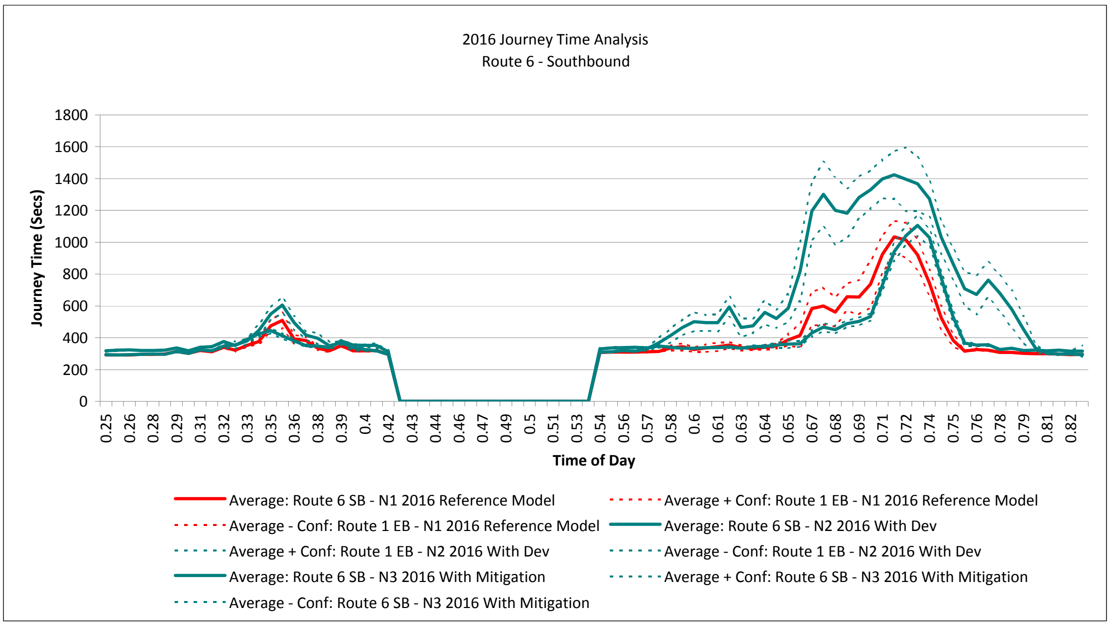
2016 Journey Time Analysis
Route 5 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 5 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 5 NB - N3 2016 With Mitigation
Average + Conf: Route 5 NB - N3 2016 With Mitigation
Average - Conf: Route 5 NB - N3 2016 With Mitigation

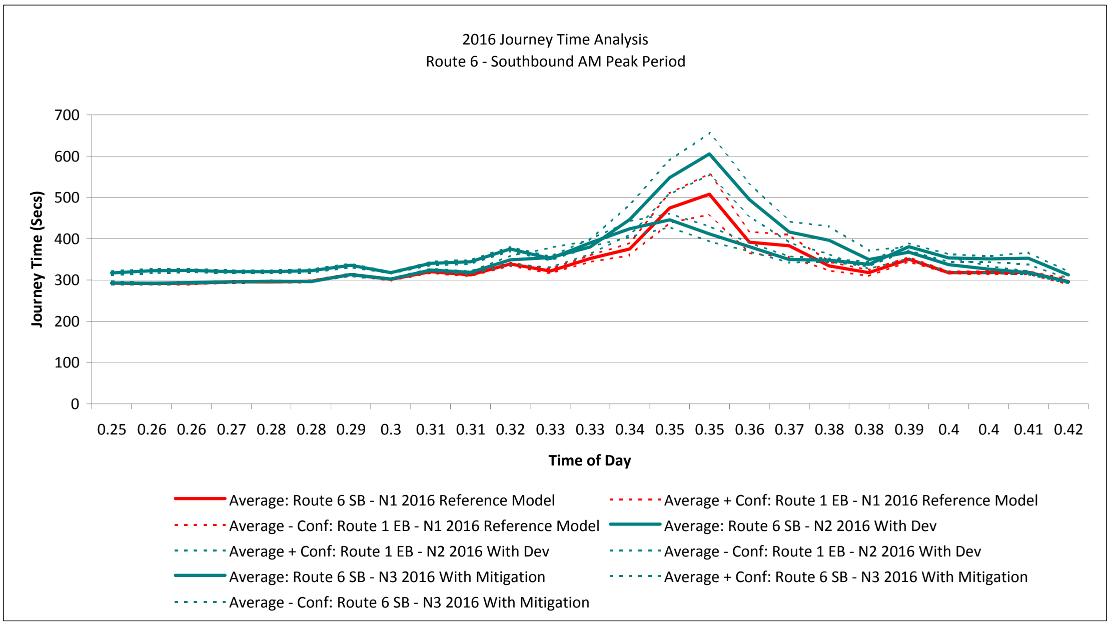


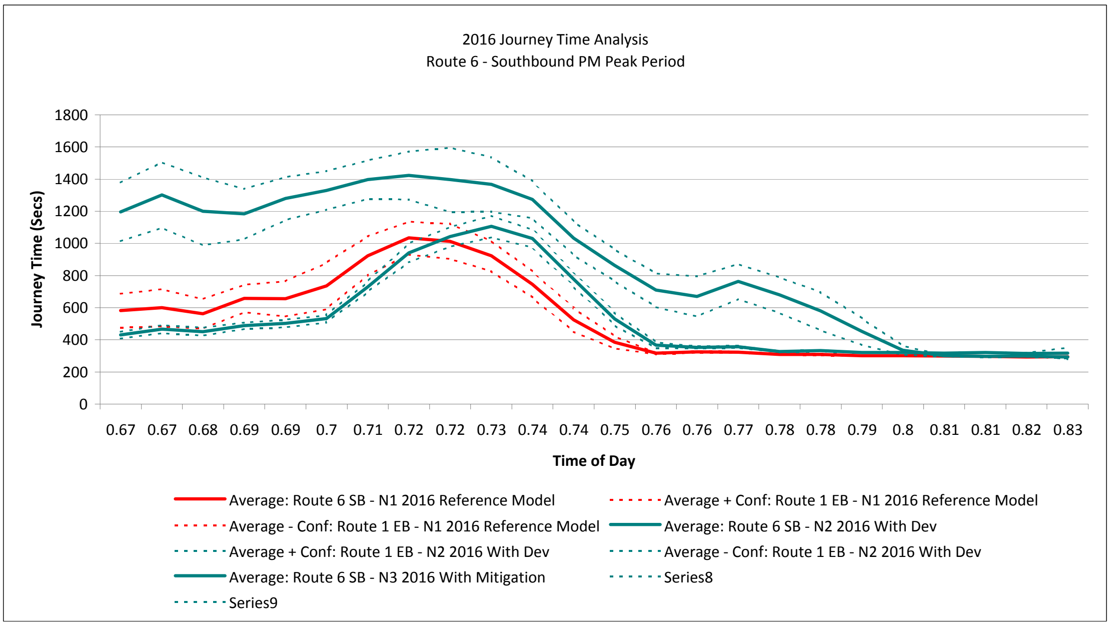
2016 Journey Time Analysis
Route 5 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 5 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 5 NB - N3 2016 With Mitigation
Average + Conf: Route 5 NB - N3 2016 With Mitigation
Average - Conf: Route 5 NB - N3 2016 With Mitigation

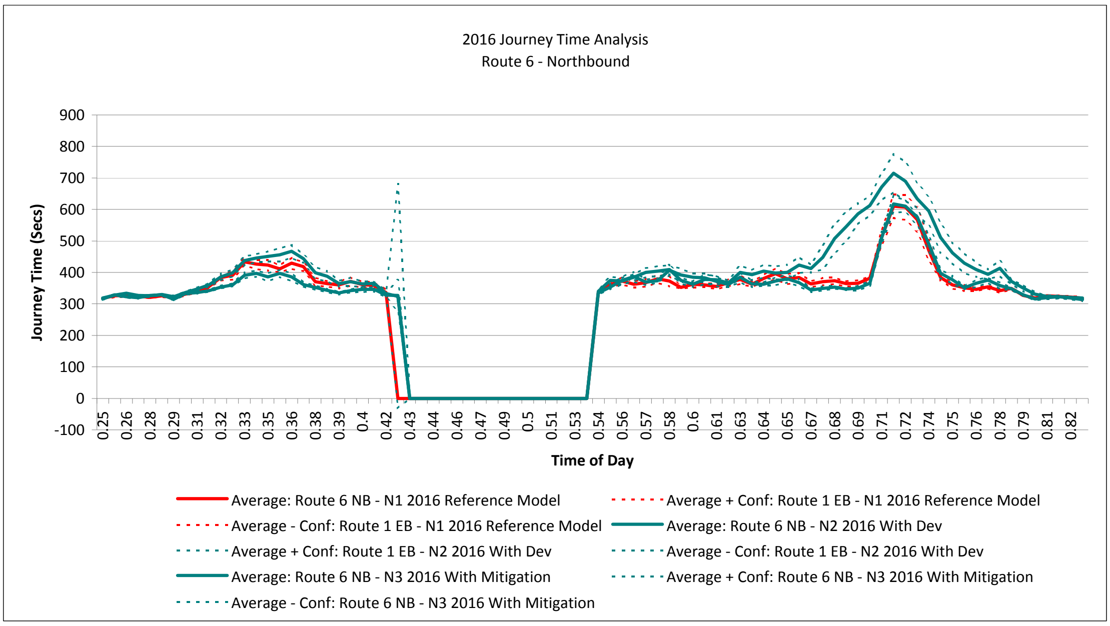


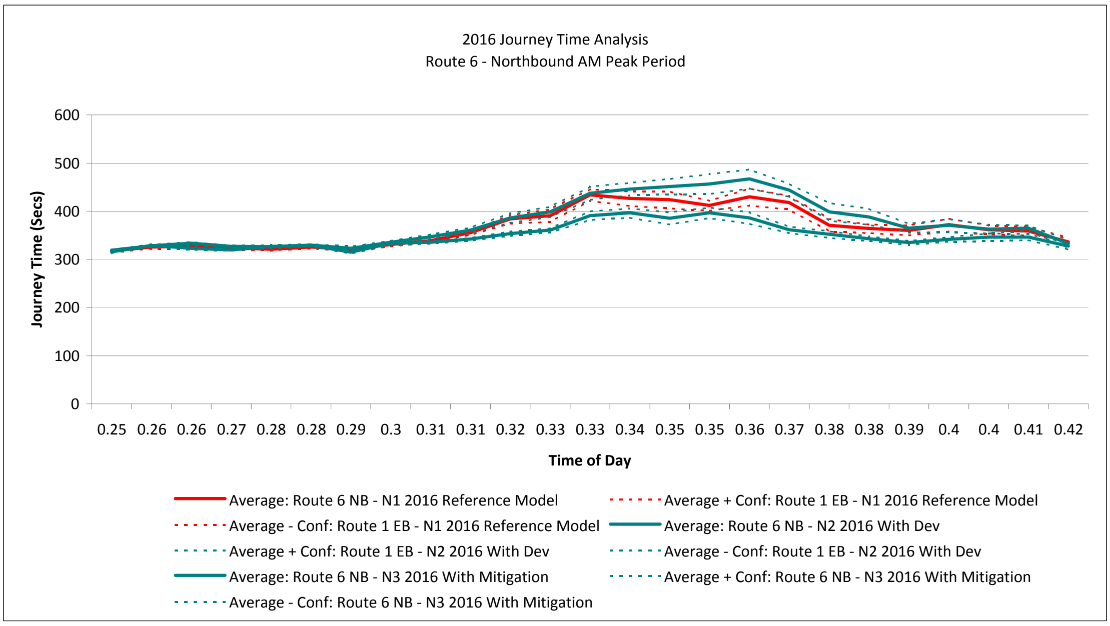
2016 Journey Time Analysis
Route 5 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 5 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 5 NB - N3 2016 With Mitigation
Series8
Series9

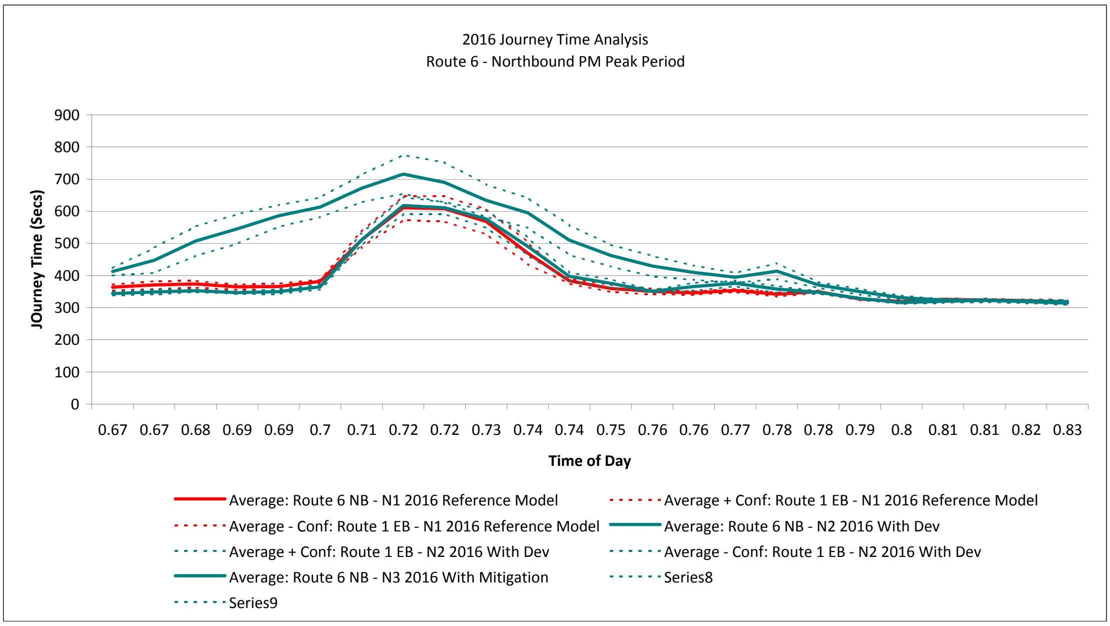

2016 Journey Time Analysis
Route 6 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 6 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 6 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 6 SB - N3 2016 With Mitigation
Average + Conf: Route 6 SB - N3 2016 With Mitigation
Average - Conf: Route 6 SB - N3 2016 With Mitigation

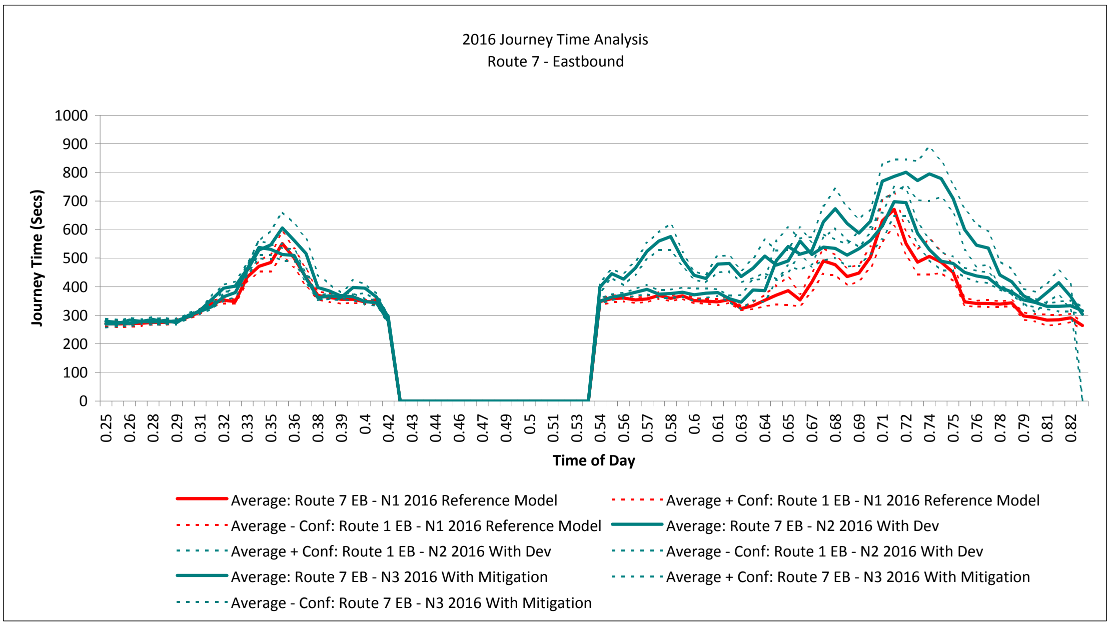

2016 Journey Time Analysis
Route 6 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 6 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 6 SB - N3 2016 With Mitigation
Average + Conf: Route 6 SB - N3 2016 With Mitigation
Average - Conf: Route 6 SB - N3 2016 With Mitigation

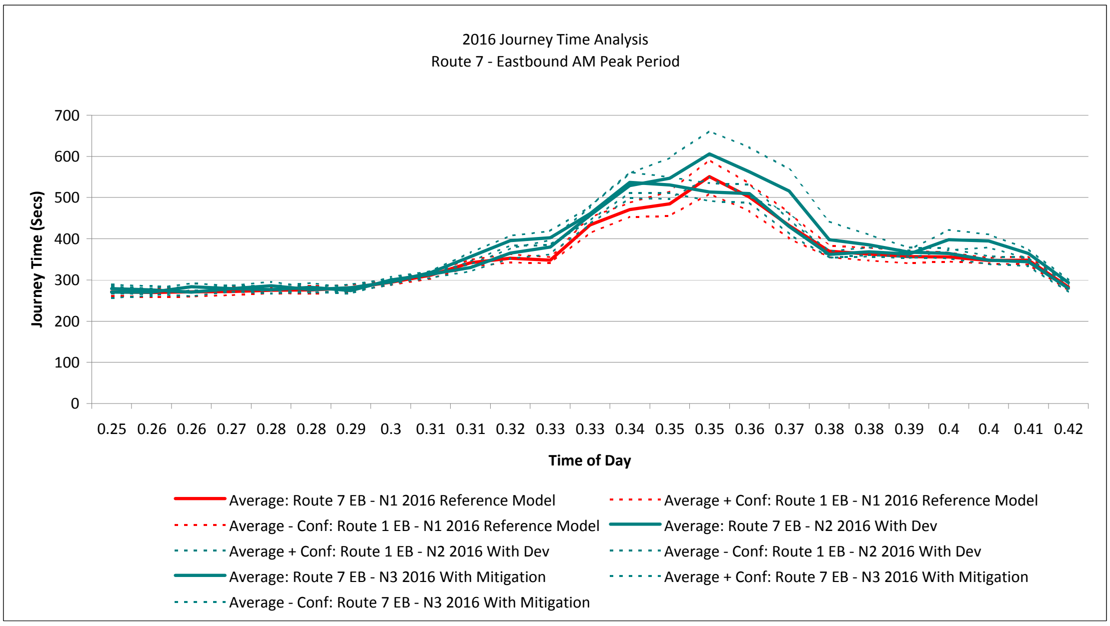

2016 Journey Time Analysis
Route 6 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 6 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 6 SB - N3 2016 With Mitigation
Series8
Series9

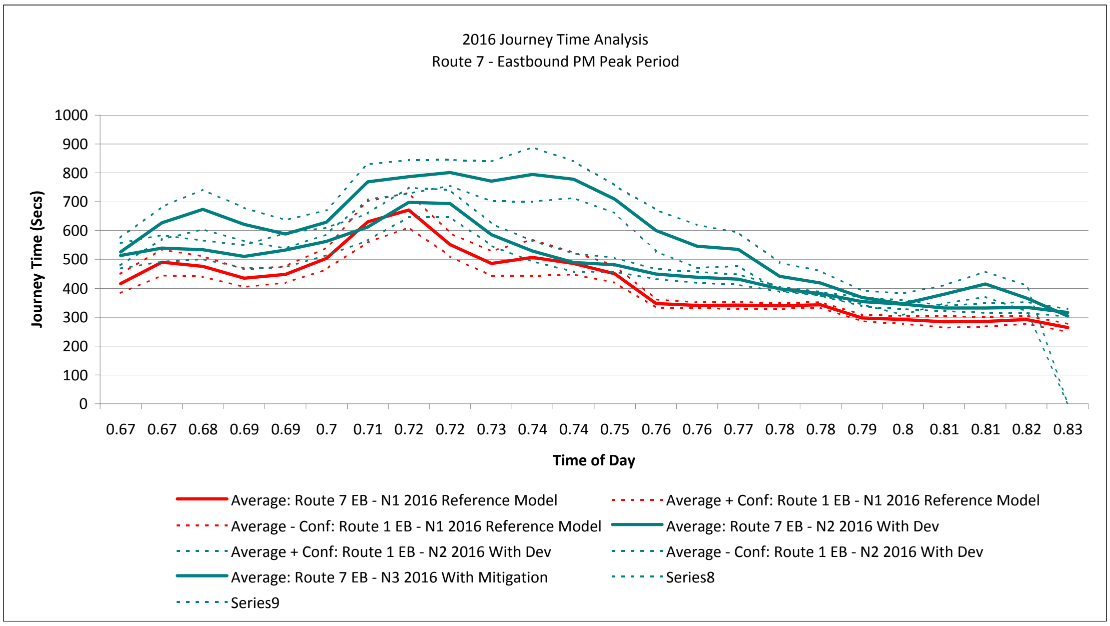

2016 Journey Time Analysis
Route 6 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 6 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 6 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 6 NB - N3 2016 With Mitigation
Average + Conf: Route 6 NB - N3 2016 With Mitigation
Average - Conf: Route 6 NB - N3 2016 With Mitigation

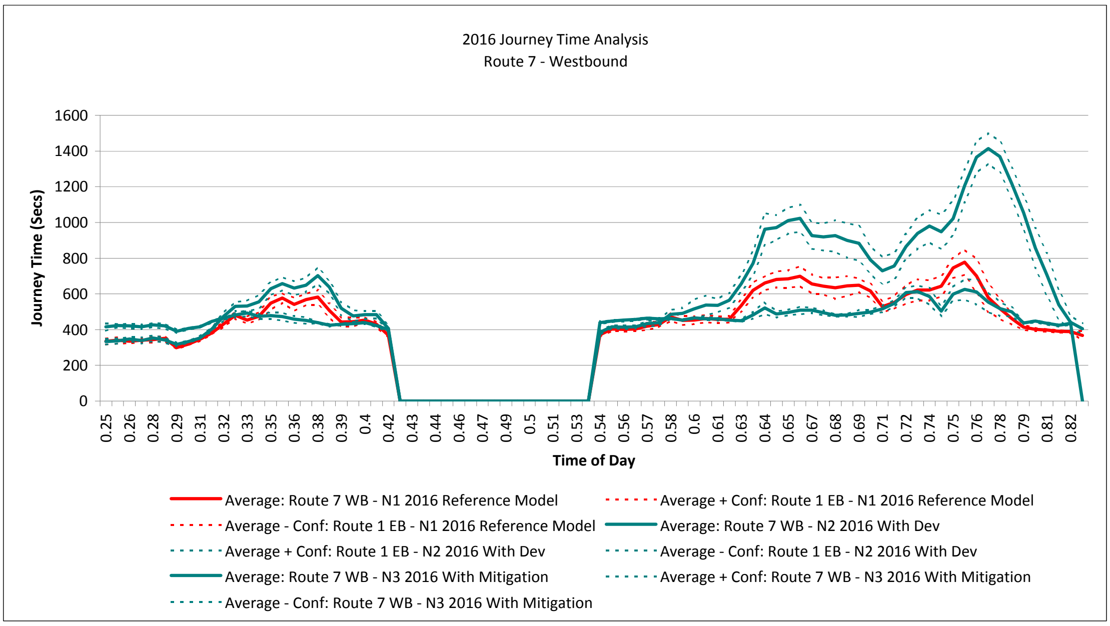

2016 Journey Time Analysis
Route 6 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 6 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 6 NB - N3 2016 With Mitigation
Average + Conf: Route 6 NB - N3 2016 With Mitigation
Average - Conf: Route 6 NB - N3 2016 With Mitigation


2016 Journey Time Analysis
Route 6 - Northbound PM Peak Period
JOurney Time (Secs)
Time of Day
Average: Route 6 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 6 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 6 NB - N3 2016 With Mitigation
Series8
Series9

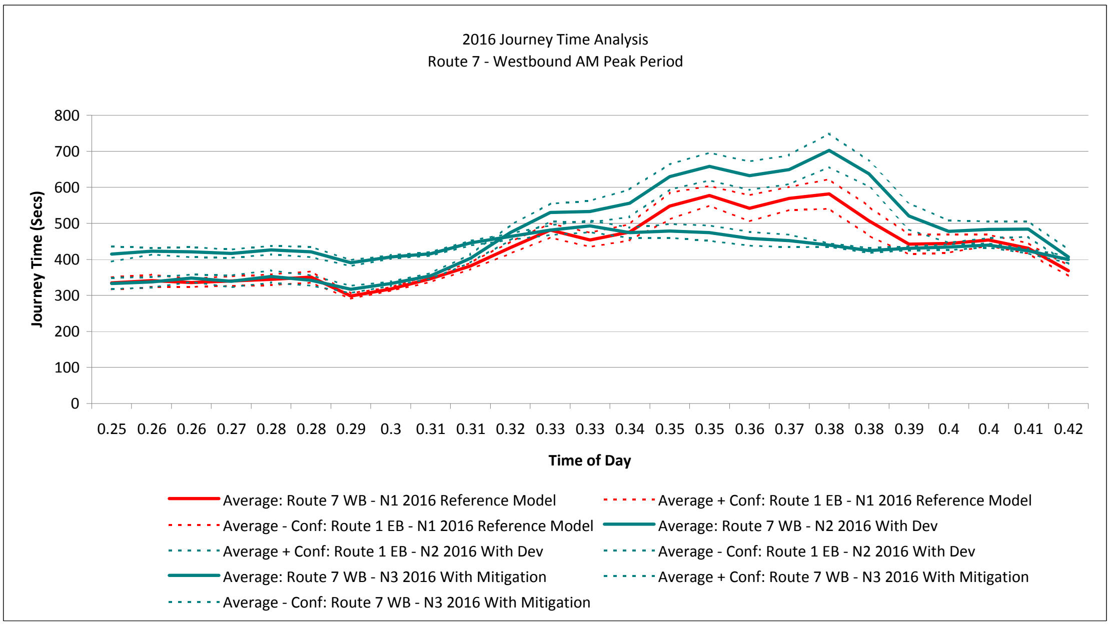

2016 Journey Time Analysis
Route 7 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 7 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 7 EB - N3 2016 With Mitigation
Average + Conf: Route 7 EB - N3 2016 With Mitigation
Average - Conf: Route 7 EB - N3 2016 With Mitigation


2016 Journey Time Analysis
Route 7 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 7 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 7 EB - N3 2016 With Mitigation
Average + Conf: Route 7 EB - N3 2016 With Mitigation
Average - Conf: Route 7 EB - N3 2016 With Mitigation

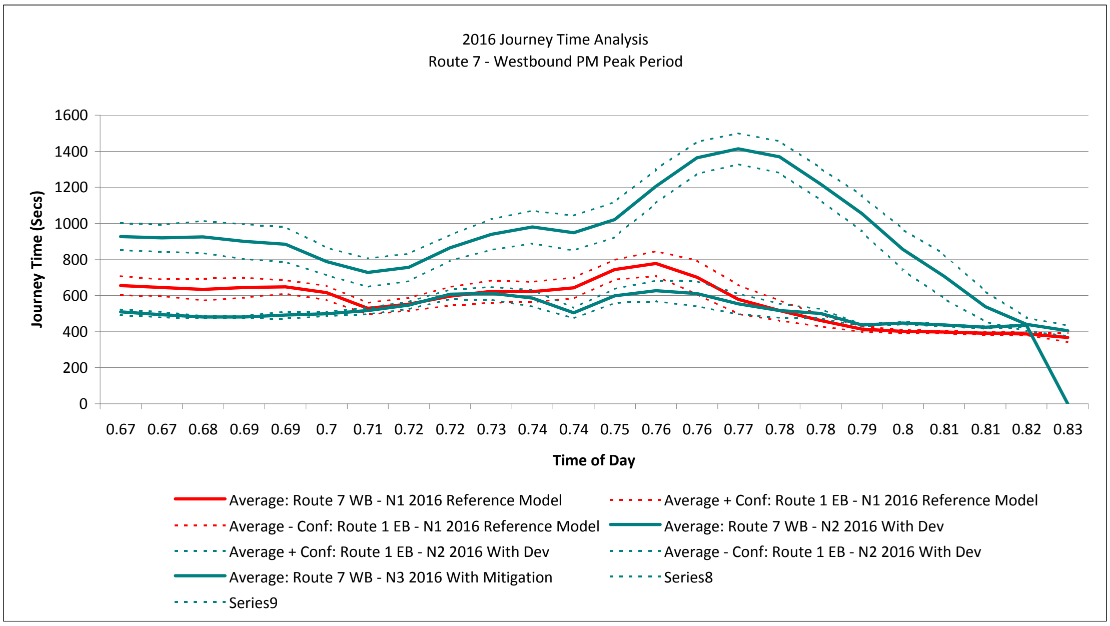

2016 Journey Time Analysis
Route 7 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 7 EB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 7 EB - N3 2016 With Mitigation
Series8
Series9



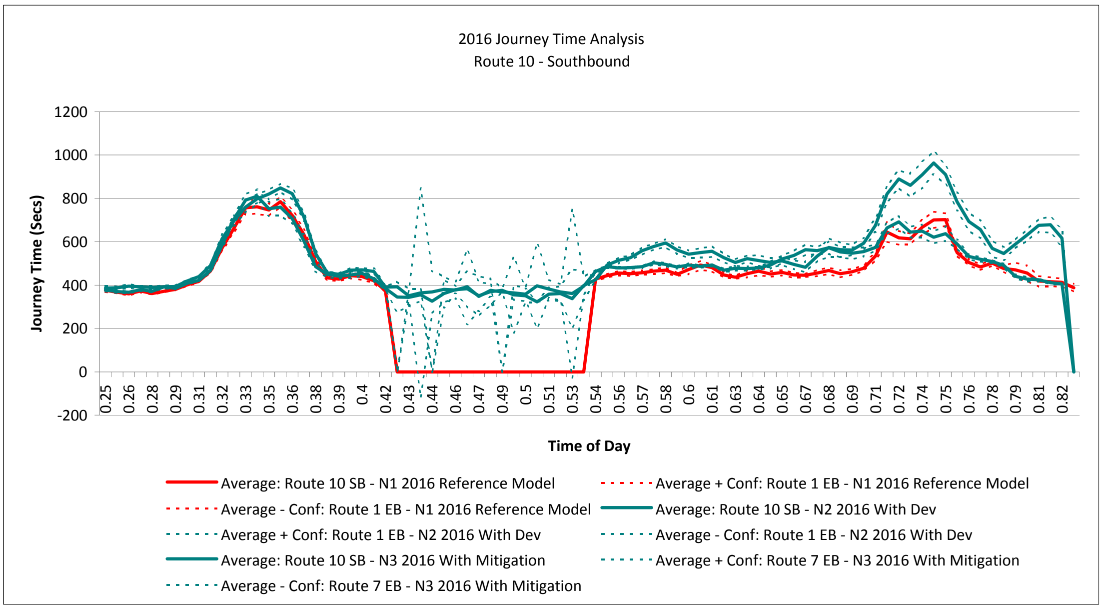
2016 Journey Time Analysis
Route 7 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 7 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 7 WB - N3 2016 With Mitigation
Average + Conf: Route 7 WB - N3 2016 With Mitigation
Average - Conf: Route 7 WB - N3 2016 With Mitigation

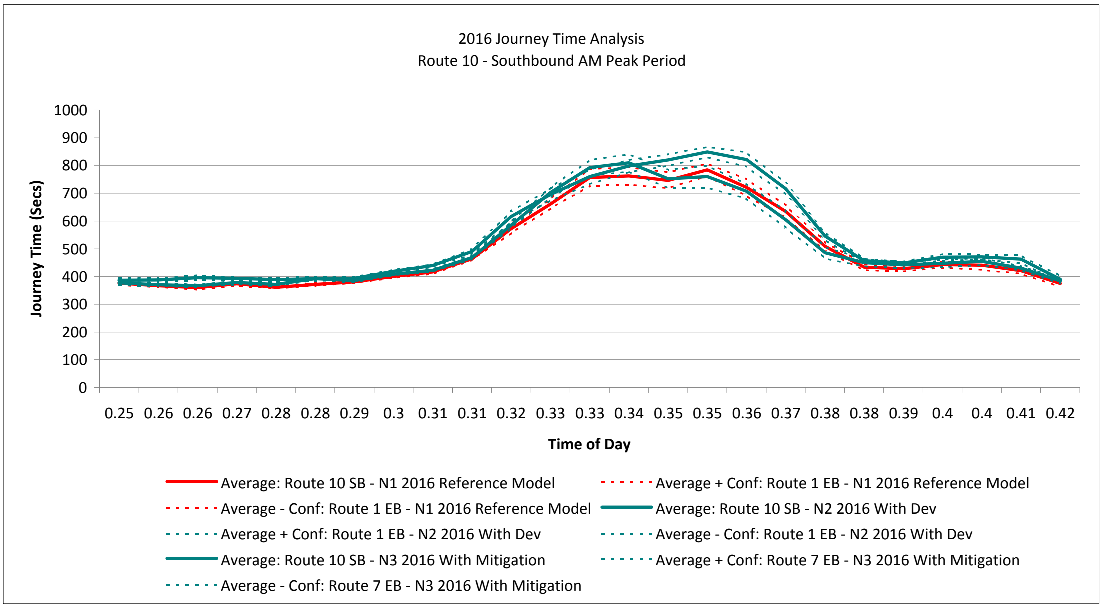


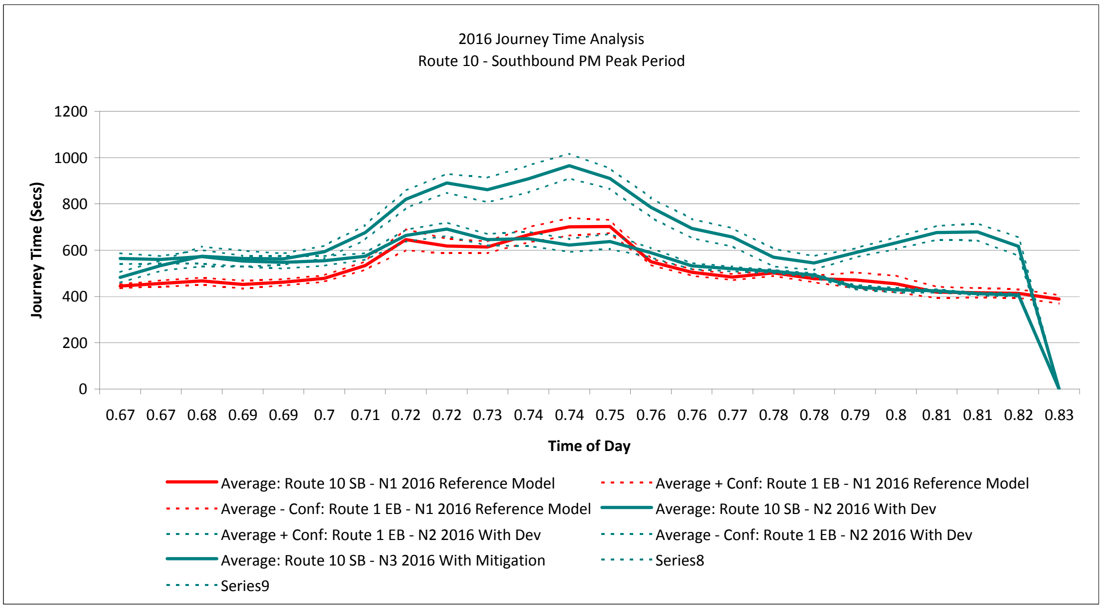
2016 Journey Time Analysis
Route 7 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 7 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 7 WB - N3 2016 With Mitigation
Average + Conf: Route 7 WB - N3 2016 With Mitigation
Average - Conf: Route 7 WB - N3 2016 With Mitigation

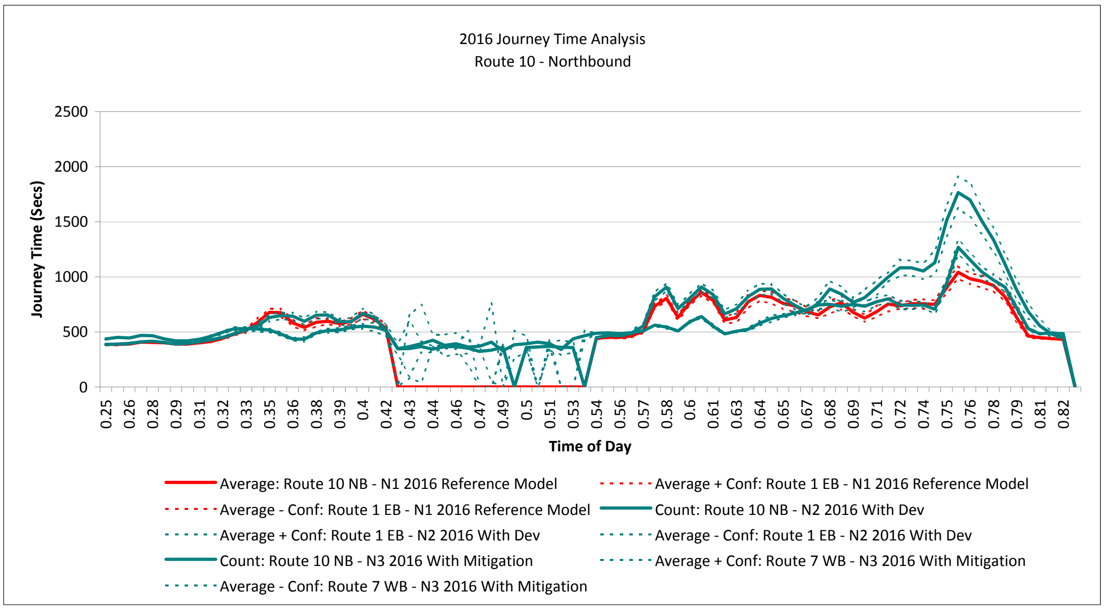


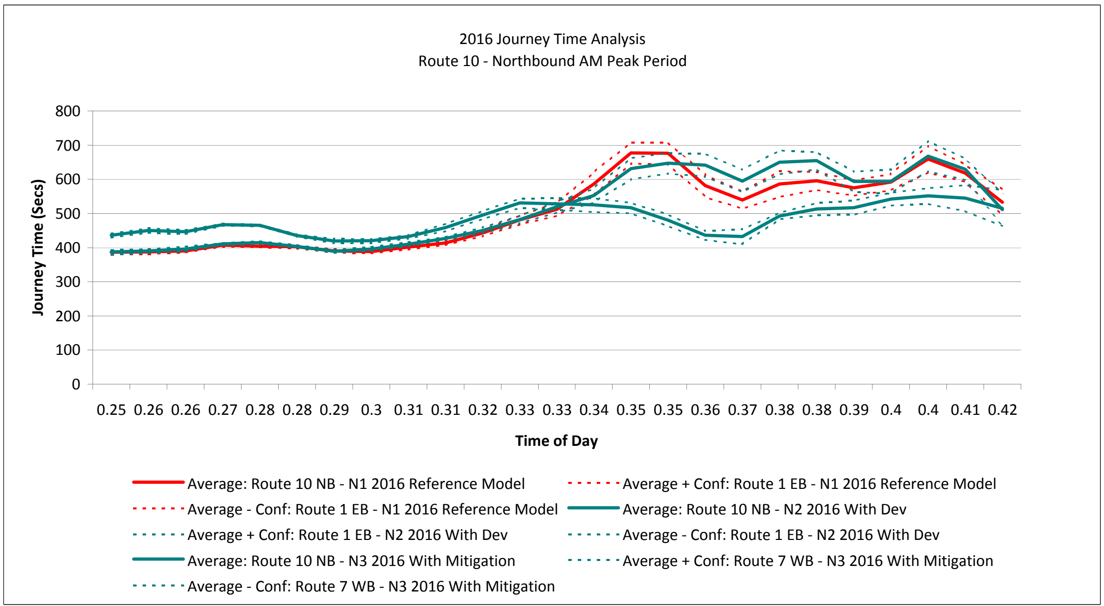
2016 Journey Time Analysis
Route 7 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 7 WB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 7 WB - N3 2016 With Mitigation
Series8
Series9

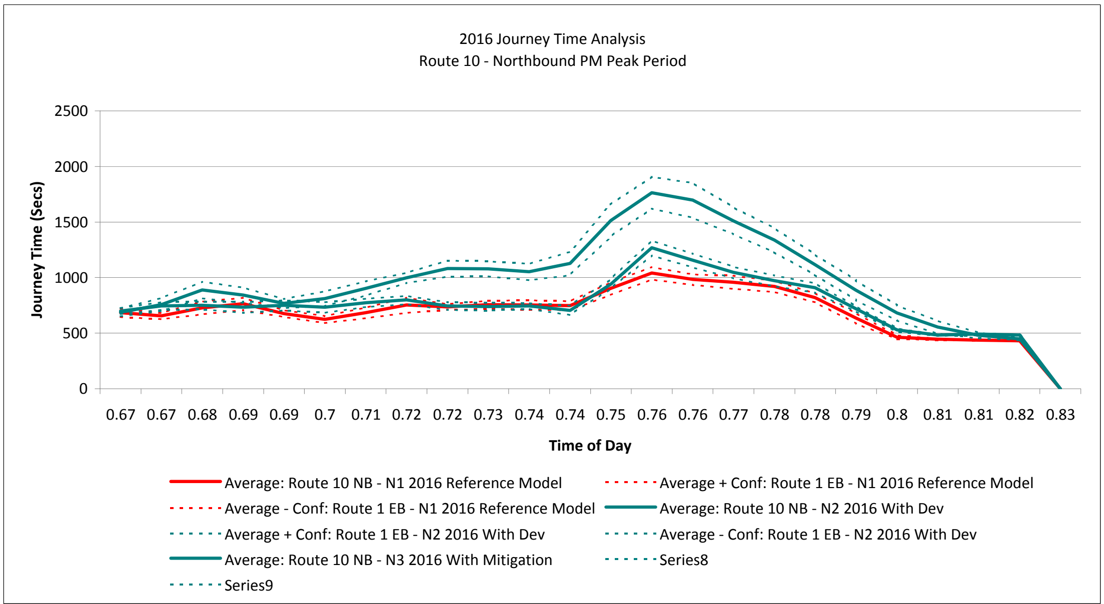

2016 Journey Time Analysis
Route 10 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 10 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 10 SB - N3 2016 With Mitigation
Average + Conf: Route 7 EB - N3 2016 With Mitigation
Average - Conf: Route 7 EB - N3 2016 With Mitigation

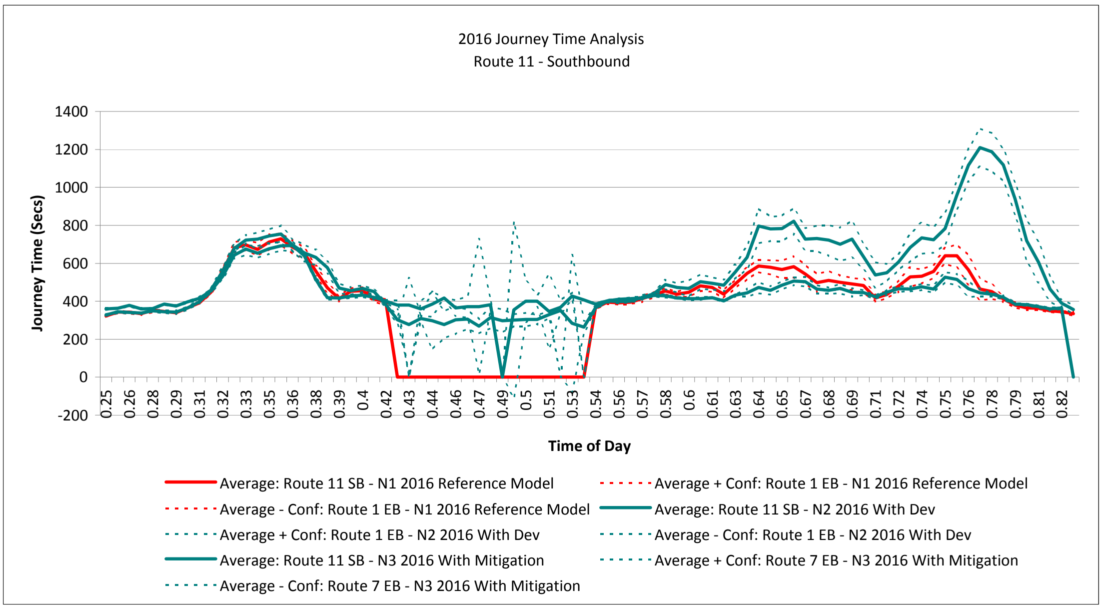

2016 Journey Time Analysis
Route 10 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 10 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 10 SB - N3 2016 With Mitigation
Average + Conf: Route 7 EB - N3 2016 With Mitigation
Average - Conf: Route 7 EB - N3 2016 With Mitigation


2016 Journey Time Analysis
Route 10 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 10 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 10 SB - N3 2016 With Mitigation
Series8
Series9

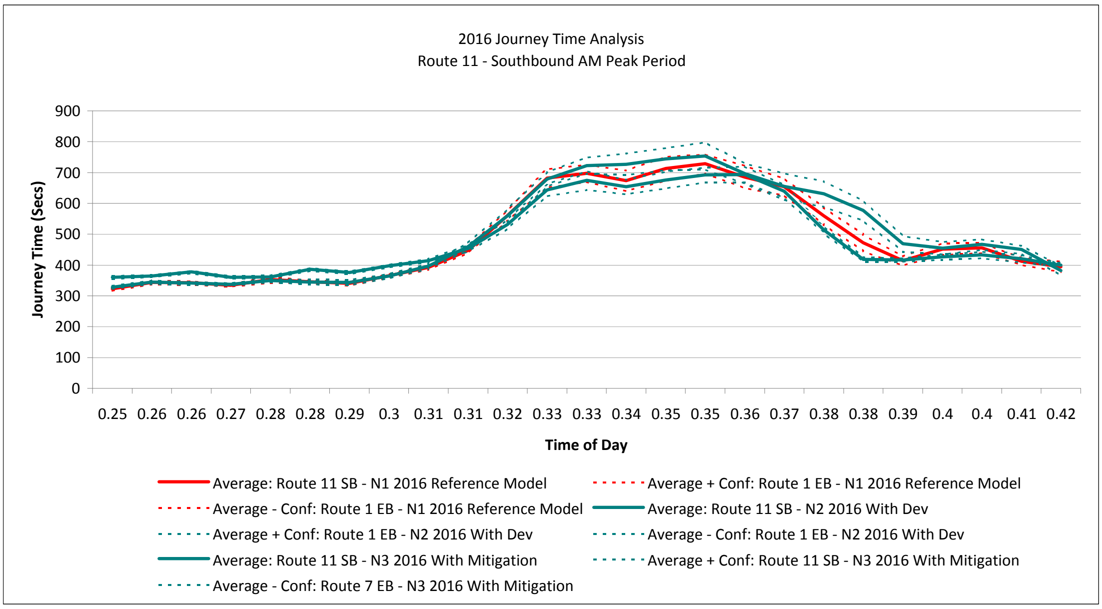

2016 Journey Time Analysis
Route 10 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Count: Route 10 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Count: Route 10 NB - N3 2016 With Mitigation
Average + Conf: Route 7 WB - N3 2016 With Mitigation
Average - Conf: Route 7 WB - N3 2016 With Mitigation


2016 Journey Time Analysis
Route 10 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 10 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 10 NB - N3 2016 With Mitigation
Average + Conf: Route 7 WB - N3 2016 With Mitigation
Average - Conf: Route 7 WB - N3 2016 With Mitigation

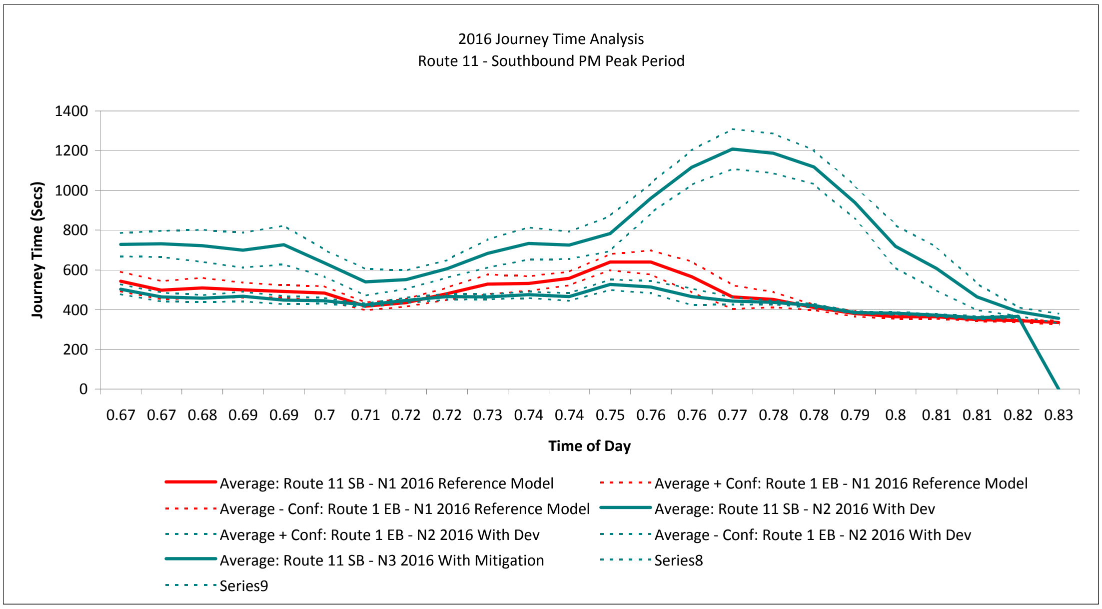

2016 Journey Time Analysis
Route 10 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 10 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 10 NB - N3 2016 With Mitigation
Series8
Series9



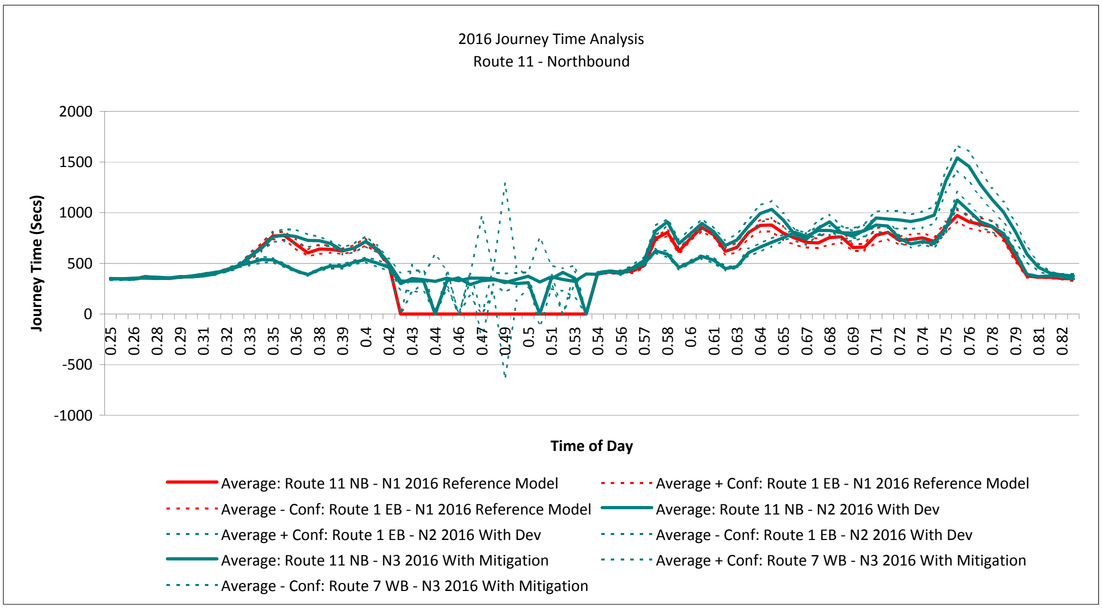
2016 Journey Time Analysis
Route 11 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 11 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 11 SB - N3 2016 With Mitigation
Average + Conf: Route 7 EB - N3 2016 With Mitigation
Average - Conf: Route 7 EB - N3 2016 With Mitigation

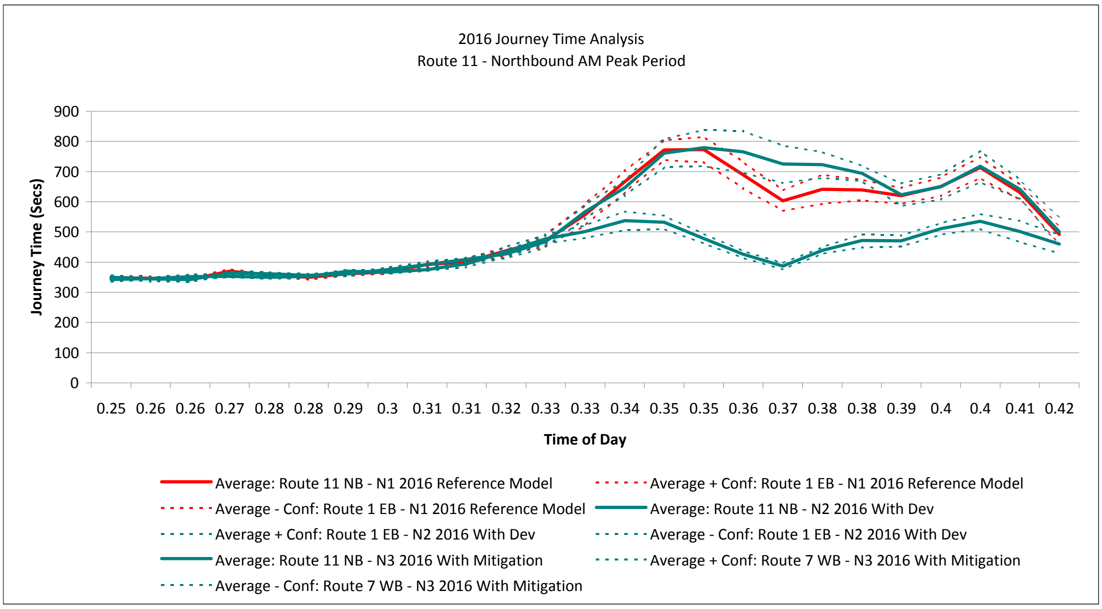


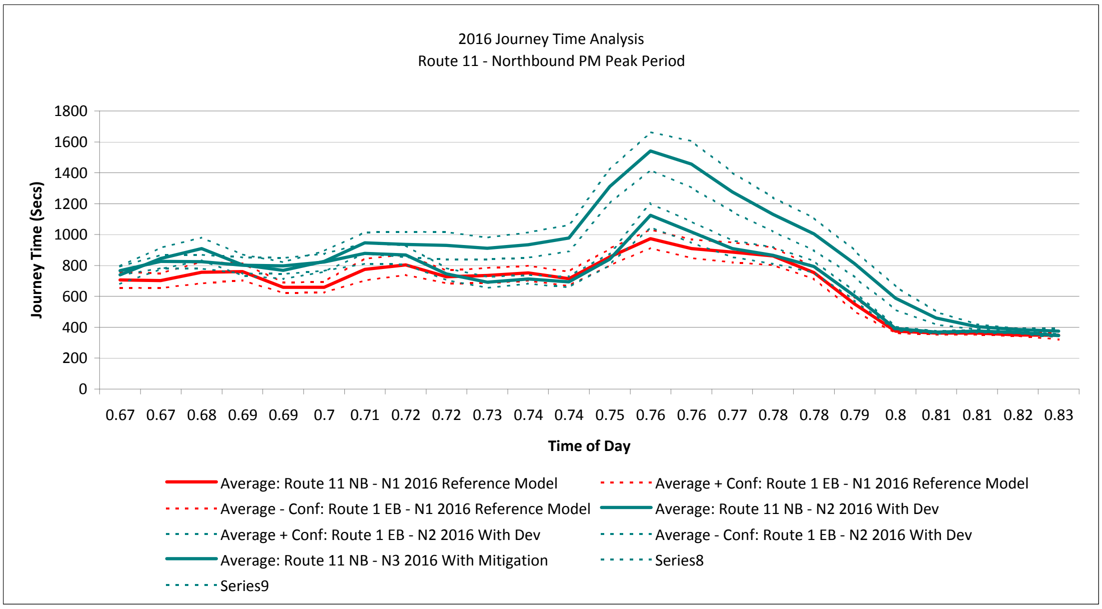
2016 Journey Time Analysis
Route 11 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 11 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 11 SB - N3 2016 With Mitigation
Average + Conf: Route 11 SB - N3 2016 With Mitigation
Average - Conf: Route 7 EB - N3 2016 With Mitigation



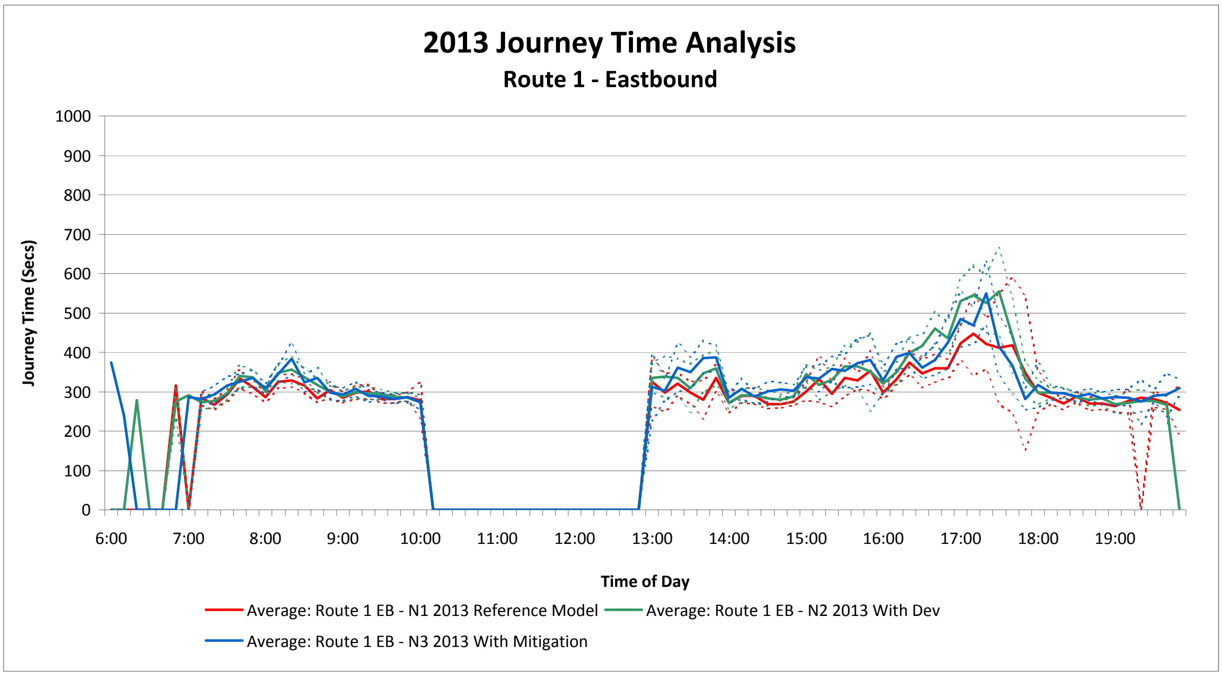
2016 Journey Time Analysis
Route 11 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 11 SB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 11 SB - N3 2016 With Mitigation
Series8
Series9

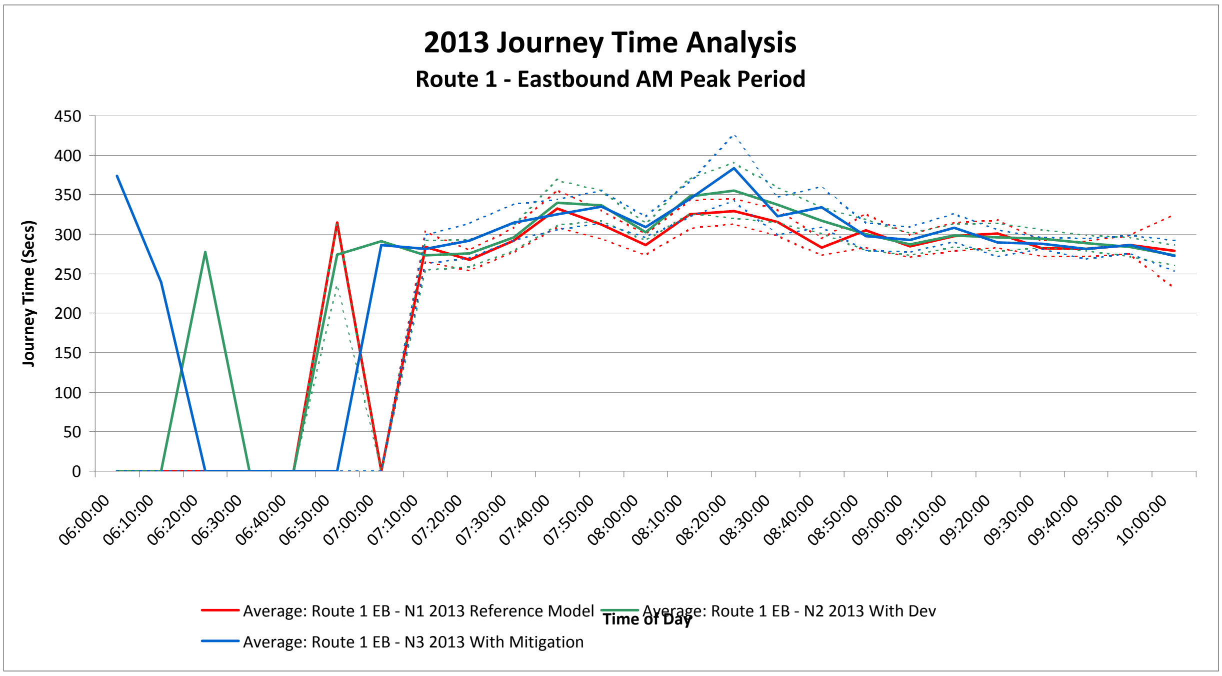

2016 Journey Time Analysis
Route 11 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 11 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 11 NB - N3 2016 With Mitigation
Average + Conf: Route 7 WB - N3 2016 With Mitigation
Average - Conf: Route 7 WB - N3 2016 With Mitigation

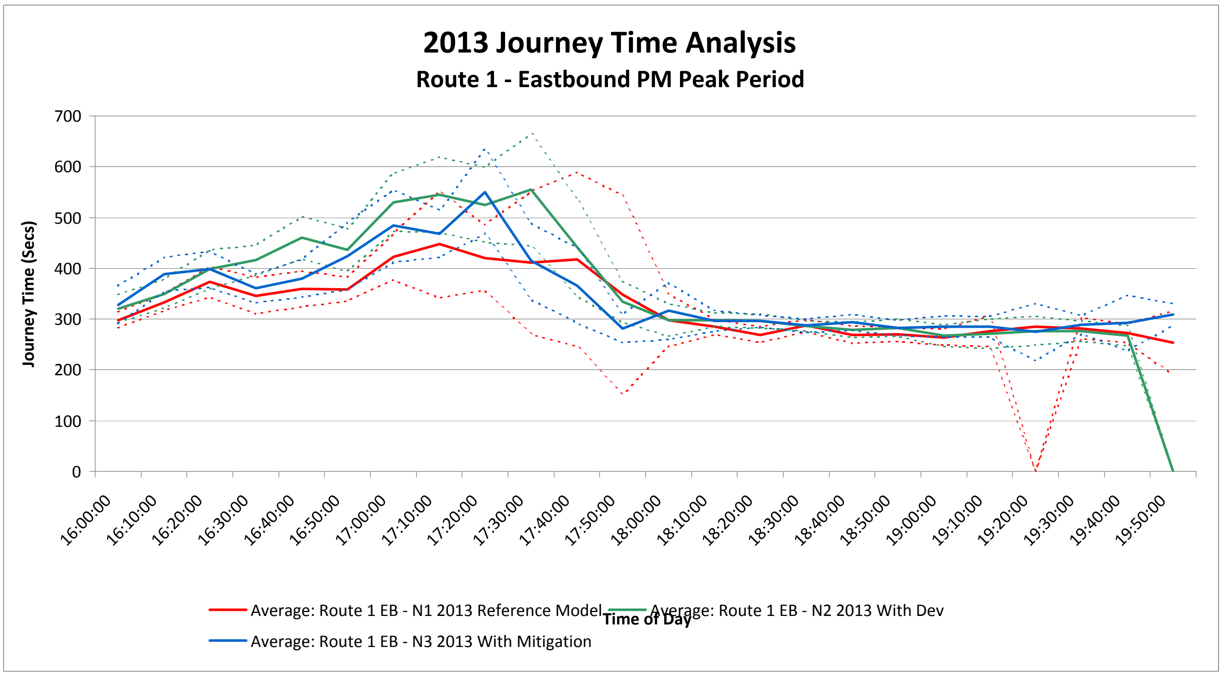

2016 Journey Time Analysis
Route 11 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 11 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 11 NB - N3 2016 With Mitigation
Average + Conf: Route 7 WB - N3 2016 With Mitigation
Average - Conf: Route 7 WB - N3 2016 With Mitigation

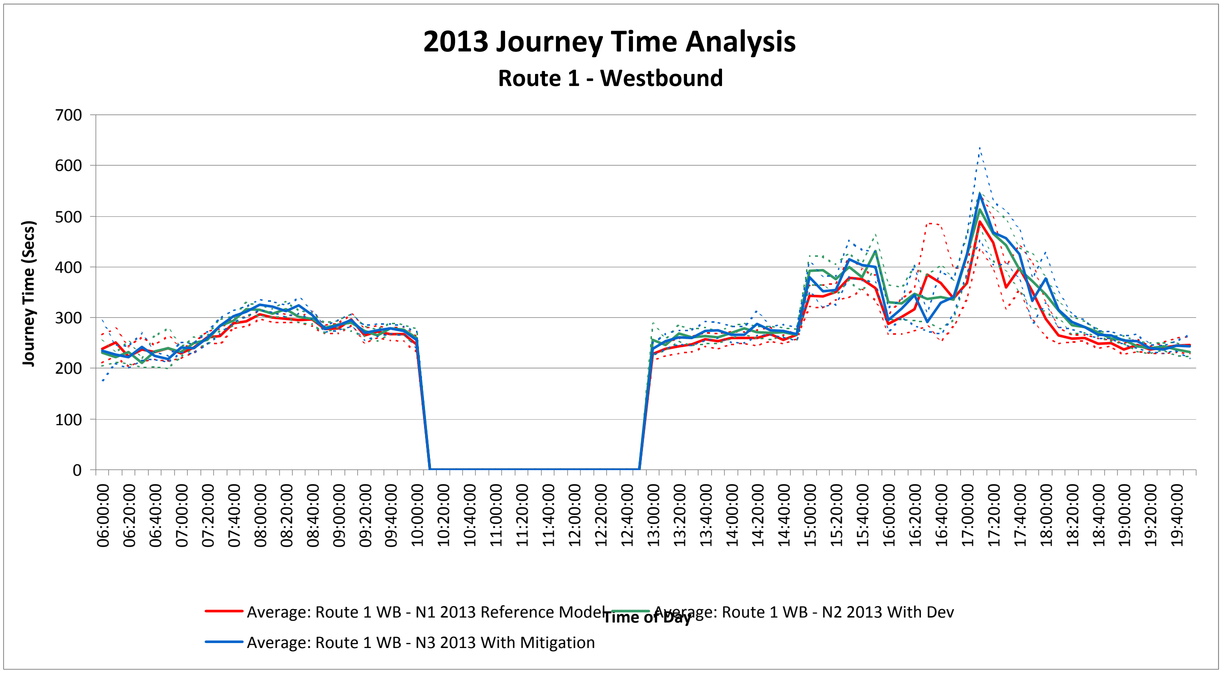

2016 Journey Time Analysis
Route 11 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2016 Reference Model
Average + Conf: Route 1 EB - N1 2016 Reference Model
Average - Conf: Route 1 EB - N1 2016 Reference Model
Average: Route 11 NB - N2 2016 With Dev
Average + Conf: Route 1 EB - N2 2016 With Dev
Average - Conf: Route 1 EB - N2 2016 With Dev
Average: Route 11 NB - N3 2016 With Mitigation
Series8
Series9

APPENDIX 15.4: 2013 REFERENCE V WITH DEVELOPMENT V WITH MITIGATION JOURNEY TIME GRAPHS

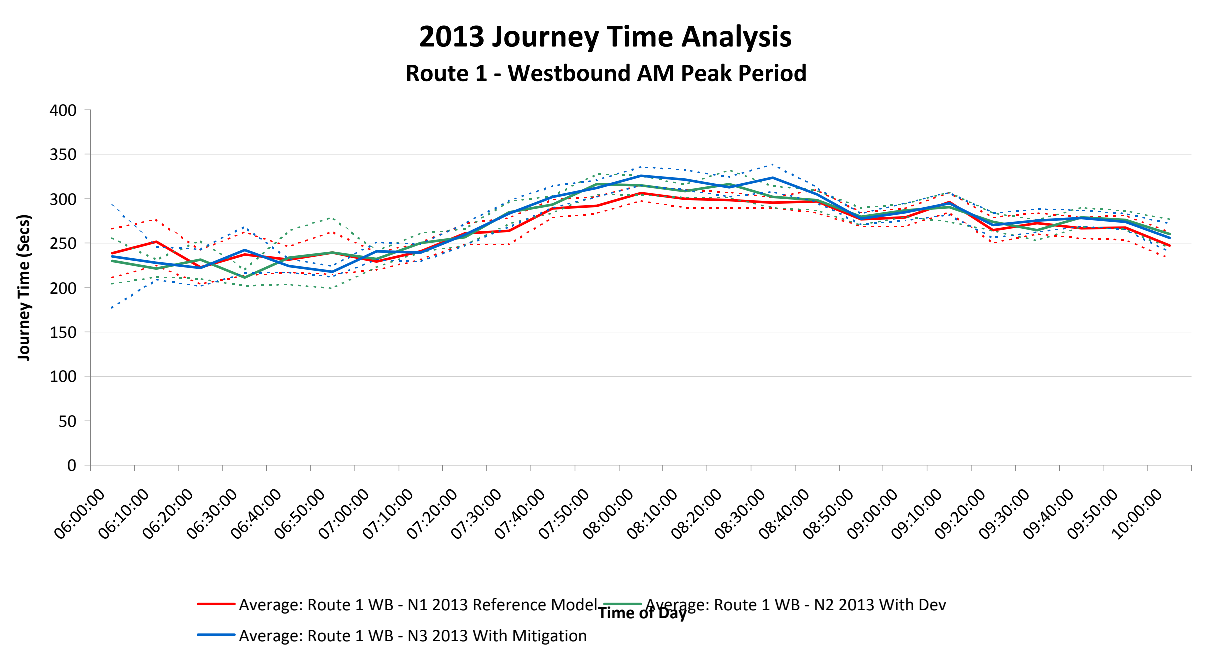

2013 Journey Time Analysis
Route 1 - Eastbound
Journey Time (Secs)
1000
900
800
700
600
500
400
300
200
100
0
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day
Average: Route 1 EB - N1 2013 Reference Model
Average: Route 1 EB - N2 2013 With Dev
Average: Route 1 EB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 1 - Eastbound AM Peak Period
Journey Time (Secs)
450
400
350
300
250
200
150
100
50
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average: Route 1 EB - N1 2013 Reference Model
Average: Route 1 EB - N2 2013 With Dev
Average: Route 1 EB - N3 2013 With Mitigation

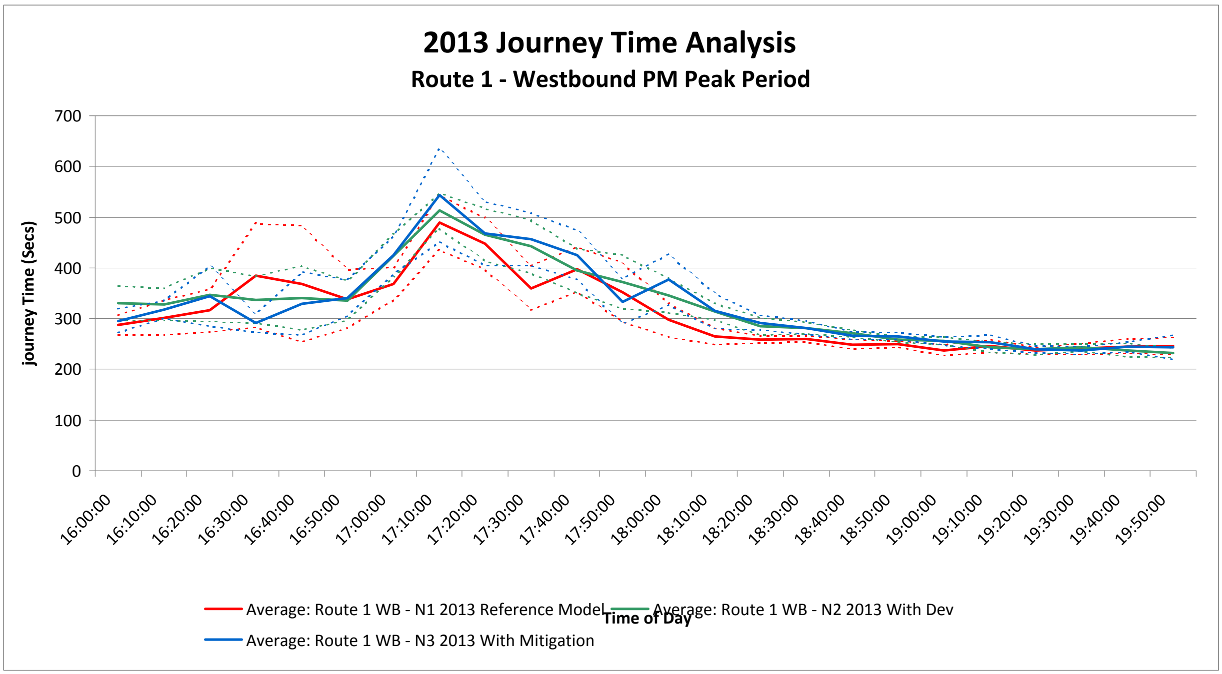

2013 Journey Time Analysis
Route 1 - Eastbound PM Peak Period
Journey Time (Secs)
700
600
500
400
300
200
100
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average: Route 1 EB - N1 2013 Reference Model
Average: Route 1 EB - N2 2013 With Dev
Average: Route 1 EB - N3 2013 With Mitigation



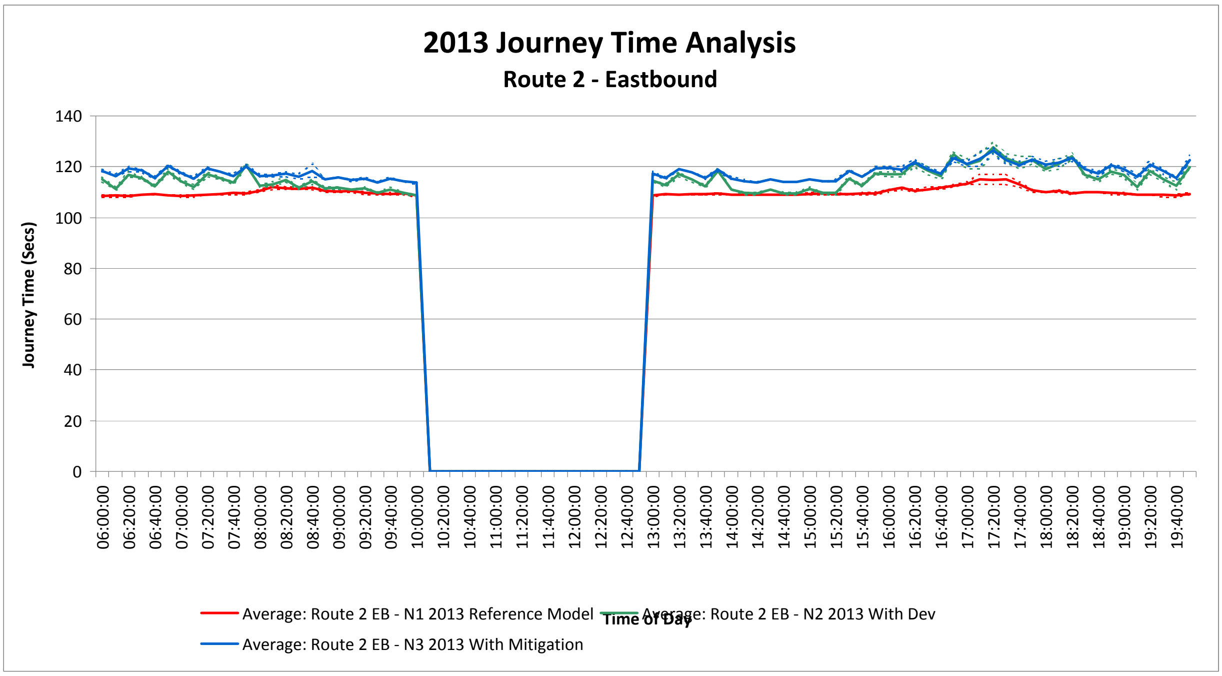
2013 Journey Time Analysis
Route 1 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2013 Reference Model
Average: Route 1 WB - N2 2013 With Dev
Average: Route 1 WB - N3 2013 With Mitigation

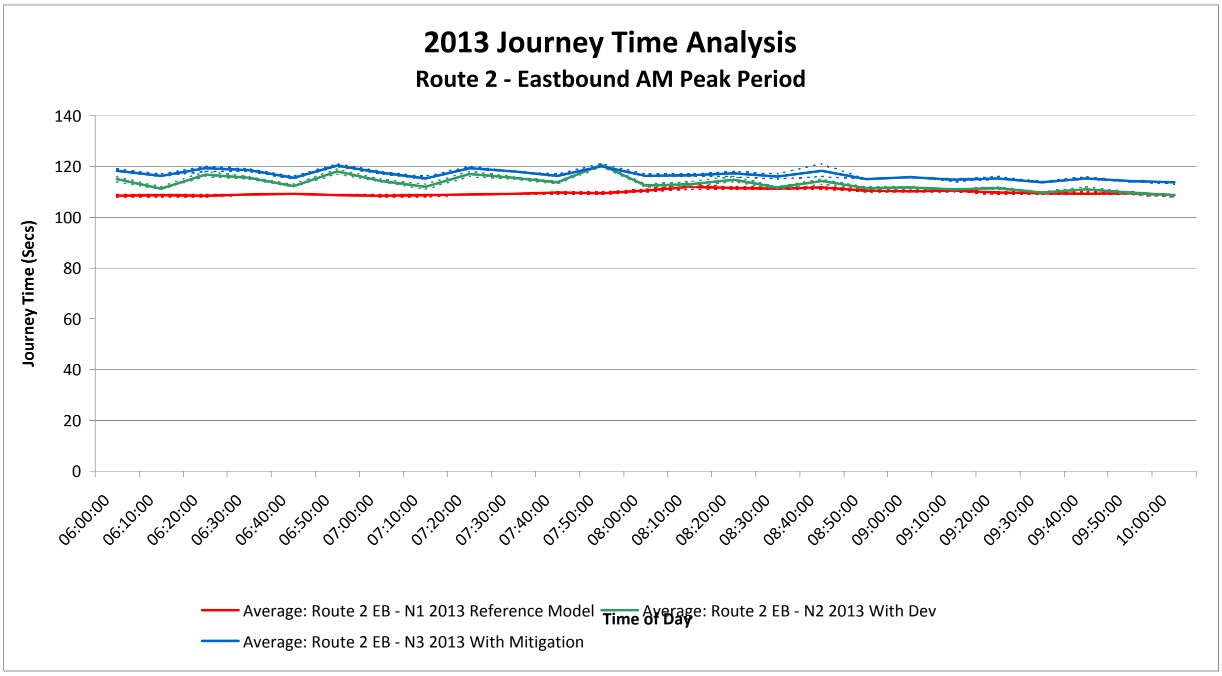


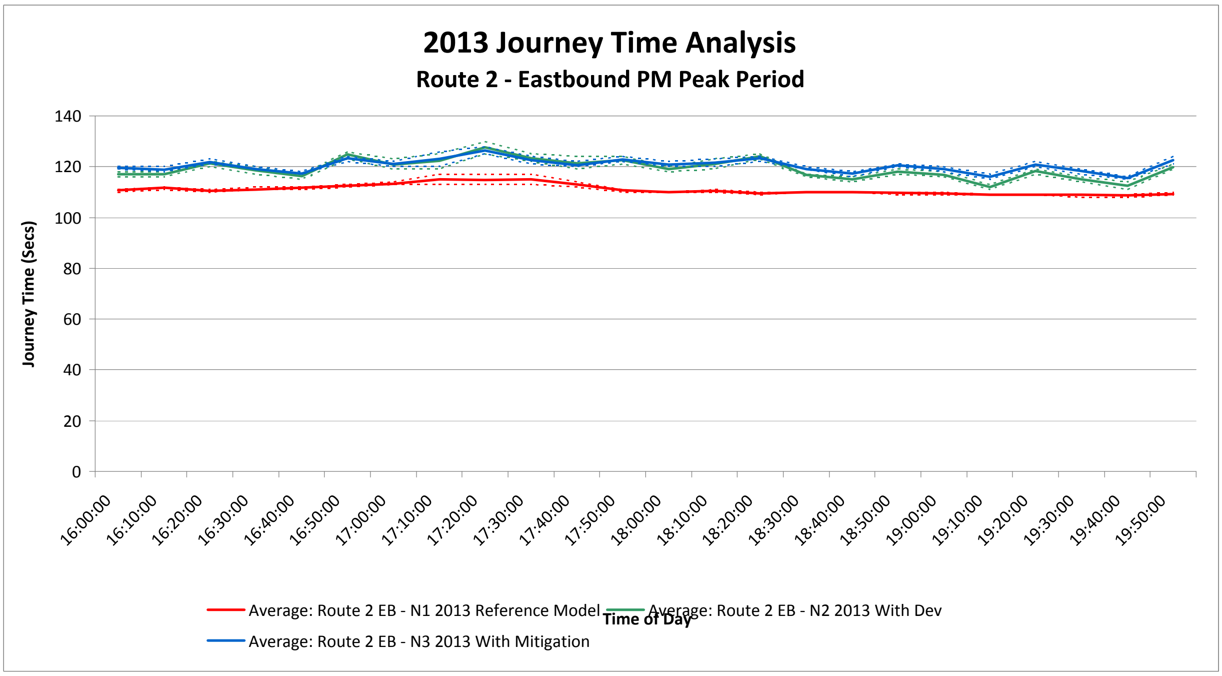
2013 Journey Time Analysis
Route 1 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2013 Reference Model
Average: Route 1 WB - N2 2013 With Dev
Average: Route 1 WB - N3 2013 With Mitigation

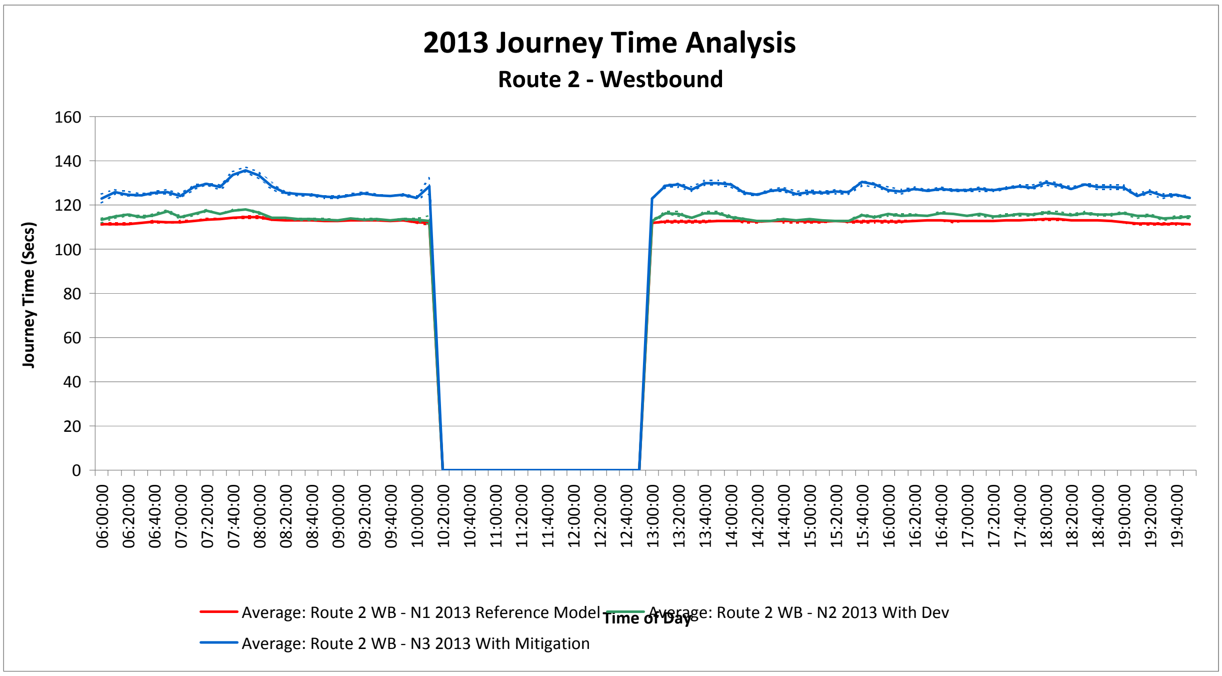


2013 Journey Time Analysis
Route 1 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2013 Reference Model
Average: Route 1 WB - N2 2013 With Dev
Average: Route 1 WB - N3 2013 With Mitigation

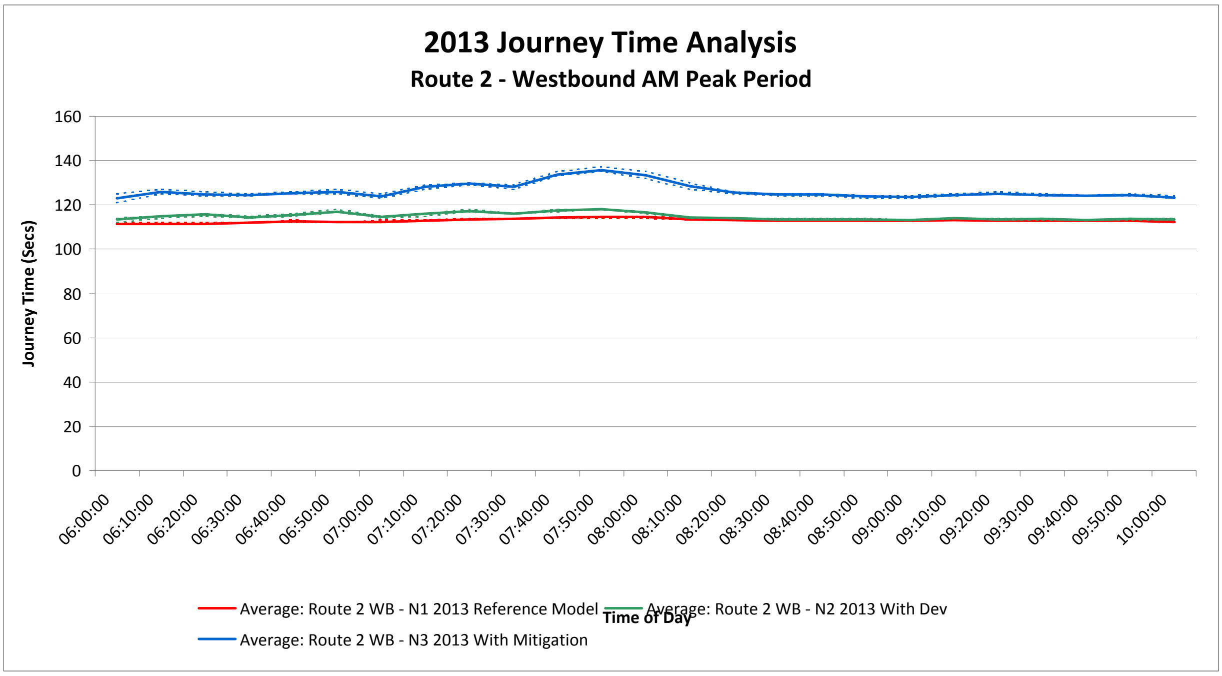

2013 Journey Time Analysis
Route 2 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 2 EB - N1 2013 Reference Model
Average: Route 2 EB - N2 2013 With Dev
Average: Route 2 EB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 2 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 EB - N1 2013 Reference Model
Average: Route 2 EB - N2 2013 With Dev
Average: Route 2 EB - N3 2013 With Mitigation

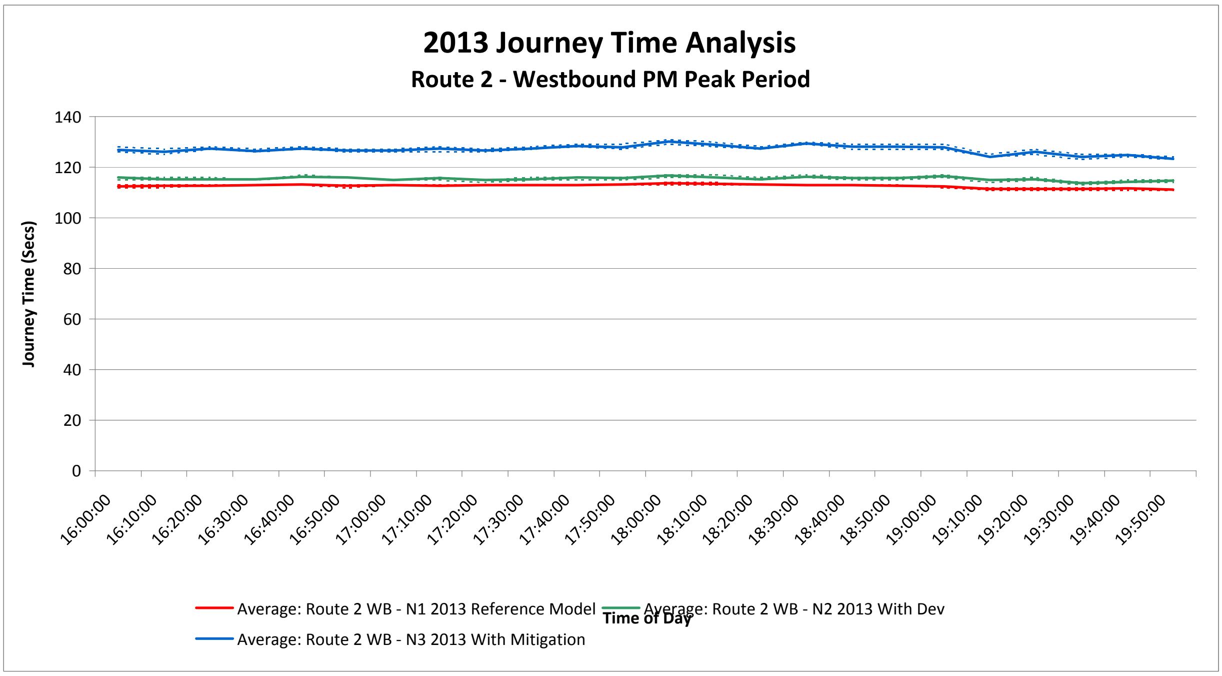

2013 Journey Time Analysis
Route 2 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 EB - N1 2013 Reference Model
Average: Route 2 EB - N2 2013 With Dev
Average: Route 2 EB - N3 2013 With Mitigation



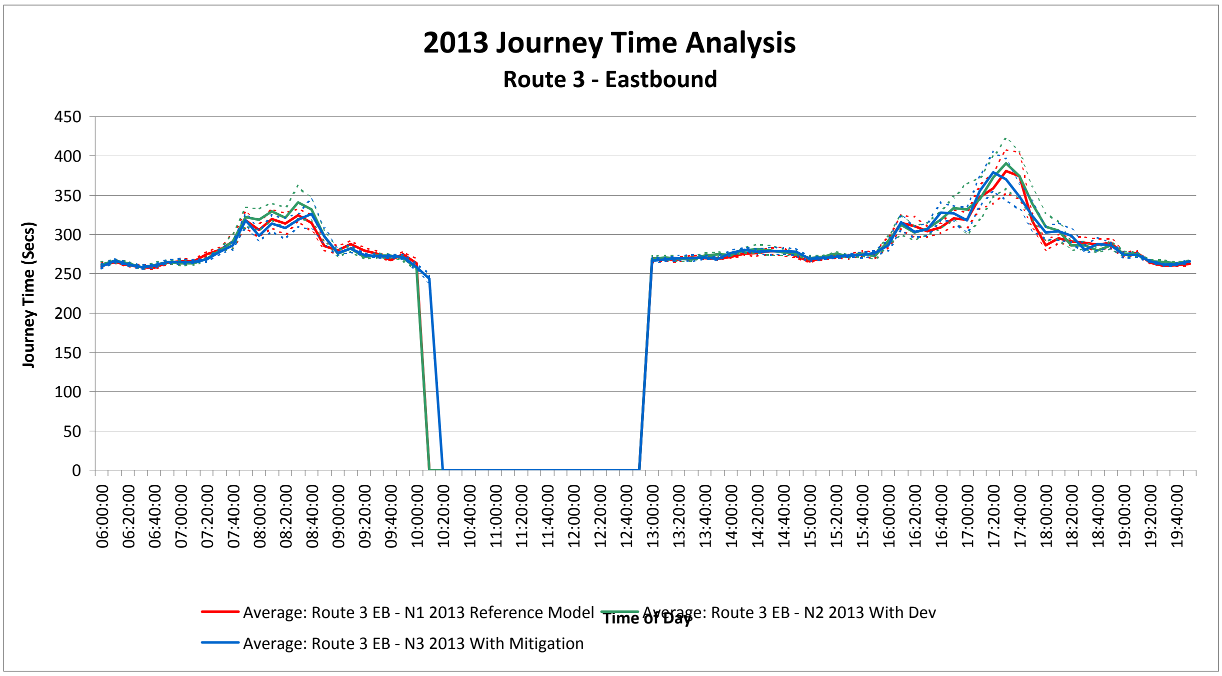
2013 Journey Time Analysis
Route 2 - Westbound
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
Time of Day
Average: Route 2 WB - N1 2013 Reference Model
Average: Route 2 WB - N2 2013 With Dev
Average: Route 2 WB - N3 2013 With Mitigation

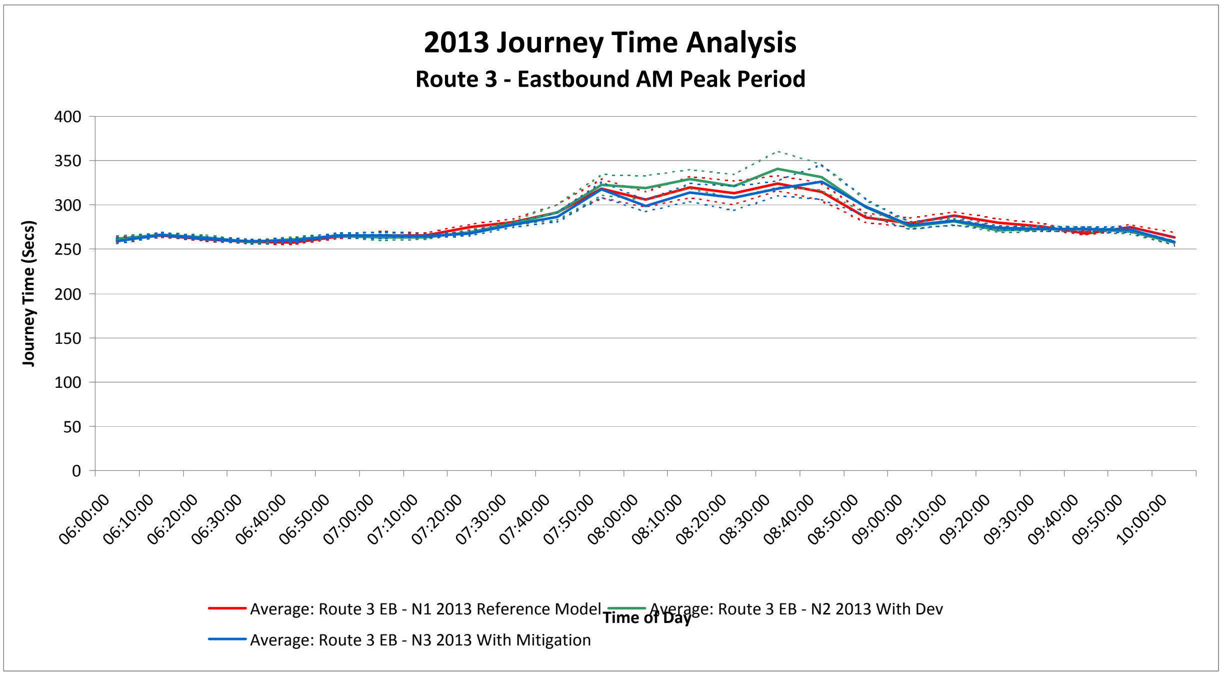


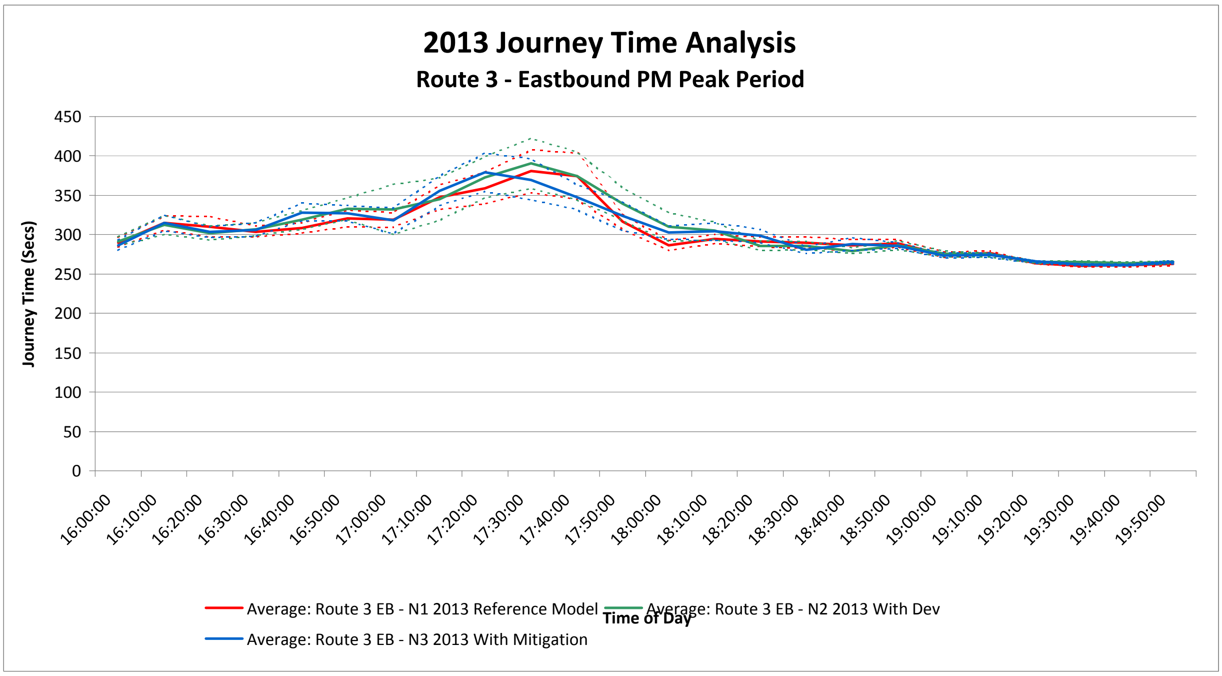
2013 Journey Time Analysis
Route 2 - Westbound AM Peak Period
Journey Time (Secs)
160
140
120
100
80
60
40
20
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average: Route 2 WB - N1 2013 Reference Model
Average: Route 2 WB - N2 2013 With Dev
Average: Route 2 WB - N3 2013 With Mitigation

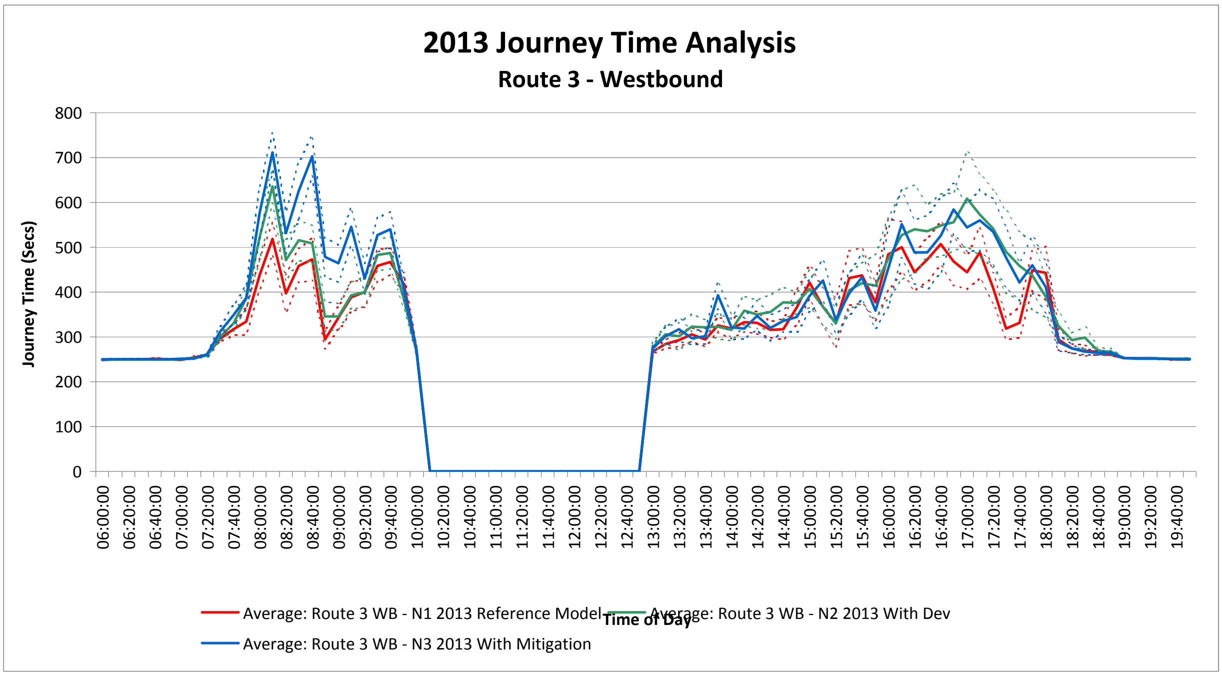


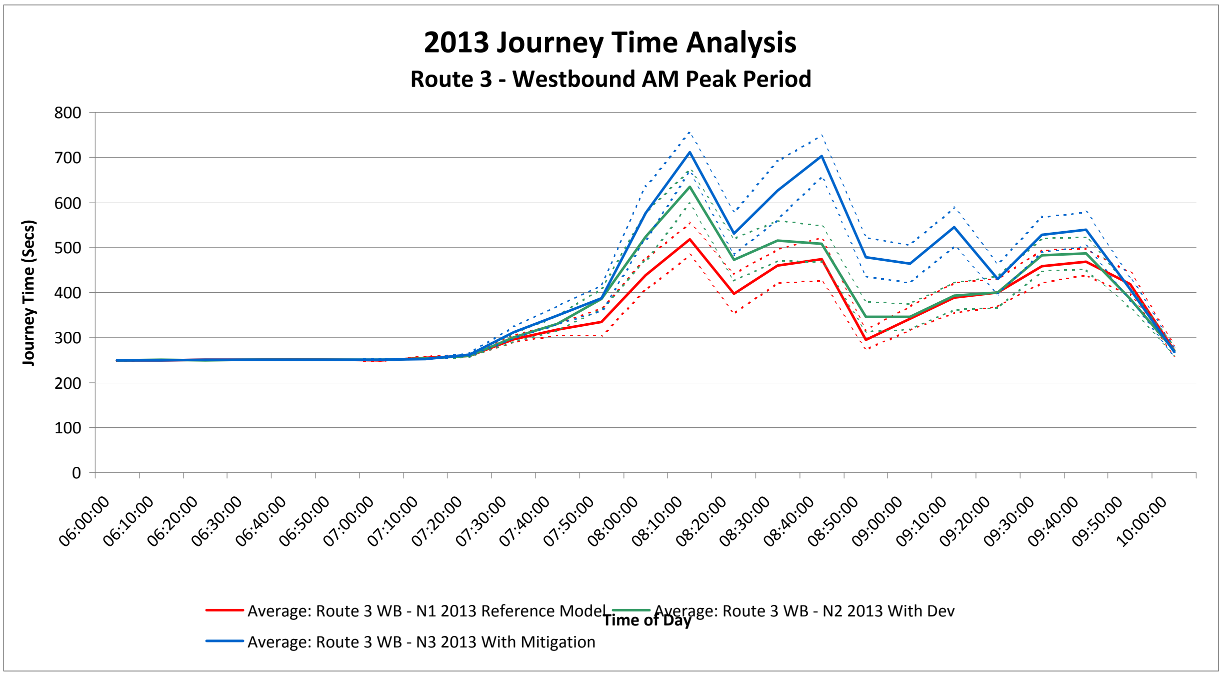
2013 Journey Time Analysis
Route 2 - Westbound PM Peak Period
Journey Time (Secs)
140
120
100
80
60
40
20
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average: Route 2 WB - N1 2013 Reference Model
Average: Route 2 WB - N2 2013 With Dev
Average: Route 2 WB - N3 2013 With Mitigation

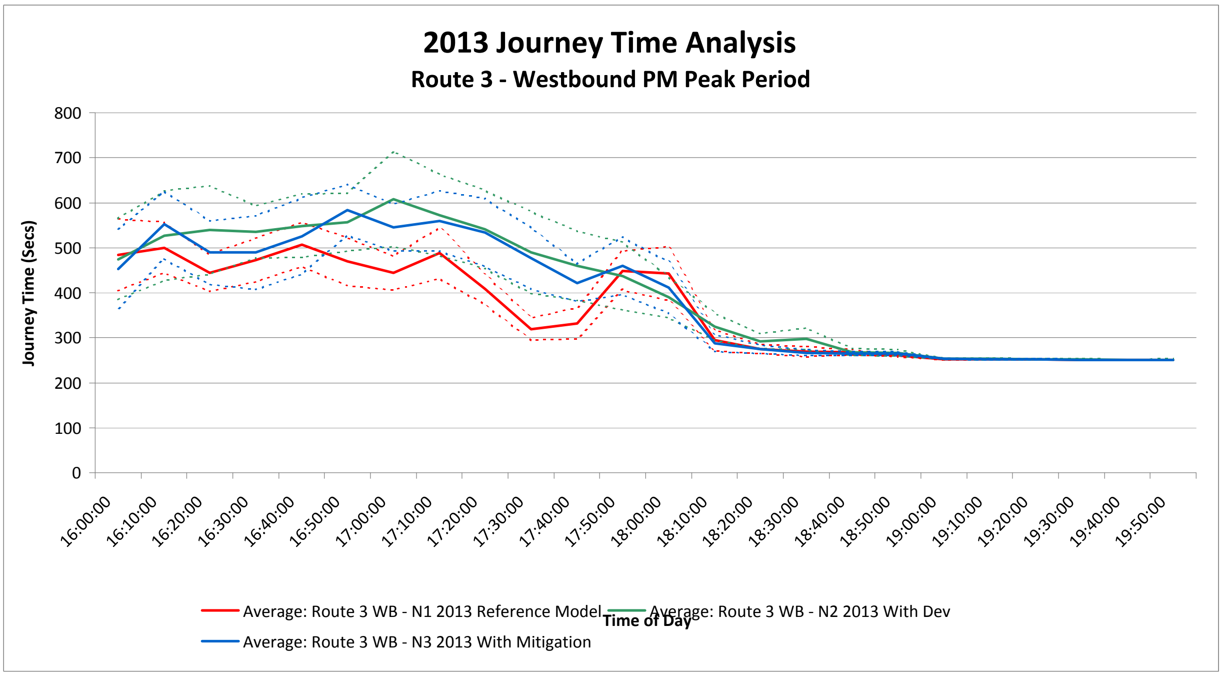

2013 Journey Time Analysis
Route 3 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 3 EB - N1 2013 Reference Model
Average: Route 3 EB - N2 2013 With Dev
Average: Route 3 EB - N3 2013 With Mitigation

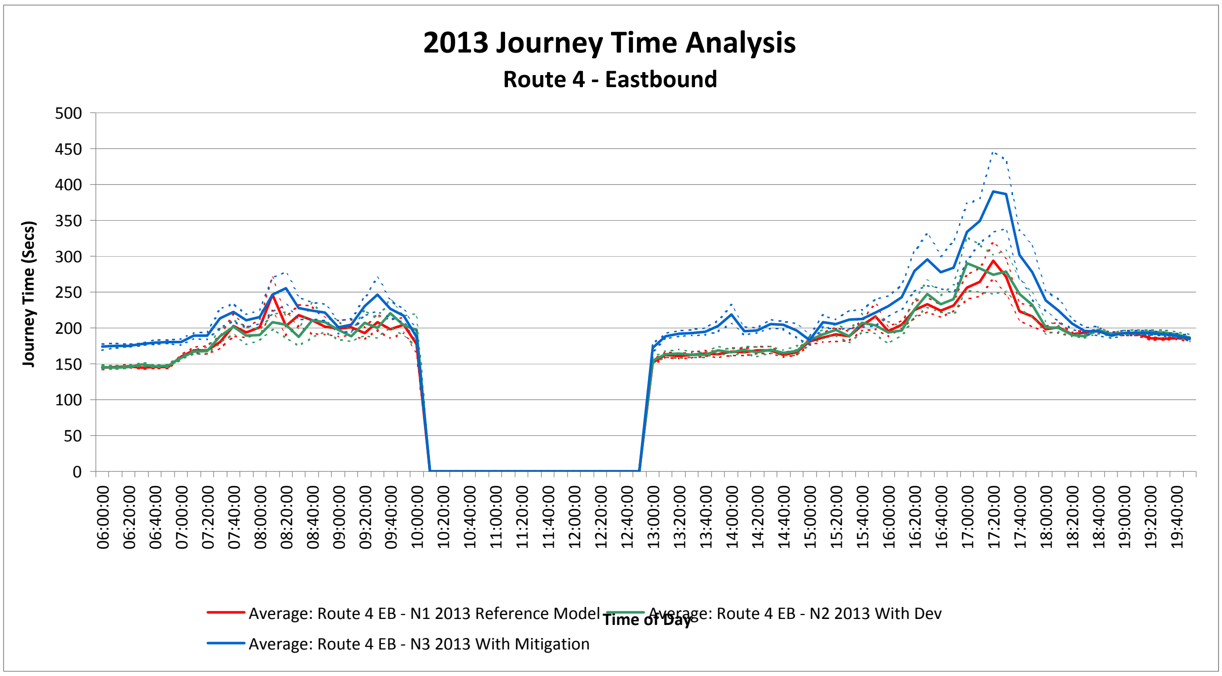

2013 Journey Time Analysis
Route 3 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 EB - N1 2013 Reference Model
Average: Route 3 EB - N2 2013 With Dev
Average: Route 3 EB - N3 2013 With Mitigation

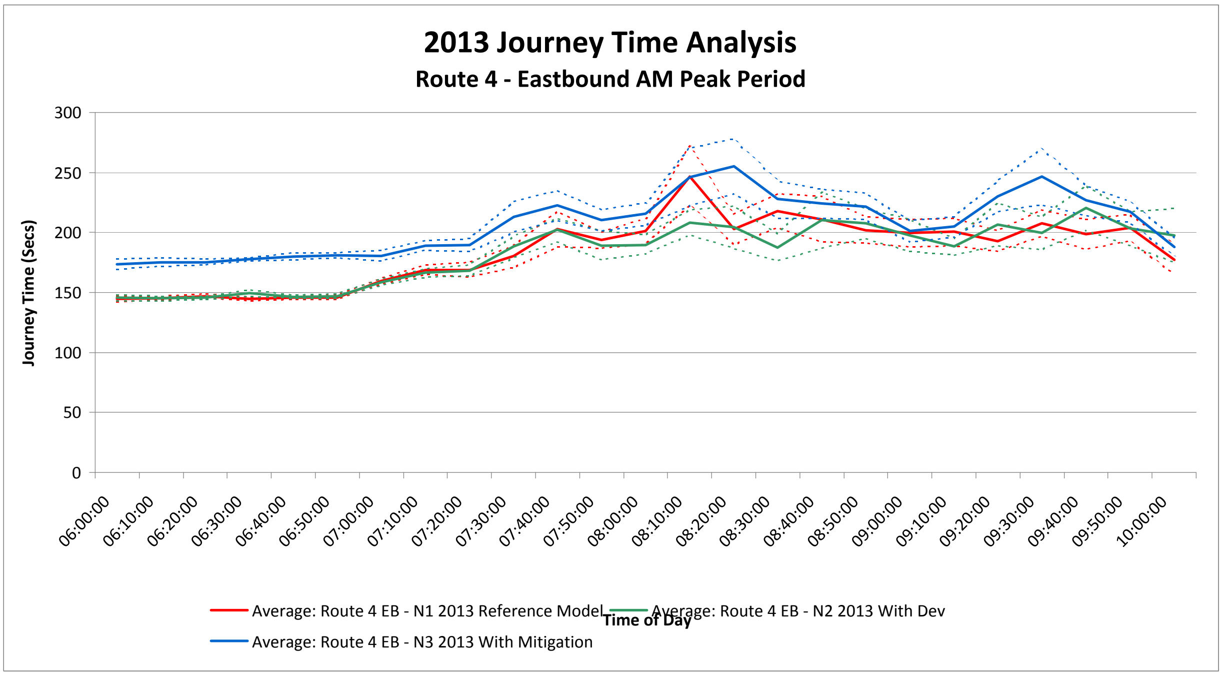

2013 Journey Time Analysis
Route 3 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 EB - N1 2013 Reference Model
Average: Route 3 EB - N2 2013 With Dev
Average: Route 3 EB - N3 2013 With Mitigation

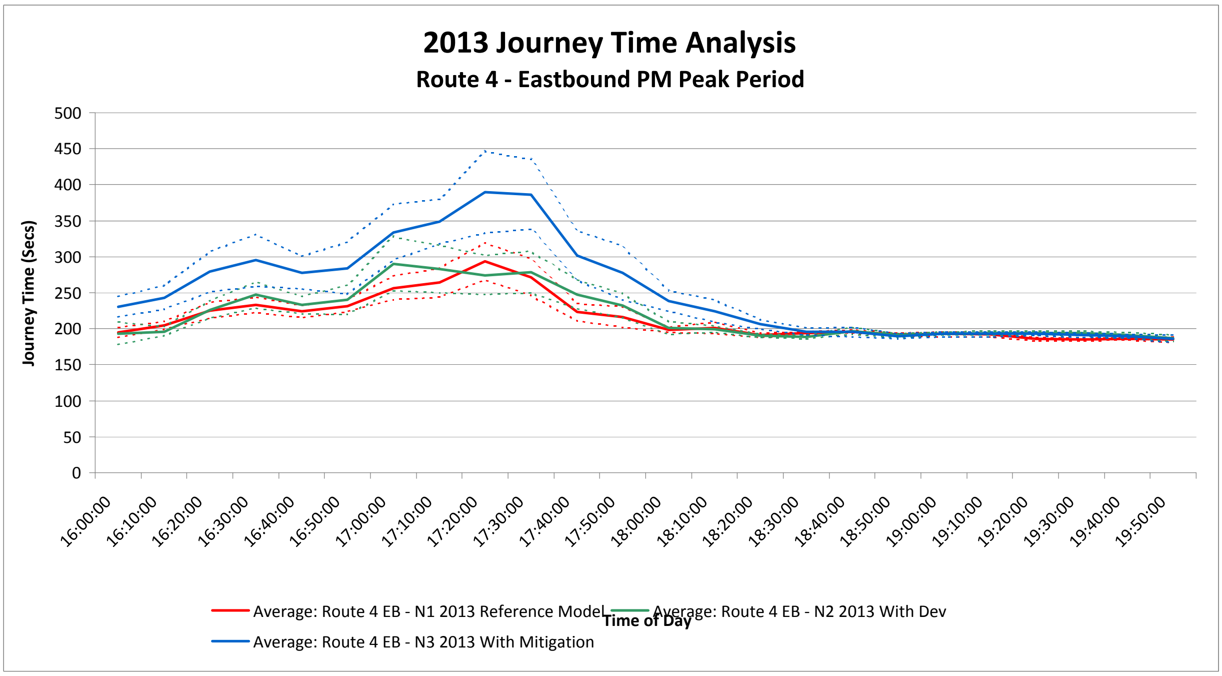

2013 Journey Time Analysis
Route 3 - Westbound
Journey Time (Secs)
800
700
600
500
400
300
200
100
0
Time of Day
Average: Route 3 WB - N1 2013 Reference Model
Average: Route 3 WB - N2 2013 With Dev
Average: Route 3 WB - N3 2013 With Mitigation

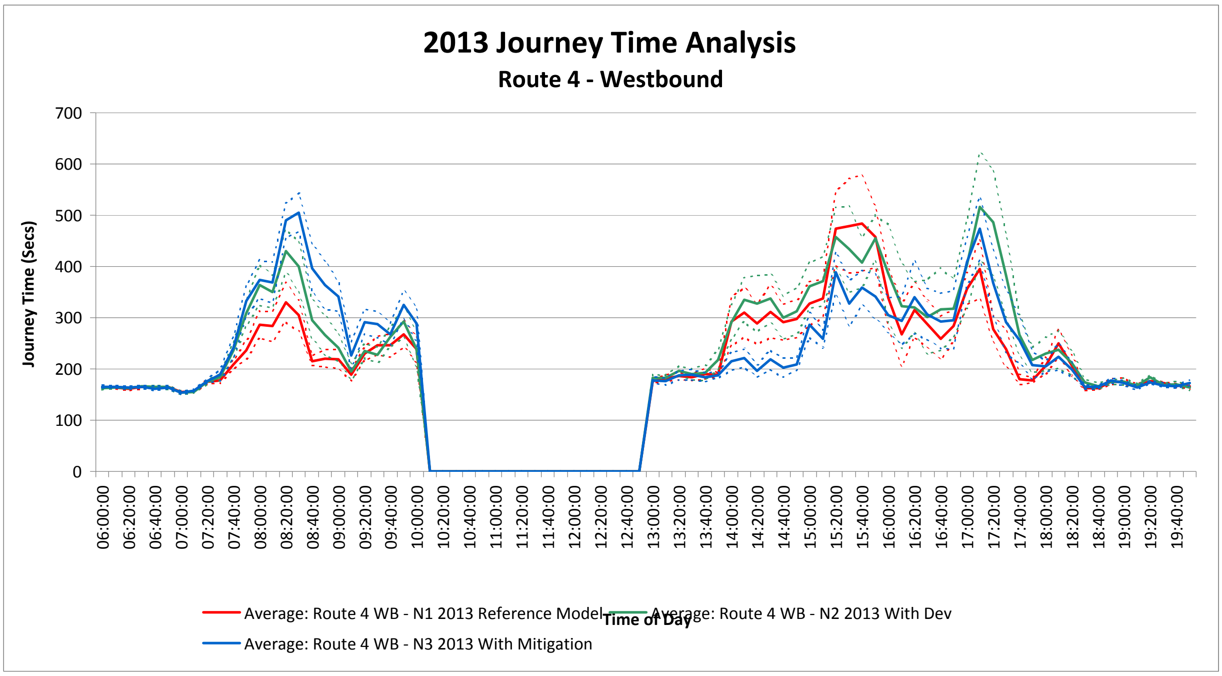

2013 Journey Time Analysis
Route 3 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 WB - N1 2013 Reference Model
Average: Route 3 WB - N2 2013 With Dev
Average: Route 3 WB - N3 2013 With Mitigation

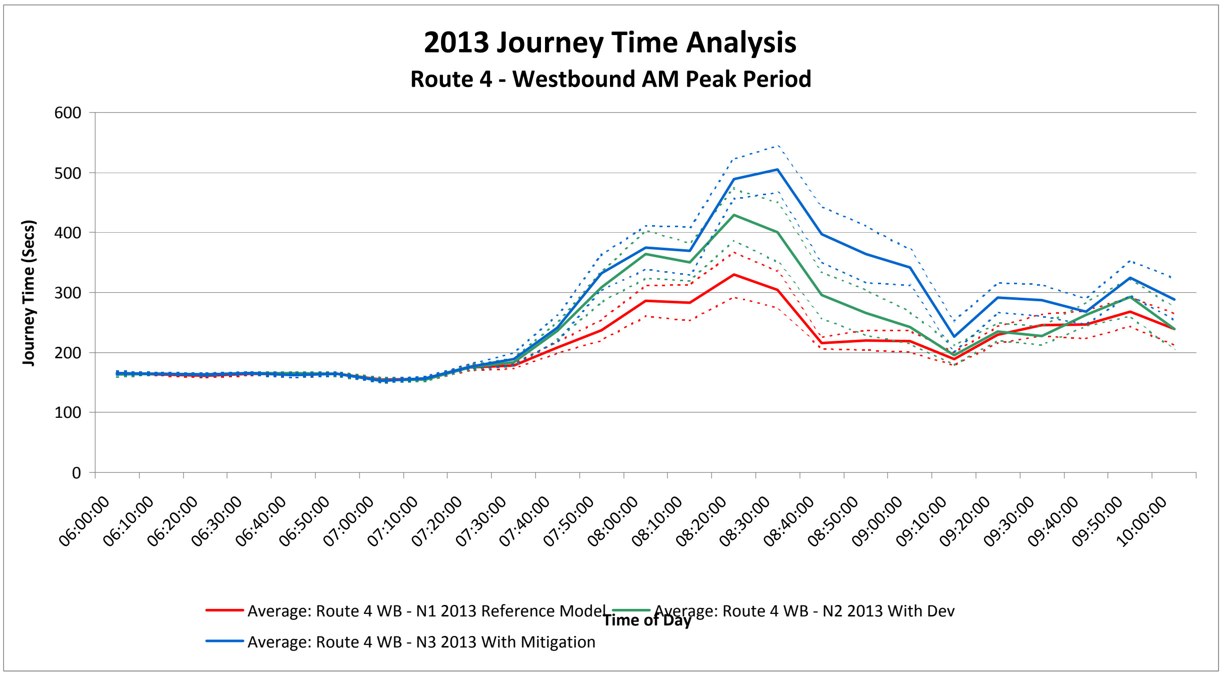

2013 Journey Time Analysis
Route 3 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 WB - N1 2013 Reference Model
Average: Route 3 WB - N2 2013 With Dev
Average: Route 3 WB - N3 2013 With Mitigation

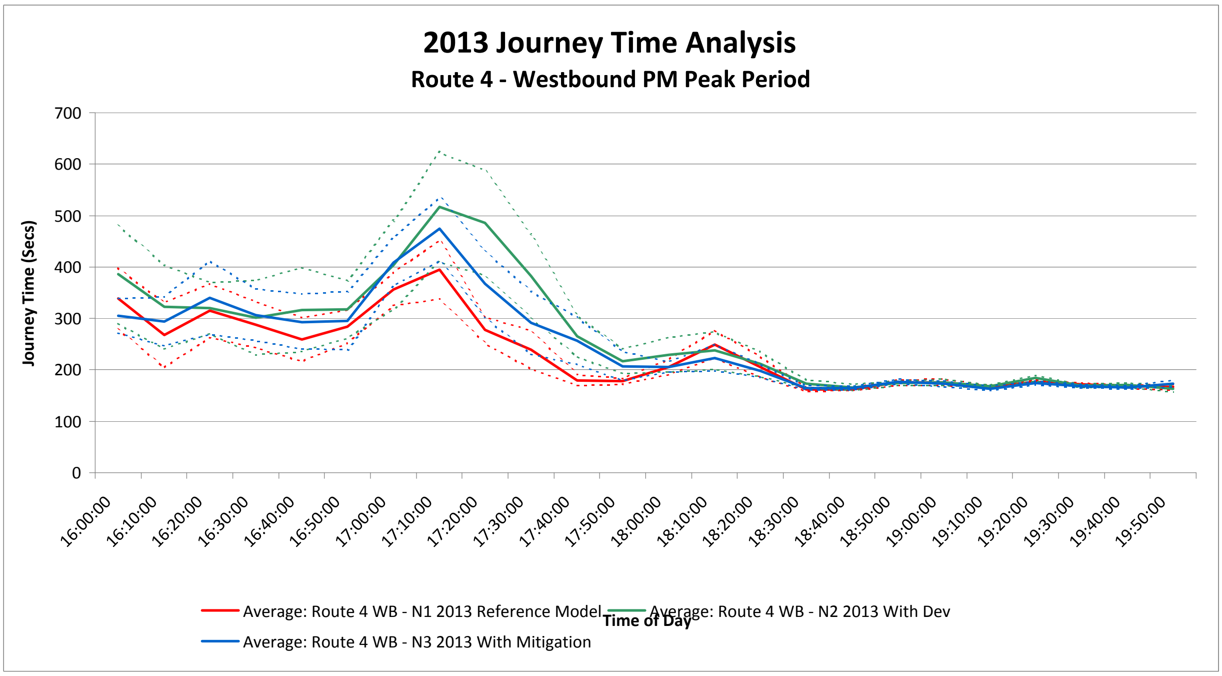

2013 Journey Time Analysis
Route 4 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2013 Reference Model
Average: Route 4 EB - N2 2013 With Dev
Average: Route 4 EB - N3 2013 With Mitigation

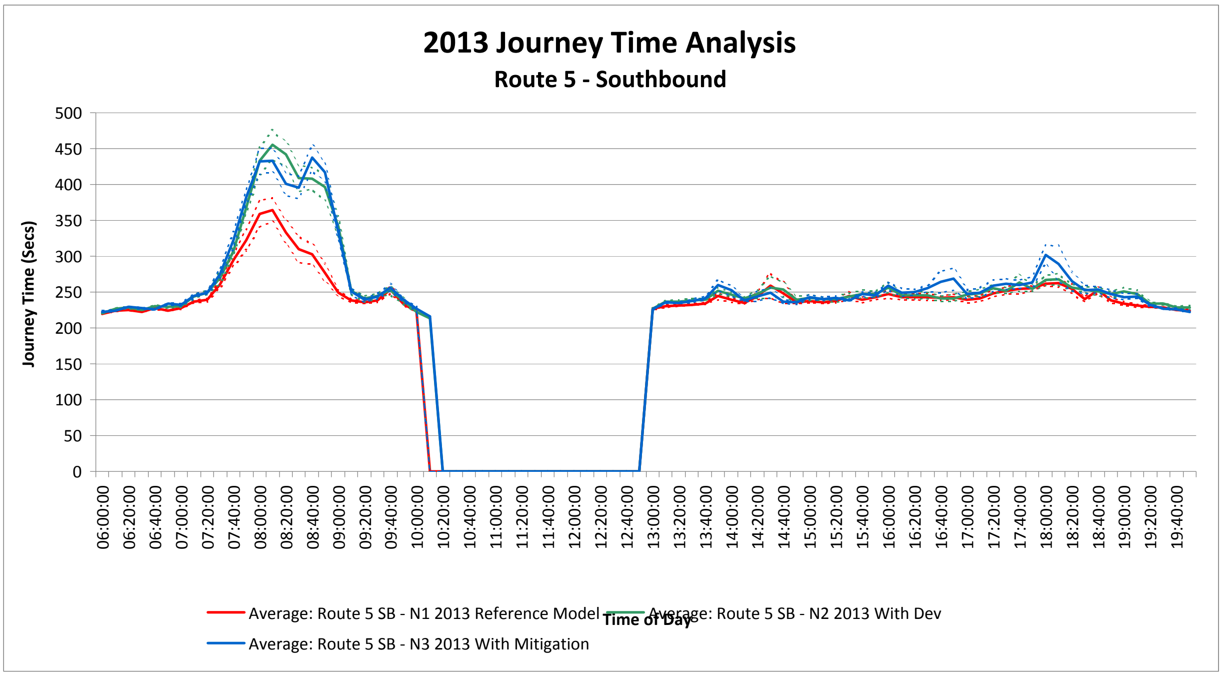

2013 Journey Time Analysis
Route 4 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2013 Reference Model
Average: Route 4 EB - N2 2013 With Dev
Average: Route 4 EB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 4 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2013 Reference Model
Average: Route 4 EB - N2 2013 With Dev
Average: Route 4 EB - N3 2013 With Mitigation

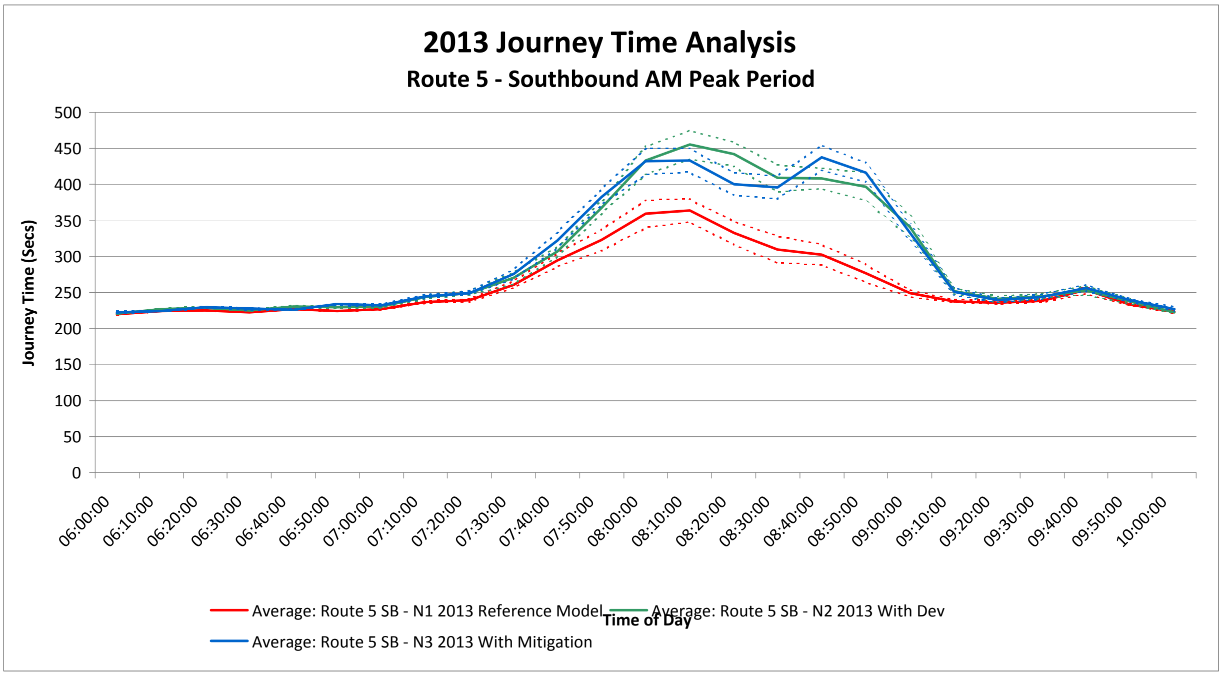

2013 Journey Time Analysis
Route 4 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2013 Reference Model
Average: Route 4 WB - N2 2013 With Dev
Average: Route 4 WB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 4 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2013 Reference Model
Average: Route 4 WB - N2 2013 With Dev
Average: Route 4 WB - N3 2013 With Mitigation

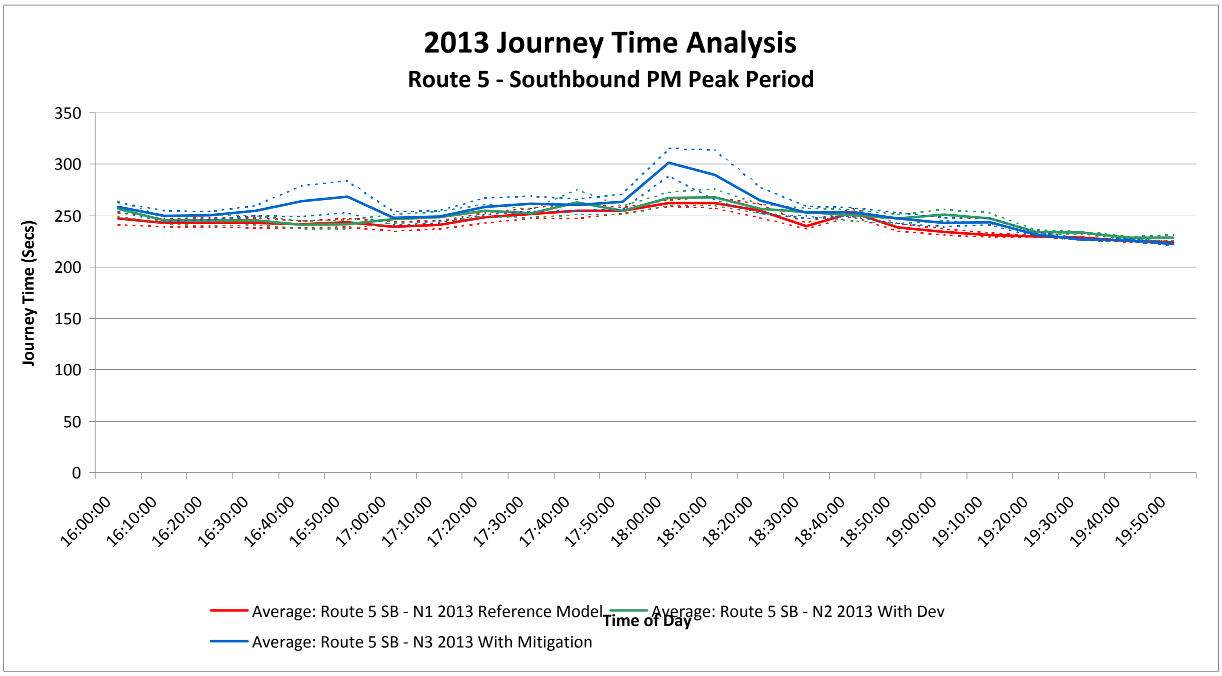

2013 Journey Time Analysis
Route 4 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2013 Reference Model
Average: Route 4 WB - N2 2013 With Dev
Average: Route 4 WB - N3 2013 With Mitigation



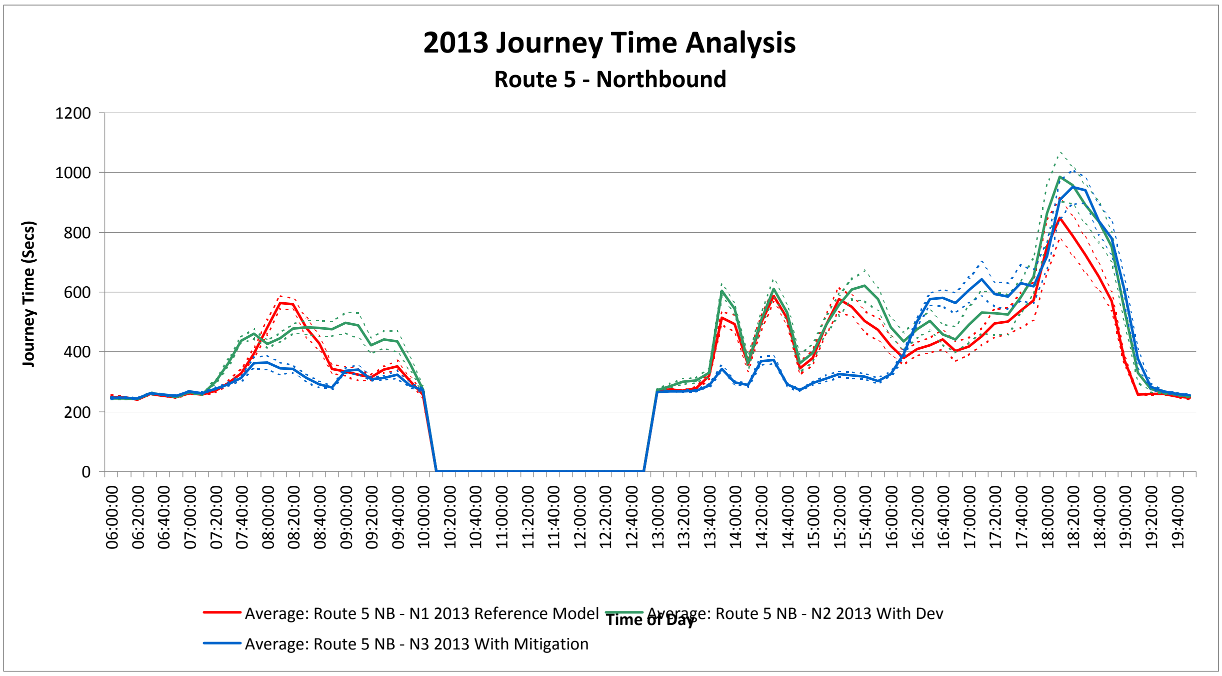
2013 Journey Time Analysis
Route 5 - Southbound
Journey Time (Secs)
0
50
100
150
200
250
300
350
400
450
500
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average: Route 5 SB - N1 2013 Reference Model
Average: Route 5 SB - N2 2013 With Dev
Average: Route 5 SB - N3 2013 With Mitigation

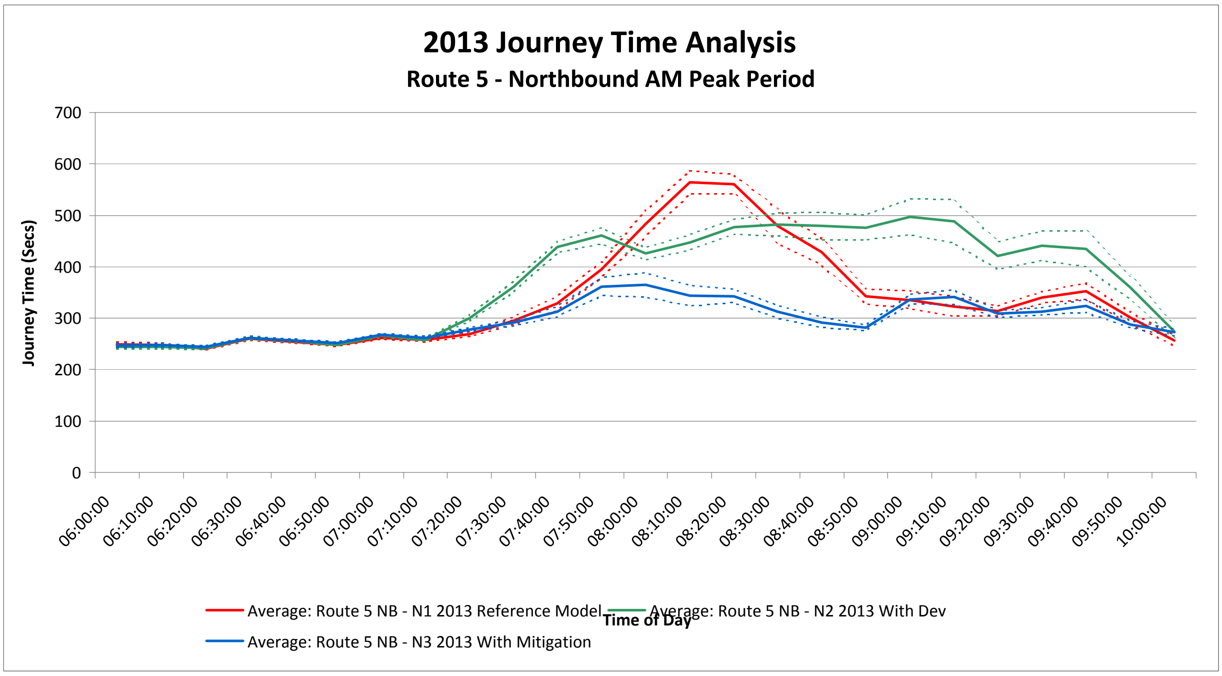


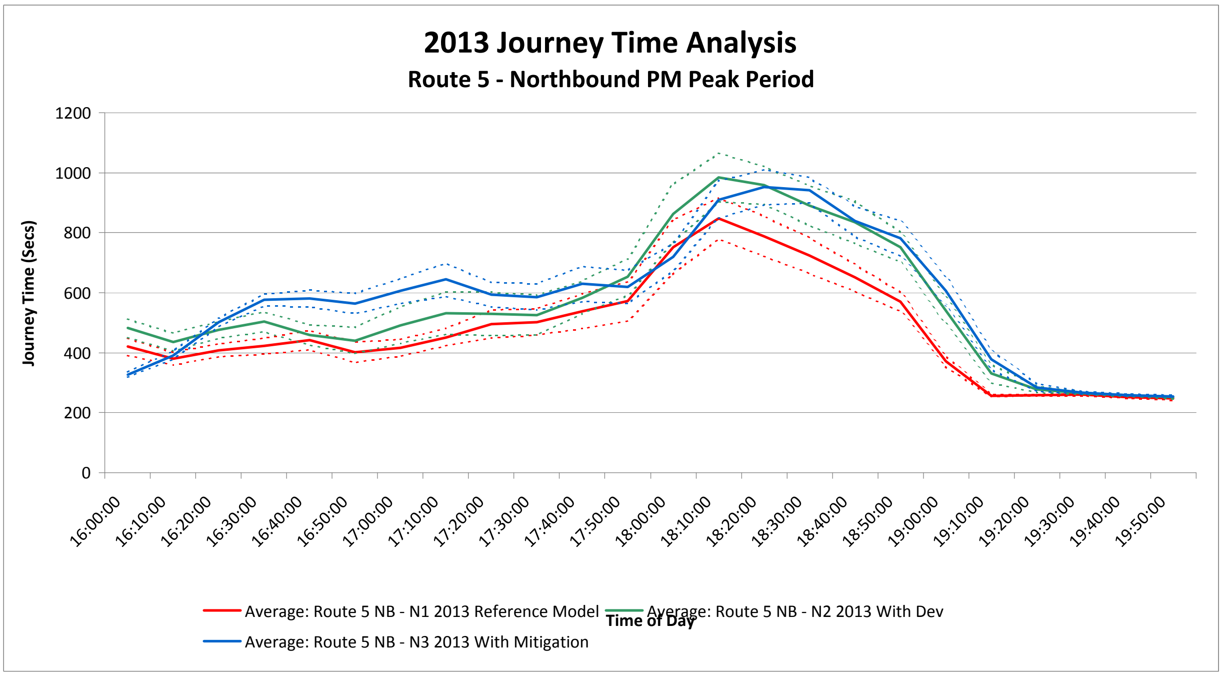
2013 Journey Time Analysis
Route 5 - Southbound AM Peak Period
Journey Time (Secs)
0
50
100
150
200
250
300
350
400
450
500
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average: Route 5 SB - N1 2013 Reference Model
Average: Route 5 SB - N2 2013 With Dev
Average: Route 5 SB - N3 2013 With Mitigation

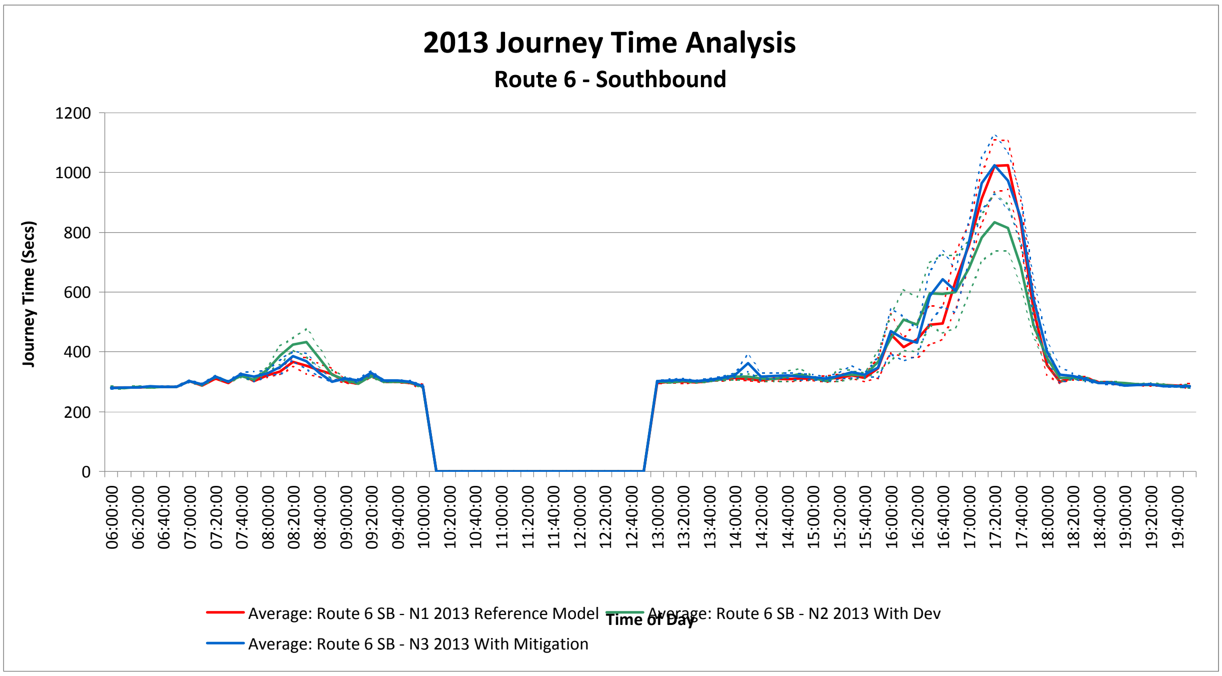


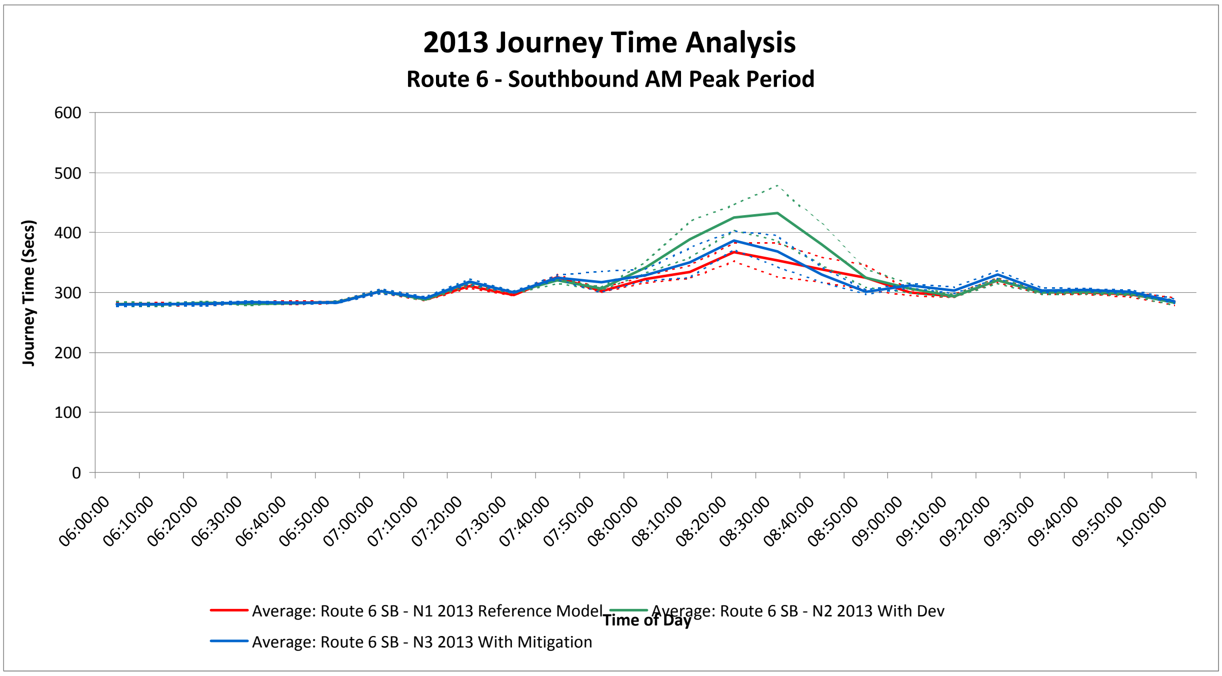
2013 Journey Time Analysis
Route 5 - Southbound PM Peak Period
Journey Time (Secs)
0
50
100
150
200
250
300
350
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average: Route 5 SB - N1 2013 Reference Model
Average: Route 5 SB - N2 2013 With Dev
Average: Route 5 SB - N3 2013 With Mitigation

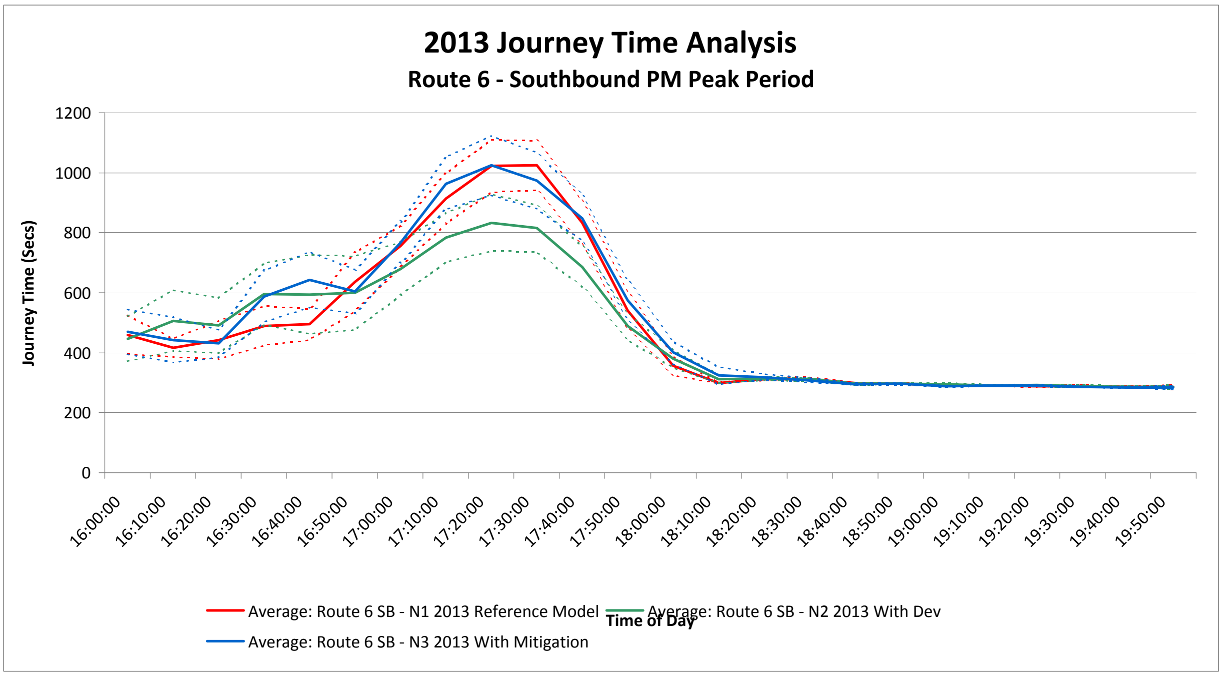

2013 Journey Time Analysis
Route 5 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2013 Reference Model
Average: Route 5 NB - N2 2013 With Dev
Average: Route 5 NB - N3 2013 With Mitigation

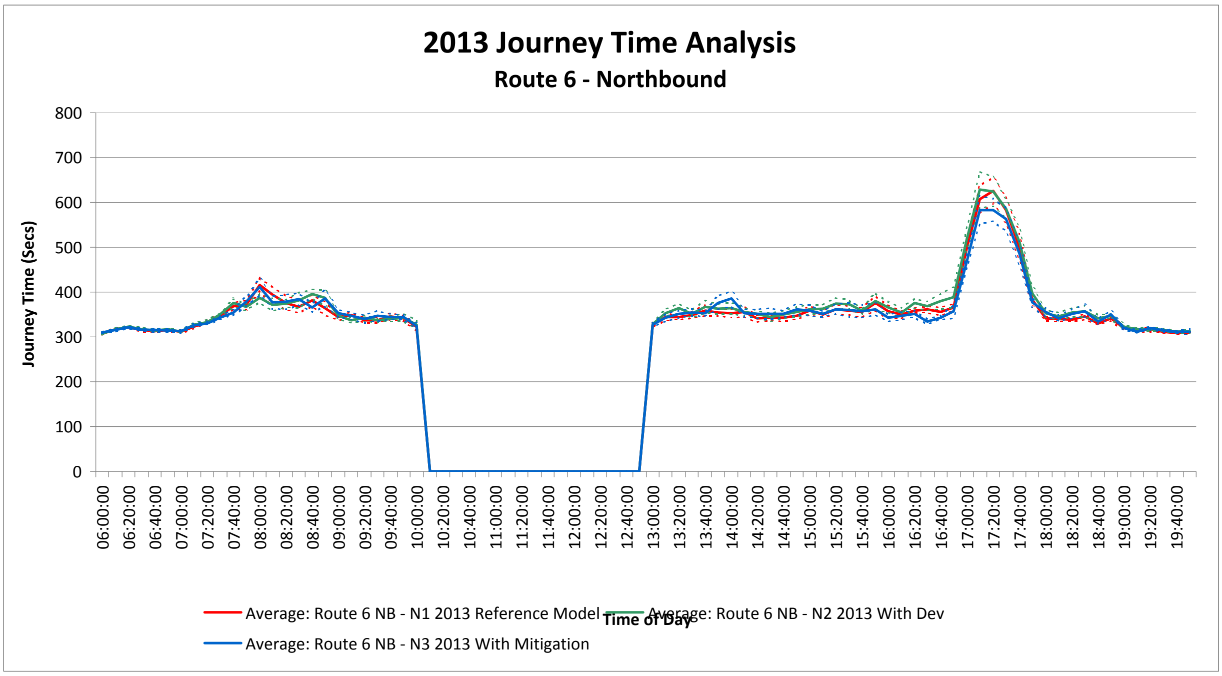

2013 Journey Time Analysis
Route 5 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2013 Reference Model
Average: Route 5 NB - N2 2013 With Dev
Average: Route 5 NB - N3 2013 With Mitigation

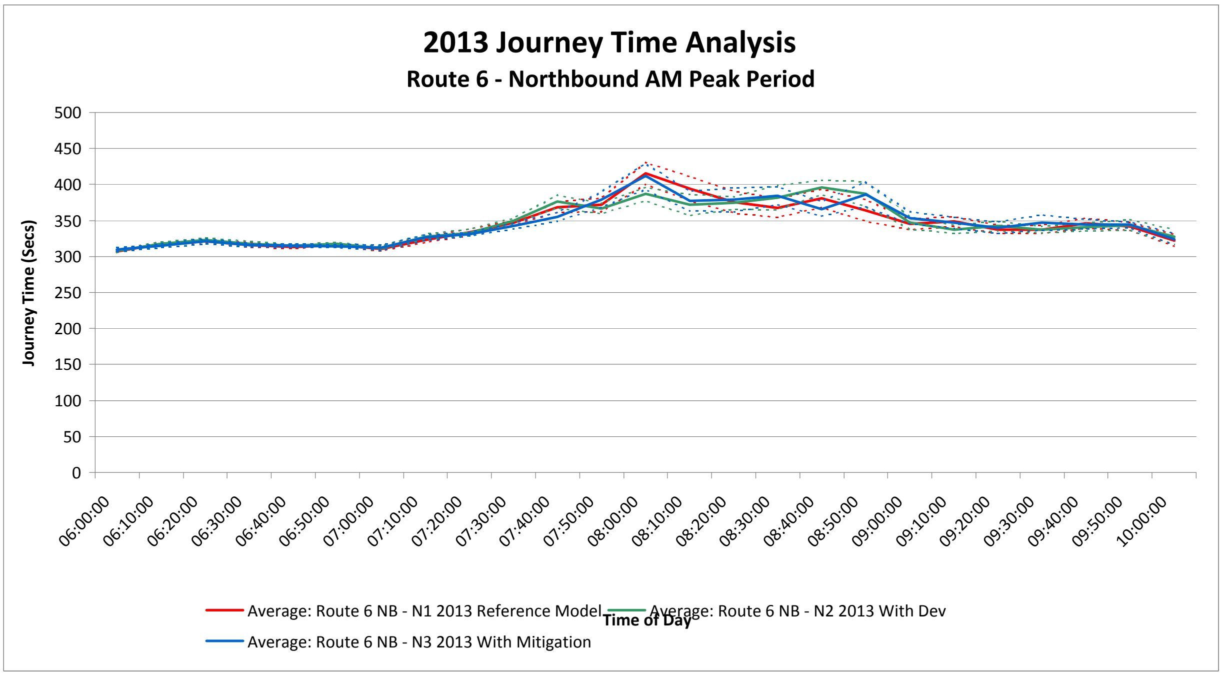

2013 Journey Time Analysis
Route 5 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2013 Reference Model
Average: Route 5 NB - N2 2013 With Dev
Average: Route 5 NB - N3 2013 With Mitigation

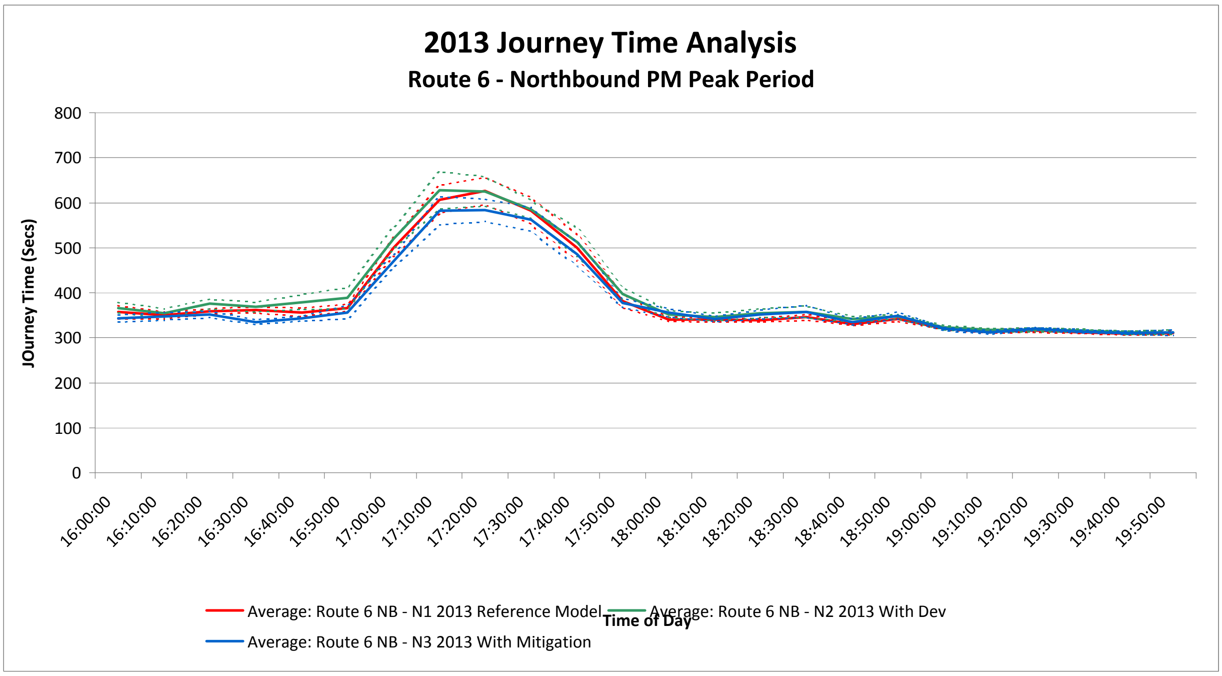

2013 Journey Time Analysis
Route 6 - Southbound
Journey Time (Secs)
0
200
400
600
800
1000
1200
06:00:00 06:20:00 06:40:00 07:00:00 07:20:00 07:40:00 08:00:00 08:20:00 08:40:00 09:00:00 09:20:00 09:40:00 10:00:00 10:20:00 10:40:00 11:00:00 11:20:00 11:40:00 12:00:00 12:20:00 12:40:00 13:00:00 13:20:00 13:40:00 14:00:00 14:20:00 14:40:00 15:00:00 15:20:00 15:40:00 16:00:00 16:20:00 16:40:00 17:00:00 17:20:00 17:40:00 18:00:00 18:20:00 18:40:00 19:00:00 19:20:00 19:40:00
Time of Day
Average: Route 6 SB - N1 2013 Reference Model
Average: Route 6 SB - N2 2013 With Dev
Average: Route 6 SB - N3 2013 With Mitigation

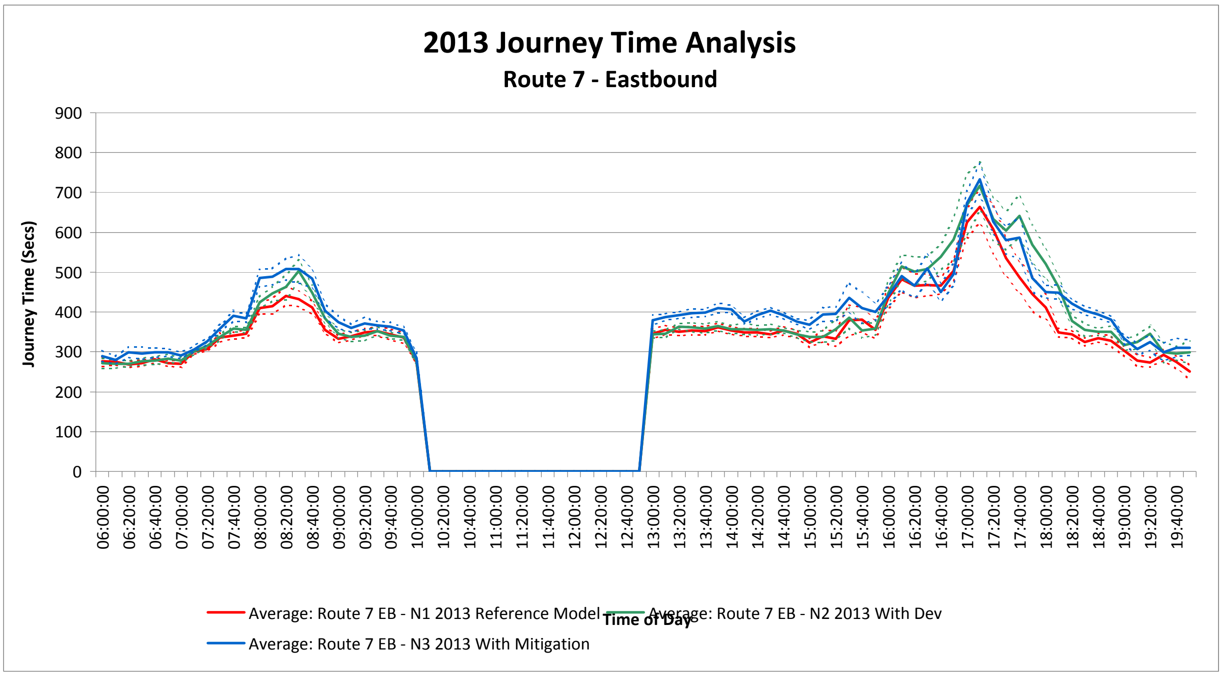

2013 Journey Time Analysis
Route 6 - Southbound AM Peak Period
Journey Time (Secs)
0
100
200
300
400
500
600
06:00:00 06:10:00 06:20:00 06:30:00 06:40:00 06:50:00 07:00:00 07:10:00 07:20:00 07:30:00 07:40:00 07:50:00 08:00:00 08:10:00 08:20:00 08:30:00 08:40:00 08:50:00 09:00:00 09:10:00 09:20:00 09:30:00 09:40:00 09:50:00 10:00:00
Time of Day
Average: Route 6 SB - N1 2013 Reference Model
Average: Route 6 SB - N2 2013 With Dev
Average: Route 6 SB - N3 2013 With Mitigation

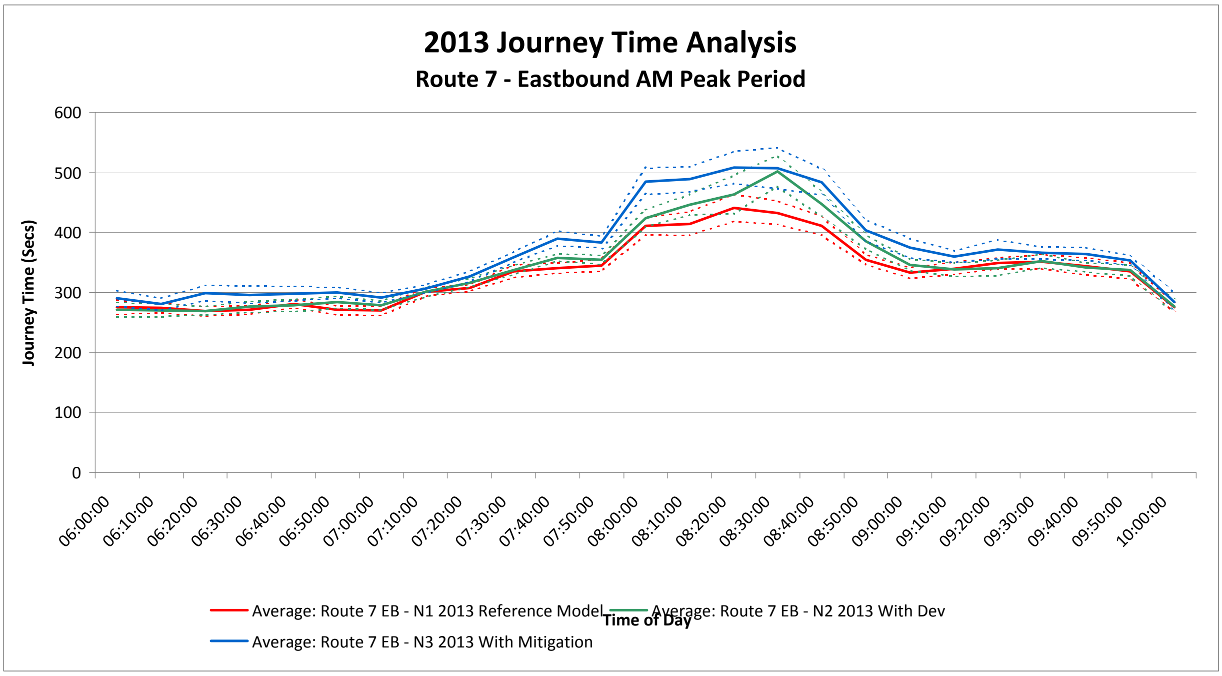

2013 Journey Time Analysis
Route 6 - Southbound PM Peak Period
Journey Time (Secs)
0
200
400
600
800
1000
1200
16:00:00 16:10:00 16:20:00 16:30:00 16:40:00 16:50:00 17:00:00 17:10:00 17:20:00 17:30:00 17:40:00 17:50:00 18:00:00 18:10:00 18:20:00 18:30:00 18:40:00 18:50:00 19:00:00 19:10:00 19:20:00 19:30:00 19:40:00 19:50:00
Time of Day
Average: Route 6 SB - N1 2013 Reference Model
Average: Route 6 SB - N2 2013 With Dev
Average: Route 6 SB - N3 2013 With Mitigation

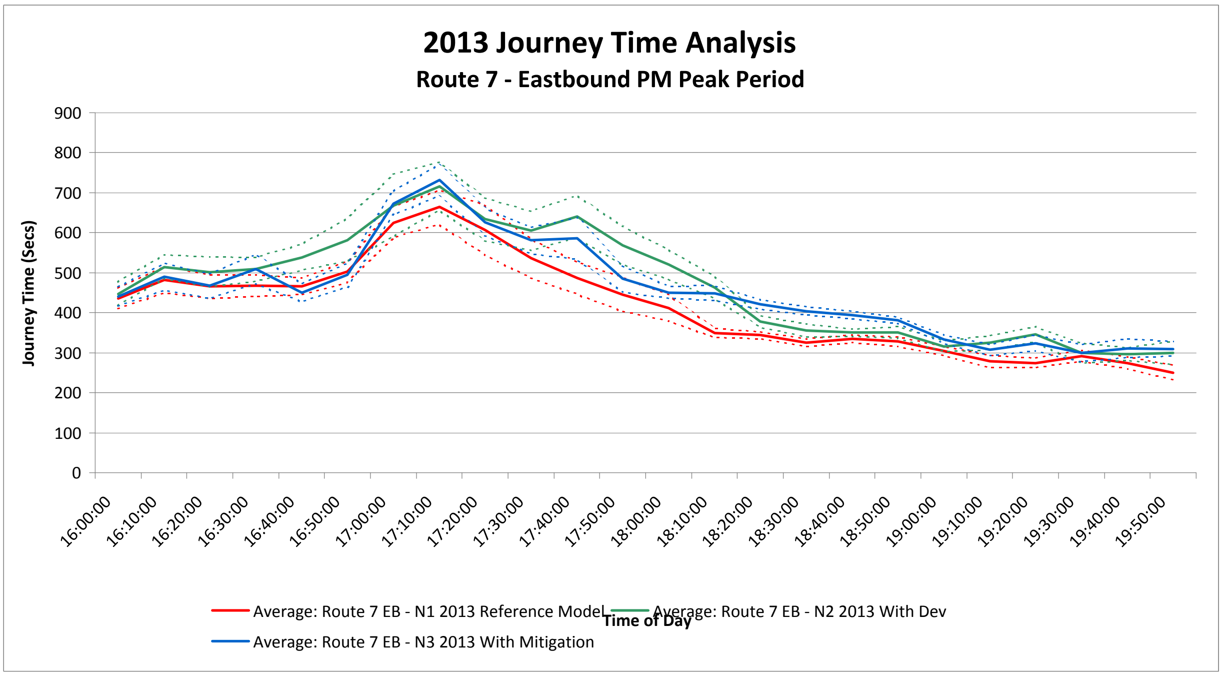

2013 Journey Time Analysis
Route 6 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 6 NB - N1 2013 Reference Model
Average: Route 6 NB - N2 2013 With Dev
Average: Route 6 NB - N3 2013 With Mitigation

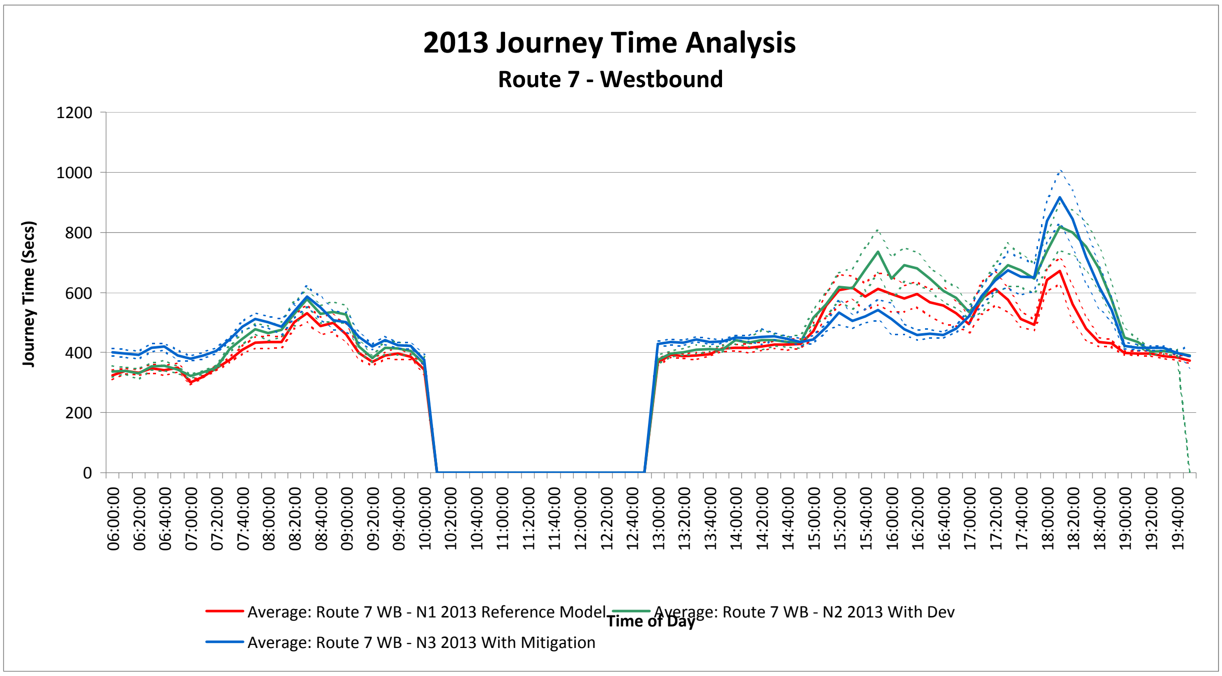

2013 Journey Time Analysis
Route 6 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 NB - N1 2013 Reference Model
Average: Route 6 NB - N2 2013 With Dev
Average: Route 6 NB - N3 2013 With Mitigation

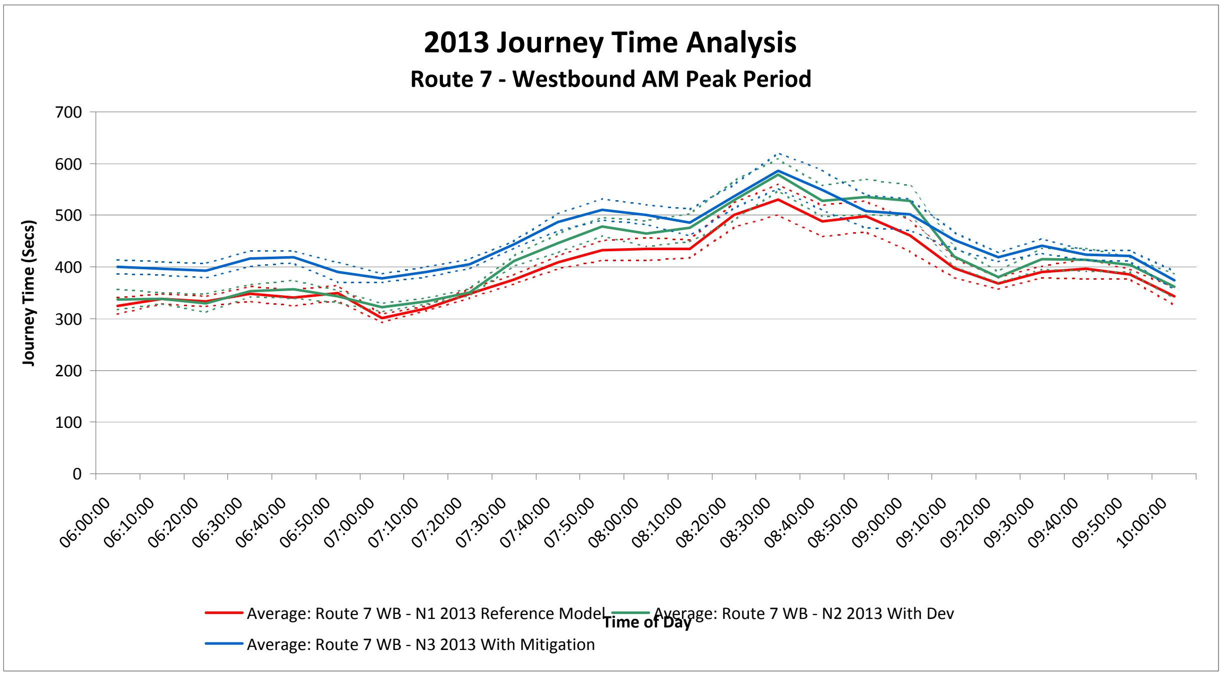

2013 Journey Time Analysis
Route 6 - Northbound PM Peak Period
JOurney Time (Secs)
Time of Day
Average: Route 6 NB - N1 2013 Reference Model
Average: Route 6 NB - N2 2013 With Dev
Average: Route 6 NB - N3 2013 With Mitigation

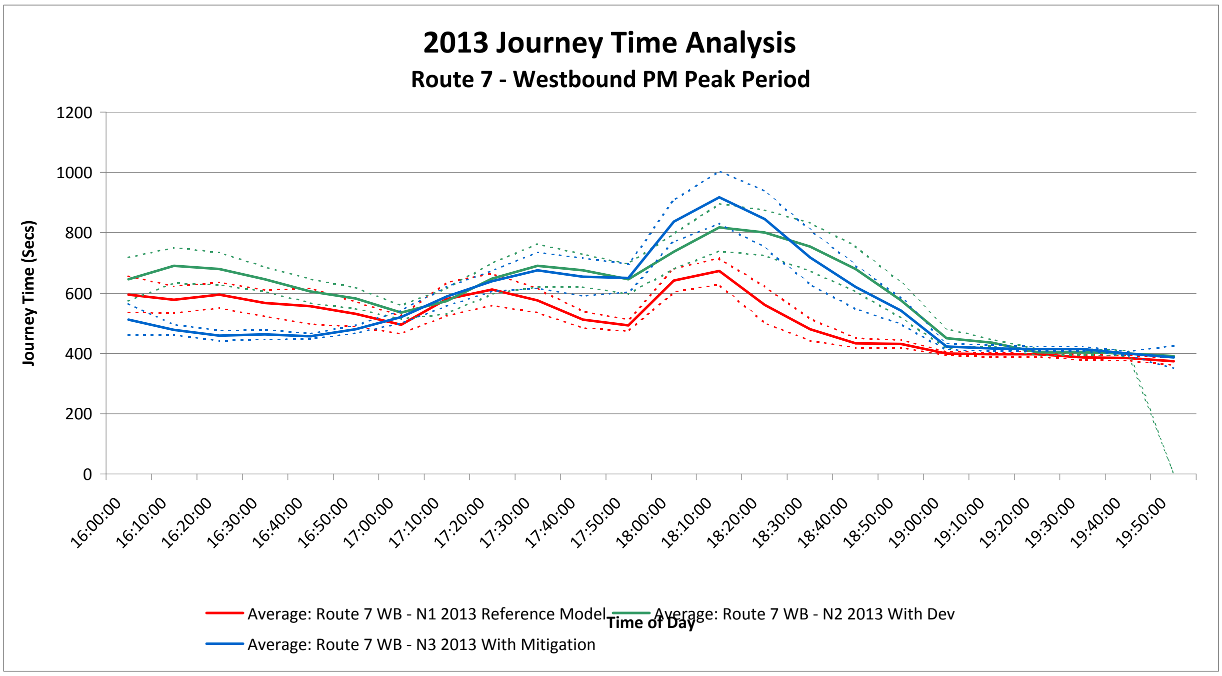

2013 Journey Time Analysis
Route 7 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2013 Reference Model
Average: Route 7 EB - N2 2013 With Dev
Average: Route 7 EB - N3 2013 With Mitigation

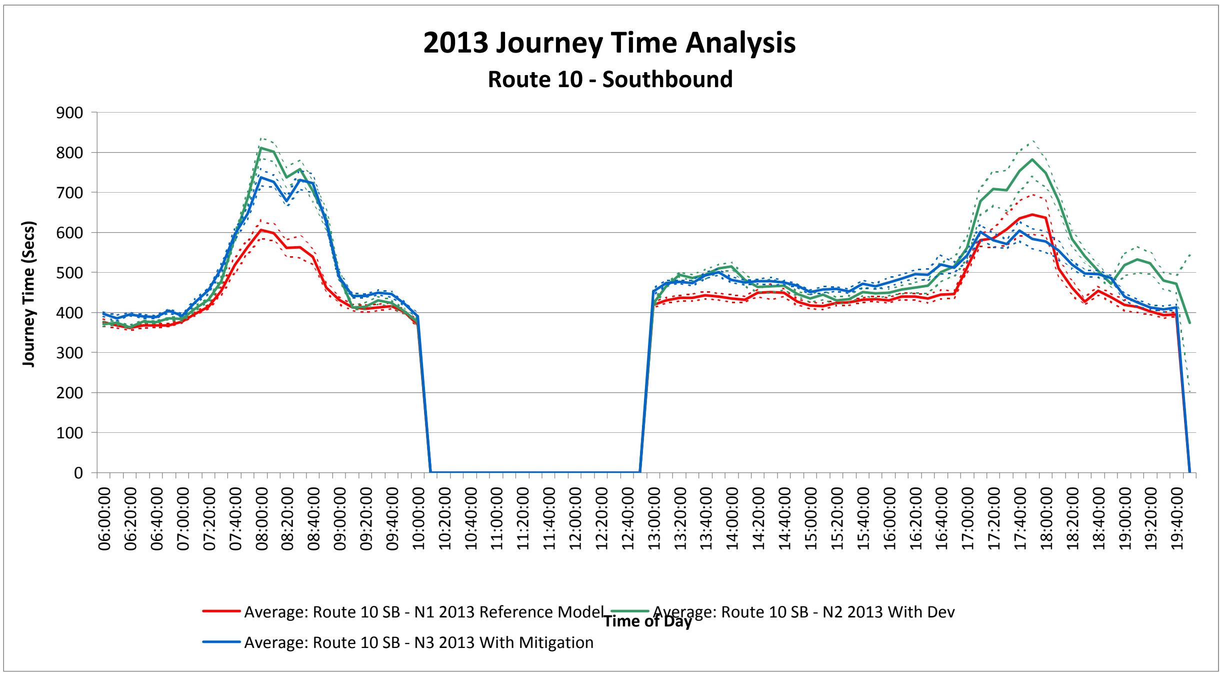

2013 Journey Time Analysis
Route 7 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2013 Reference Model
Average: Route 7 EB - N2 2013 With Dev
Average: Route 7 EB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 7 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2013 Reference Model
Average: Route 7 EB - N2 2013 With Dev
Average: Route 7 EB - N3 2013 With Mitigation

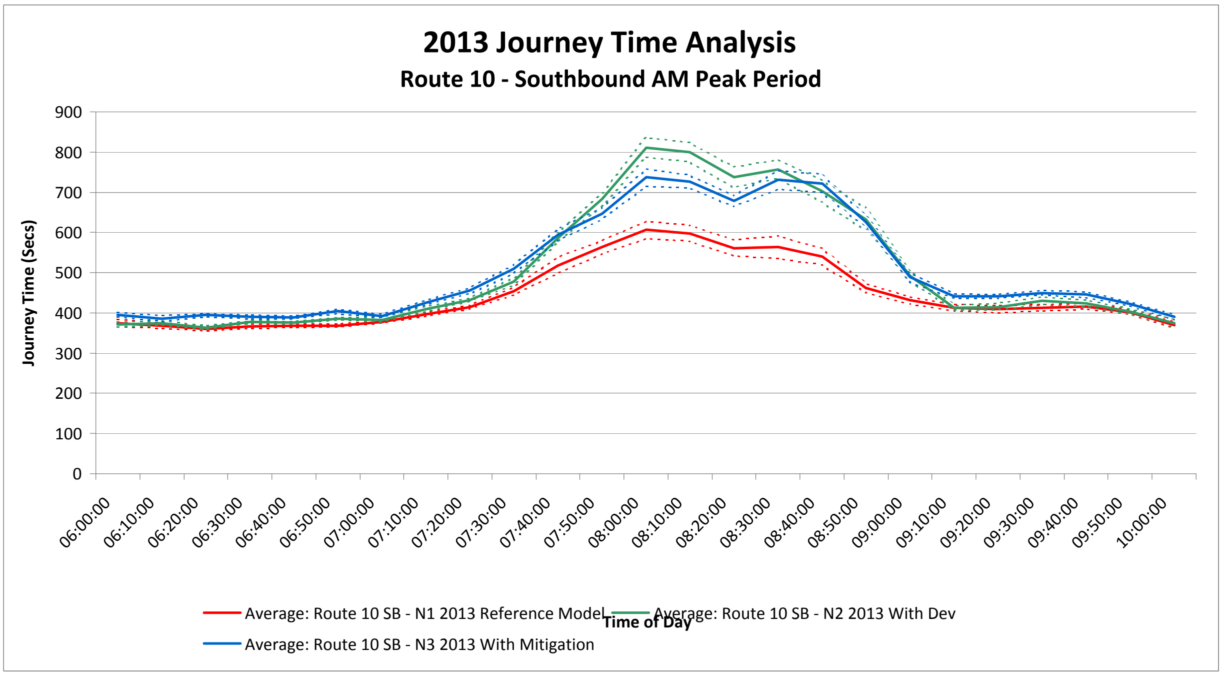

2013 Journey Time Analysis
Route 7 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2013 Reference Model
Average: Route 7 WB - N2 2013 With Dev
Average: Route 7 WB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 7 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2013 Reference Model
Average: Route 7 WB - N2 2013 With Dev
Average: Route 7 WB - N3 2013 With Mitigation

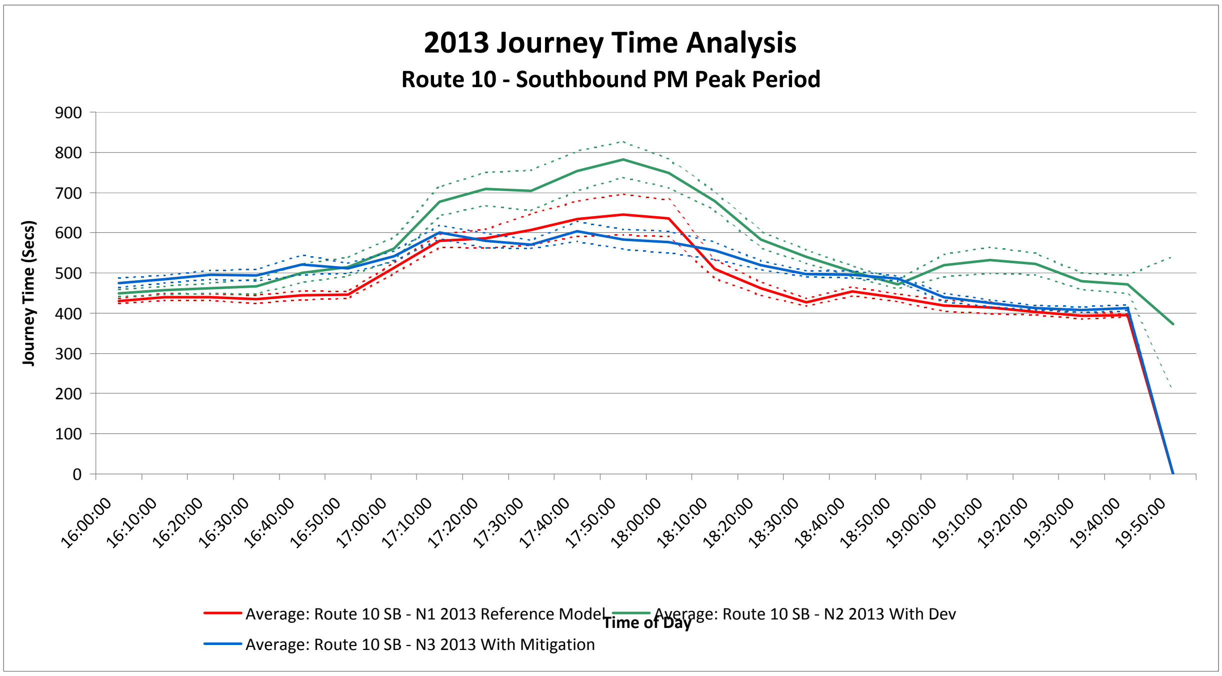

2013 Journey Time Analysis
Route 7 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2013 Reference Model
Average: Route 7 WB - N2 2013 With Dev
Average: Route 7 WB - N3 2013 With Mitigation



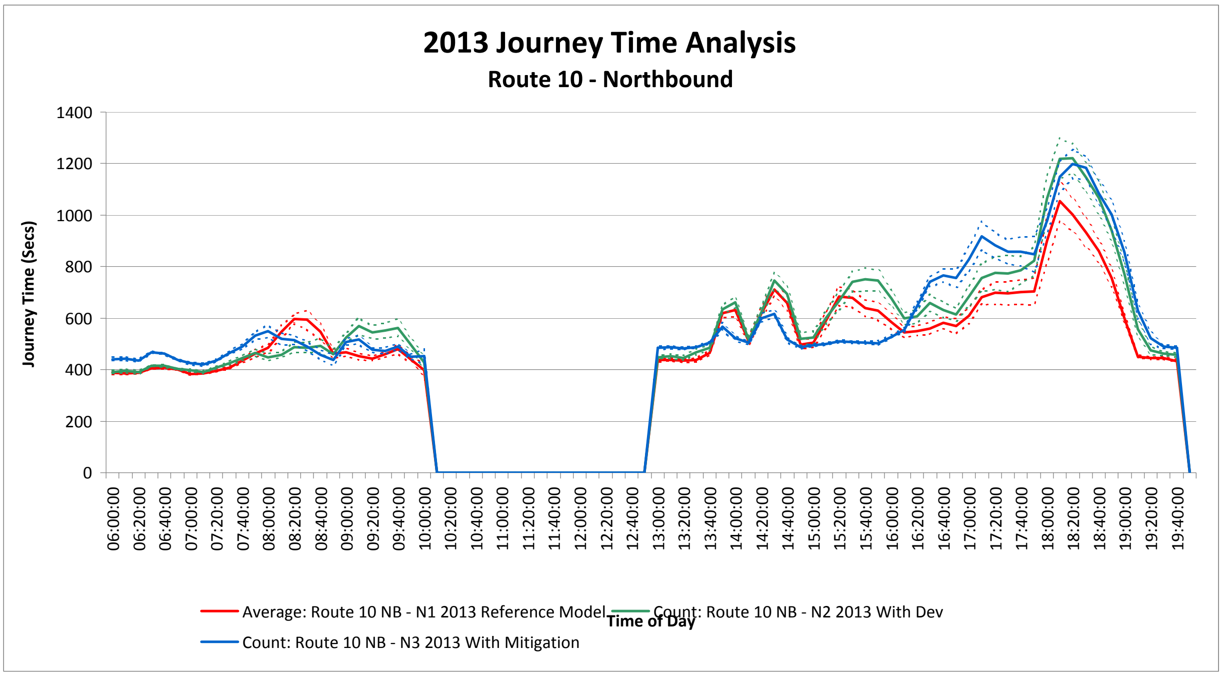
2013 Journey Time Analysis
Route 10 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2013 Reference Model
Average: Route 10 SB - N2 2013 With Dev
Average: Route 10 SB - N3 2013 With Mitigation

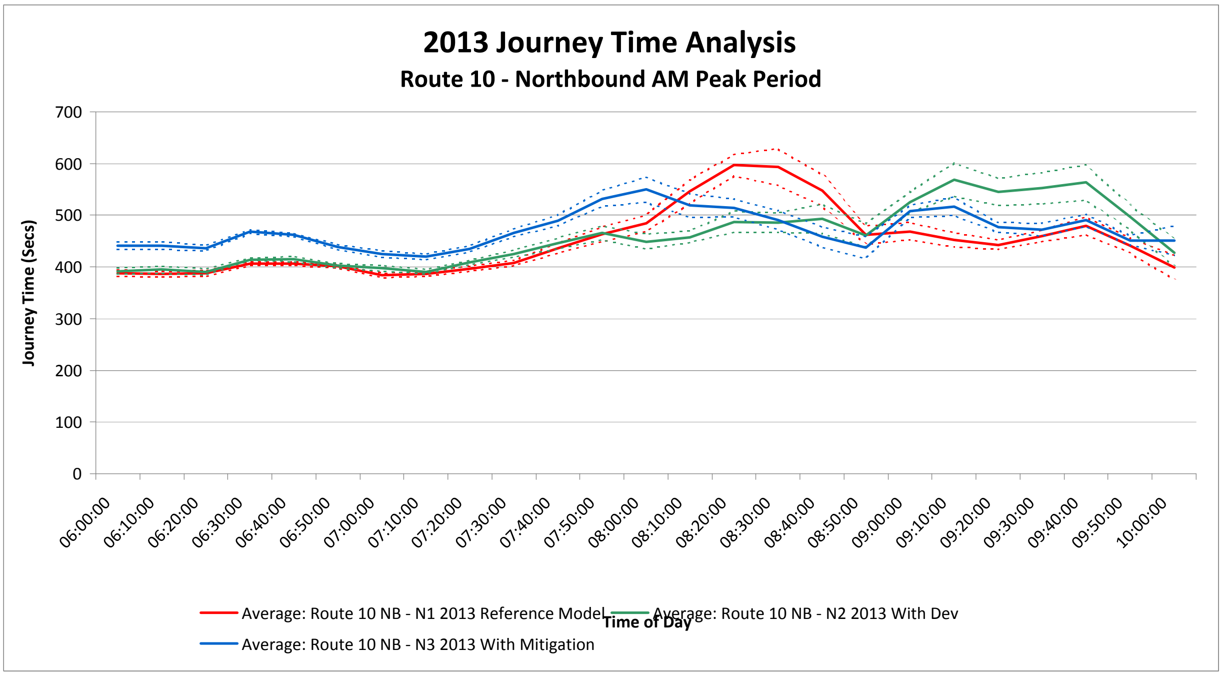


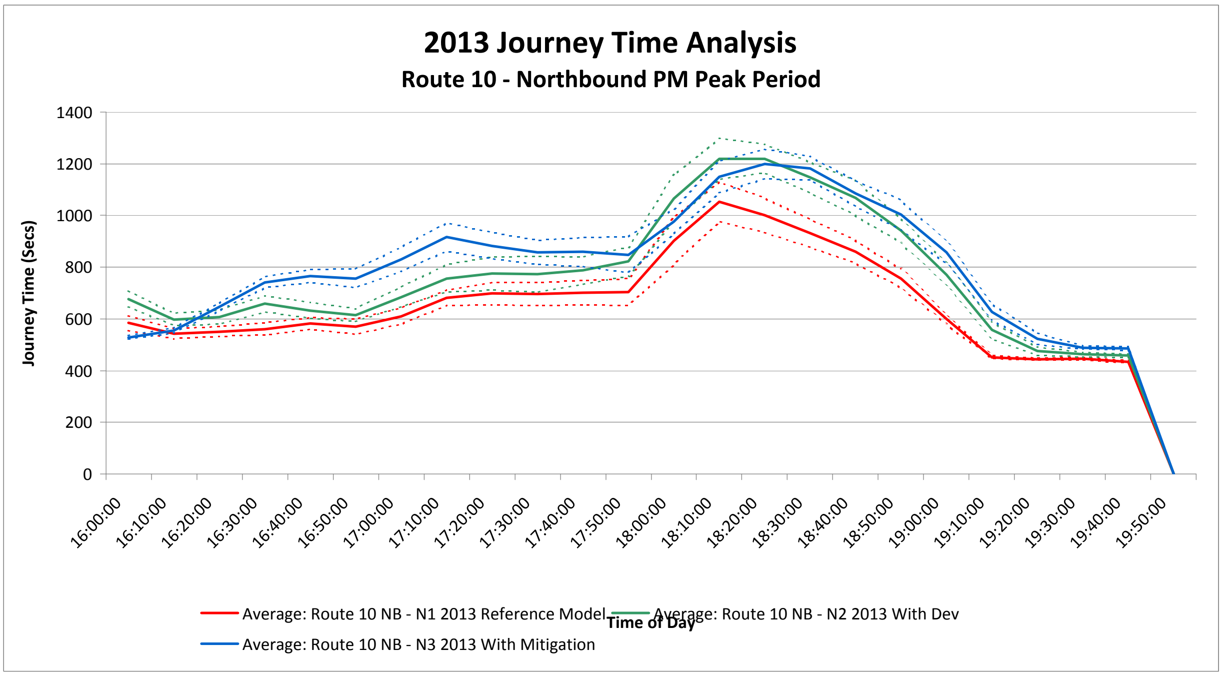
2013 Journey Time Analysis
Route 10 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2013 Reference Model
Average: Route 10 SB - N2 2013 With Dev
Average: Route 10 SB - N3 2013 With Mitigation

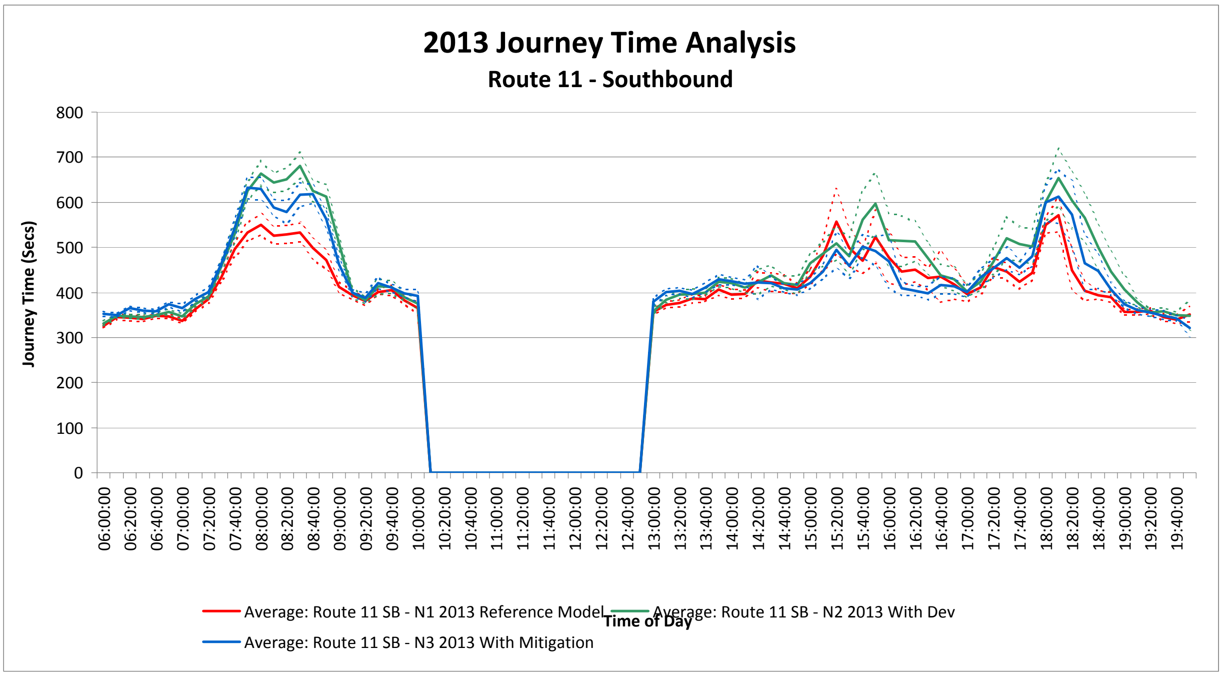


2013 Journey Time Analysis
Route 10 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2013 Reference Model
Average: Route 10 SB - N2 2013 With Dev
Average: Route 10 SB - N3 2013 With Mitigation

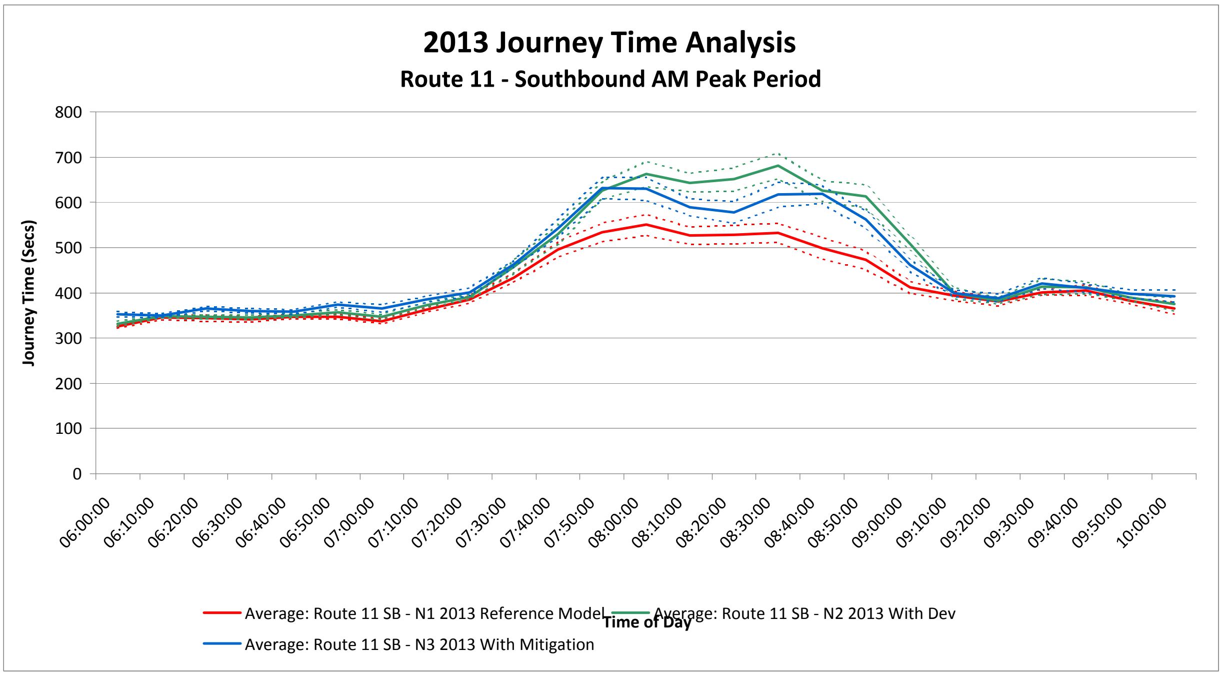

2013 Journey Time Analysis
Route 10 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2013 Reference Model
Count: Route 10 NB - N2 2013 With Dev
Count: Route 10 NB - N3 2013 With Mitigation


2013 Journey Time Analysis
Route 10 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2013 Reference Model
Average: Route 10 NB - N2 2013 With Dev
Average: Route 10 NB - N3 2013 With Mitigation

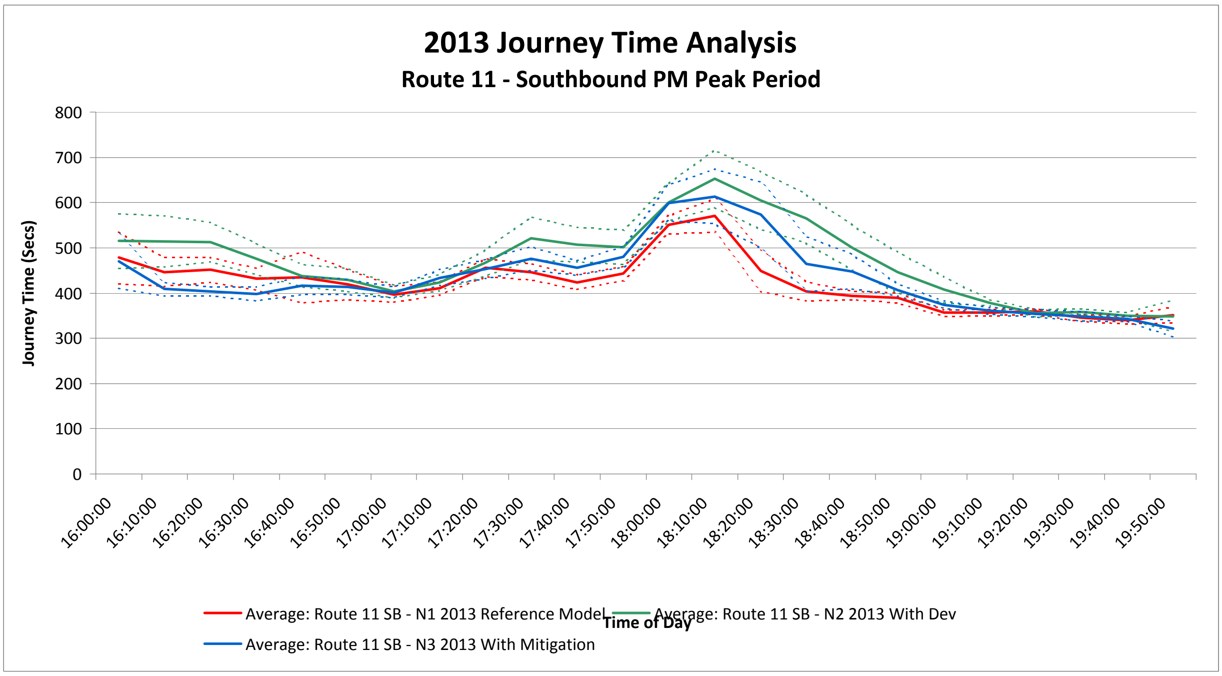

2013 Journey Time Analysis
Route 10 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2013 Reference Model
Average: Route 10 NB - N2 2013 With Dev
Average: Route 10 NB - N3 2013 With Mitigation



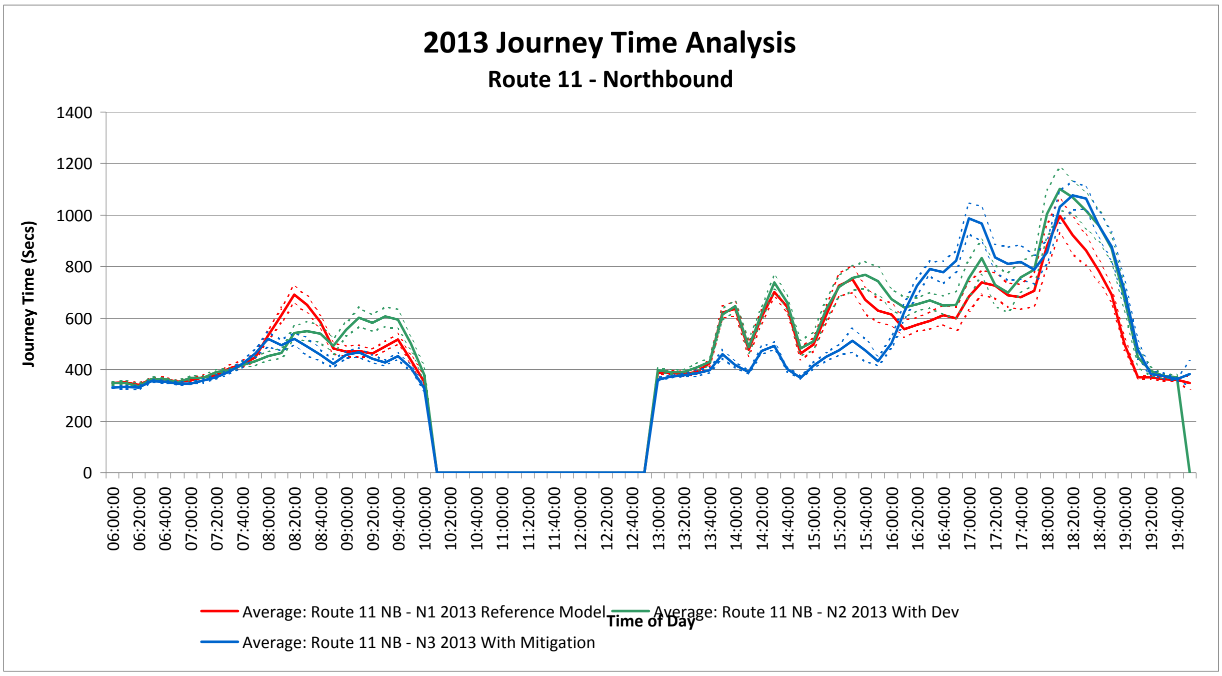
2013 Journey Time Analysis
Route 11 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2013 Reference Model
Average: Route 11 SB - N2 2013 With Dev
Average: Route 11 SB - N3 2013 With Mitigation

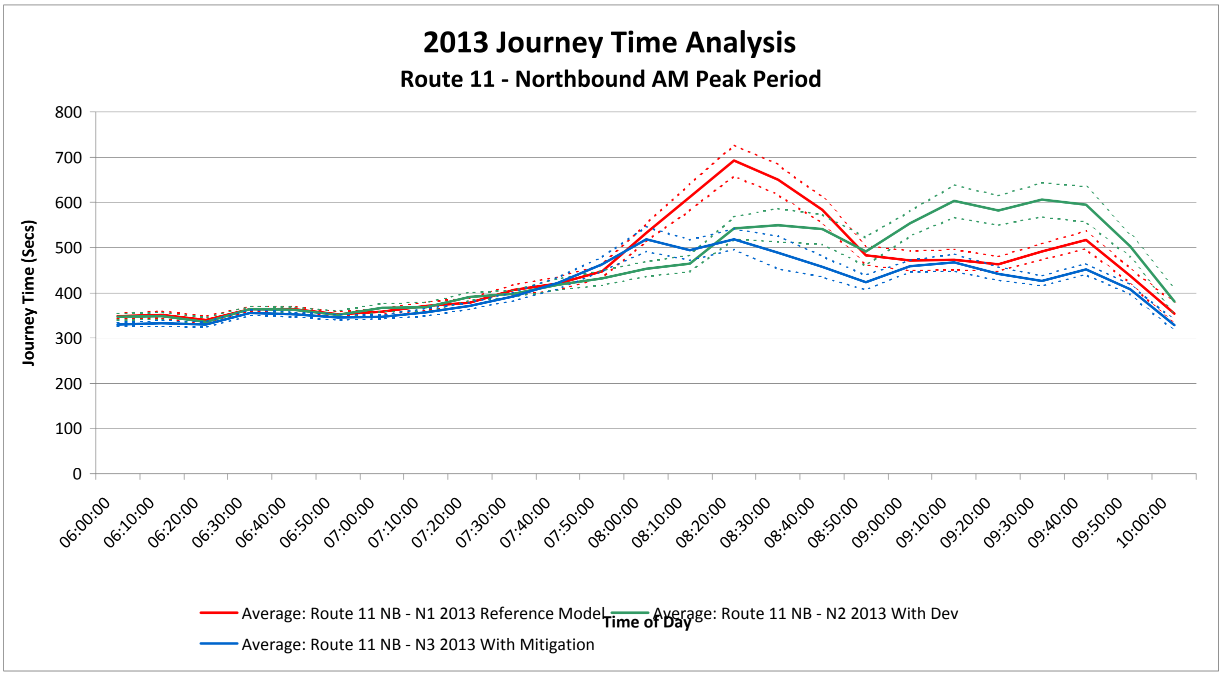


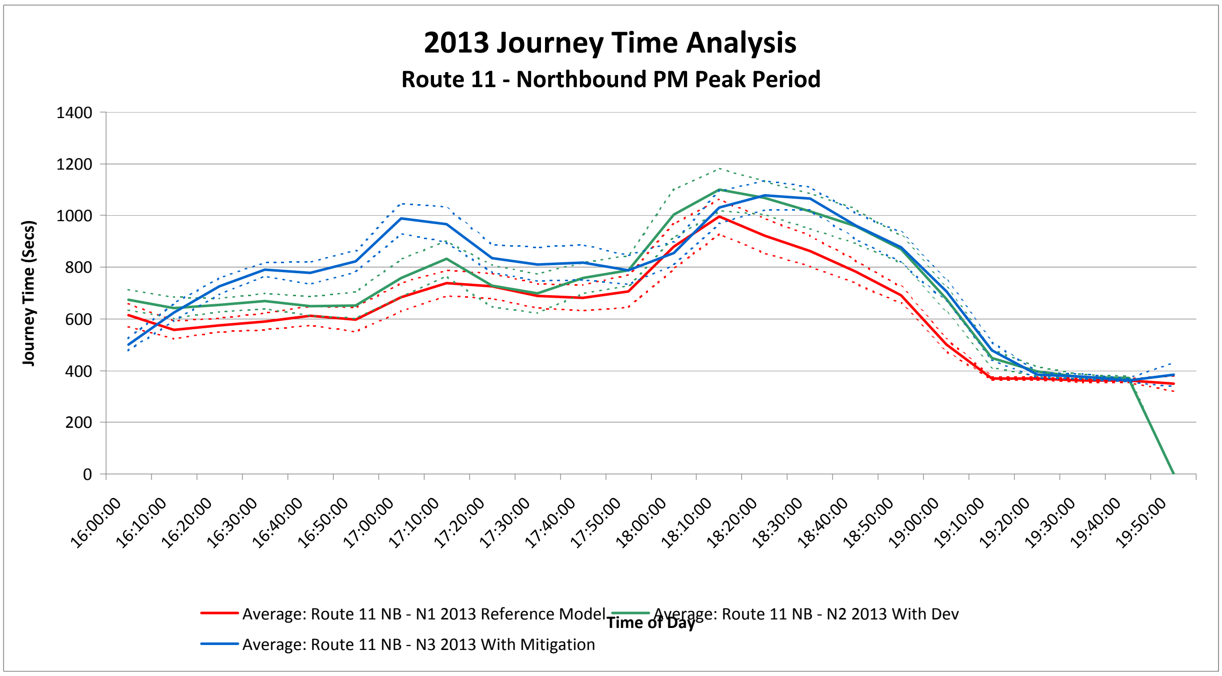
2013 Journey Time Analysis
Route 11 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2013 Reference Model
Average: Route 11 SB - N2 2013 With Dev
Average: Route 11 SB - N3 2013 With Mitigation



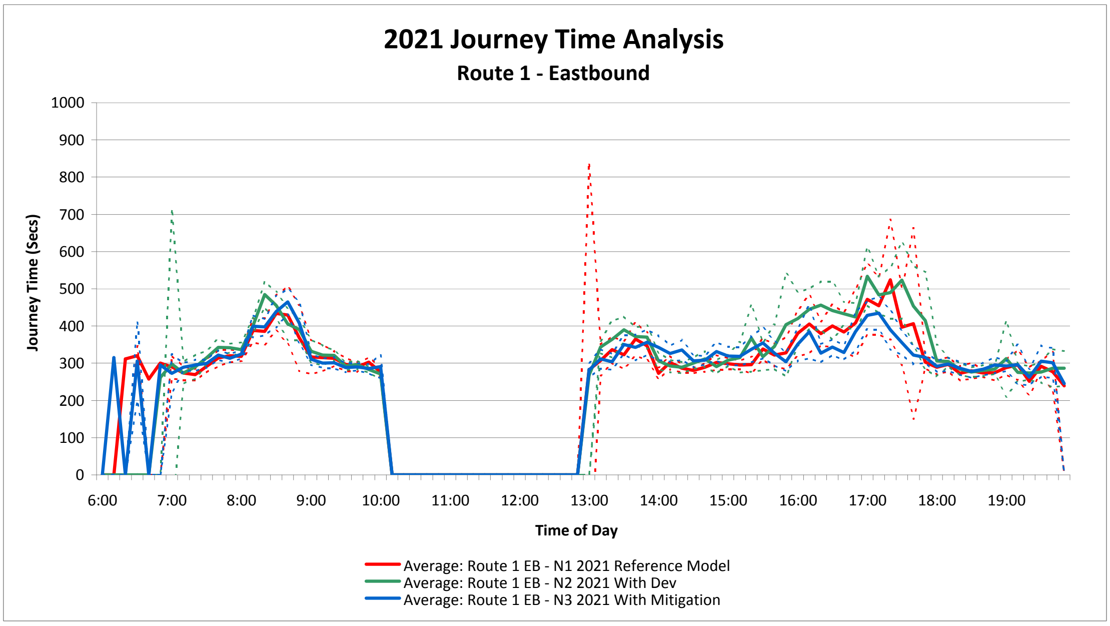
2013 Journey Time Analysis
Route 11 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2013 Reference Model
Average: Route 11 SB - N2 2013 With Dev
Average: Route 11 SB - N3 2013 With Mitigation

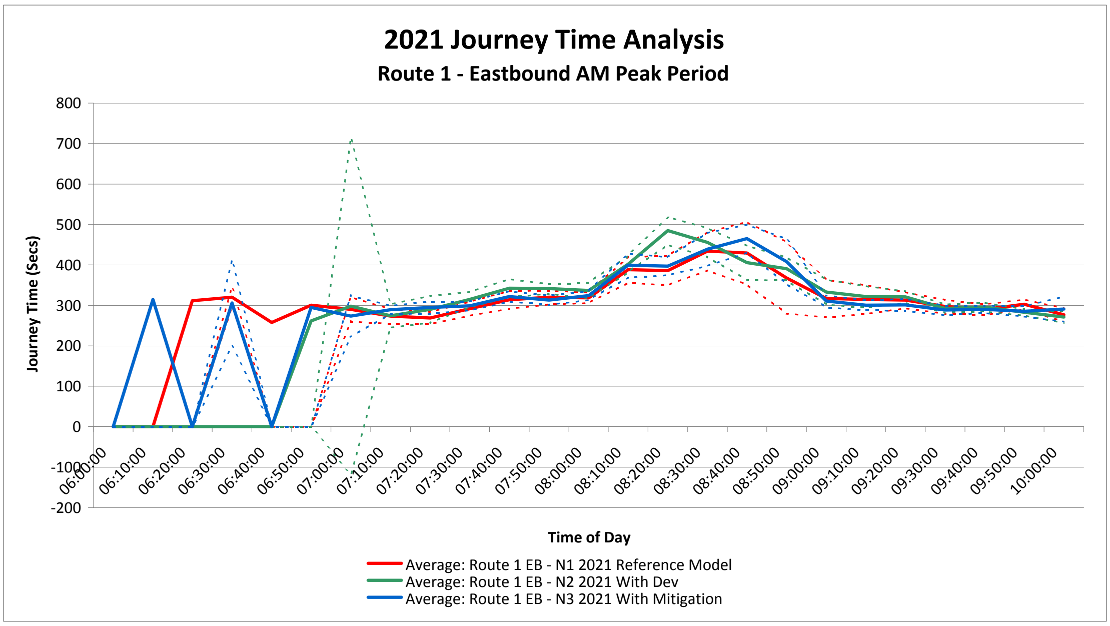

2013 Journey Time Analysis
Route 11 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2013 Reference Model
Average: Route 11 NB - N2 2013 With Dev
Average: Route 11 NB - N3 2013 With Mitigation

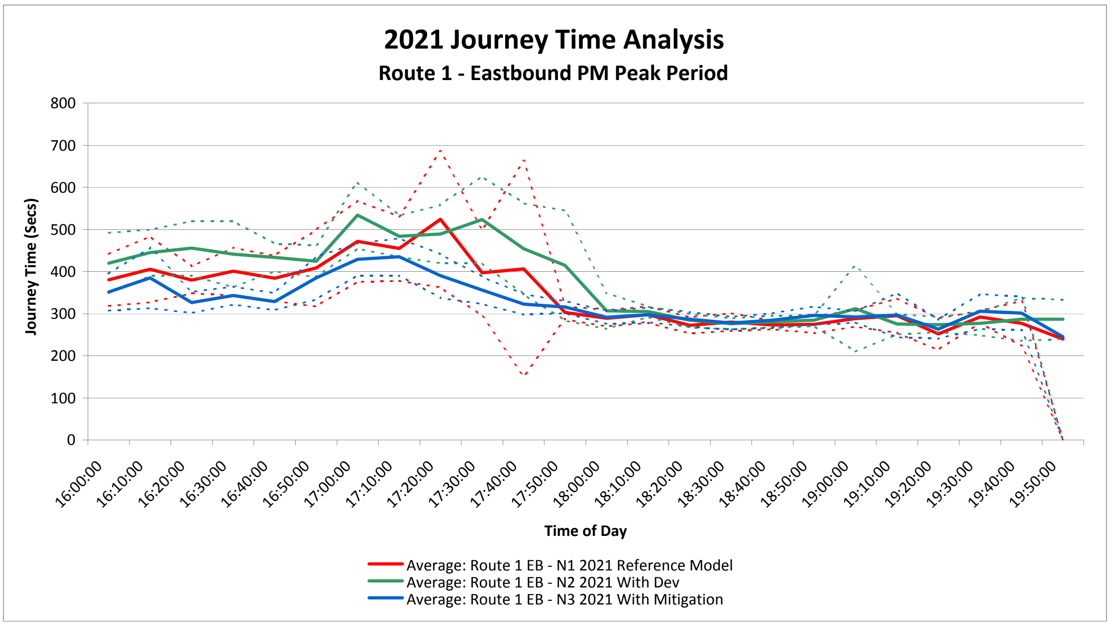

2013 Journey Time Analysis
Route 11 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2013 Reference Model
Average: Route 11 NB - N2 2013 With Dev
Average: Route 11 NB - N3 2013 With Mitigation

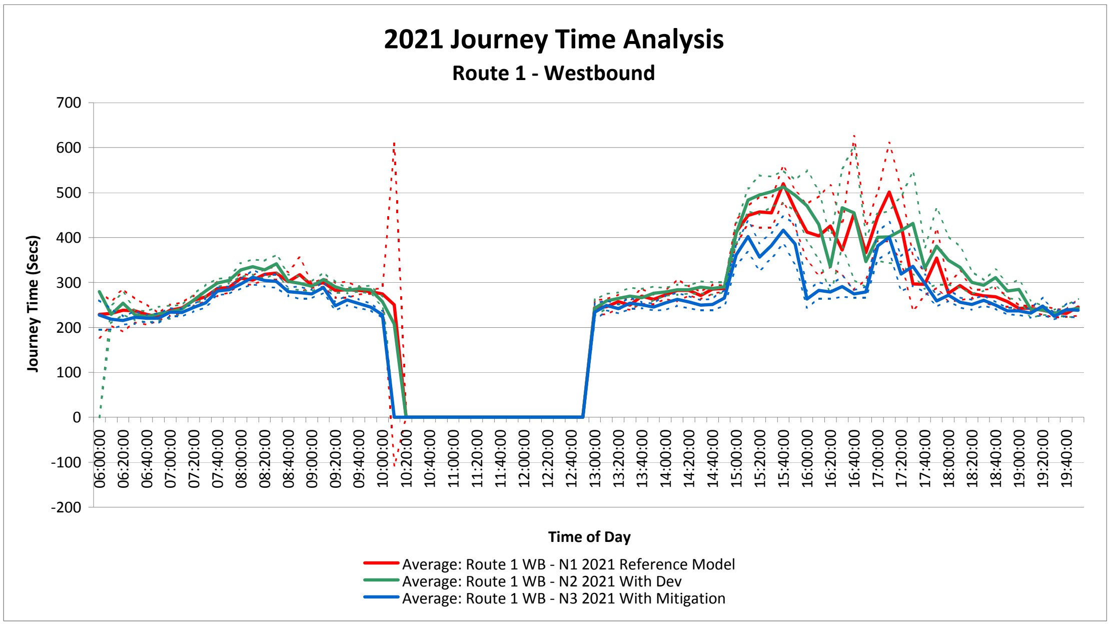

2013 Journey Time Analysis
Route 11 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2013 Reference Model
Average: Route 11 NB - N2 2013 With Dev
Average: Route 11 NB - N3 2013 With Mitigation

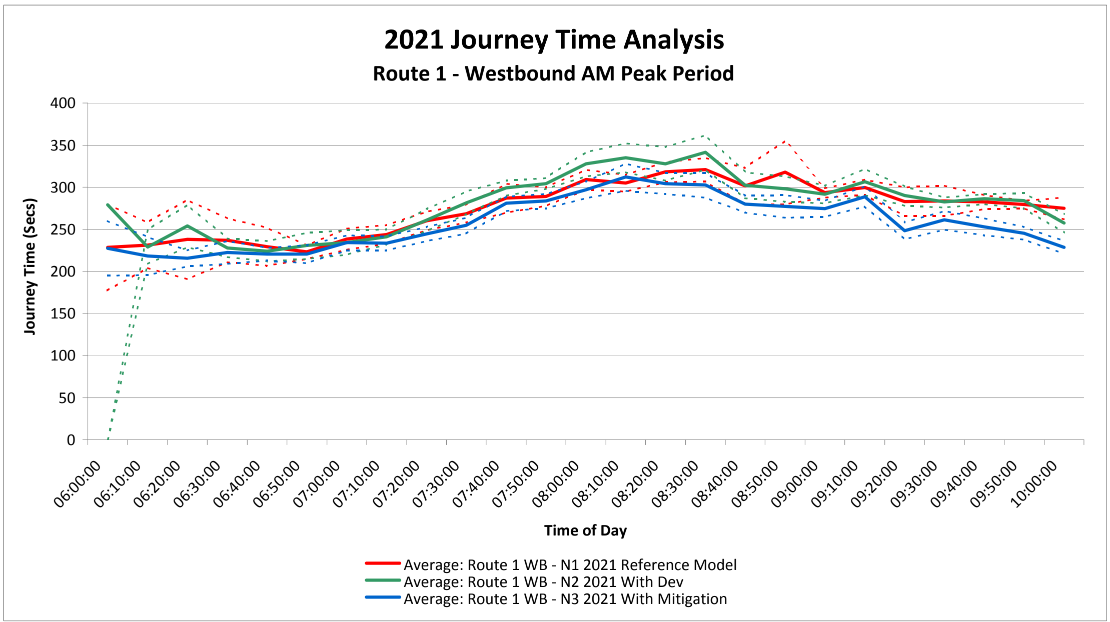
APPENDIX 15.5: 2021 REFERENCE v WITH DEVELOPMENT v WITH MITIGATION JOURNEY TIME GRAPHS

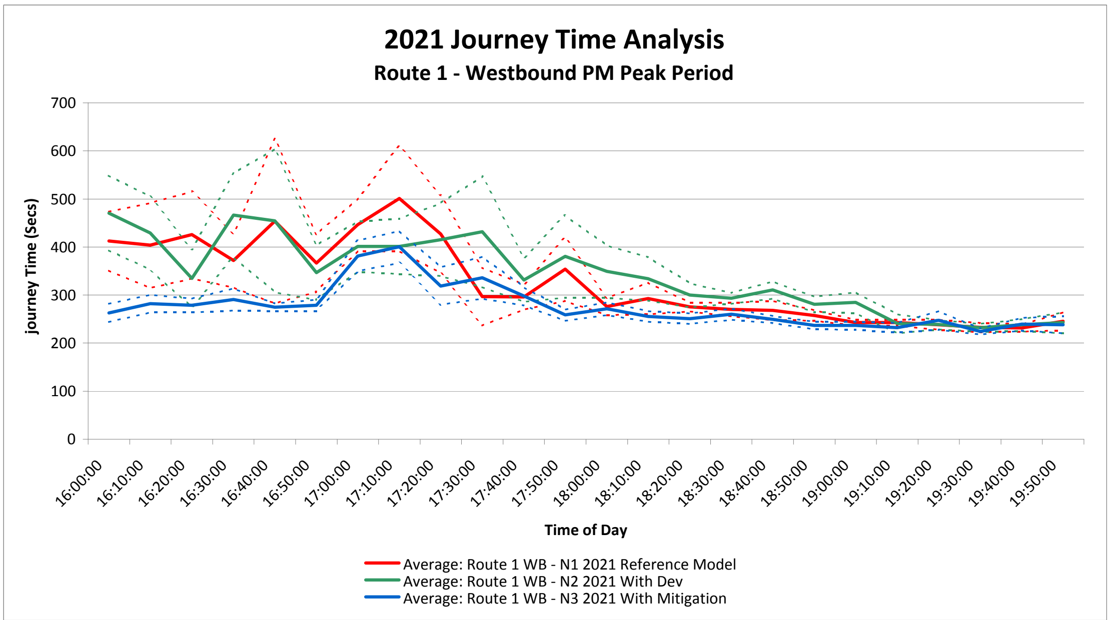

2021 Journey Time Analysis
Route 1 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 1 EB - N1 2021 Reference Model
Average: Route 1 EB - N2 2021 With Dev
Average: Route 1 EB - N3 2021 With Mitigation

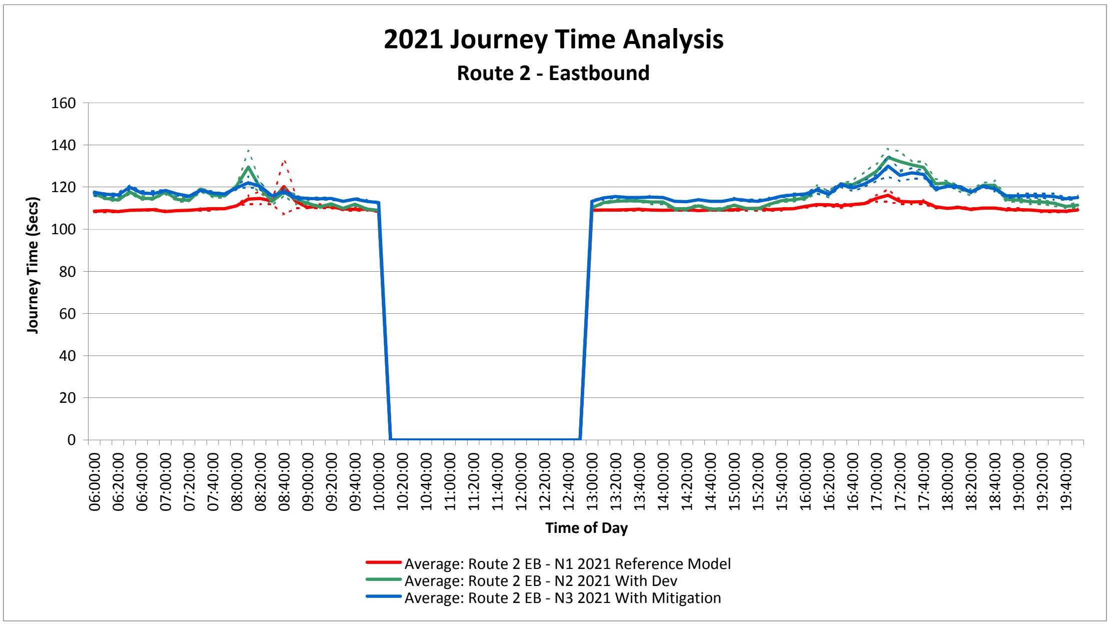

2021 Journey Time Analysis
Route 1 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 EB - N1 2021 Reference Model
Average: Route 1 EB - N2 2021 With Dev
Average: Route 1 EB - N3 2021 With Mitigation

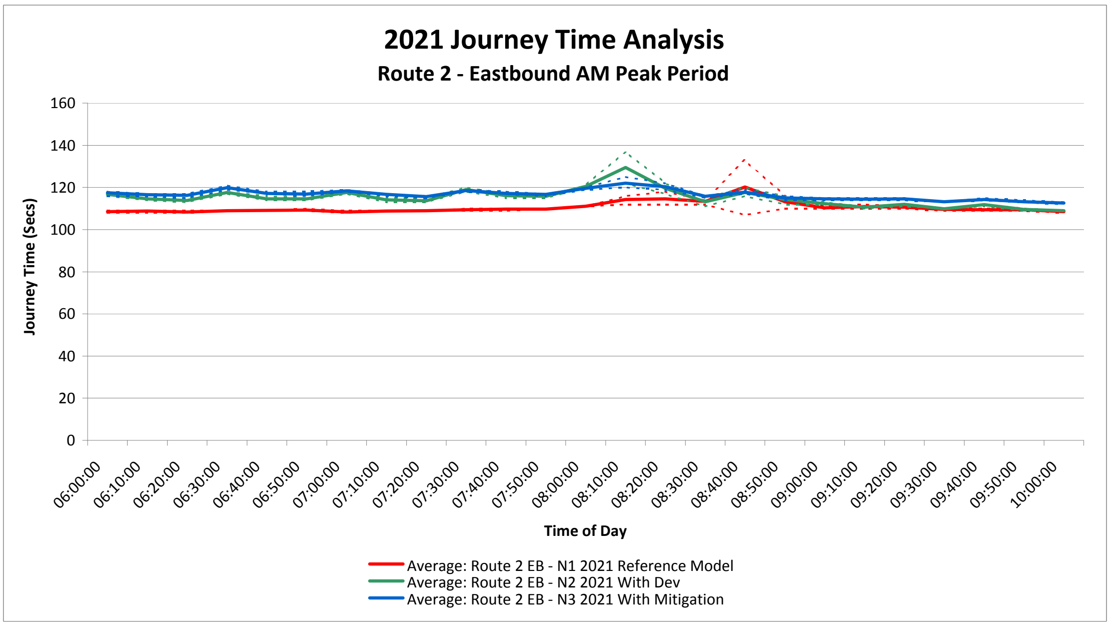

2021 Journey Time Analysis
Route 1 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 EB - N1 2021 Reference Model
Average: Route 1 EB - N2 2021 With Dev
Average: Route 1 EB - N3 2021 With Mitigation

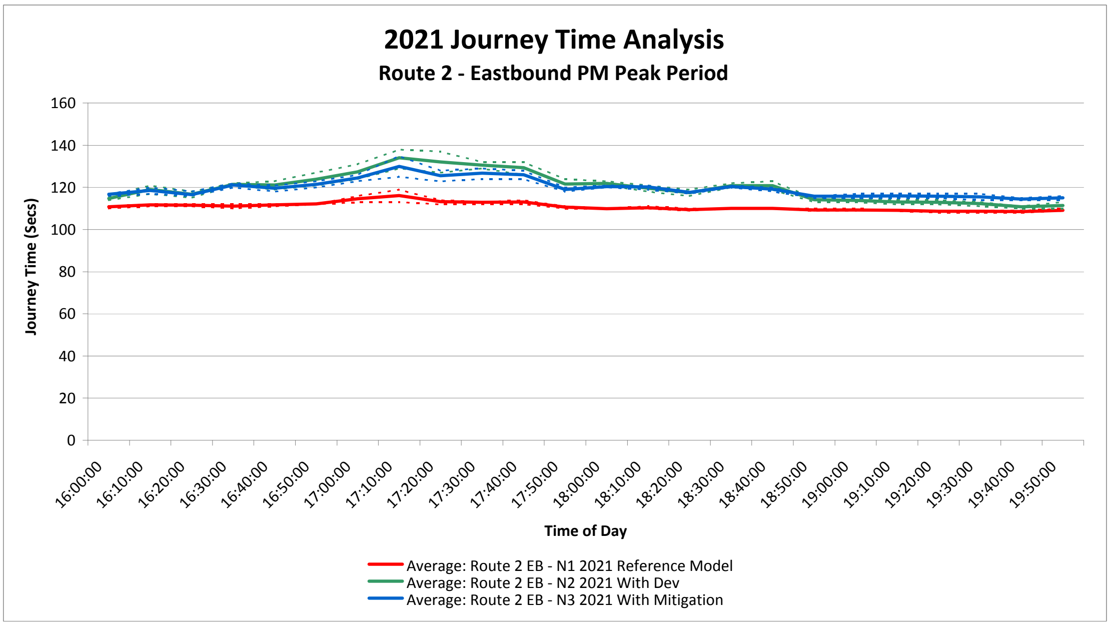

2021 Journey Time Analysis
Route 1 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2021 Reference Model
Average: Route 1 WB - N2 2021 With Dev
Average: Route 1 WB - N3 2021 With Mitigation

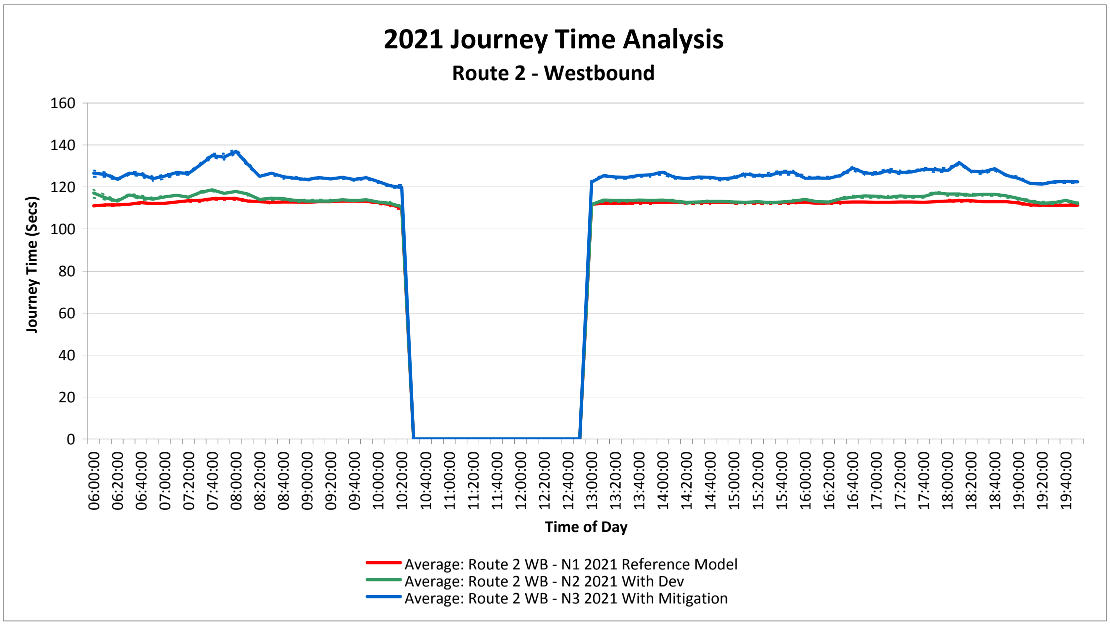

2021 Journey Time Analysis
Route 1 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2021 Reference Model
Average: Route 1 WB - N2 2021 With Dev
Average: Route 1 WB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 1 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 1 WB - N1 2021 Reference Model
Average: Route 1 WB - N2 2021 With Dev
Average: Route 1 WB - N3 2021 With Mitigation

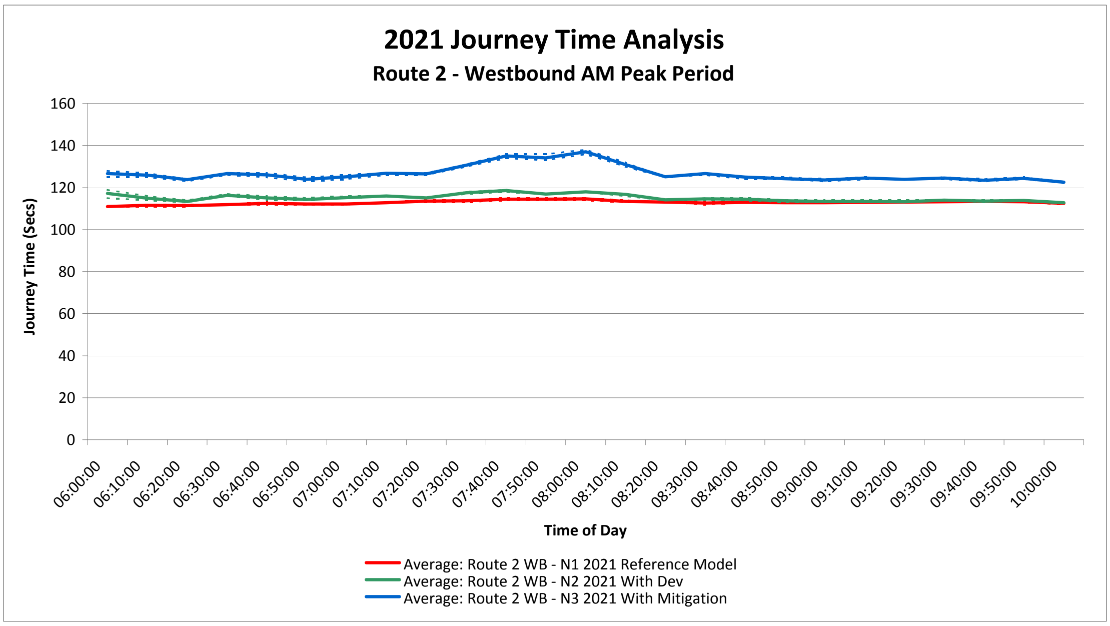

2021 Journey Time Analysis
Route 2 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 2 EB - N1 2021 Reference Model
Average: Route 2 EB - N2 2021 With Dev
Average: Route 2 EB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 2 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 EB - N1 2021 Reference Model
Average: Route 2 EB - N2 2021 With Dev
Average: Route 2 EB - N3 2021 With Mitigation

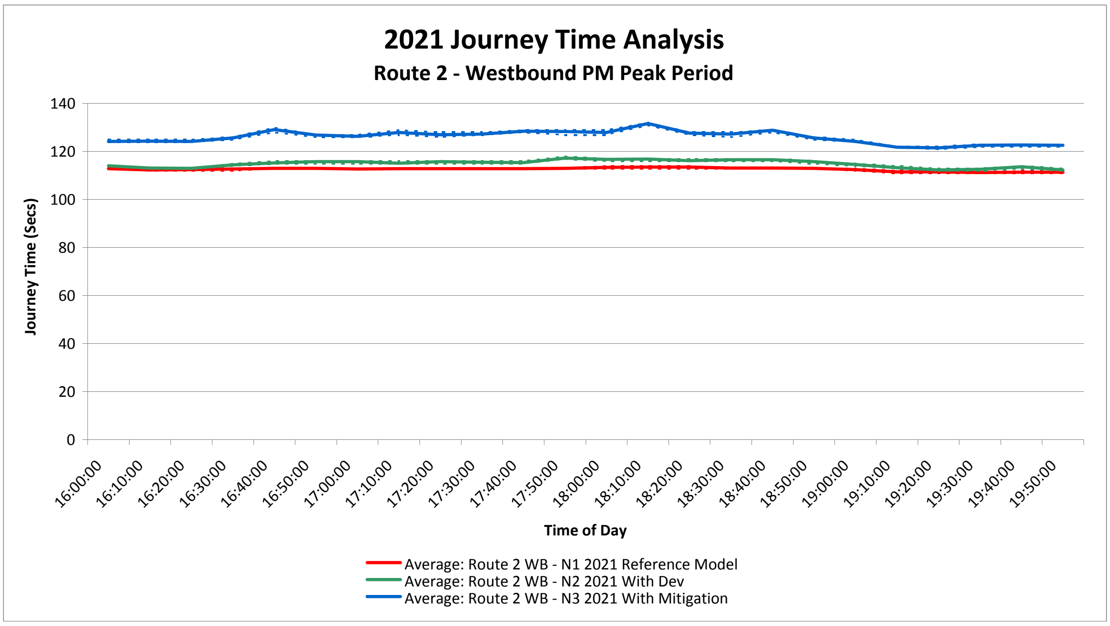

2021 Journey Time Analysis
Route 2 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 EB - N1 2021 Reference Model
Average: Route 2 EB - N2 2021 With Dev
Average: Route 2 EB - N3 2021 With Mitigation



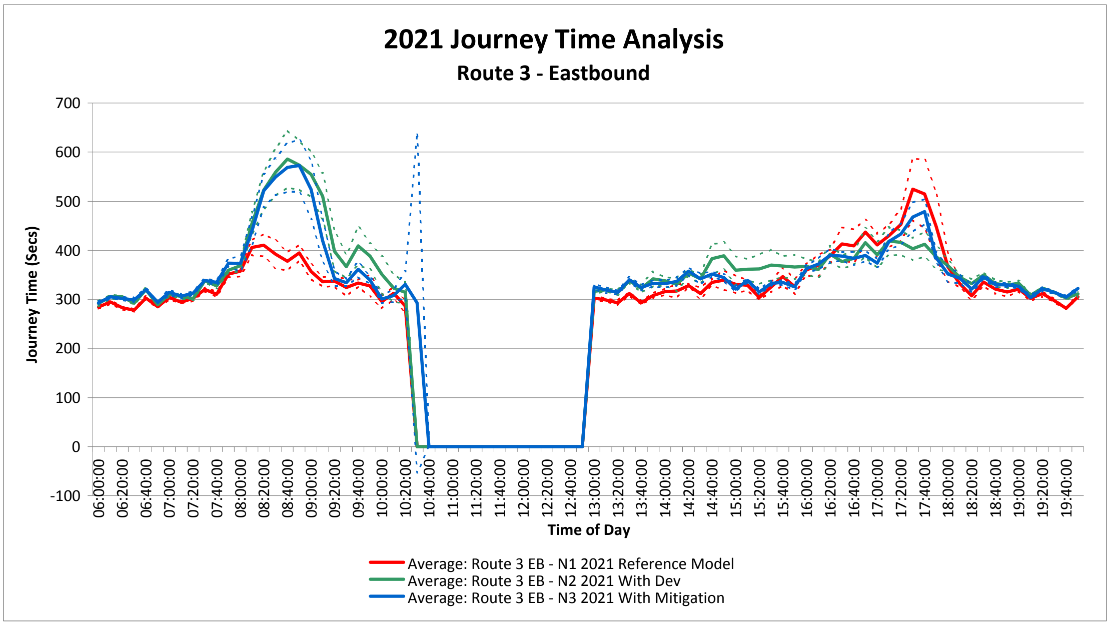
2021 Journey Time Analysis
Route 2 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 2 WB - N1 2021 Reference Model
Average: Route 2 WB - N2 2021 With Dev
Average: Route 2 WB - N3 2021 With Mitigation

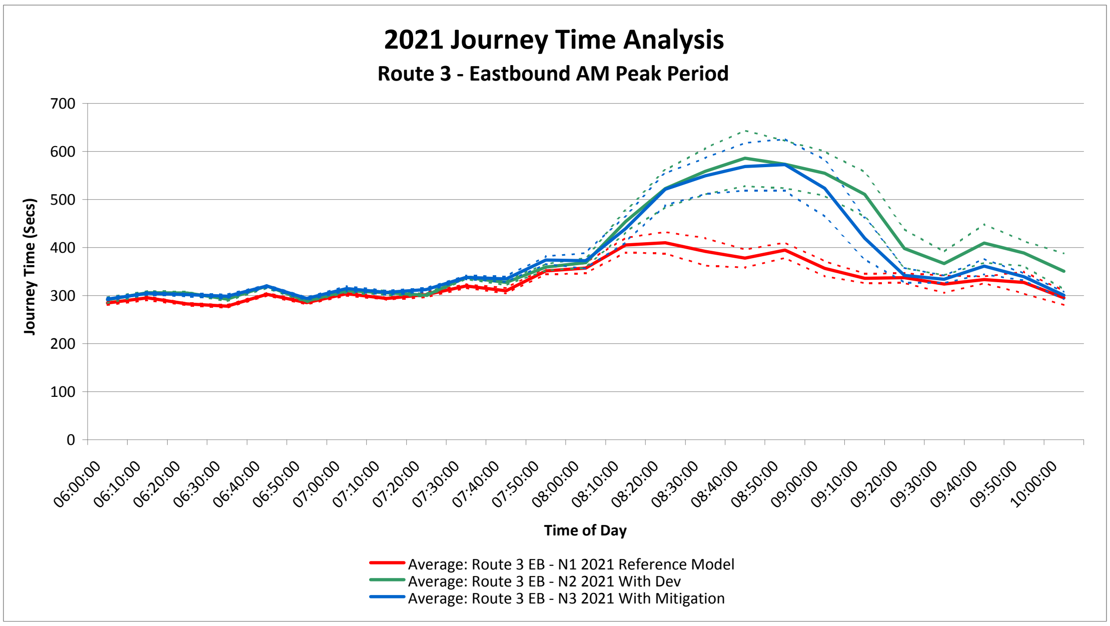


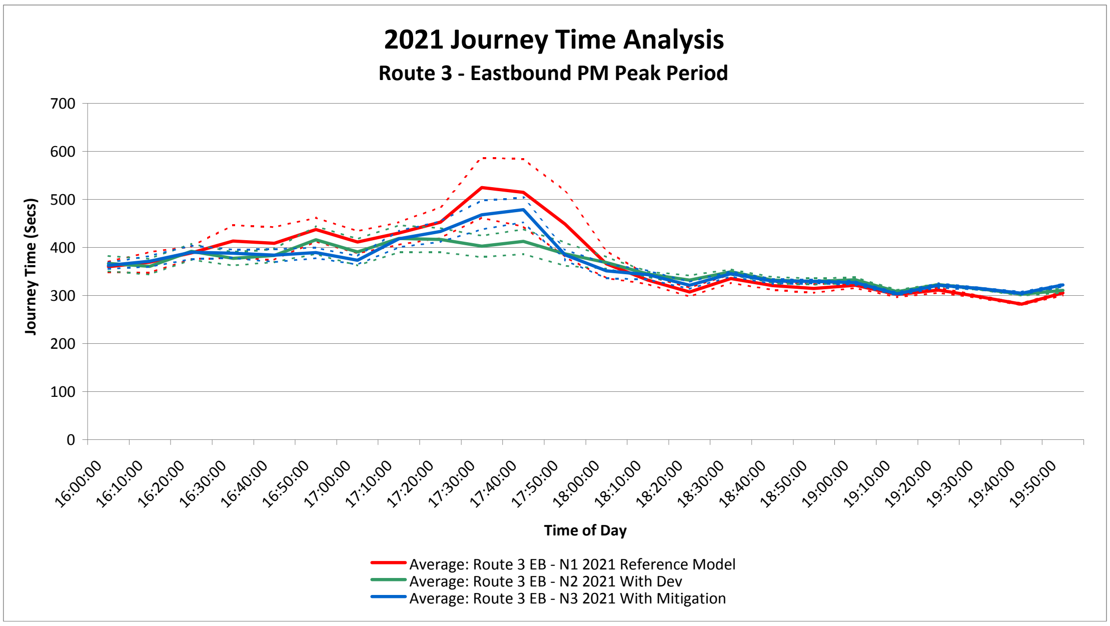
2021 Journey Time Analysis
Route 2 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 WB - N1 2021 Reference Model
Average: Route 2 WB - N2 2021 With Dev
Average: Route 2 WB - N3 2021 With Mitigation

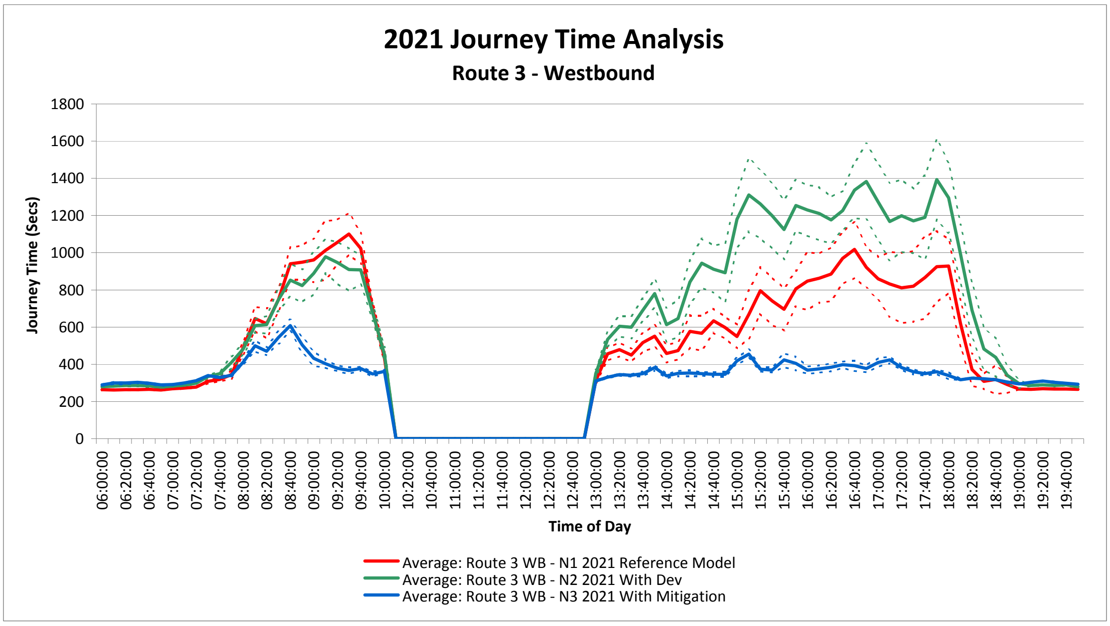


2021 Journey Time Analysis
Route 2 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 2 WB - N1 2021 Reference Model
Average: Route 2 WB - N2 2021 With Dev
Average: Route 2 WB - N3 2021 With Mitigation

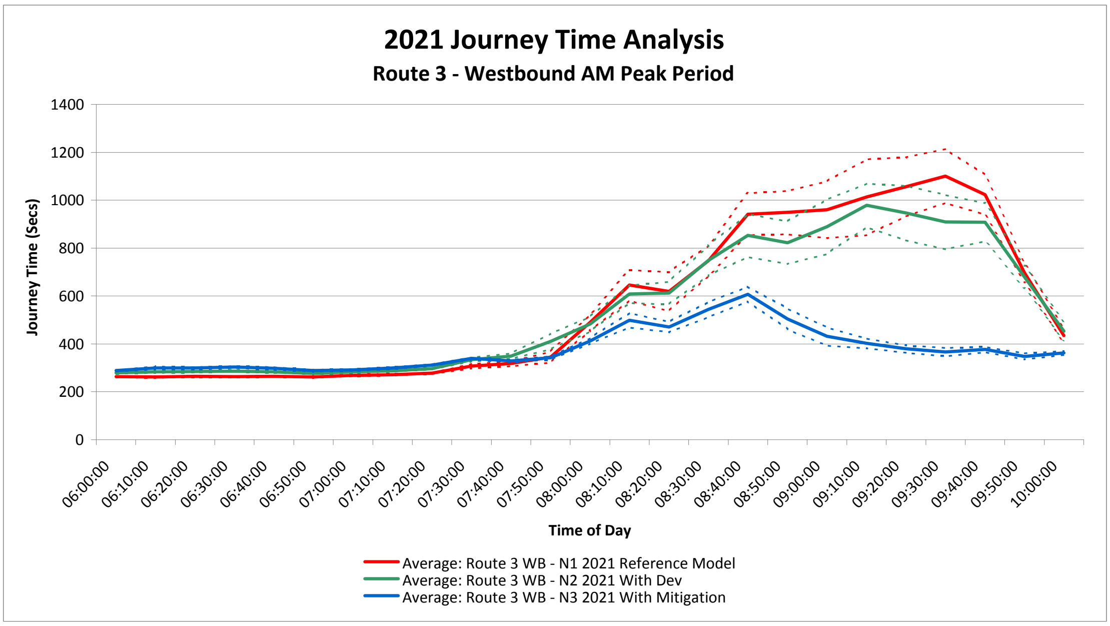

2021 Journey Time Analysis
Route 3 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 3 EB - N1 2021 Reference Model
Average: Route 3 EB - N2 2021 With Dev
Average: Route 3 EB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 3 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 EB - N1 2021 Reference Model
Average: Route 3 EB - N2 2021 With Dev
Average: Route 3 EB - N3 2021 With Mitigation

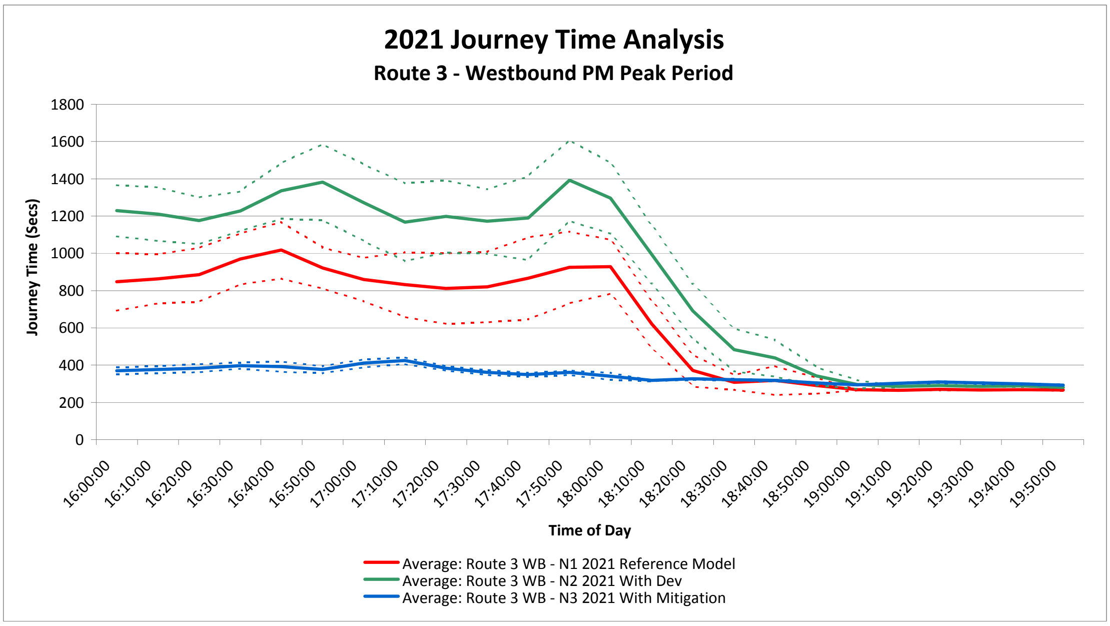

2021 Journey Time Analysis
Route 3 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 EB - N1 2021 Reference Model
Average: Route 3 EB - N2 2021 With Dev
Average: Route 3 EB - N3 2021 With Mitigation



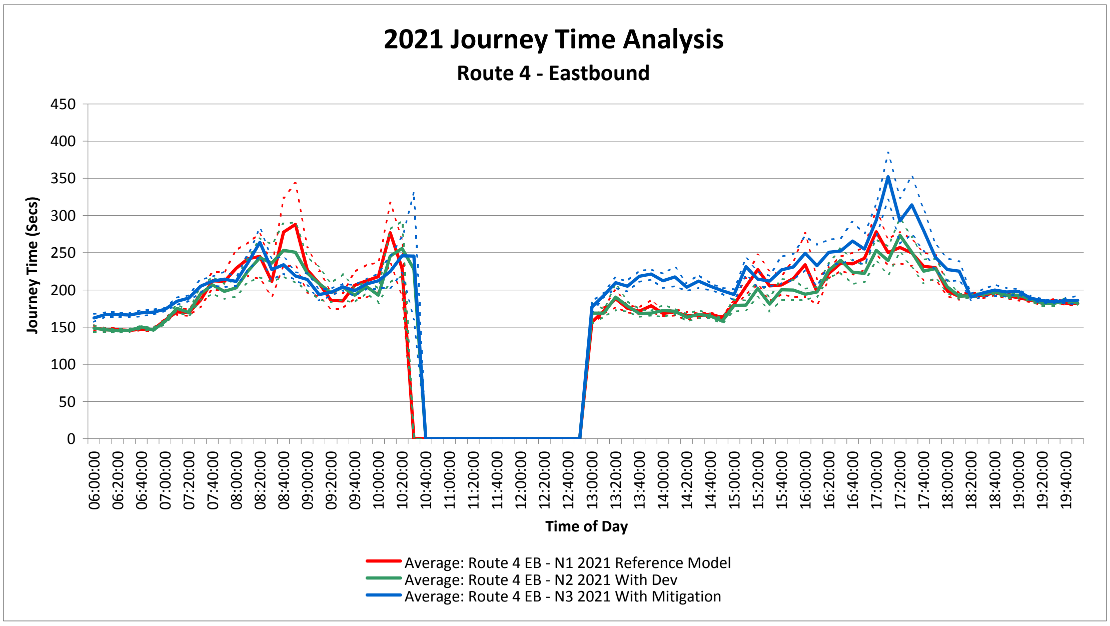
2021 Journey Time Analysis
Route 3 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 3 WB - N1 2021 Reference Model
Average: Route 3 WB - N2 2021 With Dev
Average: Route 3 WB - N3 2021 With Mitigation

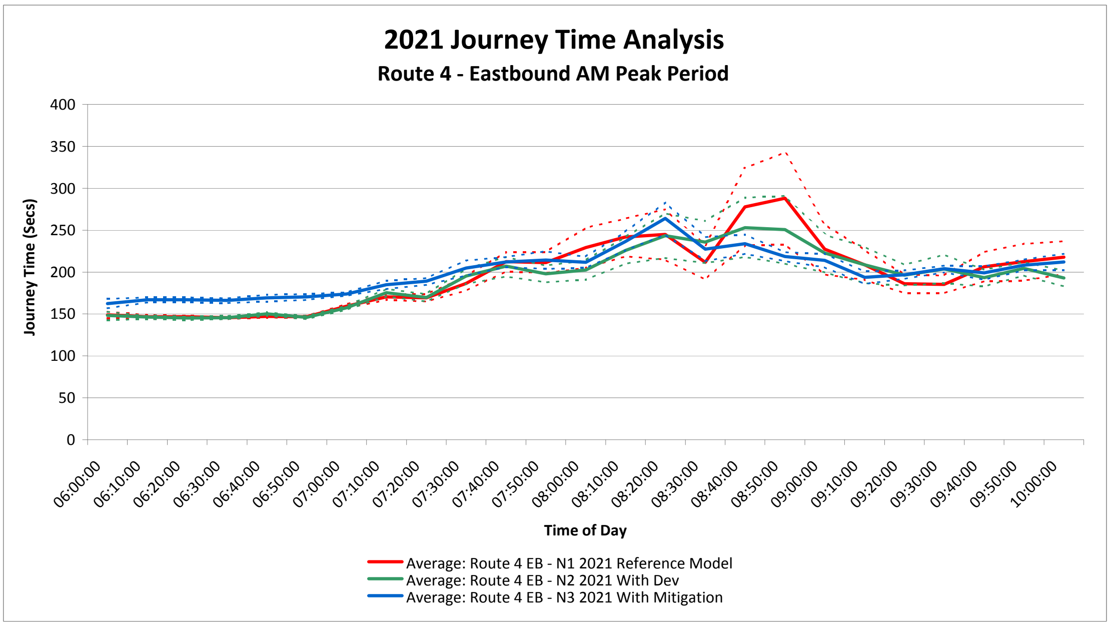


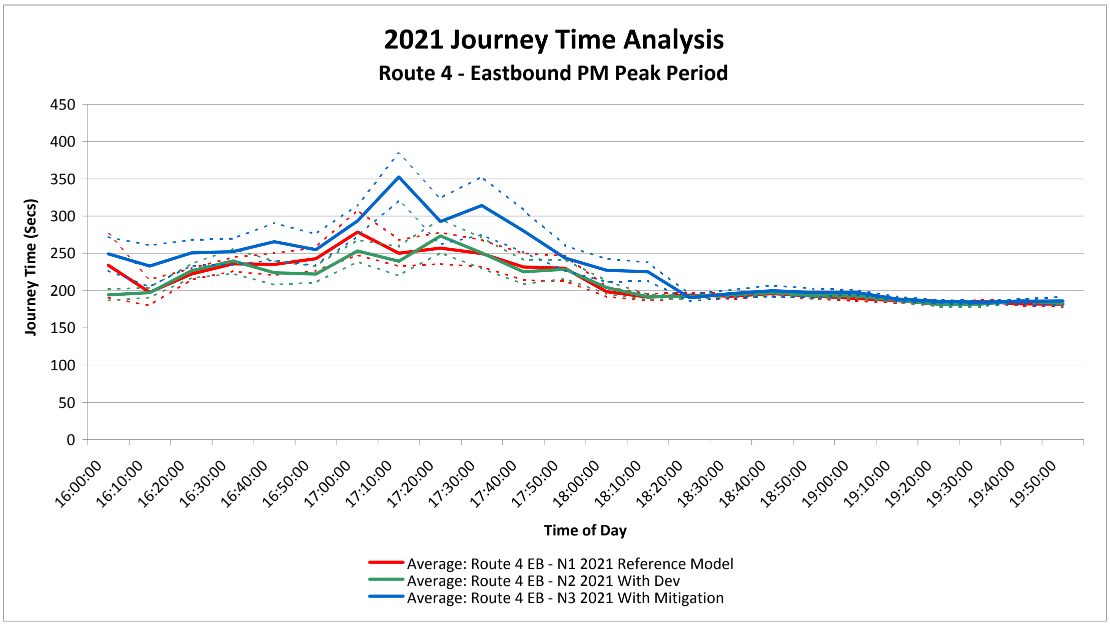
2021 Journey Time Analysis
Route 3 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 WB - N1 2021 Reference Model
Average: Route 3 WB - N2 2021 With Dev
Average: Route 3 WB - N3 2021 With Mitigation

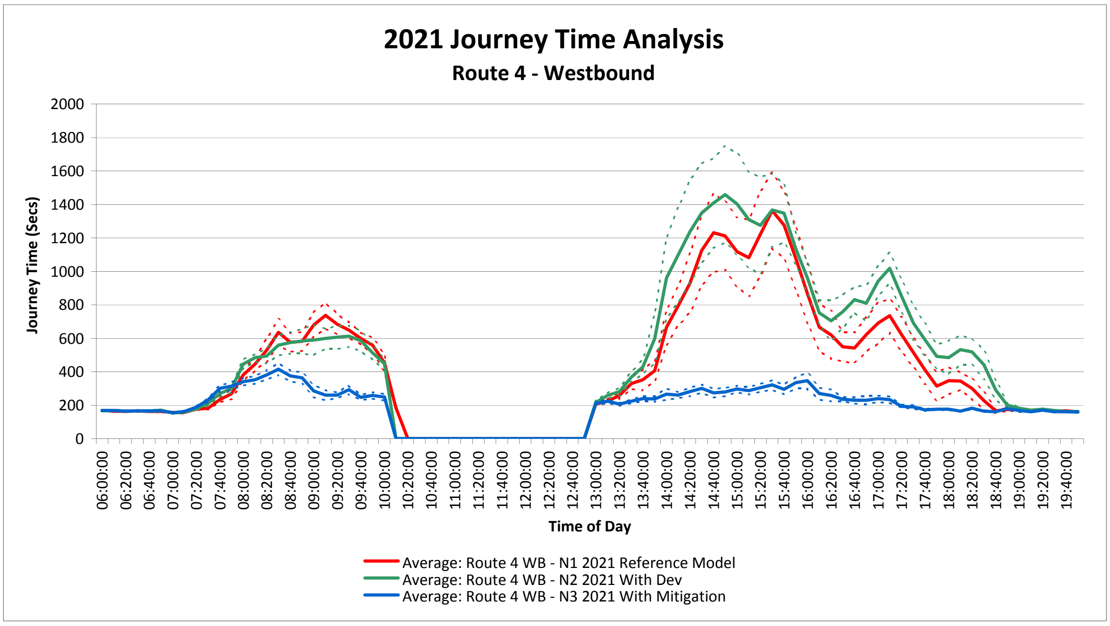


2021 Journey Time Analysis
Route 3 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 3 WB - N1 2021 Reference Model
Average: Route 3 WB - N2 2021 With Dev
Average: Route 3 WB - N3 2021 With Mitigation

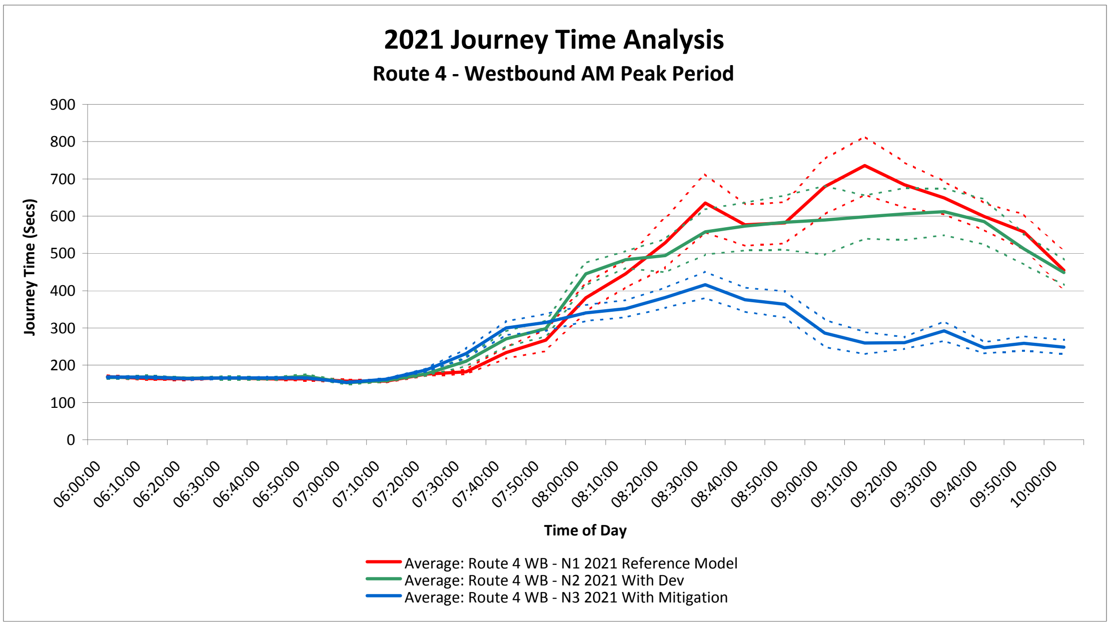

2021 Journey Time Analysis
Route 4 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2021 Reference Model
Average: Route 4 EB - N2 2021 With Dev
Average: Route 4 EB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 4 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2021 Reference Model
Average: Route 4 EB - N2 2021 With Dev
Average: Route 4 EB - N3 2021 With Mitigation

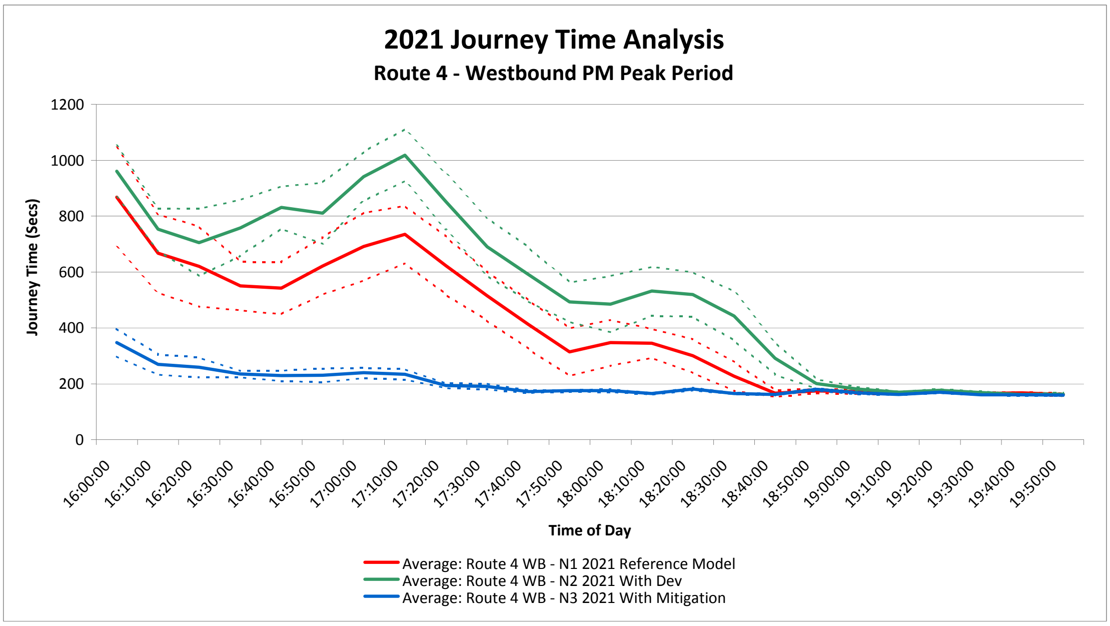

2021 Journey Time Analysis
Route 4 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 EB - N1 2021 Reference Model
Average: Route 4 EB - N2 2021 With Dev
Average: Route 4 EB - N3 2021 With Mitigation



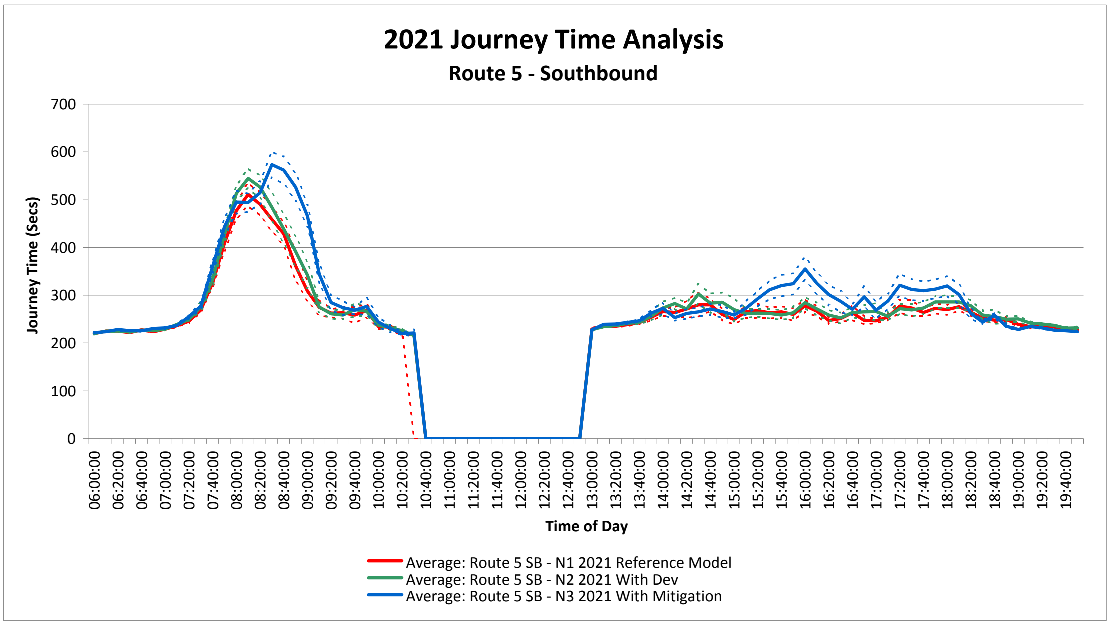
2021 Journey Time Analysis
Route 4 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2021 Reference Model
Average: Route 4 WB - N2 2021 With Dev
Average: Route 4 WB - N3 2021 With Mitigation

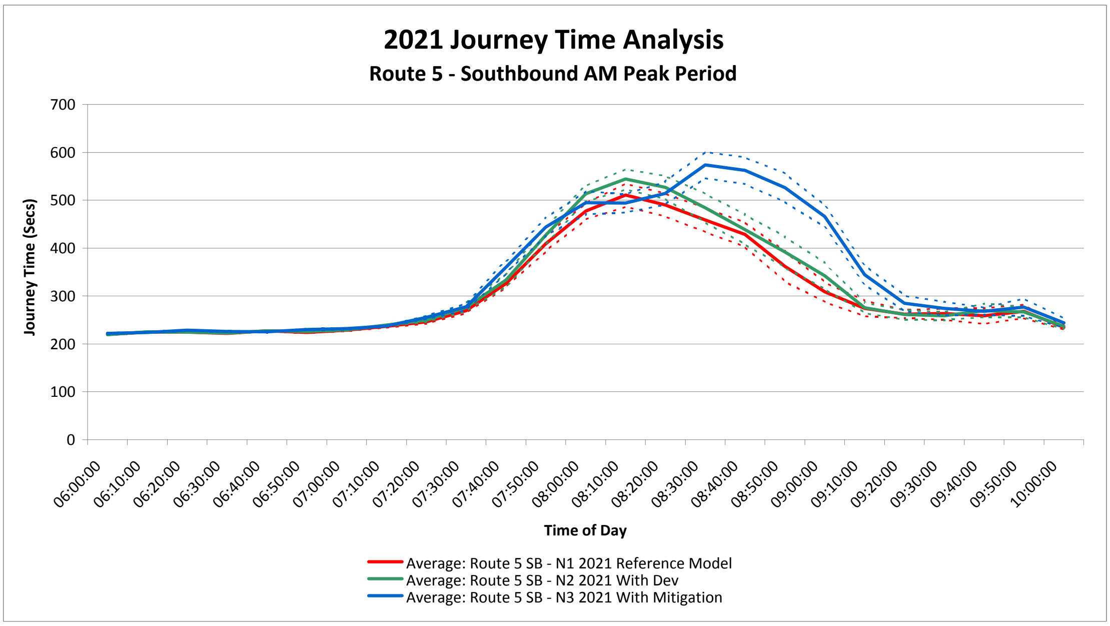


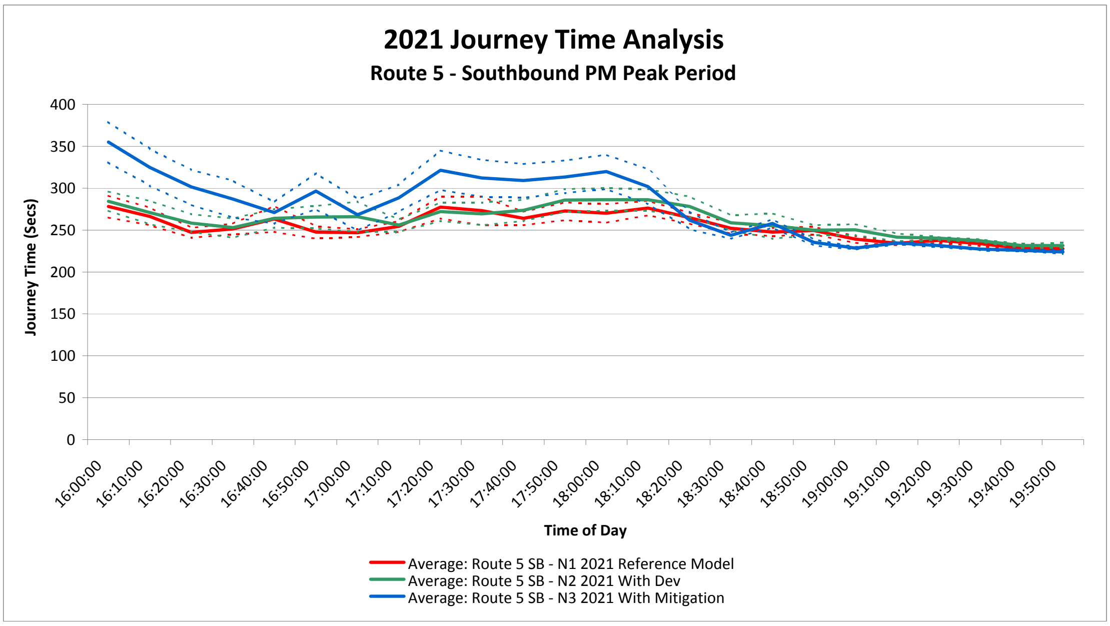
2021 Journey Time Analysis
Route 4 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2021 Reference Model
Average: Route 4 WB - N2 2021 With Dev
Average: Route 4 WB - N3 2021 With Mitigation

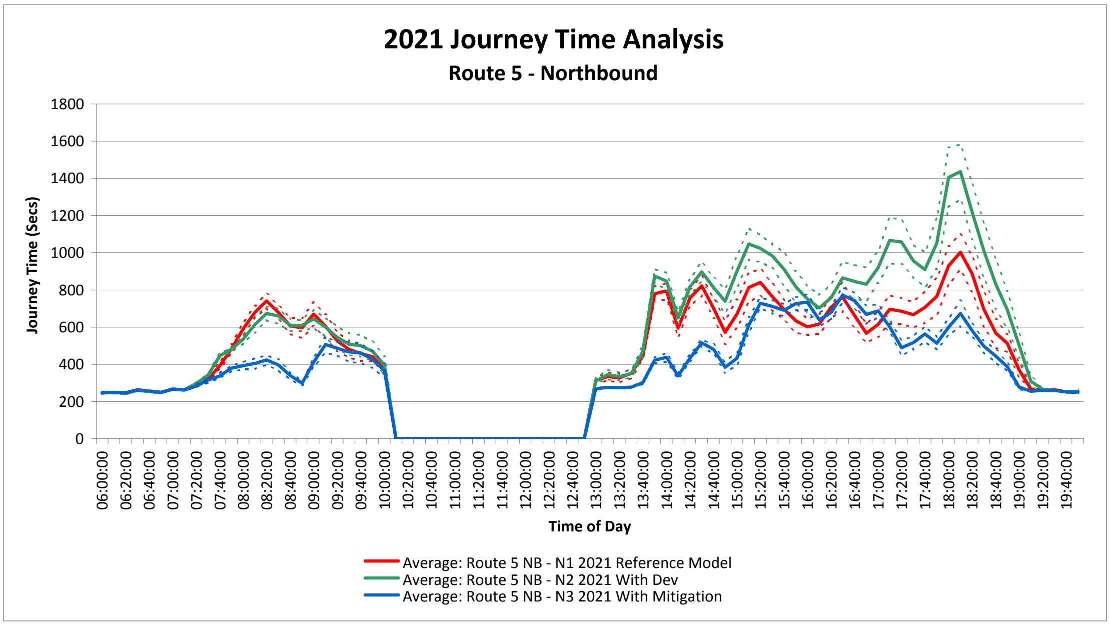


2021 Journey Time Analysis
Route 4 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 4 WB - N1 2021 Reference Model
Average: Route 4 WB - N2 2021 With Dev
Average: Route 4 WB - N3 2021 With Mitigation

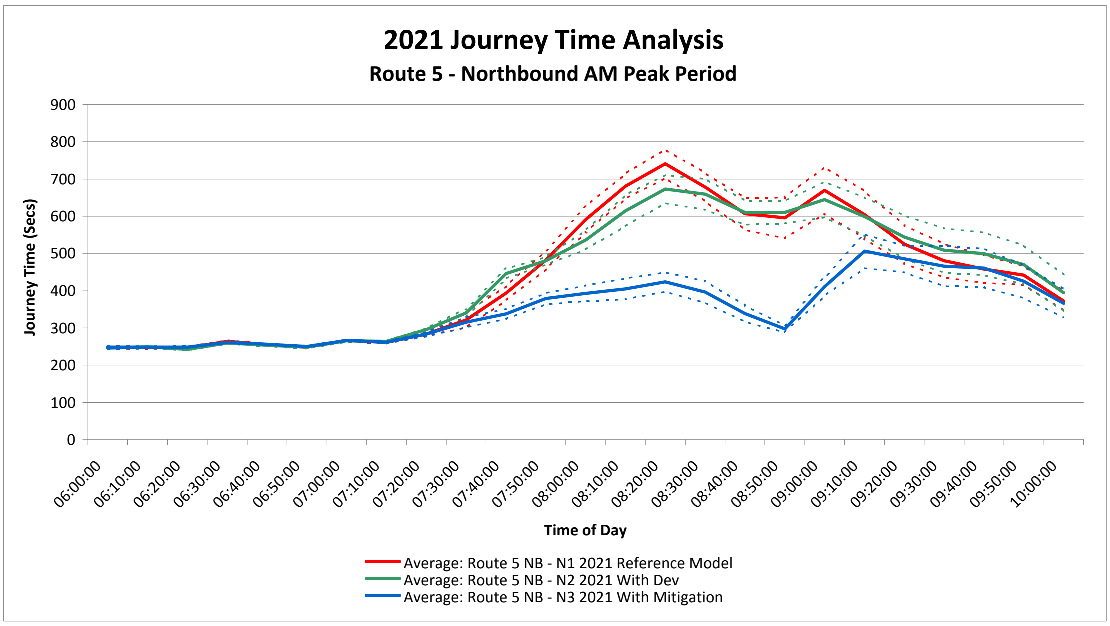

2021 Journey Time Analysis
Route 5 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 5 SB - N1 2021 Reference Model
Average: Route 5 SB - N2 2021 With Dev
Average: Route 5 SB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 5 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 SB - N1 2021 Reference Model
Average: Route 5 SB - N2 2021 With Dev
Average: Route 5 SB - N3 2021 With Mitigation

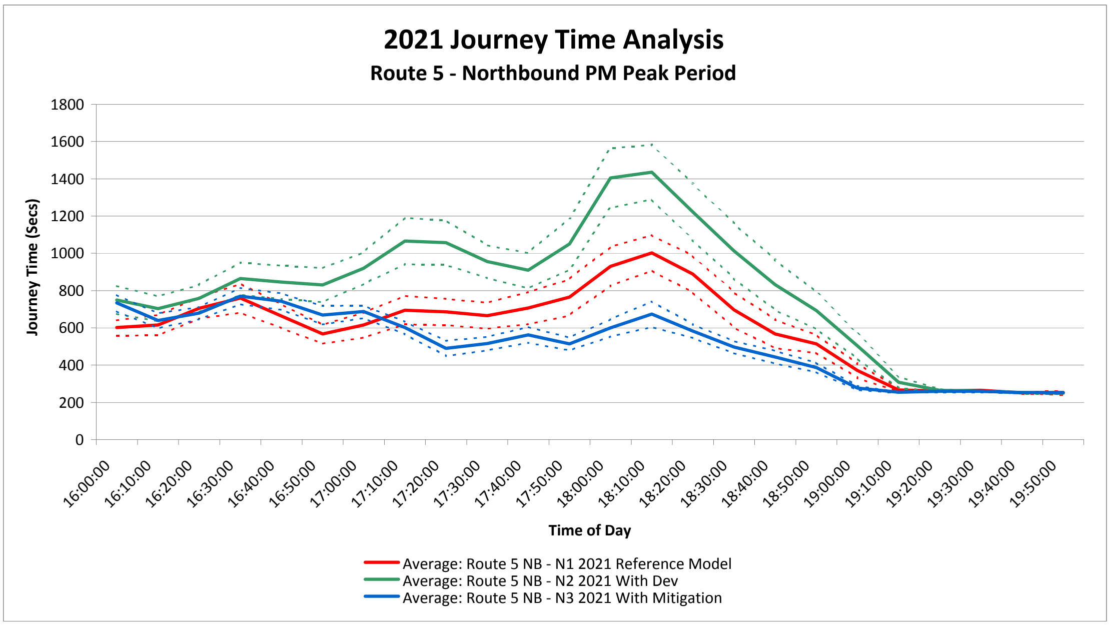

2021 Journey Time Analysis
Route 5 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 SB - N1 2021 Reference Model
Average: Route 5 SB - N2 2021 With Dev
Average: Route 5 SB - N3 2021 With Mitigation



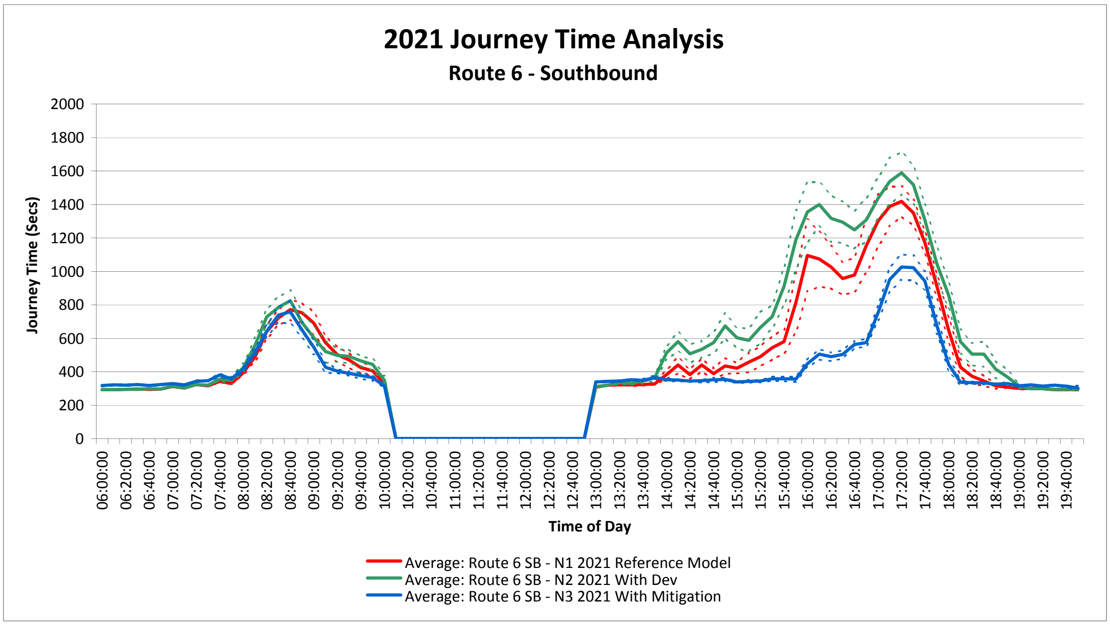
2021 Journey Time Analysis
Route 5 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2021 Reference Model
Average: Route 5 NB - N2 2021 With Dev
Average: Route 5 NB - N3 2021 With Mitigation

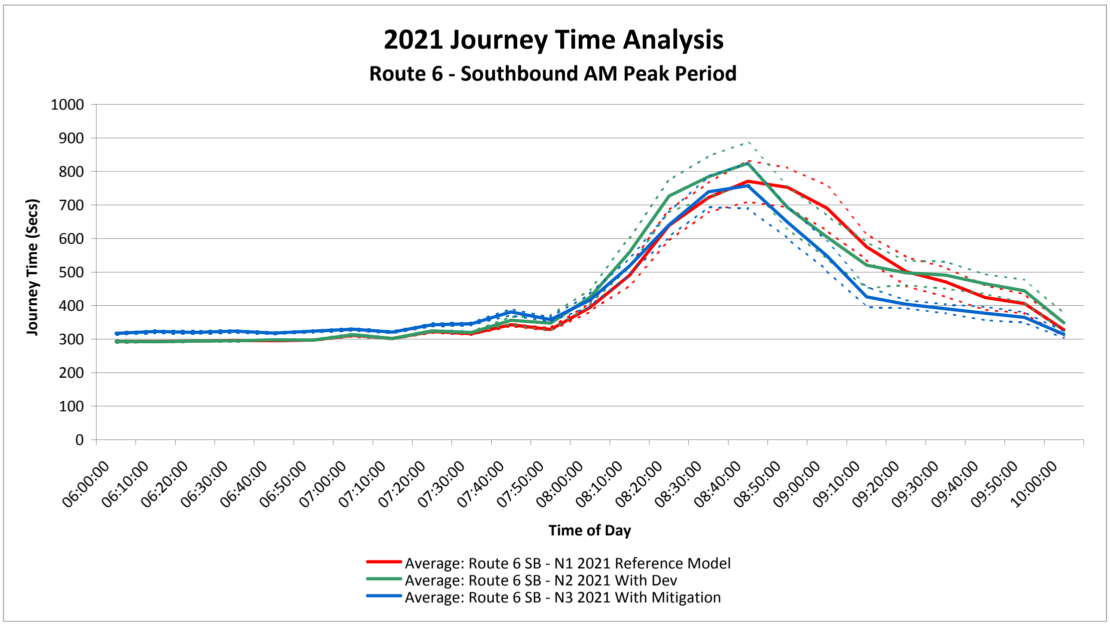


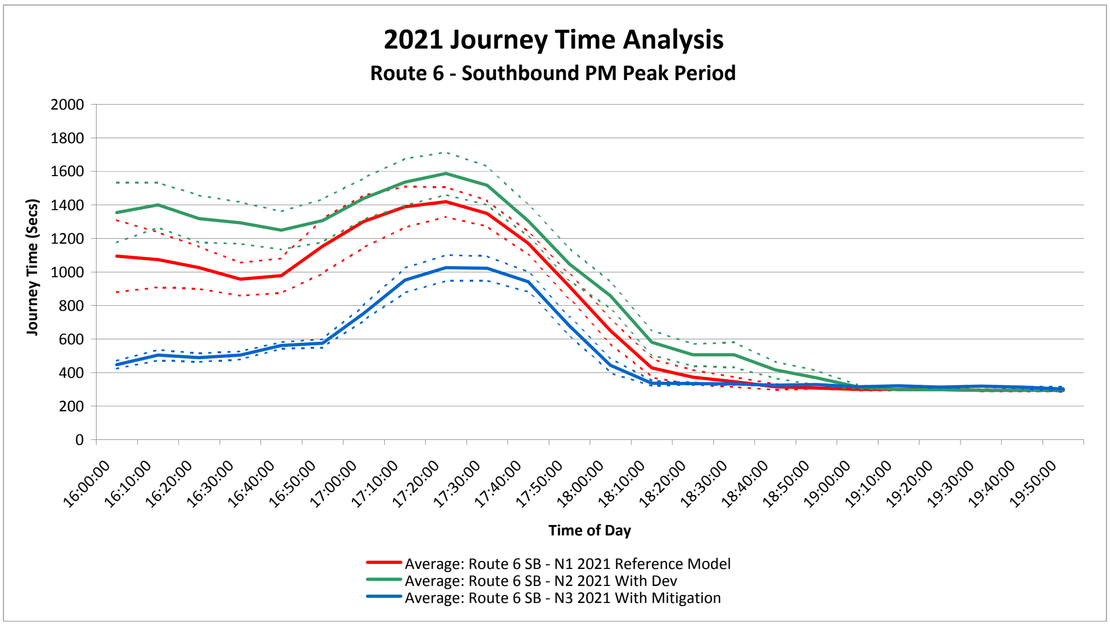
2021 Journey Time Analysis
Route 5 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2021 Reference Model
Average: Route 5 NB - N2 2021 With Dev
Average: Route 5 NB - N3 2021 With Mitigation

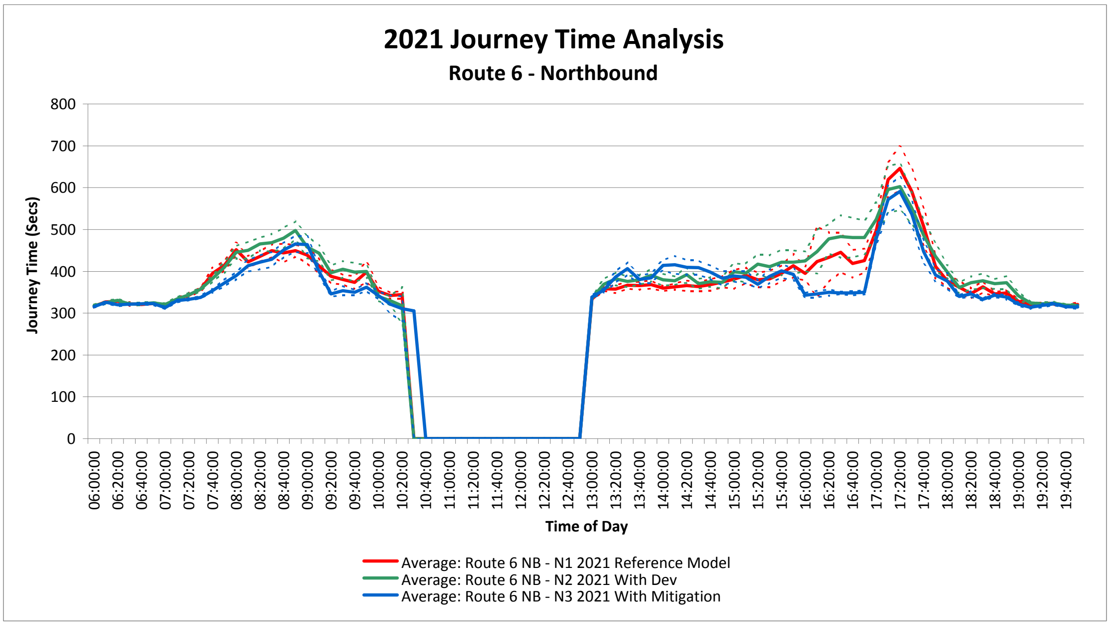


2021 Journey Time Analysis
Route 5 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 5 NB - N1 2021 Reference Model
Average: Route 5 NB - N2 2021 With Dev
Average: Route 5 NB - N3 2021 With Mitigation

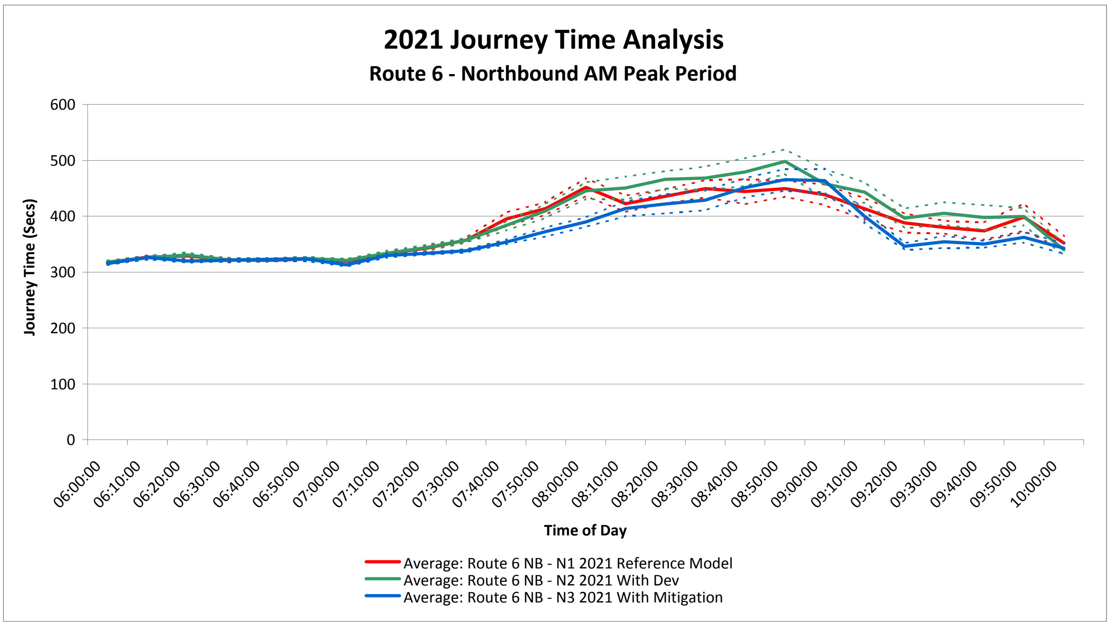

2021 Journey Time Analysis
Route 6 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 6 SB - N1 2021 Reference Model
Average: Route 6 SB - N2 2021 With Dev
Average: Route 6 SB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 6 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 SB - N1 2021 Reference Model
Average: Route 6 SB - N2 2021 With Dev
Average: Route 6 SB - N3 2021 With Mitigation

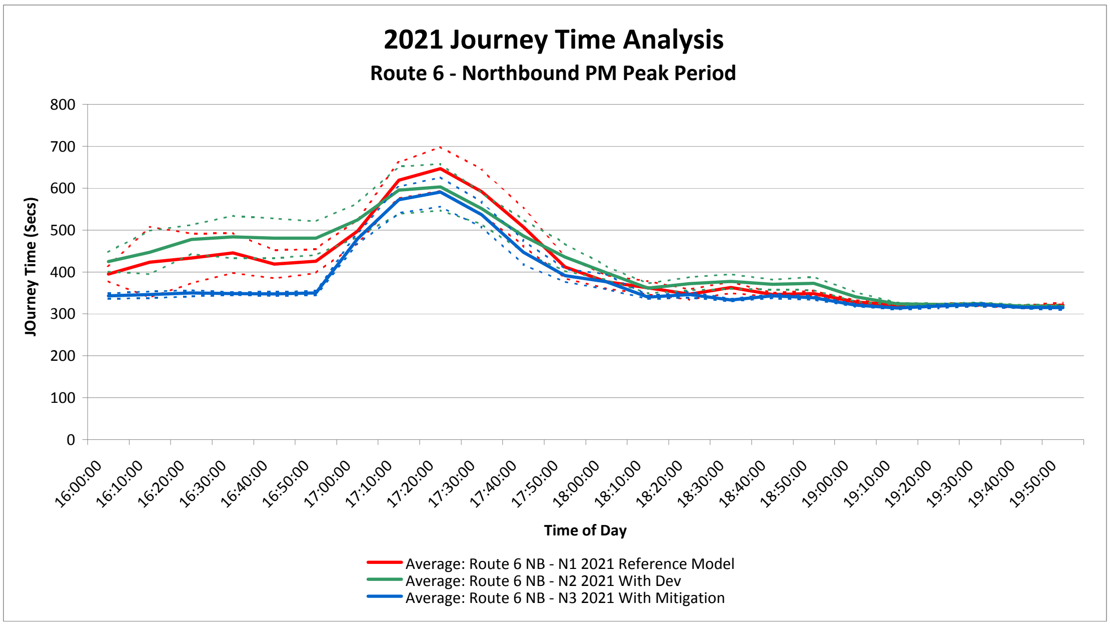

2021 Journey Time Analysis
Route 6 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 SB - N1 2021 Reference Model
Average: Route 6 SB - N2 2021 With Dev
Average: Route 6 SB - N3 2021 With Mitigation



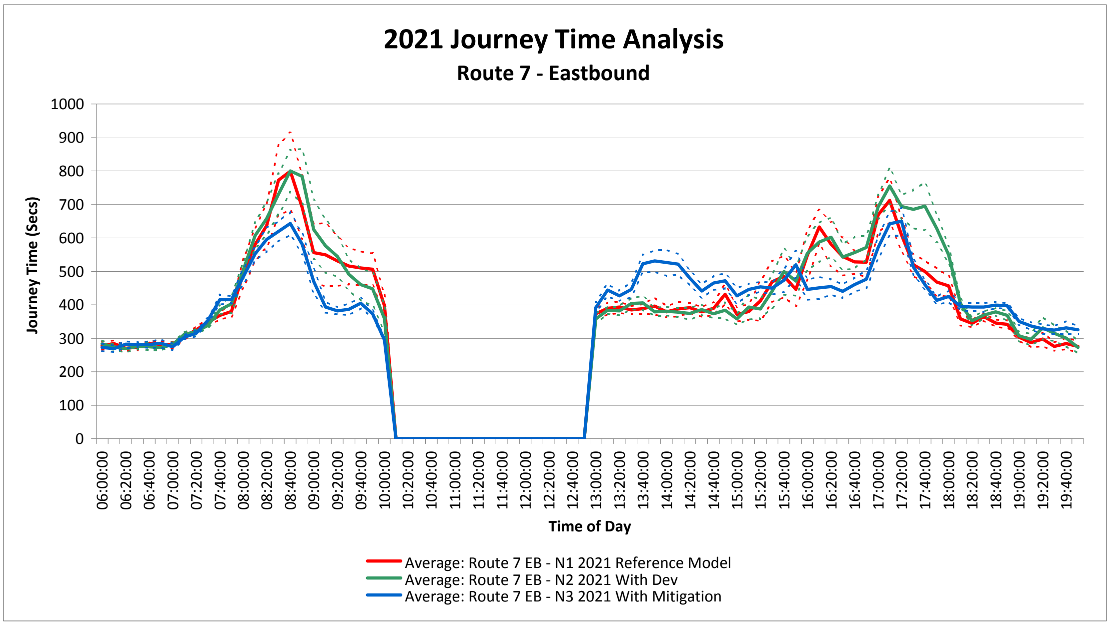
2021 Journey Time Analysis
Route 6 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 6 NB - N1 2021 Reference Model
Average: Route 6 NB - N2 2021 With Dev
Average: Route 6 NB - N3 2021 With Mitigation

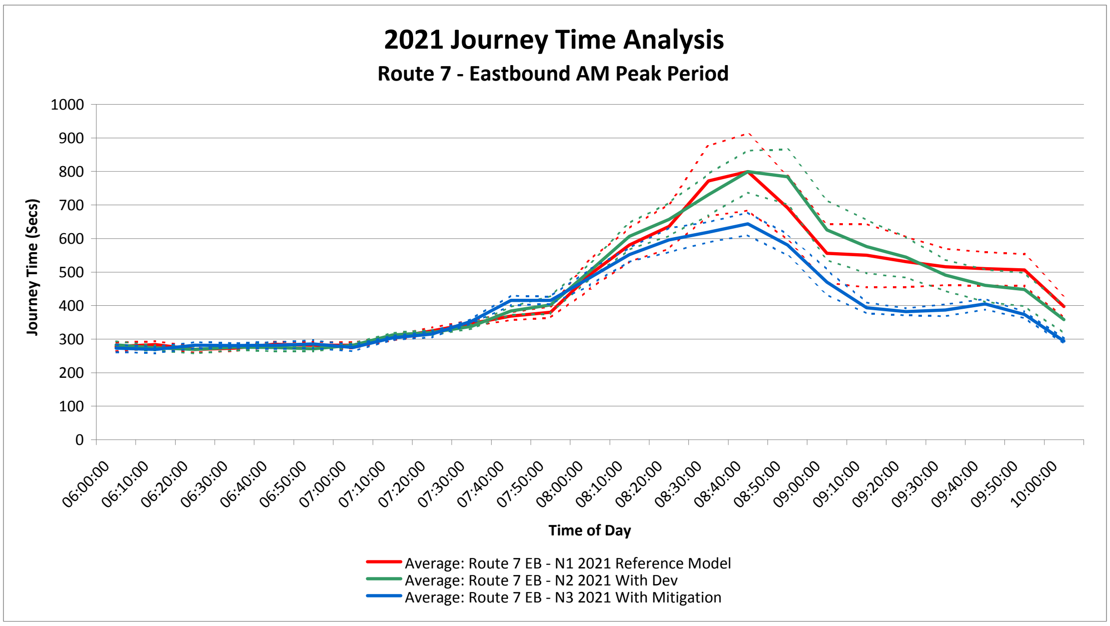


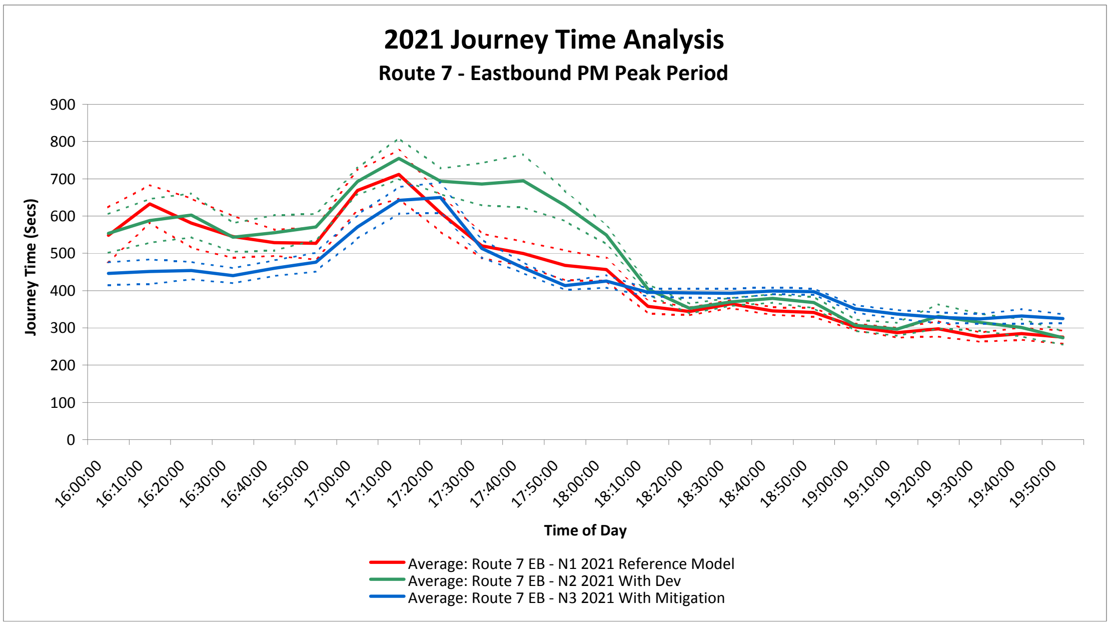
2021 Journey Time Analysis
Route 6 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 6 NB - N1 2021 Reference Model
Average: Route 6 NB - N2 2021 With Dev
Average: Route 6 NB - N3 2021 With Mitigation

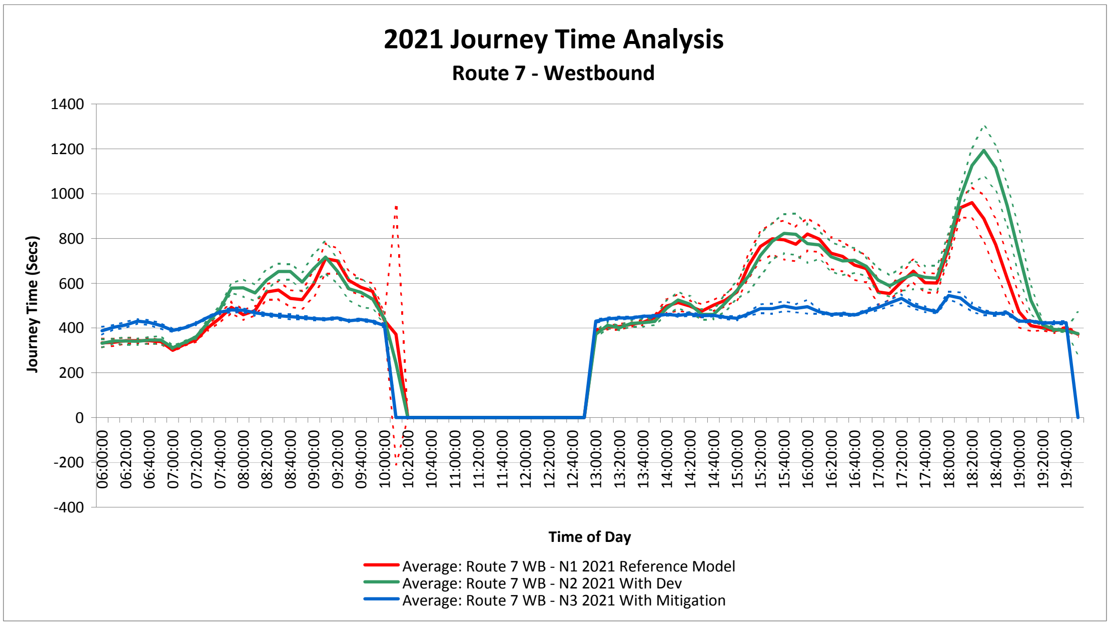


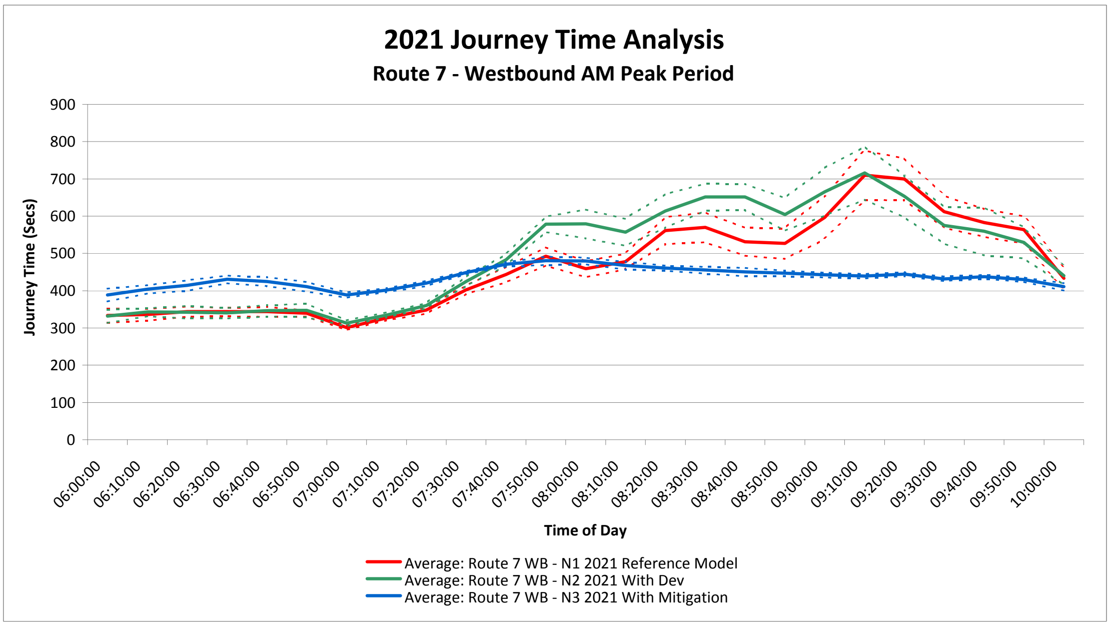
2021 Journey Time Analysis
Route 6 - Northbound PM Peak Period
JOurney Time (Secs)
Time of Day
Average: Route 6 NB - N1 2021 Reference Model
Average: Route 6 NB - N2 2021 With Dev
Average: Route 6 NB - N3 2021 With Mitigation

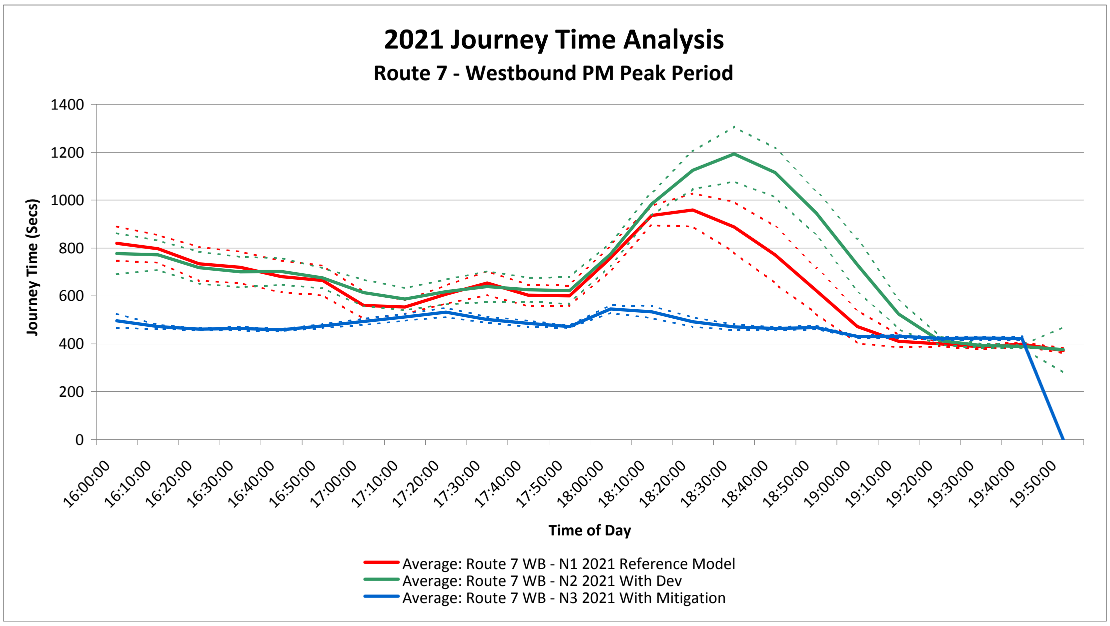

2021 Journey Time Analysis
Route 7 - Eastbound
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2021 Reference Model
Average: Route 7 EB - N2 2021 With Dev
Average: Route 7 EB - N3 2021 With Mitigation

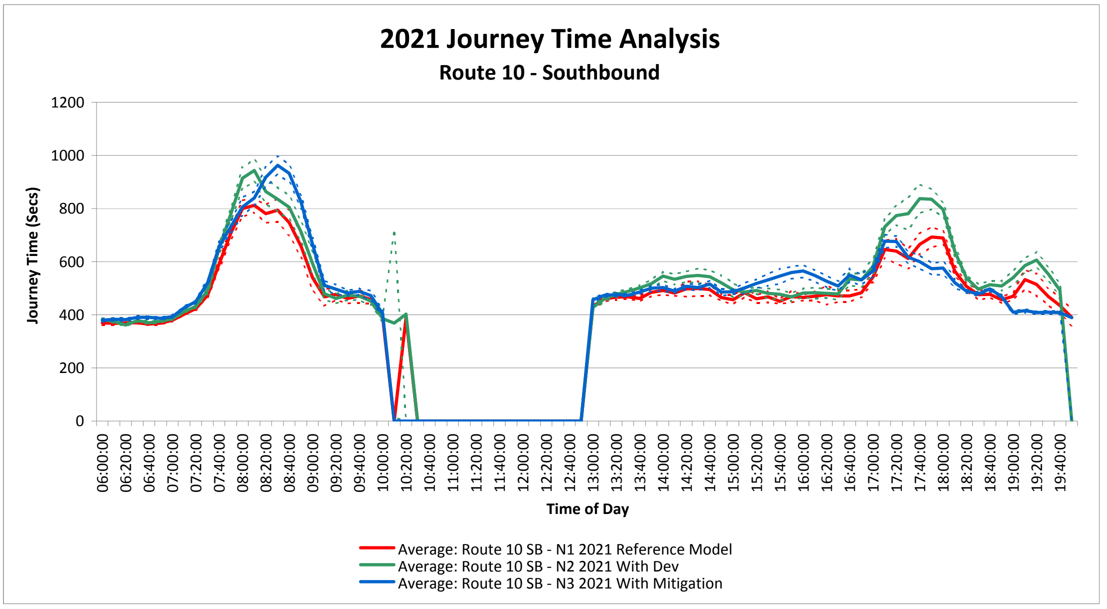

2021 Journey Time Analysis
Route 7 - Eastbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2021 Reference Model
Average: Route 7 EB - N2 2021 With Dev
Average: Route 7 EB - N3 2021 With Mitigation

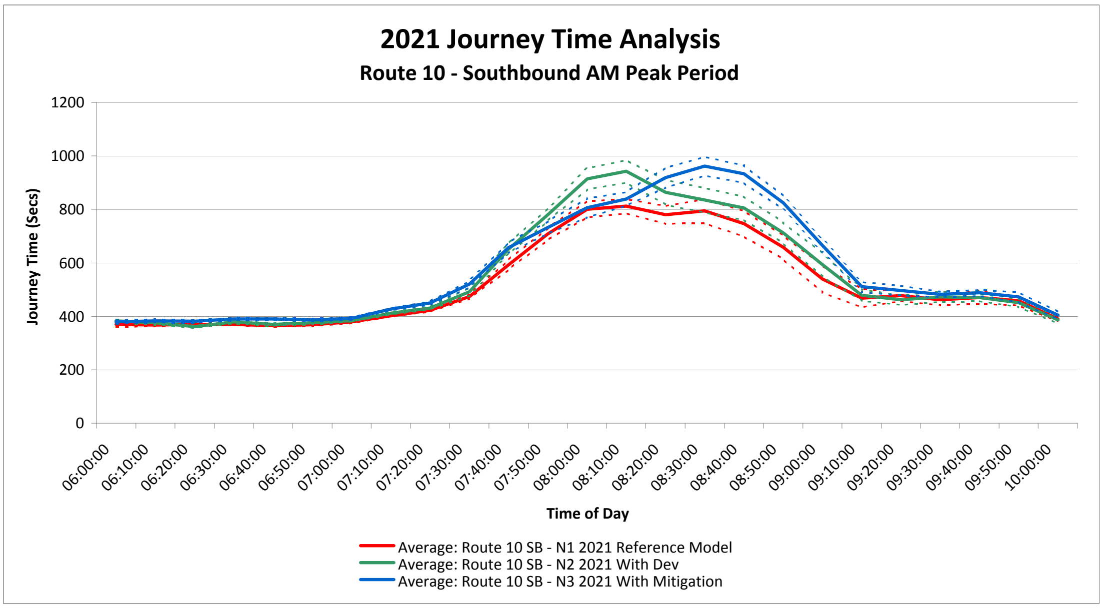

2021 Journey Time Analysis
Route 7 - Eastbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 EB - N1 2021 Reference Model
Average: Route 7 EB - N2 2021 With Dev
Average: Route 7 EB - N3 2021 With Mitigation

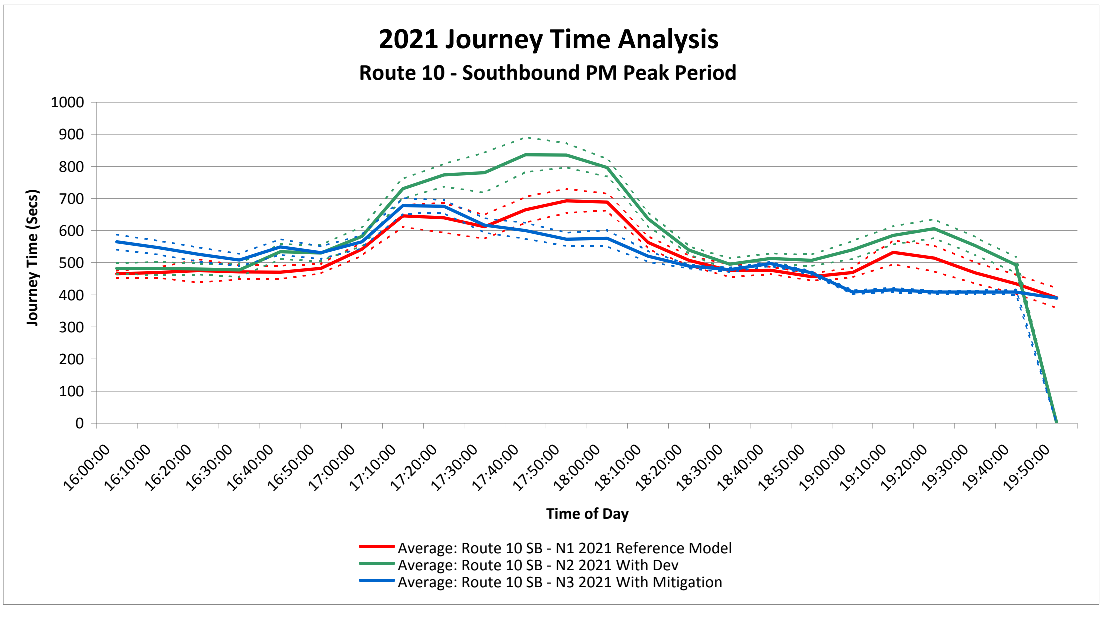

2021 Journey Time Analysis
Route 7 - Westbound
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2021 Reference Model
Average: Route 7 WB - N2 2021 With Dev
Average: Route 7 WB - N3 2021 With Mitigation

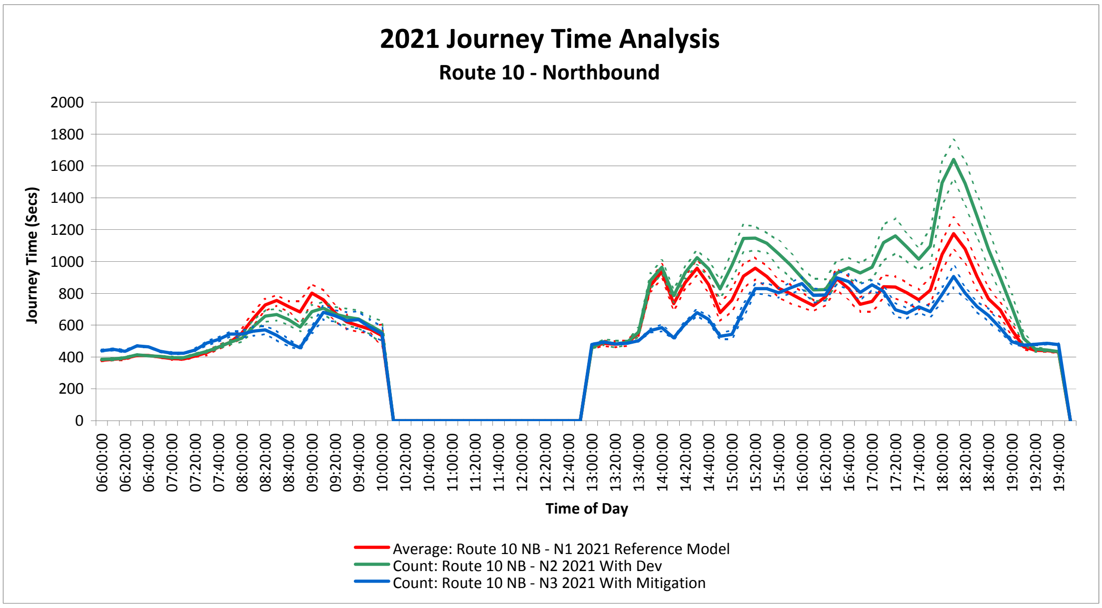

2021 Journey Time Analysis
Route 7 - Westbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2021 Reference Model
Average: Route 7 WB - N2 2021 With Dev
Average: Route 7 WB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 7 - Westbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 7 WB - N1 2021 Reference Model
Average: Route 7 WB - N2 2021 With Dev
Average: Route 7 WB - N3 2021 With Mitigation

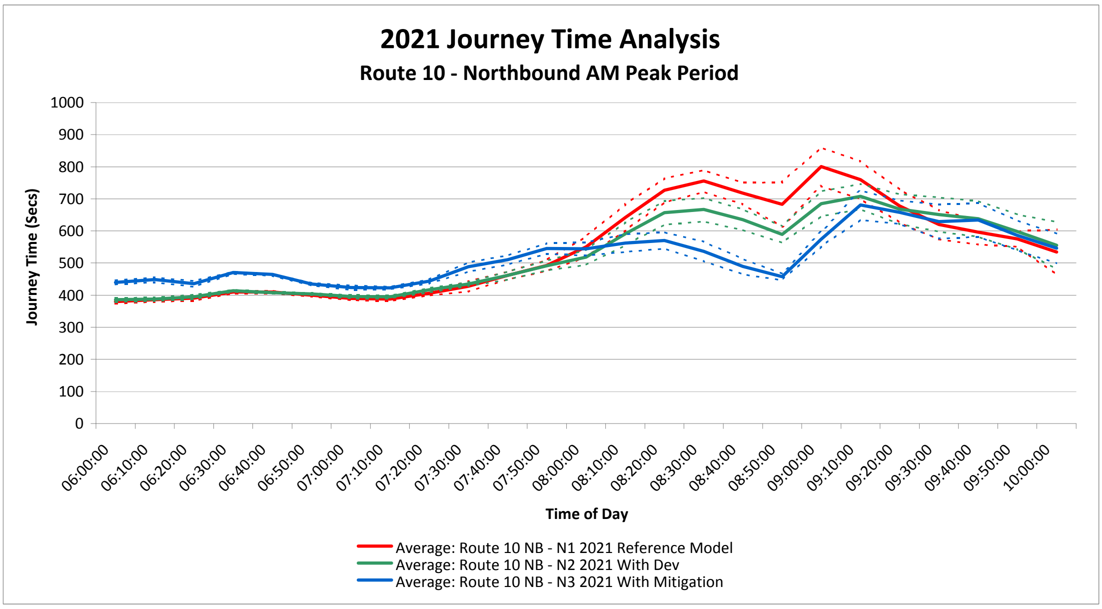

2021 Journey Time Analysis
Route 10 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2021 Reference Model
Average: Route 10 SB - N2 2021 With Dev
Average: Route 10 SB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 10 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2021 Reference Model
Average: Route 10 SB - N2 2021 With Dev
Average: Route 10 SB - N3 2021 With Mitigation

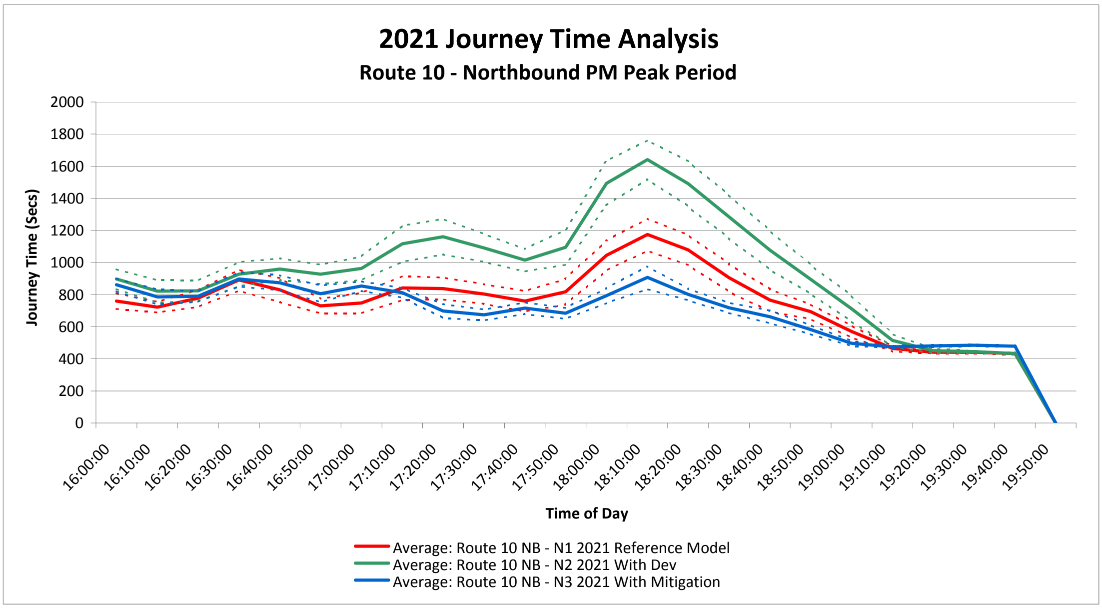

2021 Journey Time Analysis
Route 10 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 SB - N1 2021 Reference Model
Average: Route 10 SB - N2 2021 With Dev
Average: Route 10 SB - N3 2021 With Mitigation



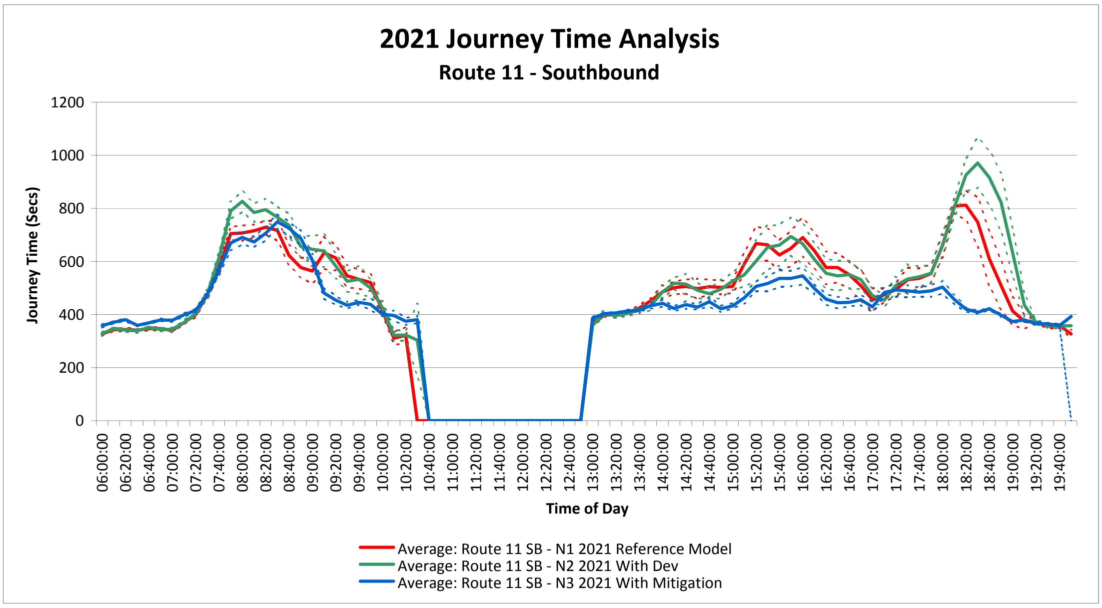
2021 Journey Time Analysis
Route 10 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2021 Reference Model
Count: Route 10 NB - N2 2021 With Dev
Count: Route 10 NB - N3 2021 With Mitigation

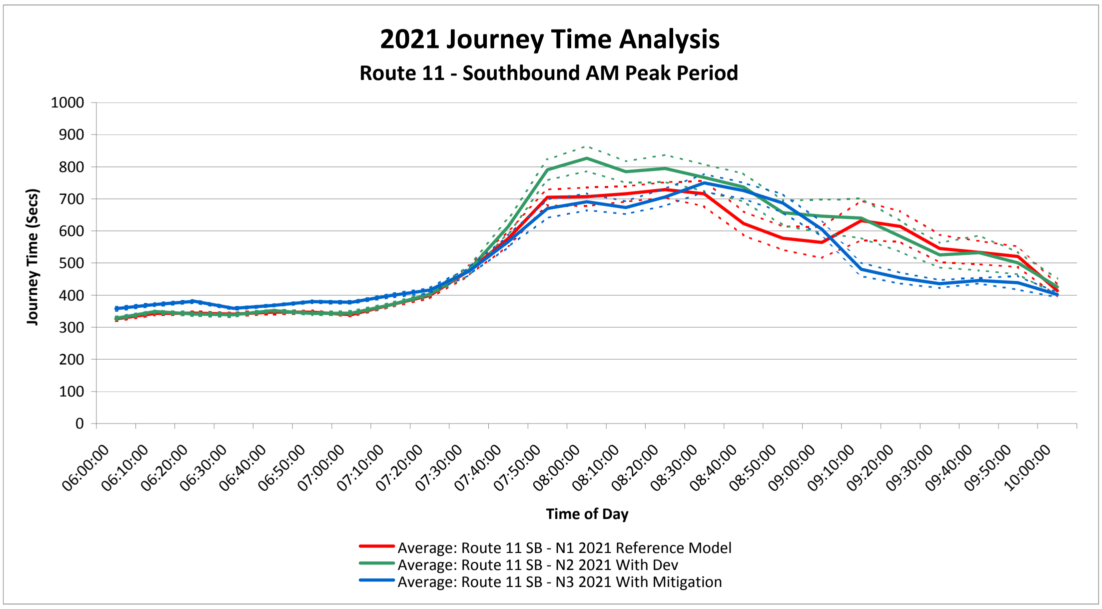


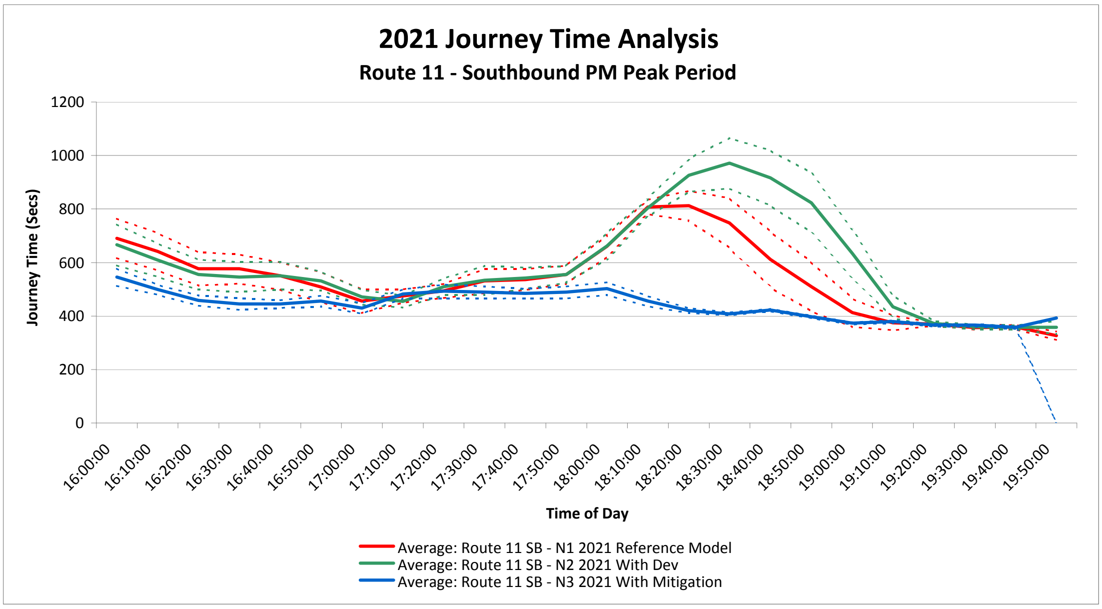
2021 Journey Time Analysis
Route 10 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2021 Reference Model
Average: Route 10 NB - N2 2021 With Dev
Average: Route 10 NB - N3 2021 With Mitigation

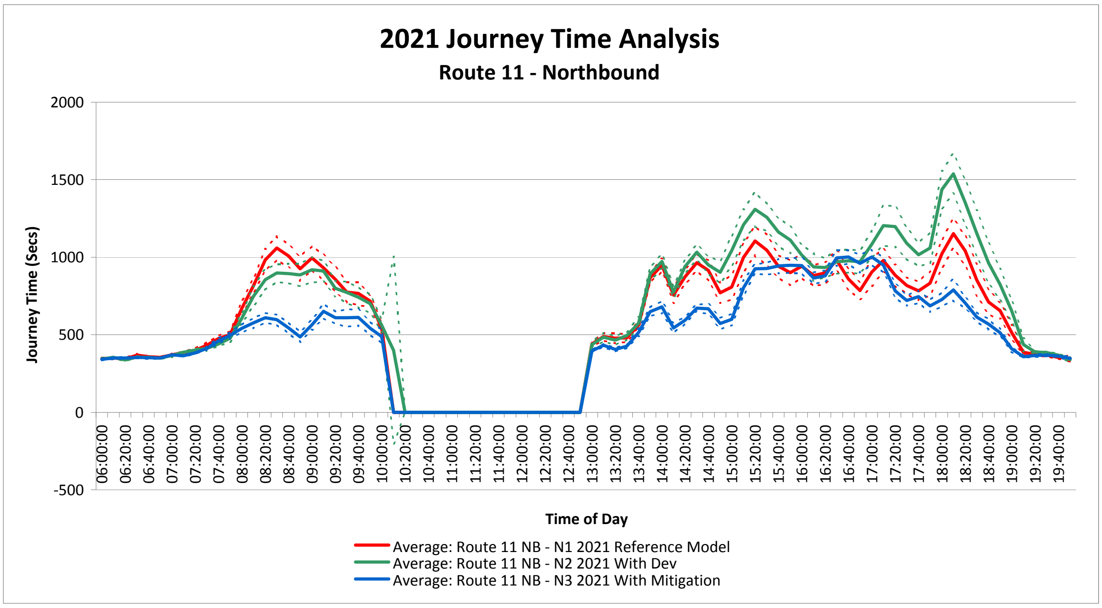


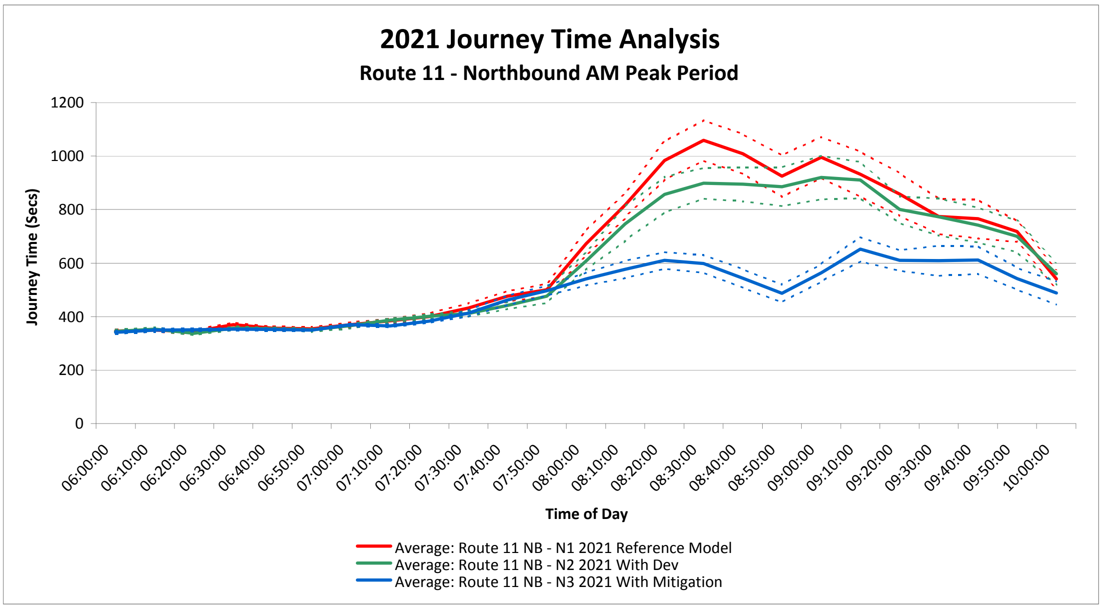
2021 Journey Time Analysis
Route 10 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 10 NB - N1 2021 Reference Model
Average: Route 10 NB - N2 2021 With Dev
Average: Route 10 NB - N3 2021 With Mitigation

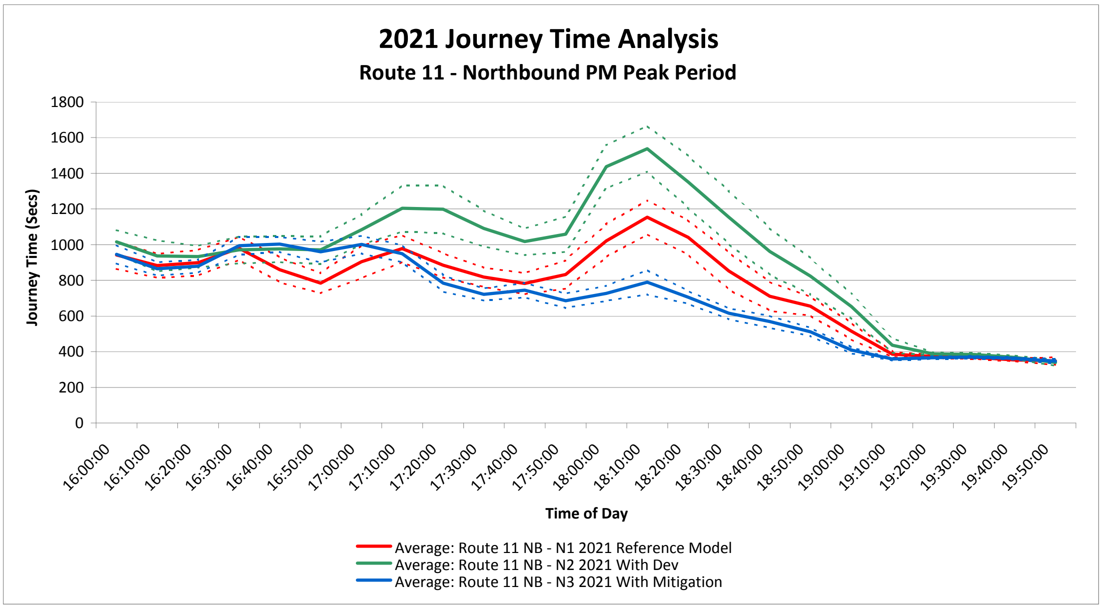

2021 Journey Time Analysis
Route 11 - Southbound
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2021 Reference Model
Average: Route 11 SB - N2 2021 With Dev
Average: Route 11 SB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 11 - Southbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2021 Reference Model
Average: Route 11 SB - N2 2021 With Dev
Average: Route 11 SB - N3 2021 With Mitigation

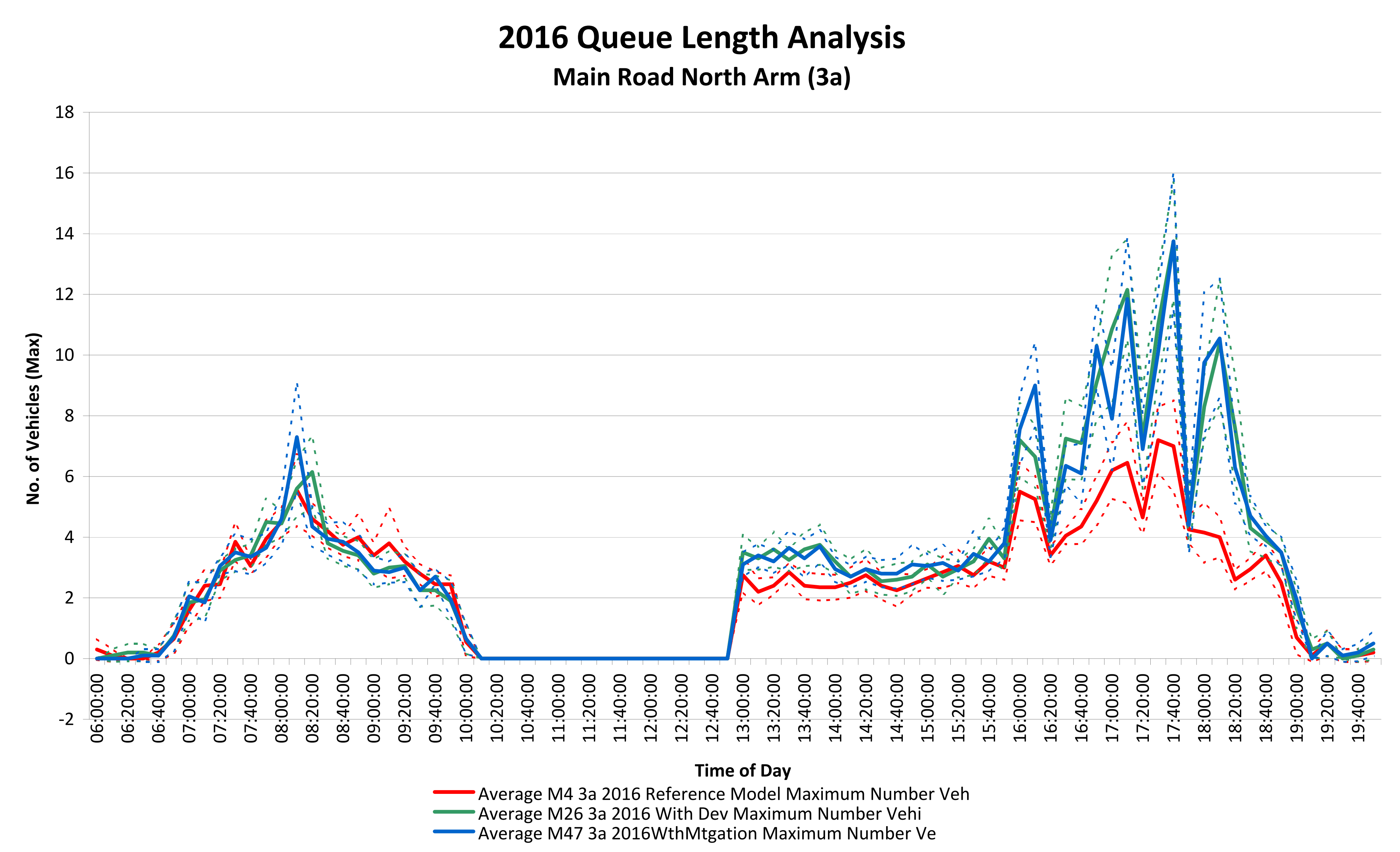

2021 Journey Time Analysis
Route 11 - Southbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 SB - N1 2021 Reference Model
Average: Route 11 SB - N2 2021 With Dev
Average: Route 11 SB - N3 2021 With Mitigation


2021 Journey Time Analysis
Route 11 - Northbound
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2021 Reference Model
Average: Route 11 NB - N2 2021 With Dev
Average: Route 11 NB - N3 2021 With Mitigation

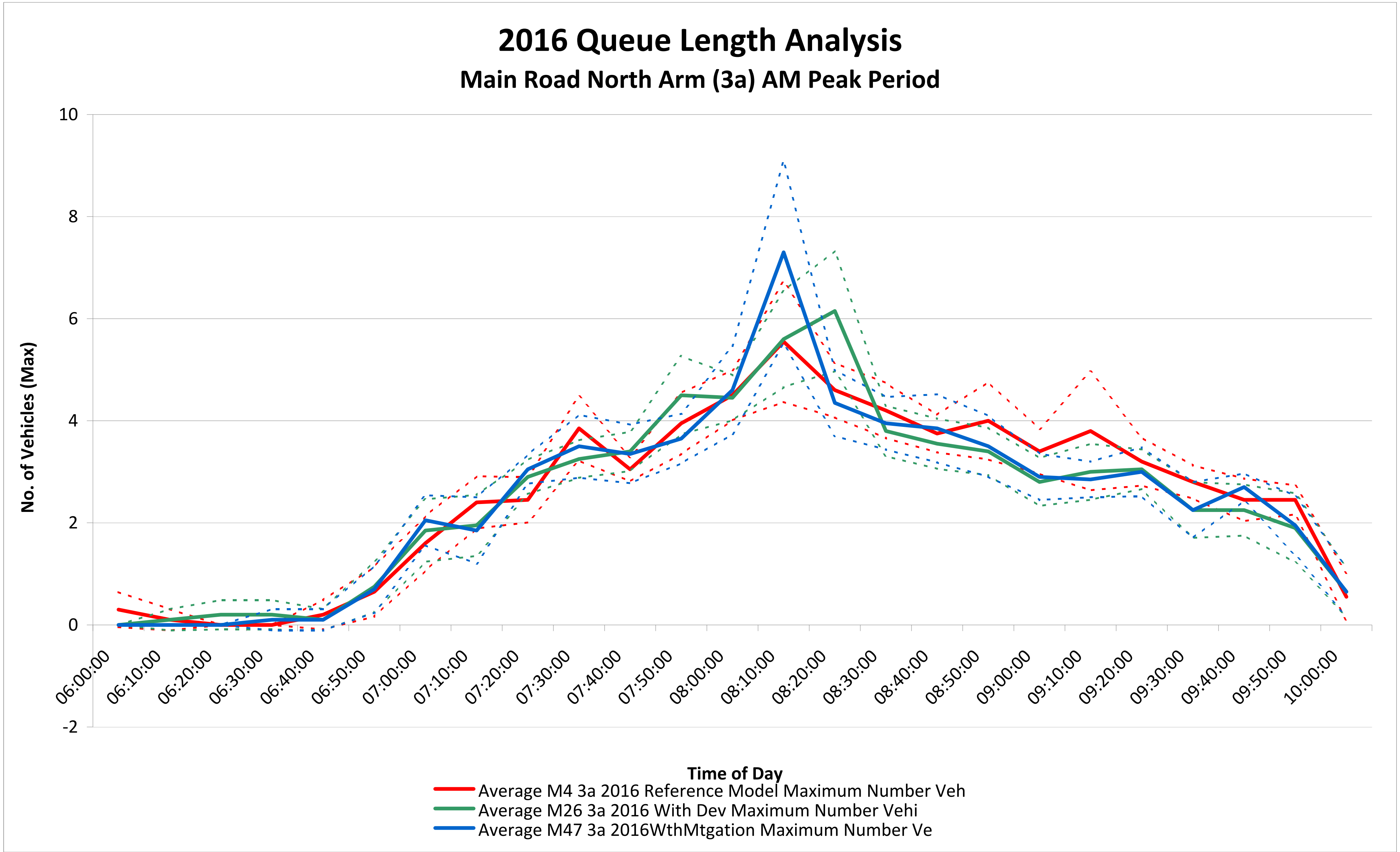

2021 Journey Time Analysis
Route 11 - Northbound AM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2021 Reference Model
Average: Route 11 NB - N2 2021 With Dev
Average: Route 11 NB - N3 2021 With Mitigation

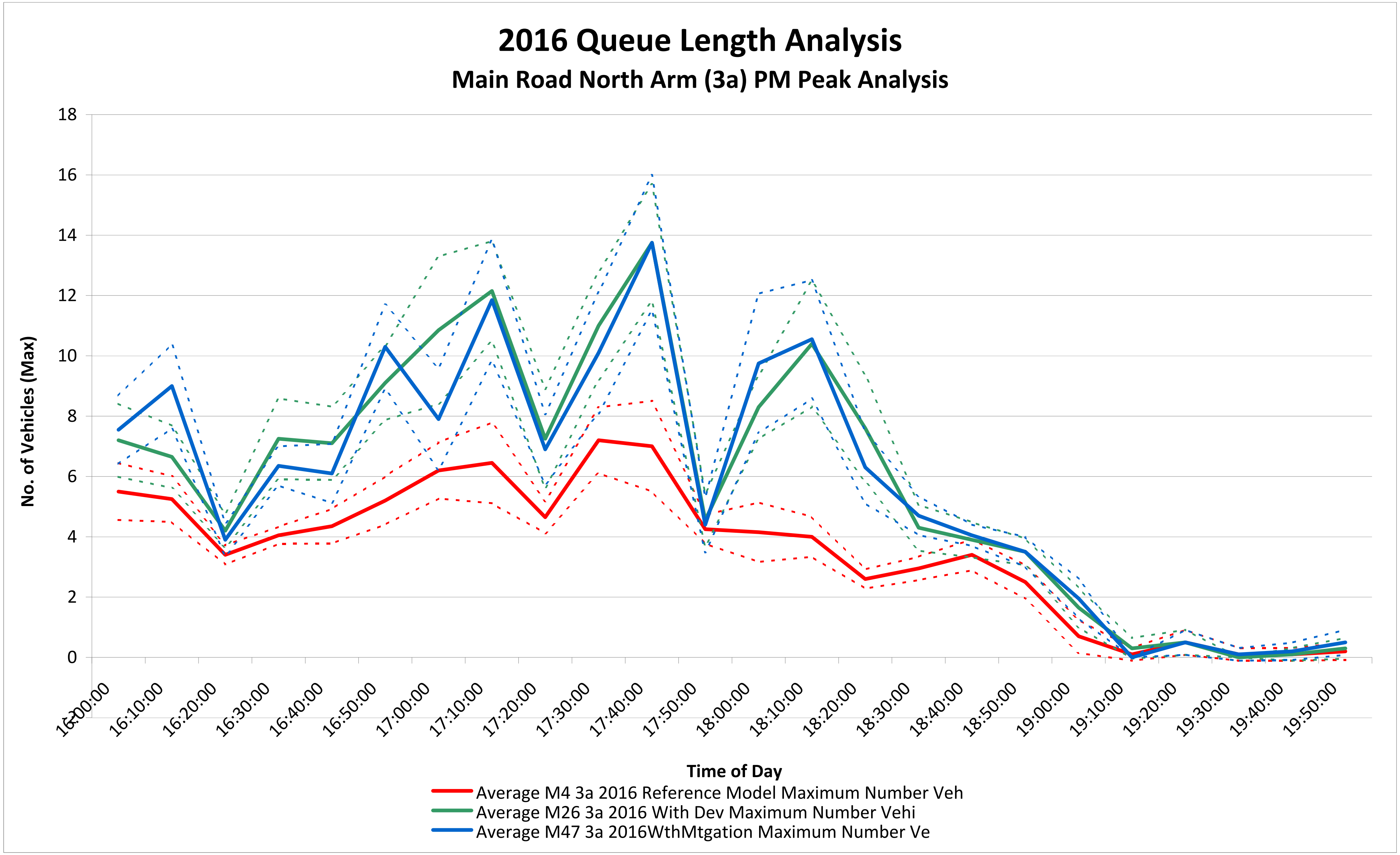

2021 Journey Time Analysis
Route 11 - Northbound PM Peak Period
Journey Time (Secs)
Time of Day
Average: Route 11 NB - N1 2021 Reference Model
Average: Route 11 NB - N2 2021 With Dev
Average: Route 11 NB - N3 2021 With Mitigation

APPENDIX 15.6: 2016 REFERENCE V WITH DEVELOPMENT V WITH MITIGATION QUEUE GRAPHS

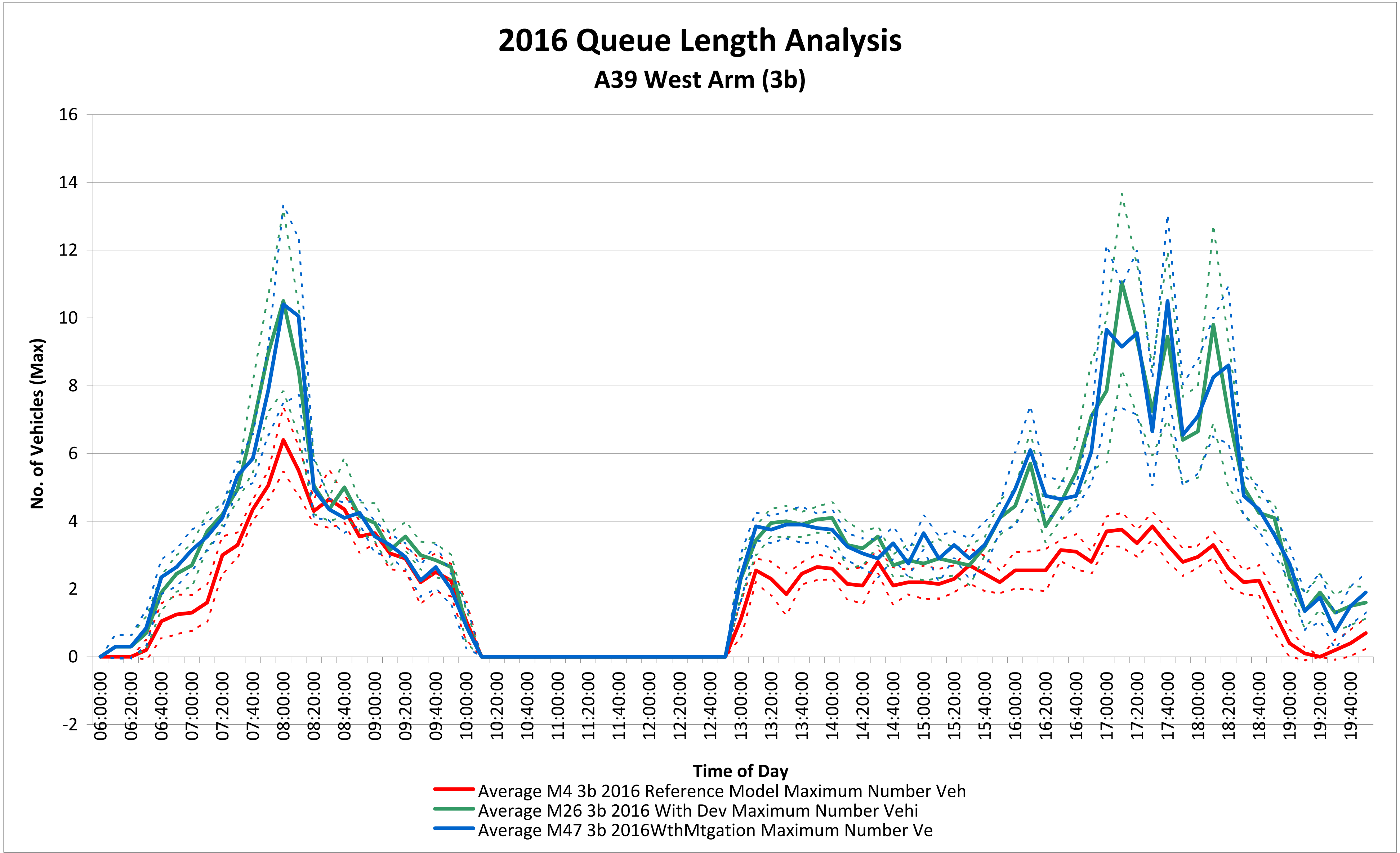


2016 Queue Length Analysis
Main Road North Arm (3a)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 3a 2016 Reference Model Maximum Number Veh
Average M26 3a 2016 With Dev Maximum Number Vehi
Average M47 3a 2016WthMtgation Maximum Number Ve

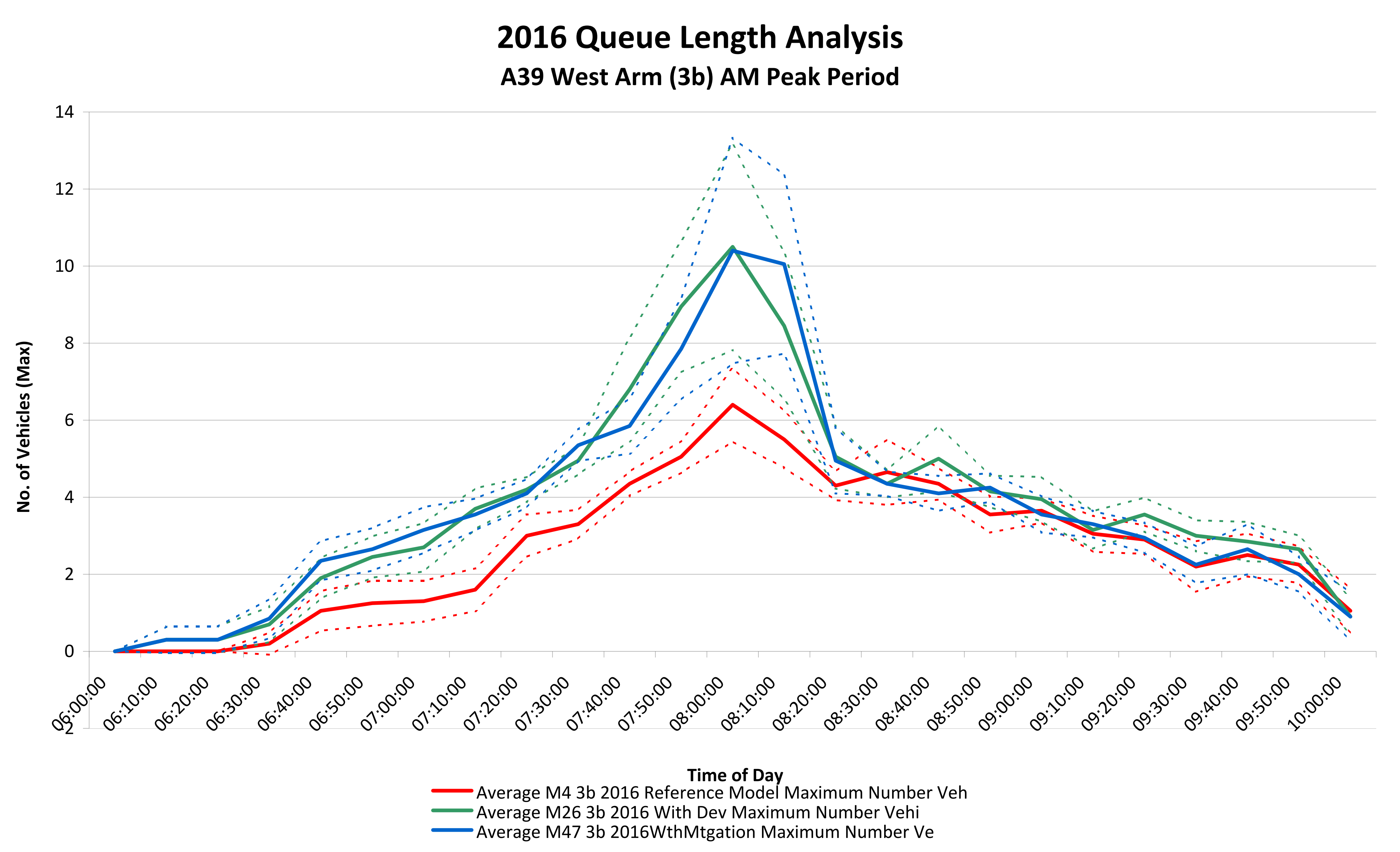

2016 Queue Length Analysis
Main Road North Arm (3a) AM Peak Period
No. of Vehicles (Max)
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 3a 2016 Reference Model Maximum Number Veh
Average M26 3a 2016 With Dev Maximum Number Vehi
Average M47 3a 2016WthMtgation Maximum Number Ve

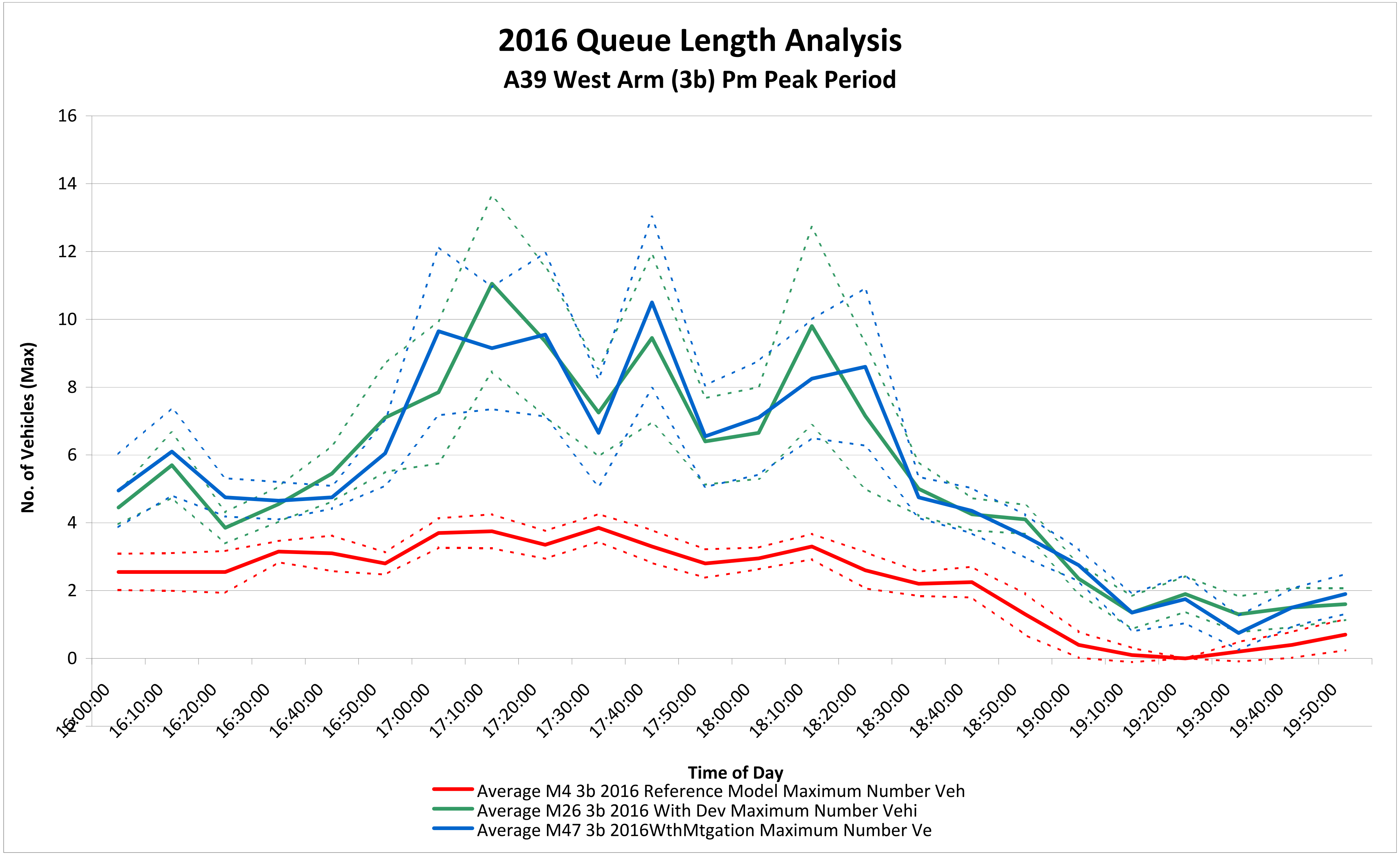


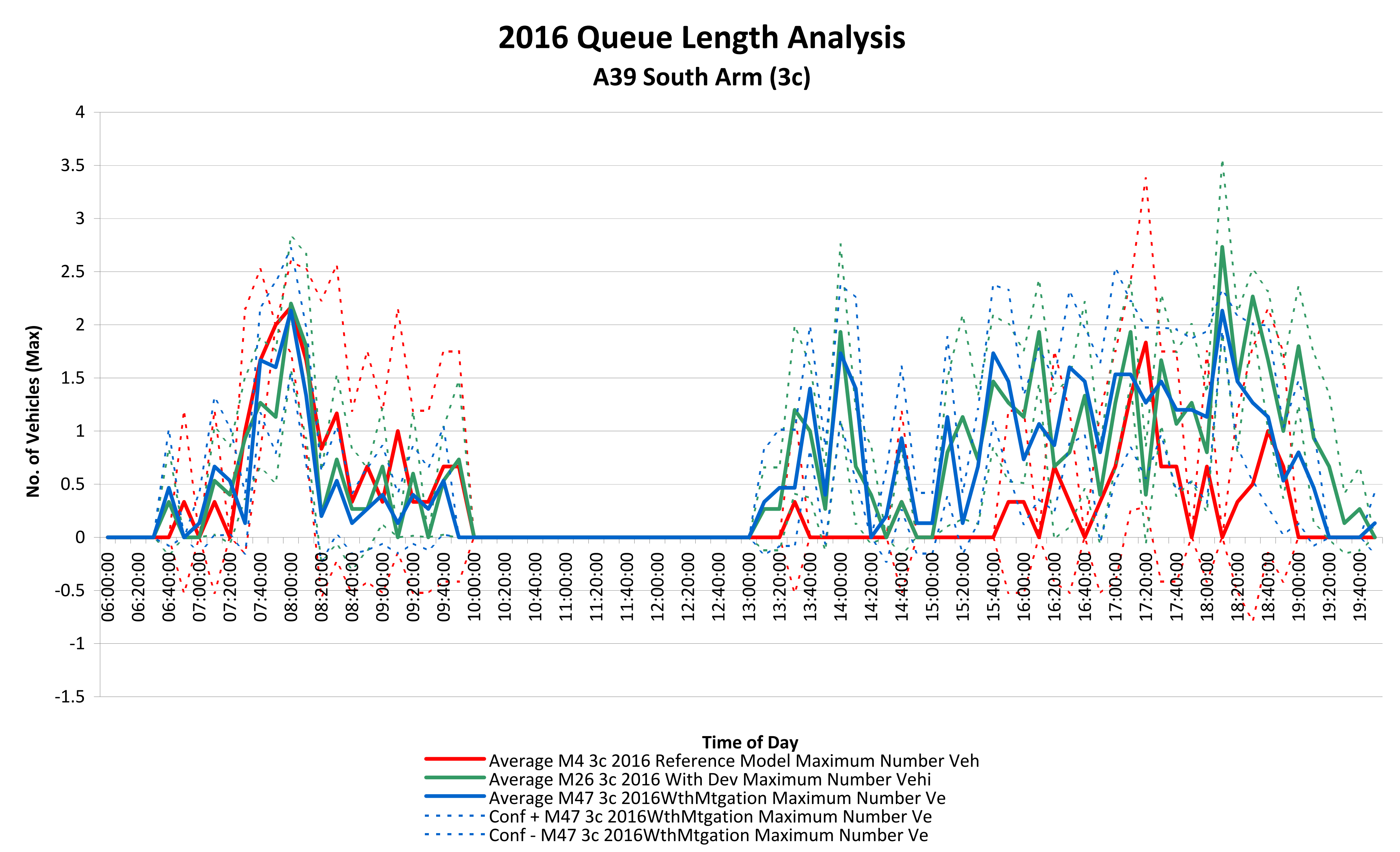
2016 Queue Length Analysis
Main Road North Arm (3a) PM Peak Analysis
18
16
14
12
10
8
6
4
2
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 3a 2016 Reference Model Maximum Number Veh
Average M26 3a 2016 With Dev Maximum Number Vehi
Average M47 3a 2016WthMtgation Maximum Number Ve

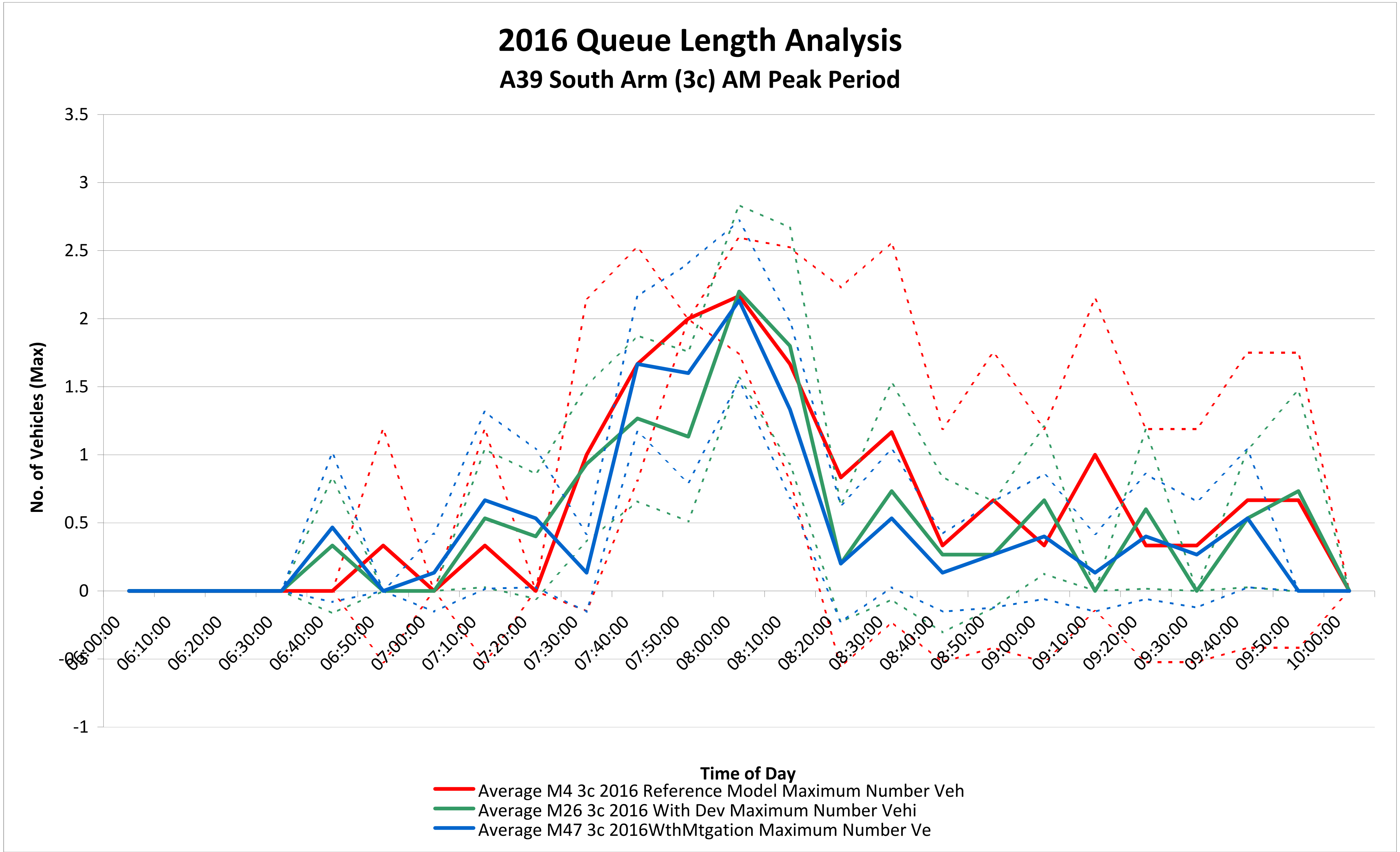


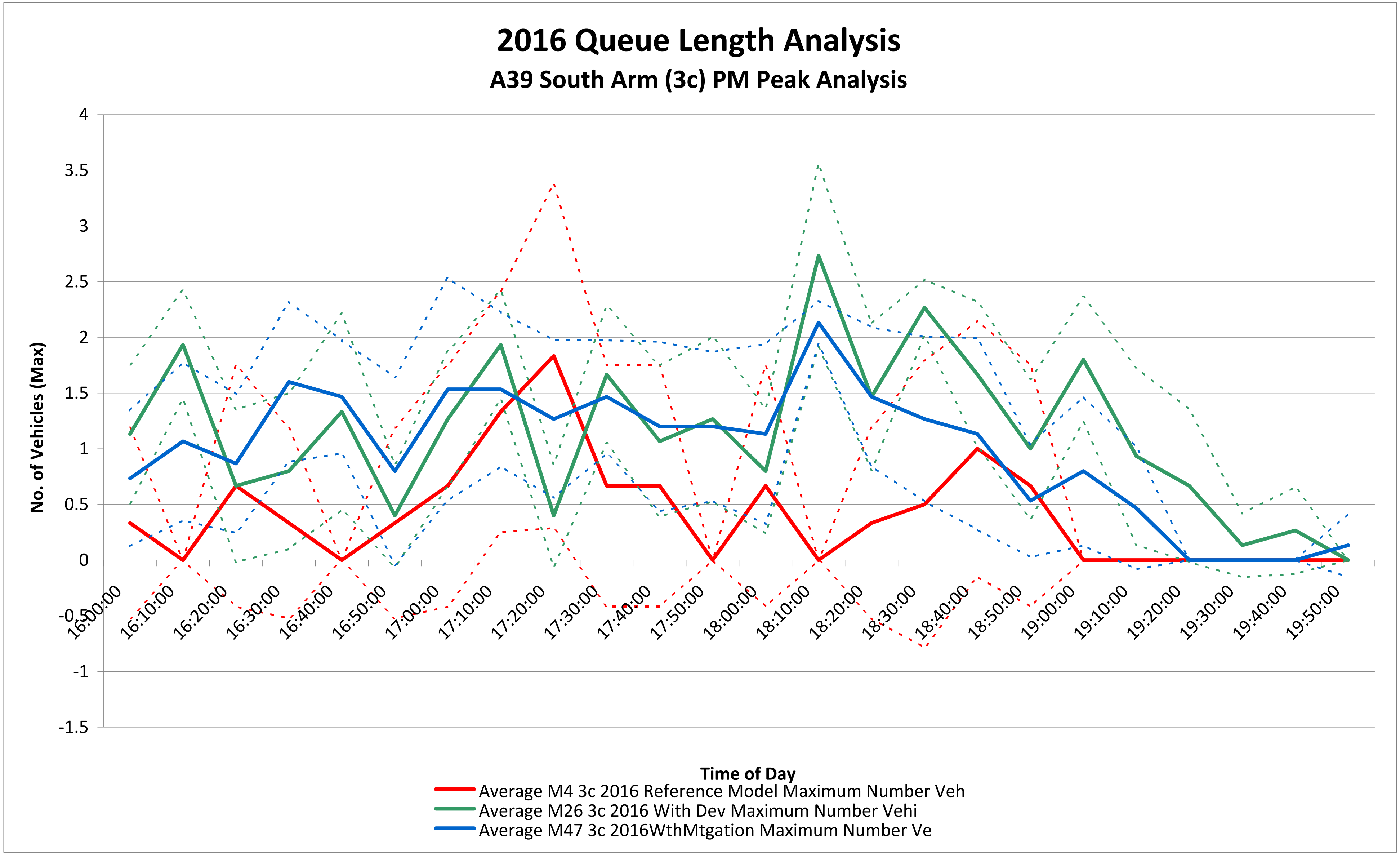
2016 Queue Length Analysis
A39 West Arm (3b)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 3b 2016 Reference Model Maximum Number Veh
Average M26 3b 2016 With Dev Maximum Number Vehi
Average M47 3b 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
A39 West Arm (3b) AM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 3b 2016 Reference Model Maximum Number Veh
Average M26 3b 2016 With Dev Maximum Number Vehi
Average M47 3b 2016WthMtgation Maximum Number Ve

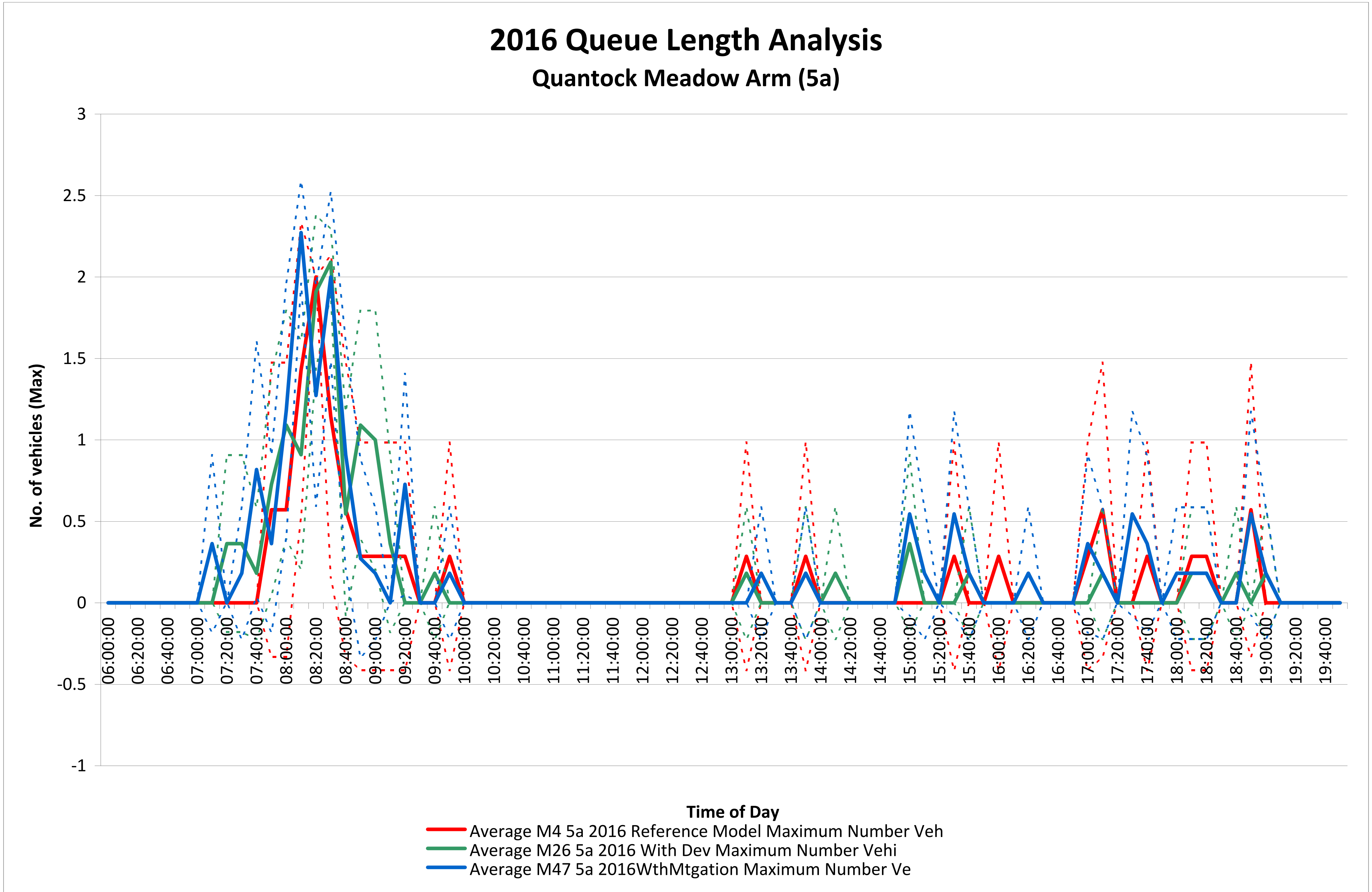

2016 Queue Length Analysis
A39 West Arm (3b) Pm Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 3b 2016 Reference Model Maximum Number Veh
Average M26 3b 2016 With Dev Maximum Number Vehi
Average M47 3b 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
A39 South Arm (3c)
No. of Vehicles (Max)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 3c 2016 Reference Model Maximum Number Veh
Average M26 3c 2016 With Dev Maximum Number Vehi
Average M47 3c 2016WthMtgation Maximum Number Ve
Conf + M47 3c 2016WthMtgation Maximum Number Ve
Conf - M47 3c 2016WthMtgation Maximum Number Ve

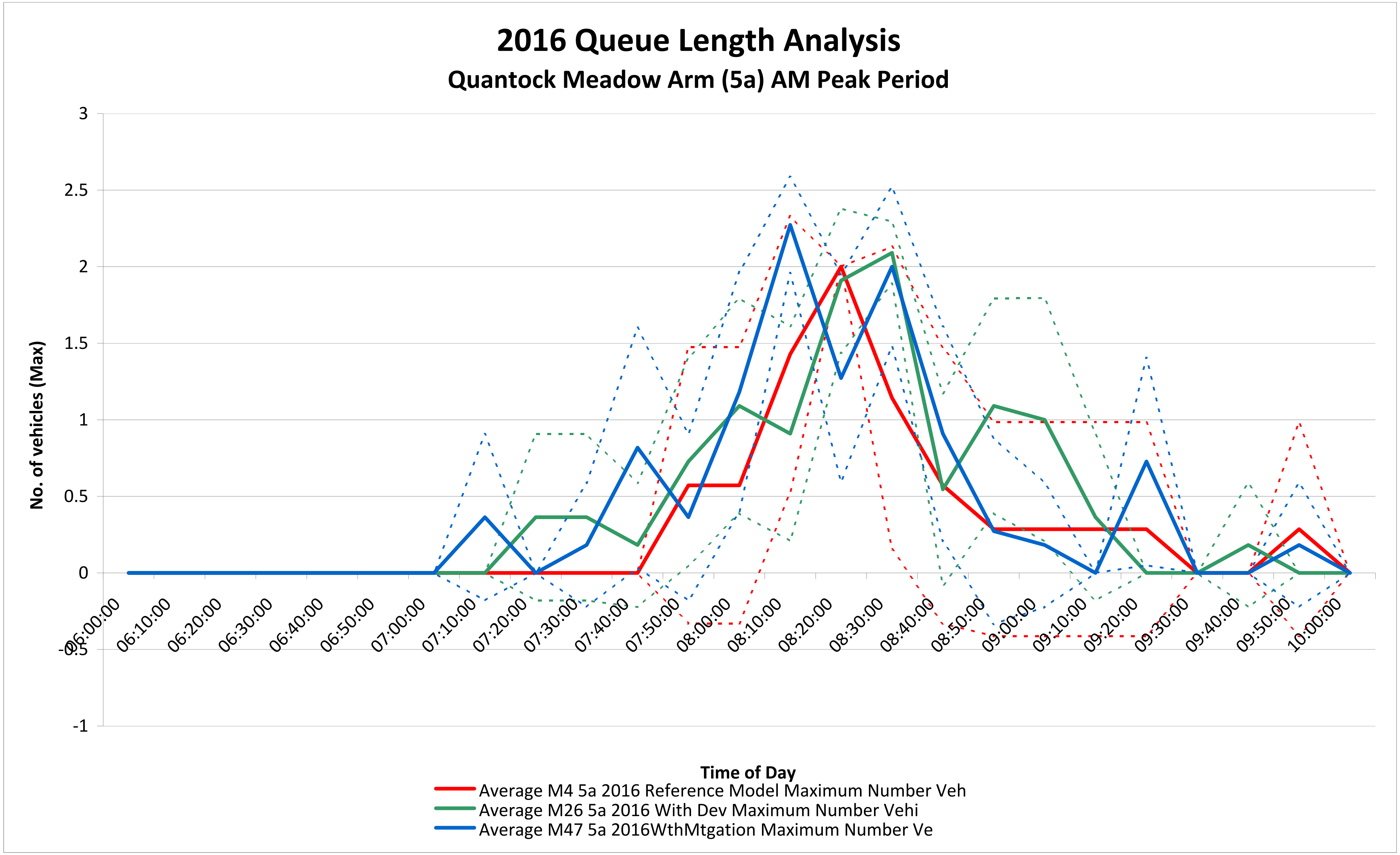

2016 Queue Length Analysis
A39 South Arm (3c) AM Peak Period
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 3c 2016 Reference Model Maximum Number Veh
Average M26 3c 2016 With Dev Maximum Number Vehi
Average M47 3c 2016WthMtgation Maximum Number Ve

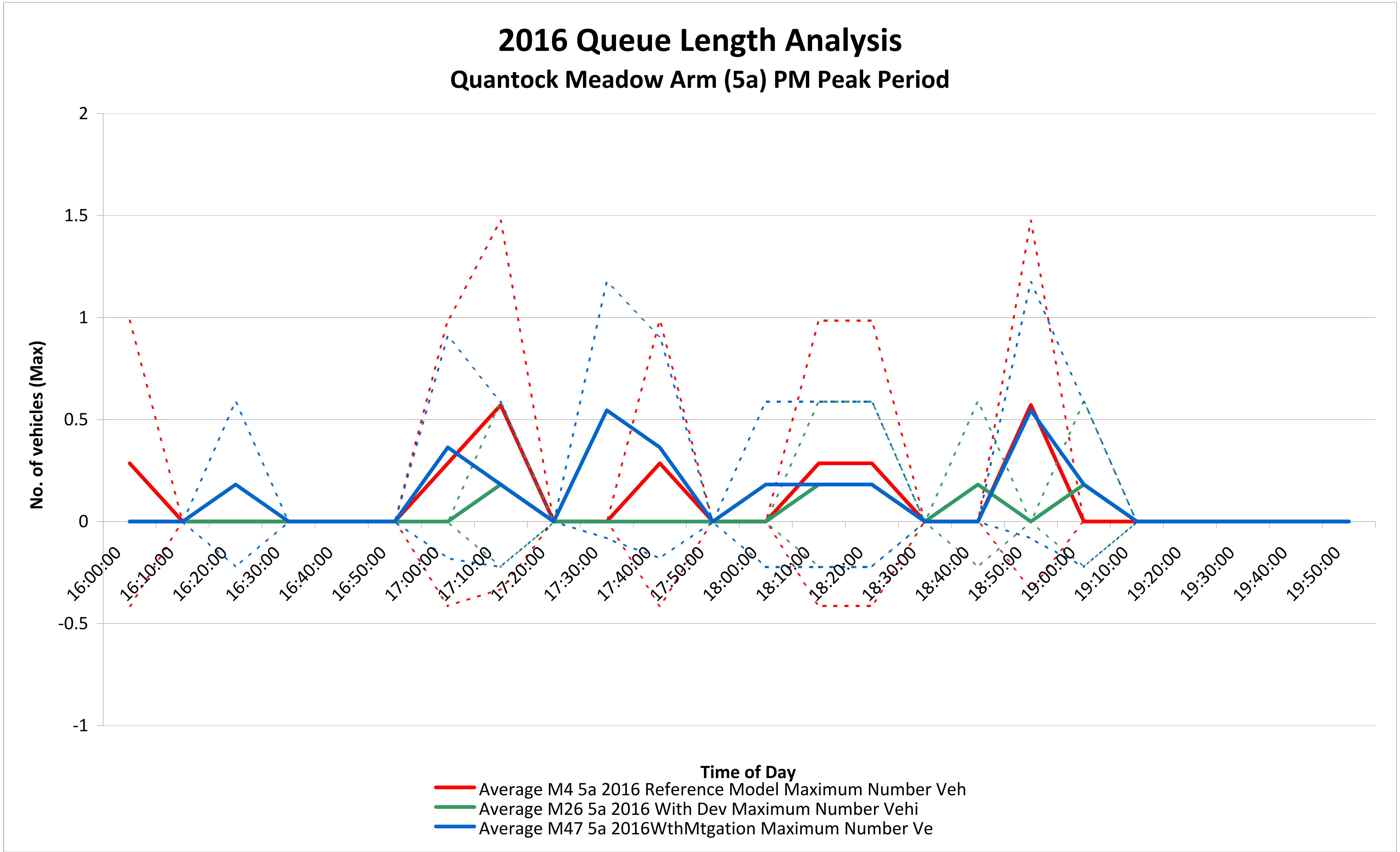


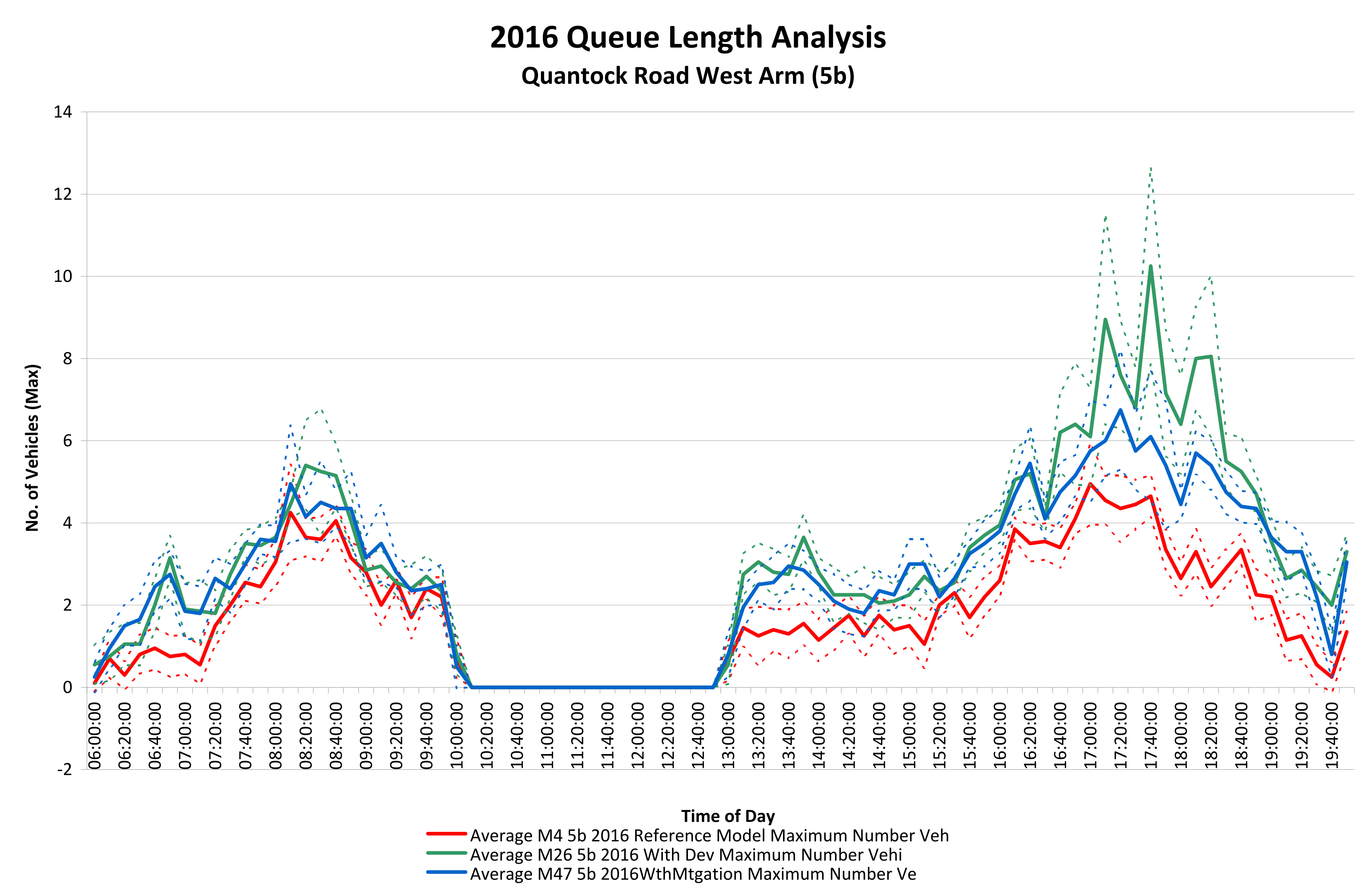
2016 Queue Length Analysis
A39 South Arm (3c) PM Peak Analysis
No. of Vehicles (Max)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 3c 2016 Reference Model Maximum Number Veh
Average M26 3c 2016 With Dev Maximum Number Vehi
Average M47 3c 2016WthMtgation Maximum Number Ve

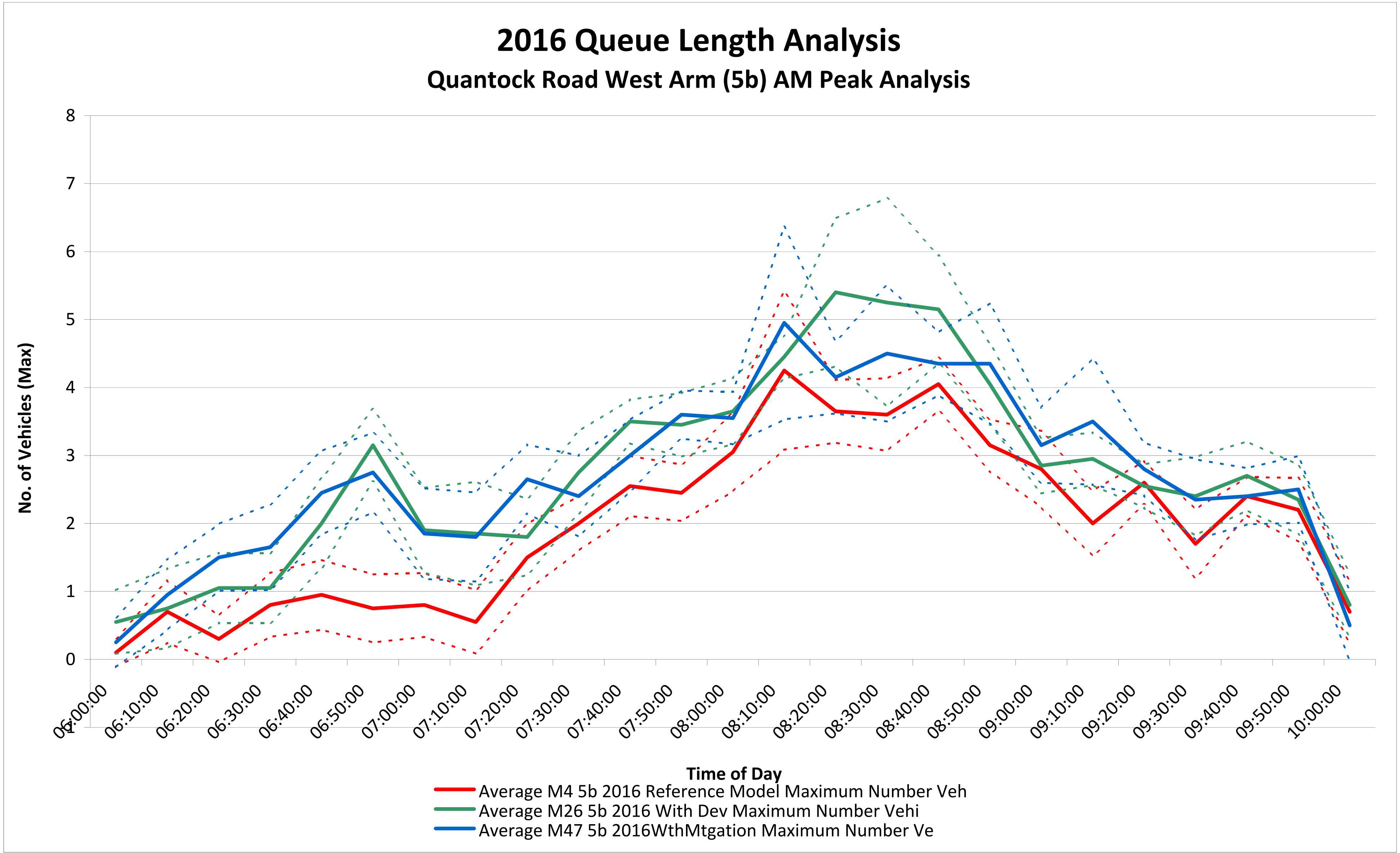


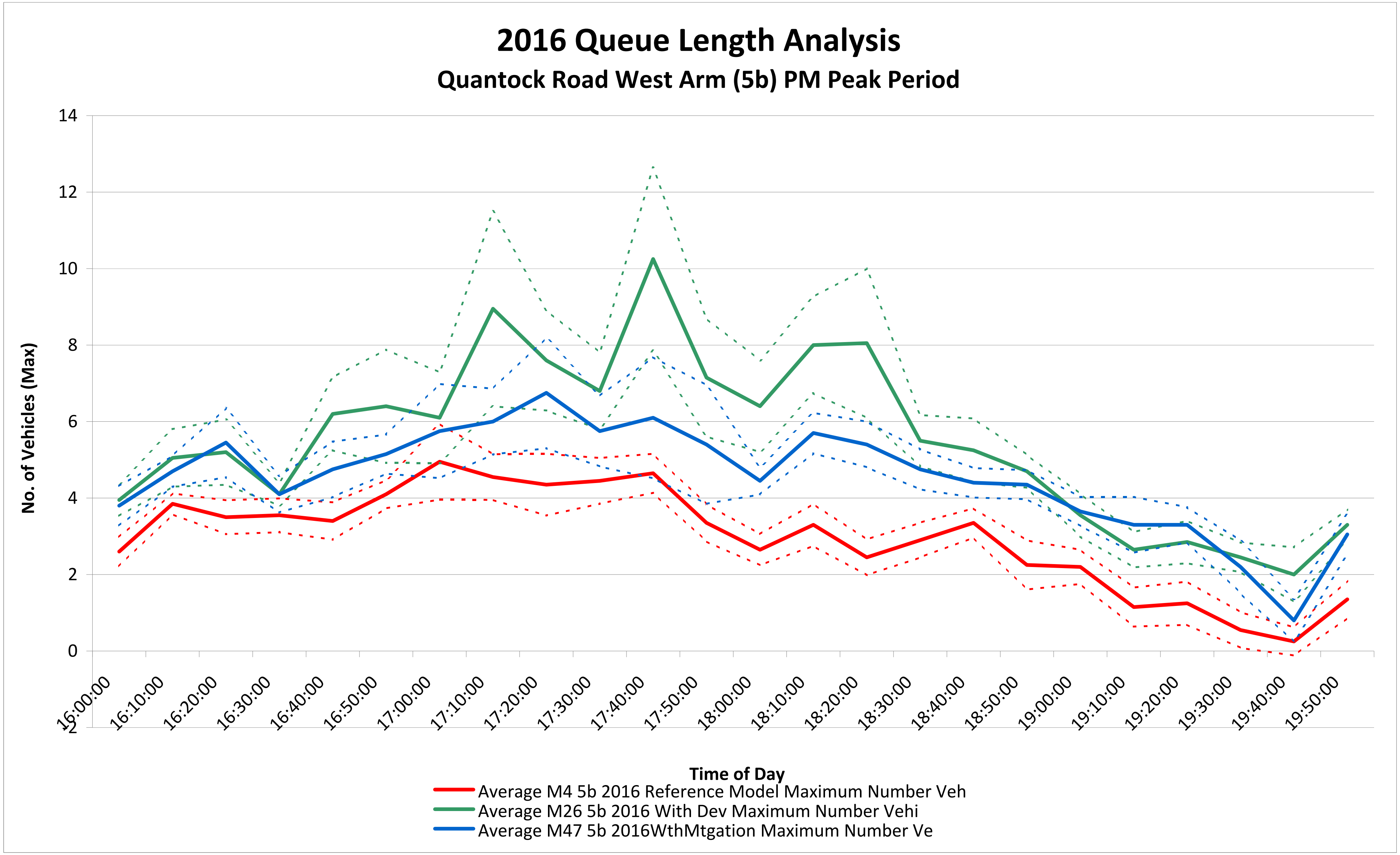
2016 Queue Length Analysis
Quantock Meadow Arm (5a)
No. of vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5a 2016 Reference Model Maximum Number Veh
Average M26 5a 2016 With Dev Maximum Number Vehi
Average M47 5a 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Quantock Meadow Arm (5a) AM Peak Period
3
2.5
2
1.5
1
0.5
0
-0.5
-1
No. of vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5a 2016 Reference Model Maximum Number Veh
Average M26 5a 2016 With Dev Maximum Number Vehi
Average M47 5a 2016WthMtgation Maximum Number Ve

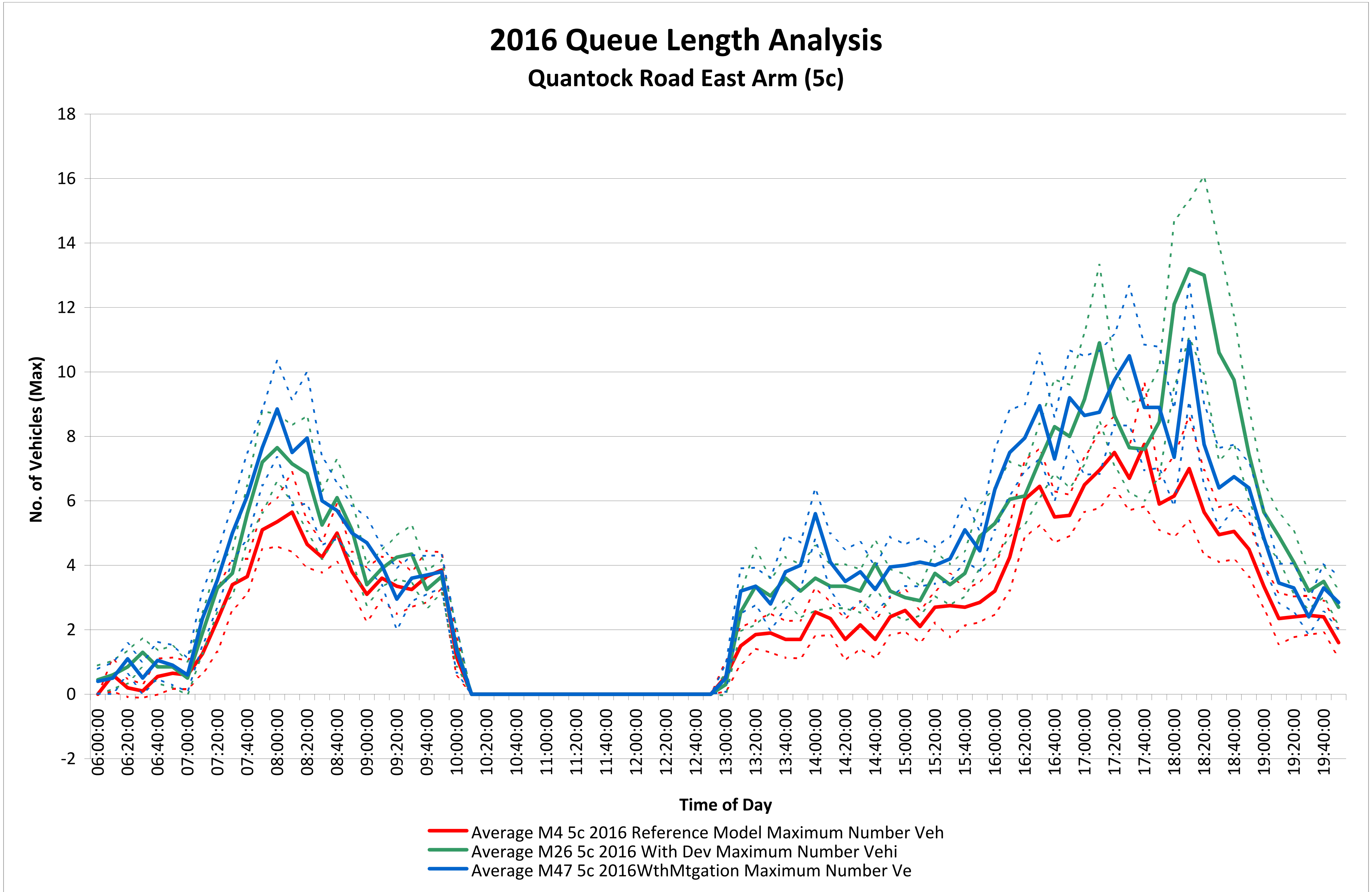

2016 Queue Length Analysis
Quantock Meadow Arm (5a) PM Peak Period
No. of vehicles (Max)
2
1.5
1
0.5
0
-0.5
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5a 2016 Reference Model Maximum Number Veh
Average M26 5a 2016 With Dev Maximum Number Vehi
Average M47 5a 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Quantock Road West Arm (5b)
No. of Vehicles (Max)
Time of Day
Average M4 5b 2016 Reference Model Maximum Number Veh
Average M26 5b 2016 With Dev Maximum Number Vehi
Average M47 5b 2016WthMtgation Maximum Number Ve

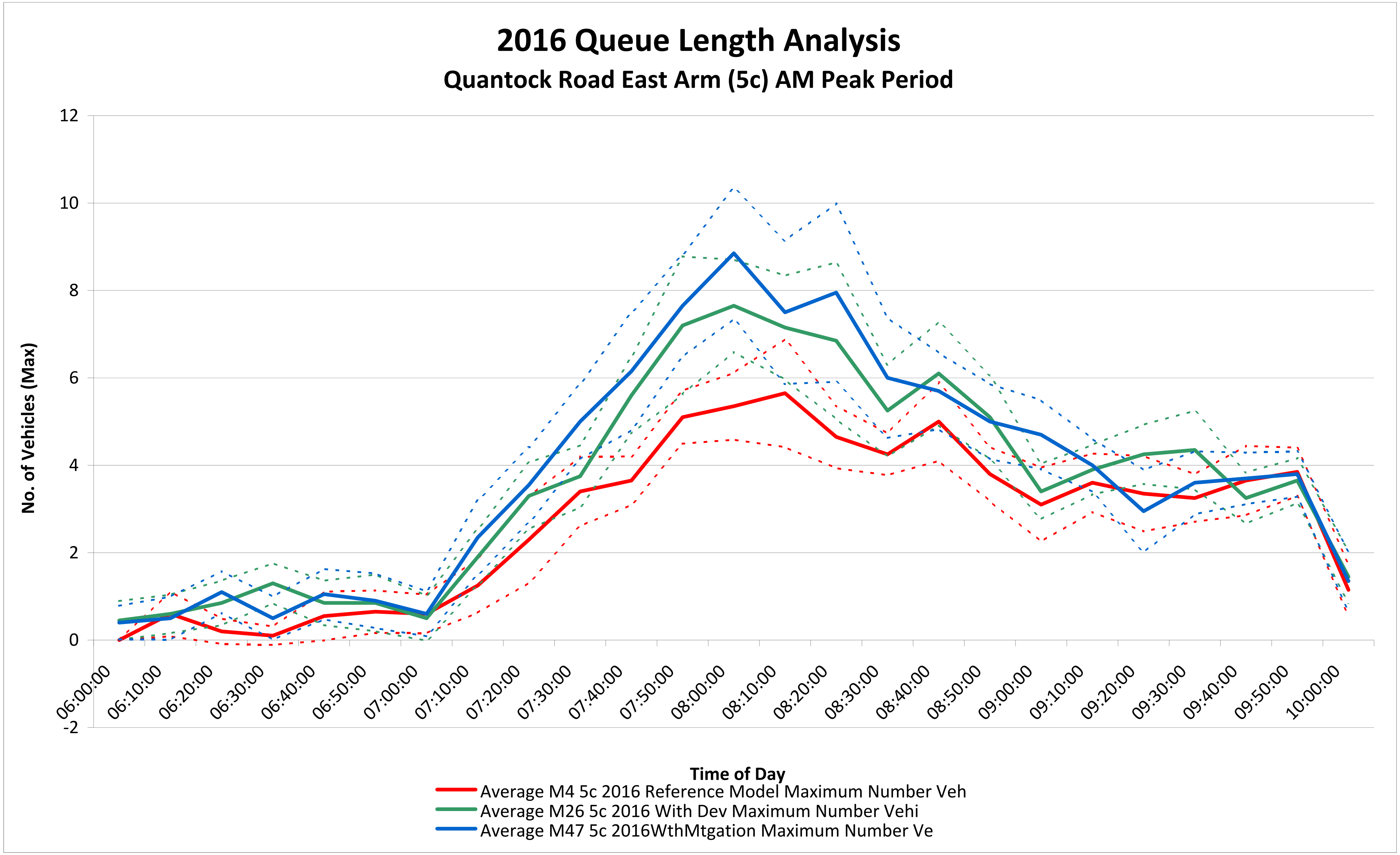

2016 Queue Length Analysis
Quantock Road West Arm (5b) AM Peak Analysis
No. of Vehicles (Max)
Time of Day
Average M4 5b 2016 Reference Model Maximum Number Veh
Average M26 5b 2016 With Dev Maximum Number Vehi
Average M47 5b 2016WthMtgation Maximum Number Ve

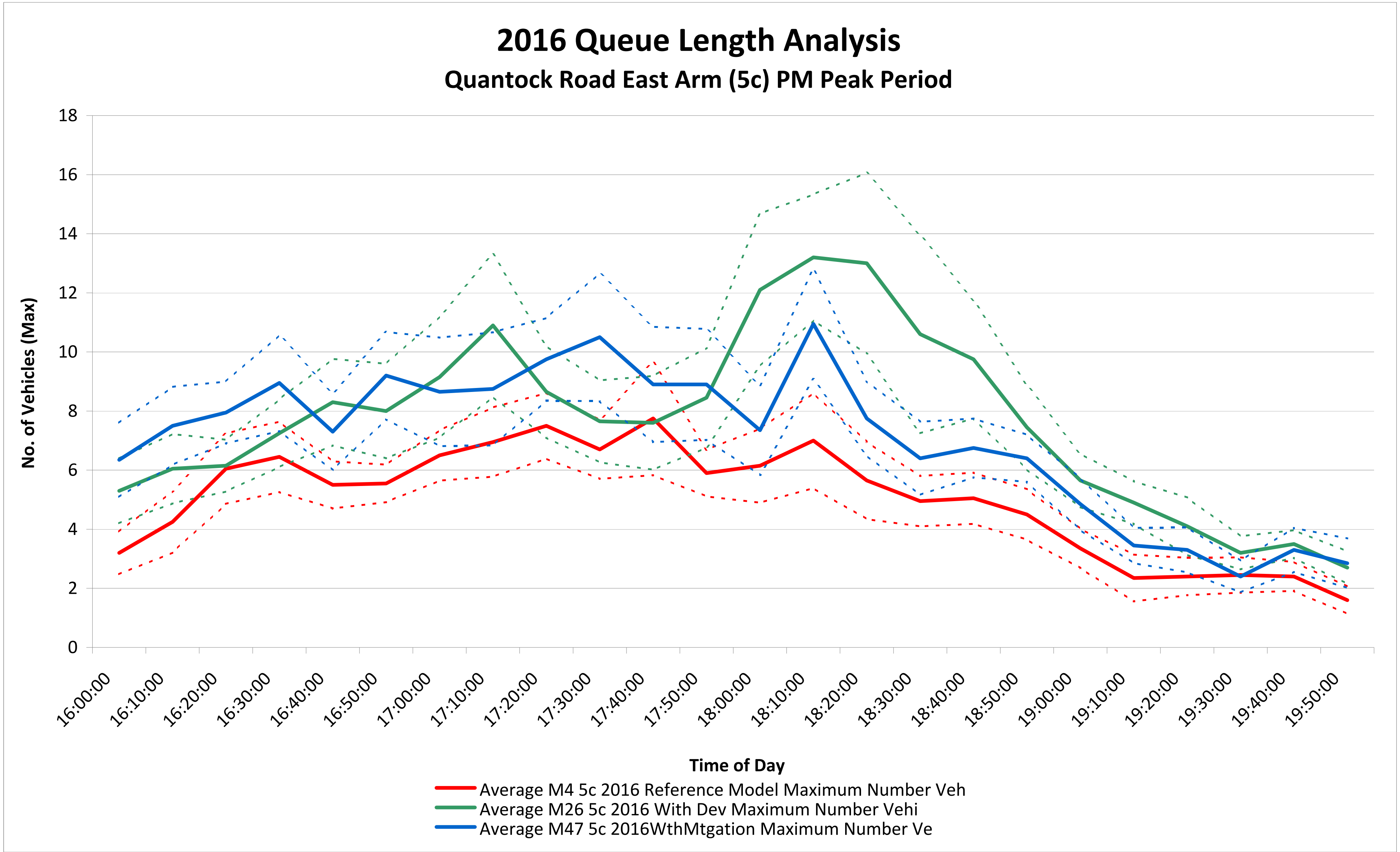


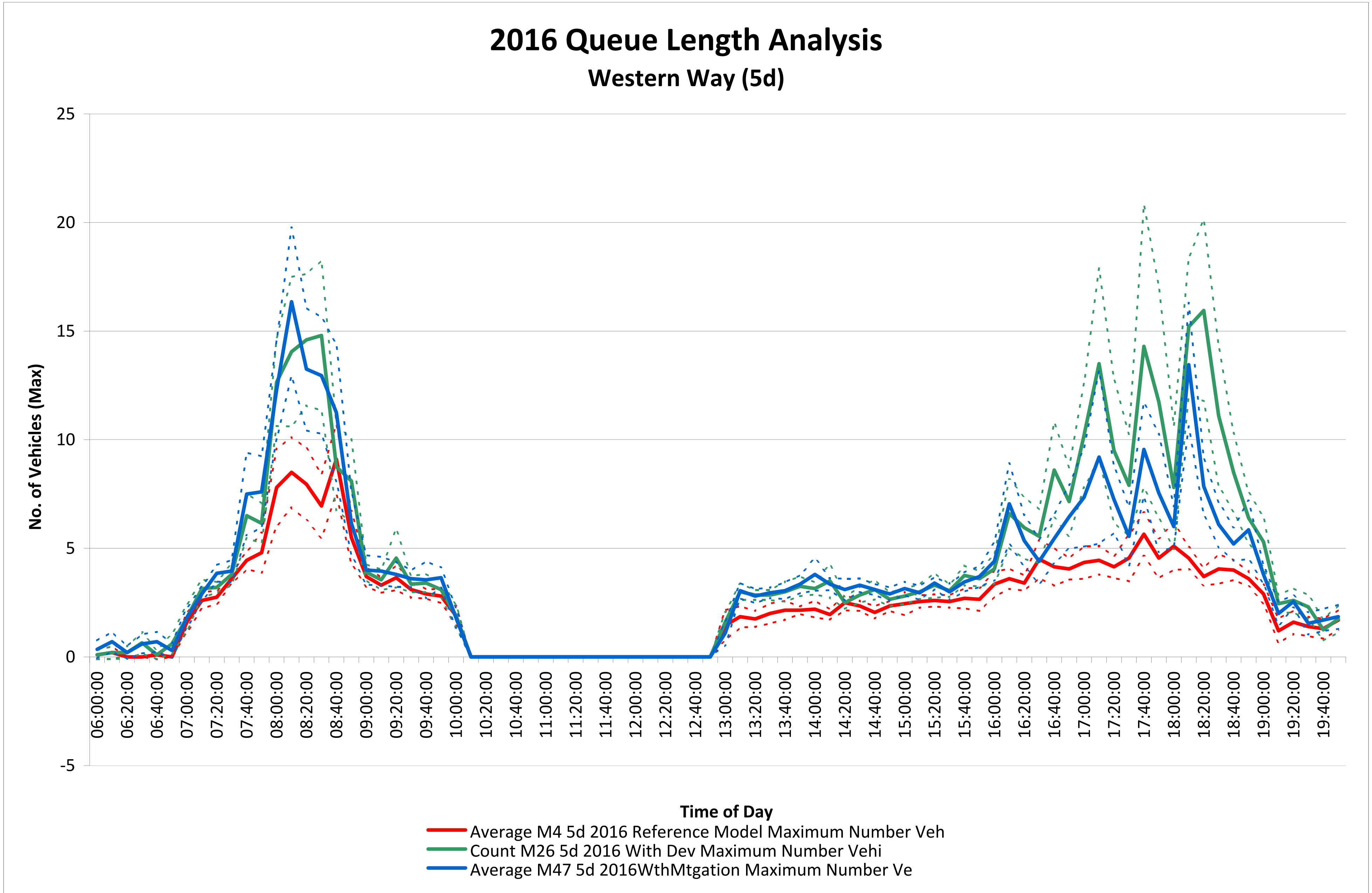
2016 Queue Length Analysis
Quantock Road West Arm (5b) PM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5b 2016 Reference Model Maximum Number Veh
Average M26 5b 2016 With Dev Maximum Number Vehi
Average M47 5b 2016WthMtgation Maximum Number Ve



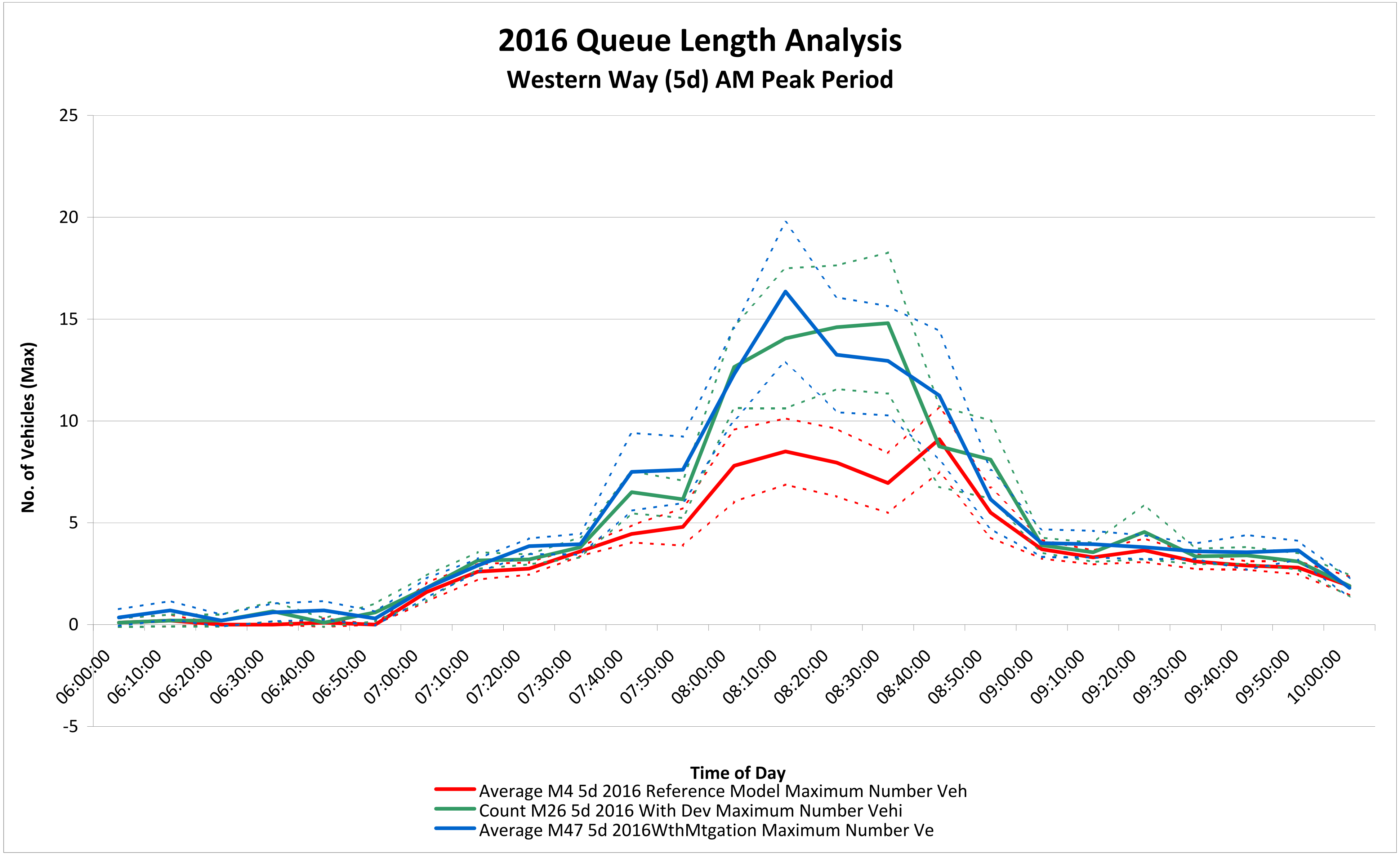
2016 Queue Length Analysis
Quantock Road East Arm (5c)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5c 2016 Reference Model Maximum Number Veh
Average M26 5c 2016 With Dev Maximum Number Vehi
Average M47 5c 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Quantock Road East Arm (5c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5c 2016 Reference Model Maximum Number Veh
Average M26 5c 2016 With Dev Maximum Number Vehi
Average M47 5c 2016WthMtgation Maximum Number Ve

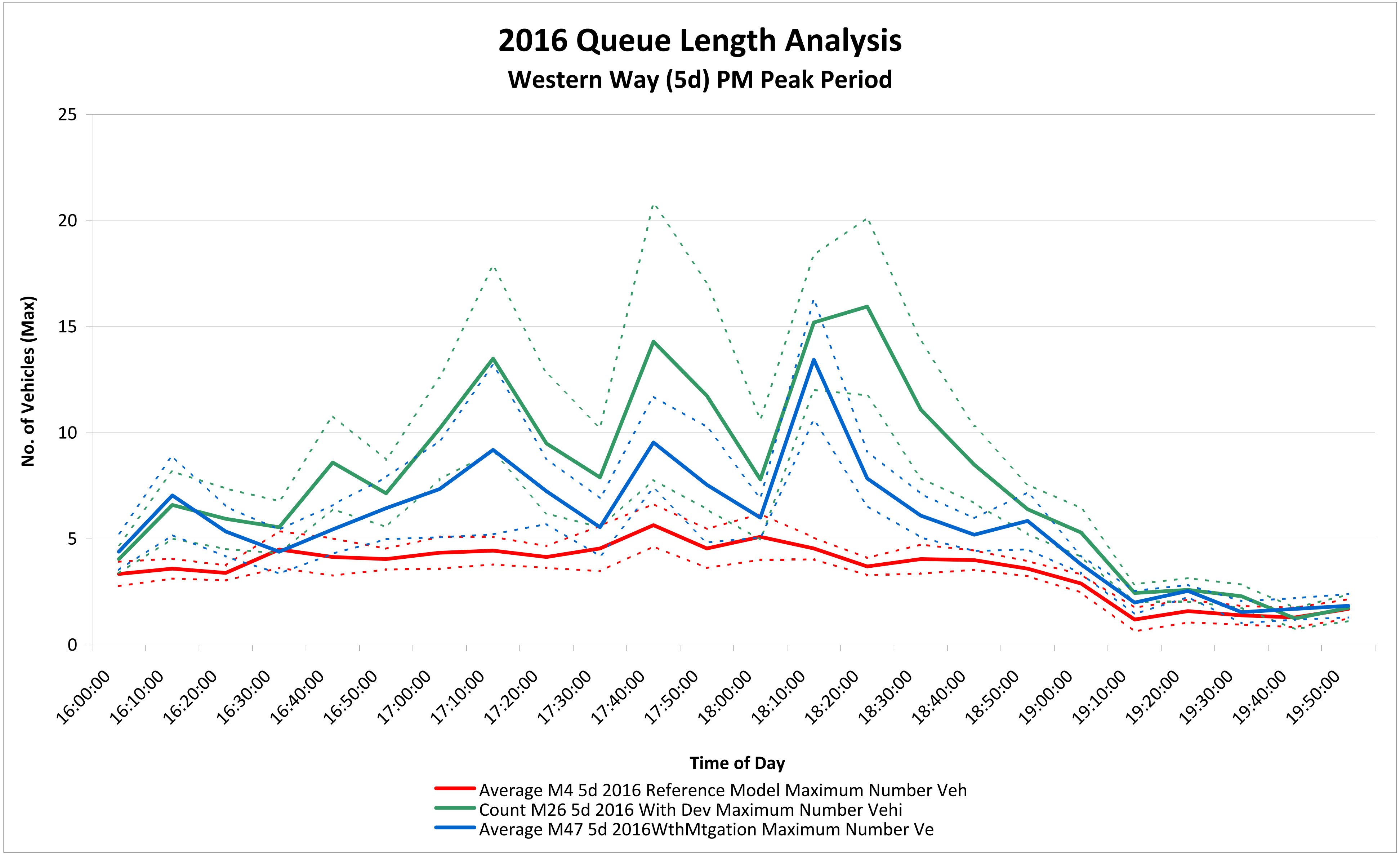

2016 Queue Length Analysis
Quantock Road East Arm (5c) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5c 2016 Reference Model Maximum Number Veh
Average M26 5c 2016 With Dev Maximum Number Vehi
Average M47 5c 2016WthMtgation Maximum Number Ve

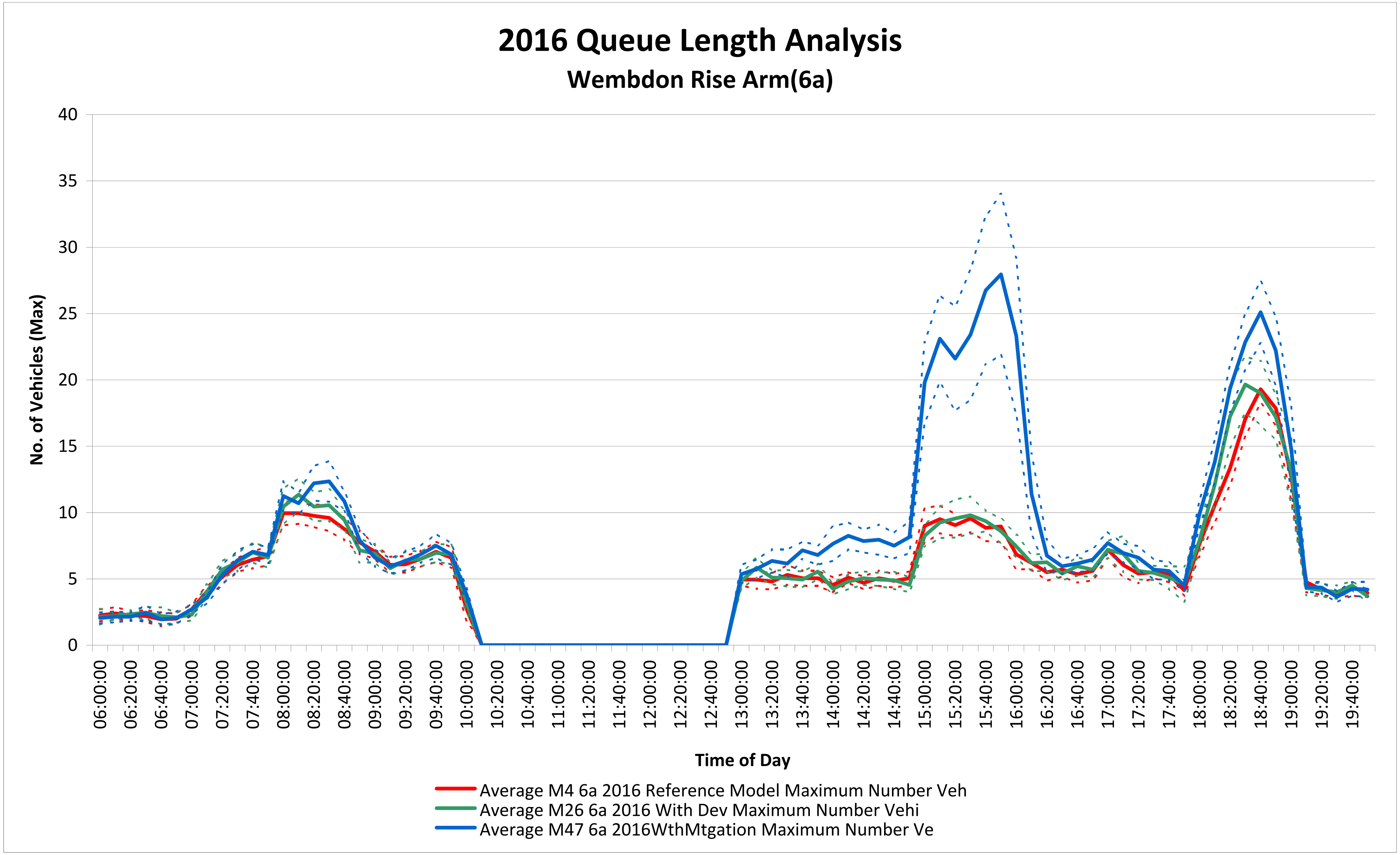


2016 Queue Length Analysis
Western Way (5d)
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5d 2016 Reference Model Maximum Number Veh
Count M26 5d 2016 With Dev Maximum Number Vehi
Average M47 5d 2016WthMtgation Maximum Number Ve



2016 Queue Length Analysis
Western Way (5d) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5d 2016 Reference Model Maximum Number Veh
Count M26 5d 2016 With Dev Maximum Number Vehi
Average M47 5d 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Western Way (5d) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5d 2016 Reference Model Maximum Number Veh
Count M26 5d 2016 With Dev Maximum Number Vehi
Average M47 5d 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Wembdon Rise Arm(6a)
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
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15:00:00
15:20:00
15:40:00
16:00:00
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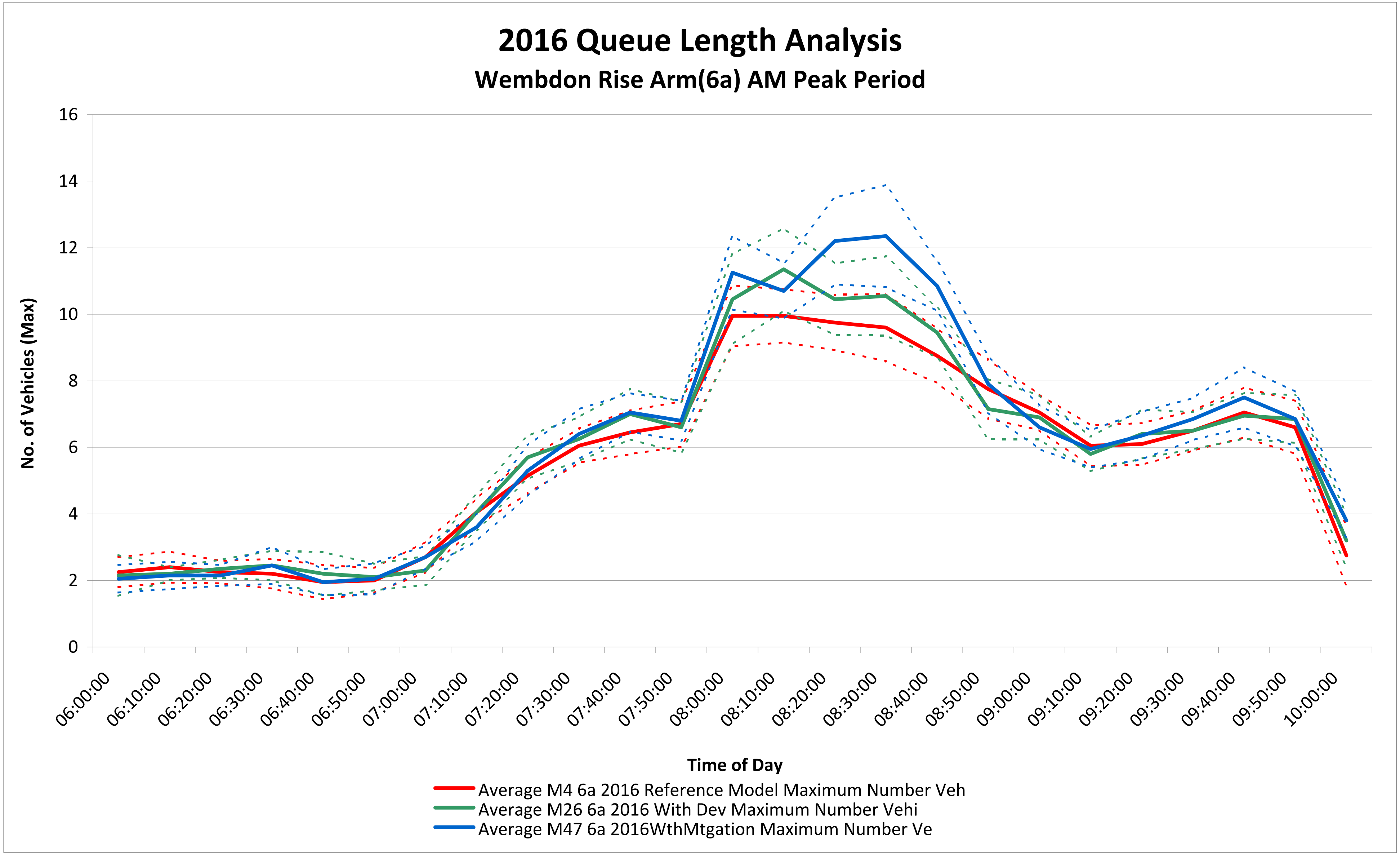
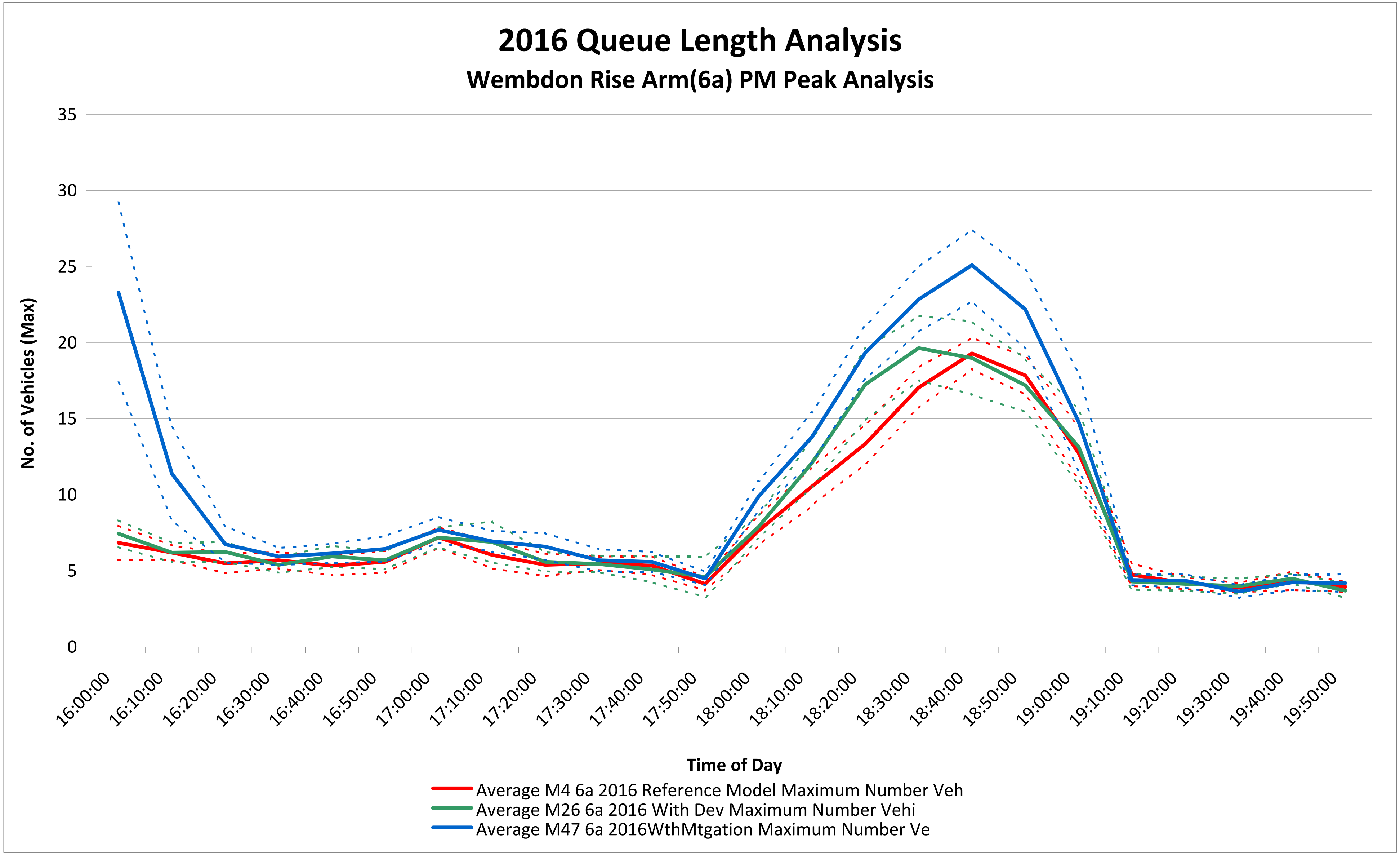
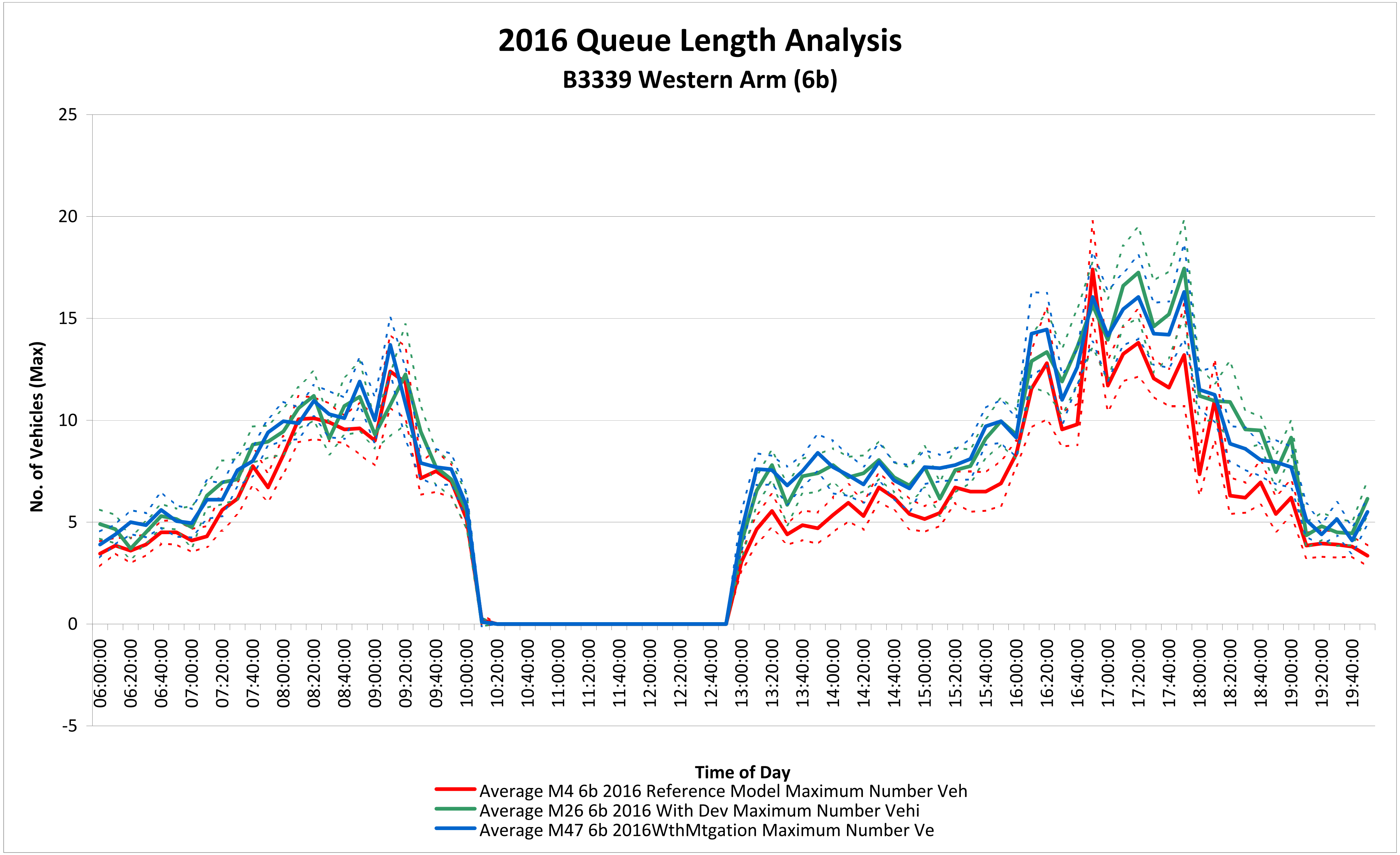
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 6a 2016 Reference Model Maximum Number Veh
Average M26 6a 2016 With Dev Maximum Number Vehi
Average M47 6a 2016WthMtgation Maximum Number Ve

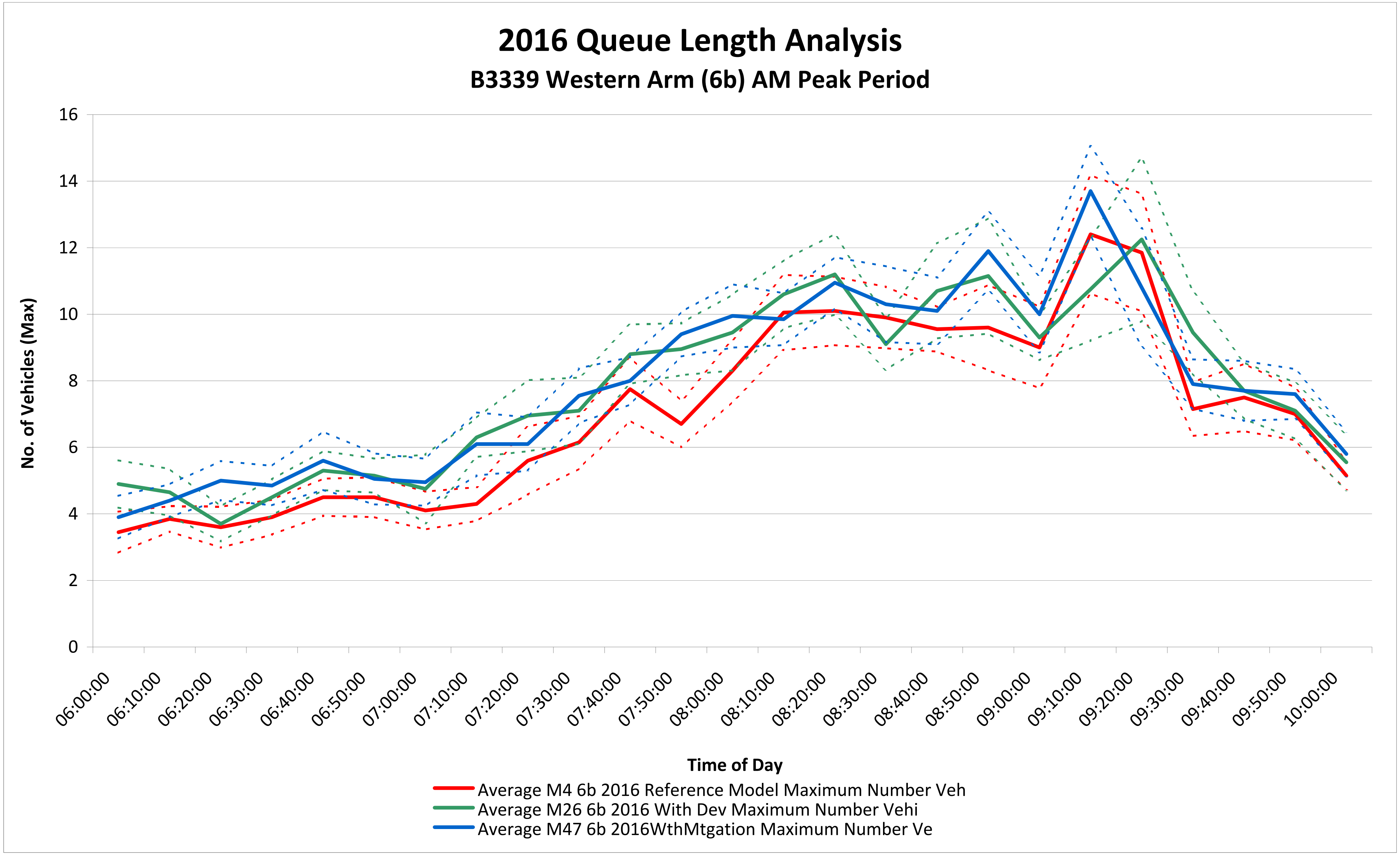


2016 Queue Length Analysis
Wembdon Rise Arm(6a) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 6a 2016 Reference Model Maximum Number Veh
Average M26 6a 2016 With Dev Maximum Number Vehi
Average M47 6a 2016WthMtgation Maximum Number Ve

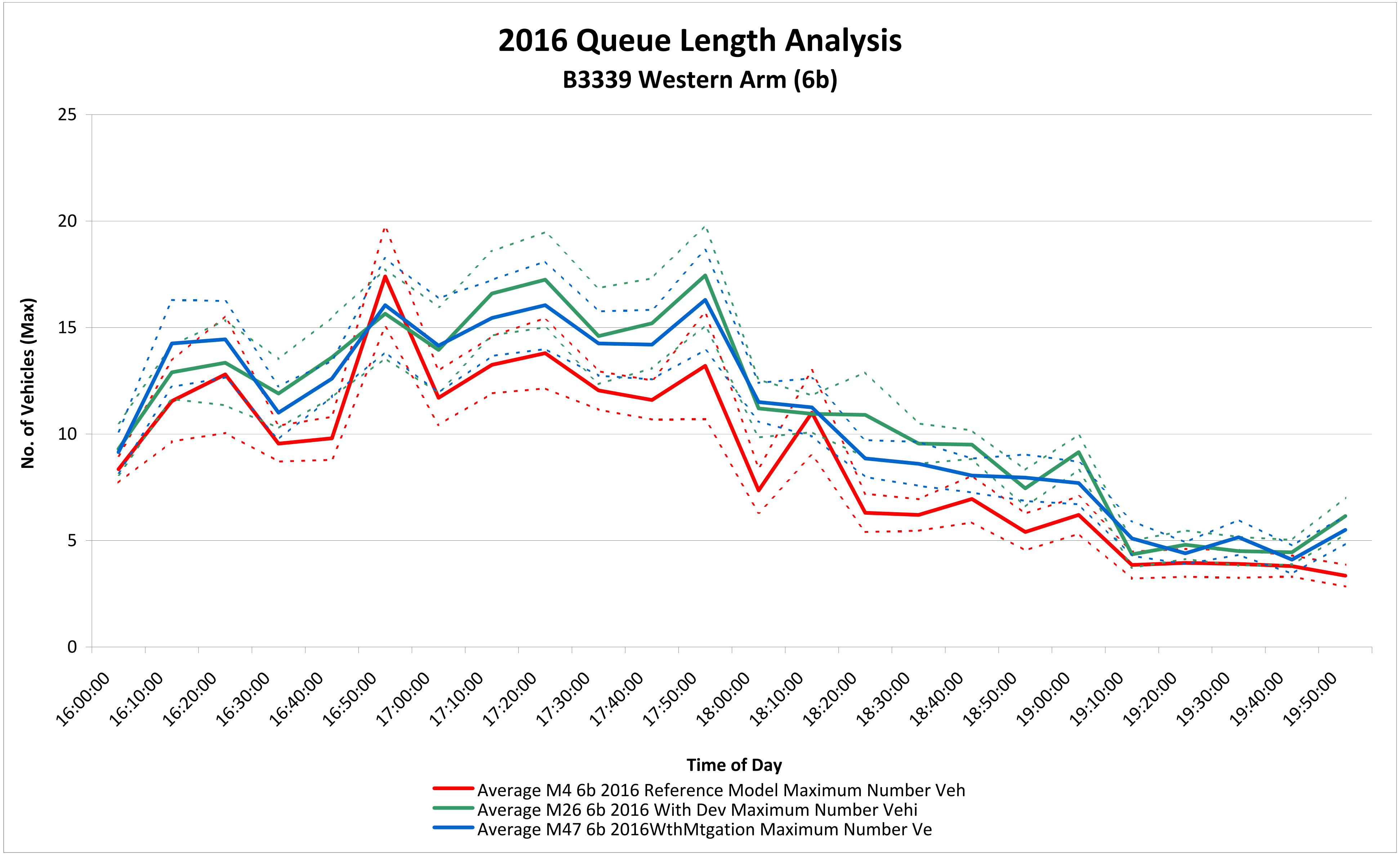


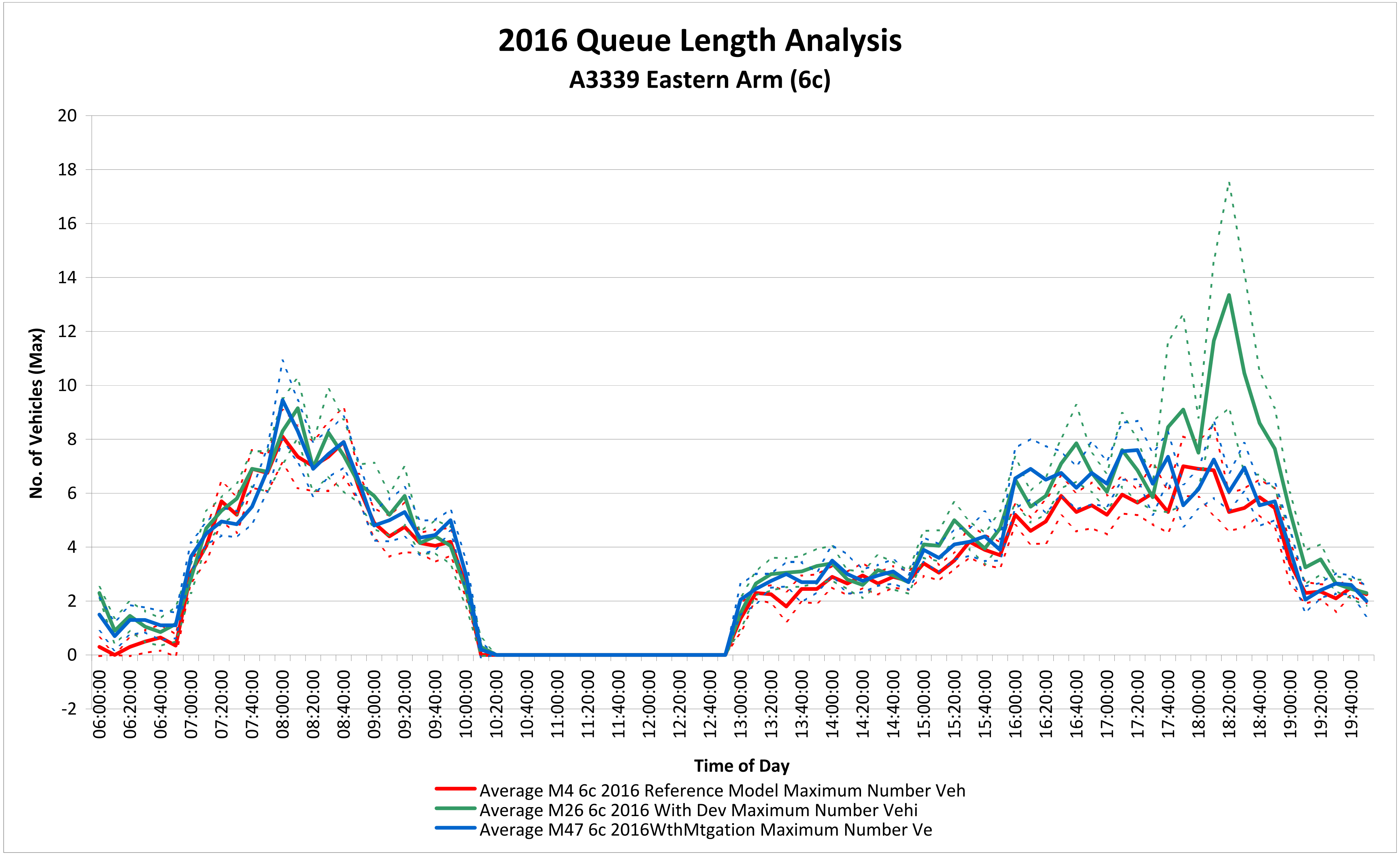
2016 Queue Length Analysis
Wembdon Rise Arm(6a) PM Peak Analysis
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 6a 2016 Reference Model Maximum Number Veh
Average M26 6a 2016 With Dev Maximum Number Vehi
Average M47 6a 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
B3339 Western Arm (6b)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 6b 2016 Reference Model Maximum Number Veh
Average M26 6b 2016 With Dev Maximum Number Vehi
Average M47 6b 2016WthMtgation Maximum Number Ve

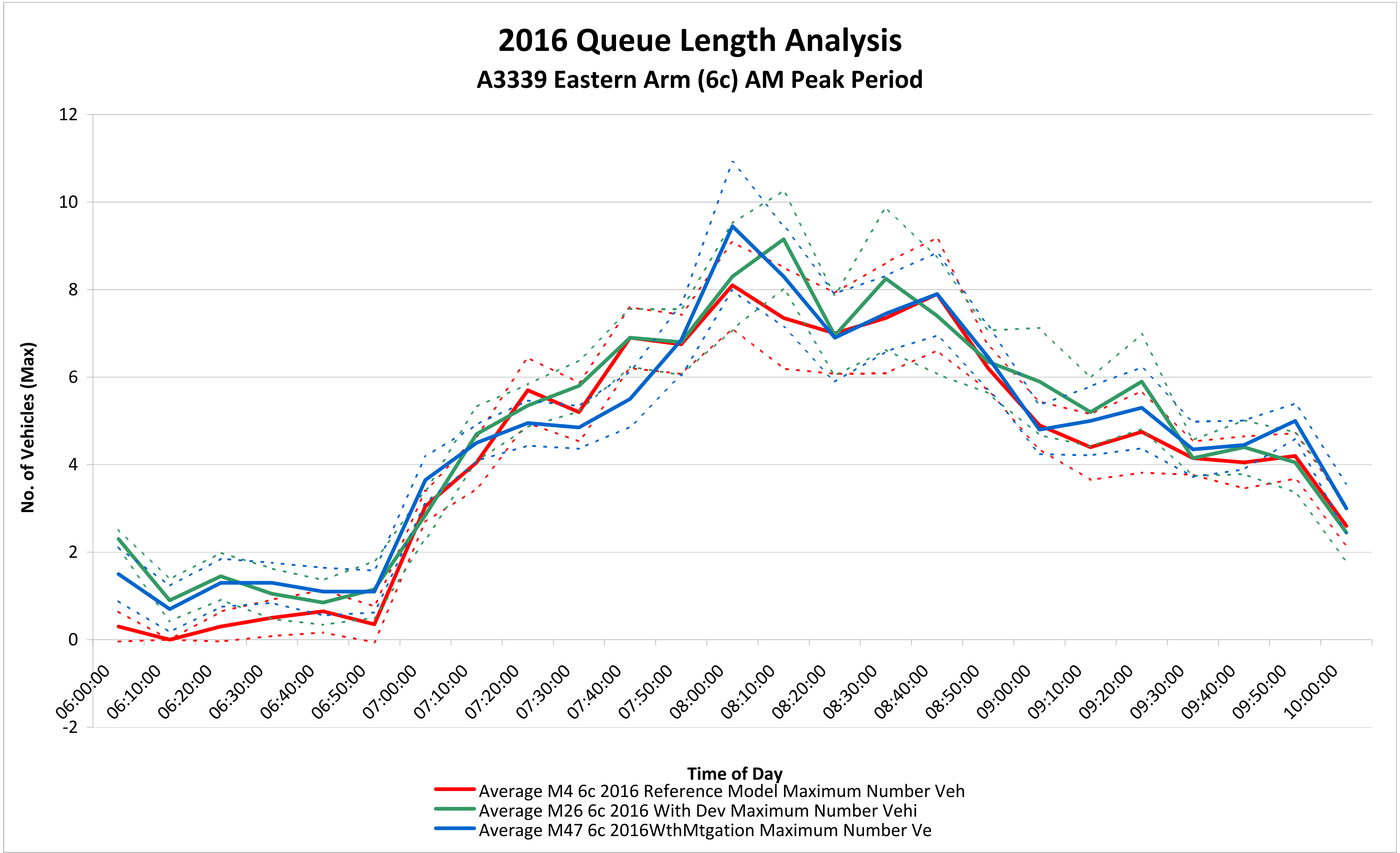


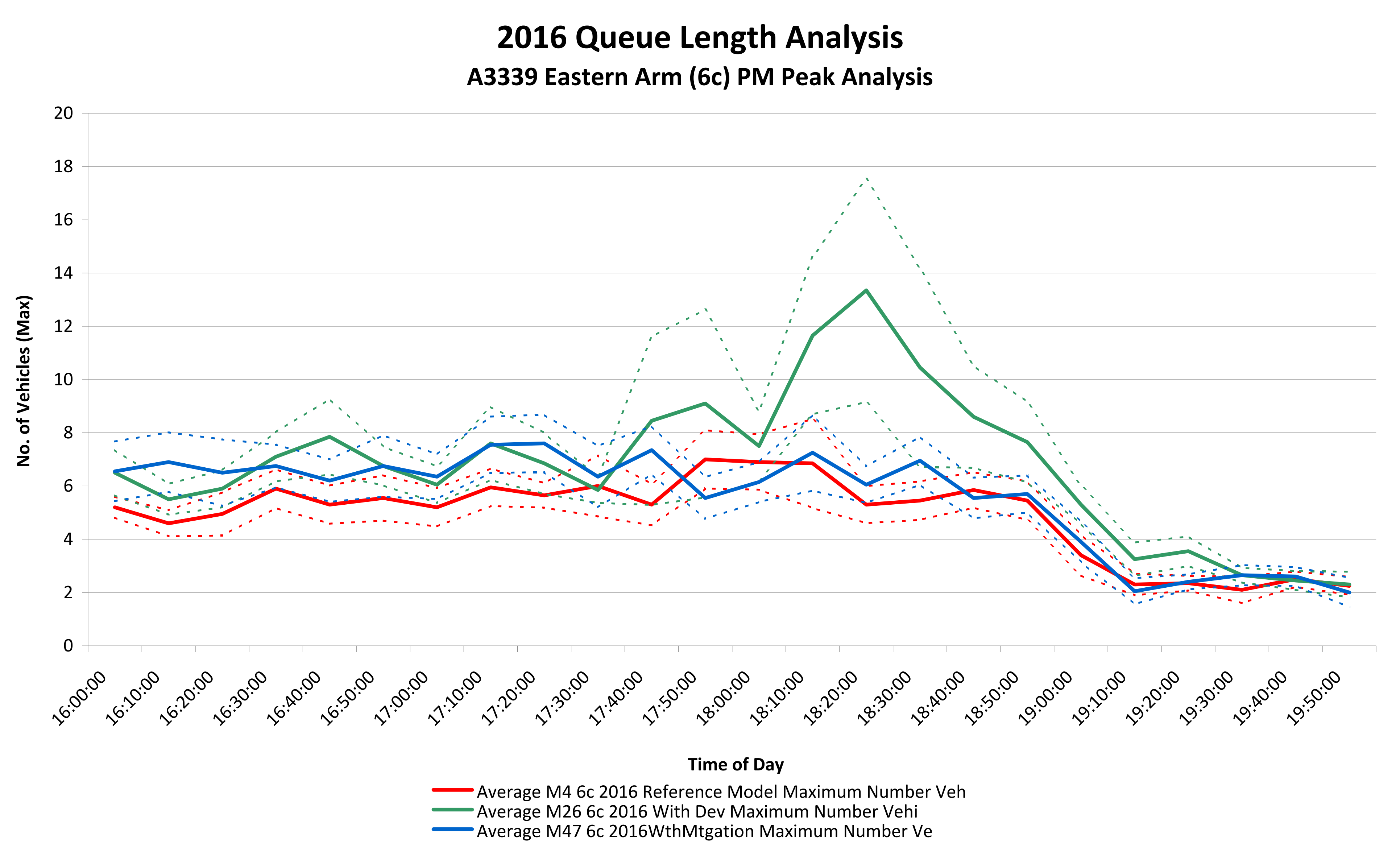
2016 Queue Length Analysis
B3339 Western Arm (6b) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 6b 2016 Reference Model Maximum Number Veh
Average M26 6b 2016 With Dev Maximum Number Vehi
Average M47 6b 2016WthMtgation Maximum Number Ve

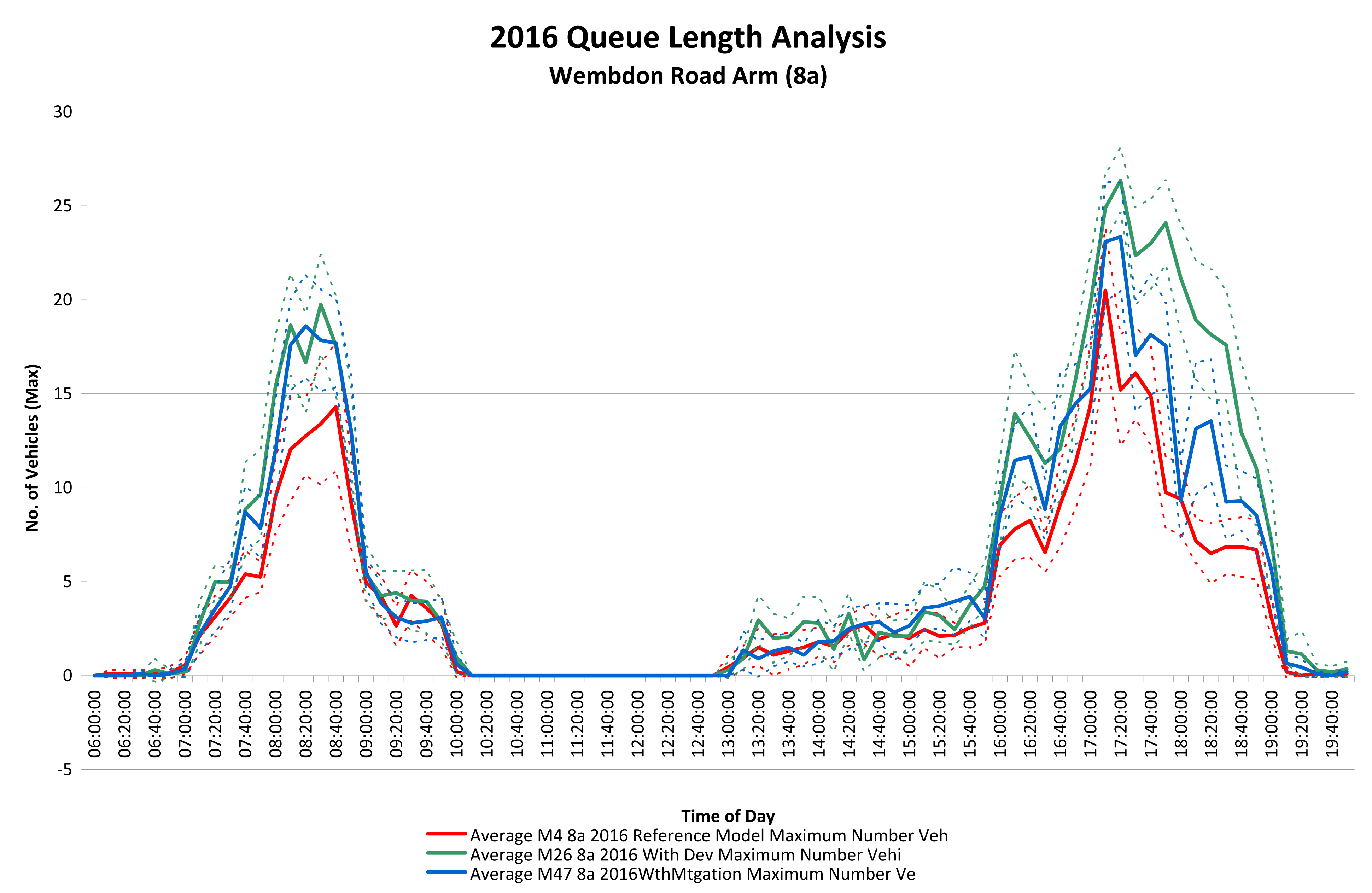

2016 Queue Length Analysis
B3339 Western Arm (6b)
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 6b 2016 Reference Model Maximum Number Veh
Average M26 6b 2016 With Dev Maximum Number Vehi
Average M47 6b 2016WthMtgation Maximum Number Ve

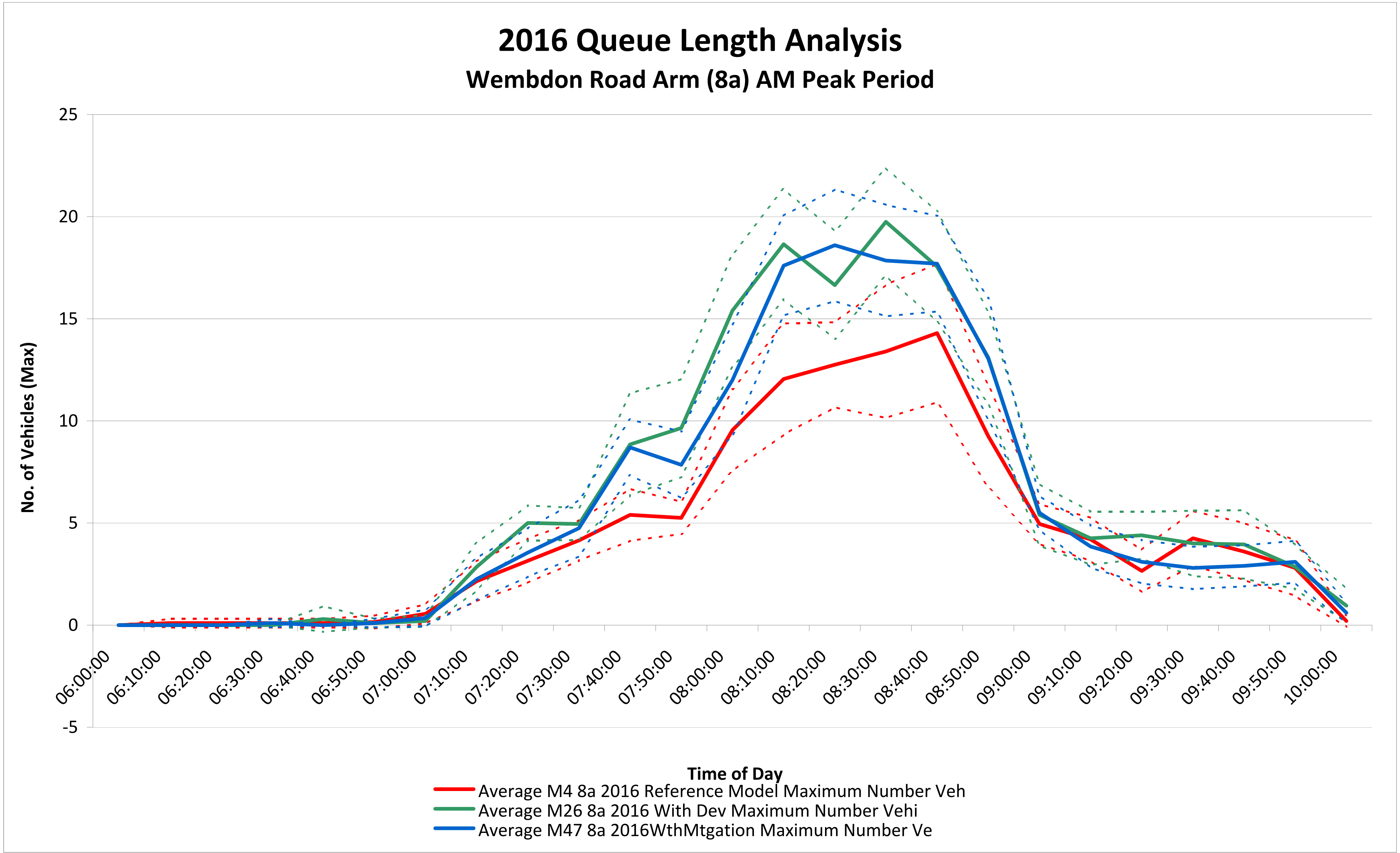


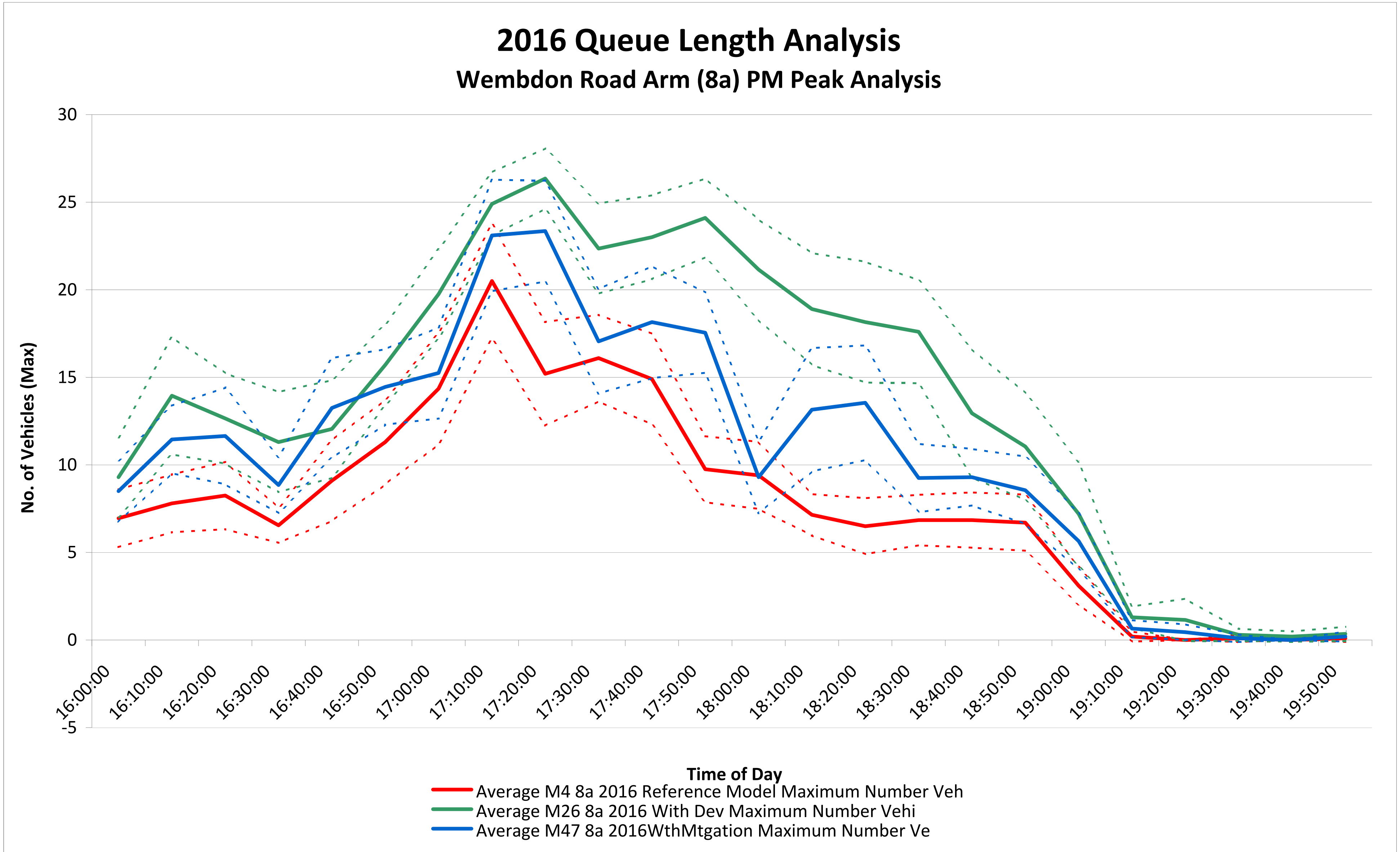
2016 Queue Length Analysis
A3339 Eastern Arm (6c)
No. of Vehicles (Max)
Time of Day
Average M4 6c 2016 Reference Model Maximum Number Veh
Average M26 6c 2016 With Dev Maximum Number Vehi
Average M47 6c 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
A3339 Eastern Arm (6c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 6c 2016 Reference Model Maximum Number Veh
Average M26 6c 2016 With Dev Maximum Number Vehi
Average M47 6c 2016WthMtgation Maximum Number Ve

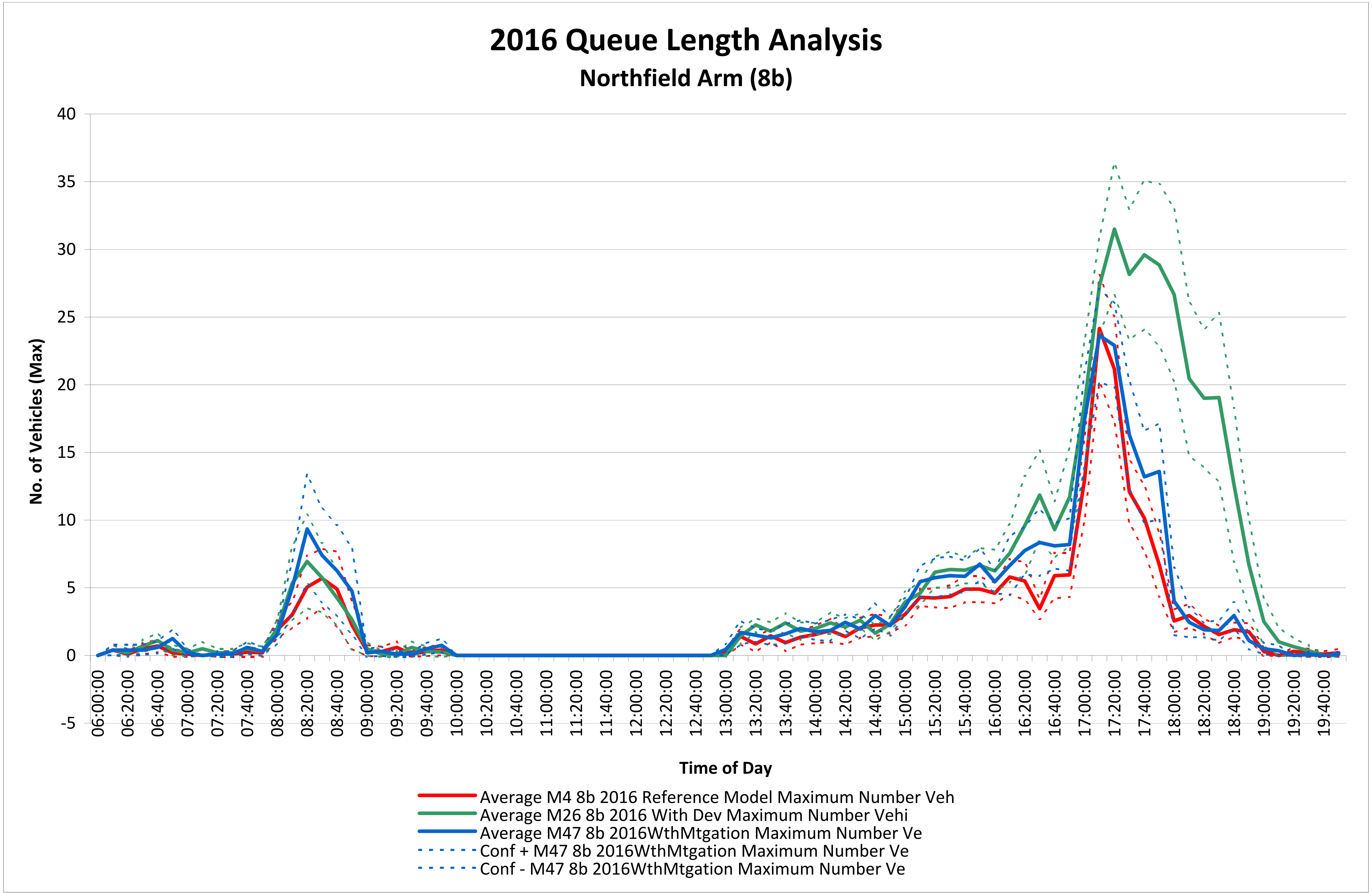

2016 Queue Length Analysis
A3339 Eastern Arm (6c) PM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 6c 2016 Reference Model Maximum Number Veh
Average M26 6c 2016 With Dev Maximum Number Vehi
Average M47 6c 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Wembdon Road Arm (8a)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 8a 2016 Reference Model Maximum Number Veh
Average M26 8a 2016 With Dev Maximum Number Vehi
Average M47 8a 2016WthMtgation Maximum Number Ve

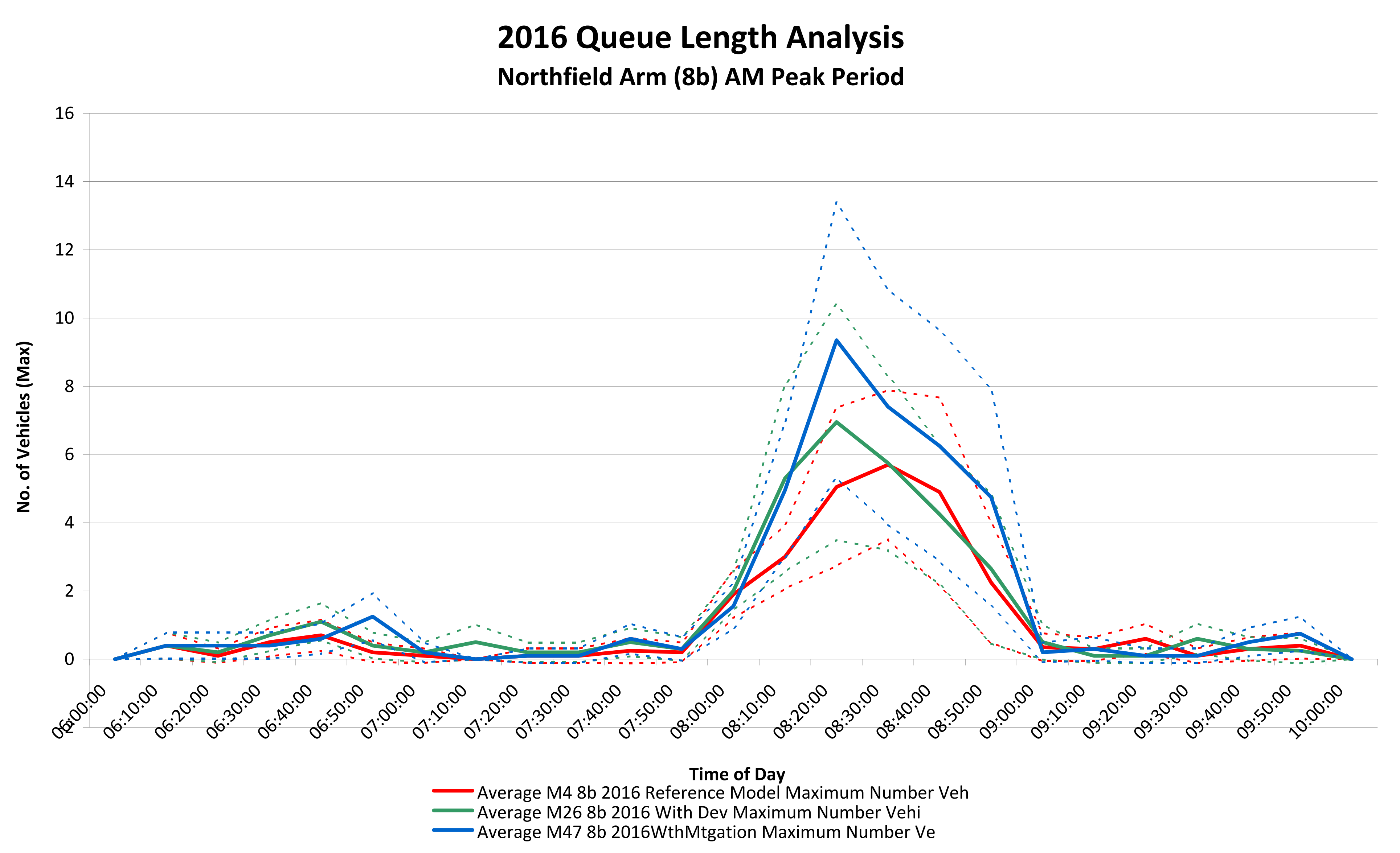

2016 Queue Length Analysis
Wembdon Road Arm (8a) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 8a 2016 Reference Model Maximum Number Veh
Average M26 8a 2016 With Dev Maximum Number Vehi
Average M47 8a 2016WthMtgation Maximum Number Ve

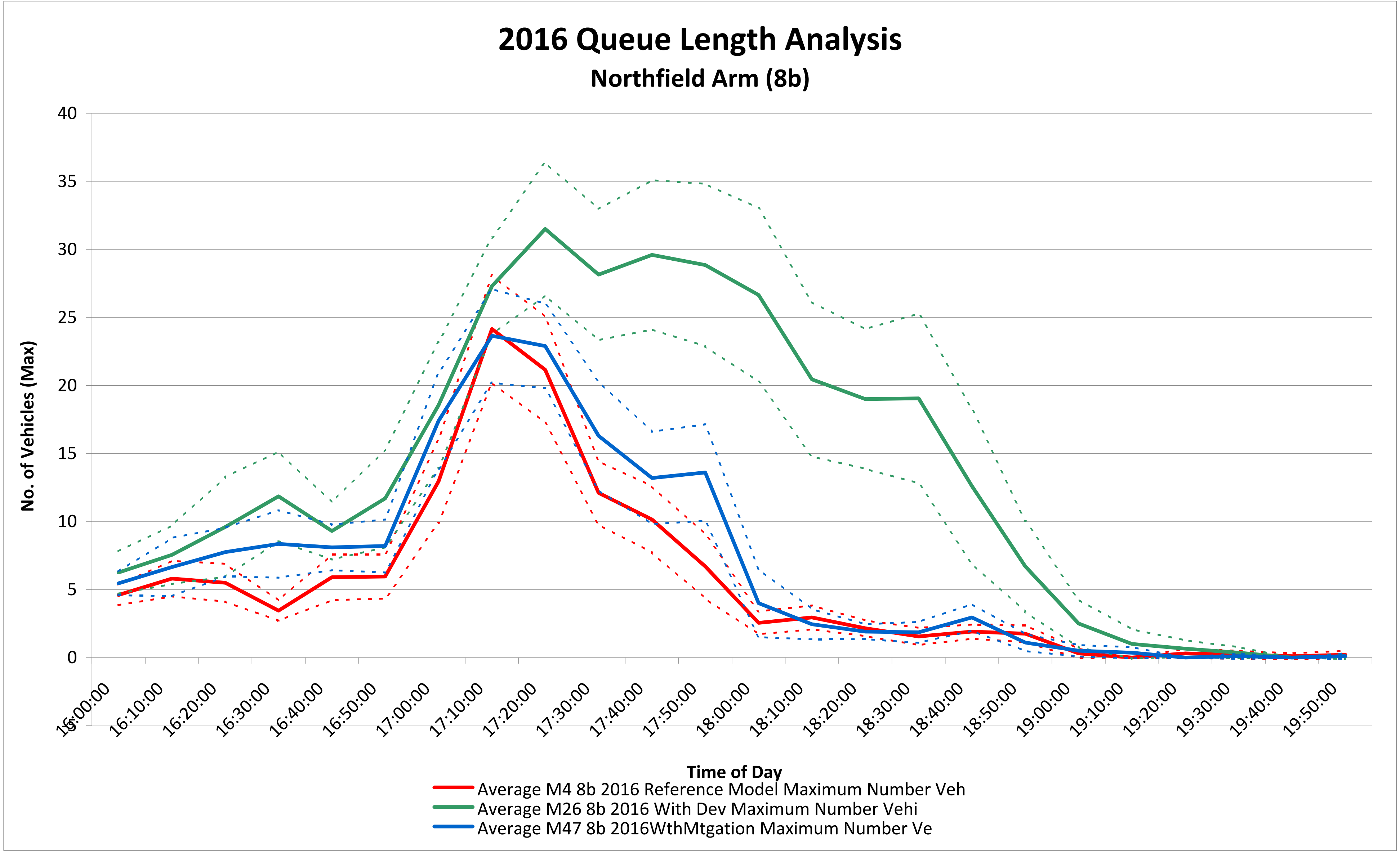


2016 Queue Length Analysis
Wembdon Road Arm (8a) PM Peak Analysis
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 8a 2016 Reference Model Maximum Number Veh
Average M26 8a 2016 With Dev Maximum Number Vehi
Average M47 8a 2016WthMtgation Maximum Number Ve

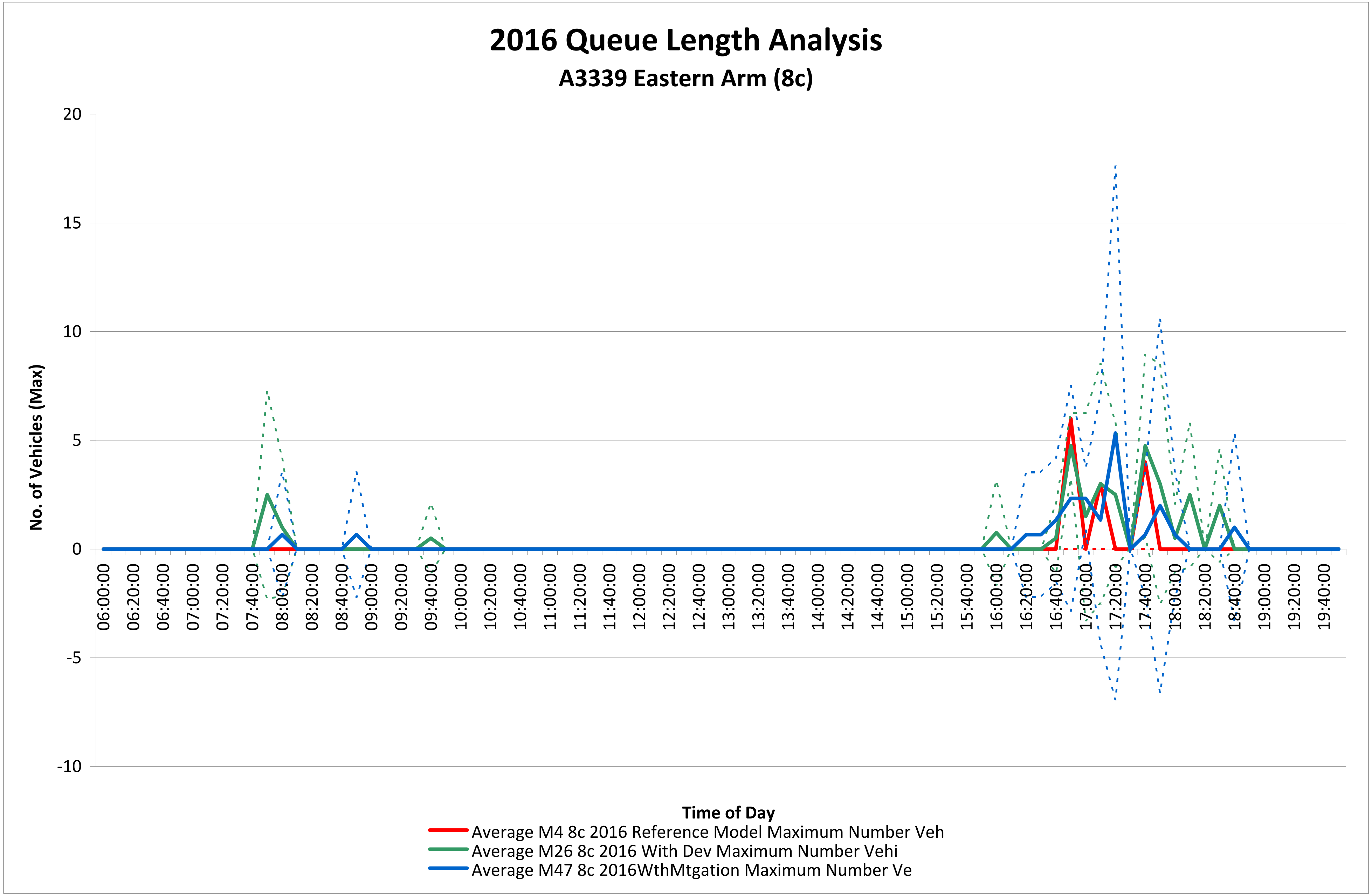


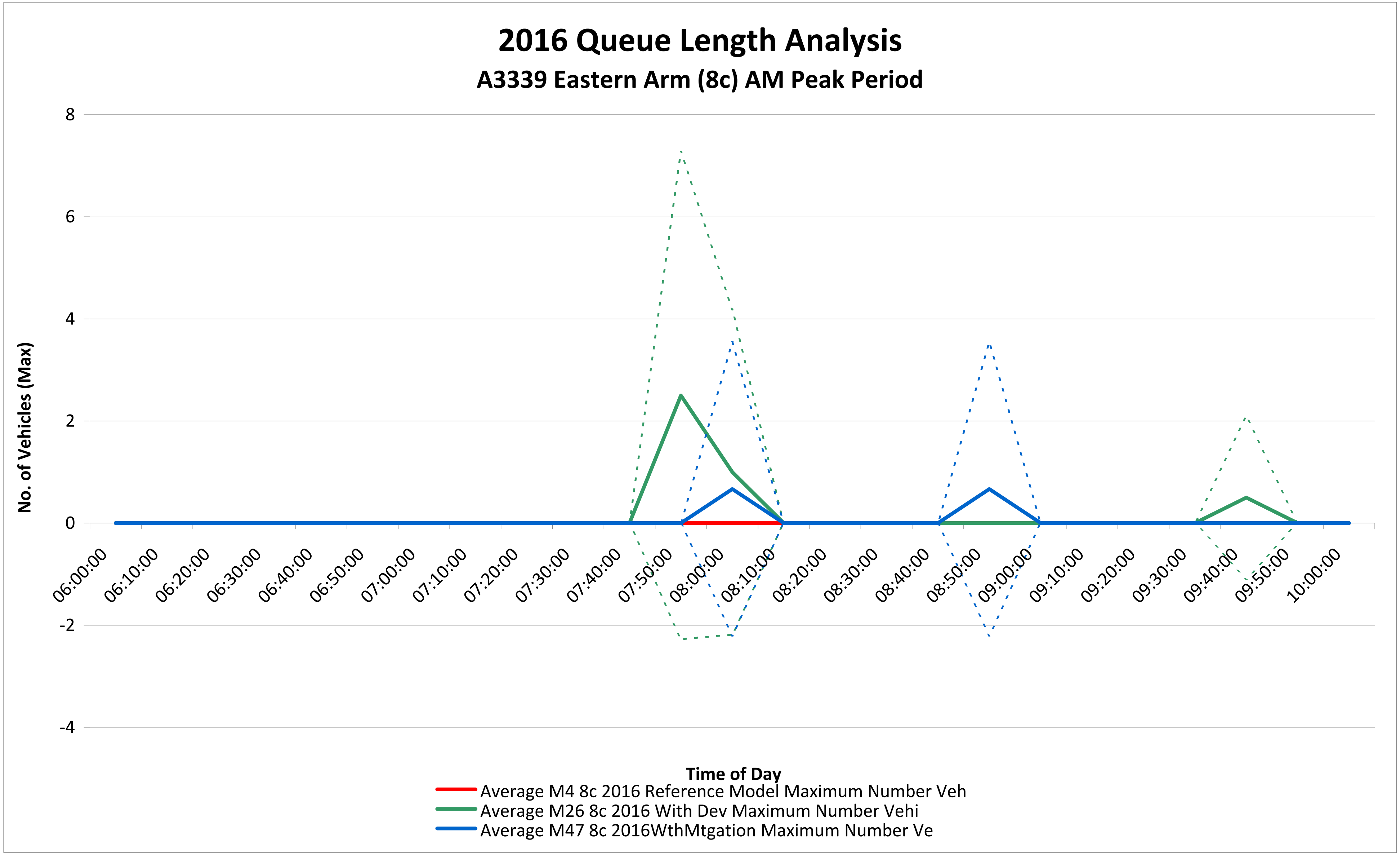
2016 Queue Length Analysis
Northfield Arm (8b)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 8b 2016 Reference Model Maximum Number Veh
Average M26 8b 2016 With Dev Maximum Number Vehi
Average M47 8b 2016WthMtgation Maximum Number Ve
Conf + M47 8b 2016WthMtgation Maximum Number Ve
Conf - M47 8b 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
Northfield Arm (8b) AM Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 8b 2016 Reference Model Maximum Number Veh
Average M26 8b 2016 With Dev Maximum Number Vehi
Average M47 8b 2016WthMtgation Maximum Number Ve

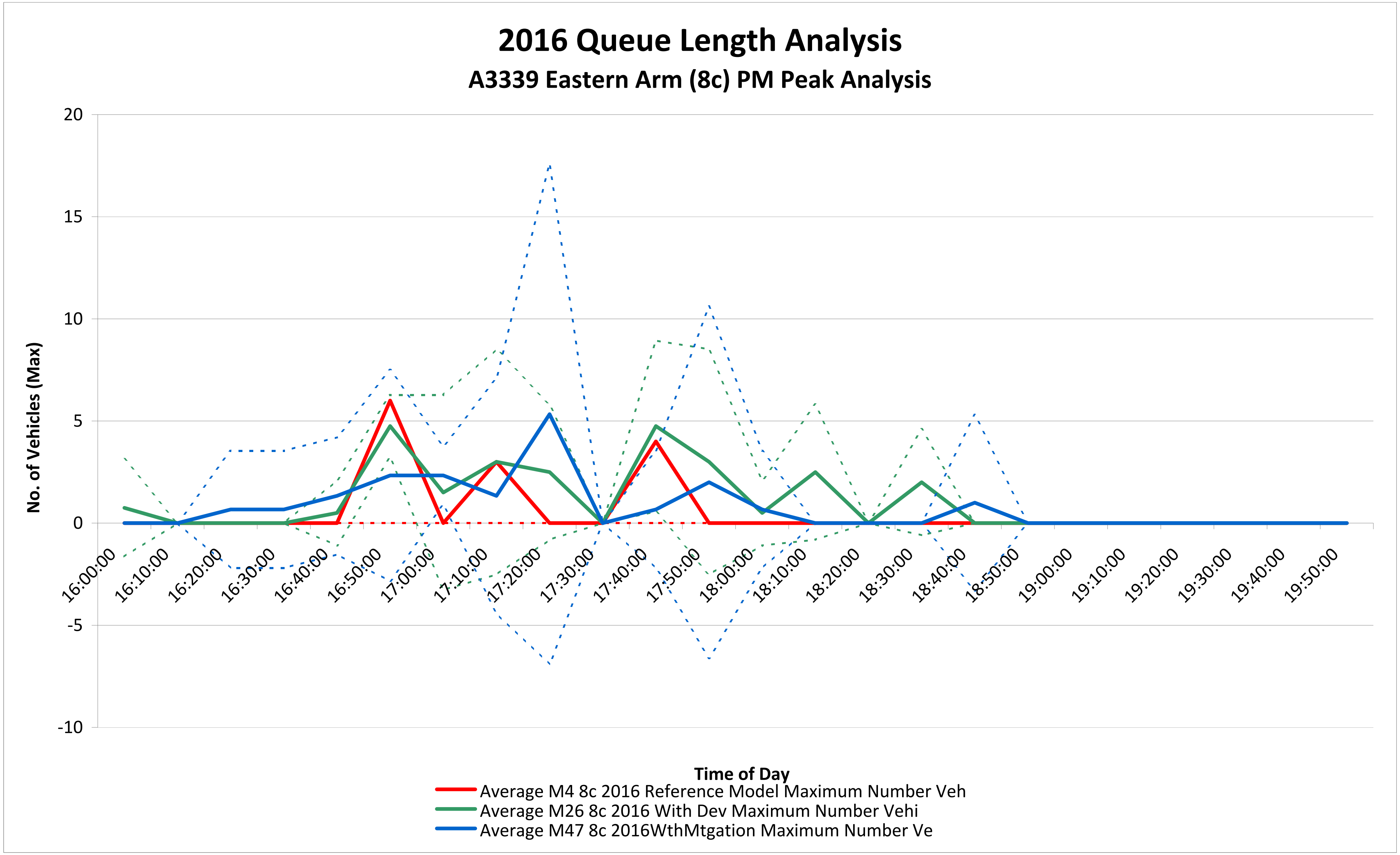


2016 Queue Length Analysis
Northfield Arm (8b)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
-5
Time of Day
Average M4 8b 2016 Reference Model Maximum Number Veh
Average M26 8b 2016 With Dev Maximum Number Vehi
Average M47 8b 2016WthMtgation Maximum Number Ve

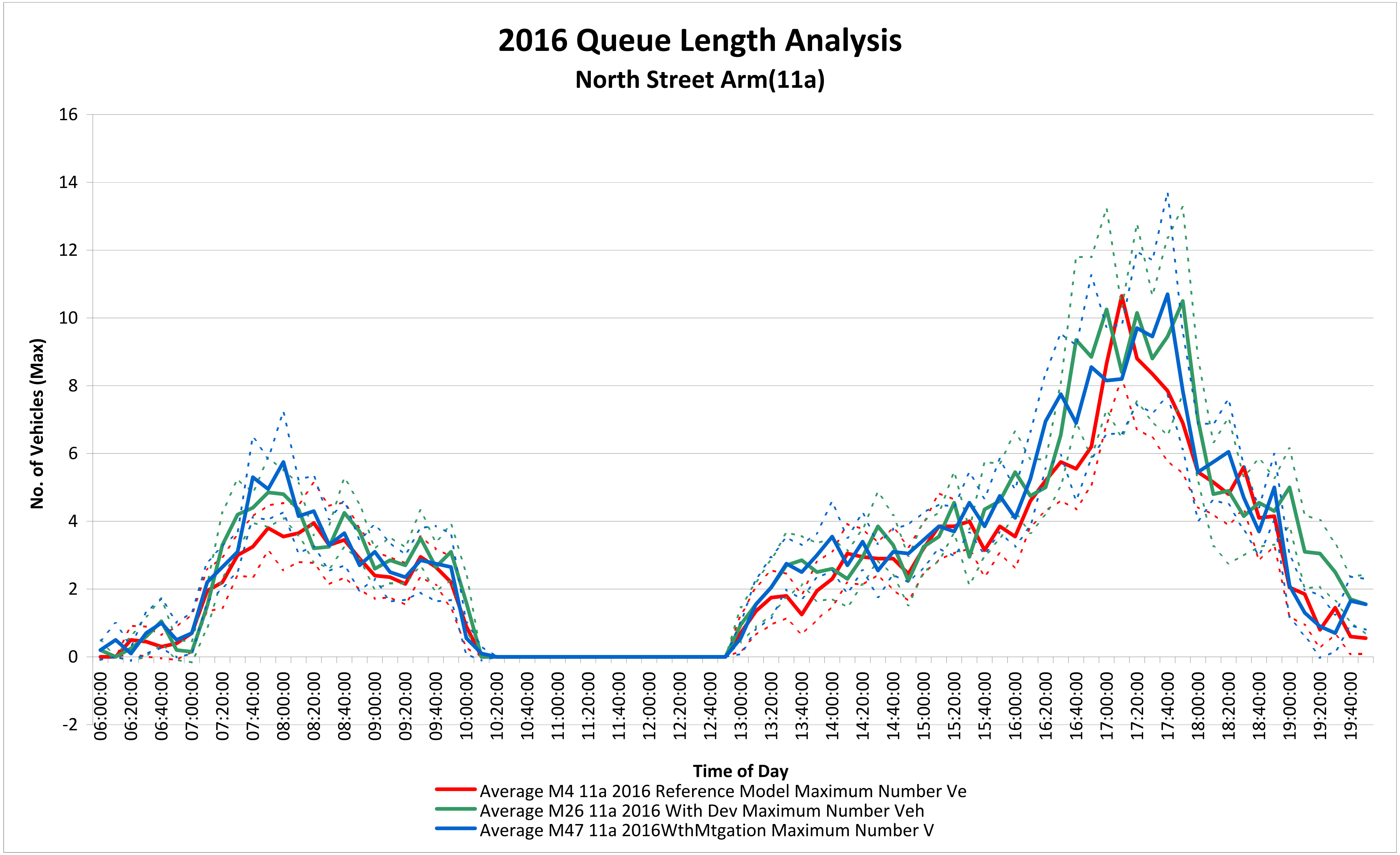

2016 Queue Length Analysis
A3339 Eastern Arm (8c)
20
15
10
5
0
-5
-10
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 8c 2016 Reference Model Maximum Number Veh
Average M26 8c 2016 With Dev Maximum Number Vehi
Average M47 8c 2016WthMtgation Maximum Number Ve

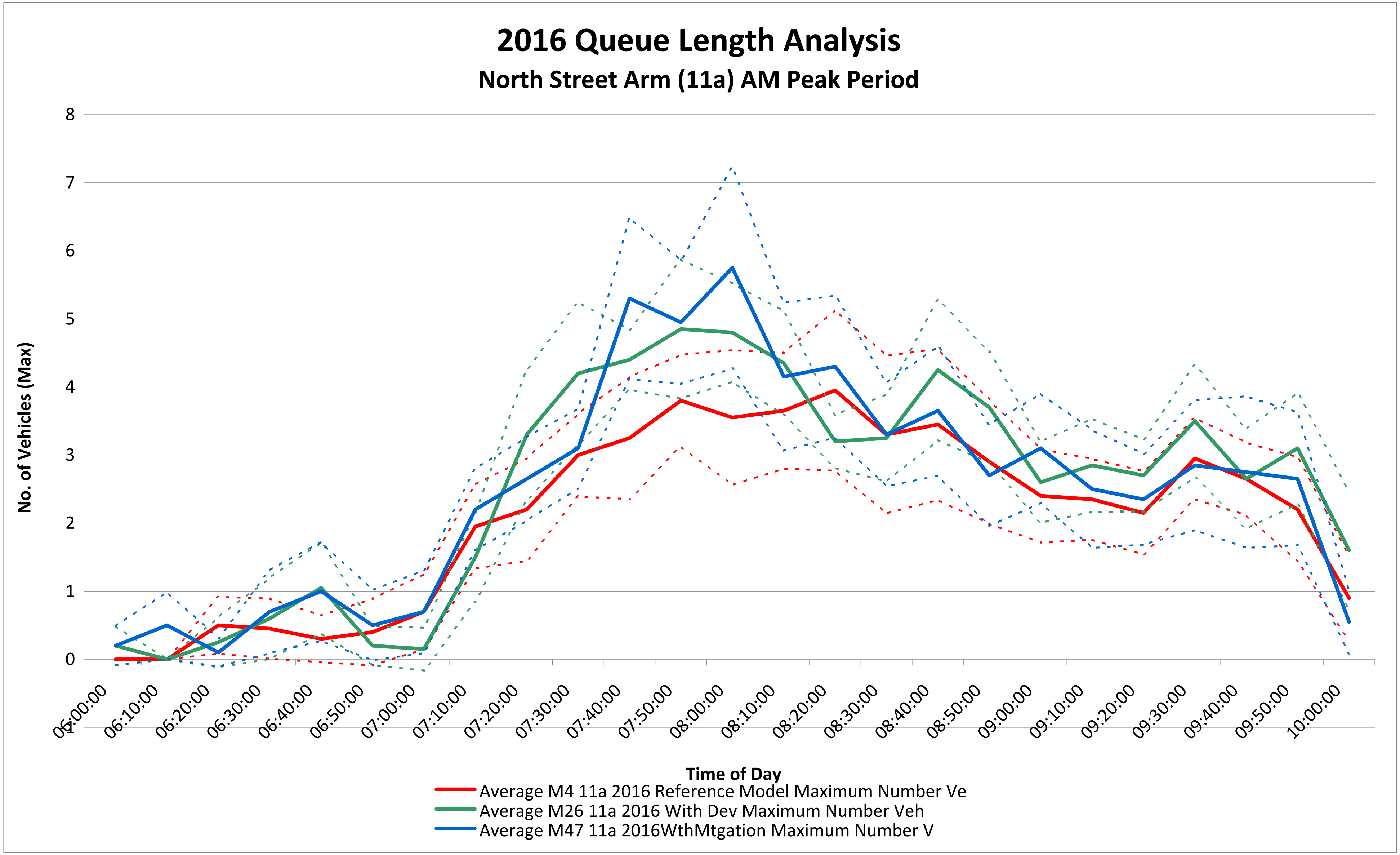


2016 Queue Length Analysis
A3339 Eastern Arm (8c) AM Peak Period
No. of Vehicles (Max)
8
6
4
2
0
-2
-4
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 8c 2016 Reference Model Maximum Number Veh
Average M26 8c 2016 With Dev Maximum Number Vehi
Average M47 8c 2016WthMtgation Maximum Number Ve

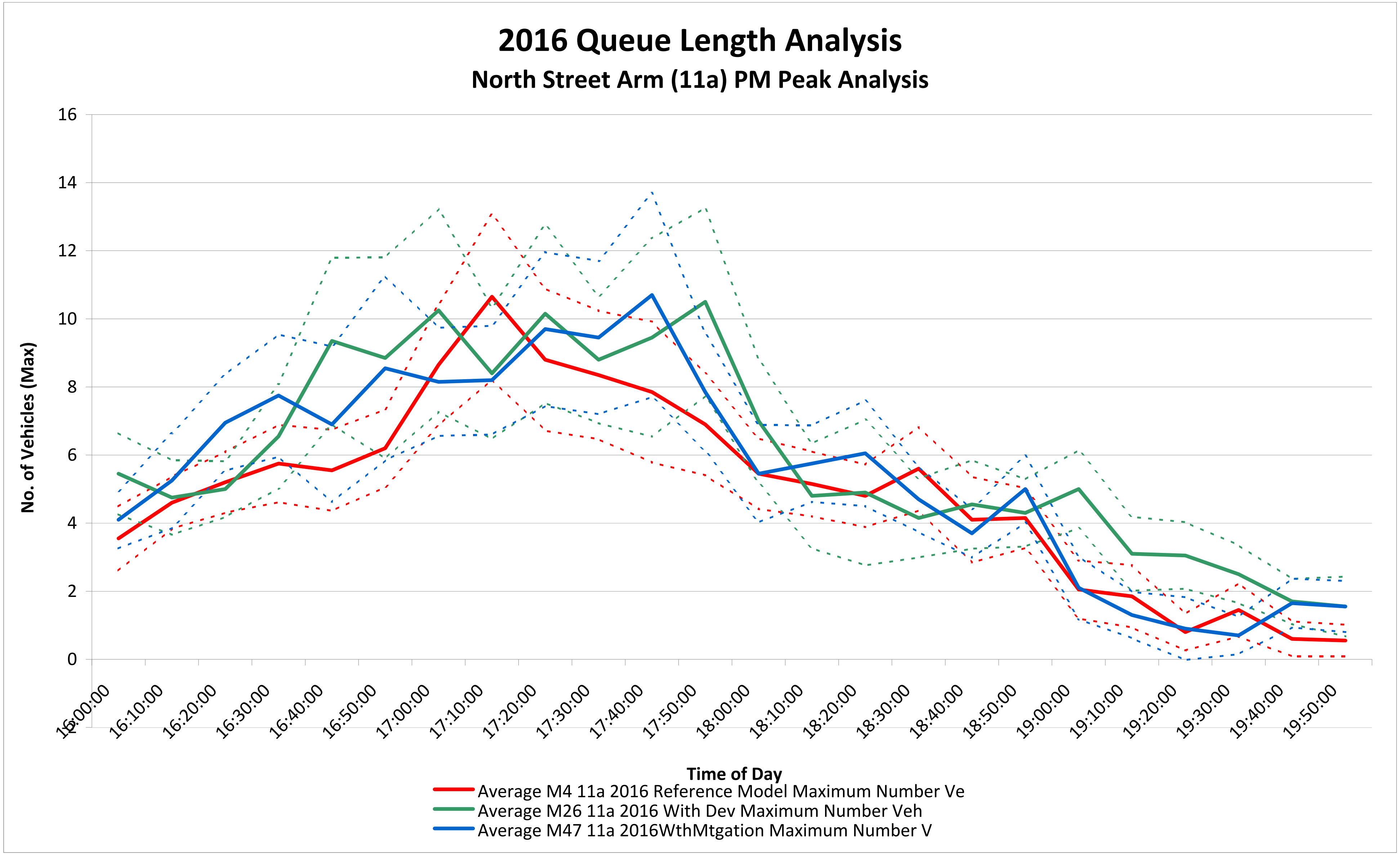


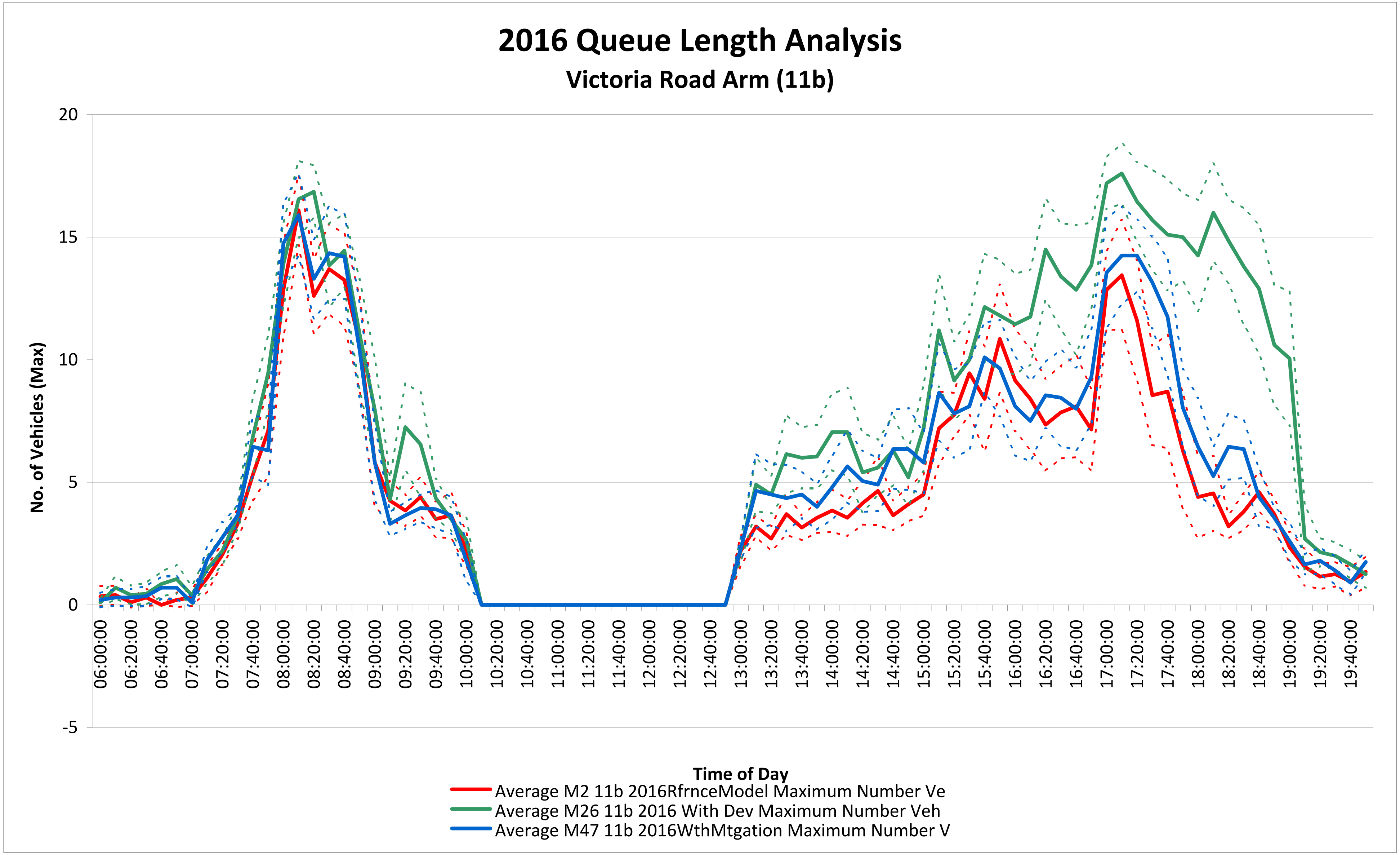
2016 Queue Length Analysis
A3339 Eastern Arm (8c) PM Peak Analysis
20
15
10
5
0
-5
-10
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 8c 2016 Reference Model Maximum Number Veh
Average M26 8c 2016 With Dev Maximum Number Vehi
Average M47 8c 2016WthMtgation Maximum Number Ve


2016 Queue Length Analysis
North Street Arm(11a)
No. of Vehicles (Max)
Time of Day
Average M4 11a 2016 Reference Model Maximum Number Ve
Average M26 11a 2016 With Dev Maximum Number Veh
Average M47 11a 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
North Street Arm (11a) AM Peak Period
No. of Vehicles (Max)
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 11a 2016 Reference Model Maximum Number Ve
Average M26 11a 2016 With Dev Maximum Number Veh
Average M47 11a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
North Street Arm (11a) PM Peak Analysis
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 11a 2016 Reference Model Maximum Number Ve
Average M26 11a 2016 With Dev Maximum Number Veh
Average M47 11a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Victoria Road Arm (11b)
No. of Vehicles (Max)
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
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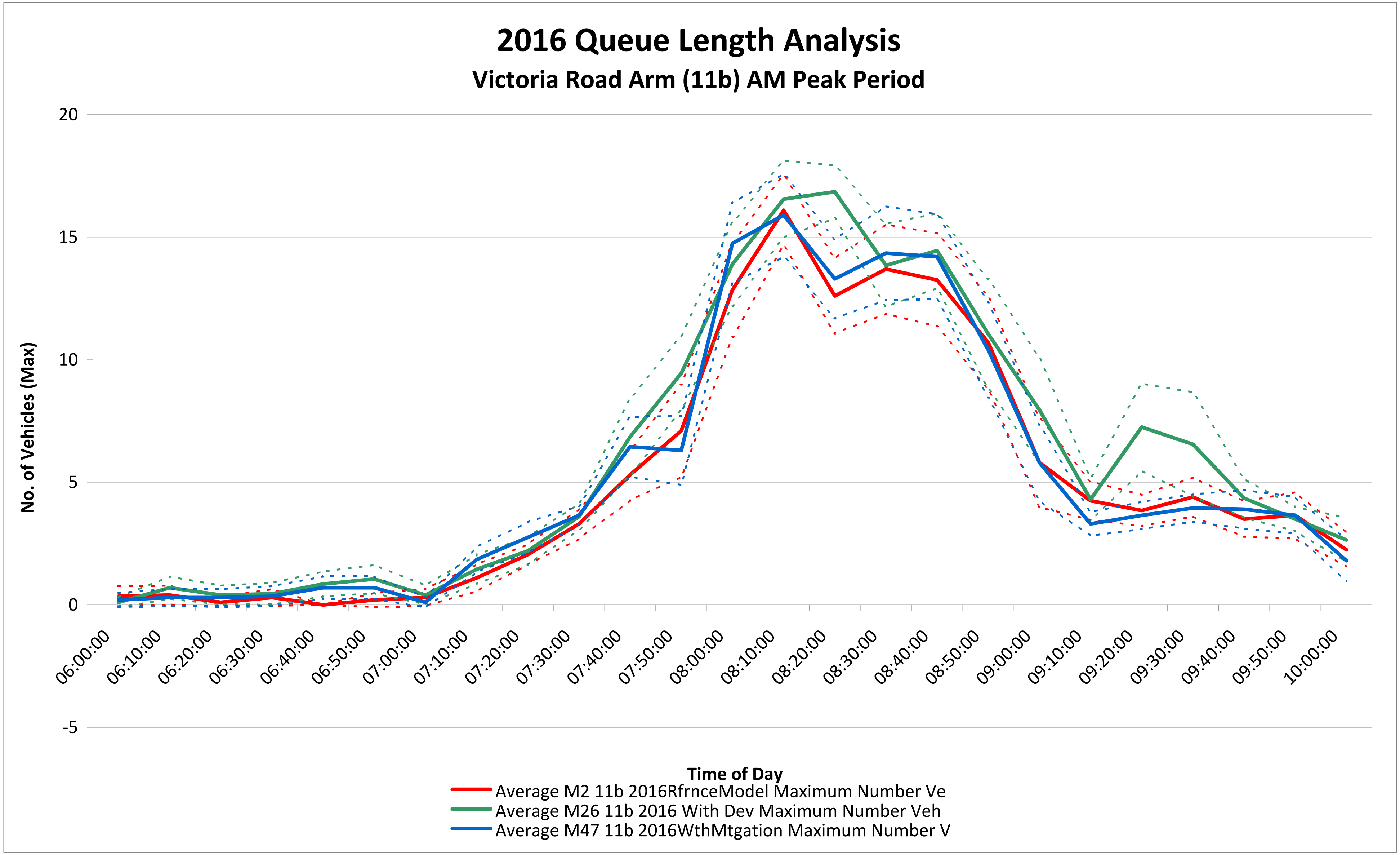
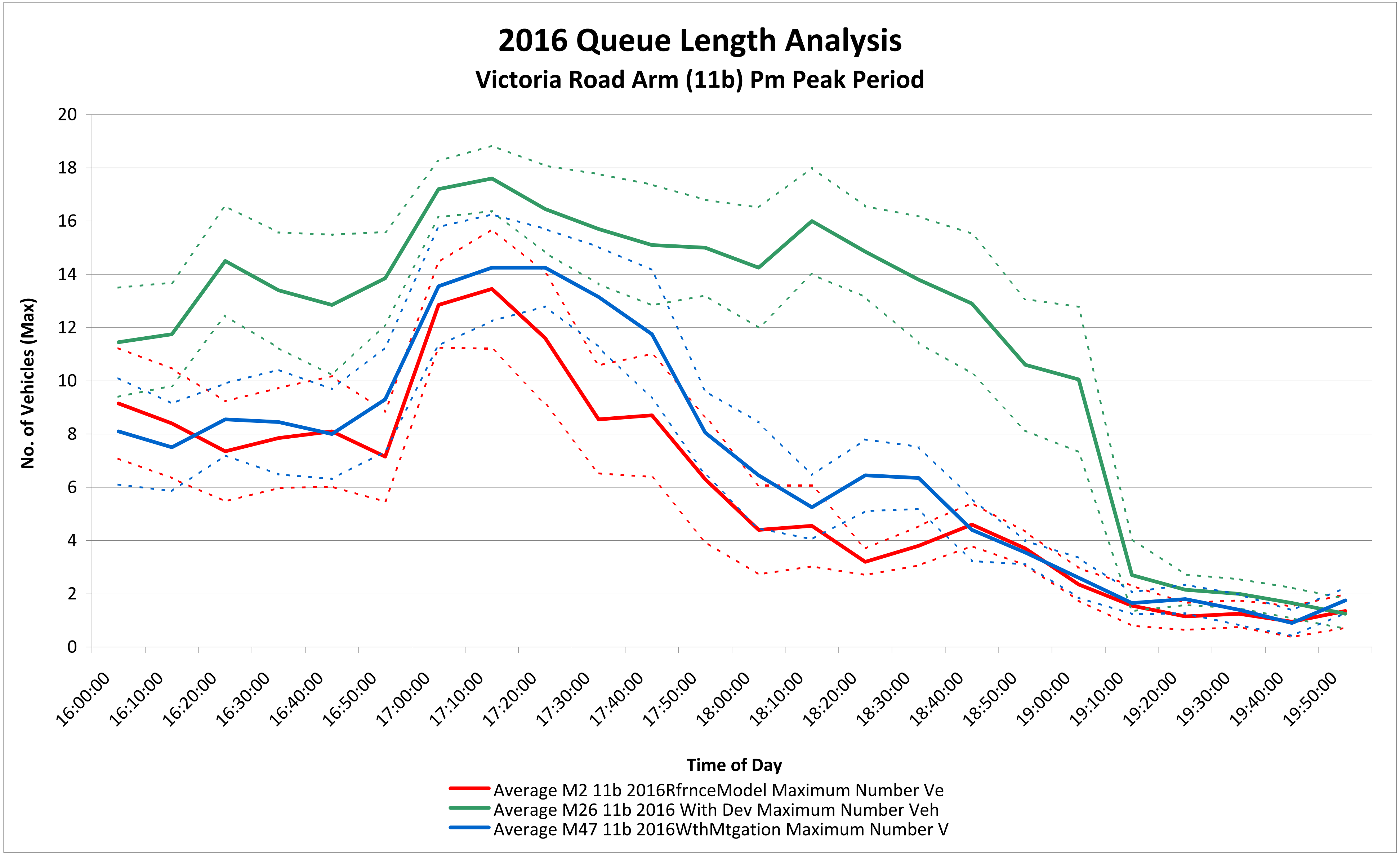
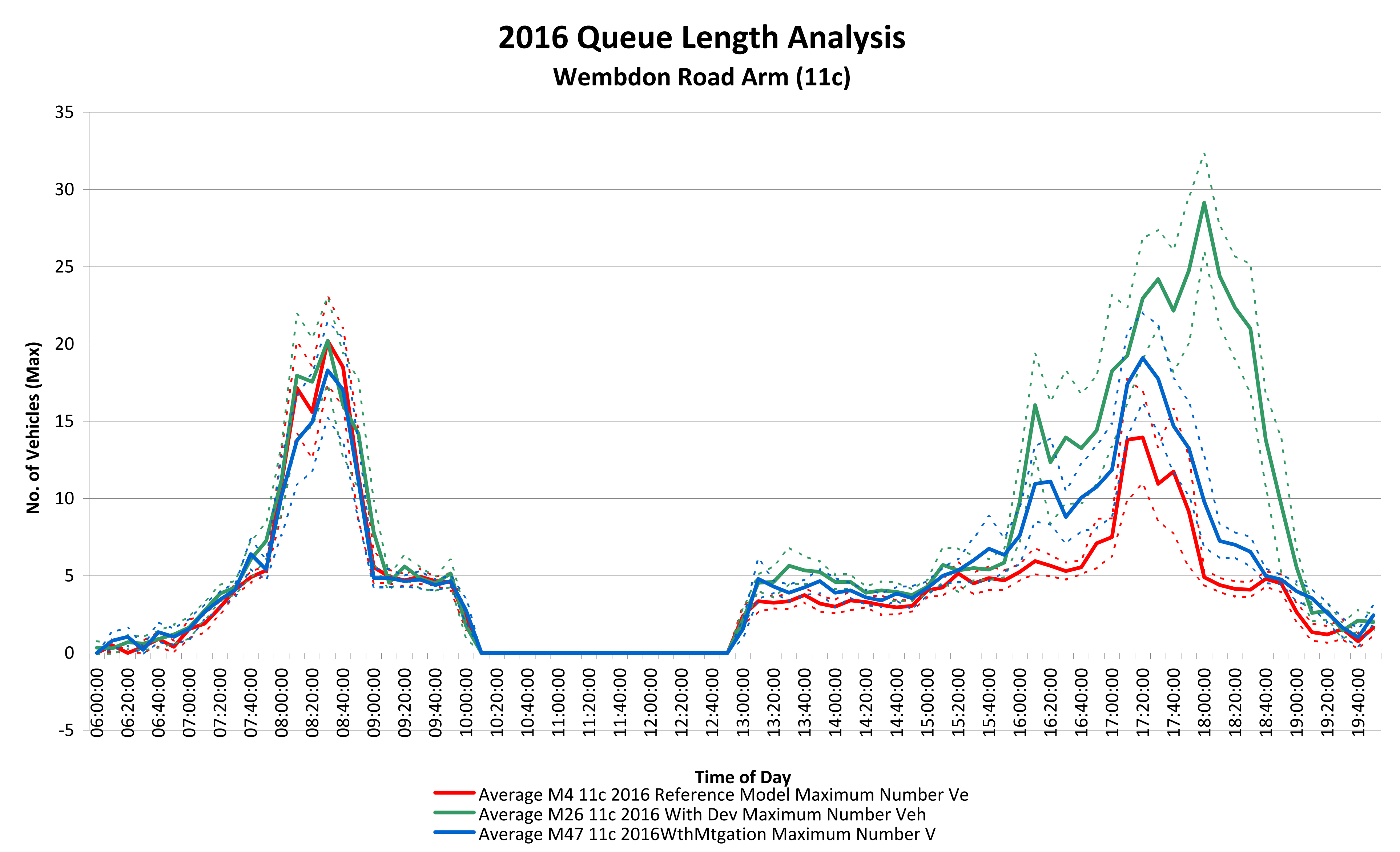
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M2 11b 2016RfrnceModel Maximum Number Ve
Average M26 11b 2016 With Dev Maximum Number Veh
Average M47 11b 2016WthMtgation Maximum Number V

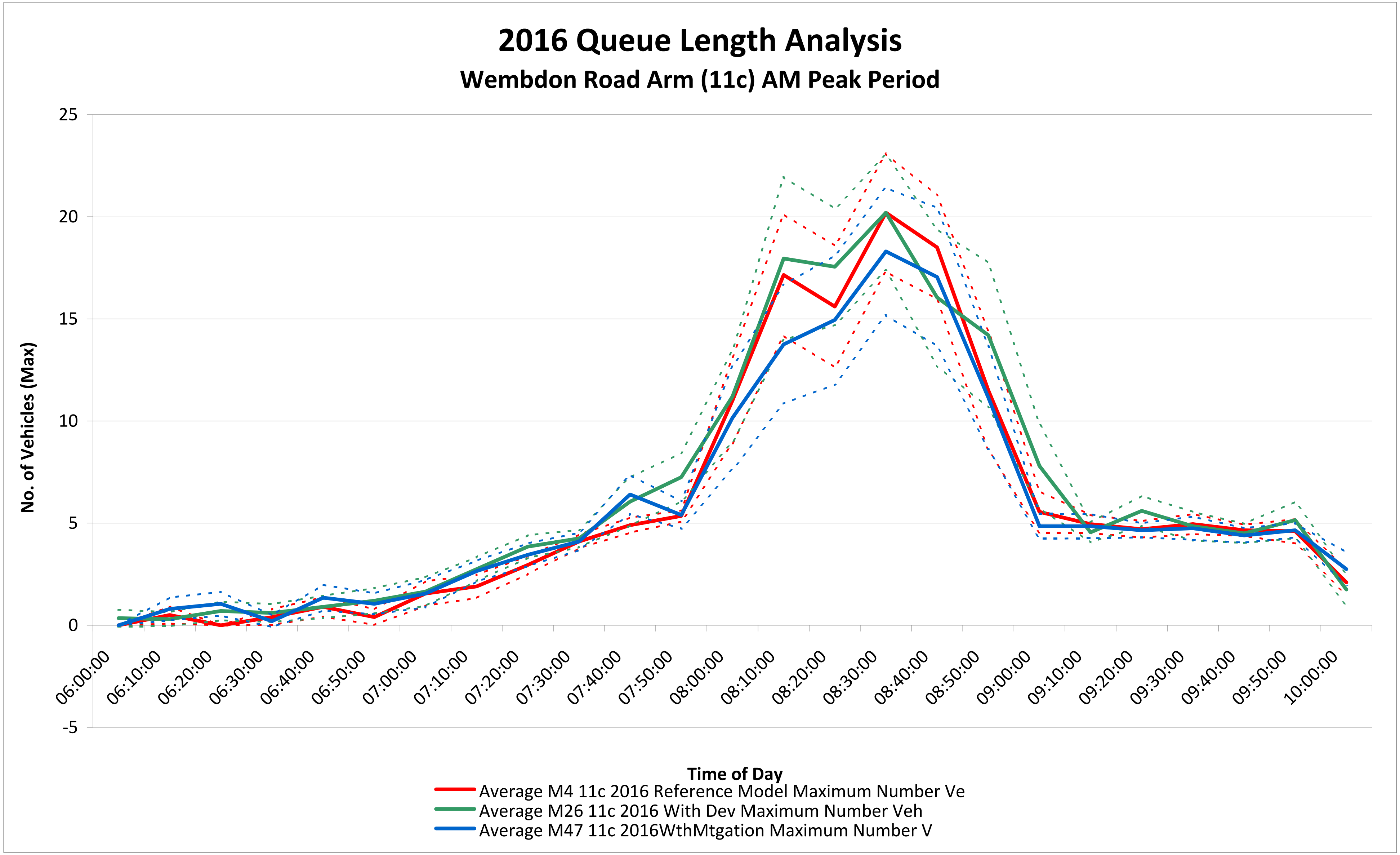


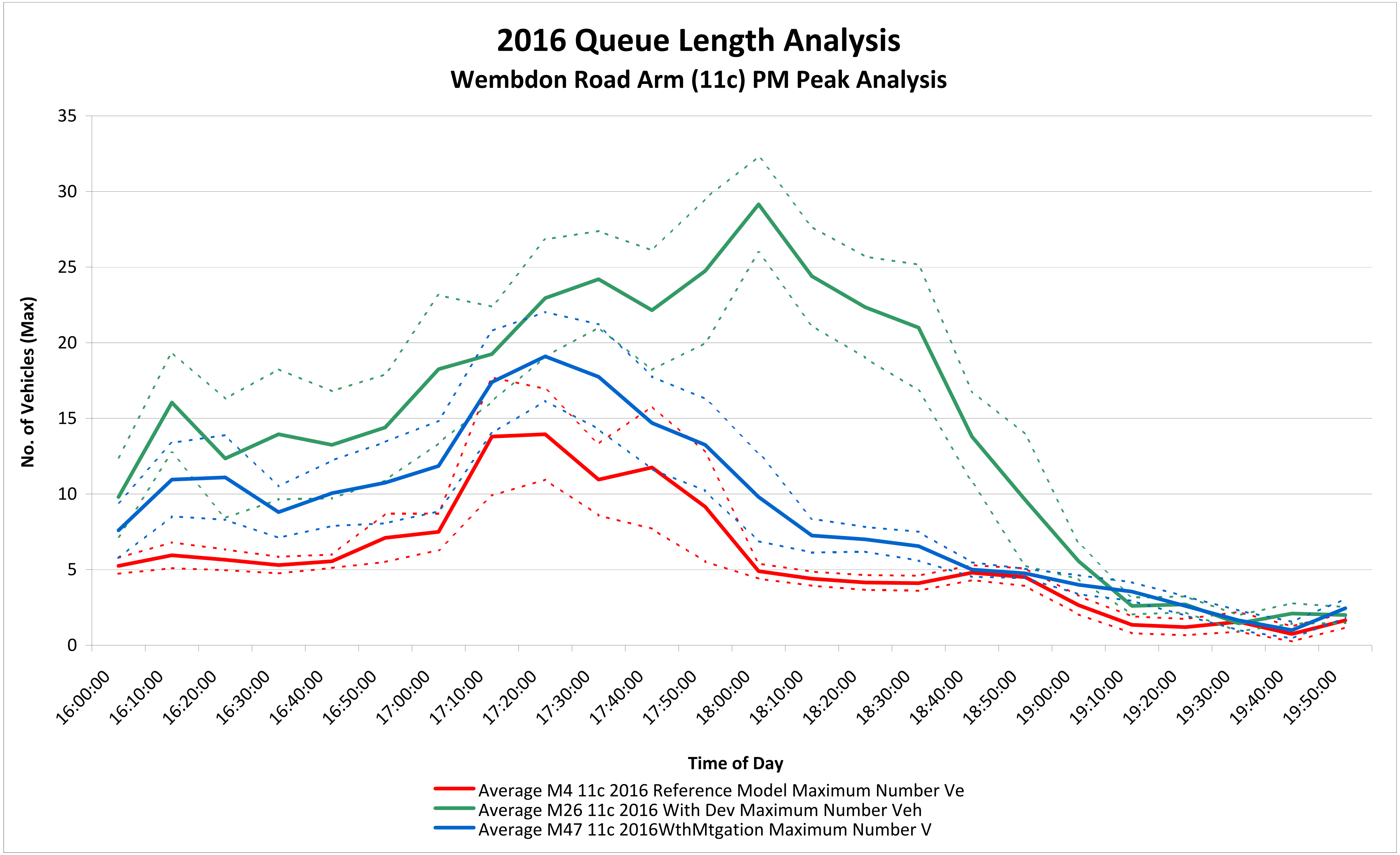
2016 Queue Length Analysis
Victoria Road Arm (11b) AM Peak Period
No. of Vehicles (Max)
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M2 11b 2016RfrnceModel Maximum Number Ve
Average M26 11b 2016 With Dev Maximum Number Veh
Average M47 11b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Victoria Road Arm (11b) Pm Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M2 11b 2016RfrnceModel Maximum Number Ve
Average M26 11b 2016 With Dev Maximum Number Veh
Average M47 11b 2016WthMtgation Maximum Number V

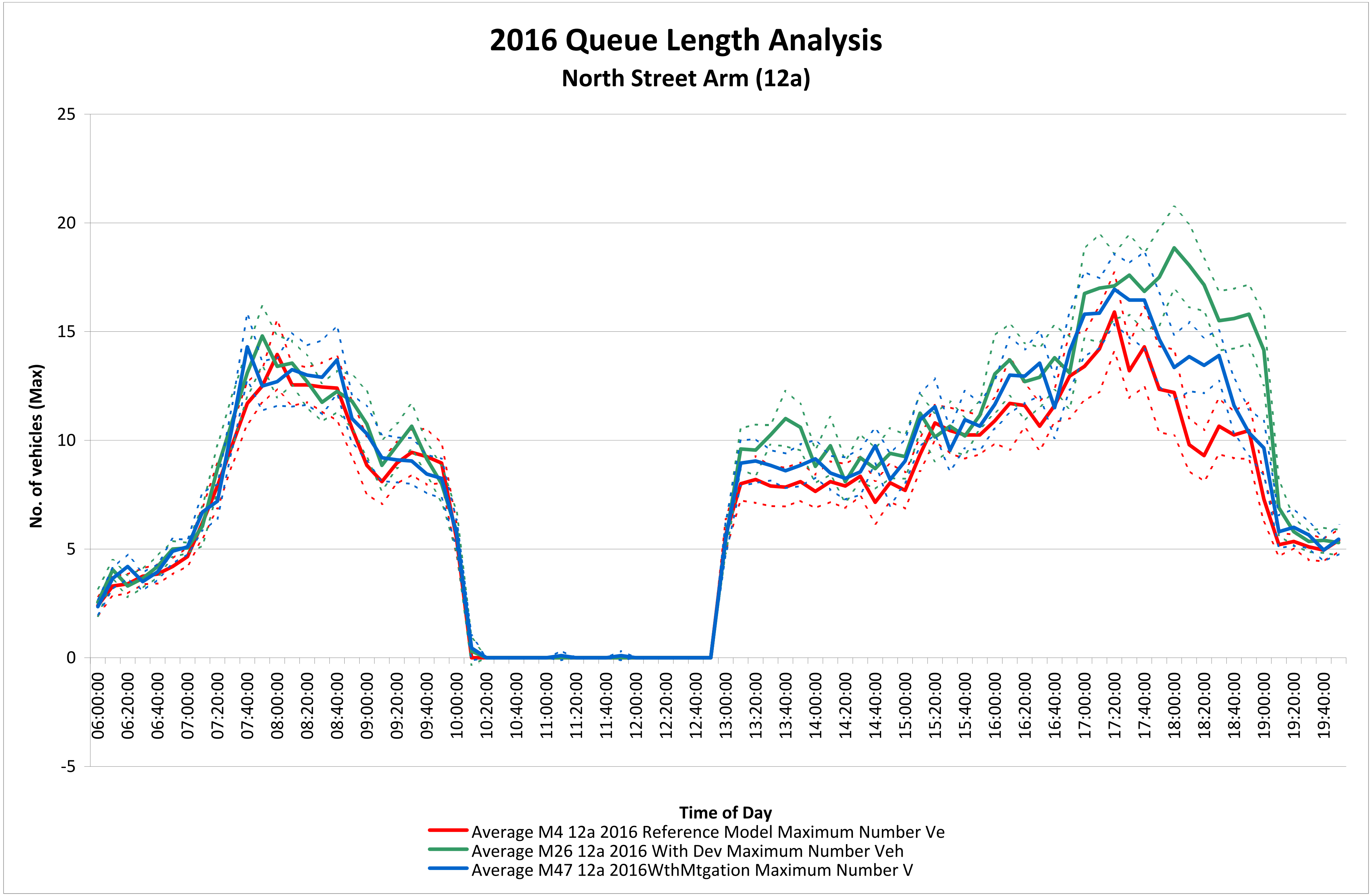


2016 Queue Length Analysis
Wembdon Road Arm (11c)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 11c 2016 Reference Model Maximum Number Ve
Average M26 11c 2016 With Dev Maximum Number Veh
Average M47 11c 2016WthMtgation Maximum Number V

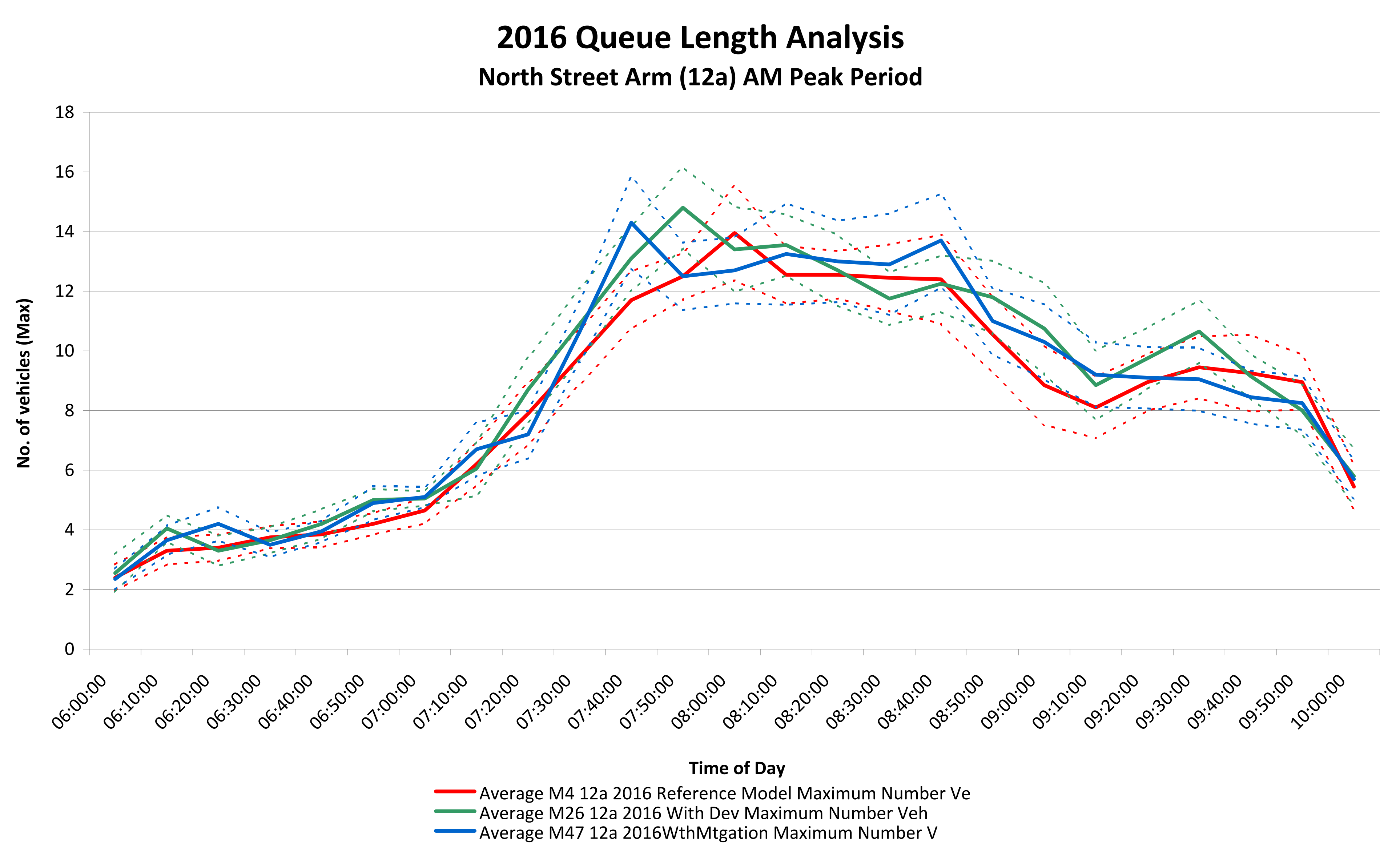

2016 Queue Length Analysis
Wembdon Road Arm (11c) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 11c 2016 Reference Model Maximum Number Ve
Average M26 11c 2016 With Dev Maximum Number Veh
Average M47 11c 2016WthMtgation Maximum Number V



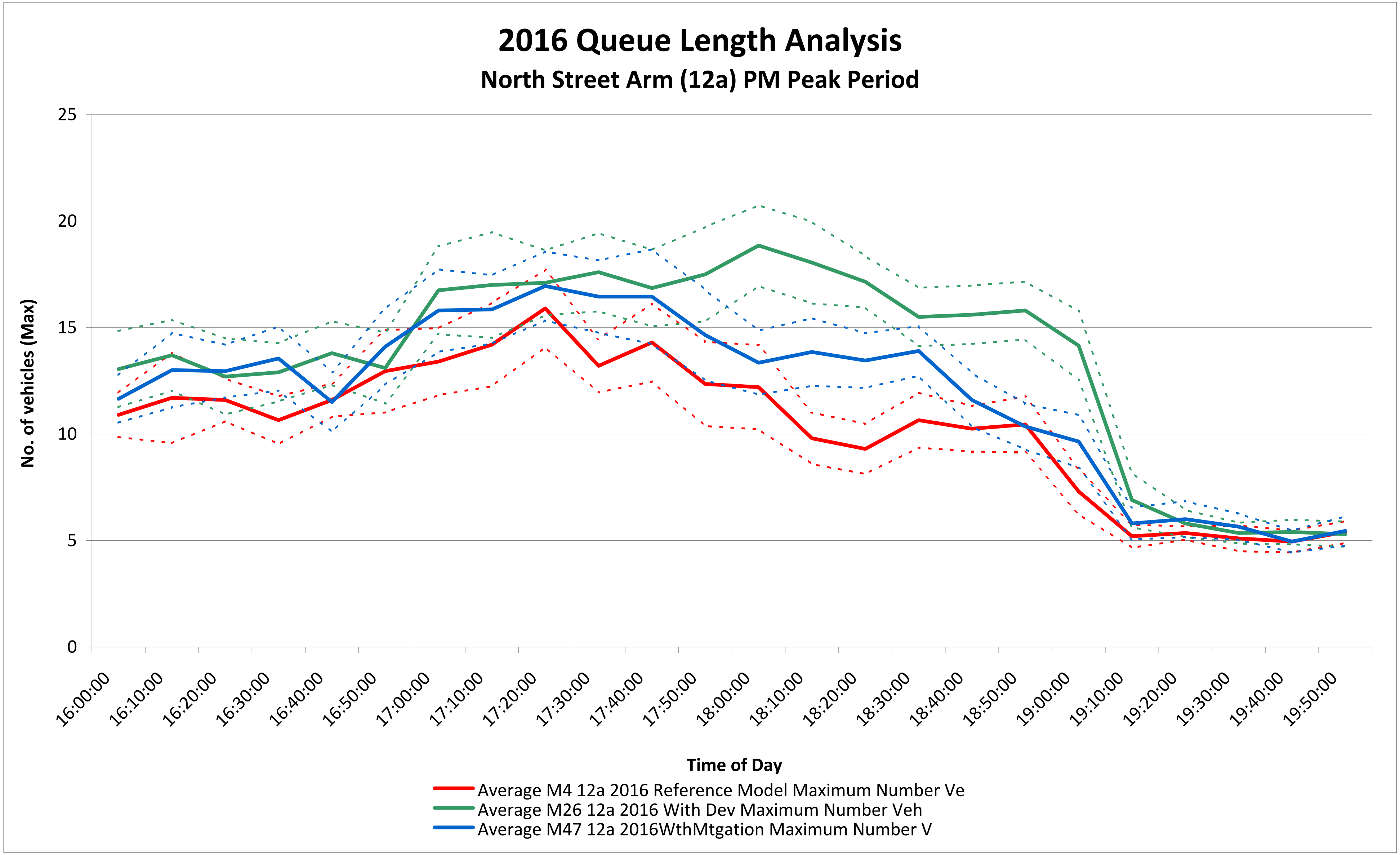
2016 Queue Length Analysis
Wembdon Road Arm (11c) PM Peak Analysis
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 11c 2016 Reference Model Maximum Number Ve
Average M26 11c 2016 With Dev Maximum Number Veh
Average M47 11c 2016WthMtgation Maximum Number V

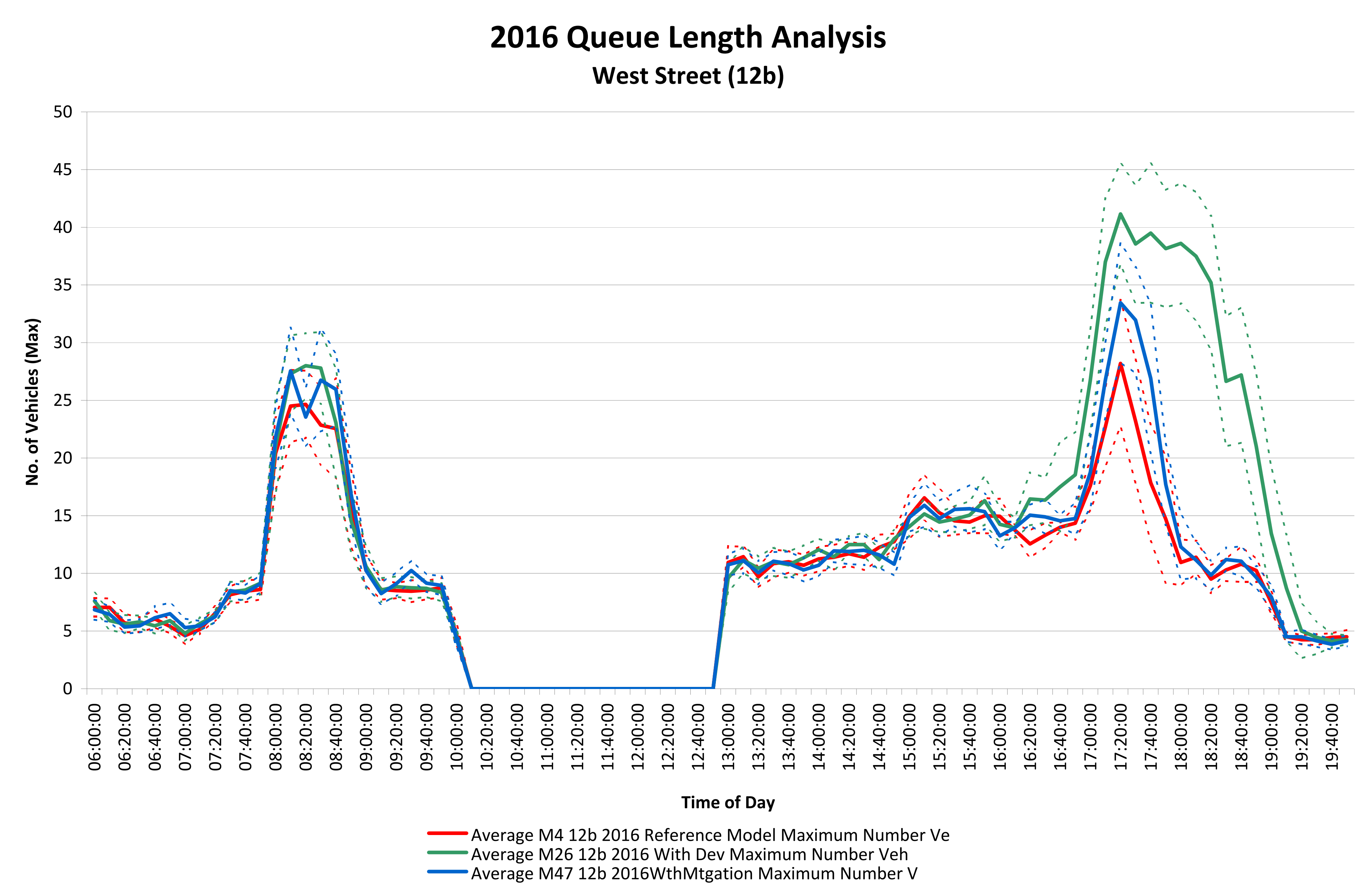


2016 Queue Length Analysis
North Street Arm (12a)
25
20
15
10
5
0
-5
No. of vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12a 2016 Reference Model Maximum Number Ve
Average M26 12a 2016 With Dev Maximum Number Veh
Average M47 12a 2016WthMtgation Maximum Number V

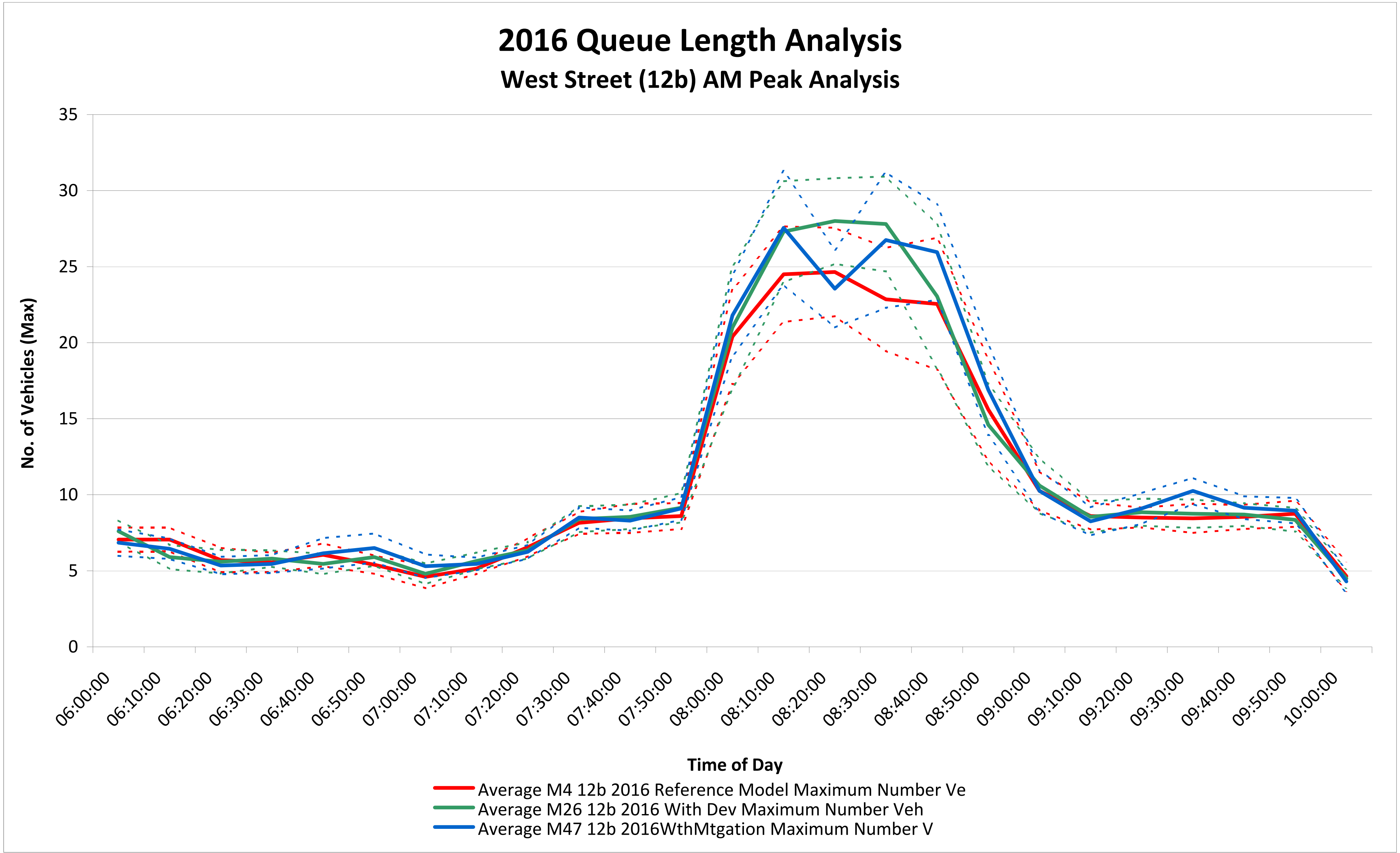


2016 Queue Length Analysis
North Street Arm (12a) AM Peak Period
No. of vehicles (Max)
18
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12a 2016 Reference Model Maximum Number Ve
Average M26 12a 2016 With Dev Maximum Number Veh
Average M47 12a 2016WthMtgation Maximum Number V

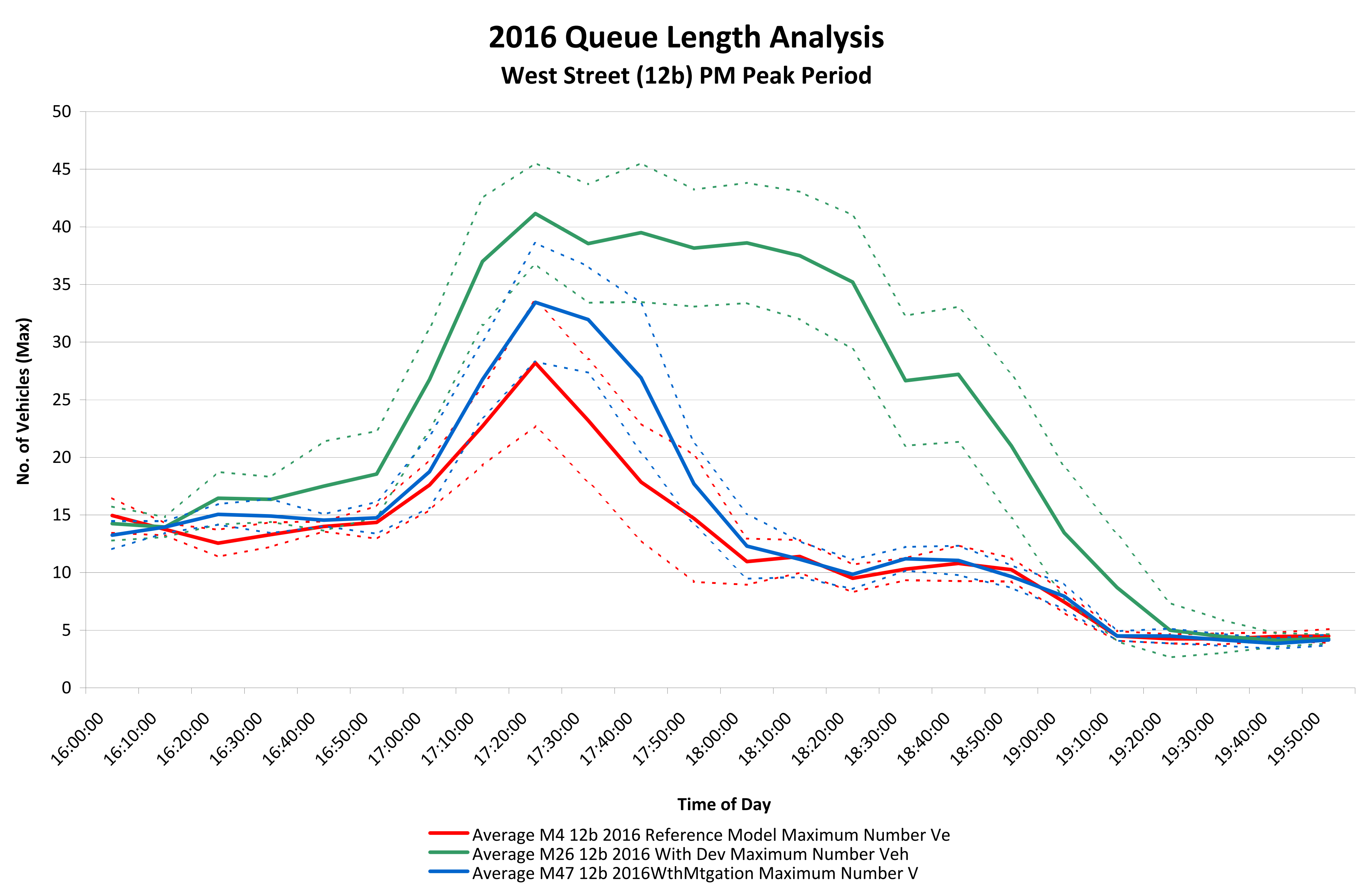

2016 Queue Length Analysis
North Street Arm (12a) PM Peak Period
No. of vehicles (Max)
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12a 2016 Reference Model Maximum Number Ve
Average M26 12a 2016 With Dev Maximum Number Veh
Average M47 12a 2016WthMtgation Maximum Number V



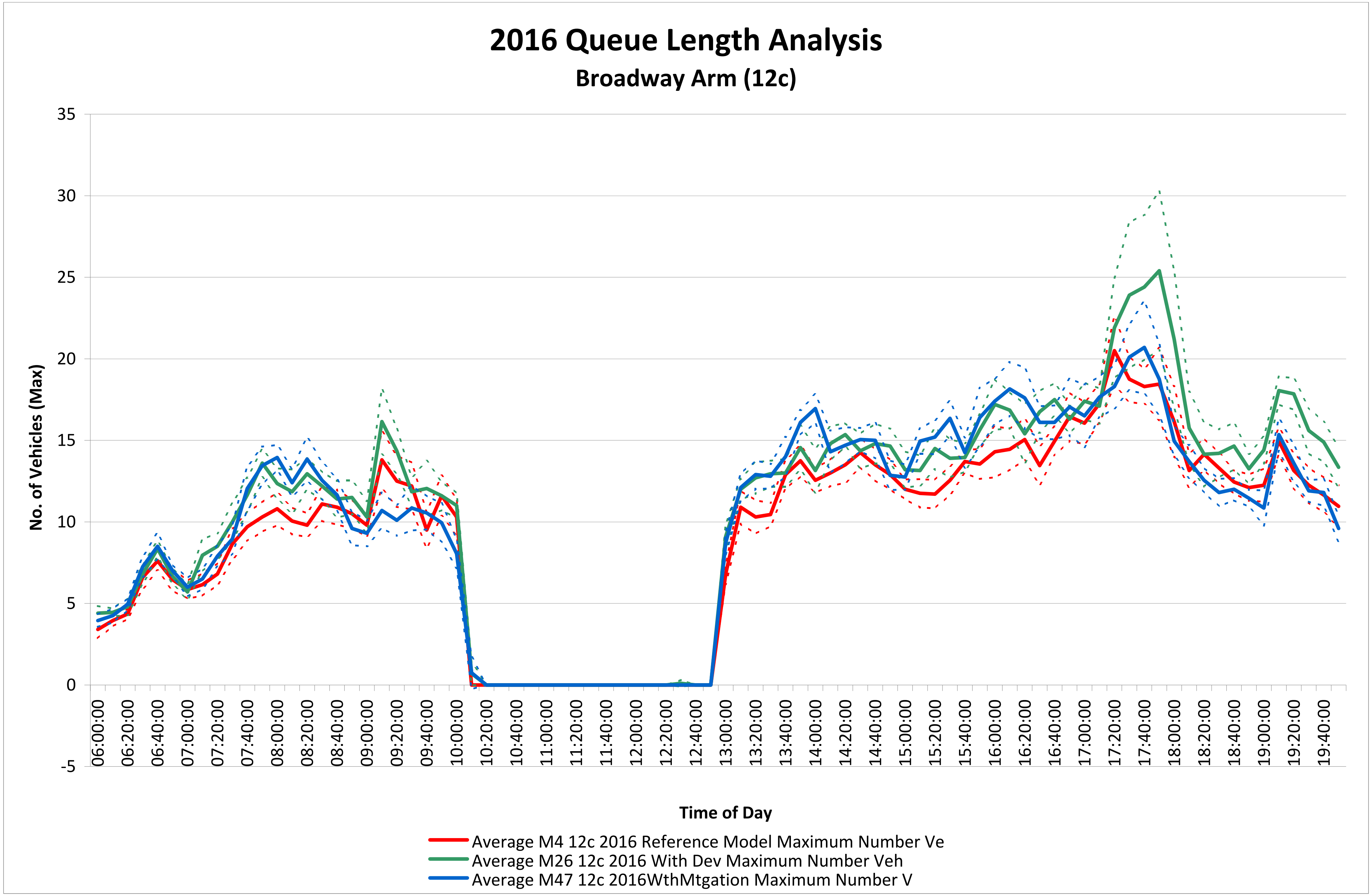
2016 Queue Length Analysis
West Street (12b)
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
45
50
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12b 2016 Reference Model Maximum Number Ve
Average M26 12b 2016 With Dev Maximum Number Veh
Average M47 12b 2016WthMtgation Maximum Number V



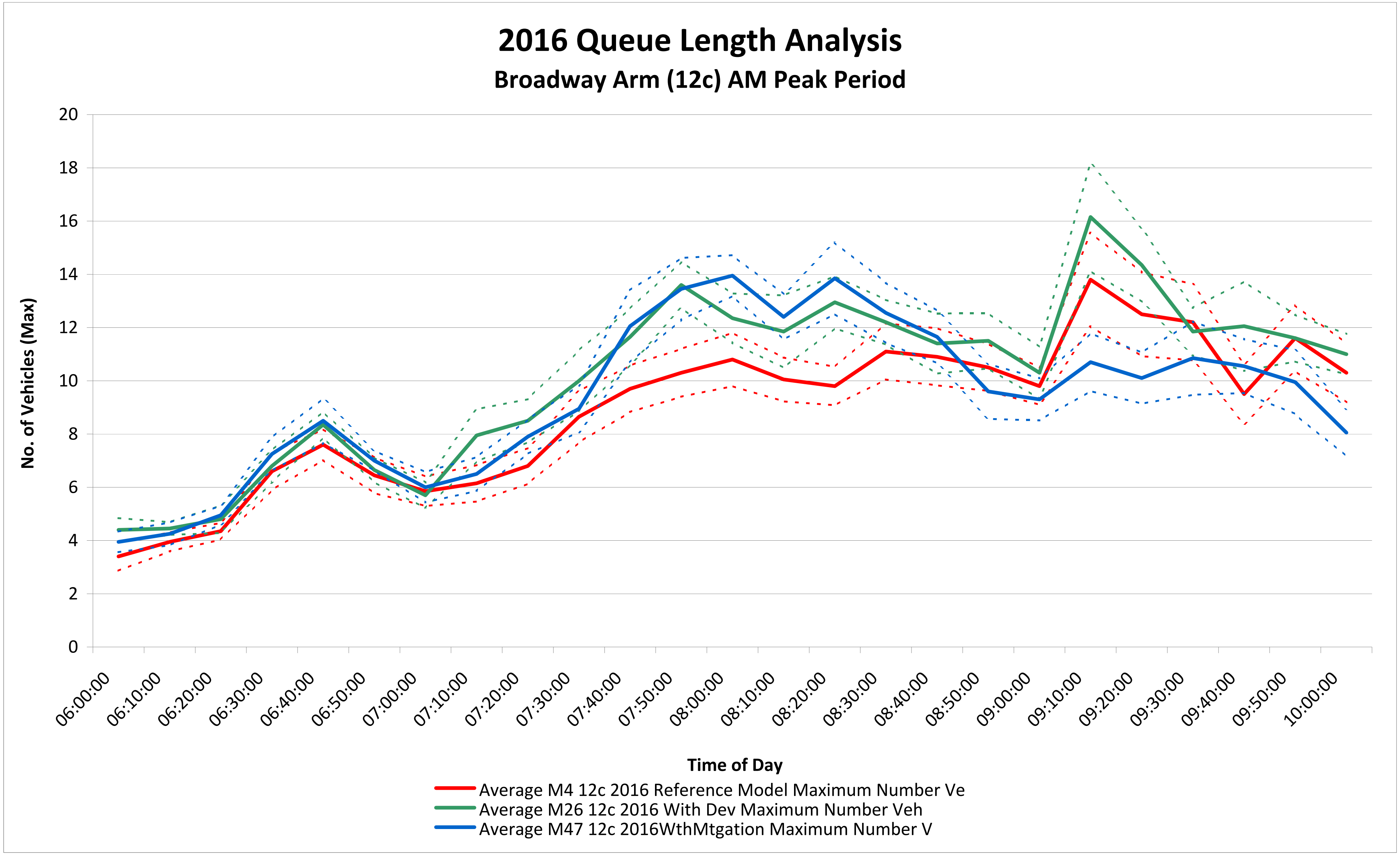
2016 Queue Length Analysis
West Street (12b) AM Peak Analysis
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12b 2016 Reference Model Maximum Number Ve
Average M26 12b 2016 With Dev Maximum Number Veh
Average M47 12b 2016WthMtgation Maximum Number V



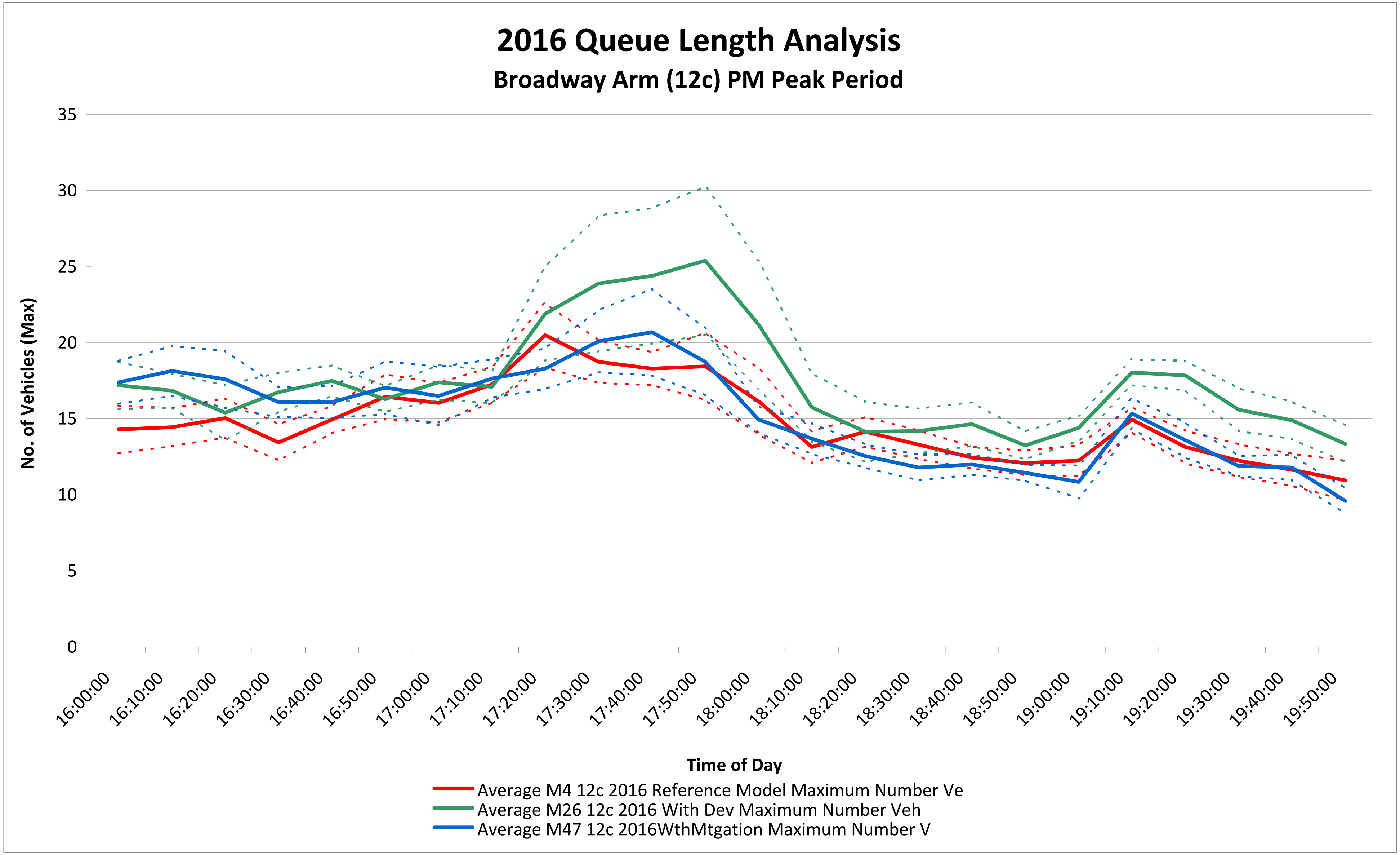
2016 Queue Length Analysis
West Street (12b) PM Peak Period
No. of Vehicles (Max)
50
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12b 2016 Reference Model Maximum Number Ve
Average M26 12b 2016 With Dev Maximum Number Veh
Average M47 12b 2016WthMtgation Maximum Number V



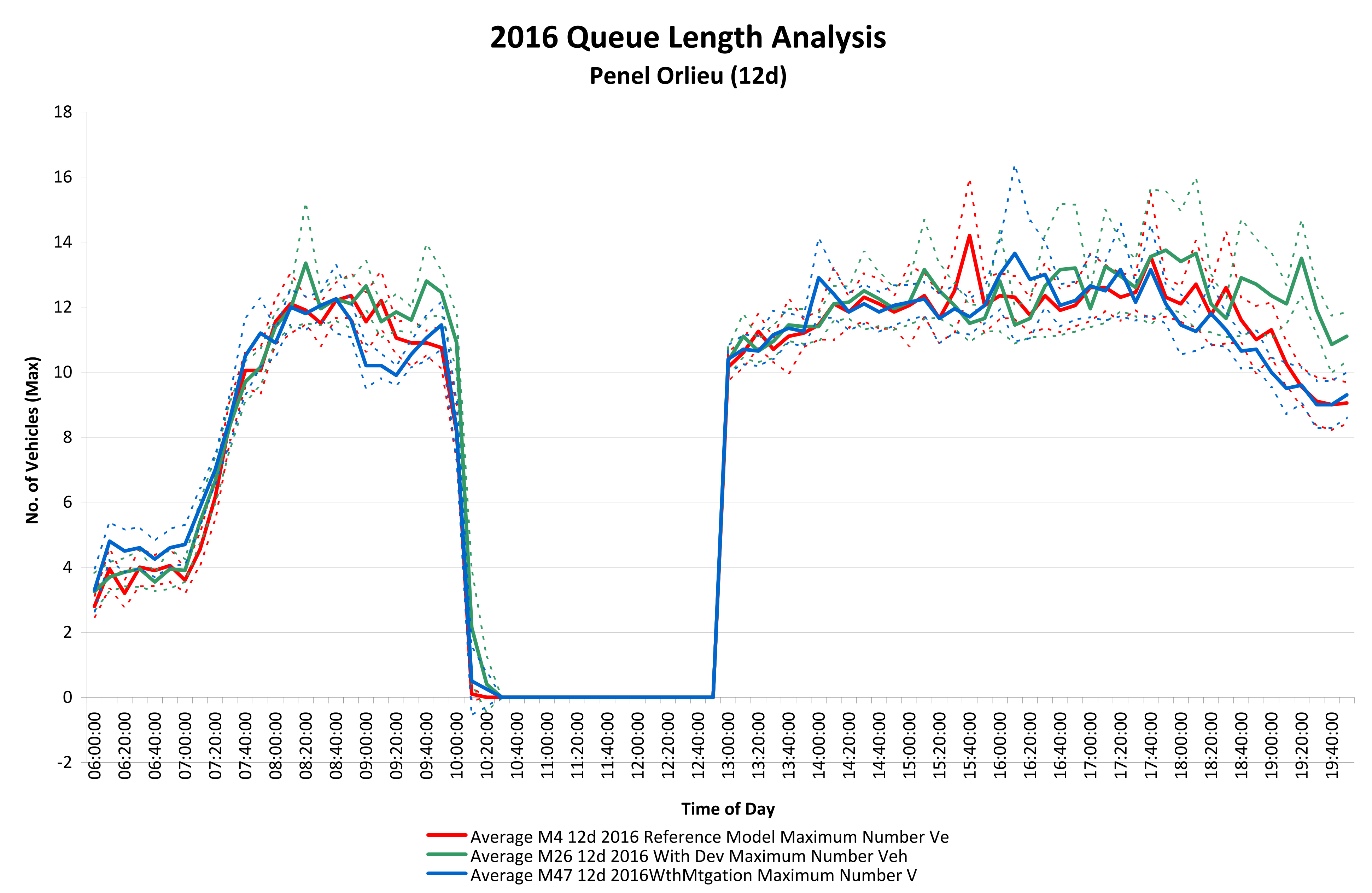
2016 Queue Length Analysis
Broadway Arm (12c)
35
30
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12c 2016 Reference Model Maximum Number Ve
Average M26 12c 2016 With Dev Maximum Number Veh
Average M47 12c 2016WthMtgation Maximum Number V

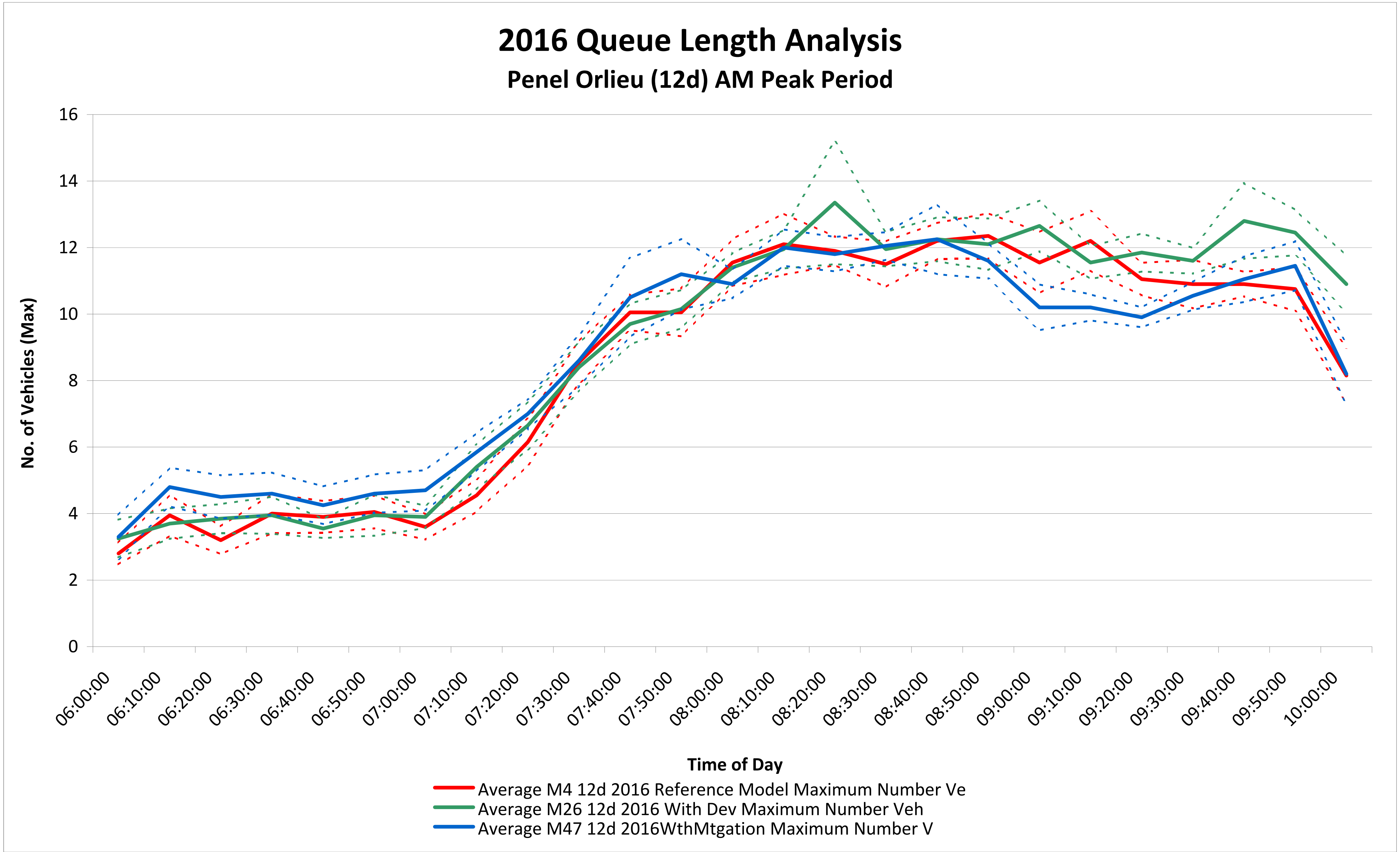


2016 Queue Length Analysis
Broadway Arm (12c) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12c 2016 Reference Model Maximum Number Ve
Average M26 12c 2016 With Dev Maximum Number Veh
Average M47 12c 2016WthMtgation Maximum Number V

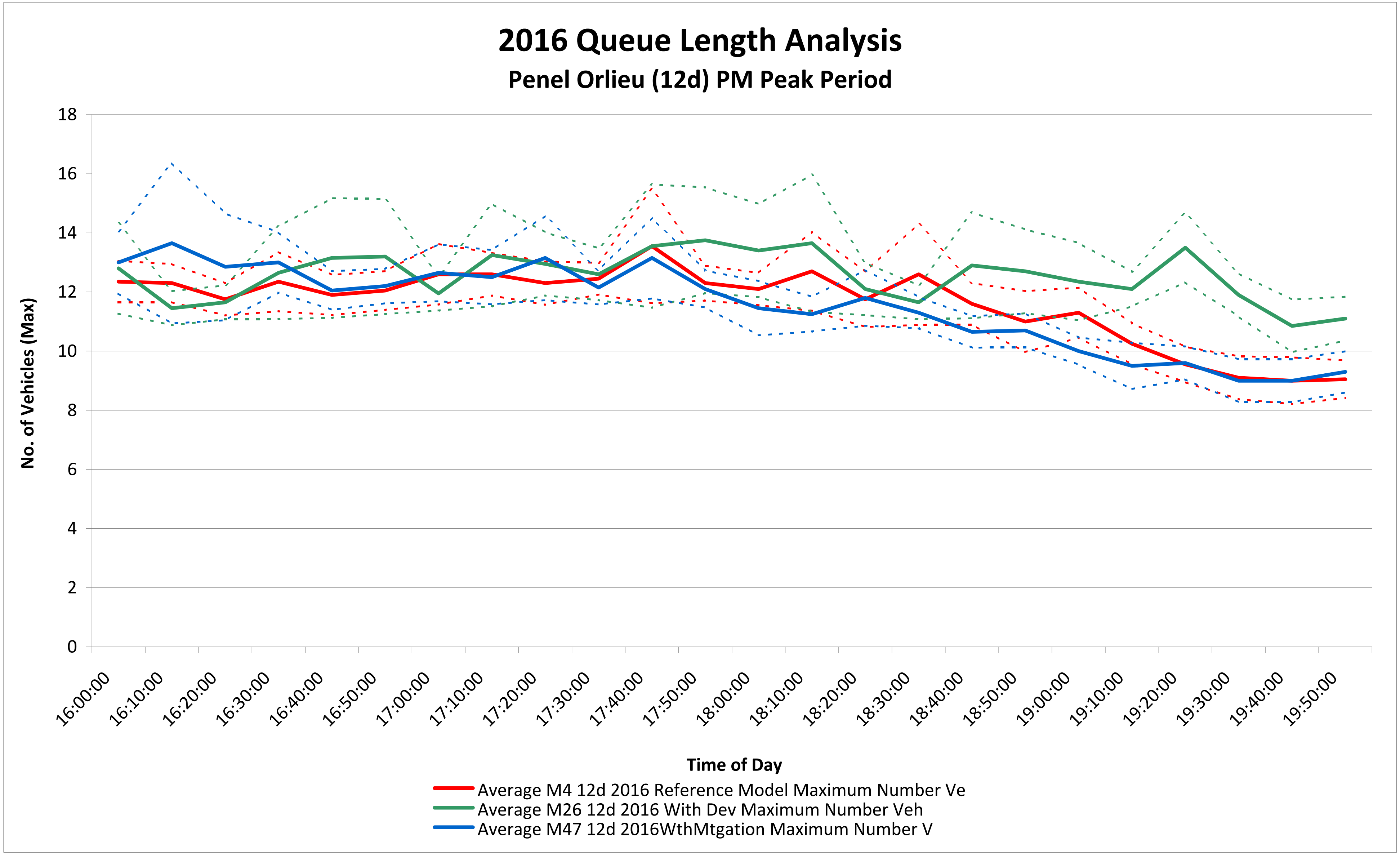


2016 Queue Length Analysis
Broadway Arm (12c) PM Peak Period
35
30
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12c 2016 Reference Model Maximum Number Ve
Average M26 12c 2016 With Dev Maximum Number Veh
Average M47 12c 2016WthMtgation Maximum Number V

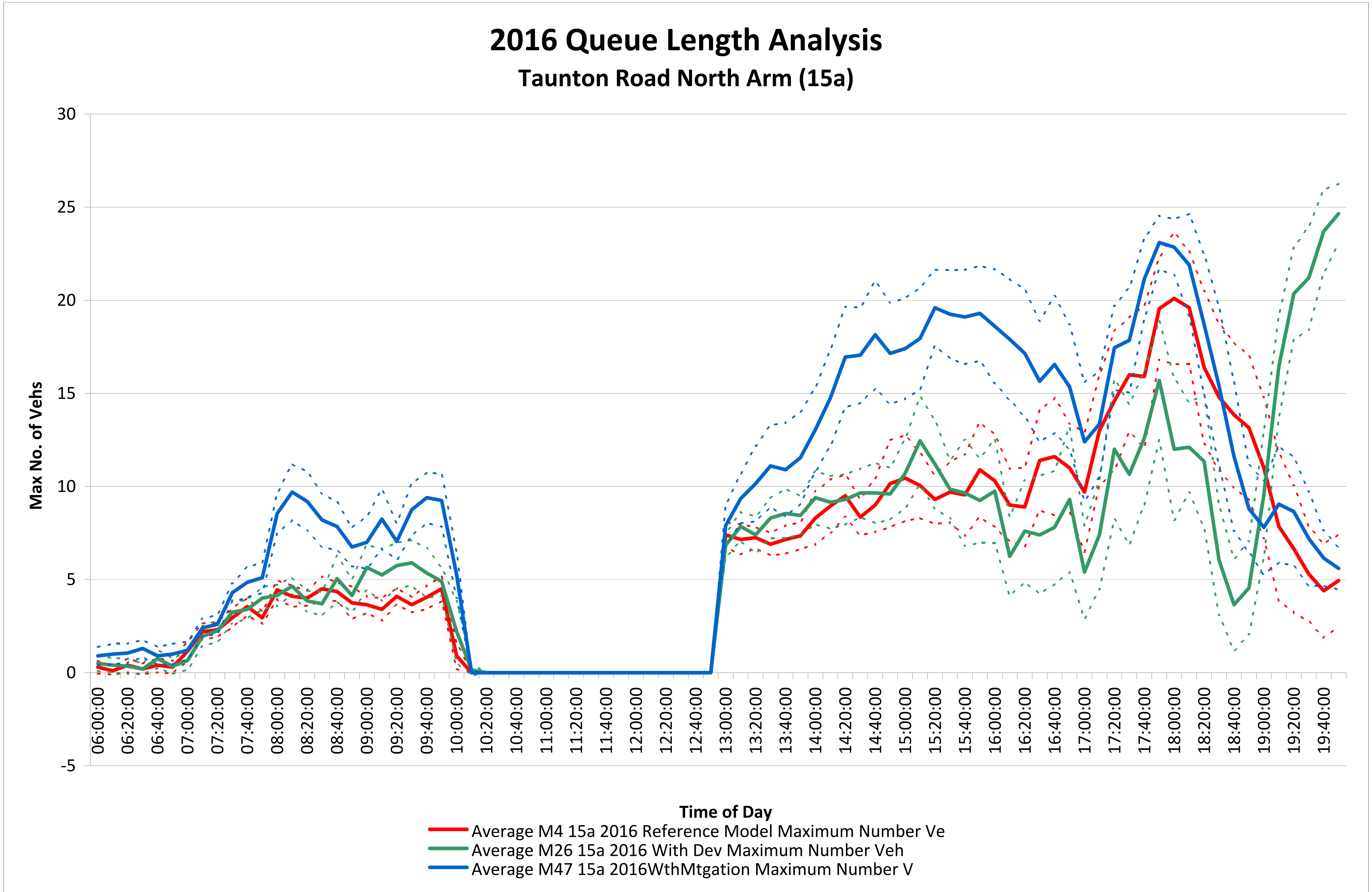

2016 Queue Length Analysis
Penel Orlieu (12d)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12d 2016 Reference Model Maximum Number Ve
Average M26 12d 2016 With Dev Maximum Number Veh
Average M47 12d 2016WthMtgation Maximum Number V



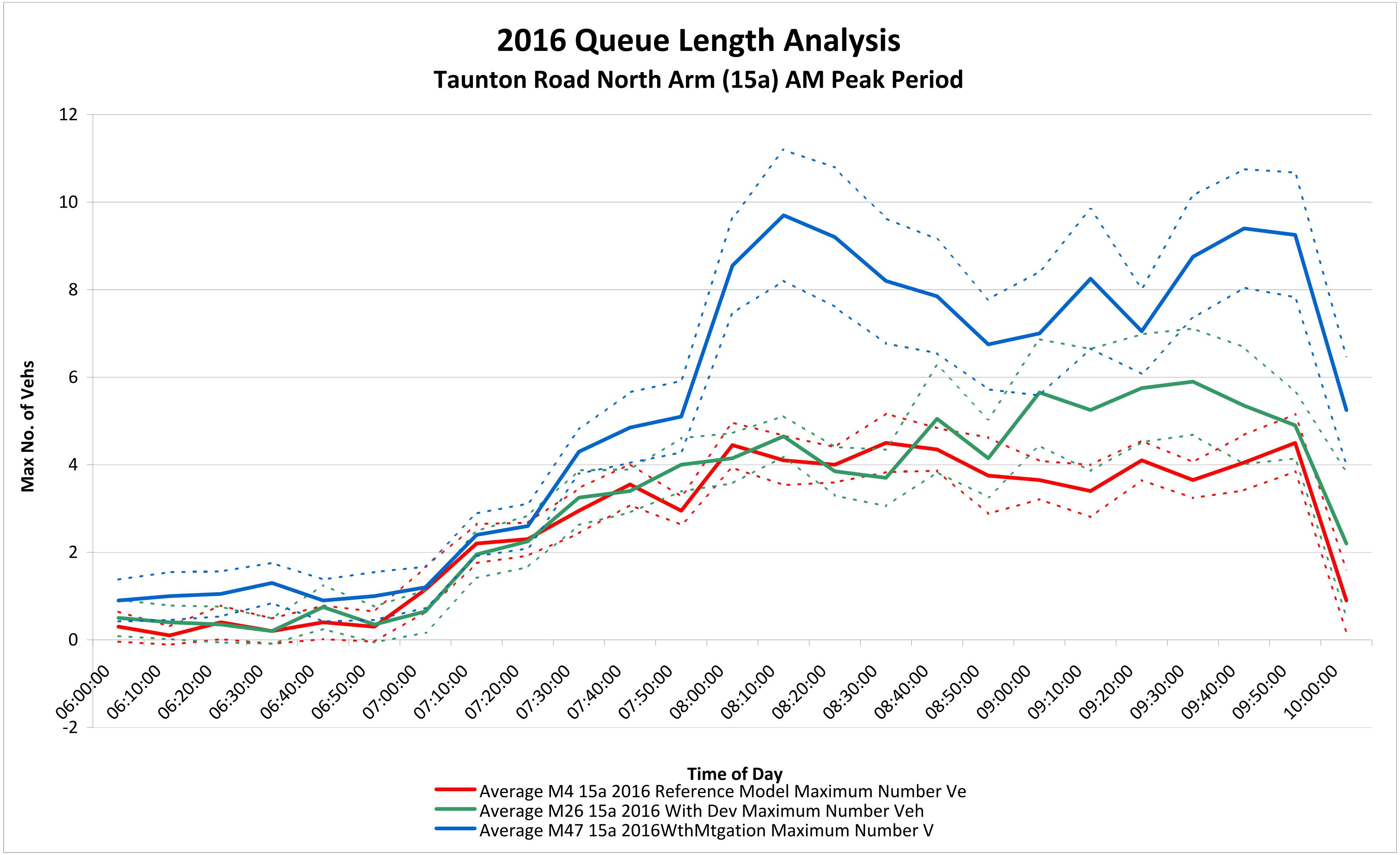
2016 Queue Length Analysis
Penel Orlieu (12d) AM Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12d 2016 Reference Model Maximum Number Ve
Average M26 12d 2016 With Dev Maximum Number Veh
Average M47 12d 2016WthMtgation Maximum Number V



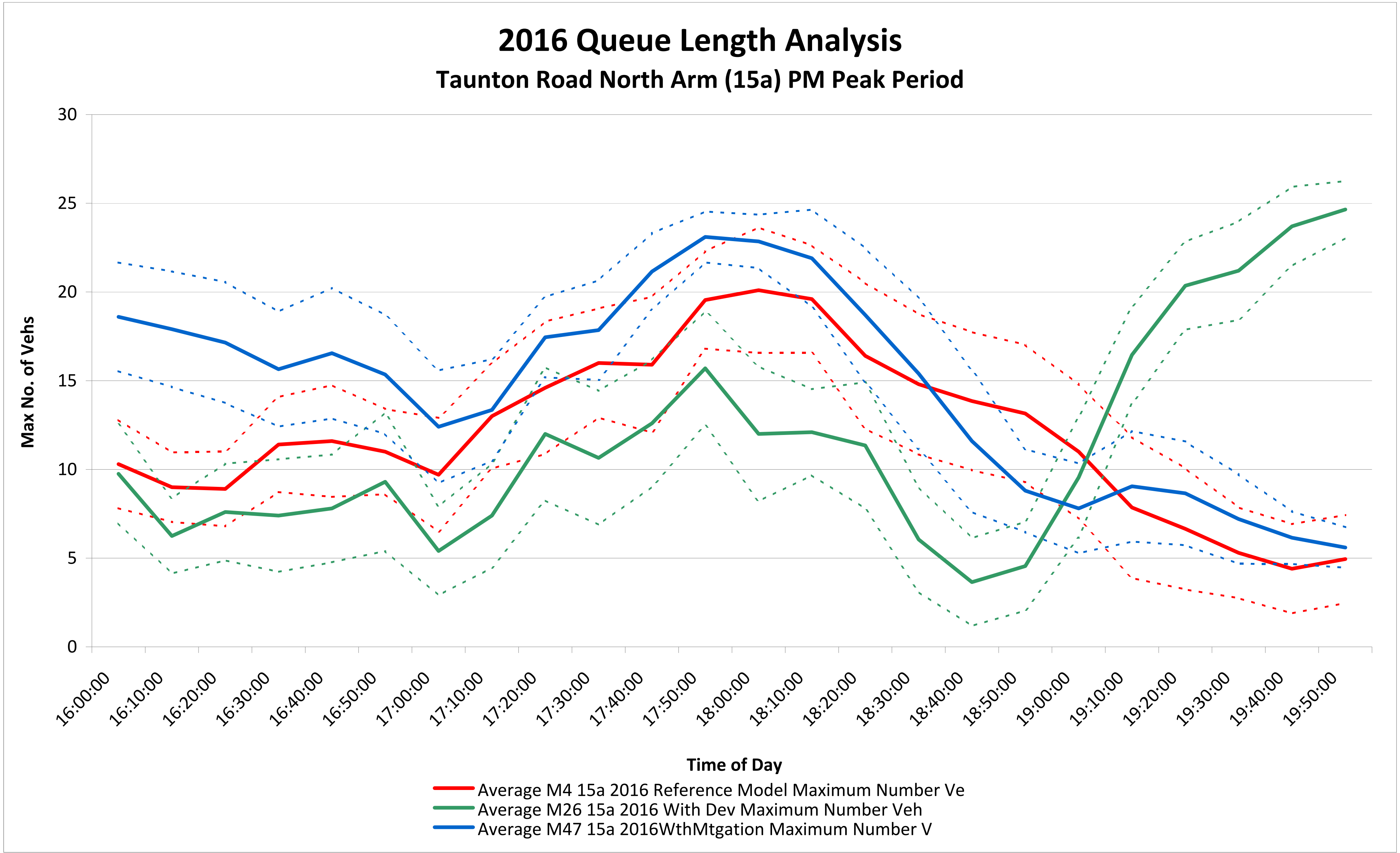
2016 Queue Length Analysis
Penel Orlieu (12d) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12d 2016 Reference Model Maximum Number Ve
Average M26 12d 2016 With Dev Maximum Number Veh
Average M47 12d 2016WthMtgation Maximum Number V



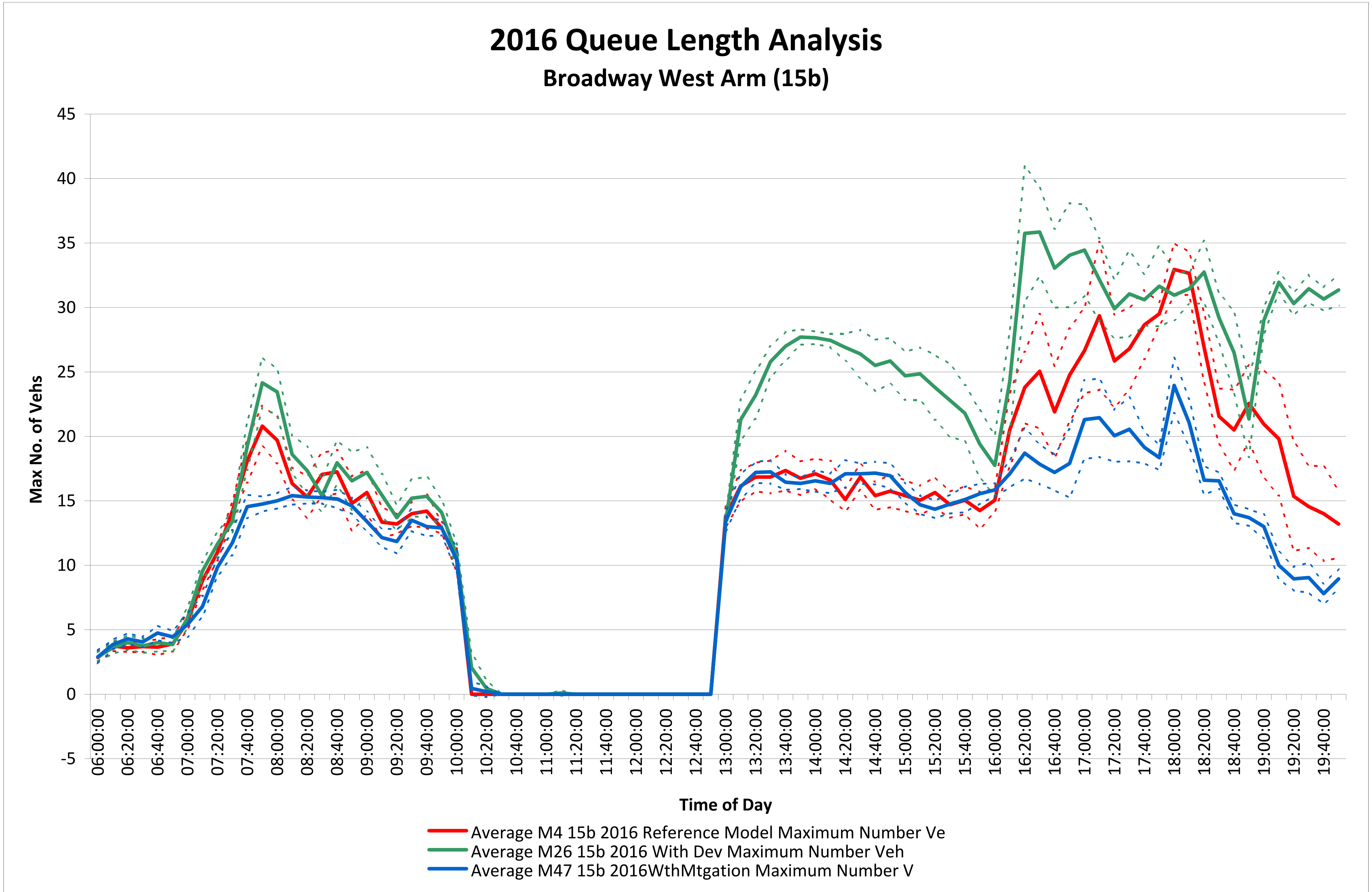
2016 Queue Length Analysis
Taunton Road North Arm (15a)
Max No. of Vehs
Time of Day
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 15a 2016 Reference Model Maximum Number Ve
Average M26 15a 2016 With Dev Maximum Number Veh
Average M47 15a 2016WthMtgation Maximum Number V



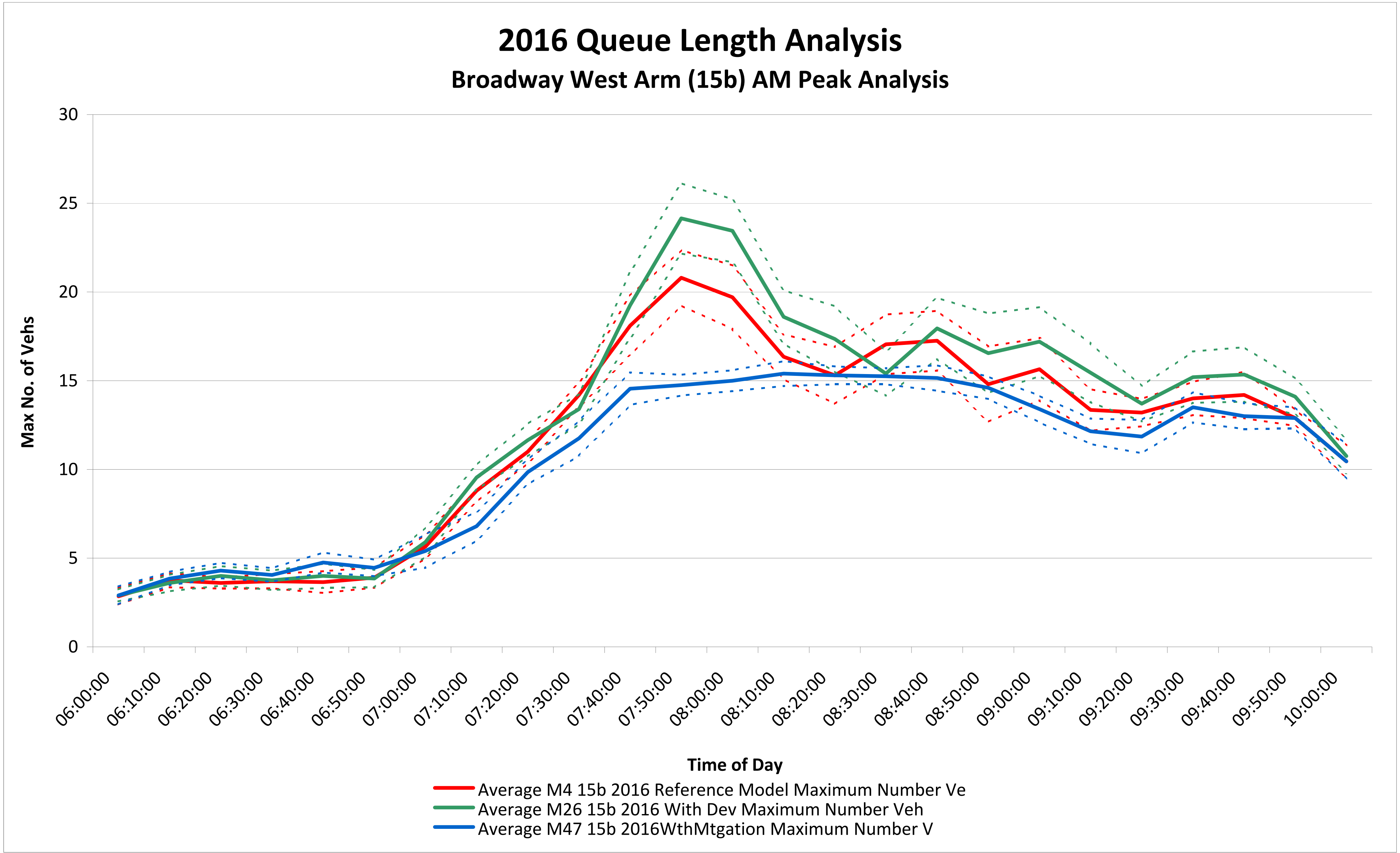
2016 Queue Length Analysis
Taunton Road North Arm (15a) AM Peak Period
Max No. of Vehs
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15a 2016 Reference Model Maximum Number Ve
Average M26 15a 2016 With Dev Maximum Number Veh
Average M47 15a 2016WthMtgation Maximum Number V

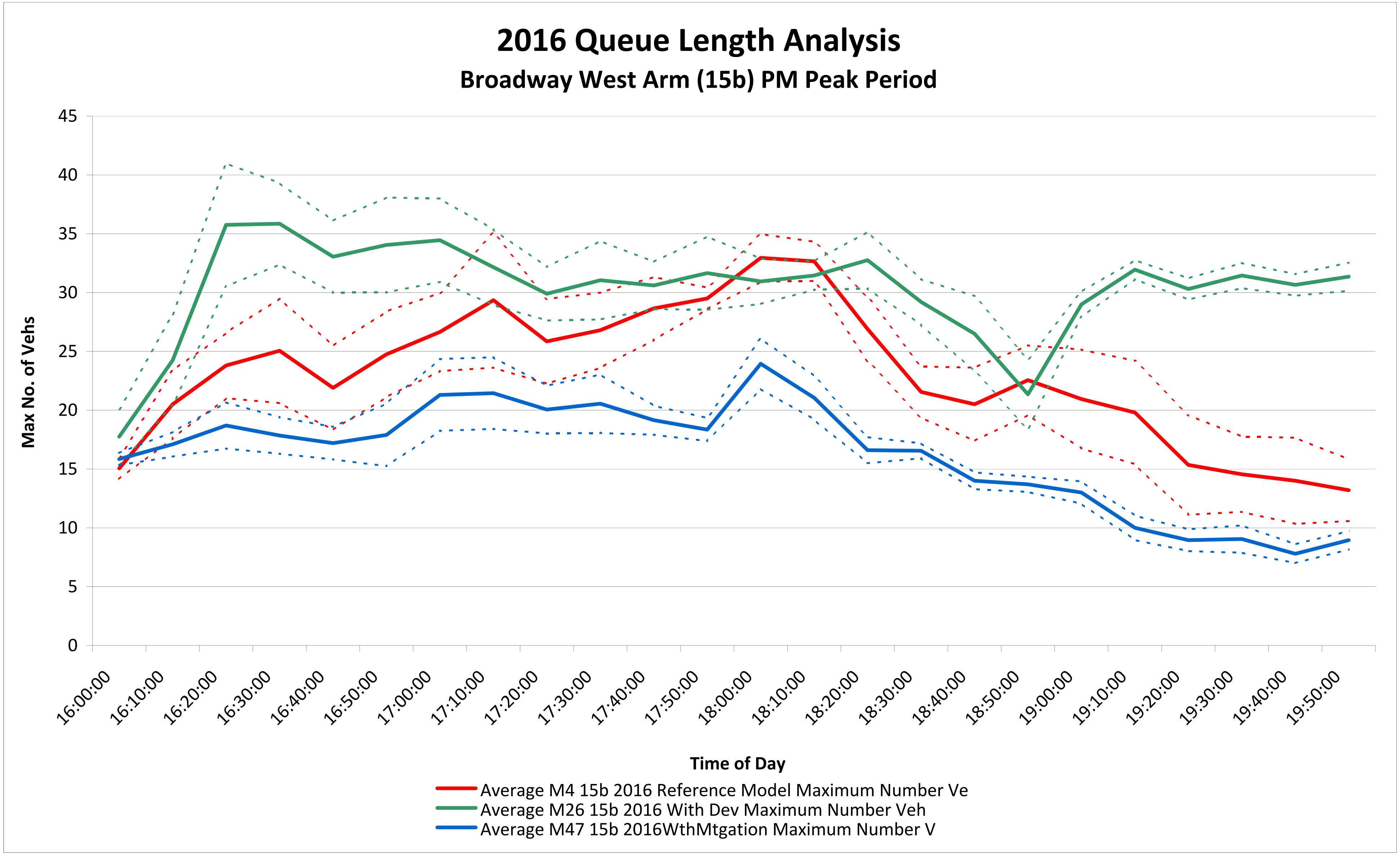


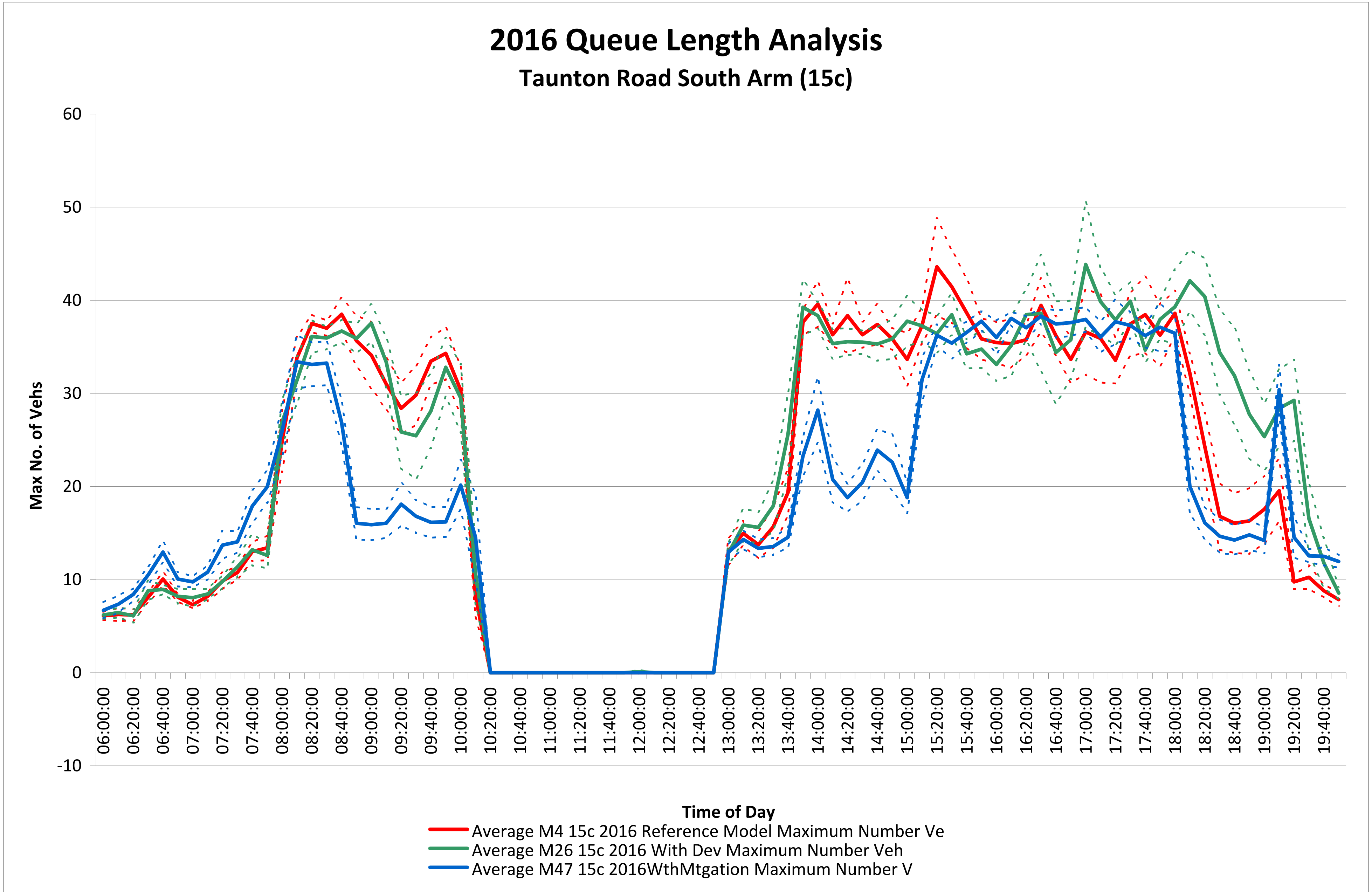
2016 Queue Length Analysis
Taunton Road North Arm (15a) PM Peak Period
Max No. of Vehs
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15a 2016 Reference Model Maximum Number Ve
Average M26 15a 2016 With Dev Maximum Number Veh
Average M47 15a 2016WthMtgation Maximum Number V



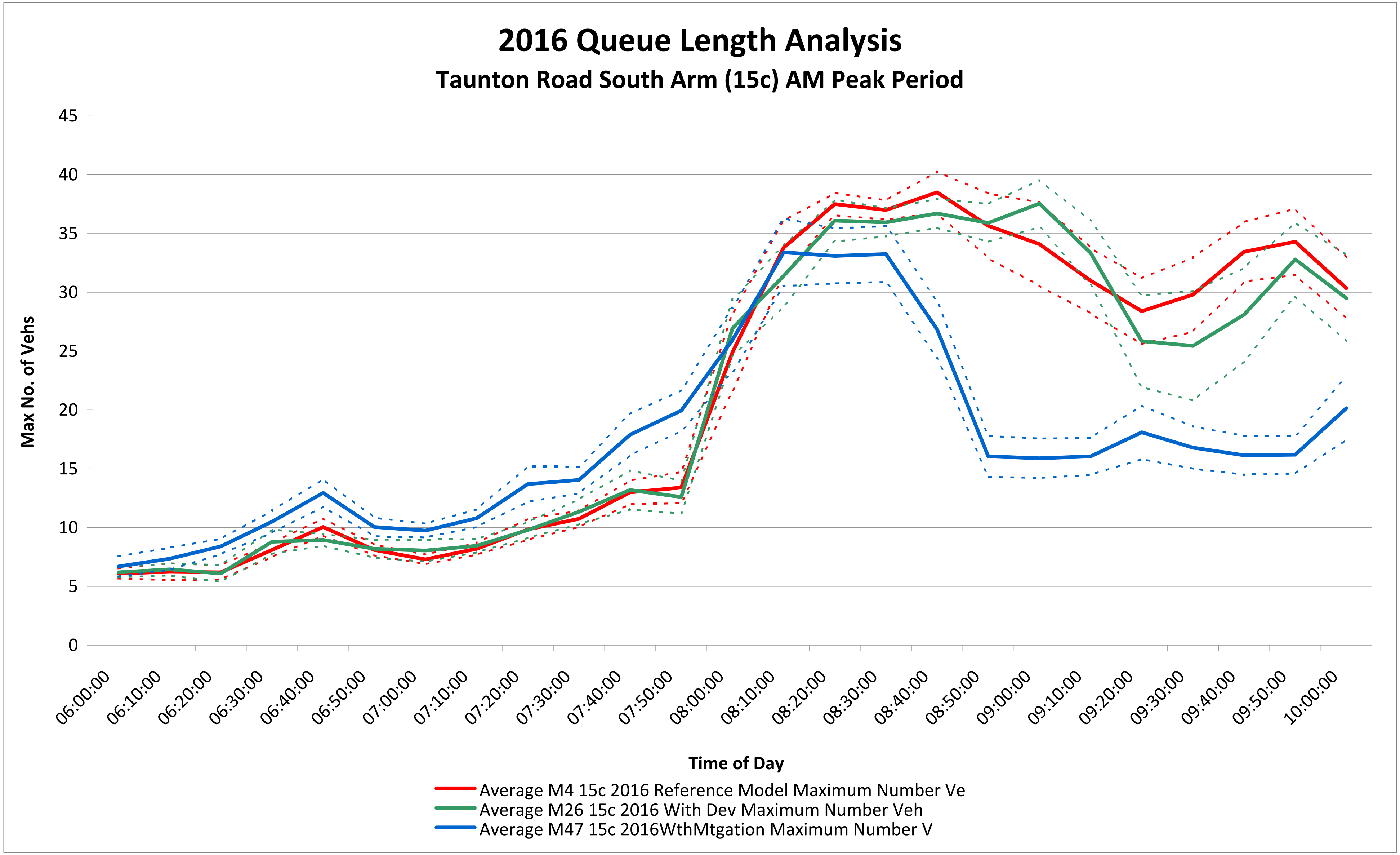
2016 Queue Length Analysis
Broadway West Arm (15b)
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 15b 2016 Reference Model Maximum Number Ve
Average M26 15b 2016 With Dev Maximum Number Veh
Average M47 15b 2016WthMtgation Maximum Number V

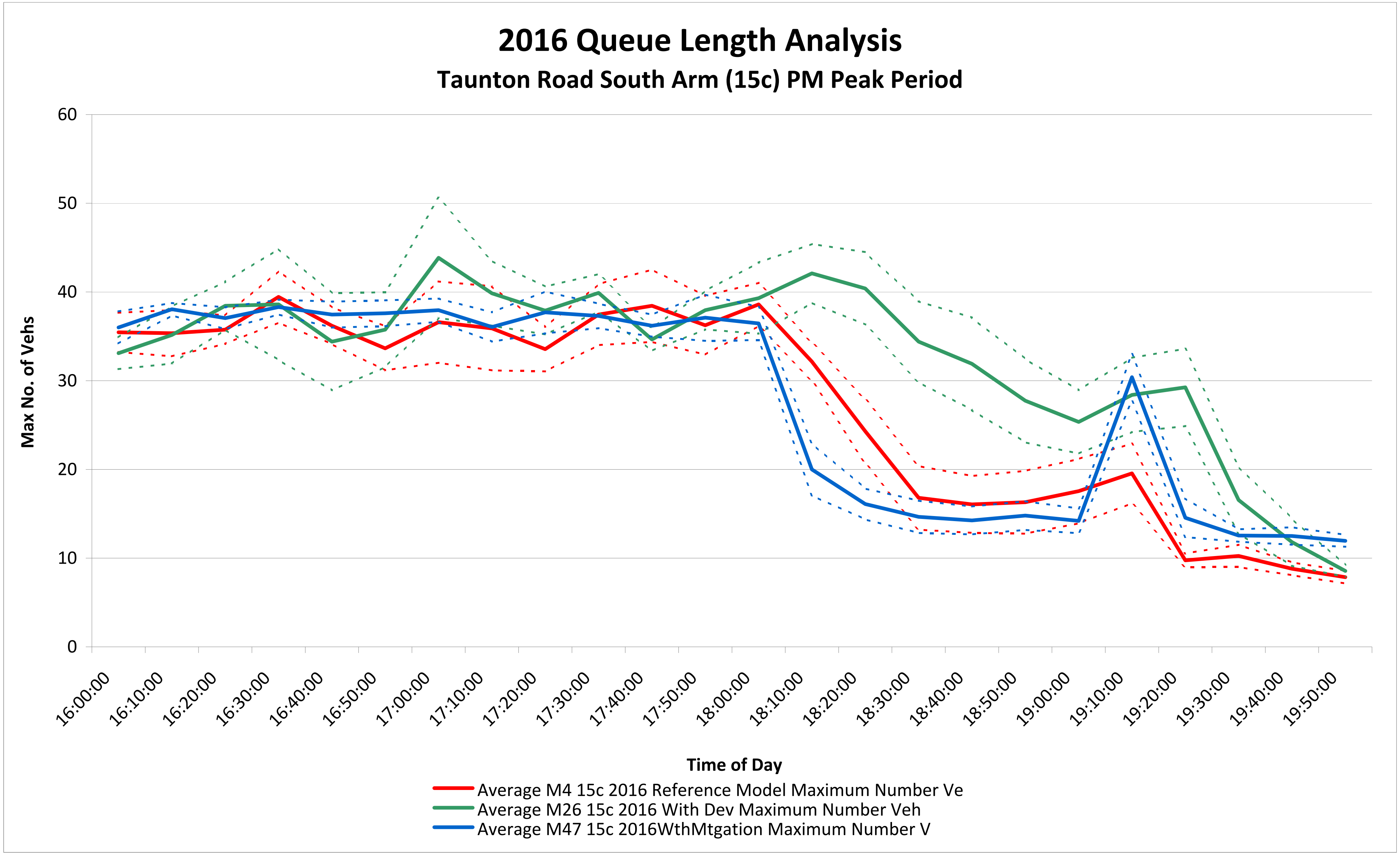

2016 Queue Length Analysis
Broadway West Arm (15b) AM Peak Analysis
30
25
20
15
10
5
0
Max No. of Vehs
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15b 2016 Reference Model Maximum Number Ve
Average M26 15b 2016 With Dev Maximum Number Veh
Average M47 15b 2016WthMtgation Maximum Number V

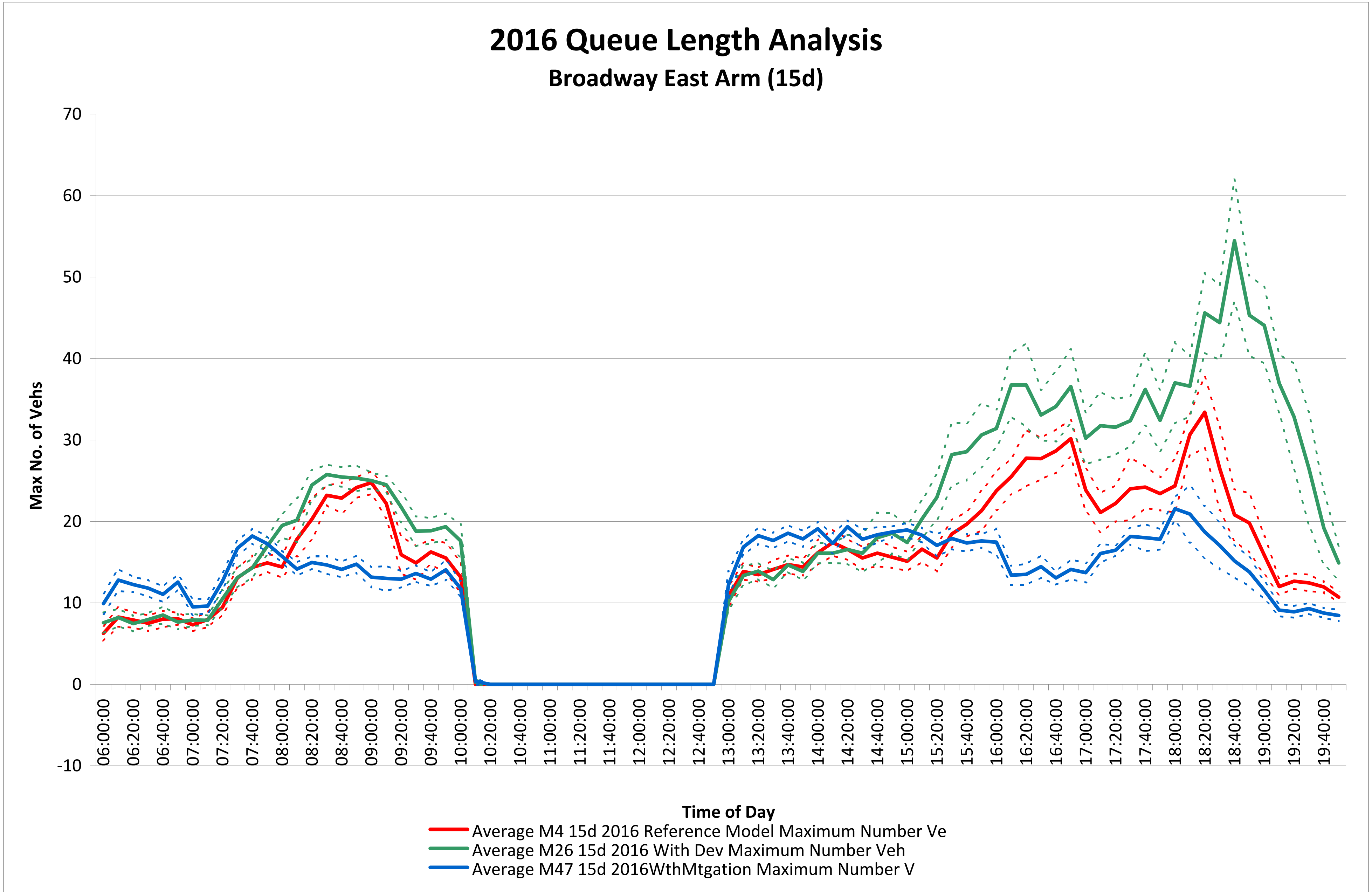

2016 Queue Length Analysis
Broadway West Arm (15b) PM Peak Period
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15b 2016 Reference Model Maximum Number Ve
Average M26 15b 2016 With Dev Maximum Number Veh
Average M47 15b 2016WthMtgation Maximum Number V

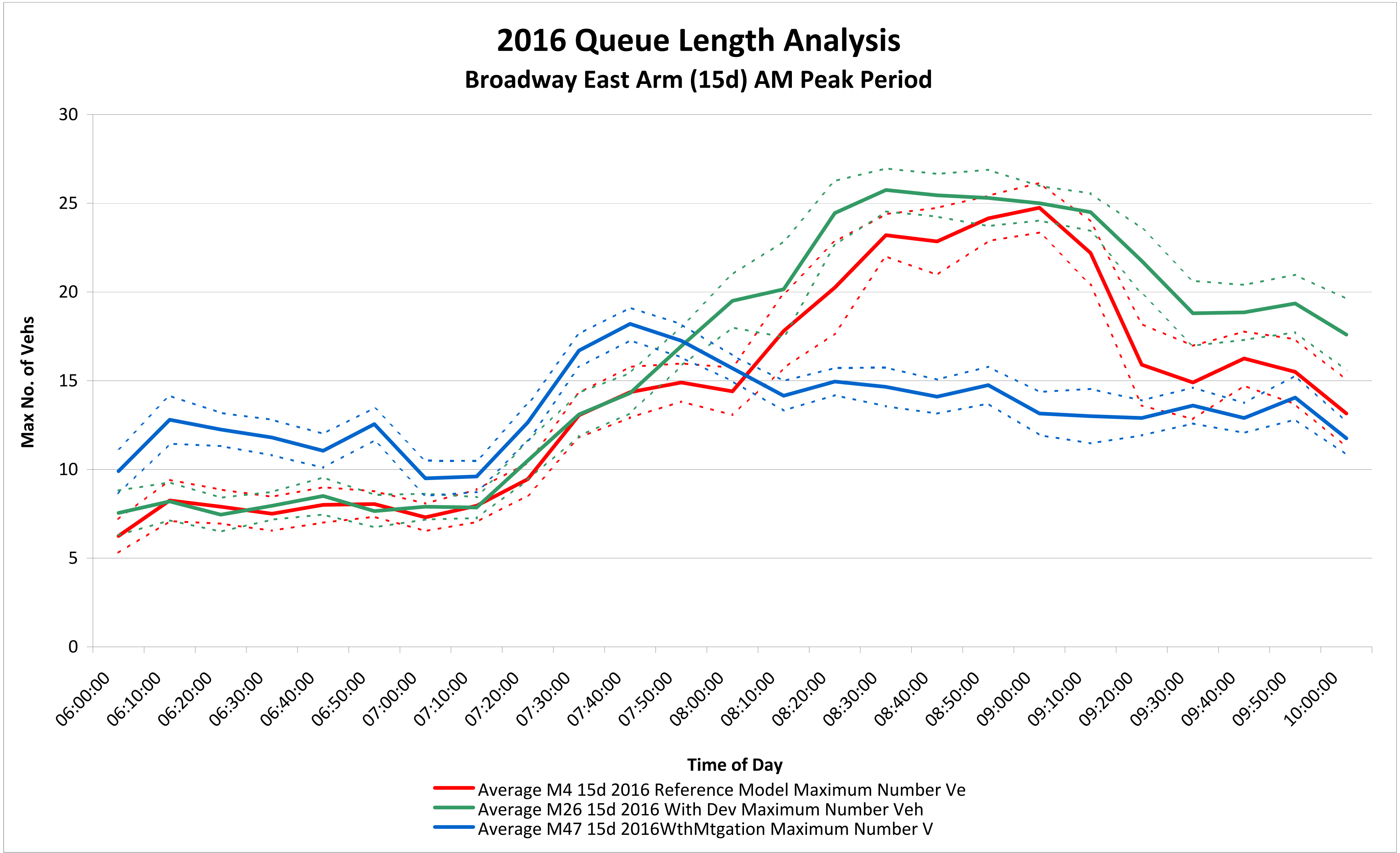


2016 Queue Length Analysis
Taunton Road South Arm (15c)
Max No. of Vehs
Time of Day
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 15c 2016 Reference Model Maximum Number Ve
Average M26 15c 2016 With Dev Maximum Number Veh
Average M47 15c 2016WthMtgation Maximum Number V

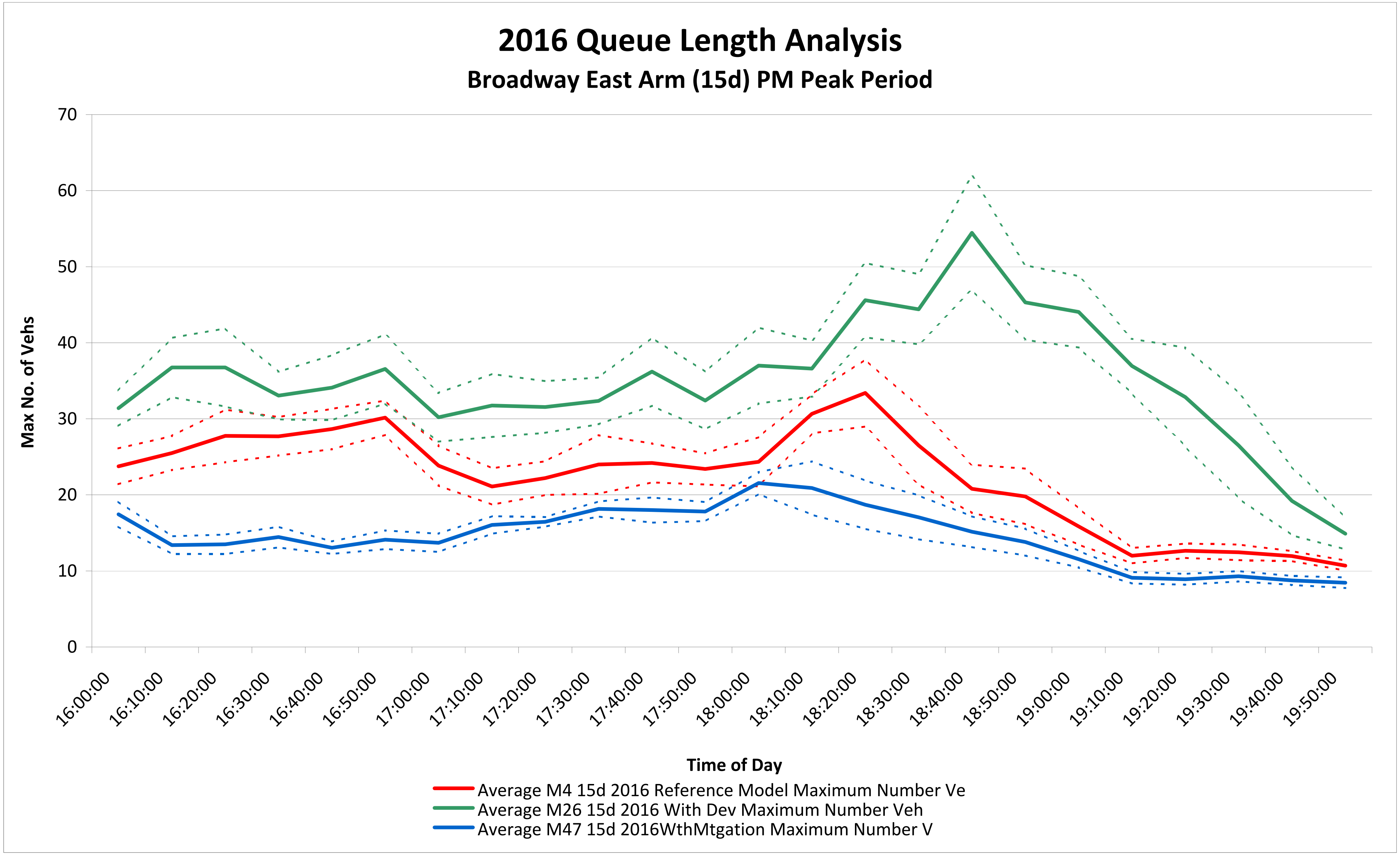

2016 Queue Length Analysis
Taunton Road South Arm (15c) AM Peak Period
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15c 2016 Reference Model Maximum Number Ve
Average M26 15c 2016 With Dev Maximum Number Veh
Average M47 15c 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Taunton Road South Arm (15c) PM Peak Period
Max No. of Vehs
0
10
20
30
40
50
60
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15c 2016 Reference Model Maximum Number Ve
Average M26 15c 2016 With Dev Maximum Number Veh
Average M47 15c 2016WthMtgation Maximum Number V

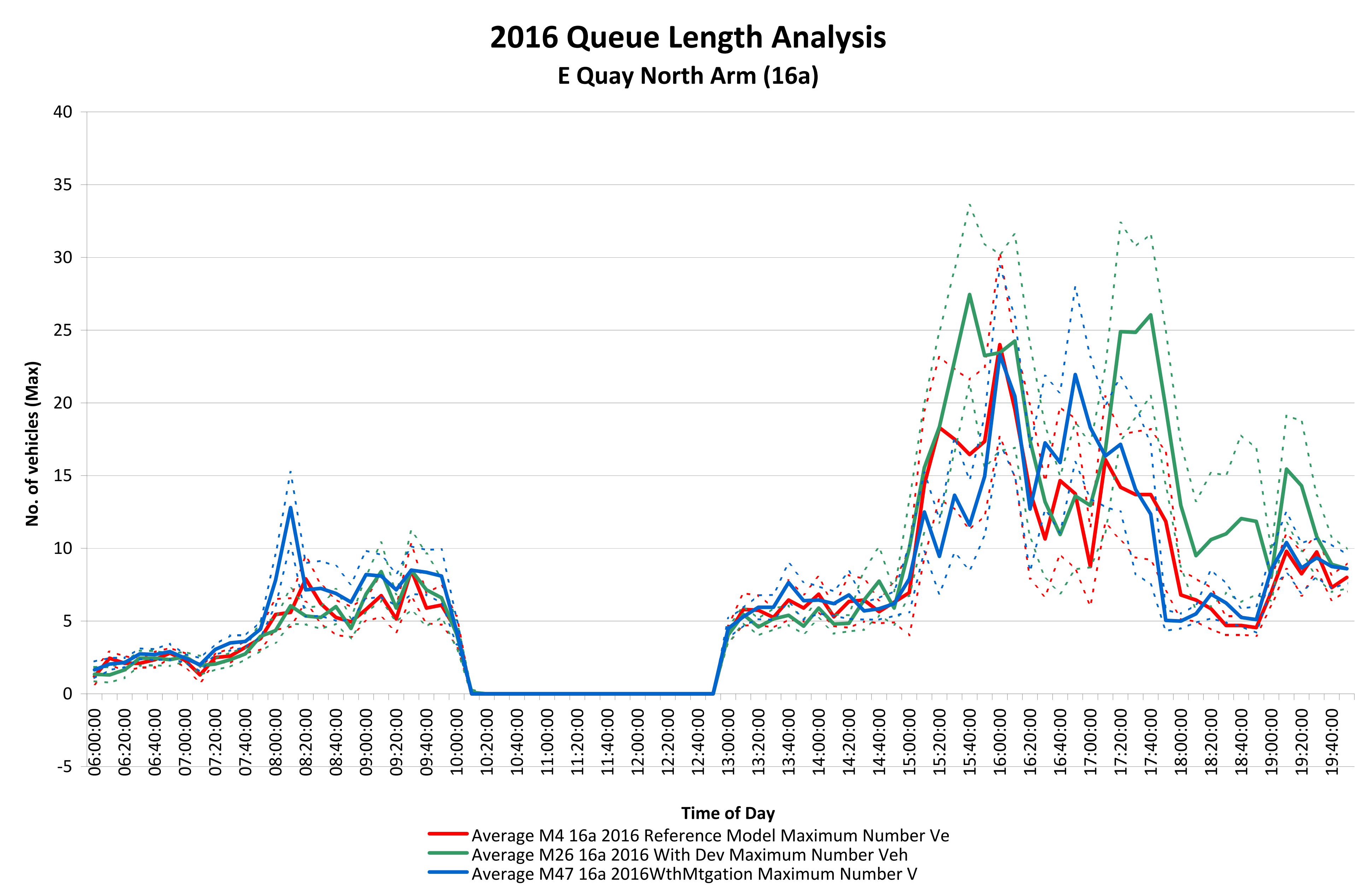

2016 Queue Length Analysis
Broadway East Arm (15d)
Max No. of Vehs
70
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 15d 2016 Reference Model Maximum Number Ve
Average M26 15d 2016 With Dev Maximum Number Veh
Average M47 15d 2016WthMtgation Maximum Number V



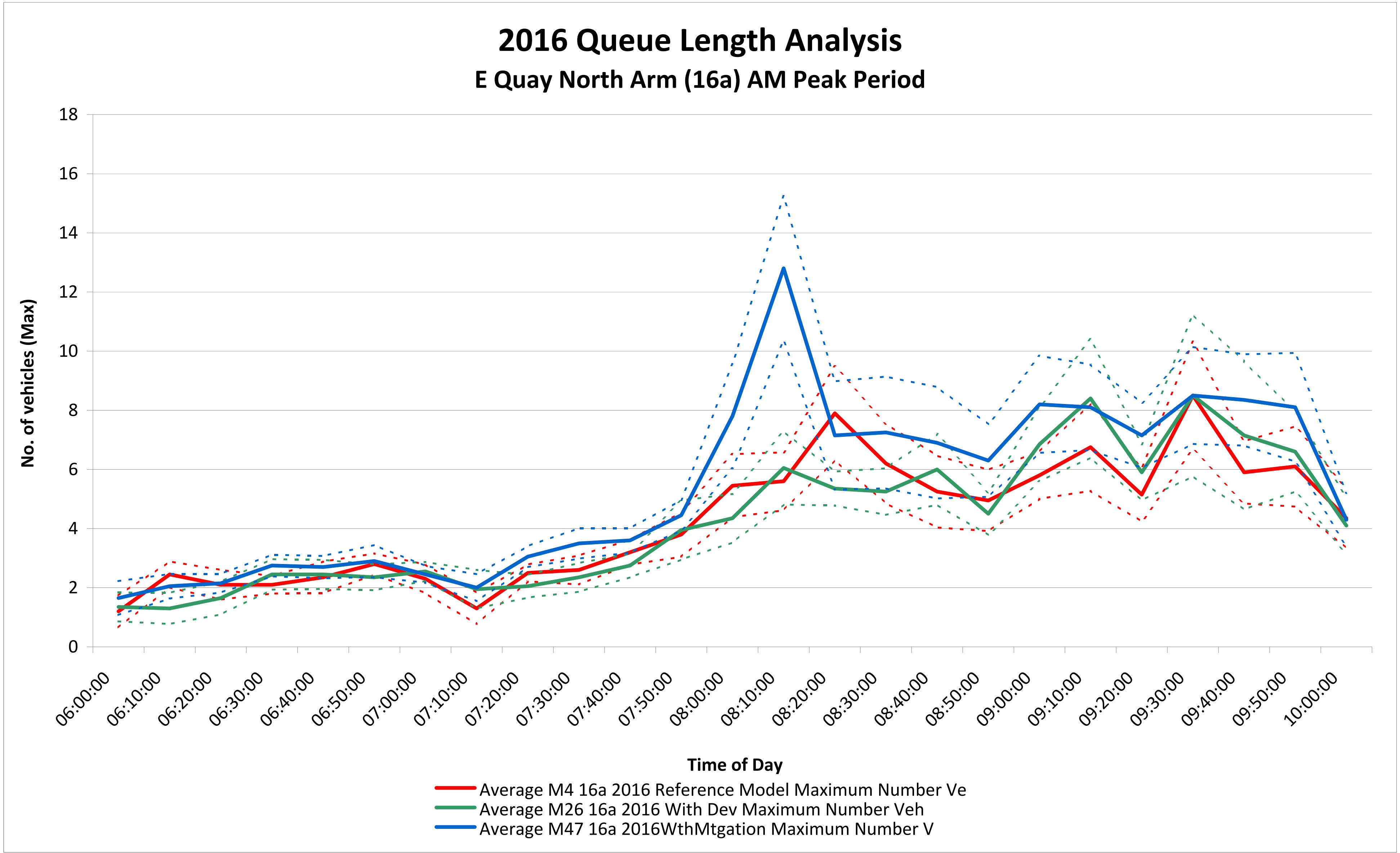
2016 Queue Length Analysis
Broadway East Arm (15d) AM Peak Period
Max No. of Vehs
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15d 2016 Reference Model Maximum Number Ve
Average M26 15d 2016 With Dev Maximum Number Veh
Average M47 15d 2016WthMtgation Maximum Number V

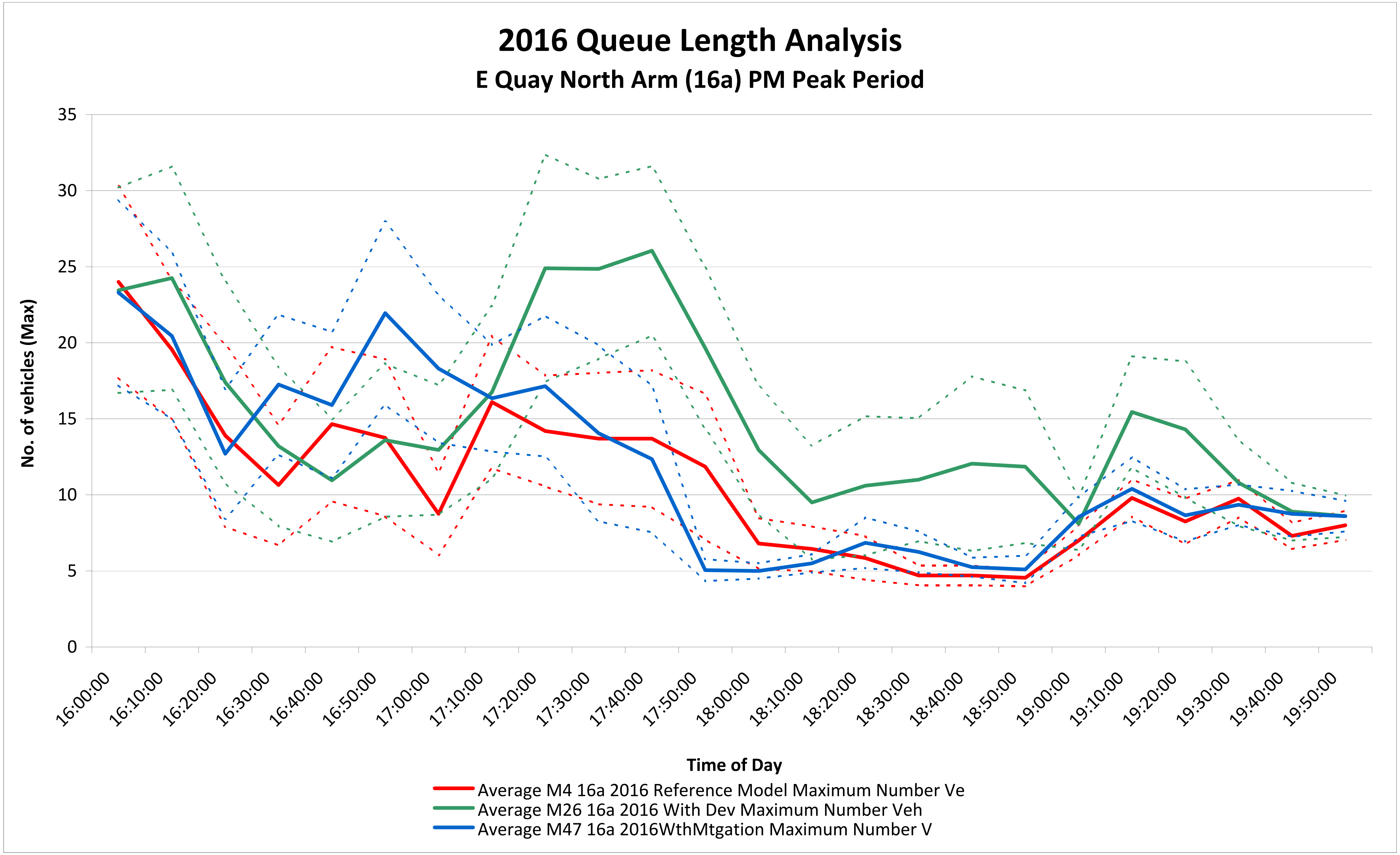


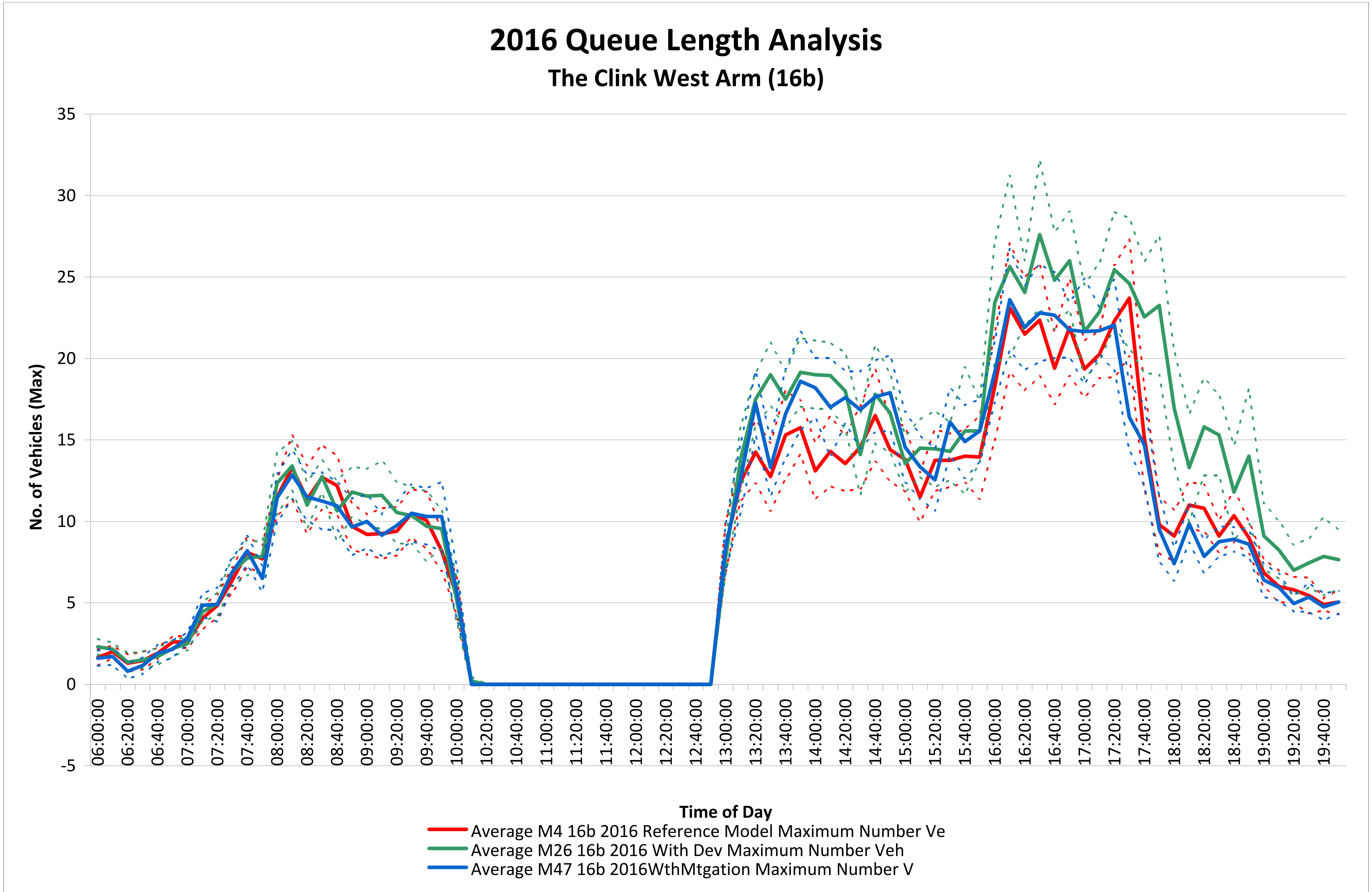
2016 Queue Length Analysis
Broadway East Arm (15d) PM Peak Period
Max No. of Vehs
70
60
50
40
30
20
10
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15d 2016 Reference Model Maximum Number Ve
Average M26 15d 2016 With Dev Maximum Number Veh
Average M47 15d 2016WthMtgation Maximum Number V



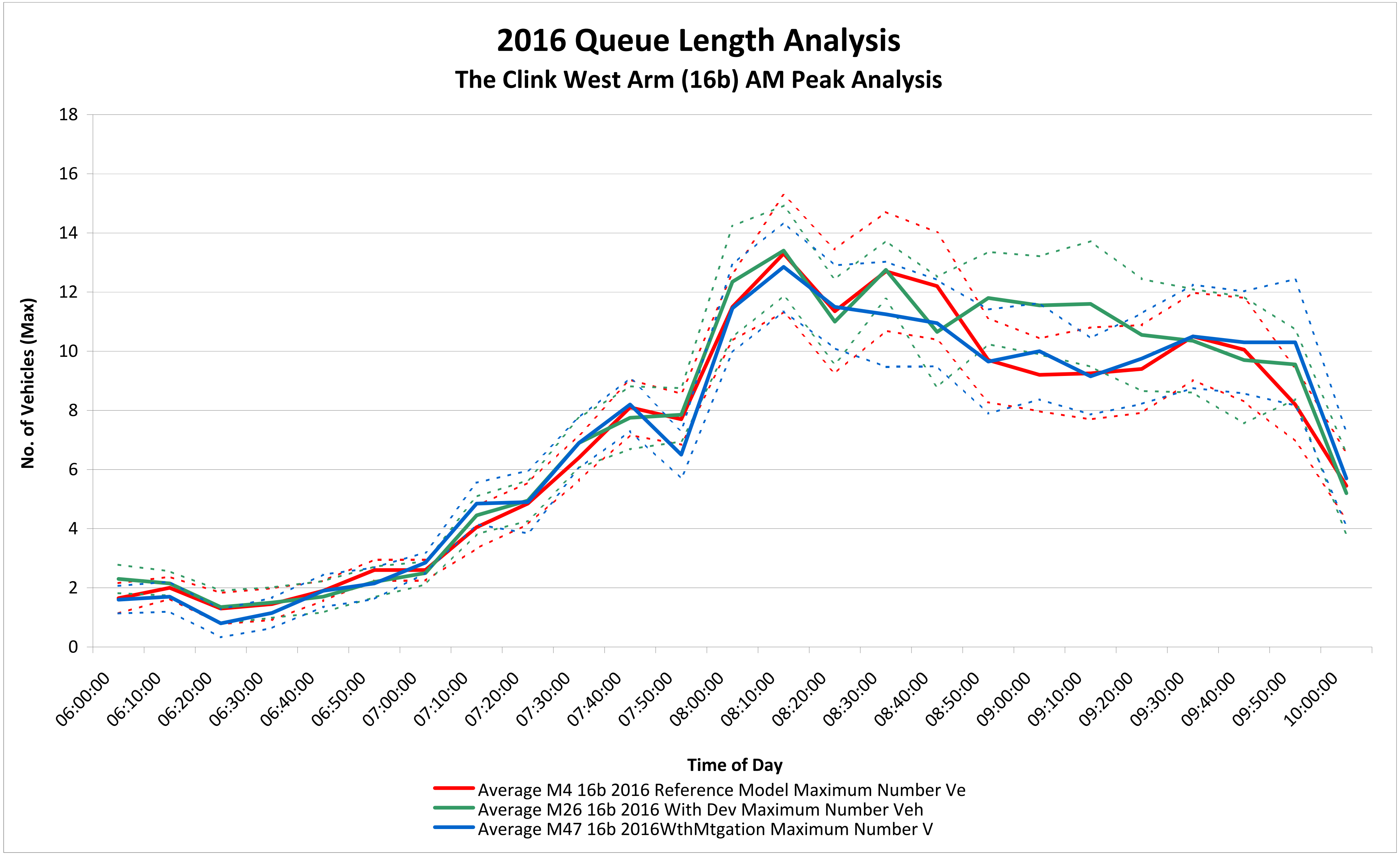
2016 Queue Length Analysis
E Quay North Arm (16a)
No. of vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 16a 2016 Reference Model Maximum Number Ve
Average M26 16a 2016 With Dev Maximum Number Veh
Average M47 16a 2016WthMtgation Maximum Number V

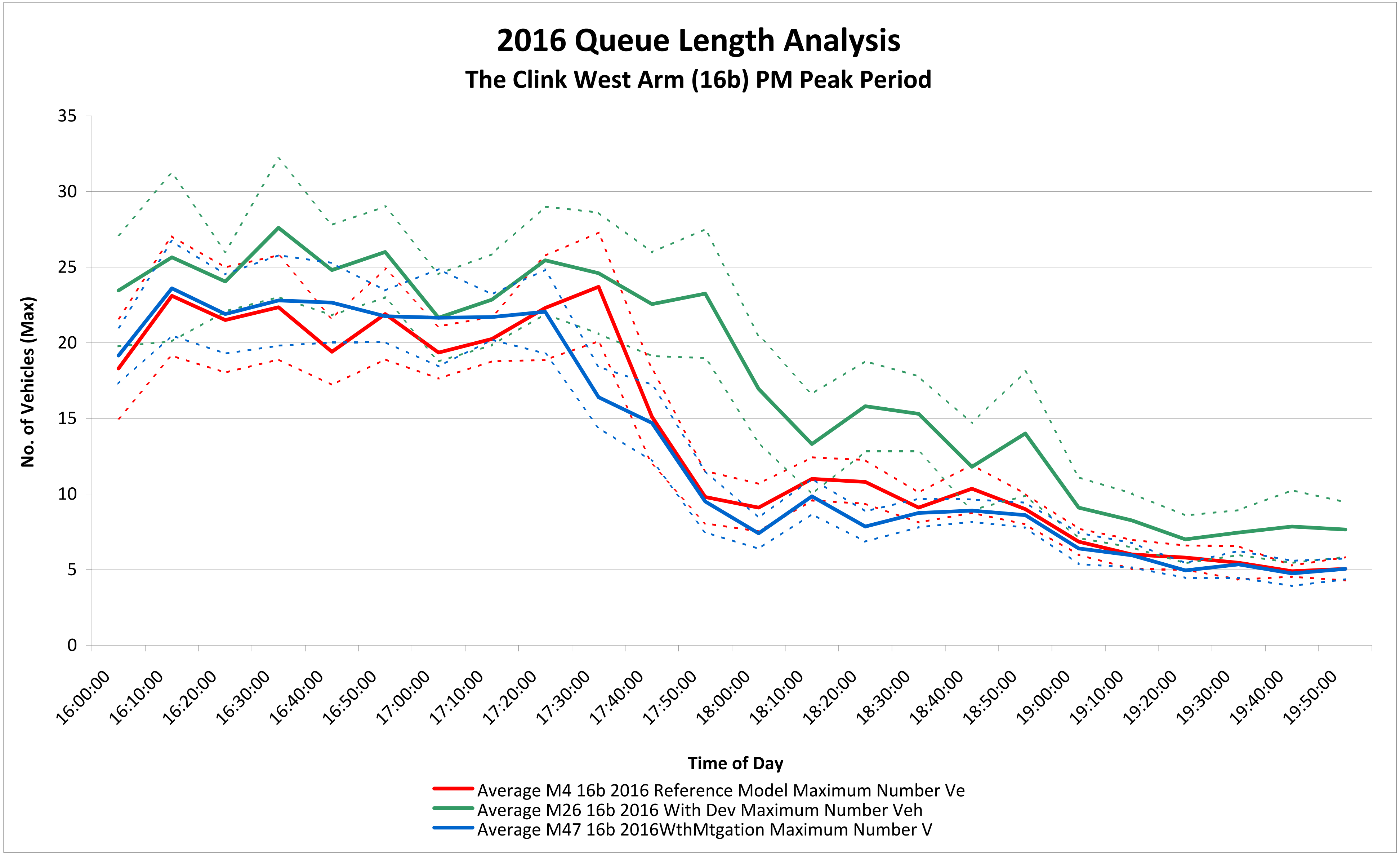

2016 Queue Length Analysis
E Quay North Arm (16a) AM Peak Period
No. of vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 16a 2016 Reference Model Maximum Number Ve
Average M26 16a 2016 With Dev Maximum Number Veh
Average M47 16a 2016WthMtgation Maximum Number V

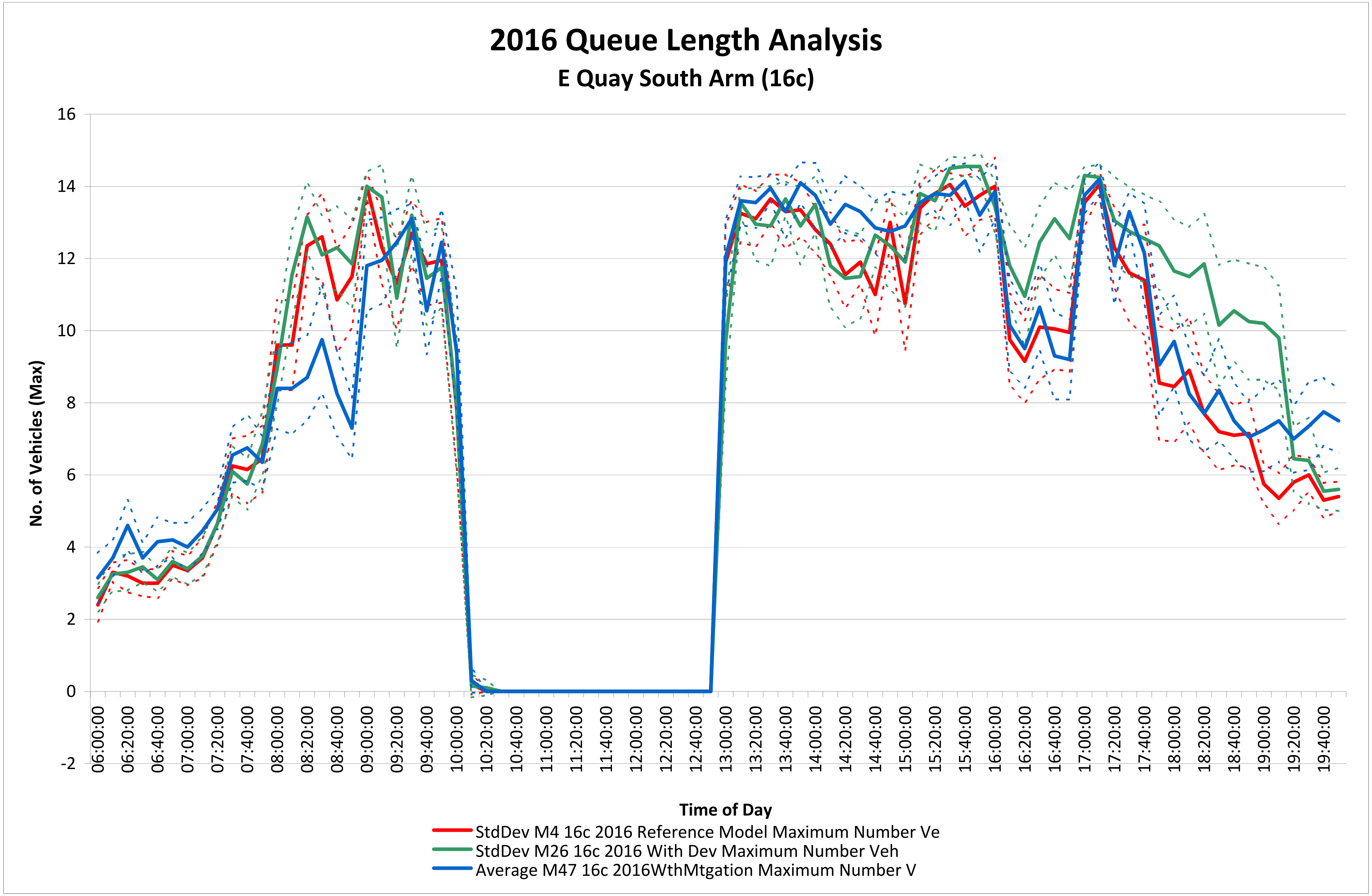

2016 Queue Length Analysis
E Quay North Arm (16a) PM Peak Period
35
30
25
20
15
10
5
0
No. of vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 16a 2016 Reference Model Maximum Number Ve
Average M26 16a 2016 With Dev Maximum Number Veh
Average M47 16a 2016WthMtgation Maximum Number V



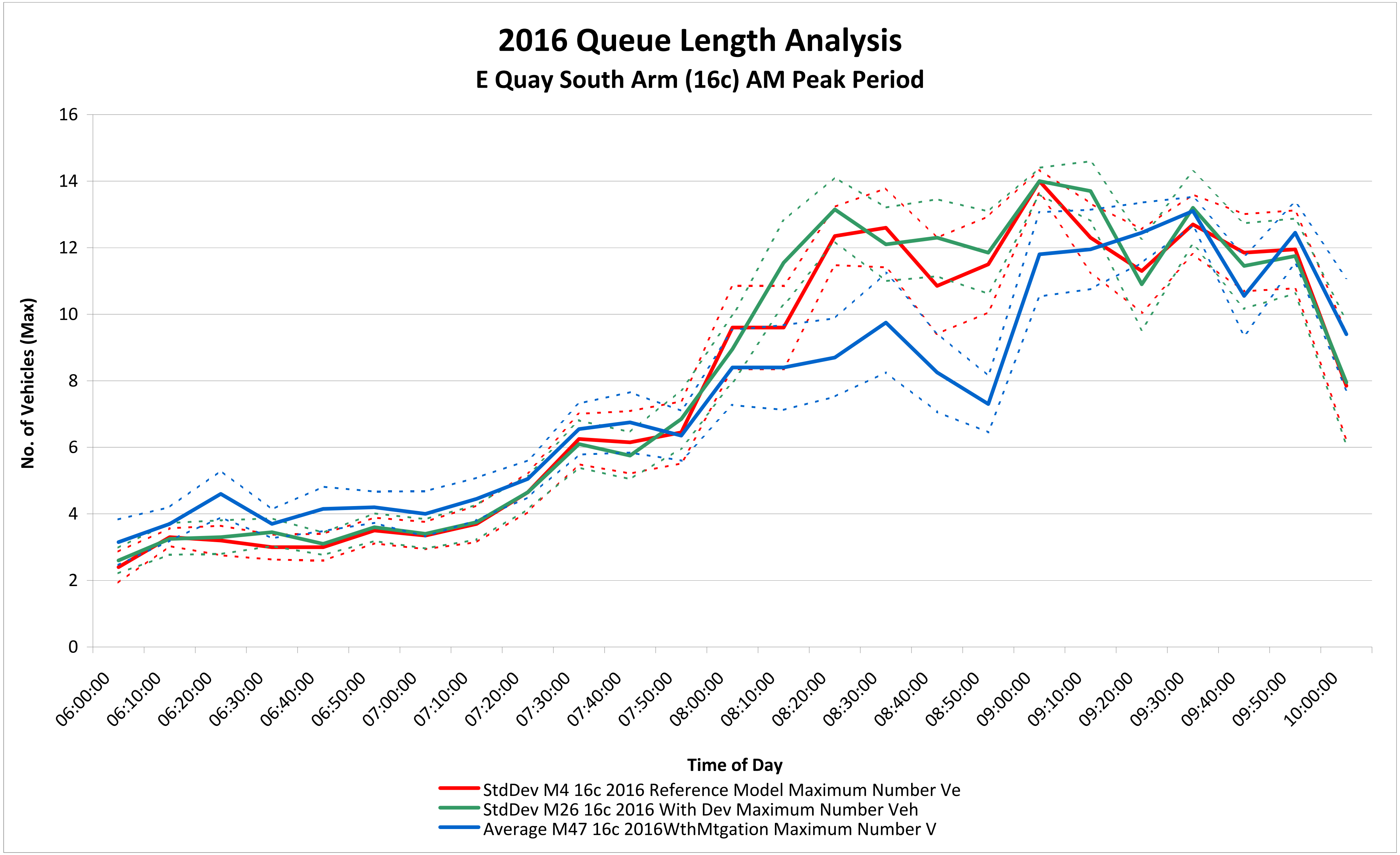
2016 Queue Length Analysis
The Clink West Arm (16b)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 16b 2016 Reference Model Maximum Number Ve
Average M26 16b 2016 With Dev Maximum Number Veh
Average M47 16b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
The Clink West Arm (16b) AM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 16b 2016 Reference Model Maximum Number Ve
Average M26 16b 2016 With Dev Maximum Number Veh
Average M47 16b 2016WthMtgation Maximum Number V

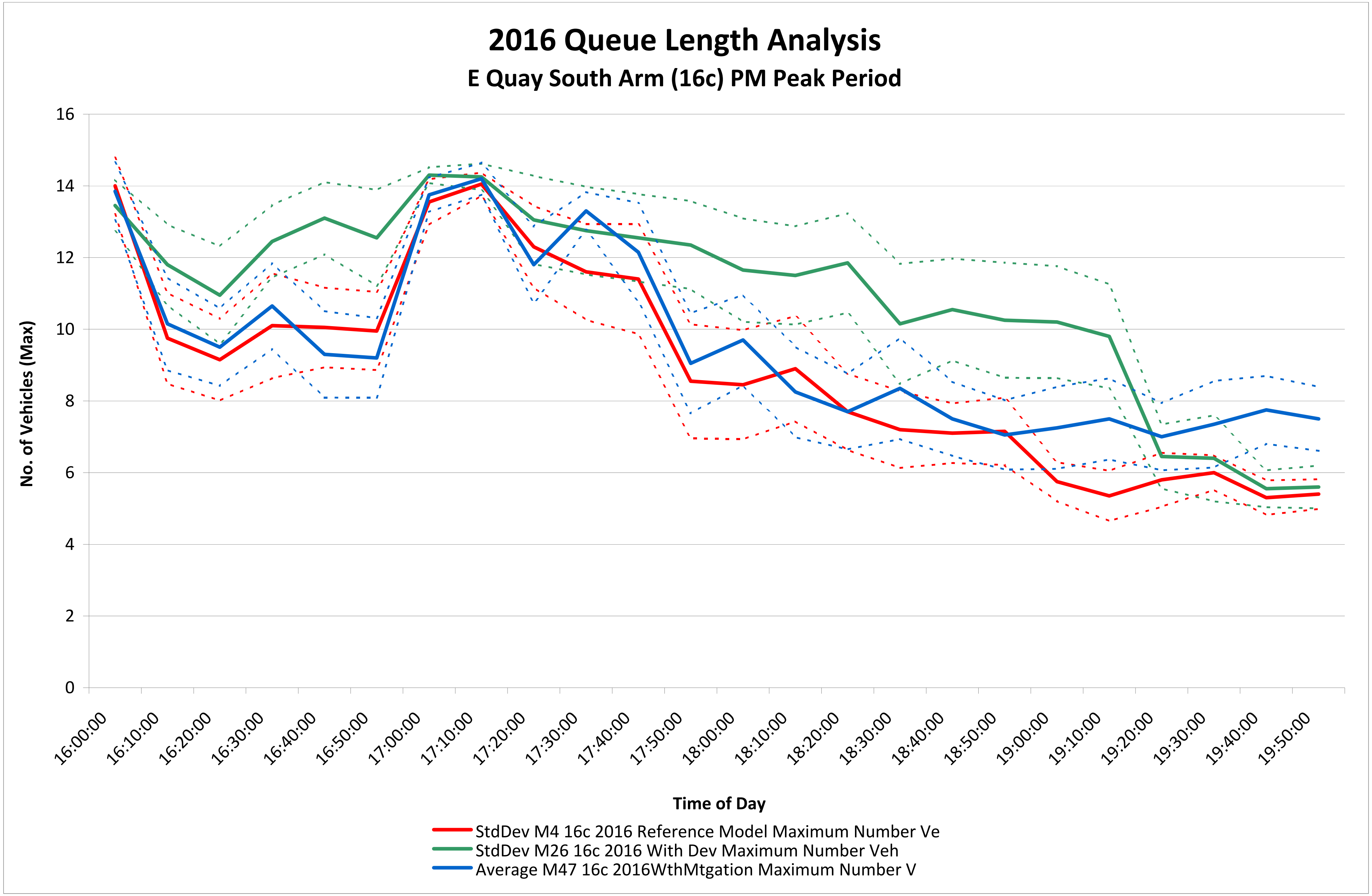

2016 Queue Length Analysis
The Clink West Arm (16b) PM Peak Period
35
30
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 16b 2016 Reference Model Maximum Number Ve
Average M26 16b 2016 With Dev Maximum Number Veh
Average M47 16b 2016WthMtgation Maximum Number V



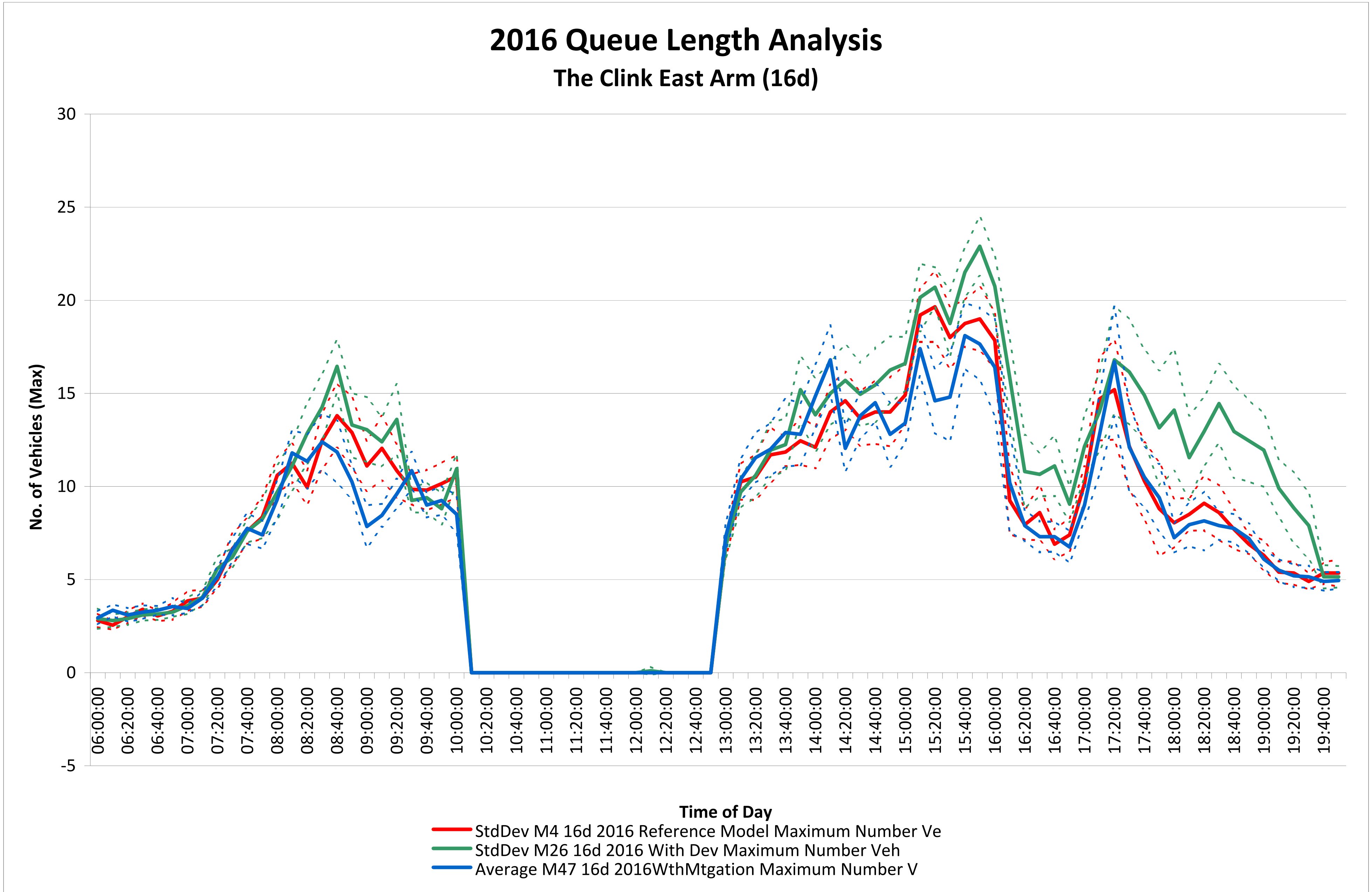
2016 Queue Length Analysis
E Quay South Arm (16c)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 16c 2016 Reference Model Maximum Number Ve
StdDev M26 16c 2016 With Dev Maximum Number Veh
Average M47 16c 2016WthMtgation Maximum Number V



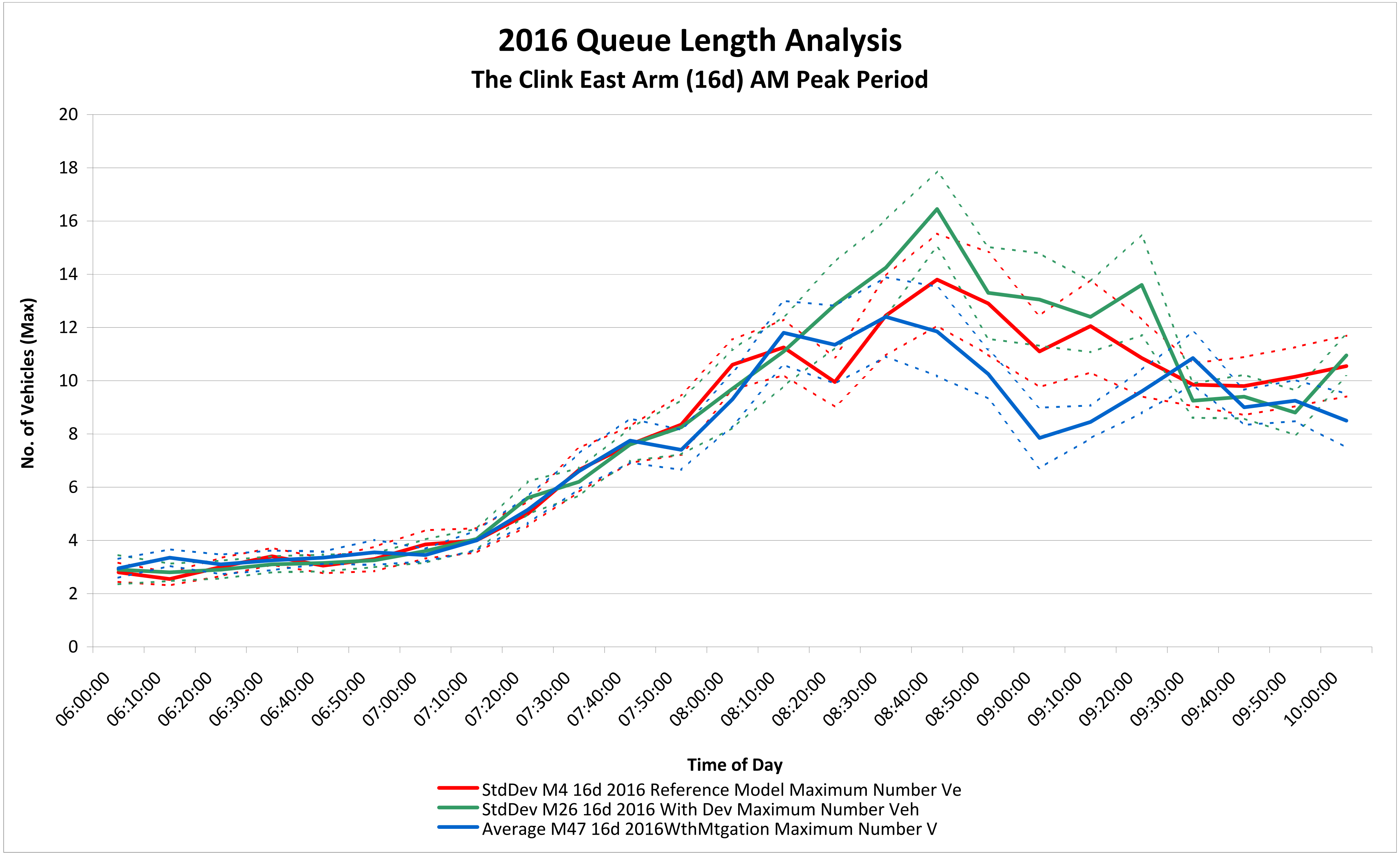
2016 Queue Length Analysis
E Quay South Arm (16c) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 16c 2016 Reference Model Maximum Number Ve
StdDev M26 16c 2016 With Dev Maximum Number Veh
Average M47 16c 2016WthMtgation Maximum Number V



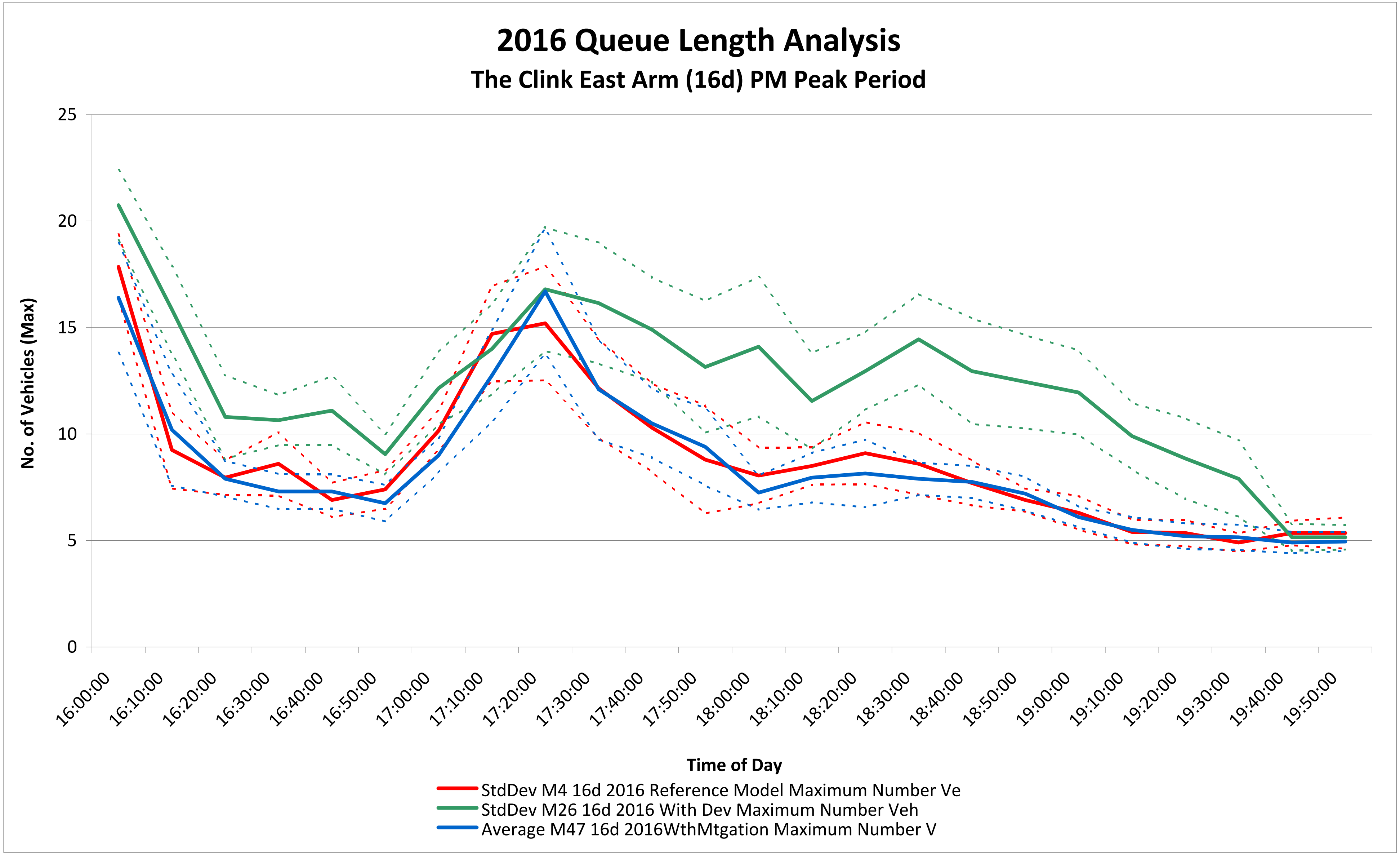
2016 Queue Length Analysis
E Quay South Arm (16c) PM Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 16c 2016 Reference Model Maximum Number Ve
StdDev M26 16c 2016 With Dev Maximum Number Veh
Average M47 16c 2016WthMtgation Maximum Number V



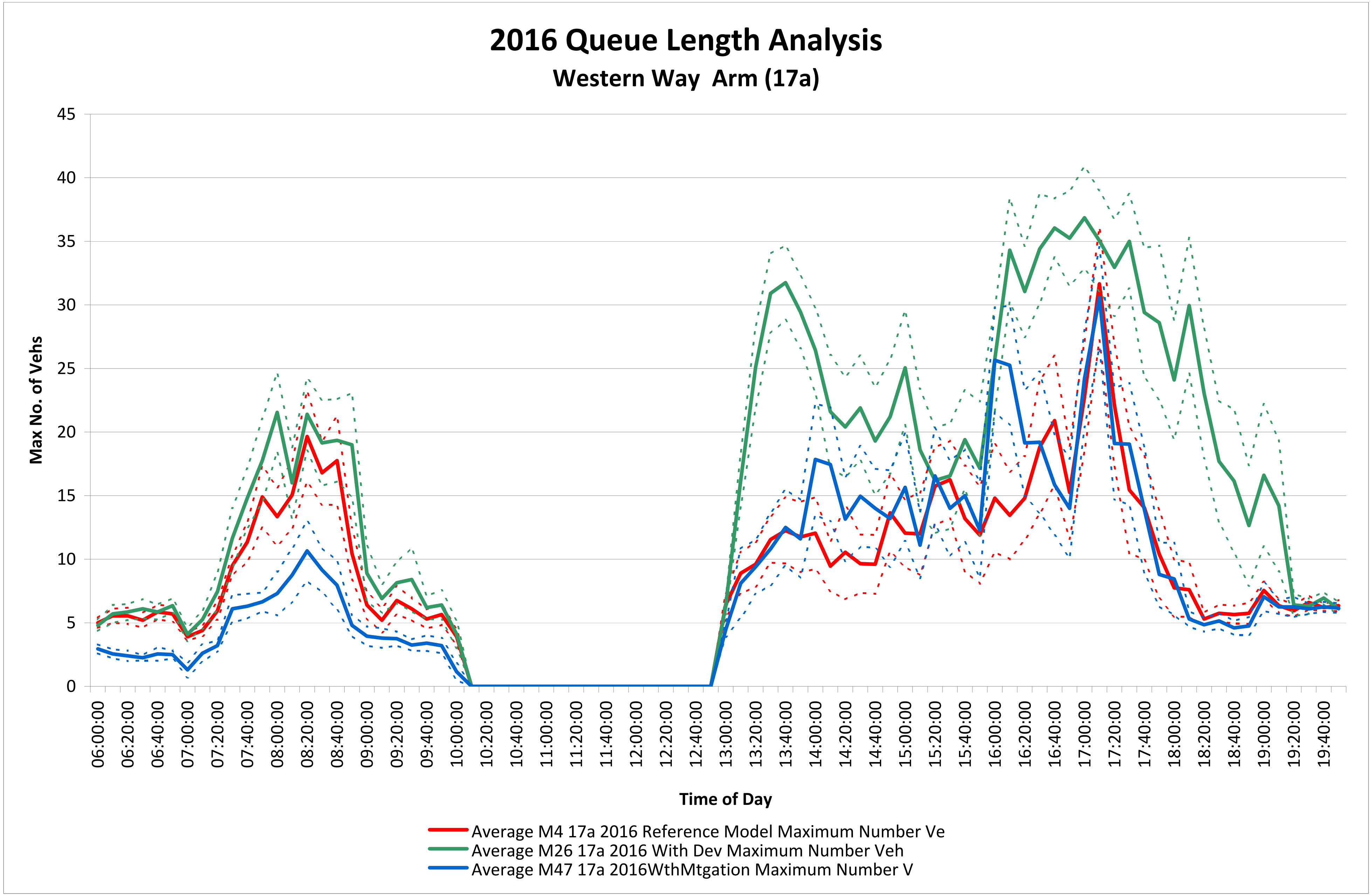
2016 Queue Length Analysis
The Clink East Arm (16d)
No. of Vehicles (Max)
Time of Day
StdDev M4 16d 2016 Reference Model Maximum Number Ve
StdDev M26 16d 2016 With Dev Maximum Number Veh
Average M47 16d 2016WthMtgation Maximum Number V



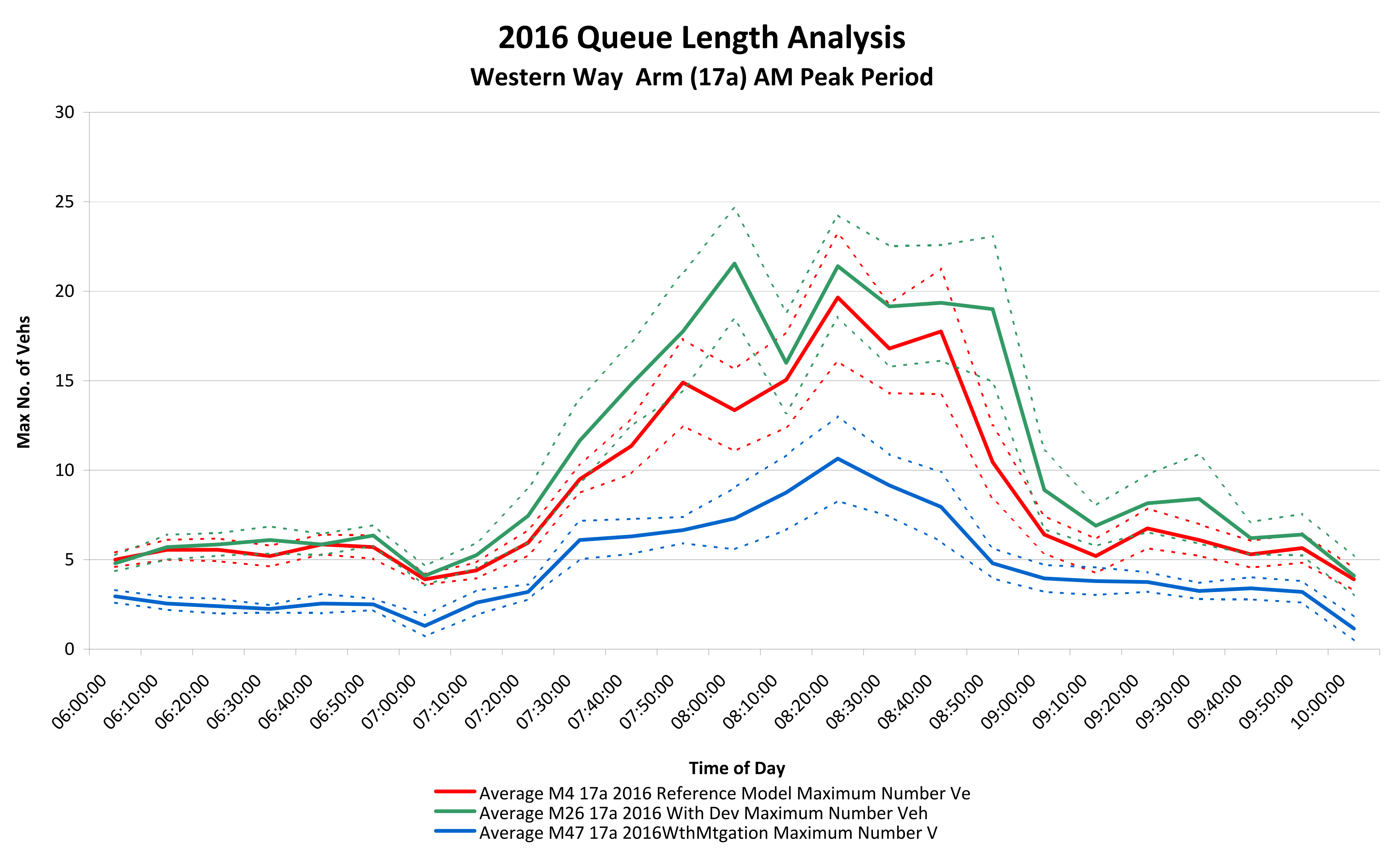
2016 Queue Length Analysis
The Clink East Arm (16d) AM Peak Period
No. of Vehicles (Max)
20
18
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 16d 2016 Reference Model Maximum Number Ve
StdDev M26 16d 2016 With Dev Maximum Number Veh
Average M47 16d 2016WthMtgation Maximum Number V



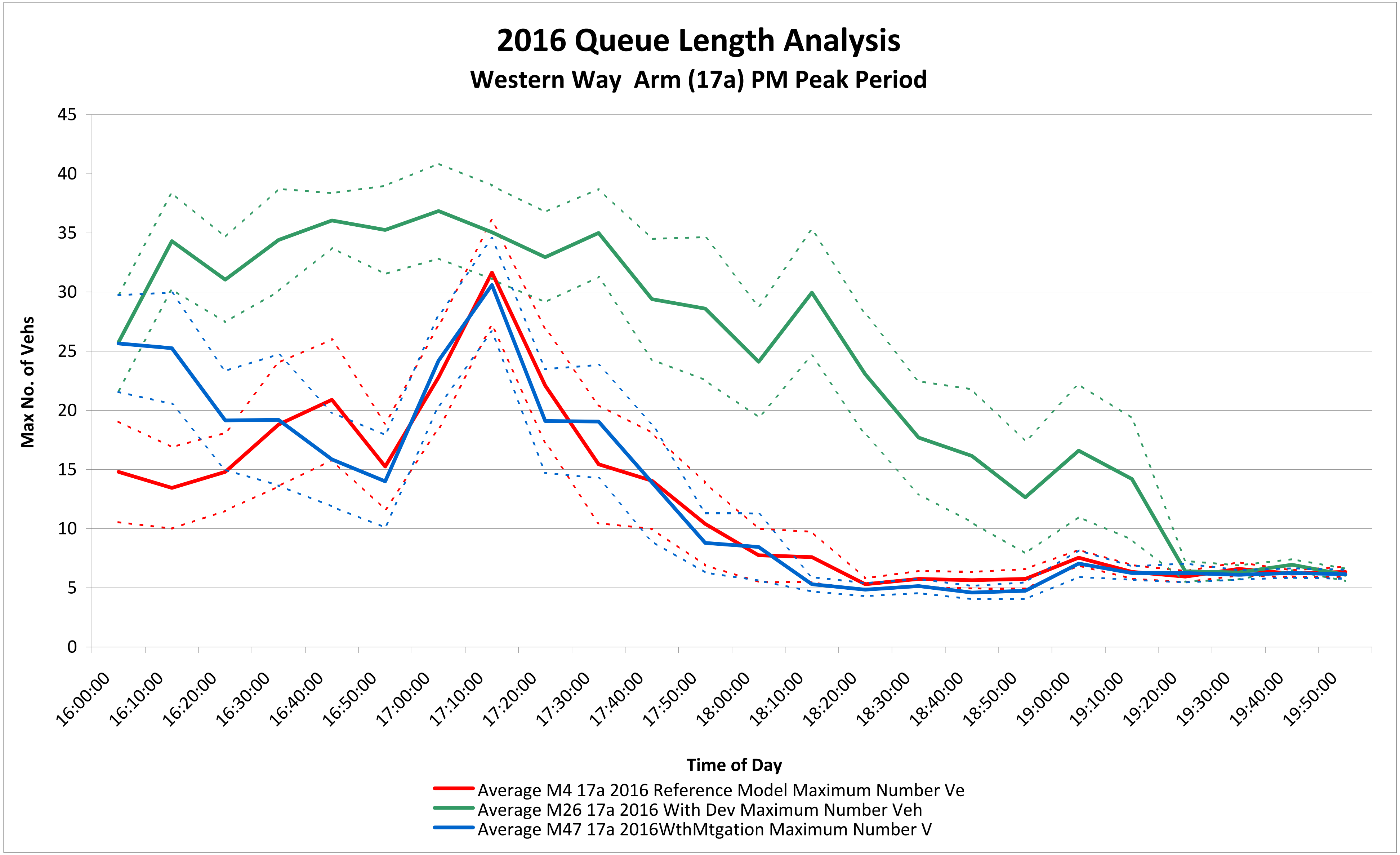
2016 Queue Length Analysis
The Clink East Arm (16d) PM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 16d 2016 Reference Model Maximum Number Ve
StdDev M26 16d 2016 With Dev Maximum Number Veh
Average M47 16d 2016WthMtgation Maximum Number V



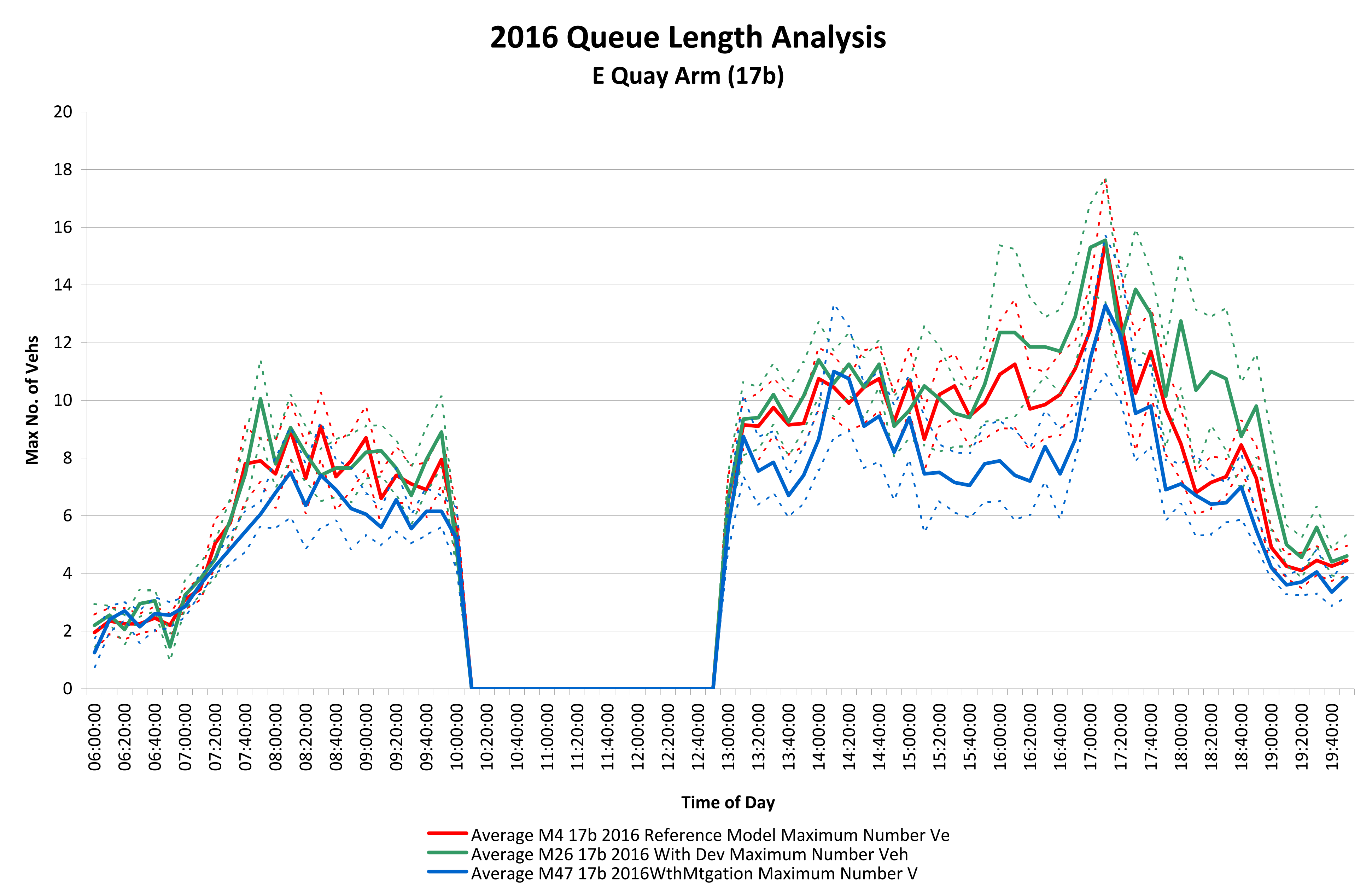
2016 Queue Length Analysis
Western Way Arm (17a)
Max No. of Vehs
Time of Day
45
40
35
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 17a 2016 Reference Model Maximum Number Ve
Average M26 17a 2016 With Dev Maximum Number Veh
Average M47 17a 2016WthMtgation Maximum Number V

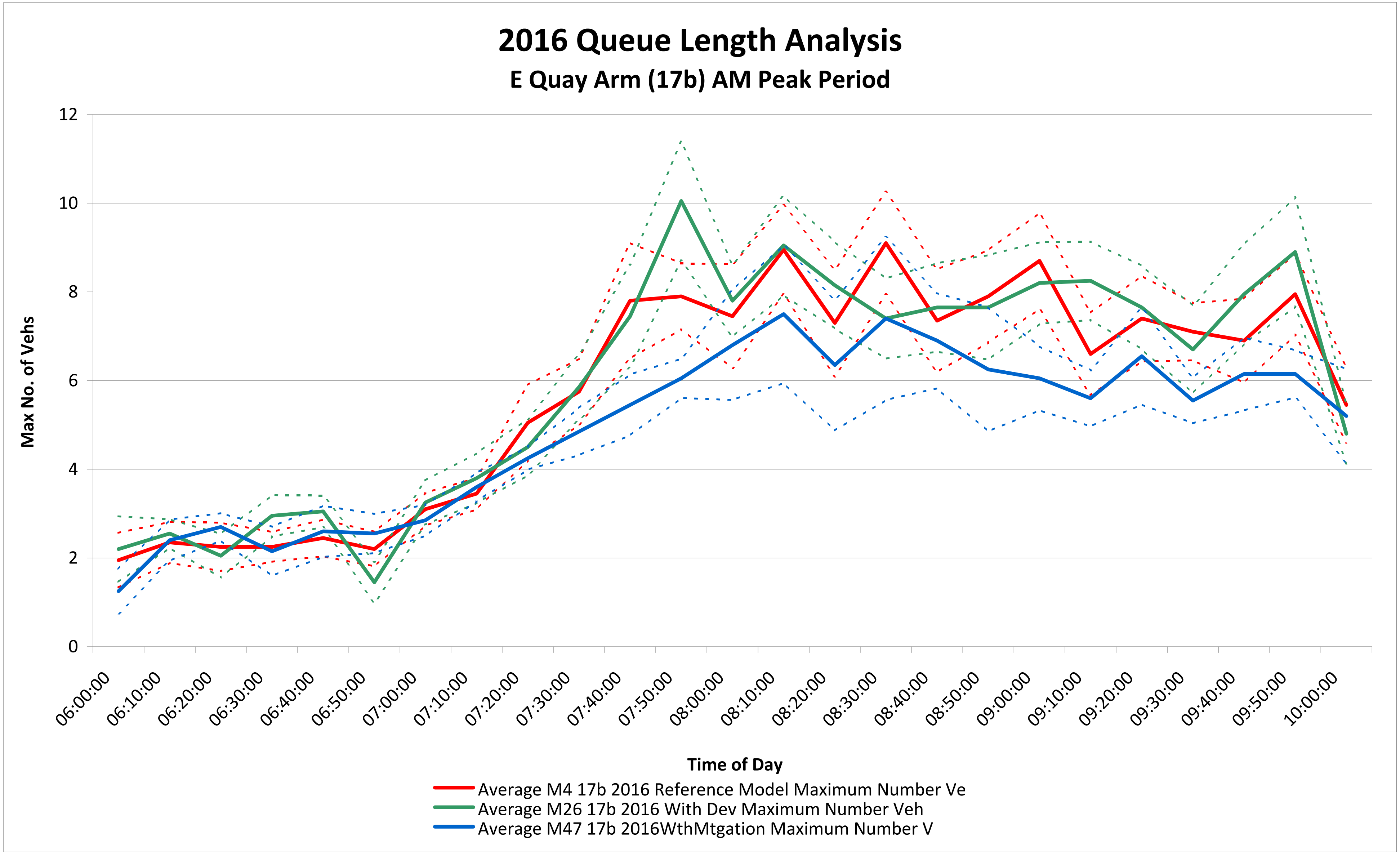


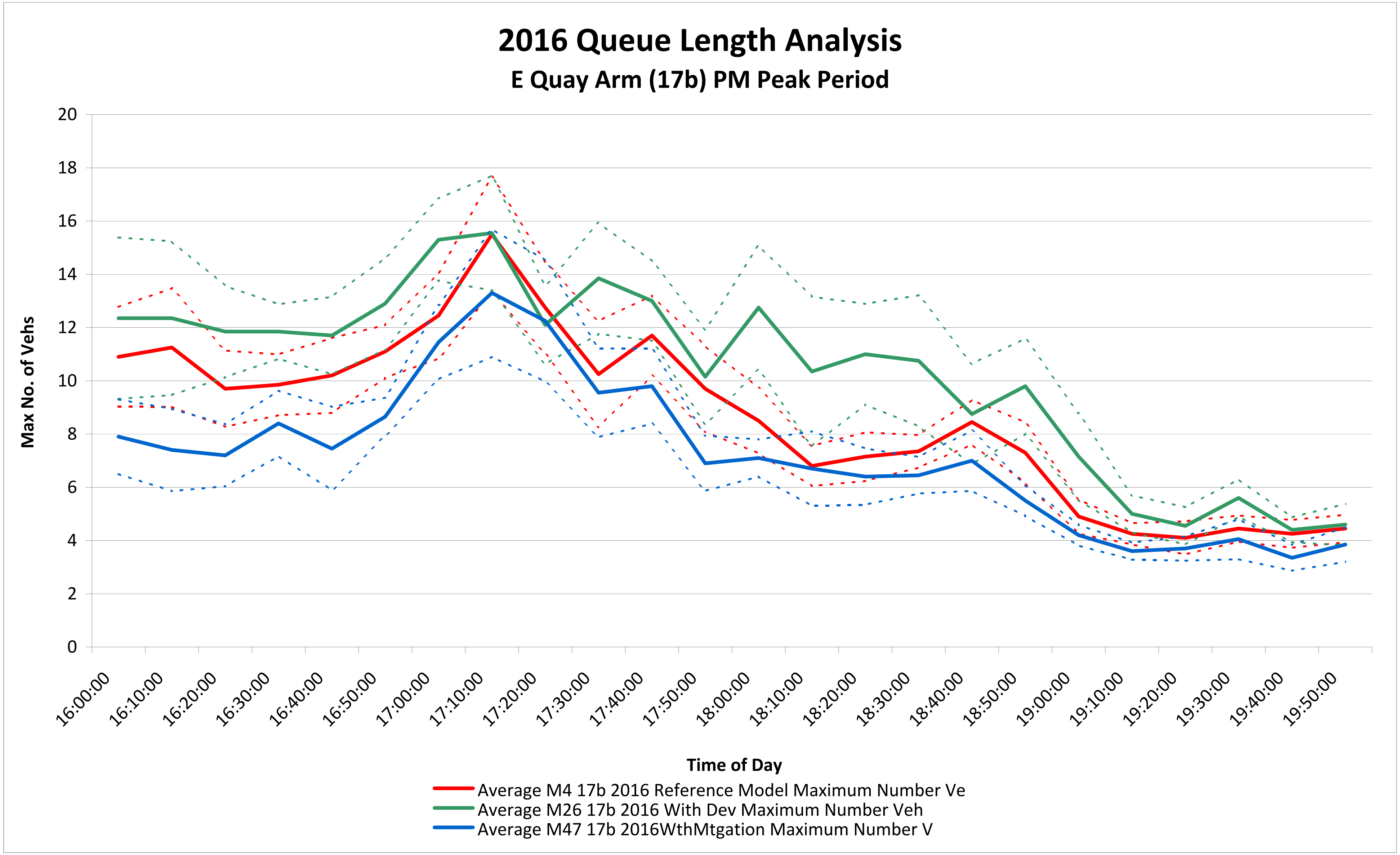
2016 Queue Length Analysis
Western Way Arm (17a) AM Peak Period
Max No. of Vehs
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17a 2016 Reference Model Maximum Number Ve
Average M26 17a 2016 With Dev Maximum Number Veh
Average M47 17a 2016WthMtgation Maximum Number V

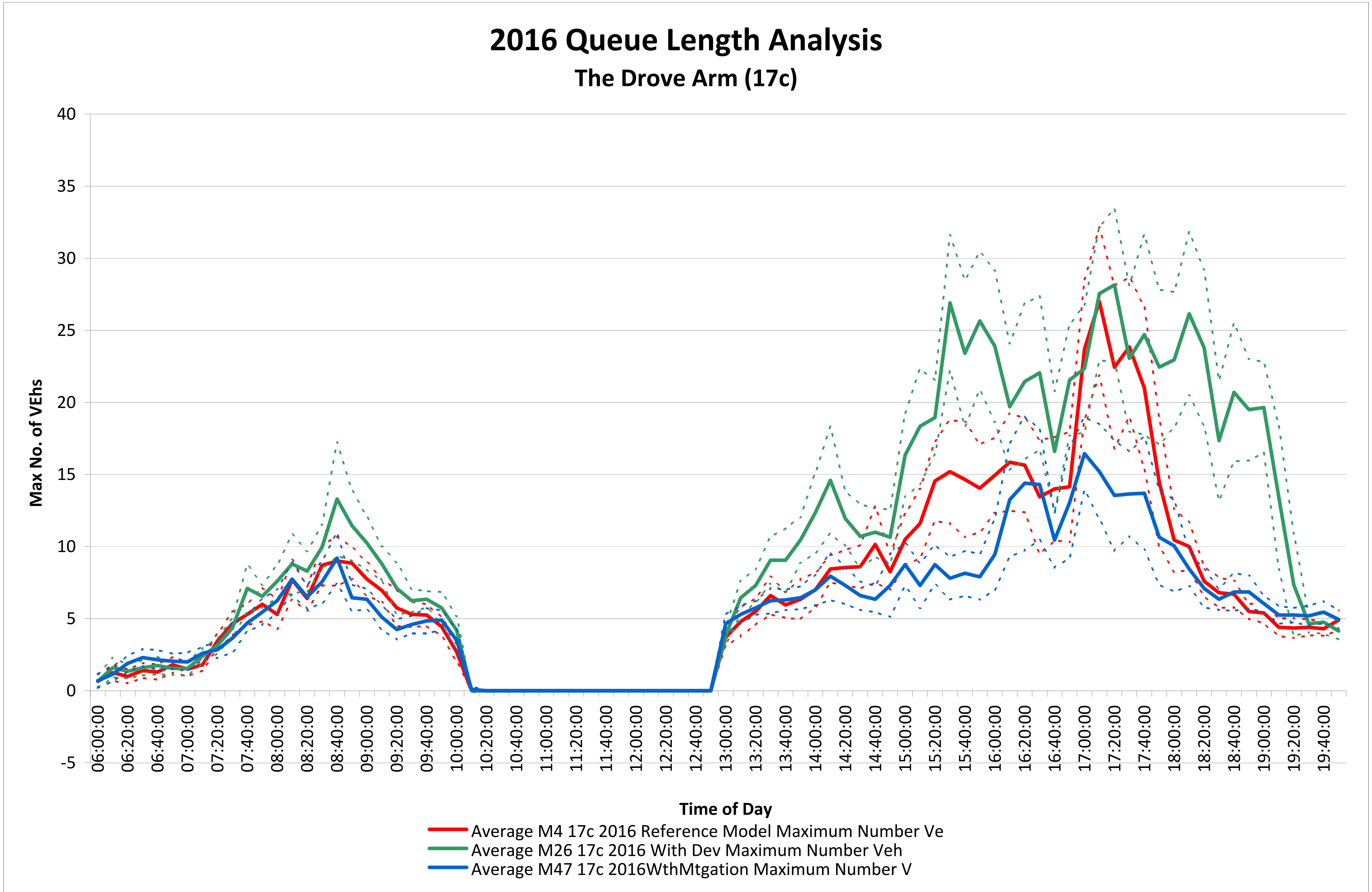


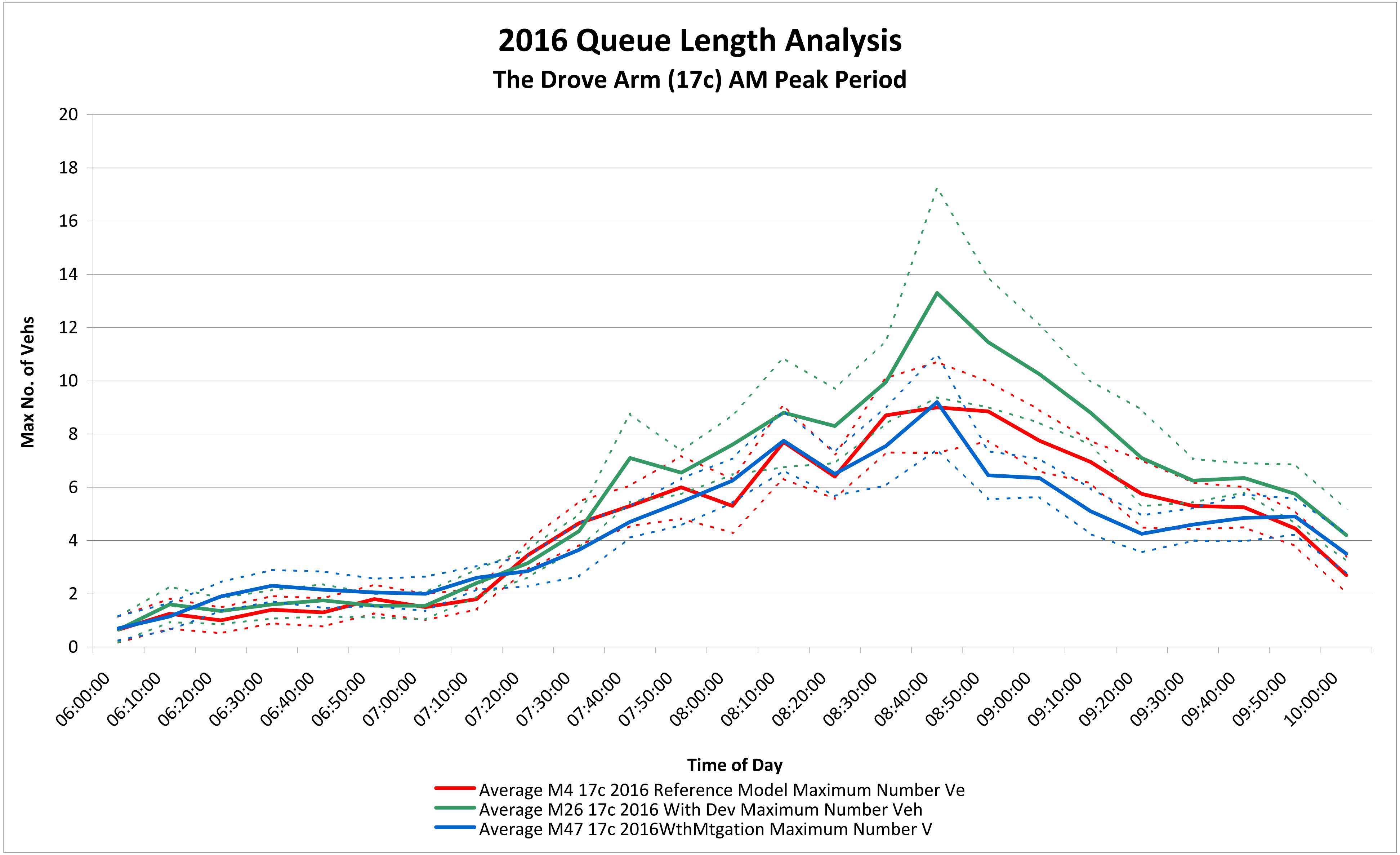
2016 Queue Length Analysis
Western Way Arm (17a) PM Peak Period
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17a 2016 Reference Model Maximum Number Ve
Average M26 17a 2016 With Dev Maximum Number Veh
Average M47 17a 2016WthMtgation Maximum Number V

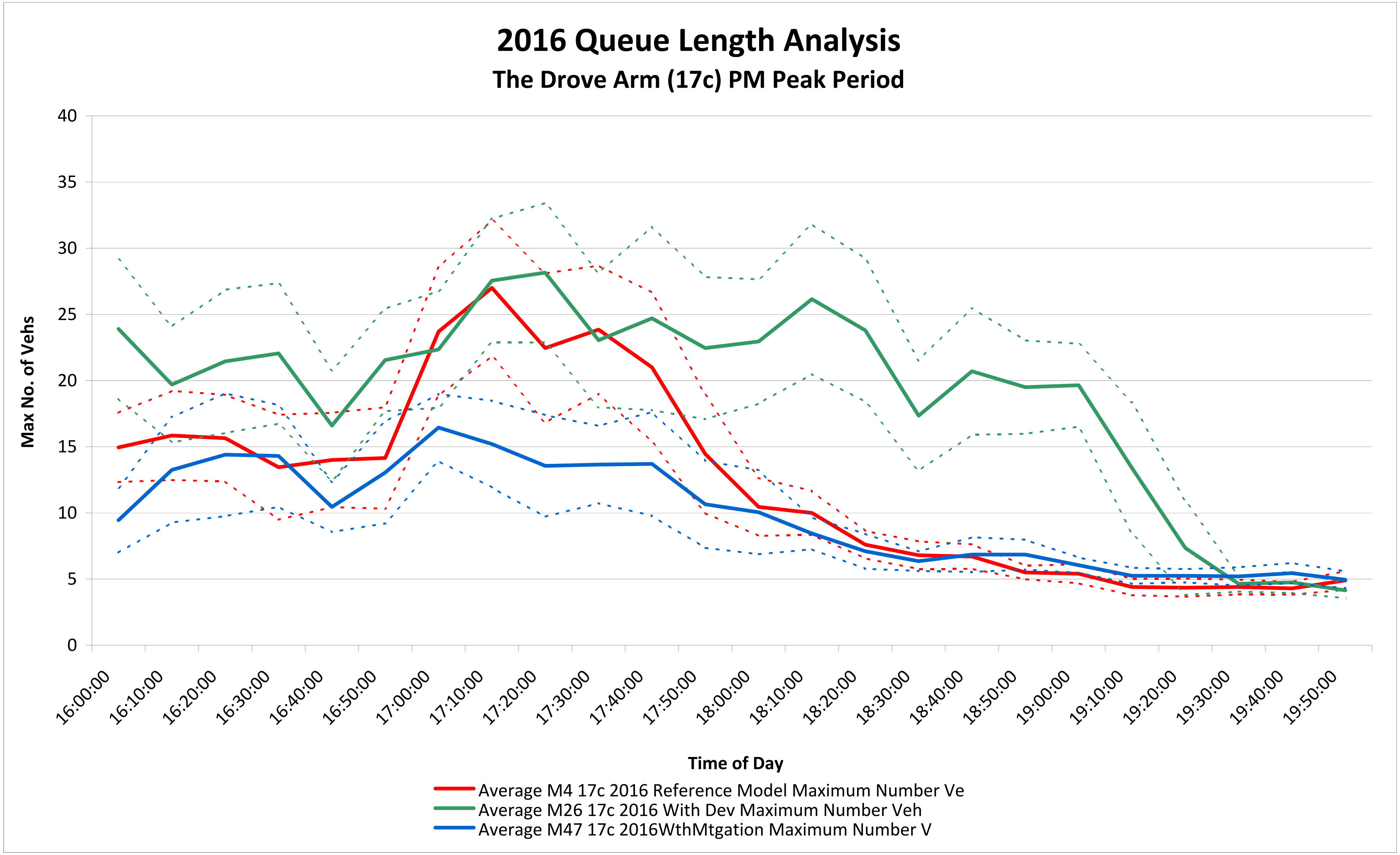

2016 Queue Length Analysis
E Quay Arm (17b)
Max No. of Vehs
20
18
16
14
12
10
8
6
4
2
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 17b 2016 Reference Model Maximum Number Ve
Average M26 17b 2016 With Dev Maximum Number Veh
Average M47 17b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
E Quay Arm (17b) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17b 2016 Reference Model Maximum Number Ve
Average M26 17b 2016 With Dev Maximum Number Veh
Average M47 17b 2016WthMtgation Maximum Number V

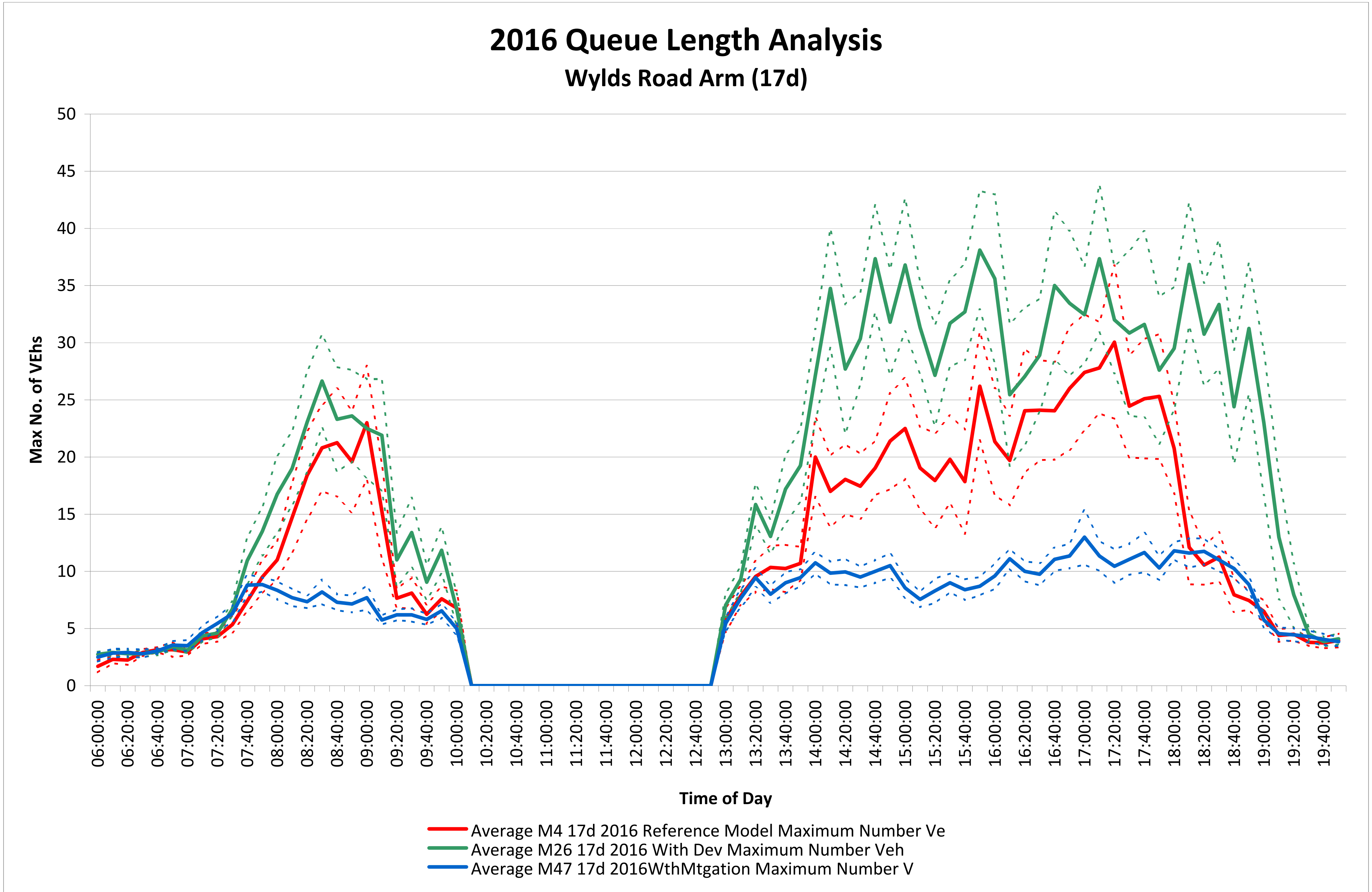

2016 Queue Length Analysis
E Quay Arm (17b) PM Peak Period
Max No. of Vehs
20
18
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17b 2016 Reference Model Maximum Number Ve
Average M26 17b 2016 With Dev Maximum Number Veh
Average M47 17b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
The Drove Arm (17c)
Max No. of VEhs
Time of Day
Average M4 17c 2016 Reference Model Maximum Number Ve
Average M26 17c 2016 With Dev Maximum Number Veh
Average M47 17c 2016WthMtgation Maximum Number V

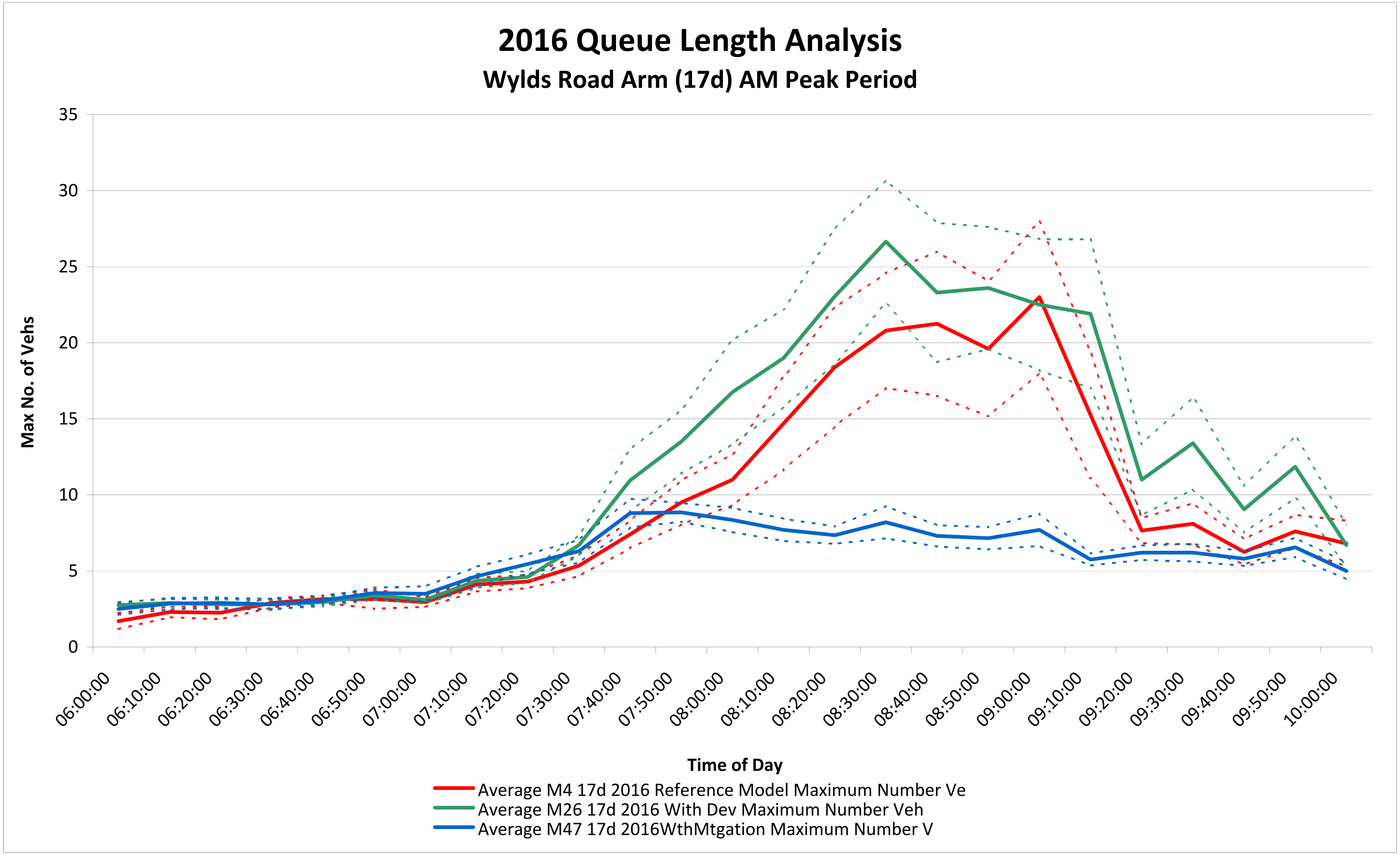

2016 Queue Length Analysis
The Drove Arm (17c) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
18
20
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17c 2016 Reference Model Maximum Number Ve
Average M26 17c 2016 With Dev Maximum Number Veh
Average M47 17c 2016WthMtgation Maximum Number V



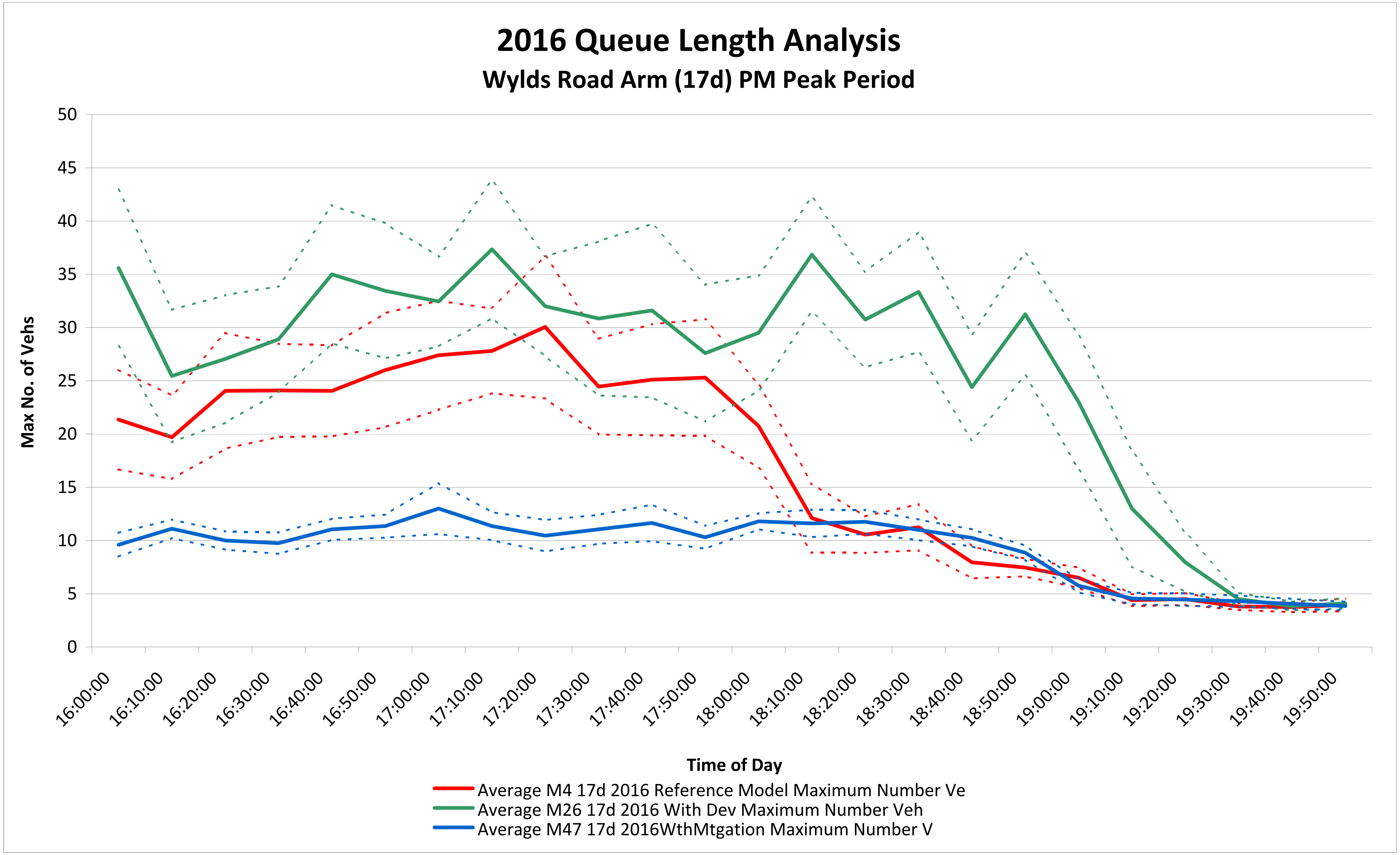
2016 Queue Length Analysis
The Drove Arm (17c) PM Peak Period
Max No. of Vehs
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17c 2016 Reference Model Maximum Number Ve
Average M26 17c 2016 With Dev Maximum Number Veh
Average M47 17c 2016WthMtgation Maximum Number V



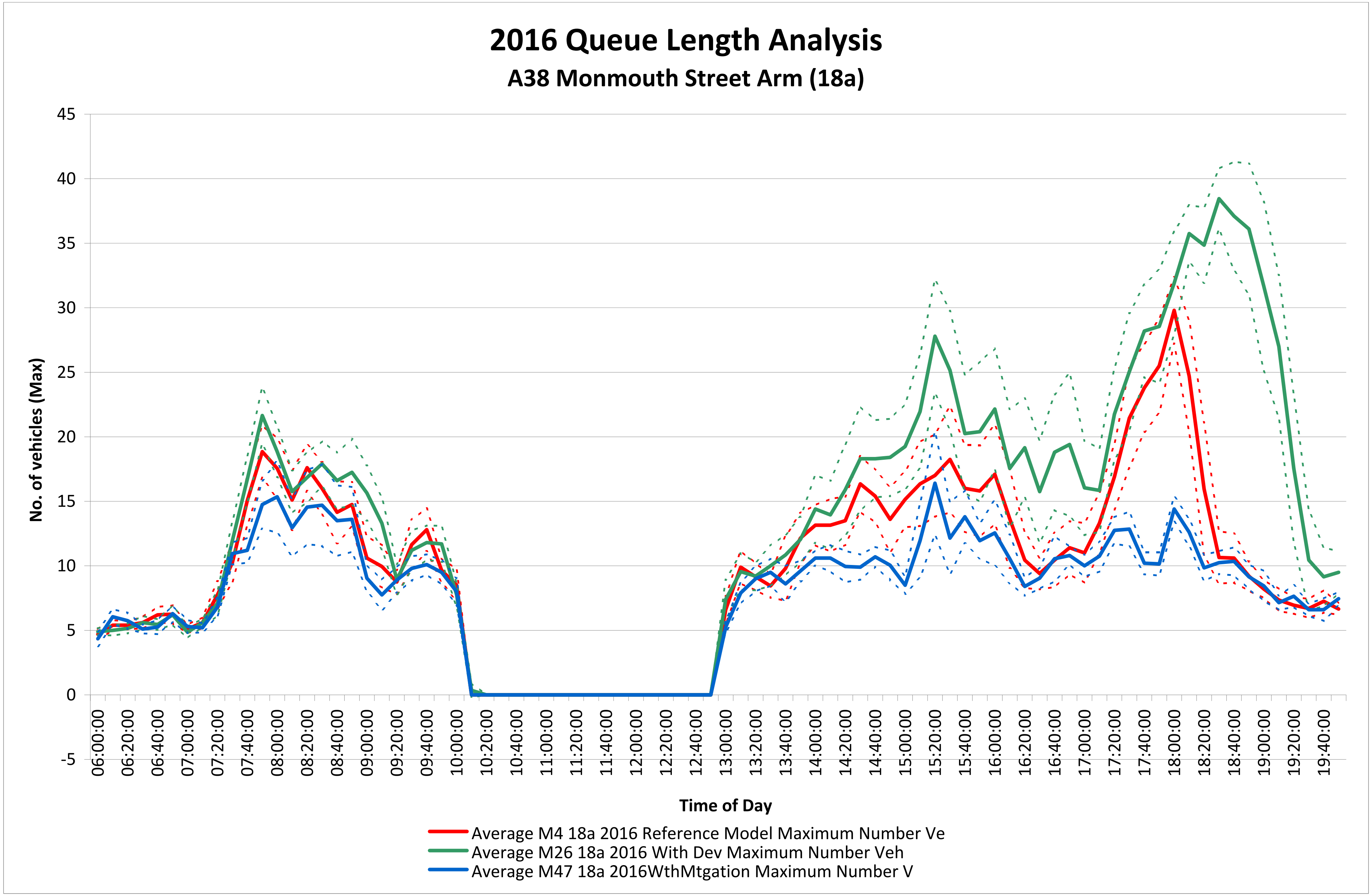
2016 Queue Length Analysis
Wylds Road Arm (17d)
Max No. of VEhs
0
5
10
15
20
25
30
35
40
45
50
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 17d 2016 Reference Model Maximum Number Ve
Average M26 17d 2016 With Dev Maximum Number Veh
Average M47 17d 2016WthMtgation Maximum Number V



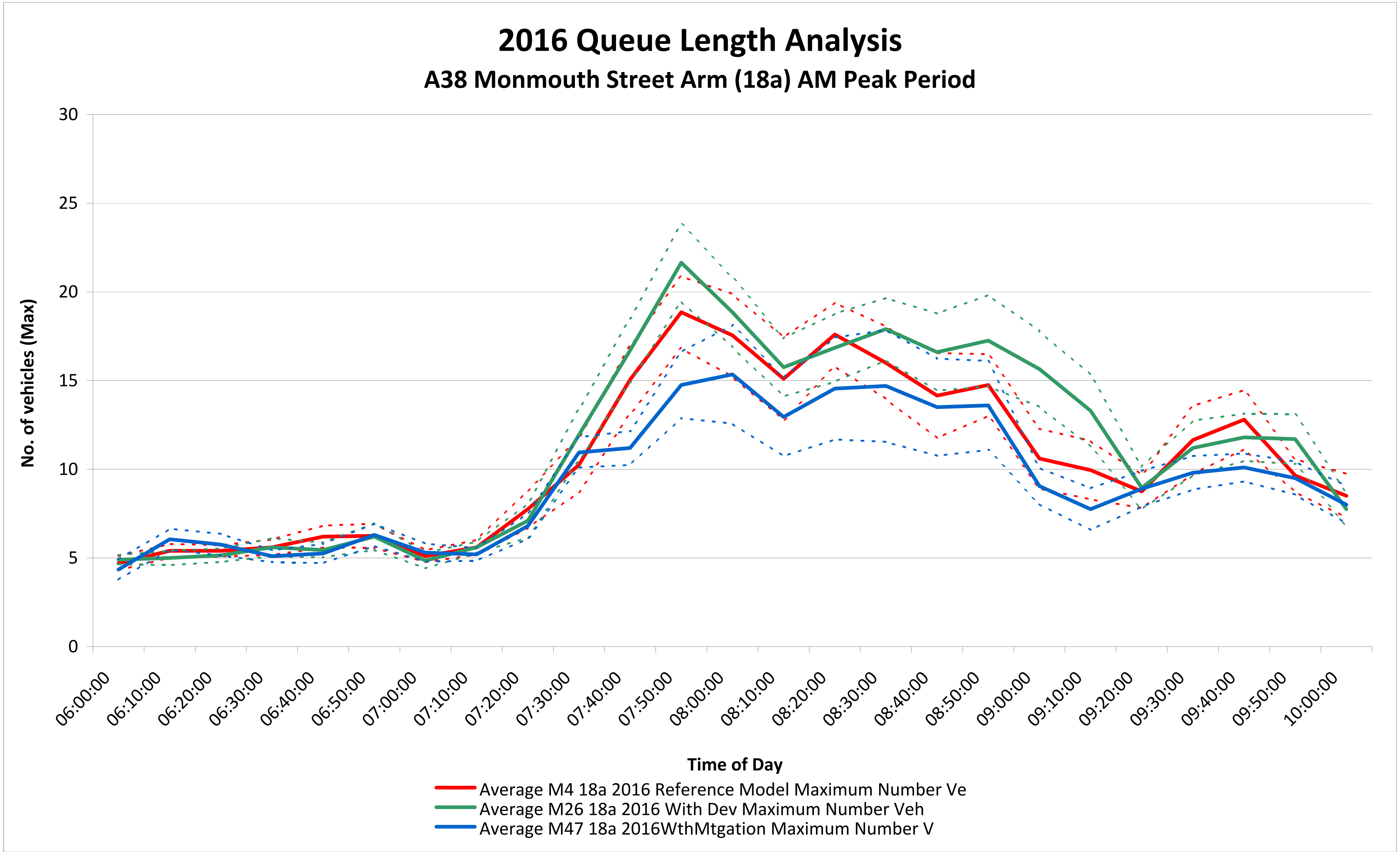
2016 Queue Length Analysis
Wylds Road Arm (17d) AM Peak Period
35
30
25
20
15
10
5
0
Max No. of Vehs
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17d 2016 Reference Model Maximum Number Ve
Average M26 17d 2016 With Dev Maximum Number Veh
Average M47 17d 2016WthMtgation Maximum Number V

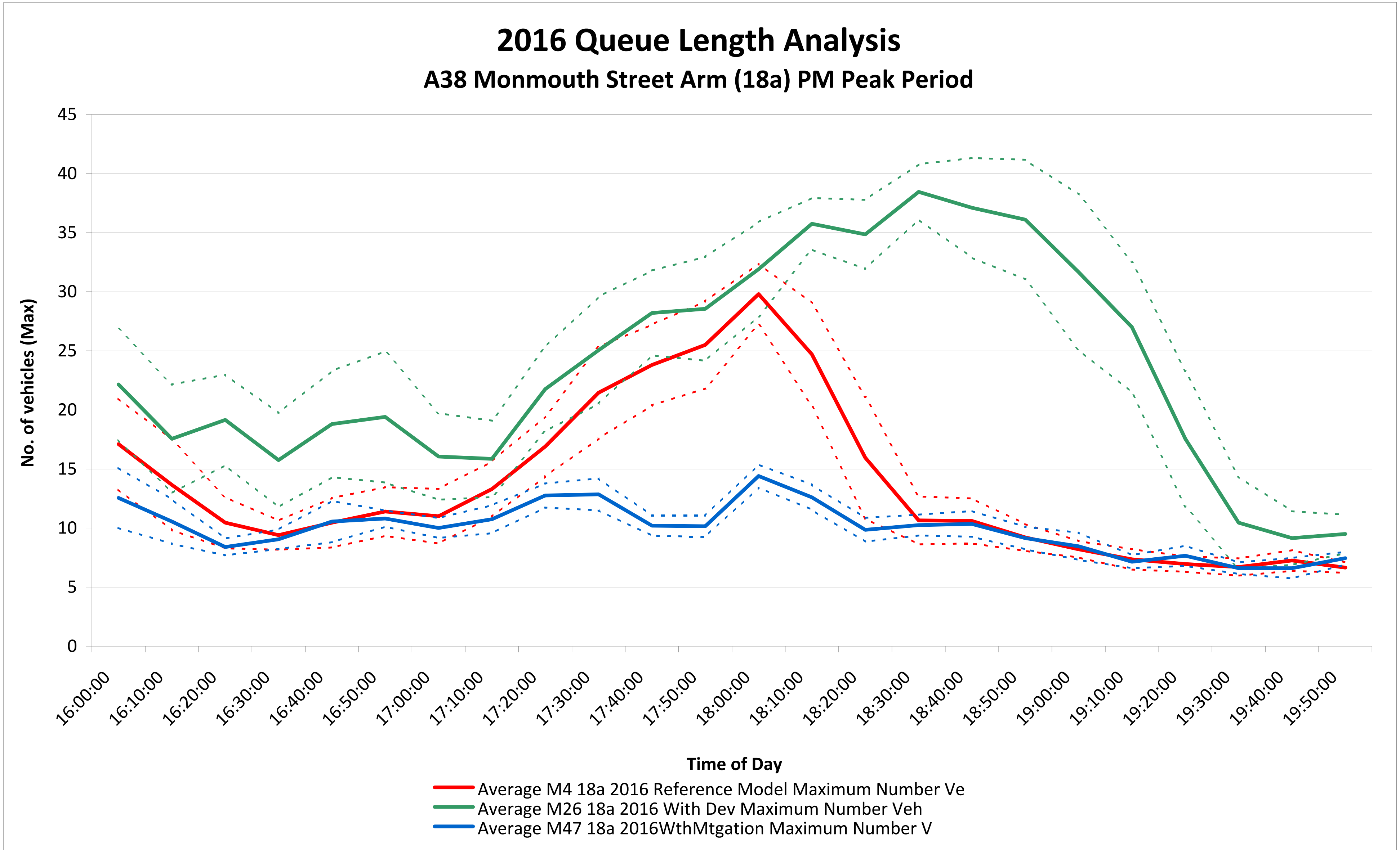


2016 Queue Length Analysis
Wylds Road Arm (17d) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
45
50
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17d 2016 Reference Model Maximum Number Ve
Average M26 17d 2016 With Dev Maximum Number Veh
Average M47 17d 2016WthMtgation Maximum Number V

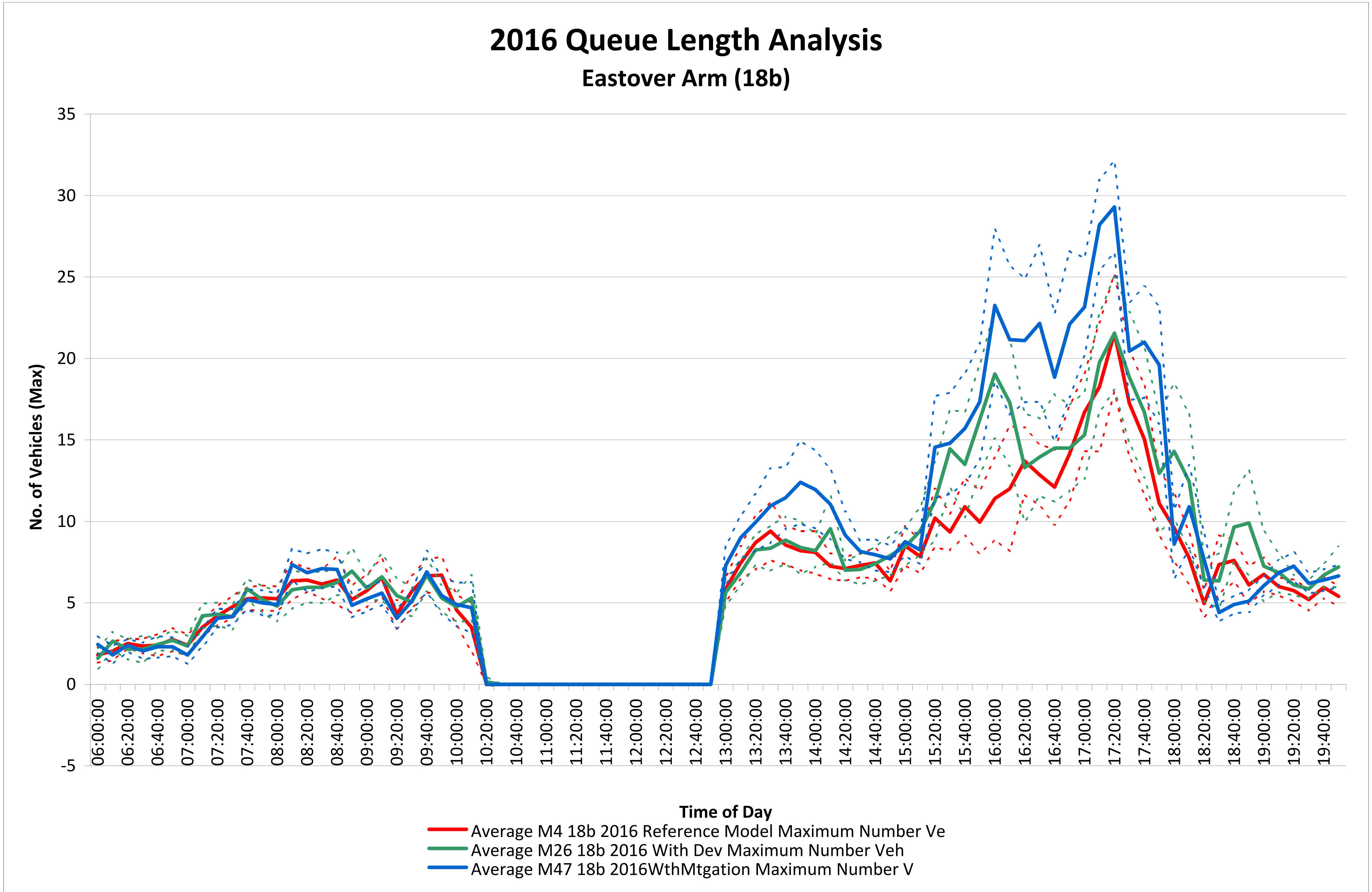


2016 Queue Length Analysis
A38 Monmouth Street Arm (18a)
No. of vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 18a 2016 Reference Model Maximum Number Ve
Average M26 18a 2016 With Dev Maximum Number Veh
Average M47 18a 2016WthMtgation Maximum Number V

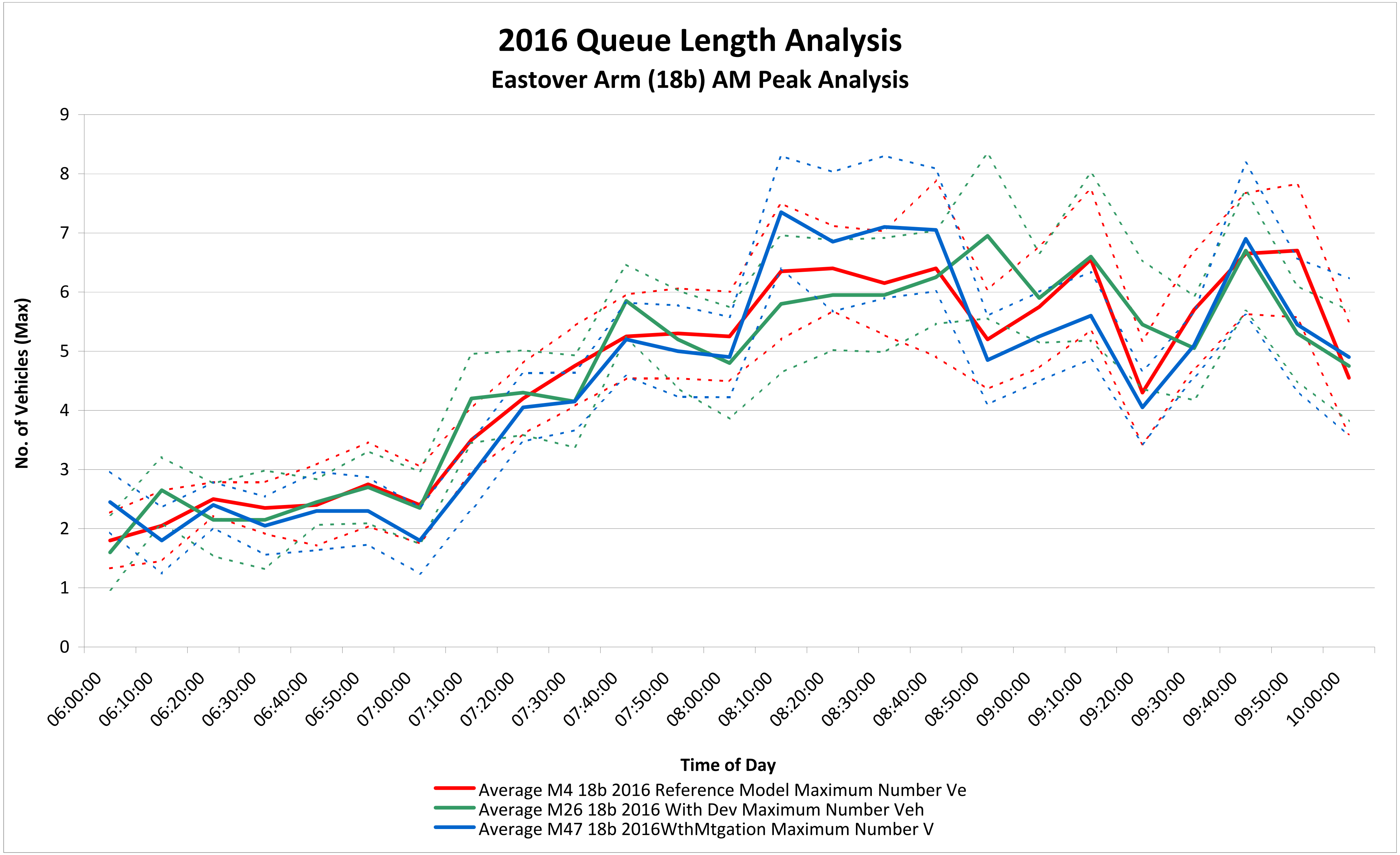

2016 Queue Length Analysis
A38 Monmouth Street Arm (18a) AM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 18a 2016 Reference Model Maximum Number Ve
Average M26 18a 2016 With Dev Maximum Number Veh
Average M47 18a 2016WthMtgation Maximum Number V



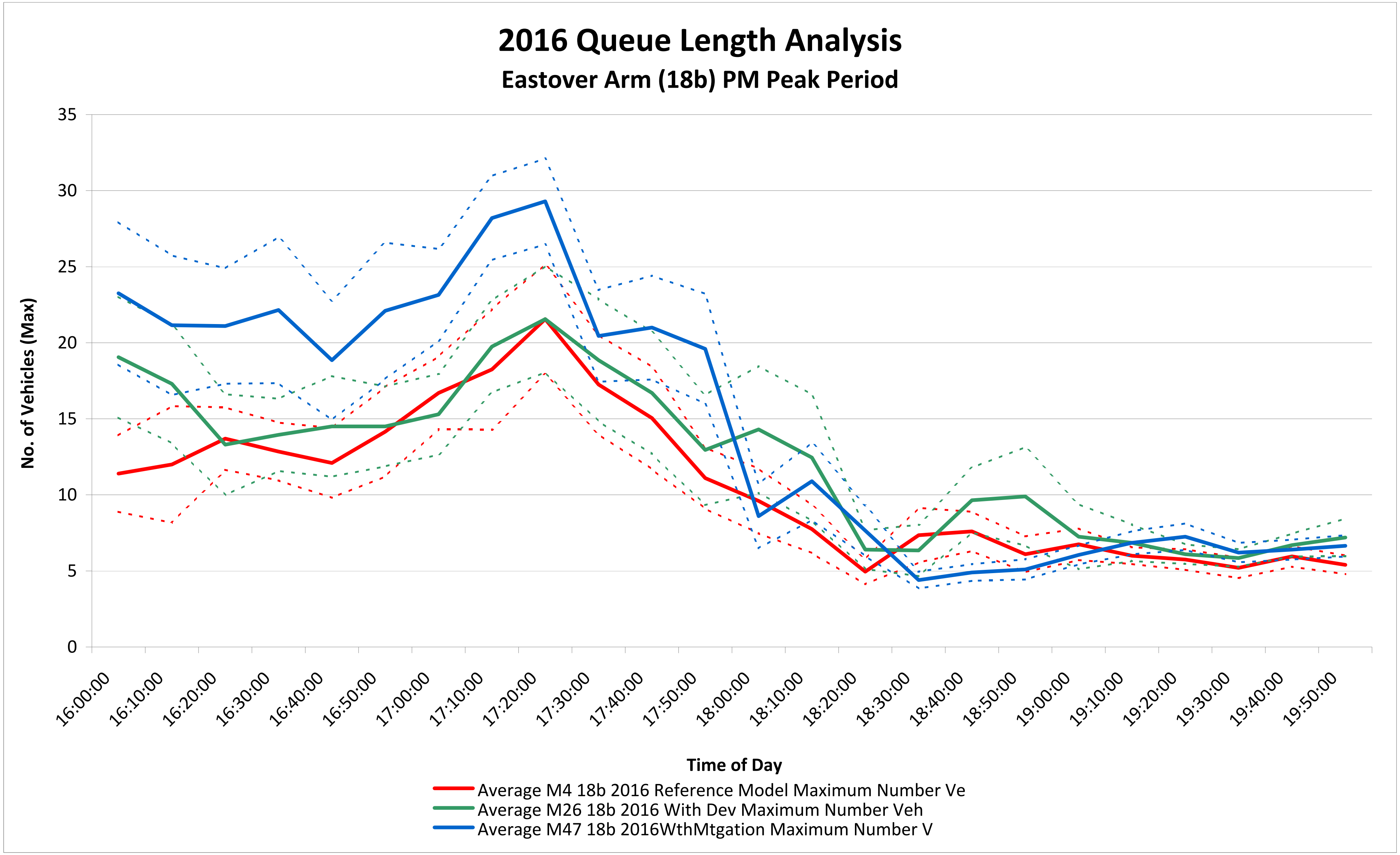
2016 Queue Length Analysis
A38 Monmouth Street Arm (18a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
35
40
45
Time of Day
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Average M4 18a 2016 Reference Model Maximum Number Ve
Average M26 18a 2016 With Dev Maximum Number Veh
Average M47 18a 2016WthMtgation Maximum Number V



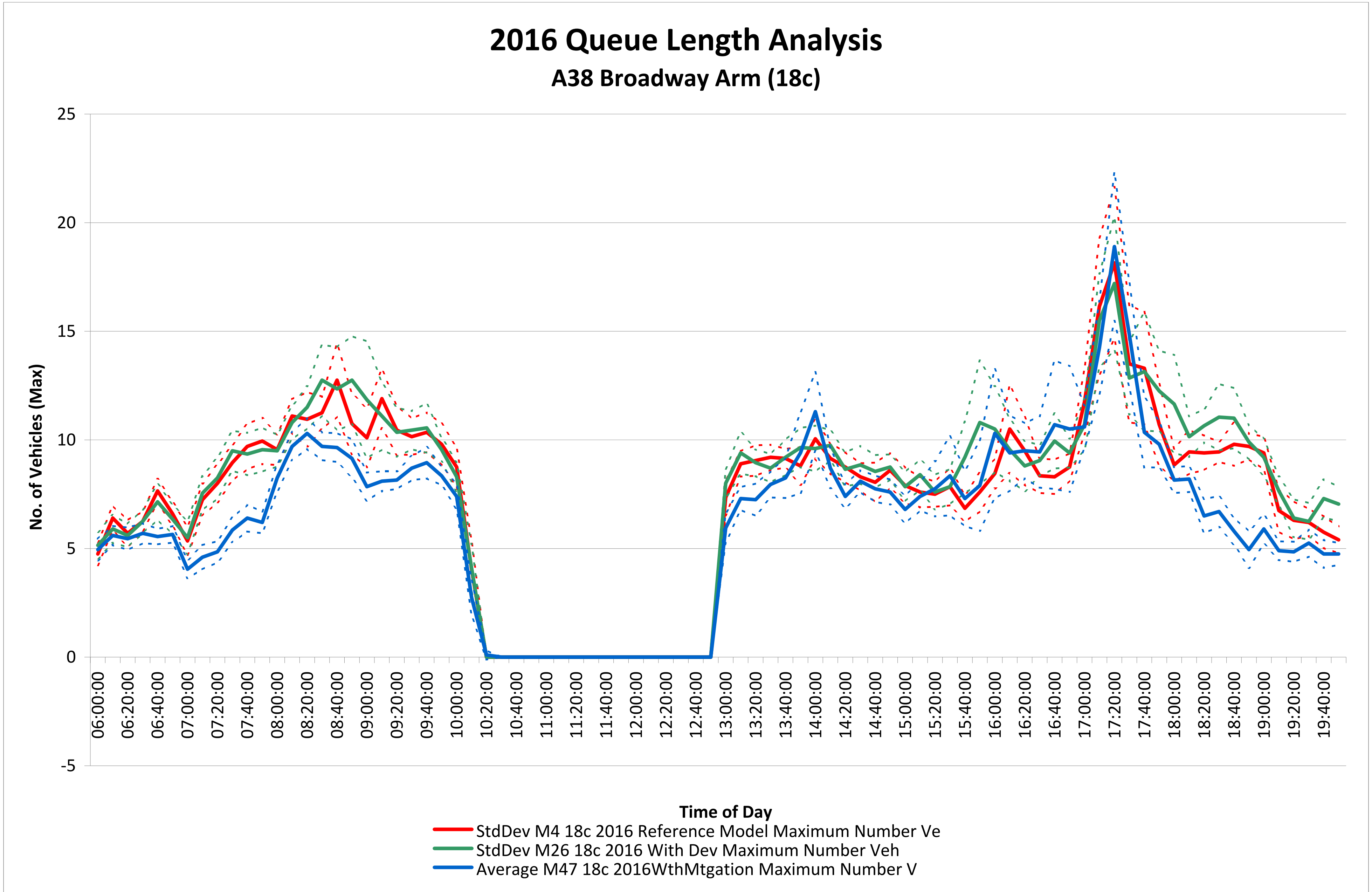
2016 Queue Length Analysis
Eastover Arm (18b)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 18b 2016 Reference Model Maximum Number Ve
Average M26 18b 2016 With Dev Maximum Number Veh
Average M47 18b 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
Eastover Arm (18b) AM Peak Analysis
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 18b 2016 Reference Model Maximum Number Ve
Average M26 18b 2016 With Dev Maximum Number Veh
Average M47 18b 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
Eastover Arm (18b) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 18b 2016 Reference Model Maximum Number Ve
Average M26 18b 2016 With Dev Maximum Number Veh
Average M47 18b 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
A38 Broadway Arm (18c)
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
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11:40:00
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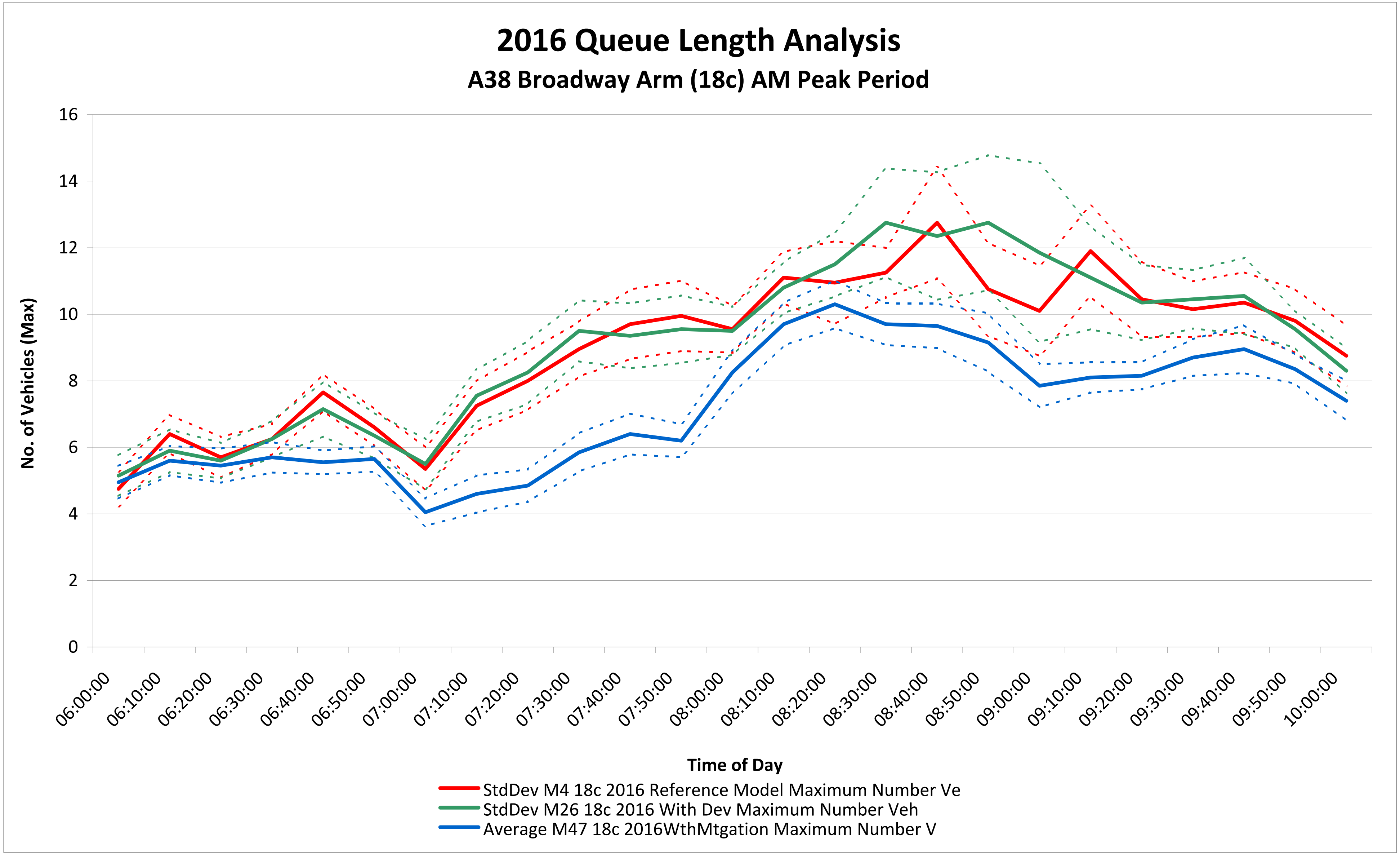
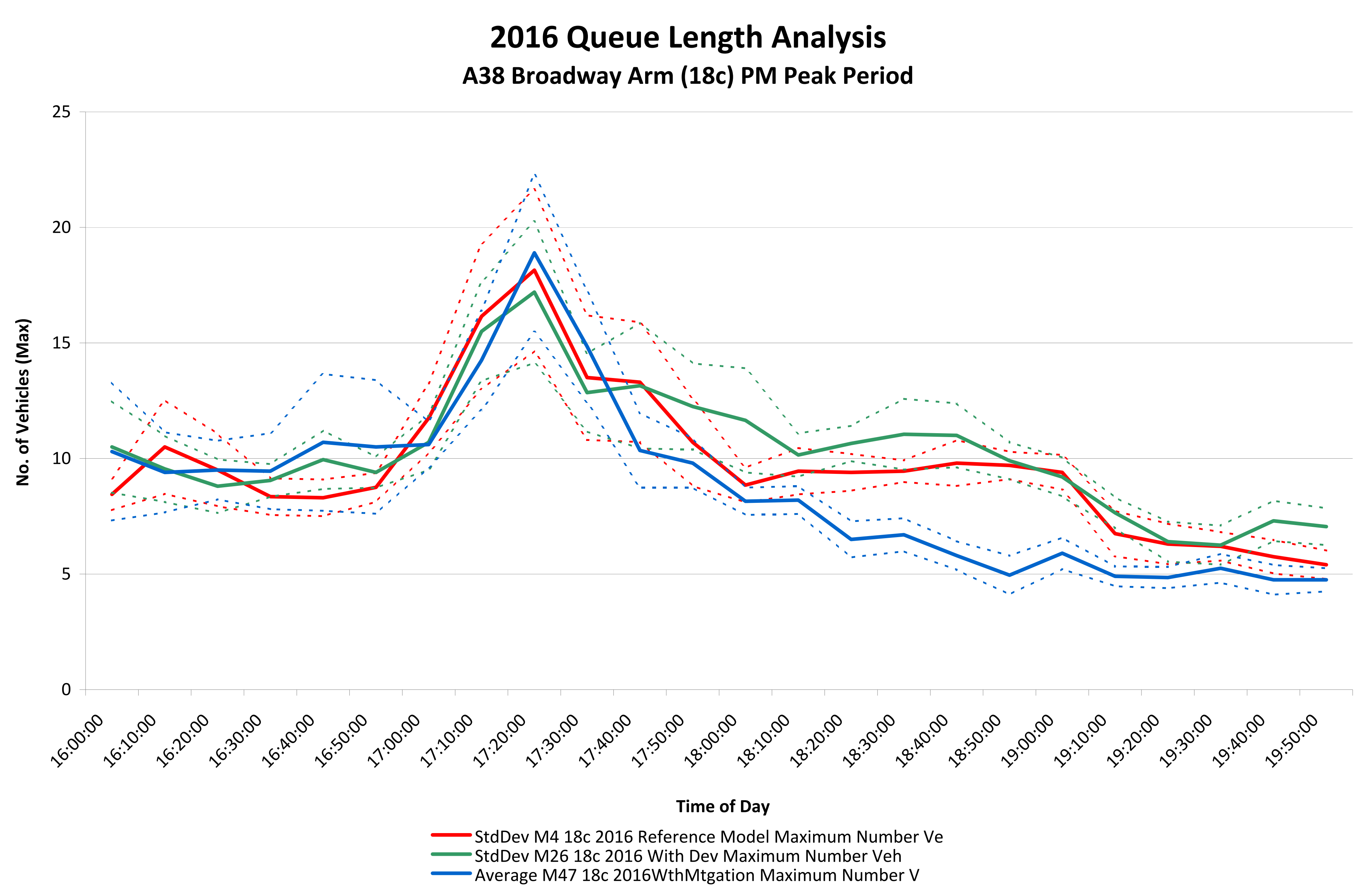
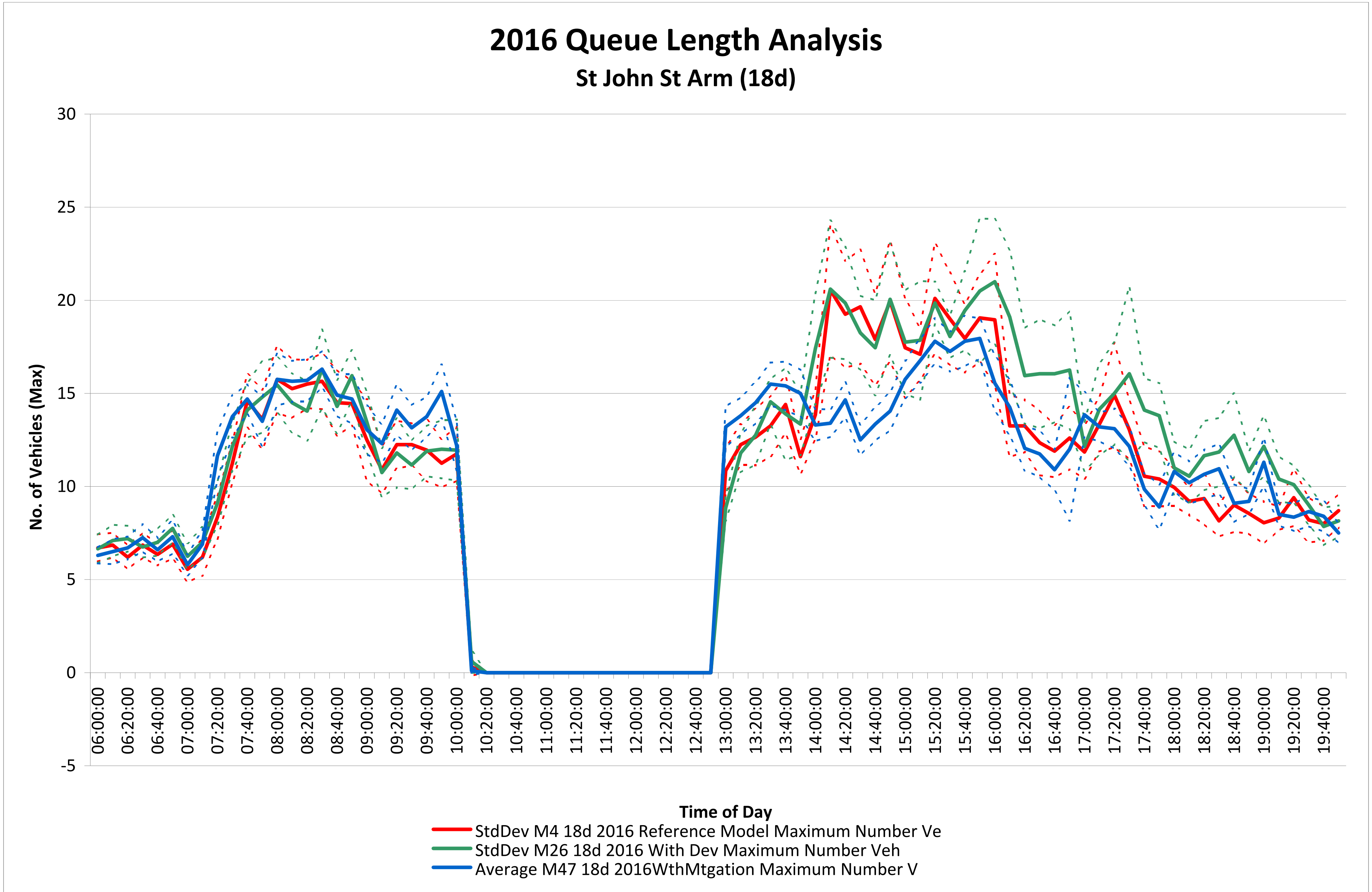
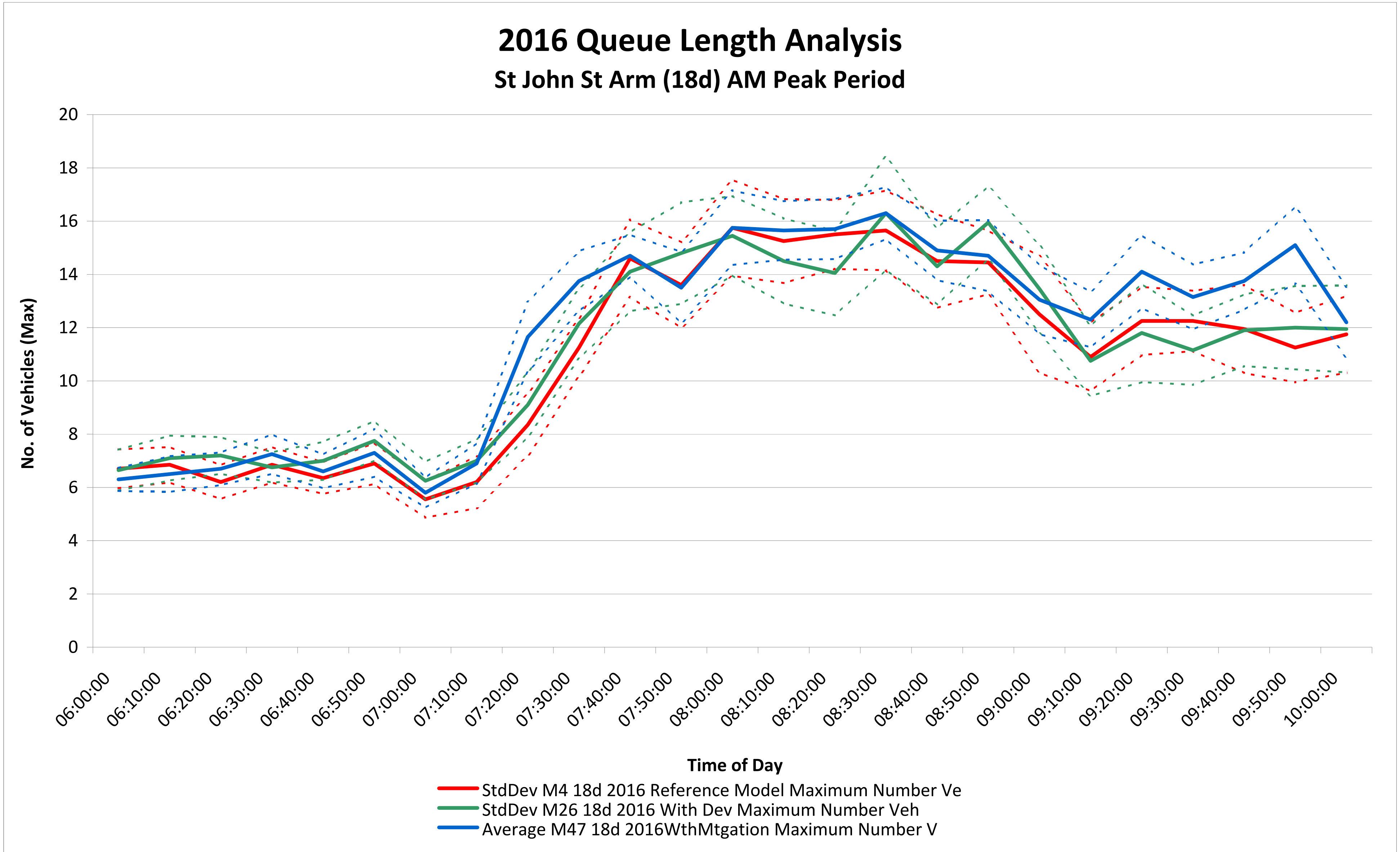
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 18c 2016 Reference Model Maximum Number Ve
StdDev M26 18c 2016 With Dev Maximum Number Veh
Average M47 18c 2016WthMtgation Maximum Number V

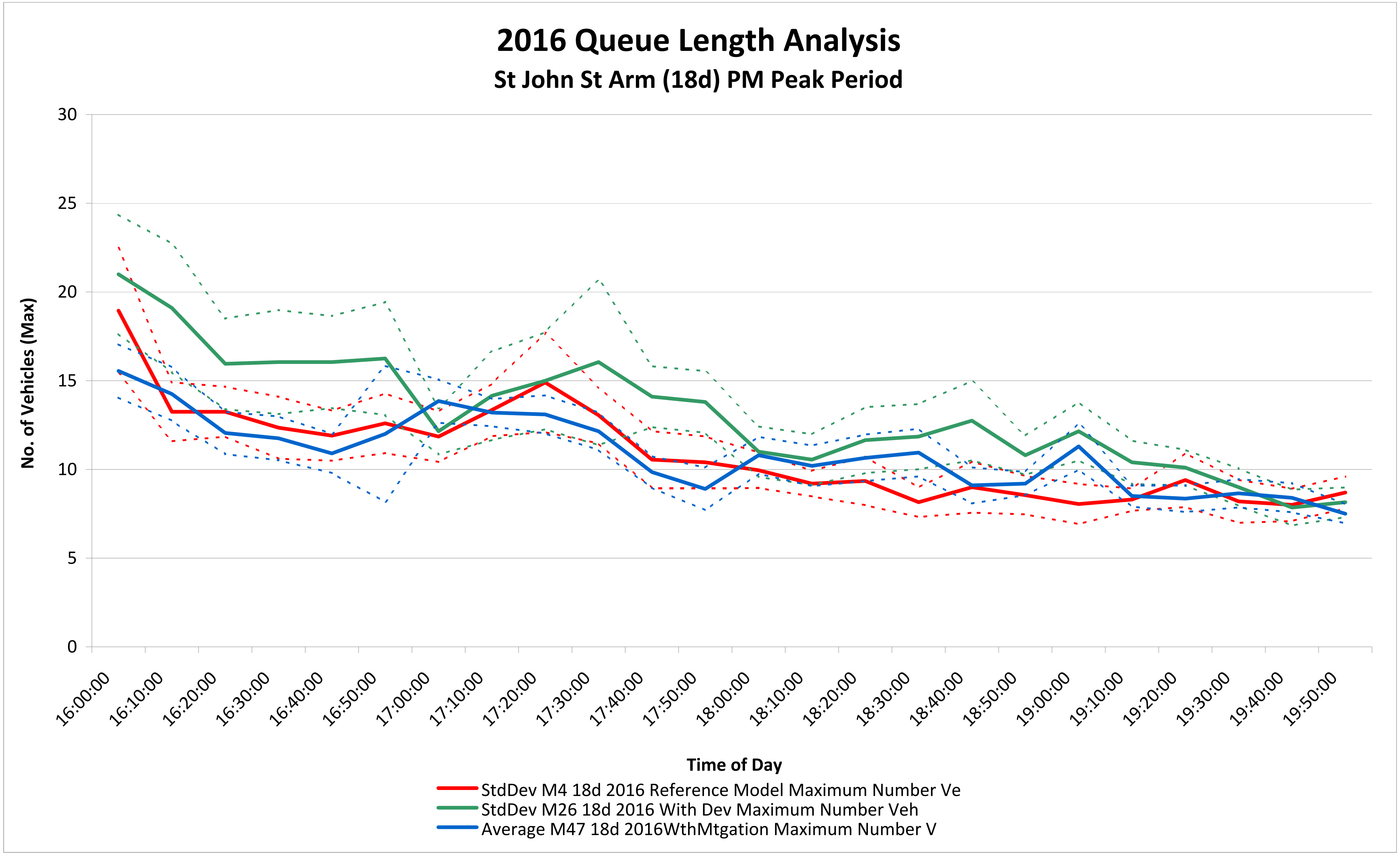

2016 Queue Length Analysis
A38 Broadway Arm (18c) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 18c 2016 Reference Model Maximum Number Ve
StdDev M26 18c 2016 With Dev Maximum Number Veh
Average M47 18c 2016WthMtgation Maximum Number V

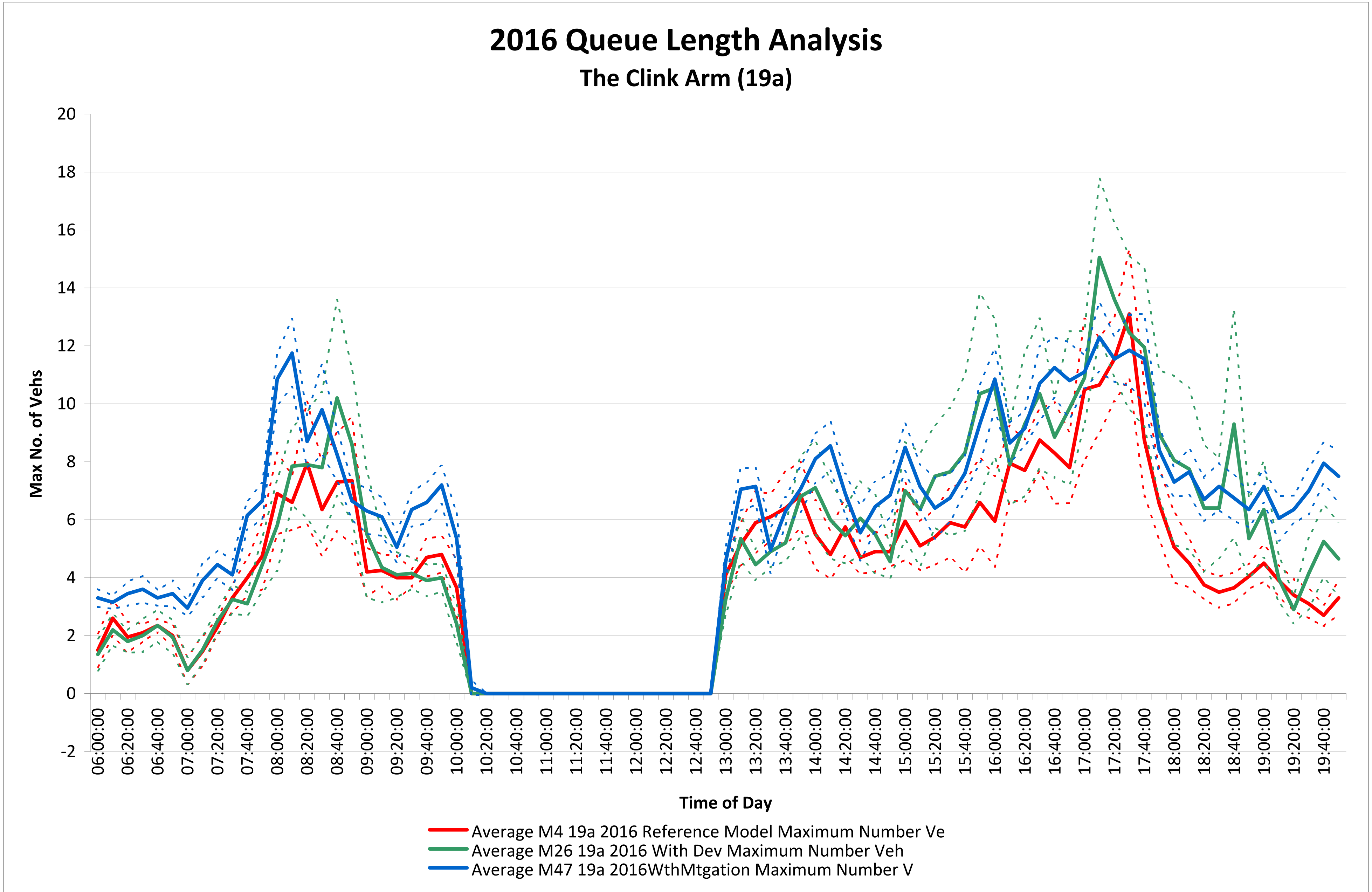

2016 Queue Length Analysis
A38 Broadway Arm (18c) PM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 18c 2016 Reference Model Maximum Number Ve
StdDev M26 18c 2016 With Dev Maximum Number Veh
Average M47 18c 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
St John St Arm (18d)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 18d 2016 Reference Model Maximum Number Ve
StdDev M26 18d 2016 With Dev Maximum Number Veh
Average M47 18d 2016WthMtgation Maximum Number V

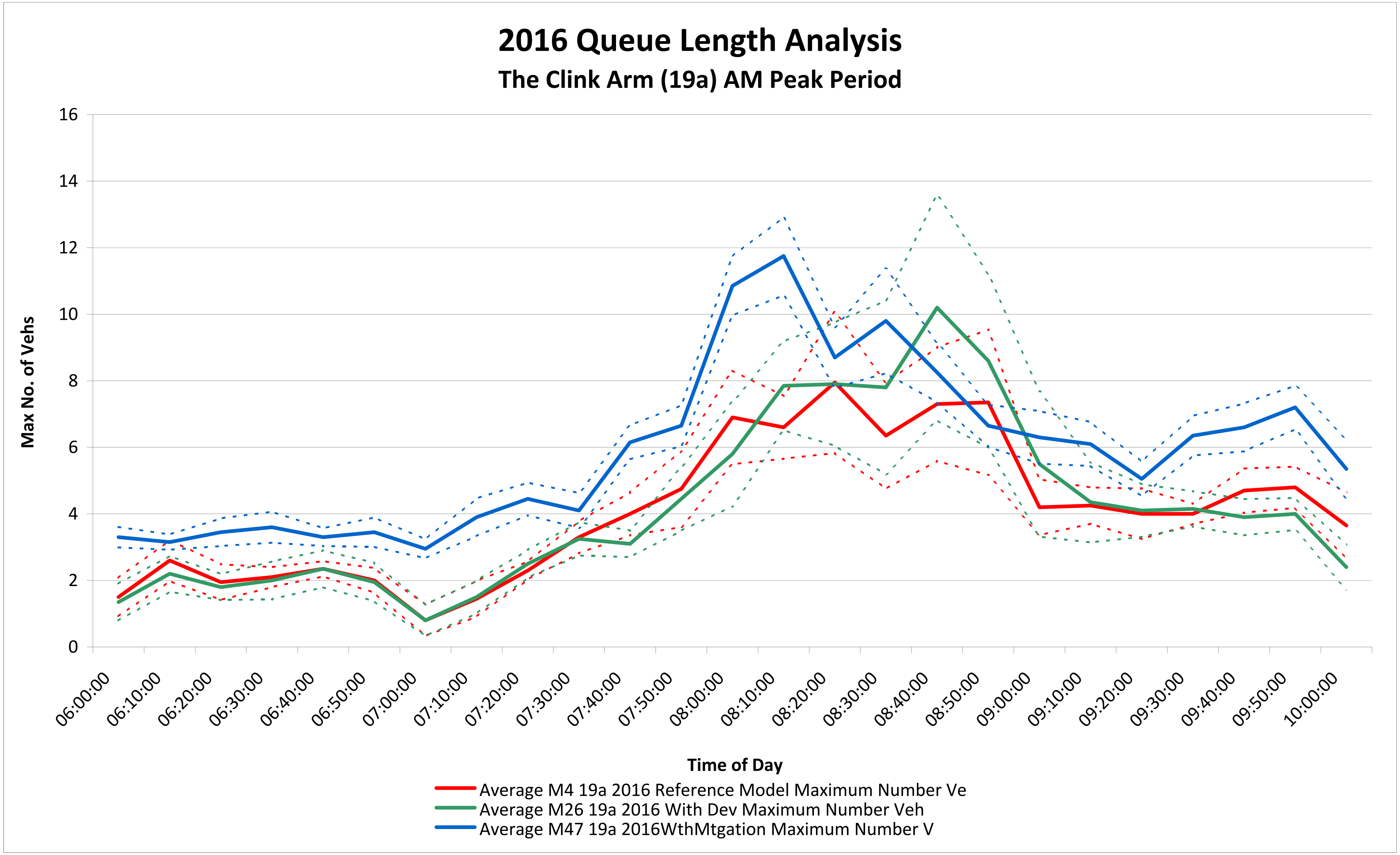


2016 Queue Length Analysis
St John St Arm (18d) AM Peak Period
No. of Vehicles (Max)
20
18
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 18d 2016 Reference Model Maximum Number Ve
StdDev M26 18d 2016 With Dev Maximum Number Veh
Average M47 18d 2016WthMtgation Maximum Number V

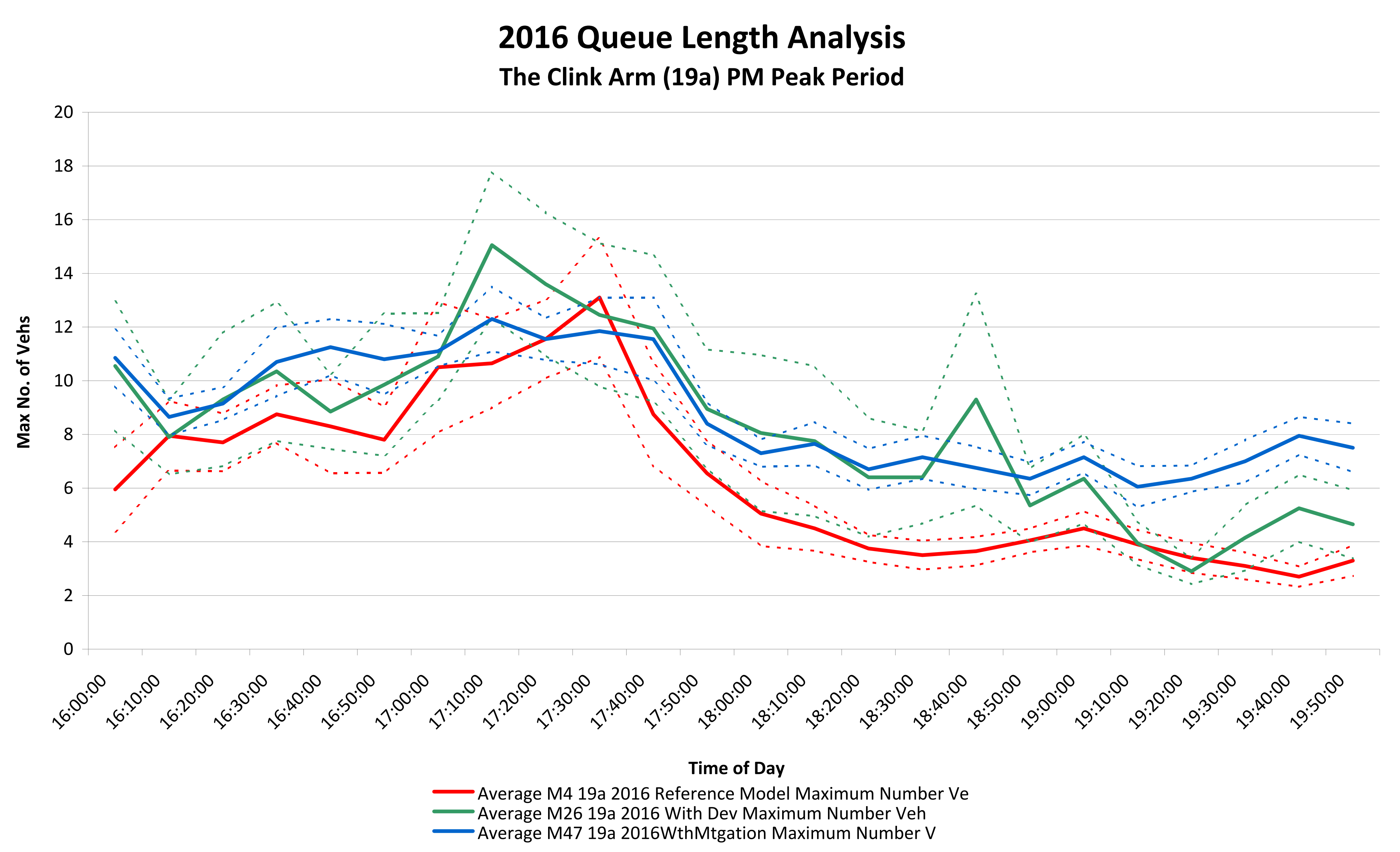

2016 Queue Length Analysis
St John St Arm (18d) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 18d 2016 Reference Model Maximum Number Ve
StdDev M26 18d 2016 With Dev Maximum Number Veh
Average M47 18d 2016WthMtgation Maximum Number V

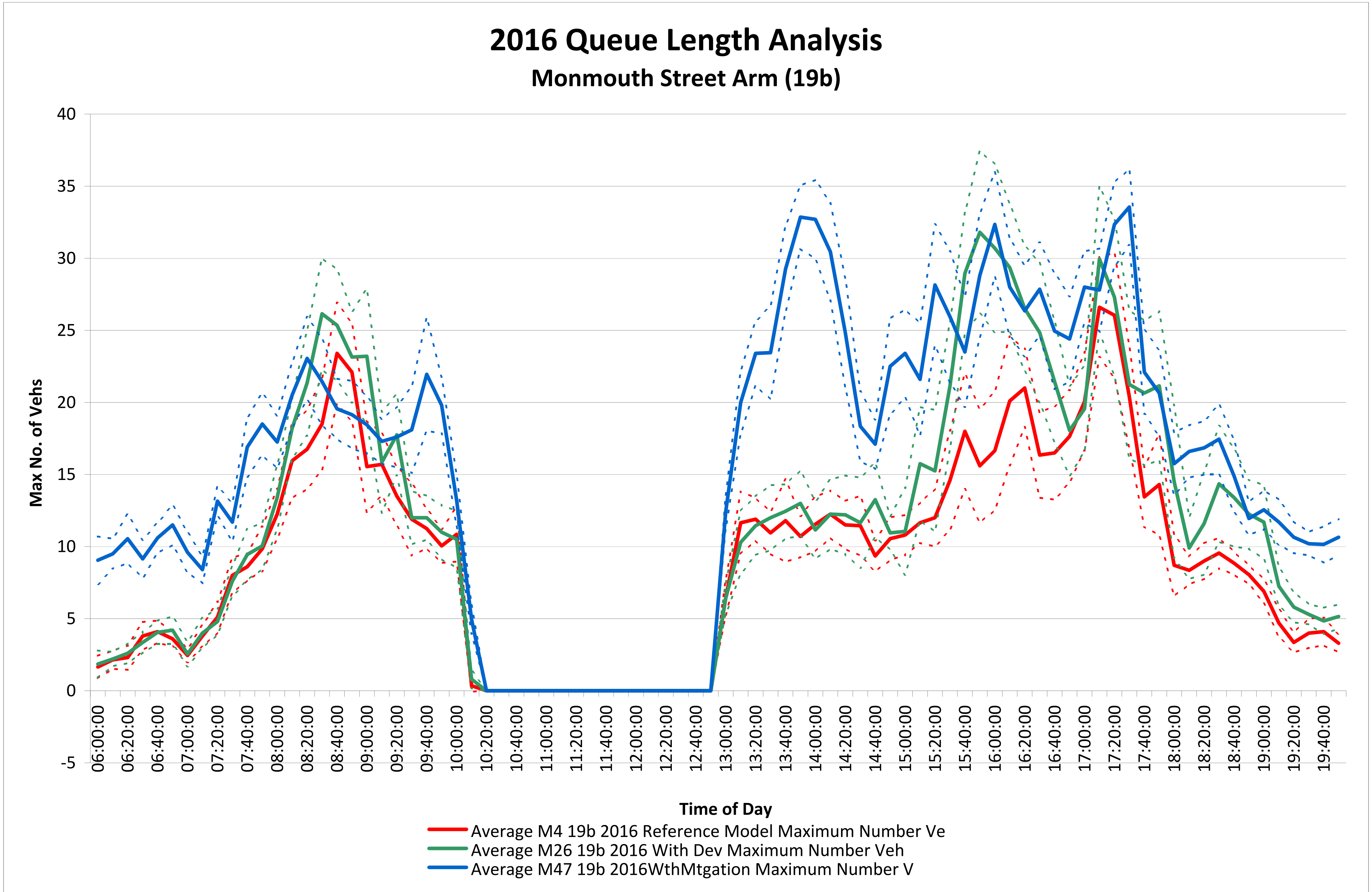


2016 Queue Length Analysis
The Clink Arm (19a)
Max No. of Vehs
Time of Day
20
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 19a 2016 Reference Model Maximum Number Ve
Average M26 19a 2016 With Dev Maximum Number Veh
Average M47 19a 2016WthMtgation Maximum Number V

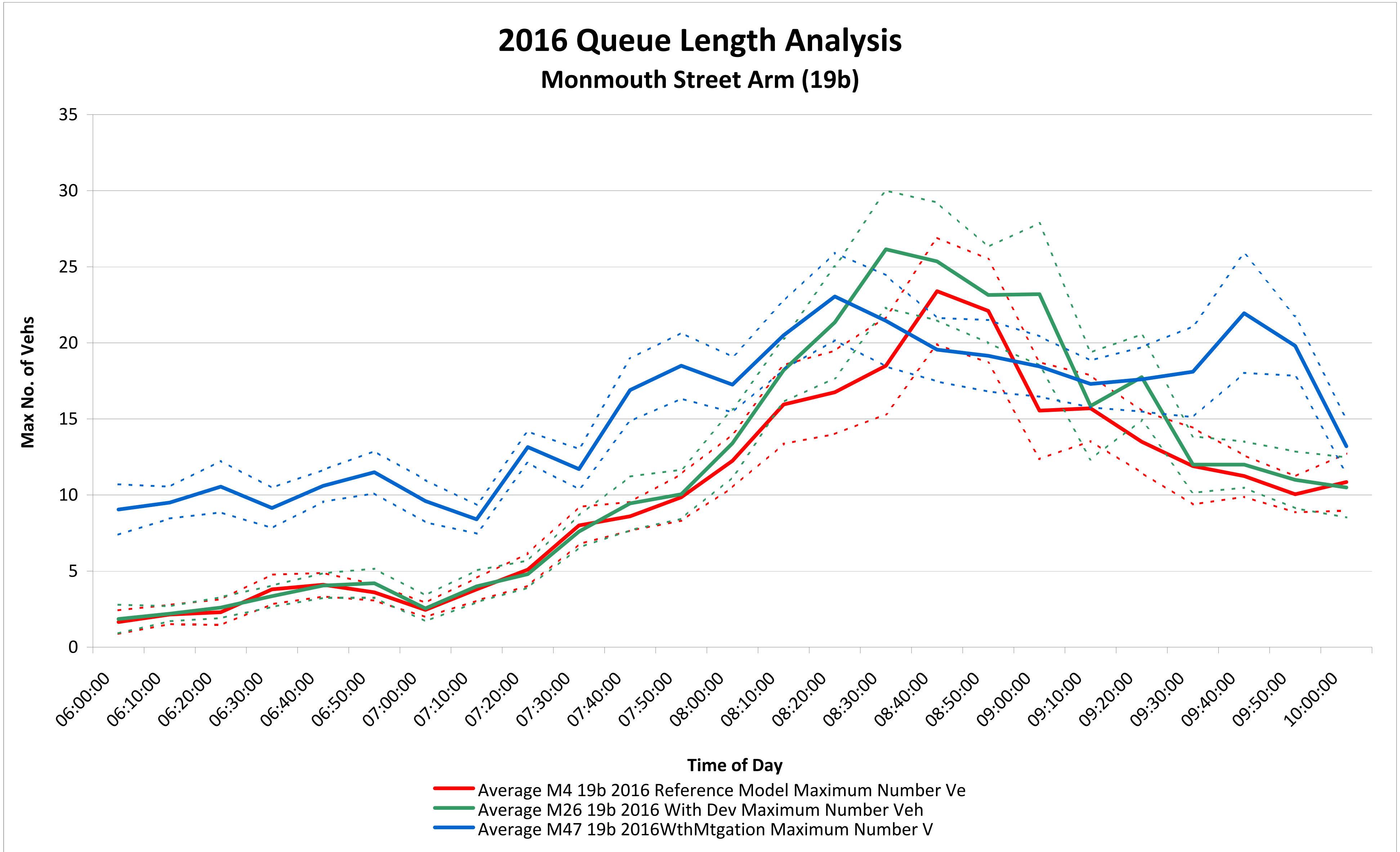


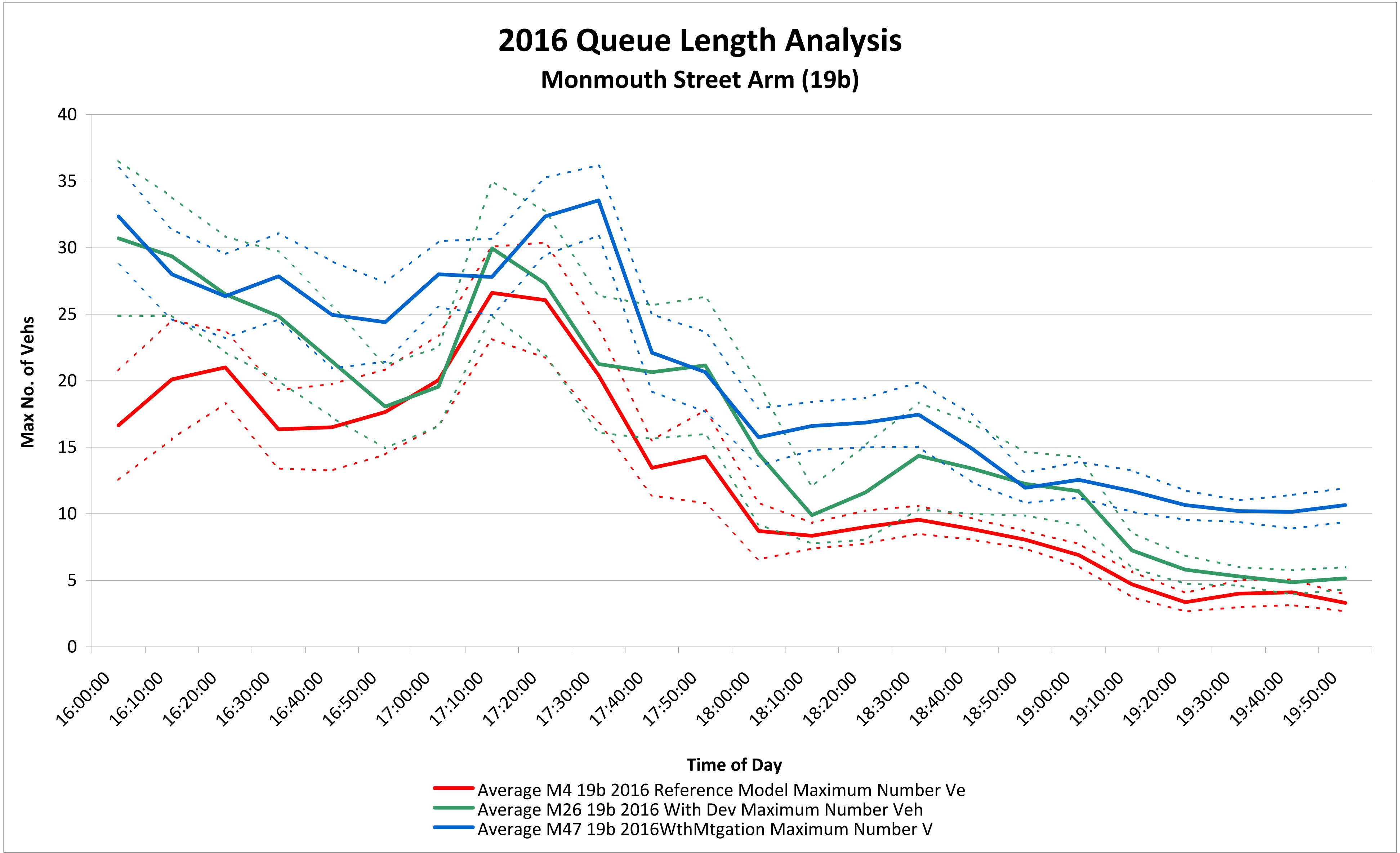
2016 Queue Length Analysis
The Clink Arm (19a) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19a 2016 Reference Model Maximum Number Ve
Average M26 19a 2016 With Dev Maximum Number Veh
Average M47 19a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
The Clink Arm (19a) PM Peak Period
Max No. of Vehs
20
18
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19a 2016 Reference Model Maximum Number Ve
Average M26 19a 2016 With Dev Maximum Number Veh
Average M47 19a 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
Monmouth Street Arm (19b)
40
35
30
25
20
15
10
5
0
-5
Max No. of Vehs
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 19b 2016 Reference Model Maximum Number Ve
Average M26 19b 2016 With Dev Maximum Number Veh
Average M47 19b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19b 2016 Reference Model Maximum Number Ve
Average M26 19b 2016 With Dev Maximum Number Veh
Average M47 19b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
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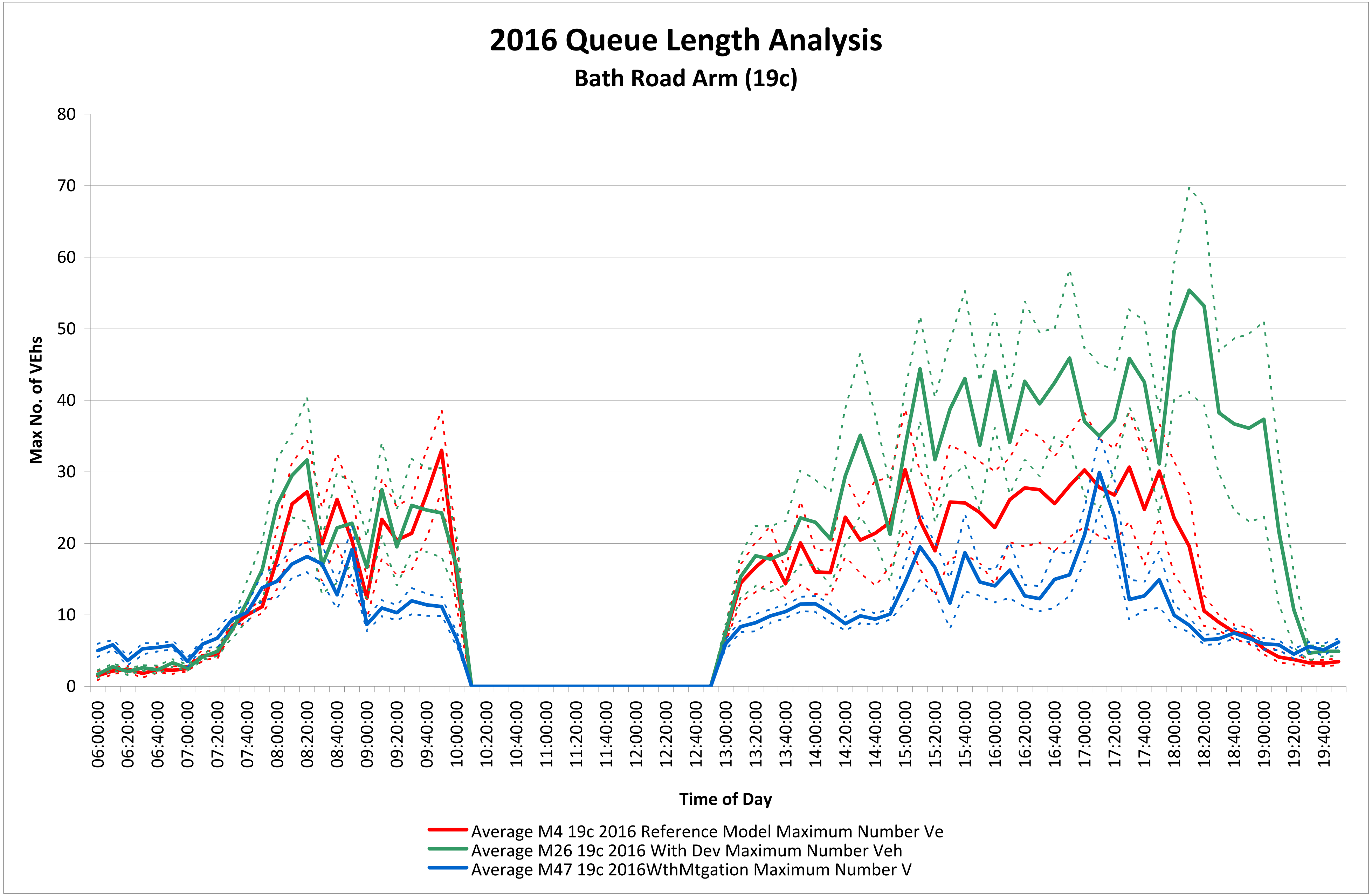
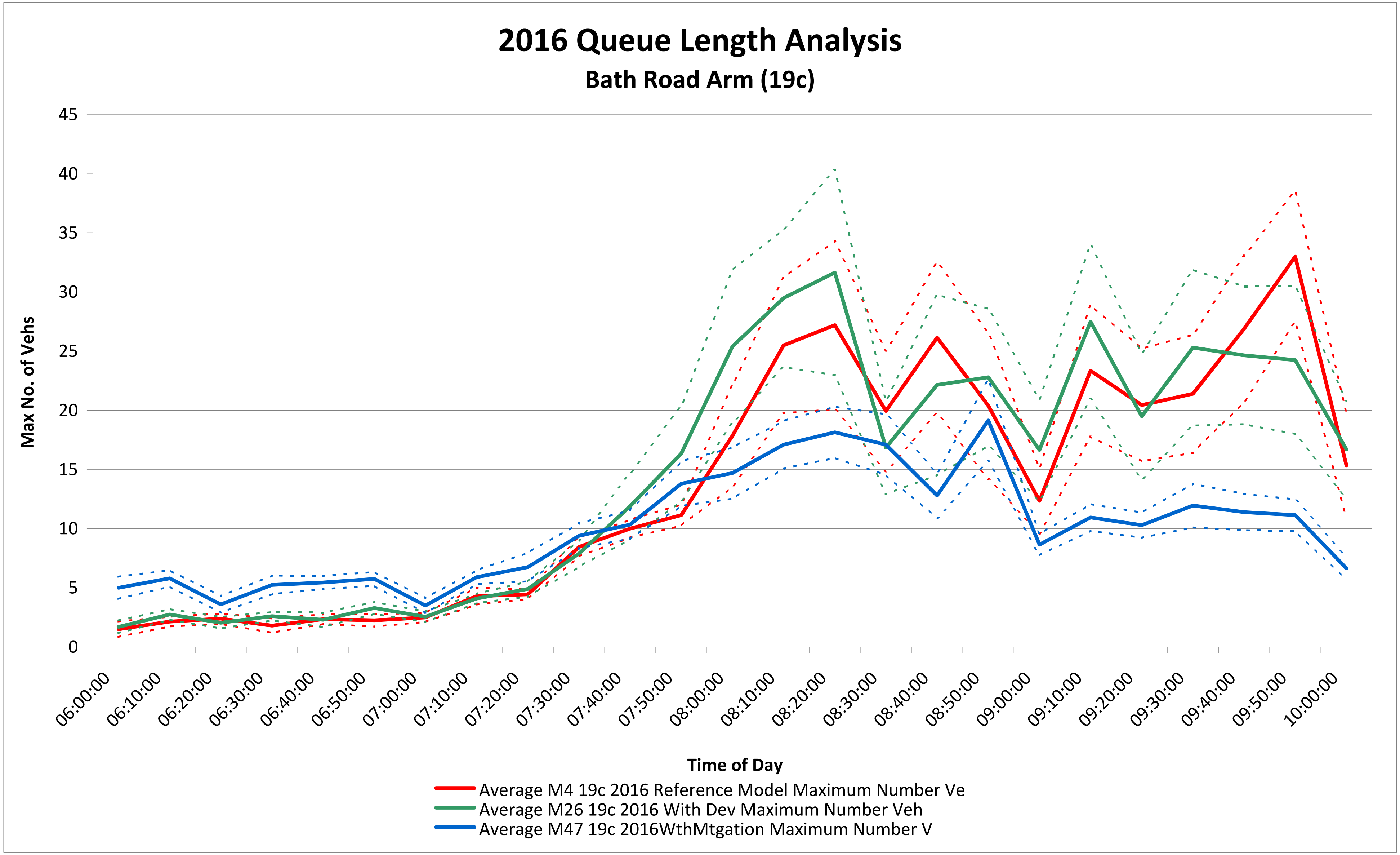
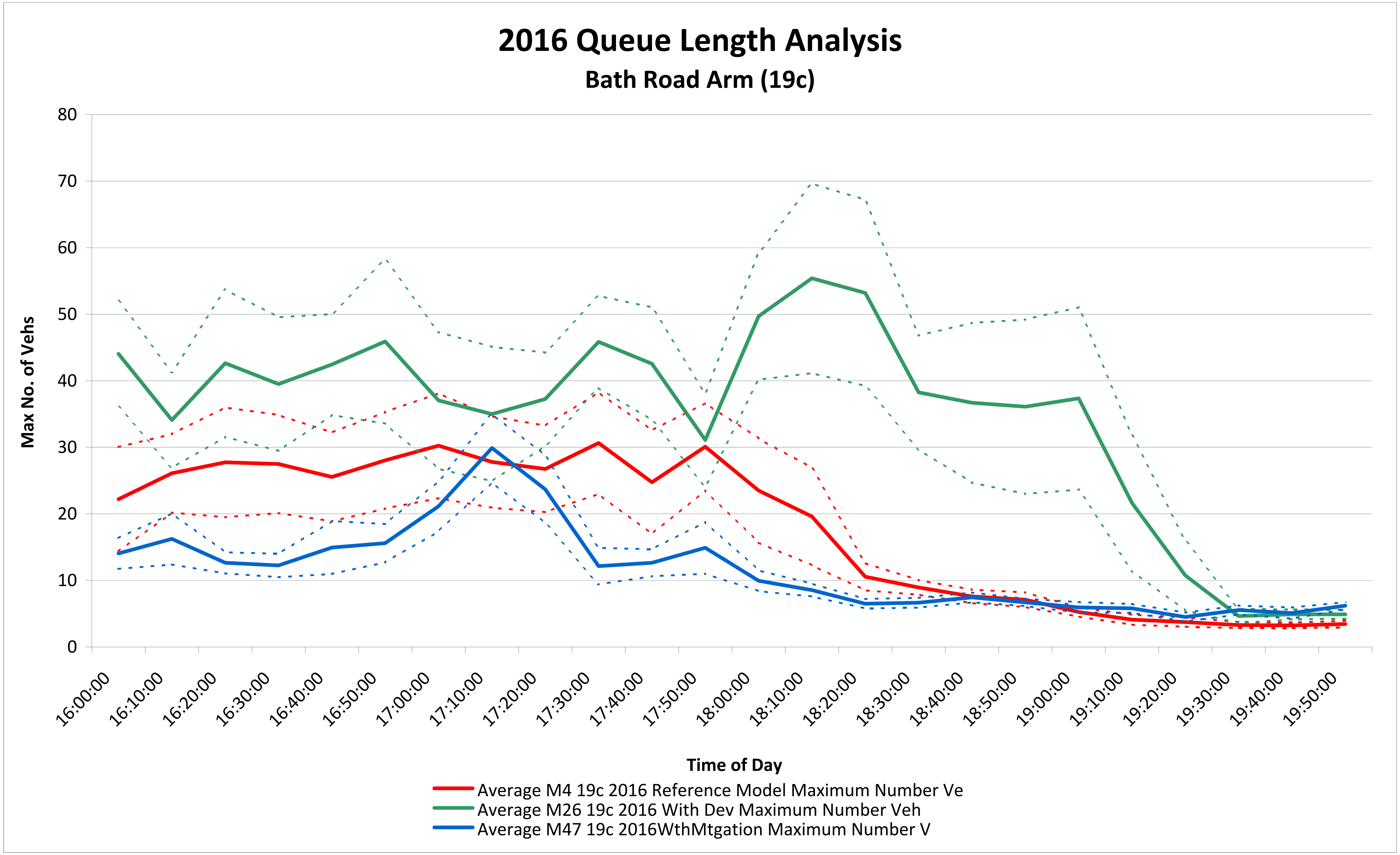
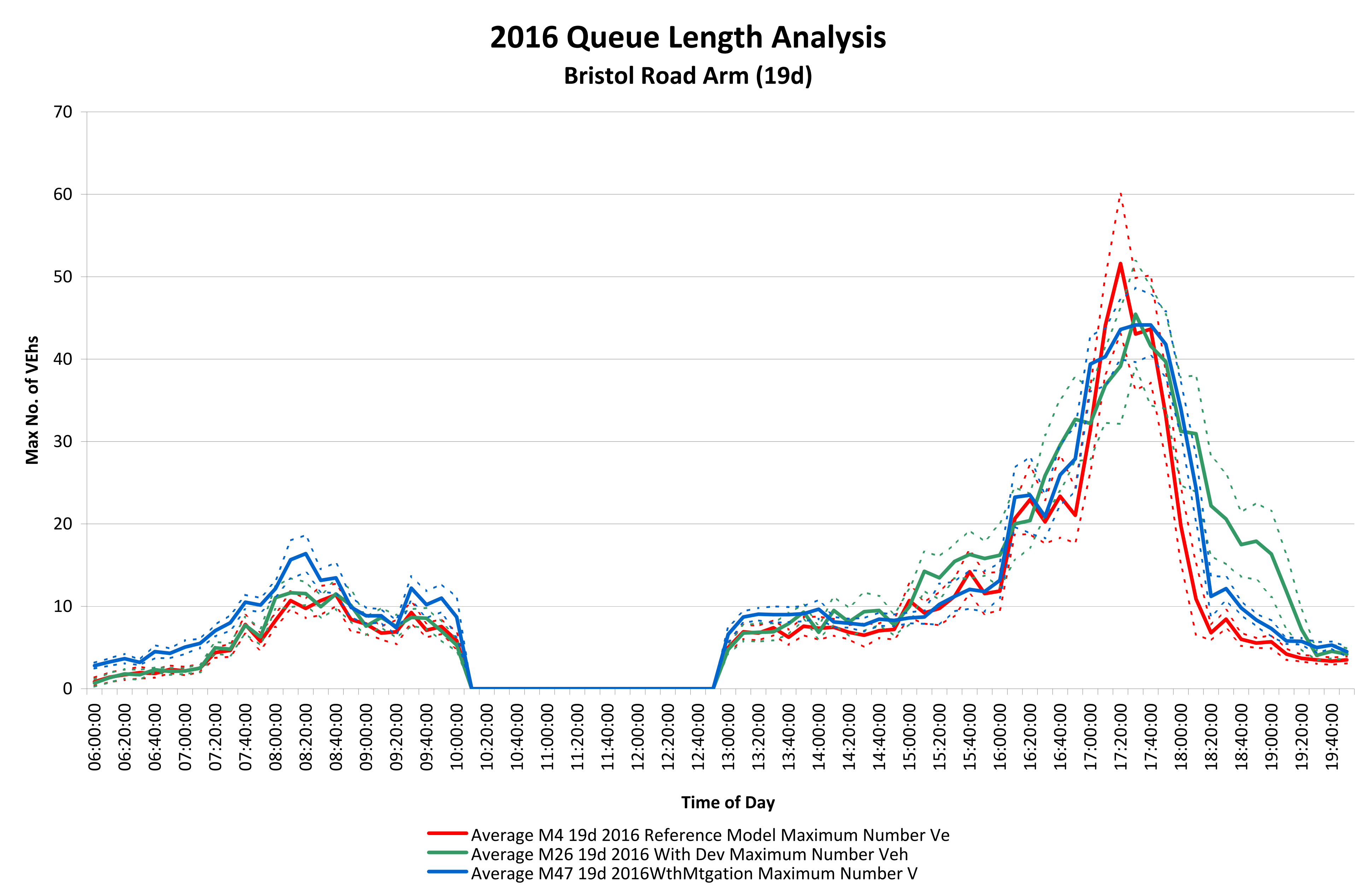
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19b 2016 Reference Model Maximum Number Ve
Average M26 19b 2016 With Dev Maximum Number Veh
Average M47 19b 2016WthMtgation Maximum Number V

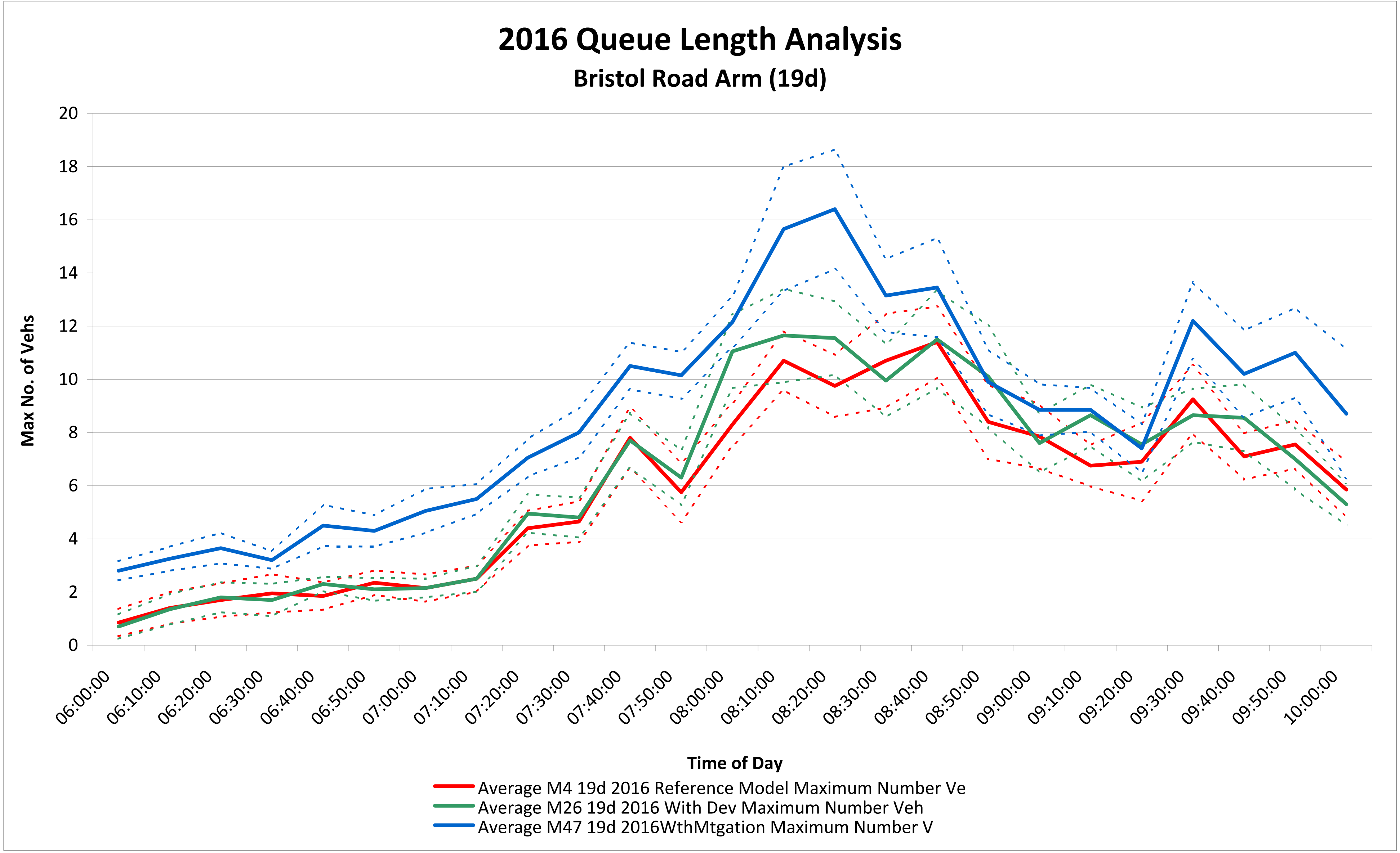

2016 Queue Length Analysis
Bath Road Arm (19c)
Max No. of VEhs
0
10
20
30
40
50
60
70
80
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 19c 2016 Reference Model Maximum Number Ve
Average M26 19c 2016 With Dev Maximum Number Veh
Average M47 19c 2016WthMtgation Maximum Number V

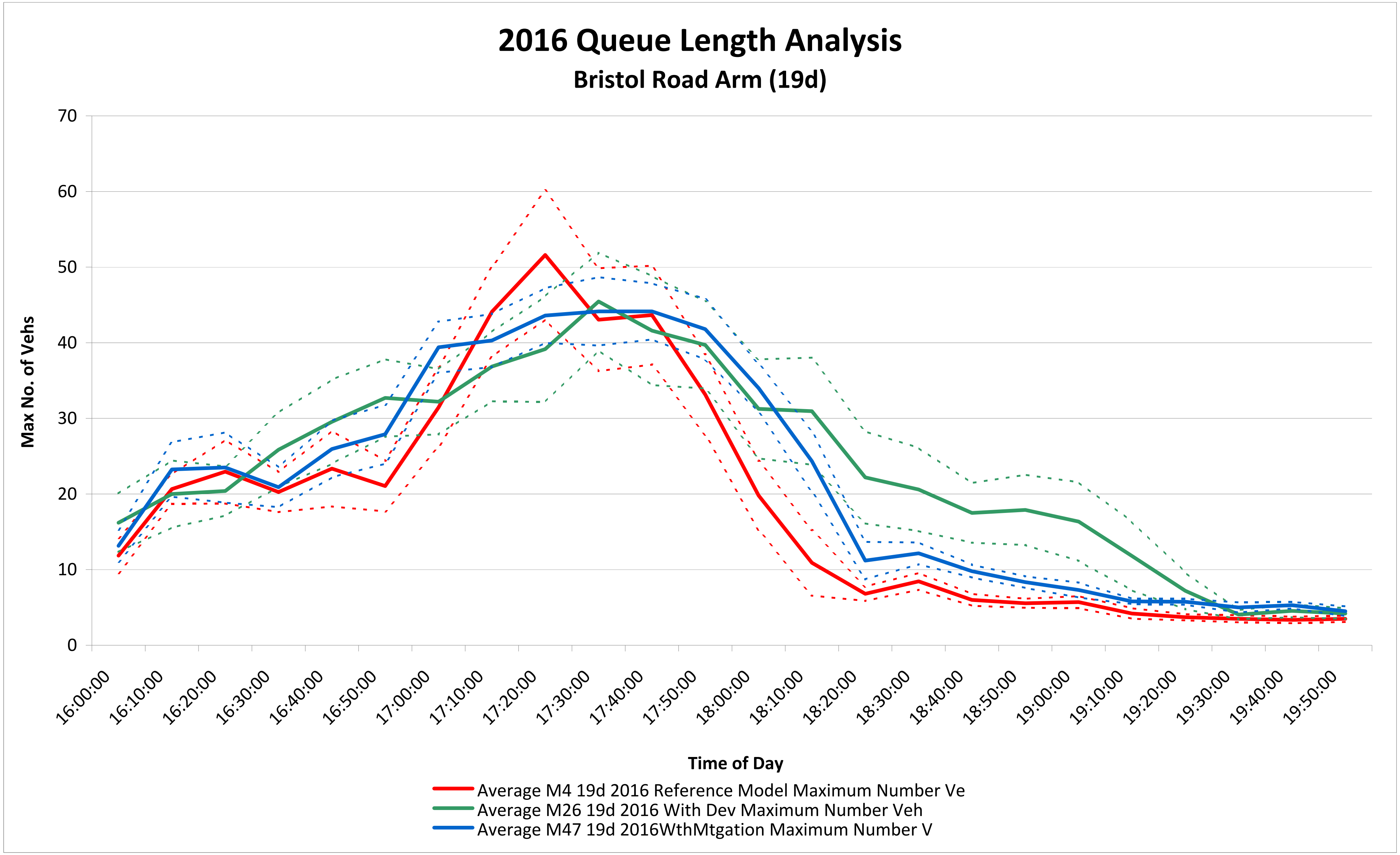


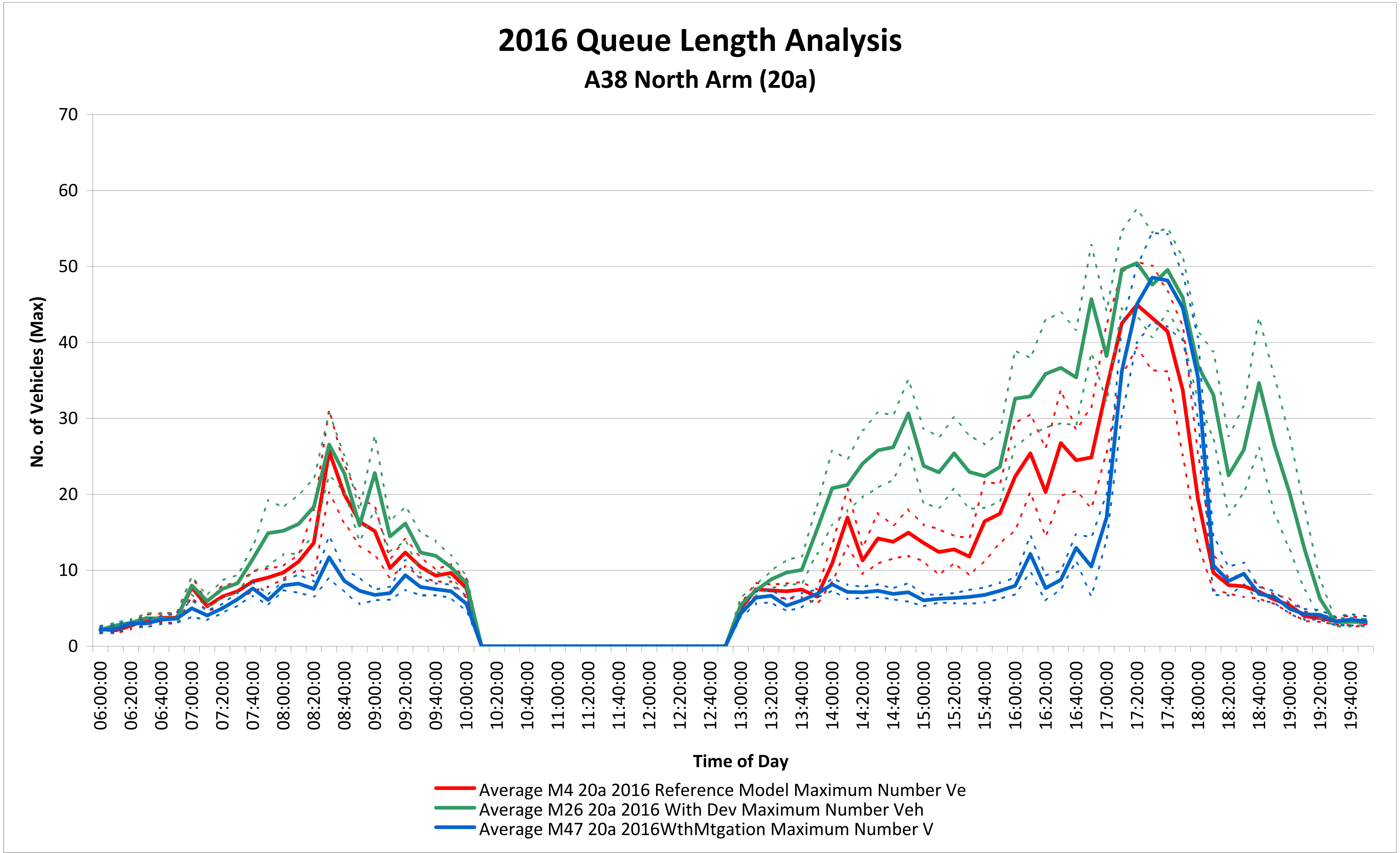
2016 Queue Length Analysis
Bath Road Arm (19c)
Max No. of Vehs
0
5
10
15
20
25
30
35
40
45
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19c 2016 Reference Model Maximum Number Ve
Average M26 19c 2016 With Dev Maximum Number Veh
Average M47 19c 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Bath Road Arm (19c)
Max No. of Vehs
0
10
20
30
40
50
60
70
80
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19c 2016 Reference Model Maximum Number Ve
Average M26 19c 2016 With Dev Maximum Number Veh
Average M47 19c 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Bristol Road Arm (19d)
70
60
50
40
30
20
10
0
Max No. of VEhs
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 19d 2016 Reference Model Maximum Number Ve
Average M26 19d 2016 With Dev Maximum Number Veh
Average M47 19d 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of Vehs
0
2
4
6
8
10
12
14
16
18
20
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19d 2016 Reference Model Maximum Number Ve
Average M26 19d 2016 With Dev Maximum Number Veh
Average M47 19d 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of Vehs
0
10
20
30
40
50
60
70
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19d 2016 Reference Model Maximum Number Ve
Average M26 19d 2016 With Dev Maximum Number Veh
Average M47 19d 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
A38 North Arm (20a)
No. of Vehicles (Max)
0
10
20
30
40
50
60
70
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
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13:40:00
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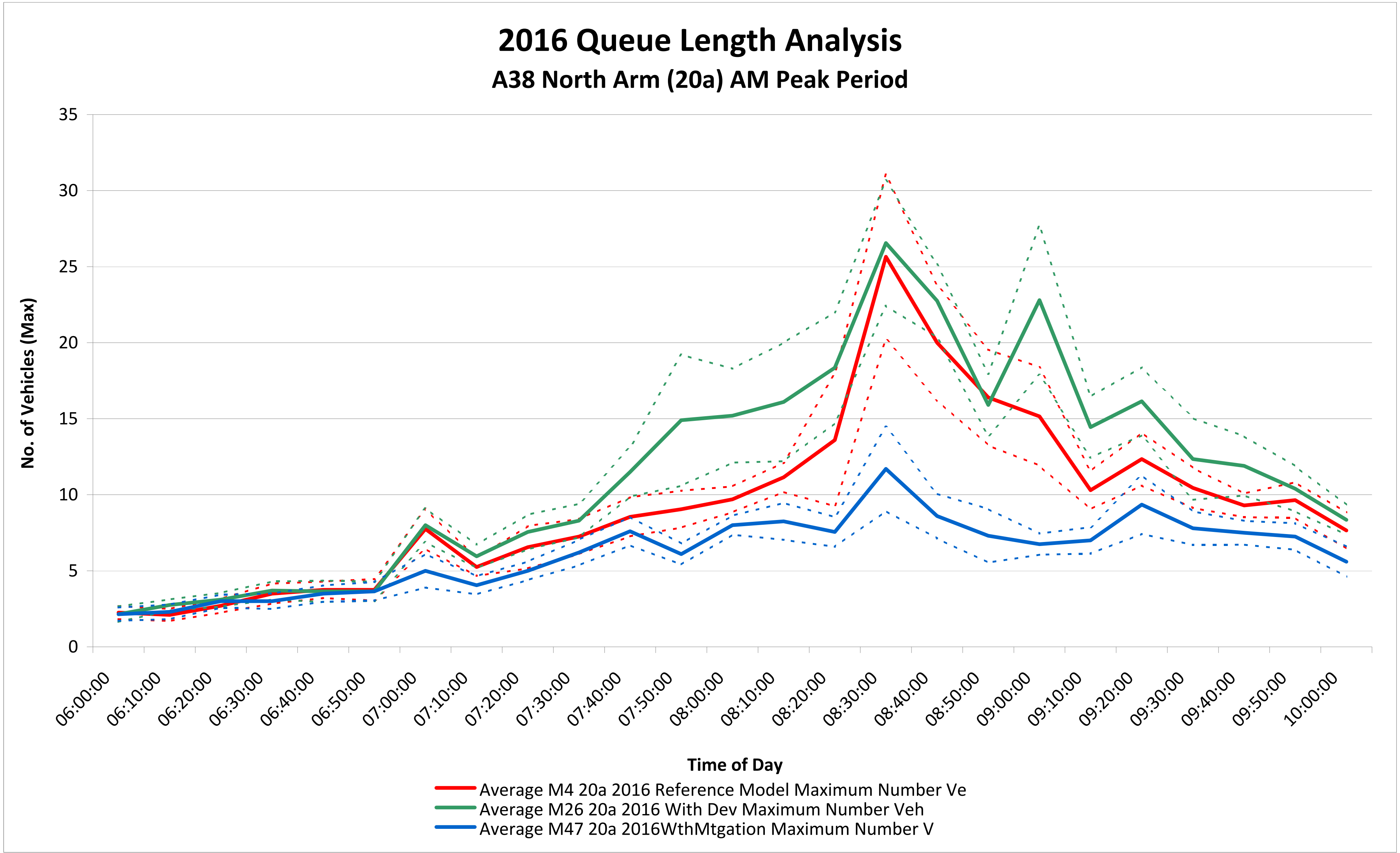
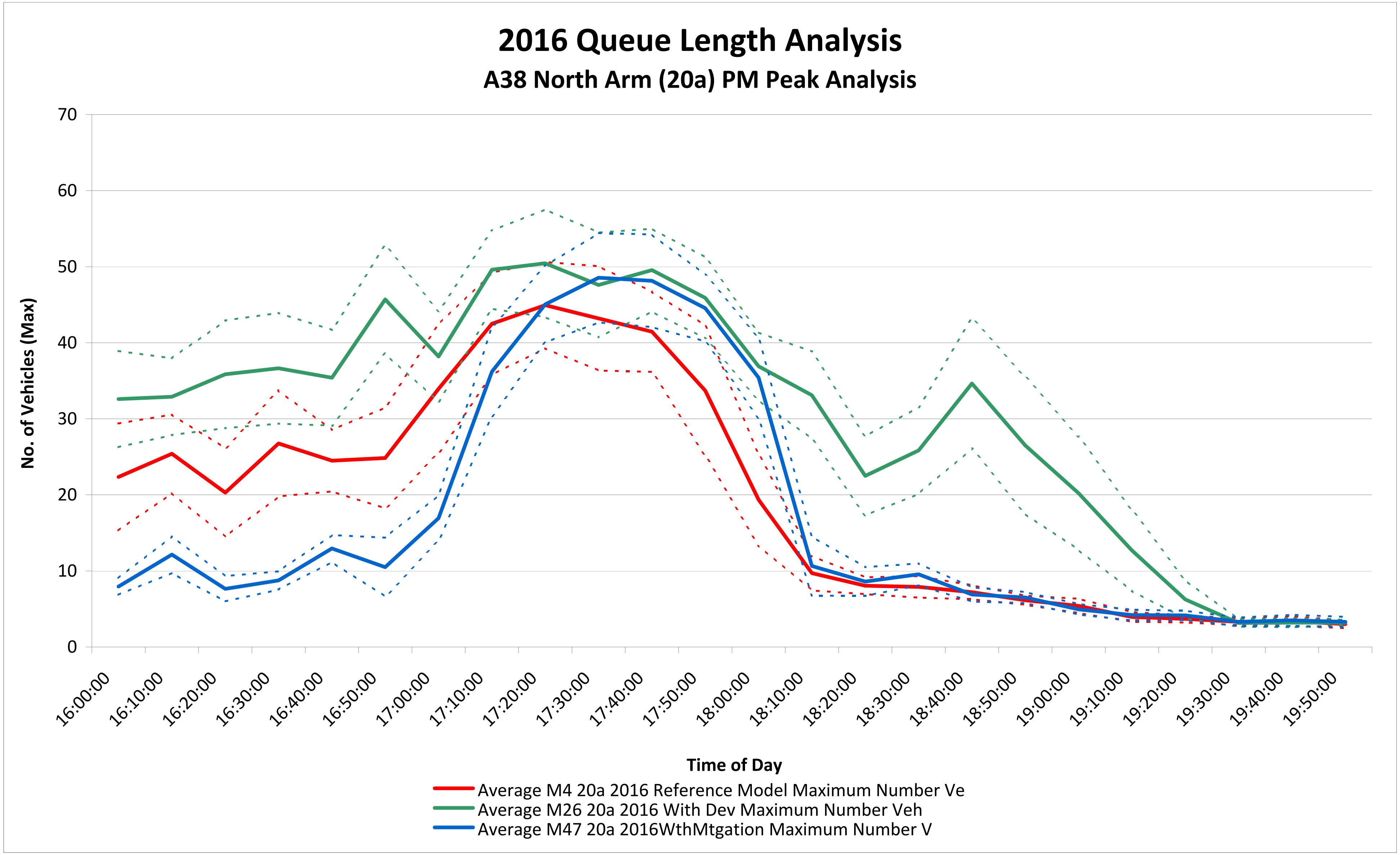
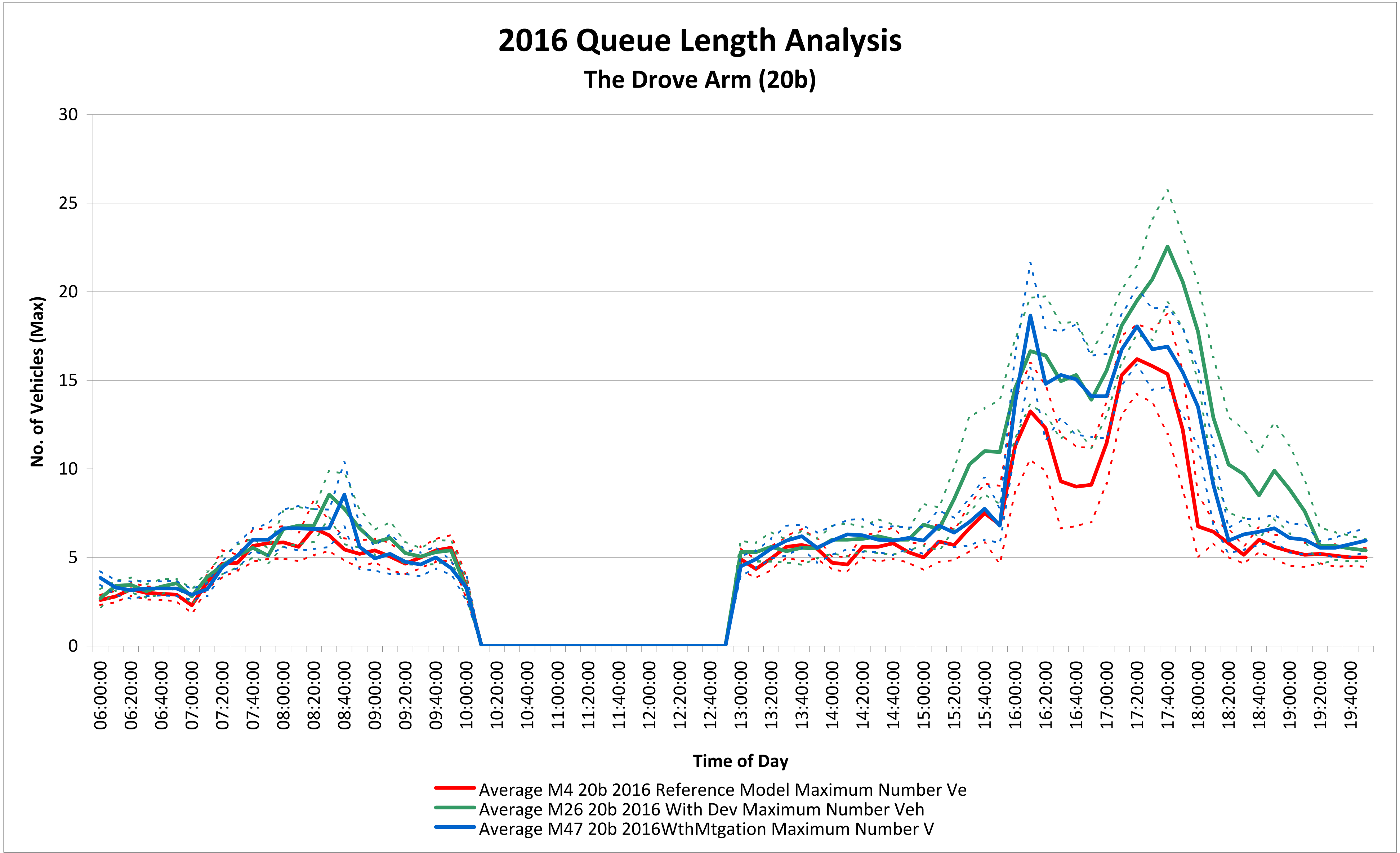
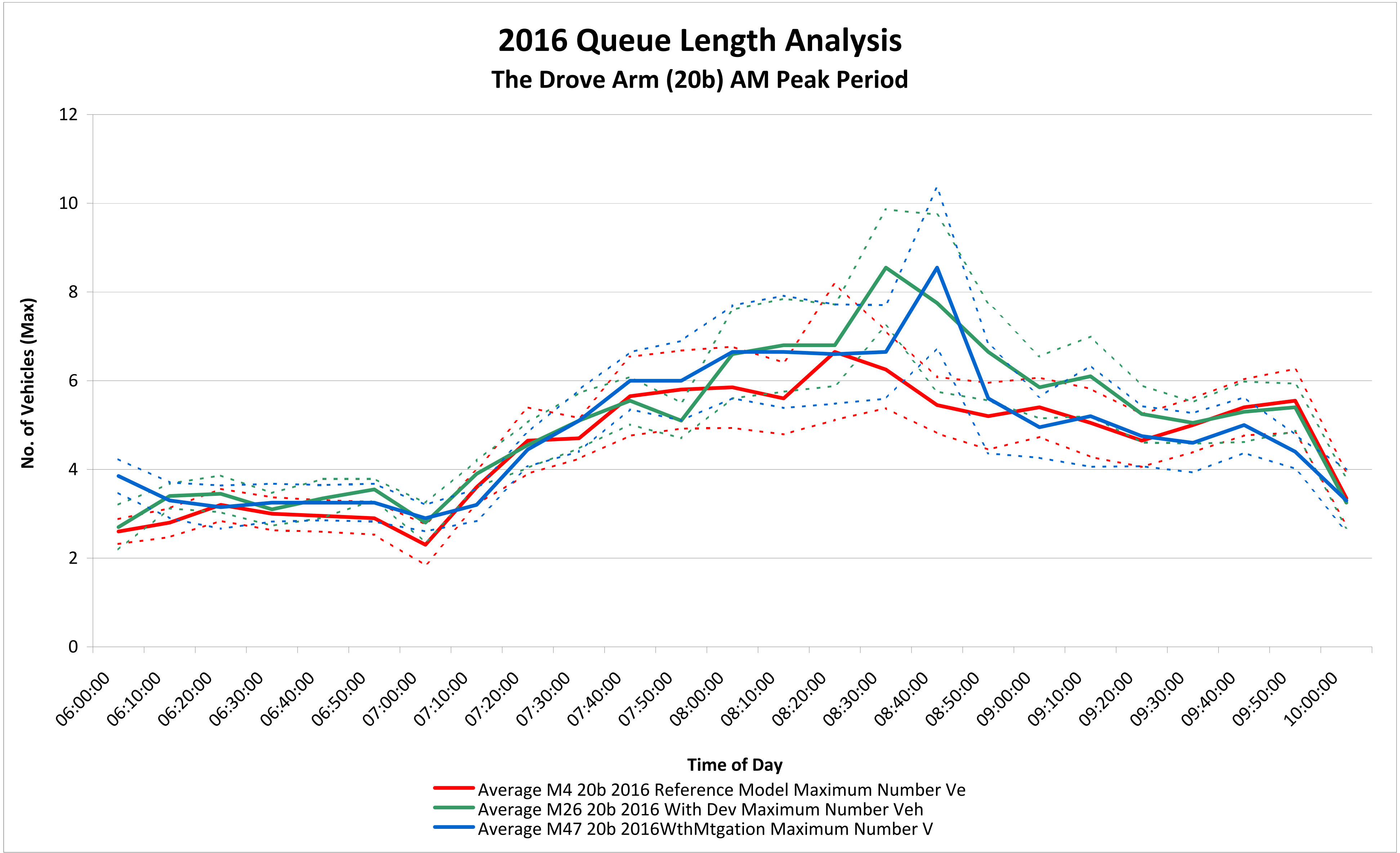
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 20a 2016 Reference Model Maximum Number Ve
Average M26 20a 2016 With Dev Maximum Number Veh
Average M47 20a 2016WthMtgation Maximum Number V

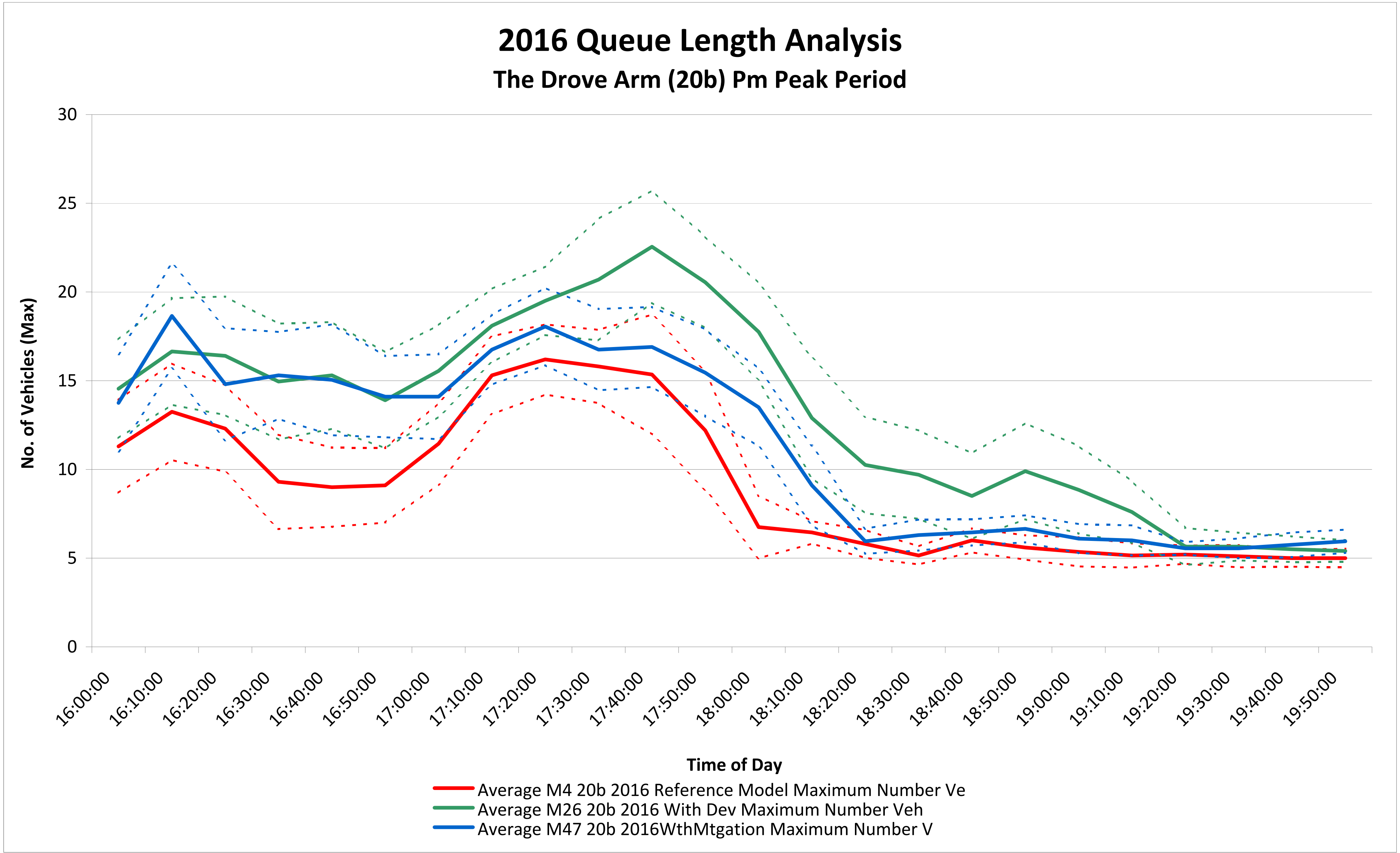

2016 Queue Length Analysis
A38 North Arm (20a) AM Peak Period
35
30
25
20
15
10
5
0
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 20a 2016 Reference Model Maximum Number Ve
Average M26 20a 2016 With Dev Maximum Number Veh
Average M47 20a 2016WthMtgation Maximum Number V



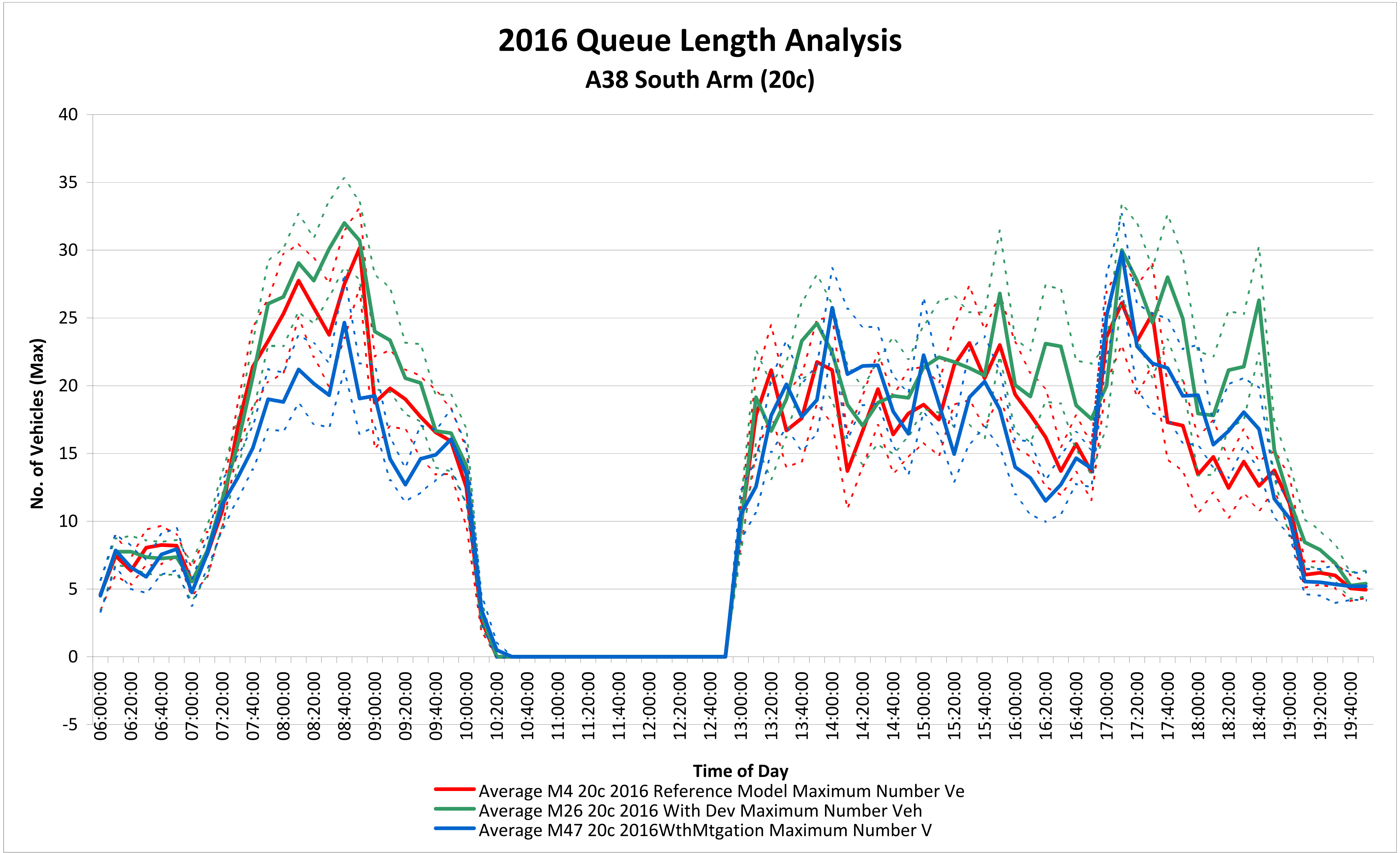
2016 Queue Length Analysis
A38 North Arm (20a) PM Peak Analysis
No. of Vehicles (Max)
70
60
50
40
30
20
10
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 20a 2016 Reference Model Maximum Number Ve
Average M26 20a 2016 With Dev Maximum Number Veh
Average M47 20a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
The Drove Arm (20b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 20b 2016 Reference Model Maximum Number Ve
Average M26 20b 2016 With Dev Maximum Number Veh
Average M47 20b 2016WthMtgation Maximum Number V

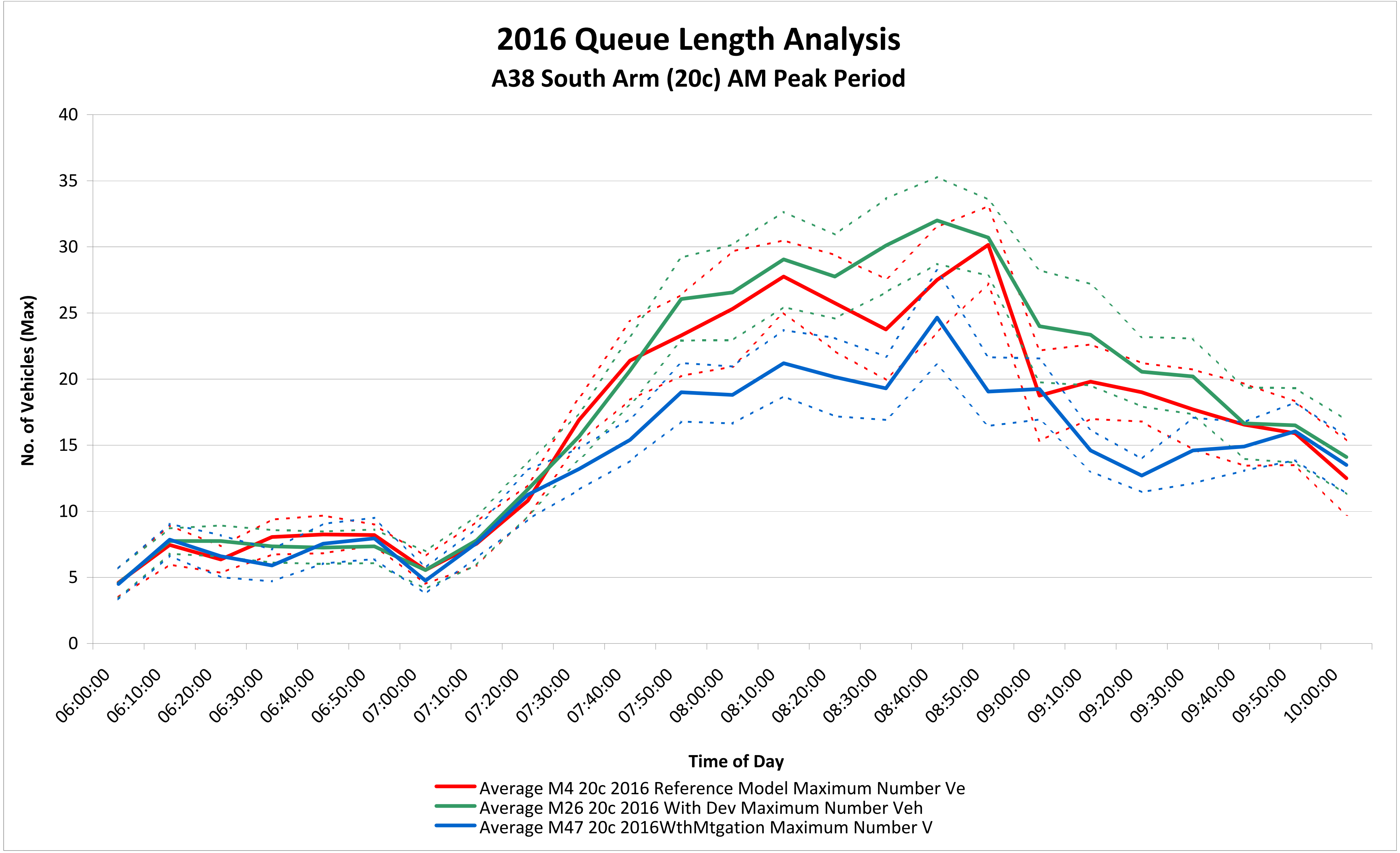

2016 Queue Length Analysis
The Drove Arm (20b) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
Time of Day
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Average M4 20b 2016 Reference Model Maximum Number Ve
Average M26 20b 2016 With Dev Maximum Number Veh
Average M47 20b 2016WthMtgation Maximum Number V

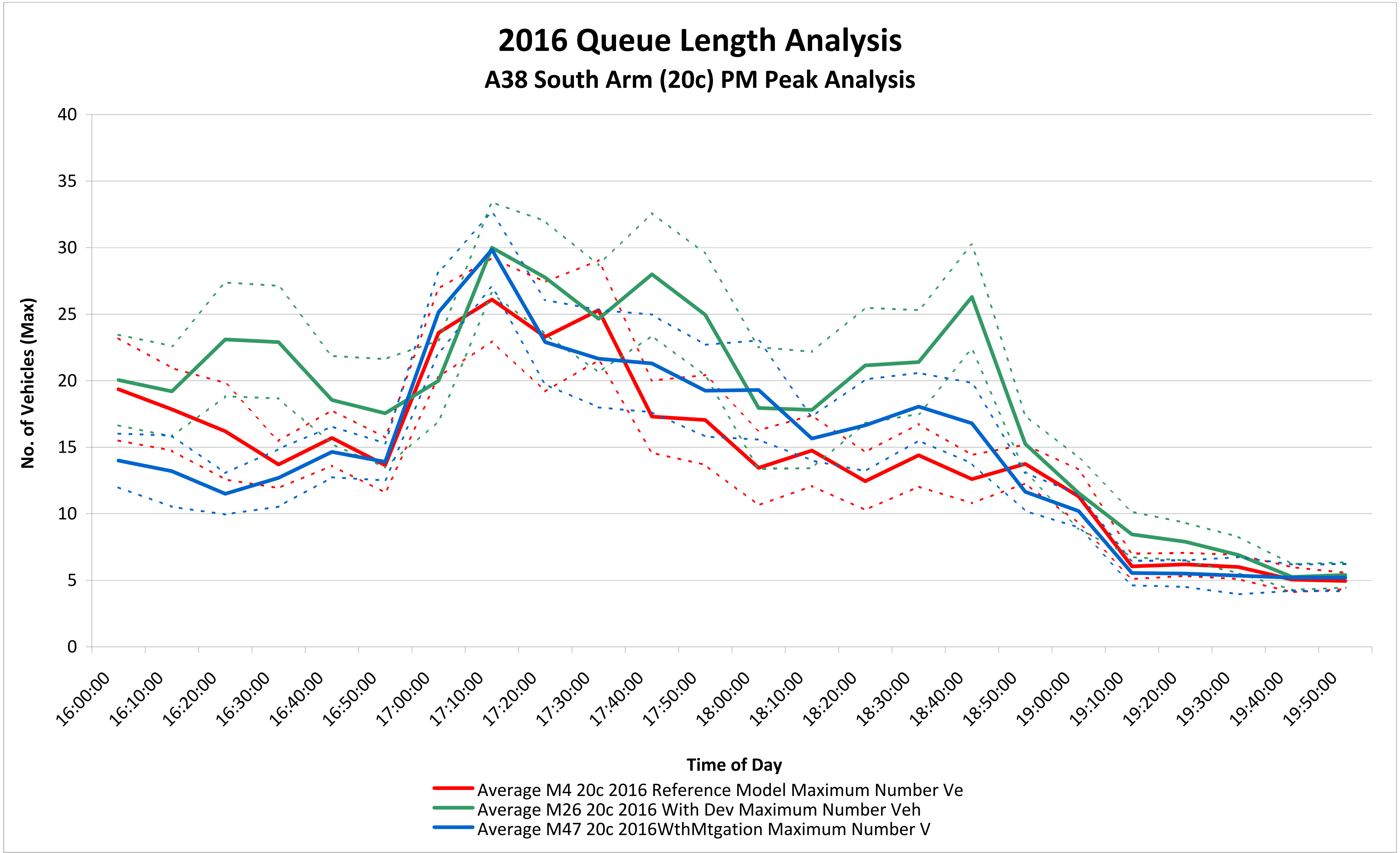


2016 Queue Length Analysis
The Drove Arm (20b) Pm Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 20b 2016 Reference Model Maximum Number Ve
Average M26 20b 2016 With Dev Maximum Number Veh
Average M47 20b 2016WthMtgation Maximum Number V

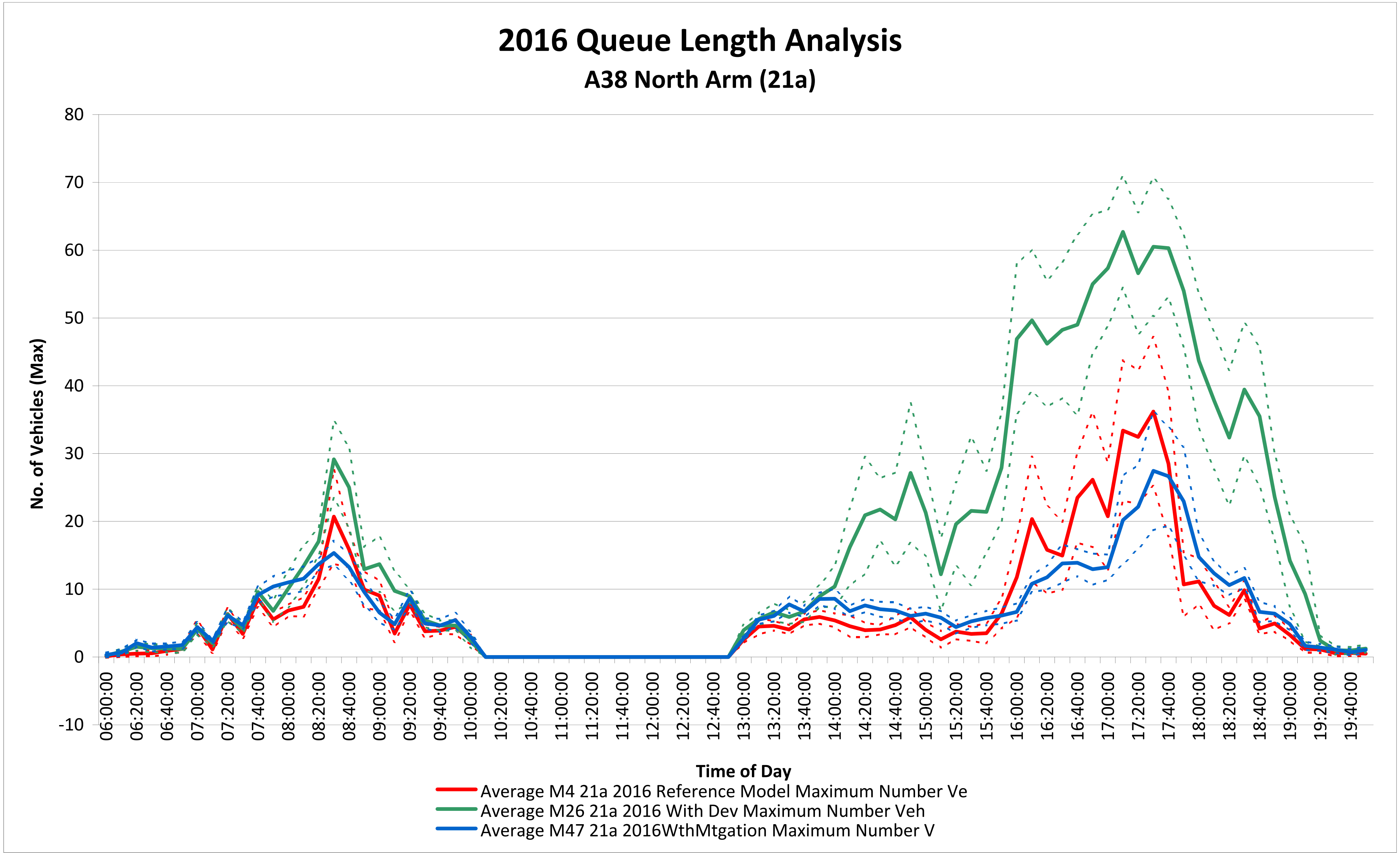


2016 Queue Length Analysis
A38 South Arm (20c)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 20c 2016 Reference Model Maximum Number Ve
Average M26 20c 2016 With Dev Maximum Number Veh
Average M47 20c 2016WthMtgation Maximum Number V

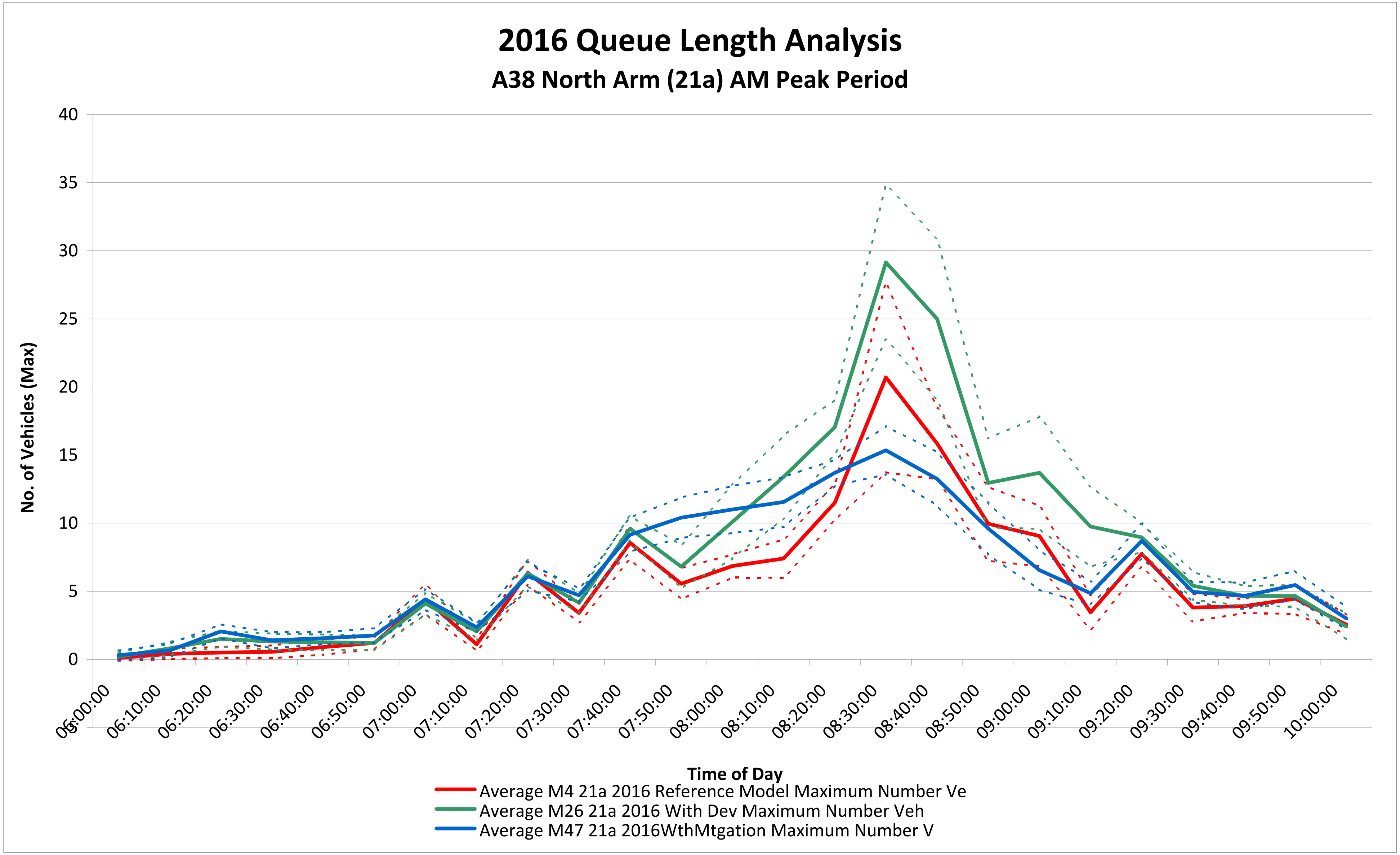

2016 Queue Length Analysis
A38 South Arm (20c) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 20c 2016 Reference Model Maximum Number Ve
Average M26 20c 2016 With Dev Maximum Number Veh
Average M47 20c 2016WthMtgation Maximum Number V

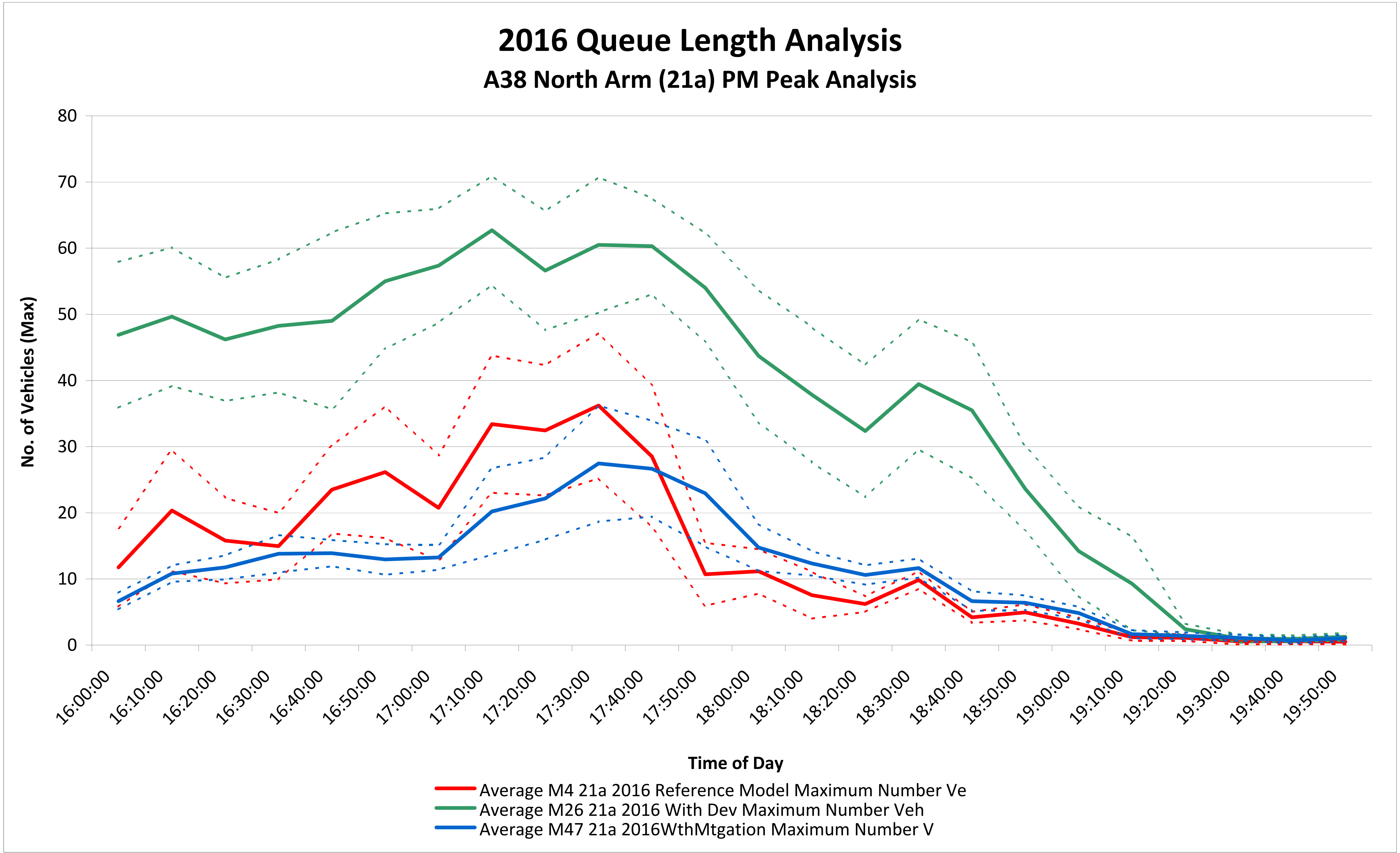


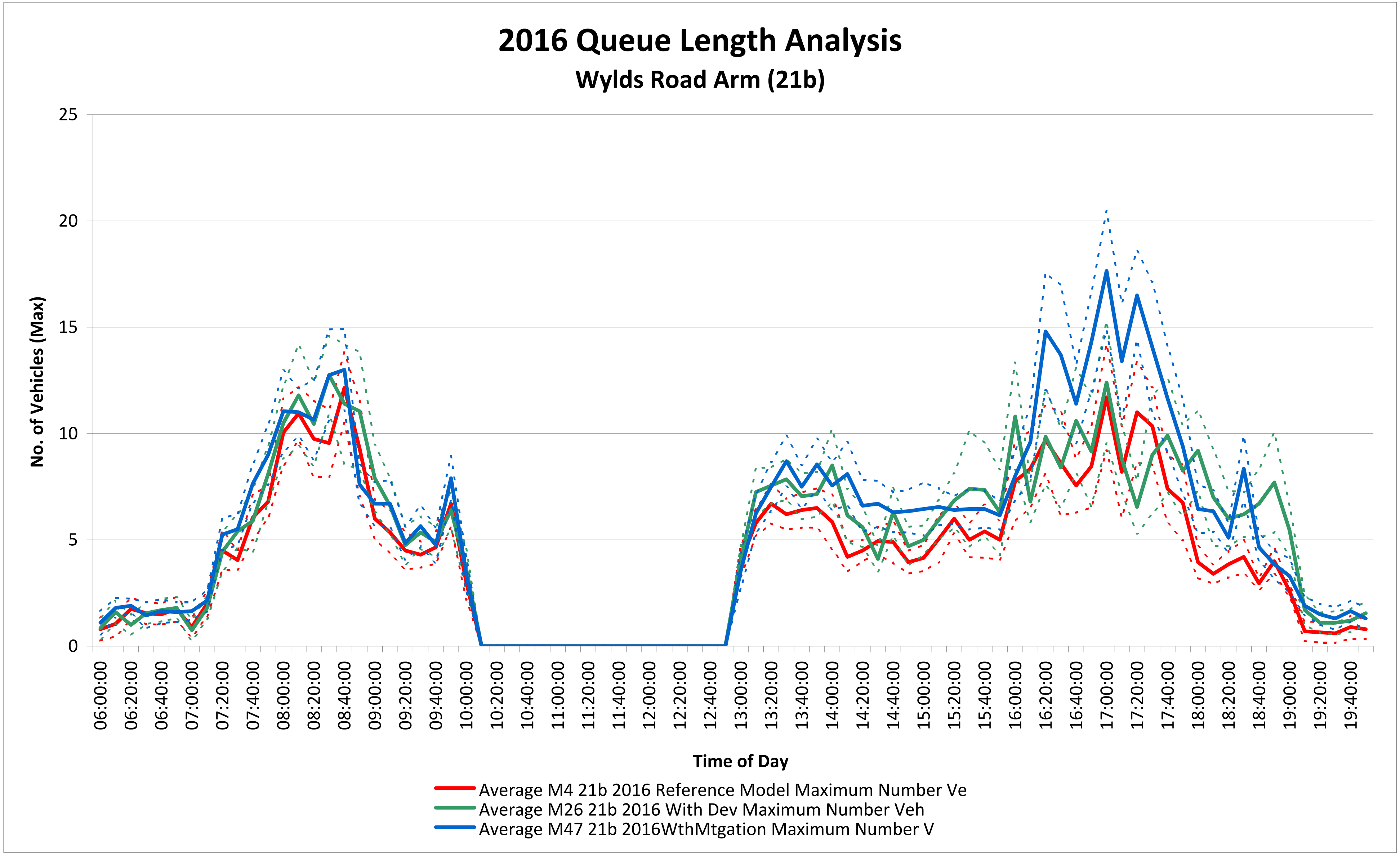
2016 Queue Length Analysis
A38 South Arm (20c) PM Peak Analysis
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 20c 2016 Reference Model Maximum Number Ve
Average M26 20c 2016 With Dev Maximum Number Veh
Average M47 20c 2016WthMtgation Maximum Number V

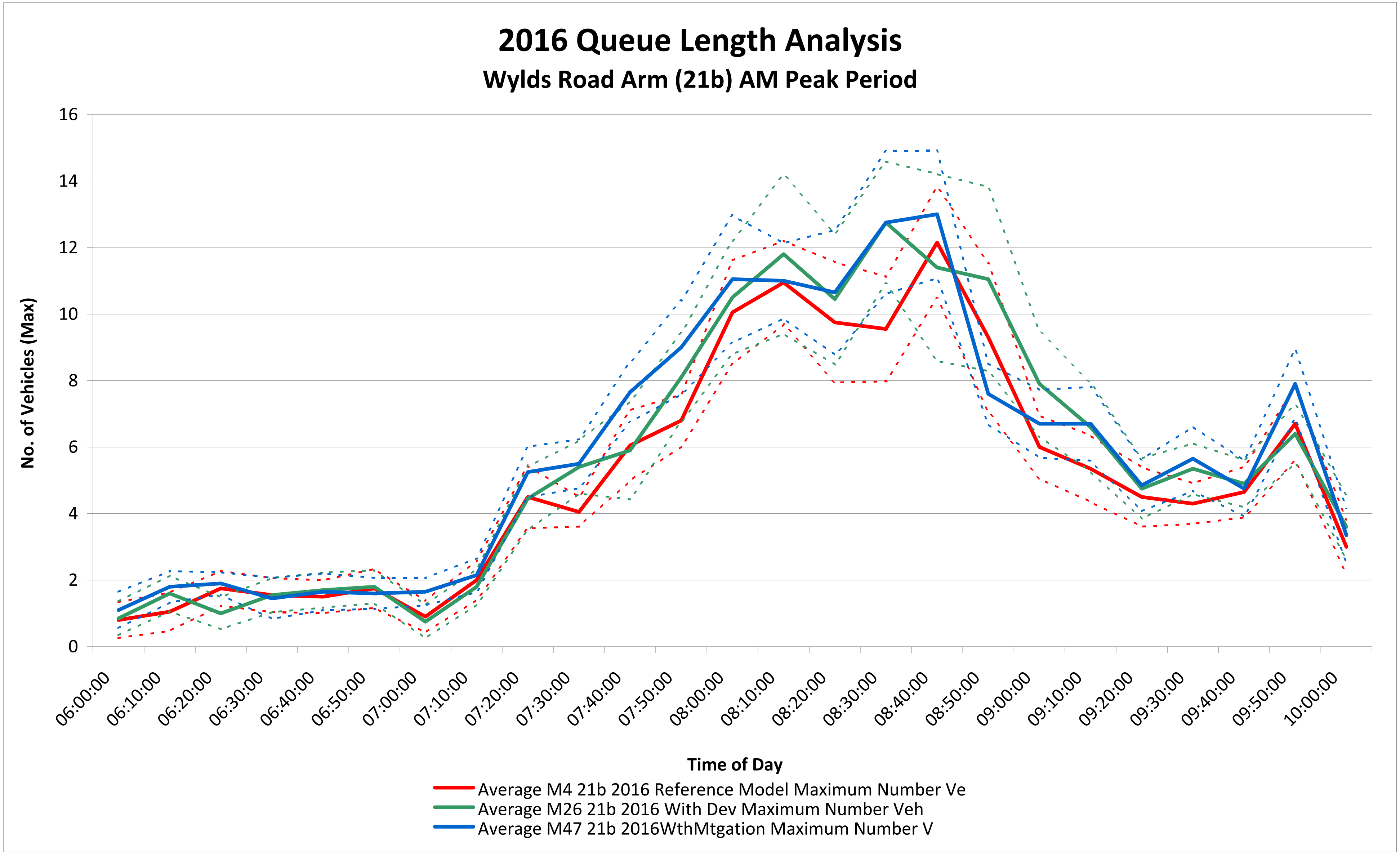


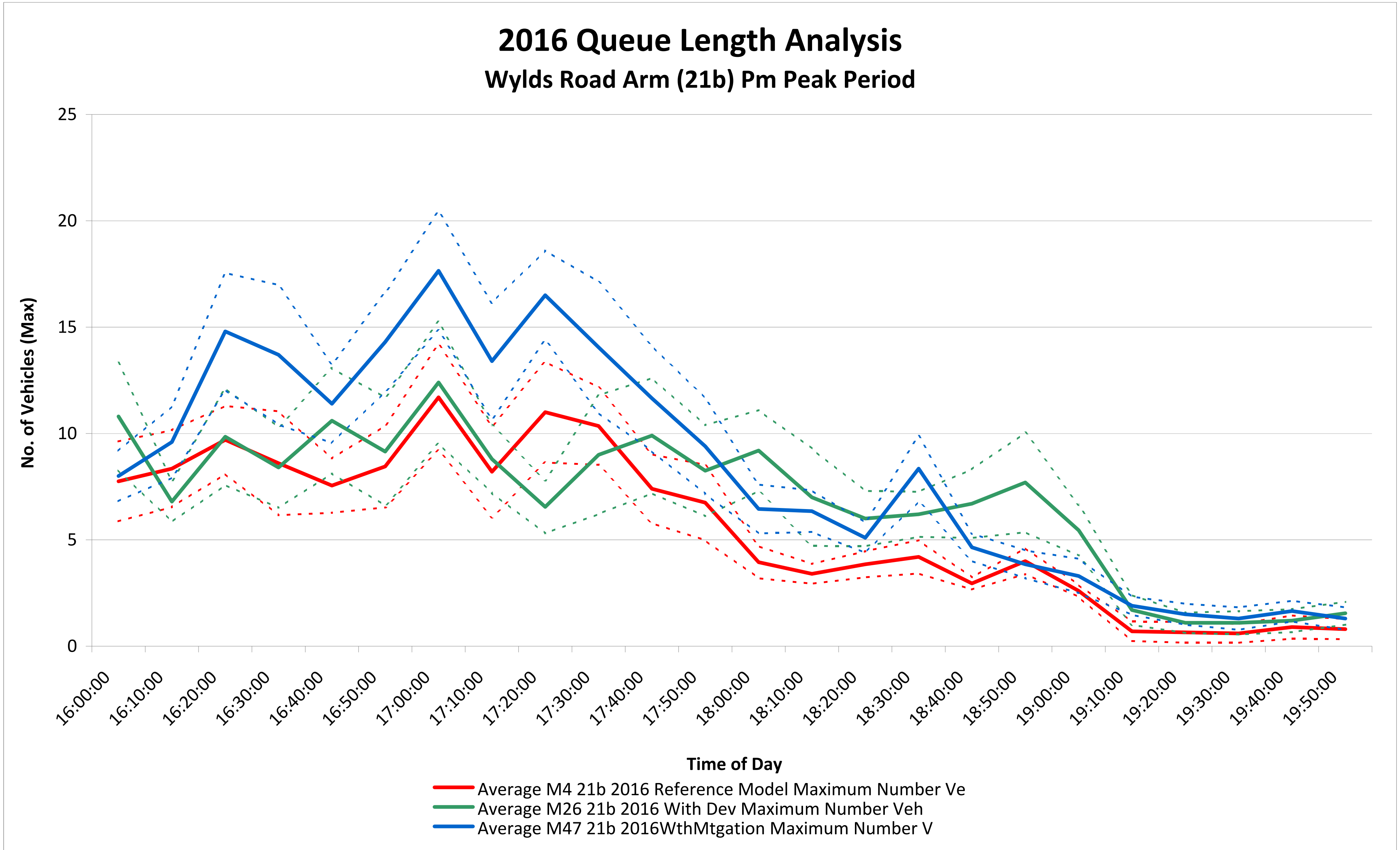
2016 Queue Length Analysis
A38 North Arm (21a)
No. of Vehicles (Max)
80
70
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 21a 2016 Reference Model Maximum Number Ve
Average M26 21a 2016 With Dev Maximum Number Veh
Average M47 21a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
A38 North Arm (21a) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 21a 2016 Reference Model Maximum Number Ve
Average M26 21a 2016 With Dev Maximum Number Veh
Average M47 21a 2016WthMtgation Maximum Number V

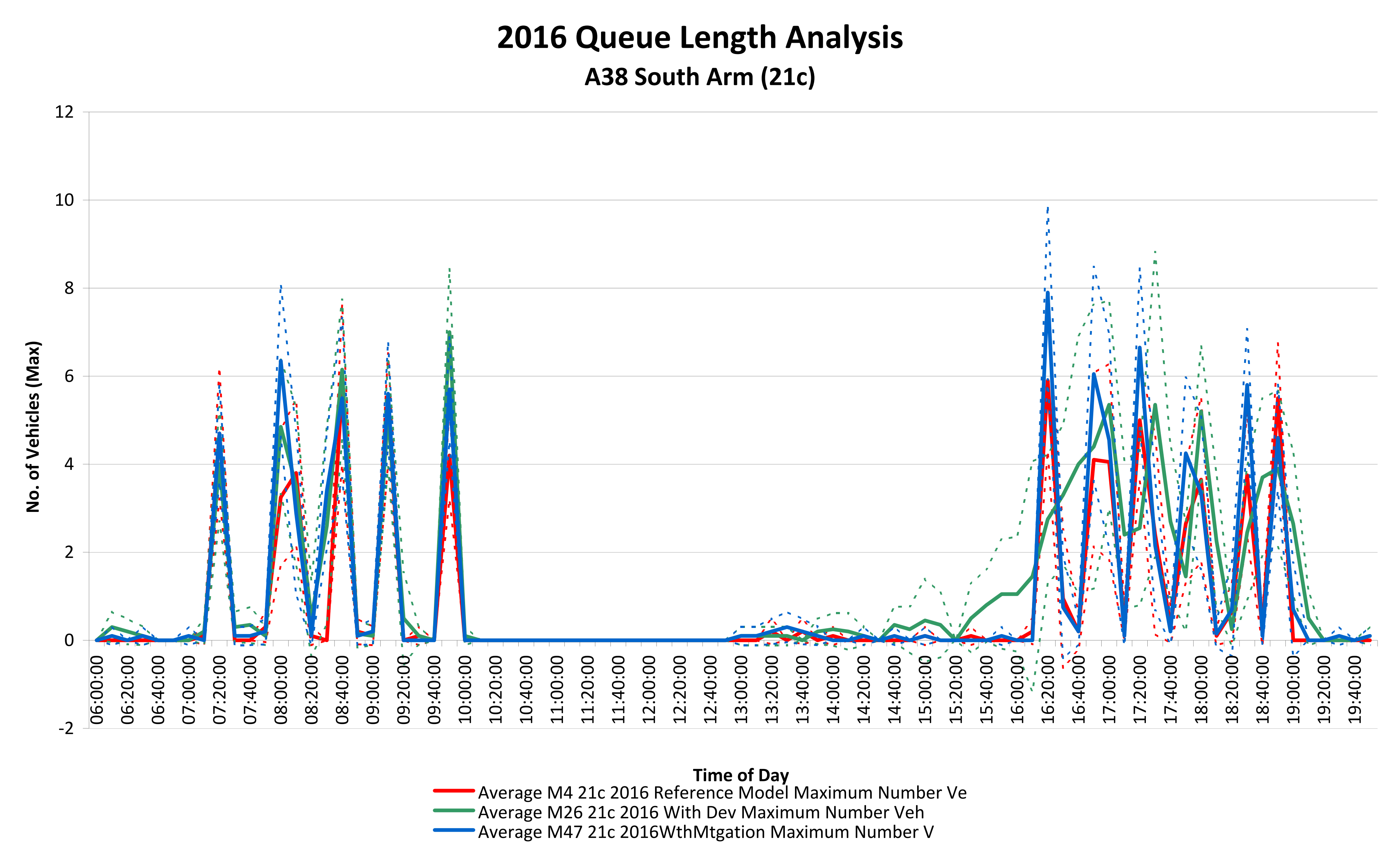

2016 Queue Length Analysis
A38 North Arm (21a) PM Peak Analysis
No. of Vehicles (Max)
0
10
20
30
40
50
60
70
80
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 21a 2016 Reference Model Maximum Number Ve
Average M26 21a 2016 With Dev Maximum Number Veh
Average M47 21a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Wylds Road Arm (21b)
No. of Vehicles (Max)
0
5
10
15
20
25
Time of Day
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 21b 2016 Reference Model Maximum Number Ve
Average M26 21b 2016 With Dev Maximum Number Veh
Average M47 21b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Wylds Road Arm (21b) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 21b 2016 Reference Model Maximum Number Ve
Average M26 21b 2016 With Dev Maximum Number Veh
Average M47 21b 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
Wylds Road Arm (21b) Pm Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 21b 2016 Reference Model Maximum Number Ve
Average M26 21b 2016 With Dev Maximum Number Veh
Average M47 21b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
A38 South Arm (21c)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
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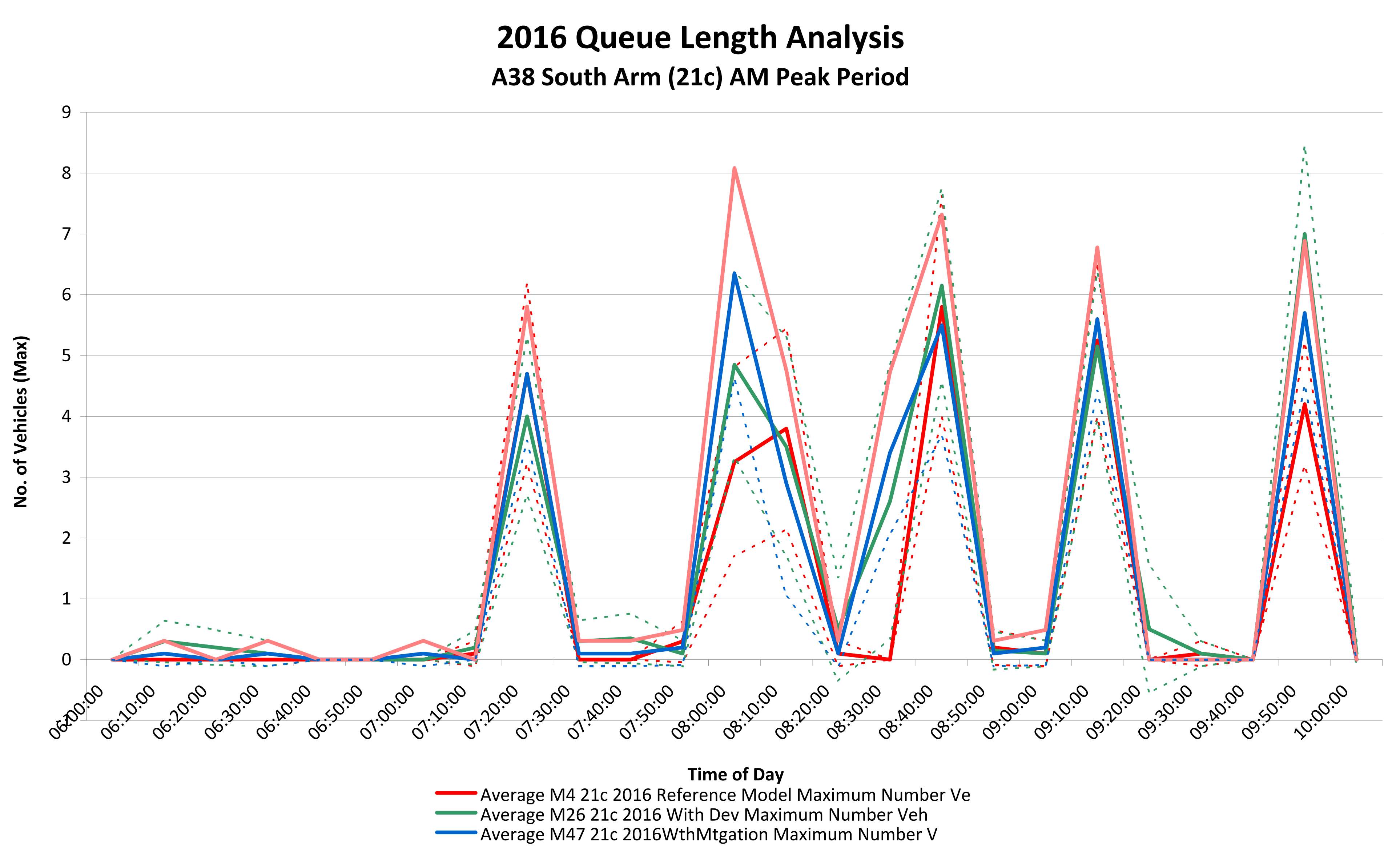
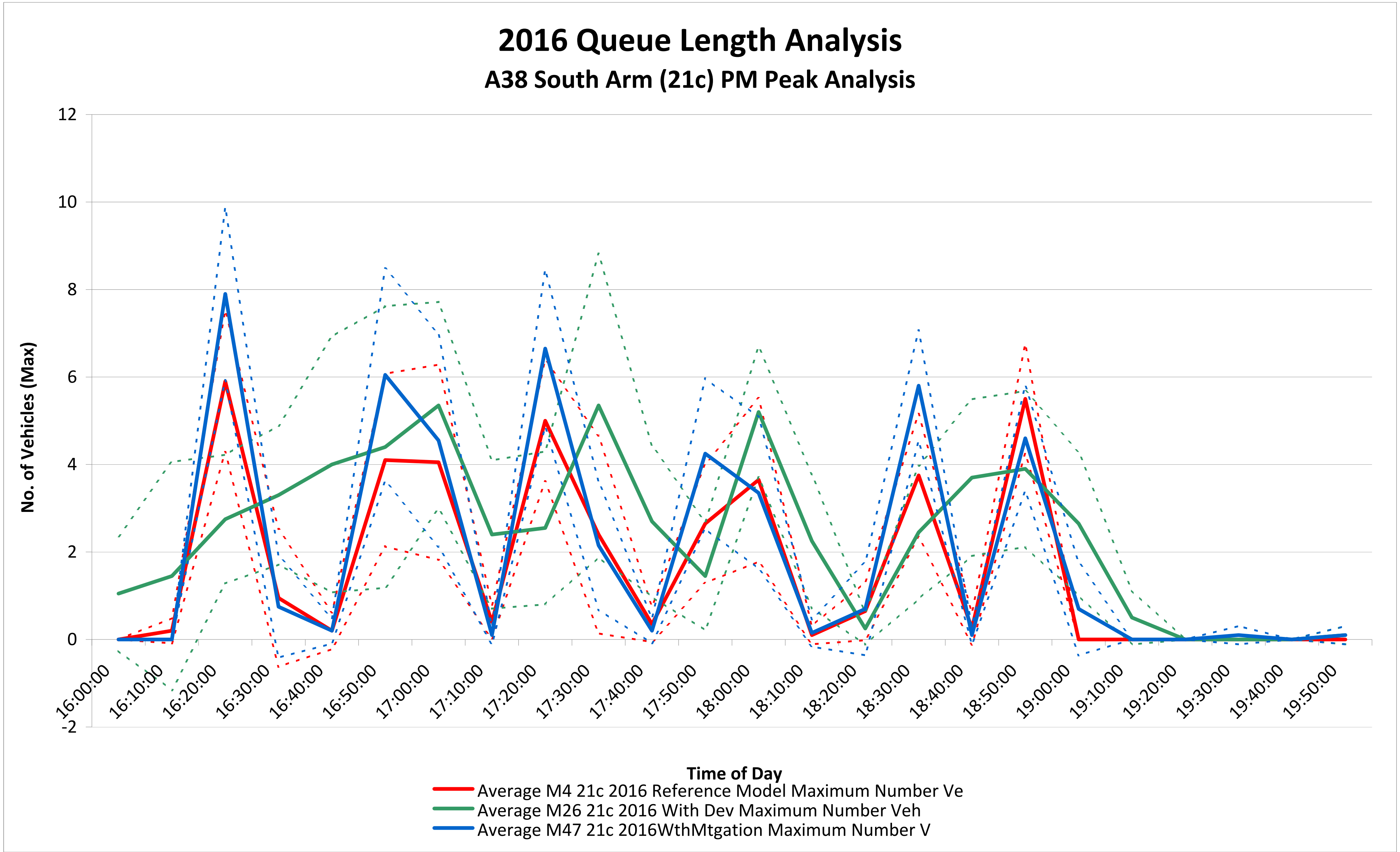
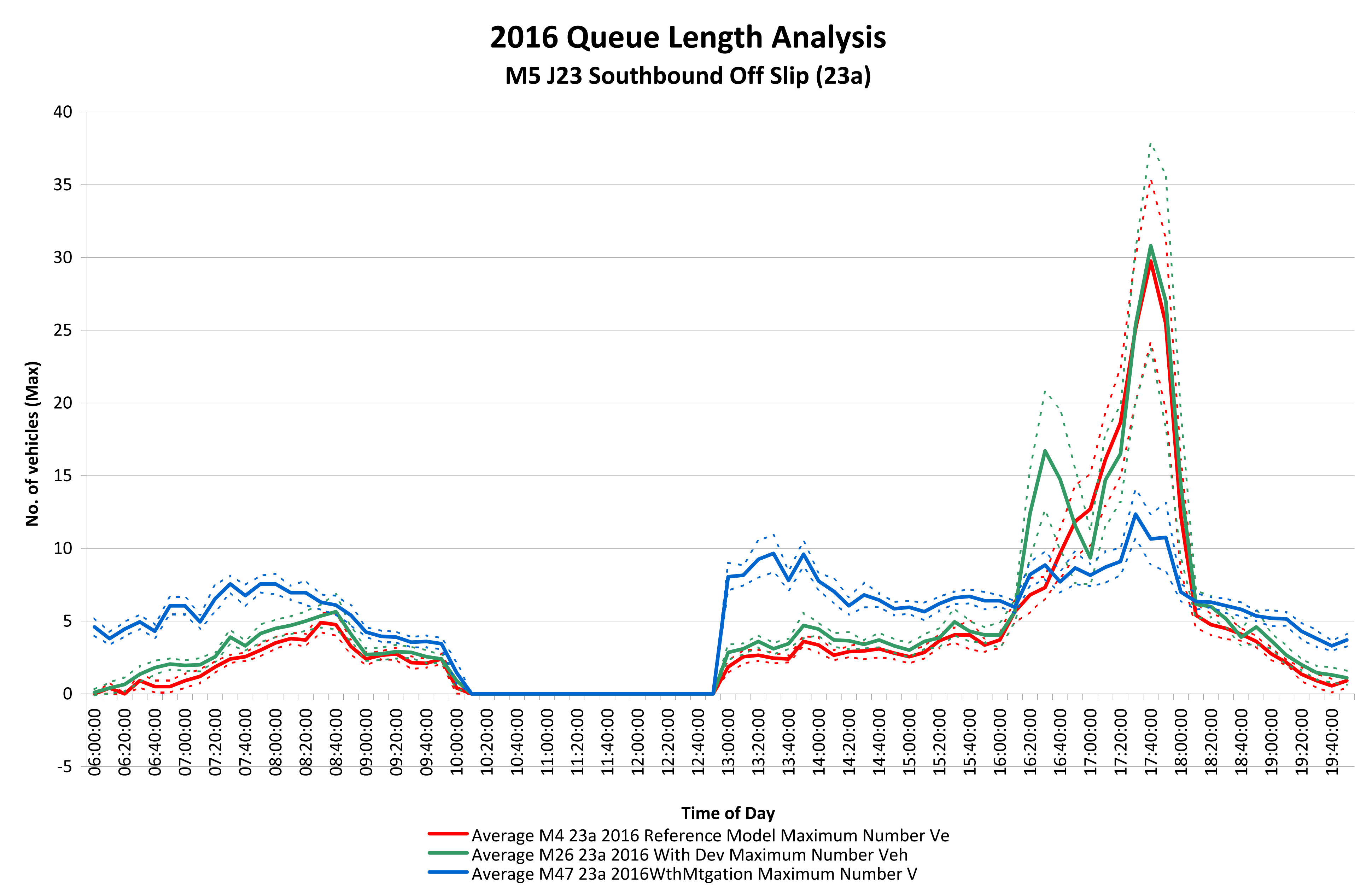
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 21c 2016 Reference Model Maximum Number Ve
Average M26 21c 2016 With Dev Maximum Number Veh
Average M47 21c 2016WthMtgation Maximum Number V

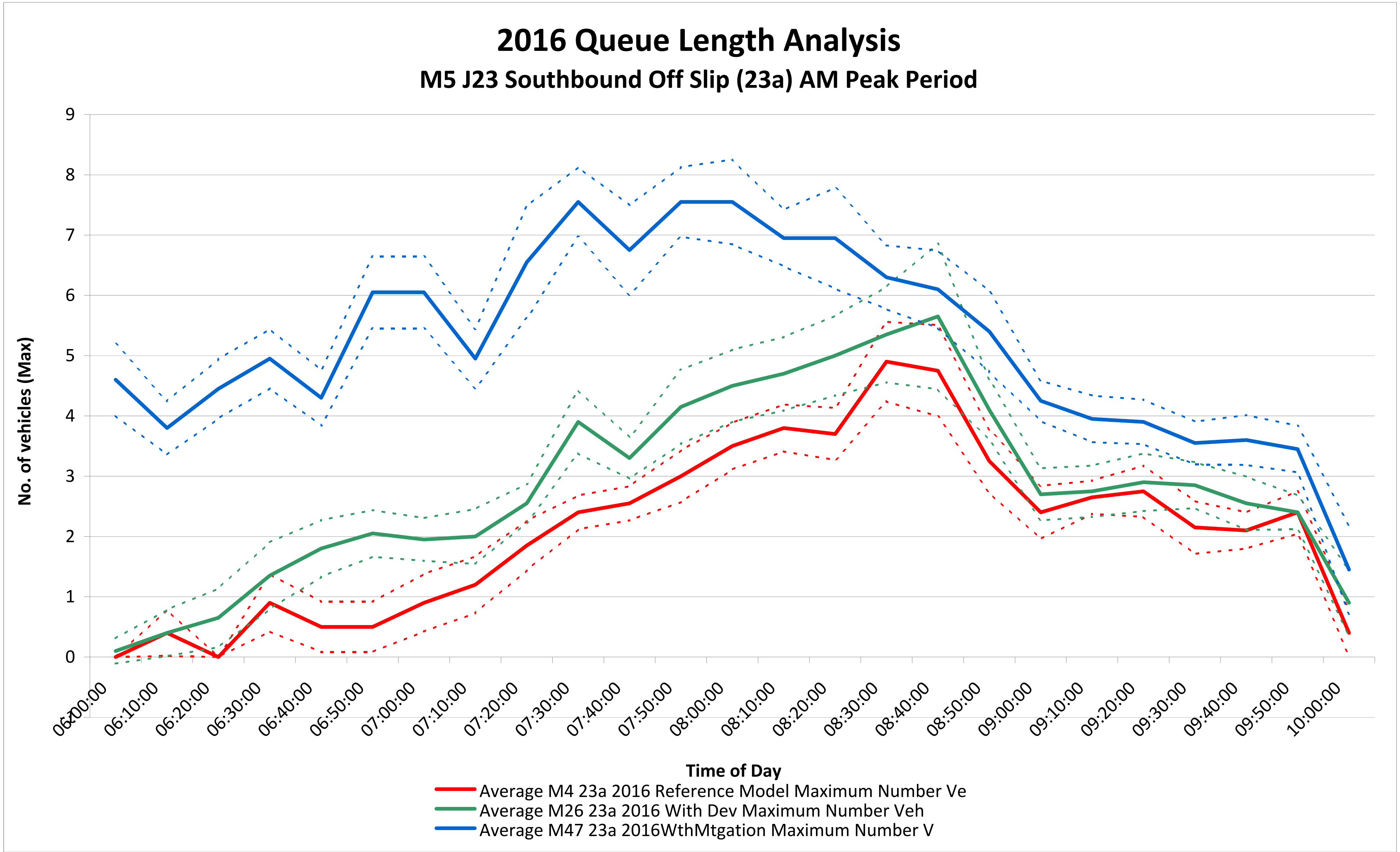

2016 Queue Length Analysis
A38 South Arm (21c) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 21c 2016 Reference Model Maximum Number Ve
Average M26 21c 2016 With Dev Maximum Number Veh
Average M47 21c 2016WthMtgation Maximum Number V

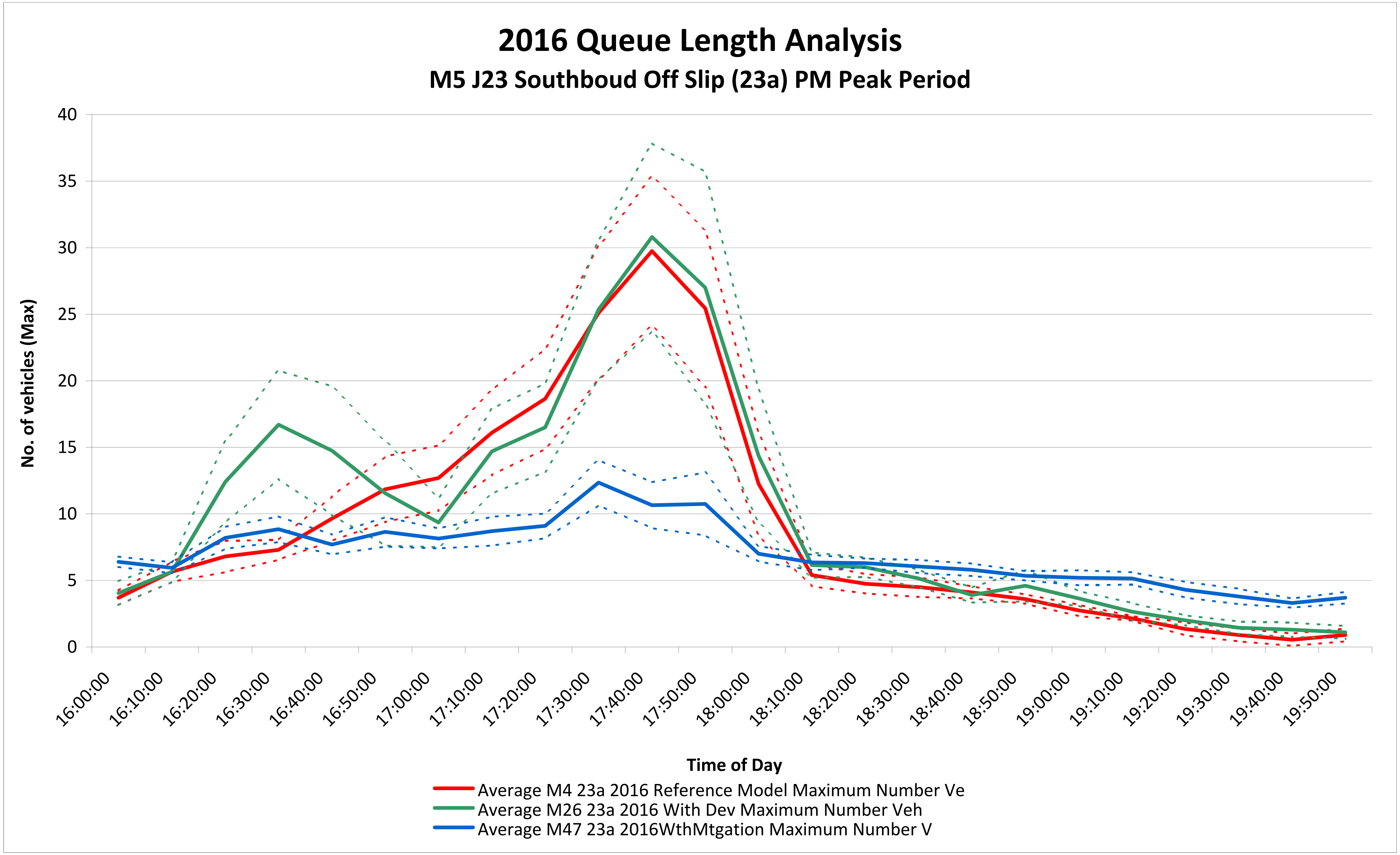


2016 Queue Length Analysis
A38 South Arm (21c) PM Peak Analysis
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 21c 2016 Reference Model Maximum Number Ve
Average M26 21c 2016 With Dev Maximum Number Veh
Average M47 21c 2016WthMtgation Maximum Number V

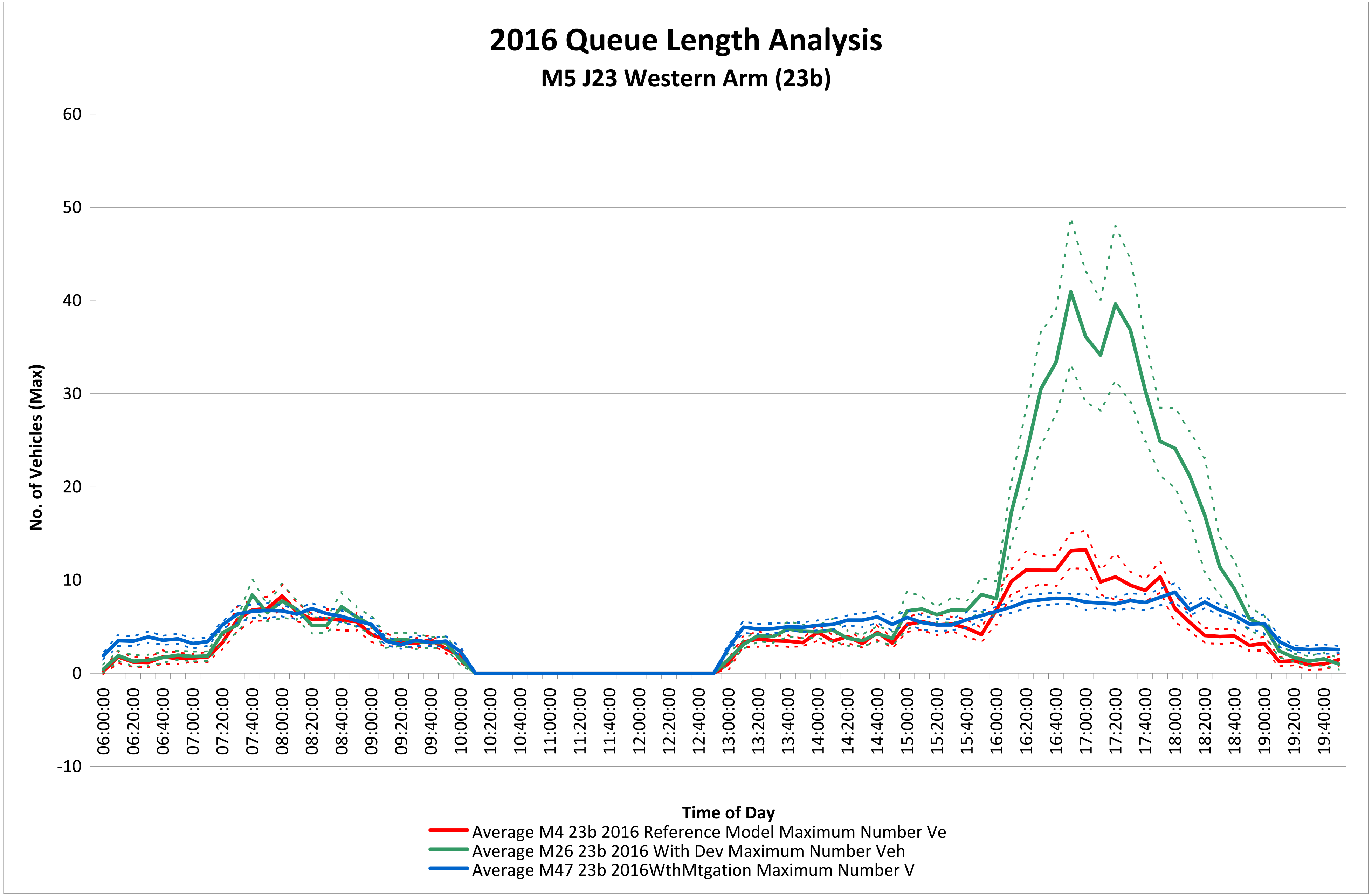


2016 Queue Length Analysis
M5 J23 Southbound Off Slip (23a)
No. of vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 23a 2016 Reference Model Maximum Number Ve
Average M26 23a 2016 With Dev Maximum Number Veh
Average M47 23a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
M5 J23 Southbound Off Slip (23a) AM Peak Period
No. of vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 23a 2016 Reference Model Maximum Number Ve
Average M26 23a 2016 With Dev Maximum Number Veh
Average M47 23a 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
M5 J23 Southboud Off Slip (23a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 23a 2016 Reference Model Maximum Number Ve
Average M26 23a 2016 With Dev Maximum Number Veh
Average M47 23a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
M5 J23 Western Arm (23b)
No. of Vehicles (Max)
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
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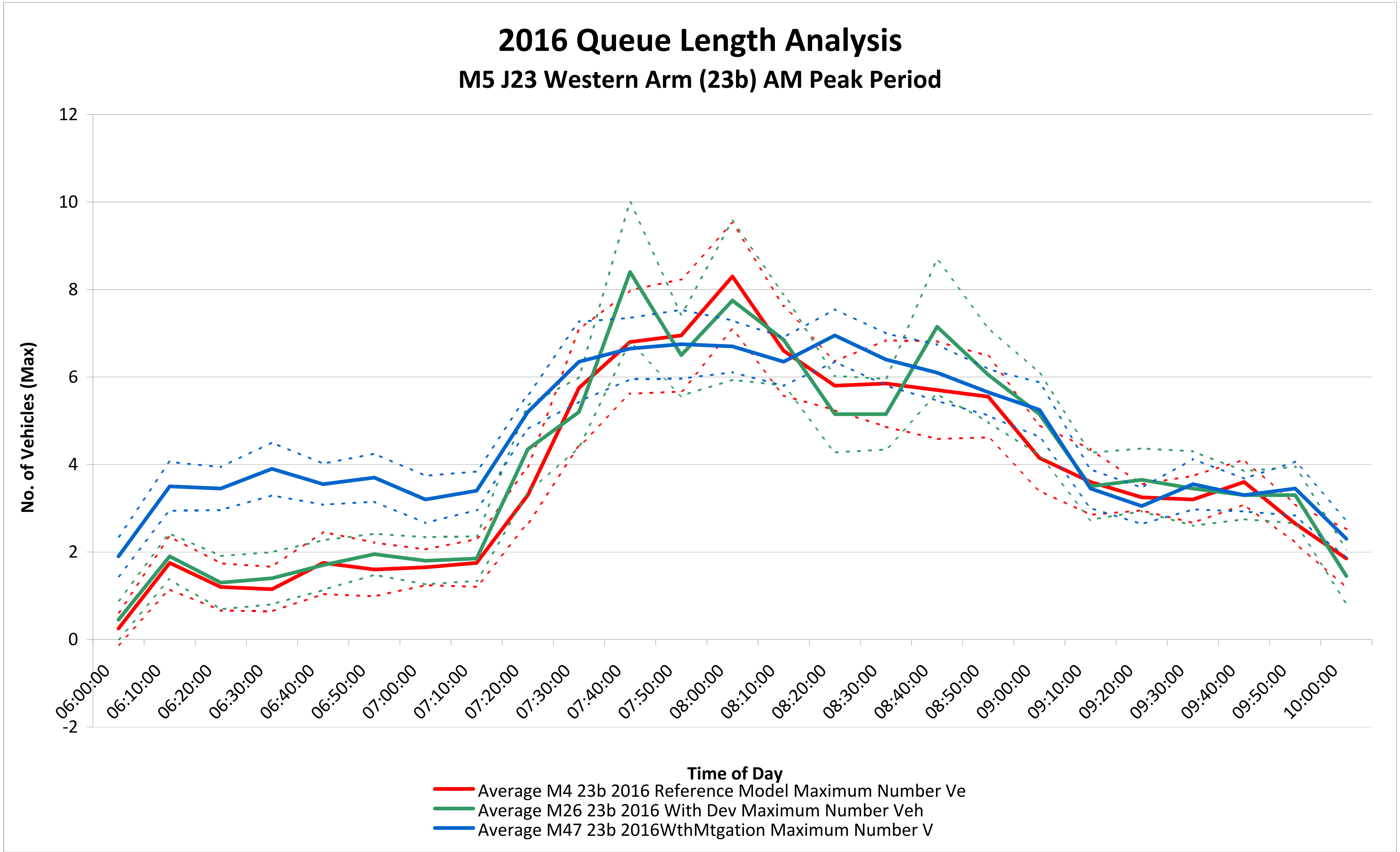
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 23b 2016 Reference Model Maximum Number Ve
Average M26 23b 2016 With Dev Maximum Number Veh
Average M47 23b 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
M5 J23 Western Arm (23b) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
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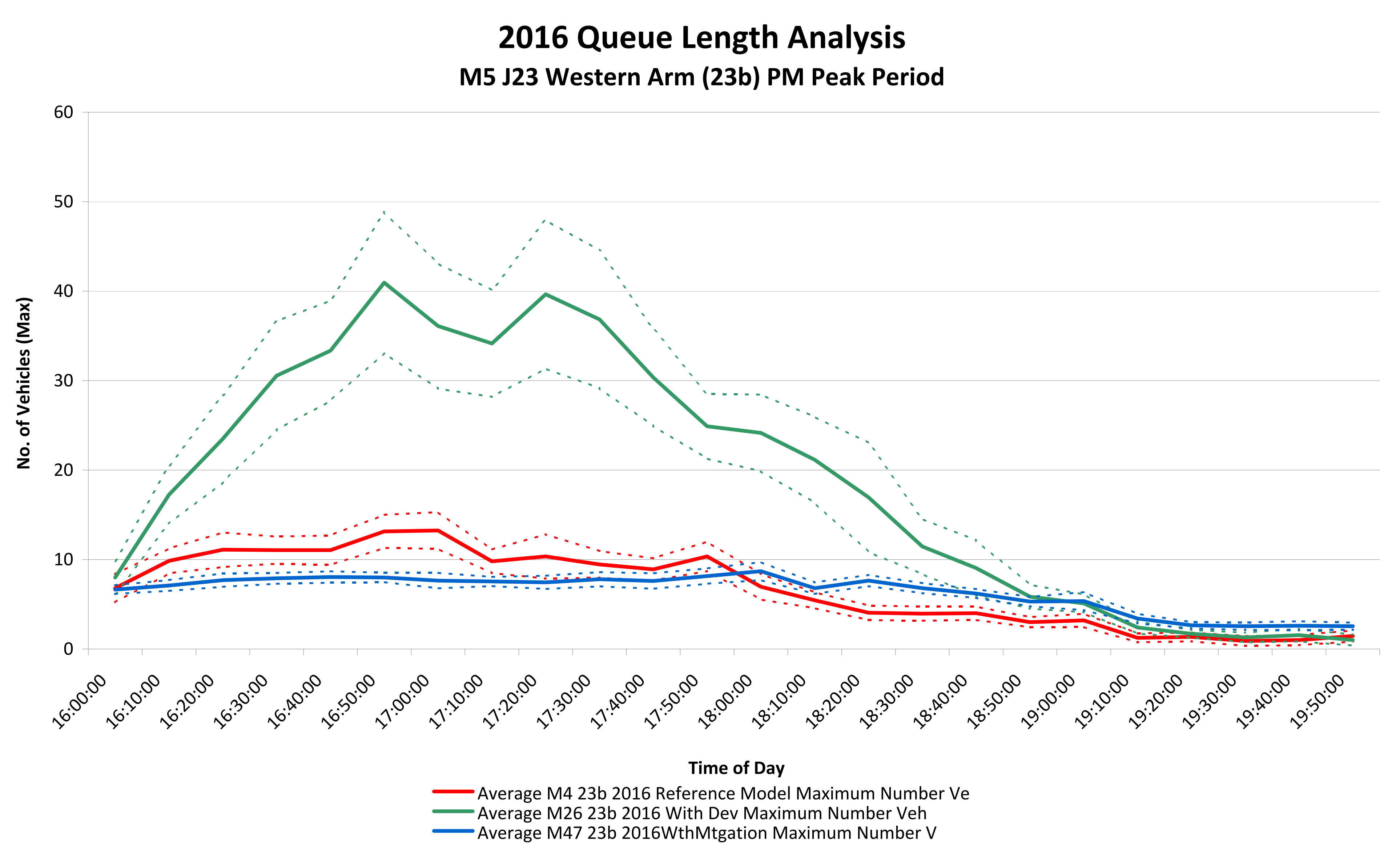
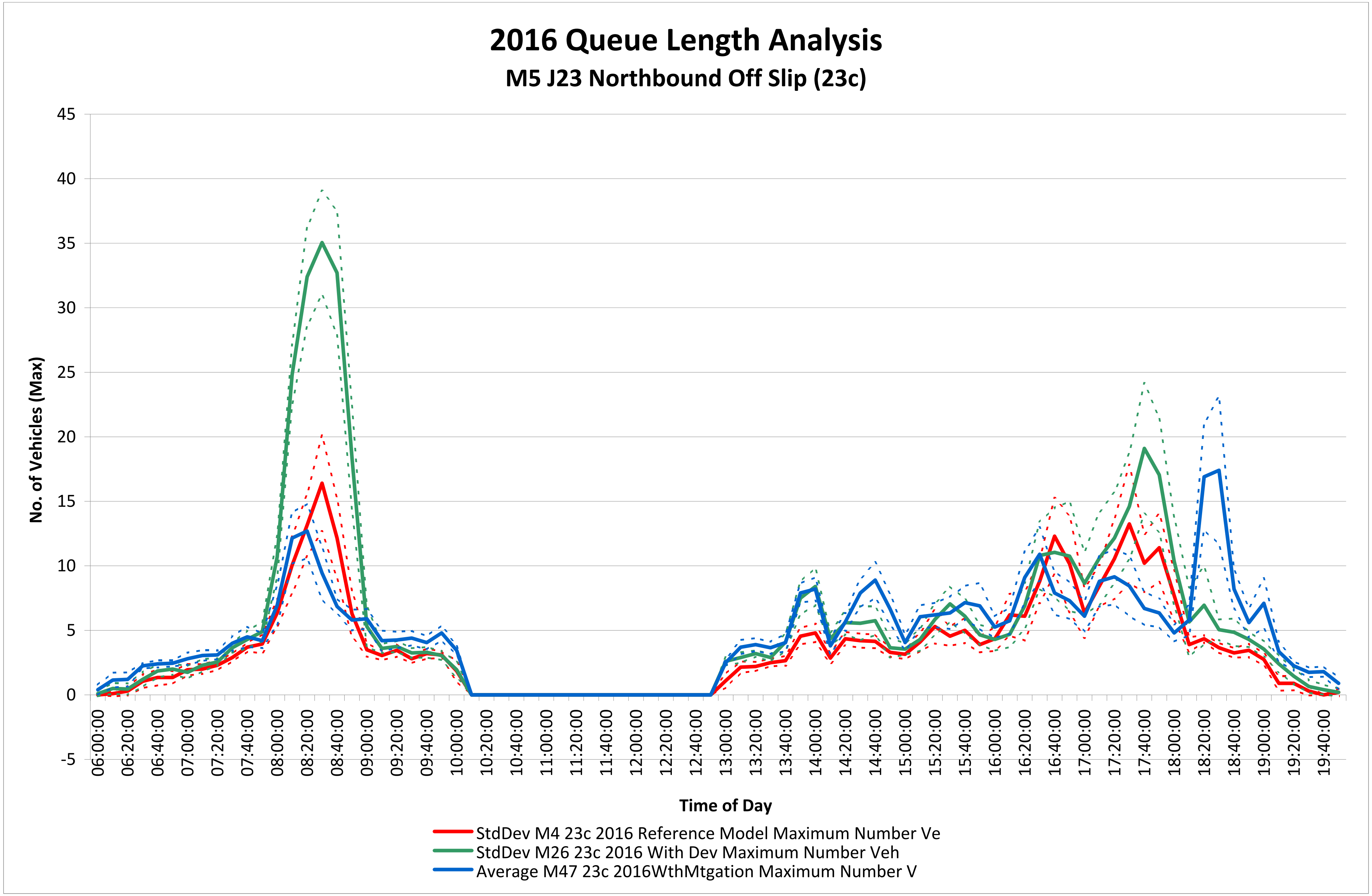
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 23b 2016 Reference Model Maximum Number Ve
Average M26 23b 2016 With Dev Maximum Number Veh
Average M47 23b 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
M5 J23 Western Arm (23b) PM Peak Period
No. of Vehicles (Max)
0
10
20
30
40
50
60
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 23b 2016 Reference Model Maximum Number Ve
Average M26 23b 2016 With Dev Maximum Number Veh
Average M47 23b 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
M5 J23 Northbound Off Slip (23c)
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
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14:40:00
15:00:00
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15:40:00
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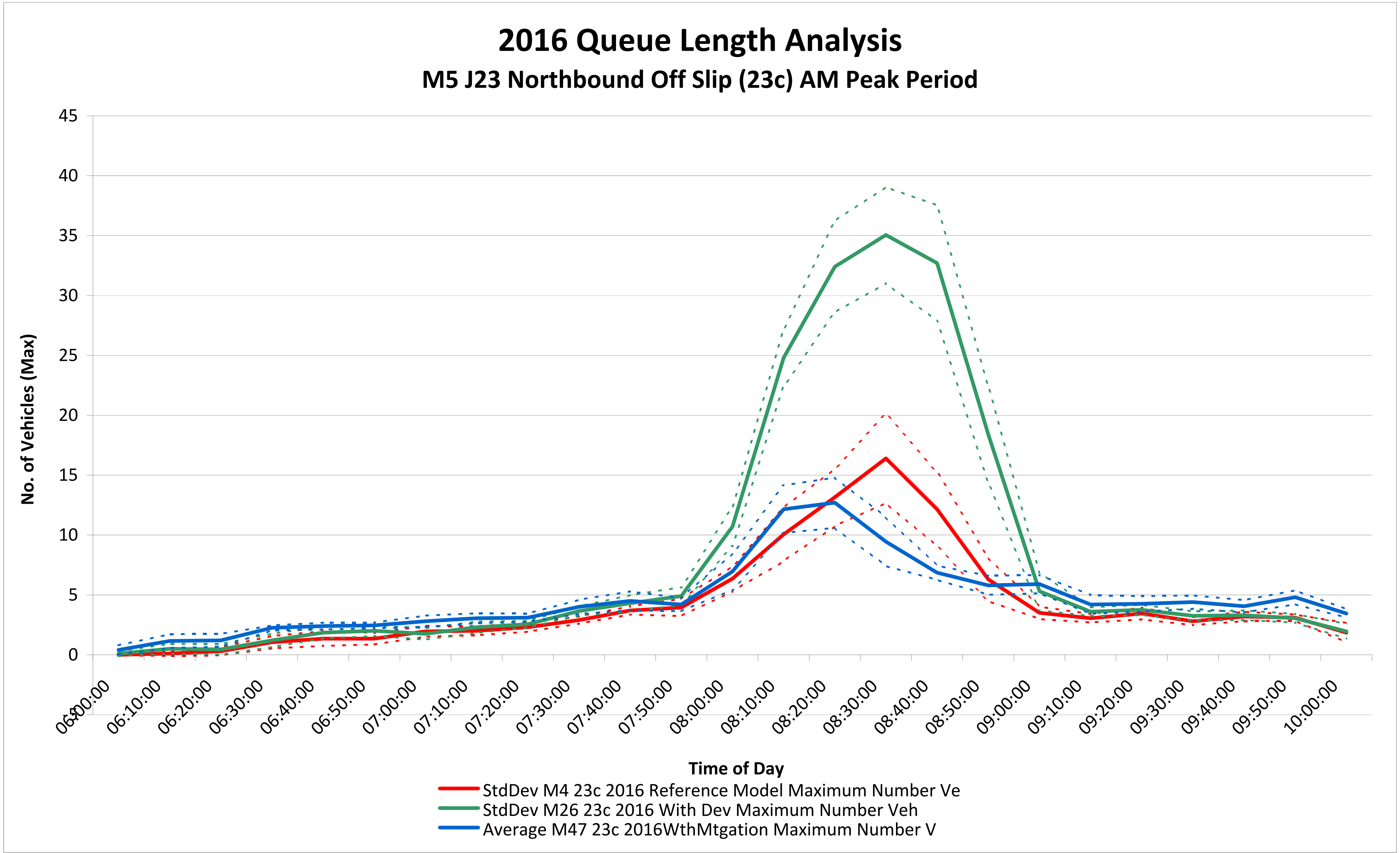
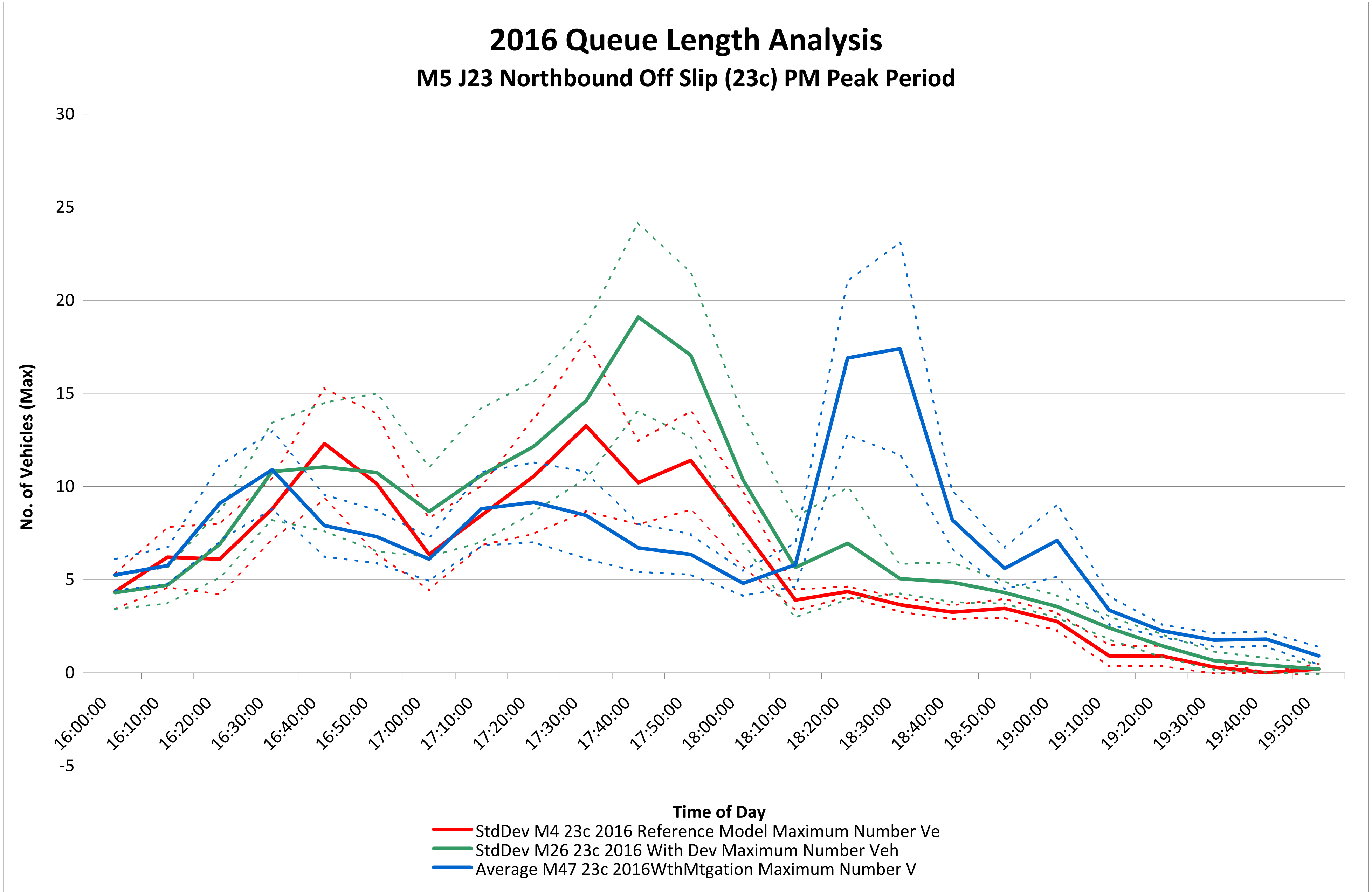
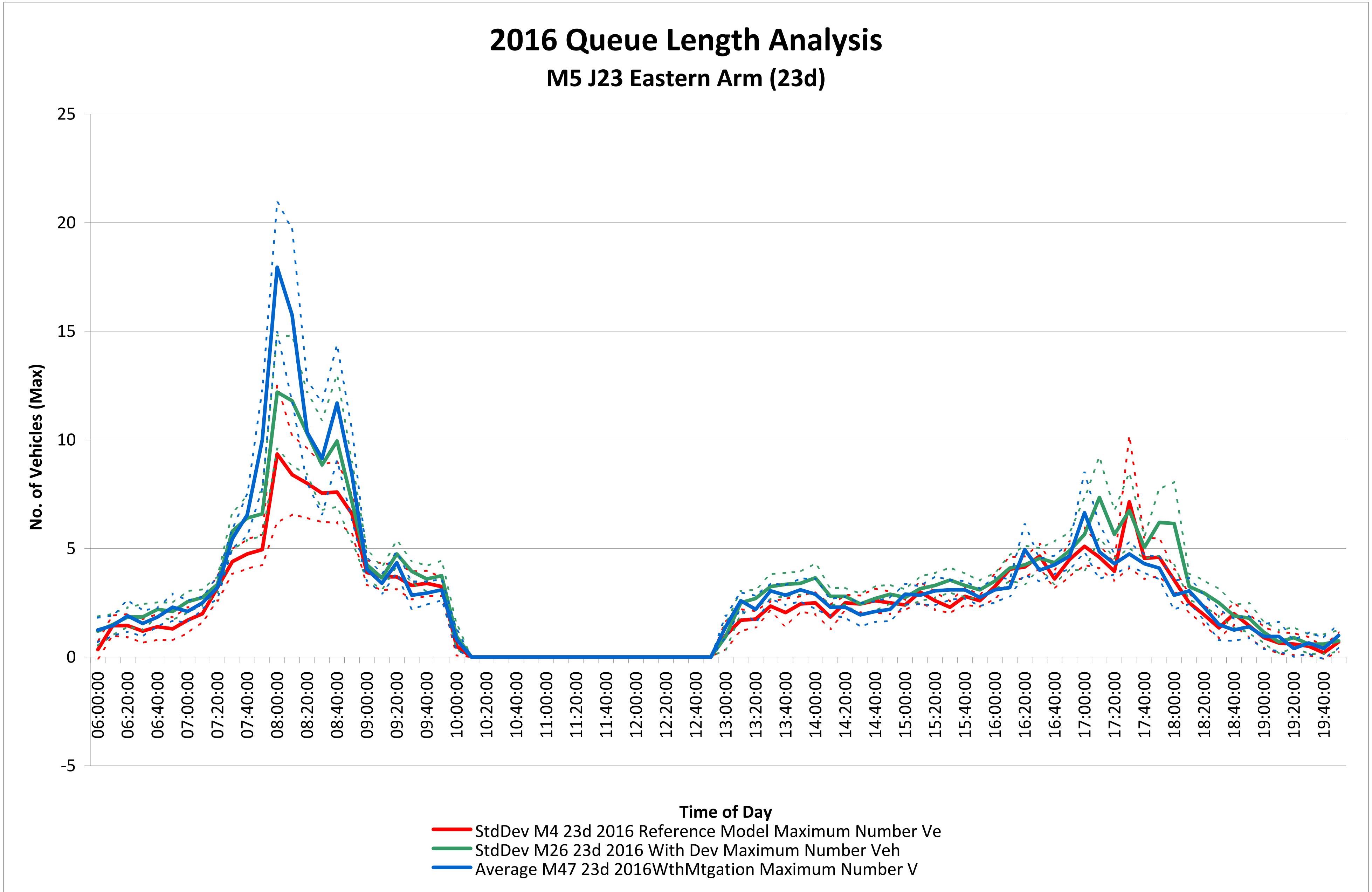
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 23c 2016 Reference Model Maximum Number Ve
StdDev M26 23c 2016 With Dev Maximum Number Veh
Average M47 23c 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
M5 J23 Northbound Off Slip (23c) AM Peak Period
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 23c 2016 Reference Model Maximum Number Ve
StdDev M26 23c 2016 With Dev Maximum Number Veh
Average M47 23c 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
M5 J23 Northbound Off Slip (23c) PM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 23c 2016 Reference Model Maximum Number Ve
StdDev M26 23c 2016 With Dev Maximum Number Veh
Average M47 23c 2016WthMtgation Maximum Number V



2016 Queue Length Analysis
M5 J23 Eastern Arm (23d)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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10:20:00
10:40:00
11:00:00
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11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
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13:40:00
14:00:00
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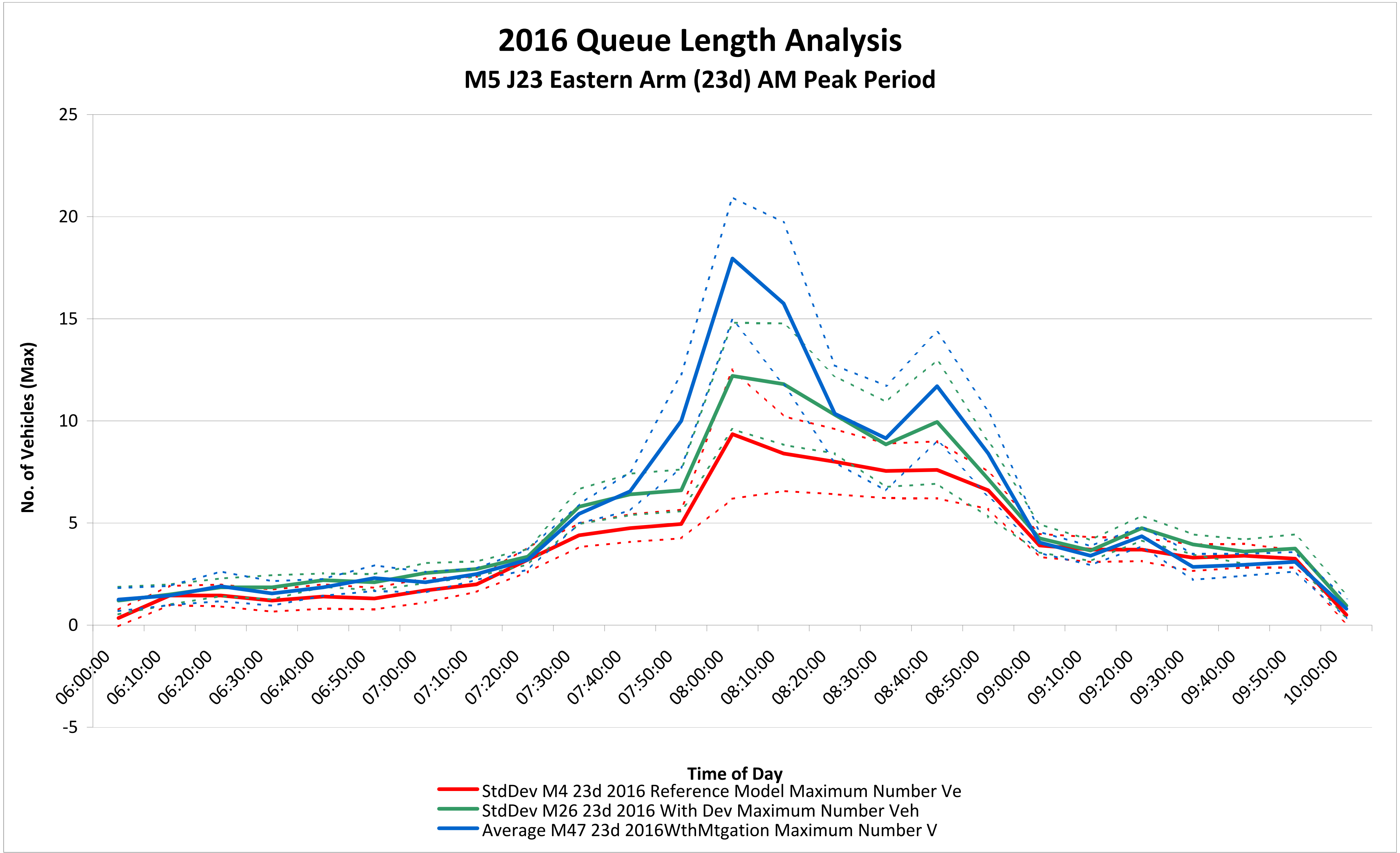
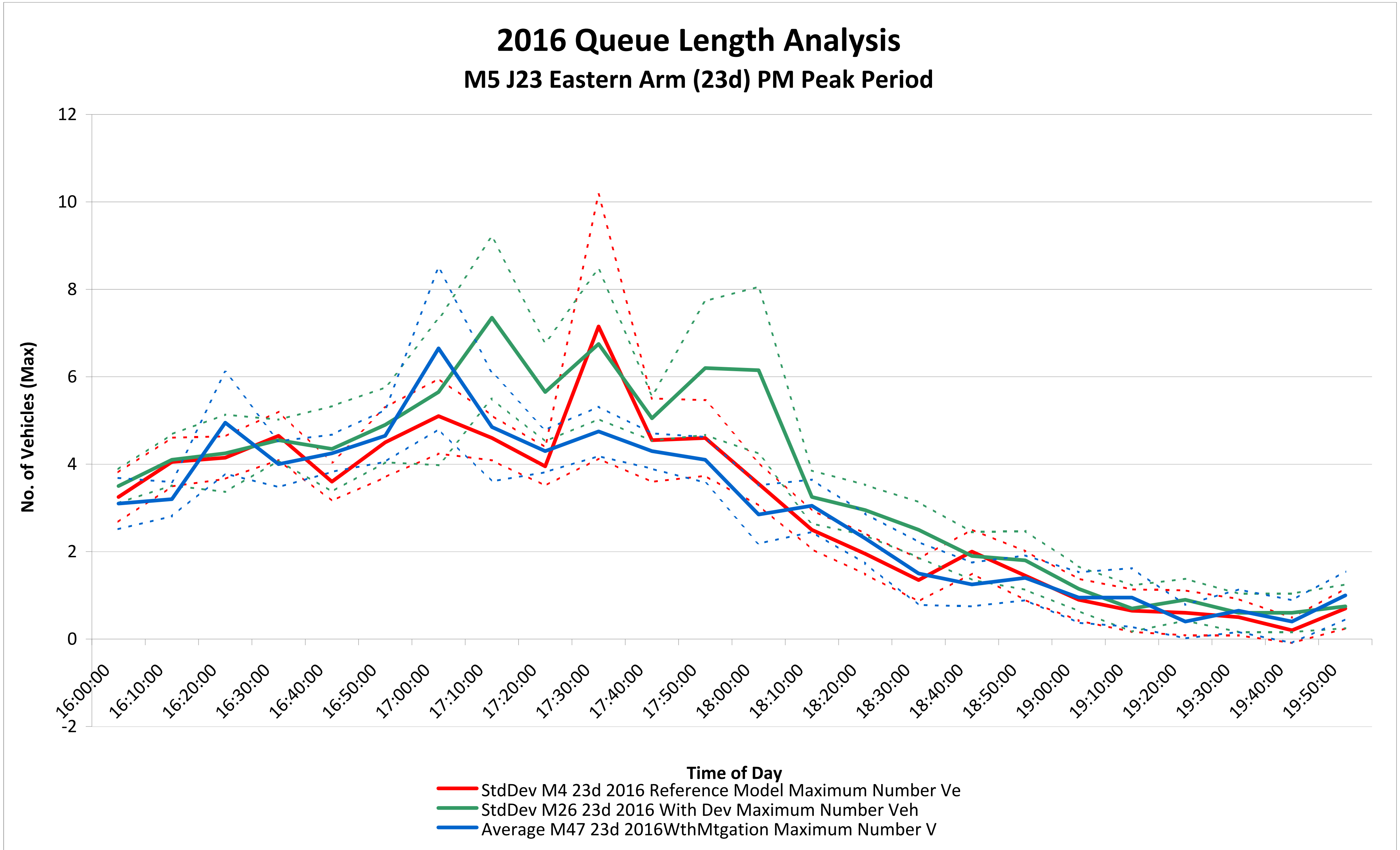
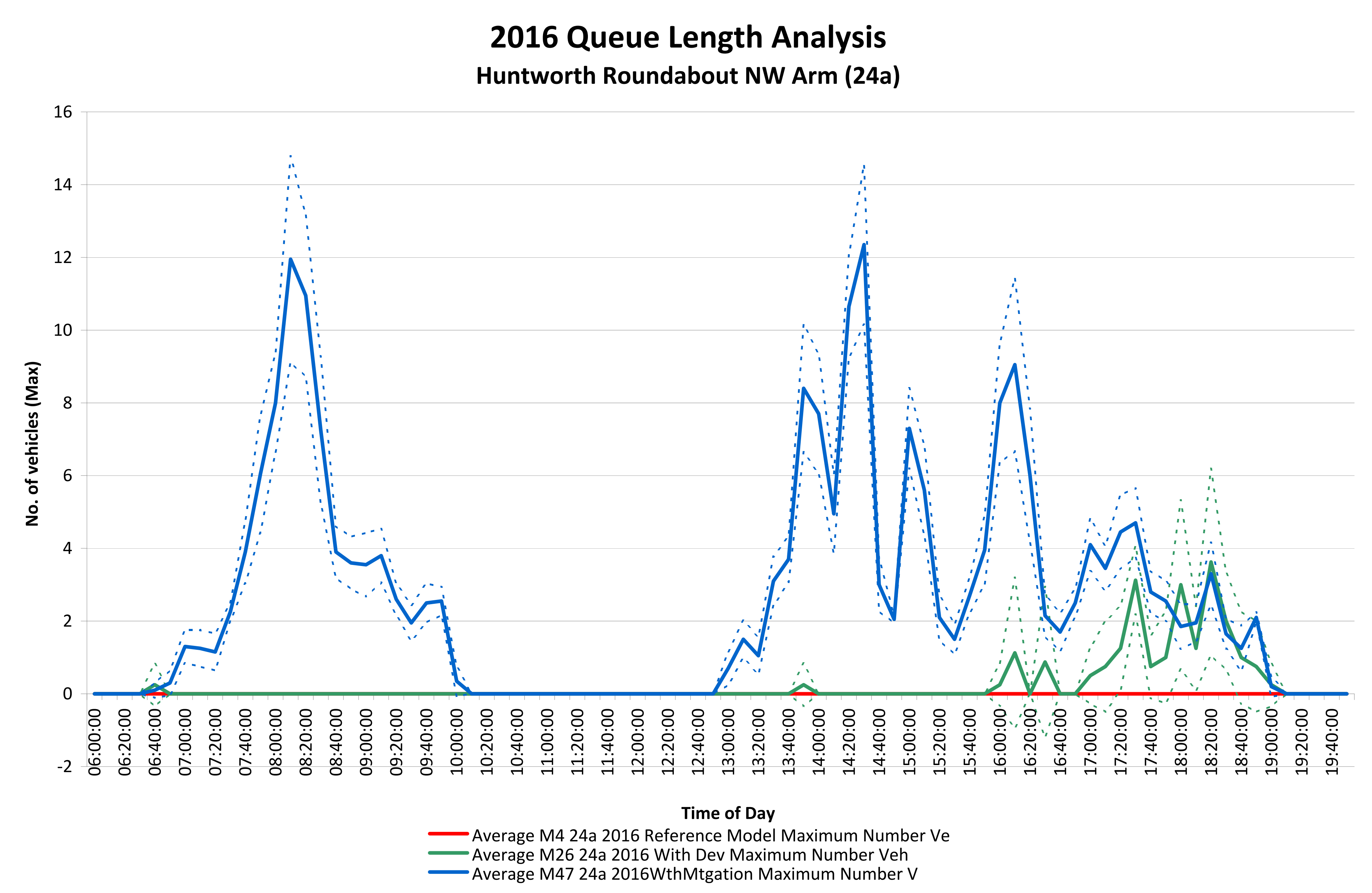
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 23d 2016 Reference Model Maximum Number Ve
StdDev M26 23d 2016 With Dev Maximum Number Veh
Average M47 23d 2016WthMtgation Maximum Number V

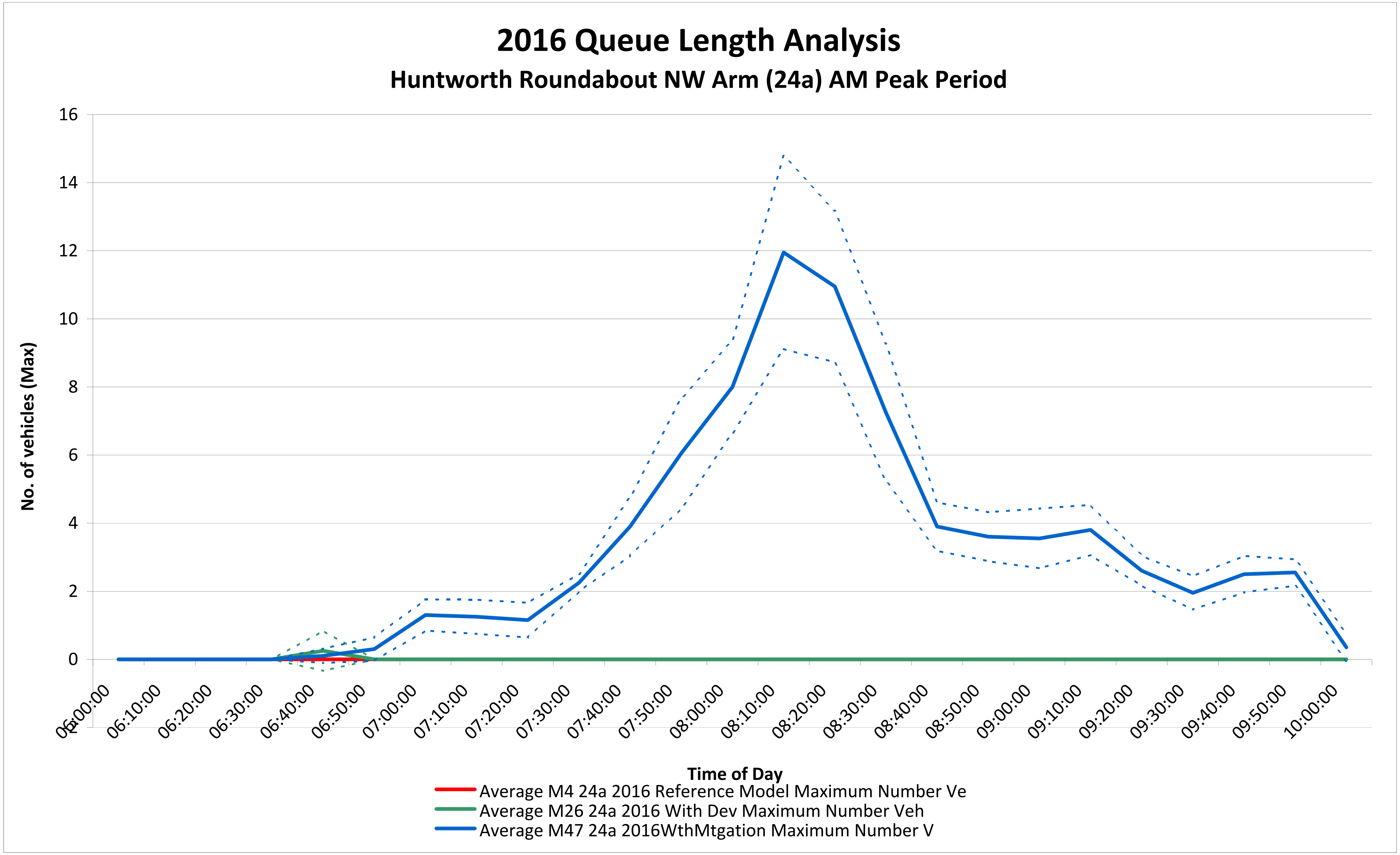


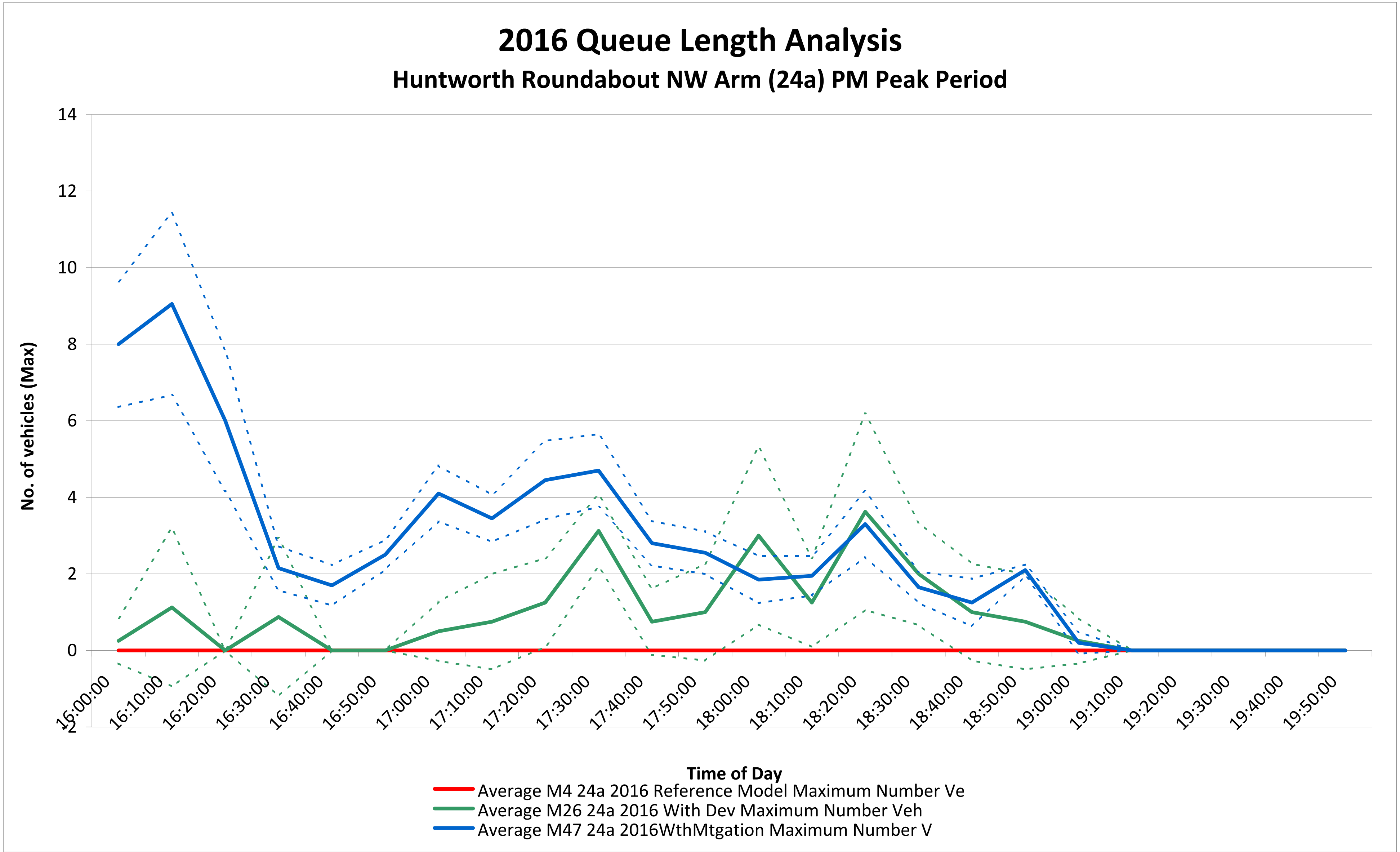
2016 Queue Length Analysis
M5 J23 Eastern Arm (23d) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 23d 2016 Reference Model Maximum Number Ve
StdDev M26 23d 2016 With Dev Maximum Number Veh
Average M47 23d 2016WthMtgation Maximum Number V



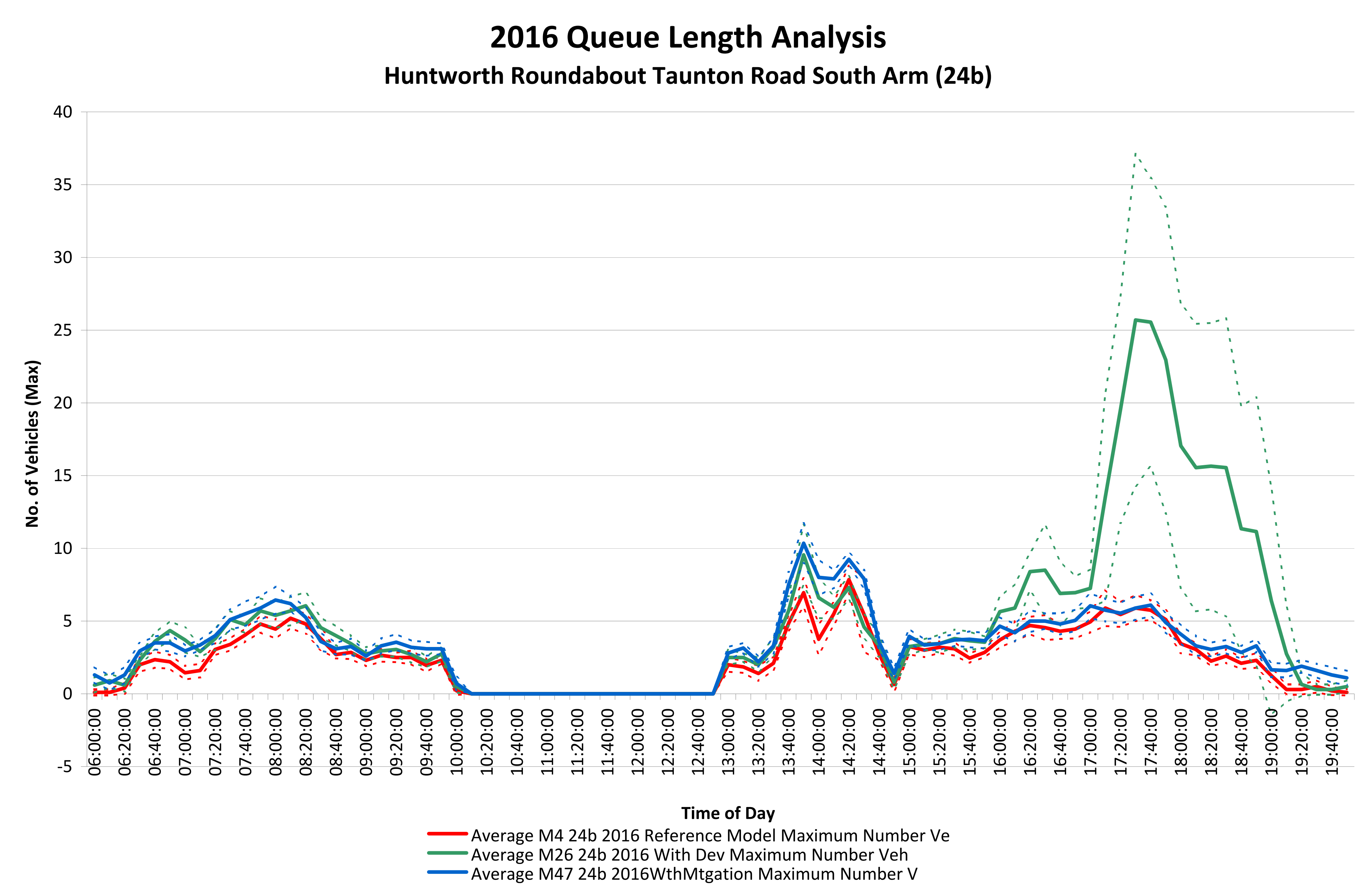
2016 Queue Length Analysis
M5 J23 Eastern Arm (23d) PM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 23d 2016 Reference Model Maximum Number Ve
StdDev M26 23d 2016 With Dev Maximum Number Veh
Average M47 23d 2016WthMtgation Maximum Number V

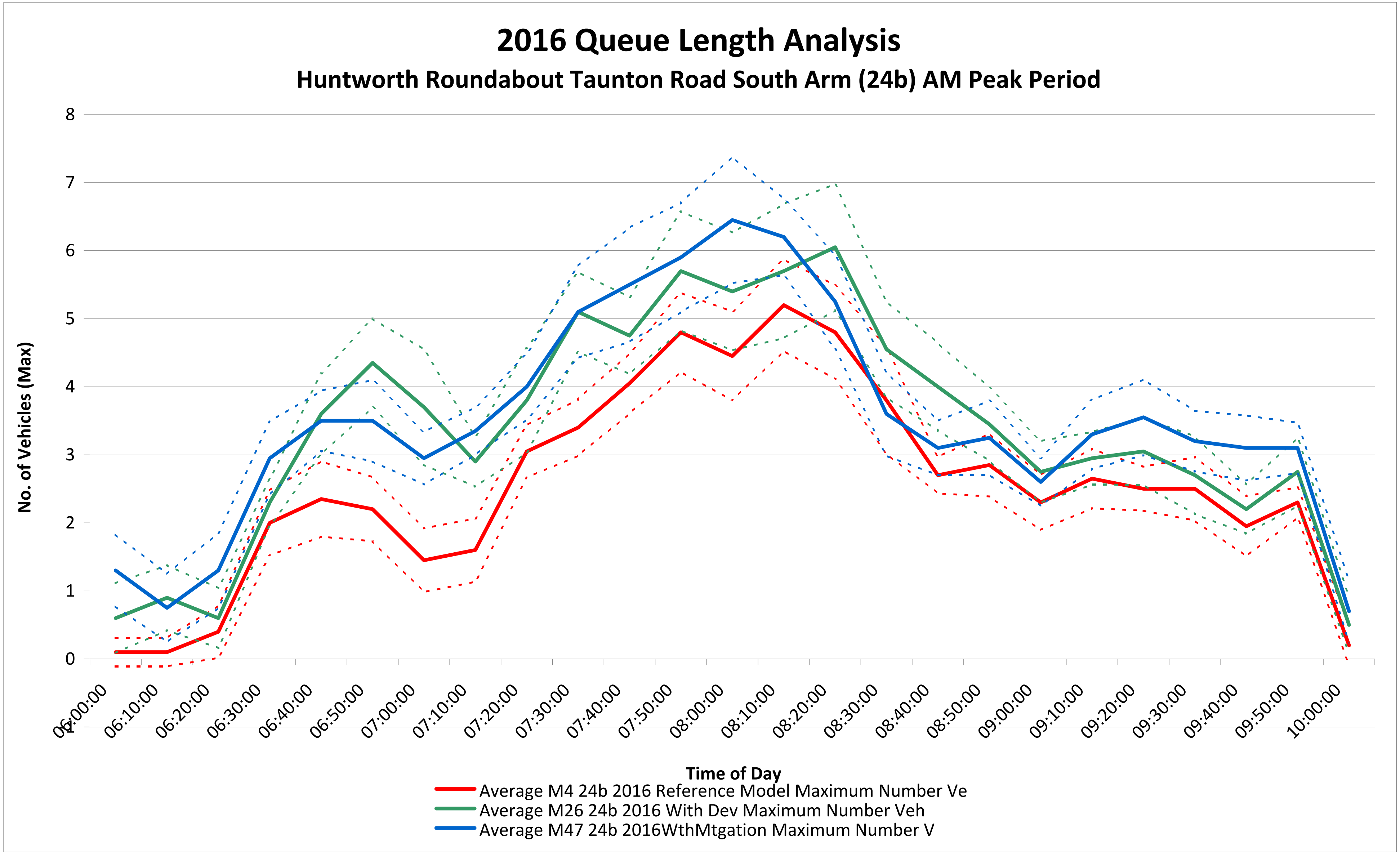

2016 Queue Length Analysis
Huntworth Roundabout NW Arm (24a)
No. of vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 24a 2016 Reference Model Maximum Number Ve
Average M26 24a 2016 With Dev Maximum Number Veh
Average M47 24a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
Huntworth Roundabout NW Arm (24a) AM Peak Period
No. of vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24a 2016 Reference Model Maximum Number Ve
Average M26 24a 2016 With Dev Maximum Number Veh
Average M47 24a 2016WthMtgation Maximum Number V

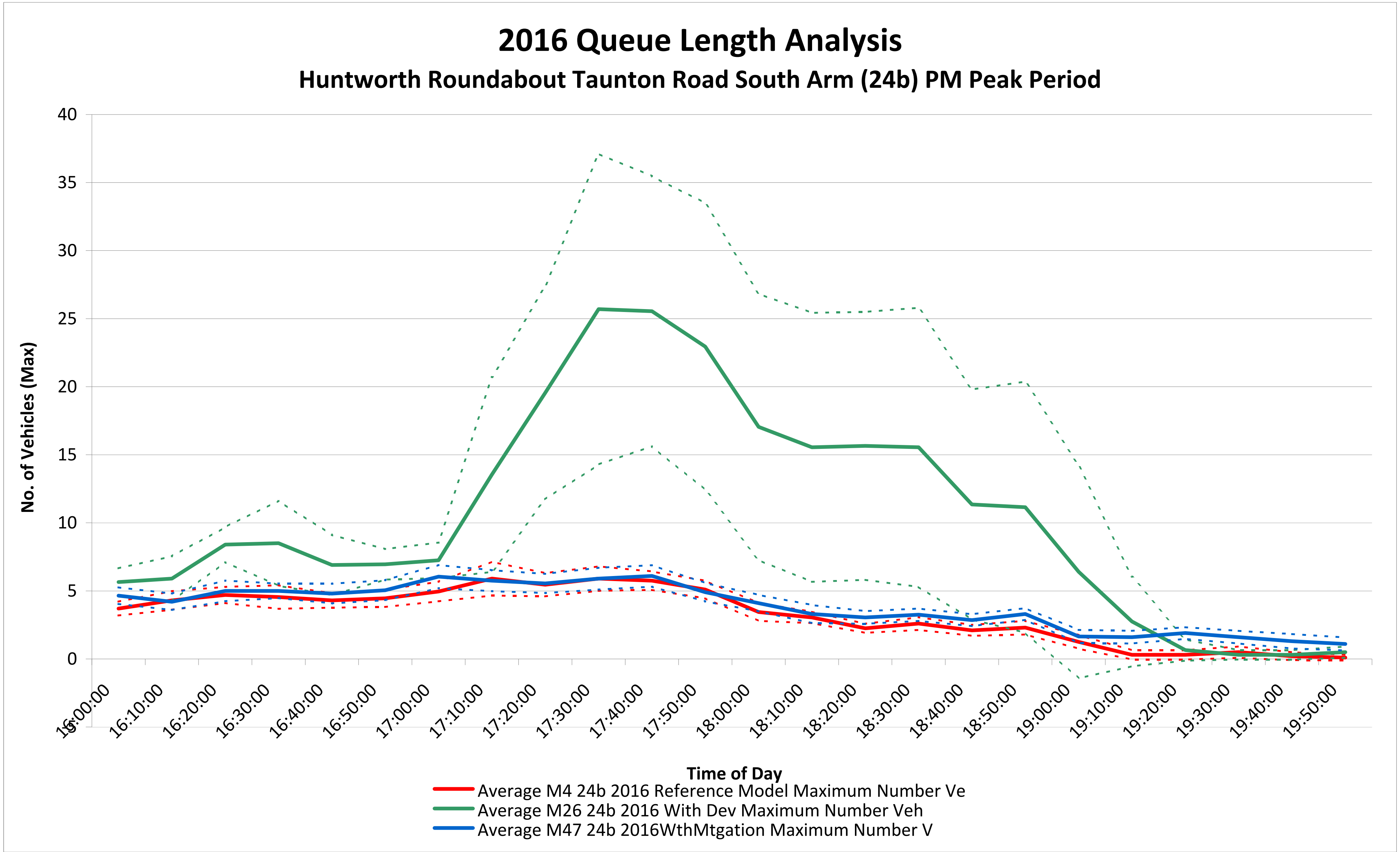


2016 Queue Length Analysis
Huntworth Roundabout NW Arm (24a) PM Peak Period
No. of vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 24a 2016 Reference Model Maximum Number Ve
Average M26 24a 2016 With Dev Maximum Number Veh
Average M47 24a 2016WthMtgation Maximum Number V

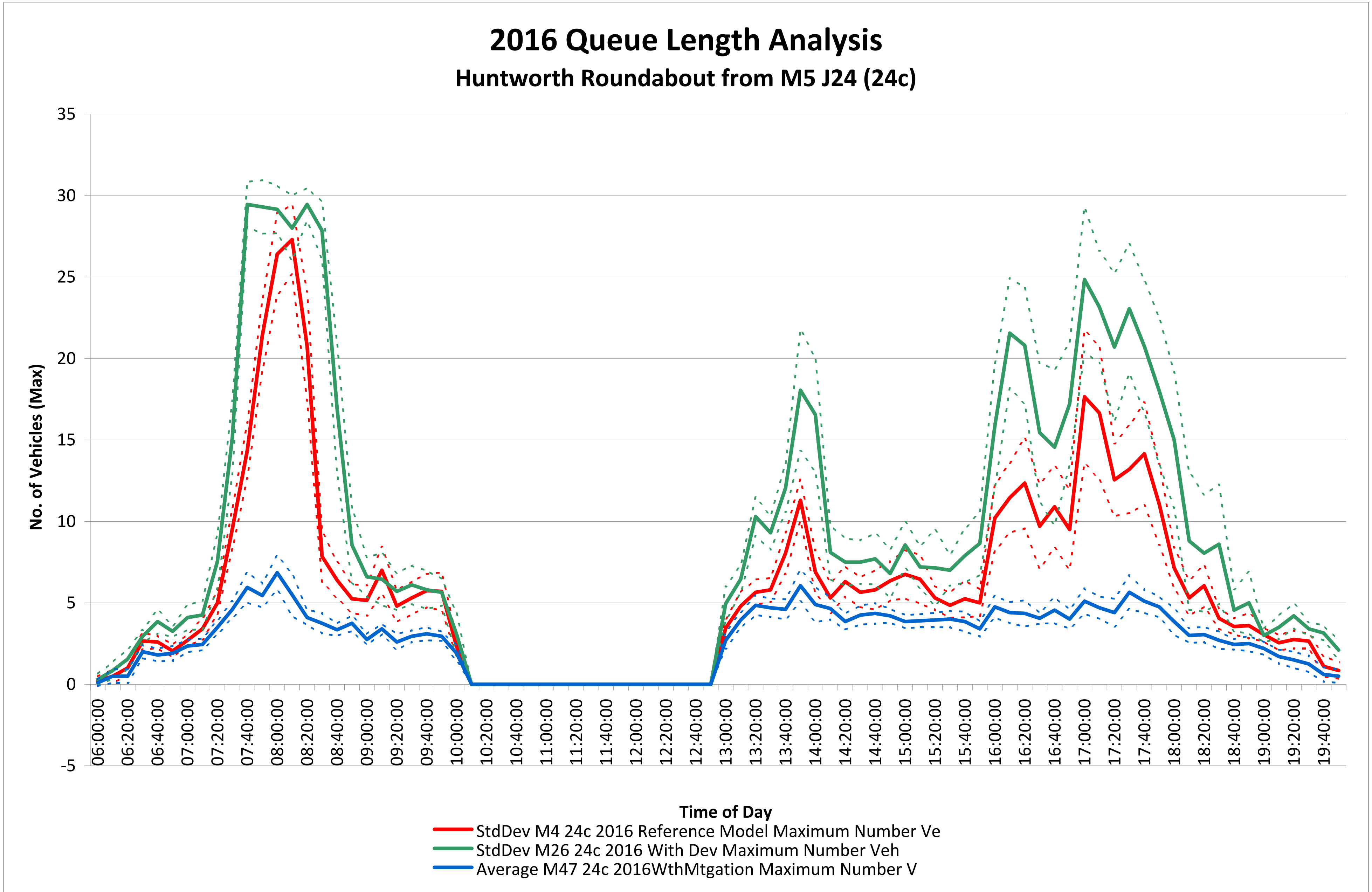

2016 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 24b 2016 Reference Model Maximum Number Ve
Average M26 24b 2016 With Dev Maximum Number Veh
Average M47 24b 2016WthMtgation Maximum Number V



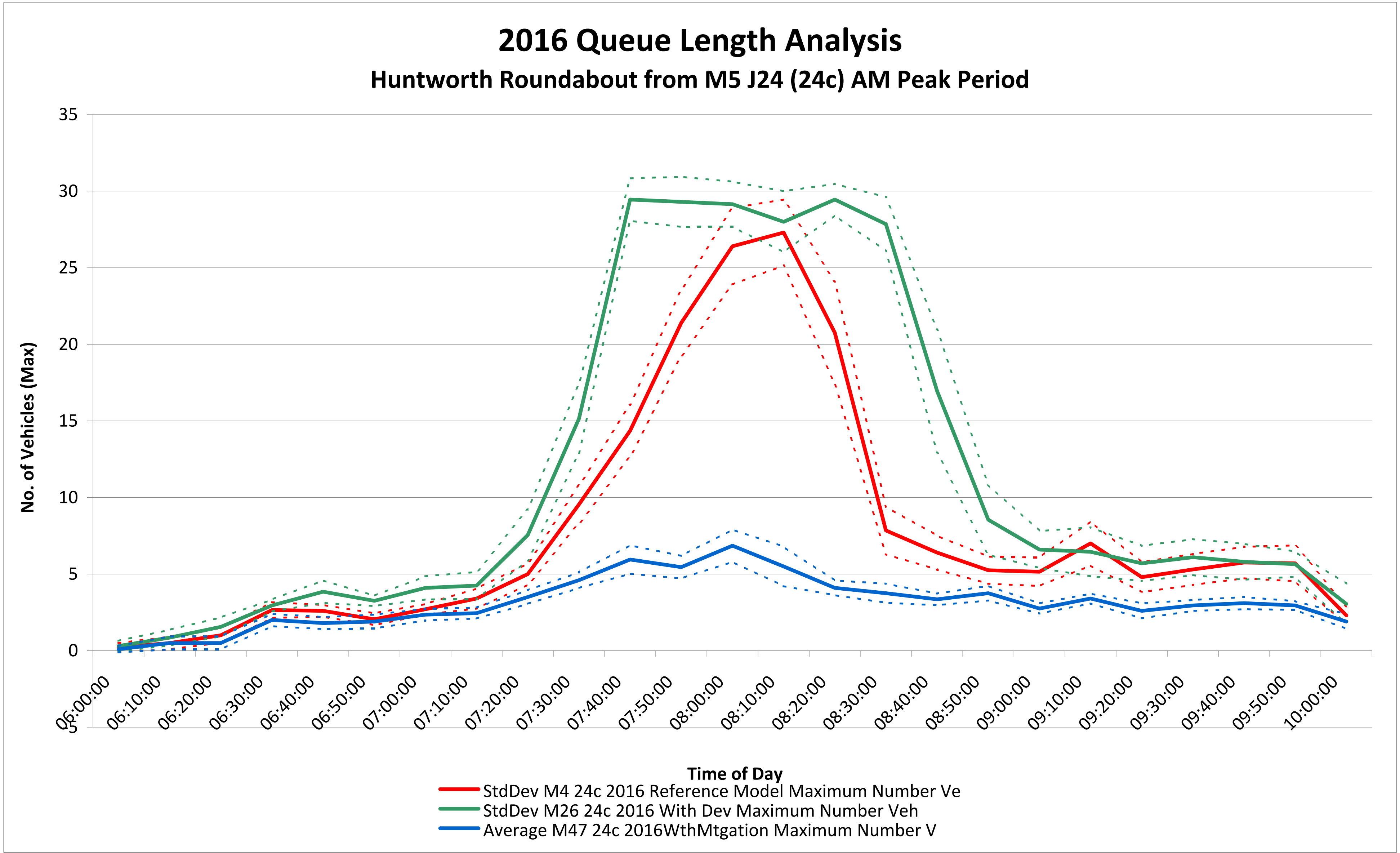
2016 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24b 2016 Reference Model Maximum Number Ve
Average M26 24b 2016 With Dev Maximum Number Veh
Average M47 24b 2016WthMtgation Maximum Number V



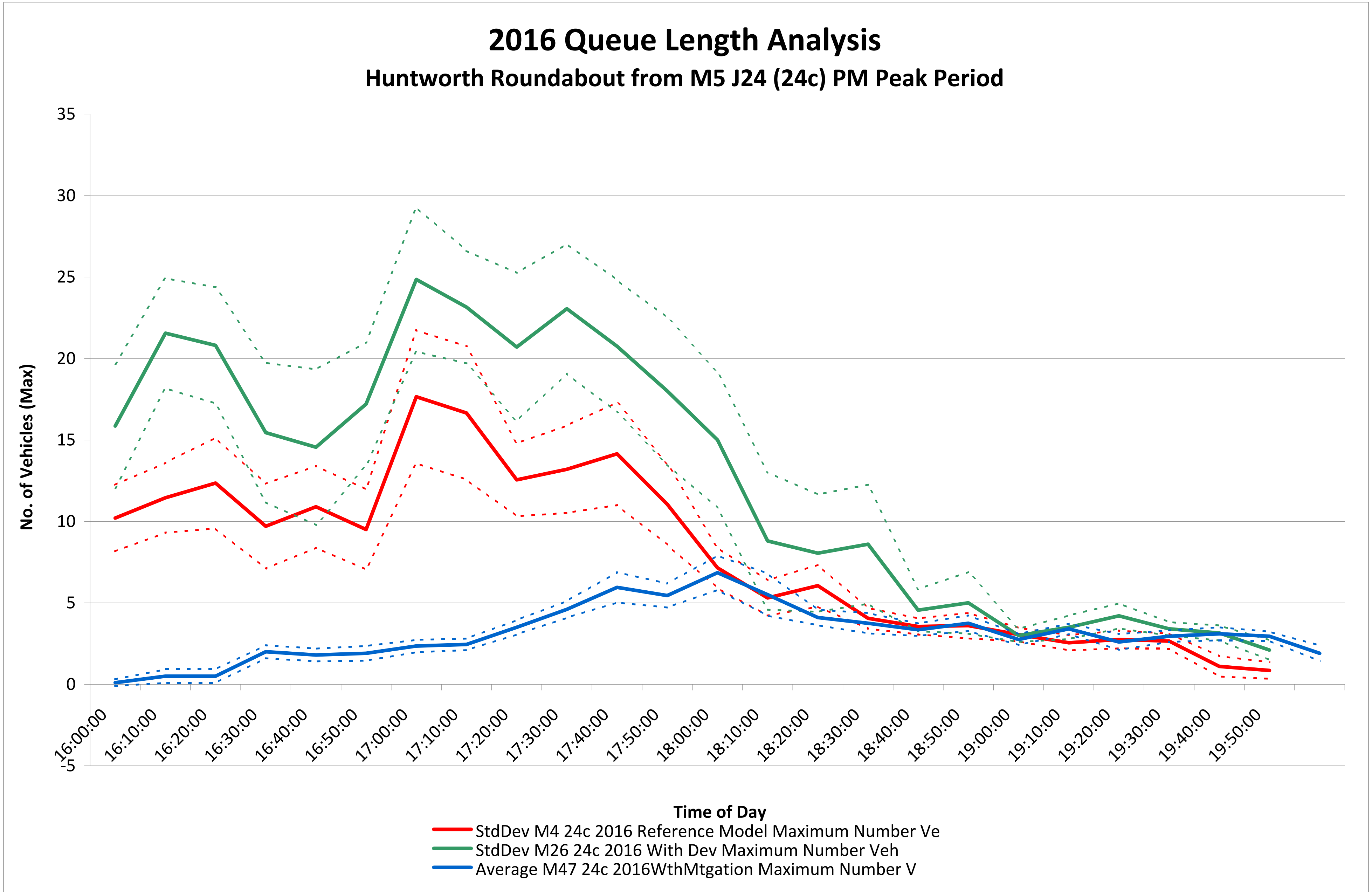
2016 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b) PM Peak Period
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 24b 2016 Reference Model Maximum Number Ve
Average M26 24b 2016 With Dev Maximum Number Veh
Average M47 24b 2016WthMtgation Maximum Number V

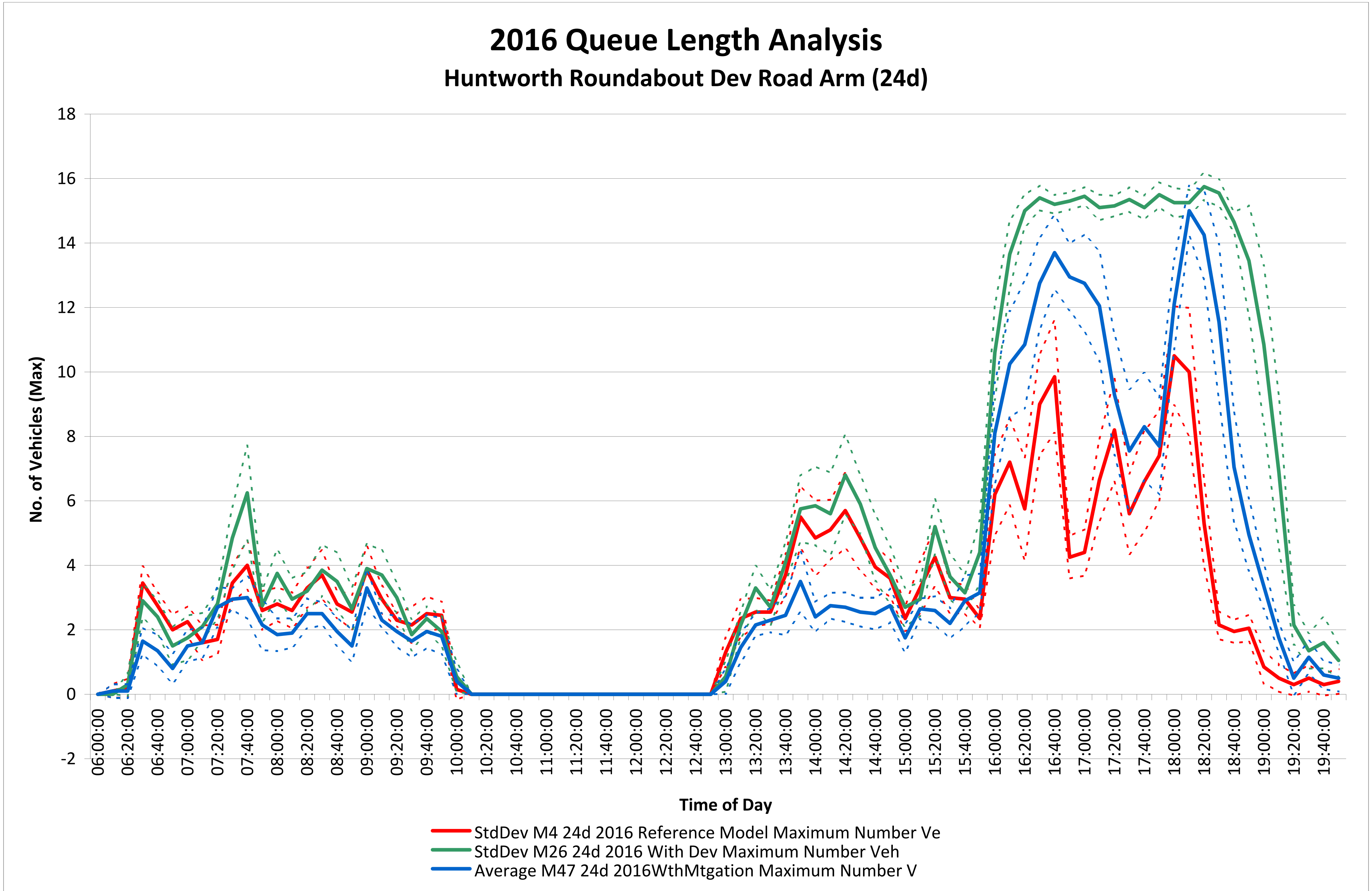


2016 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 24c 2016 Reference Model Maximum Number Ve
StdDev M26 24c 2016 With Dev Maximum Number Veh
Average M47 24c 2016WthMtgation Maximum Number V

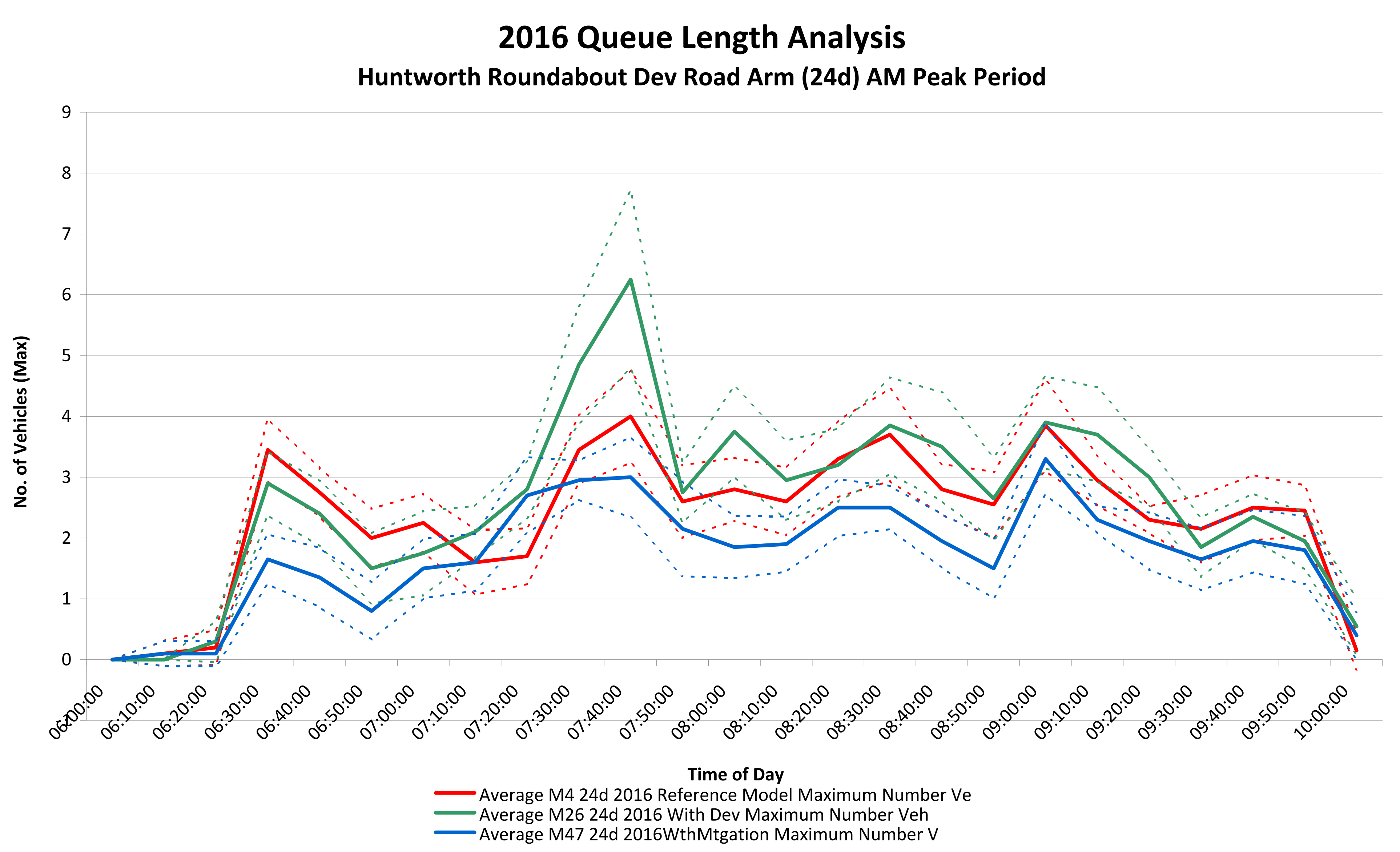


2016 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c) AM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 24c 2016 Reference Model Maximum Number Ve
StdDev M26 24c 2016 With Dev Maximum Number Veh
Average M47 24c 2016WthMtgation Maximum Number V

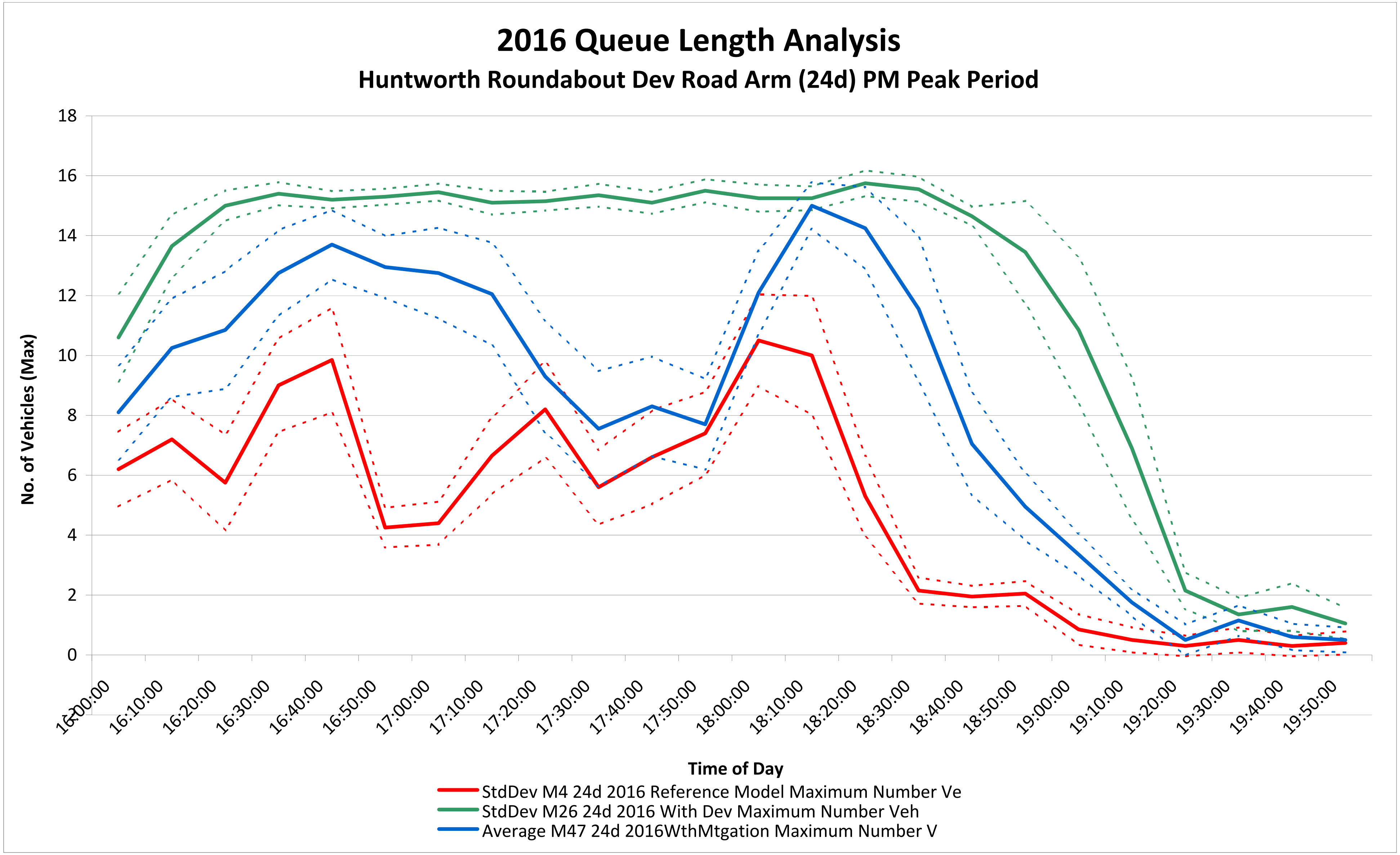

2016 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 24c 2016 Reference Model Maximum Number Ve
StdDev M26 24c 2016 With Dev Maximum Number Veh
Average M47 24c 2016WthMtgation Maximum Number V

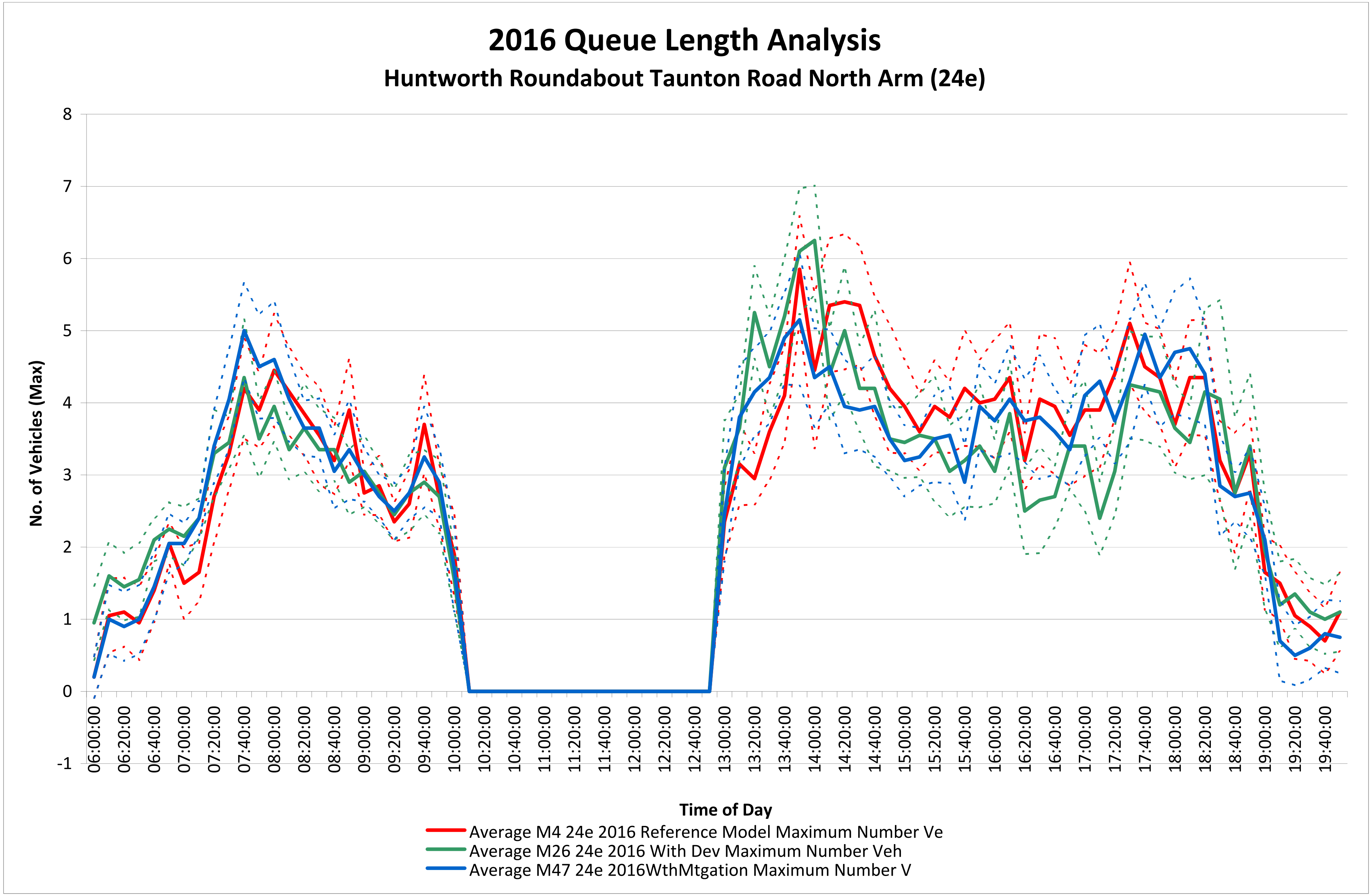


2016 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d)
18
16
14
12
10
8
6
4
2
0
-2
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 24d 2016 Reference Model Maximum Number Ve
StdDev M26 24d 2016 With Dev Maximum Number Veh
Average M47 24d 2016WthMtgation Maximum Number V

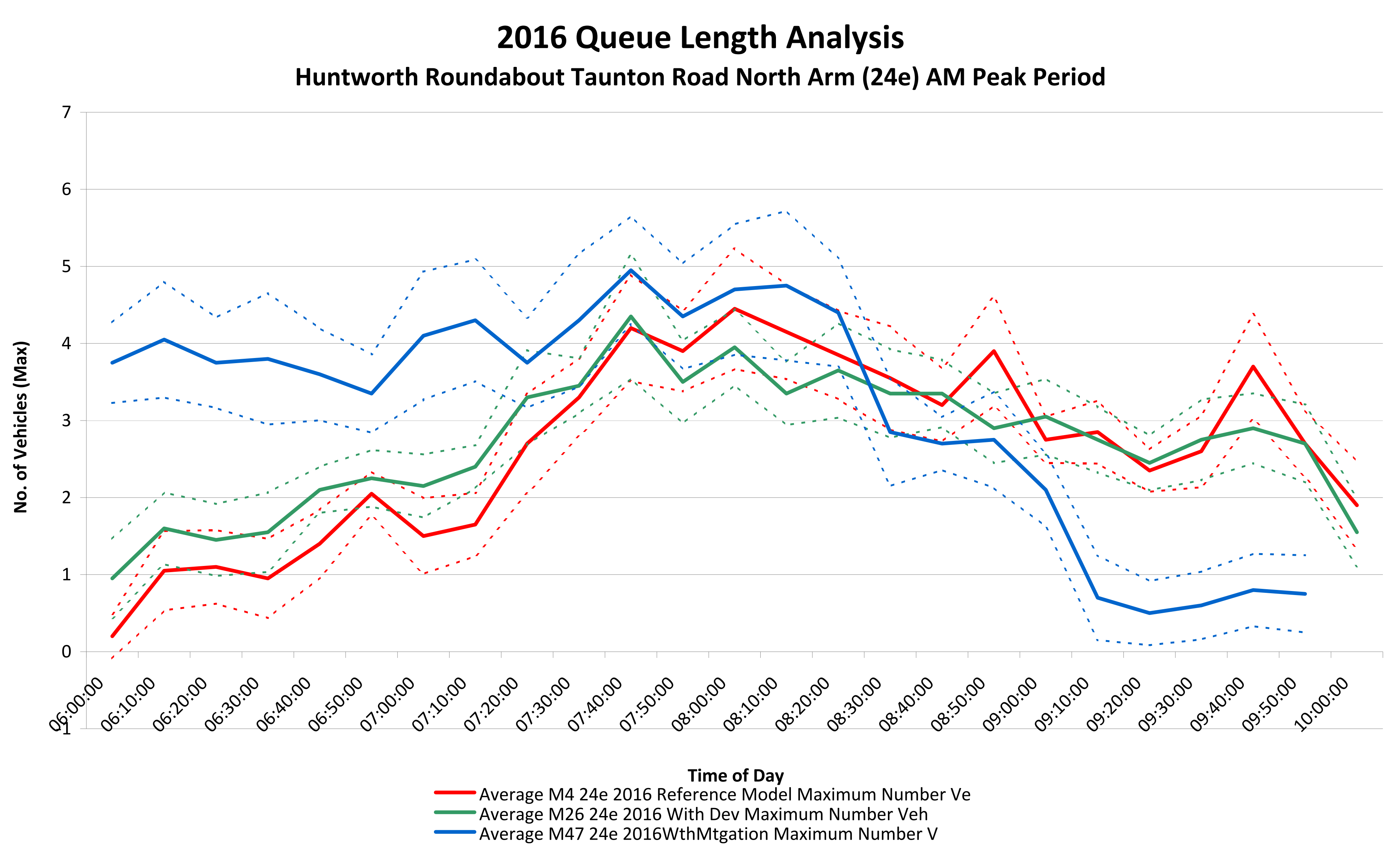


2016 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24d 2016 Reference Model Maximum Number Ve
Average M26 24d 2016 With Dev Maximum Number Veh
Average M47 24d 2016WthMtgation Maximum Number V

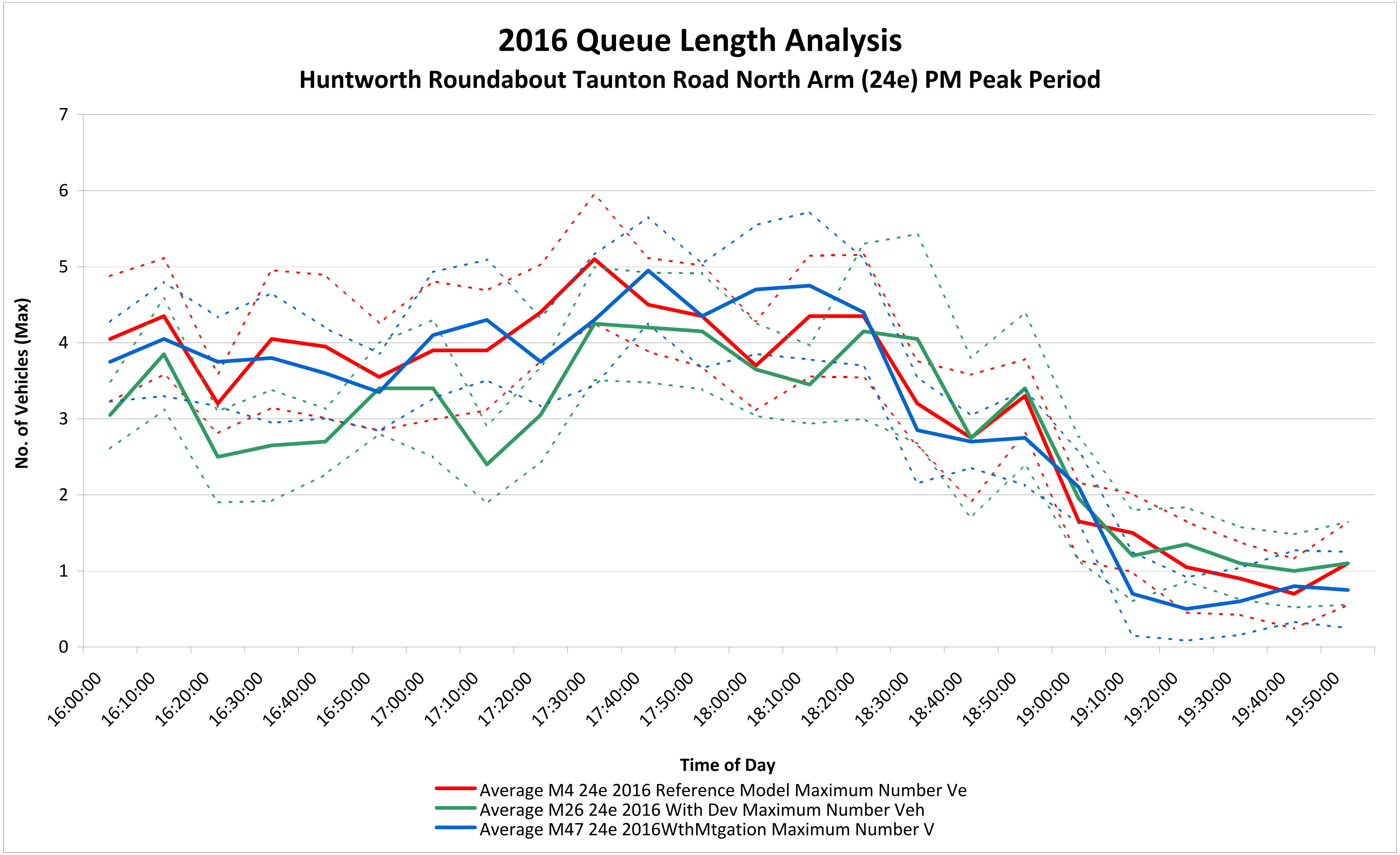

2016 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d) PM Peak Period
18
16
14
12
10
8
6
4
2
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 24d 2016 Reference Model Maximum Number Ve
StdDev M26 24d 2016 With Dev Maximum Number Veh
Average M47 24d 2016WthMtgation Maximum Number V



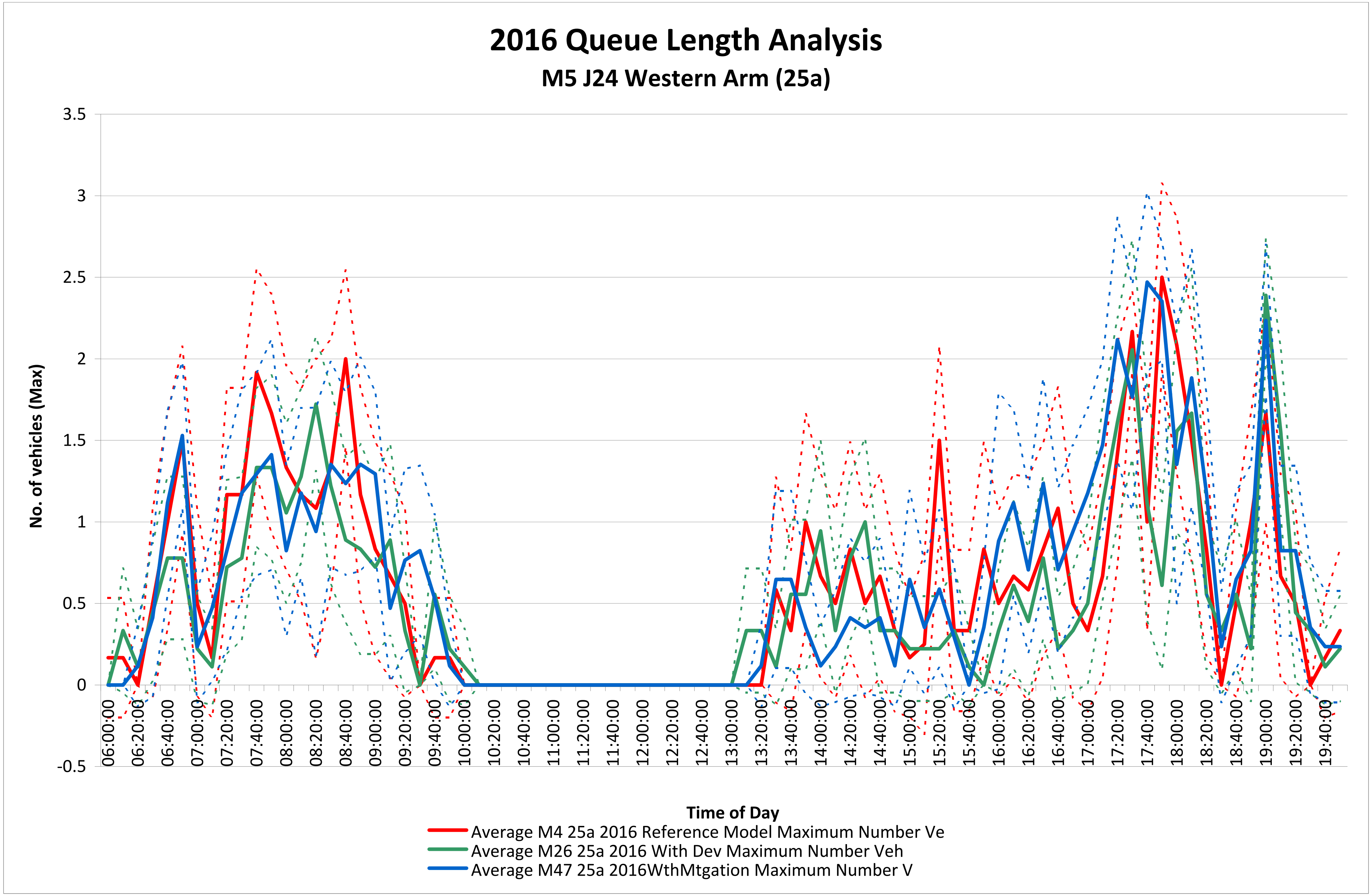
2016 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e)
No. of Vehicles (Max)
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 24e 2016 Reference Model Maximum Number Ve
Average M26 24e 2016 With Dev Maximum Number Veh
Average M47 24e 2016WthMtgation Maximum Number V



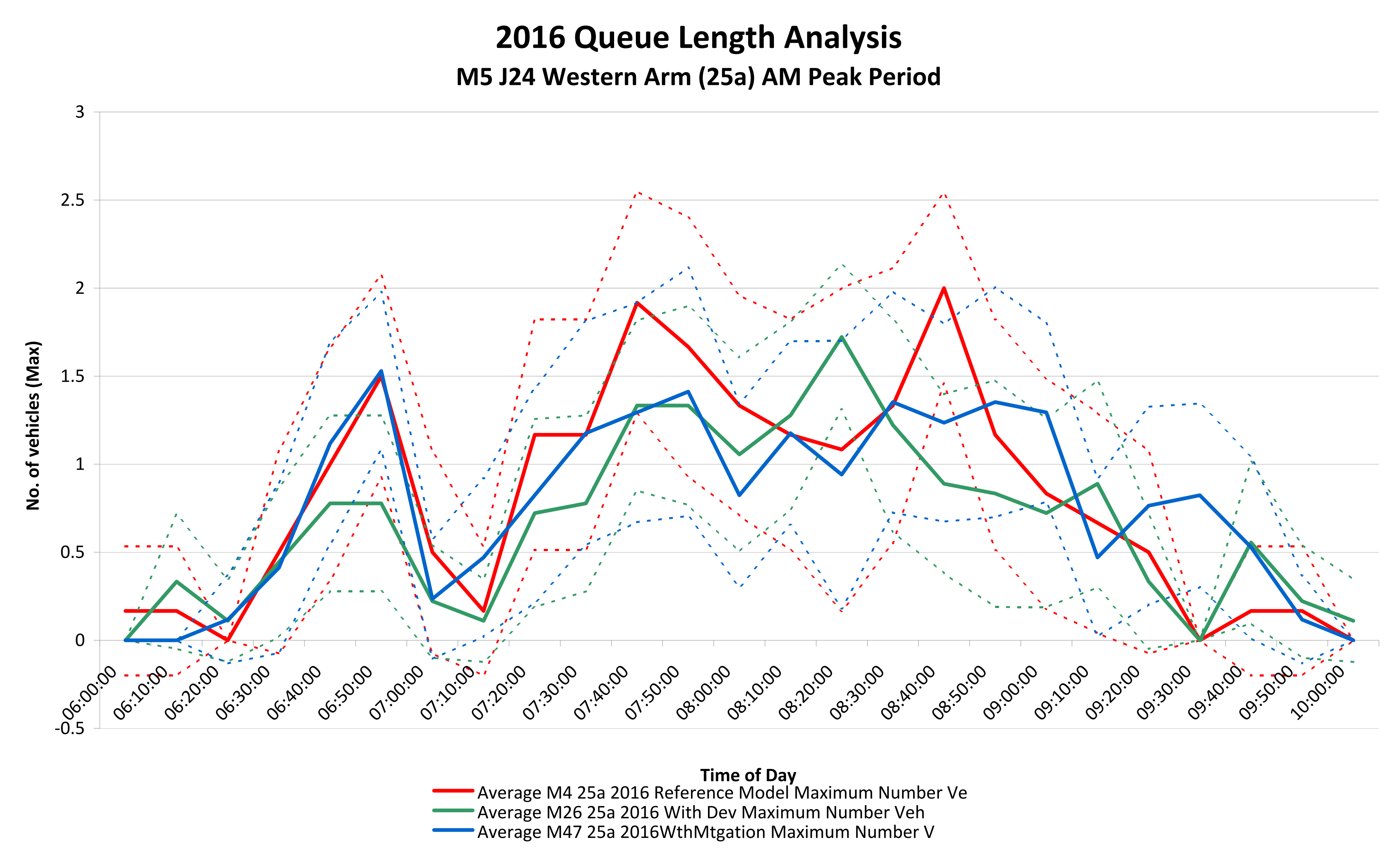
2016 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e) AM Peak Period
No. of Vehicles (Max)
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24e 2016 Reference Model Maximum Number Ve
Average M26 24e 2016 With Dev Maximum Number Veh
Average M47 24e 2016WthMtgation Maximum Number V

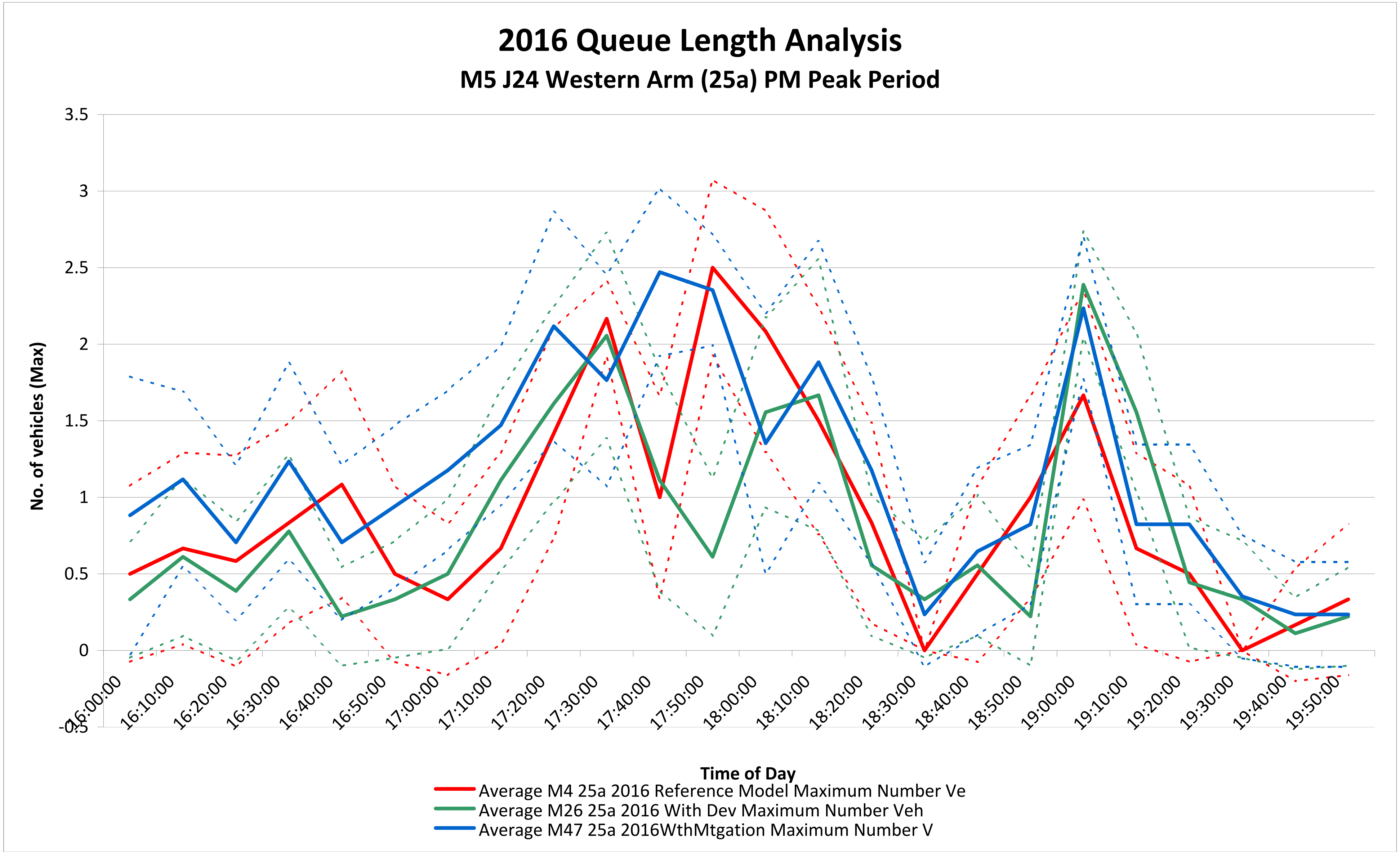


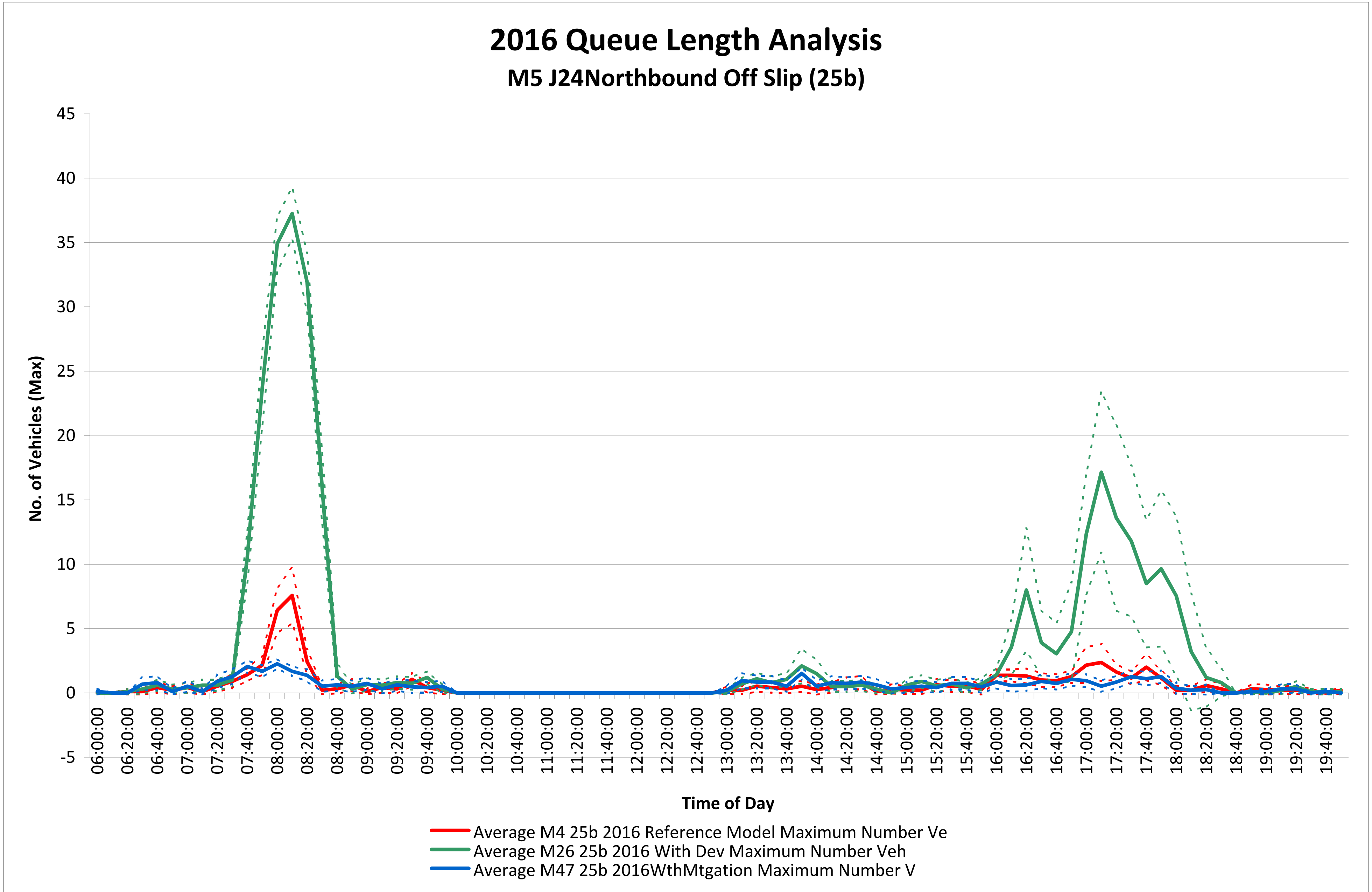
2016 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e) PM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 24e 2016 Reference Model Maximum Number Ve
Average M26 24e 2016 With Dev Maximum Number Veh
Average M47 24e 2016WthMtgation Maximum Number V

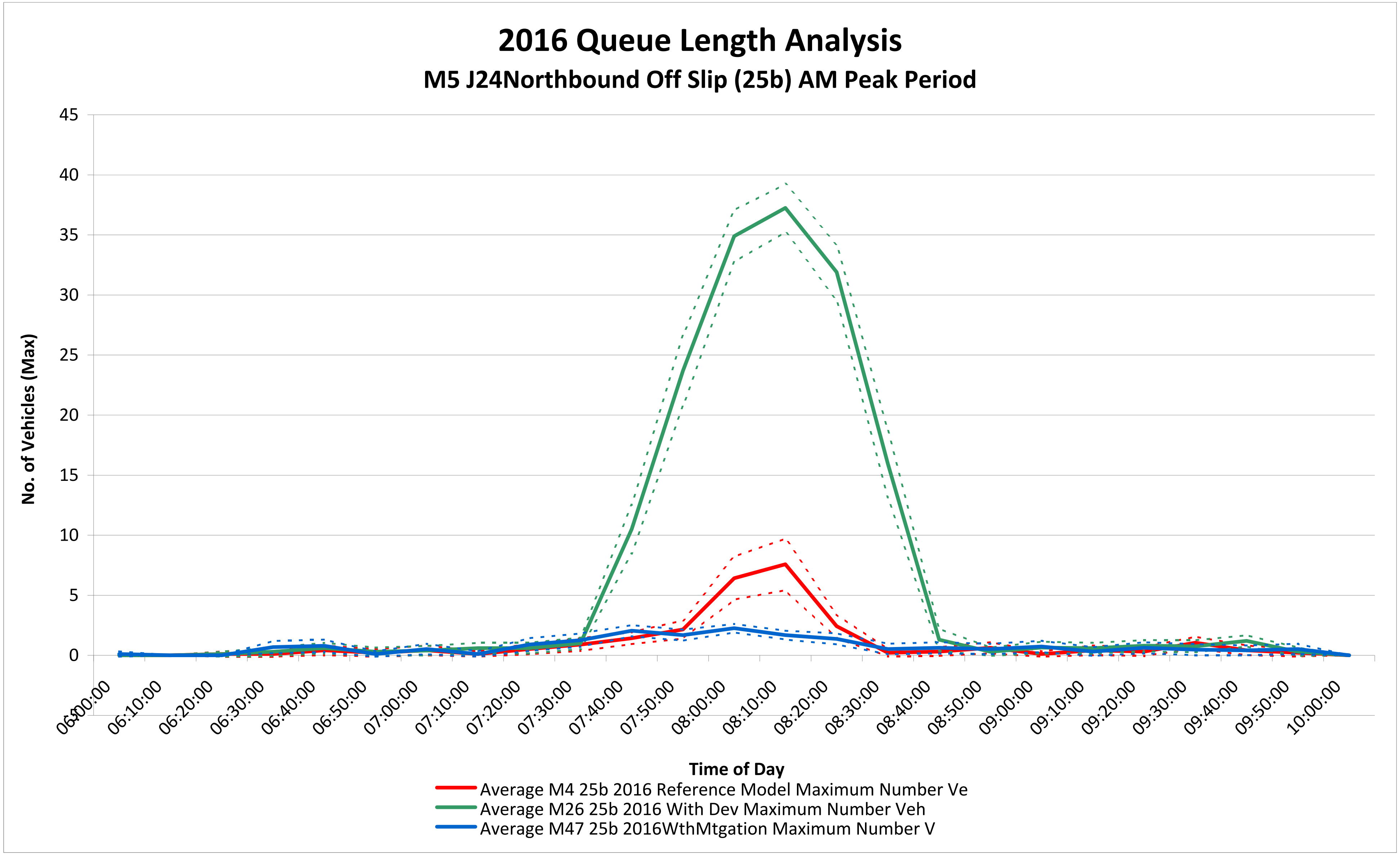


2016 Queue Length Analysis
M5 J24 Western Arm (25a)
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25a 2016 Reference Model Maximum Number Ve
Average M26 25a 2016 With Dev Maximum Number Veh
Average M47 25a 2016WthMtgation Maximum Number V

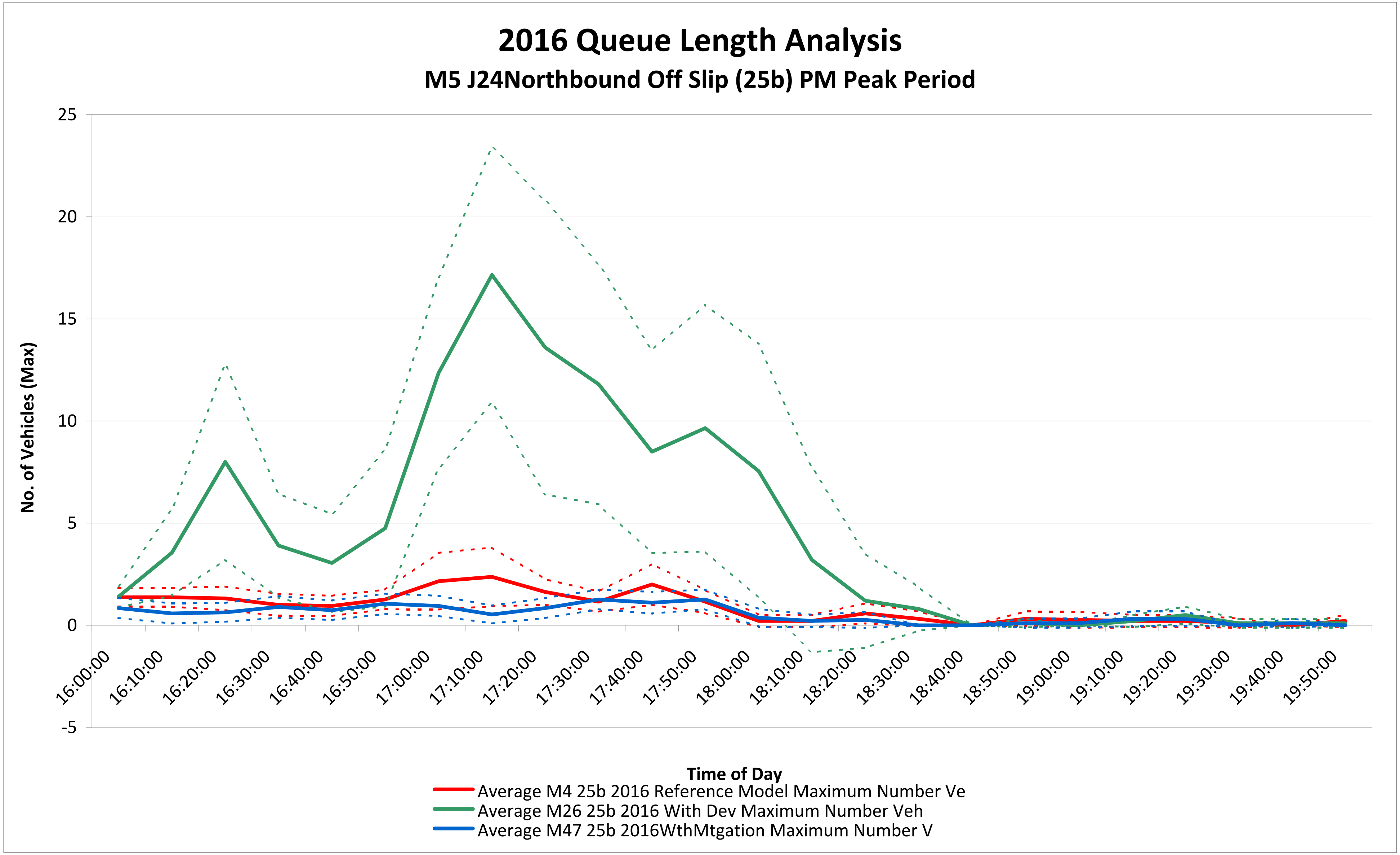

2016 Queue Length Analysis
M5 J24 Western Arm (25a) AM Peak Period
No. of vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25a 2016 Reference Model Maximum Number Ve
Average M26 25a 2016 With Dev Maximum Number Veh
Average M47 25a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
M5 J24 Western Arm (25a) PM Peak Period
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25a 2016 Reference Model Maximum Number Ve
Average M26 25a 2016 With Dev Maximum Number Veh
Average M47 25a 2016WthMtgation Maximum Number V


2016 Queue Length Analysis
M5 J24Northbound Off Slip (25b)
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25b 2016 Reference Model Maximum Number Ve
Average M26 25b 2016 With Dev Maximum Number Veh
Average M47 25b 2016WthMtgation Maximum Number V



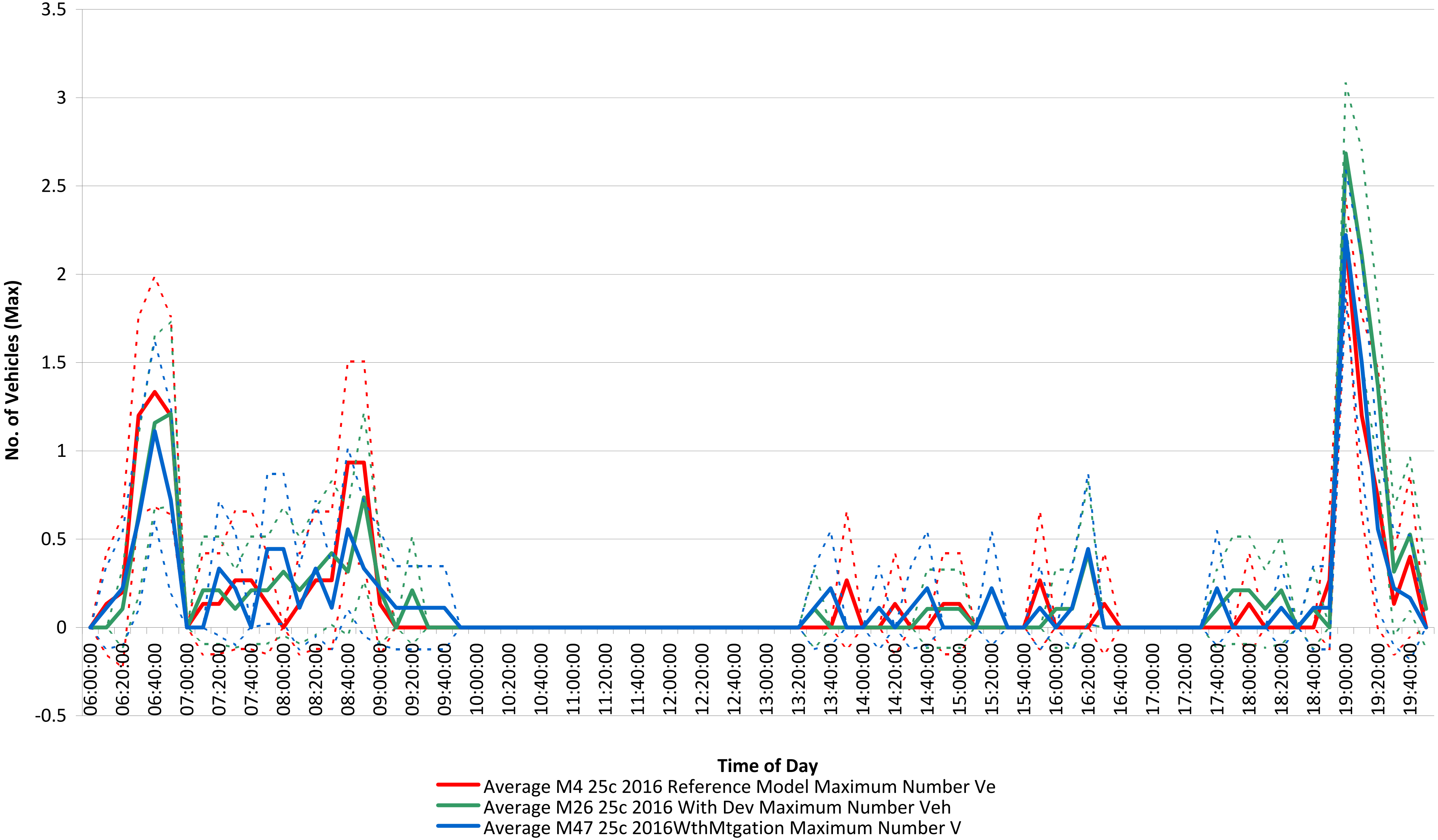
2016 Queue Length Analysis
M5 J24Northbound Off Slip (25b) AM Peak Period
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25b 2016 Reference Model Maximum Number Ve
Average M26 25b 2016 With Dev Maximum Number Veh
Average M47 25b 2016WthMtgation Maximum Number V

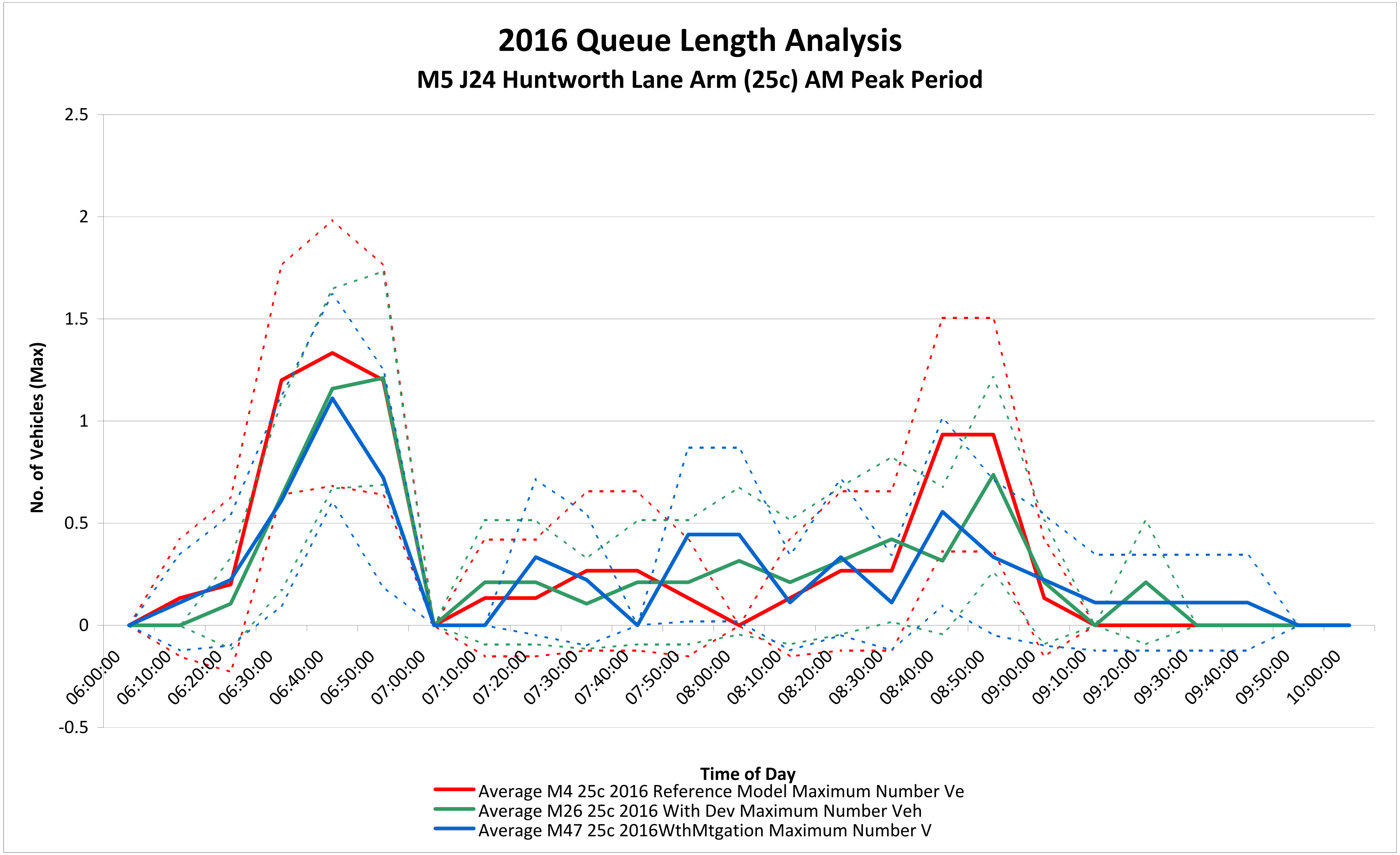


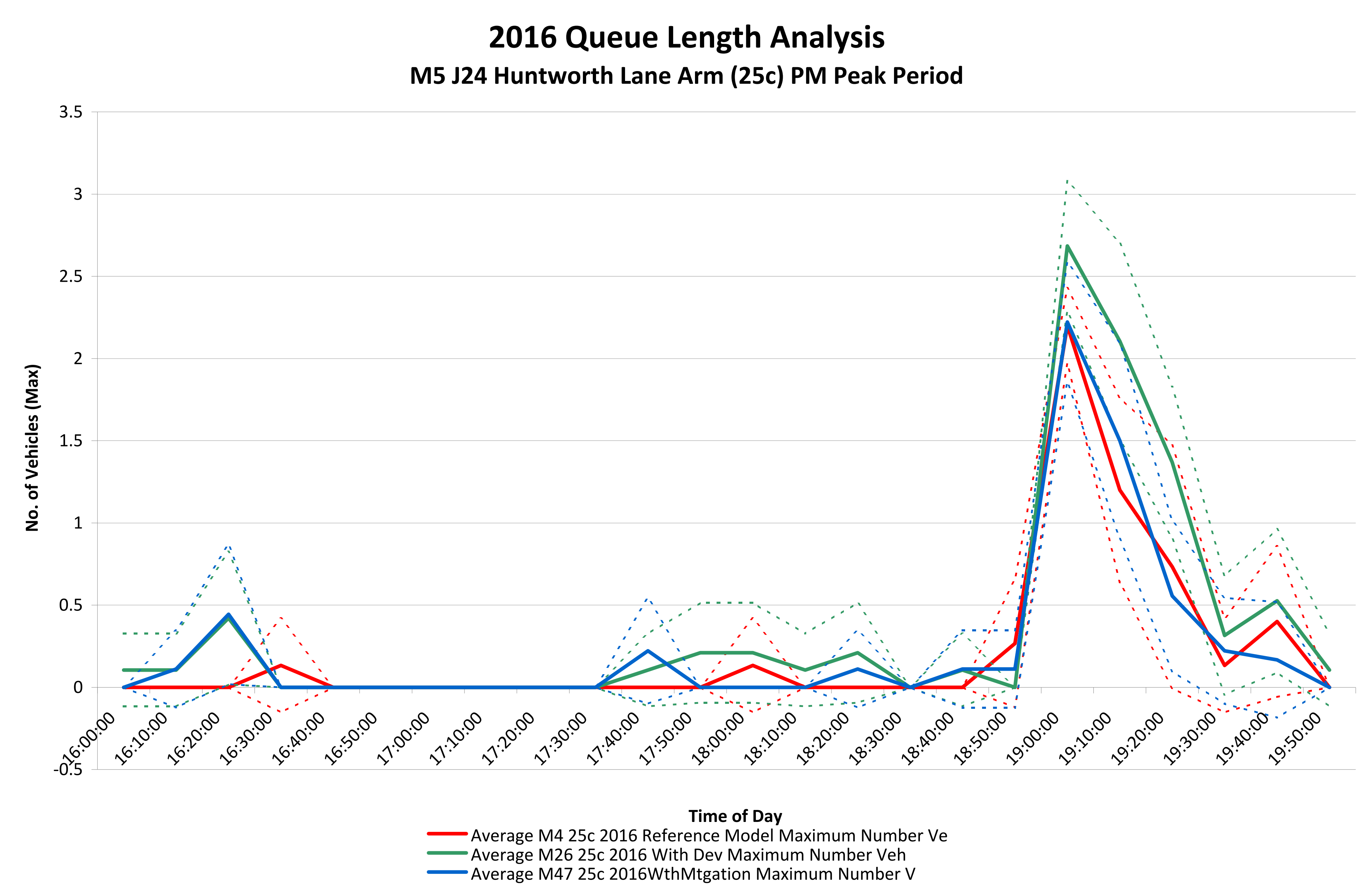
2016 Queue Length Analysis
M5 J24Northbound Off Slip (25b) PM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25b 2016 Reference Model Maximum Number Ve
Average M26 25b 2016 With Dev Maximum Number Veh
Average M47 25b 2016WthMtgation Maximum Number V

2016 Queue Length Analysis

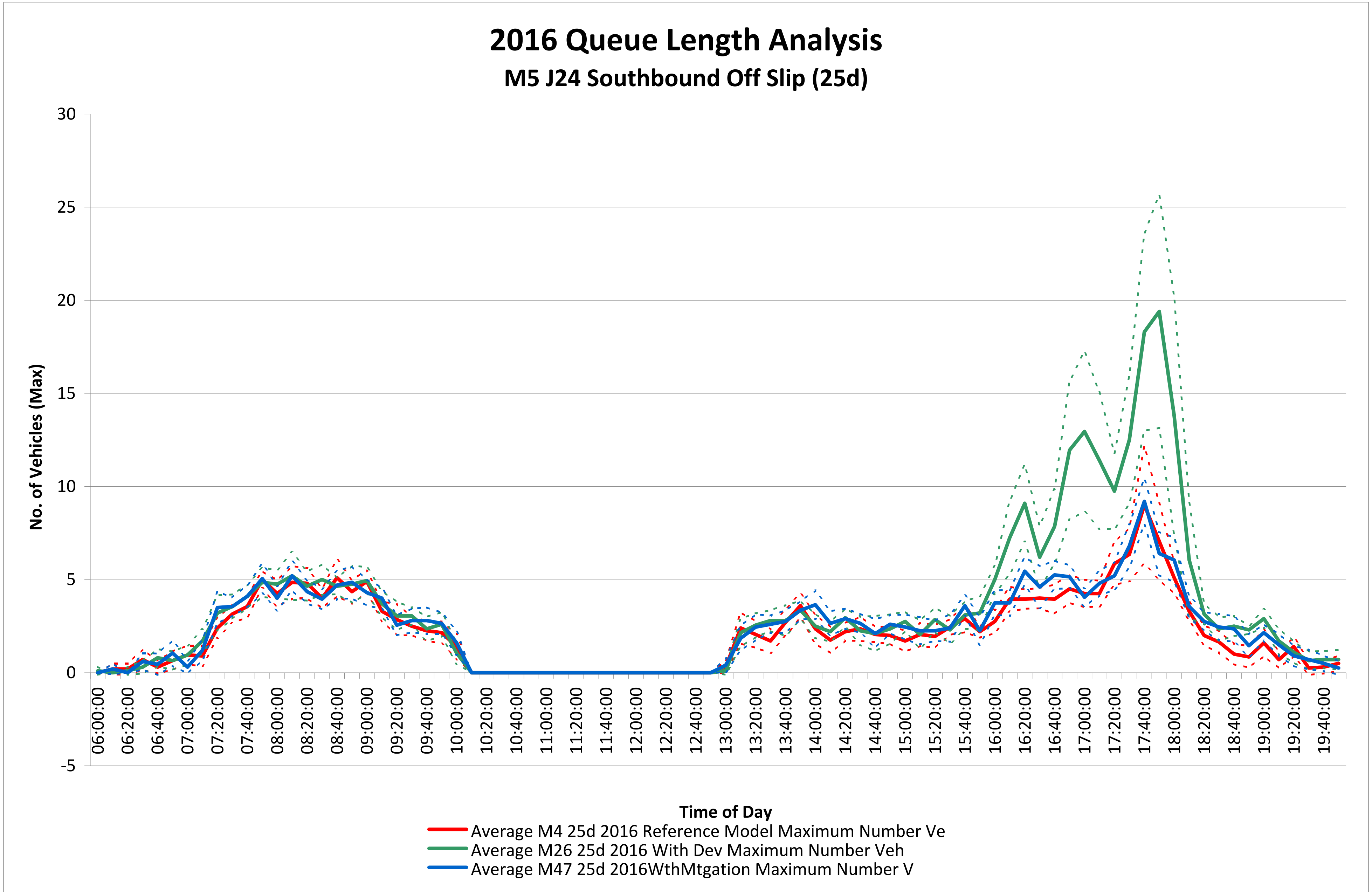
M5 J24 Huntworth Lane Arm (25c)



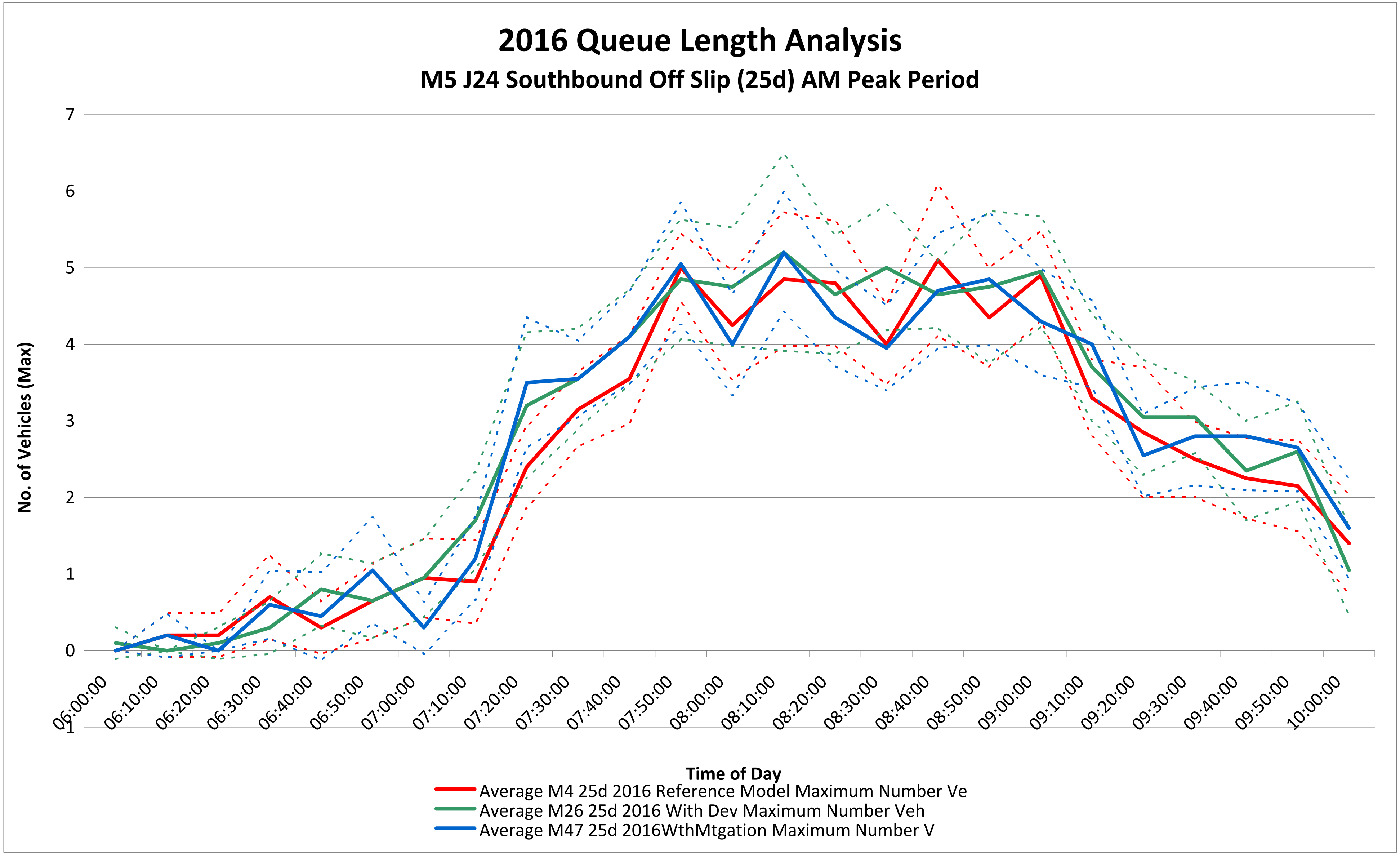

2016 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c) AM Peak Period
No. of Vehicles (Max)
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25c 2016 Reference Model Maximum Number Ve
Average M26 25c 2016 With Dev Maximum Number Veh
Average M47 25c 2016WthMtgation Maximum Number V

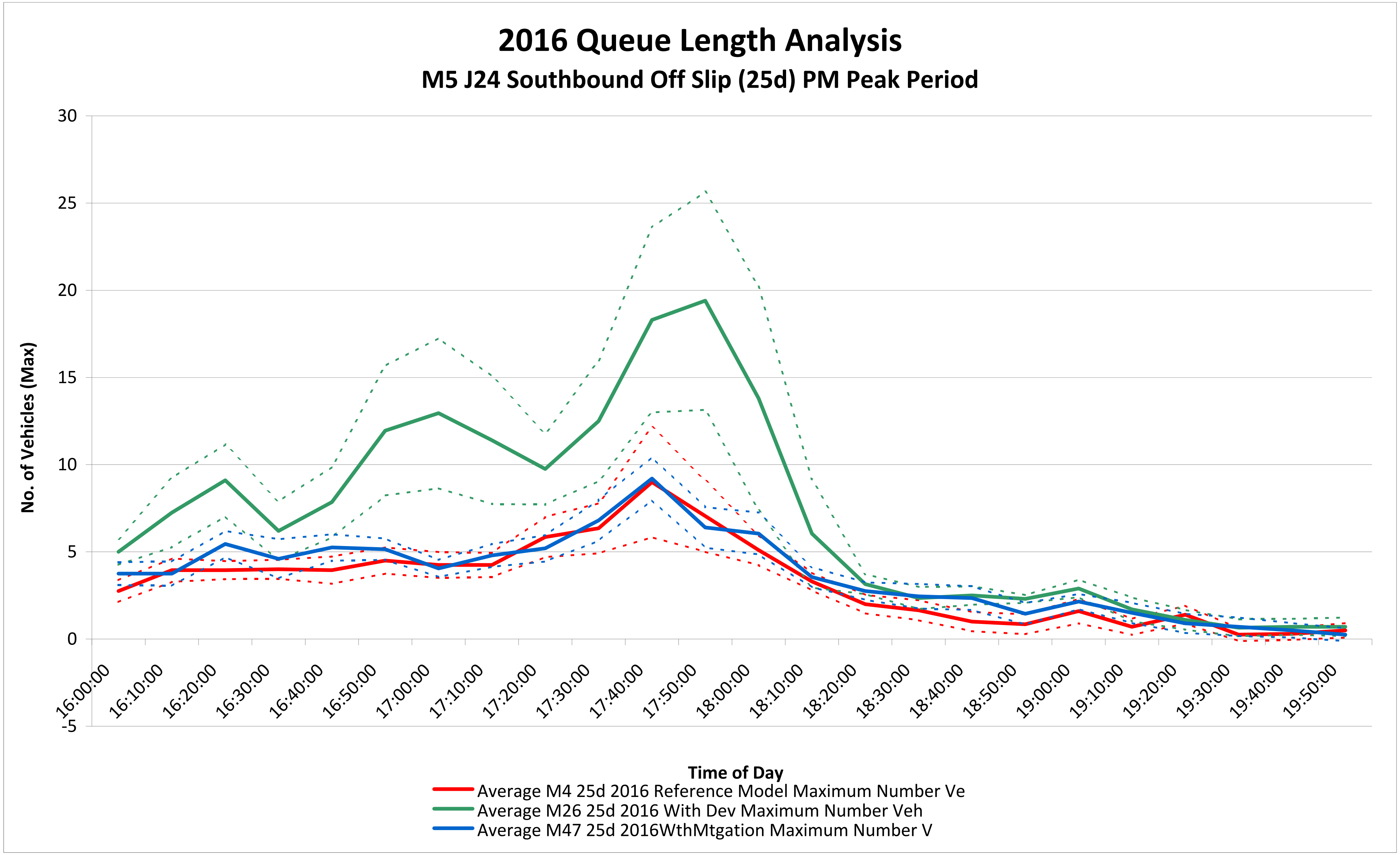


2016 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c) PM Peak Period
No. of Vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25c 2016 Reference Model Maximum Number Ve
Average M26 25c 2016 With Dev Maximum Number Veh
Average M47 25c 2016WthMtgation Maximum Number V

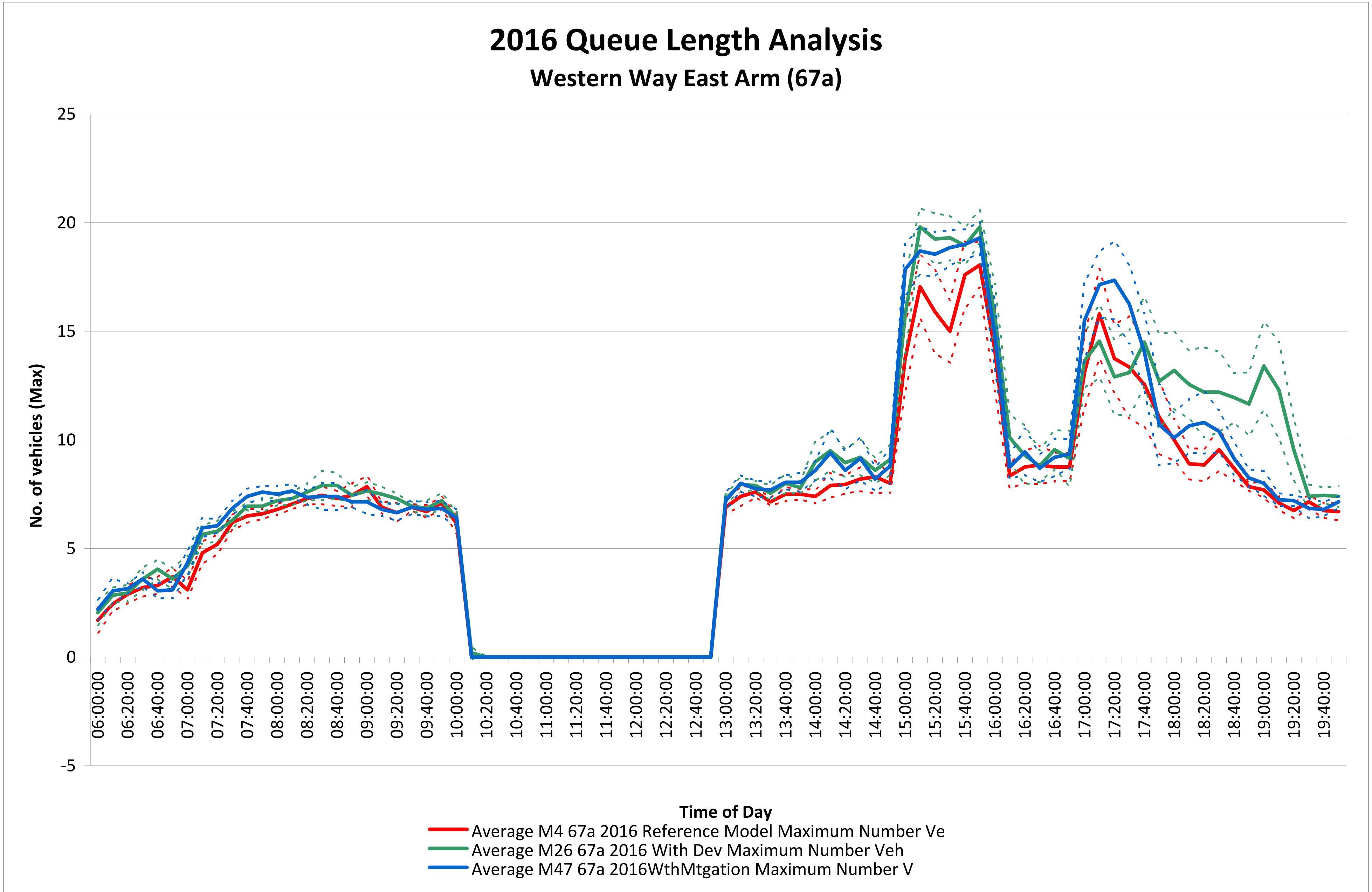


2016 Queue Length Analysis
M5 J24 Southbound Off Slip (25d)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25d 2016 Reference Model Maximum Number Ve
Average M26 25d 2016 With Dev Maximum Number Veh
Average M47 25d 2016WthMtgation Maximum Number V

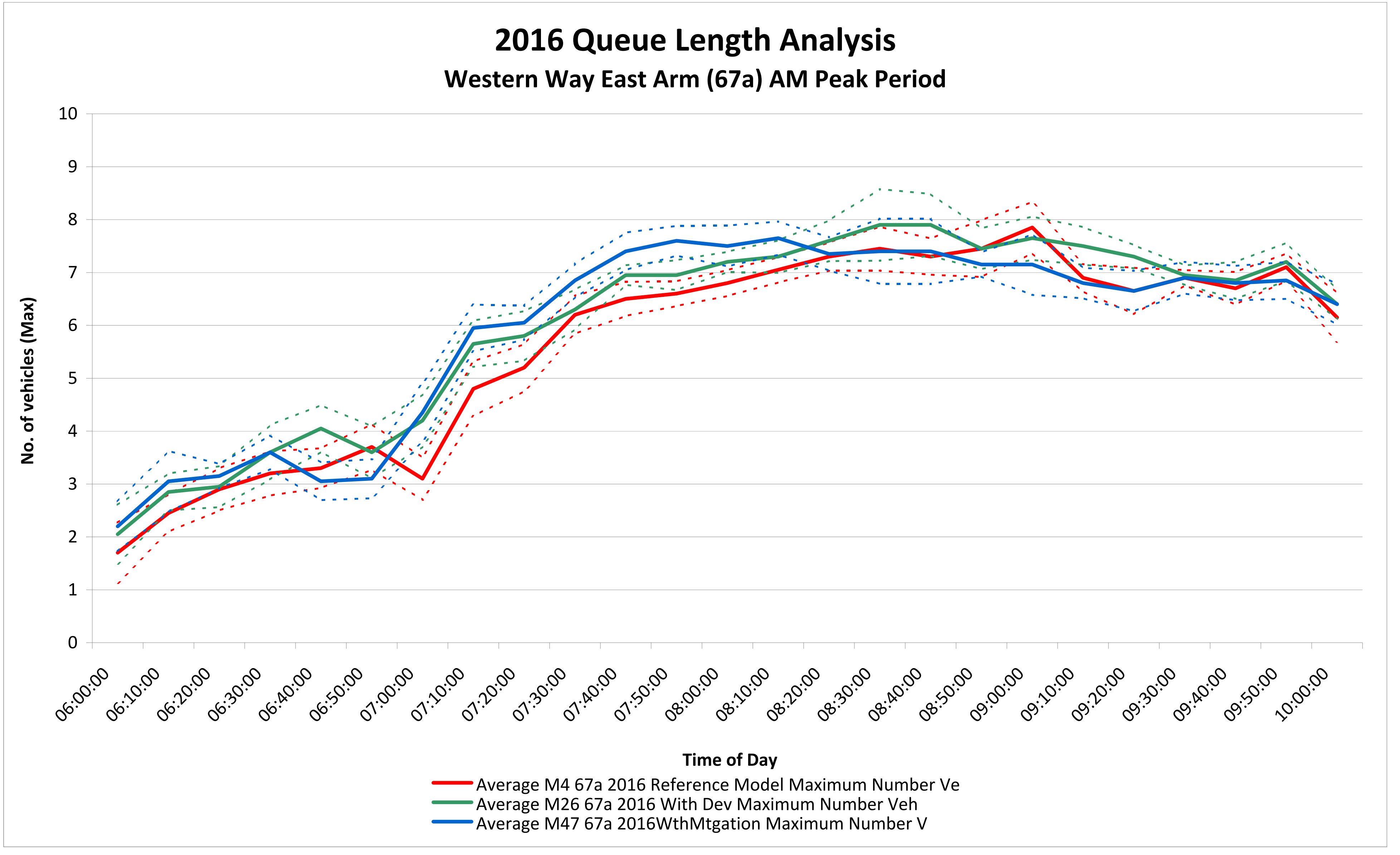

2016 Queue Length Analysis
M5 J24 Southbound Off Slip (25d) AM Peak Period
No. of Vehicles (Max)
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25d 2016 Reference Model Maximum Number Ve
Average M26 25d 2016 With Dev Maximum Number Veh
Average M47 25d 2016WthMtgation Maximum Number V



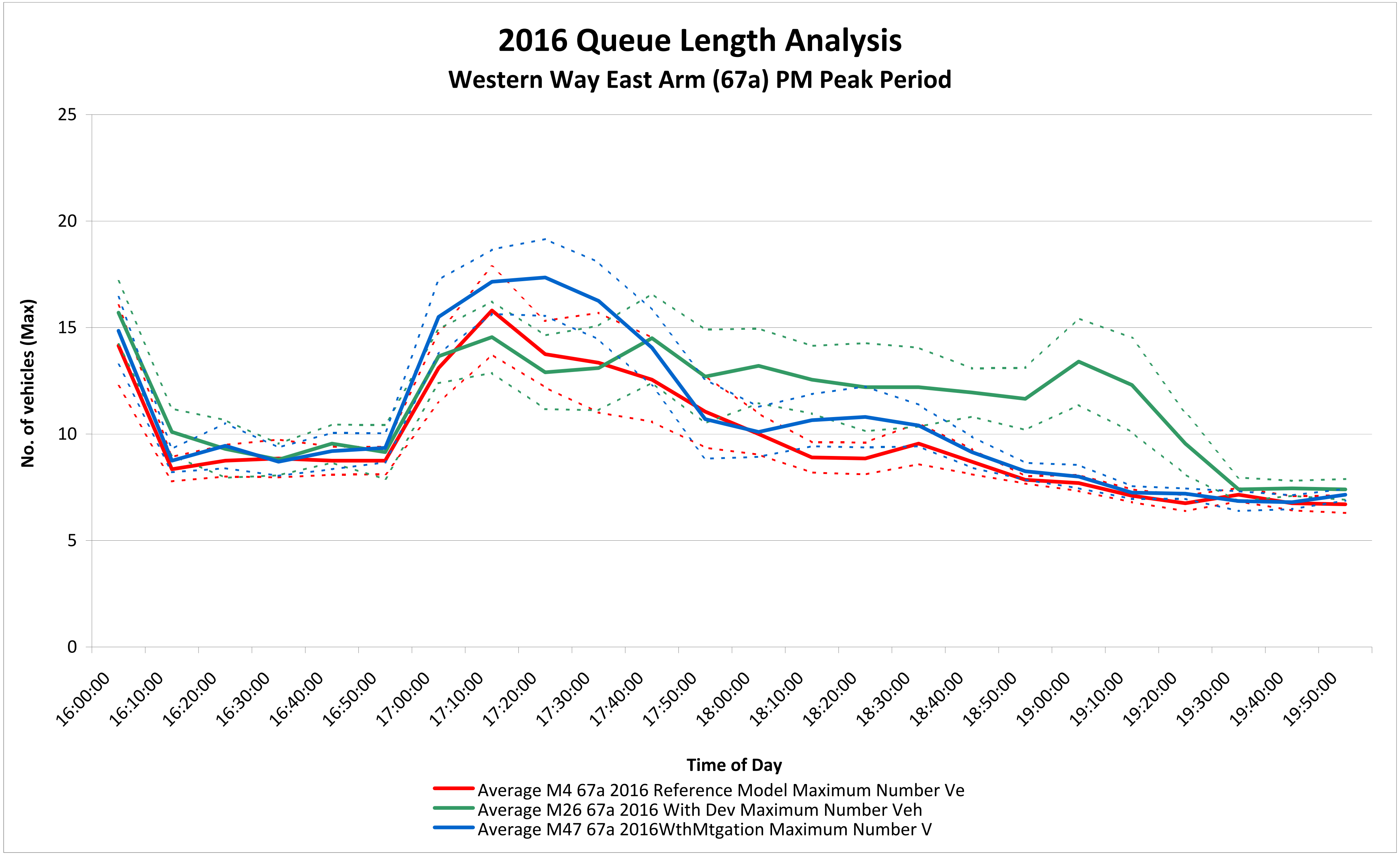
2016 Queue Length Analysis
M5 J24 Southbound Off Slip (25d) PM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25d 2016 Reference Model Maximum Number Ve
Average M26 25d 2016 With Dev Maximum Number Veh
Average M47 25d 2016WthMtgation Maximum Number V



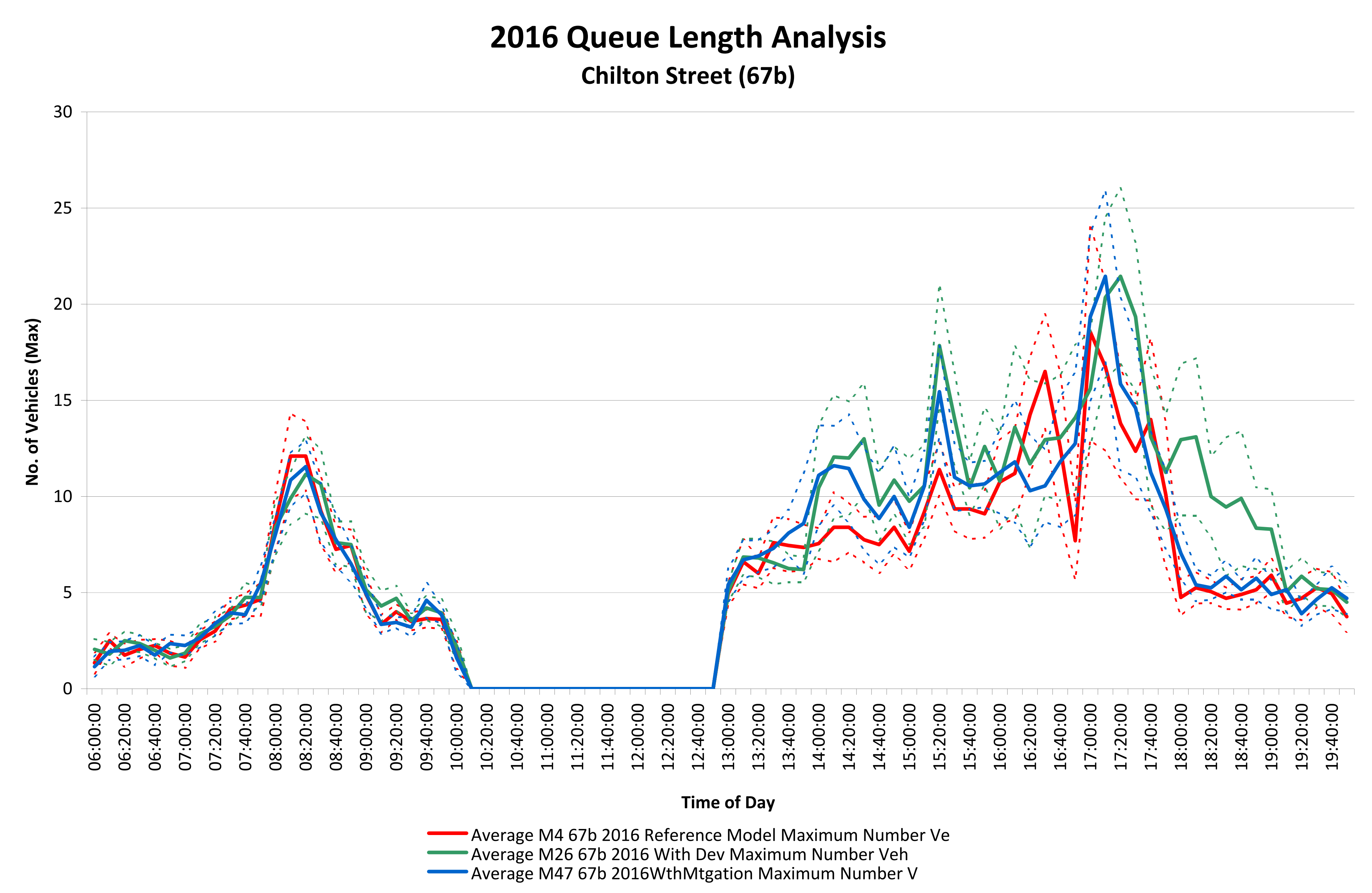
2016 Queue Length Analysis
Western Way East Arm (67a)
No. of vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 67a 2016 Reference Model Maximum Number Ve
Average M26 67a 2016 With Dev Maximum Number Veh
Average M47 67a 2016WthMtgation Maximum Number V



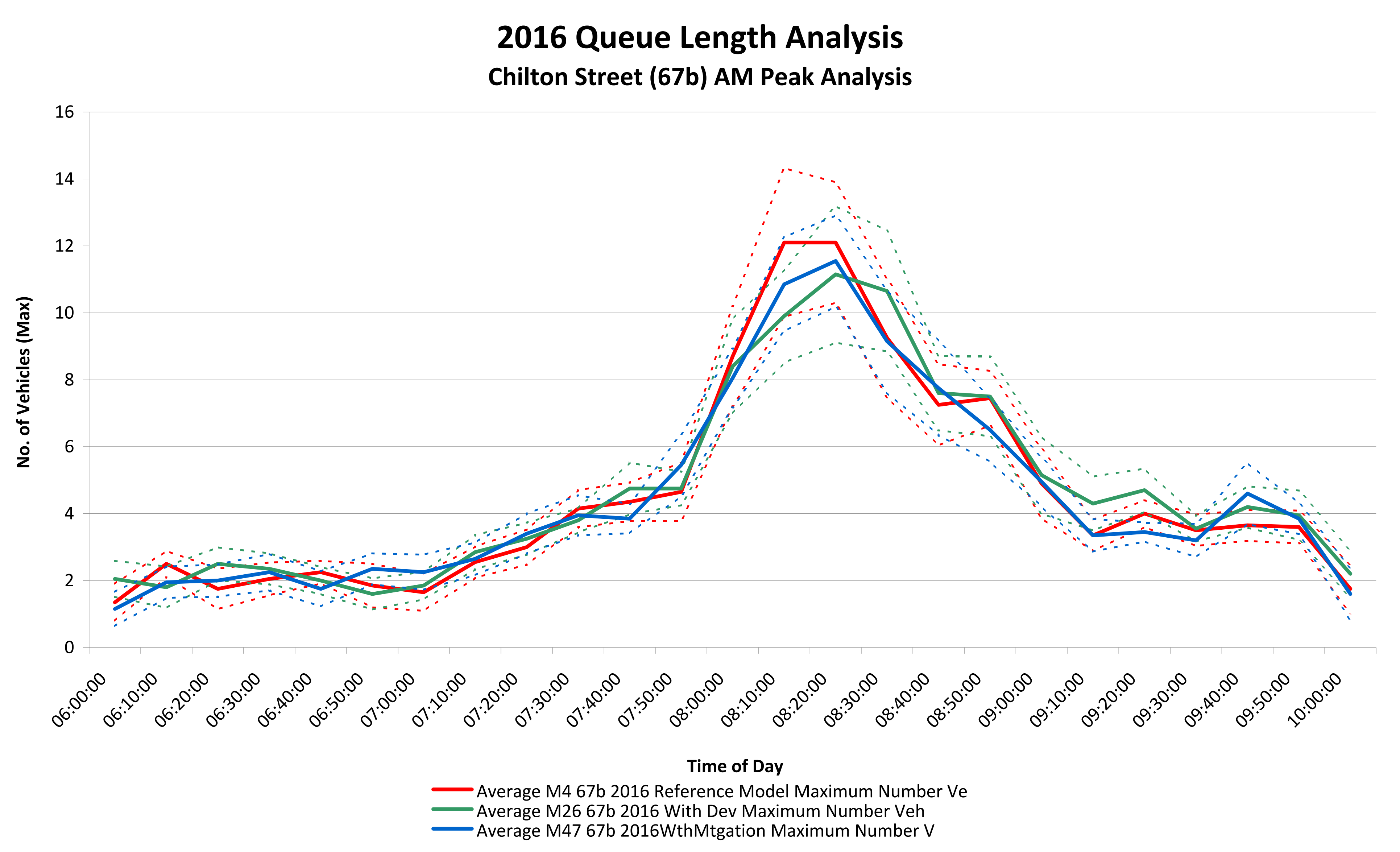
2016 Queue Length Analysis
Western Way East Arm (67a) AM Peak Period
No. of vehicles (Max)
10
9
8
7
6
5
4
3
2
1
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 67a 2016 Reference Model Maximum Number Ve
Average M26 67a 2016 With Dev Maximum Number Veh
Average M47 67a 2016WthMtgation Maximum Number V



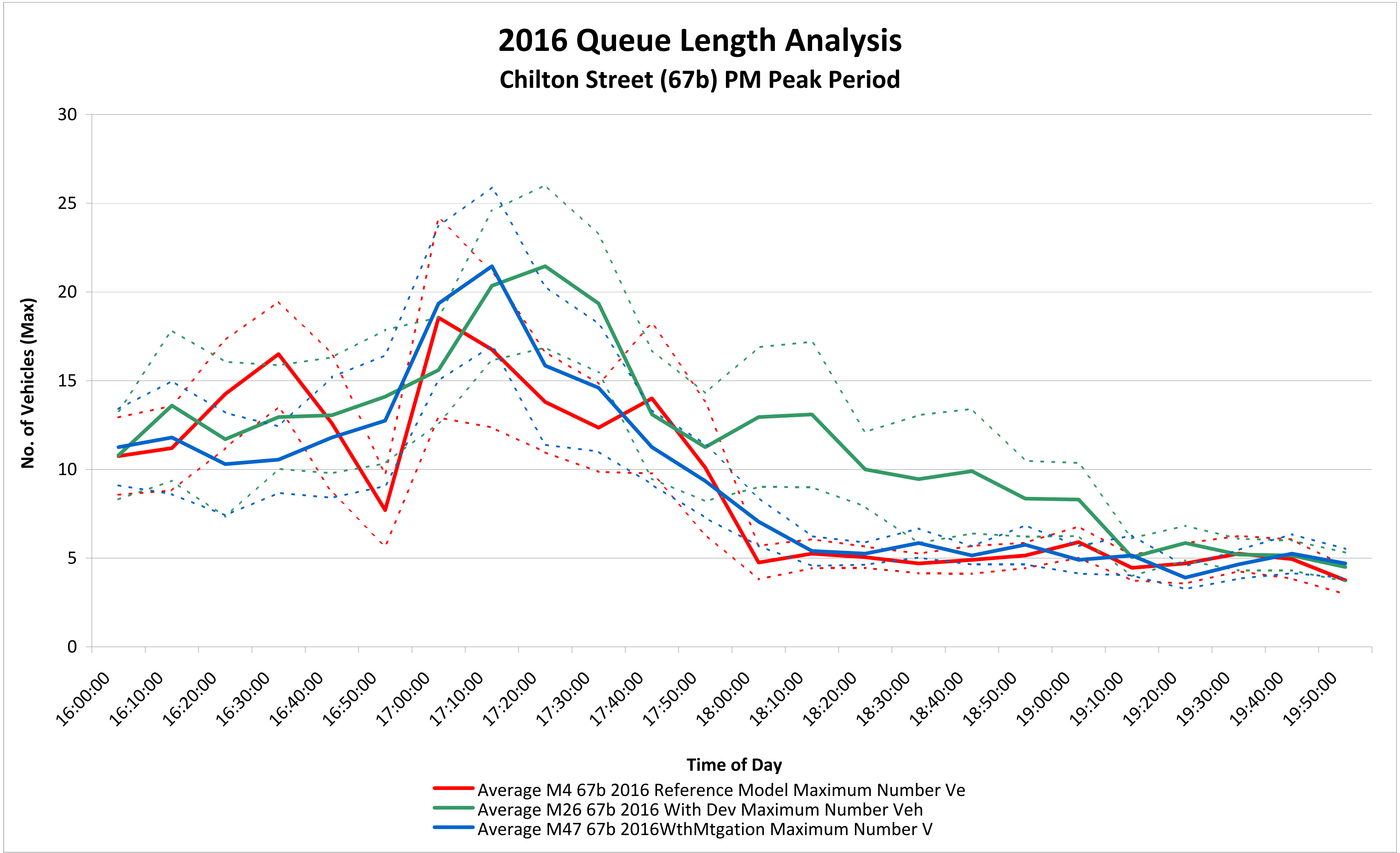
2016 Queue Length Analysis
Western Way East Arm (67a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 67a 2016 Reference Model Maximum Number Ve
Average M26 67a 2016 With Dev Maximum Number Veh
Average M47 67a 2016WthMtgation Maximum Number V

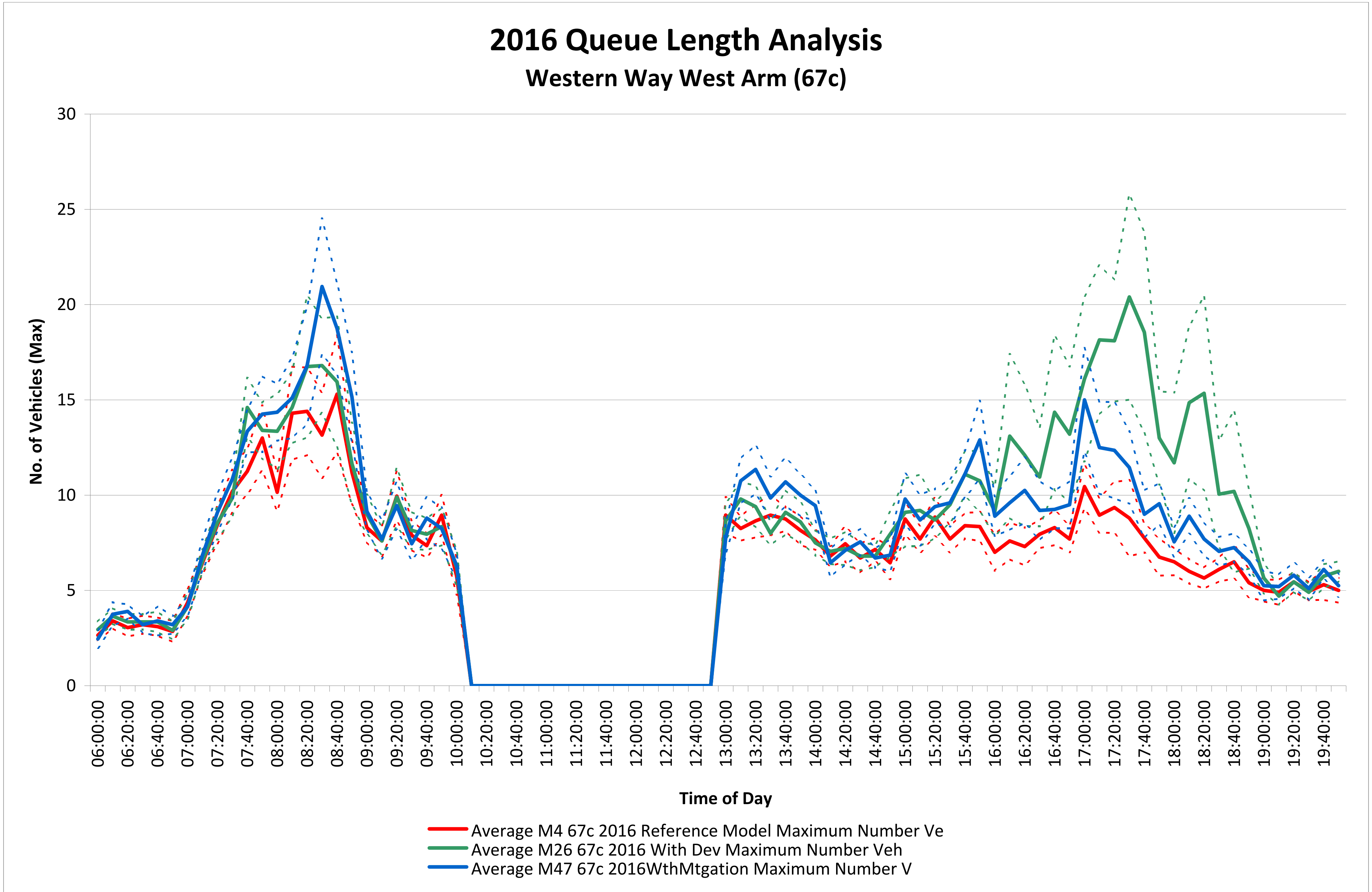


2016 Queue Length Analysis
Chilton Street (67b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 67b 2016 Reference Model Maximum Number Ve
Average M26 67b 2016 With Dev Maximum Number Veh
Average M47 67b 2016WthMtgation Maximum Number V

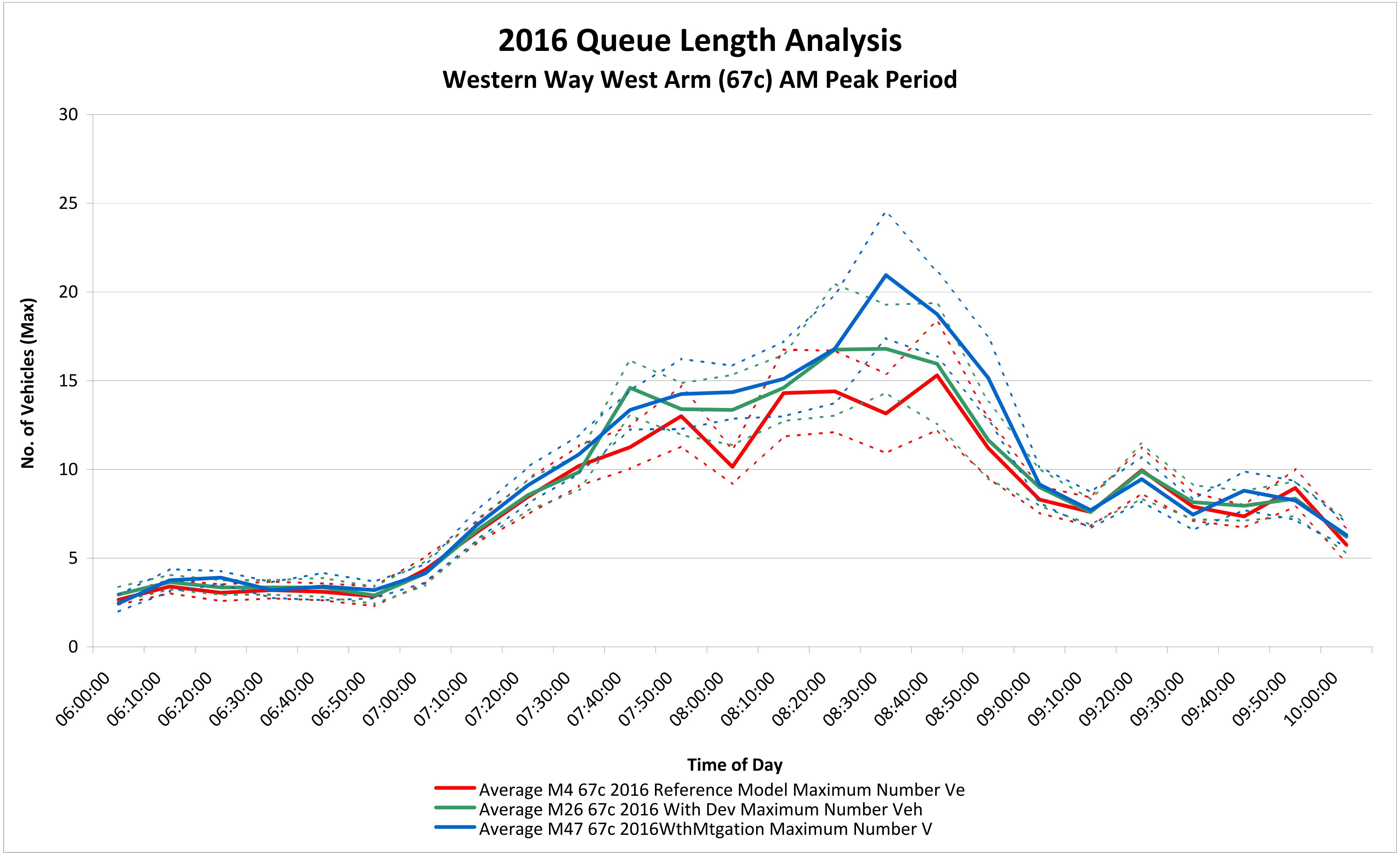


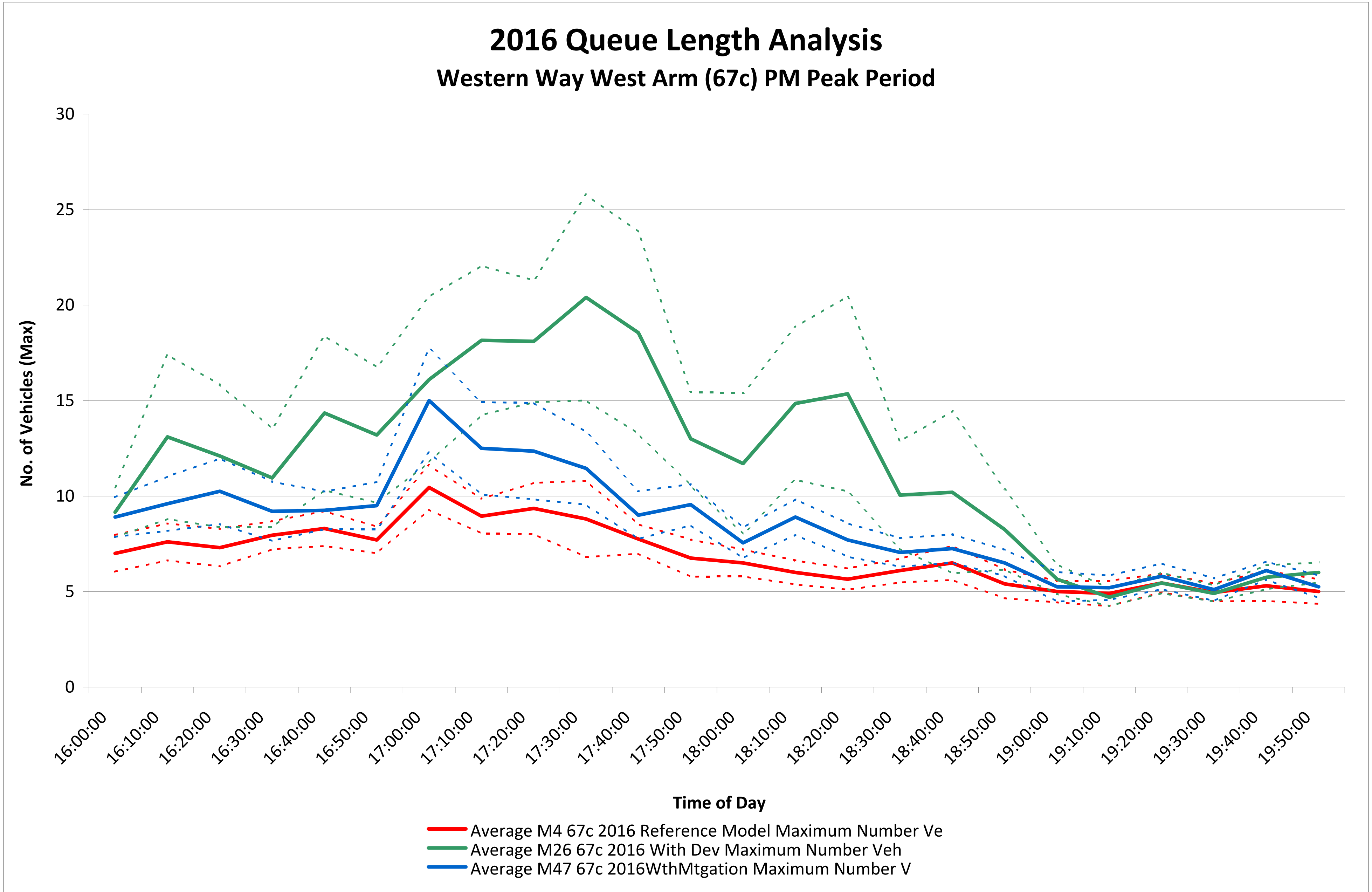
2016 Queue Length Analysis
Chilton Street (67b) AM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 67b 2016 Reference Model Maximum Number Ve
Average M26 67b 2016 With Dev Maximum Number Veh
Average M47 67b 2016WthMtgation Maximum Number V

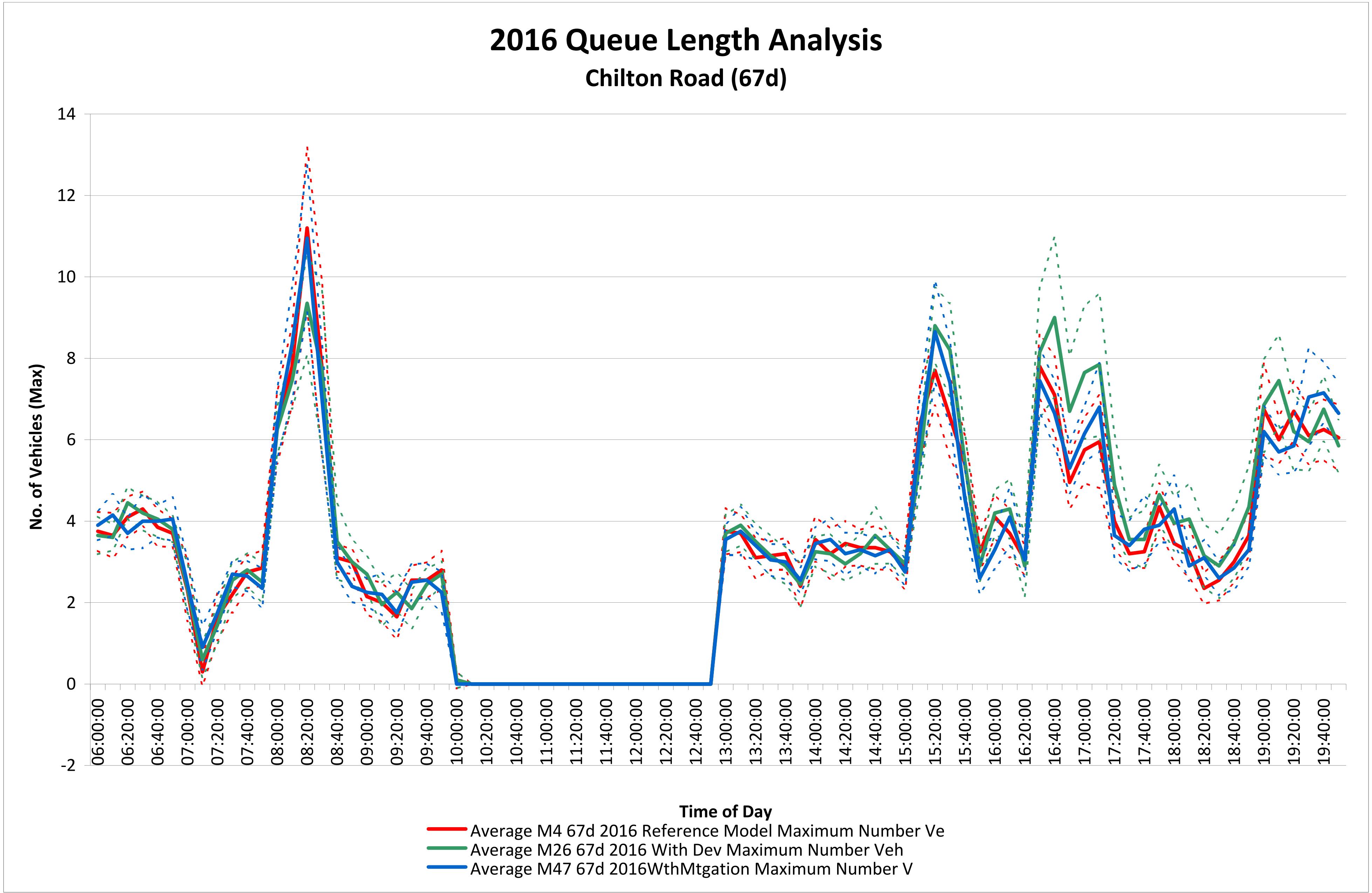

2016 Queue Length Analysis
Chilton Street (67b) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 67b 2016 Reference Model Maximum Number Ve
Average M26 67b 2016 With Dev Maximum Number Veh
Average M47 67b 2016WthMtgation Maximum Number V



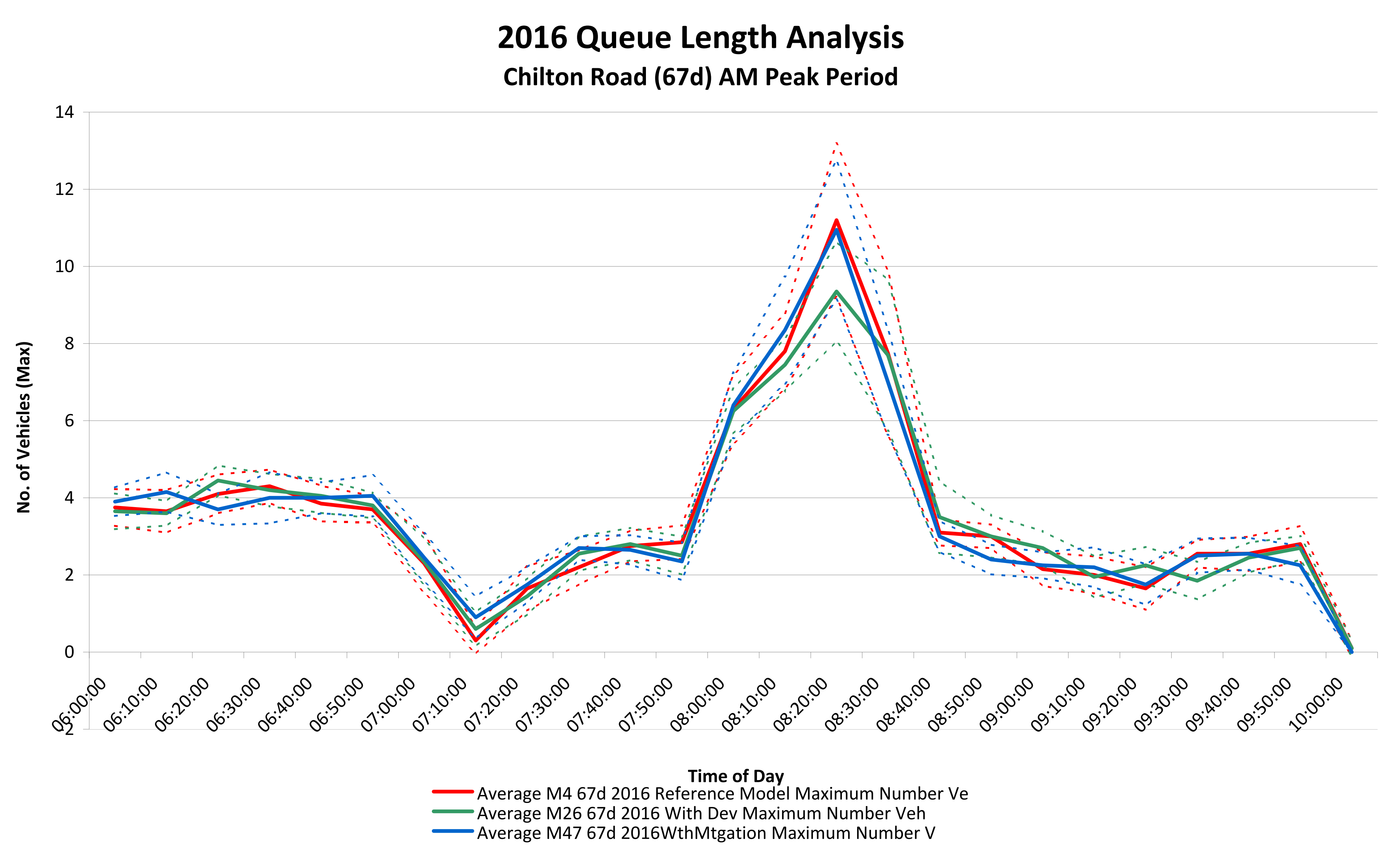
2016 Queue Length Analysis
Western Way West Arm (67c)
No. of Vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 67c 2016 Reference Model Maximum Number Ve
Average M26 67c 2016 With Dev Maximum Number Veh
Average M47 67c 2016WthMtgation Maximum Number V

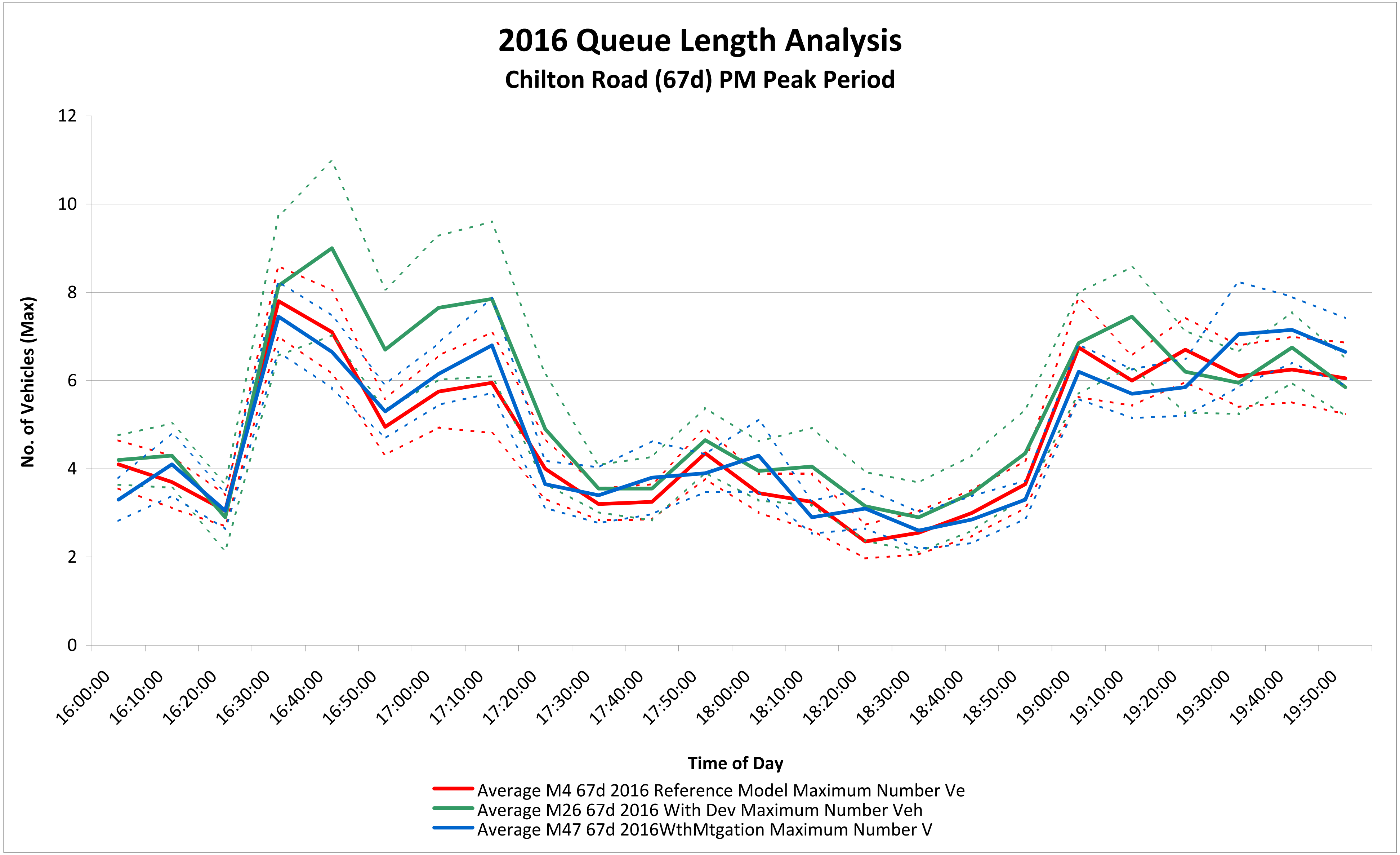

2016 Queue Length Analysis
Western Way West Arm (67c) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 67c 2016 Reference Model Maximum Number Ve
Average M26 67c 2016 With Dev Maximum Number Veh
Average M47 67c 2016WthMtgation Maximum Number V

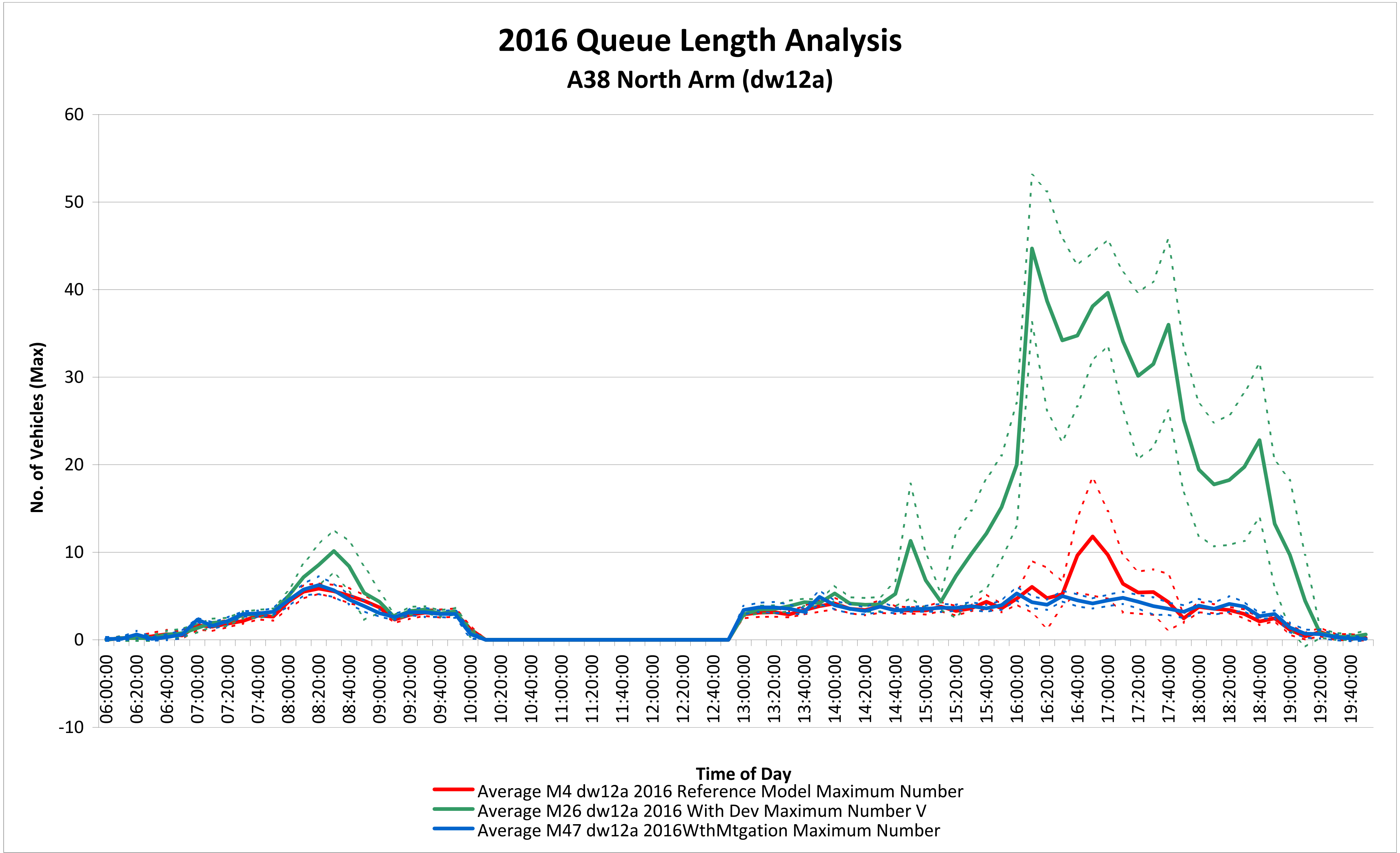

2016 Queue Length Analysis
Western Way West Arm (67c) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 67c 2016 Reference Model Maximum Number Ve
Average M26 67c 2016 With Dev Maximum Number Veh
Average M47 67c 2016WthMtgation Maximum Number V

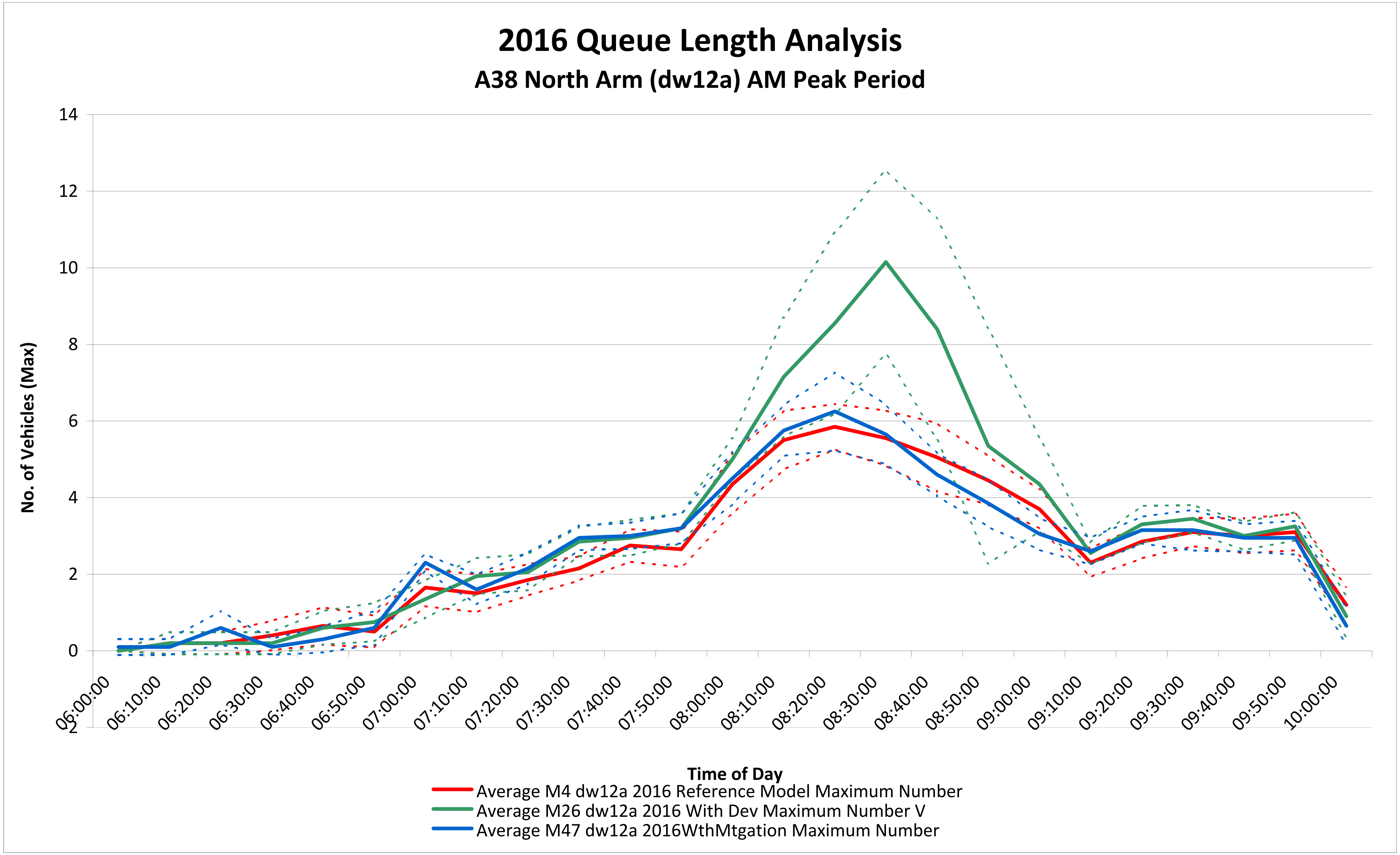


2016 Queue Length Analysis
Chilton Road (67d)
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 67d 2016 Reference Model Maximum Number Ve
Average M26 67d 2016 With Dev Maximum Number Veh
Average M47 67d 2016WthMtgation Maximum Number V

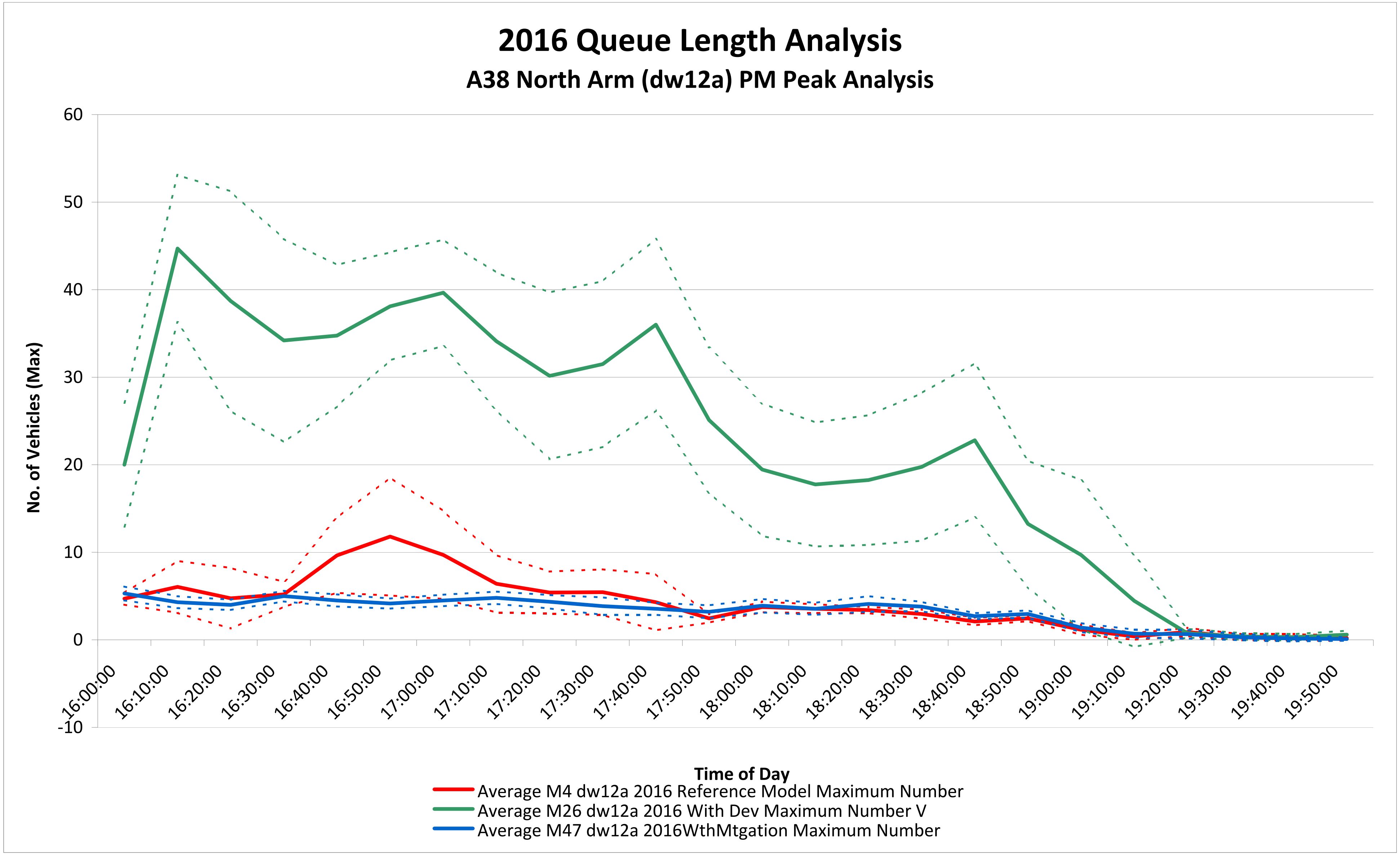

2016 Queue Length Analysis
Chilton Road (67d) AM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 67d 2016 Reference Model Maximum Number Ve
Average M26 67d 2016 With Dev Maximum Number Veh
Average M47 67d 2016WthMtgation Maximum Number V

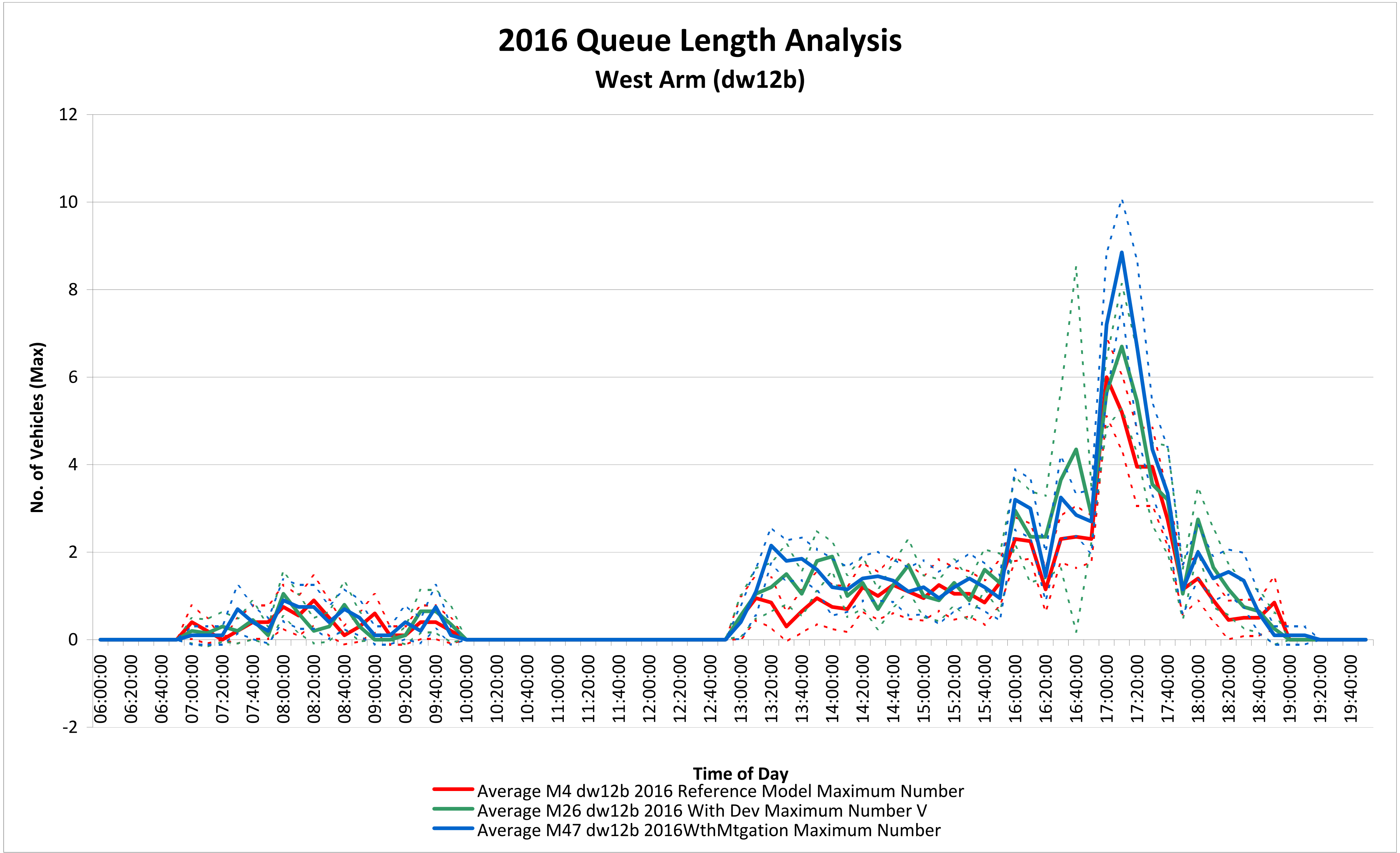

2016 Queue Length Analysis
Chilton Road (67d) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 67d 2016 Reference Model Maximum Number Ve
Average M26 67d 2016 With Dev Maximum Number Veh
Average M47 67d 2016WthMtgation Maximum Number V

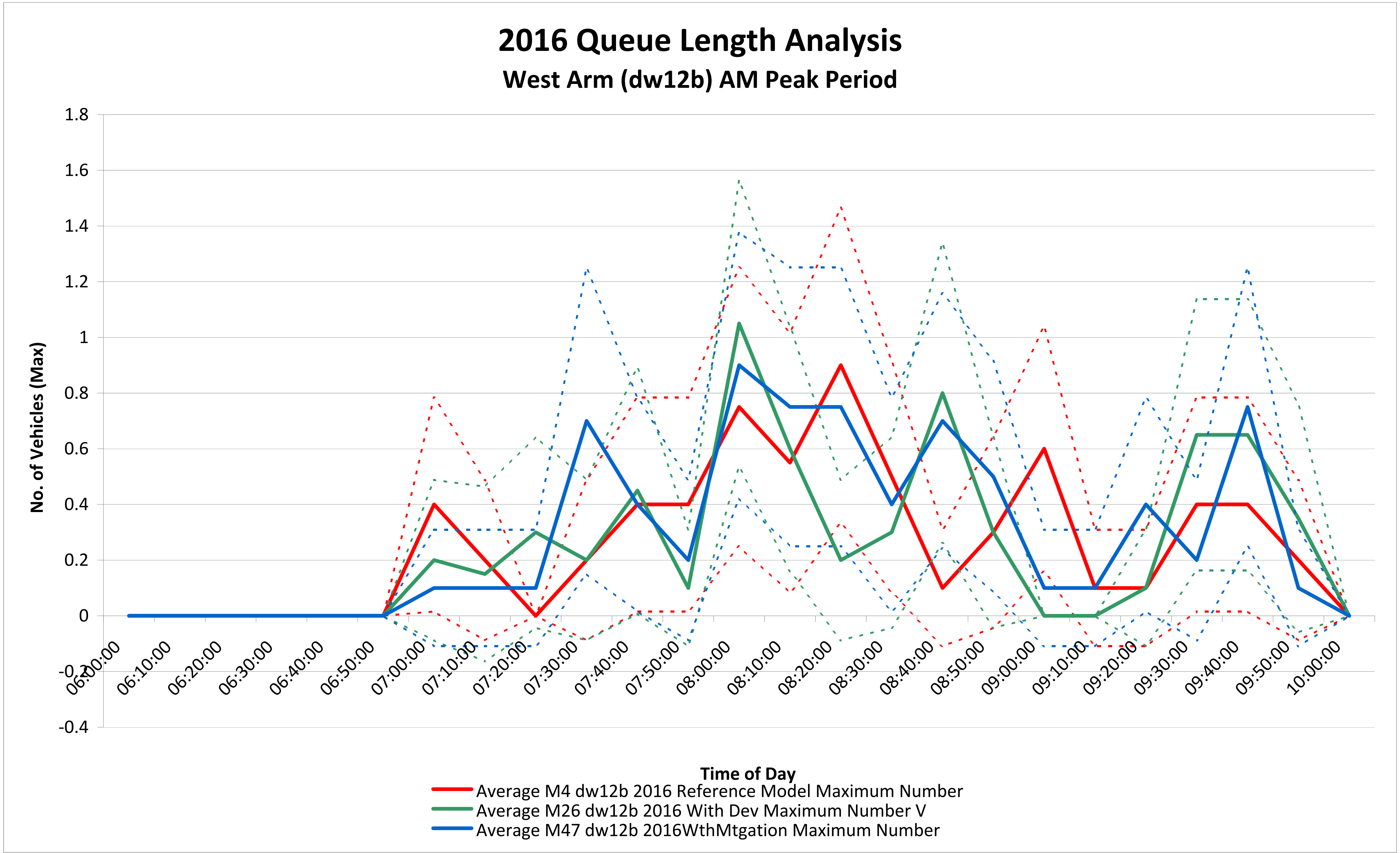

2016 Queue Length Analysis
A38 North Arm (dw12a)
60
50
40
30
20
10
0
-10
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 dw12a 2016 Reference Model Maximum Number
Average M26 dw12a 2016 With Dev Maximum Number V
Average M47 dw12a 2016WthMtgation Maximum Number

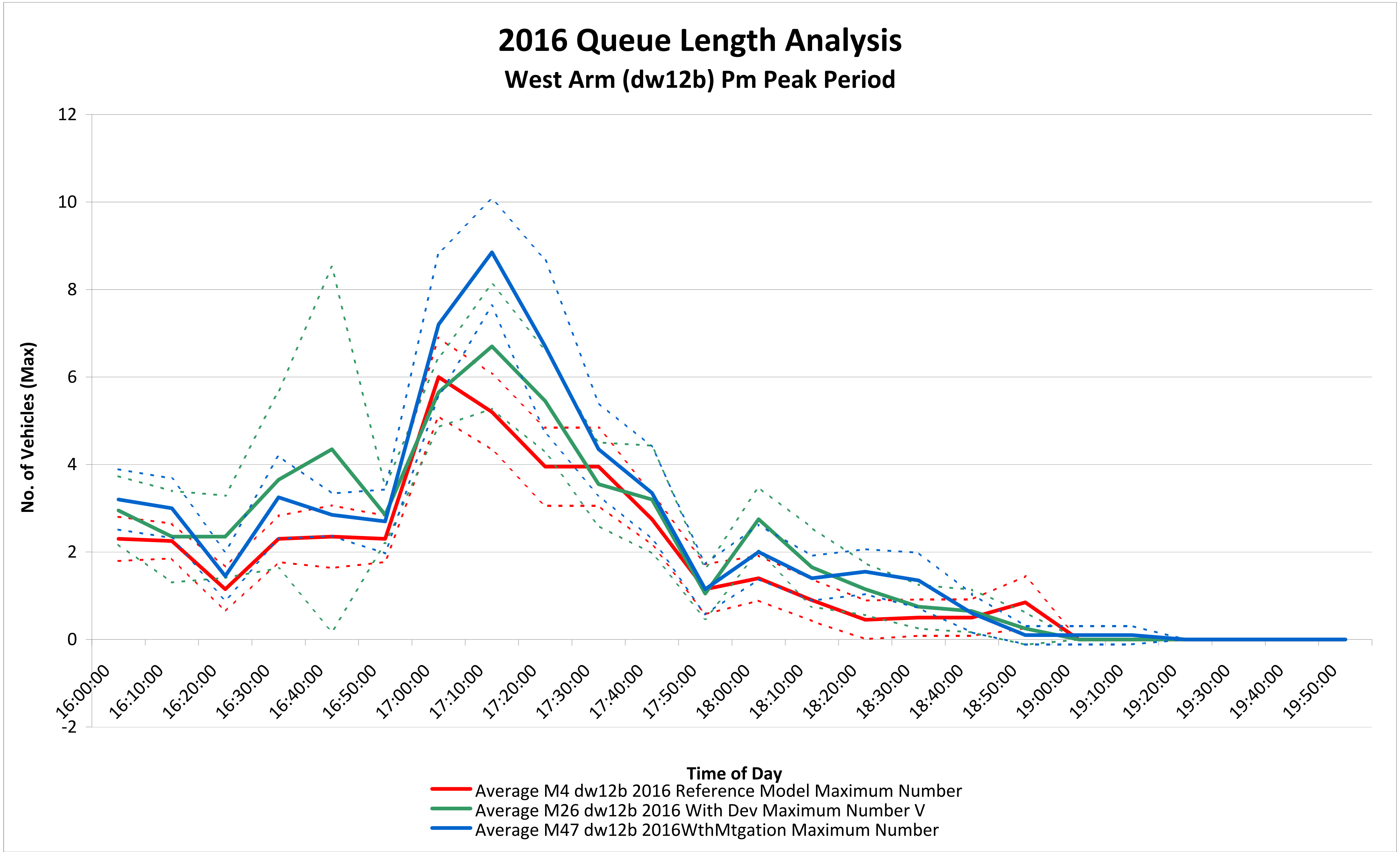


2016 Queue Length Analysis
A38 North Arm (dw12a) AM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 dw12a 2016 Reference Model Maximum Number
Average M26 dw12a 2016 With Dev Maximum Number V
Average M47 dw12a 2016WthMtgation Maximum Number

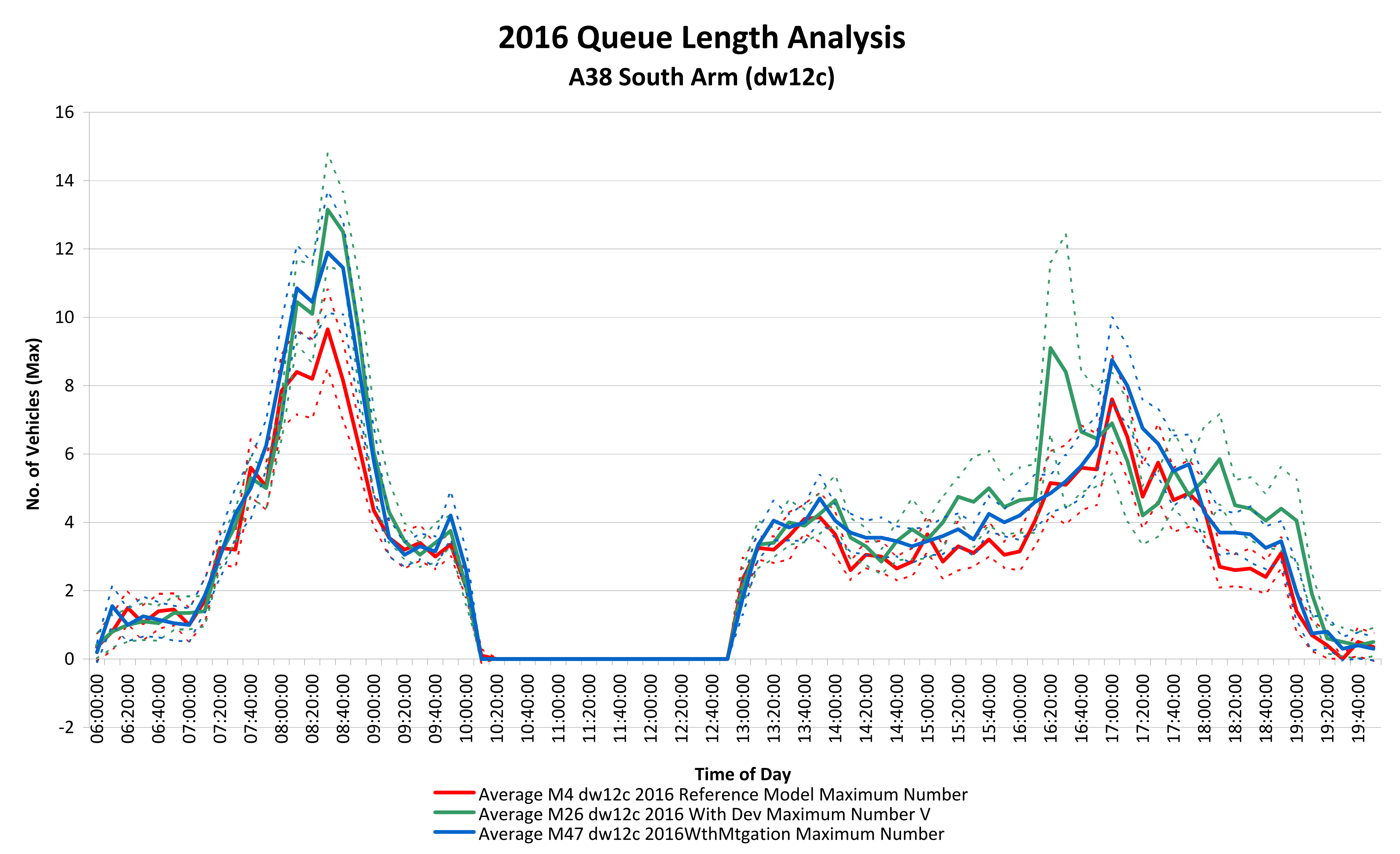

2016 Queue Length Analysis
A38 North Arm (dw12a) PM Peak Analysis
No. of Vehicles (Max)
60
50
40
30
20
10
0
-10
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 dw12a 2016 Reference Model Maximum Number
Average M26 dw12a 2016 With Dev Maximum Number V
Average M47 dw12a 2016WthMtgation Maximum Number

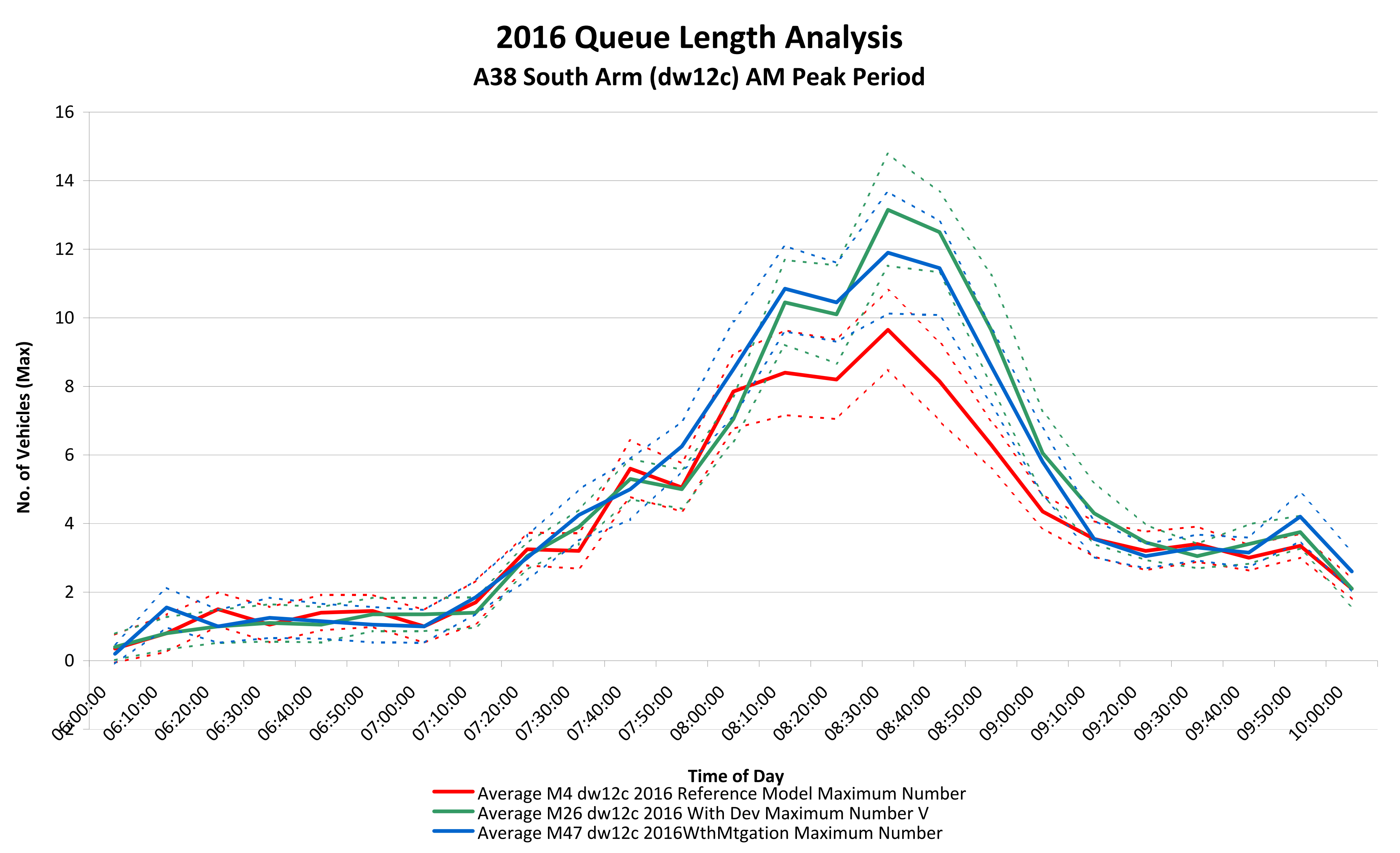

2016 Queue Length Analysis
West Arm (dw12b)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 dw12b 2016 Reference Model Maximum Number
Average M26 dw12b 2016 With Dev Maximum Number V
Average M47 dw12b 2016WthMtgation Maximum Number


2016 Queue Length Analysis
West Arm (dw12b) AM Peak Period
No. of Vehicles (Max)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 dw12b 2016 Reference Model Maximum Number
Average M26 dw12b 2016 With Dev Maximum Number V
Average M47 dw12b 2016WthMtgation Maximum Number

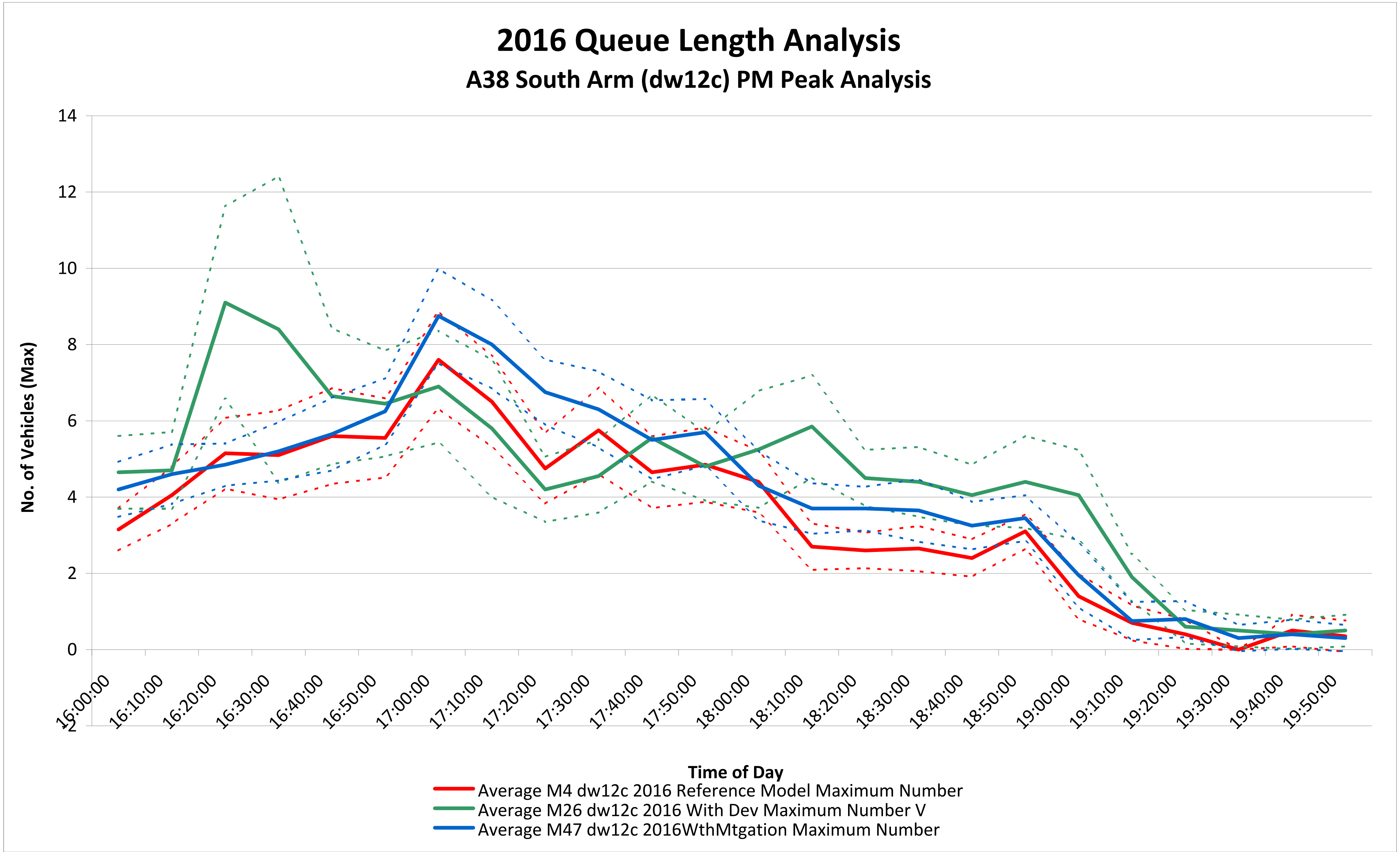


2016 Queue Length Analysis
West Arm (dw12b) Pm Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 dw12b 2016 Reference Model Maximum Number
Average M26 dw12b 2016 With Dev Maximum Number V
Average M47 dw12b 2016WthMtgation Maximum Number

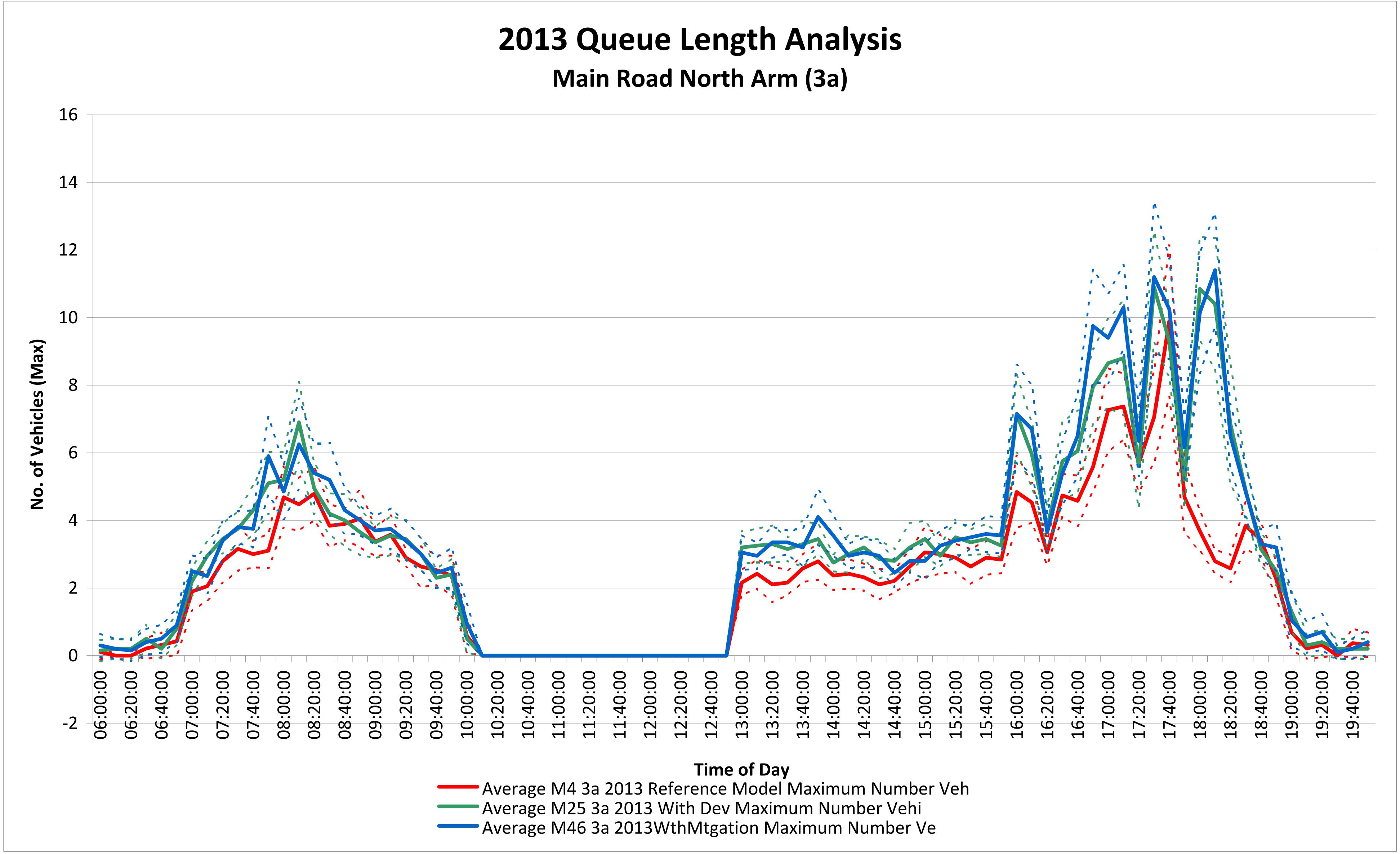

2016 Queue Length Analysis
A38 South Arm (dw12c)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 dw12c 2016 Reference Model Maximum Number
Average M26 dw12c 2016 With Dev Maximum Number V
Average M47 dw12c 2016WthMtgation Maximum Number



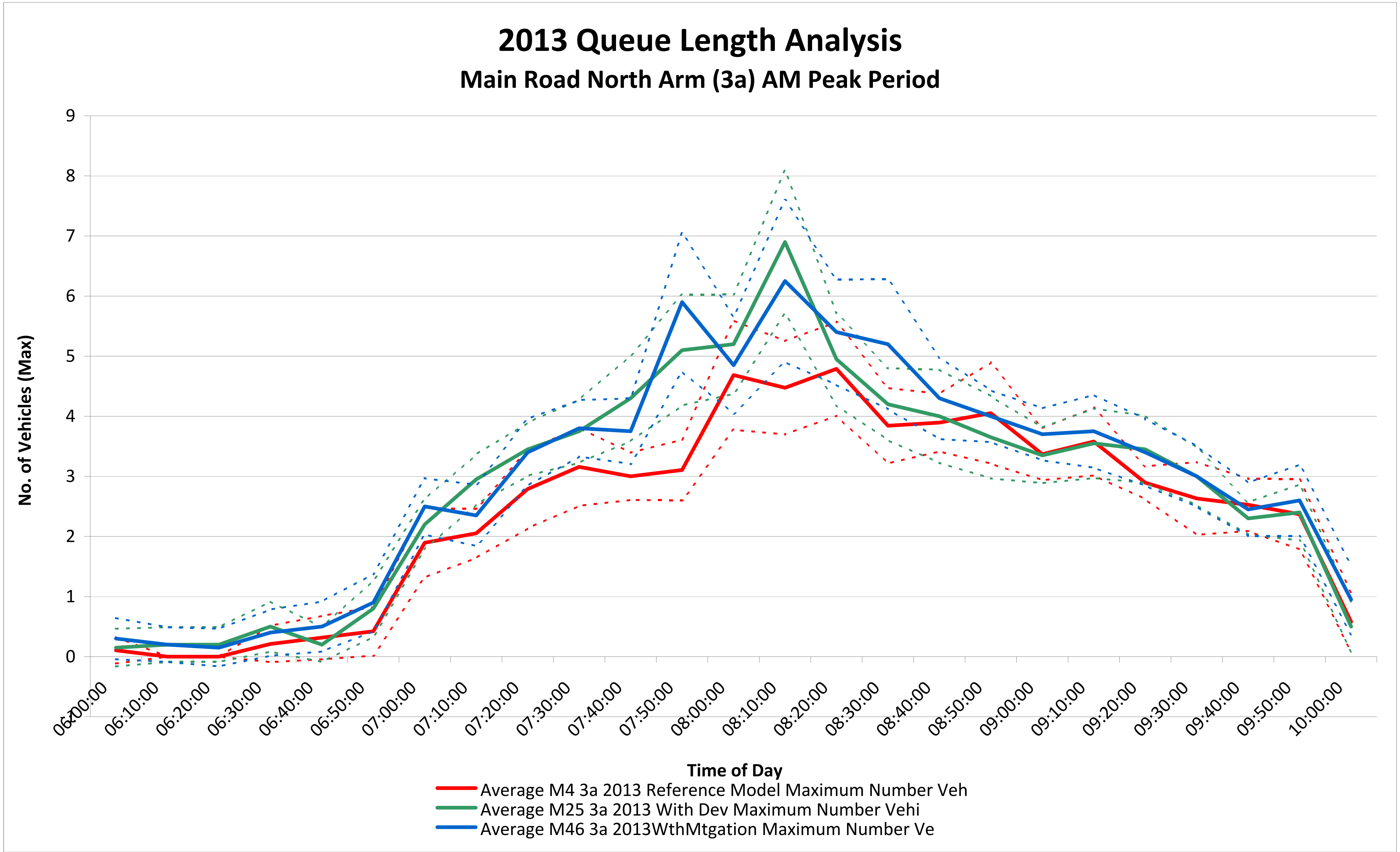
2016 Queue Length Analysis
A38 South Arm (dw12c) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 dw12c 2016 Reference Model Maximum Number
Average M26 dw12c 2016 With Dev Maximum Number V
Average M47 dw12c 2016WthMtgation Maximum Number

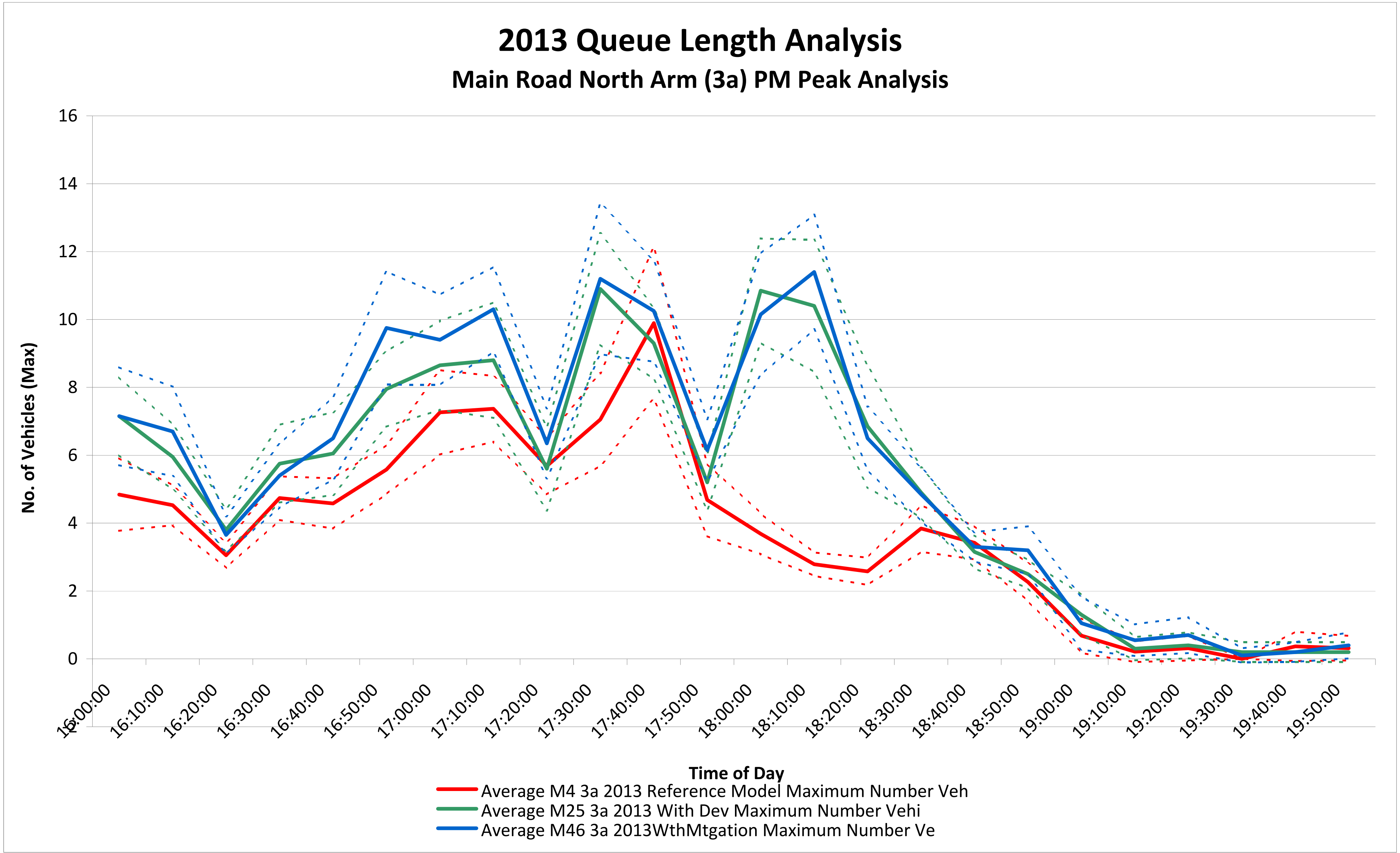

2016 Queue Length Analysis
A38 South Arm (dw12c) PM Peak Analysis
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 dw12c 2016 Reference Model Maximum Number
Average M26 dw12c 2016 With Dev Maximum Number V
Average M47 dw12c 2016WthMtgation Maximum Number

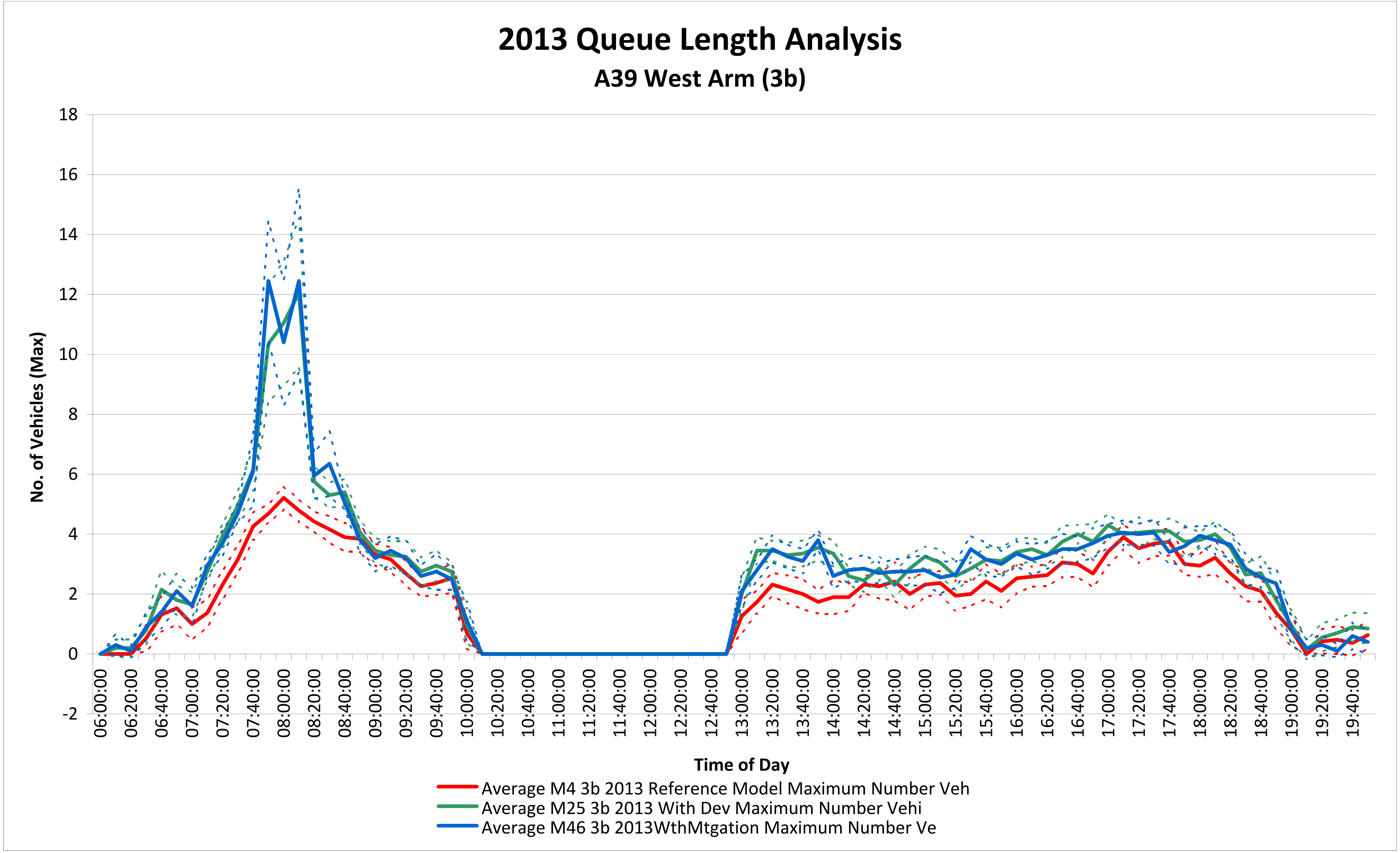
APPENDIX 15.7: 2013 REFERENCE V WITH DEVELOPMENT V WITH MITIGATION QUEUE GRAPHS



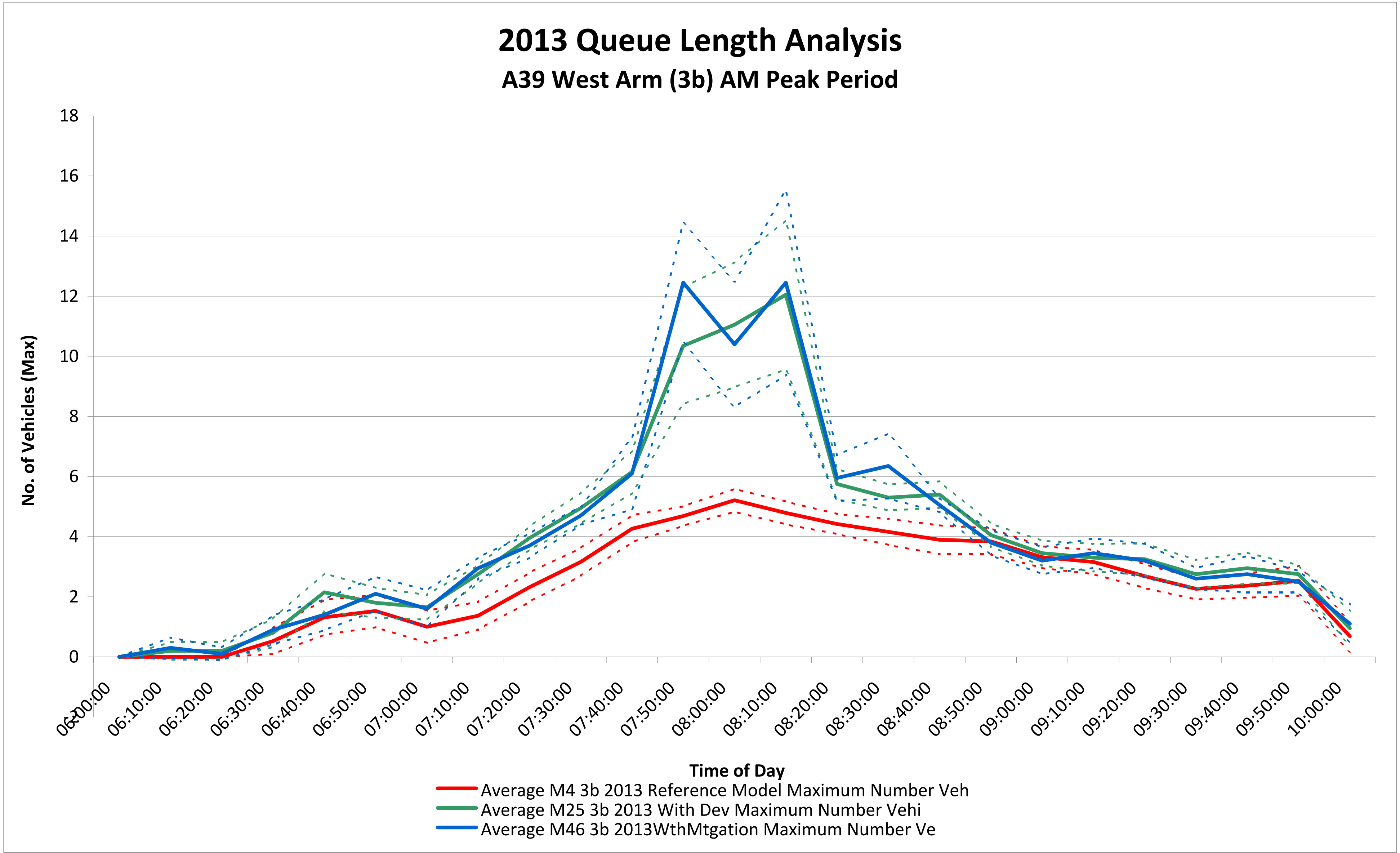
2013 Queue Length Analysis
Main Road North Arm (3a)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 3a 2013 Reference Model Maximum Number Veh
Average M25 3a 2013 With Dev Maximum Number Vehi
Average M46 3a 2013WthMtgation Maximum Number Ve

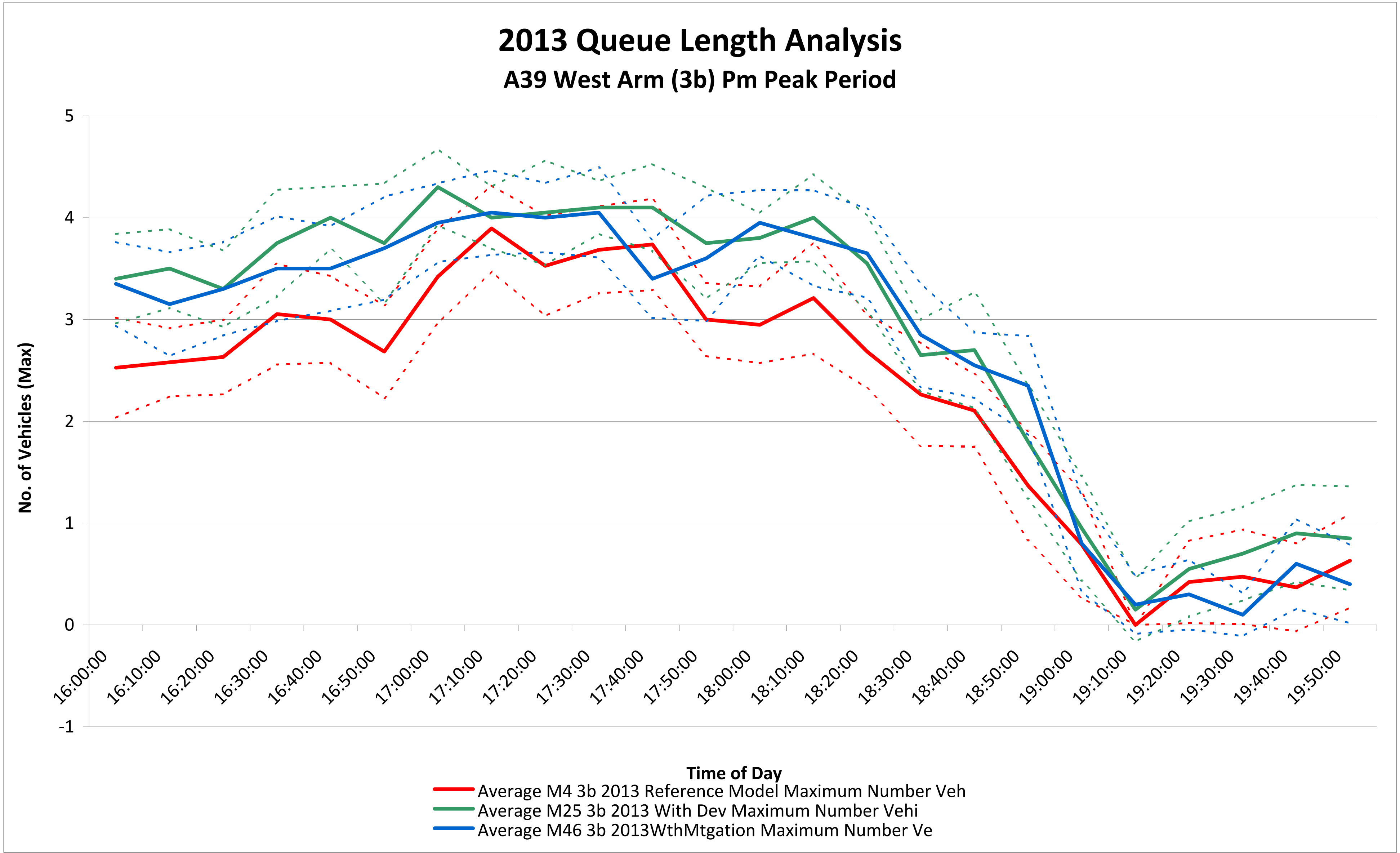

2013 Queue Length Analysis
Main Road North Arm (3a) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 3a 2013 Reference Model Maximum Number Veh
Average M25 3a 2013 With Dev Maximum Number Vehi
Average M46 3a 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
Main Road North Arm (3a) PM Peak Analysis
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 3a 2013 Reference Model Maximum Number Veh
Average M25 3a 2013 With Dev Maximum Number Vehi
Average M46 3a 2013WthMtgation Maximum Number Ve

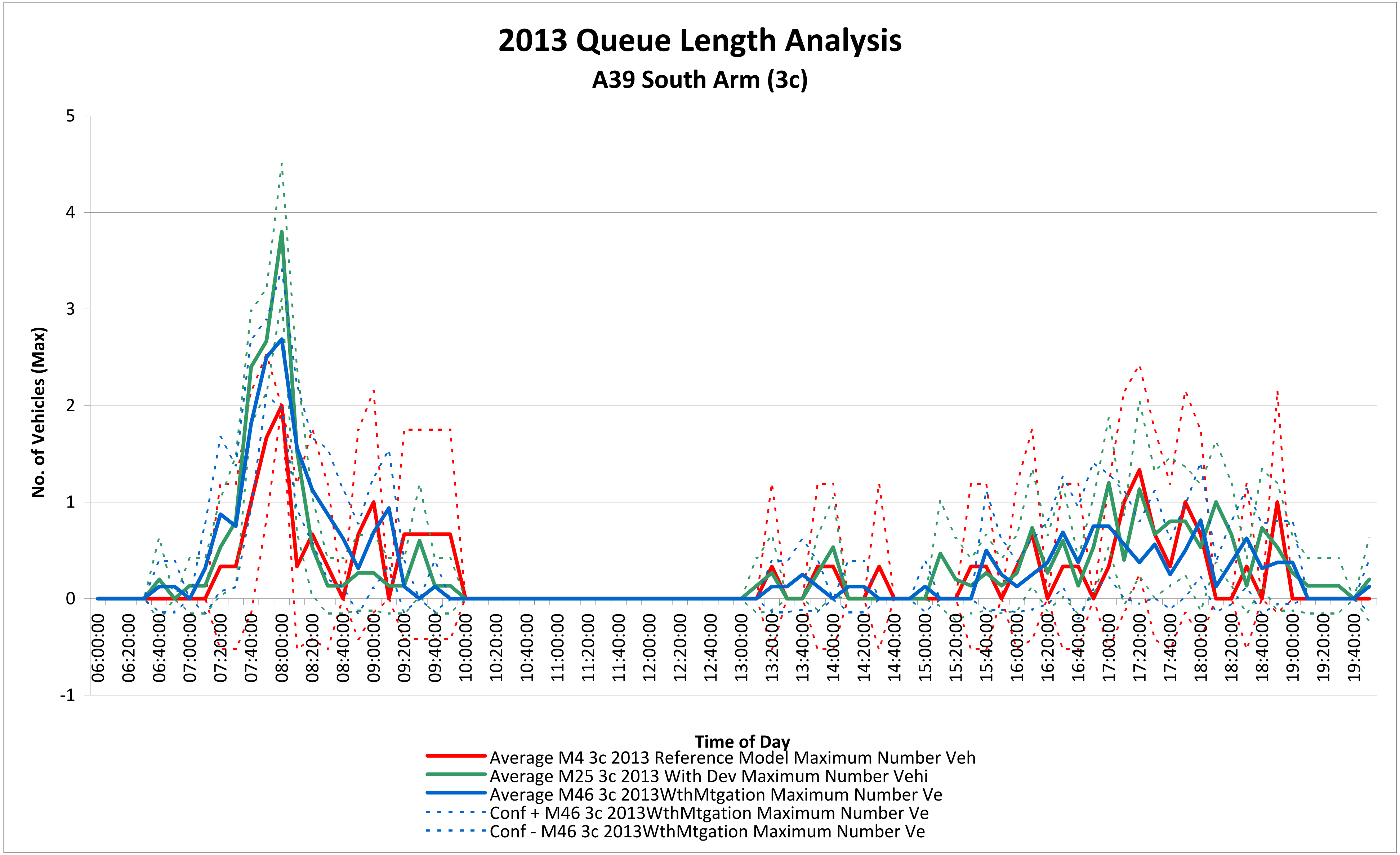


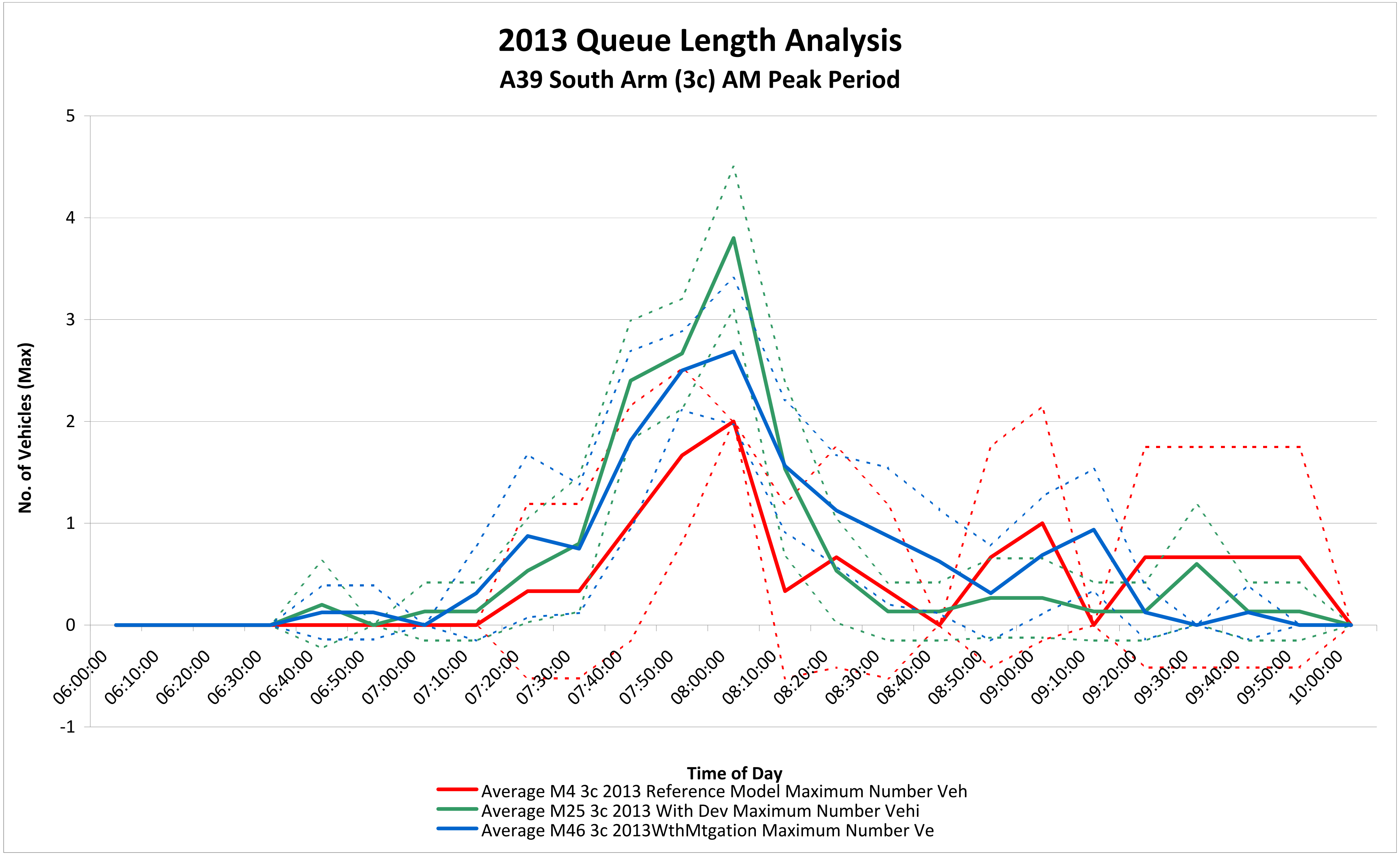
2013 Queue Length Analysis
A39 West Arm (3b)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 3b 2013 Reference Model Maximum Number Veh
Average M25 3b 2013 With Dev Maximum Number Vehi
Average M46 3b 2013WthMtgation Maximum Number Ve

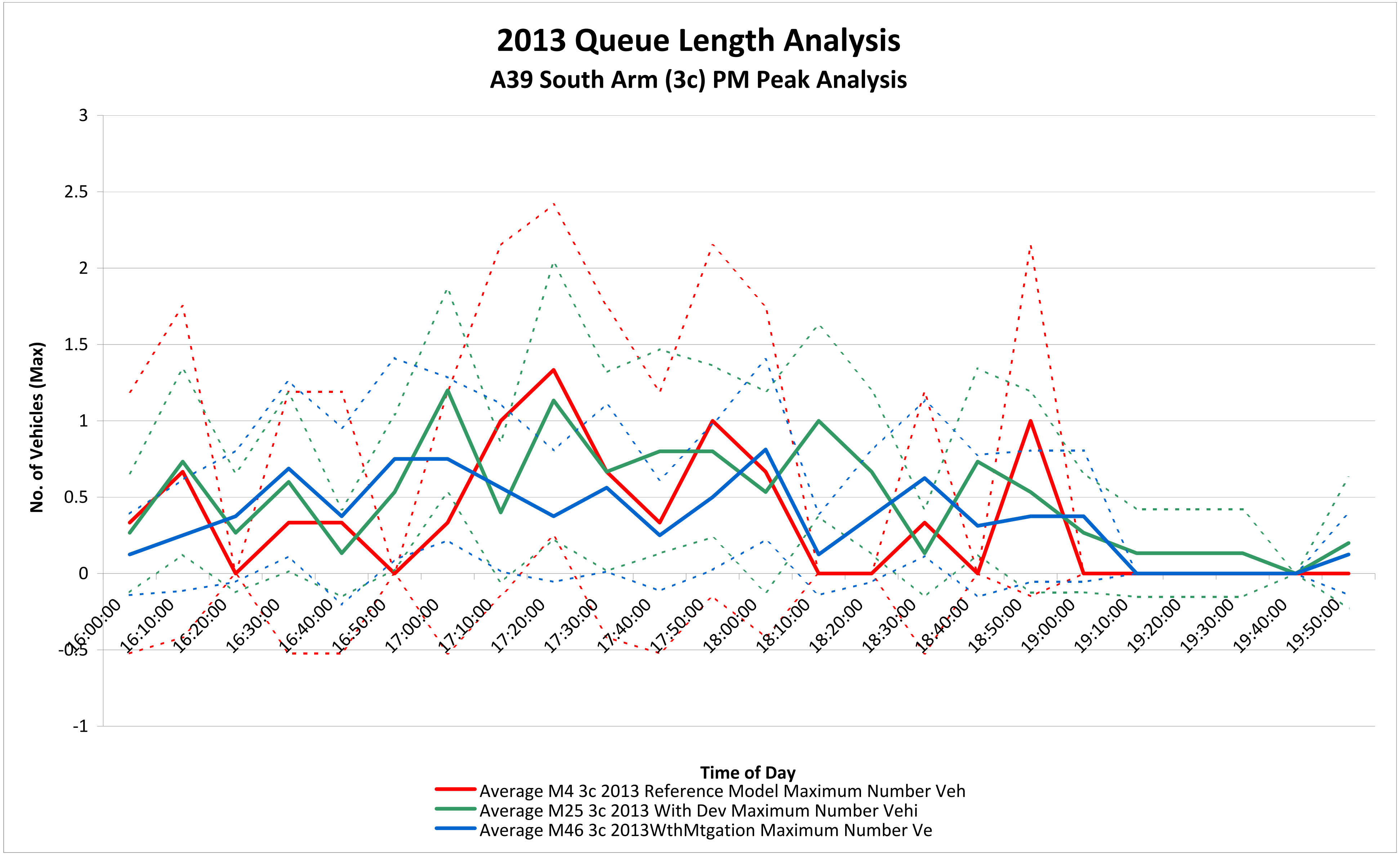

2013 Queue Length Analysis
A39 West Arm (3b) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 3b 2013 Reference Model Maximum Number Veh
Average M25 3b 2013 With Dev Maximum Number Vehi
Average M46 3b 2013WthMtgation Maximum Number Ve

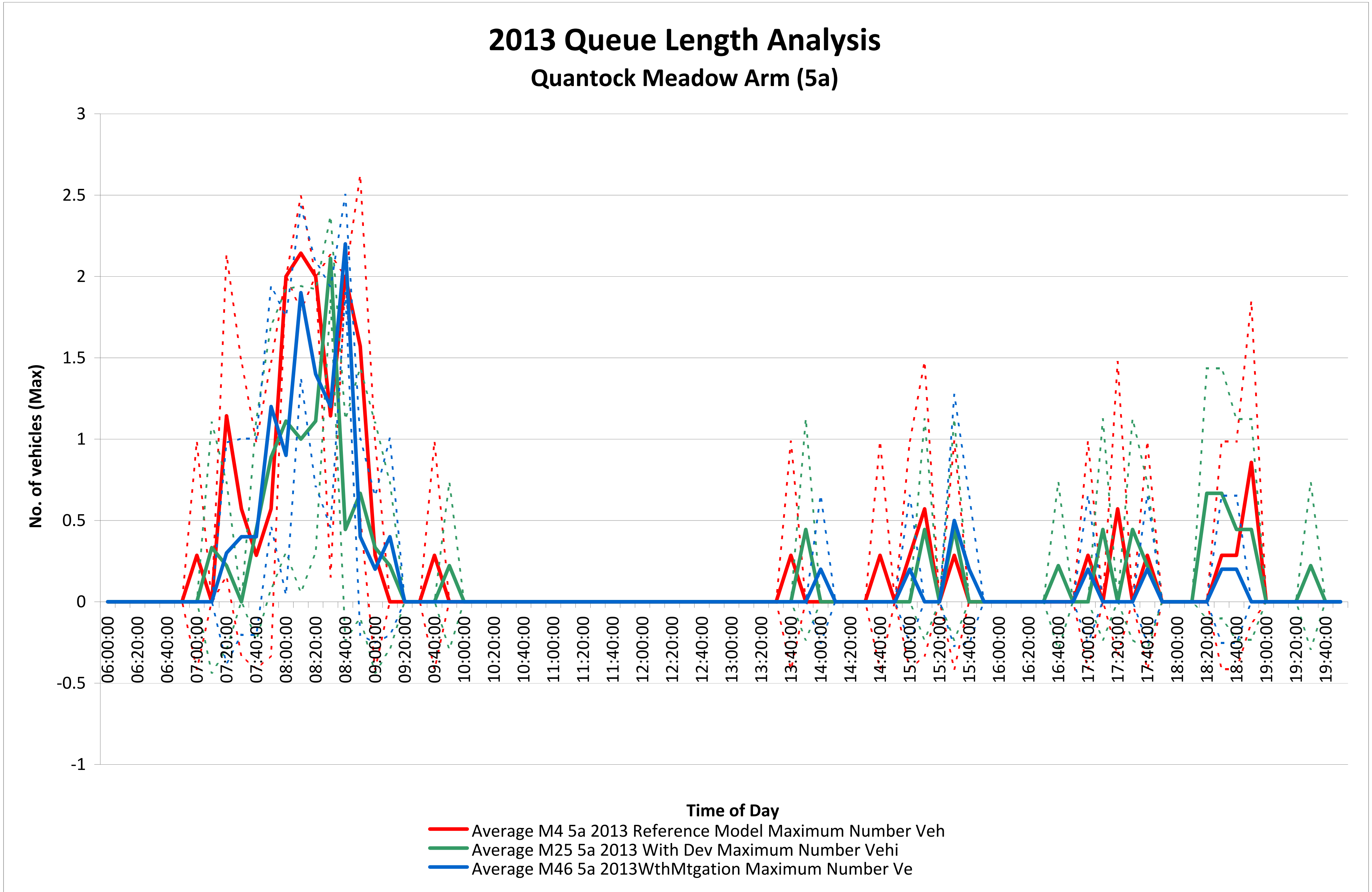


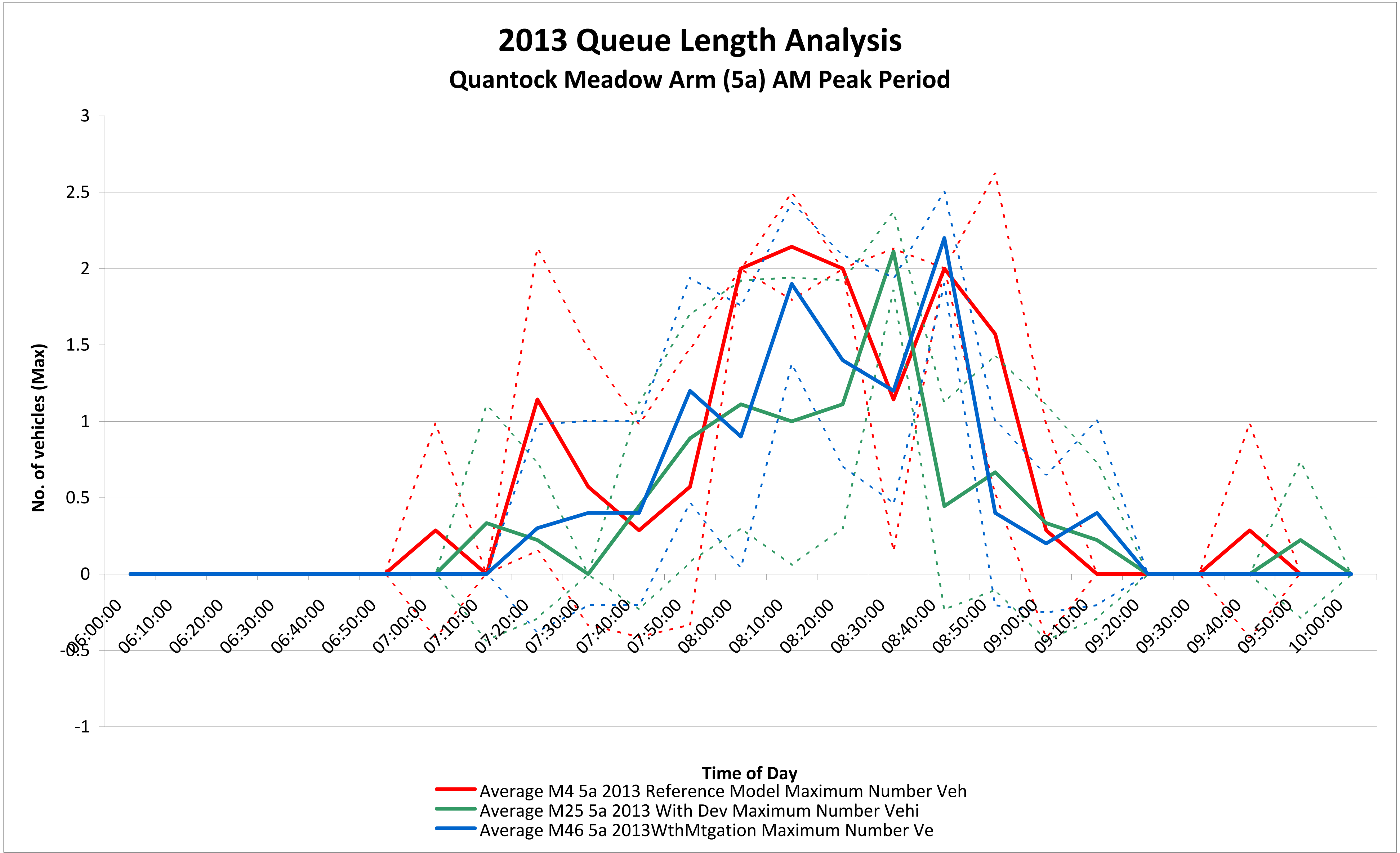
2013 Queue Length Analysis
A39 West Arm (3b) Pm Peak Period
No. of Vehicles (Max)
5
4
3
2
1
0
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 3b 2013 Reference Model Maximum Number Veh
Average M25 3b 2013 With Dev Maximum Number Vehi
Average M46 3b 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
A39 South Arm (3c)
No. of Vehicles (Max)
5
4
3
2
1
0
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 3c 2013 Reference Model Maximum Number Veh
Average M25 3c 2013 With Dev Maximum Number Vehi
Average M46 3c 2013WthMtgation Maximum Number Ve
Conf + M46 3c 2013WthMtgation Maximum Number Ve
Conf - M46 3c 2013WthMtgation Maximum Number Ve

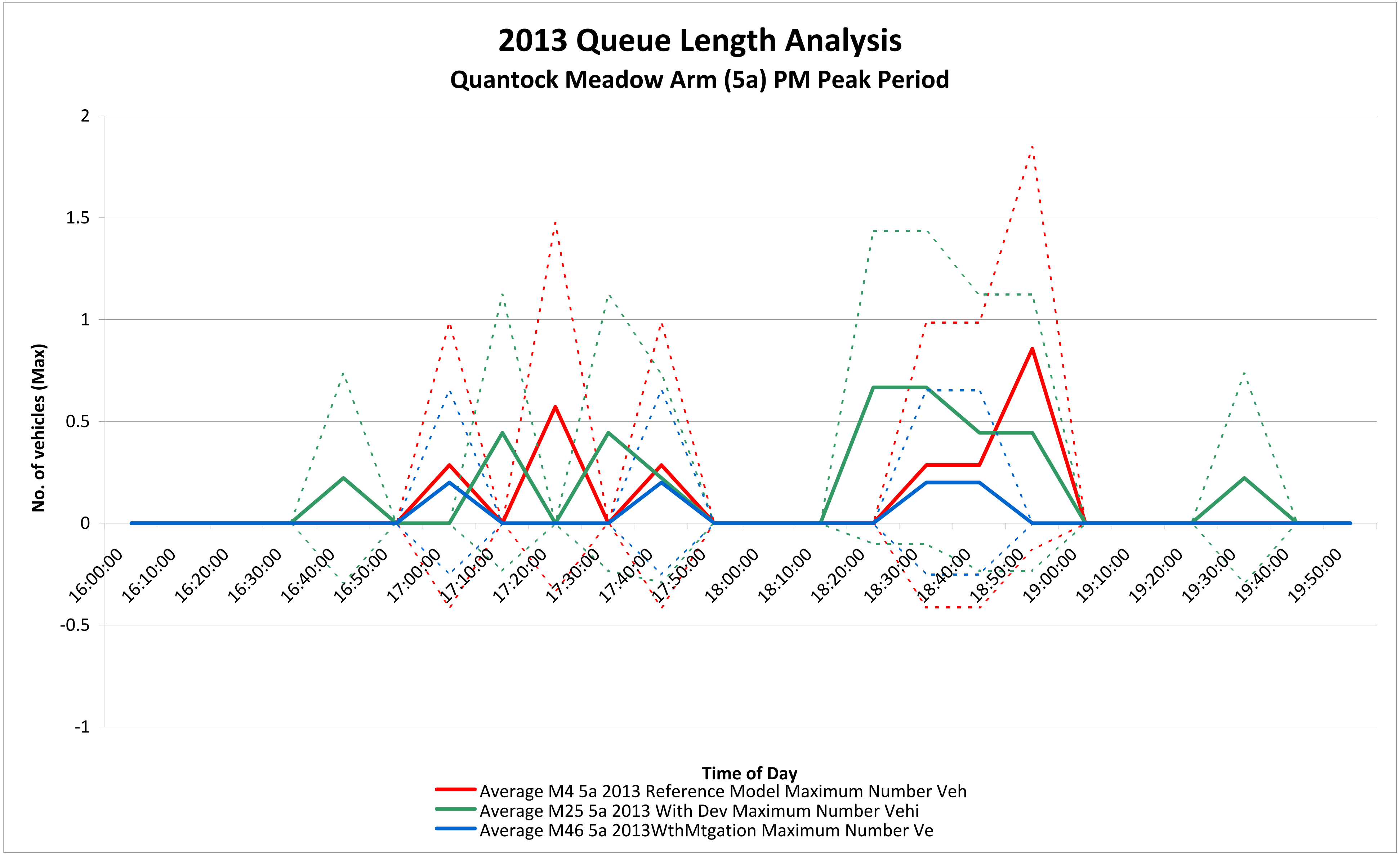

2013 Queue Length Analysis
A39 South Arm (3c) AM Peak Period
No. of Vehicles (Max)
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 3c 2013 Reference Model Maximum Number Veh
Average M25 3c 2013 With Dev Maximum Number Vehi
Average M46 3c 2013WthMtgation Maximum Number Ve

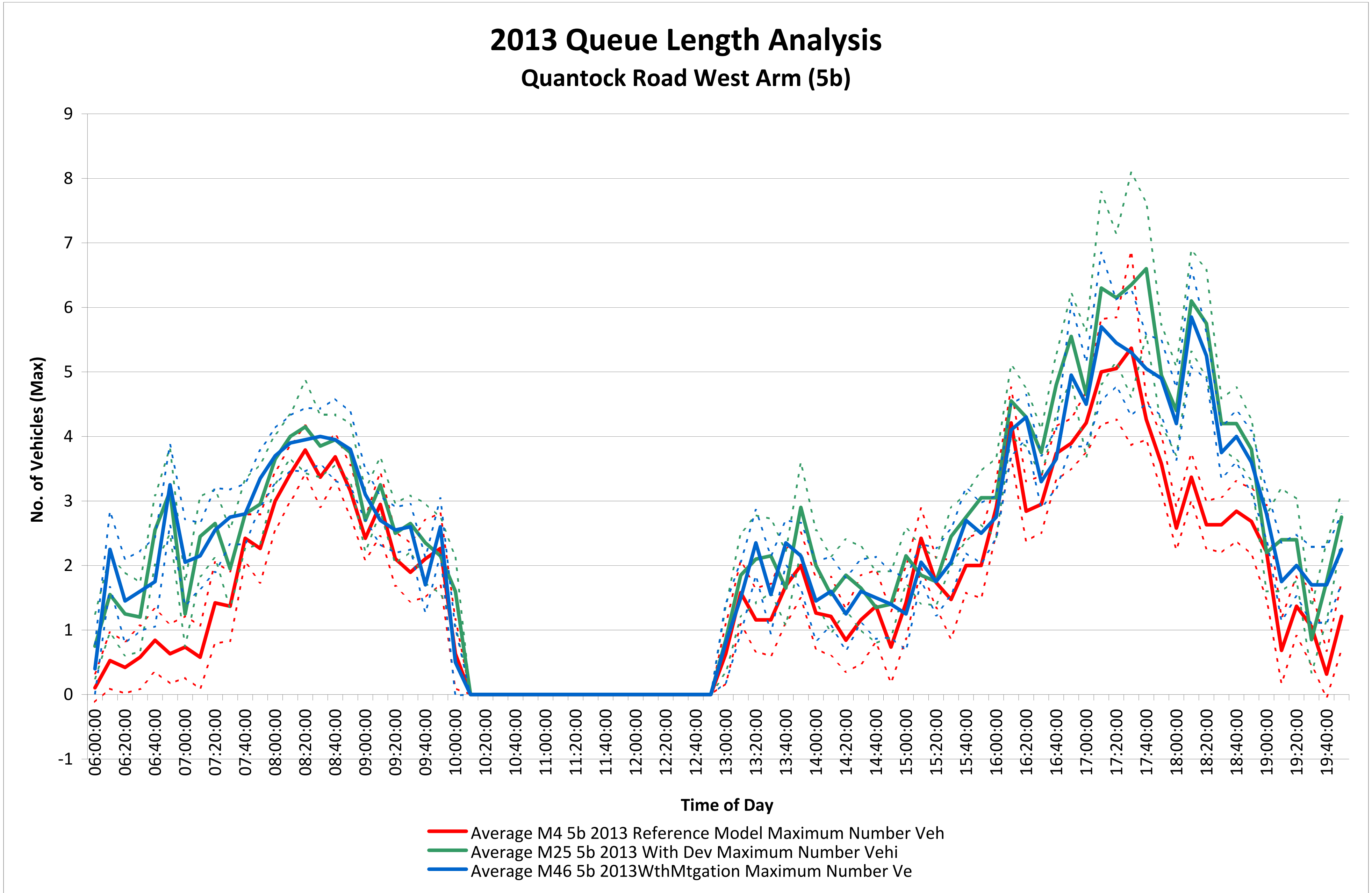

2013 Queue Length Analysis
A39 South Arm (3c) PM Peak Analysis
No. of Vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 3c 2013 Reference Model Maximum Number Veh
Average M25 3c 2013 With Dev Maximum Number Vehi
Average M46 3c 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
Quantock Meadow Arm (5a)
No. of vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5a 2013 Reference Model Maximum Number Veh
Average M25 5a 2013 With Dev Maximum Number Vehi
Average M46 5a 2013WthMtgation Maximum Number Ve

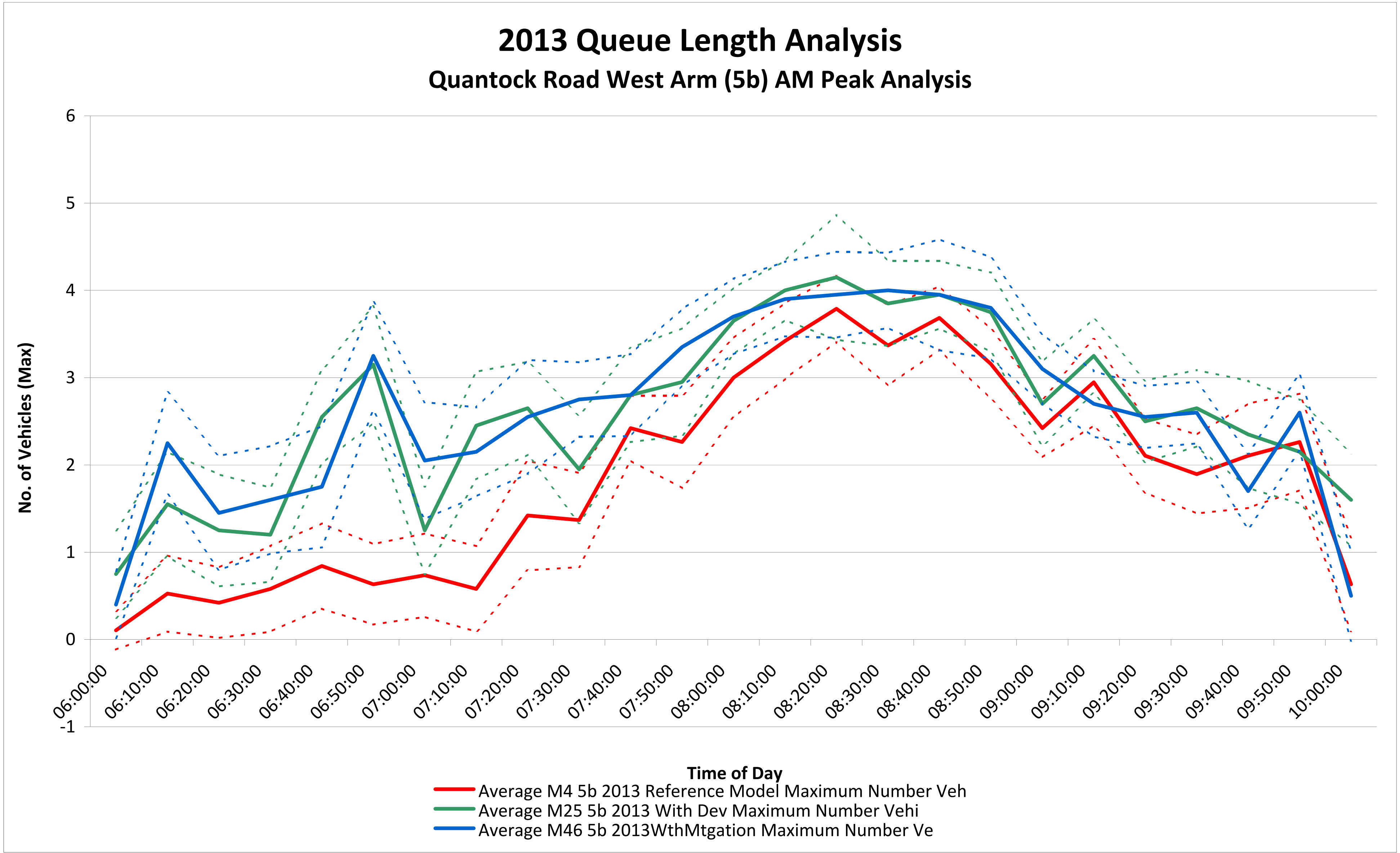


2013 Queue Length Analysis
Quantock Meadow Arm (5a) AM Peak Period
No. of vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5a 2013 Reference Model Maximum Number Veh
Average M25 5a 2013 With Dev Maximum Number Vehi
Average M46 5a 2013WthMtgation Maximum Number Ve

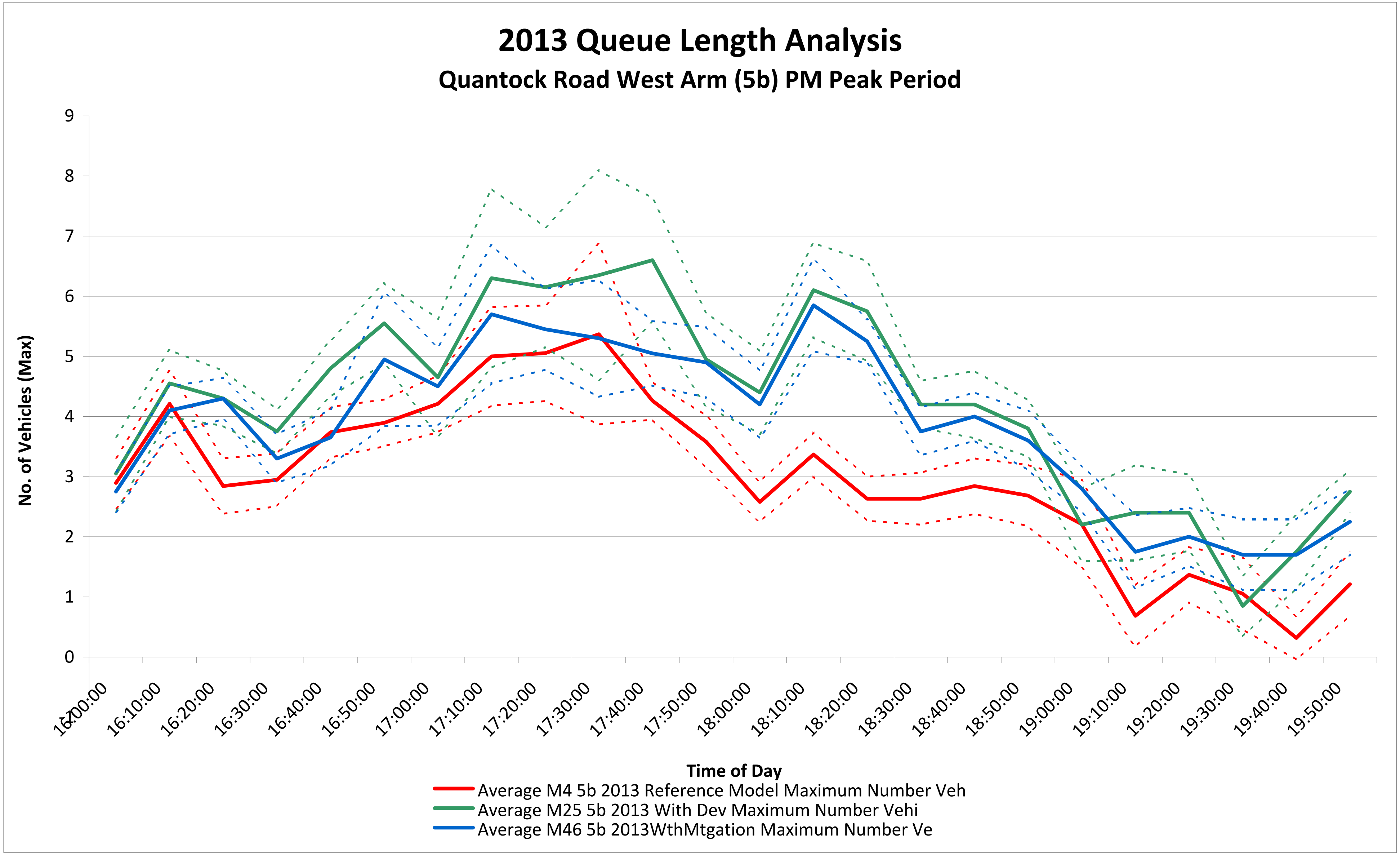

2013 Queue Length Analysis
Quantock Meadow Arm (5a) PM Peak Period
No. of vehicles (Max)
2
1.5
1
0.5
0
-0.5
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5a 2013 Reference Model Maximum Number Veh
Average M25 5a 2013 With Dev Maximum Number Vehi
Average M46 5a 2013WthMtgation Maximum Number Ve

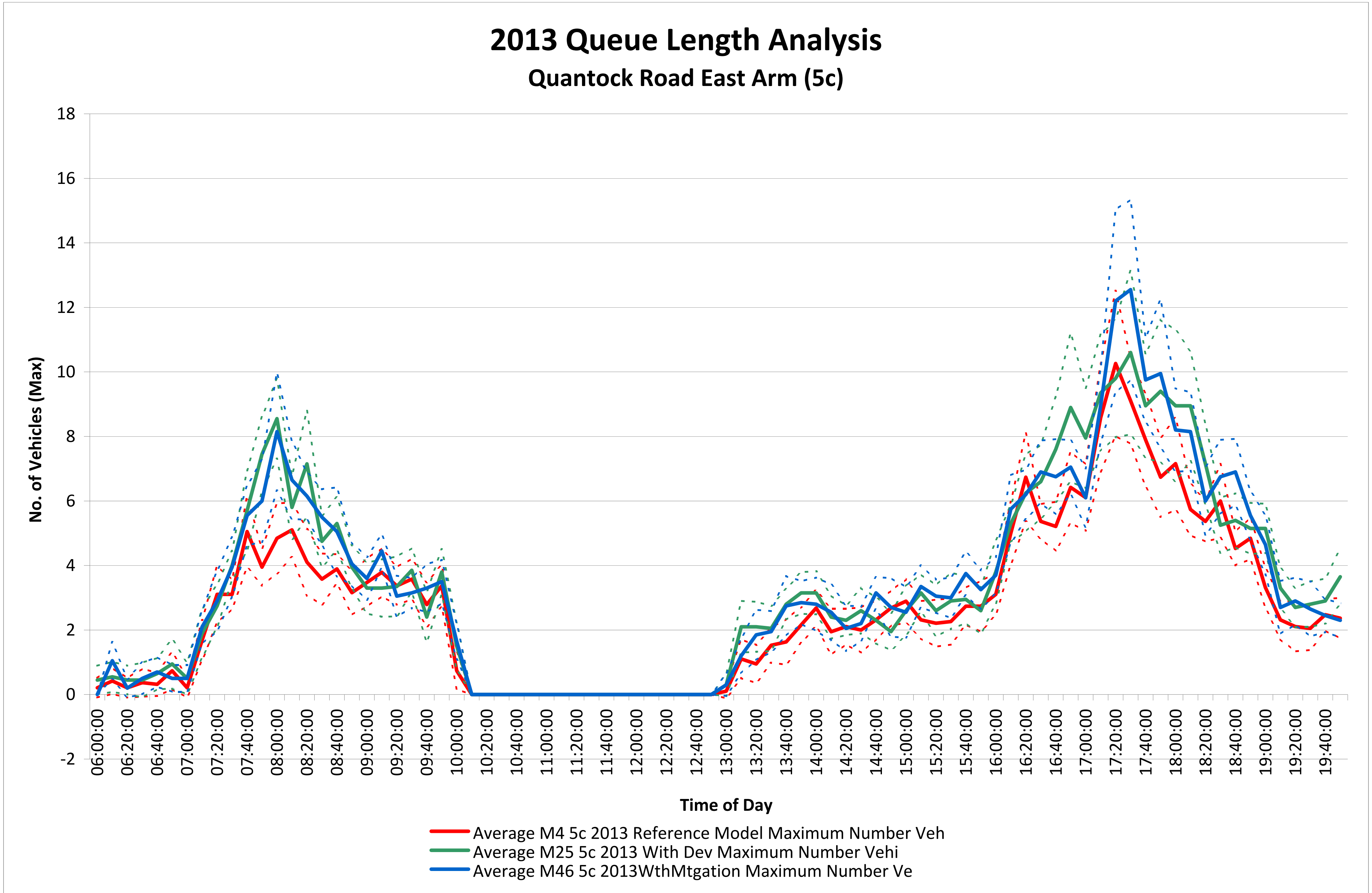


2013 Queue Length Analysis
Quantock Road West Arm (5b)
No. of Vehicles (Max)
9
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5b 2013 Reference Model Maximum Number Veh
Average M25 5b 2013 With Dev Maximum Number Vehi
Average M46 5b 2013WthMtgation Maximum Number Ve

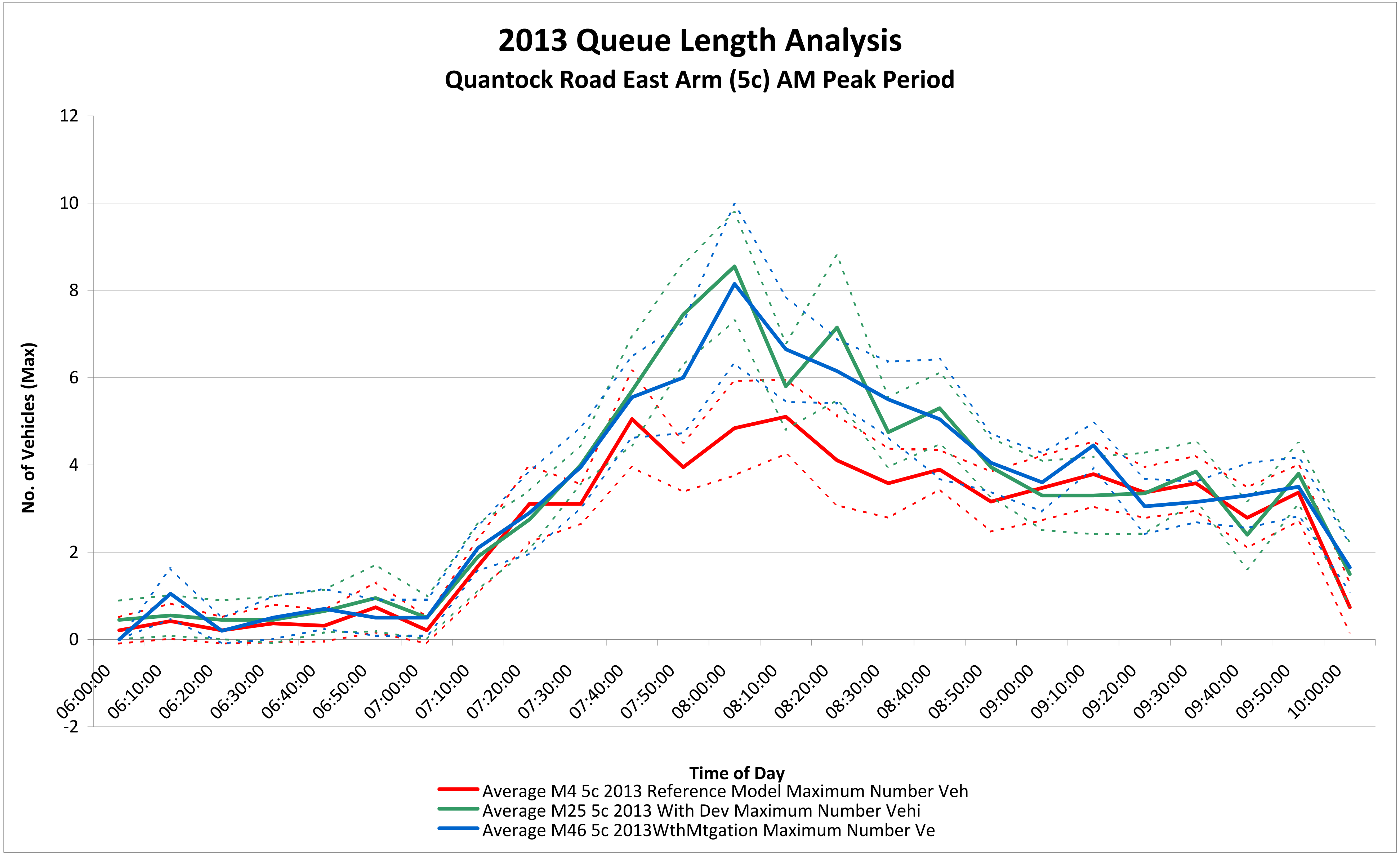


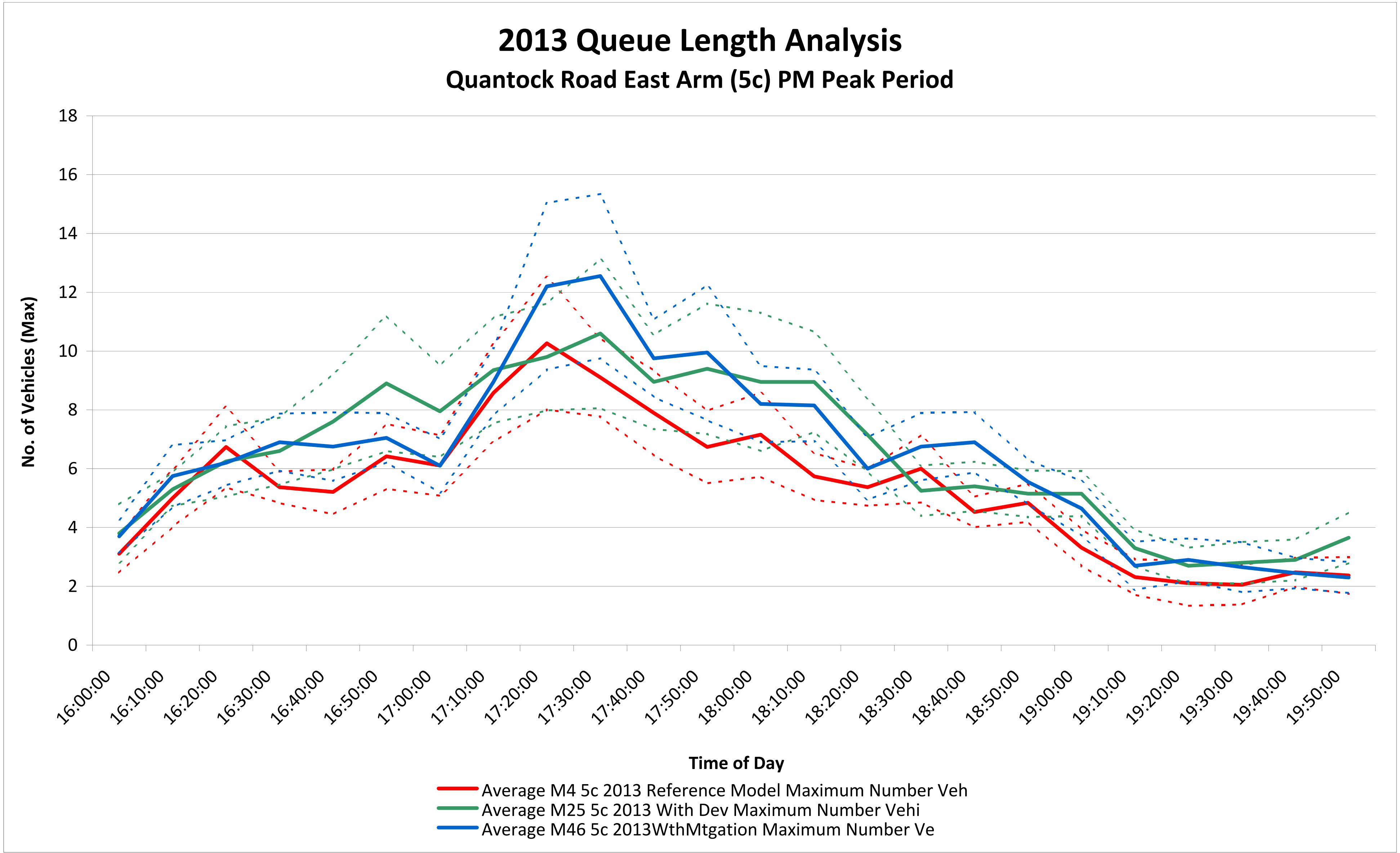
2013 Queue Length Analysis
Quantock Road West Arm (5b) AM Peak Analysis
No. of Vehicles (Max)
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5b 2013 Reference Model Maximum Number Veh
Average M25 5b 2013 With Dev Maximum Number Vehi
Average M46 5b 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
Quantock Road West Arm (5b) PM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5b 2013 Reference Model Maximum Number Veh
Average M25 5b 2013 With Dev Maximum Number Vehi
Average M46 5b 2013WthMtgation Maximum Number Ve

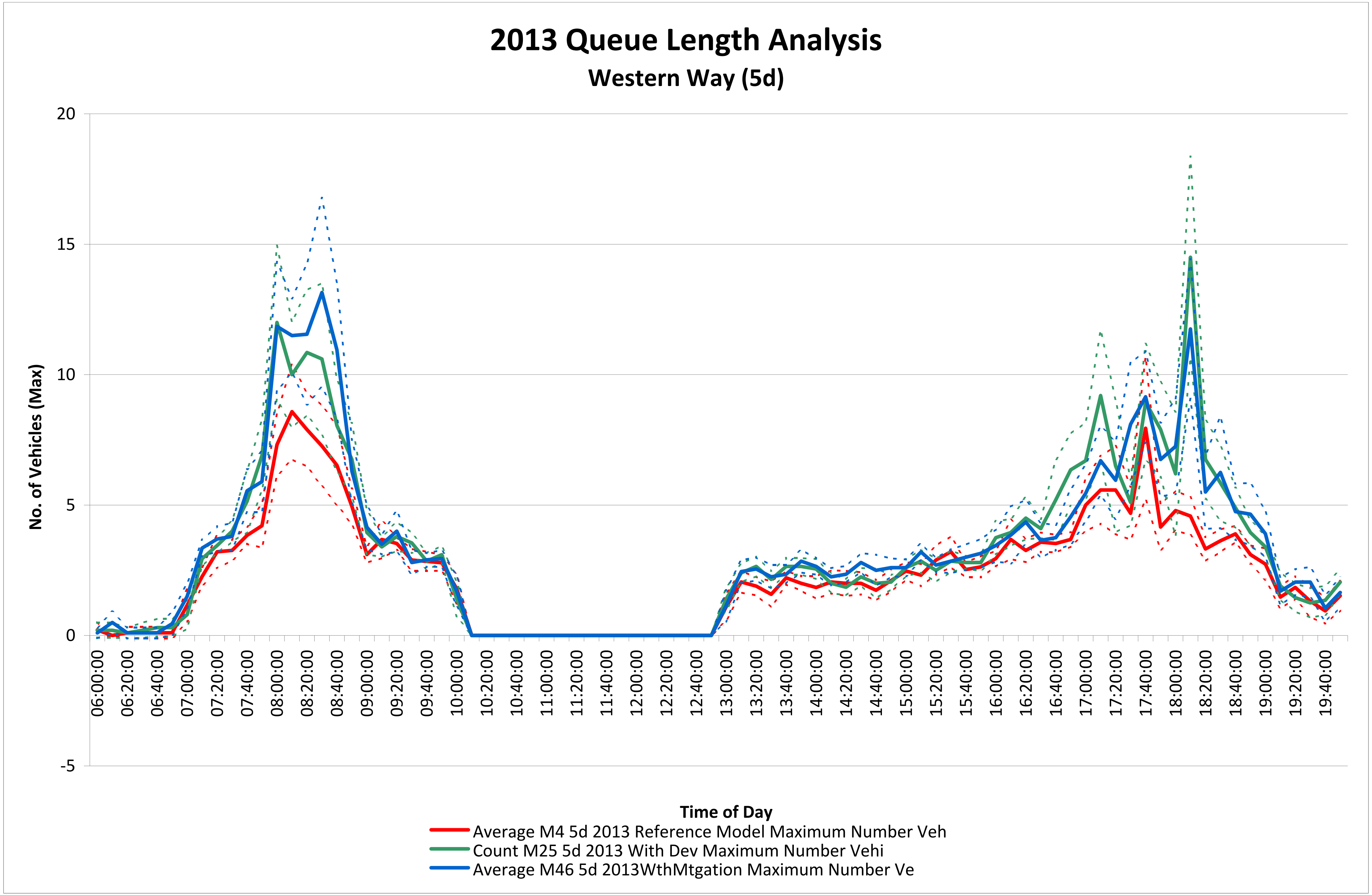


2013 Queue Length Analysis
Quantock Road East Arm (5c)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5c 2013 Reference Model Maximum Number Veh
Average M25 5c 2013 With Dev Maximum Number Vehi
Average M46 5c 2013WthMtgation Maximum Number Ve

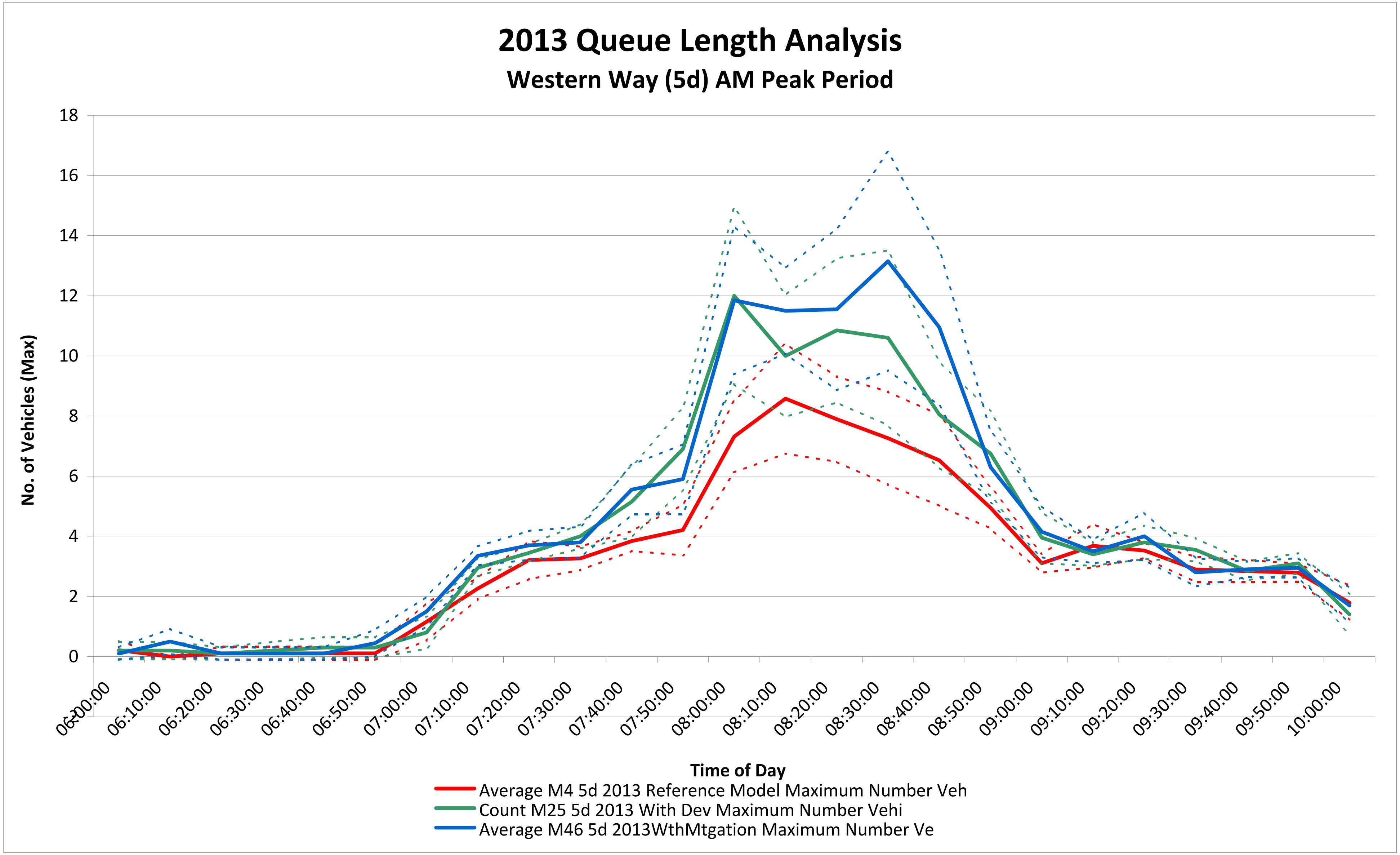

2013 Queue Length Analysis
Quantock Road East Arm (5c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5c 2013 Reference Model Maximum Number Veh
Average M25 5c 2013 With Dev Maximum Number Vehi
Average M46 5c 2013WthMtgation Maximum Number Ve



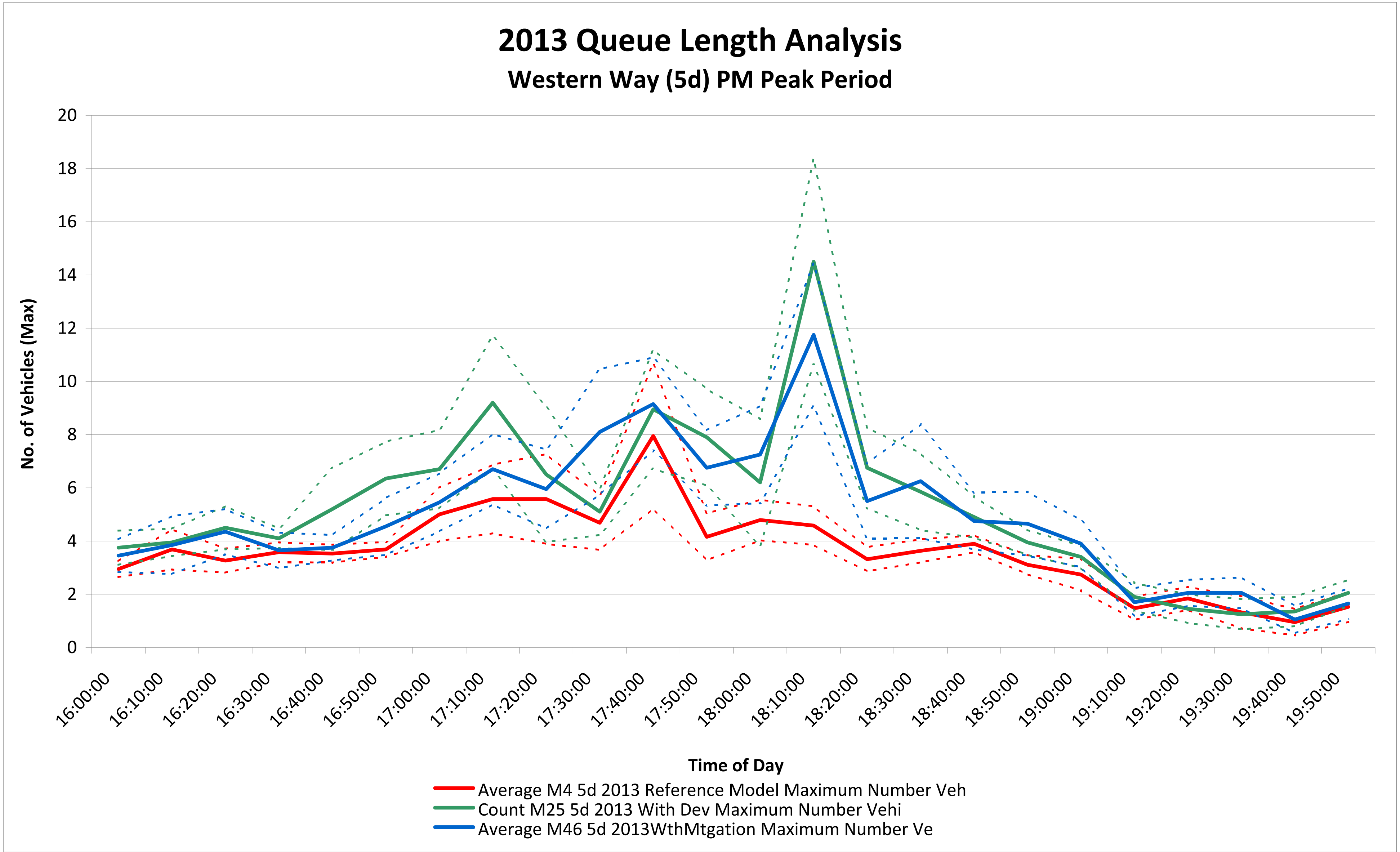
2013 Queue Length Analysis
Quantock Road East Arm (5c) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5c 2013 Reference Model Maximum Number Veh
Average M25 5c 2013 With Dev Maximum Number Vehi
Average M46 5c 2013WthMtgation Maximum Number Ve

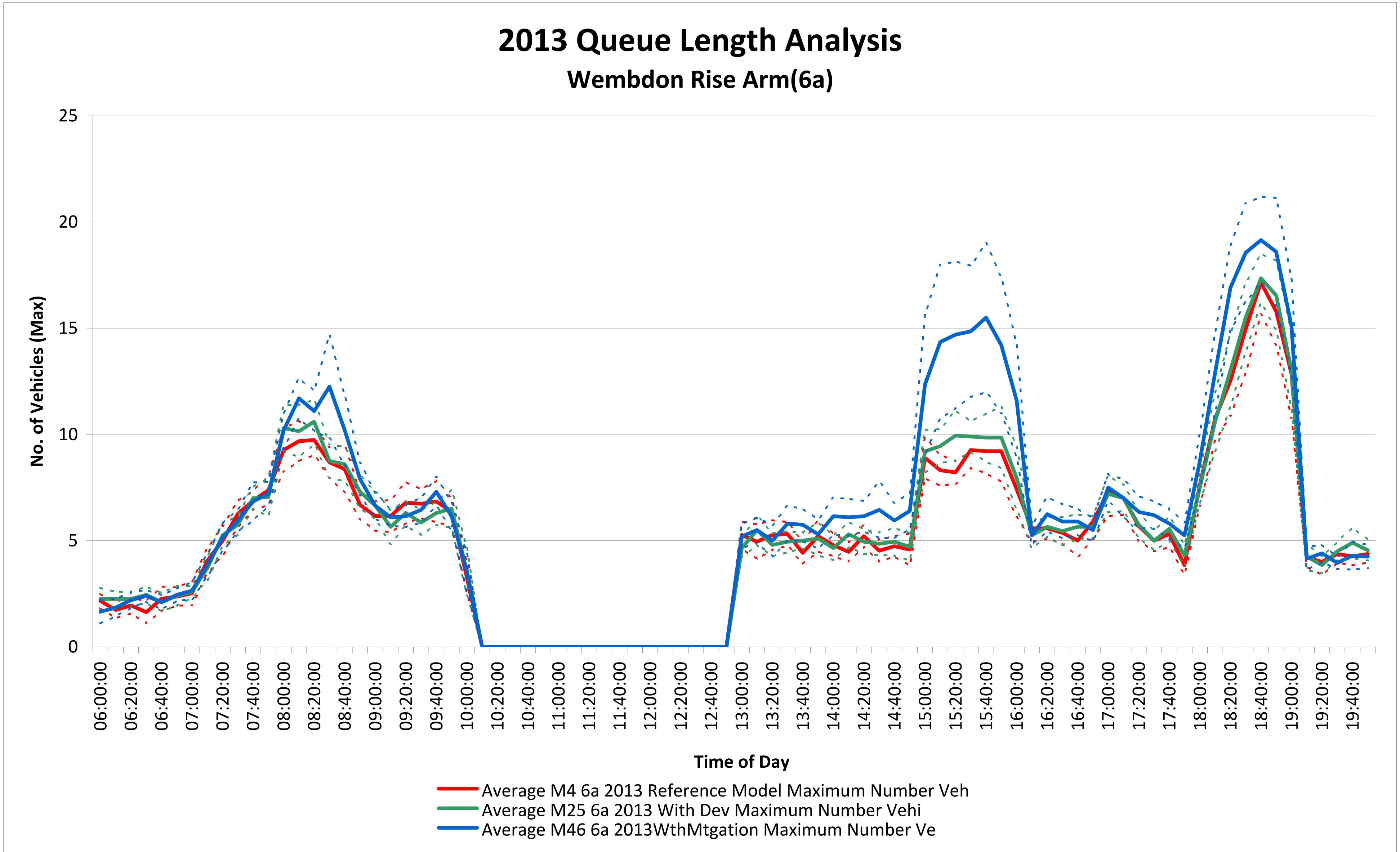


2013 Queue Length Analysis
Western Way (5d)
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 5d 2013 Reference Model Maximum Number Veh
Count M25 5d 2013 With Dev Maximum Number Vehi
Average M46 5d 2013WthMtgation Maximum Number Ve

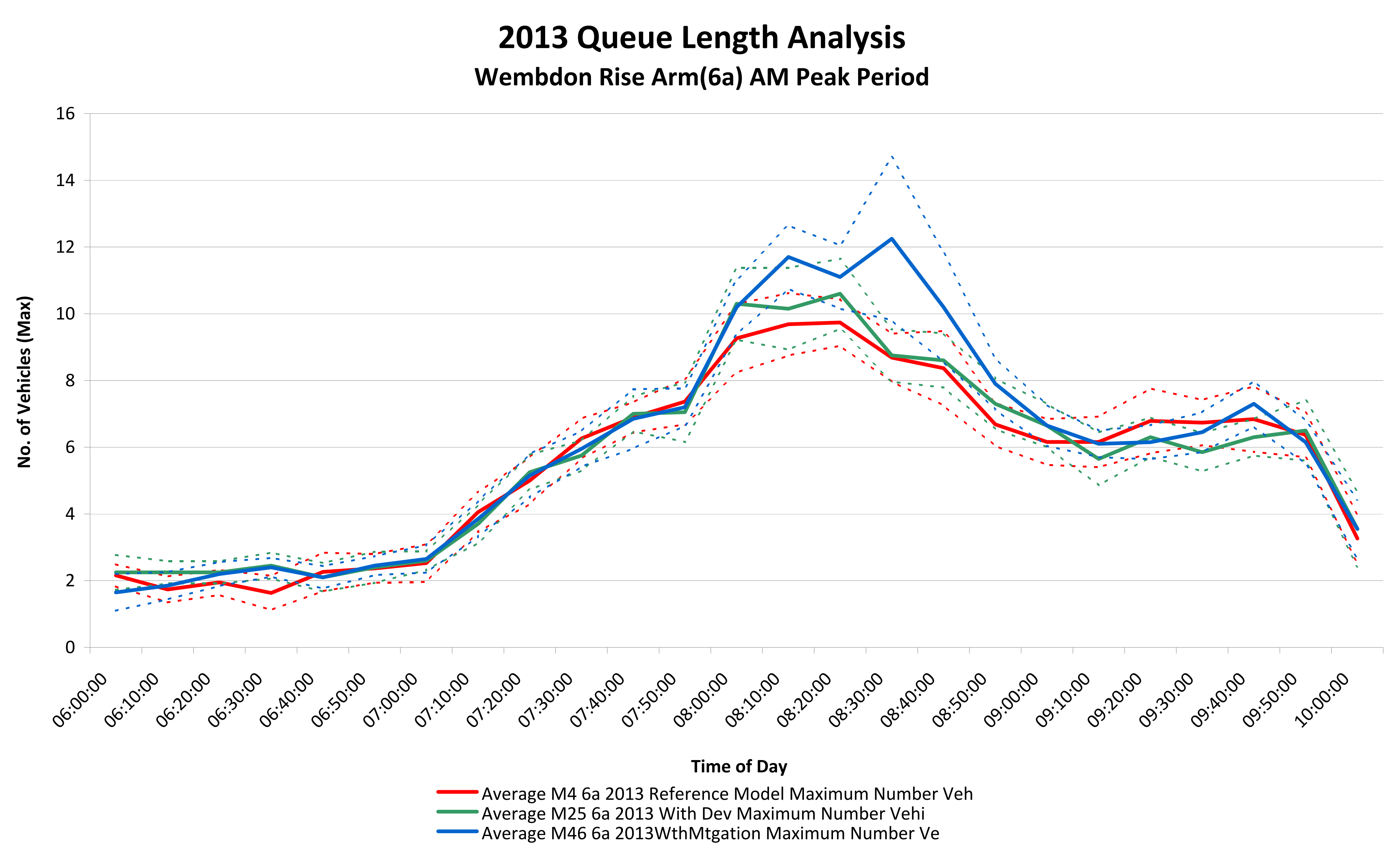


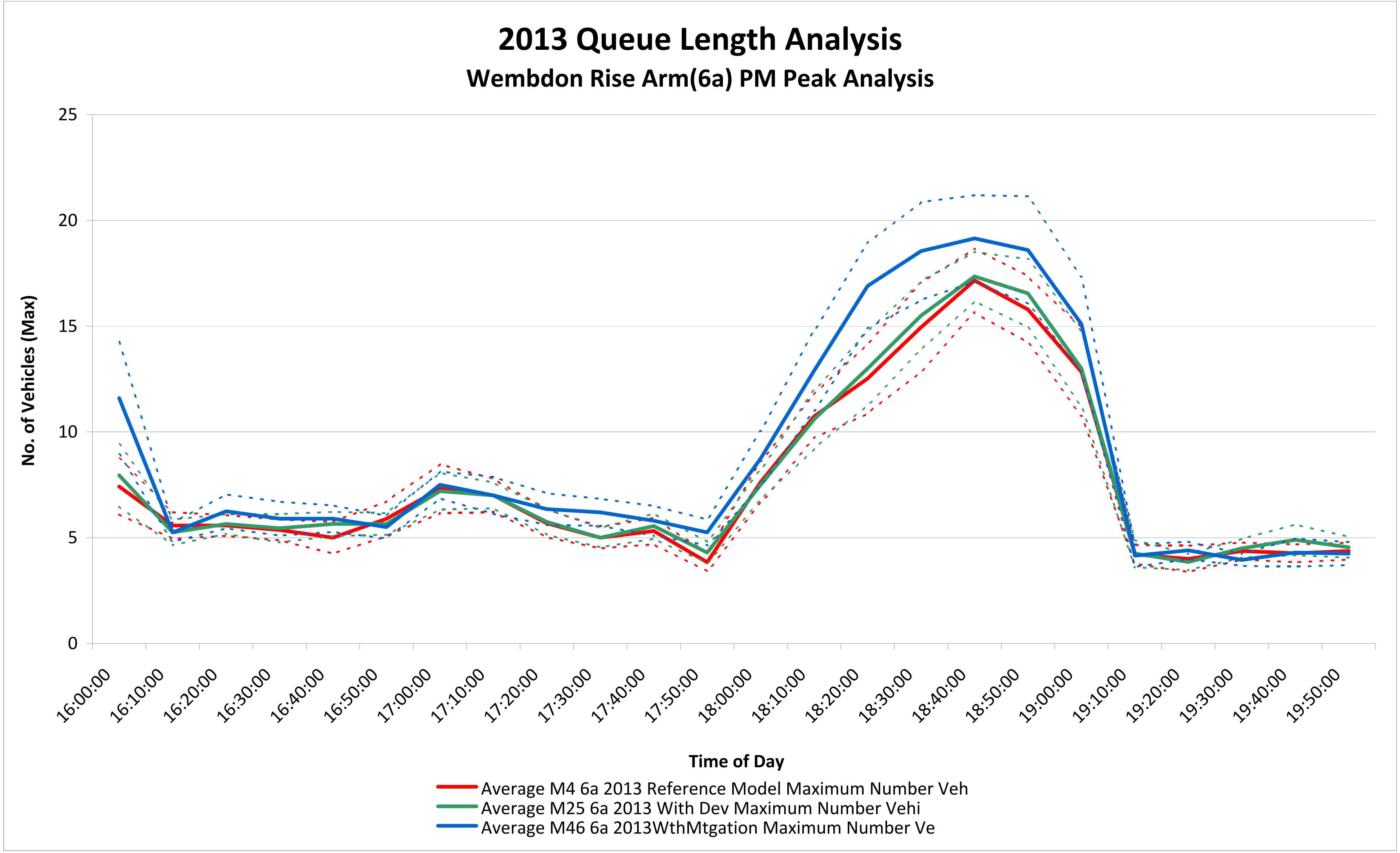
2013 Queue Length Analysis
Western Way (5d) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 5d 2013 Reference Model Maximum Number Veh
Count M25 5d 2013 With Dev Maximum Number Vehi
Average M46 5d 2013WthMtgation Maximum Number Ve

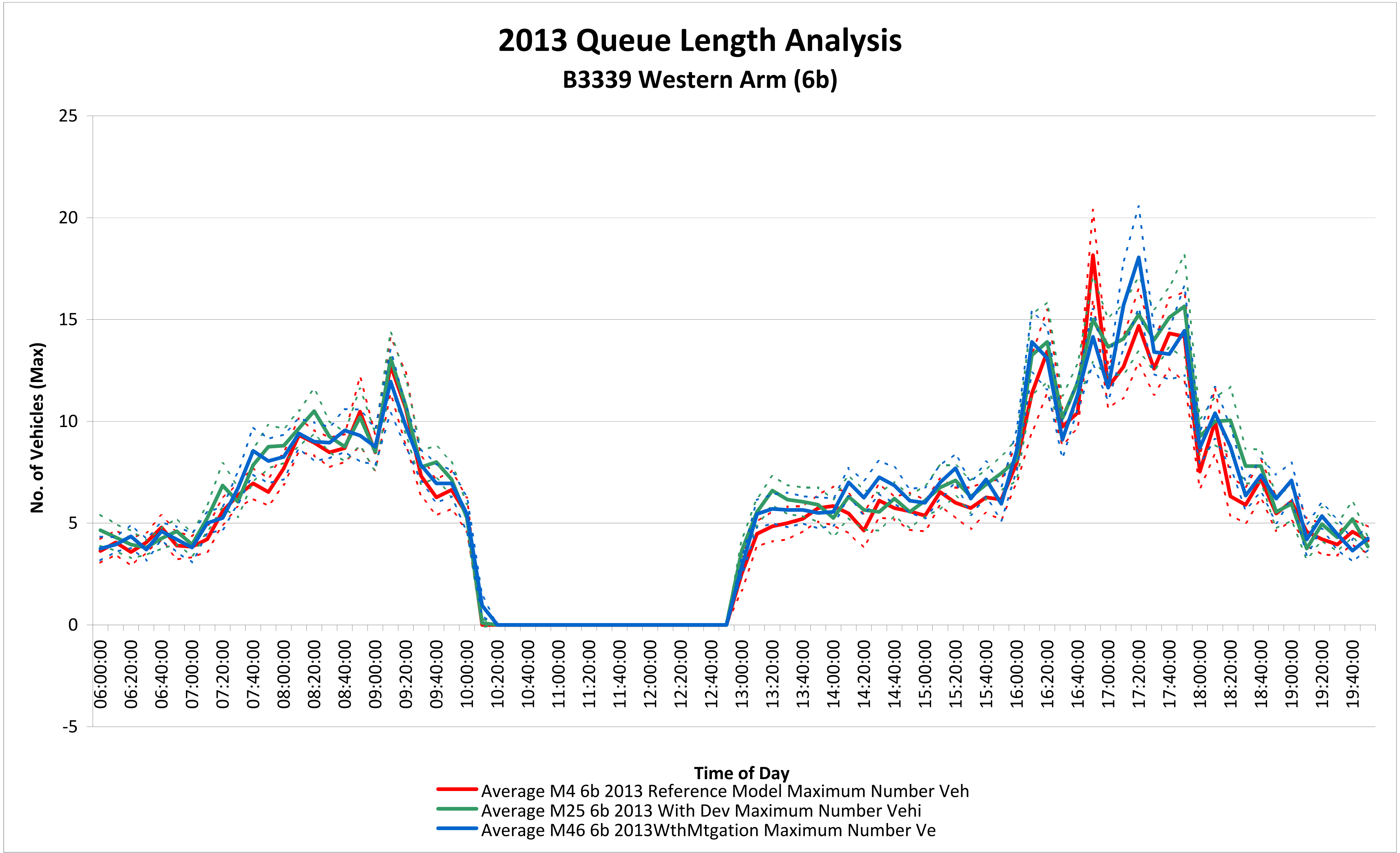

2013 Queue Length Analysis
Western Way (5d) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 5d 2013 Reference Model Maximum Number Veh
Count M25 5d 2013 With Dev Maximum Number Vehi
Average M46 5d 2013WthMtgation Maximum Number Ve



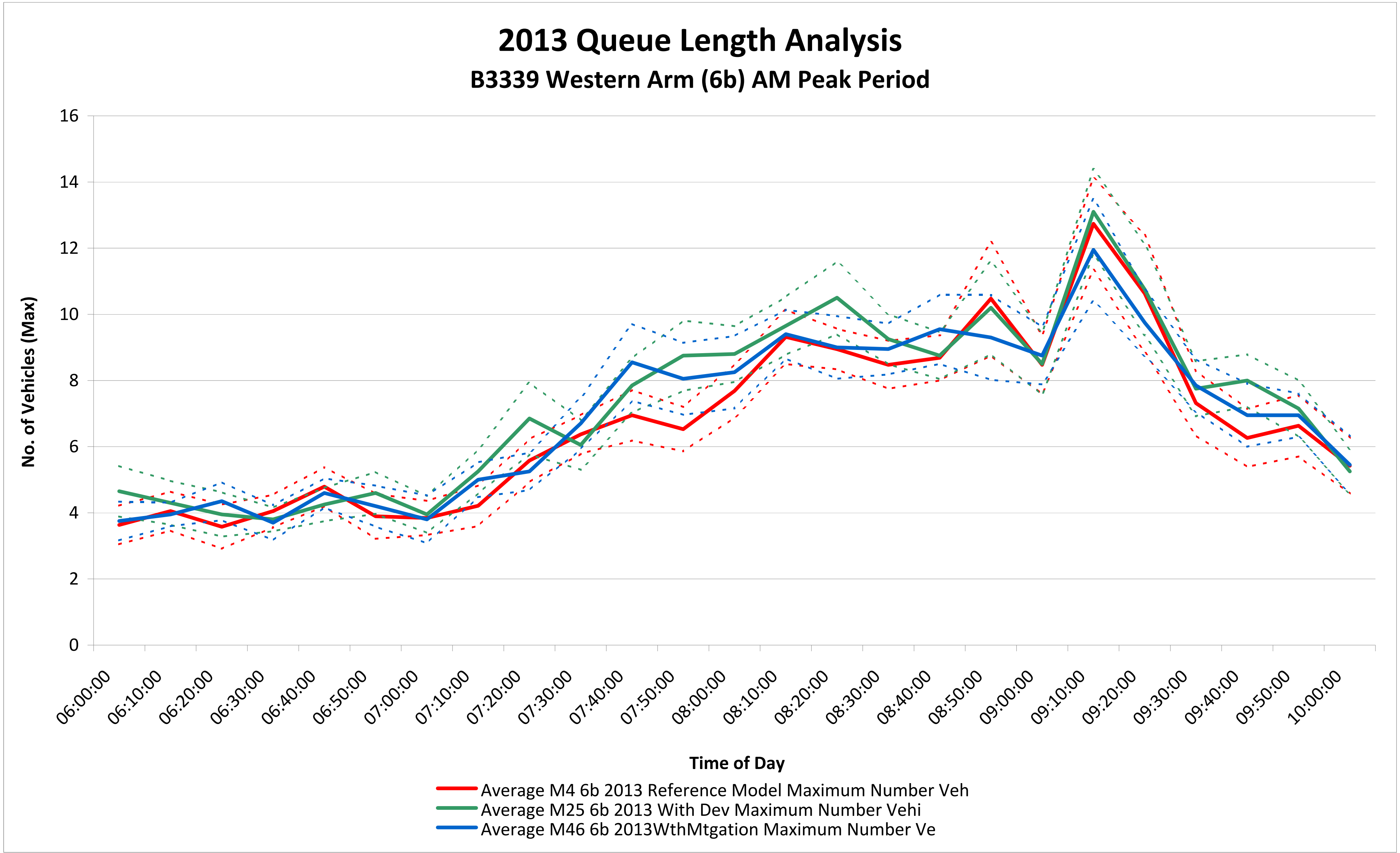
2013 Queue Length Analysis
Wembdon Rise Arm(6a)
No. of Vehicles (Max)
0
5
10
15
20
25
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 6a 2013 Reference Model Maximum Number Veh
Average M25 6a 2013 With Dev Maximum Number Vehi
Average M46 6a 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
Wembdon Rise Arm(6a) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 6a 2013 Reference Model Maximum Number Veh
Average M25 6a 2013 With Dev Maximum Number Vehi
Average M46 6a 2013WthMtgation Maximum Number Ve

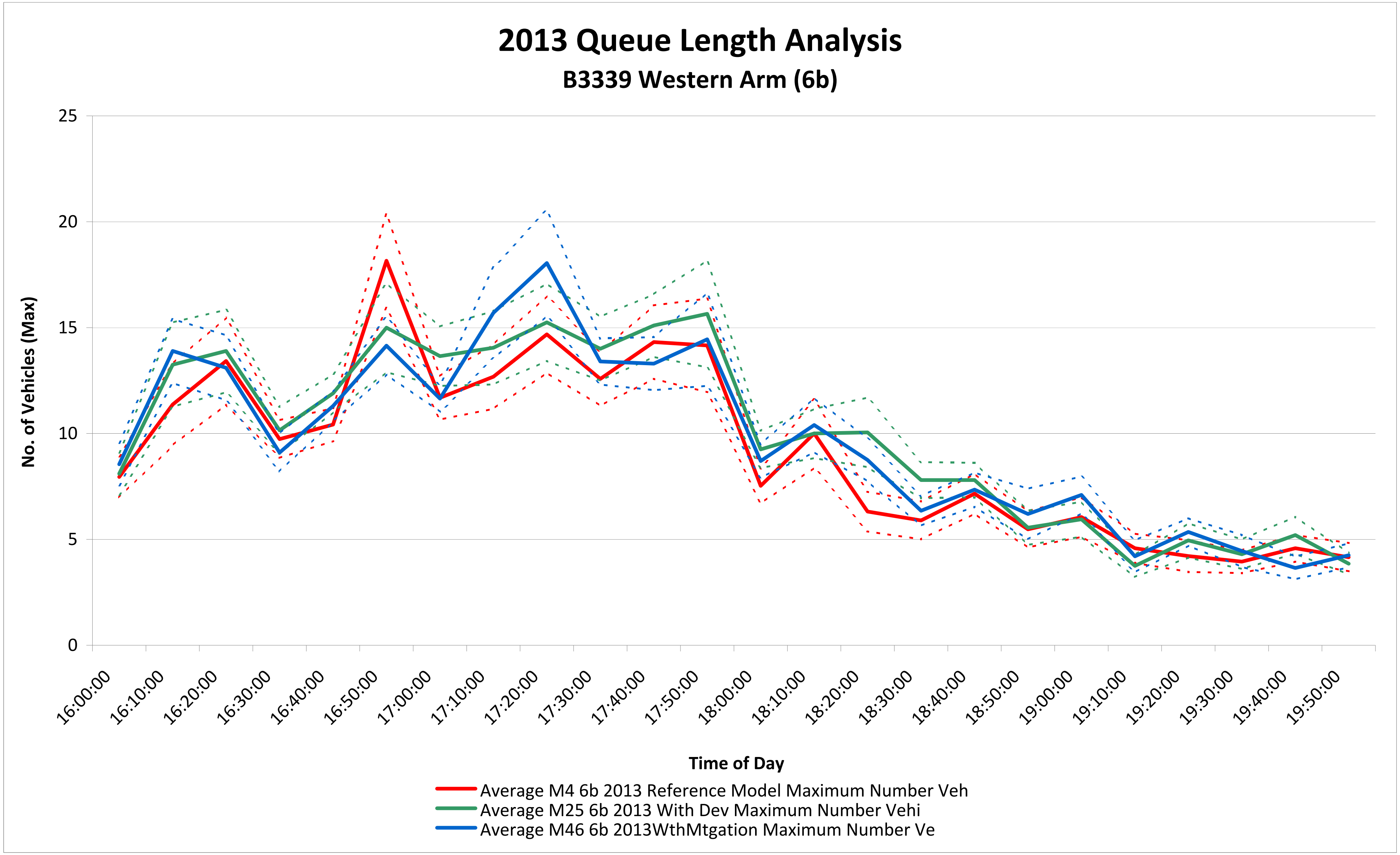

2013 Queue Length Analysis
Wembdon Rise Arm(6a) PM Peak Analysis
No. of Vehicles (Max)
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 6a 2013 Reference Model Maximum Number Veh
Average M25 6a 2013 With Dev Maximum Number Vehi
Average M46 6a 2013WthMtgation Maximum Number Ve

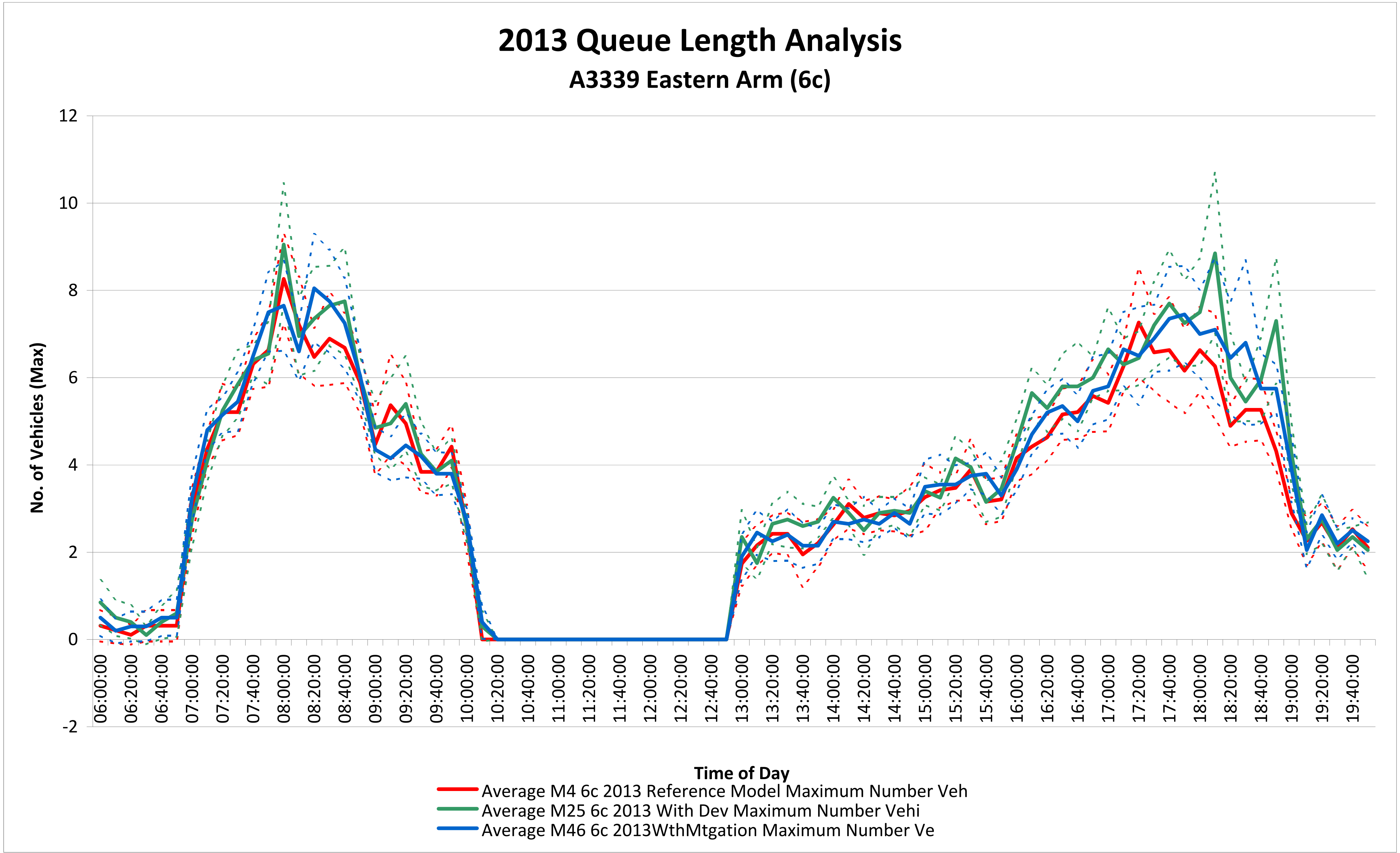


2013 Queue Length Analysis
B3339 Western Arm (6b)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 6b 2013 Reference Model Maximum Number Veh
Average M25 6b 2013 With Dev Maximum Number Vehi
Average M46 6b 2013WthMtgation Maximum Number Ve

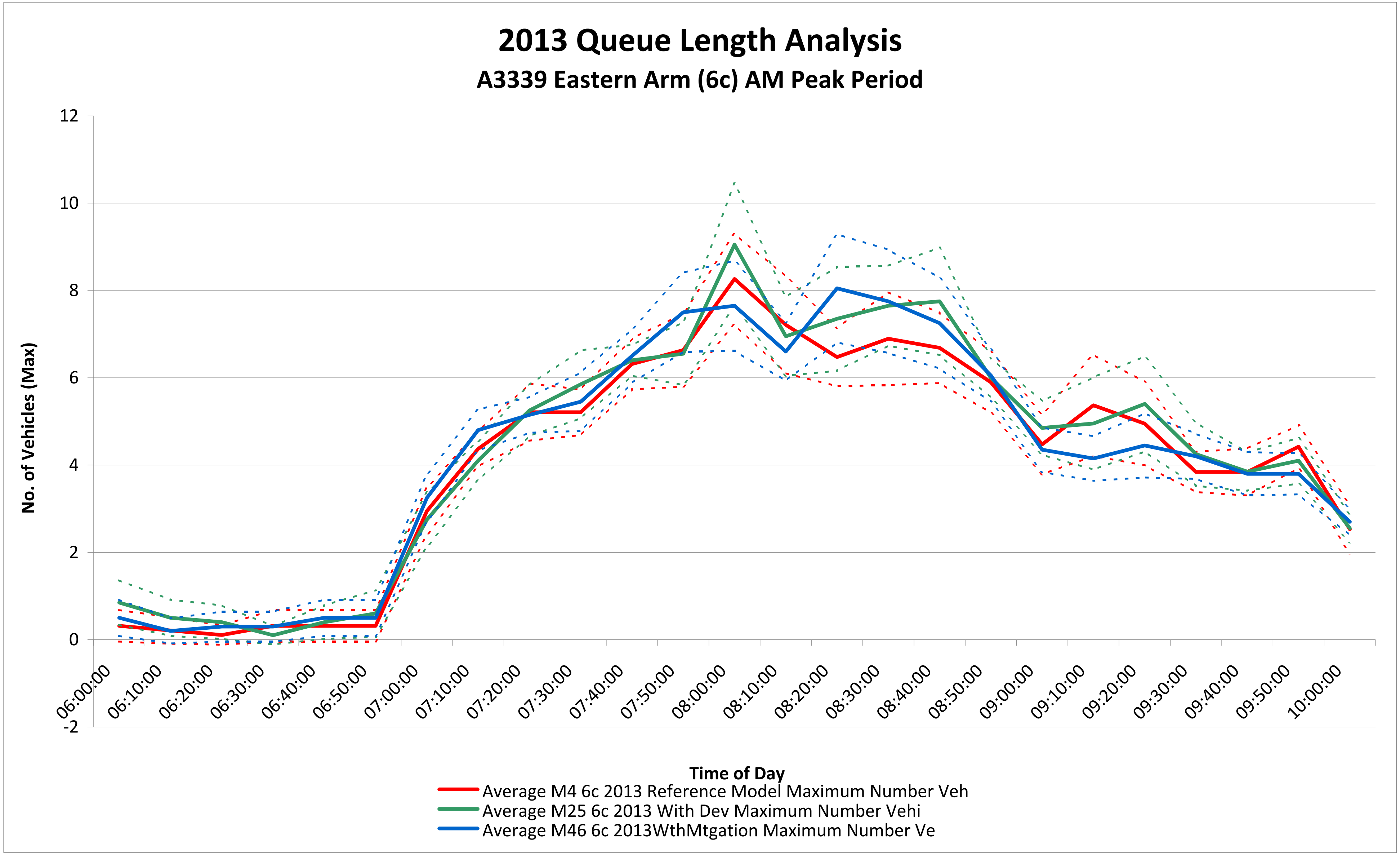


2013 Queue Length Analysis
B3339 Western Arm (6b) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 6b 2013 Reference Model Maximum Number Veh
Average M25 6b 2013 With Dev Maximum Number Vehi
Average M46 6b 2013WthMtgation Maximum Number Ve

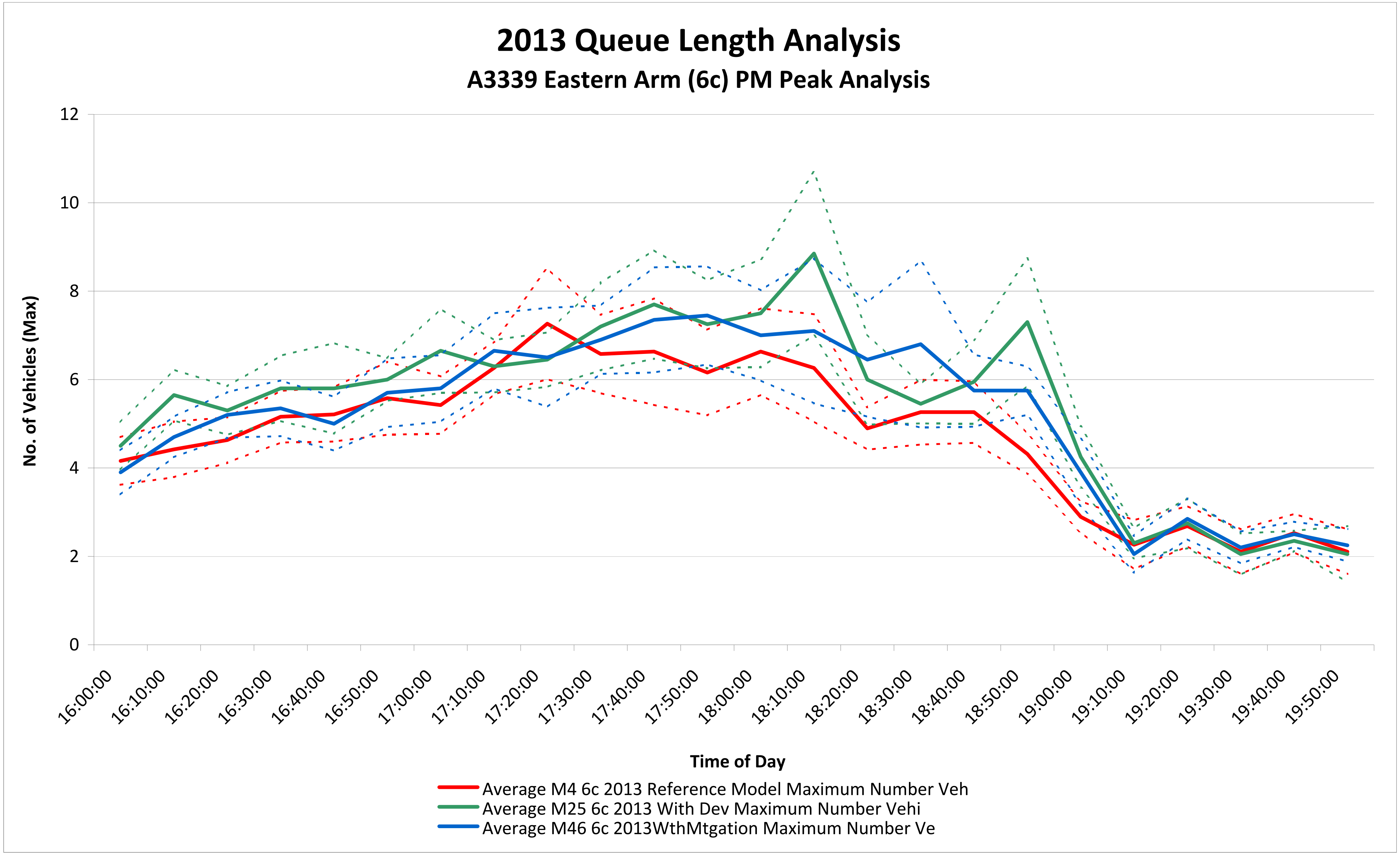

2013 Queue Length Analysis
B3339 Western Arm (6b)
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 6b 2013 Reference Model Maximum Number Veh
Average M25 6b 2013 With Dev Maximum Number Vehi
Average M46 6b 2013WthMtgation Maximum Number Ve

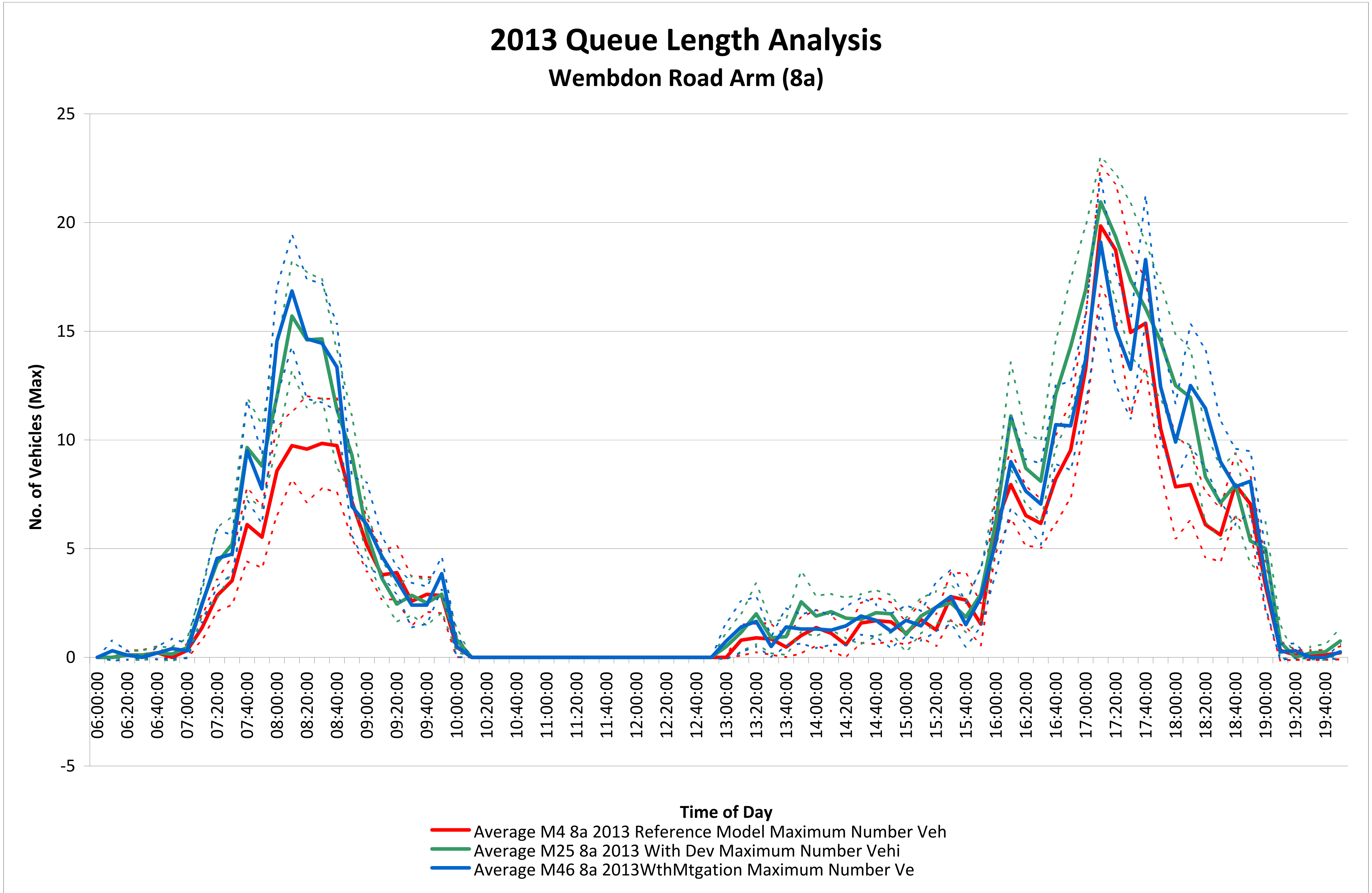


2013 Queue Length Analysis
A3339 Eastern Arm (6c)
No. of Vehicles (Max)
Time of Day
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 6c 2013 Reference Model Maximum Number Veh
Average M25 6c 2013 With Dev Maximum Number Vehi
Average M46 6c 2013WthMtgation Maximum Number Ve

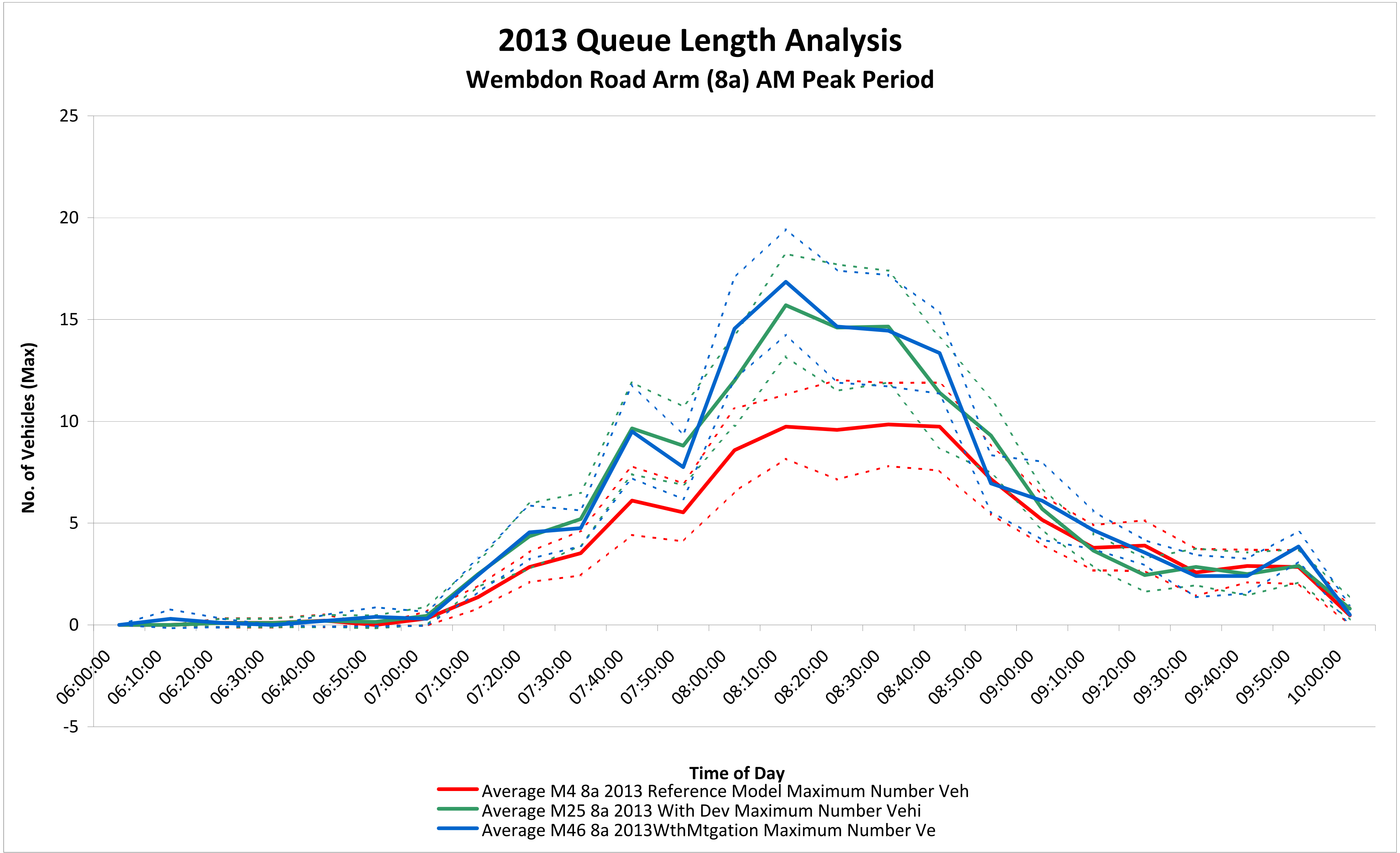


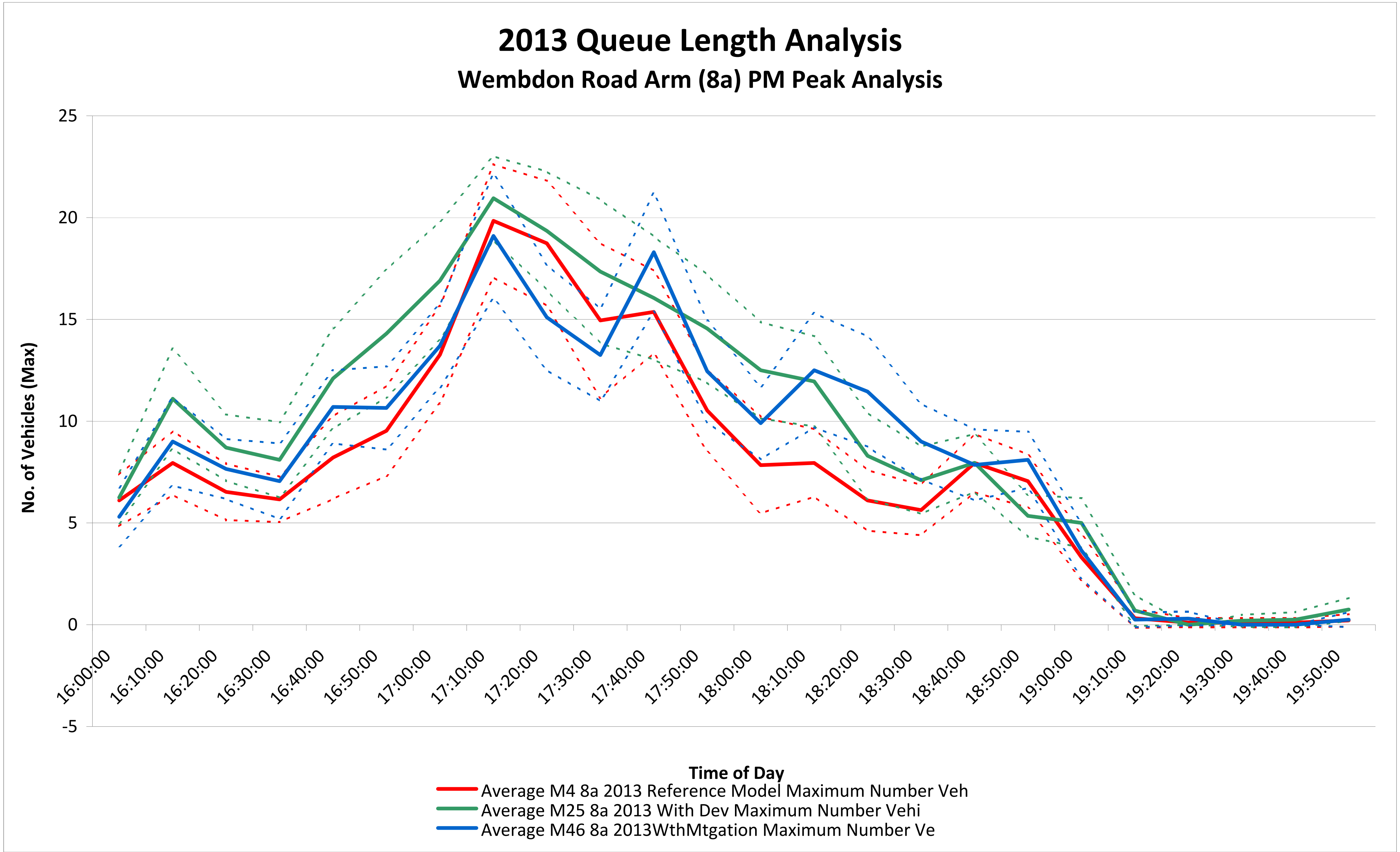
2013 Queue Length Analysis
A3339 Eastern Arm (6c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 6c 2013 Reference Model Maximum Number Veh
Average M25 6c 2013 With Dev Maximum Number Vehi
Average M46 6c 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
A3339 Eastern Arm (6c) PM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 6c 2013 Reference Model Maximum Number Veh
Average M25 6c 2013 With Dev Maximum Number Vehi
Average M46 6c 2013WthMtgation Maximum Number Ve

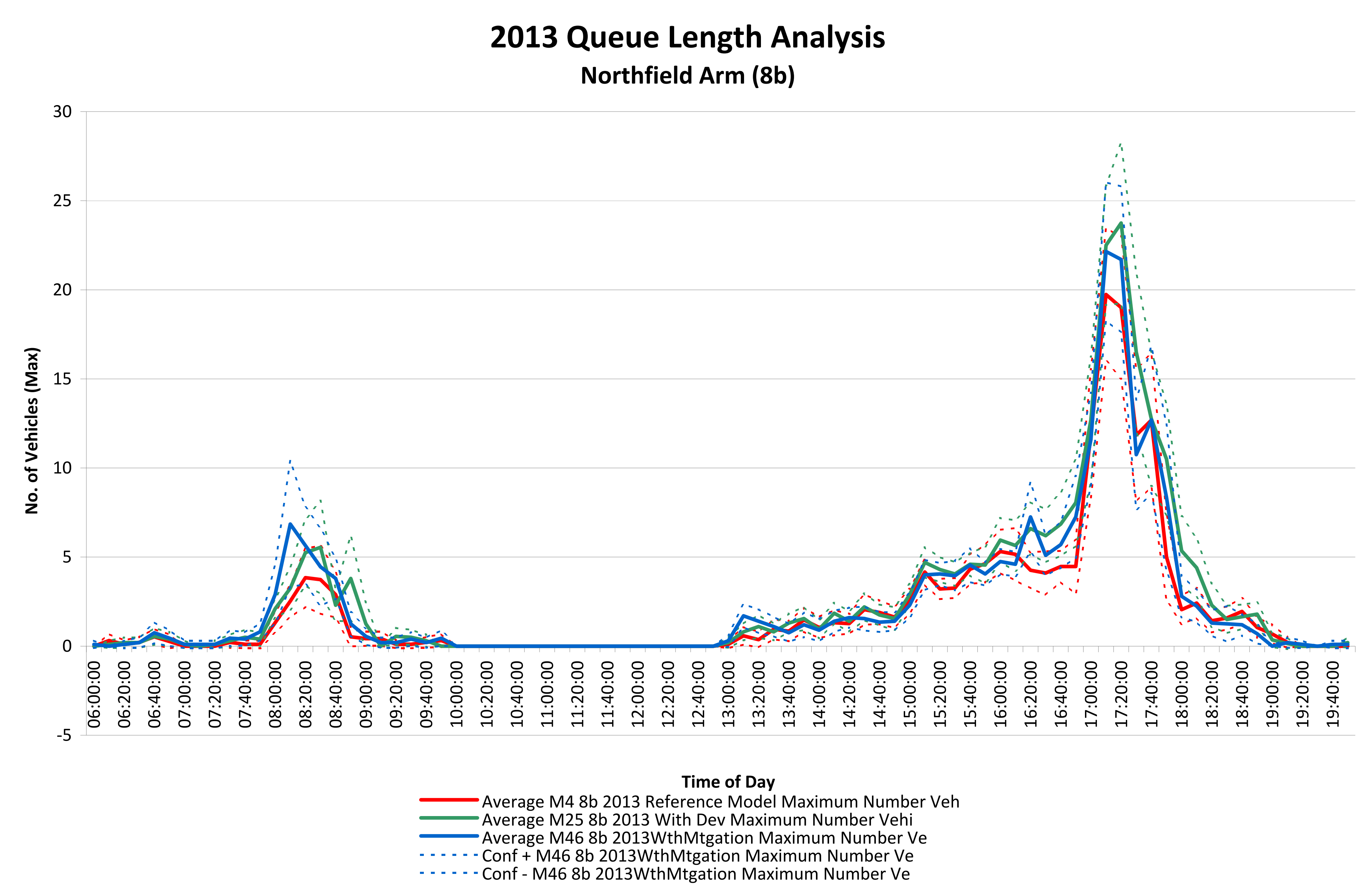


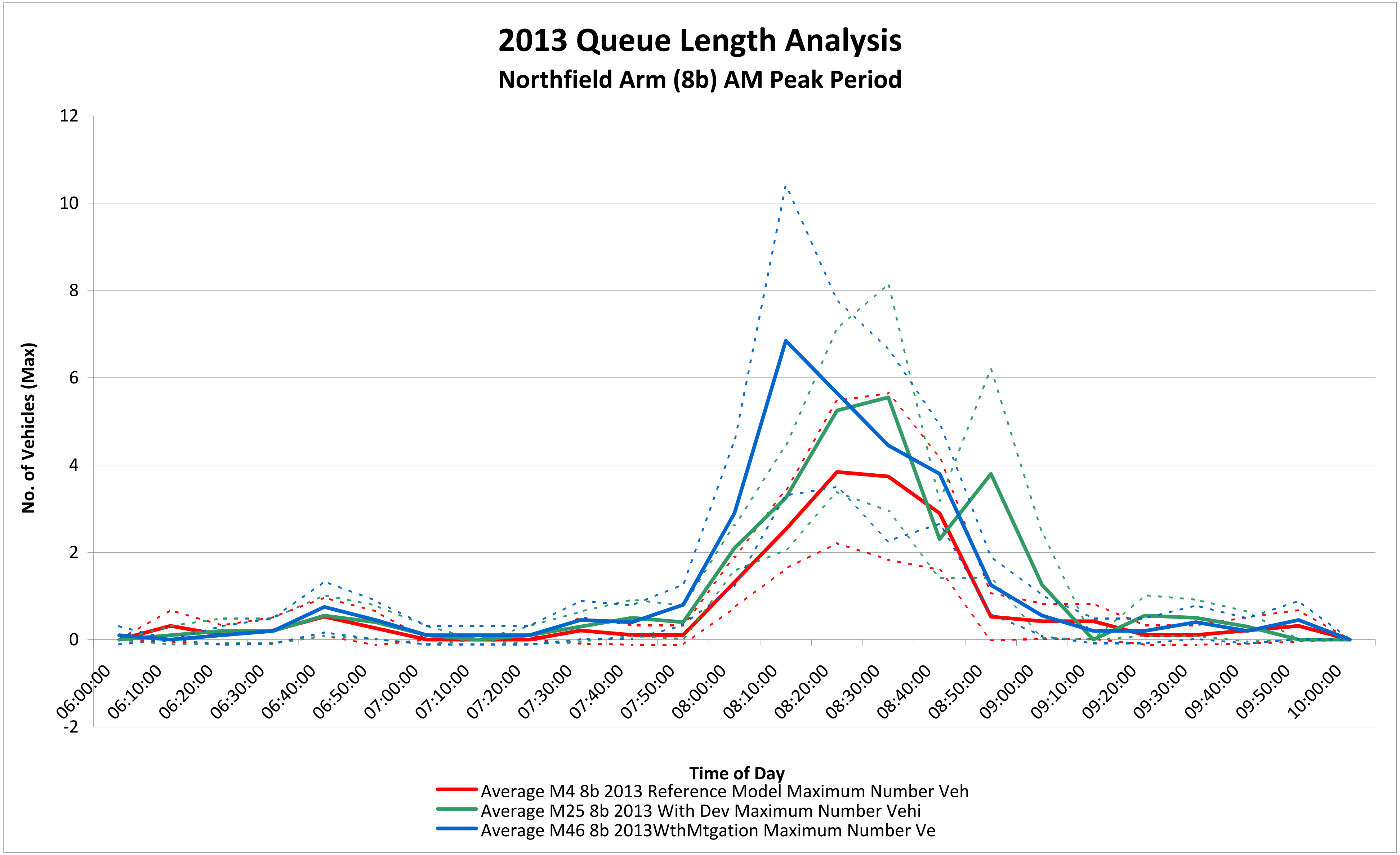
2013 Queue Length Analysis
Wembdon Road Arm (8a)
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 8a 2013 Reference Model Maximum Number Veh
Average M25 8a 2013 With Dev Maximum Number Vehi
Average M46 8a 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
Wembdon Road Arm (8a) AM Peak Period
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 8a 2013 Reference Model Maximum Number Veh
Average M25 8a 2013 With Dev Maximum Number Vehi
Average M46 8a 2013WthMtgation Maximum Number Ve

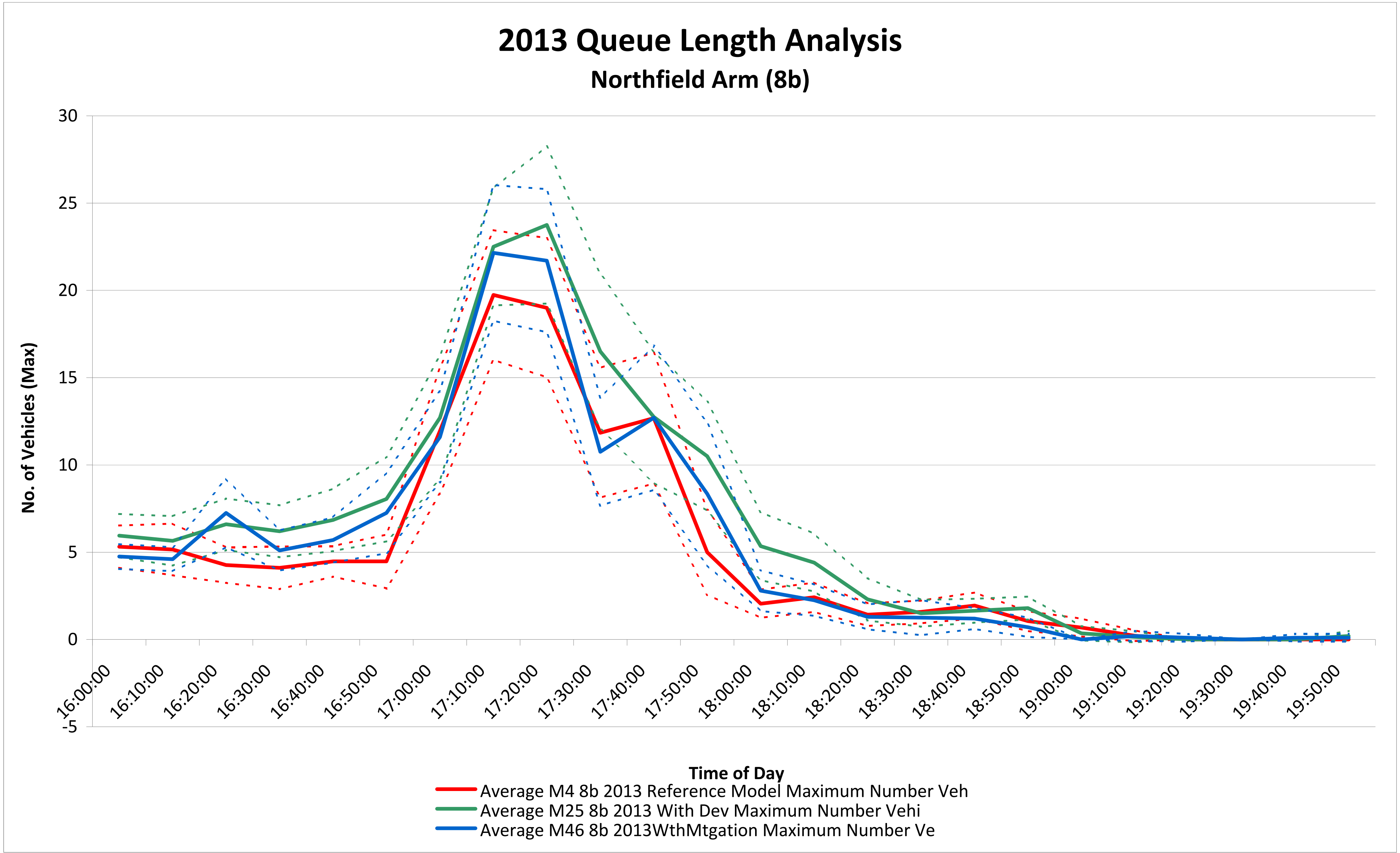


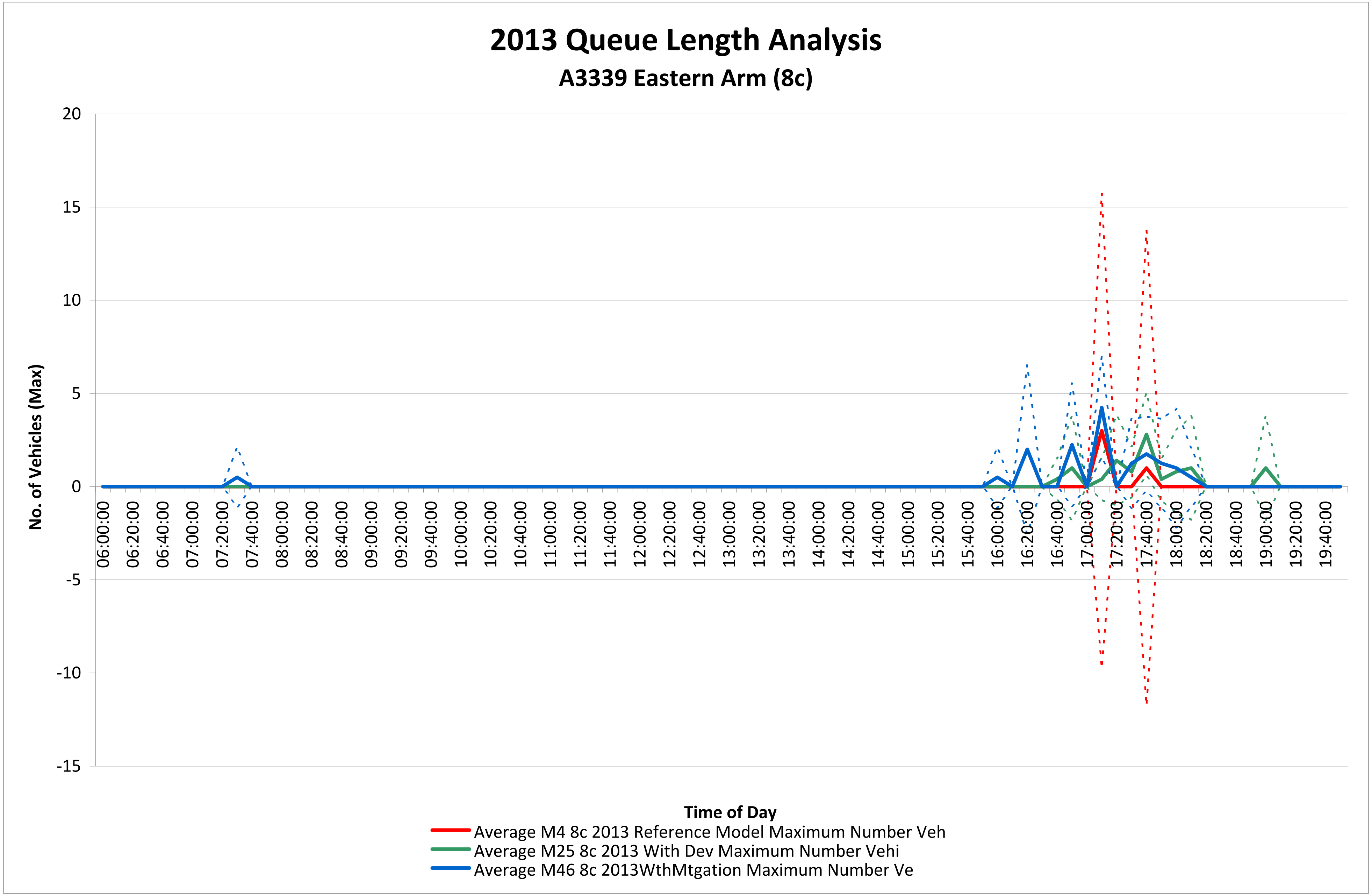
2013 Queue Length Analysis
Wembdon Road Arm (8a) PM Peak Analysis
No. of Vehicles (Max)
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 8a 2013 Reference Model Maximum Number Veh
Average M25 8a 2013 With Dev Maximum Number Vehi
Average M46 8a 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
Northfield Arm (8b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 8b 2013 Reference Model Maximum Number Veh
Average M25 8b 2013 With Dev Maximum Number Vehi
Average M46 8b 2013WthMtgation Maximum Number Ve
Conf + M46 8b 2013WthMtgation Maximum Number Ve
Conf - M46 8b 2013WthMtgation Maximum Number Ve

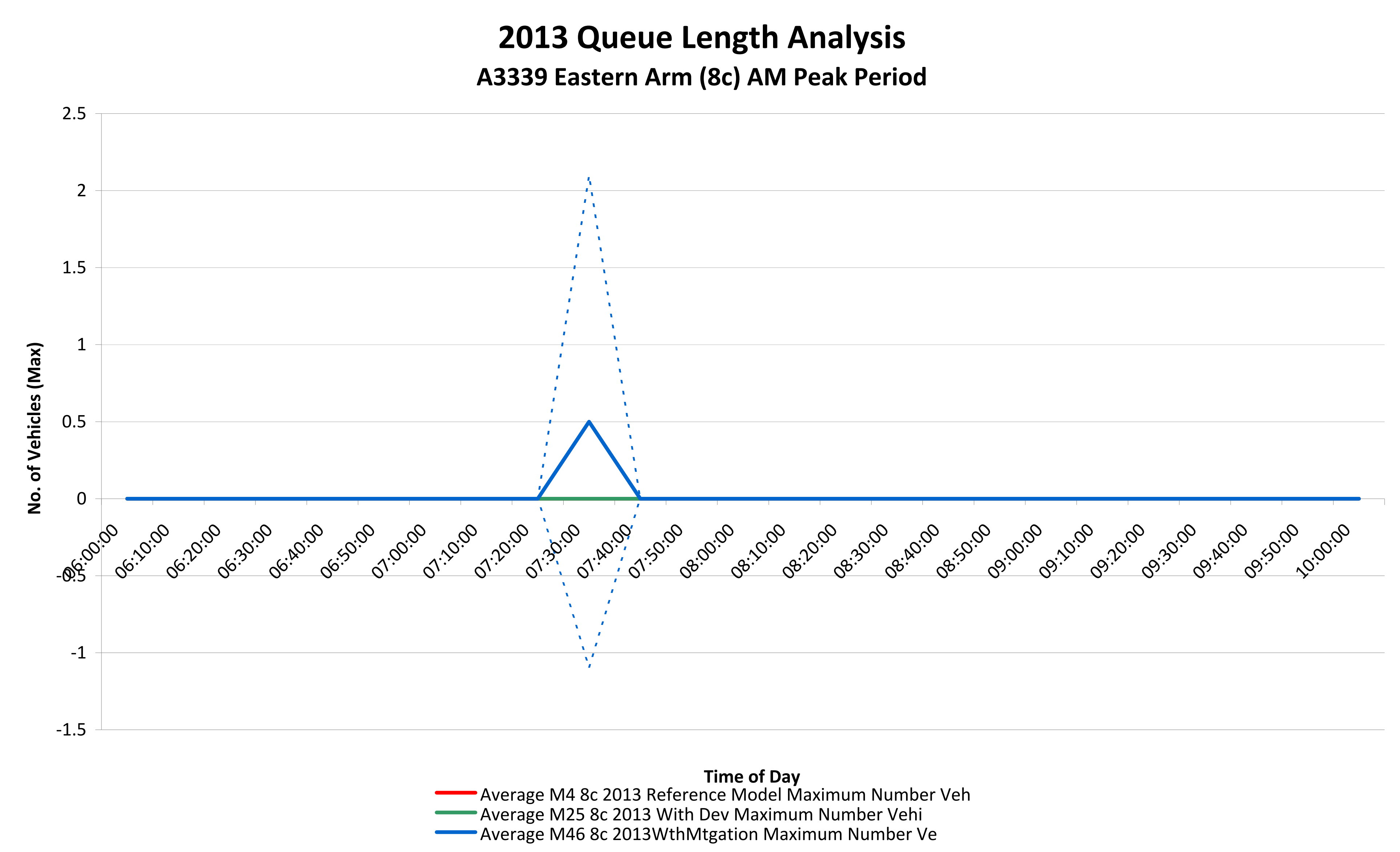


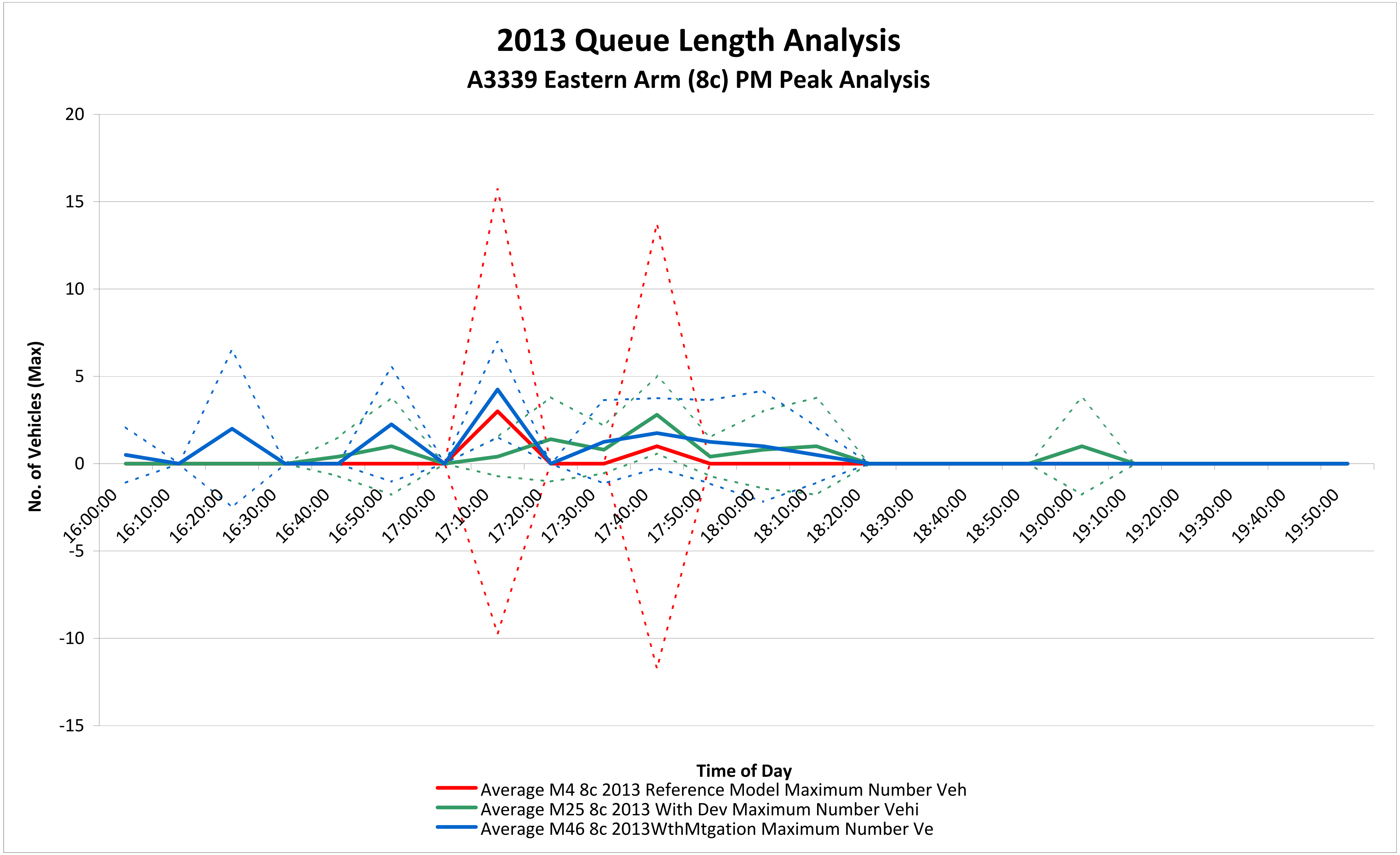
2013 Queue Length Analysis
Northfield Arm (8b) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 8b 2013 Reference Model Maximum Number Veh
Average M25 8b 2013 With Dev Maximum Number Vehi
Average M46 8b 2013WthMtgation Maximum Number Ve

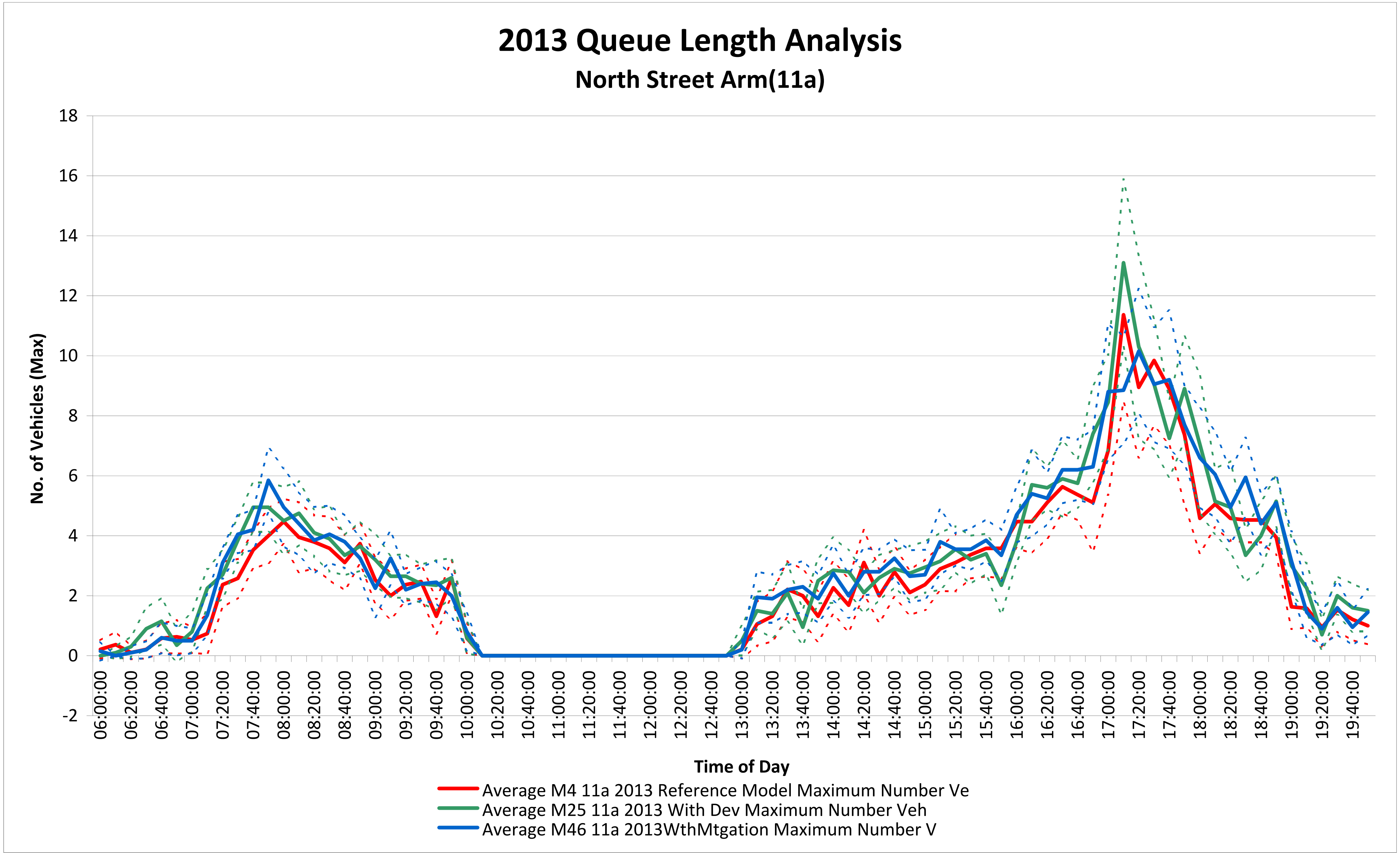

2013 Queue Length Analysis
Northfield Arm (8b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 8b 2013 Reference Model Maximum Number Veh
Average M25 8b 2013 With Dev Maximum Number Vehi
Average M46 8b 2013WthMtgation Maximum Number Ve



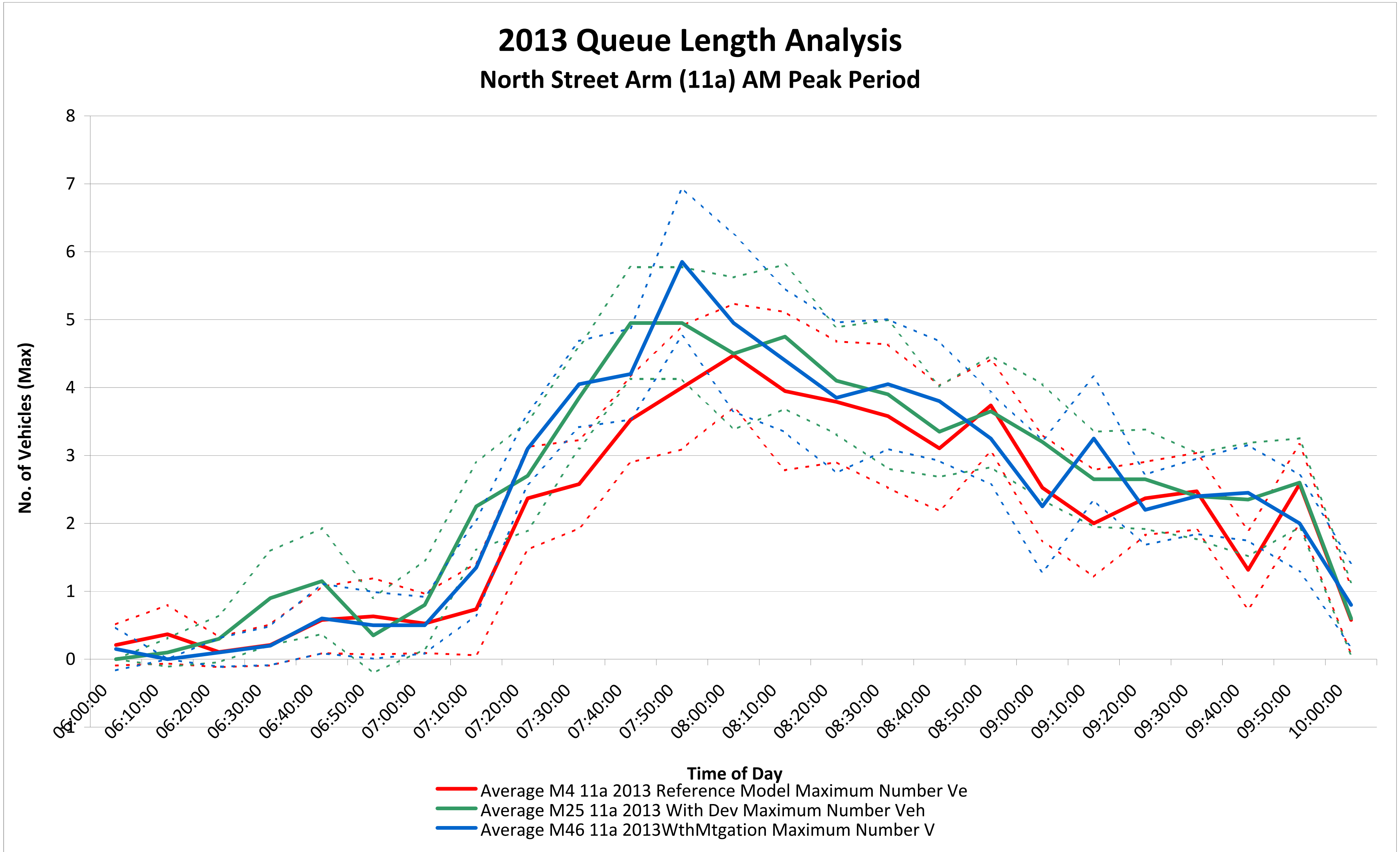
2013 Queue Length Analysis
A3339 Eastern Arm (8c)
No. of Vehicles (Max)
20
15
10
5
0
-5
-10
-15
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 8c 2013 Reference Model Maximum Number Veh
Average M25 8c 2013 With Dev Maximum Number Vehi
Average M46 8c 2013WthMtgation Maximum Number Ve


2013 Queue Length Analysis
A3339 Eastern Arm (8c) AM Peak Period
No. of Vehicles (Max)
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 8c 2013 Reference Model Maximum Number Veh
Average M25 8c 2013 With Dev Maximum Number Vehi
Average M46 8c 2013WthMtgation Maximum Number Ve

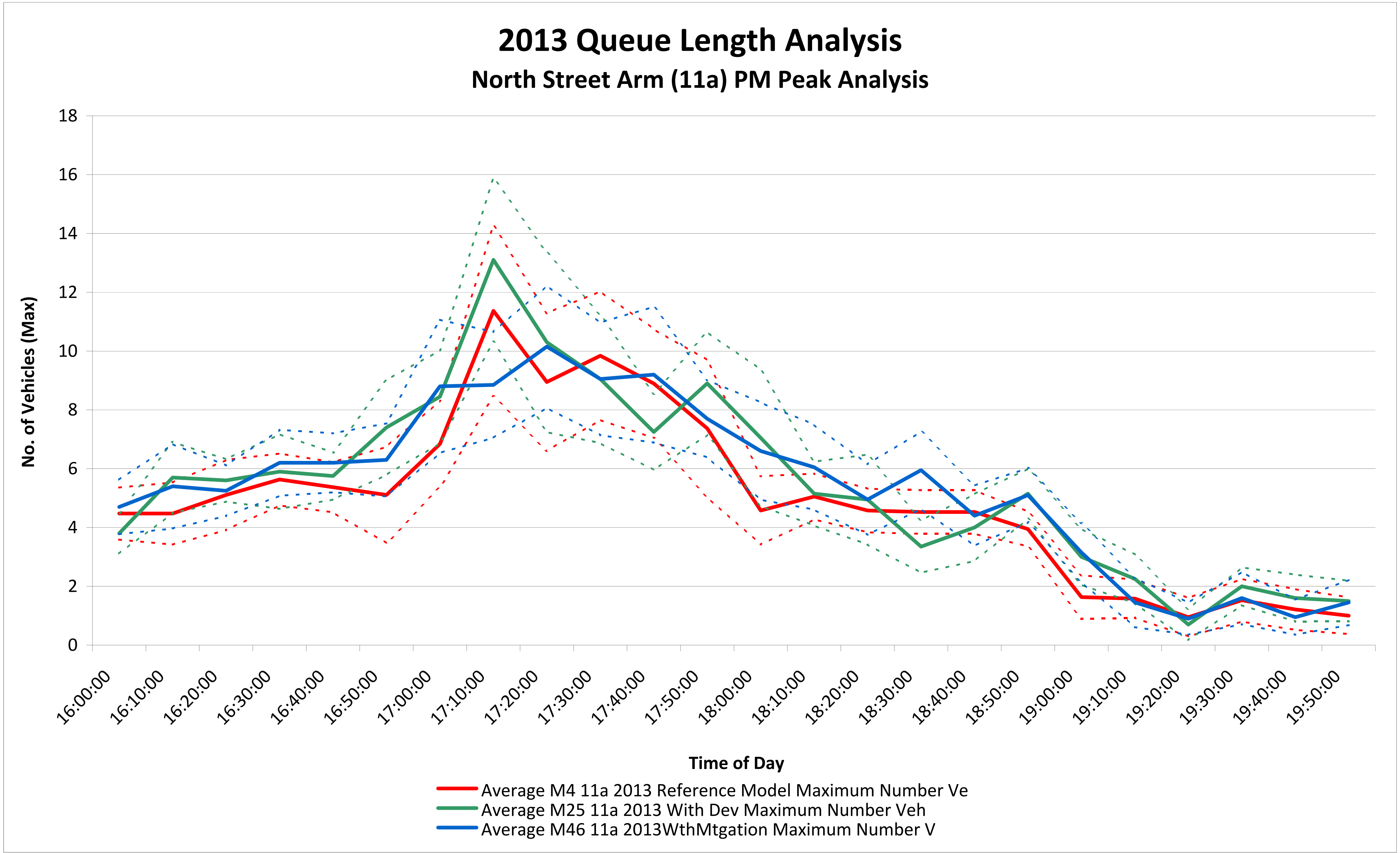

2013 Queue Length Analysis
A3339 Eastern Arm (8c) PM Peak Analysis
20
15
10
5
0
-5
-10
-15
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 8c 2013 Reference Model Maximum Number Veh
Average M25 8c 2013 With Dev Maximum Number Vehi
Average M46 8c 2013WthMtgation Maximum Number Ve

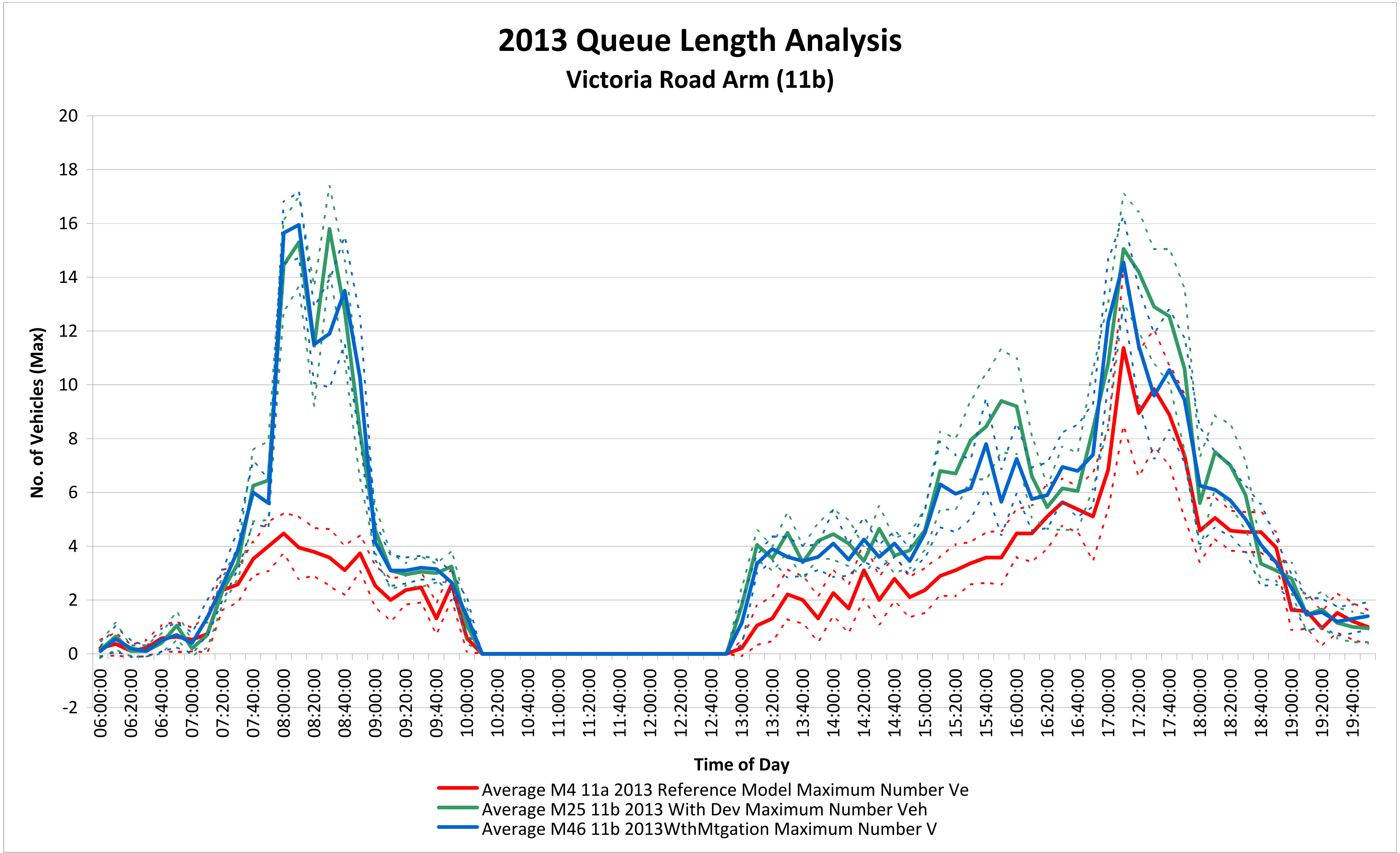


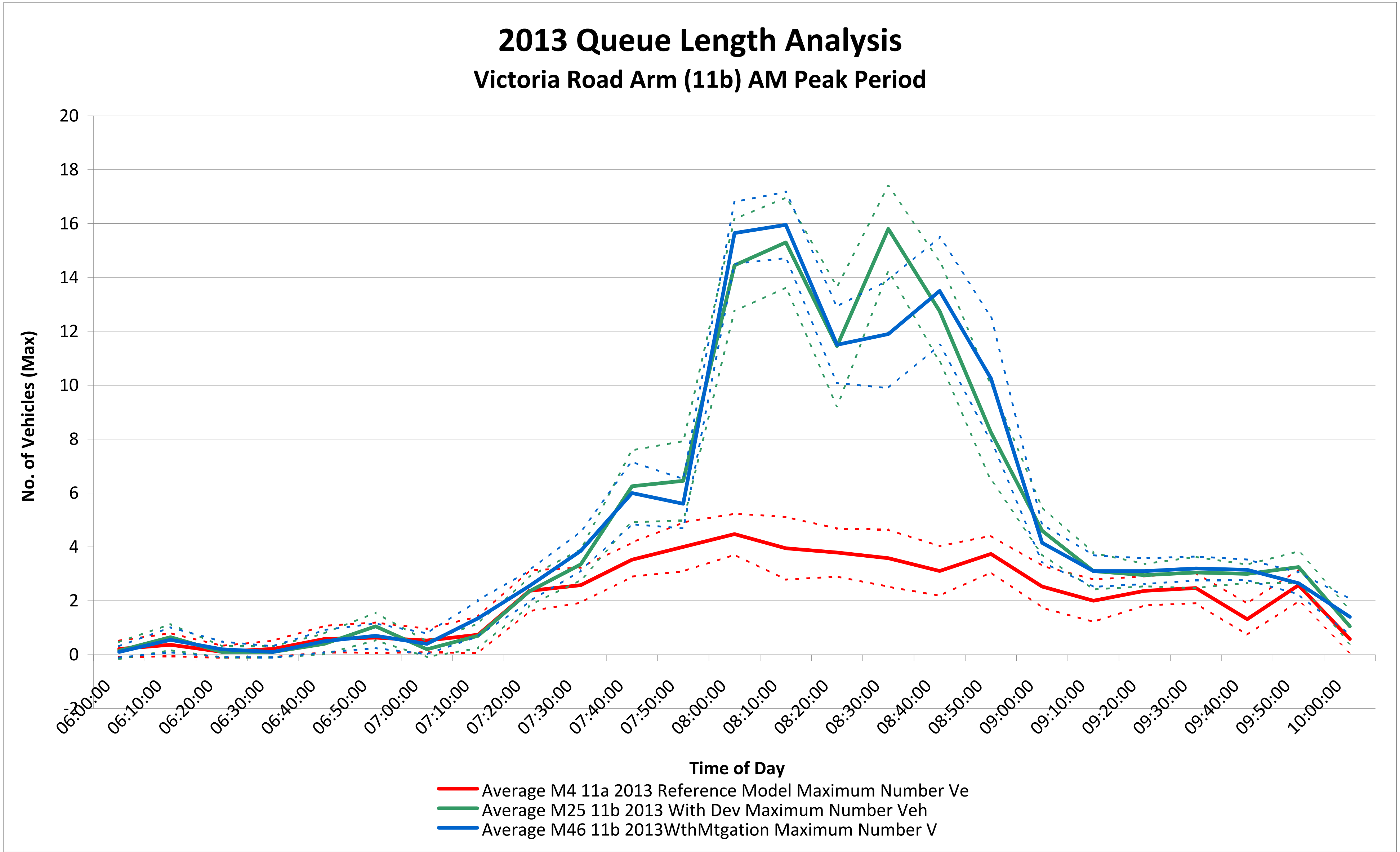
2013 Queue Length Analysis
North Street Arm(11a)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 11a 2013 Reference Model Maximum Number Ve
Average M25 11a 2013 With Dev Maximum Number Veh
Average M46 11a 2013WthMtgation Maximum Number V



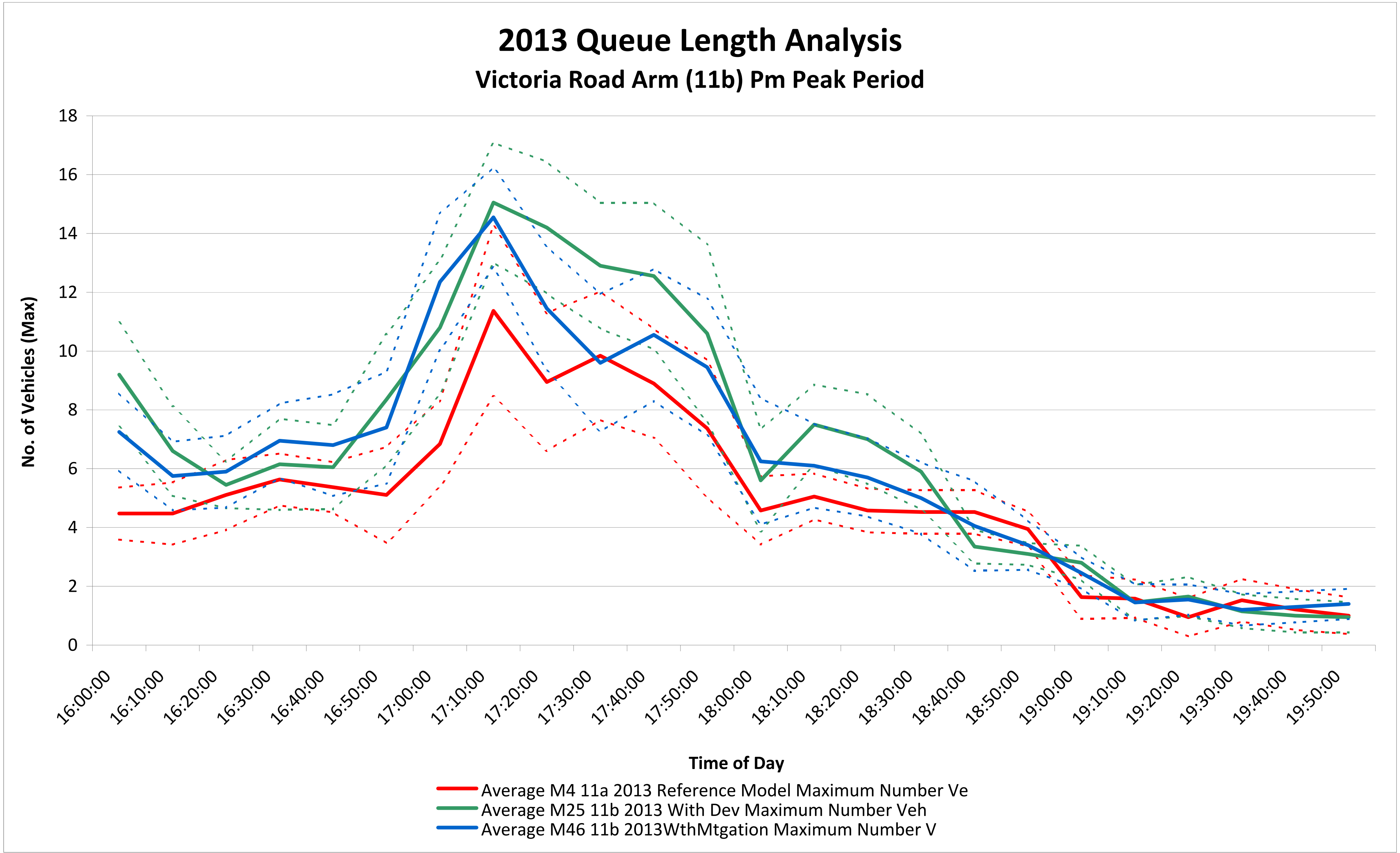
2013 Queue Length Analysis
North Street Arm (11a) AM Peak Period
No. of Vehicles (Max)
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 11a 2013 Reference Model Maximum Number Ve
Average M25 11a 2013 With Dev Maximum Number Veh
Average M46 11a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
North Street Arm (11a) PM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 11a 2013 Reference Model Maximum Number Ve
Average M25 11a 2013 With Dev Maximum Number Veh
Average M46 11a 2013WthMtgation Maximum Number V

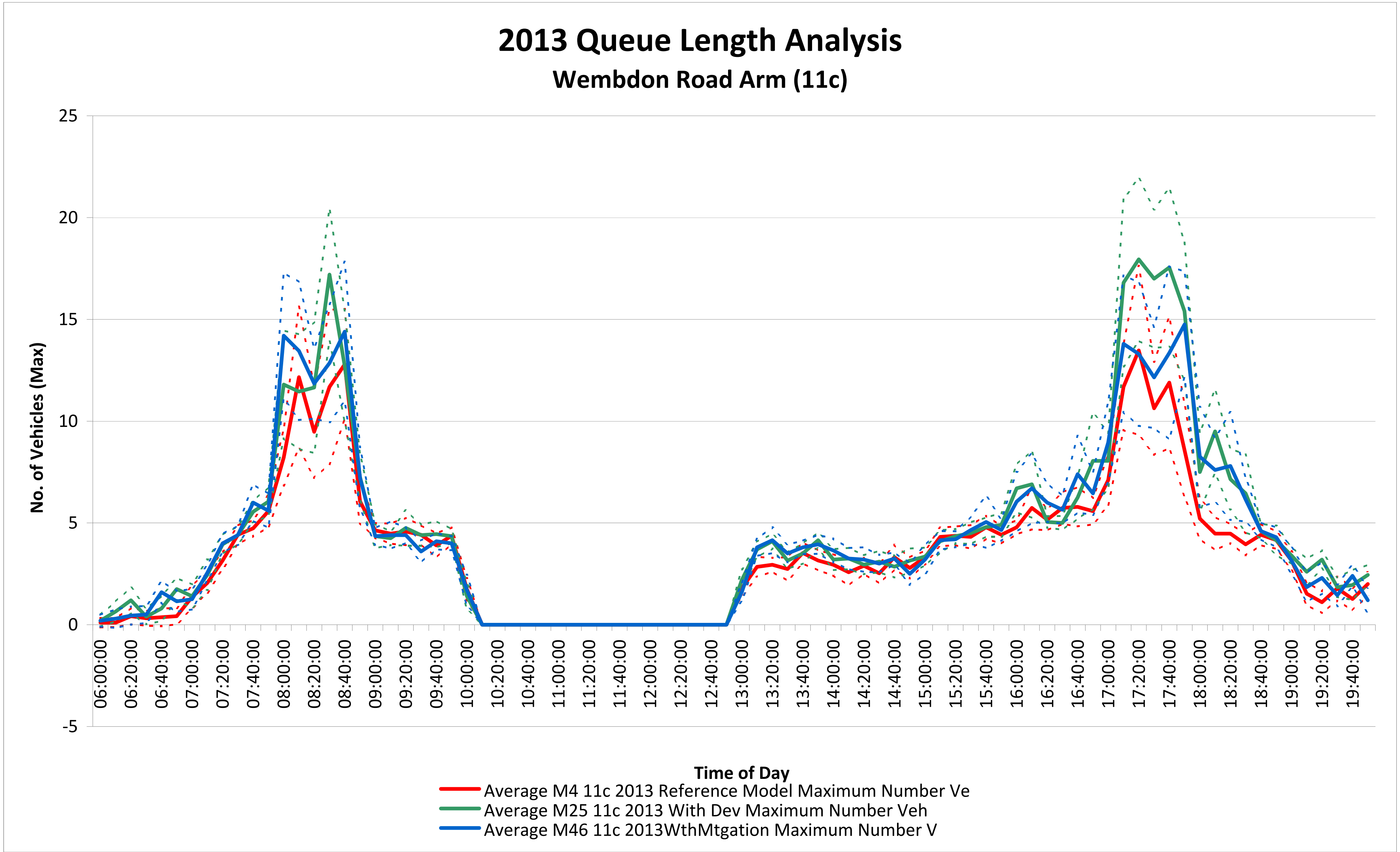

2013 Queue Length Analysis
Victoria Road Arm (11b)
No. of Vehicles (Max)
20
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 11a 2013 Reference Model Maximum Number Ve
Average M25 11b 2013 With Dev Maximum Number Veh
Average M46 11b 2013WthMtgation Maximum Number V



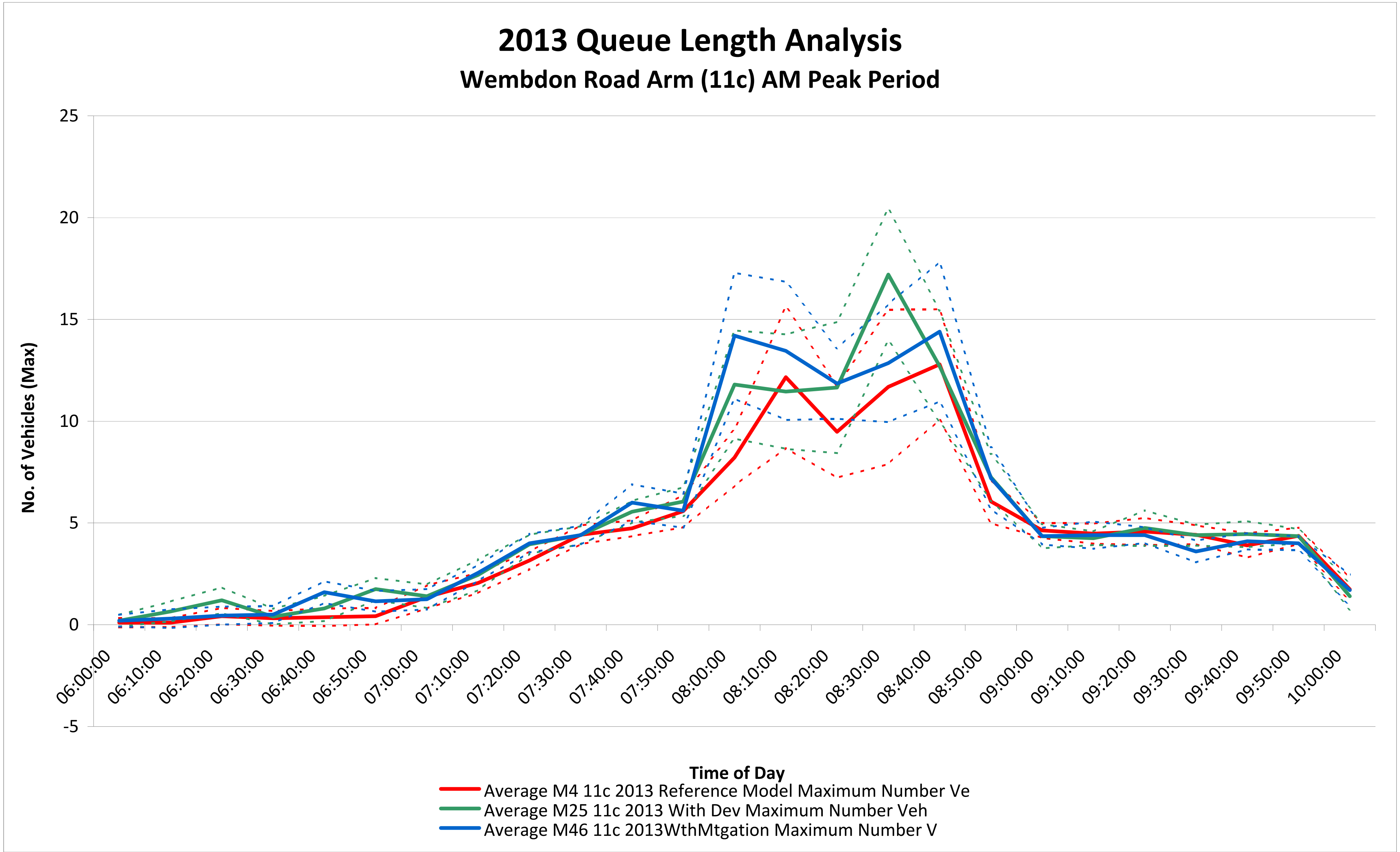
2013 Queue Length Analysis
Victoria Road Arm (11b) AM Peak Period
No. of Vehicles (Max)
20
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 11a 2013 Reference Model Maximum Number Ve
Average M25 11b 2013 With Dev Maximum Number Veh
Average M46 11b 2013WthMtgation Maximum Number V

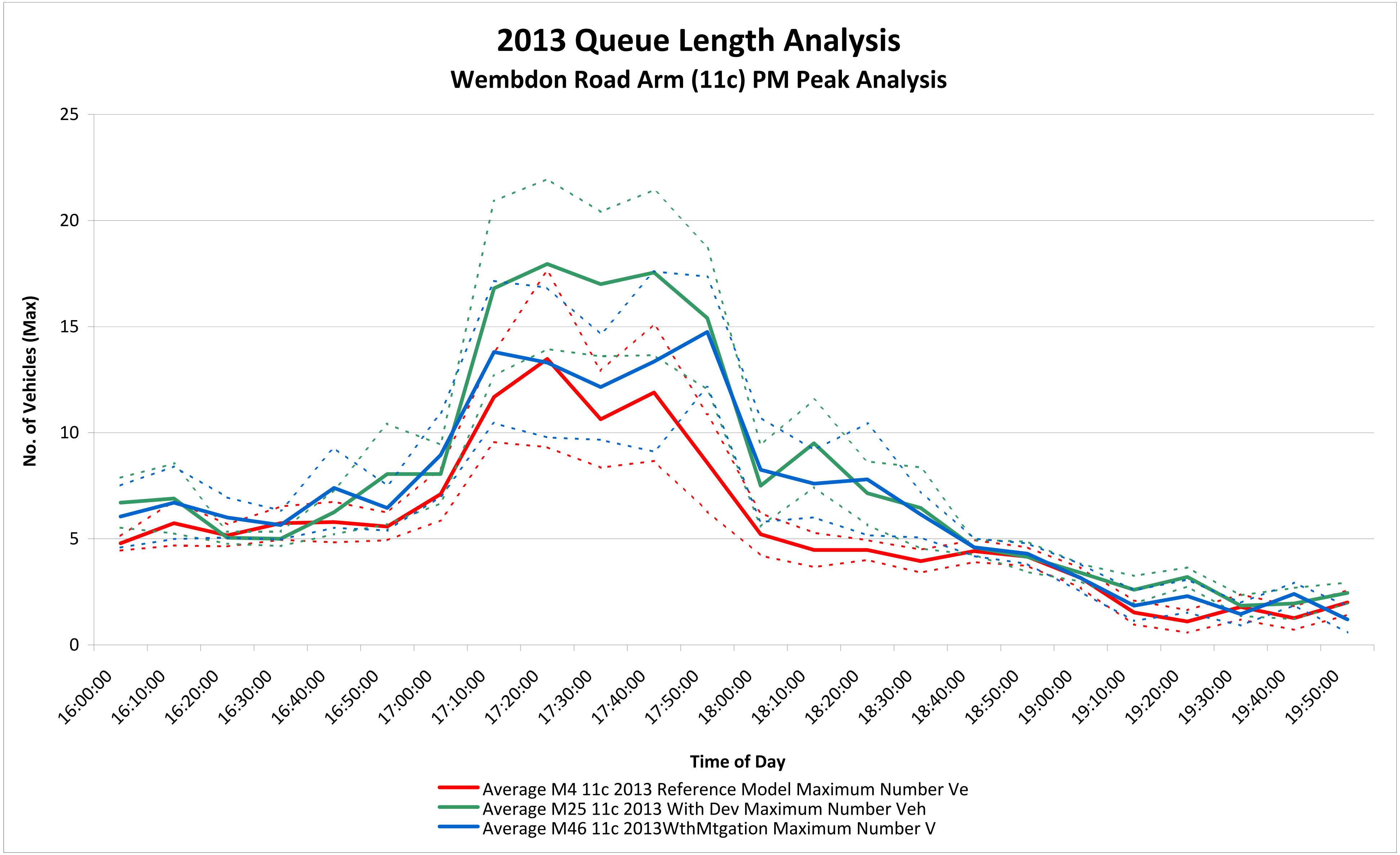


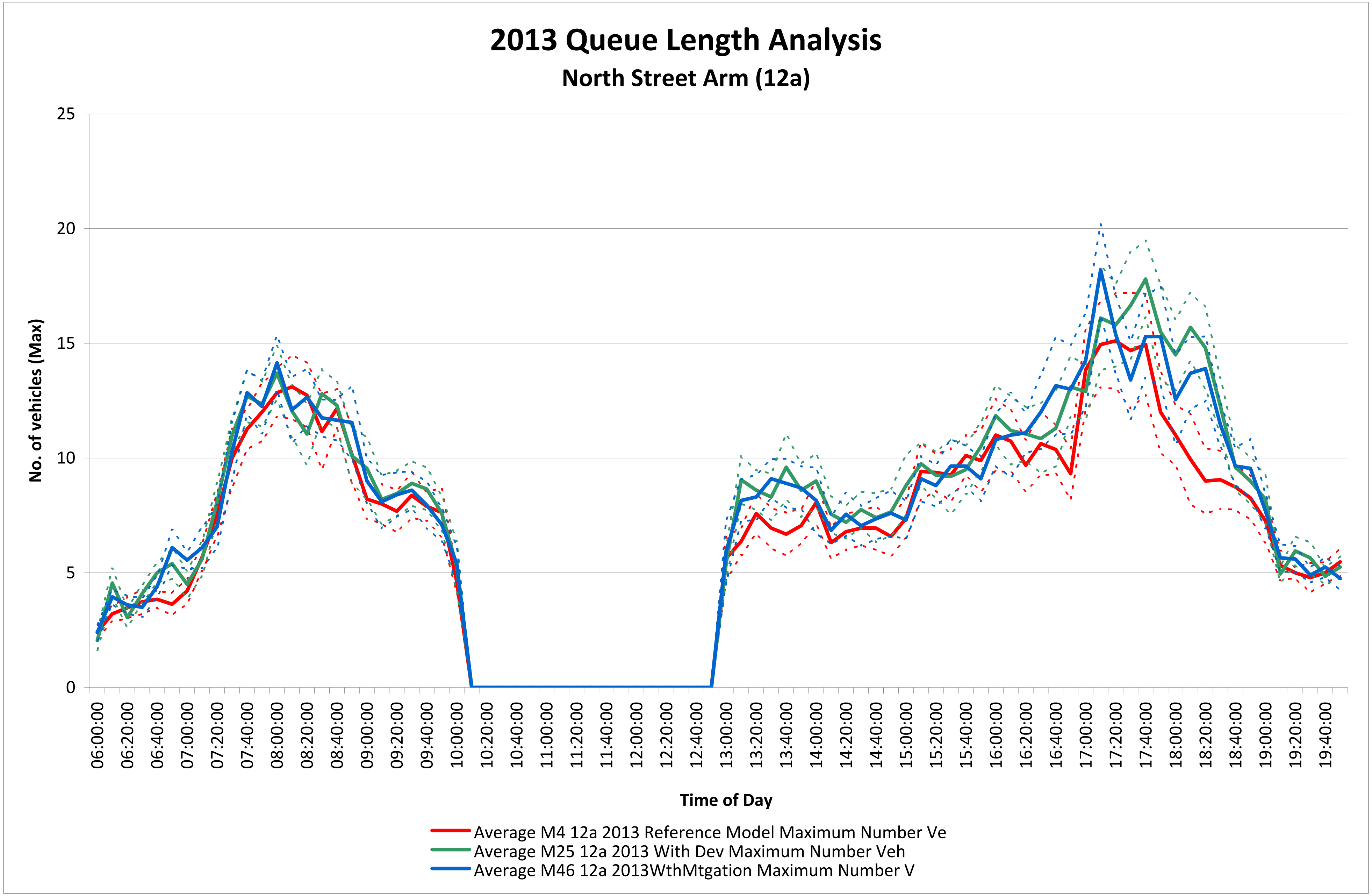
2013 Queue Length Analysis
Victoria Road Arm (11b) Pm Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 11a 2013 Reference Model Maximum Number Ve
Average M25 11b 2013 With Dev Maximum Number Veh
Average M46 11b 2013WthMtgation Maximum Number V

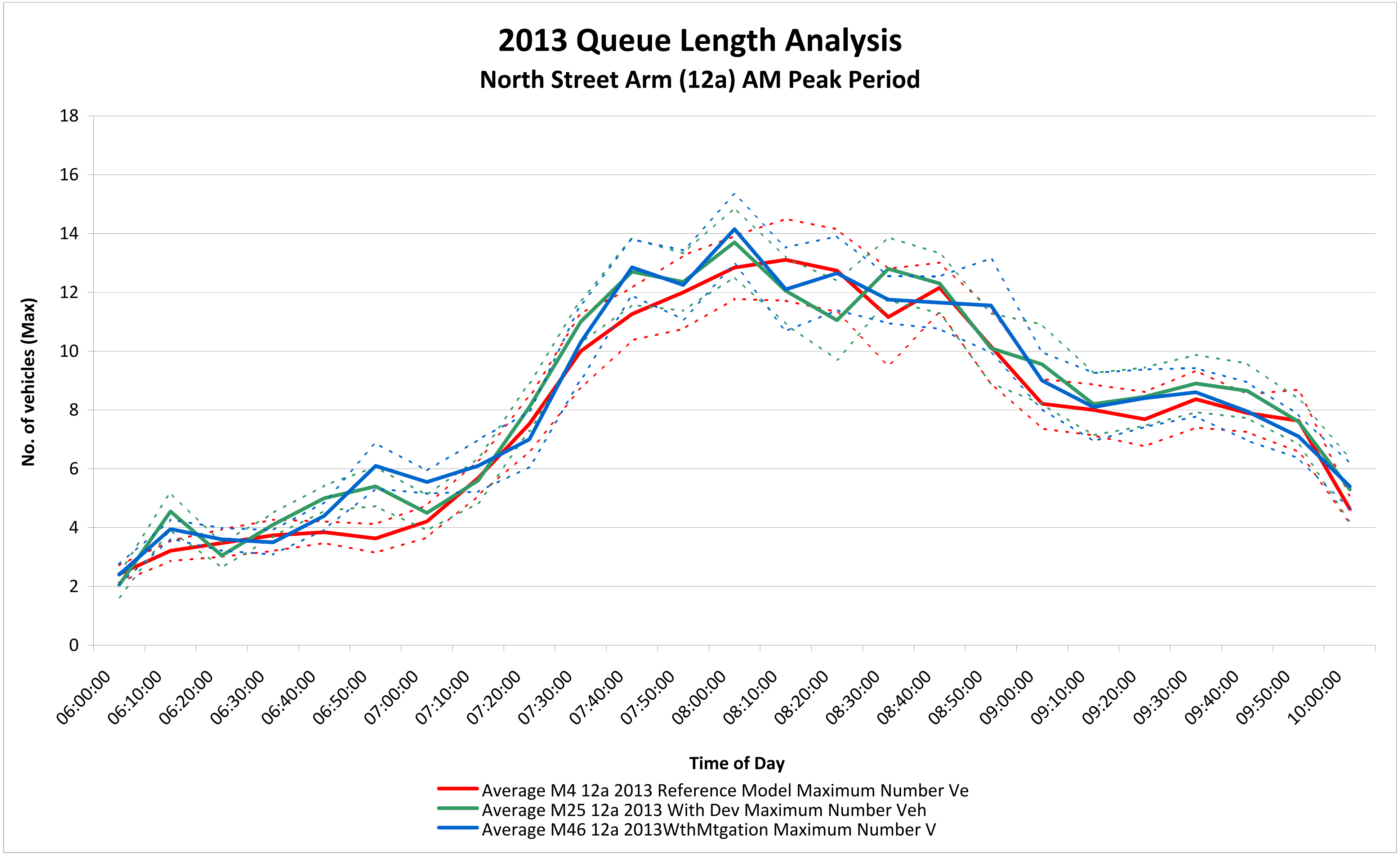


2013 Queue Length Analysis
Wembdon Road Arm (11c)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 11c 2013 Reference Model Maximum Number Ve
Average M25 11c 2013 With Dev Maximum Number Veh
Average M46 11c 2013WthMtgation Maximum Number V

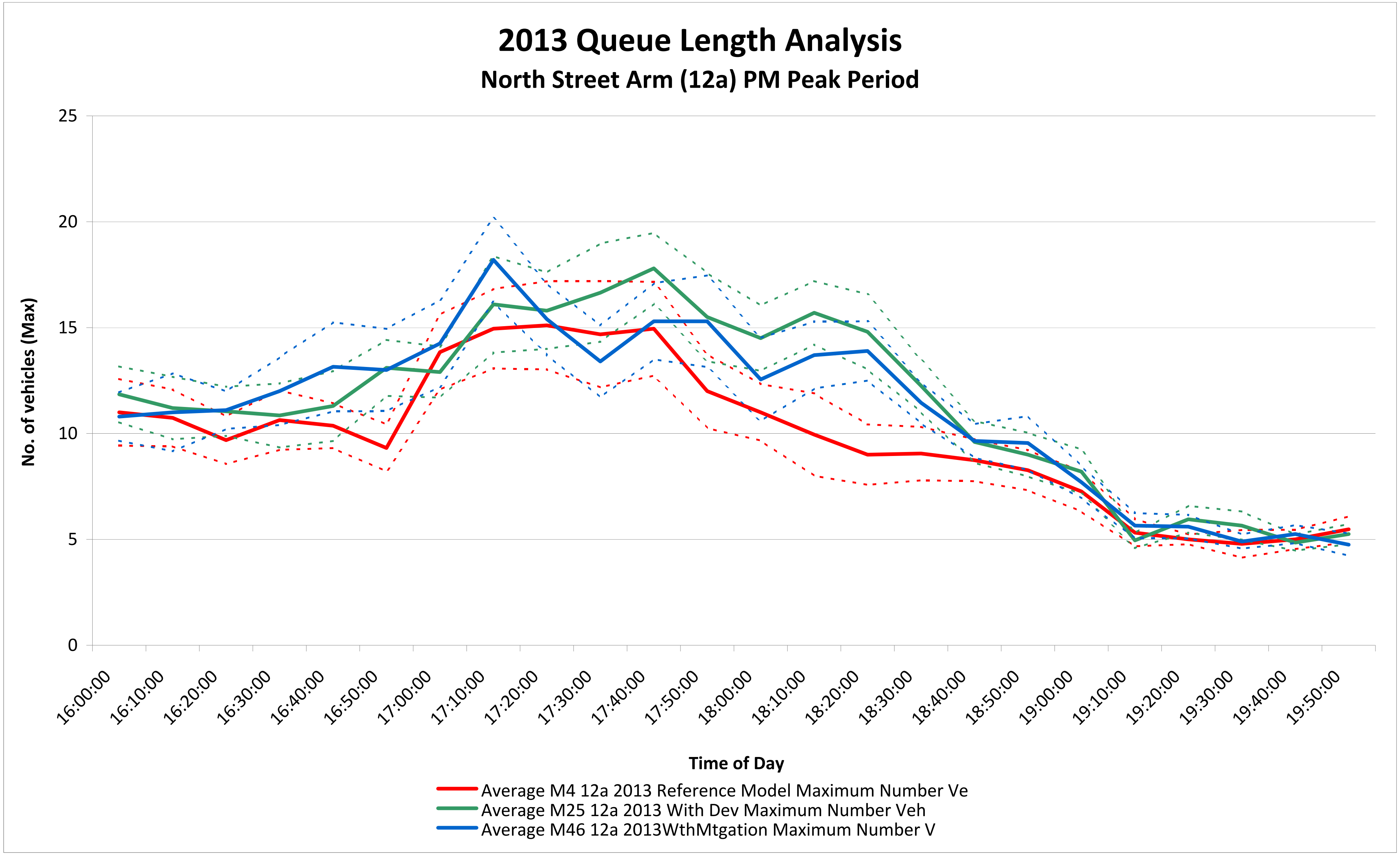

2013 Queue Length Analysis
Wembdon Road Arm (11c) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 11c 2013 Reference Model Maximum Number Ve
Average M25 11c 2013 With Dev Maximum Number Veh
Average M46 11c 2013WthMtgation Maximum Number V

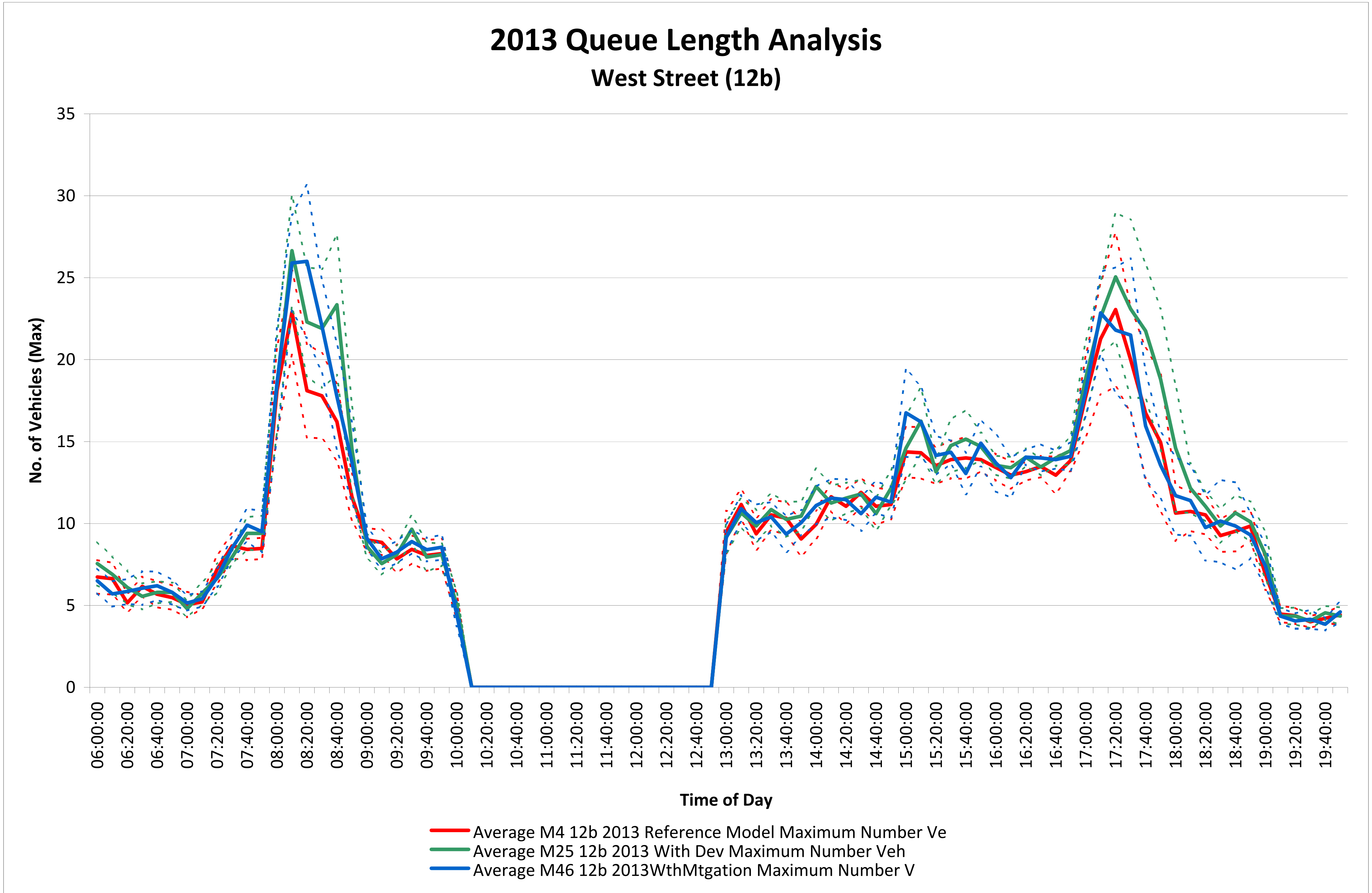

2013 Queue Length Analysis
Wembdon Road Arm (11c) PM Peak Analysis
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 11c 2013 Reference Model Maximum Number Ve
Average M25 11c 2013 With Dev Maximum Number Veh
Average M46 11c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
North Street Arm (12a)
No. of vehicles (Max)
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12a 2013 Reference Model Maximum Number Ve
Average M25 12a 2013 With Dev Maximum Number Veh
Average M46 12a 2013WthMtgation Maximum Number V

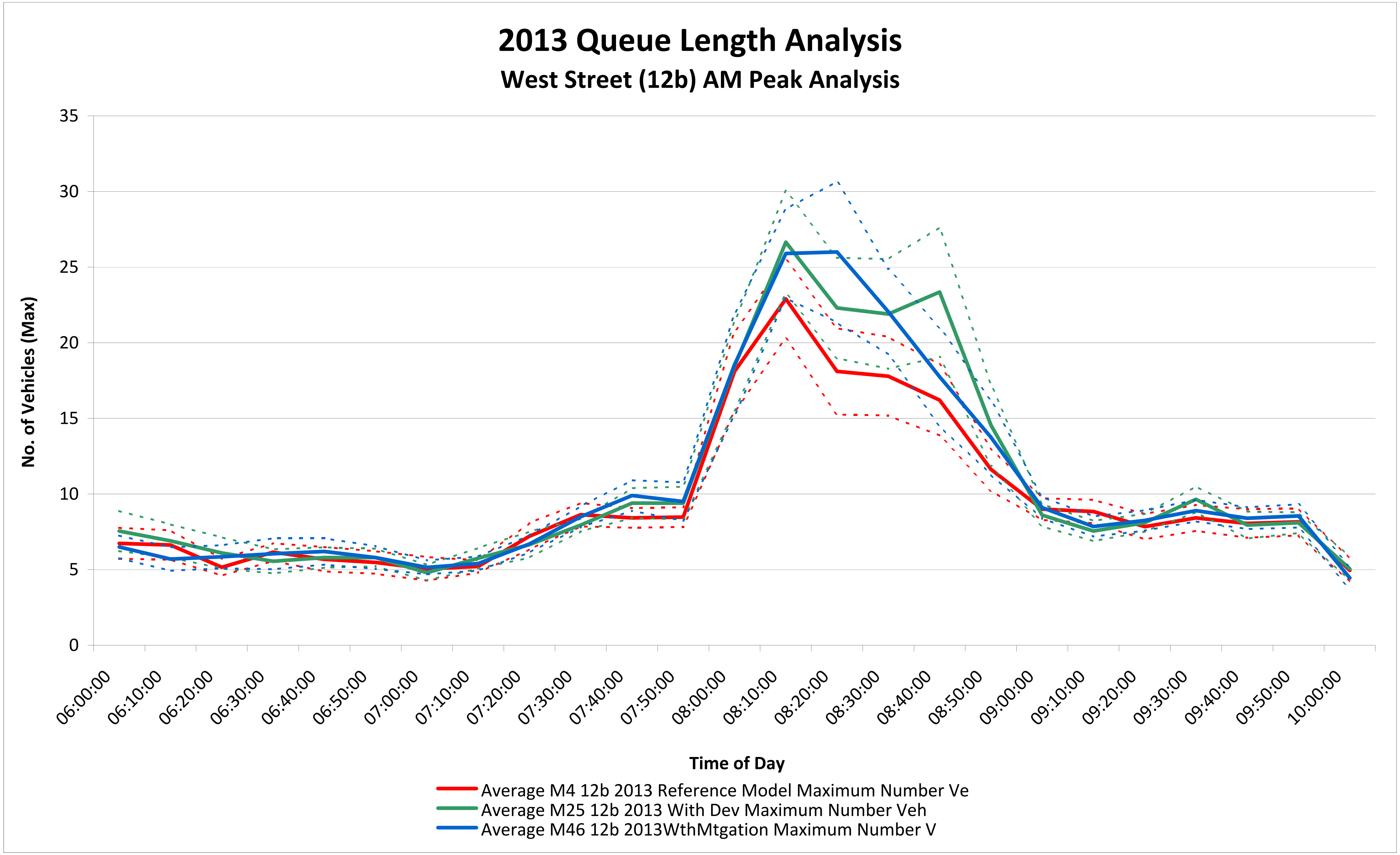


2013 Queue Length Analysis
North Street Arm (12a) AM Peak Period
No. of vehicles (Max)
18
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12a 2013 Reference Model Maximum Number Ve
Average M25 12a 2013 With Dev Maximum Number Veh
Average M46 12a 2013WthMtgation Maximum Number V

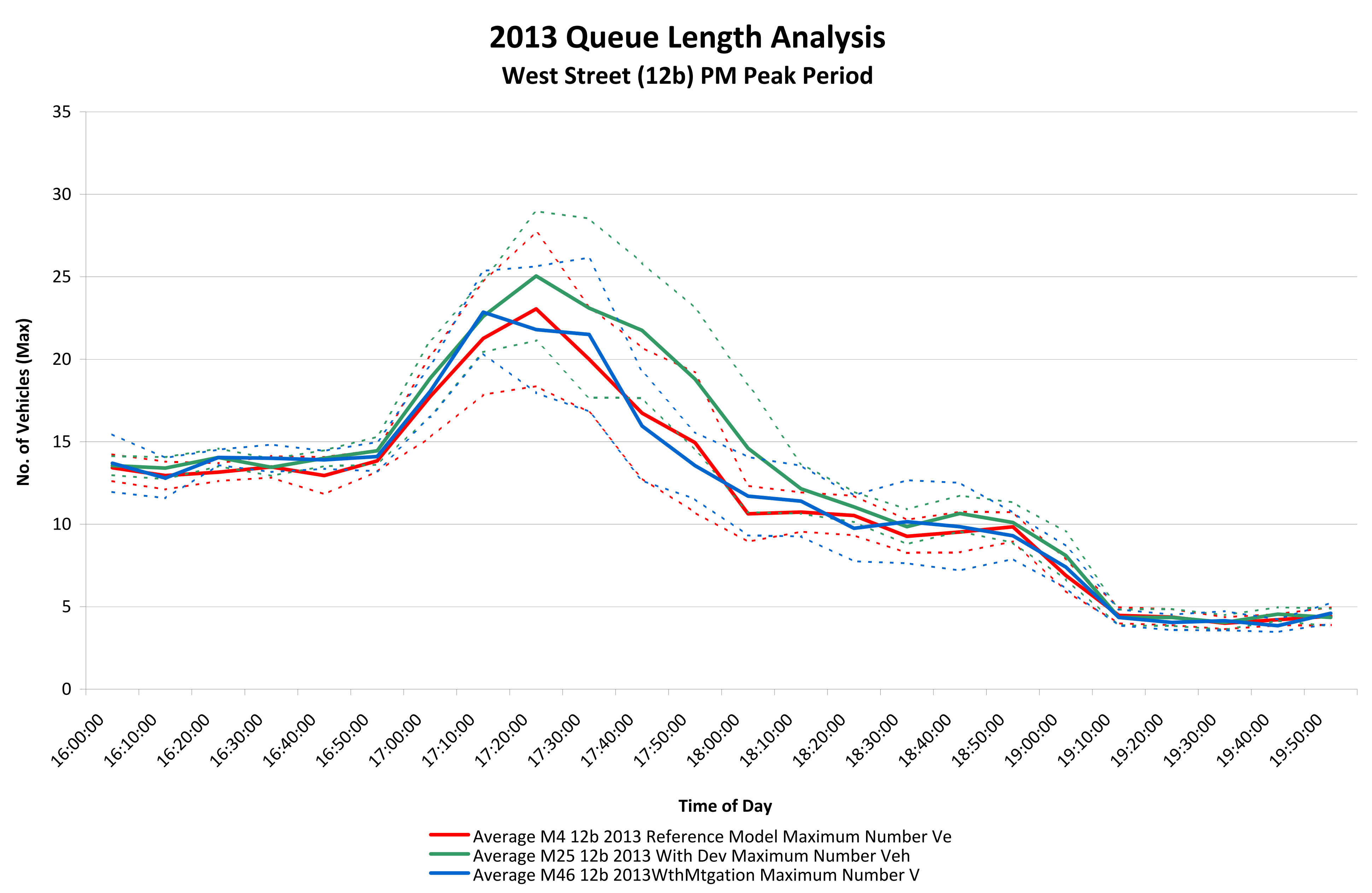

2013 Queue Length Analysis
North Street Arm (12a) PM Peak Period
25
20
15
10
5
0
No. of vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12a 2013 Reference Model Maximum Number Ve
Average M25 12a 2013 With Dev Maximum Number Veh
Average M46 12a 2013WthMtgation Maximum Number V

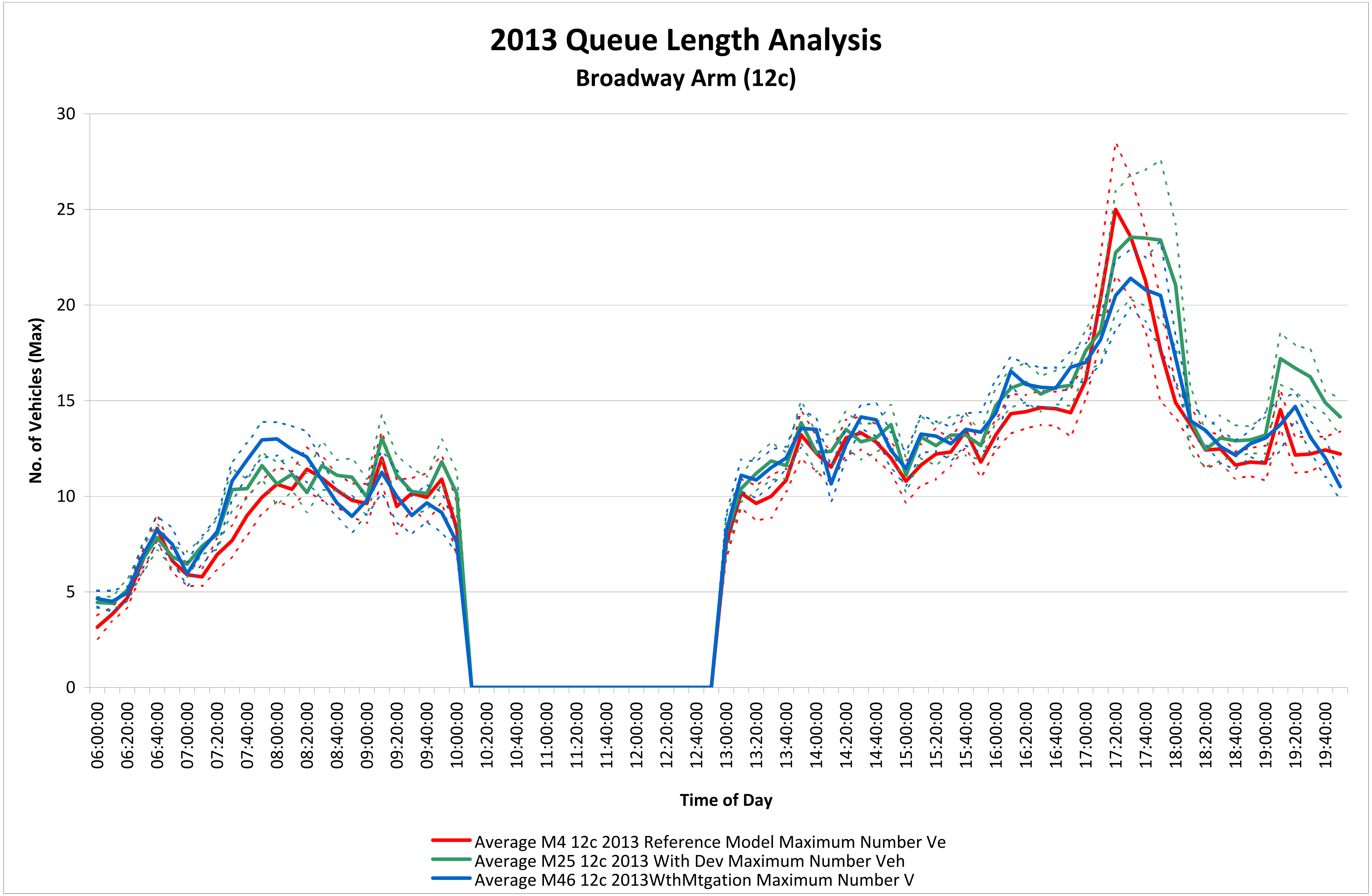


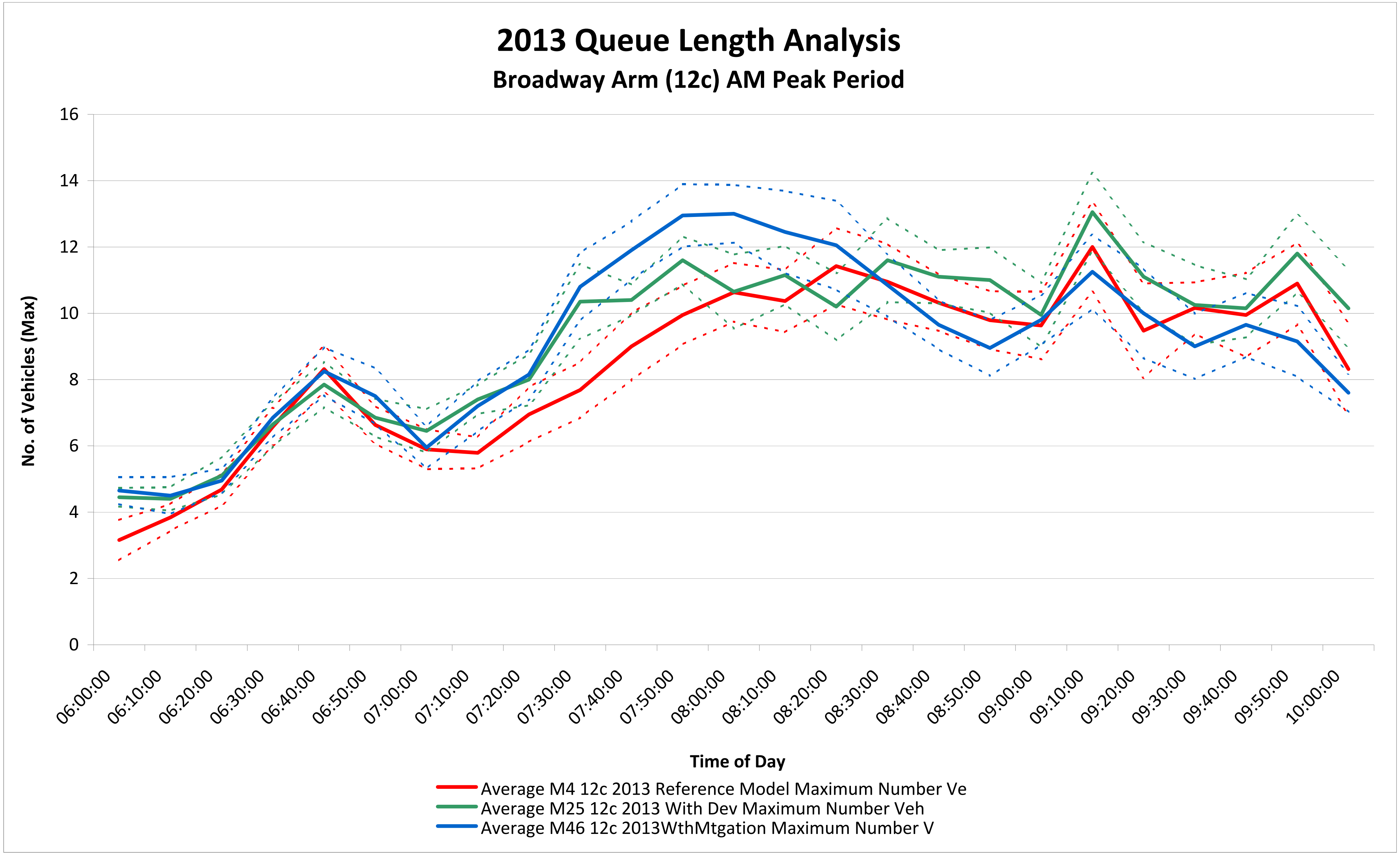
2013 Queue Length Analysis
West Street (12b)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12b 2013 Reference Model Maximum Number Ve
Average M25 12b 2013 With Dev Maximum Number Veh
Average M46 12b 2013WthMtgation Maximum Number V

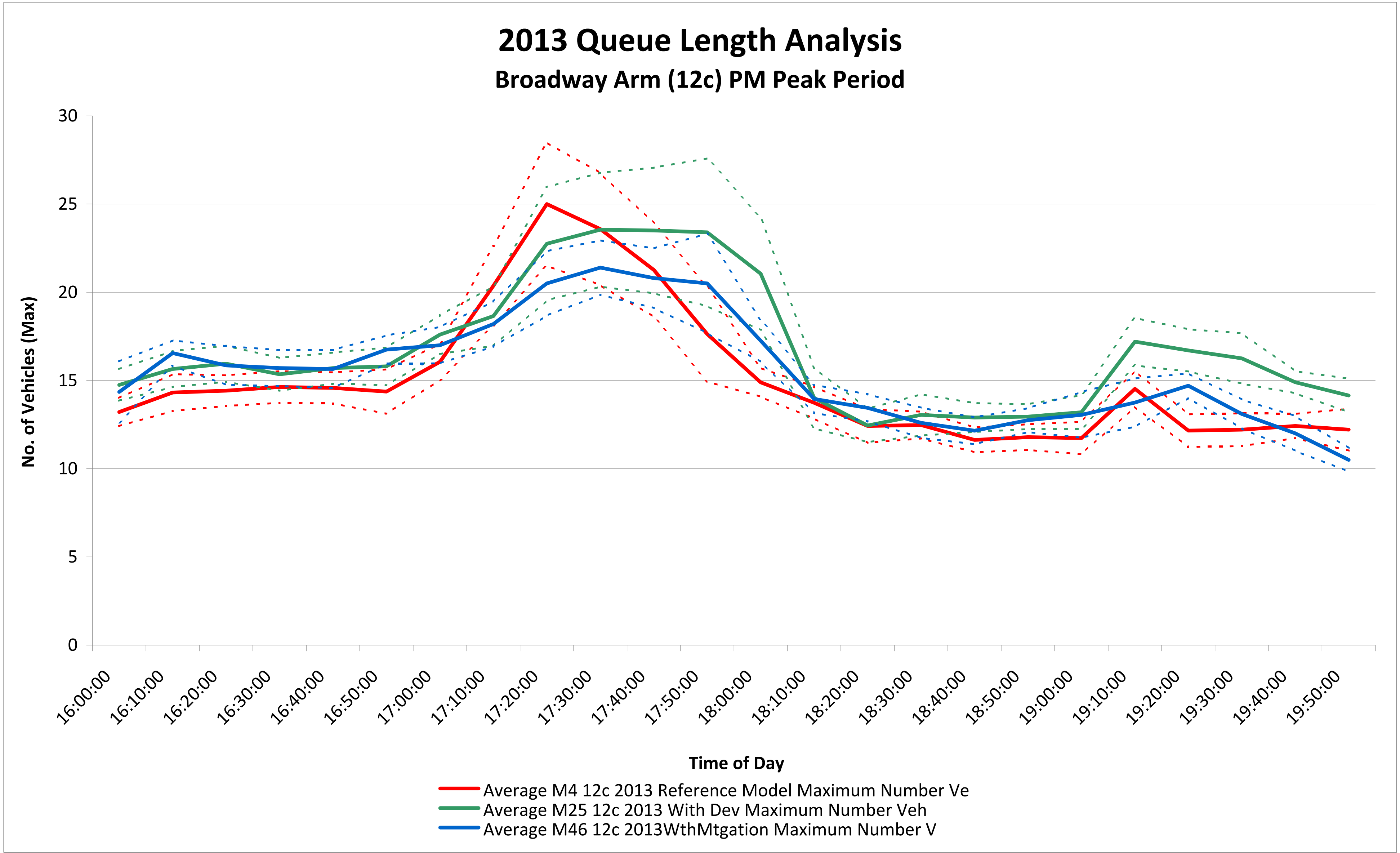


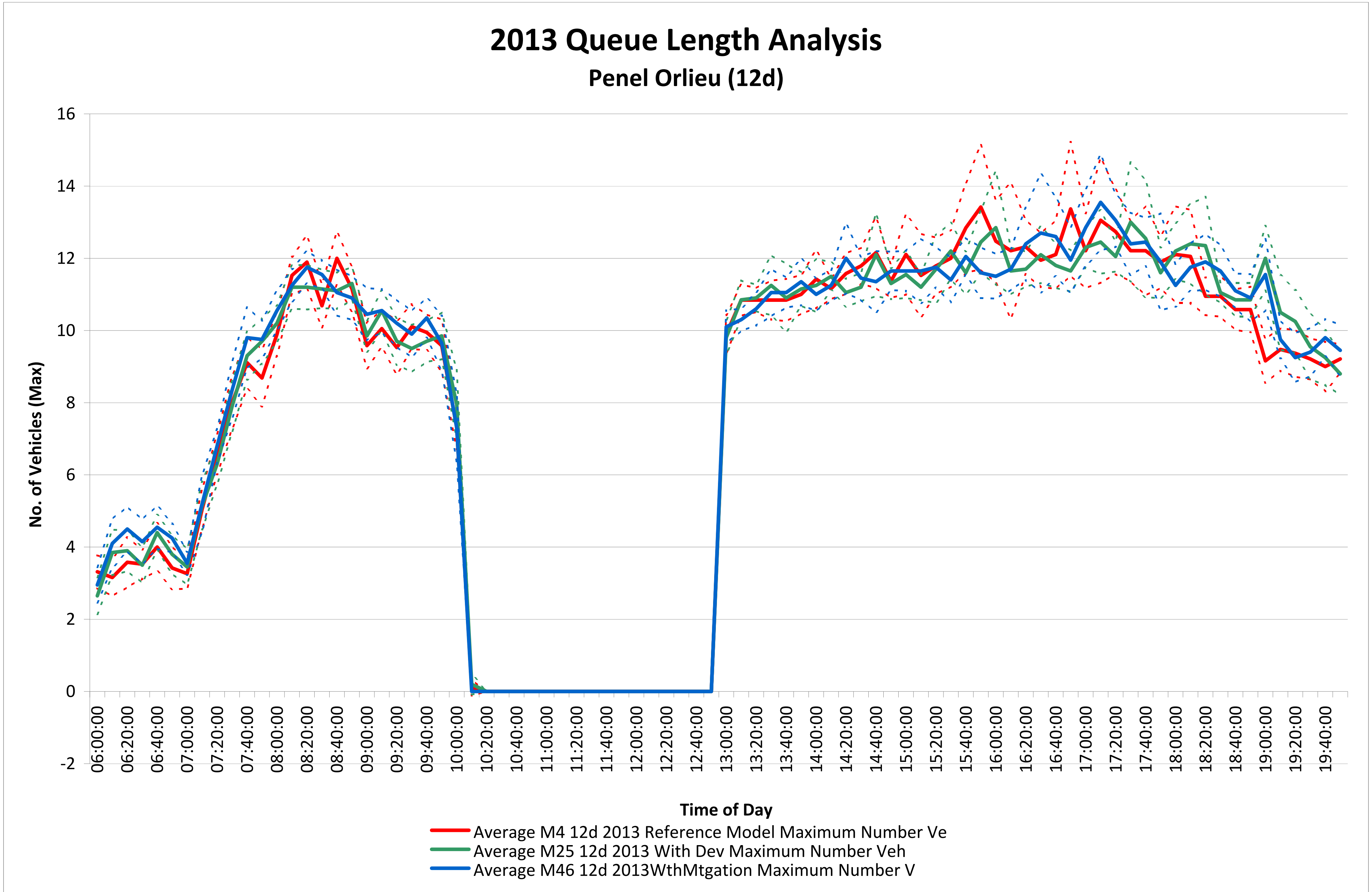
2013 Queue Length Analysis
West Street (12b) AM Peak Analysis
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12b 2013 Reference Model Maximum Number Ve
Average M25 12b 2013 With Dev Maximum Number Veh
Average M46 12b 2013WthMtgation Maximum Number V

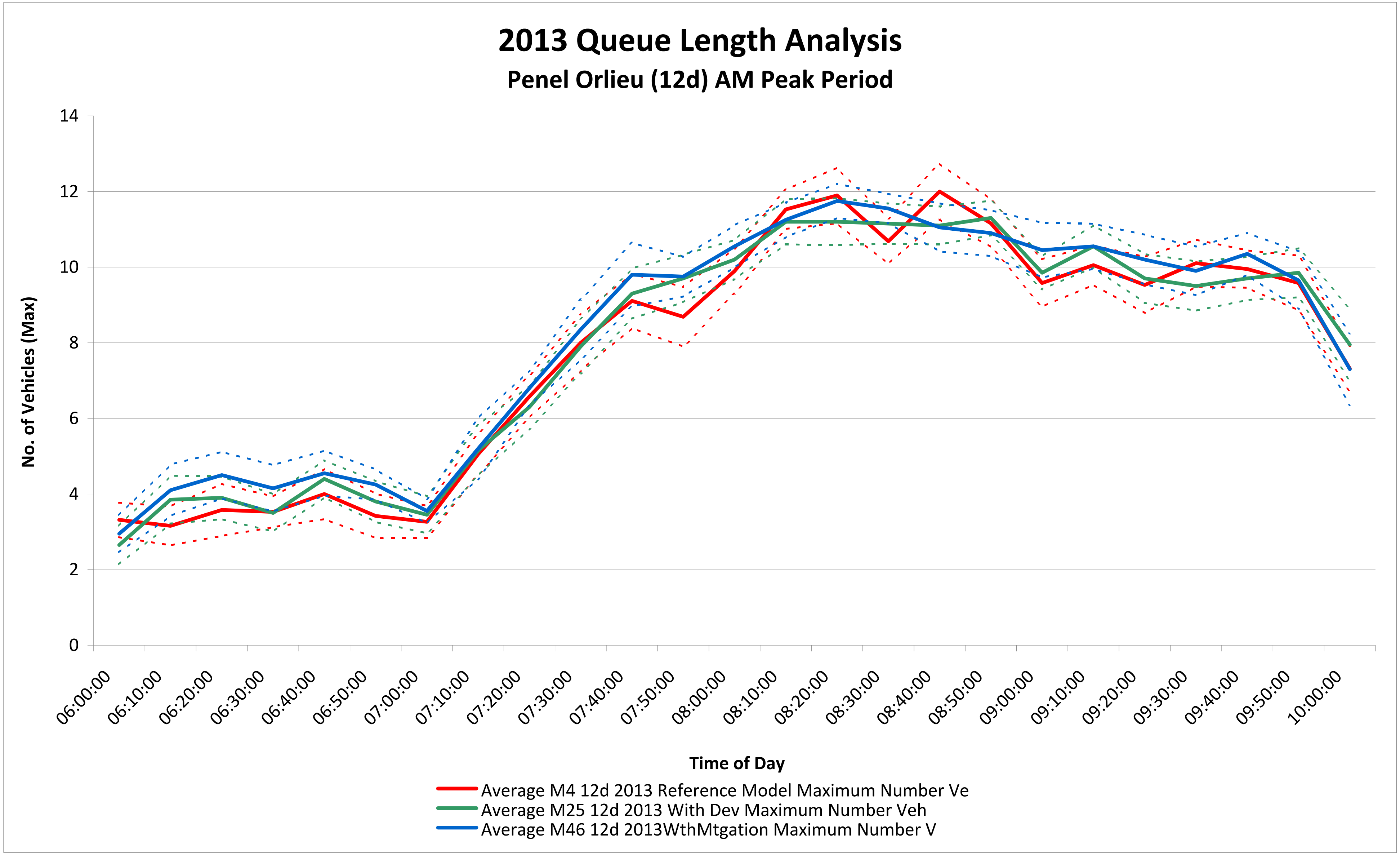

2013 Queue Length Analysis
West Street (12b) PM Peak Period
35
30
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12b 2013 Reference Model Maximum Number Ve
Average M25 12b 2013 With Dev Maximum Number Veh
Average M46 12b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Broadway Arm (12c)
No. of Vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12c 2013 Reference Model Maximum Number Ve
Average M25 12c 2013 With Dev Maximum Number Veh
Average M46 12c 2013WthMtgation Maximum Number V

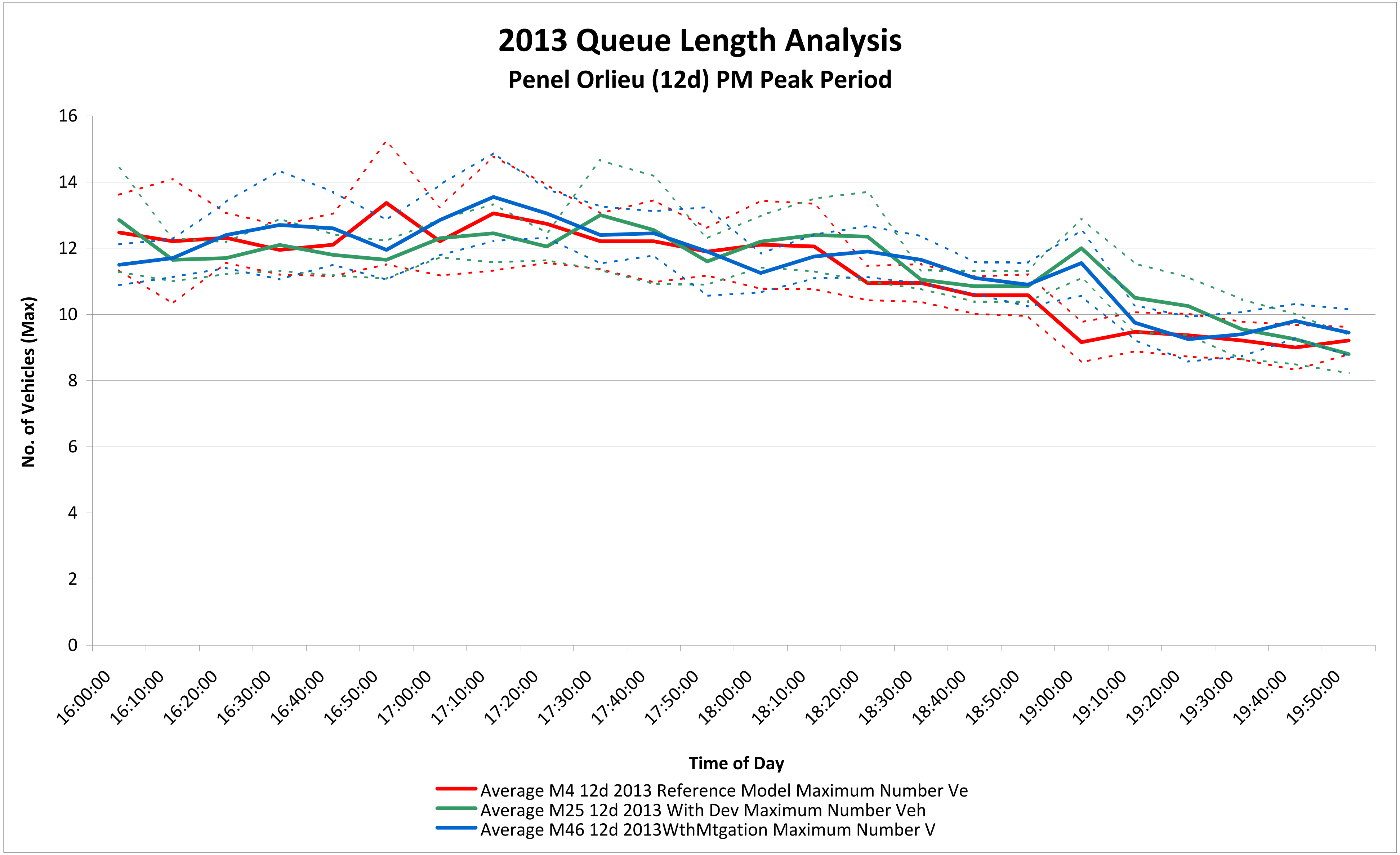

2013 Queue Length Analysis
Broadway Arm (12c) AM Peak Period
16
14
12
10
8
6
4
2
0
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12c 2013 Reference Model Maximum Number Ve
Average M25 12c 2013 With Dev Maximum Number Veh
Average M46 12c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Broadway Arm (12c) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12c 2013 Reference Model Maximum Number Ve
Average M25 12c 2013 With Dev Maximum Number Veh
Average M46 12c 2013WthMtgation Maximum Number V

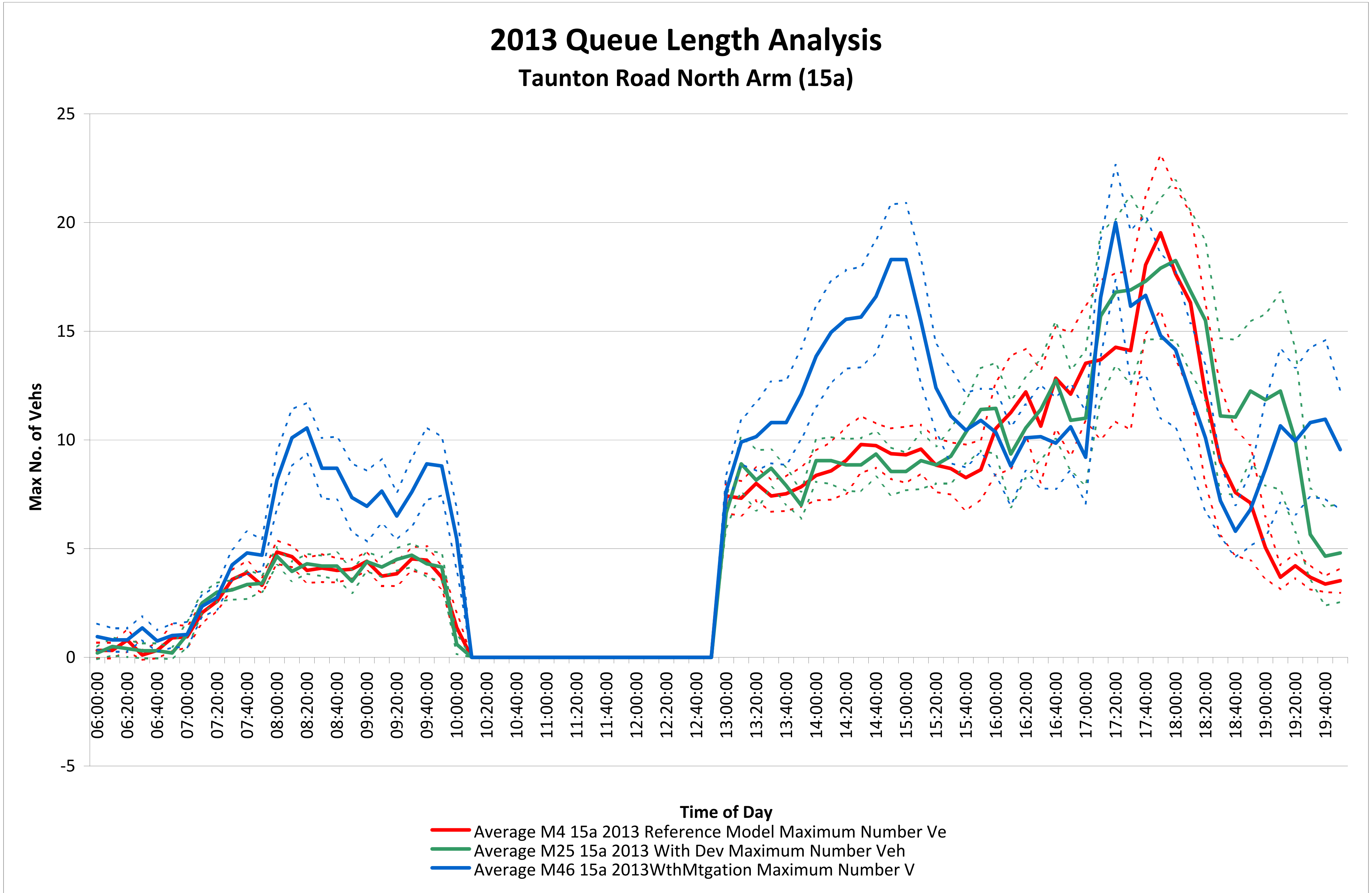

2013 Queue Length Analysis
Penel Orlieu (12d)
16
14
12
10
8
6
4
2
0
-2
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 12d 2013 Reference Model Maximum Number Ve
Average M25 12d 2013 With Dev Maximum Number Veh
Average M46 12d 2013WthMtgation Maximum Number V



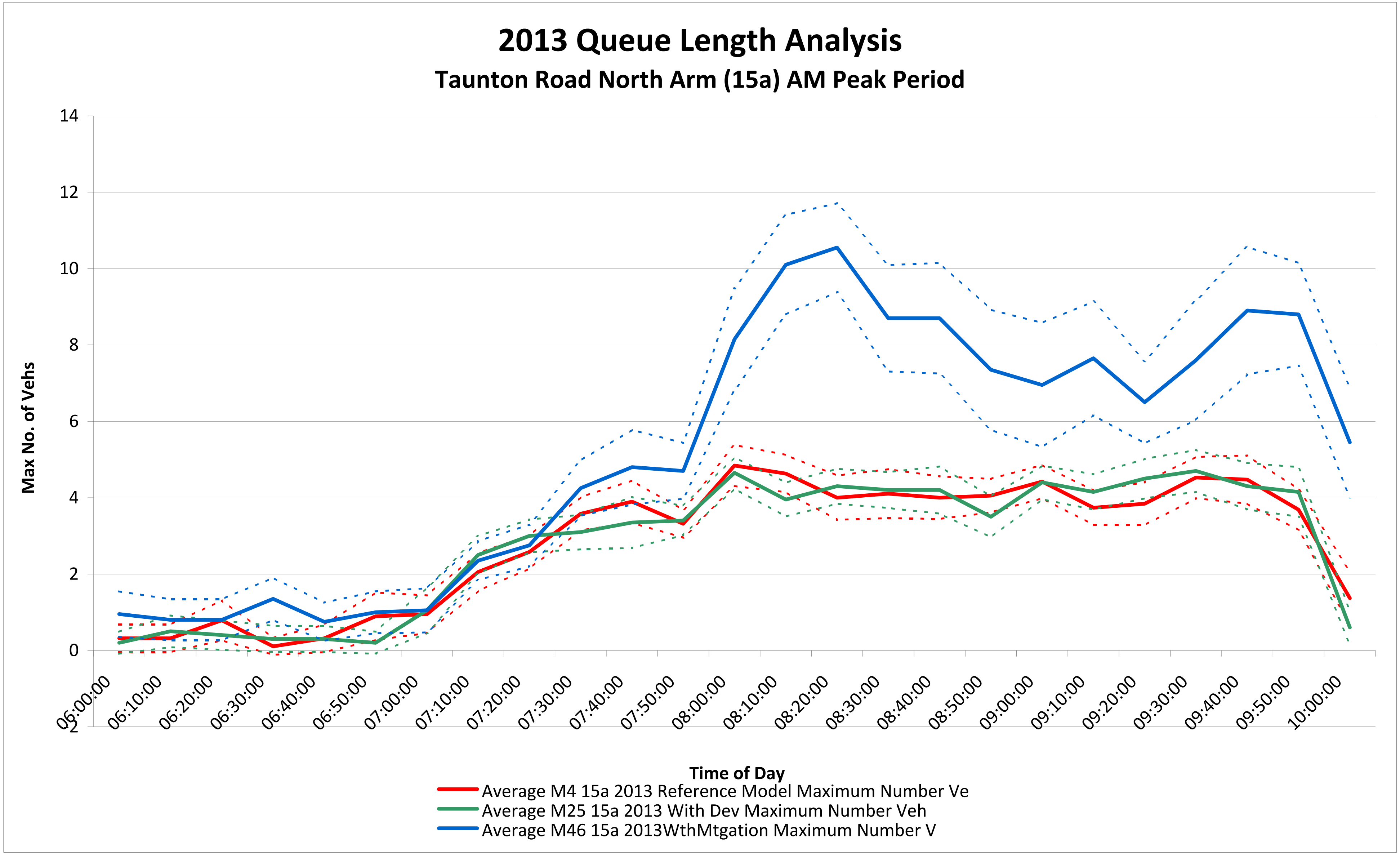
2013 Queue Length Analysis
Penel Orlieu (12d) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 12d 2013 Reference Model Maximum Number Ve
Average M25 12d 2013 With Dev Maximum Number Veh
Average M46 12d 2013WthMtgation Maximum Number V



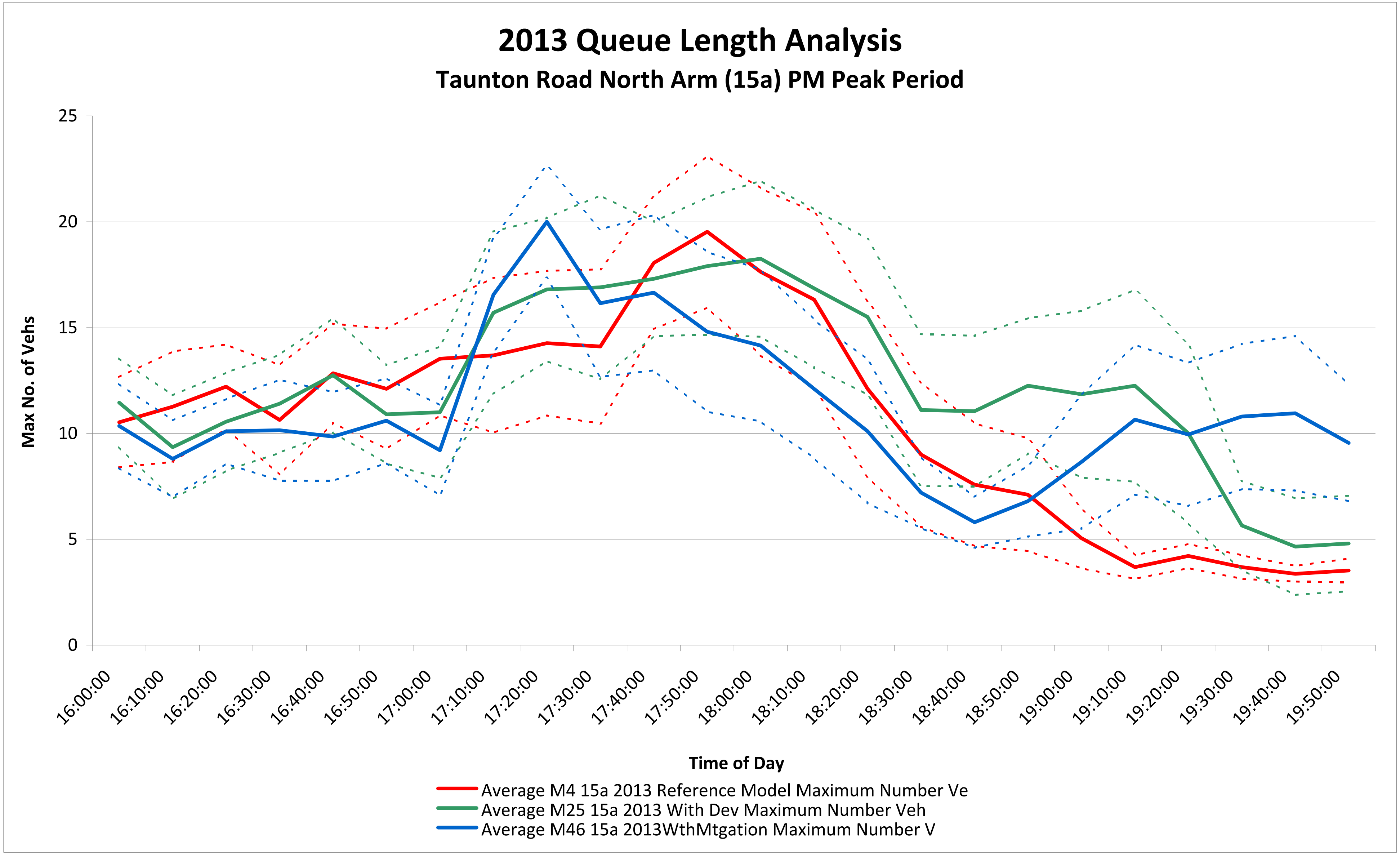
2013 Queue Length Analysis
Penel Orlieu (12d) PM Peak Period
16
14
12
10
8
6
4
2
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 12d 2013 Reference Model Maximum Number Ve
Average M25 12d 2013 With Dev Maximum Number Veh
Average M46 12d 2013WthMtgation Maximum Number V



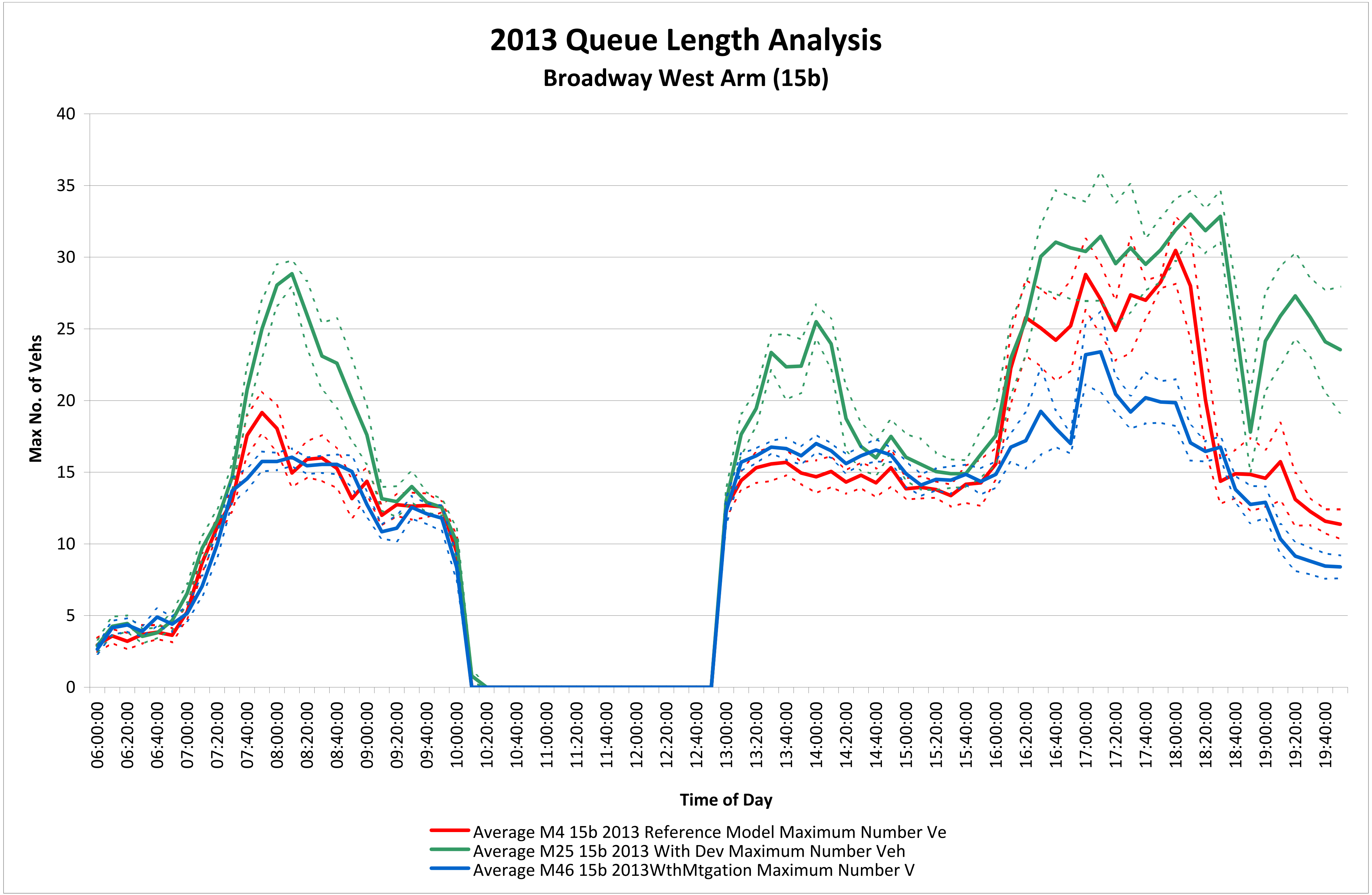
2013 Queue Length Analysis
Taunton Road North Arm (15a)
Max No. of Vehs
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 15a 2013 Reference Model Maximum Number Ve
Average M25 15a 2013 With Dev Maximum Number Veh
Average M46 15a 2013WthMtgation Maximum Number V



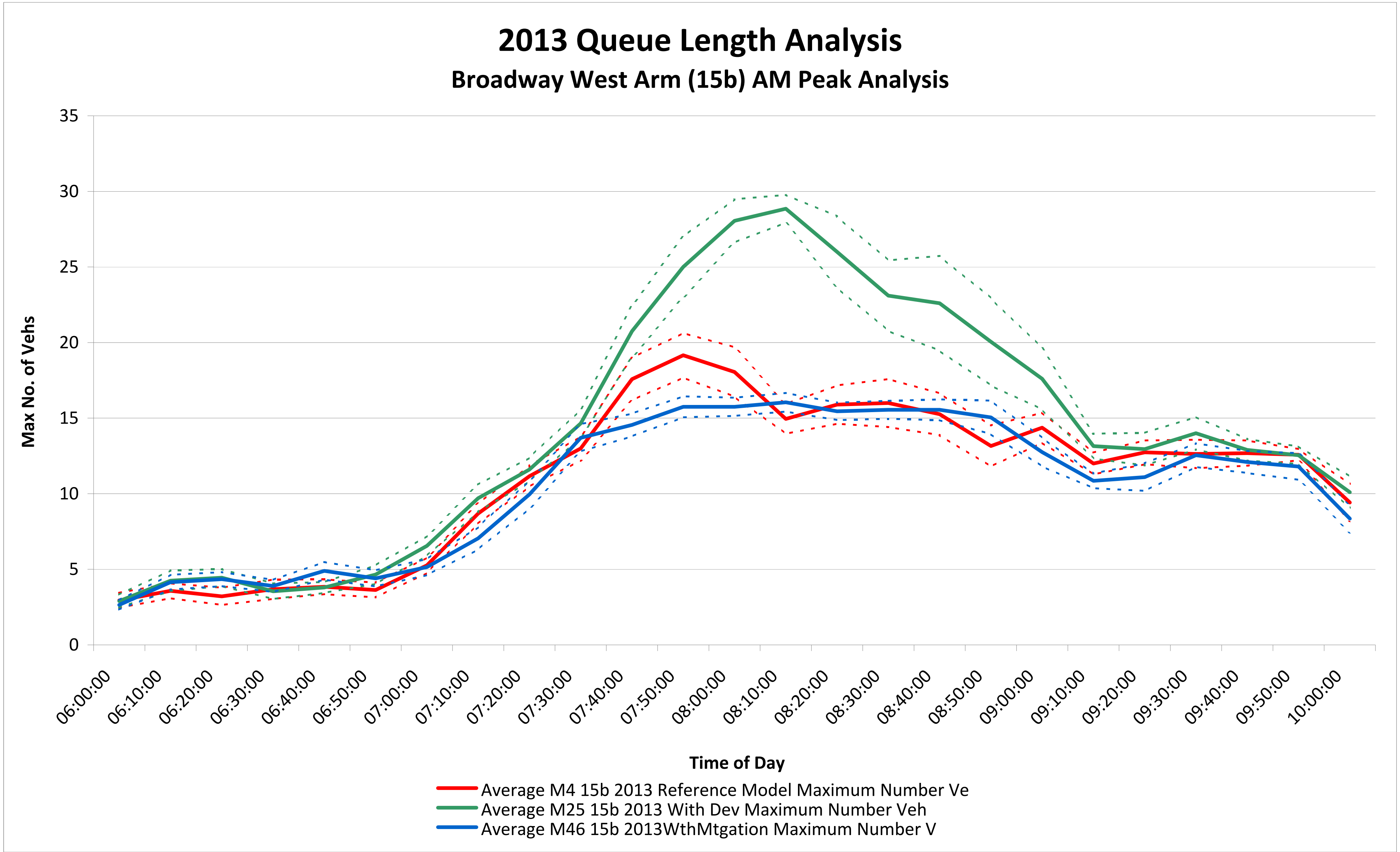
2013 Queue Length Analysis
Taunton Road North Arm (15a) AM Peak Period
Max No. of Vehs
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15a 2013 Reference Model Maximum Number Ve
Average M25 15a 2013 With Dev Maximum Number Veh
Average M46 15a 2013WthMtgation Maximum Number V

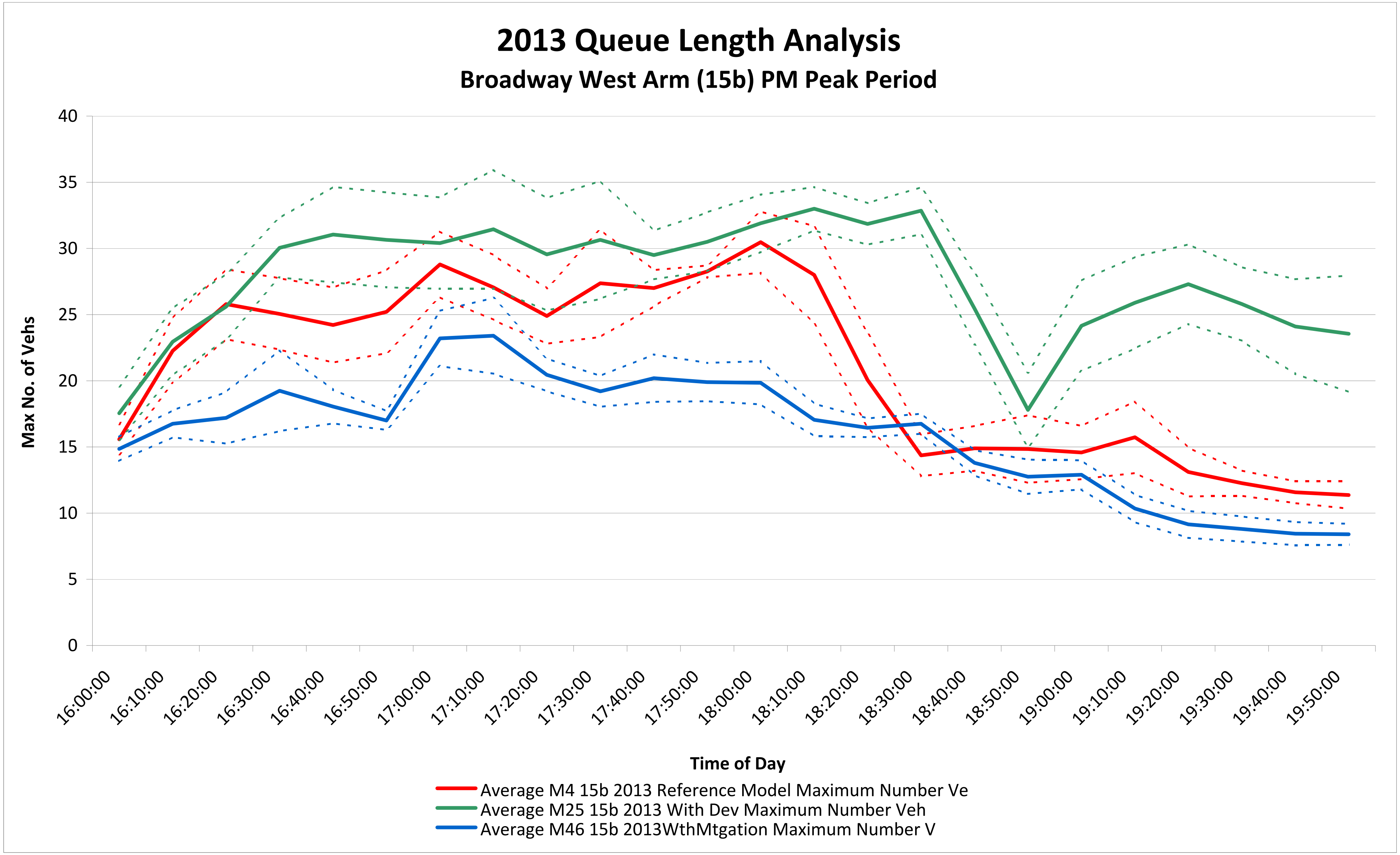


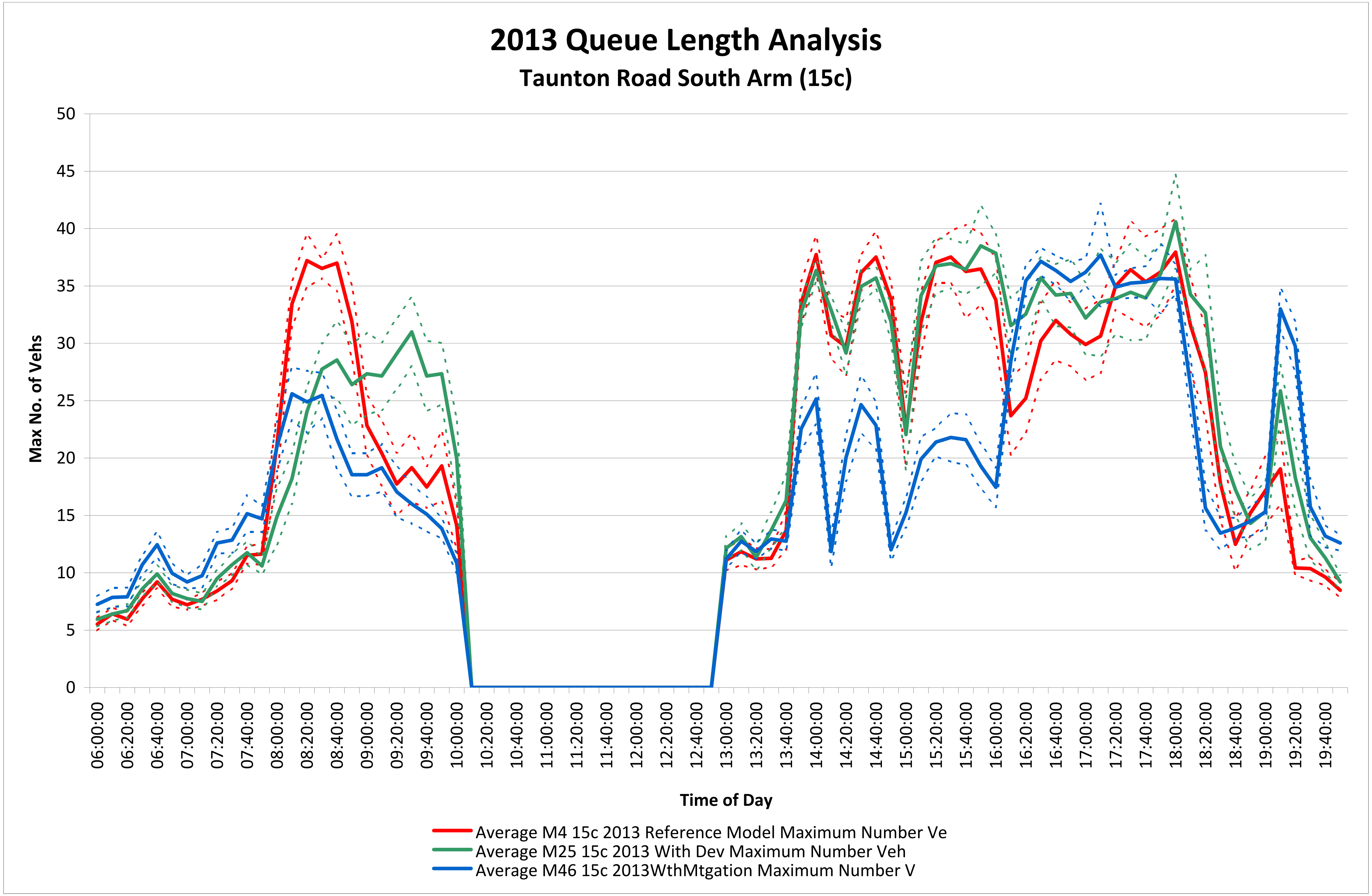
2013 Queue Length Analysis
Taunton Road North Arm (15a) PM Peak Period
Max No. of Vehs
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15a 2013 Reference Model Maximum Number Ve
Average M25 15a 2013 With Dev Maximum Number Veh
Average M46 15a 2013WthMtgation Maximum Number V



2013 Queue Length Analysis
Broadway West Arm (15b)
Max No. of Vehs
0
5
10
15
20
25
30
35
40
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 15b 2013 Reference Model Maximum Number Ve
Average M25 15b 2013 With Dev Maximum Number Veh
Average M46 15b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Broadway West Arm (15b) AM Peak Analysis
Max No. of Vehs
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15b 2013 Reference Model Maximum Number Ve
Average M25 15b 2013 With Dev Maximum Number Veh
Average M46 15b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Broadway West Arm (15b) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15b 2013 Reference Model Maximum Number Ve
Average M25 15b 2013 With Dev Maximum Number Veh
Average M46 15b 2013WthMtgation Maximum Number V



2013 Queue Length Analysis
Taunton Road South Arm (15c)
Max No. of Vehs
50
45
40
35
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
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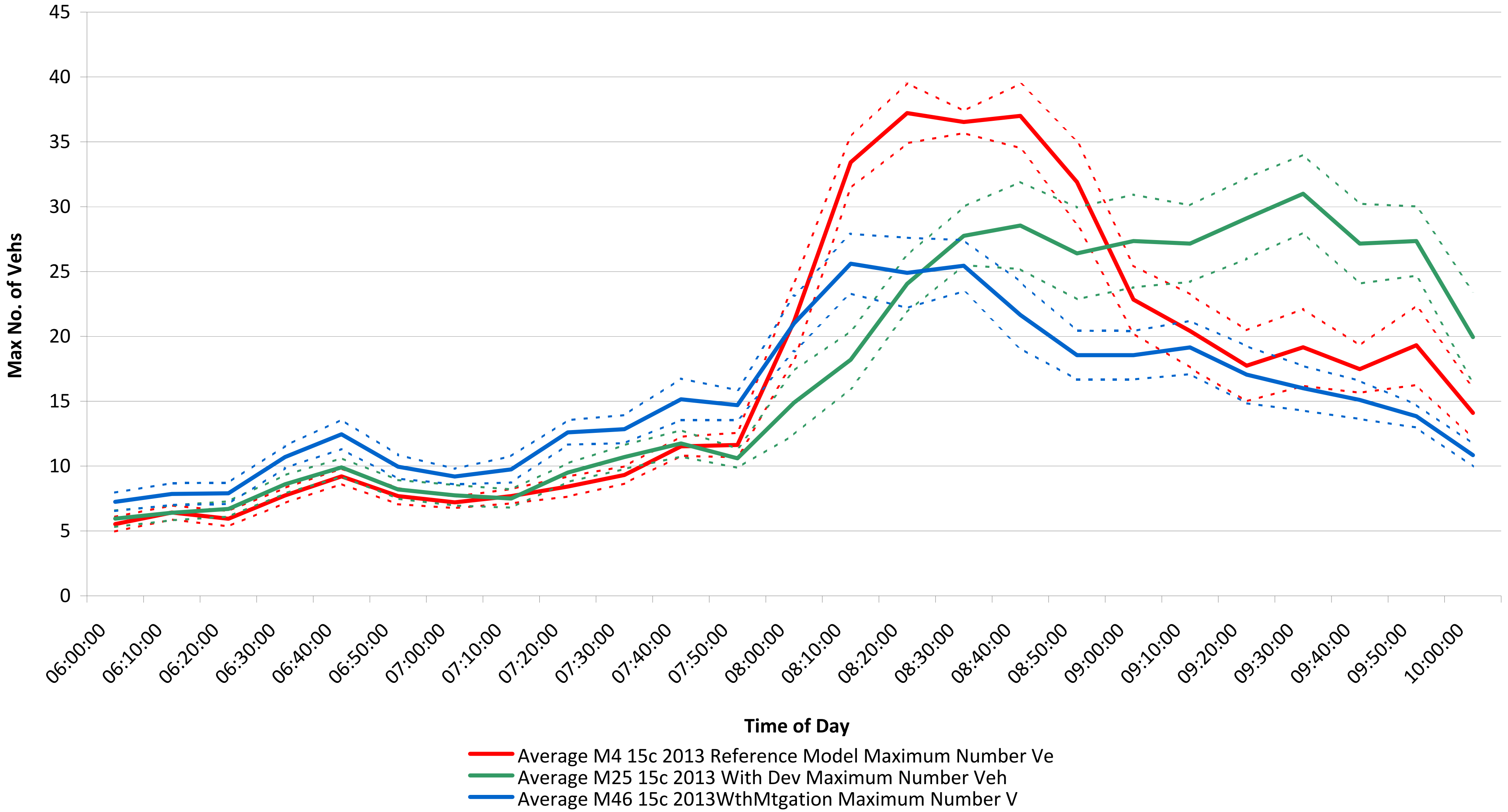
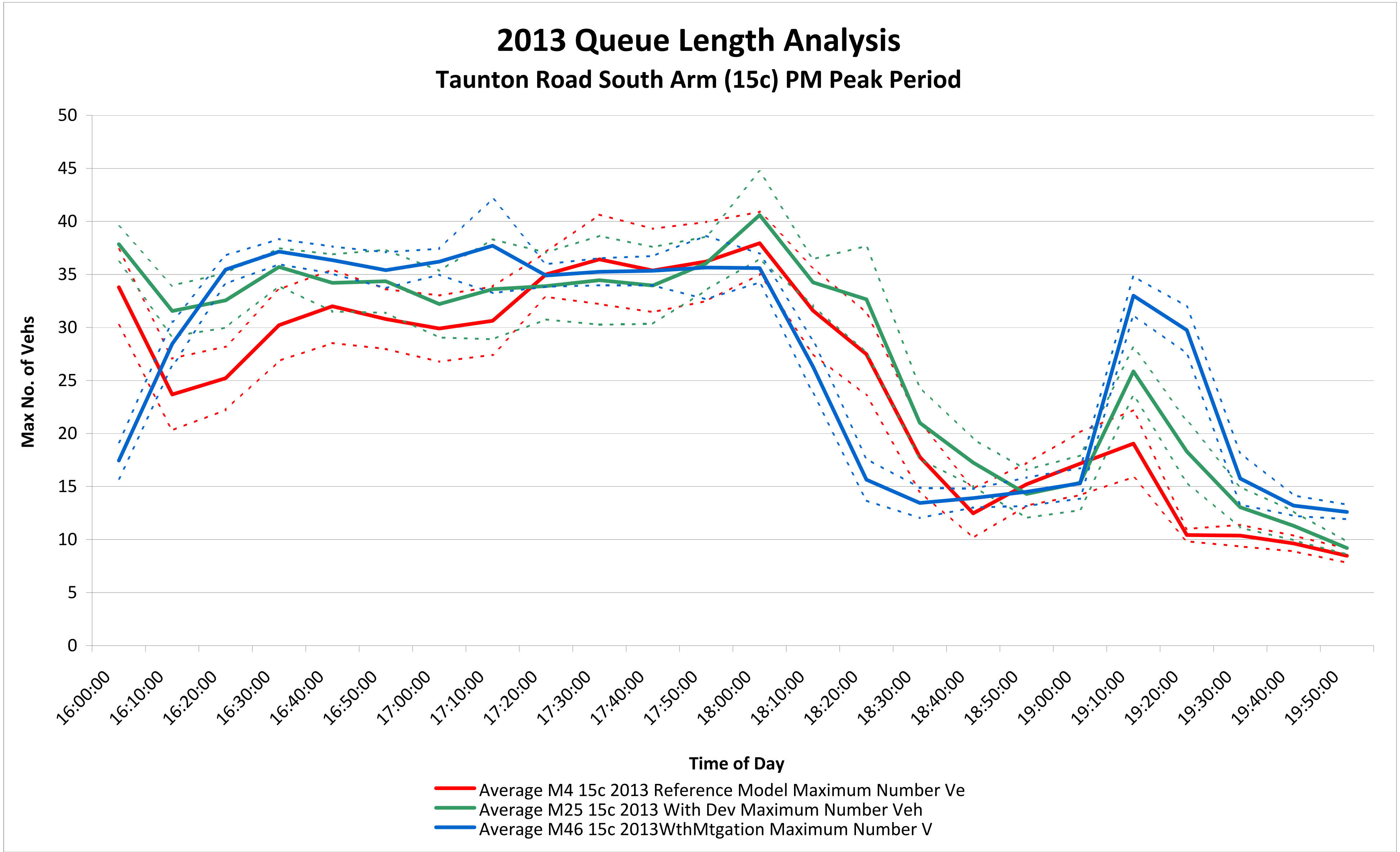
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 15c 2013 Reference Model Maximum Number Ve
Average M25 15c 2013 With Dev Maximum Number Veh
Average M46 15c 2013WthMtgation Maximum Number V

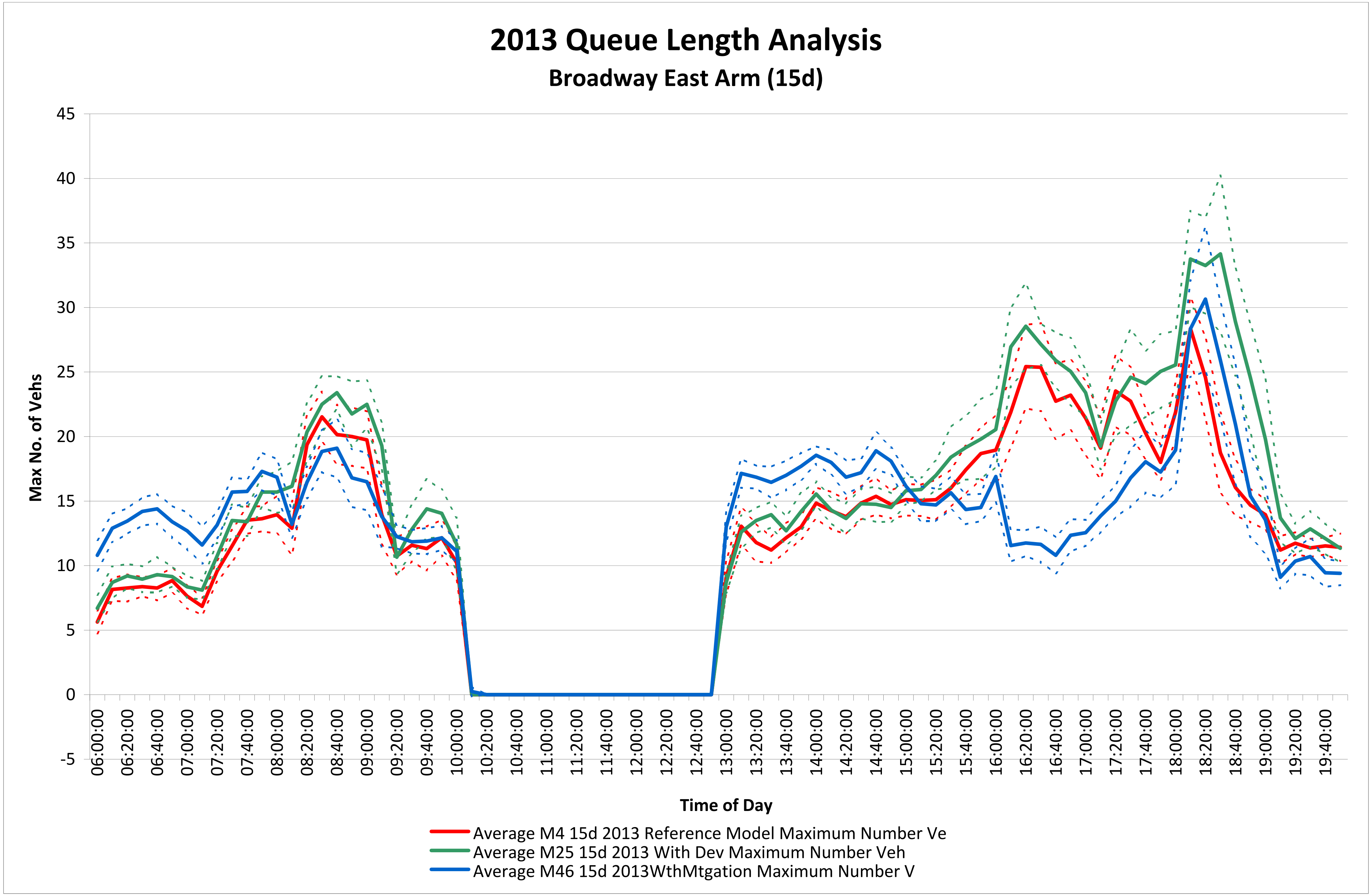
2013 Queue Length Analysis

Taunton Road South Arm (15c) AM Peak Period

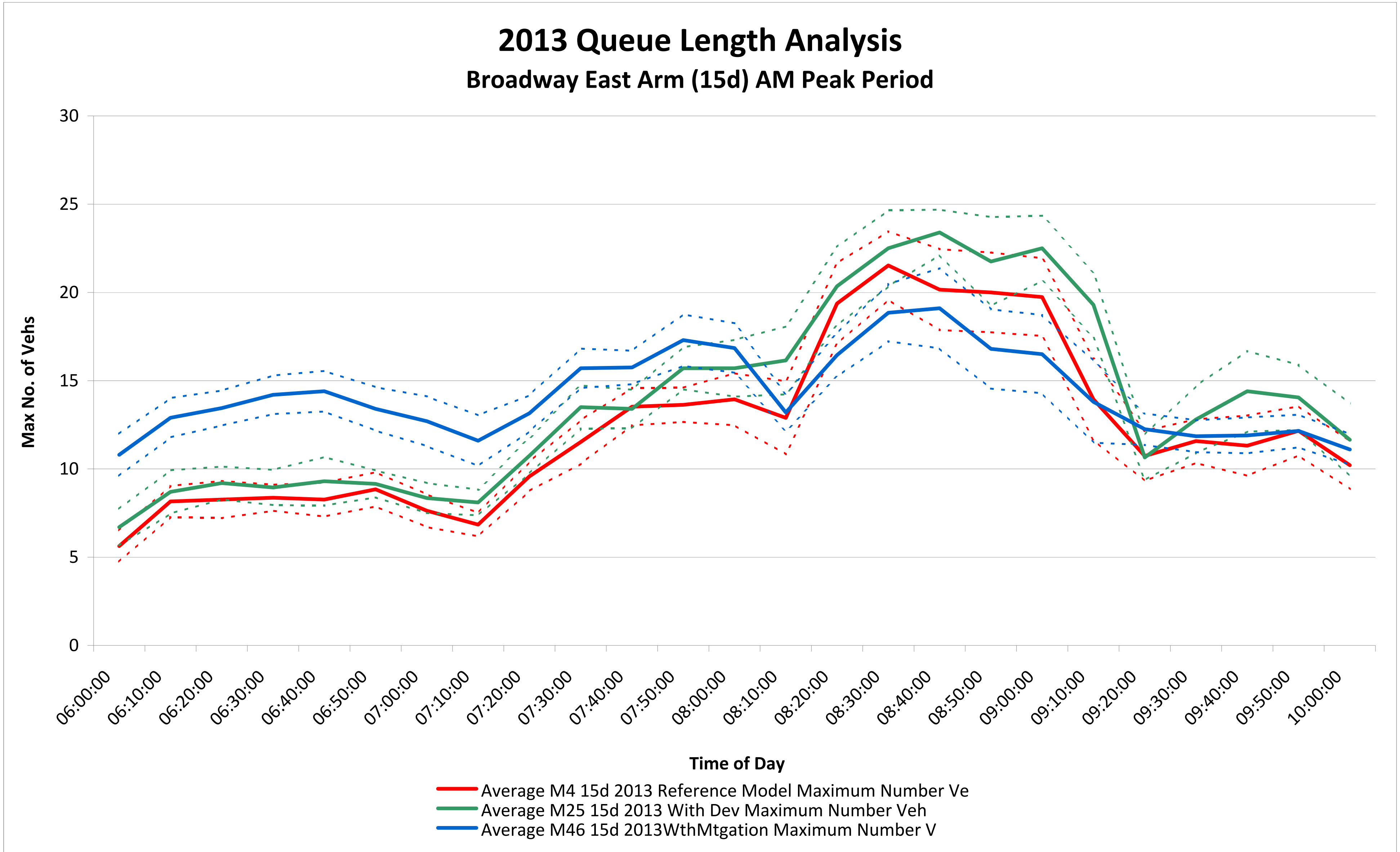


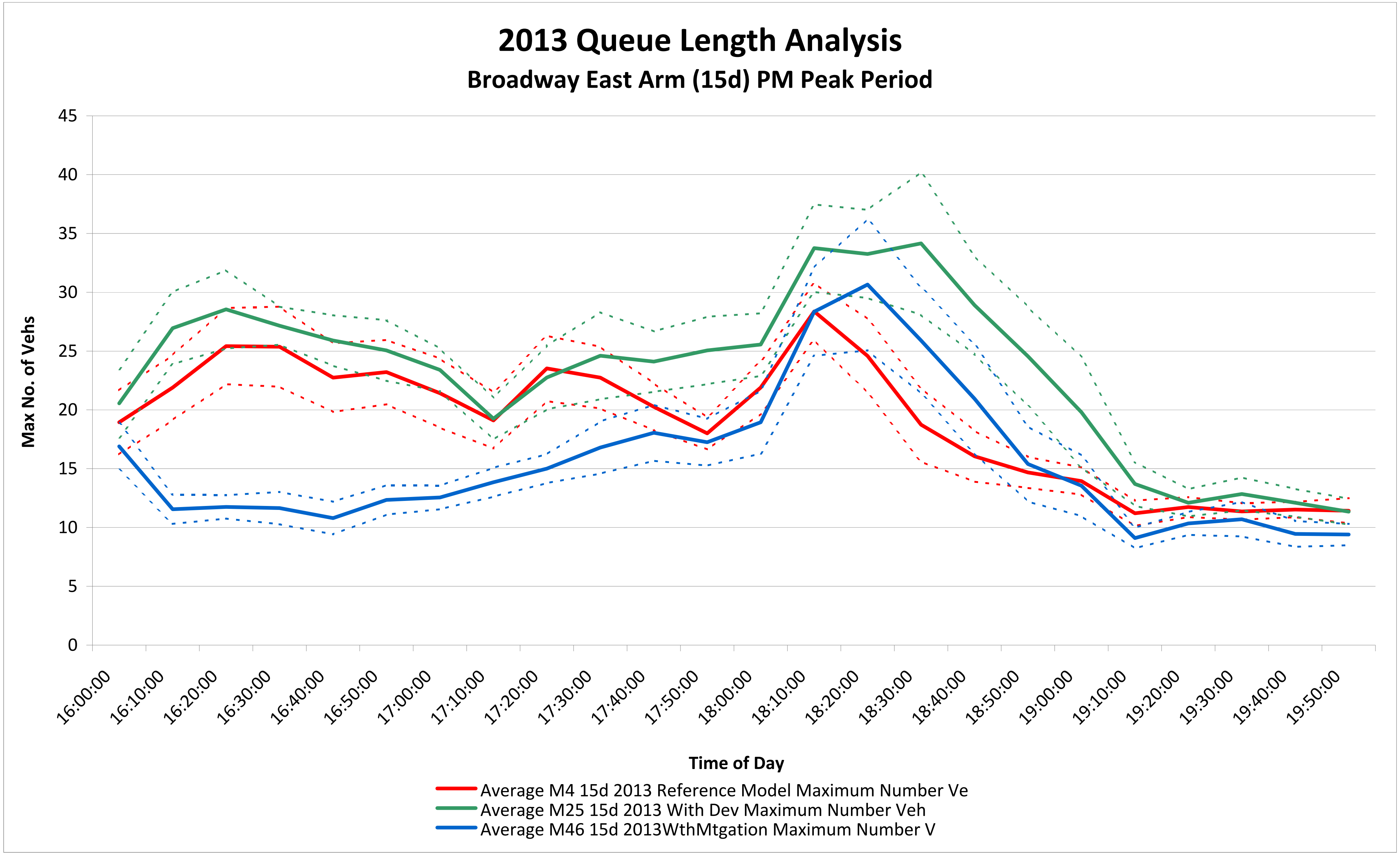


2013 Queue Length Analysis
Taunton Road South Arm (15c) PM Peak Period
Max No. of Vehs
50
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15c 2013 Reference Model Maximum Number Ve
Average M25 15c 2013 With Dev Maximum Number Veh
Average M46 15c 2013WthMtgation Maximum Number V

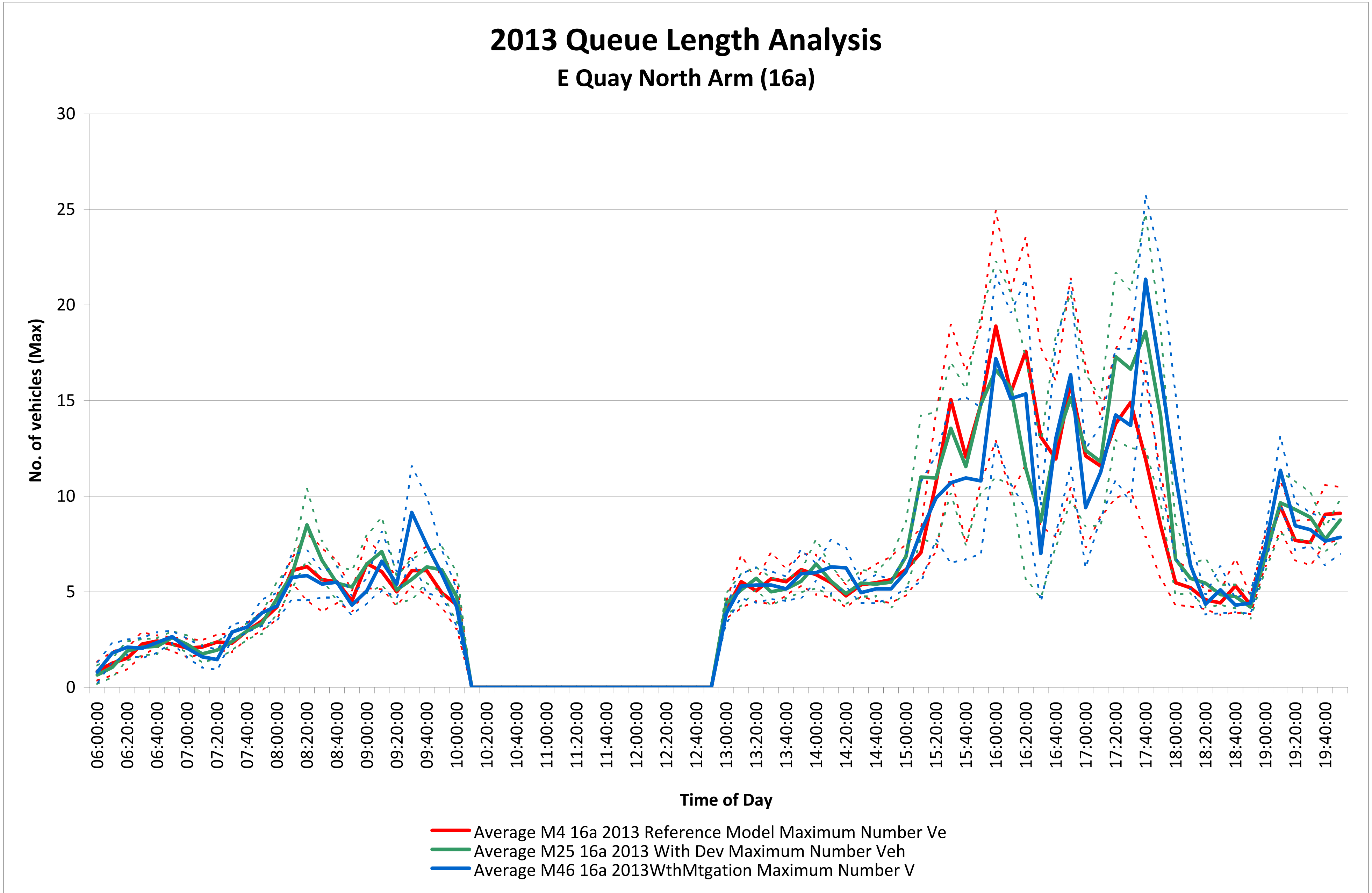


2013 Queue Length Analysis
Broadway East Arm (15d)
Max No. of Vehs
Time of Day
Average M4 15d 2013 Reference Model Maximum Number Ve
Average M25 15d 2013 With Dev Maximum Number Veh
Average M46 15d 2013WthMtgation Maximum Number V

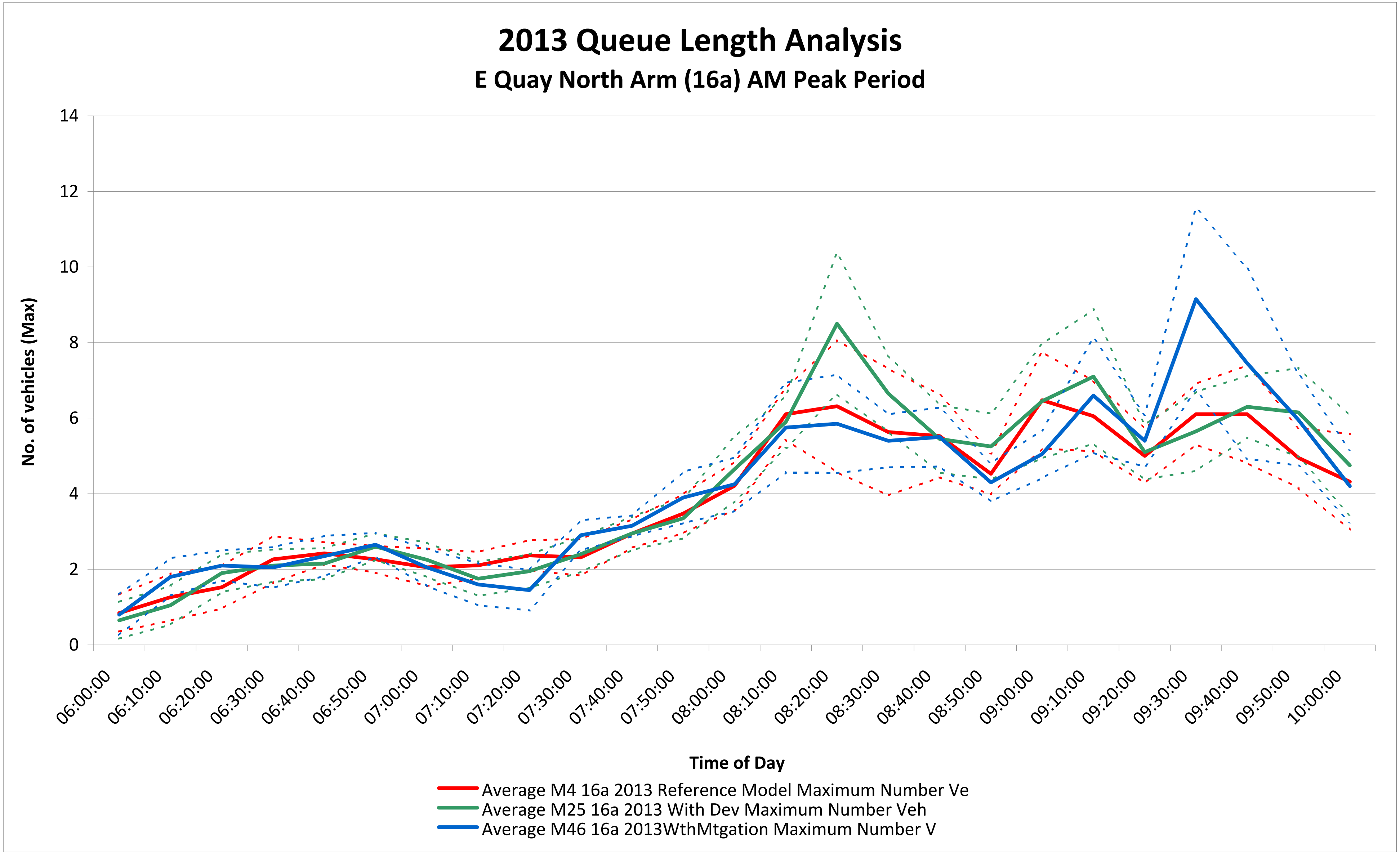

2013 Queue Length Analysis
Broadway East Arm (15d) AM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 15d 2013 Reference Model Maximum Number Ve
Average M25 15d 2013 With Dev Maximum Number Veh
Average M46 15d 2013WthMtgation Maximum Number V

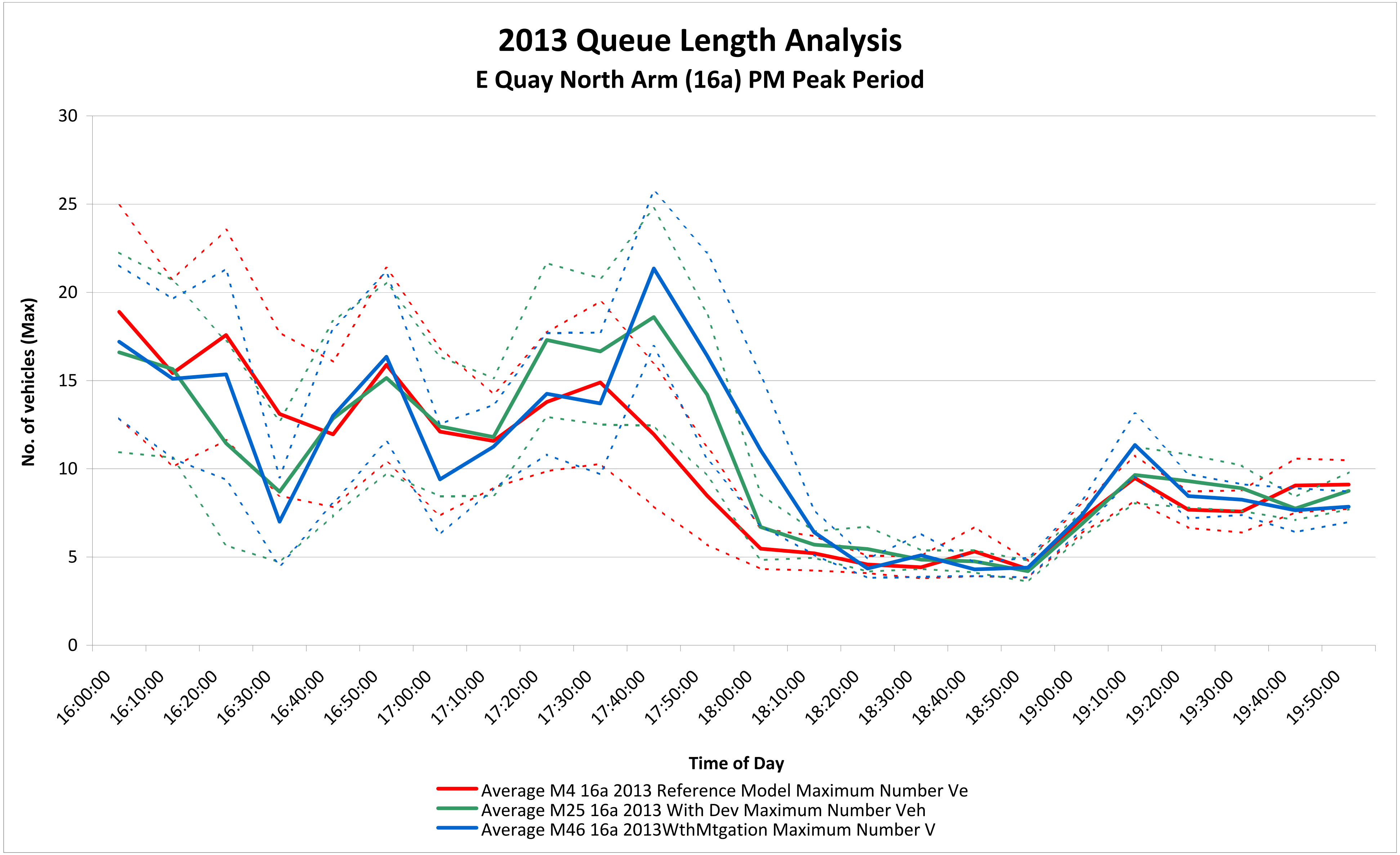


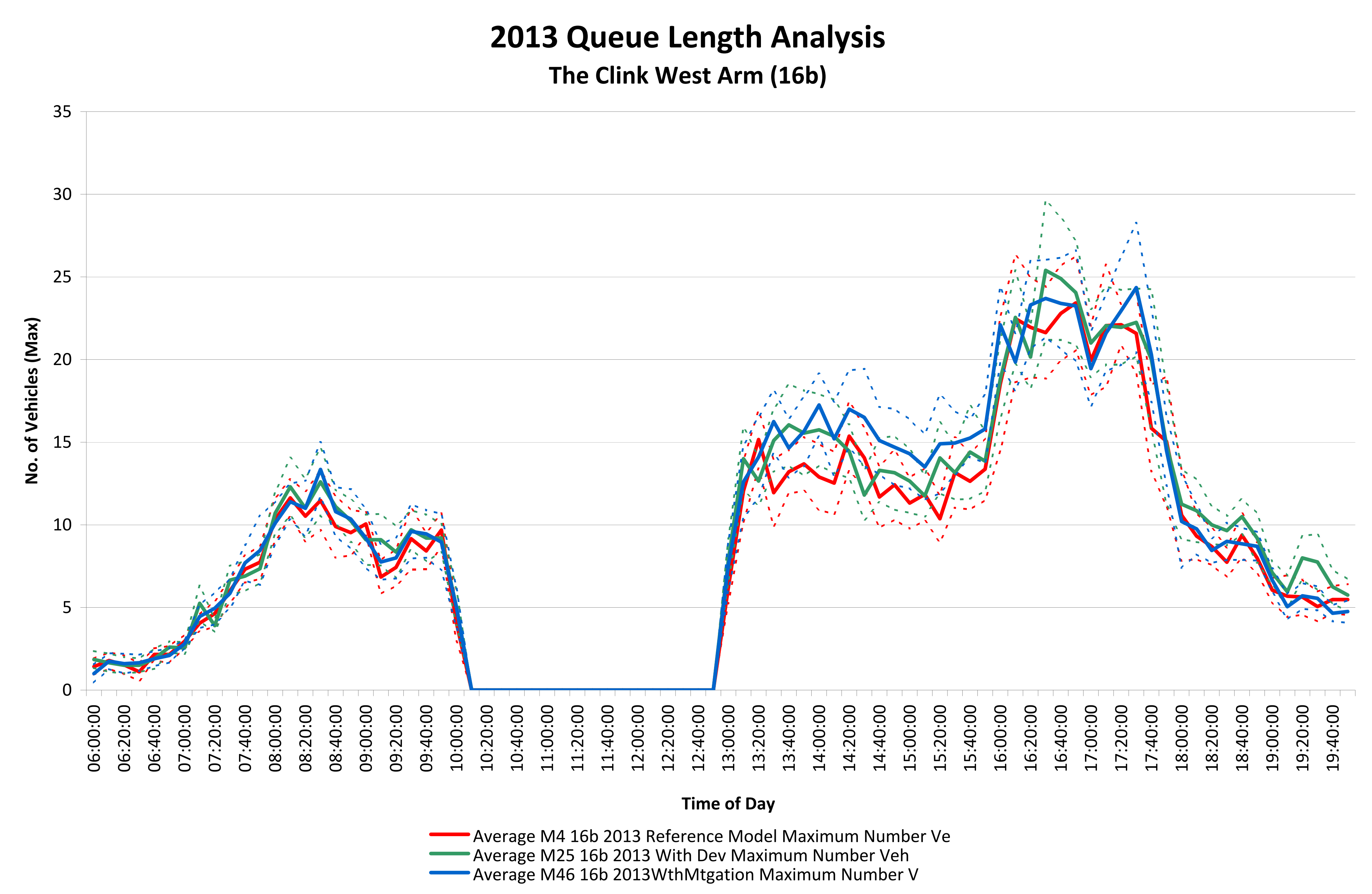
2013 Queue Length Analysis
Broadway East Arm (15d) PM Peak Period
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 15d 2013 Reference Model Maximum Number Ve
Average M25 15d 2013 With Dev Maximum Number Veh
Average M46 15d 2013WthMtgation Maximum Number V



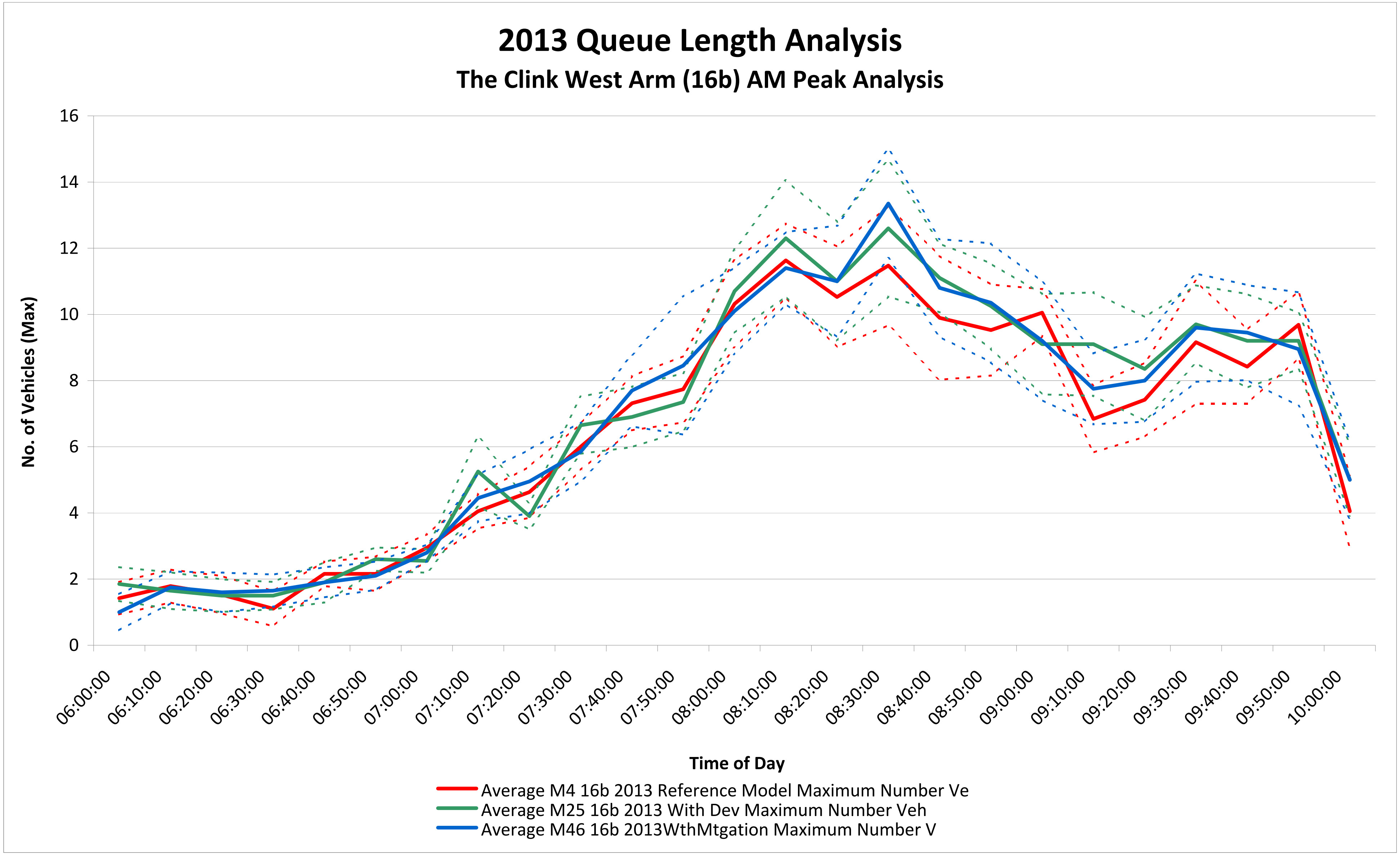
2013 Queue Length Analysis
E Quay North Arm (16a)
No. of vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 16a 2013 Reference Model Maximum Number Ve
Average M25 16a 2013 With Dev Maximum Number Veh
Average M46 16a 2013WthMtgation Maximum Number V

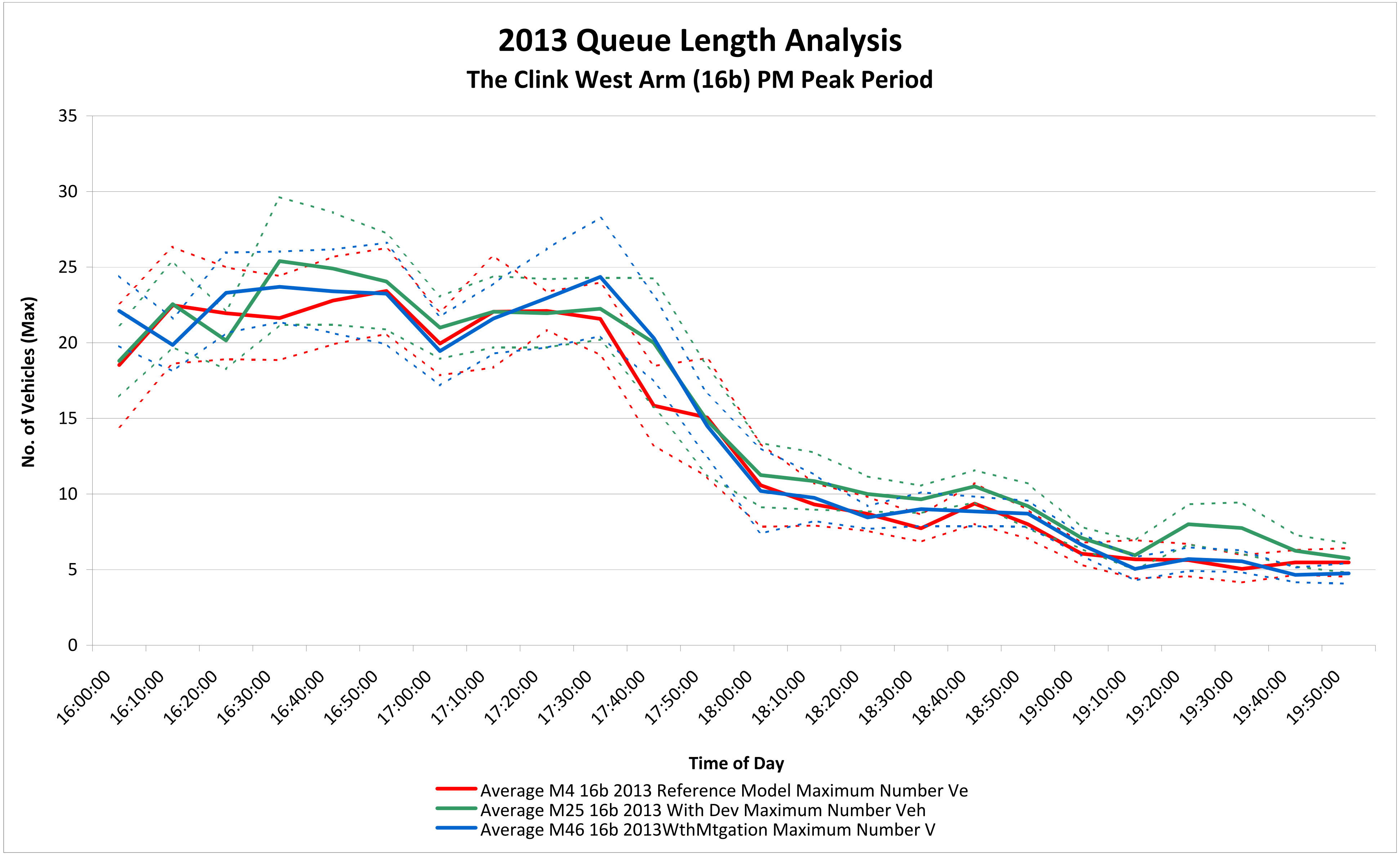

2013 Queue Length Analysis
E Quay North Arm (16a) AM Peak Period
14
12
10
8
6
4
2
0
No. of vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 16a 2013 Reference Model Maximum Number Ve
Average M25 16a 2013 With Dev Maximum Number Veh
Average M46 16a 2013WthMtgation Maximum Number V

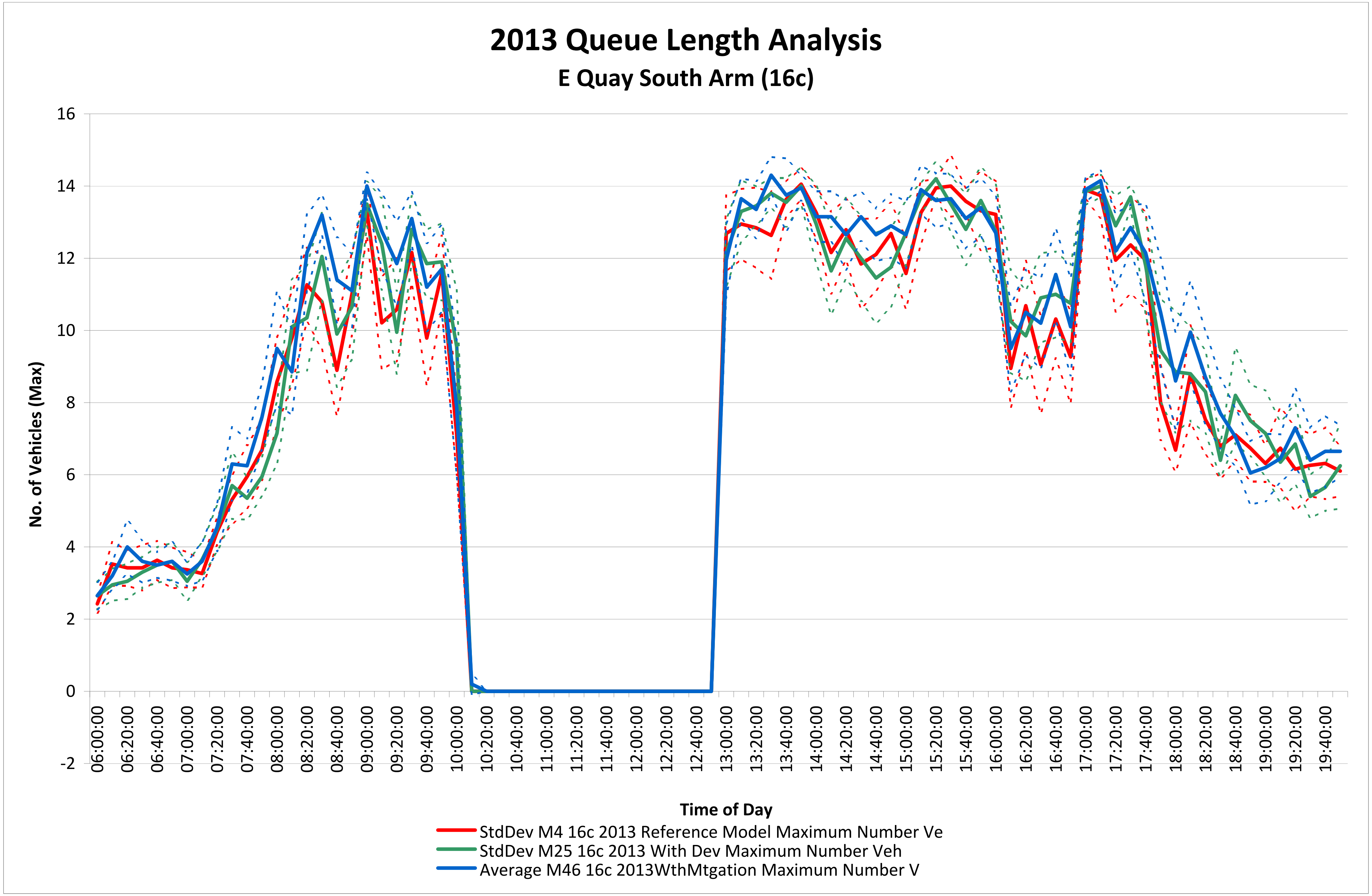

2013 Queue Length Analysis
E Quay North Arm (16a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 16a 2013 Reference Model Maximum Number Ve
Average M25 16a 2013 With Dev Maximum Number Veh
Average M46 16a 2013WthMtgation Maximum Number V



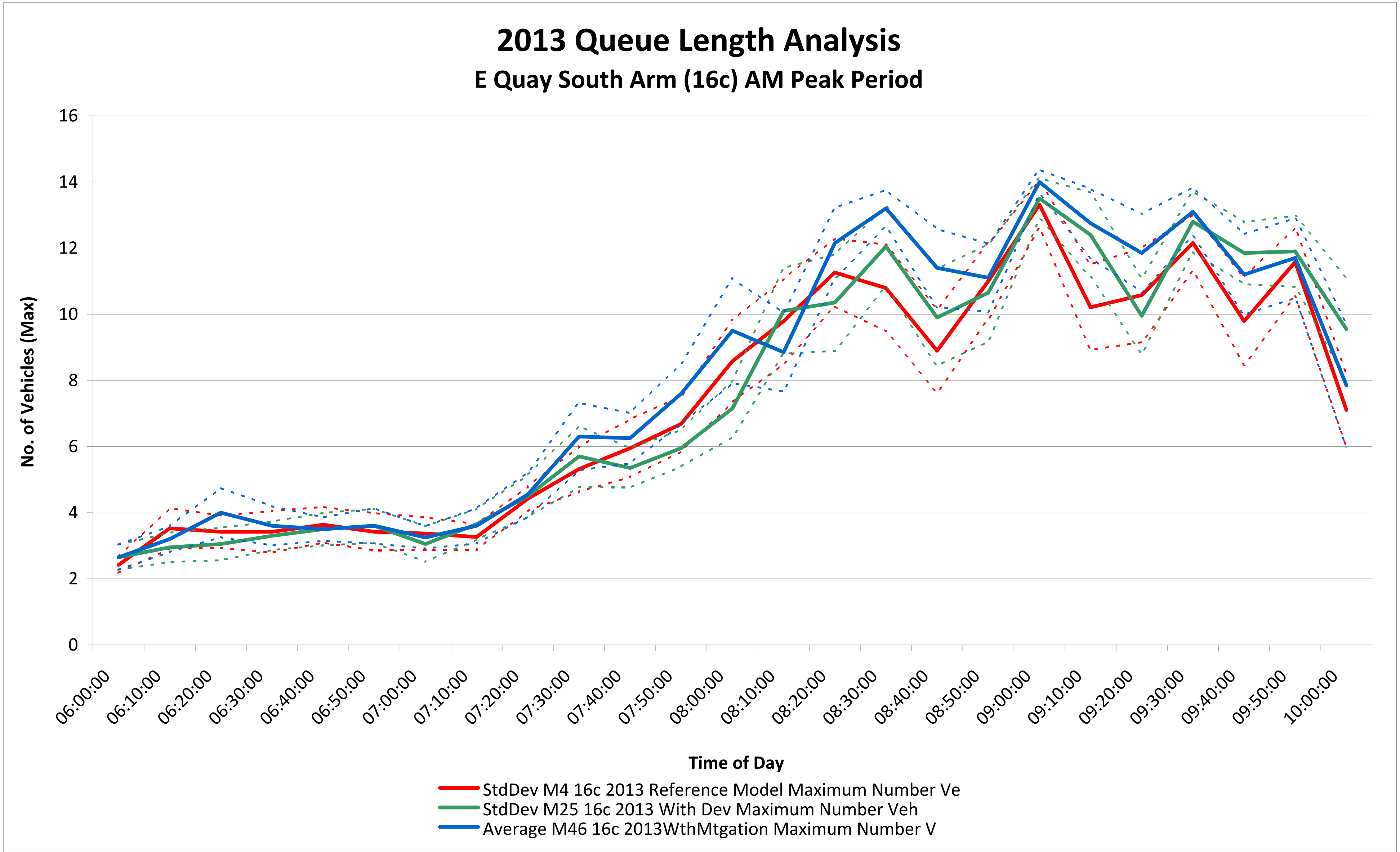
2013 Queue Length Analysis
The Clink West Arm (16b)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 16b 2013 Reference Model Maximum Number Ve
Average M25 16b 2013 With Dev Maximum Number Veh
Average M46 16b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
The Clink West Arm (16b) AM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 16b 2013 Reference Model Maximum Number Ve
Average M25 16b 2013 With Dev Maximum Number Veh
Average M46 16b 2013WthMtgation Maximum Number V

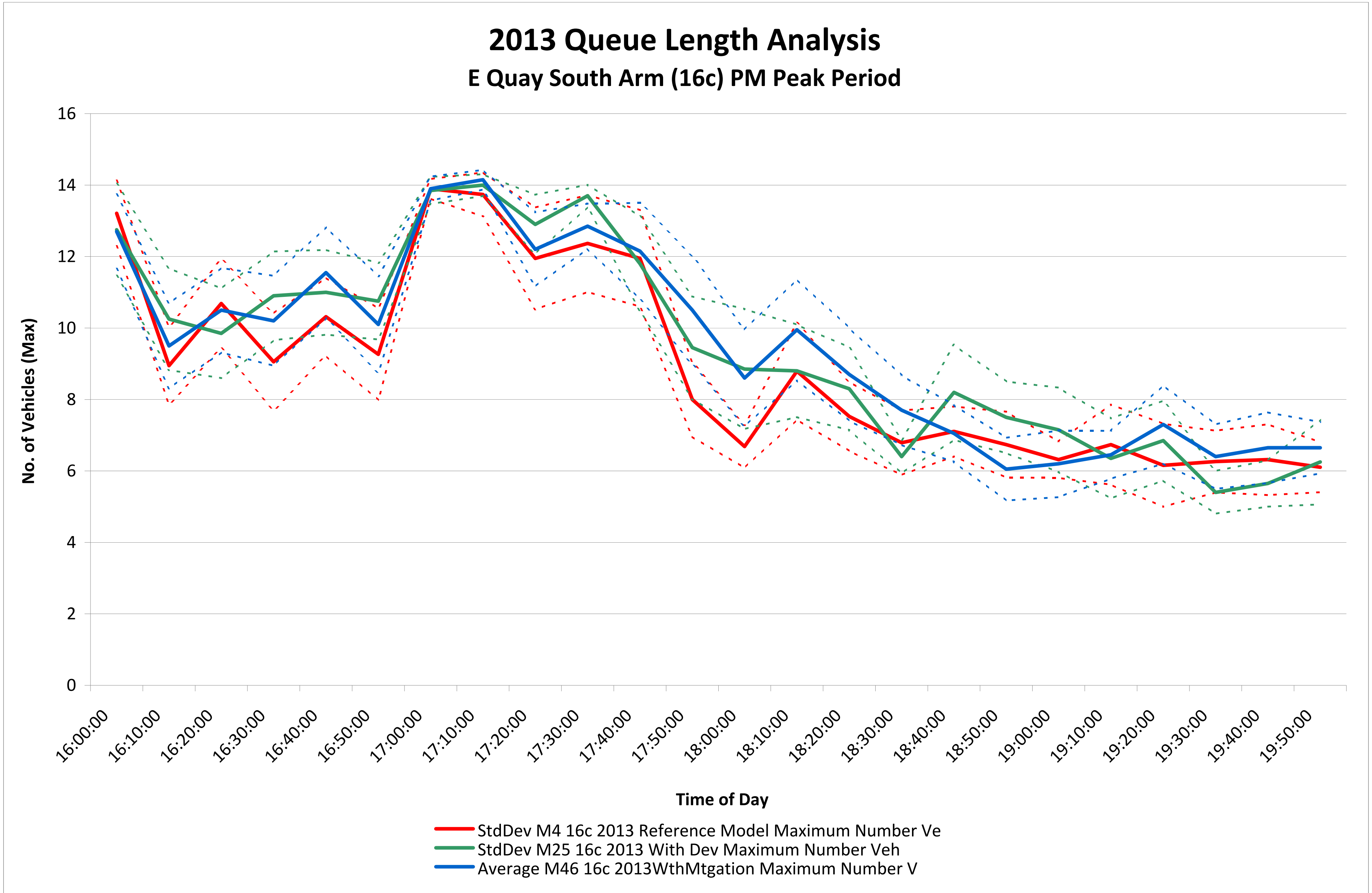

2013 Queue Length Analysis
The Clink West Arm (16b) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 16b 2013 Reference Model Maximum Number Ve
Average M25 16b 2013 With Dev Maximum Number Veh
Average M46 16b 2013WthMtgation Maximum Number V

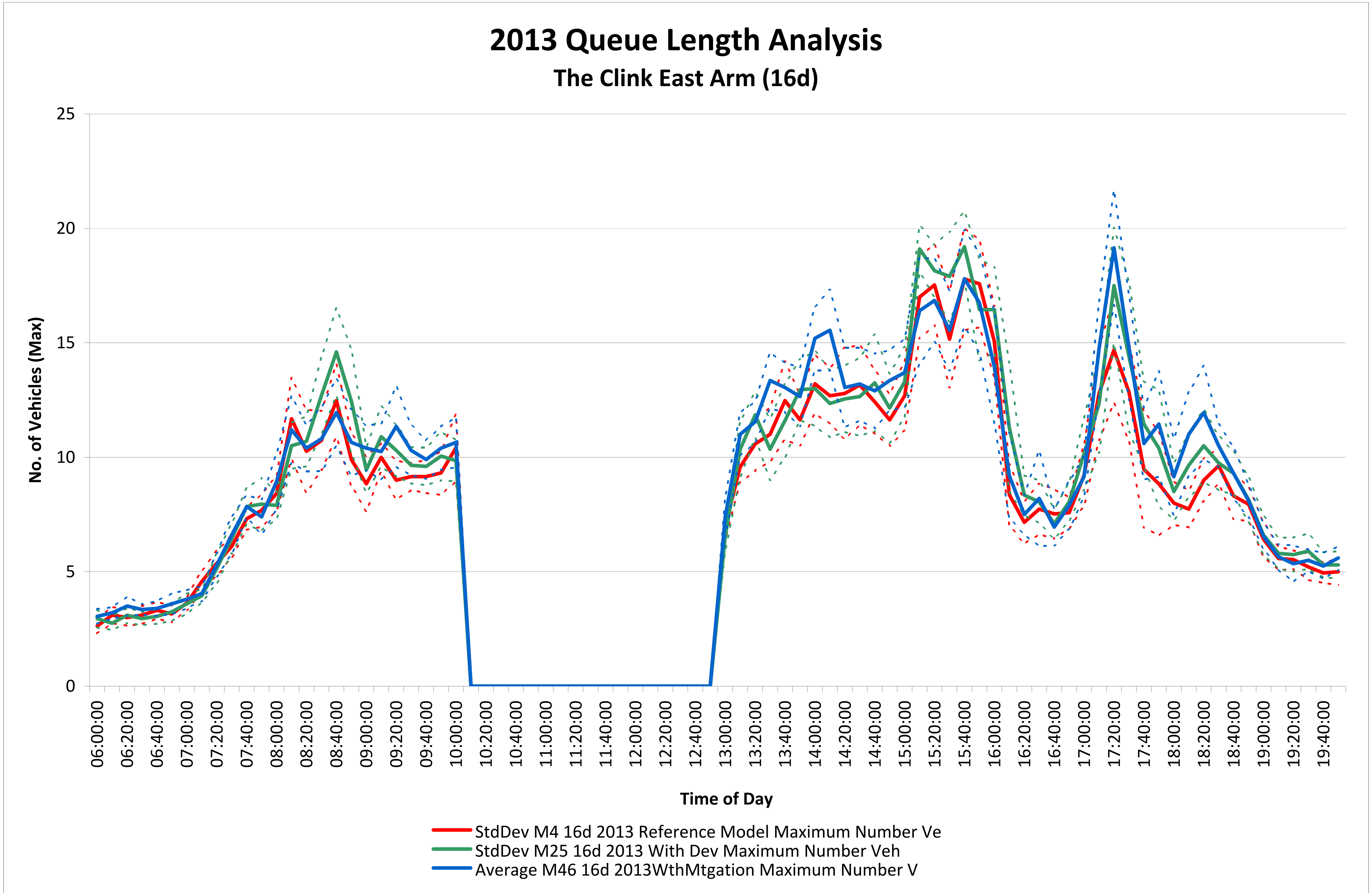


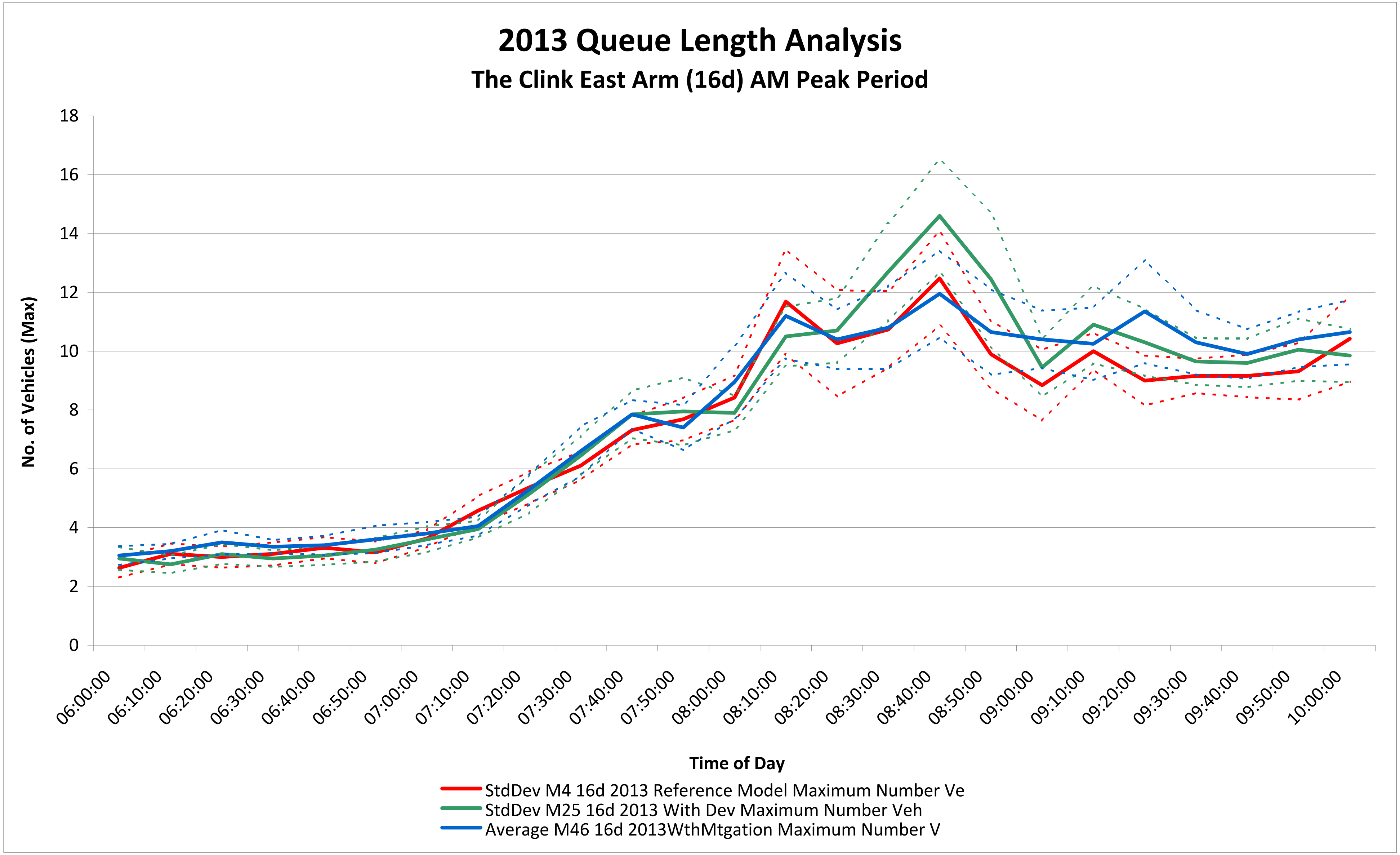
2013 Queue Length Analysis
E Quay South Arm (16c)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 16c 2013 Reference Model Maximum Number Ve
StdDev M25 16c 2013 With Dev Maximum Number Veh
Average M46 16c 2013WthMtgation Maximum Number V



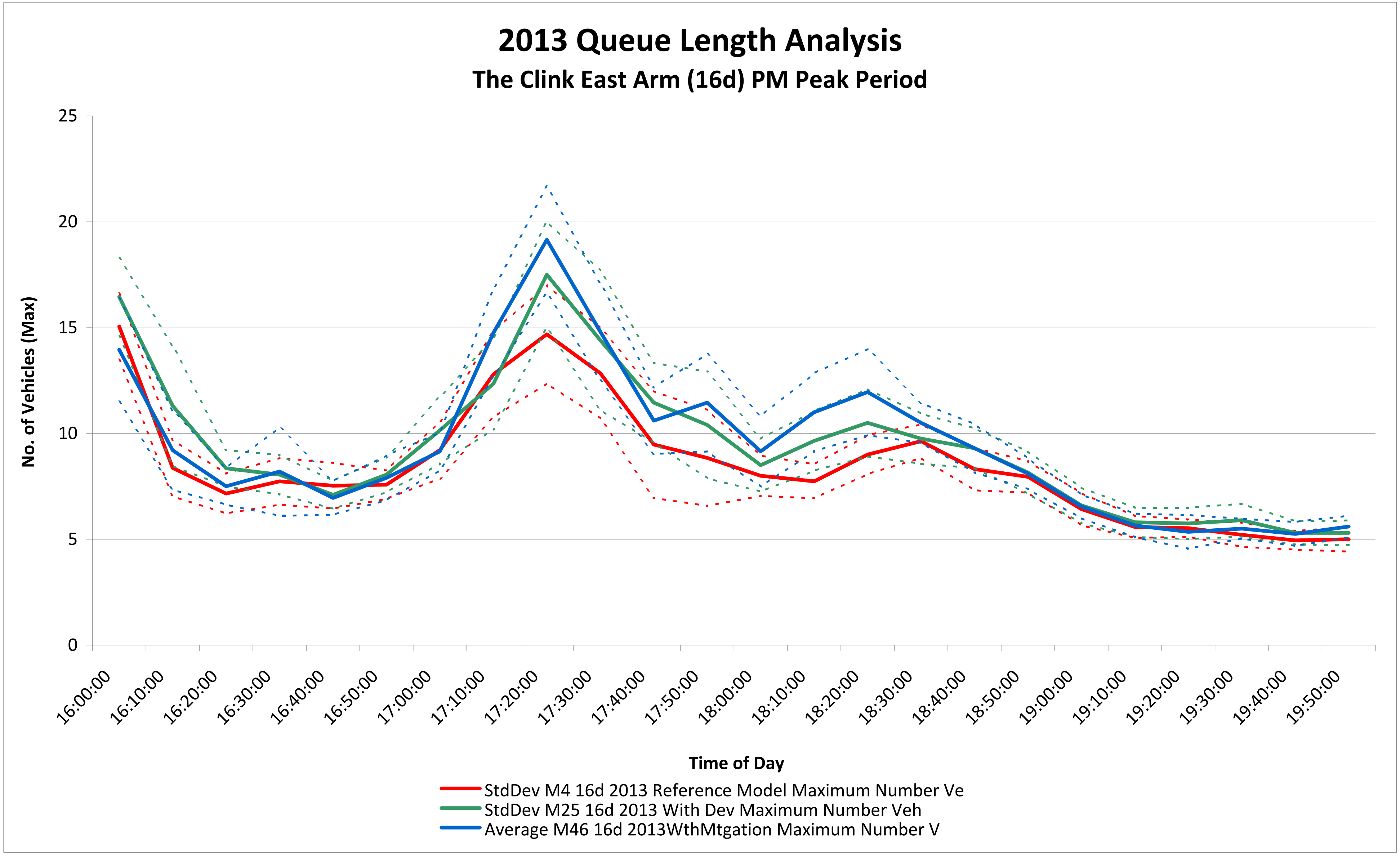
2013 Queue Length Analysis
E Quay South Arm (16c) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 16c 2013 Reference Model Maximum Number Ve
StdDev M25 16c 2013 With Dev Maximum Number Veh
Average M46 16c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
E Quay South Arm (16c) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 16c 2013 Reference Model Maximum Number Ve
StdDev M25 16c 2013 With Dev Maximum Number Veh
Average M46 16c 2013WthMtgation Maximum Number V

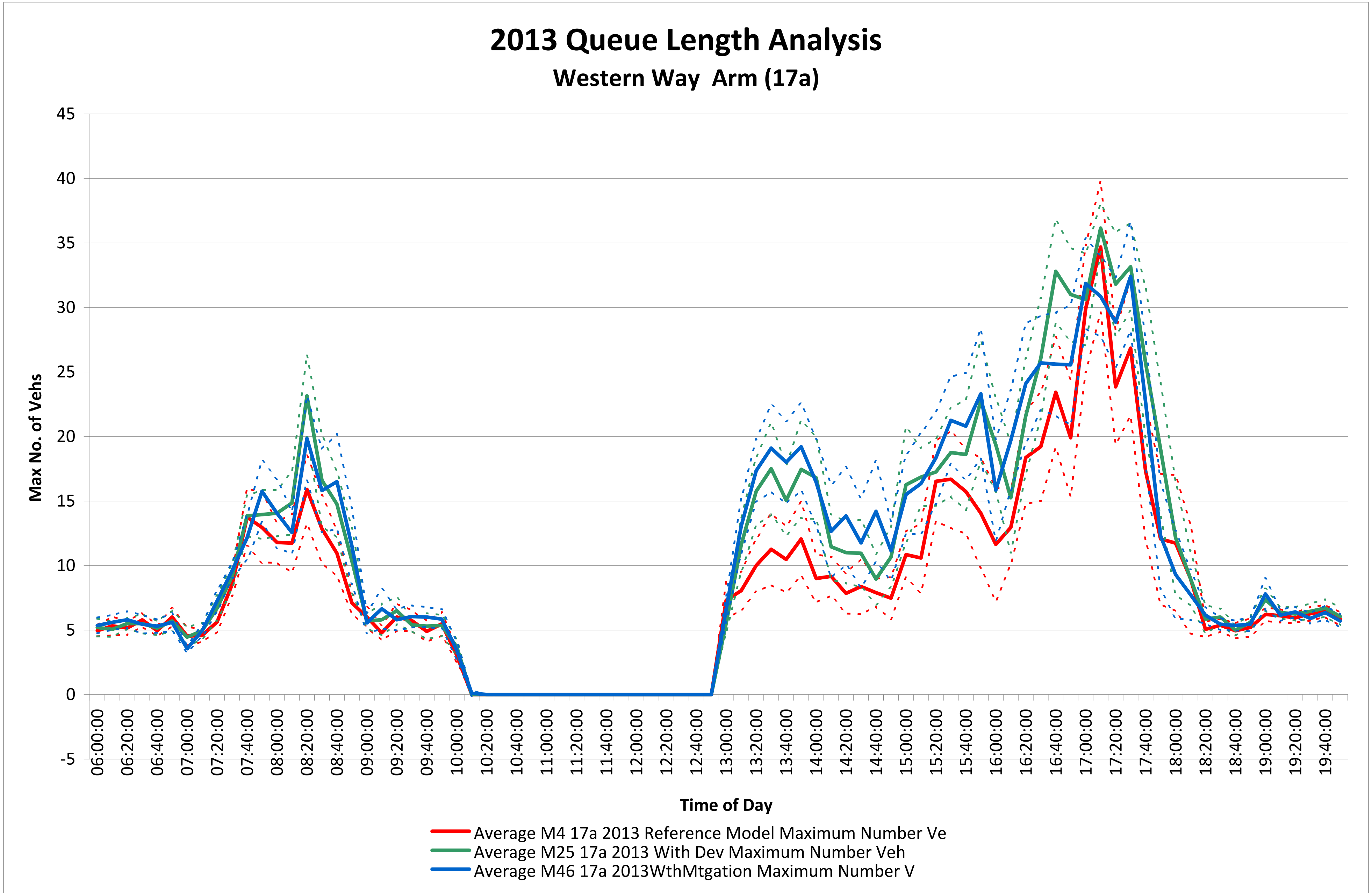

2013 Queue Length Analysis
The Clink East Arm (16d)
No. of Vehicles (Max)
Time of Day
0
5
10
15
20
25
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
StdDev M4 16d 2013 Reference Model Maximum Number Ve
StdDev M25 16d 2013 With Dev Maximum Number Veh
Average M46 16d 2013WthMtgation Maximum Number V

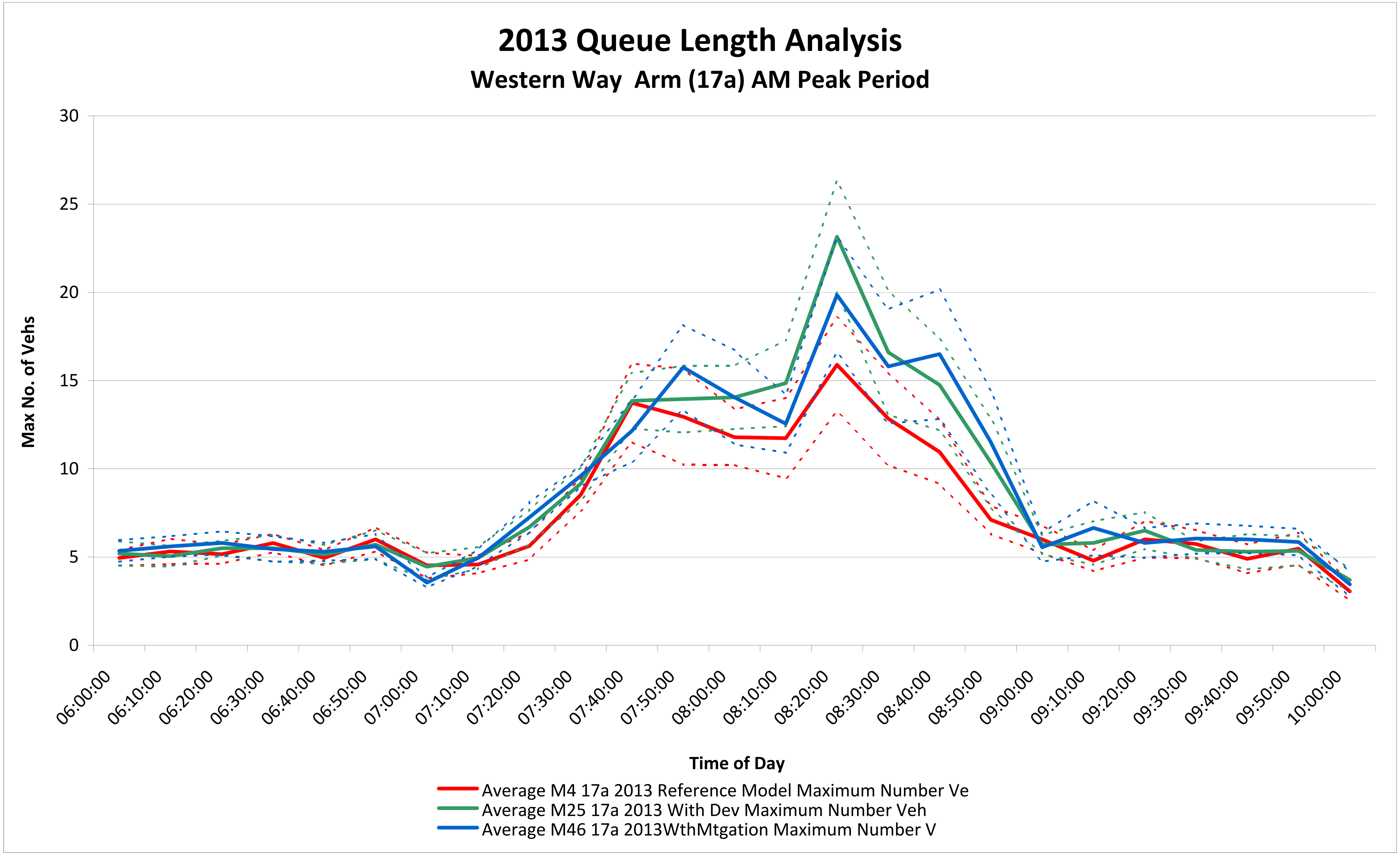


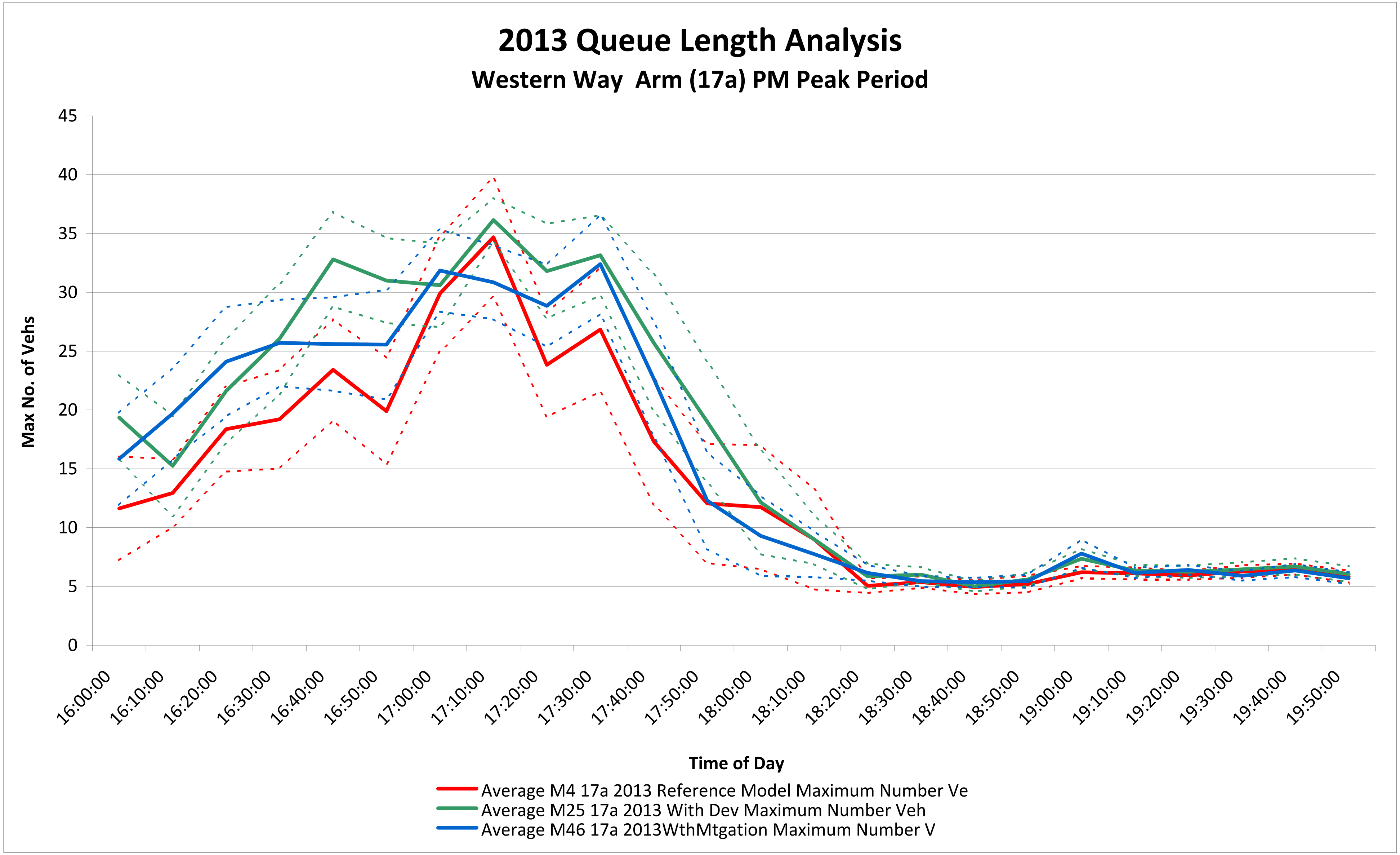
2013 Queue Length Analysis
The Clink East Arm (16d) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 16d 2013 Reference Model Maximum Number Ve
StdDev M25 16d 2013 With Dev Maximum Number Veh
Average M46 16d 2013WthMtgation Maximum Number V

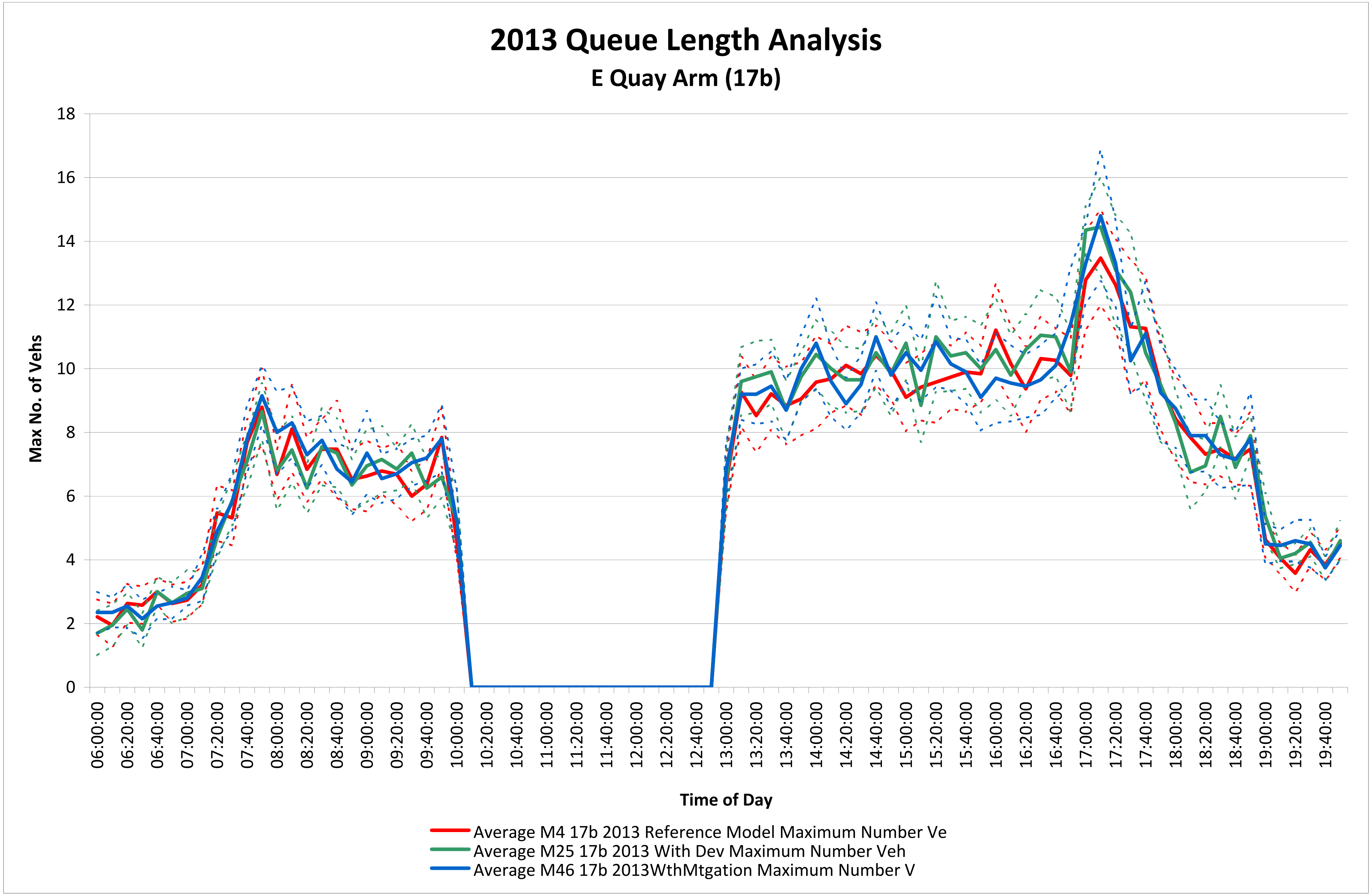


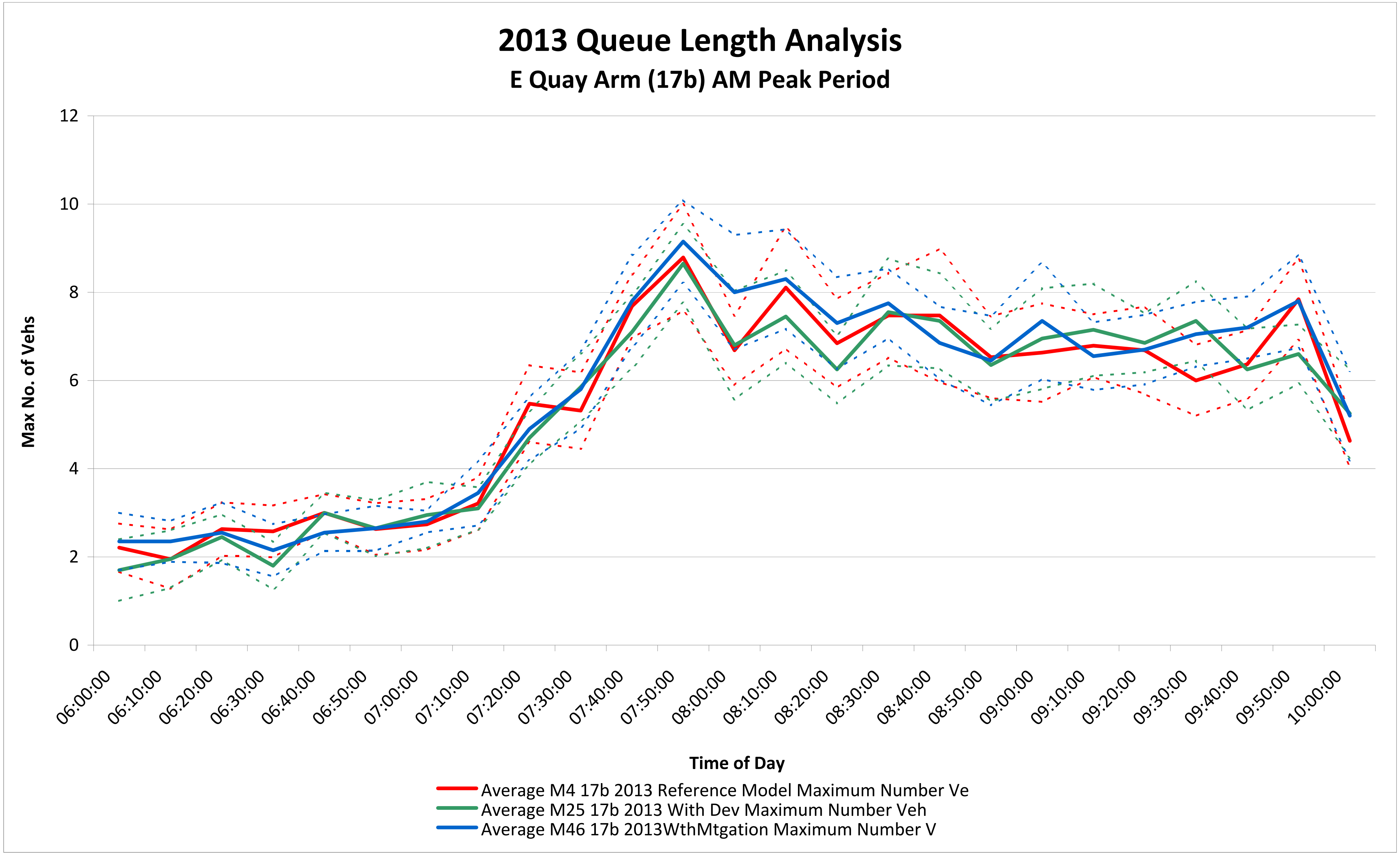
2013 Queue Length Analysis
The Clink East Arm (16d) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 16d 2013 Reference Model Maximum Number Ve
StdDev M25 16d 2013 With Dev Maximum Number Veh
Average M46 16d 2013WthMtgation Maximum Number V

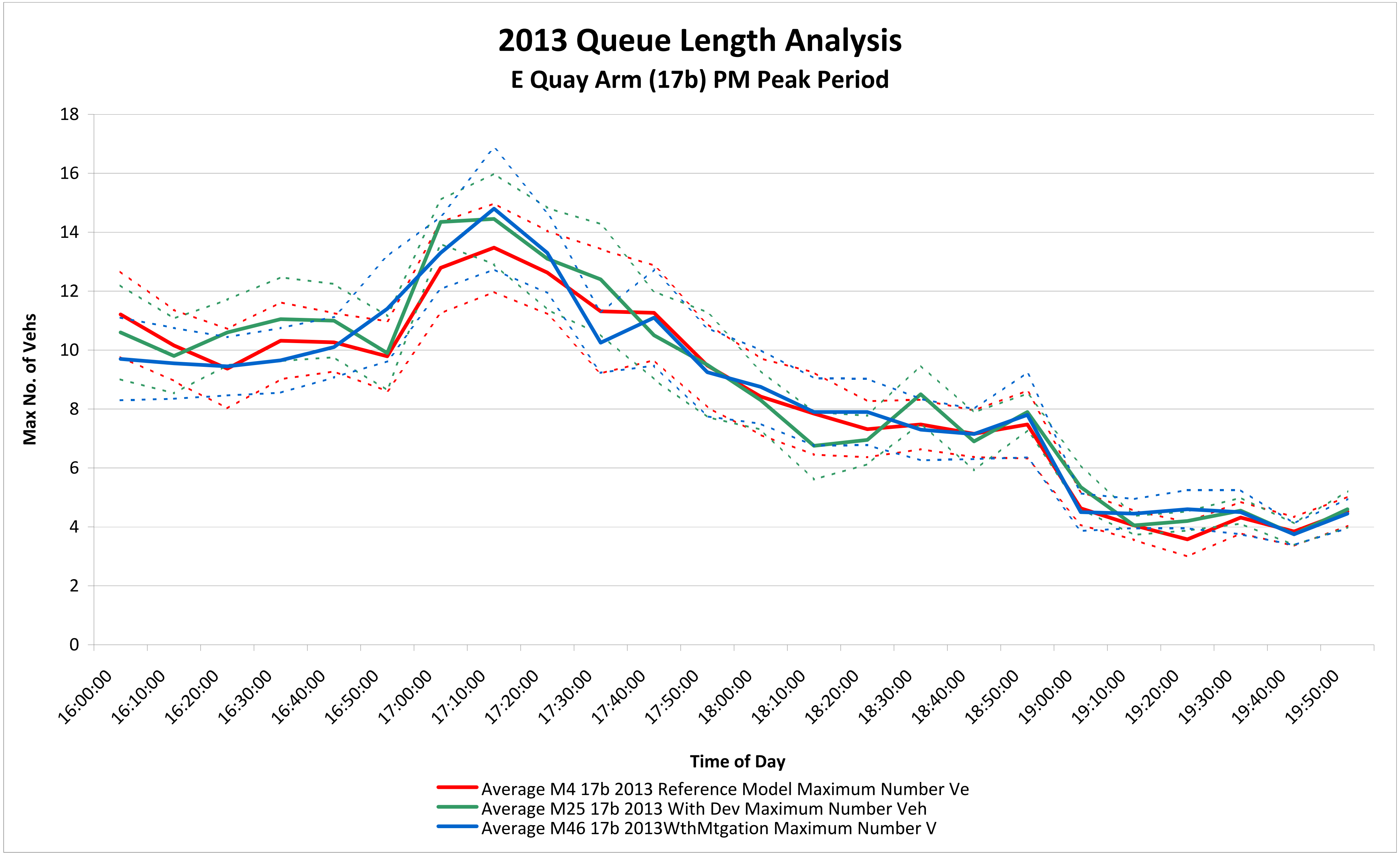

2013 Queue Length Analysis
Western Way Arm (17a)
Max No. of Vehs
Time of Day
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M4 17a 2013 Reference Model Maximum Number Ve
Average M25 17a 2013 With Dev Maximum Number Veh
Average M46 17a 2013WthMtgation Maximum Number V

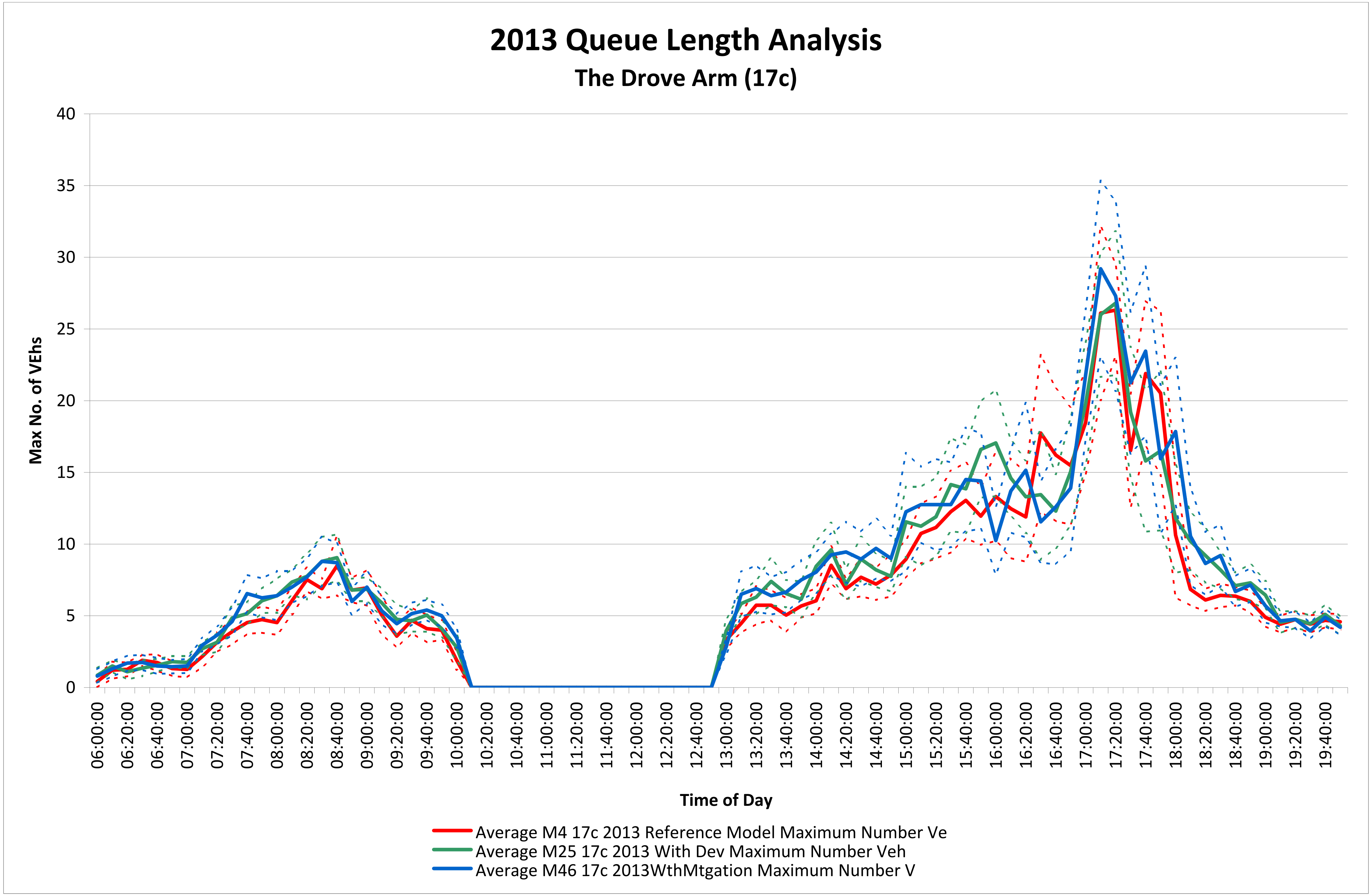

2013 Queue Length Analysis
Western Way Arm (17a) AM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17a 2013 Reference Model Maximum Number Ve
Average M25 17a 2013 With Dev Maximum Number Veh
Average M46 17a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Western Way Arm (17a) PM Peak Period
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17a 2013 Reference Model Maximum Number Ve
Average M25 17a 2013 With Dev Maximum Number Veh
Average M46 17a 2013WthMtgation Maximum Number V

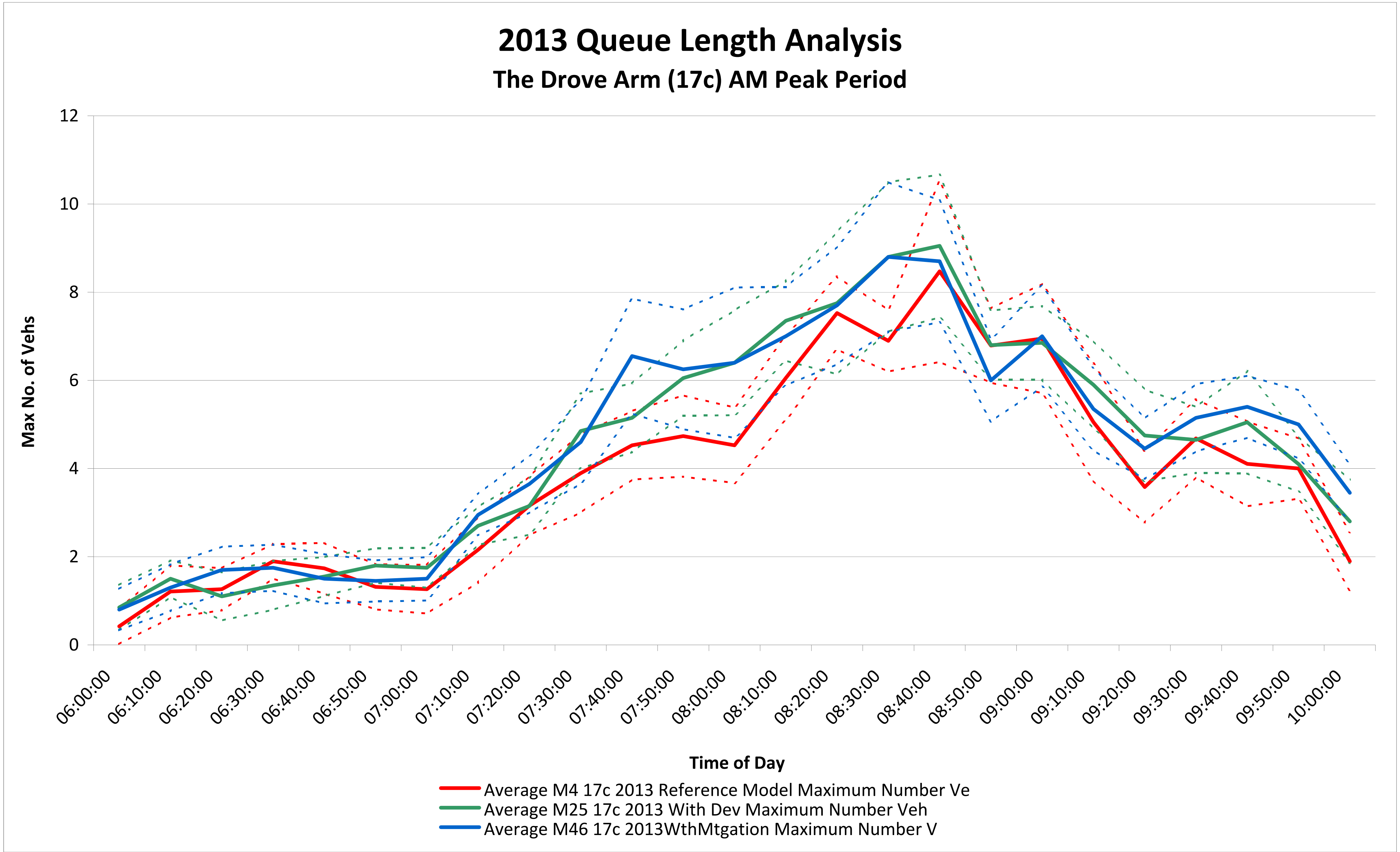

2013 Queue Length Analysis
E Quay Arm (17b)
Max No. of Vehs
Time of Day
Average M4 17b 2013 Reference Model Maximum Number Ve
Average M25 17b 2013 With Dev Maximum Number Veh
Average M46 17b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
E Quay Arm (17b) AM Peak Period
12
10
8
6
4
2
0
Max No. of Vehs
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17b 2013 Reference Model Maximum Number Ve
Average M25 17b 2013 With Dev Maximum Number Veh
Average M46 17b 2013WthMtgation Maximum Number V

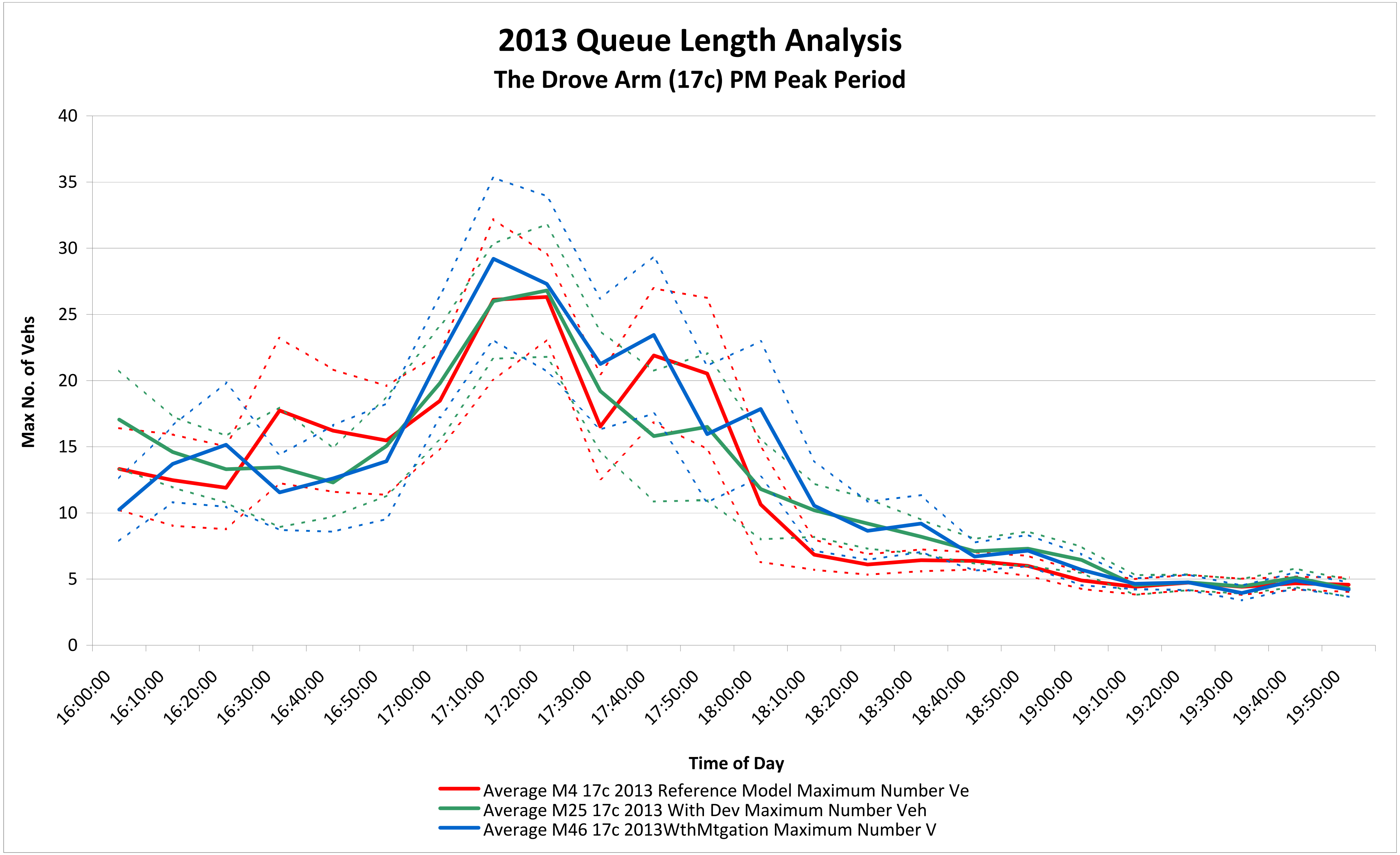

2013 Queue Length Analysis
E Quay Arm (17b) PM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17b 2013 Reference Model Maximum Number Ve
Average M25 17b 2013 With Dev Maximum Number Veh
Average M46 17b 2013WthMtgation Maximum Number V

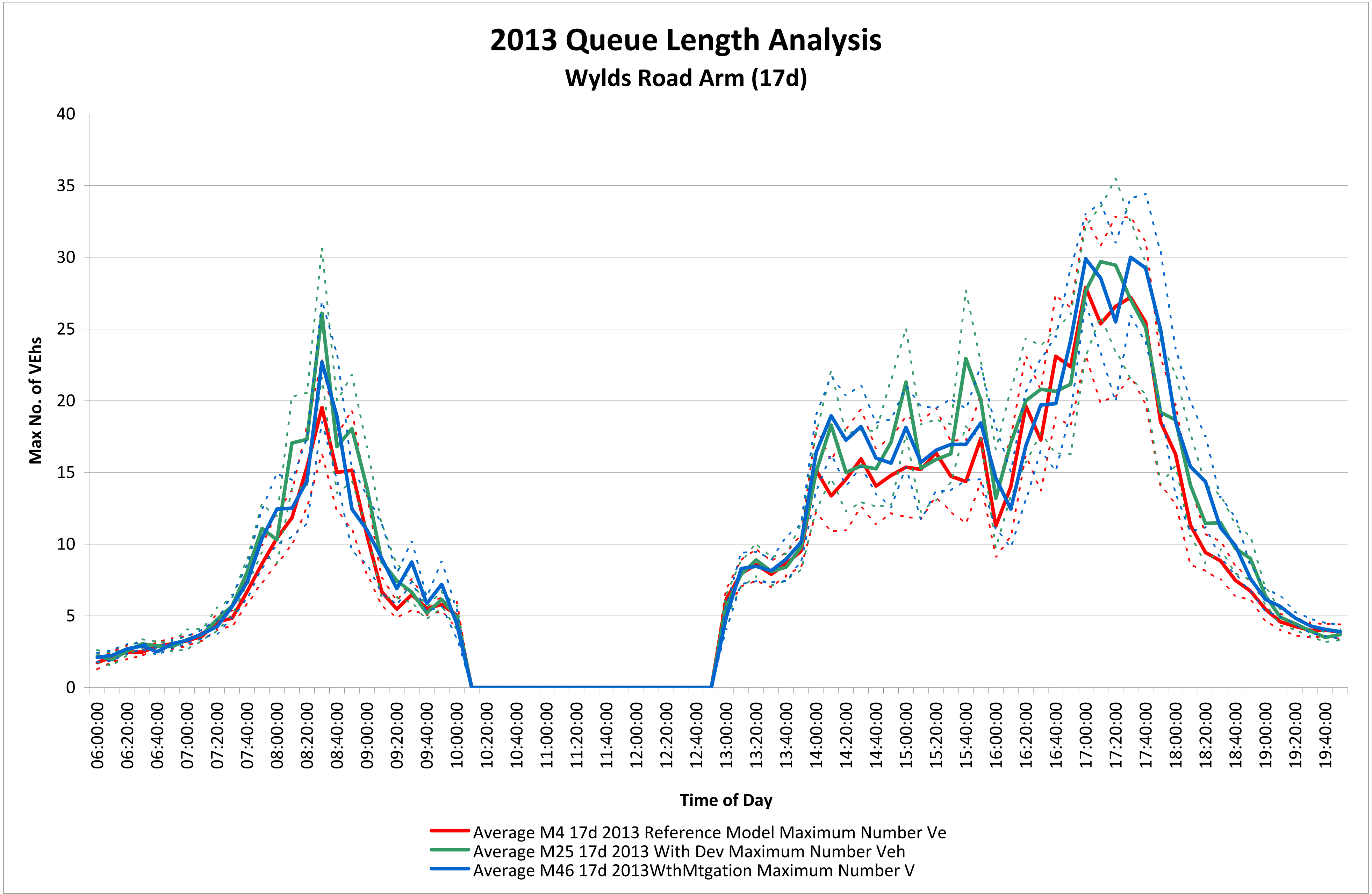


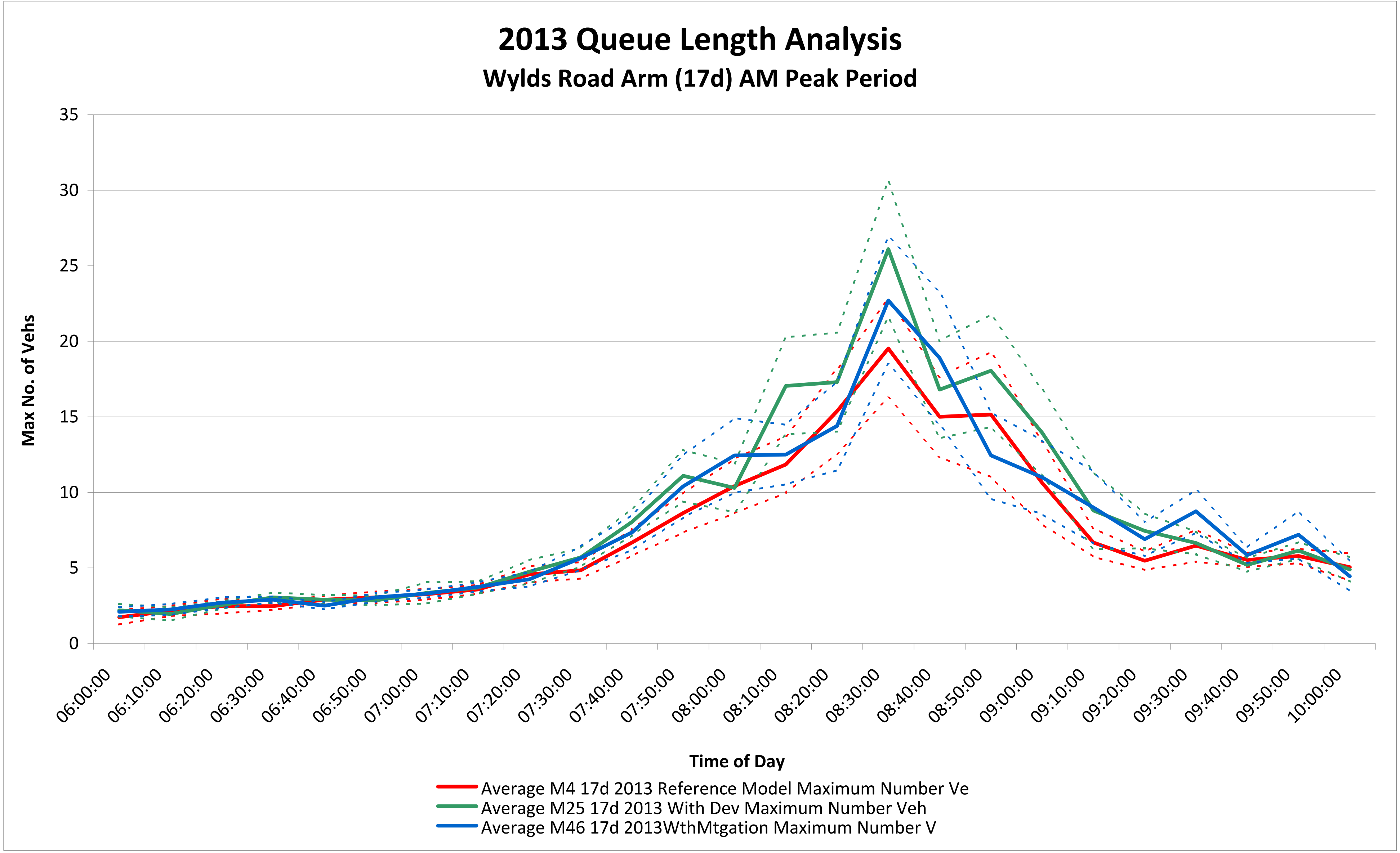
2013 Queue Length Analysis
The Drove Arm (17c)
Max No. of VEhs
0
5
10
15
20
25
30
35
40
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 17c 2013 Reference Model Maximum Number Ve
Average M25 17c 2013 With Dev Maximum Number Veh
Average M46 17c 2013WthMtgation Maximum Number V



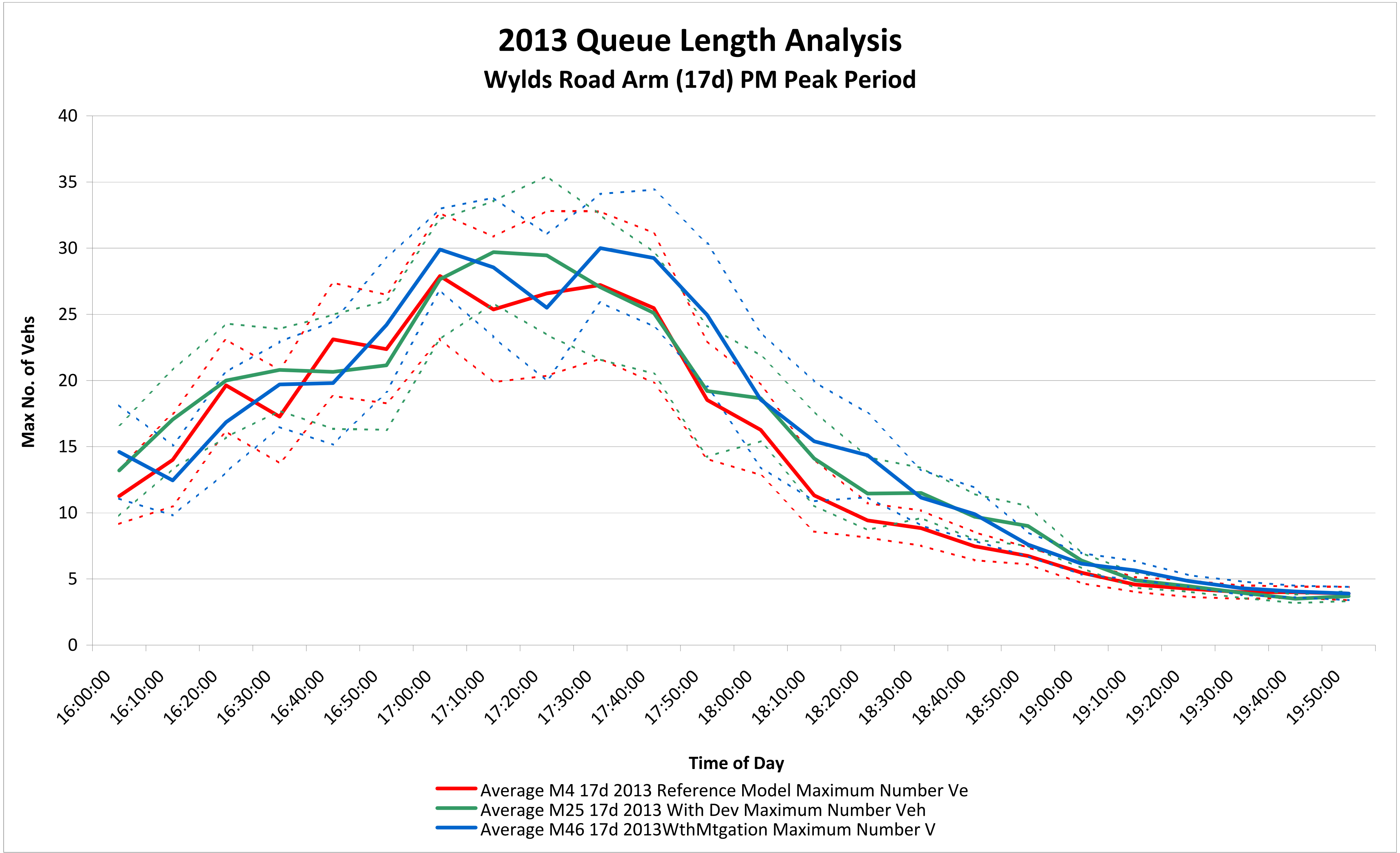
2013 Queue Length Analysis
The Drove Arm (17c) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17c 2013 Reference Model Maximum Number Ve
Average M25 17c 2013 With Dev Maximum Number Veh
Average M46 17c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
The Drove Arm (17c) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17c 2013 Reference Model Maximum Number Ve
Average M25 17c 2013 With Dev Maximum Number Veh
Average M46 17c 2013WthMtgation Maximum Number V

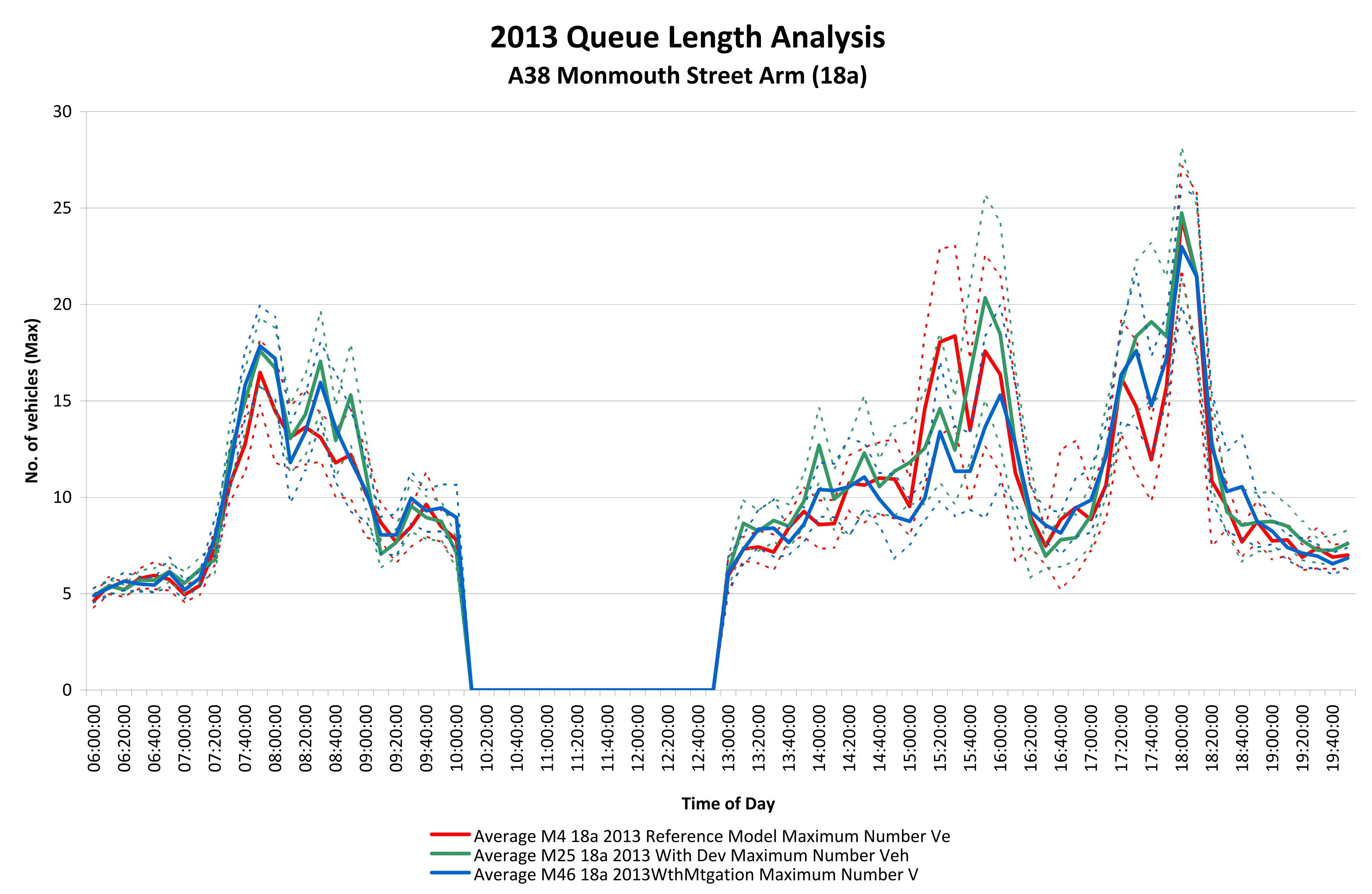

2013 Queue Length Analysis
Wylds Road Arm (17d)
Max No. of VEhs
Time of Day
Average M4 17d 2013 Reference Model Maximum Number Ve
Average M25 17d 2013 With Dev Maximum Number Veh
Average M46 17d 2013WthMtgation Maximum Number V



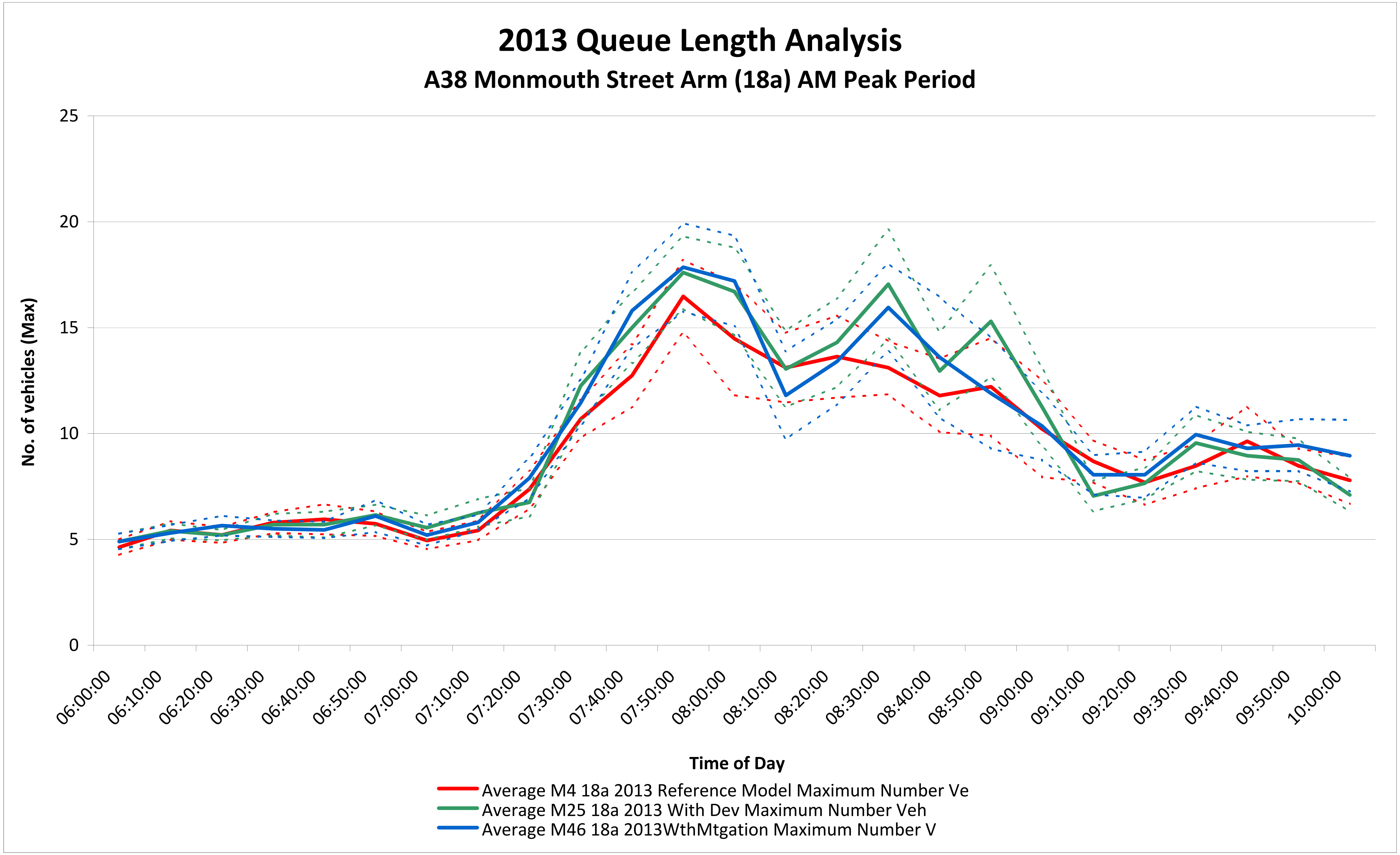
2013 Queue Length Analysis
Wylds Road Arm (17d) AM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 17d 2013 Reference Model Maximum Number Ve
Average M25 17d 2013 With Dev Maximum Number Veh
Average M46 17d 2013WthMtgation Maximum Number V

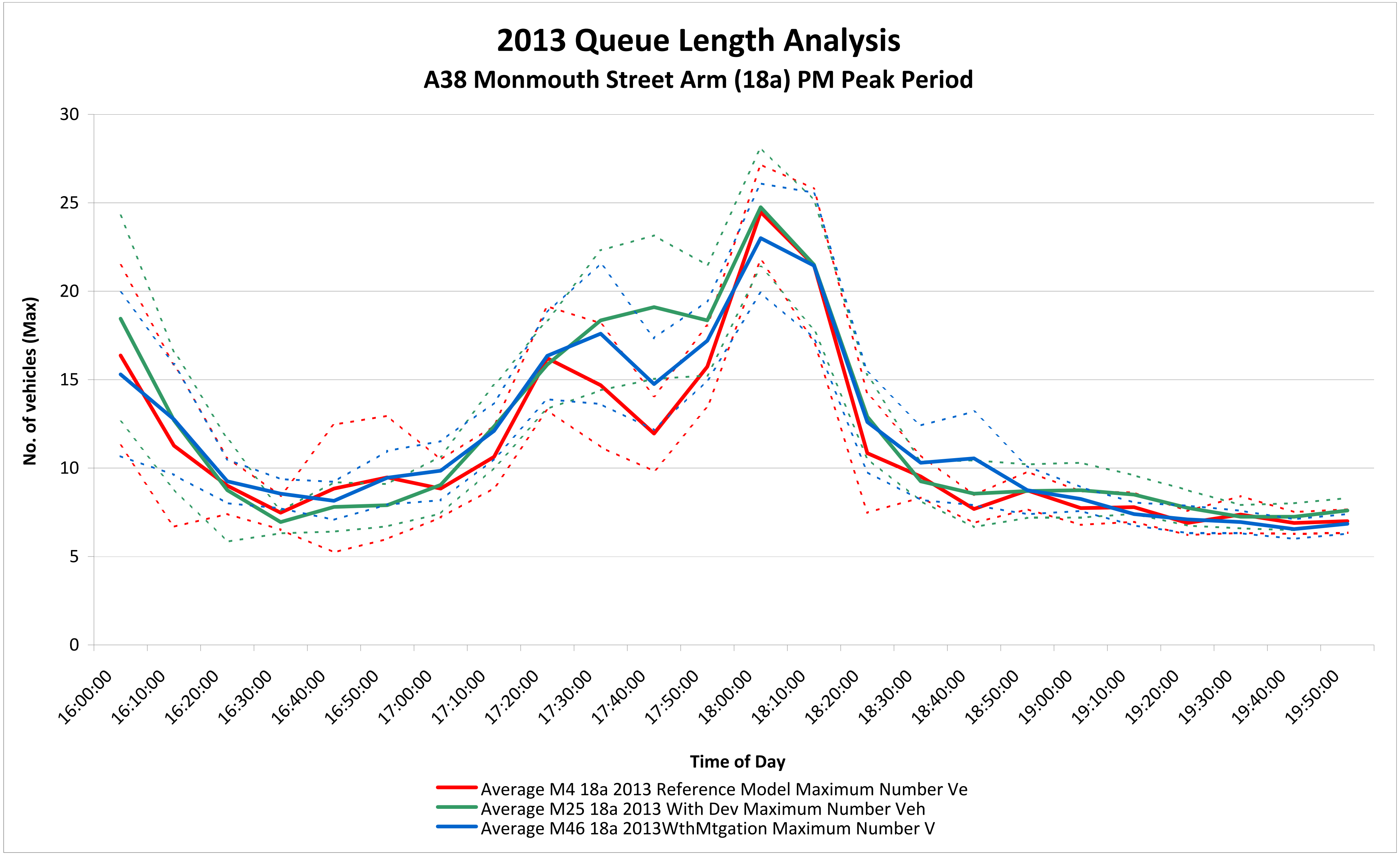


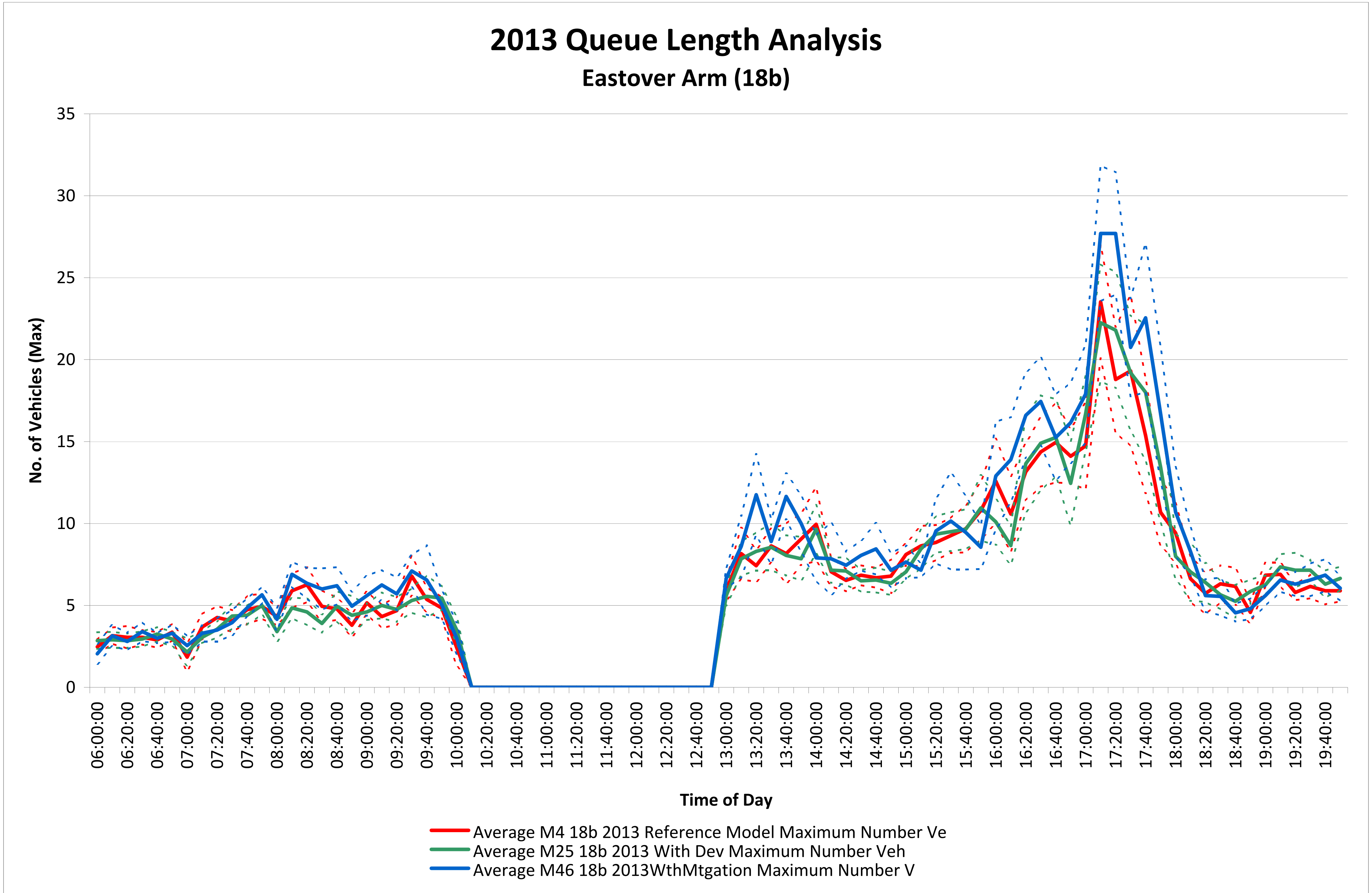
2013 Queue Length Analysis
Wylds Road Arm (17d) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 17d 2013 Reference Model Maximum Number Ve
Average M25 17d 2013 With Dev Maximum Number Veh
Average M46 17d 2013WthMtgation Maximum Number V



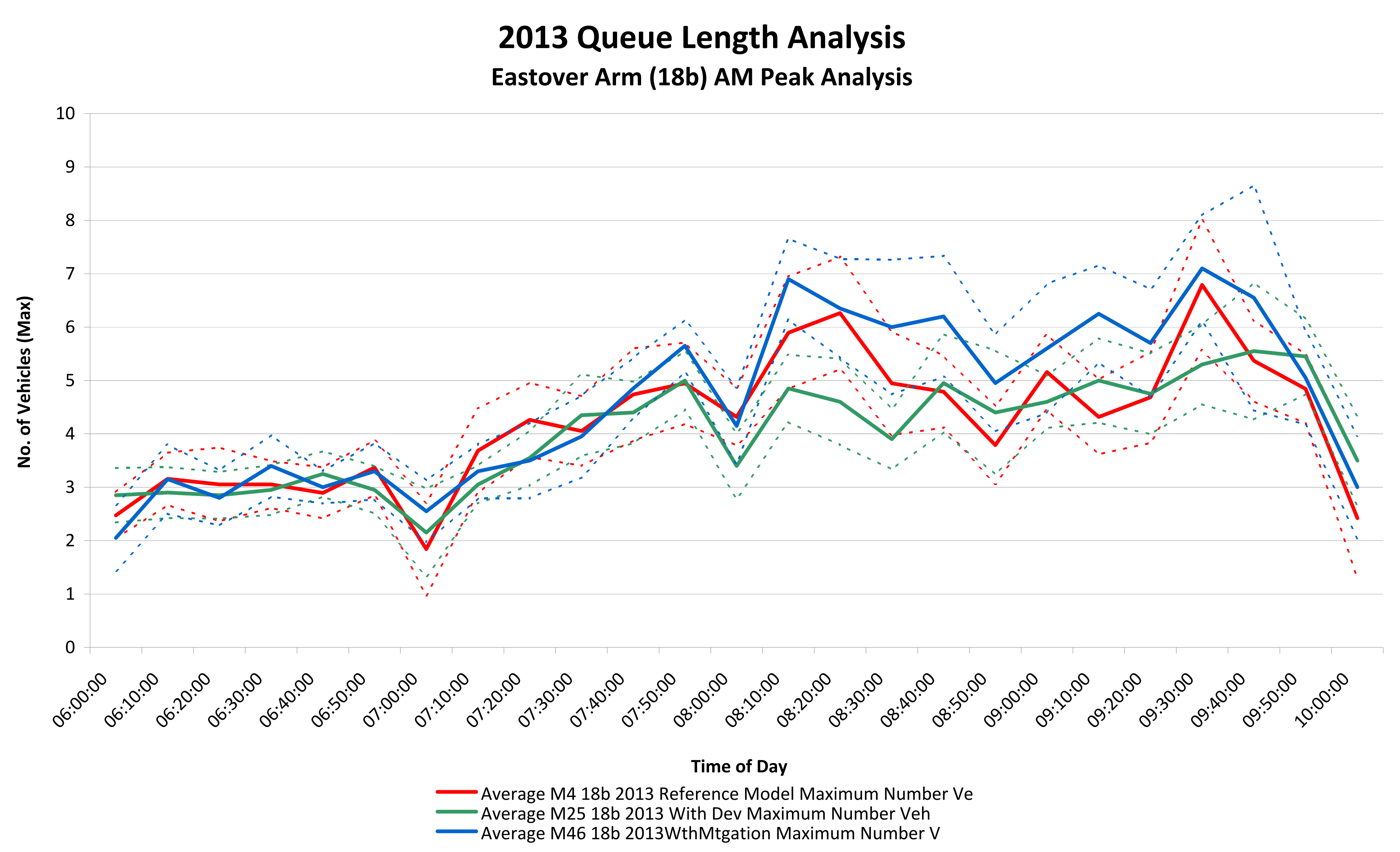
2013 Queue Length Analysis
A38 Monmouth Street Arm (18a)
No. of vehicles (Max)
0
5
10
15
20
25
30
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 18a 2013 Reference Model Maximum Number Ve
Average M25 18a 2013 With Dev Maximum Number Veh
Average M46 18a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 Monmouth Street Arm (18a) AM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 18a 2013 Reference Model Maximum Number Ve
Average M25 18a 2013 With Dev Maximum Number Veh
Average M46 18a 2013WthMtgation Maximum Number V

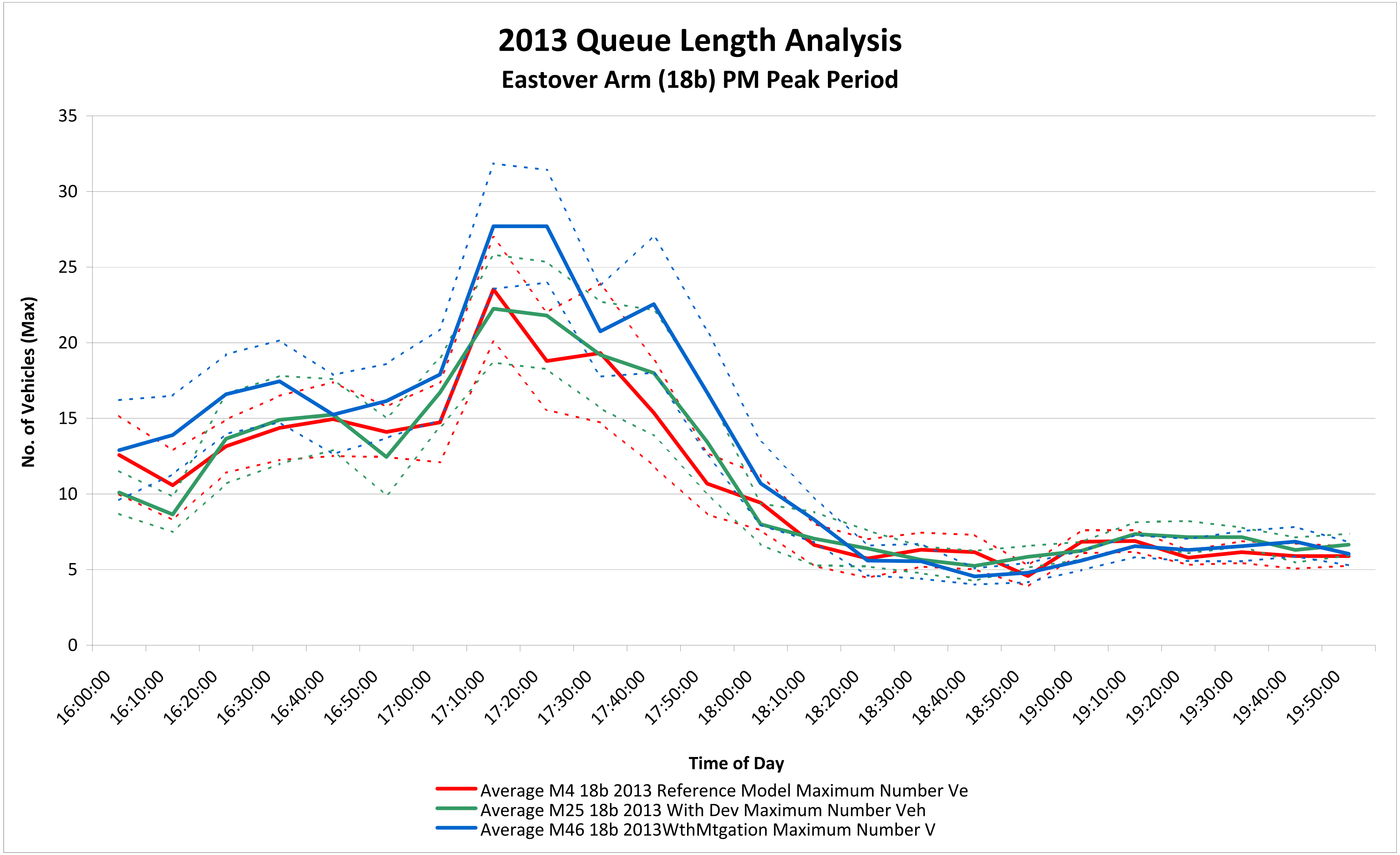

2013 Queue Length Analysis
A38 Monmouth Street Arm (18a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 18a 2013 Reference Model Maximum Number Ve
Average M25 18a 2013 With Dev Maximum Number Veh
Average M46 18a 2013WthMtgation Maximum Number V



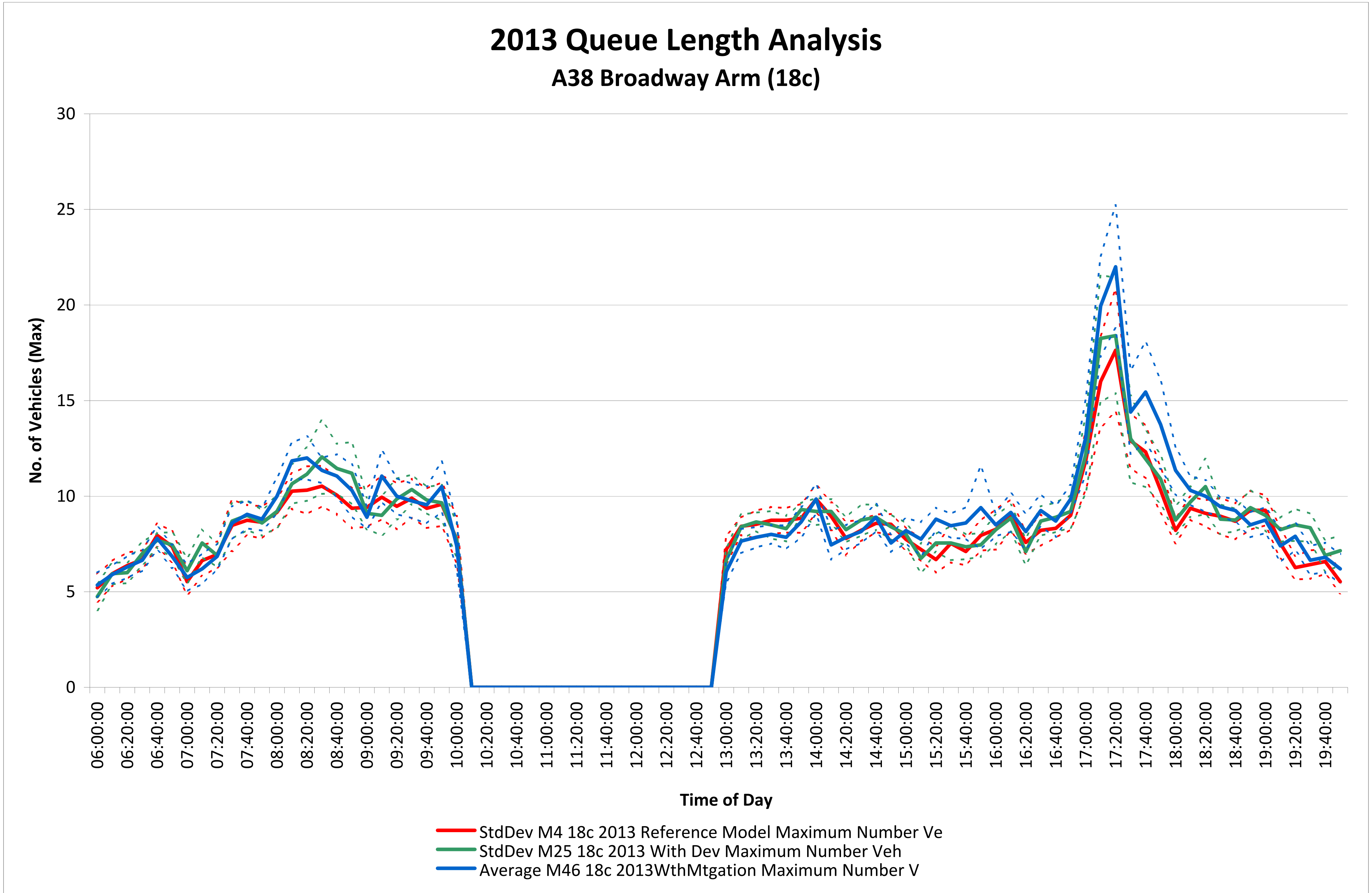
2013 Queue Length Analysis
Eastover Arm (18b)
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 18b 2013 Reference Model Maximum Number Ve
Average M25 18b 2013 With Dev Maximum Number Veh
Average M46 18b 2013WthMtgation Maximum Number V



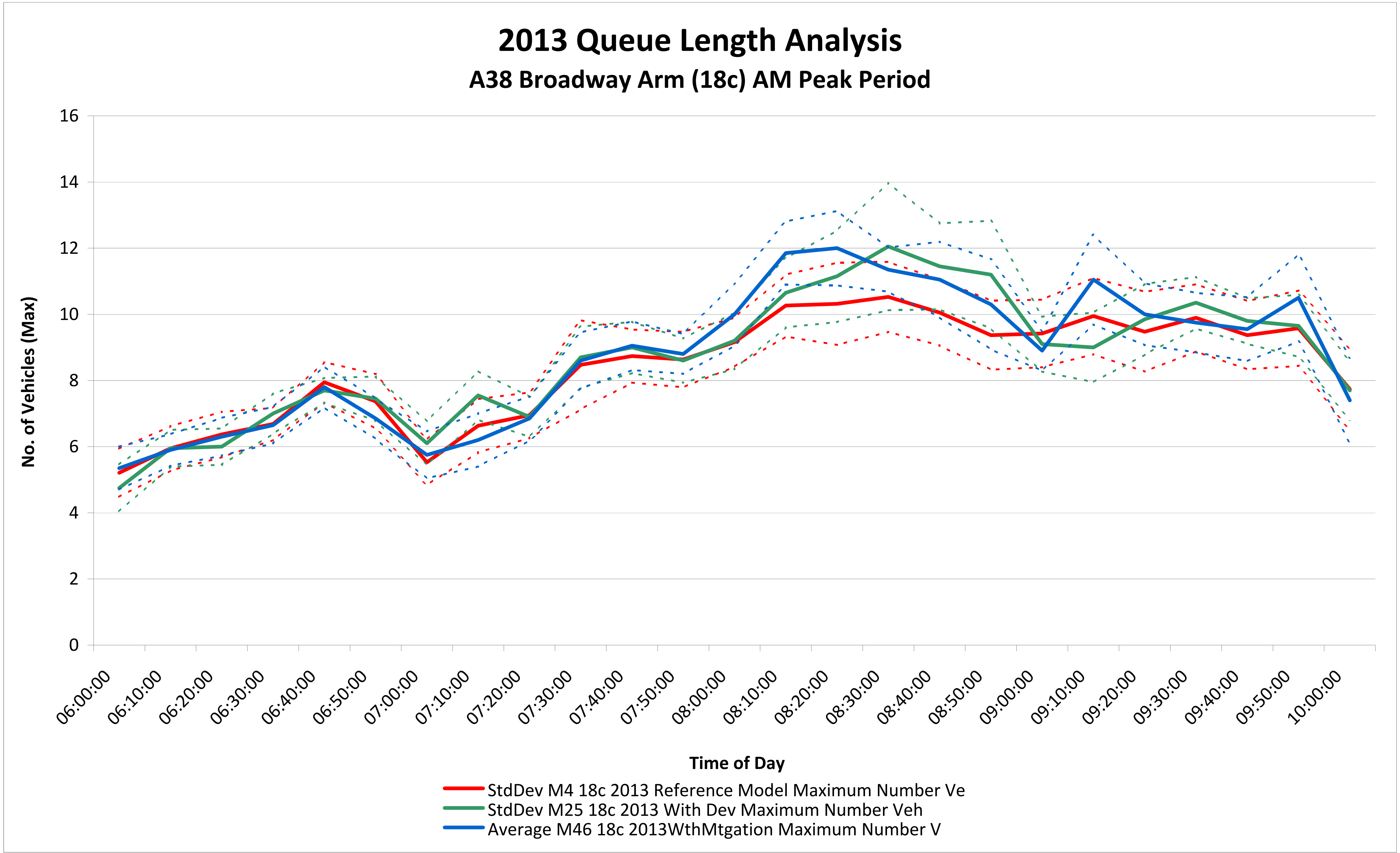
2013 Queue Length Analysis
Eastover Arm (18b) AM Peak Analysis
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
10
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 18b 2013 Reference Model Maximum Number Ve
Average M25 18b 2013 With Dev Maximum Number Veh
Average M46 18b 2013WthMtgation Maximum Number V

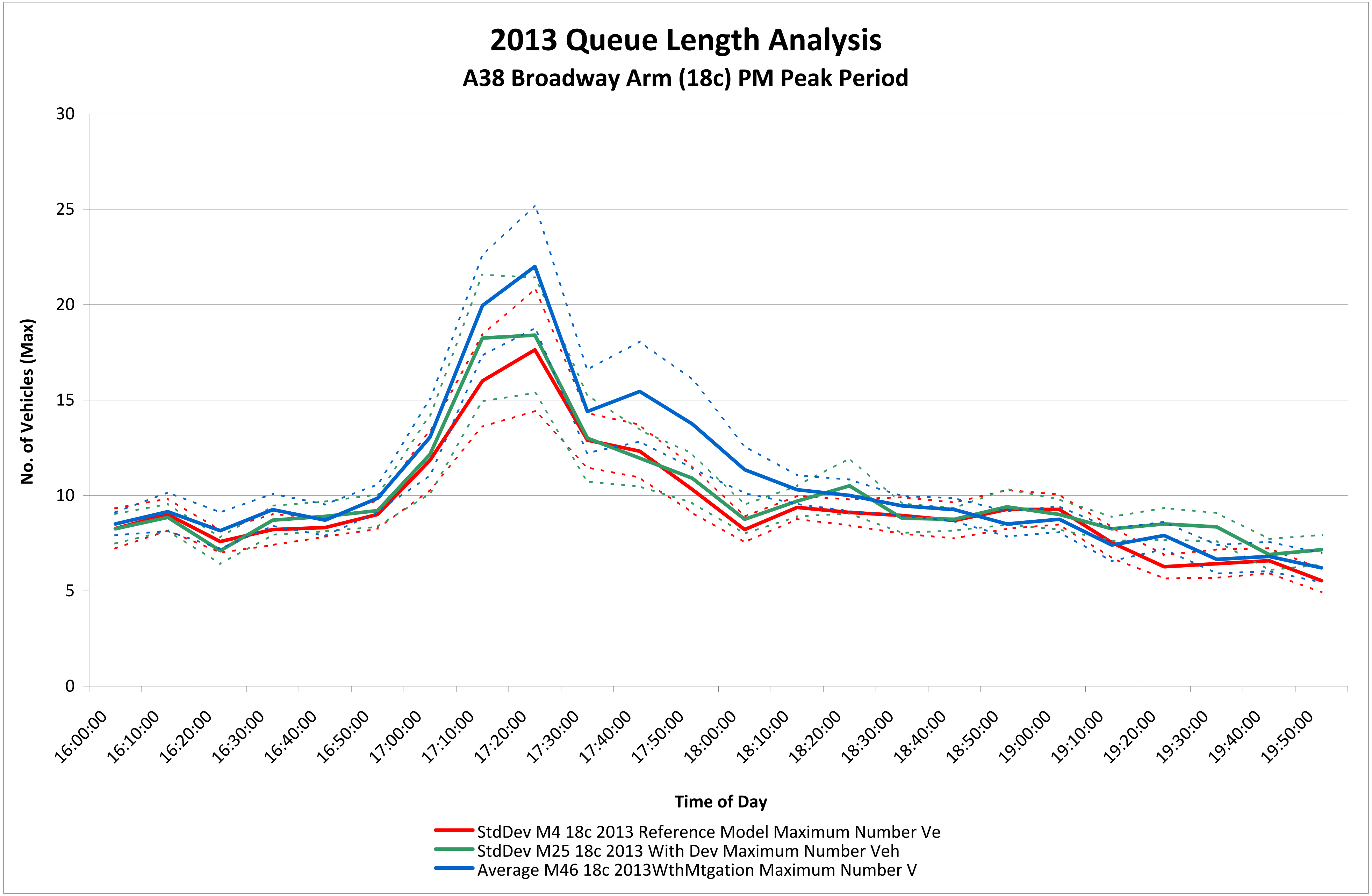


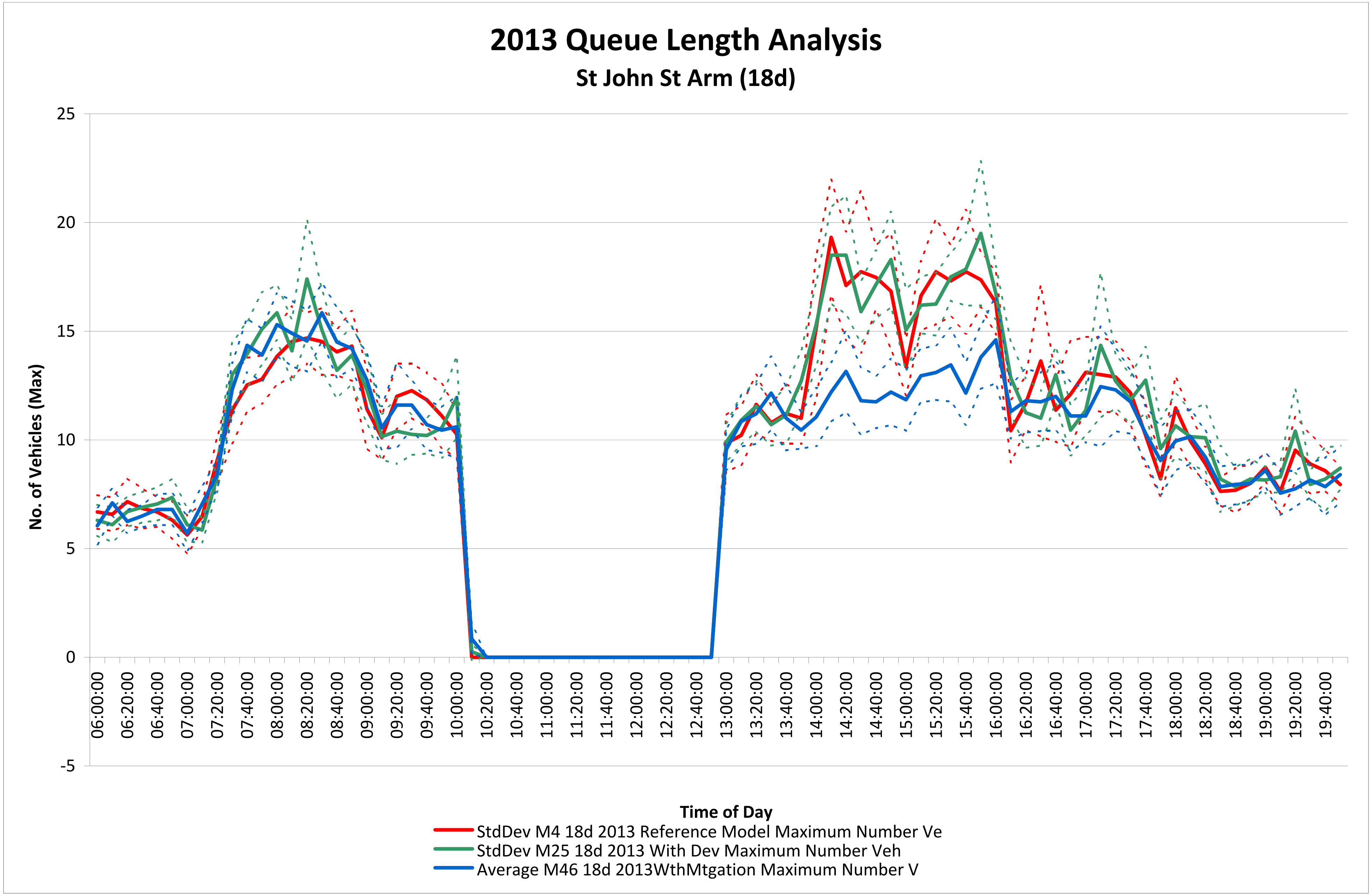
2013 Queue Length Analysis
Eastover Arm (18b) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 18b 2013 Reference Model Maximum Number Ve
Average M25 18b 2013 With Dev Maximum Number Veh
Average M46 18b 2013WthMtgation Maximum Number V



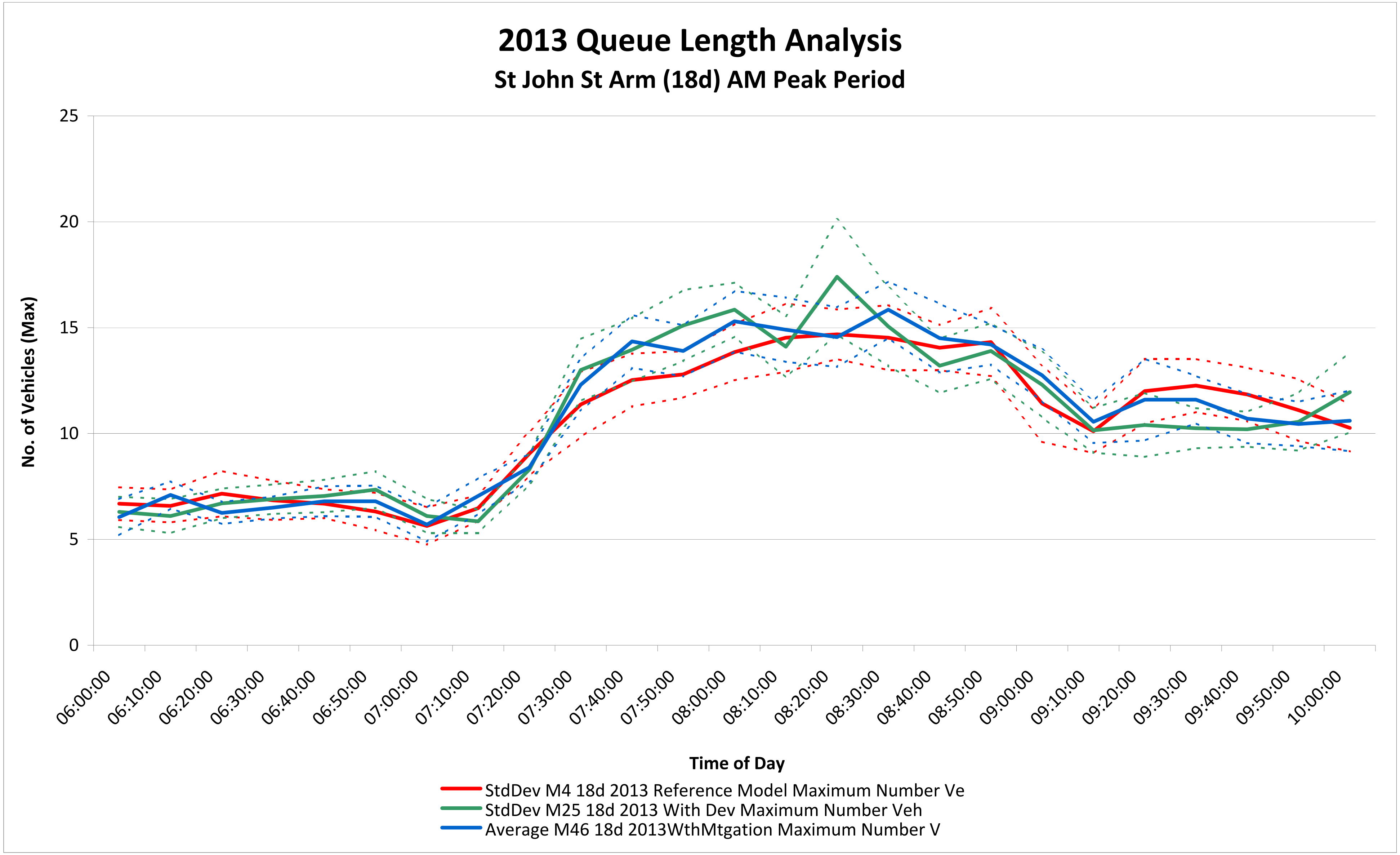
2013 Queue Length Analysis
A38 Broadway Arm (18c)
No. of Vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 18c 2013 Reference Model Maximum Number Ve
StdDev M25 18c 2013 With Dev Maximum Number Veh
Average M46 18c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 Broadway Arm (18c) AM Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 18c 2013 Reference Model Maximum Number Ve
StdDev M25 18c 2013 With Dev Maximum Number Veh
Average M46 18c 2013WthMtgation Maximum Number V

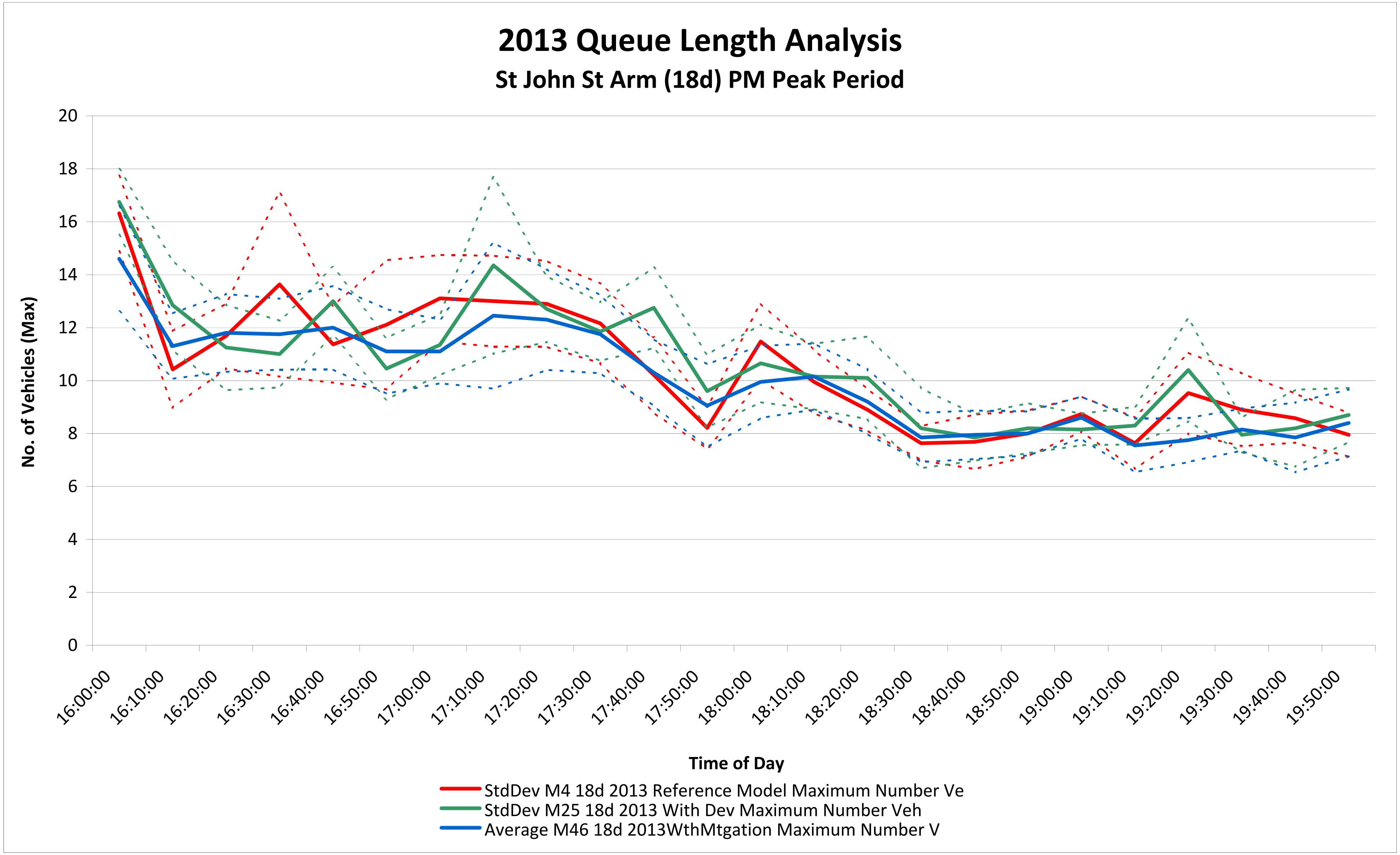

2013 Queue Length Analysis
A38 Broadway Arm (18c) PM Peak Period
30
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 18c 2013 Reference Model Maximum Number Ve
StdDev M25 18c 2013 With Dev Maximum Number Veh
Average M46 18c 2013WthMtgation Maximum Number V

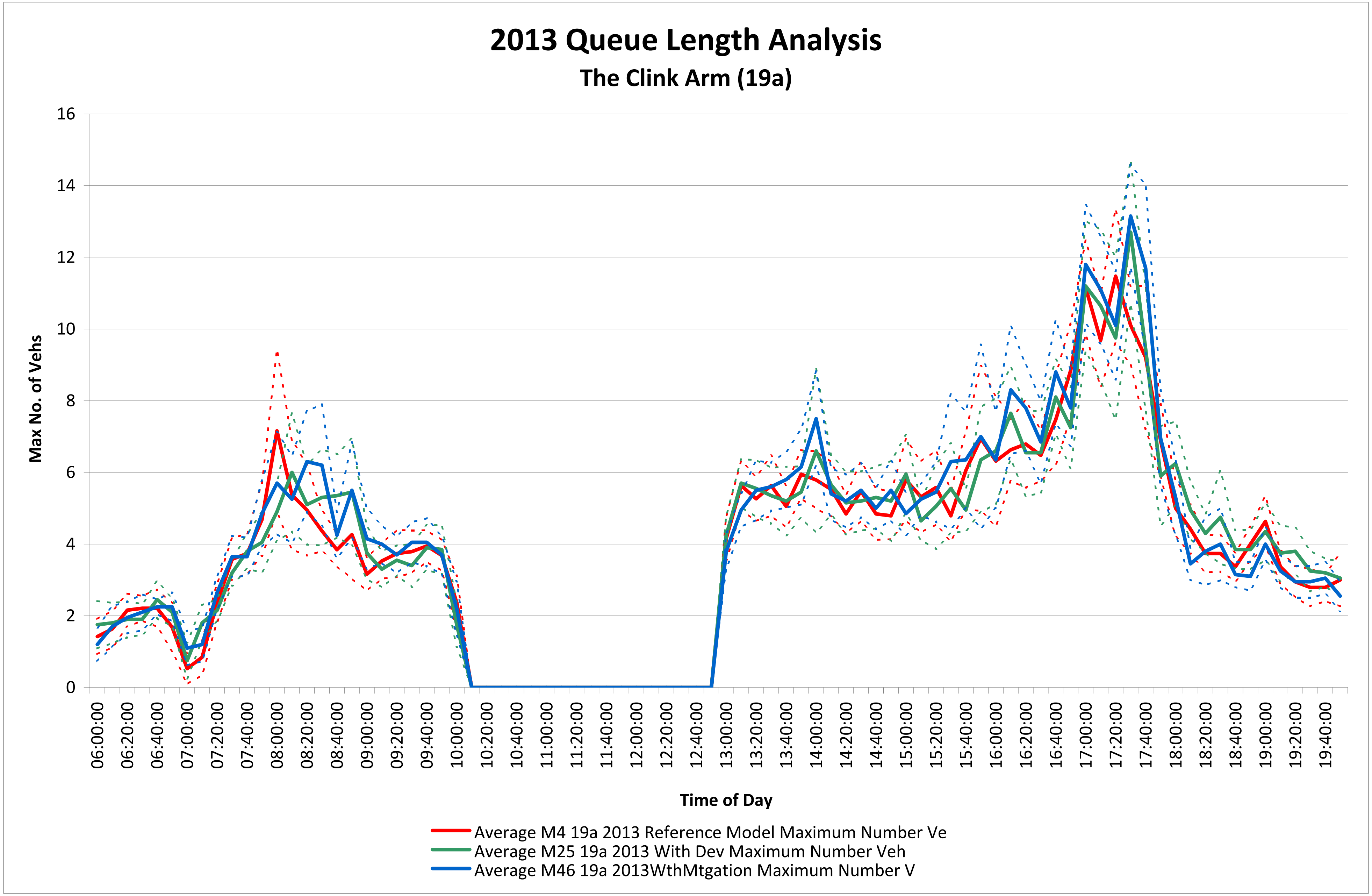


2013 Queue Length Analysis
St John St Arm (18d)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 18d 2013 Reference Model Maximum Number Ve
StdDev M25 18d 2013 With Dev Maximum Number Veh
Average M46 18d 2013WthMtgation Maximum Number V



2013 Queue Length Analysis
St John St Arm (18d) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 18d 2013 Reference Model Maximum Number Ve
StdDev M25 18d 2013 With Dev Maximum Number Veh
Average M46 18d 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
St John St Arm (18d) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 18d 2013 Reference Model Maximum Number Ve
StdDev M25 18d 2013 With Dev Maximum Number Veh
Average M46 18d 2013WthMtgation Maximum Number V



2013 Queue Length Analysis
The Clink Arm (19a)
Max No. of Vehs
0
2
4
6
8
10
12
14
16
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
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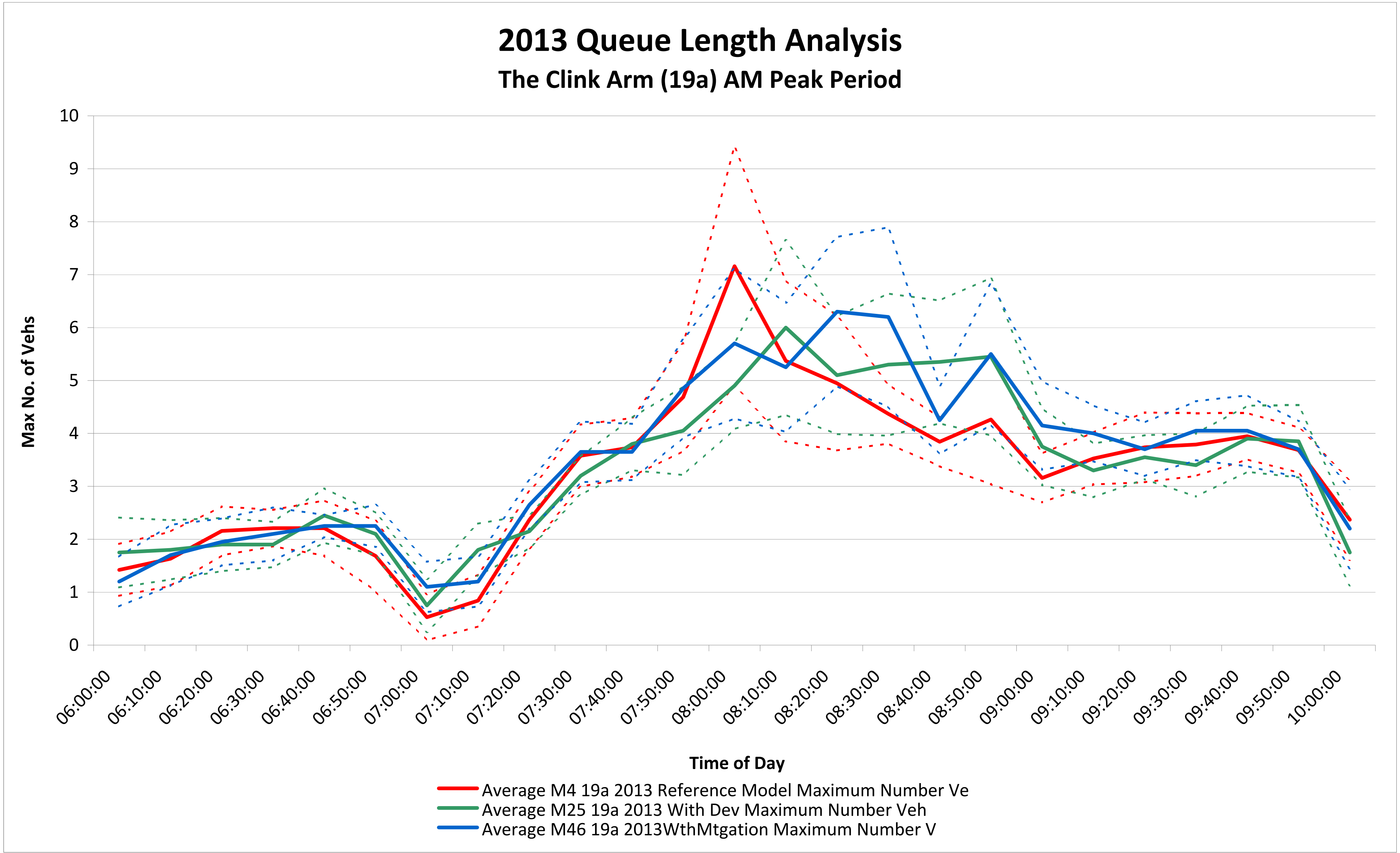
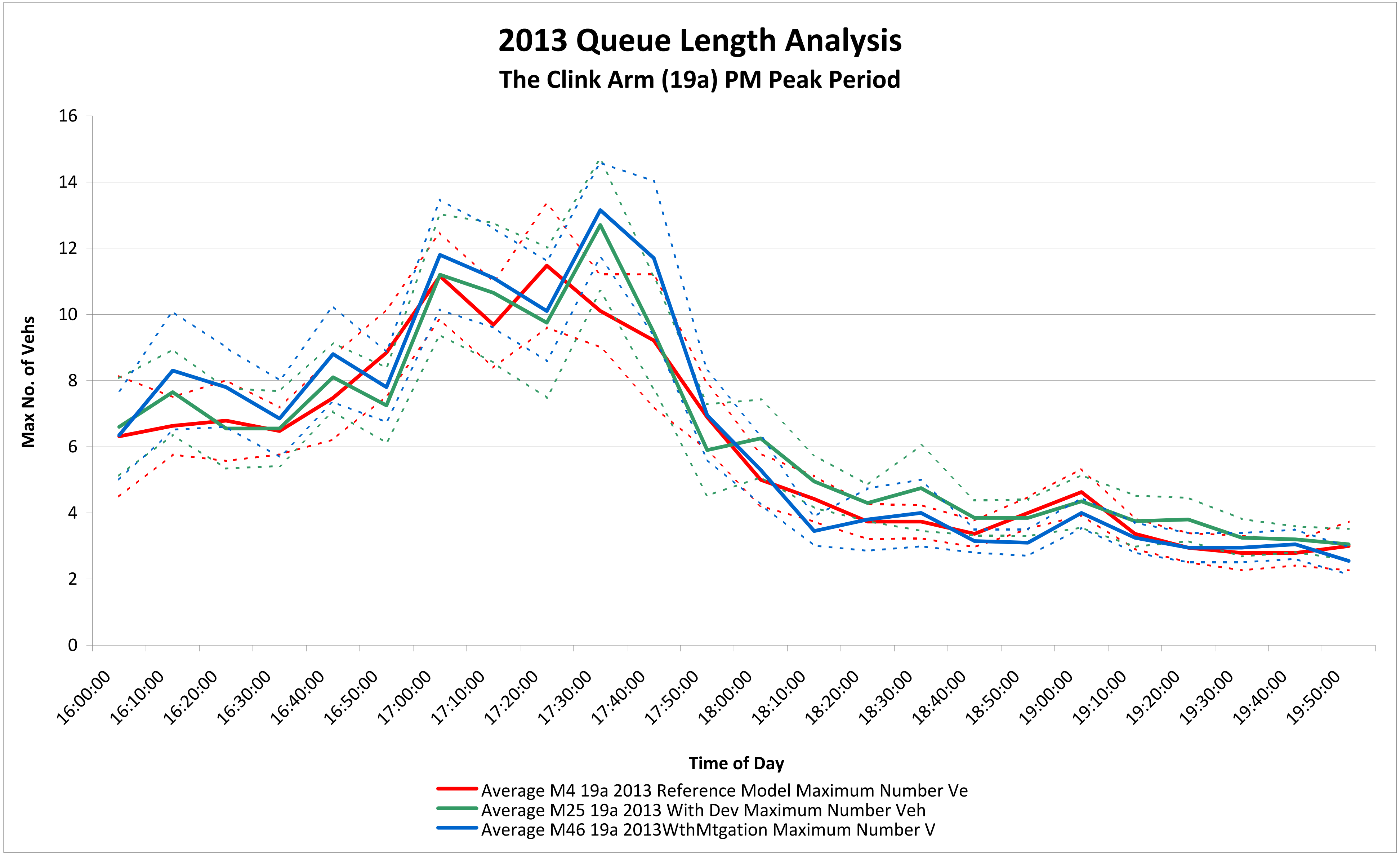
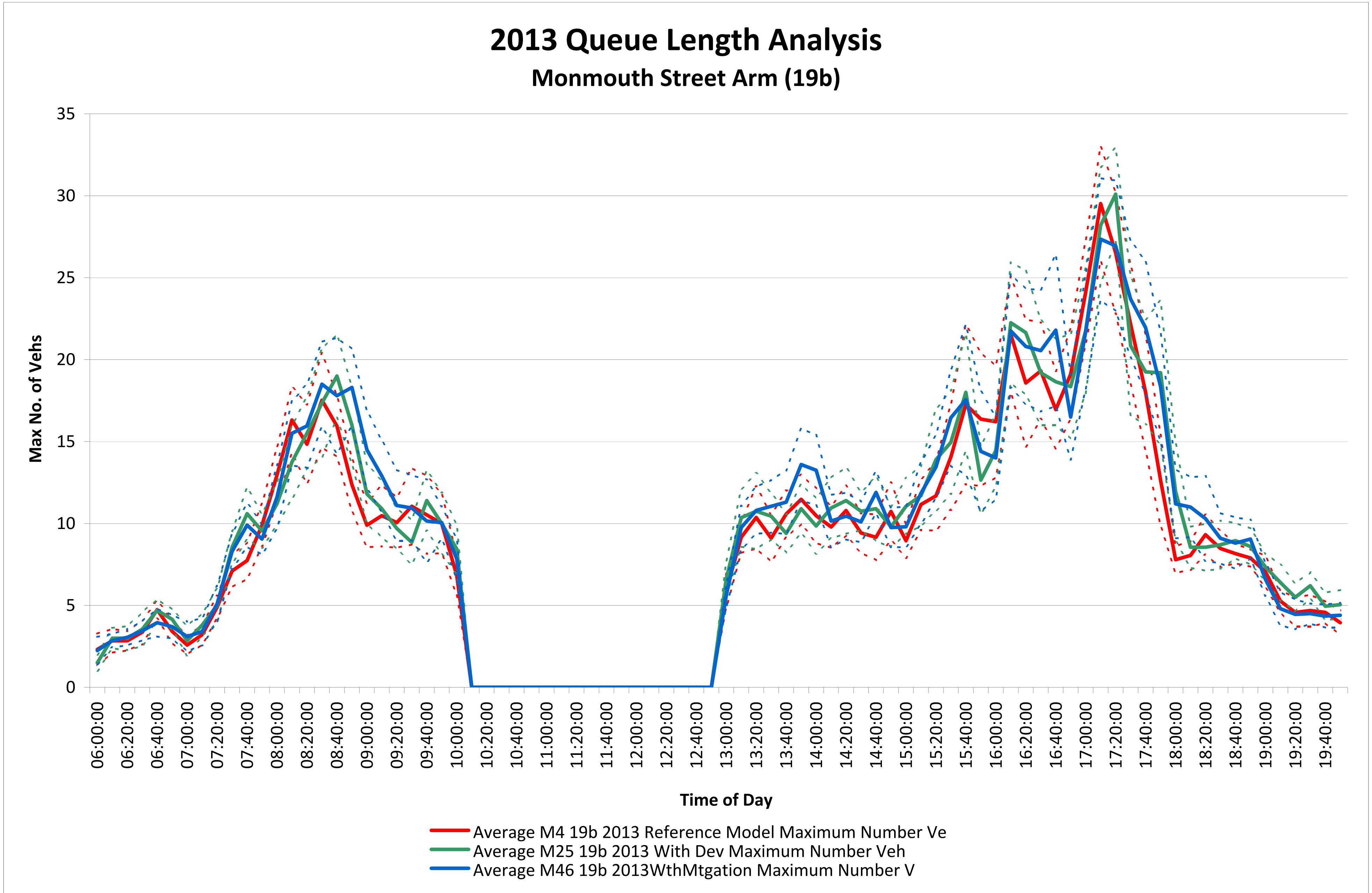
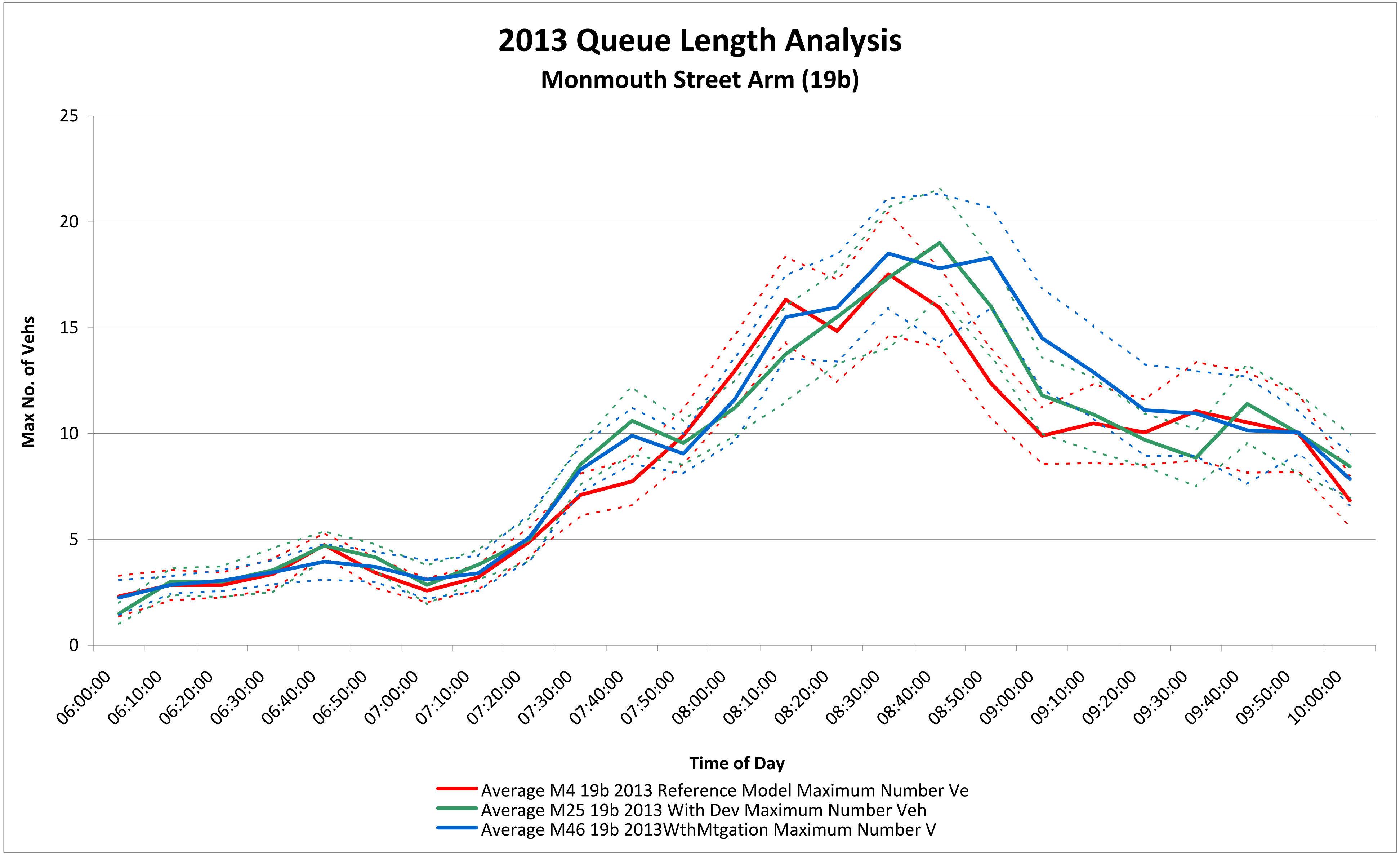
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 19a 2013 Reference Model Maximum Number Ve
Average M25 19a 2013 With Dev Maximum Number Veh
Average M46 19a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
The Clink Arm (19a) AM Peak Period
Max No. of Vehs
10
9
8
7
6
5
4
3
2
1
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19a 2013 Reference Model Maximum Number Ve
Average M25 19a 2013 With Dev Maximum Number Veh
Average M46 19a 2013WthMtgation Maximum Number V

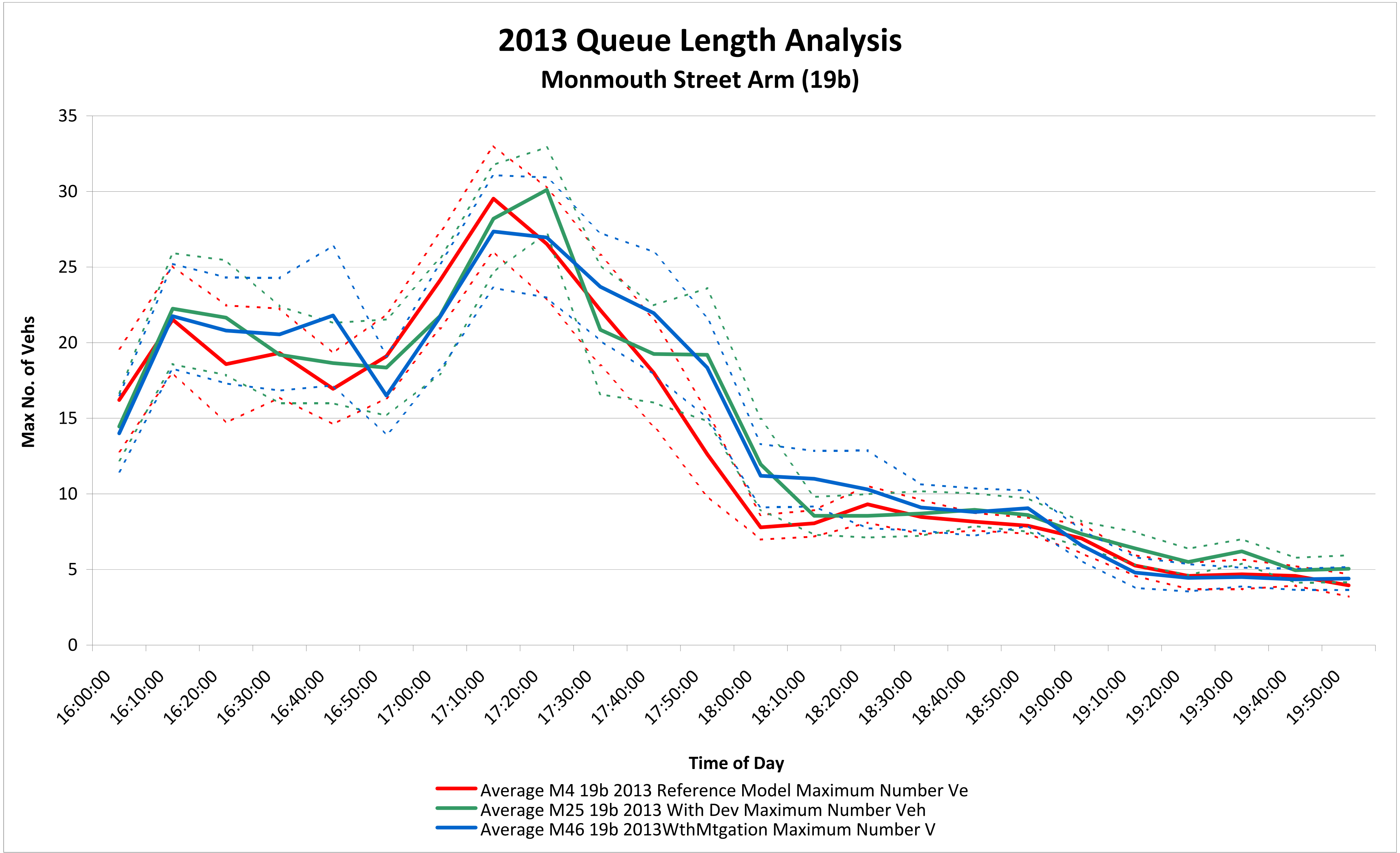

2013 Queue Length Analysis
The Clink Arm (19a) PM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19a 2013 Reference Model Maximum Number Ve
Average M25 19a 2013 With Dev Maximum Number Veh
Average M46 19a 2013WthMtgation Maximum Number V

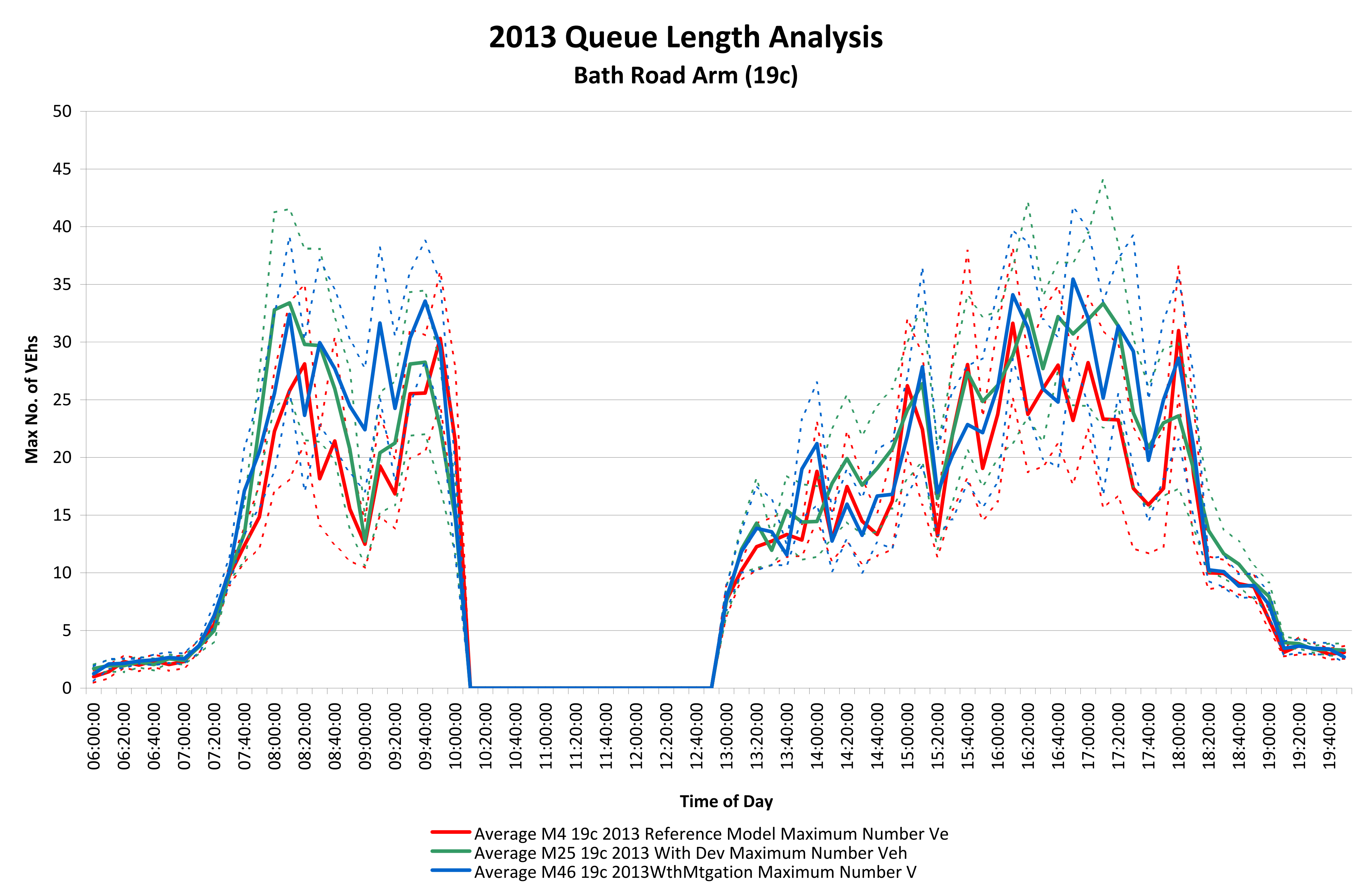


2013 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
0
5
10
15
20
25
30
35
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 19b 2013 Reference Model Maximum Number Ve
Average M25 19b 2013 With Dev Maximum Number Veh
Average M46 19b 2013WthMtgation Maximum Number V

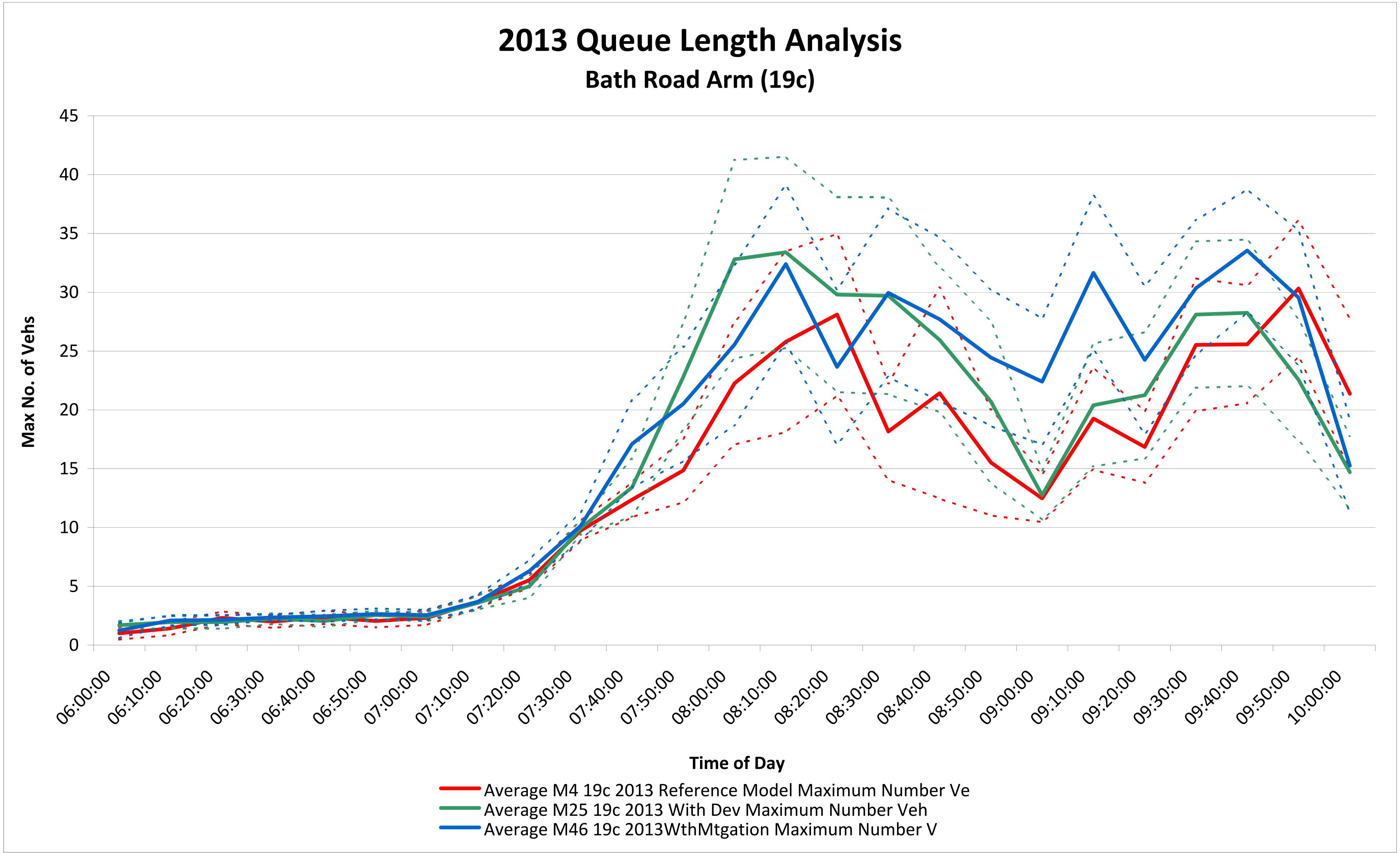


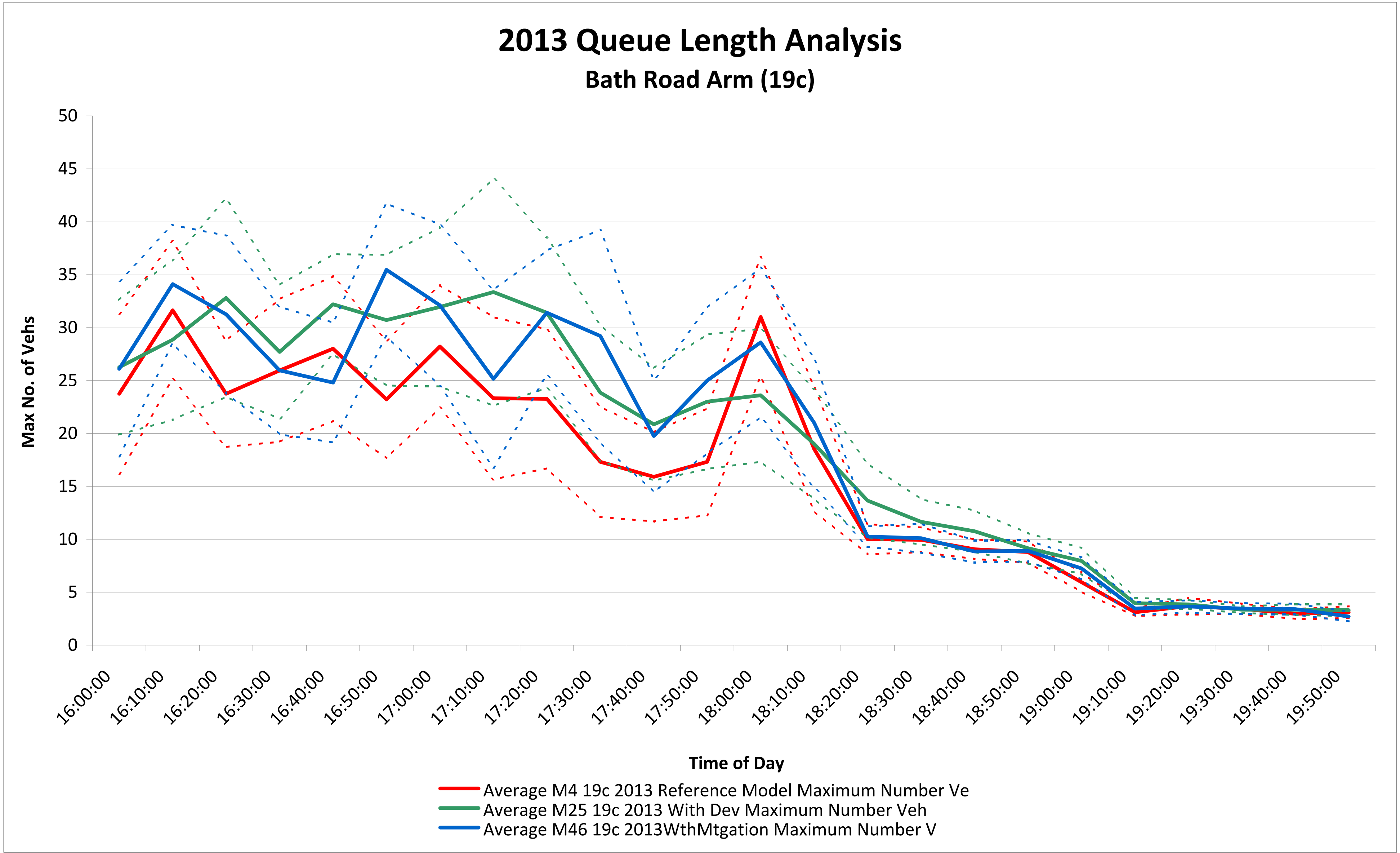
2013 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
0
5
10
15
20
25
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19b 2013 Reference Model Maximum Number Ve
Average M25 19b 2013 With Dev Maximum Number Veh
Average M46 19b 2013WthMtgation Maximum Number V

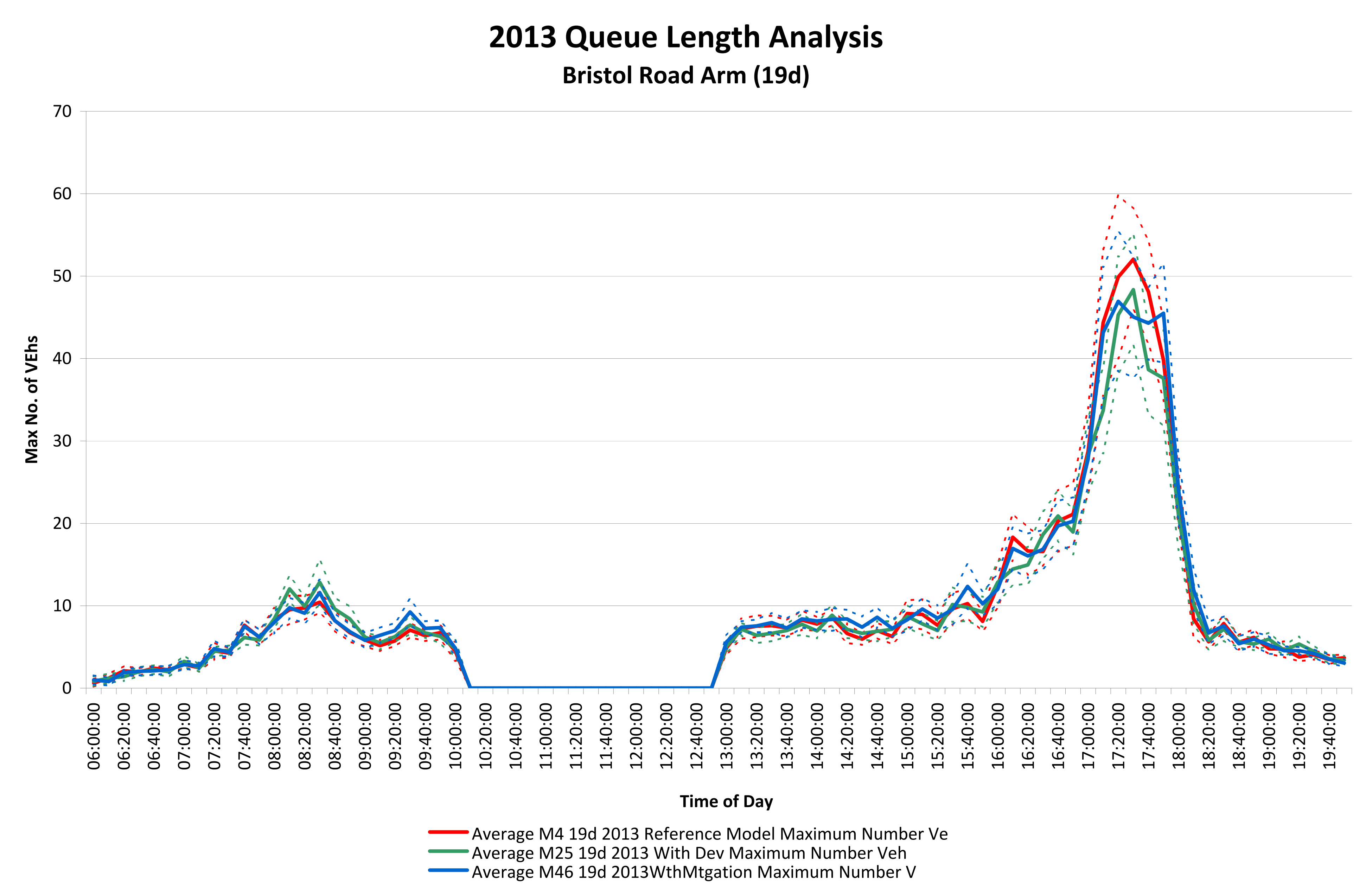

2013 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19b 2013 Reference Model Maximum Number Ve
Average M25 19b 2013 With Dev Maximum Number Veh
Average M46 19b 2013WthMtgation Maximum Number V

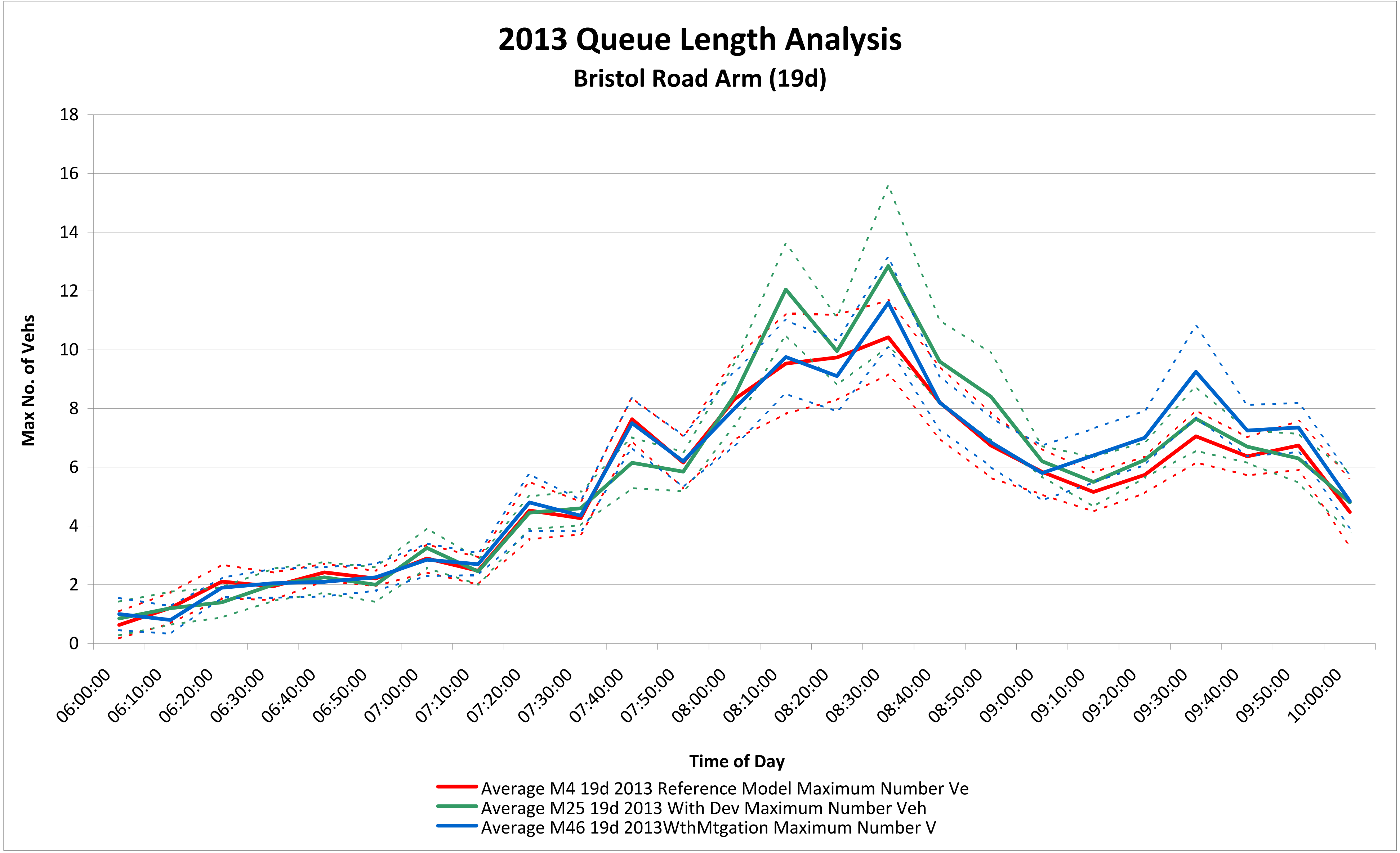


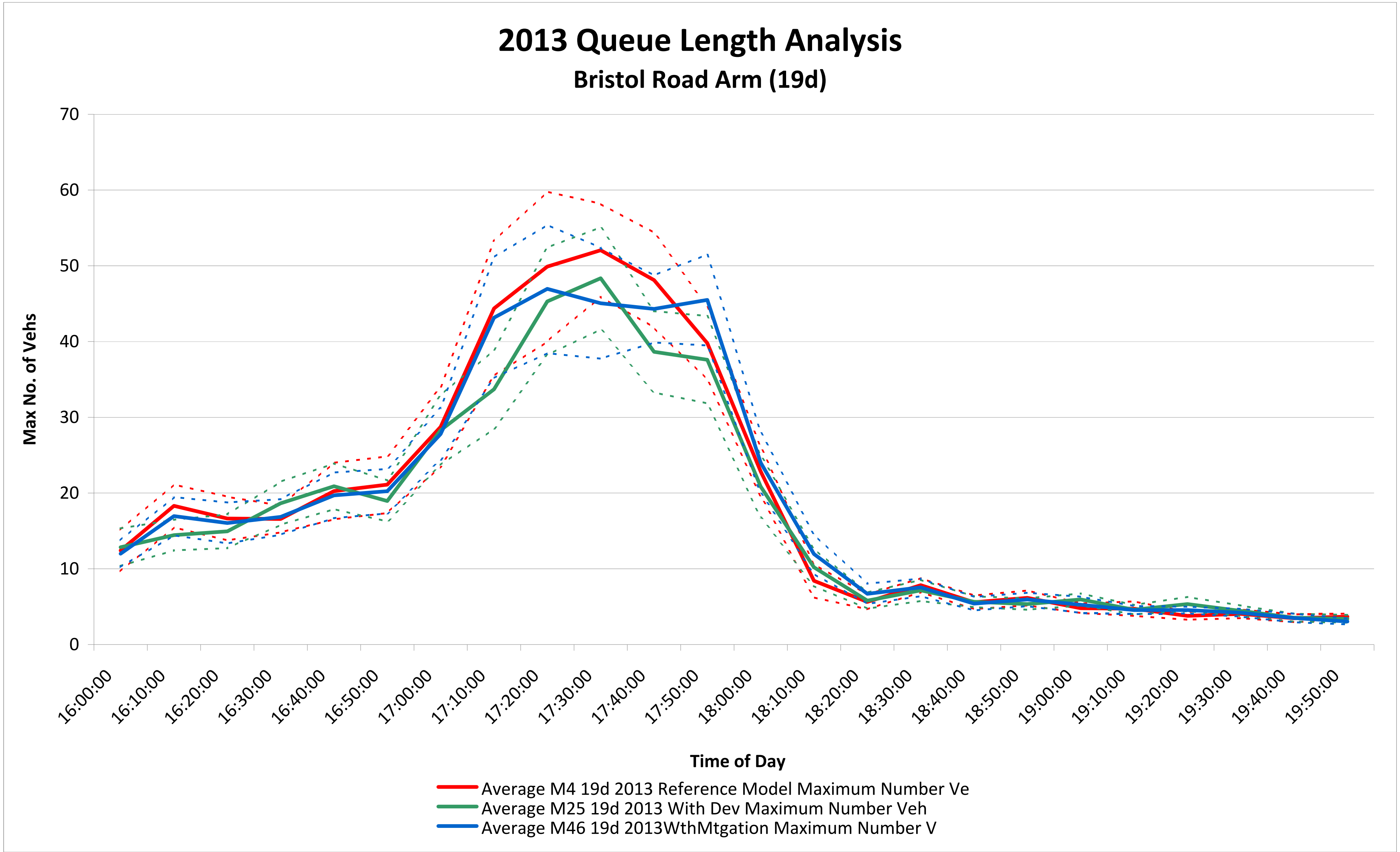
2013 Queue Length Analysis
Bath Road Arm (19c)
50
45
40
35
30
25
20
15
10
5
0
Max No. of VEhs
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 19c 2013 Reference Model Maximum Number Ve
Average M25 19c 2013 With Dev Maximum Number Veh
Average M46 19c 2013WthMtgation Maximum Number V

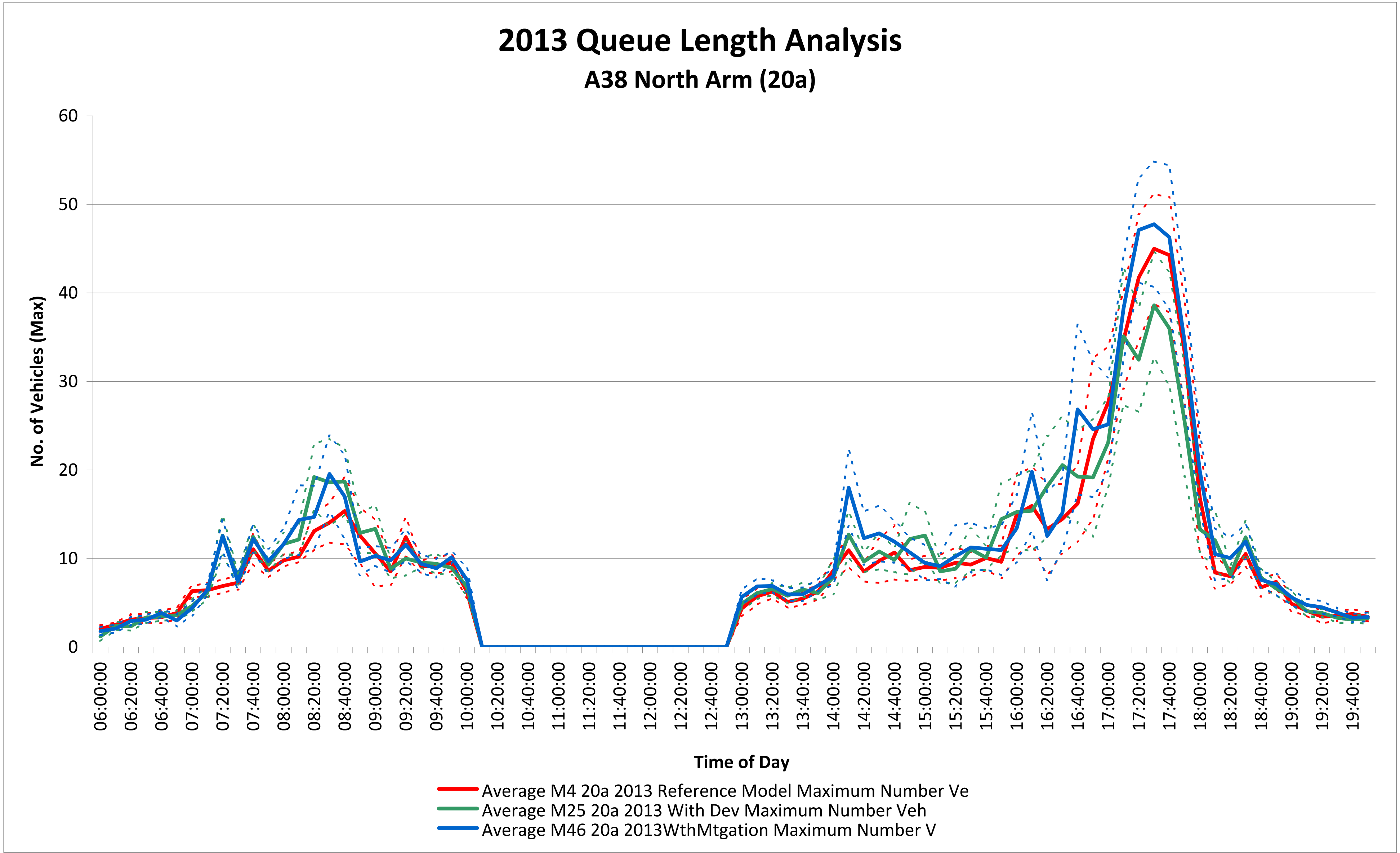

2013 Queue Length Analysis
Bath Road Arm (19c)
45
40
35
30
25
20
15
10
5
0
Max No. of Vehs
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19c 2013 Reference Model Maximum Number Ve
Average M25 19c 2013 With Dev Maximum Number Veh
Average M46 19c 2013WthMtgation Maximum Number V

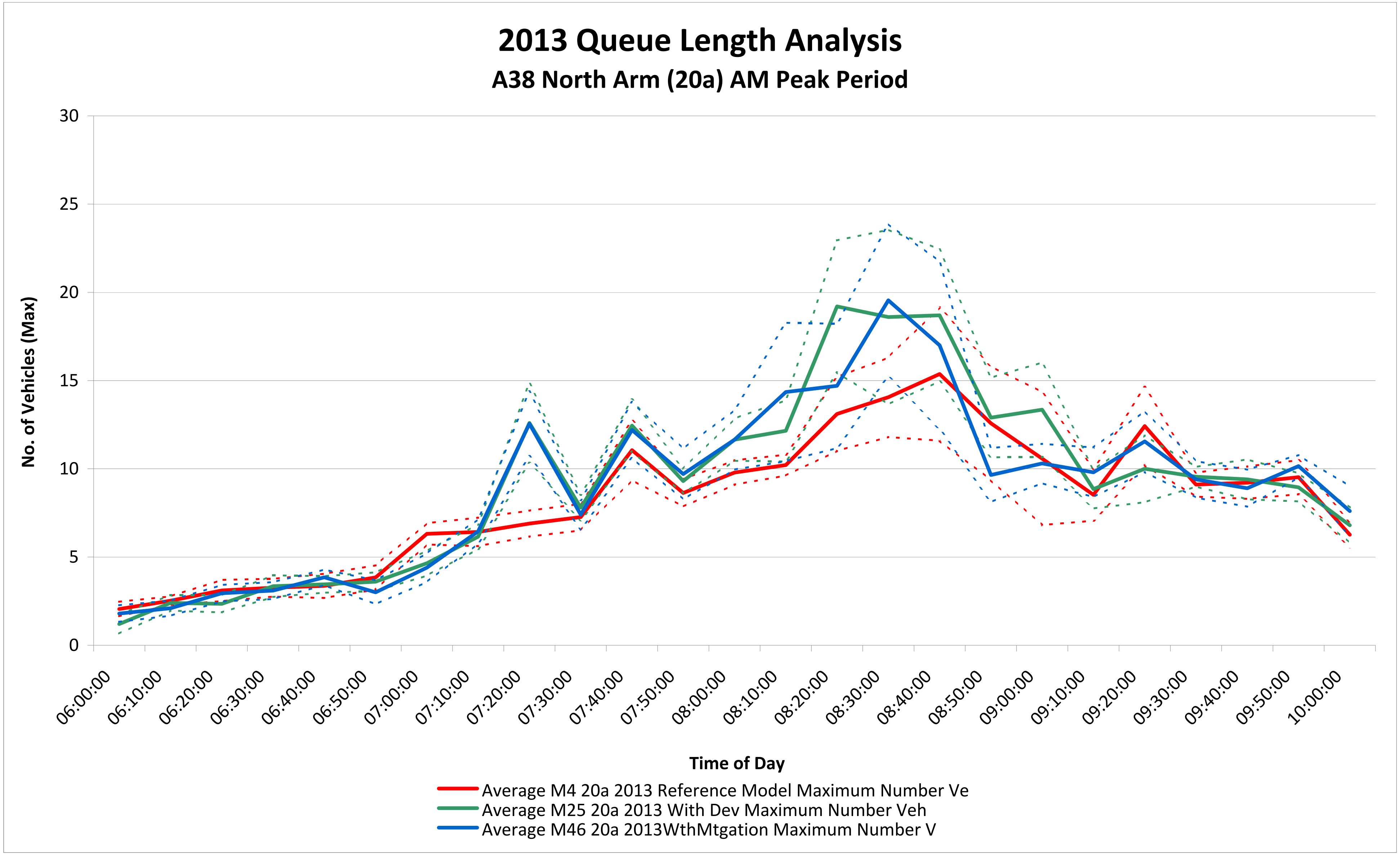

2013 Queue Length Analysis
Bath Road Arm (19c)
Max No. of Vehs
0
5
10
15
20
25
30
35
40
45
50
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19c 2013 Reference Model Maximum Number Ve
Average M25 19c 2013 With Dev Maximum Number Veh
Average M46 19c 2013WthMtgation Maximum Number V

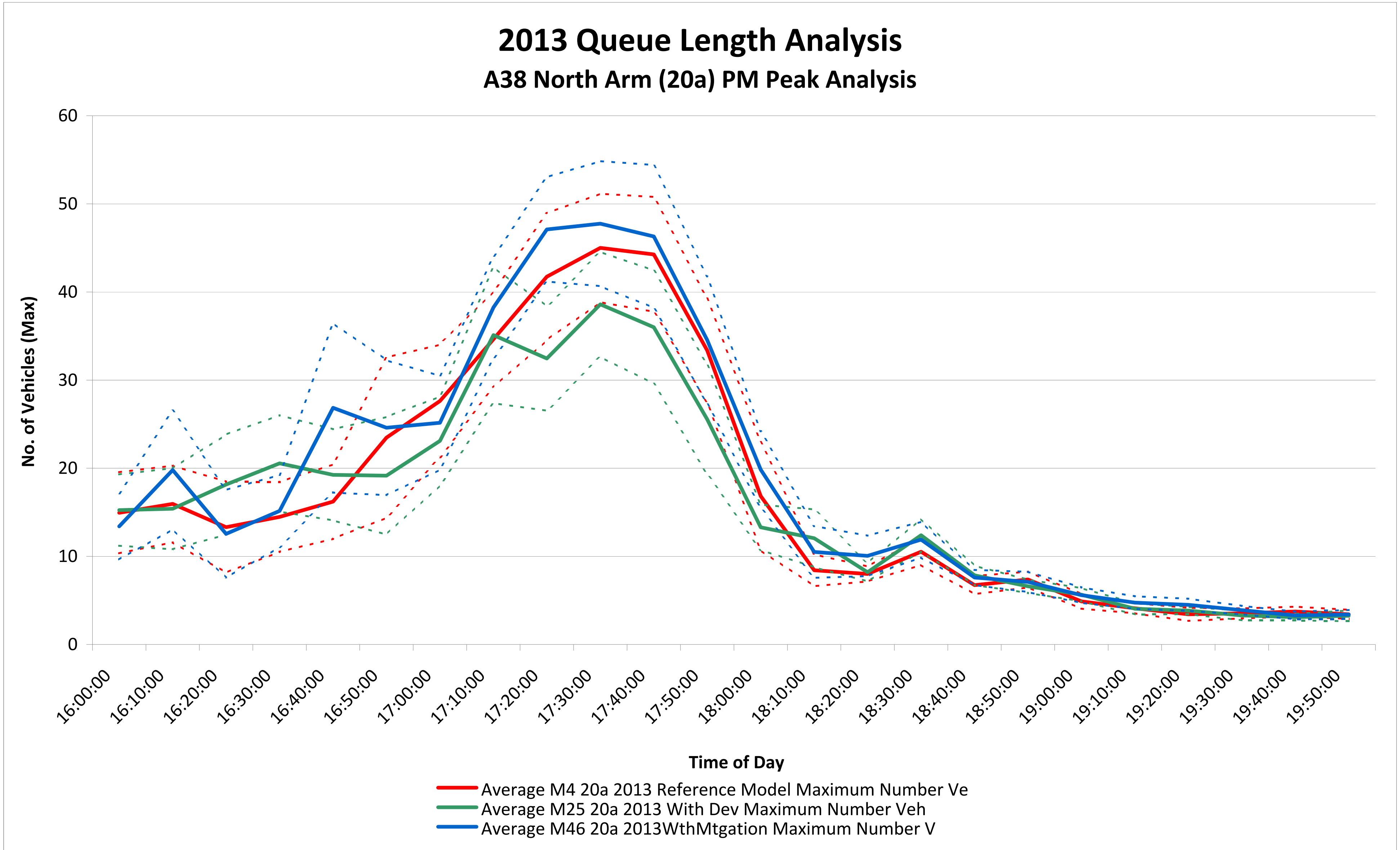

2013 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of VEhs
Time of Day
Average M4 19d 2013 Reference Model Maximum Number Ve
Average M25 19d 2013 With Dev Maximum Number Veh
Average M46 19d 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Bristol Road Arm (19d)
18
16
14
12
10
8
6
4
2
0
Max No. of Vehs
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 19d 2013 Reference Model Maximum Number Ve
Average M25 19d 2013 With Dev Maximum Number Veh
Average M46 19d 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of Vehs
70
60
50
40
30
20
10
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 19d 2013 Reference Model Maximum Number Ve
Average M25 19d 2013 With Dev Maximum Number Veh
Average M46 19d 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 North Arm (20a)
No. of Vehicles (Max)
0
10
20
30
40
50
60
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 20a 2013 Reference Model Maximum Number Ve
Average M25 20a 2013 With Dev Maximum Number Veh
Average M46 20a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 North Arm (20a) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 20a 2013 Reference Model Maximum Number Ve
Average M25 20a 2013 With Dev Maximum Number Veh
Average M46 20a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 North Arm (20a) PM Peak Analysis
No. of Vehicles (Max)
0
10
20
30
40
50
60
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
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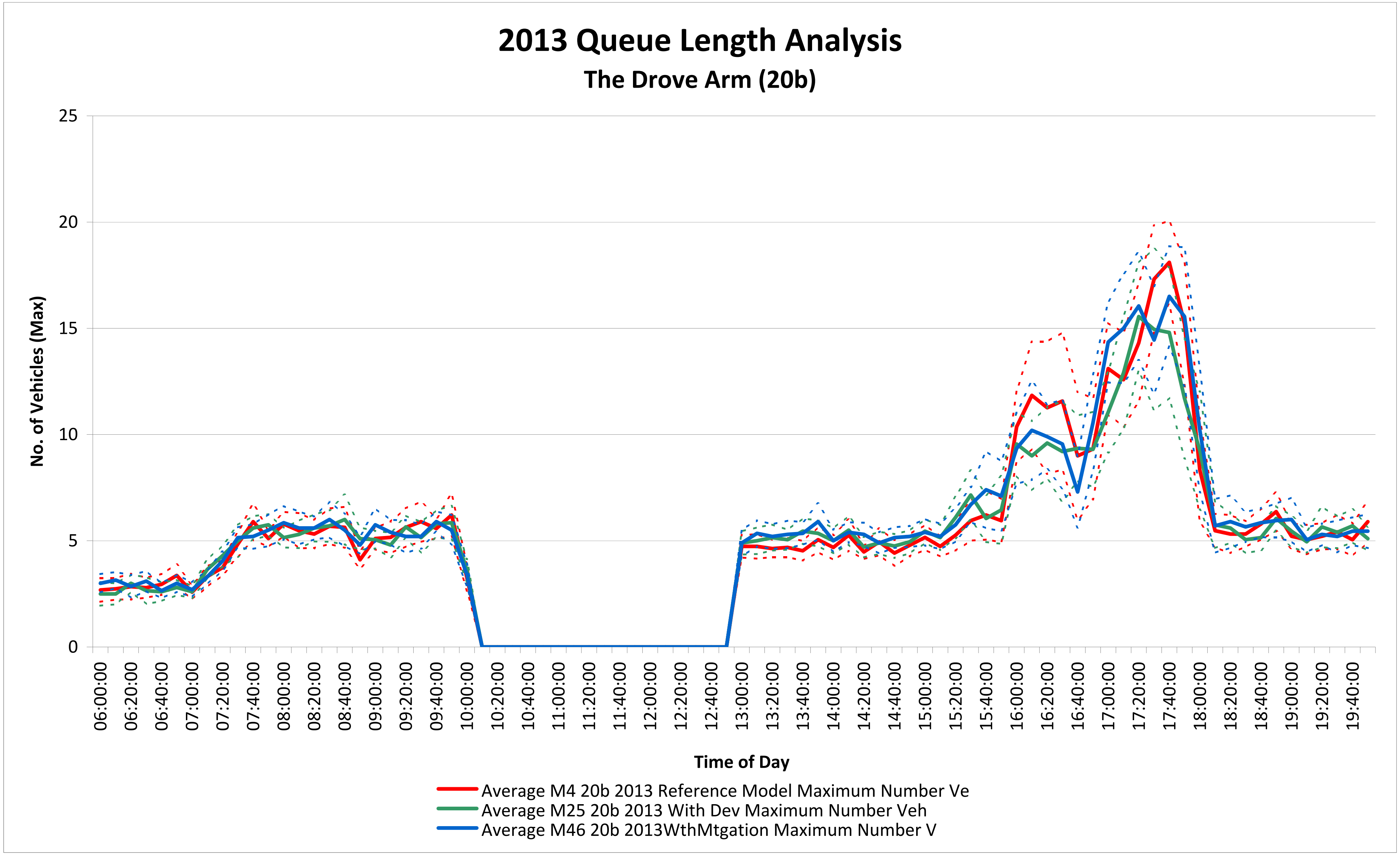
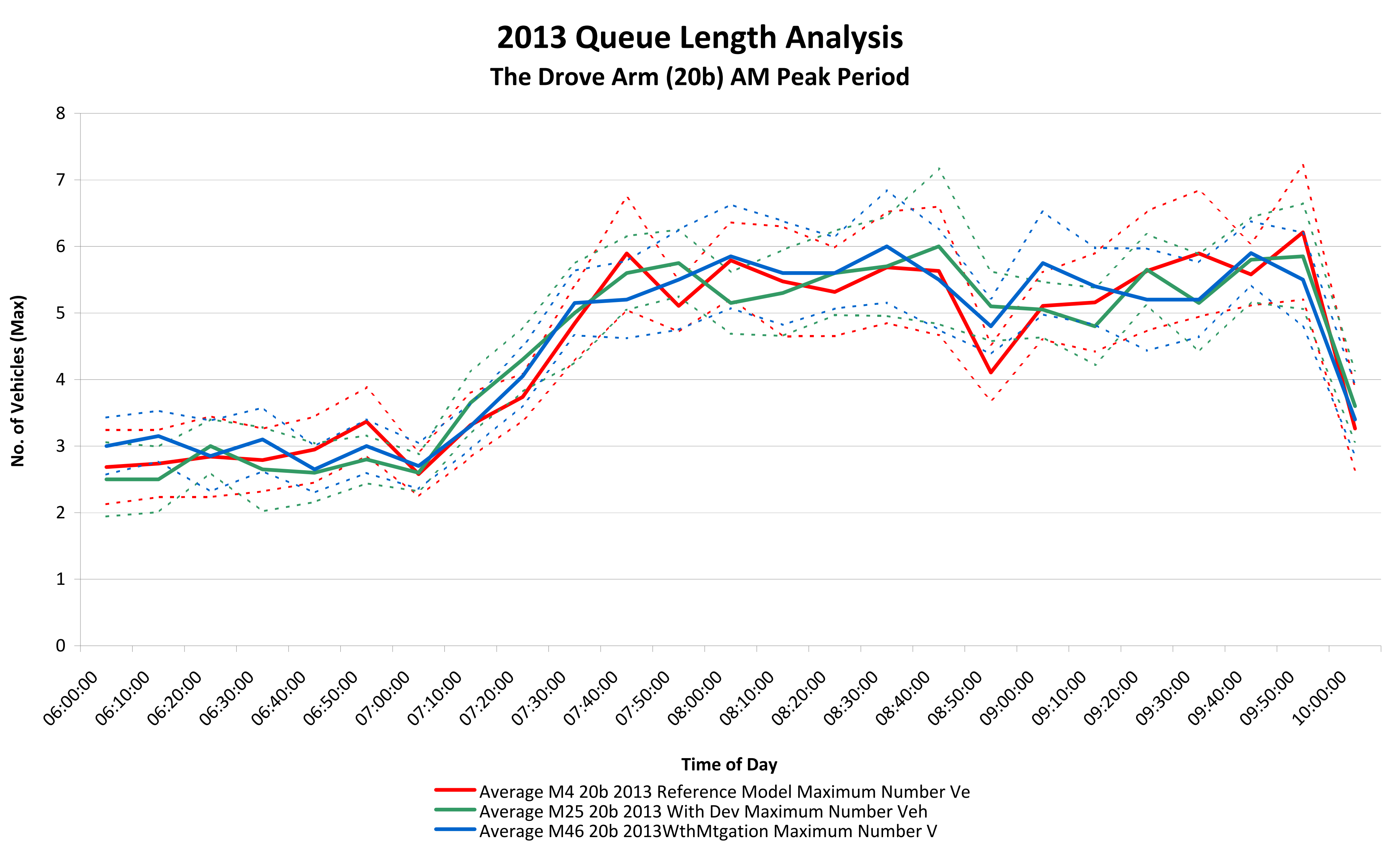
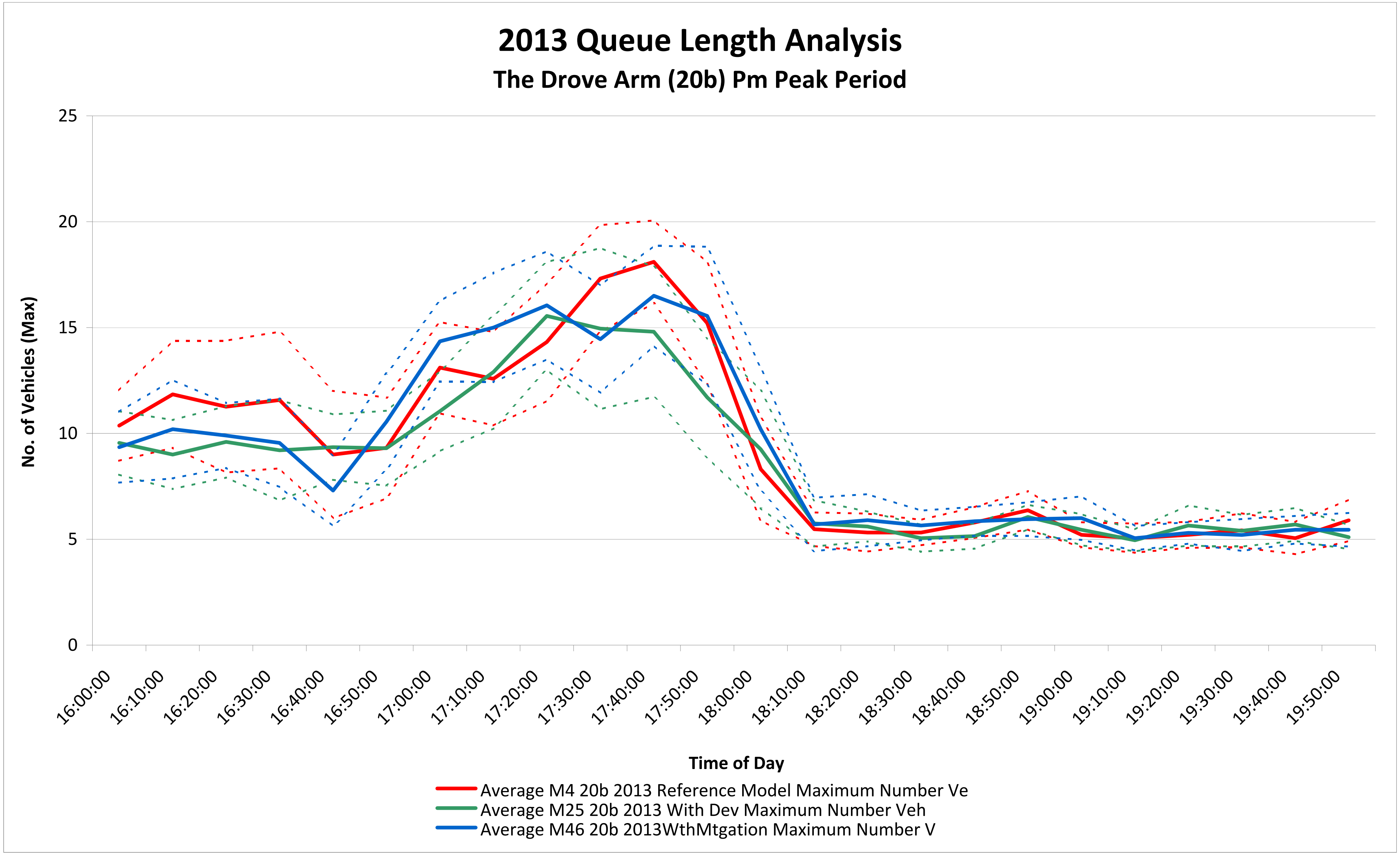
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 20a 2013 Reference Model Maximum Number Ve
Average M25 20a 2013 With Dev Maximum Number Veh
Average M46 20a 2013WthMtgation Maximum Number V



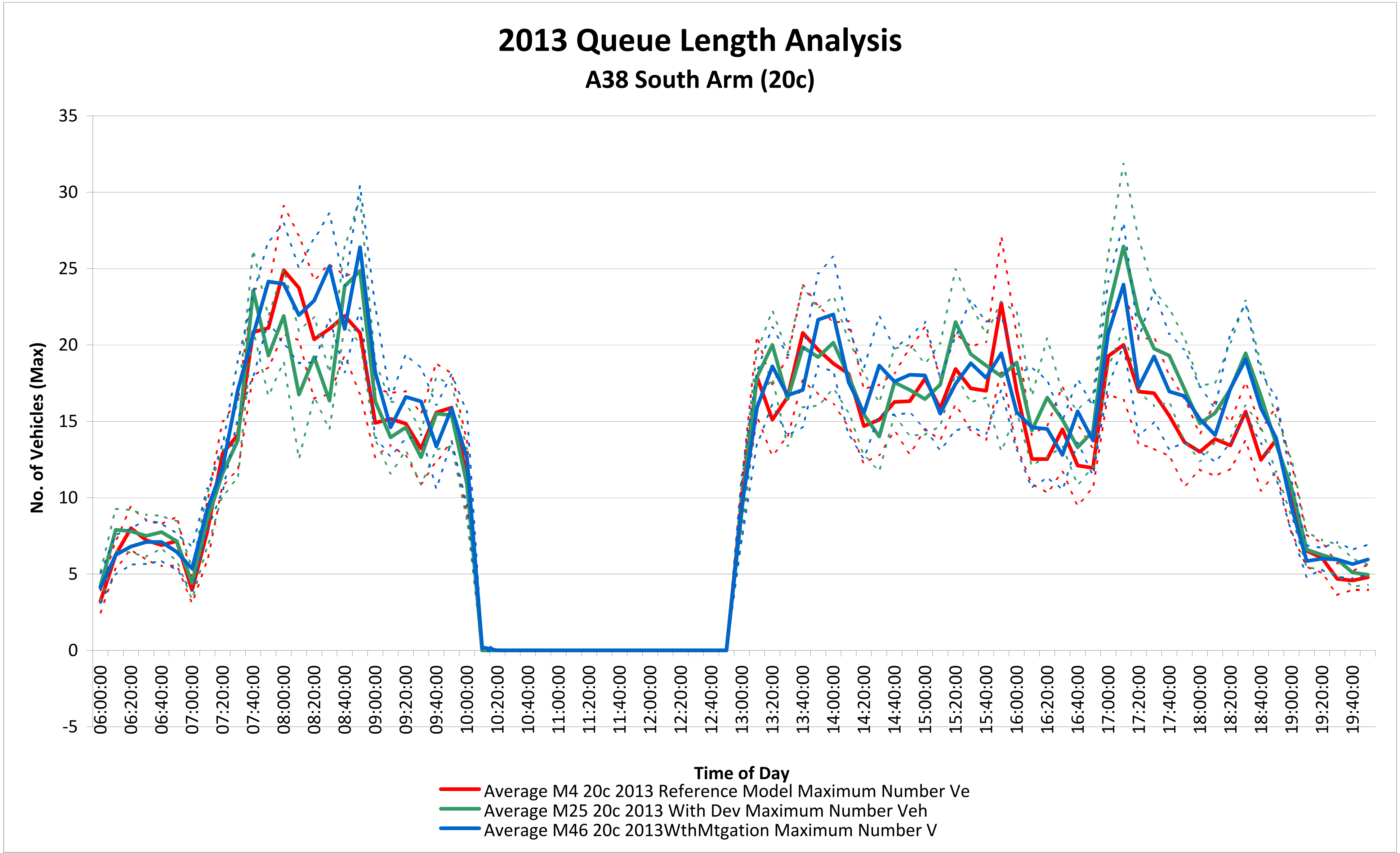
2013 Queue Length Analysis
The Drove Arm (20b)
25
20
15
10
5
0
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 20b 2013 Reference Model Maximum Number Ve
Average M25 20b 2013 With Dev Maximum Number Veh
Average M46 20b 2013WthMtgation Maximum Number V



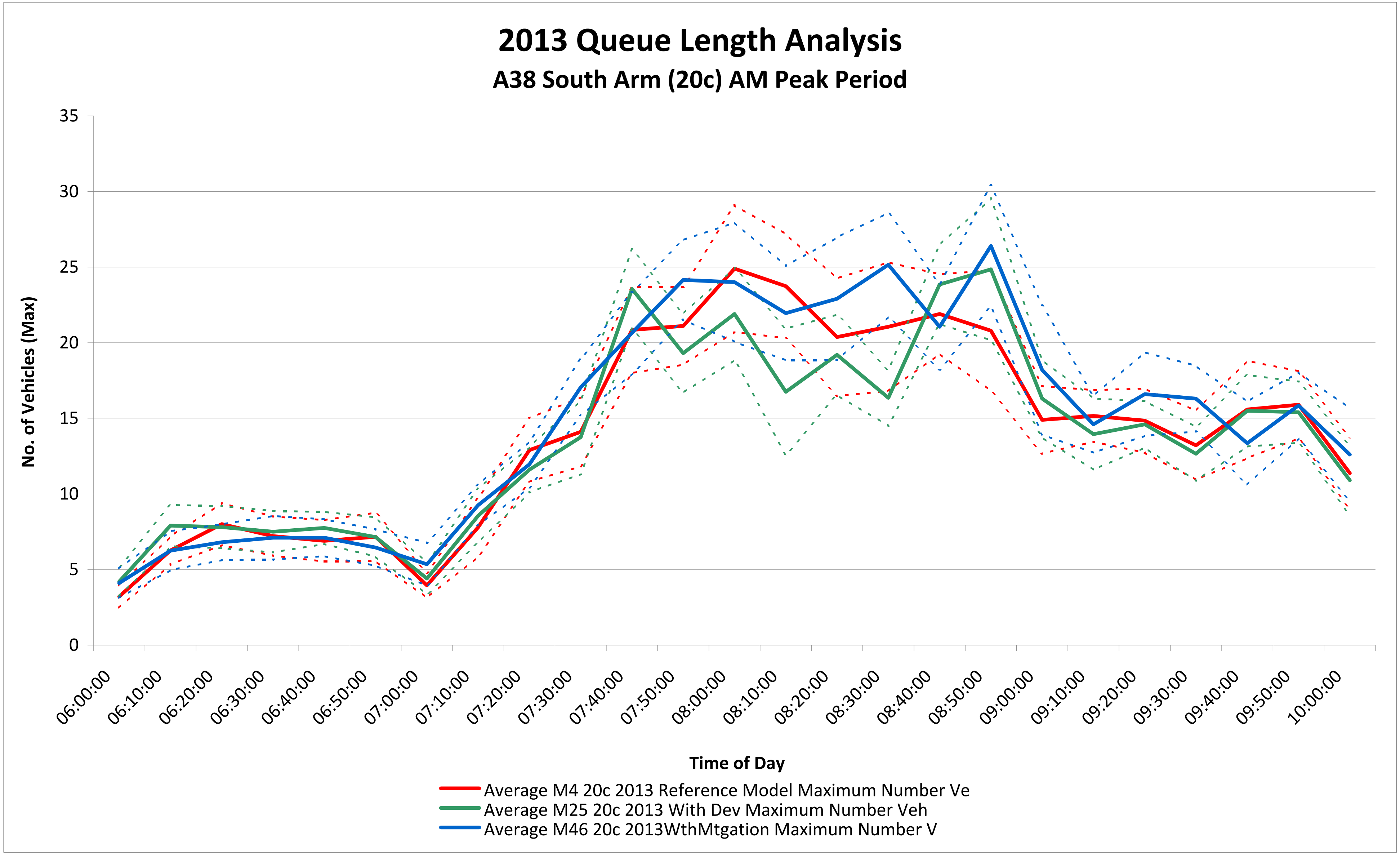
2013 Queue Length Analysis
The Drove Arm (20b) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 20b 2013 Reference Model Maximum Number Ve
Average M25 20b 2013 With Dev Maximum Number Veh
Average M46 20b 2013WthMtgation Maximum Number V

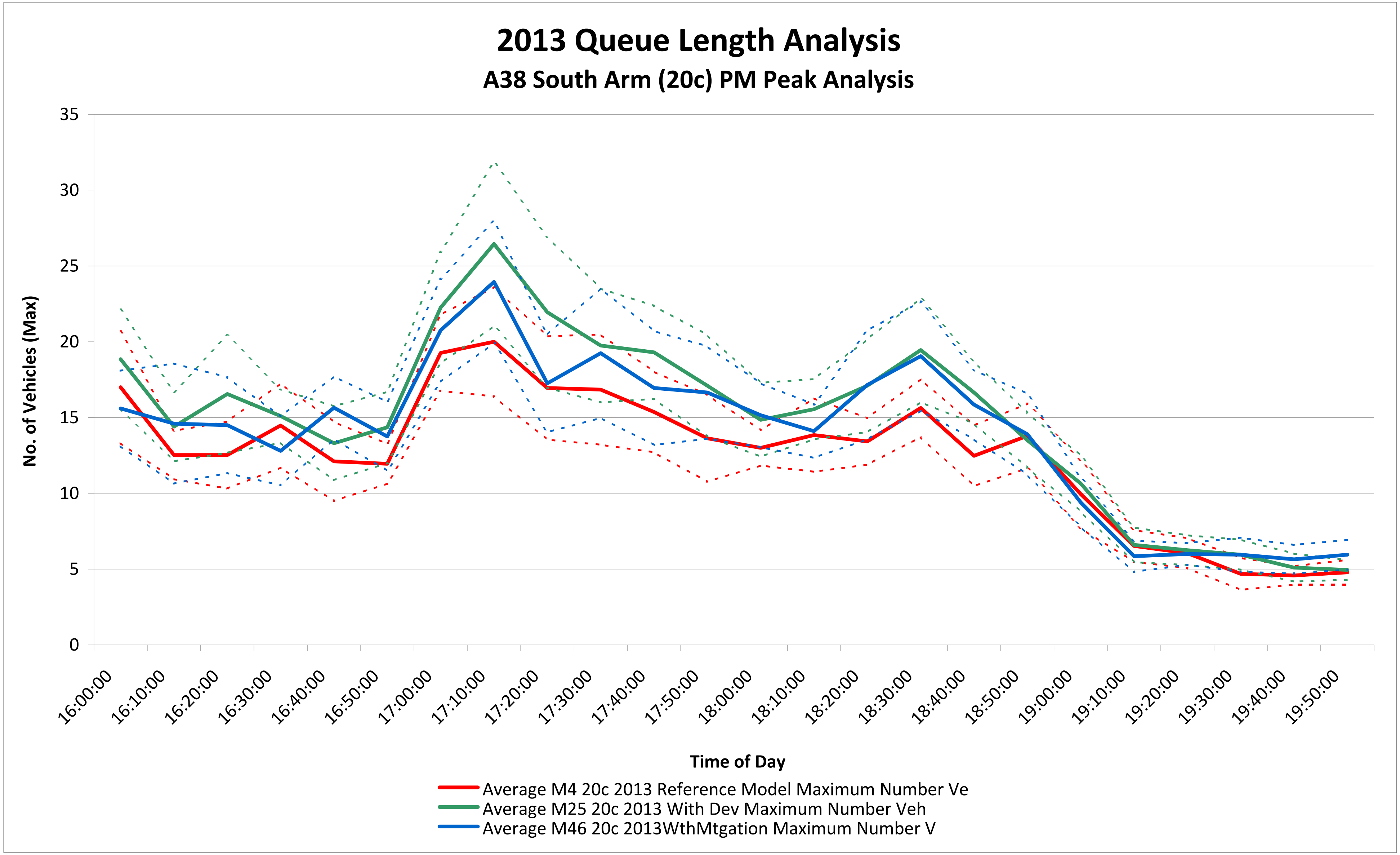


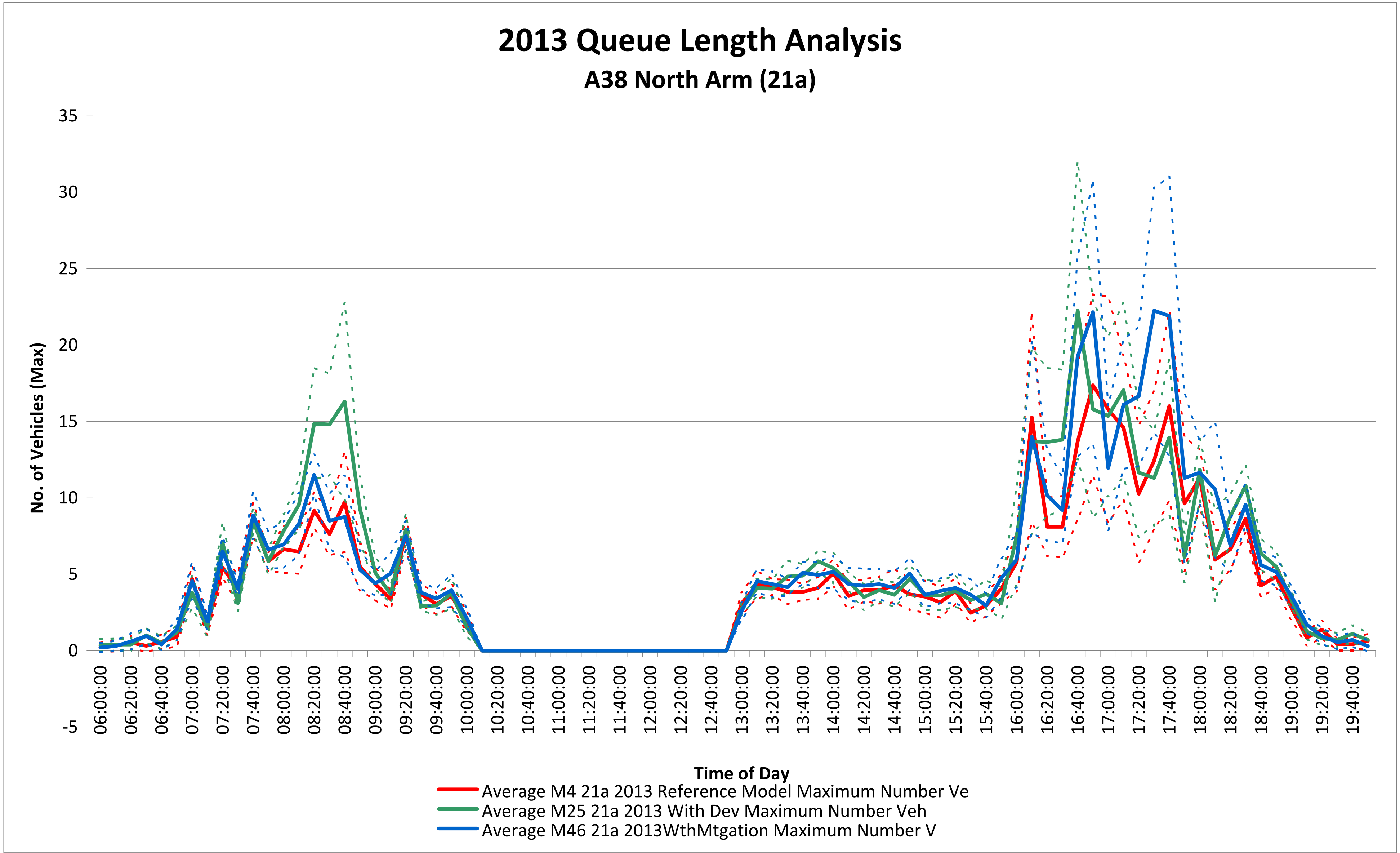
2013 Queue Length Analysis
The Drove Arm (20b) Pm Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 20b 2013 Reference Model Maximum Number Ve
Average M25 20b 2013 With Dev Maximum Number Veh
Average M46 20b 2013WthMtgation Maximum Number V

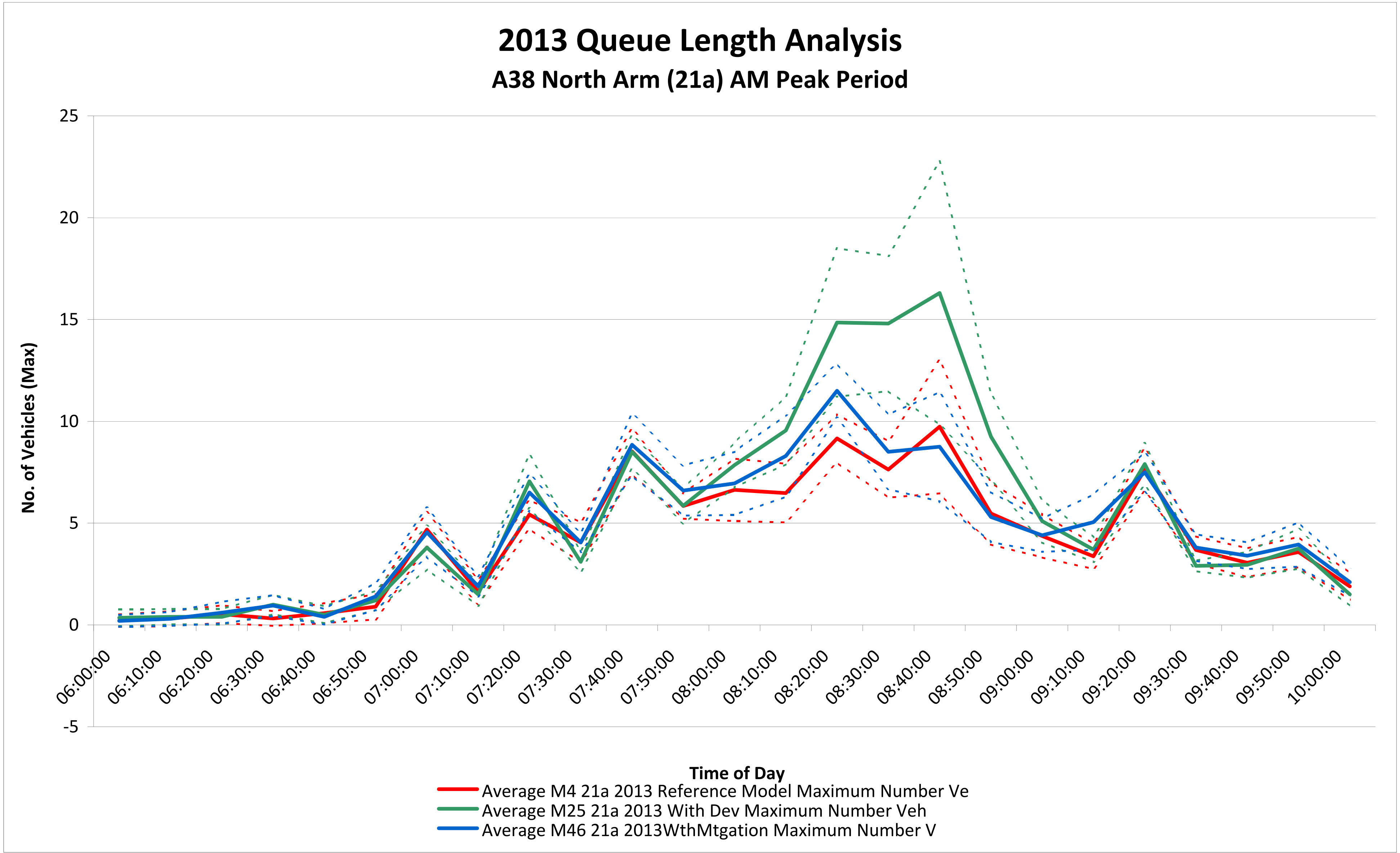


2013 Queue Length Analysis
A38 South Arm (20c)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 20c 2013 Reference Model Maximum Number Ve
Average M25 20c 2013 With Dev Maximum Number Veh
Average M46 20c 2013WthMtgation Maximum Number V

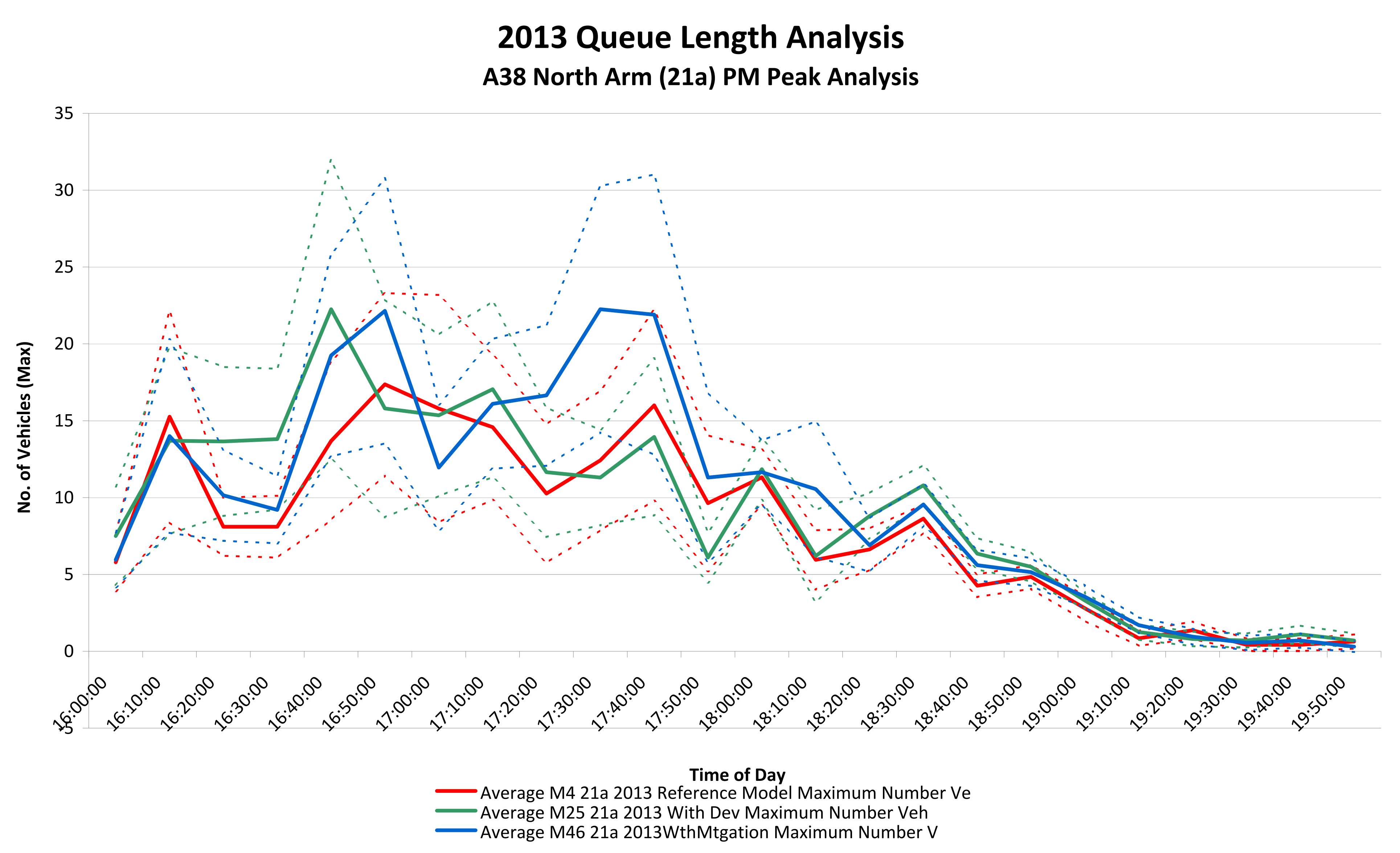

2013 Queue Length Analysis
A38 South Arm (20c) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 20c 2013 Reference Model Maximum Number Ve
Average M25 20c 2013 With Dev Maximum Number Veh
Average M46 20c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 South Arm (20c) PM Peak Analysis
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 20c 2013 Reference Model Maximum Number Ve
Average M25 20c 2013 With Dev Maximum Number Veh
Average M46 20c 2013WthMtgation Maximum Number V

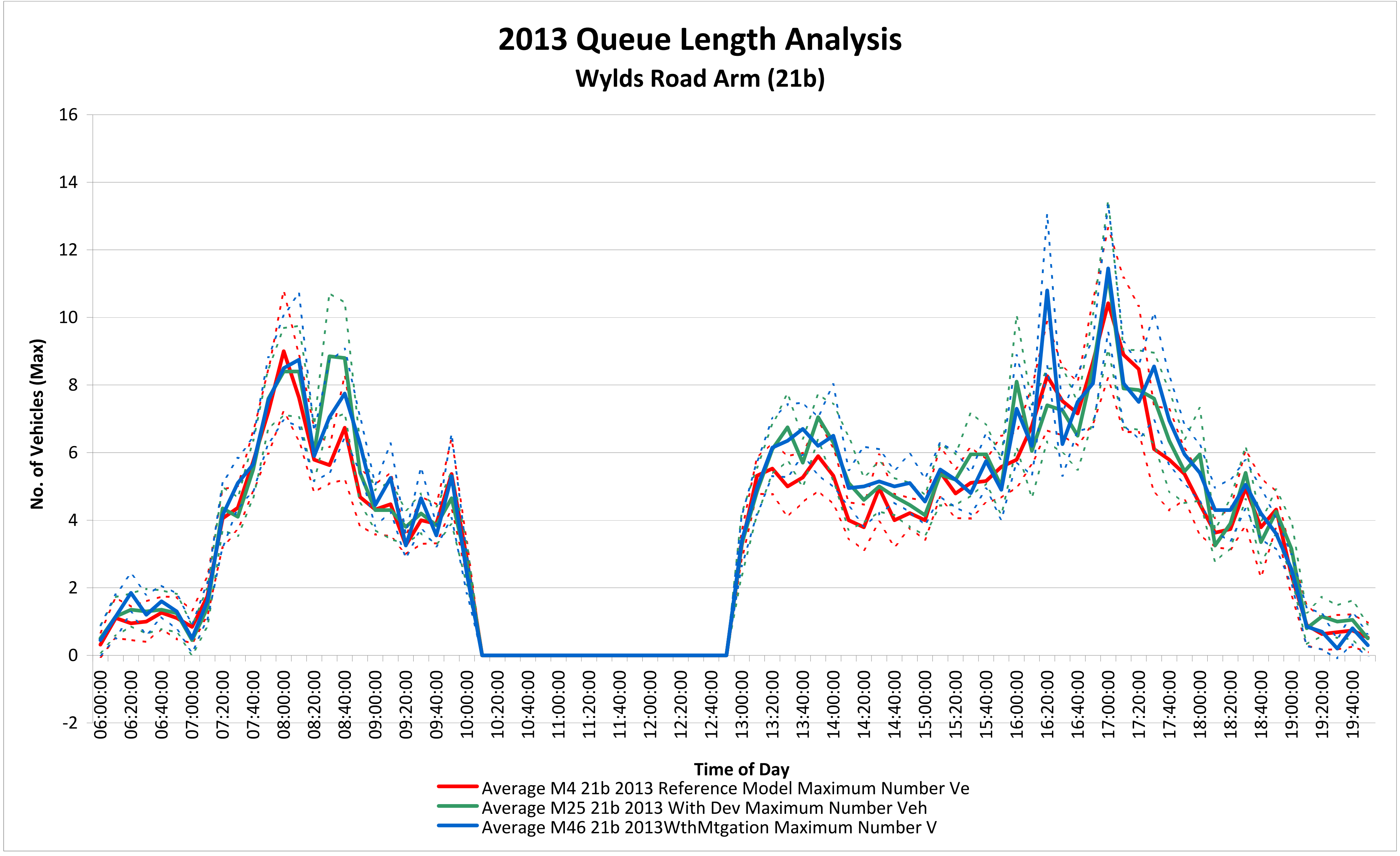

2013 Queue Length Analysis
A38 North Arm (21a)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 21a 2013 Reference Model Maximum Number Ve
Average M25 21a 2013 With Dev Maximum Number Veh
Average M46 21a 2013WthMtgation Maximum Number V



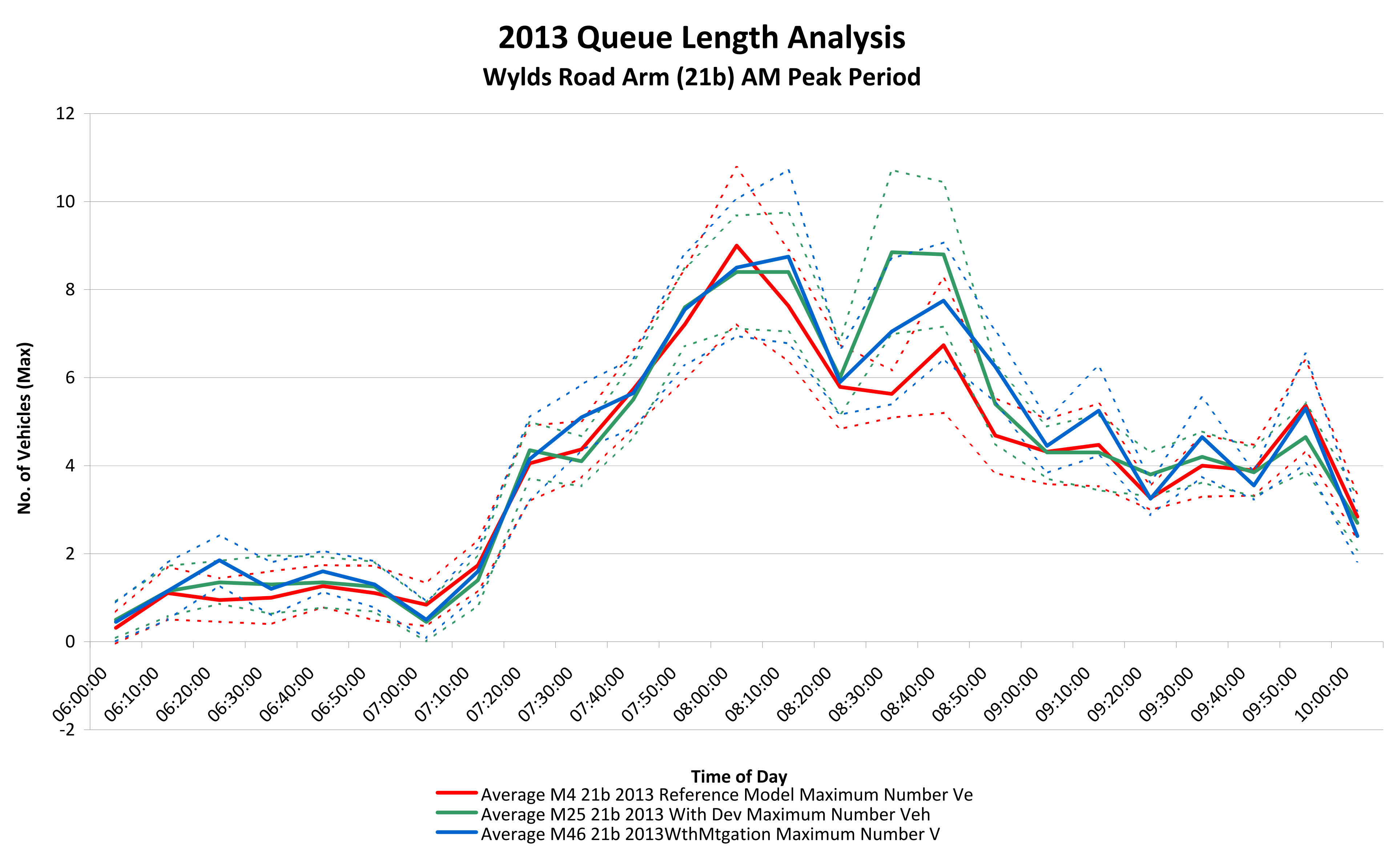
2013 Queue Length Analysis
A38 North Arm (21a) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 21a 2013 Reference Model Maximum Number Ve
Average M25 21a 2013 With Dev Maximum Number Veh
Average M46 21a 2013WthMtgation Maximum Number V

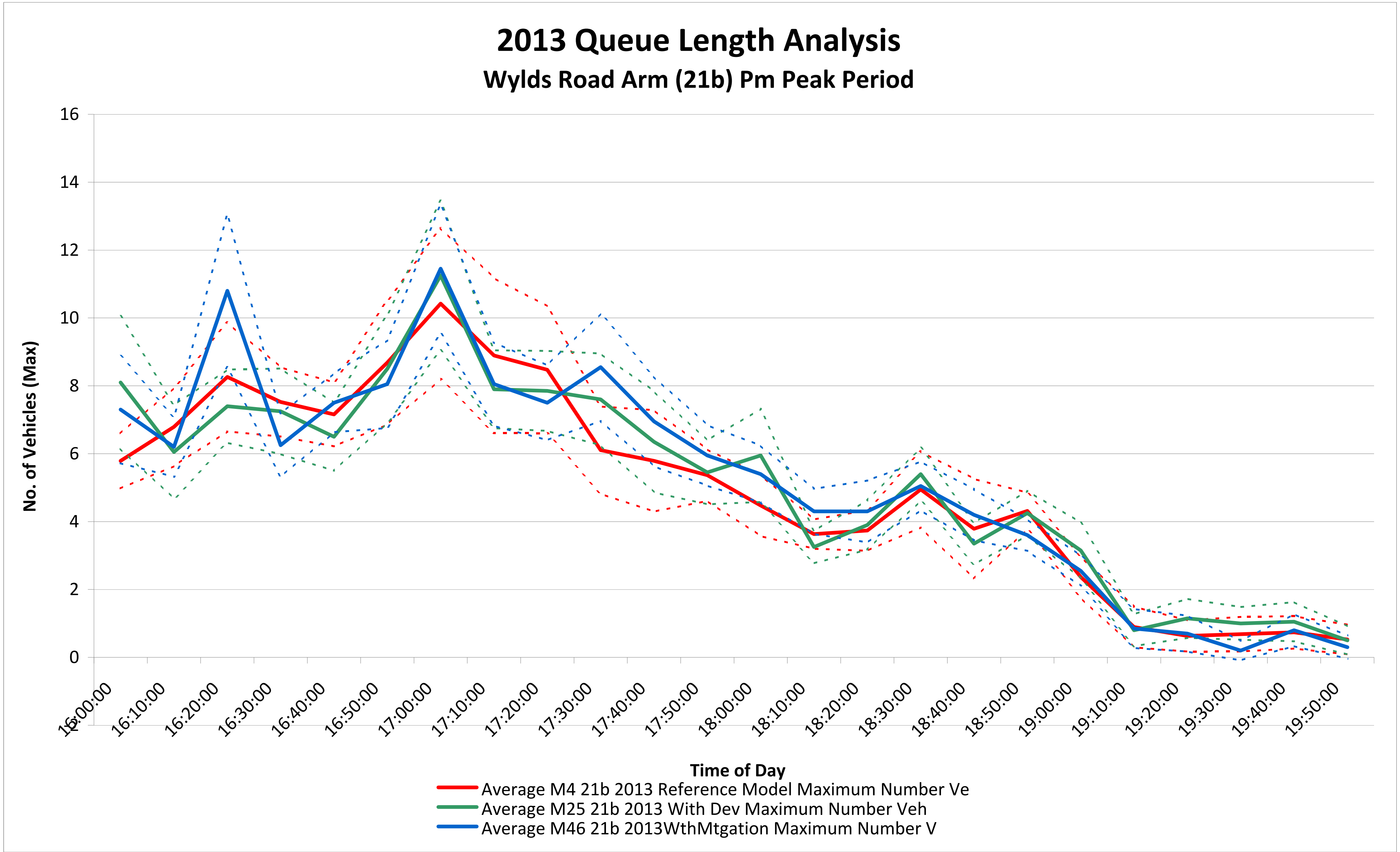


2013 Queue Length Analysis
A38 North Arm (21a) PM Peak Analysis
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 21a 2013 Reference Model Maximum Number Ve
Average M25 21a 2013 With Dev Maximum Number Veh
Average M46 21a 2013WthMtgation Maximum Number V

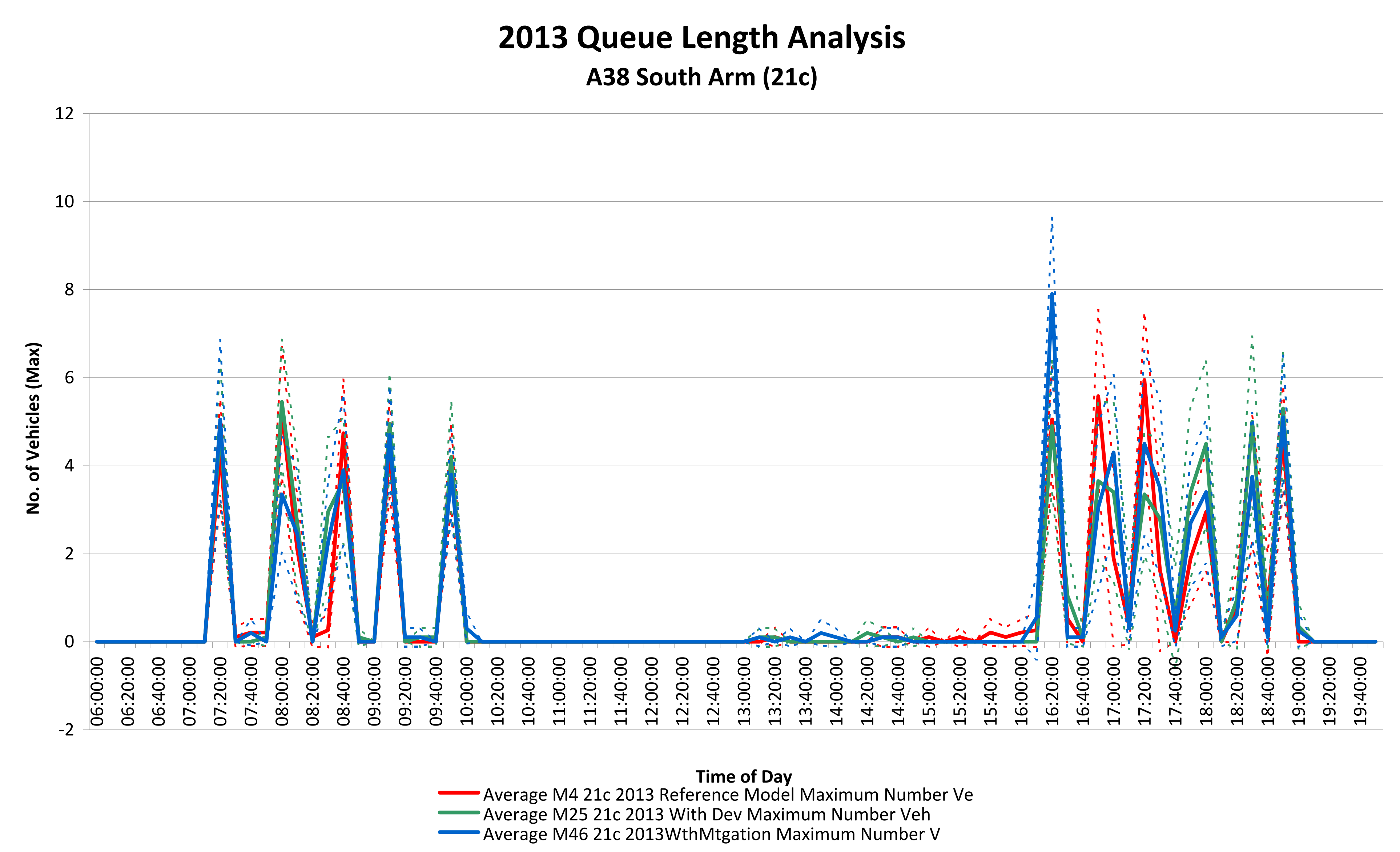


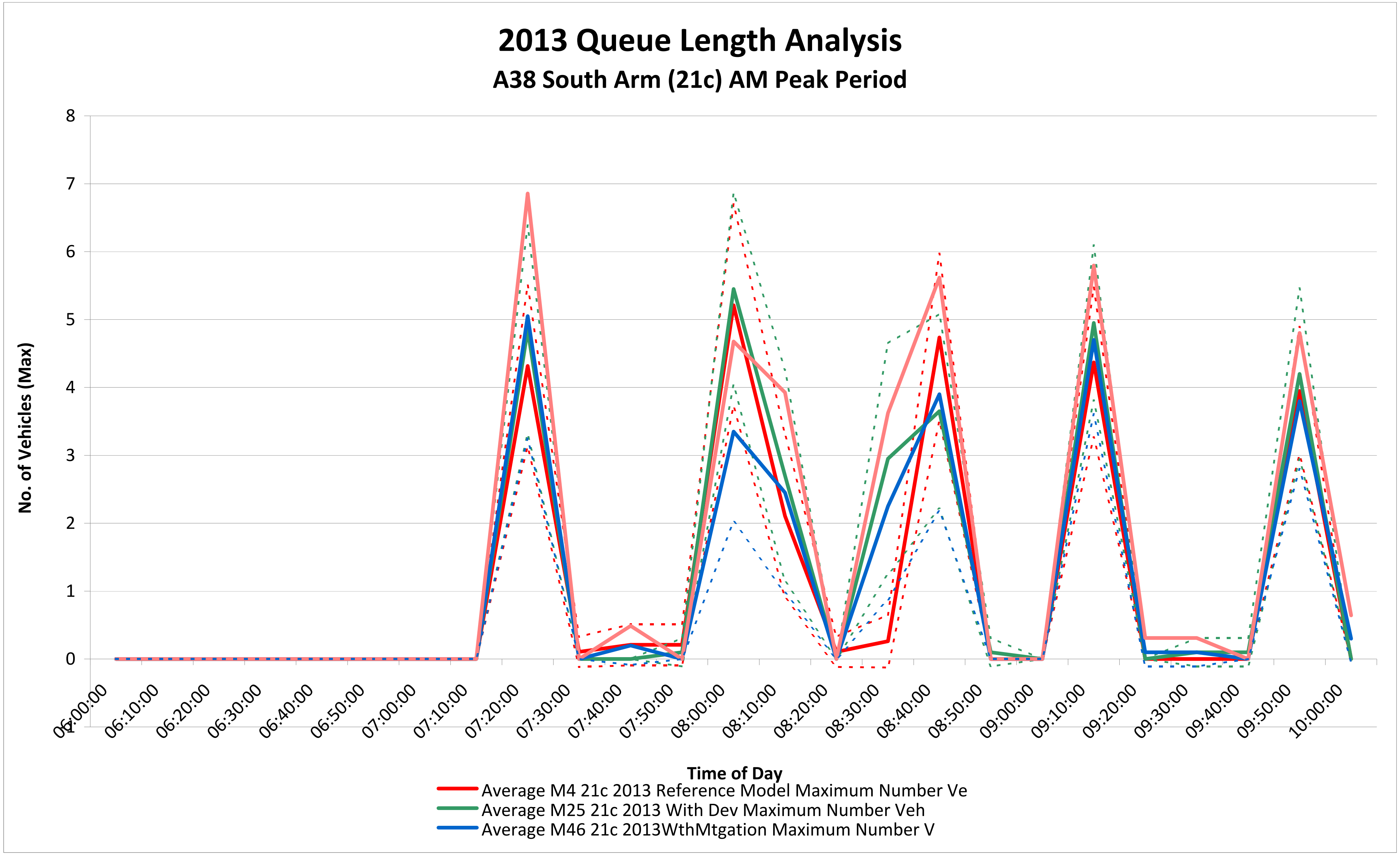
2013 Queue Length Analysis
Wylds Road Arm (21b)
16
14
12
10
8
6
4
2
0
-2
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 21b 2013 Reference Model Maximum Number Ve
Average M25 21b 2013 With Dev Maximum Number Veh
Average M46 21b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Wylds Road Arm (21b) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 21b 2013 Reference Model Maximum Number Ve
Average M25 21b 2013 With Dev Maximum Number Veh
Average M46 21b 2013WthMtgation Maximum Number V

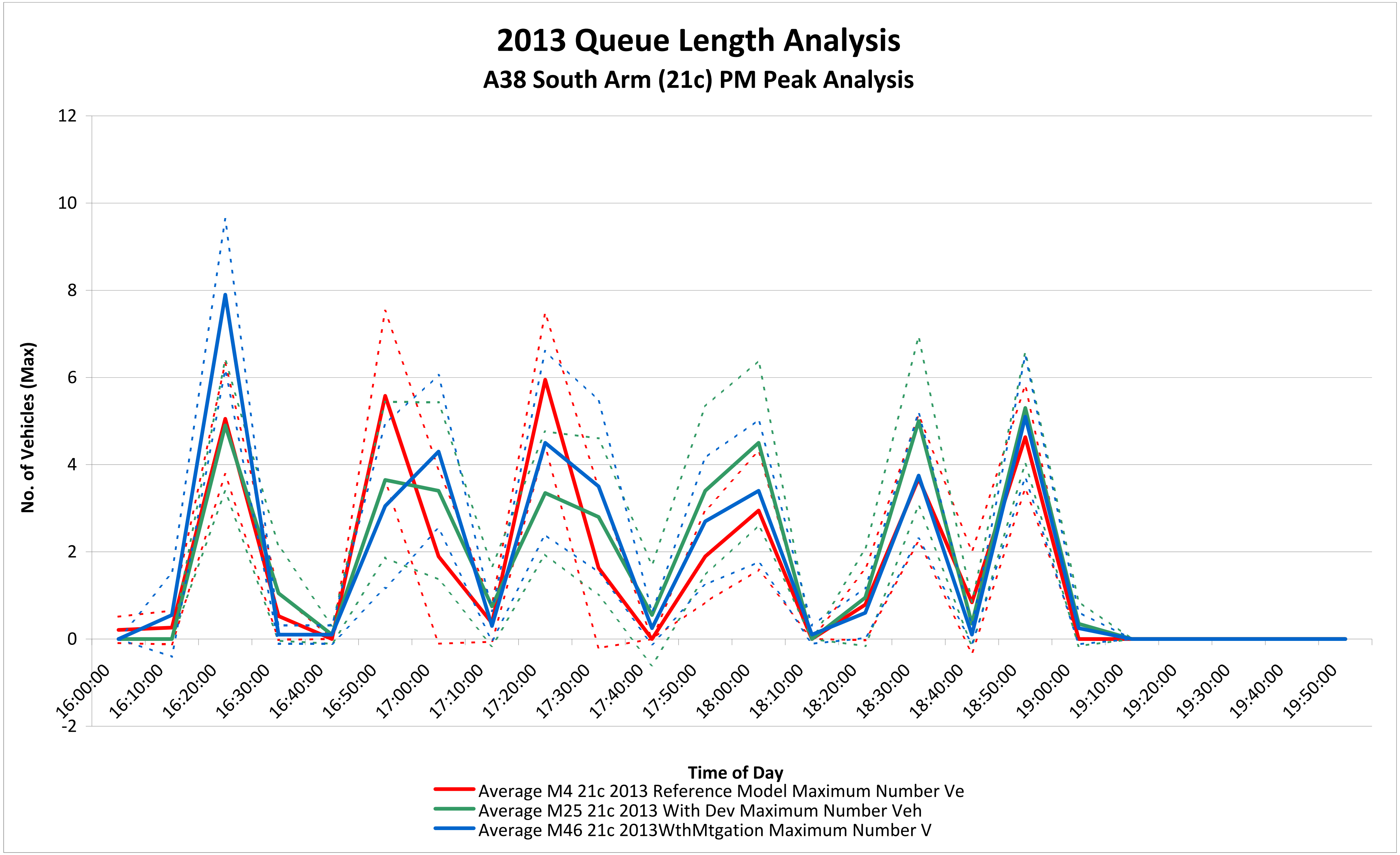


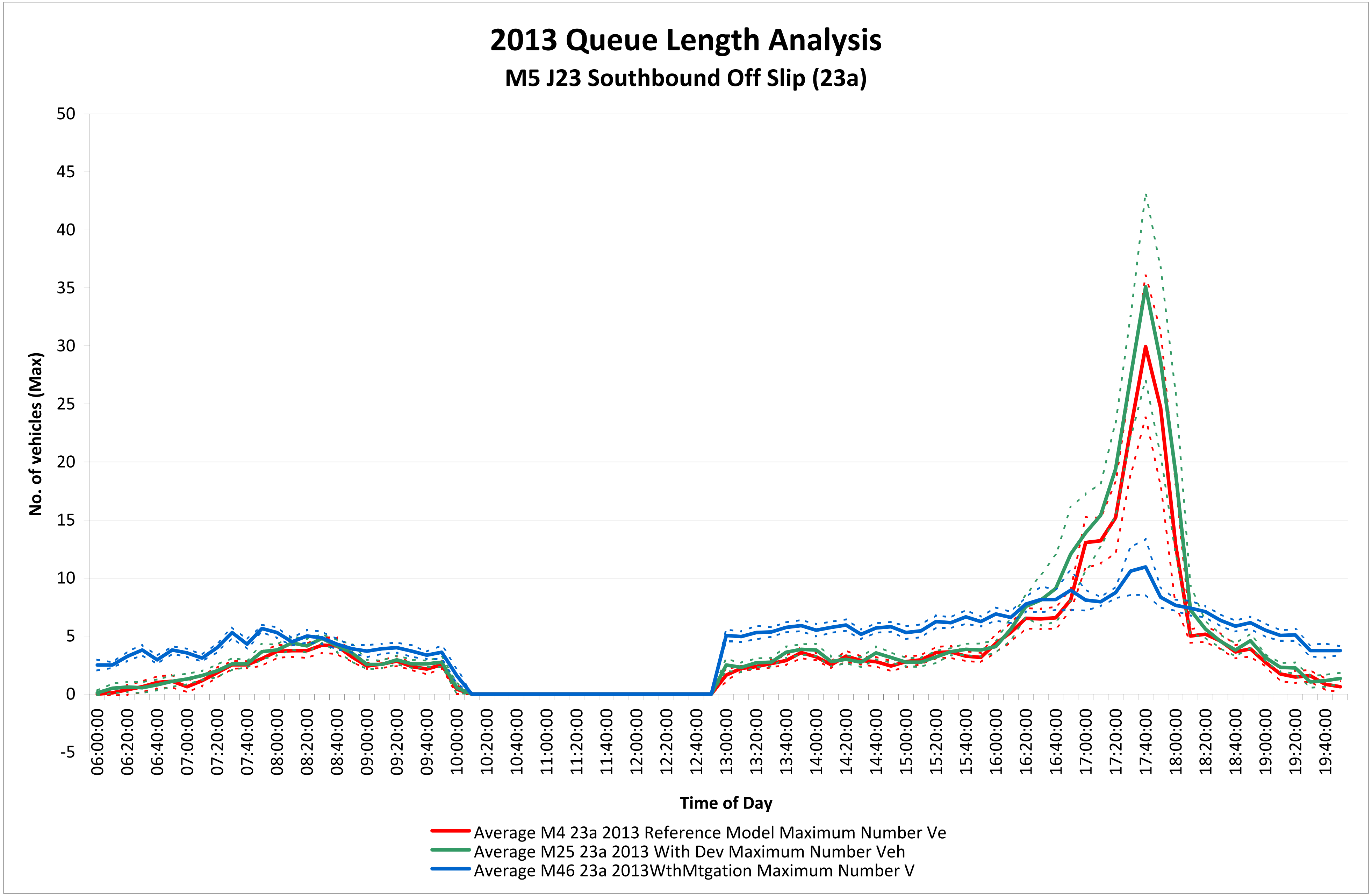
2013 Queue Length Analysis
Wylds Road Arm (21b) Pm Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 21b 2013 Reference Model Maximum Number Ve
Average M25 21b 2013 With Dev Maximum Number Veh
Average M46 21b 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
A38 South Arm (21c)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 21c 2013 Reference Model Maximum Number Ve
Average M25 21c 2013 With Dev Maximum Number Veh
Average M46 21c 2013WthMtgation Maximum Number V

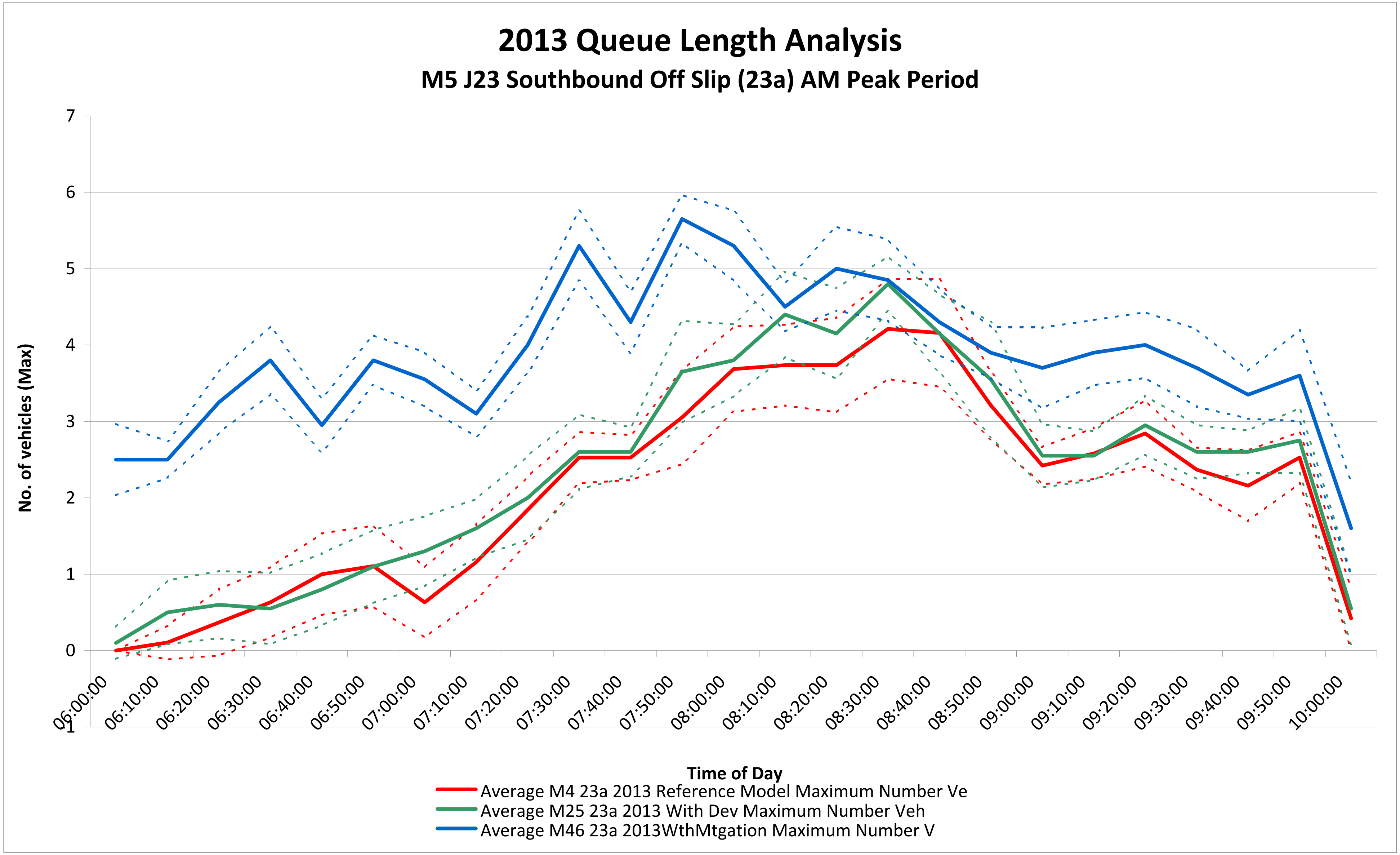


2013 Queue Length Analysis
A38 South Arm (21c) AM Peak Period
No. of Vehicles (Max)
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 21c 2013 Reference Model Maximum Number Ve
Average M25 21c 2013 With Dev Maximum Number Veh
Average M46 21c 2013WthMtgation Maximum Number V

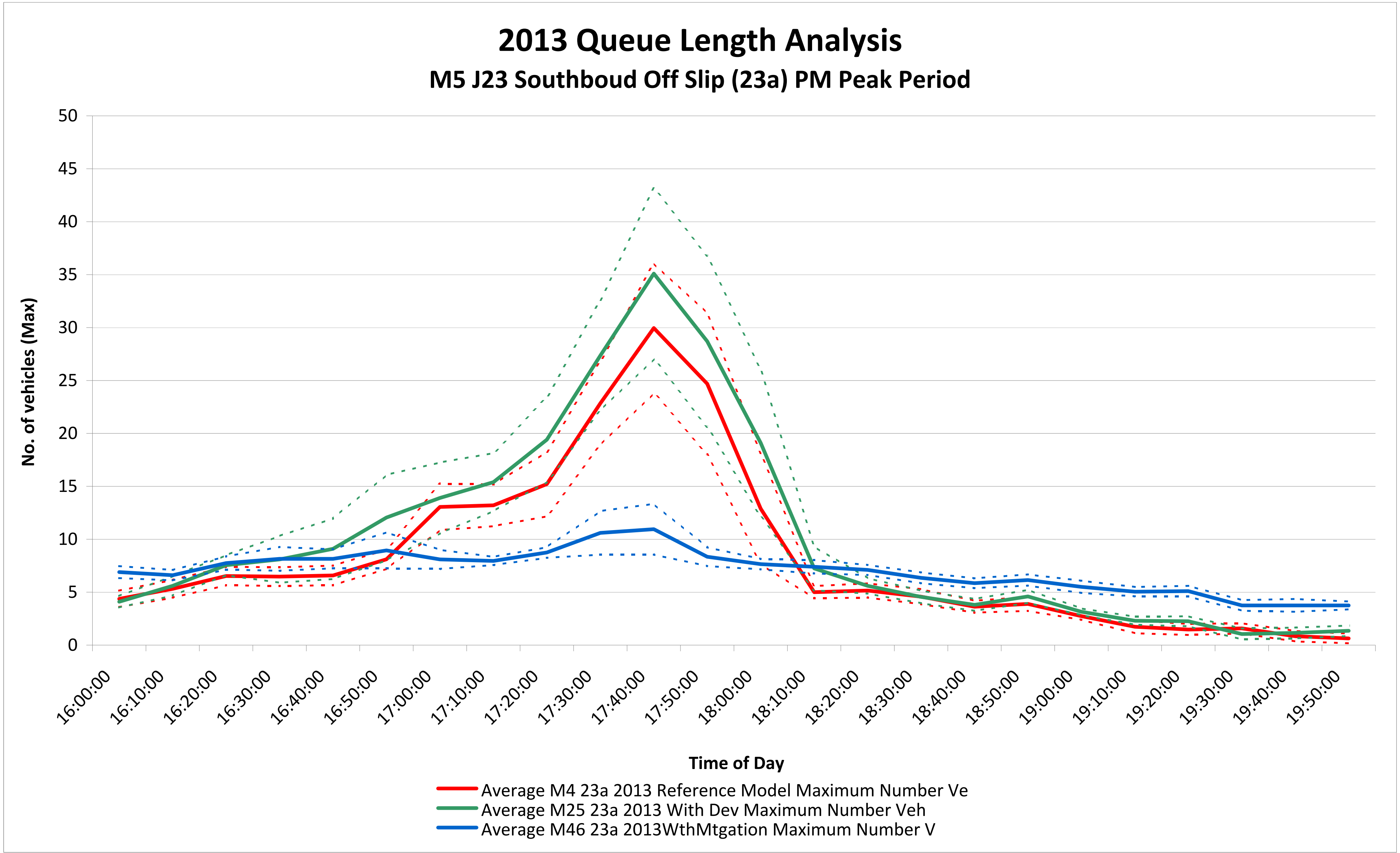

2013 Queue Length Analysis
A38 South Arm (21c) PM Peak Analysis
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 21c 2013 Reference Model Maximum Number Ve
Average M25 21c 2013 With Dev Maximum Number Veh
Average M46 21c 2013WthMtgation Maximum Number V

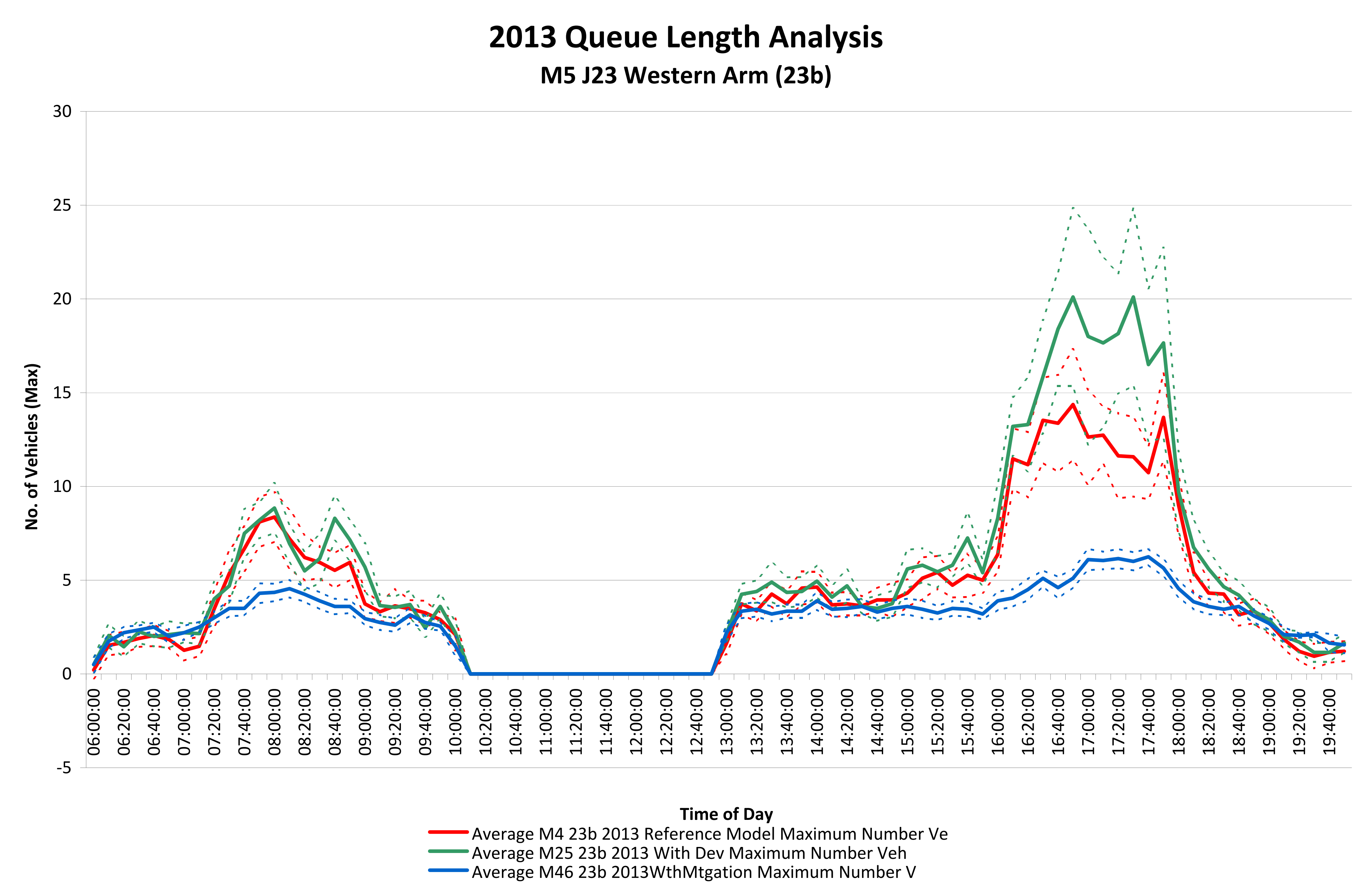


2013 Queue Length Analysis
M5 J23 Southbound Off Slip (23a)
No. of vehicles (Max)
50
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 23a 2013 Reference Model Maximum Number Ve
Average M25 23a 2013 With Dev Maximum Number Veh
Average M46 23a 2013WthMtgation Maximum Number V

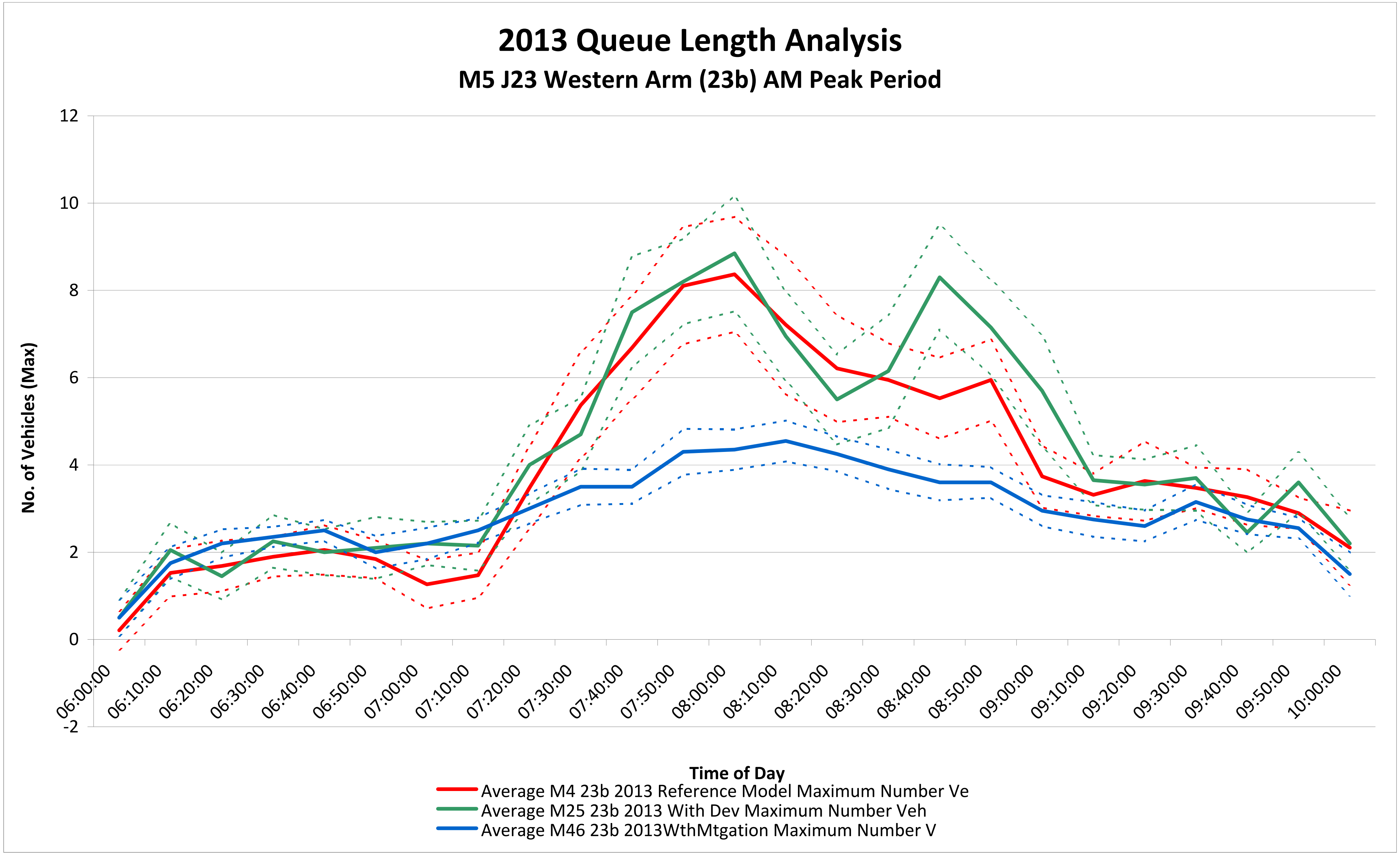


2013 Queue Length Analysis
M5 J23 Southbound Off Slip (23a) AM Peak Period
No. of vehicles (Max)
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 23a 2013 Reference Model Maximum Number Ve
Average M25 23a 2013 With Dev Maximum Number Veh
Average M46 23a 2013WthMtgation Maximum Number V

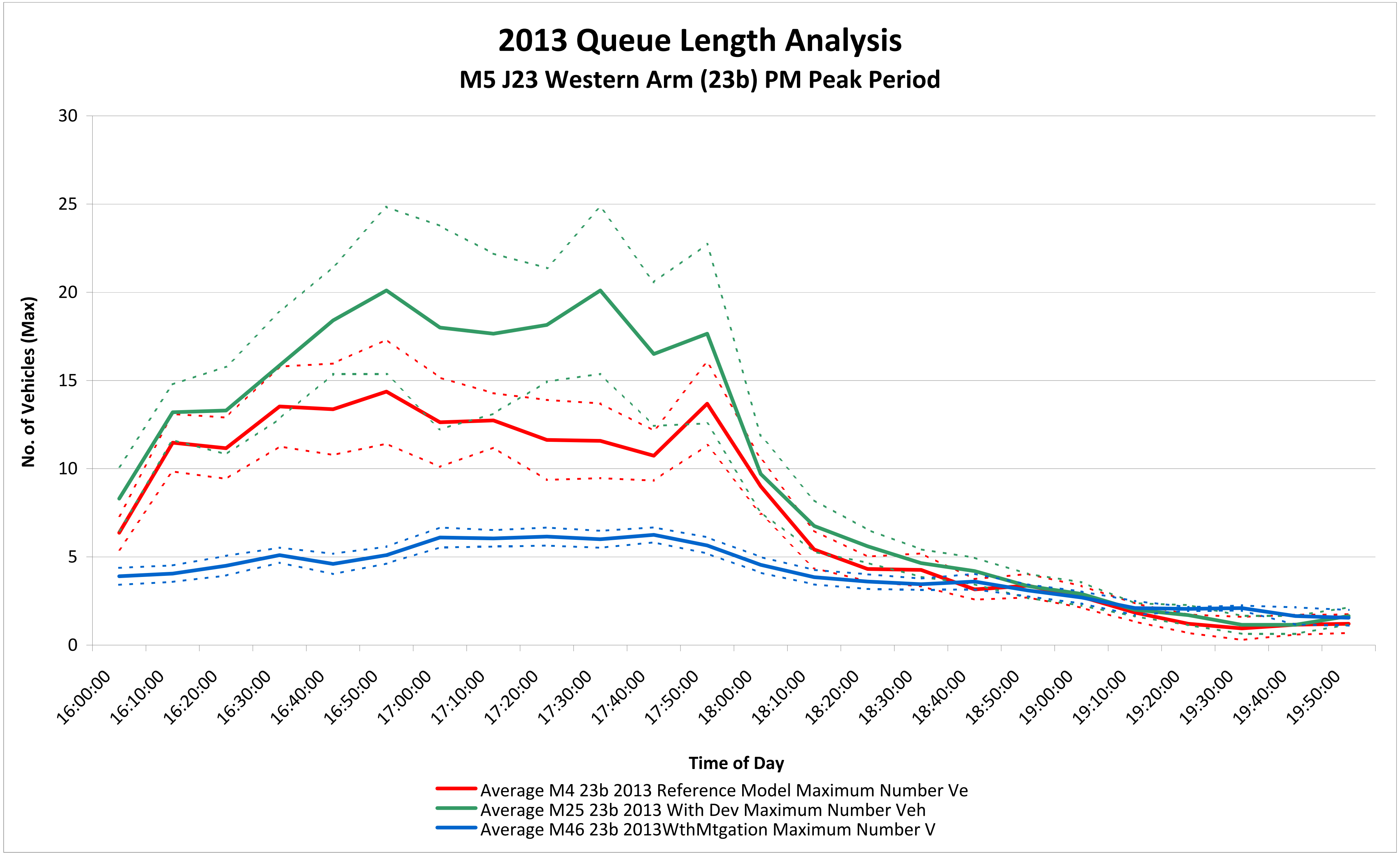

2013 Queue Length Analysis
M5 J23 Southboud Off Slip (23a) PM Peak Period
50
45
40
35
30
25
20
15
10
5
0
No. of vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 23a 2013 Reference Model Maximum Number Ve
Average M25 23a 2013 With Dev Maximum Number Veh
Average M46 23a 2013WthMtgation Maximum Number V



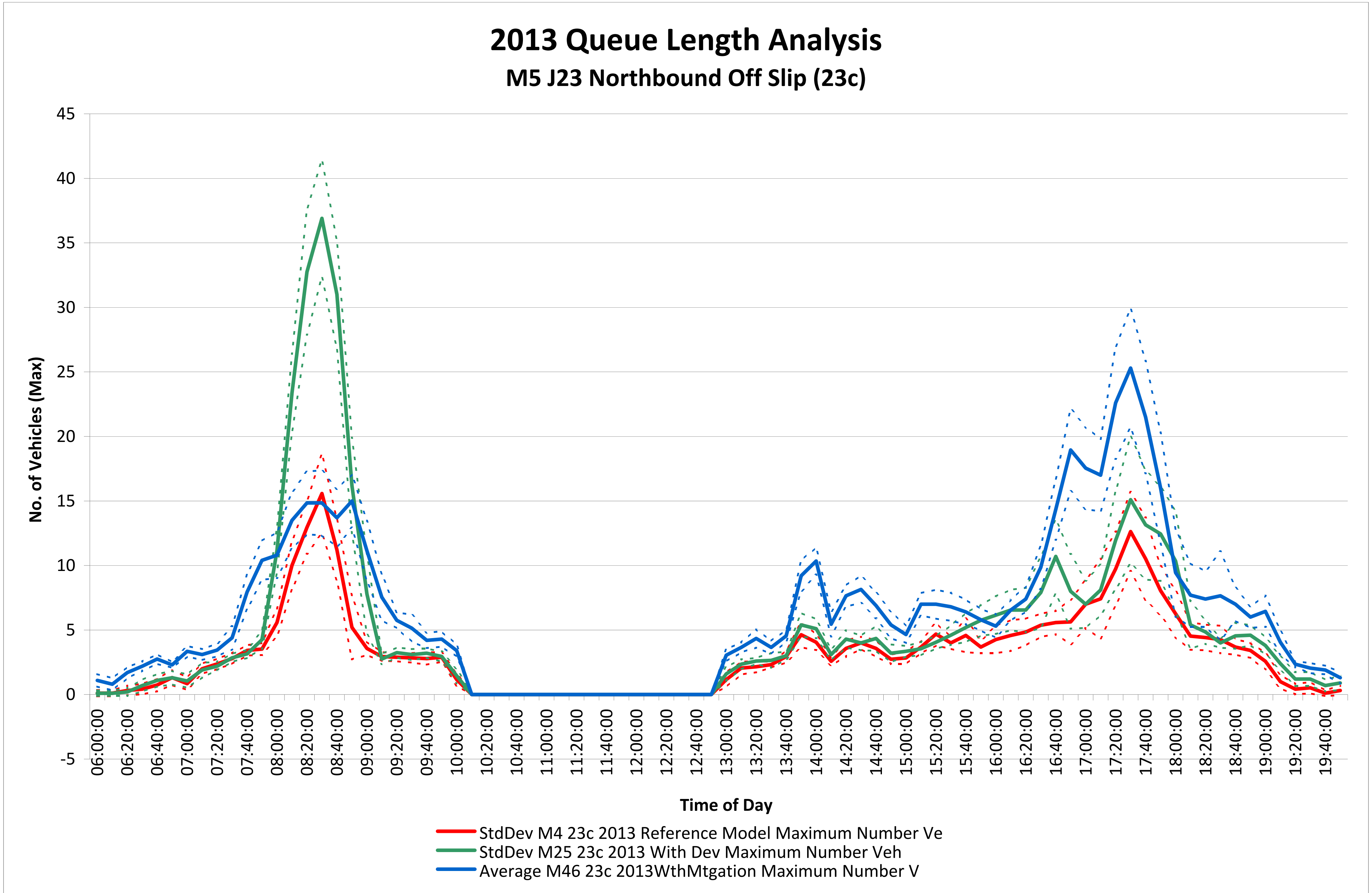
2013 Queue Length Analysis
M5 J23 Western Arm (23b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 23b 2013 Reference Model Maximum Number Ve
Average M25 23b 2013 With Dev Maximum Number Veh
Average M46 23b 2013WthMtgation Maximum Number V



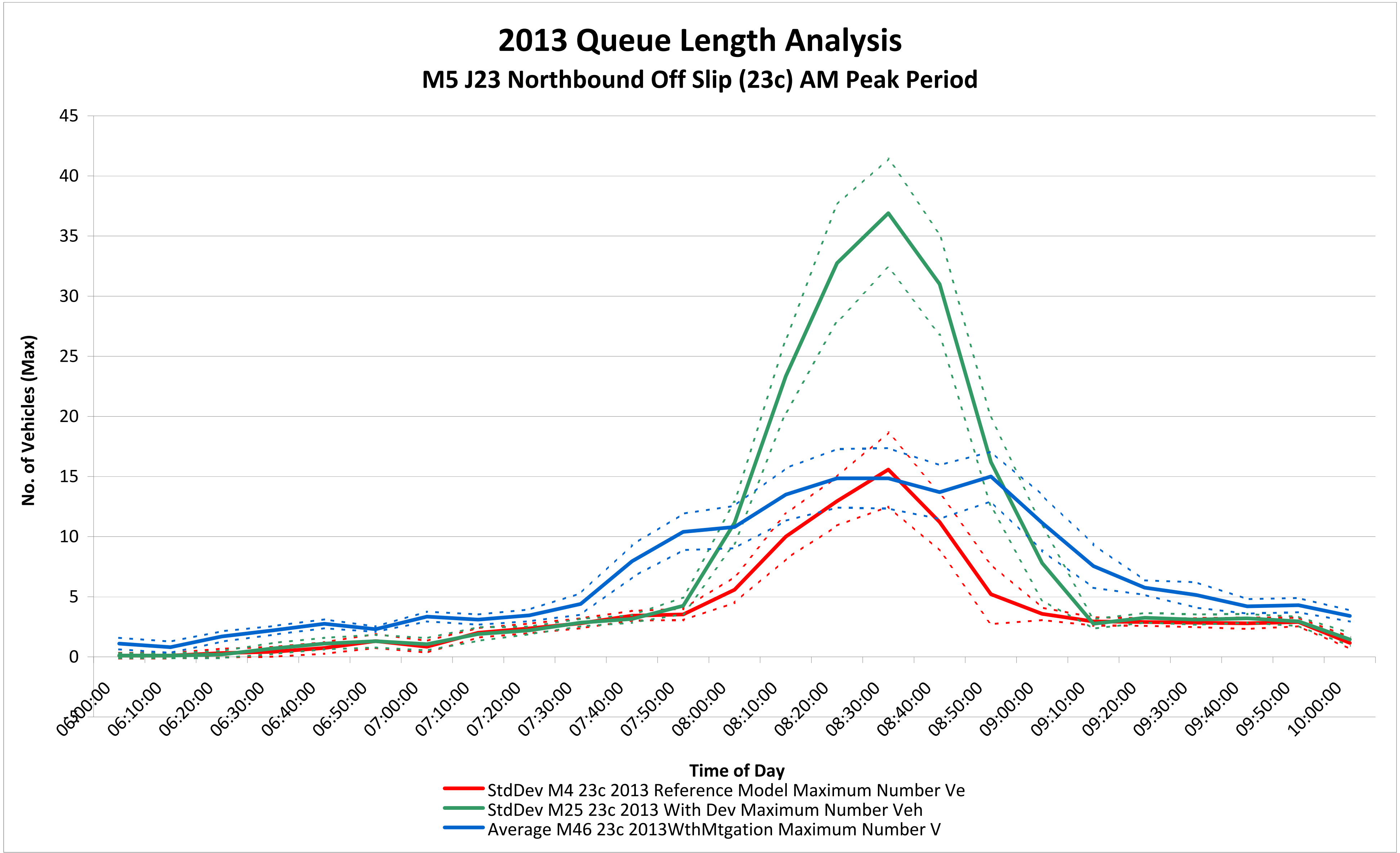
2013 Queue Length Analysis
M5 J23 Western Arm (23b) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 23b 2013 Reference Model Maximum Number Ve
Average M25 23b 2013 With Dev Maximum Number Veh
Average M46 23b 2013WthMtgation Maximum Number V



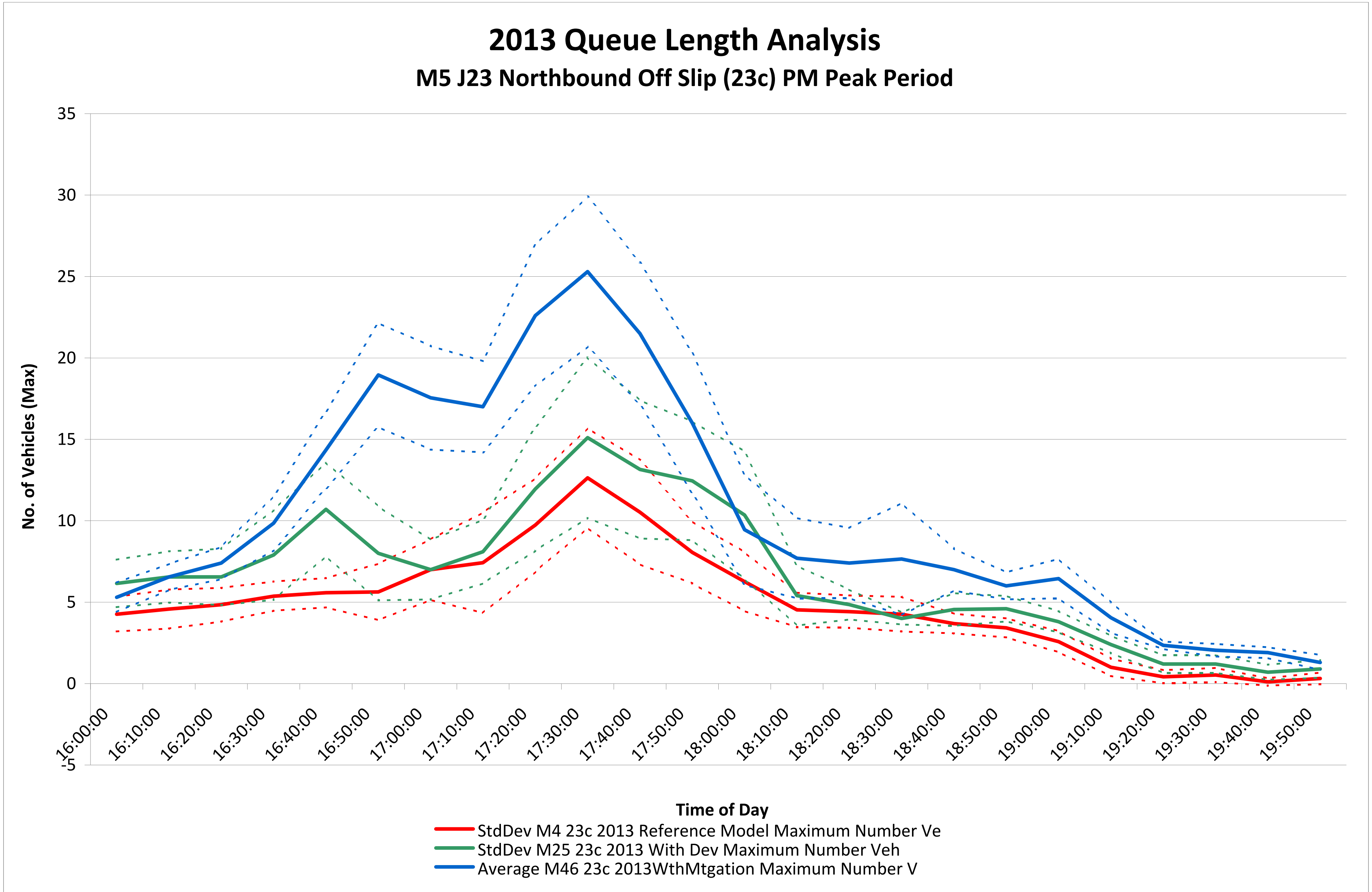
2013 Queue Length Analysis
M5 J23 Western Arm (23b) PM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 23b 2013 Reference Model Maximum Number Ve
Average M25 23b 2013 With Dev Maximum Number Veh
Average M46 23b 2013WthMtgation Maximum Number V

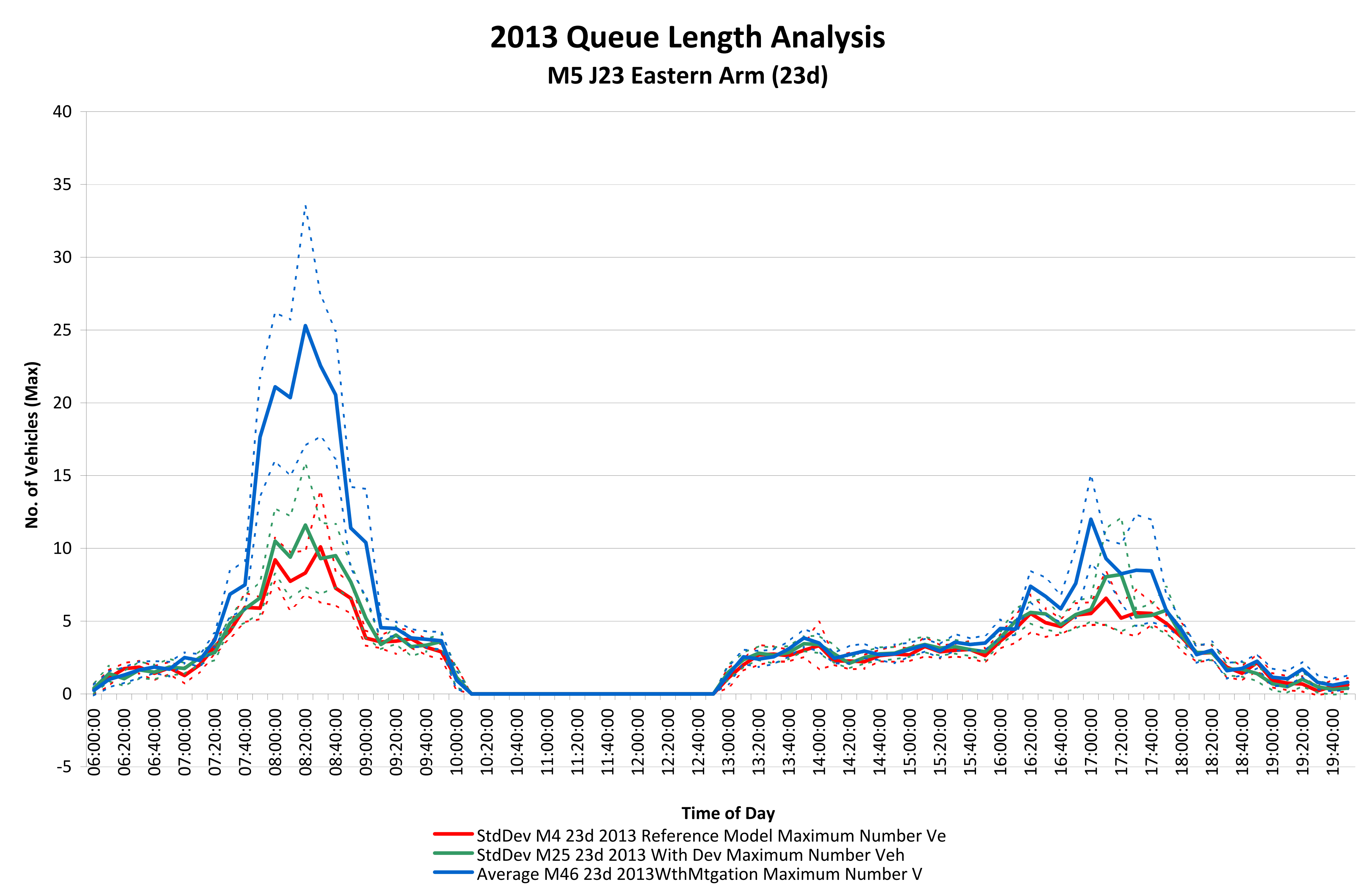


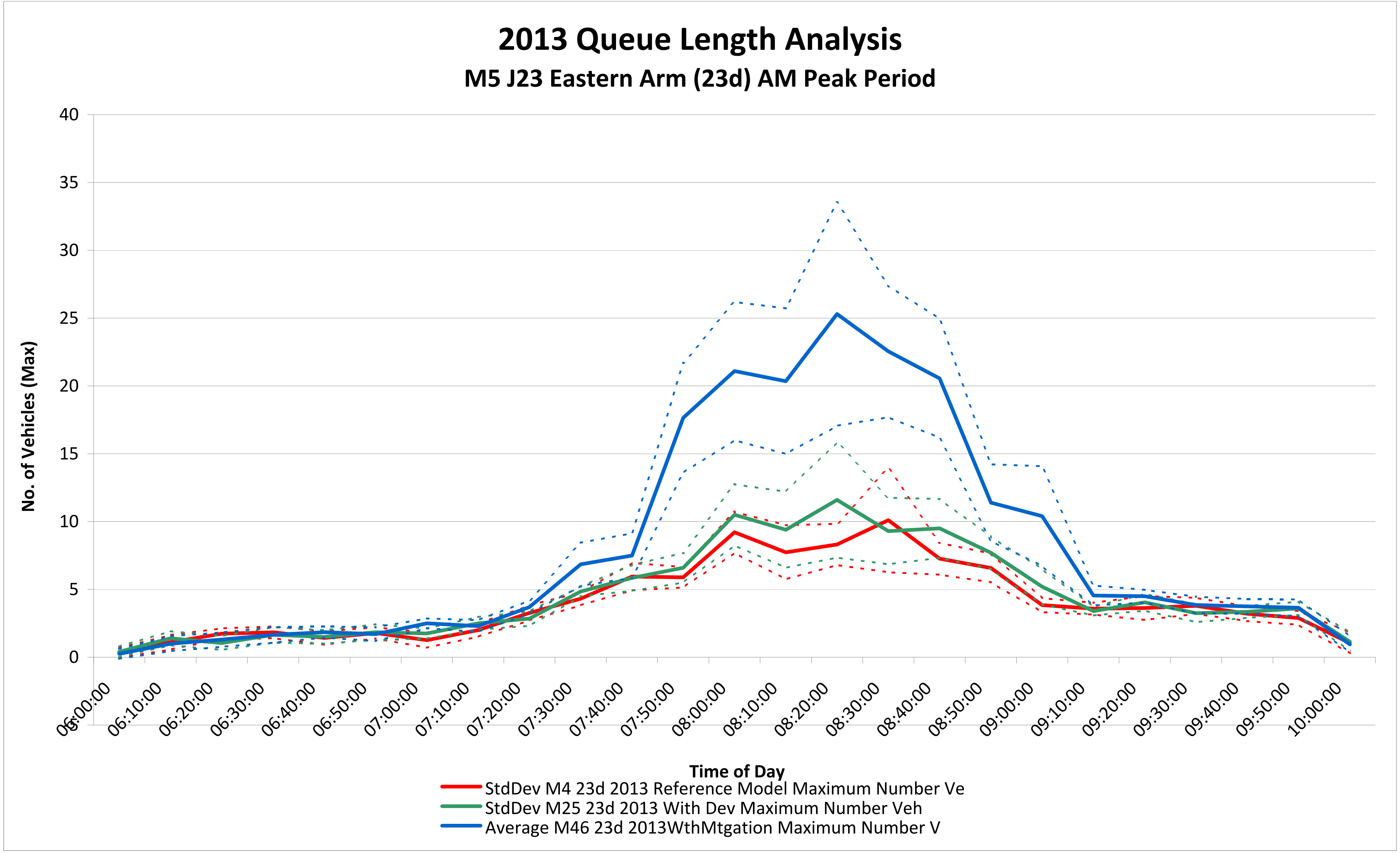
2013 Queue Length Analysis
M5 J23 Northbound Off Slip (23c)
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 23c 2013 Reference Model Maximum Number Ve
StdDev M25 23c 2013 With Dev Maximum Number Veh
Average M46 23c 2013WthMtgation Maximum Number V



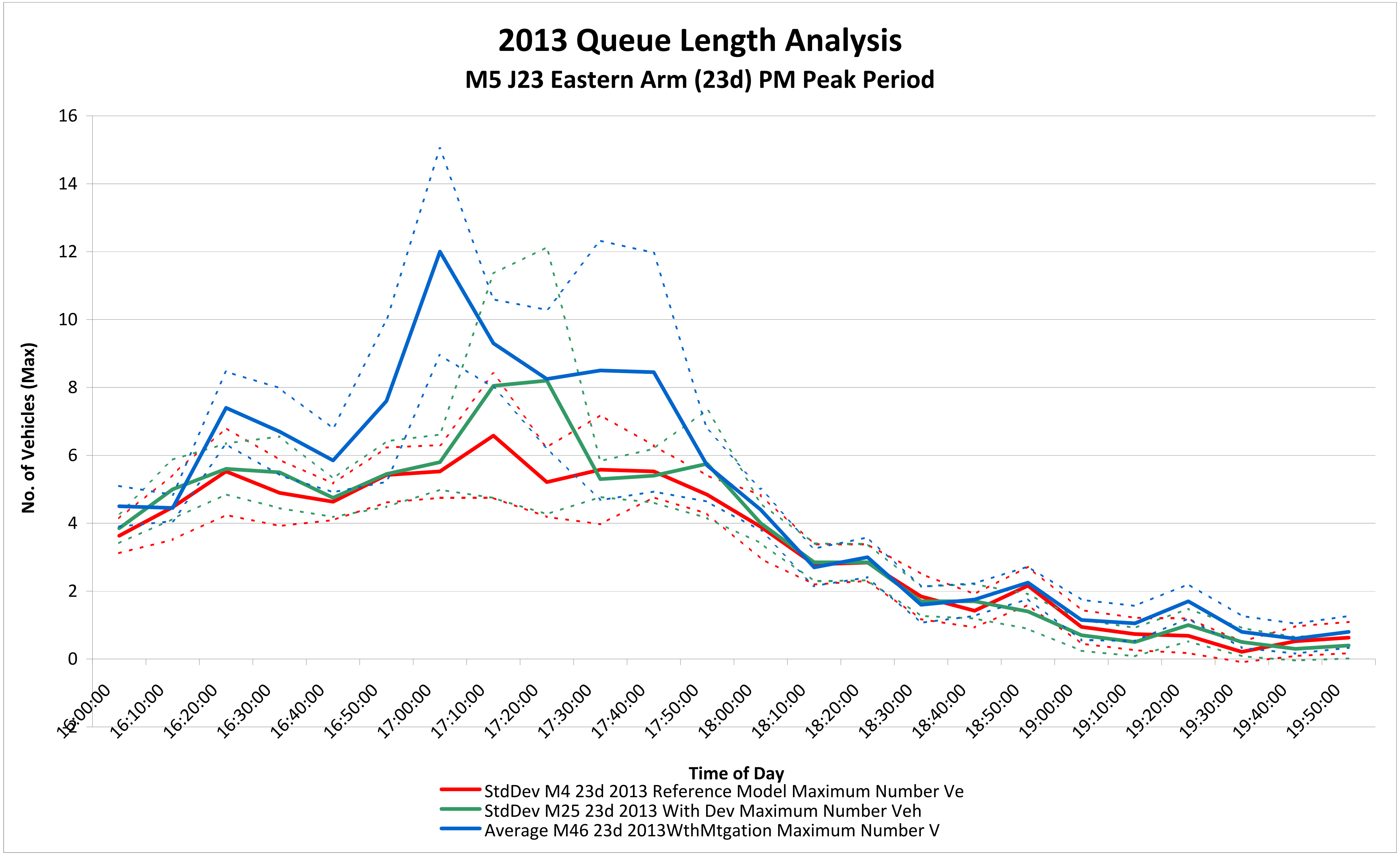
2013 Queue Length Analysis
M5 J23 Northbound Off Slip (23c) AM Peak Period
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 23c 2013 Reference Model Maximum Number Ve
StdDev M25 23c 2013 With Dev Maximum Number Veh
Average M46 23c 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
M5 J23 Northbound Off Slip (23c) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 23c 2013 Reference Model Maximum Number Ve
StdDev M25 23c 2013 With Dev Maximum Number Veh
Average M46 23c 2013WthMtgation Maximum Number V

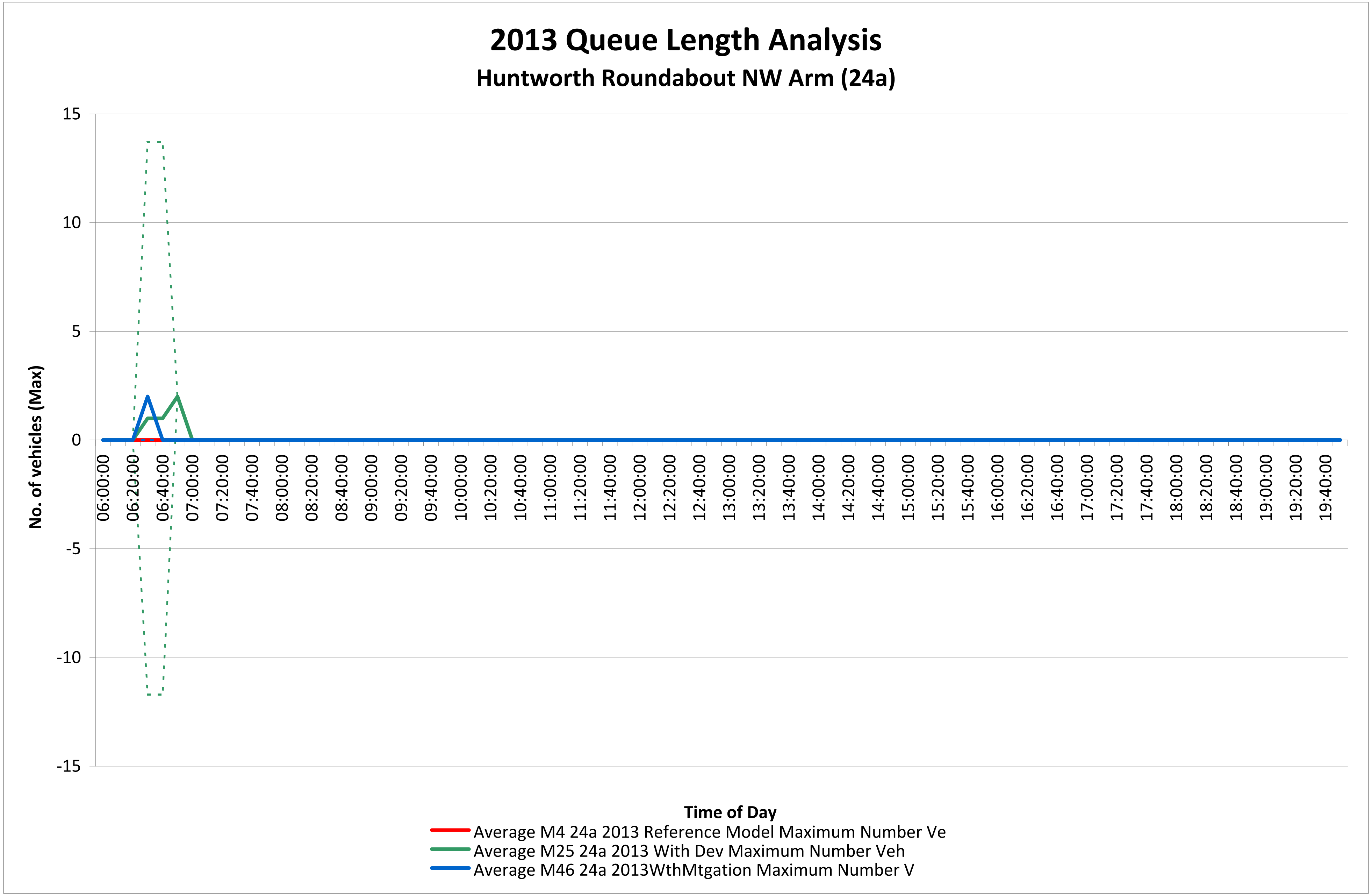

2013 Queue Length Analysis
M5 J23 Eastern Arm (23d)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 23d 2013 Reference Model Maximum Number Ve
StdDev M25 23d 2013 With Dev Maximum Number Veh
Average M46 23d 2013WthMtgation Maximum Number V

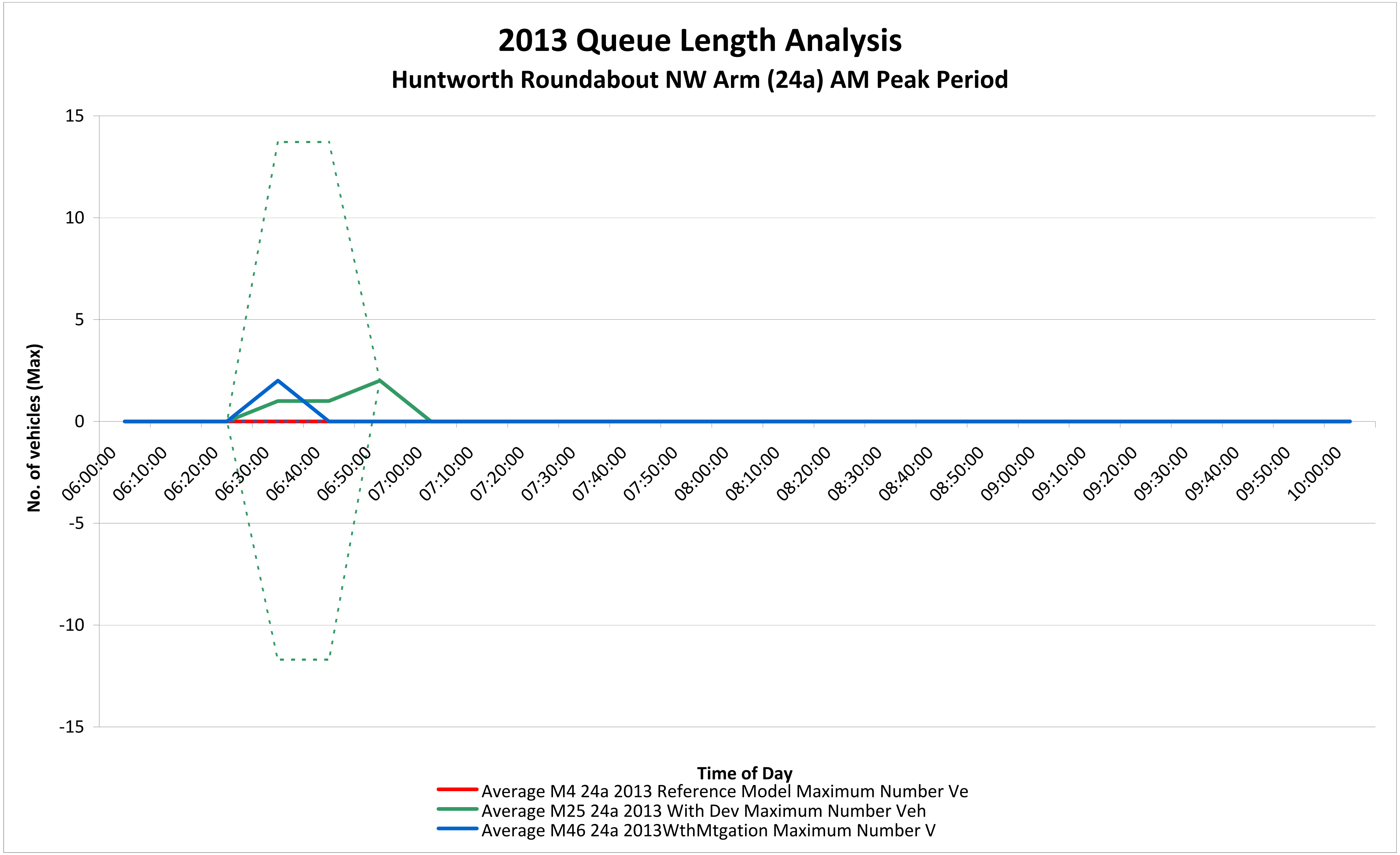


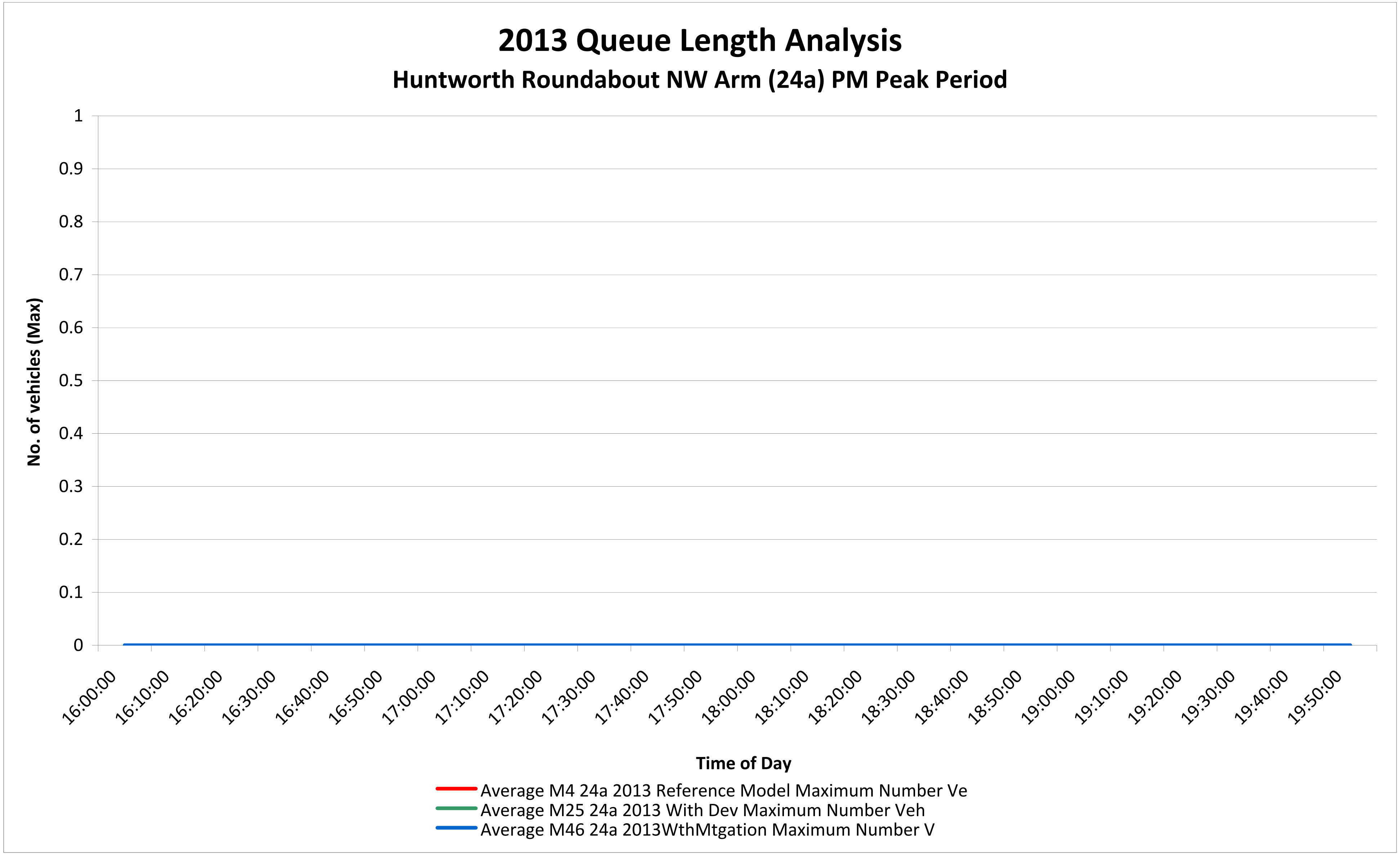
2013 Queue Length Analysis
M5 J23 Eastern Arm (23d) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 23d 2013 Reference Model Maximum Number Ve
StdDev M25 23d 2013 With Dev Maximum Number Veh
Average M46 23d 2013WthMtgation Maximum Number V



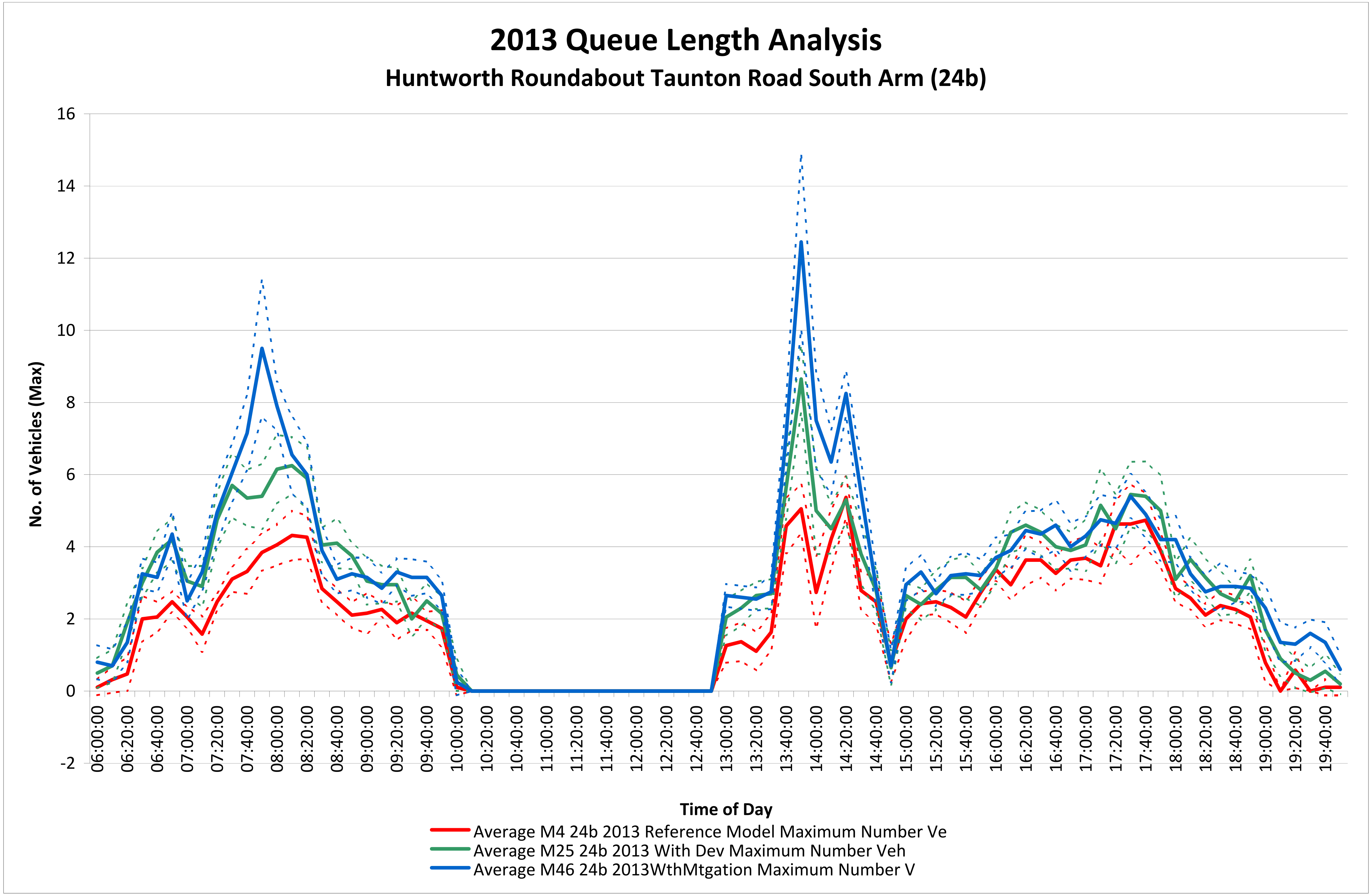
2013 Queue Length Analysis
M5 J23 Eastern Arm (23d) PM Peak Period
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 23d 2013 Reference Model Maximum Number Ve
StdDev M25 23d 2013 With Dev Maximum Number Veh
Average M46 23d 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
Huntworth Roundabout NW Arm (24a)
No. of vehicles (Max)
15
10
5
0
-5
-10
-15
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 24a 2013 Reference Model Maximum Number Ve
Average M25 24a 2013 With Dev Maximum Number Veh
Average M46 24a 2013WthMtgation Maximum Number V

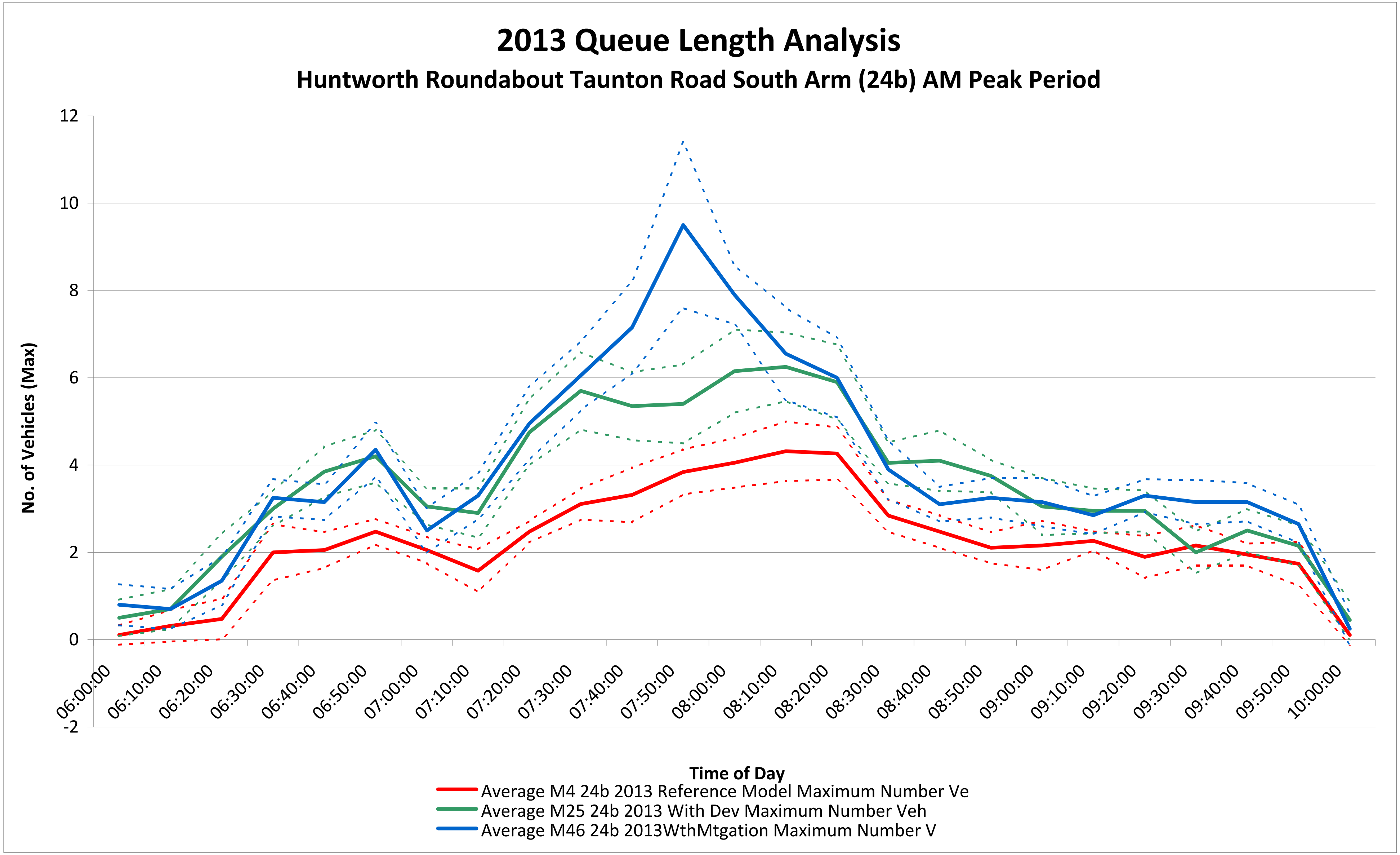

2013 Queue Length Analysis
Huntworth Roundabout NW Arm (24a) AM Peak Period
No. of vehicles (Max)
15
10
5
0
-5
-10
-15
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24a 2013 Reference Model Maximum Number Ve
Average M25 24a 2013 With Dev Maximum Number Veh
Average M46 24a 2013WthMtgation Maximum Number V

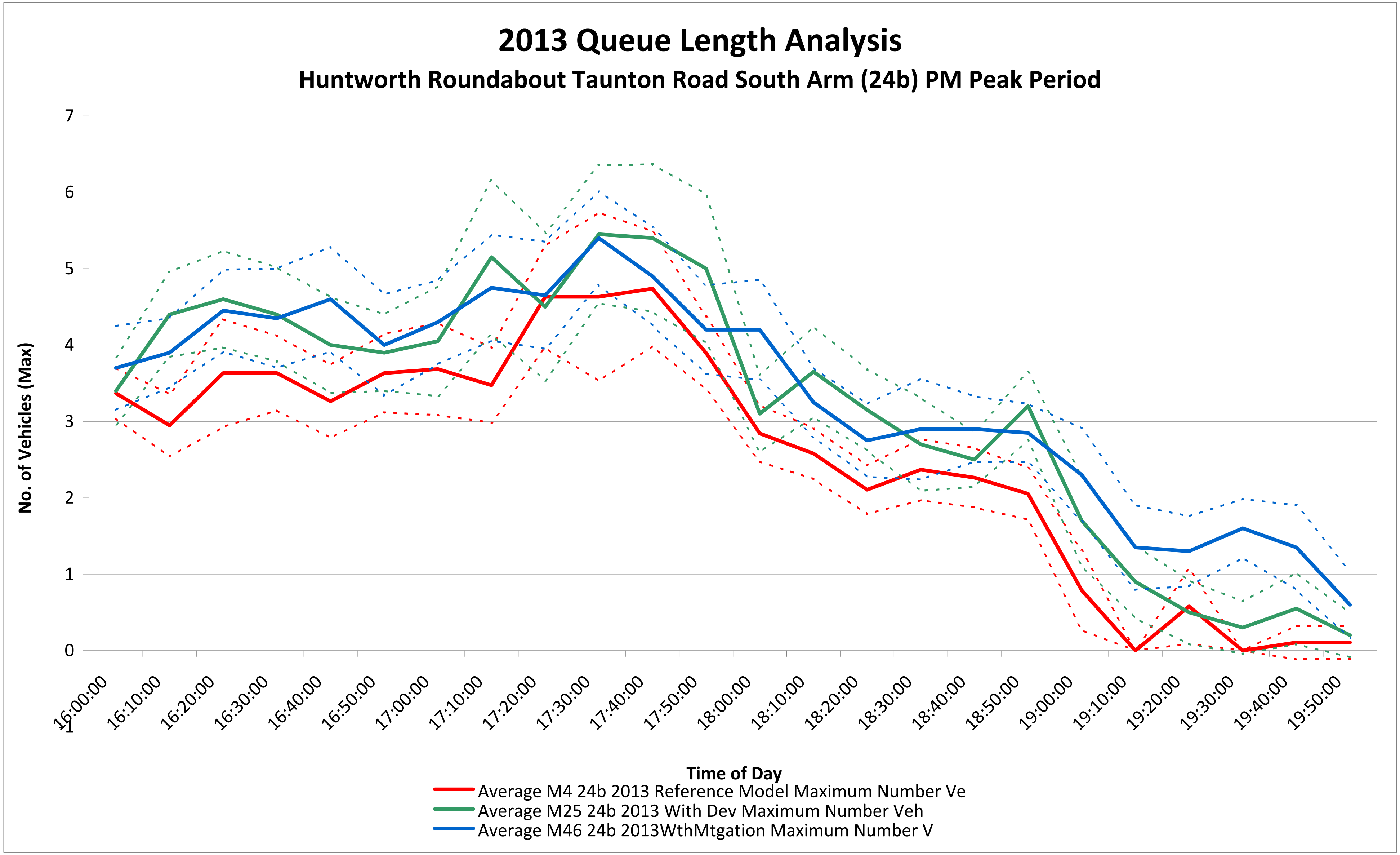


2013 Queue Length Analysis
Huntworth Roundabout NW Arm (24a) PM Peak Period
No. of vehicles (Max)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 24a 2013 Reference Model Maximum Number Ve
Average M25 24a 2013 With Dev Maximum Number Veh
Average M46 24a 2013WthMtgation Maximum Number V

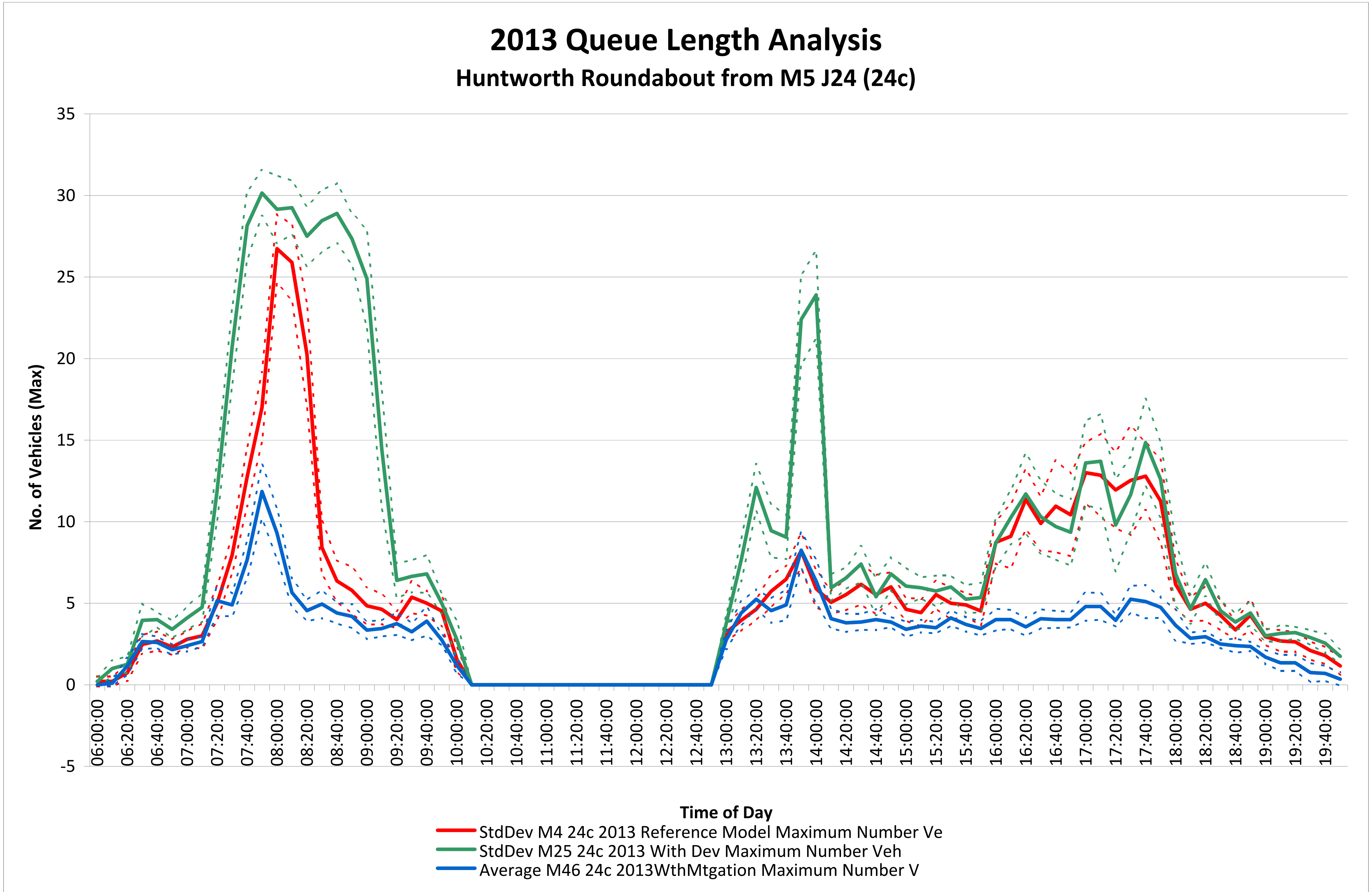


2013 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 24b 2013 Reference Model Maximum Number Ve
Average M25 24b 2013 With Dev Maximum Number Veh
Average M46 24b 2013WthMtgation Maximum Number V

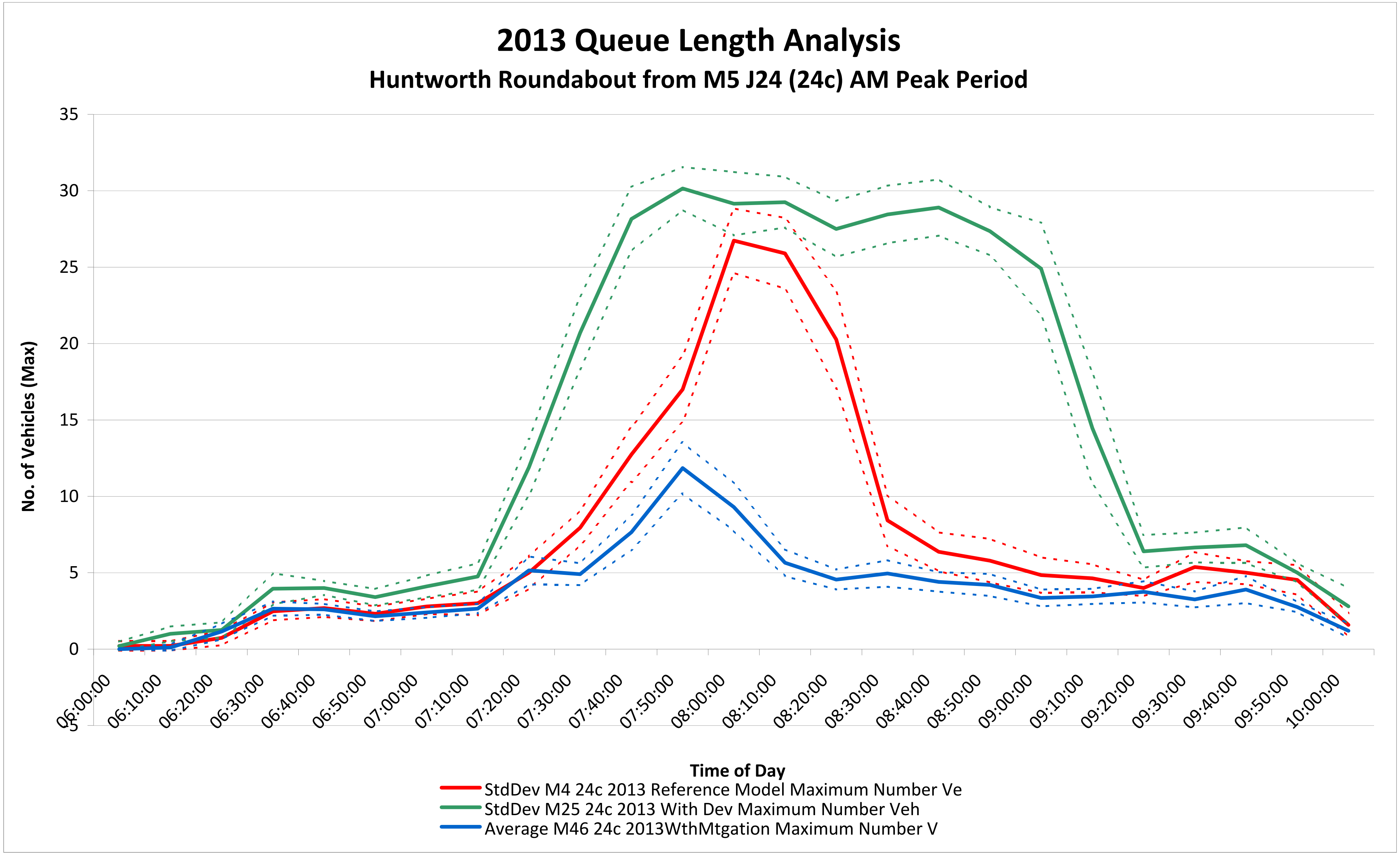

2013 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24b 2013 Reference Model Maximum Number Ve
Average M25 24b 2013 With Dev Maximum Number Veh
Average M46 24b 2013WthMtgation Maximum Number V



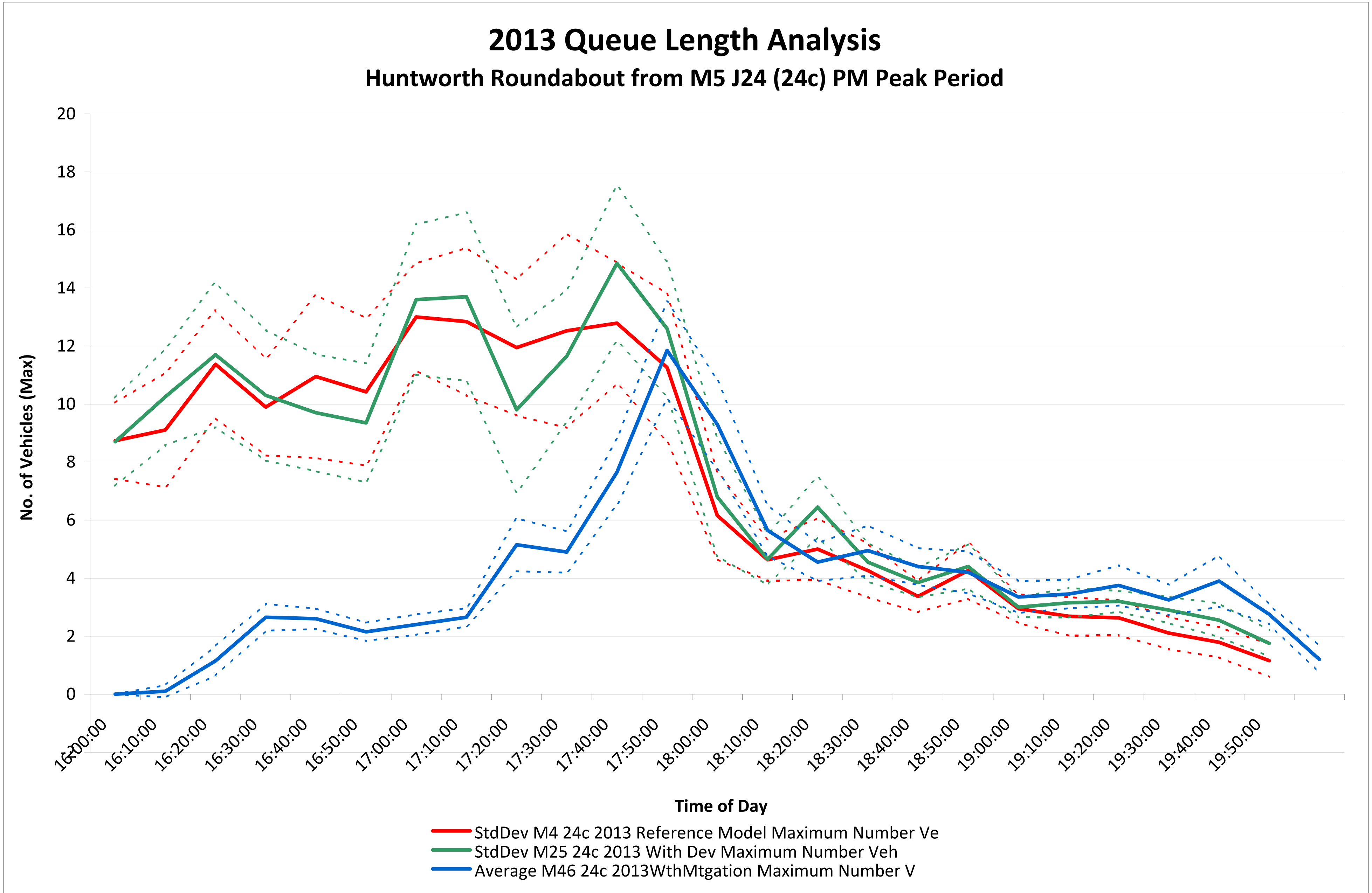
2013 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b) PM Peak Period
No. of Vehicles (Max)
7
6
5
4
3
2
1
0
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 24b 2013 Reference Model Maximum Number Ve
Average M25 24b 2013 With Dev Maximum Number Veh
Average M46 24b 2013WthMtgation Maximum Number V



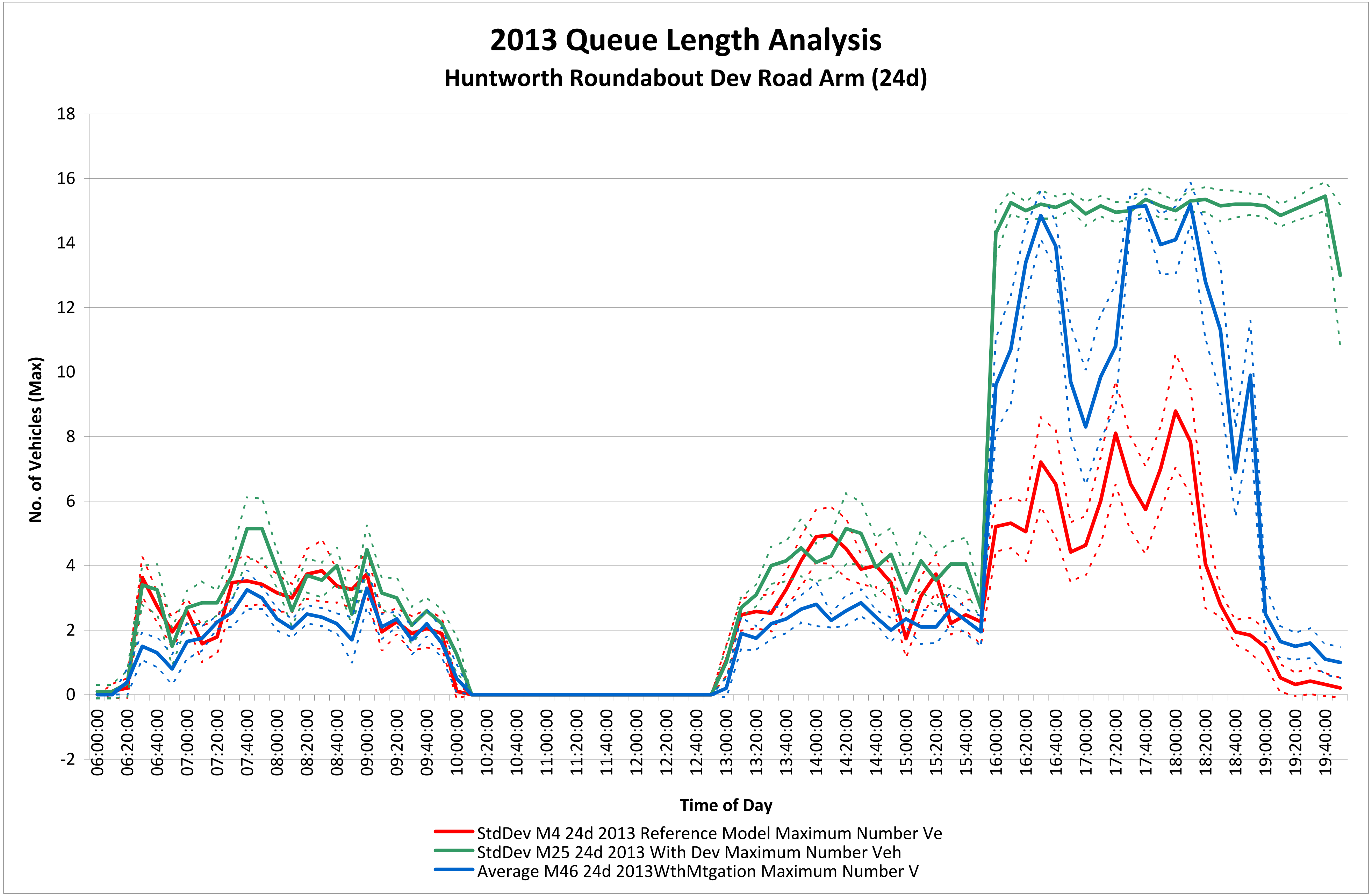
2013 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c)
35
30
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M4 24c 2013 Reference Model Maximum Number Ve
StdDev M25 24c 2013 With Dev Maximum Number Veh
Average M46 24c 2013WthMtgation Maximum Number V

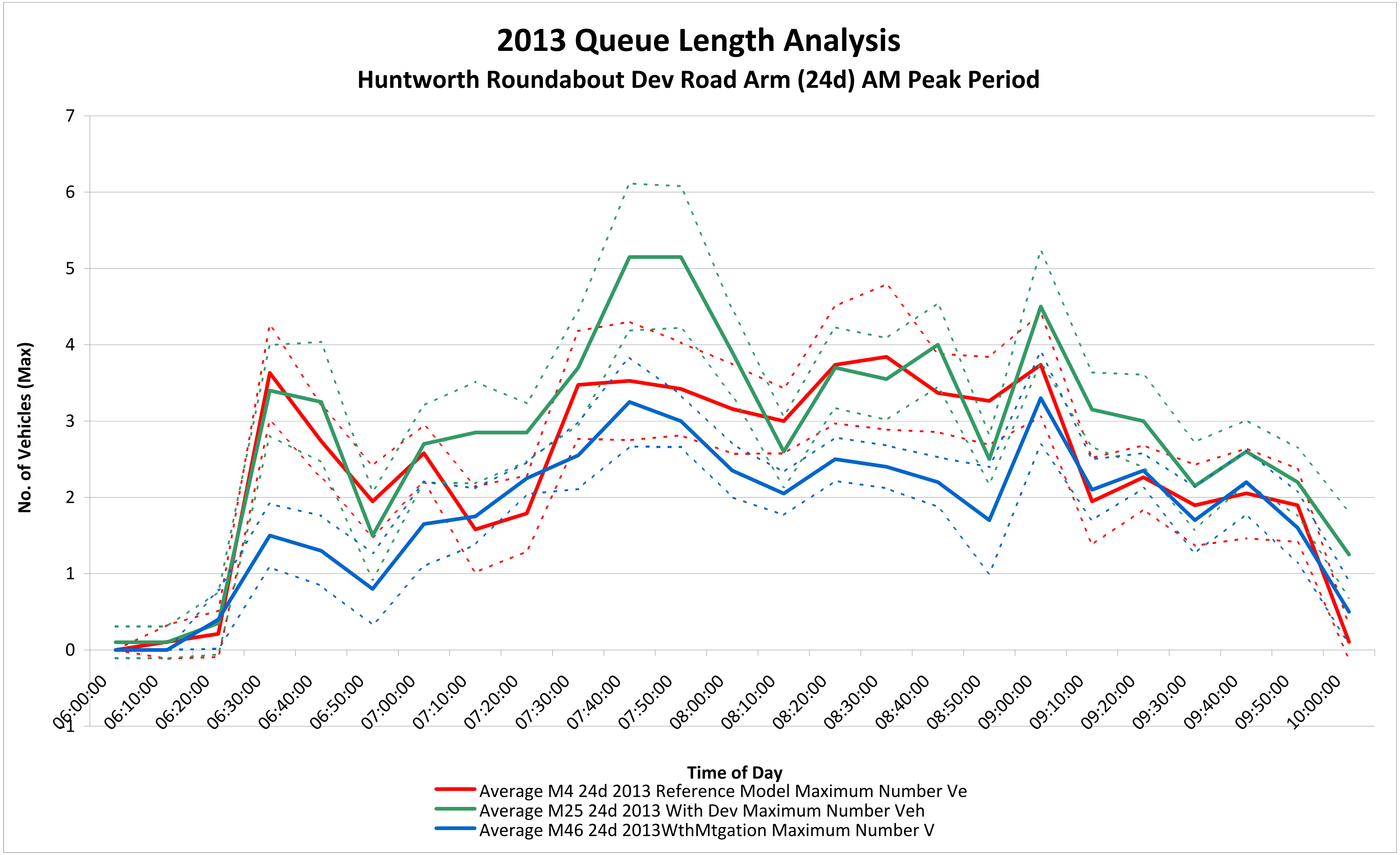


2013 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c) AM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M4 24c 2013 Reference Model Maximum Number Ve
StdDev M25 24c 2013 With Dev Maximum Number Veh
Average M46 24c 2013WthMtgation Maximum Number V

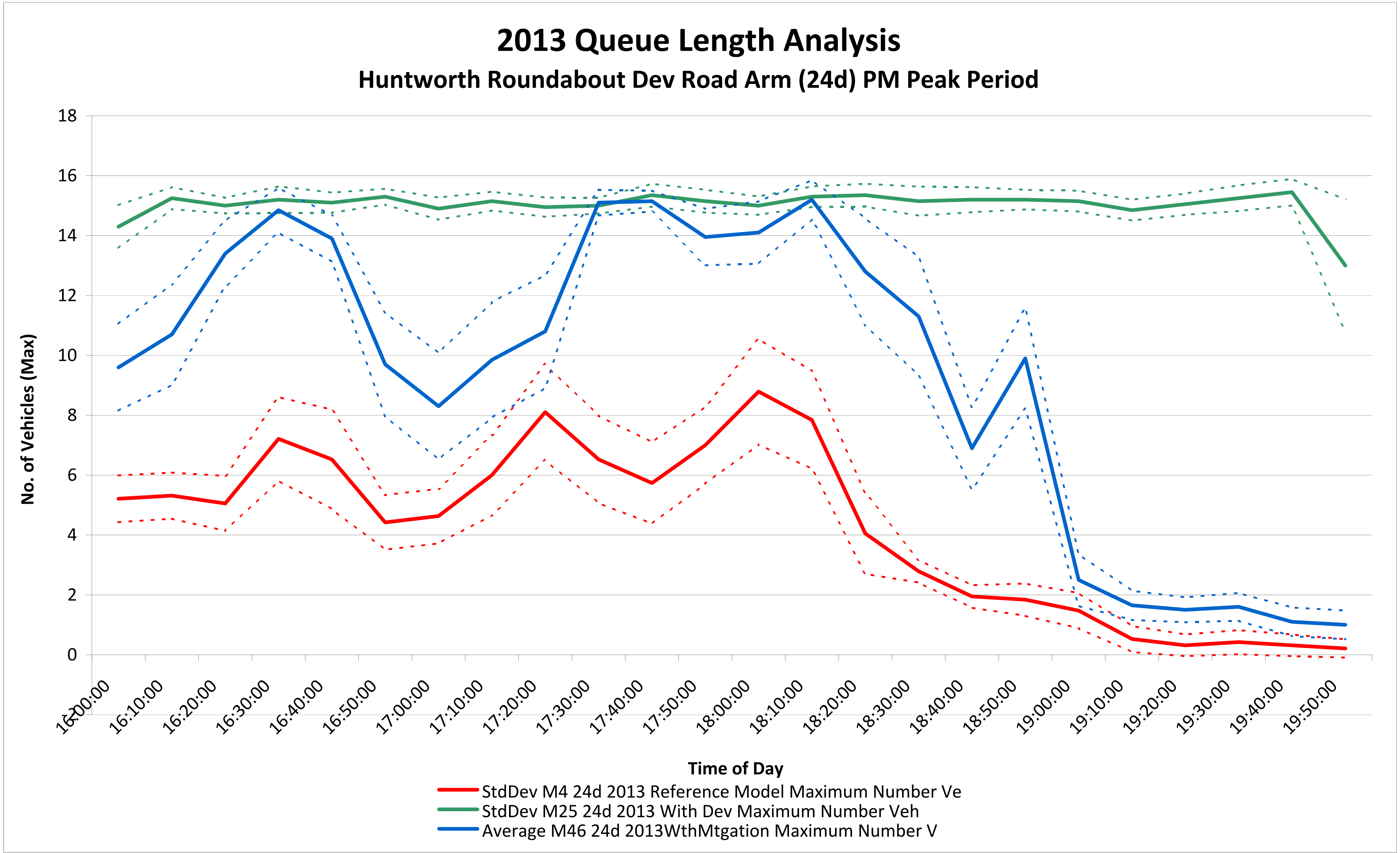


2013 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c) PM Peak Period
No. of Vehicles (Max)
20
18
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 24c 2013 Reference Model Maximum Number Ve
StdDev M25 24c 2013 With Dev Maximum Number Veh
Average M46 24c 2013WthMtgation Maximum Number V

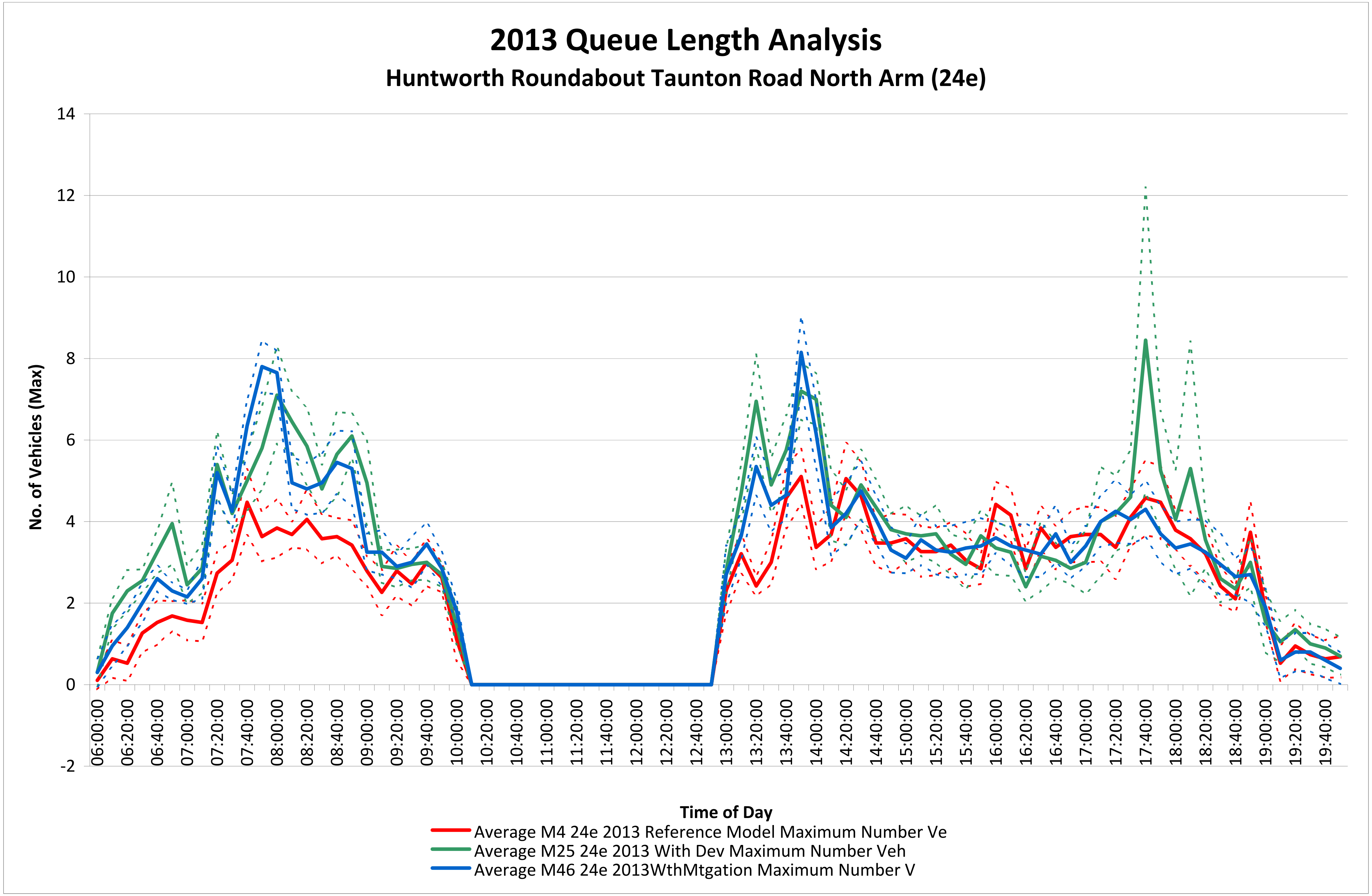

2013 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d)
No. of Vehicles (Max)
Time of Day
StdDev M4 24d 2013 Reference Model Maximum Number Ve
StdDev M25 24d 2013 With Dev Maximum Number Veh
Average M46 24d 2013WthMtgation Maximum Number V



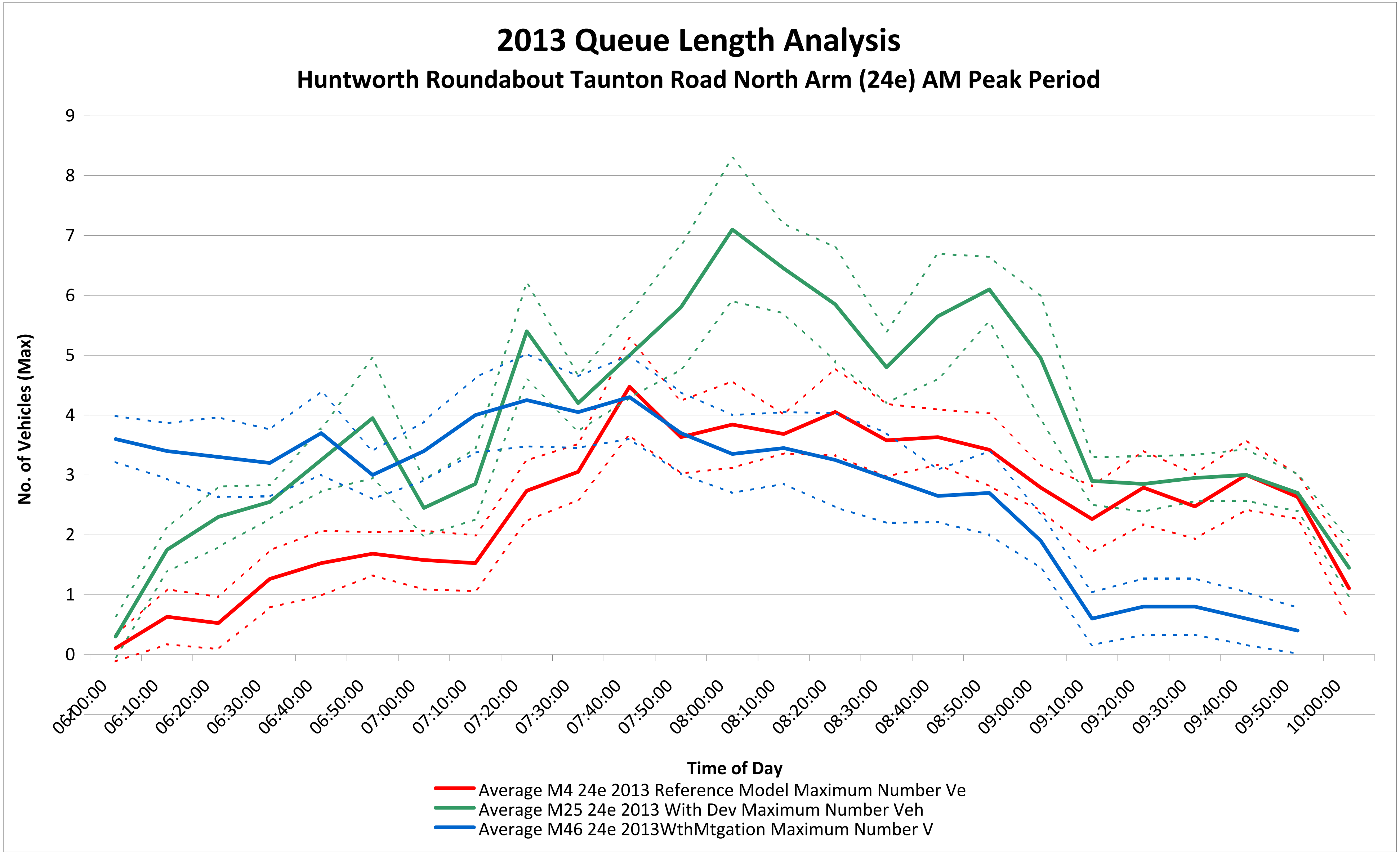
2013 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d) AM Peak Period
No. of Vehicles (Max)
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24d 2013 Reference Model Maximum Number Ve
Average M25 24d 2013 With Dev Maximum Number Veh
Average M46 24d 2013WthMtgation Maximum Number V

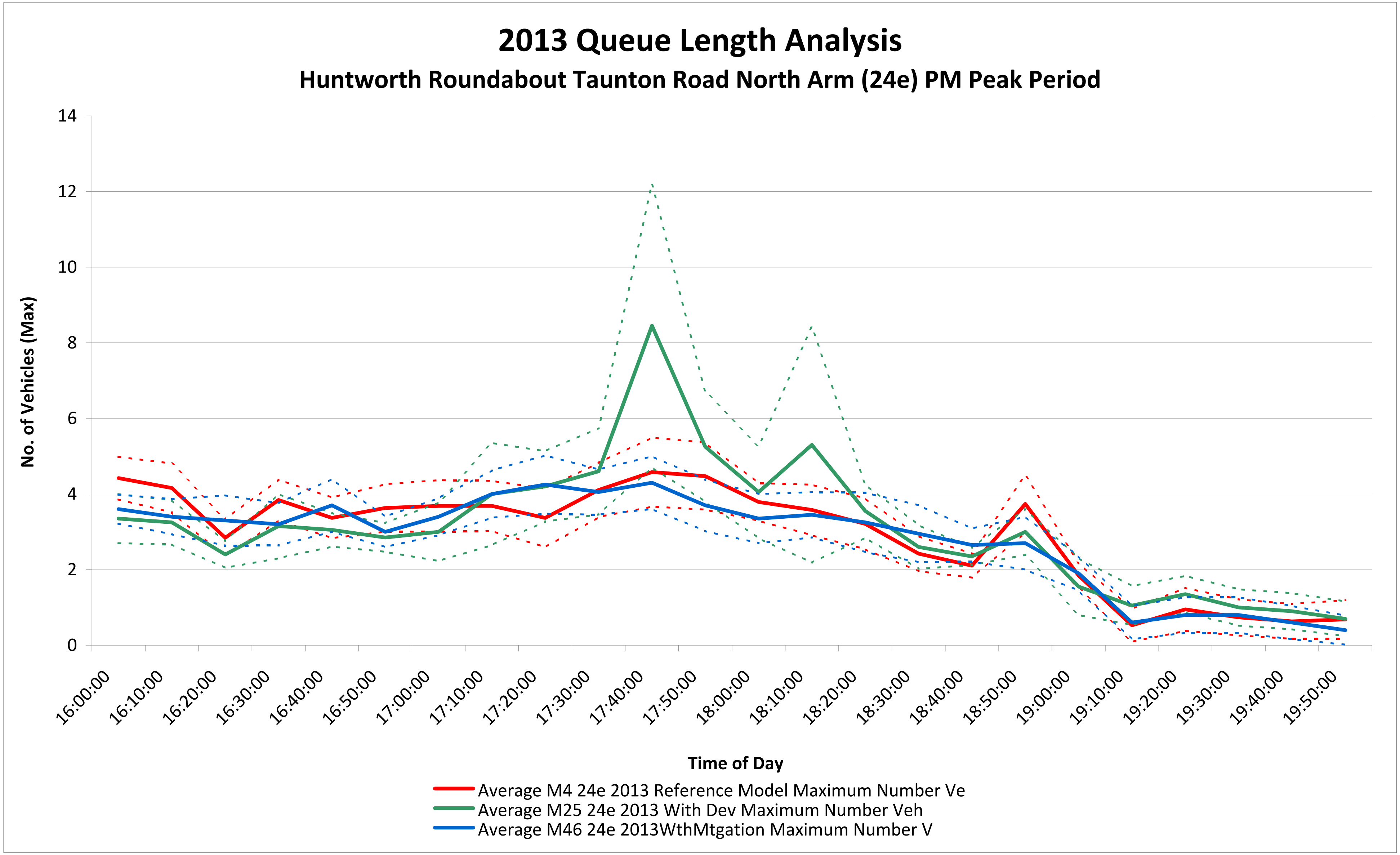


2013 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d) PM Peak Period
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M4 24d 2013 Reference Model Maximum Number Ve
StdDev M25 24d 2013 With Dev Maximum Number Veh
Average M46 24d 2013WthMtgation Maximum Number V

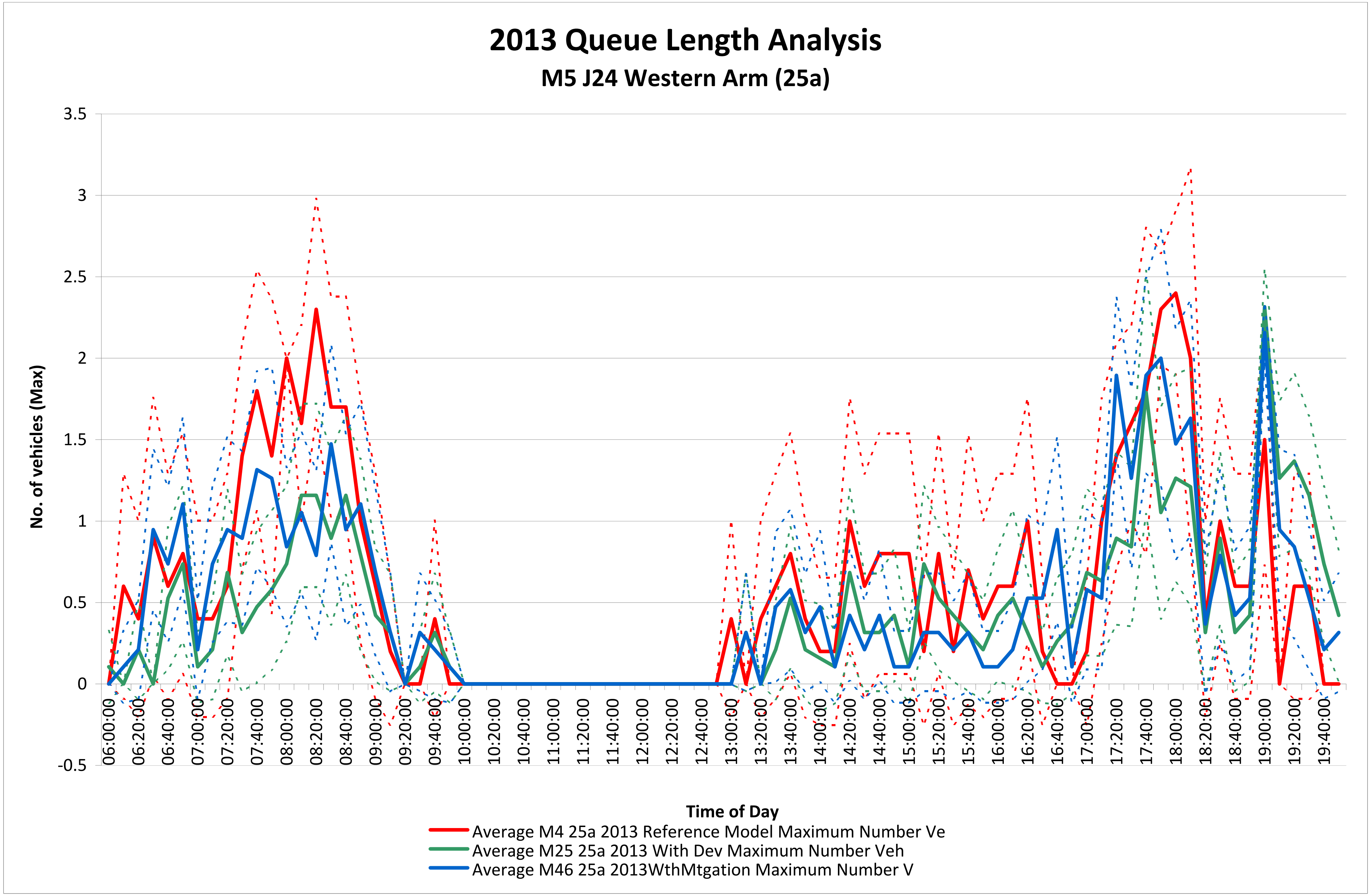


2013 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e)
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 24e 2013 Reference Model Maximum Number Ve
Average M25 24e 2013 With Dev Maximum Number Veh
Average M46 24e 2013WthMtgation Maximum Number V

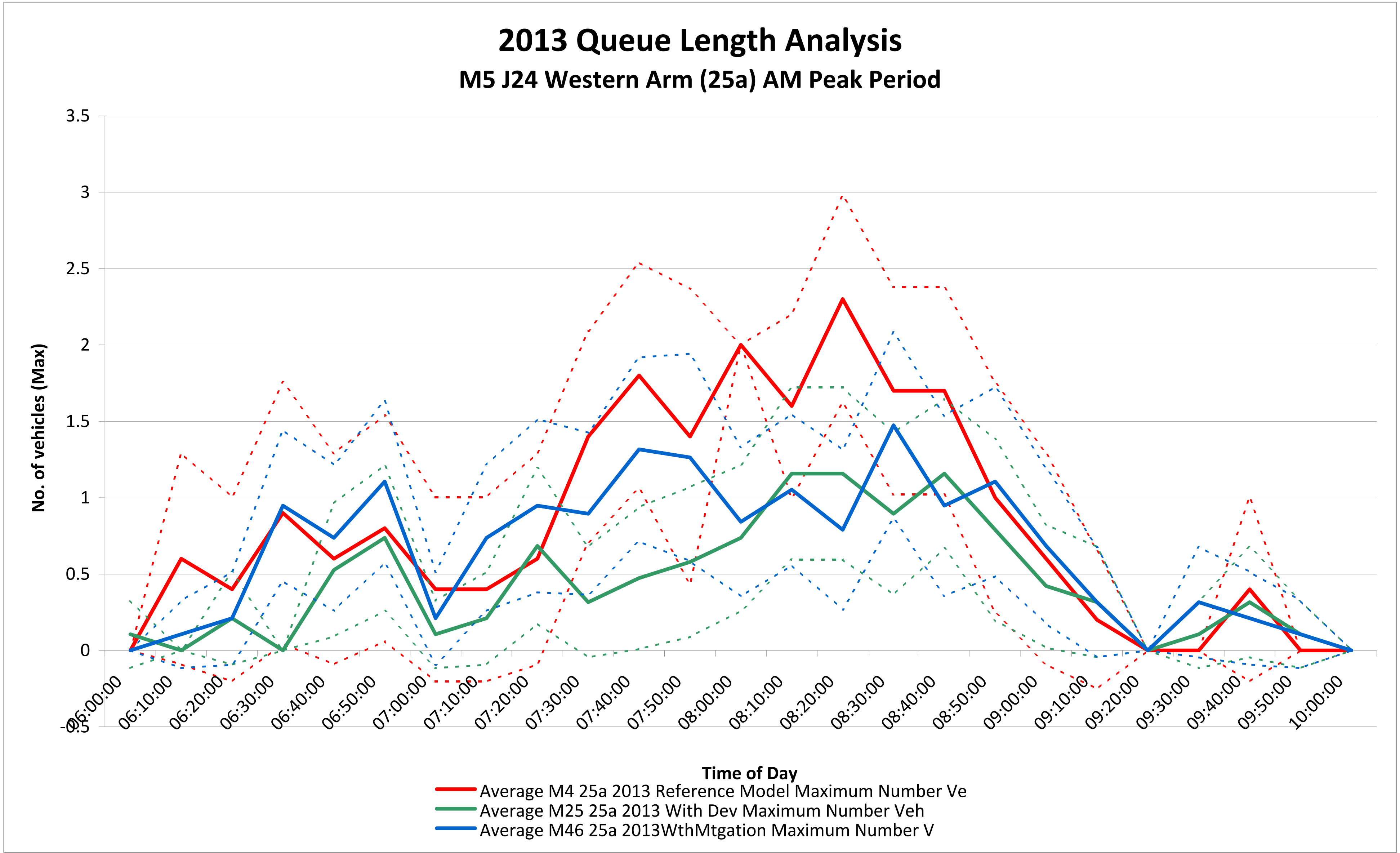

2013 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 24e 2013 Reference Model Maximum Number Ve
Average M25 24e 2013 With Dev Maximum Number Veh
Average M46 24e 2013WthMtgation Maximum Number V

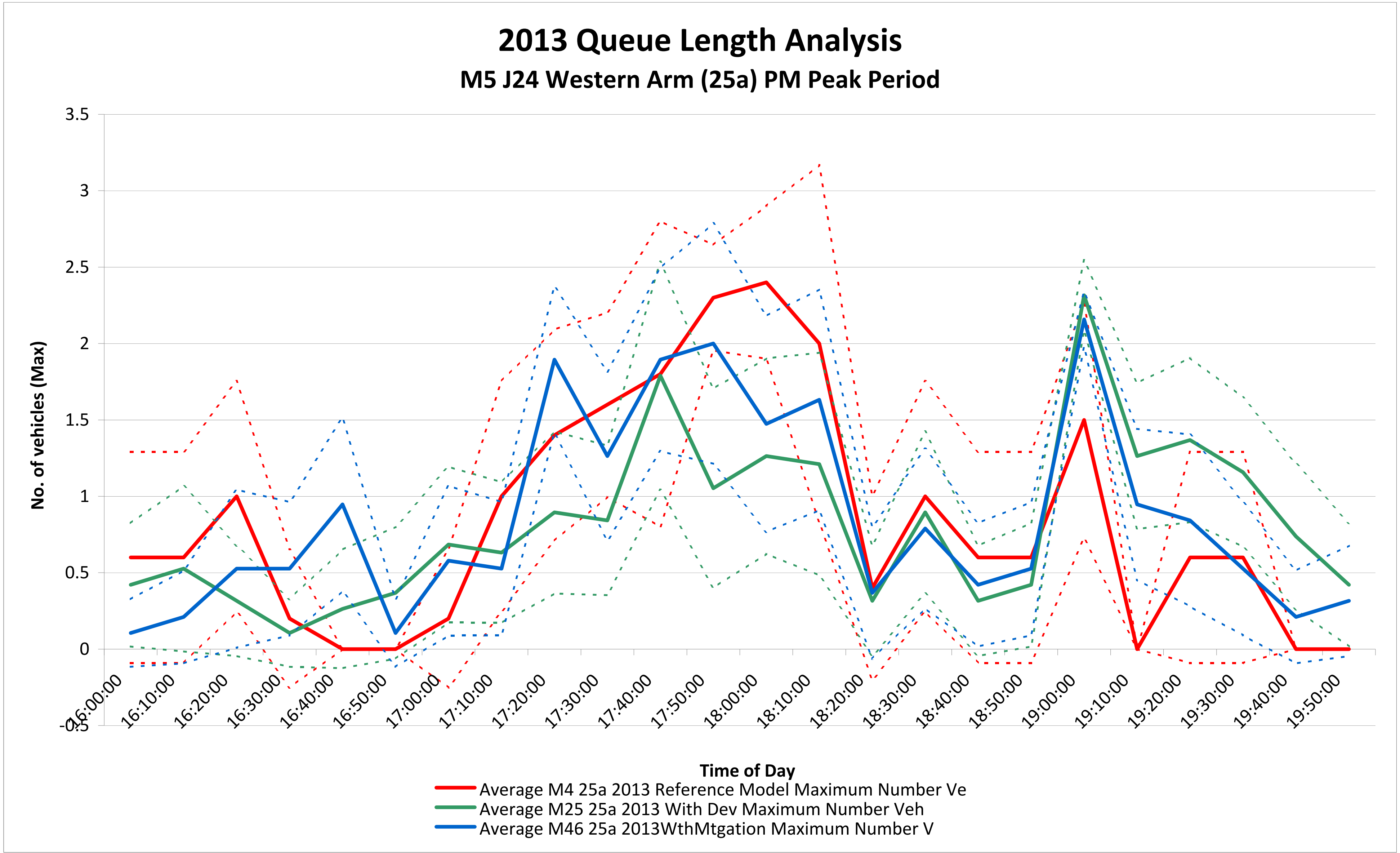


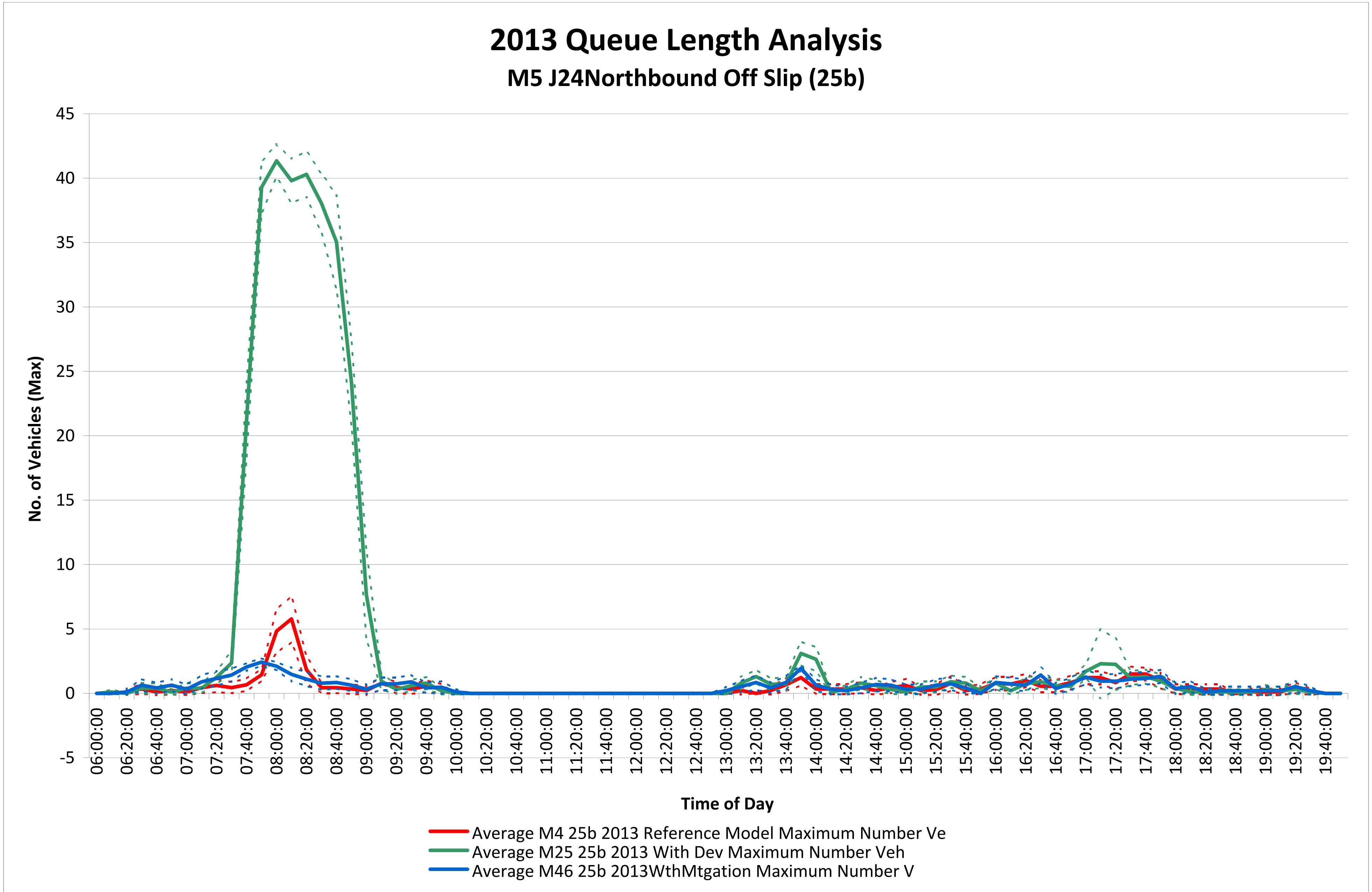
2013 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 24e 2013 Reference Model Maximum Number Ve
Average M25 24e 2013 With Dev Maximum Number Veh
Average M46 24e 2013WthMtgation Maximum Number V

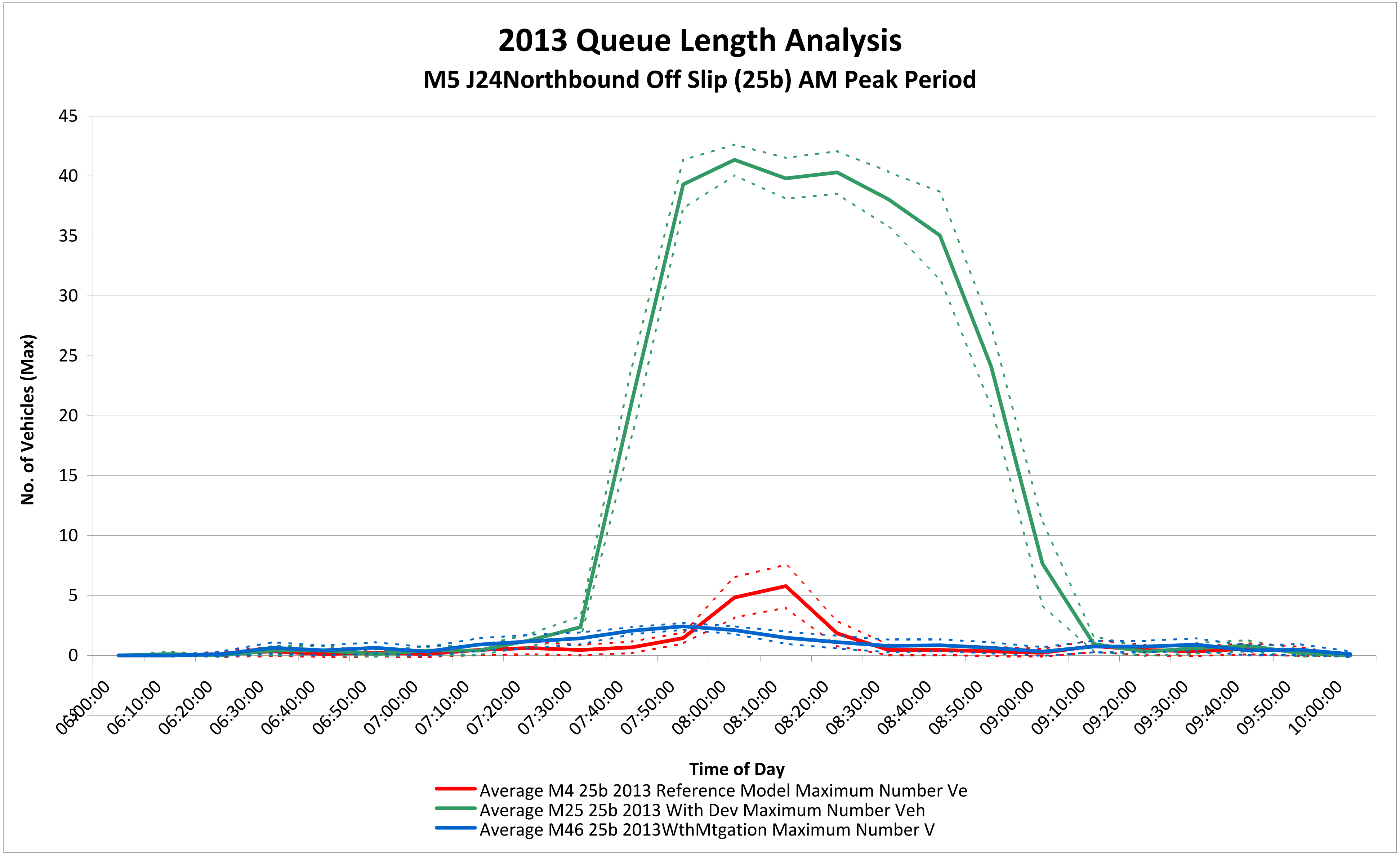


2013 Queue Length Analysis
M5 J24 Western Arm (25a)
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25a 2013 Reference Model Maximum Number Ve
Average M25 25a 2013 With Dev Maximum Number Veh
Average M46 25a 2013WthMtgation Maximum Number V

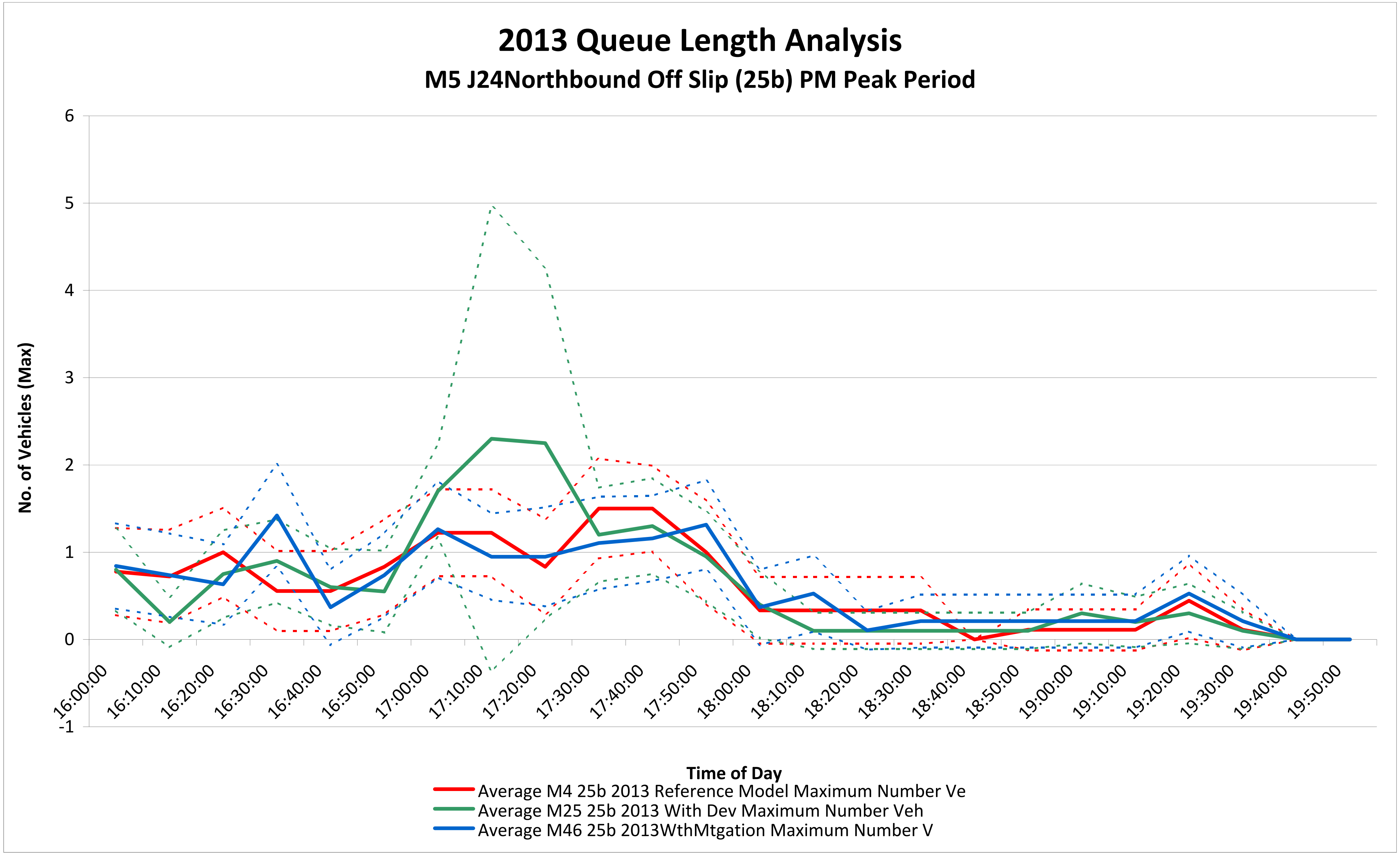

2013 Queue Length Analysis
M5 J24 Western Arm (25a) AM Peak Period
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25a 2013 Reference Model Maximum Number Ve
Average M25 25a 2013 With Dev Maximum Number Veh
Average M46 25a 2013WthMtgation Maximum Number V


2013 Queue Length Analysis
M5 J24 Western Arm (25a) PM Peak Period
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25a 2013 Reference Model Maximum Number Ve
Average M25 25a 2013 With Dev Maximum Number Veh
Average M46 25a 2013WthMtgation Maximum Number V

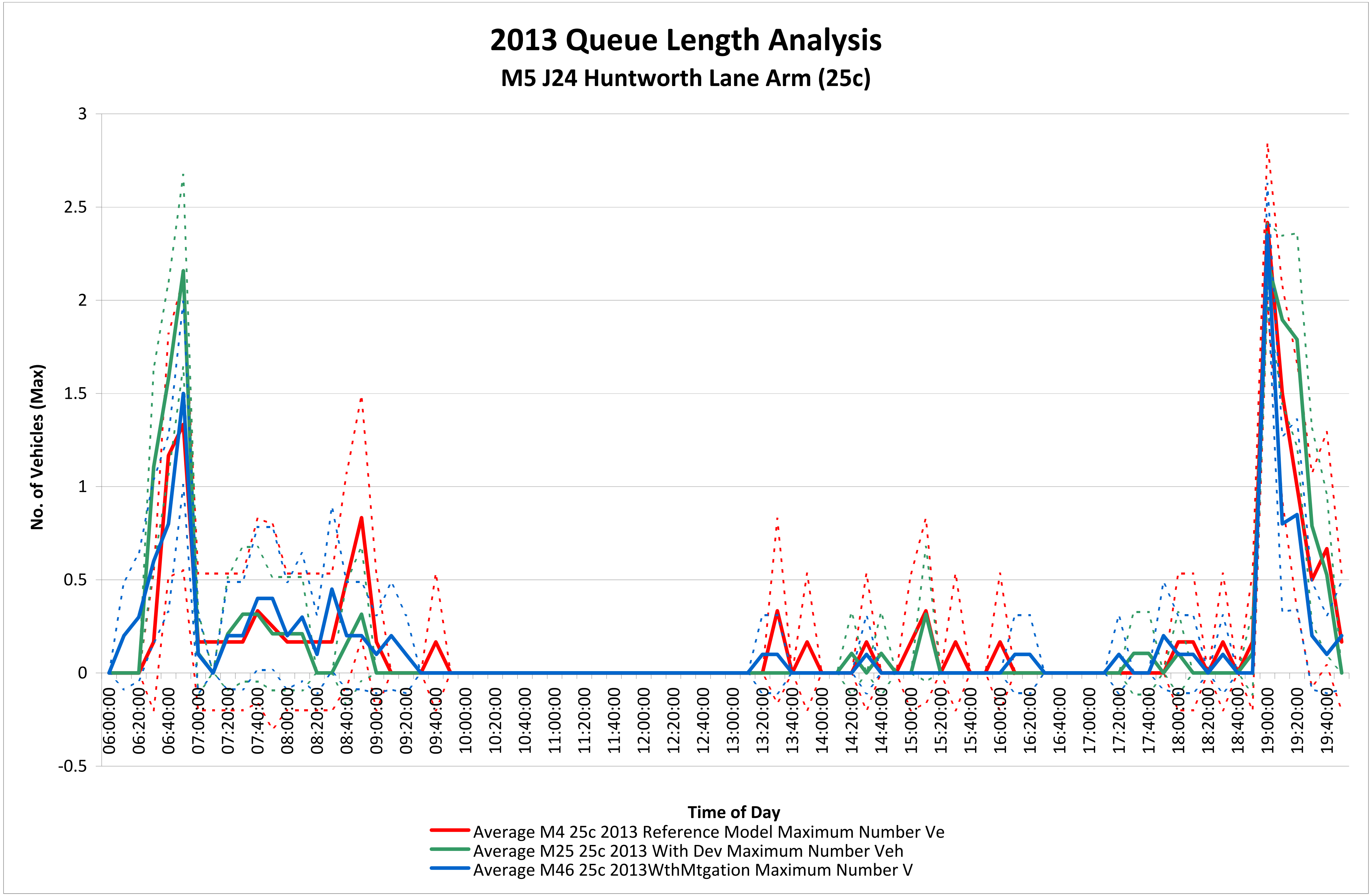

2013 Queue Length Analysis
M5 J24Northbound Off Slip (25b)
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25b 2013 Reference Model Maximum Number Ve
Average M25 25b 2013 With Dev Maximum Number Veh
Average M46 25b 2013WthMtgation Maximum Number V



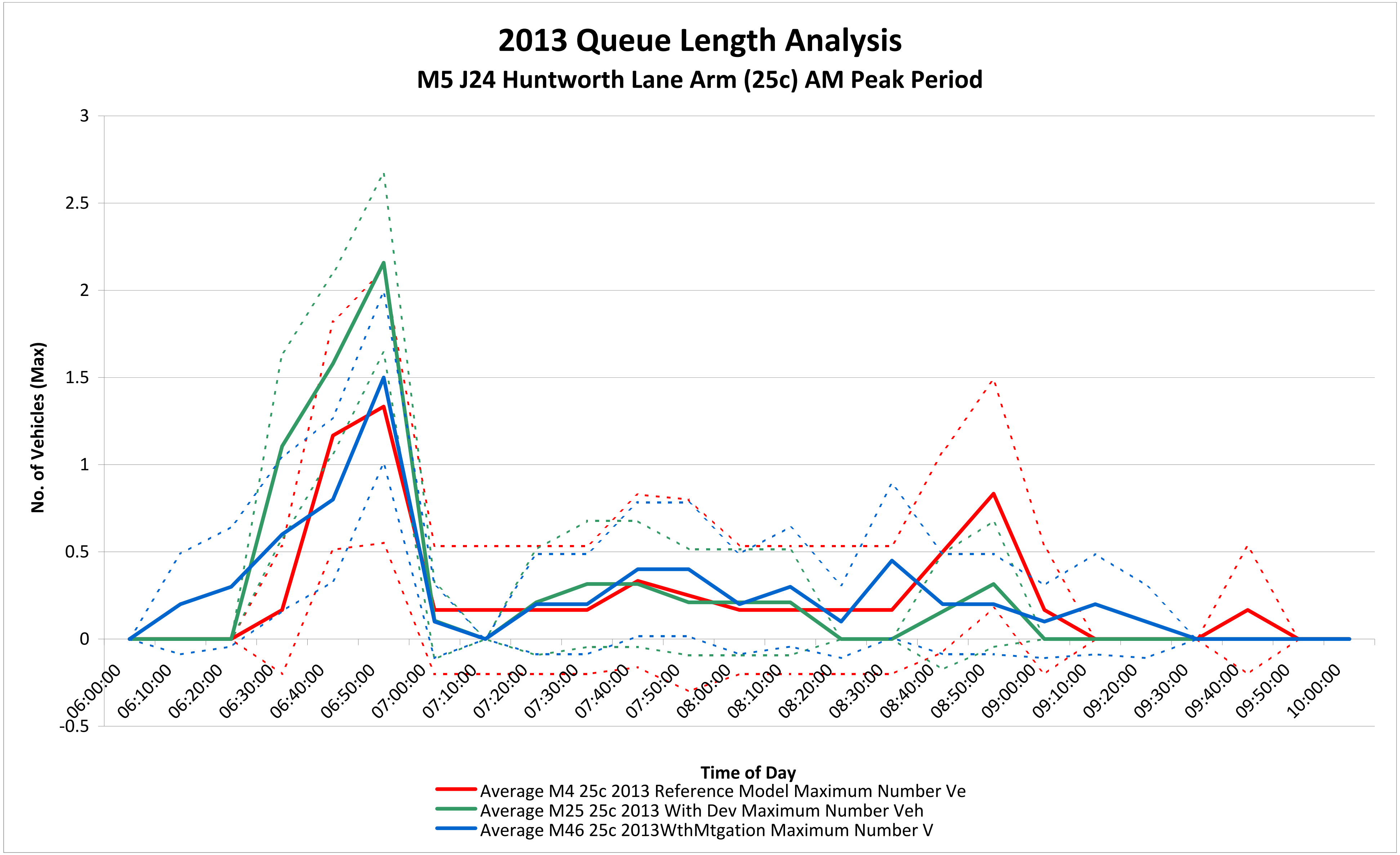
2013 Queue Length Analysis
M5 J24Northbound Off Slip (25b) AM Peak Period
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25b 2013 Reference Model Maximum Number Ve
Average M25 25b 2013 With Dev Maximum Number Veh
Average M46 25b 2013WthMtgation Maximum Number V

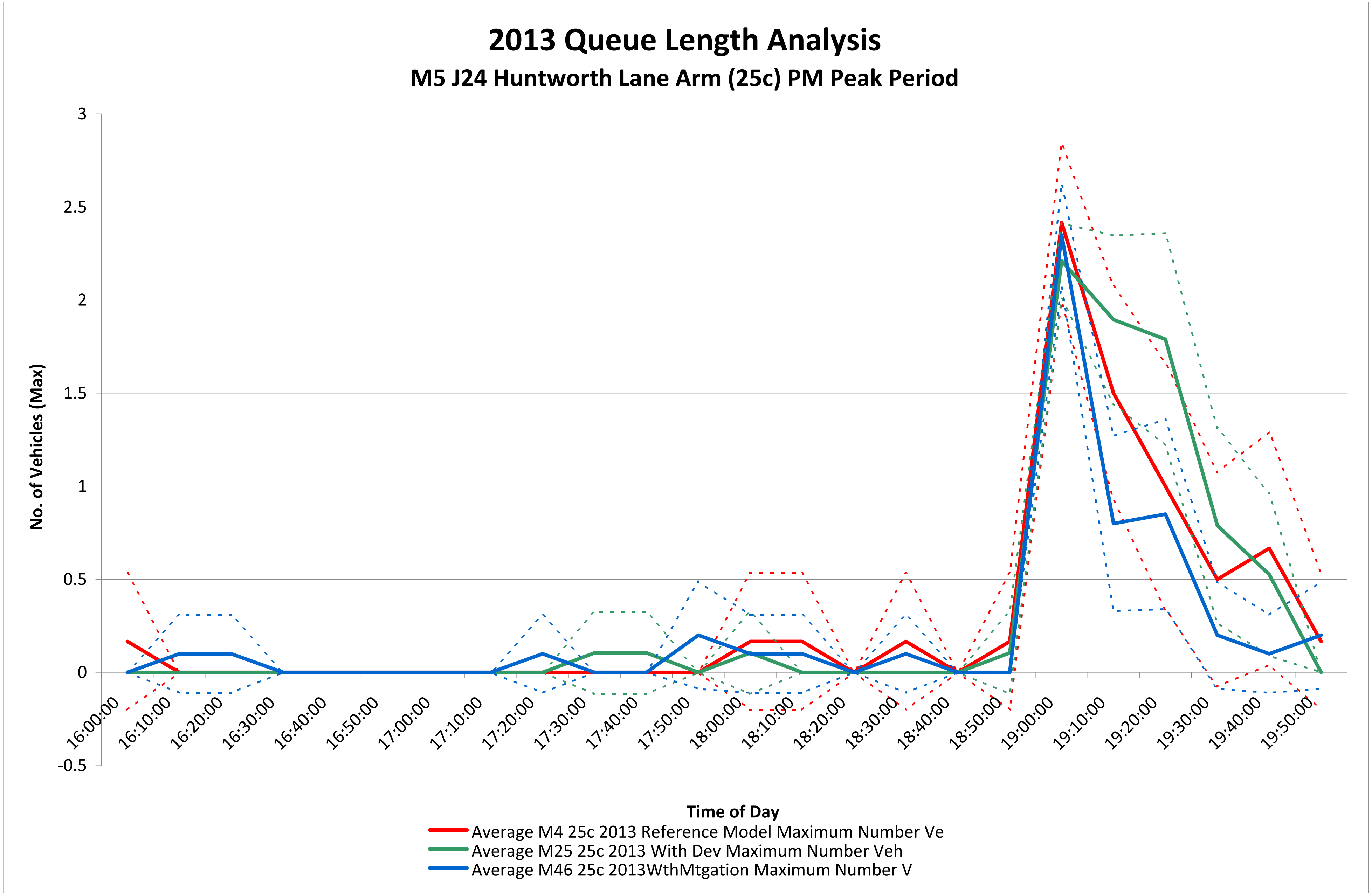


2013 Queue Length Analysis
M5 J24Northbound Off Slip (25b) PM Peak Period
No. of Vehicles (Max)
6
5
4
3
2
1
0
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25b 2013 Reference Model Maximum Number Ve
Average M25 25b 2013 With Dev Maximum Number Veh
Average M46 25b 2013WthMtgation Maximum Number V

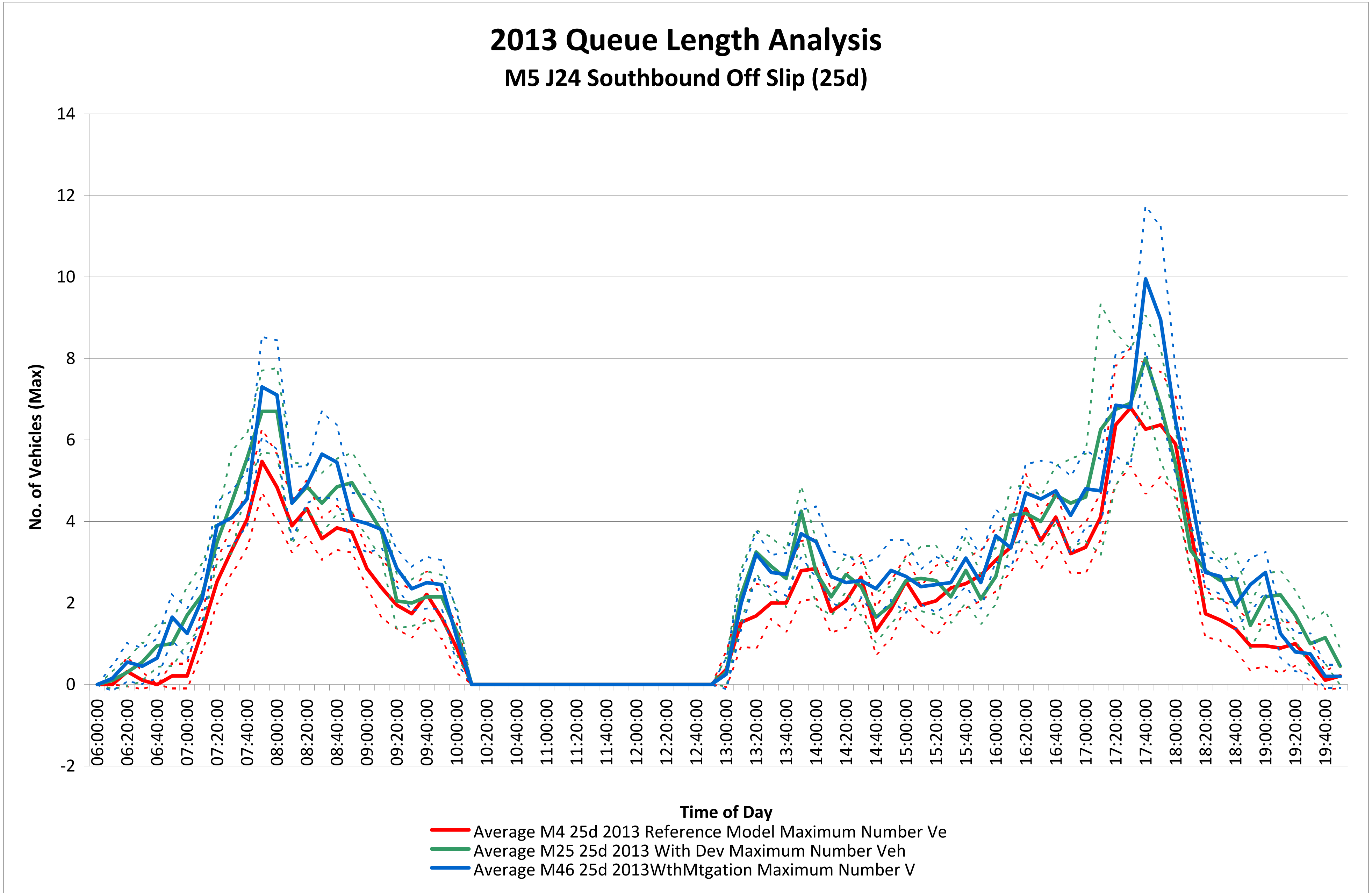


2013 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c)
No. of Vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25c 2013 Reference Model Maximum Number Ve
Average M25 25c 2013 With Dev Maximum Number Veh
Average M46 25c 2013WthMtgation Maximum Number V

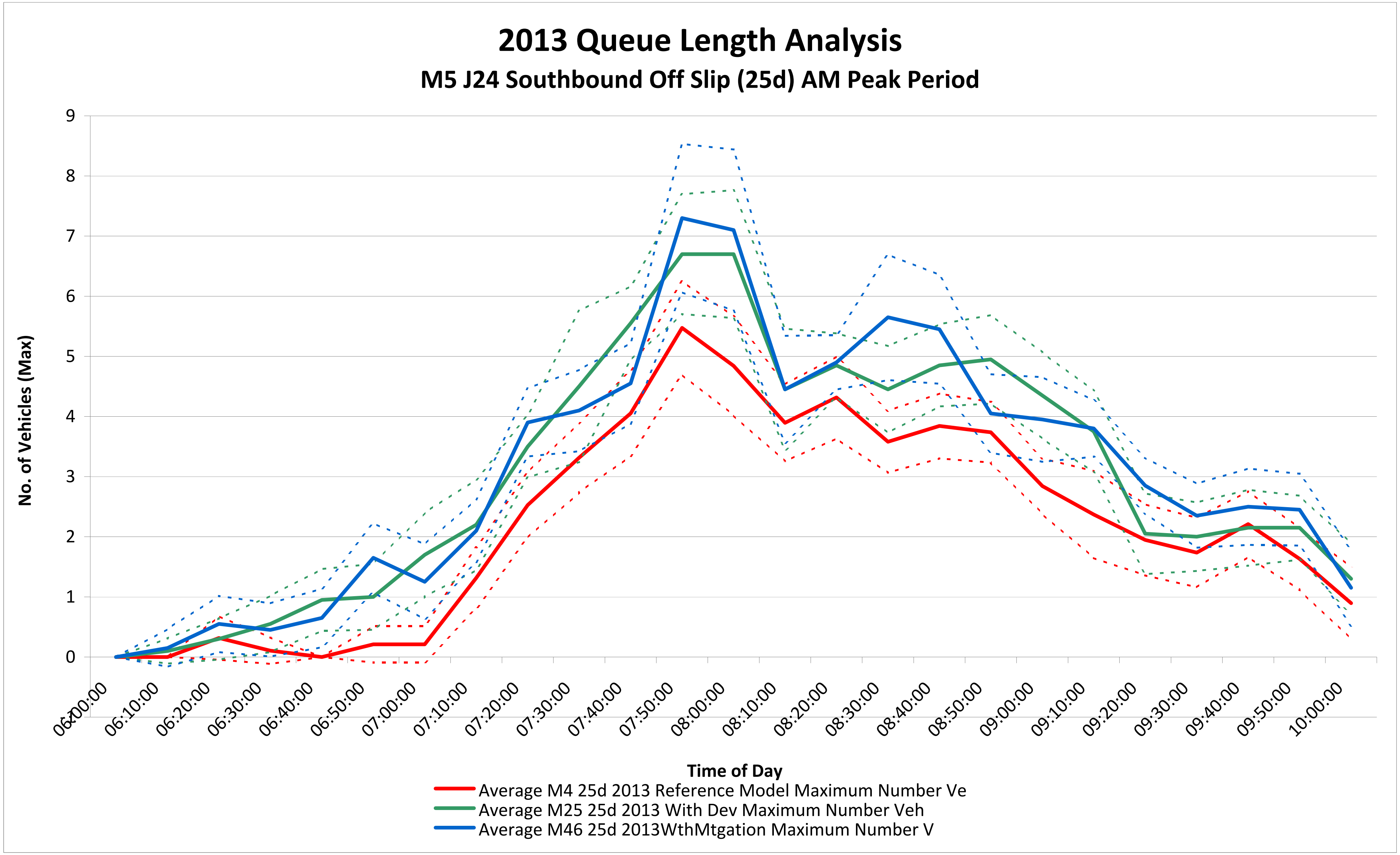

2013 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c) AM Peak Period
No. of Vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25c 2013 Reference Model Maximum Number Ve
Average M25 25c 2013 With Dev Maximum Number Veh
Average M46 25c 2013WthMtgation Maximum Number V



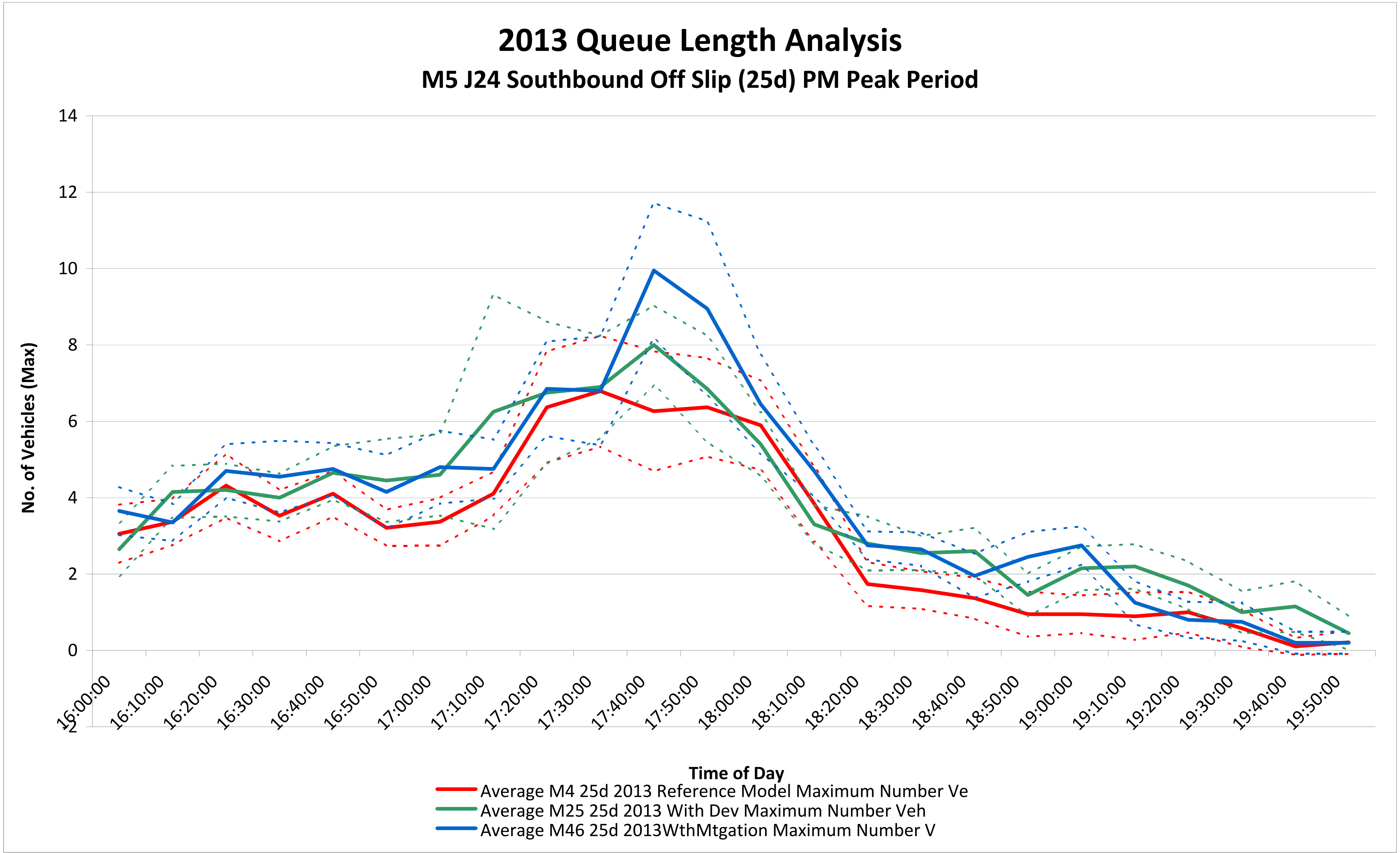
2013 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c) PM Peak Period
No. of Vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25c 2013 Reference Model Maximum Number Ve
Average M25 25c 2013 With Dev Maximum Number Veh
Average M46 25c 2013WthMtgation Maximum Number V



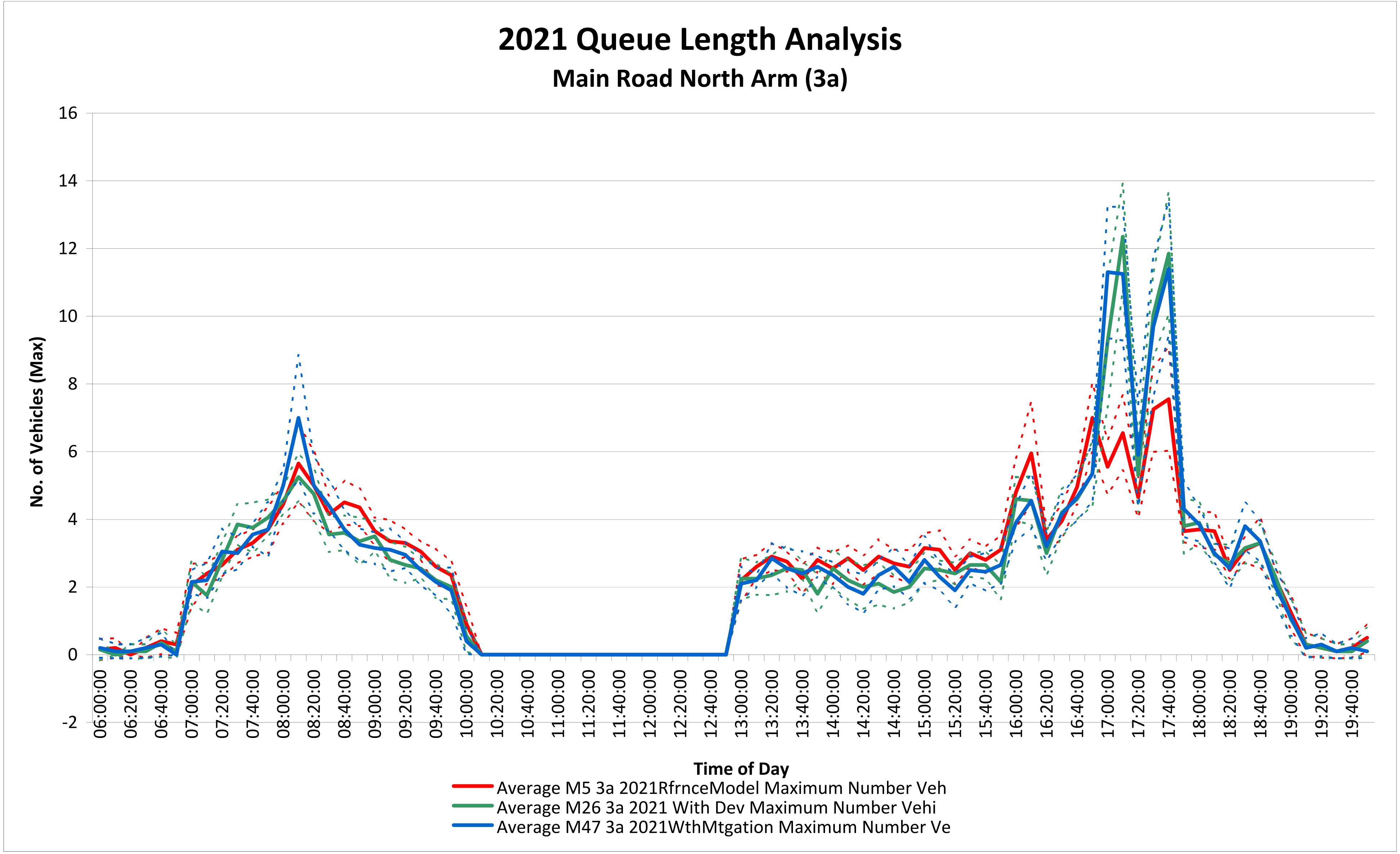
2013 Queue Length Analysis
M5 J24 Southbound Off Slip (25d)
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M4 25d 2013 Reference Model Maximum Number Ve
Average M25 25d 2013 With Dev Maximum Number Veh
Average M46 25d 2013WthMtgation Maximum Number V



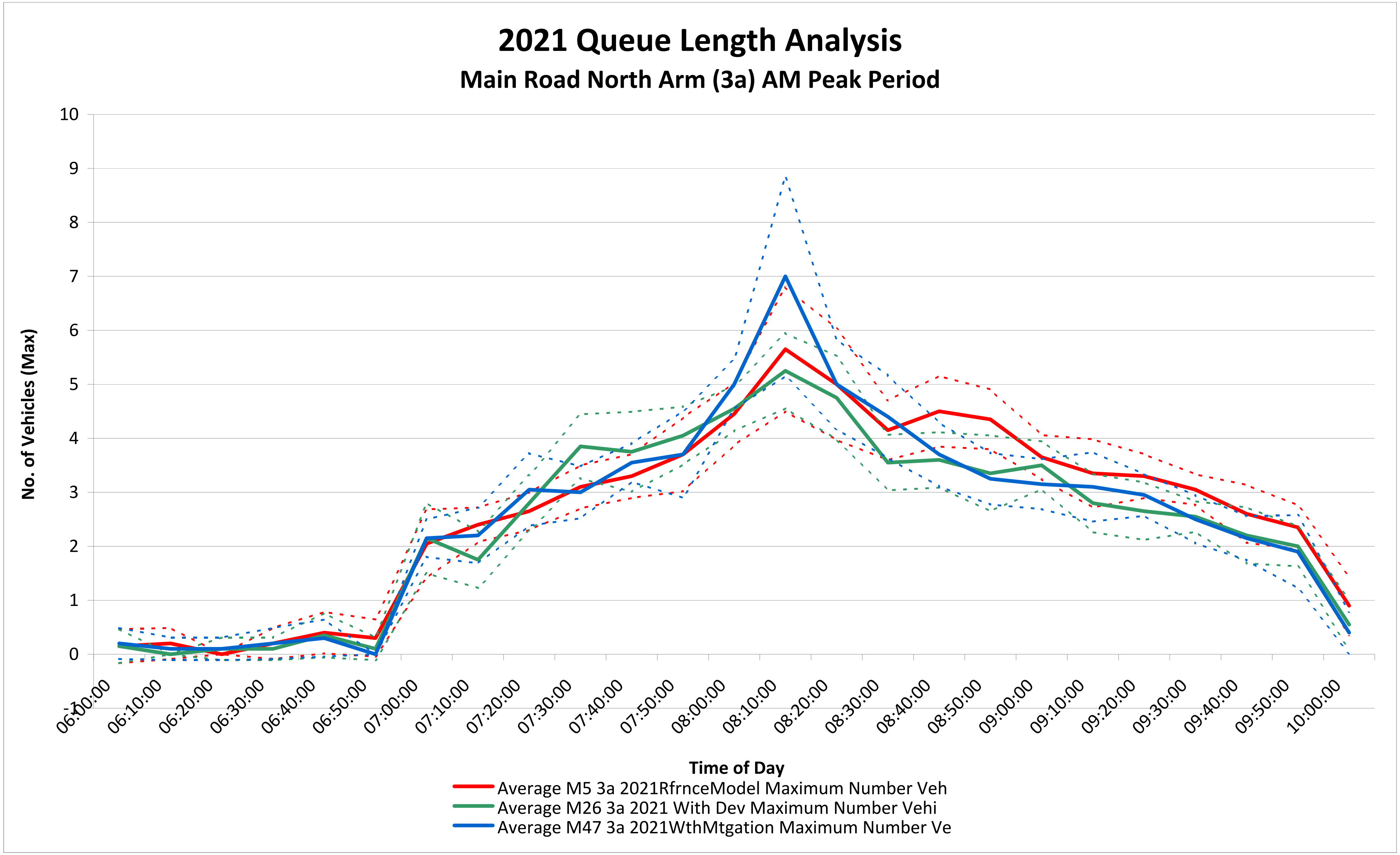
2013 Queue Length Analysis
M5 J24 Southbound Off Slip (25d) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M4 25d 2013 Reference Model Maximum Number Ve
Average M25 25d 2013 With Dev Maximum Number Veh
Average M46 25d 2013WthMtgation Maximum Number V

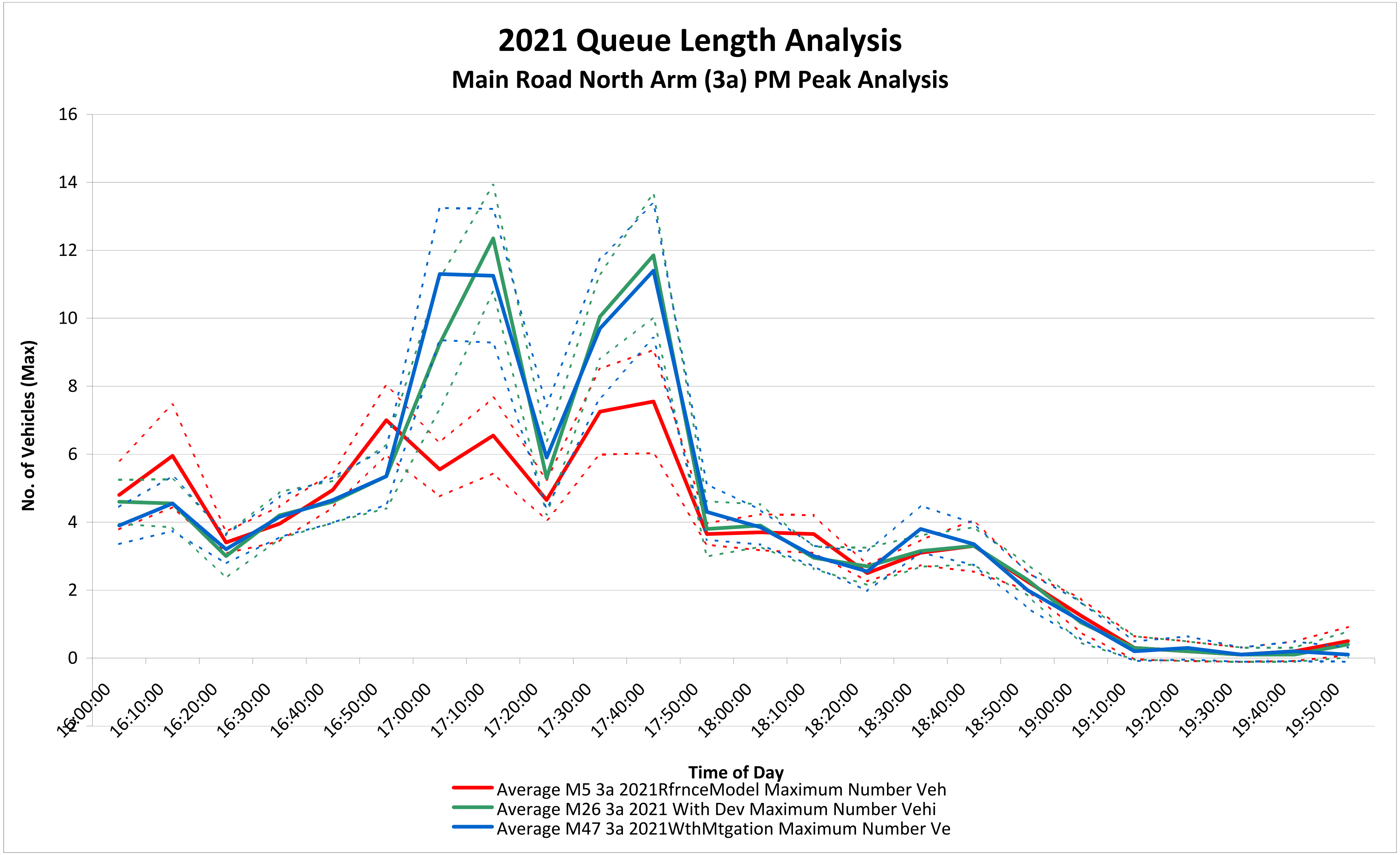

2013 Queue Length Analysis
M5 J24 Southbound Off Slip (25d) PM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M4 25d 2013 Reference Model Maximum Number Ve
Average M25 25d 2013 With Dev Maximum Number Veh
Average M46 25d 2013WthMtgation Maximum Number V

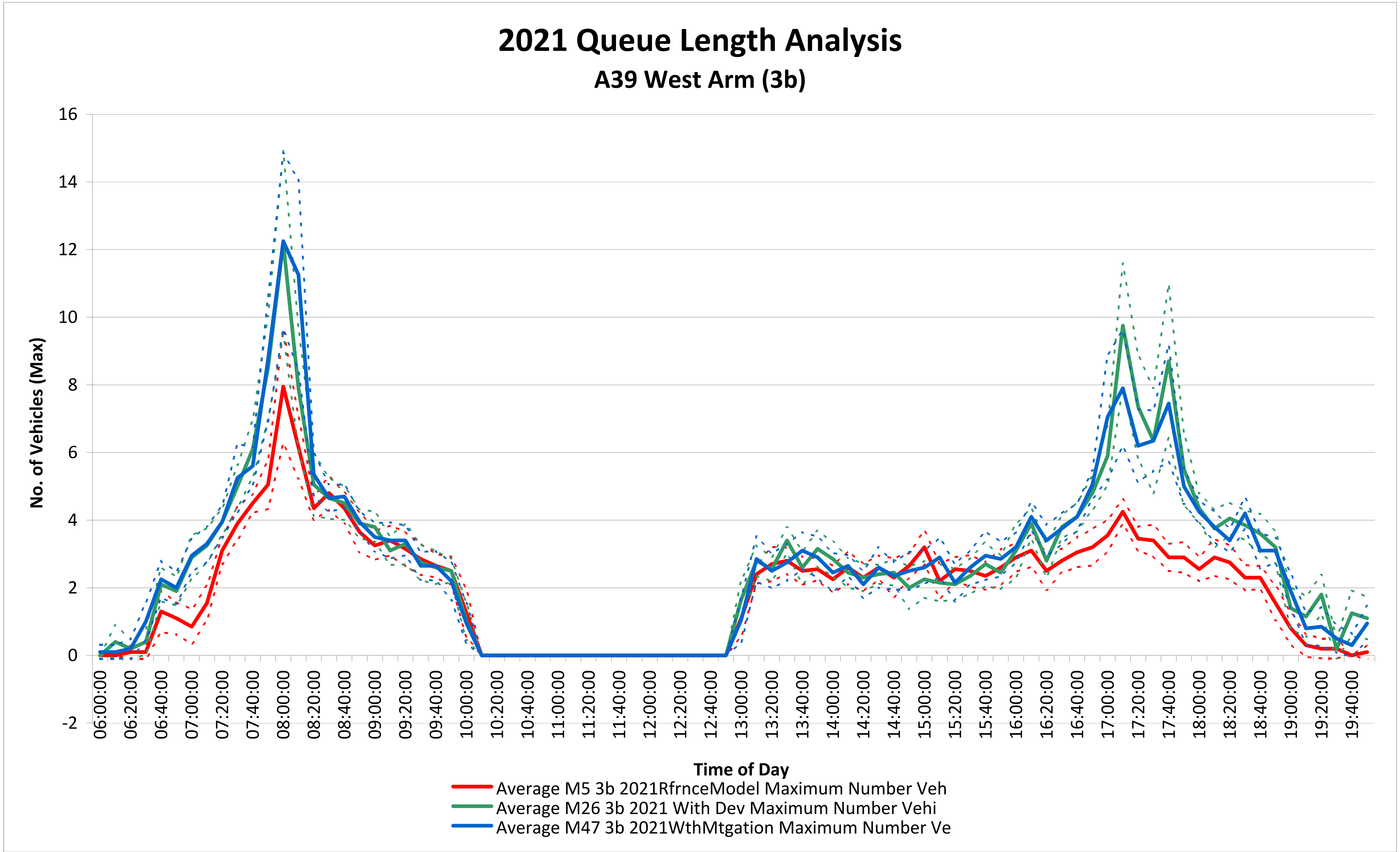
APPENDIX 15.8: 2021 REFERENCE V WITH DEVELOPMENT V WITH MITIGATION QUEUE GRAPHS

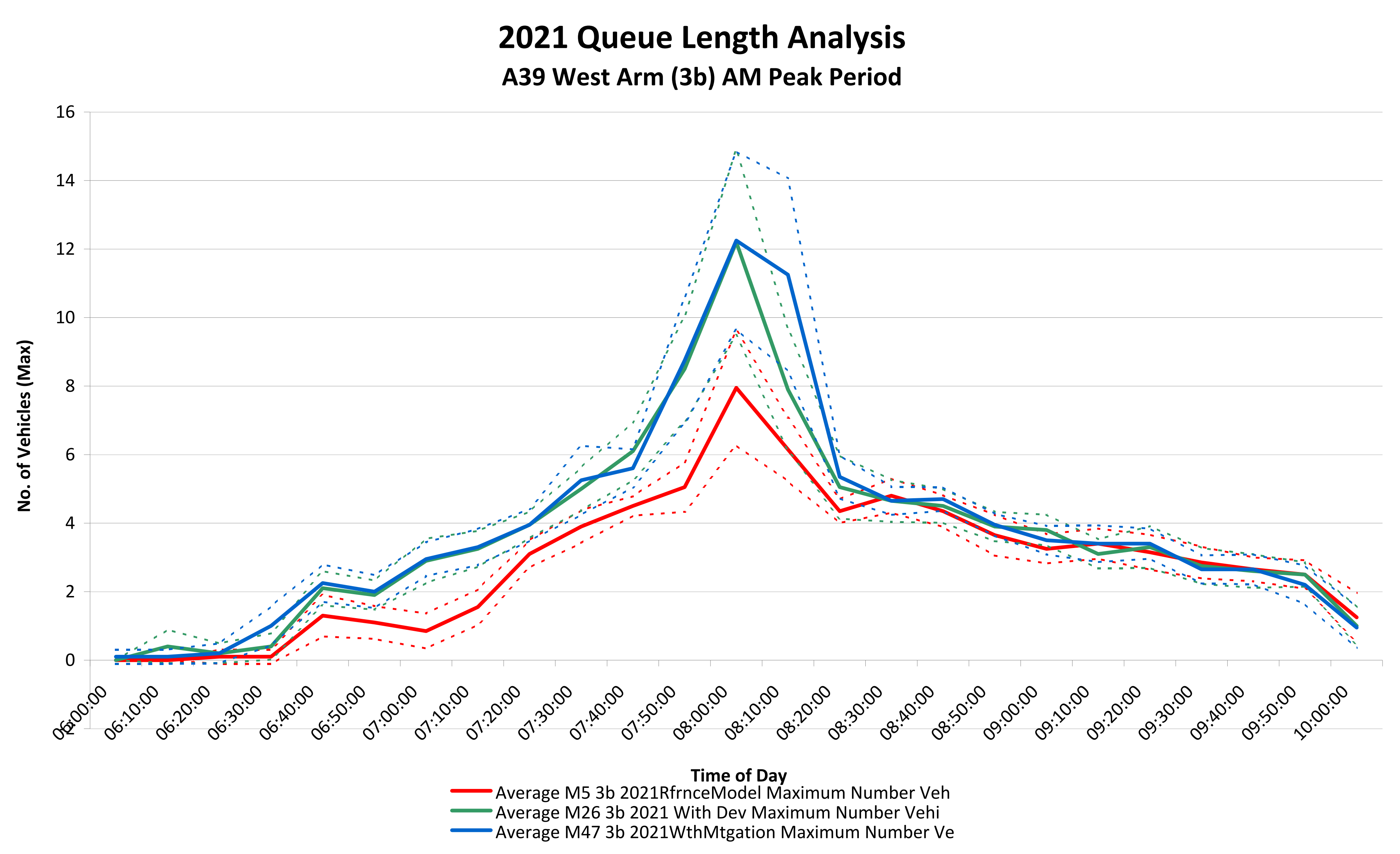


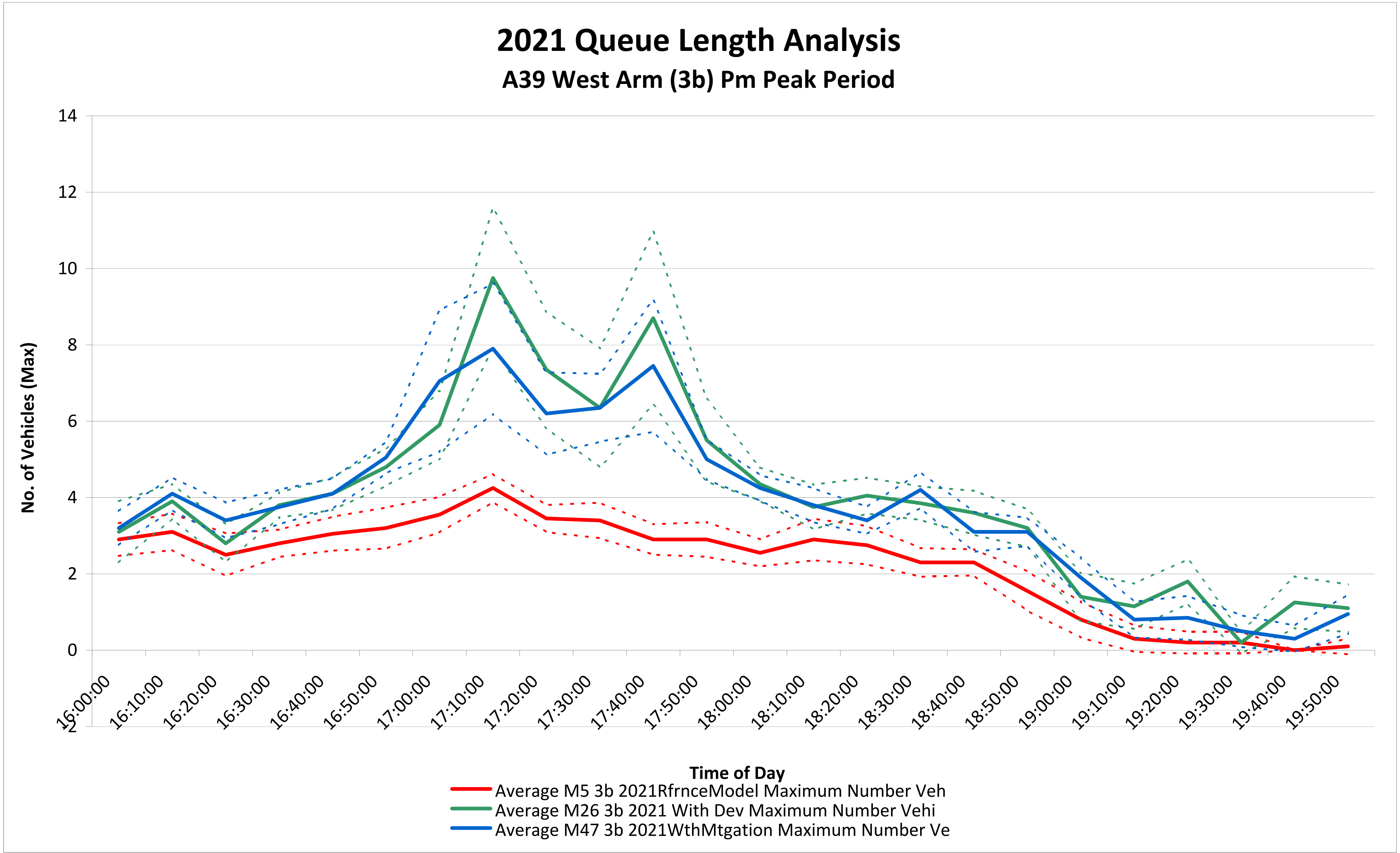
2021 Queue Length Analysis
Main Road North Arm (3a)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 3a 2021RfrnceModel Maximum Number Veh
Average M26 3a 2021 With Dev Maximum Number Vehi
Average M47 3a 2021WthMtgation Maximum Number Ve

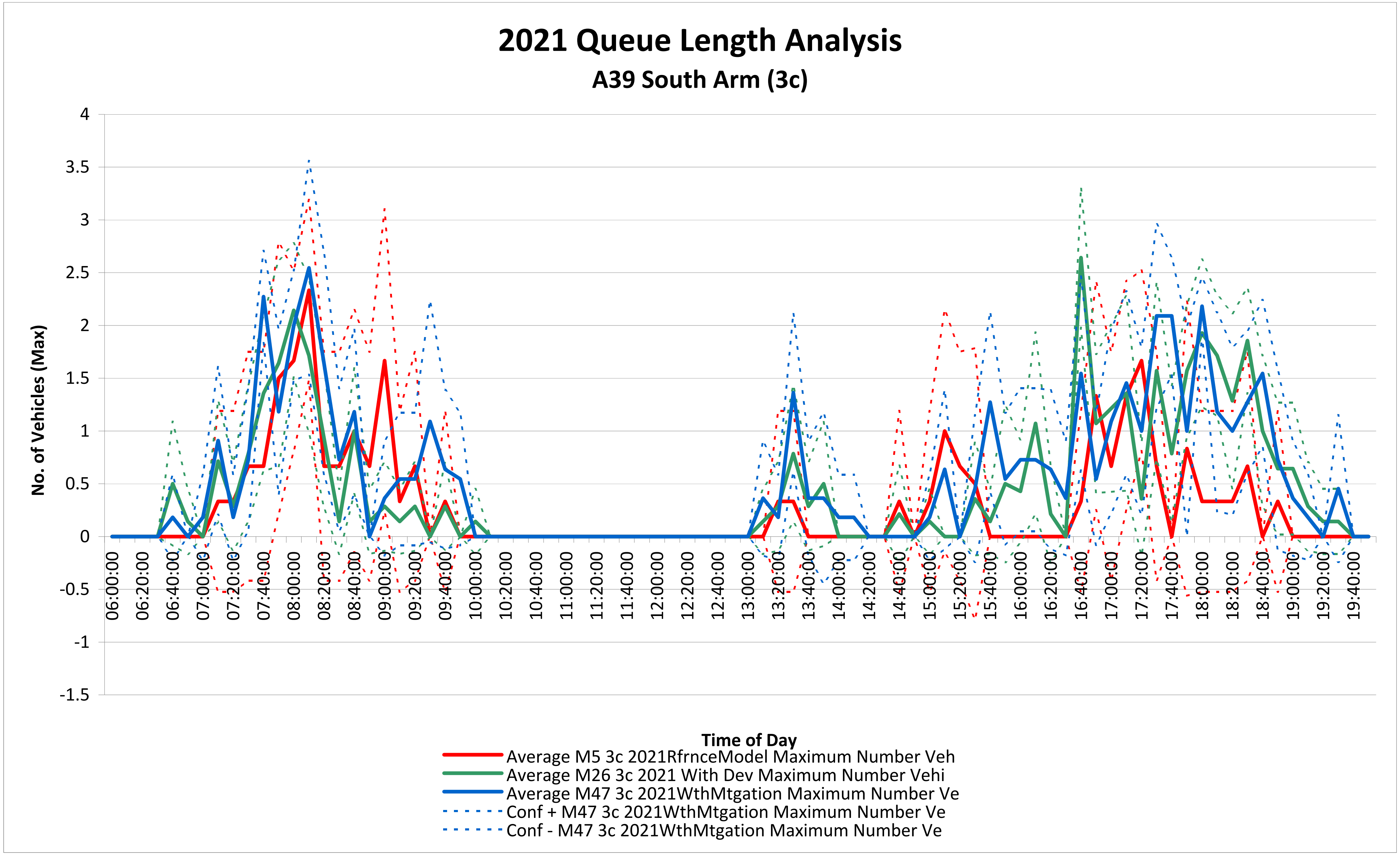

2021 Queue Length Analysis
Main Road North Arm (3a) AM Peak Period
No. of Vehicles (Max)
10
9
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 3a 2021RfrnceModel Maximum Number Veh
Average M26 3a 2021 With Dev Maximum Number Vehi
Average M47 3a 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Main Road North Arm (3a) PM Peak Analysis
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 3a 2021RfrnceModel Maximum Number Veh
Average M26 3a 2021 With Dev Maximum Number Vehi
Average M47 3a 2021WthMtgation Maximum Number Ve

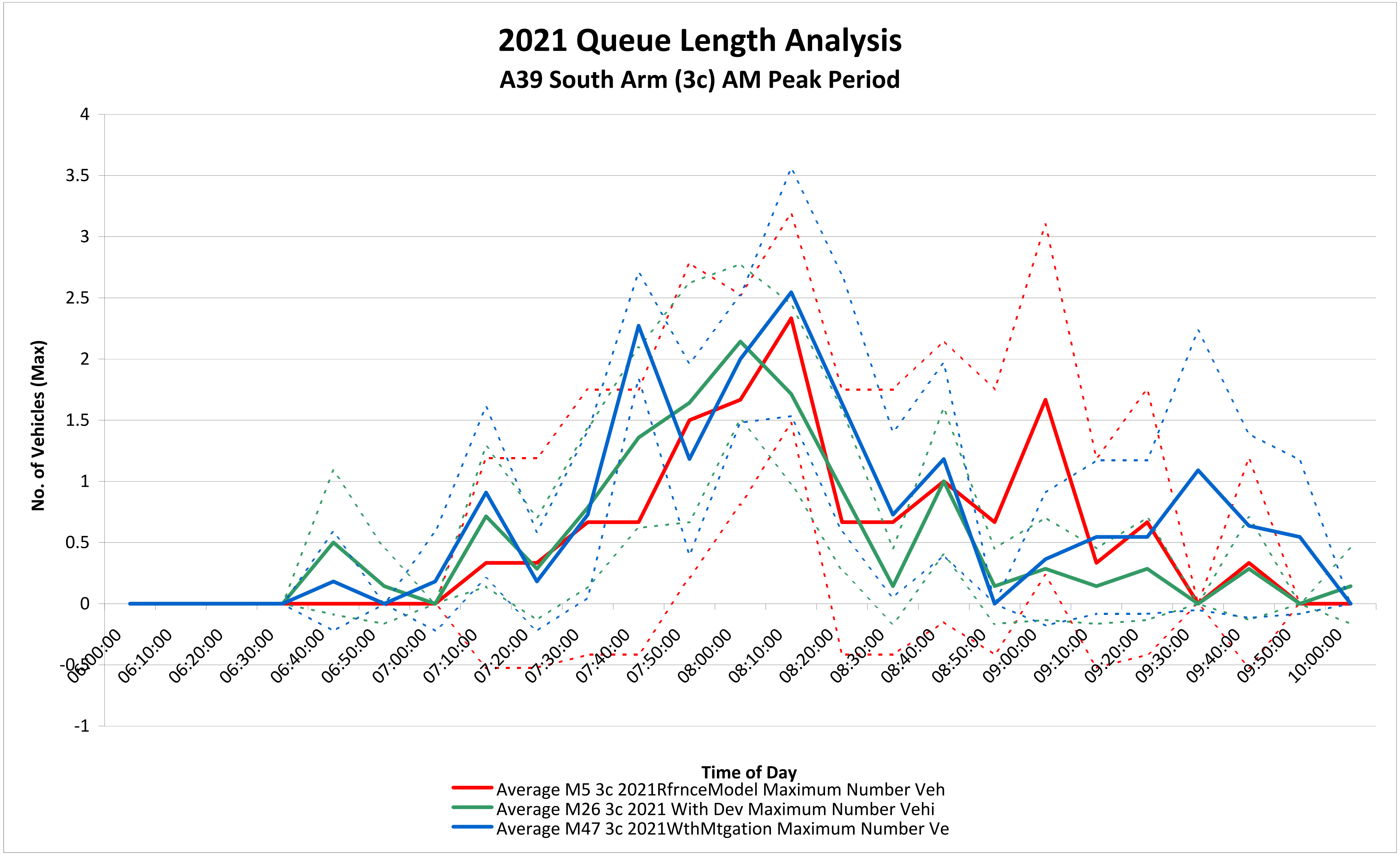

2021 Queue Length Analysis
A39 West Arm (3b)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 3b 2021RfrnceModel Maximum Number Veh
Average M26 3b 2021 With Dev Maximum Number Vehi
Average M47 3b 2021WthMtgation Maximum Number Ve

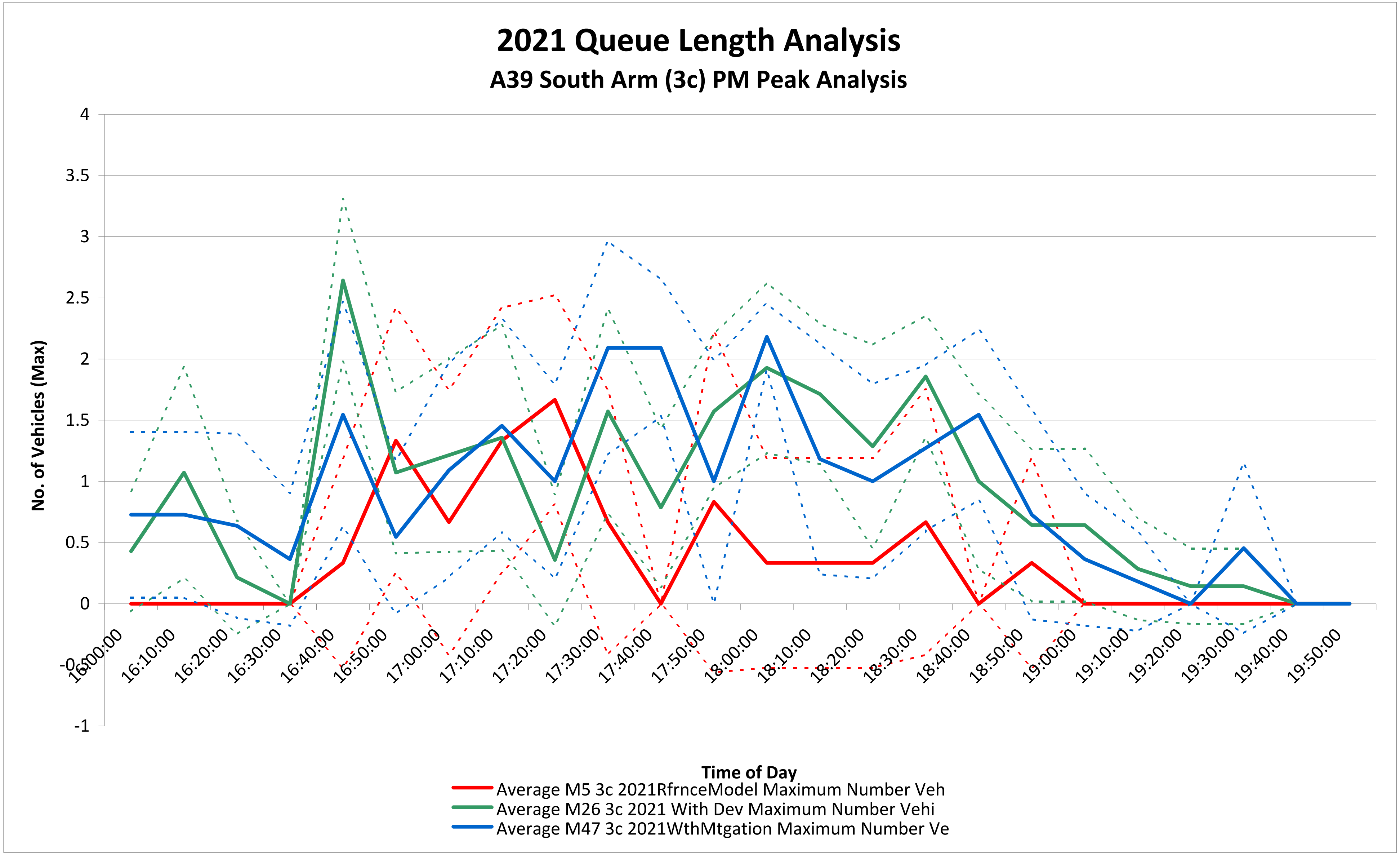

2021 Queue Length Analysis
A39 West Arm (3b) AM Peak Period
16
14
12
10
8
6
4
2
0
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 3b 2021RfrnceModel Maximum Number Veh
Average M26 3b 2021 With Dev Maximum Number Vehi
Average M47 3b 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
A39 West Arm (3b) Pm Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 3b 2021RfrnceModel Maximum Number Veh
Average M26 3b 2021 With Dev Maximum Number Vehi
Average M47 3b 2021WthMtgation Maximum Number Ve

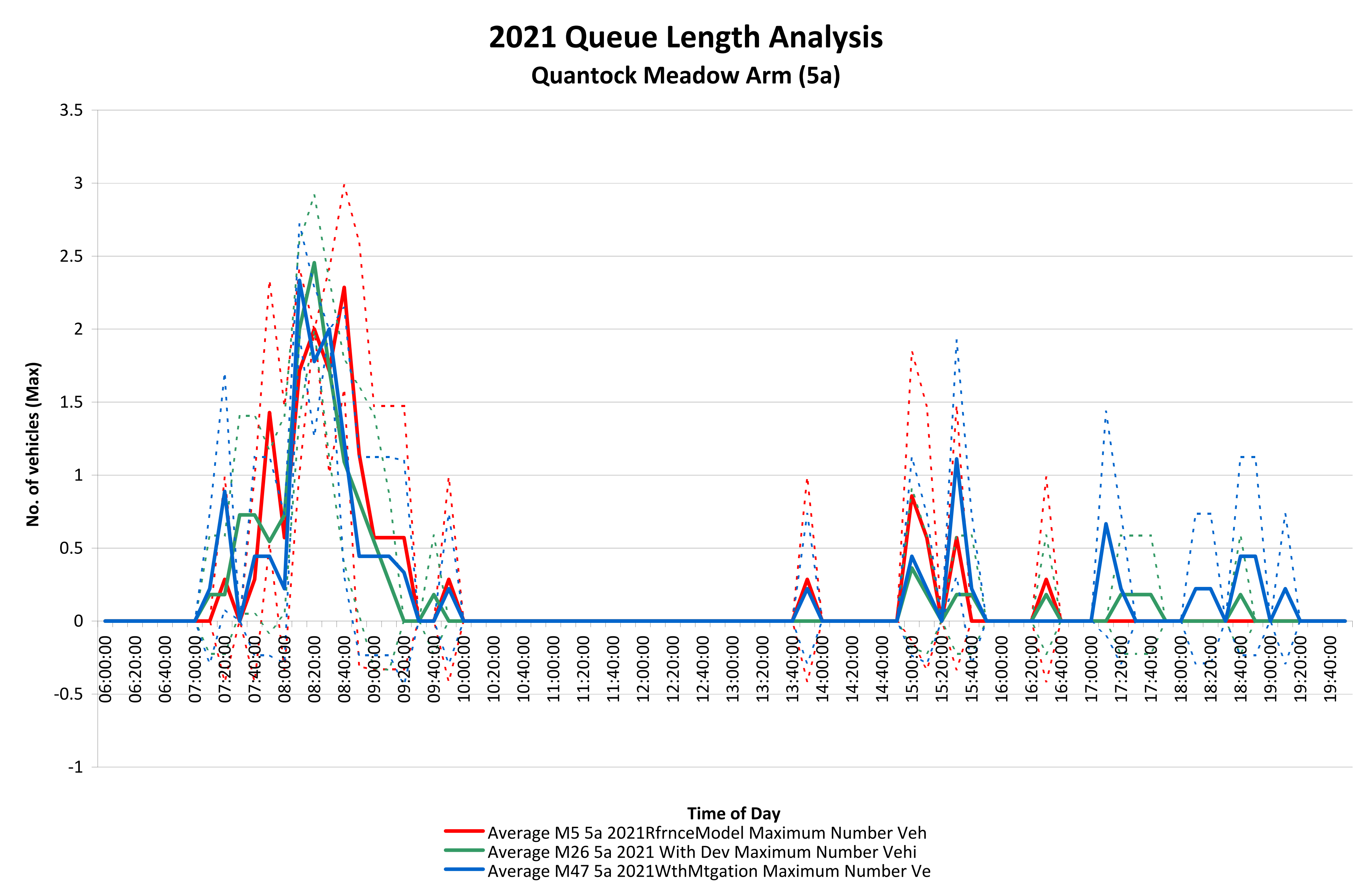


2021 Queue Length Analysis
A39 South Arm (3c)
No. of Vehicles (Max)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 3c 2021RfrnceModel Maximum Number Veh
Average M26 3c 2021 With Dev Maximum Number Vehi
Average M47 3c 2021WthMtgation Maximum Number Ve
Conf + M47 3c 2021WthMtgation Maximum Number Ve
Conf - M47 3c 2021WthMtgation Maximum Number Ve

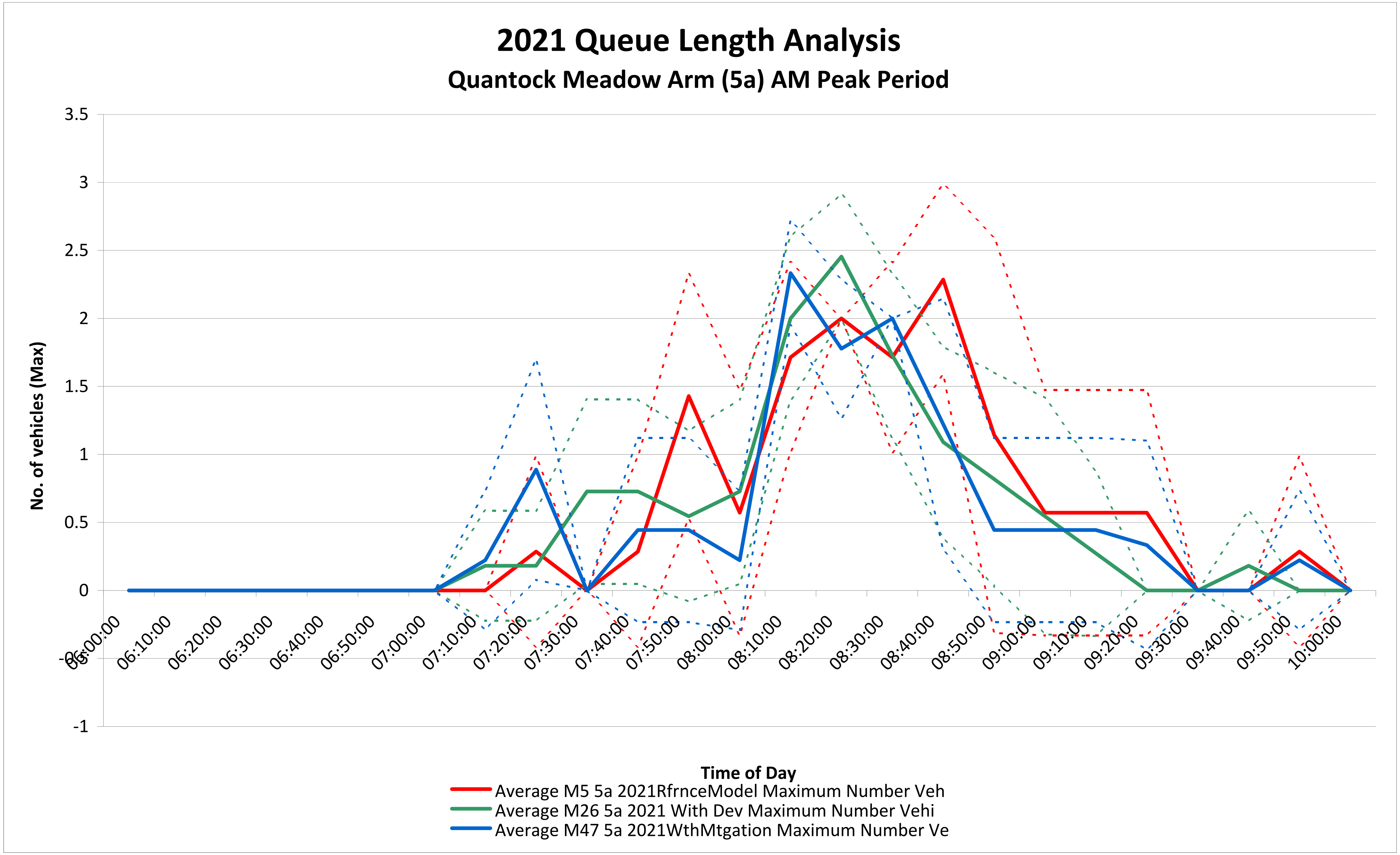

2021 Queue Length Analysis
A39 South Arm (3c) AM Peak Period
No. of Vehicles (Max)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 3c 2021RfrnceModel Maximum Number Veh
Average M26 3c 2021 With Dev Maximum Number Vehi
Average M47 3c 2021WthMtgation Maximum Number Ve

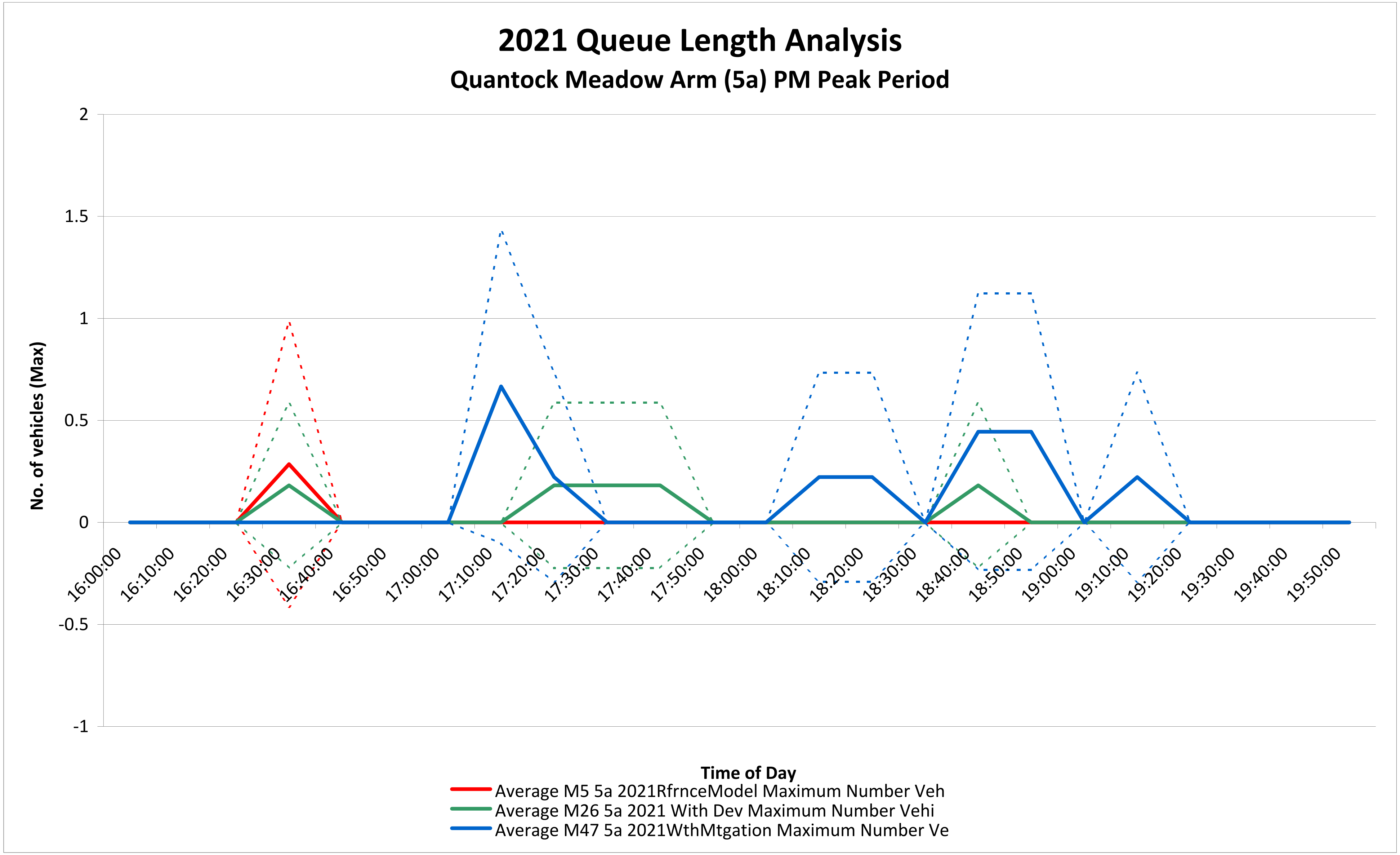


2021 Queue Length Analysis
A39 South Arm (3c) PM Peak Analysis
No. of Vehicles (Max)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 3c 2021RfrnceModel Maximum Number Veh
Average M26 3c 2021 With Dev Maximum Number Vehi
Average M47 3c 2021WthMtgation Maximum Number Ve

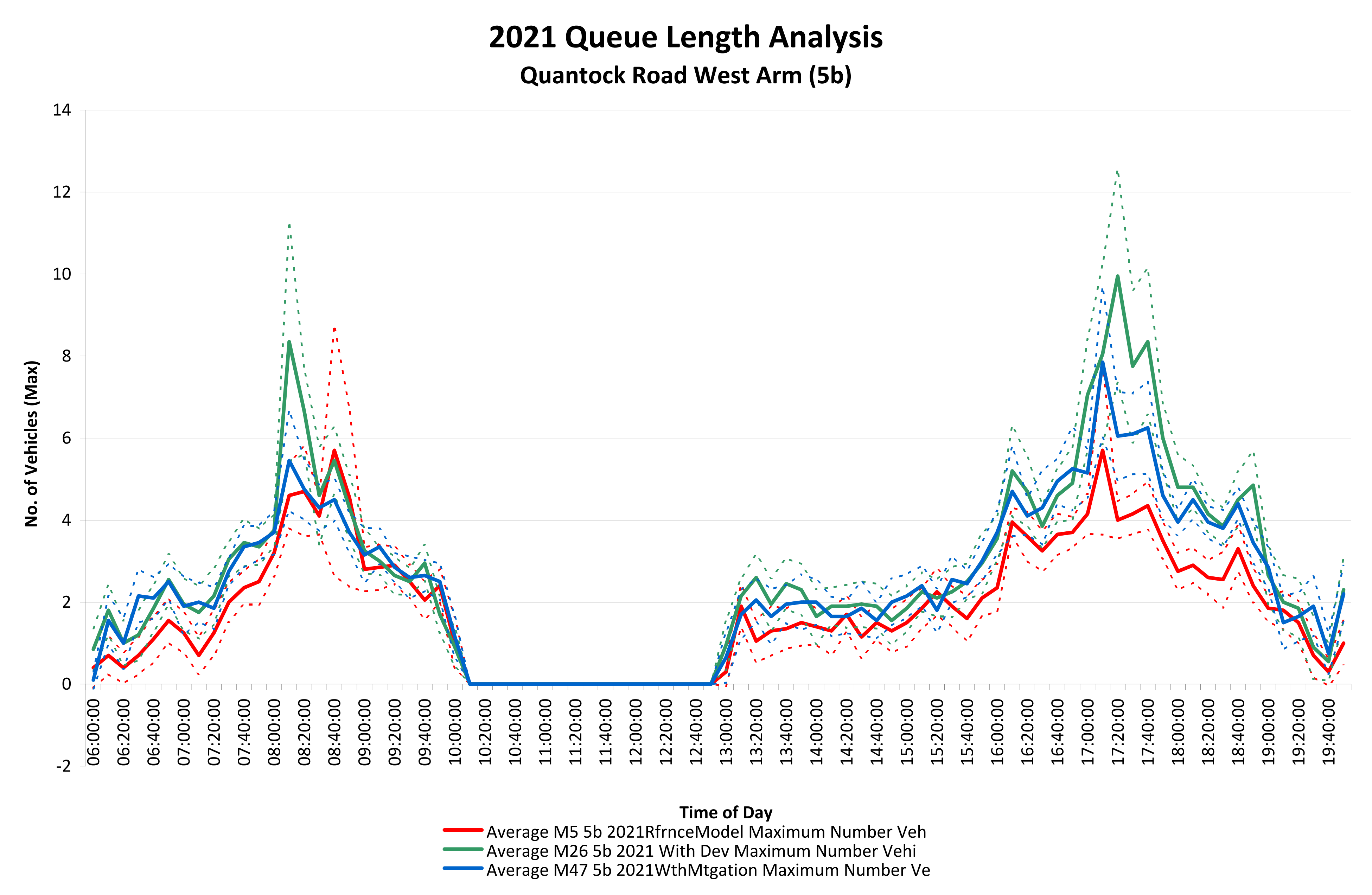


2021 Queue Length Analysis
Quantock Meadow Arm (5a)
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 5a 2021RfrnceModel Maximum Number Veh
Average M26 5a 2021 With Dev Maximum Number Vehi
Average M47 5a 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Quantock Meadow Arm (5a) AM Peak Period
No. of vehicles (Max)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 5a 2021RfrnceModel Maximum Number Veh
Average M26 5a 2021 With Dev Maximum Number Vehi
Average M47 5a 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Quantock Meadow Arm (5a) PM Peak Period
No. of vehicles (Max)
2
1.5
1
0.5
0
-0.5
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 5a 2021RfrnceModel Maximum Number Veh
Average M26 5a 2021 With Dev Maximum Number Vehi
Average M47 5a 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Quantock Road West Arm (5b)
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
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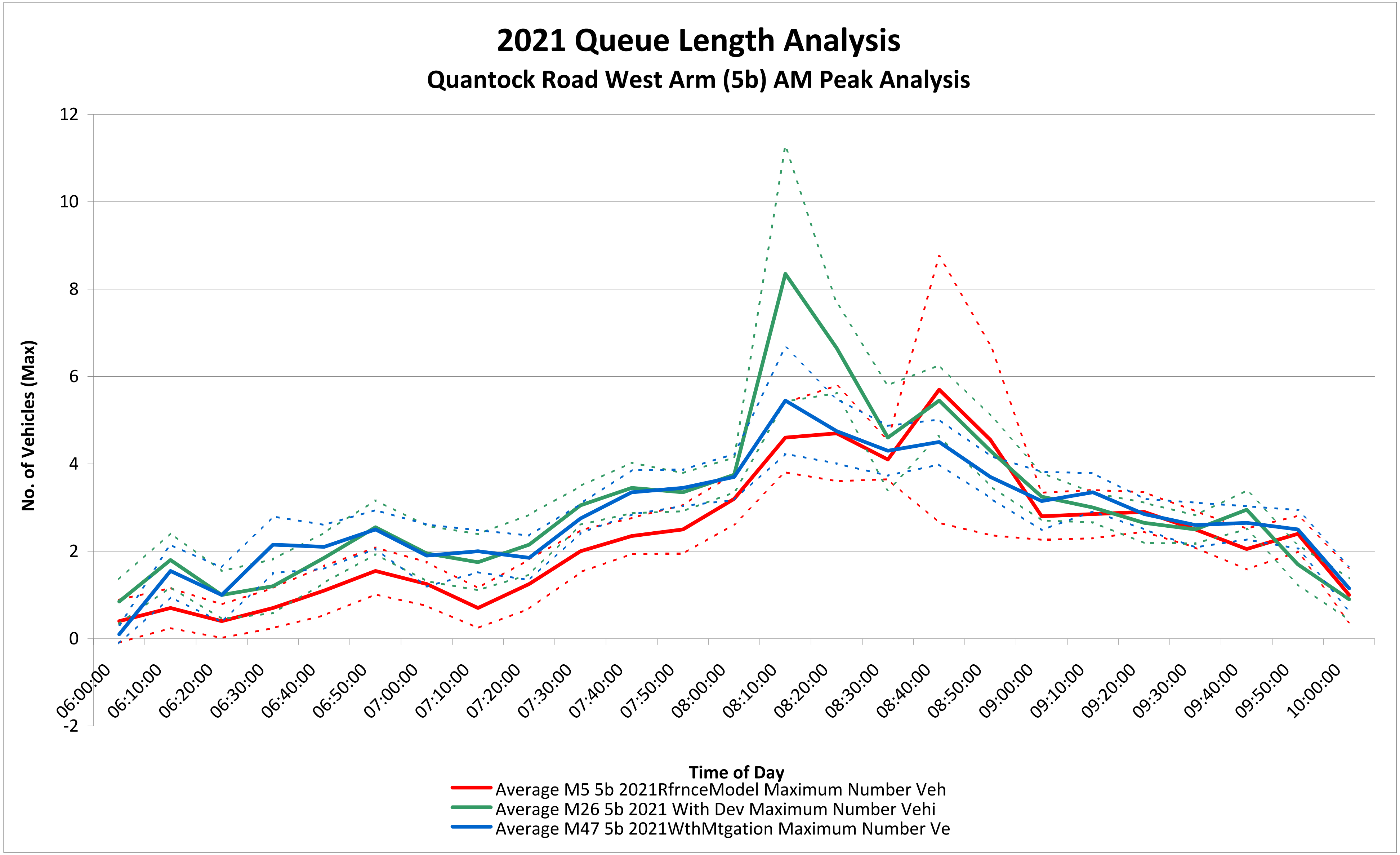
Time of Day
Average M5 5b 2021RfrnceModel Maximum Number Veh
Average M26 5b 2021 With Dev Maximum Number Vehi
Average M47 5b 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Quantock Road West Arm (5b) AM Peak Analysis
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
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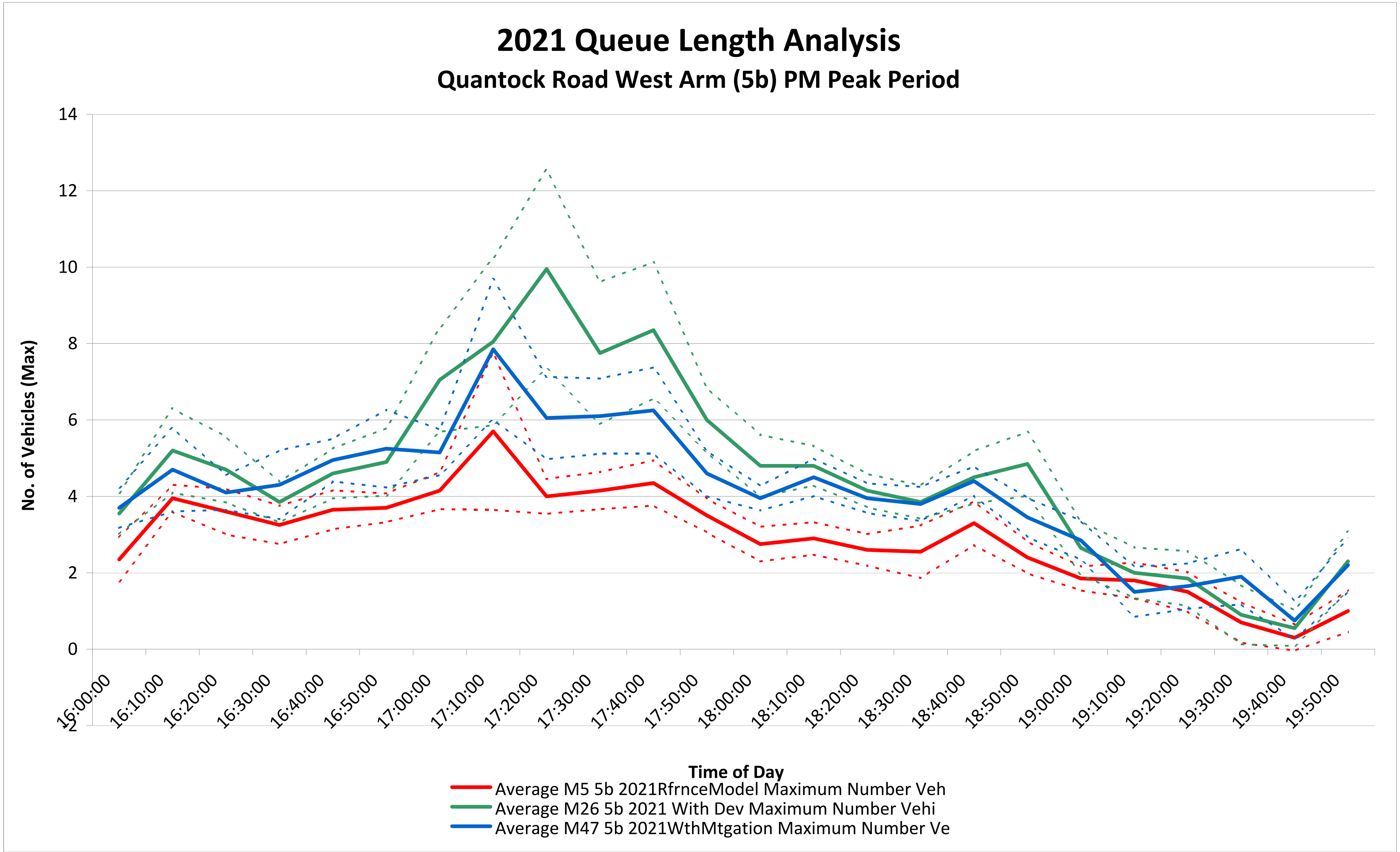
Time of Day
Average M5 5b 2021RfrnceModel Maximum Number Veh
Average M26 5b 2021 With Dev Maximum Number Vehi
Average M47 5b 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Quantock Road West Arm (5b) PM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
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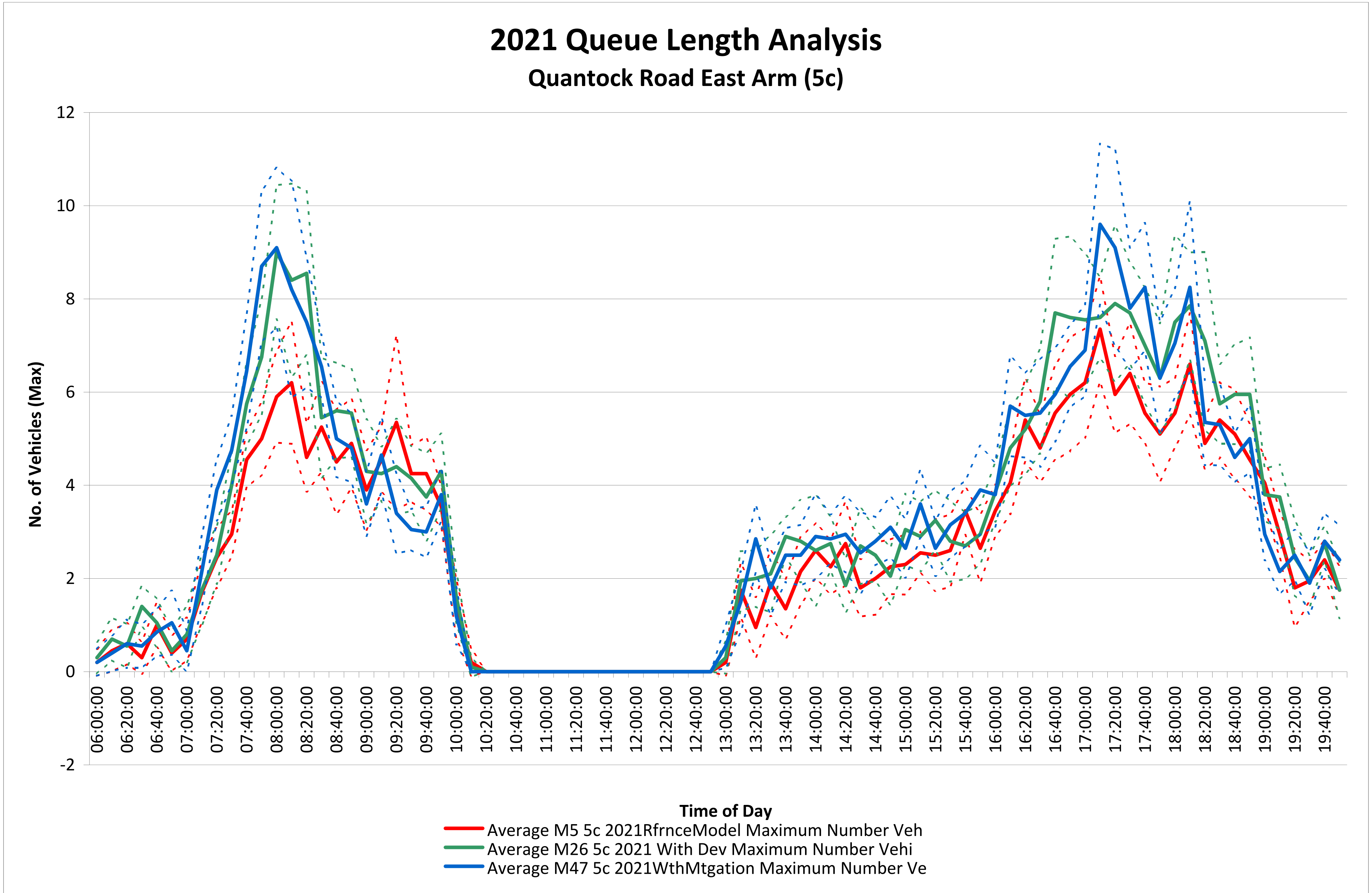
Time of Day
Average M5 5b 2021RfrnceModel Maximum Number Veh
Average M26 5b 2021 With Dev Maximum Number Vehi
Average M47 5b 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Quantock Road East Arm (5c)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
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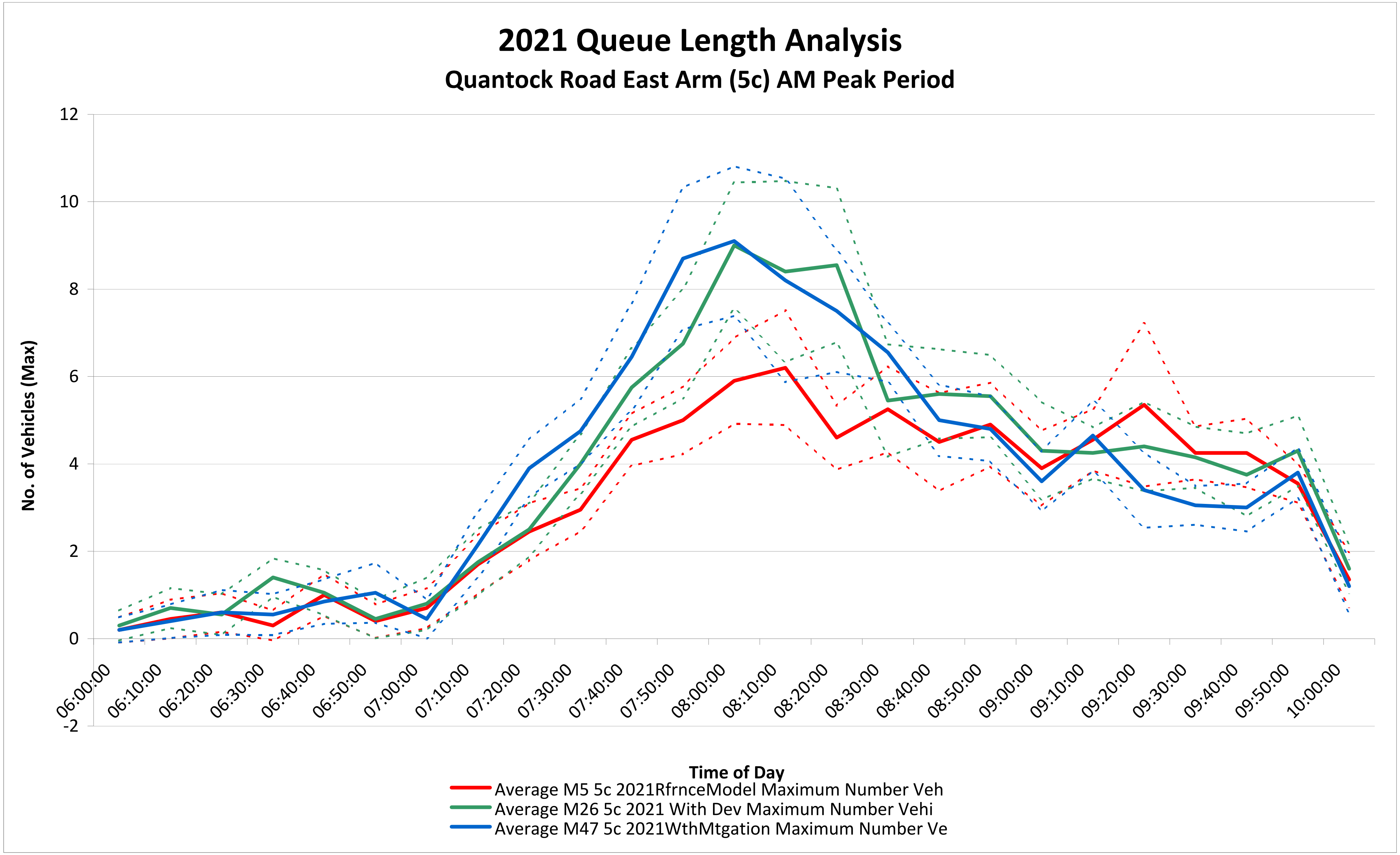
19:40:00
Time of Day
Average M5 5c 2021RfrnceModel Maximum Number Veh
Average M26 5c 2021 With Dev Maximum Number Vehi
Average M47 5c 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Quantock Road East Arm (5c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
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06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
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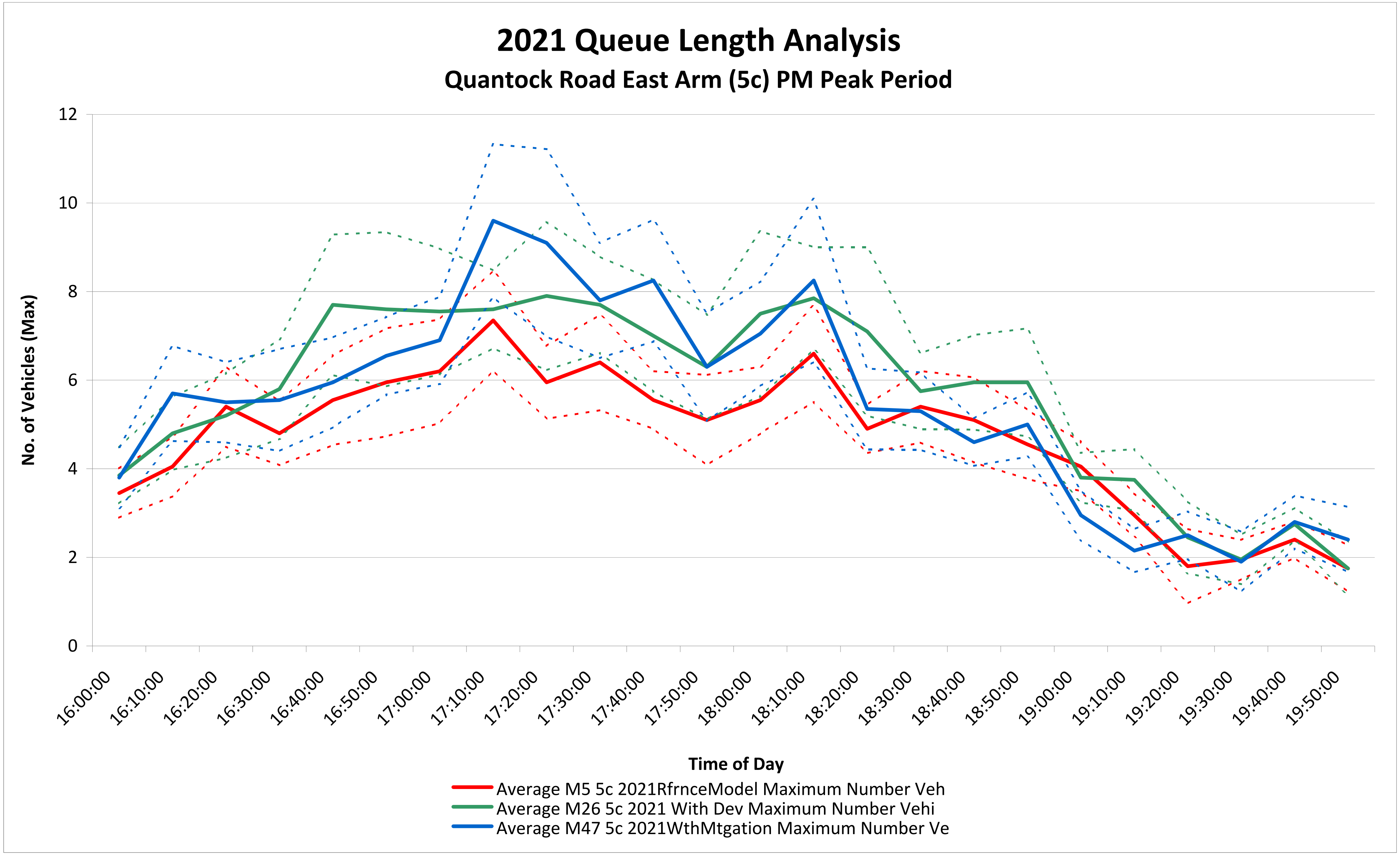
Time of Day
Average M5 5c 2021RfrnceModel Maximum Number Veh
Average M26 5c 2021 With Dev Maximum Number Vehi
Average M47 5c 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Quantock Road East Arm (5c) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
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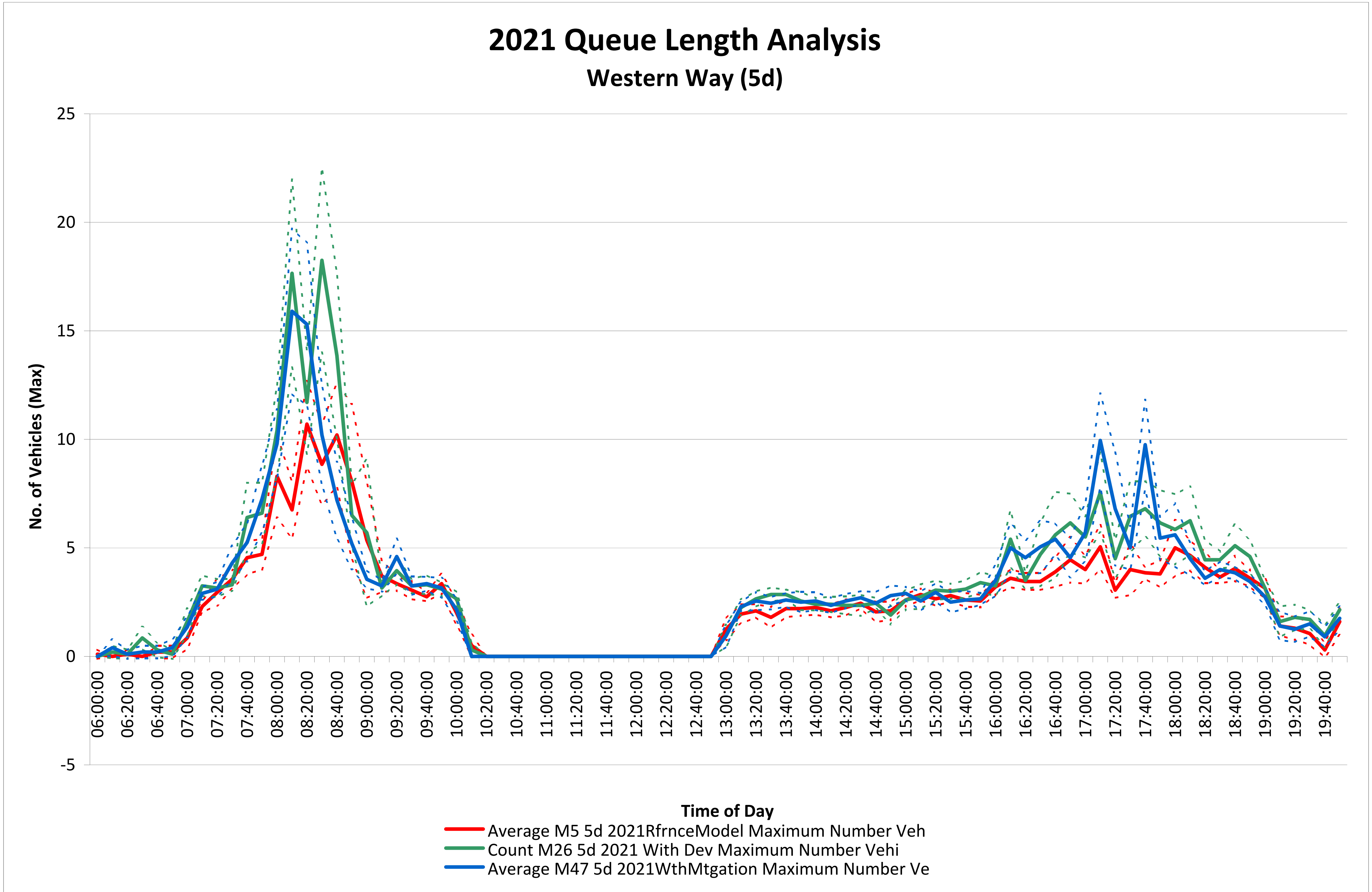
Time of Day
Average M5 5c 2021RfrnceModel Maximum Number Veh
Average M26 5c 2021 With Dev Maximum Number Vehi
Average M47 5c 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Western Way (5d)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
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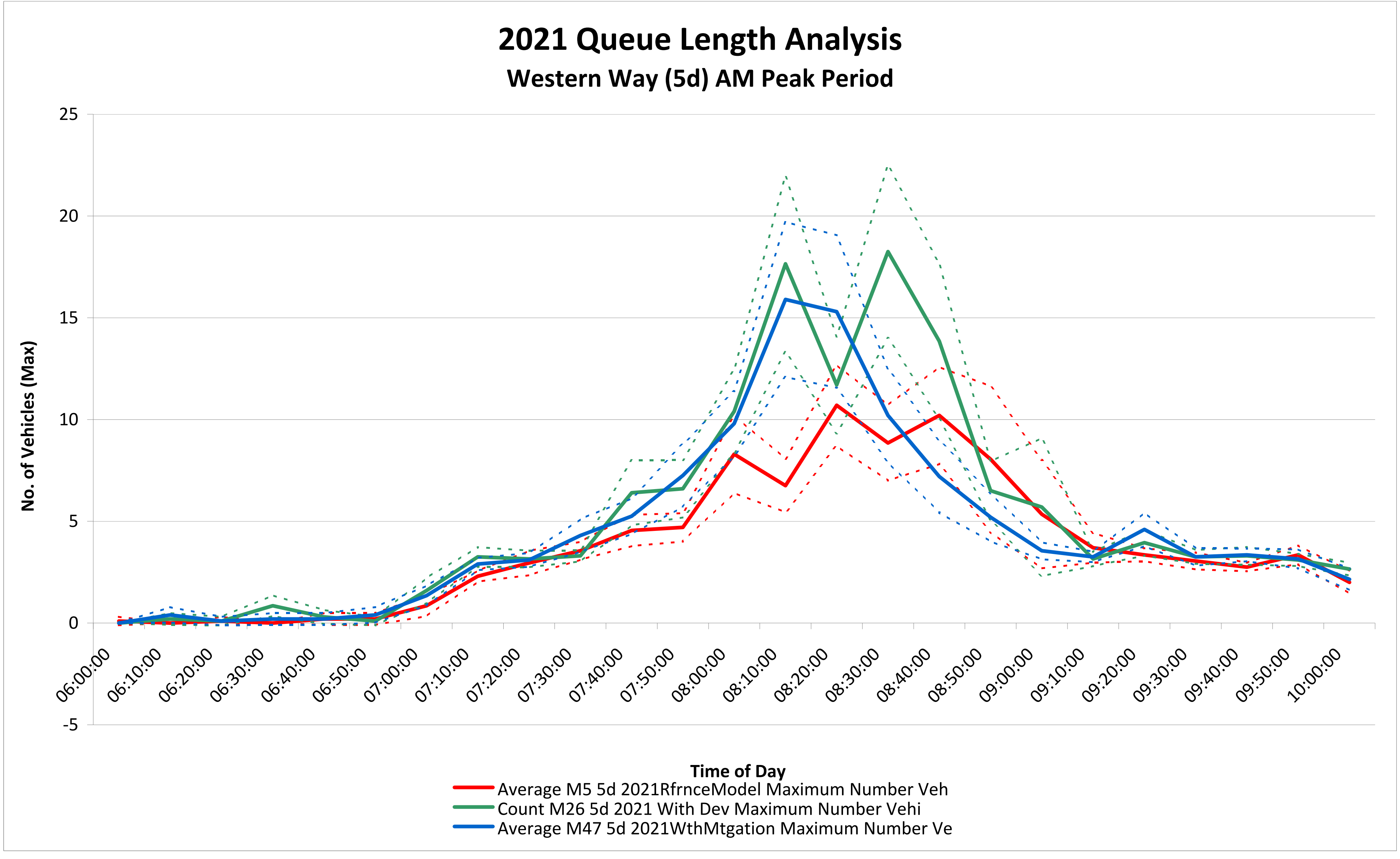
19:40:00
Time of Day
Average M5 5d 2021RfrnceModel Maximum Number Veh
Count M26 5d 2021 With Dev Maximum Number Vehi
Average M47 5d 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Western Way (5d) AM Peak Period
No. of Vehicles (Max)
25
20
15
10
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06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
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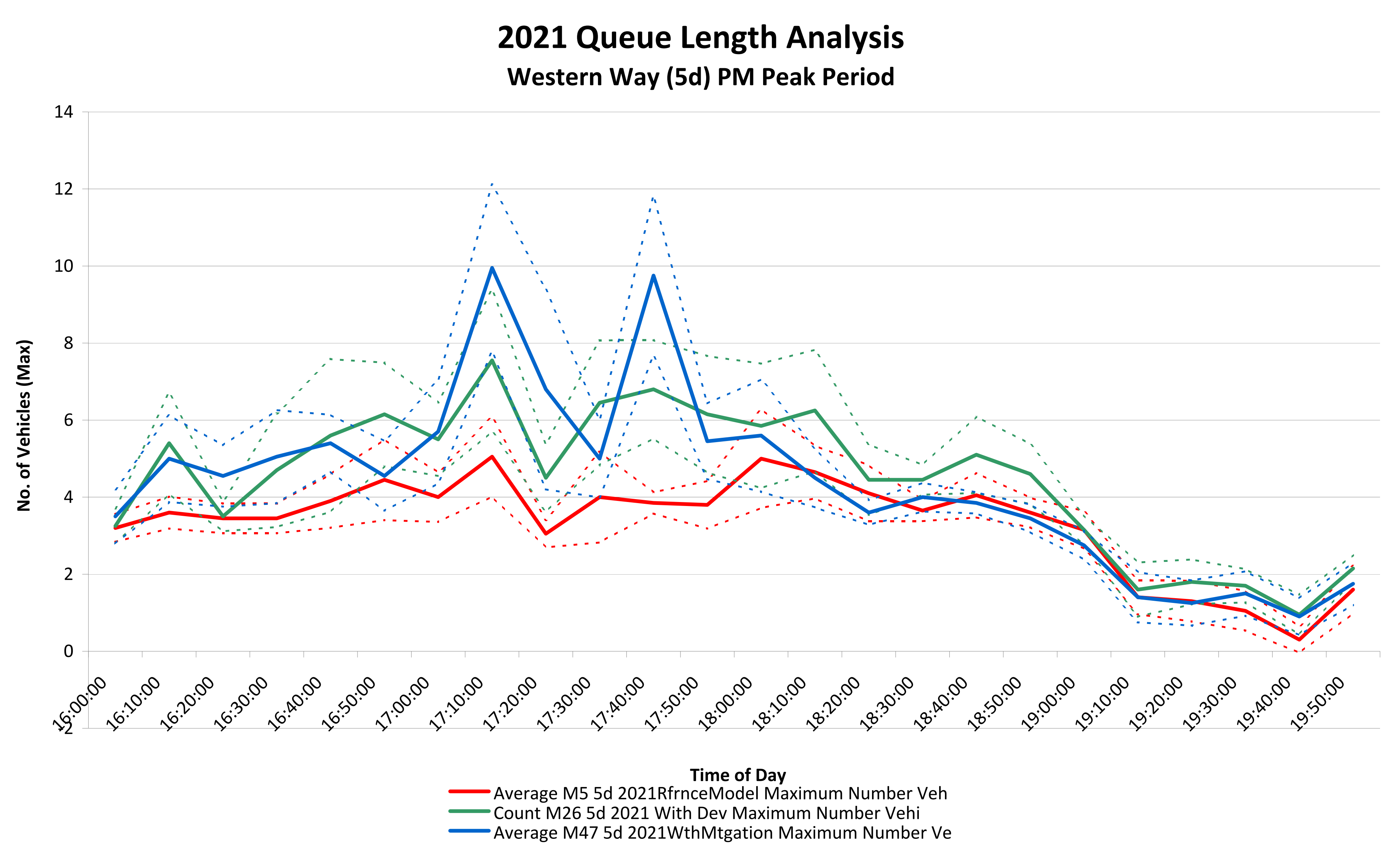
Time of Day
Average M5 5d 2021RfrnceModel Maximum Number Veh
Count M26 5d 2021 With Dev Maximum Number Vehi
Average M47 5d 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Western Way (5d) PM Peak Period
No. of Vehicles (Max)
14
12
10
8
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16:00:00
16:10:00
16:20:00
16:30:00
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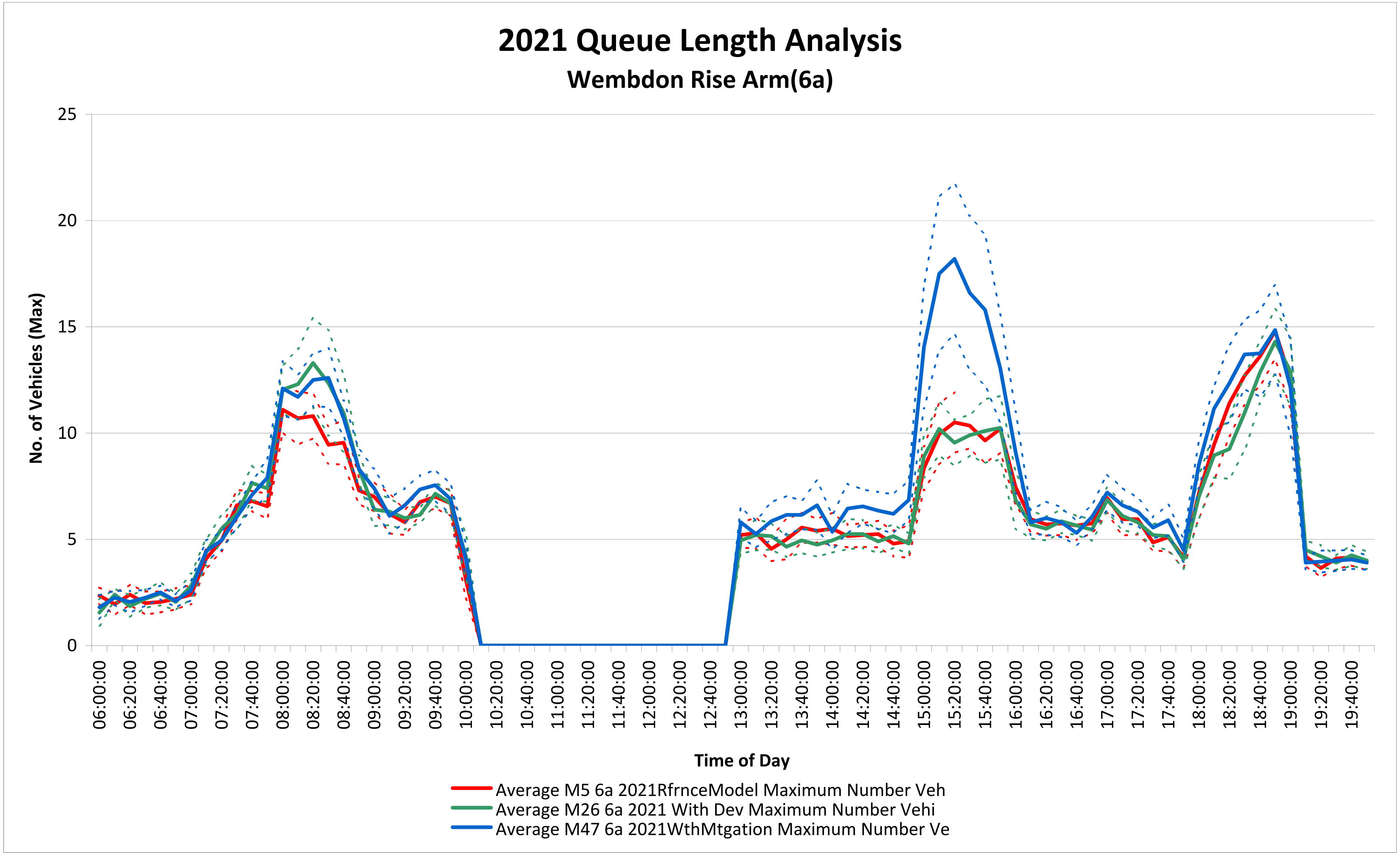
Time of Day
Average M5 5d 2021RfrnceModel Maximum Number Veh
Count M26 5d 2021 With Dev Maximum Number Vehi
Average M47 5d 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Wembdon Rise Arm(6a)
No. of Vehicles (Max)
0
5
10
15
20
25
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06:40:00
07:00:00
07:20:00
07:40:00
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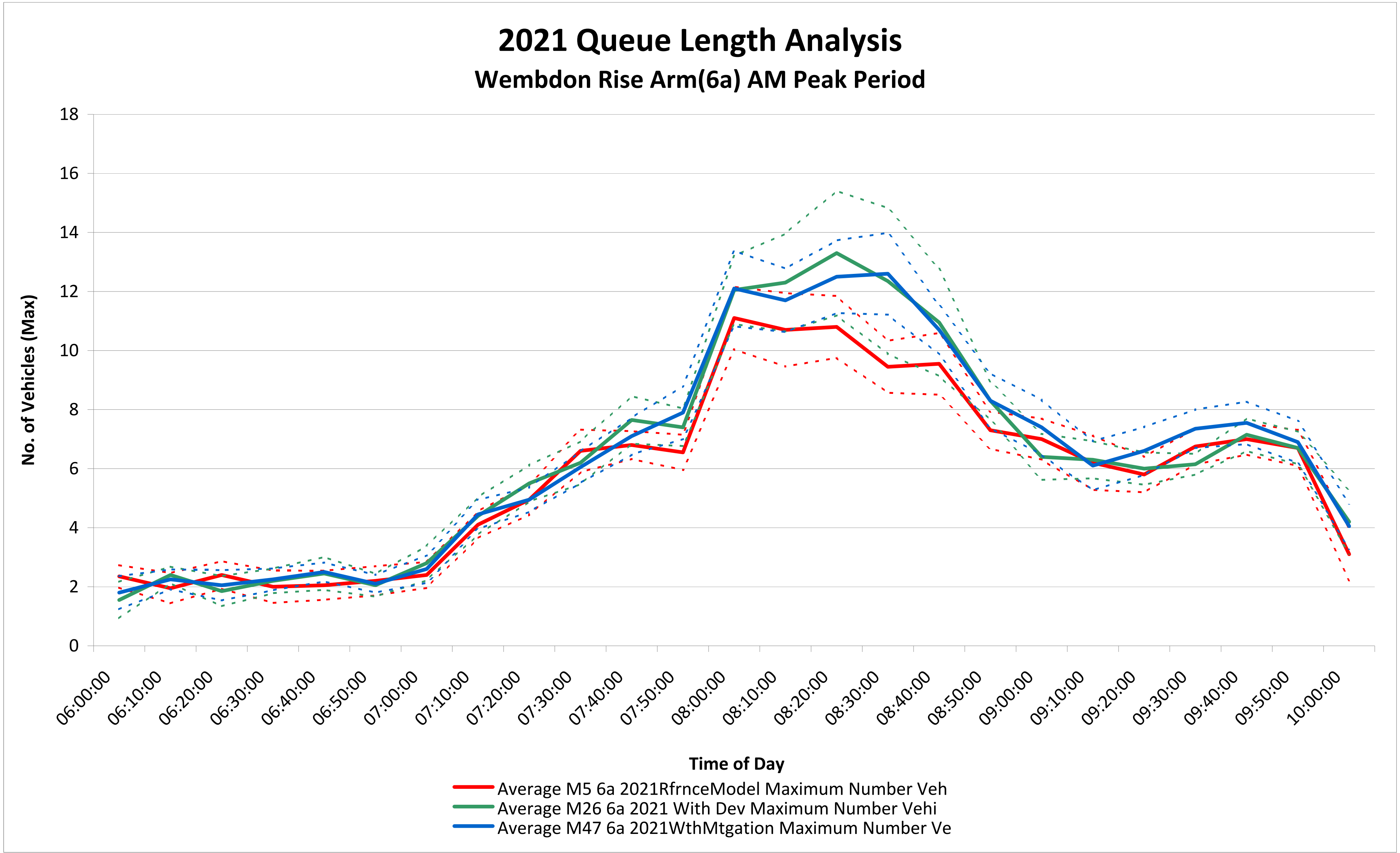
Time of Day
Average M5 6a 2021RfrnceModel Maximum Number Veh
Average M26 6a 2021 With Dev Maximum Number Vehi
Average M47 6a 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Wembdon Rise Arm(6a) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
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18
06:00:00
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06:20:00
06:30:00
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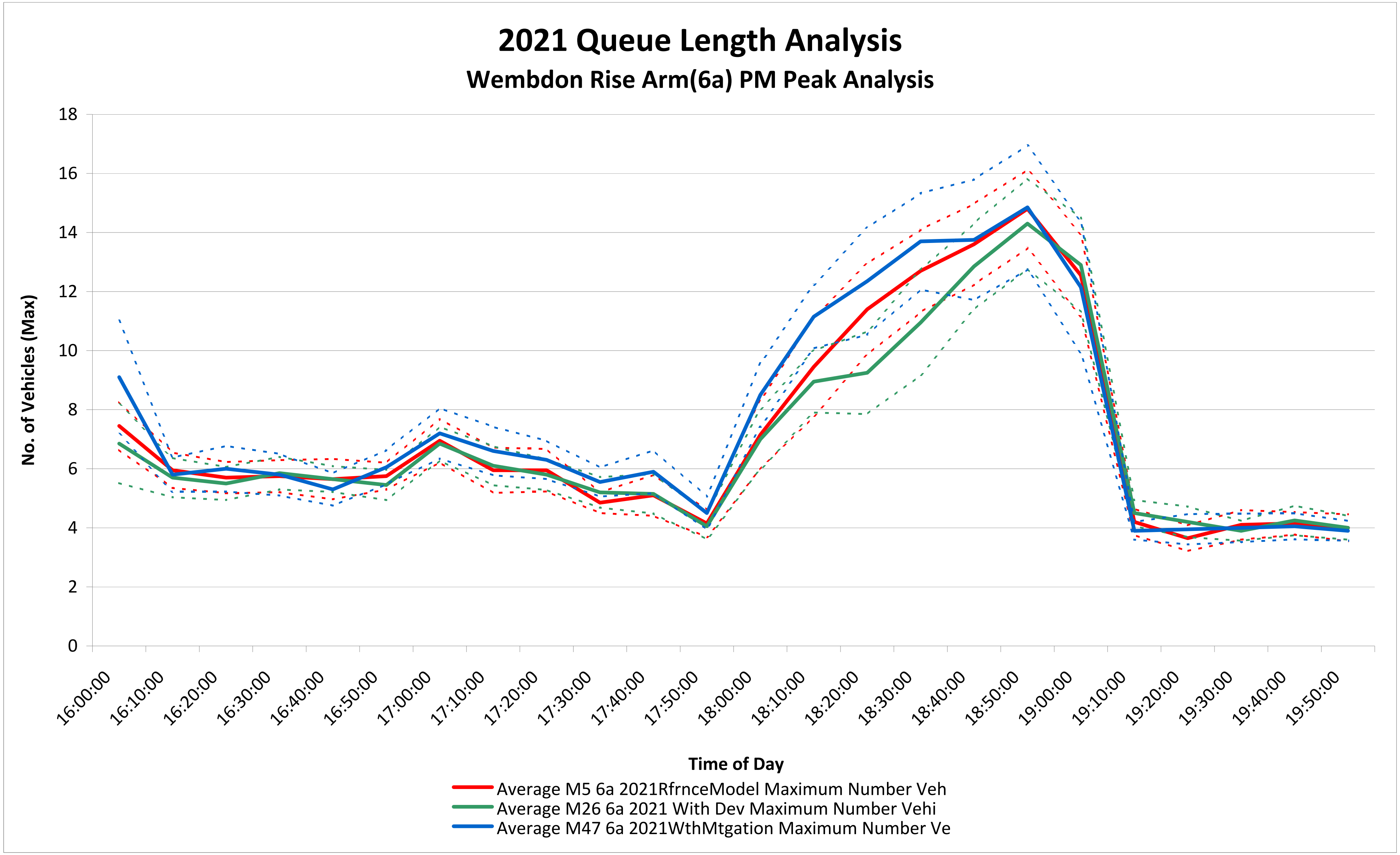
Time of Day
Average M5 6a 2021RfrnceModel Maximum Number Veh
Average M26 6a 2021 With Dev Maximum Number Vehi
Average M47 6a 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Wembdon Rise Arm(6a) PM Peak Analysis
No. of Vehicles (Max)
0
2
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16:10:00
16:20:00
16:30:00
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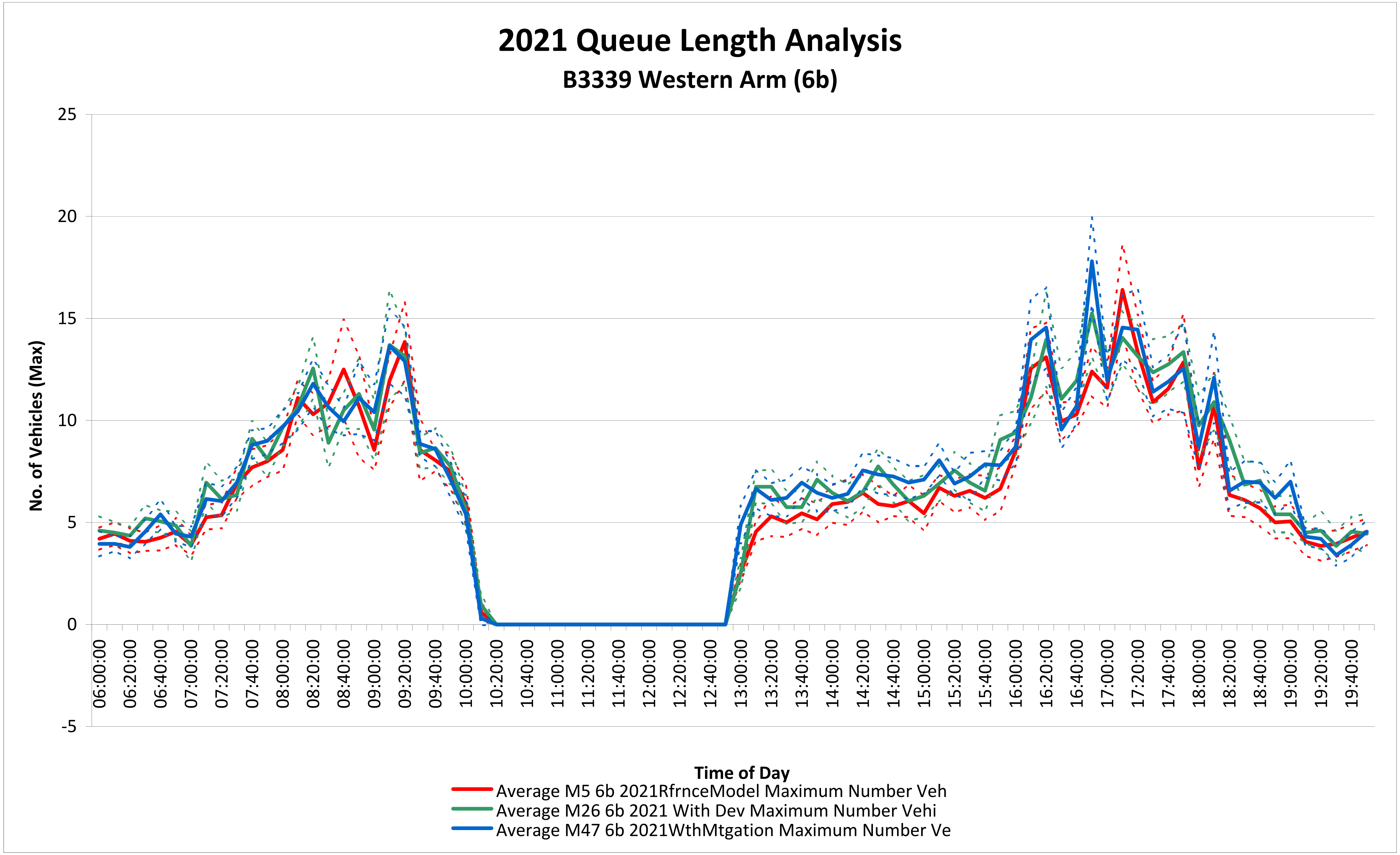
Time of Day
Average M5 6a 2021RfrnceModel Maximum Number Veh
Average M26 6a 2021 With Dev Maximum Number Vehi
Average M47 6a 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
B3339 Western Arm (6b)
No. of Vehicles (Max)
25
20
15
10
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06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
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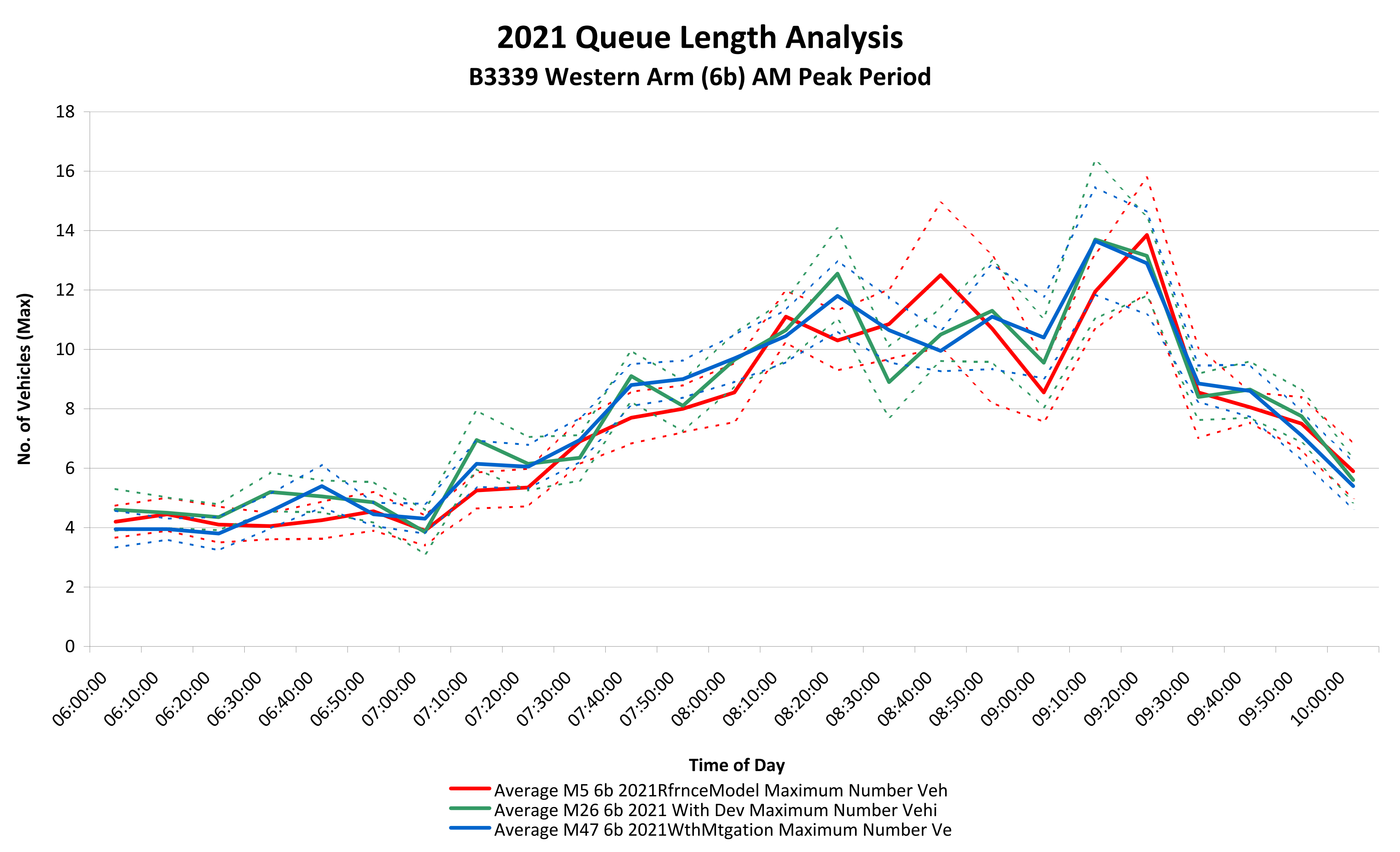
Time of Day
Average M5 6b 2021RfrnceModel Maximum Number Veh
Average M26 6b 2021 With Dev Maximum Number Vehi
Average M47 6b 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
B3339 Western Arm (6b) AM Peak Period
No. of Vehicles (Max)
0
2
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6
8
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16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
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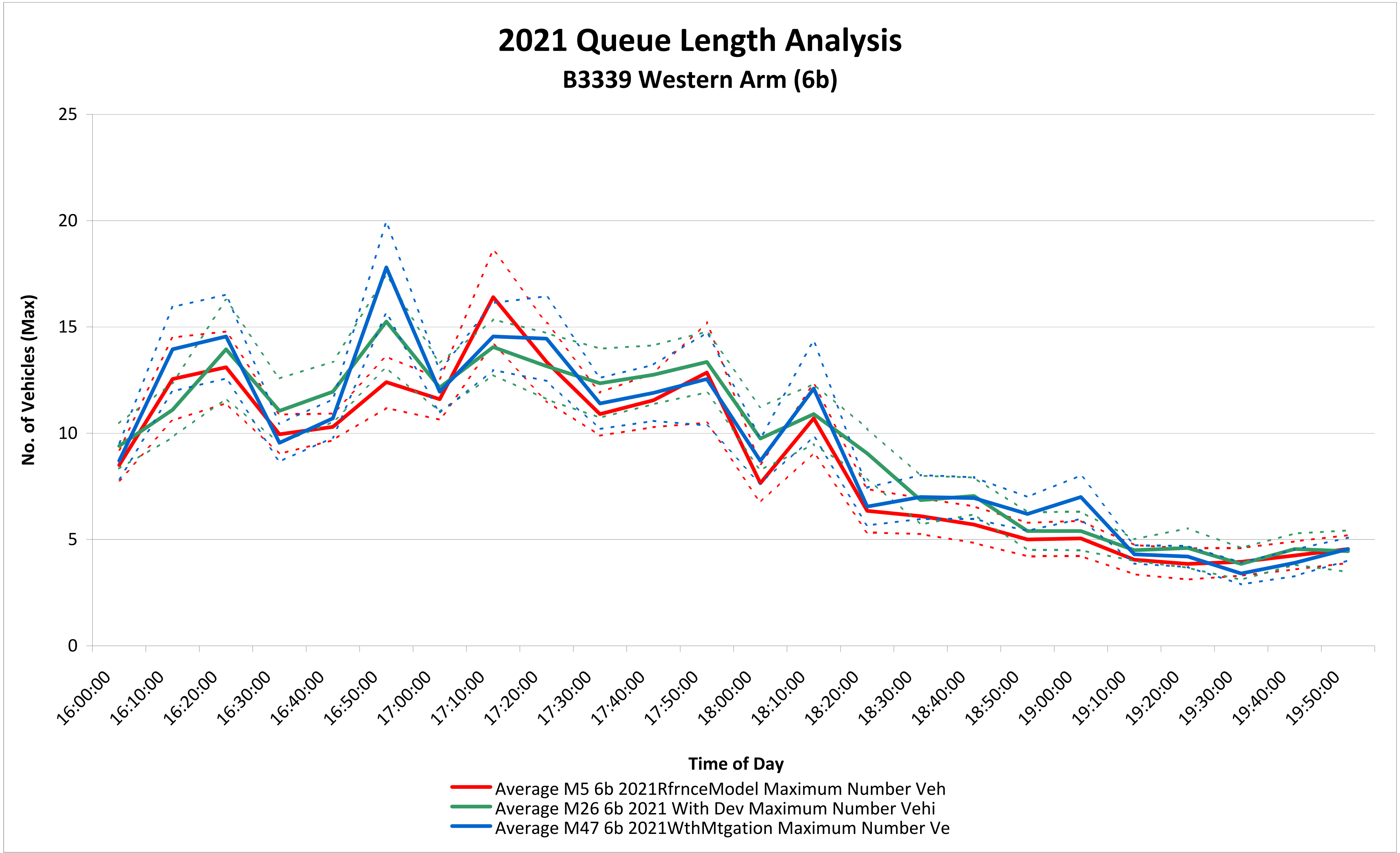
Time of Day
Average M5 6b 2021RfrnceModel Maximum Number Veh
Average M26 6b 2021 With Dev Maximum Number Vehi
Average M47 6b 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
B3339 Western Arm (6b)
No. of Vehicles (Max)
25
20
15
10
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16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
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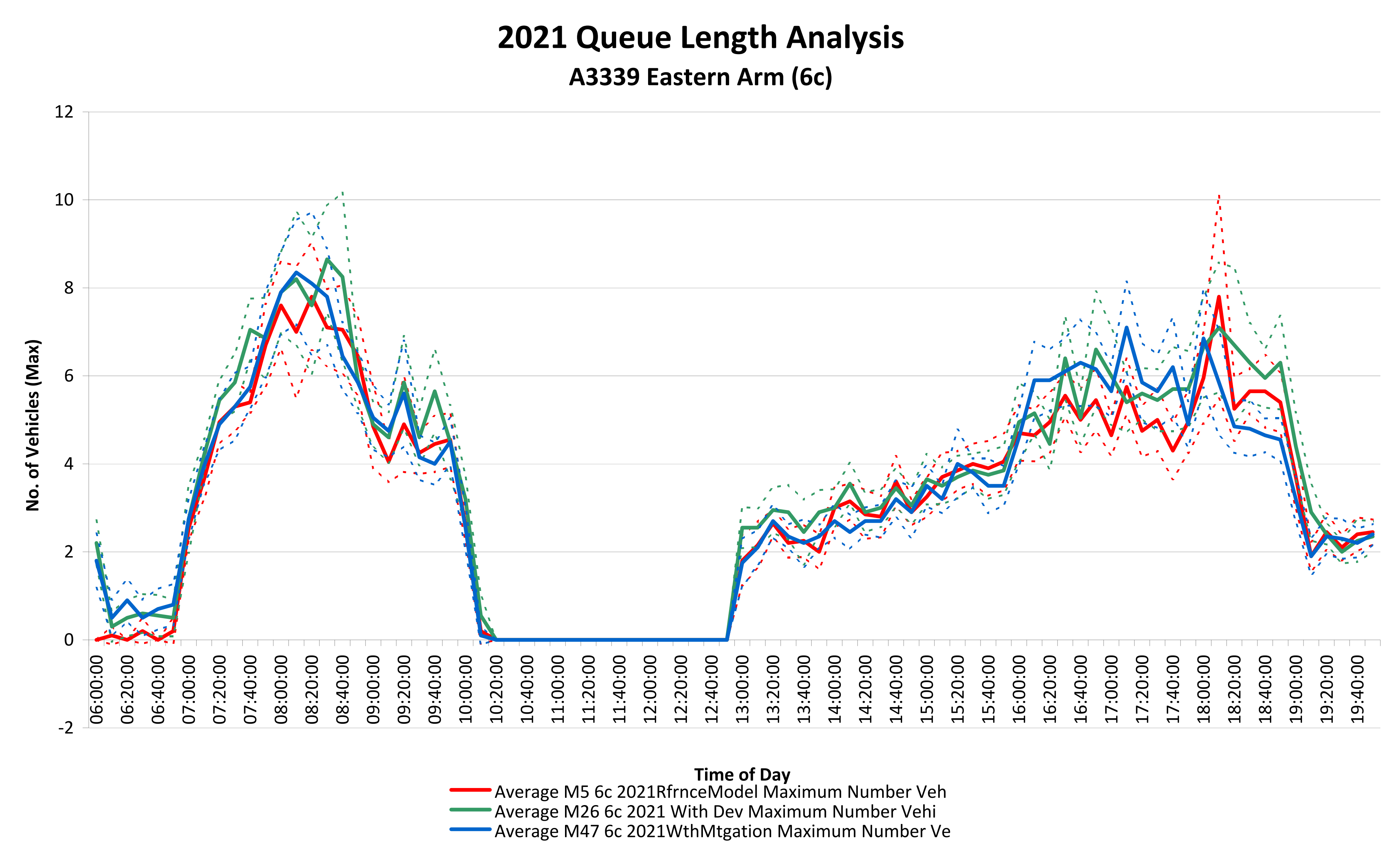
Time of Day
Average M5 6b 2021RfrnceModel Maximum Number Veh
Average M26 6b 2021 With Dev Maximum Number Vehi
Average M47 6b 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
A3339 Eastern Arm (6c)
No. of Vehicles (Max)
12
10
8
6
4
2
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-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
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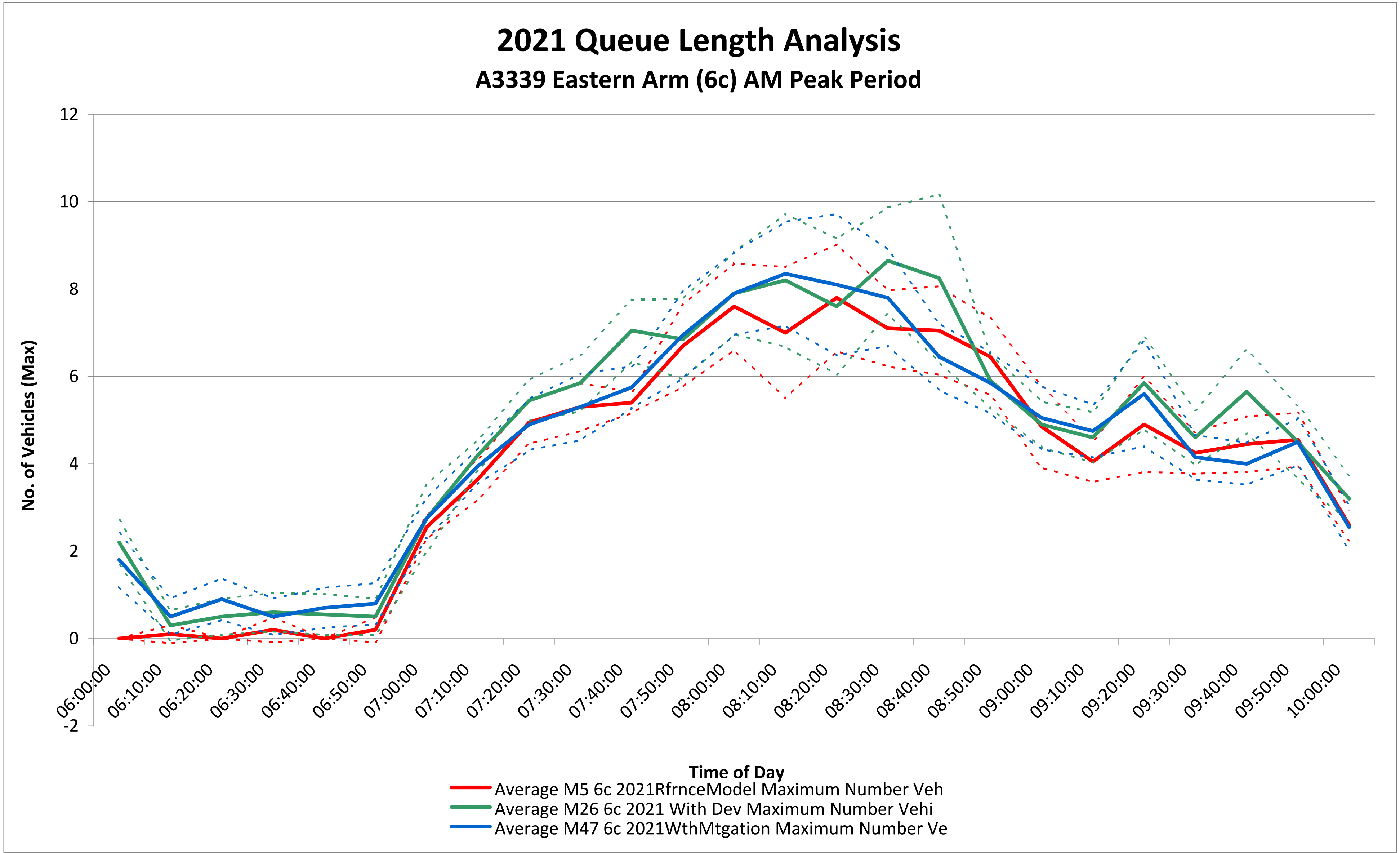
Time of Day
Average M5 6c 2021RfrnceModel Maximum Number Veh
Average M26 6c 2021 With Dev Maximum Number Vehi
Average M47 6c 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
A3339 Eastern Arm (6c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
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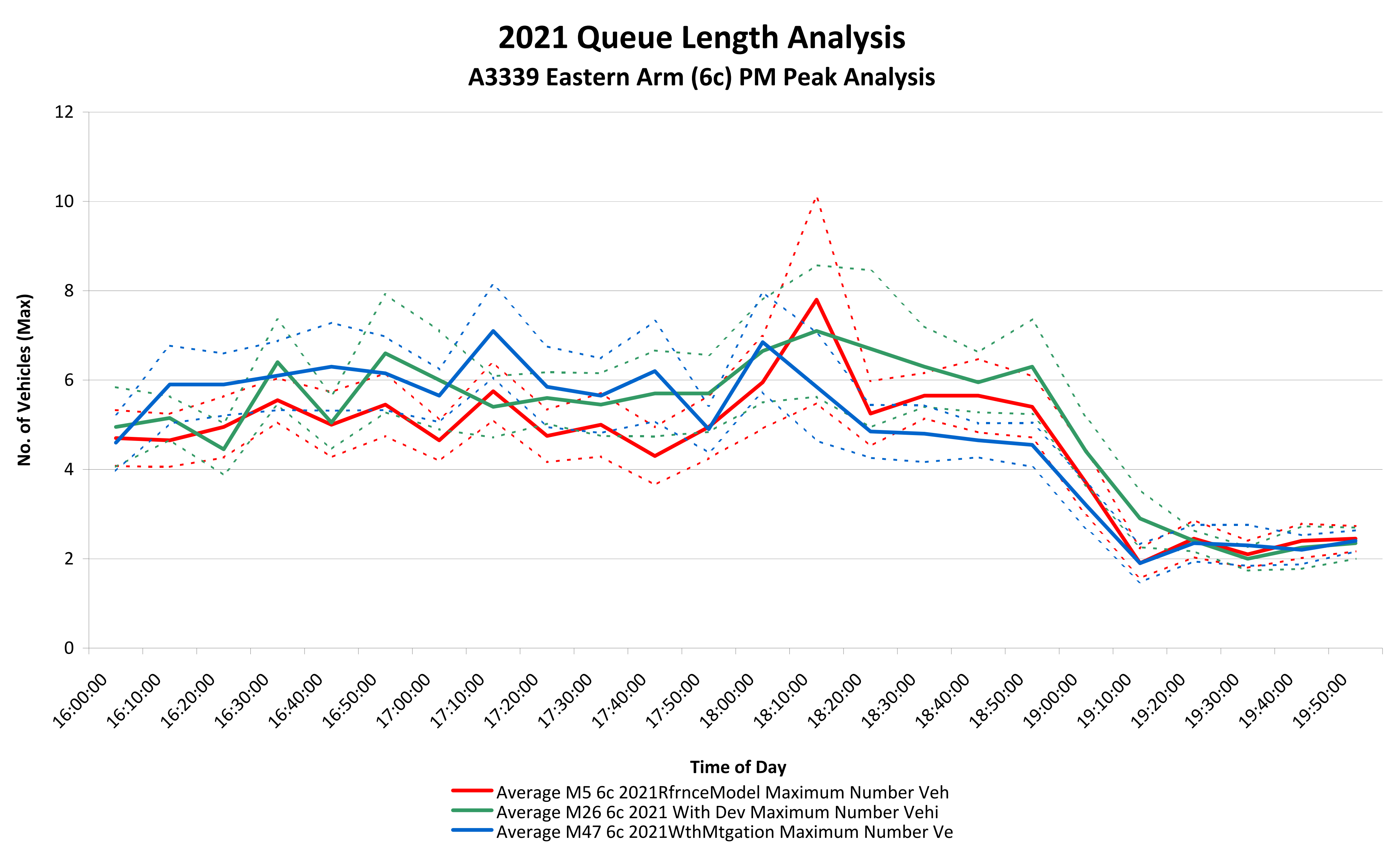
Time of Day
Average M5 6c 2021RfrnceModel Maximum Number Veh
Average M26 6c 2021 With Dev Maximum Number Vehi
Average M47 6c 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
A3339 Eastern Arm (6c) PM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
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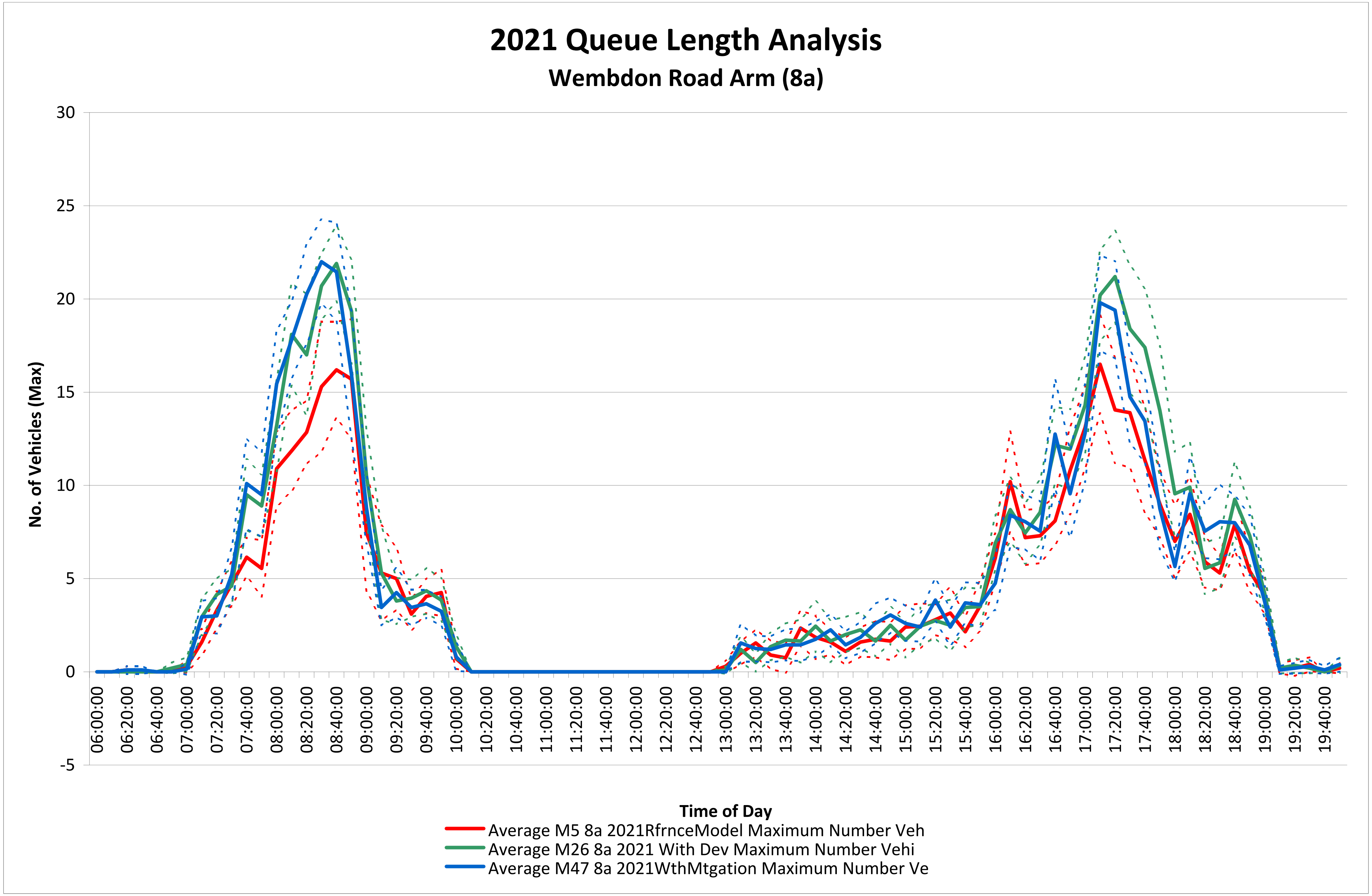
Time of Day
Average M5 6c 2021RfrnceModel Maximum Number Veh
Average M26 6c 2021 With Dev Maximum Number Vehi
Average M47 6c 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Wembdon Road Arm (8a)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
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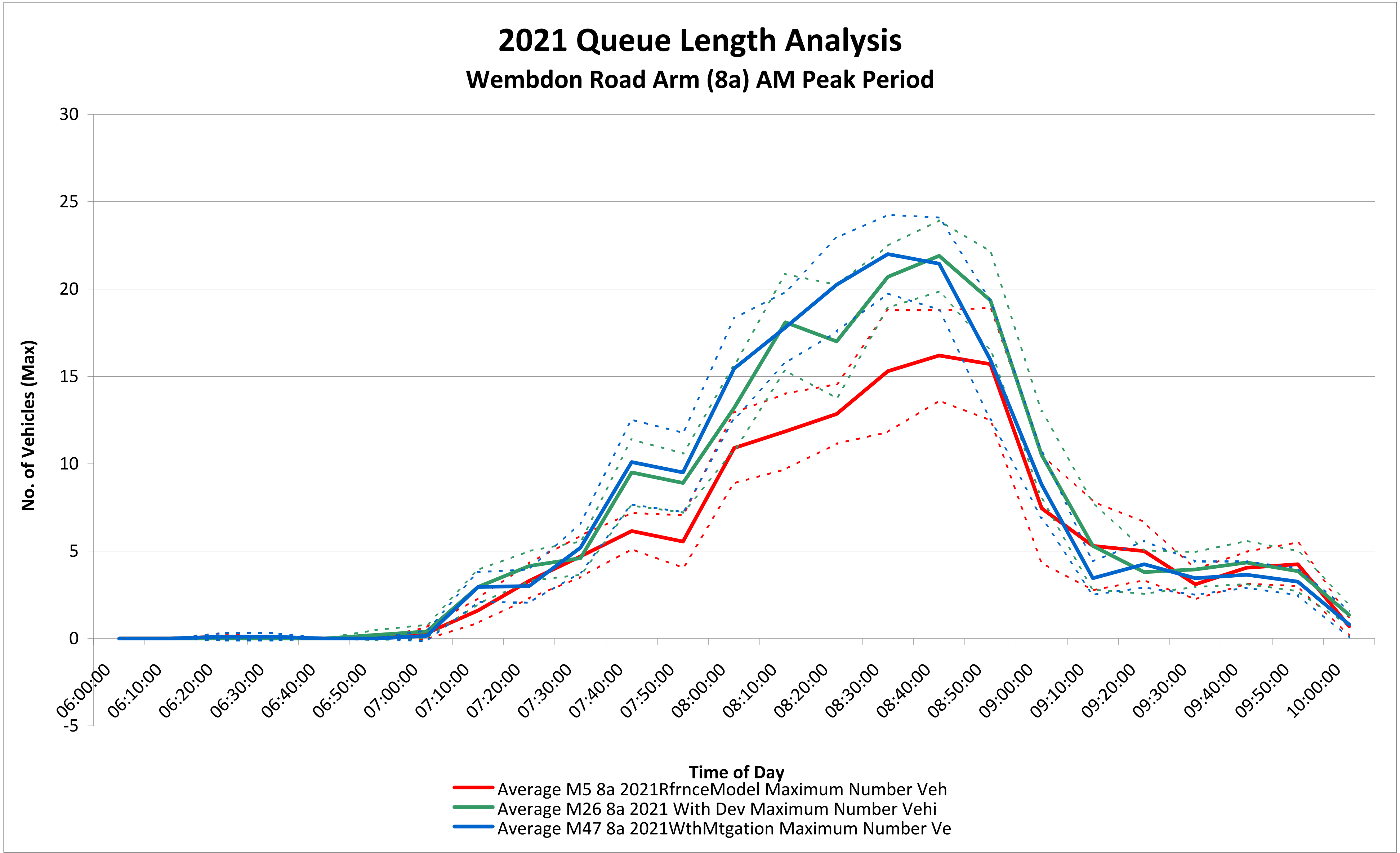
Time of Day
Average M5 8a 2021RfrnceModel Maximum Number Veh
Average M26 8a 2021 With Dev Maximum Number Vehi
Average M47 8a 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Wembdon Road Arm (8a) AM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
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06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
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07:20:00
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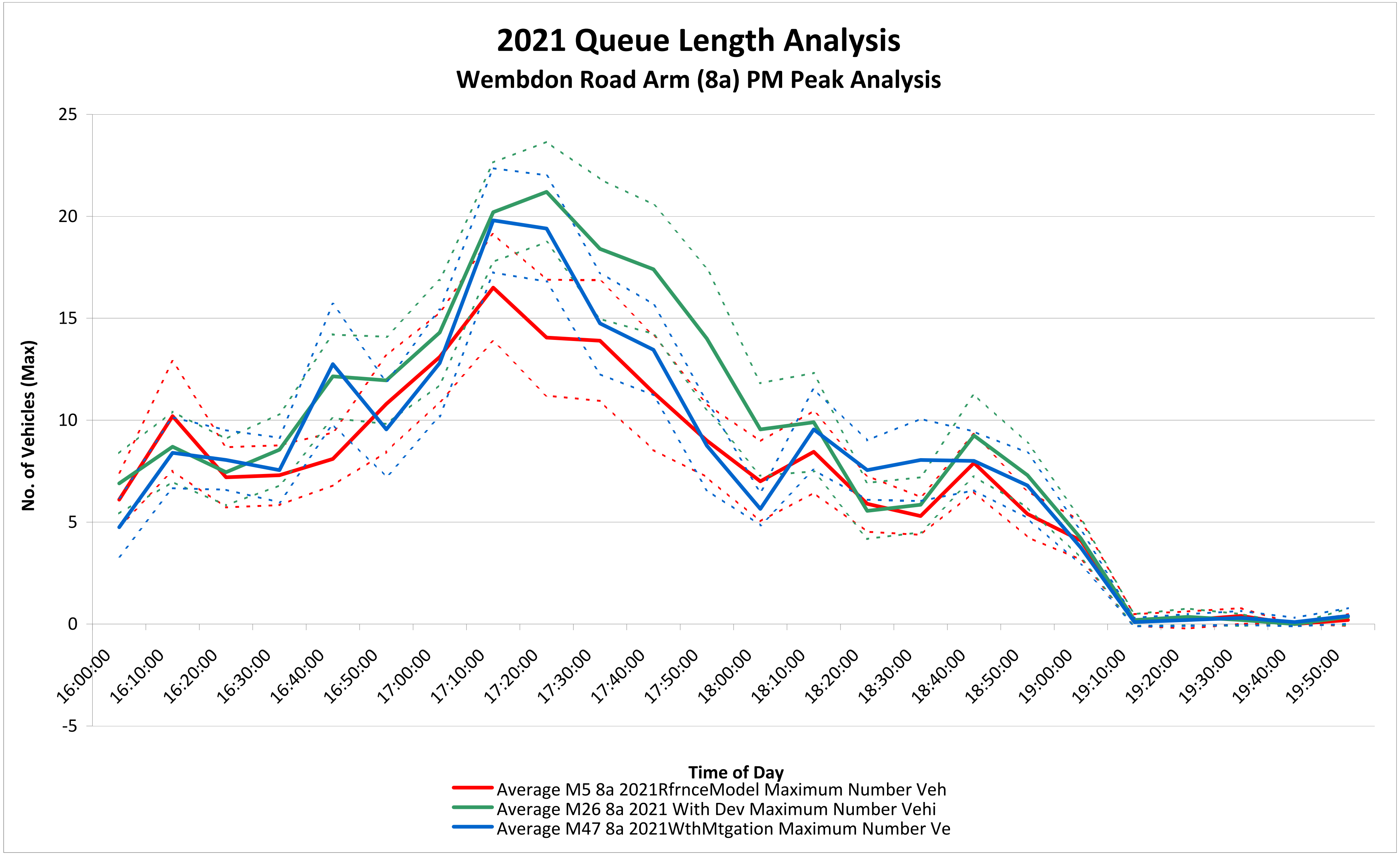
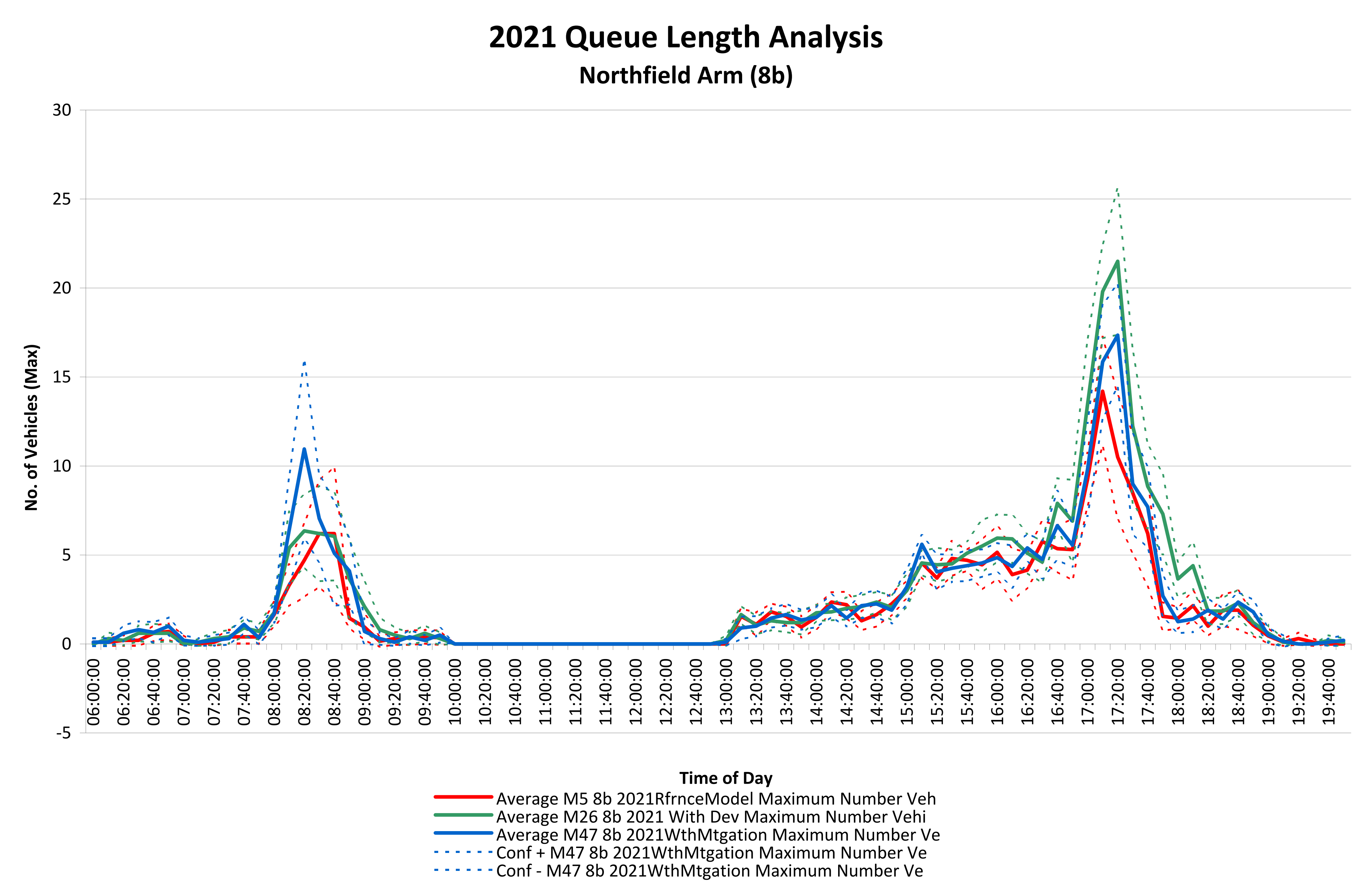
Time of Day
Average M5 8a 2021RfrnceModel Maximum Number Veh
Average M26 8a 2021 With Dev Maximum Number Vehi
Average M47 8a 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Wembdon Road Arm (8a) PM Peak Analysis
No. of Vehicles (Max)
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 8a 2021RfrnceModel Maximum Number Veh
Average M26 8a 2021 With Dev Maximum Number Vehi
Average M47 8a 2021WthMtgation Maximum Number Ve


2021 Queue Length Analysis
Northfield Arm (8b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
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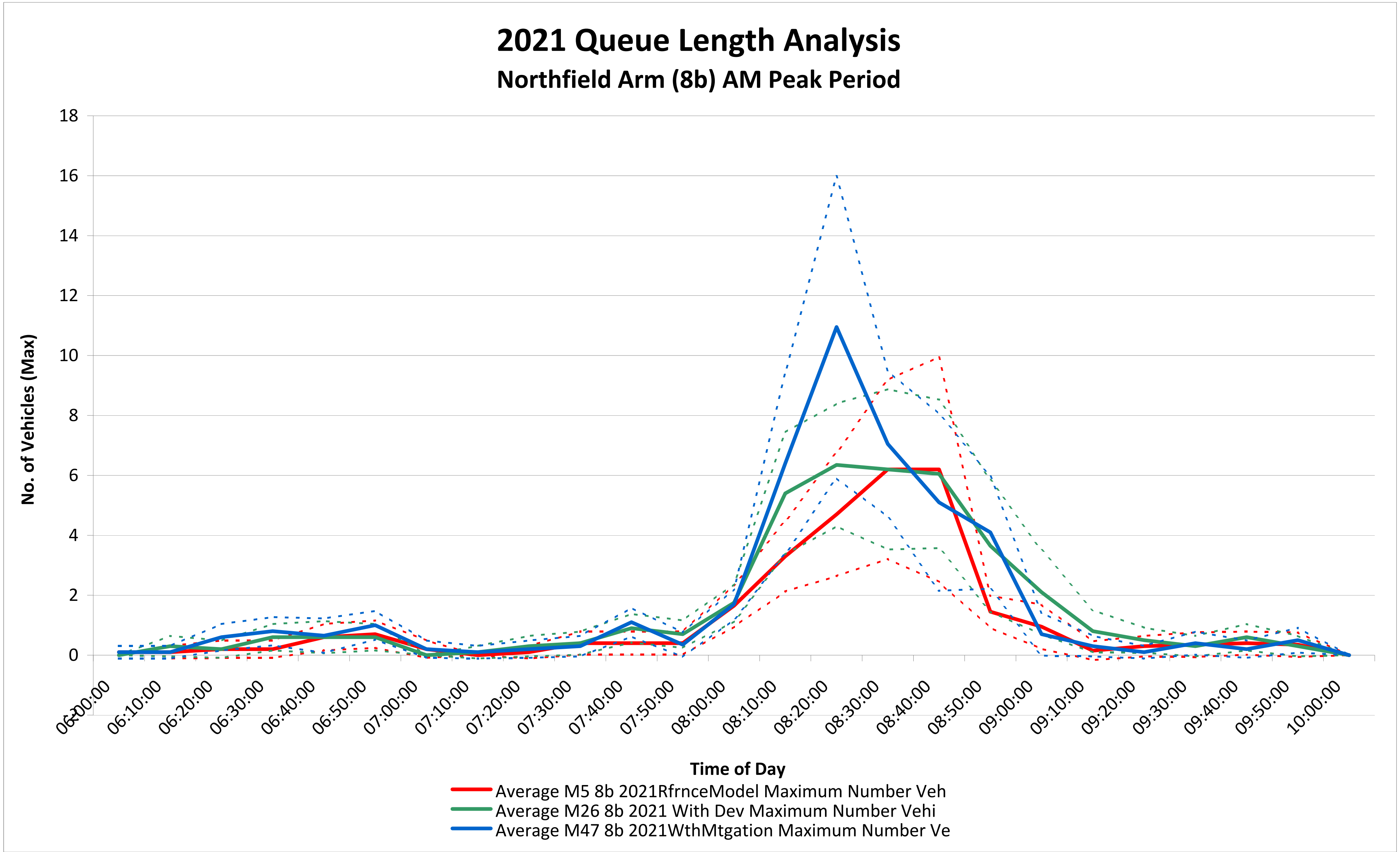
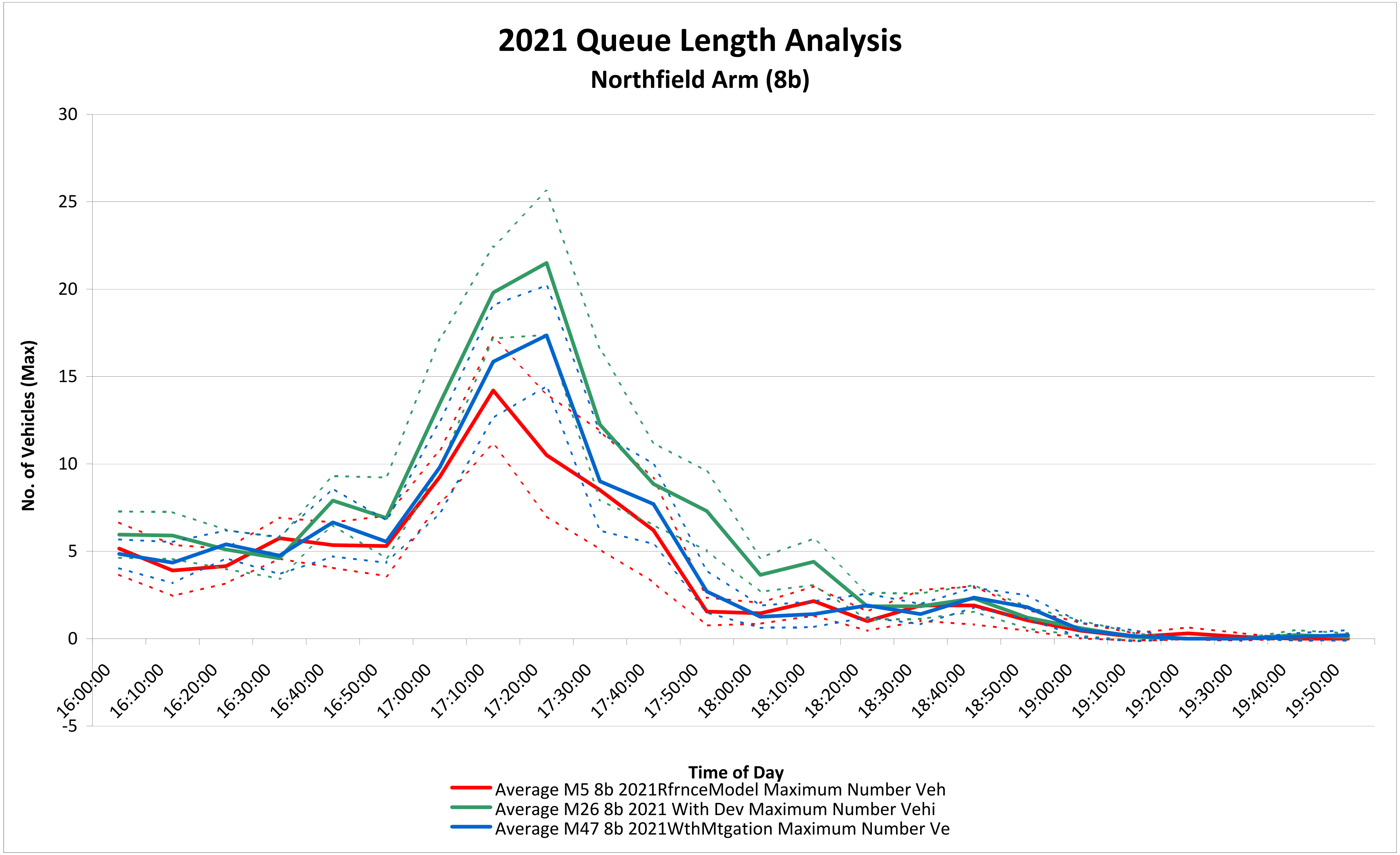
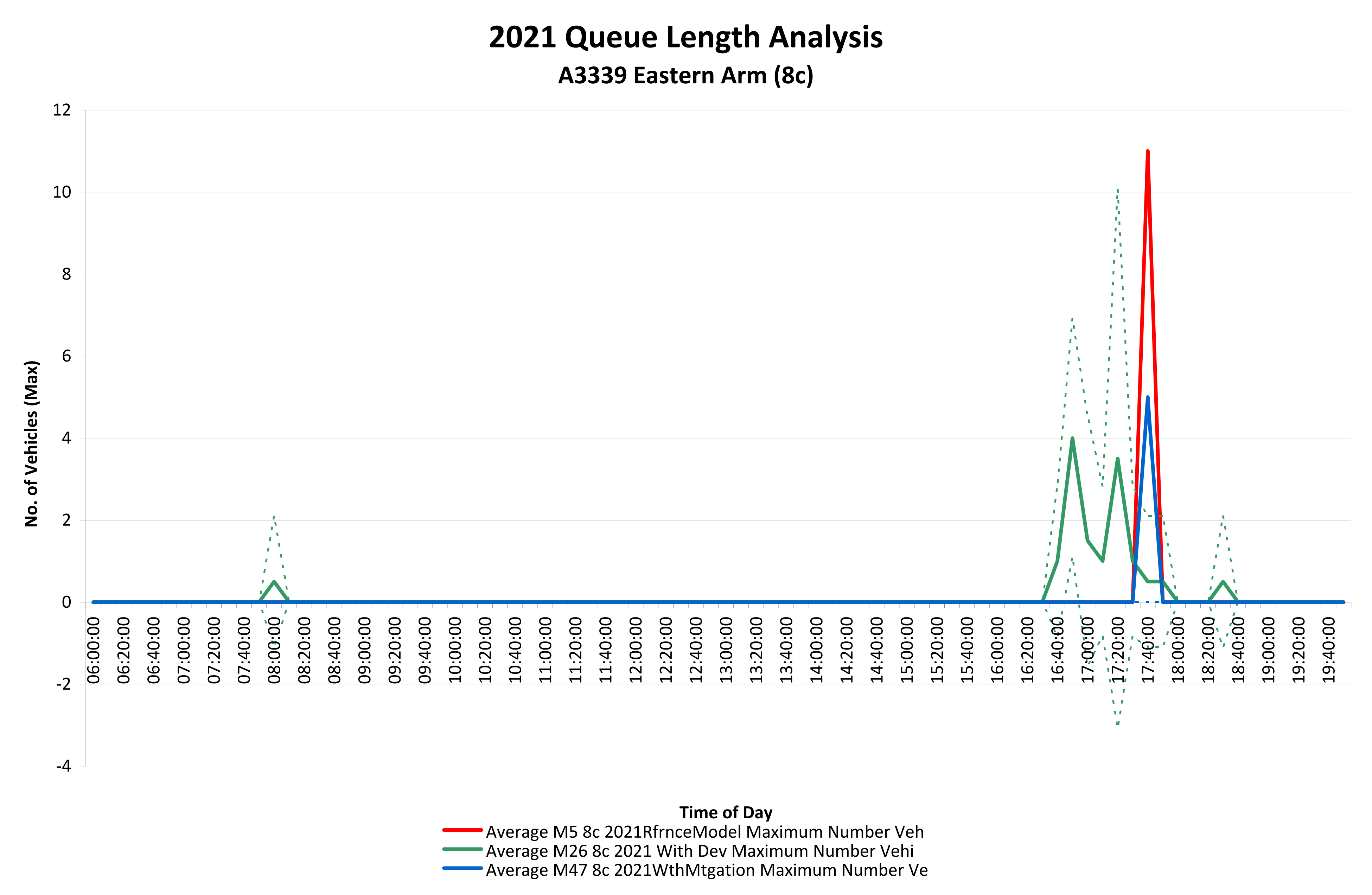
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 8b 2021RfrnceModel Maximum Number Veh
Average M26 8b 2021 With Dev Maximum Number Vehi
Average M47 8b 2021WthMtgation Maximum Number Ve
Conf + M47 8b 2021WthMtgation Maximum Number Ve
Conf - M47 8b 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
Northfield Arm (8b) AM Peak Period
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 8b 2021RfrnceModel Maximum Number Veh
Average M26 8b 2021 With Dev Maximum Number Vehi
Average M47 8b 2021WthMtgation Maximum Number Ve

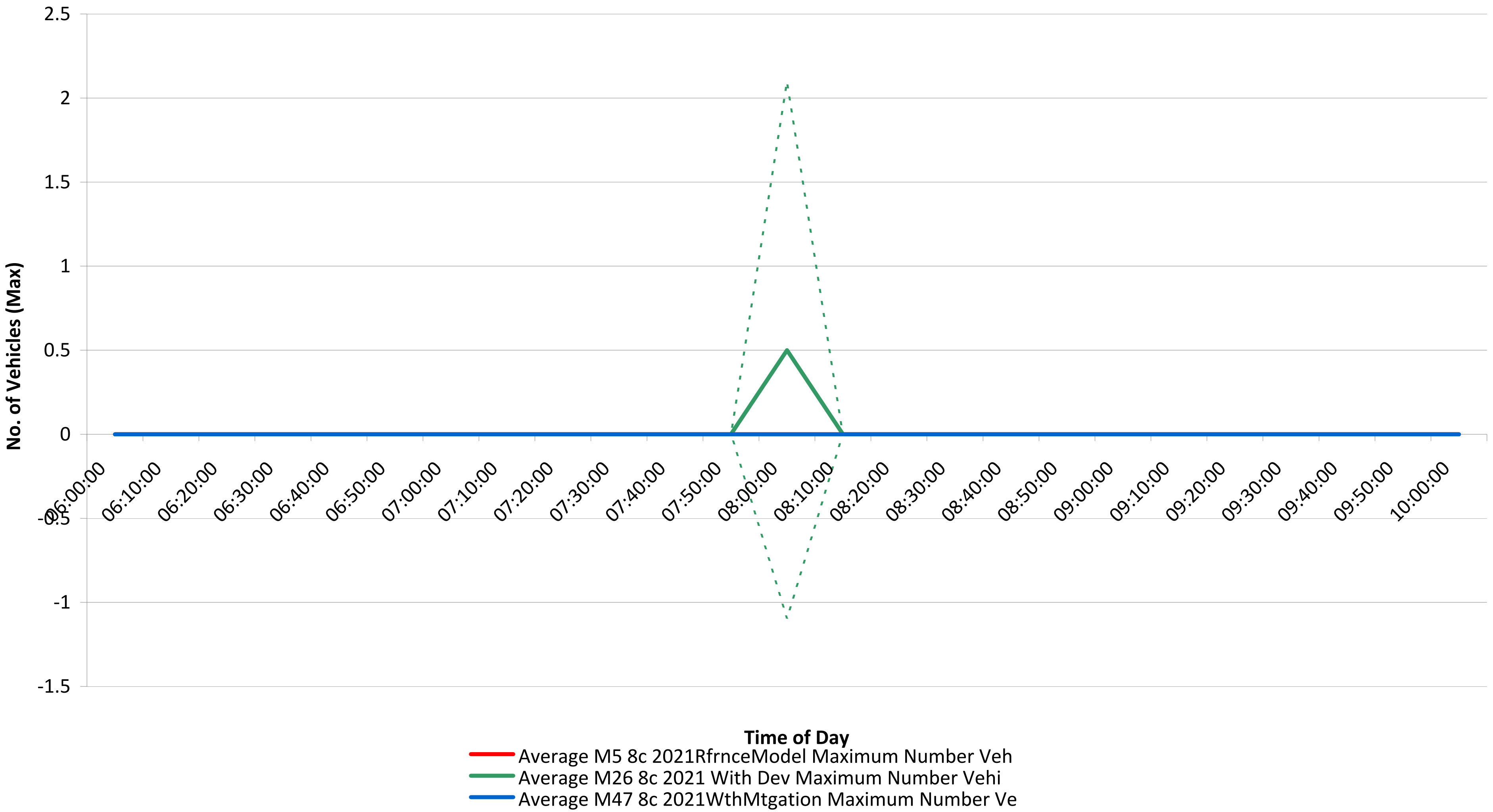

2021 Queue Length Analysis
Northfield Arm (8b)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 8b 2021RfrnceModel Maximum Number Veh
Average M26 8b 2021 With Dev Maximum Number Vehi
Average M47 8b 2021WthMtgation Maximum Number Ve

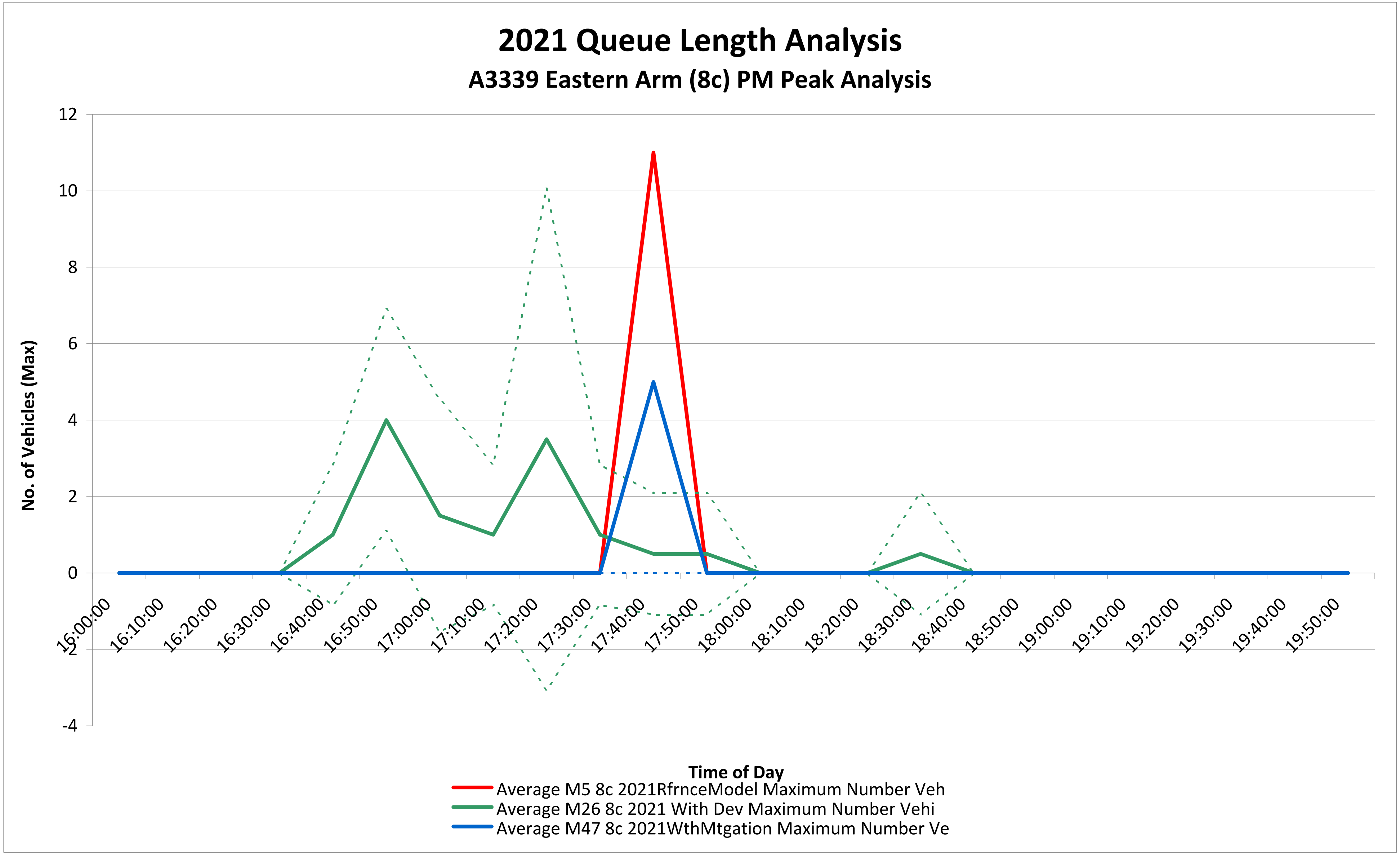


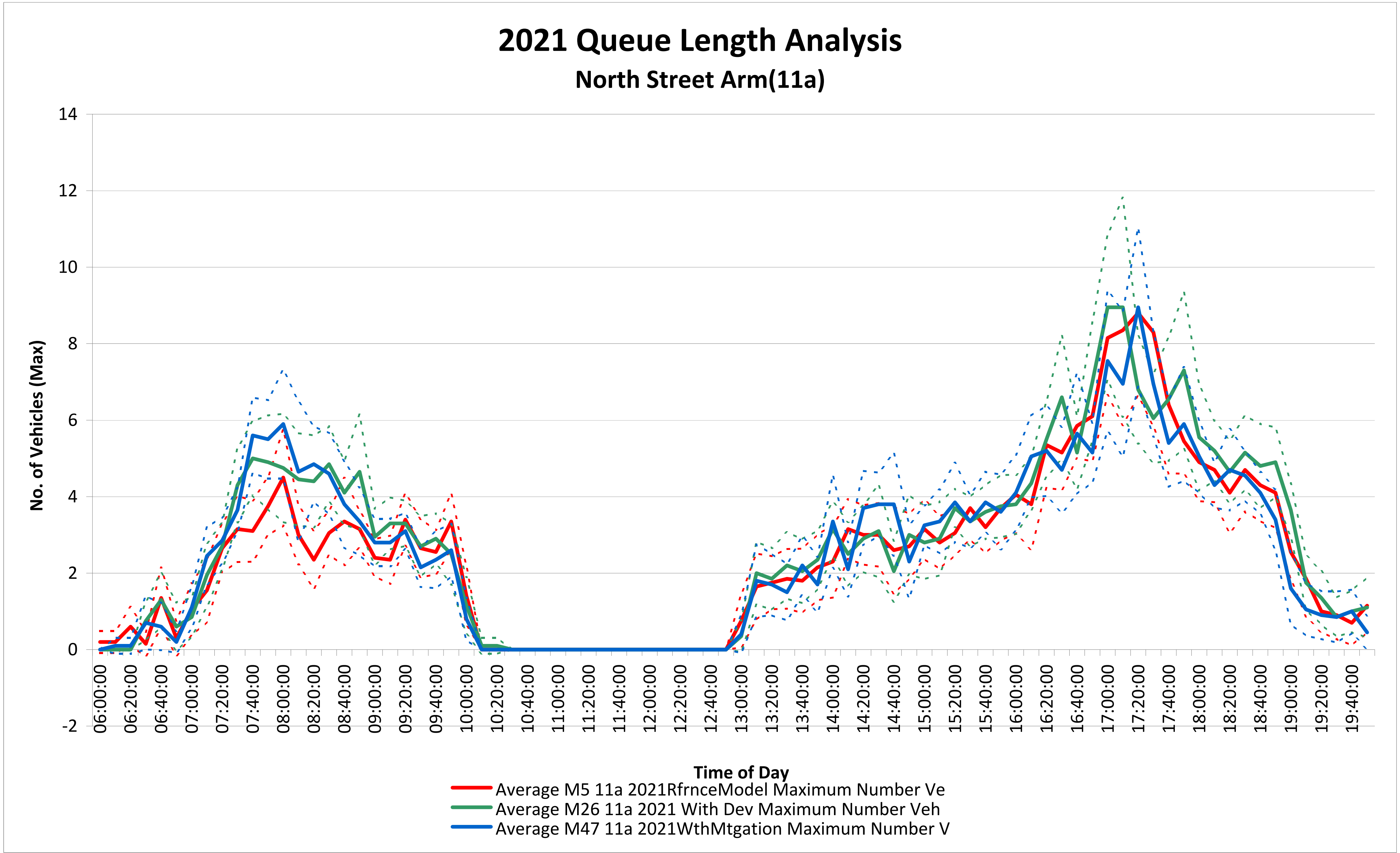
2021 Queue Length Analysis
A3339 Eastern Arm (8c)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
-4
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 8c 2021RfrnceModel Maximum Number Veh
Average M26 8c 2021 With Dev Maximum Number Vehi
Average M47 8c 2021WthMtgation Maximum Number Ve

2021 Queue Length Analysis

A3339 Eastern Arm (8c) AM Peak Period




2021 Queue Length Analysis
A3339 Eastern Arm (8c) PM Peak Analysis
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
-4
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 8c 2021RfrnceModel Maximum Number Veh
Average M26 8c 2021 With Dev Maximum Number Vehi
Average M47 8c 2021WthMtgation Maximum Number Ve



2021 Queue Length Analysis
North Street Arm(11a)
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
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15:40:00
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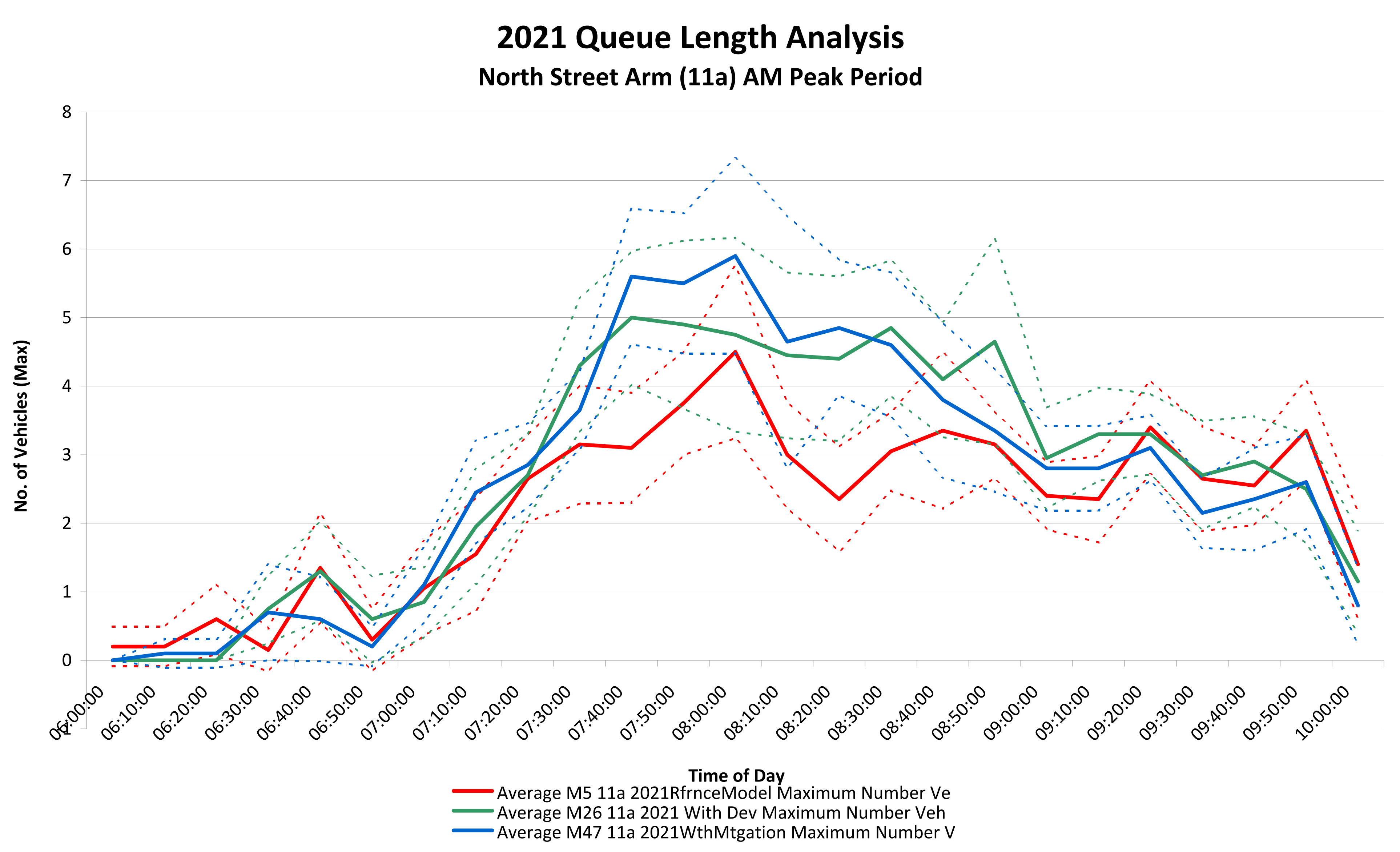
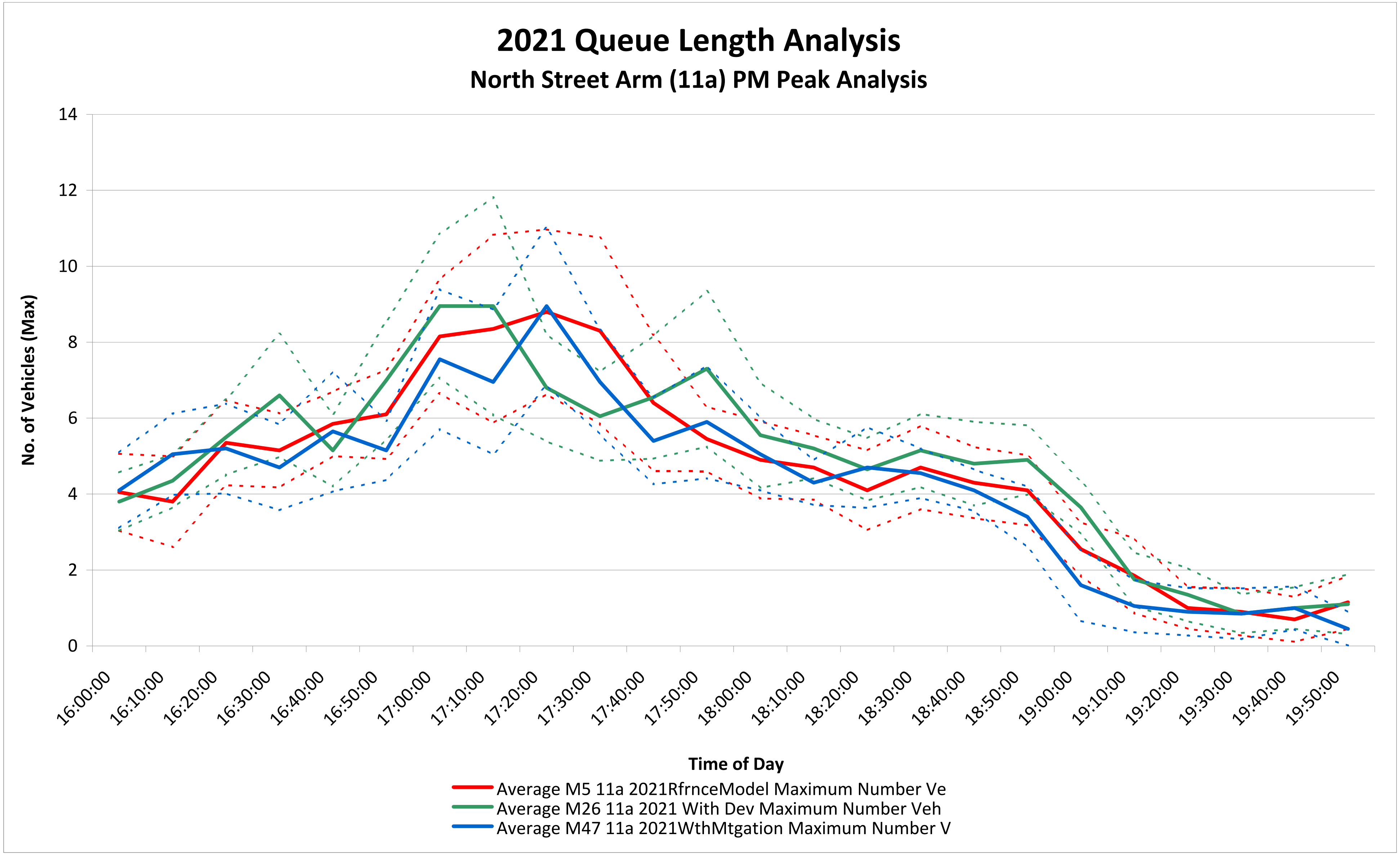
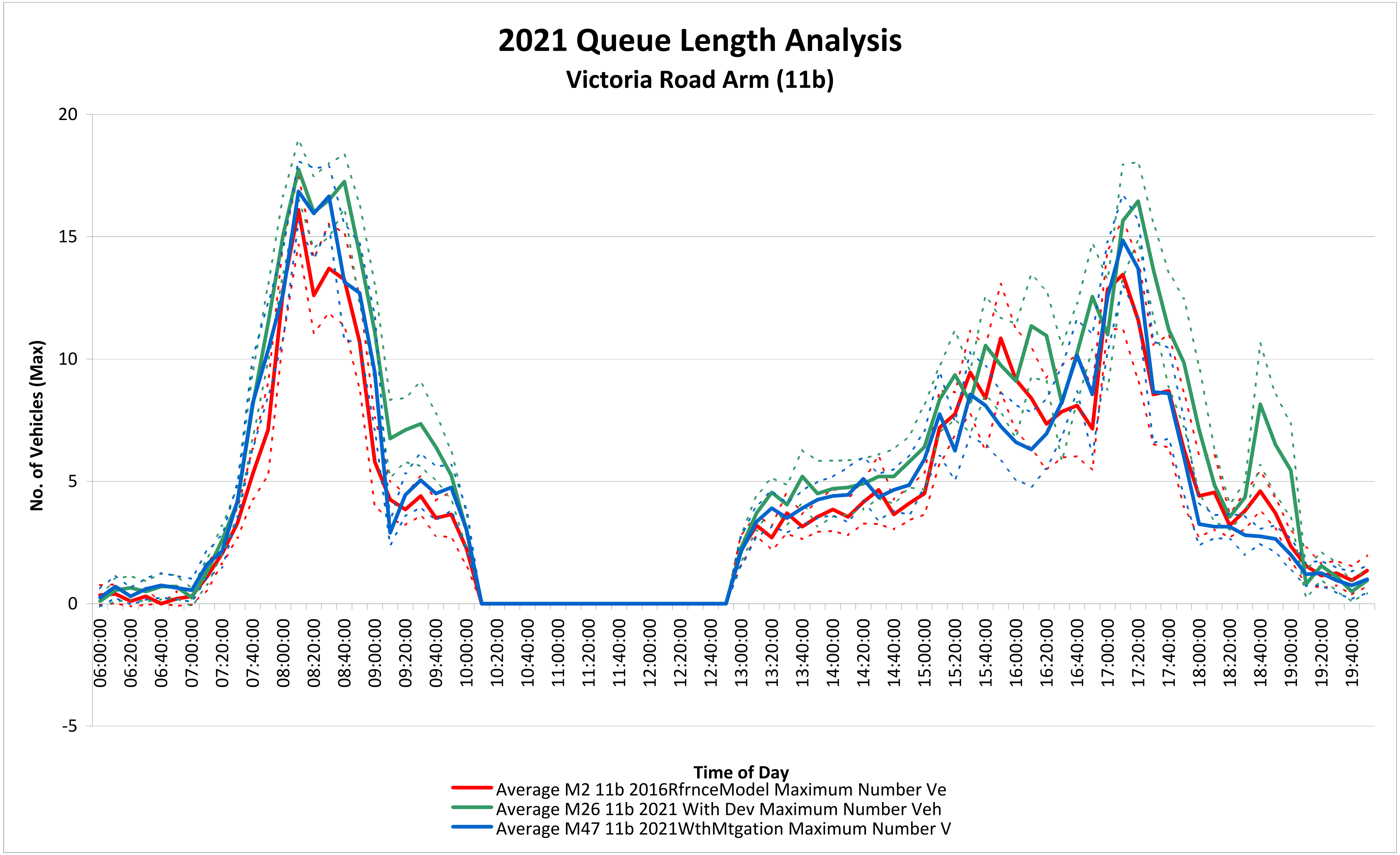
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 11a 2021RfrnceModel Maximum Number Ve
Average M26 11a 2021 With Dev Maximum Number Veh
Average M47 11a 2021WthMtgation Maximum Number V

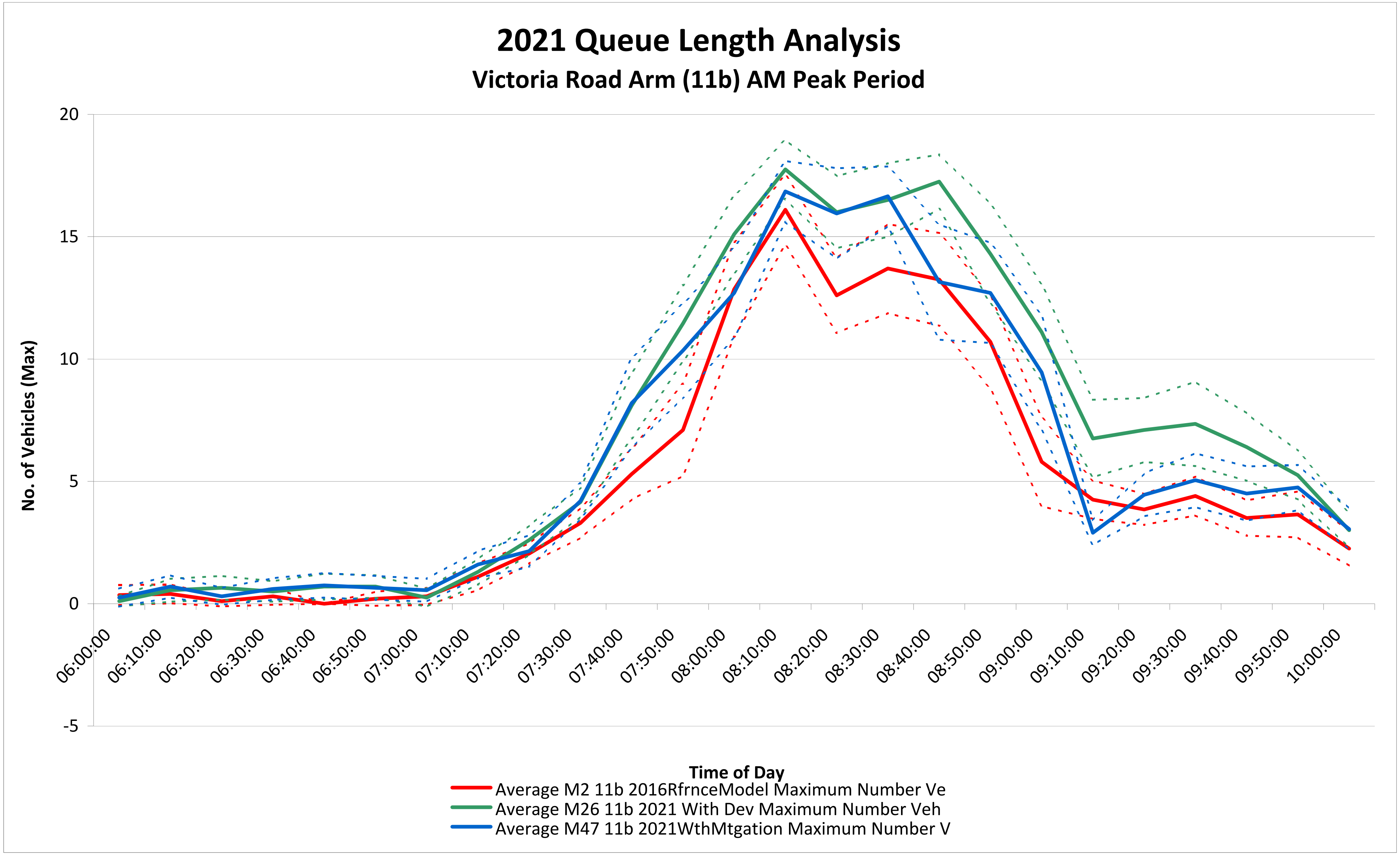


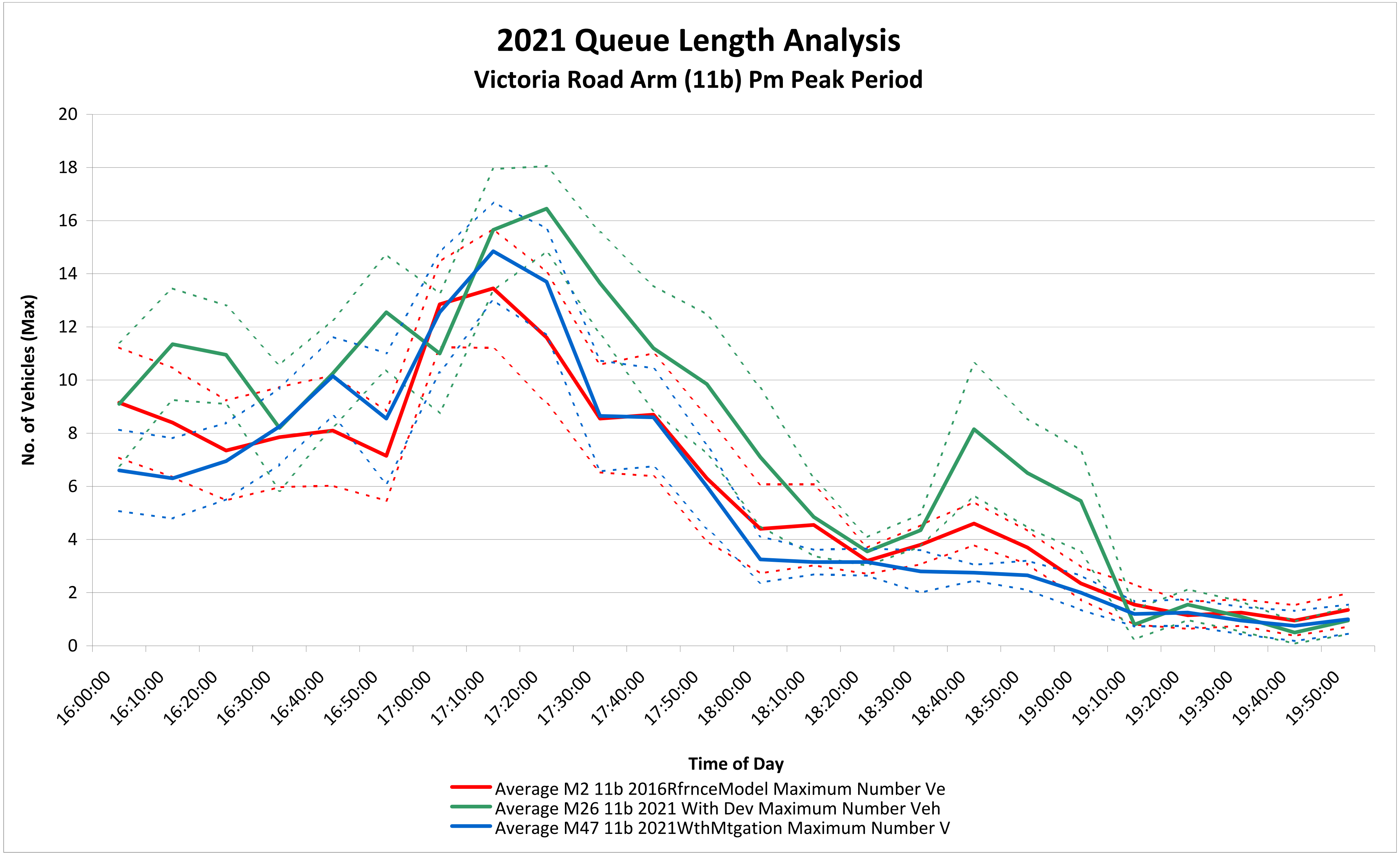
2021 Queue Length Analysis
North Street Arm (11a) AM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 11a 2021RfrnceModel Maximum Number Ve
Average M26 11a 2021 With Dev Maximum Number Veh
Average M47 11a 2021WthMtgation Maximum Number V

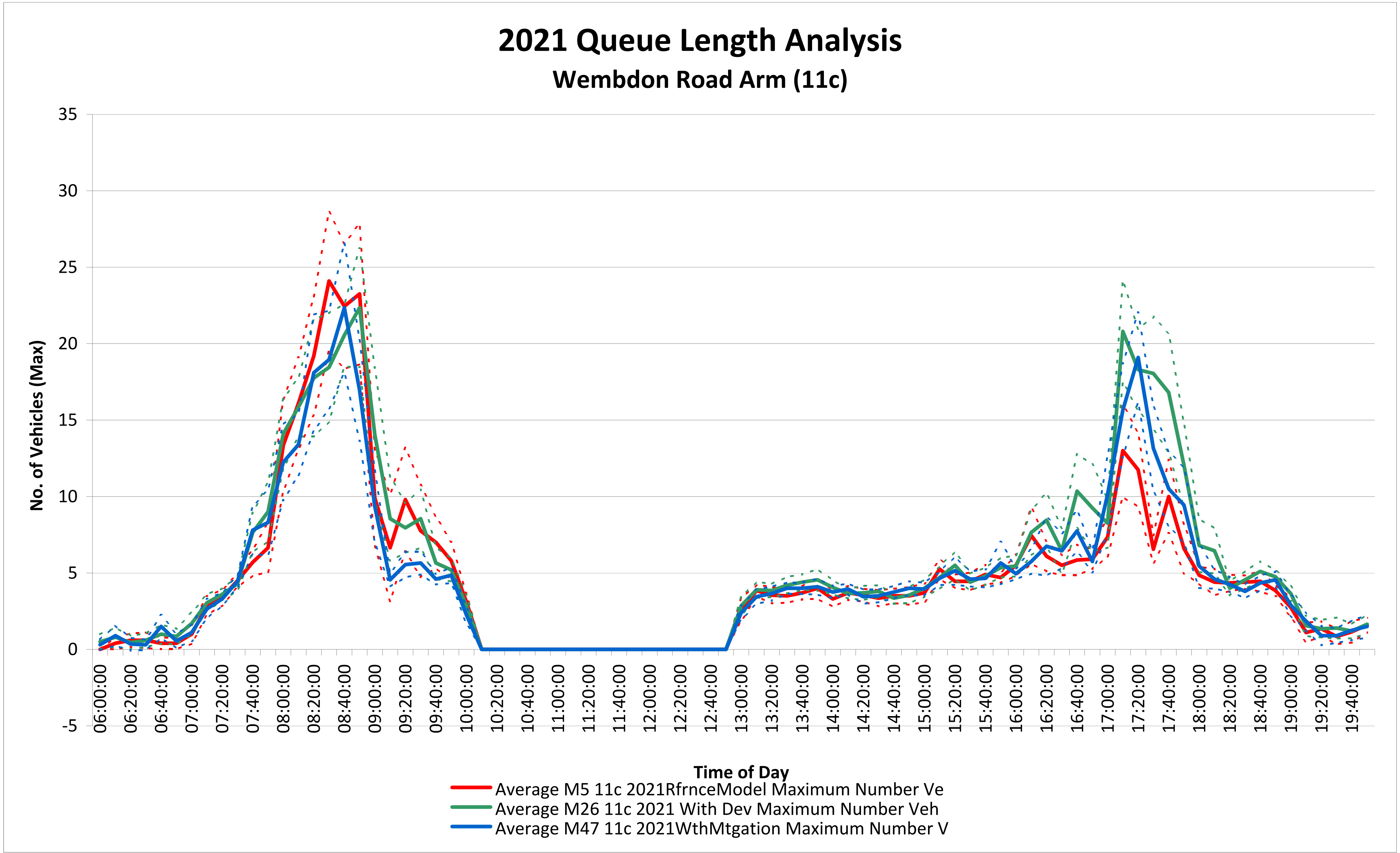


2021 Queue Length Analysis
North Street Arm (11a) PM Peak Analysis
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 11a 2021RfrnceModel Maximum Number Ve
Average M26 11a 2021 With Dev Maximum Number Veh
Average M47 11a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Victoria Road Arm (11b)
No. of Vehicles (Max)
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M2 11b 2016RfrnceModel Maximum Number Ve
Average M26 11b 2021 With Dev Maximum Number Veh
Average M47 11b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Victoria Road Arm (11b) AM Peak Period
No. of Vehicles (Max)
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M2 11b 2016RfrnceModel Maximum Number Ve
Average M26 11b 2021 With Dev Maximum Number Veh
Average M47 11b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Victoria Road Arm (11b) Pm Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M2 11b 2016RfrnceModel Maximum Number Ve
Average M26 11b 2021 With Dev Maximum Number Veh
Average M47 11b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Wembdon Road Arm (11c)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
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14:20:00
14:40:00
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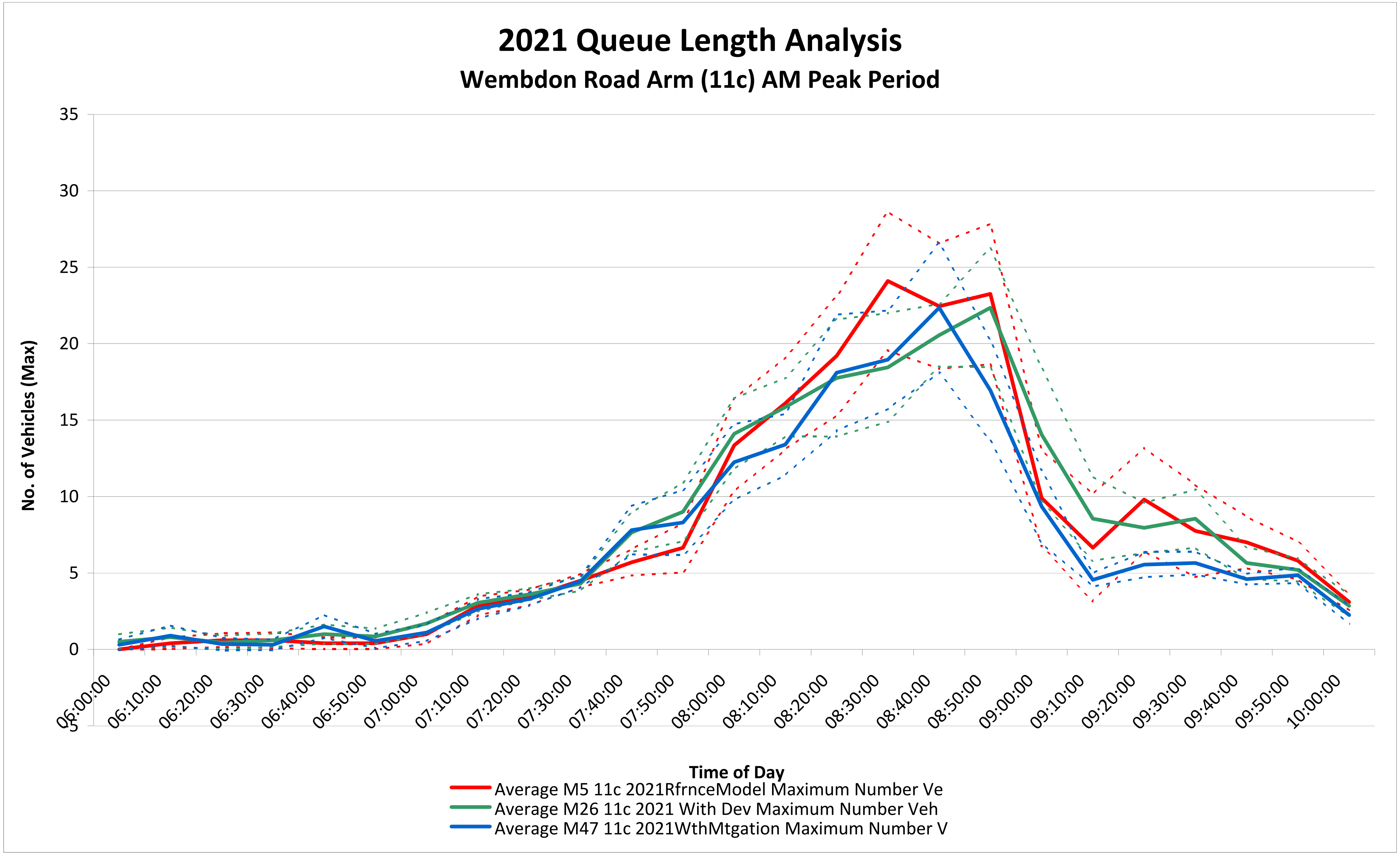
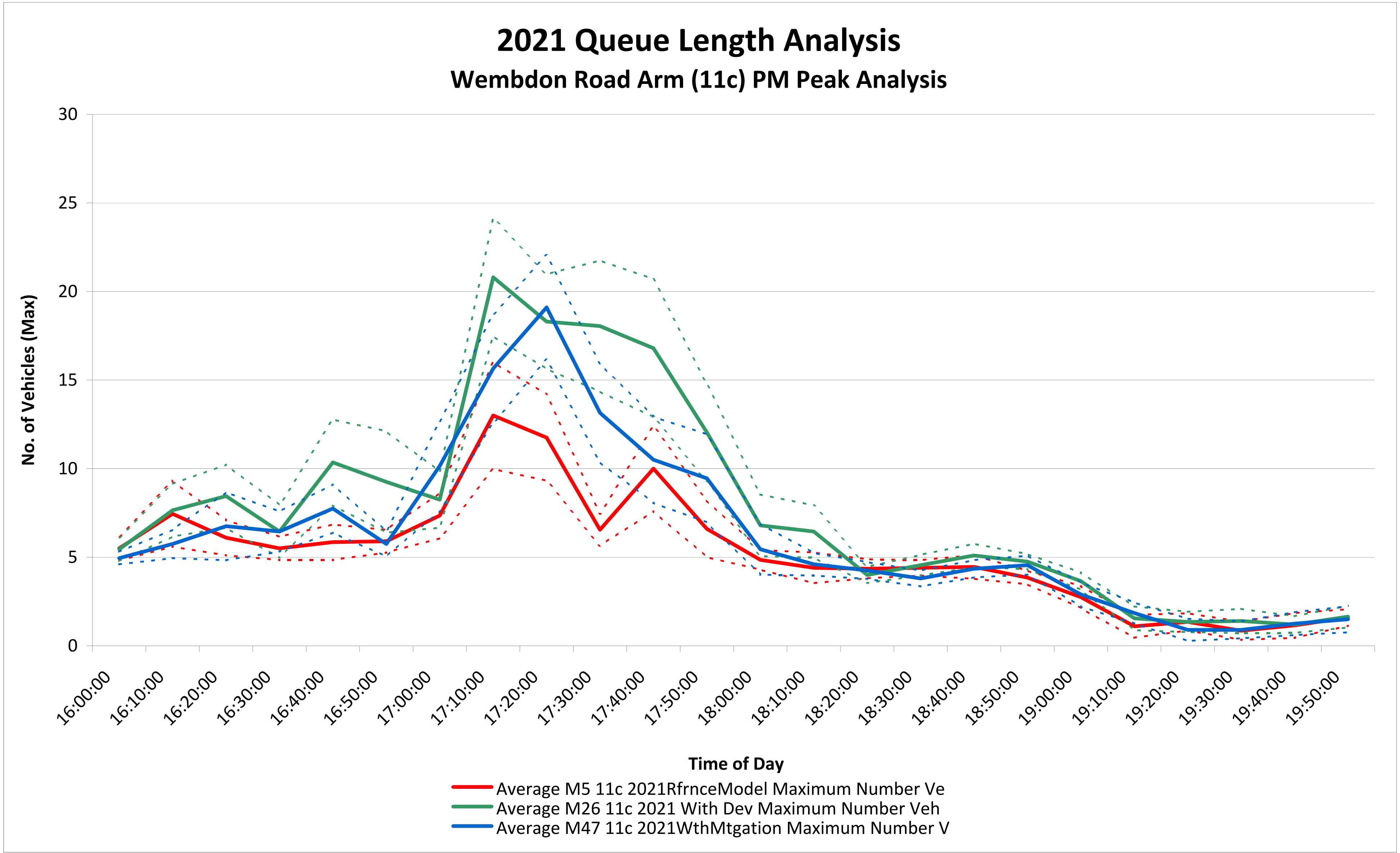
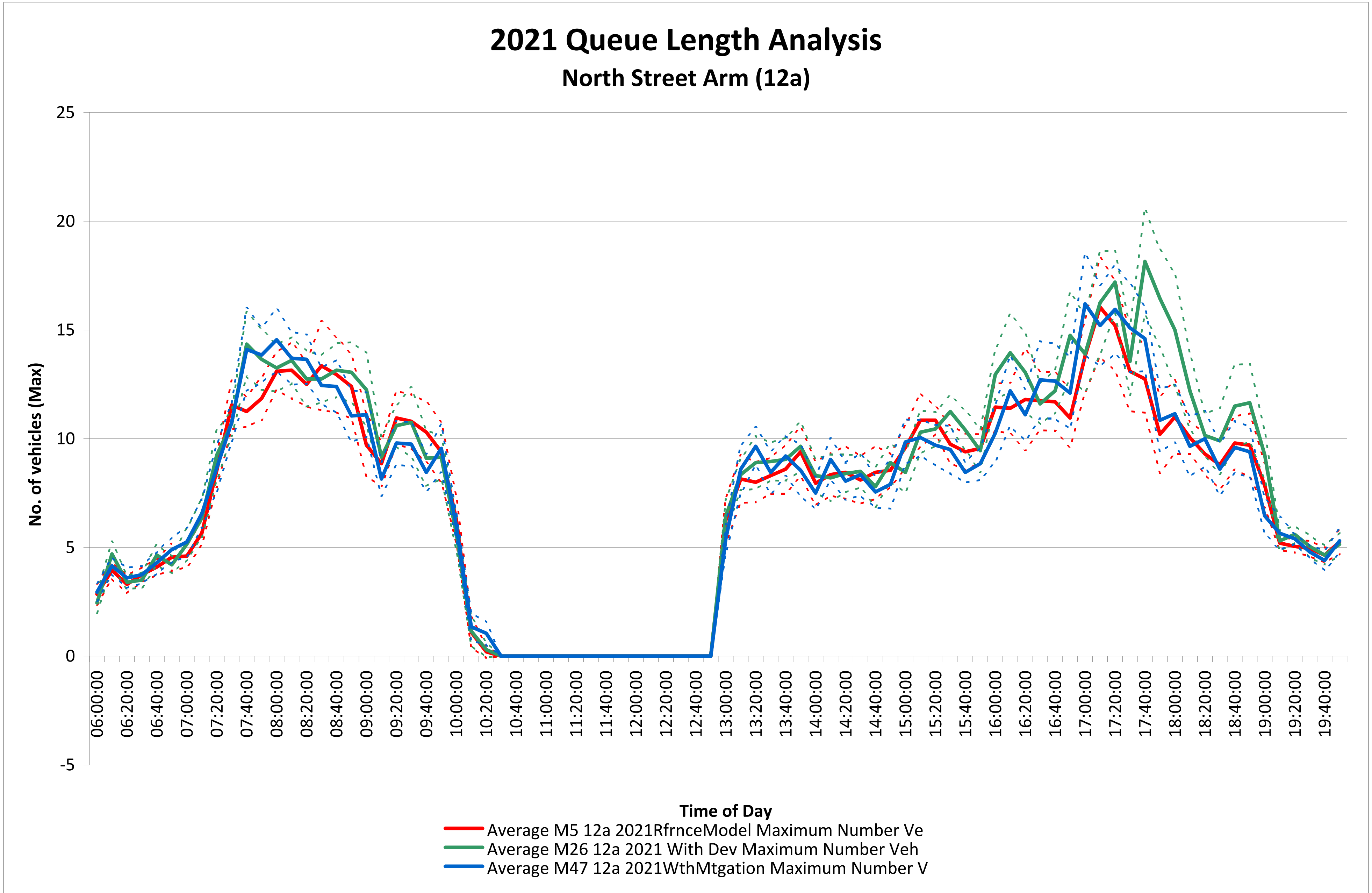
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 11c 2021RfrnceModel Maximum Number Ve
Average M26 11c 2021 With Dev Maximum Number Veh
Average M47 11c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Wembdon Road Arm (11c) AM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 11c 2021RfrnceModel Maximum Number Ve
Average M26 11c 2021 With Dev Maximum Number Veh
Average M47 11c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Wembdon Road Arm (11c) PM Peak Analysis
No. of Vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 11c 2021RfrnceModel Maximum Number Ve
Average M26 11c 2021 With Dev Maximum Number Veh
Average M47 11c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
North Street Arm (12a)
No. of vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
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11:40:00
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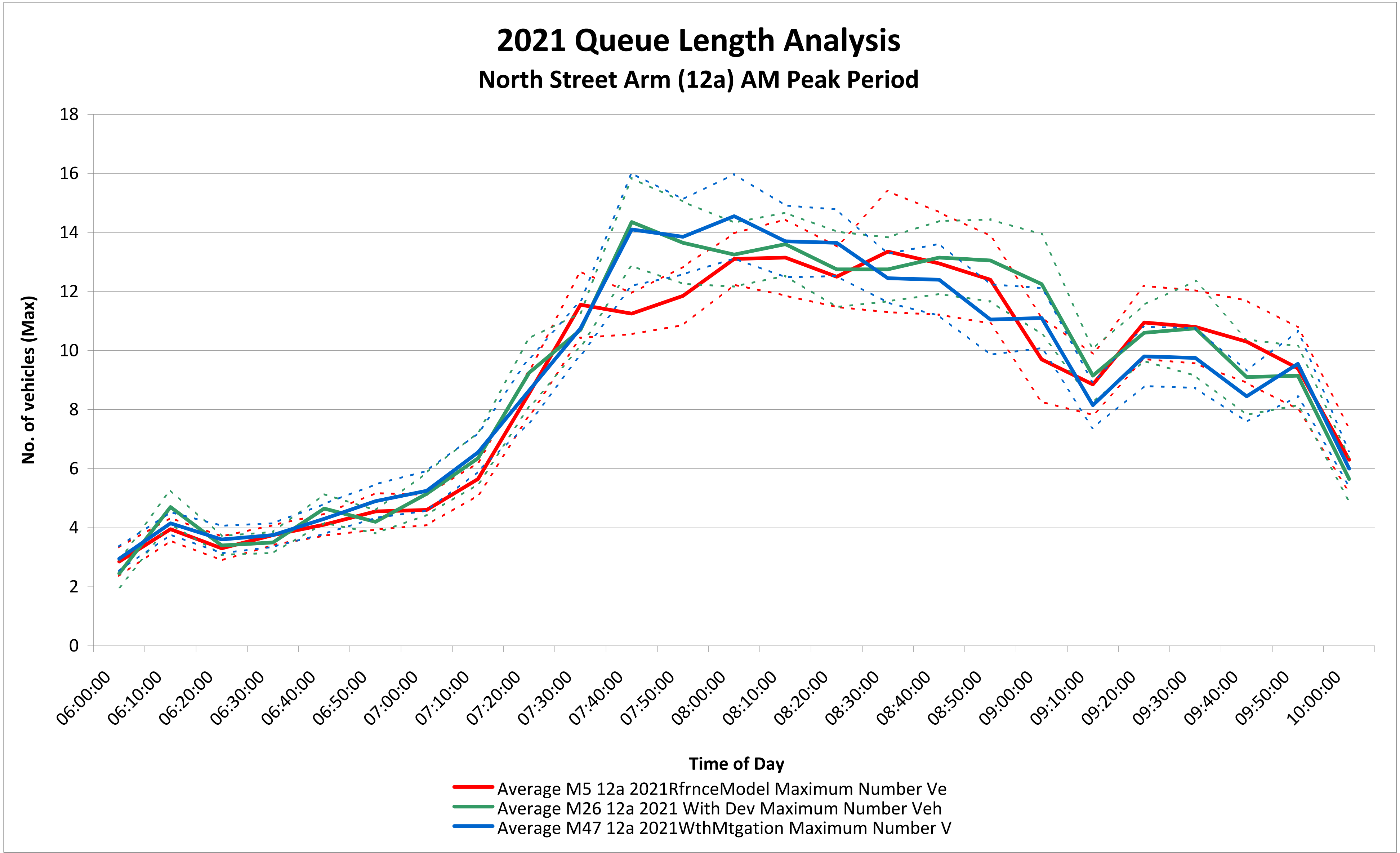
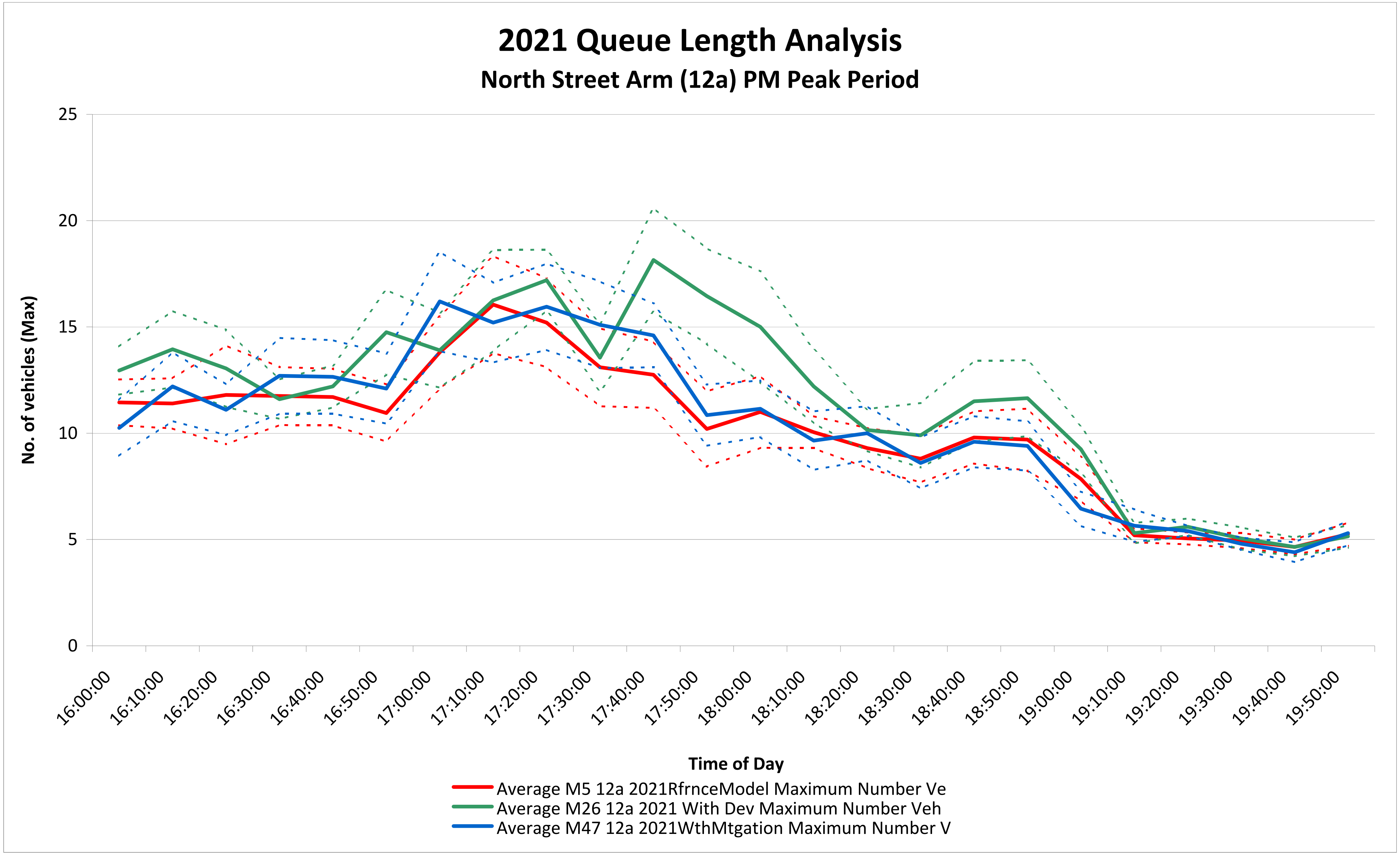
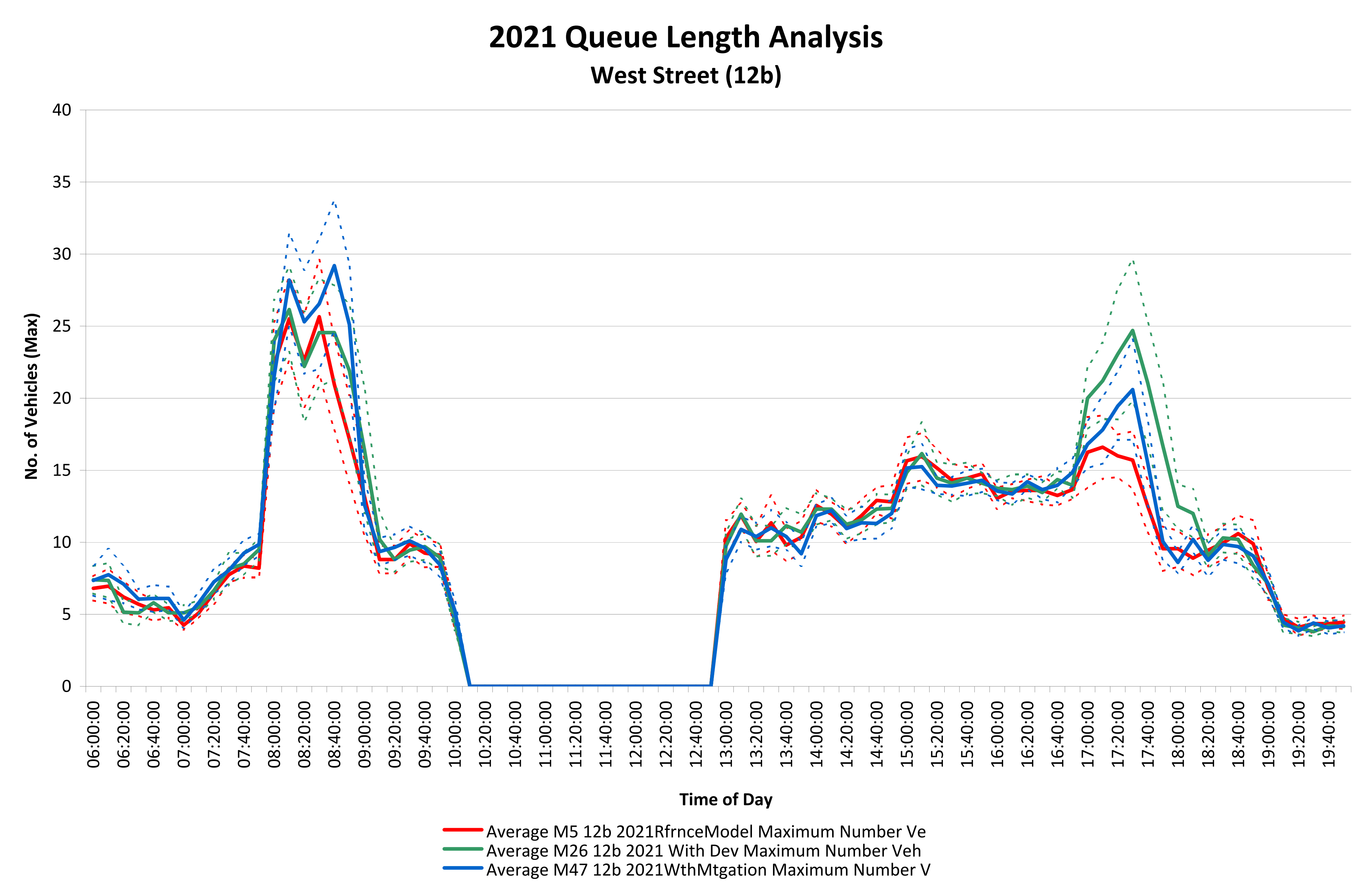
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 12a 2021RfrnceModel Maximum Number Ve
Average M26 12a 2021 With Dev Maximum Number Veh
Average M47 12a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
North Street Arm (12a) AM Peak Period
No. of vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 12a 2021RfrnceModel Maximum Number Ve
Average M26 12a 2021 With Dev Maximum Number Veh
Average M47 12a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
North Street Arm (12a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 12a 2021RfrnceModel Maximum Number Ve
Average M26 12a 2021 With Dev Maximum Number Veh
Average M47 12a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
West Street (12b)
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
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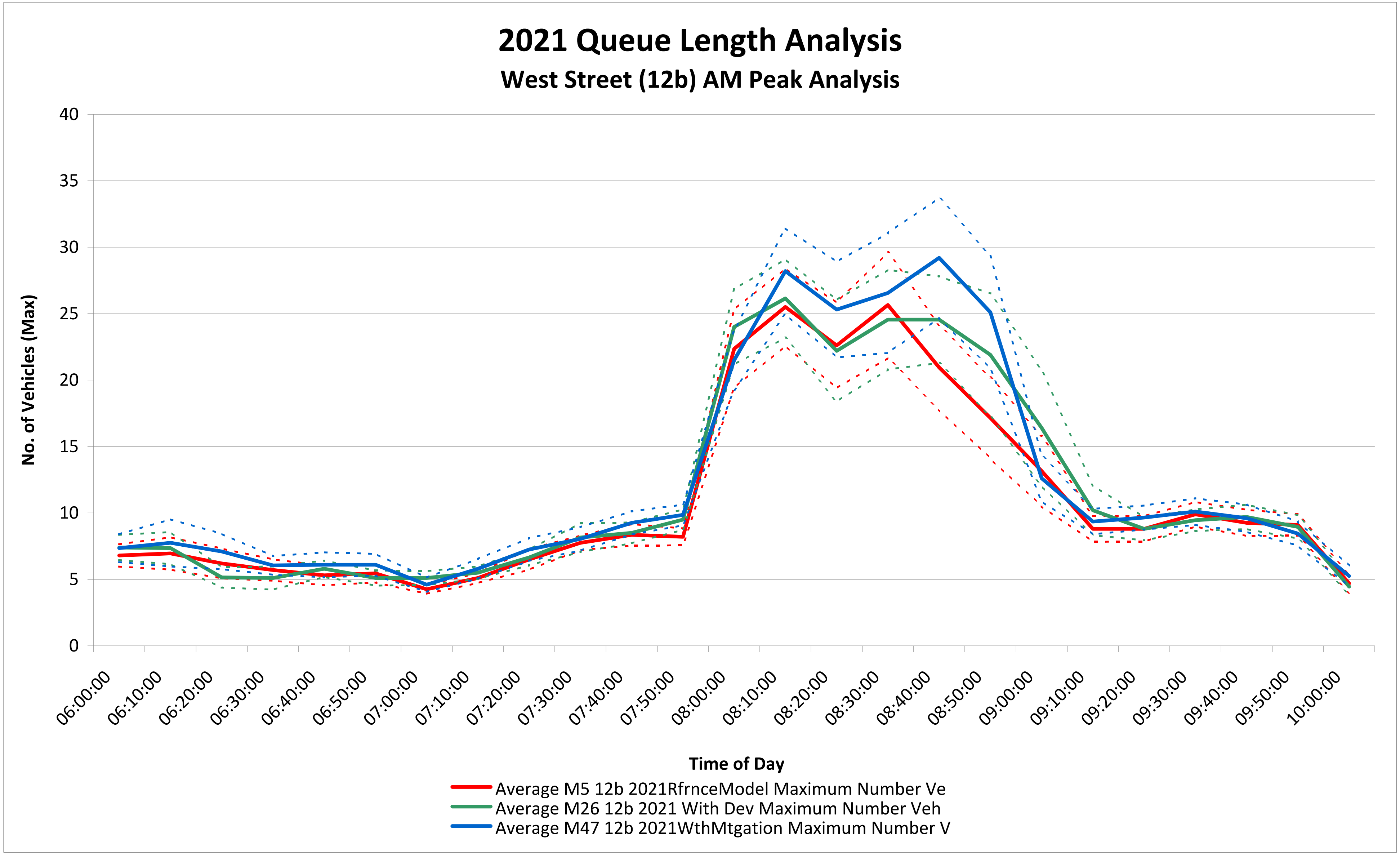
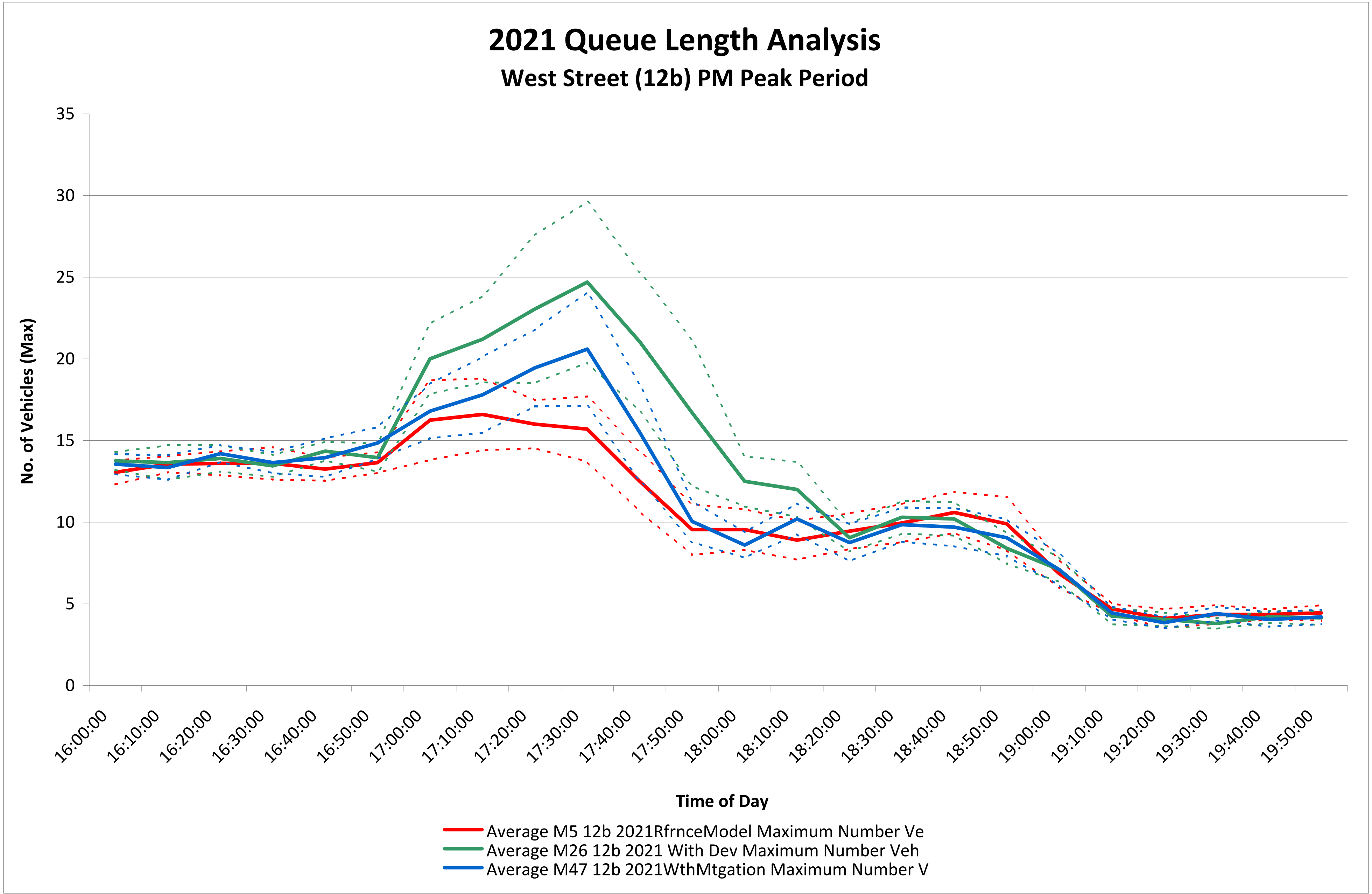
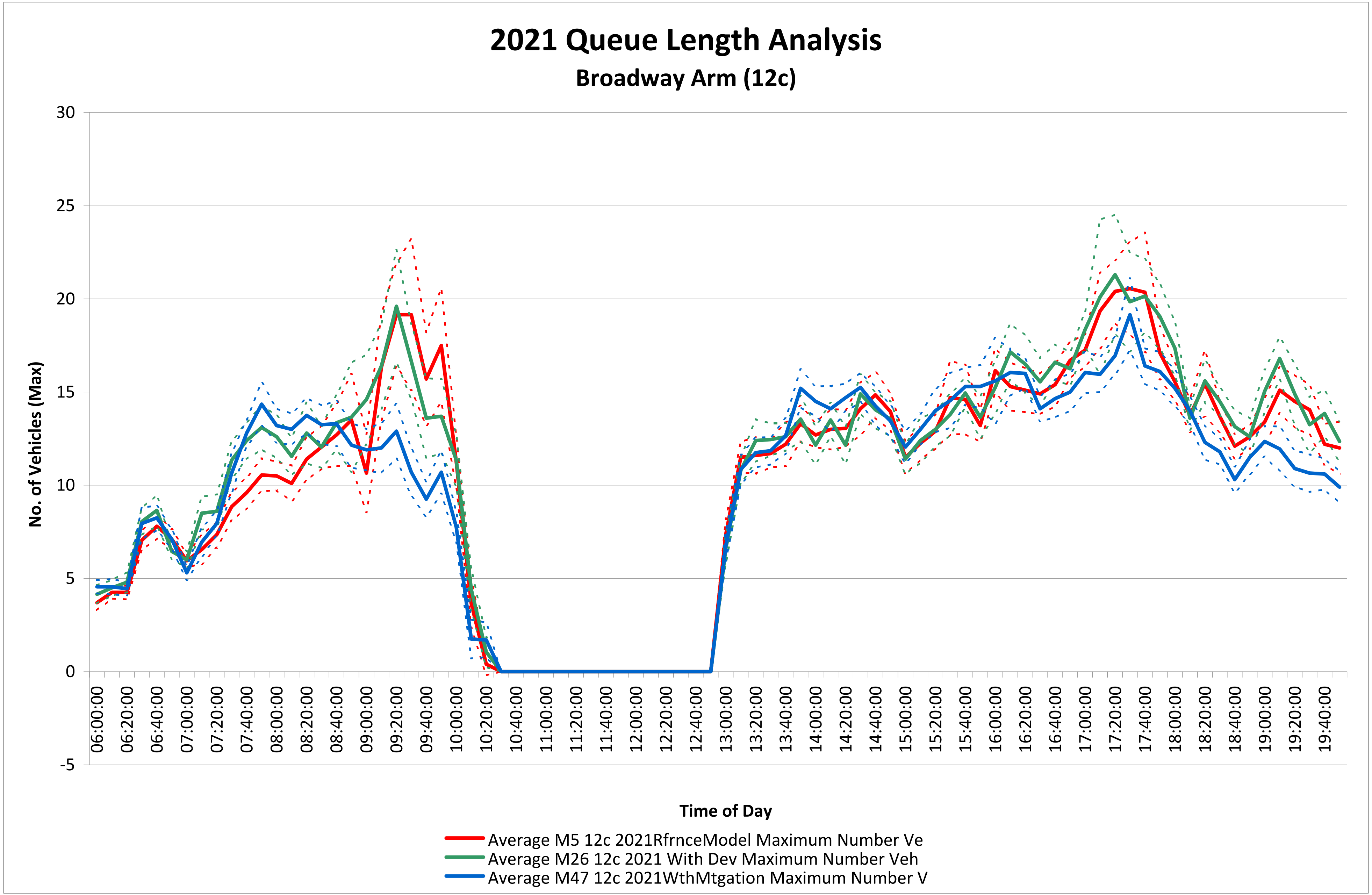
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 12b 2021RfrnceModel Maximum Number Ve
Average M26 12b 2021 With Dev Maximum Number Veh
Average M47 12b 2021WthMtgation Maximum Number V

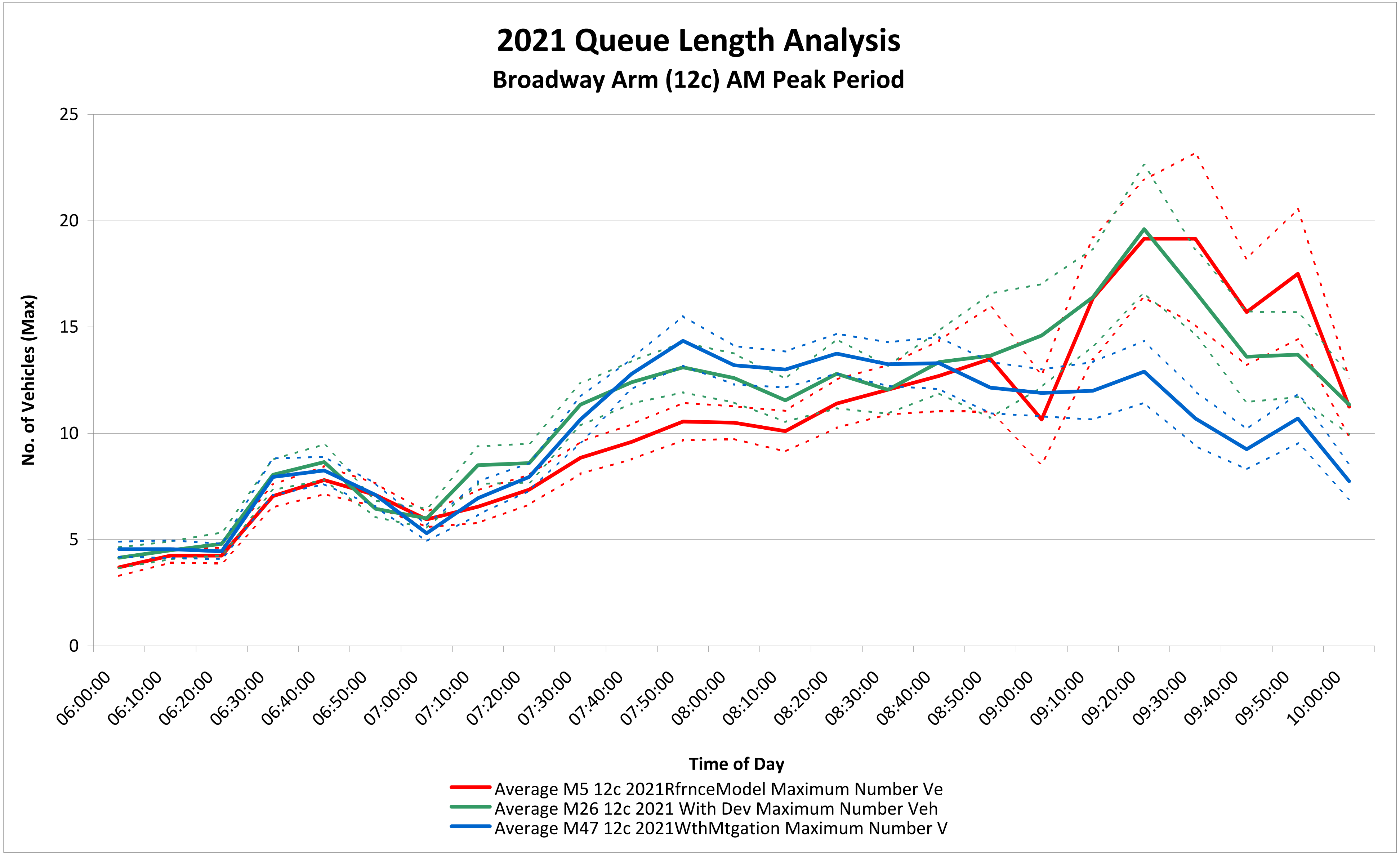


2021 Queue Length Analysis
West Street (12b) AM Peak Analysis
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 12b 2021RfrnceModel Maximum Number Ve
Average M26 12b 2021 With Dev Maximum Number Veh
Average M47 12b 2021WthMtgation Maximum Number V

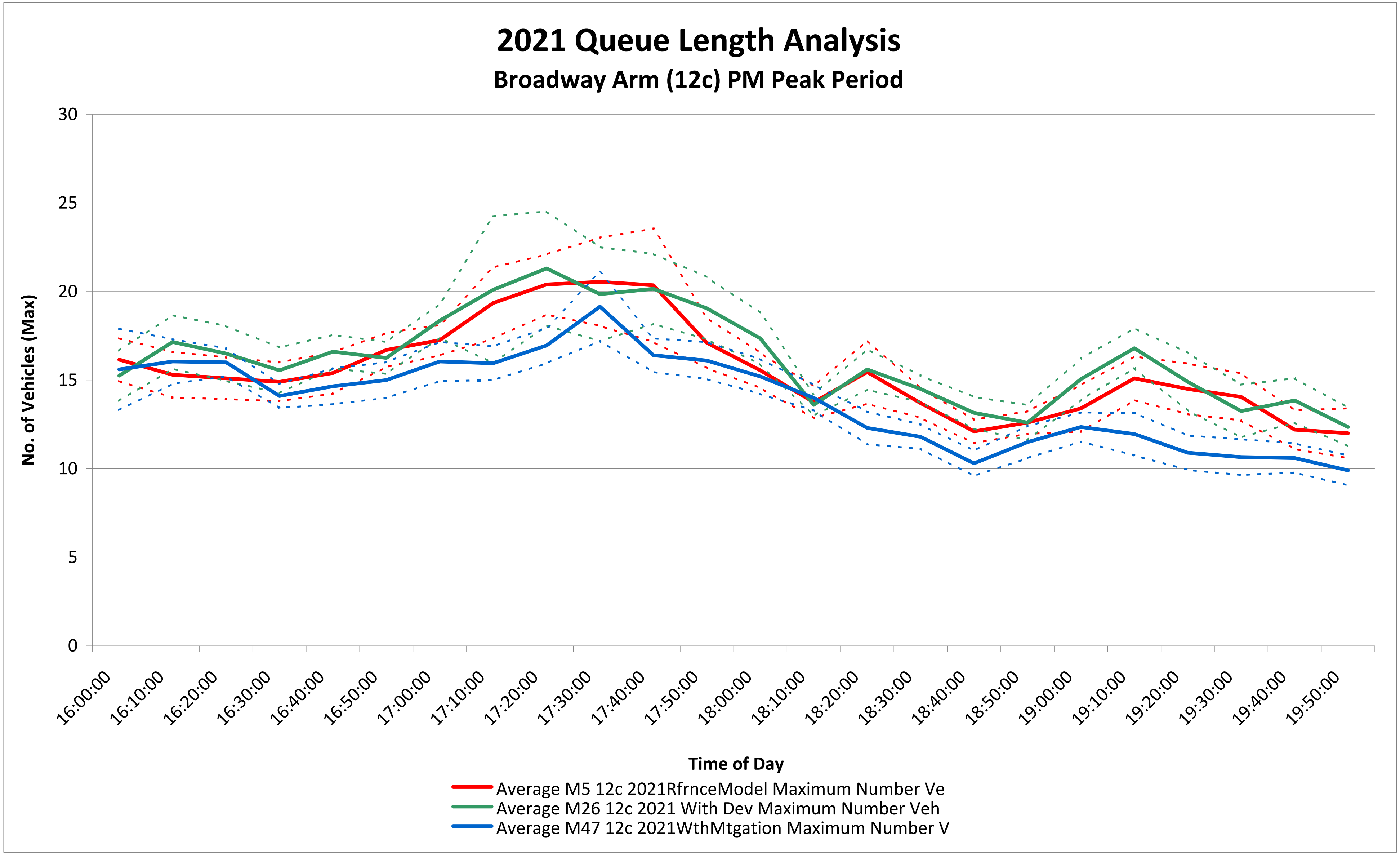

2021 Queue Length Analysis
West Street (12b) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 12b 2021RfrnceModel Maximum Number Ve
Average M26 12b 2021 With Dev Maximum Number Veh
Average M47 12b 2021WthMtgation Maximum Number V



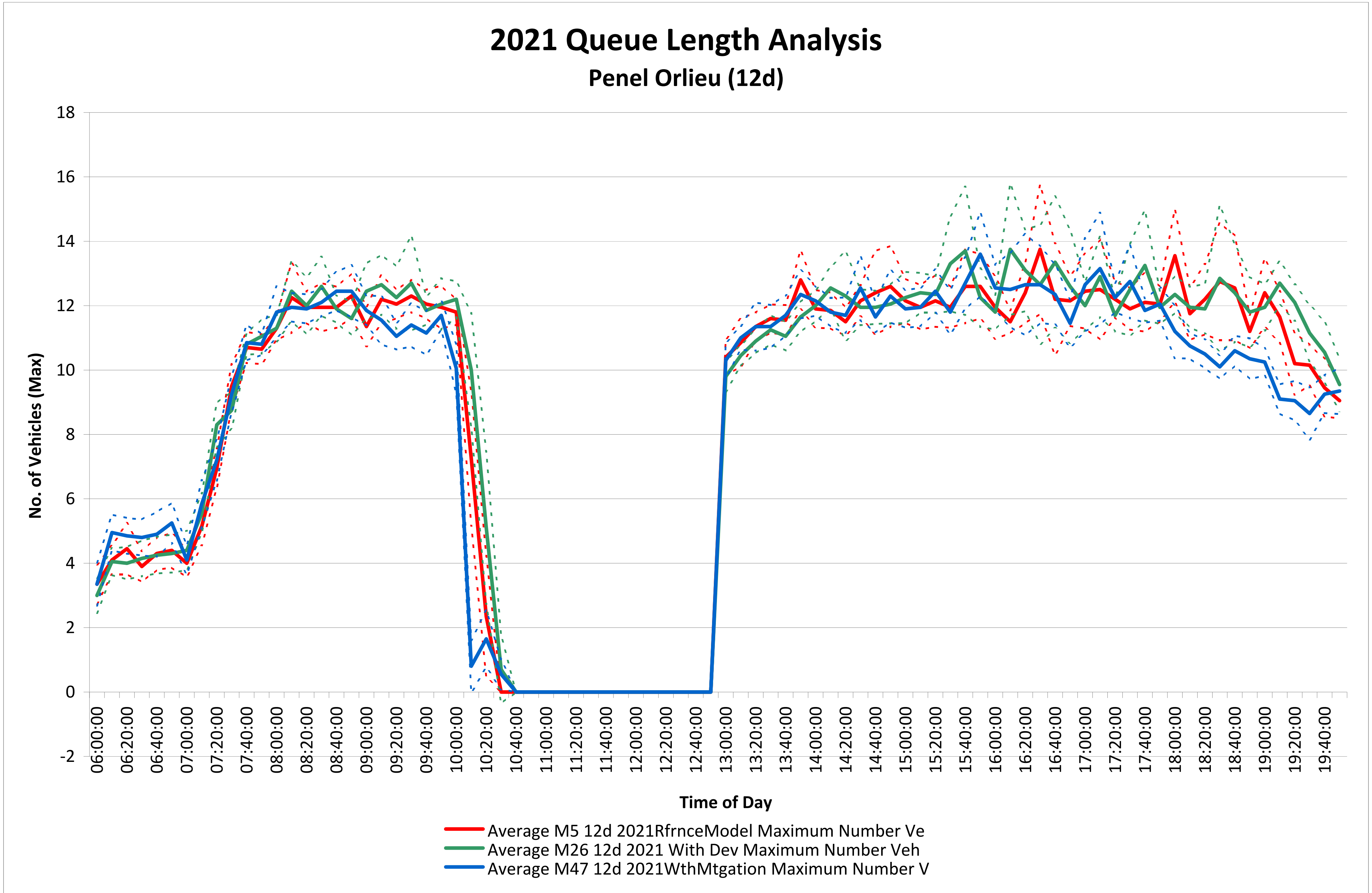
2021 Queue Length Analysis
Broadway Arm (12c)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 12c 2021RfrnceModel Maximum Number Ve
Average M26 12c 2021 With Dev Maximum Number Veh
Average M47 12c 2021WthMtgation Maximum Number V

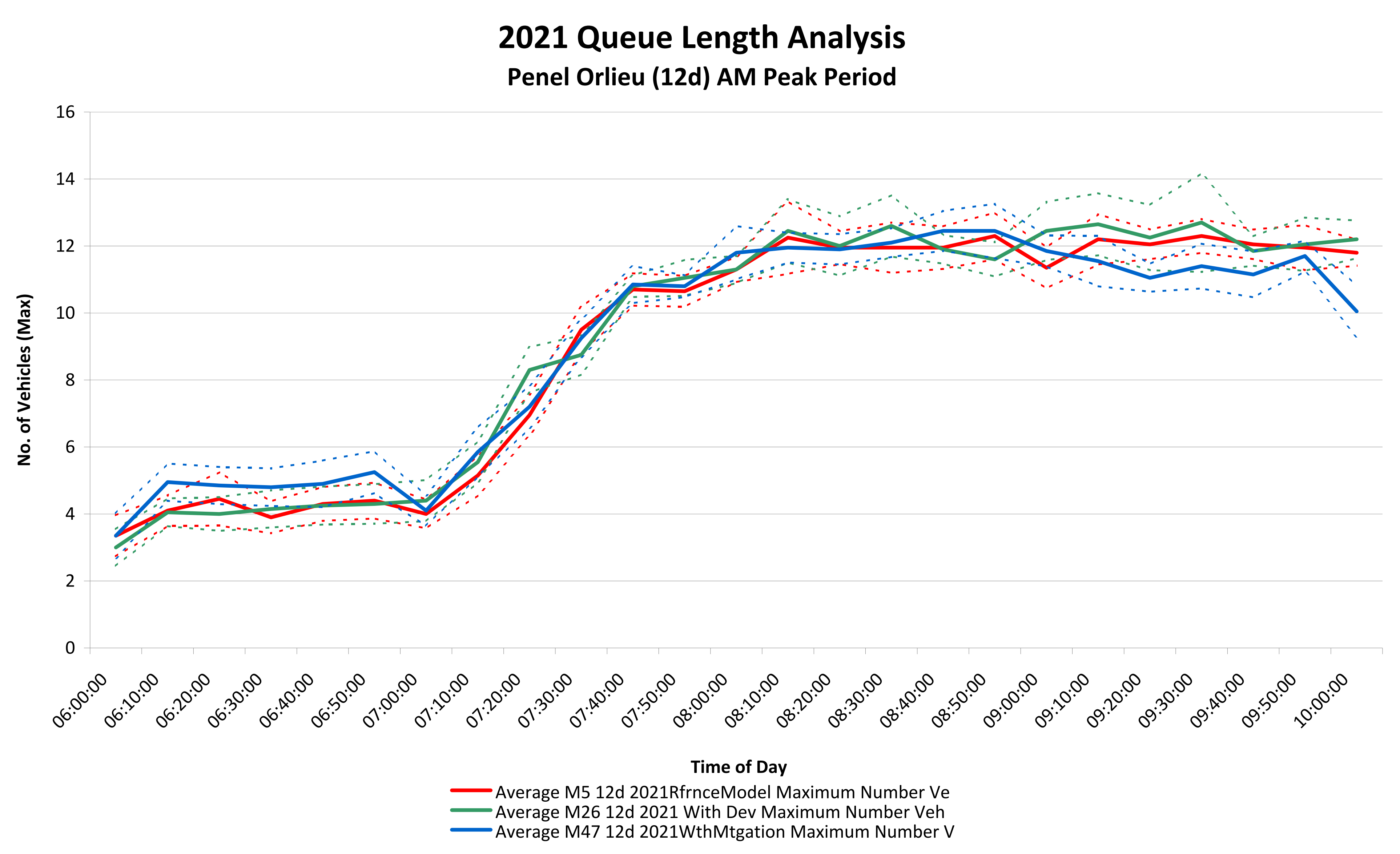


2021 Queue Length Analysis
Broadway Arm (12c) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 12c 2021RfrnceModel Maximum Number Ve
Average M26 12c 2021 With Dev Maximum Number Veh
Average M47 12c 2021WthMtgation Maximum Number V

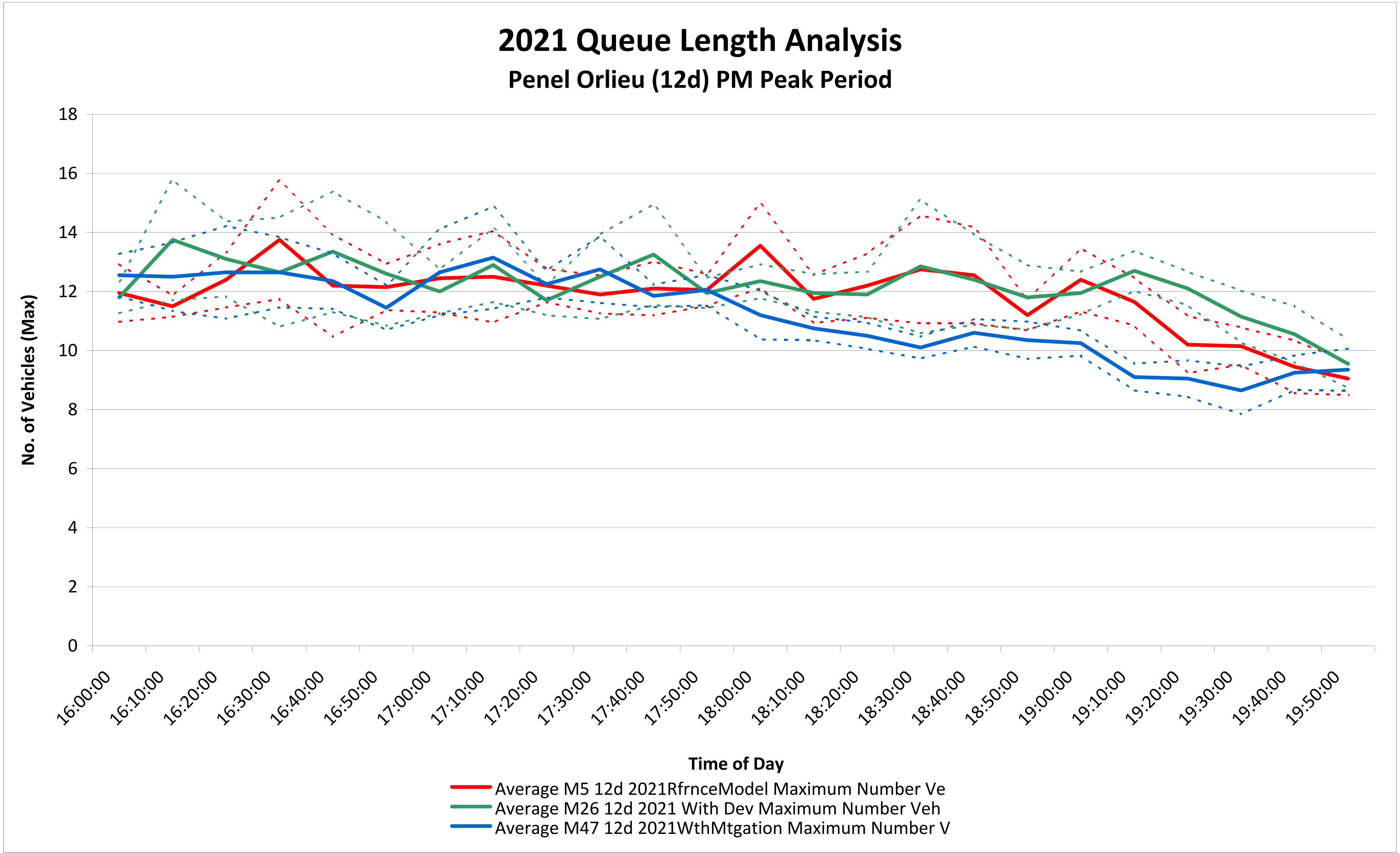


2021 Queue Length Analysis
Broadway Arm (12c) PM Peak Period
30
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 12c 2021RfrnceModel Maximum Number Ve
Average M26 12c 2021 With Dev Maximum Number Veh
Average M47 12c 2021WthMtgation Maximum Number V

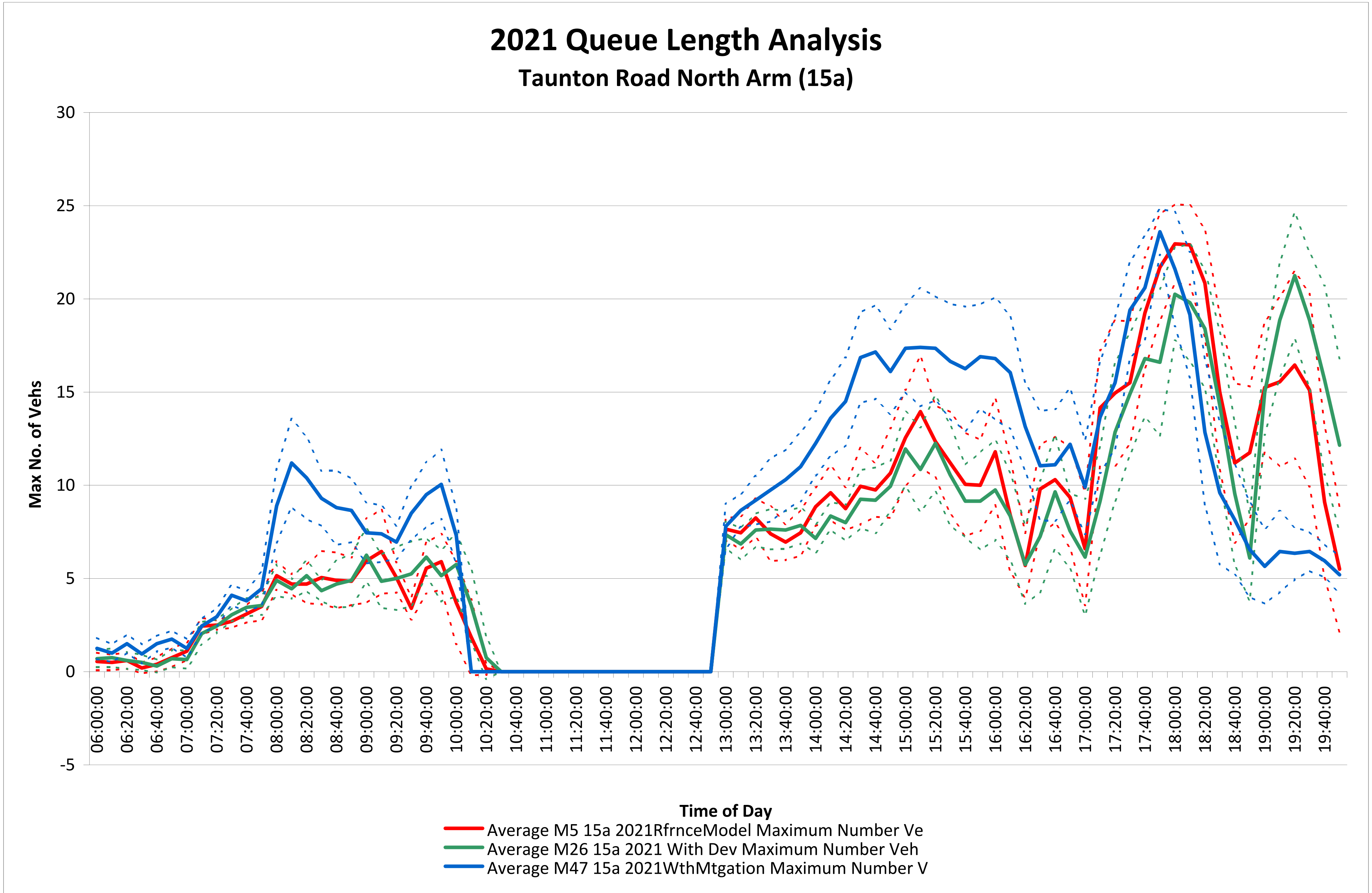

2021 Queue Length Analysis
Penel Orlieu (12d)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 12d 2021RfrnceModel Maximum Number Ve
Average M26 12d 2021 With Dev Maximum Number Veh
Average M47 12d 2021WthMtgation Maximum Number V



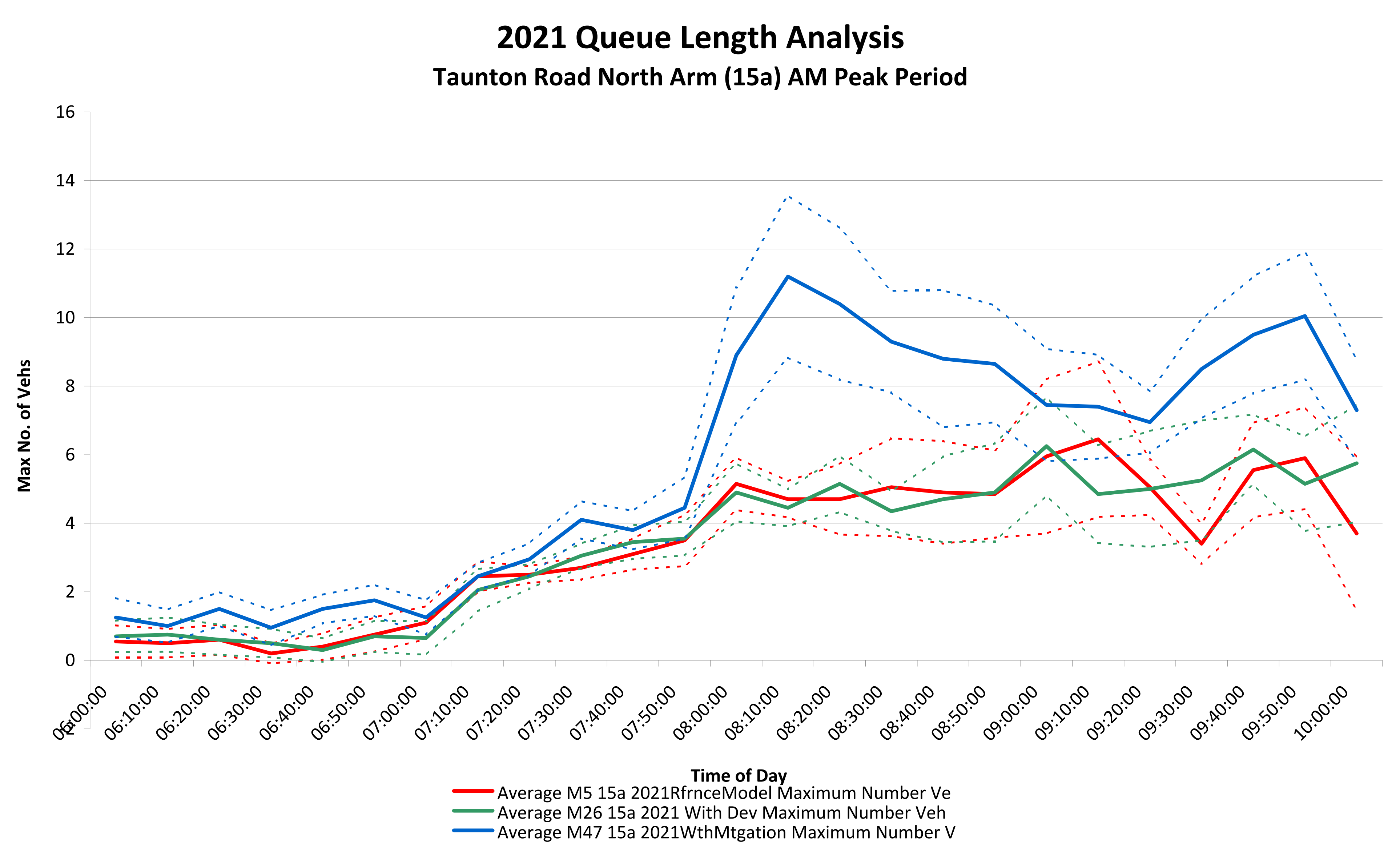
2021 Queue Length Analysis
Penel Orlieu (12d) AM Peak Period
16
14
12
10
8
6
4
2
0
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 12d 2021RfrnceModel Maximum Number Ve
Average M26 12d 2021 With Dev Maximum Number Veh
Average M47 12d 2021WthMtgation Maximum Number V



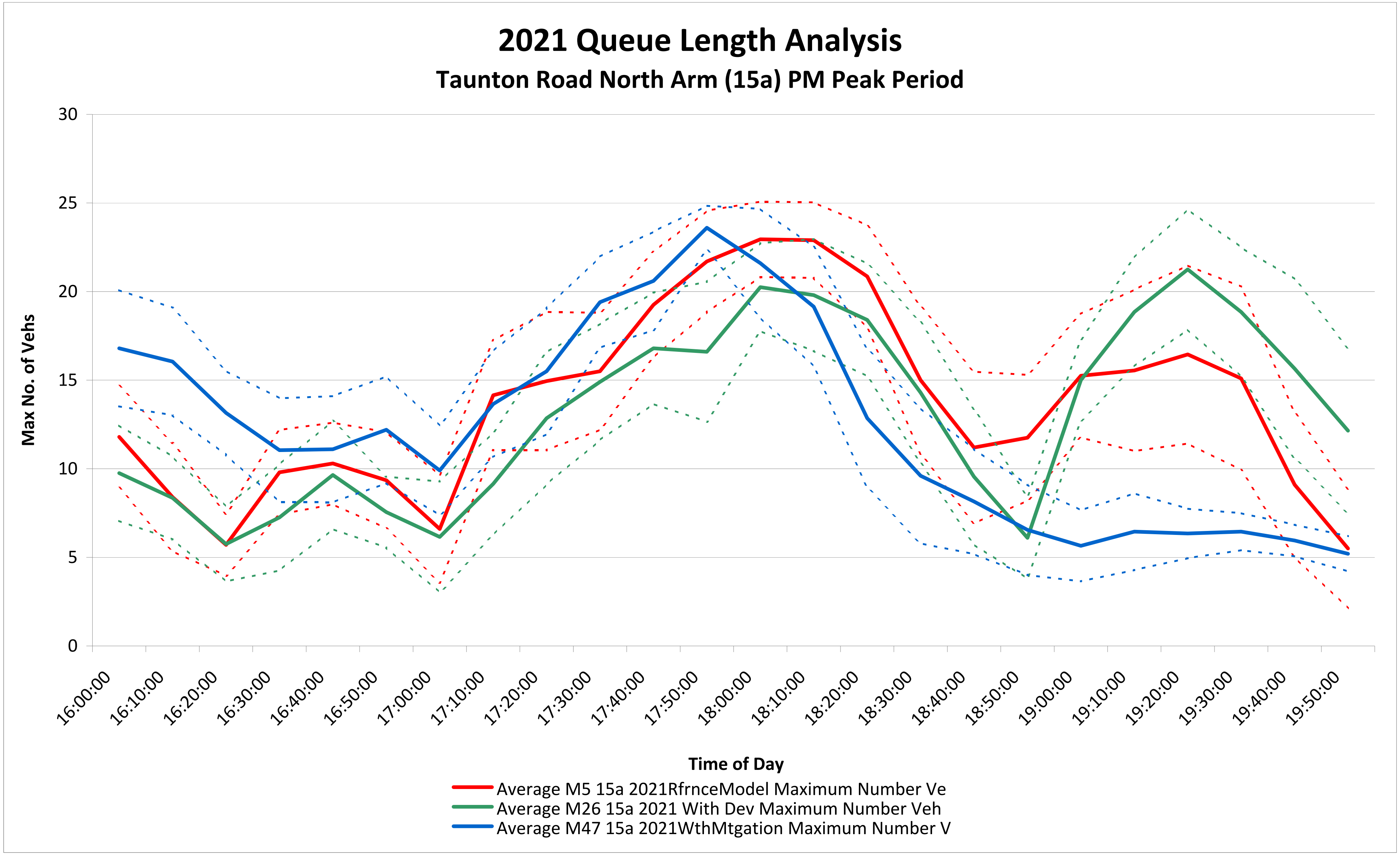
2021 Queue Length Analysis
Penel Orlieu (12d) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 12d 2021RfrnceModel Maximum Number Ve
Average M26 12d 2021 With Dev Maximum Number Veh
Average M47 12d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Taunton Road North Arm (15a)
Max No. of Vehs
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 15a 2021RfrnceModel Maximum Number Ve
Average M26 15a 2021 With Dev Maximum Number Veh
Average M47 15a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Taunton Road North Arm (15a) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 15a 2021RfrnceModel Maximum Number Ve
Average M26 15a 2021 With Dev Maximum Number Veh
Average M47 15a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Taunton Road North Arm (15a) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
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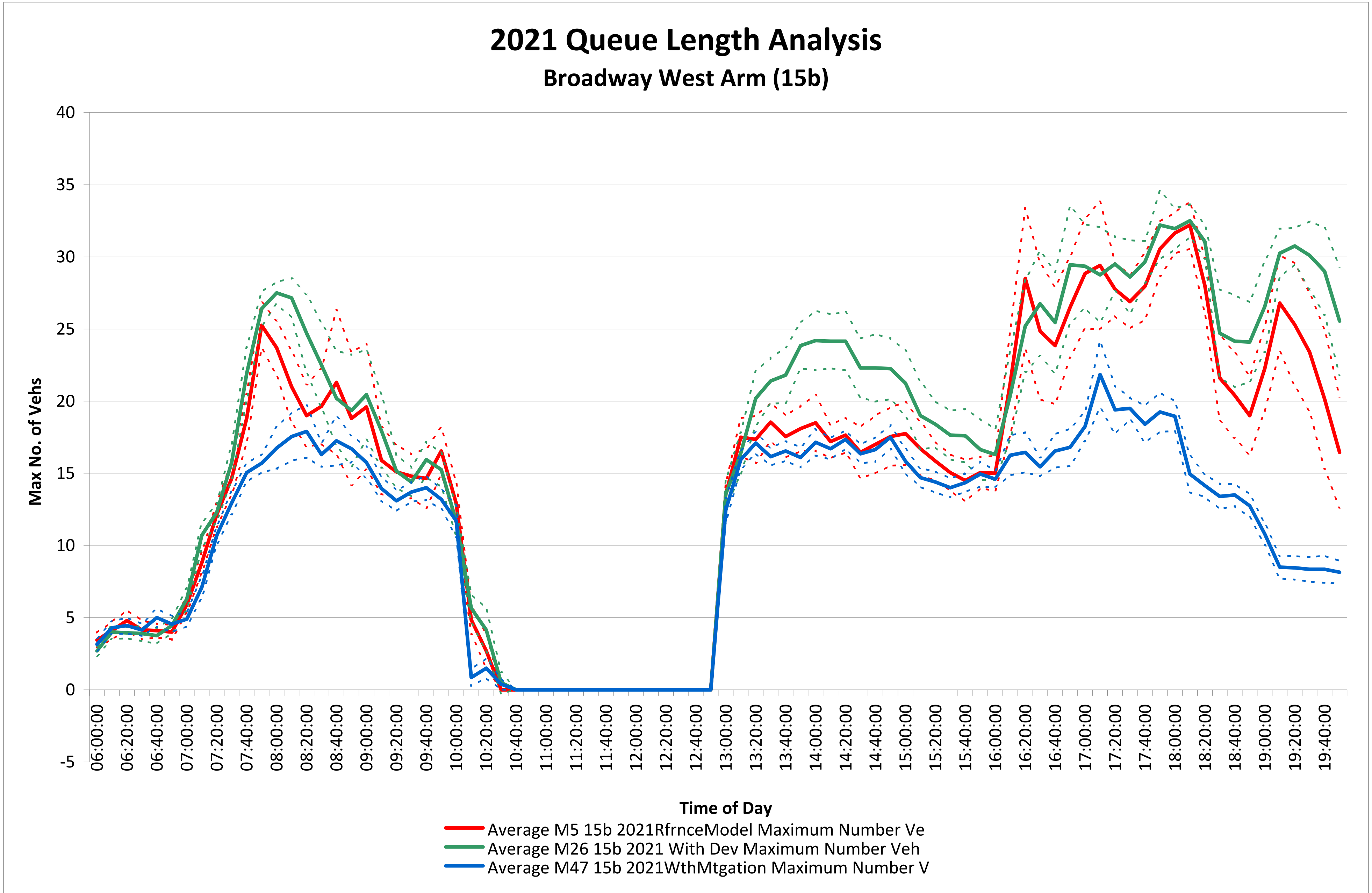
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 15a 2021RfrnceModel Maximum Number Ve
Average M26 15a 2021 With Dev Maximum Number Veh
Average M47 15a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Broadway West Arm (15b)
Max No. of Vehs
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
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15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
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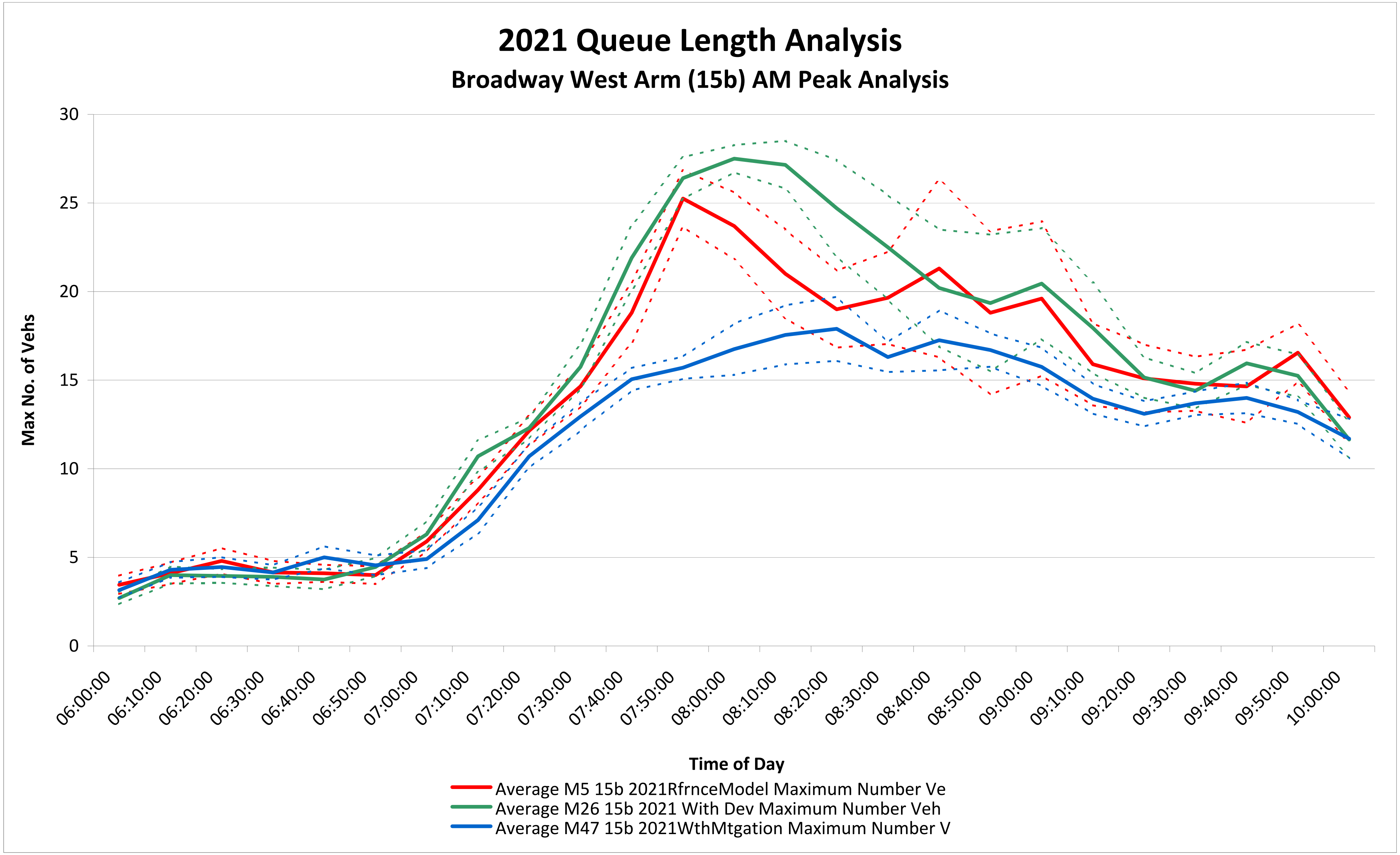
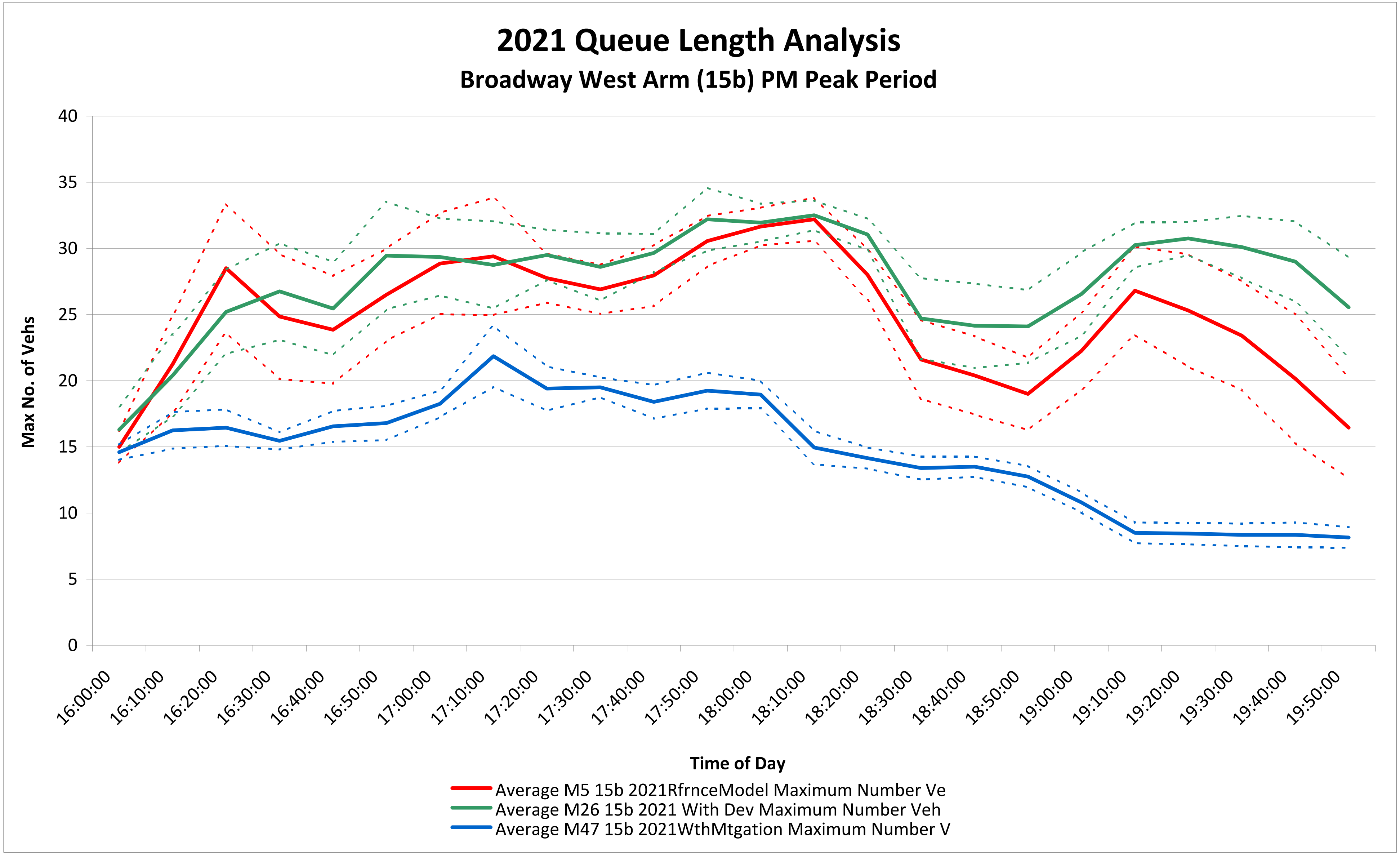
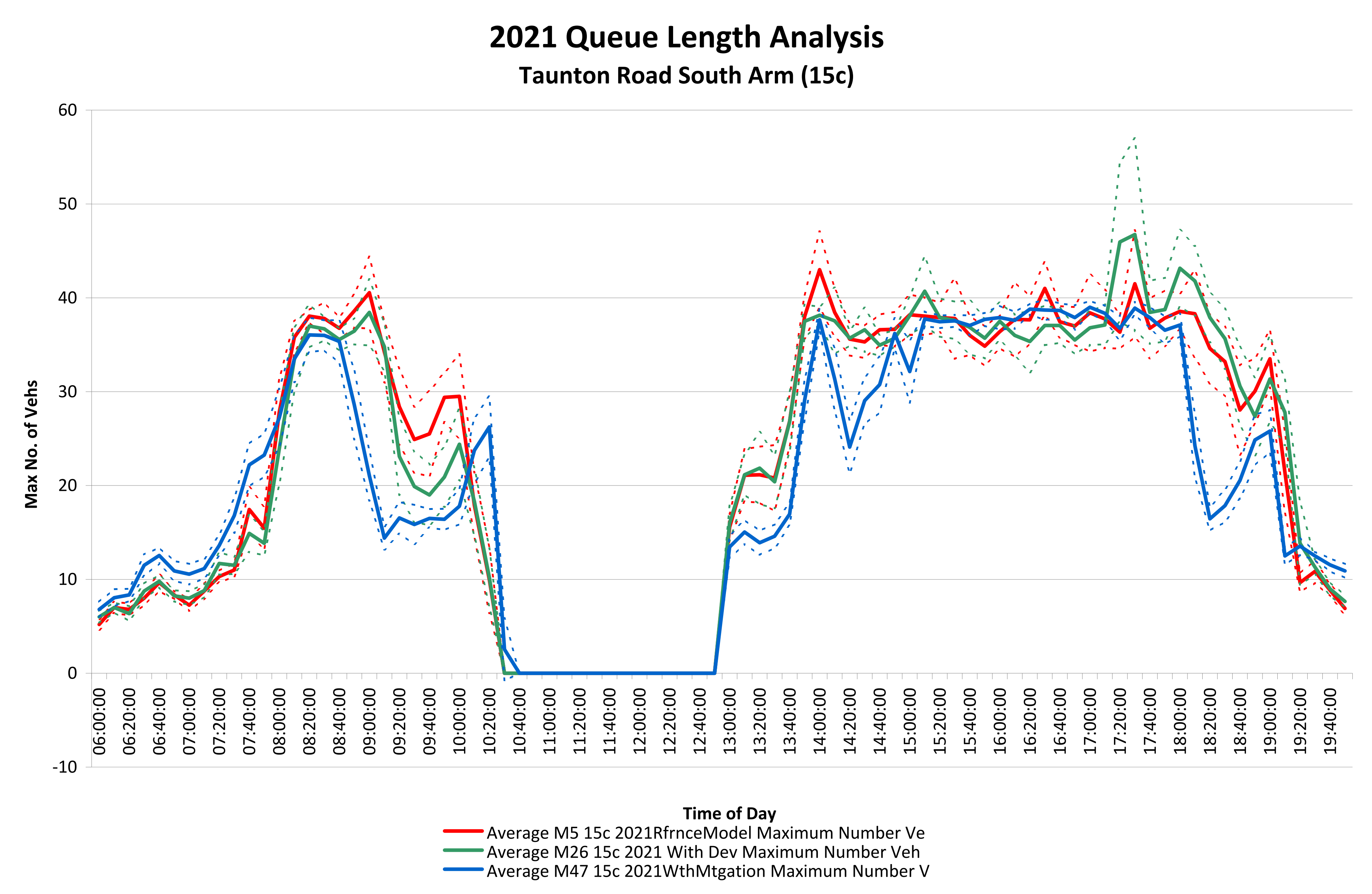
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 15b 2021RfrnceModel Maximum Number Ve
Average M26 15b 2021 With Dev Maximum Number Veh
Average M47 15b 2021WthMtgation Maximum Number V

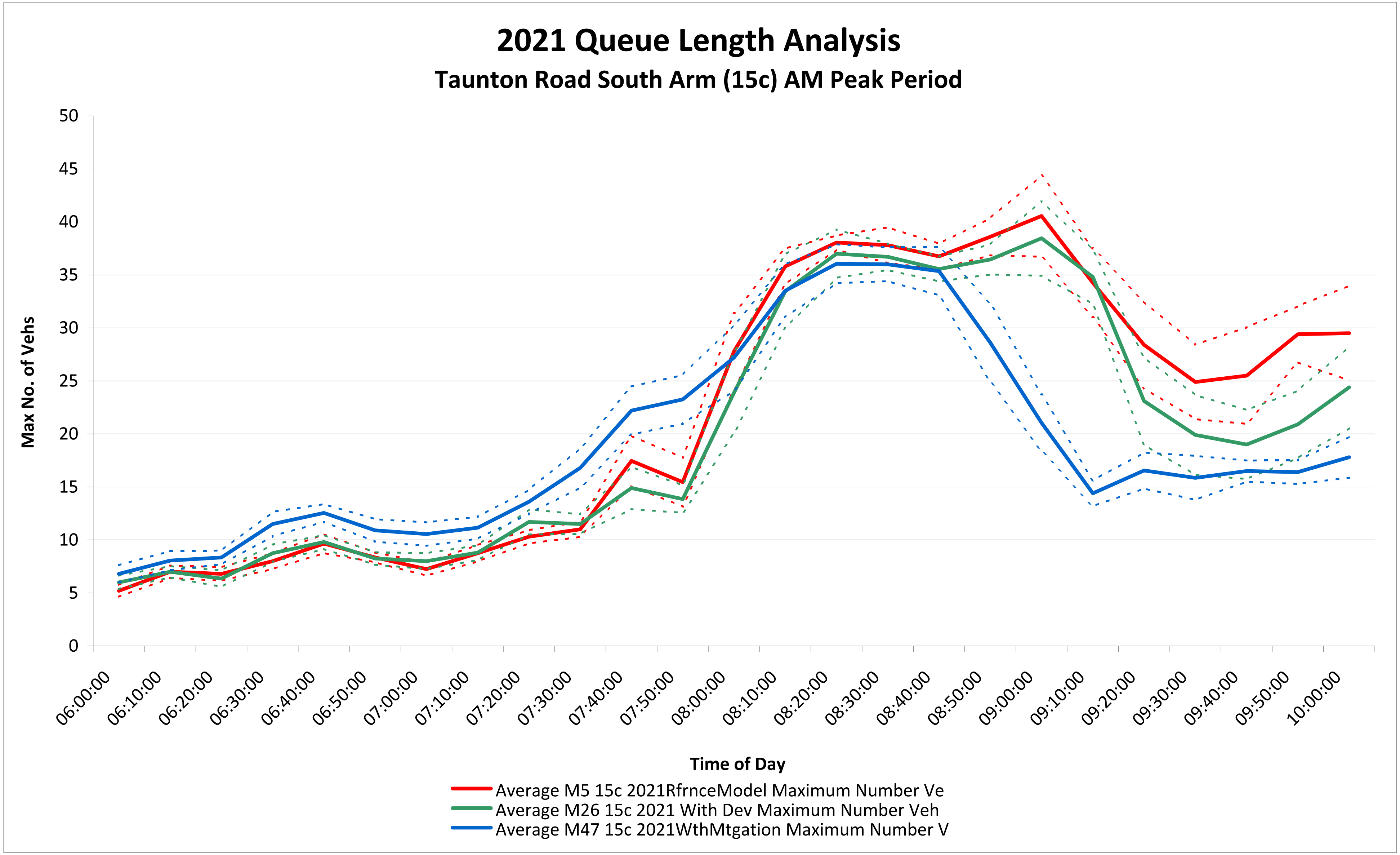

2021 Queue Length Analysis
Broadway West Arm (15b) AM Peak Analysis
30
25
20
15
10
5
0
Max No. of Vehs
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 15b 2021RfrnceModel Maximum Number Ve
Average M26 15b 2021 With Dev Maximum Number Veh
Average M47 15b 2021WthMtgation Maximum Number V



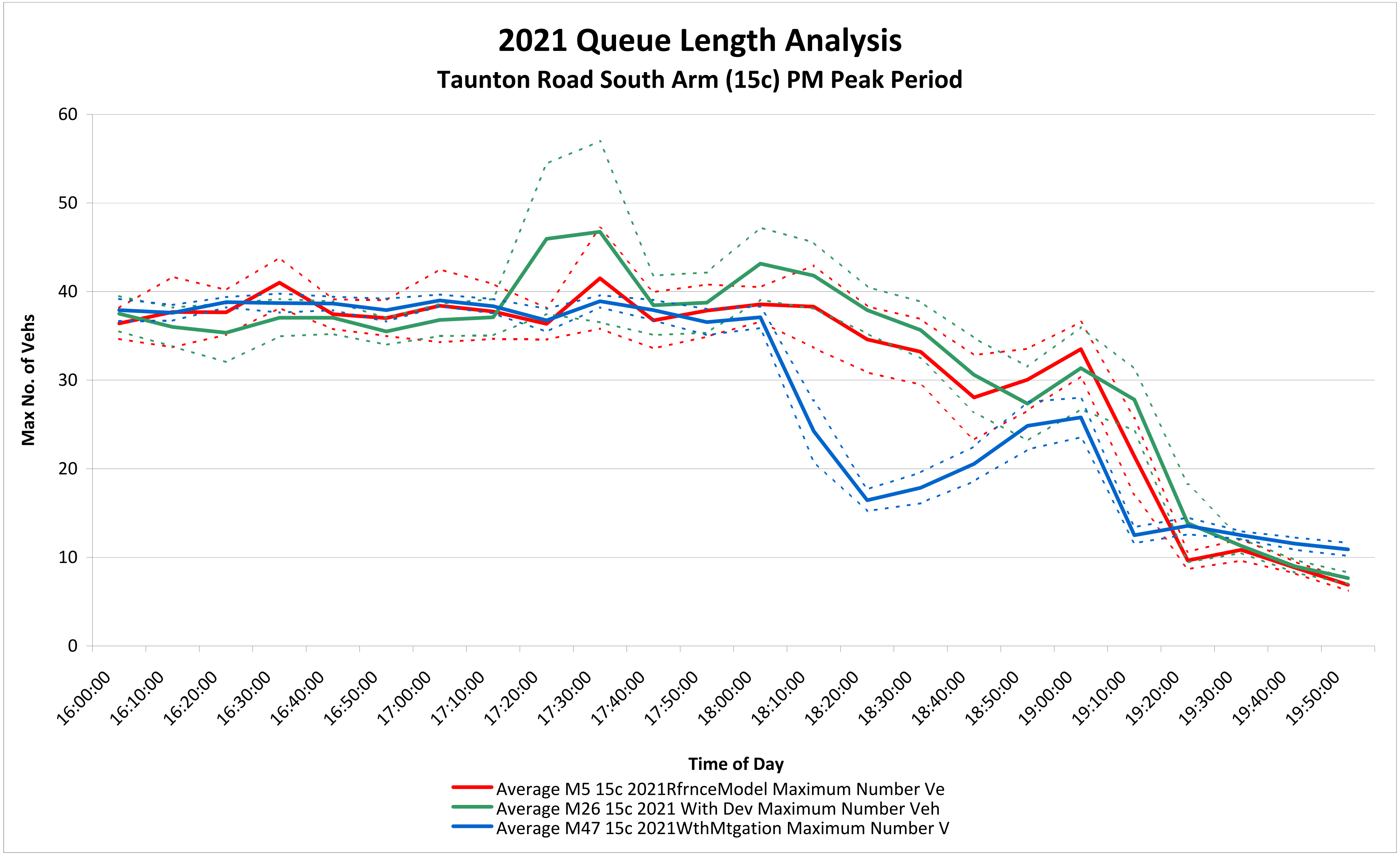
2021 Queue Length Analysis
Broadway West Arm (15b) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 15b 2021RfrnceModel Maximum Number Ve
Average M26 15b 2021 With Dev Maximum Number Veh
Average M47 15b 2021WthMtgation Maximum Number V

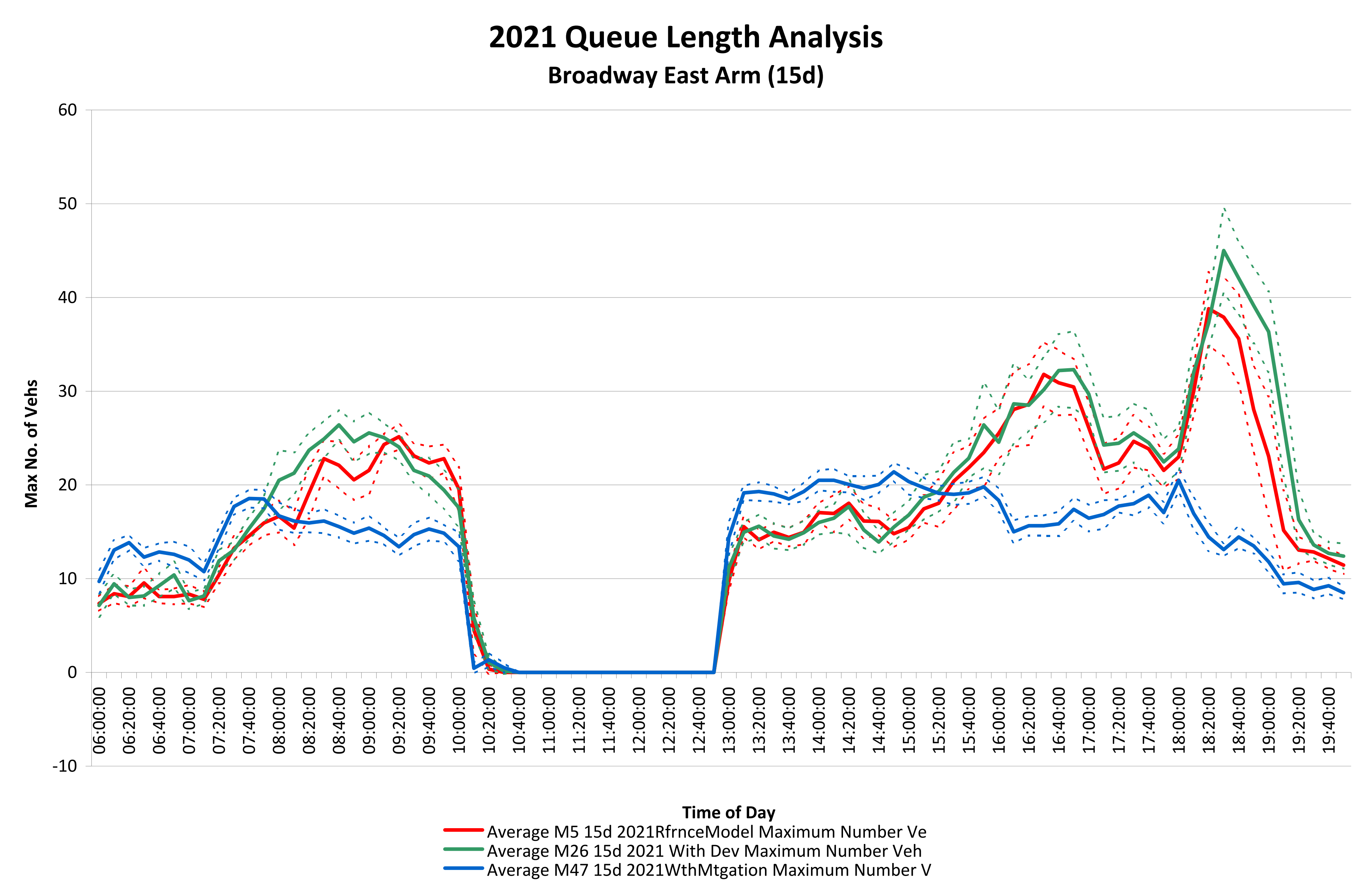


2021 Queue Length Analysis
Taunton Road South Arm (15c)
Max No. of Vehs
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 15c 2021RfrnceModel Maximum Number Ve
Average M26 15c 2021 With Dev Maximum Number Veh
Average M47 15c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Taunton Road South Arm (15c) AM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
45
50
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 15c 2021RfrnceModel Maximum Number Ve
Average M26 15c 2021 With Dev Maximum Number Veh
Average M47 15c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Taunton Road South Arm (15c) PM Peak Period
Max No. of Vehs
0
10
20
30
40
50
60
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 15c 2021RfrnceModel Maximum Number Ve
Average M26 15c 2021 With Dev Maximum Number Veh
Average M47 15c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Broadway East Arm (15d)
Max No. of Vehs
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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15:00:00
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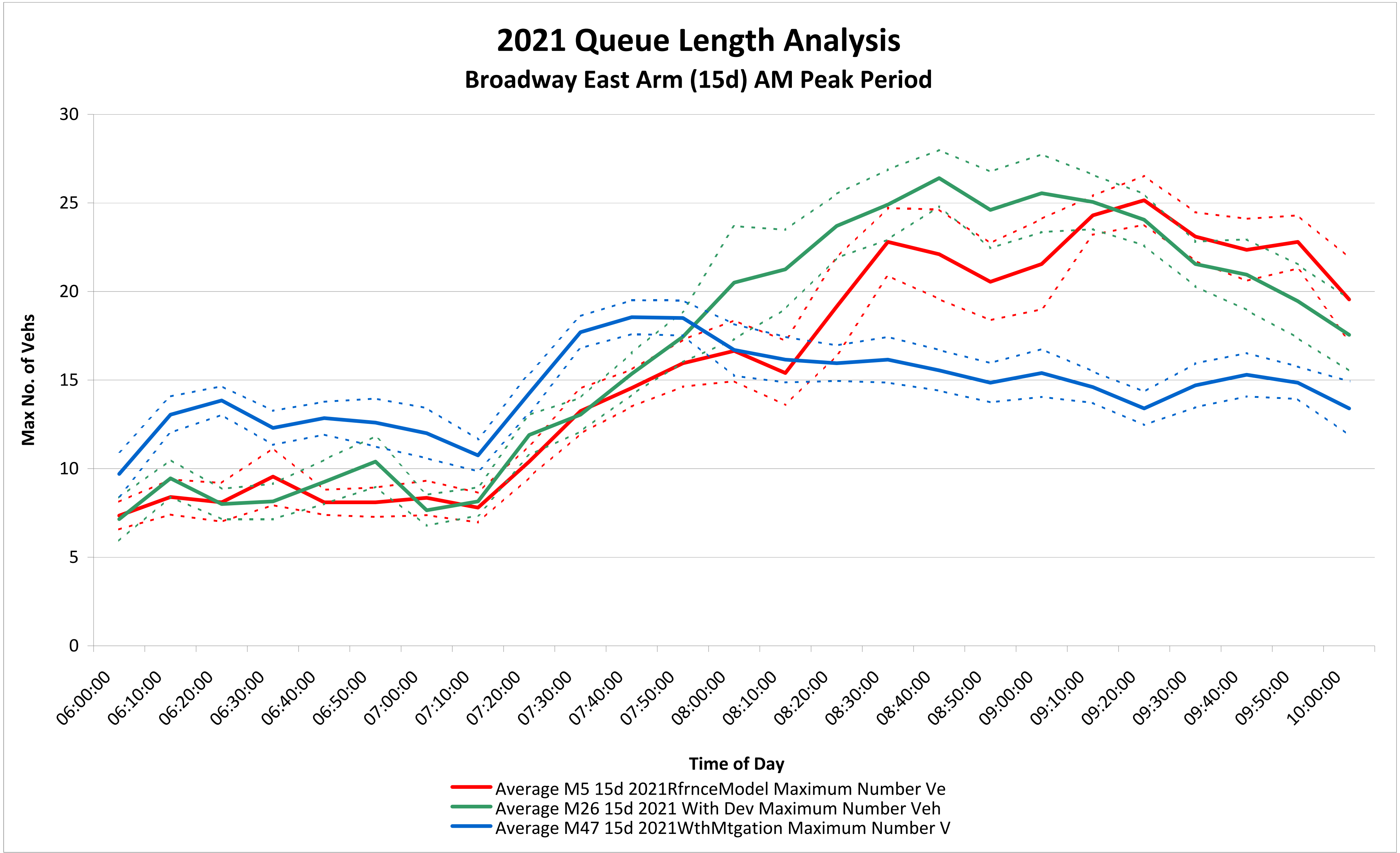
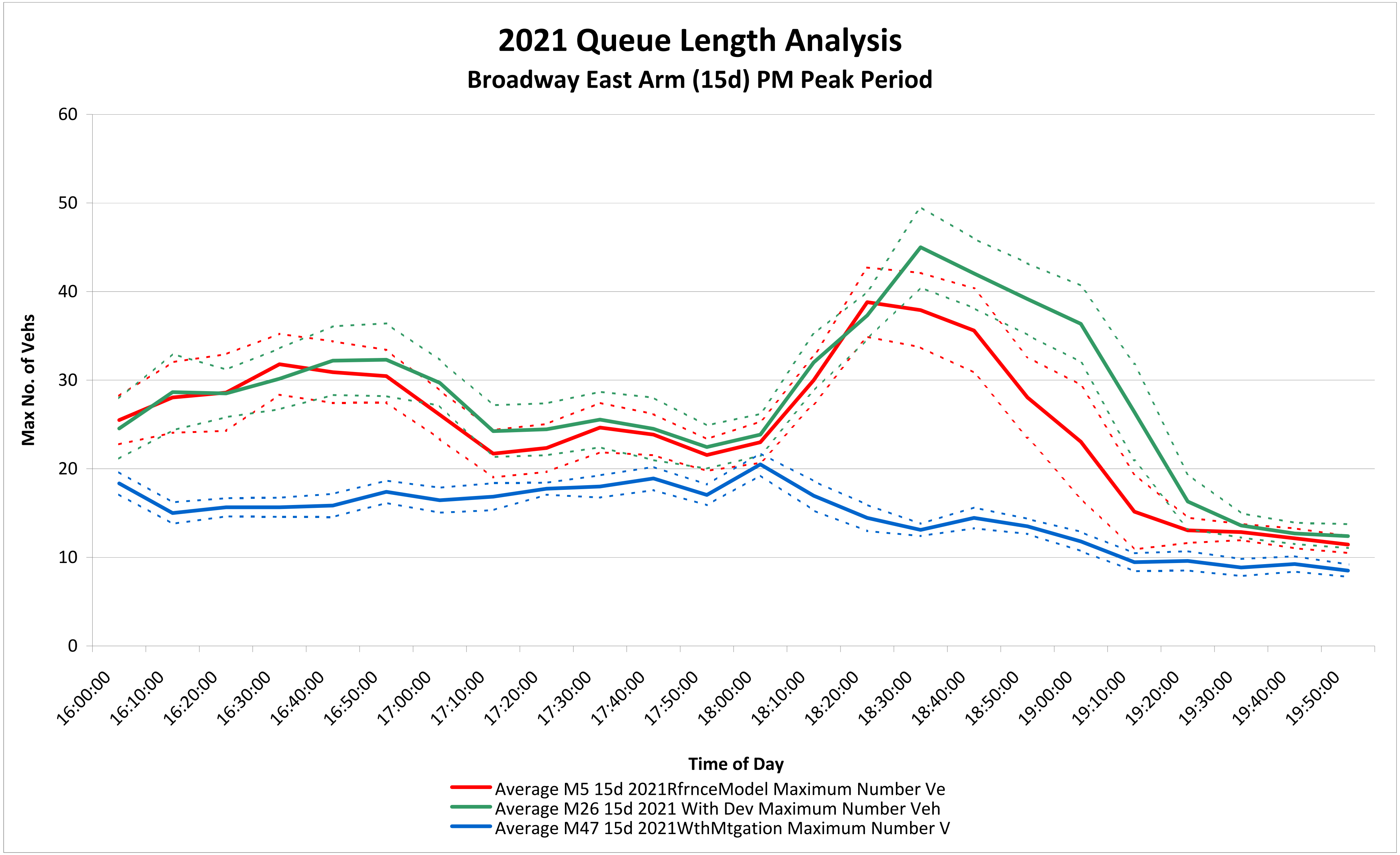
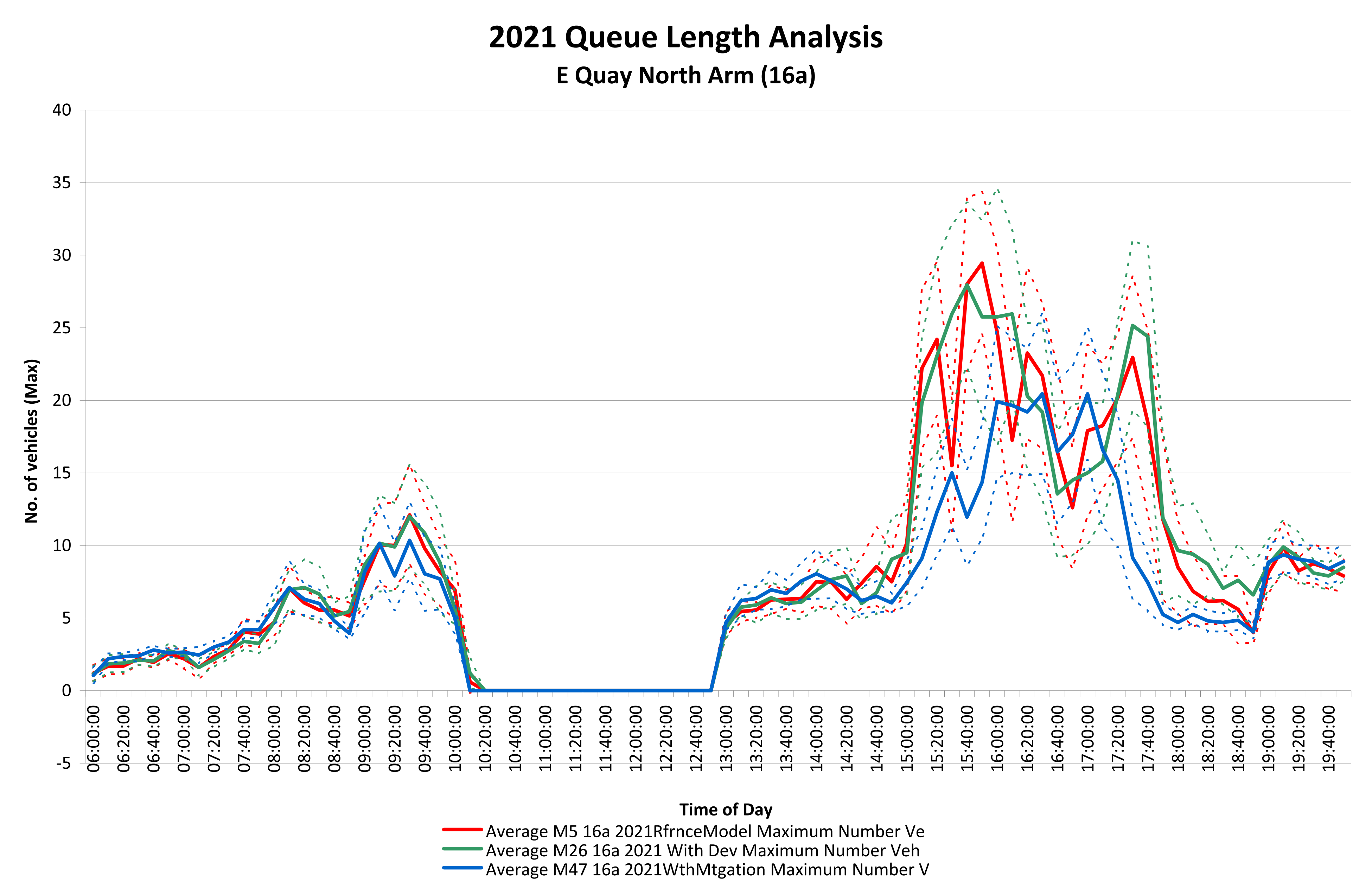
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 15d 2021RfrnceModel Maximum Number Ve
Average M26 15d 2021 With Dev Maximum Number Veh
Average M47 15d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Broadway East Arm (15d) AM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 15d 2021RfrnceModel Maximum Number Ve
Average M26 15d 2021 With Dev Maximum Number Veh
Average M47 15d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Broadway East Arm (15d) PM Peak Period
Max No. of Vehs
0
10
20
30
40
50
60
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 15d 2021RfrnceModel Maximum Number Ve
Average M26 15d 2021 With Dev Maximum Number Veh
Average M47 15d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
E Quay North Arm (16a)
No. of vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
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14:40:00
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15:40:00
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16:20:00
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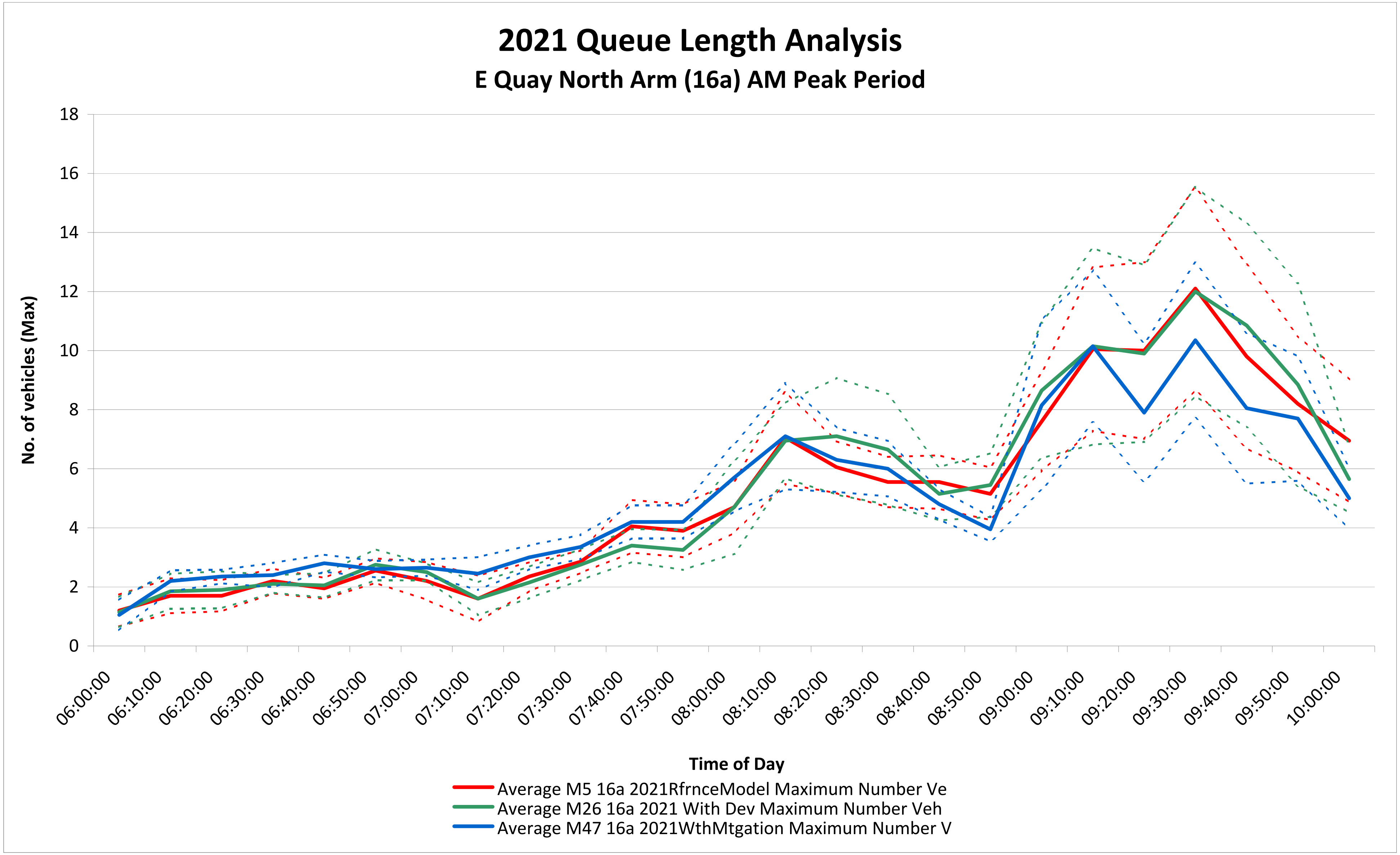
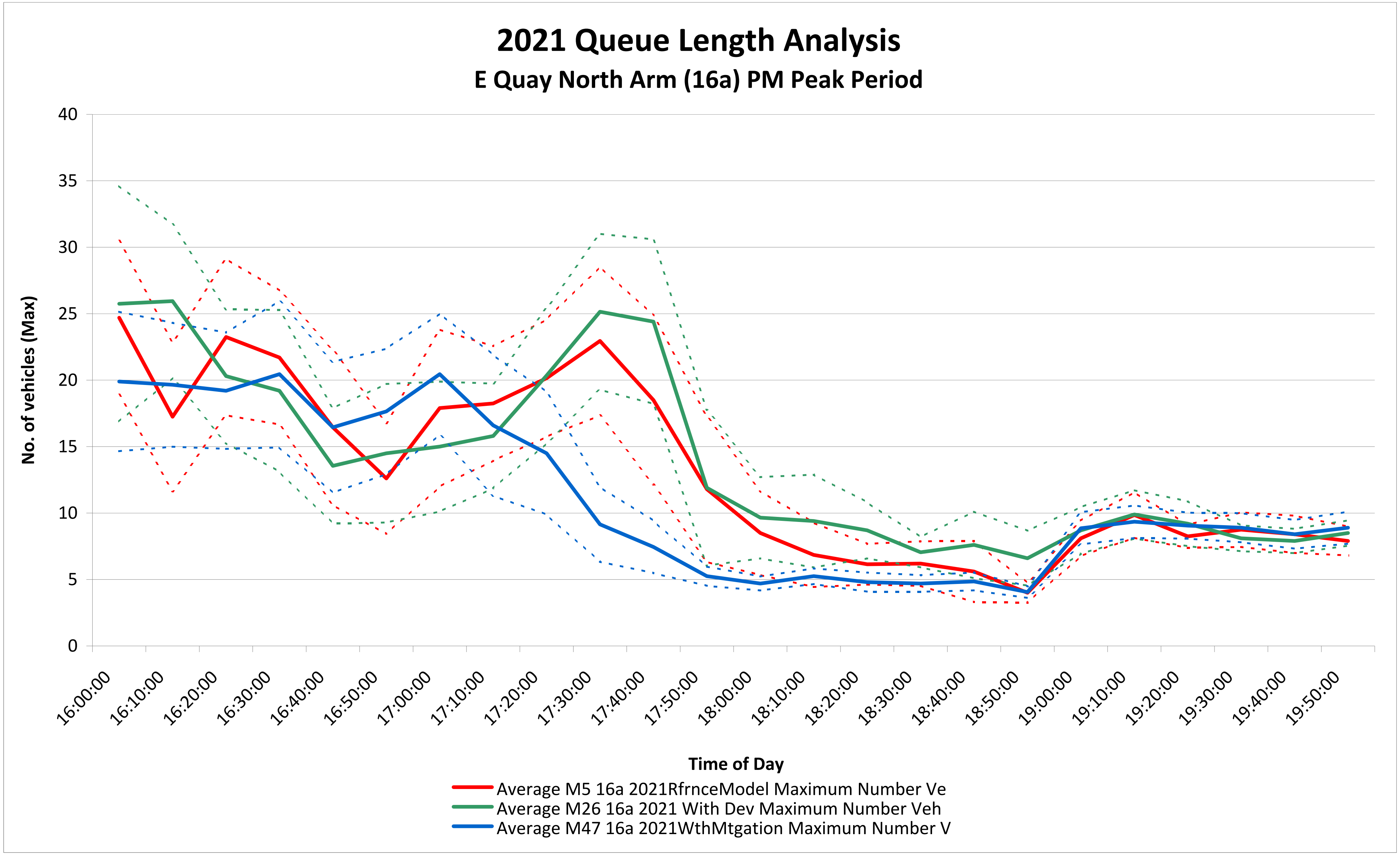
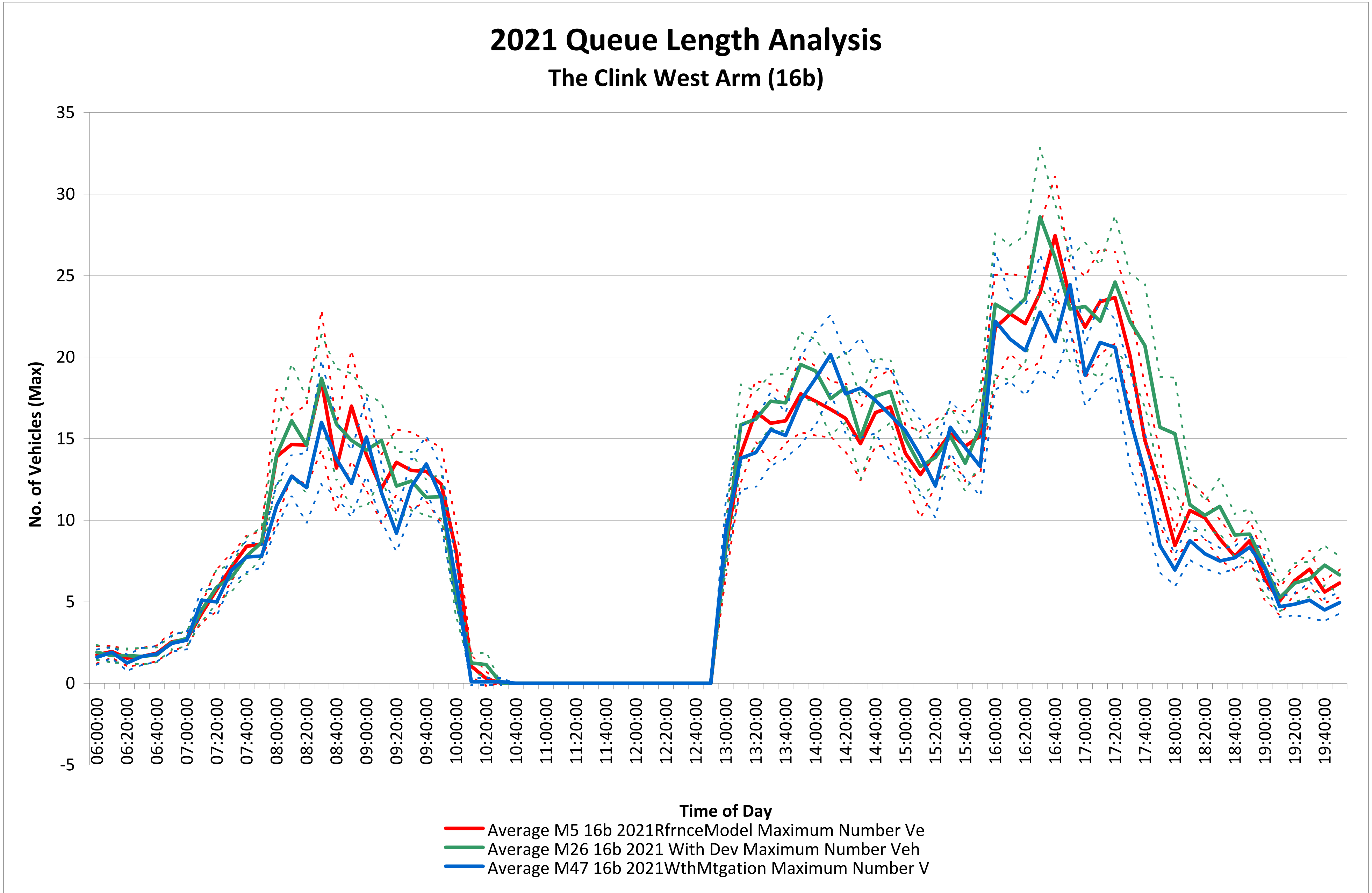
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 16a 2021RfrnceModel Maximum Number Ve
Average M26 16a 2021 With Dev Maximum Number Veh
Average M47 16a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
E Quay North Arm (16a) AM Peak Period
No. of vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 16a 2021RfrnceModel Maximum Number Ve
Average M26 16a 2021 With Dev Maximum Number Veh
Average M47 16a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
E Quay North Arm (16a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 16a 2021RfrnceModel Maximum Number Ve
Average M26 16a 2021 With Dev Maximum Number Veh
Average M47 16a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Clink West Arm (16b)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
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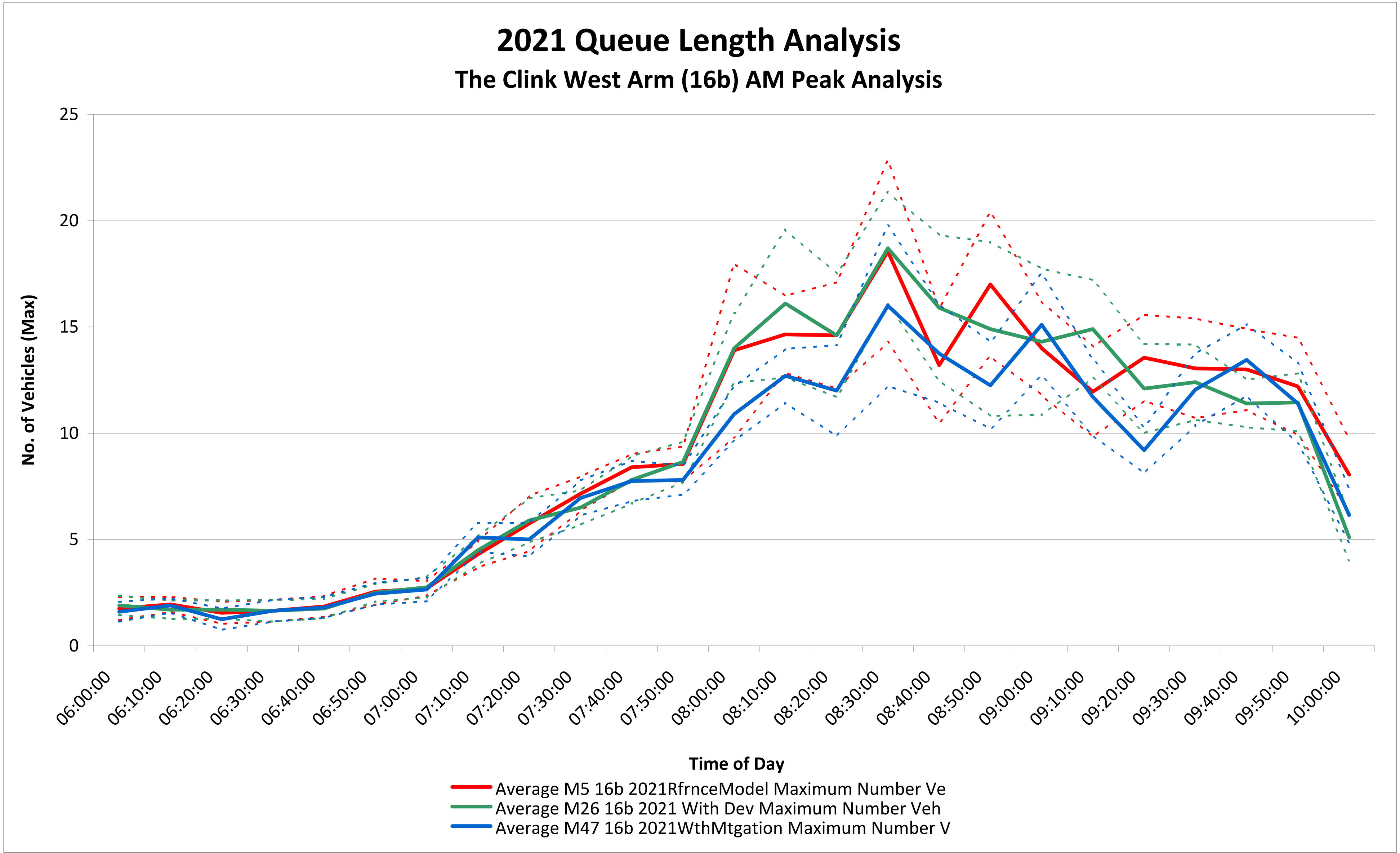
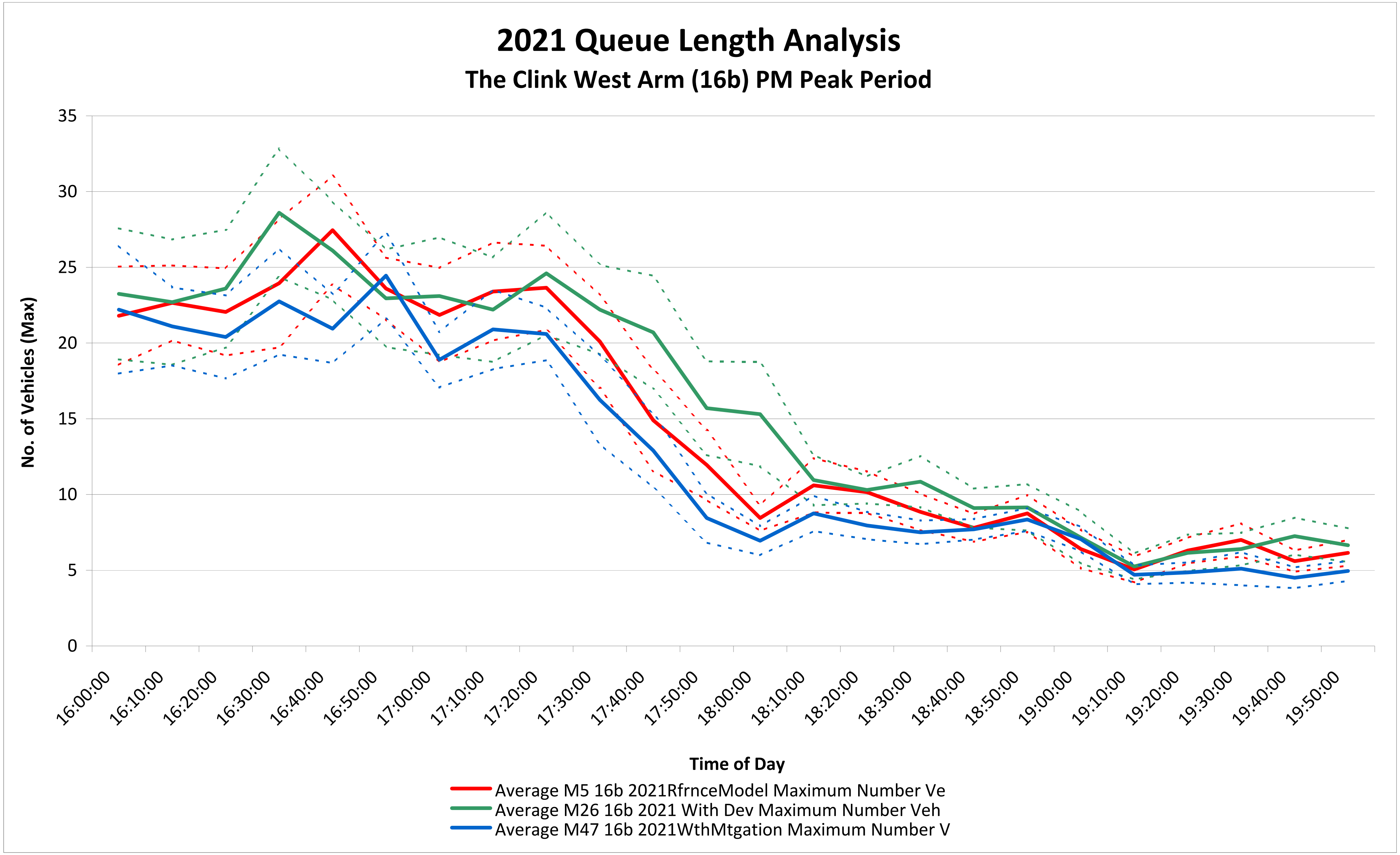
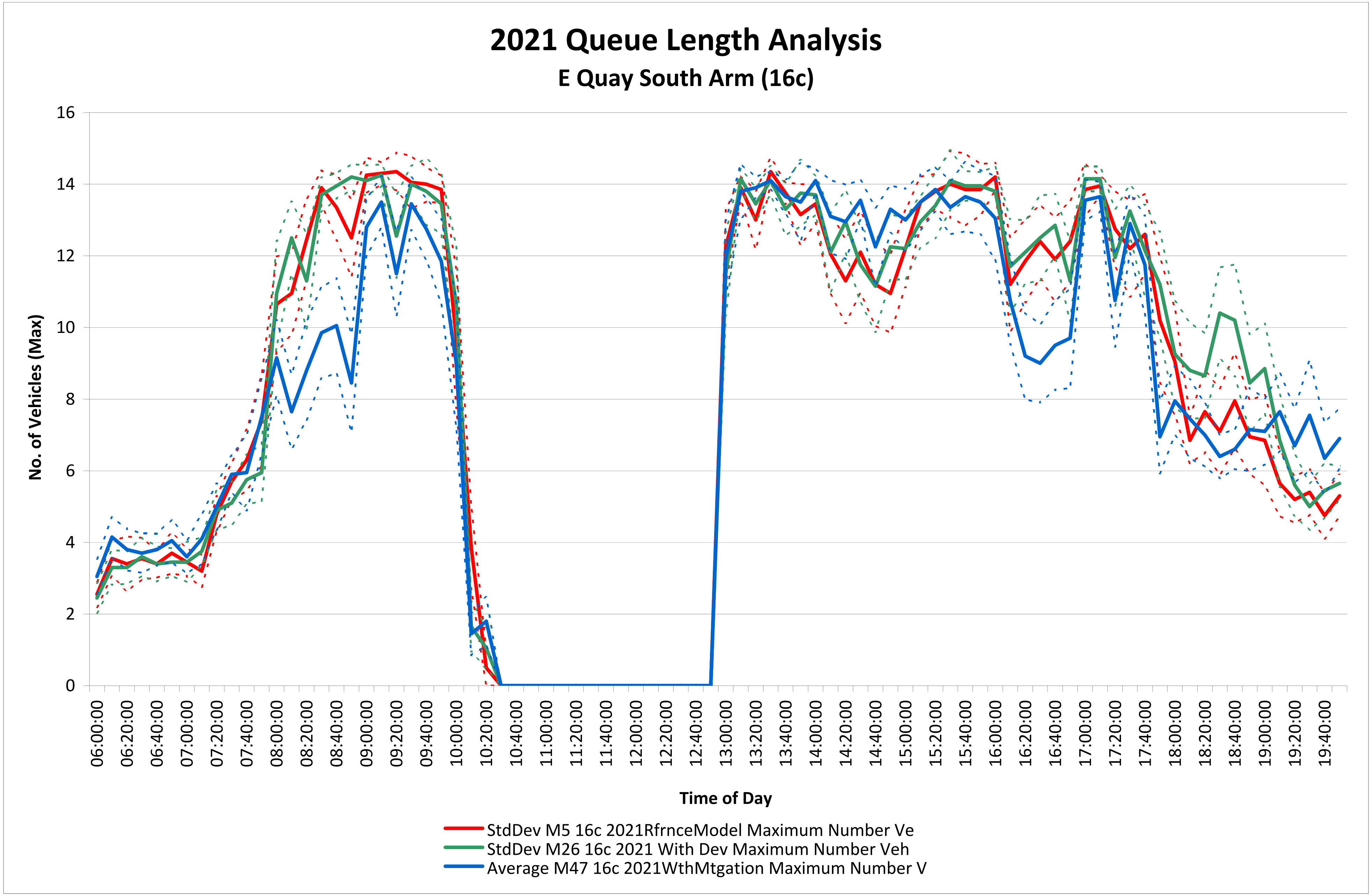
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 16b 2021RfrnceModel Maximum Number Ve
Average M26 16b 2021 With Dev Maximum Number Veh
Average M47 16b 2021WthMtgation Maximum Number V

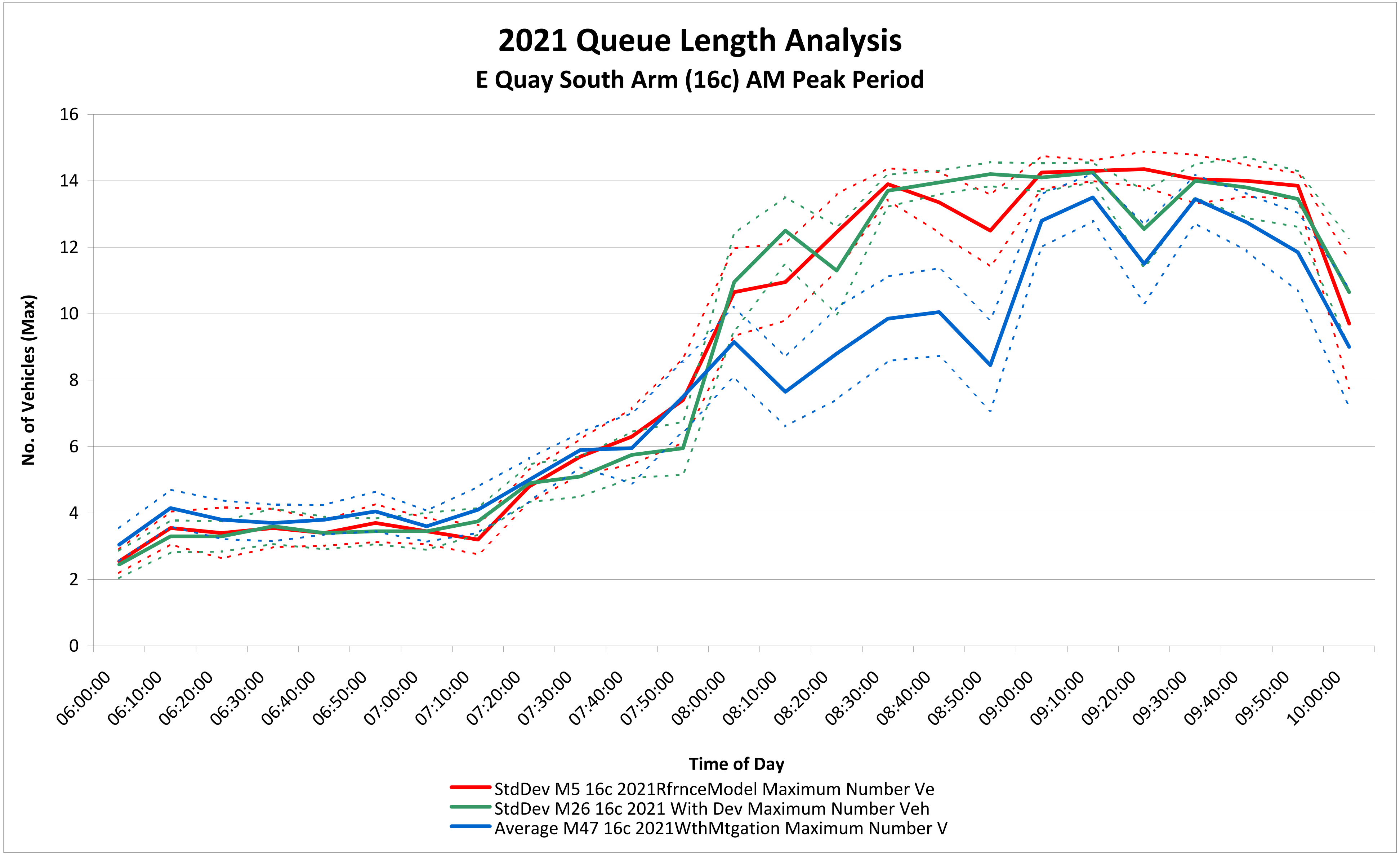

2021 Queue Length Analysis
The Clink West Arm (16b) AM Peak Analysis
No. of Vehicles (Max)
0
5
10
15
20
25
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 16b 2021RfrnceModel Maximum Number Ve
Average M26 16b 2021 With Dev Maximum Number Veh
Average M47 16b 2021WthMtgation Maximum Number V



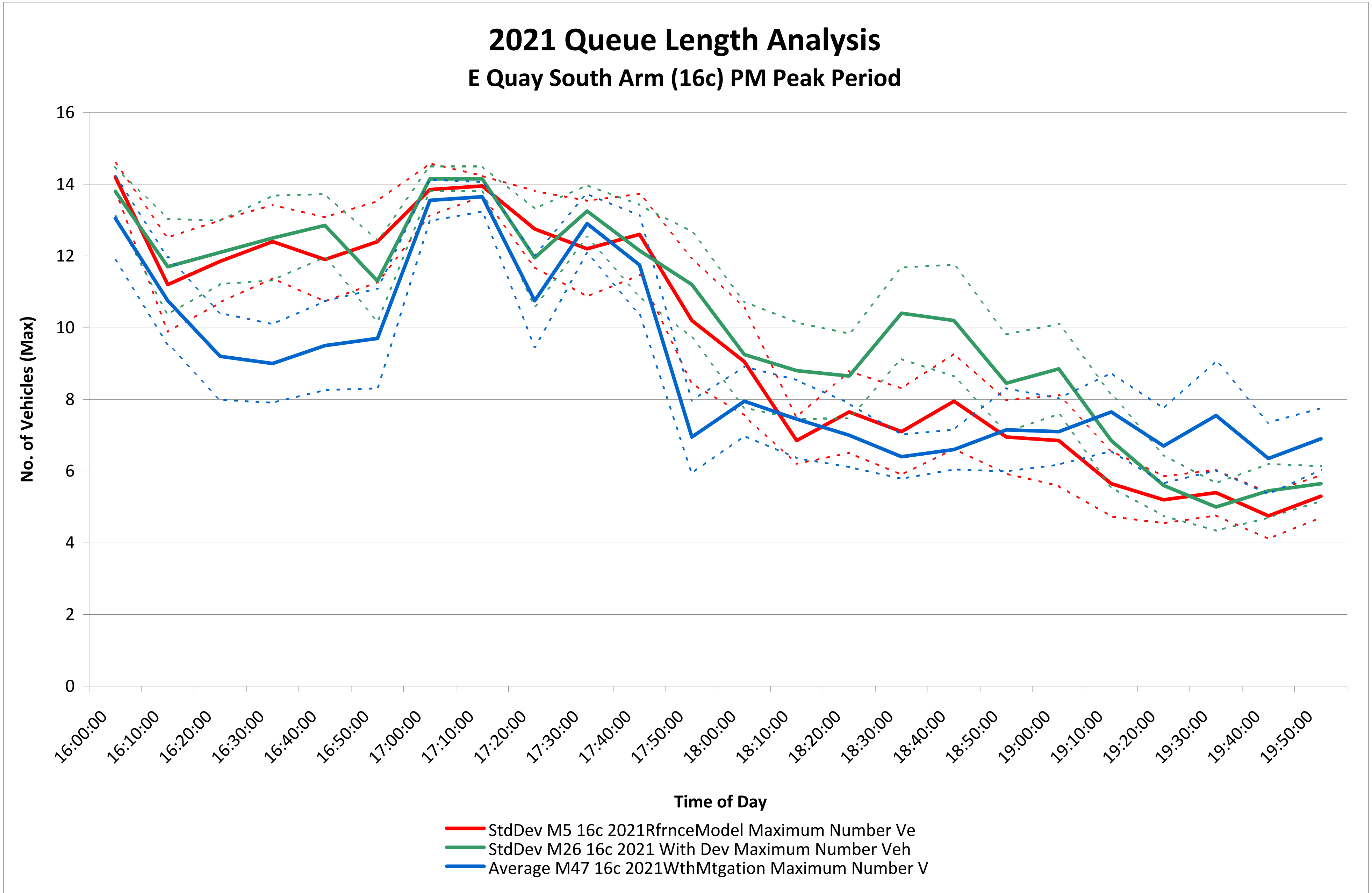
2021 Queue Length Analysis
The Clink West Arm (16b) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 16b 2021RfrnceModel Maximum Number Ve
Average M26 16b 2021 With Dev Maximum Number Veh
Average M47 16b 2021WthMtgation Maximum Number V



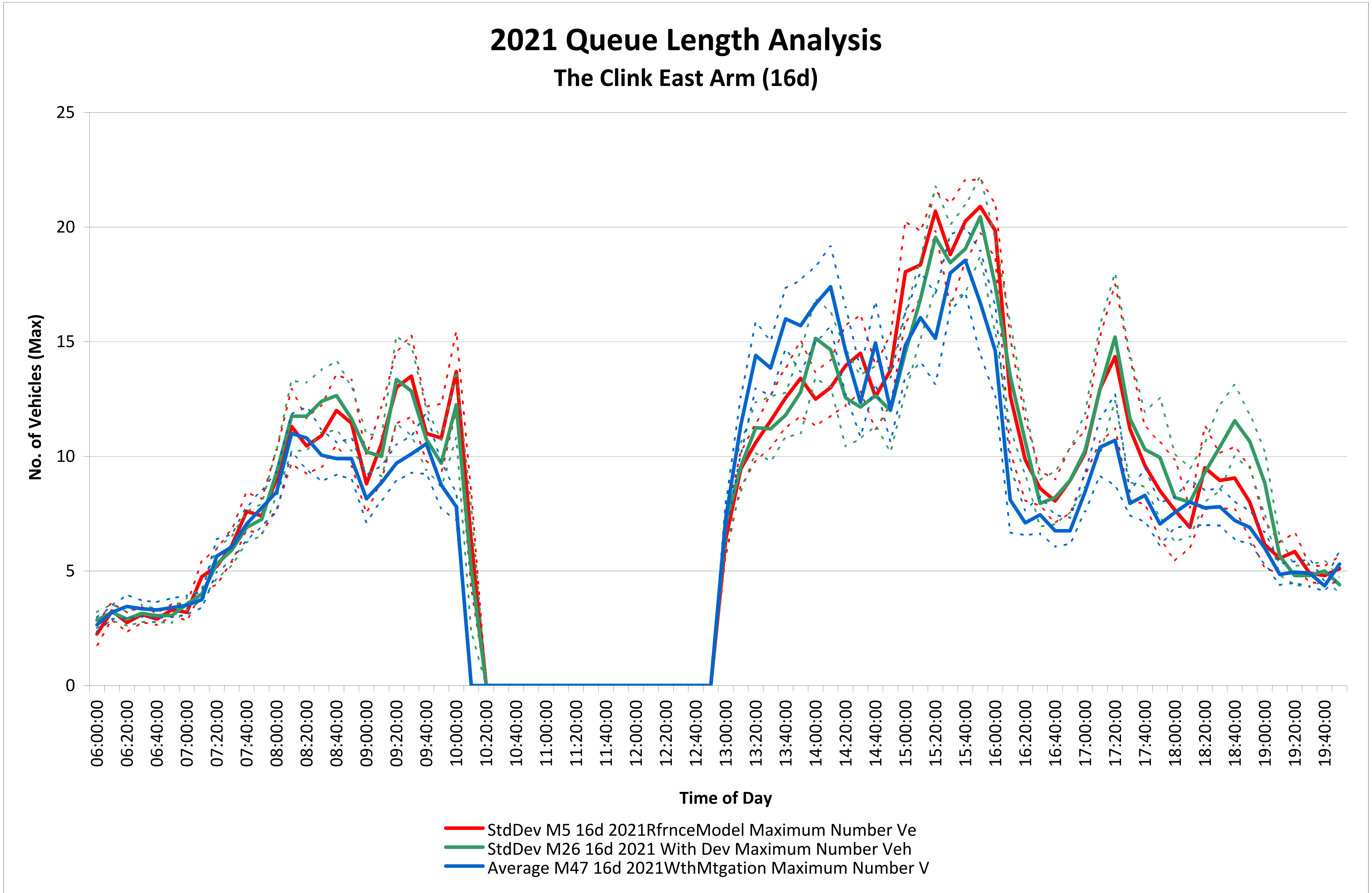
2021 Queue Length Analysis
E Quay South Arm (16c)
No. of Vehicles (Max)
Time of Day
StdDev M5 16c 2021RfrnceModel Maximum Number Ve
StdDev M26 16c 2021 With Dev Maximum Number Veh
Average M47 16c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
E Quay South Arm (16c) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 16c 2021RfrnceModel Maximum Number Ve
StdDev M26 16c 2021 With Dev Maximum Number Veh
Average M47 16c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
E Quay South Arm (16c) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 16c 2021RfrnceModel Maximum Number Ve
StdDev M26 16c 2021 With Dev Maximum Number Veh
Average M47 16c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Clink East Arm (16d)
No. of Vehicles (Max)
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
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11:20:00
11:40:00
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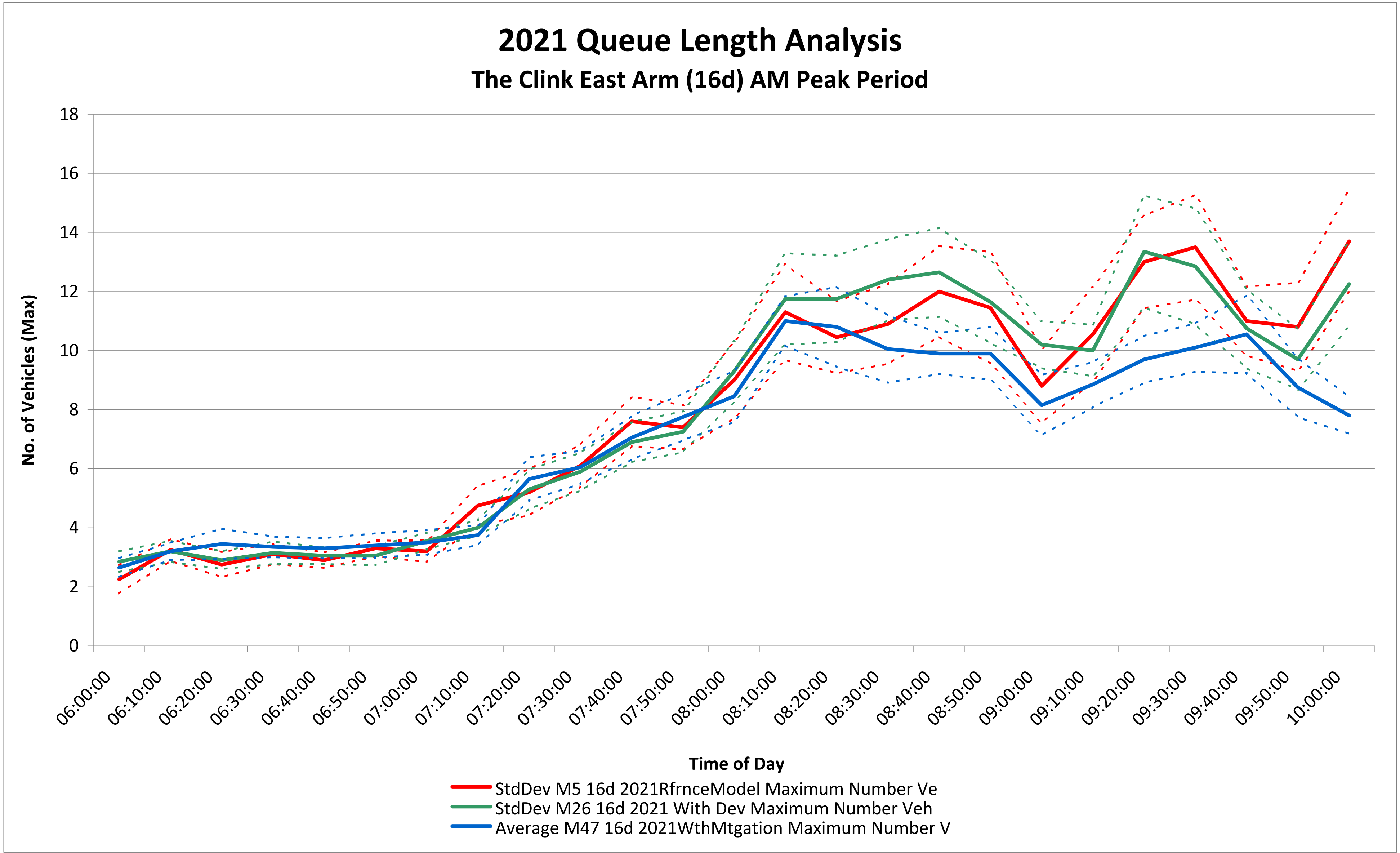
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 16d 2021RfrnceModel Maximum Number Ve
StdDev M26 16d 2021 With Dev Maximum Number Veh
Average M47 16d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
The Clink East Arm (16d) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
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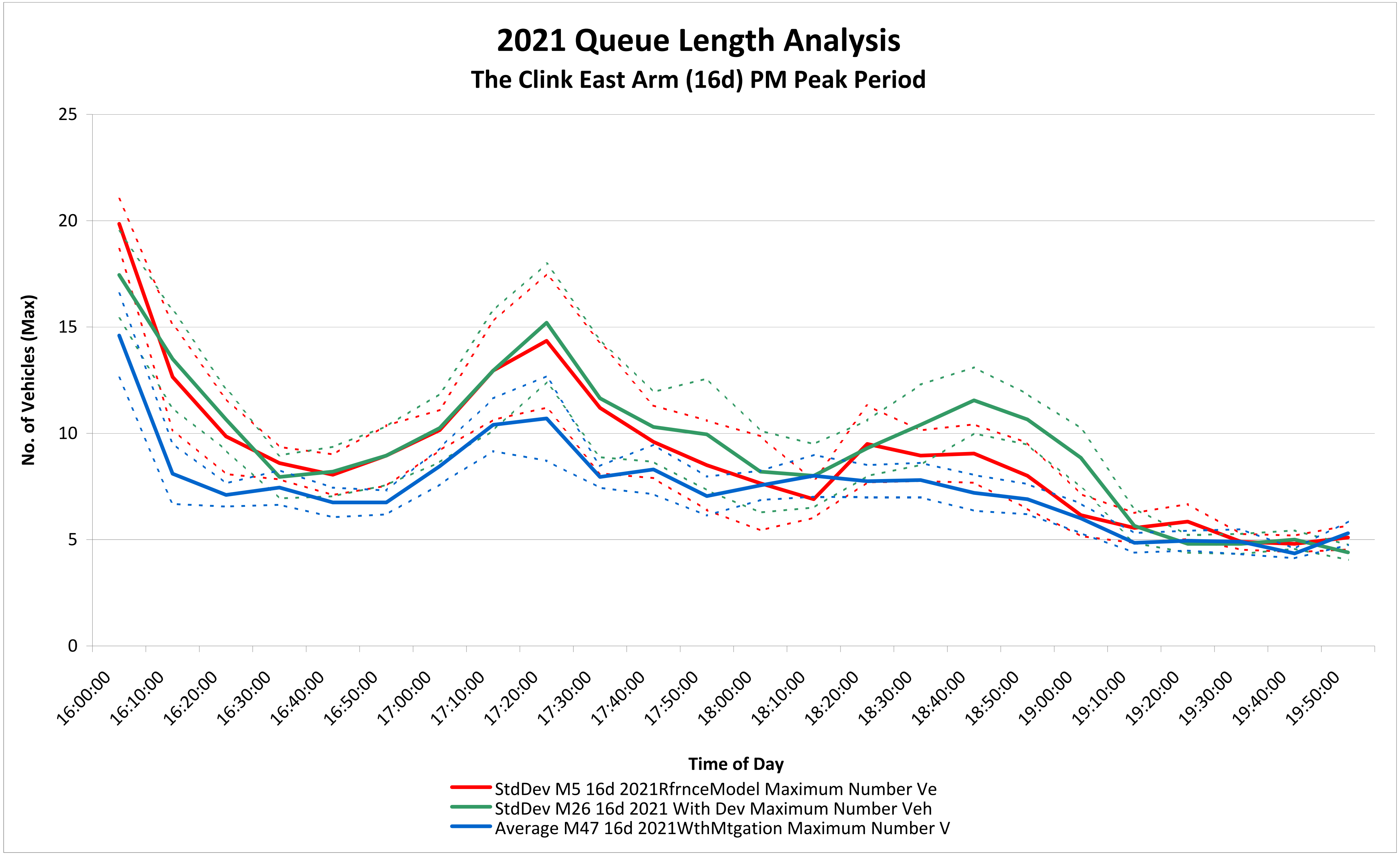
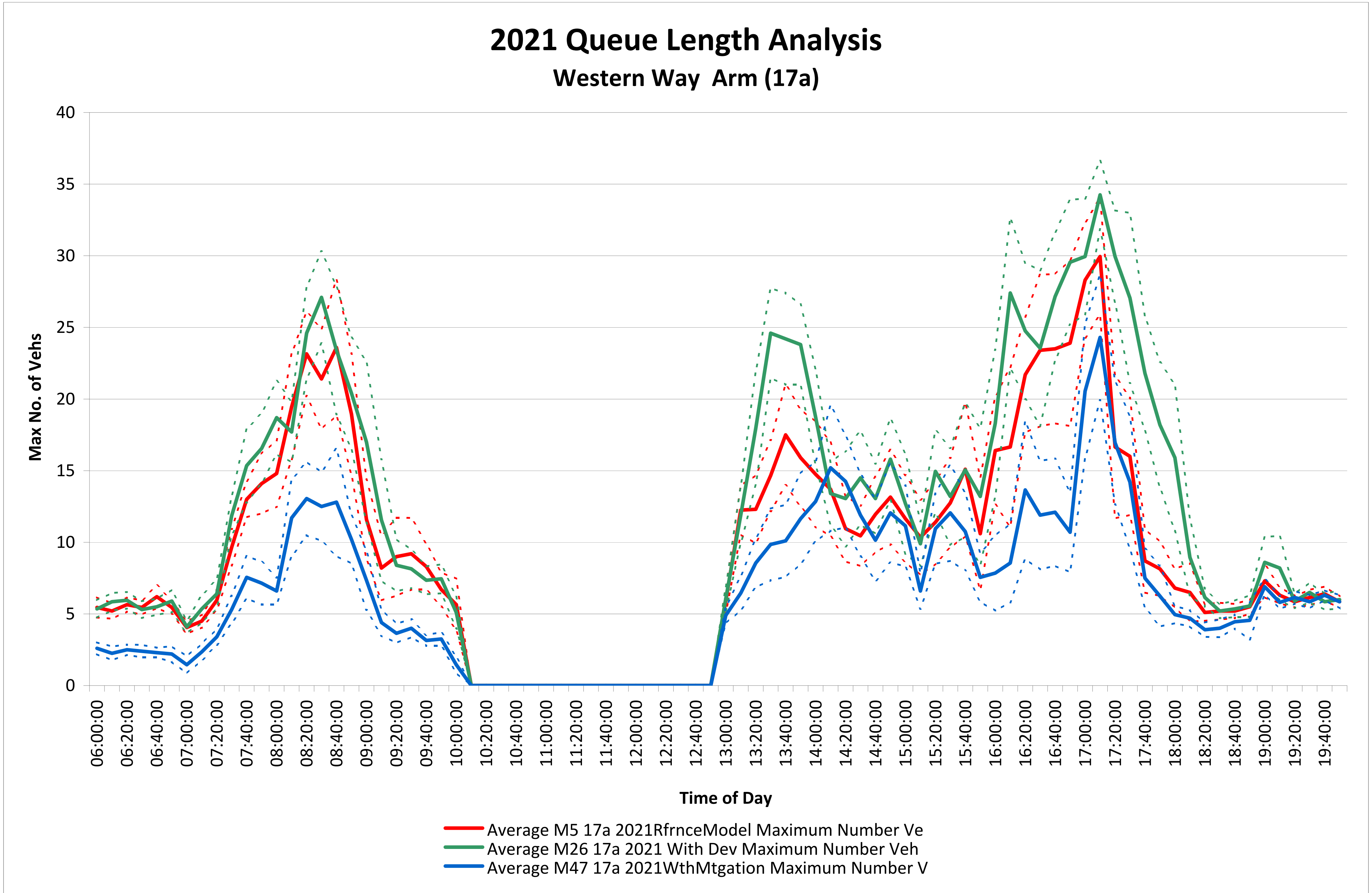
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 16d 2021RfrnceModel Maximum Number Ve
StdDev M26 16d 2021 With Dev Maximum Number Veh
Average M47 16d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Clink East Arm (16d) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 16d 2021RfrnceModel Maximum Number Ve
StdDev M26 16d 2021 With Dev Maximum Number Veh
Average M47 16d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Western Way Arm (17a)
Max No. of Vehs
40
35
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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11:00:00
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11:40:00
12:00:00
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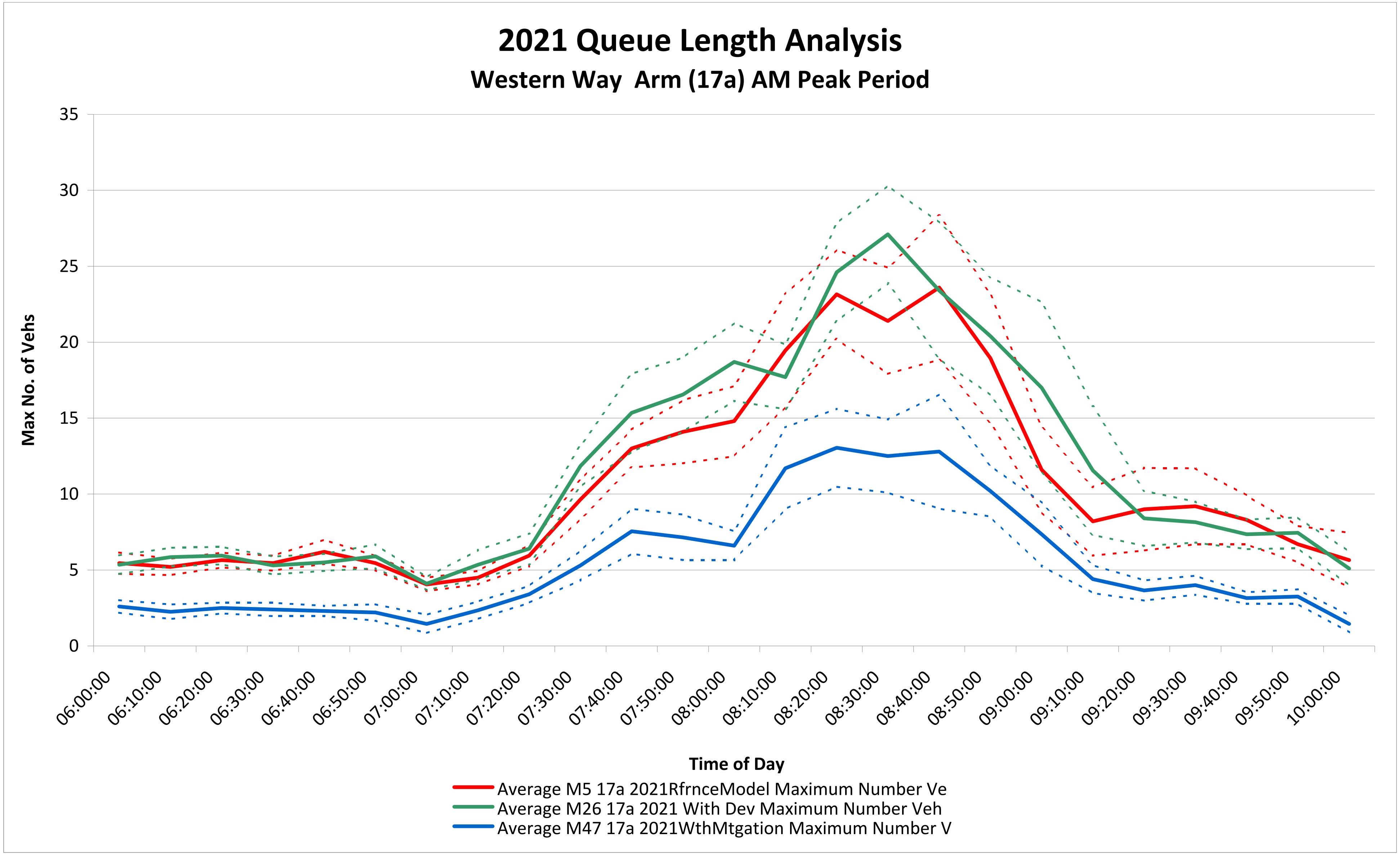
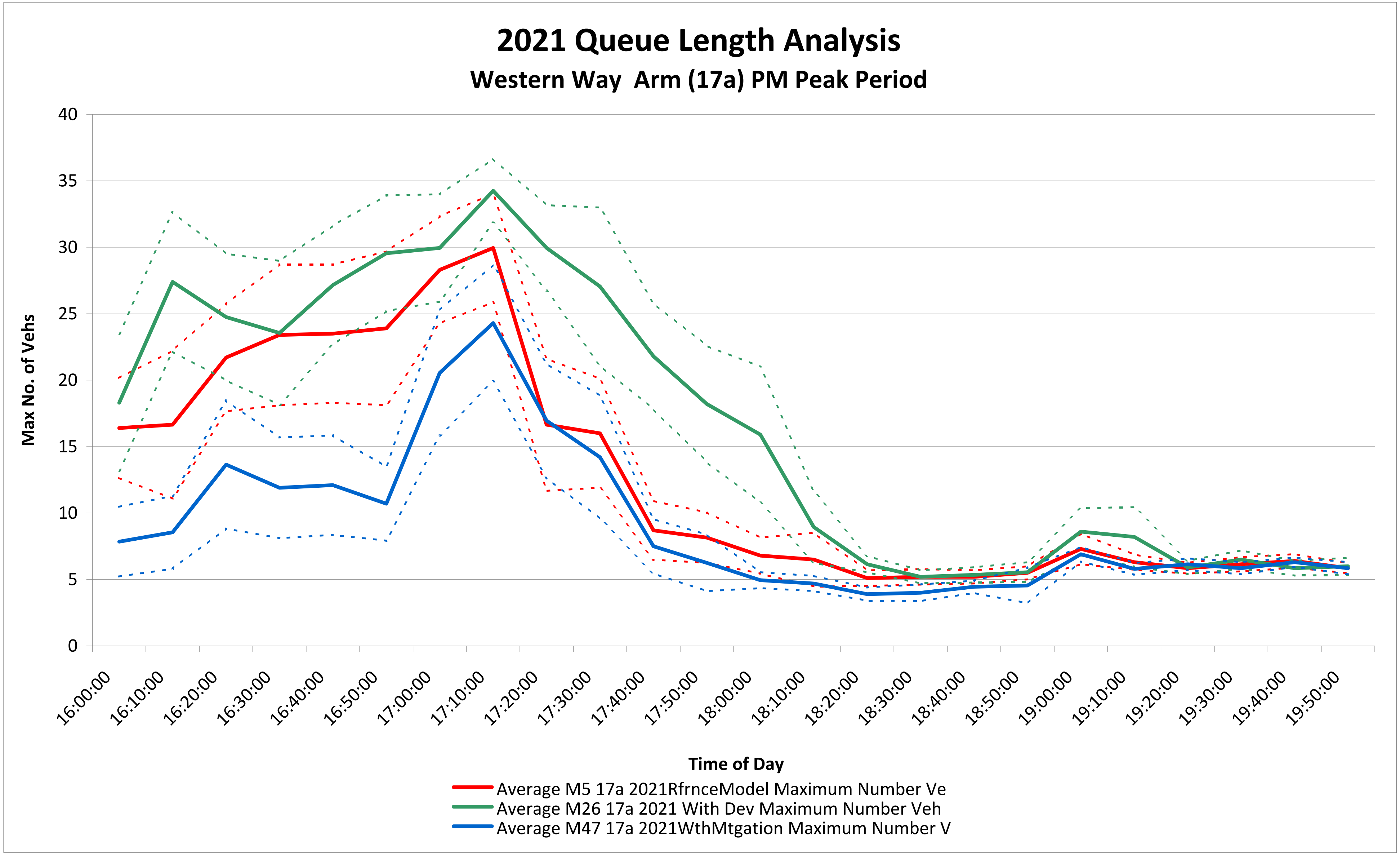
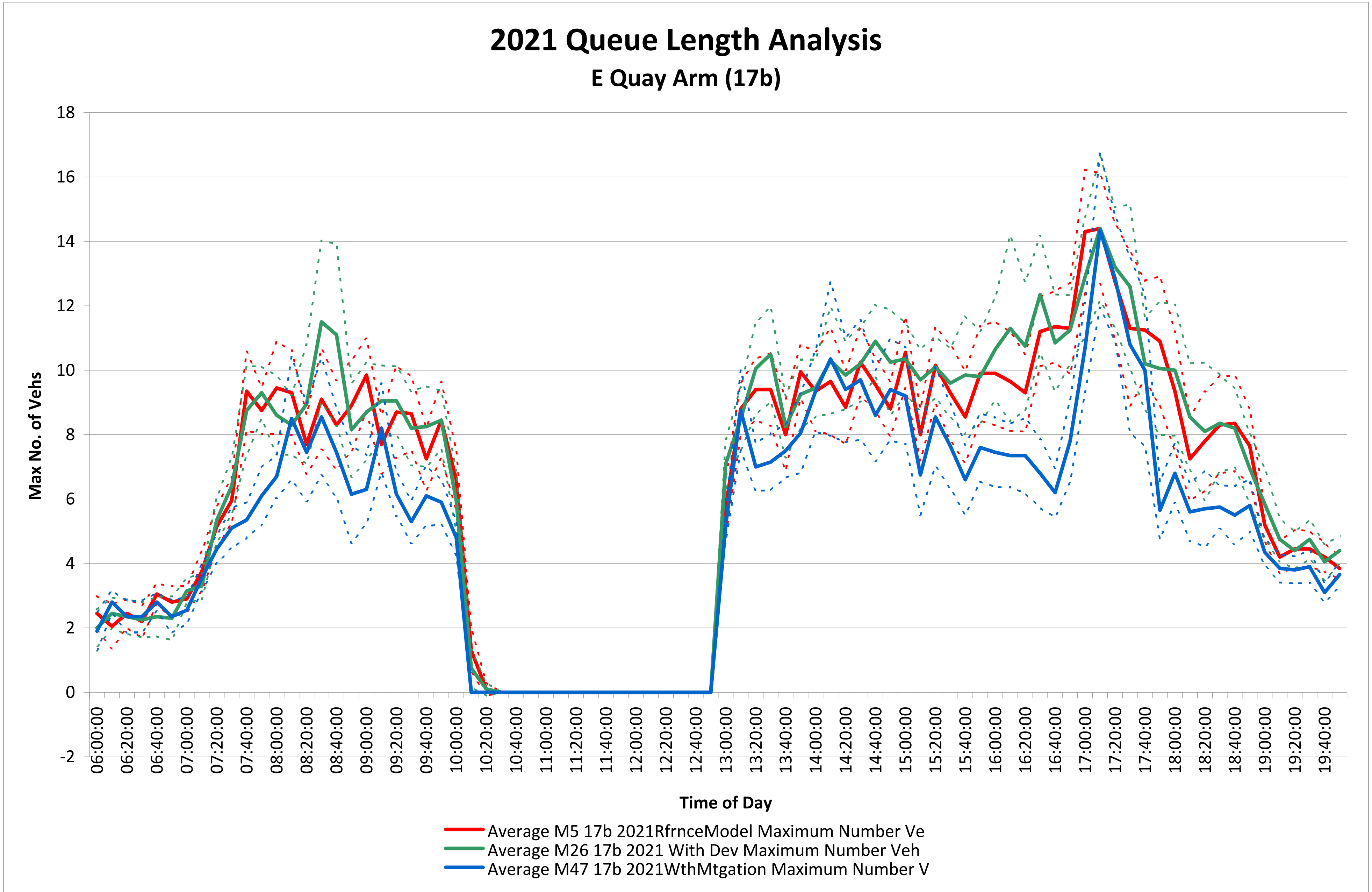
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 17a 2021RfrnceModel Maximum Number Ve
Average M26 17a 2021 With Dev Maximum Number Veh
Average M47 17a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Western Way Arm (17a) AM Peak Period
Max No. of Vehs
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 17a 2021RfrnceModel Maximum Number Ve
Average M26 17a 2021 With Dev Maximum Number Veh
Average M47 17a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Western Way Arm (17a) PM Peak Period
Max No. of Vehs
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 17a 2021RfrnceModel Maximum Number Ve
Average M26 17a 2021 With Dev Maximum Number Veh
Average M47 17a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
E Quay Arm (17b)
18
16
14
12
10
8
6
4
2
0
-2
Max No. of Vehs
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
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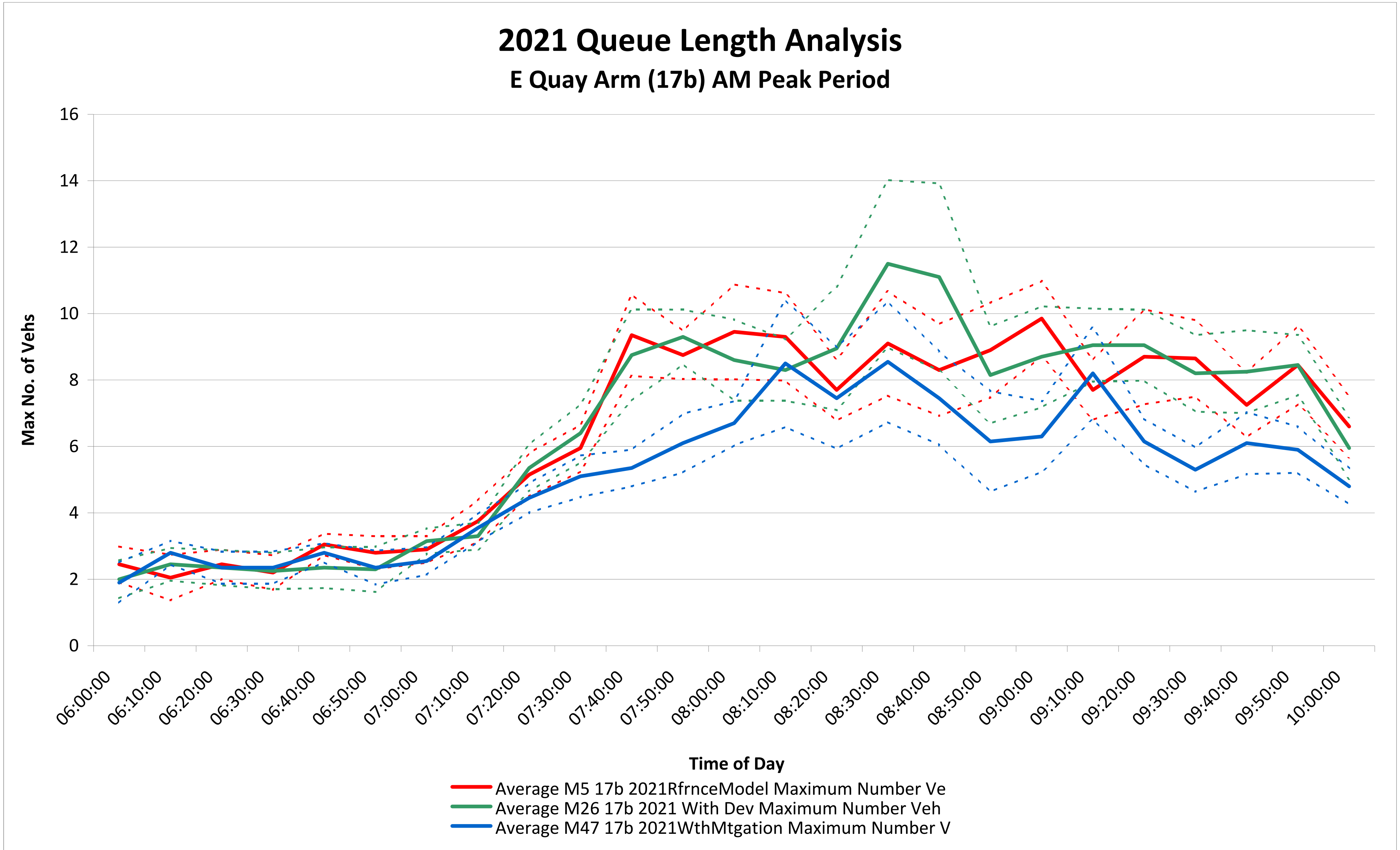
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 17b 2021RfrnceModel Maximum Number Ve
Average M26 17b 2021 With Dev Maximum Number Veh
Average M47 17b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
E Quay Arm (17b) AM Peak Period
Max No. of Vehs
16
14
12
10
8
6
4
2
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
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08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
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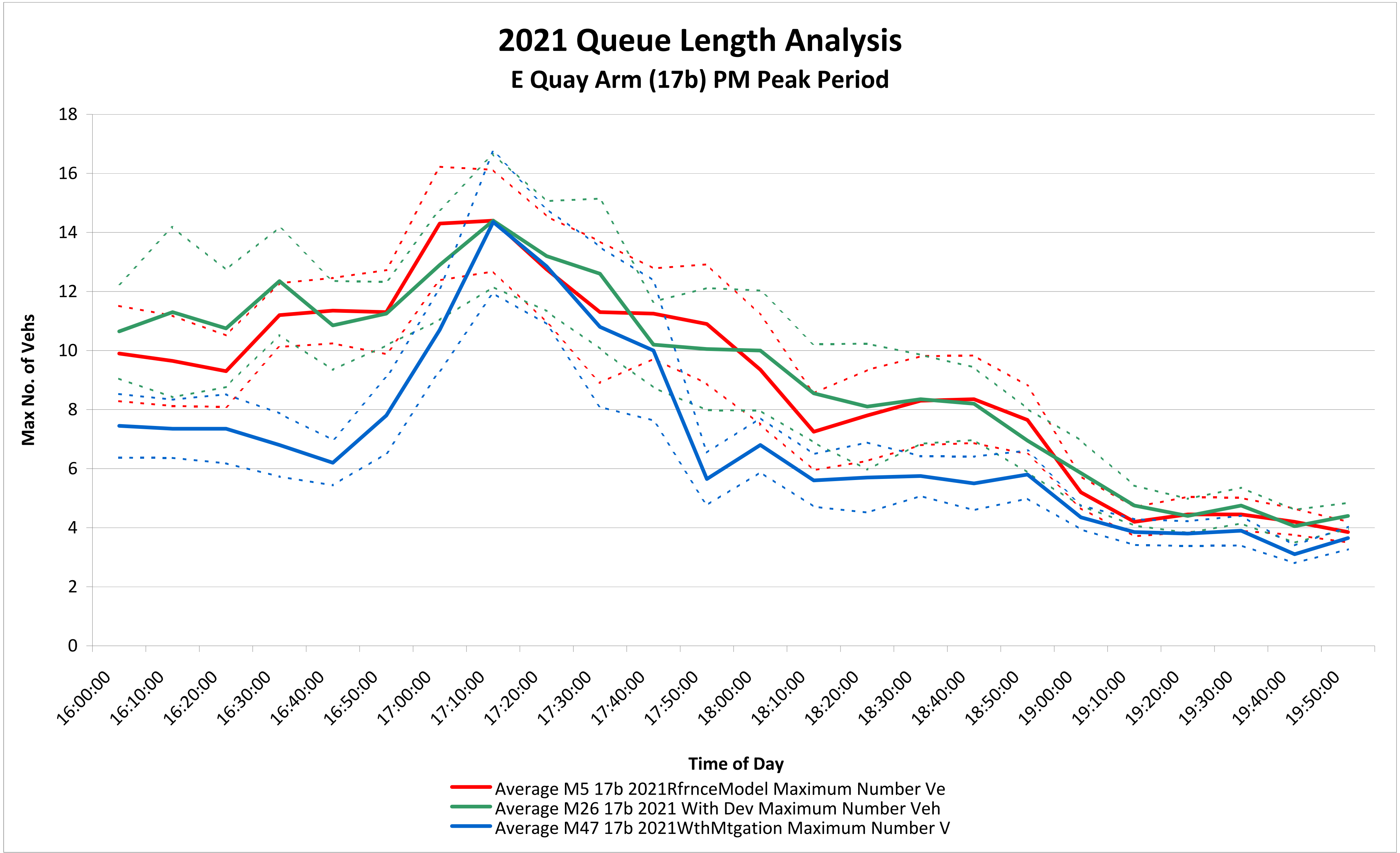
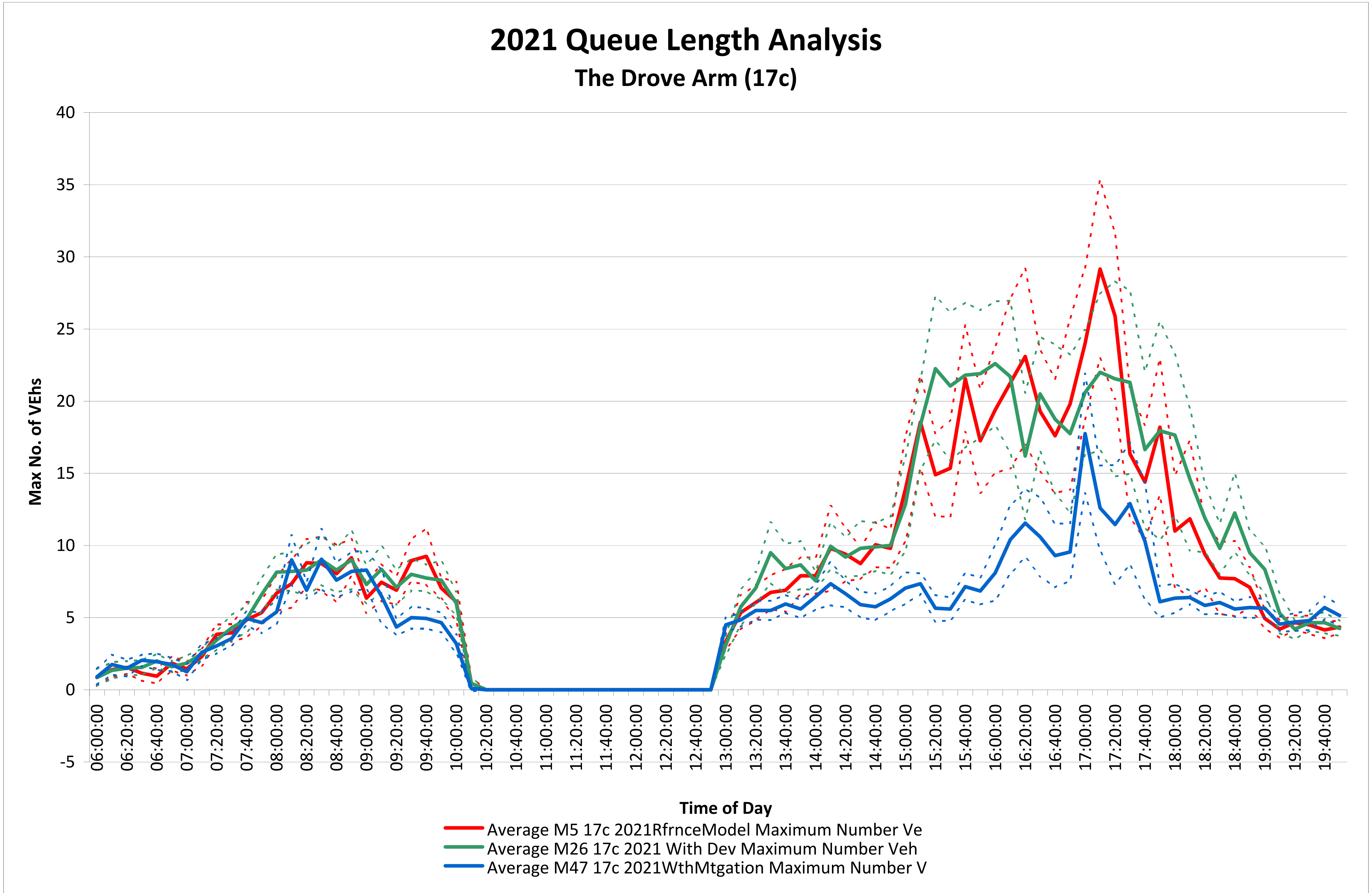
Time of Day
Average M5 17b 2021RfrnceModel Maximum Number Ve
Average M26 17b 2021 With Dev Maximum Number Veh
Average M47 17b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
E Quay Arm (17b) PM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
18
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 17b 2021RfrnceModel Maximum Number Ve
Average M26 17b 2021 With Dev Maximum Number Veh
Average M47 17b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Drove Arm (17c)
Max No. of VEhs
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
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12:00:00
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13:40:00
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14:20:00
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15:00:00
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15:40:00
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17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
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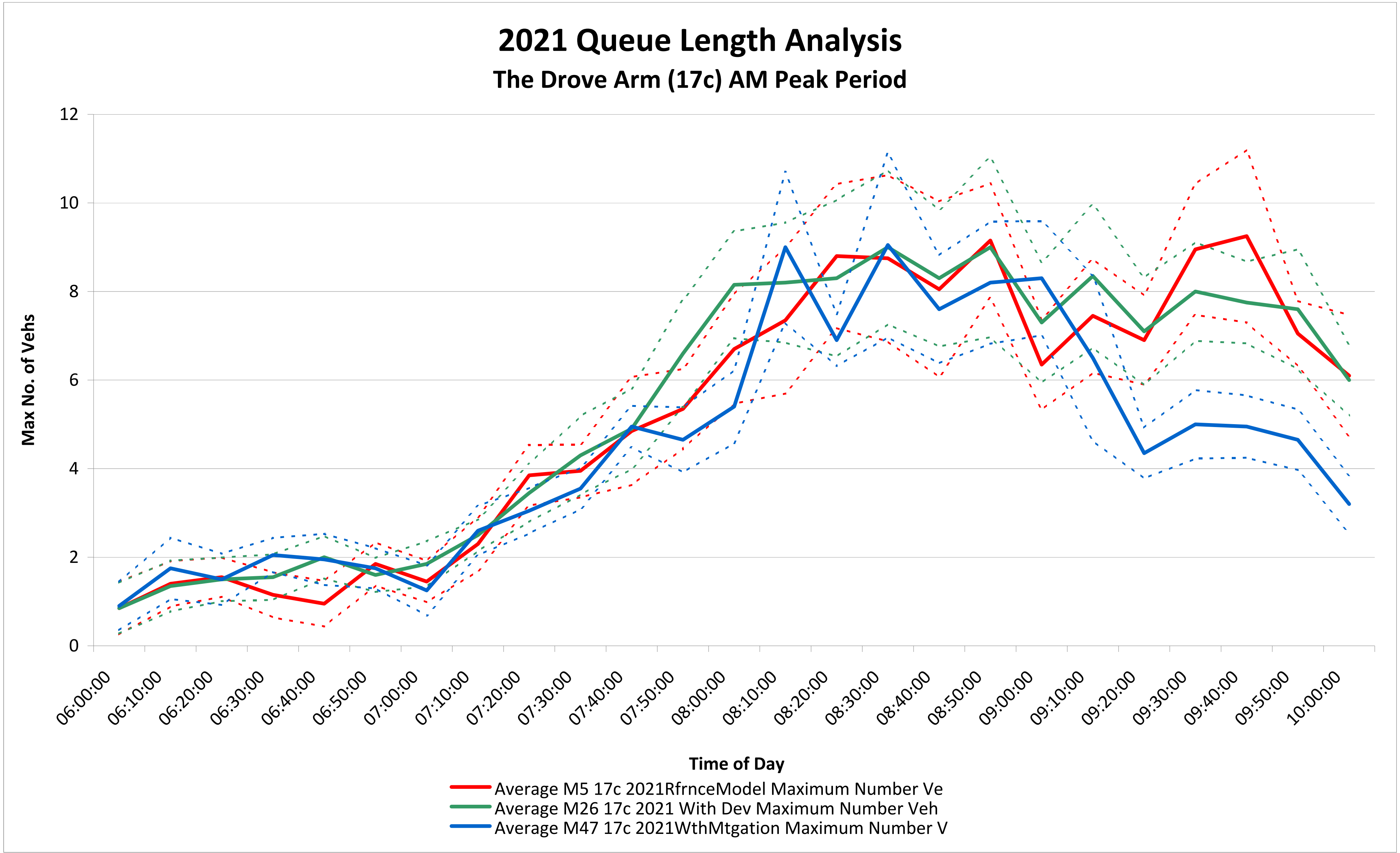
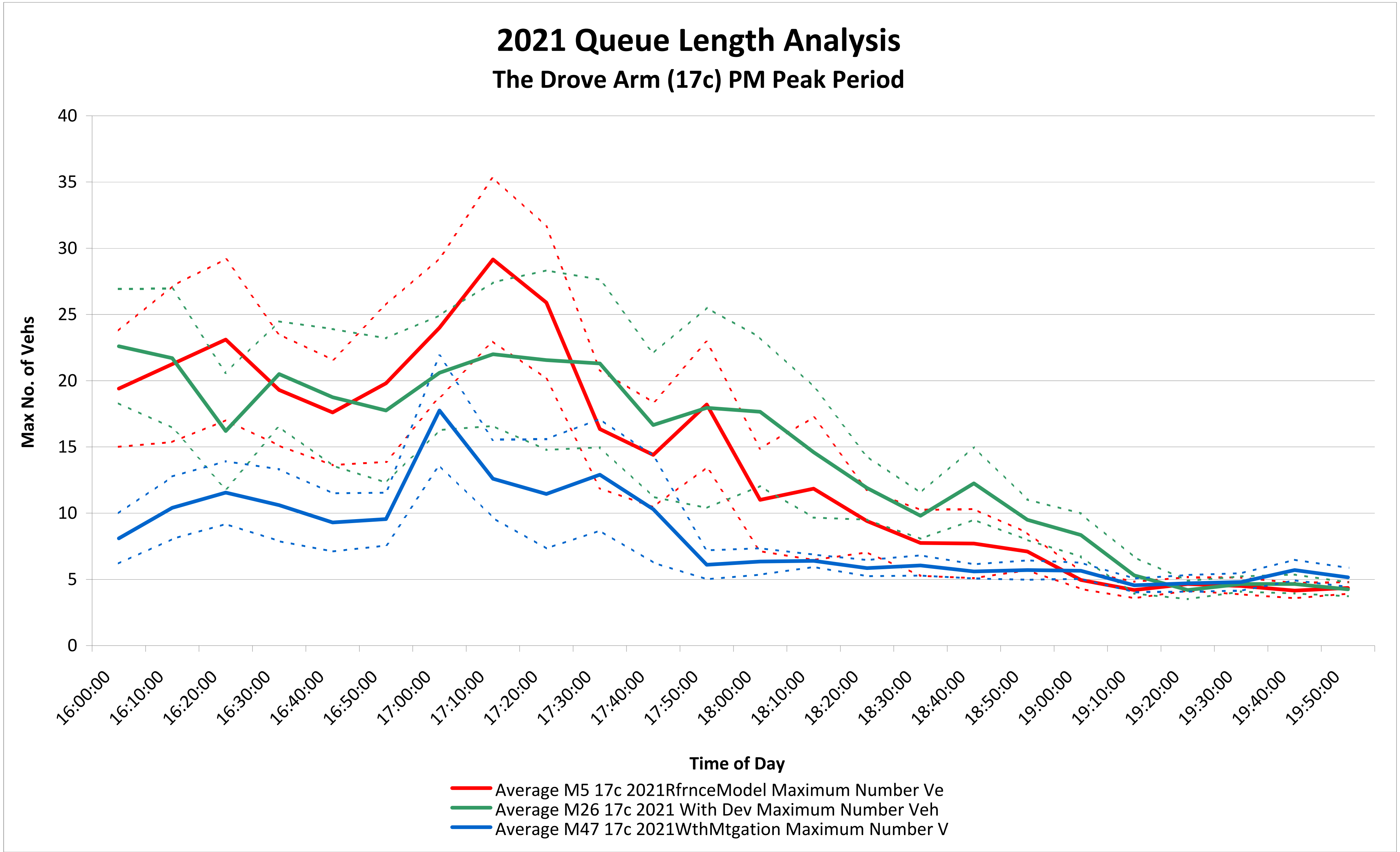
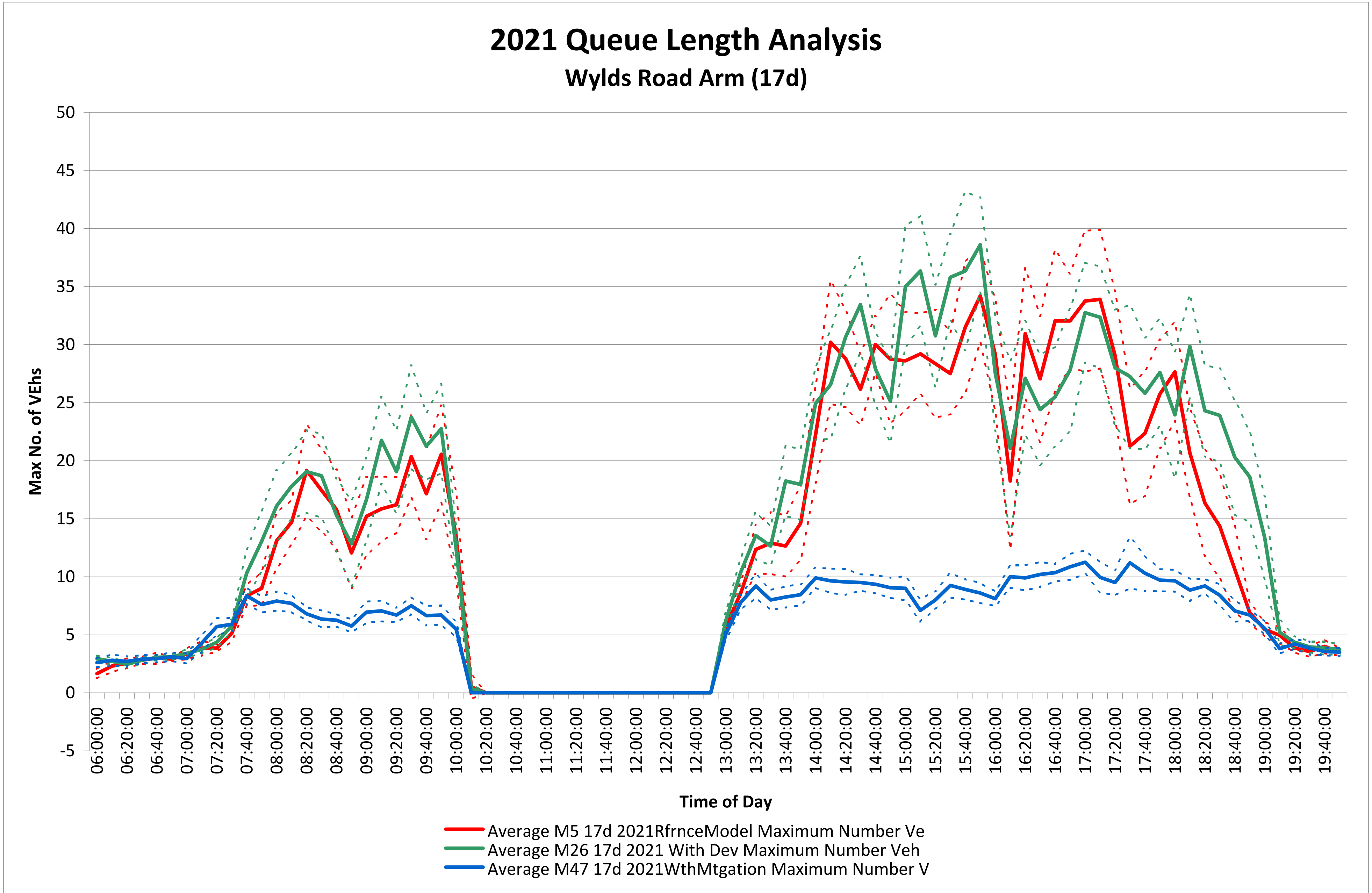
19:40:00
Time of Day
Average M5 17c 2021RfrnceModel Maximum Number Ve
Average M26 17c 2021 With Dev Maximum Number Veh
Average M47 17c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Drove Arm (17c) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 17c 2021RfrnceModel Maximum Number Ve
Average M26 17c 2021 With Dev Maximum Number Veh
Average M47 17c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Drove Arm (17c) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 17c 2021RfrnceModel Maximum Number Ve
Average M26 17c 2021 With Dev Maximum Number Veh
Average M47 17c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Wylds Road Arm (17d)
Max No. of VEhs
50
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
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14:40:00
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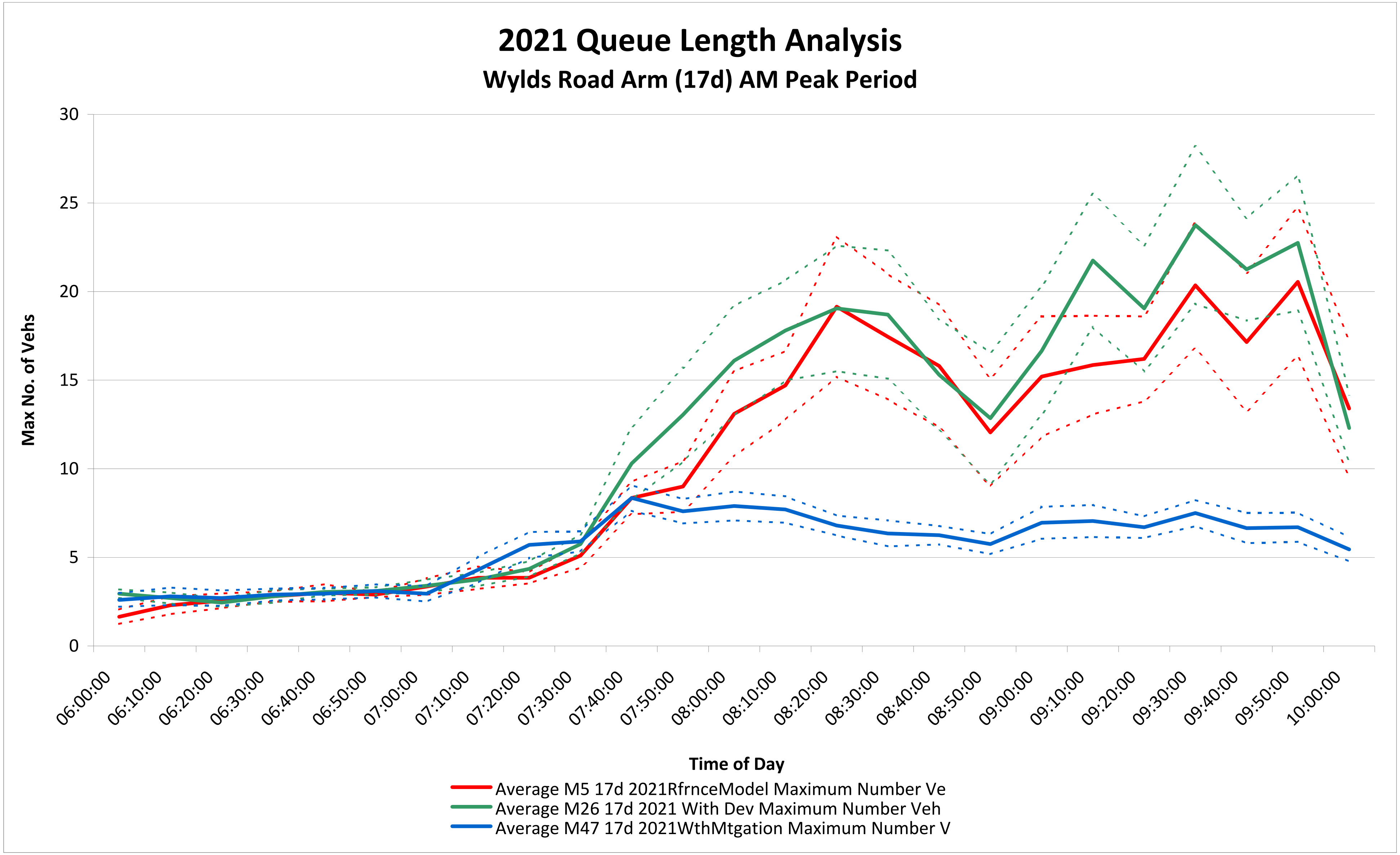
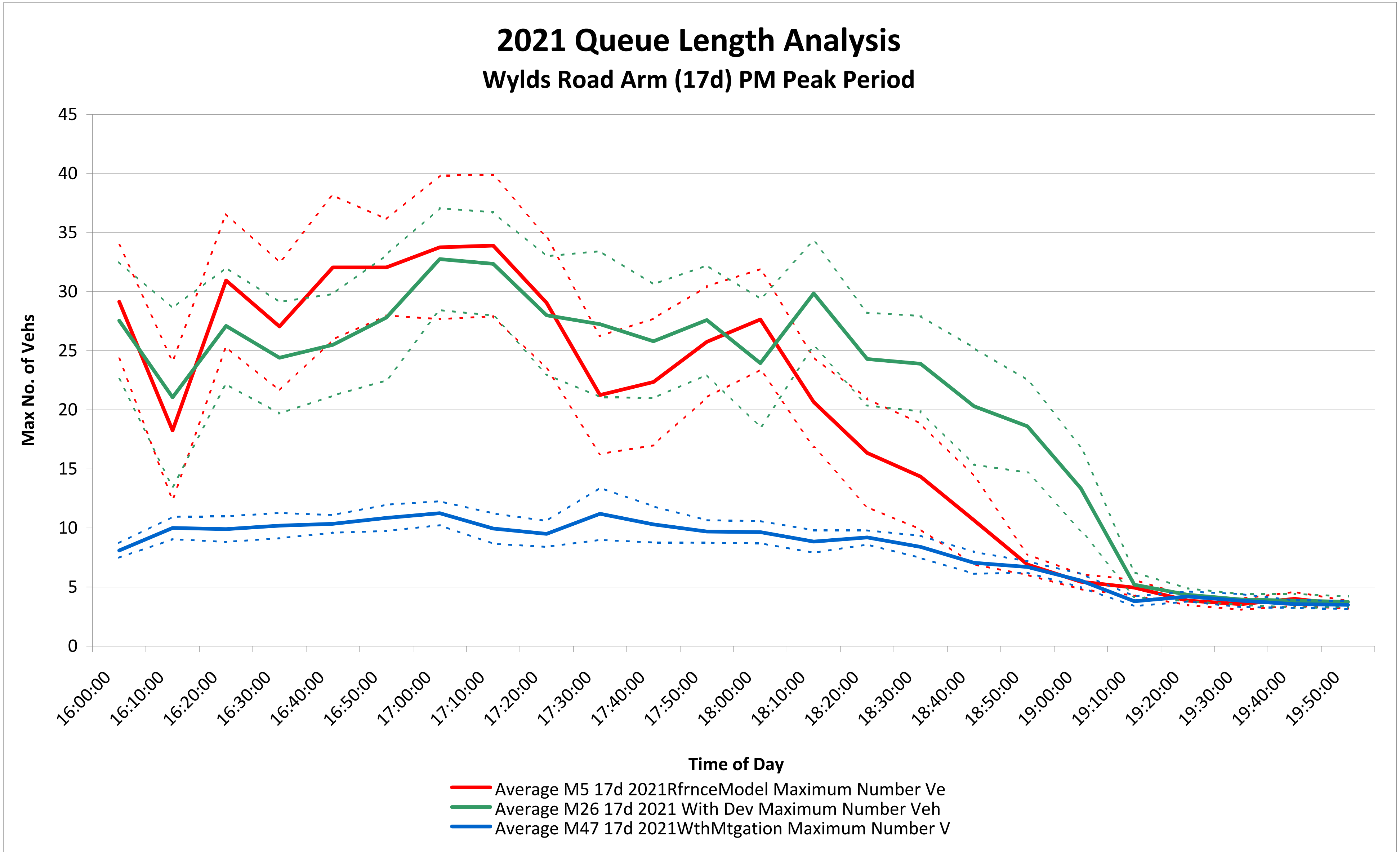
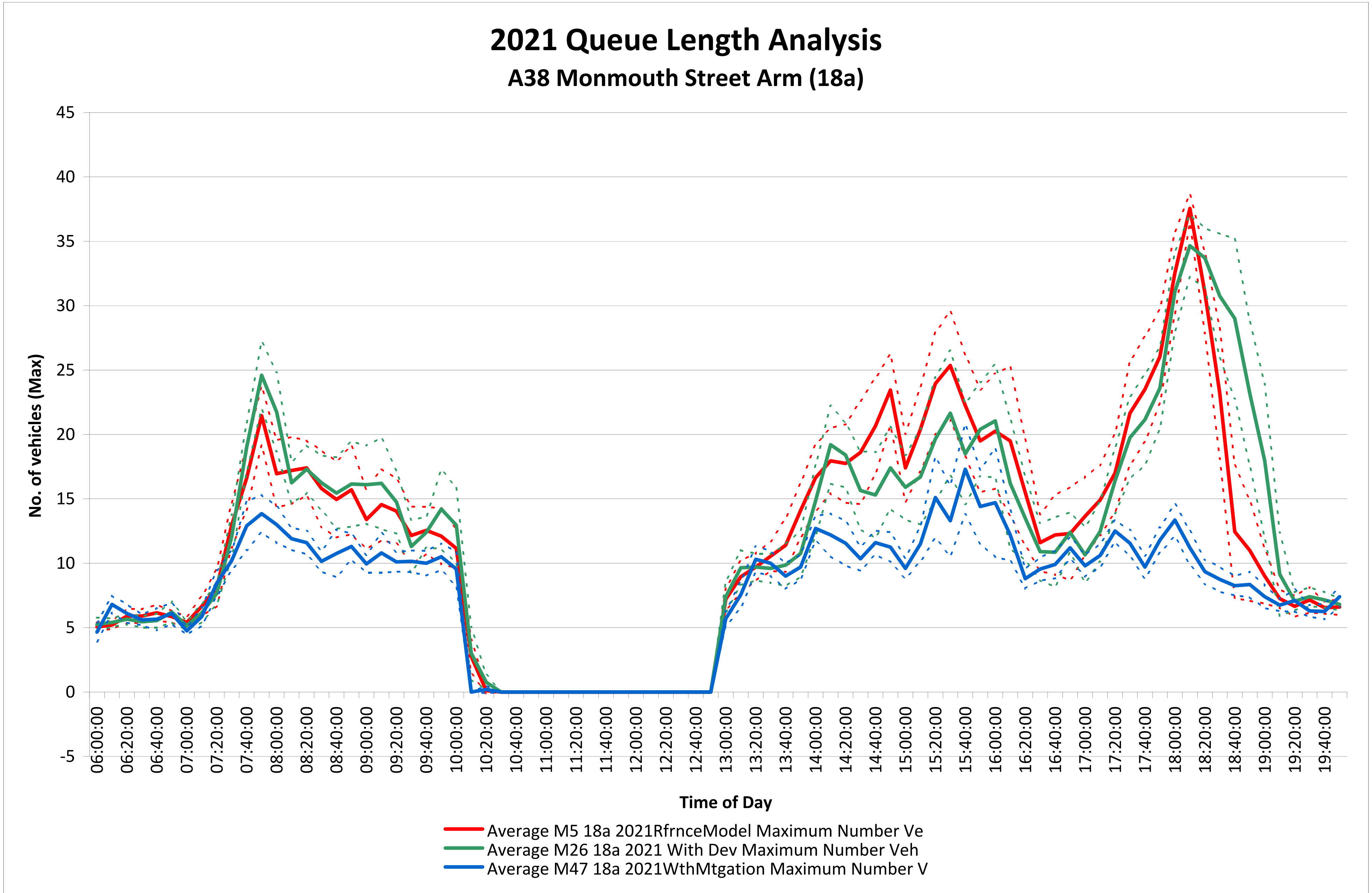
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 17d 2021RfrnceModel Maximum Number Ve
Average M26 17d 2021 With Dev Maximum Number Veh
Average M47 17d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Wylds Road Arm (17d) AM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 17d 2021RfrnceModel Maximum Number Ve
Average M26 17d 2021 With Dev Maximum Number Veh
Average M47 17d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Wylds Road Arm (17d) PM Peak Period
Max No. of Vehs
0
5
10
15
20
25
30
35
40
45
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 17d 2021RfrnceModel Maximum Number Ve
Average M26 17d 2021 With Dev Maximum Number Veh
Average M47 17d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 Monmouth Street Arm (18a)
No. of vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
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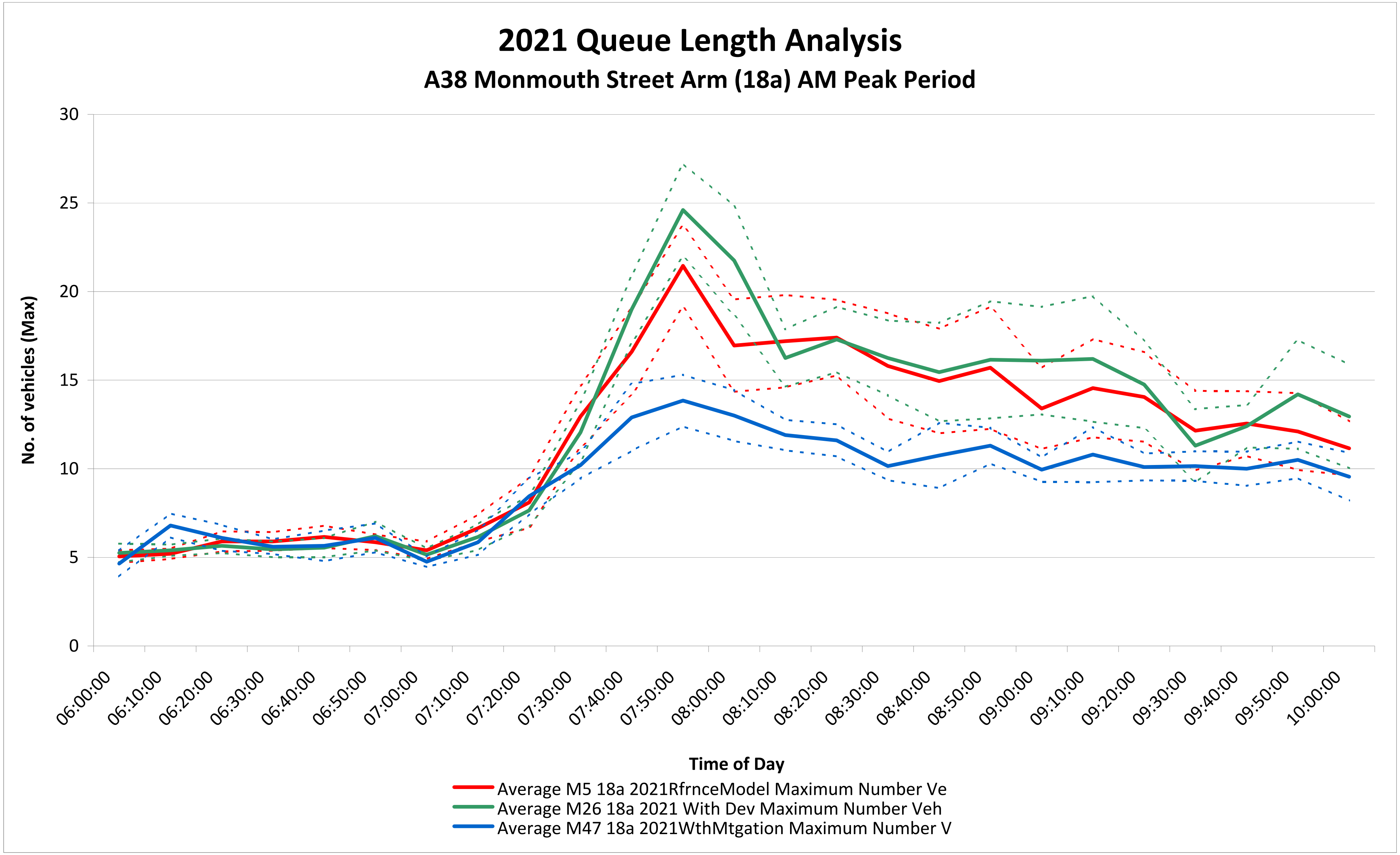
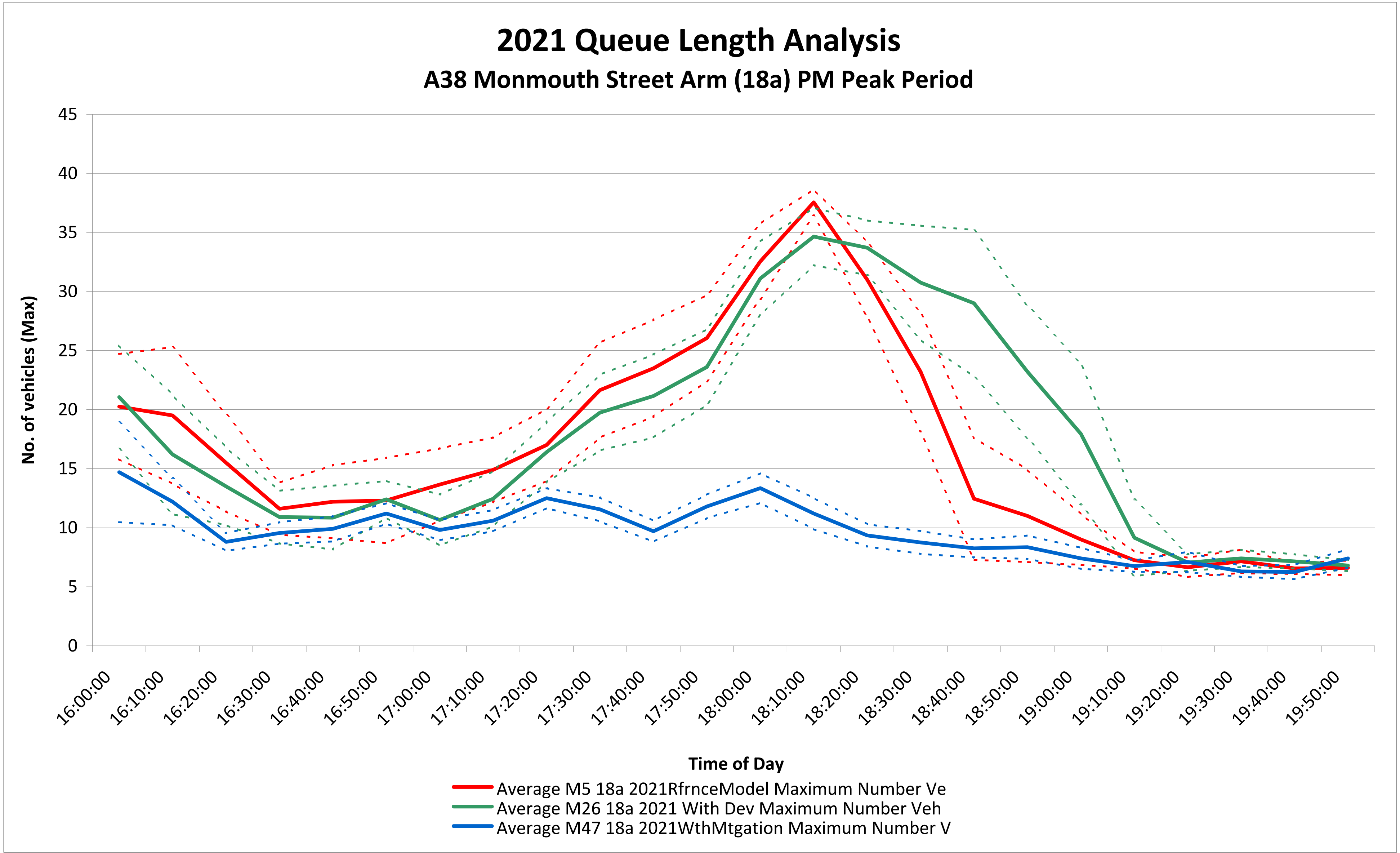
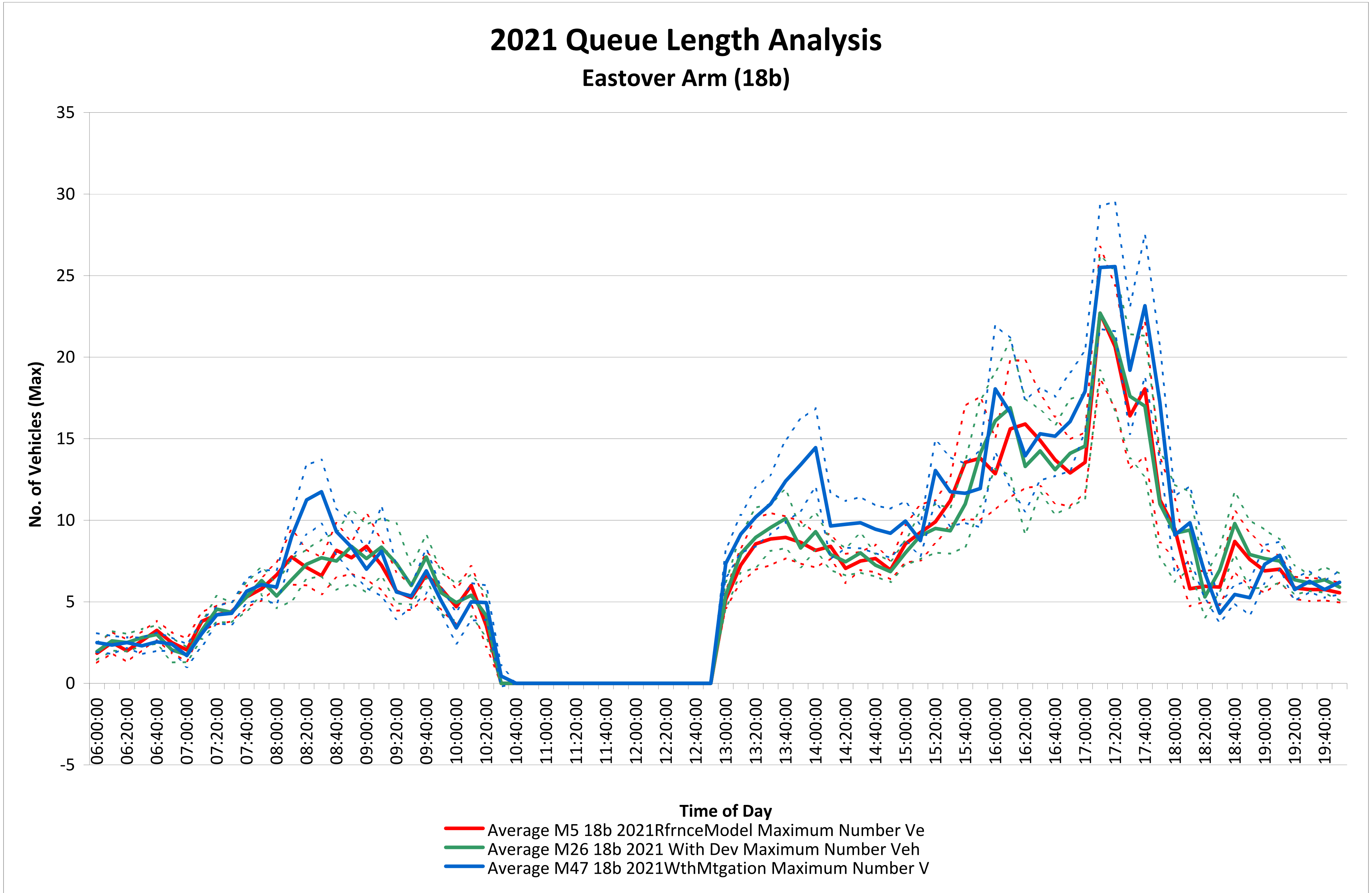
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 18a 2021RfrnceModel Maximum Number Ve
Average M26 18a 2021 With Dev Maximum Number Veh
Average M47 18a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 Monmouth Street Arm (18a) AM Peak Period
No. of vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 18a 2021RfrnceModel Maximum Number Ve
Average M26 18a 2021 With Dev Maximum Number Veh
Average M47 18a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 Monmouth Street Arm (18a) PM Peak Period
No. of vehicles (Max)
0
5
10
15
20
25
30
35
40
45
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 18a 2021RfrnceModel Maximum Number Ve
Average M26 18a 2021 With Dev Maximum Number Veh
Average M47 18a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Eastover Arm (18b)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
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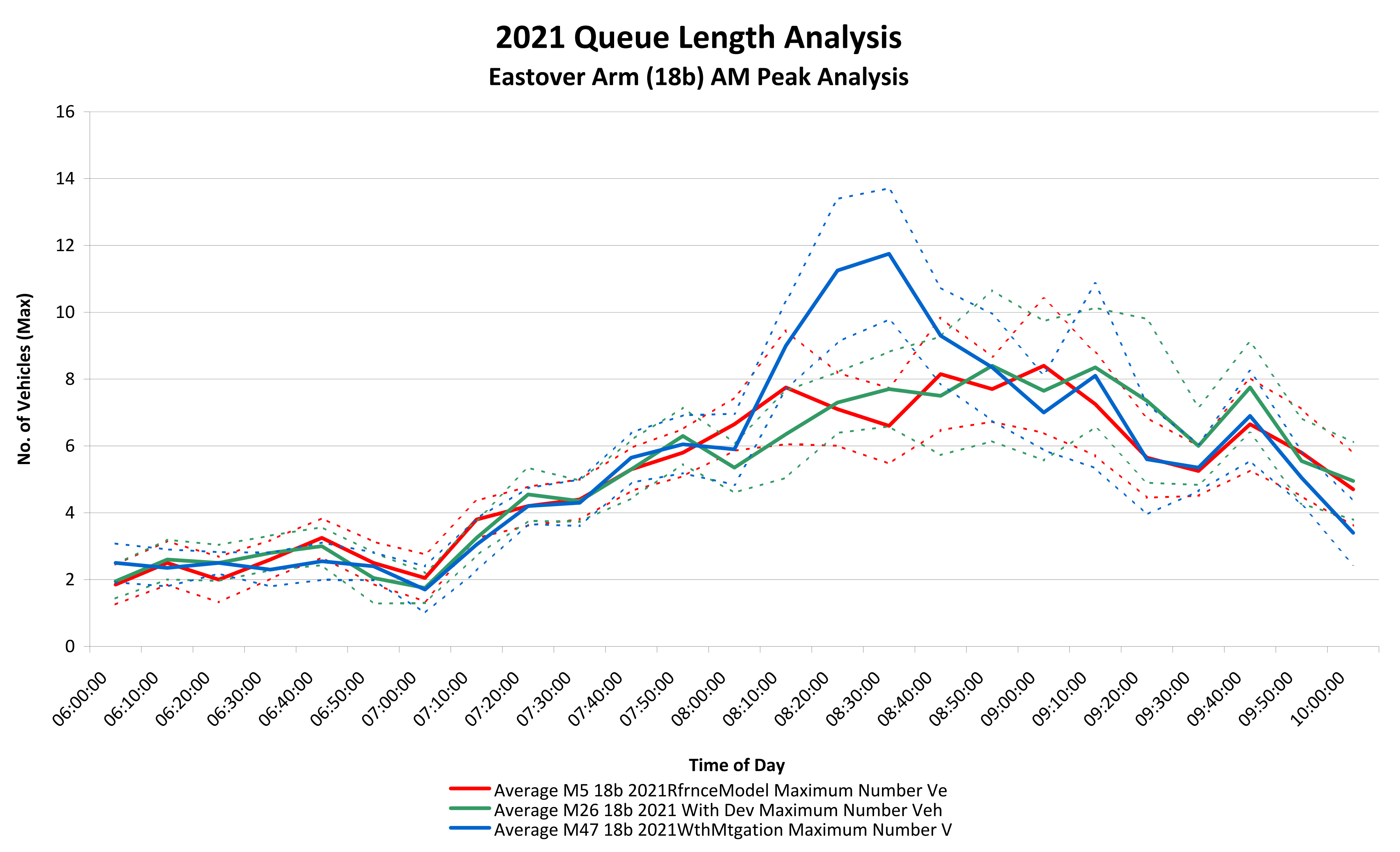
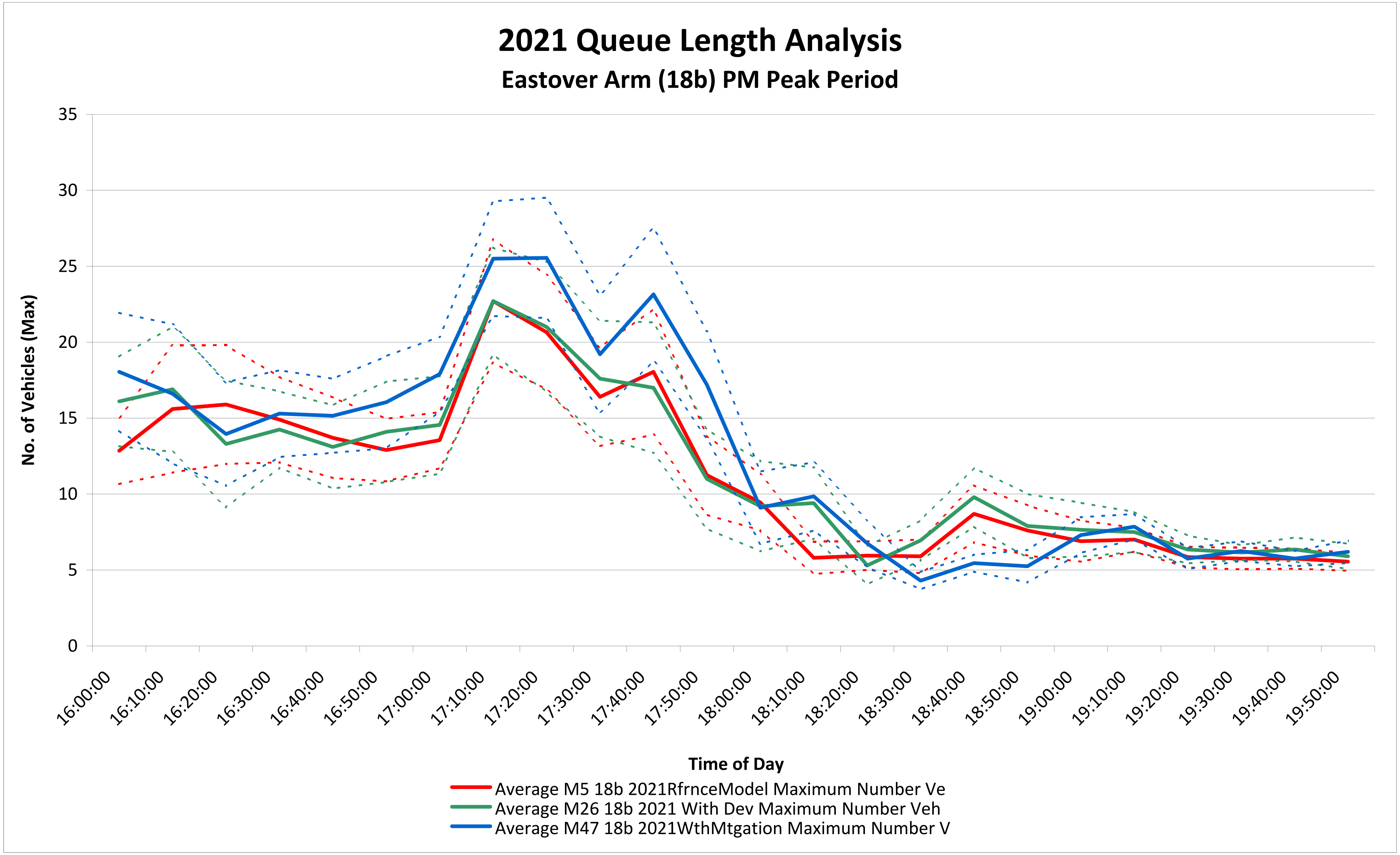
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 18b 2021RfrnceModel Maximum Number Ve
Average M26 18b 2021 With Dev Maximum Number Veh
Average M47 18b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Eastover Arm (18b) AM Peak Analysis
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 18b 2021RfrnceModel Maximum Number Ve
Average M26 18b 2021 With Dev Maximum Number Veh
Average M47 18b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Eastover Arm (18b) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
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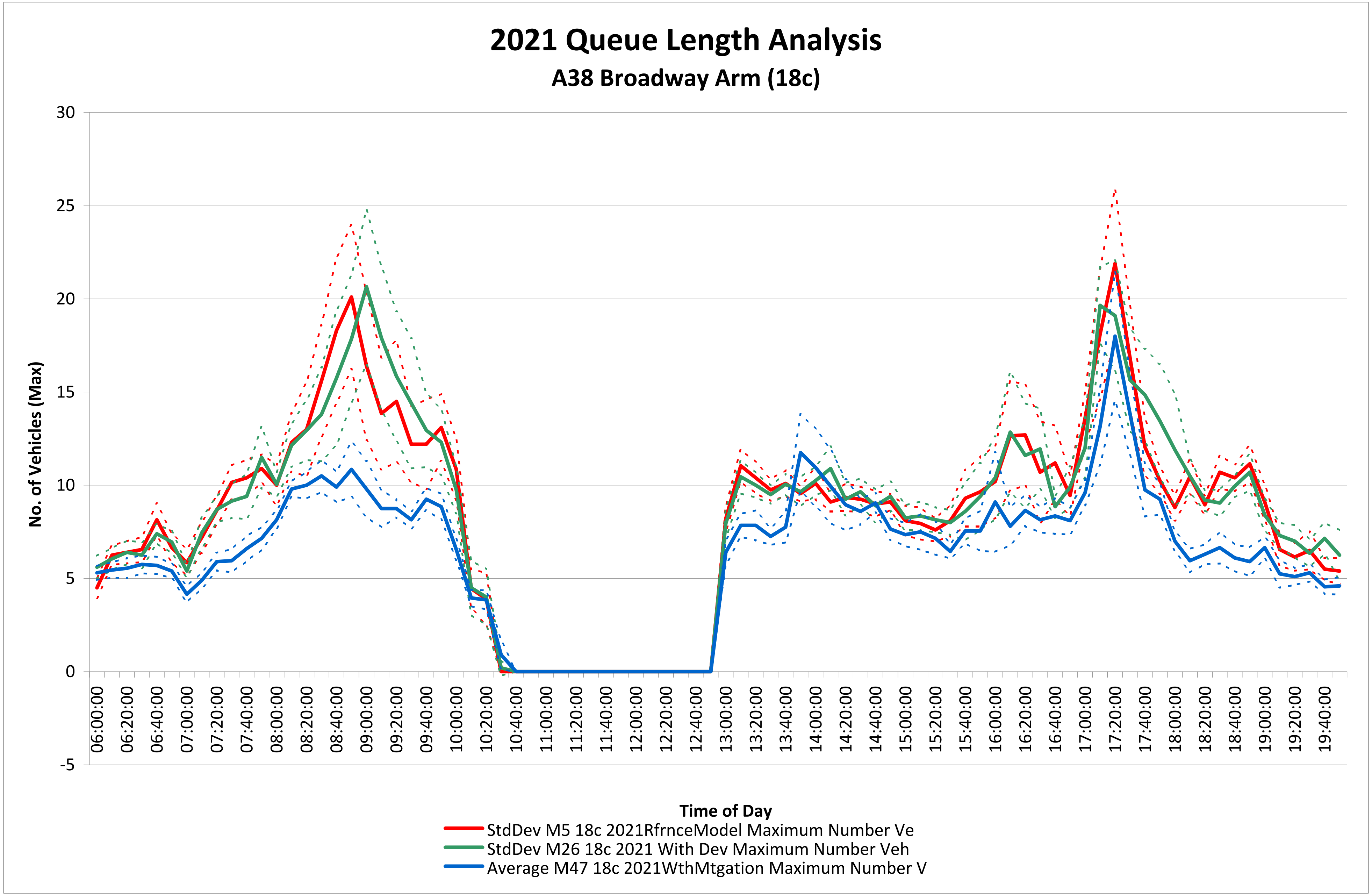
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 18b 2021RfrnceModel Maximum Number Ve
Average M26 18b 2021 With Dev Maximum Number Veh
Average M47 18b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 Broadway Arm (18c)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
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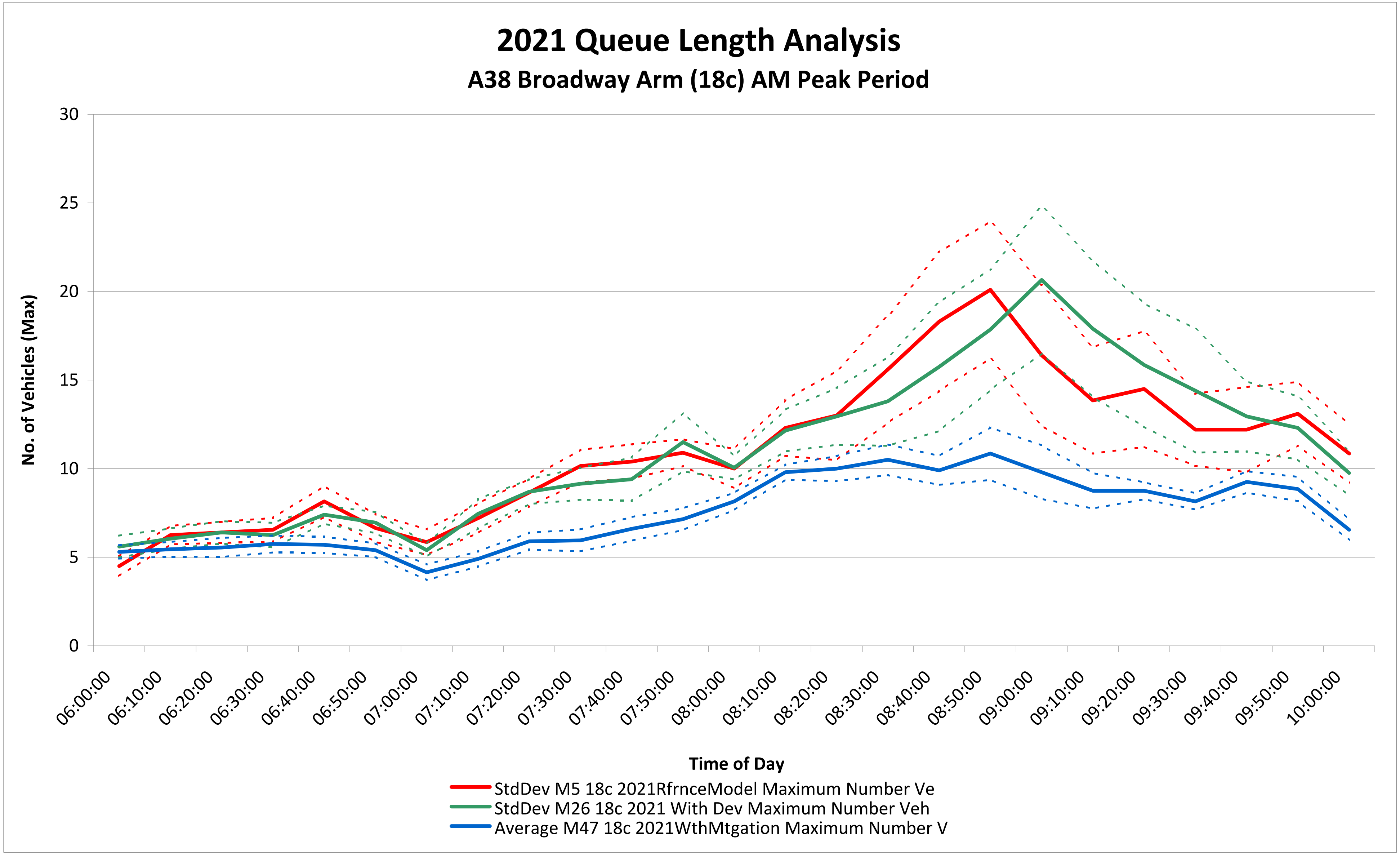
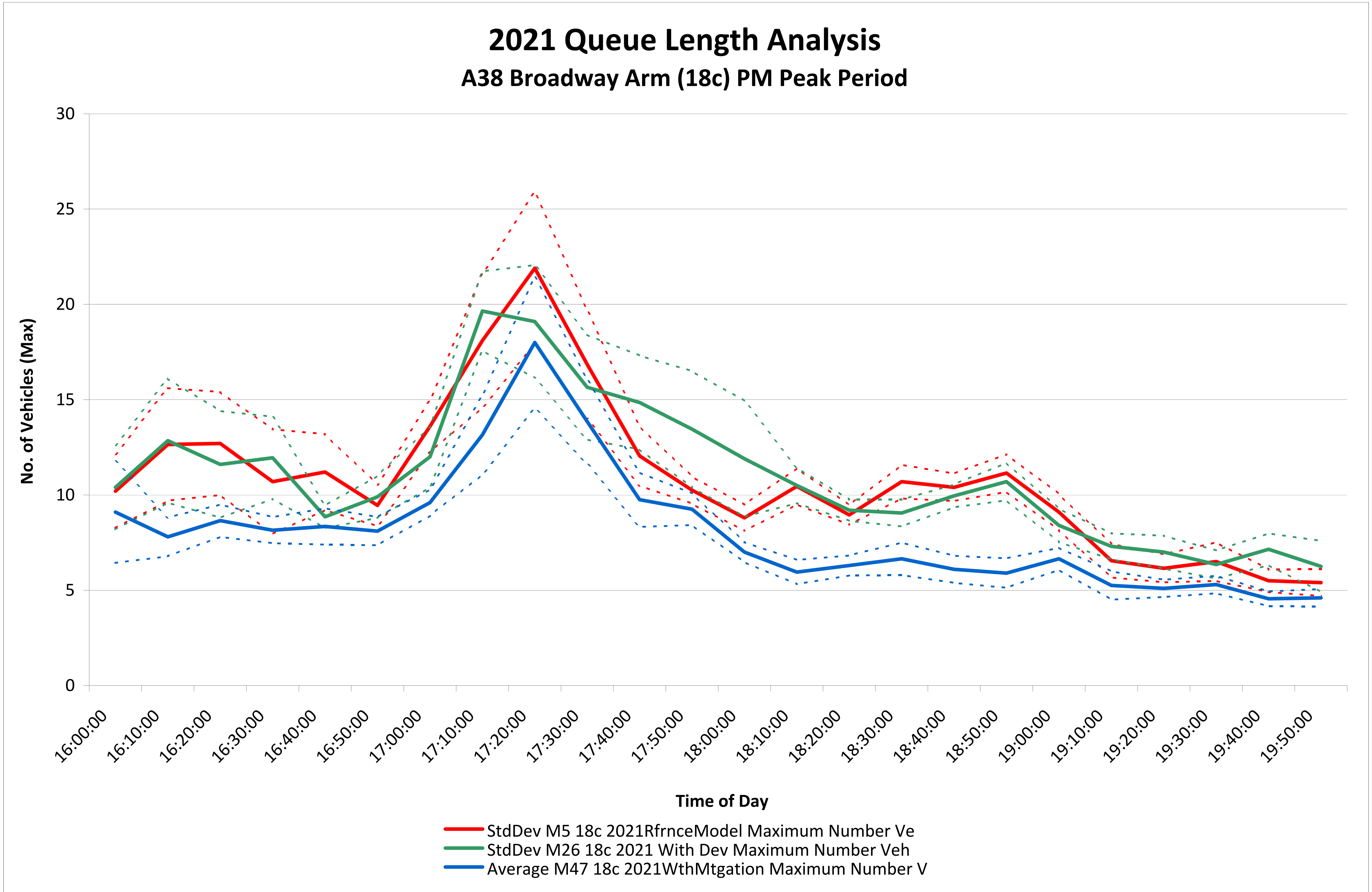
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 18c 2021RfrnceModel Maximum Number Ve
StdDev M26 18c 2021 With Dev Maximum Number Veh
Average M47 18c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 Broadway Arm (18c) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 18c 2021RfrnceModel Maximum Number Ve
StdDev M26 18c 2021 With Dev Maximum Number Veh
Average M47 18c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 Broadway Arm (18c) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
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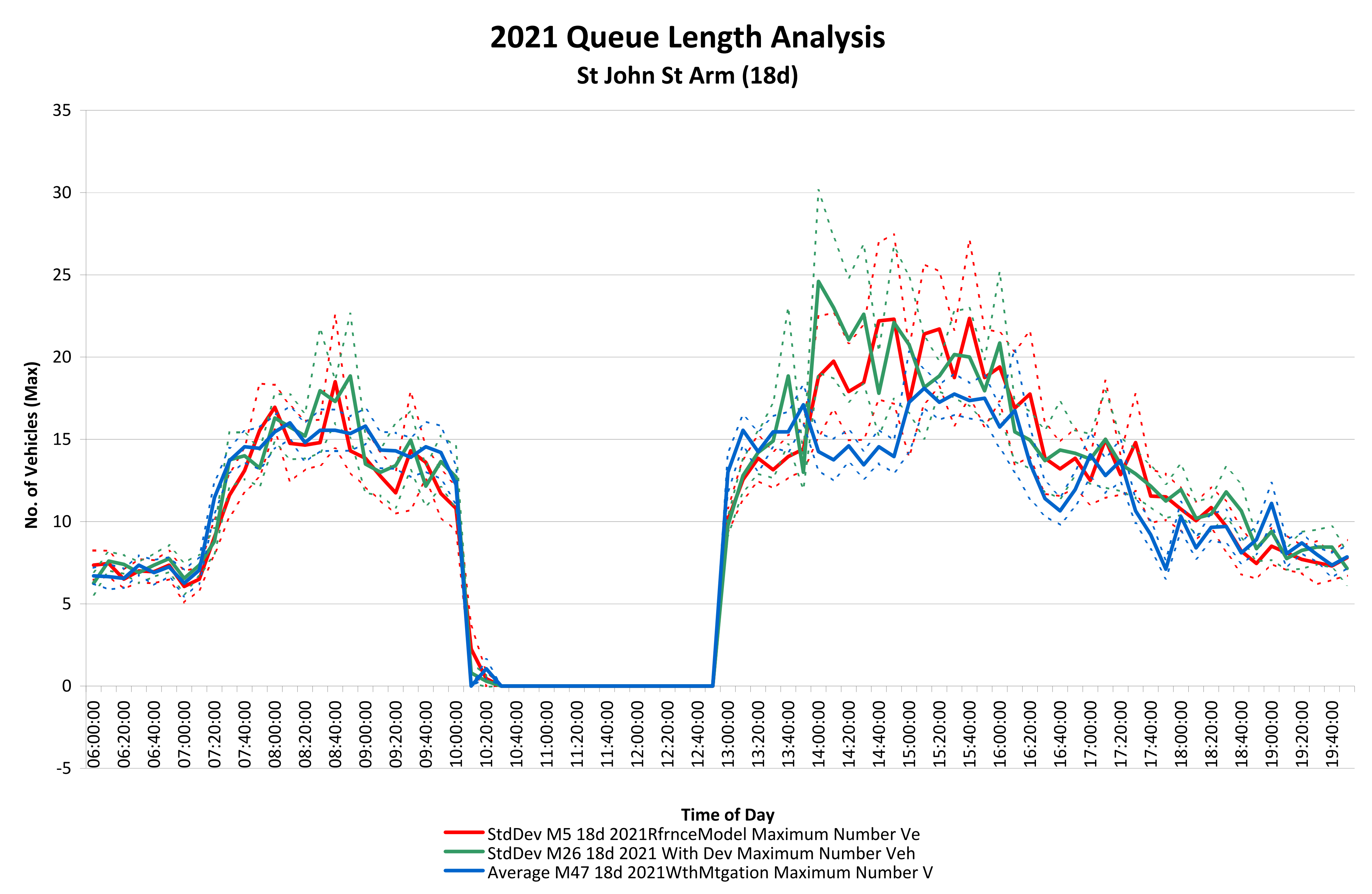
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 18c 2021RfrnceModel Maximum Number Ve
StdDev M26 18c 2021 With Dev Maximum Number Veh
Average M47 18c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
St John St Arm (18d)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
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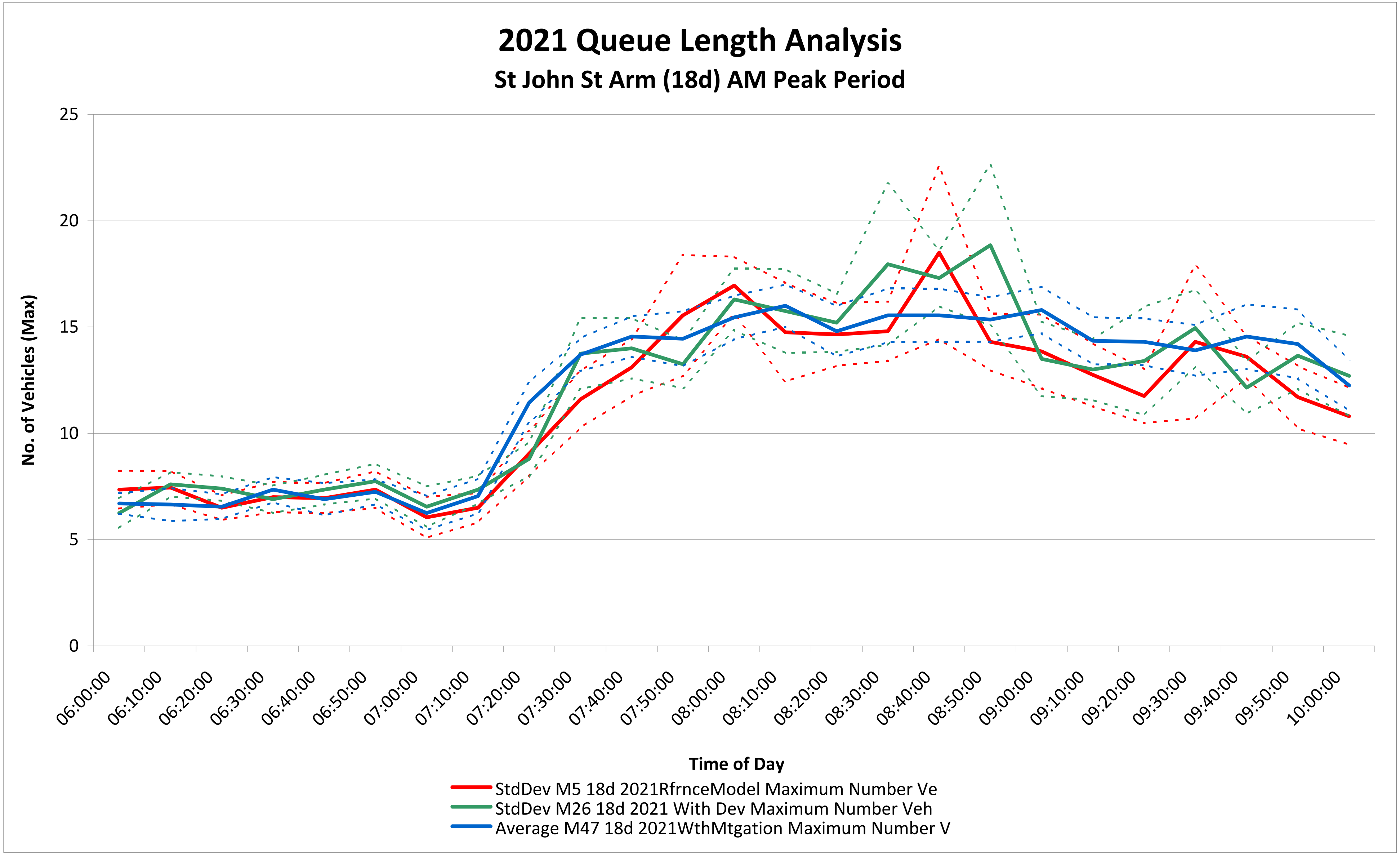
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 18d 2021RfrnceModel Maximum Number Ve
StdDev M26 18d 2021 With Dev Maximum Number Veh
Average M47 18d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
St John St Arm (18d) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
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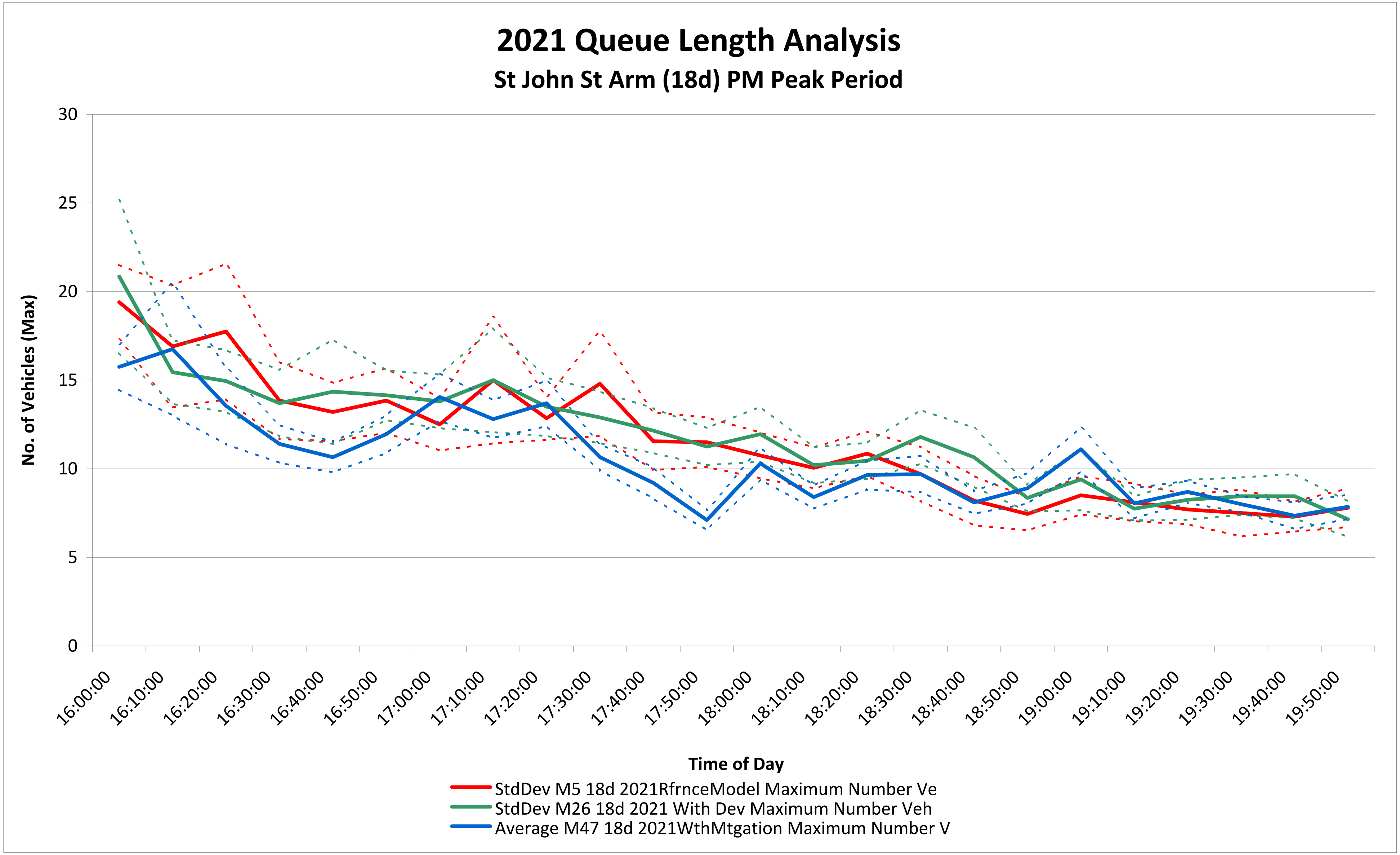
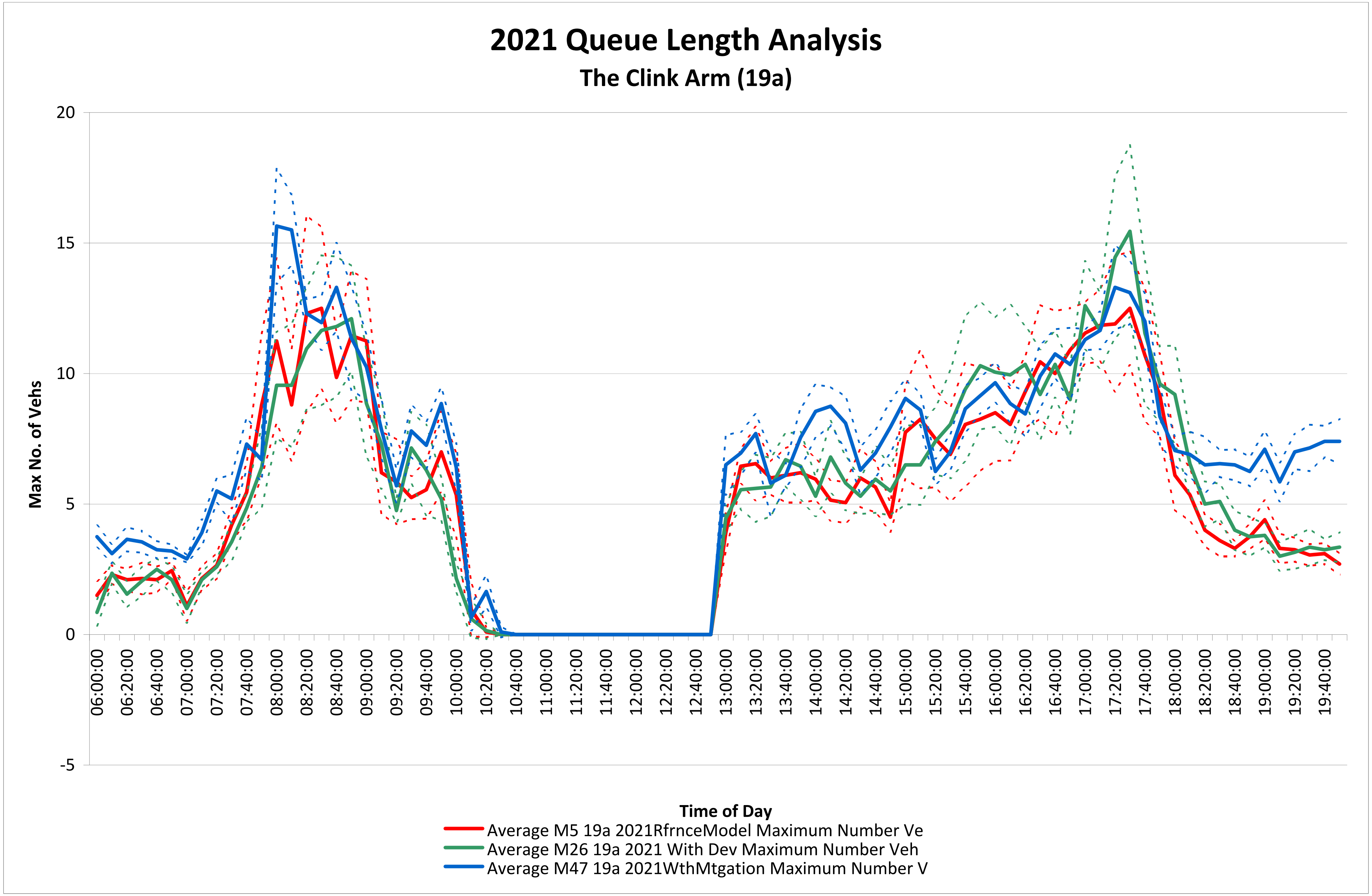
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 18d 2021RfrnceModel Maximum Number Ve
StdDev M26 18d 2021 With Dev Maximum Number Veh
Average M47 18d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
St John St Arm (18d) PM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 18d 2021RfrnceModel Maximum Number Ve
StdDev M26 18d 2021 With Dev Maximum Number Veh
Average M47 18d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Clink Arm (19a)
20
15
10
5
0
-5
Max No. of Vehs
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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11:00:00
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11:40:00
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12:40:00
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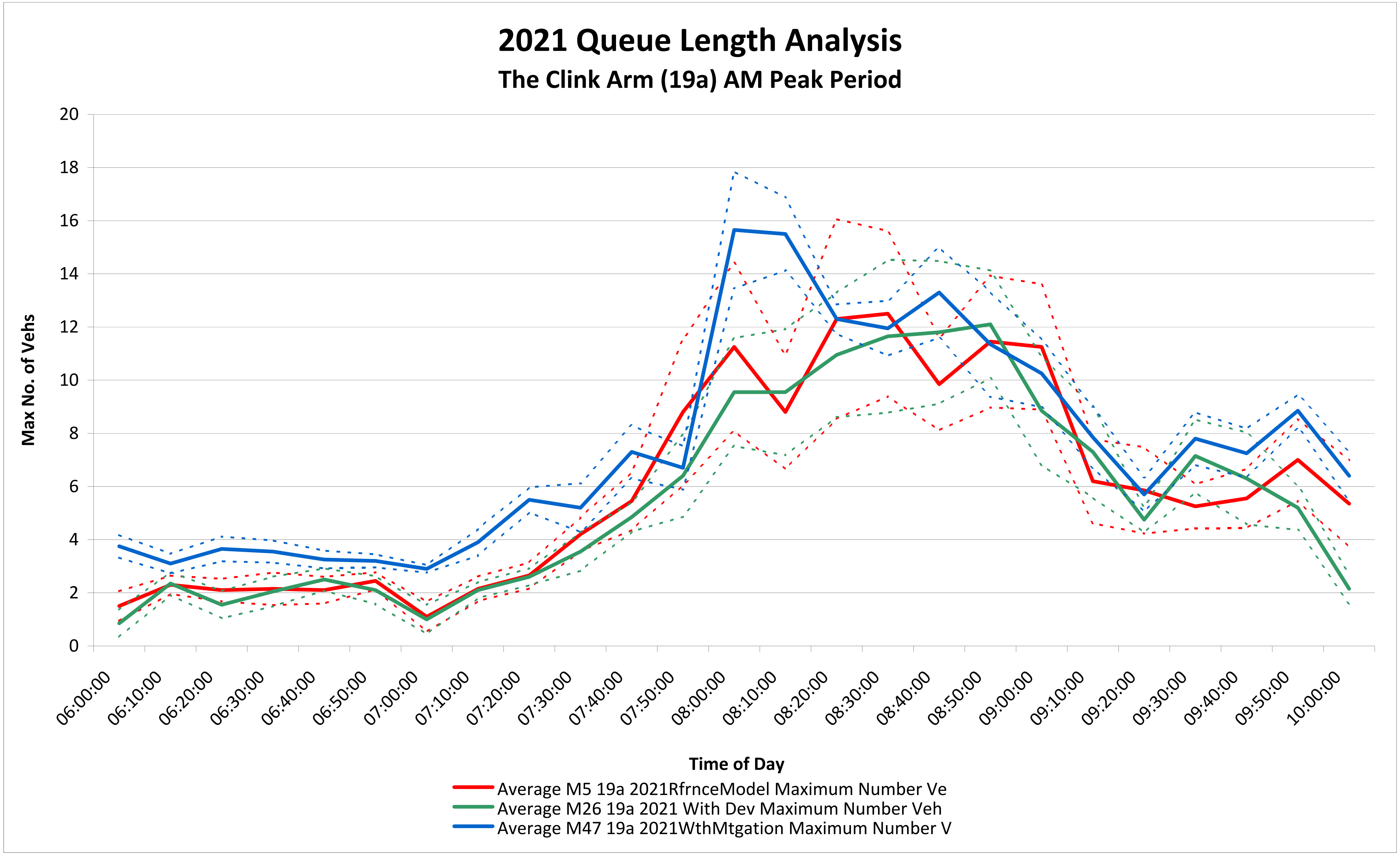
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 19a 2021RfrnceModel Maximum Number Ve
Average M26 19a 2021 With Dev Maximum Number Veh
Average M47 19a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Clink Arm (19a) AM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
18
20
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
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08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
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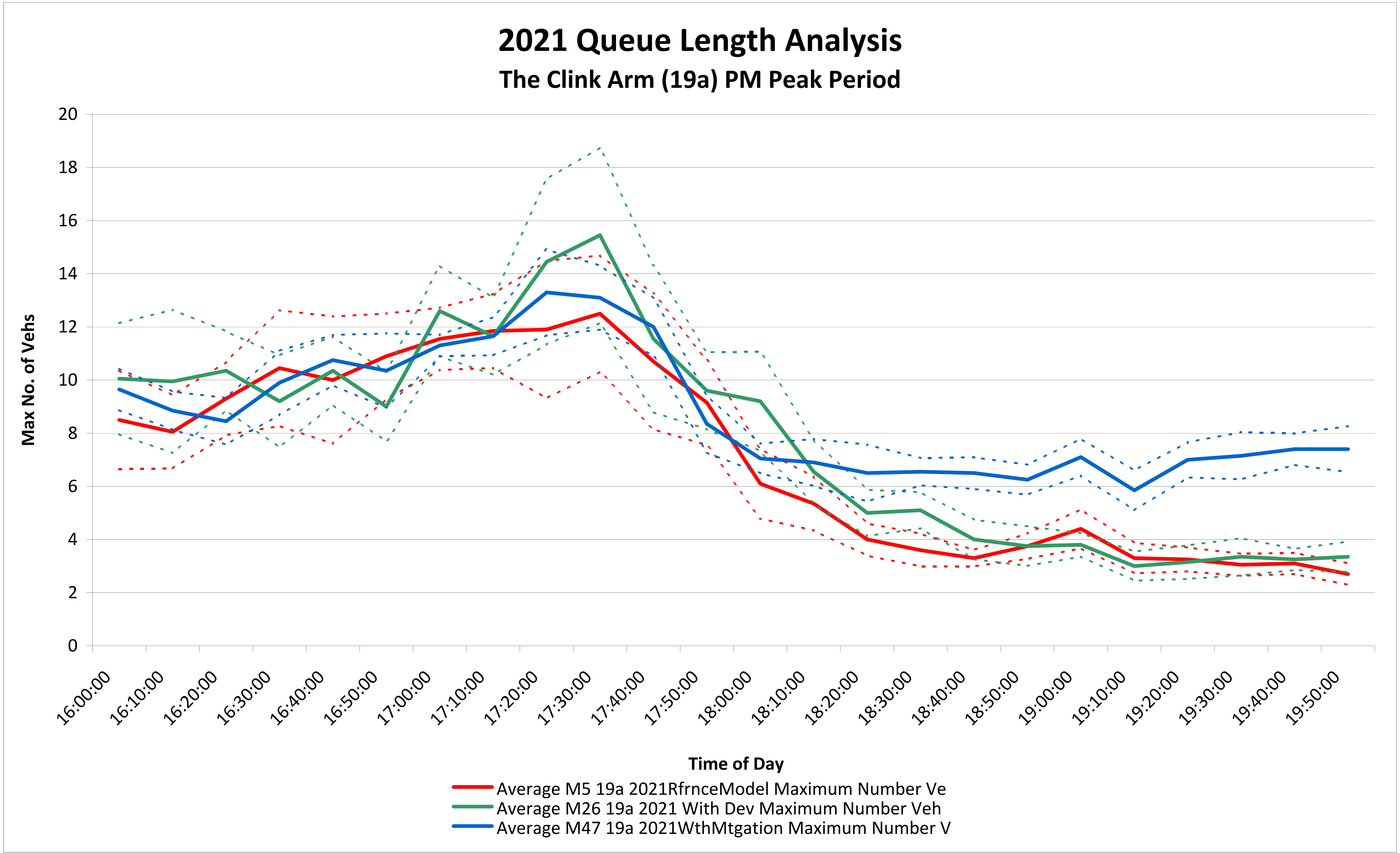
Time of Day
Average M5 19a 2021RfrnceModel Maximum Number Ve
Average M26 19a 2021 With Dev Maximum Number Veh
Average M47 19a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Clink Arm (19a) PM Peak Period
Max No. of Vehs
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
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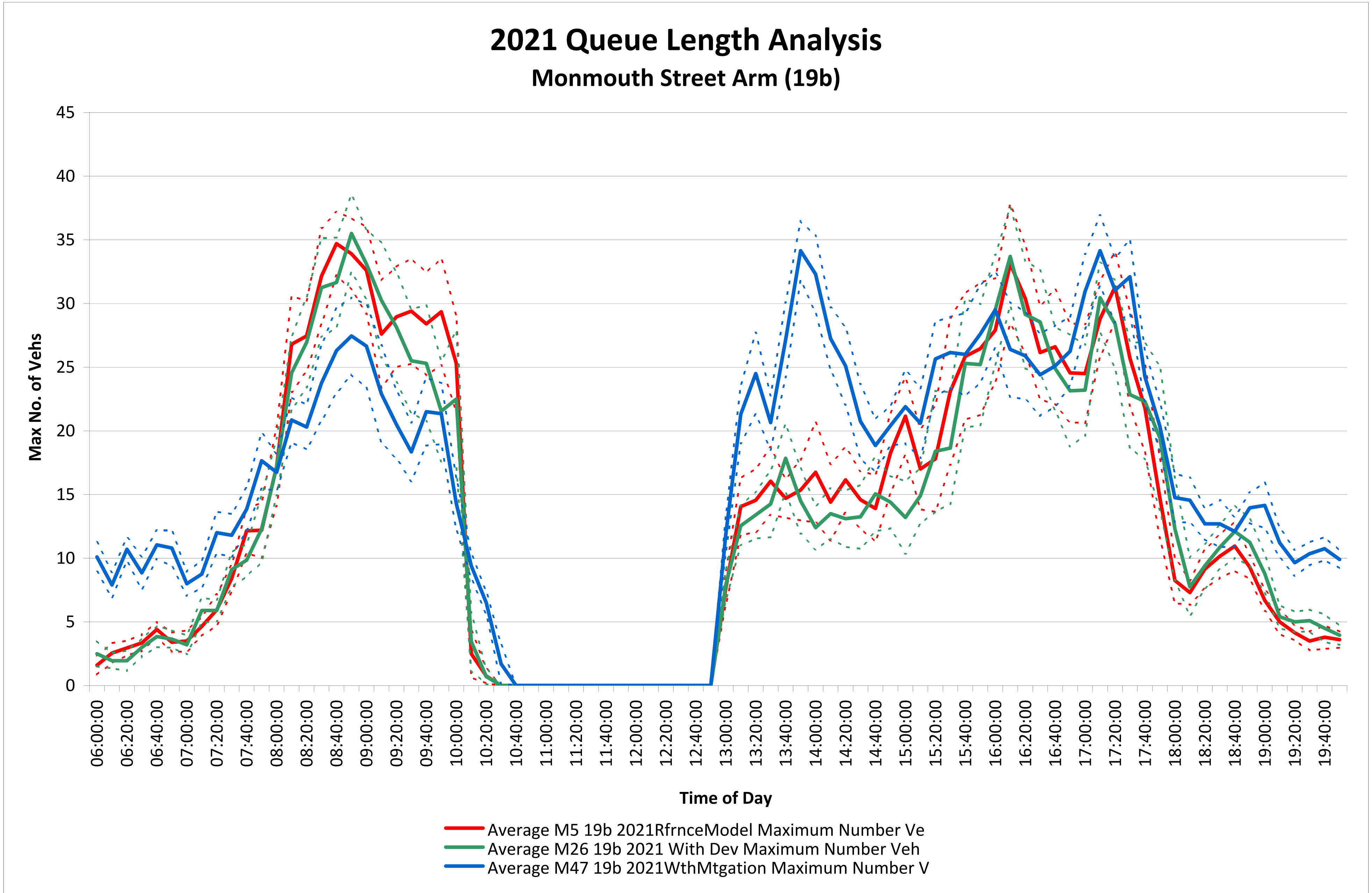
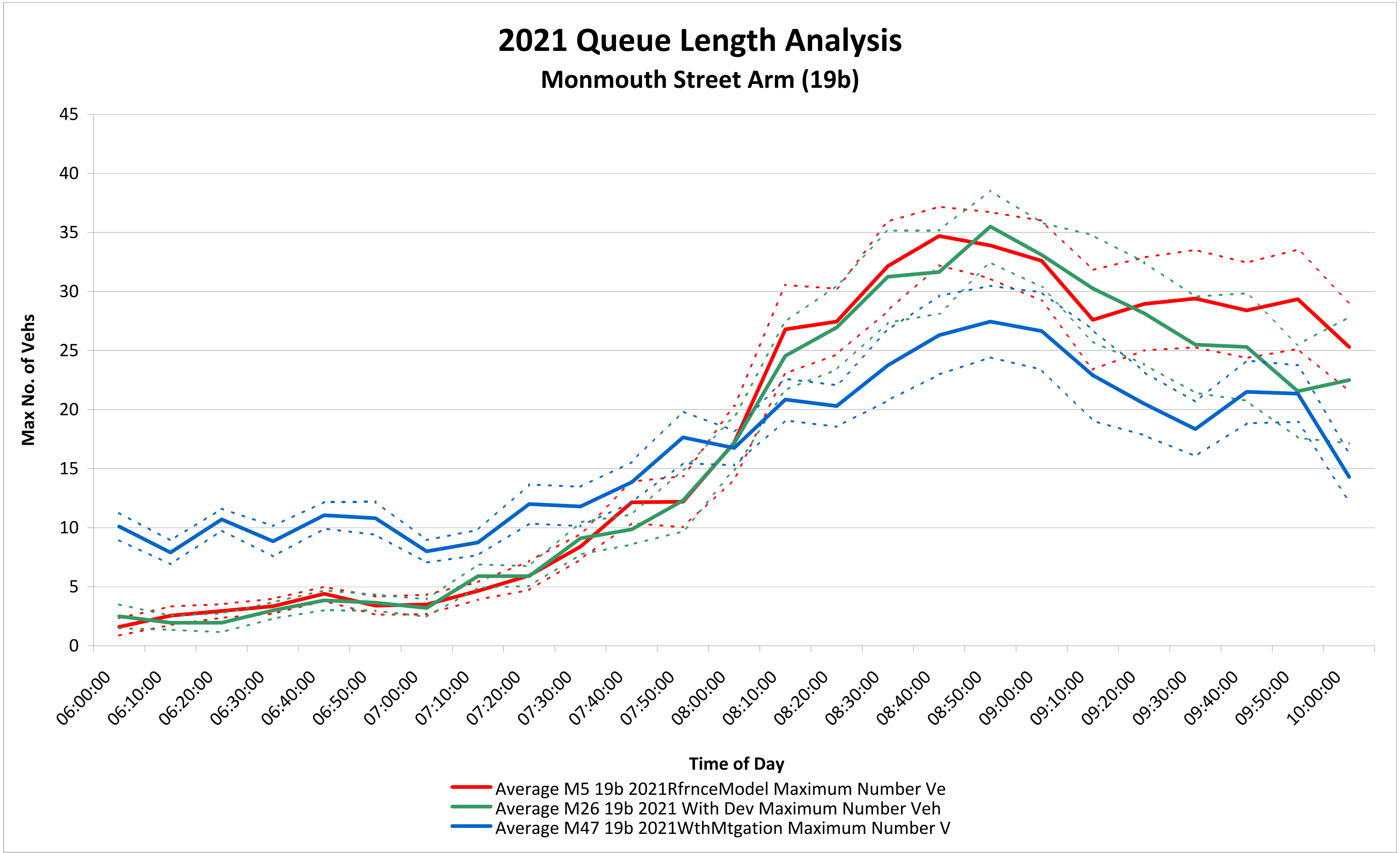
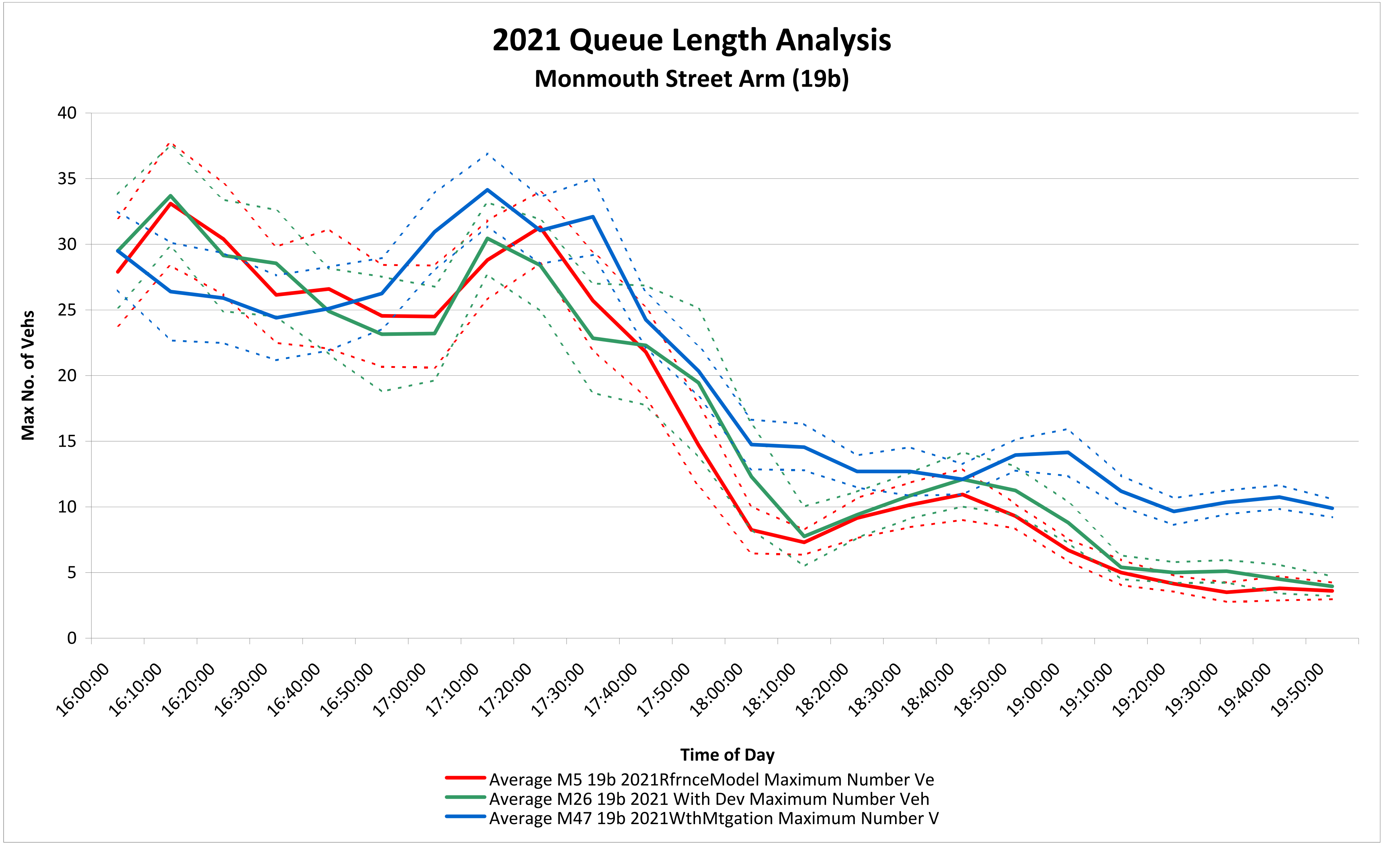
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 19a 2021RfrnceModel Maximum Number Ve
Average M26 19a 2021 With Dev Maximum Number Veh
Average M47 19a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
0
5
10
15
20
25
30
35
40
45
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 19b 2021RfrnceModel Maximum Number Ve
Average M26 19b 2021 With Dev Maximum Number Veh
Average M47 19b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 19b 2021RfrnceModel Maximum Number Ve
Average M26 19b 2021 With Dev Maximum Number Veh
Average M47 19b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Monmouth Street Arm (19b)
Max No. of Vehs
0
5
10
15
20
25
30
35
40
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
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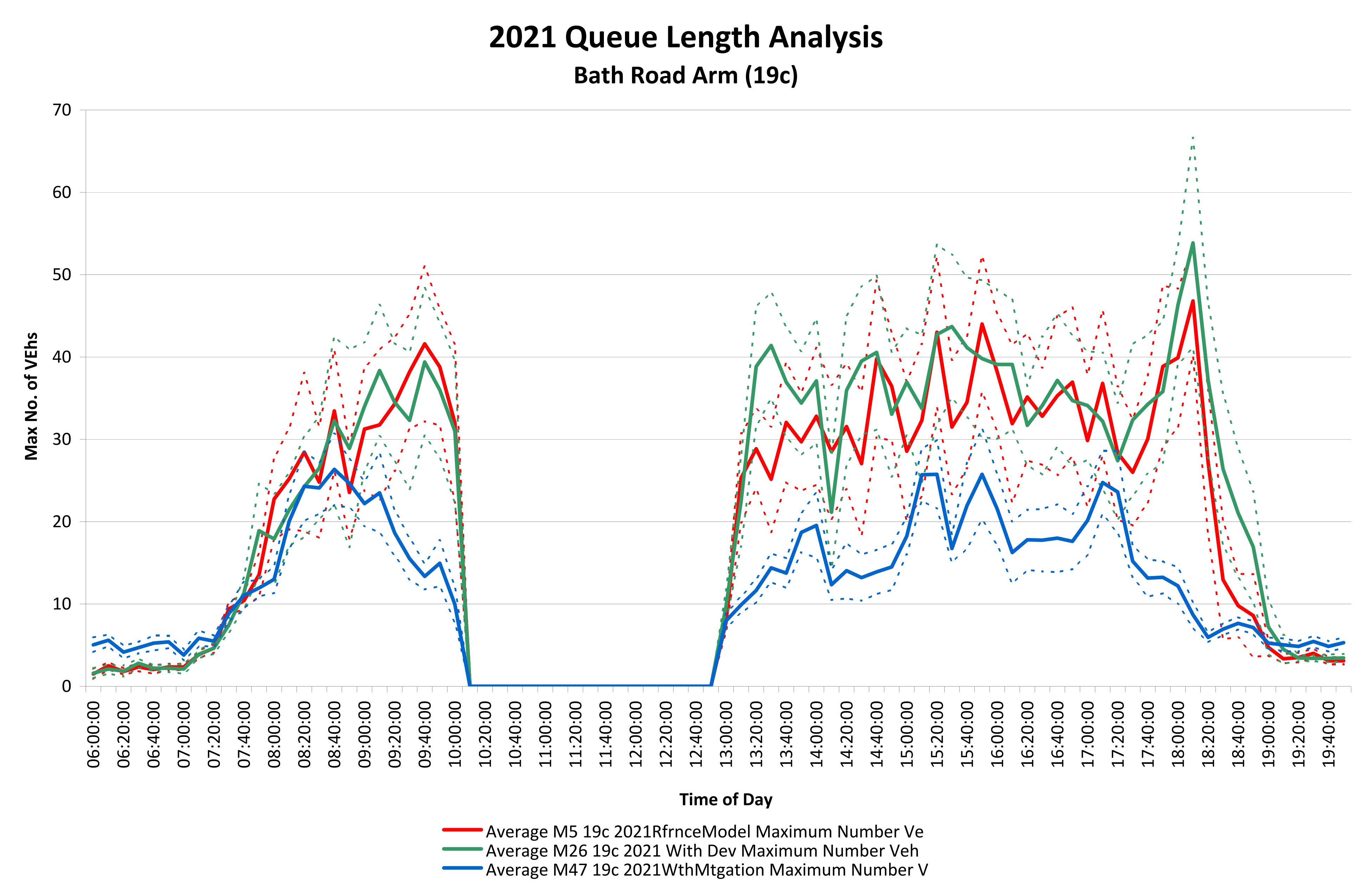
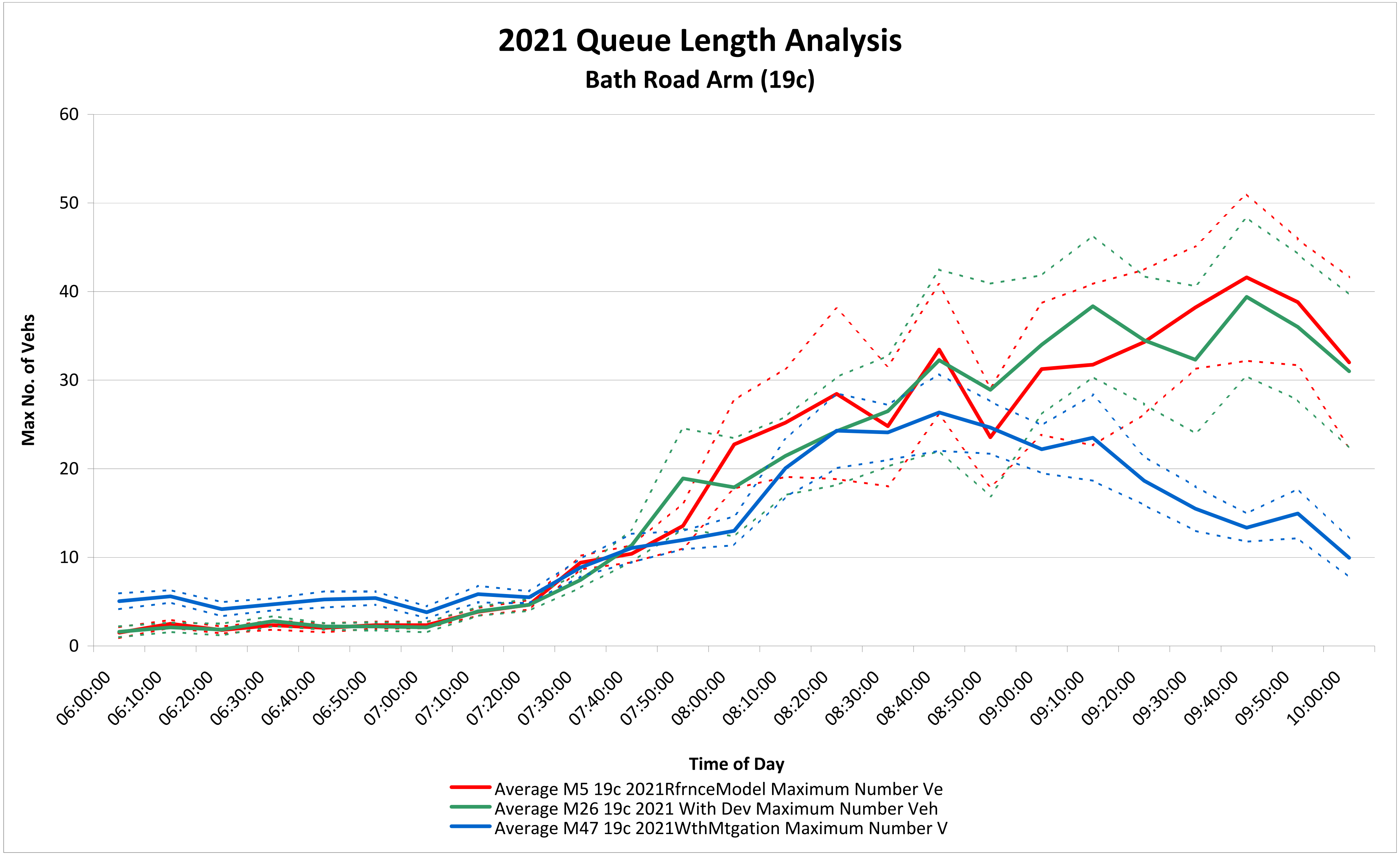
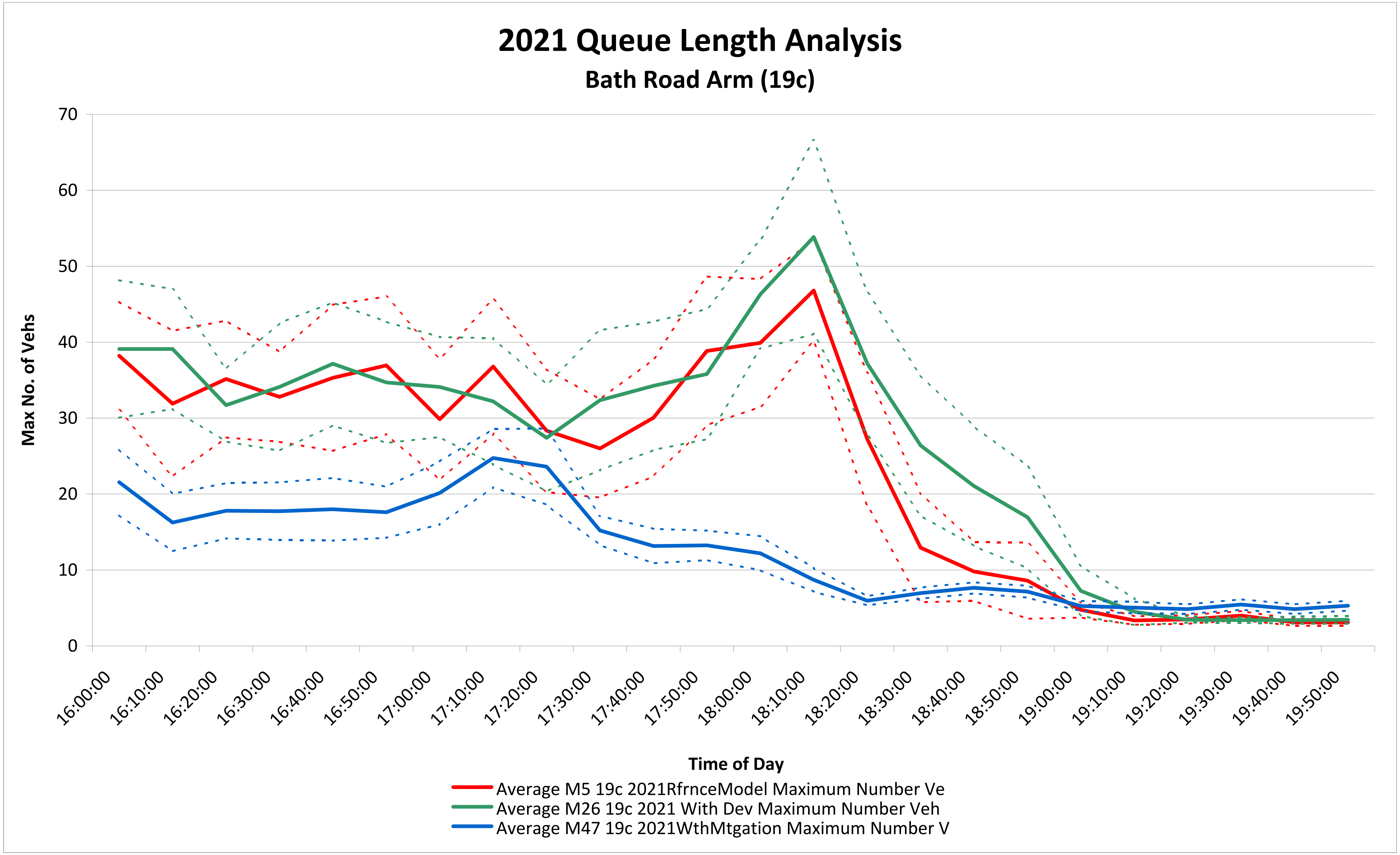
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 19b 2021RfrnceModel Maximum Number Ve
Average M26 19b 2021 With Dev Maximum Number Veh
Average M47 19b 2021WthMtgation Maximum Number V



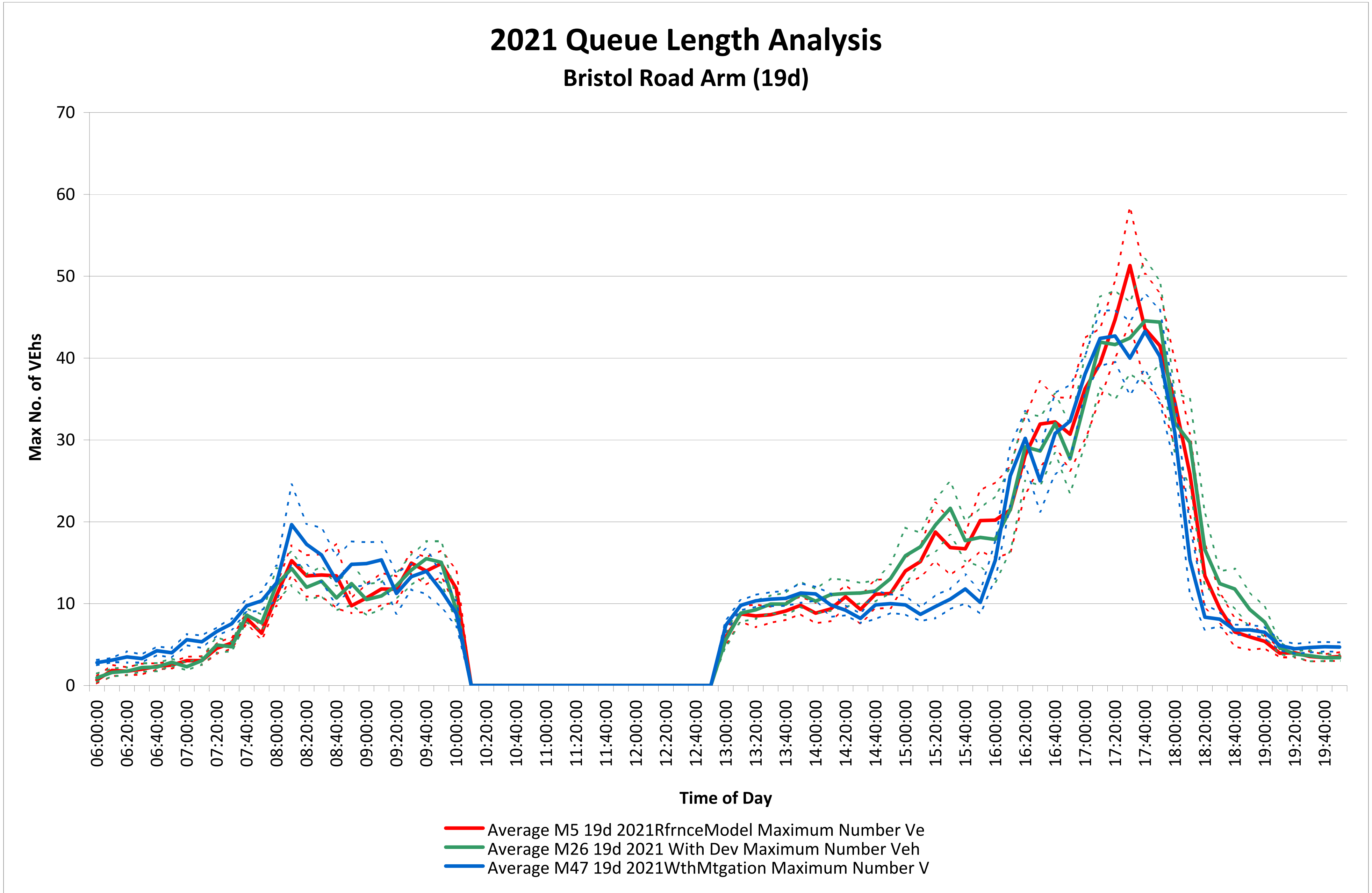
2021 Queue Length Analysis
Bath Road Arm (19c)
Max No. of VEhs
0
10
20
30
40
50
60
70
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 19c 2021RfrnceModel Maximum Number Ve
Average M26 19c 2021 With Dev Maximum Number Veh
Average M47 19c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Bath Road Arm (19c)
Max No. of Vehs
0
10
20
30
40
50
60
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 19c 2021RfrnceModel Maximum Number Ve
Average M26 19c 2021 With Dev Maximum Number Veh
Average M47 19c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Bath Road Arm (19c)
Max No. of Vehs
70
60
50
40
30
20
10
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 19c 2021RfrnceModel Maximum Number Ve
Average M26 19c 2021 With Dev Maximum Number Veh
Average M47 19c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of VEhs
70
60
50
40
30
20
10
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
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15:00:00
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15:40:00
16:00:00
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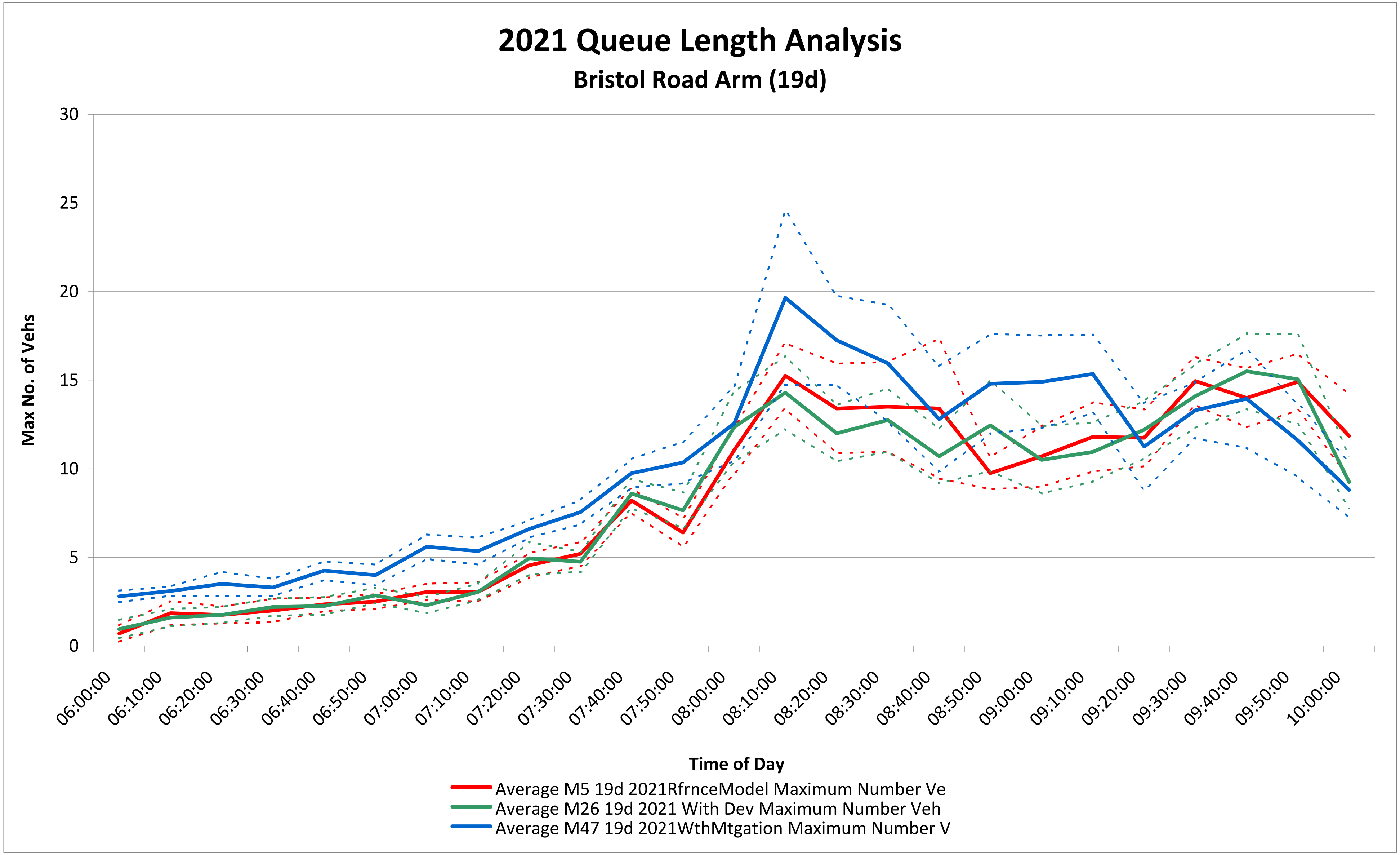
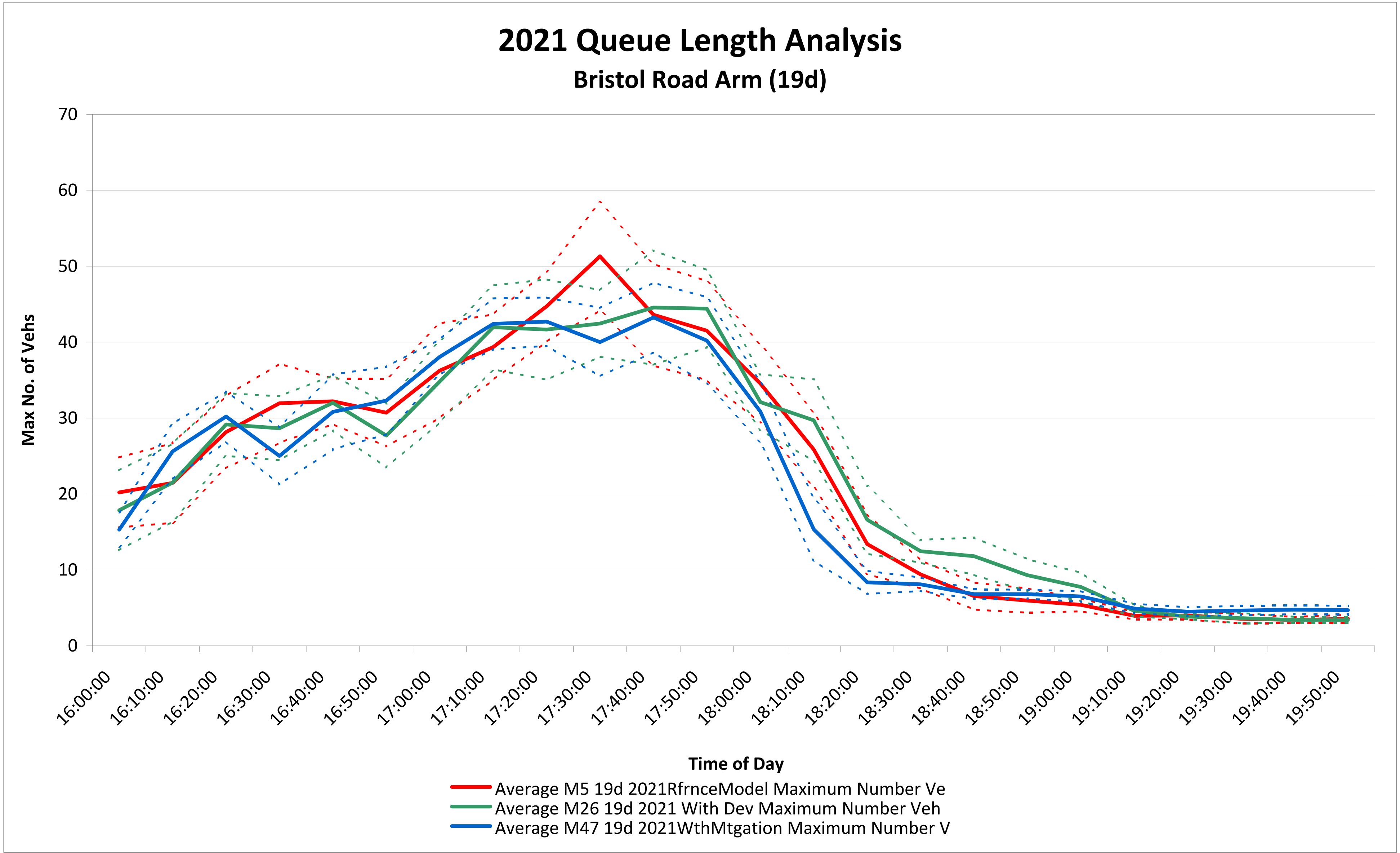
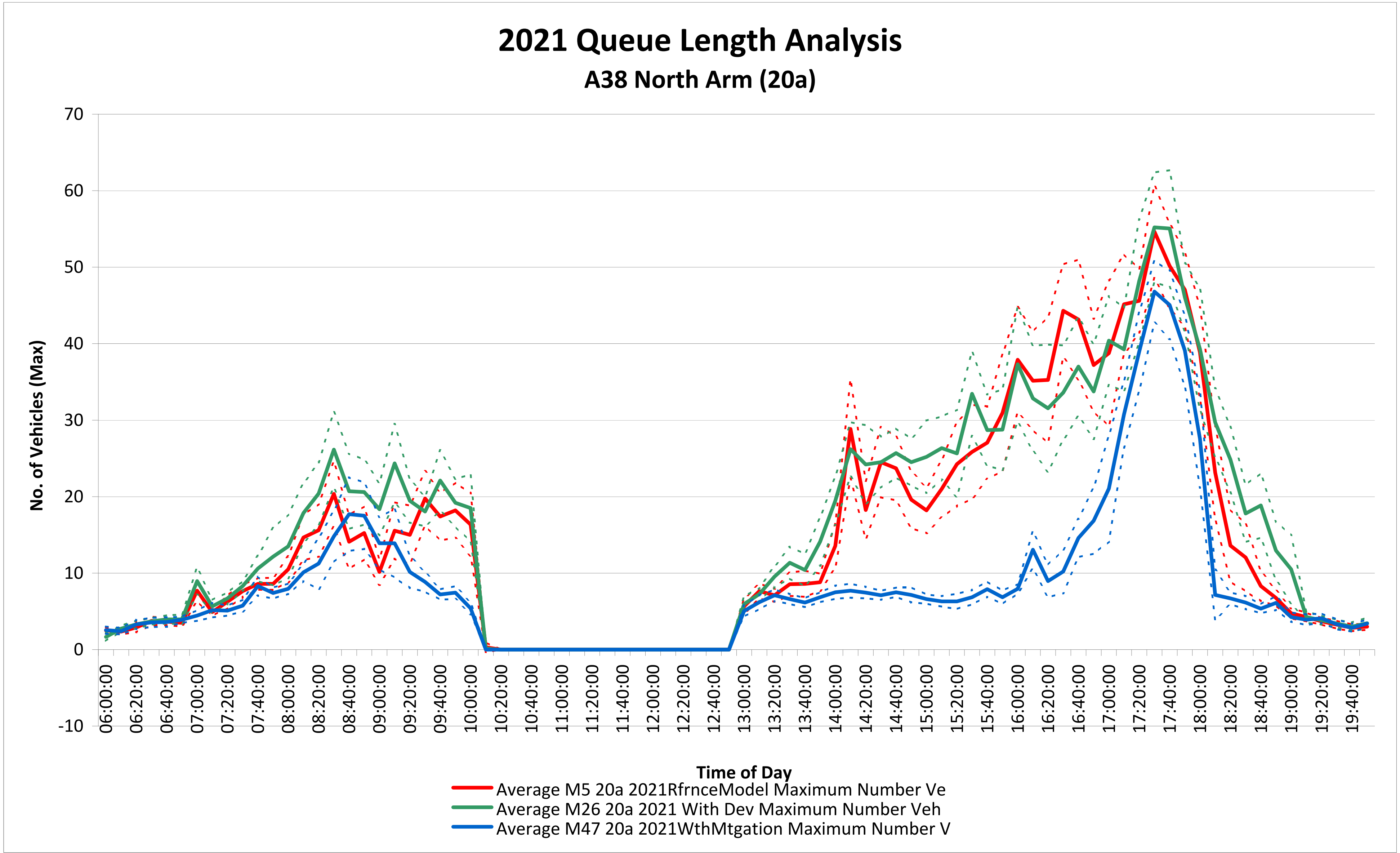
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 19d 2021RfrnceModel Maximum Number Ve
Average M26 19d 2021 With Dev Maximum Number Veh
Average M47 19d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of Vehs
0
5
10
15
20
25
30
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 19d 2021RfrnceModel Maximum Number Ve
Average M26 19d 2021 With Dev Maximum Number Veh
Average M47 19d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Bristol Road Arm (19d)
Max No. of Vehs
70
60
50
40
30
20
10
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 19d 2021RfrnceModel Maximum Number Ve
Average M26 19d 2021 With Dev Maximum Number Veh
Average M47 19d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 North Arm (20a)
No. of Vehicles (Max)
70
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
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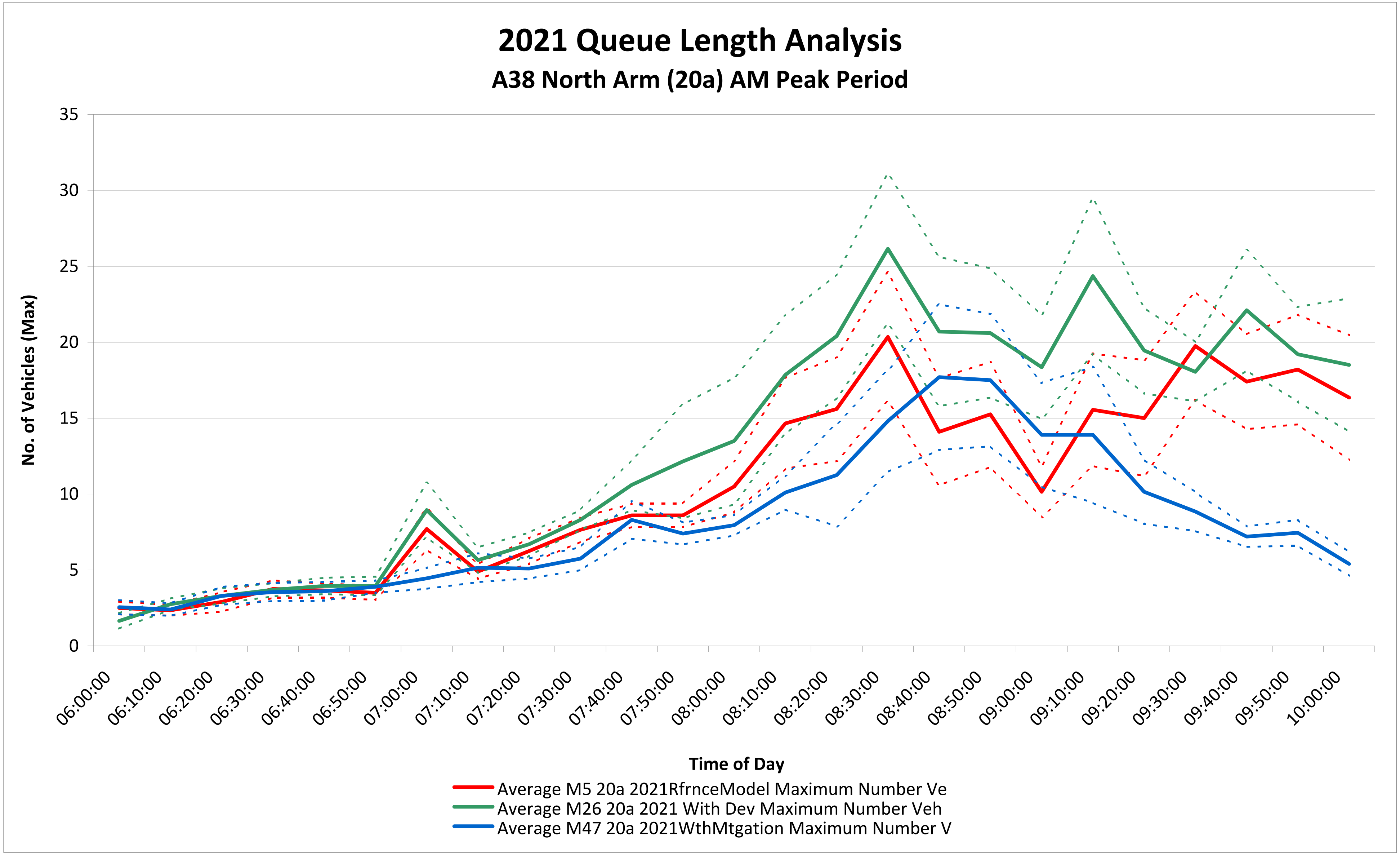
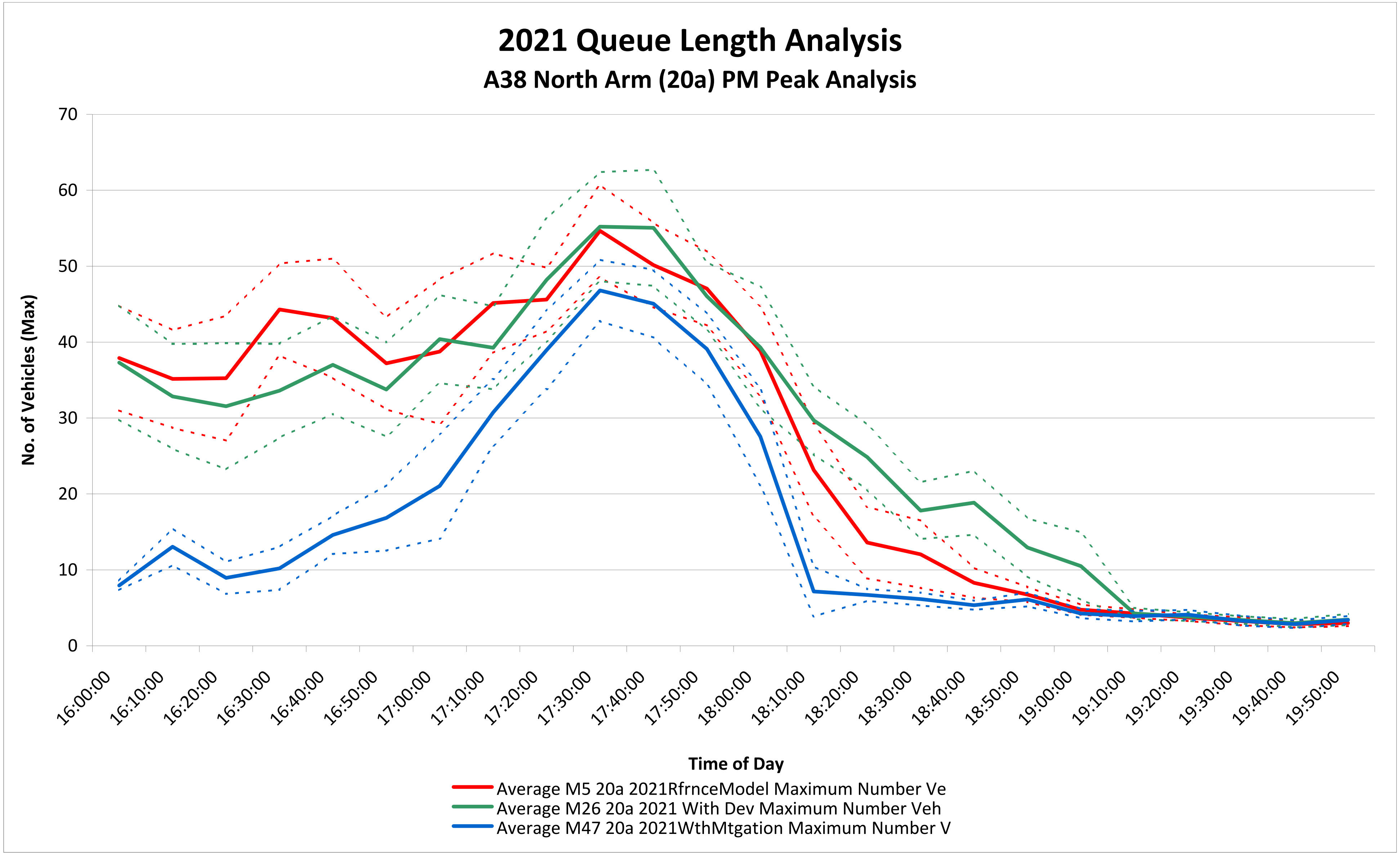
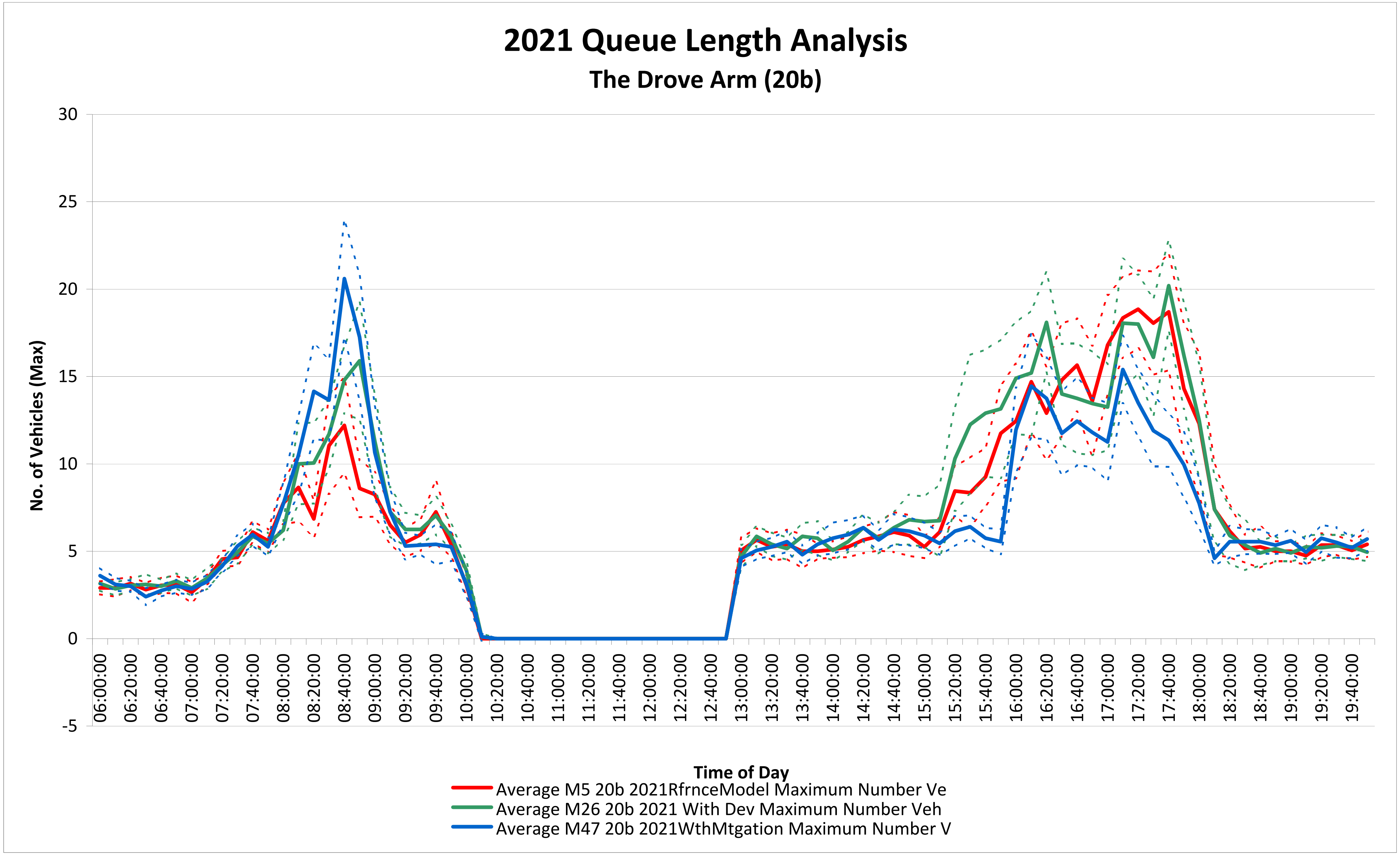
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 20a 2021RfrnceModel Maximum Number Ve
Average M26 20a 2021 With Dev Maximum Number Veh
Average M47 20a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 North Arm (20a) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 20a 2021RfrnceModel Maximum Number Ve
Average M26 20a 2021 With Dev Maximum Number Veh
Average M47 20a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 North Arm (20a) PM Peak Analysis
No. of Vehicles (Max)
0
10
20
30
40
50
60
70
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 20a 2021RfrnceModel Maximum Number Ve
Average M26 20a 2021 With Dev Maximum Number Veh
Average M47 20a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Drove Arm (20b)
30
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
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10:40:00
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15:00:00
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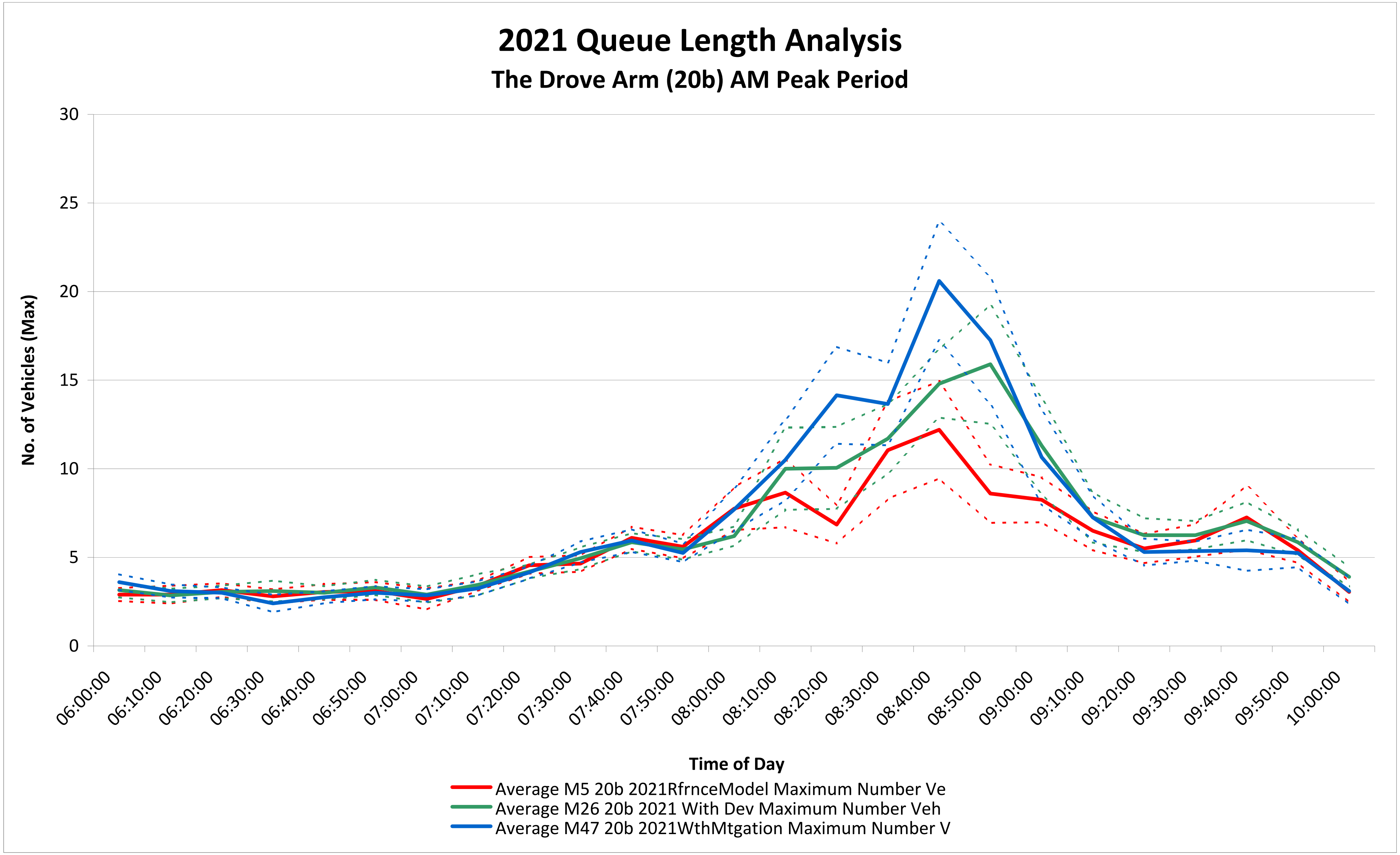
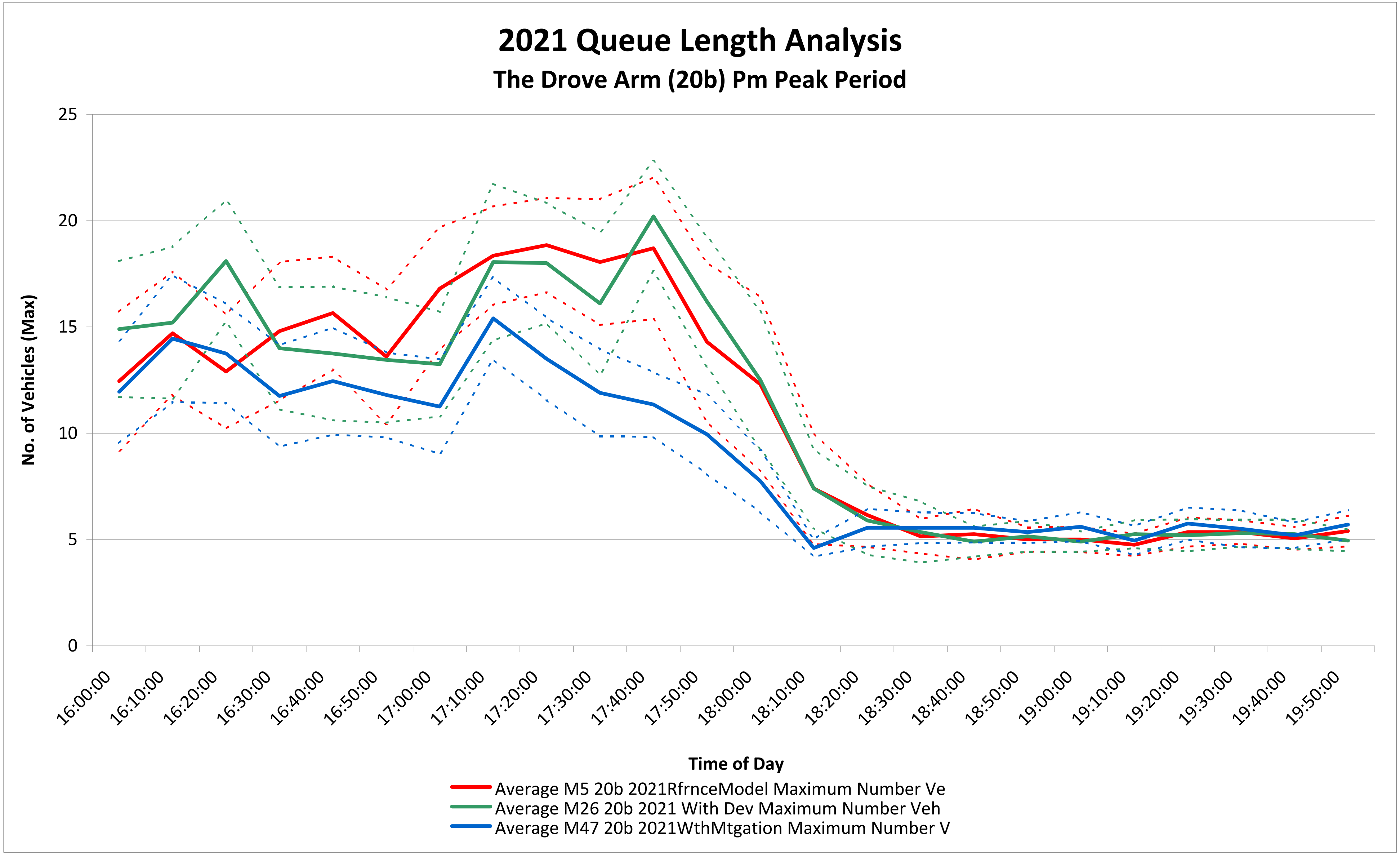
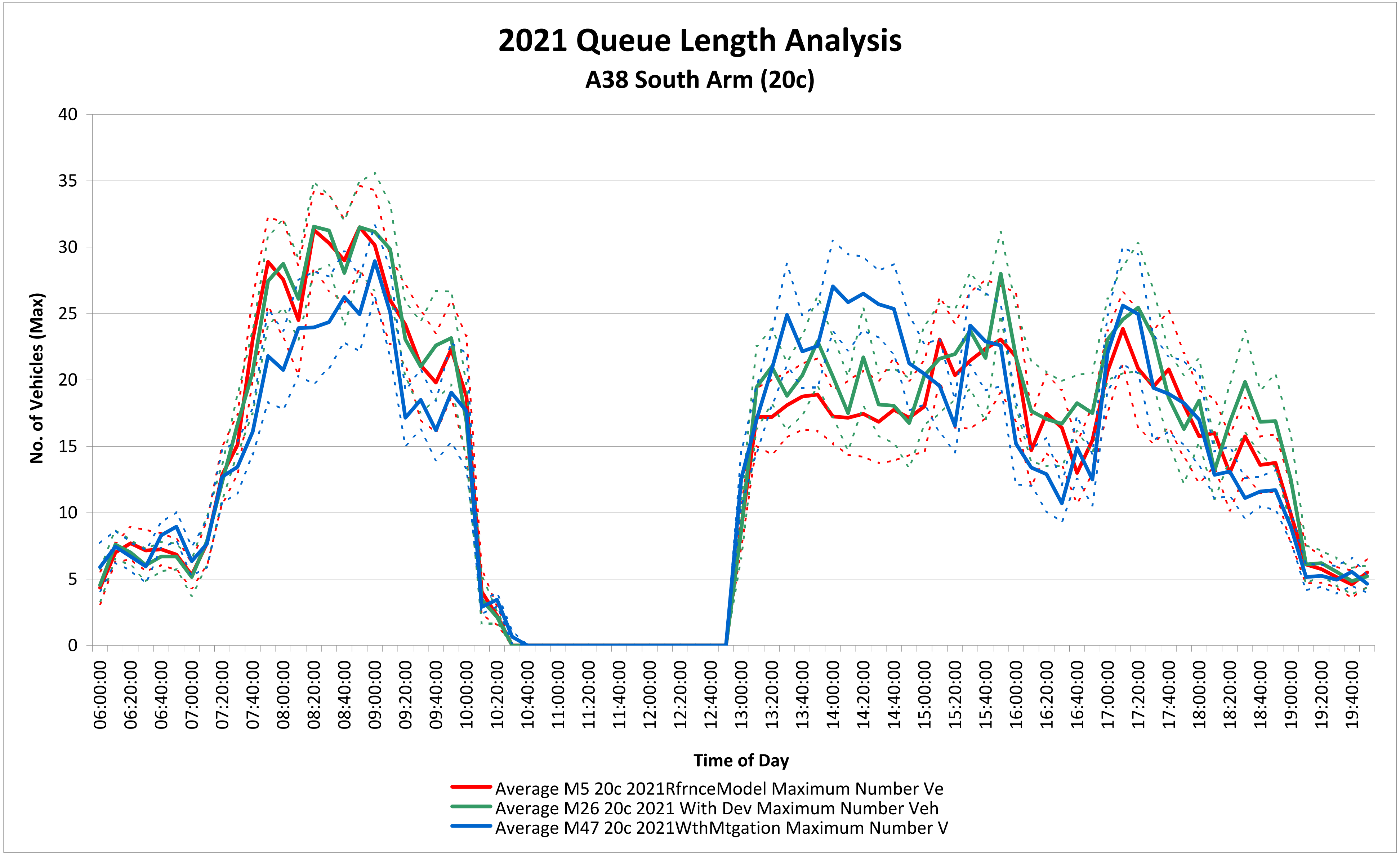
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 20b 2021RfrnceModel Maximum Number Ve
Average M26 20b 2021 With Dev Maximum Number Veh
Average M47 20b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
The Drove Arm (20b) AM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 20b 2021RfrnceModel Maximum Number Ve
Average M26 20b 2021 With Dev Maximum Number Veh
Average M47 20b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
The Drove Arm (20b) Pm Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 20b 2021RfrnceModel Maximum Number Ve
Average M26 20b 2021 With Dev Maximum Number Veh
Average M47 20b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 South Arm (20c)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
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10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
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13:00:00
13:20:00
13:40:00
14:00:00
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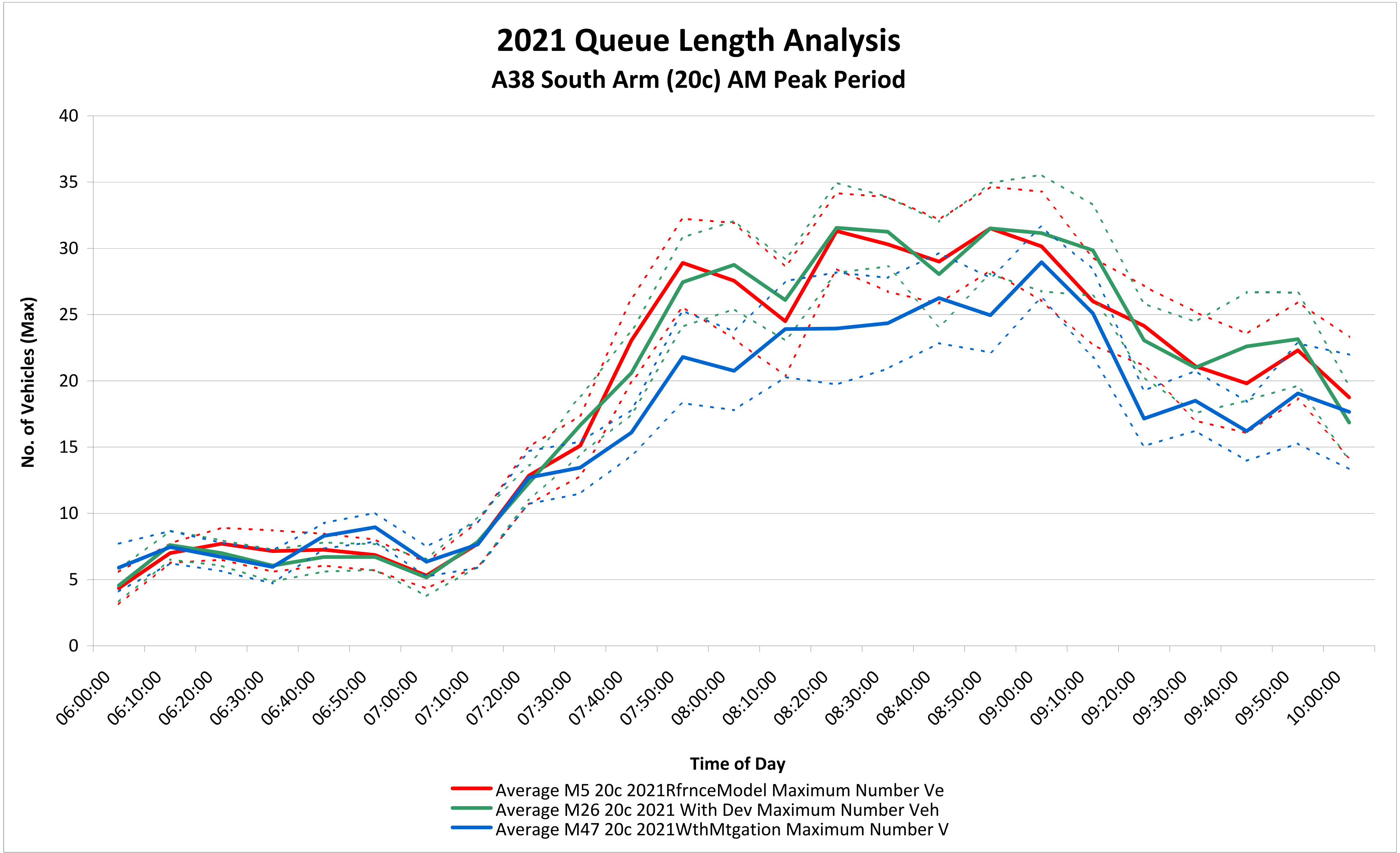
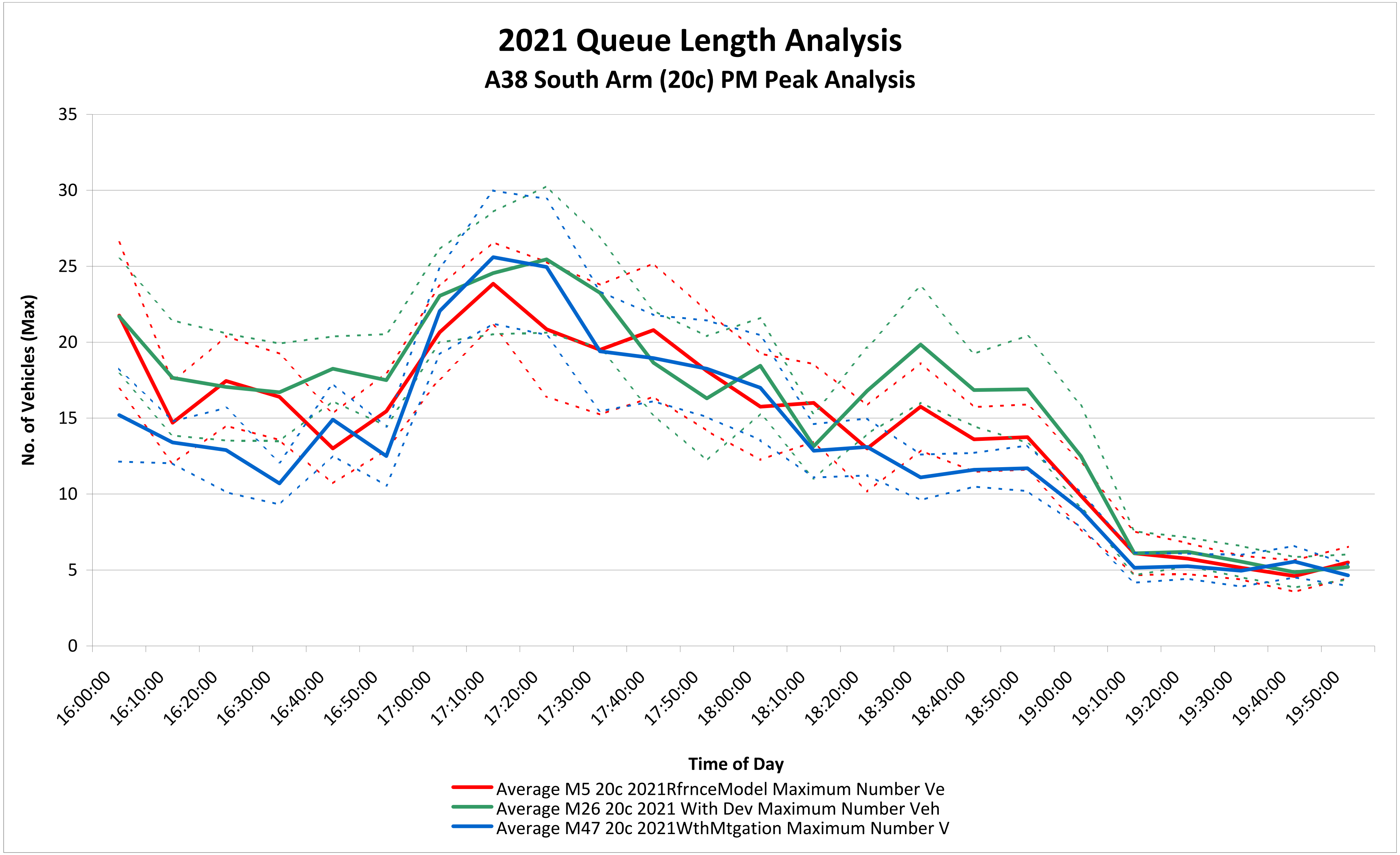
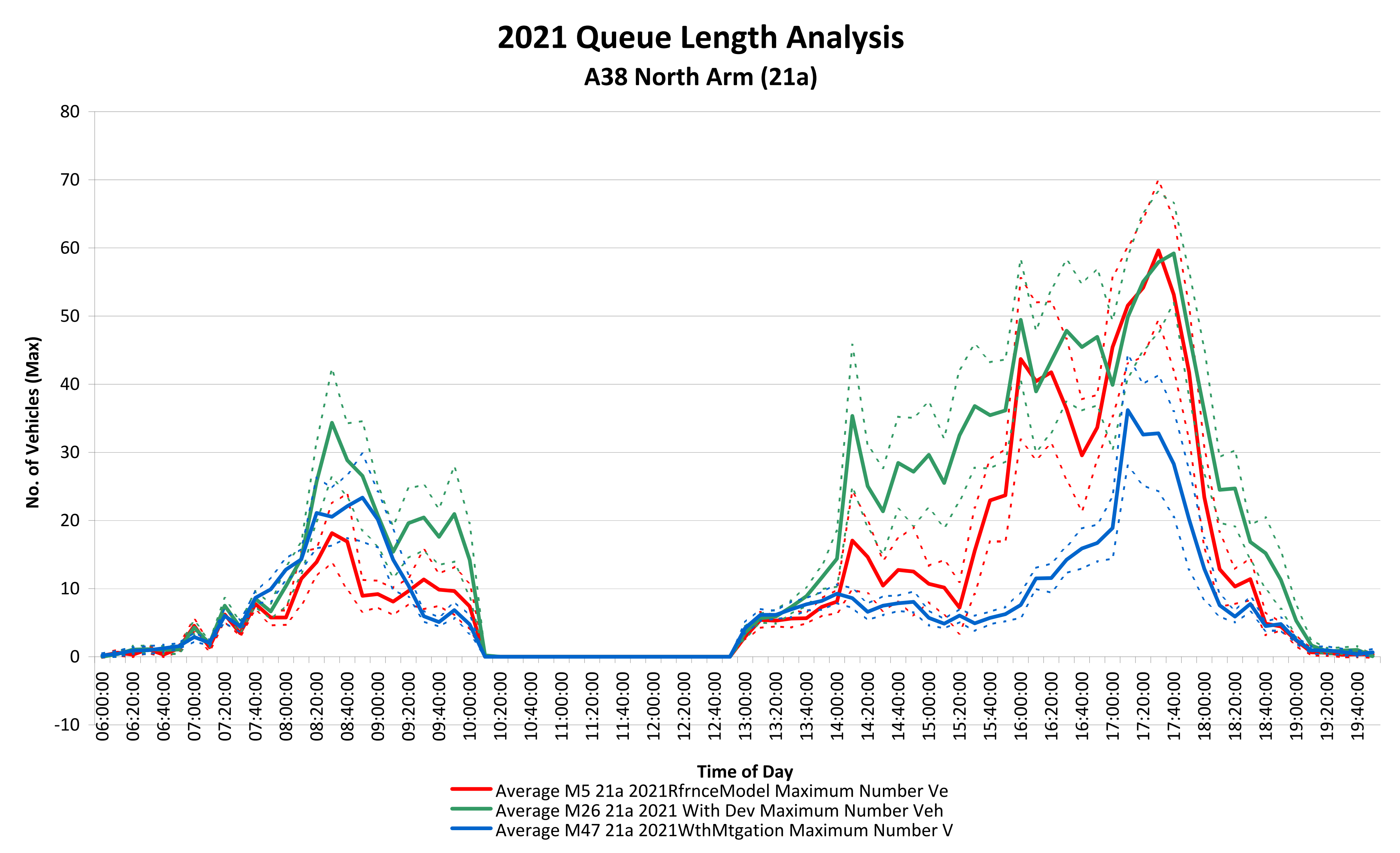
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 20c 2021RfrnceModel Maximum Number Ve
Average M26 20c 2021 With Dev Maximum Number Veh
Average M47 20c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 South Arm (20c) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
40
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 20c 2021RfrnceModel Maximum Number Ve
Average M26 20c 2021 With Dev Maximum Number Veh
Average M47 20c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 South Arm (20c) PM Peak Analysis
35
30
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 20c 2021RfrnceModel Maximum Number Ve
Average M26 20c 2021 With Dev Maximum Number Veh
Average M47 20c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 North Arm (21a)
No. of Vehicles (Max)
80
70
60
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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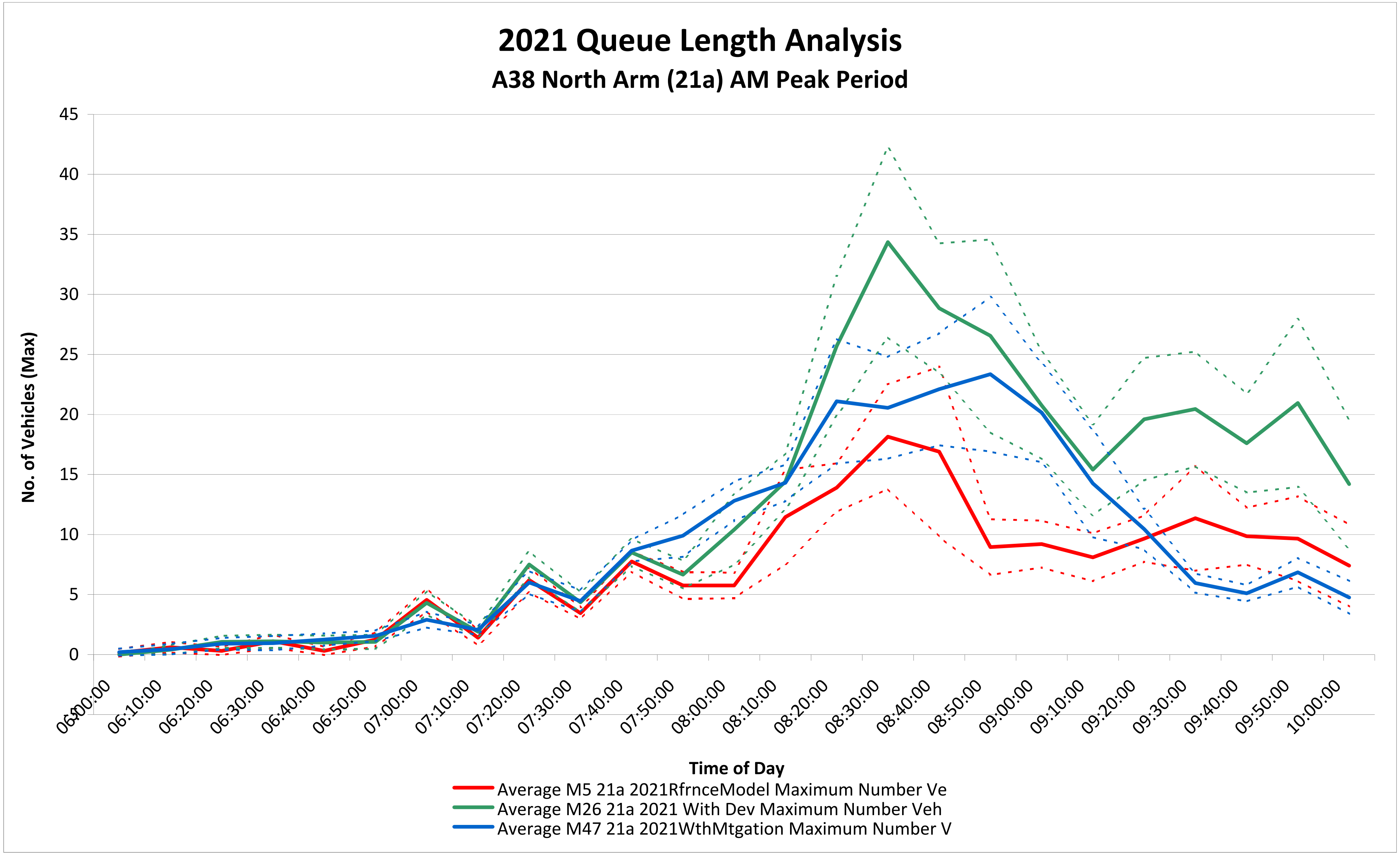
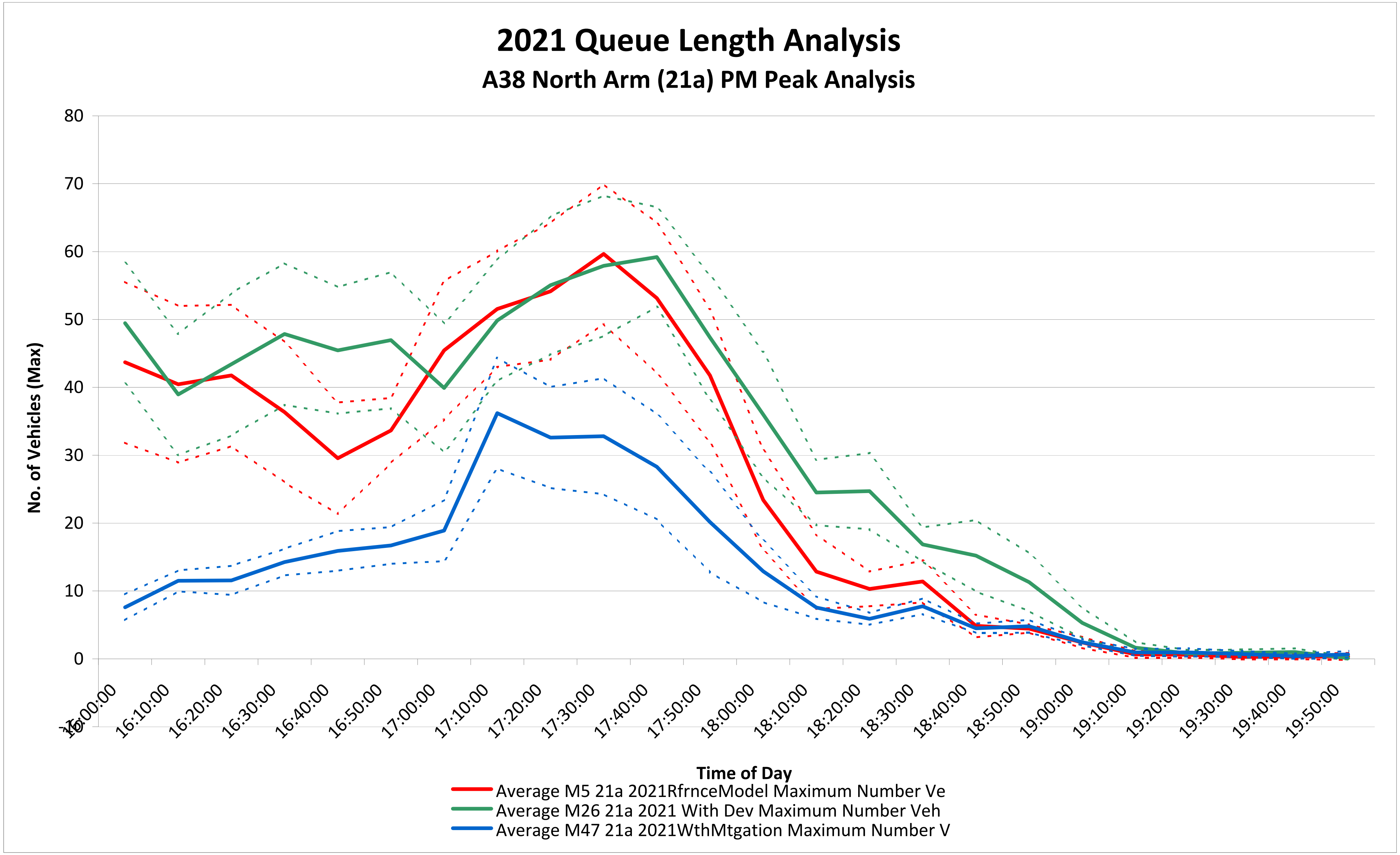
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 21a 2021RfrnceModel Maximum Number Ve
Average M26 21a 2021 With Dev Maximum Number Veh
Average M47 21a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 North Arm (21a) AM Peak Period
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 21a 2021RfrnceModel Maximum Number Ve
Average M26 21a 2021 With Dev Maximum Number Veh
Average M47 21a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 North Arm (21a) PM Peak Analysis
No. of Vehicles (Max)
80
70
60
50
40
30
20
10
0
-10
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
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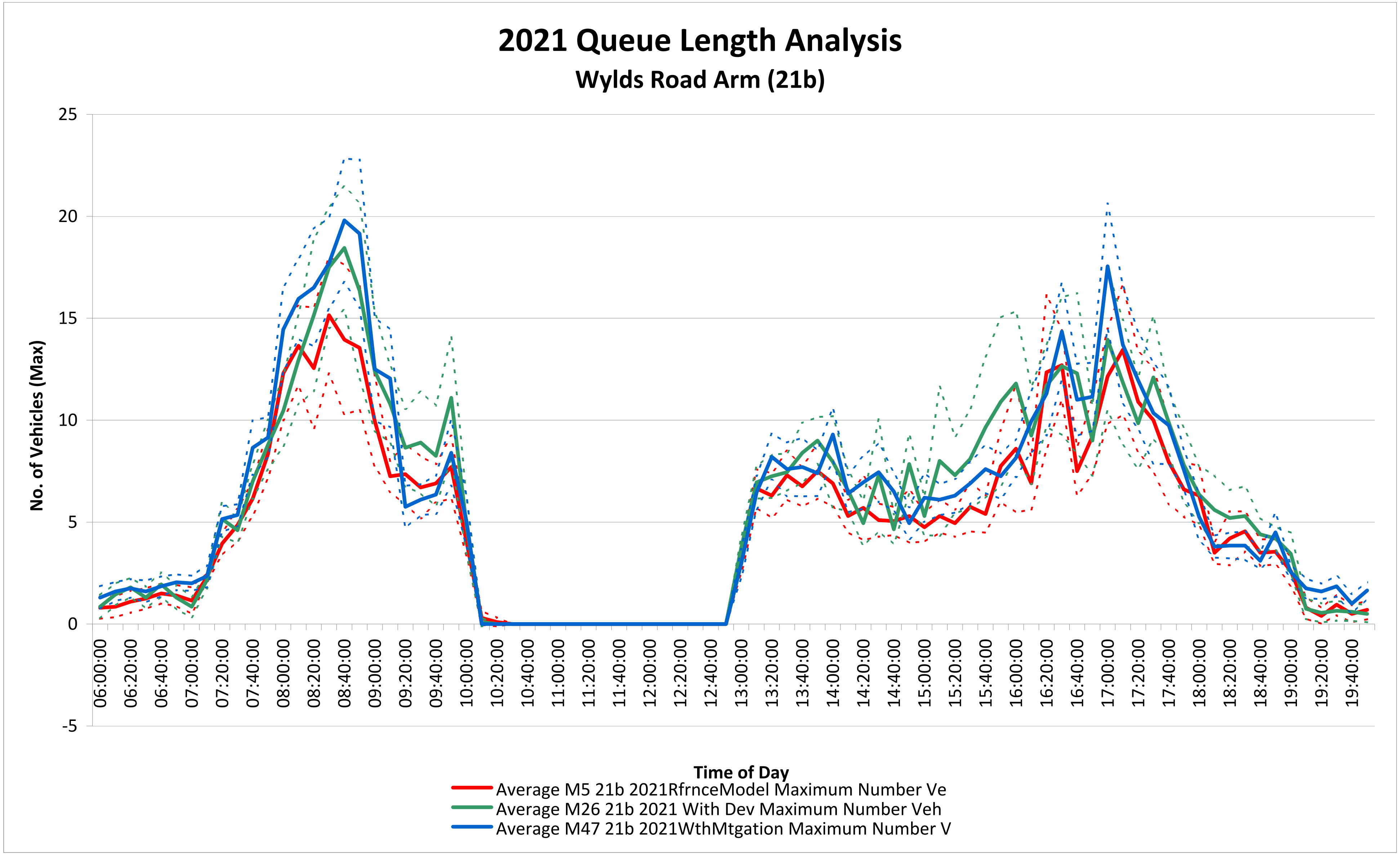
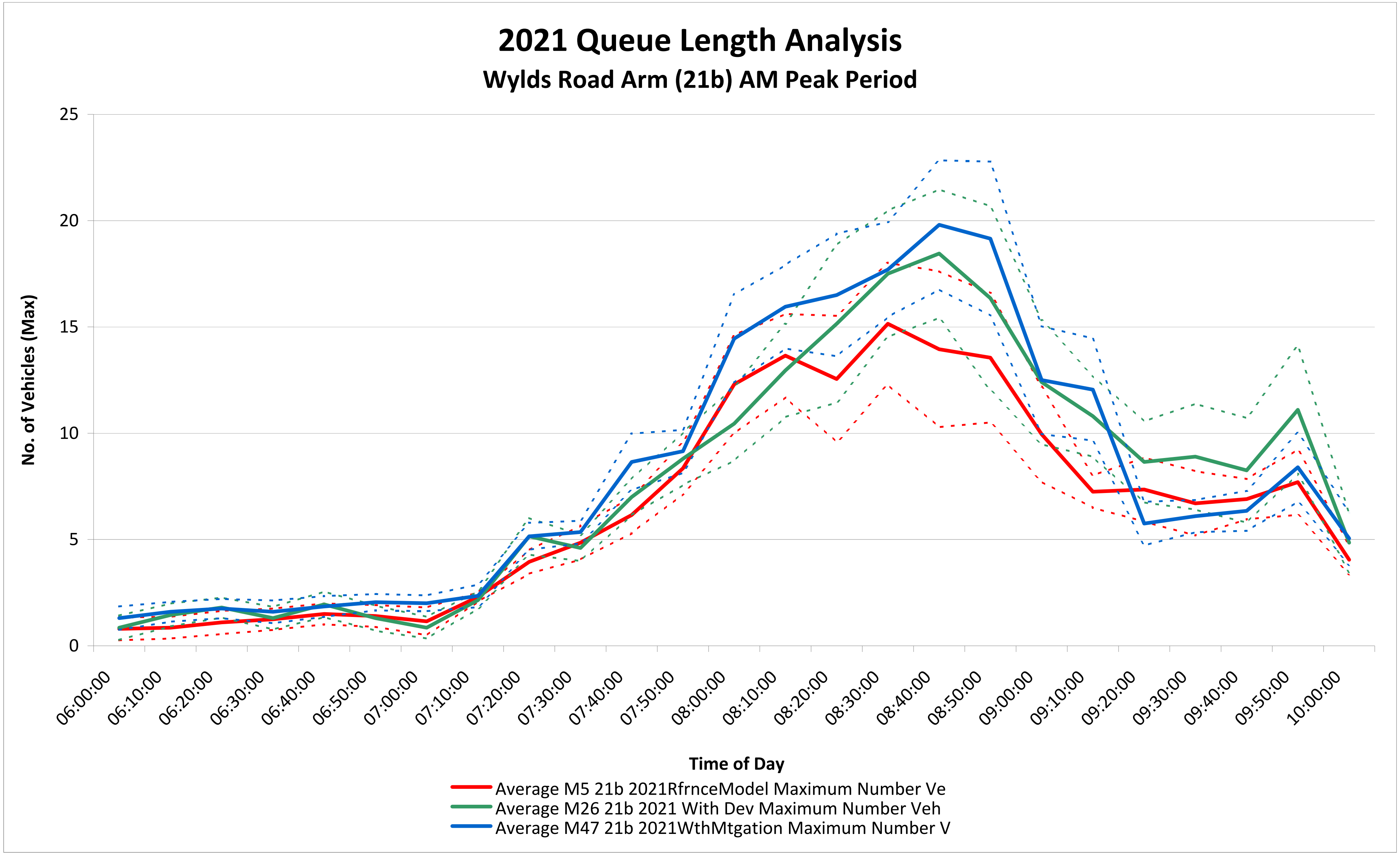
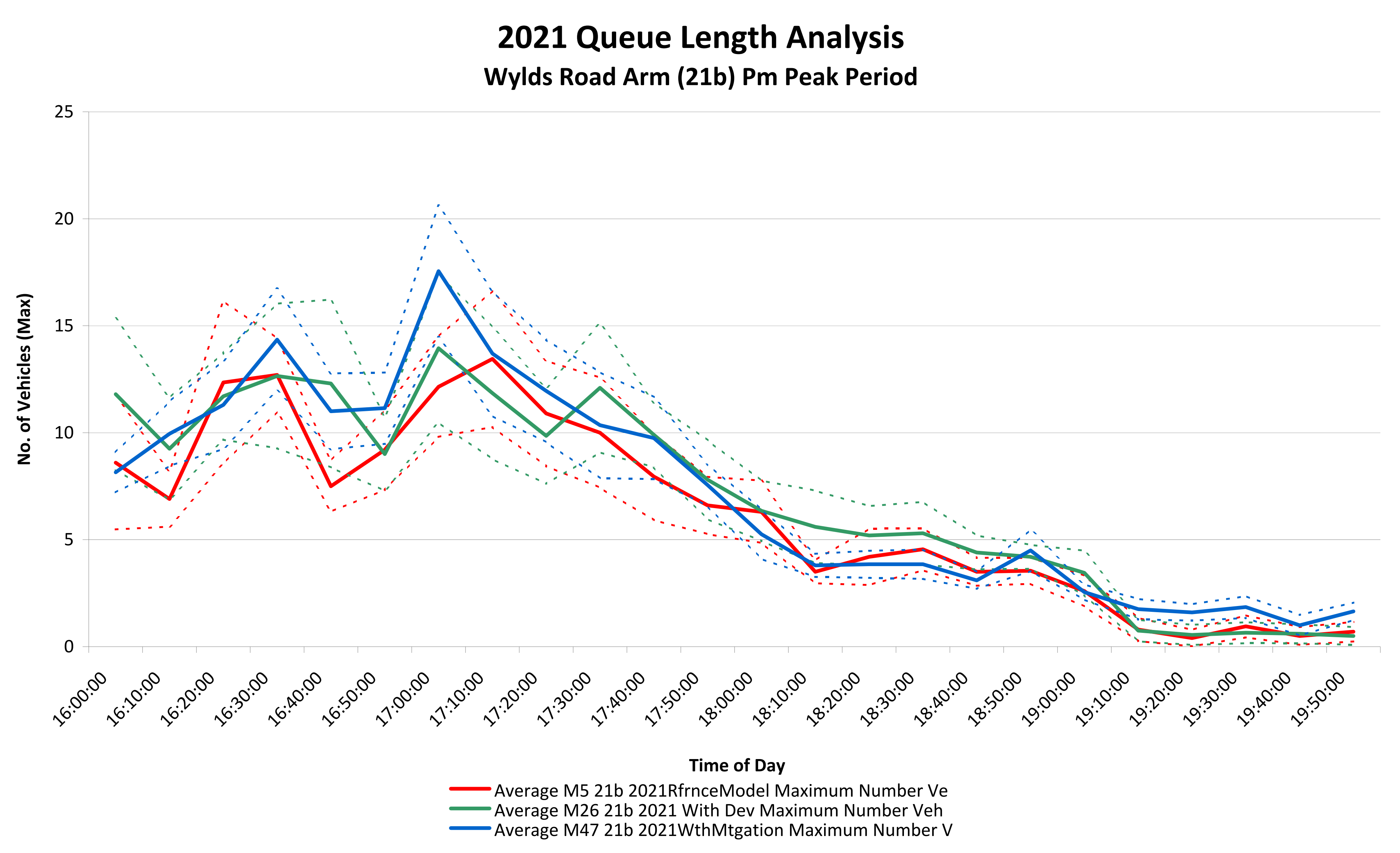
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 21a 2021RfrnceModel Maximum Number Ve
Average M26 21a 2021 With Dev Maximum Number Veh
Average M47 21a 2021WthMtgation Maximum Number V

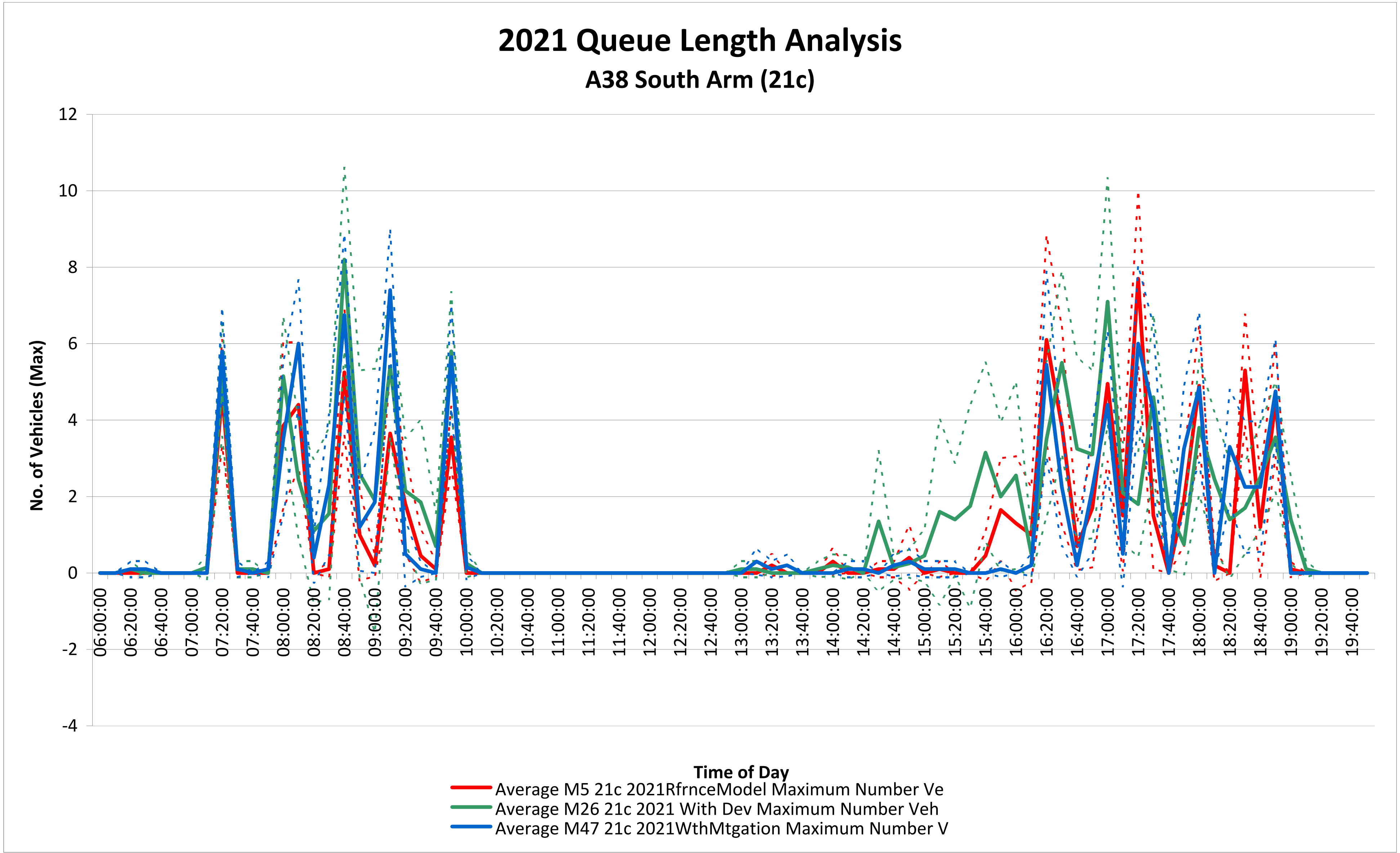


2021 Queue Length Analysis
Wylds Road Arm (21b)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 21b 2021RfrnceModel Maximum Number Ve
Average M26 21b 2021 With Dev Maximum Number Veh
Average M47 21b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Wylds Road Arm (21b) AM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 21b 2021RfrnceModel Maximum Number Ve
Average M26 21b 2021 With Dev Maximum Number Veh
Average M47 21b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Wylds Road Arm (21b) Pm Peak Period
25
20
15
10
5
0
No. of Vehicles (Max)
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 21b 2021RfrnceModel Maximum Number Ve
Average M26 21b 2021 With Dev Maximum Number Veh
Average M47 21b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 South Arm (21c)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
-4
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
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16:20:00
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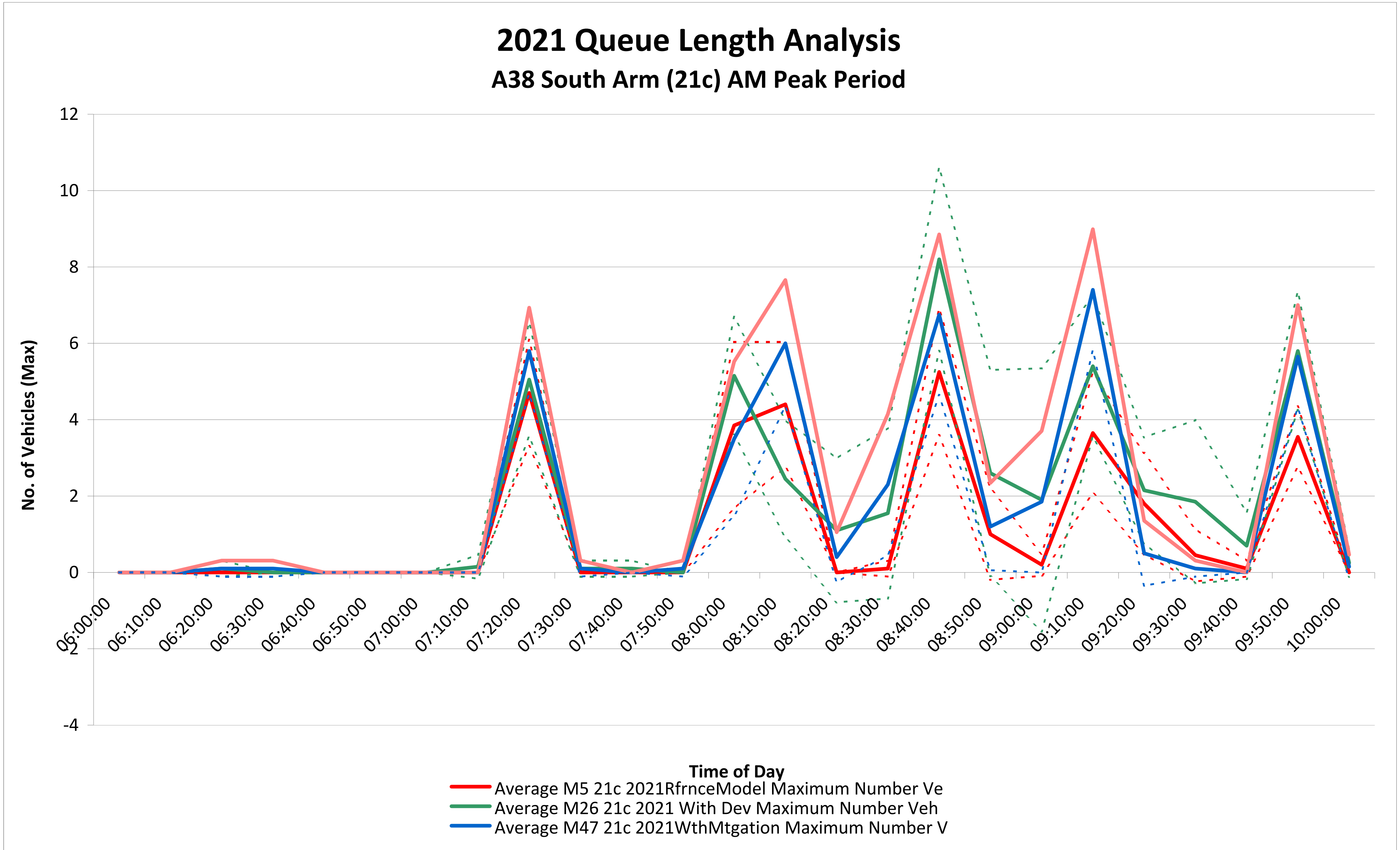
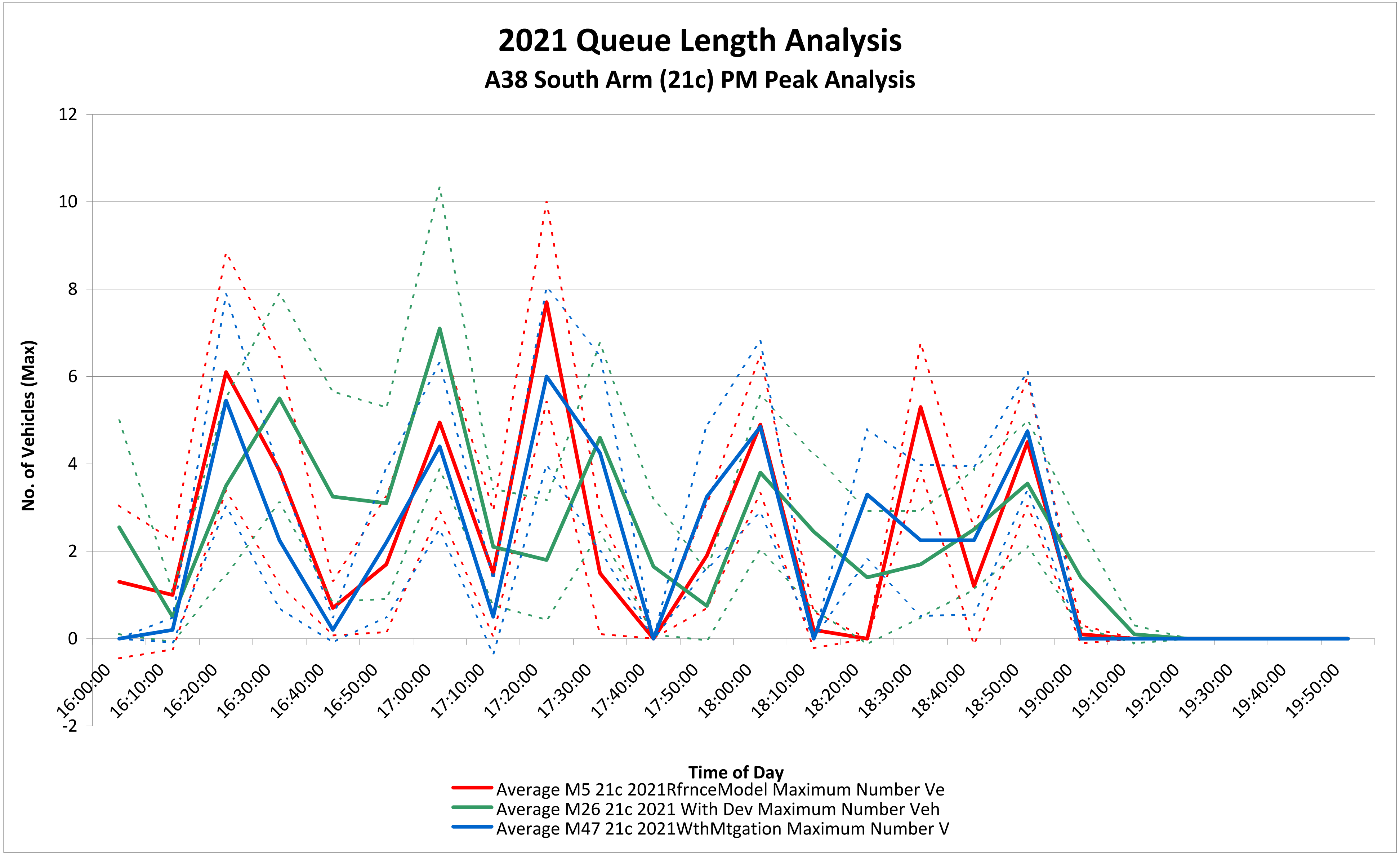
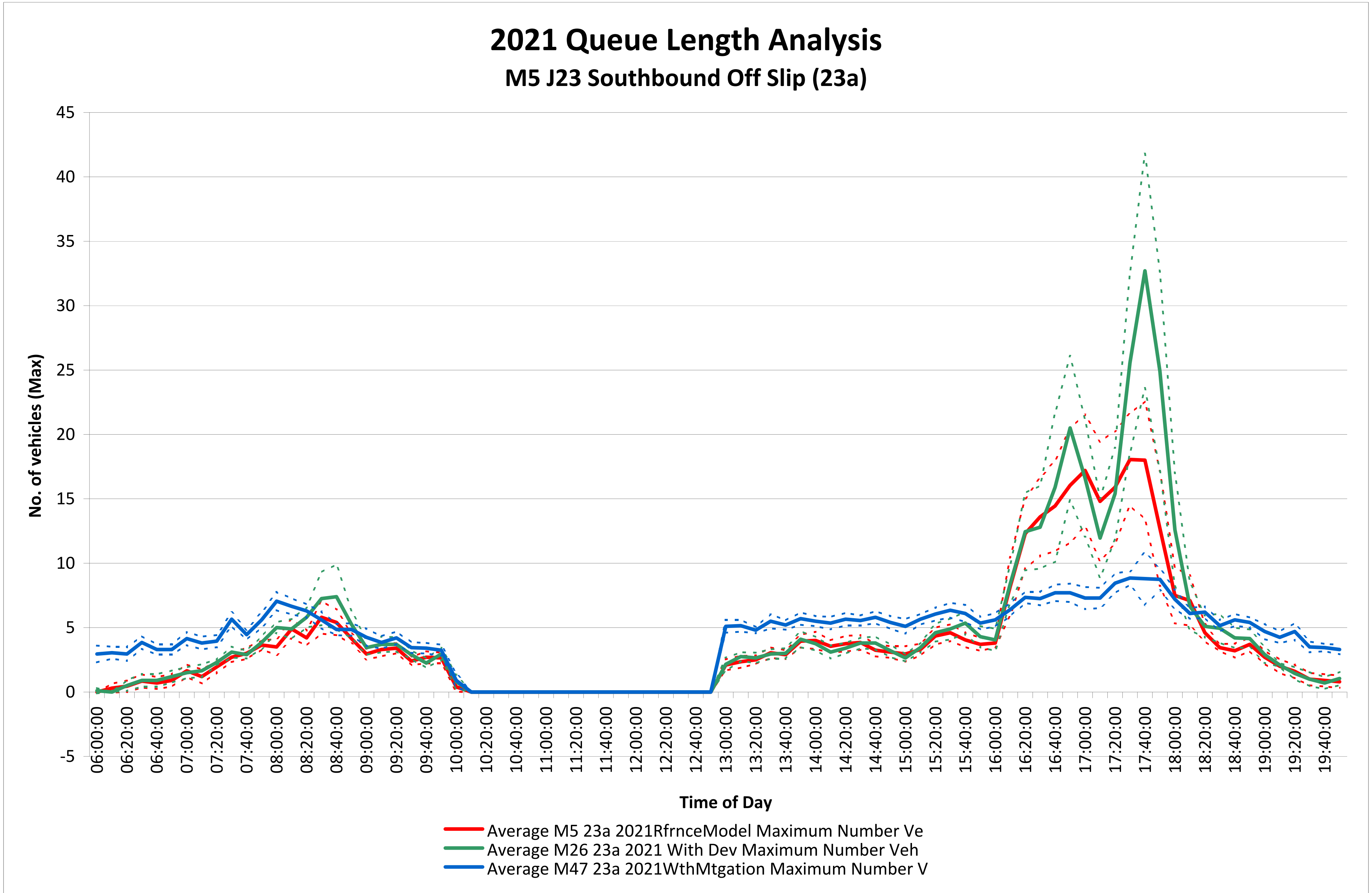
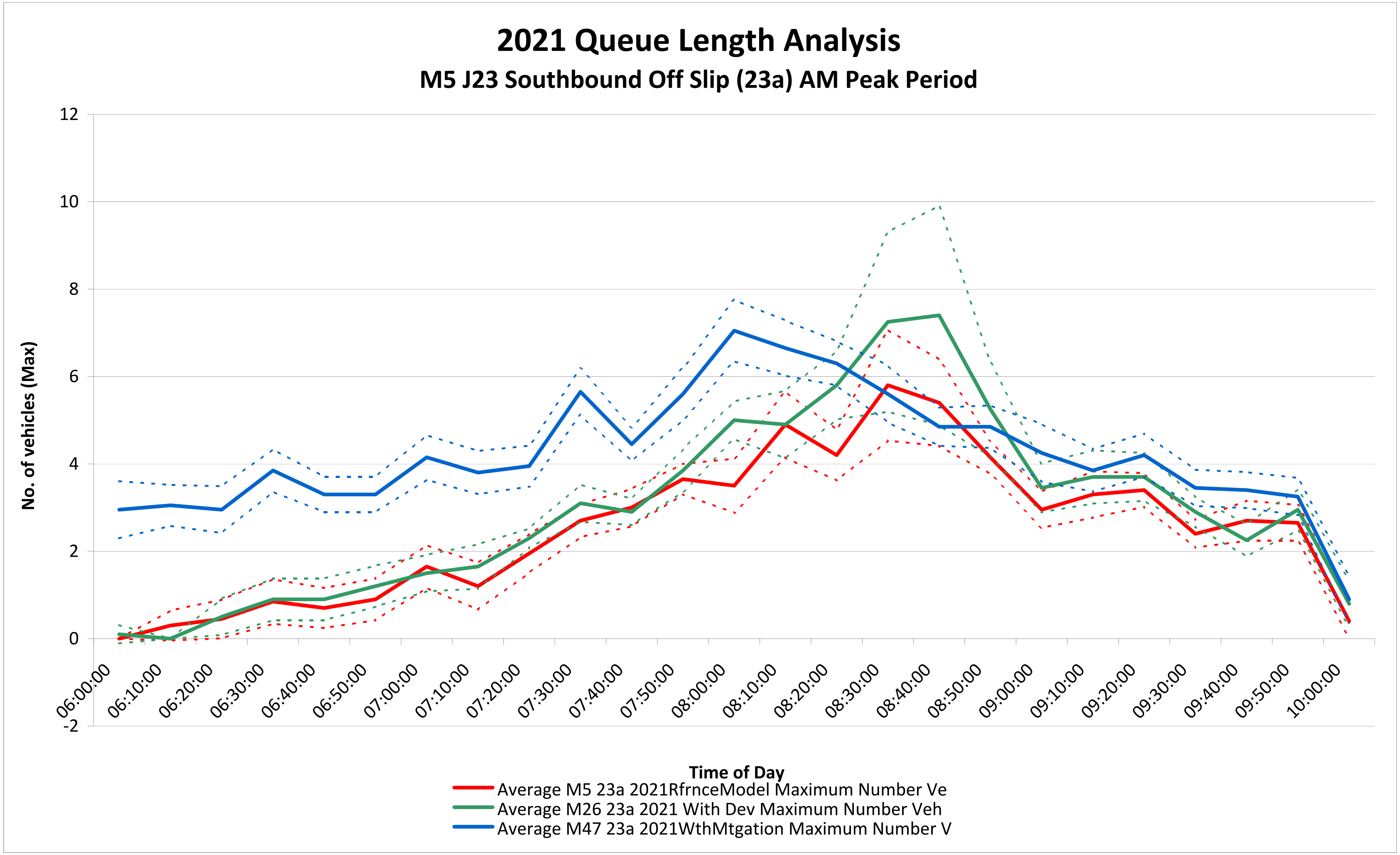
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 21c 2021RfrnceModel Maximum Number Ve
Average M26 21c 2021 With Dev Maximum Number Veh
Average M47 21c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
A38 South Arm (21c) AM Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
-4
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 21c 2021RfrnceModel Maximum Number Ve
Average M26 21c 2021 With Dev Maximum Number Veh
Average M47 21c 2021WthMtgation Maximum Number V

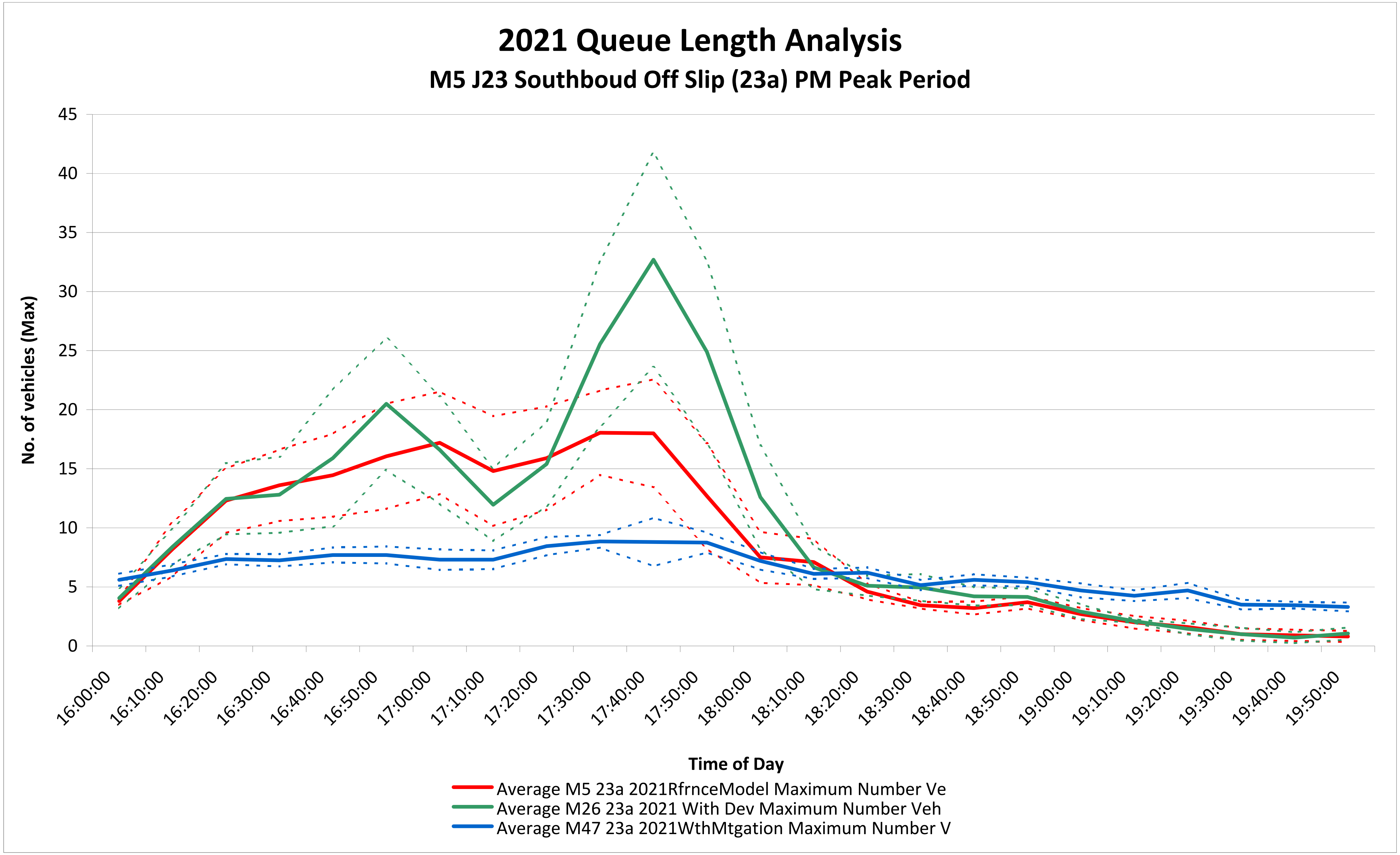

2021 Queue Length Analysis
A38 South Arm (21c) PM Peak Analysis
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 21c 2021RfrnceModel Maximum Number Ve
Average M26 21c 2021 With Dev Maximum Number Veh
Average M47 21c 2021WthMtgation Maximum Number V

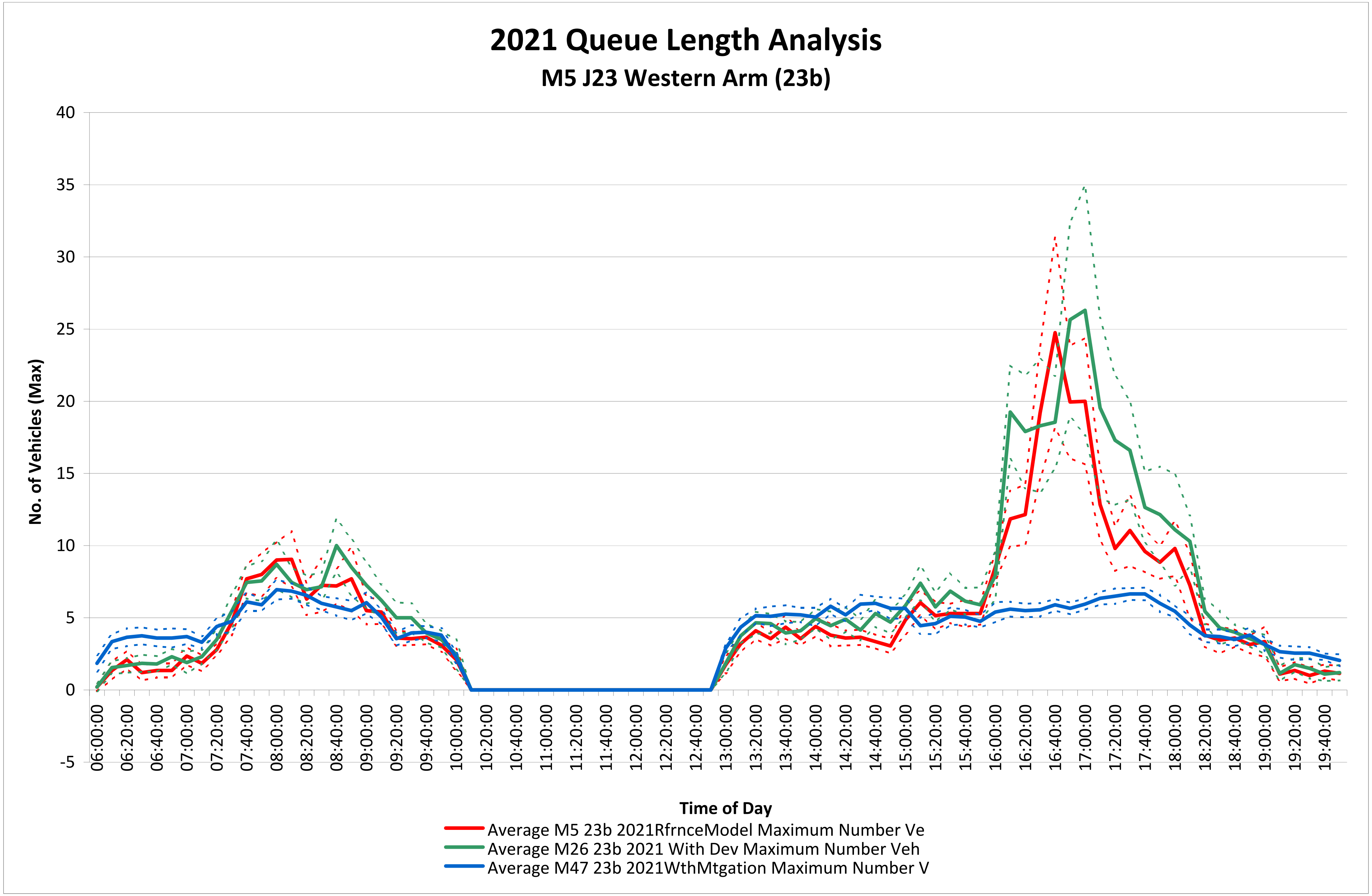


2021 Queue Length Analysis
M5 J23 Southbound Off Slip (23a)
No. of vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 23a 2021RfrnceModel Maximum Number Ve
Average M26 23a 2021 With Dev Maximum Number Veh
Average M47 23a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J23 Southbound Off Slip (23a) AM Peak Period
No. of vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 23a 2021RfrnceModel Maximum Number Ve
Average M26 23a 2021 With Dev Maximum Number Veh
Average M47 23a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J23 Southboud Off Slip (23a) PM Peak Period
No. of vehicles (Max)
45
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 23a 2021RfrnceModel Maximum Number Ve
Average M26 23a 2021 With Dev Maximum Number Veh
Average M47 23a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J23 Western Arm (23b)
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
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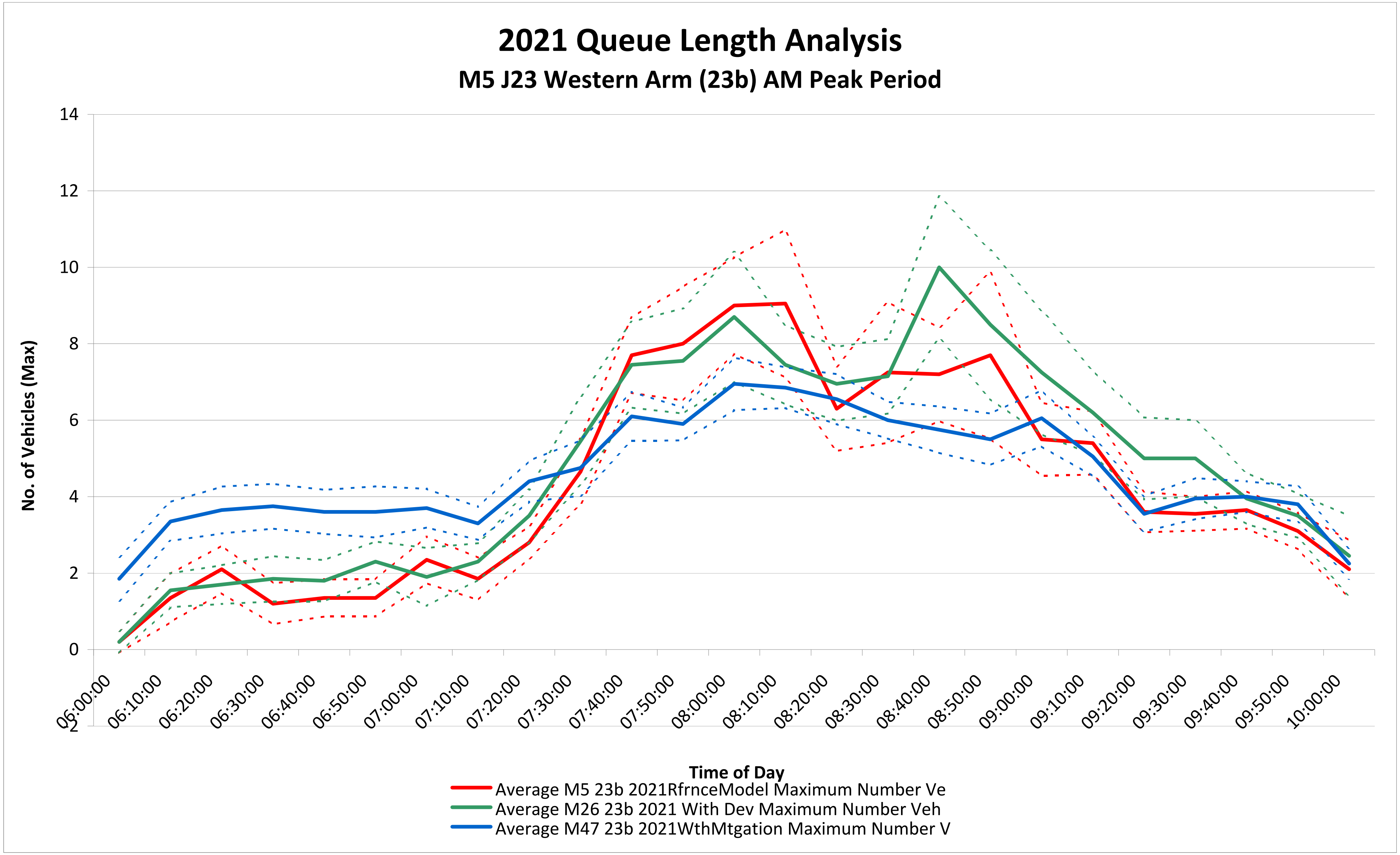
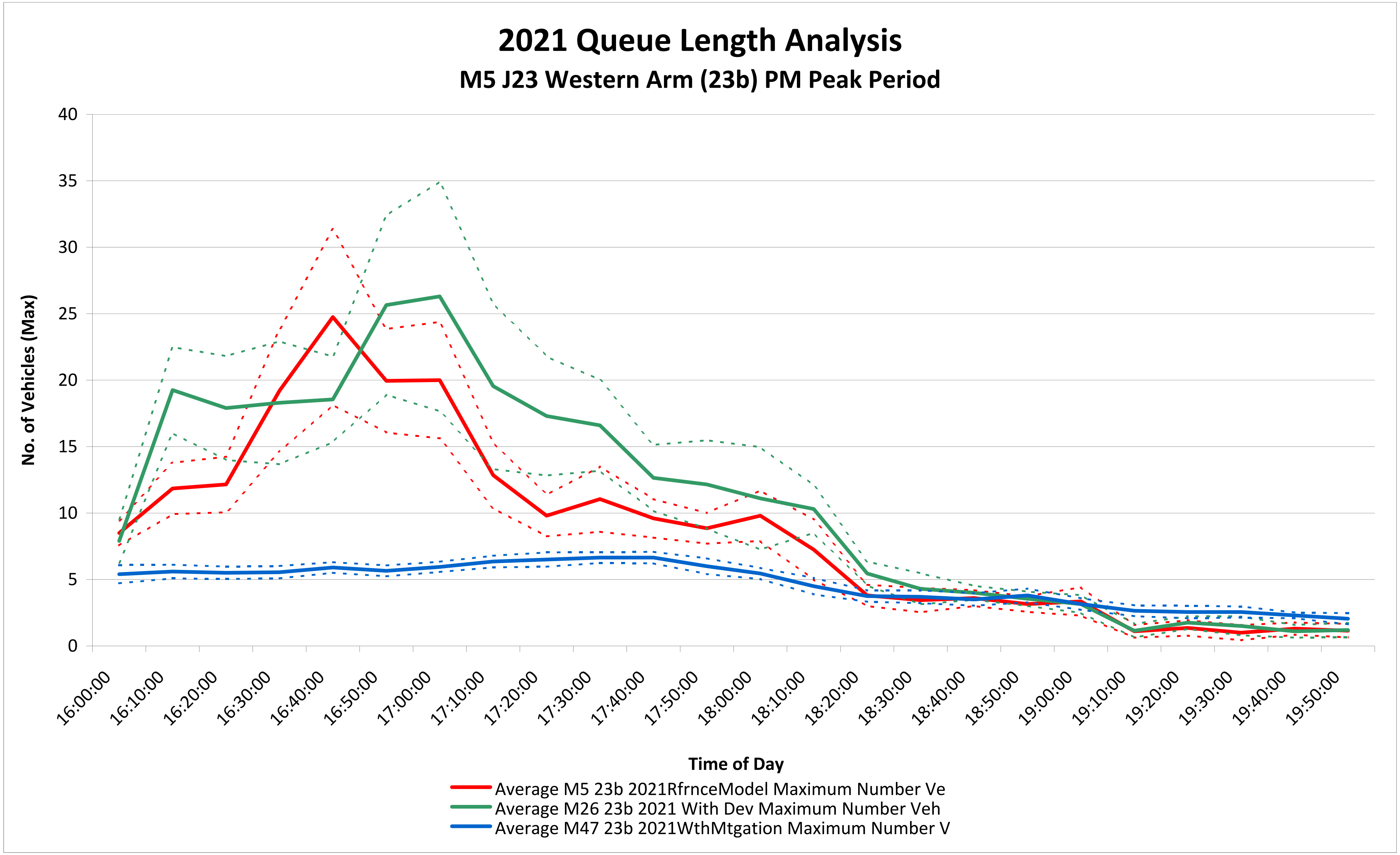
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 23b 2021RfrnceModel Maximum Number Ve
Average M26 23b 2021 With Dev Maximum Number Veh
Average M47 23b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J23 Western Arm (23b) AM Peak Period
No. of Vehicles (Max)
14
12
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 23b 2021RfrnceModel Maximum Number Ve
Average M26 23b 2021 With Dev Maximum Number Veh
Average M47 23b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J23 Western Arm (23b) PM Peak Period
No. of Vehicles (Max)
40
35
30
25
20
15
10
5
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
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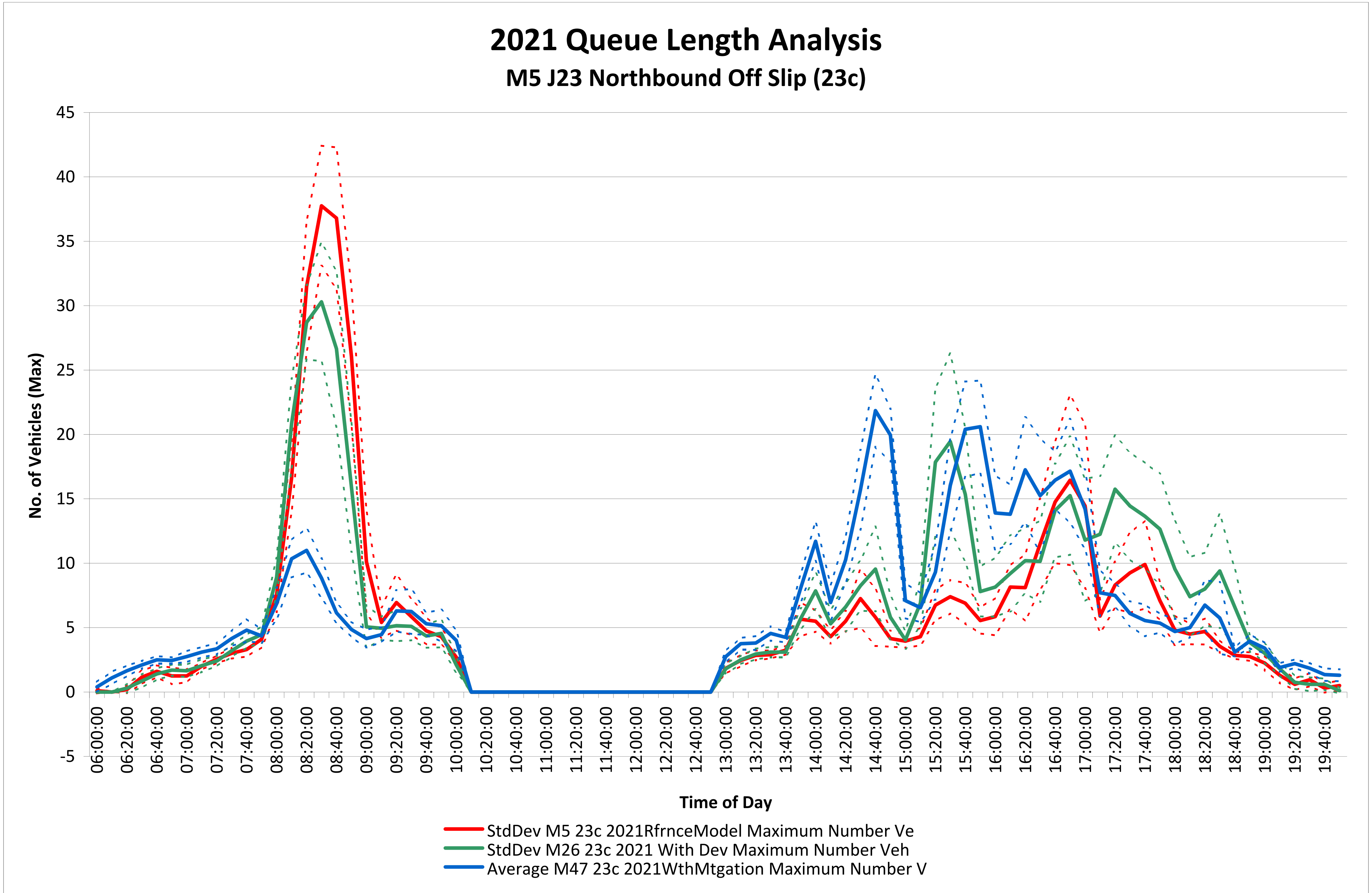
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 23b 2021RfrnceModel Maximum Number Ve
Average M26 23b 2021 With Dev Maximum Number Veh
Average M47 23b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J23 Northbound Off Slip (23c)
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
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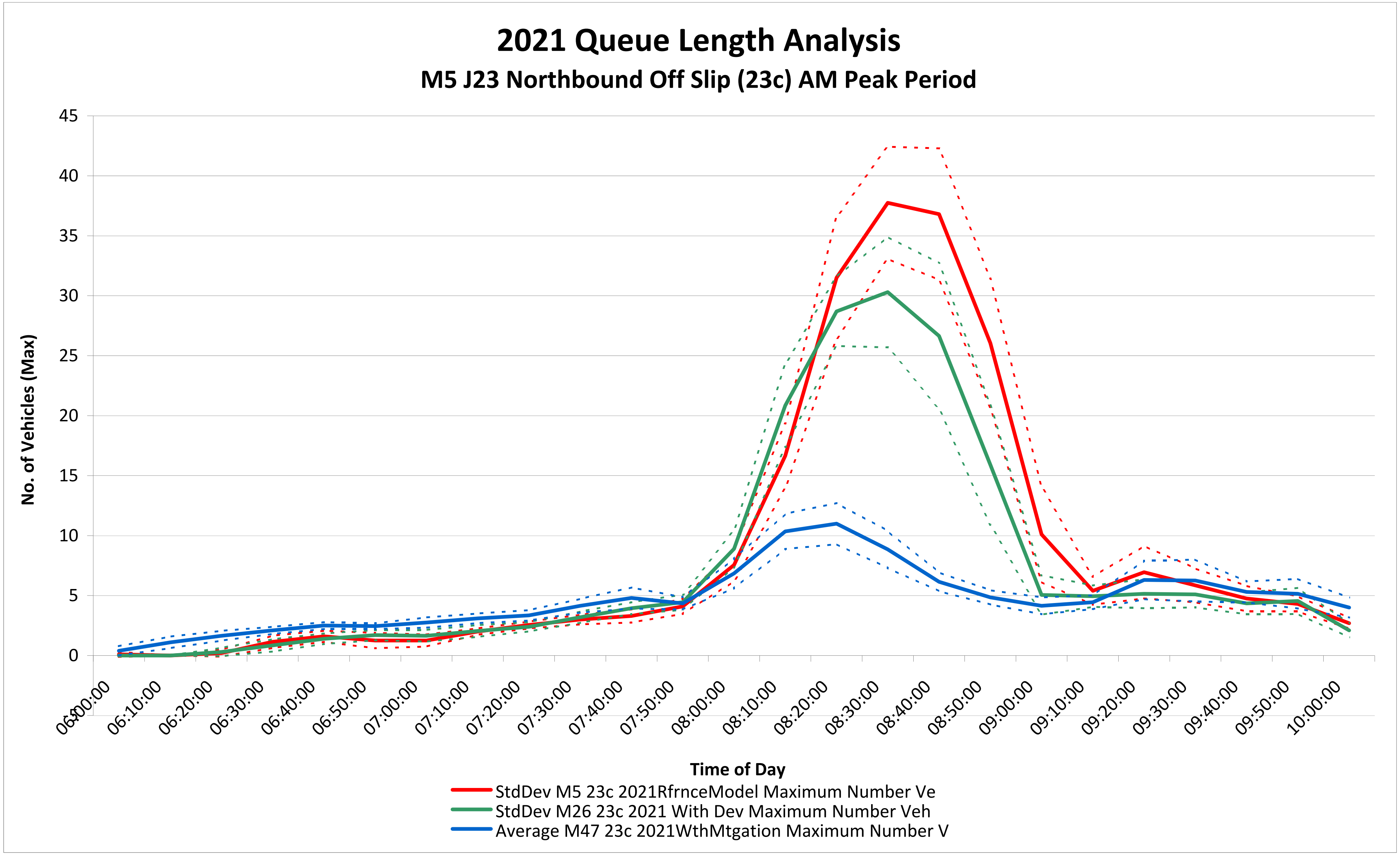
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 23c 2021RfrnceModel Maximum Number Ve
StdDev M26 23c 2021 With Dev Maximum Number Veh
Average M47 23c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J23 Northbound Off Slip (23c) AM Peak Period
No. of Vehicles (Max)
45
40
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
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07:50:00
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08:10:00
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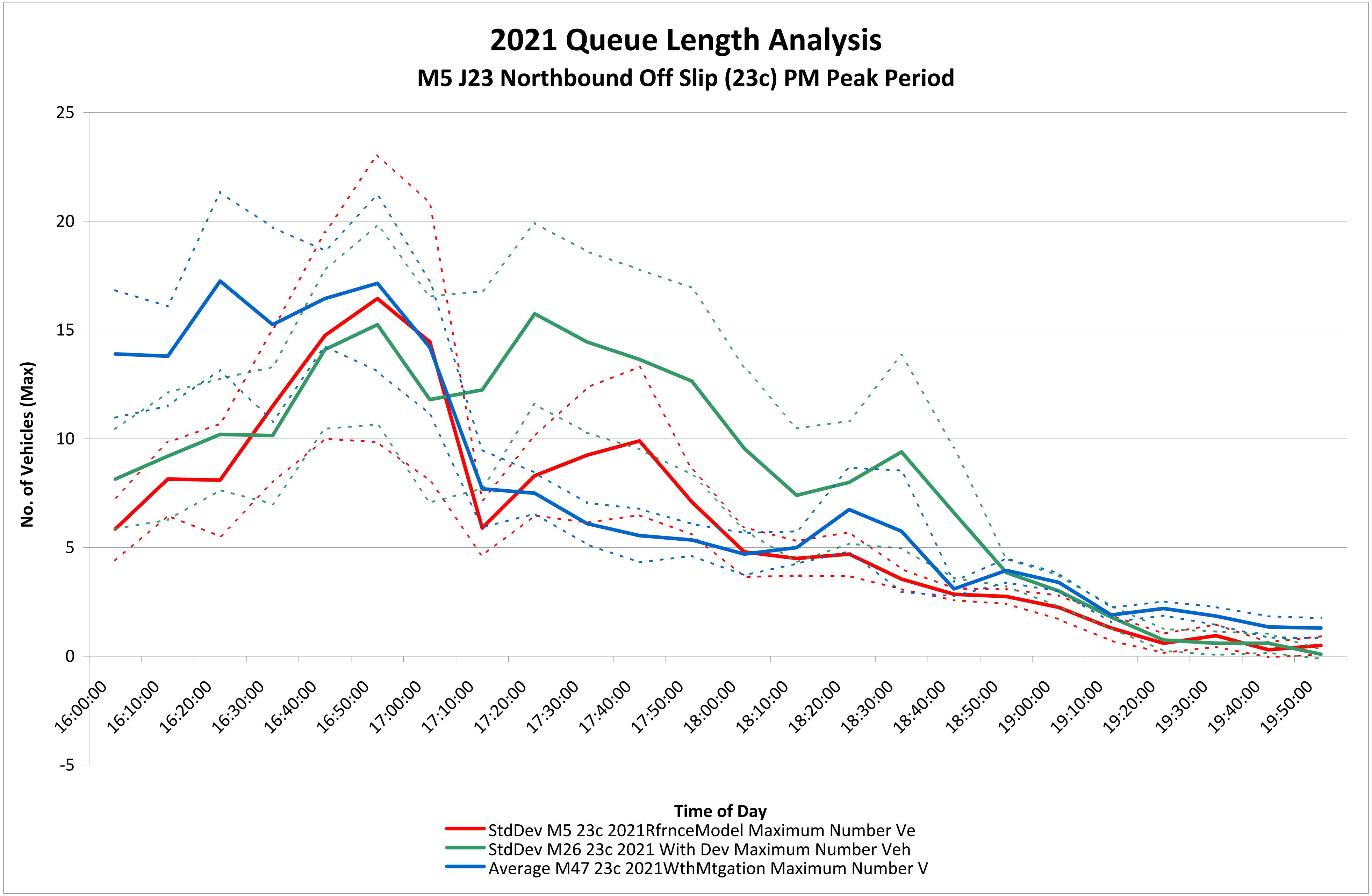
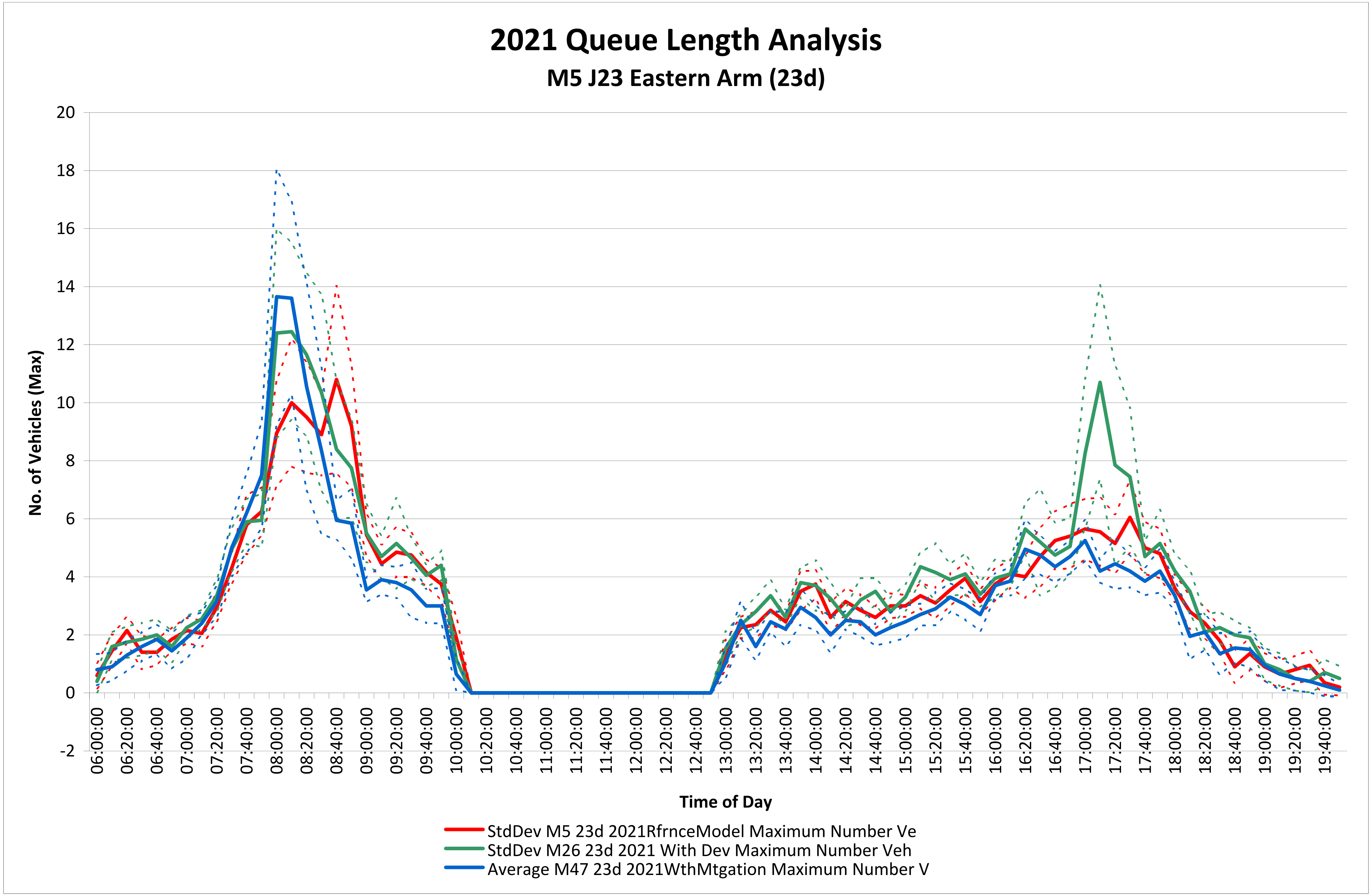
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 23c 2021RfrnceModel Maximum Number Ve
StdDev M26 23c 2021 With Dev Maximum Number Veh
Average M47 23c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J23 Northbound Off Slip (23c) PM Peak Period
No. of Vehicles (Max)
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 23c 2021RfrnceModel Maximum Number Ve
StdDev M26 23c 2021 With Dev Maximum Number Veh
Average M47 23c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J23 Eastern Arm (23d)
No. of Vehicles (Max)
20
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
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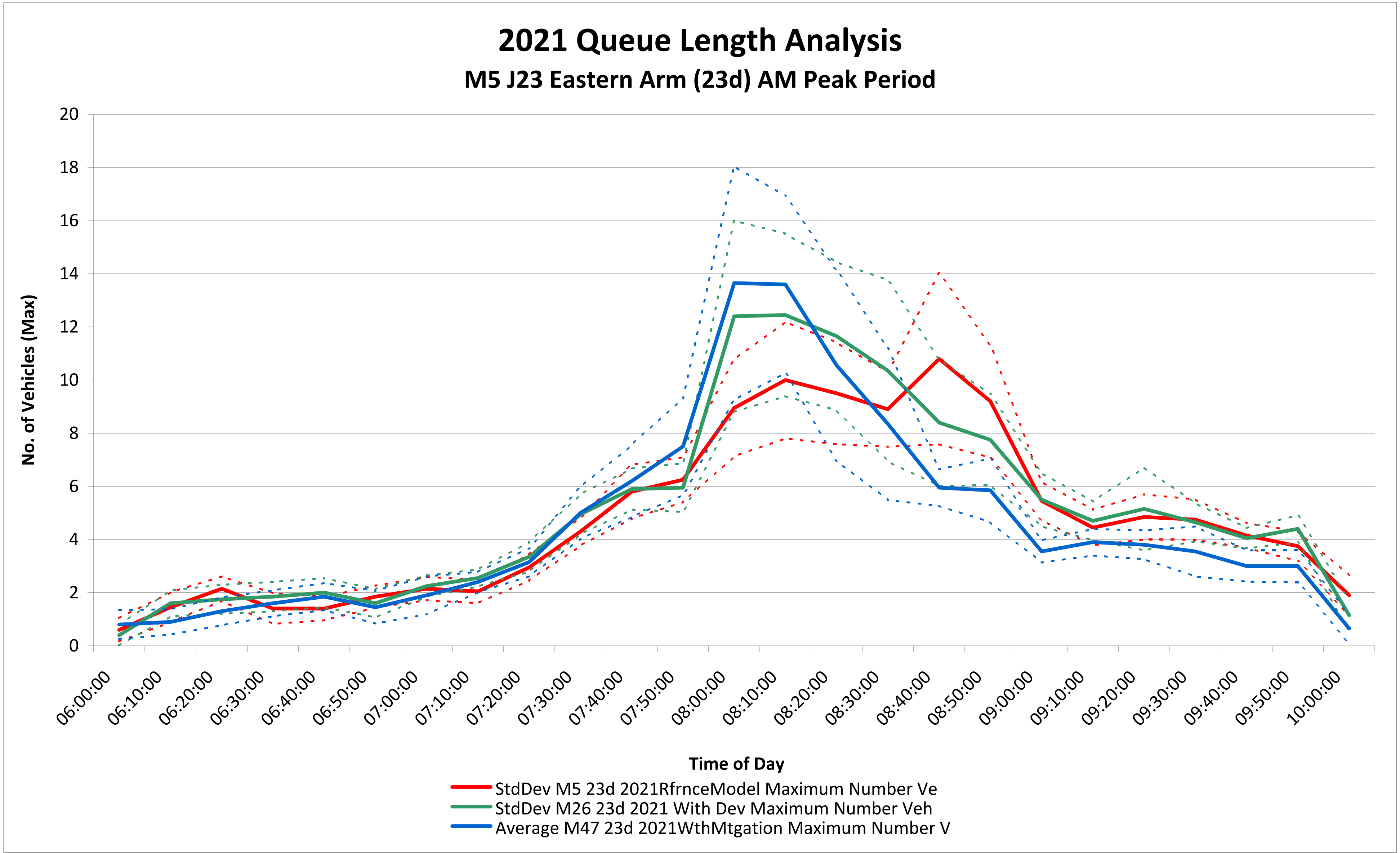
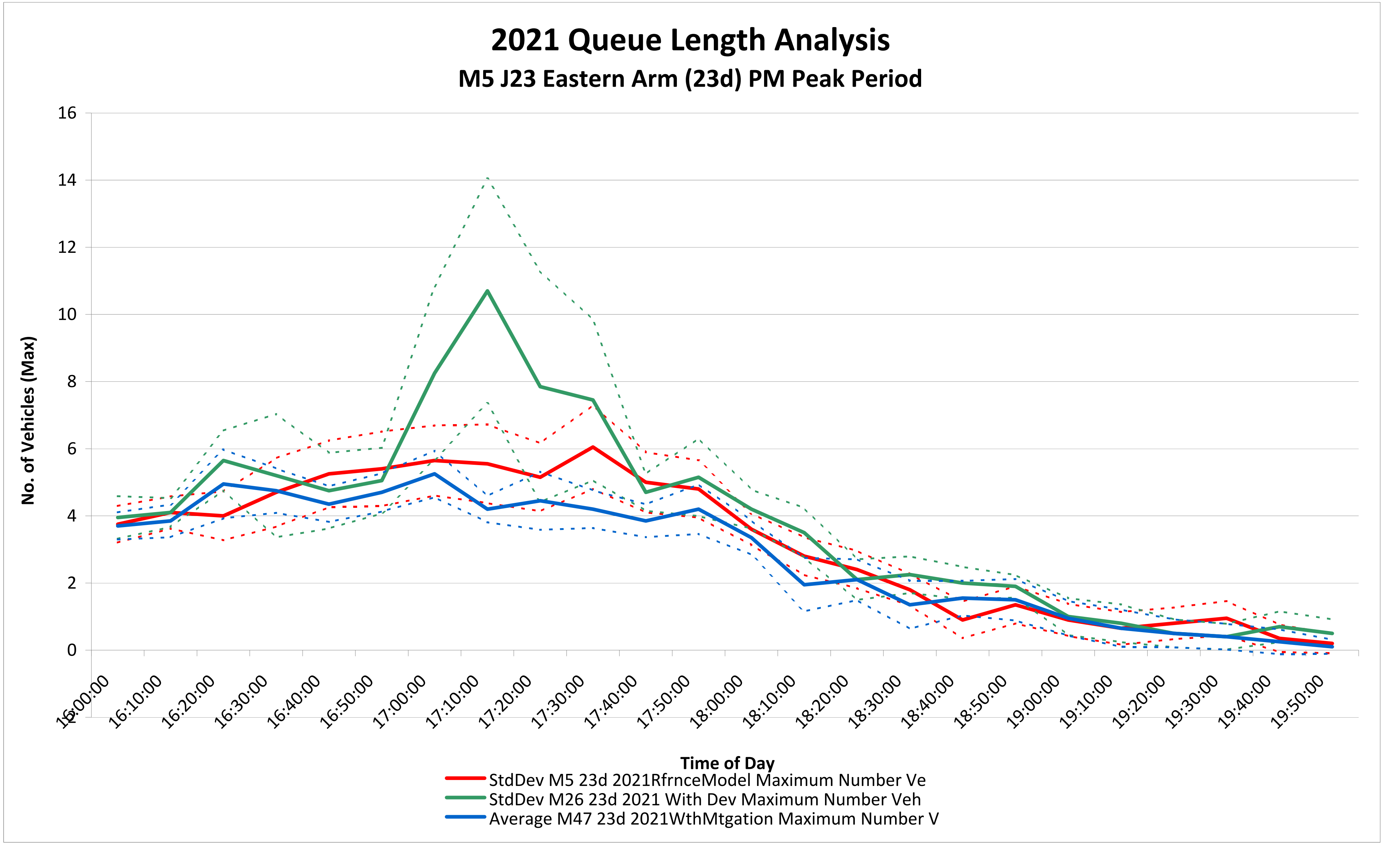
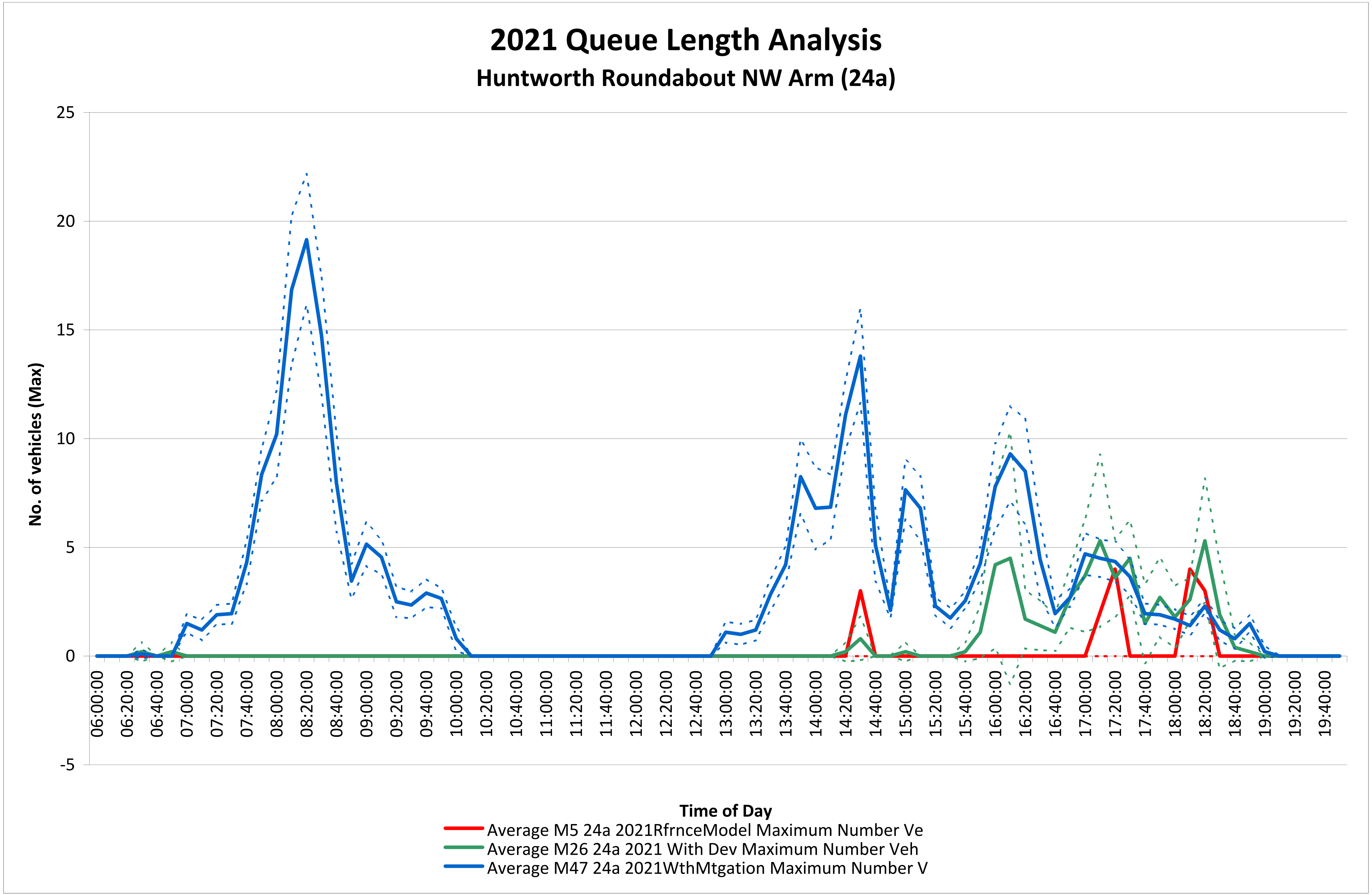
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 23d 2021RfrnceModel Maximum Number Ve
StdDev M26 23d 2021 With Dev Maximum Number Veh
Average M47 23d 2021WthMtgation Maximum Number V

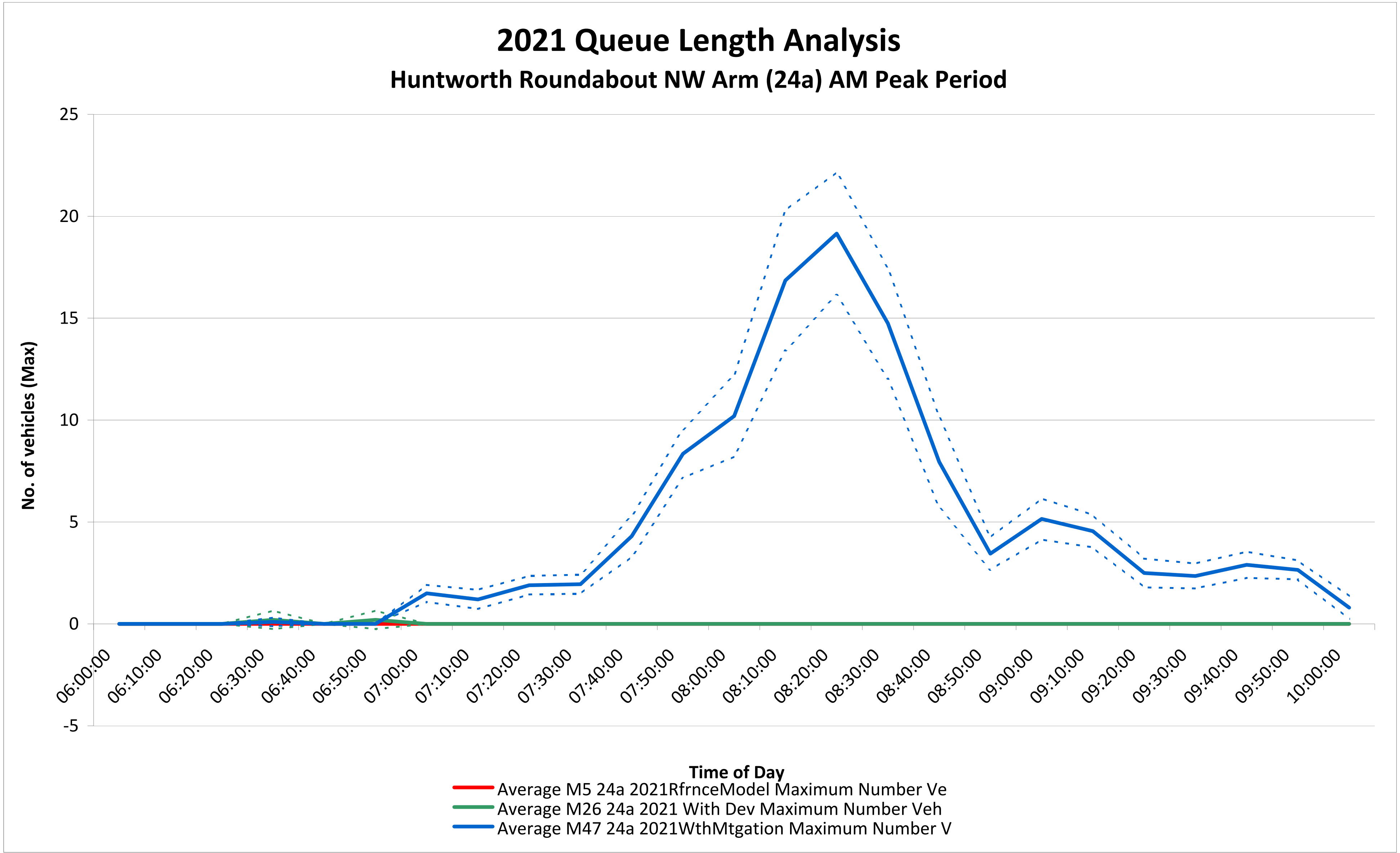


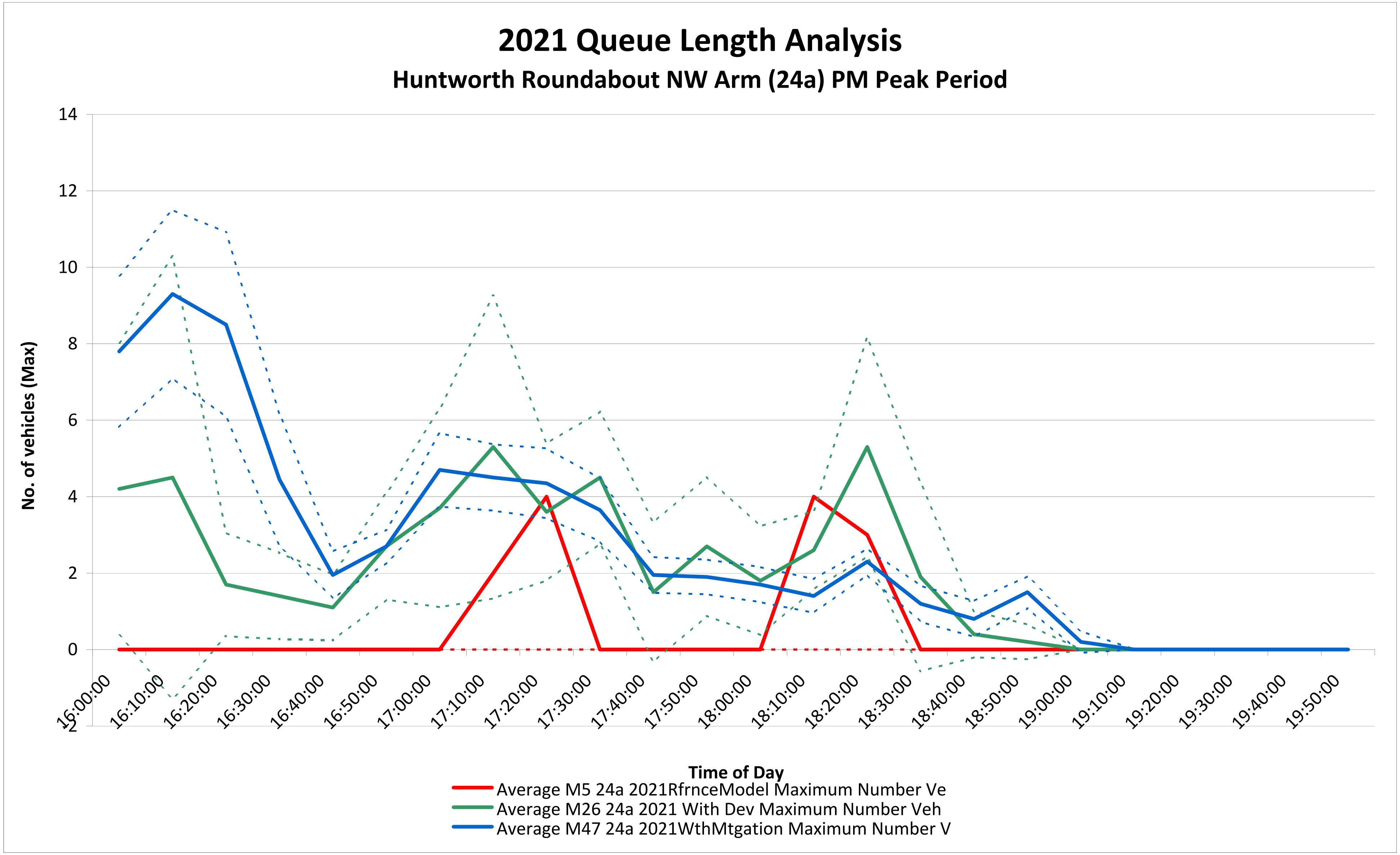
2021 Queue Length Analysis
M5 J23 Eastern Arm (23d) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 23d 2021RfrnceModel Maximum Number Ve
StdDev M26 23d 2021 With Dev Maximum Number Veh
Average M47 23d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J23 Eastern Arm (23d) PM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 23d 2021RfrnceModel Maximum Number Ve
StdDev M26 23d 2021 With Dev Maximum Number Veh
Average M47 23d 2021WthMtgation Maximum Number V

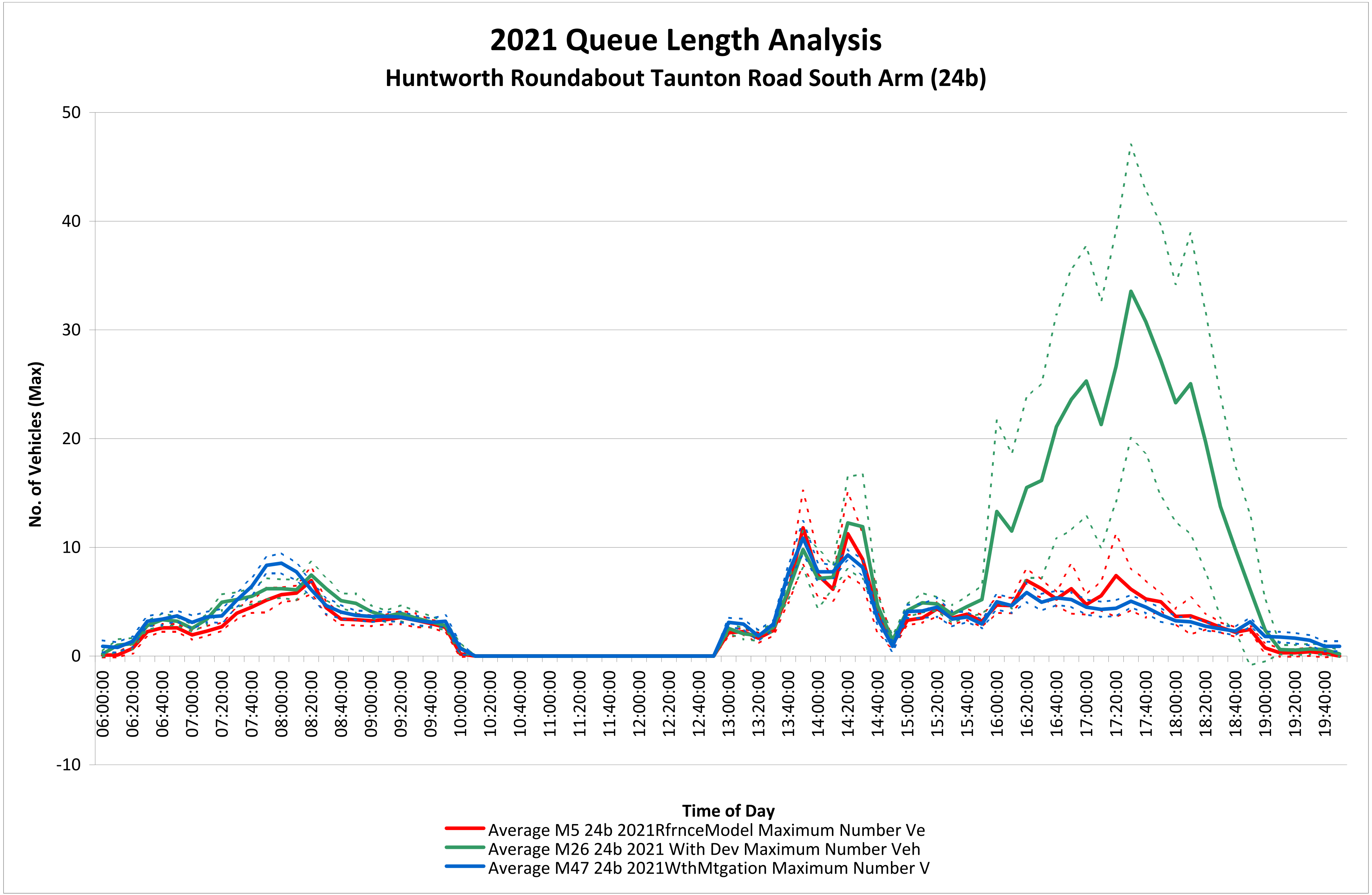


2021 Queue Length Analysis
Huntworth Roundabout NW Arm (24a)
No. of vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 24a 2021RfrnceModel Maximum Number Ve
Average M26 24a 2021 With Dev Maximum Number Veh
Average M47 24a 2021WthMtgation Maximum Number V

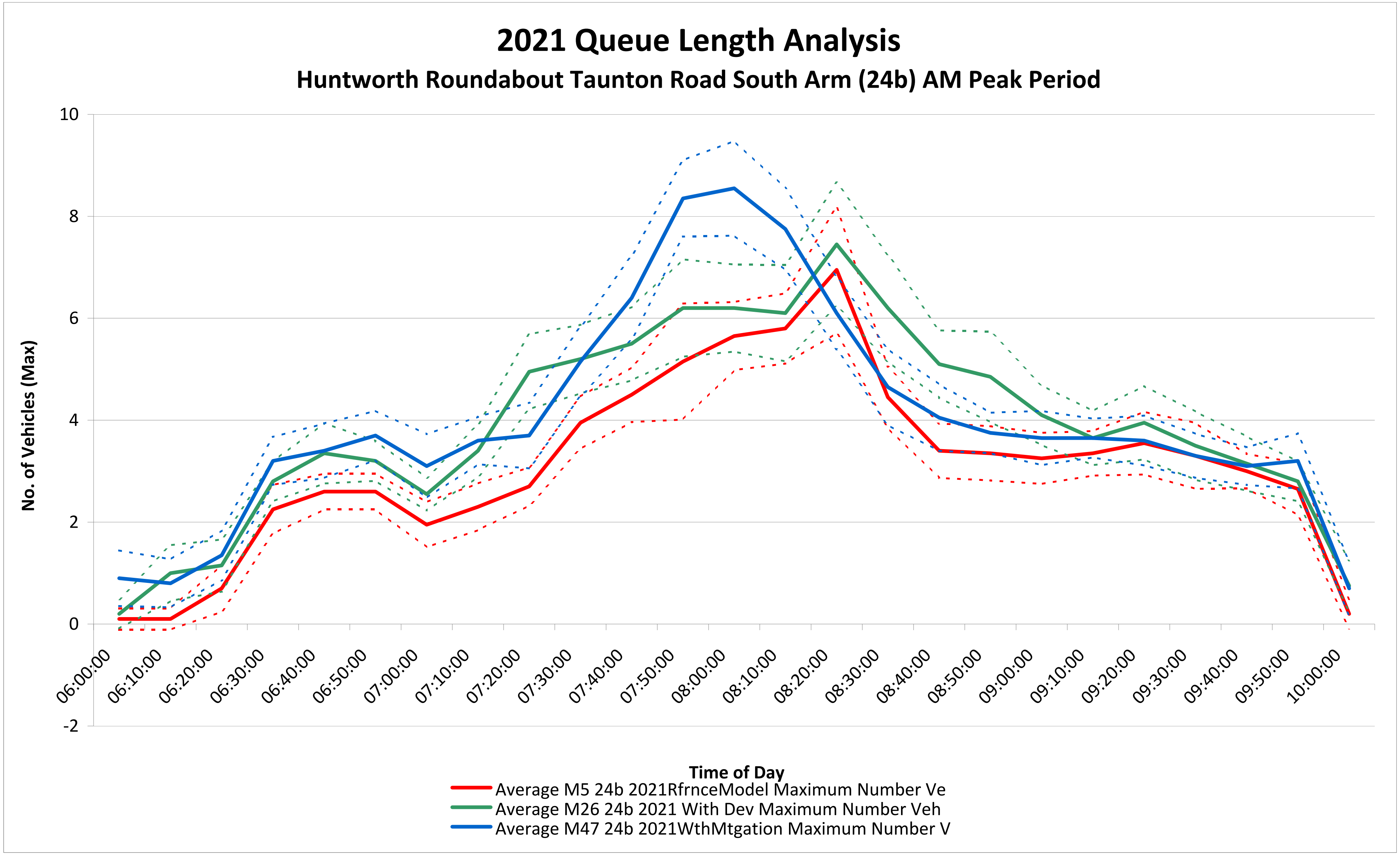

2021 Queue Length Analysis
Huntworth Roundabout NW Arm (24a) AM Peak Period
No. of vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 24a 2021RfrnceModel Maximum Number Ve
Average M26 24a 2021 With Dev Maximum Number Veh
Average M47 24a 2021WthMtgation Maximum Number V



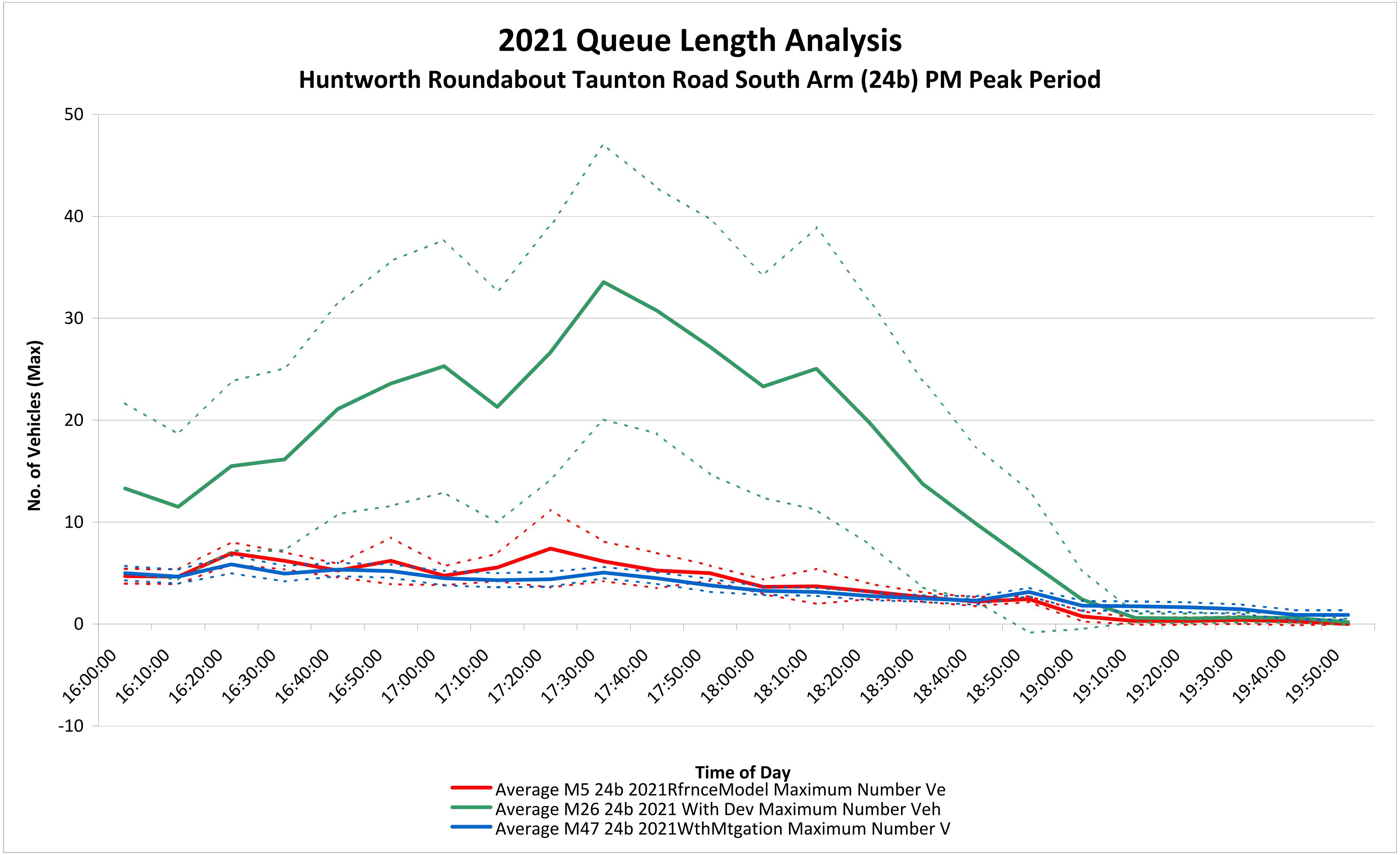
2021 Queue Length Analysis
Huntworth Roundabout NW Arm (24a) PM Peak Period
No. of vehicles (Max)
14
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 24a 2021RfrnceModel Maximum Number Ve
Average M26 24a 2021 With Dev Maximum Number Veh
Average M47 24a 2021WthMtgation Maximum Number V



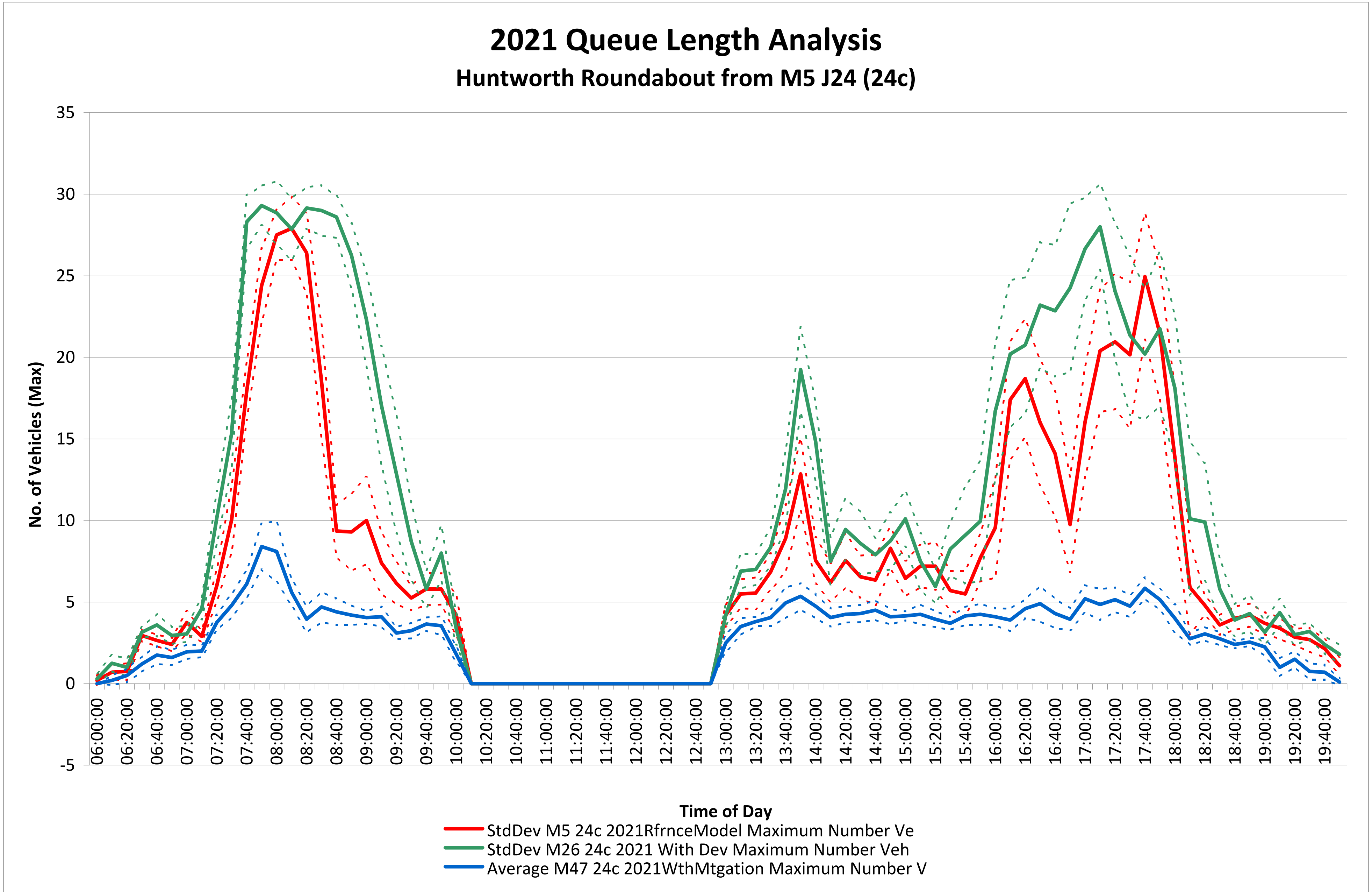
2021 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b)
No. of Vehicles (Max)
50
40
30
20
10
0
-10
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 24b 2021RfrnceModel Maximum Number Ve
Average M26 24b 2021 With Dev Maximum Number Veh
Average M47 24b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b) AM Peak Period
No. of Vehicles (Max)
10
8
6
4
2
0
-2
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 24b 2021RfrnceModel Maximum Number Ve
Average M26 24b 2021 With Dev Maximum Number Veh
Average M47 24b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout Taunton Road South Arm (24b) PM Peak Period
No. of Vehicles (Max)
50
40
30
20
10
0
-10
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 24b 2021RfrnceModel Maximum Number Ve
Average M26 24b 2021 With Dev Maximum Number Veh
Average M47 24b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c)
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
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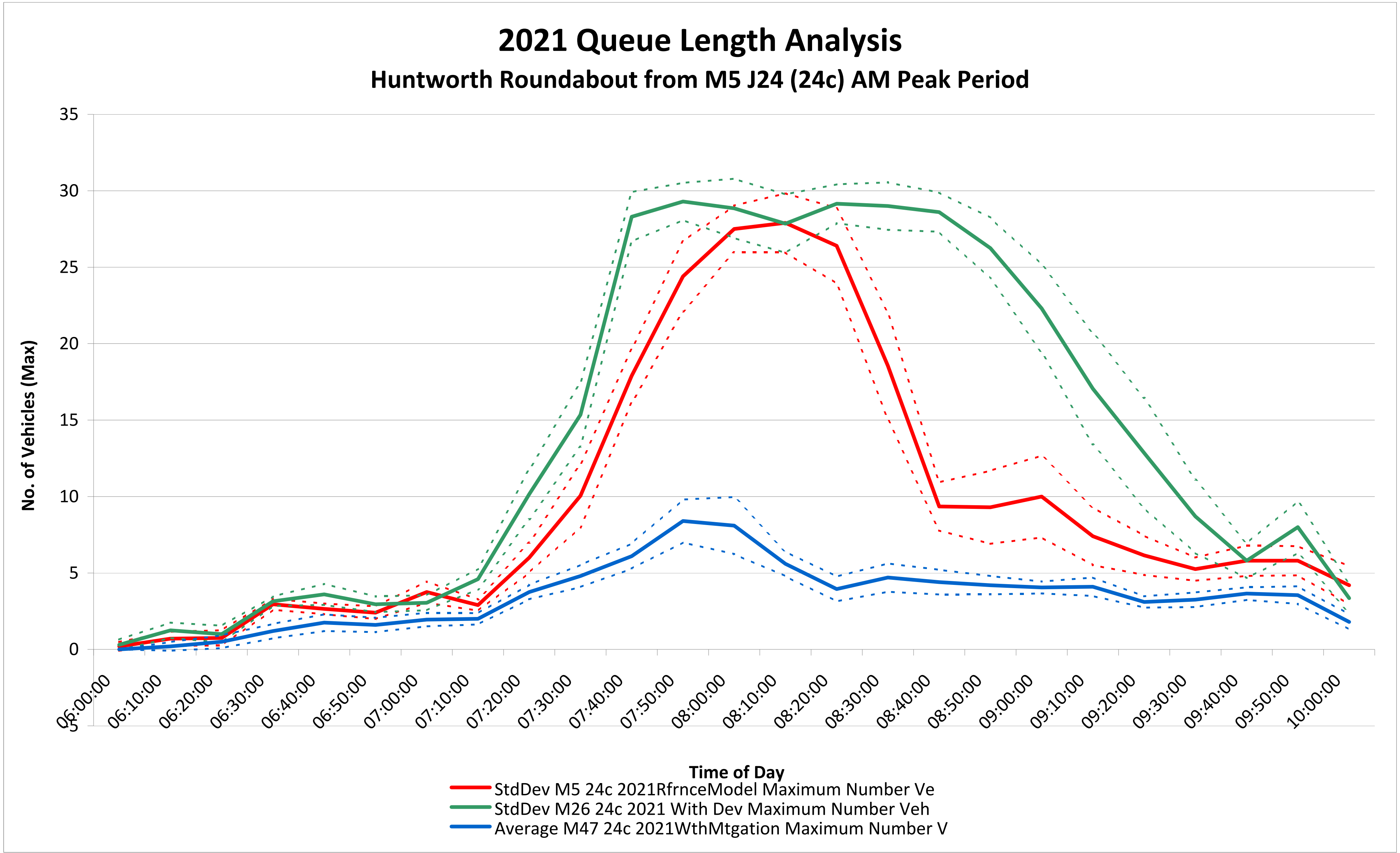
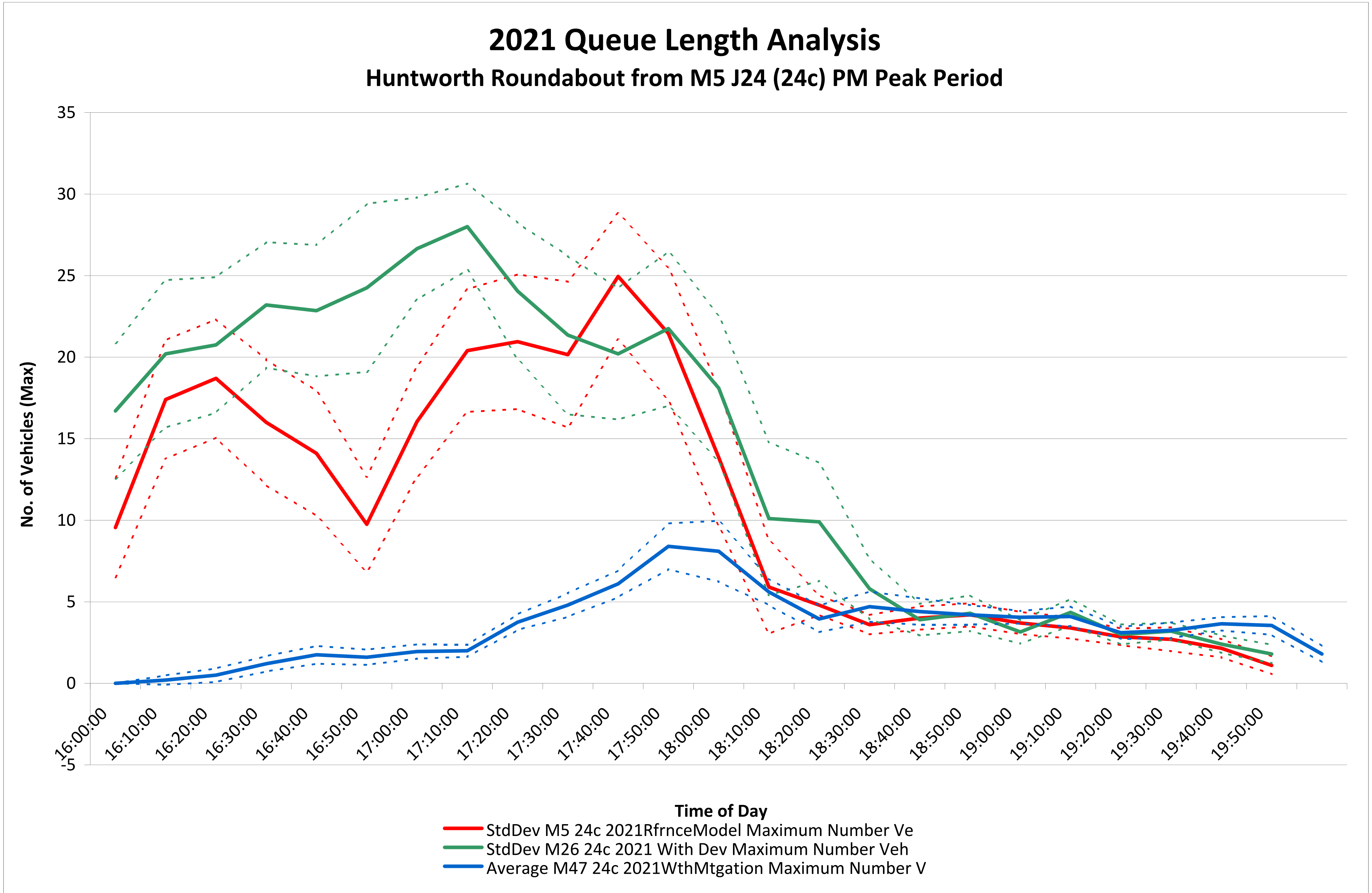
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 24c 2021RfrnceModel Maximum Number Ve
StdDev M26 24c 2021 With Dev Maximum Number Veh
Average M47 24c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c) AM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
StdDev M5 24c 2021RfrnceModel Maximum Number Ve
StdDev M26 24c 2021 With Dev Maximum Number Veh
Average M47 24c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Huntworth Roundabout from M5 J24 (24c) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
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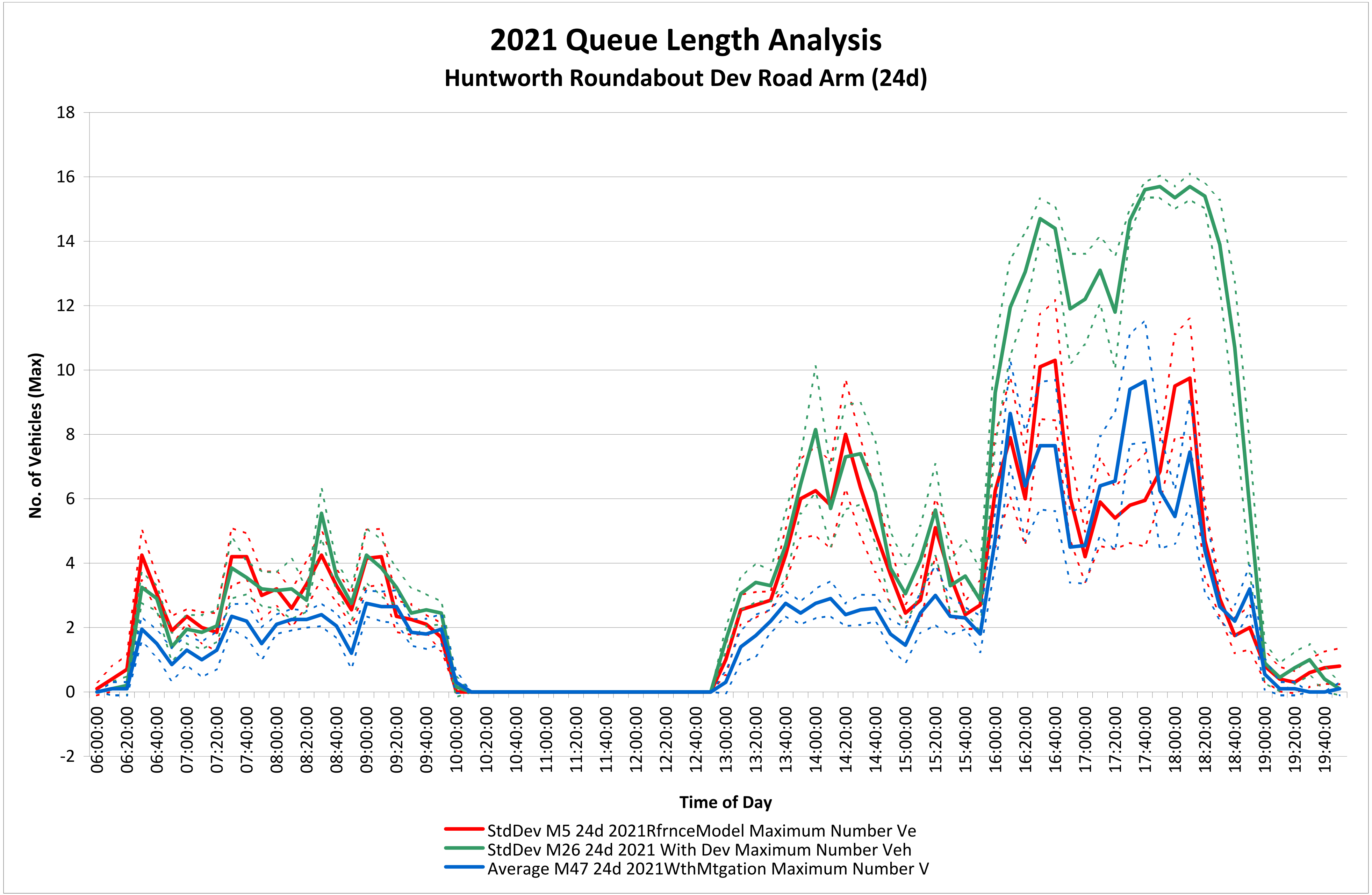
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
StdDev M5 24c 2021RfrnceModel Maximum Number Ve
StdDev M26 24c 2021 With Dev Maximum Number Veh
Average M47 24c 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d)
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
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10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
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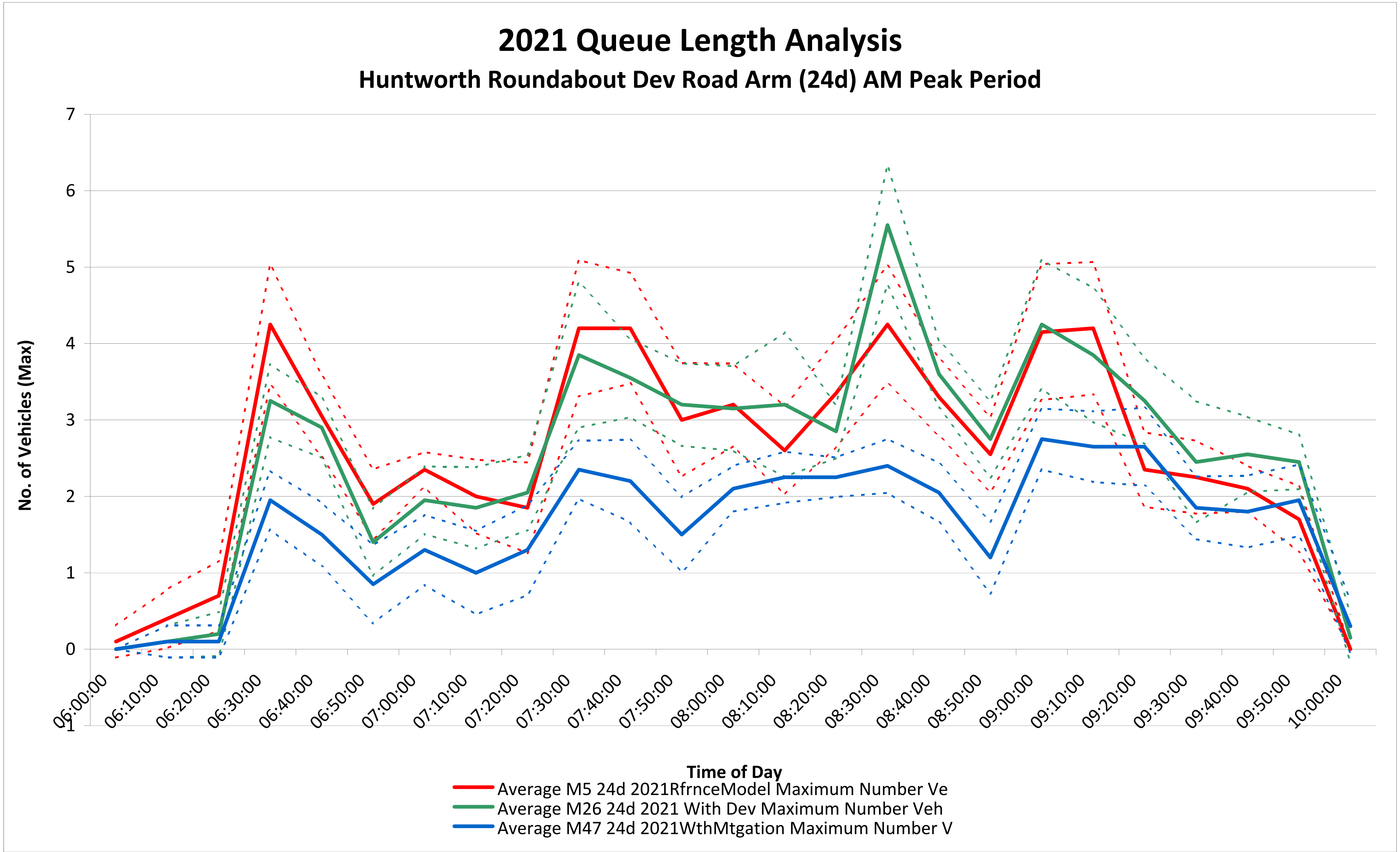
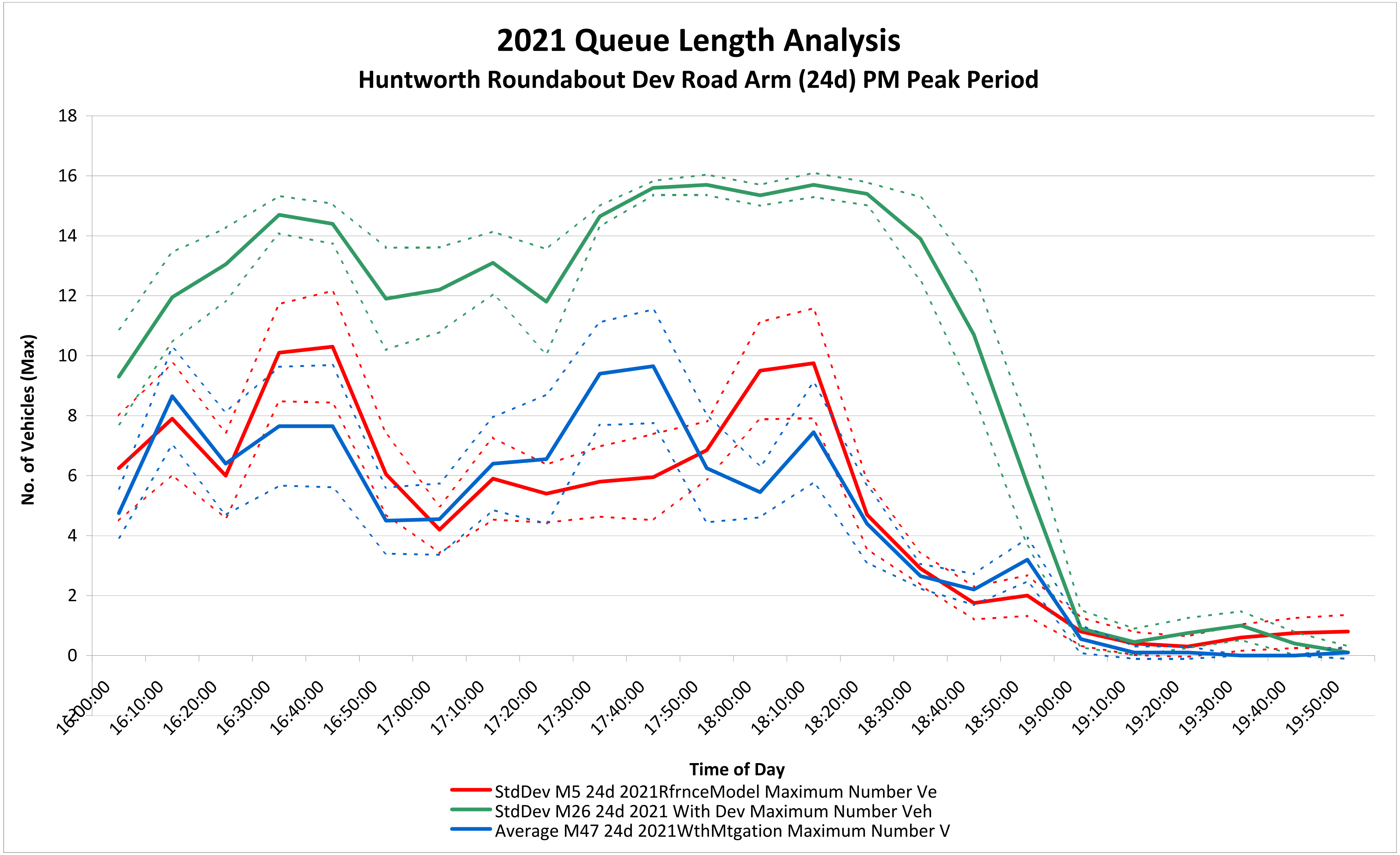
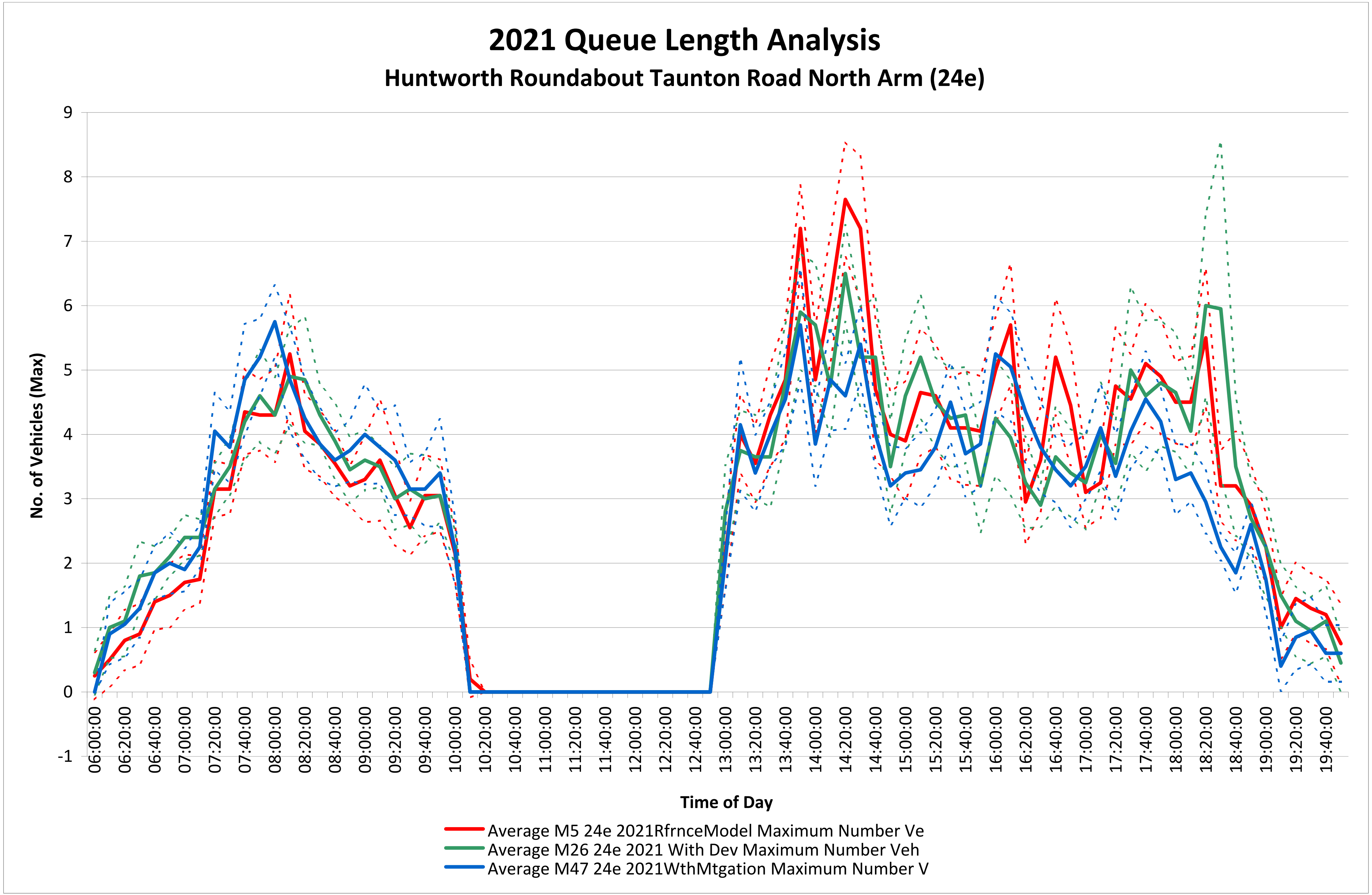
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
StdDev M5 24d 2021RfrnceModel Maximum Number Ve
StdDev M26 24d 2021 With Dev Maximum Number Veh
Average M47 24d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d) AM Peak Period
No. of Vehicles (Max)
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 24d 2021RfrnceModel Maximum Number Ve
Average M26 24d 2021 With Dev Maximum Number Veh
Average M47 24d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Huntworth Roundabout Dev Road Arm (24d) PM Peak Period
No. of Vehicles (Max)
Time of Day
StdDev M5 24d 2021RfrnceModel Maximum Number Ve
StdDev M26 24d 2021 With Dev Maximum Number Veh
Average M47 24d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e)
No. of Vehicles (Max)
9
8
7
6
5
4
3
2
1
0
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
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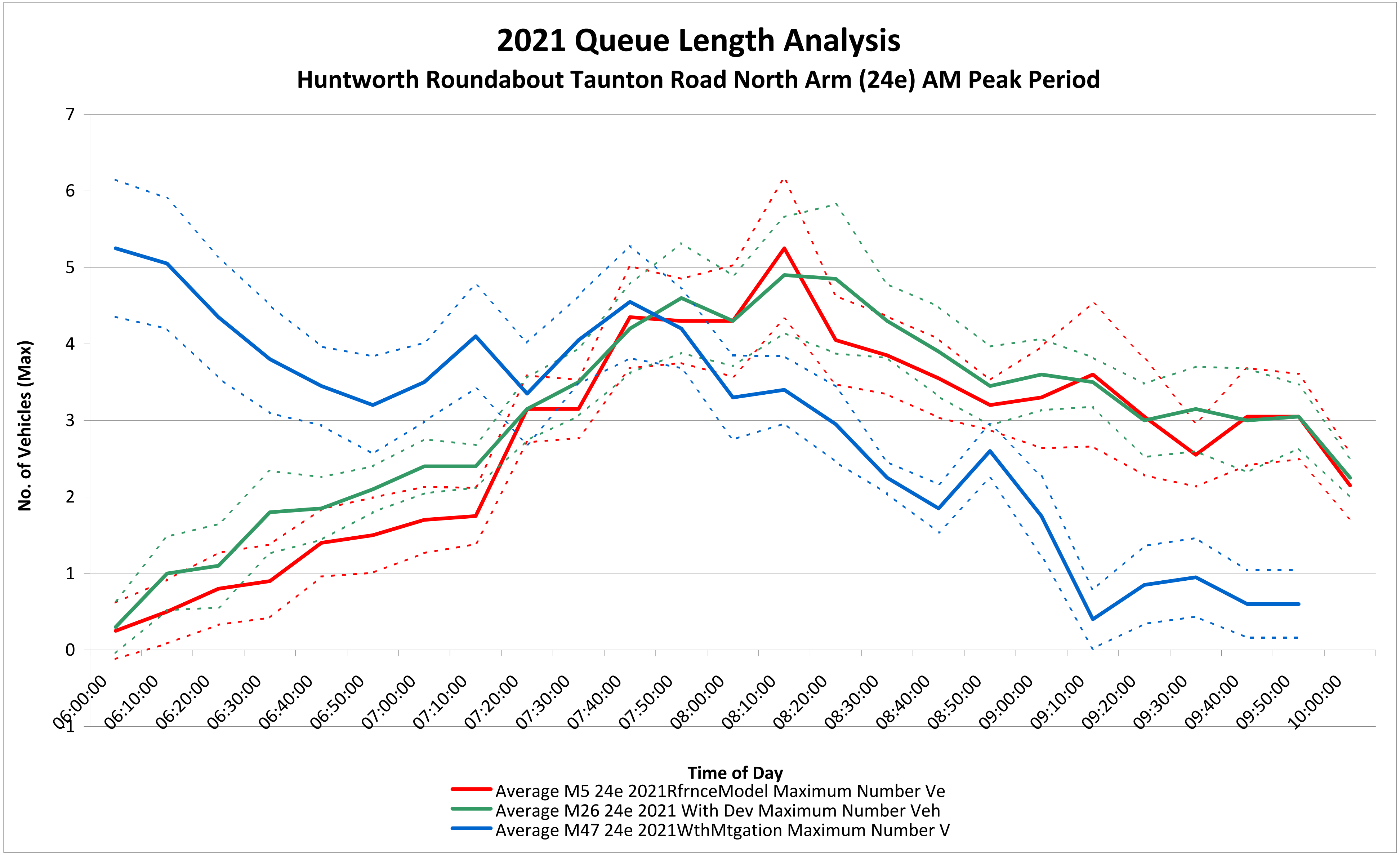
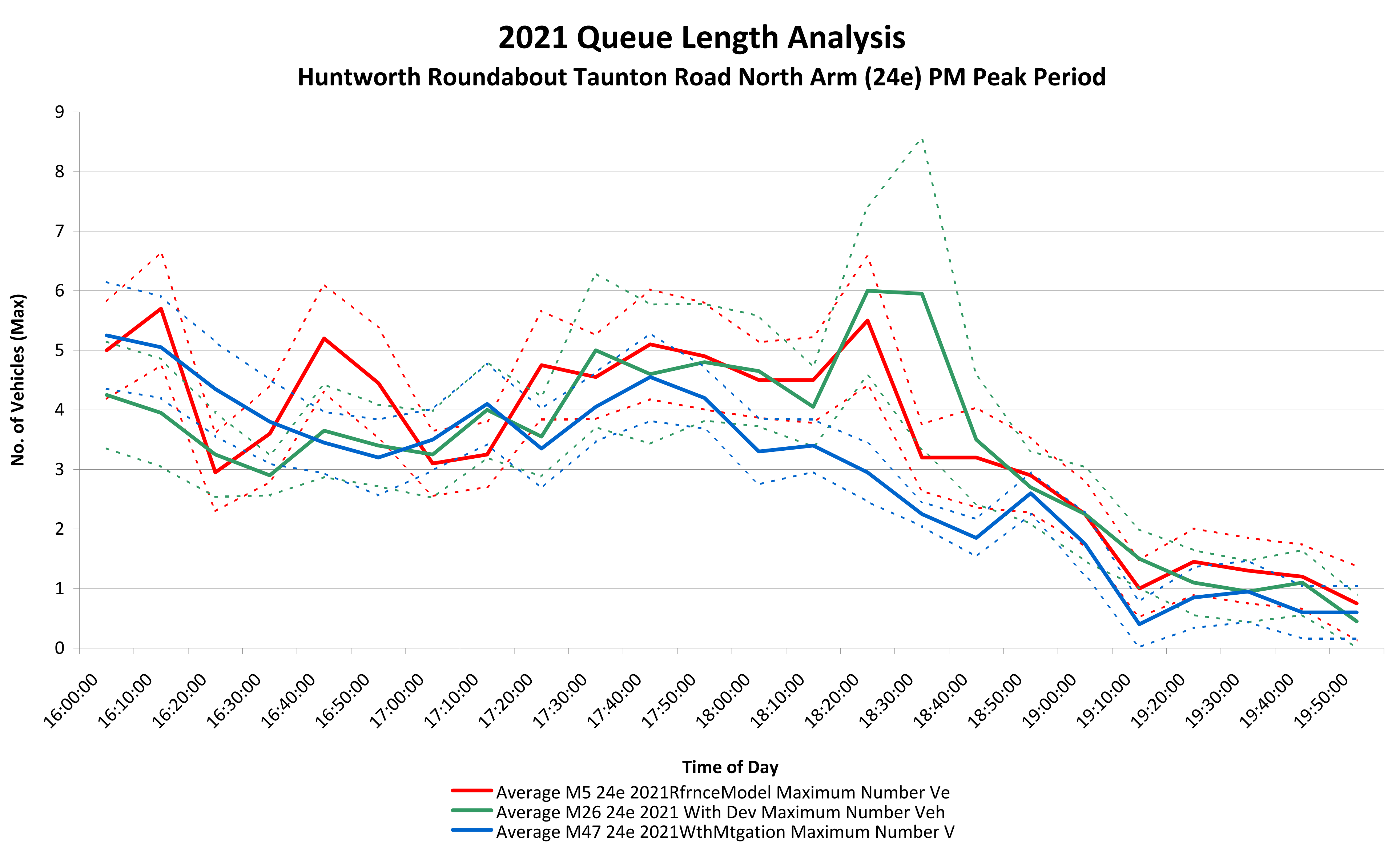
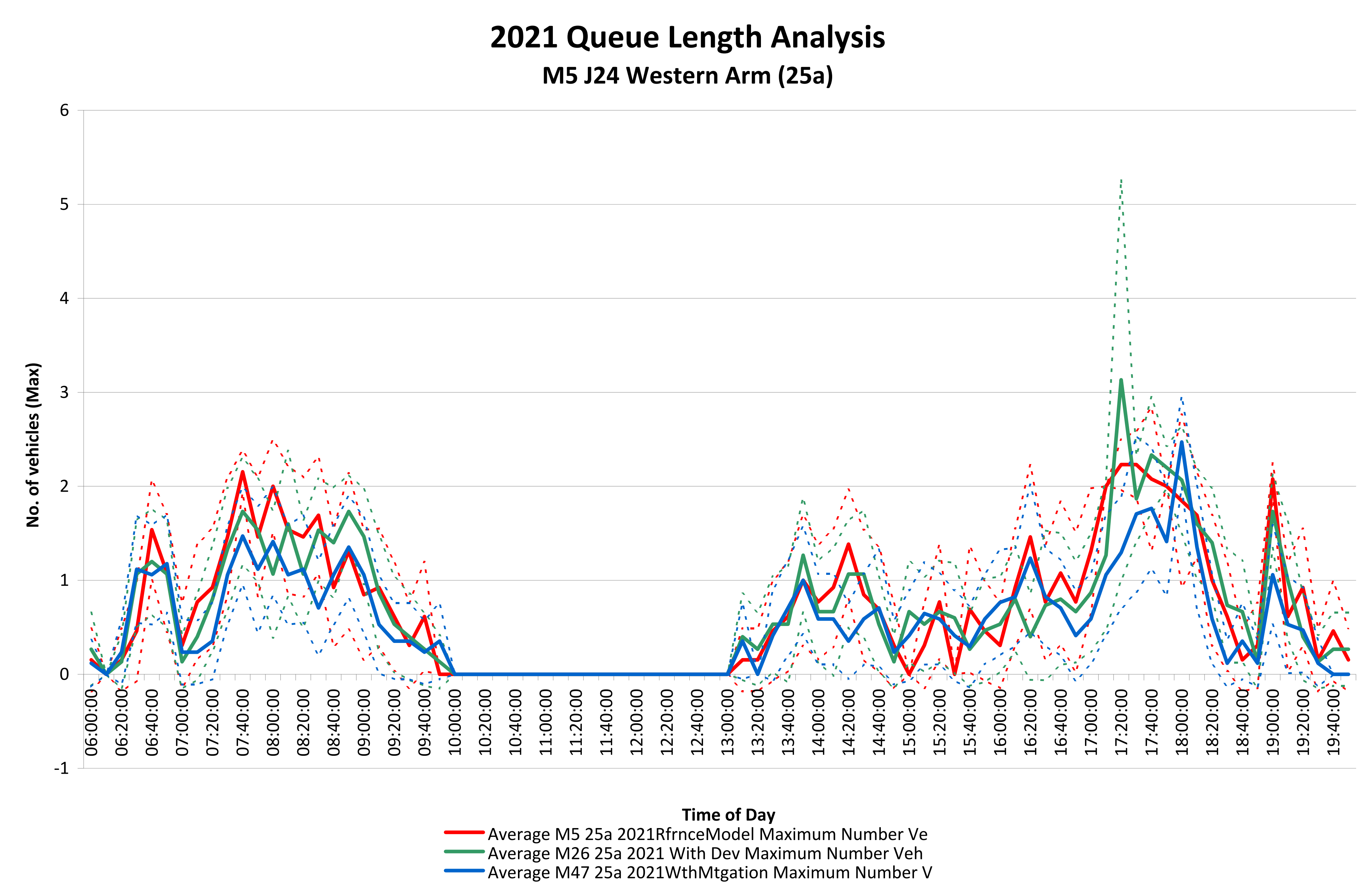
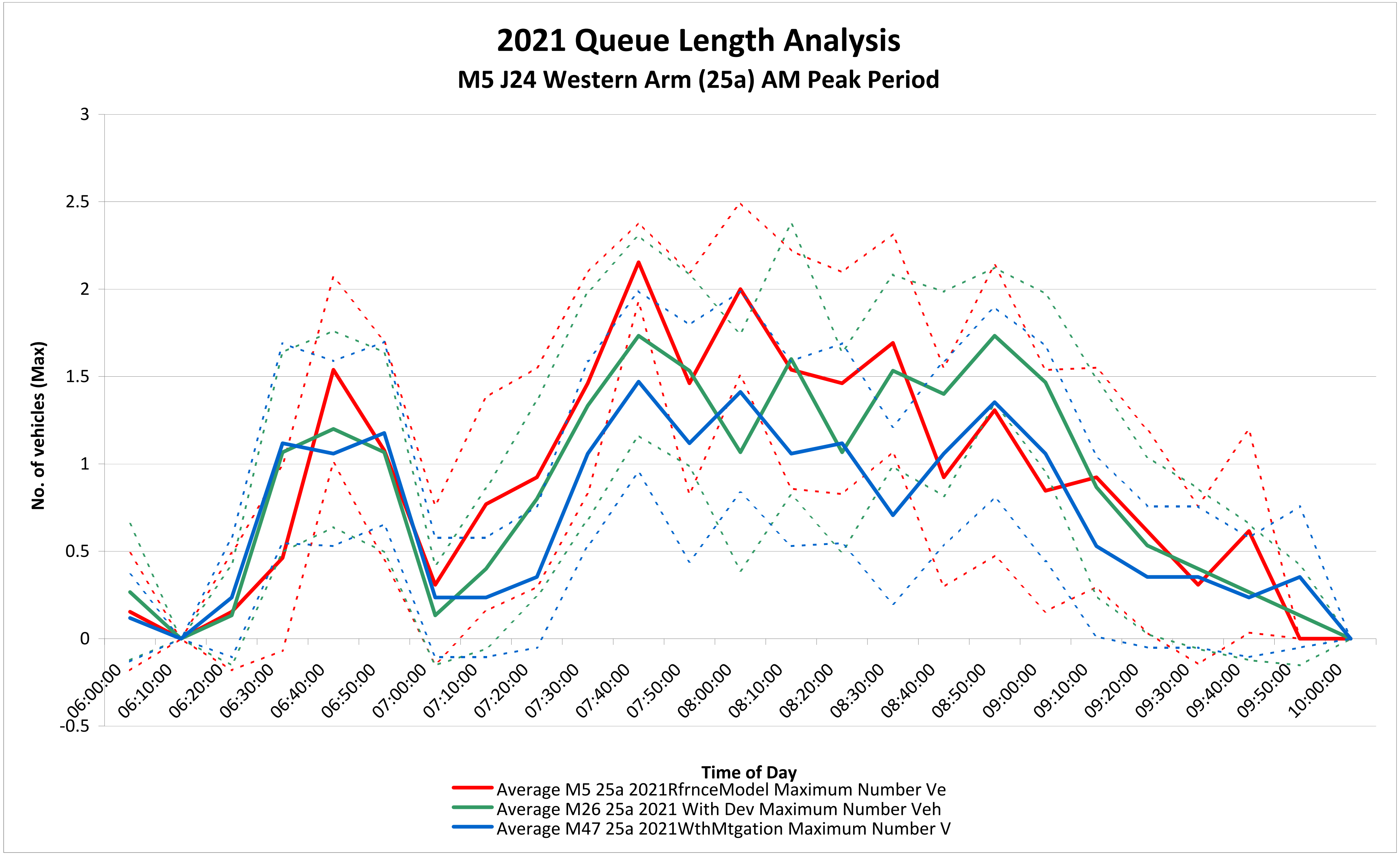
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 24e 2021RfrnceModel Maximum Number Ve
Average M26 24e 2021 With Dev Maximum Number Veh
Average M47 24e 2021WthMtgation Maximum Number V

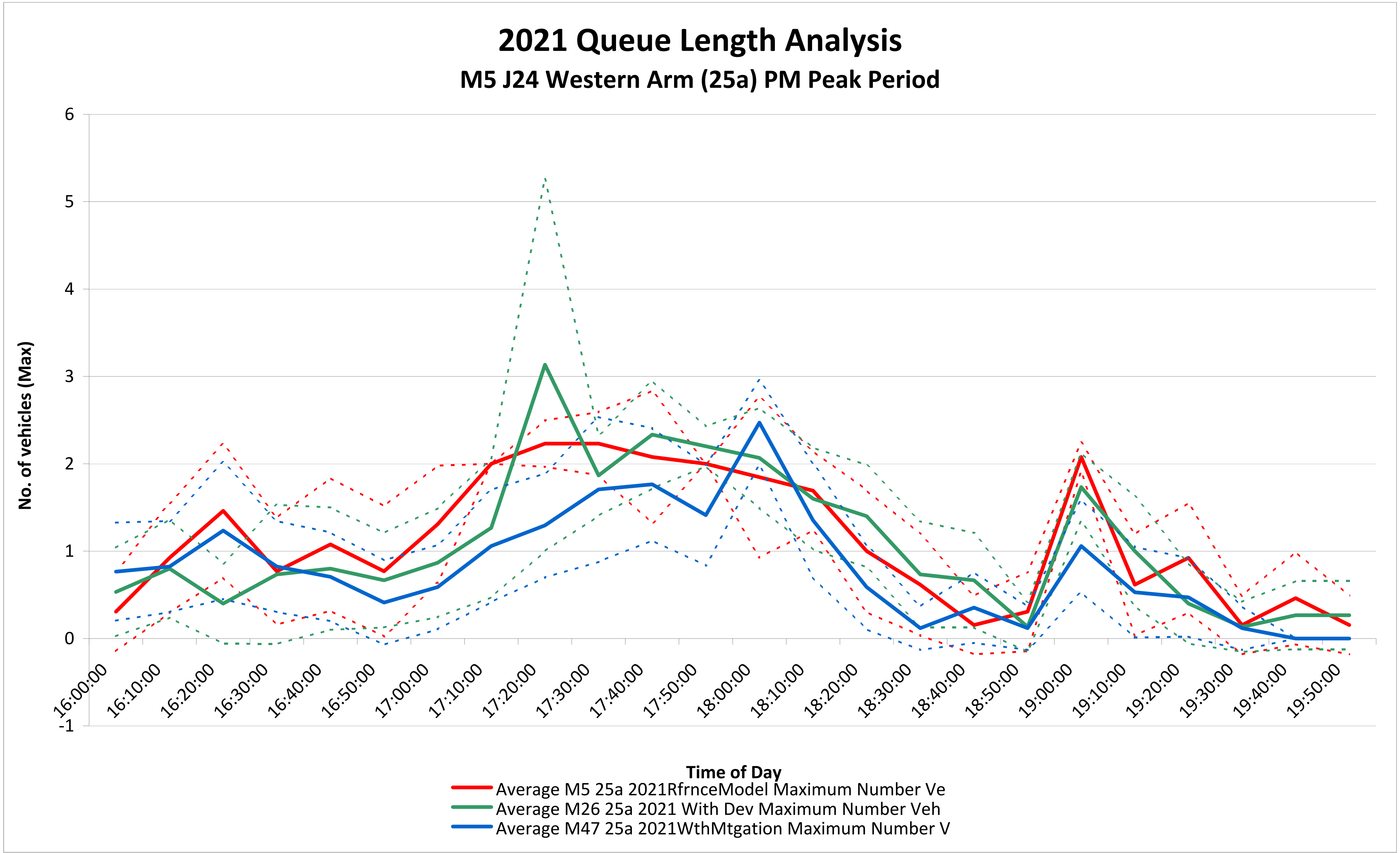

2021 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e) AM Peak Period
No. of Vehicles (Max)
7
6
5
4
3
2
1
0
-1
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 24e 2021RfrnceModel Maximum Number Ve
Average M26 24e 2021 With Dev Maximum Number Veh
Average M47 24e 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Huntworth Roundabout Taunton Road North Arm (24e) PM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 24e 2021RfrnceModel Maximum Number Ve
Average M26 24e 2021 With Dev Maximum Number Veh
Average M47 24e 2021WthMtgation Maximum Number V

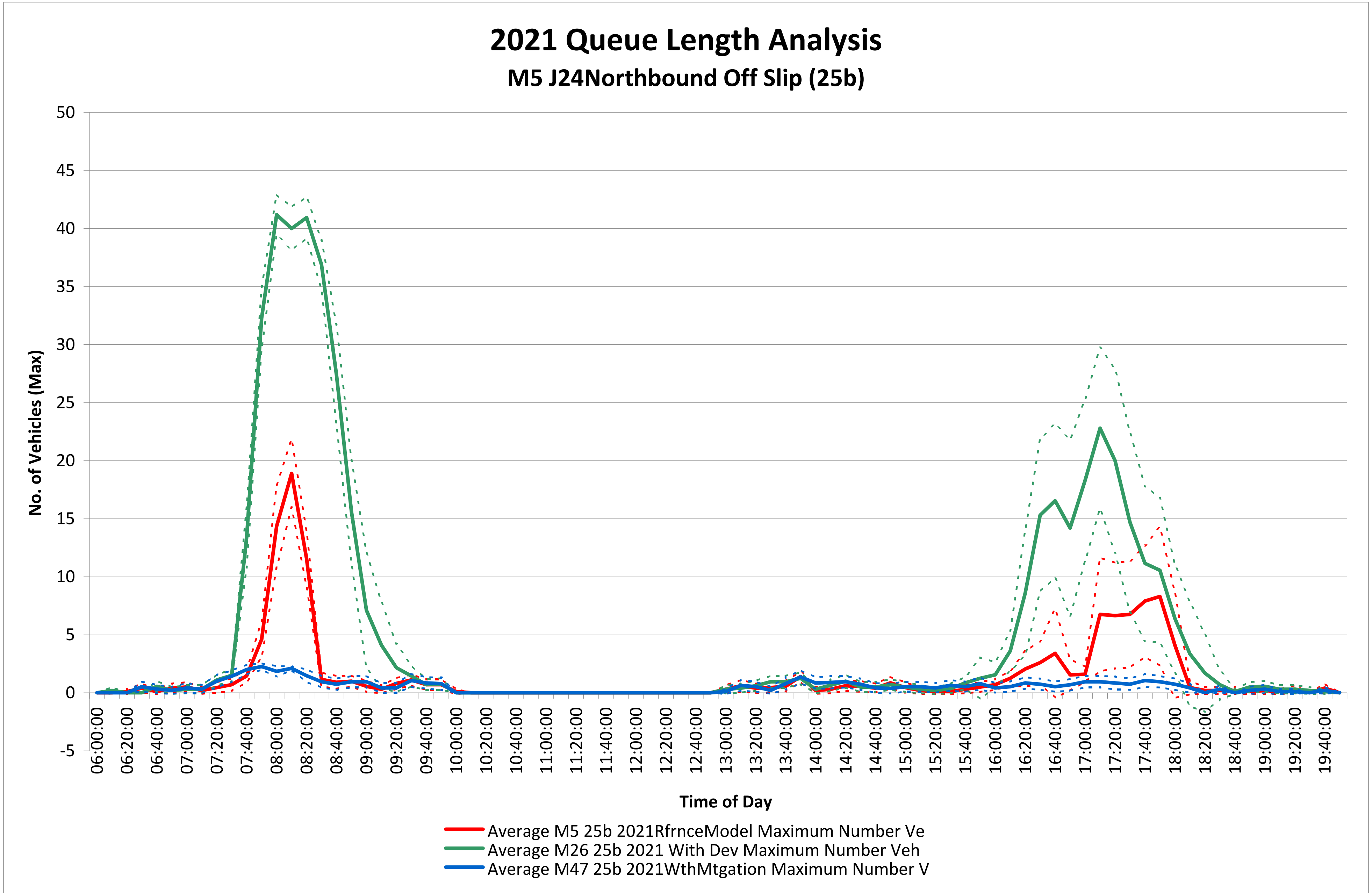


2021 Queue Length Analysis
M5 J24 Western Arm (25a)
No. of vehicles (Max)
6
5
4
3
2
1
0
-1
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 25a 2021RfrnceModel Maximum Number Ve
Average M26 25a 2021 With Dev Maximum Number Veh
Average M47 25a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J24 Western Arm (25a) AM Peak Period
No. of vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 25a 2021RfrnceModel Maximum Number Ve
Average M26 25a 2021 With Dev Maximum Number Veh
Average M47 25a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J24 Western Arm (25a) PM Peak Period
No. of vehicles (Max)
6
5
4
3
2
1
0
-1
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 25a 2021RfrnceModel Maximum Number Ve
Average M26 25a 2021 With Dev Maximum Number Veh
Average M47 25a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
M5 J24Northbound Off Slip (25b)
No. of Vehicles (Max)
50
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
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15:00:00
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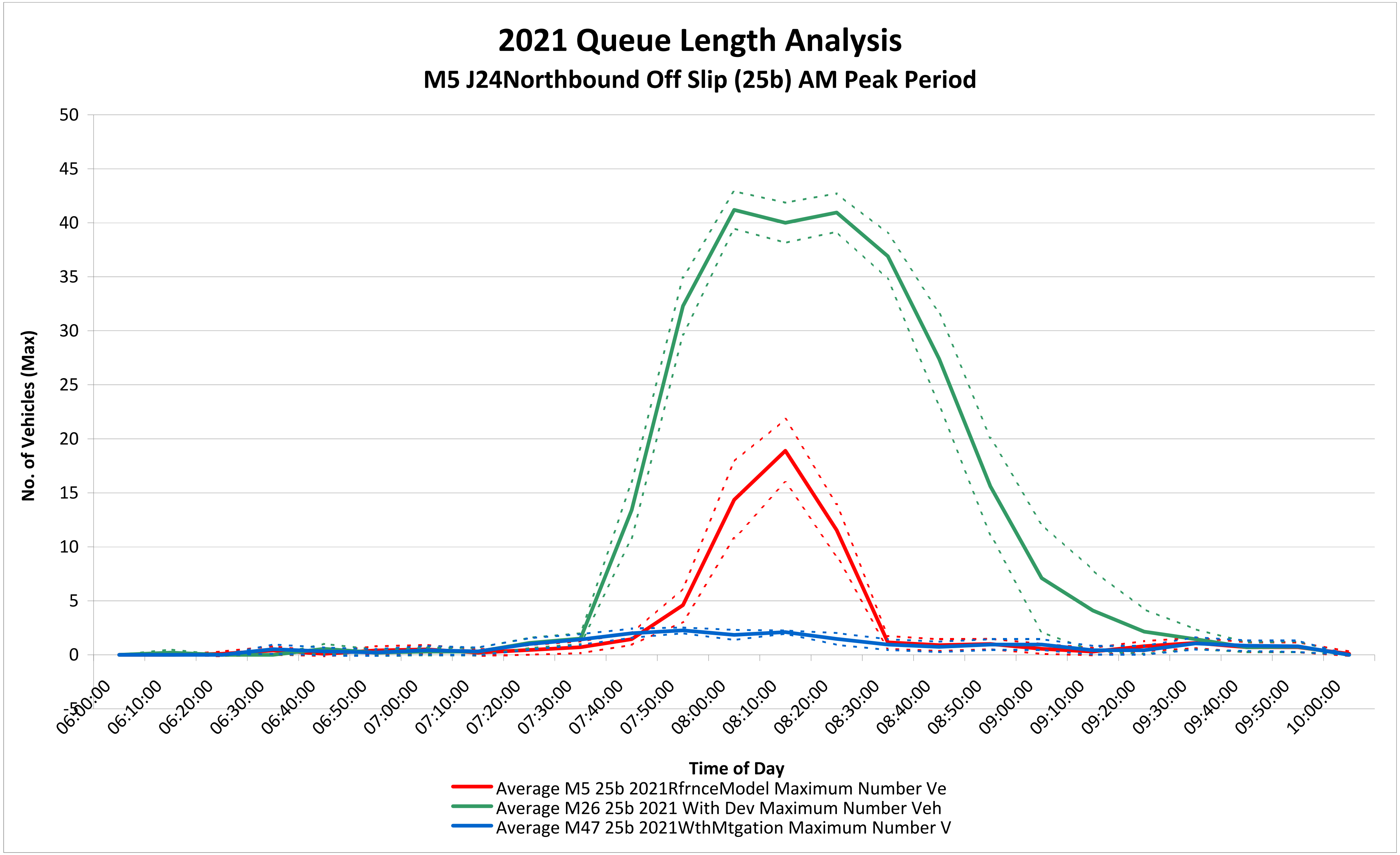
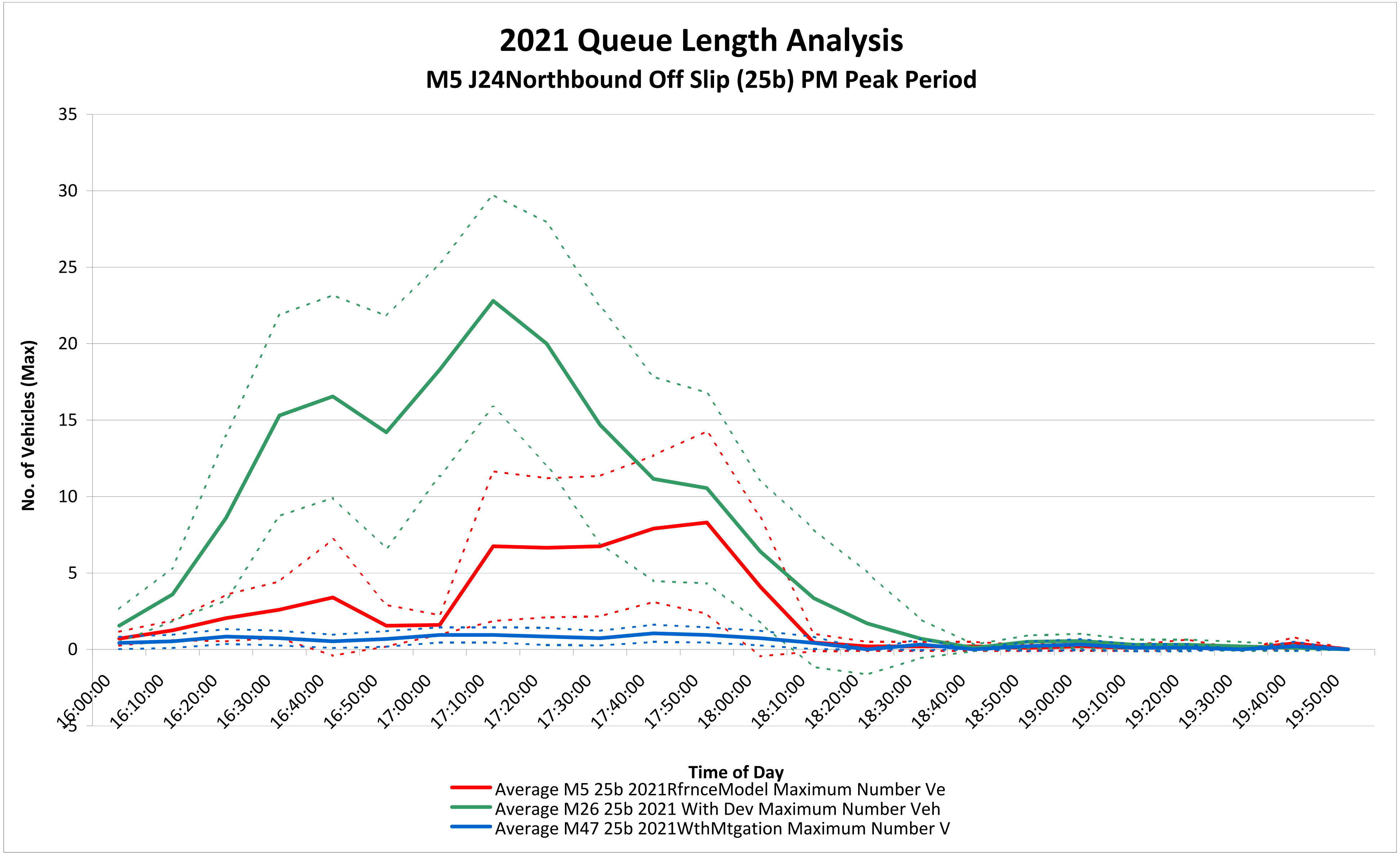
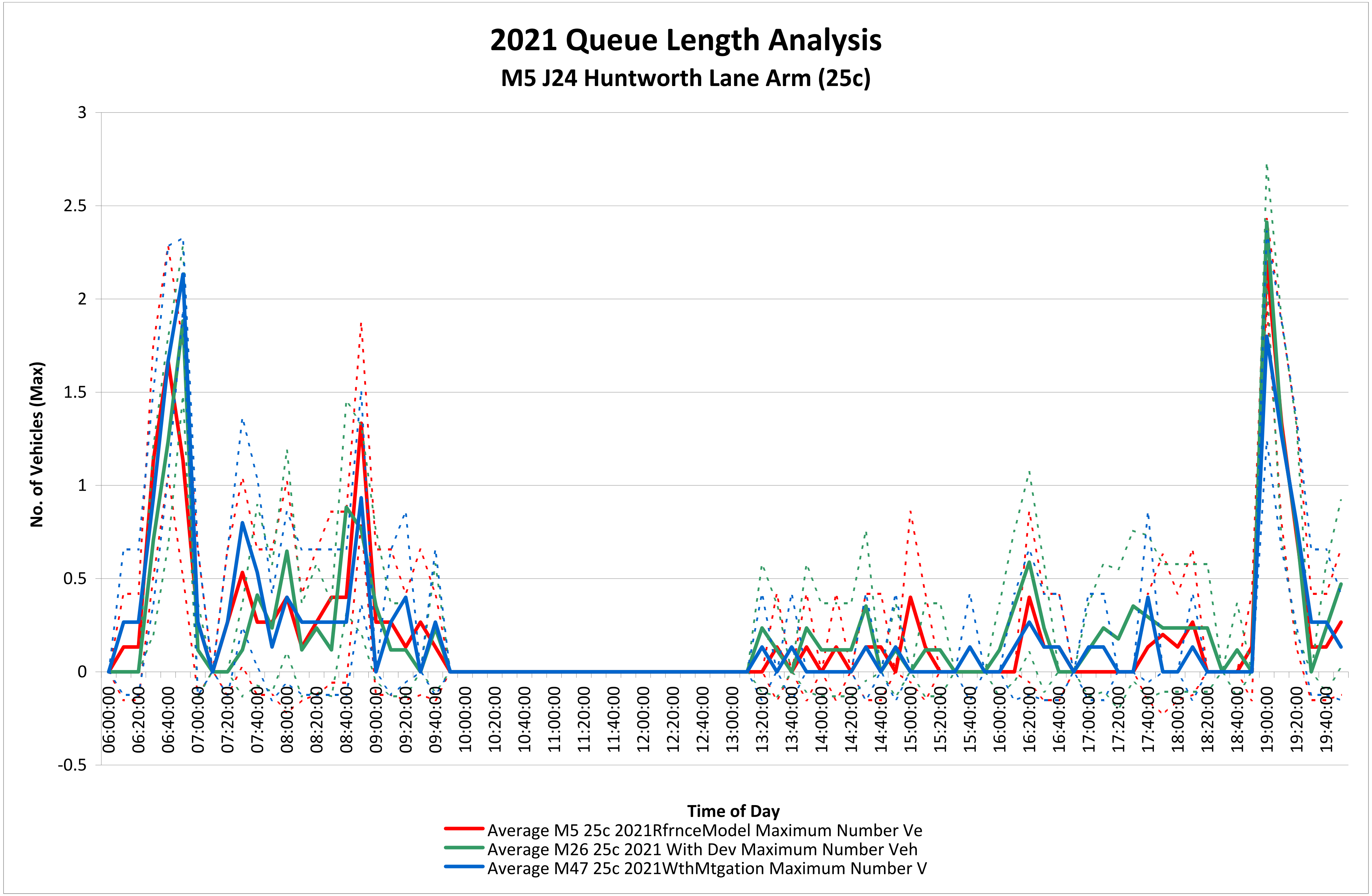
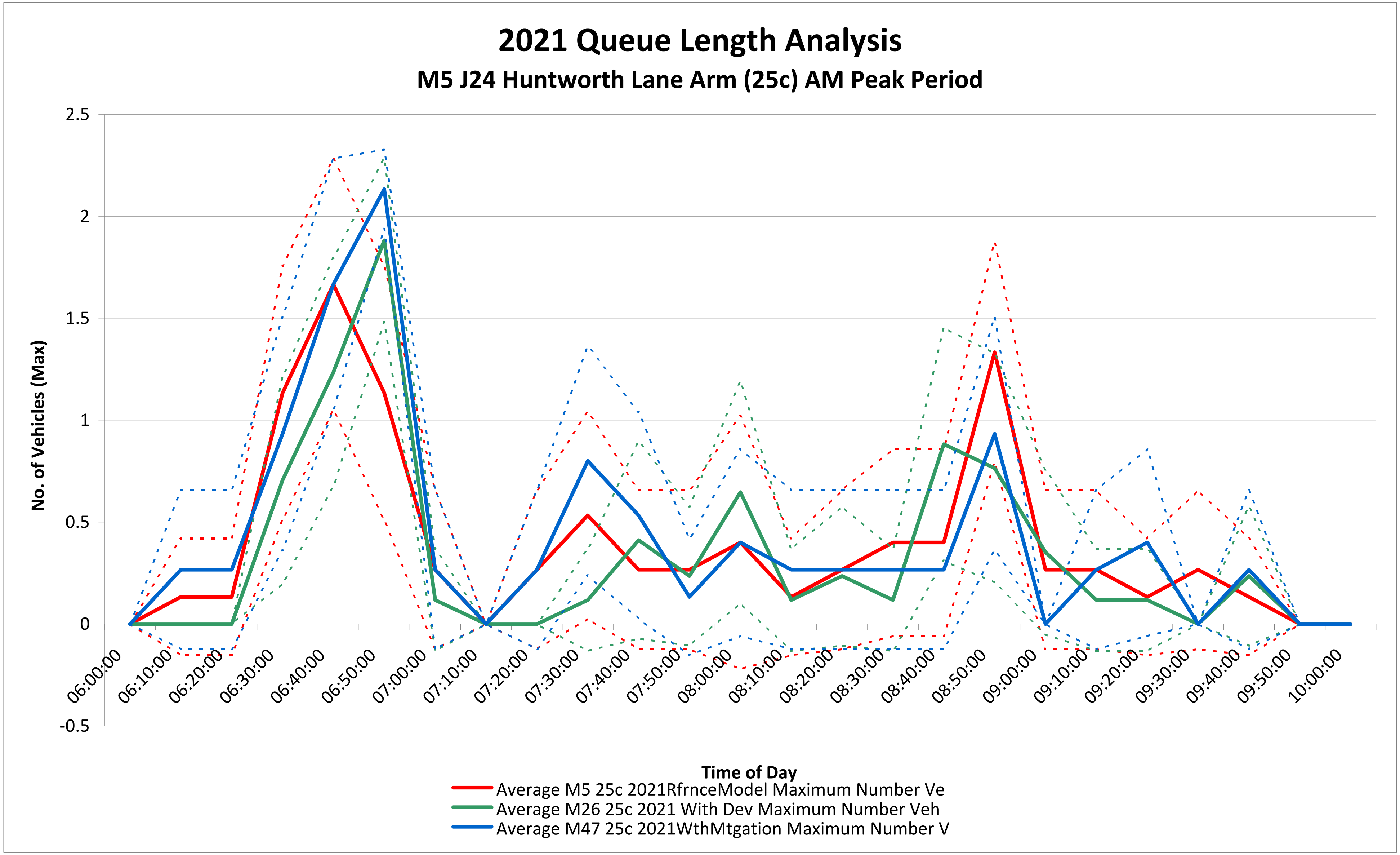
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 25b 2021RfrnceModel Maximum Number Ve
Average M26 25b 2021 With Dev Maximum Number Veh
Average M47 25b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J24Northbound Off Slip (25b) AM Peak Period
No. of Vehicles (Max)
50
45
40
35
30
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 25b 2021RfrnceModel Maximum Number Ve
Average M26 25b 2021 With Dev Maximum Number Veh
Average M47 25b 2021WthMtgation Maximum Number V

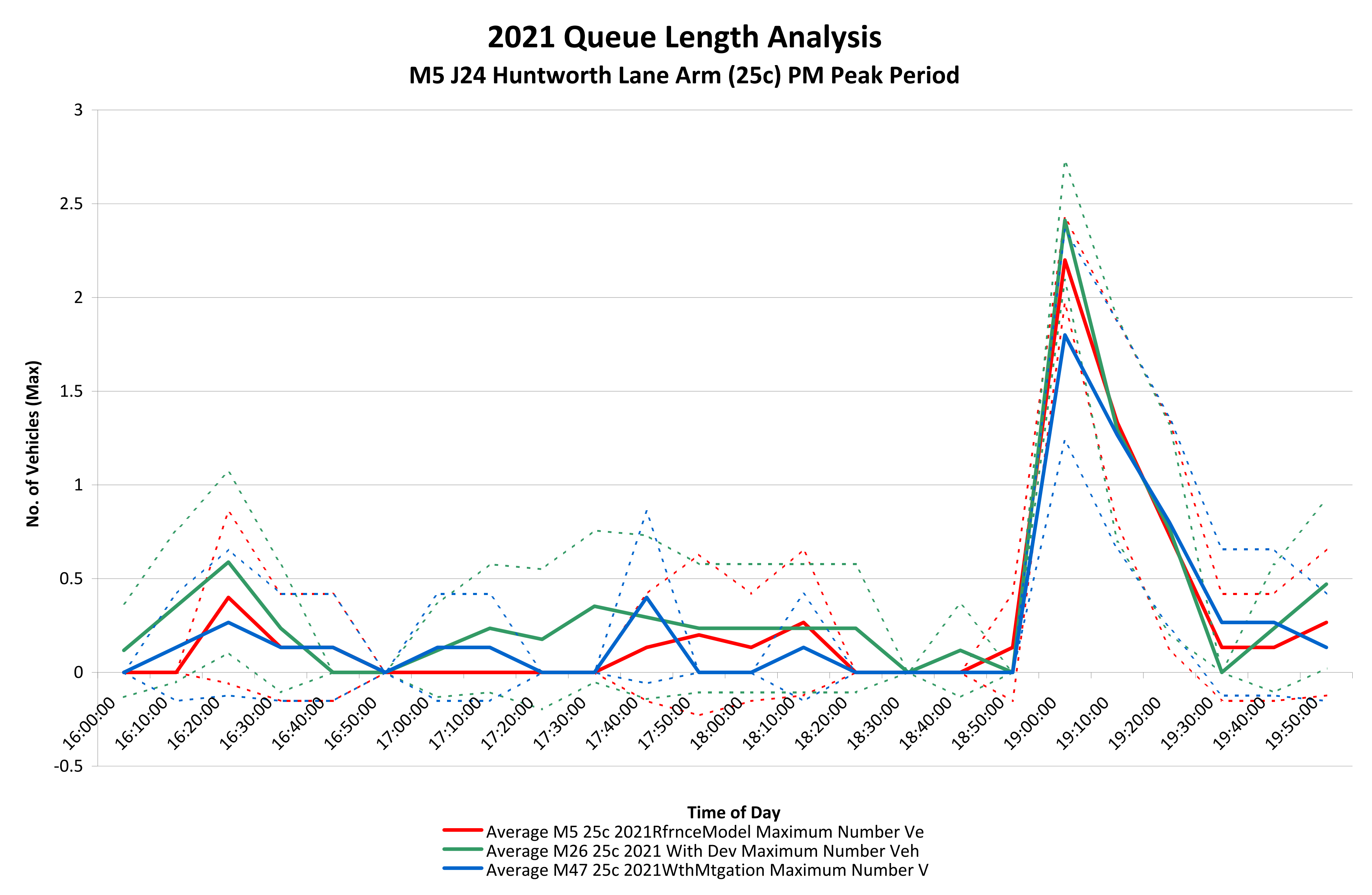

2021 Queue Length Analysis
M5 J24Northbound Off Slip (25b) PM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 25b 2021RfrnceModel Maximum Number Ve
Average M26 25b 2021 With Dev Maximum Number Veh
Average M47 25b 2021WthMtgation Maximum Number V



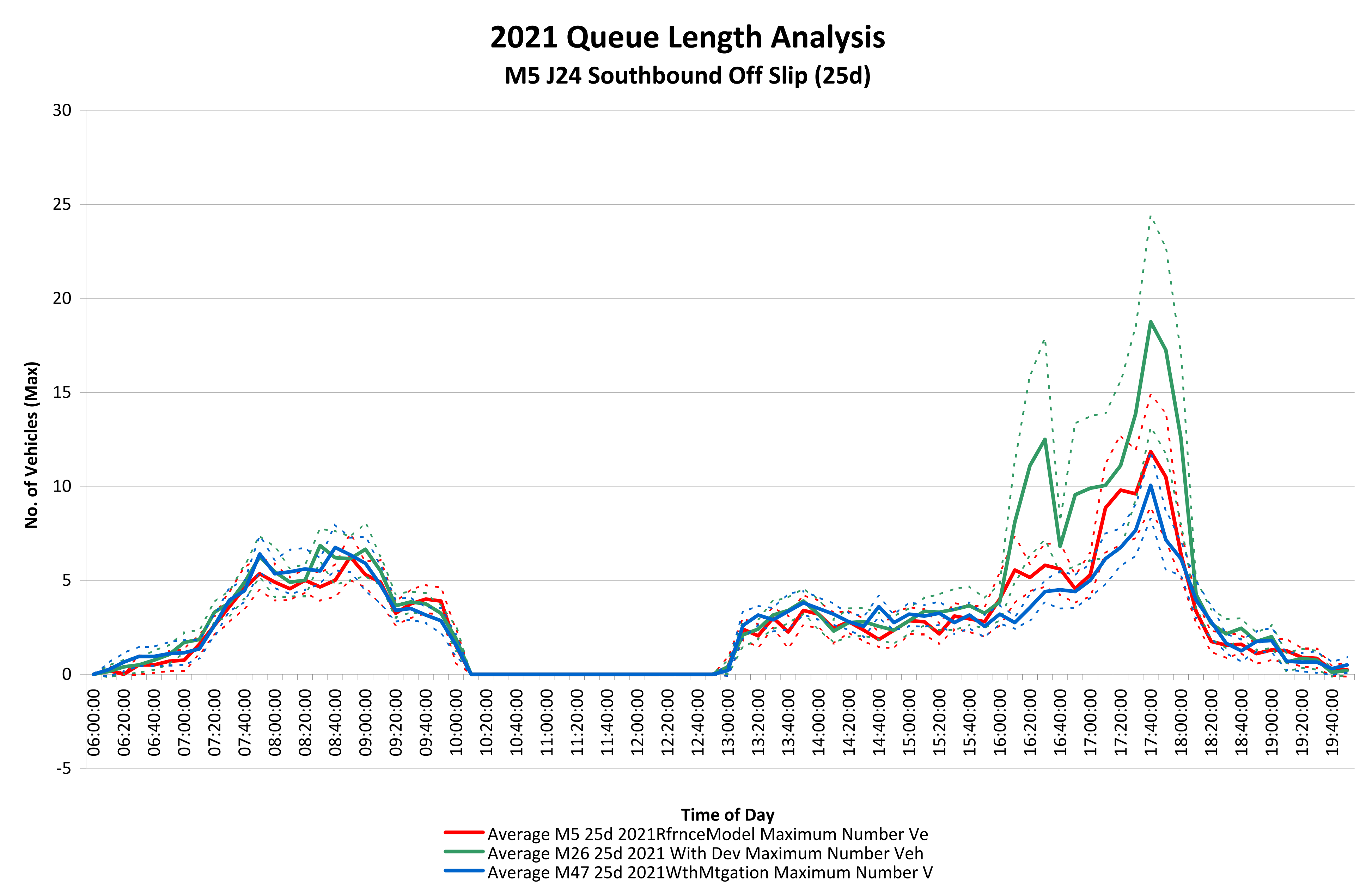
2021 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c)
No. of Vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 25c 2021RfrnceModel Maximum Number Ve
Average M26 25c 2021 With Dev Maximum Number Veh
Average M47 25c 2021WthMtgation Maximum Number V



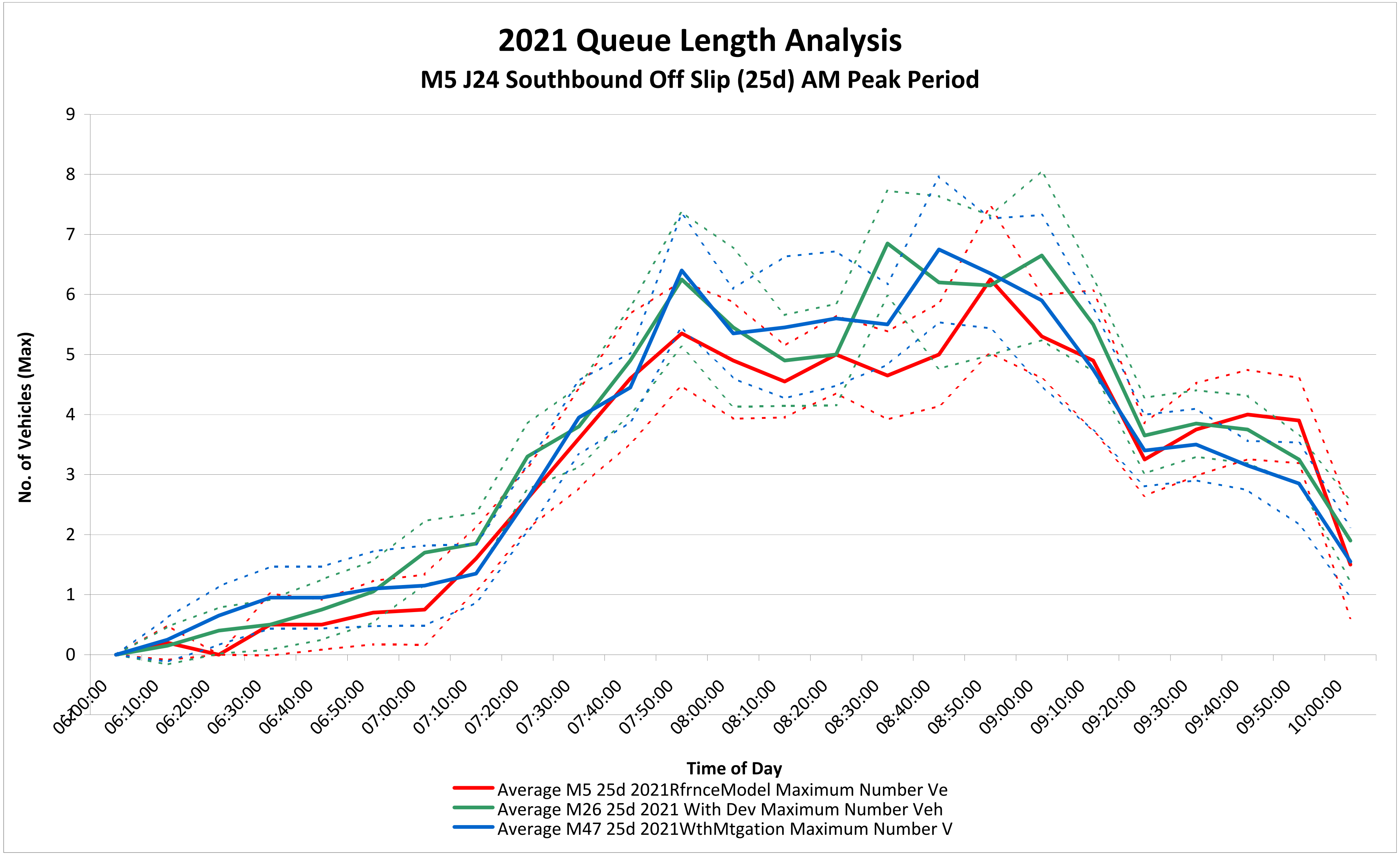
2021 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c) AM Peak Period
No. of Vehicles (Max)
2.5
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 25c 2021RfrnceModel Maximum Number Ve
Average M26 25c 2021 With Dev Maximum Number Veh
Average M47 25c 2021WthMtgation Maximum Number V

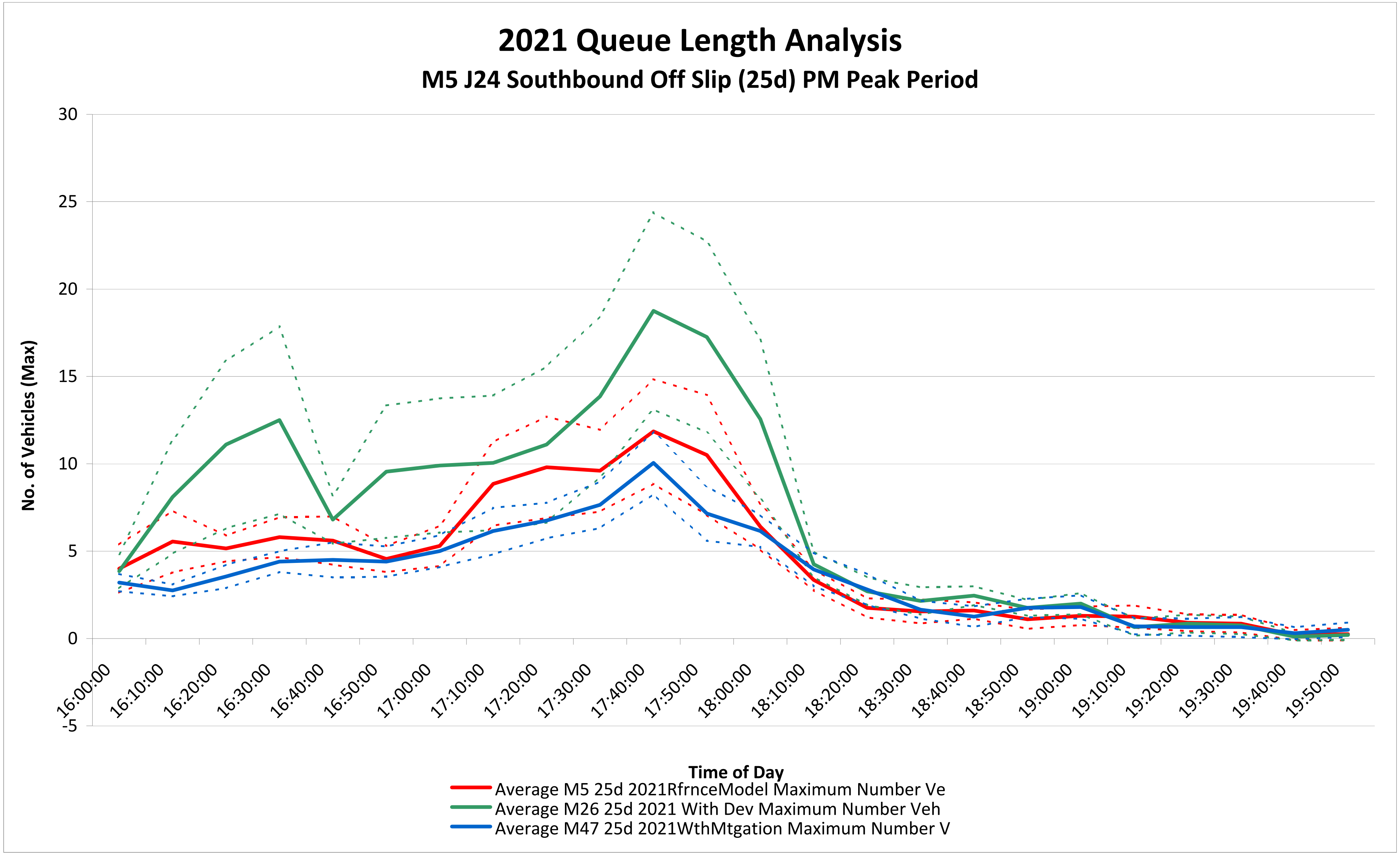


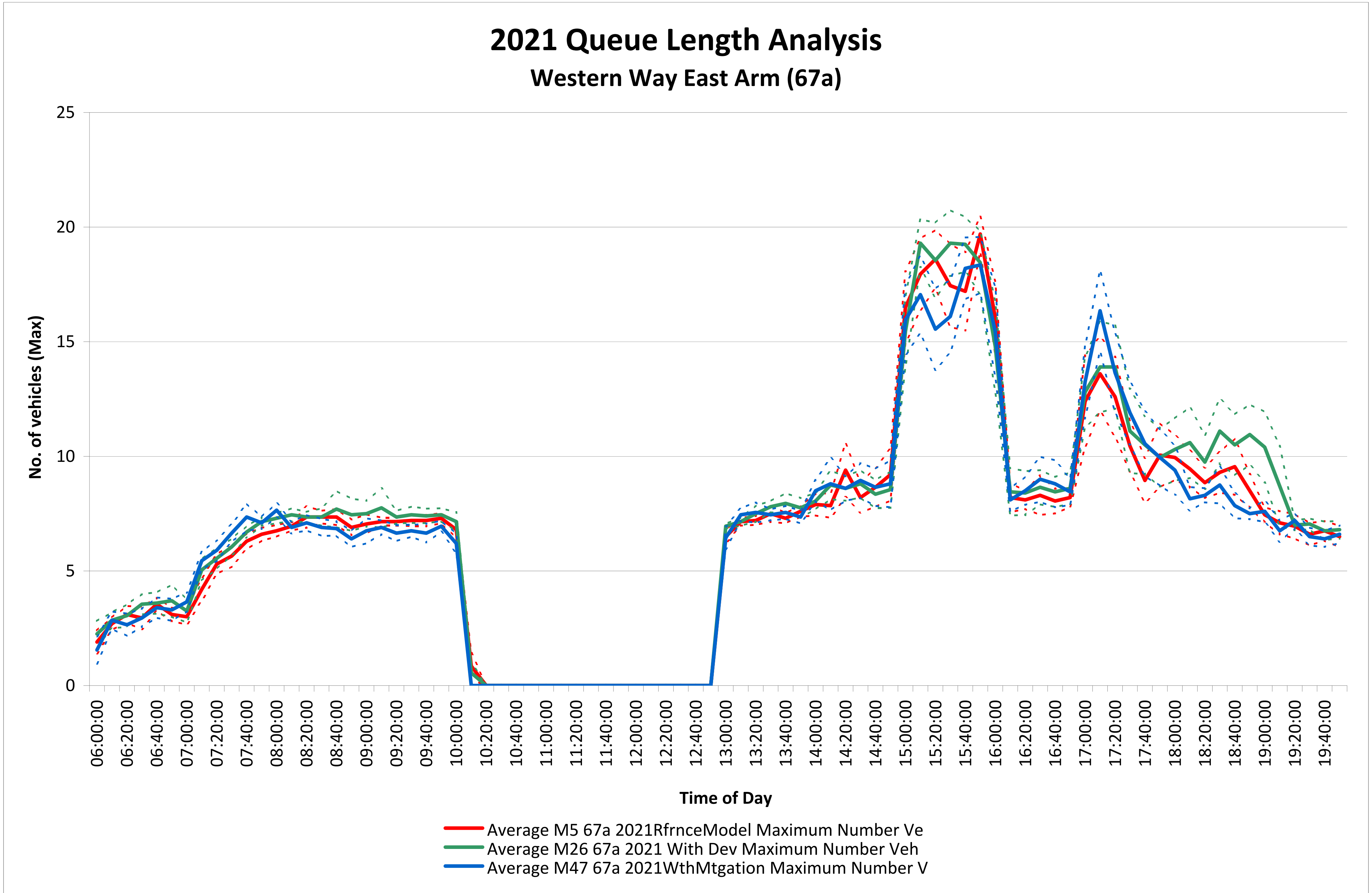
2021 Queue Length Analysis
M5 J24 Huntworth Lane Arm (25c) PM Peak Period
No. of Vehicles (Max)
3
2.5
2
1.5
1
0.5
0
-0.5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 25c 2021RfrnceModel Maximum Number Ve
Average M26 25c 2021 With Dev Maximum Number Veh
Average M47 25c 2021WthMtgation Maximum Number V

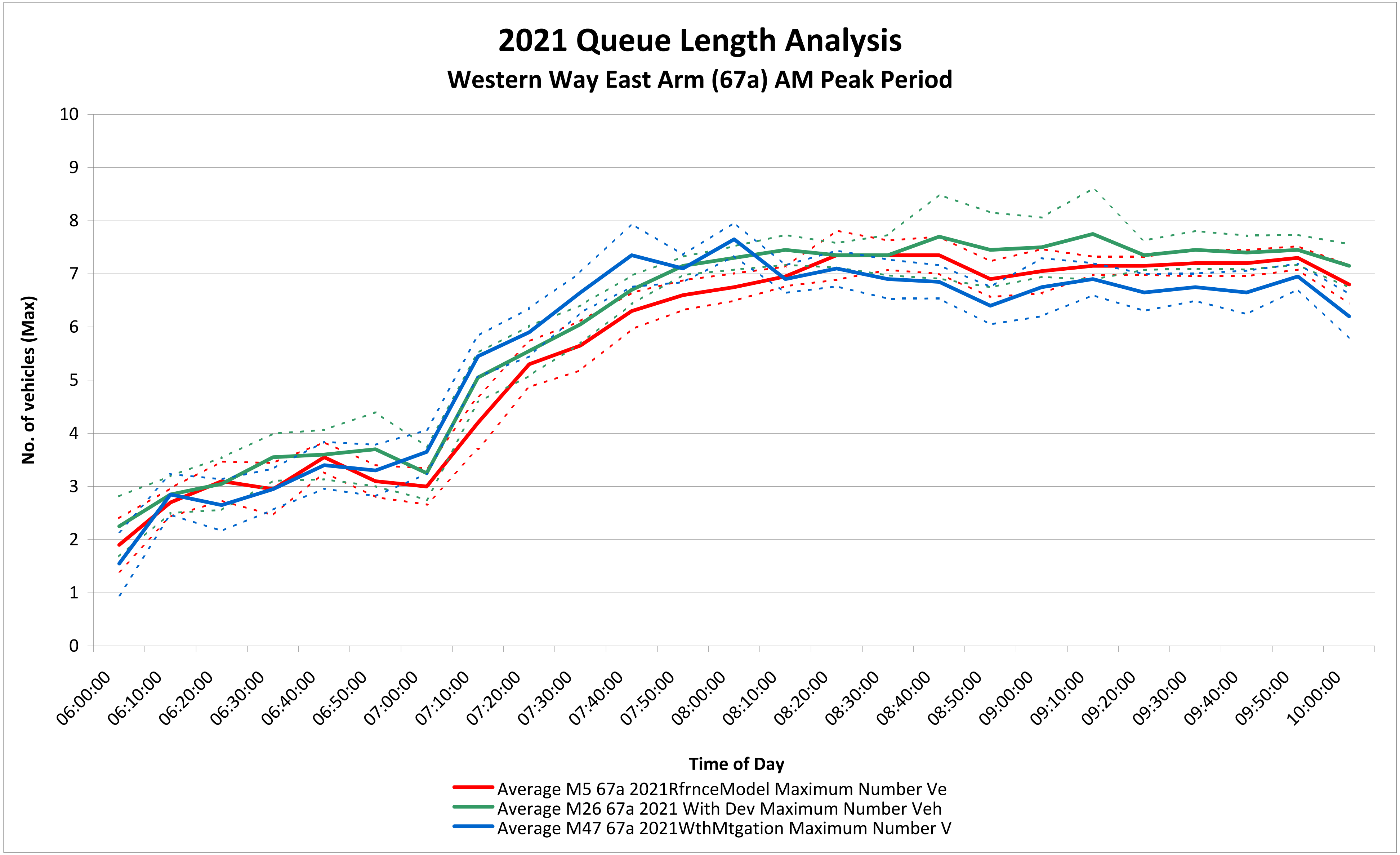


2021 Queue Length Analysis
M5 J24 Southbound Off Slip (25d)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 25d 2021RfrnceModel Maximum Number Ve
Average M26 25d 2021 With Dev Maximum Number Veh
Average M47 25d 2021WthMtgation Maximum Number V

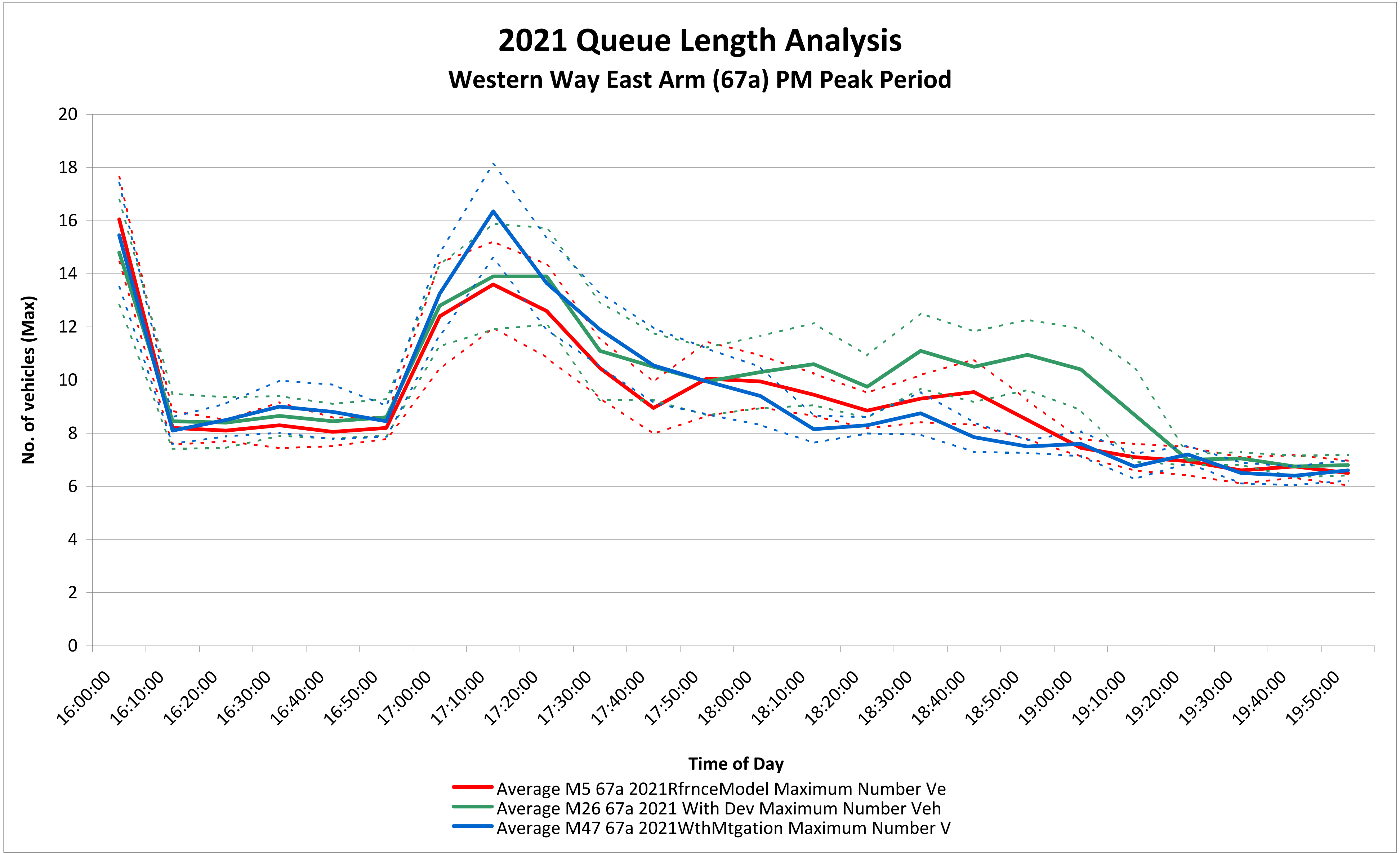

2021 Queue Length Analysis
M5 J24 Southbound Off Slip (25d) AM Peak Period
No. of Vehicles (Max)
9
8
7
6
5
4
3
2
1
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 25d 2021RfrnceModel Maximum Number Ve
Average M26 25d 2021 With Dev Maximum Number Veh
Average M47 25d 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
M5 J24 Southbound Off Slip (25d) PM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 25d 2021RfrnceModel Maximum Number Ve
Average M26 25d 2021 With Dev Maximum Number Veh
Average M47 25d 2021WthMtgation Maximum Number V

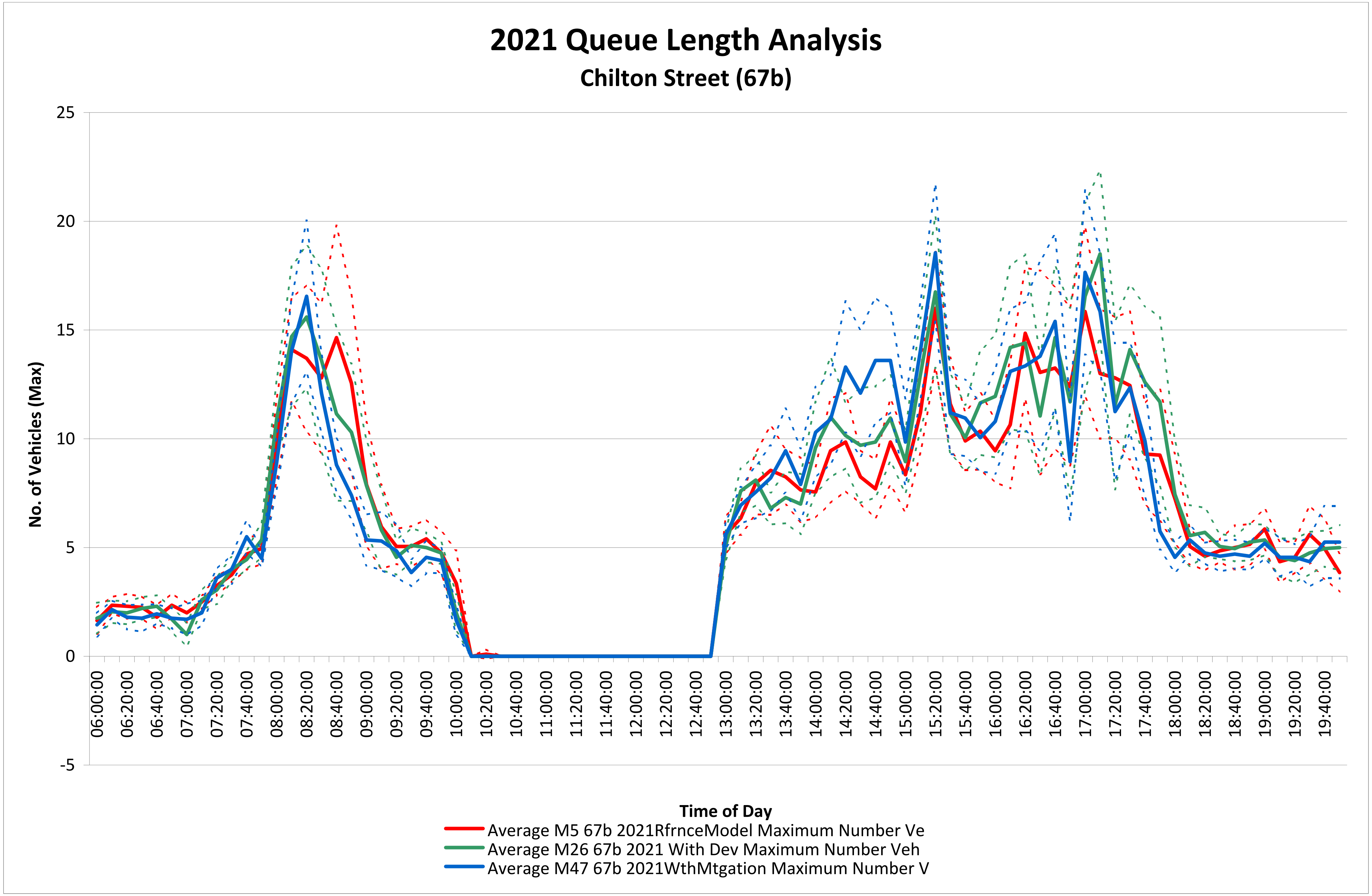

2021 Queue Length Analysis
Western Way East Arm (67a)
No. of vehicles (Max)
25
20
15
10
5
0
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 67a 2021RfrnceModel Maximum Number Ve
Average M26 67a 2021 With Dev Maximum Number Veh
Average M47 67a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Western Way East Arm (67a) AM Peak Period
No. of vehicles (Max)
10
9
8
7
6
5
4
3
2
1
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 67a 2021RfrnceModel Maximum Number Ve
Average M26 67a 2021 With Dev Maximum Number Veh
Average M47 67a 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Western Way East Arm (67a) PM Peak Period
No. of vehicles (Max)
0
2
4
6
8
10
12
14
16
18
20
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 67a 2021RfrnceModel Maximum Number Ve
Average M26 67a 2021 With Dev Maximum Number Veh
Average M47 67a 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Chilton Street (67b)
No. of Vehicles (Max)
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
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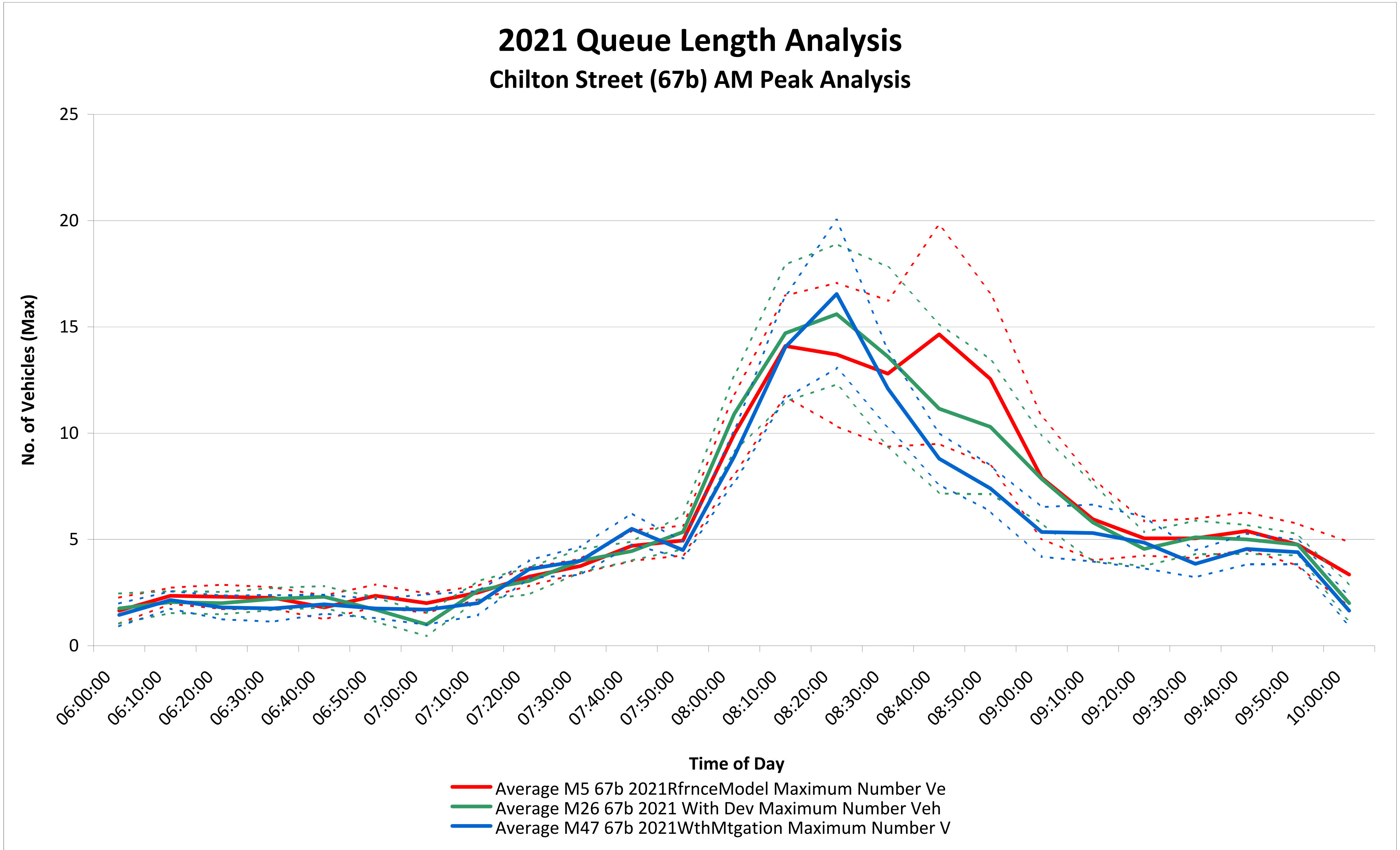
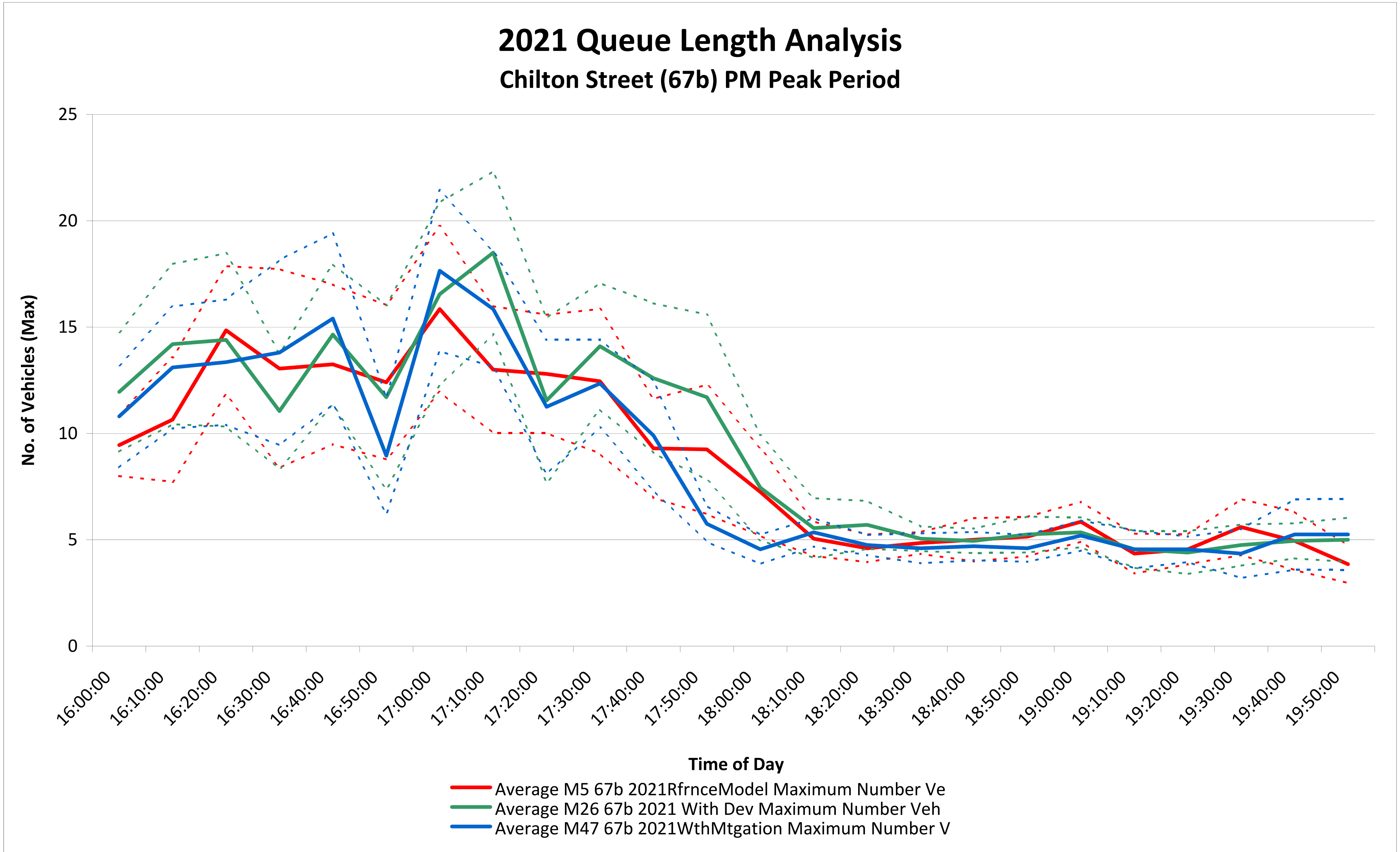
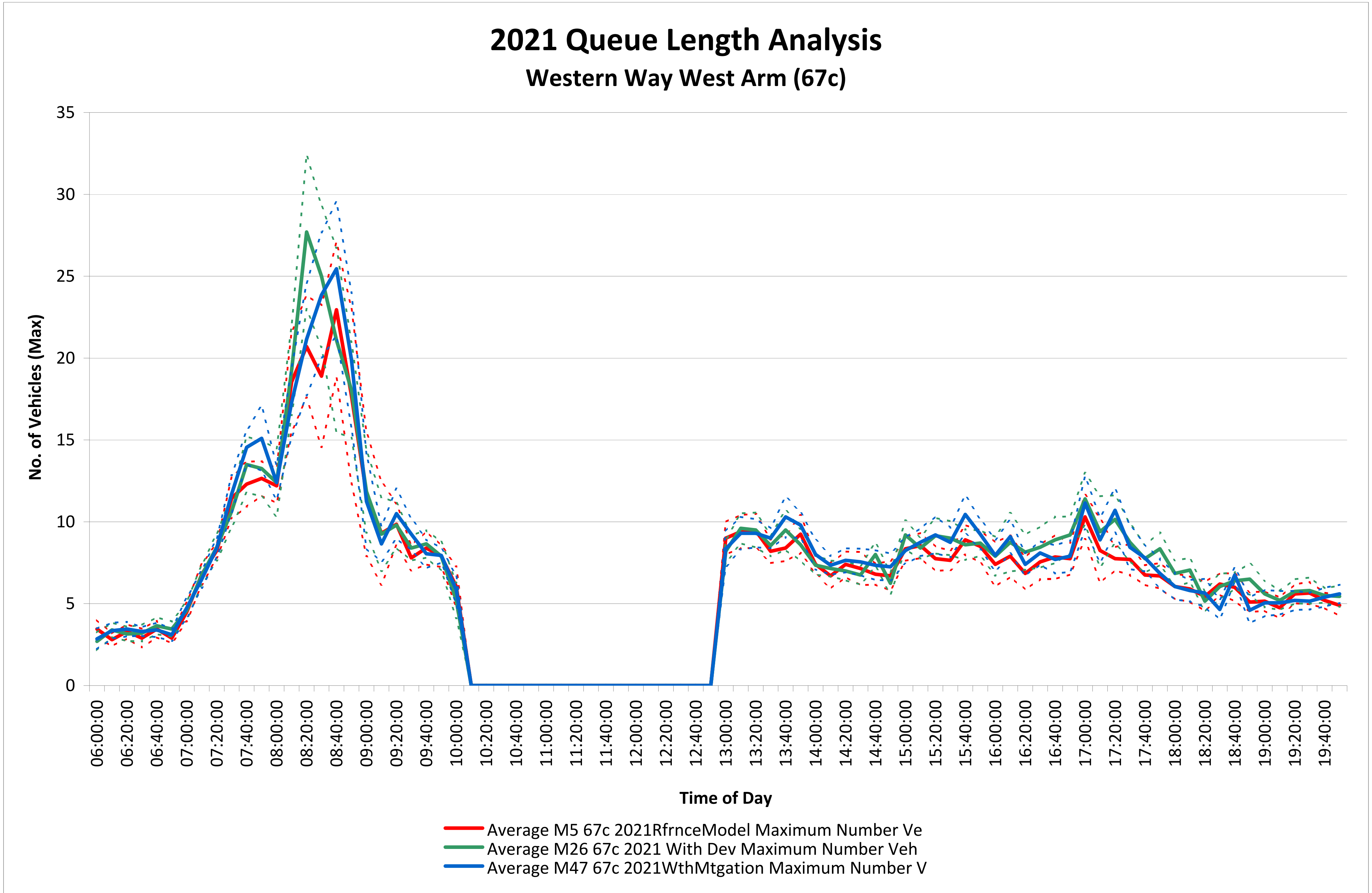
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 67b 2021RfrnceModel Maximum Number Ve
Average M26 67b 2021 With Dev Maximum Number Veh
Average M47 67b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Chilton Street (67b) AM Peak Analysis
25
20
15
10
5
0
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 67b 2021RfrnceModel Maximum Number Ve
Average M26 67b 2021 With Dev Maximum Number Veh
Average M47 67b 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
Chilton Street (67b) PM Peak Period
No. of Vehicles (Max)
0
5
10
15
20
25
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 67b 2021RfrnceModel Maximum Number Ve
Average M26 67b 2021 With Dev Maximum Number Veh
Average M47 67b 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Western Way West Arm (67c)
No. of Vehicles (Max)
0
5
10
15
20
25
30
35
Time of Day
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
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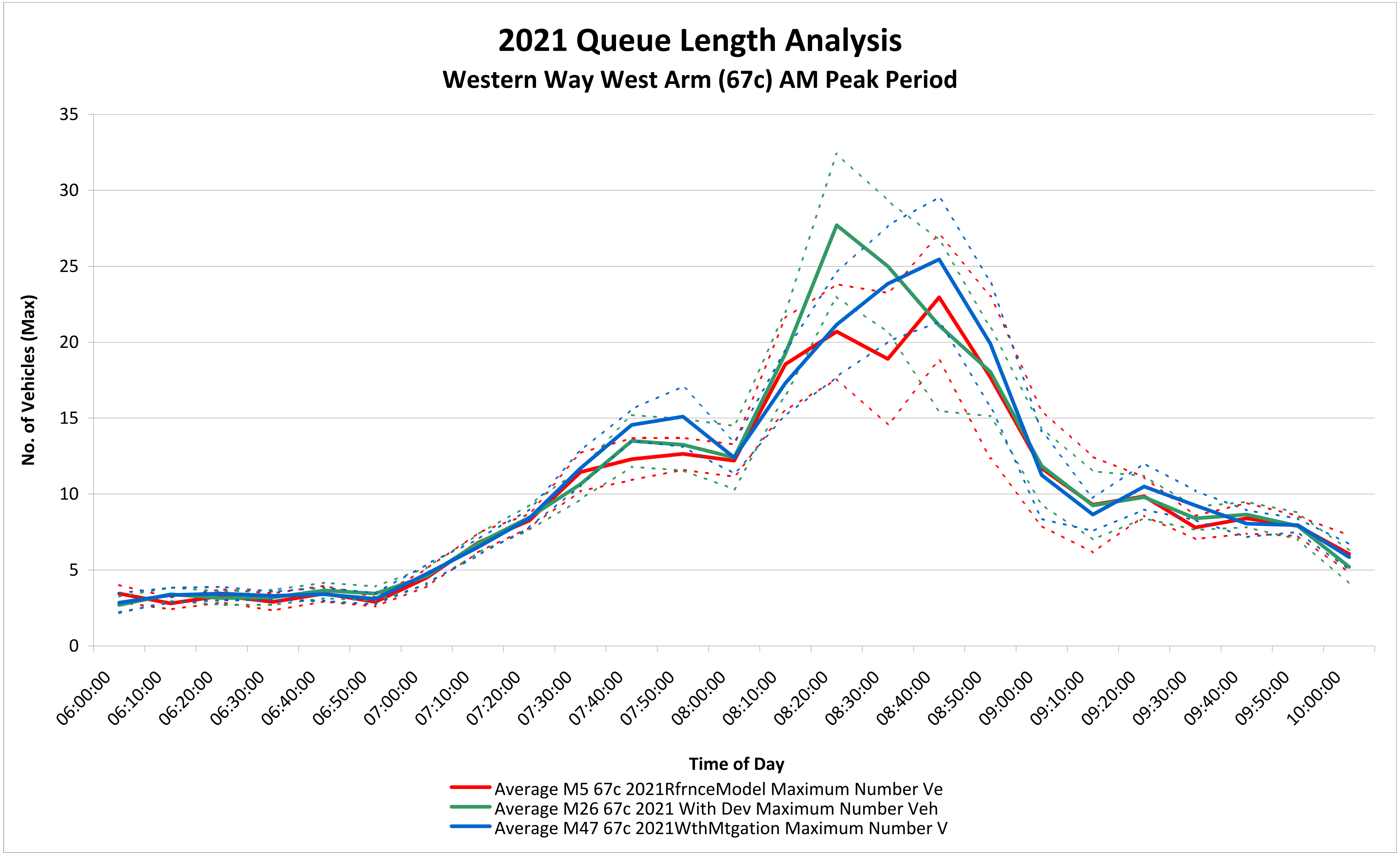
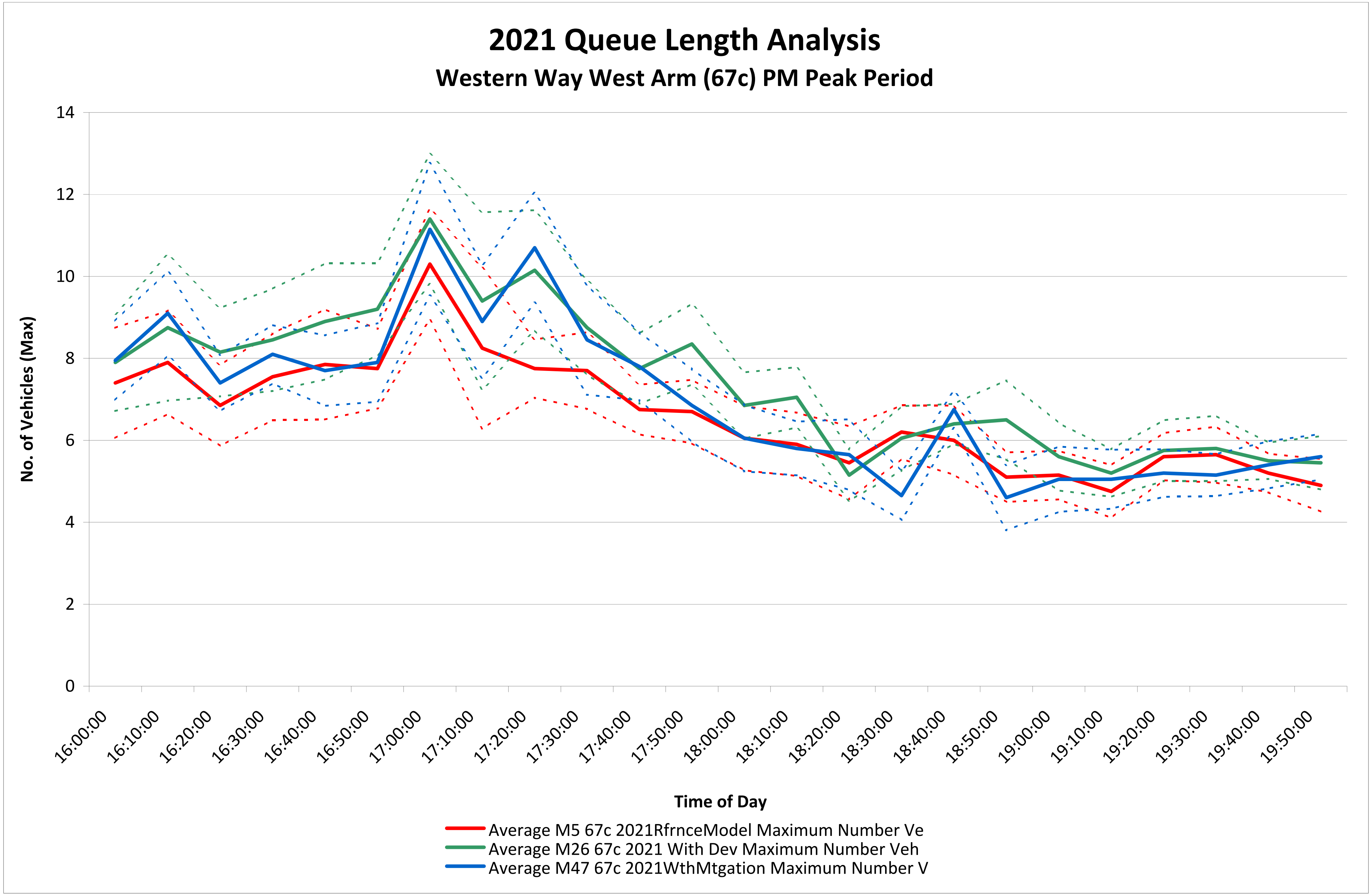
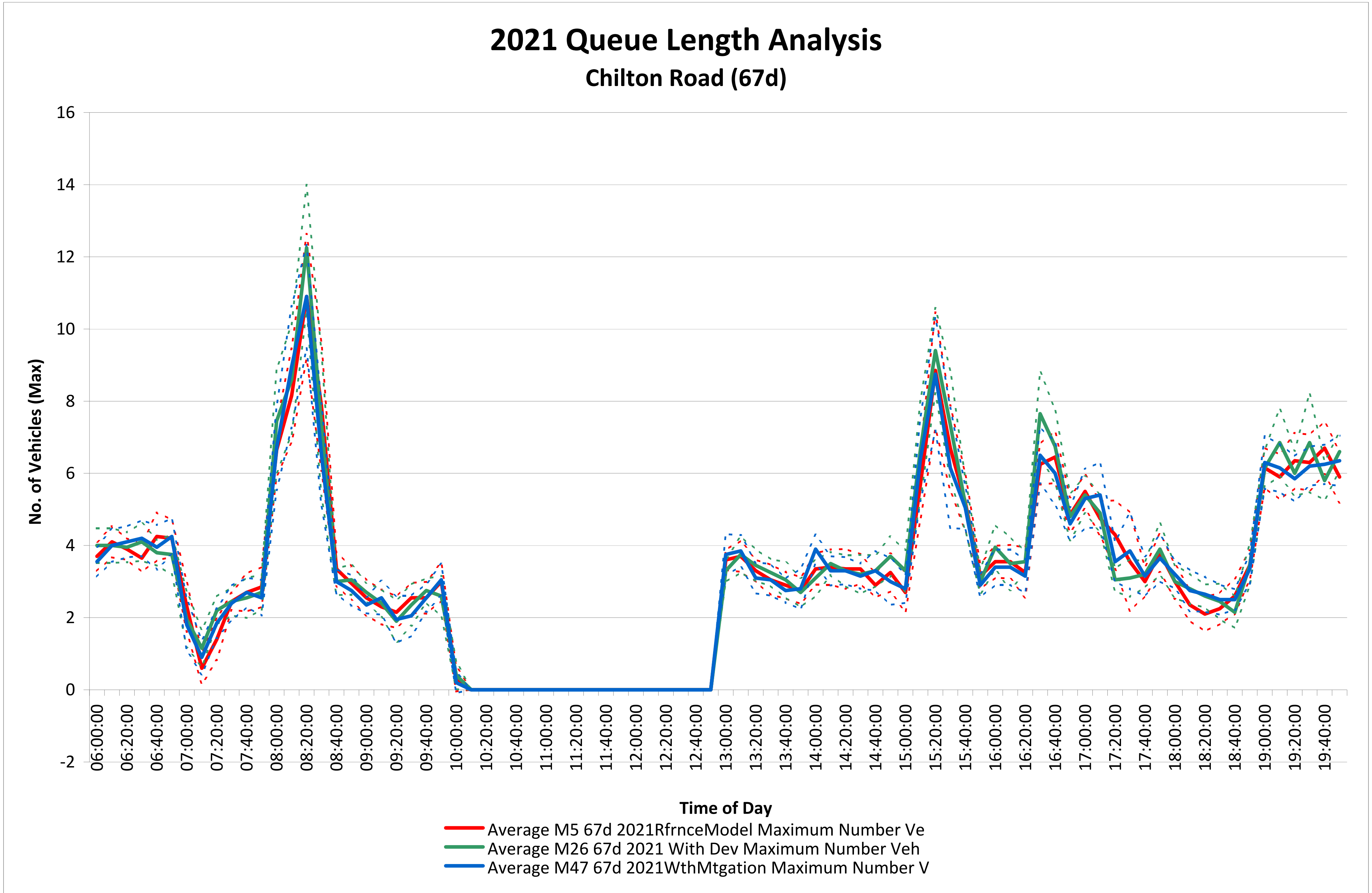
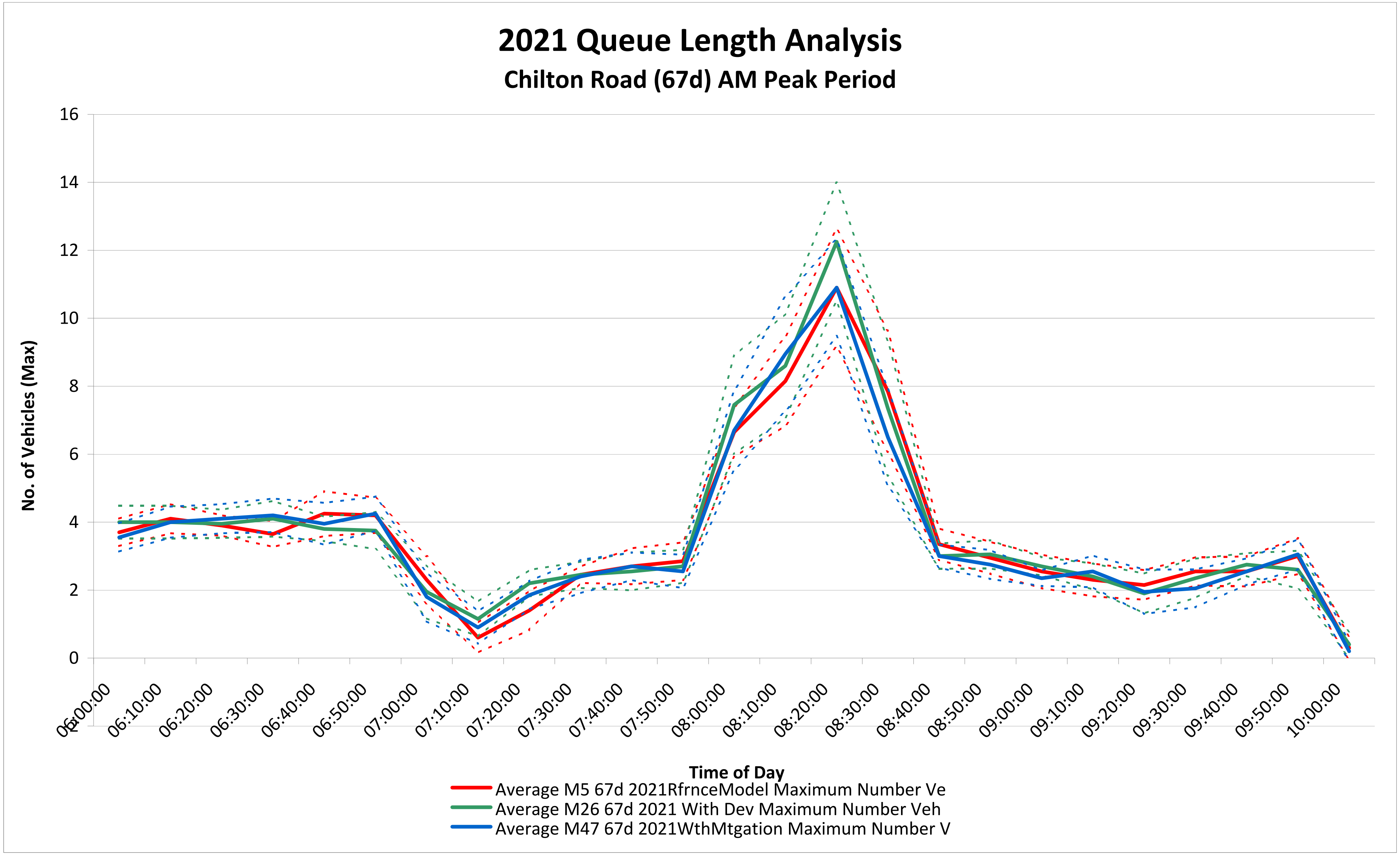
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Average M5 67c 2021RfrnceModel Maximum Number Ve
Average M26 67c 2021 With Dev Maximum Number Veh
Average M47 67c 2021WthMtgation Maximum Number V

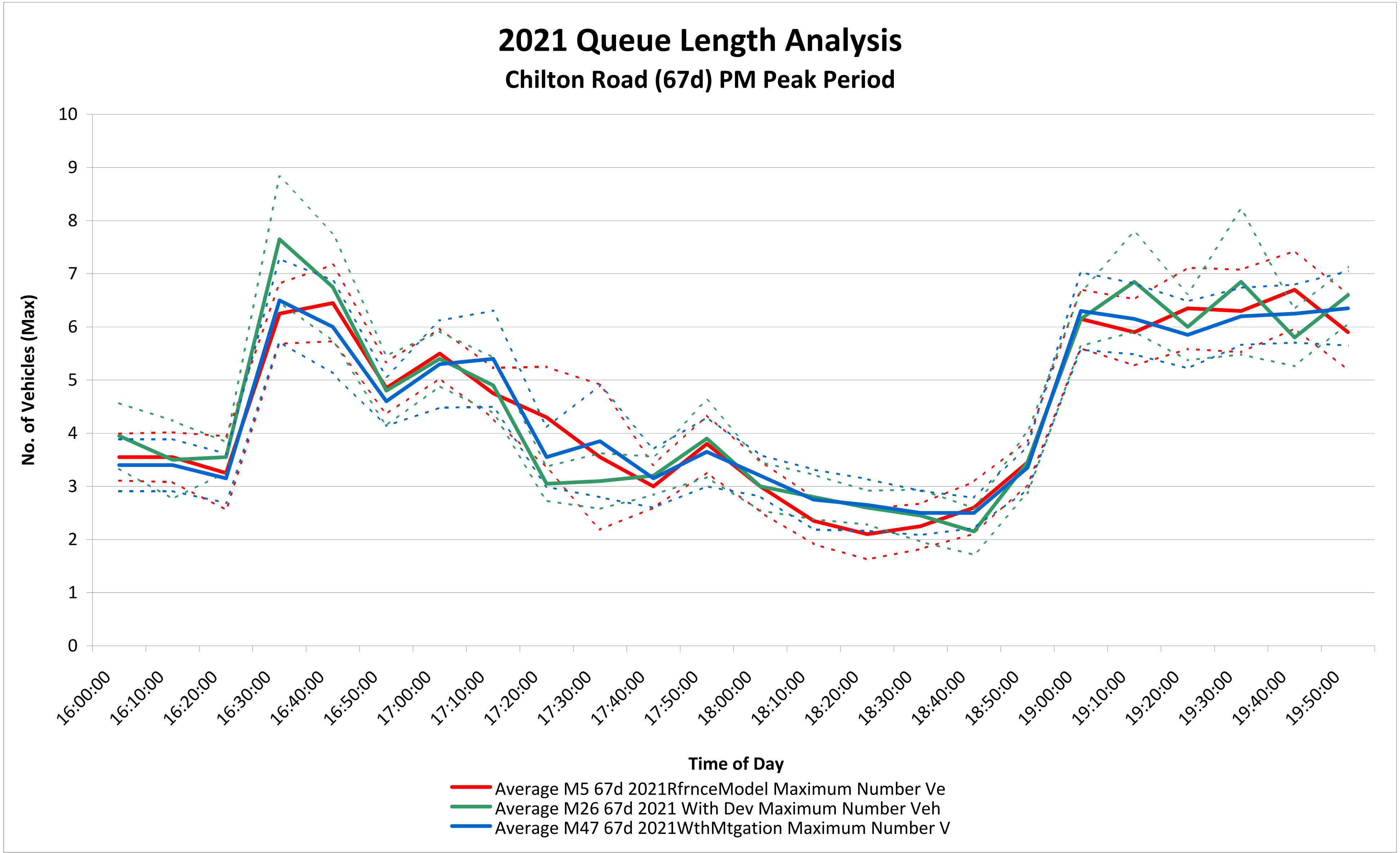


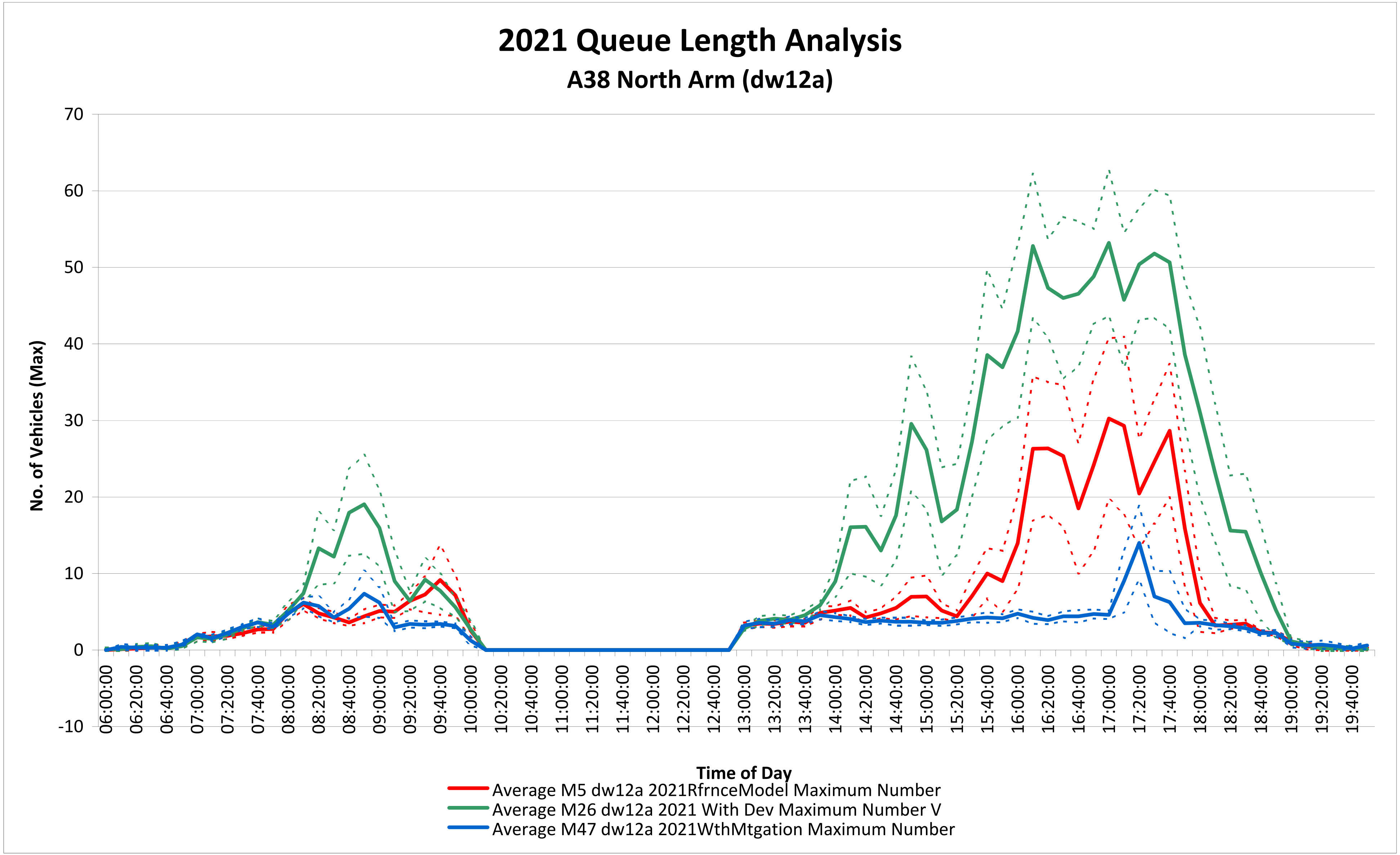
2021 Queue Length Analysis
Western Way West Arm (67c) AM Peak Period
No. of Vehicles (Max)
35
30
25
20
15
10
5
0
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 67c 2021RfrnceModel Maximum Number Ve
Average M26 67c 2021 With Dev Maximum Number Veh
Average M47 67c 2021WthMtgation Maximum Number V


2021 Queue Length Analysis
Western Way West Arm (67c) PM Peak Period
No. of Vehicles (Max)
Time of Day
0
2
4
6
8
10
12
14
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Average M5 67c 2021RfrnceModel Maximum Number Ve
Average M26 67c 2021 With Dev Maximum Number Veh
Average M47 67c 2021WthMtgation Maximum Number V

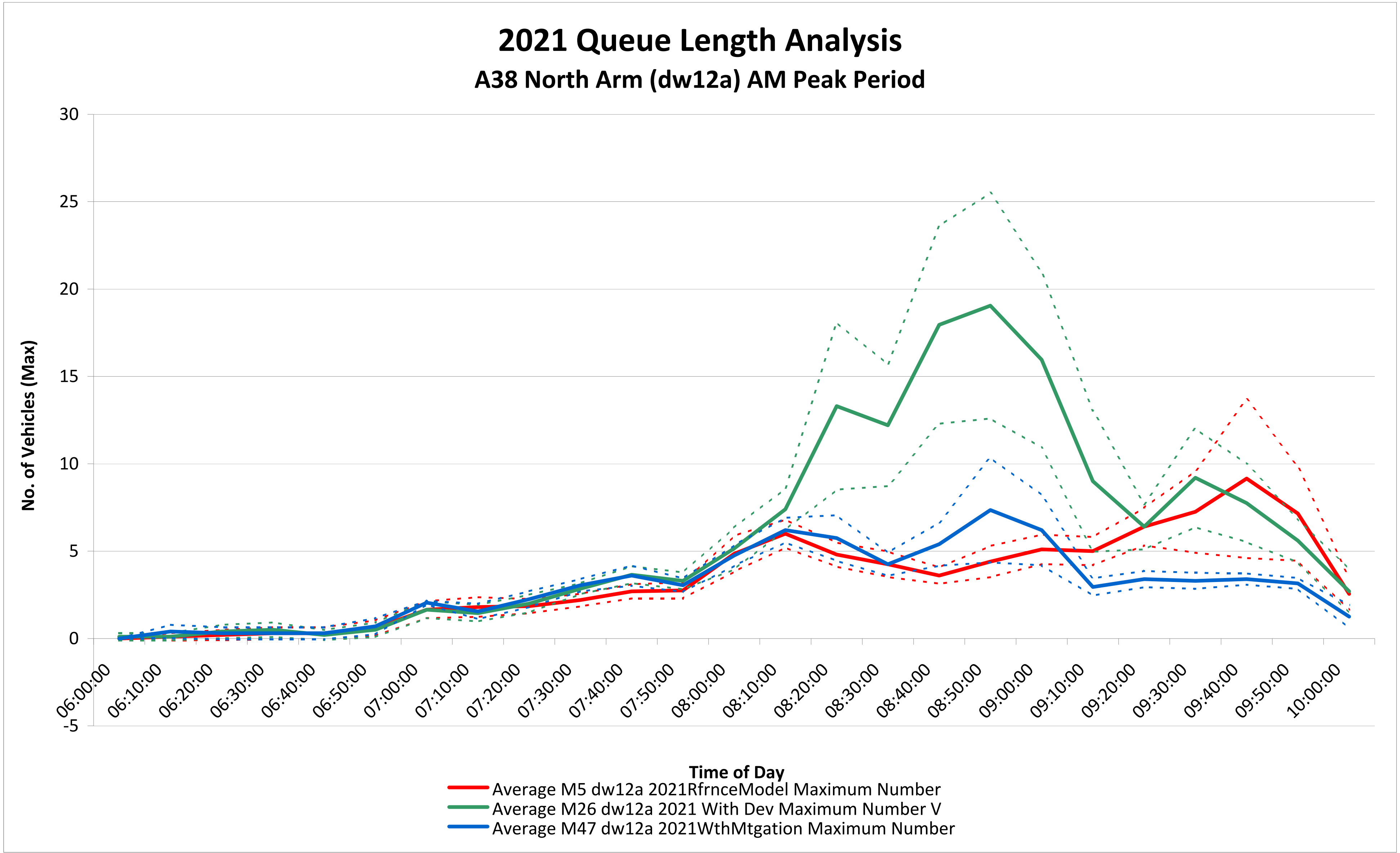

2021 Queue Length Analysis
Chilton Road (67d)
No. of Vehicles (Max)
16
14
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
12:20:00
12:40:00
13:00:00
13:20:00
13:40:00
14:00:00
14:20:00
14:40:00
15:00:00
15:20:00
15:40:00
16:00:00
16:20:00
16:40:00
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 67d 2021RfrnceModel Maximum Number Ve
Average M26 67d 2021 With Dev Maximum Number Veh
Average M47 67d 2021WthMtgation Maximum Number V

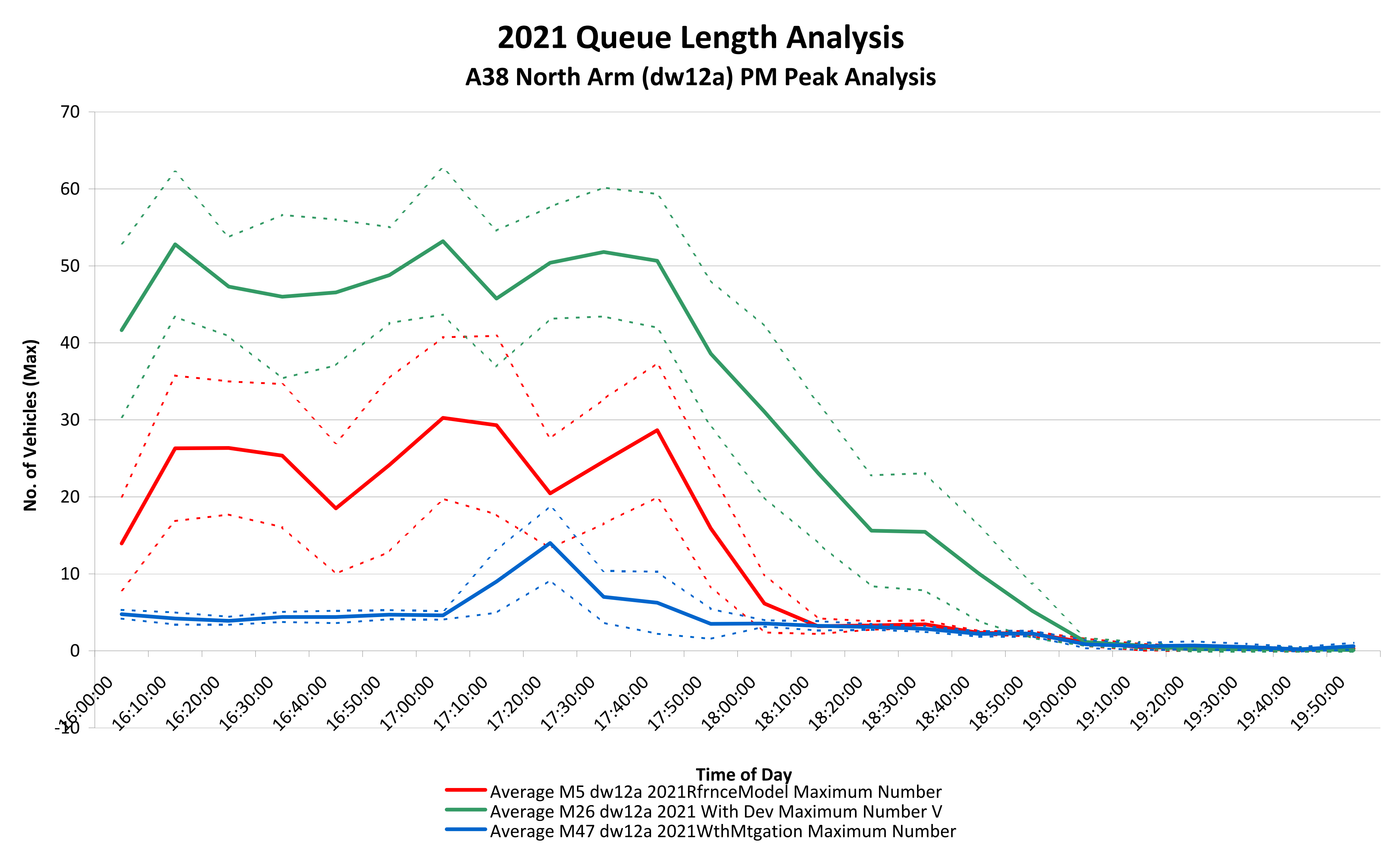

2021 Queue Length Analysis
Chilton Road (67d) AM Peak Period
No. of Vehicles (Max)
0
2
4
6
8
10
12
14
16
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 67d 2021RfrnceModel Maximum Number Ve
Average M26 67d 2021 With Dev Maximum Number Veh
Average M47 67d 2021WthMtgation Maximum Number V

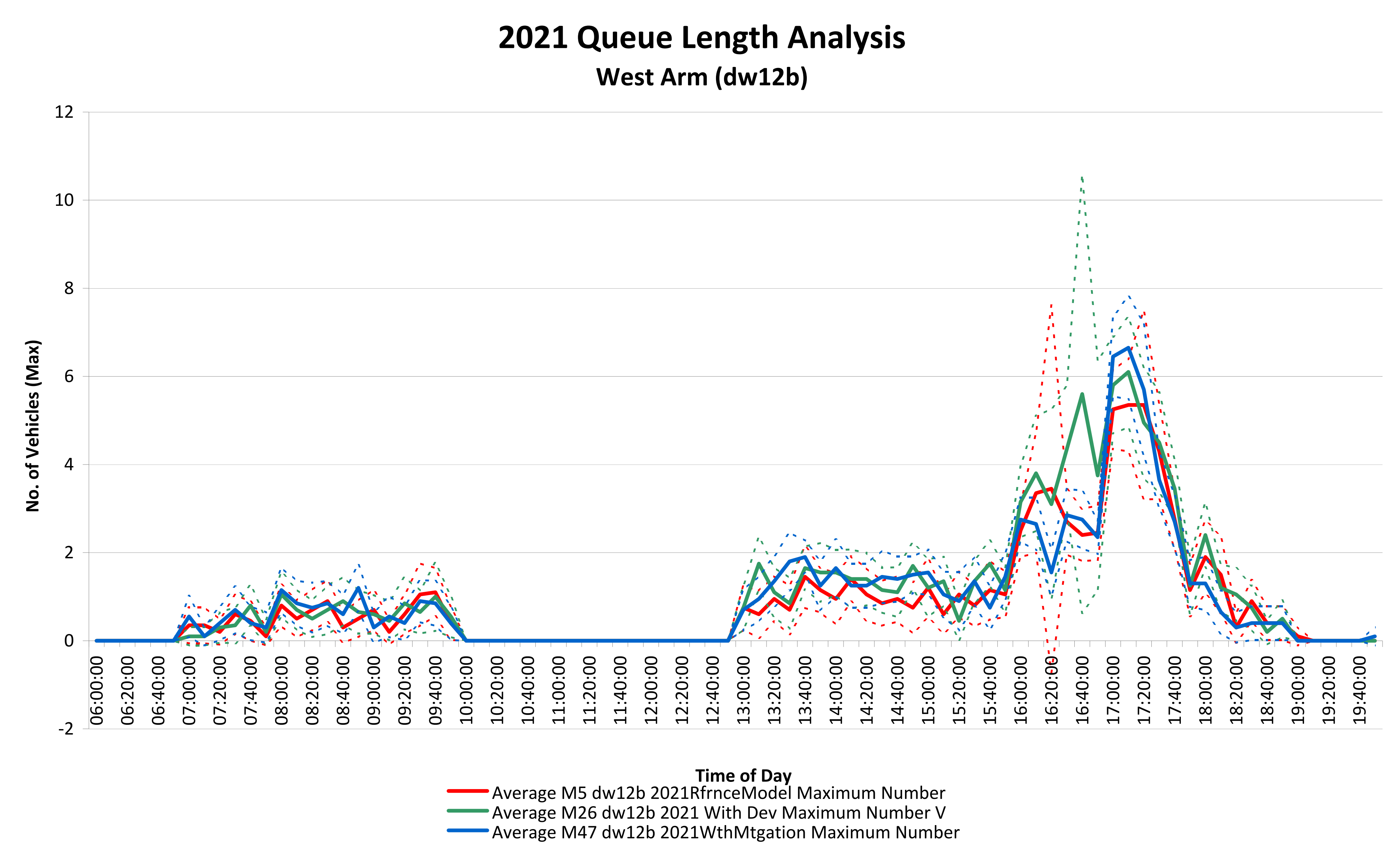

2021 Queue Length Analysis
Chilton Road (67d) PM Peak Period
No. of Vehicles (Max)
0
1
2
3
4
5
6
7
8
9
10
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 67d 2021RfrnceModel Maximum Number Ve
Average M26 67d 2021 With Dev Maximum Number Veh
Average M47 67d 2021WthMtgation Maximum Number V



2021 Queue Length Analysis
A38 North Arm (dw12a)
No. of Vehicles (Max)
Time of Day
Average M5 dw12a 2021RfrnceModel Maximum Number
Average M26 dw12a 2021 With Dev Maximum Number V
Average M47 dw12a 2021WthMtgation Maximum Number


2021 Queue Length Analysis
A38 North Arm (dw12a) AM Peak Period
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
08:30:00
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 dw12a 2021RfrnceModel Maximum Number
Average M26 dw12a 2021 With Dev Maximum Number V
Average M47 dw12a 2021WthMtgation Maximum Number


2021 Queue Length Analysis
A38 North Arm (dw12a) PM Peak Analysis
No. of Vehicles (Max)
70
60
50
40
30
20
10
0
-10
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 dw12a 2021RfrnceModel Maximum Number
Average M26 dw12a 2021 With Dev Maximum Number V
Average M47 dw12a 2021WthMtgation Maximum Number



2021 Queue Length Analysis
West Arm (dw12b)
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
09:20:00
09:40:00
10:00:00
10:20:00
10:40:00
11:00:00
11:20:00
11:40:00
12:00:00
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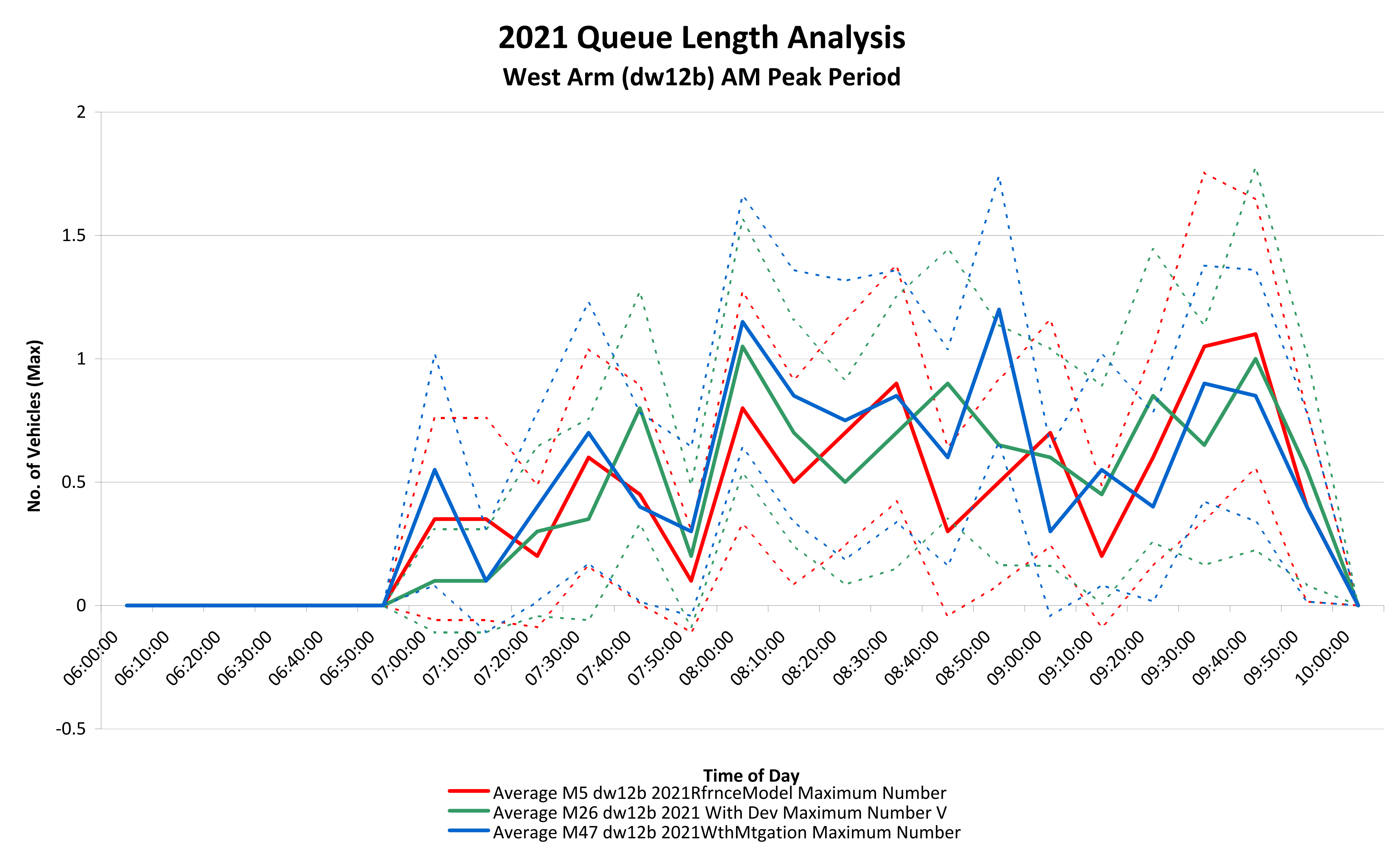
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 dw12b 2021RfrnceModel Maximum Number
Average M26 dw12b 2021 With Dev Maximum Number V
Average M47 dw12b 2021WthMtgation Maximum Number



2021 Queue Length Analysis
West Arm (dw12b) AM Peak Period
No. of Vehicles (Max)
2
1.5
1
0.5
0
-0.5
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
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08:40:00
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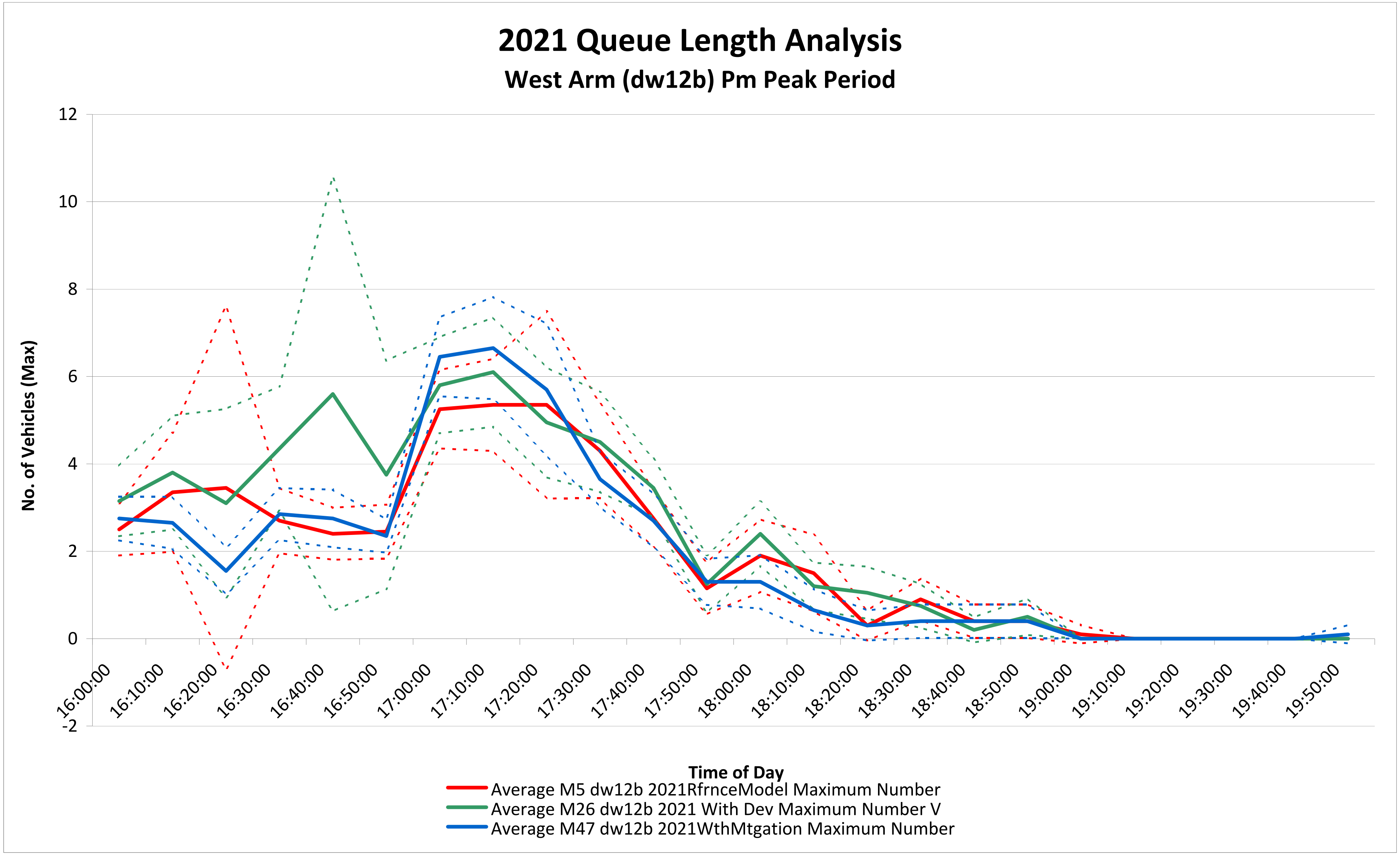
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 dw12b 2021RfrnceModel Maximum Number
Average M26 dw12b 2021 With Dev Maximum Number V
Average M47 dw12b 2021WthMtgation Maximum Number


2021 Queue Length Analysis
West Arm (dw12b) Pm Peak Period
No. of Vehicles (Max)
12
10
8
6
4
2
0
-2
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
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17:30:00
17:40:00
17:50:00
18:00:00
18:10:00
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18:30:00
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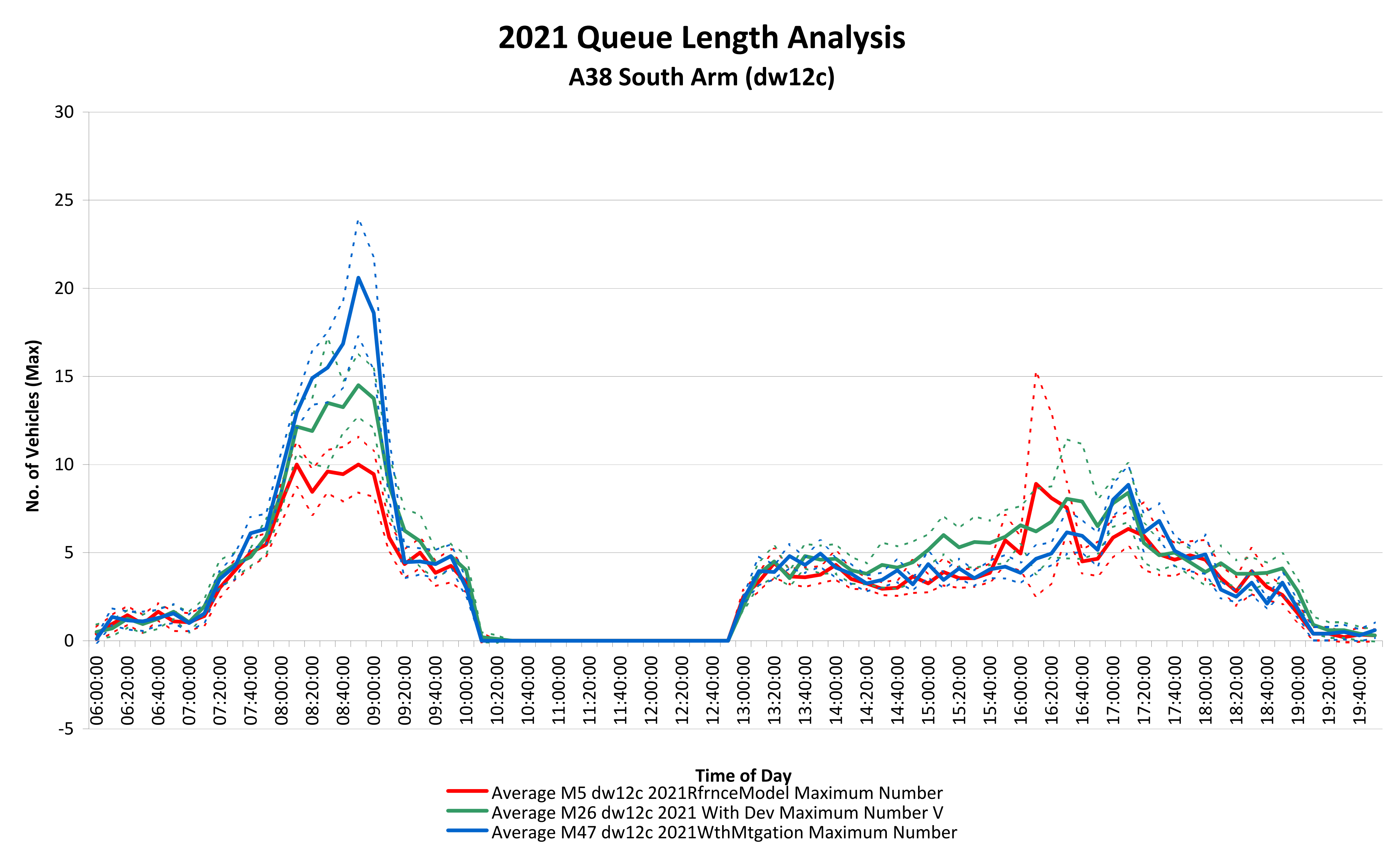
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 dw12b 2021RfrnceModel Maximum Number
Average M26 dw12b 2021 With Dev Maximum Number V
Average M47 dw12b 2021WthMtgation Maximum Number


2021 Queue Length Analysis
A38 South Arm (dw12c)
No. of Vehicles (Max)
30
25
20
15
10
5
0
-5
06:00:00
06:20:00
06:40:00
07:00:00
07:20:00
07:40:00
08:00:00
08:20:00
08:40:00
09:00:00
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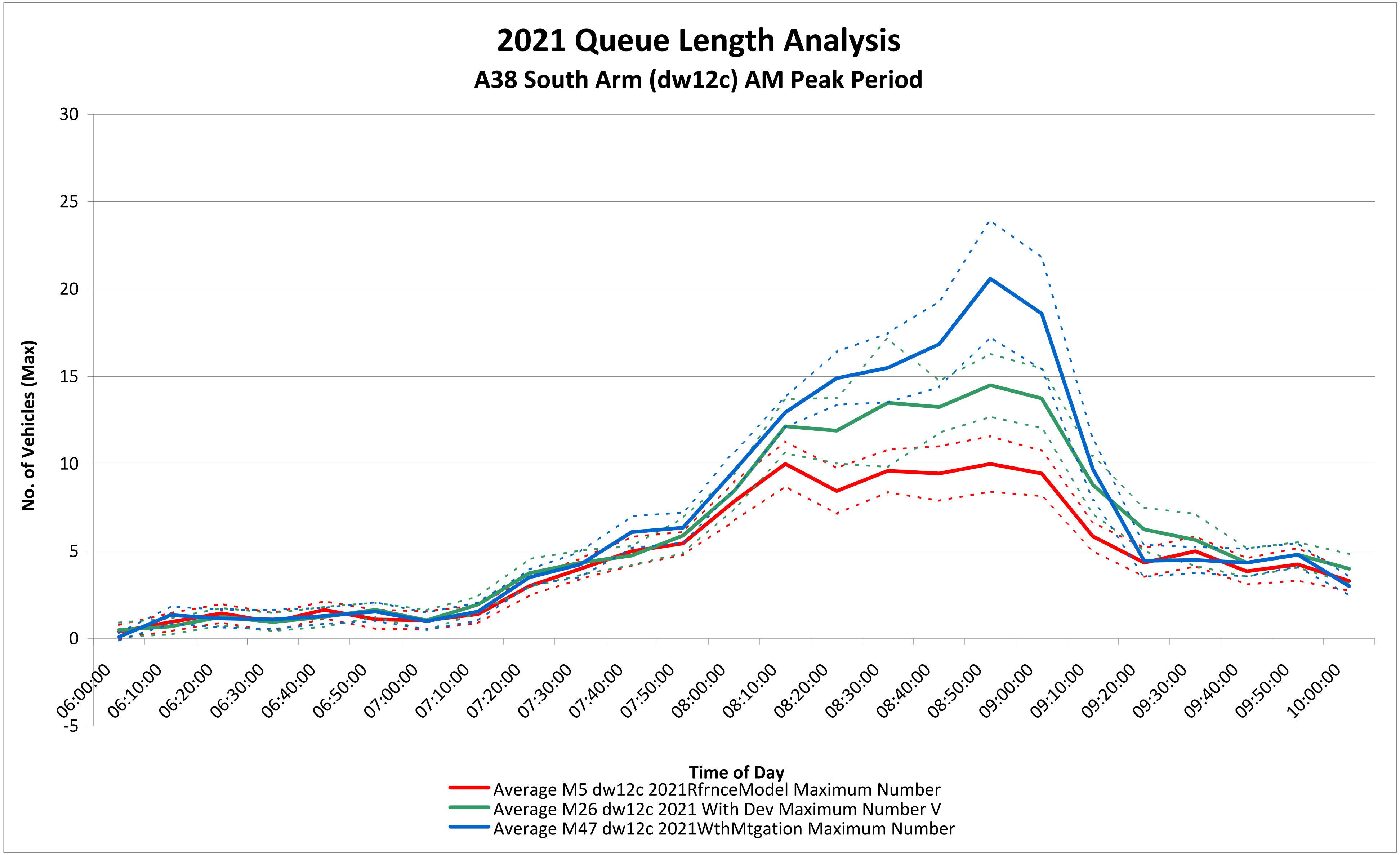
17:00:00
17:20:00
17:40:00
18:00:00
18:20:00
18:40:00
19:00:00
19:20:00
19:40:00
Time of Day
Average M5 dw12c 2021RfrnceModel Maximum Number
Average M26 dw12c 2021 With Dev Maximum Number V
Average M47 dw12c 2021WthMtgation Maximum Number



2021 Queue Length Analysis
A38 South Arm (dw12c) AM Peak Period
30
25
20
15
10
5
0
-5
No. of Vehicles (Max)
06:00:00
06:10:00
06:20:00
06:30:00
06:40:00
06:50:00
07:00:00
07:10:00
07:20:00
07:30:00
07:40:00
07:50:00
08:00:00
08:10:00
08:20:00
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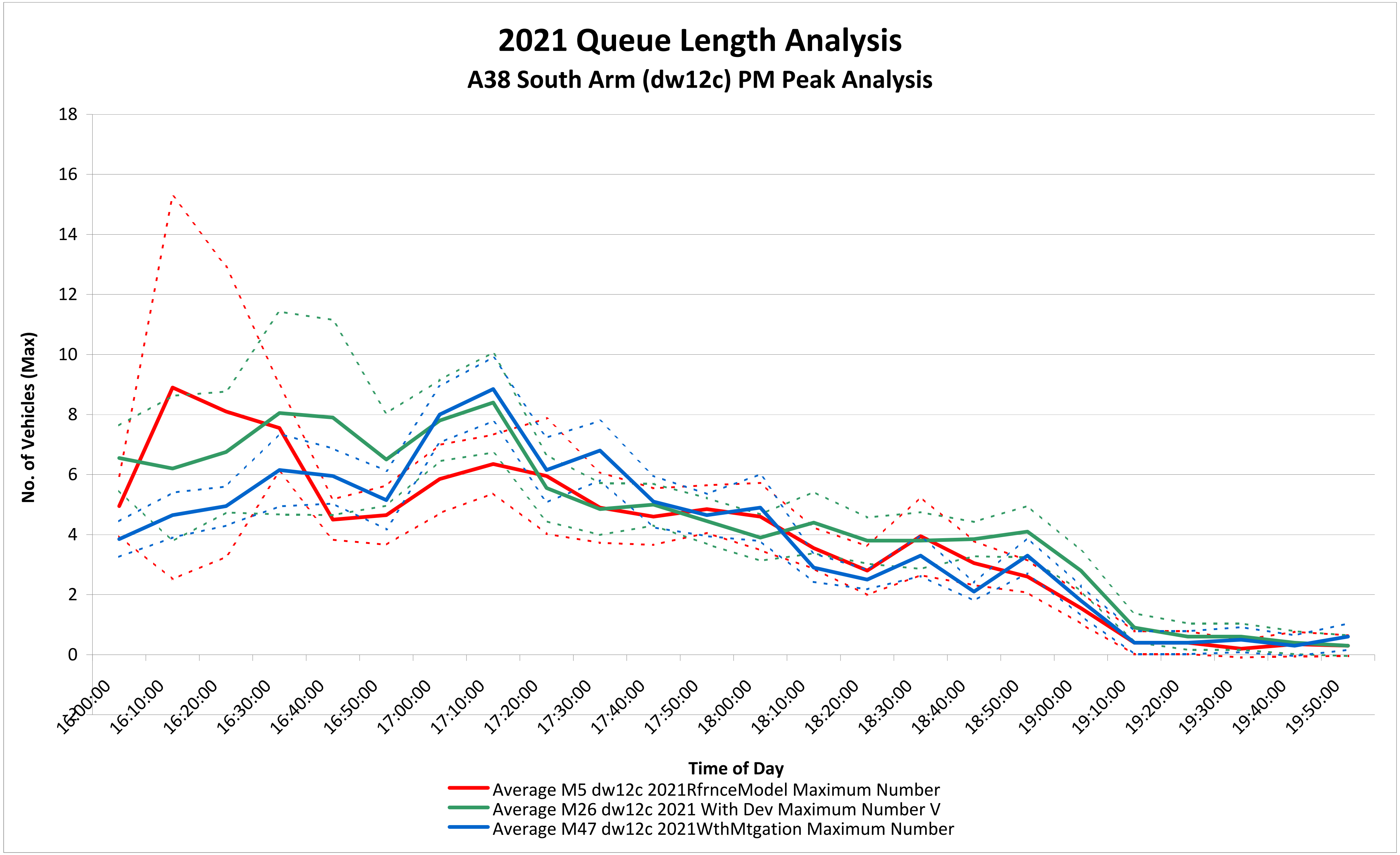
08:40:00
08:50:00
09:00:00
09:10:00
09:20:00
09:30:00
09:40:00
09:50:00
10:00:00
Time of Day
Average M5 dw12c 2021RfrnceModel Maximum Number
Average M26 dw12c 2021 With Dev Maximum Number V
Average M47 dw12c 2021WthMtgation Maximum Number


2021 Queue Length Analysis
A38 South Arm (dw12c) PM Peak Analysis
No. of Vehicles (Max)
18
16
14
12
10
8
6
4
2
0
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00
17:20:00
17:30:00
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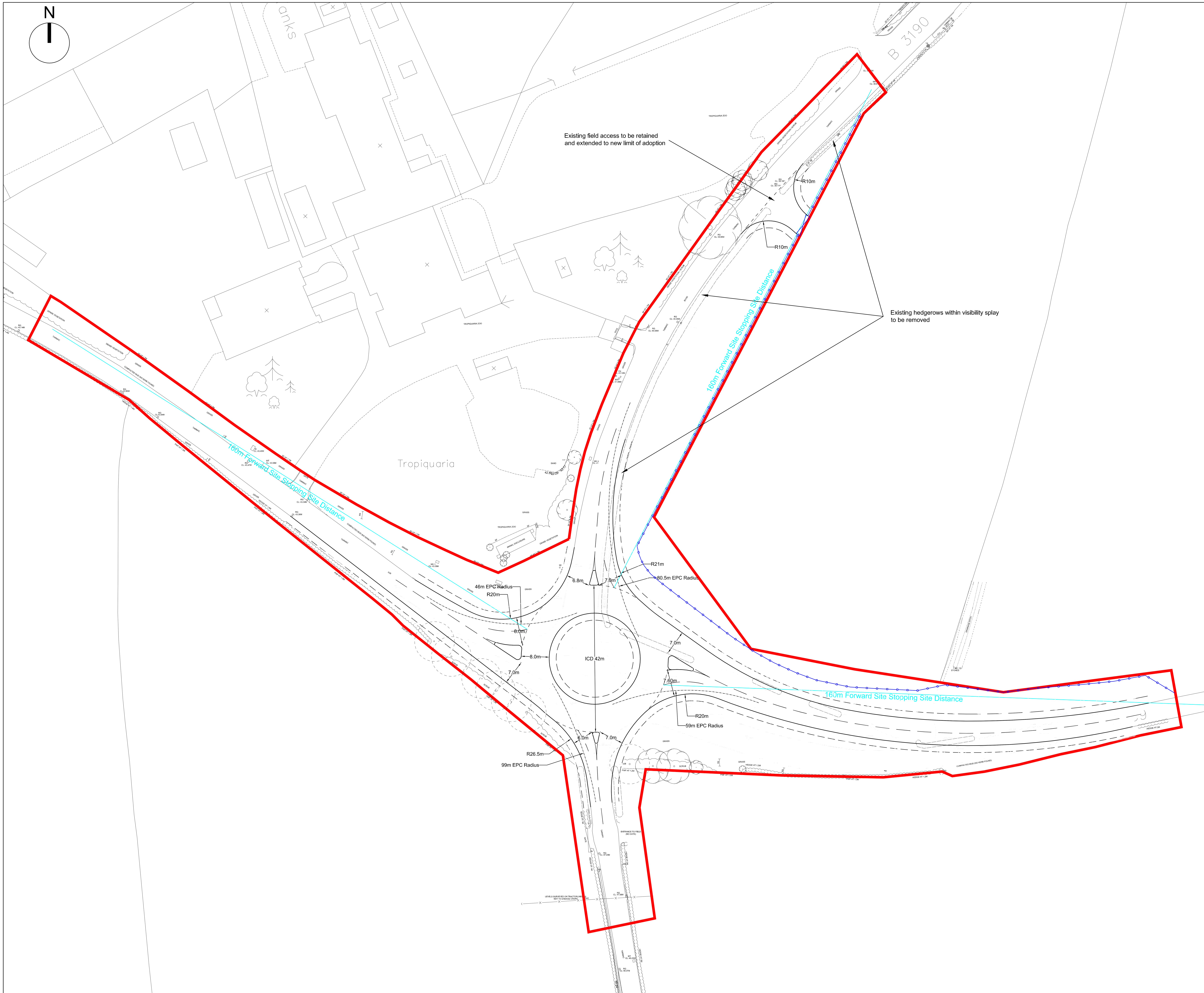
18:00:00
18:10:00
18:20:00
18:30:00
18:40:00
18:50:00
19:00:00
19:10:00
19:20:00
19:30:00
19:40:00
19:50:00
Time of Day
Average M5 dw12c 2021RfrnceModel Maximum Number
Average M26 dw12c 2021 With Dev Maximum Number V
Average M47 dw12c 2021WthMtgation Maximum Number

APPENDIX 16.1: HIGHWAY IMPROVEMENT PLANS



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO for details.

KEY

- Proposed Washford Cross Roundabout Development Site Boundary (the site)
- Post and rail boundary fence
- Lockable gate
- Forward site stopping distance visibility
- General earthworks slopes
- Existing trees to remain
- Existing tree to be removed
- Existing hedgerows

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	RH	RH	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

WASHFORD CROSS ROUNDABOUT
PROPOSED SITE LAYOUT AND
GENERAL ARRANGEMENT

Regulation 5(2)(o)

FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
000101	01	1:500 @A1	SEPT 2011

DOCUMENT

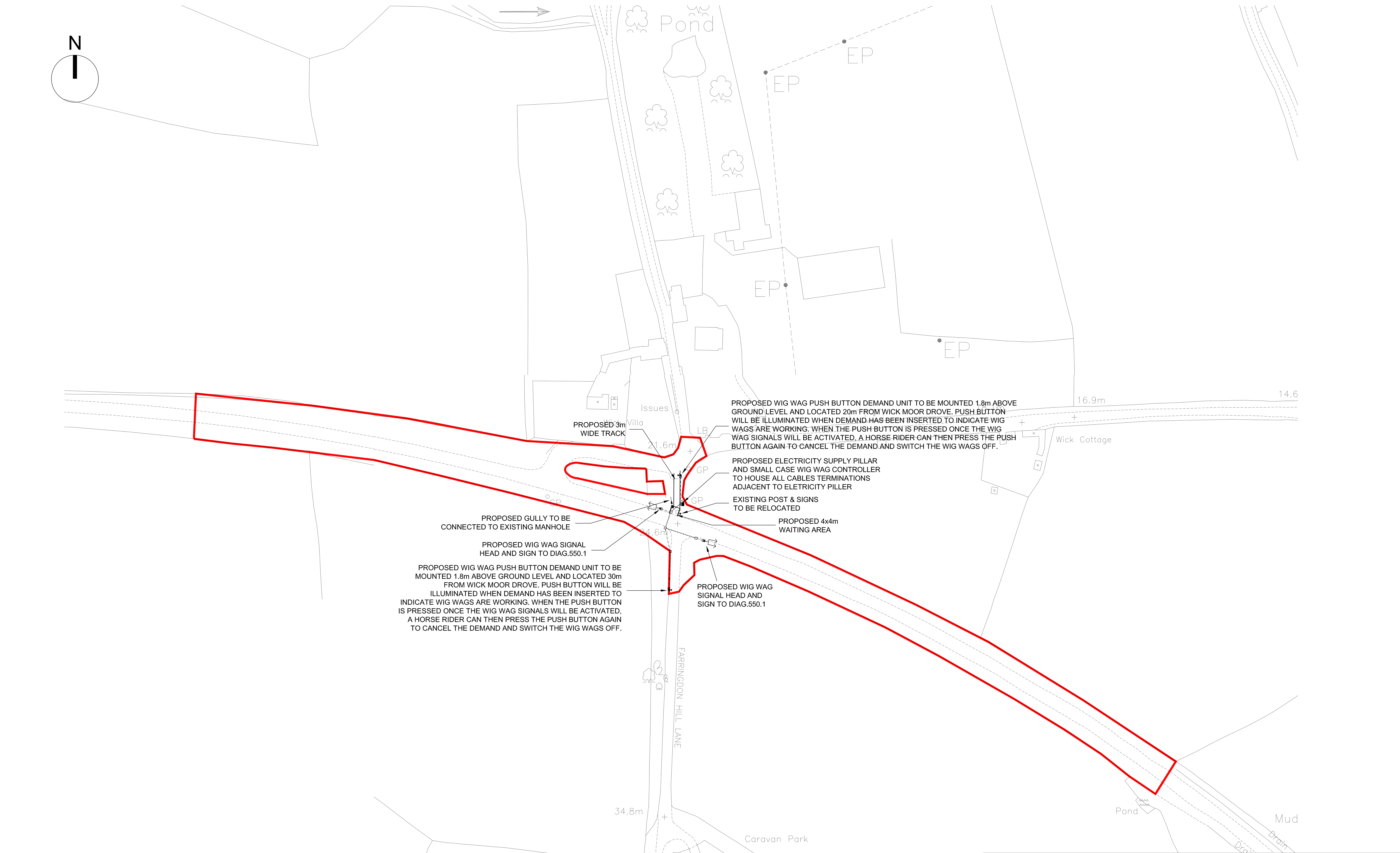
HPC-NNBPEA-AD-000-REP-000039

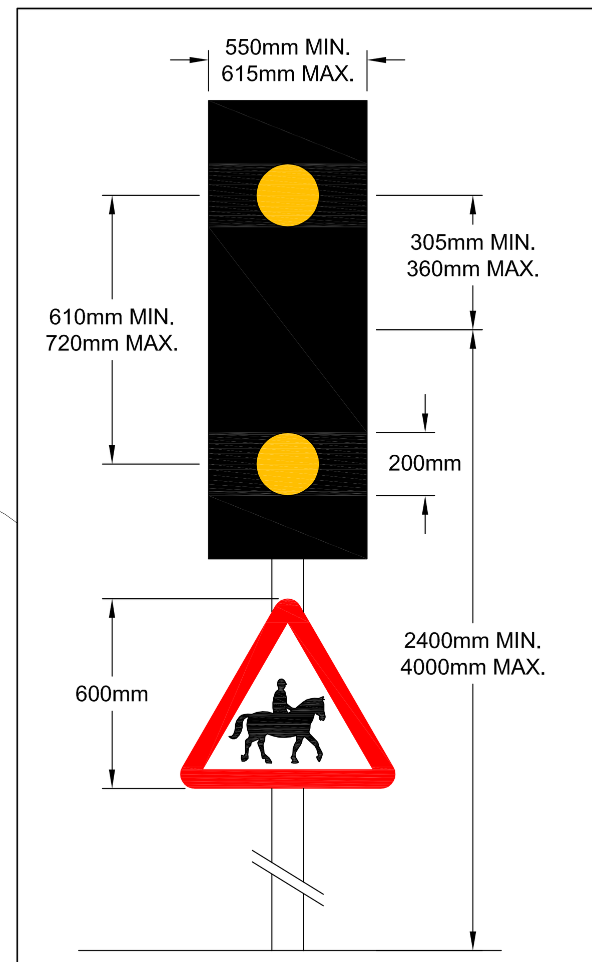
SCALE BAR

0 5 10 25 50
metres

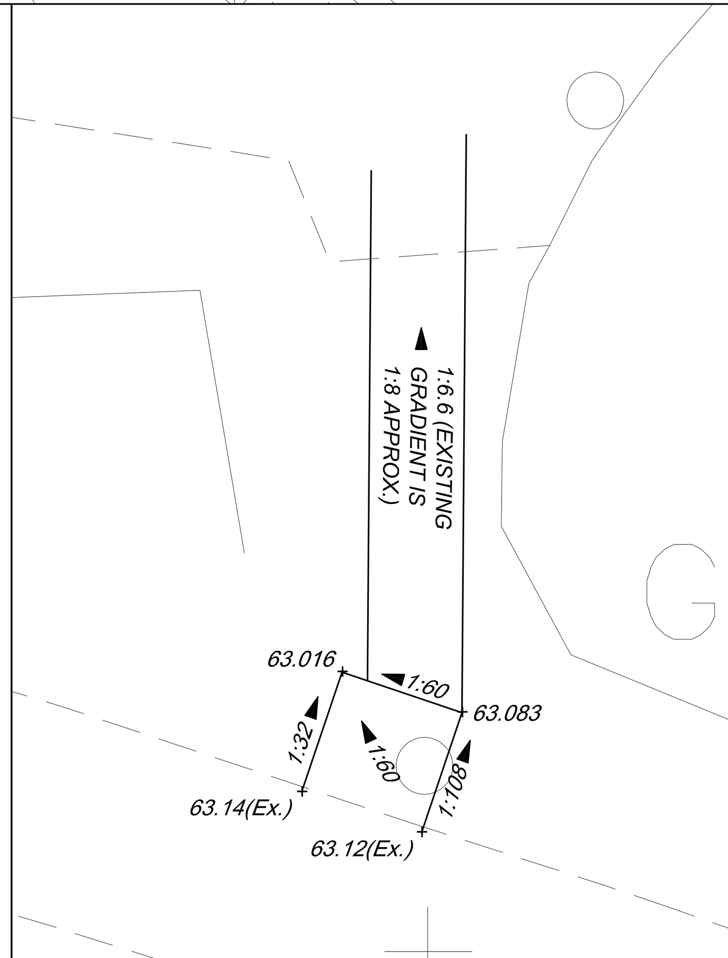
DRAWING SECURITY CLASSIFICATION

- ☐ PROTECTIVE MARKING REQUIRED
- ☒ NOT PROTECTIVELY MARKED





WIG WAG SIGNAL HEAD



LEVELS & GRADIENTS

NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO
3. For changes to existing landscaping refer to the Tree and Hedgerow Retention and Removal Plan

KEY:

- Proposed C182 Horse Crossing Development Site Boundary (the site)
- Proposed wooden fence
- Proposed gully & connection
- Proposed 4m signal pole
- Wig wag signal head
- Wig wag push button demand unit
- Wig wag controller
- Electricity supply pillar ("haldo")
- 1 no. polyethelene 100mm duct
- 2 no. polyethelene 100mm duct
- NAL RS115 type pole box with duct foot
- Access box 600mm x 450mm
- Access box 450mm x 450mm
- High friction surfacing, colour black

TRAFFIC SIGNS SHEDULE:

	Sign Ref. No: N/A		Sign Ref. No: N/A
Diag. No.	550.1	Diag. No.	548.1
Size (Height)	600mm	Size (x-Height)	62.5mm
Symbol/Text	Black	Symbol/Text	Black
Background	White	Background	White
Border	Red	Border	Red
Material	Class-1	Material	Class-1
Mounting height	2400mm MIN.	Mounting height	2400mm MIN.
Illumination	External	Illumination	External

(Sign 548.1 text: When lights show 200yds)

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

C182 HORSE CROSSING
GENERAL ARRANGEMENT,
ROAD MARKINGS AND SIGNAGE

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
102	01	1:1000 @A1	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

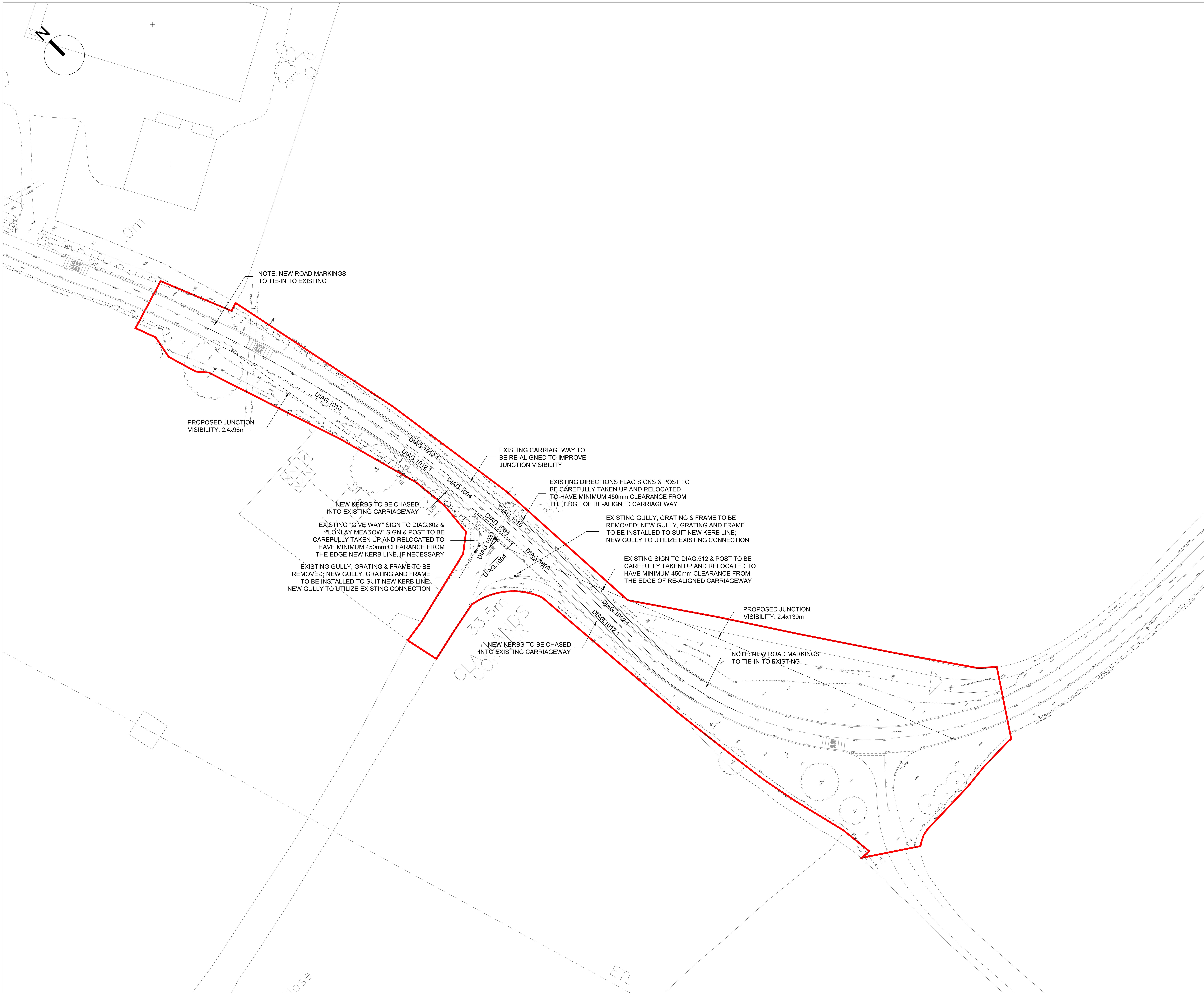
SCALE BAR

SCALE IN METRES 1:1000
0 20 40 60

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO
3. For changes to existing landscaping refer to the Tree and Hedgerow Retention and Removal Plan

KEY

Proposed Claylands Corner Development Site Boundary (the site)

Proposed junction visibility

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

CLAYLANDS CORNER JUNCTION
GENERAL ARRANGEMENTS,
ROAD MARKINGS AND SIGNAGE

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
202	01	1:500 @A1	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

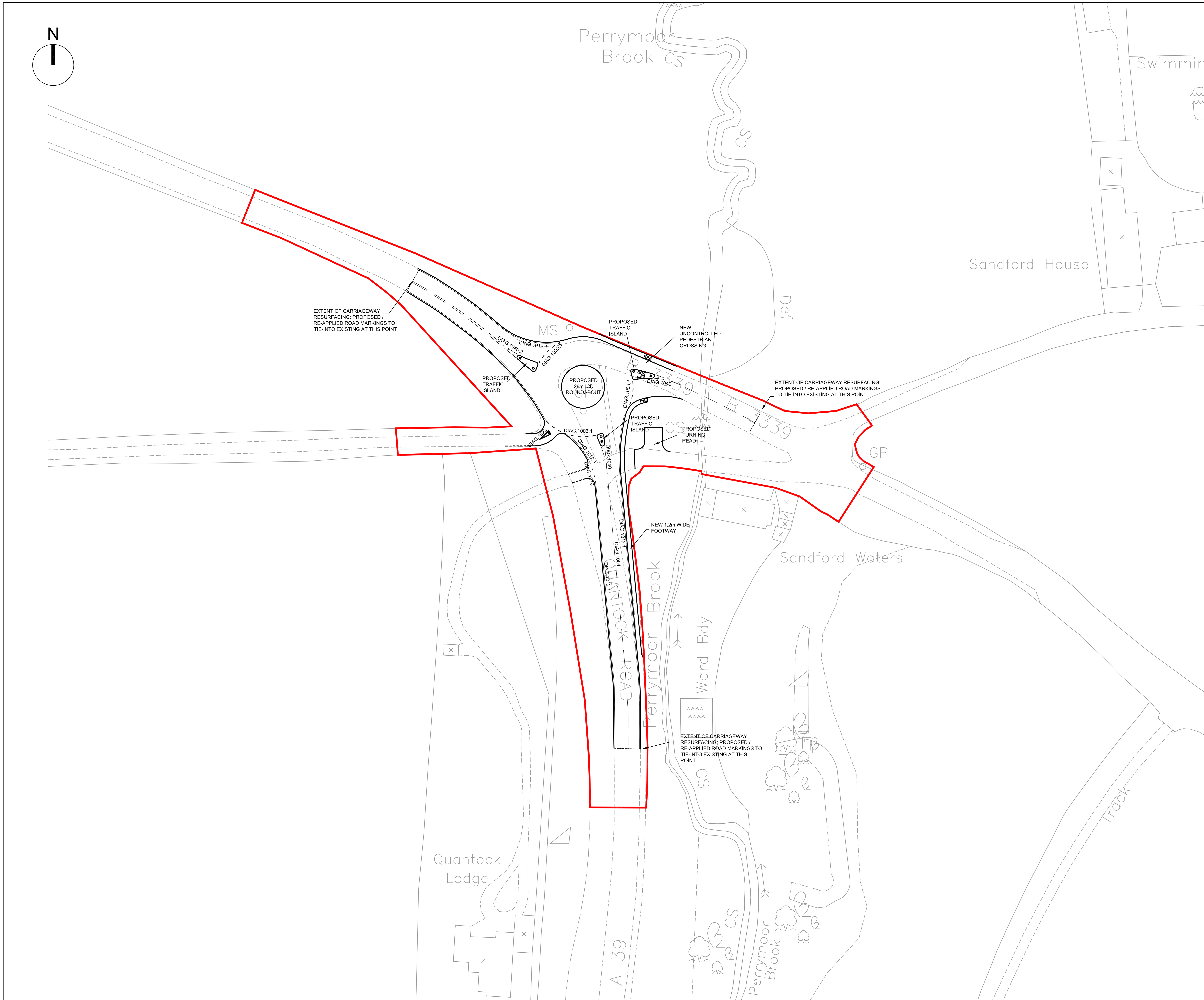
SCALE IN METRES 1:500

0 5 10 15 20 25 30

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

☒ NOT PROTECTIVELY MARKED



NOTES:
1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO
3. For changes to existing landscaping refer to the Tree and Hedgerow Retention and Removal Plan

KEY

(red outline)	Proposed A39 New road / B3339 Sandford Hill Roundabout Development Site Boundary (the site)
(symbol)	Proposed blank face illuminated bollard
(symbol)	Proposed keep left illuminated bollard
(symbol)	Proposed tactile paving

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

A39 NEW ROAD / B3339 SANDFORD HILL ROUNDABOUT GENERAL ARRANGEMENTS, ROAD MARKINGS AND SIGNAGE

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
302	01	1:500 @A1	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

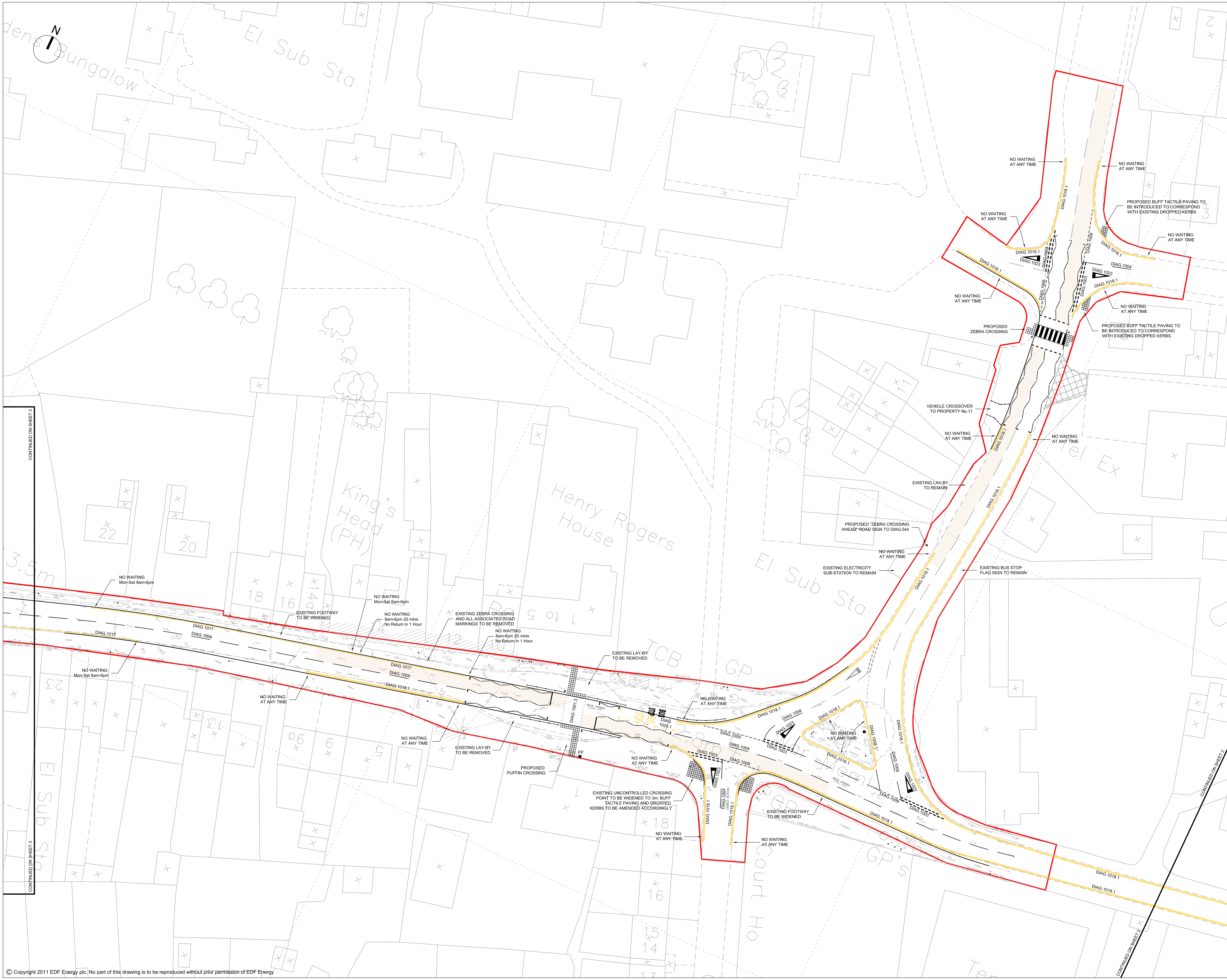
SCALE BAR

SCALE IN METRES 1:500
0 5 10 15 20 25 30

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

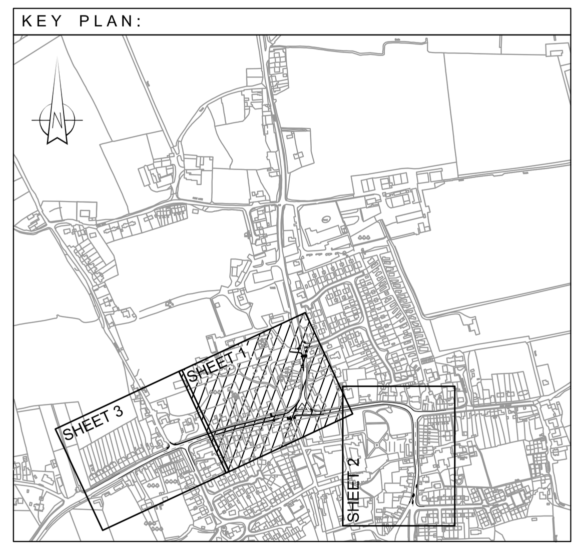
☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO

KEY PLAN:



KEY:

- Proposed Cannington Development Site Boundary (the site)
- Tactile paving, colour buff (400x400mm slabs) used on all uncontrolled pedestrian dropped crossings
- Tactile paving, colour red (400x400mm slabs) used on all controlled pedestrian dropped crossings
- High friction surfacing, colour buff to be laid onto wearing course 50m in advance of stop line
- High visibility pedestrian guardrail
- Proposed traffic signal pole / belisha beacon
- RS Proposed / relocated road sign
- FP Proposed / relocated feeder pillar

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

CANNINGTON TRAFFIC CALMING
GENERAL ARRANGEMENTS,
ROAD MARKINGS AND SIGNAGE
1 OF 3

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
402.1	01	1:250 @A0	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

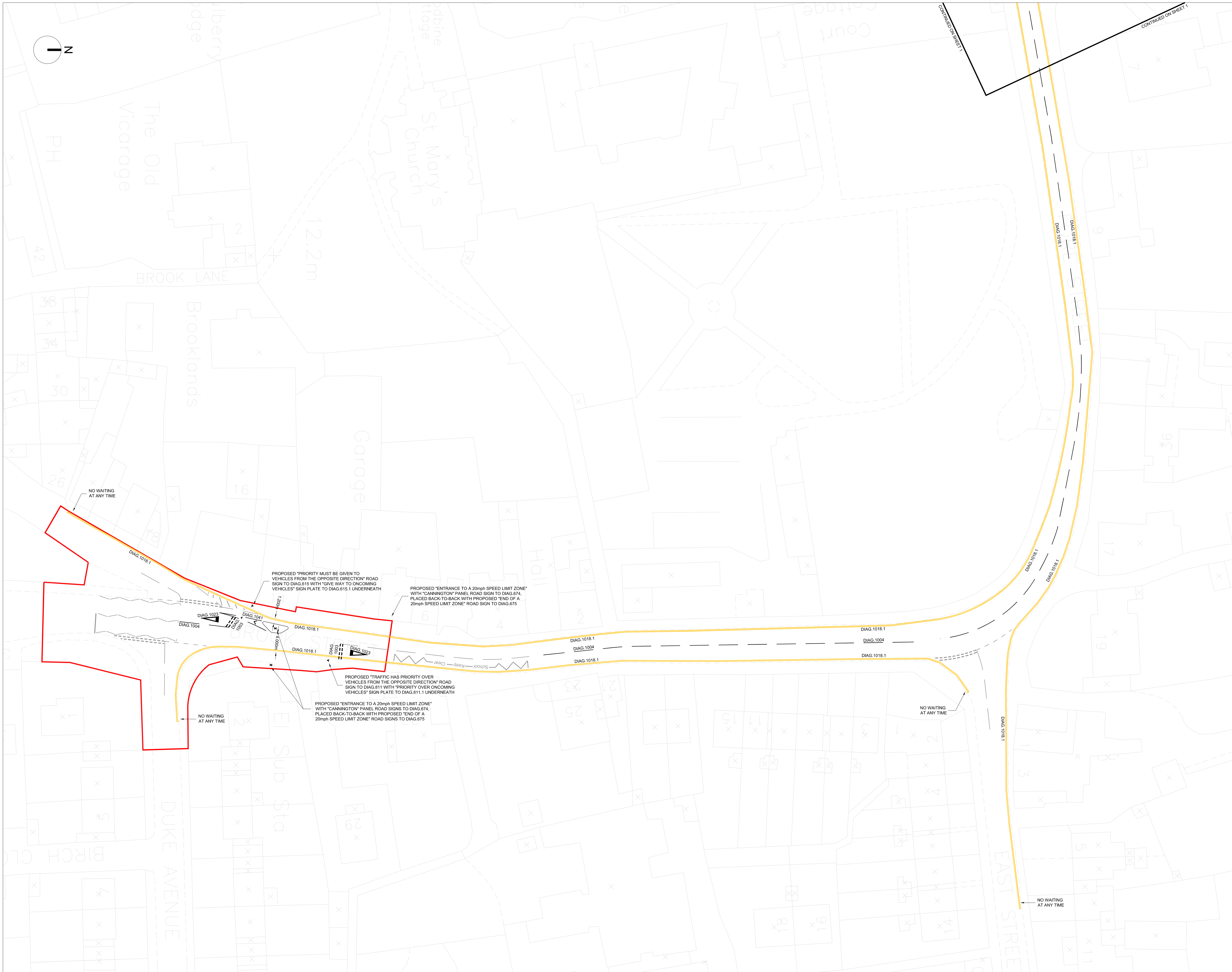
SCALE IN METRES 1:250

0 5 10 15

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

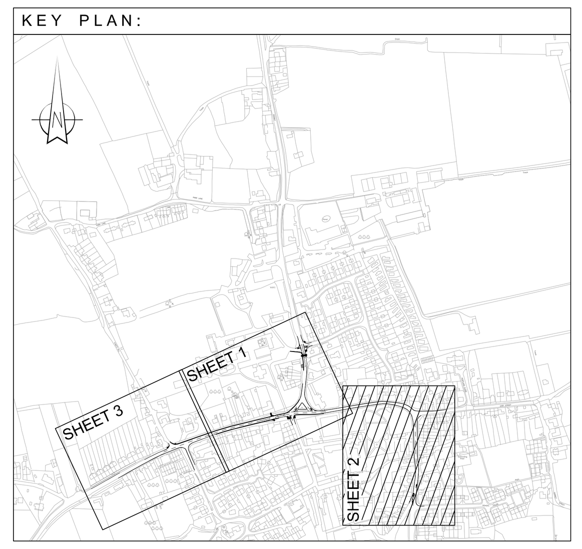
☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO

KEY PLAN:



KEY:

- Proposed Cannington Development Site Boundary (the site)
- RS — Proposed / relocated road sign

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

CANNINGTON TRAFFIC CALMING
GENERAL ARRANGEMENTS,
ROAD MARKINGS & SIGNAGE
2 OF 3

Regulation 5(2)(o)

FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
402.2	01	1:250 @A0	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

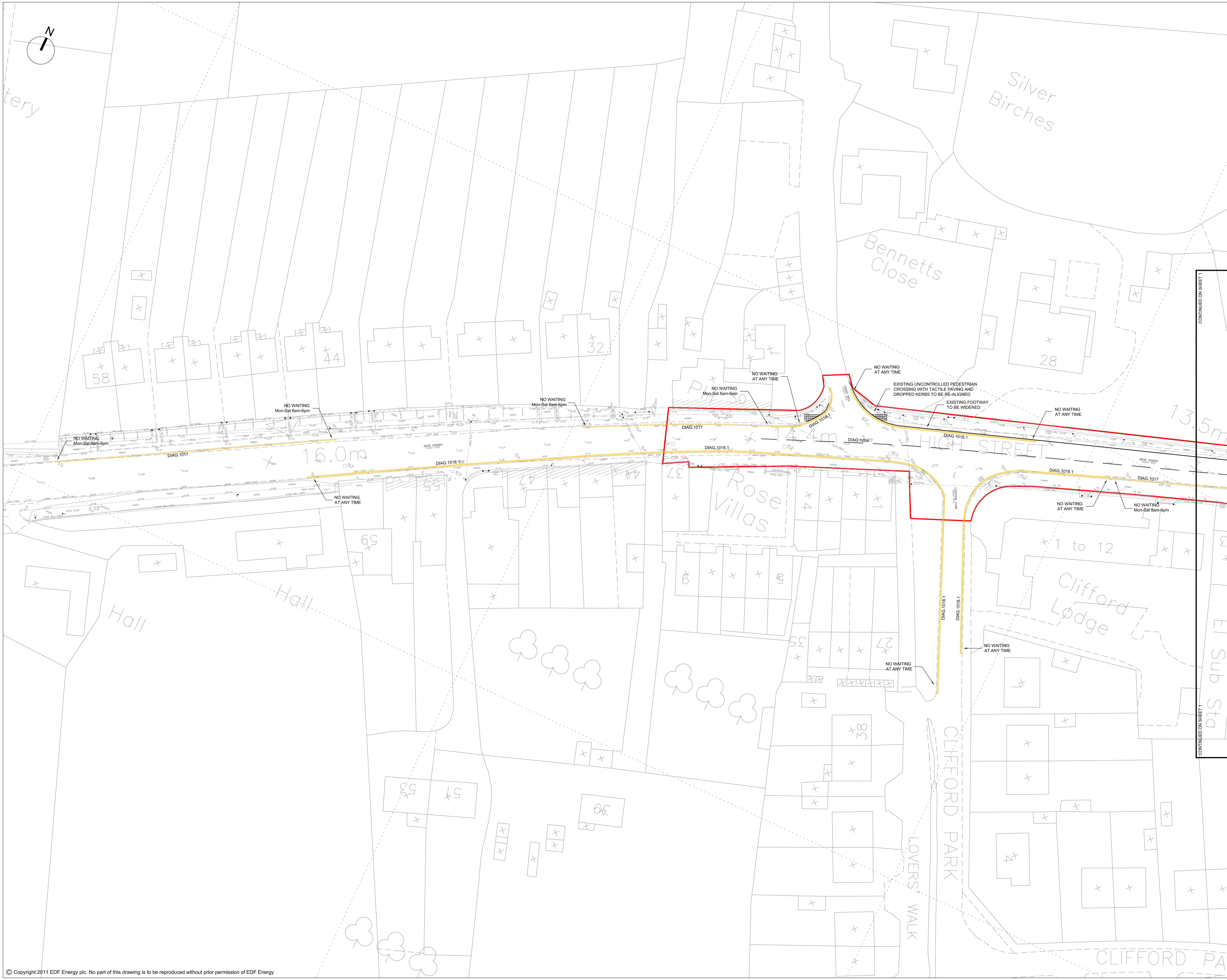
SCALE BAR

SCALE IN METRES 1:250

0 5 10 15

DRAWING SECURITY CLASSIFICATION

- [ ] PROTECTIVE MARKING REQUIRED
- [x] NOT PROTECTIVELY MARKED



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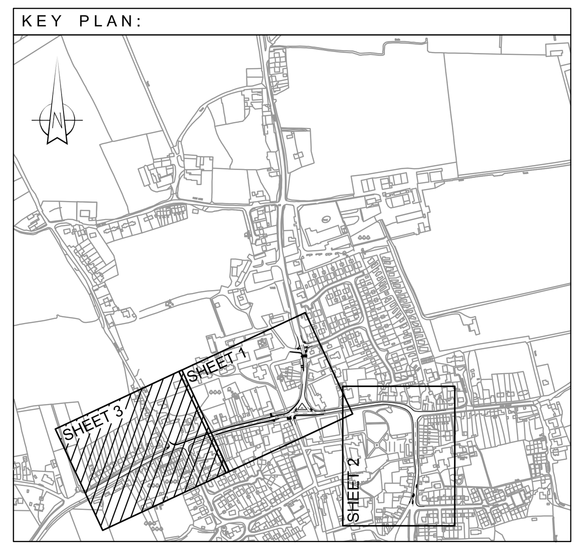
NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO

KEY PLAN:



KEY:

Proposed Cannington Development Site Boundary (the site)

Tactile paving

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

CANNINGTON TRAFFIC CALMING
GENERAL ARRANGEMENTS,
ROAD MARKINGS AND SIGNAGE
3 OF 3

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
402.3	01	1:250 @A0	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

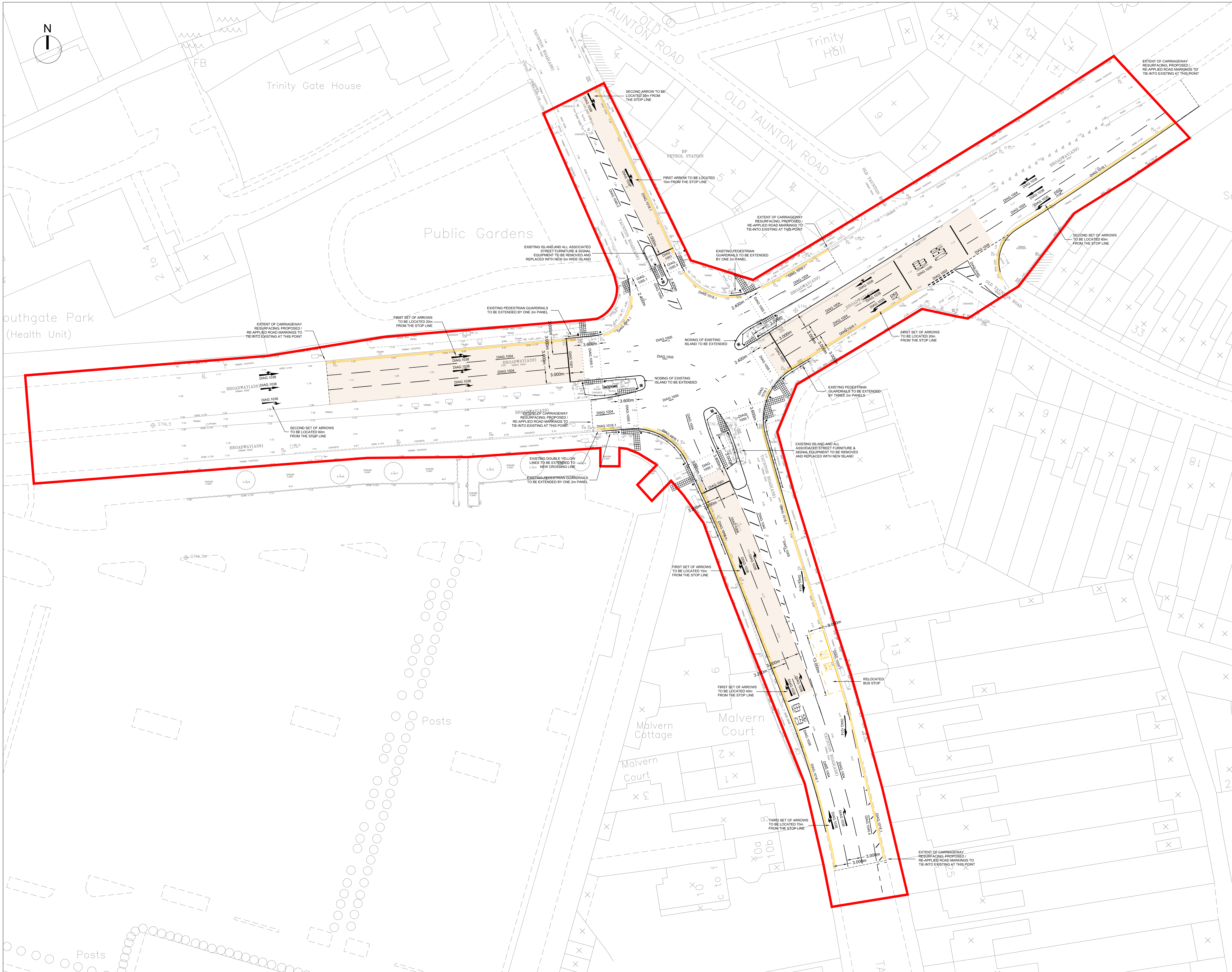
SCALE IN METRES 1:250

0 5 10 15

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO

KEY:

- Proposed A39 Broadway / A38 Taunton road junction development site boundary (the site)
- Tactile paving, colour buff (400x400mm SLABS) Used on all uncontrolled pedestrian dropped crossings
- Tactile paving, colour red (400x400mm SLABS) Used on all controlled pedestrian dropped crossings
- High friction surfacing, colour buff to be laid onto wearing course 50m in advance of stop line
- High visibility pedestrian guardrail
- Proposed traffic signal pole
- Proposed illuminated bollard

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

A39 BROADWAY / A38 TAUNTON ROAD JUNCTION
GENERAL ARRANGEMENTS,
ROAD MARKINGS AND SIGNAGE

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
502	01	1:250 @A0	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

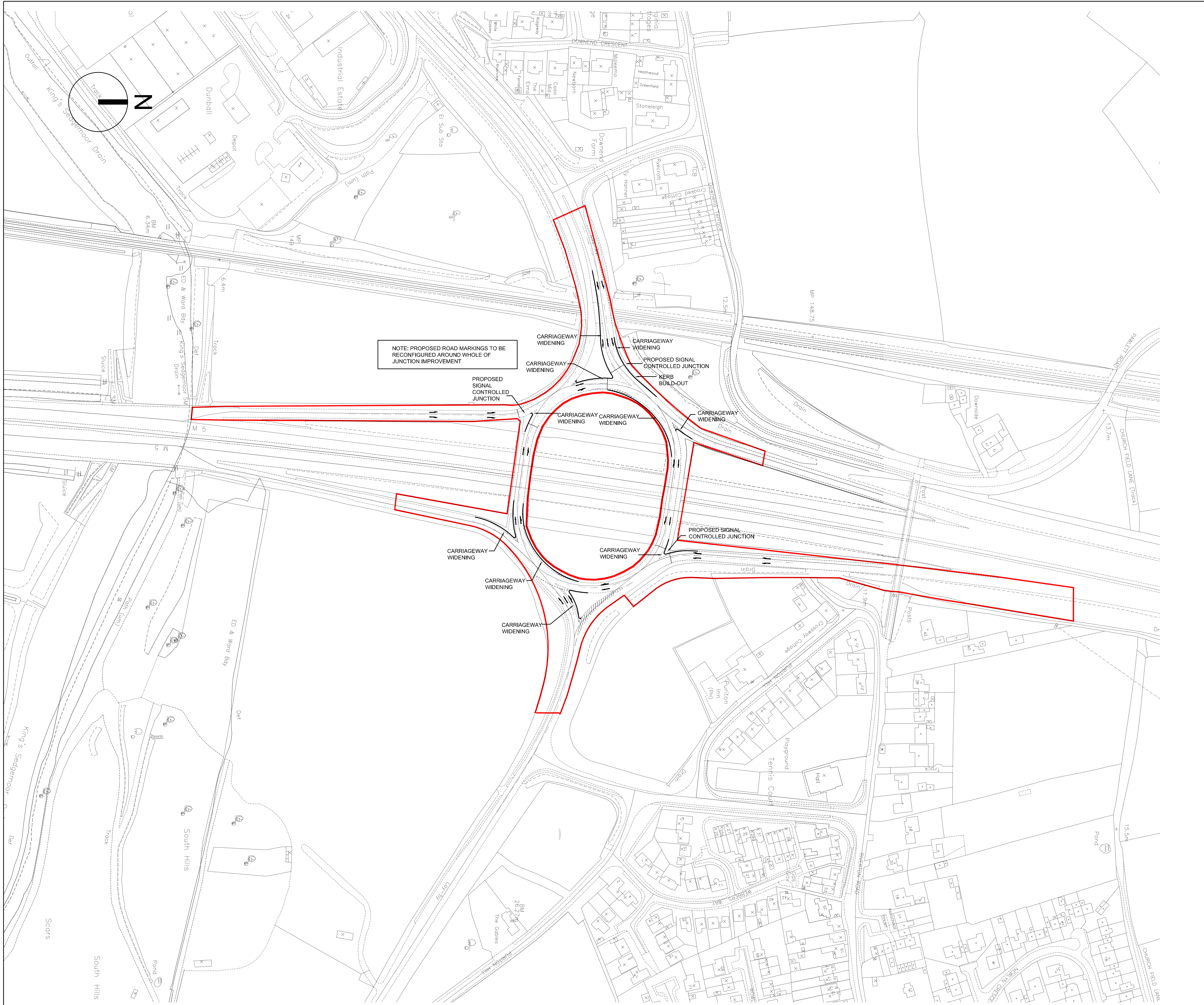
SCALE IN METRES 1:250

0 5 10 15

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement, refer to the DCO.

KEY

Proposed M5 junction 23 roundabout development site boundary (the site)

Proposed kerb re-alignment (carriageway widening)

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

M5 JUNCTION 23 ROUNDABOUT GENERAL ARRANGEMENT

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRG. REF. NO.	REVISION	SCALE	DATE
602	01	1:2000 @A2	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

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DRAWING SECURITY CLASSIFICATION

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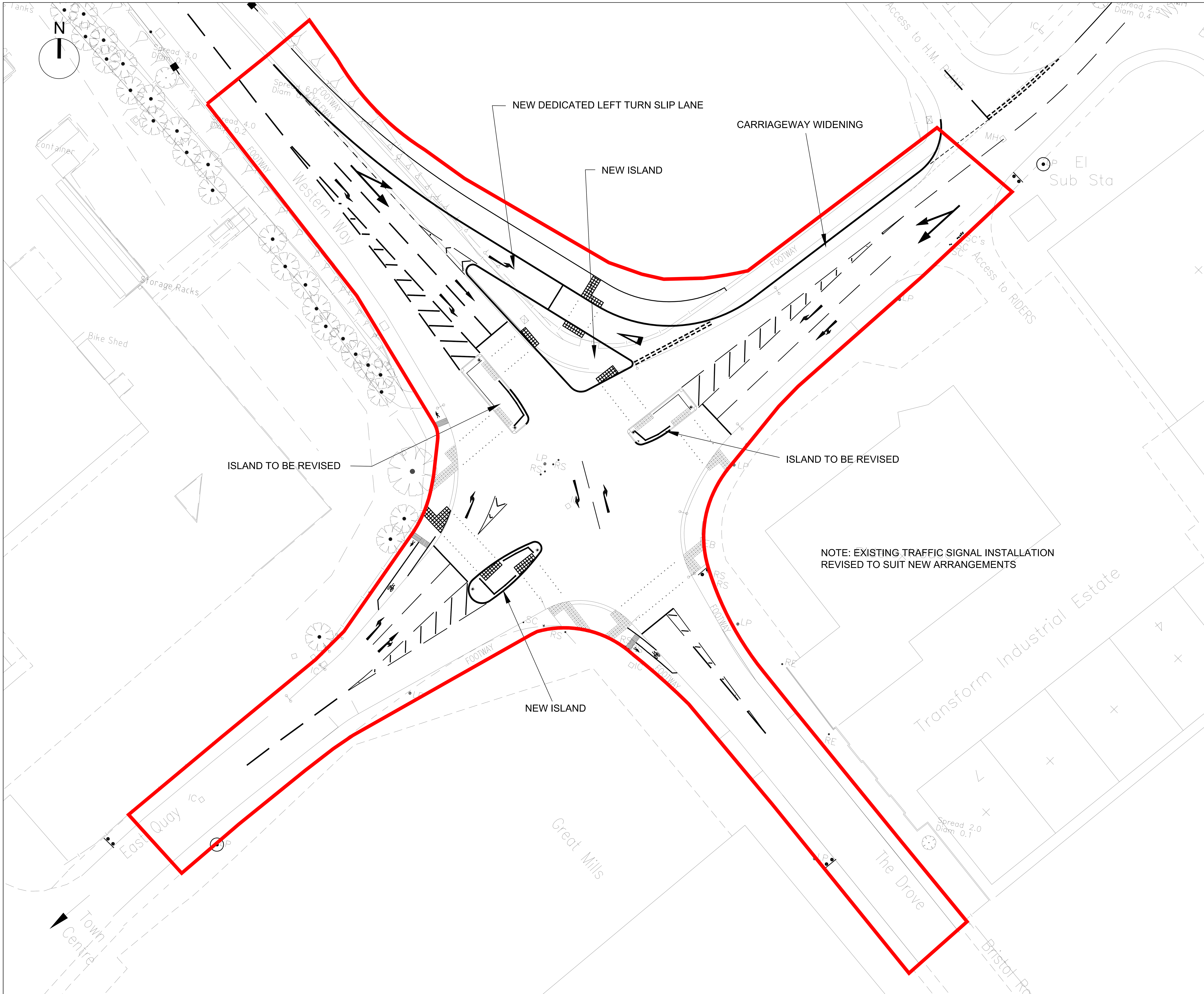

NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement. Refer to the DCO

KEY

- Proposed Wylds Road/The Drove Development Site Boundary (the site)
- Carriageway re-alignment (carriageway widening)
- Tactile paving, colour red (400x400mm slabs) Used on all controlled pedestrian dropped crossings
- Existing corduroy paving
- Existing tactile paving
- Existing road sign

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/ COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

WYLDS ROAD - THE DROVE
GENERAL ARRANGEMENT

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRAWING REFERENCE NO.	REVISION	SCALE	DATE
702	01	1:250 @A1	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

SCALE IN METRES 1:250

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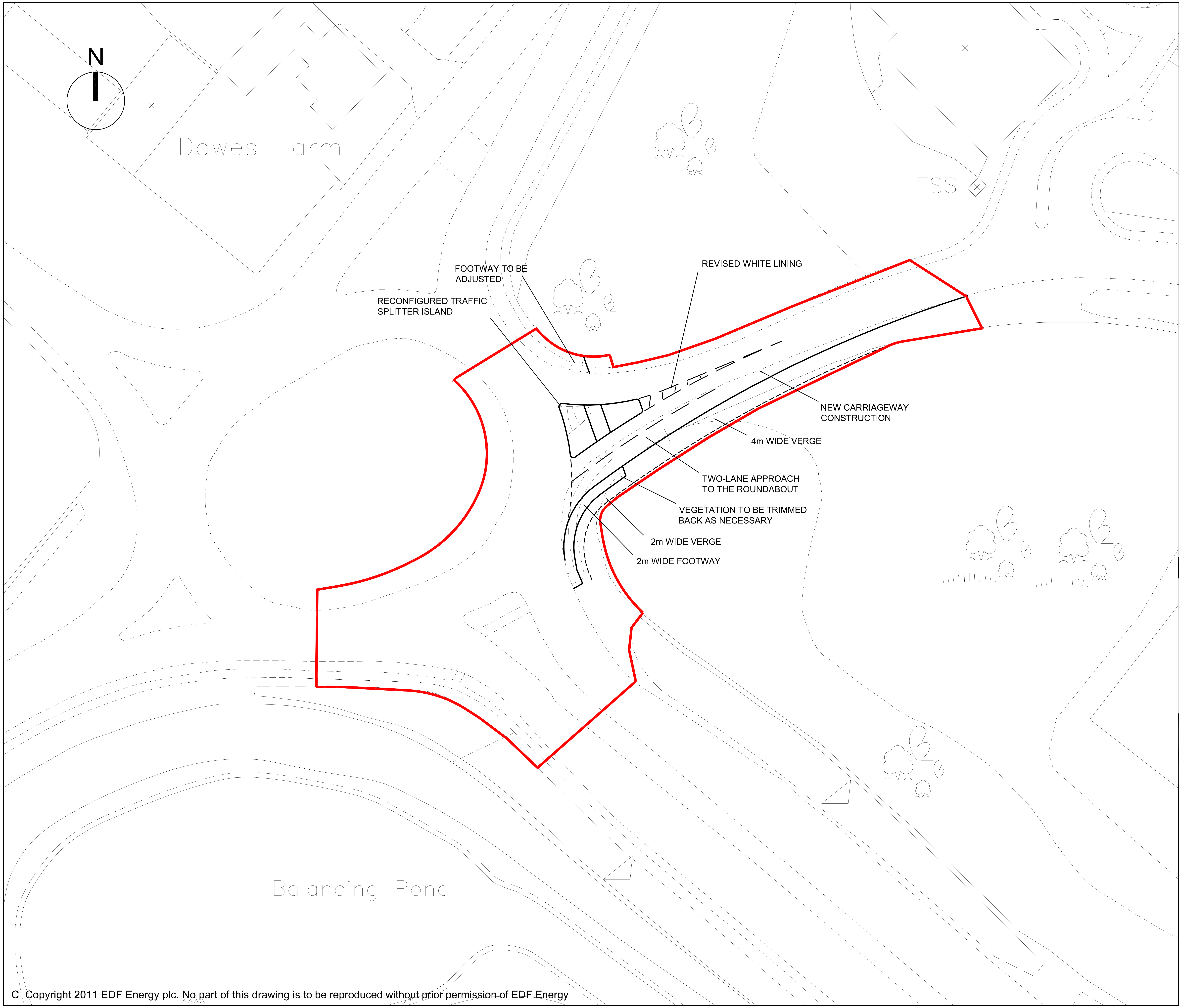
☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement, refer to the DCO.

KEY

Proposed Huntworth roundabout Development Site Boundary (the site)

Carriageway re-alignment

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

HUNTWORTH ROUNDABOUT GENERAL ARRANGEMENT

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRG. REF. NO.	REVISION	SCALE	DATE
802	01	1:500 @A2	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

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DRAWING SECURITY CLASSIFICATION

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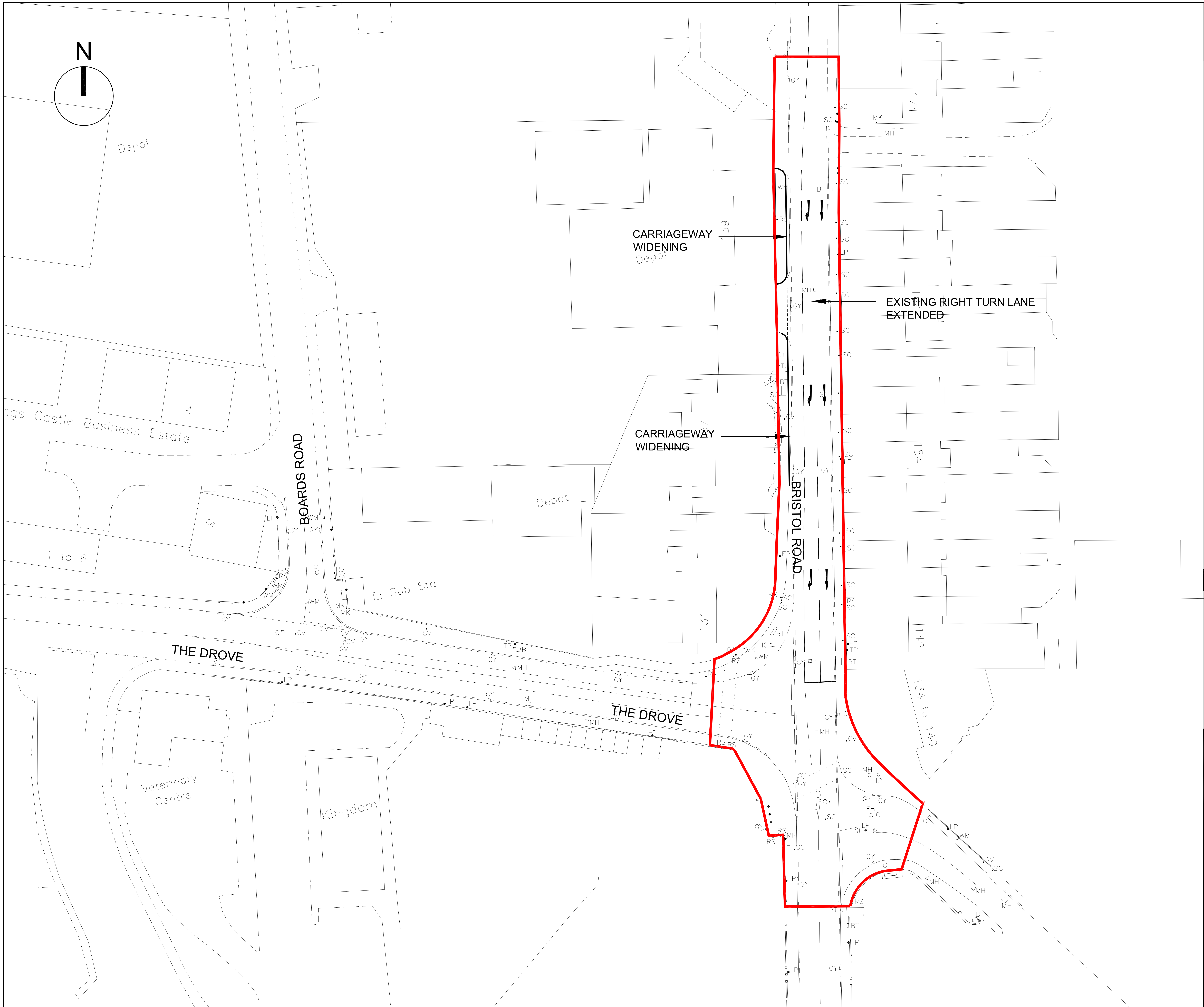
☒ NOT PROTECTIVELY MARKED



NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement, refer to the DCO.

KEY

Proposed A38 Bristol Road / The Drove junction Development Site Boundary (the site)

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

A38 BRISTOL ROAD / THE DROVE JUNCTION GENERAL ARRANGEMENT

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRG. REF. NO.	REVISION	SCALE	DATE
902	01	1:500 @A2	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

SCALE IN METRES 1:500

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DRAWING SECURITY CLASSIFICATION

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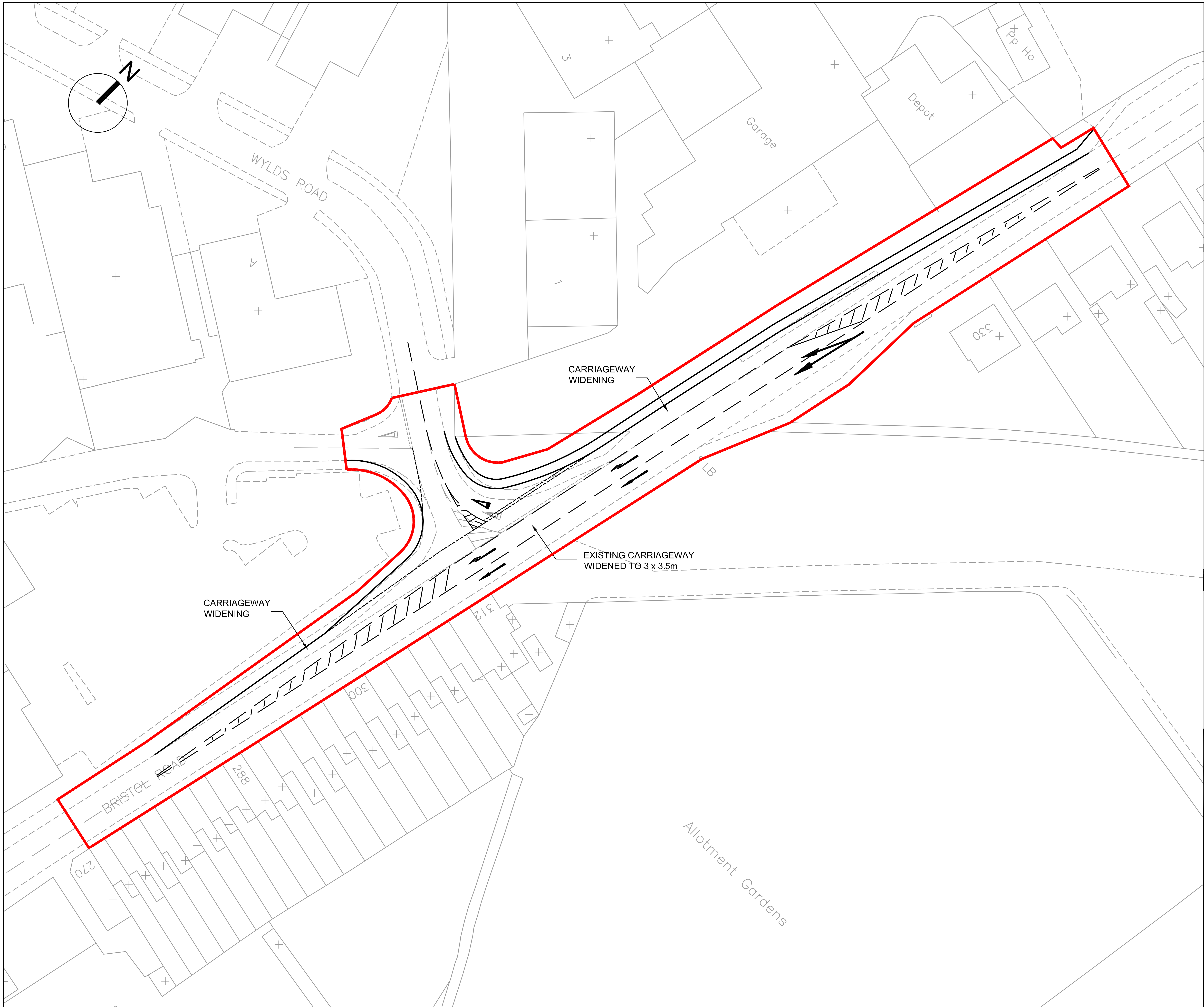

NOTES:

1. This drawing is for planning purposes only and shall not be used for construction or any other purposes
2. The development shall be constructed as shown on the drawing unless alternative details are submitted and approved pursuant to a requirement, refer to the DCO.

KEY

- Proposed A38 Bristol road / Wylds road junction Development Site Boundary (the site)
- Proposed carriageway re-alignment

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION/COMMENTS	APPROVED
01	SEPT 11	SBA	SBA	FOR IPC SUBMISSION	NNB

EDF ENERGY

HINKLEY POINT C

DRAWING TITLE

A38 BRISTOL ROAD /
WYLDS ROAD JUNCTION
GENERAL ARRANGEMENT

Regulation 5(2)(o) FOR APPROVAL

PROJECT DRG. REF. NO.	REVISION	SCALE	DATE
1002	01	1:500 @A2	SEPT 2011

DOCUMENT

HPC-NNBPEA-AD-000-REP-000039

SCALE BAR

SCALE IN METRES 1:500

0 5 10 15 20 25 30

DRAWING SECURITY CLASSIFICATION

☐ PROTECTIVE MARKING REQUIRED

☒ NOT PROTECTIVELY MARKED

APPENDIX 17.1: FRAMEWORK TRAVEL PLAN

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EXECUTIVE SUMMARY

This Framework Travel Plan has been prepared in support of the Development Consent Order (DCO) submitted by EDF Energy for the proposed development of a new Nuclear Power Station at Hinkley Point C. The Framework Travel Plan considers the management and movement of people involved in the construction and operation of the HPC Project. The Framework Travel Plan responds to EDF Energy's transport objectives for the project which are:

- To minimise the volume of traffic associated with the development of the new power station so far as reasonably practicable, at all times but especially during peak hours.
- To maximise the safe, efficient and sustainable movement of materials required for the HPC Project so far as reasonably practicable.
- To minimise the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable.
- To provide long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate.
- To take all reasonable steps to ensure the resilience of the transport network in the event of an incident.
- To take all reasonable steps to protect the natural and built environment.

Transport Strategy and Travel Plan

The Hinkley Point C Project (HPC) is not a conventional project. Rather than giving encouragement to use sustainable modes of transport, EDF Energy's transport strategy will require that workers use a prescribed mode of travel. Therefore the transport strategy delivers a very high non car mode share. The Framework Travel Plan builds on this strategy and seeks to achieve further improvements in certain areas.

At peak construction the transport strategy will deliver the following approximate modal share in respect of the daily journey to work for the construction workforce:

- Direct Bus to Site: 21%
- Campus accommodation bus (or resident at the on-site campus): 26%
- Park and Ride: 49%
- Car Driver to site: 4%

The Framework Travel Plan concentrates on area where there could be further improvements as follows:

- Walking and cycling.
- Public bus to park and ride sites.
- Car sharing.
- Rail use.

Management of the Travel Plans

Overall management and implementation of the transport strategy and the Travel Plans will be the responsibility of EDF Energy. The Framework Travel Plan will be used as the framework within which site specific travel plans are developed.

A Transport Co-ordinator will be appointed by EDF Energy and be in place throughout the construction phase of the HPC Project although the role will change and evolve over time. The Transport Co-ordinator will be responsible for the management, development and implementation of the Travel Plans for the duration of the HPC Project.

A Transport Review Group (TRG) will be established with members of the key transport stakeholders and EDF Energy. The purpose of the TRG is to review the performance of the Travel Plans and advise on potential revisions.

A separate Transport Forum, a body of town and parish councillors, which is responsible for representing the views of the local community, has already been established. The Forum will continue to meet at regular intervals during the life of the HPC Project and will be able to provide feedback to the TRG.

Travel Plan Measures

A range of measures have been developed to promote and facilitate the use of sustainable modes of travel wherever possible. Some of these measures are more prescriptive and will be delivered as part of the transport strategy for the HPC Project, whilst other softer measures are set out within this Framework Travel Plan. They include:

- A bus fleet funded by EDF Energy to transport workers to and from the HPC Development Site including direct bus services, park and ride bus services and accommodation campus bus services. The services will be free to workers (transport strategy);
- A strict requirement that workers will only use the mode of transport allocated to them be it direct bus, campus bus or park and ride bus (transport strategy);
- Constraining and controlling on-site parking to essential workers and visitors only (transport strategy); and
- The promotion of viable sustainable transport options such as walking, cycling, public bus and rail through encouragement, and provision of information and incentives as appropriate (Framework Travel Plan).

Monitoring

The Framework Travel Plan will be monitored, reviewed and revised to ensure it remains effective. All monitoring will be the responsibility of EDF Energy and a monitoring strategy will be developed to ensure that the level of success in meeting identified performance targets can be measured for the duration of construction and operation of the HPC Project. The approach to monitoring encompasses both the transport strategy and the Framework Travel Plan.

The monitoring will follow best practice guidance as set out in the Somerset County Council Travel Plan Guidance documentation, ‘Moving Forward: Manual for Travel Plans’ December 2008, and the DfT document, ‘Good Practice Guidelines: Delivering Travel Plans through the Planning Process’ April 2009.

EDF Energy will implement a transport strategy which will prescribe the mode of travel the construction workforce will use. The primary method of enforcement is through the restriction in on-site car parking spaces during the construction, allied to the provision of convenient and regular bus services free of charge. The requirement to use the provided bus services will also be placed as a condition of contract on contractors. Therefore the mode share targets set out in the paragraph 3 above are expected to be achieved.

It is not considered appropriate to set additional performance targets for the Framework Travel Plan at this stage since appropriate targets will depend upon a range of factors including the precise location where workers live. However, this Framework Travel Plan identifies the area where additional targets will be set.

Funding

EDF Energy proposes to establish a joint fund for the Travel Plan within the Section 106 Agreement for the DCO Works. This fund would be used to implement any additional measures in the event that the Travel Plan requirements fail to be met.

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1. INTRODUCTION AND SCOPE

1.1 Introduction

1.1.1 NNB Generation Company Limited (part of EDF Energy and hereafter referred to as 'EDF Energy') is proposing to develop a new nuclear power station at Hinkley Point, Somerset, adjacent to the existing Hinkley Point Power Station Complex.

1.1.2 The new nuclear power station is referred to as the Hinkley Point C (HPC) power station and will comprise two United Kingdom European Pressurised Reactor (UK EPR) units. All other development adjacent to the nuclear power station is referred to as On-site Associated Development. Collectively this is referred to as the HPC Development Site. Development located away from the HPC Development Site is referred to as Off-site Associated Development. The development proposals at the HPC Development Site and the Off-site Associated Development are collectively referred to as the HPC Project.

1.1.3 The two UK EPR units will be constructed from 2011 (site preparation works) until mid 2020. The first unit is due to be operational by Quarter 1 2019 and the second unit some 18 months later. The plant is designed to operate for 60 years, which will be followed by around 25 years for decommissioning.

1.1.4 This Framework Travel Plan has been prepared in support of the Development Consent Order (DCO) application to the Infrastructure Planning Commission (IPC) under the Planning Act (2008). It is designed to act as a Framework and set the overarching principles which Site Specific Travel Plans will accord with.

1.1.5 This Framework Travel Plan builds on the Travel Plan submitted to West Somerset Council for the site preparation works stage of development and is designed to incorporate the full requirement of the DCO application including the comprehensive transport strategy which forms part of the HPC Project. It aims to address as many stakeholder comments as possible that have been the subject of discussion through the Transport Forum, regular Transport Workstream meetings and public consultation.

1.1.6 This Travel Plan is a 'live' document that will be regularly updated to represent the current situation. Regular monitoring will track that progress is being made towards achieving the performance targets. Appropriate adjustments will also be made to ensure that targets are met and maintained.

1.2 Travel Plan Scope

1.2.1 It is important to distinguish between EDF Energy's transport strategy and this Framework Travel Plan. The strategy will require that workers use a prescribed mode of travel and therefore delivers a very high non car mode share. Notwithstanding this EDF Energy are committed to encouraging a further mode shift through this Framework Travel Plan.

1.2.2 At peak construction the transport strategy will deliver the following approximate modal share in respect of the daily journey to work of the construction workforce:

- Direct Bus to Site: 21%
- Campus accommodation bus (or resident at the on-site campus): 26%
- Park and Ride: 49%
- Car Driver to site: 4%

1.2.3 The Travel Plan concentrates on areas where there could be further improvements as follows:

- Walking and cycling.
- Public bus to park and ride sites.
- Car sharing.
- Rail use.

1.2.4 This Framework Travel Plan is a management strategy that seeks to deliver sustainable transport objectives. It is an over-arching document which defines, in an integrated approach, how the transport demand created by the HPC Project will be managed. It provides a Framework within which mode share targets will be set and demonstrates that these will be linked to a comprehensive package of measures designed to encourage more sustainable travel; with an emphasis on reducing single occupancy car use wherever possible.

1.2.5 However, even with the stringent measures already proposed within the transport strategy, EDF Energy is committed to encouraging any further mode shift that may be achievable through implementation of this Framework Travel Plan.

1.2.6 The following Site Specific Travel Plans will be prepared, which will adhere to and be based on this document:

- a Workplace Travel Plan for the construction of the HPC Development Site, referred to as the HPC Construction Site Travel Plan;
- a Residential Travel Plan for each of the accommodation campus sites (Bridgwater A, Bridgwater C and the HPC on-site Campus), referred to as Campus Accommodation Travel Plans. These would only deal with trips not associated with the journey to work;
- The Public Information Centre (PIC) Travel Plan;
- Induction Centre Travel Plan; and
- a Workplace Travel Plan for the operational life-span of the HPC power station, referred to as the HPC Operational Site Travel Plan.

1.2.7 This Framework Travel Plan specifically considers the management and movement of people involved in the construction and operation of the HPC Project. A separate Freight Management Strategy has been prepared and submitted as part of this DCO application, which deals with the management of freight movements. In addition, a Waste Management Strategy has also been prepared and submitted as part of the DCO application which considers the management of waste associated with the HPC Project.

1.3 Document Structure

1.3.1 This document sets out the Framework Travel Plan for the HPC Project and is structured as follows:

- Section 2: Travel Plan Policy and Guidance;
- Section 3: Existing Transport Context;
- Section 4: DCO Development Proposals;
- Section 5: Travel Plan Objectives and Benefits;
- Section 6: Travel Plan Management;
- Section 7: Baseline Mode Share Assessment;
- Section 8: Travel Plan Measures;
- Section 9: Travel Plan Targets;
- Section 10: Monitoring and Review; and
- Section 11: Enforcement.

2. TRANSPORT POLICIES AND TRAVEL PLAN POLICY AND GUIDANCE

2.1 National Policy and Guidance

2.1.1 This section summarises the relevant policy at a national, regional and local level.

2.1.2 The Overarching National Policy Statement (NPS) for Energy (NPS EN-1) when combined with the NPS for Nuclear Power Generation (NPS EN-6) provides the primary basis for decisions by the IPC on applications for nuclear power generation developments that fall within the scope of the NPSs.

2.1.3 Notwithstanding this, the IPC may consider other matters that are both important and relevant to its decision-making. This could include Planning Policy Statements (PPSs), Planning Policy Guidance Notes (PPGs), regional and local policy documents, although, if there is a conflict between these and the NPS, the NPS prevails for the purposes of IPC decision making.

2.1.4 Furthermore, the Planning Act 2008 provides that the IPC must, in making its decision on an application, have regard to any Local Impact Report (LIR) prepared by relevant local authorities. It is anticipated that the LIRs will rely in part on PPSs, PPGs, and regional and local policy to provide a context for their assessment. On this basis, regard has been given to these documents (where relevant to the technical assessment) since they are likely to inform the LIRs prepared by the relevant local authorities.

2.1.5 It is also noted that, on 25 July 2011, the Department for Communities and Local Government issued the consultation draft of the National Planning Policy Framework (NPPF) which is intended to replace PPSs, PPGs and some Circulars within a single consolidated document. This provides another reason to attach primary weight to the policies of the NPSs. The consultation period concludes on 17 October 2011 and it is expected that the final NPPF will be adopted in 2012. The draft NPPF sets out a presumption in favour of sustainable development, and the need to support economic growth through the planning system. The draft NPPF also states that Nationally Significant Infrastructure Projects (NSIPs) are determined by the decision-making framework set out in NPSs, which are part of the overall framework of planning policy (paragraph 6). The weight to be attached to different policy documents is addressed in the Planning Statement. For the purposes of this Framework Travel Plan, however, greatest weight is attached to the tests and guidance set out in the NPSs. Other policy documents are reviewed, however, as they may be relied on by others, including the IPC.

a) National Policy

2.1.6 In July 2011, parliament adopted the Overarching National Policy Statement for Energy' (EN-1) which is the principal document for consideration of all new energy development and establishes the need for new energy infrastructure in the UK.

2.1.7 Paragraph 5.13.3 on Traffic and Transport Impacts sets out the requirement for a Transport Assessment in accordance with the NATA/WebTAG methodology stipulated in the Department for Transport's (DfT) 'Guidance on Transport Assessment' (March 2007). Furthermore, clear direction is given on mitigation measures in paragraph 5.13.8 as follows:

2.1.8 "Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts."

2.1.9 Paragraph 5.13.10 states that:

2.1.10 "Water-borne or rail transport is preferred over road transport at all stages of the project, where cost-effective."

2.1.11 Managing travel demand in this context can be broadly defined as prioritising the use of alternatives to private car use and road borne freight movements.

2.1.12 When referring to transport impacts the policy states at paragraph 5.13.7:

"Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG transport assessment, with attribution of costs calculated in accordance with the Department for Transports guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure"

2.1.13 Paragraph 5.13.5 also introduces the possibility of cost sharing between the applicant and Government for any third party benefits i.e. where the improvements provided more than offset the impact of the proposal.

2.1.14 Therefore the thrust of policy is that the applicant should take reasonable steps to provide mitigation so as to reduce impacts to an acceptable level but that limited weight should be applied to residual impacts.

i. Draft National Planning Policy Framework (July 2011)

2.1.15 Within the Transport Chapter, at paragraph 86 the NPPF advises:

"All developments that generate significant amounts of movement, as determined by local criteria, should be supported by a Transport Statement or Transport Assessment. Planning policies and decisions should consider whether:

- the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
- safe and suitable access to the site can be achieved for all people; and
- improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Subject to those considerations, development should not be prevented or refused on transport grounds unless the residual impacts of development are severe, and the need to encourage

increased delivery of homes and sustainable economic development should be taken into account."

ii. Planning Policy Statement 1: Delivering Sustainable Development (PPS1) (2005)

2.1.16 Planning Policy Statement 1 (PPS1) was published in January 2005 and sets out the Government's overarching planning policies on the delivery of sustainable development through the town and country planning system.

2.1.17 PPS1 includes a number of key principles relating to development plans including the formulation of an integrated approach to development and the formulation of access policies.

2.1.18 Paragraph 27 (Delivering Sustainable Development) sets out the general approach to delivering sustainable development. In preparing development plans, planning authorities should, amongst other things:

> *"Provide improved access for all to jobs, health, education, shops, leisure and community facilities, open space, sport and recreation, by ensuring that new development is located where everyone can access services or facilities on foot, bicycle or public transport rather than having to rely on access by car, while recognising that this may be more difficult in rural areas."*

iii. Planning Policy Guidance 13: Transport (PPG13) 2011)

2.1.19 Originally published in March 2001 and revised in January 2011, Planning Policy Guidance 13 on Transport (PPG13) sets out the national context for planning for transport.

2.1.20 The objectives of PPG 13 are to integrate planning and transport at the national, regional, strategic and local level to:

- *"Promote more sustainable transport choices for both people and for moving freight;*
- *Promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling; and*
- *Reduce the need to travel, especially by car."*

b) National Travel Plan Guidance

2.1.21 The Department for Transport (DfT) published 'Guidance on Transport Assessment' in March 2007 which explains the role of a supporting Travel Plan in delivering sustainable outcomes and provides links to guidance on preparing a Travel Plan.

2.1.22 The DfT has also published a variety of guidance documents to assist in the development and implementation of Travel Plans. The latest DfT guidance on Travel Plans is the 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process', April 2009.

2.1.23 This guidance document, which seeks to enable the most sustainable access to a new development, has been the primary guiding document for the compilation of this

Travel Plan. The guidance places strong emphasis on ensuring the success of Travel Plans, linking them closely to the transport planning work undertaken at the planning stages and ensuring that clear objectives and outcomes are set.

2.1.24 Emphasis is also placed on ensuring the success of the outcomes predicted within the document. Sanctions and penalties are encouraged throughout the document and the onus is placed heavily on the developer/landowner to ensure that needs of the Travel Plan are met and that it is implemented effectively throughout its lifetime.

2.2 Regional Policy and Guidance

2.2.1 On 27 May 2010 the Secretary of State advised of the Government's intention to abolish regional planning policy and that this should be a material consideration in planning decisions. On 6 July 2010 the Secretary of State for Communities and Local Government revoked all Regional Strategies with immediate effect under section 79(6) of the Local Democracy, Economic Development and Construction Act 2009. This includes Regional Planning Guidance for the South West (RPG10). However, following the High Court judgement on 10 November 2010 in a case brought by Cala Homes the Secretary of State's decision to revoke Regional Strategies was quashed.

2.2.2 As a result, on that same date, the Government wrote to the Chief Planning Officer to reiterate the Government's intention to abolish Regional Strategies through the Localism Bill.

2.2.3 This letter was also challenged on the grounds that the Government's intended revocation of Regional Strategies (including any Saved Structure Plan Policies) by the promotion of legislation for that purposes in the forthcoming Localism Bill was immaterial to the determination of planning applications and appeals prior to the revocation of Regional Strategies.

2.2.4 However, on 7 February 2011, the High Court held that the Government's advice to local authorities that the proposed revocation of Regional Strategies was to be regarded as a material consideration in their planning development control decisions should stand. The decision of the High Court was upheld by the Court of Appeal on 27 May 2011. The Court of Appeal clarified that it would be unlawful to have regard to the Government's intention to abolish Regional Strategies in the preparation and examination of Development Plan Documents. Therefore, the regional strategies remain in place but in the case of a development control decision it is for planning decision makers to decide on the weight to attach to the strategies taking into account, as a material consideration, the Government's stated intention to revoke them.

a) Regional Planning Guidance 10 for the South West 2001 – 2016 (RPG10) (2001)

2.2.5 Regional Planning Guidance for the South West (RPG10) sets out a broad strategy for the South West up to 2016.

2.2.6 Section 8 relates specifically to Transport and sets out the Regional Transport Strategy (RTS). The role of the RTS is to support the spatial strategy, to provide the strategic transport framework for the Local Transport Plans (LTPs) and development plans and to provide a framework for the investment and operational plans for relevant transport agencies/operators.

2.2.7 The RTS has five key objectives:

- *"To support the spatial strategy of RPG and to service existing and new development efficiently and in an integrated fashion;*
- *To reduce the impact of transport on the environment, by reducing the need to travel, encouraging travel by more sustainable means (especially by walking and cycling) and locating development at accessible locations, particularly by public transport; and to achieve environmental improvements by directing investment to those locations where infrastructure is required to offset the damaging effects arising from the impacts of traffic and transport;*
- *To secure improved accessibility to work, shopping, leisure and services by public transport, walking and cycling;*
- *To create a modern, efficient and integrated transport system that will meet the demands of a dynamic regional economy, help overcome regional peripherality and meet all travel needs; and*
- *To ensure the safe use of regional transport network and its associated facilities." (Page 83).*

2.2.8 Policy TRAN 1 (Reducing the Need to Travel) states that local authorities, developers and other agencies should work towards reducing the need to travel by private motor vehicle through the appropriate location of new development.

2.2.9 Policy TRAN10 (Walking, Cycling and Public Transport) states that:

"Local authorities, transport operators and other agencies should aim to increase the share of total travel by these modes and ensure that they provide attractive and reliable alternatives to the private car by:

- *Seeking transport assessments and travel plans for all new major developments and encouraging major organisations to prepare and implement such plans, having regard to sustainable transport objectives set by local authorities in the local transport plan; and*
- *Ensuring that major new development delivers (or sets out a clear and realistic strategy to deliver) a realistic choice of access by public transport, walking and cycling."*

b) The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of 'States Proposed Changes 2008 – 2026 (July 2008)

2.2.10 The Draft Regional Spatial Strategy (RSS) for the South West (2006-2026) was published by the South West Regional Assembly in 2006. In 2008 the Secretary of State published proposed changes to the draft RSS for further consultation.

2.2.11 If adopted, this document would replace the existing RTS, published in RPG10. Chapter 5 sets out the strategy's regional approach to transport. The main aim of the RTS is to support the RSS and reduce the rate of road traffic growth by:

- *"Supporting economic development (identified in the RES) by maintaining and improving the reliability and resilience of links from the region's Strategically Significant Cities and Towns (SSCTs) to other regions, international markets and connectivity within the region;*
- *Addressing social exclusion by improving accessibility to jobs and services;*
- *Making urban areas work effectively and creating attractive places to live by developing the transport network in support of the strategy to concentrate growth and development in the SSCTs; and*
- *Reducing negative impacts of transport on the environment including climate change." (Page 139).*

2.2.12 Policy RTS1 (Corridor Management) states that, in order to improve the reliability and resilience of journey times, to develop opportunities to facilitate a modal shift and support growth at the Strategically Significant Cities and Towns (SSCTs), which include Bridgwater and Taunton, provision will be made to manage the demand for long distance journeys and reduce the impacts of local trips on corridors of national and regional importance.

2.2.13 Policy RTS2 (Demand Management and Sustainable Travel Measures at the SSCTs) states that demand management measures should be introduced progressively at the SSCTs to reduce the growth of road traffic levels and congestion. This should be accompanied by a 'step change' in the prioritisation of sustainable travel measures serving these places.

2.2.14 Policy RTS3 (Parking) states that parking measures should be implemented to reduce reliance on the car and encourage the use of sustainable transport modes.

c) Somerset and Exmoor National Park Joint Structure Plan Review 1991–2011 (2000) (Policies 'saved' from 27th September 2007)

2.2.15 The Somerset and Exmoor National Park Joint Structure Plan was adopted in 2000 with relevant policies saved from 27 September 2007. All policies have been saved with the exception of Policy 53 which related to the Department of the Environment, Transport and the Regions Road Schemes. The Plan provides a strategic base for all land use planning within the plan area for the period up to 2011.

2.2.16 The Structure Plan sets out a preferred strategy for development which includes the encouragement of a balanced and integrated transport system which emphasises alternatives to the private car, where practical (paragraph 3.8).

2.2.17 Policy STR1 (Sustainable Development) states that development should, amongst other things, develop a pattern of land use and transport which minimises the length of journeys and the need to travel and maximises the potential for the use of public transport, cycling and walking; and conserve biodiversity and environmental assets, particularly nationally and internationally designated areas.

2.2.18 Policy 39 (Transport and Development) states that proposals for development should be considered having regard to:

- The management of demand for transport.

- Achieving a shift in transport modes to alternatives to the private car and lorry wherever possible.
- The need for improvements to transport infrastructure.

2.2.19 Policy 45 (Bus) states that facilities for buses should be improved. This should include measures to give priority to buses and to introduce park and ride systems where these are the most sustainable option.

2.2.20 Policy 48 (Access and Parking) states that developments which generate significant transport movements should be located where provision may be made for access by walking, cycling and public transport. The level of parking provision in settlements should reflect their functions, the potential for the use of alternatives to the private car and the need to prevent harmful competitive provision of parking. The level of car parking provision associated with new development should first take account of the potential for access and provide for alternatives to the private car, and then, should be no more than is necessary to enable development to proceed.

2.3 Local Policy and Guidance

a) Local Policy

i. West Somerset Council Local Plan (2006) (Policies 'saved' from 17 April 2009)

2.3.1 The West Somerset Local Plan forms part of the development plan for West Somerset. The Local Plan was adopted in 2006 (with relevant policies ‘saved’ from 17 April 2009). The key transport objectives of the West Somerset Local Plan are not saved as they are not policies, but were as follows:

- reduce the need to travel and the distances travelled;
- promote the best use of public transport routes and nodes, especially for journeys to work;
- reduce environmental damage and promote environmental improvement by traffic management and calming measures, particularly in town and village centres;
- promote the development of safe and convenient routes for cyclists and pedestrians;
- ensure that new development proposals have appropriate access to public transport services; and
- safeguard the implementation of major highway schemes in the Structure Plan.

ii. West Somerset District Local Development Framework (LDF) Core Strategy (Options Paper) (January 2010)

2.3.2 In accordance with the Planning and Compulsory Purchase Act 2004, West Somerset Council is in the process of producing its LDF, which, once adopted, will replace the Local Plan.

2.3.3 In January 2010, WSC published its Core Strategy Options Paper which is a material consideration for determining planning applications, although the weight attached to this document will be limited, given that it is at a relatively early stage of preparation.

2.3.4 The Options Paper does not include any specific policies relating to transport. The paper does however identify the types of policy that WSC considers could be included in the Core Strategy. In relation to transport, these are as follows:

- *"Reduce the threshold for travel plans to require them for medium sized as well as large development.*
- *Require contributions from new development to improve cycling and walking infrastructure.*
- *Locate new developments likely to give rise to significant numbers of trips in locations which are served by a range of modes of transport.*
- *Explore the opportunity offered by the West Somerset Railway to connect sites within the District to the national rail network for freight traffic.*
- *Examine the potential for a commuter train service to be offered using the West Somerset Railway.*
- *Any new major development to be of an appropriate mix of uses and facilities to offer the opportunity to reduce transport demand."*

iii. Sedgemoor District Local Plan 1991–2011 (2004) (Policies 'saved' from 27 September 2007)

2.3.5 The Sedgemoor District Local Plan forms part of the Development Plan for Sedgemoor. The Local Plan was adopted in 2004 (with relevant policies 'saved' from 27 September 2007).The Transport and Movement chapter of the Local Plan states that an efficient transport system is vital to the economic and social well being of the District. It explains that policy on transport and movement will therefore support the Local Plan's strategy of balance between sustainability and controlled economic growth (paragraph 7.01).

2.3.6 Paragraph 7.05 states that the vision of the Local Plan is for an efficient, high quality and sustainable transport system, accessible to all sections of the community. This will be achieved by maintaining and improving transport infrastructure while reducing dependence on the private car.

iv. Sedgemoor Local Development Framework (LDF) Core Strategy (Proposed Submission) (September 2010)

2.3.7 The Sedgemoor LDF Core Strategy (Proposed Submission) was consulted on from September to November 2010. An addendum to the Core Strategy was subject to a further consultation from 23 November 2010 until 18 January 2011. Changes prior to submission, proposed as a result of the consultation process were reported and endorsed by SDC's Executive Committee on 9 February 2011. The Core Strategy Proposed Submission was submitted to the Secretary of State on 3 March 2011 and an Examination in Public (EiP) was held in May 2011. Once adopted, the Core Strategy will form part of the Development Plan for Sedgemoor.

2.3.8 EDF Energy submitted representations objecting to the Core Strategy (Proposed Submission), relating to Chapter 4 'Major Infrastructure Projects' (and policies MIP1, MIP2 and MIP3 contained in that chapter) and those sections relating to housing and Hinkley Point. EDF Energy also participated at the relevant EiP hearings.

2.3.9 At the close of the hearing sessions on 26 May 2011, the Inspector agreed with SDC and EDF Energy that, in an attempt to reach agreement on the disputed Chapter 4, SDC would re-draft Chapter 4 and EDF Energy would have the opportunity to respond. The position of both parties in relation to the re-drafted Chapter 4 was set out in correspondence between SDC, EDF Energy and the Inspector. As a result of the correspondence invited by the Inspector, SDC has agreed to further changes to the Core Strategy which make clear that the Core Strategy does not set any policies, tests or requirements for the IPC to apply in deciding whether any element of the development comprised in an application for development consent is acceptable, nor the basis on which any such application should be approved. Instead, the Chapter is to set out those matters which SDC may take into account in preparing its LIR for the Hinkley Point C DCO application. These, therefore, represent aspirations of the Council, rather than formal planning policy for the Hinkley Point C DCO application. This status has now been confirmed in the Inspector's report on the examination of the Core Strategy, which was published on 27 September 2011.

2.3.10 Emerging policies MIP1, MIP2 and MIP3 relate specifically to the HPC Project, as set out in the re-drafted Chapter 4 (dated 29 July 2011):

2.3.11 Policy MIP1 (Major Infrastructure Proposals) explains that applications for major infrastructure development will be considered against the relevant national planning policy and the strategy and relevant policies of the development plan. The objective from the Council's perspective is that major infrastructure proposals should, where possible, contribute positively to the implementation of the spatial strategy and meet the underlying objectives of it.

2.3.12 Policy MIP2 (Hinkley Point C Associated and Ancillary Development) sets out the considerations that the Council will take into account in the preparation of a LIR in responding to proposals for development associated with, or ancillary or related to the HPC Project, where they are not the determining authority. Such considerations include: measures to avoid, minimise and then mitigate adverse impacts on the transport network; highway safety for all users should be maintained and where possible improved; investments that encourage travel by public transport, walking and cycling; and the delivery of investment in infrastructure, buildings and green infrastructure.

2.3.13 Policy MIP3 (Hinkley Point C: Planning Obligations and Mitigation) states that the Council will seek to ensure, wherever possible, that the proposals avoid, minimise and mitigate (including, where appropriate, compensate for) impacts during the construction, operation, decommissioning, and restoration phases.

2.3.14 In addition, the following emerging policies contained in the Core Strategy (Proposed Submission) are considered to be of potential relevance:

2.3.15 Policy S1 (Spatial Strategy for Sedgemoor) states that development proposals will be expected to support the delivery of required infrastructure, including such things as transport infrastructure.

2.3.16 Policy S2 (Infrastructure Delivery) states that all new development that generates a demand for infrastructure will only be permitted if the necessary on and off-site infrastructure required to support and mitigate the impact of the development site is either already in place or there is a reliable mechanism in place to ensure that it will be delivered at the time and in the location it is required.

2.3.17 Policy S3 (Sustainable Development Principles) states that development proposals will be expected to, amongst other things, be located to minimise the need to travel and to encourage any journeys that remain necessary to be possible by alternative modes of travel including maximising opportunities for walking, cycling and the use of public transport.

2.3.18 Policy S4 (Mitigating the Causes and Adapting to the Effects of Climate Change) states that development should mitigate the cause of climate change through, amongst other things, ensuring development encourages modes of transport other than the car.

2.3.19 Policy D2 (Promoting High Quality and Inclusive Design) states, amongst other things, that development will need to demonstrate that it is accessible to all potential users using a range of transport modes, be integrated into existing patterns of movement and be permeable. Its design should create good connections to wider areas with a clear network of routes for walking and cycling.

2.3.20 Policy D9 (Sustainable Transport and Movement) states, amongst other things, that travel management schemes and development proposals that reduce congestion, encourage an improved and integrated transport network and allow for a wide choice of modes of transport as a means of access to jobs, homes, leisure and recreation, services and facilities will be encouraged and supported.

2.3.21 Policy D10 (Managing the Transport Impacts of Development) states that development proposals that will have a significant transport impact should, amongst other things: be supported by an appropriate Transport Assessment and Travel Plan; ensure inclusive, safe and convenient access for all; provide safe access to roads; ensure that the expected nature and volume of traffic and parked vehicles generated would not compromise road safety and/ or function; comprehensively address the transport impact of development and appropriately contribute to the delivery of necessary transport infrastructure; not prejudice safeguarded transport infrastructure; and enhance and develop rights-of way.

b) Other Local Documents

i. Hinkley Point C Project Supplementary Planning Document Consultation Draft (February 2011)

2.3.22 SDC and West Somerset Council (WSC) have jointly prepared draft supplementary planning guidance in relation to the HPC Project. Public consultation on the Consultation Draft version of the Hinkley Point C Project Supplementary Planning Document ("the draft HPC SPD") commenced on 1 March 2011 and concluded on 12 April 2011. EDF Energy has submitted representations which object to the draft HPC SPD.

2.3.23 Following the Sedgemoor Core Strategy EiP and subsequent correspondence with the Inspector, it is clear that the SPD cannot set tests, policies or requirements for the IPC to apply to the consideration of the Hinkley Point C project. If the Councils continue with the SPD preparation, its text will need to be considered in this light and it could not carry any weight in the determination of the DCO application. As it may be relied upon by some stakeholders, however, the principal contents of the draft SPD as it relates to the site are summarised below. In relation to transport, Box 8 of the draft HPC SPD includes a list of matters that the County Council and District Councils will expect the HPC Project promoter comply with. These include:

- *"Align the Transport/Freight Strategy with other Council plans and strategies. The transport proposals for the HPC project during both the construction and operational phases of the power station should integrate with and contribute to the delivery of the approved transport strategies as set out in the Somerset Future Transport Plan and associated transport policies and implementation plan, the Bridgwater, Taunton and Wellington Future Transport Strategy, the Bridgwater Vision, Western Somerset Economic Development and Access Strategy and emerging Williton master-plan.*
- *Maximise the safe, efficient and sustainable movement of people and materials required for the proposed nuclear power station.*
- *Provide sustainable transport solutions for access to the site that workers and visitors will be required to use. This should include provision of public transport priority measures in the form of bus lanes and other bus priority measures on key routes from associated development sites to the main site for construction and other vehicles, providing a beneficial transport legacy.*
- *Provide sustainable transport linkages to and from all associated development sites to provide access to employment, education, retail, leisure and healthcare facilities.*
- *Ensure the number of parking spaces provided at or near to the site during the construction phase is as close as possible to zero.*
- *Develop and implement Travel Plans for the proposed power station and associated development that will be monitored during construction and operation of Hinkley Point C.*
- *Monitor all movement associated with the development to ensure agreed mode share targets and thresholds for traffic congestion, air quality and road safety are achieved during construction and operation.*
- *Fully mitigate against and compensate for the adverse environmental impact of development related traffic. This should involve providing sufficient funds through appropriate legal agreements to enable the relevant authorities and agencies to implement further mitigation measures should any unforeseen impacts occur during the construction of the development."*

ii. Somerset Future Transport Plan

2.3.24 Somerset's Future Transport Plan 2011 – 2026 (FTP) replaced Somerset County Council's (SCC) Second Local Transport Plan (LTP2) in April 2011 and sets out a long term strategy for helping to deliver transport priorities up until 2026.

2.3.25 The FTP contains the following statements:

- *"Help communities help themselves with regard to transport improvements;*
- *Assisting people to make smarter travel choices;*

- *Assisting people in being more active by providing more opportunities to travel in a healthy way;*
- *Manage the effect transport-related noise has on communities;*
- *Work with developers to ensure they take in to account the way people travel, and how people travel to access services;*
- *We will help hauliers choose the most appropriate routes and work to improve communication between communities and the hauliers that serve them; and*
- *Encourage people to cycle and make more trips on foot."*

2.3.26 This demonstrates that local transport policy supports the provision of sustainable travel measures above new road building and capacity improvements.

iii. Technical Note 4 – Somerset County Council Transport Policies: Transport and Development

2.3.27 The 'Technical Note 4 – Somerset County Council Transport Policies: Transport and Development – March 2010' document is a supporting Technical Document to the FTP.

2.3.28 Section 3 of the policy relates to Assessing Transport Impacts of Development.

2.3.29 Paragraph 3.19 states that:

> *"The Council will agree a suitable approach to determining the level of impact depending on the location and scale of the proposed development. In the main urban areas of Taunton, Bridgwater and Yeovil strategic traffic models are available and should be used in the first instance to identify potential development impacts. A useful starting point is to identify those junctions where the development traffic increases the modelled queue length by 5 or more vehicles on one or more arms of the junction. More detailed investigations into the impact of development traffic at these locations should then be undertaken using appropriate junction modelling tools. It should be noted that this is only a guideline value and the Case Officer may identify other junctions where detailed assessments will be required on a case–by-case basis."*

2.3.30 Paragraph 3.21 states that:

> *"Once detailed investigations into the impact of development traffic have been undertaken at agreed locations the Council will consider whether measures are required to mitigate the impacts of the development. In considering the assessment and subsequent mitigation, the Council will seek to achieve the following outcomes, and will agree on a case by case basis how this will be assessed by the developer:*

- *Nil-detriment to junction capacity and delay from development traffic where junctions currently operate at greater than 85% ratio of flow to capacity (RFC) for non-signalised junctions, or 90% for signalised junctions;*
- *Nil-detriment from development traffic on links where capacity is currently at 90% or more;*

- *Nil-detriment to journey times for traffic on agreed routes;*
- *Nil-detriment to journey times for public transport, walking or cycling;*
- *Nil-detriment to accident rates at clusters along key routes; and*
- *Agreed mode share targets for development related trips where travel plans are required (see Section 3.4)."*

2.3.31 Section 6 of this policy relates specifically to the proposed development at Hinkley. SCC should not seek to develop new planning policies to test a nationally significant infrastructure project (NSIP). NSIPs are subject to their own planning regime set out in the Planning Act 2008 and the primary consideration for NSIPs is the policy to be set out in the Energy and Nuclear National Policy Statement (NPS), in respect of both the main site and the associated development.

2.3.32 Policy HIN 1: Transport requirements for new nuclear development states that Council will require the developer of new nuclear power stations in Somerset to:

- *"Minimise the volume of road traffic associated with the development of the new power station especially at peak hours.*
- *Provide sustainable transport solutions for access to the site that workers and visitors will be required to use.*
- *Provide sustainable transport linkages to and from all associated development sites.*
- *Ensure as close as possible to zero parking spaces are provided at or near to the site during the construction phase.*
- *Enable effective controls to be put in place to ensure workers and visitors do not park in inappropriate locations.*
- *Ensure as much construction material as possible is delivered by sea.*
- *Minimise the amount of waste materials transported off-site.*
- *Provide necessary improvements to the transport network to mitigate against any adverse impacts on the community; including but not limited to congestion, air quality and road safety impacts.*
- *Minimise disruption both for the local community and visitors to the area.*
- *Control and manage the flow of any road freight movement associated with the development in order to ensure appropriate routes are used, avoid peak hour movement and to respond to incidents on the transport network.*
- *Agree and enable deployment of robust plans for managing unforeseen incidents on the transport network; including but not limited to traffic management plans, diversionary routes and freight/delivery management systems.*
- *Provide long-term, sustainable legacy benefits for the local community.*
- *Protect the natural and built environment and ensure the image of the area is not adversely affected.*
- *Monitor all movement associated with the development to ensure agreed mode share targets and thresholds for traffic congestion, air quality and road safety are achieved during construction and operation.*

- *Provide sufficient funds through appropriate legal agreements to enable the relevant authorities and agencies to implement further mitigation measures should any unforeseen impacts occur during the construction of the development."*

2.3.33 Policy HIN 2 sets out the 'Requirement for an Evidence Based Approach' as follows:

> *"An evidence-based approach will be taken to determine the effectiveness of the proposed transport interventions for the implementation of the HPC transport/freight strategy. We will require the HPC project promoter to adhere to performance criteria in relation to key parts of the transport network. It should be noted that as such, a transport strategy package of measures will be expected to meet this approach, which would include:*

- *Highway improvements, including junction improvements and more strategic network improvements identified through the transport assessment process and associated evidence base.*
- *Public transport provision, including waiting facilities, support for existing and additional services, and priority measures that will ensure public transport journey time reliability.*
- *Intelligent Transport Systems (ITS) to promote and support the use of public transport facilities.*
- *Road Safety Improvements.*
- *Infrastructure needs associated with deploying a Traffic Management Plan.*
- *Pedestrian and cyclist facilities, including those which support the use of public transport and support the provision of a high quality public realm.*
- *Motorcycle parking.*
- *Park and Ride facilities if demonstrated as necessary.*
- *Car parking management for the site, associated development and residential areas, including clearway provision.*
- *Coach and rail facilities.*
- *Provision and management of water-borne transport.*
- *Highways and bridge strengthening measures.*
- *Transport maintenance packages.*
- *Transport monitoring strategy to assess effectiveness of measures and identify further mitigation, where necessary."*

2.3.34 Policy HIN 3 summarises SCC's requirements for the 'Evidence for the Development Consent Application' as follows:

> *"Prior to the Development Consent Application to the IPC the Council will require the following evidence to be in place to enable the robust development of a Statement of Common Ground and a Local Impact Report:*

- *A Transport Assessment to cover the construction and operation of the site and associated developments, including an assessment of the required access* *arrangements, likely impacts, appropriate mitigation and improvements to the transport system with completed technical audits.*

- *A Transport Strategy and associated evidential base for managing freight waste and people movements associated with the construction of the development.*
- *A Travel Plan for the construction phase; including mode share targets for access to and from the main site and each associated development site.*
- *Directly linked to parking standards, provision of access infrastructure, provision of sustainable transport linkages and design of development layouts.*
- *Full transport assessments and travel plans for any other significant related development proposals that emerge such as induction facilities.*
- *A Travel Plan to manage access to the development in its operational phase.*
- *A Visitor Management Plan to manage visitor access to the site and maximise access by sustainable transport.*
- *Traffic Management Plans to manage unforeseen incidents on the transport network.*
- *Construction Management Plan for HGV and construction worker movements.*
- *Agreed monitoring, control and enforcement proposals for all aspects of movement."*

2.3.35 Finally, Policy HIN 4 summarises SCC's requirements for 'Arrangements Prior to Commencement of Construction' as follows:

> *"Prior to commencement of construction the Council will require the following to be agreed with the relevant authorities and agencies:*

- *Site specific travel plans for each associated development site.*
- *Final detailed freight management plans based on actual materials sourcing.*
- *Final detailed waste management plans.*
- *Implementation of agreed access arrangements and necessary controls.*
- *Implementation of an agreed transport mitigation package.*
- *Implementation of visitor management, traffic management, monitoring and enforcement arrangements.*
- *Any required financial contributions."*

iv. Bridgwater, Taunton and Wellington Transport Strategy

2.3.36 The Transport Strategy for Bridgwater, Taunton and Wellington for the period 2009 – 2026 was adopted by SCC in March 2010. The strategy indicates a number of infrastructure improvements that may be implemented during the strategy's lifespan in support of the draft Regional Spatial Strategy and will likely be a key component of the Third Somerset LTP.

2.3.37 At section 5.1 on Bridgwater the strategy states that SCC:

> *"… will further investigate the potential for introducing park and ride sites on the edges of the town to reduce town centre congestion. We will seek to*

improve sustainable links to the railway station, as well as increasing opportunities for walking and cycling in the town by removing physical barriers created by roads, by providing new infrastructure and by improving the pedestrian environment in the town centre."

2.3.38 SCC's transport strategy document also indicates a number of improvements that may be implemented during their strategy's life-span. Some of the improvements that are listed are advised to be development-related and will only be implemented should the site specific developments proceed.

v. Somerset Manual for Travel Plans

2.3.39 Somerset County Council has developed a comprehensive Manual for Travel Plans dated December 2008. The manual is divided into the following three guides covering all aspects of Travel Plan design and management:

- Site Audit and Design Guidelines;
- Menu of Measures; and
- Monitoring Guidance.

3. EXISTING TRANSPORT CONTEXT

3.1 Site Location

a) HPC Main Site and HPC Accommodation Campus

3.1.1 The application site is located on the north Somerset coast, 25km to the east of Minehead and 12km to the north-west of Bridgwater.

3.1.2 The site is bounded to the north by Bridgwater Bay and to the west by agricultural land. The village of Shurton lies to the south. Immediately to the east of the site is the existing Hinkley Point Power Station Complex consisting of Hinkley Point A (HPA) and Hinkley Point B (HPB) power stations.

3.1.3 This section of the Framework Travel Plan sets out the existing transport context, explaining the accessibility of the application site by each mode of travel.

b) Off-site Accommodation Campus Sites

3.1.4 There are two accommodation campuses proposed off-site in Bridgwater; Bridgwater A accommodation campus and Bridgwater C accommodation campus.

3.1.5 Bridgwater A campus is proposed to be located to the north-east of Bridgwater town centre to the north of the A39 Bath Road. The site is bounded to the north and east by industrial uses, to the south by the A39 Bath Road, and to the west by the Bristol to Exeter railway line.

3.1.6 Bridgwater C campus is proposed to be located to the north-east of Bridgwater town centre to the south of the A39 Bath Road. The site is bounded to the north by the A39 Bath Road, to the east by residential uses, to the south by Bridgwater College and to the west by land used by the Bridgwater Rugby Club and the Bristol to Exeter railway line.

3.2 Pedestrian Network

a) HPC Main Site and HPC Accommodation Campus

3.2.1 Paragraph 75 of PPG13, advises that walking offers the greatest potential to replace short car trips, particularly those under 2km. **Figure 3.1** below details the 2km walking isochrone for the Main HPC site.

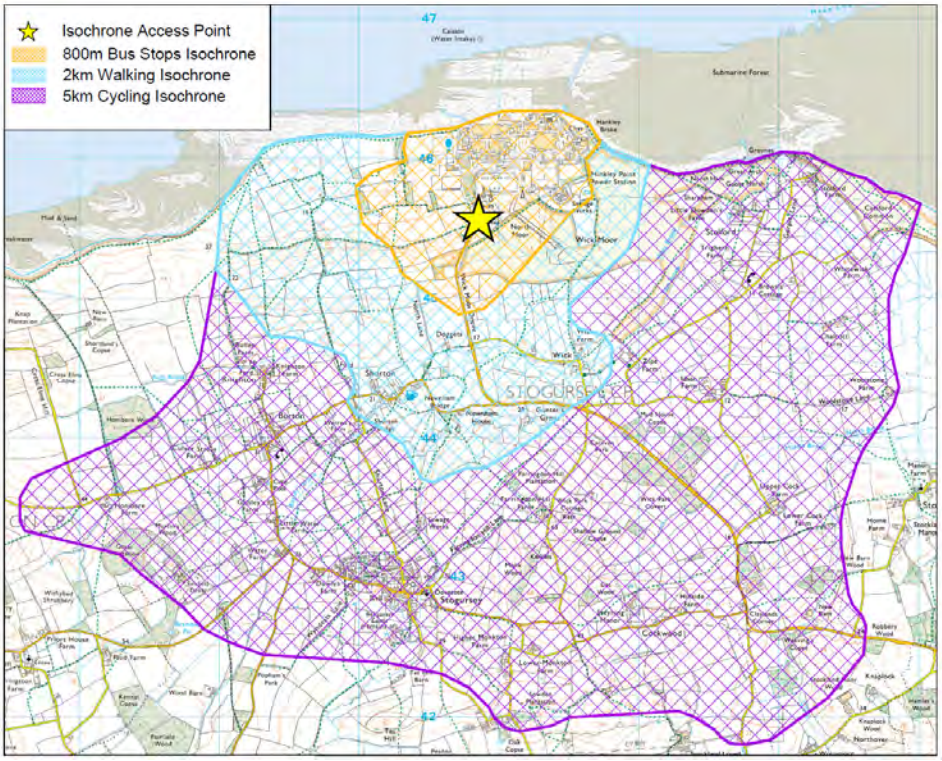
3.2.2 Facilities and infrastructure for pedestrian movement in the immediate vicinity of the application site are extremely limited. There are no pedestrian facilities adjacent to the local roads within the 2km isochrone, except within the village of Shurton.

3.2.3 There is a network of Public Rights of Way (PRoW) within the local area. The existing PRoW within the site are:

- a section of the West Somerset Coast Path which links the River Parrett Trail at Steart in Bridgwater Bay with the South West Coast Path National Trail at Minehead;
- the Green Lane which is an east-west track that runs along the ridge through the middle of the site; and

- a number of smaller, interconnecting footpaths running north-south and east-west.

Figure 3.1: Walking and Cycling Isochrones for the Main HPC Site



b) Off-site Accommodation Campus Sites

3.2.4 **Figure 3.2** and **Figure 3.3** illustrate the 2km walking isochrone from the centre of Bridgwater accommodation campuses A and C, respectively. The isochrones demonstrate that key destinations such as Bridgwater railway station, the bus and coach station, Sainsbury's and ASDA supermarkets, Bridgwater Retail Park and Bridgwater town centre are all within a 2km walk from both of the proposed Bridgwater accommodation campuses.

3.2.5 There are footways along both sides of the A39 Bath Road, approximately 2m in width. A zebra crossing is provided to the west of Union Street and a further zebra crossing is provided to the west of College Way. Over the railway bridge on the A39 Bath Road there is a footway on the northern side approximately 2m wide. A separate footbridge is provided on the southern side of Bath Road, which is approximately 3m in width.

3.2.6 There is a zebra crossing approximately 30m north of the Cross Rifles roundabout on the A38 Bristol Road that provides pedestrian access to the nearby Sainsbury's supermarket. There are also footways on both sides of the A38 Bristol Road and two arms of the A38/Bristol Road/The Drove junction have signal controlled pedestrian cross

Figure 3.2: Bridgwater A Accommodation Campus Walk and Cycle Isochrones

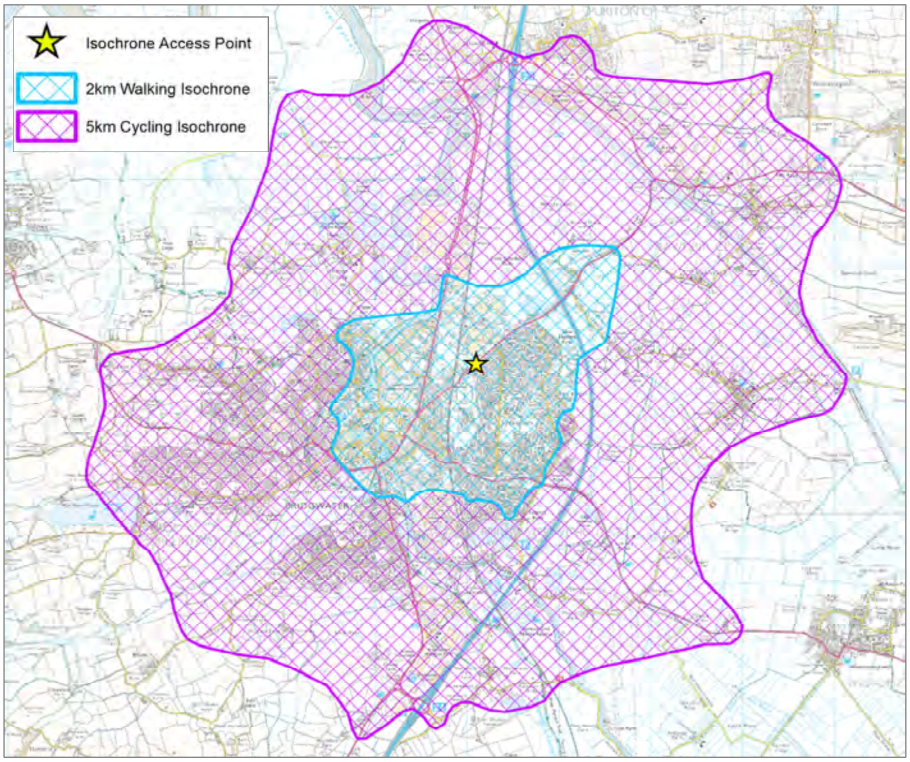
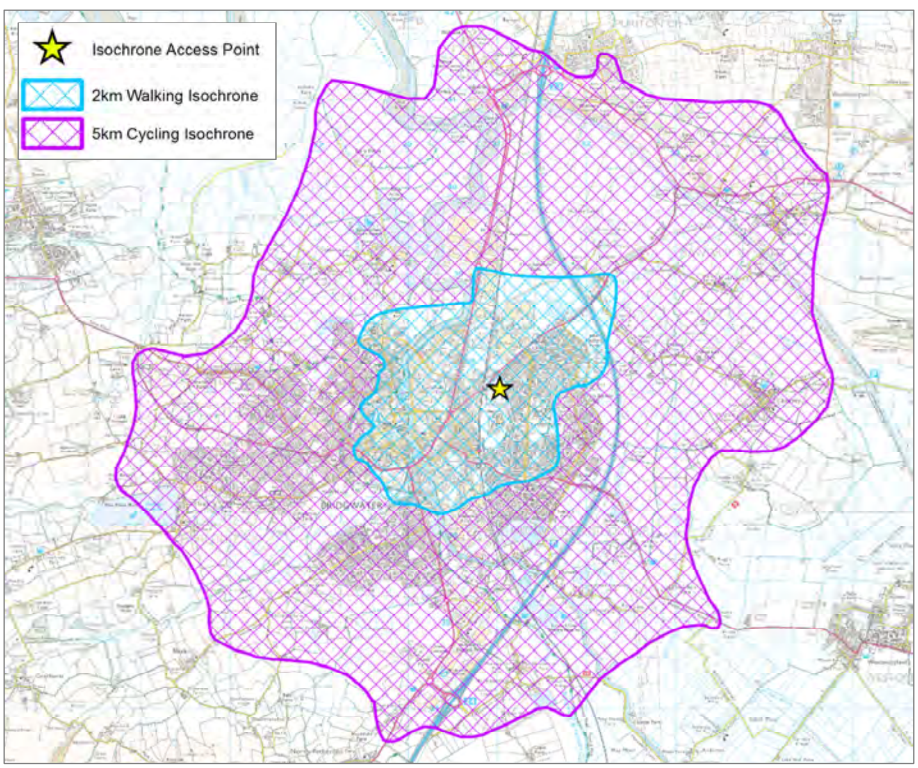


Figure 3.3: Bridgwater C Accommodation Campus Walk and Cycle Isochrones



3.3 Cycle Network

a) HPC Main Site and HPC Accommodation Campus

3.3.1 Paragraph 78 of PPG13 advises that cycling has potential to substitute for short car trips, particularly those under 5km, and to form part of a longer journey by public transport. **Figure 3.1** above details the 5km distance isochrone for the site.

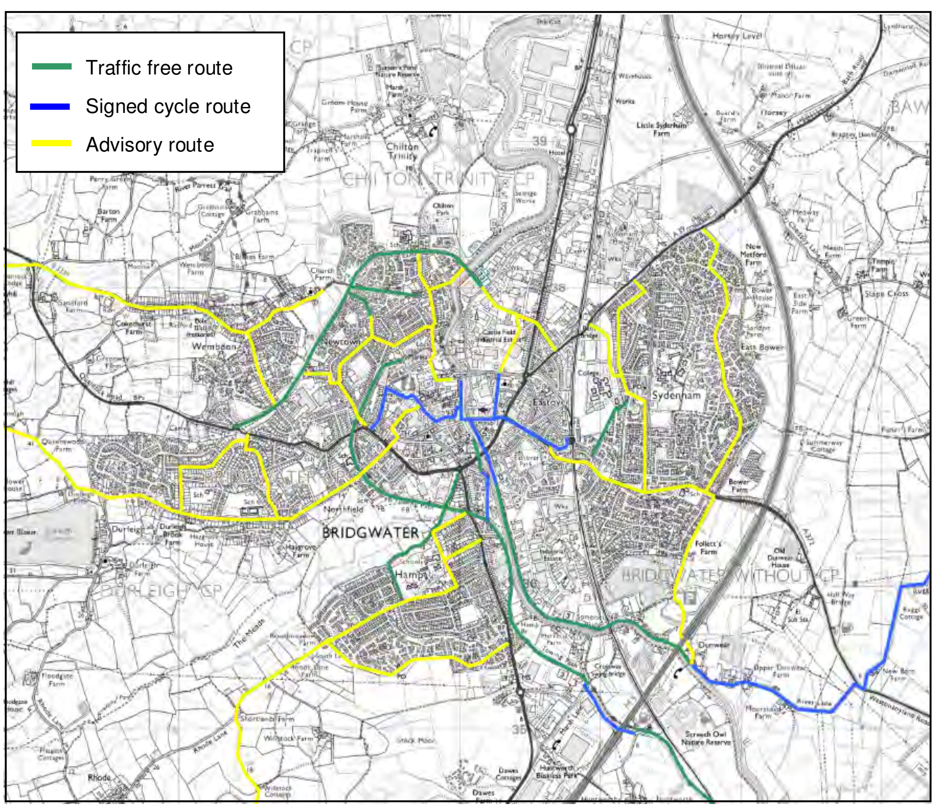
3.3.2 There is no dedicated cycling infrastructure present within 5km of the site. The traffic levels on the roads within the cycle catchment are currently low. However, the roads within the cycle catchment are generally subject to the national speed limit of 60mph, with the exception of sections through the local villages, where the speed limit reduces to 30mph. The roads are also unlit outside of the villages. It is considered that the existing local road network within the 5km cycle catchment is currently not favourable for cycling.

b) Off-site Accommodation Campus Sites

3.3.3 Within Bridgwater there is a network of dedicated cycle routes as well as roads with 30mph speed limits suitable for cycling.

3.3.4 **Figure 3.2** and **Figure 3.3** illustrate the 5km cycle isochrone from the centre of Bridgwater accommodation campuses A and C, respectively. The 5km isochrones demonstrate that workers living at the Bridgwater accommodation campuses would be able to access all of Bridgwater and some of the surrounding smaller settlements by bicycle. Information on the existing cycle routes within Bridgwater is provided in **Figure 3.4**.

Figure 3.4: Bridgwater Existing Cycle Network



3.3.5 The existing cycle facilities within the 5km catchment of the accommodation campuses include:

- a signed cycle route provides a connection between Bridgwater railway station and the town centre via St John Street and Eastover;
- a high quality segregated pedestrian and cycle route along one side of the northern section of Feversham Road;
- a high quality off-road cycle route connecting the Northern Distributor Road (NDR) to Crowpill Lane;
- an off-road shared pedestrian and cycle route is provided in the Sydenham part of Bridgwater, connecting Redgate Street to Longstone Avenue;
- a high quality segregated pedestrian and cycle route along at least one but in parts on both sides of the NDR between A39 and the junction with Wylds Road; and
- as the NDR segregated pedestrian and cycle route approaches the River Parrett, it routes south to connect to Linham Road. The cycle route runs south along Linham Road and at the Marina the route divides in two, with one route heading west along the Bridgwater to Taunton Canal to connect to Victoria Road. The other part of the route heads south off-road along the River Parrett, over the Clink (no formal crossing facilities provided) and then continues along West Quay and Binford Place. At the southern end of Binford Place the cycle route continues off-road through Blake Gardens, under the A39 Broadway, connects to Old Taunton Road and then connects back onto the Canal towpath, which forms part of the River Parrett Trail (National Cycle Network Route 3).

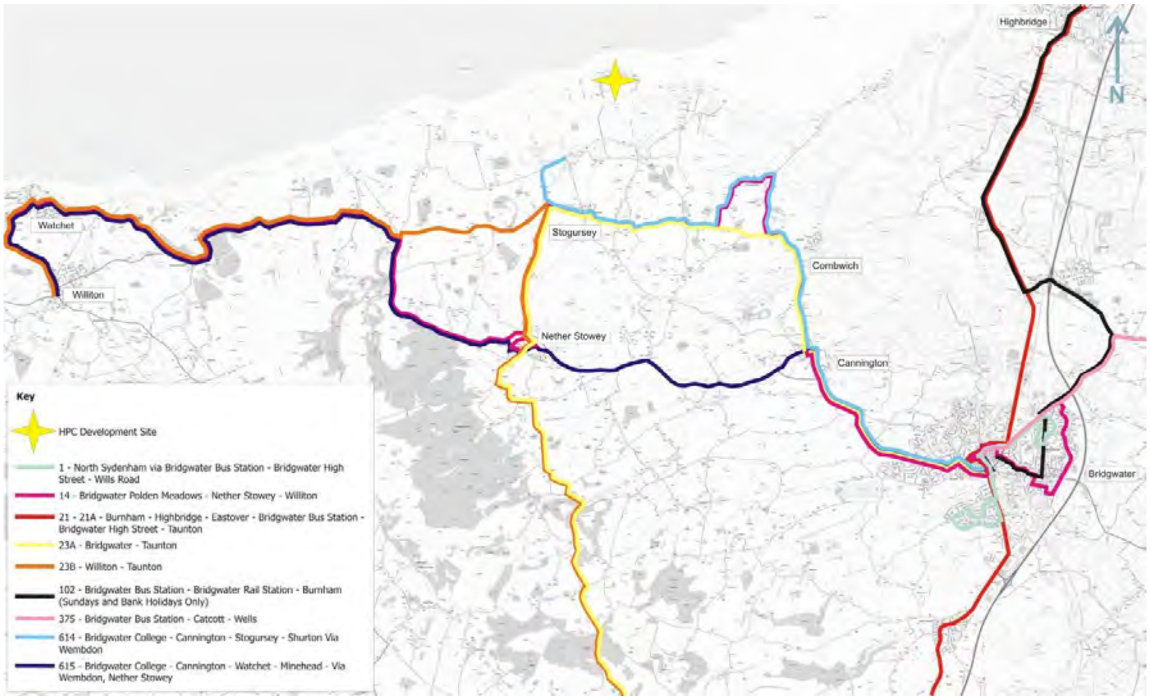
3.4 Equestrians

3.4.1 There are land uses in the vicinity of Cannington, Hinkley Point and further afield that generate equestrian movement to and from the C182 in the vicinity of the HPC Development Site. Minimising vehicle trips to and from the HPC Development Site during its construction will assist in minimising potential ‘conflicts’ between HPC associated traffic and equestrians using the C182.

3.5 Bus Network

3.5.1 Figure 3.6 details the existing bus services operating in central Bridgwater and the wider area.

Figure 3.5: Local Bus Network



3.5.2 Table 3.1 below summarises the existing bus services that route on the local highway network.

Table 3.1: Local Bus Services

Service	Route	Weekday		Saturday	Sunday
		Daytime	Evening		
1	North Sydenham – Bridgwater – North Sydenham	15 mins	-	20 mins	-
2	Bridgwater – Durleigh - Bridgwater	30 mins	-	20 mins	-
6	Bridgwater – Newtown - Bridgwater	60 mins	-	60 mins	-
14	Bridgwater - Polden Meadows - Bridgwater	30 mins	-	30 mins	-
14	Bridgwater – Cannington - Bridgwater	60 mins	-	60 mins	-
14	Bridgwater – Williton - Bridgwater	120 mins	-	120 mins	120 mins
21/21A	Burnham - Bridgwater – Taunton return	30 mins	60 mins	20-60 mins	120 mins
23A	Bridgwater - Nether Stowey – Taunton return	1 service (09 :00)	-	-	-
23B	Williton – Taunton - Williton	1 service (07 :15)	-	-	-
102	Bridgwater – Burnham - Bridgwater	-	-	-	120 mins

		Weekday			
375	Wells - Catcott – Bridgwater return	60 mins	-	60 mins	180 mins
614	Bridgwater College – Shurton – Bridgwater College	1 service (16 :40)	-	-	-
615	Bridgwater - Nether Stowey – Minehead return	1 service (16 :40)	-	-	-

3.5.3 The majority of regular services shown in Table 3.1 operate between the hours of 07:00-19:00, with the exception of 375 and 21/21A services which operate between 06:00-21:00 and 06:00-00:00, respectively. Specific times are shown in the table for the infrequent services where applicable. Saturday hours of operation typically match those of weekday services, with Sunday services starting slightly later and finishing slightly earlier than weekday/Saturday services.

3.5.4 There are no bus stops within walking distance from the HPC Development Site. There are also currently no bus services that serve the HPC Development Site.

3.5.5 The existing bus routes that are the nearest to the HPC Development Site are Routes 14 and 614, both of which are operated by First Group. Route 614 provides one service between Shurton and Bridgwater College in the weekday morning and a return service in the weekday evenings. It routes via Shurton, Stogursey, Combwich, Cannington and Bridgwater.

3.5.6 Route 14 provides a two hourly service during the day between Williton and Bridgwater via Watchet, Nether Stowey, Stogursey, Combwich and Cannington. It also provides a more regular hourly service between Cannington and Bridgwater.

3.5.7 The existing bus services nearest to the HPC Development Site do not correspond with the proposed construction shift times and would need to be significantly enhanced to be suitable for the HPC workers to use during the construction phase.

3.5.8 Within Bridgwater there is a bus and coach station at Watsons Lane, near to the Asda supermarket. The bus and coach station was opened in 2004 and is operated by First Group.

3.5.9 With regard to bus stops near to the proposed accommodation campuses in Bridgwater, there is a set of bus stops immediately to the west of the Bath Road/Union Street/Lower Bath Road junction and these are served by Route 1, the Sydenham/Wyndham Road Circular.

3.5.10 There is also a set of bus stops on Bath Road, adjacent to Frederick Road, which is served by Route 1, Route 102 to Burnham on Sea and Route 375 to Wells and Bristol.

3.5.11 There are also a number of bus stops on the A38 Bristol Road, the nearest of which to the campuses is a set of bus stops to the south of Union Road. These are served by Route 21/21A from Taunton to Burnham on Sea.

3.5.12 The Chartered Institute of Highways and Transportation (CIHT) 'Guidelines for Planning for Public Transport in Developments', published in 1999, recommends a maximum walking distance to bus stops of 400m. Notwithstanding this, it has been discussed with the highway authorities that a maximum 800m walking distance to bus stops would be considered appropriate recognising the likely workforce demographic. At present there are no bus stops within 800m walking distance to the application site. There are also currently no bus services that serve the existing Hinkley Point Power Station Complex.

3.6 Rail Network

3.6.1 The nearest railway station to the HPC Development Site is at Bridgwater, some 16km away. Bridgwater railway station is located on the main rail network on the route between Bristol and Exeter.

3.6.2 The route carries a mixture of both inter-regional express (Intercity), regional (limited stop) and local (all stations) passenger services. First Great Western and Cross Country provide services to and from Bridgwater.

Table 3.2: Existing Rail Timetable – Bridgwater

From	To	Weekday			Saturday Trains / Day	Sunday Trains / Day
		Trains / Hour	First Train	Last Train		
Bridgwater	Taunton	1	06:03	01:00	17	10
Taunton	Bridgwater	1	05:30	22:45	16	11
Bridgwater	Bristol	1	05:42	23:05	16	11
Bristol	Bridgwater	1	05:24	23:15	17	10
Bridgwater	Exeter	1	06:03	01:00	3	3
Bridgwater	Cardiff	3	06:14	23:24	13	0
Exeter	Bridgwater	1	05:58	21:12	2	4

3.7 Highway Network

3.7.1 **Figure 3.6** illustrates the highway network in the vicinity of the site and the wider area.

Figure 3.6: Existing Highway Network

3.7.2 The main access road serving the application site is the C182 which runs from Hinkley Point to the village of Cannington. At the Cannington junction of the C182 Rodway/High Street (referred to as the War Memorial junction), traffic can either head east along Main Road to access the A39 or head west along the High Street also to access the A39.

3.7.3 The C182 is an unlit, single-carriageway rural road generally subject to the national speed limit for such roads, i.e. 60mph. The C182 is subject to a speed limit of 30mph where it routes through the village of Cannington.

3.7.4 The A39 runs westwards towards Williton and Minehead and south-eastwards towards Bridgwater and then eastward to Glastonbury.

3.7.5 The A38 routes through Bridgwater on a predominantly north-south alignment. It provides access to Bristol to the north and Taunton to the south. The M5 motorway by-passes Bridgwater to the east of the town with two interchanges at Junctions 23 and 24. Junction 23 is located north of Bridgwater and Junction 24 of the motorway is located south-east of Bridgwater.

3.7.6 The Northern Distribution Road (NDR) was built during 2001/02 and links the A38 with the A39 to the west of Bridgwater. The NDR was built to route traffic around central Bridgwater to reduce congestion and HGV flows through central Bridgwater as well as provide a distributor road for new housing. It has recently been reclassified as an A road.

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4. DCO WORKS PROPOSALS

4.1 Introduction

4.1.1 This section summarises the development proposals for the DCO application.

4.1.2 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to the description of development chapter of the Transport Assessment.

4.2 Hinkley Point C Main Site

4.2.1 The HPC main site development will comprise a range of buildings above ground, on the sea bed and sub-surface structures and related facilities including:

- Two permanent nuclear islands housing the UK EPR reactor buildings and other essential buildings.
- Two conventional islands, including the turbine halls, located adjacent to the nuclear islands.
- A cooling water pumphouse for each UK EPR reactor unit with related infrastructure.
- Sea bed cooling water intakes and outfall structures together with bored tunnels connecting these to the cooling water pumphouses and turbine halls.
- Energy transmission infrastructure from the turbine halls and associated infrastructure, to the National Grid 400kV substation.
- Fuel and waste management and storage facilities.
- Ancillary office facilities and storage facilities.
- A Public Information Centre (PIC) to provide education and public facilities.
- A sea wall incorporating a public footpath.
- Access and parking facilities for workers, visitors and deliveries for the main nuclear plant and the National Grid 400kV substation.
- Landscaped areas (including ecological features and public rights of way (PRoW)).

a) Proposed Access Arrangements

4.2.2 The existing access road into the Hinkley Point Power Station Complex will also be the main vehicle access for the proposed development. Two roundabouts are proposed along this route. The first to the east of HPC will provide access to site personnel and some special deliveries. The second, to the south-east of the Southern Construction Phase Area will provide access to the freight during the construction phase, and during the operational phase will provide an alternative means of access to HPC, including public access to the PIC.

4.2.3 In addition, it is proposed to construct an emergency access road from the south of the HPC development site as an alternative means of accessing HPC and is only required for use in exceptional circumstances such as for the emergency services to respond to an incident at the power station. It is not intended to be used during the construction period and the requirement to use the road during the operational period is expected to be infrequent. The public highway route for this emergency access is proposed to be from Shurton to the A39 via Stogursey Lane.

4.2.4 There shall be locked gates at the end of the emergency access road where it joins roads open to general use. The gates shall be sufficient to prevent unauthorised access of motor vehicles. Separate provision may be made for pedestrian access, where required.

b) Proposed On-Site Parking

4.2.5 During the main period of construction of HPC, on-site car parking will be limited to 300 spaces. This will be composed of 200 spaces for EDF Energy and contractors employees and 100 spaces for a combination of business visitors, VIP visitors, disabled parking and bus parking for the Public Information Centre. Access to on-site parking during construction will be strictly controlled and provided to named personnel only on the basis of need.

4.2.6 Once HPC is fully operational, a car park comprising 505 spaces will be provided, to be known as the south east car park . In addition, a second permanent car park will be located to south of the HPC main site (west of the National Grid substation) and will comprise a total of 508 parking spaces for additional workers who will be required during the planned ‘outages’ (i.e. maintenance periods). This car park will also provide for attendees and workers at the training and simulator facility and car and coach parking for visitors to the PIC.

4.2.7 A further smaller car park, comprising 180 spaces, will be provided to the east of the site to replace the existing Hinkley Point Power Station Complex overflow car park. Disabled parking will be included within the car parking provision.

4.2.8 Due to requirements to provide replacement car parking for Hinkley Point B the number of spaces available to HPC workers is 430. This provides significant restraint for the 810 operational workers expected to be on site on any one day.

c) Hinkley Point C On-site Accommodation Campus

4.2.9 The proposed HPC on-site accommodation campus would provide accommodation, recreation and amenity facilities for up to 510 workers

4.2.10 The proposed development would comprise:

- an accommodation campus including living space for 510 occupants within 15 accommodation buildings; two 5-a-side football pitches and associated toilet facilities; 319 car parking spaces and motorcycle and bicycle parking spaces; an amenity building providing amongst other things administration, canteen, laundry, gymnasium and recreational facilities; bus drop-off point; and internal access roads;
- access off the C182 (Wick Moor Drove);
- landscaping within the site, including tree planting around the perimeter of the site; and

- other ancillary development including signage, fencing, lighting, CCTV and utilities.

4.2.11 Construction of the HPC on-site accommodation campus would commence in Quarter 2 2013 and complete in Q3 2014. The accommodation campus would be operational between Quarter 3 2014 and Quarter 2 2020. Following completion of the HPC construction phase, the accommodation campus would be removed and the site landscaped in accordance with details set out in the Landscape Restoration Strategy appended to the Environmental Statement.

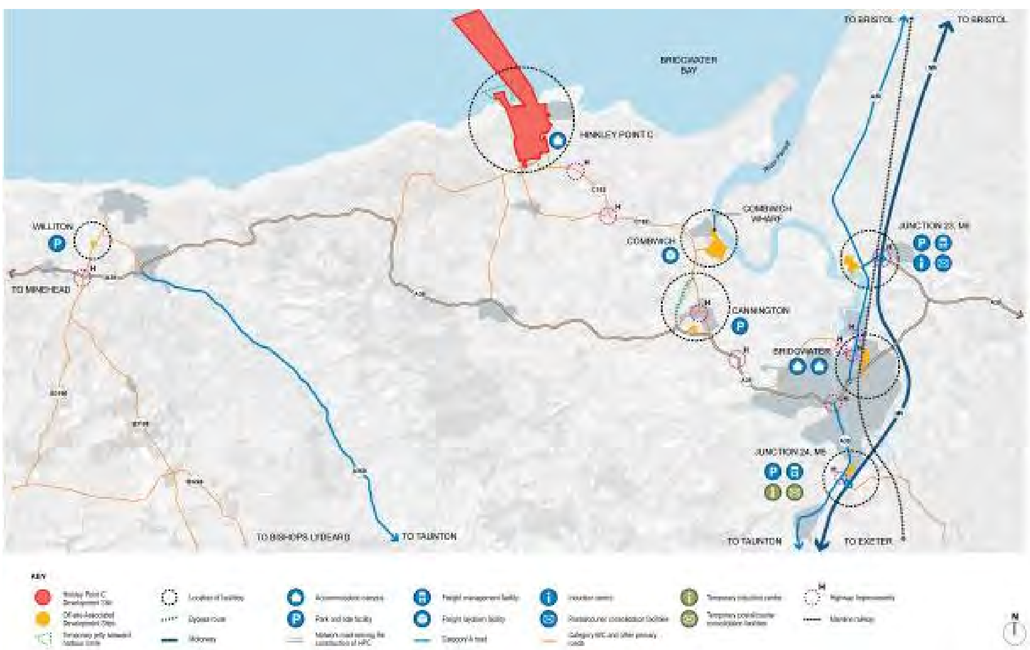
4.2.12 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 2 of the Environmental Statement.

4.3 Off-Site Associated Developments

4.3.1 In conjunction with the HPC main site works, a number of off-site associated development sites would be implemented to facilitate the construction activities.

4.3.2 The locations, in the context of the wider HPC Project, of all of the associated development proposals, are shown in Figure 4.1.

Figure 4.1: Locations of Associated Developments



4.3.3 The Off-site Associated Development comprises the following:

- Accommodation campuses for up to 1,000 construction workers, with ancillary facilities, across two sites. These are in addition to the accommodation campus for 510 workers proposed within the HPC construction site.
- Park and ride facilities for up to 2,410 spaces for cars, vans and mini-buses, 125 motorcycle spaces, 125 cycle spaces and 51 bus parking spaces, with ancillary facilities, across four sites.

- Freight management facilities for up to 140 heavy goods vehicles (HGV) parking spaces, with ancillary facilities, across two sites.
- An induction centre for HPC construction site workers to be processed through their induction requirements.
- A consolidation facility for postal/courier deliveries.
- A bypass around the west of Cannington.
- Refurbishment and extension of Combwich Wharf and an associated freight laydown facility for the storage of Abnormal Indivisible Loads (AILs) and other construction goods being delivered via Combwich Wharf or by road.

a) Bridgwater A Accommodation Campus

4.3.4 The proposed Bridgwater A accommodation campus would provide accommodation, recreation and amenity facilities for up to 850 workers. Occupants of the Bridgwater C accommodation campus would use the recreational and amenity facilities at the Bridgwater A accommodation campus once available.

4.3.5 The proposed development would comprise:

- an accommodation campus, including living space for 850 occupants within 25 accommodation buildings; three football pitches (one full size and two 5-a-side pitches) and associated changing facilities; 543 car parking spaces and bus, motorcycle and bicycle parking spaces; and an amenity building providing amongst other things administration, canteen, laundry, gymnasium and recreational facilities; and internal access roads;
- access off the A39 (Bath Road), changes to the road markings along the A39 (Bath Road) and the stopping up of Fredrick Road;
- a new drainage rhyne;
- landscaping within the site, including tree planting around the perimeter of the site; and
- other ancillary development, including signage, fencing, lighting, CCTV and utilities.

4.3.6 Construction of the Bridgwater A accommodation campus would commence in Quarter 2 2013 for approximately 25 months, in two phases that would run concurrently. These works would include the demolition of existing buildings and structures and the remediation of the land. Phase 1 of the accommodation campus would be operational from Quarter 3 2014, with Phase 2 available from Quarter 2 2015. Following completion of the HPC construction phase in Quarter 3 2020, the accommodation campus would be removed with the exception of some infrastructure including the drainage rhyne and some landscaping. The site would be available by Quarter 4 2021 for redevelopment.

4.3.7 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 3 of the Environmental Statement.

b) Bridgwater C Accommodation Campus

4.3.8 The proposed Bridgwater C accommodation campus would provide accommodation, recreation and temporary canteen facilities for up to 150 workers. Occupants of this accommodation campus would use the recreational and amenity facilities at the Bridgwater A accommodation campus once available.

4.3.9 The proposed development would comprise:

- an accommodation campus, including living space for 150 occupants within four accommodation buildings; an all weather 5-a-side football pitch; 60 car parking spaces and motorcycle and bicycle spaces; a temporary canteen building, for a period of nine months, until the Bridgwater A accommodation campus becomes operational; and internal access roads;
- alterations to the existing gyratory on the A39 (Bath Road), including provision of a bus shelter and changes to the road markings;
- access road off College Way;
- landscaping within the site, including tree planting along College Way; and
- other ancillary development, including signage, fencing, lighting, CCTV and utilities.

4.3.10 Construction of the Bridgwater C accommodation campus would commence in Quarter 1 2013 for approximately 12 months. The accommodation campus would be operational between Quarter 1 2014 and Quarter 3 2020. Following completion of the HPC construction phase, the accommodation campus would be retained and used in connection with Bridgwater College as student accommodation or other alternative educational uses.

4.3.11 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 4 of the Environmental Statement.

c) Cannington Bypass

4.3.12 The proposed Cannington bypass would link the existing A39 southern bypass to the C182 (Rodway). The proposed development would comprise:

- a 1.6km single carriageway road, with a design speed of 40 miles per hour (mph), 7.3m wide with a 2.5 wide verge on the west side and a 3.5m wide cycle/footway on the east side;
- alterations to the alignment of the existing C182 (Chads Hill), Brymore School, Park Lane, Withiel Drive and Sandy Lane;
- ecological mitigation, in the form of an underpass and culverts;
- earth bunds for acoustic and visual mitigation;
- landscaping and screen planting;
- surface water drainage infrastructure (including balancing ponds); and
- other ancillary development, including signage, fencing, lighting, CCTV and utilities.

4.3.13 Construction of the Cannington bypass would commence in Quarter 1 2013 for approximately 18 months, with the northern, central and southern sections built concurrently. The bypass would be operational from Quarter 4 2014 and would be available to support the construction and operational phases of the HPC power station as well as the general public, as it would be adopted by the highways authority (Somerset County Council) as a public highway.

4.3.14 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 5 of the Environmental Statement.

d) Cannington Park and Ride

4.3.15 The proposed Cannington park and ride facility would provide car parking spaces for the workforce and visitors of the HPC construction site, in addition to space for motorcycles, bicycles, mini-buses and buses. The proposed development would comprise:

- a park and ride facility comprising two separate car parks for the workforce (132 car, disabled and van/mini-bus parking spaces) and public visitors (120 car parking spaces respectively) and motorcycle, bicycle and bus parking spaces; ancillary structures including bus shelters and welfare and security buildings; and internal roads;
- a priority junction access off the A39 into the site;
- widening of the A39 and provision of a footway between site access and the A39 (Main Road) eastern roundabout;
- landscaping, screen planting and the provision of an earth bund for visual mitigation and spoil storage;
- surface water drainage infrastructure (including a balancing pond); and
- other ancillary development, including fencing, lighting, CCTV and utilities.

4.3.16 Construction of the Cannington park and ride facility would commence in Quarter 1 2013 for approximately 12 months. The park and ride facility would be operational from Quarter 4 2013. Following completion of the HPC construction phase the facility would be removed and the land restored to green field status, which is estimated to be by Quarter 3 2022.

4.3.17 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 6 of the Environmental Statement.

e) Combwich

4.3.18 The proposed development at Combwich will include the refurbishment and extension of the existing Combwich Wharf and an associated freight laydown facility for the storage of AILs and other construction goods being delivered via Combwich Wharf or by road before they are transferred to the HPC construction site. An access road is proposed to link Combwich Wharf with the existing Combwich Wharf private access road; and the use of, and amendments to, the existing Combwich Wharf access road.

4.3.19 The proposed development would comprise:

- Refurbishment and extension of Combwich Wharf to allow for water-borne deliveries of AILs and construction goods associated with the HPC power station. An access road would be constructed between Combwich Wharf and the Combwich Wharf access road to provide links to the freight laydown facility. This access road will cater for HGVs delivering general construction goods from Combwich Wharf to the freight laydown facility.
- A freight laydown facility for the handling and storage of AILs, construction equipment and materials. This would be used for the temporary storage of equipment and goods delivered principally via the wharf destined for the HPC construction site. Associated welfare, administration and security buildings would support the operation of the facility. Ancillary development is also proposed, including landscaping, car parking for 50 cars/light goods vehicles, internal access roads, a flood defence bund and associated retaining wall, earth bunds for acoustic and visual mitigation and spoil storage, surface water drainage infrastructure, including four balancing ponds, fencing, lighting, CCTV and utilities.
- Improvements to and the use of the existing Combwich Wharf private access road.
- Minor alterations to the junction of the C182 and the existing Combwich Wharf private access road.

4.3.20 The refurbishment and extension of Combwich Wharf would commence in Quarter 1 2013 for approximately 13 months. The facility would be operational from Quarter 1 2014 and would continue to be used by EDF Energy to support the construction and operational phase of the HPC Project. The wharf would continue to be used by National Grid and the Hinkley Point A and B power stations. Following construction of the HPC power station, the wharf would be retained in its refurbished state and will continue to be used, on an ad hoc basis, similar to the level of use currently for the occasional delivery of AILs.

4.3.21 Construction of the freight laydown facility would commence in Quarter 1 2014 for approximately 12 months. The facility would be operational from Quarter 1 2015. Following completion of the HPC construction phase in Quarter 3 2020, the facility would be removed entirely and the land restored to green fields by Quarter 2 2022.

4.3.22 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 7 of the Environmental Statement.

f) M5 Junction 23 Park and Ride, Freight Management and Courier Consolidation Facilities and Induction Centre

4.3.23 The proposed development at Junction 23 would provide park and ride, freight management and courier consolidation facilities and an induction centre for workers of the HPC construction phase. The proposed development would comprise:

- a park and ride facility, including two areas for parking of 1,300 cars, with associated motorcycle, bicycle, mini-bus, van and bus parking spaces; bus terminus; and ancillary structures, including bus shelters and welfare and security buildings;

- a freight management facility, including an area for the parking of 85 HGVs and other vehicles; a freight checking area; associated car parking and ancillary structures, including a welfare and security building;
- a consolidation facility for courier deliveries comprising a building with associated loading bay and parking area; and
- a worker induction centre comprising induction space, canteen and welfare facilities; and 120 car parking spaces and motorcycle and bicycle spaces;
- realignment of the highway arrangements off the Dunball roundabout;
- internal access roads and a roundabout;
- works to River Parrett flood defences;
- landscaping, screen planting, ecological mitigation area and the provision of earth bunds for visual mitigation and spoil storage;
- surface water drainage infrastructure (including balancing ponds); and
- other ancillary development, including fencing, lighting, CCTV and utilities.

4.3.24 Construction of the proposed development at Junction 23 would commence in Quarter 3 2013 for approximately 12 months. The facilities would be operational from Quarter 3 2014. Following completion of the HPC construction phase in Quarter 3 2020 the facility would either be removed and the land restored to green fields by Quarter 4 2021; or retained in part to allow for future use by third parties.

4.3.25 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 8 of the Environmental Statement.

g) M5 Junction 24 Park and Ride and Freight Management Facilities and Temporary Courier Consolidation Facility and Induction Centre

4.3.26 The proposed development at Junction 24 would provide park and ride and freight management facilities for workers of the HPC construction phase; and temporary courier consolidation facilities and an induction centre until those facilities at Junction 23 become available.

4.3.27 The proposed development would comprise:

- a park and ride facility, including parking of 1,300 cars, and motorcycle, bicycle, mini-bus, van and bus parking spaces, reducing to 698 spaces once all the park and ride facilities at Junction 23 become available; bus terminus; and ancillary structures, including bus shelters and welfare and security buildings;
- a freight management facility, including an area for the parking of 140 HGVs and other vehicles, reducing to 55 spaces once the freight management facility at Junction 23 become available; a freight checking area; associated car parking; and ancillary structures, including administration welfare and security buildings;
- a temporary consolidation facility for courier deliveries, until the facilities at Junction 23 become available;

- a temporary worker induction centre comprising induction space, canteen and welfare facilities; and 120 car parking spaces and motorcycle and bicycle spaces, until the facilities at Junction 23 become available;
- landscaping;
- surface water drainage infrastructure; and
- other ancillary development, including fencing, lighting, CCTV and utilities.

4.3.28 Construction of the proposed development at Junction 24 would commence in Quarter 1 2013 for approximately six months. The facilities at the site would be introduced in phases from Q1 2013 onwards with all elements of the site fully operational by Q3 2013. The site would be operating until the end of the HPC construction phase. Following cessation of use the site (or parts of) would be available for employment generating purposes by a third party.

4.3.29 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 6 of the Environmental Statement.

h) Williton Park and Ride Site

4.3.30 The proposed Williton park and ride facility would provide car parking for the workforce of the HPC construction site, and motorcycle, bicycle and bus parking spaces. The site forms part of a wider existing lorry park, which will continue to operate (on a reduced area) whilst EDF Energy occupies part of the site. The proposed development would comprise:

- a park and ride facility, including parking for 160 cars, disability and van/mini-buses, and motorcycle, bicycle, mini-bus and bus parking spaces; internal roads; and ancillary structures including bus shelters and welfare and security building;
- improvements to the access off the B3190 into the site;
- landscaping and screen planting;
- surface water drainage infrastructure; and
- other ancillary development, including fencing, lighting, CCTV and utilities.

4.3.31 Construction of the Williton park and ride facility would commence in Quarter 1 2013 for approximately nine months. The park and ride facility would be operational from Quarter 4 2013. Following completion of the HPC construction phase in Quarter 3 2020 the site would be returned to its current use as a lorry park facility by Quarter 2 2021.

4.3.32 For a full description of the proposed development, including the construction, operation and post-operational phases, refer to Volume 10 of the Environmental Statement.

4.4 Construction and Operation Characteristics

4.4.1 This section summarises the construction and operational characteristics of the HPC Project with regards to workforce profile and skills. The workforce details set out in this chapter have been used to inform the assessment of trip generation and distribution for HPC and its associated development sites.

4.4.2 This section also identifies the assessment years used within the trip generation and modelling analysis for HPC, described in later chapters of this report, and summarises the construction programme for HPC and its associated development sites providing clarity on the elements of the scheme included within each assessment year.

a) Construction Programme

4.4.3 It is anticipated that it would take nine years to build the HPC power station, including the Preliminary Works. Construction of the main HPC site is expected to commence in Quarter 1 of 2013, subject to development consent being granted, and the power station is expected to be complete by 2020.

4.4.4 **Table 4.1** summarises the construction programme for HPC and the Associated Development Sites.

Table 4.1: Construction and Decommission Programme

Site	Start of Construction	Commence Operation	Commence Post Operation	End of Post Operation
HPC	Q4 2011	Unit 1 Q1 2019 Unit 2 Q3 2020	N/A	N/A
HPC On-site Campus	Q2 2013	Q3 2014	Q2 2020	Q1 2021
Bridgwater A Campus (Phase 1)	Q2 2013	Q3 2014	Q1 2021	Q4 2021
Bridgwater A Campus (Phase 2)	Q2 2013	Q2 2015	Q1 2021	Q4 2021
Bridgwater C Campus	Q1 2013	Q1 2014	N/A	N/A
Junction 23	Q3 2013	Q3 2014	Q4 2020	Q4 2021
Junction 24	Q1 2013	Q3 2013	Q1 2022	Q3 2022
Cannington park and ride	Q1 2013	Q4 2013	Q1 2022	Q4 2022
Williton park and ride	Q1 2013	Q4 2013	Q4 2020	Q2 2021
Cannington bypass	Q1 2013	Q4 2014	N/A	N/A
Combwich Laydown Area	Q1 2014	Q1 2015	Q3 2021	Q2 2022
Combwich Wharf	Q1 2013	Q1 2014	N/A	N/A
Induction Centre (J23)	Q3 2013	Q3 2014	Q4 2020	Q4 2021
Visitor Centre	Q2 2013	Q1 2014	N/A	N/A

b) Workforce Profile

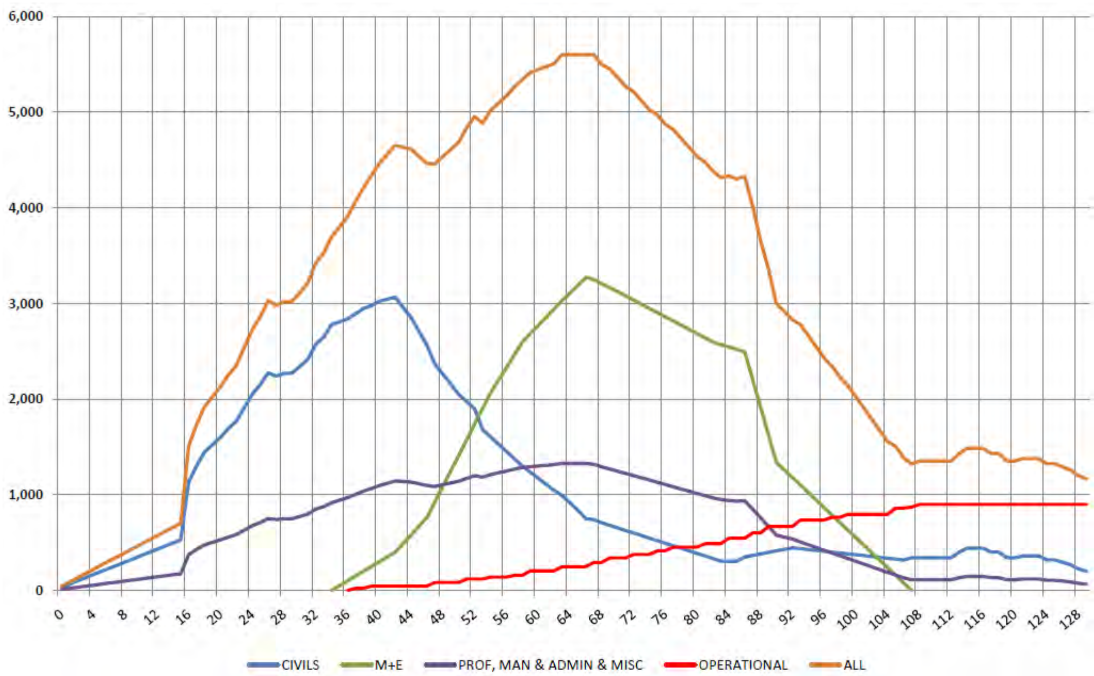
4.4.5 EDF Energy has defined the workforce profile for the full construction and operation phase of HPC and provided the construction workforce numbers as an input to this assessment.

4.4.6 During the construction phase of HPC the workforce will gradually build up from Quarter 4 2011. It is forecast that the workforce will peak at 5,600 workers in late

2016 before subsequently decreasing until construction is complete. The operational workforce is expected to gradually build up before the reactors at HPC are commissioned. Following commission of both reactors, it is anticipated that an operational workforce of 900 personnel will be required.

4.4.7 **Figure 4.2** below illustrates the workforce profile over the construction phase of the HPC Project for each of the main type of workers.

Figure 4.2: Hinkley Point C Construction Workforce Numbers



4.4.8 In terms of skills, the workforce during the construction phase can be divided predominantly into civil operatives and mechanical and electrical operatives with the remaining workforce comprising supervisory, managerial and clerical staff, plus site services and security employees.

4.4.9 The existing skills profile in the local area does not fully meet the specialist requirements of the construction of the HPC Project and as such, there will be two types of construction workers including:

- home-based workers, who will commute to and from work on a daily basis from their home address; and
- non-home-based workers who cannot feasibly commute to and from work on a daily basis from their home address and will, therefore, require temporary accommodation in the vicinity of the HPC Development Site.

4.4.10 The split of home-based and non-home-based workers is expected to change over the course of the construction period as the nature of the construction evolves. There will be a higher proportion of home-based workers at the outset, which will reduce as the project moves towards peak construction and will increase again towards completion as the permanent operational workforce grows, all of whom will ultimately live in the area.

c) Peak Construction

4.4.11 The peak of the construction phase assessed is Quarter 4 2016 since this will be when there is the greatest numbers of construction workers present (5,600). All of the Associated Development sites will be operational by this year including all accommodation campuses, all four park and ride sites and the Cannington bypass.

d) Operational Year

4.4.12 An assessment of the operation of the HPC power station has also been considered. The power station is expected to be operational by 2020 but an assessment year of 2021 has been used since this provides an assessment of 10 years from the application submission date, in accordance with the Department for Transport 'Guidance on Transport Assessment'. Many of the Associated Development sites will be being decommissioned in this year.

4.4.13 **Table 4.2** summarises the differences between the three assessment years in terms of infrastructure and facilities that will be operational.

Table 4.2: Assessment Scenarios

Infrastructure	Q3 2013	Q4 2016	2021
Junction 23	× (Construction)	✓	× (Decommission)
Junction 24	✓	✓	✓
Williton park and ride	× (Construction)	✓	× (Decommission)
Cannington park and ride	× (Construction)	✓	✓
HPC On-site Campus	× (Construction)	✓	× (Decommission)
Bridgwater A Campus	× (Construction)	✓	× (Decommission)
Bridgwater C Campus	× (Construction)	✓	×
Cannington bypass	× (Construction)	✓	✓
Induction Centre	✓ (J24)	✓ (J23)	× (Decommission)
Postal/Courier Consolidation Centre	✓ (J24)	✓ (J23)	× (Decommission)
Visitor Centre	×	✓	✓

e) Shift Patterns

4.4.14 EDF Energy has provided information which confirms that during construction of the HPC Project all construction workers at the main HPC site will operate on a shift basis. The information supplied by EDF Energy indicates that a range of shifts will operate during construction of HPC including:

- First Shift (of a double shift operation).
- Second Shift (of a double shift operation).
- Night Shift.
- Single Shift.
- Office Shift.

4.4.15 Shift patterns have been derived by EDF Energy to provide defined windows within which contractors have the flexibility they need to adapt their organisation for the works to be delivered. Therefore, the shift patterns for HPC have each been allocated a start and end window within which workers could arrive at or depart from the HPC site.

4.4.16 At weekends different shift patterns will apply. Other construction staff will be expected to work an alternating pattern (for example 11 days on, 3 days off, 12 days on, 2 days off) in which one weekend is worked as a full normal shift (operating on the same times as the Monday-Friday shifts) and the following weekend is non-working. Overall the arrangements will ensure that every other weekend, aside from small scale maintenance or preparatory activity, there will be no construction activity on site on Saturday afternoons or all day Sundays. The arrangement also provides an opportunity for non-home based workers to make use of the 3 days weekend once a month to return home.

f) Shift Start/End Windows

4.4.17 In addition to providing flexibility to the contractors, the start and end windows for each shift have been developed with a number of issues in mind. These include minimising development traffic coinciding with the AM and PM network peak hours of 08:00-09:00 and 17:00-18:00 respectively.

4.4.18 The start and end windows for each shift (Weekdays only) are shown at **Table 4.3**.

Table 4.3: Shift Start and End Windows (Monday to Friday)

Shift	Start Window	End Window
First Shift	From 06:00-07:30	From 14:00-16:00 or after 17:30
Second Shift	From 13:30-15:00	From 22:00-00:00
Night Shift	From 20:30-22:00	From 06:00-08:00
Single Shift	From 07:00-08:30	From 16:30-18:30
Office Shift	From 07:30-09:00	From 17:30-19:00

g) Operational Phase

4.4.19 The operational staff at HPC will follow a similar working pattern to the existing operational staff at Hinkley Point B. **Table 4.4** summarises the weekday shift pattern for the typical operational staff as defined by EDF Energy.

Table 4.4: Operational Weekday Shift Pattern

Shift	Start Window	End Window
Day Workers / Contractors	08:00-08:30	16:30-17:00
Shift 1	08:00	20:00
Shift 2	20:00	08:00

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5. OBJECTIVES AND BENEFITS

5.1 Objectives

5.1.1 The site specific Travel Plans will address EDF Energy's seven transport objectives which are as follows:

- Minimising the volume of traffic associated with the development of the new power station so far as reasonably practicable, at all times but especially during peak hours.
- Maximising the safe, efficient and sustainable movement of people (i.e. travel by non-car) and materials (i.e. delivery by non-road) required for the HPC Project so far as reasonably practicable.
- Minimising the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable.
- Providing long-term, sustainable legacy benefits for the local community from new infrastructure, where appropriate.
- Maximising the control of movements associated with the construction of the HPC Project so far as reasonably practicable.
- Taking all reasonable steps to ensure the resilience of the transport network in the event of an incident.
- Taking all reasonable steps to protect the natural and built environment

5.2 Transport Hierarchy

5.2.1 In line with Government policies on sustainable transport, this Framework Travel Plan uses the following hierarchy of transport modes to ensure that as much emphasis as possible is given to the most sustainable modes of transport:

- walking;
- cycling;
- bus/minibus/rail;
- motorcycle;
- car share; and
- single occupancy car.

5.3 Benefits

5.3.1 The achievement of the agreed objectives will bring about a range of benefits to EDF Energy, their employees and also to the wider Bridgwater area, as set out below.

5.3.2 The benefits to employees include:

- reduced reliance on the private car;

- reliable and quality journeys to and from work; and
- the opportunity to save money by using alternative modes of travel rather than a single occupant vehicle trip.

5.3.3 The benefits to EDF Energy include:

- assistance with the creation of good relations with the local community;
- a demonstration of the environmental responsibility of the development; and

5.3.4 The benefits to the local area:

- reduction in traffic movements, particularly by private car;
- improved walking and cycling facilities in the Bridgwater area.

6. TRAVEL PLAN MANAGEMENT

6.1 Introduction

This section sets out the proposed management structure for the Framework Travel Plan and the responsibilities of each stakeholder.

6.1.1 The overall management and implementation of the Travel Plans will be the responsibility of EDF Energy.

a) Transport Review Group

6.1.2 A Transport Review Group (TRG) will be established with members of the key transport stakeholders and EDF Energy. The scope of the TRG is proposed to be as follows:

- Receive monitoring reports from EDF Energy
- Advise on potential Travel Plan enhancements
- Consider the use of the additional funds within the Section 106 Agreement.
- Liaise with the Transport Forum

6.1.3 The TRG members are proposed to be (one voting member each unless indicated otherwise):

- Transport Co-ordinator
- EDF Energy (3 members);
- Somerset County Council;
- Highways Agency;
- Sedgemoor District Council; and
- West Somerset Council.

6.1.4 In addition, specialist ad-hoc attendance can be called upon from transport providers, emergency services and the main contractor. However, these invitees will not have any voting rights.

6.1.5 Membership of the TRG does not fetter the members planning and other statutory duties.

6.2 Transport Forum

6.2.1 Consisting of local stakeholder groups, the Transport Forum is responsible for collating views from the public and feeding through to the TRG for review. They form the key link between the TRG and the wider community and provide an indication of the issues that are impacting the general public.

6.2.2 The Transport Forum has already begun meeting on a monthly basis to discuss transport issues associated with pre-planning requirements prior to submission of the

DCO application for the HPC Project. It is anticipated that the Transport Forum will continue to meet on a monthly basis and the minutes will be provided to the TRG for consideration and response.

6.3 Transport Co-ordinator

6.3.1 EDF Energy will appoint a Transport Co-ordinator. The Transport Co-ordinator will be a professional transport expert who is qualified to meet the requirements of the role.

6.3.2 The Transport Co-ordinator has the following transport-related responsibilities:

- ensure effective implementation and enforcement of the Transport Strategy;
- develop and manage the implementation of the Travel Plans;
- promote the objectives and benefits of the Travel Plans;
- monitor the success of the implemented Travel Plans against the agreed targets;
- report on the performance of the Travel Plans to the TRG;
- report feedback from the Transport Forum to the TRG;
- update the Travel Plans as required in consultation with the TRG;
- resolve issues and problems through liaison with other parts of EDF Energy and its contractors; and
- act as a point of contact for contractors and the workforce.

6.3.3 The role of Transport Co-ordinator will be fully funded by EDF Energy.

6.4 Travel Plan Budget

6.4.1 EDF Energy will be responsible for the cost of implementing the Travel Plan. In addition, a contribution will be secured through a S106 Agreement for Somerset County Council's attendance at TRG meetings and for additional Travel Plan measures if proposed by EDF Energy or the TRG.

7. BASELINE MODE SHARE ASSESSMENT

7.1 Introduction

7.1.1 The SCC Manual for Travel Plans sets out the process of how to set achievable mode share targets for the Travel Plan. The manual suggests that a baseline mode share assessment is undertaken to understand what the likely mode share would be before the implementation of any Travel Plan measures.

7.2 HPC Transport Strategy

7.2.1 HPC is different from many projects in that EDF Energy are already committed to a transport strategy that prescribes how workers will travel. For example, the Transport Assessment prepared in support of the HPC development demonstrates that implementation of the transport strategy, prior to any aspects of this Travel Plan being implemented will result in only approximately 4% of the total workforce at peak construction driving to the main HPC site.

7.2.2 Therefore the baseline mode share assumes implementation of EDF Energy's transport strategy.

7.2.3 The baseline mode share assessment considers travel to the main HPC site and off-site Associated Developments. The assessment has been undertaken in two stages which firstly considers travel to/from the HPC main site (excluding the main site accommodation campus) and the four proposed park and ride sites, and secondly, considers travel to/from the three accommodation campuses.

7.3 HPC Main Site and Park and Ride Sites

7.3.1 For the first stage of the baseline mode share assessment, considering travel to the main HPC site and park and ride sites, the outputs from the 2016 (peak construction) gravity model have been used to understand where the workforce are expected to live and what existing travel mode options would be available to them. This analysis will allow the number of trips by all modes of travel to each park and ride site and the main site to be estimated.

7.3.2 It is important to note that the Gravity Model prepared for HPC is not an exact assessment of where workers will live in the future. The Gravity Model is a tool designed to provide the best estimate of where workers will live and therefore, where figures are provided within this mode share assessment they are the best estimates of the likely baseline mode share.

7.3.3 In order to establish the baseline mode share 2001 census data has been used. Since staff will not have the option to work from home due to the nature of the work during both construction and operation of HPC, the existing mode share percentages from the census data have been adjusted to remove working from home. Full details of the mode share analysis are set out within the Transport Assessment for HPCA summary of the results for each park and ride site and the main HPC site is shown at **Table 7.1** below.

Table 7.1: Summary of Baseline Travel by Mode Prior to Travel Plan

Mode	Number of Workers					
	To J23	To J24	To Can.	To Wil	To HPC	TOTAL
Walk	0	0	3	0	0	3
Cycle	16	14	24	5	0	59
Public Bus	5	4	1	2	0	12
Rail	1	0	0	0	0	1
Motorcycle	31	15	4	6	0	56
Single Occupancy Car	283	220	116	84	200	903
Car Share	1,121	618	129	78	0	1,946
Direct Bus	0	0	0	0	1,170	1170
Campus Bus	0	0	0	0	1,450	1,450
Total	**1,457**	**871**	**277**	**175**	**2,820**	**5,600**

7.3.4 The total number of workers who could use park and ride sites is 3,950. This figure is derived from deducting from the peak workforce of 5,600 those workers who can drive direct to HPC (200) and those workers resident at EDF Energy provided accommodation campuses (1,450). Of these 3,950 workers it is estimated that 1,170 will travel by direct bus – leaving an estimated 2,780 who will utilise the park & ride sites.

7.3.5 In order to understand the baseline mode split associated with each of the four park and ride sites, the figures provided at **Table 7.1** have been converted into a percentage of the total workforce allocated to each park & ride site. This is shown at **Table 7.2**.

Table 7.2: Baseline Mode Split for P&R sites prior to Travel Plan

Mode	Percentage Mode Split			
	To J23	To J24	To Can.	To Wil.
Walk	0.0%	0.0%	1.1%	0.0%
Cycle	1.1%	1.6%	8.7%	2.9%
Public Bus	0.3%	0.5%	0.4%	1.1%
Rail	0.1%	0.0%	0.0%	0.0%
Motorcycle	2.1%	1.7%	1.4%	3.4%
Single Occupancy Car	19.4%	25.3%	41.9%	48.0%
Car Share	76.9%	71.0%	46.6%	44.6%
Total	**100%**	**100%**	**100%**	**100%**

7.3.6 It should be noted that the above figures do not include the percentage mode share for the main HPC site since the workers travelling to the site by campus buses, have not been considered within the preceding sections. This is addressed below.

7.4 Accommodation Campus Mode Share

7.4.1 For the second stage of the baseline mode share assessment, considering travel to and from the accommodation campuses, the analysis considers both work and non-work trips.

7.4.2 In terms of travel to work, to and from each accommodation campus, all trips (100%) would be undertaken by dedicated direct bus services. The HPC accommodation campus is located within the HPC main site and as such would not generate any work related trips on the local highway network. For Bridgwater A and C accommodation campuses, a dedicated bus services would pick up at Bridgwater A and C accommodation campuses and then travel direct to the main HPC site.

7.4.3 Therefore, it is only the non-work trips associated with workers residing at each accommodation campus and their mode of travel to and from the campus and their normal place of residence that are considered.

7.4.4 Non-work trips associated with each accommodation campus have been considered within the Transport Assessment. The non-work trips that are likely to occur for Bridgwater A and C accommodation campuses are related to the following types of trip:

- Holiday/ Day Trip.
- Personal Business.
- Recreation/ Social.
- Shopping.
- Visiting Friends/ Relatives.

7.4.5 A total of 475 non-work trips per day are expected to be generated by the Bridgwater A accommodation campus per day, 131 by Bridgwater C and 424 by the HPC accommodation campus. These trips are total person trips by all modes. The mode share associated with these types of trip has been derived from Census and TEMPRO data for the AM, PM and inter-peak periods for the Bridgwater area considering trips made to the local Bridgwater area and also the wider Somerset area. From this the daily mode split has been derived. The mode share for each accommodation campus is shown at **Table 7.3**. It should be noted that an adjustment has been made to the rail and bus mode share for the HPC accommodation campus, since no bus services or rail services pass within close proximity to the main HPC site. For robustness, these trips have been re-allocated to car driver mode.

Table 7.3: Baseline Mode Split for Campus Non-Work Trips

Mode	BRI-A	BRI-C	HPC	Mode Split
Walk	23%	23%	23%	23%
Cycle	3%	3%	3%	3%
Car Driver	40%	41%	48%	43%
Car Passenger	27%	27%	27%	27%
Bus	5%	5%	0%	3%
Rail	2%	2%	0%	1%
Total	**100%**	**100%**	**100%**	**100%**

7.4.6 The only other trips associated with the accommodation campus sites relate to travel between the workers usual place of residence, their 'home' and the campus. The campus sites will accommodate non-home based workers, who will travel from all over the UK and possibly abroad, to work at HPC.

7.4.7 The shift patterns implemented for the HPC Project mean that many of these workers will be on a shift pattern which allows two weekends each month, one a 2 day weekend and one a 3 day weekend. The shift patterns are designed to allow workers a 3 day weekend each month to facilitate travel to their usual place of residence.

7.4.8 At this stage it is not known where workers that are resident in accommodation campuses will travel from, and as such, it is not possible to estimate a mode split.

7.5 Main HPC Site Mode Share

7.5.1 **Table 7.4** summarises the baseline mode share for the main HPC site.

Table 7.4: HPC Main Site Baseline Mode Share

Mode of Travel	Number of Trips	Mode Share
Walk	0	0%
Cycle	0	0%
Public Bus	0	0%
Rail	0	0%
Motorcycle	0	0%
Single Occupancy Car	200	3.6%
Car Share	0	0%
Direct Bus	1170	20.9%
P&R Bus	2,780	49.6%
On-site Campus or Campus Bus	1,450	25.9%
Total	**5,600**	**100%**

7.5.2 The assessment of baseline mode share demonstrates that the HPC transport strategy to be implemented by EDF Energy provides significant mode shift towards sustainable modes, with more than 90% of the construction workers either resident at the on-site campus or making their daily journey to work via EDF Energy funded bus services for at least part of their journey.

7.5.3 This baseline provides the starting point for examining Travel Plan measures and future targets which are discussed in the following two chapters.

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8. TRAVEL PLAN MEASURES

8.1 Introduction

8.1.1 This section of the Framework Travel Plan deals with each mode in turn and proposes measures to promote sustainable modes of travel and reduce single occupancy car use.

8.1.2 The measures put forward within this Framework Travel Plan should be read in the context of the transport strategy for HPC. The preceding chapters of this Travel Plan have demonstrated that the transport strategy creates very significant mode shift towards sustainable modes, and particularly EDF Energy funded bus services.

8.1.3 Therefore, the measures are focussed on areas such as walking and cycling to seek to reduce the number of journeys where cars are used for any part of the journey or indeed to reduce the number of buses required.

8.1.4 As part of the monitoring and review process the Transport Review Group will consider the effectiveness of the measures and if additional or more onerous measures are required to meet the targets. This section therefore sets out the proposed measures to be implemented in the Travel Plans and also potential additional measures to be considered if the targets are not met by the proposed measures.

8.2 Walking Measures

8.2.1 Potential measures to encourage workers to walk to work at the application site, walk to the four park and ride sites and increase uptake on non-work walking trips include the following:

- provision of maps showing safe local walking routes;
- promotional literature to encourage walking, emphasising the health benefits;
- provision of storage at work to hang/store clothes;
- provision of shower facilities at the main site;
- improvements to off-site infrastructure.

Proposed Walking Measures

8.2.2 It is proposed to provide maps showing the walking routes in the area, including public rights of way, to all workers that live within the 2km walking catchment of the main HPC site and the four park and ride sites. Additional copies of this map will be displayed in the changing room at the main HPC site and also at the bus stops in each of the four park and ride sites to inform other workers who may not walk of the options available to them.

8.2.3 It is also proposed to provide literature to all workers living within the 2km walking catchment of the main HPC site and four park and ride sites, which sets out the benefits of walking to work and the health benefits. Additional copies of this literature will be provided alongside the map in the changing room at HPC and bus stops in each of the four park & ride sites, so that other workers who do not walk can better understand the benefits, health and otherwise, of walking.

8.2.4 There will be changing and storage facilities provided for workers at the main HPC site. Therefore, any worker that walks to work, or walks to a park and ride site, would be able to store their clothes at work.

Potential Additional Walking Measures

8.2.5 Given the low number of people that are expected to live within the 2km walking catchment of the application site during the works (i.e. 1 person at peak) it is not considered viable to invest in off-site improvements to encourage the worker to walk to work. Should more workers than expected live within the 2km walking catchment then the investment in off-site pedestrian infrastructure will be reconsidered as part of the review of the Travel Plan with the TRG.

8.3 Cycle Measures

8.3.1 There is estimated to be 1,082 workers, at peak, living within the 8km cycle catchment of the main HPC site and park and ride sites. Of those, it is considered that 59 workers may cycle on their journey to work, whether direct to the main site or to a park and ride site. In addition, a further 31 cycle trips per day are expected to be undertaken by residents of the three accommodation campuses.

8.3.2 Potential measures to encourage more workers to cycle to work at the application site, to one of the park and ride sites and on non-work trips include the following:

- provision of a map showing local cycle routes;
- promotional literature to encourage cycling, emphasising the health benefits;
- provision of storage at work to hang/store clothes;
- provision of shower facilities at the main HPC site;
- provision of cycle accessories;
- establish a Bicycle User Group (BUG);
- buddy system;
- secure, sheltered cycle parking;
- cycle repair facilities;
- cycle training;
- pool bicycles; and
- improvements to off-site infrastructure.

Proposed Cycle Measures

8.3.3 It is proposed to provide a map showing the cycle routes in the area to all workers that live within the 8km cycle catchment of the site and the four park and ride sites. Additional copies of this map will be provided in the changing room at the main HPC site and at bus stops within each park and ride site, so that those that do not cycle can be better informed of the opportunities available to them.

8.3.4 It is also proposed to provide literature to all workers living within the 8km cycle catchment, which sets out the benefits of cycling to work and the health benefits. Additional copies of this literature will be provided in the changing room at the main HPC site and at park and ride site bus stops.

8.3.5 There will be shower, changing and storage facilities provided for workers on the HPC site and therefore any worker that cycles direct to the main site or cycles to one of the four park and rides sites, would be able to wash, change and store their clothes at work.

8.3.6 If uptake is likely to be high enough, the Transport Co-ordinator will establish a Bicycle User Group (BUG). This will be a group of people who want to improve facilities for cyclists and encourage others to cycle on their journey to work and for non-work trips. It will also provide a channel for cyclists to discuss any issues with the Transport Co-ordinator that they would like to be addressed. The existing workers at HPA/HPB who cycle to work would also be invited to join the BUG.

8.3.7 SCC has partnered with Liftshare to provide a car share scheme (www.carsharesomerset.com). As part of this facility, it is also possible to arrange a BikeBUDi. This system matches people up with other people travelling on the same route so that you can cycle together. This facility will be promoted by the Transport Co-ordinator through the email and written communication strategy set out later in this section.

8.3.8 The Somerset Cycle Parking Standards do not provide standards for construction sites and therefore the level of cycle parking during the construction phase has been based on the estimated demand with spare capacity to accommodate future growth in cycle use. It is estimated that 1,082 workers at peak will live within the cycle catchment, but the baseline mode share indicates that only 59 are likely to cycle direct to work or to a park and ride site. It is proposed to provide secured, sheltered cycle parking spaces at the main HPC site and also at the park and ride sites. Provision will be in excess of currently estimated demand and will allow for significant scope for growth in usage compared to the baseline estimates. Cycle parking utilisation will be monitored by the Transport Co-ordinator and further cycle parking will be provided if necessary.

8.3.9 As part of the Transport Assessment EDF Energy have investigated potential cycle infrastructure improvements and these are outlined within the Walking and Cycling Strategy that forms part of the Transport Assessment. EDF Energy propose to make a contribution to SCC to fund these improvements, which include improved cycle routes and crossings.

Potential Additional Cycle Measures

8.3.10 Pool bikes are useful for short work-related journeys and to make it easier to use public transport for longer journeys. They can also be made available to staff for other purposes, for example, to cycle off-site at lunchtime, or for sport, recreation and exercise.

8.3.11 It is considered that pool bikes could be provided at the three accommodation campus sites to encourage workers to cycle or to try out cycling as a viable means of transport – in particular for residents non-work related trips.

8.3.12 EDF Energy will not be the direct employer of workers at HPC, as such it is difficult to provide financial incentives to the workers to encourage them to cycle to work. For example, tax free purchasing schemes are sometimes provided by employers to their employees to help them purchase a bicycle. These are known as 'salary sacrifice' schemes, where the company purchases the cycle on behalf of an employee. The employee then pays back the cost of the cycle over a 12-18 month period, minus tax and National Insurance which is taken off the total value of the bike as part of the employee's salary. EDF Energy will liaise with the contractors and ascertain if such benefits are already available to the employees or could be made available.

8.4 Bus Measures

8.4.1 EDF Energy is already committed to an extensive bus system that will be provided free to workers. The system will be prescriptive and workers will be advised of their mode of travel. As such, there is likely to be little more that is feasible to do for the journey to work. Therefore, the Travel Plan measures will focus on the successful enforcement of the already high usage of buses determined by the transport strategy (see section 11) and the trip to park and ride and non-work journeys for campus residents.

8.4.2 Potential measures to encourage workers to travel by public bus on their journey to a park and ride site of for non-work trips include the following:

8.5 Rail Measures

8.5.1 Potential measures to encourage the workers to travel by rail to work at the application site include the following:

- collection from station(s);
- information (i.e. maps and timetables);
- financial incentives.

Proposed Rail Measures

8.5.2 It is proposed to provide a minibus pickup point at Bridgwater railway station to enable workers wishing to travel to Bridgwater station by rail to complete their journey to and from the main HPC site. It is envisaged that the minibus serving the rail station would also be used by workers living within the walking or cycling catchment of Bridgwater station. Additional cycle parking at Bridgwater station could be provided to facilitate this.

8.5.3 Information regarding available rail services and minibus collection service will be provided to all workers and will also be displayed at the main HPC site, park and ride sites and campus sites.

Potential Additional Rail Measures

8.5.4 EDF Energy will not be the direct employer of the workers and therefore it is difficult to provide financial incentives to the workers to encourage them to travel by rail to work. For example, interest free or low interest loans are sometimes provided by employers to their employees to help them purchase a season ticket and the loan payment is deducted from their salary. EDF Energy will liaise with the contractors and ascertain if such benefits are already available to the employees or could be made available.

8.6 Motorcycle

8.6.1 Motorcycles and mopeds can offer a more environmentally friendly alternative to travel by private car. The benefits to the environment in terms of emissions and fuel consumption will vary according to the engine size of the motorcycle/ moped. They are also more space efficient than other vehicles, particularly in terms of parking and congestion. The main concern with motorcycle travel is road safety.

8.6.2 There will be no motorcycle parking at the main HPC site during the construction phase and the construction workforce will not be allowed to motorcycle direct to the site (in order to avoid nuisance to the local community). But provision for motorcycle parking will be made at the accommodation campus sites and the four park and ride sites

8.6.3 Section 7 provided details on the baseline mode share for motorcycle which indicates that 56 workers could travel by this mode to the park and ride sites, for which parking will be provided.

8.6.4 Potential measures to encourage more workers to motorcycle to the park and ride sites and campus accommodation sites include the following:

- provision of storage at work to hang/store clothes;
- secure motorcycle parking;
- motorcycle training; and
- improvements to off-site infrastructure.

Proposed Motorcycle Measures

8.6.5 There will be shower, changing and storage facilities provided for workers at the main HPC site and as such any worker that motorcycles to a park and ride site and continues their journey to work by Park & ride bus would be able to store their clothes and accessories (e.g. helmet, leather clothing) at work.

8.6.6 It is proposed to provide 125 secured motorcycle parking spaces at the four park and ride sites which creates significant scope for expansion of this mode relative to the baseline estimate of usage. The motorcycle parking utilisation will be monitored by the Transport Co-ordinator and further motorcycle parking will be provided if necessary.

Potential Additional Motorcycle Measures

8.6.7 EDF Energy is proposing to provide a contribution to SCC to assist with the implementation of a package of road safety measures which will provide benefit to the workers and local community including motorcyclists.

8.7 Car Measures

8.7.1 Potential measures to reduce the number of single occupancy trips and encourage alternative modes to the car include the following:

- car share matching service;
- preferential parking for car sharers;

Proposed Car Measures

8.7.2 SCC has partnered with Liftshare, the UK's largest implementer of car-sharing systems, to set up www.carsharesomerset.com.

8.7.3 EDF Energy proposes to set up a private group within the Carshare Somerset website. A private site enables EDF Energy to have its own restricted groups for its staff allowing workers to search for matches amongst their colleagues. The Transport Co-ordinator will circulate promotional material to all workers.

8.7.4 Information will be made available to the workers at the main HPC site and information provided in each of the accommodation campus sites to facilitate car sharing and access to the Carshare Somerset website.

8.8 Communication and Marketing

8.8.1 The Transport Co-ordinator will develop and implement a communication strategy which will be designed to maximise the effectiveness of the Travel Plans. The key elements of the strategy are set out below.

Travel Pack

8.8.2 A Travel Pack will be provided to all workers at induction. This will include:

- specific information regarding their individual journey to work;
- information on walking and cycling options and bus and rail services in the local area;
- contact details for enquiries; and
- information on key elements of the Travel Plans including monitoring and enforcement.

Emails & Texts

8.8.3 During the course of the DCO Works, regular information will be sent to workers updating on the following:

- results of monitoring of the Travel Plans;
- details of car sharing;
- updates on minibus routes and pick up points;
- details on any issues and how they are being addressed.

Any other relevant information or news on the Travel Plans will also be provided to the construction workforce.

Information Board

8.8.4 It is proposed to have an information board in the on-site office and HPC main site changing room which will have all the up to date information on the Travel Plans.

8.9 Visitor Management

8.9.1 Any technical visitors to the site will be required to contact the site at least one day in advance to arrange their visit to the main HPC site. This will also be a security requirement to gain access to the site. Once the visitor details are known (i.e. origin, date and time of visit) the visitor will be informed on how they should travel to the application site. For example, it may be that they get collected by minibus from Bridgwater railway station, or use the park & ride site at Cannington which has dedicated visitor parking. If it is considered that the visitor has no alternative but to arrive at the main HPC site by car then they will be pre-booked a parking space at one of the 30 on-site spaces provided for this purpose.

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9. TRAVEL PLAN TARGETS

9.1 Introduction

9.1.1 Targets will enable the TRG to assess whether this Framework Travel Plan has been successful in achieving the objectives set out in **Section 5** of this document.

9.1.2 All proposed targets will be SMART, that is:

- Specific;
- Measureable;
- Achievable;
- Realistic; and
- Time related.

9.1.3 There are two types of targets, namely: ‘Action’ and ‘Aim’ targets. These are set out below.

9.2 Action Targets

9.2.1 Action targets are task specific and are typically consolidated into the Action Plan. This will be prepared and agreed with the TRG .

9.2.2 The Action Plan enables the TRG to monitor progress. So that the Travel Plan is ready in advance of construction, the Action Plan sets out which measures can be planned in advance and implemented on day one of DCO construction commencing.

9.2.3 This Travel Plan does not seek to set targets at this stage in the DCO process. The reasons for this are that the mode share is very dependant on where workers ultimately live.

9.2.4 Once the pattern of where workers not resident in accommodation campuses are living is established in the early stages of construction, targets will be set by the TRG.

9.2.5 The objectives of the targets will be:

- to increase the number of people walking and cycling to the site;
- of those using park and ride, to increase the proportion of walking, cycling and car sharing; and
- to explore the potential for increasing rail travel.

9.2.6 However, it should be noted that in deriving the modal splits used in the Transport Assessment it has been assumed that where it is practicable to use a direct bus workers will be required to use a direct bus. Therefore, the opportunity to increase direct bus mode share for a fixed distribution of workers is limited.

9.3 Aim Targets

9.3.1 As noted earlier in this Framework Travel Plan, the transport strategy leads to very significant use of sustainable modes for the daily journey to work of the construction workforce. The expected mode share is shown below:

Table 9.1: HPC Main Site Baseline Mode Share

Mode of Travel	Number of Trips	Mode Share
Walk	0	0%
Cycle	0	0%
Public Bus	0	0%
Rail	0	0%
Motorcycle	0	0%
Single Occupancy Car	200	3.6%
Car Share	0	0%
Direct Bus	1170	20.9%
Park and Ride Bus	2,780	49.6%
On-site Accommodation Campus or Accommodation Campus Bus	1,450	25.9%
Total	**5,600**	**100%**

9.3.2 The Framework Travel Plan targets will consider how this level of use can be improved upon.

9.3.3 It is not considered appropriate to set additional mode share performance targets for the Framework Travel Plan at this stage since appropriate targets will depend upon a range of factors including the precise location where workers live. However, the groups of workers and types of trips where an improvement in modal shift may be achievable are shown at **Table 9.2**.

Table 9.2: Travel Plan Targets

Worker	Type	Strategy	Travel Plan Target
Accommodation Campus	Work	100% by Bus	No Change
	Non-Work	Existing Baseline	✓
Other Workers	Walk and Cycle to Site	Existing Baseline	✓
	Walk and Cycle to P&R	Existing Baseline	✓
	Public Bus to P&R	Existing Baseline	✓
	Car Share to P&R	Existing Baseline	✓
	Direct Bus to Site	21% of all workers	No Change
	Rail	Existing Baseline	✓

10. MONITORING AND REVIEW

10.1 Introduction

10.1.1 The Framework Travel Plan will require monitoring, review and revision to ensure it remains effective. All monitoring will be the responsibility of EDF Energy.

10.1.2 The monitoring will follow best practice guidance as set out in the Somerset County Council Travel Plan Guidance documentation, 'Moving Forward: Manual for Travel Plans' December 2008, and the DfT document, 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process' April 2009.

10.1.3 Monitoring will begin with the site preparation works and this DCO Framework Travel Plan builds upon the approach proposed for site preparation works.

10.2 Monitoring Strategy

10.2.1 The Monitoring Strategy will:

- allow staff to express concerns about transport and contribute their ideas;
- listen to stakeholder feedback; and
- utilise a range of tools to monitor adherence to the plan and initiate timely intervention if required; and
- Adjust approaches to best achieve key objectives – for example this might involve adaptation of the timetables or locations for direct buses in the light of changing patterns of demand.

Monitoring

10.2.2 A range of surveys will be undertaken at regular intervals egg:

- Mode share to main site (including car share);
- Mode share to park and ride sites (including car share); and
- Bus occupancy.

10.2.3 In addition, a formal staff travel survey will be undertaken at designated points throughout the construction works. It is recommended that this takes place annually since if surveys are undertaken too regularly survey fatigue can set in. The survey format will be agreed with the TRG and the results shared with the TRG as part of the monitoring report. The monitoring report would contain the results of the surveys undertaken and set out headline figures for car occupancy, bus occupancy and mode share, against the baseline and subsequently against previous monitoring reports.

10.2.4 In addition ad-hoc data can be obtained to address any complaints made by the Transport Forum or other members of the public.

Suggestion Boxes

10.2.5 In addition to the monitoring set out above it is proposed to have suggestion boxes located in the changing rooms and on-site offices for workers to post suggestions for improvements or feedback on the Travel Plan. These will be reviewed by the Transport Co-ordinator and incorporated into the monthly monitoring report.

Key Performance Indicators

10.2.6 Key performance indicators that will be monitored and reported will include the following:

- Mode of travel to work of all workers;
- Mode of travel of non work trips for campus based workers;

10.2.7 **Section 11** sets out the enforcement that will be implemented in the event that the results of the key performance indicators suggest that the targets are not being met.

10.3 Review

10.3.1 This Framework Travel Plan is a 'live' document (i.e. the plan needs to be dynamic and evolve as the situation changes). It will continue to evolve during the construction and operation of the HPC project. Reviewing the results of the monitoring process is essential to ensure that the plan delivers the required outcomes.

10.3.2 The TRG will be provided with a regular monitoring report from commencement of DCO Works, summarising the monitoring results for the previous month and staff suggestions and public complaints, if any have been undertaken that month. The monitoring report will be provided at least 3 working days before the TRG meeting.

11. ENFORCEMENT

11.1 Introduction

11.1.1 This section provides a summary of the mechanisms that will ensure that this Framework Travel Plan is effectively enforced.

11.1.2 The two main methods of enforcement of the Travel Plan will be limits on car park numbers and prescription of mode to be used by workers.

11.1.3 The enforcement of the Travel Plan is considered under the following headings:

- **Control Mechanisms:** controls enforced by EDF Energy;
- **Legal and Contractual Obligations:** EDF Energy and the Contractors are legally and contractually obliged to adhere to the Travel Plan; and
- **Default Mechanisms:** default mechanisms are based on the failure to meet mode share targets.

11.2 Control Mechanisms

11.2.1 A number of control mechanisms are proposed as part of the HPC project and through the transport strategy.

- Series of parking controls;
- Limited and controlled on-site parking (only accessible to those with a pass);
- Requirement for workers to travel to site in a specified way, i.e. allocation of designated spaces on accommodation campus buses and direct buses and park and ride sites.
- Smart card system to ensure workers use the transport option they have been allocated (to be allocated at induction);
- Provision of direct bus services, campus bus services and park and ride bus services free of charge to workers;
- Allocation of workers to direct bus services only if they live within 800m of a direct bus pick up or stop point, otherwise allocated to park and ride site;
- Regular monitoring to check that control mechanisms are working.

a) Parking Controls

11.2.2 Parking controls will be implemented at the HPC Development Site, accommodation campus sites and park and ride sites.

Main Site

11.2.3 A maximum of 200 spaces will provided at the main HPC site for the construction workforce in order to restrict car travel to the site for all but essential means.

NOT PROTECTIVELY MARKED

11.2.4 Each worker allocated one of the few parking spaces on the main HPC site will be provided with an parking pass issued by the Security Team. Workers arriving at the main HPC site by car or minibus will access the development site via a manned access. Only drivers with a pass indicating that they are authorised to park within the site will be permitted to enter the site.

Cars without a parking permit for the main site will not be allowed to gain entry to the site. It should be emphasised that no other parking areas, such as the Hinkley Point A and B car parks, will be made available to HPC workers.

Accommodation Campus and Park and Ride sites

Parking will be controlled at park & ride sites and only staff allocated a space will be able to access each park & ride site. Security passes/permits will be issued up to the maximum parking allocation of each site in order to control demand.

Workers will be required to register their postcode during the Induction process. Those that live within walk or cycle distance from a direct bus pick up point will be allocated a place on the relevant direct bus service. Workers will be required to show their identity pass when boarding the direct bus service. Only allowing people with access to pick up points by sustainable modes to use direct bus services, will mean that fly parking near direct bus pick up points is unlikely to occur. allocating those who live very close to these services. A process will be established to allow workers to change their allocation to a different service or park and ride site if they move to different accommodation in a new location or need to change for any other relevant change in personal circumstances **Legal and Contractual Obligations**

11.2.5 DfT guidance states that planning obligations (S106 agreements) are the most effective way of securing Travel Plans. EDF Energy recognises that, subject to permission being granted, the Framework Travel Plan will form part of the legal obligation for the DCO application.

11.2.6 EDF Energy will ensure that key Travel Plan requirements will be included within all contracts for the DCO Works. In particular the requirement for the construction workforce to use the direct, cam**pus and Park** and **Ride bus services p**rovided by EDF Energy will be imposed on all lead contractors appointed to work on the HPC Development Site, with a further requirement that this requirement flows through to sub-contractors in so far as they employ individuals at the HPC construction site.

11.3 Default Mechanisms

11.3.1 The DfT 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process' states that:

> *"Default mechanisms must not be punitive. They must satisfy the appropriate legal and policy tests for planning obligations or conditions. They may operate as an incentive to deliver the Travel Plan's preferred outcomes, but they must be justifiable on their own merits."*

11.3.2 It is generally recommended that default mechanisms should be tied to the failure to meet targets. As set out above, any default mechanisms must meet the policy guidance for planning obligations generally in Circular 5/2005.

11.3.3 This Framework Travel Plan sets out a number of potential additional measures that could be implemented should the targets fail to be met. Should additional measures be required they will be funded by EDF Energy to bring the trip generation back in line with the agreed targets. This will satisfy the 'relevant, necessary, fairly and reasonably related' argument (Circular 05/05). Any additional measures would need to be discussed and agreed with the TSG.

11.3.4 EDF Energy proposes to establish a joint fund for the Travel Plans within the Section 106 Agreement for the DCO Works. This fund would be used to implement any additional measures in the event that the requirements of the Travel Plans fail to be met.