Reading Transport Model

Highway Assignment Model

Local Model Validation Report

On behalf of **Reading Borough Council**

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1 Introduction

1.1 Background

1.1.1 Peter Brett Associates LLP (PBA) was commissioned by Reading Borough Council (RBC) to update the Reading Transport Model (RTM). This report summarises the methodology which has been adopted in order to build and validate a base year SATURN model of Reading. The purpose of this model is to assist in assessing the relative effects of different transport schemes to alleviate transport issues in and around Reading.

1.1.2 The aim of the project is to develop a traffic model with a base year of 2015 that will be used to test the relative effects of transport infrastructure schemes and development proposals within the Reading area. The immediate need for the RTM is to support a Local Growth Fund bid to the Thames Valley Berkshire Local Enterprise Partnership (TVB LEP) for the East Reading Mass Rapid Transit Scheme.

1.2 Model Area

1.2.1 The area covered by the model is shown in Figure 1-1. The model includes the whole of the Reading urban area, therefore covering areas included within Wokingham Borough Council and West Berkshire Council areas.

1.2.2 The RTM is a highway network model being developed using the established SATURN software. The model will consist of an AM peak hour model (08:00 to 09:00), an average Inter Peak hour model (10:00 to 16:00) and a PM peak hour model (17:00 to 18:00). The model will consist of five user classes comprising car commute, car employer business, car other, Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGV).

Figure 1-1: Reading Transport Model – Study Area

1.3 Future Model Applications

1.3.1 When considering the use of the RTM for future work the following should be considered:

1) Although it is desirable for the models reflect the day to day variations, in practice models are tools with limited ability to capture all the intricate sensitivities inherent in a network like Reading. The model represents average weekday conditions, and therefore it is not possible to replicate the day to day variability and sensitivities accurately. The model has been created to consider the availability of route choices even though it may not be possible to match in every case, actual flows and journey times for specific competing routes. The model has therefore validated to replicate directional cordon and screen line flows as priority over individual link flows for example. The stability of the model is demonstrated through achieving acceptable convergence criteria demonstrating its robustness.

2) In considering the compliance of the RTM with WebTAG validation criteria and guidelines, it is important to understand the purpose for which the model is required. Guidance notes on validation acceptability are provided in TAG Unit M3.1. As stated in the guidance, this does not guarantee that a model is 'fit for purpose' and likewise a failure to meet the specified validation standards, does not mean that a model is not 'fit for purpose'. A model that meets the specified validation standards may not be fit for the particular purposes and conversely, a model that fails to meet to some degree the validation standards maybe useable for certain applications. On this basis, the validation of the RTM prioritises areas of the network at which interventions and development are proposed. The use matrix estimation has been minimised to alter the prior matrices in an effort to meet calibration and validation standards. It should be noted that the model has been created to test schemes that are currently known and consideration to the suitability of the model for testing all future schemes should be taken before any new scheme is tested. The model may need to be updated and/or therefore be subject to local area reviews before testing each scheme and/or development proposal.

1.4 Report Structure

1.4.1 Following this introduction, this report is presented with the following structure:

- Section 2 provides an overview of the highway assignment model
- Section 3 summarises the traffic data used in the model development
- Section 4 details the matrix development
- Section 5 outlines the assignment, calibration and validation procedures
- Section 6 outlines the calibration results
- Section 7 outlines the model validation results
- Section 8 provides an overall summary

2 Highway Model Overview

2.1 Introduction

2.1.1 The RTM has been developed using SATURN version 11.3.12F. This software is suitable for developing the network and assignment of the matrix. The matrix building process has been carried out in Excel, with the final matrices output to SATURN format for assignment to the network.

2.1.2 One of the main benefits of using SATURN for the assignment process is that it is applicable to both urban and rural networks and can model peak hour congestion in sufficient detail. As a combined simulation and assignment model, SATURN also has the advantage that it enables detailed junction modelling.

2.1.3 The model in question is a highway assignment model only and does not include any multimodal or demand modelling.

2.1.1 The assignment model predicts routes that drivers will choose and the way that traffic demand interacts with the available road capacity. The underlying principle used in the adopted assignment algorithm is Wardrop's First Principle of Traffic Equilibrium. Wardrop's First Principle states that:

"*Traffic arranges itself on networks such that the cost of travel on all routes used between each OD pair is equal to the minimum cost of travel and all unused routes have equal or greater cost".*

2.1.2 The aim of the assignment model is to reach equilibrium such that costs and flows are in balance under the assumption that individual users will seek to minimise their costs of travel through the network.

2.2 Previous Models

2.2.1 The previous RTM was originally developed in 2007 to assess the transport and development needs of the town. Over the intervening years, there have been a range of geographical expansions and model updates.

2.2.2 The most recent partial update was undertaken in 2011 by PBA and was used to inform the development of a successful funding bid for the Local Sustainable Transport Fund

2.2.3 The previous models were based on roadside interview data and other traffic count data collected in 2007.

2.3 Model Year and Time Periods

2.3.1 This updated model has been developed with a base year of 2015 as the majority of the data used in the model development was collected in October 2015.

2.3.2 Three time periods have been represented within the model:

- AM Peak hour (0800-0900);
- Inter Peak (1000-1600 average hour); and
- PM Peak hour (1700-1800).

2.4 Vehicle Types and Travel Purposes

2.4.1 The following vehicle types have been included within the model:

- Car;
- Light Goods Vehicles;
- Heavy Goods Vehicles comprising OGV1 and OGV2 combined.

2.4.2 Cars are further classified by travel or trip purpose resulting in five user classes in the model:

- Car commuting (carcom)
- Car other (caroth)
- Car employer business (careb)
- Light Goods Vehicles;
- Heavy Goods Vehicles comprising OGV1 and OGV2 combined.

PCU Factors

2.4.3 Passenger Car Units (PCU) is used as the standard unit for demand and capacity within the model. This allows for the impact of large vehicles which take up more road space and take longer to clear junctions to be accounted for. The factors used within the RTM are:

- Car - 1.0
- LGV – 1.0
- HGV – 2.3
- PSV/Bus – 2.5

2.5 Network Development

Network Extent

2.5.1 The extent of the detailed highway network is shown in Figure 2-1 and the wider modelled network is shown in Figure 2-2.

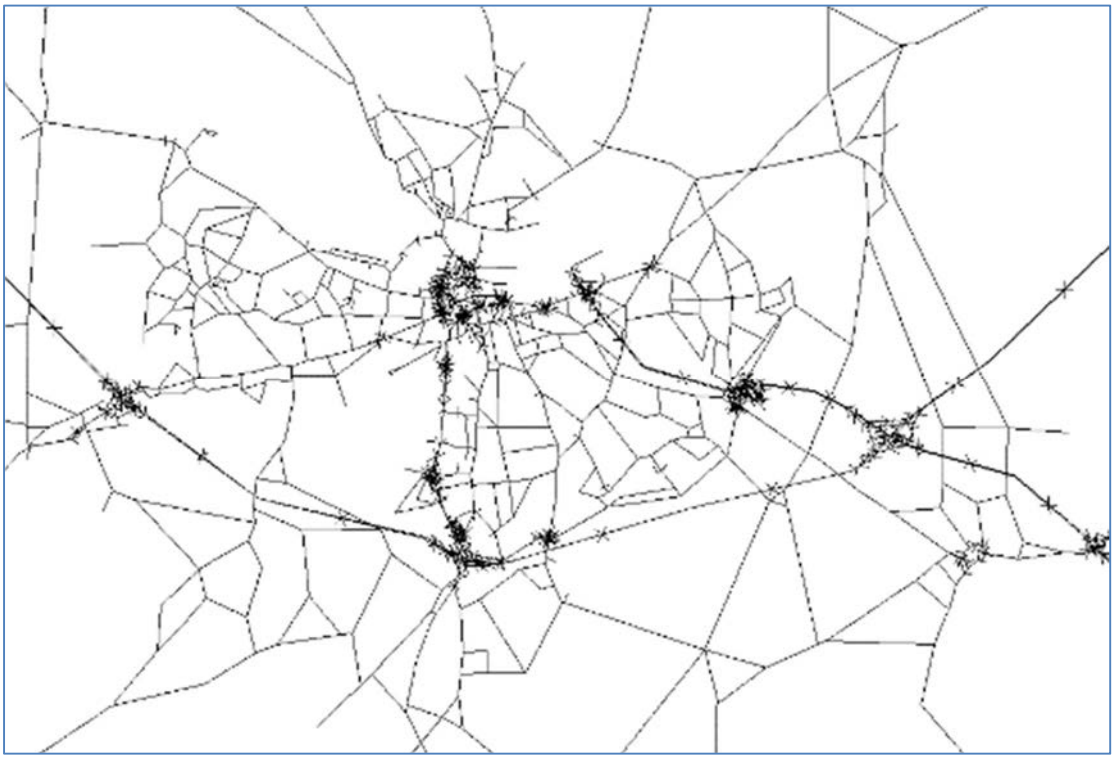


Figure 2-1: Detailed Modelled Network Area

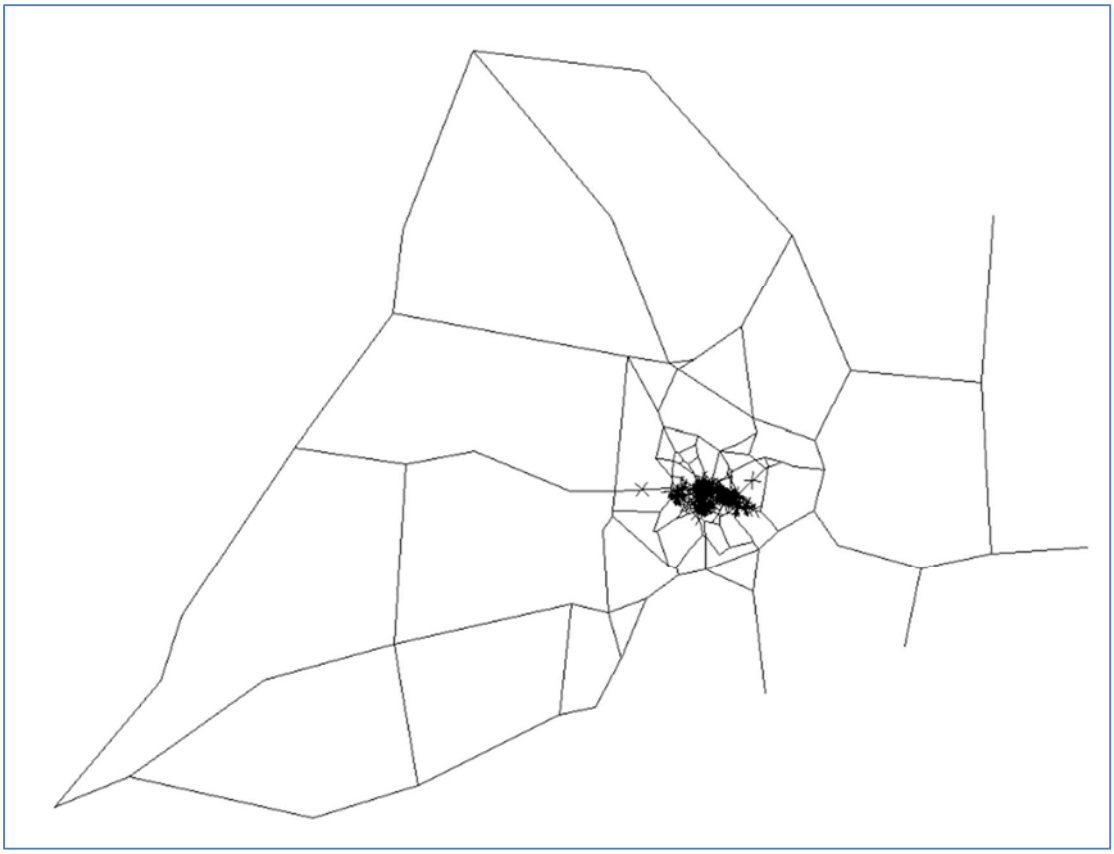


Figure 2-2: Wider Modelled Network Area

Network Structure

2.5.2 The network within the detailed modelled area was coded in simulation, while the area covered by the wider model was coded in buffer.

2.5.3 In the simulation area, junctions are modelled in detail and this allows the effects of junction delays to be represented more realistically. In the buffer area, junctions are not explicitly modelled. Routeings and assignment of trips in the buffer network are determined by link based attributes and speed/flow relationships.

2.5.4 In developing the highway network, key highway link characteristics were included in the network coding. This included attributes such as:

- Link length - Measured by reshaping the network using MapInfo;
- Link type;
- Link capacity;
- Link cruise speed in kilometres per hour (kph) initial coded as speed limits before being modified as necessary during the calibration/validation process;
- Speed/flow relationship in the buffer network and on the M4 and A329(M)
- One way or two-way link operation as appropriate;
- Bus lanes;
- Bus routes and frequencies – using scheduled bus timetables for local services

Junction Types and Saturation Flows

2.5.5 The RTM consists of various types of junctions including priority junctions, roundabouts and signal controlled junctions. Table 2-1 summarise the default turn saturation flows that have been assumed in the RTM subject to amendment as part of the calibration process.

2.5.6 Within the simulated urban area, the main delays to a journey predominantly result from traffic interaction at junctions. In between junctions within the simulation network, traffic is assumed to travel at uniform speeds.

Table 2-1: Default Turn Saturation Flows assumed (PCU/hr)

Junction Type	Movement	Saturation Flow
Priority	Major-Straight ahead	1,825
	Major-minor left turn	1,725
	Major-minor right turn	1,650
	Minor-major left turn	1,200
	Minor-major right turn	875
	Minor-major ahead	950
Roundabout	One lane	1,620
	Two lanes	3,200
	Three lanes	4,500
Signals	Left turn	1,750
	Straight ahead	1,900
	Right turn	1,700

Speed Flow Curves

2.5.7 Speed/flow curves were used in the buffer model area to model the flow delay relationships. In the buffer area, journey times including delays were determined using speed/flow curves. The speed/flow relationships were derived from DMRB Volume 13 COBA manual. Speed/flow curves have also been used on the M4 and A3290.

Zone Centroid Connectors

2.5.8 Centroid connectors enable the zones to be linked to the highway network. These are coded where possible using specific entry / exit junctions from local access roads onto the main road network from self-contained residential areas, business parks, retail areas and car parks for example.

2.5.9 Judgement is used to determine the number of centroid connectors required from each zone to represent locations where the traffic from the zones was likely to load in reality.

2.6 Zoning System

2.6.1 The zoning system used for the RTM is based on 2011 census output areas. The benefit of using these as the zoning structure is ease of use and comparison with planning data, such as population and employment estimates in both the development of the base model and for model forecasting going forward.

2.6.2 The zoning system comprises 560 zones. These are more refined in the areas immediately outside the detailed modelled area and become more coarse further out.

2.6.3 For ease of analysis and understanding of the trip making patterns, the zoning system is divided into sectors. As with the zoning system itself, the sectors are more refined within the detailed modelled area, again, becoming more coarse further out from the detailed area.

2.6.4 The zoning system is shown in Figures 2-4 and 2-5.

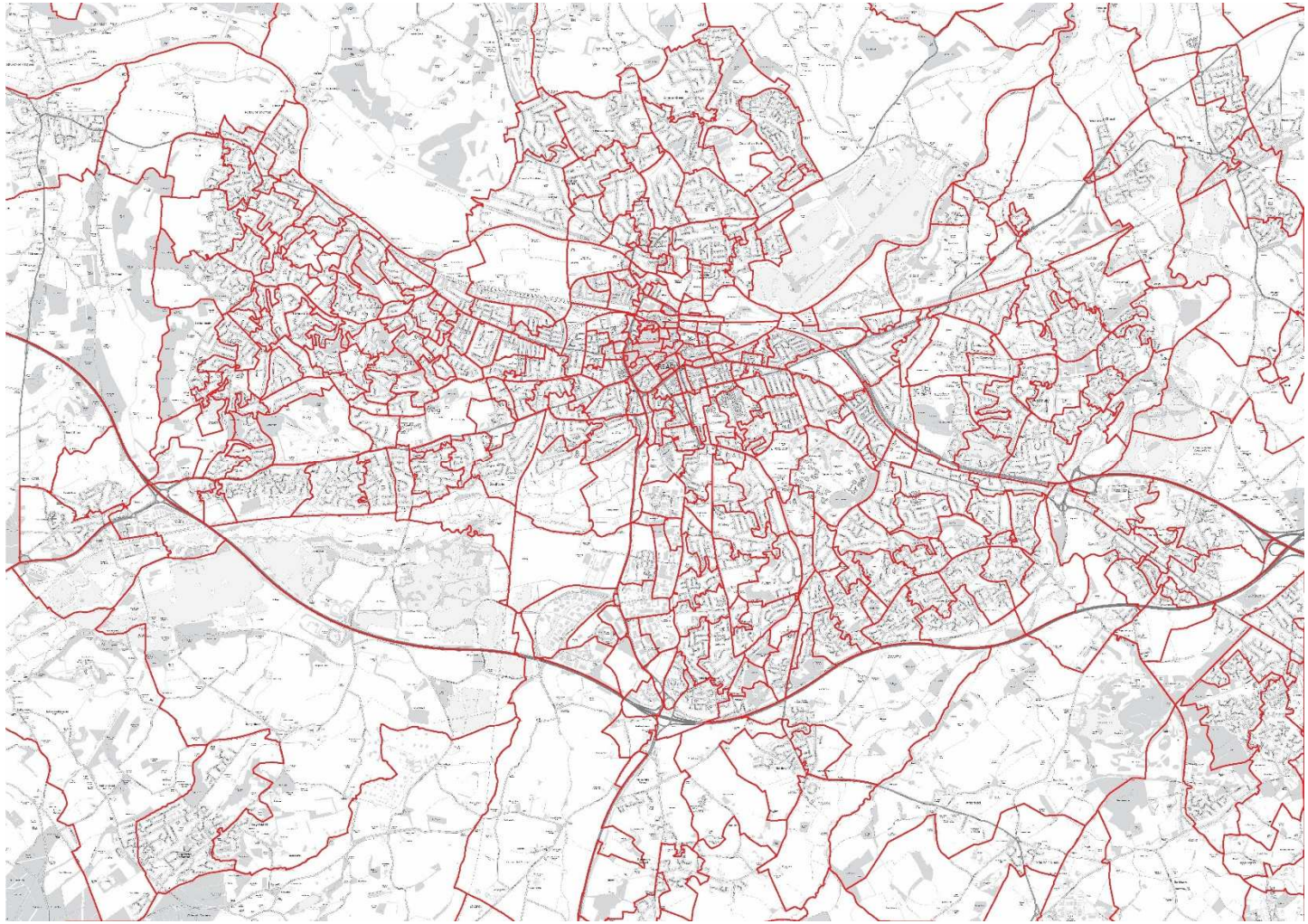


Figure 2-4: Reading Simulation Area Model Zones

Figure 2-5: Wider Area Model Zones

3 Survey Data

3.1 Overview

3.1.1 This section provides an overview of the data sources that has been used to update the RTM and includes both existing data and new data that has recently been collected. The types of existing and new collected data comprise:

- Automatic Traffic Counts (ATC)
- Manual Classified Turning Counts (MCTC)
- Journey Time data (TrafficMaster and Bluetooth)
- Mobile Phone data for matrix building
- Traffic Signal Data

3.1.2 More detailed information on the data collection and analysis of the data that has been used in developing the RTM is reported in the Reading Transport Data Report (RTM-28791-5506-TDR dated October 2016).

3.2 Existing Data

3.2.1 In line with WebTAG guidance, existing data has been used where ever possible in order to keep data costs to a minimum while not compromising the integrity of the model. The following existing data has been used:

- Reading Borough Council Data
- Wokingham Borough Council Data
- Highways England Data

3.2.2 The existing Reading and Wokingham data consisted of ATC's mainly collected at permanent sites across the boroughs. The data was downloaded for the same dates as that collected for the newly collected ATC surveys i.e. October 2015.

3.3.1 Count data was obtained from HE's open data source website to inform flow calibration and validation on the Highways England (HE) network within the Reading model area. The data was also downloaded for October 2015.

3.4 New Data Collection

3.4.1 New ATC and MCTC data was collected in the RBC area by Nationwide Data Collection (NDC) who was commissioned by PBA. New traffic data was also supplied by Wokingham Borough Council (WBC), from surveys undertaken by Traffic Survey Partners (TSP).

3.4.2 The RBC ATC surveys were undertaken over a two-week period (14 days) from 4th October to 18th October and WBC ATC surveys over a two-week period from 28th September 2015 to 11th October 2015. The data complemented existing ATC data collected as part of their permanent and periodic monitoring sites. The ATC data was classified into cars, LGV, OGV1 and OGV2.

3.4.3 Surveys undertaken on behalf of WBC were carried out on Thursday 1st October and the surveys undertaken on behalf of RBC were undertaken on Tuesday the 13th October 2015. Both being within the two-week period within which the new ATC surveys were undertaken in the local authority areas.

3.4.4 The main purpose of the MCTC data is to inform the matrix estimation process as part of the matrix development and calibration process.

3.4.5 Surveys were undertaken for a 12-hour period from 0700 to 1900. There were no reports on the RBC system of any major events or road works that could distort the data.

3.4.6 The data was fully classified into car, LGV, OGV1, OGV2, PSV, Motorcycles and cycles and was collected in 15 minute intervals.

3.5 Journey Time Data

3.5.1 Journey time data for model update was sourced from Traffic Master Data via the Department for Transport (DfT) covering the period October and November 2015 and from the RBC Bluetooth traffic monitoring system.

3.5.2 Journey time routes for validation were defined and the relevant journey time data for the AM peak hour (08:00 to 09:00), Inter Peak average hour (10:00 to 16:00) and PM peak hour (17:00 to 18:00) extracted from the full data for the study area. The data used was for the neutral weekdays Tuesday to Thursday.

3.5.3 The journey time routes are described in Table 3-1 and are shown in Figure 3-1.

Table 3-1: Journey Time Routes

Route Number	Description	Direction	From	To
1	Wokingham Road	NB	Robinhood Ln	London Rd/Denmark Rd
		SB	London Rd/Denmark Rd	Robinhood Ln
2	Basingstoke Rd	NB	Imperial Way	London Rd
		SB	London Rd	Imperial Way
3	A33	NB	South of Mereoak	Rose Kiln Court
		SB	Rose Kiln Court	South of Mereoak
4	Bath Road	EB	M4 Junction 12	Berkeley Ave
		WB	Berkeley Ave	M4 Junction 12
5	Norcot Road/Oxford Road	EB	School Rd	Eaton Place
		WB	Eaton Place	School Rd
6	Woodcote Road	SB	Shepherds Ln	Richfields Ave
		NB	Richfields Ave	Shepherds Lane
7	Peppard Road	SB	Tower Cl	Richfields Ave
		NB	Richfields Ave	Tower Cl
8	Henley Road	SB	Playhatch	Vastern Rd
		NB	Vastern Rd	Playhatch
9	London Road	WB	Bath Rd	Craven Ro
		EB	London Rd/Denmark Rd	Bath Rd
10	Shinfield Road	NB	B3270	Elmhurst Rd
		SB	Elmhurst Rd	B3270
13	Langley Hill/Meadway/Tilehurst Road	EB	Bath Rd	Brunswick Hill
		WB	Brunswick Hill	Bath Rd
14	B3270	EB	M4 Junction 11	A329
		WB	A329	M4 Junction 11

Figure 3-1: Journey Time Routes

3.6 Mobile Network Data

3.6.1 The mobile network data (MND) was used as the main source of data to develop origin destination matrices for the RTM. This was in preference to undertaking Roadside Interview Surveys (RSI) which has been the traditional method of developing matrices for transport models in the UK for a long time. However, RSI surveys are disruptive to travellers and sample rates can be low leading to less robust matrices. Use of mobile phone data is increasingly being accepted as a credible alternative although understanding and experience of using this data for matrix development is still limited. The use of the MND data in the matrix development is discussed further in Section 4.

3.6.2 The data was provided by CitiLogik, and covered both Reading and Wokingham boroughs.

4 Prior Matrix Development

4.1 Introduction

4.1.1 This section explains the methods used to develop the origin destination demand matrices prior to them being assigned to the network.

4.2 Mobile Network Data Matrices

4.2.1 As explained in Section 3.5, mobile network data was used as the main source of data to develop origin destination matrices for the RTM. The mobile network data has been provided by CitiLogik. CitiLogik undertook some initial validation of the mobile phone data prior to releasing it for use in the RTM. The initial validation is reported in Appendix A.

4.3 MND Matrix Development

4.3.1 Once the initial MND validation checks had been undertaken, the data was used to develop initial matrices. The data provided by CitiLogik was already split by the required three model time periods. The OD movements were translated to match RTM zoning system. The MND trip purpose matrices were merged to create the three model assignment purpose splits of car commute, car other and car employer business.

4.3.2 The initial matrices were sectored to enable ease analysis of trips within the model area. This allowed for trips that would not travel through the detailed study area to be removed from the trip matrix to make it a more manageable size. Other initial checks were made on HGV numbers and trip numbers on corridors that are parallel to rail routes. These checks were made with reference to local ATC data and amendments to trip numbers made where necessary.

4.3.3 The output from this step was a prior or initial matrix that could be assigned to the network to enable the next stages to be commenced as detailed in Section 5.

5 Model Assignment, Calibration and Validation Procedures

5.1 Introduction

5.1.1 Calibration of the network and matrices was undertaken to demonstrate that the model outputs provide a reasonable representation of observed traffic flows and behaviours in the updated model. The calibration process involved the refinement of the network detail to check that link lengths, link speeds and junction behaviour/operation are well represented. Junction parameters reviewed and amended as part of the calibration process include turn saturation flows and signal timings as appropriate.

5.2 Generalised Cost Parameters

5.2.1 Generalised cost parameters are used in the model network to determine the minimum cost routes by which traffic is assigned onto the network. Within SATURN, generalised cost coefficients are input by user class. The two parameters required are pence per minute (PPM) and pence per kilometre. The values of time and values of distance for 2010 and 2015 used to calculate the PPM and PPK coefficients were determined using TAG Data Book Autumn 2015 release v1.4b. The coefficients are shown in Table 5-1.

Table 5-1: Generalised Cost Coefficients

User Class	Class Type	AM		IP		PM	
		PPM	PPK	PPM	PPK	PPM	PPK
1	Commute	1.00	0.42	1.00	0.41	1.00	0.42
2	Employer business	1.00	0.17	1.00	0.16	1.00	0.17
3	Other	1.00	0.33	1.00	0.32	1.00	0.33
4	LGV	1.00	0.51	1.00	0.51	1.00	0.51
5	HGV	1.00	1.55	1.00	1.50	1.00	1.55

5.3 Network Calibration

5.3.1 In order to verify that the modelled network correctly represents the existing situation, a number of checks were undertaken as part of the calibration process. These include the following:

- Checks to verify that loading of zone connectors were reasonable;
- Link lengths checks including verifying that directional distances were matched and where different, that the differences were reasonable;
- Routeing checks through the network by using SATURN's 'built trees' facility
- Verifying that lane designations at junctions were correctly coded;
- Verifying of turn saturation flows at key junctions;

5.3.2 An examination of the SATURN network has confirmed that each zone centroid has been loaded onto an appropriate link, link length checks also confirmed that link lengths had been coded correctly.

5.3.3 The modelled routeing of traffic throughout the network has been checked. Appendix B shows P1X plots of the routeing calibration checks for all three modelled time periods.

5.3.4 The routeings have been checked using the 'forest trees' option within SATURN's P1X module. Routes between a wide range of Origin and Destination pairs across the whole network were checked to verify that route choice in the model was reasonable. This included checks for north to south and south to north key movements; checks for east to west and west to east movements. The routes encompassed both long distance cross Reading movements and shorter distance trips within Reading. Up to 12 directional routes have been checked for plausibility of routeing in the model.

5.3.5 The routeing checks indicated that the model was in main replicating the complex route choice in the RTM.

5.4 Matrix Calibration

5.4.1 The matrix calibration involved assigning the initial or prior matrices onto the network and checking that observed flows were reasonably replicated. The prior matrix was developed from the MND data and synthesised matrices as described in Section 4.

5.4.2 Where necessary, selective factoring of light vehicle matrices was also undertaken so that modelled flows were more consistent with observed flows. These matrix processes were only undertaken after the network checks had been made. They were also undertaken prior to carrying out the matrix estimation process. This process was undertaken in locations where it was noticeable that flows derived from the mobile phone data were low.

5.4.3 While matrix estimation generally improves flow calibration and validation, it should only be undertaken once network issues have been resolved and only when trip matrices are reasonably close to the expected demands, otherwise the matrix estimation process amplifies the network and demand errors. The results of the flow calibration following the matrix estimation process are reported in the next section.

6 Model Calibration Results

6.1 Introduction

6.1.1 This section reports on the flow calibration. As noted in Section 5, calibration of the network and matrices was undertaken to seek to achieve an accurate representation of observed traffic flows and behaviours in the updated corridor model. This section reports on the results of the flow calibration in the RTM for all three time periods.

6.1.2 The flow calibration was undertaken for key junctions in Reading. Given the importance of the HE network, flow calibration has also been undertaken on the M4.

6.1.3 The RTM flow calibration consists of up to 551 records in each time period. This underlines the extensive coverage of the calibration with a view to developing a model that is reasonably robust across the network.

6.2 Flow Calibration Results

6.2.1 The GEH (Geoffrey Edward Havers) statistic has been used to summarise the flow calibration results. This summary is shown in Table 6-1. The actual flow calibration records are shown in Appendix C.

6.2.2 The GEH Statistic is a formula used in traffic modelling to compare two sets of traffic volumes and assess the fit between the observed and modelled flows. It takes account of the fact that when traffic flows are low, the percentage difference between observed and modelled flows may be high but the significance of this difference is small.

6.2.3 A GEH of less than 5.0 is considered to represent a good match between the modelled and observed hourly flows. A GEH value greater than 10 indicates that the match between observed and modelled flows is poor and closer attention is required. The guideline is to aim for 85% of counts with a GEH below 5.

Table 6-1: GEH Flow Calibration (PCU/hr) by Time Period

Location Link No.	AM Peak	Inter Peak	PM Peak
No of Observed Turn Counts	551	551	551
No of Modelled flows with GEH < 5	294	440	282
% of Modelled flows with GEH < 5	53%	80%	51%
No of Modelled flows with GEH < 10	447	533	438
% of Modelled flows with GEH < 10	81%	97%	79%

6.2.4 In respect of the flow calibration, Table 6-1 shows that 53% of flows achieve a GEH value of less than 5 in the AM peak, increasing to 81% for flows with GEH of less than 10. In the Inter Peak, 80% achieve a GEH value of less than 5 and this increase to 97% for flows with a GEH value of less than 10. In the PM peak, 51% of flows achieve a GEH value of less than 5, increasing to 79% when a GEH value of 10 is analysed.

6.2.5 It is evident from Table 6-1 that the model does not meet the criteria set out, but given the congested nature of the network and the sensitivity between route choices, it is felt the level of calibration is satisfactory.

6.3 Trip Length Calibration Results

6.3.1 Trip length distribution pre and post matrix estimation has been checked. This is to check that the matrix estimation process does not materially alter the trip making patterns in the prior matrices. Matrix estimation can have the tendency to increase short distance trips at the expense of long distance trips, which needs to be kept to a minimum.

6.3.2 The results of the trip length distribution checks are shown in Figures 6-1 to 6-3 for each of the AM, Inter Peak and PM peaks respectively. The results show that the trip length distribution does not change too greatly pre and post matrix estimation and this demonstrates that the matrix estimation has not overly altered trip length distribution within the model.

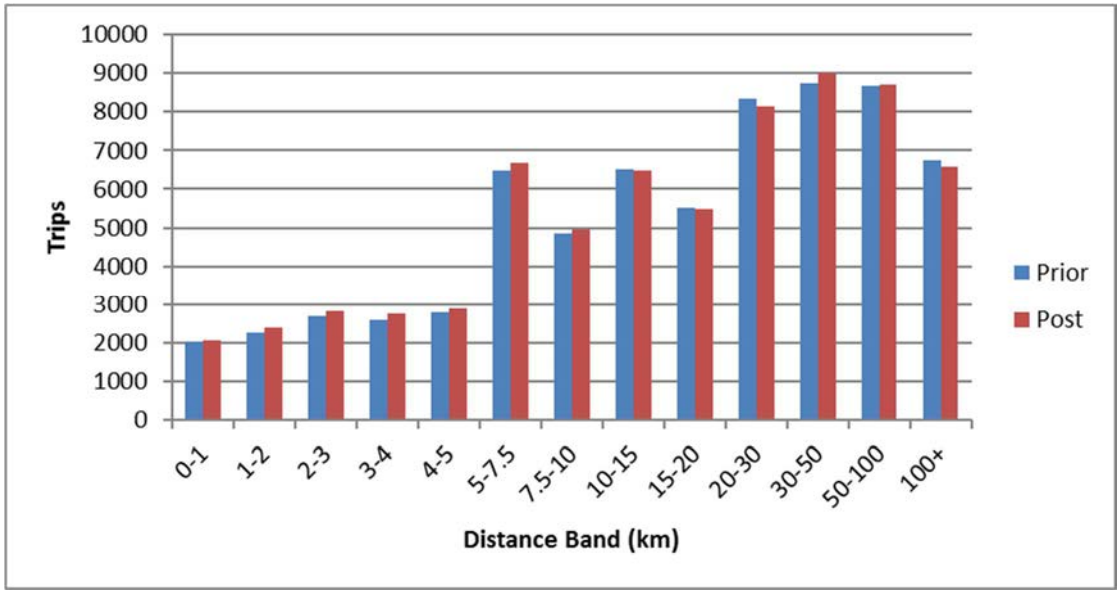


Figure 6-1: AM Peak TLD comparison

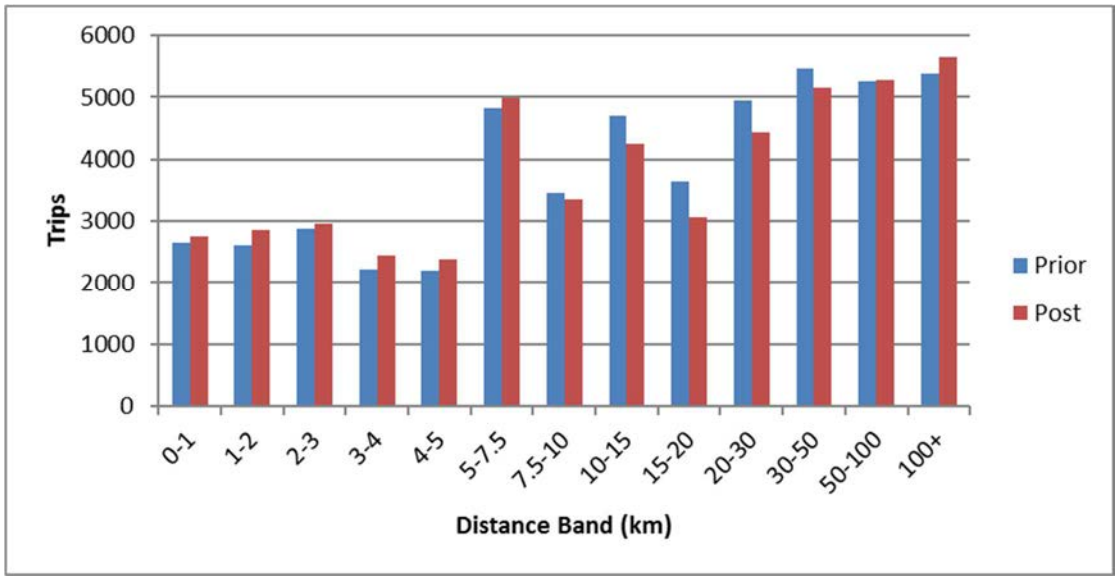


Figure 6-2: Inter Peak TLD comparison

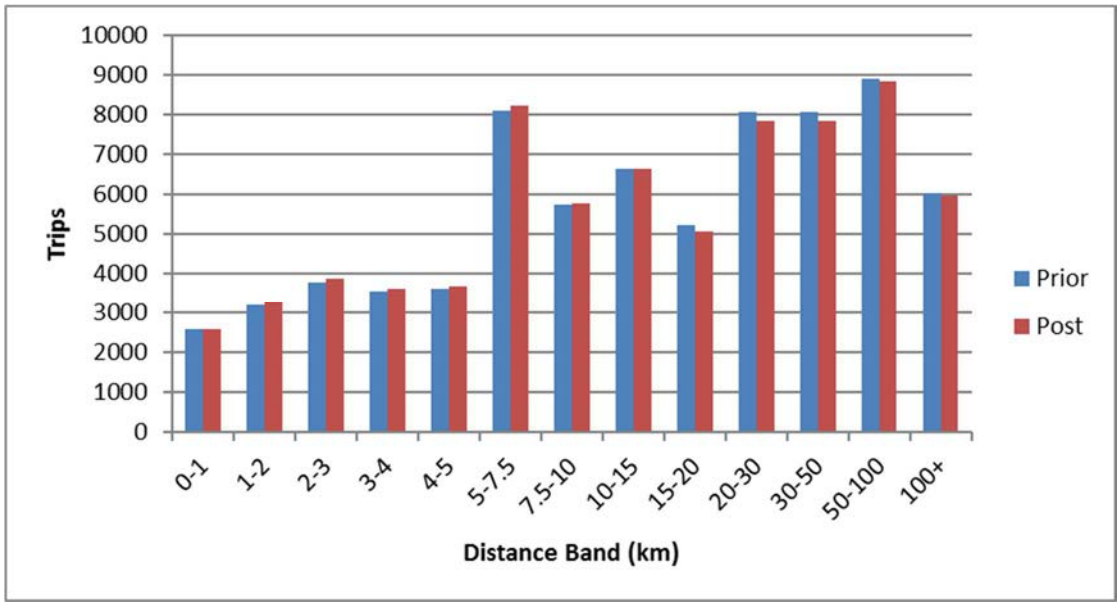


Figure 6-3: PM Peak TLD comparison

7 Model Validation Results

7.1 Introduction

7.1.1 This section reports on the flow and journey time validation achieved by the RTM. The results have been considered with respect to validation criteria and acceptability guidelines contained in Section 3 of TAG Unit M3.1 (Highway Assignment Modelling). The guidance notes that any adjustments to the model intended to reduce the differences between the modelled and observed data should be regarded as calibration. Validation simply involves comparing modelled and observed data that is independent from that used in the calibration.

7.1.2 The main comparisons required for the validation of a highway assignment model as noted in the guidance are listed below:

- A check on the quality of the trip matrices – this requires a comparison of assigned flows and counts totalled for each screenline or cordon.
- A check on the quality of the assignment – this is demonstrated by comparing flows and counts on individual links and turning movements at junctions;
- A check on the quality of the network and assignment – this is demonstrated by comparing modelled and observed journey times along routes.

7.2 Flow and Journey Time Validation Criteria and Acceptability Guidelines

7.2.1 The criteria and guidelines apply to models created both for general purposes and those created to address specific interventions. In respect of the latter, it is expected that greater attention should be paid to validation quality in the vicinity of the interventions (para 3.1.2).

7.2.2 Table 7-1 provides a summary of WebTAG flow validation criteria and acceptability guidelines. It also includes journey time validation criteria and acceptability guidelines.

7.2.3 Criterion 1 relates directly to the flows, criterion 2 relates to the GEH statistic, which was explained in Section 6.2. Criterion 3 relates to screenlines and cordons and Criterion 4 relates to journey time validation.

Table 7-1: Validation Criteria and Acceptability Guidelines

Link Flow and Turning Movement Validation Criteria and Acceptability Guidelines		
Criteria	Description of Criteria	Acceptability Guideline
	Individual flows within 100 vph of counts for flows less than 700 vph	>85% of cases
1	Individual flows within 15% of counts for flows from 700 to 2,700 vph	>85% of cases
	Individual flows within 400 vph of counts for flows more than 2,700 vph	>85% of cases
2	GEH < 5 for individual flows	>85% of cases
	Screenline Flow Validation and Acceptability Guideline	Acceptability Guideline
3	Differences between modelled flows and observed counts should be less than 5% of the observed counts	All or nearly all screenlines
4	Journey Time Validation Criterion and Acceptability Guideline	Acceptability Guideline
4	Modelled Times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	>85% of routes

7.3 Screenline Validation Results

7.3.1 Flow validation has been undertaken on seven screenlines within the model. The screenlines are shown on Figure 7-1. The results of the flow validation are presented by time period and discussed below.

AM Peak hour (0800-0900) Screenline Validation

7.3.2 Tables 7-2 and 7-3 show the AM Peak hour flow validation results for the Western Outer screenline, Eastbound and Westbound respectively.

Table 7-2: AM Peak Flow Validation (PCU/hr) – Western Outer Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
Purley Rise near Beech Road	356	333	1.21	✓
Bath Road to Dorking Roundabout	1042	1069	0.83	✓
J12 to J11	4772	4919	2.12	✓
Total	6169	6321	1.92	✓
Percentage	0	2%	100%	100%

Table 7-3: AM Peak Flow Validation (PCU/hr) – Western Outer Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
Purley Rise near Beech Road	462	456	0.26	✓
Bath Road to Dorking Roundabout	1705	1817	2.67	✓
J11 to J12	4248	4640	5.88	✓
Total	6415	6913	6.10	×
Percentage		8%	67%	100%

7.3.3 Tables 7-4 and 7-5 show that the AM Peak hour flow validation results for the Western Middle screenline in the Eastbound and Westbound directions respectively.

Table 7-4: AM Peak Flow Validation (PCU/hr) – Western Middle Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
A329 Oxford Road	945	701	8.51	×
Norcot Road	358	375	0.87	✓
Corwen Road	214	36	15.93	×
Mayfair / The Meadway	904	634	9.72	×
Bath Road	600	589	0.45	✓
J12 to J11	4772	4919	2.12	✓
Total	7792	7253	6.21	×
Percentage		-7%	50%	50%

Figure 7-1: Validation Screenlines

Table 7-5: AM Peak Flow Validation (PCU/hr) – Western Middle Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
A329 Oxford Road	584	423	7.20	×
Norcot Road	304	154	9.89	×
Corwen Road	116	44	8.09	✓
Mayfair / The Meadway	671	522	6.10	×
Bath Road	561	622	2.49	✓
J11 to J12	4248	4640	5.88	✓
Total	6484	6404	1.00	✓
Percentage		-1%	17%	50%

7.3.4 Tables 7-6 and 7-7 show that the AM Peak hour flow validation results for the Western Railway screenline in the Eastbound and Westbound directions respectively.

Table 7-6: AM Peak Flow Validation (PCU/hr) – Western Railway Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
Cow Lane Bridges	661	697	1.38	✓
Oxford Road near Beresford Road	726	803	2.77	✓
Tilehurst Road	932	943	0.35	✓
Bath Road Benyon Court Junction	716	849	4.77	×
Berkeley Avenue	655	469	7.86	×
Total	3690	3761	1.16	✓
Percentage		2%	80%	60%

Table 7-7: AM Peak Flow Validation (PCU/hr) – Western Railway Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
Cow Lane Bridges	388	439	2.52	✓
Oxford Road near Beresford Road	482	527	2.02	✓
Tilehurst Road	380	372	0.41	✓
Bath Road Benyon Court Junction	430	387	2.09	✓
Berkeley Avenue	563	495	2.96	✓
Total	2242	2221	0.46	✓
Percentage		-1%	100%	100%

7.3.5 Tables 7-8 and 7-9 show that the AM Peak hour flow validation results for the Northern screenline in the Southbound and Northbound directions respectively

Table 7-8: AM Peak Flow Validation (PCU/hr) – Northern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Upper Woodcote Road	532	515	0.75	✓
Peppard Road The Riding Junction	507	354	7.38	×
Henley Road	577	771	7.47	×
Total	1616	1640	0.59	✓
Percentage		1%	33%	33%

Table 7-9: AM Peak Flow Validation (PCU/hr) – Northern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Upper Woodcote Road	695	665	1.15	✓
Peppard Road The Riding Junction	604	450	6.72	×
Henley Road	848	980	4.38	×
Total	2146	2094	1.12	✓
Percentage		-2%	67%	33%

7.3.6 Tables 7-10 and 7-11 show that the AM Peak hour flow validation results for the River screenline in the Northbound and Southbound directions respectively.

Table 7-10: AM Peak Flow Validation (PCU/hr) – River Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Caversham Bridge	1510	1556	1.17	✓
George Street	901	846	1.87	✓
Sonning Bridge	468	489	0.97	✓
Total	2879	2891	0.22	✓
Percentage		0%	100%	100%

Table 7-11: AM Peak Flow Validation (PCU/hr) – River Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Caversham Bridge	1315	1279	0.99	✓
George Street	538	748	8.26	×
Sonning Bridge	601	617	0.64	✓
Total	2454	2644	3.76	✓
Percentage		8%	67%	67%

7.3.7 Tables 7-12 and 7-13 show that the AM Peak hour flow validation results for the Outer Southern screenline in the Northbound and Southbound directions respectively.

Table 7-12: AM Peak Flow Validation (PCU/hr) – Outer Southern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Basingstoke Road	2714	2790	1.44	✓
Hollow Lane, Shinfield	1227	1193	0.98	✓
Total	3941	3982	0.66	✓
Percentage		1%	100%	100%

Table 7-13: AM Peak Flow Validation (PCU/hr) – Outer Southern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Basingstoke Road	1885	1984	2.26	✓
Hollow Lane, Shinfield	1075	822	8.20	×
Total	2960	2807	2.85	✓
Percentage		-5%	50%	50%

7.3.8 Tables 7-14 and 7-15 show that the AM Peak hour flow validation results for the Inner Southern screenline in the Northbound and Southbound directions respectively.

Table 7-14: AM Peak Flow Validation (PCU/hr) – Inner Southern and Eastern Screenline – Northbound/Eastbound

Description	Observed	Modelled	GEH	DMRB
A33	1435	1585	3.89	✓
Basingstoke Road	366	344	1.17	✓
Northumberland Avenue	746	560	7.26	×
Shinfield Road near Beech Road	628	553	3.08	✓
Whiteknights Road	615	439	7.69	×
Wokingham Road Bell Avenue Junction	376	299	4.19	✓
London Road	1216	1209	0.19	✓
Total	5382	4990	5.44	✓
Percentage		-7%	71%	71%

Table 7-15: AM Peak Flow Validation (PCU/hr) – Inner Southern and Eastern Screenline – Southbound/Westbound

Description	Observed	Modelled	GEH	DMRB
A33	1756	1678	1.88	✓
Basingstoke Road	390	210	10.42	×
Northumberland Avenue	491	463	1.28	✓
Shinfield Road near Beech Road	373	459	4.24	✓
Whiteknights Road	410	528	5.44	×
Wokingham Road Bell Avenue Junction	466	196	14.82	×
London Road	1030	1111	2.48	✓
Total	4916	4646	3.91	✓
Percentage		-5%	57%	57%

AM Peak Screenline Validation Summary

7.3.9 WebTAG guidelines require that all or nearly all screenline total flows are modelled within 5% of observed flows. In the case of the RTM in the Inter Peak, it has been shown that all but four of the screenline flows are within 5%. Of those outside this, all are within 8%.

7.3.10 Overall, as indicated in Table 7-16, 67% of the screenline validation counts have a GEH less than 5 and 95% have a GEH less than 10.

Table 7-16: AM Peak Flow Validation – Summary of Validation Results.

Parameter	Results
No of Observed Counts	58
No of Modelled flows with GEH < 5	39
% of Modelled flows with GEH < 5	67%
No of Modelled flows with GEH < 10	55
% of Modelled flows with GEH < 10	95%

Inter Peak Average hour (1000-1600) Screenline Validation

7.3.11 Tables 7-17 and 7-18 show the Inter Peak hour flow validation results for the Western Outer screenline, Eastbound and Westbound respectively.

Table 7-17: Inter Peak Flow Validation (PCU/hr) – Western Outer Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
Purley Rise near Beech Road	331	298	1.83	✓
Bath Road to Dorking Roundabout	979	982	0.11	✓
J12 to J11	3055	2961	1.73	✓
Percentage	0	-3%	100%	100%

Table 7-18: Inter Peak Flow Validation (PCU/hr) – Western Outer Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
Purley Rise near Beech Road	308	292	0.92	✓
Bath Road to Dorking Roundabout	908	901	0.23	✓
J11 to J12	3166	3198	0.58	✓
Percentage	0	0%	100%	100%

7.3.12 Tables 7-19 and 7-20 show that the Inter Peak hour flow validation results for the Western Middle screenline in the Eastbound and Westbound directions respectively.

Table 7-19 Inter Peak Flow Validation (PCU/hr) – Western Middle Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
A329 Oxford Road	627	554	3.02	✓
Norcot Road	265	198	4.43	✓
Cornwell Road	178	43	12.80	×
Mayfair / The Meadway	460	436	1.16	✓
Bath Road	561	461	4.41	✓
J12 to J11	3055	2961	1.73	✓
Total	5146	4652	7.06	×
Percentage		-10%	83%	83%

Table 7-20: Inter Peak Flow Validation (PCU/hr) – Western Middle Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
A329 Oxford Road	620	557	2.59	✓
Norcot Road	303	182	7.77	×
Cornwell Road	124	31	10.59	✓
Mayfair / The Meadway	511	434	3.55	✓
Bath Road	608	495	4.81	×
J11 to J12	3166	3198	0.58	✓
Total	5331	4896	6.07	×
Percentage		-8%	67%	67%

7.3.13 Tables 7-21 and 7-22 show that the Inter Peak hour flow validation results for the Western Railway screenline in the Eastbound and Westbound directions respectively.

Table 7-21: Inter Peak Flow Validation (PCU/hr) – Western Railway Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
Cow Lane Bridges	457	565	4.78	×
Oxford Road near Beresford Road	513	611	4.11	✓
Tilehurst Road	423	537	5.19	×
Bath Road Benyon Court Junction	477	464	0.61	✓
Berkeley Avenue	443	283	8.38	×
Total	2313	2459	3.00	✓
Percentage		6%	60%	40%

Table 7-22: Inter Peak Flow Validation (PCU/hr) – Western Railway Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
Cow Lane Bridges	465	525	2.70	✓
Oxford Road near Beresford Road	592	567	1.04	✓
Tilehurst Road	432	534	4.64	×
Bath Road Benyon Court Junction	396	347	2.51	✓
Berkeley Avenue	563	514	2.11	✓
Total	2448	2488	0.80	✓
Percentage		2%	100%	80%

7.3.14 Tables 7-23 and 7-24 show that the Inter Peak hour flow validation results for the Northern screenline in the Southbound and Northbound directions respectively.

Table 7-23: Inter Peak Flow Validation (PCU/hr) – Northern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Upper Woodcote Road	386	416	1.51	✓
Peppard Road The Riding Junction	331	231	6.01	×
Henley Road	517	546	1.26	✓
Total	1234	1193	1.19	✓
Percentage		-3%	67%	67%

Table 7-24: Inter Peak Flow Validation (PCU/hr) – Northern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Upper Woodcote Road	379	444	3.21	✓
Peppard Road The Riding Junction	311	276	2.02	✓
Henley Road	505	440	2.99	✓
Total	1195	1161	1.00	✓
Percentage		-3%	100%	100%

7.3.15 Tables 7-25 and 7-26 show that the Inter Peak hour flow validation results for the River screenline in the Northbound and Southbound directions respectively.

Table 7-25: Inter Peak Flow Validation (PCU/hr) – River Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Caversham Bridge	1129	1102	0.81	✓
George Street	601	586	0.63	✓
Sonning Bridge	350	274	4.27	✓
Total	2080	1962	2.62	✓
Percentage		-6%	100%	100%

Table 7-26: Inter Peak Flow Validation (PCU/hr) – River Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Caversham Bridge	1079	1080	0.00	✓
George Street	579	578	0.03	✓
Sonning Bridge	341	440	5.04	✓
Total	1999	2098	2.19	✓
Percentage		5%	67%	100%

7.3.16 Tables 7-27 and 7-28 show that the Inter Peak hour flow validation results for the Outer Southern screenline in the Northbound and Southbound directions respectively.

Table 7-27: Inter Peak Flow Validation (PCU/hr) – Outer Southern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Basingstoke Road	1251	1323	2.01	✓
Hollow Lane, Shinfield	643	601	1.65	✓
Total	1894	1925	0.71	✓
Percentage		2%	100%	100%

Table 7-28: Inter Peak Flow Validation (PCU/hr) – Outer Southern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Basingstoke Road	1373	1364	0.24	✓
Hollow Lane, Shinfield	627	594	1.30	✓
Total	2000	1958	0.93	✓
Percentage		-2%	100%	100%

7.3.17 Tables 7-29 and 7-30 show that the Inter Peak hour flow validation results for the Inner Southern screenline in the Northbound and Southbound directions respectively.

Table 7-29: Inter Peak Flow Validation (PCU/hr) – Inner Southern and Eastern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
A33	1139	1129	0.28	✓
B3031 Basingstoke Road	443	369	3.67	✓
Northumberland Avenue	312	378	3.53	✓
Shinfield Road near Beech Road	447	316	6.72	×
Whiteknights Road	215	189	1.83	✓
Wokingham Road Bell Avenue Junction	364	382	0.93	✓
London Road	1000	1124	3.82	✓
Total	3920	3887	0.52	✓
Percentage		-1%	86%	86%

Table 7-30: Inter Peak Flow Validation (PCU/hr) – Inner Southern and Eastern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
A33	1071	1095	0.71	✓
B3031 Basingstoke Road	459	440	0.93	✓
Northumberland Avenue	290	353	3.53	✓
Shinfield Road near Beech Road	412	333	4.09	✓
Whiteknights Road	221	288	4.17	✓
Wokingham Road Bell Avenue Junction	402	292	5.86	×
London Road	940	1185	7.53	×
Total	3794	3985	3.06	✓
Percentage		5%	71%	71%

Inter Peak Screenline Validation Summary

7.3.18 WebTAG guidelines require that all or nearly all screenline total flows are modelled within 5% of observed flows. In the case of the RTM in the Inter Peak, it has been shown that all but four of the screenline flows are within 5%. Of those outside this, all are within 10%. Overall, as indicated in Table 7-31, 82% of validation screenline counts have a GEH of less than 5 and 96% less than 10.

Table 7-31: Inter Peak Flow Validation – Summary of Validation Results.

Parameter	Inter Peak
No of Observed Counts	55
No of Modelled flows with GEH<5	45
% of Modelled flows with GEH < 5	82%
No of Modelled flows with GEH< 10	53
% of Modelled flows with GEH < 10	96%

PM Peak hour (1700-1800) Validation

7.3.19 Tables 7-34 and 7-35 show the PM Peak hour flow validation results for the Western Outer screenline, Eastbound and Westbound respectively.

Table 7-34: PM Peak Flow Validation (PCU/hr) – Western Outer Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
Purley Rise near Beech Road	561	603	1.74	✓
Bath Road	2066	2100	0.74	✓
J12 to J11	4542	4965	6.14	×
Total	7169	7668	5.80	×
Percentage		7%	67%	67%

Table 7-35: PM Peak Flow Validation (PCU/hr) – Western Outer Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
Purley Rise near Beech Road	357	283	4.17	✓
Bath Road	1508	1551	1.10	✓
J11 to J12	5197	5604	5.55	×
Total	7062	7438	4.42	✓
Percentage		5%	67%	67%

7.3.20 Tables 7-36 and 7-37 show that the PM Peak hour flow validation results for the Western Middle screenline in the Eastbound and Westbound directions respectively. [Table 7-36 PM Peak Flow Validation (PCU/hr) – Western Middle Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
A329 Oxford Road	693	626	2.63	✓
Norcot Road	285	269	1.01	✓
Cornwell Road	181	62	10.84	×
Mayfair / The Meadway	660	655	0.20	✓
Bath Road	719	752	1.21	✓
J12 to J11	4542	4965	6.14	×
Total	7081	7328	2.91	✓
Percentage		3%	67%	67%

Table 7-37: PM Peak Flow Validation (PCU/hr) – Western Middle Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
A329 Oxford Road	911	732	6.21	×
Norcot Road	377	266	6.17	×
Cornwell Road	158	44	11.38	×
Mayfair / The Meadway	964	852	3.72	✓
Bath Road	864	724	4.97	×
J11 to J12	5197	5604	5.55	×
Total	8470	8223	2.71	✓
Percentage		-3%	33%	17%

7.3.21 Tables 7-38 and 7-39 show that the PM Peak hour flow validation results for the Western Railway screenline in the Eastbound and Westbound directions respectively.

Table 7-38: PM Peak Flow Validation (PCU/hr) – Western Railway Screenline – Eastbound

Description	Observed	Modelled	GEH	DMRB
Cow Lane Bridges	485	520	1.57	✓
Oxford Road near Beresford Road	480	613	5.70	×
Tilehurst Road	464	487	1.06	✓
Bath Road Benyon Court Junction	385	549	7.58	×
Berkeley Avenue	487	433	2.53	✓
Total	2301	2601	6.07	✓
Percentage		13%	60%	60%

Table 7-39: PM Peak Flow Validation (PCU/hr) – Western Railway Screenline – Westbound

Description	Observed	Modelled	GEH	DMRB
Cow Lane Bridges	730	717	0.48	✓
Oxford Road near Beresford Road	700	747	1.75	✓
Tilehurst Road	840	902	2.08	✓
Bath Road Benyon Court Junction	755	1062	10.18	×
Berkeley Avenue	789	681	3.97	✓
Total	3814	4109	4.69	✓
Percentage		8%	80%	80%

7.3.22 Tables 7-40 and 7-41 show that the PM Peak hour flow validation results for the Northern screenline in the Southbound and Northbound directions respectively.

Table 7-40: PM Peak Flow Validation (PCU/hr) – Northern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Upper Woodcote Road	528	505	1.01	✓
Peppard Road The Riding Junction	520	319	9.81	×
Henley Road	935	818	3.94	✓
Total	1983	1643	8.00	×
Percentage		-17%	67%	67%

Table 7-41: PM Peak Flow Validation (PCU/hr) – Northern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Upper Woodcote Road	583	512	3.01	✓
Peppard Road The Riding Junction	493	219	14.52	×
Henley Road	631	865	8.53	×
Total	1707	1596	2.73	✓
Percentage		-6%	33%	33%

7.3.23 Tables 7-42 and 7-43 show that the Inter Peak hour flow validation results for the River screenline in the Northbound and Southbound directions respectively.

Table 7-42: PM Peak Flow Validation (PCU/hr) – River Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Caversham Bridge	1063	1244	5.34	×
George Street	446	484	1.78	✓
Sonning Bridge	699	616	3.23	✓
Total	2208	2345	2.87	✓
Percentage		6%	67%	67%

Table 7-43: PM Peak Flow Validation (PCU/hr) – River Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Caversham Bridge	1466	1730	6.60	×
George Street	955	1044	2.83	✓
Sonning Bridge	511	429	3.76	✓
Total	2932	3203	4.91	✓
Percentage		9%	67%	67%

7.3.24 Tables 7-44 and 7-45 show that the PM Peak hour flow validation results for the Outer Southern screenline in the Northbound and Southbound directions respectively.

Table 7-44: PM Peak Flow Validation (PCU/hr) – Outer Southern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
Basingstoke Road	1933	1984	1.15	✓
Hollow Lane, Shinfield	1142	934	6.45	×
Total	3075	2918	2.87	✓
Percentage		-5%	50%	50%

Table 7-45: PM Peak Flow Validation (PCU/hr) – Outer Southern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
Basingstoke Road	2580	2583	0.06	✓
Hollow Lane, Shinfield	1202	1208	0.18	✓
Total	3782	3791	0.15	✓
Percentage		0%	100%	100%

7.3.25 Tables 7-46 and 7-47 show that the PM Peak hour flow validation results for the Inner Southern screenline in the Northbound and Southbound directions respectively. [

Table 7-46: PM Peak Flow Validation (PCU/hr) – Inner Southern Screenline – Northbound

Description	Observed	Modelled	GEH	DMRB
A33	1754	1821	1.58	✓
Basingstoke Road	405	446	1.95	✓
Northumberland Avenue	497	627	5.50	×
Shinfield Road near Beech Road	426	235	10.49	×
Whiteknights Road	346	411	3.36	✓
Wokingham Road Bell Avenue Junction	395	364	1.59	✓
London Road	1344	1256	2.44	✓
Total	5167	5160	0.10	✓
Percentage		0%	71%	71%

Table 7-47: PM Peak Flow Validation (PCU/hr) – Inner Southern Screenline – Southbound

Description	Observed	Modelled	GEH	DMRB
A33	1086	1637	14.93	×
Basingstoke Road	399	264	7.42	×
Northumberland Avenue	707	403	12.88	×
Shinfield Road near Beech Road	463	663	8.44	×
Whiteknights Road	607	970	12.93	×
Wokingham Road Bell Avenue Junction	541	335	9.86	×
London Road	999	806	6.44	×
Total	4801	5077	3.93	✓
Percentage		6%	0%	0%

PM Peak Screenline Validation Summary

7.3.26 WebTAG guidelines require that all or nearly all screenline total flows are modelled within 5% of observed flows. In the case of the RTM in the PM Peak, it has been shown that 9 of the screenlines have a flow difference over 5%, but most are below 10%. Two of the screenlines in the west part of the model are above 10%.

7.3.27 The GEH summary in Table 7-48 indicates that in the PM peak 53% of flows have a GEH less than 5 and 85% less than 10.

Table 7-48: PM Peak Flow Validation – Summary of Validation Results.

Parameter	PM Peak
No of Observed Turn Counts	55
No of Modelled flows with GEH<5	30
% of Modelled flows with GEH < 5	55%
No of Modelled flows with GEH< 10	47
% of Modelled flows with GEH < 10	85%

7.4 Motorway Link Validation

AM Peak

7.4.1 Tables 7-15 and 7-16 show the M4 motorway flow validation in the westbound and eastbound directions respectively.

Table 7-15 AM Peak M4 Motorway Validation Flows - Westbound

Description	Observed	Modelled	GEH	DMRB
J8 to J10	4836	4870	0.50	✓
J10 to J11	5003	4957	0.65	✓
J11 to J12	4248	4644	5.94	✓
J12 to J13	3313	3577	4.50	✓
Percentage			75%	100%

Table 7-16 AM Peak M4 Motorway Validation Flows - Eastbound

Description	Observed	Modelled	GEH	DMRB
J13 to J12	3668	3644	0.40	✓
J12 to J11	4772	4918	2.11	✓
J11 to J10	4298	4580	4.23	✓
J10 to J8	4573	4415	2.37	✓
Percentage			100%	100%

Inter Peak

7.4.2 Tables 7-32 and 7-33 show the M4 motorway flow validation in the westbound and eastbound directions respectively.

Table 7-32 Inter Peak M4 Motorway Validation Flows - Westbound

Description	Observed	Modelled	GEH	DMRB
J8 to J10	3412	3268	2.50	✓
J10 to J11	3233	3148	1.50	✓
J11 to J12	3166	3198	0.58	✓
J12 to J13	2575	2624	0.95	✓
Percentage		-1%	100%	100%

Table 7-33 Inter Peak M4 Motorway Validation Flows - Eastbound

Description	Observed	Modelled	GEH	DMRB
J13 to J12	2474	2339	2.74	✓
J12 to J11	3055	2961	1.73	✓
J11 to J10	3133	2941	3.47	✓
J10 to J8	3279	3224	0.96	✓
Percentage		-4%	100%	100%

PM Peak

7.4.3 Tables 7-49 and 7-50 show the M4 motorway flow validation in the westbound and eastbound directions respectively.

Table 7-49 PM Peak M4 Motorway Validation Flows - Westbound

Description	Observed	Modelled	GEH	DMRB
J8 to J10	5014	5051	0.53	✓
J10 to J11	5384	5308	1.04	✓
J11 to J12	5197	5604	5.55	×
J12 to J13	3831	3997	2.65	✓
Percentage			75%	75%

Table 7-50 PM Peak M4 Motorway Validation Flows - Eastbound

Description	Observed	Modelled	GEH	DMRB
J13 to J12	3671	3721	0.83	✓
J12 to J11	4542	4965	6.14	×
J11 to J10	4509	4424	1.27	✓
J10 to J8	5024	4405	9.00	×
Percentage	0	-1%	50%	50%

Motorway Summary

7.4.4 Overall the level of link flow validation on the M4 is shown to be good, with one GEH in the AM peak and three in the PM, above 5.

7.5 Model Convergence

7.5.1 WebTAG guidance notes that before the results of any traffic assignment are used to influence decisions, the stability or degree of convergence of the assignment must be confirmed at the appropriate level (para 3.3 of TAG M3.1).

7.5.2 The importance of achieving convergence at an appropriate level is related to the need to provide stable, consistent and robust model results. This is especially so when model outputs are used to compare 'with' and 'without' scheme scenarios in cost benefit analysis. It is important to be able to distinguish differences due to the scheme from those associated with different degrees of convergence.

7.5.3 Table 7-51 summarises the most appropriate convergence measures of proximity and stability given in WebTAG Unit M3.1 Table 4 for model convergence.

Table 7-51 Summary of Convergence Measures and Base Model Acceptable Values.

Measure of Convergence	Base Model Acceptable Values
Delta and % Gap	Less than 0.1% or at least stable with convergence fully documented and all other criteria met
Percentage of links with flow change (P) < 1%	Four consecutive iterations greater than 98%
Percentage of links with cost change (P2) < 1%	Four consecutive iterations greater than 98%
Percentage change in total user costs (V)	Four consecutive iterations less than 0.1% (SUE only)

7.5.4 The results of convergence statistics achieved for all three time periods of the RTM are shown in Table 7-52. This shows that all three time period models exceed the convergence criteria required and there demonstrate that the models are stable and robust.

Table 7-52: Convergence Statistics

AM				IP				PM			
Iteration	% Gap/ Delta	% Flow	%Cost Delays	Iteration	% Gap/ Delta	% Flow	%Cost Delays	Iteration	% Gap/ Delta	% Flow	% Cost Delay
42	0.050	98.8	99.5	28	0.0046	99.3	99.9	78	0.023	99.0	99.1
43	0.086	99.3	99.6	29	0.0021	99.1	99.8	79	0.017	98.7	99.0
44	0.0047	99.3	99.5	30	0.0024	98.9	99.9	80	0.020	98.7	98.5
45	0.0063	99.3	99.6	31	0.0019	99.1	99.8	81	0.026	98.8	98.9

7.6 Journey Time Validation

7.6.1 Observed journey times were informed by Traffic Master Data. Twelve journey time routes on key routes have been checked for journey time validation. Each route has been checked for validation in both directions. The validation routes were previously shown in Figure 3-5.

7.6.2 Tables 7-53 to 7-55 gives a summary of the AM peak, Inter Peak and PM peak journey time validation respectively. Appendix D gives graphical presentation of the journey time validation.

Table 7-53: AM Peak Journey Time Validation Results

Route	Observed	Lower 15%	Upper 15%	Modelled	Validation
1 inbound	17:51	15:10	20:31	17:05	✓
1 outbound	17:33	14:55	20:11	17:45	✓
2 inbound	11:54	10:07	13:41	10:32	✓
2 outbound	09:24	07:59	10:48	08:57	✓
3 inbound	08:14	06:59	09:28	09:08	✓
3 outbound	10:26	08:52	11:59	08:07	×
4 inbound	18:14	15:30	20:58	13:07	×
4 outbound	13:52	11:47	15:57	12:33	✓
5 inbound	16:23	13:56	18:51	12:12	×
5 outbound	12:29	10:37	14:22	11:34	✓
6 inbound	19:27	16:32	22:22	18:50	✓
6 outbound	14:39	12:27	16:51	15:00	✓
7 inbound	14:36	12:24	16:47	13:04	✓
7 outbound	11:17	09:35	12:58	10:07	✓
8 inbound	10:40	09:04	12:16	08:59	×
8 outbound	11:30	09:47	13:14	09:17	×
9 inbound	22:07	18:48	25:26	17:38	×
9 outbound	19:47	16:49	22:45	22:29	✓
10a inbound	13:05	11:07	15:03	10:36	×
10a outbound	10:49	09:12	12:27	08:56	×
13 inbound	17:16	14:41	19:52	15:04	✓
13 outbound	14:11	12:04	16:19	13:17	✓
14 eastbound	15:16	12:58	17:33	11:33	×
14 westbound	09:32	08:06	10:58	09:24	✓

Table 7-54: Inter Peak Journey Time Validation Results

Route	Observed	Lower 15%	Upper 15%	Modelled	Validation
1 inbound	14:16	12:07	16:24	11:29	×
1 outbound	13:39	11:36	15:42	11:39	✓
2 inbound	10:40	09:04	12:16	08:46	×
2 outbound	09:42	08:15	11:10	08:28	✓
3 inbound	07:16	06:10	08:21	07:27	✓
3 outbound	08:14	07:00	09:28	07:21	✓
4 inbound	11:47	10:01	13:33	11:26	✓
4 outbound	12:22	10:31	14:13	12:25	✓
5 inbound	14:09	12:02	16:16	11:10	×
5 outbound	13:52	11:47	15:56	11:52	✓
6 inbound	13:10	11:12	15:09	10:40	×
6 outbound	12:31	10:38	14:23	11:35	✓
7 inbound	10:21	08:48	11:55	08:05	×
7 outbound	09:40	08:13	11:07	08:08	×
8 inbound	08:12	06:59	09:26	06:10	×
8 outbound	10:00	08:30	11:30	06:46	×
9 inbound	15:44	13:22	18:05	13:46	✓
9 outbound	15:30	13:11	17:50	14:45	✓
10a inbound	07:51	06:40	09:01	07:01	✓
10a outbound	08:10	06:57	09:24	08:16	✓
13 inbound	13:13	11:14	15:12	14:06	✓
13 outbound	14:06	11:59	16:13	12:54	✓
14 eastbound	07:12	06:08	08:17	08:09	✓
14 westbound	07:25	06:19	08:32	07:45	✓

Table 7-55: PM Peak Journey Time Validation Results

Route	Observed	Lower 15%	Upper 15%	Modelled	Validation
1 inbound	18:10	15:27	20:54	19:31	✓
1 outbound	19:21	16:27	22:16	22:21	×
2 inbound	15:46	13:24	18:08	14:51	✓
2 outbound	13:17	11:17	15:17	12:40	✓
3 inbound	09:40	08:13	11:07	11:15	×
3 outbound	15:42	13:20	18:03	13:36	✓
4 inbound	15:53	13:30	18:16	14:14	✓
4 outbound	14:35	12:24	16:46	15:56	✓
5 inbound	15:05	12:49	17:20	11:37	×
5 outbound	17:39	15:01	20:18	18:48	✓
6 inbound	19:09	16:16	22:01	23:38	×
6 outbound	18:27	15:41	21:13	17:10	✓
7 inbound	11:03	09:24	12:43	11:17	✓
7 outbound	11:12	09:31	12:52	12:12	✓
8 inbound	09:35	08:08	11:01	06:25	×
8 outbound	11:06	09:26	12:45	11:25	✓
9 inbound	23:57	20:21	27:32	22:16	✓
9 outbound	28:46	24:27	33:05	27:10	✓
10a inbound	12:29	10:36	14:21	07:36	×
10a outbound	13:26	11:25	15:27	13:08	✓
13 inbound	15:40	13:19	18:01	16:41	✓
13 outbound	20:44	17:38	23:51	19:14	✓
14 eastbound	10:01	08:30	11:31	09:44	✓
14 westbound	11:40	09:55	13:25	11:49	✓

7.6.3 The results show that in the AM peak 15 of the 24 routes fall within 15% of the observed journey time. Of those that are over 15%, most are close.

7.6.4 In the Inter Peak 16 of the 24 routes are within 15%.

7.6.5 In the PM peak 18 of the 24 routes are within 15%.

7.7 Day to Day Flow Variations at ATC Sites

7.7.1 A key issue in validating the RTM is the variation in day to day peak traffic flows in Reading and trying to best model these. The model should be viewed within the context of these day to day variations.

7.7.2 To demonstrate the variation, a comparison of flows at ATC sites on major routes within the study area is shown in Figures 7-2 to 7-x for the following links for the AM and PM peak hours:

- A33 North of Imperial Way
- A33 Relief Road South of Inner Distributor Road

- Wokingham Road
- London Road – East of Cemetery junction
- George Street – North of Reading Bridge
- Henley Road
- Bath Road
- Oxford Road

7.7.3 The day to day variation in the ATC count data at a number of the sites is particularly evident in the PM peak period. The day to day variation in the ATC data highlights the difficulty in validating the model to replicate a 'typical day'.

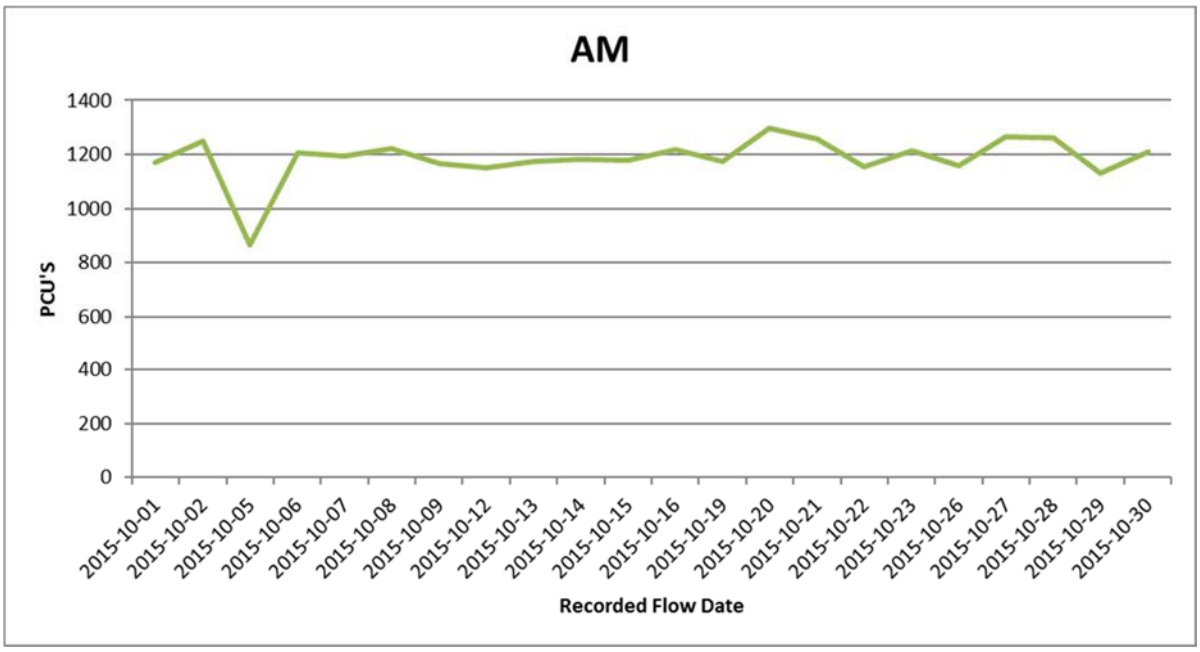


Figure 7-2 A33 North of Imperial Way ATC Southbound – AM Peak

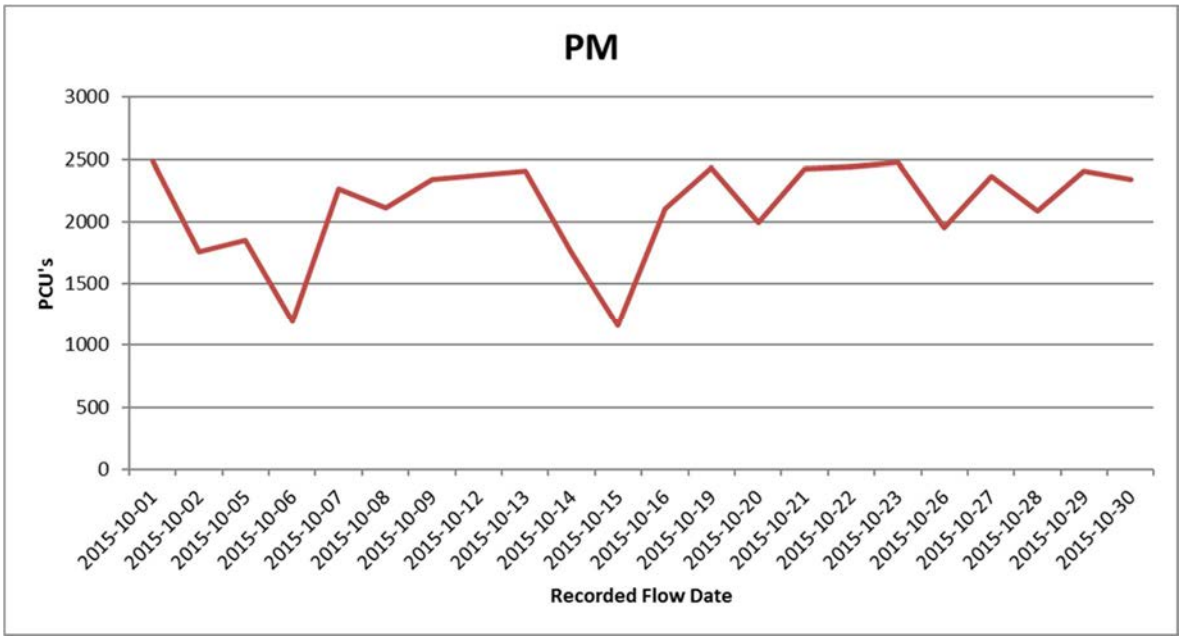


Figure 7-3: A33 North of Imperial Way ATC Southbound – PM Peak

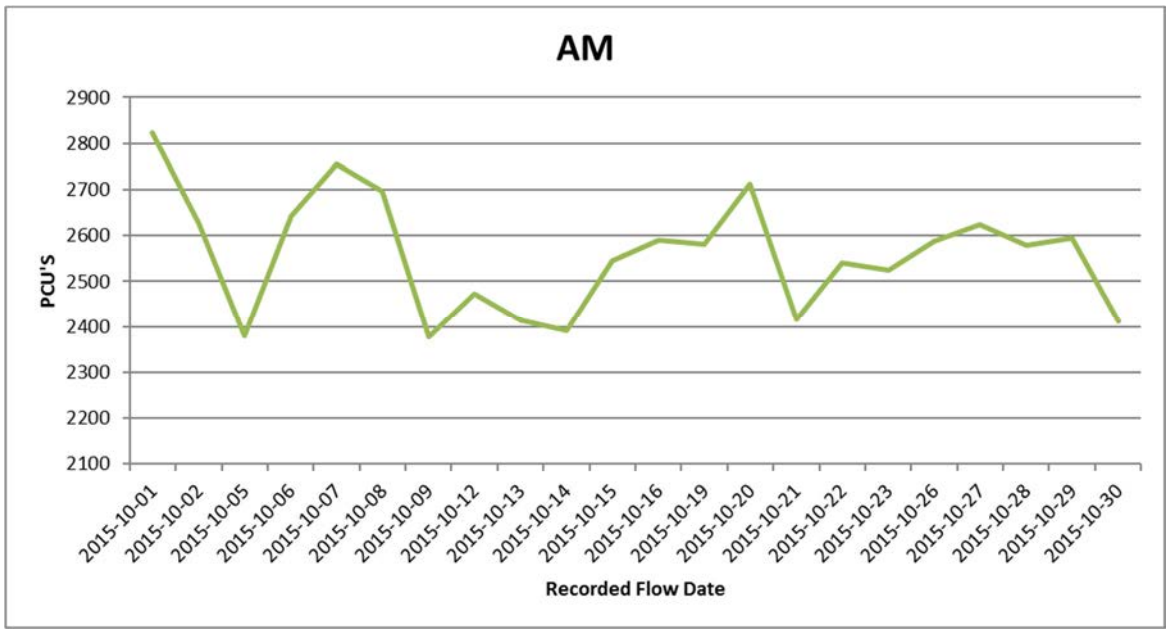


Figure 7-4: A33 North of Imperial Way ATC Northbound – PM Peak

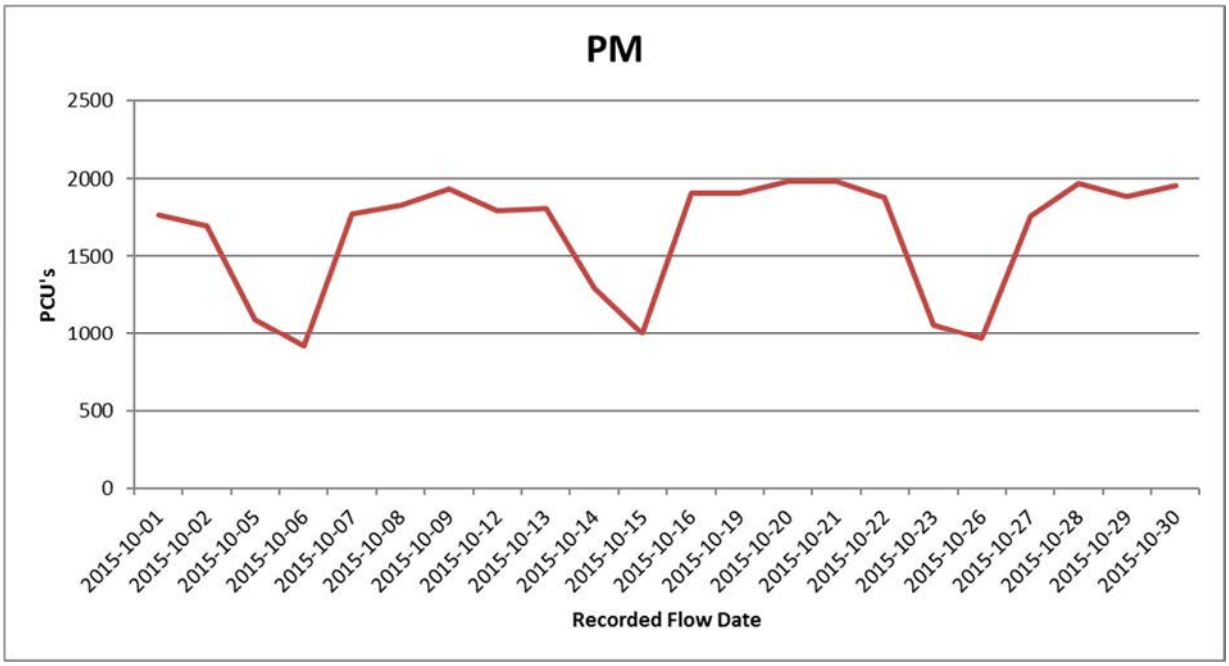


Figure 7-5: A33 North of Imperial Way ATC Northbound – PM Peak

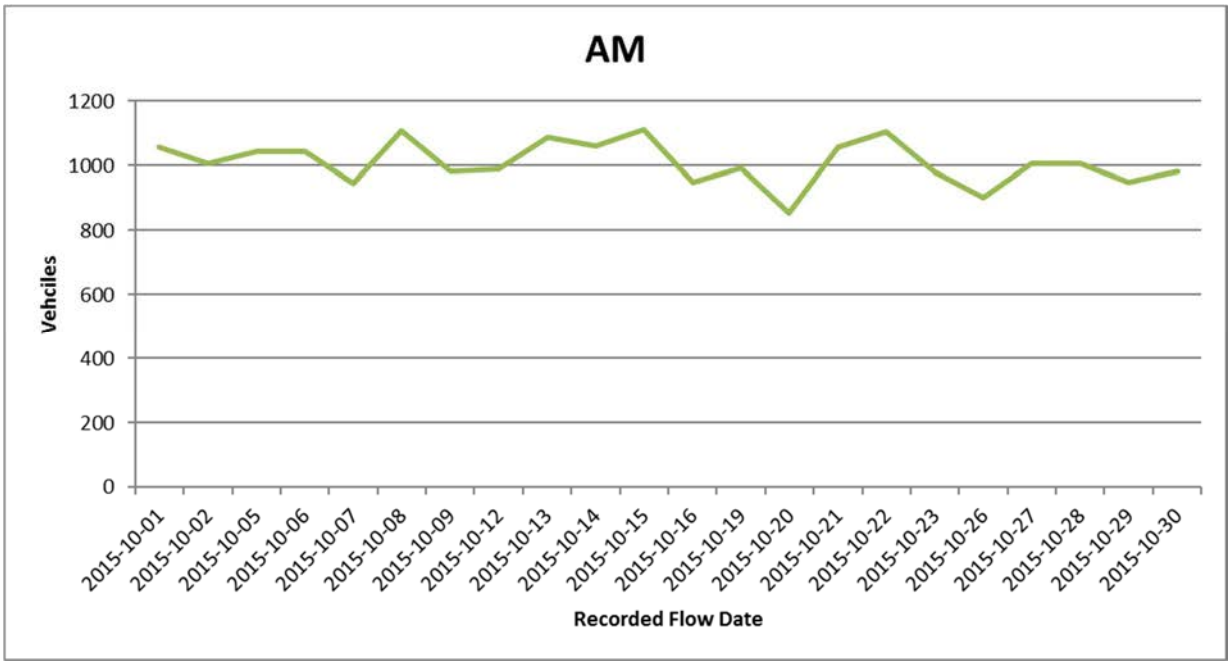


Figure 7-6: A33 South of Inner Distributor Road ATC Southbound – AM Peak

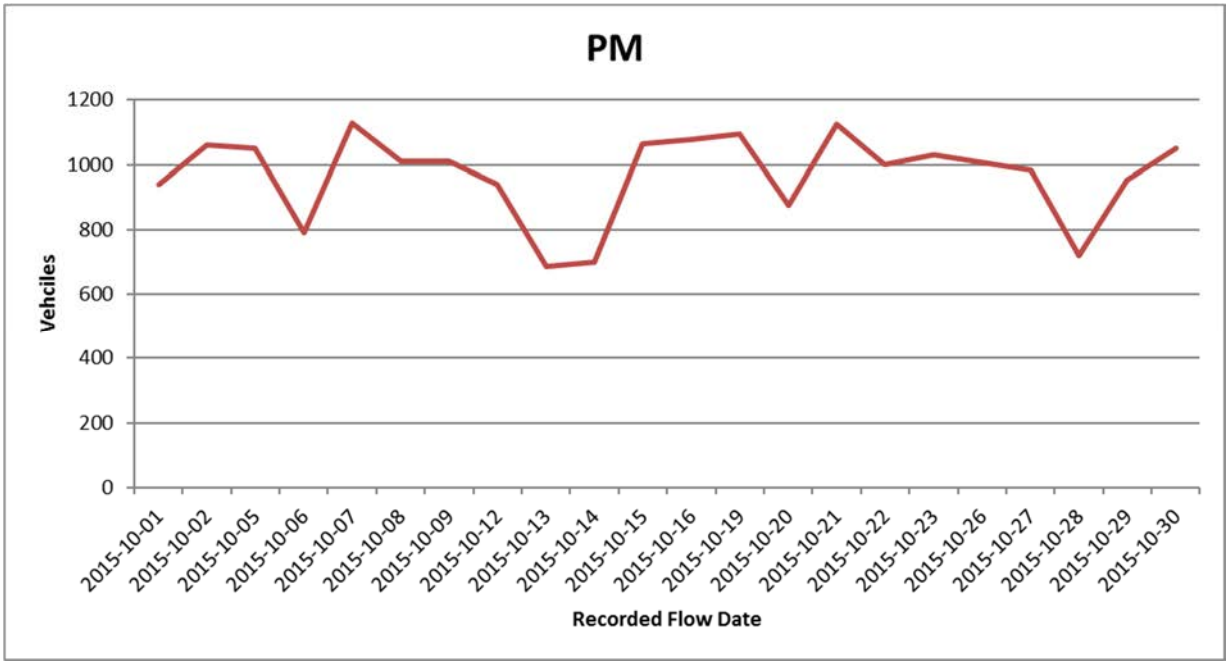


Figure 7-7: A33 South of Inner Distributor Road ATC Southbound – PM Peak

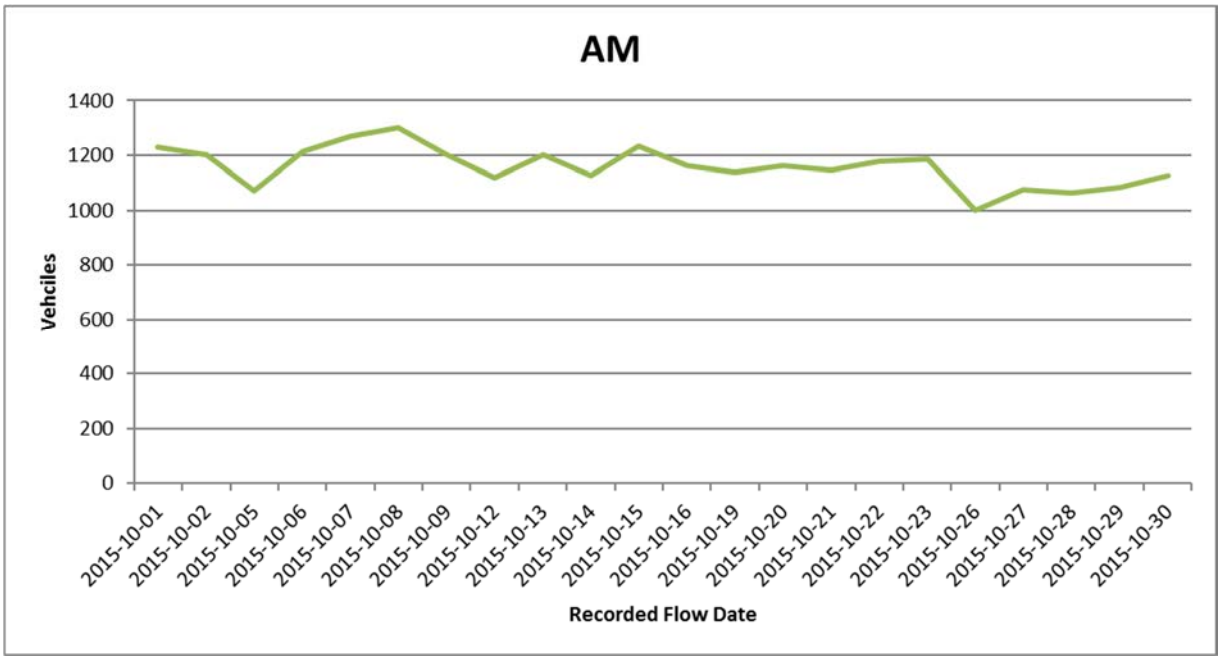


Figure 7-8: A33 South of Inner Distributor Road ATC Northbound – AM Peak

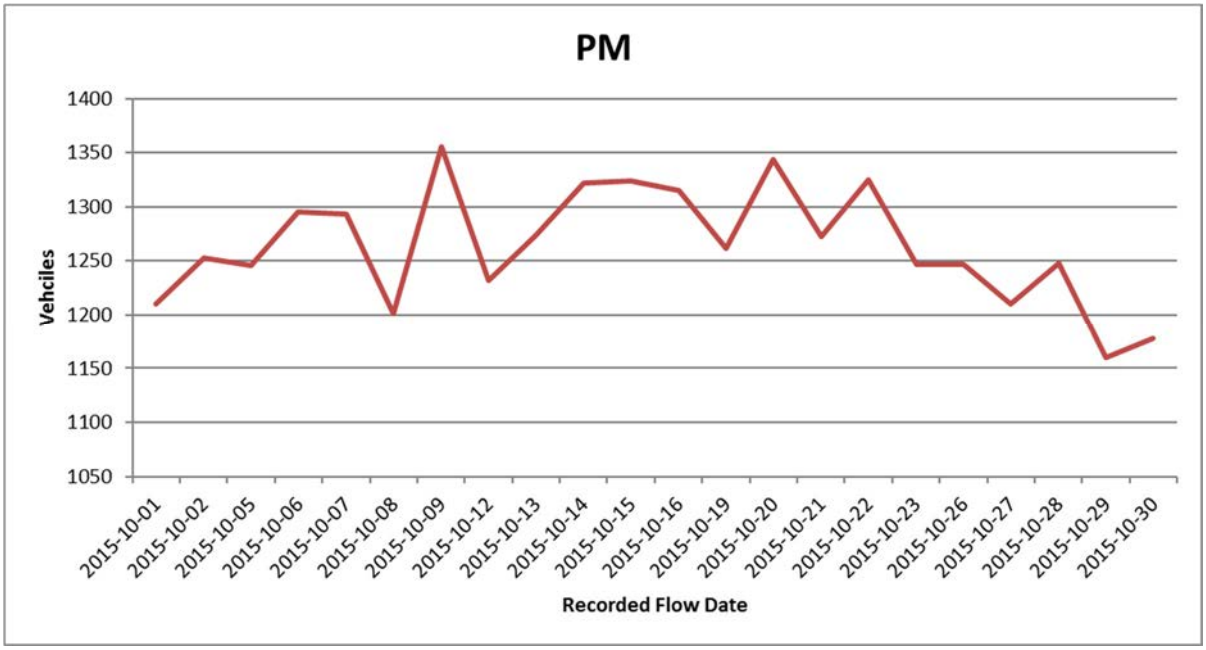


Figure 7-9: A33 South of Inner Distributor Road ATC Northbound – PM Peak

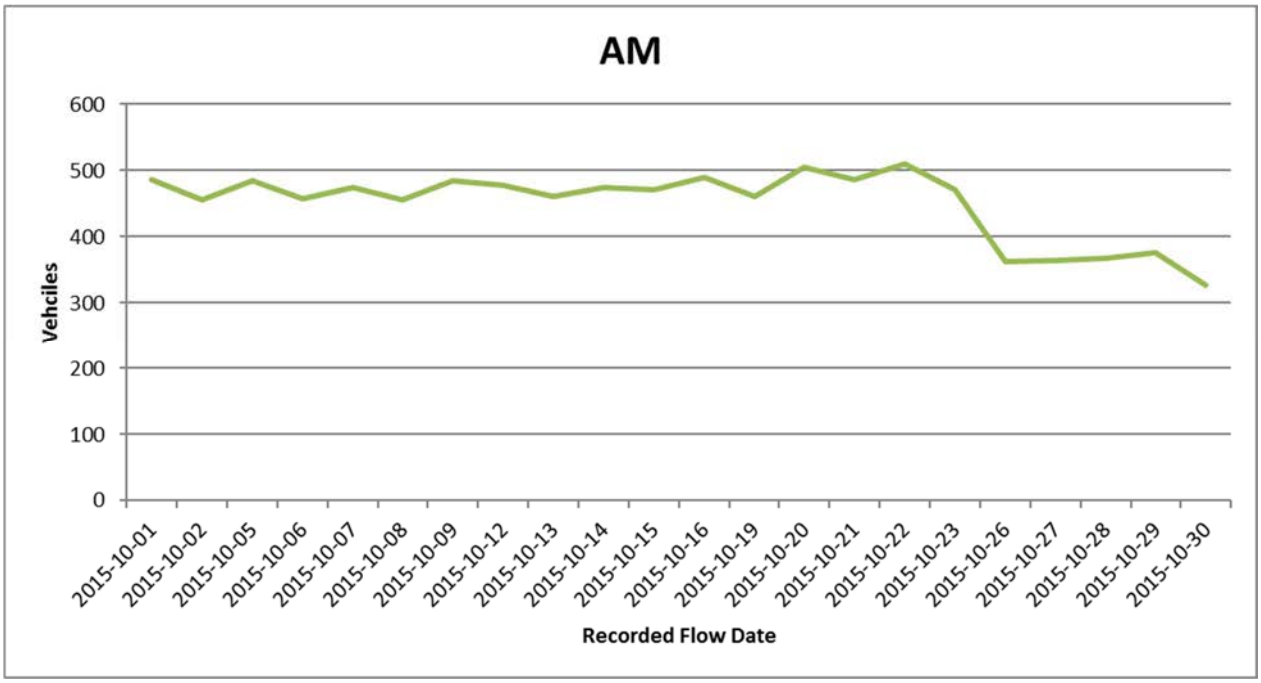


Figure 7-10: Wokingham Road ATC Southbound – AM Peak

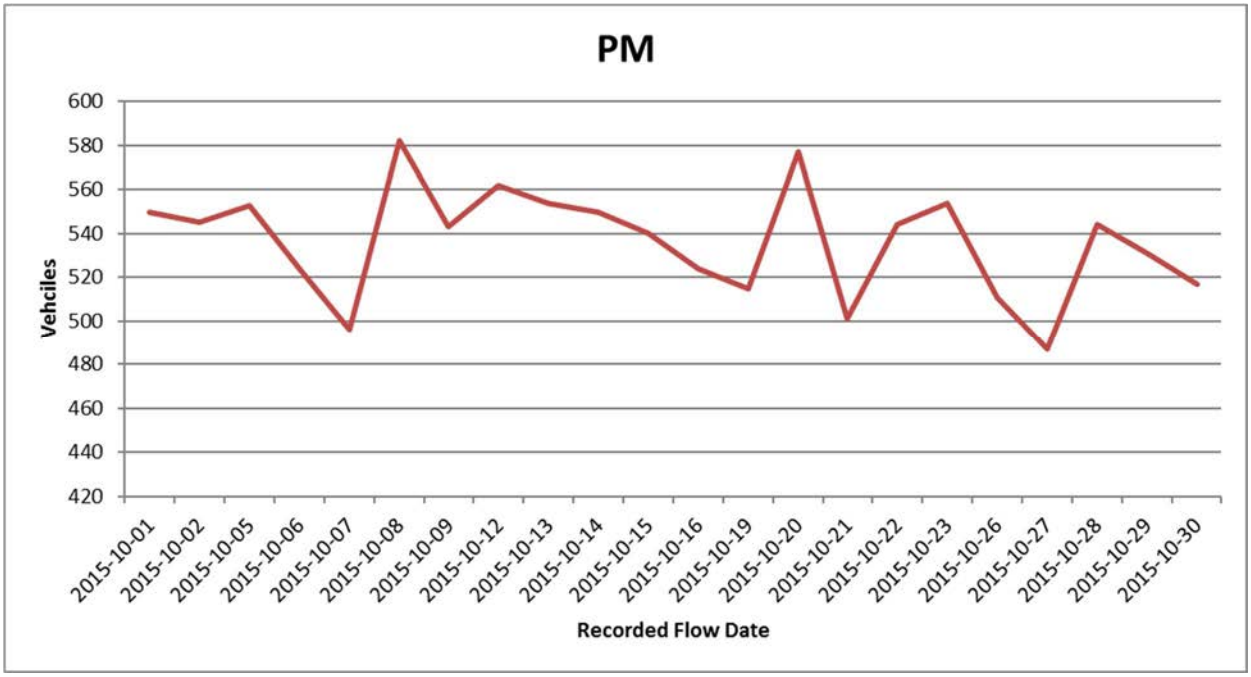


Figure 7-11: Wokingham Road ATC Southbound – PM Peak

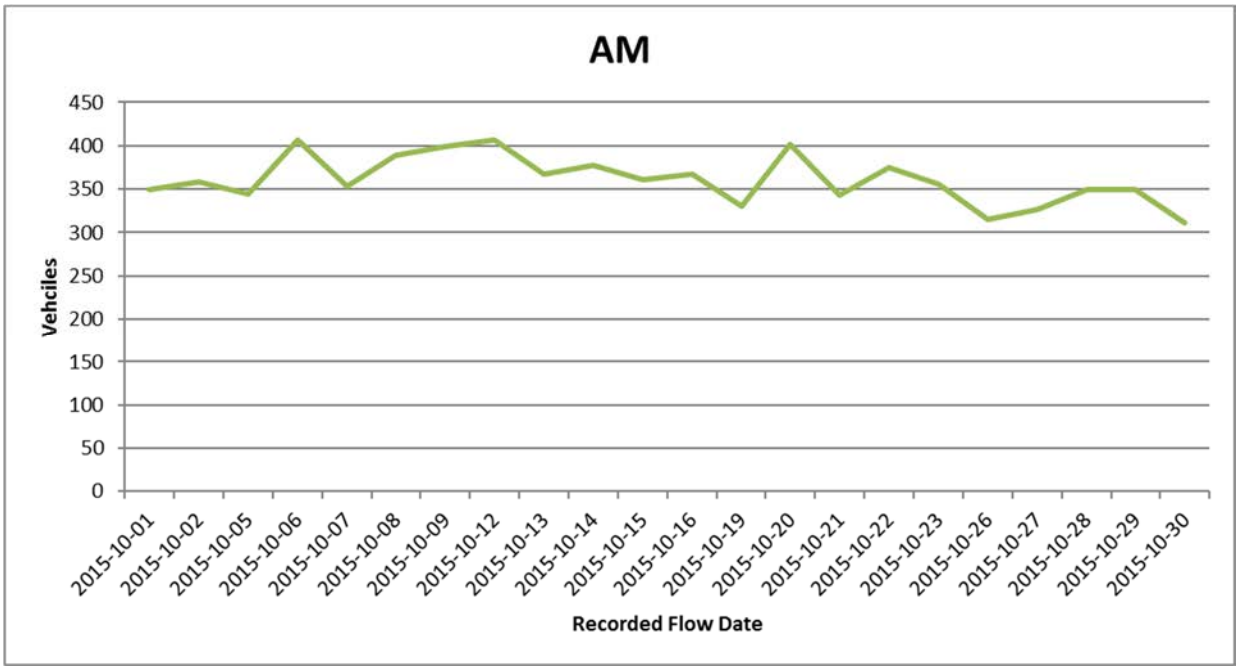


Figure 7-12: Wokingham Road ATC Northbound – AM Peak

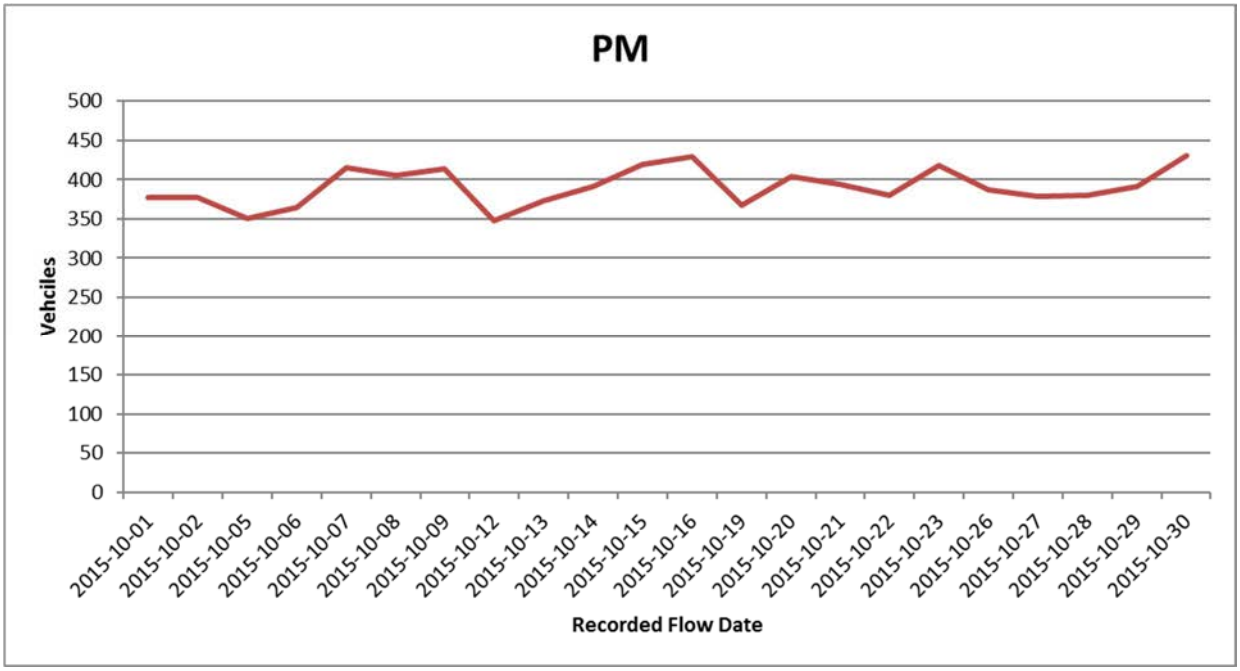


Figure 7-13: Wokingham Road ATC Northbound – PM Peak

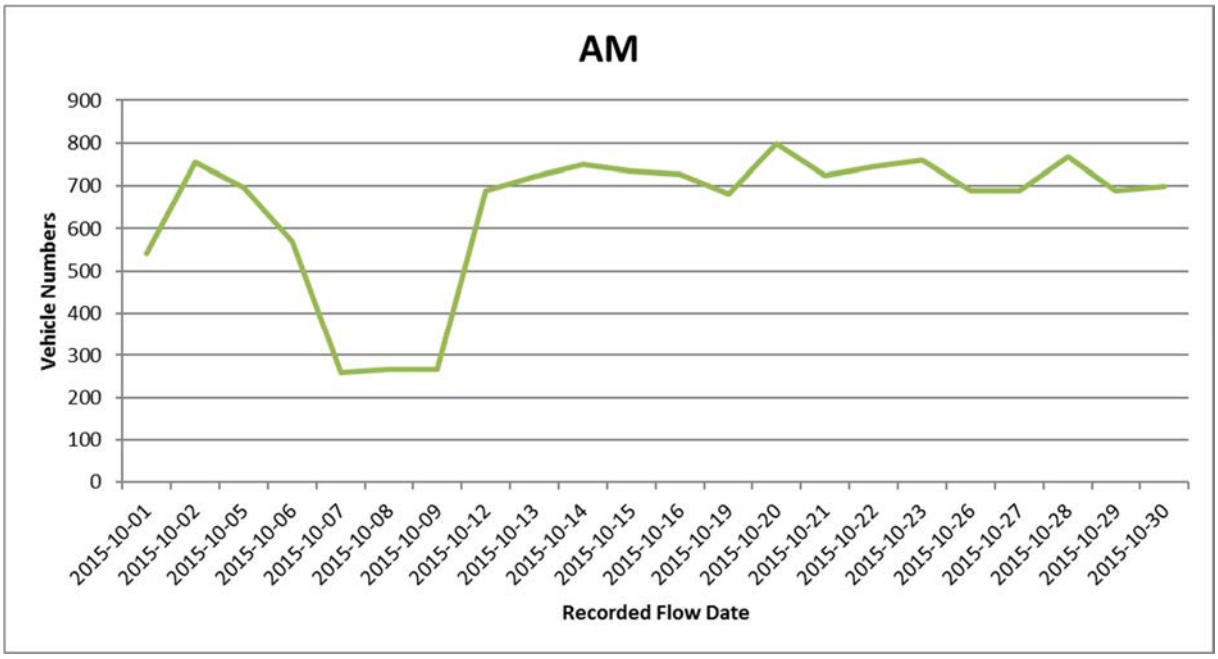


Figure 7-14: London Road East of Cemetery Junction ATC Eastbound – AM Peak

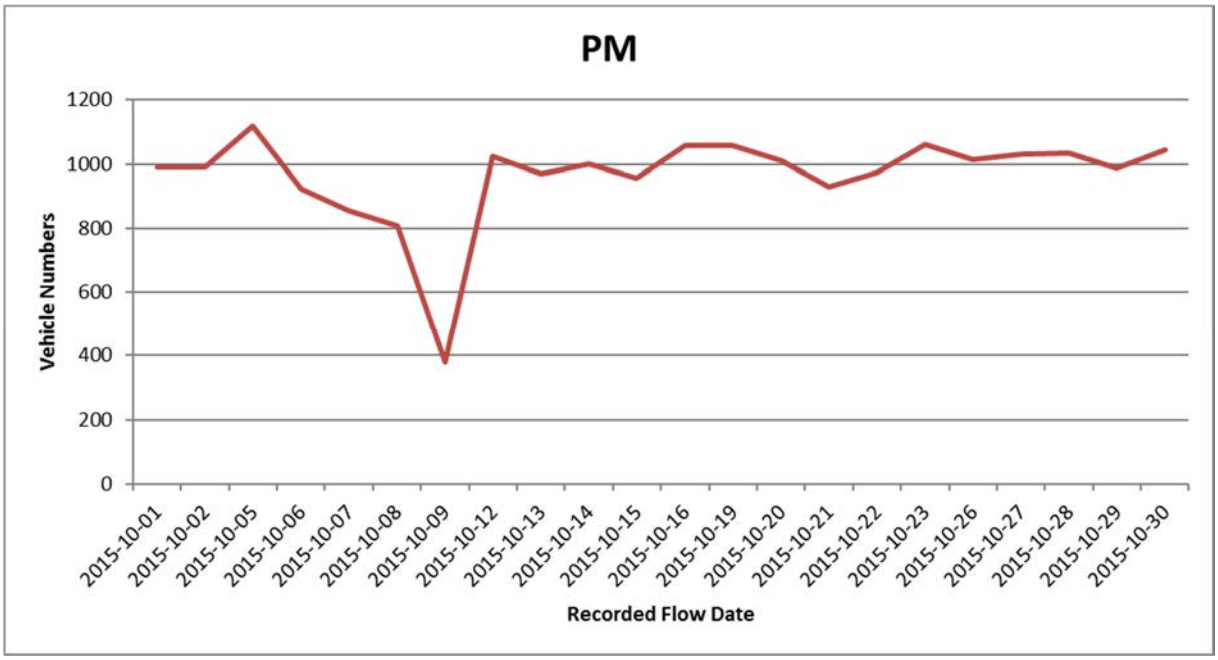


Figure 7-15: London Road East of Cemetery Junction ATC Eastbound – PM Peak

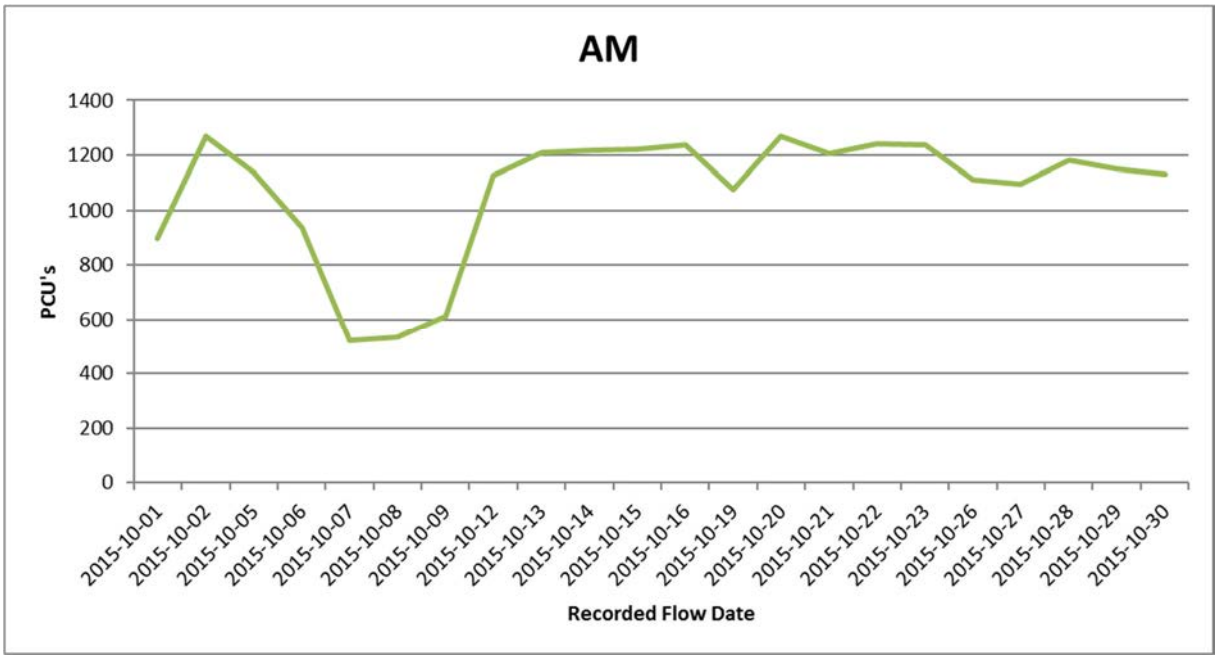


Figure 7-16: London Road East of Cemetery Junction ATC Westbound – AM Peak

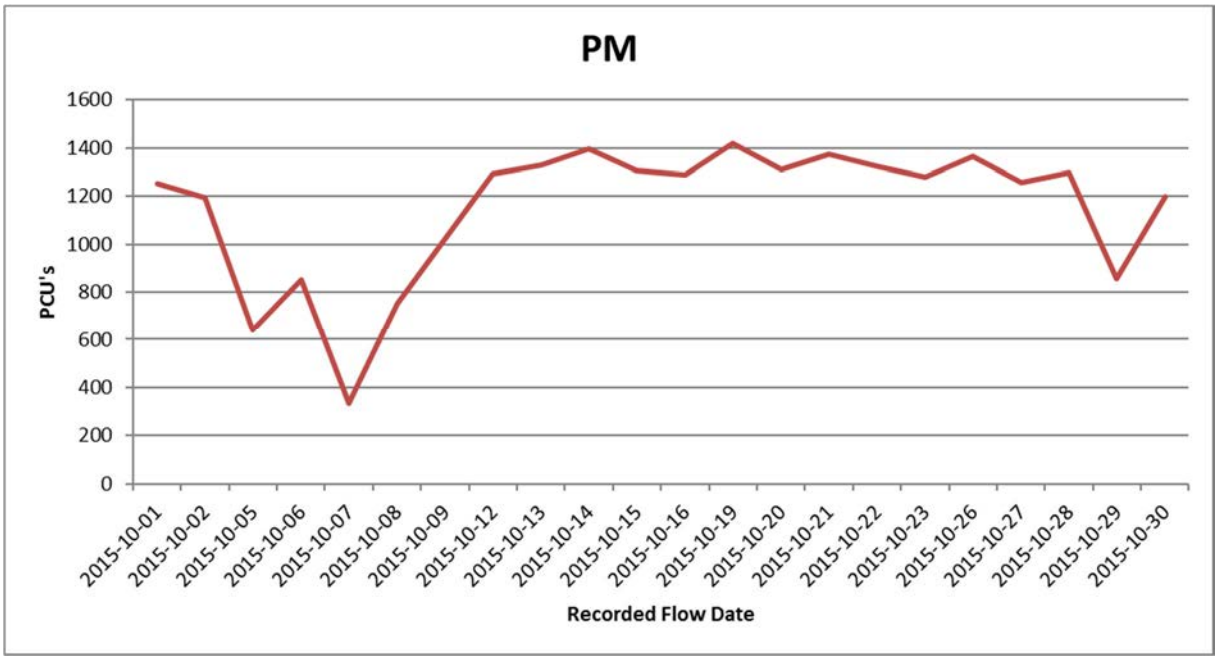


Figure 7-17: London Road East of Cemetery Junction ATC Westbound – PM Peak

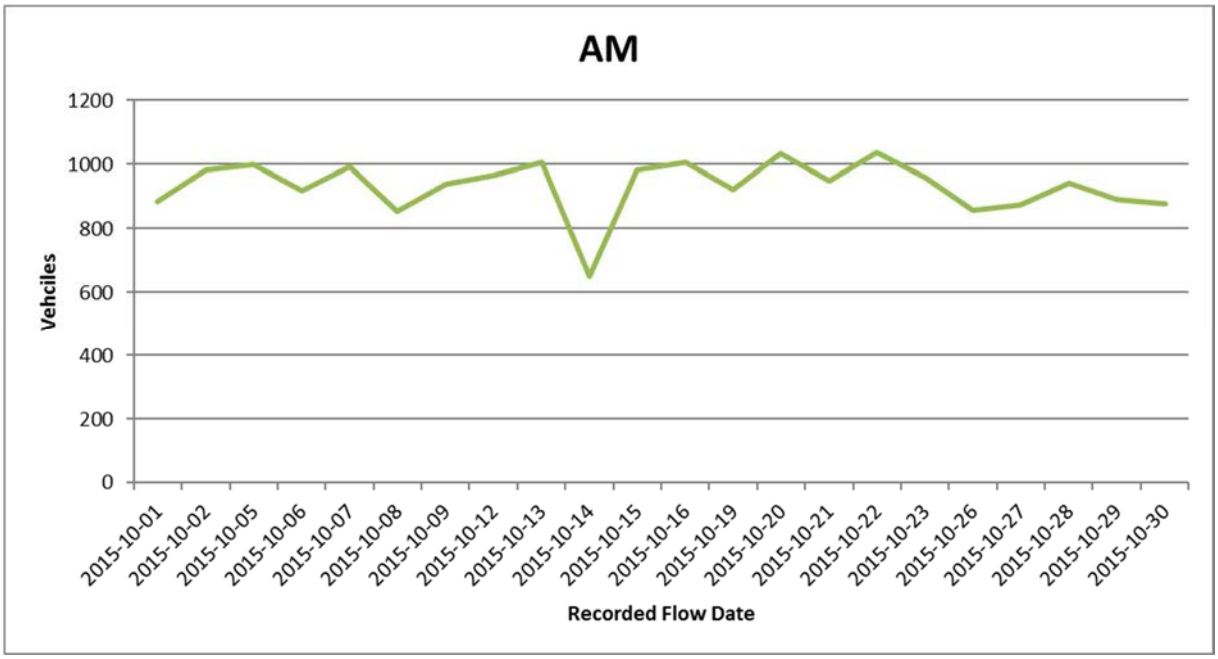


Figure 7-18: George Street North of Reading Bridge ATC Southbound – AM Peak

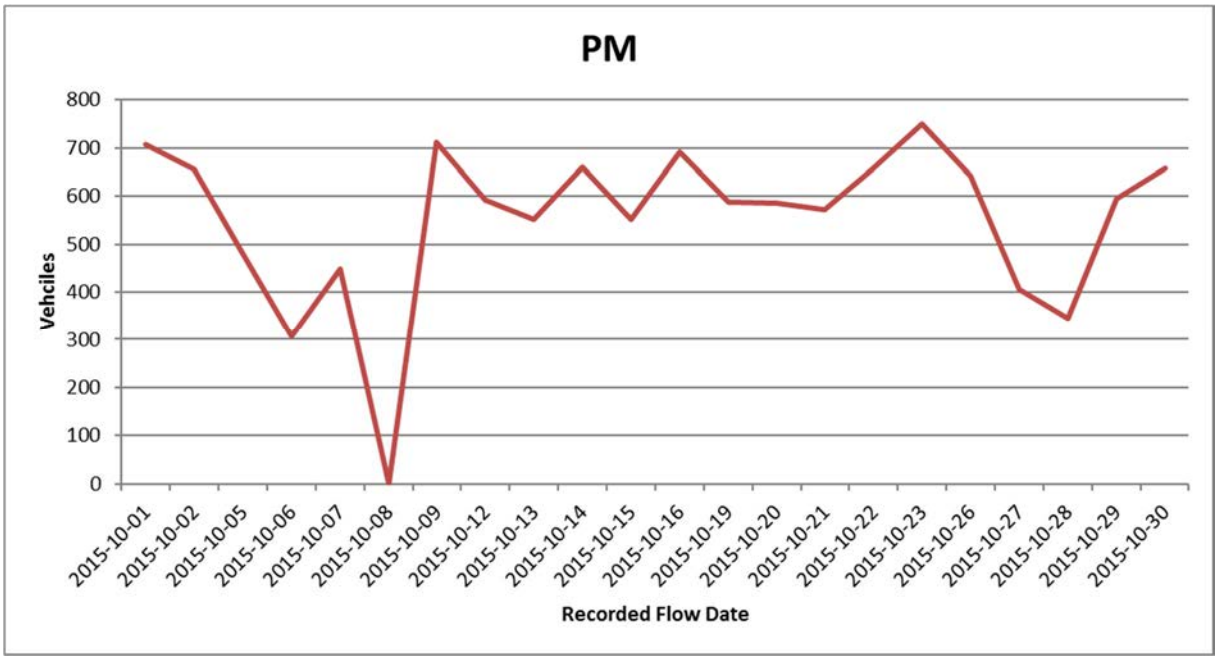


Figure 7-19: George Street North of Reading Bridge ATC Southbound – PM Peak

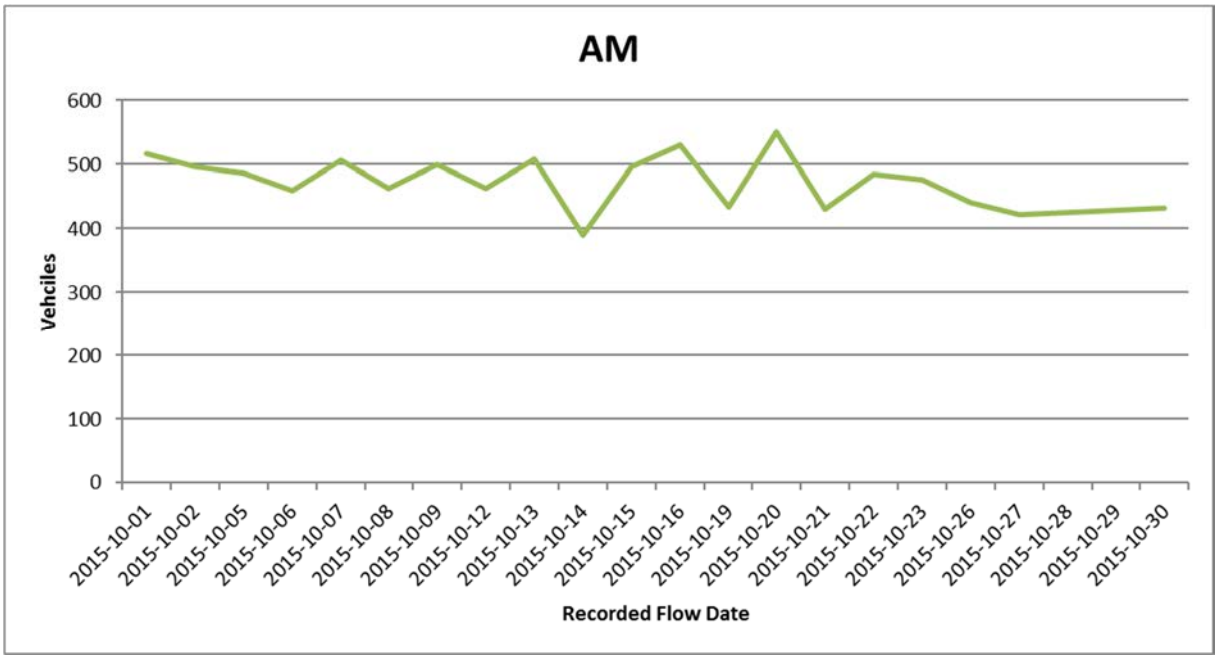


Figure 7-20: George Street North of Reading Bridge ATC Northbound – AM Peak

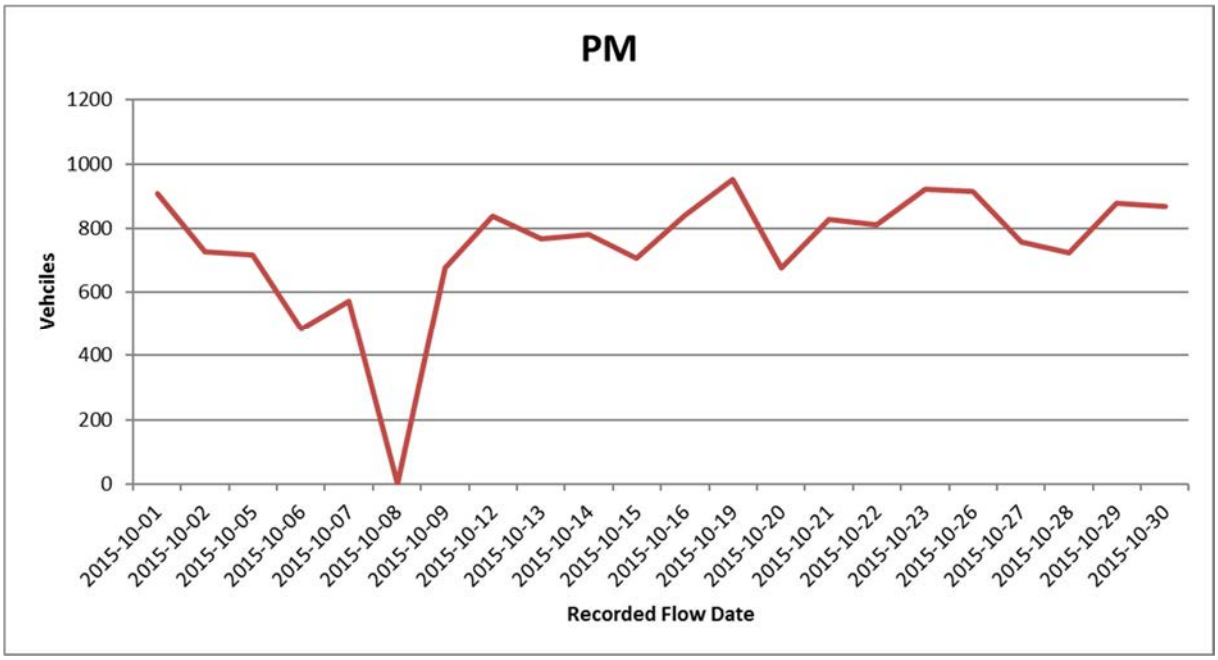


Figure 7-21: George Street North of Reading Bridge ATC Southbound – PM Peak

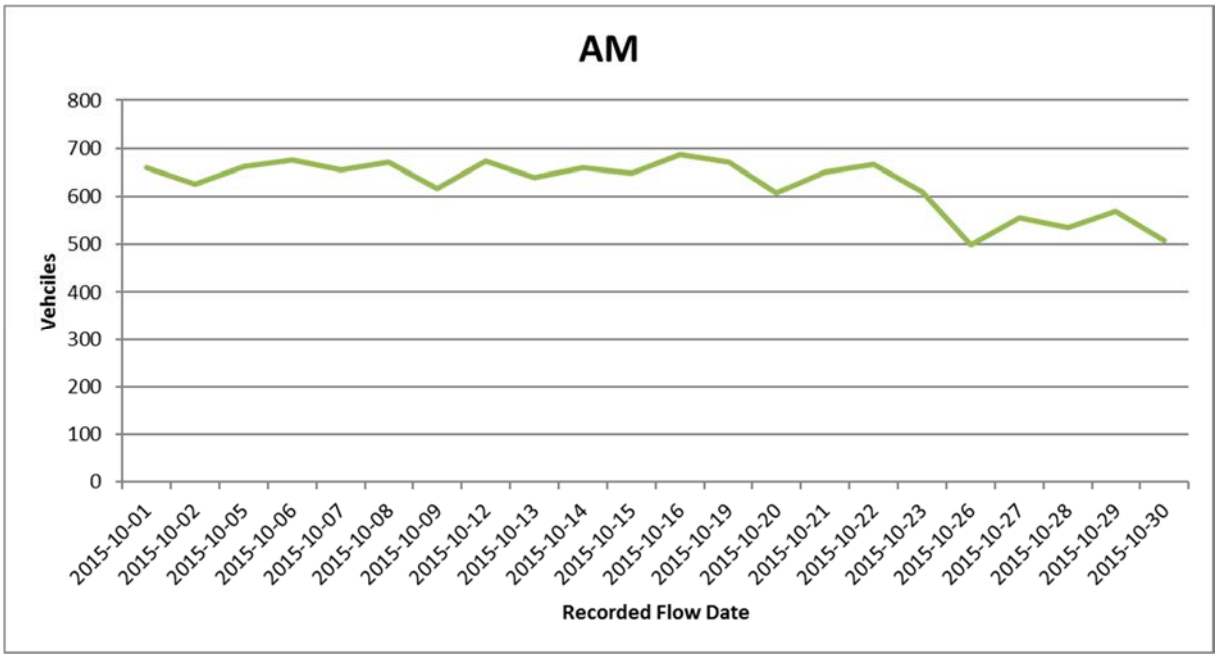


Figure 7-22: Henley Road ATC Eastbound – AM Peak

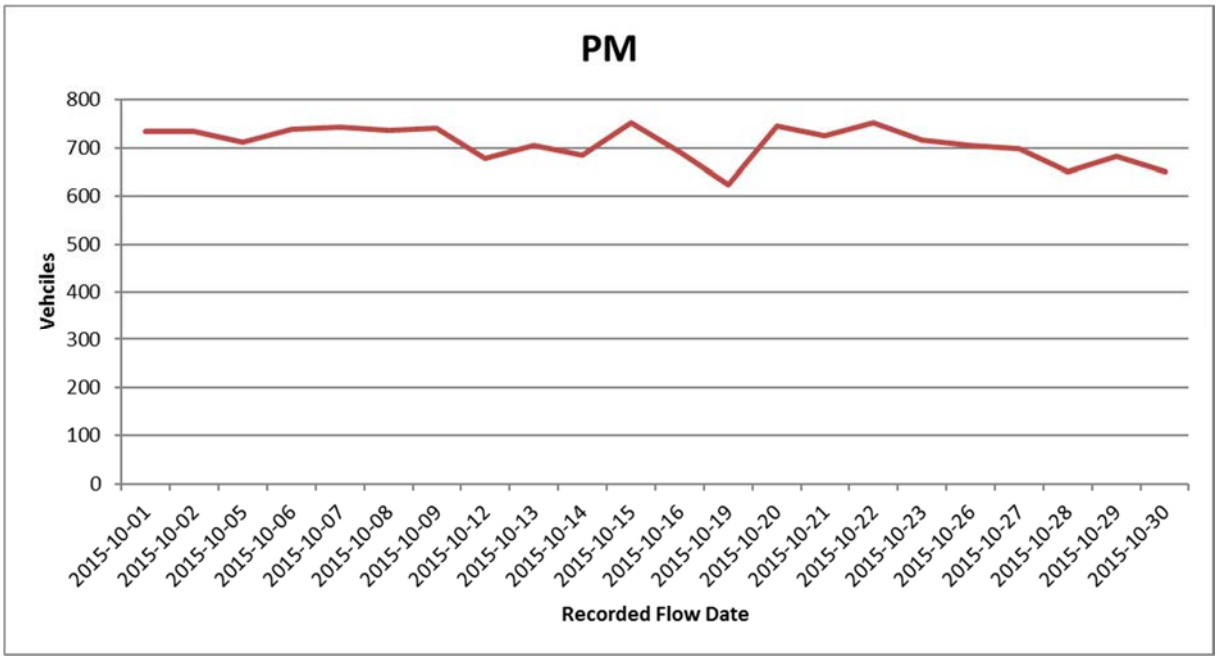


Figure 7-23: Henley Road ATC Eastbound – PM Peak

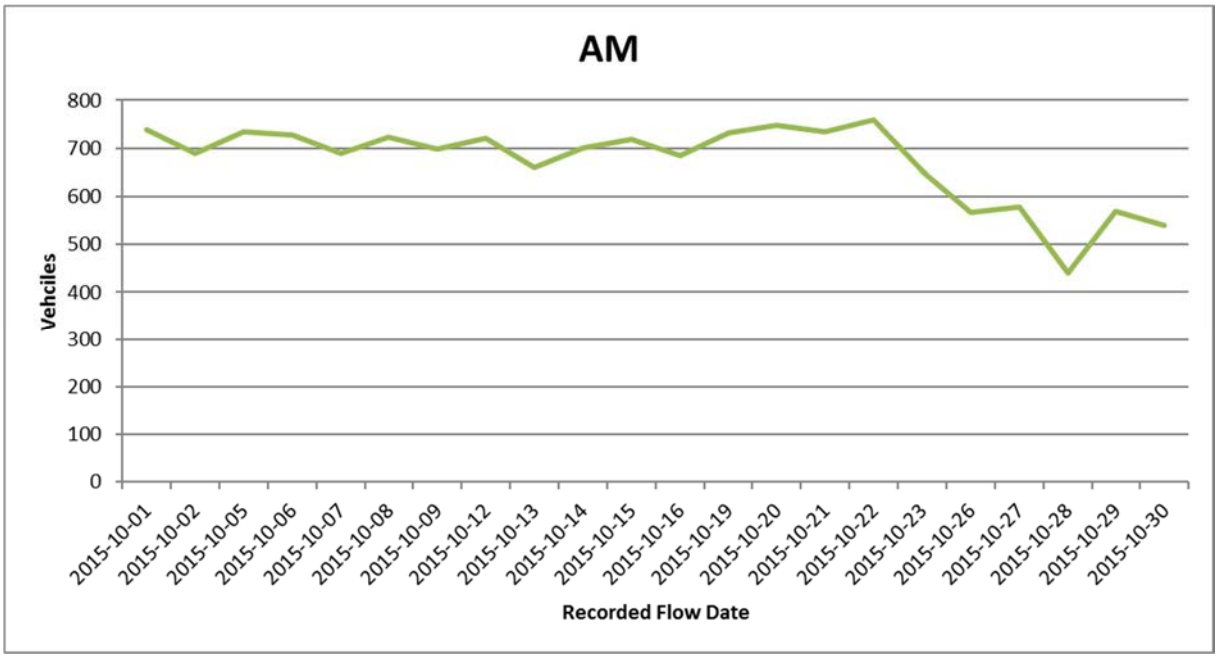


Figure 7-24: Henley Road ATC Westbound – AM Peak

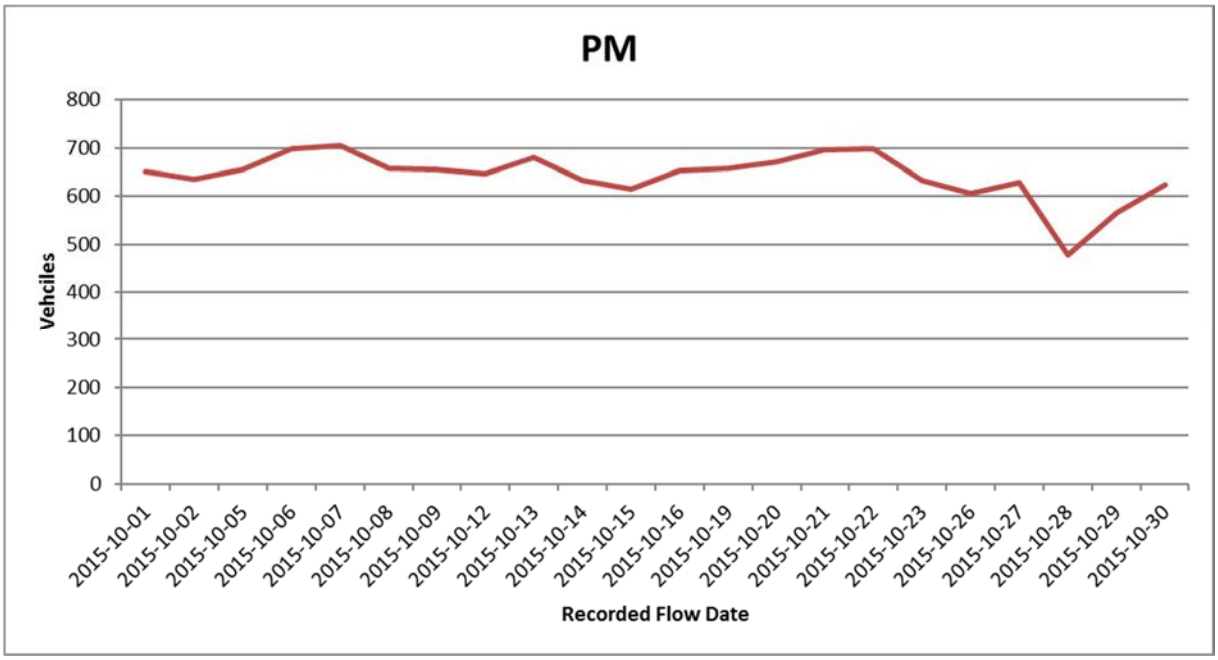


Figure 7-25: Henley Road ATC Westbound – PM Peak

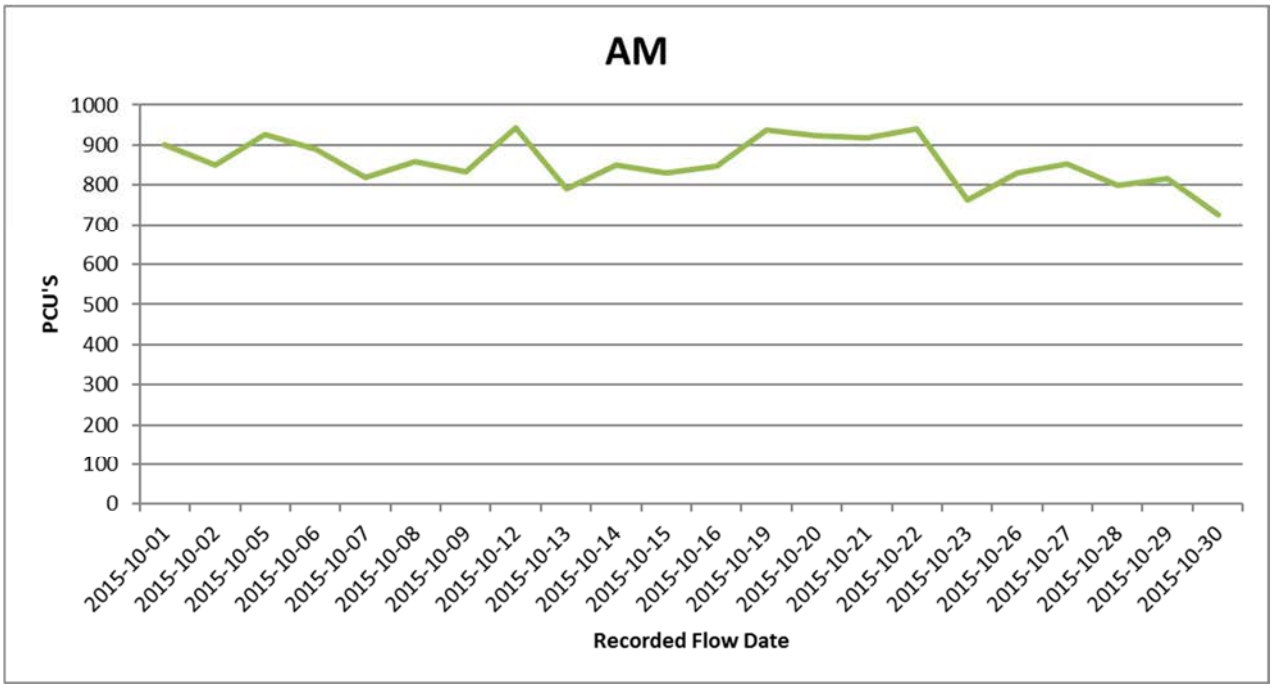


Figure 7-26: Bath Road ATC Eastbound – AM Peak

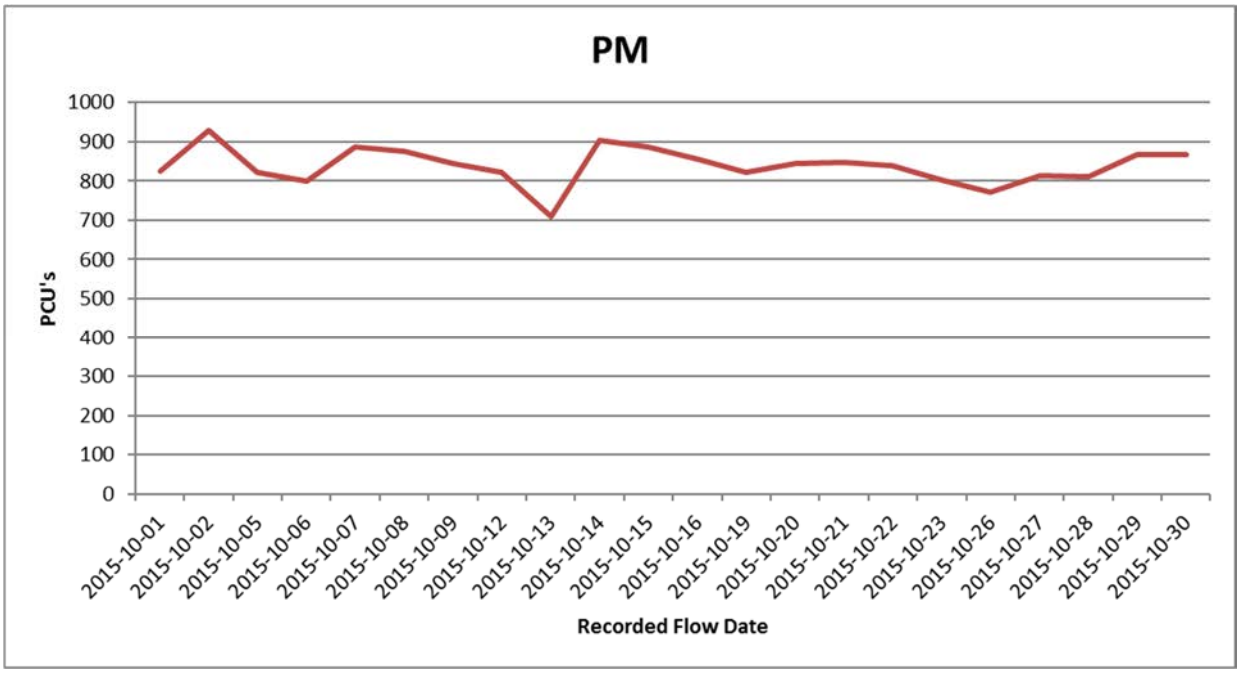


Figure 7-27: Bath Road ATC Eastbound – PM Peak

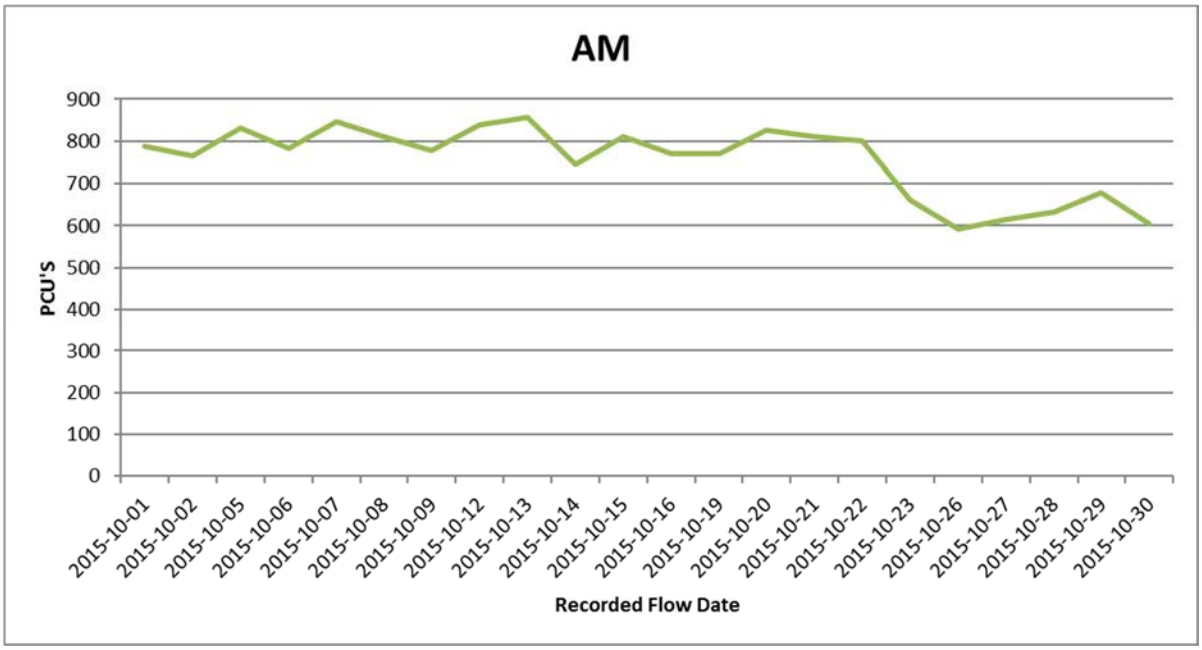


Figure 7-28: Bath Road ATC Westbound – AM Peak

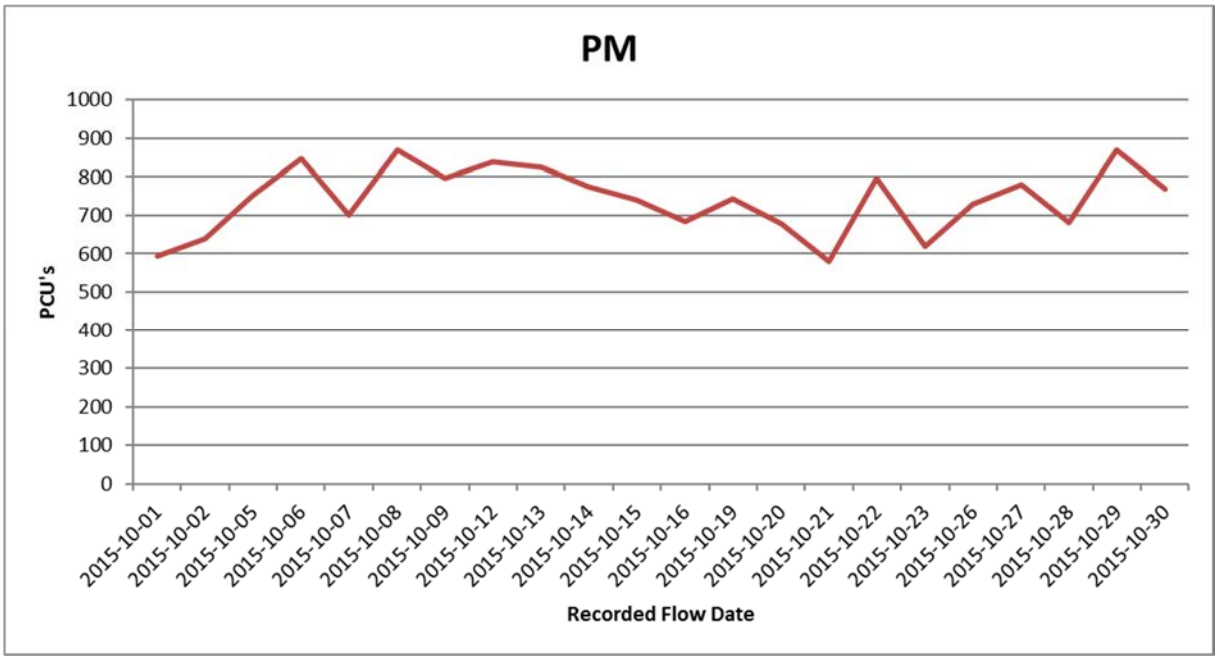


Figure 7-29: Bath Road ATC Westbound – PM Peak

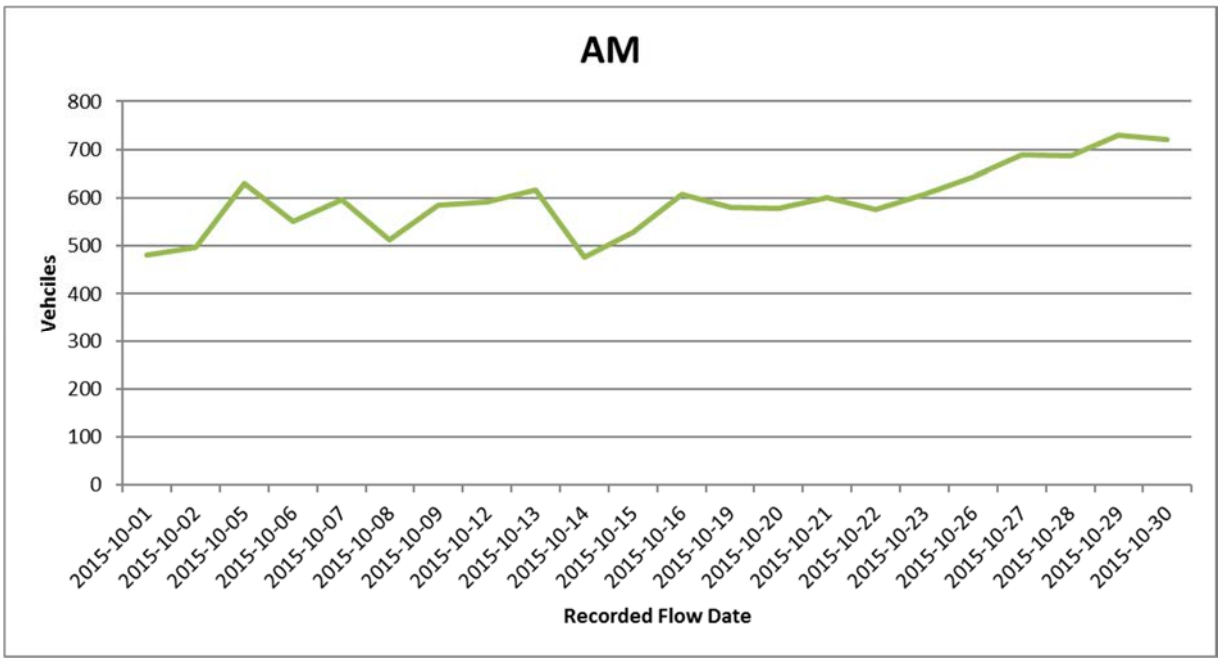


Figure 7-30: Oxford Road ATC Eastbound – AM Peak

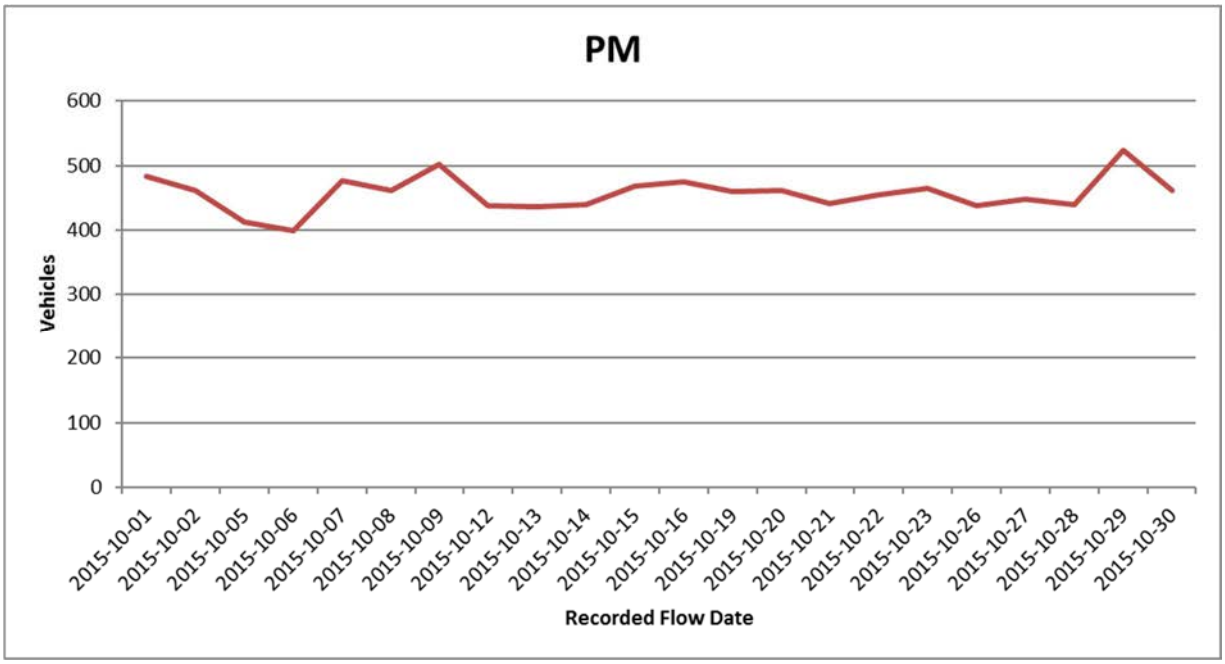


Figure 7-31: Oxford Road ATC Eastbound – PM Peak

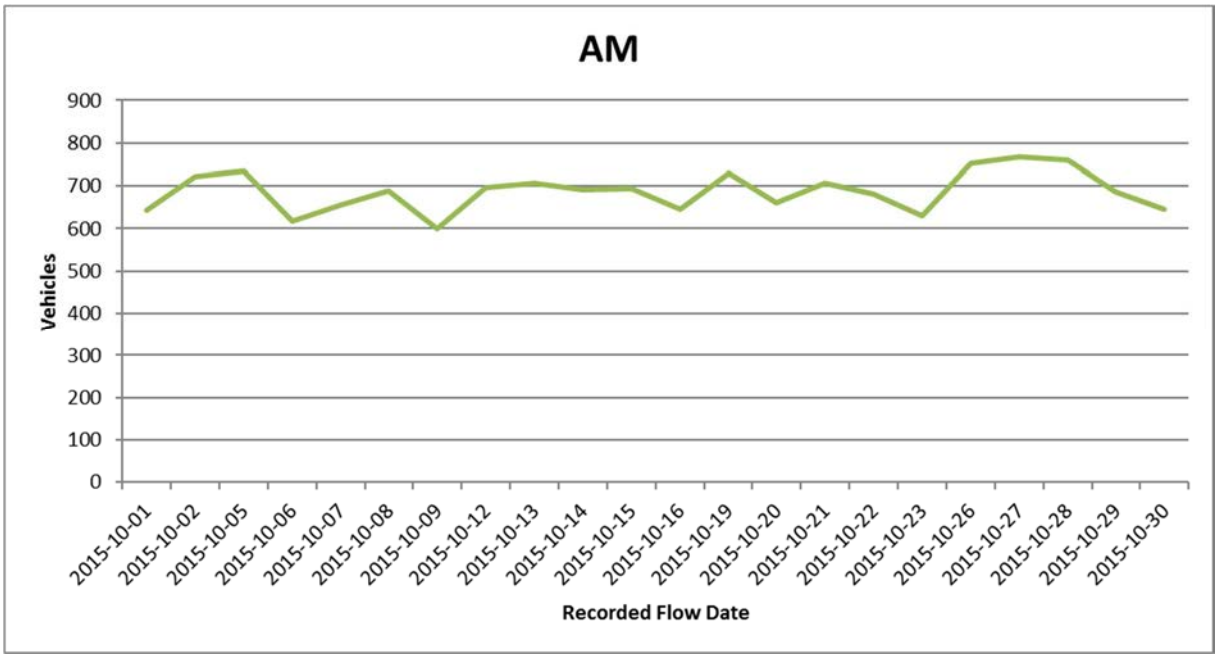


Figure 7-32: Oxford Road ATC Westbound – AM Peak

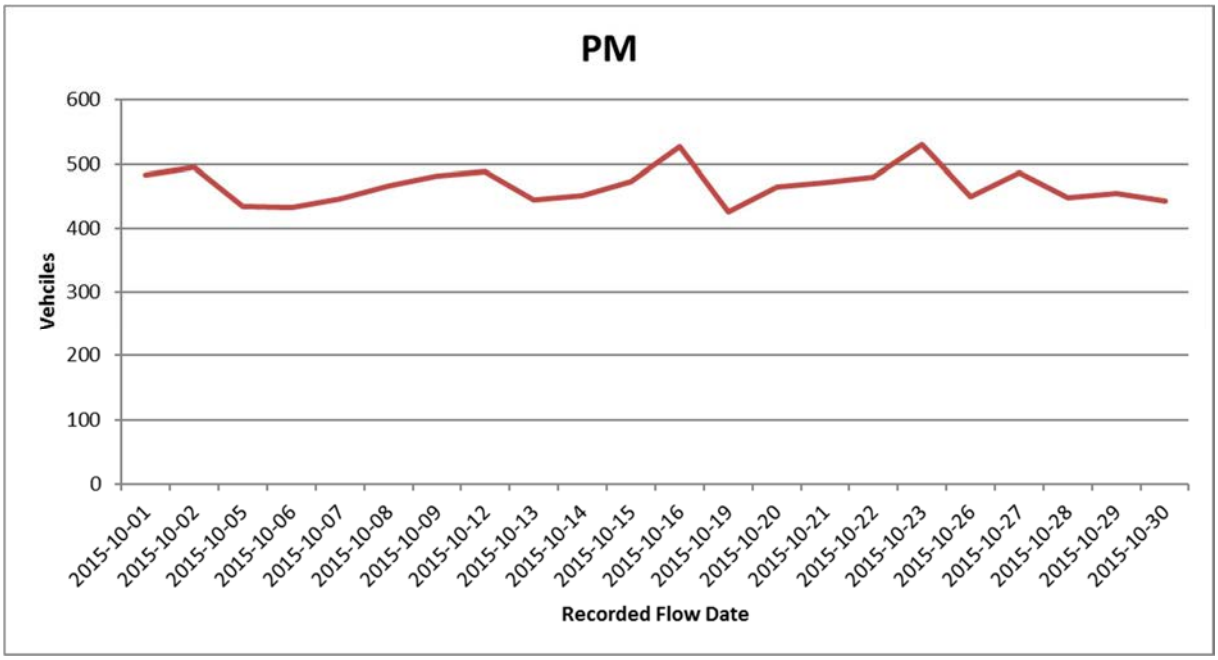


Figure 7-33: Oxford Road ATC Westbound – PM Peak

7.8 Summary

7.8.1 This chapter has presented and discussed the flow validation and Journey time validation of the RTM model. It has also presented convergence statistics achieved by the model. It has been concluded that the model achieves adequate validation to be considered a robust tool that can be relied upon for the purposes for which the model was commissioned such as informing business cases to support infrastructure schemes. Considerable effort has been made to improve validation on key links likely to be critical to assessing schemes and development in the vicinity of these links.

8 Summary

8.1 Overview

8.1.1 This report has summarised the methodology which has been adopted in order to build and validate a base year 2015 SATURN model of Reading.

8.1.2 The purpose of this model is to assist in assessing the relative effects of different transport schemes to alleviate transport issues in and around Reading.

8.1.3 The aim of the project is to develop a traffic model with a base year of 2015 that will be used to test the effects of transport infrastructure schemes and development proposals within the Reading area. The immediate need for the RTM is to support a local growth fund bid to the TVB LEP for the East Reading Mass Rapid Transit scheme.

8.2 Conclusions

8.2.1 Whilst the model does not reach the required level of validation specified as a guide within WebTAG, given the congested nature of the network within Reading and the day to day variations that occur due to the congested network, it is considered that the model is adequately validated to inform the modelling of the known schemes.

8.2.2 As with any modelling tool, the suitability of the tool for a specified purpose should be reviewed and local changes may be necessary in some cases.

Appendix A Mobile Network Data Validation

1 Introduction

1.1 Project Scope

The purpose of this project was to provide WSP with a zonal breakdown of Origins and Destination movements around Wokingham, using cellular mobile data from the Vodafone network. This included generating travel demand matrices at a zoning system provided by WSP as aggregations of Lower Super Output Areas (LSOA) and to segment trips by day of the week, time of the day, mode purpose and direction in order to allow the development of travel demand matrices for the study area in both Origin Destination (OD) and Production Attraction (PA) form. As part of the development of these matrices Citi Logik has undertaken a number of checks and verifications, these are detailed in TN02.

1.2 Study Area

The Wokingham study area is shown in Figure 1. As part of the study, all trips starting, finishing or travelling through the study area had to be included in the database.

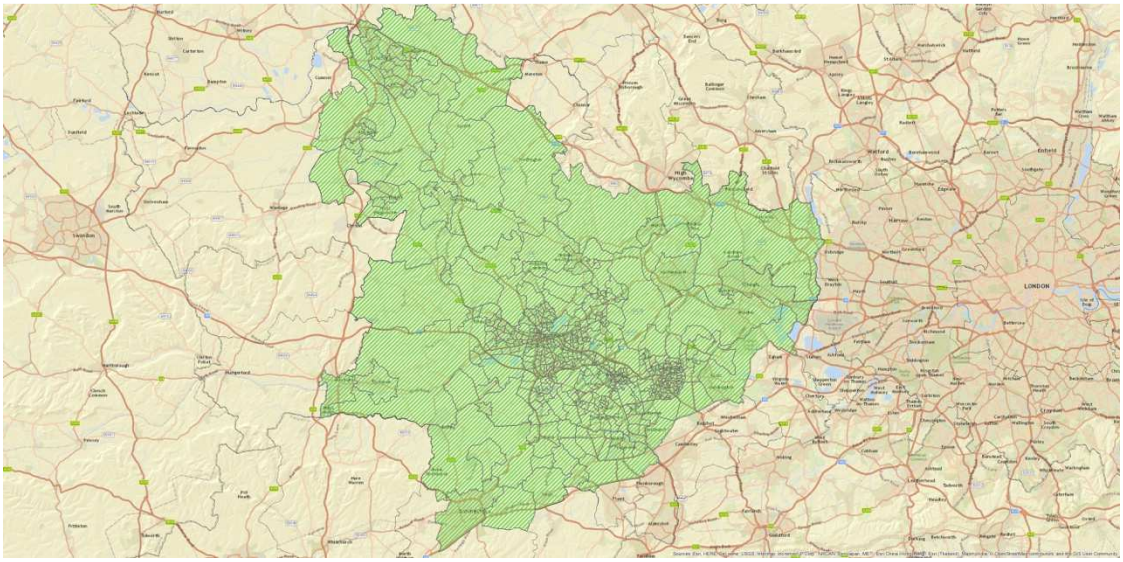


Figure 1: Wokingham Study Area

1.3 Contents

This Technical Note presents a high-level methodology for deriving Origin Destination matrices from mobile phone data, and details the format of the outputs.

2 High Level Methodology

The methodology can be separated into distinct tasks, some being generic and some including specific parameters in order to derive the information required for Wokingham.

The data collection is same for all processing purposes and an initial generic data processing methodology has been used to generate a database of defined trips and routing for the whole survey period, covering Tuesday 10th November to Sunday 22nd November 2015. Once this has been completed, a series of processes and queries specific to Wokingham have been built.

Each of these are discussed in turn in the next sections.

2.1 Data Collection

The first step included data collection of any data event taking place on the Vodafone network within the study area, this included all Vodafone customers but excluded any international roaming on the Vodafone network. An event can be summarised as any communication made between a unique device (mobile phone) and a cell (Vodafone radio cell area) within the study area over the course of the survey period. The study area, including the Vodafone cells locations is shown in Figure 2. This includes about 12.500 cells within an area covering the whole of the study area and a buffer around it.

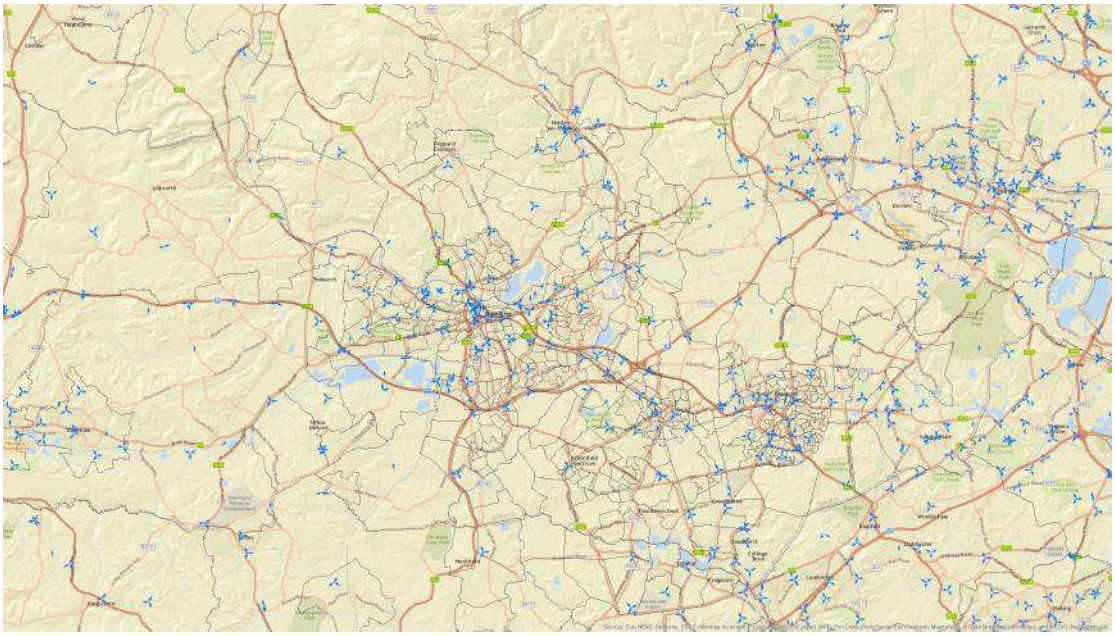


Figure 2: Study Area, Including the Vodafone Cells Locations

The first action taking place, and undertaken by Vodafone, has been to anonymise the data. This means replacing the device identification (ID) by a randomly generated key allocated to this device for the duration of the study. This is to ensure that no privacy regulations are breached. Once completed, Citi Logik have used the raw anonymised data with the Citi Logik algorithms to build its base journey database. From this core database Citi Logik have been able to start undertaking the analysis. As part of this study, 2G, 3G and 4G mobile phone cells have been used.

Citi Logik have received from Vodafone several billion events within the study area, covering the whole of the study area and buffer. Each of these events contained a mobile phone device ID, cell ID and day/time stamp. Vodafone have also provided Citi Logik with inferred nighttime (Home) and daytime (Work) mobile device locations based on long-term trend analysis if these could be identified[1] and for all white listed devices[2].

[1] For some mobile devices, behaviour does not allow identification of a nighttime or daytime location, this might be mobiles seen to move all the time or mobiles switched off at night.

[2] Black listed devices included devices owned by under aged population, security cleared devices and tablet mounted devices.

Citi Logik first pre-processed and cleaned the data and kept 600 million events[3] for further analysis. Review of the data received highlighted an issue with data for the 18th of November with a cell power outage having resulted in loss of data for that day. To avoid confusion, data for that entire day was excluded from all further processing.

2.2 Initial Processing

2.2.1 Cell to Location Analysis

Whilst the data is anonymised by Vodafone, Citi Logik, through detailed analysis of the Vodafone network and mobile phone cell locations, have derived the most logical positioning for each cell coverage, named virtual location hereafter. This differs from the physical location of the cell and it is optimized based on a number of complex parameters. It corresponds to the statistically most likely place for the mobile phone device to be, if connected to this mobile phone cell using parameters such as transport infrastructure.

Citi Logik have developed an approach by which the localisation of the device varies if the device is moving or static (called Snap to Road, Snap to Rail or Snap to Zone depending on the situation). This goes back to first radio frequency principles and uses the cell characteristics to generate some most statistically likely position of the device. Through this approach, Citi Logik have achieved, with the right cell configuration, a significantly better accuracy than the MSOA typically used. Where cell density is good and coverage including 4G is in place, localisation down to LSOA level can be achieved.

In a number of instances, it was however found through our checking processes that the proposed zoning level could not be achieved. Checks have carried out using the

[3] Only pertinent events are kept for analysis. When on call, mobile devices can communicate with cell towers every second, but this does not bring additional value to the dataset for transport planning purposes, hence only one event per minute is kept in the database reducing its size significantly.

Vodafone devices population (based on inferred nighttime location) plotted against UK adult population (as provided by WSP). This process has helped checking:

- The cell to zone mapping; and
- The expansion factors.

This has highlighted that the automatic snap to zone process required some adjustment. Figure 3 showing expansion factors per zone (red small expansion / blue large expansion) and the masts/cells locations shown arrows demonstrates that the cell to zone allocation needed to be adjusted to correct imbalance between contiguous zones with too high and too low expansion factors. Cell boundaries are not precise hence making it difficult to automate cell to zone allocation.

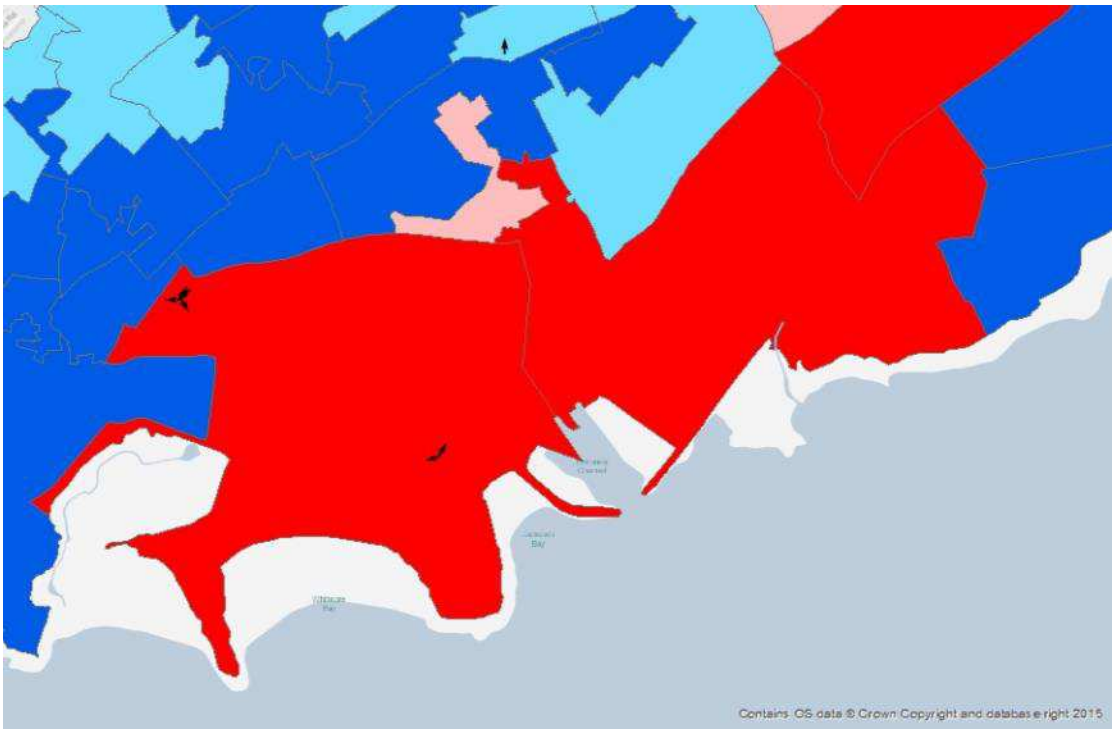


Figure 3: Expansion Factors per Zone (red small expansion / blue large expansion)

In these instances, first the cell to zone allocation was adjusted. However where this was not sufficient, zones were aggregated to sectors. By grouping zones with high and low factors it was possible to correct expansion factors for them to fall within expected range of 2-5.

This led to:

- More logical expansion factors; and
- Trips for the aggregated zones being aggregated and split back based on population.

A conversion table of zones has been created and provided as part of the outputs of the study.

2.2.2 Data processing and Cleaning

Citi Logik have cleaned, removed duplicates, processed and optimized this database to retain only pertinent information for derivation of trip information. This has resulted in about 2.2 million mobile devices being tracked over the 10/11/15-22/11/15 excluding 18/11 survey period, resulting in 600 millions events being used for trip analysis (on average about 50 events being recorded per device per day).

2.2.3 Trip Identification

All available events recorded have been aggregated by unique mobile user. The random key generated by Vodafone as part of the anonymising process has been used to undertake this task.

This stage was a pre-requisite to identifying the chain of events completed by each unique mobile user to define trips made by the mobile device user. The chain of events contains a location and time stamp every time an event has been captured for a mobile device.

The chain of events made throughout the day by a unique mobile user has been analysed. Trip origins and destinations were allocated based on either:

- Unique mobile user appearing (mobile being switched on), or
- No events or events located in the same cell for more than 30 minutes[4].

[4] 30 minutes has been defined as the minimum duration for a mobile device not to move from location it is at to be considered as the end of a trip. This was calibrated as part of previous studies undertaken by Citi Logik.

At that stage a start and end location and start and end time is allocated to that journey for that unique mobile user.

However, this has then been further refined during the checking processes on purpose breakdown and symmetry which highlighted that the trip database contained not enough Home Based trips. Because mobile phone are only seen entering an area, when a device start to move it is perceived as starting a trip from the first cell it moves to, leading to many Home Trips starting from home being seen starting from the adjacent cell. This has been adjusted to bring back the start of the trip to the previous location where the device was known to be (with a number of thresholds on time and distance to avoid picking up mobile phone having been switched off).

A database containing all these trips (Origin cells – Destination cells, trip start and end dates and times) for the survey period has been generated. All visited cells as part of a trip have also been saved, and routing between these inferred using the Snap to Road outputs, allowing interrogation of the database for routing information and mode identification based on speed profiling.

The Journey database now included each trip details to aid with identifying the full chain of trips from the morning to the evening for each mobile phone device, as required to undertake the expansion. This also had benefits in identifying Home and Work locations, trip purposes and trip directionality (from/to Home).

2.2.4 Mode Identification

The first phase of the mode analysis has been completed, and trips have been split into three categories, namely static, slow and motorised based on speed distributions. Static trips can be seen as either a mobile device not moving for more than 30 minutes or moving within the coverage of a single cell[5]. Slow trips relate to pedestrians and cyclists. Motorised trips relate to trips made by car, LGV, HGV, bus, coach or rail.

[5] Note that static trips are different from intrazonal trips. An intrazonal trip classified as slow/motorised/rail implies movement between cells located within a same zone. On the contrary a static trip really means a mobile device not moving for more than 30 minutes or moving within the coverage of a single cell.

The motorised trips needed to be split between road related (car/LGV/HGV/bus) and rail related trips. The process has been based on routing analysis to separate rail corridors from road corridors and cluster analysis and travel time duration analysis.

Whilst it has not been possible to consider all rail routes, the key rail routes running through the study area have considered for extraction of rails trips. The full list of routes considered is given below and shown in Figure 4.

Table 1: Train Routes Considered as Part of the Wokingham Study

Route	Start Station	End Station
1	Pangbourne	Reading
2	Reading	Dummy Junction (rail fork at Cumberland Rd)
3	Dummy Junction (rail fork at Cumberland Rd)	Twyford
4	Dummy Junction (rail fork at Cumberland Rd)	Wokingham
5	Dummy Junction (rail fork at Winser Drive)	Reading
6	Mortimer	Dummy Junction (rail fork at Winser Drive)
7	Theale	Dummy Junction (rail fork at Winser Drive)
8	Grove Wick/Swindon	Didcot Parkway
9	Oxford	Didcot Parkway
10	Didcot Parkway	Pangbourne
11	Wokingham	Bracknell
12	Twyford	Maidenhead
13	Basingstoke	Mortimer

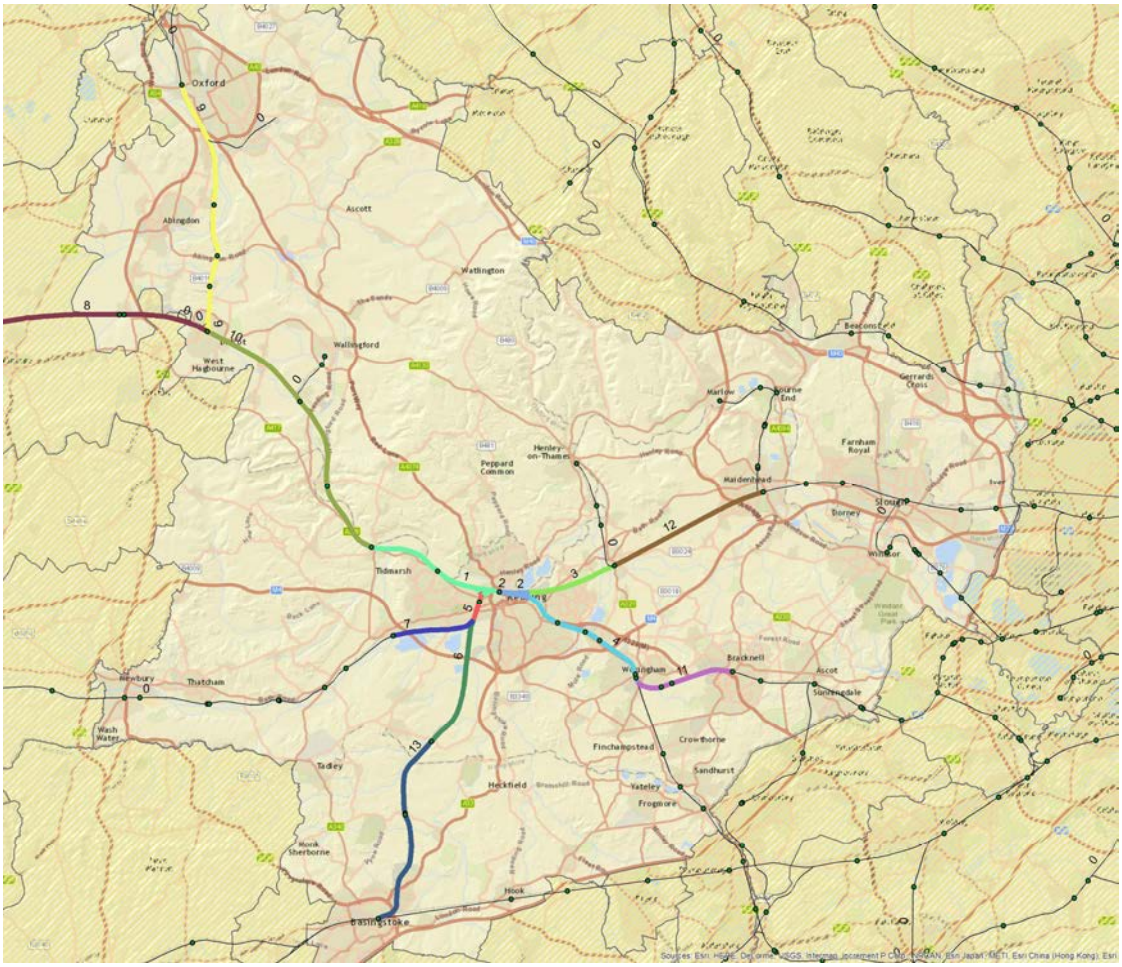


Figure 4: Train Routes Considered as Part of the Wokingham Study

Through the rail route definition presented above, all rail movements identifiable travelling between or to/from the main urban centres or even through the study area without stopping are picked up as part of the analysis.

When rail trips are identified, the whole trip, end to end is classified as rail, including the access and egress part of the trip.

Owing to the relatively small distances between stations within the study area (for Example Reading to Reading West), it is likely that not all rail trips have been picked up and that a number of these are still included in the motorised category.

2.2.5 Purpose Identification

Using the inferred day time and night information, and assuming the Home to be related to the night time location and the Work to be related to the daytime location, all trip origins and trip destinations have been allocated a purpose.

- 1 – Home Only
- 2 – Work Only
- 3 – Home/work
- 4 – Other (within the fully modelled area but not related to home or work)
- 5 – External

The Home/work category corresponds to a location that is both the night and daytime inferred location. This might be home workers, unemployed or retired mobile device owners. External refers to locations that are outside the study area.

By combining the origin and destination purposes, a trip purpose has been created through a series of 25 rules. It should however be noted that for some devices it has not been possible to derive inferred night and daytime locations. Trip purposes for trips made by these devices are classified as unknown.

During this process, the trip directionality has also been added for the home Based trips (from home/to home) allowing the development of PA matrices.

2.2.6 Expansion to Full Population

The data collected only covers the proportion of the population using Vodafone mobile devices (approximately 1/3rd of the population in the UK). Hence, it is important to expand this sample to the full UK population, this process is called expansion.

In principle, expansion factors are calculated by comparing the numbers of users identified to have a home location (based on number and duration of hours stayed in a place overnight) and the total UK population, in a given geographic area. The size of geographical areas used to estimate expansion factors has a significant effect on the outcome of expansion. The expansion factors should represent variation in

market share of the mobile data provider. It is therefore important to calculate and use expansion factors at a disaggregate spatial level to account for variation in market share.

As described previously, Citi Logik and Vodafone have generated an inferred nighttime and inferred daytime location for each device. Each device has been given an anonymous hashed key permitting us to follow a device over a long period of time (but cannot identify device owner). This has been undertaken for the entire pool of devices using the Vodafone network and not just over the specific survey period but longer (ensuring the results are statistically relevant). This allowed a count of devices to be identified for all cells overnight time and over daytime periods (called nighttime Vodafone population and daytime Vodafone population thereafter). Generally, it is assumed that the nighttime location corresponds to the home location, and the daytime location to the work location. These have then been converted to the WSP using the cell to zone conversion developed of the study.

After the cell to zone conversion has been undertaken, the Vodafone nighttime population has been compared to the UK adult population provided by WSP. This has been used to create an expansion factor for each zone (or sector if aggregation was required) and each device that “lives” within that zone or sector. This expansion factor has then been applied to the entire chain of trips (sometimes called tour, independent of the origins being in the home zone or no) made by devices recorded as being part of the Vodafone night time population for that zone, in a similar way to expansion factor being applied to trips recorded as part of household surveys.

For devices without an inferred nighttime location available, the expansion factor for the zone of origin of each trip made by that device has been used as a proxy factor.

2.2.7 Core Database

This last step resulted in the Core journey database being ready for interrogation. This in particular meant that trips relevant to the Wokingham area could be extracted and combined using the relevant time of the day and day of the week information.

2.3 Wokingham Specific Build

Whilst the database was produced for the entire survey period, WSP requirements were for trips covering Monday to Thursday only, and the database extraction has been done for these specific days only.

Because the core database includes all trips origins destinations but also the routing information between the trip ends, the time definition for trips could be provided in different ways. It could be the trip start or trip end time but also the time at which the trip enters the fully modelled area. This time was selected for trips starting outside the fully modelled area as the most appropriate considering the transport model requirements, whilst for trips starting within the fully modelled area the start time was used to aggregate trips by time period.

Trips were split into four time bands, considering key peak periods, these are:

- 0 AM 0700-1000
- 1 Inter Peak 1000-1600
- 2 PM 1600-1900
- 3 Off Peak Rest

This resulted in the production of a listing report containing person-trips based on the information above. These has been analysed by Citi Logik as is to undertake the verification tests, and also further processed with privacy rules applied prior to issue to WSP. The verification tests are described in TN02.

The database has been provided as a sum of person-trips over the survey period for all Monday to Thursday (six full days considered in total). The privacy rules include that all figures lower than 15 trips in the output reports are changed to 15, hence protecting the mobile users' privacy.

In addition, files containing trip end information only have also been generated, one for origins, and one for destinations. These can be used by WSP to derive correction factors for the privacy rules applied.

After discussions with WSP it was also agreed that matrices should also be provided at sector level, as described in section 2.2.1 for WSP to disaggregate to zones based on various data sources.

2.4 File Format

All data has been transferred to WSP via secured transfer including password-protected packages. The files have been provided as text comma separated files (.csv). The key for the reports is provided below:

```
Report Keys

Mode
0 = Rail
1 = Motorized
2 = Static
3 = Other/Slow

Period
0 = '07:00:00' to '09:59:59'
1 = '10:00:00' to '15:59:59'
2 = '16:00:00' to '19:00:00'
3 = '19:00:01' to '06:59:59'

DayClassification
1 = 'Weekend' Not requested by Client
2 = 'WeekDay' Monday to Thursday only

Purpose
1 = 'HBW'
2 = 'HBO'
3 = 'NHBW'
4 = 'NHBO'
5 = 'Unknown'

HomeDirection
1 = 'FromHome'
2 = 'ToHome'
3 = 'NonHomeBased'
```

2.5 File Names

The latest files delivered are based on version 10 of the matrix build:

- Wokingham_OD_client.csv – Full matrix;
- Wokingham_Origin_client.csv – origin trip ends;
- Wokingham_Destination_client.csv – destination trip ends;
- Wokingham_OD_sector_client – Full matrix at sector level;
- Wokingham_Origin_sector_client – origin trip ends at sector level;

- Wokingham_Destination_sector_client.csv – destination trip ends at sector level;
- Report keys.doc – Contains keys to understand above files.

2.6 Additional Analyses

To facilitate mobile phone data validation through its comparison to observed data WSP requested to trace trip movements passing through the following locations in Wokingham Borough shown in Figure 5:

- RSI 2 (A327 Shinfield Road)
- RSI 4 (A321 Finchamstead Road)
- RSI 8 (A329 Reading Road)

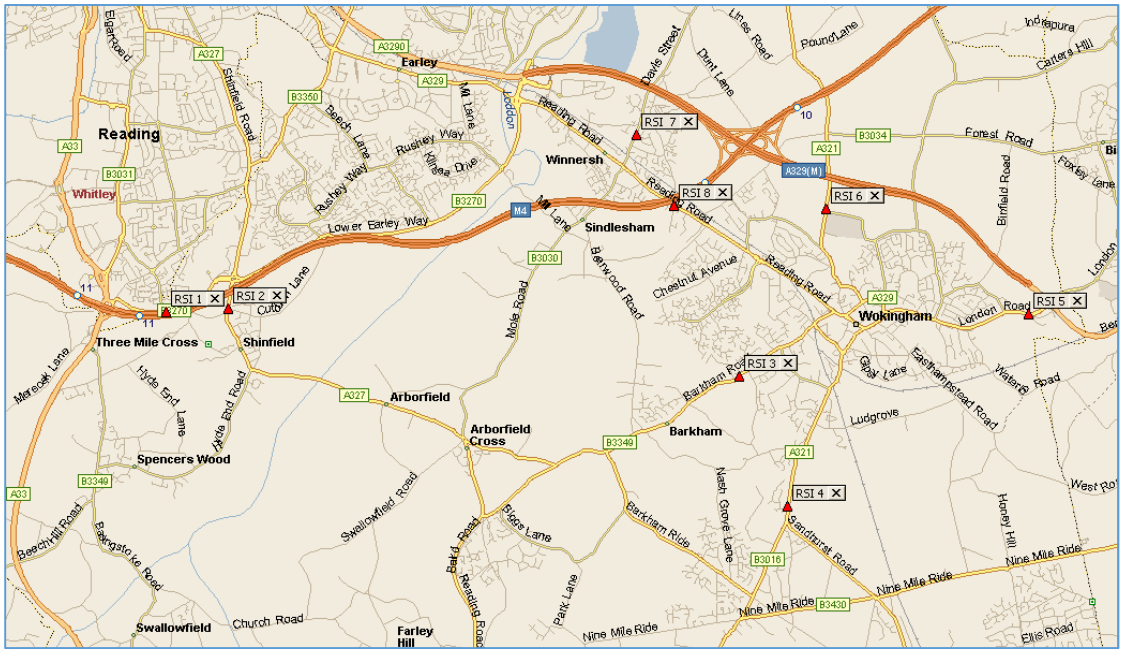


Figure 5: Movement Tracing Locations

In addition, to capture the up-to-date distribution of trips across the Thames in Reading area, WSP also requested to trace trip movements passing through each bridge in Reading (Caversham Bridge, Reading Bridge and Sonning Bridge) as well as the bridge in Henley-on-Thames. On review Citi Logik reported on movements for the bridge in Henley-on-Thames, Sonning Bridge as requested but on the Caversham and Reading Bridges combined as these two bridges are too close to be able to spear river crossing traffic using a specific bridge between these two.

There is also a perception that there is a significant proportion of travellers travelling between Oxfordshire and Reading via the A34 and the M4, which may choose to go through rural areas of South Oxfordshire to get to their destination in Reading if additional capacity by the new bridge is provided. To confirm existing movements, WSP requested to identify the distribution of the highway trips passing through the M4 between J12 and J11 and the A34 based on mobile phone records.

To undertake these analyses, Citi Logik selected cells groups covering these areas and queried the routing database containing all the cells visited for all the trips identified as part of this study and retained only those trips passing through these groups of cells. Because the results of these analyses are small subsets of the larger matrix files provided, the outputs were significantly affected by the privacy rules threshold to be applied to protect mobile device users. As a result, it was agreed that these files would be presented at the study zoning system but only by direction and time period, with the mode and purpose/trip directionality being ignored. The format used for these outputs is as presented in section 2.4

WSP also asked for the provision of the number of signals (possibly unique signals) recorded within each WSTM4 zone using 15-minute interval. Following discussions with WSP, a table providing the number of events per zone and hour of the day has been generated. In this table, Citi Logik have reported, for each zone and hour the number of devices passing through the area. To avoid biases each device is only counted once for each area and hour, and the numbers have been expanded to adult UK population.

Project	WOKINGHAM – Travel OD Matrices based on VF Mobile Phone Moves		Contract	
Original	**Prepared by**	**Reviewed by**	**Rev**	**Rev Date**
05/02/2016	D Golovenko	P Perret	3	29/02/2016

1 Introduction

A number of verifications have been undertaken on the expanded person trips derived from Vodafone mobile phone movements to confirm that the outputs of the Wokingham OD matrix given at zone level are suitable for transport modelling purposes. This note provides information on the results of the following verifications undertaken on the version 11 of the matrix build:

- Average 24hr Working Day Total Travel Flow;
- 'All Purpose' Symmetry;
- Symmetry Test for All Home Based 'from home' and 'to home' trips;
- Symmetry Test for Home-Base Work (HBW) Trips;
- Correlation between All-Purpose Trips and 16yr+ Population;
- Correlation between Home-Based Trips and 16yr+ Population;
- Symmetry Test for Non Home-Based Trips;
- HBW Outbound Versus Inbound by Time of Day; and
- All Purpose Trips by Time of Day.

Considering the matrix build configuration, verification tests have been performed for the internal zones of the Study Area only (Fully Modelled Area as defined by WSP). All external zones have been excluded (except where specifically mentioned) as only partial trips are included in the matrix build (only trips starting, finishing or passing through the internal area are included). In addition, static trips have been excluded from the analysis as these are deemed as not interacting with the transport network.

2 Results

Analyses of the traffic flows within the Study Area are summarised in the following tables, scatter plots and histograms. Data is generally presented for an average weekday (Monday to Thursday) which was generated by dividing all expanded counts by 6 (number of survey days). All tests have been undertaken on data prior to the privacy rules (15 threshold) being applied.

2.1 Average 24hr Working Day Total Travel Flow

It is estimated that the average daily traffic within the Study Area amounts to over 7.3m trips, as presented in Table 1. The majority of trips, by all modes of transport (excluding statics), for all purposes and across all hours of a typical working day, (c.47%) are generated and attracted by external zones through the Fully Modelled Area. Around 41% of the total traffic is done within the Fully Modelled Area. Movements from internal to external zones and back each take about 6% of the total traffic. That symmetry suggests that over the course of an average day, most outbound trips leaving external zones for internals return back to the same location.

The majority of trips (52%) are uninterrupted journeys starting and finishing in the same zones – denoted as "intra-zonal" flows in the table. These can be of two different natures:

- Either a trip observed from a mobile cell to another located in the same zone; or
- A round trip starting and finishing at the same location but having gone through a number of other zones (typical school run for example).

Some 48% of the traffic is generated by residents of the Study Area zones - denoted as "Home-Based" purposes (HBO and HBW) in Table 1.

Table 1: All Modes Weekday Matrix

DESTINATION/ Purpose ORIGIN Zones/ Trip Direction		INTERNAL Zones				EXTERNAL Zones				TOTAL
		HBO	HBW	NHB	UNWN	HBO	HBW	NHB	UNWN	
INTERNAL	Intra-zonal	553,163	30,366	602,999	1,362					**1,187,890**
INTERNAL	Inter-zonal	748,113	85,039	955,134	2,742	157,733	31,068	202,630	58,423	**2,240,882**
EXTERNAL	Intra-zonal					1,126,329	211,765	1,051,534	229,411	**2,619,038**
EXTERNAL	Inter-zonal	152,973	20,448	211,256	64,283	247,180	126,556	305,560	147,648	**1,275,905**
TOTAL		**1,454,249**	**135,852**	**1,769,389**	**68,388**	**1,531,242**	**369,389**	**1,559,724**	**435,482**	**7,323,714**

In terms of modal splits, as shown in Table 2, 68.1% of total movements are road based, 31.7% of journeys are done by foot or using other slow modes, and only 0.2% of travel is done by rail.

This table also highlights the purpose split achieved. “No purpose” was recorded for about 7% of the trips because there is no information on the inferred day and nighttime locations for devices involved in these trips.

Overall, about 45% of the trips (NHB) are not related to Home, whereas Home Based Work trips - for about 7% of the trips and are well balanced in terms of ‘From home/To home’ directions. Home Based Other (HBO) trips from a large proportion of trips, these show a significant imbalance towards ‘From home’ but this is due to round trips starting and finishing back at home without any observed trip (typical school run) being allocated a ‘from home’ direction, with no ‘to home’ trip to balance this1.

Table 2: All Modes Weekday Matrix

TRIP PURPOSE		HBO	HBW	NHB	UNWN	TOTAL
MODE	DIRECTION					
Road	FromHome	1,670,370	189,181			**1,859,551**
	NHB			2,320,234	396,062	**2,716,297**
	ToHome	227,168	186,821			**413,989**
Rail	FromHome	3,921	452			**4,373**
	NHB			6,100	1,004	**7,104**
	ToHome	552	433			**985**
Other	FromHome	996,796	65,005			**1,061,800**
	NHB			1,002,779	106,803	**1,109,583**
	ToHome	86,683	63,351			**150,034**
TOTAL		**2,985,490**	**505,241**	**3,329,113**	**503,870**	**7,323,714**

2.2 ‘All Purpose’ Symmetry

The scatter plot in Figure 1 shows correlations between ‘from zone’ and ‘to zone’ movements for the Fully Modelled Area zones. It suggests a well-balanced travel generation and attraction behaviour for all zones, with a slope close to 1, intercept close to 0 and R^2 close to 1.

[1] Citi Logik recognises this as a current shortcoming in the dataset. Research is taking place in this area to improve data in this area but this is unlikely to be available to customers within the coming month.

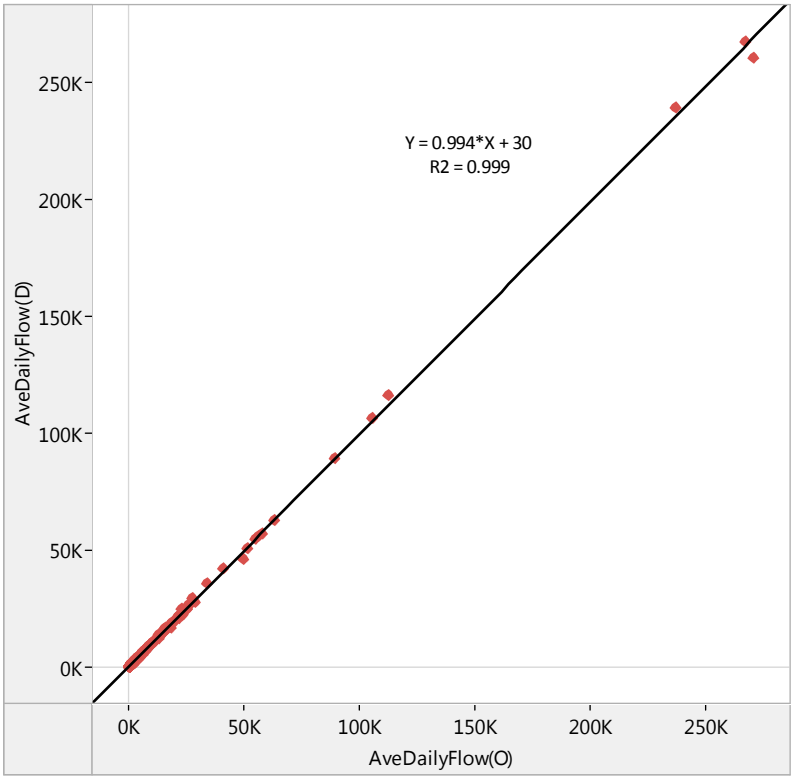


Figure 1: All originated trips (X) vs All attracted trips (Y), Fully Modelled Area

2.3 Symmetry Test for All Home Based 'from home' and 'to home' trips

Figure 2 shows correlation between all daily average Home Based 'from home' and 'to home' trips (containing HBW and HBO trips) for the internal area zones. The tight clustering of points around the trend lines, high R^2 (over 0.9) and consistently low levels of interception suggest a good match between all Home Based 'from home' and 'to home' trips.

However, the slope is lower than 1, suggesting a deficiency in the returning 'to home' trips. Further analysis confirmed that this deficiency is caused by non-work related home-based movements. This can be explained by non-interrupted nature of such travel, whereby trips originate from and return to home without stops, without changing the "from home" status, as previously detailed.

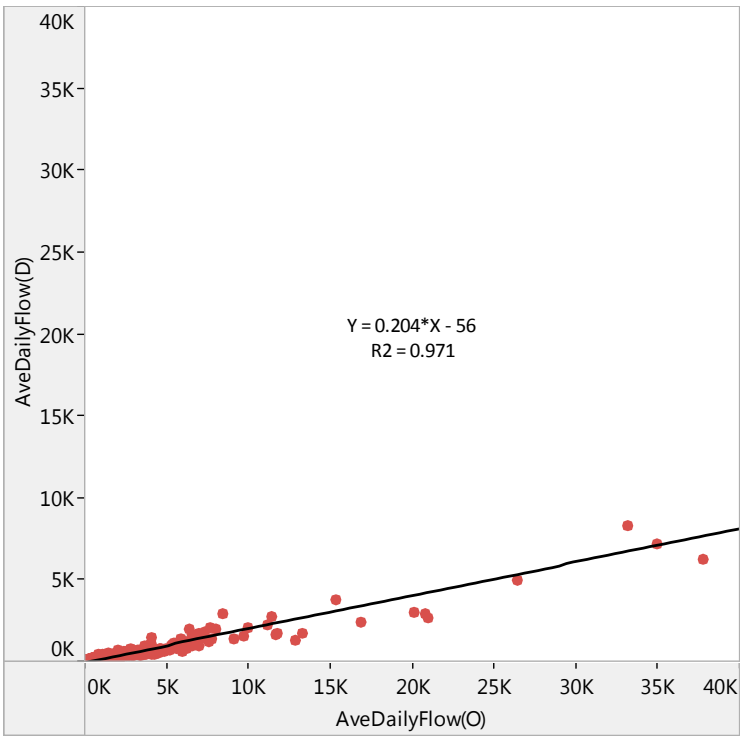


Figure 2: Home-based 'from home' (X) vs. 'to home' trips (Y), Fully Modelled Area

2.4 Symmetry Test for Home-Based Work Trips

It can be observed from the scatter plot in Figure 3 that home-based work (HBW) trips to and from home are strongly correlated for the Fully Modelled Area. On average, most work-bound home-based trips return home over the course of an average weekday.

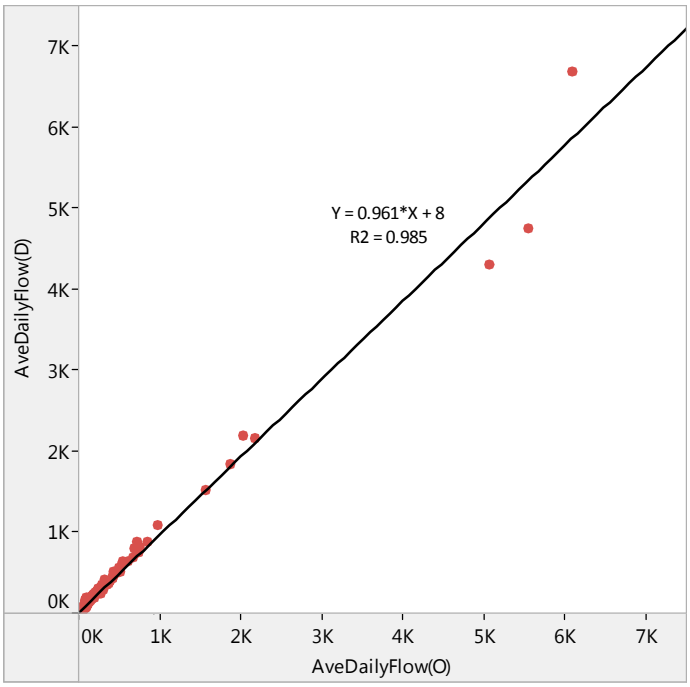


Figure 3: Home-based work 'from home' (X) vs. 'to home' trips (Y), Fully Modelled Area

2.5 Correlation between All-Purpose Trips and 16yr+ Population

Figure 4 shows correlation between 16yr+ population and all-purpose travel for the corresponding Fully Modelled Area zones. This was derived by summing all trips starting or finishing in a zone (all modes) and plotting these against its population.

The tight clustering of points around the trend line, the R^2 of 0.95 and relatively low levels of interception suggest a reasonably good match between population and trip making.

It can be observed that on average each adult residing in an internal zone of the Fully Modelled Area is responsible for generating and attracting over 5 trips of all purposes by all modes of transport in any direction.

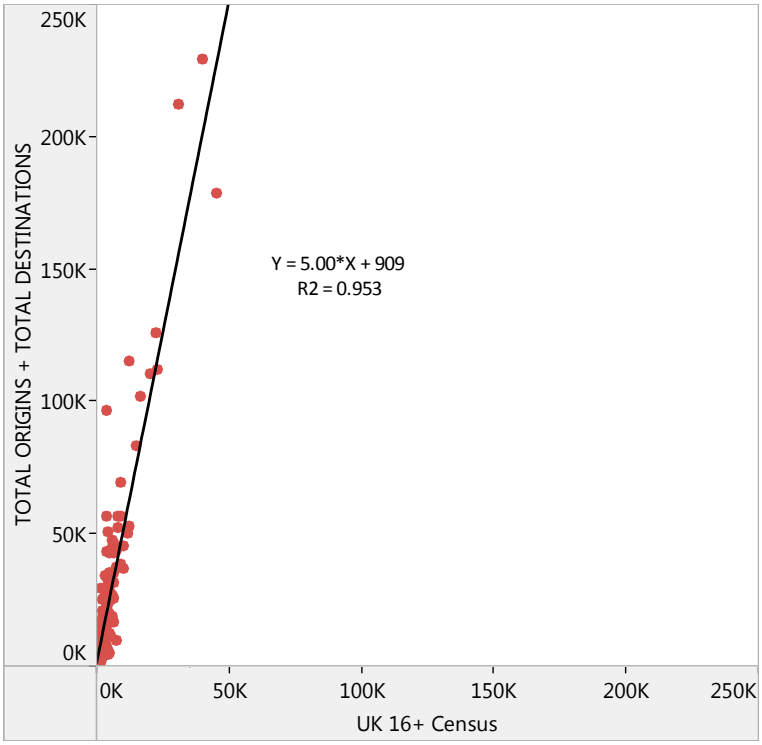


Figure 4: UK 16yr+ Population (X) vs. All Trips (Y), Fully Modelled Area

2.6 Correlation between Home-Based Trips and 16yr+ Population

Figure 5 shows a similar to Figure 4 correlation, but for Home-Based purposes only. On average more than 2.3 home-based trips are attributed to an adult resident from the Fully Modelled Area.

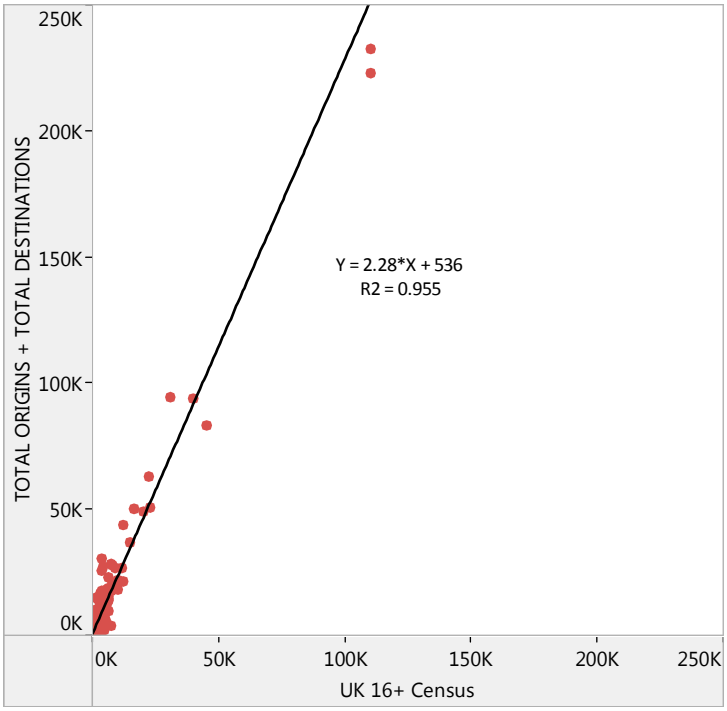


Figure 5: UK 16yr+ Population (X) vs. Home-Based Trips (Y), Fully Modelled Area

2.7 Symmetry Test for Non Home-Based Trips

As observed from the scatter plot in Figure 6, correlation between originating and ending non-home-based movements are much stronger that at the all home-based trips level. On average, each zone's originating NHB trip is matched with a finishing NHB trip in the same zone.

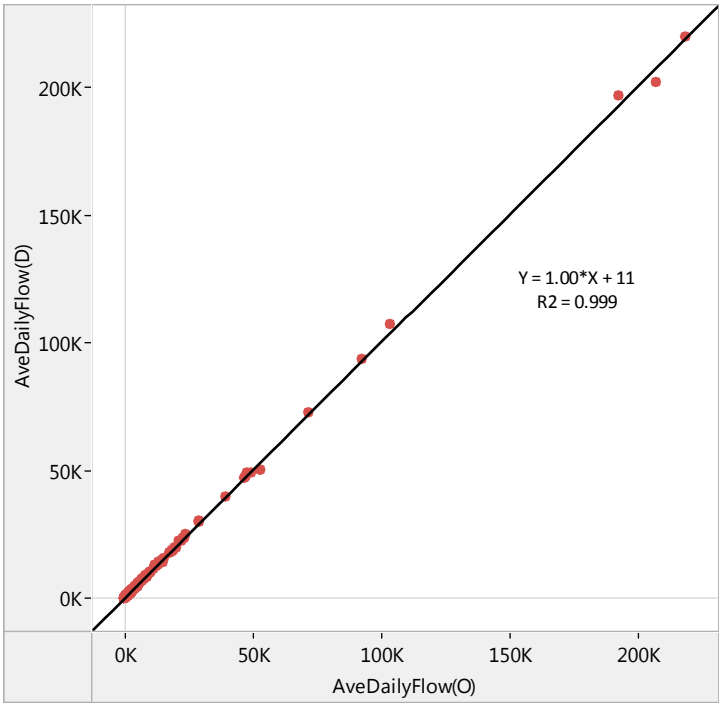


Figure 6: Non-Home-based Origination (X) vs Destination (Y) trips, Fully Modelled Area

2.8 HBW Outbound Versus Inbound by Time of Day

Figures 7 and 8 display differences between home-based work-related flows in opposing directions by periods of day, for All Zones of the Study and the Fully Modelled Area only respectively.

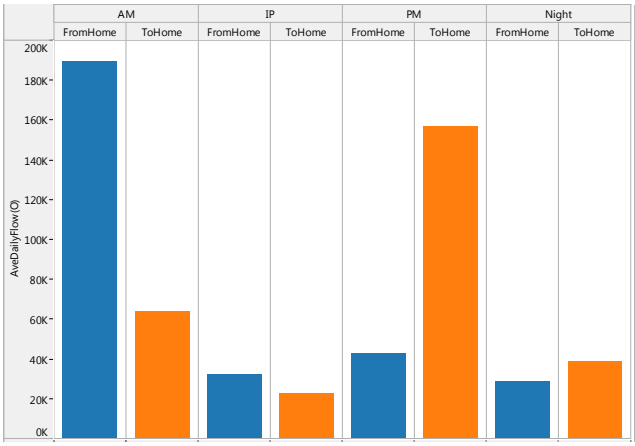


Figure 7: HBW Outbound vs Inbound Flows by Period of Day, All trips (int. and ext.)

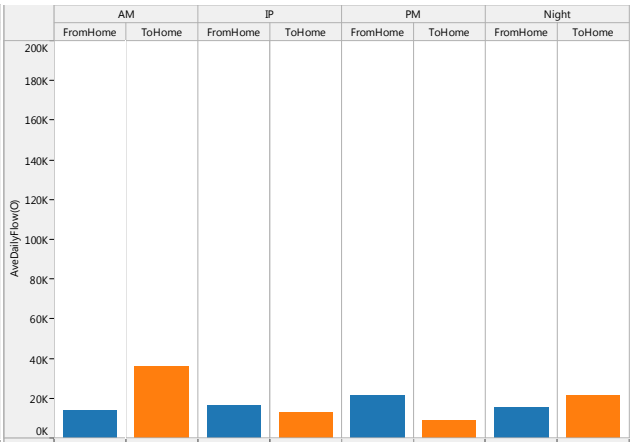


Figure 8: HBW Outbound vs Inbound Flows by Period of Day, Fully Modelled Area only

Patterns for the entire study area are as expected with trips 'from home' being dominant in the morning peak period and 'to home' being mostly seen in the PM peak period. This is not what is observed for the Fully Modelled area and this is currently being investigated.

2.9 All Purpose Trips by Time of Day

Figures 9 and 10 show percentages of 'All Purposes' trips by time periods of working day for 'All Modes' and Road-based travel only respectively for all trips starting in or entering the fully Modelled Area. The peaks may be considered a bit low, but these figures relate to trips and not vehicle-km hence results are not directly comparable to traffic counts collected in the area. In addition, these figures use the trip start time to aggregate trips, but trips can overlap over periods. For example, a trip starting at 6.50 in the morning is classified as a Night trip but may be actually undertaking most of its travel over the AM peak.

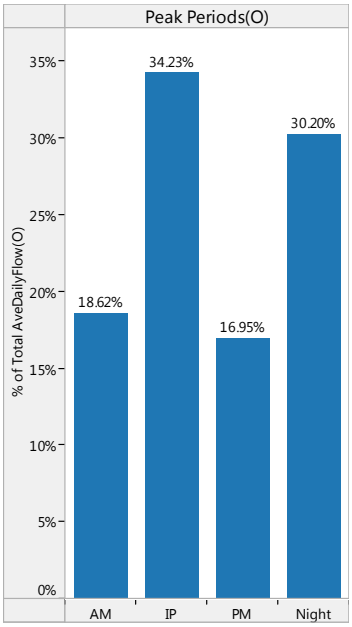


Figure 9: All Purposes/All Modes Trip Proportions by Time of Day (Fully Modelled Area)

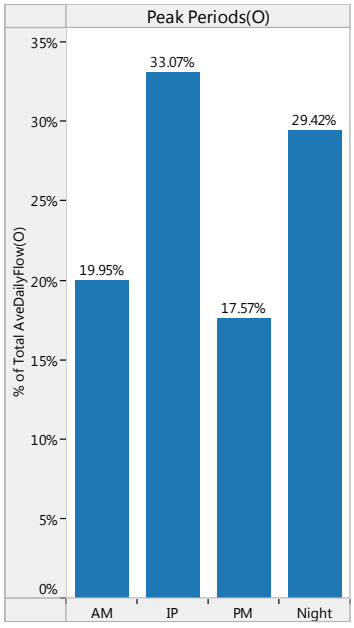


Figure 10: All Purposes Road-Based Trip Proportions by Time of Day (Fully Modelled Area)

3 Conclusions

Various tests have been undertaken to validate trip matrices developed on the basis of Vodafone customers' movements for the Wokingham Study Area. The results confirm that overall the level of trips identified, distribution are in line with expectations.

A good symmetry is observed for HBW and all trips, but this is skewed towards from home for the HBO trips, but this is due to round trips starting and finishing back at home without any observed trip (typical school run) being allocated a From home direction, with no to home trip to balance this.

The distribution of home based trip directionality by time of the day is in line with expectations. However, these results are counter intuitive for the Fully Modelled Area, which is currently being investigated.

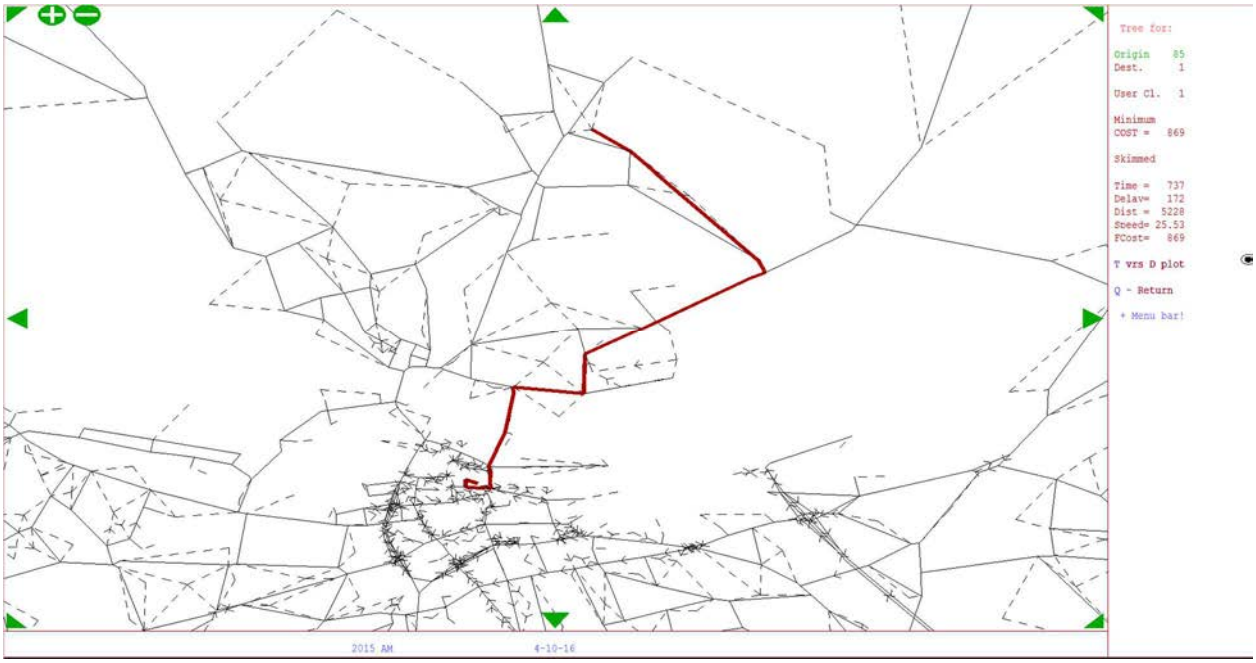
Overall, the trip distribution and mode allocation appears reasonable. Purpose allocation including trip directionality for home based trips is currently being reviewed to assess if possible improvements are feasible.

Appendix B Model Routing Checks

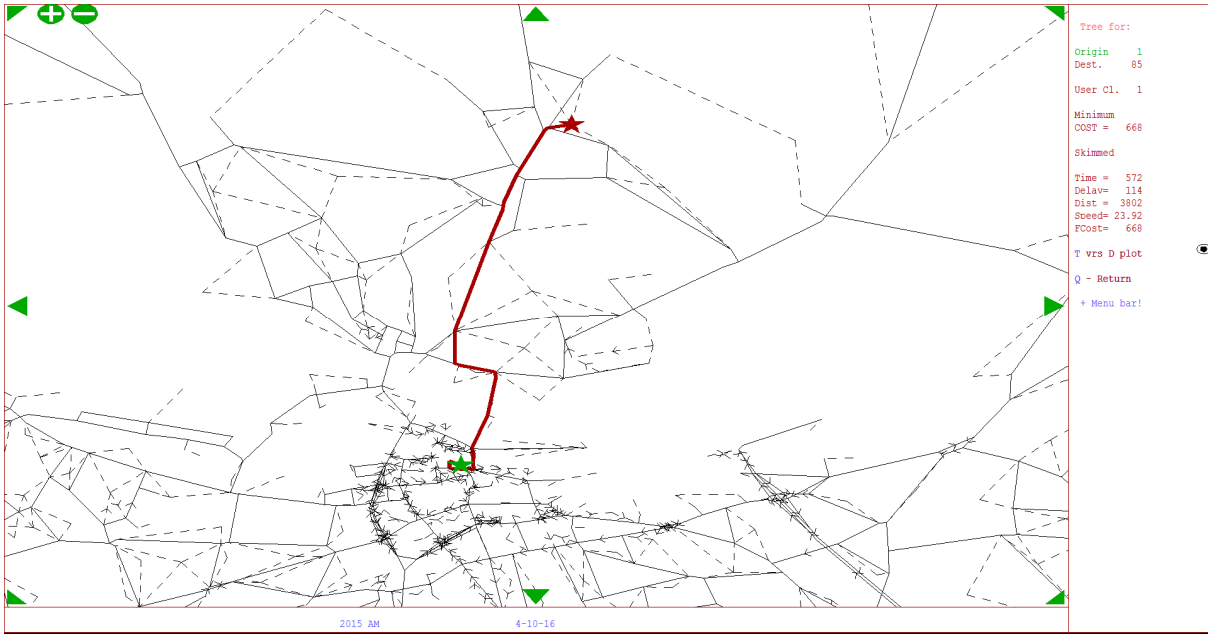
AM Peak

From North

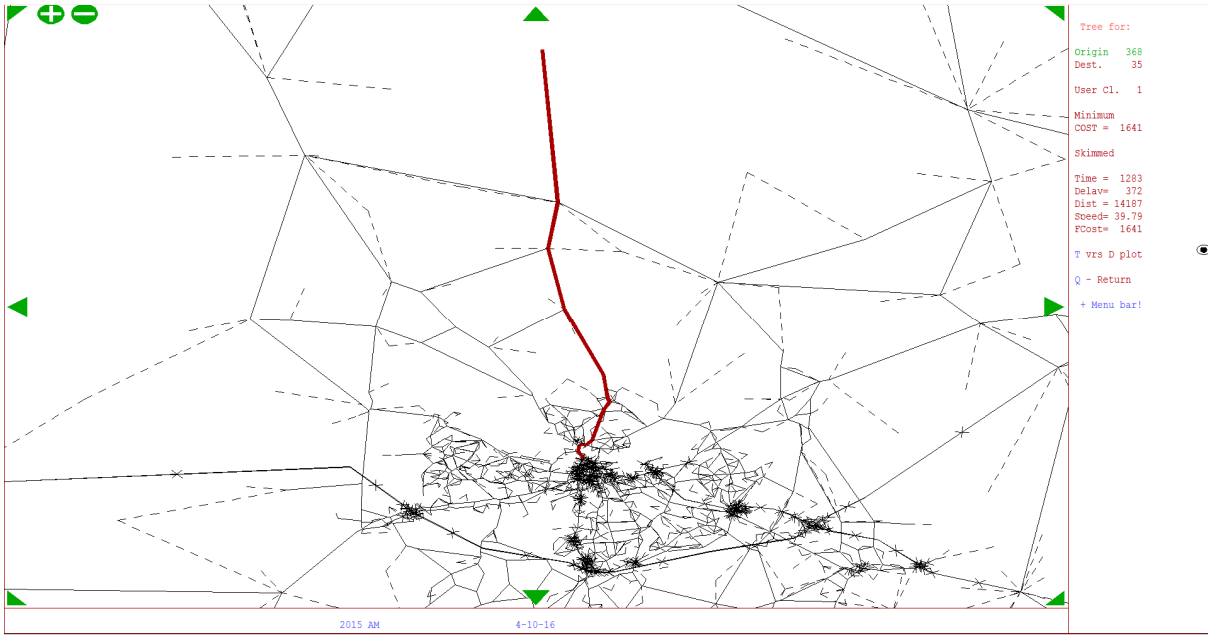
Zone 85 - Zone 1



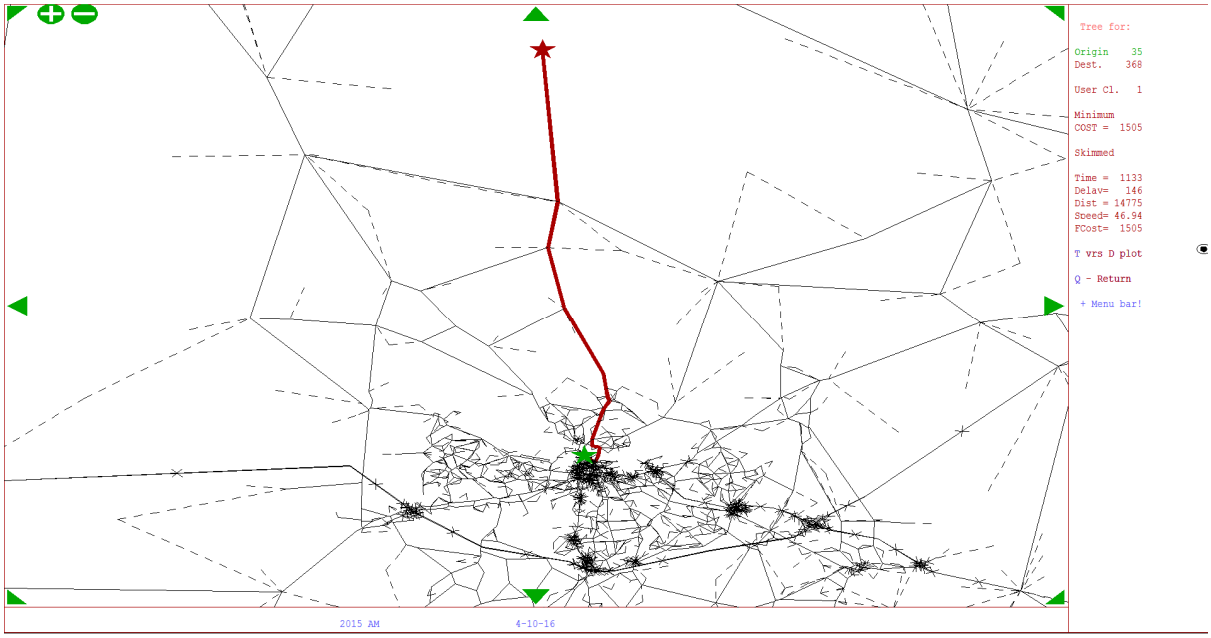
Zone 1 - Zone 85



Zone 368 - Zone 35

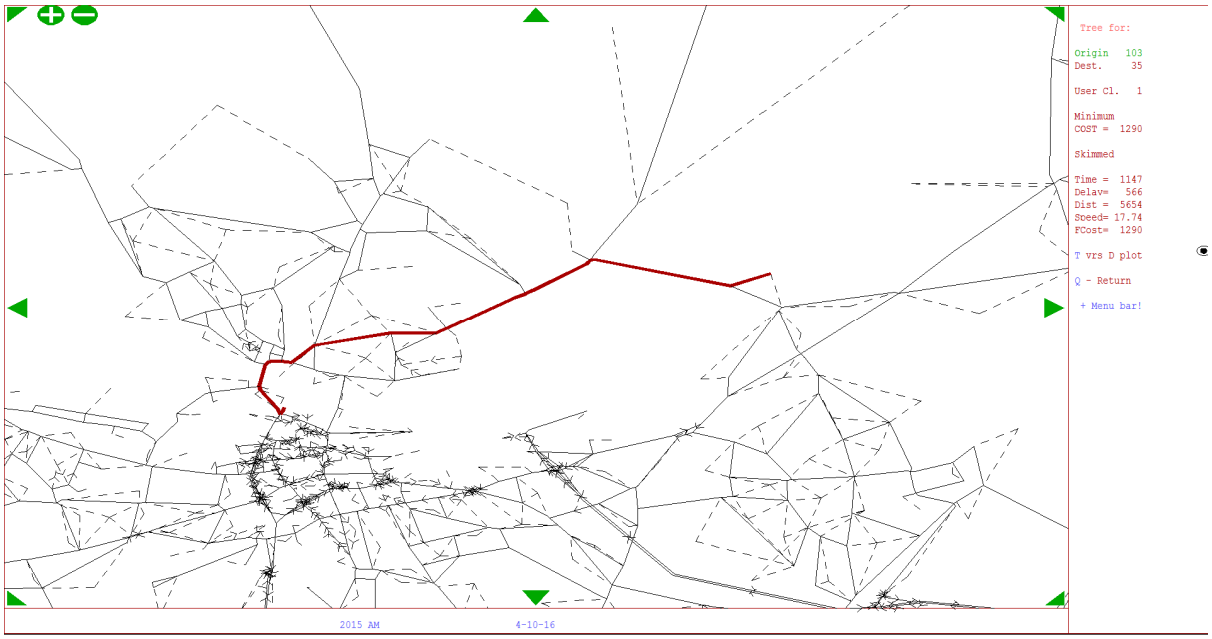


Zone 35 - Zone 368

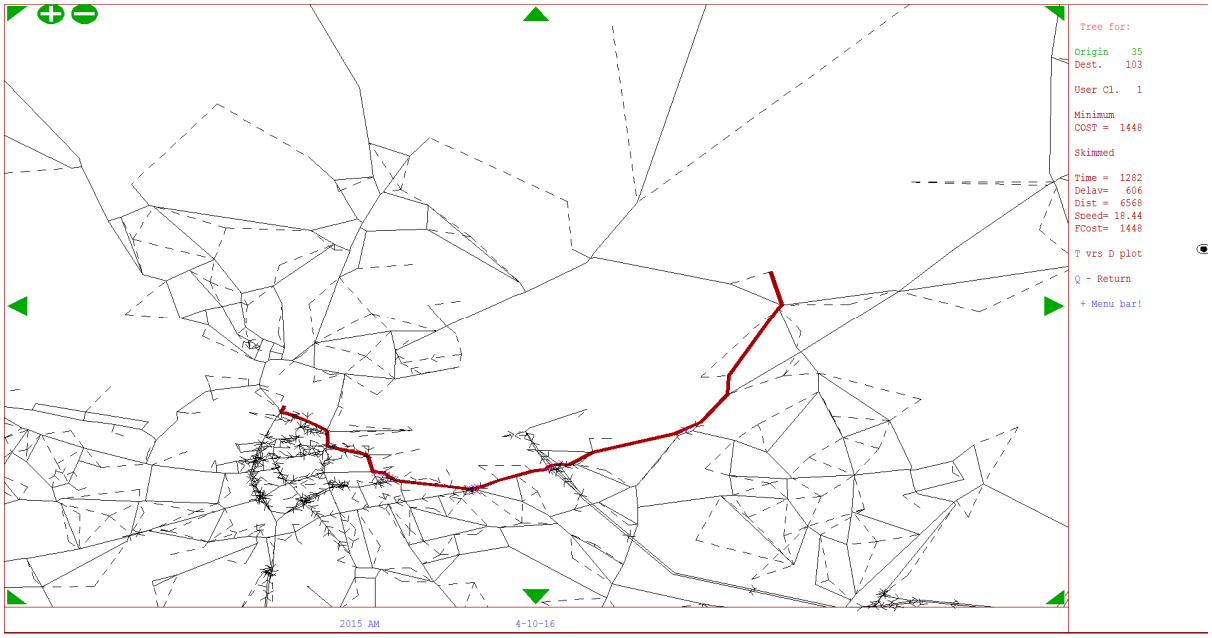


From East

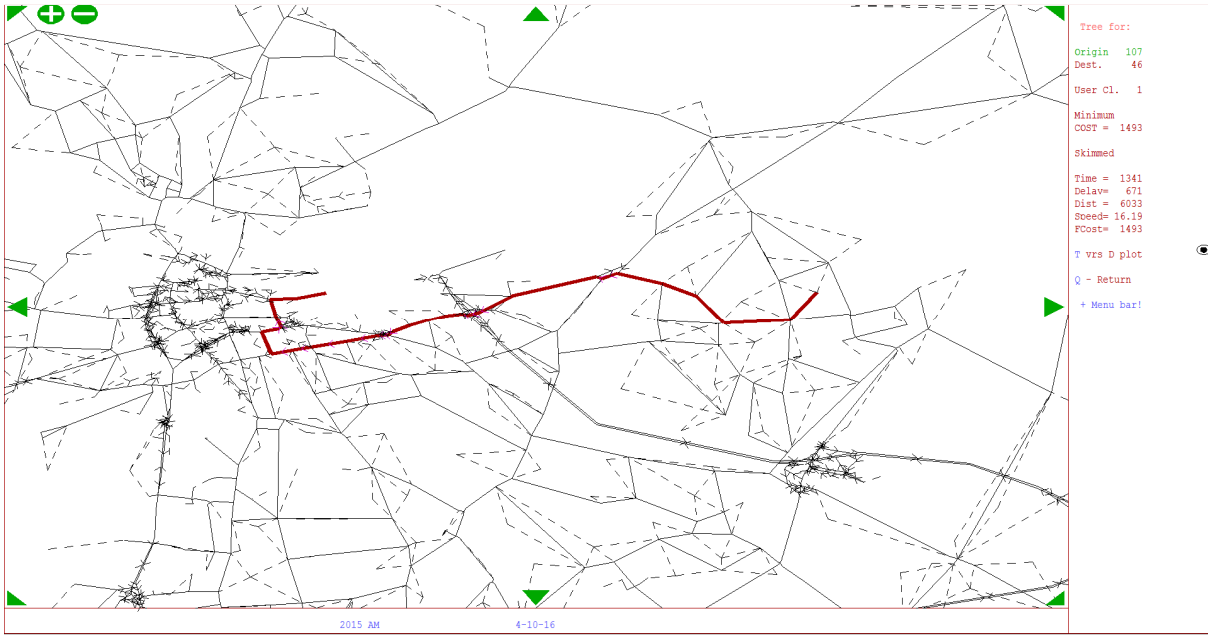
Zone 103 - Zone 35



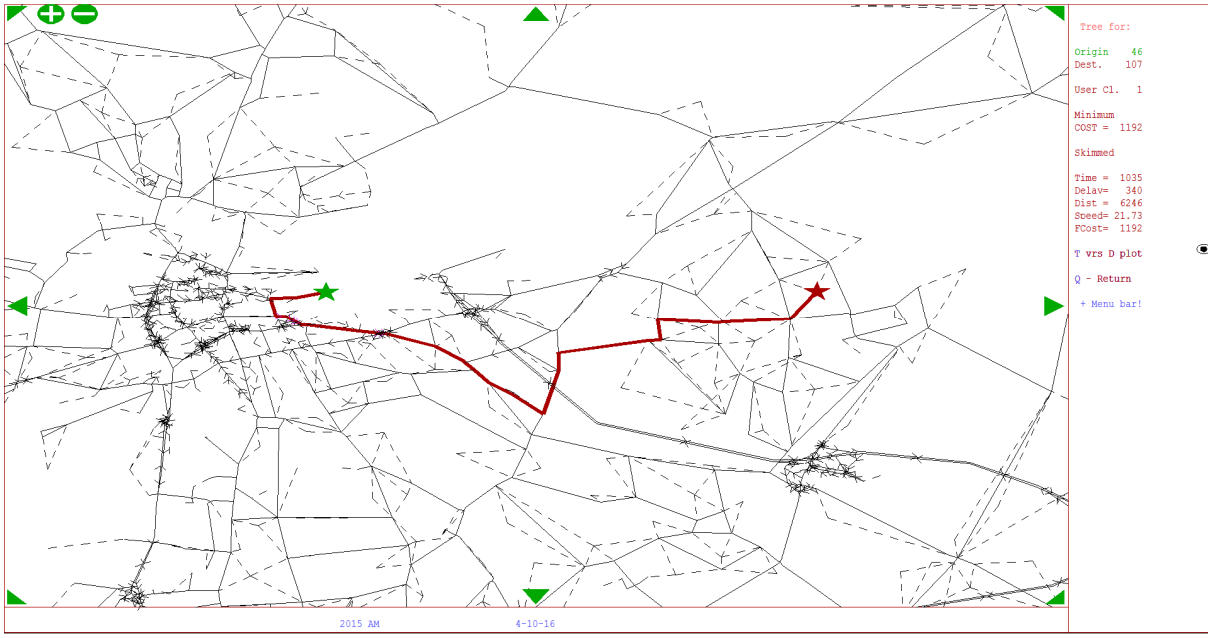
Zone 35 – Zone 103



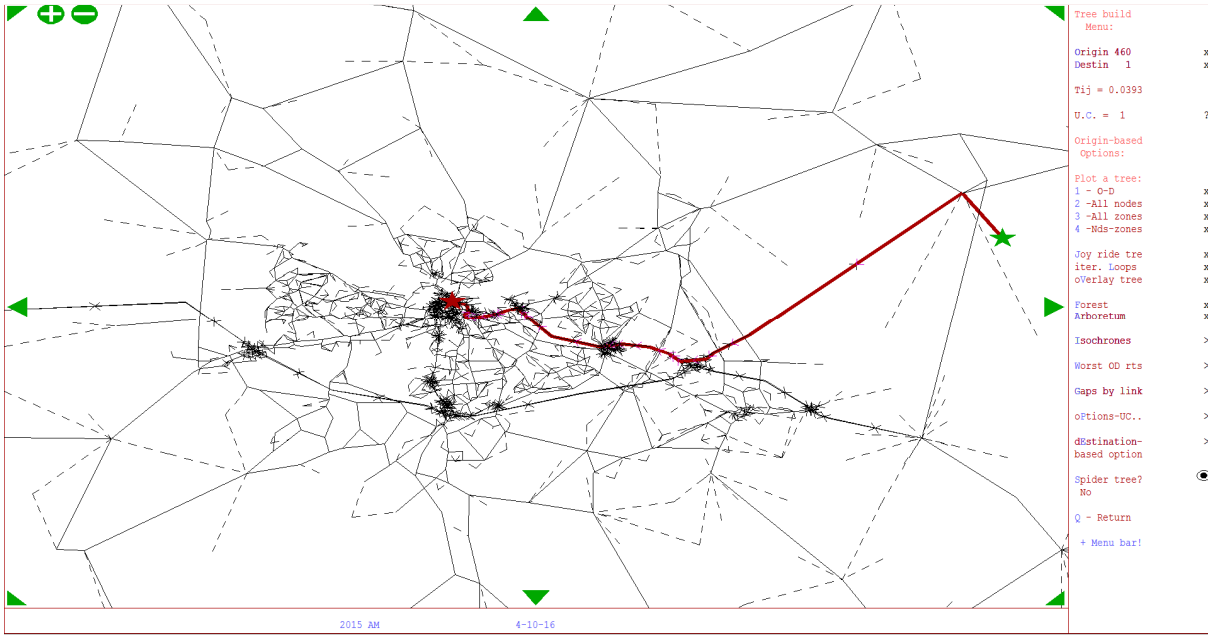
Zone 107 – Zone 46



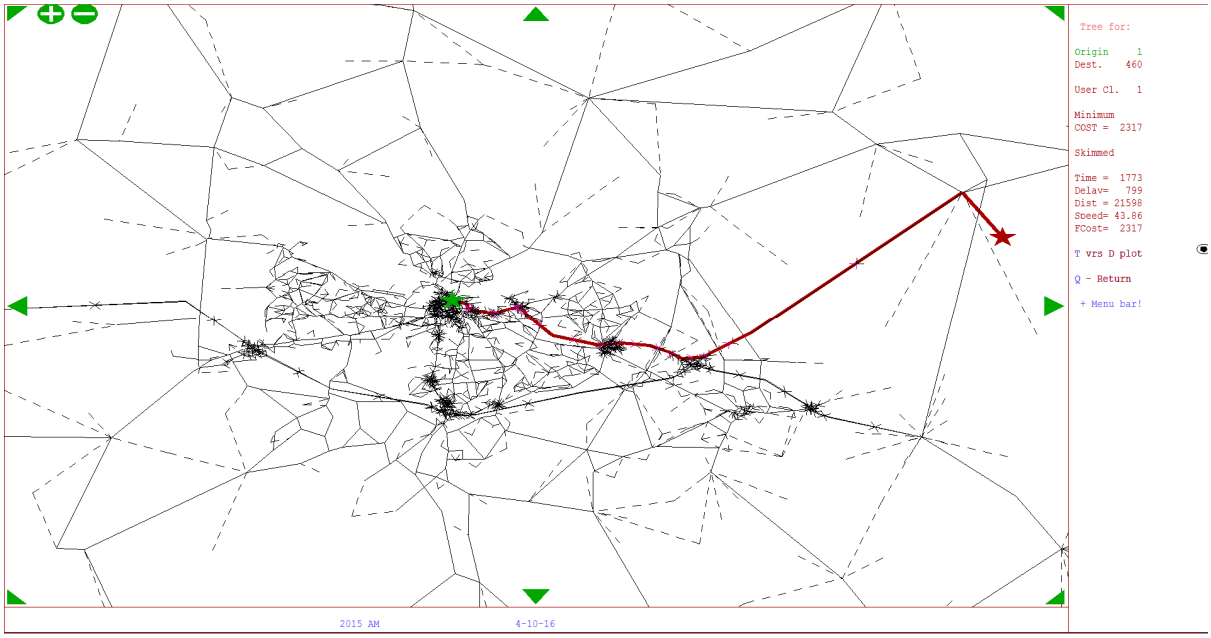
Zone 46 – Zone 107



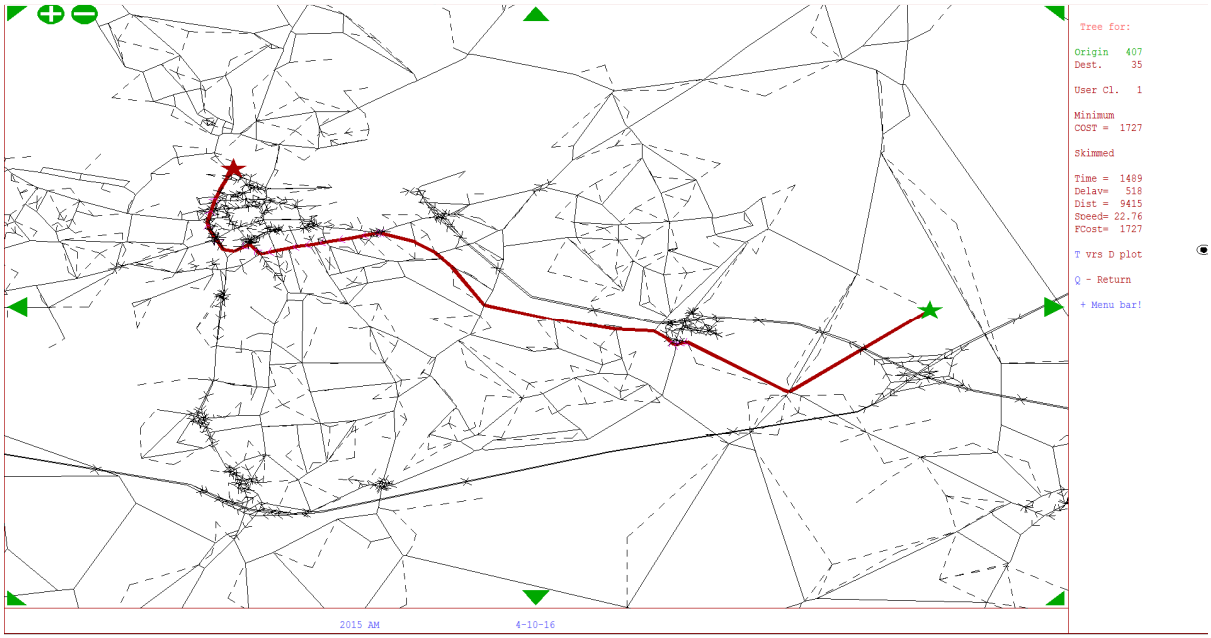
Zone 460 – Zone 1



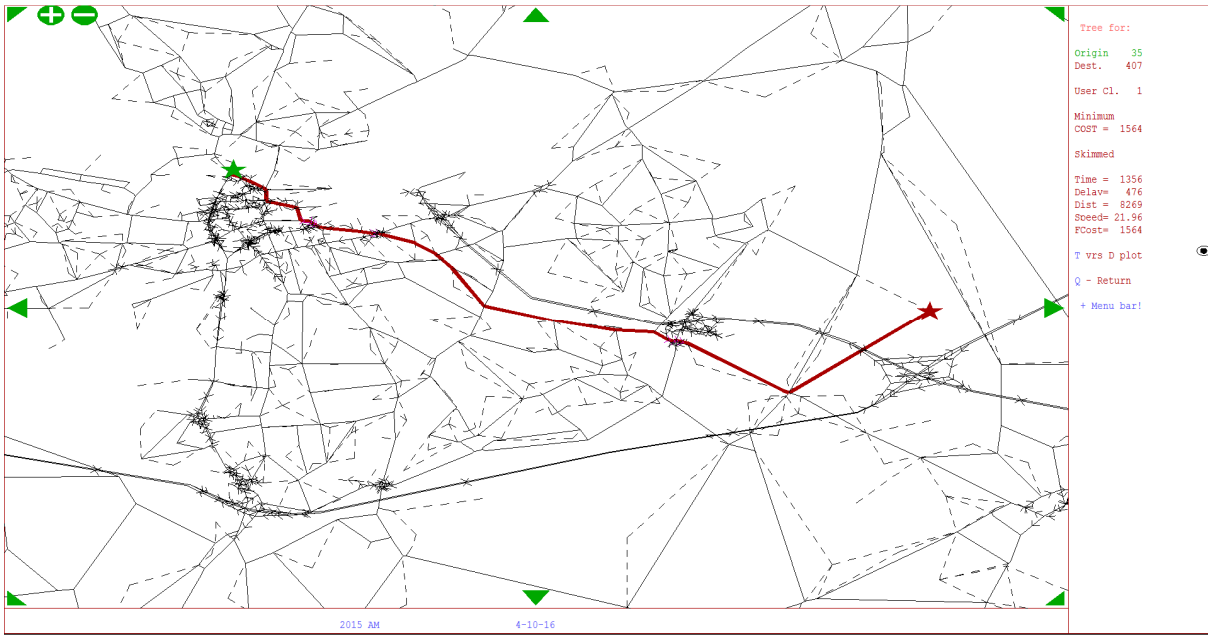
Zone 1 - Zone 460



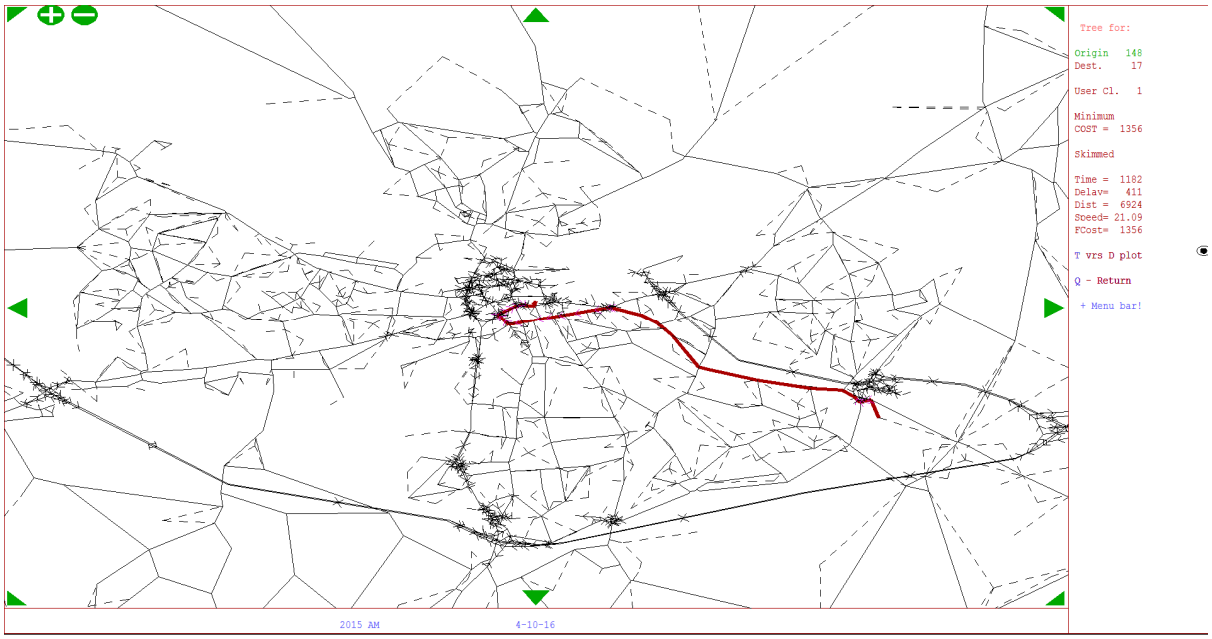
Zone 407 – Zone 35



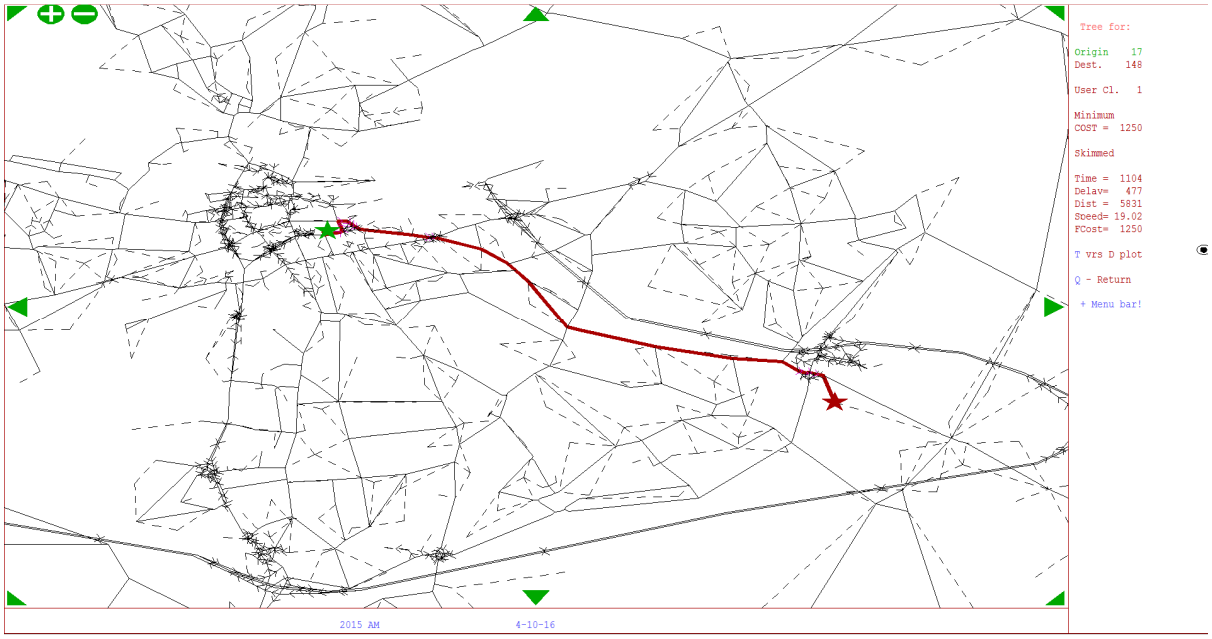
Zone 35 – Zone 407



Zone 148 – Zone 17

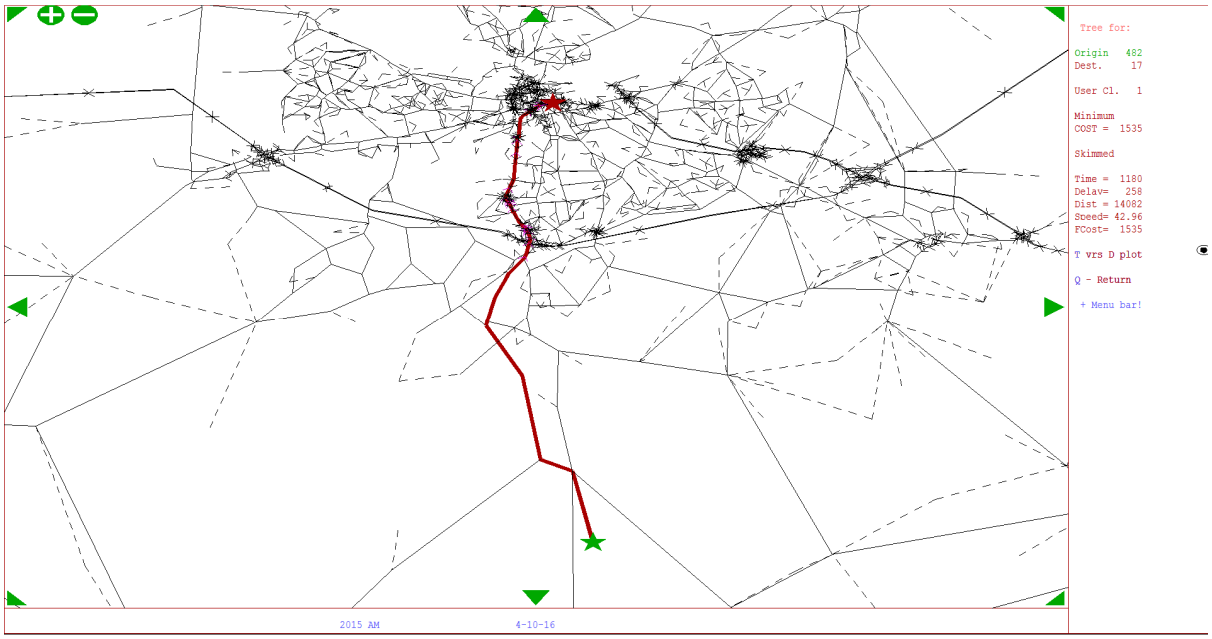


Zone 17 - Zone 148

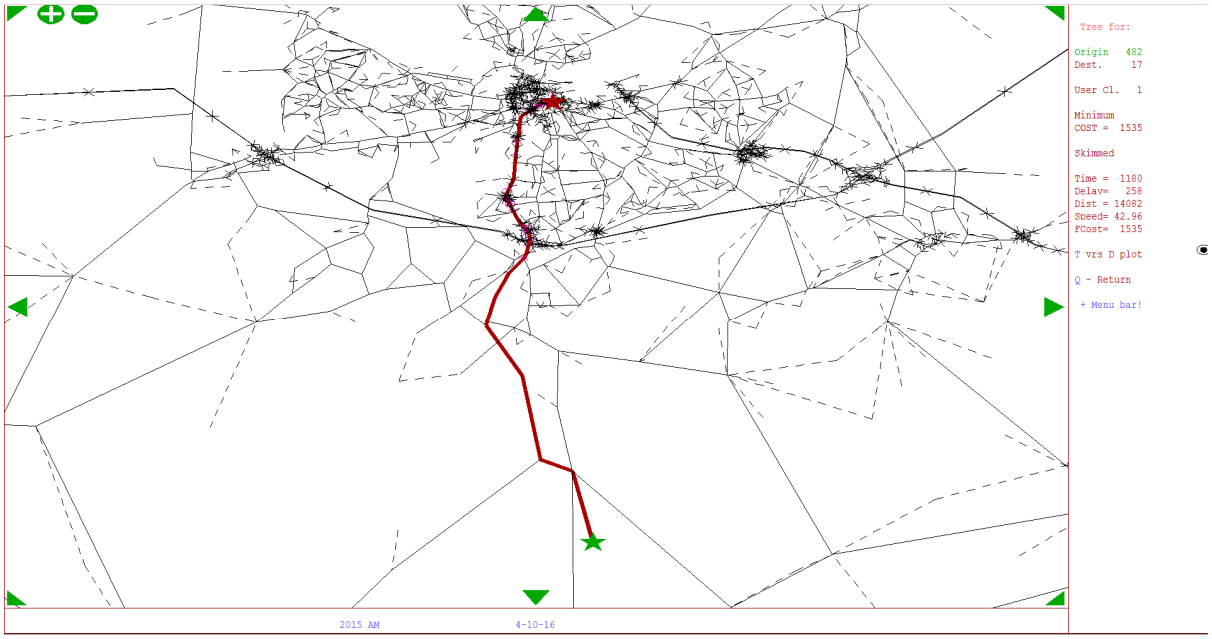


From South

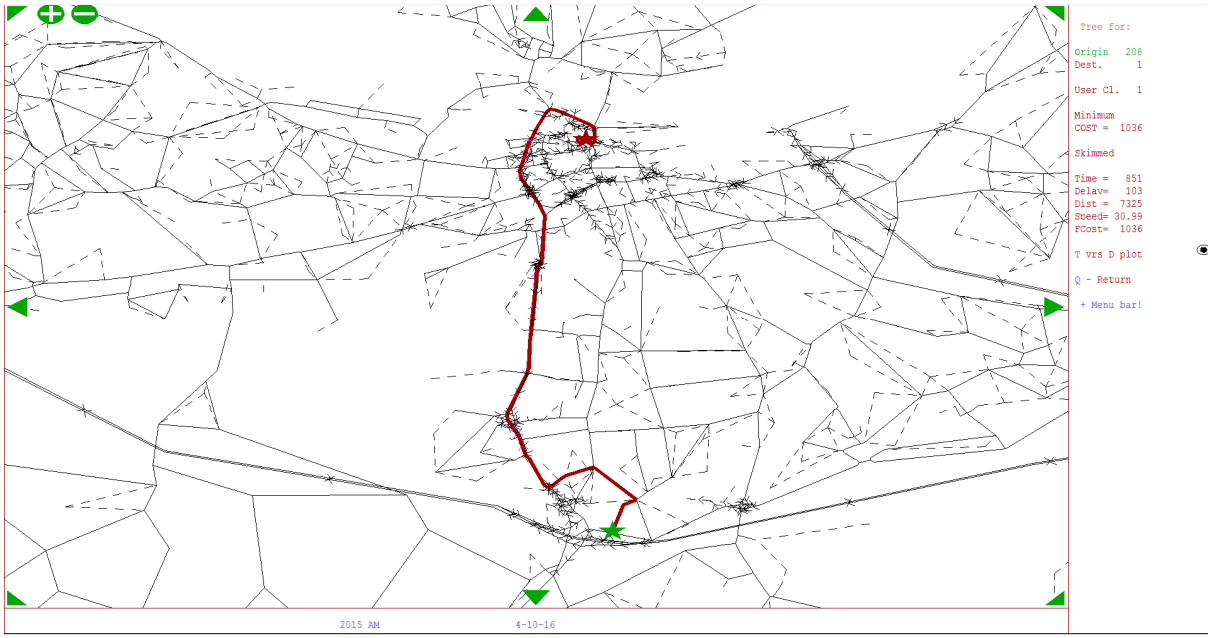
Zone 482 - Zone 17



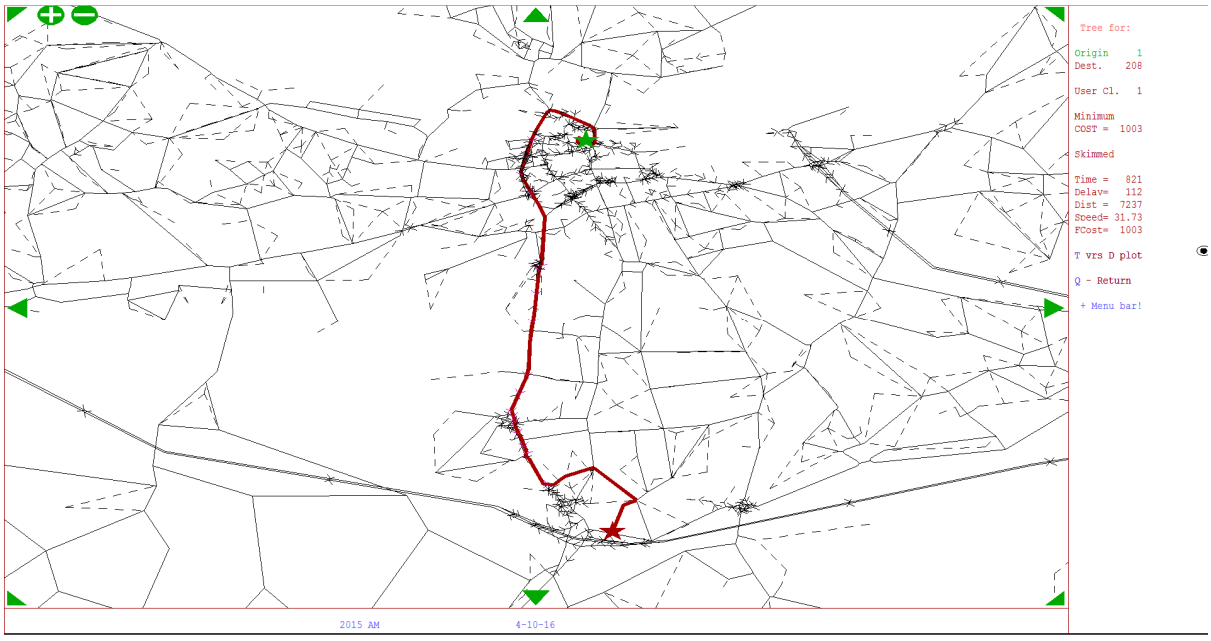
Zone 17 - Zone 482



Zone 208 - Zone 1

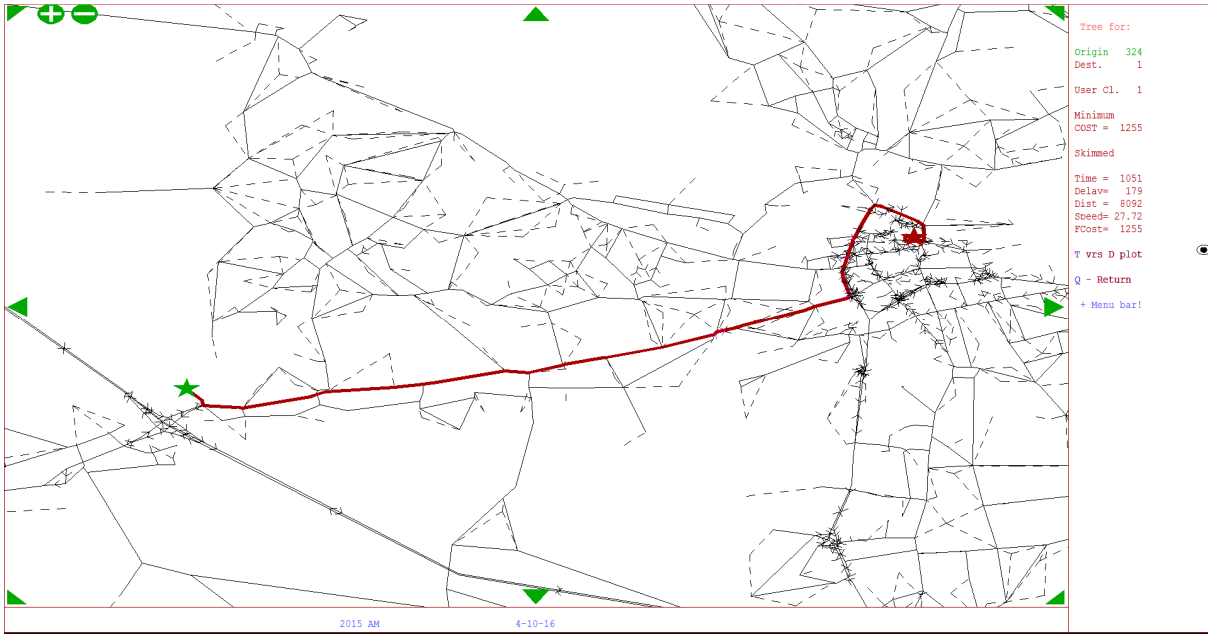


Zone 1 - Zone 208

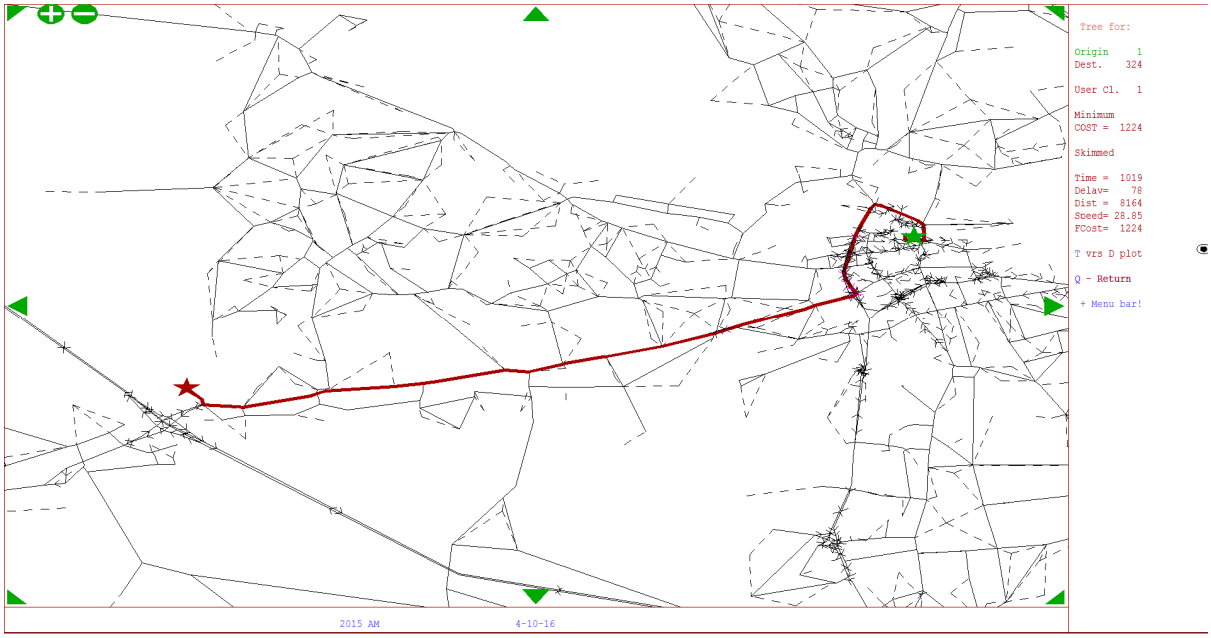


From West

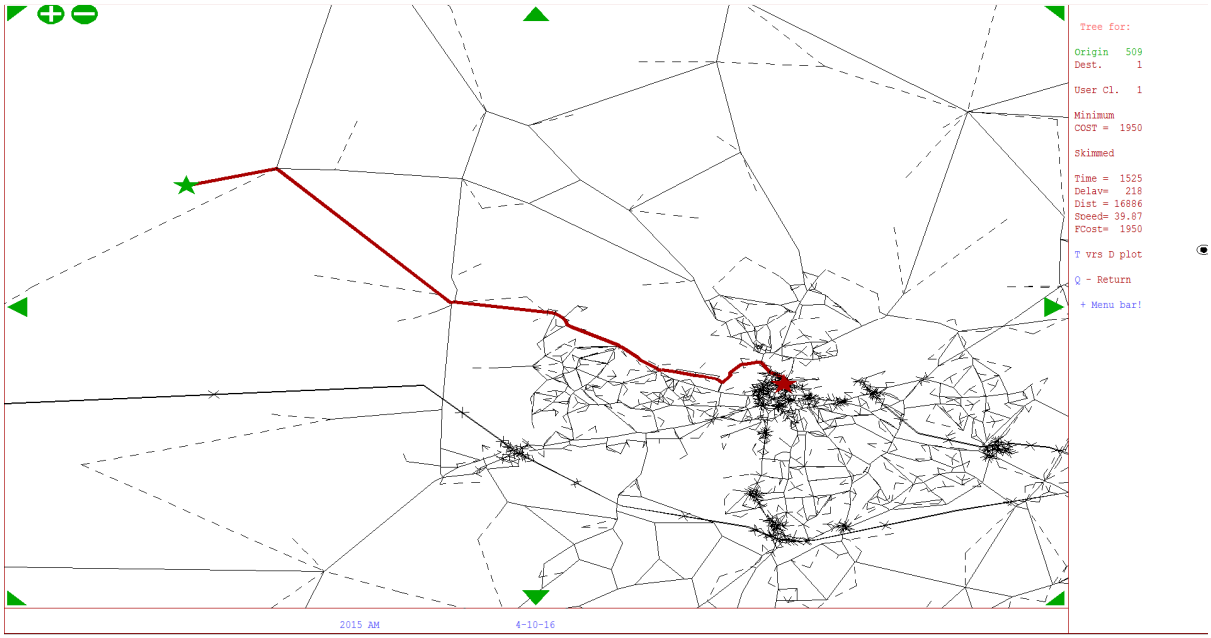
Zone 324 – Zone 1



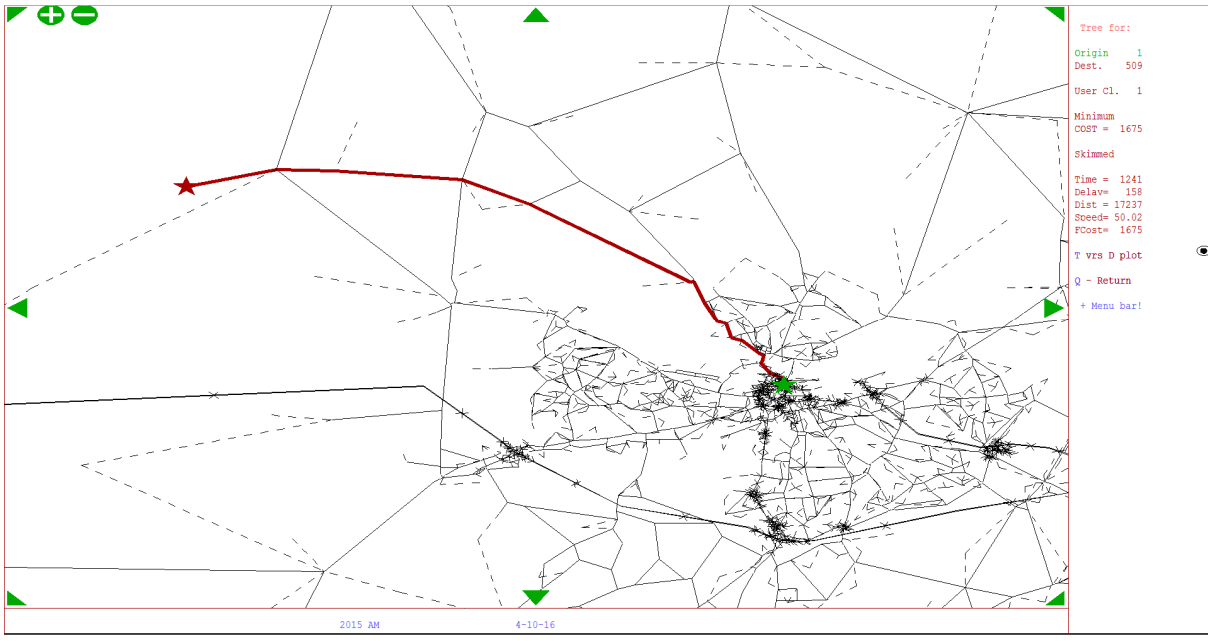
Zone 1 – Zone 324



Zone 509 – Zone 1



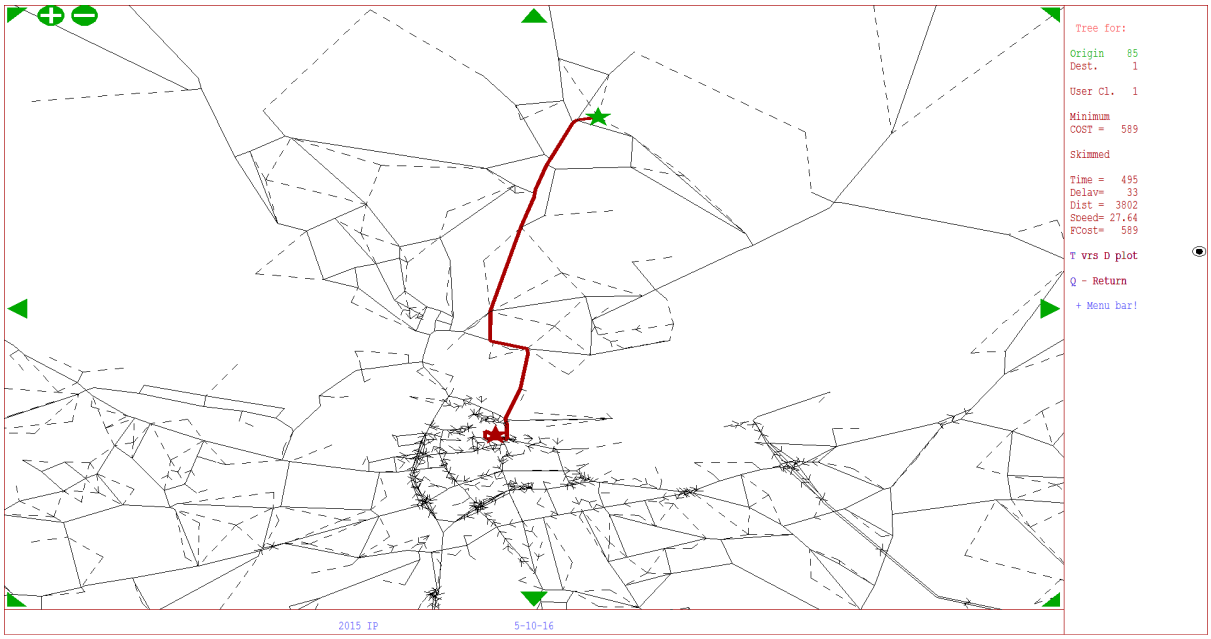
Zone 1 - Zone 509



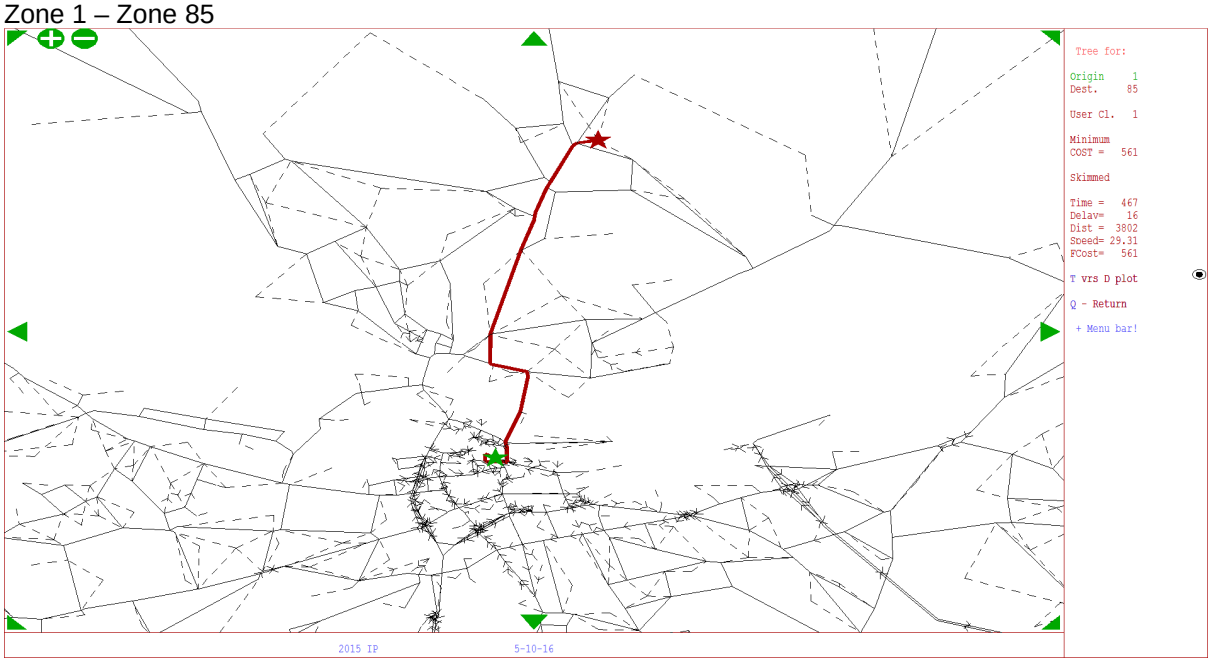
Inter Peak

From North

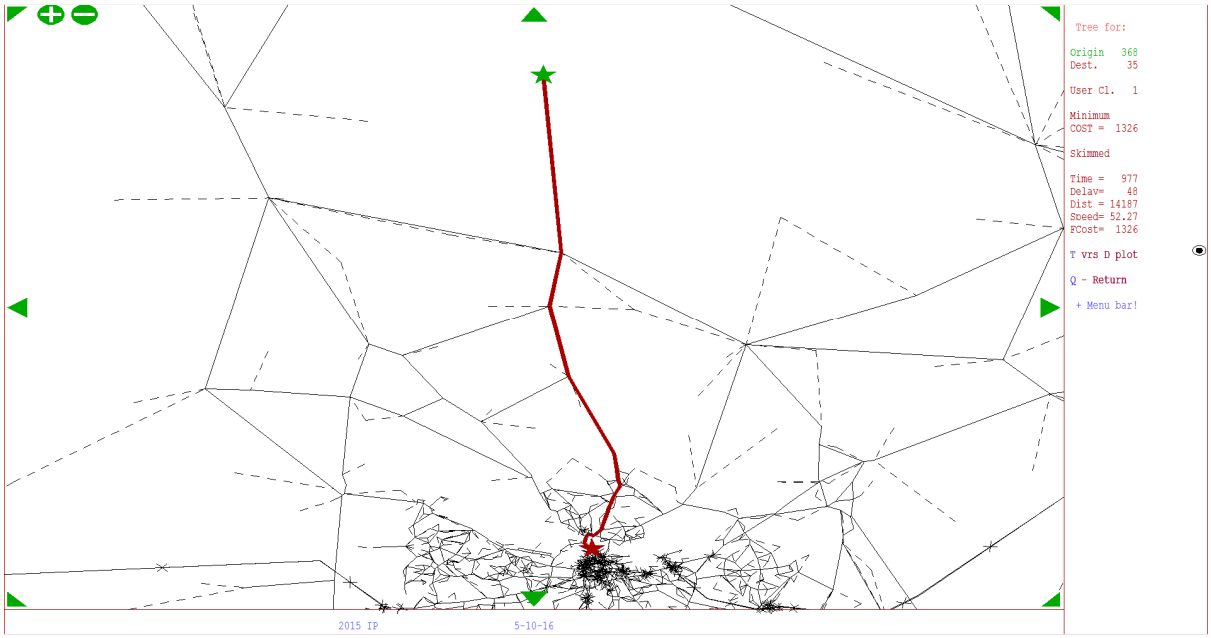
Zone 85 – Zone 1



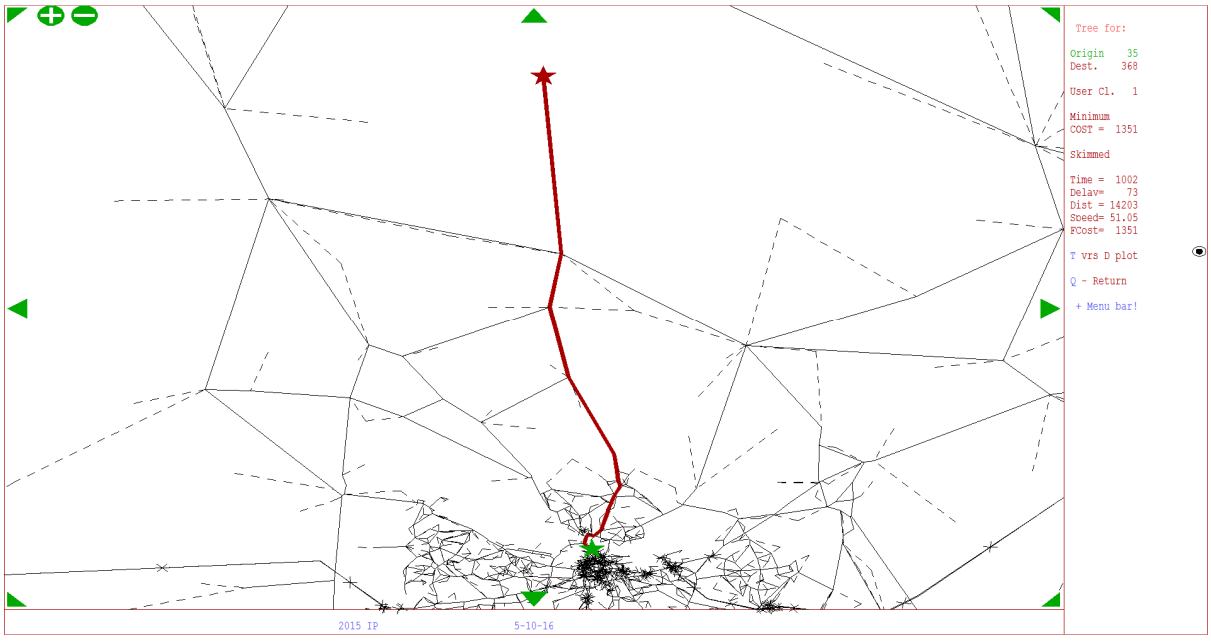
Zone 1 – Zone 85



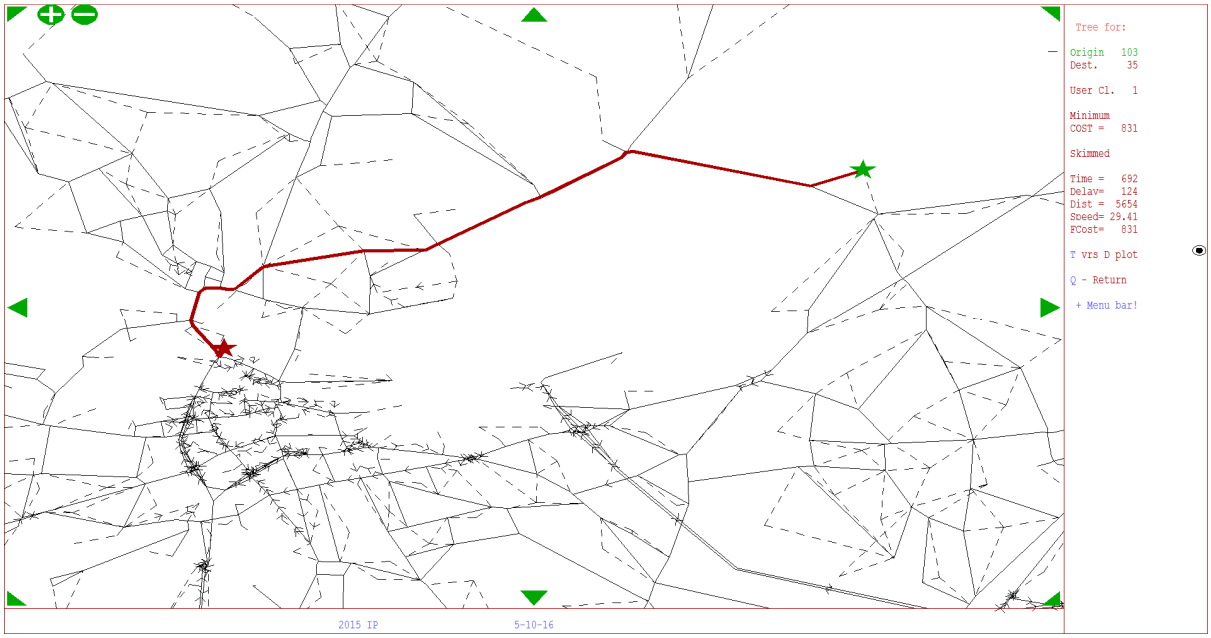
Zone 368 – Zone 35



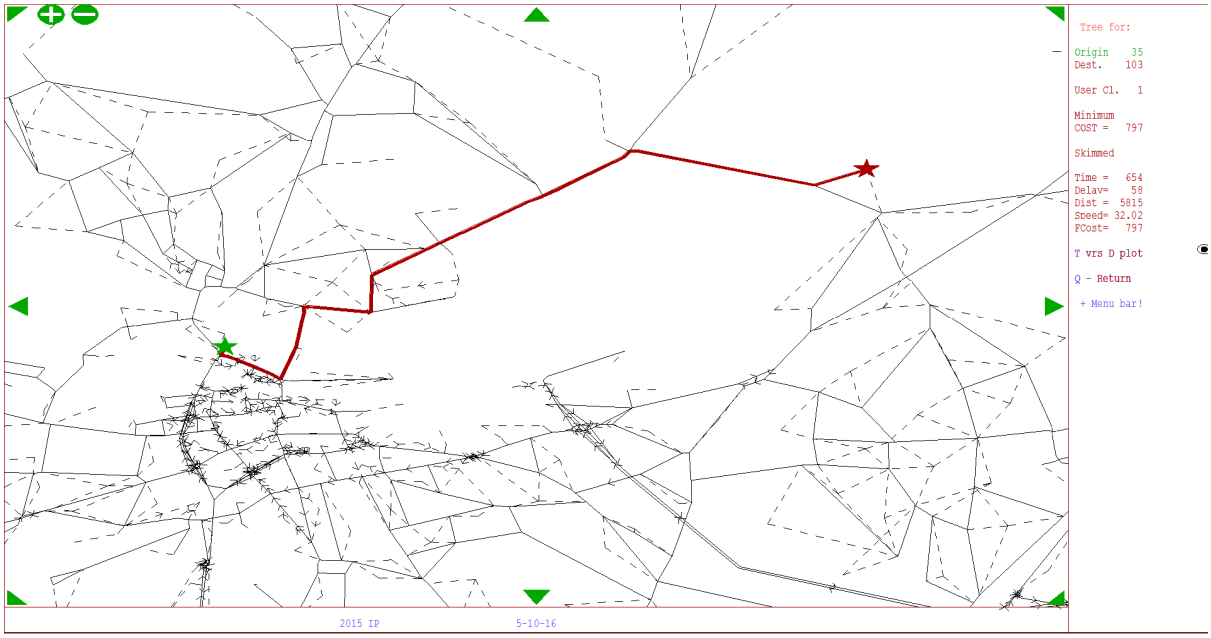
Zone 35 – Zone 368



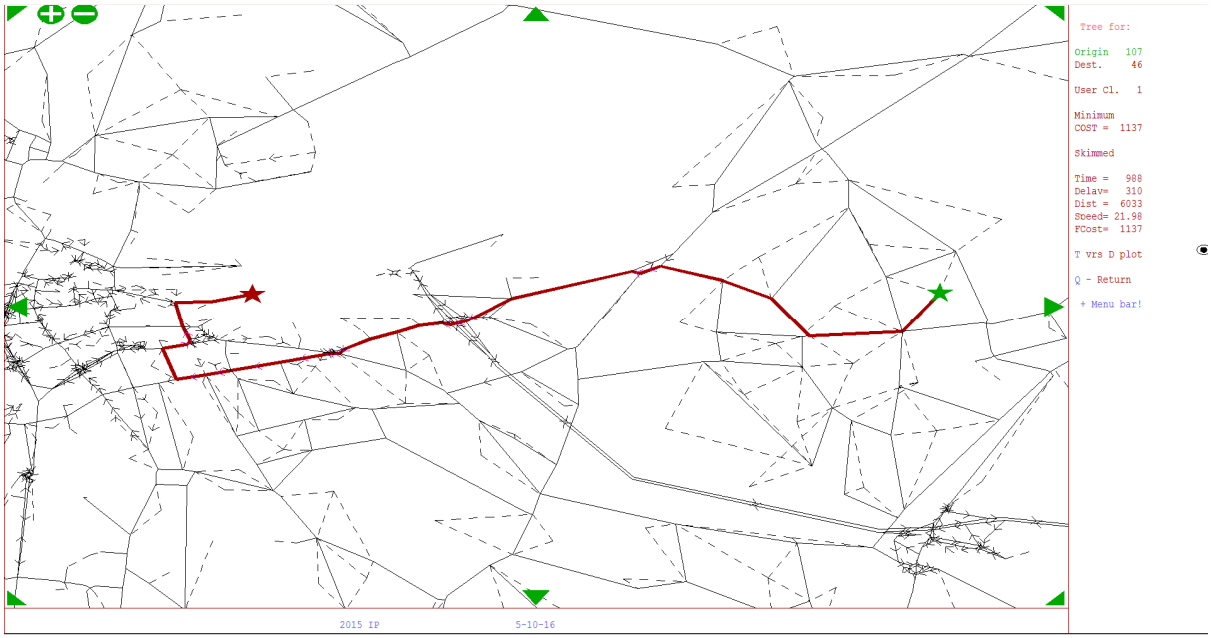
From East
Zone 103 – Zone 35



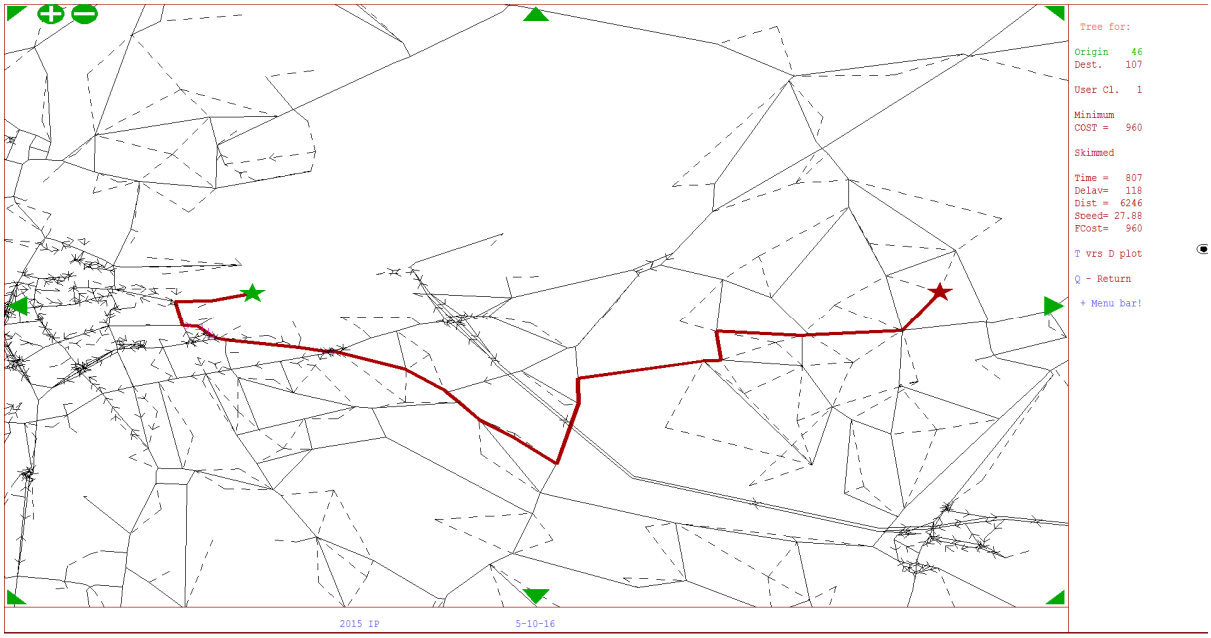
Zone 35 – Zone 103



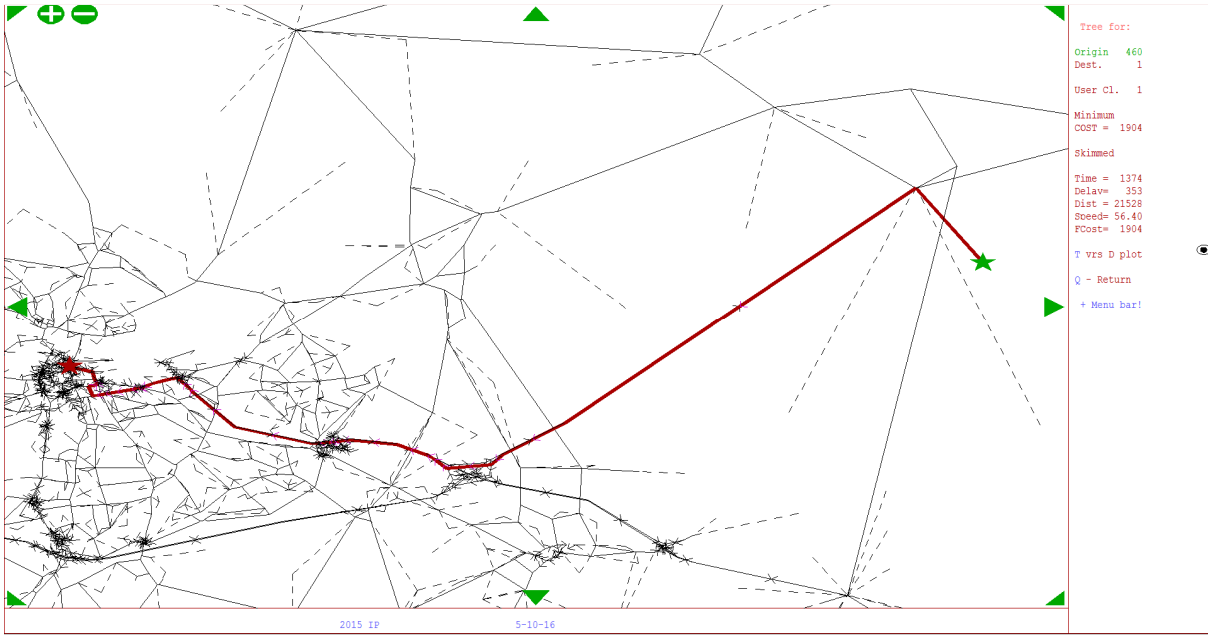
Zone 107 – Zone 46



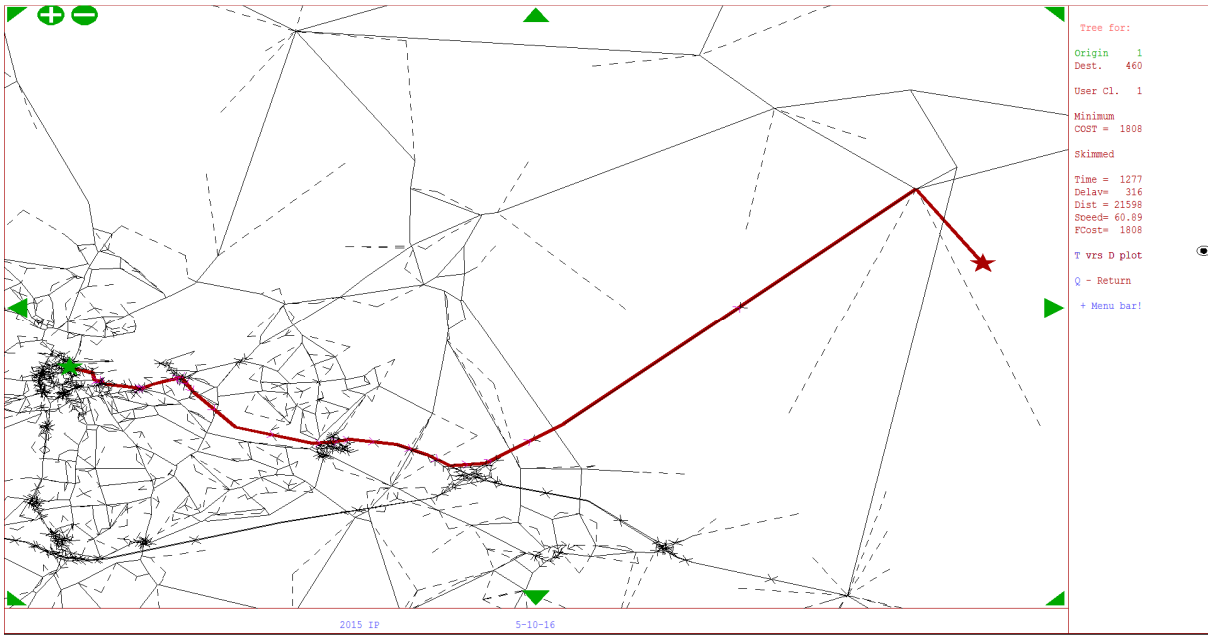
Zone 46 – Zone 107



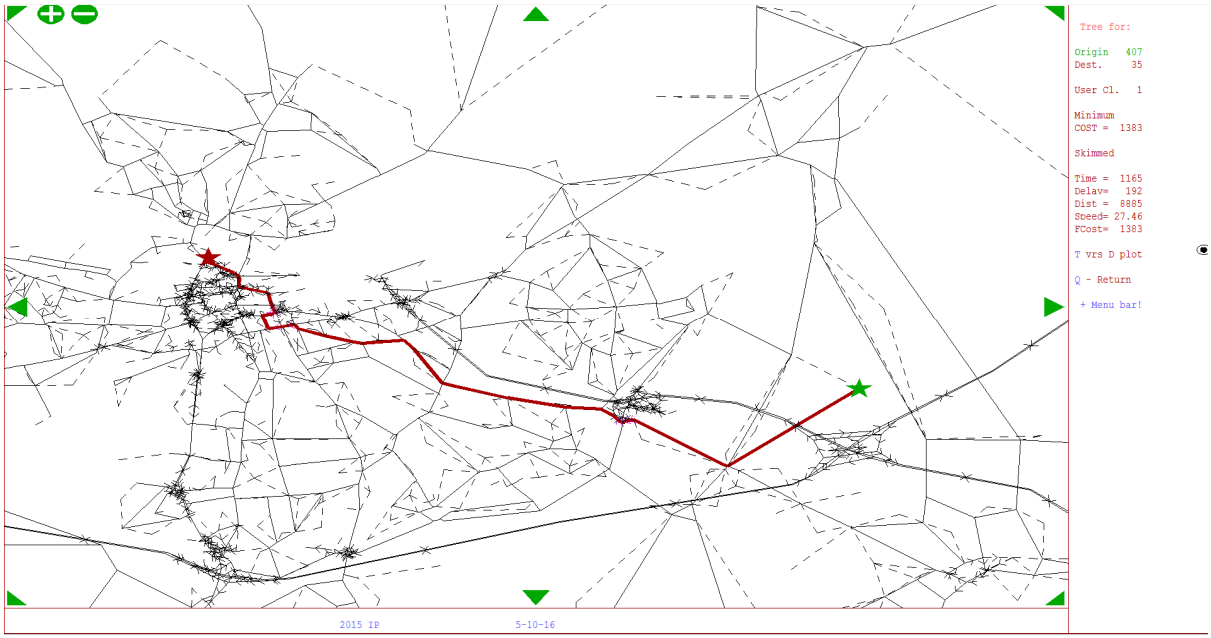
Zone 460 – Zone 1



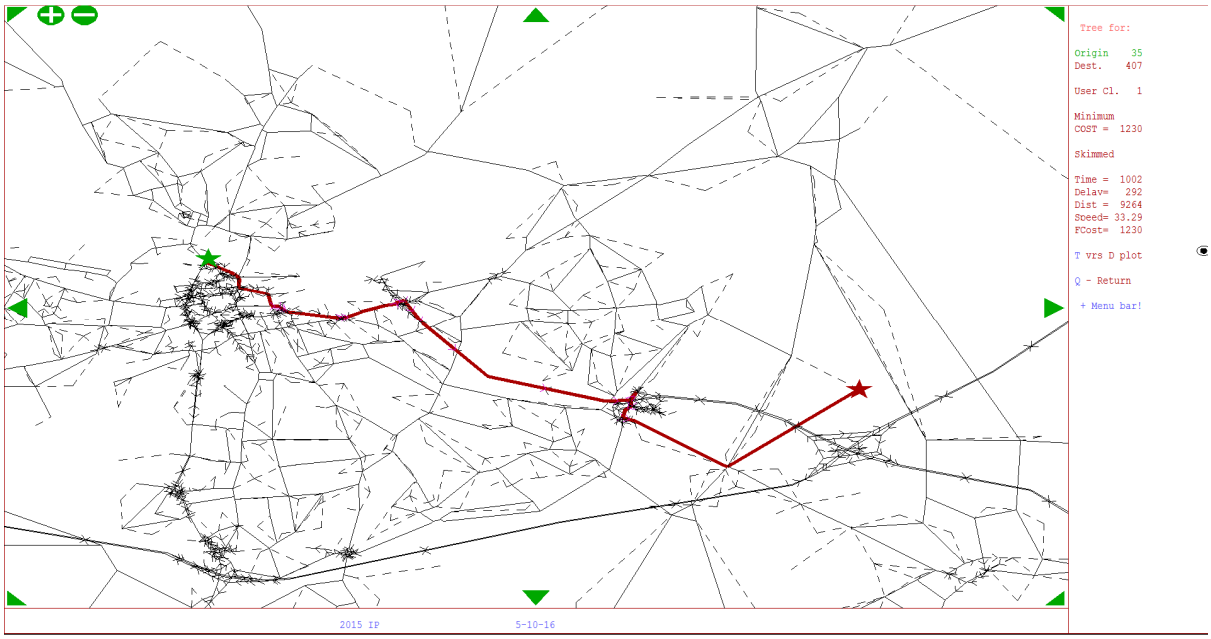
Zone 1 – Zone 460



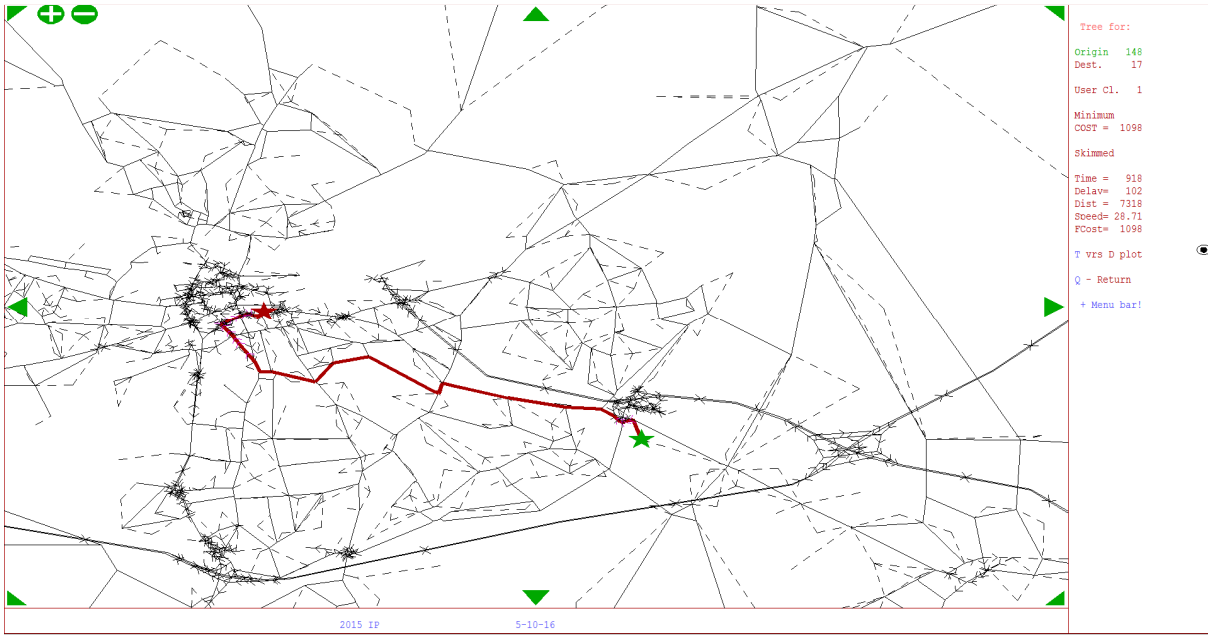
Zone 407 - Zone 35



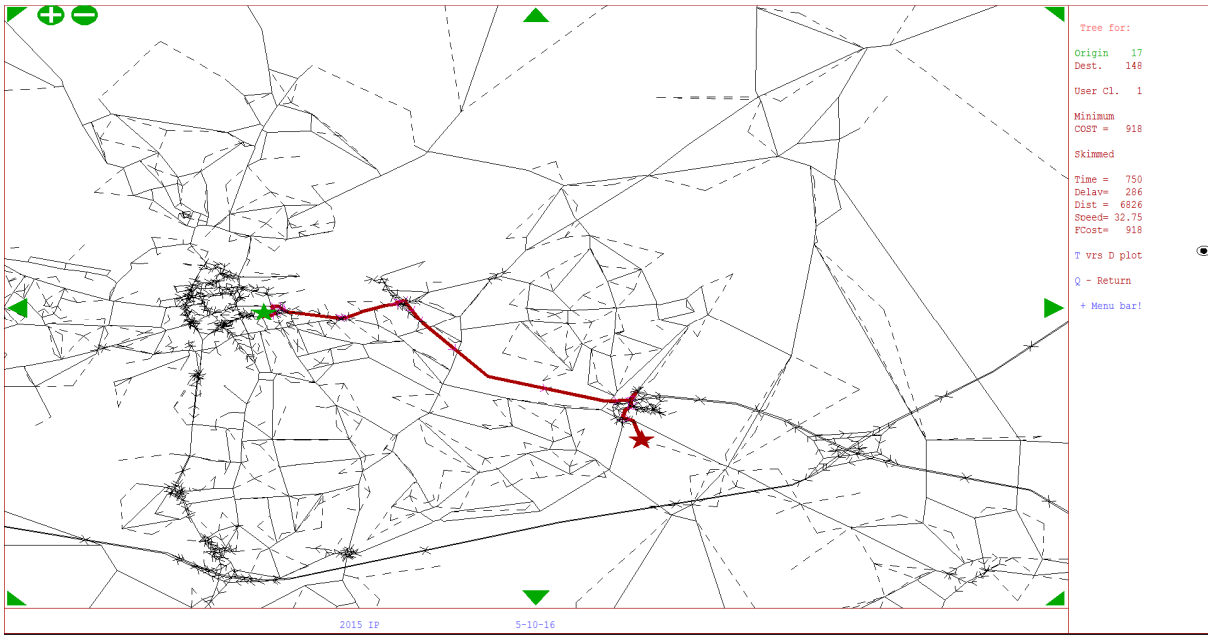
Zone 35 – Zone 407



Zone 148 – Zone 17

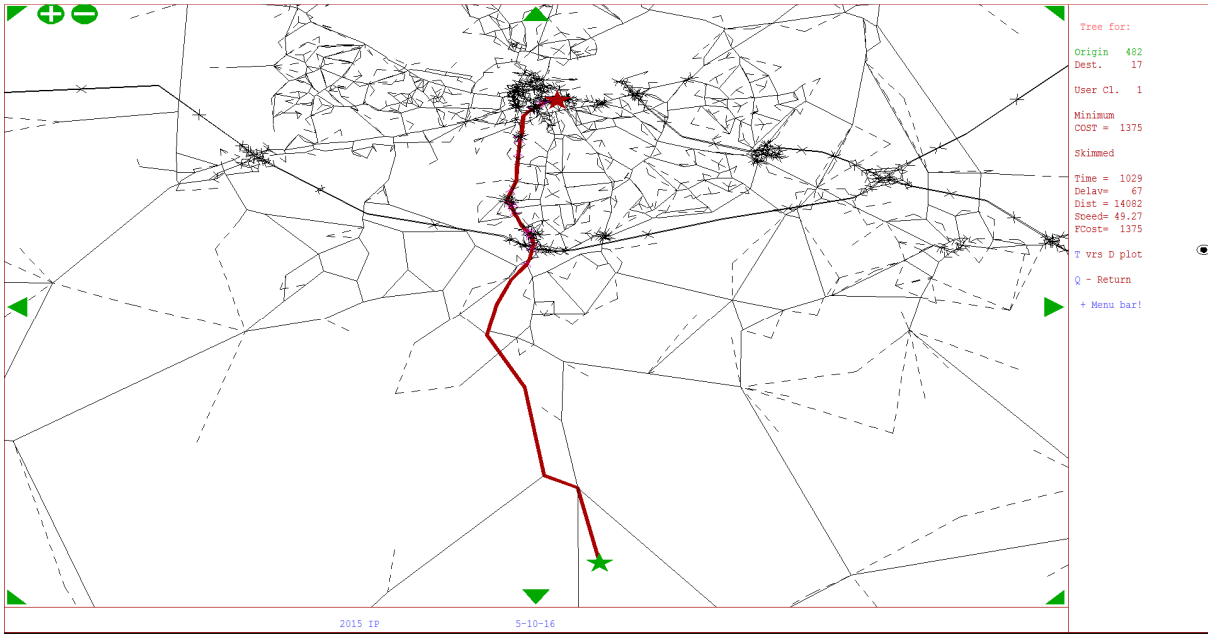


Zone 17 – Zone 148

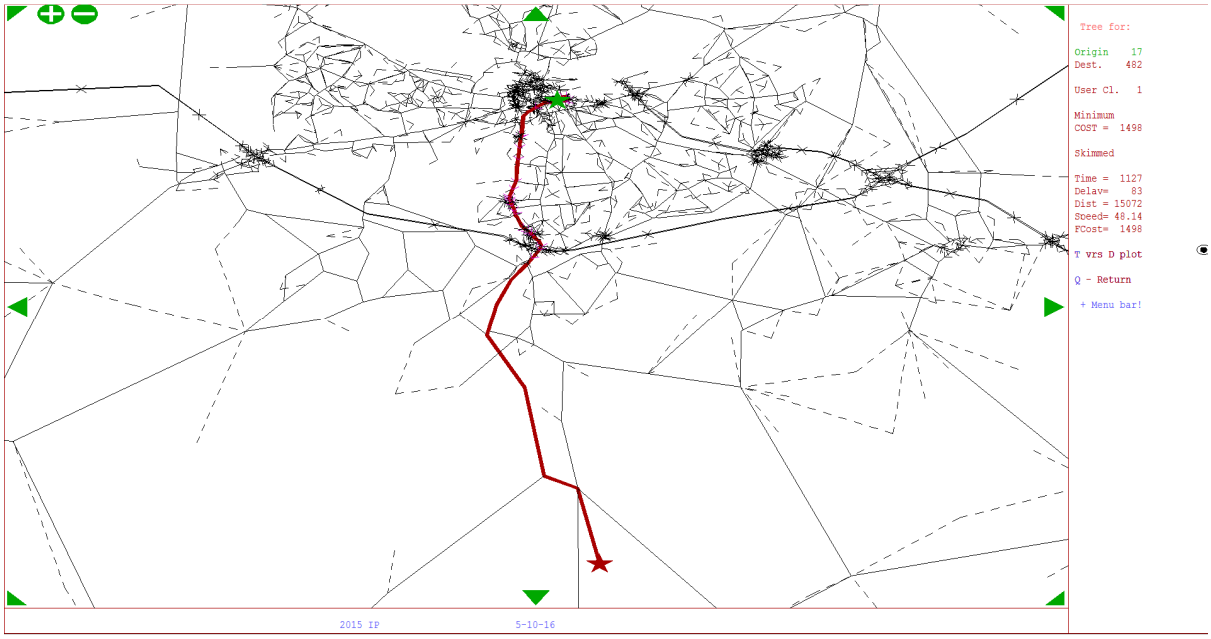


From South

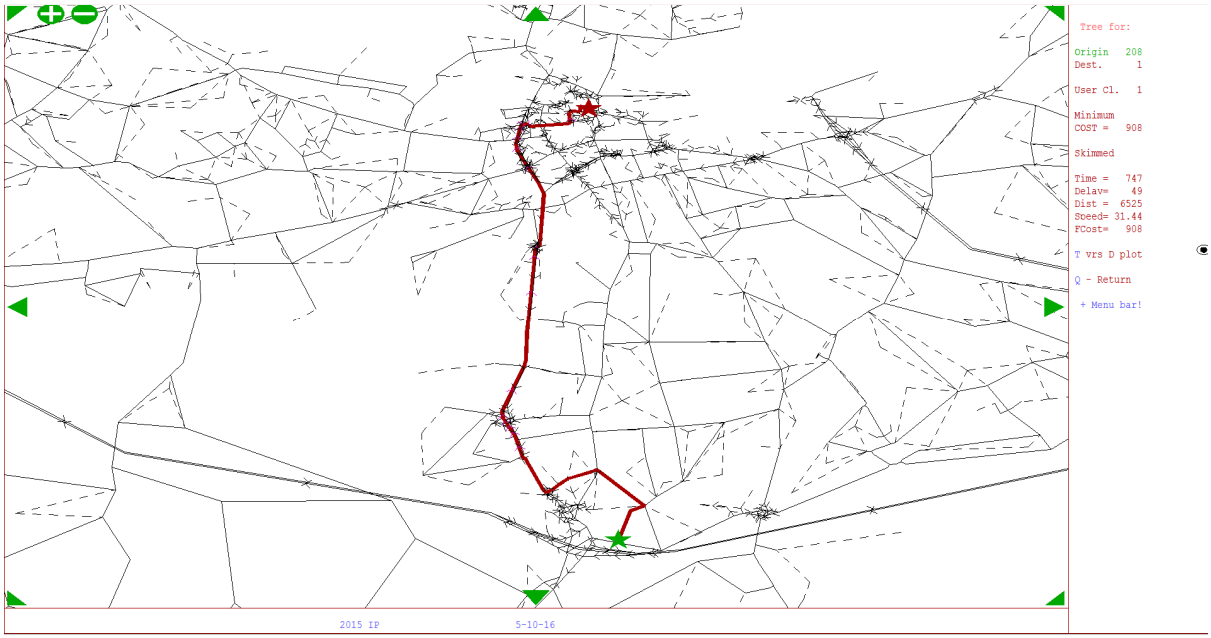
Zone 482 – Zone 17



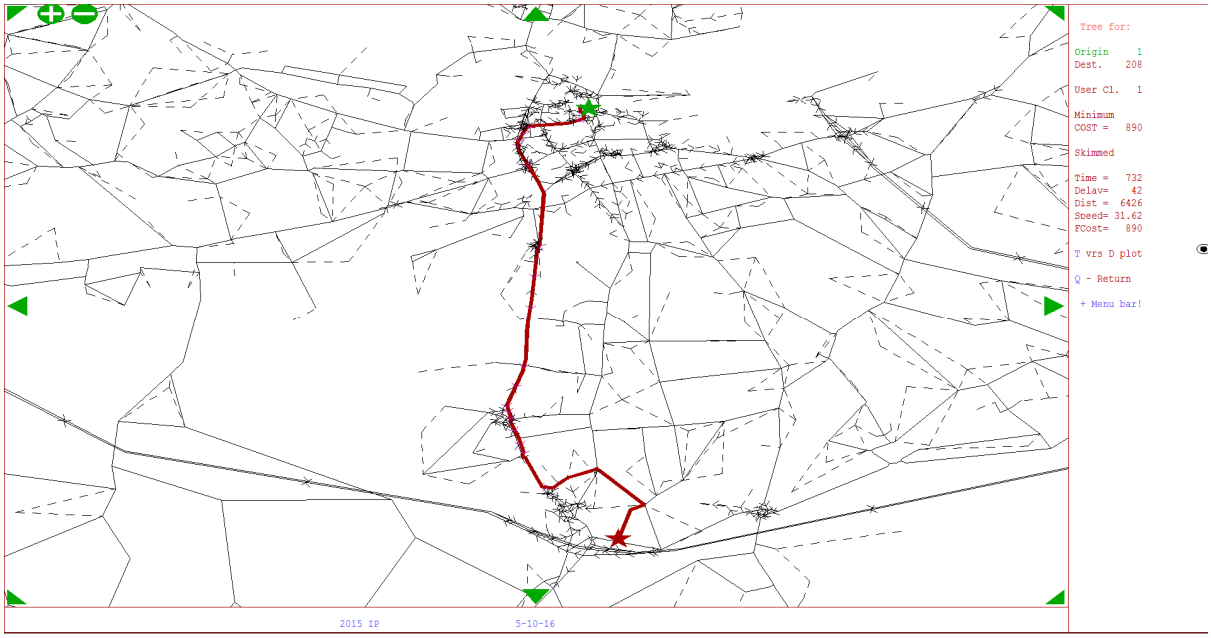
Zone 17 – Zone 482



Zone 208 – Zone 1

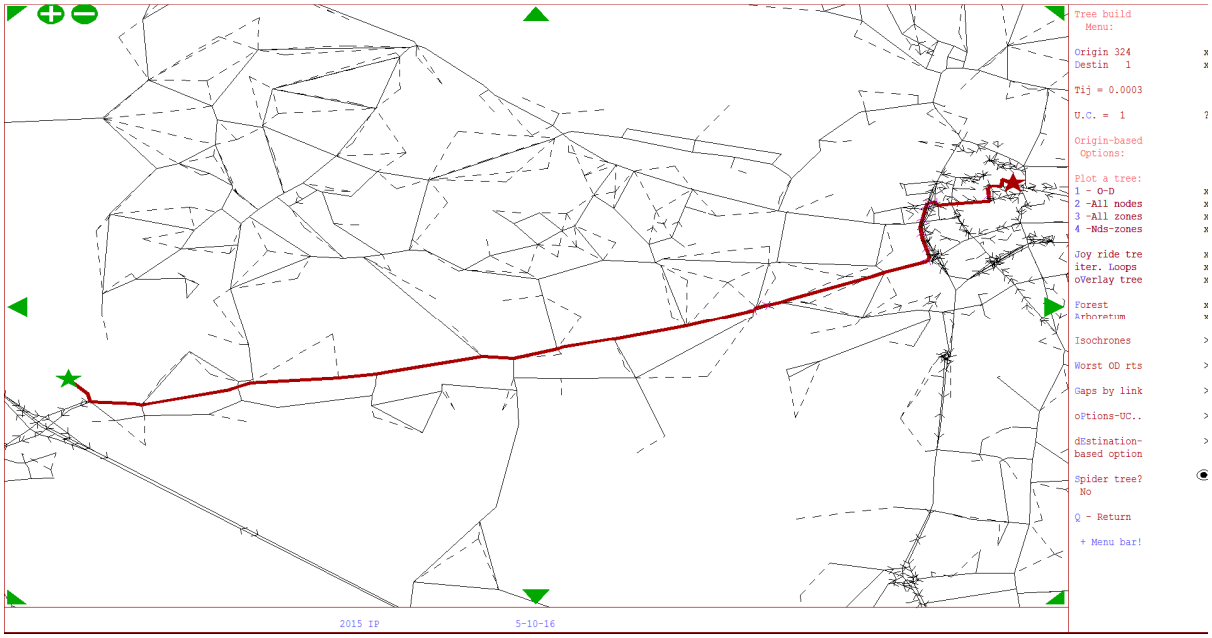


Zone 1 – Zone 208

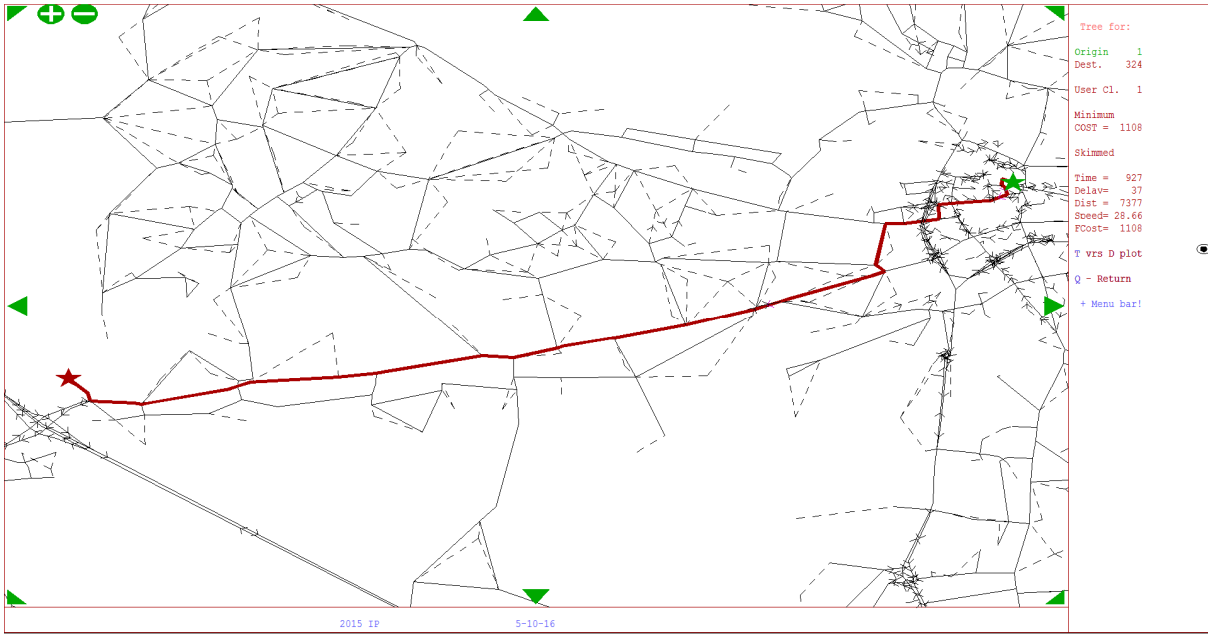


From West

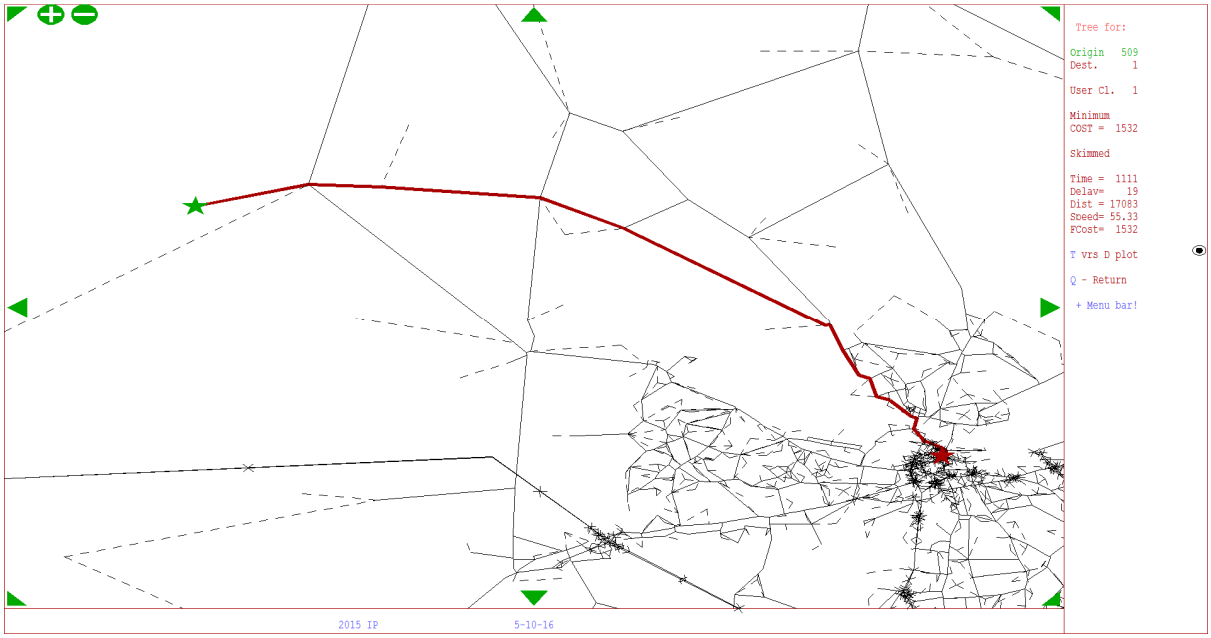
Zone 324 –Zone 1



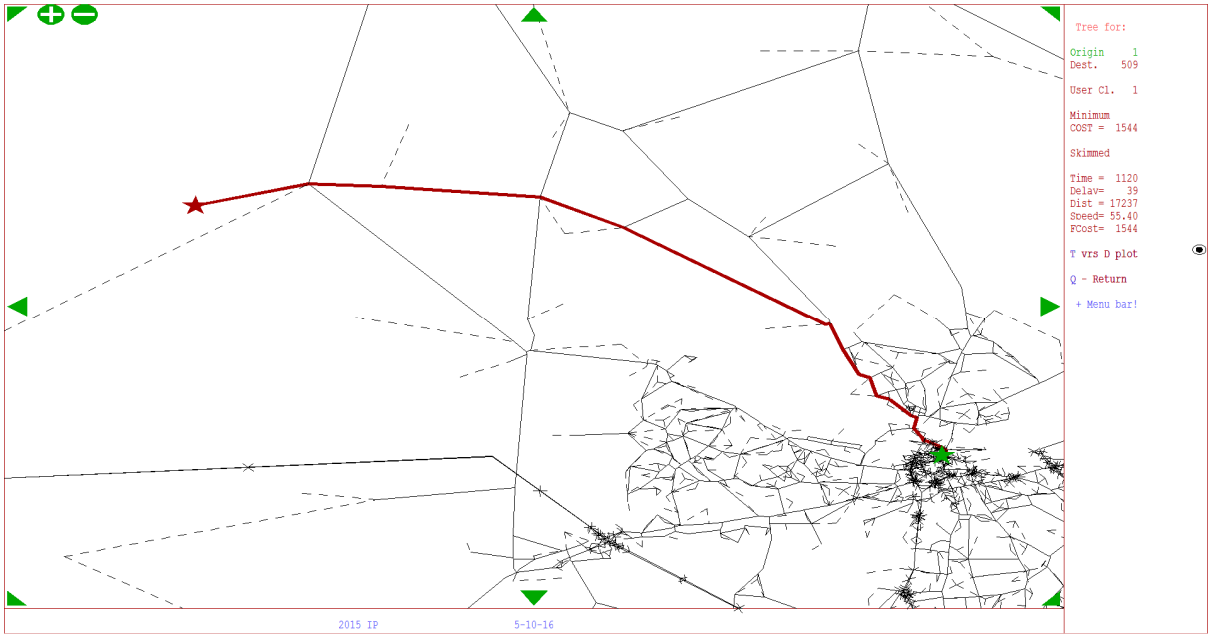
Zone 1 – Zone 324



Zone 509 – Zone 1



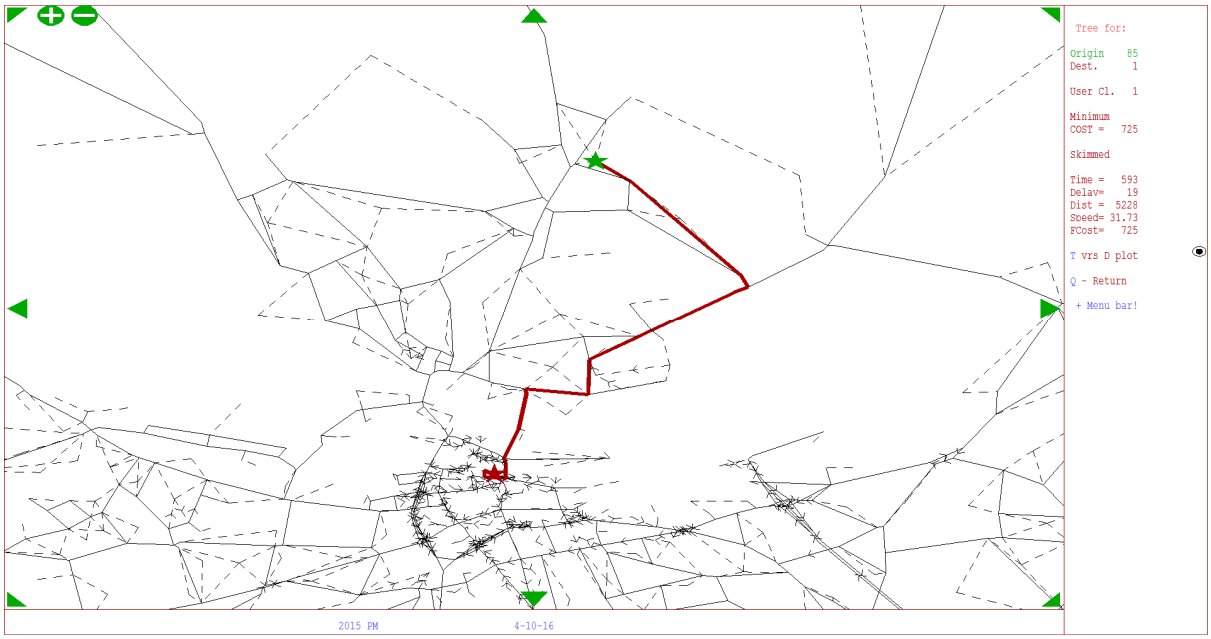
Zone 1 – Zone 509



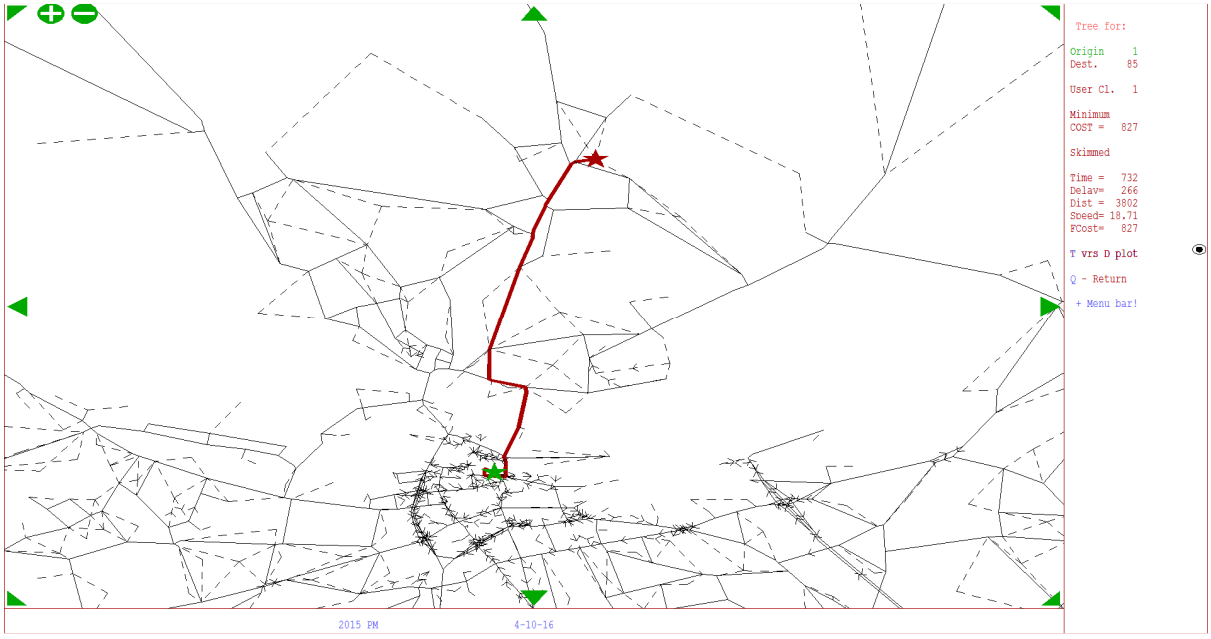
PM Peak

From North

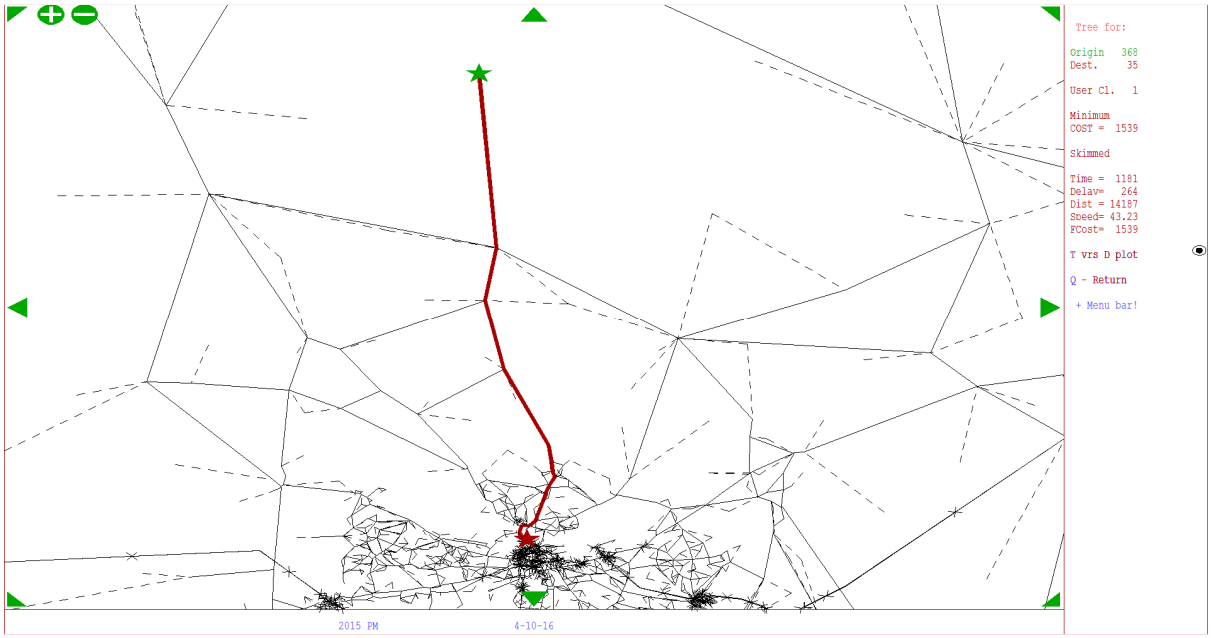
Zone 85 – Zone 1



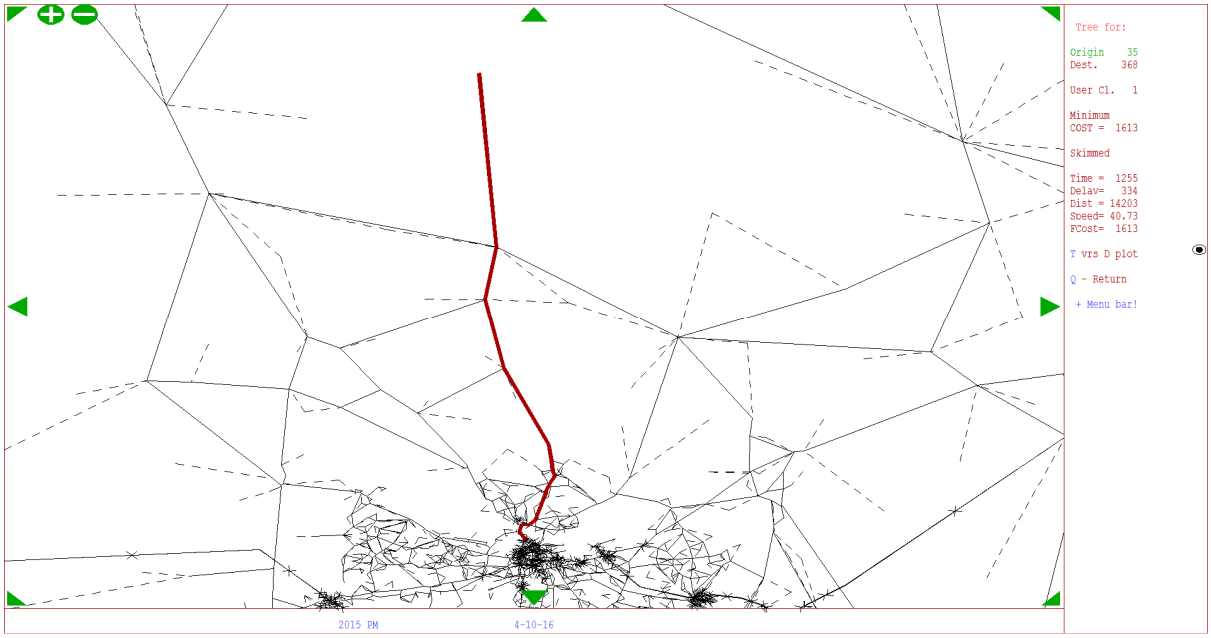
Zone 1 – Zone 85



Zone 368 – Zone 35

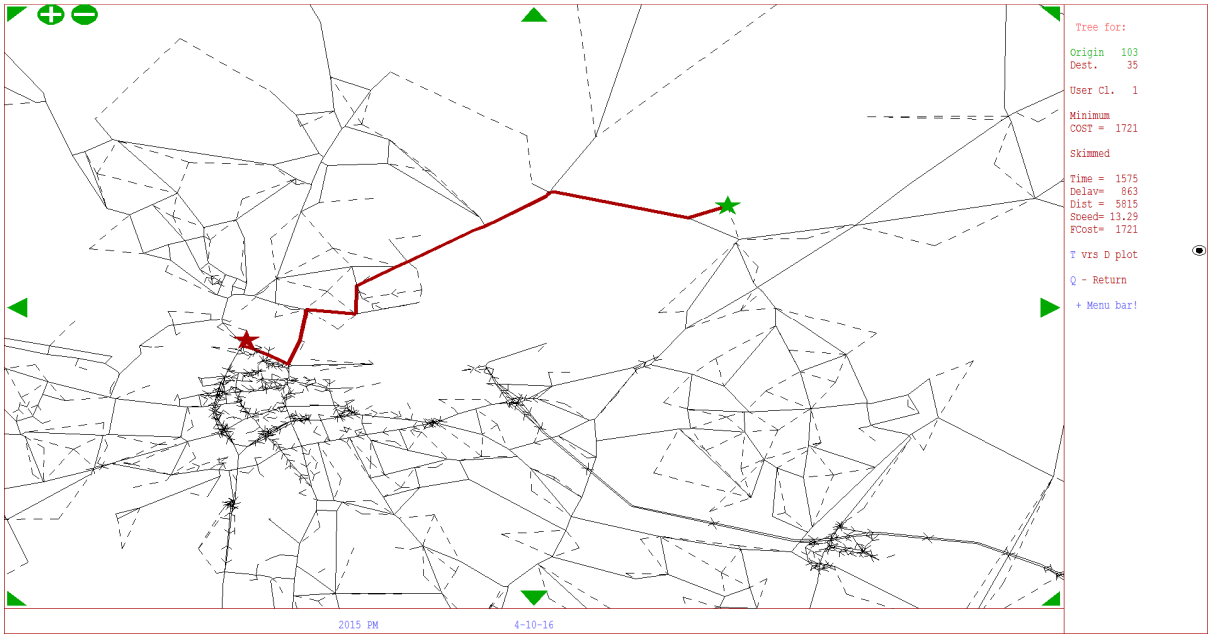


Zone 35 – Zone 368

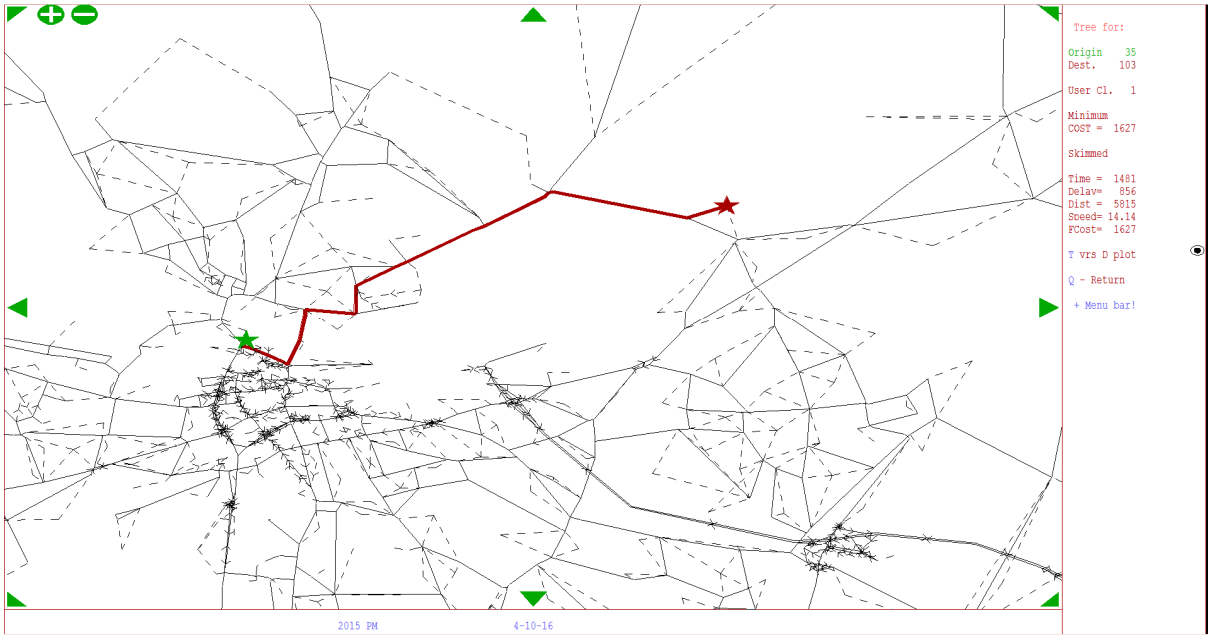


From East

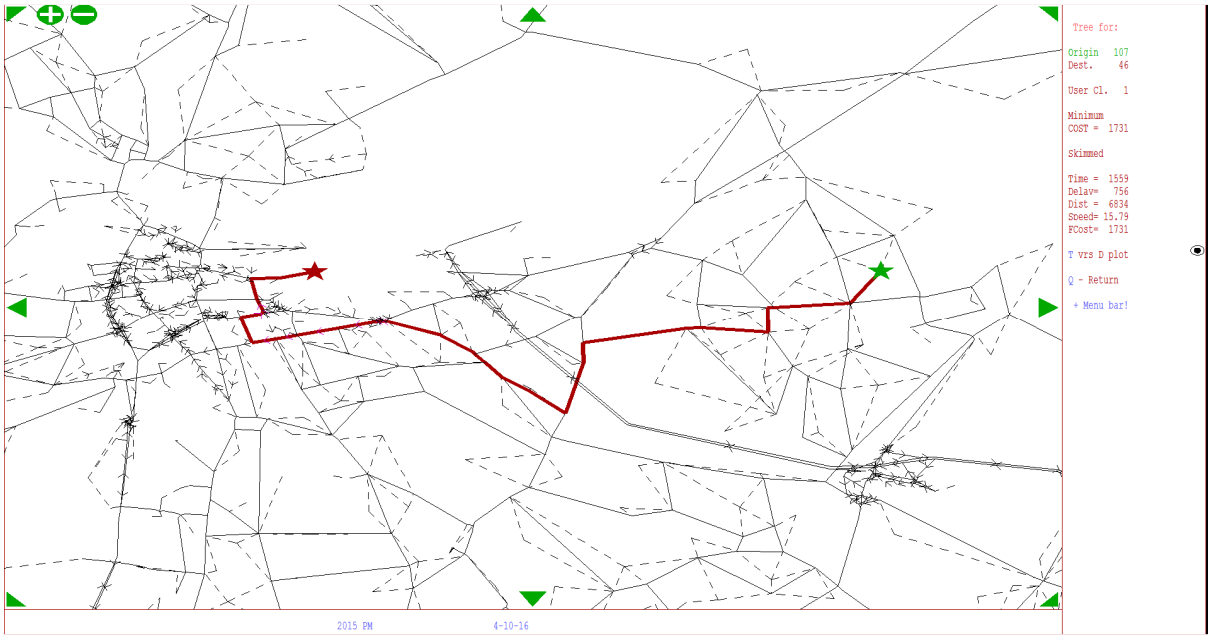
Zone 103 – Zone 35



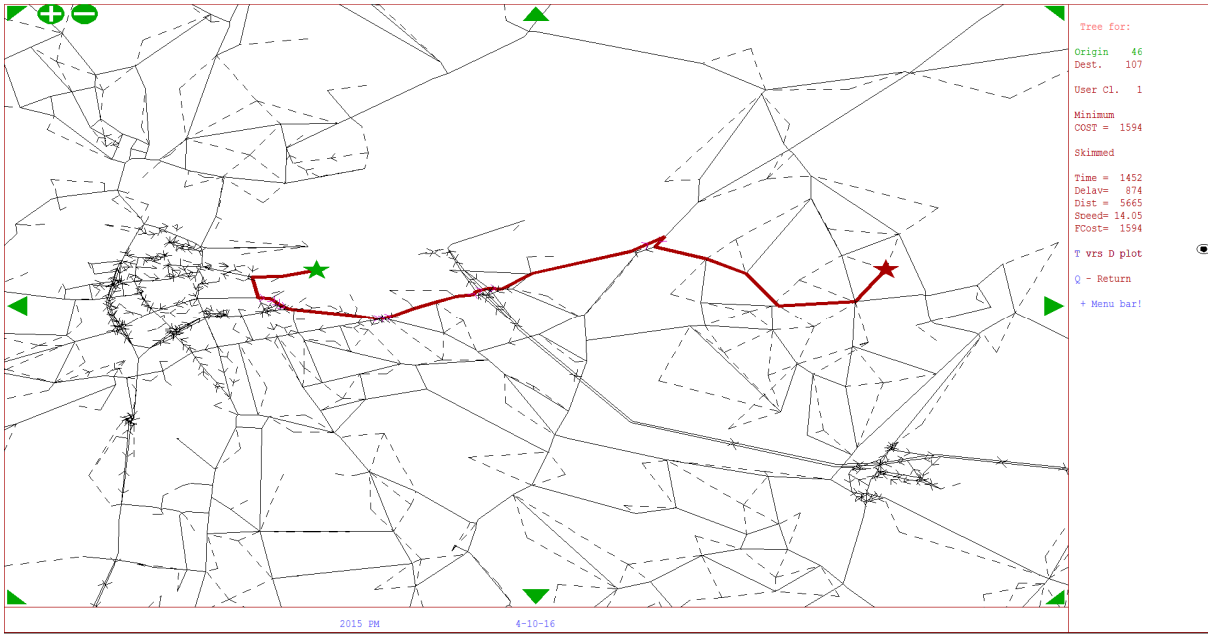
Zone 35 – Zone 103



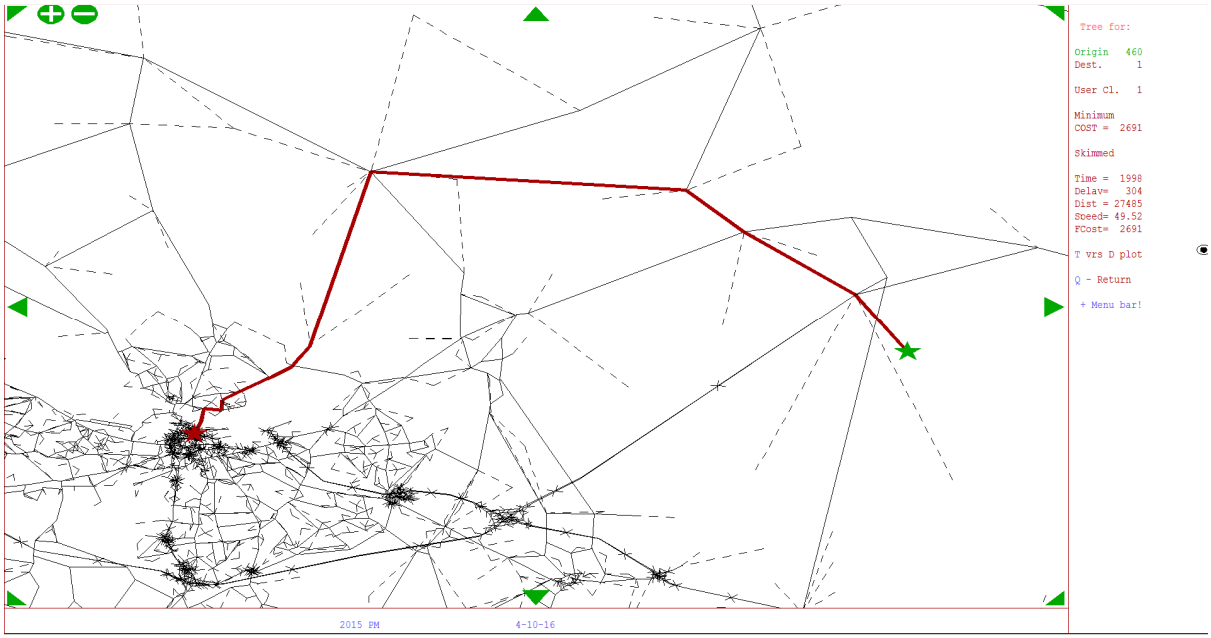
Zone 107 – Zone 46



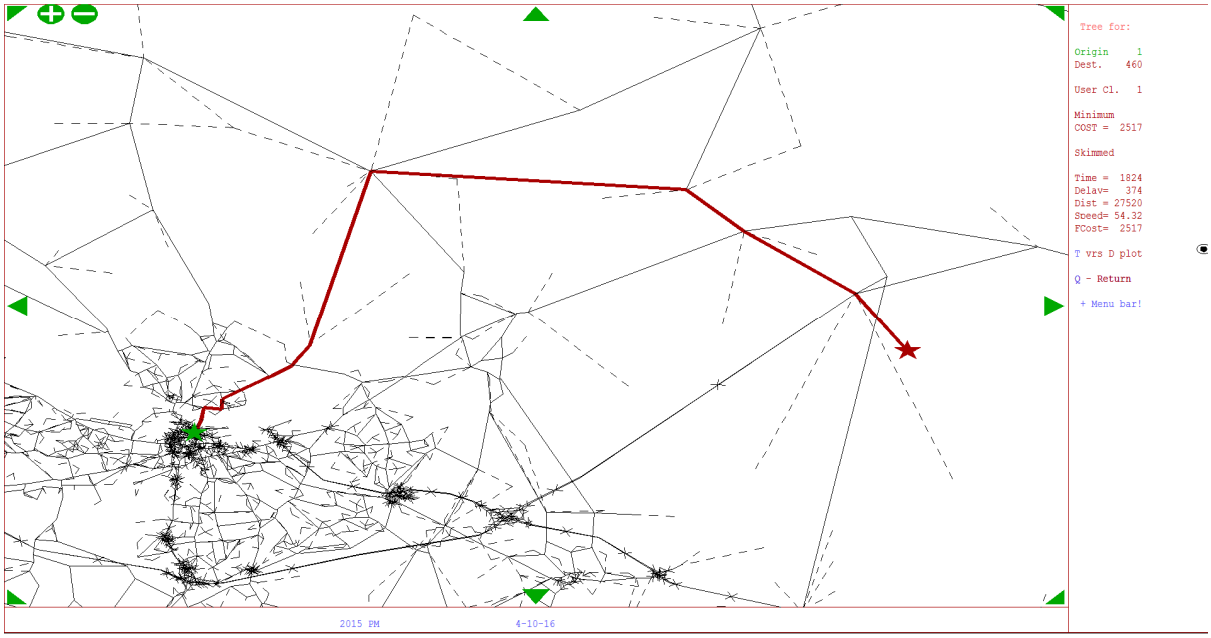
Zone 46 – Zone 107



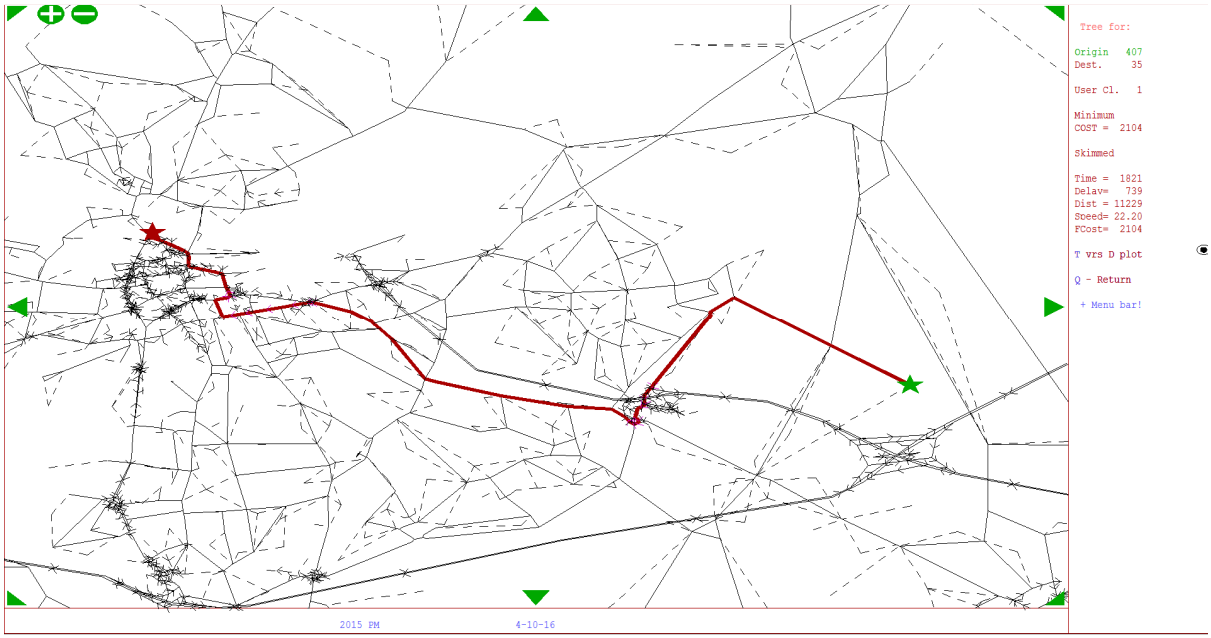
Zone 460 – Zone 1



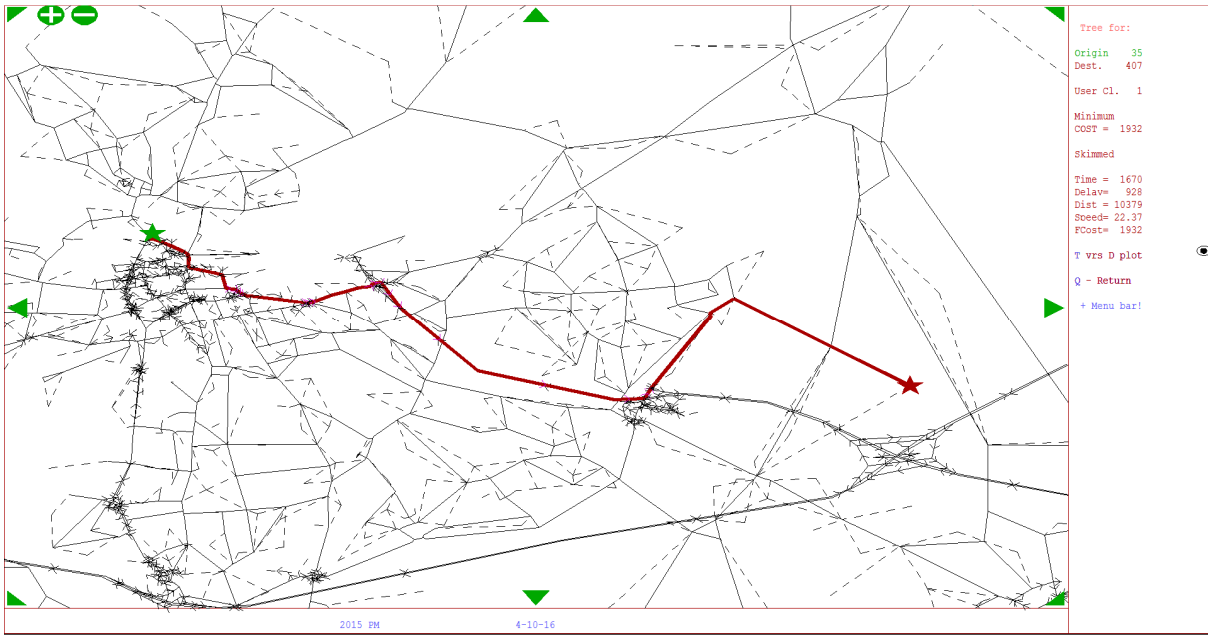
Zone 1 – Zone 460



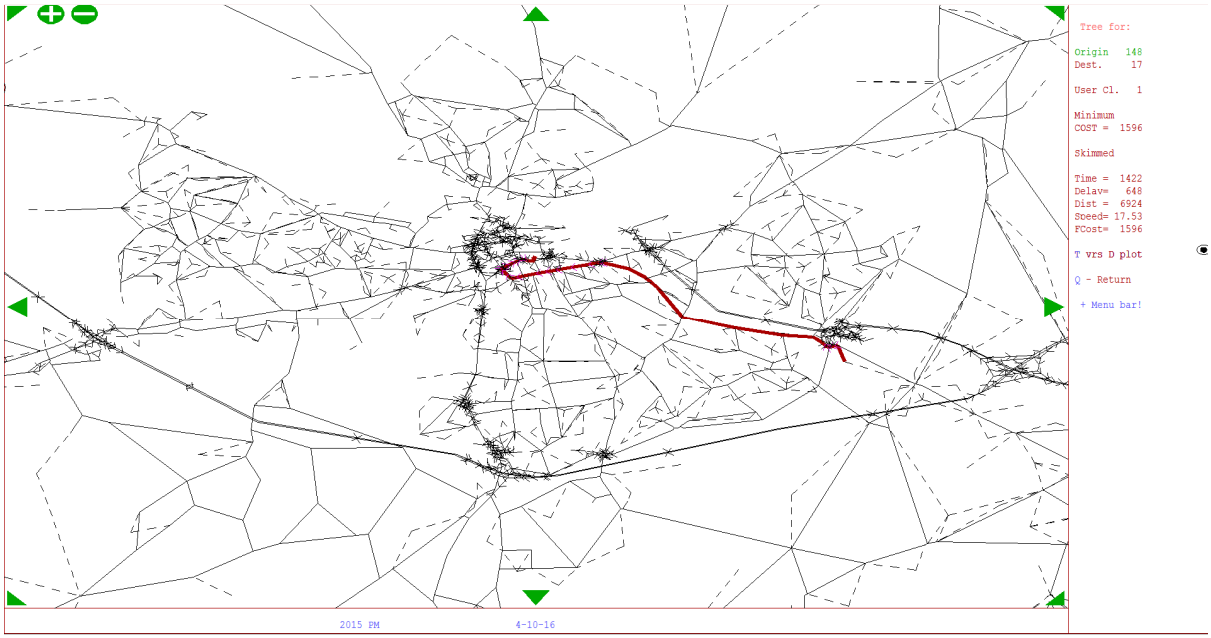
Zone 407 – Zone 35



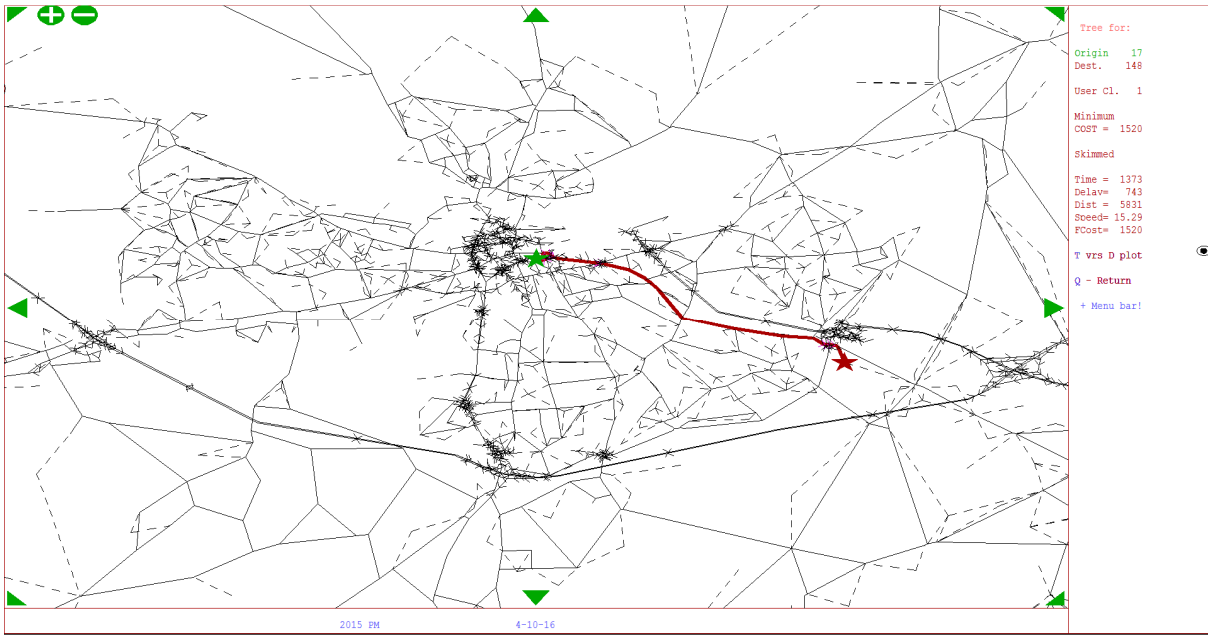
Zone 35 – Zone 407



Zone 148 – Zone 17

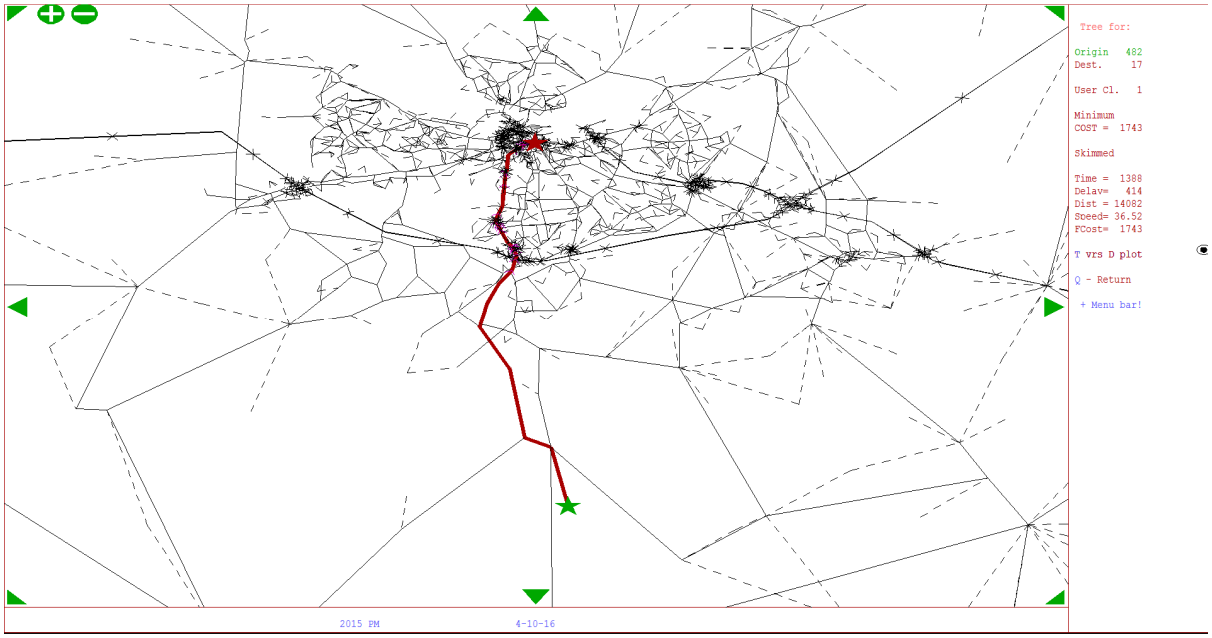


Zone 17 – Zone 148

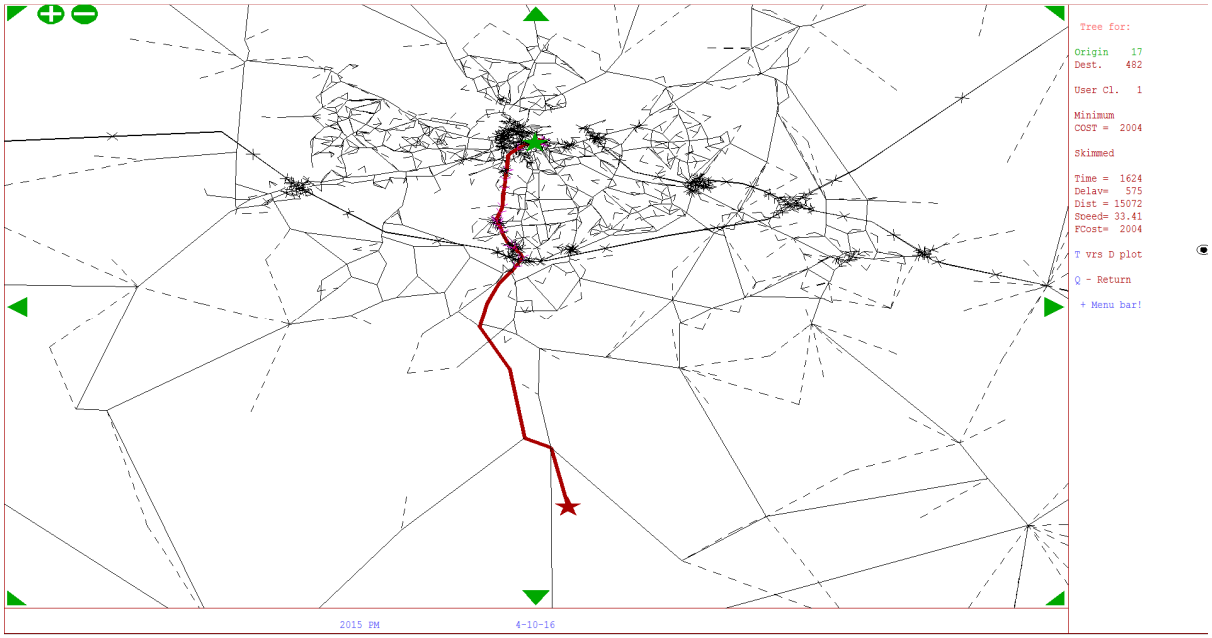


From South

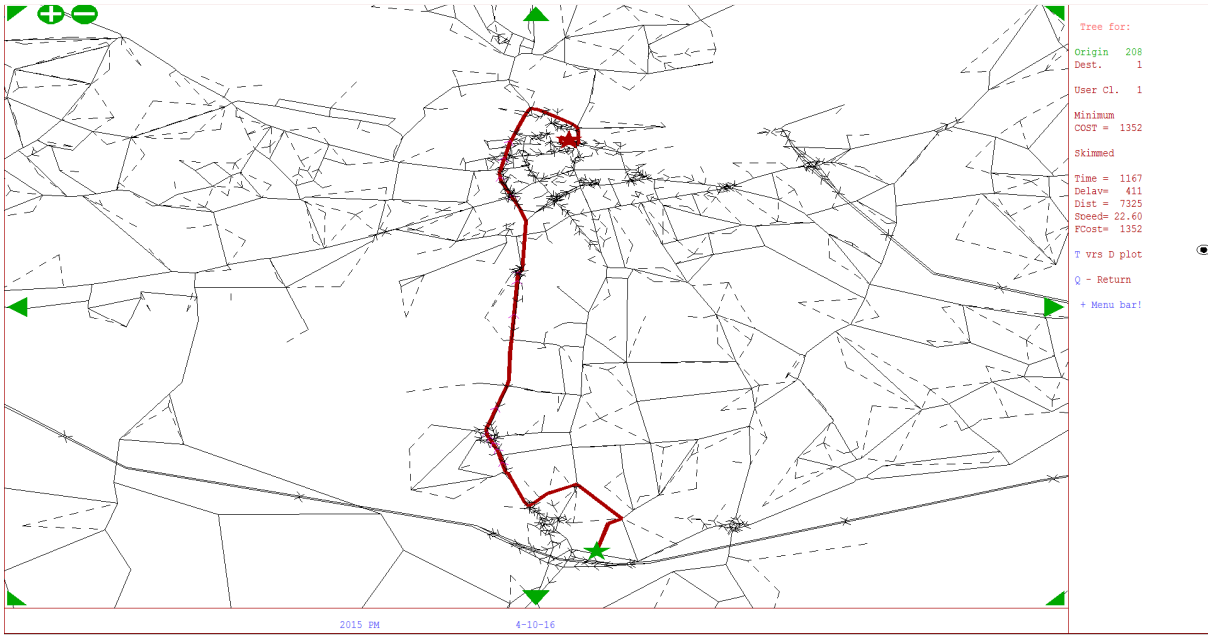
Zone 482 – Zone 17



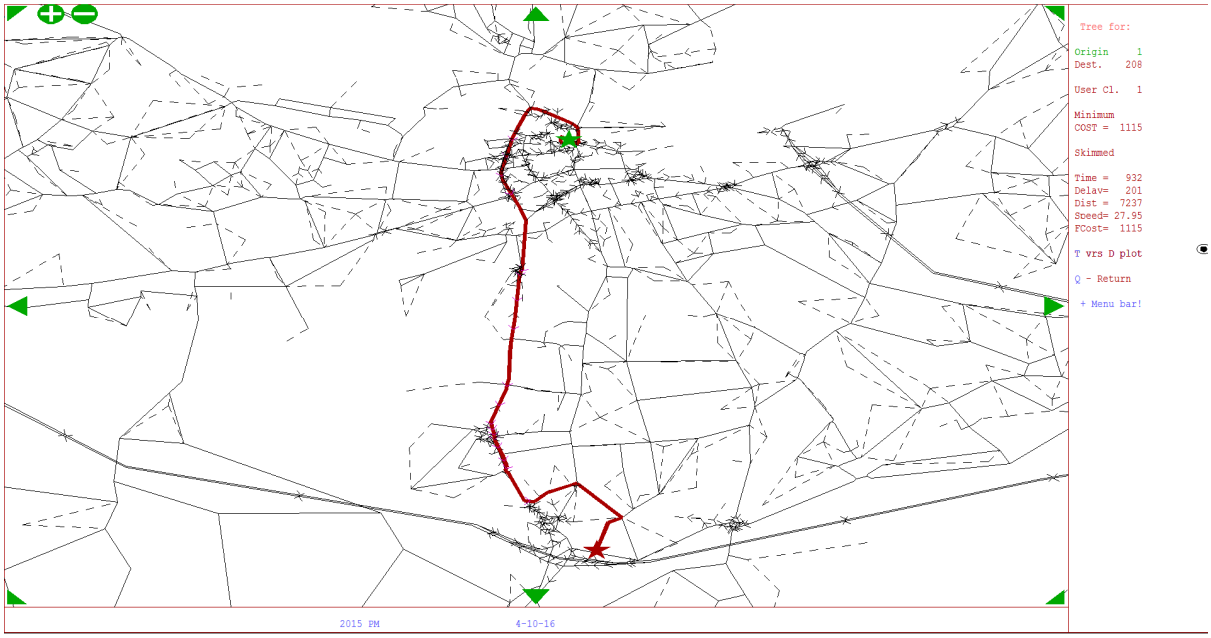
Zone 17 – Zone 482



Zone 208 – Zone 1

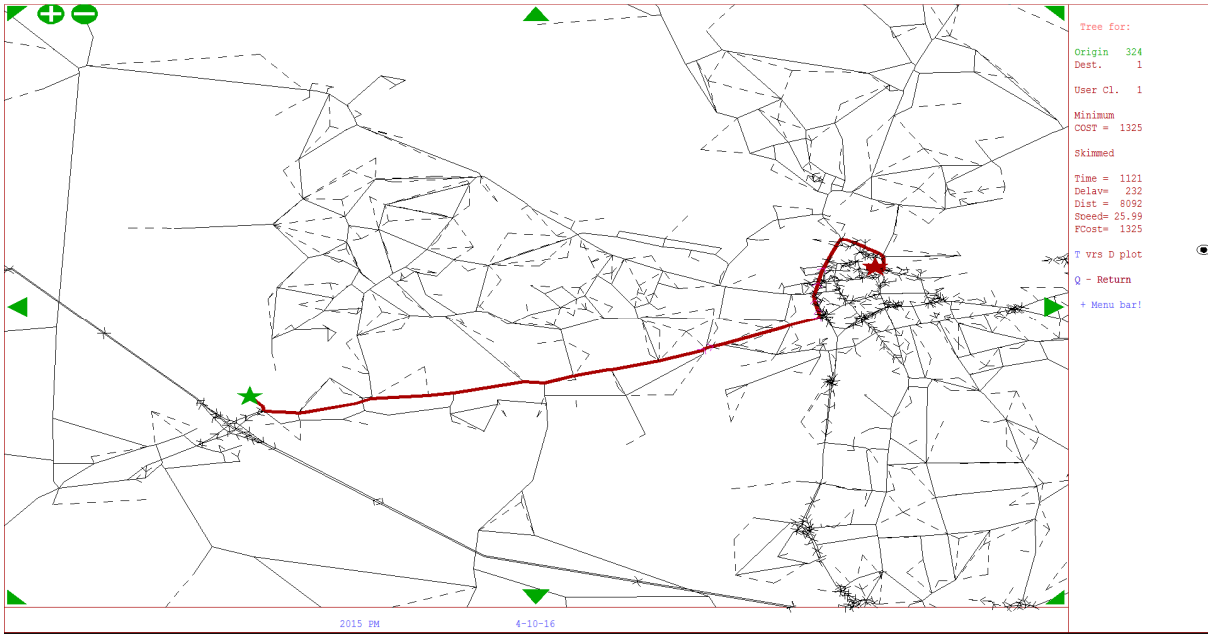


Zone 1 –Zone 208

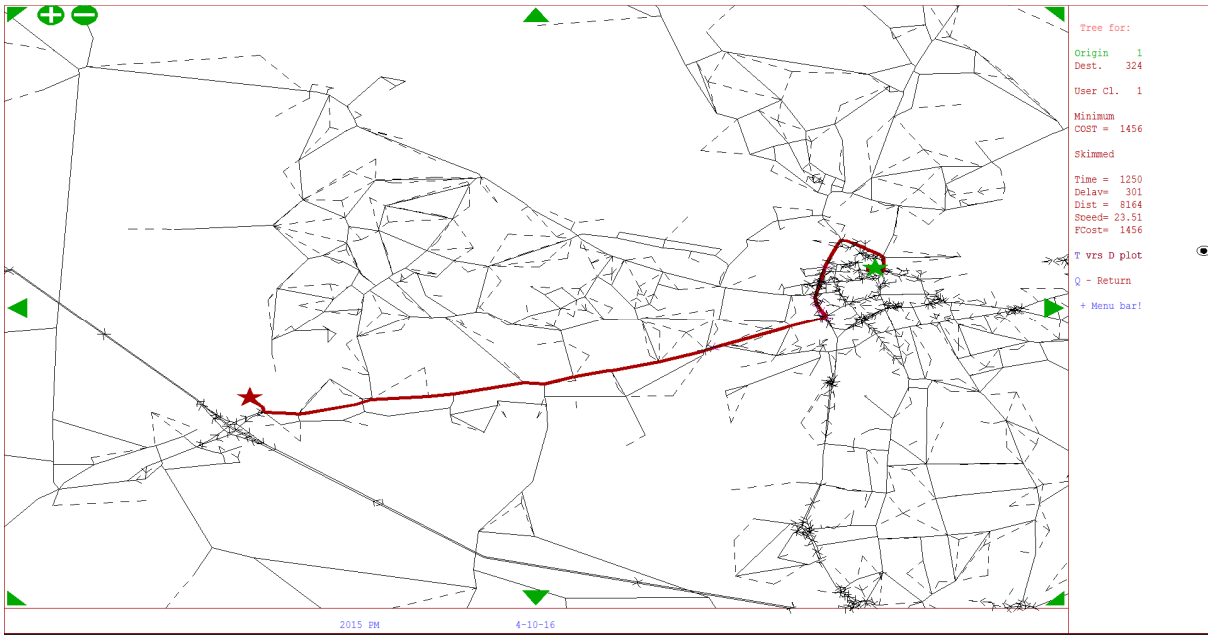


From West

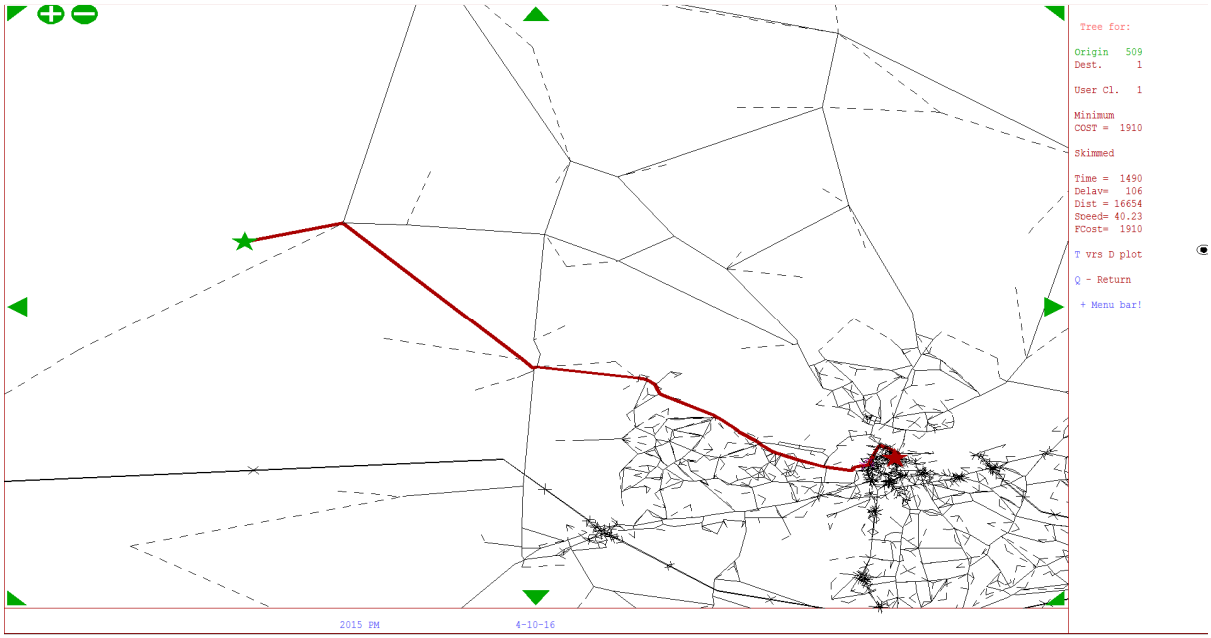
Zone 324 – Zone 1



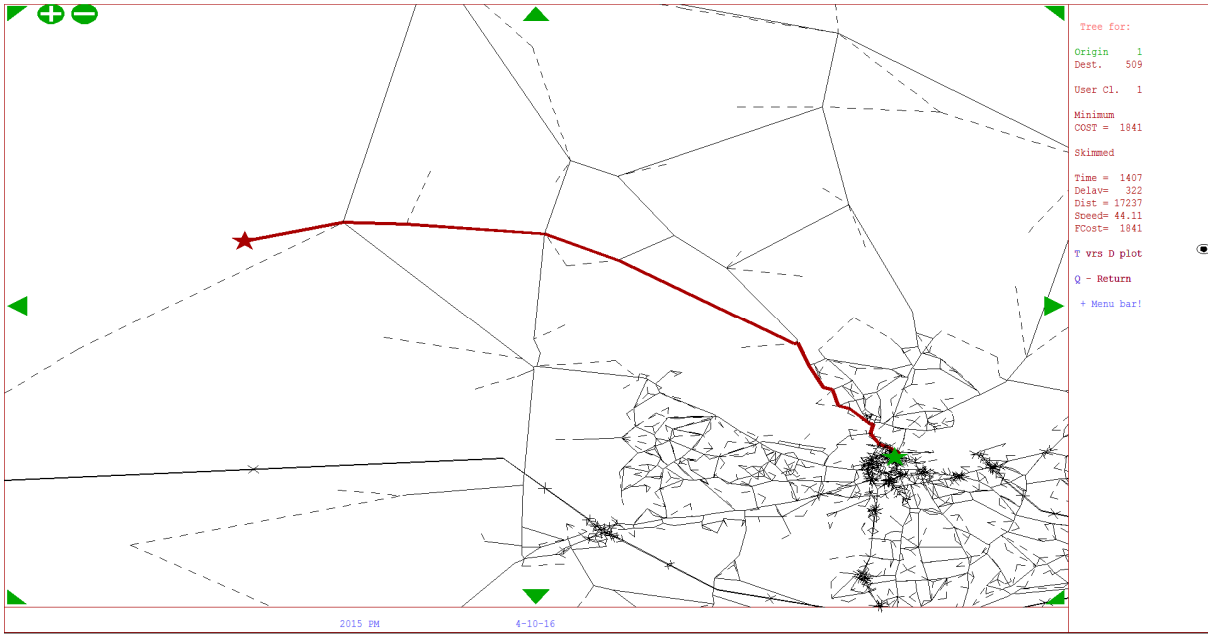
Zone 1 – Zone 324



Zone 509 – Zone 1



Zone 1 – Zone 509



Appendix C Flow Calibration

AM Peak

Description	All (vehicles)			
	Observed	Modelled	GEH	DMRB
A4 Bath Road / Charrington Road / Old Bath Road	756	1008	8.46	×
A4 Bath Road / Charrington Road / Old Bath Road	72	10	9.72	✓
A4 Bath Road / Charrington Road / Old Bath Road	56	57	0.11	✓
A4 Bath Road / Charrington Road / Old Bath Road	431	523	4.22	✓
A4 Bath Road / Charrington Road / Old Bath Road	12	0	4.90	✓
A4 Bath Road / Charrington Road / Old Bath Road	565	568	0.13	✓
A4 Bath Road / Charrington Road / Old Bath Road	111	10	13.04	×
A4 Bath Road / Charrington Road / Old Bath Road	17	0	5.83	✓
A4 Bath Road / Charrington Road / Old Bath Road	43	17	4.65	✓
A4 Bath Road / Charrington Road / Old Bath Road	176	49	12.02	×
A4 Bath Road / Charrington Road / Old Bath Road	637	686	1.89	✓
A4 Bath Road / Charrington Road / Old Bath Road	58	8	8.82	✓
Oxford Road / Wigmore Lane / Norcot Road	2	0	1.39	✓
Oxford Road / Wigmore Lane / Norcot Road	60	66	0.82	✓
Oxford Road / Wigmore Lane / Norcot Road	432	424	0.38	✓
Oxford Road / Wigmore Lane / Norcot Road	444	355	4.43	✓
Oxford Road / Wigmore Lane / Norcot Road	101	85	1.73	✓
Oxford Road / Wigmore Lane / Norcot Road	0	3	2.62	✓
Oxford Road / Wigmore Lane / Norcot Road	49	288	18.41	×
Oxford Road / Wigmore Lane / Norcot Road	457	392	3.13	✓
Oxford Road / Wigmore Lane / Norcot Road	367	326	2.19	✓
Oxford Road / Wigmore Lane / Norcot Road	138	152	1.12	✓
Oxford Road / Wigmore Lane / Norcot Road	9	0	4.17	✓
Oxford Road / Wigmore Lane / Norcot Road	183	87	8.21	✓
Oxford Road / Wigmore Lane / Norcot Road	173	156	1.30	✓
Oxford Road / Wigmore Lane / Norcot Road	168	164	0.30	✓
Oxford Road / Wigmore Lane / Norcot Road	310	51	19.26	×
Oxford Road / Wigmore Lane / Norcot Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	5	0	3.16	✓
Oxford Road / Overdown Road / Rodway Road	84	40	5.56	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	491	453	1.74	✓
Oxford Road / Overdown Road / Rodway Road	126	105	1.99	✓
Oxford Road / Overdown Road / Rodway Road	2	0	1.81	✓
Oxford Road / Overdown Road / Rodway Road	2	0	2.00	✓
Oxford Road / Overdown Road / Rodway Road	434	255	9.67	×
Oxford Road / Overdown Road / Rodway Road	26	0	7.21	✓
Oxford Road / Overdown Road / Rodway Road	85	24	8.23	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	41	0	9.06	✓
Oxford Road / Overdown Road / Rodway Road	336	264	4.18	✓
Oxford Road / Overdown Road / Rodway Road	259	132	9.05	×
Oxford Road / Overdown Road / Rodway Road	3	27	6.15	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.00	✓
Tilehurst Road / Water Road	1	0	1.41	✓
Tilehurst Road / Water Road	171	81	8.08	✓

Tilehurst Road / Water Road	192	231	2.69	✓
Tilehurst Road / Water Road	174	83	7.99	✓
Tilehurst Road / Water Road	0	0	0.00	✓
Tilehurst Road / Water Road	406	440	1.64	✓
Tilehurst Road / Water Road	266	111	11.31	×
Tilehurst Road / Water Road	345	220	7.43	×
Tilehurst Road / Water Road	1	0	1.41	✓
Bath Road / Berkeley Avenue	455	400	2.66	✓
Bath Road / Berkeley Avenue	32	19	2.66	✓
Bath Road / Berkeley Avenue	612	871	9.51	×
Bath Road / Berkeley Avenue	506	452	2.49	✓
Bath Road / Berkeley Avenue	24	2	6.28	✓
Bath Road / Berkeley Avenue	632	515	4.86	×
A33 Bennet Road Gyratory	1756	1682	1.78	✓
A33 Bennet Road Gyratory	320	172	9.38	×
A33 Bennet Road Gyratory	1704	1632	1.74	✓
A33 Bennet Road Gyratory	1442	1343	2.63	✓
A33 Bennet Road Gyratory	262	289	1.64	✓
A33 Bennet Road Gyratory	126	72	5.38	✓
A33 Bennet Road Gyratory	133	127	0.57	✓
A33 Bennet Road Gyratory	80	13	9.81	✓
A33 Bennet Road Gyratory	314	402	4.64	✓
A33 Bennet Road Gyratory	24	0	6.85	✓
A33 Bennet Road Gyratory	1926	1610	7.51	×
A33 Bennet Road Gyratory	80	13	9.81	✓
A33 Bennet Road Gyratory	551	336	10.23	×
A33 Bennet Road Gyratory	1689	1677	0.31	✓
A33 Bennet Road Gyratory	8	0	4.00	✓
A33 Bennet Road Gyratory	23	1	6.51	✓
A33 Bennet Road Gyratory	1475	1558	2.14	✓
A33 Bennet Road Gyratory	238	120	8.84	×
A33 Bennet Road Gyratory	55	12	7.46	✓
A33 Bennet Road Gyratory	31	3	6.85	✓
A33 Bennet Road Gyratory	269	123	10.47	×
Chatham Street / A329 / Friar Street	69	109	4.25	✓
Chatham Street / A329 / Friar Street	245	110	10.13	×
Chatham Street / A329 / Friar Street	240	112	9.70	×
Chatham Street / A329 / Friar Street	626	545	3.37	✓
Chatham Street / A329 / Friar Street	86	197	9.30	×
Chatham Street / A329 / Friar Street	143	168	1.98	✓
Chatham Street / A329 / Friar Street	187	70	10.39	×
Chatham Street / A329 / Friar Street	139	238	7.24	✓
Chatham Street / A329 / Friar Street	429	665	10.08	×
Chatham Street / A329 / Friar Street	452	283	8.82	×
Chatham Street / A329 / Friar Street	169	284	7.67	×
Chatham Street / A329 / Friar Street	422	237	10.21	×
Chatham Street / A329 / Friar Street	307	370	3.39	✓
Chatham Street / A329 / Friar Street	691	577	4.53	×
Chatham Street / A329 / Friar Street	492	267	11.55	×
Chatham Street / A329 / Friar Street	621	547	3.08	✓

Basingstoke Road / Christchurch Road	42	48	0.94	✓
Basingstoke Road / Christchurch Road	278	289	0.64	✓
Basingstoke Road / Christchurch Road	369	661	12.85	×
Basingstoke Road / Christchurch Road	346	360	0.72	✓
Basingstoke Road / Christchurch Road	6	0	3.46	✓
Basingstoke Road / Christchurch Road	322	133	12.49	×
Basingstoke Road / Christchurch Road	453	968	19.34	×
Basingstoke Road / Christchurch Road	199	125	5.83	✓
Basingstoke Road / Christchurch Road	4	0	2.69	✓
A329 / A33	358	470	5.49	×
A329 / A33	1168	1234	1.90	✓
A329 / A33	657	1006	12.09	×
A329 / A33	387	494	5.11	×
A329 / A33	889	1179	9.03	×
A329 / A33	106	113	0.60	✓
A329 / A33	854	861	0.22	✓
Park Lane / School Road / Chapel Hill	0	0	0.00	✓
Park Lane / School Road / Chapel Hill	118	21	11.71	✓
Park Lane / School Road / Chapel Hill	364	254	6.28	×
Park Lane / School Road / Chapel Hill	102	81	2.24	✓
Park Lane / School Road / Chapel Hill	0	0	0.00	✓
Park Lane / School Road / Chapel Hill	292	212	5.03	✓
Park Lane / School Road / Chapel Hill	372	216	9.11	×
Park Lane / School Road / Chapel Hill	153	115	3.29	✓
Park Lane / School Road / Chapel Hill	0	0	0.00	✓
Norcot Road / Church End Lane	238	196	2.86	✓
Norcot Road / Church End Lane	319	160	10.26	×
Norcot Road / Church End Lane	299	471	8.75	×
Norcot Road / Church End Lane	49	27	3.57	✓
Norcot Road / Church End Lane	210	134	5.78	✓
Norcot Road / Church End Lane	42	20	3.93	✓
Peppard Road / Henley Road / Prospect Street	202	558	18.22	×
Peppard Road / Henley Road / Prospect Street	211	263	3.39	✓
Peppard Road / Henley Road / Prospect Street	10	27	4.01	✓
Peppard Road / Henley Road / Prospect Street	222	160	4.45	✓
Peppard Road / Henley Road / Prospect Street	46	0	9.59	✓
Peppard Road / Henley Road / Prospect Street	226	192	2.29	✓
Peppard Road / Henley Road / Prospect Street	140	160	1.62	✓
Peppard Road / Henley Road / Prospect Street	10	0	4.47	✓
Peppard Road / Henley Road / Prospect Street	25	6	4.68	✓
Peppard Road / Henley Road / Prospect Street	48	138	9.36	✓
Peppard Road / Henley Road / Prospect Street	158	369	13.02	×
Peppard Road / Henley Road / Prospect Street	12	10	0.47	✓
Burghfield Road / Bath Road	323	152	11.12	×
Burghfield Road / Bath Road	562	693	5.24	×
Burghfield Road / Bath Road	253	174	5.38	✓
Burghfield Road / Bath Road	293	482	9.62	×
Burghfield Road / Bath Road	518	602	3.52	✓
Burghfield Road / Bath Road	263	127	9.77	×
South Oak Way / A33	103	64	4.28	✓

South Oak Way / A33	205	183	1.62	✓
South Oak Way / A33	1176	1219	1.25	✓
South Oak Way / A33	32	21	2.24	✓
South Oak Way / A33	0	0	0.00	✓
South Oak Way / A33	110	26	10.13	✓
South Oak Way / A33	1798	1572	5.51	✓
South Oak Way / A33	947	891	1.84	✓
South Oak Way / A33	5	0	3.16	✓
Queens Road / Watlington Street	1877	1947	1.60	✓
Queens Road / Watlington Street	132	21	12.76	×
Rose Kiln Lane / Gillette Way	25	5	5.03	✓
Rose Kiln Lane / Gillette Way	304	293	0.63	✓
Rose Kiln Lane / Gillette Way	64	49	2.04	✓
Rose Kiln Lane / Gillette Way	73	121	4.91	✓
Rose Kiln Lane / Gillette Way	435	266	9.04	×
Rose Kiln Lane / Gillette Way	1	0	1.41	✓
Rose Kiln Lane / Gillette Way	78	75	0.34	✓
Rose Kiln Lane / Gillette Way	96	54	4.89	✓
Rose Kiln Lane / Gillette Way	49	16	5.80	✓
Rose Kiln Lane / Gillette Way	86	28	7.68	✓
Rose Kiln Lane / Gillette Way	1	0	1.41	✓
Rose Kiln Lane / Gillette Way	12	1	4.31	✓
Rose Kiln Lane / Gillette Way	120	24	11.37	✓
Rose Kiln Lane / Gillette Way	89	27	8.06	✓
Rose Kiln Lane / Gillette Way	23	1	6.48	✓
Rose Kiln Lane / Gillette Way	0	0	0.00	✓
M4 J11	729	1103	12.35	×
M4 J11	439	725	11.85	×
M4 J11	1399	1380	0.52	✓
M4 J11	2036	2593	11.57	×
M4 J11	439	725	11.86	×
M4 J11	1399	1380	0.52	✓
M4 J11	1173	1586	11.13	×
M4 J11	863	1006	4.69	×
M4 J11	2080	2024	1.23	✓
M4 J11	712	389	13.74	×
M4 J11	1368	1635	6.88	×
M4 J11	868	1011	4.67	×
M4 J11	1363	1630	6.89	×
M4 J11	619	690	2.76	✓
M4 J11	2095	2064	0.68	✓
M4 J11	2477	2660	3.62	✓
M4 J11	1182	1033	4.46	✓
M4 J11	1785	1716	1.66	✓
M4 J11	941	584	12.93	×
M4 J11	844	1132	9.16	×
M4 J11	2025	2165	3.06	✓
M4 J11	827	1125	9.55	×
M4 J11	2706	2869	3.09	✓
Mereoak Northern Junction	294	740	19.61	×

Mereoak Northern Junction	1671	1236	11.41	×
Mereoak Northern Junction	689	665	0.94	✓
Mereoak Northern Junction	257	56	16.10	×
Mereoak Northern Junction	2159	2089	1.52	✓
Mereoak Northern Junction	216	179	2.61	✓
Mereoak Southern Junction	1341	987	10.37	×
Mereoak Southern Junction	584	305	13.22	×
Mereoak Southern Junction	1612	1524	2.21	✓
Mereoak Southern Junction	104	65	4.28	✓
Mereoak Southern Junction	733	746	0.47	✓
Mereoak Southern Junction	181	274	6.19	✓
Hollow Lane / Arborfield Road / School Green	2	0	2.00	✓
Hollow Lane / Arborfield Road / School Green	682	754	2.68	✓
Hollow Lane / Arborfield Road / School Green	359	138	14.03	×
Hollow Lane / Arborfield Road / School Green	613	720	4.14	×
Hollow Lane / Arborfield Road / School Green	1	0	1.41	✓
Hollow Lane / Arborfield Road / School Green	145	45	10.32	×
Hollow Lane / Arborfield Road / School Green	305	166	9.07	×
Hollow Lane / Arborfield Road / School Green	186	59	11.45	×
Hollow Lane / Arborfield Road / School Green	1	0	1.41	✓
Blackboy Junction	159	159	0.03	✓
Blackboy Junction	458	453	0.22	✓
Blackboy Junction	672	490	7.56	×
Blackboy Junction	173	105	5.74	✓
Blackboy Junction	403	335	3.56	✓
Blackboy Junction	899	1503	17.43	×
Blackboy Junction	966	1445	13.80	×
Blackboy Junction	106	163	4.92	✓
Blackboy Junction	566	546	0.86	✓
Blackboy Junction	712	675	1.41	✓
Blackboy Junction	470	546	3.36	✓
Blackboy Junction	348	292	3.12	✓
Blackboy Junction	866	1005	4.54	×
Blackboy Junction	390	142	15.23	×
Blackboy Junction	200	129	5.55	✓
Blackboy Junction	908	854	1.80	✓
Shinfield Road / Hollow Lane / Brookers Hill	778	612	6.30	×
Shinfield Road / Hollow Lane / Brookers Hill	309	147	10.73	×
Shinfield Road / Hollow Lane / Brookers Hill	841	871	1.03	✓
Shinfield Road / Hollow Lane / Brookers Hill	39	0	8.83	✓
Shinfield Road / Hollow Lane / Brookers Hill	280	273	0.44	✓
Shinfield Road / Hollow Lane / Brookers Hill	80	0	12.65	✓
A3290/Reading Road/Lower Earley Way	515	657	5.88	×
A3290/Reading Road/Lower Earley Way	402	585	8.25	×
A3290/Reading Road/Lower Earley Way	811	1213	12.63	×
A3290/Reading Road/Lower Earley Way	493	507	0.63	✓
A3290/Reading Road/Lower Earley Way	402	585	8.25	×
A3290/Reading Road/Lower Earley Way	493	507	0.63	✓
A3290/Reading Road/Lower Earley Way	1133	1491	9.89	×
A3290/Reading Road/Lower Earley Way	256	667	19.15	×

A3290/Reading Road/Lower Earley Way	1127	1331	5.82	×
A3290/Reading Road/Lower Earley Way	818	1006	6.23	×
A3290/Reading Road/Lower Earley Way	683	1104	14.09	×
A3290/Reading Road/Lower Earley Way	976	1111	4.17	✓
A3290/Reading Road/Lower Earley Way	374	780	16.89	×
A3290/Reading Road/Lower Earley Way	976	1111	4.17	✓
A3290/Reading Road/Lower Earley Way	683	1104	14.09	×
A3290/Reading Road/Lower Earley Way	1209	1326	3.30	✓
A3290/Reading Road/Lower Earley Way	1103	1368	7.54	×
A3290/Reading Road/Lower Earley Way	789	1062	8.99	×
M4 J10	1869	1695	4.11	✓
M4 J10	849	469	14.80	×
M4 J10	1020	1226	6.16	×
M4 J10	849	469	14.80	×
M4 J10	1020	1226	6.16	×
M4 J10	1751	1681	1.69	✓
M4 J10	1478	1684	5.18	✓
M4 J10	2324	1650	15.12	×
M4 J10	1478	1684	5.18	✓
M4 J10	1570	1024	15.16	×
M4 J10	1716	1844	3.03	✓
M4 J10	902	1212	9.53	×
M4 J10	814	559	9.72	×
M4 J10	902	1212	9.53	×
M4 J10	814	559	9.72	×
M4 J10	1834	1785	1.14	✓
M4 J10	937	1047	3.50	✓
M4 J10	2158	1509	15.14	×
M4 J10	937	1047	3.50	✓
M4 J10	1715	1405	7.85	×
M4 J10	754	626	4.88	×
M4 J10	754	626	4.88	×
M4 J10	443	104	20.46	×
M4 J10	443	104	20.46	×
A3290 / Wharfedale Road	192	357	9.97	×
A3290 / Wharfedale Road	255	277	1.37	✓
A3290 / Wharfedale Road	249	277	1.74	✓
A3290 / Wharfedale Road	14	0	5.29	✓
A3290 / Wharfedale Road	665	966	10.52	×
A3290 / Wharfedale Road	488	144	19.33	×
A3290 / Wharfedale Road	455	144	17.95	×
A3290 / Wharfedale Road	47	0	9.70	✓
A3290 / Wharfedale Road	1374	1630	6.59	×
A3290 / Wharfedale Road	668	849	6.58	×
A3290 / Wharfedale Road	8	0	4.00	✓
A3290 / Wharfedale Road	707	849	5.10	×
Wharfedale Road / A329 Slip Road	499	439	2.75	✓
Wharfedale Road / A329 Slip Road	1010	1063	1.63	✓
Wharfedale Road / A329 Slip Road	1037	1124	2.66	✓
Wharfedale Road / A329 Slip Road	0	0	0.00	✓

Wharfedale Road / A329 Slip Road	120	58	6.58	✓
Wharfedale Road / A329 Slip Road	27	17	2.23	✓
Wharfedale Road / A329 Slip Road	26	17	2.04	✓
Wharfedale Road / A329 Slip Road	1	0	1.41	✓
Wharfedale Road / A329 Slip Road	288	366	4.29	✓
Wharfedale Road / A329 Slip Road	514	841	12.55	×
Wharfedale Road / A329 Slip Road	488	779	11.55	×
Wharfedale Road / A329 Slip Road	27	62	5.24	✓
Lower Earley Way / Mill Lane / Rushey Way	6	0	3.46	✓
Lower Earley Way / Mill Lane / Rushey Way	195	186	0.69	✓
Lower Earley Way / Mill Lane / Rushey Way	451	921	17.96	×
Lower Earley Way / Mill Lane / Rushey Way	198	146	3.98	✓
Lower Earley Way / Mill Lane / Rushey Way	356	541	8.72	×
Lower Earley Way / Mill Lane / Rushey Way	0	0	0.00	✓
Lower Earley Way / Mill Lane / Rushey Way	124	133	0.80	✓
Lower Earley Way / Mill Lane / Rushey Way	177	261	5.69	✓
Lower Earley Way / Mill Lane / Rushey Way	486	1000	18.86	×
Lower Earley Way / Mill Lane / Rushey Way	45	201	14.05	×
Lower Earley Way / Mill Lane / Rushey Way	0	0	0.00	✓
Lower Earley Way / Mill Lane / Rushey Way	55	33	3.25	✓
Lower Earley Way / Mill Lane / Rushey Way	440	437	0.13	✓
Lower Earley Way / Mill Lane / Rushey Way	191	374	10.89	×
Lower Earley Way / Mill Lane / Rushey Way	24	57	5.17	✓
Robinhood Lane / Reading Road / King Street Lane	171	69	9.27	×
Robinhood Lane / Reading Road / King Street Lane	216	139	5.82	✓
Robinhood Lane / Reading Road / King Street Lane	170	88	7.20	✓
Robinhood Lane / Reading Road / King Street Lane	123	66	5.85	✓
Robinhood Lane / Reading Road / King Street Lane	145	95	4.59	✓
Robinhood Lane / Reading Road / King Street Lane	396	1086	25.35	×
Robinhood Lane / Reading Road / King Street Lane	245	199	3.07	✓
Robinhood Lane / Reading Road / King Street Lane	217	202	1.06	✓
Robinhood Lane / Reading Road / King Street Lane	80	174	8.36	✓
Robinhood Lane / Reading Road / King Street Lane	47	35	1.91	✓
Robinhood Lane / Reading Road / King Street Lane	369	1071	26.17	×
Robinhood Lane / Reading Road / King Street Lane	85	82	0.28	✓
Wargrave Road / London Road / Church Street / High Street	12	3	3.43	✓
Wargrave Road / London Road / Church Street / High Street	158	240	5.83	✓
Wargrave Road / London Road / Church Street / High Street	16	2	4.81	✓
Wargrave Road / London Road / Church Street / High Street	27	64	5.49	✓
Wargrave Road / London Road / Church Street / High Street	34	0	8.25	✓
Wargrave Road / London Road / Church Street / High Street	114	94	2.00	✓
Wargrave Road / London Road / Church Street / High Street	170	214	3.19	✓
Wargrave Road / London Road / Church Street / High Street	16	0	5.66	✓
Wargrave Road / London Road / Church Street / High Street	118	49	7.61	✓
Wargrave Road / London Road / Church Street / High Street	57	24	5.26	✓
Wargrave Road / London Road / Church Street / High Street	116	32	9.78	✓
Wargrave Road / London Road / Church Street / High Street	138	110	2.53	✓
New Bath Road / Old Bath Road / Charvil Lane	38	0	8.72	✓
New Bath Road / Old Bath Road / Charvil Lane	28	9	4.29	✓
New Bath Road / Old Bath Road / Charvil Lane	769	688	3.01	✓

New Bath Road / Old Bath Road / Charvil Lane	149	95	4.90	✓
New Bath Road / Old Bath Road / Charvil Lane	244	0	22.09	×
New Bath Road / Old Bath Road / Charvil Lane	2	0	2.00	✓
New Bath Road / Old Bath Road / Charvil Lane	265	96	12.55	×
New Bath Road / Old Bath Road / Charvil Lane	94	72	2.46	✓
New Bath Road / Old Bath Road / Charvil Lane	550	625	3.07	✓
New Bath Road / Old Bath Road / Charvil Lane	151	108	3.76	✓
New Bath Road / Old Bath Road / Charvil Lane	1	0	1.41	✓
New Bath Road / Old Bath Road / Charvil Lane	11	33	4.75	✓
New Bath Road / Old Bath Road / Charvil Lane	243	87	12.12	×
New Bath Road / Old Bath Road / Charvil Lane	103	75	2.98	✓
New Bath Road / Old Bath Road / Charvil Lane	27	129	11.58	×
New Bath Road / Old Bath Road / Charvil Lane	1	0	1.41	✓
London Road/Reading Road/Pitts Lane	1282	1172	3.13	✓
London Road/Reading Road/Pitts Lane	132	72	5.98	✓
London Road/Reading Road/Pitts Lane	1263	1127	3.93	✓
London Road/Reading Road/Pitts Lane	437	452	0.69	✓
London Road/Reading Road/Pitts Lane	519	603	3.56	✓
London Road/Reading Road/Pitts Lane	1181	975	6.26	×
London Road/Reading Road/Pitts Lane	1120	955	5.11	✓
London Road/Reading Road/Pitts Lane	468	613	6.25	×
London Road/Reading Road/Pitts Lane	407	593	8.32	×
London Road/Reading Road/Pitts Lane	748	795	1.68	✓
London Road/Reading Road/Pitts Lane	113	27	10.29	✓
London Road/Reading Road/Pitts Lane	393	211	10.45	×
London Road / Wokingham Road / Granby Gardens / Cumber	1130	1032	2.99	✓
London Road / Wokingham Road / Granby Gardens / Cumber	42	1	8.75	✓
London Road / Wokingham Road / Granby Gardens / Cumber	1088	1031	1.74	✓
London Road / Wokingham Road / Granby Gardens / Cumber	1486	1572	2.20	✓
London Road / Wokingham Road / Granby Gardens / Cumber	398	560	7.39	×
London Road / Wokingham Road / Granby Gardens / Cumber	1486	1572	2.20	✓
London Road / Wokingham Road / Granby Gardens / Cumber	1071	1321	7.23	×
London Road / Wokingham Road / Granby Gardens / Cumber	737	972	8.03	×
London Road / Wokingham Road / Granby Gardens / Cumber	334	320	0.75	✓
London Road / Wokingham Road / Granby Gardens / Cumber	737	964	7.77	×
London Road / Wokingham Road / Granby Gardens / Cumber	334	317	0.95	✓
W31	46	31	2.50	✓
W31	415	461	2.21	✓
W31	9	0	4.24	✓
W31	152	244	6.54	✓
W31	376	169	12.52	×
W31	328	290	2.17	✓
W31	452	666	9.06	×
W31	178	139	3.07	✓
W31	98	18	10.54	✓
W31	63	18	7.01	✓
W31	246	123	9.01	×
W31	176	76	8.88	✓
Cutbush Lane / Lower Earley Way / Beeston Way	1	0	1.41	✓
Cutbush Lane / Lower Earley Way / Beeston Way	58	0	10.77	✓

Cutbush Lane / Lower Earley Way / Beeston Way	230	169	4.34	✓
Cutbush Lane / Lower Earley Way / Beeston Way	48	0	9.80	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	626	1083	15.64	×
Cutbush Lane / Lower Earley Way / Beeston Way	83	121	3.79	✓
Cutbush Lane / Lower Earley Way / Beeston Way	468	1043	20.91	×
Cutbush Lane / Lower Earley Way / Beeston Way	615	1039	14.73	×
Cutbush Lane / Lower Earley Way / Beeston Way	241	213	1.84	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	432	890	17.80	×
Cutbush Lane / Lower Earley Way / Beeston Way	567	274	14.29	×
Cutbush Lane / Lower Earley Way / Beeston Way	432	890	17.80	×
Cutbush Lane / Lower Earley Way / Beeston Way	119	274	11.08	×
Cutbush Lane / Lower Earley Way / Beeston Way	666	799	4.92	×
Cutbush Lane / Lower Earley Way / Beeston Way	1	0	1.41	✓
Cutbush Lane / Lower Earley Way / Beeston Way	551	1164	20.94	×
Cutbush Lane / Lower Earley Way / Beeston Way	856	1252	12.19	×
Shinfield Road / Elm Road / Cedar Road	104	291	13.32	×
Shinfield Road / Elm Road / Cedar Road	363	302	3.34	✓
Shinfield Road / Elm Road / Cedar Road	120	269	10.68	×
Shinfield Road / Elm Road / Cedar Road	279	245	2.07	✓
Shinfield Road / Elm Road / Cedar Road	497	408	4.20	✓
Shinfield Road / Elm Road / Cedar Road	216	275	3.76	✓
Beech Lane / Rushey Way	0	0	0.00	✓
Beech Lane / Rushey Way	235	144	6.65	✓
Beech Lane / Rushey Way	97	89	0.84	✓
Beech Lane / Rushey Way	322	126	13.08	×
Beech Lane / Rushey Way	0	0	0.00	✓
Beech Lane / Rushey Way	473	316	7.91	×
Beech Lane / Rushey Way	128	39	9.80	✓
Beech Lane / Rushey Way	488	245	12.68	×
Beech Lane / Rushey Way	3	1	1.77	✓
Wilderness Road / Beech Lane	0	0	0.00	✓
Wilderness Road / Beech Lane	87	63	2.78	✓
Wilderness Road / Beech Lane	893	991	3.18	✓
Wilderness Road / Beech Lane	270	86	13.84	×
Wilderness Road / Beech Lane	0	1	1.38	✓
Wilderness Road / Beech Lane	82	173	8.09	✓
Wilderness Road / Beech Lane	558	837	10.57	×
Wilderness Road / Beech Lane	32	70	5.27	✓
Wilderness Road / Beech Lane	0	0	0.00	✓
Elm Road / Elm Lane / Rowland Way	2	0	2.00	✓
Elm Road / Elm Lane / Rowland Way	311	339	1.57	✓
Elm Road / Elm Lane / Rowland Way	229	424	10.78	×
Elm Road / Elm Lane / Rowland Way	9	0	4.24	✓
Elm Road / Elm Lane / Rowland Way	385	314	3.78	✓
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Elm Road / Elm Lane / Rowland Way	135	96	3.63	✓
Elm Road / Elm Lane / Rowland Way	141	4	16.14	×

Elm Road / Elm Lane / Rowland Way	195	473	15.21	×
Elm Road / Elm Lane / Rowland Way	151	79	6.70	✓
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Elm Road / Elm Lane / Rowland Way	10	16	1.64	✓
Elm Road / Elm Lane / Rowland Way	8	0	4.00	✓
Elm Road / Elm Lane / Rowland Way	17	17	0.11	✓
Elm Road / Elm Lane / Rowland Way	8	10	0.57	✓
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Caversham Park Road / Henley Road	340	547	9.84	×
Caversham Park Road / Henley Road	276	196	5.20	✓
Caversham Park Road / Henley Road	216	219	0.20	✓
Caversham Park Road / Henley Road	376	554	8.27	×
Caversham Park Road / Henley Road	213	70	12.07	×
Caversham Park Road / Henley Road	526	418	4.95	×
Gosbrook Road / George Street	536	529	0.28	✓
Gosbrook Road / George Street	169	10	16.79	×
Gosbrook Road / George Street	317	375	3.13	✓
Gosbrook Road / George Street	206	352	8.72	×
Gosbrook Road / George Street	102	25	9.74	✓
Gosbrook Road / George Street	350	330	1.08	✓
Church Street / Bridge Street / Church Road	711	921	7.35	×
Church Street / Bridge Street / Church Road	39	3	7.87	✓
Church Street / Bridge Street / Church Road	588	573	0.64	✓
Church Street / Bridge Street / Church Road	543	690	5.92	×
Church Street / Bridge Street / Church Road	43	2	8.67	✓
Church Street / Bridge Street / Church Road	487	660	7.22	×
Reading Bridge Roundabout	0	0	0.00	✓
Reading Bridge Roundabout	41	16	4.66	✓
Reading Bridge Roundabout	344	488	7.08	×
Reading Bridge Roundabout	63	35	3.93	✓
Reading Bridge Roundabout	381	290	5.00	✓
Reading Bridge Roundabout	30	7	5.20	✓
Reading Bridge Roundabout	0	0	0.56	✓
Reading Bridge Roundabout	51	30	3.26	✓
Reading Bridge Roundabout	5	0	2.86	✓
Reading Bridge Roundabout	60	25	5.39	✓
Reading Bridge Roundabout	199	428	12.96	×
Reading Bridge Roundabout	70	60	1.27	✓
Reading Bridge Roundabout	2	0	2.00	✓
Reading Bridge Roundabout	84	121	3.69	✓
Reading Bridge Roundabout	220	74	12.04	×
Reading Bridge Roundabout	4	0	2.57	✓
Reading Bridge Roundabout	0	0	0.14	✓
Reading Bridge Roundabout	1	1	0.43	✓
Reading Bridge Roundabout	0	0	0.00	✓
Reading Bridge Roundabout	1	1	0.20	✓
Reading Bridge Roundabout	350	378	1.45	✓
Reading Bridge Roundabout	141	71	6.85	✓
Reading Bridge Roundabout	478	840	14.10	×
Reading Bridge Roundabout	175	164	0.87	✓

Reading Bridge Roundabout	25	19	1.20	✓
Caversham Bridge Roundabout	1	0	1.41	✓
Caversham Bridge Roundabout	8	12	1.36	✓
Caversham Bridge Roundabout	813	1143	10.55	×
Caversham Bridge Roundabout	349	402	2.72	✓
Caversham Bridge Roundabout	4	4	0.19	✓
Caversham Bridge Roundabout	0	0	0.00	✓
Caversham Bridge Roundabout	7	17	2.79	✓
Caversham Bridge Roundabout	0	2	2.14	✓
Caversham Bridge Roundabout	669	914	8.72	×
Caversham Bridge Roundabout	14	38	4.65	✓
Caversham Bridge Roundabout	7	0	3.60	✓
Caversham Bridge Roundabout	213	211	0.15	✓
Caversham Bridge Roundabout	415	344	3.62	✓
Caversham Bridge Roundabout	0	7	3.67	✓
Caversham Bridge Roundabout	283	358	4.17	✓
Caversham Bridge Roundabout	6	0	3.46	✓
Peppard Road / Kiln Road	180	151	2.25	✓
Peppard Road / Kiln Road	137	71	6.43	✓
Peppard Road / Kiln Road	406	266	7.64	×
Henley Road / Playhatch Road	4	37	7.29	✓
Henley Road / Playhatch Road	198	237	2.62	✓
Henley Road / Playhatch Road	2	3	0.67	✓
Henley Road / Playhatch Road	185	54	11.95	×
Henley Road / Playhatch Road	0	0	0.00	✓
Henley Road / Playhatch Road	377	533	7.30	×
Henley Road / Playhatch Road	45	13	5.96	✓
Henley Road / Playhatch Road	444	518	3.38	✓
Henley Road / Playhatch Road	370	443	3.61	✓
Henley Road / Playhatch Road	3	0	2.45	✓
Henley Road / Playhatch Road	26	4	5.53	✓
Henley Road / Playhatch Road	31	8	5.17	✓
Henley Road / Playhatch Road	30	10	4.54	✓
Henley Road / Playhatch Road	22	5	4.53	✓
Henley Road / Playhatch Road	0	0	0.00	✓
M4 J12	719	809	3.25	✓
M4 J12	1292	1114	5.12	✓
M4 J12	1727	1807	1.90	✓
M4 J12	1237	1108	3.77	✓
M4 J12	443	400	2.07	✓
M4 J12	1710	1649	1.50	✓
M4 J12	1279	991	8.55	×
M4 J12	431	658	9.72	×
M4 J12	448	400	2.32	✓
M4 J12	426	658	9.97	×
M4 J12	188	189	0.10	✓
M4 J12	1626	1434	4.90	✓
M4 J12	636	590	1.87	✓
M4 J12	1030	907	3.95	✓
M4 J12	1022	1185	4.92	×

M4 J12	758	485	10.94	×
M4 J12	357	279	4.40	✓
M4 J12	401	207	11.15	×
M4 J12	1035	998	1.16	✓
M4 J12	388	394	0.30	✓
Total	226706	233465	14.09	×
Percentage			53%	67%

>10	103	19%
>8	64	12%
>6	49	9%
>5	41	7%
<5	294	53%
	551	

Inter Peak

Description	All (vehicles)			
	Observed	Modelled	GEH	DMRB
A4 Bath Road / Charrington Road / Old Bath Road	325	463	6.97	×
A4 Bath Road / Charrington Road / Old Bath Road	59	10	8.29	✓
A4 Bath Road / Charrington Road / Old Bath Road	82	76	0.77	✓
A4 Bath Road / Charrington Road / Old Bath Road	394	512	5.51	×
A4 Bath Road / Charrington Road / Old Bath Road	14	0	5.27	✓
A4 Bath Road / Charrington Road / Old Bath Road	440	467	1.25	✓
A4 Bath Road / Charrington Road / Old Bath Road	42	13	5.44	✓
A4 Bath Road / Charrington Road / Old Bath Road	5	0	3.00	✓
A4 Bath Road / Charrington Road / Old Bath Road	45	30	2.46	✓
A4 Bath Road / Charrington Road / Old Bath Road	86	58	3.34	✓
A4 Bath Road / Charrington Road / Old Bath Road	390	435	2.23	✓
A4 Bath Road / Charrington Road / Old Bath Road	64	18	7.19	✓
Oxford Road / Wigmore Lane / Norcot Road	8	1	3.69	✓
Oxford Road / Wigmore Lane / Norcot Road	69	68	0.09	✓
Oxford Road / Wigmore Lane / Norcot Road	354	372	0.94	✓
Oxford Road / Wigmore Lane / Norcot Road	276	262	0.89	✓
Oxford Road / Wigmore Lane / Norcot Road	69	69	0.09	✓
Oxford Road / Wigmore Lane / Norcot Road	1	4	1.52	✓
Oxford Road / Wigmore Lane / Norcot Road	82	110	2.91	✓
Oxford Road / Wigmore Lane / Norcot Road	258	241	1.07	✓
Oxford Road / Wigmore Lane / Norcot Road	367	355	0.60	✓
Oxford Road / Wigmore Lane / Norcot Road	174	169	0.37	✓
Oxford Road / Wigmore Lane / Norcot Road	14	0	5.05	✓
Oxford Road / Wigmore Lane / Norcot Road	216	59	13.40	×
Oxford Road / Wigmore Lane / Norcot Road	288	258	1.79	✓
Oxford Road / Wigmore Lane / Norcot Road	203	204	0.07	✓
Oxford Road / Wigmore Lane / Norcot Road	359	62	20.46	×
Oxford Road / Wigmore Lane / Norcot Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	3	0	2.38	✓
Oxford Road / Overdown Road / Rodway Road	56	53	0.34	✓
Oxford Road / Overdown Road / Rodway Road	1	0	1.00	✓
Oxford Road / Overdown Road / Rodway Road	334	336	0.15	✓
Oxford Road / Overdown Road / Rodway Road	68	68	0.04	✓
Oxford Road / Overdown Road / Rodway Road	2	0	1.86	✓
Oxford Road / Overdown Road / Rodway Road	1	0	1.63	✓
Oxford Road / Overdown Road / Rodway Road	252	227	1.60	✓
Oxford Road / Overdown Road / Rodway Road	7	0	3.74	✓
Oxford Road / Overdown Road / Rodway Road	25	24	0.20	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.58	✓
Oxford Road / Overdown Road / Rodway Road	26	0	7.17	✓
Oxford Road / Overdown Road / Rodway Road	329	319	0.55	✓
Oxford Road / Overdown Road / Rodway Road	285	210	4.75	✓
Oxford Road / Overdown Road / Rodway Road	4	27	5.77	✓
Oxford Road / Overdown Road / Rodway Road	5	0	3.16	✓
Tilehurst Road / Water Road	0	0	0.58	✓
Tilehurst Road / Water Road	104	59	4.92	✓

Tilehurst Road / Water Road	201	166	2.65	✓
Tilehurst Road / Water Road	123	65	5.95	✓
Tilehurst Road / Water Road	0	0	0.00	✓
Tilehurst Road / Water Road	324	284	2.29	✓
Tilehurst Road / Water Road	272	220	3.31	✓
Tilehurst Road / Water Road	336	308	1.55	✓
Tilehurst Road / Water Road	1	0	1.41	✓
Bath Road / Berkeley Avenue	367	356	0.60	✓
Bath Road / Berkeley Avenue	23	18	1.16	✓
Bath Road / Berkeley Avenue	432	486	2.55	✓
Bath Road / Berkeley Avenue	434	266	8.95	×
Bath Road / Berkeley Avenue	24	6	4.67	✓
Bath Road / Berkeley Avenue	569	524	1.94	✓
A33 Bennet Road Gyratory	1254	1095	4.66	✓
A33 Bennet Road Gyratory	260	268	0.45	✓
A33 Bennet Road Gyratory	1367	1115	7.14	×
A33 Bennet Road Gyratory	1291	1041	7.33	×
A33 Bennet Road Gyratory	75	74	0.08	✓
A33 Bennet Road Gyratory	152	138	1.18	✓
A33 Bennet Road Gyratory	115	116	0.08	✓
A33 Bennet Road Gyratory	33	3	7.02	✓
A33 Bennet Road Gyratory	156	187	2.31	✓
A33 Bennet Road Gyratory	15	0	5.29	✓
A33 Bennet Road Gyratory	1446	1169	7.65	×
A33 Bennet Road Gyratory	33	3	7.02	✓
A33 Bennet Road Gyratory	121	93	2.77	✓
A33 Bennet Road Gyratory	1481	1263	5.88	✓
A33 Bennet Road Gyratory	8	0	3.55	✓
A33 Bennet Road Gyratory	43	3	8.39	✓
A33 Bennet Road Gyratory	1219	1045	5.17	✓
A33 Bennet Road Gyratory	305	221	5.18	✓
A33 Bennet Road Gyratory	68	84	1.83	✓
A33 Bennet Road Gyratory	69	67	0.21	✓
A33 Bennet Road Gyratory	374	288	4.71	✓
Chatham Street / A329 / Friar Street	69	133	6.38	✓
Chatham Street / A329 / Friar Street	241	161	5.62	✓
Chatham Street / A329 / Friar Street	256	159	6.78	✓
Chatham Street / A329 / Friar Street	463	444	0.89	✓
Chatham Street / A329 / Friar Street	61	86	2.93	✓
Chatham Street / A329 / Friar Street	98	123	2.31	✓
Chatham Street / A329 / Friar Street	206	95	9.03	×
Chatham Street / A329 / Friar Street	111	149	3.36	✓
Chatham Street / A329 / Friar Street	399	500	4.77	×
Chatham Street / A329 / Friar Street	244	205	2.63	✓
Chatham Street / A329 / Friar Street	159	150	0.69	✓
Chatham Street / A329 / Friar Street	196	204	0.53	✓
Chatham Street / A329 / Friar Street	201	100	8.28	×
Chatham Street / A329 / Friar Street	517	556	1.69	✓
Chatham Street / A329 / Friar Street	235	318	5.02	✓
Chatham Street / A329 / Friar Street	479	442	1.72	✓

Basingstoke Road / Christchurch Road	57	55	0.17	✓
Basingstoke Road / Christchurch Road	267	274	0.46	✓
Basingstoke Road / Christchurch Road	263	354	5.21	✓
Basingstoke Road / Christchurch Road	291	302	0.67	✓
Basingstoke Road / Christchurch Road	5	0	3.16	✓
Basingstoke Road / Christchurch Road	234	141	6.82	✓
Basingstoke Road / Christchurch Road	264	483	11.34	×
Basingstoke Road / Christchurch Road	179	190	0.84	✓
Basingstoke Road / Christchurch Road	6	1	2.82	✓
A329 / A33	388	389	0.08	✓
A329 / A33	685	652	1.27	✓
A329 / A33	446	592	6.40	×
A329 / A33	422	519	4.47	✓
A329 / A33	700	815	4.17	×
A329 / A33	100	64	3.93	✓
A329 / A33	607	526	3.37	✓
Park Lane / School Road / Chapel Hill	0	0	0.58	✓
Park Lane / School Road / Chapel Hill	67	30	5.40	✓
Park Lane / School Road / Chapel Hill	320	201	7.38	×
Park Lane / School Road / Chapel Hill	74	60	1.71	✓
Park Lane / School Road / Chapel Hill	0	0	0.00	✓
Park Lane / School Road / Chapel Hill	128	128	0.03	✓
Park Lane / School Road / Chapel Hill	306	222	5.17	✓
Park Lane / School Road / Chapel Hill	115	120	0.47	✓
Park Lane / School Road / Chapel Hill	0	0	0.82	✓
Norcot Road / Church End Lane	273	259	0.86	✓
Norcot Road / Church End Lane	164	137	2.22	✓
Norcot Road / Church End Lane	233	234	0.07	✓
Norcot Road / Church End Lane	35	30	0.85	✓
Norcot Road / Church End Lane	145	130	1.24	✓
Norcot Road / Church End Lane	40	20	3.62	✓
Peppard Road / Henley Road / Prospect Street	261	262	0.08	✓
Peppard Road / Henley Road / Prospect Street	132	132	0.01	✓
Peppard Road / Henley Road / Prospect Street	30	30	0.00	✓
Peppard Road / Henley Road / Prospect Street	288	216	4.52	✓
Peppard Road / Henley Road / Prospect Street	7	0	3.70	✓
Peppard Road / Henley Road / Prospect Street	243	197	3.12	✓
Peppard Road / Henley Road / Prospect Street	130	126	0.39	✓
Peppard Road / Henley Road / Prospect Street	5	0	3.24	✓
Peppard Road / Henley Road / Prospect Street	14	0	5.23	✓
Peppard Road / Henley Road / Prospect Street	30	30	0.09	✓
Peppard Road / Henley Road / Prospect Street	248	246	0.15	✓
Peppard Road / Henley Road / Prospect Street	9	0	4.32	✓
Burghfield Road / Bath Road	175	108	5.64	✓
Burghfield Road / Bath Road	498	499	0.01	✓
Burghfield Road / Bath Road	168	158	0.76	✓
Burghfield Road / Bath Road	199	203	0.27	✓
Burghfield Road / Bath Road	493	483	0.45	✓
Burghfield Road / Bath Road	176	121	4.48	✓
South Oak Way / A33	230	85	11.55	×

South Oak Way / A33	121	105	1.57	✓
South Oak Way / A33	1099	966	4.14	✓
South Oak Way / A33	116	60	5.99	✓
South Oak Way / A33	1	0	1.29	✓
South Oak Way / A33	300	198	6.48	×
South Oak Way / A33	1163	1018	4.38	✓
South Oak Way / A33	233	243	0.67	✓
South Oak Way / A33	3	0	2.38	✓
Queens Road / Watlington Street	1553	1693	3.49	✓
Queens Road / Watlington Street	86	32	7.06	✓
Rose Kiln Lane / Gillette Way	24	10	3.53	✓
Rose Kiln Lane / Gillette Way	305	175	8.39	×
Rose Kiln Lane / Gillette Way	48	34	2.10	✓
Rose Kiln Lane / Gillette Way	114	23	10.94	✓
Rose Kiln Lane / Gillette Way	405	242	9.09	×
Rose Kiln Lane / Gillette Way	6	0	3.56	✓
Rose Kiln Lane / Gillette Way	59	22	5.68	✓
Rose Kiln Lane / Gillette Way	183	20	16.09	×
Rose Kiln Lane / Gillette Way	53	14	6.81	✓
Rose Kiln Lane / Gillette Way	90	39	6.37	✓
Rose Kiln Lane / Gillette Way	1	0	1.29	✓
Rose Kiln Lane / Gillette Way	31	1	7.62	✓
Rose Kiln Lane / Gillette Way	195	20	16.91	×
Rose Kiln Lane / Gillette Way	204	28	16.38	×
Rose Kiln Lane / Gillette Way	47	1	9.28	✓
Rose Kiln Lane / Gillette Way	0	0	0.82	✓
M4 J11	411	531	5.53	×
M4 J11	173	155	1.40	✓
M4 J11	911	829	2.76	✓
M4 J11	1566	1545	0.53	✓
M4 J11	173	155	1.40	✓
M4 J11	911	829	2.76	✓
M4 J11	932	921	0.38	✓
M4 J11	634	624	0.37	✓
M4 J11	977	890	2.85	✓
M4 J11	441	443	0.11	✓
M4 J11	536	447	4.04	✓
M4 J11	635	625	0.41	✓
M4 J11	535	446	4.00	✓
M4 J11	315	315	0.01	✓
M4 J11	936	1009	2.32	✓
M4 J11	1075	969	3.31	✓
M4 J11	512	485	1.17	✓
M4 J11	849	849	0.02	✓
M4 J11	364	350	0.71	✓
M4 J11	485	498	0.59	✓
M4 J11	997	984	0.40	✓
M4 J11	591	625	1.37	✓
M4 J11	2066	1844	5.03	✓
Mereoak Northern Junction	287	239	2.99	✓

Mereoak Northern Junction	1103	1125	0.67	✓
Mereoak Northern Junction	276	301	1.50	✓
Mereoak Northern Junction	108	92	1.67	✓
Mereoak Northern Junction	1059	1022	1.15	✓
Mereoak Northern Junction	104	117	1.22	✓
Mereoak Southern Junction	867	867	0.01	✓
Mereoak Southern Junction	351	350	0.09	✓
Mereoak Southern Junction	792	772	0.74	✓
Mereoak Southern Junction	40	12	5.50	✓
Mereoak Southern Junction	376	367	0.43	✓
Mereoak Southern Junction	54	71	2.19	✓
Hollow Lane / Arborfield Road / School Green	3	0	2.24	✓
Hollow Lane / Arborfield Road / School Green	361	324	2.01	✓
Hollow Lane / Arborfield Road / School Green	183	112	5.82	✓
Hollow Lane / Arborfield Road / School Green	384	356	1.45	✓
Hollow Lane / Arborfield Road / School Green	3	0	2.38	✓
Hollow Lane / Arborfield Road / School Green	97	61	4.02	✓
Hollow Lane / Arborfield Road / School Green	172	95	6.65	✓
Hollow Lane / Arborfield Road / School Green	111	63	5.11	✓
Hollow Lane / Arborfield Road / School Green	1	0	1.53	✓
Blackboy Junction	71	51	2.53	✓
Blackboy Junction	324	306	1.02	✓
Blackboy Junction	387	390	0.17	✓
Blackboy Junction	128	100	2.54	✓
Blackboy Junction	221	205	1.10	✓
Blackboy Junction	444	486	1.93	✓
Blackboy Junction	517	520	0.13	✓
Blackboy Junction	55	66	1.46	✓
Blackboy Junction	219	199	1.39	✓
Blackboy Junction	405	402	0.13	✓
Blackboy Junction	267	276	0.57	✓
Blackboy Junction	193	192	0.05	✓
Blackboy Junction	574	544	1.27	✓
Blackboy Junction	191	184	0.50	✓
Blackboy Junction	120	119	0.14	✓
Blackboy Junction	572	536	1.54	✓
Shinfield Road / Hollow Lane / Brookers Hill	489	415	3.44	✓
Shinfield Road / Hollow Lane / Brookers Hill	108	85	2.32	✓
Shinfield Road / Hollow Lane / Brookers Hill	482	393	4.23	✓
Shinfield Road / Hollow Lane / Brookers Hill	36	0	8.43	✓
Shinfield Road / Hollow Lane / Brookers Hill	114	150	3.13	✓
Shinfield Road / Hollow Lane / Brookers Hill	42	0	9.17	✓
A3290/Reading Road/Lower Earley Way	410	501	4.25	✓
A3290/Reading Road/Lower Earley Way	353	441	4.41	✓
A3290/Reading Road/Lower Earley Way	814	820	0.22	✓
A3290/Reading Road/Lower Earley Way	278	318	2.31	✓
A3290/Reading Road/Lower Earley Way	353	441	4.41	✓
A3290/Reading Road/Lower Earley Way	278	318	2.31	✓
A3290/Reading Road/Lower Earley Way	812	683	4.70	×
A3290/Reading Road/Lower Earley Way	204	219	1.06	✓

A3290/Reading Road/Lower Earley Way	756	782	0.94	✓
A3290/Reading Road/Lower Earley Way	719	767	1.76	✓
A3290/Reading Road/Lower Earley Way	367	321	2.48	✓
A3290/Reading Road/Lower Earley Way	340	401	3.19	✓
A3290/Reading Road/Lower Earley Way	330	306	1.36	✓
A3290/Reading Road/Lower Earley Way	340	401	3.19	✓
A3290/Reading Road/Lower Earley Way	367	321	2.48	✓
A3290/Reading Road/Lower Earley Way	744	770	0.94	✓
A3290/Reading Road/Lower Earley Way	429	453	1.16	✓
A3290/Reading Road/Lower Earley Way	682	638	1.73	✓
M4 J10	1053	1091	1.17	✓
M4 J10	477	488	0.50	✓
M4 J10	576	603	1.13	✓
M4 J10	477	488	0.50	✓
M4 J10	576	603	1.13	✓
M4 J10	1211	1186	0.70	✓
M4 J10	879	817	2.15	✓
M4 J10	1132	1213	2.35	✓
M4 J10	879	817	2.15	✓
M4 J10	687	768	2.98	✓
M4 J10	903	828	2.57	✓
M4 J10	733	698	1.32	✓
M4 J10	170	130	3.29	✓
M4 J10	733	698	1.32	✓
M4 J10	170	130	3.29	✓
M4 J10	746	733	0.47	✓
M4 J10	621	665	1.75	✓
M4 J10	888	961	2.40	✓
M4 J10	621	665	1.75	✓
M4 J10	685	806	4.46	×
M4 J10	445	445	0.00	✓
M4 J10	445	445	0.00	✓
M4 J10	203	155	3.63	✓
M4 J10	203	155	3.63	✓
A3290 / Wharfedale Road	51	82	3.86	✓
A3290 / Wharfedale Road	241	374	7.58	×
A3290 / Wharfedale Road	241	374	7.61	×
A3290 / Wharfedale Road	8	0	3.87	✓
A3290 / Wharfedale Road	522	568	1.96	✓
A3290 / Wharfedale Road	313	298	0.80	✓
A3290 / Wharfedale Road	314	298	0.89	✓
A3290 / Wharfedale Road	6	0	3.46	✓
A3290 / Wharfedale Road	586	697	4.37	×
A3290 / Wharfedale Road	153	158	0.40	✓
A3290 / Wharfedale Road	7	0	3.74	✓
A3290 / Wharfedale Road	152	158	0.48	✓
Wharfedale Road / A329 Slip Road	66	105	4.17	✓
Wharfedale Road / A329 Slip Road	610	632	0.89	✓
Wharfedale Road / A329 Slip Road	629	651	0.85	✓
Wharfedale Road / A329 Slip Road	2	0	2.16	✓

Wharfedale Road / A329 Slip Road	220	221	0.05	✓
Wharfedale Road / A329 Slip Road	23	57	5.46	✓
Wharfedale Road / A329 Slip Road	24	57	5.17	✓
Wharfedale Road / A329 Slip Road	1	0	1.29	✓
Wharfedale Road / A329 Slip Road	66	68	0.21	✓
Wharfedale Road / A329 Slip Road	141	172	2.49	✓
Wharfedale Road / A329 Slip Road	120	153	2.85	✓
Wharfedale Road / A329 Slip Road	22	19	0.64	✓
Lower Earley Way / Mill Lane / Rushey Way	12	0	4.83	✓
Lower Earley Way / Mill Lane / Rushey Way	124	182	4.65	✓
Lower Earley Way / Mill Lane / Rushey Way	339	319	1.09	✓
Lower Earley Way / Mill Lane / Rushey Way	231	159	5.13	✓
Lower Earley Way / Mill Lane / Rushey Way	120	263	10.34	×
Lower Earley Way / Mill Lane / Rushey Way	0	0	0.58	✓
Lower Earley Way / Mill Lane / Rushey Way	79	156	7.16	✓
Lower Earley Way / Mill Lane / Rushey Way	125	182	4.58	✓
Lower Earley Way / Mill Lane / Rushey Way	279	261	1.10	✓
Lower Earley Way / Mill Lane / Rushey Way	68	91	2.58	✓
Lower Earley Way / Mill Lane / Rushey Way	1	0	1.00	✓
Lower Earley Way / Mill Lane / Rushey Way	38	30	1.21	✓
Lower Earley Way / Mill Lane / Rushey Way	257	183	5.00	✓
Lower Earley Way / Mill Lane / Rushey Way	139	175	2.83	✓
Lower Earley Way / Mill Lane / Rushey Way	33	41	1.47	✓
Robinhood Lane / Reading Road / King Street Lane	141	94	4.33	✓
Robinhood Lane / Reading Road / King Street Lane	125	116	0.82	✓
Robinhood Lane / Reading Road / King Street Lane	103	104	0.04	✓
Robinhood Lane / Reading Road / King Street Lane	127	131	0.34	✓
Robinhood Lane / Reading Road / King Street Lane	126	246	8.79	×
Robinhood Lane / Reading Road / King Street Lane	430	435	0.23	✓
Robinhood Lane / Reading Road / King Street Lane	144	152	0.67	✓
Robinhood Lane / Reading Road / King Street Lane	141	133	0.68	✓
Robinhood Lane / Reading Road / King Street Lane	93	95	0.22	✓
Robinhood Lane / Reading Road / King Street Lane	64	85	2.36	✓
Robinhood Lane / Reading Road / King Street Lane	429	637	9.02	×
Robinhood Lane / Reading Road / King Street Lane	89	98	0.93	✓
Wargrave Road / London Road / Church Street / High Street	12	4	2.79	✓
Wargrave Road / London Road / Church Street / High Street	105	209	8.25	×
Wargrave Road / London Road / Church Street / High Street	23	3	5.41	✓
Wargrave Road / London Road / Church Street / High Street	17	2	4.92	✓
Wargrave Road / London Road / Church Street / High Street	45	0	9.47	✓
Wargrave Road / London Road / Church Street / High Street	100	56	4.92	✓
Wargrave Road / London Road / Church Street / High Street	127	148	1.80	✓
Wargrave Road / London Road / Church Street / High Street	27	0	7.37	✓
Wargrave Road / London Road / Church Street / High Street	107	98	0.85	✓
Wargrave Road / London Road / Church Street / High Street	36	7	6.28	✓
Wargrave Road / London Road / Church Street / High Street	67	47	2.66	✓
Wargrave Road / London Road / Church Street / High Street	96	86	1.01	✓
New Bath Road / Old Bath Road / Charvil Lane	18	0	6.00	✓
New Bath Road / Old Bath Road / Charvil Lane	23	7	4.08	✓
New Bath Road / Old Bath Road / Charvil Lane	438	439	0.05	✓

New Bath Road / Old Bath Road / Charvil Lane	122	134	1.11	✓
New Bath Road / Old Bath Road / Charvil Lane	88	0	13.29	✓
New Bath Road / Old Bath Road / Charvil Lane	0	0	0.82	✓
New Bath Road / Old Bath Road / Charvil Lane	180	87	8.02	✓
New Bath Road / Old Bath Road / Charvil Lane	63	68	0.57	✓
New Bath Road / Old Bath Road / Charvil Lane	426	432	0.31	✓
New Bath Road / Old Bath Road / Charvil Lane	143	98	4.09	✓
New Bath Road / Old Bath Road / Charvil Lane	3	0	2.58	✓
New Bath Road / Old Bath Road / Charvil Lane	3	16	4.05	✓
New Bath Road / Old Bath Road / Charvil Lane	125	99	2.44	✓
New Bath Road / Old Bath Road / Charvil Lane	65	50	1.97	✓
New Bath Road / Old Bath Road / Charvil Lane	13	26	2.94	✓
New Bath Road / Old Bath Road / Charvil Lane	1	0	1.00	✓
London Road/Reading Road/Pitts Lane	542	542	0.01	✓
London Road/Reading Road/Pitts Lane	188	219	2.16	✓
London Road/Reading Road/Pitts Lane	502	499	0.14	✓
London Road/Reading Road/Pitts Lane	208	201	0.48	✓
London Road/Reading Road/Pitts Lane	210	257	3.11	✓
London Road/Reading Road/Pitts Lane	501	443	2.64	✓
London Road/Reading Road/Pitts Lane	469	466	0.14	✓
London Road/Reading Road/Pitts Lane	264	265	0.06	✓
London Road/Reading Road/Pitts Lane	232	287	3.43	✓
London Road/Reading Road/Pitts Lane	542	598	2.33	✓
London Road/Reading Road/Pitts Lane	148	176	2.15	✓
London Road/Reading Road/Pitts Lane	427	509	3.79	✓
London Road / Wokingham Road / Granby Gardens / Cumber	932	955	0.74	✓
London Road / Wokingham Road / Granby Gardens / Cumber	31	0	7.90	✓
London Road / Wokingham Road / Granby Gardens / Cumber	901	955	1.77	✓
London Road / Wokingham Road / Granby Gardens / Cumber	1294	1507	5.71	×
London Road / Wokingham Road / Granby Gardens / Cumber	393	556	7.49	×
London Road / Wokingham Road / Granby Gardens / Cumber	1294	1507	5.71	×
London Road / Wokingham Road / Granby Gardens / Cumber	1116	1525	11.26	×
London Road / Wokingham Road / Granby Gardens / Cumber	788	1133	11.13	×
London Road / Wokingham Road / Granby Gardens / Cumber	329	393	3.39	✓
London Road / Wokingham Road / Granby Gardens / Cumber	788	1133	11.13	×
London Road / Wokingham Road / Granby Gardens / Cumber	329	393	3.39	✓
W31	59	58	0.12	✓
W31	304	309	0.30	✓
W31	20	4	4.47	✓
W31	72	70	0.23	✓
W31	170	179	0.66	✓
W31	255	332	4.50	✓
W31	369	364	0.28	✓
W31	192	183	0.64	✓
W31	100	92	0.82	✓
W31	40	2	8.16	✓
W31	235	213	1.47	✓
W31	112	131	1.74	✓
Cutbush Lane / Lower Earley Way / Beeston Way	1	0	1.29	✓
Cutbush Lane / Lower Earley Way / Beeston Way	27	0	7.37	✓

Cutbush Lane / Lower Earley Way / Beeston Way	89	87	0.16	✓
Cutbush Lane / Lower Earley Way / Beeston Way	29	0	7.57	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.82	✓
Cutbush Lane / Lower Earley Way / Beeston Way	400	468	3.25	✓
Cutbush Lane / Lower Earley Way / Beeston Way	91	91	0.02	✓
Cutbush Lane / Lower Earley Way / Beeston Way	354	340	0.70	✓
Cutbush Lane / Lower Earley Way / Beeston Way	334	394	3.11	✓
Cutbush Lane / Lower Earley Way / Beeston Way	155	161	0.54	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	322	299	1.26	✓
Cutbush Lane / Lower Earley Way / Beeston Way	310	295	0.83	✓
Cutbush Lane / Lower Earley Way / Beeston Way	322	299	1.26	✓
Cutbush Lane / Lower Earley Way / Beeston Way	123	132	0.80	✓
Cutbush Lane / Lower Earley Way / Beeston Way	324	297	1.55	✓
Cutbush Lane / Lower Earley Way / Beeston Way	1	0	1.29	✓
Cutbush Lane / Lower Earley Way / Beeston Way	444	431	0.63	✓
Cutbush Lane / Lower Earley Way / Beeston Way	489	555	2.90	✓
Shinfield Road / Elm Road / Cedar Road	109	130	1.92	✓
Shinfield Road / Elm Road / Cedar Road	306	299	0.42	✓
Shinfield Road / Elm Road / Cedar Road	104	101	0.28	✓
Shinfield Road / Elm Road / Cedar Road	245	202	2.91	✓
Shinfield Road / Elm Road / Cedar Road	351	336	0.79	✓
Shinfield Road / Elm Road / Cedar Road	246	257	0.67	✓
Beech Lane / Rushey Way	0	0	0.82	✓
Beech Lane / Rushey Way	129	98	2.93	✓
Beech Lane / Rushey Way	53	53	0.00	✓
Beech Lane / Rushey Way	127	101	2.46	✓
Beech Lane / Rushey Way	0	0	0.58	✓
Beech Lane / Rushey Way	343	175	10.44	×
Beech Lane / Rushey Way	60	61	0.13	✓
Beech Lane / Rushey Way	400	168	13.76	×
Beech Lane / Rushey Way	1	0	0.72	✓
Wilderness Road / Beech Lane	0	0	0.58	✓
Wilderness Road / Beech Lane	84	84	0.09	✓
Wilderness Road / Beech Lane	571	560	0.46	✓
Wilderness Road / Beech Lane	86	89	0.24	✓
Wilderness Road / Beech Lane	0	1	1.17	✓
Wilderness Road / Beech Lane	52	55	0.47	✓
Wilderness Road / Beech Lane	602	599	0.15	✓
Wilderness Road / Beech Lane	40	39	0.07	✓
Wilderness Road / Beech Lane	0	0	0.00	✓
Elm Road / Elm Lane / Rowland Way	1	0	1.63	✓
Elm Road / Elm Lane / Rowland Way	290	293	0.21	✓
Elm Road / Elm Lane / Rowland Way	213	209	0.29	✓
Elm Road / Elm Lane / Rowland Way	2	0	1.91	✓
Elm Road / Elm Lane / Rowland Way	244	221	1.46	✓
Elm Road / Elm Lane / Rowland Way	1	0	1.53	✓
Elm Road / Elm Lane / Rowland Way	148	87	5.58	✓
Elm Road / Elm Lane / Rowland Way	11	5	2.20	✓

Elm Road / Elm Lane / Rowland Way	211	301	5.64	✓
Elm Road / Elm Lane / Rowland Way	136	74	6.07	✓
Elm Road / Elm Lane / Rowland Way	1	0	1.29	✓
Elm Road / Elm Lane / Rowland Way	6	14	2.55	✓
Elm Road / Elm Lane / Rowland Way	5	0	3.21	✓
Elm Road / Elm Lane / Rowland Way	8	8	0.00	✓
Elm Road / Elm Lane / Rowland Way	5	13	2.78	✓
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Caversham Park Road / Henley Road	163	148	1.23	✓
Caversham Park Road / Henley Road	114	55	6.48	✓
Caversham Park Road / Henley Road	158	177	1.42	✓
Caversham Park Road / Henley Road	356	369	0.71	✓
Caversham Park Road / Henley Road	120	34	9.86	✓
Caversham Park Road / Henley Road	352	292	3.34	✓
Gosbrook Road / George Street	354	393	2.04	✓
Gosbrook Road / George Street	126	18	12.76	×
Gosbrook Road / George Street	357	346	0.55	✓
Gosbrook Road / George Street	257	241	1.03	✓
Gosbrook Road / George Street	135	58	7.88	✓
Gosbrook Road / George Street	241	194	3.21	✓
Church Street / Bridge Street / Church Road	611	588	0.96	✓
Church Street / Bridge Street / Church Road	68	23	6.74	✓
Church Street / Bridge Street / Church Road	588	415	7.70	×
Church Street / Bridge Street / Church Road	488	664	7.34	×
Church Street / Bridge Street / Church Road	80	78	0.26	✓
Church Street / Bridge Street / Church Road	443	514	3.26	✓
Reading Bridge Roundabout	3	0	2.31	✓
Reading Bridge Roundabout	81	11	10.39	✓
Reading Bridge Roundabout	279	331	2.97	✓
Reading Bridge Roundabout	25	23	0.45	✓
Reading Bridge Roundabout	220	218	0.10	✓
Reading Bridge Roundabout	101	12	11.87	✓
Reading Bridge Roundabout	0	0	0.22	✓
Reading Bridge Roundabout	90	35	6.96	✓
Reading Bridge Roundabout	3	0	1.89	✓
Reading Bridge Roundabout	112	43	7.89	✓
Reading Bridge Roundabout	248	308	3.58	✓
Reading Bridge Roundabout	82	31	6.82	✓
Reading Bridge Roundabout	2	0	2.16	✓
Reading Bridge Roundabout	31	30	0.02	✓
Reading Bridge Roundabout	304	316	0.69	✓
Reading Bridge Roundabout	9	10	0.10	✓
Reading Bridge Roundabout	1	0	0.49	✓
Reading Bridge Roundabout	19	19	0.05	✓
Reading Bridge Roundabout	0	0	0.00	✓
Reading Bridge Roundabout	35	39	0.75	✓
Reading Bridge Roundabout	250	277	1.68	✓
Reading Bridge Roundabout	100	42	6.78	✓
Reading Bridge Roundabout	407	445	1.84	✓
Reading Bridge Roundabout	51	49	0.28	✓

Reading Bridge Roundabout	43	31	2.03	✓
Caversham Bridge Roundabout	1	0	1.29	✓
Caversham Bridge Roundabout	2	2	0.16	✓
Caversham Bridge Roundabout	700	760	2.24	✓
Caversham Bridge Roundabout	360	339	1.10	✓
Caversham Bridge Roundabout	2	2	0.10	✓
Caversham Bridge Roundabout	0	0	0.00	✓
Caversham Bridge Roundabout	7	8	0.40	✓
Caversham Bridge Roundabout	2	2	0.12	✓
Caversham Bridge Roundabout	716	764	1.77	✓
Caversham Bridge Roundabout	4	10	2.42	✓
Caversham Bridge Roundabout	19	1	5.82	✓
Caversham Bridge Roundabout	281	246	2.15	✓
Caversham Bridge Roundabout	349	314	1.96	✓
Caversham Bridge Roundabout	2	2	0.08	✓
Caversham Bridge Roundabout	302	283	1.14	✓
Caversham Bridge Roundabout	8	0	4.08	✓
Peppard Road / Kiln Road	82	90	0.87	✓
Peppard Road / Kiln Road	106	59	5.20	✓
Peppard Road / Kiln Road	263	260	0.21	✓
Henley Road / Playhatch Road	12	13	0.47	✓
Henley Road / Playhatch Road	210	107	8.14	×
Henley Road / Playhatch Road	4	1	2.04	✓
Henley Road / Playhatch Road	64	25	5.95	✓
Henley Road / Playhatch Road	0	0	0.58	✓
Henley Road / Playhatch Road	277	425	7.93	×
Henley Road / Playhatch Road	38	13	4.87	✓
Henley Road / Playhatch Road	195	183	0.82	✓
Henley Road / Playhatch Road	297	248	2.97	✓
Henley Road / Playhatch Road	3	0	2.38	✓
Henley Road / Playhatch Road	25	9	3.82	✓
Henley Road / Playhatch Road	5	2	1.70	✓
Henley Road / Playhatch Road	32	13	3.95	✓
Henley Road / Playhatch Road	26	13	2.90	✓
Henley Road / Playhatch Road	1	0	1.00	✓
M4 J12	332	331	0.04	✓
M4 J12	780	718	2.29	✓
M4 J12	916	902	0.47	✓
M4 J12	681	592	3.50	✓
M4 J12	206	223	1.15	✓
M4 J12	946	932	0.44	✓
M4 J12	571	563	0.31	✓
M4 J12	375	369	0.32	✓
M4 J12	205	223	1.19	✓
M4 J12	376	369	0.34	✓
M4 J12	138	135	0.19	✓
M4 J12	1188	1172	0.46	✓
M4 J12	343	358	0.81	✓
M4 J12	975	970	0.17	✓
M4 J12	588	571	0.70	✓

M4 J12	294	281	0.79	✓
M4 J12	184	183	0.04	✓
M4 J12	110	97	1.27	✓
M4 J12	592	571	0.87	✓
M4 J12	106	97	0.89	✓
Total	149500	145316	10.90	×
Percentage			80%	92%

PM Peak

Description	All (vehicles)			
	Observed	Modelled	GEH	DMRB
A4 Bath Road / Charrington Road / Old Bath Road	343	728	16.60	×
A4 Bath Road / Charrington Road / Old Bath Road	145	26	12.89	×
A4 Bath Road / Charrington Road / Old Bath Road	98	69	3.26	✓
A4 Bath Road / Charrington Road / Old Bath Road	573	1124	18.92	×
A4 Bath Road / Charrington Road / Old Bath Road	16	0	5.66	✓
A4 Bath Road / Charrington Road / Old Bath Road	491	671	7.47	×
A4 Bath Road / Charrington Road / Old Bath Road	53	35	2.66	✓
A4 Bath Road / Charrington Road / Old Bath Road	3	0	2.45	✓
A4 Bath Road / Charrington Road / Old Bath Road	45	74	3.80	✓
A4 Bath Road / Charrington Road / Old Bath Road	84	97	1.37	✓
A4 Bath Road / Charrington Road / Old Bath Road	538	527	0.46	✓
A4 Bath Road / Charrington Road / Old Bath Road	109	48	6.80	✓
Oxford Road / Wigmore Lane / Norcot Road	31	0	7.72	✓
Oxford Road / Wigmore Lane / Norcot Road	147	126	1.80	✓
Oxford Road / Wigmore Lane / Norcot Road	410	492	3.89	✓
Oxford Road / Wigmore Lane / Norcot Road	249	214	2.30	✓
Oxford Road / Wigmore Lane / Norcot Road	79	92	1.44	✓
Oxford Road / Wigmore Lane / Norcot Road	0	8	3.99	✓
Oxford Road / Wigmore Lane / Norcot Road	142	243	7.31	×
Oxford Road / Wigmore Lane / Norcot Road	187	237	3.41	✓
Oxford Road / Wigmore Lane / Norcot Road	453	463	0.50	✓
Oxford Road / Wigmore Lane / Norcot Road	219	246	1.72	✓
Oxford Road / Wigmore Lane / Norcot Road	15	1	5.19	✓
Oxford Road / Wigmore Lane / Norcot Road	135	30	11.52	×
Oxford Road / Wigmore Lane / Norcot Road	375	363	0.66	✓
Oxford Road / Wigmore Lane / Norcot Road	319	446	6.49	×
Oxford Road / Wigmore Lane / Norcot Road	252	49	16.57	×
Oxford Road / Wigmore Lane / Norcot Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	6	0	3.46	✓
Oxford Road / Overdown Road / Rodway Road	115	73	4.35	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	446	442	0.17	✓
Oxford Road / Overdown Road / Rodway Road	86	101	1.51	✓
Oxford Road / Overdown Road / Rodway Road	1	0	1.09	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	262	221	2.69	✓
Oxford Road / Overdown Road / Rodway Road	7	0	3.74	✓
Oxford Road / Overdown Road / Rodway Road	30	31	0.13	✓
Oxford Road / Overdown Road / Rodway Road	0	0	0.00	✓
Oxford Road / Overdown Road / Rodway Road	29	0	7.67	✓
Oxford Road / Overdown Road / Rodway Road	455	333	6.12	×
Oxford Road / Overdown Road / Rodway Road	461	306	7.92	×
Oxford Road / Overdown Road / Rodway Road	2	71	11.46	✓
Oxford Road / Overdown Road / Rodway Road	4	0	2.83	✓
Tilehurst Road / Water Road	0	0	0.00	✓
Tilehurst Road / Water Road	121	79	4.16	✓

Tilehurst Road / Water Road	245	133	8.10	×
Tilehurst Road / Water Road	156	107	4.25	✓
Tilehurst Road / Water Road	0	0	0.00	✓
Tilehurst Road / Water Road	343	329	0.77	✓
Tilehurst Road / Water Road	420	291	6.84	×
Tilehurst Road / Water Road	558	365	8.99	×
Tilehurst Road / Water Road	2	0	2.00	✓
Bath Road / Berkeley Avenue	735	1056	10.71	×
Bath Road / Berkeley Avenue	20	2	5.22	✓
Bath Road / Berkeley Avenue	360	597	10.84	×
Bath Road / Berkeley Avenue	467	428	1.82	✓
Bath Road / Berkeley Avenue	25	2	6.25	✓
Bath Road / Berkeley Avenue	764	702	2.31	✓
A33 Bennet Road Gyratory	1086	1472	10.77	×
A33 Bennet Road Gyratory	260	203	3.76	✓
A33 Bennet Road Gyratory	1295	1553	6.83	×
A33 Bennet Road Gyratory	1217	1459	6.61	×
A33 Bennet Road Gyratory	77	94	1.84	✓
A33 Bennet Road Gyratory	282	199	5.38	✓
A33 Bennet Road Gyratory	166	274	7.28	×
A33 Bennet Road Gyratory	55	2	10.00	✓
A33 Bennet Road Gyratory	188	366	10.69	×
A33 Bennet Road Gyratory	12	1	4.42	✓
A33 Bennet Road Gyratory	1509	1434	1.95	✓
A33 Bennet Road Gyratory	55	2	10.00	✓
A33 Bennet Road Gyratory	84	106	2.23	✓
A33 Bennet Road Gyratory	1613	1694	1.99	✓
A33 Bennet Road Gyratory	9	0	4.24	✓
A33 Bennet Road Gyratory	83	5	11.72	✓
A33 Bennet Road Gyratory	1497	1598	2.56	✓
A33 Bennet Road Gyratory	199	101	7.94	✓
A33 Bennet Road Gyratory	257	177	5.49	✓
A33 Bennet Road Gyratory	271	184	5.76	✓
A33 Bennet Road Gyratory	469	285	9.48	×
Chatham Street / A329 / Friar Street	109	330	14.93	×
Chatham Street / A329 / Friar Street	347	127	14.25	×
Chatham Street / A329 / Friar Street	353	126	14.69	×
Chatham Street / A329 / Friar Street	521	421	4.60	✓
Chatham Street / A329 / Friar Street	82	93	1.20	✓
Chatham Street / A329 / Friar Street	88	210	9.98	×
Chatham Street / A329 / Friar Street	296	49	18.87	×
Chatham Street / A329 / Friar Street	138	170	2.56	✓
Chatham Street / A329 / Friar Street	539	946	14.94	×
Chatham Street / A329 / Friar Street	205	208	0.19	✓
Chatham Street / A329 / Friar Street	160	195	2.64	✓
Chatham Street / A329 / Friar Street	184	183	0.06	✓
Chatham Street / A329 / Friar Street	229	362	7.72	×
Chatham Street / A329 / Friar Street	579	427	6.77	×
Chatham Street / A329 / Friar Street	236	191	3.10	✓
Chatham Street / A329 / Friar Street	527	420	4.95	×

Basingstoke Road / Christchurch Road	65	67	0.16	✓
Basingstoke Road / Christchurch Road	273	271	0.12	✓
Basingstoke Road / Christchurch Road	344	583	11.08	×
Basingstoke Road / Christchurch Road	329	451	6.17	×
Basingstoke Road / Christchurch Road	0	0	0.00	✓
Basingstoke Road / Christchurch Road	368	404	1.82	✓
Basingstoke Road / Christchurch Road	438	479	1.91	✓
Basingstoke Road / Christchurch Road	183	179	0.31	✓
Basingstoke Road / Christchurch Road	4	0	2.56	✓
A329 / A33	448	439	0.39	✓
A329 / A33	889	1114	7.10	×
A329 / A33	384	812	17.50	×
A329 / A33	770	683	3.25	✓
A329 / A33	889	1450	16.40	×
A329 / A33	255	620	17.47	×
A329 / A33	853	743	3.91	✓
Park Lane / School Road / Chapel Hill	0	0	0.00	✓
Park Lane / School Road / Chapel Hill	88	41	5.78	✓
Park Lane / School Road / Chapel Hill	379	240	7.94	×
Park Lane / School Road / Chapel Hill	130	83	4.59	✓
Park Lane / School Road / Chapel Hill	2	0	2.00	✓
Park Lane / School Road / Chapel Hill	247	181	4.48	✓
Park Lane / School Road / Chapel Hill	367	338	1.58	✓
Park Lane / School Road / Chapel Hill	216	263	3.03	✓
Park Lane / School Road / Chapel Hill	0	0	0.00	✓
Norcot Road / Church End Lane	354	421	3.38	✓
Norcot Road / Church End Lane	285	198	5.61	✓
Norcot Road / Church End Lane	245	335	5.31	✓
Norcot Road / Church End Lane	33	34	0.21	✓
Norcot Road / Church End Lane	216	171	3.22	✓
Norcot Road / Church End Lane	59	23	5.63	✓
Peppard Road / Henley Road / Prospect Street	239	373	7.67	×
Peppard Road / Henley Road / Prospect Street	101	190	7.38	✓
Peppard Road / Henley Road / Prospect Street	38	23	2.67	✓
Peppard Road / Henley Road / Prospect Street	364	426	3.12	✓
Peppard Road / Henley Road / Prospect Street	9	0	4.24	✓
Peppard Road / Henley Road / Prospect Street	300	191	6.96	×
Peppard Road / Henley Road / Prospect Street	282	168	7.63	×
Peppard Road / Henley Road / Prospect Street	4	0	2.97	✓
Peppard Road / Henley Road / Prospect Street	20	0	6.32	✓
Peppard Road / Henley Road / Prospect Street	57	54	0.50	✓
Peppard Road / Henley Road / Prospect Street	297	417	6.36	×
Peppard Road / Henley Road / Prospect Street	9	6	1.21	✓
Burghfield Road / Bath Road	230	176	3.82	✓
Burghfield Road / Bath Road	512	828	12.19	×
Burghfield Road / Bath Road	223	200	1.61	✓
Burghfield Road / Bath Road	246	415	9.28	×
Burghfield Road / Bath Road	784	840	1.95	✓
Burghfield Road / Bath Road	222	145	5.69	✓
South Oak Way / A33	115	31	9.86	✓

South Oak Way / A33	54	41	1.96	✓
South Oak Way / A33	1380	1323	1.56	✓
South Oak Way / A33	110	52	6.46	✓
South Oak Way / A33	0	0	0.00	✓
South Oak Way / A33	811	946	4.56	×
South Oak Way / A33	1337	1338	0.02	✓
South Oak Way / A33	251	178	4.97	✓
South Oak Way / A33	0	0	0.14	✓
Queens Road / Watlington Street	1510	2256	17.18	×
Queens Road / Watlington Street	79	39	5.18	✓
Rose Kiln Lane / Gillette Way	25	103	9.76	✓
Rose Kiln Lane / Gillette Way	250	351	5.82	×
Rose Kiln Lane / Gillette Way	66	37	4.06	✓
Rose Kiln Lane / Gillette Way	112	19	11.45	✓
Rose Kiln Lane / Gillette Way	661	633	1.09	✓
Rose Kiln Lane / Gillette Way	7	0	3.74	✓
Rose Kiln Lane / Gillette Way	114	18	11.85	✓
Rose Kiln Lane / Gillette Way	160	16	15.41	×
Rose Kiln Lane / Gillette Way	65	19	7.17	✓
Rose Kiln Lane / Gillette Way	110	32	9.20	✓
Rose Kiln Lane / Gillette Way	1	0	1.41	✓
Rose Kiln Lane / Gillette Way	31	0	7.71	✓
Rose Kiln Lane / Gillette Way	206	16	17.97	×
Rose Kiln Lane / Gillette Way	135	32	11.29	×
Rose Kiln Lane / Gillette Way	64	1	11.13	✓
Rose Kiln Lane / Gillette Way	0	0	0.00	✓
M4 J11	632	840	7.68	×
M4 J11	182	413	13.38	×
M4 J11	1573	1307	7.00	×
M4 J11	2577	3300	13.34	×
M4 J11	182	413	13.39	×
M4 J11	1573	1307	7.00	×
M4 J11	1574	2106	12.40	×
M4 J11	1003	1194	5.77	×
M4 J11	1615	1313	7.89	×
M4 J11	1006	586	14.87	×
M4 J11	609	727	4.56	×
M4 J11	1008	1210	6.06	×
M4 J11	604	712	4.20	×
M4 J11	580	535	1.92	✓
M4 J11	1353	1414	1.65	✓
M4 J11	1269	1236	0.94	✓
M4 J11	912	890	0.73	✓
M4 J11	1446	1815	9.13	×
M4 J11	452	446	0.27	✓
M4 J11	994	1368	10.90	×
M4 J11	1906	2258	7.72	×
M4 J11	1299	1712	10.65	×
M4 J11	3518	3770	4.17	✓
Mereoak Northern Junction	491	1052	20.19	×

Mereoak Northern Junction	2328	1640	15.44	×
Mereoak Northern Junction	542	695	6.17	×
Mereoak Northern Junction	231	138	6.84	✓
Mereoak Northern Junction	1585	1266	8.46	×
Mereoak Northern Junction	335	142	12.46	×
Mereoak Southern Junction	1800	1104	18.27	×
Mereoak Southern Junction	724	673	1.91	✓
Mereoak Southern Junction	1120	643	16.06	×
Mereoak Southern Junction	83	258	13.42	×
Mereoak Southern Junction	784	765	0.69	✓
Mereoak Southern Junction	231	222	0.58	✓
Hollow Lane / Arborfield Road / School Green	9	0	4.24	✓
Hollow Lane / Arborfield Road / School Green	704	920	7.59	×
Hollow Lane / Arborfield Road / School Green	292	260	1.94	✓
Hollow Lane / Arborfield Road / School Green	699	708	0.34	✓
Hollow Lane / Arborfield Road / School Green	1	0	1.41	✓
Hollow Lane / Arborfield Road / School Green	191	54	12.36	×
Hollow Lane / Arborfield Road / School Green	279	97	13.30	×
Hollow Lane / Arborfield Road / School Green	179	37	13.67	×
Hollow Lane / Arborfield Road / School Green	0	0	0.00	✓
Blackboy Junction	159	153	0.51	✓
Blackboy Junction	508	527	0.84	✓
Blackboy Junction	772	744	1.00	✓
Blackboy Junction	157	133	1.95	✓
Blackboy Junction	430	475	2.09	✓
Blackboy Junction	512	1131	21.58	×
Blackboy Junction	607	1022	14.53	×
Blackboy Junction	62	230	13.89	×
Blackboy Junction	331	303	1.59	✓
Blackboy Junction	811	660	5.58	×
Blackboy Junction	366	516	7.15	×
Blackboy Junction	507	373	6.38	×
Blackboy Junction	1350	1477	3.37	✓
Blackboy Junction	428	351	3.92	✓
Blackboy Junction	159	136	1.91	✓
Blackboy Junction	1271	1454	4.96	✓
Shinfield Road / Hollow Lane / Brookers Hill	891	898	0.22	✓
Shinfield Road / Hollow Lane / Brookers Hill	253	144	7.77	×
Shinfield Road / Hollow Lane / Brookers Hill	744	555	7.43	×
Shinfield Road / Hollow Lane / Brookers Hill	86	0	13.11	✓
Shinfield Road / Hollow Lane / Brookers Hill	352	310	2.30	✓
Shinfield Road / Hollow Lane / Brookers Hill	96	0	13.86	✓
A3290/Reading Road/Lower Earley Way	645	918	9.76	×
A3290/Reading Road/Lower Earley Way	885	884	0.04	✓
A3290/Reading Road/Lower Earley Way	1025	637	13.44	×
A3290/Reading Road/Lower Earley Way	413	902	19.06	×
A3290/Reading Road/Lower Earley Way	885	884	0.04	✓
A3290/Reading Road/Lower Earley Way	413	902	19.06	×
A3290/Reading Road/Lower Earley Way	976	1153	5.41	×
A3290/Reading Road/Lower Earley Way	225	633	19.69	×

A3290/Reading Road/Lower Earley Way	1006	1421	11.92	×
A3290/Reading Road/Lower Earley Way	1123	1531	11.20	×
A3290/Reading Road/Lower Earley Way	460	841	14.95	×
A3290/Reading Road/Lower Earley Way	566	978	14.82	×
A3290/Reading Road/Lower Earley Way	577	951	13.54	×
A3290/Reading Road/Lower Earley Way	566	978	14.82	×
A3290/Reading Road/Lower Earley Way	460	841	14.95	×
A3290/Reading Road/Lower Earley Way	806	788	0.63	✓
A3290/Reading Road/Lower Earley Way	473	1008	19.66	×
A3290/Reading Road/Lower Earley Way	793	621	6.45	×
M4 J10	1796	1463	8.25	×
M4 J10	828	609	8.18	×
M4 J10	968	854	3.77	✓
M4 J10	828	609	8.18	×
M4 J10	968	854	3.77	✓
M4 J10	1899	1852	1.09	✓
M4 J10	1476	1266	5.67	✓
M4 J10	2031	1896	3.05	✓
M4 J10	1476	1266	5.67	✓
M4 J10	1292	1086	5.98	×
M4 J10	1485	1720	5.86	×
M4 J10	1071	1244	5.07	×
M4 J10	414	476	2.94	✓
M4 J10	1071	1244	5.07	×
M4 J10	414	476	2.94	✓
M4 J10	1382	1330	1.41	✓
M4 J10	955	1007	1.65	✓
M4 J10	2203	1495	16.47	×
M4 J10	955	1007	1.65	✓
M4 J10	1572	1052	14.35	×
M4 J10	739	810	2.55	✓
M4 J10	739	810	2.55	✓
M4 J10	631	443	8.13	×
M4 J10	631	443	8.13	×
A3290 / Wharfedale Road	36	295	20.11	×
A3290 / Wharfedale Road	456	385	3.46	✓
A3290 / Wharfedale Road	458	385	3.56	✓
A3290 / Wharfedale Road	3	0	2.44	✓
A3290 / Wharfedale Road	1146	1417	7.56	×
A3290 / Wharfedale Road	1125	625	16.91	×
A3290 / Wharfedale Road	1125	625	16.91	×
A3290 / Wharfedale Road	3	0	2.45	✓
A3290 / Wharfedale Road	935	1490	15.94	×
A3290 / Wharfedale Road	126	496	20.98	×
A3290 / Wharfedale Road	5	0	3.16	✓
A3290 / Wharfedale Road	124	496	21.12	×
Wharfedale Road / A329 Slip Road	35	243	17.64	×
Wharfedale Road / A329 Slip Road	1382	1271	3.04	✓
Wharfedale Road / A329 Slip Road	1485	1271	5.75	✓
Wharfedale Road / A329 Slip Road	0	0	0.00	✓

Wharfedale Road / A329 Slip Road	839	696	5.15	×
Wharfedale Road / A329 Slip Road	78	233	12.41	×
Wharfedale Road / A329 Slip Road	78	233	12.41	×
Wharfedale Road / A329 Slip Road	0	0	0.00	✓
Wharfedale Road / A329 Slip Road	68	232	13.36	×
Wharfedale Road / A329 Slip Road	188	559	19.19	×
Wharfedale Road / A329 Slip Road	85	559	26.41	×
Wharfedale Road / A329 Slip Road	103	0	14.35	×
Lower Earley Way / Mill Lane / Rushey Way	5	0	3.16	✓
Lower Earley Way / Mill Lane / Rushey Way	308	266	2.47	✓
Lower Earley Way / Mill Lane / Rushey Way	508	920	15.41	×
Lower Earley Way / Mill Lane / Rushey Way	382	331	2.71	✓
Lower Earley Way / Mill Lane / Rushey Way	202	586	19.35	×
Lower Earley Way / Mill Lane / Rushey Way	0	0	0.00	✓
Lower Earley Way / Mill Lane / Rushey Way	111	152	3.60	✓
Lower Earley Way / Mill Lane / Rushey Way	236	254	1.13	✓
Lower Earley Way / Mill Lane / Rushey Way	633	992	12.58	×
Lower Earley Way / Mill Lane / Rushey Way	117	97	1.91	✓
Lower Earley Way / Mill Lane / Rushey Way	0	0	0.00	✓
Lower Earley Way / Mill Lane / Rushey Way	133	64	6.91	✓
Lower Earley Way / Mill Lane / Rushey Way	332	351	1.05	✓
Lower Earley Way / Mill Lane / Rushey Way	259	349	5.14	✓
Lower Earley Way / Mill Lane / Rushey Way	64	37	3.83	✓
Robinhood Lane / Reading Road / King Street Lane	189	130	4.68	✓
Robinhood Lane / Reading Road / King Street Lane	276	178	6.53	✓
Robinhood Lane / Reading Road / King Street Lane	111	0	14.90	×
Robinhood Lane / Reading Road / King Street Lane	176	79	8.59	✓
Robinhood Lane / Reading Road / King Street Lane	150	213	4.69	✓
Robinhood Lane / Reading Road / King Street Lane	606	753	5.65	×
Robinhood Lane / Reading Road / King Street Lane	260	116	10.53	×
Robinhood Lane / Reading Road / King Street Lane	238	283	2.80	✓
Robinhood Lane / Reading Road / King Street Lane	106	174	5.78	✓
Robinhood Lane / Reading Road / King Street Lane	45	0	9.47	✓
Robinhood Lane / Reading Road / King Street Lane	409	307	5.38	×
Robinhood Lane / Reading Road / King Street Lane	89	130	3.90	✓
Wargrave Road / London Road / Church Street / High Street	6	2	2.03	✓
Wargrave Road / London Road / Church Street / High Street	198	244	3.08	✓
Wargrave Road / London Road / Church Street / High Street	31	1	7.52	✓
Wargrave Road / London Road / Church Street / High Street	18	83	9.12	✓
Wargrave Road / London Road / Church Street / High Street	47	0	9.70	✓
Wargrave Road / London Road / Church Street / High Street	205	47	14.12	×
Wargrave Road / London Road / Church Street / High Street	126	242	8.57	×
Wargrave Road / London Road / Church Street / High Street	8	0	4.00	✓
Wargrave Road / London Road / Church Street / High Street	186	28	15.34	×
Wargrave Road / London Road / Church Street / High Street	36	25	2.04	✓
Wargrave Road / London Road / Church Street / High Street	65	23	6.25	✓
Wargrave Road / London Road / Church Street / High Street	154	163	0.70	✓
New Bath Road / Old Bath Road / Charvil Lane	25	0	7.07	✓
New Bath Road / Old Bath Road / Charvil Lane	38	14	4.64	✓
New Bath Road / Old Bath Road / Charvil Lane	867	651	7.84	×

New Bath Road / Old Bath Road / Charvil Lane	242	88	12.01	×
New Bath Road / Old Bath Road / Charvil Lane	105	0	14.49	×
New Bath Road / Old Bath Road / Charvil Lane	0	0	0.00	✓
New Bath Road / Old Bath Road / Charvil Lane	246	66	14.45	×
New Bath Road / Old Bath Road / Charvil Lane	102	26	9.53	✓
New Bath Road / Old Bath Road / Charvil Lane	728	701	1.00	✓
New Bath Road / Old Bath Road / Charvil Lane	211	112	7.83	✓
New Bath Road / Old Bath Road / Charvil Lane	1	0	1.41	✓
New Bath Road / Old Bath Road / Charvil Lane	6	47	8.01	✓
New Bath Road / Old Bath Road / Charvil Lane	133	72	6.06	✓
New Bath Road / Old Bath Road / Charvil Lane	84	110	2.68	✓
New Bath Road / Old Bath Road / Charvil Lane	24	114	10.85	✓
New Bath Road / Old Bath Road / Charvil Lane	0	0	0.00	✓
London Road/Reading Road/Pitts Lane	836	920	2.85	✓
London Road/Reading Road/Pitts Lane	347	226	7.16	×
London Road/Reading Road/Pitts Lane	753	808	1.98	✓
London Road/Reading Road/Pitts Lane	282	253	1.76	✓
London Road/Reading Road/Pitts Lane	428	631	8.83	×
London Road/Reading Road/Pitts Lane	607	431	7.75	×
London Road/Reading Road/Pitts Lane	525	459	2.98	✓
London Road/Reading Road/Pitts Lane	540	583	1.80	✓
London Road/Reading Road/Pitts Lane	458	611	6.62	×
London Road/Reading Road/Pitts Lane	1189	1272	2.36	✓
London Road/Reading Road/Pitts Lane	264	115	10.85	×
London Road/Reading Road/Pitts Lane	913	806	3.65	✓
London Road / Wokingham Road / Granby Gardens / Cumber	1001	884	3.80	✓
London Road / Wokingham Road / Granby Gardens / Cumber	36	0	8.49	✓
London Road / Wokingham Road / Granby Gardens / Cumber	965	887	2.57	✓
London Road / Wokingham Road / Granby Gardens / Cumber	1346	1707	9.24	×
London Road / Wokingham Road / Granby Gardens / Cumber	381	850	18.89	×
London Road / Wokingham Road / Granby Gardens / Cumber	1346	1707	9.24	×
London Road / Wokingham Road / Granby Gardens / Cumber	1258	1523	7.11	×
London Road / Wokingham Road / Granby Gardens / Cumber	834	963	4.31	×
London Road / Wokingham Road / Granby Gardens / Cumber	424	479	2.57	✓
London Road / Wokingham Road / Granby Gardens / Cumber	834	963	4.31	×
London Road / Wokingham Road / Granby Gardens / Cumber	424	462	1.79	✓
W31	69	84	1.71	✓
W31	321	499	8.79	×
W31	10	14	1.12	✓
W31	109	72	3.90	✓
W31	209	75	11.25	×
W31	283	366	4.59	✓
W31	543	884	12.76	×
W31	231	278	2.97	✓
W31	95	55	4.63	✓
W31	48	14	6.13	✓
W31	379	273	5.89	×
W31	183	104	6.63	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	63	0	11.22	✓

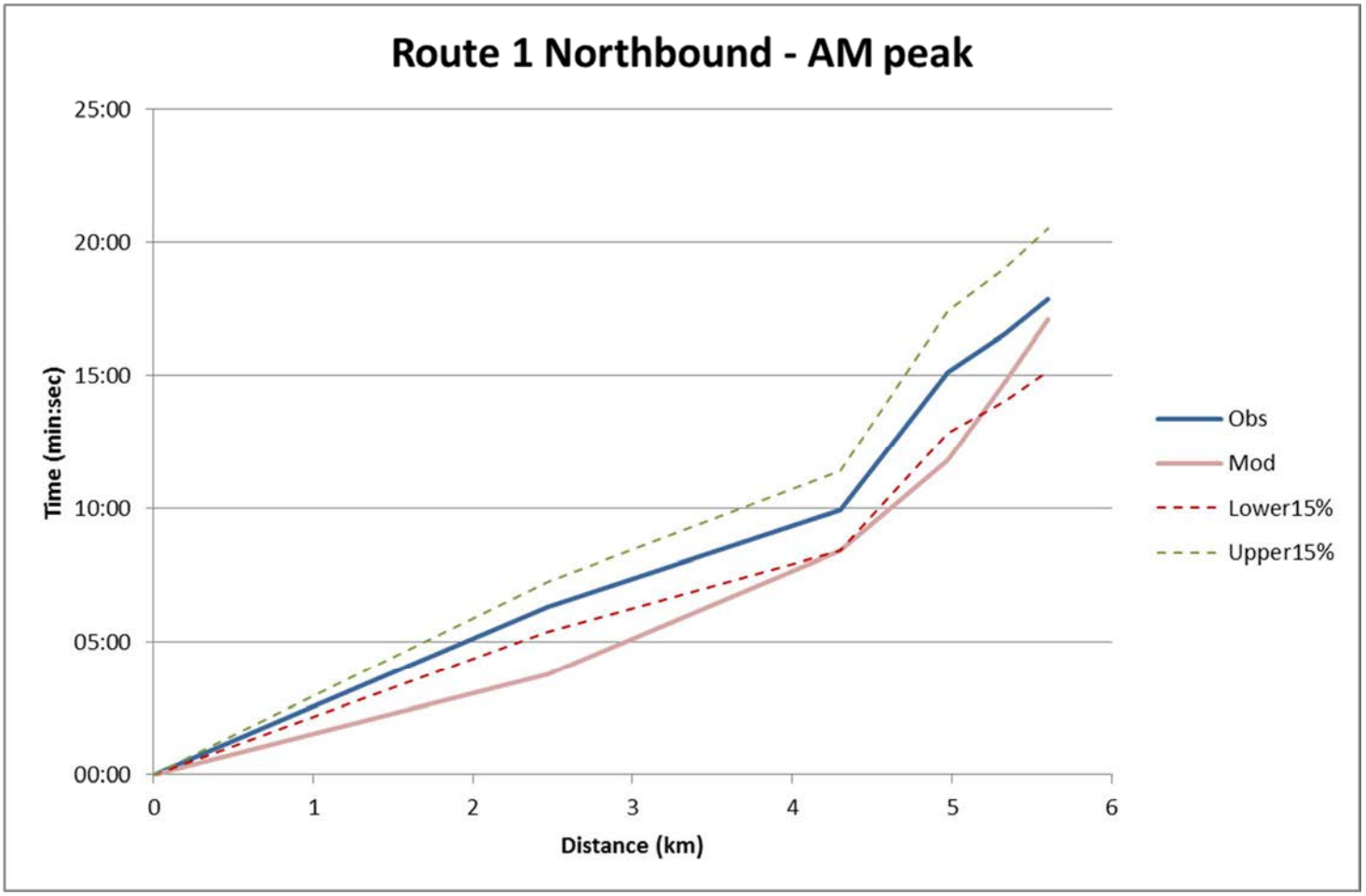
Cutbush Lane / Lower Earley Way / Beeston Way	126	198	5.69	✓
Cutbush Lane / Lower Earley Way / Beeston Way	65	0	11.40	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	601	1004	14.22	×
Cutbush Lane / Lower Earley Way / Beeston Way	177	227	3.49	✓
Cutbush Lane / Lower Earley Way / Beeston Way	754	1070	10.46	×
Cutbush Lane / Lower Earley Way / Beeston Way	498	904	15.32	×
Cutbush Lane / Lower Earley Way / Beeston Way	229	299	4.28	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	765	967	6.86	×
Cutbush Lane / Lower Earley Way / Beeston Way	703	662	1.55	✓
Cutbush Lane / Lower Earley Way / Beeston Way	765	967	6.86	×
Cutbush Lane / Lower Earley Way / Beeston Way	166	329	10.39	×
Cutbush Lane / Lower Earley Way / Beeston Way	494	702	8.49	×
Cutbush Lane / Lower Earley Way / Beeston Way	0	0	0.00	✓
Cutbush Lane / Lower Earley Way / Beeston Way	931	1296	10.95	×
Cutbush Lane / Lower Earley Way / Beeston Way	727	1202	15.30	×
Shinfield Road / Elm Road / Cedar Road	183	428	14.01	×
Shinfield Road / Elm Road / Cedar Road	383	405	1.09	✓
Shinfield Road / Elm Road / Cedar Road	75	212	11.41	×
Shinfield Road / Elm Road / Cedar Road	243	108	10.20	×
Shinfield Road / Elm Road / Cedar Road	342	312	1.68	✓
Shinfield Road / Elm Road / Cedar Road	312	412	5.27	×
Beech Lane / Rushey Way	0	0	0.00	✓
Beech Lane / Rushey Way	262	353	5.22	✓
Beech Lane / Rushey Way	67	91	2.75	✓
Beech Lane / Rushey Way	189	98	7.63	✓
Beech Lane / Rushey Way	0	0	0.00	✓
Beech Lane / Rushey Way	419	369	2.51	✓
Beech Lane / Rushey Way	102	84	1.90	✓
Beech Lane / Rushey Way	631	456	7.51	×
Beech Lane / Rushey Way	2	0	1.70	✓
Wilderness Road / Beech Lane	1	0	1.41	✓
Wilderness Road / Beech Lane	222	160	4.48	✓
Wilderness Road / Beech Lane	702	828	4.56	×
Wilderness Road / Beech Lane	116	41	8.50	✓
Wilderness Road / Beech Lane	0	1	1.63	✓
Wilderness Road / Beech Lane	65	84	2.21	✓
Wilderness Road / Beech Lane	789	814	0.88	✓
Wilderness Road / Beech Lane	51	334	20.40	×
Wilderness Road / Beech Lane	2	0	2.00	✓
Elm Road / Elm Lane / Rowland Way	2	0	2.00	✓
Elm Road / Elm Lane / Rowland Way	500	440	2.78	✓
Elm Road / Elm Lane / Rowland Way	196	259	4.20	✓
Elm Road / Elm Lane / Rowland Way	9	0	4.24	✓
Elm Road / Elm Lane / Rowland Way	303	180	7.92	×
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Elm Road / Elm Lane / Rowland Way	115	63	5.54	✓
Elm Road / Elm Lane / Rowland Way	22	3	5.21	✓

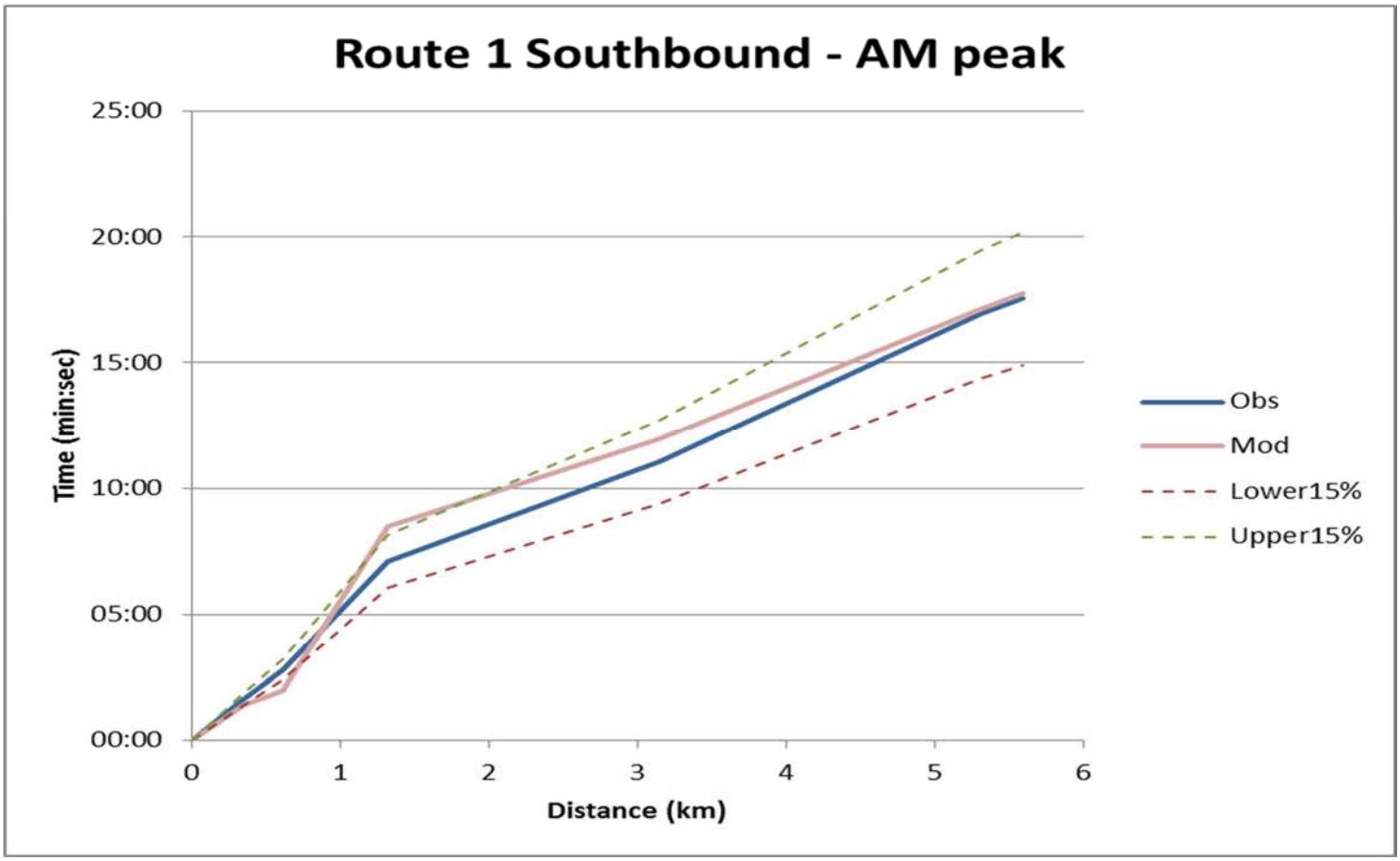
Elm Road / Elm Lane / Rowland Way	290	520	11.44	×
Elm Road / Elm Lane / Rowland Way	229	325	5.78	✓
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Elm Road / Elm Lane / Rowland Way	6	18	3.54	✓
Elm Road / Elm Lane / Rowland Way	6	0	3.46	✓
Elm Road / Elm Lane / Rowland Way	57	23	5.42	✓
Elm Road / Elm Lane / Rowland Way	8	9	0.45	✓
Elm Road / Elm Lane / Rowland Way	0	0	0.00	✓
Caversham Park Road / Henley Road	212	479	14.35	×
Caversham Park Road / Henley Road	154	141	1.11	✓
Caversham Park Road / Henley Road	357	288	3.82	✓
Caversham Park Road / Henley Road	562	567	0.23	✓
Caversham Park Road / Henley Road	200	117	6.62	✓
Caversham Park Road / Henley Road	439	349	4.53	✓
Gosbrook Road / George Street	364	299	3.55	✓
Gosbrook Road / George Street	138	31	11.71	×
Gosbrook Road / George Street	514	592	3.33	✓
Gosbrook Road / George Street	441	452	0.53	✓
Gosbrook Road / George Street	177	56	11.18	×
Gosbrook Road / George Street	223	246	1.50	✓
Church Street / Bridge Street / Church Road	638	876	8.65	×
Church Street / Bridge Street / Church Road	78	80	0.22	✓
Church Street / Bridge Street / Church Road	678	932	8.96	×
Church Street / Bridge Street / Church Road	788	780	0.28	✓
Church Street / Bridge Street / Church Road	85	4	12.11	✓
Church Street / Bridge Street / Church Road	425	395	1.50	✓
Reading Bridge Roundabout	0	0	0.00	✓
Reading Bridge Roundabout	73	6	10.60	✓
Reading Bridge Roundabout	281	414	7.15	×
Reading Bridge Roundabout	22	8	3.49	✓
Reading Bridge Roundabout	238	226	0.77	✓
Reading Bridge Roundabout	116	13	12.81	×
Reading Bridge Roundabout	0	0	0.35	✓
Reading Bridge Roundabout	108	34	8.81	✓
Reading Bridge Roundabout	4	0	2.70	✓
Reading Bridge Roundabout	132	38	10.14	✓
Reading Bridge Roundabout	376	653	12.21	×
Reading Bridge Roundabout	67	21	6.90	✓
Reading Bridge Roundabout	1	0	1.41	✓
Reading Bridge Roundabout	29	28	0.16	✓
Reading Bridge Roundabout	336	287	2.79	✓
Reading Bridge Roundabout	54	27	4.30	✓
Reading Bridge Roundabout	0	0	0.68	✓
Reading Bridge Roundabout	45	62	2.36	✓
Reading Bridge Roundabout	0	0	0.00	✓
Reading Bridge Roundabout	99	111	1.18	✓
Reading Bridge Roundabout	359	392	1.68	✓
Reading Bridge Roundabout	90	24	8.72	✓
Reading Bridge Roundabout	376	639	11.69	×
Reading Bridge Roundabout	43	37	1.00	✓

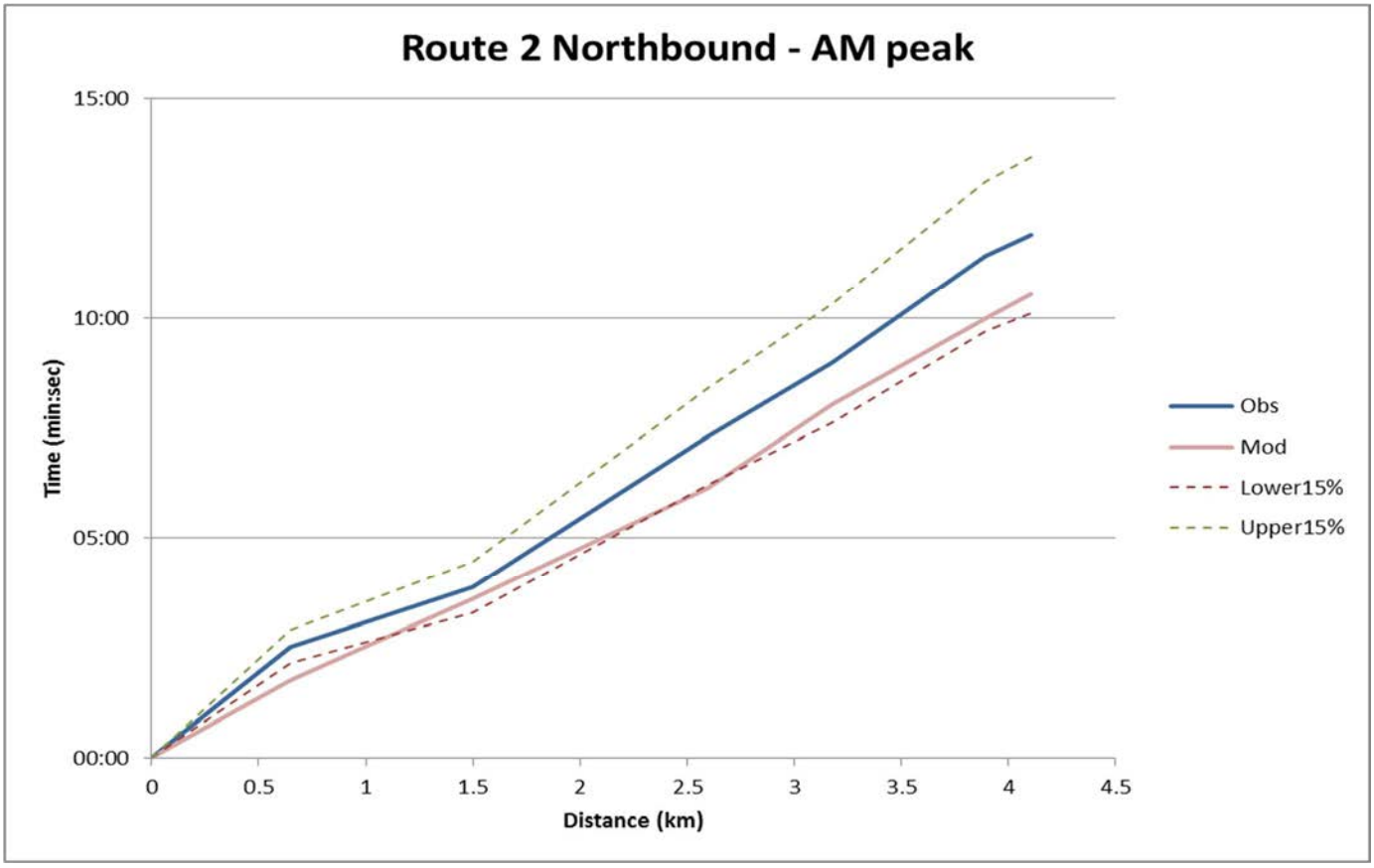
Reading Bridge Roundabout	104	30	9.08	✓
Caversham Bridge Roundabout	0	0	0.00	✓
Caversham Bridge Roundabout	5	6	0.33	✓
Caversham Bridge Roundabout	705	753	1.78	✓
Caversham Bridge Roundabout	374	499	5.97	×
Caversham Bridge Roundabout	10	6	1.47	✓
Caversham Bridge Roundabout	0	0	0.00	✓
Caversham Bridge Roundabout	23	26	0.62	✓
Caversham Bridge Roundabout	5	6	0.26	✓
Caversham Bridge Roundabout	1075	1347	7.82	×
Caversham Bridge Roundabout	6	18	3.51	✓
Caversham Bridge Roundabout	14	0	5.29	✓
Caversham Bridge Roundabout	223	240	1.14	✓
Caversham Bridge Roundabout	416	356	3.05	✓
Caversham Bridge Roundabout	6	3	1.54	✓
Caversham Bridge Roundabout	224	193	2.11	✓
Caversham Bridge Roundabout	6	0	3.46	✓
Peppard Road / Kiln Road	165	75	8.24	✓
Peppard Road / Kiln Road	153	38	11.83	×
Peppard Road / Kiln Road	351	337	0.76	✓
Henley Road / Playhatch Road	13	37	4.75	✓
Henley Road / Playhatch Road	321	475	7.71	×
Henley Road / Playhatch Road	7	5	0.75	✓
Henley Road / Playhatch Road	64	13	8.26	✓
Henley Road / Playhatch Road	0	0	0.00	✓
Henley Road / Playhatch Road	563	388	8.05	×
Henley Road / Playhatch Road	51	9	7.74	✓
Henley Road / Playhatch Road	271	261	0.63	✓
Henley Road / Playhatch Road	358	565	9.63	×
Henley Road / Playhatch Road	1	0	1.41	✓
Henley Road / Playhatch Road	26	2	6.52	✓
Henley Road / Playhatch Road	6	2	1.90	✓
Henley Road / Playhatch Road	33	11	4.67	✓
Henley Road / Playhatch Road	25	7	4.37	✓
Henley Road / Playhatch Road	0	0	0.00	✓
M4 J12	470	774	12.21	×
M4 J12	1038	651	13.34	×
M4 J12	1494	1875	9.29	×
M4 J12	884	663	7.95	×
M4 J12	306	184	7.79	×
M4 J12	1971	1754	5.04	✓
M4 J12	1043	756	9.57	×
M4 J12	928	998	2.24	✓
M4 J12	306	171	8.71	×
M4 J12	928	1010	2.63	✓
M4 J12	364	143	13.89	×
M4 J12	1772	1848	1.78	✓
M4 J12	670	314	16.04	×
M4 J12	1672	1760	2.13	✓
M4 J12	1028	1093	2.01	✓

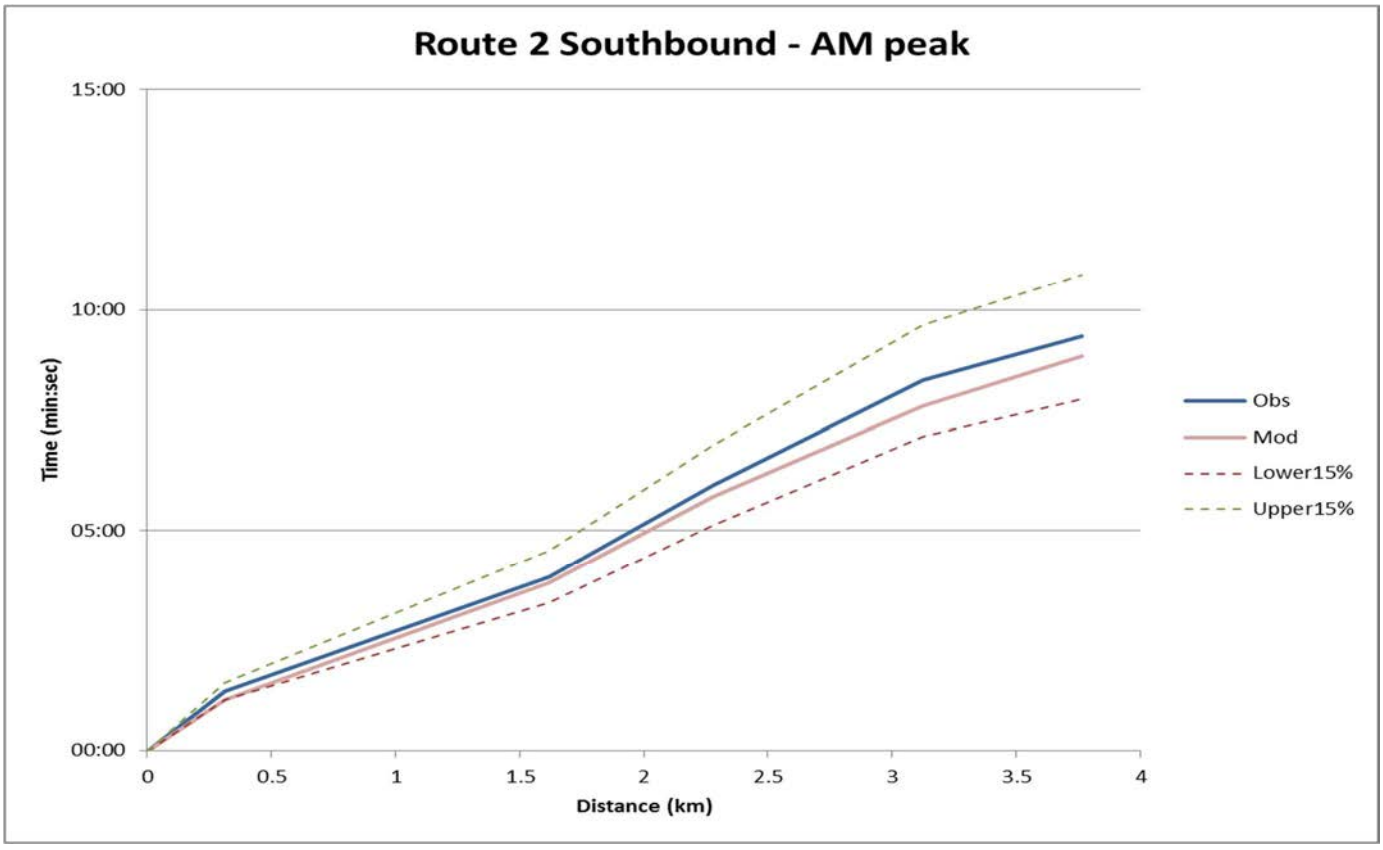
M4 J12	560	569	0.37	✓
M4 J12	394	365	1.48	✓
M4 J12	166	204	2.76	✓
M4 J12	1042	1101	1.79	✓
M4 J12	152	196	3.36	✓
Total	223342	236103	26.62	×
Percentage			51%	64%

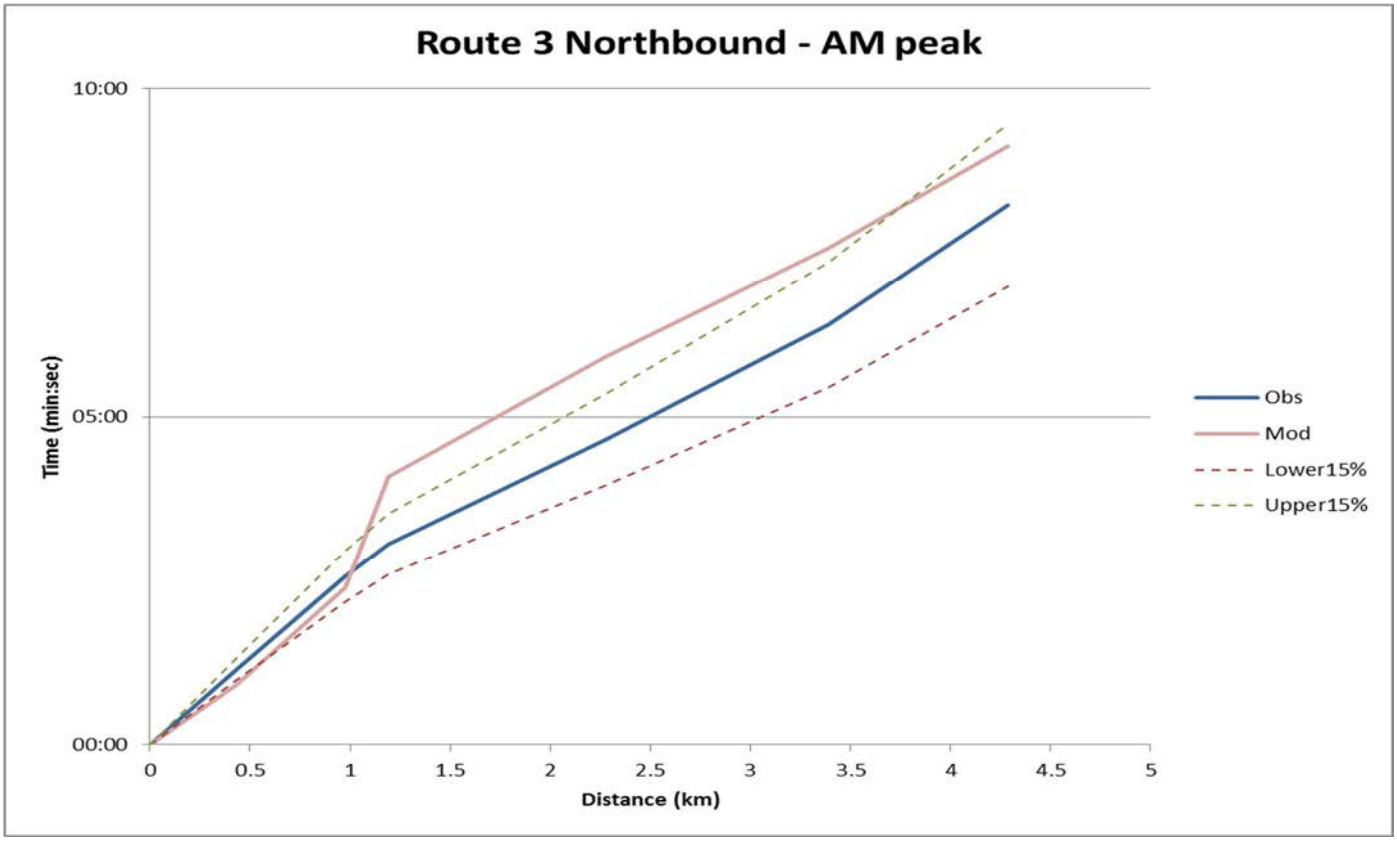
Appendix D Journey Time Validation

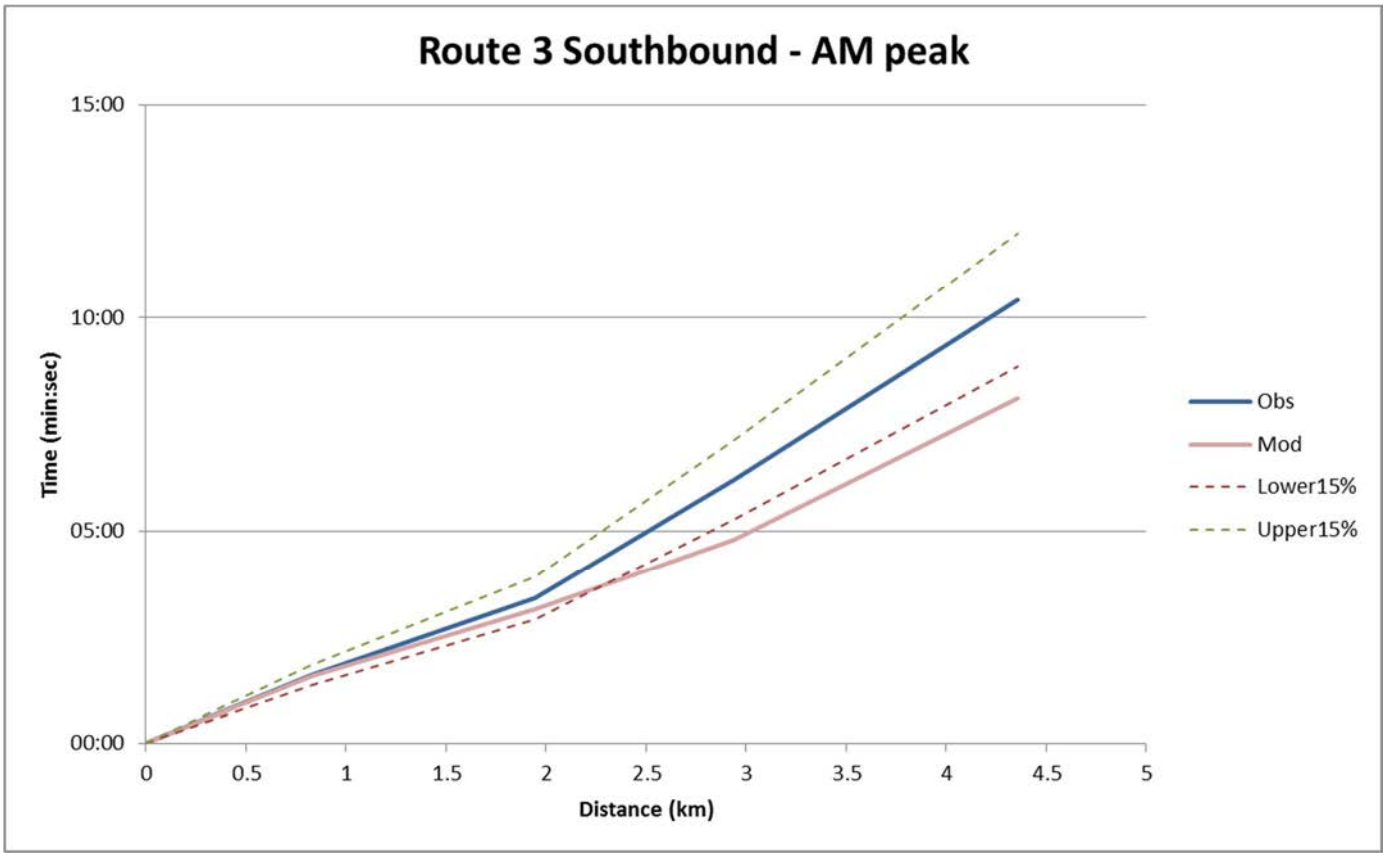

Route 1 Northbound - AM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

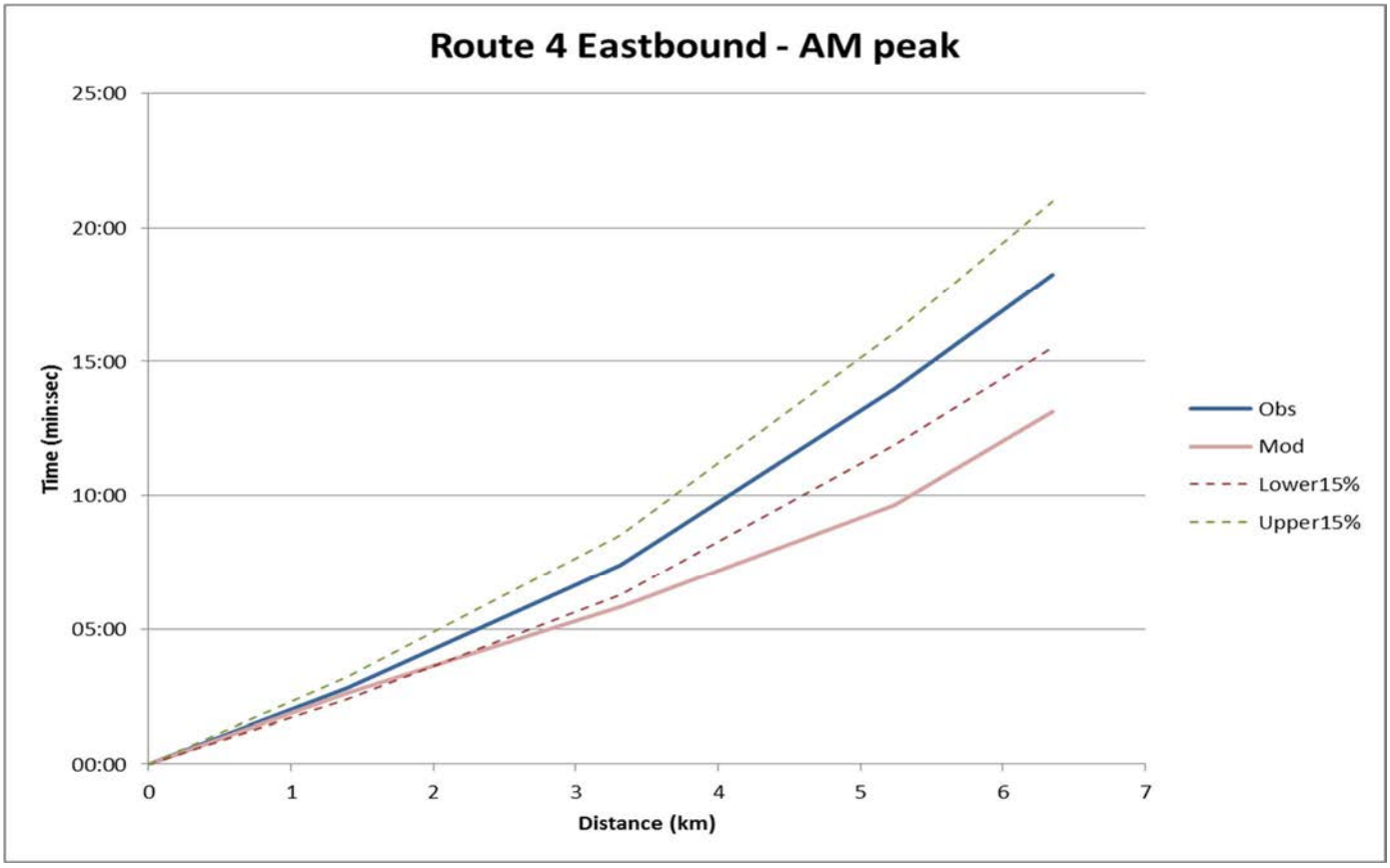

Route 1 Southbound - AM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

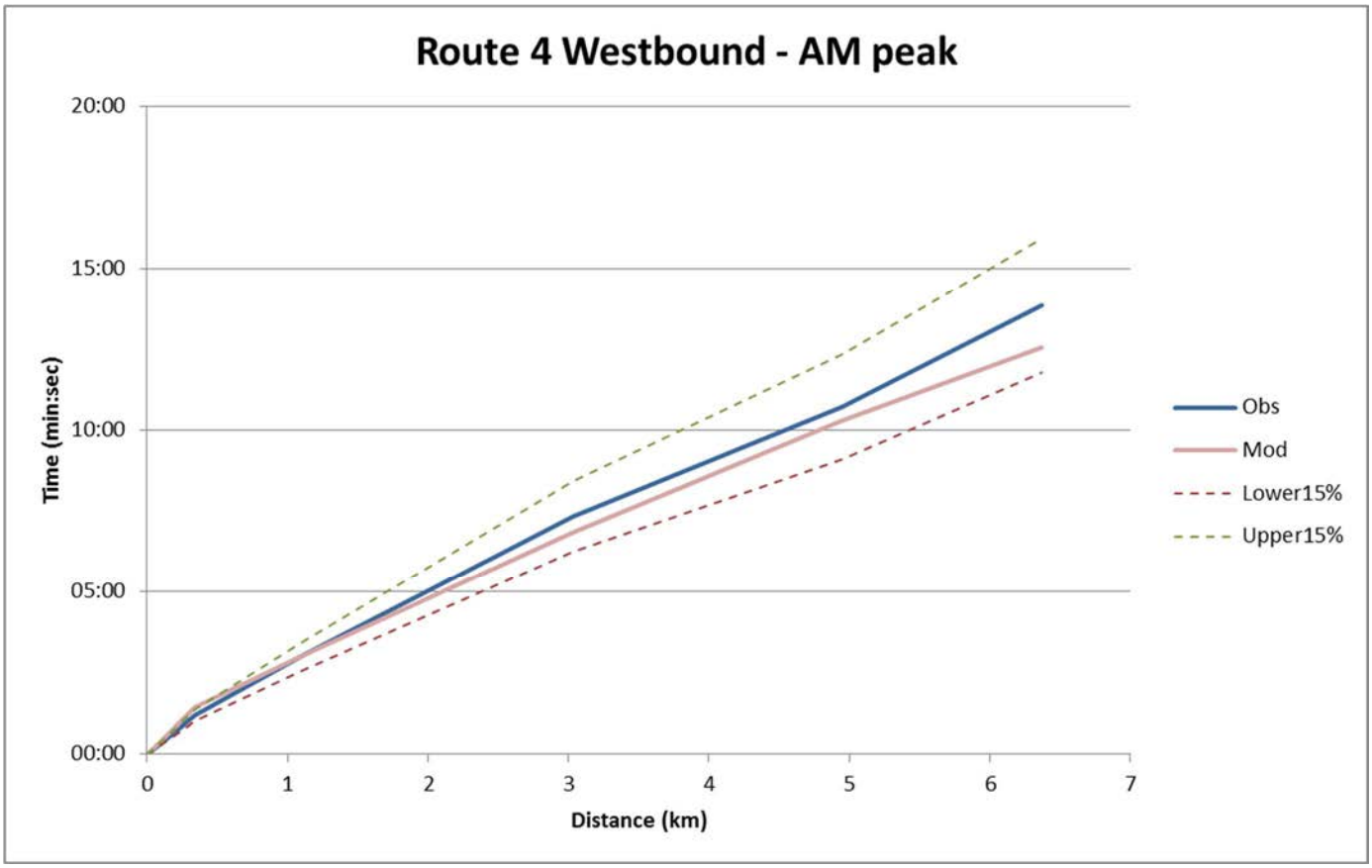

Route 2 Northbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

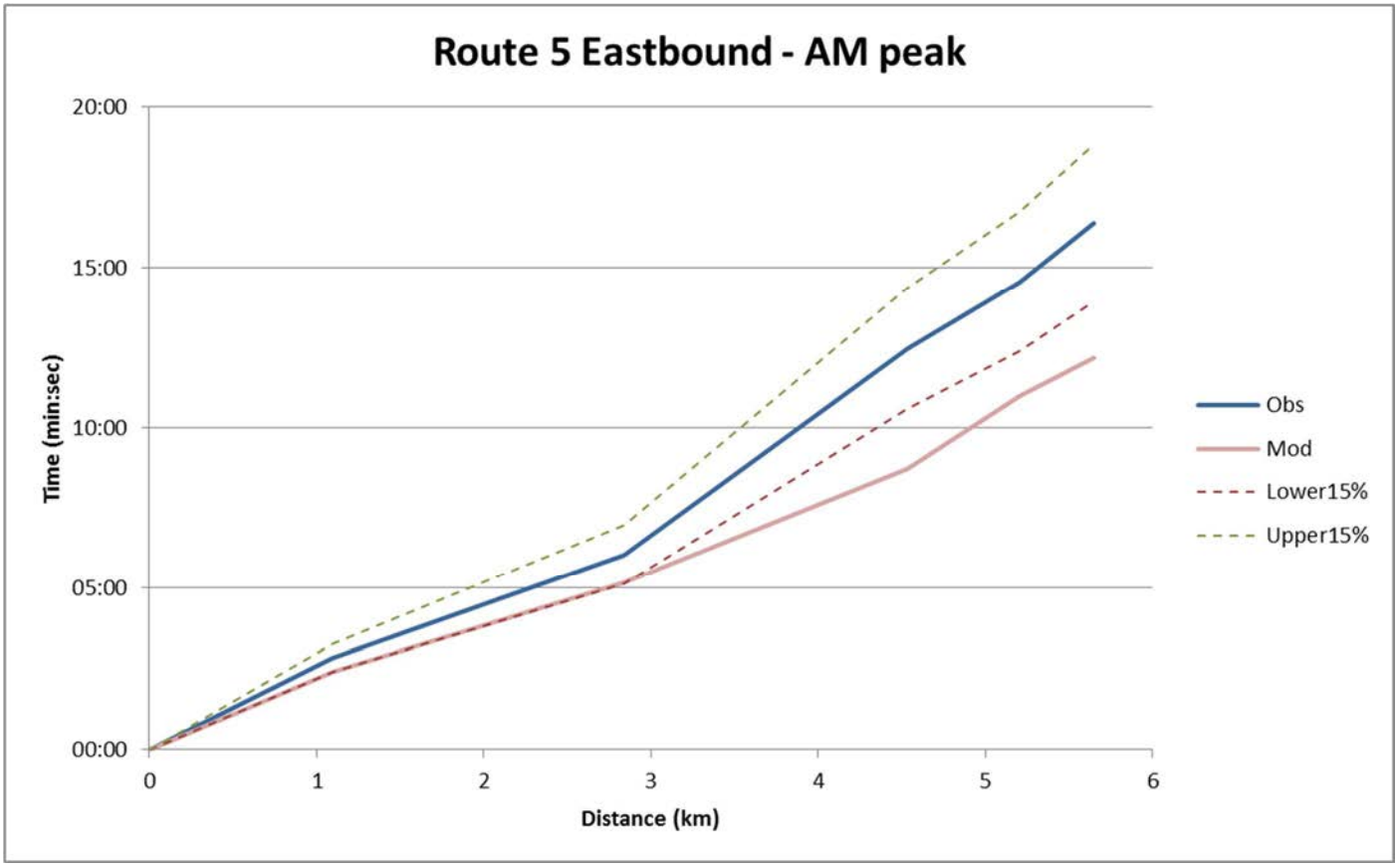

Route 2 Southbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

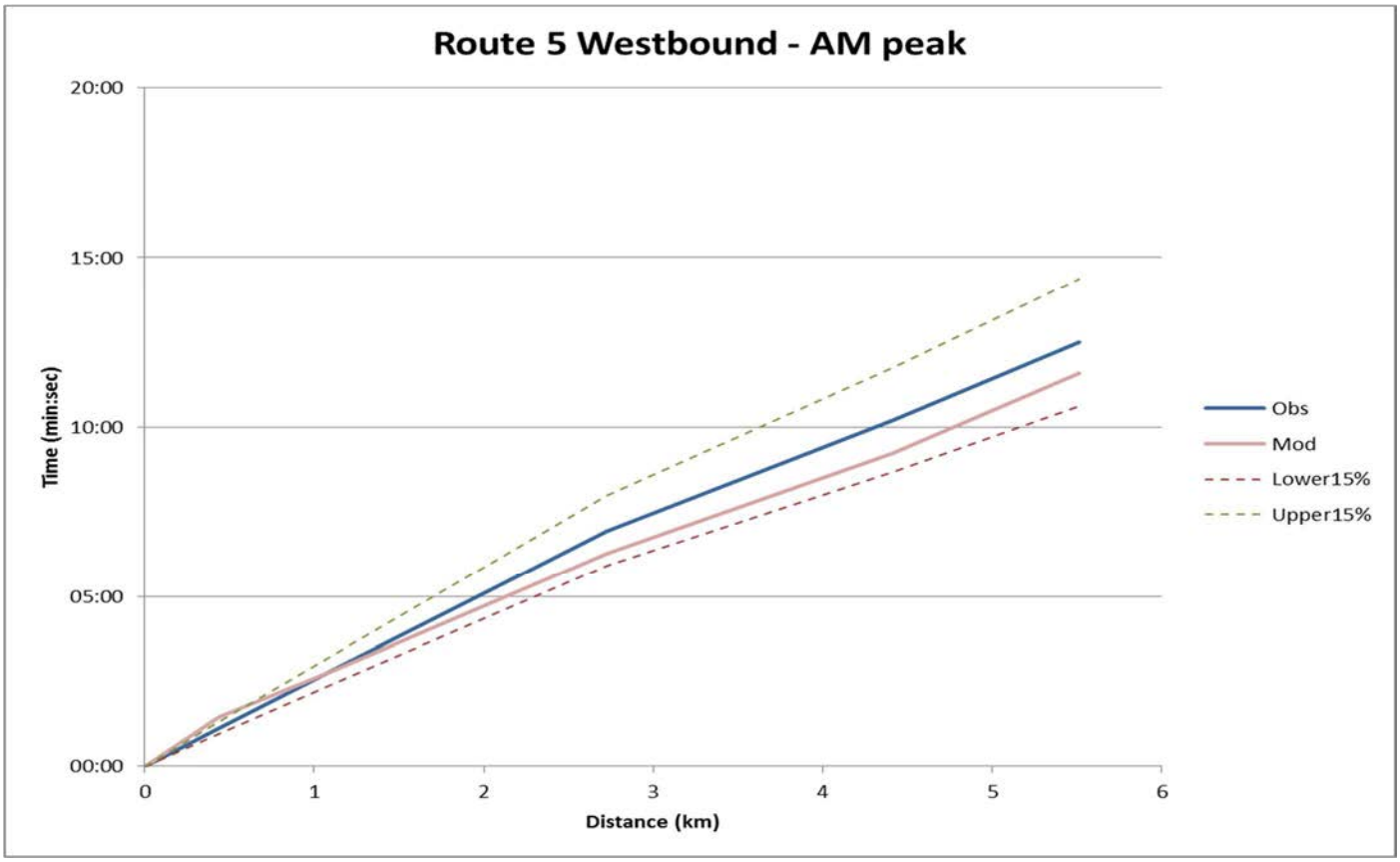

Route 3 Northbound - AM peak
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Distance (km)
Obs
Mod
Lower15%
Upper15%

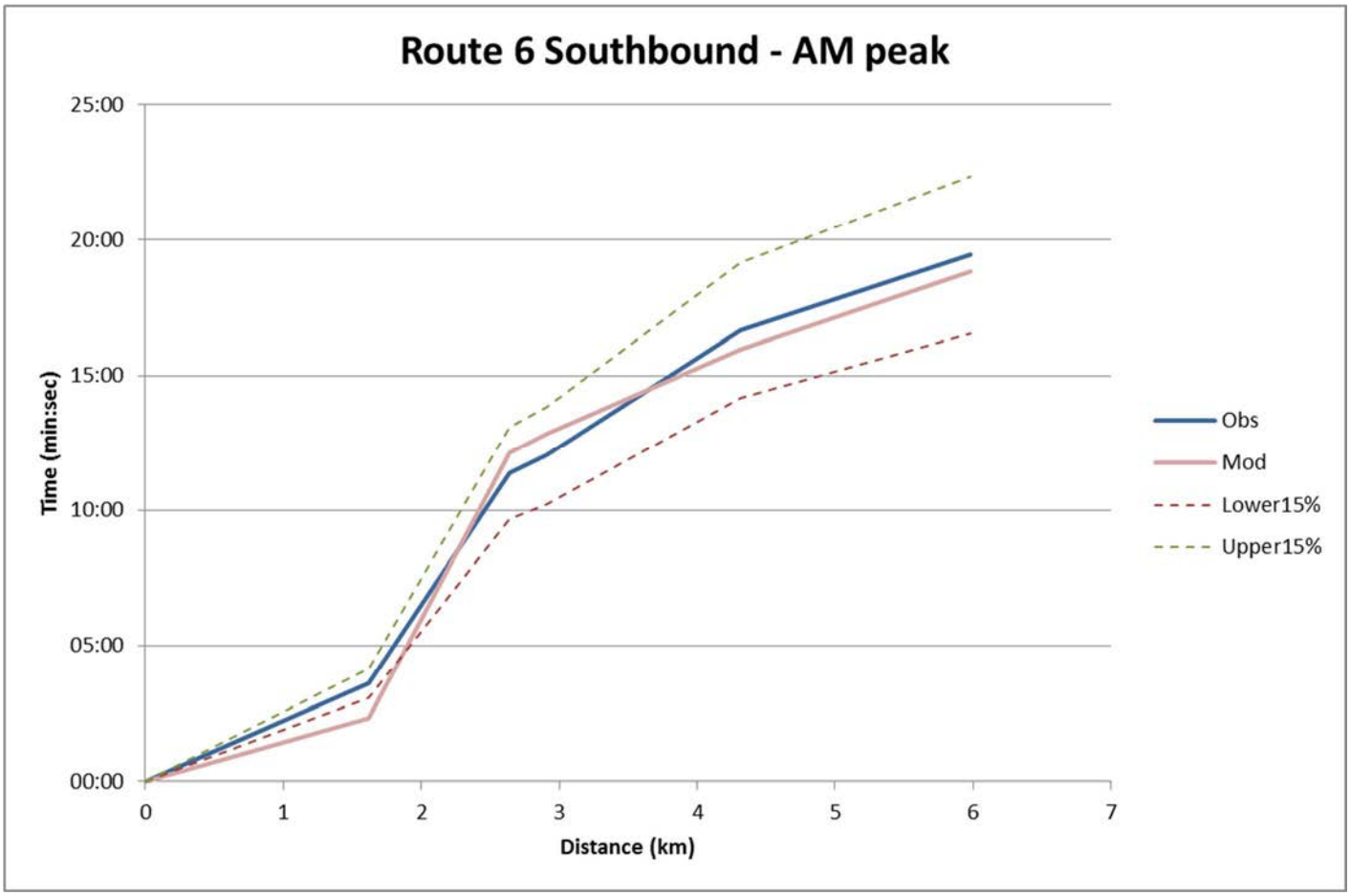

Route 3 Southbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Distance (km)
Obs
Mod
Lower15%
Upper15%

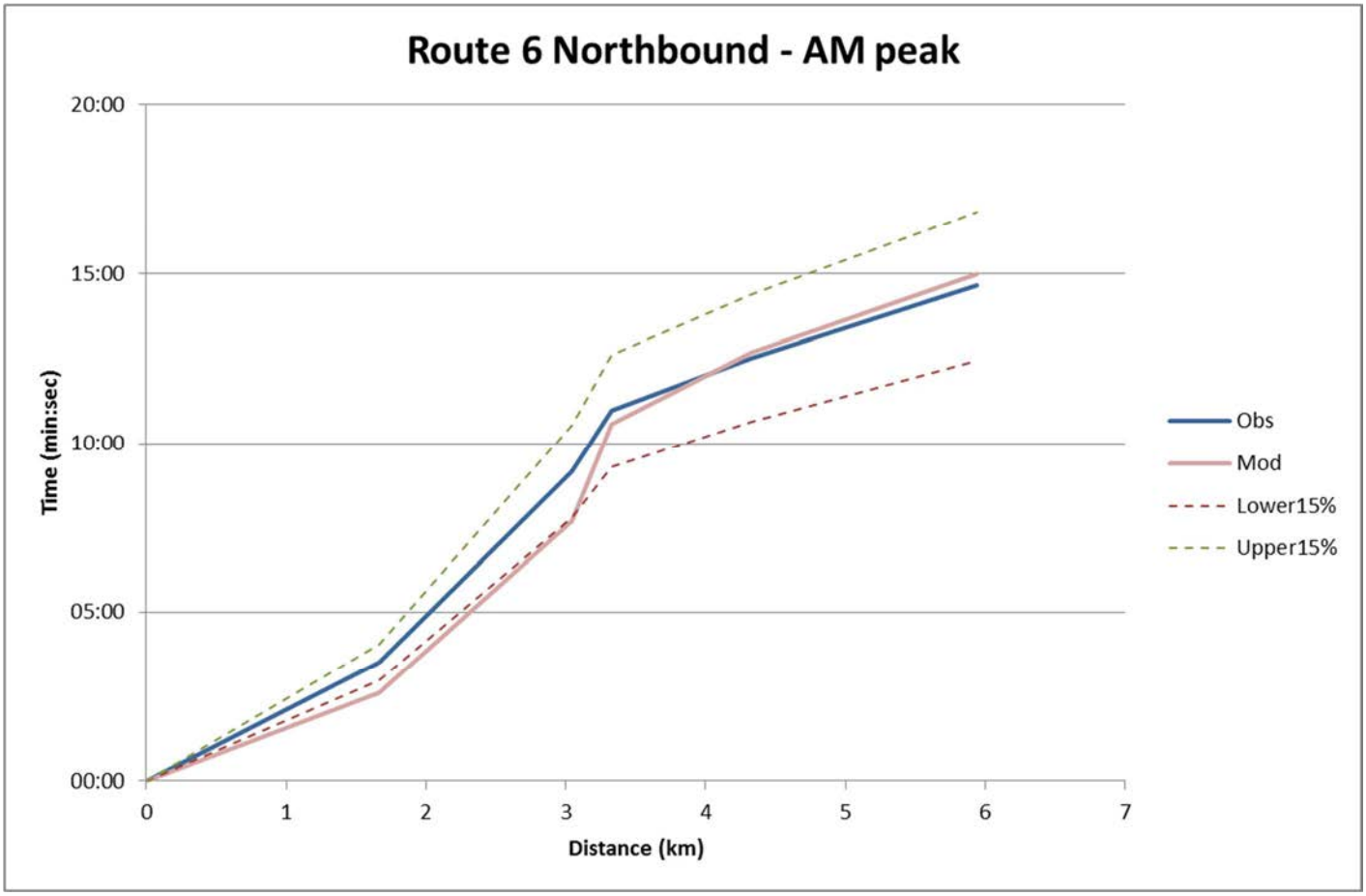

Route 4 Eastbound - AM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

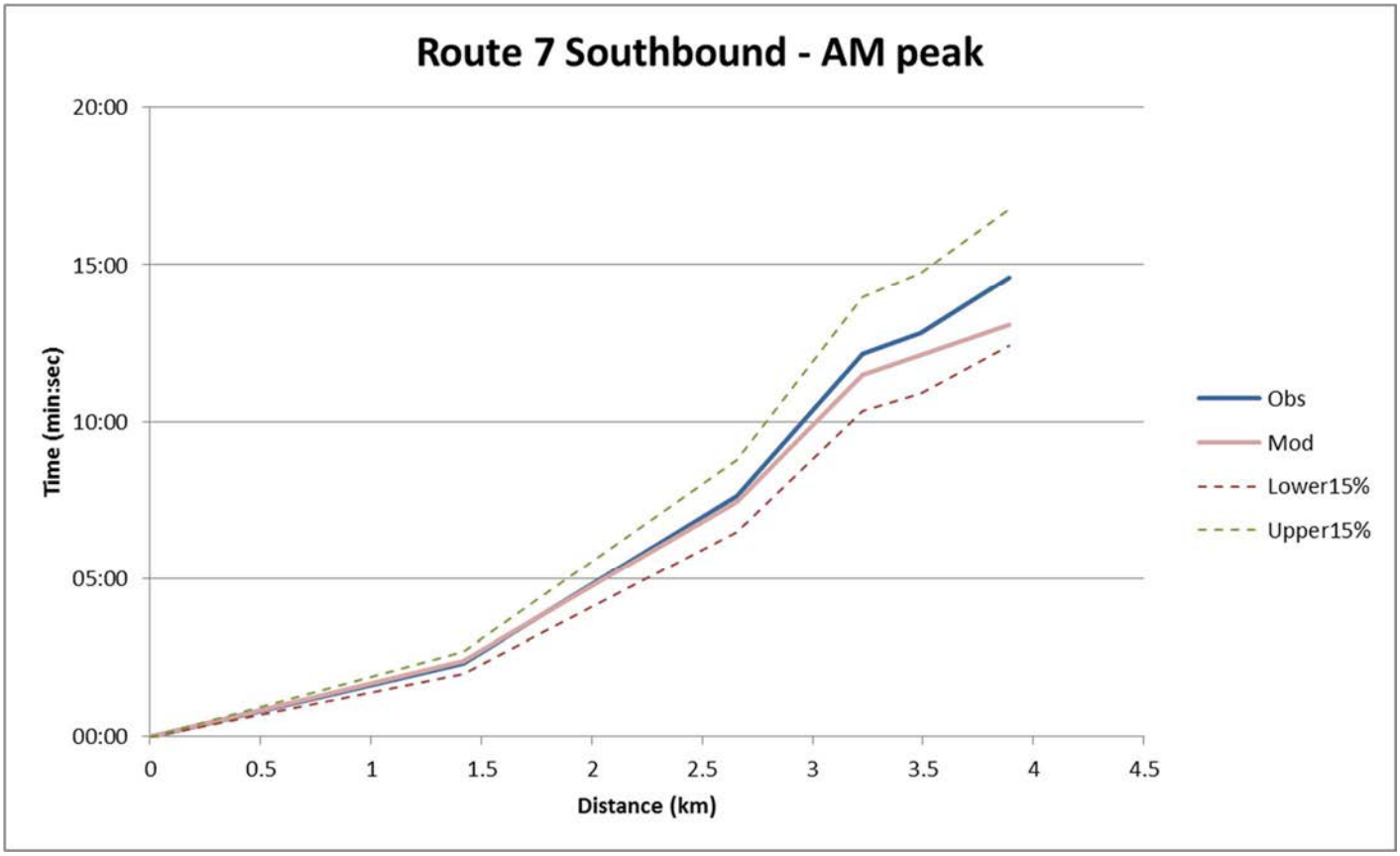

Route 4 Westbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

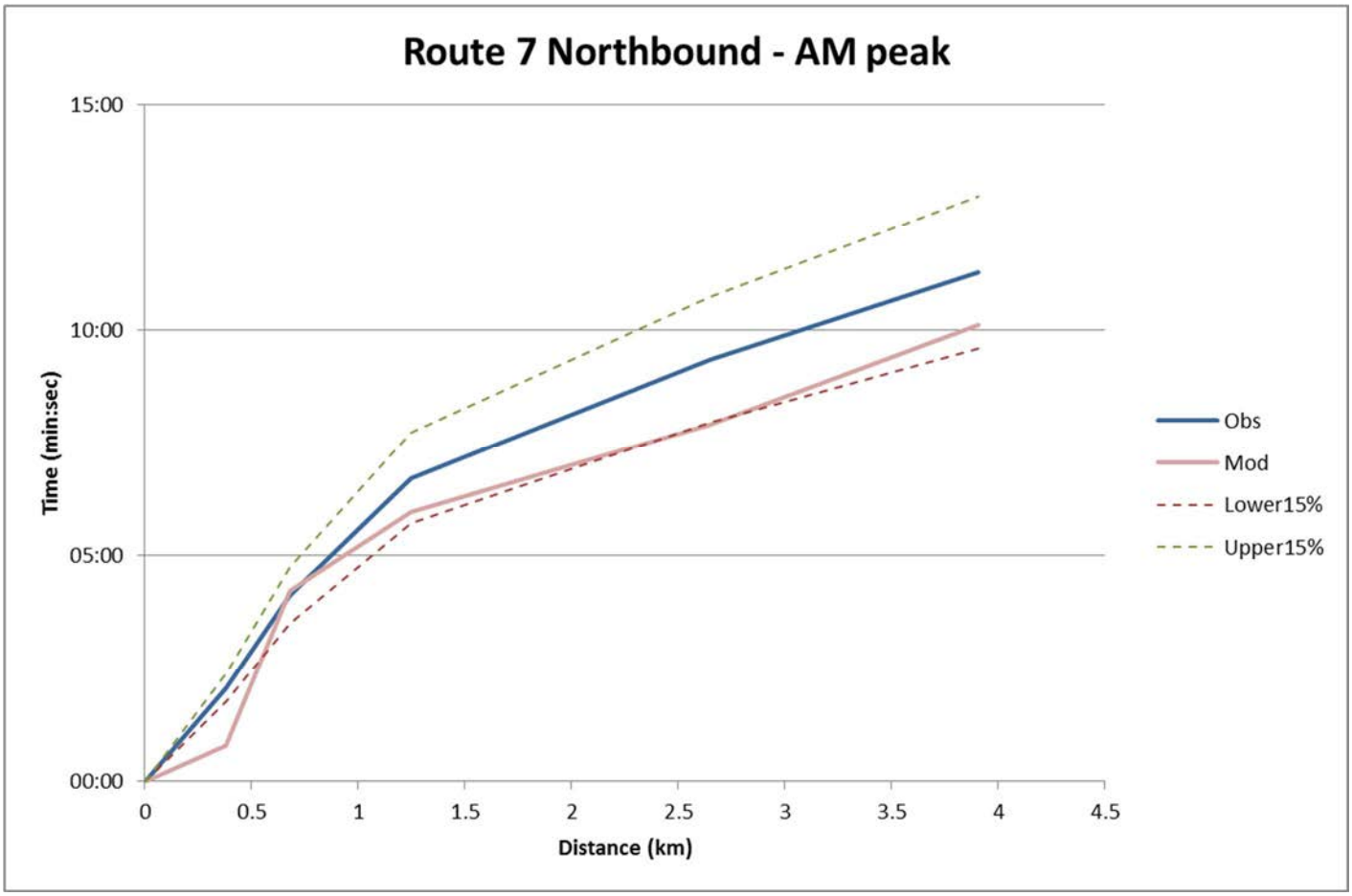

Route 5 Eastbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

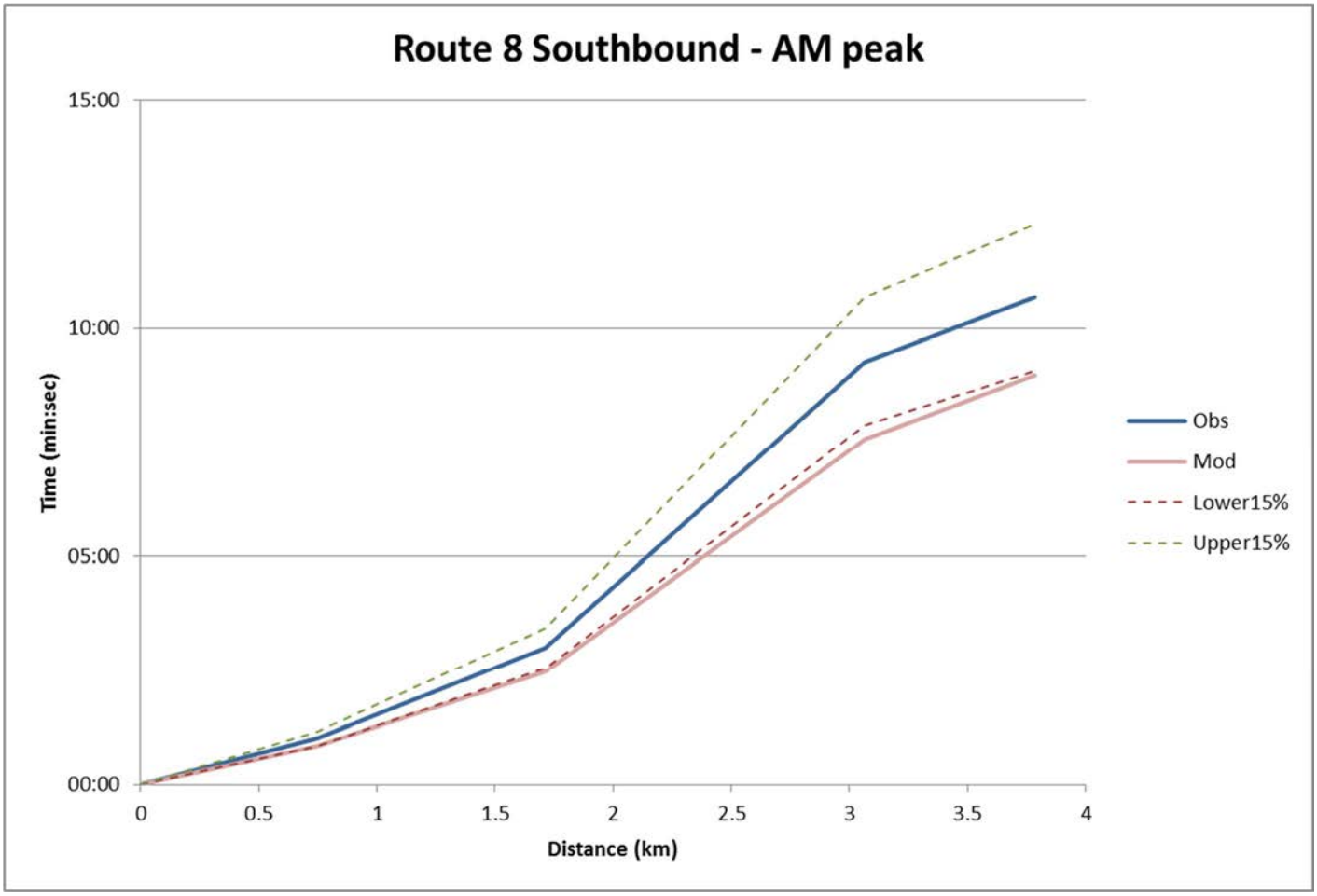

Route 5 Westbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

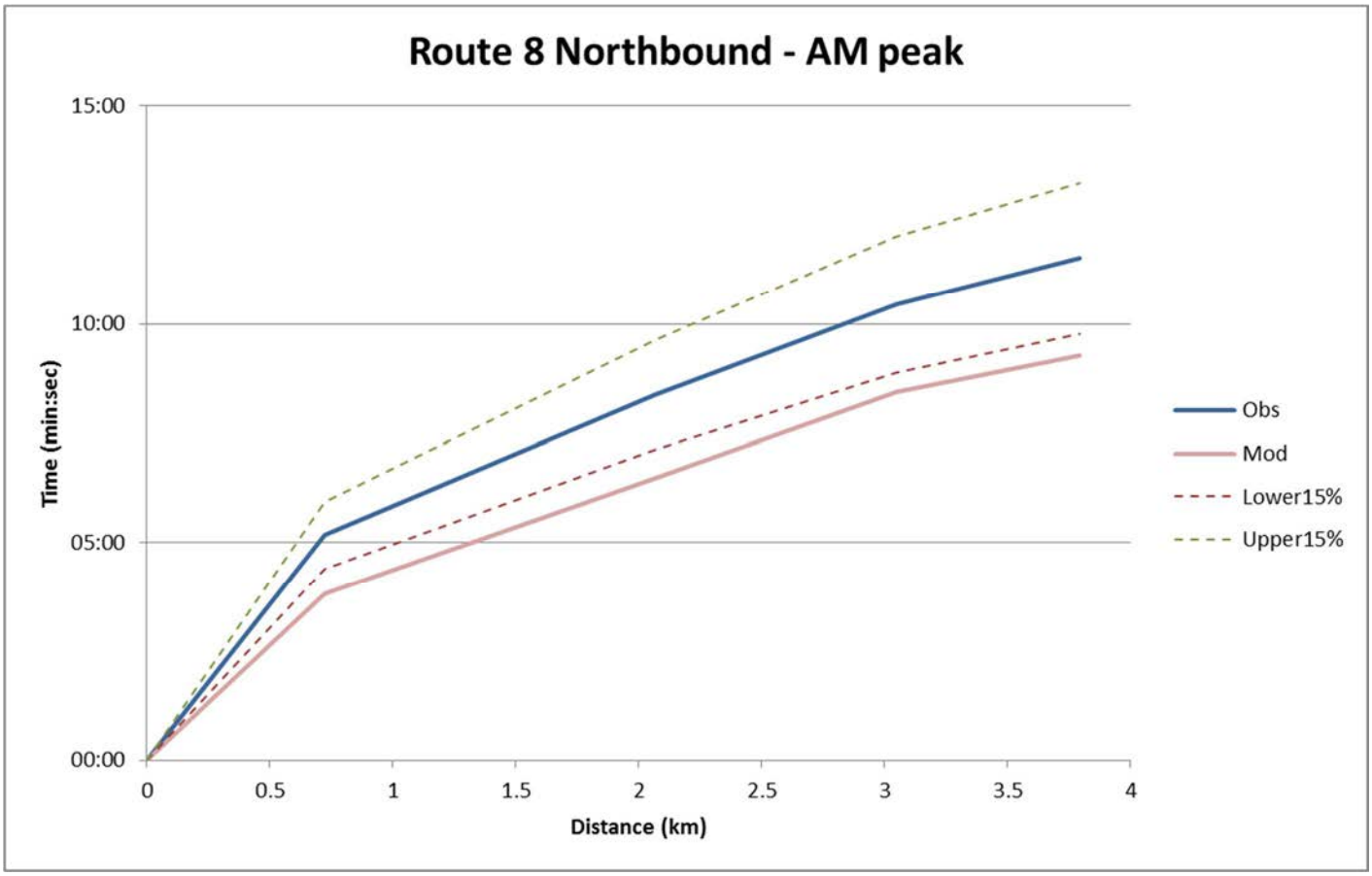

Route 6 Southbound - AM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

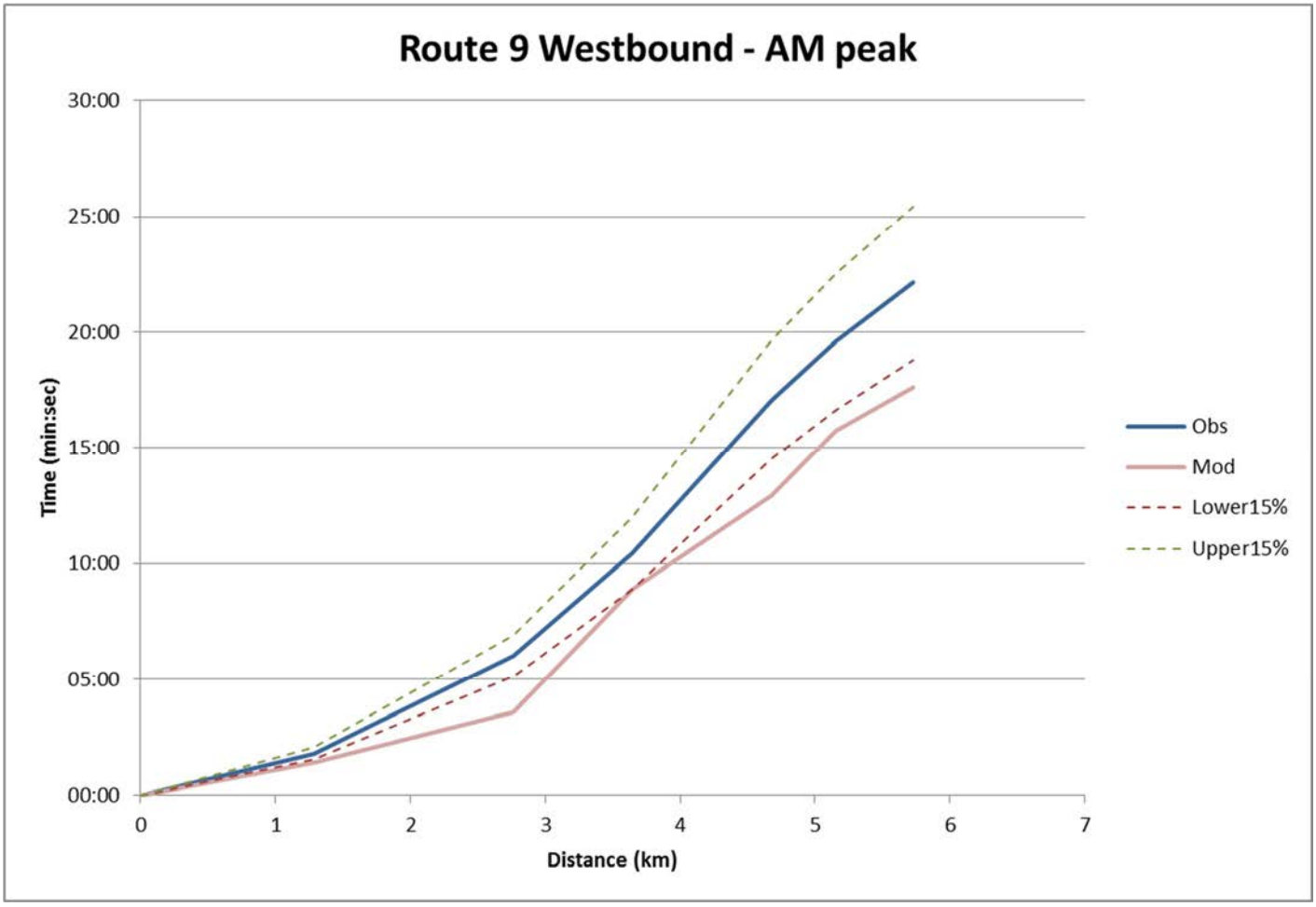

Route 6 Northbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

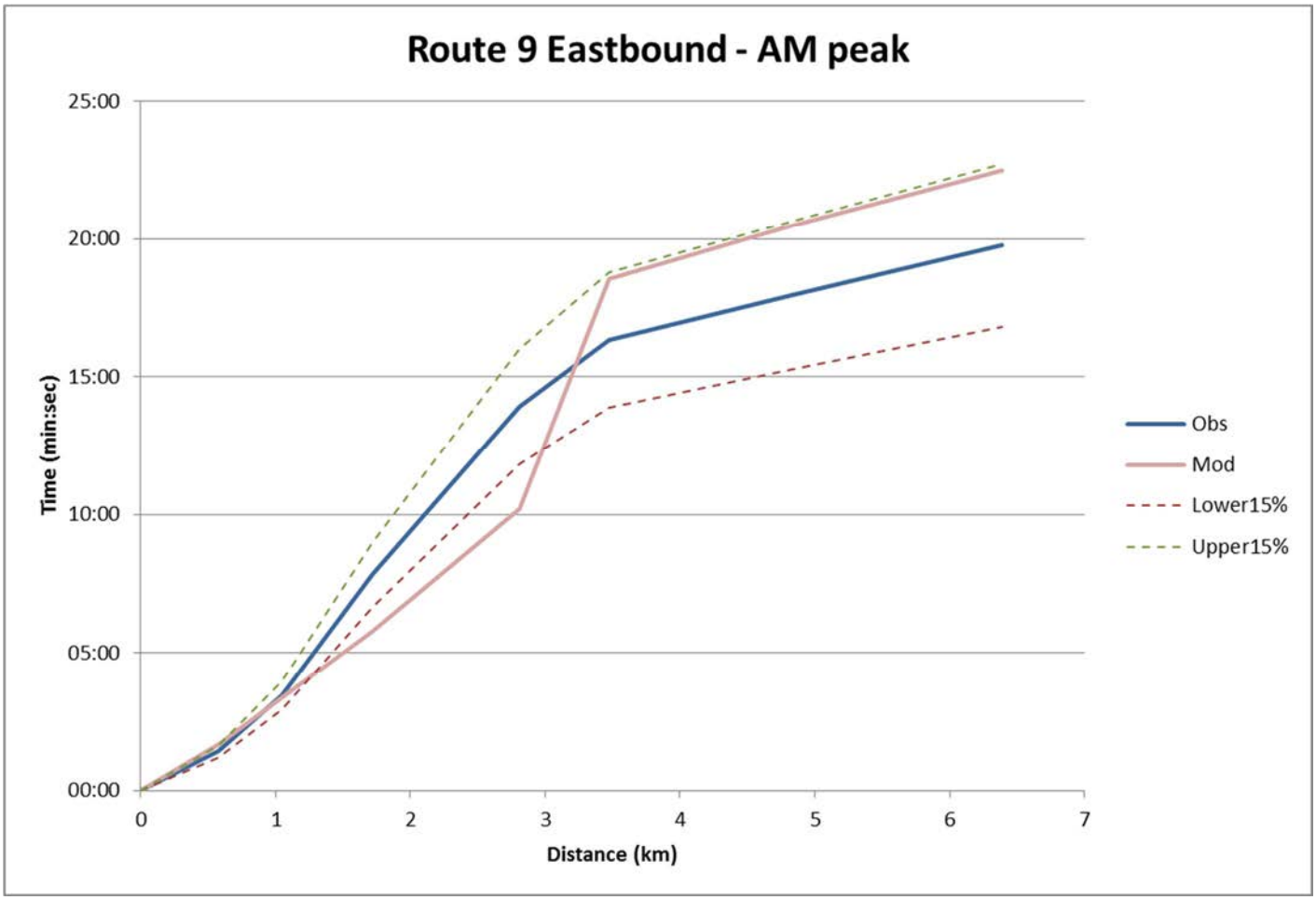

Route 7 Southbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

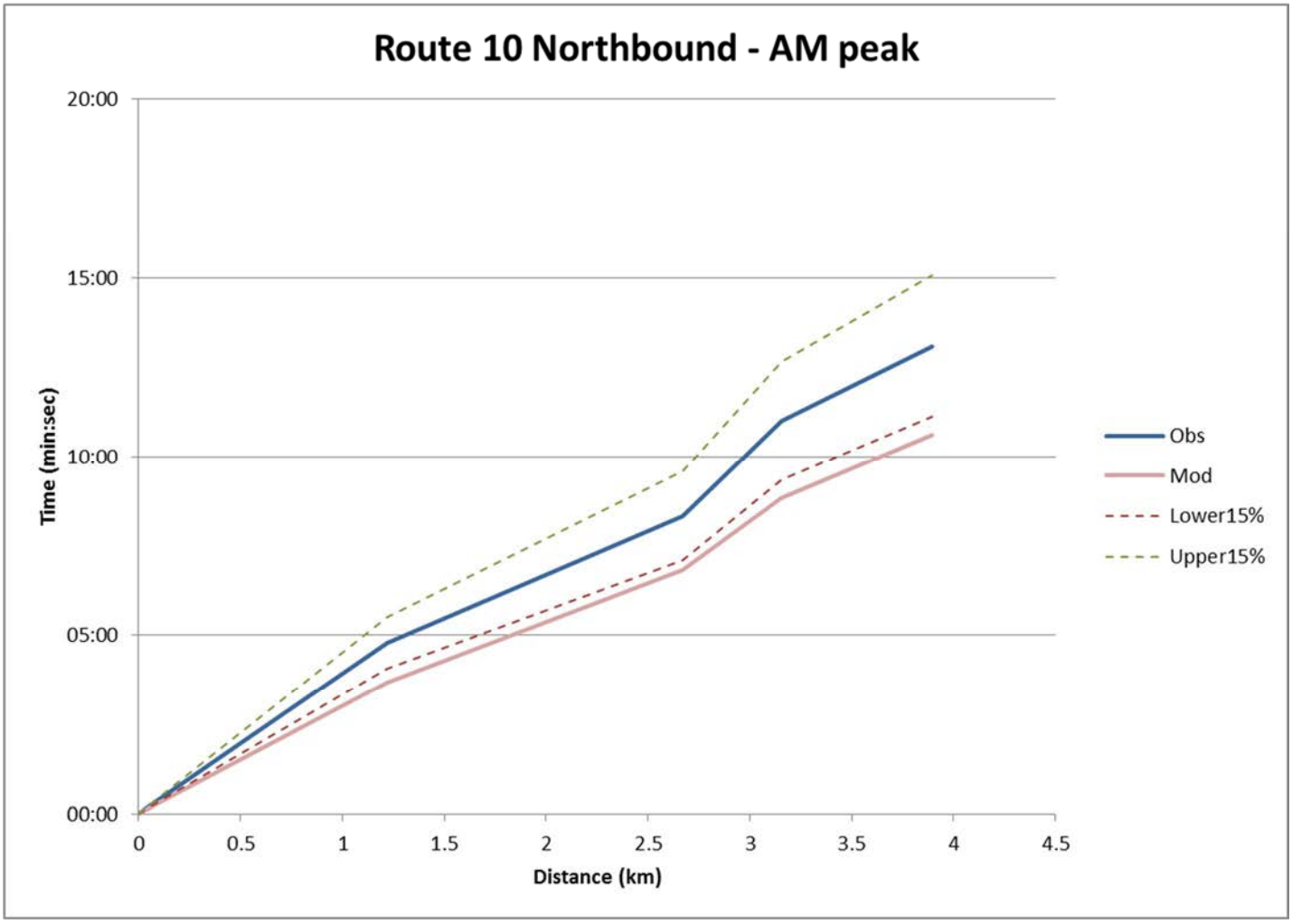

Route 7 Northbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

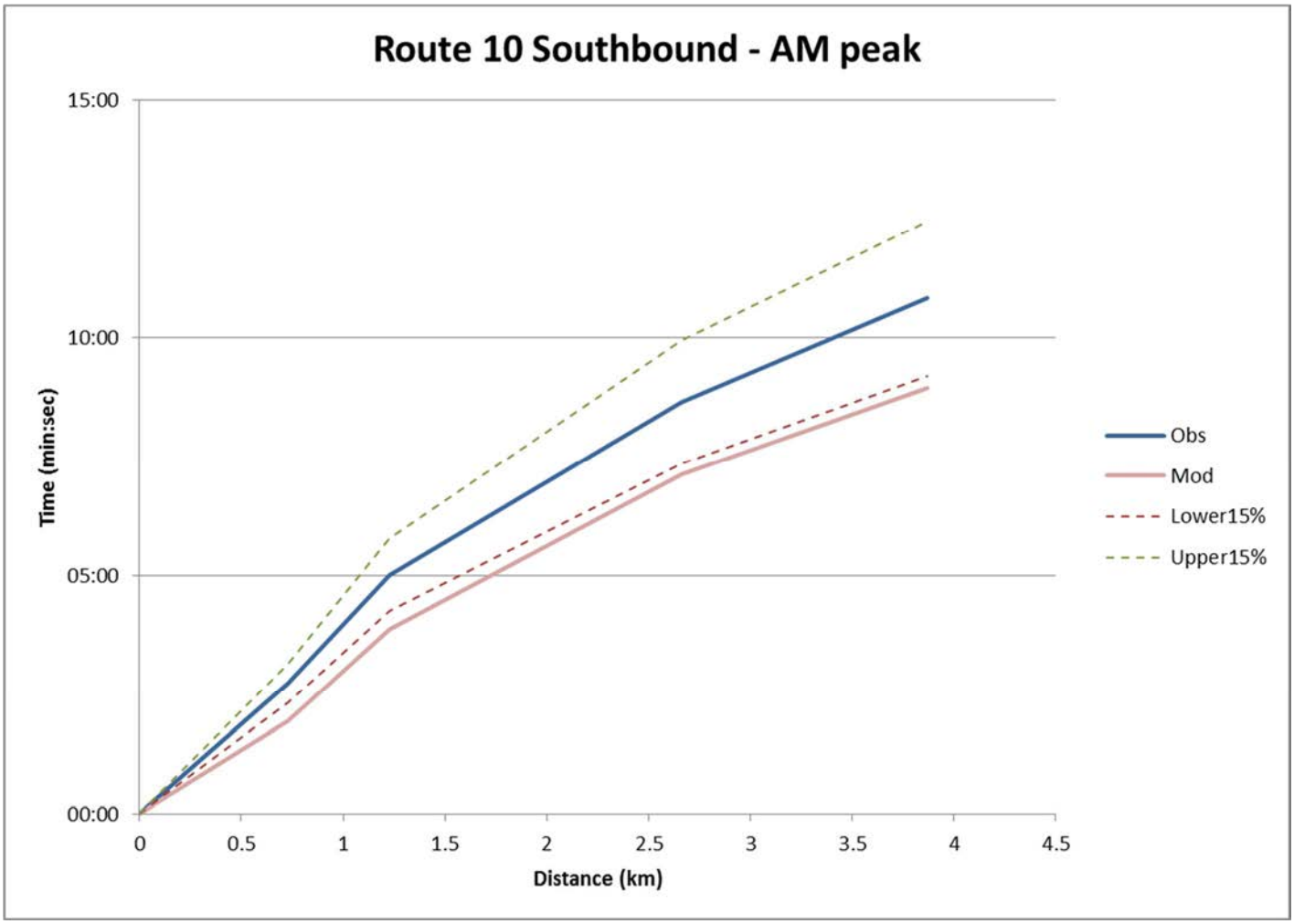

Route 8 Southbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

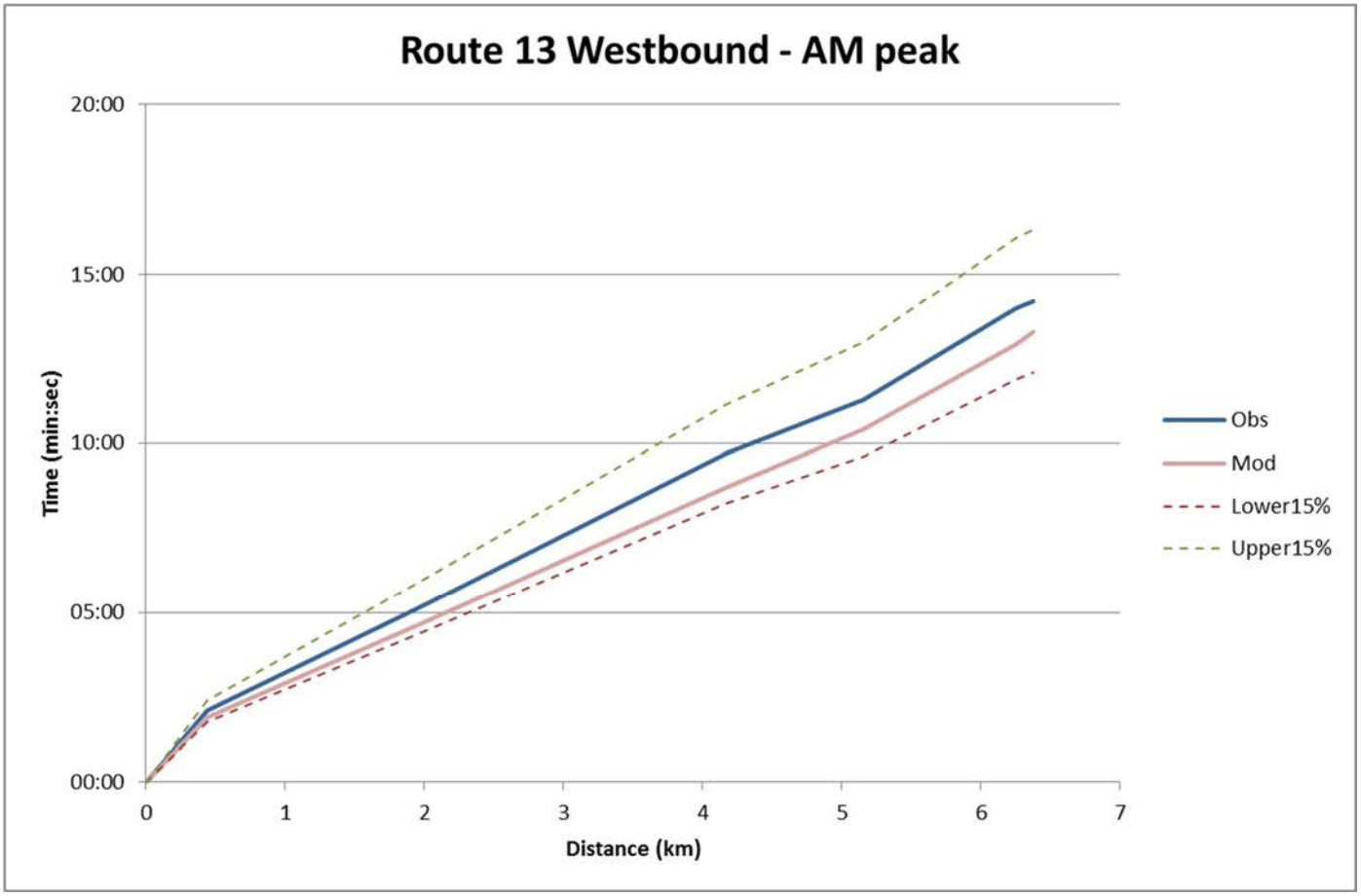

Route 8 Northbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

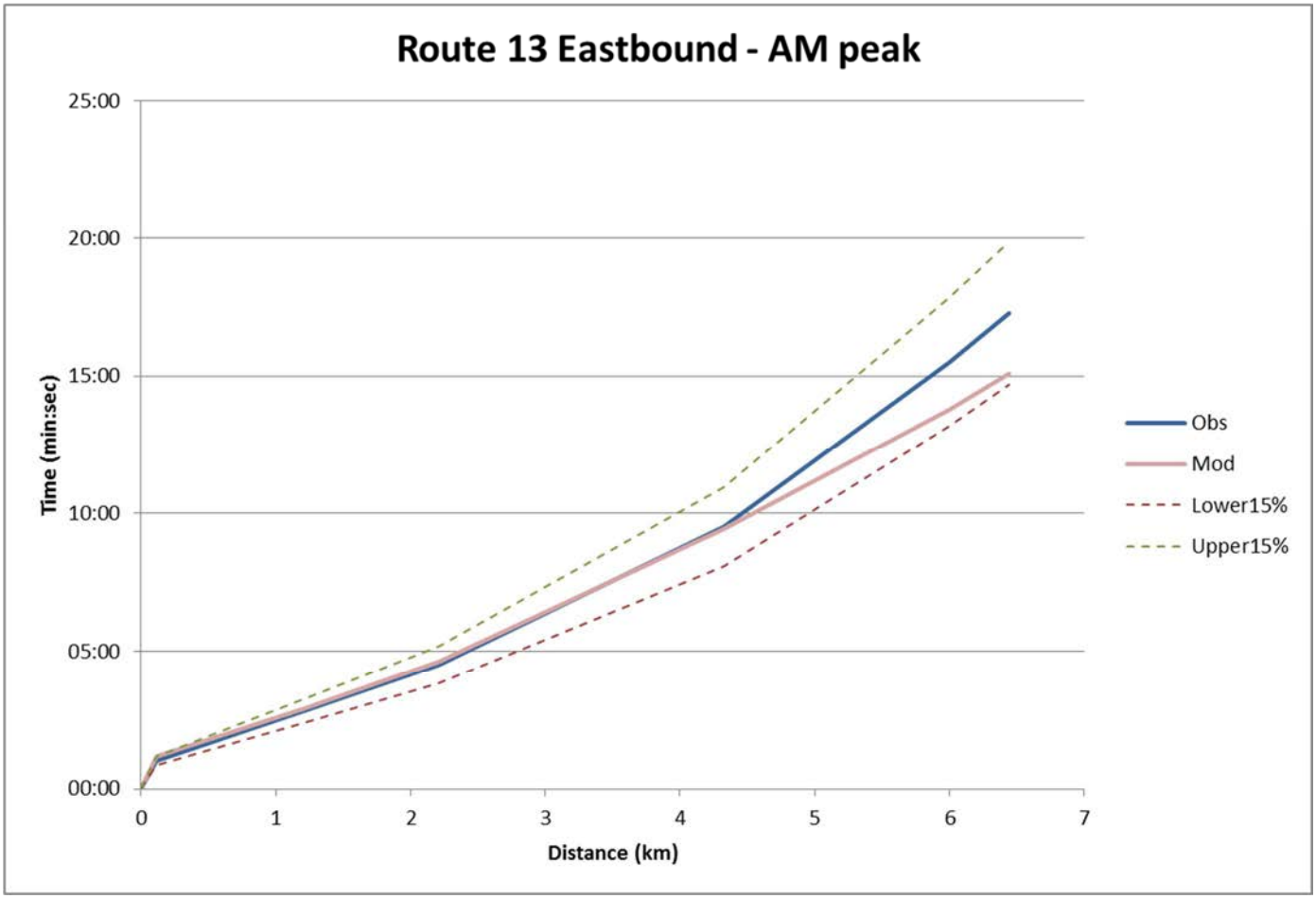

Route 9 Westbound - AM peak
30:00
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

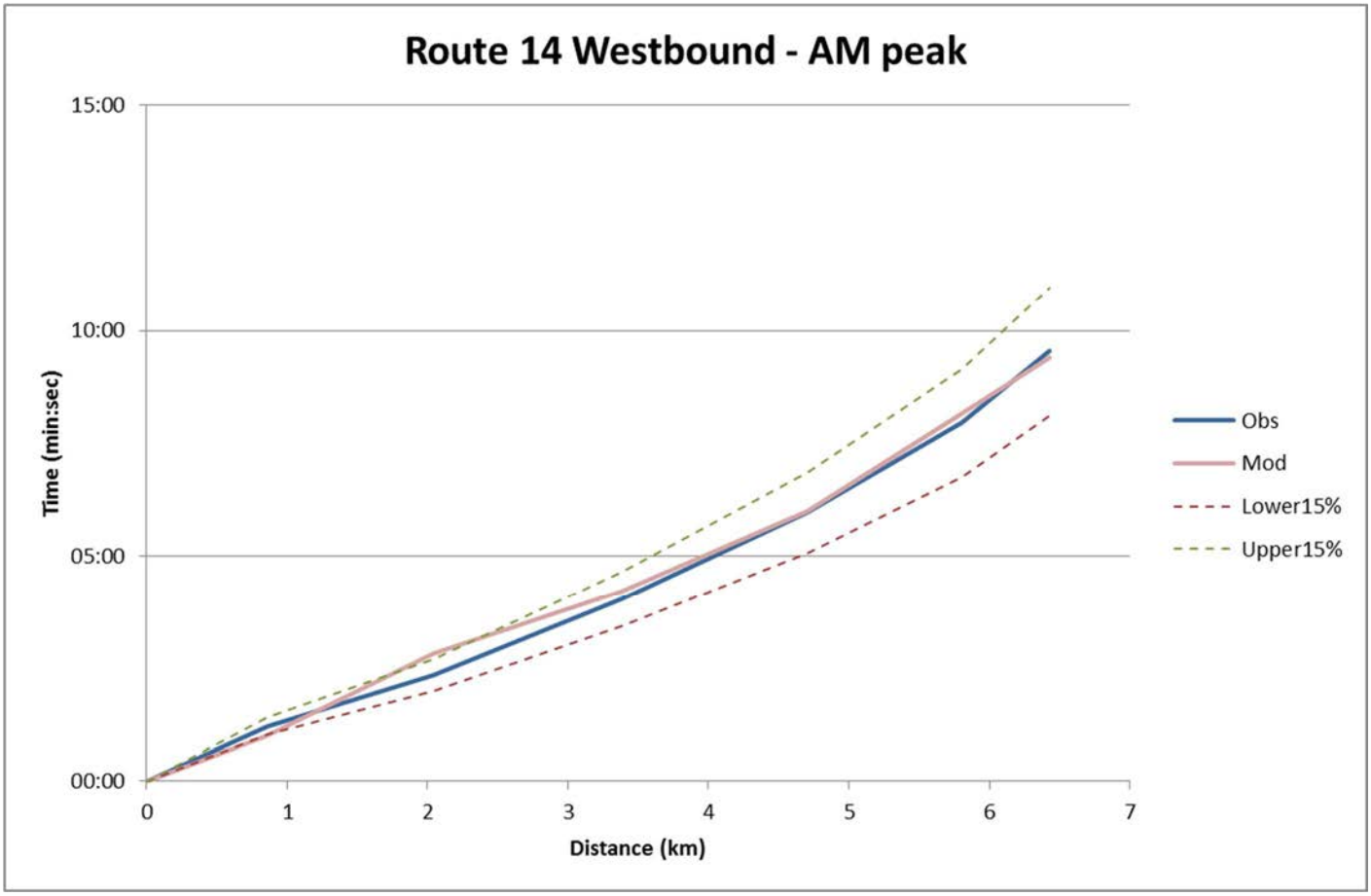

Route 9 Eastbound - AM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

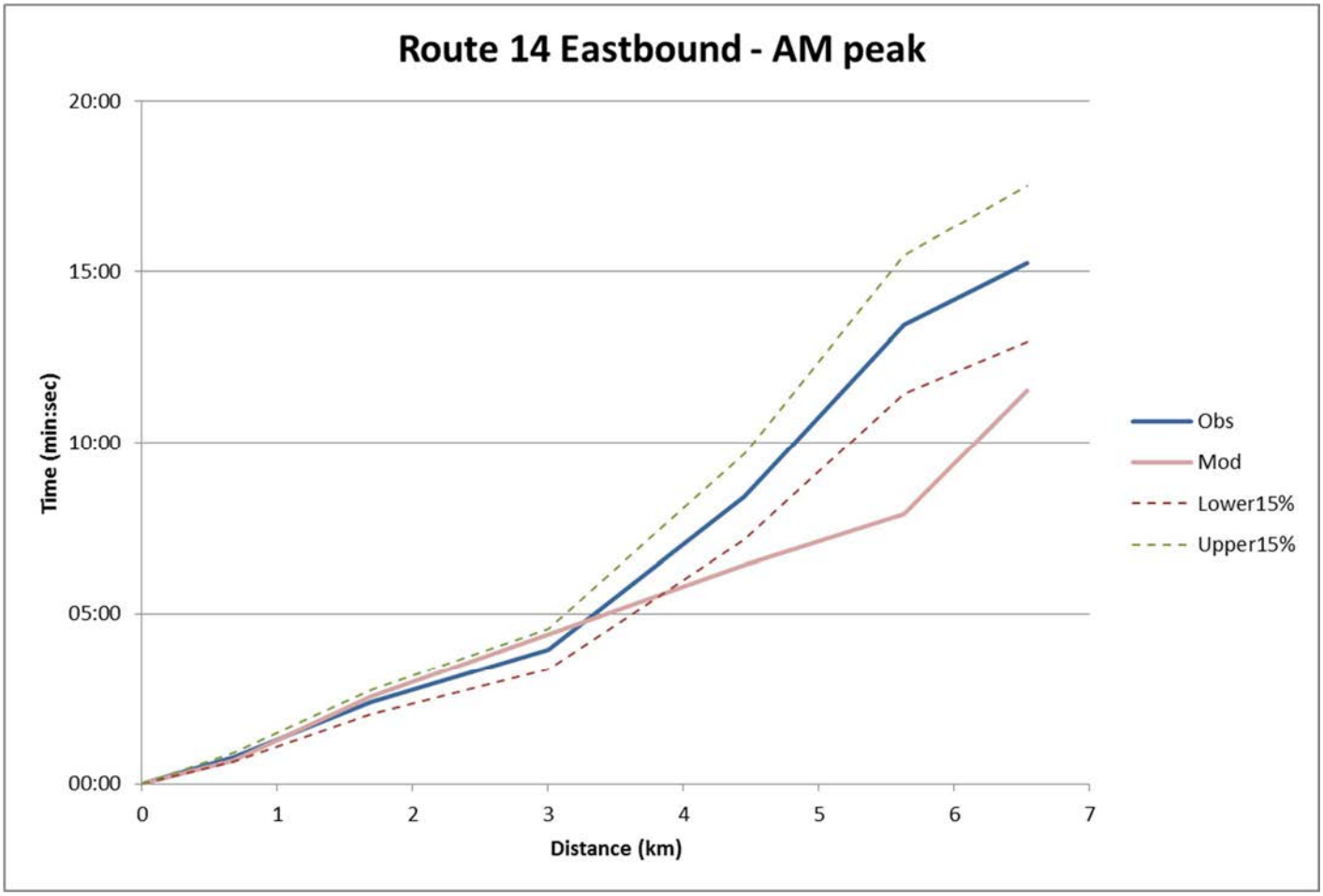

Route 10 Northbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

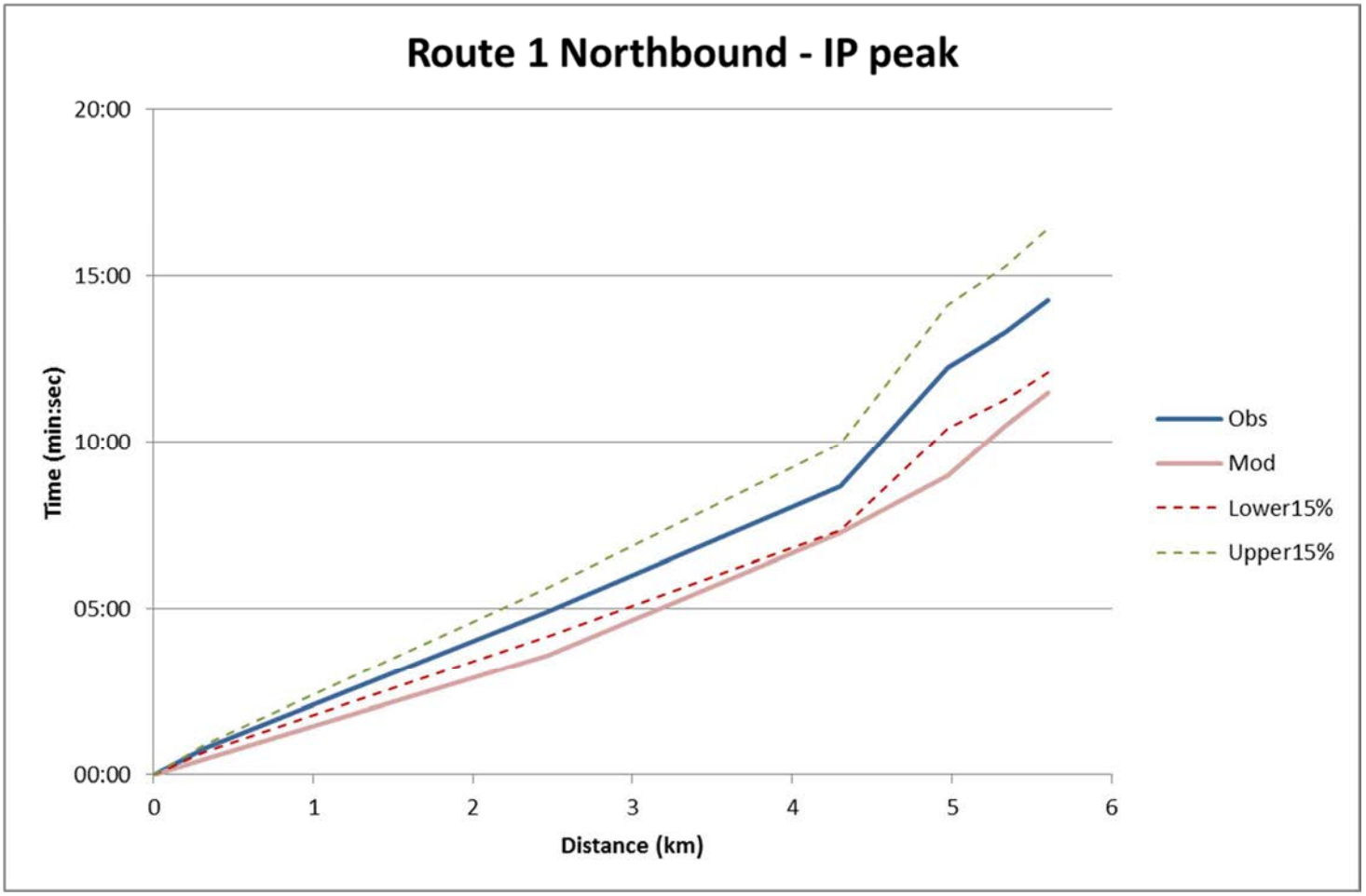

Route 10 Southbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

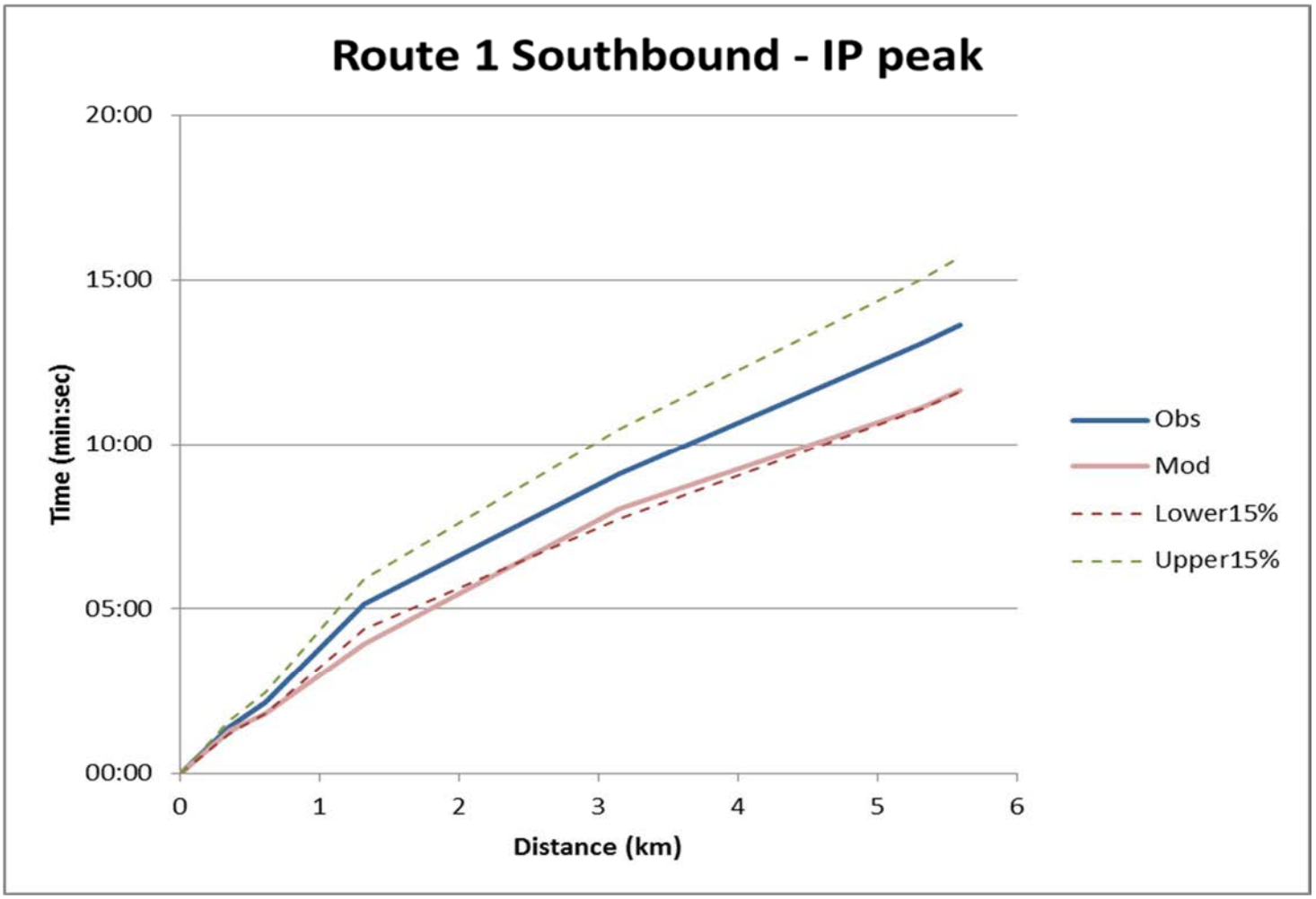

Route 13 Westbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

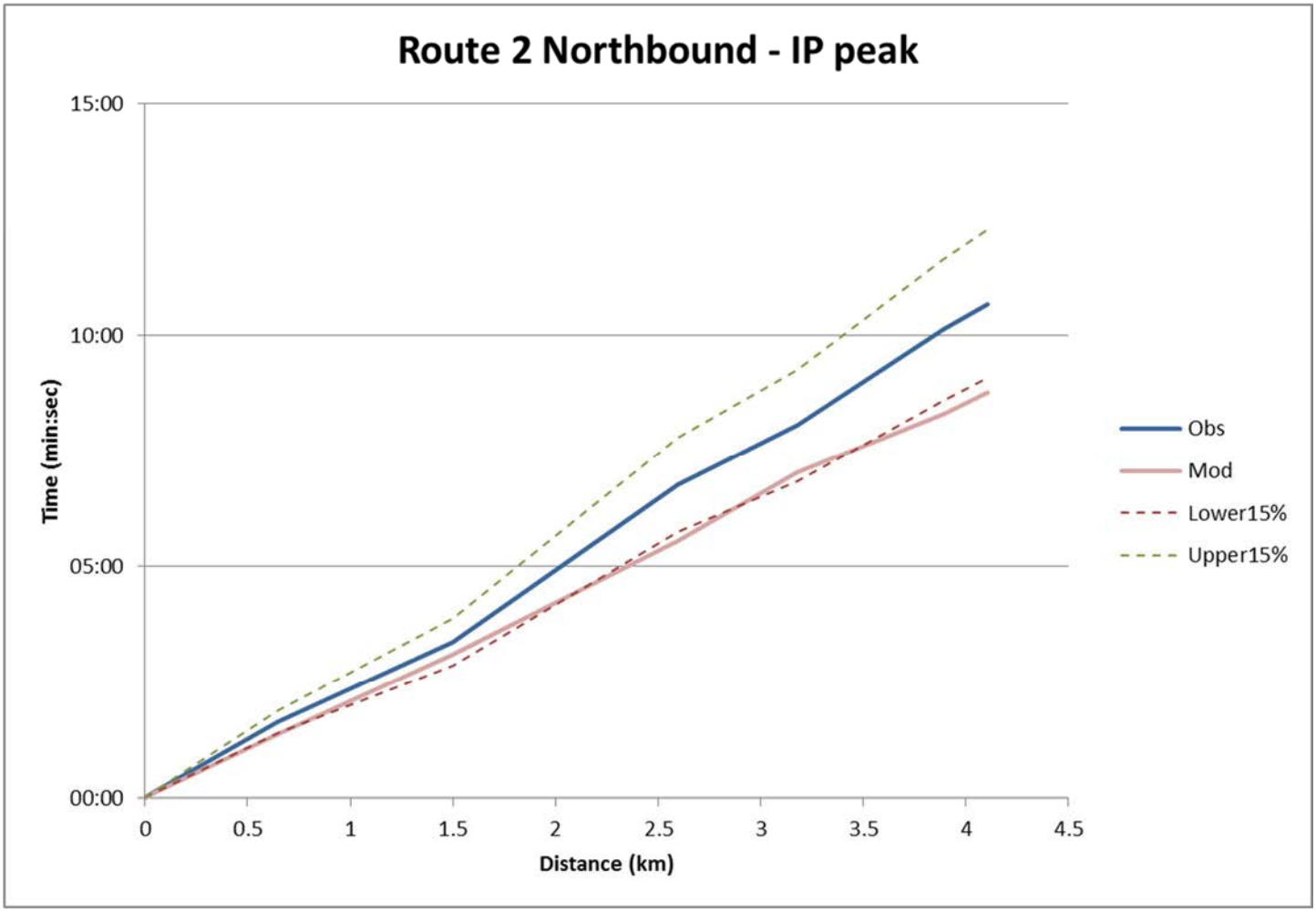

Route 13 Eastbound - AM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

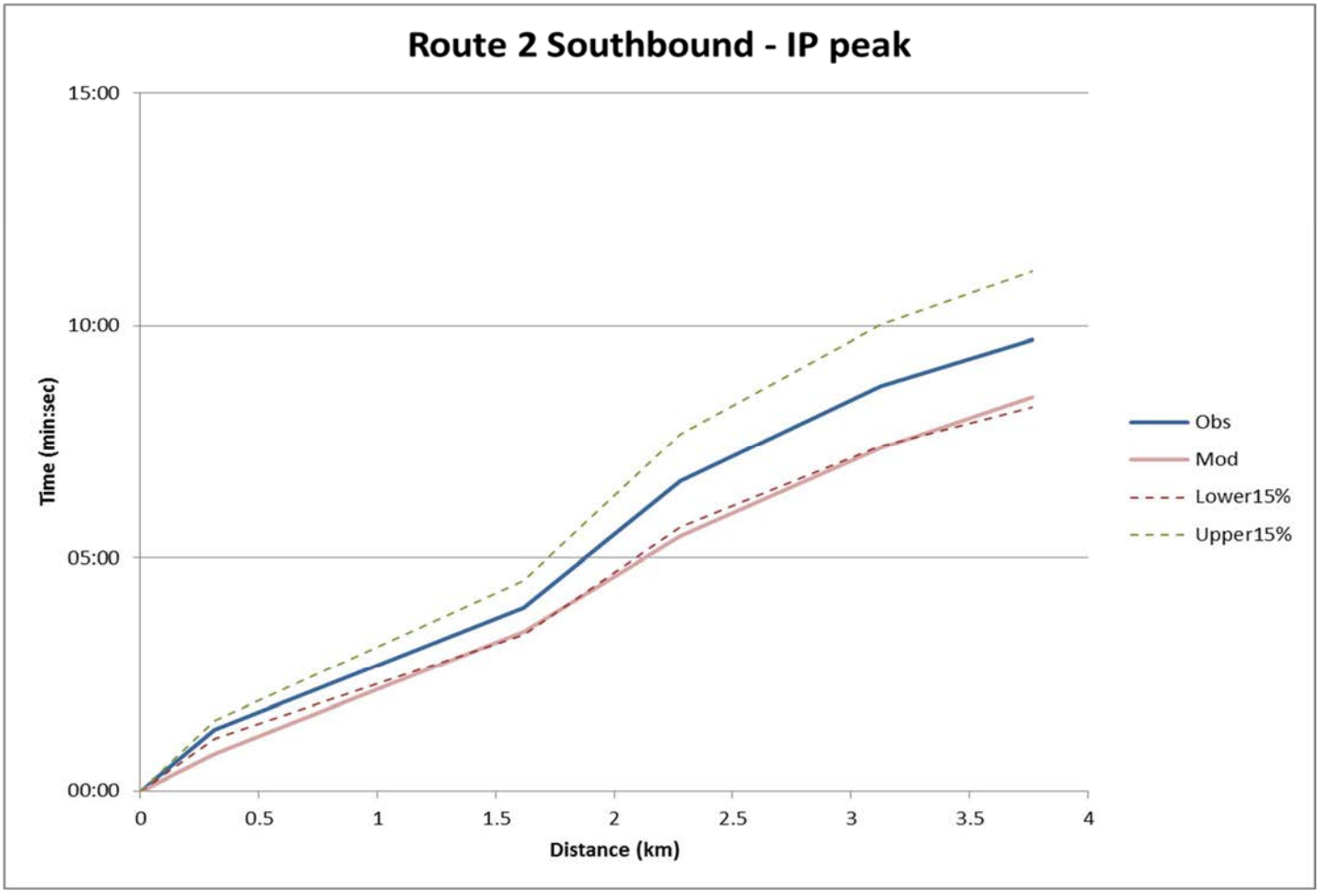

Route 14 Westbound - AM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

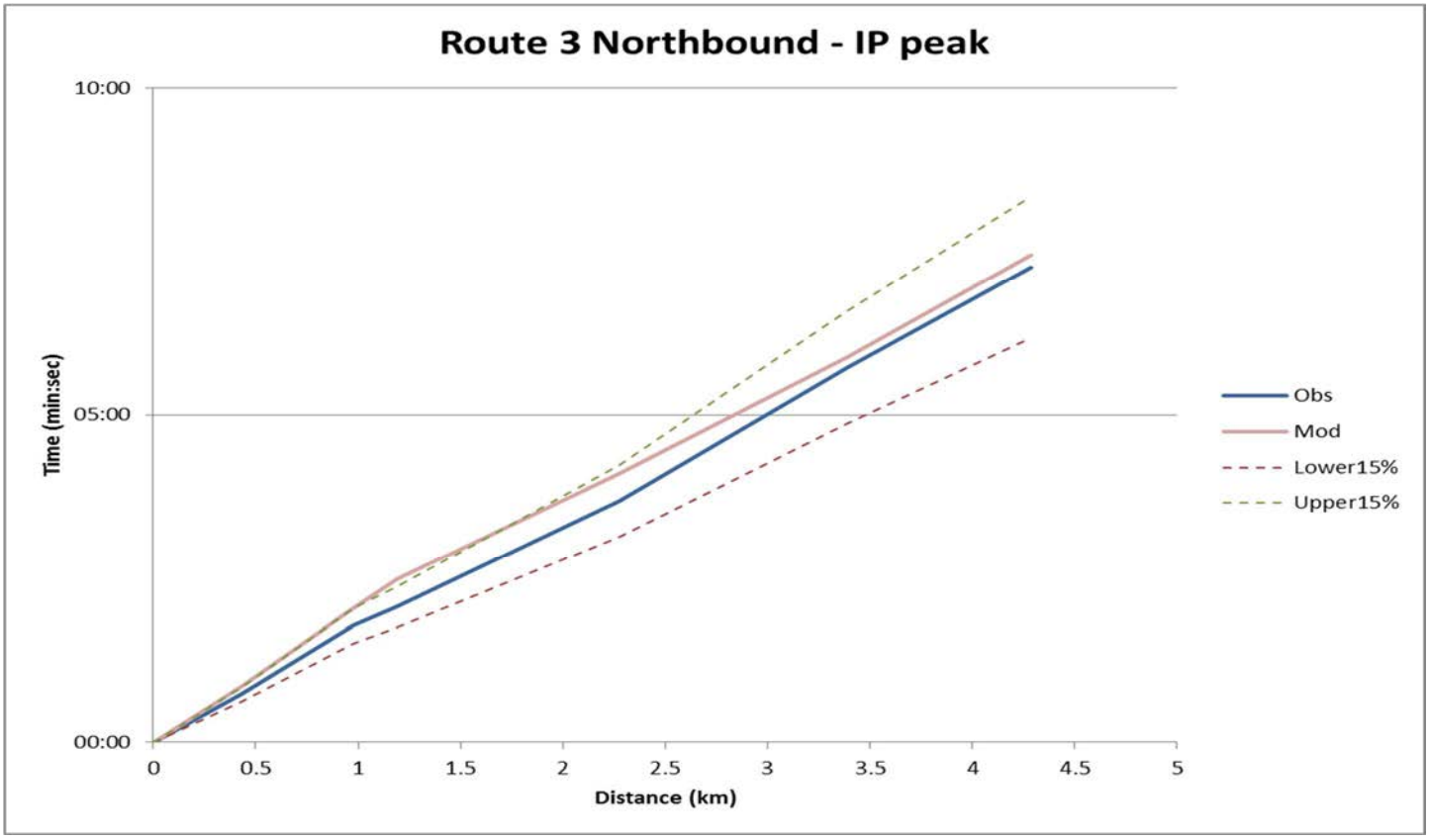

Route 14 Eastbound - AM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

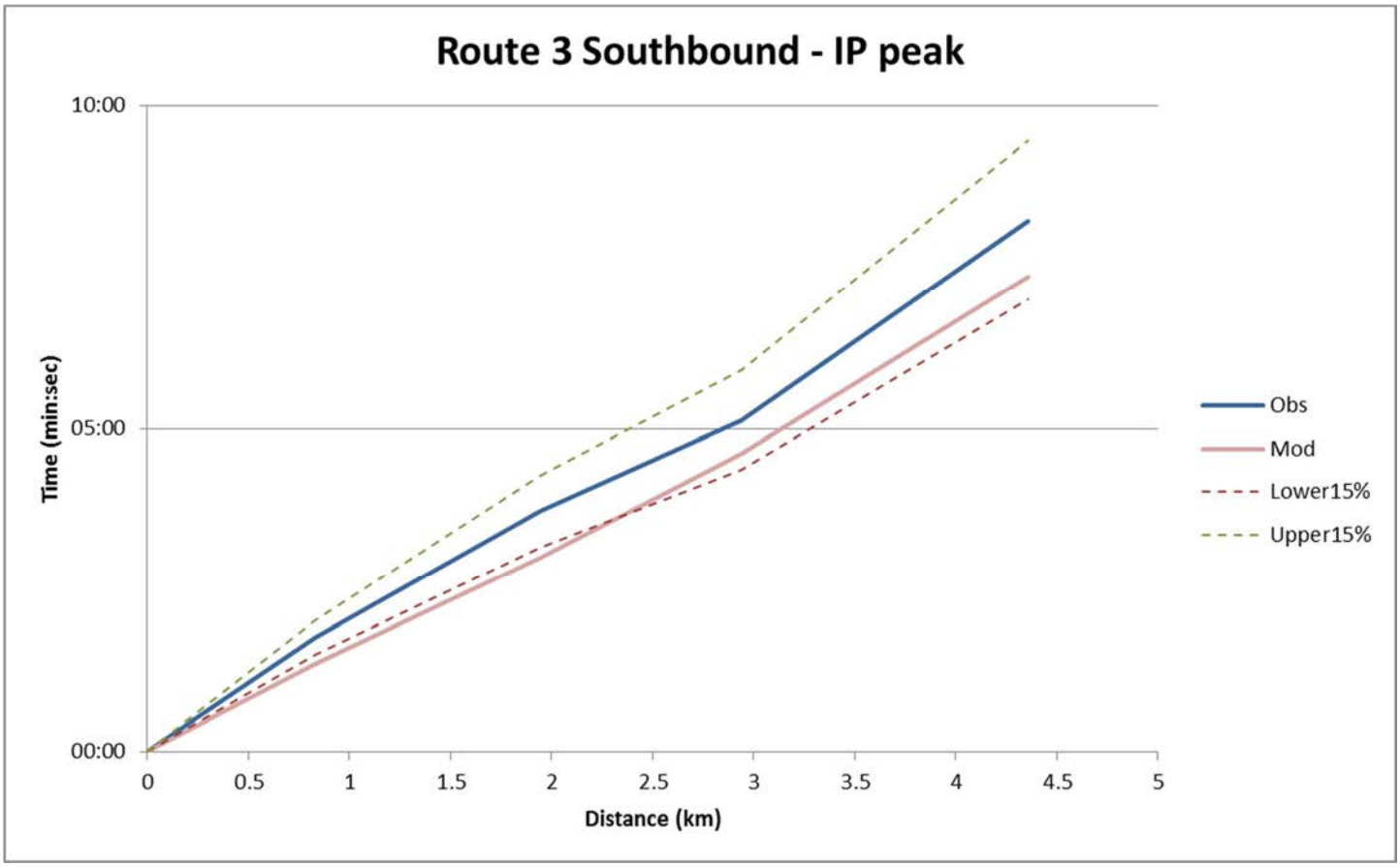

Route 1 Northbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

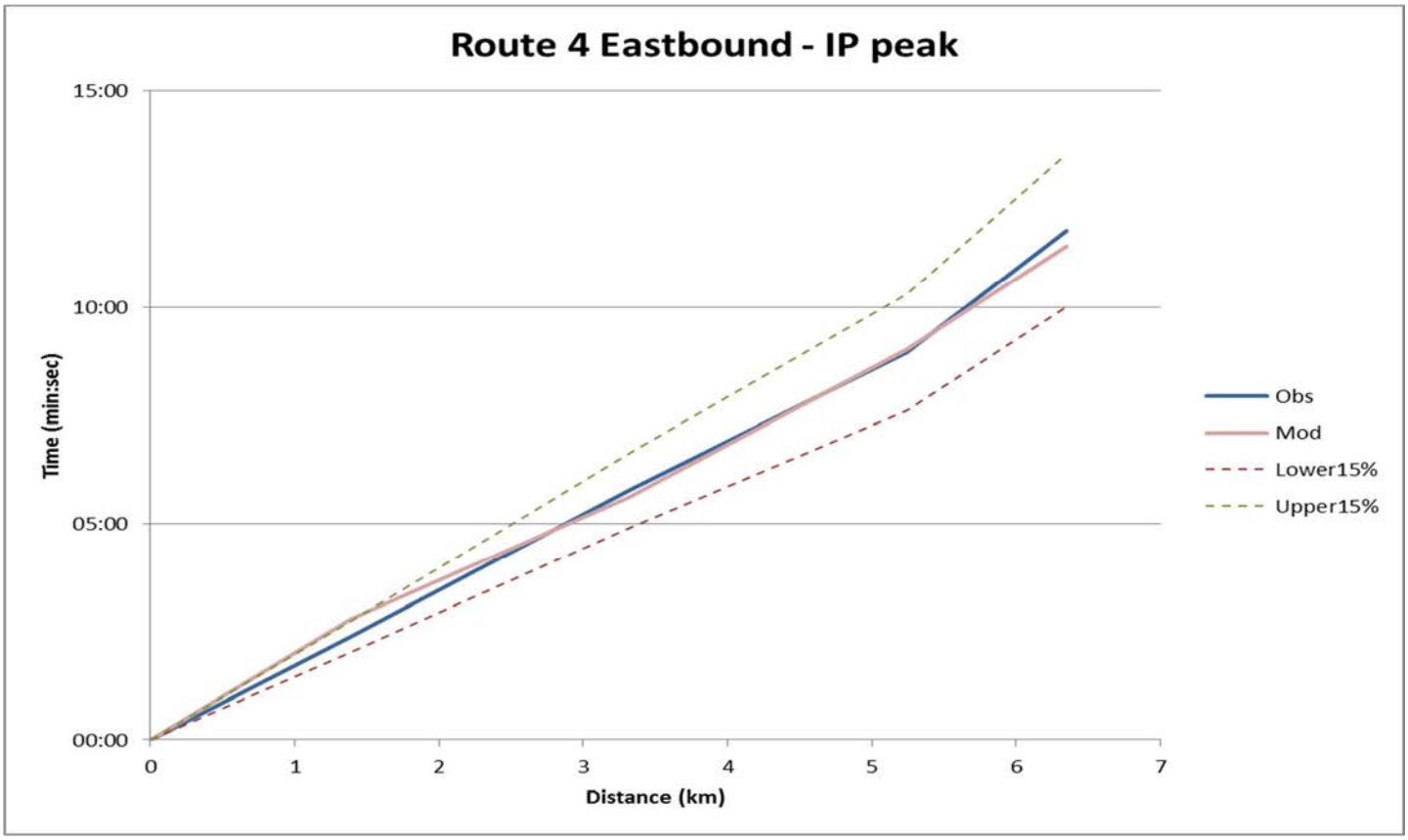

Route 1 Southbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

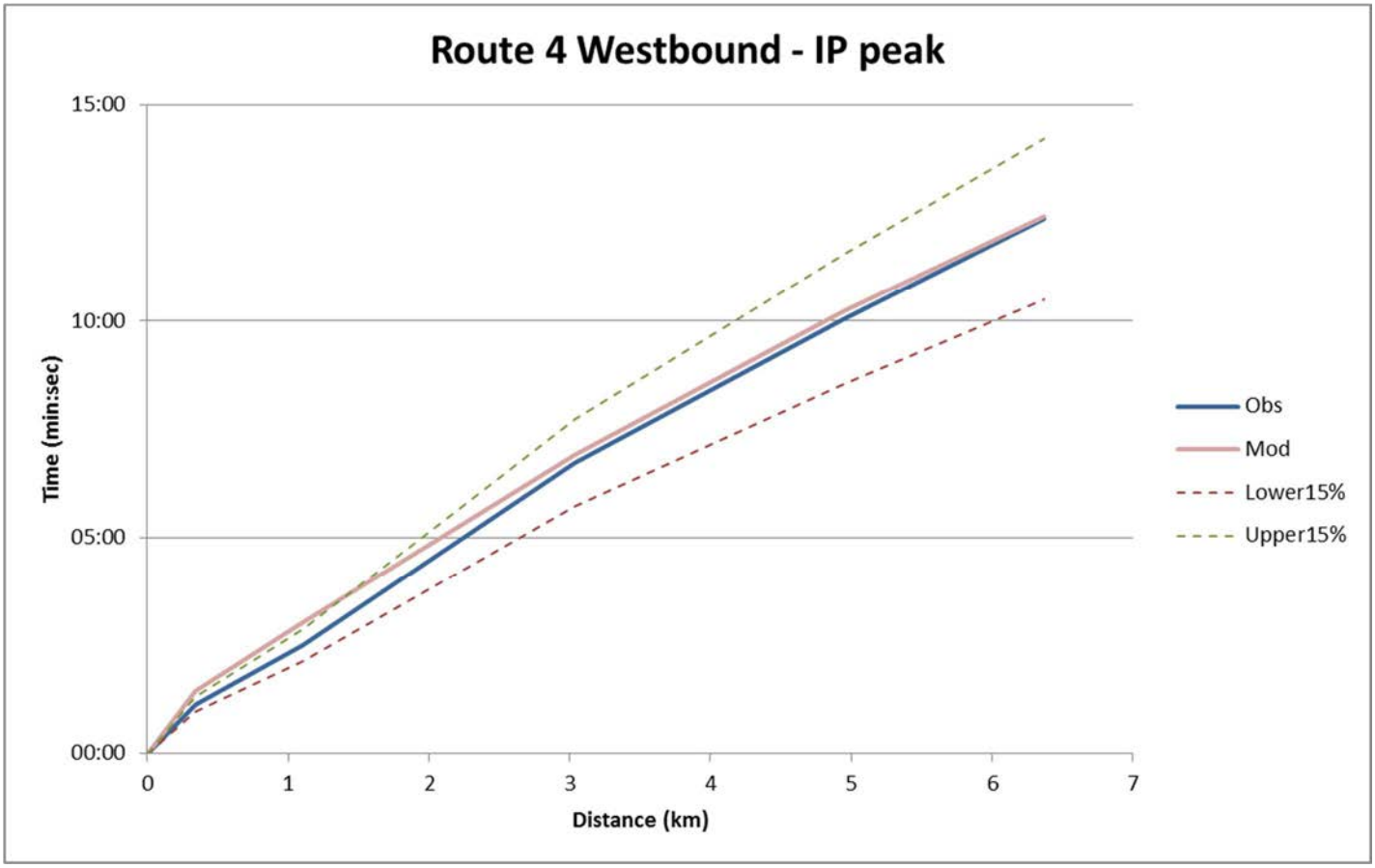

Route 2 Northbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

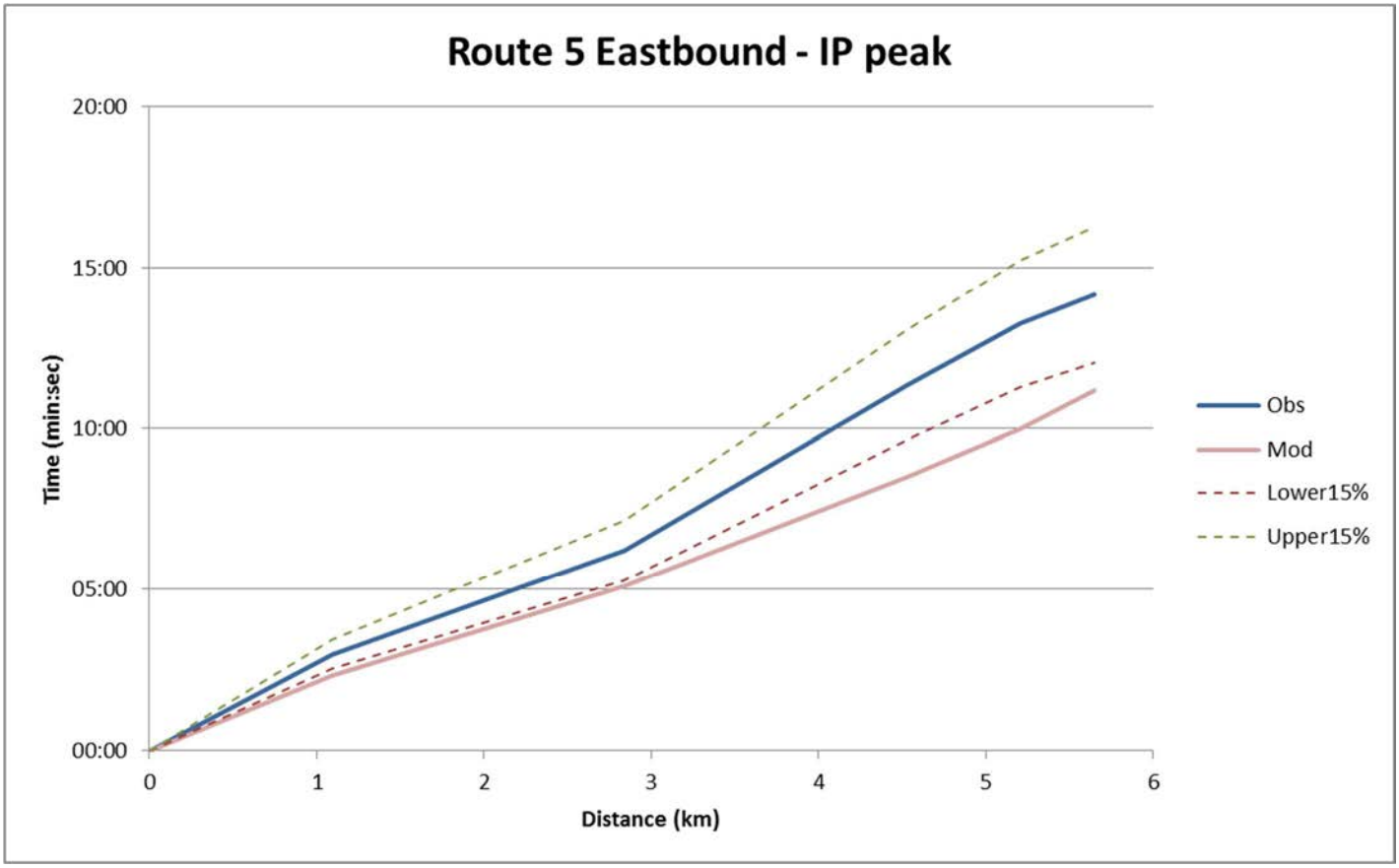

Route 2 Southbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

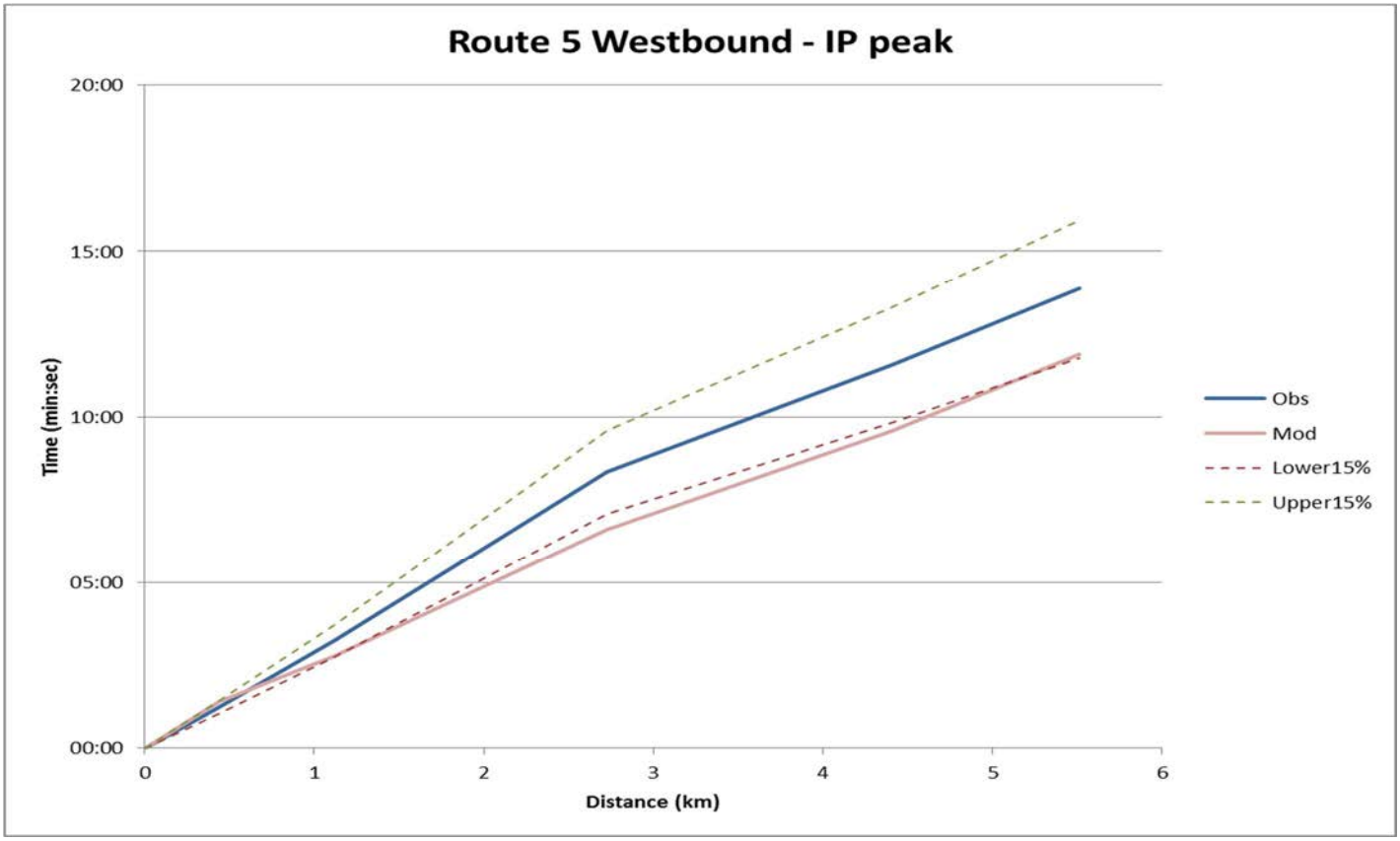

Route 3 Northbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Distance (km)
Obs
Mod
Lower15%
Upper15%

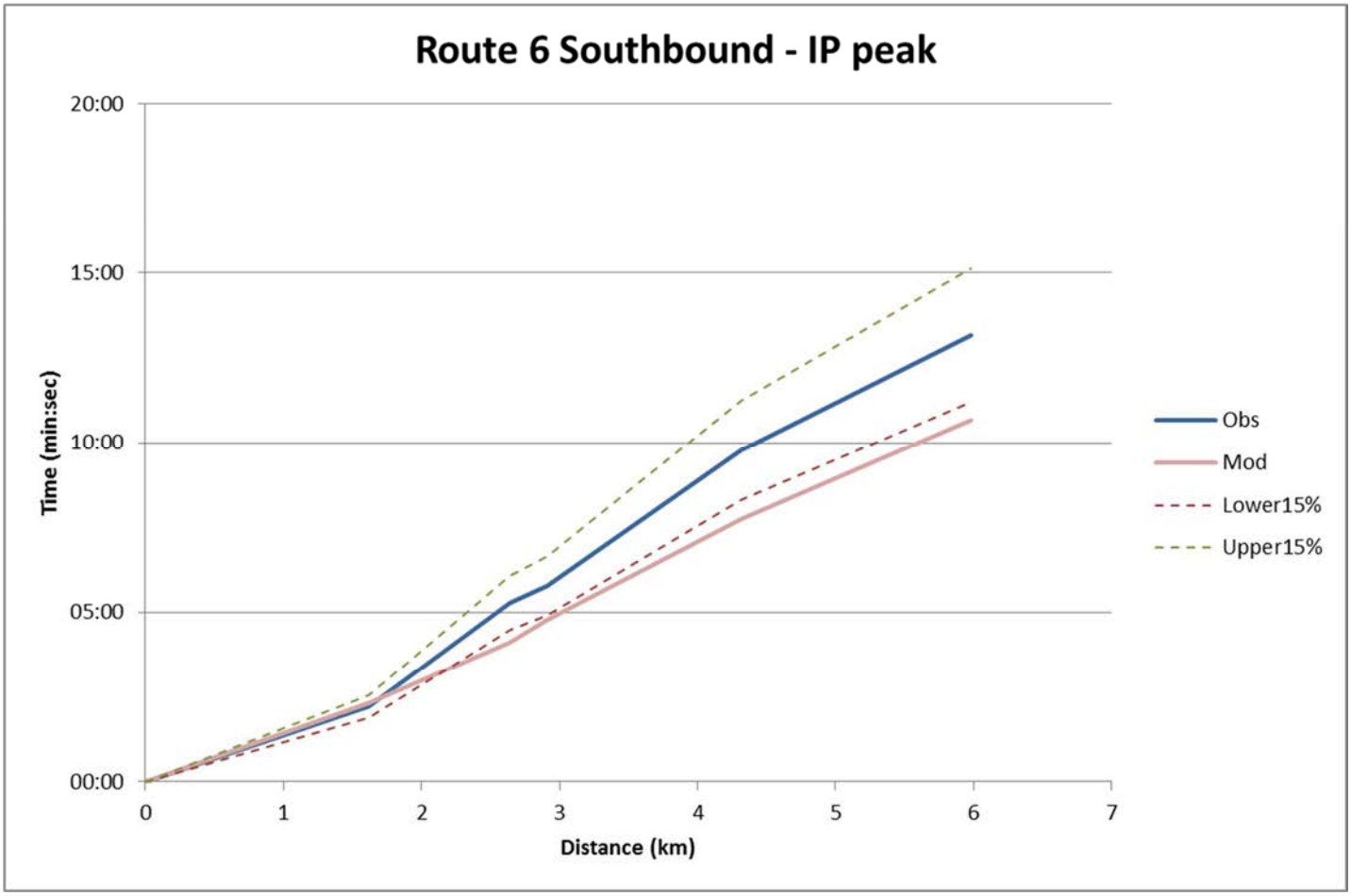

Route 3 Southbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Distance (km)
Obs
Mod
Lower15%
Upper15%

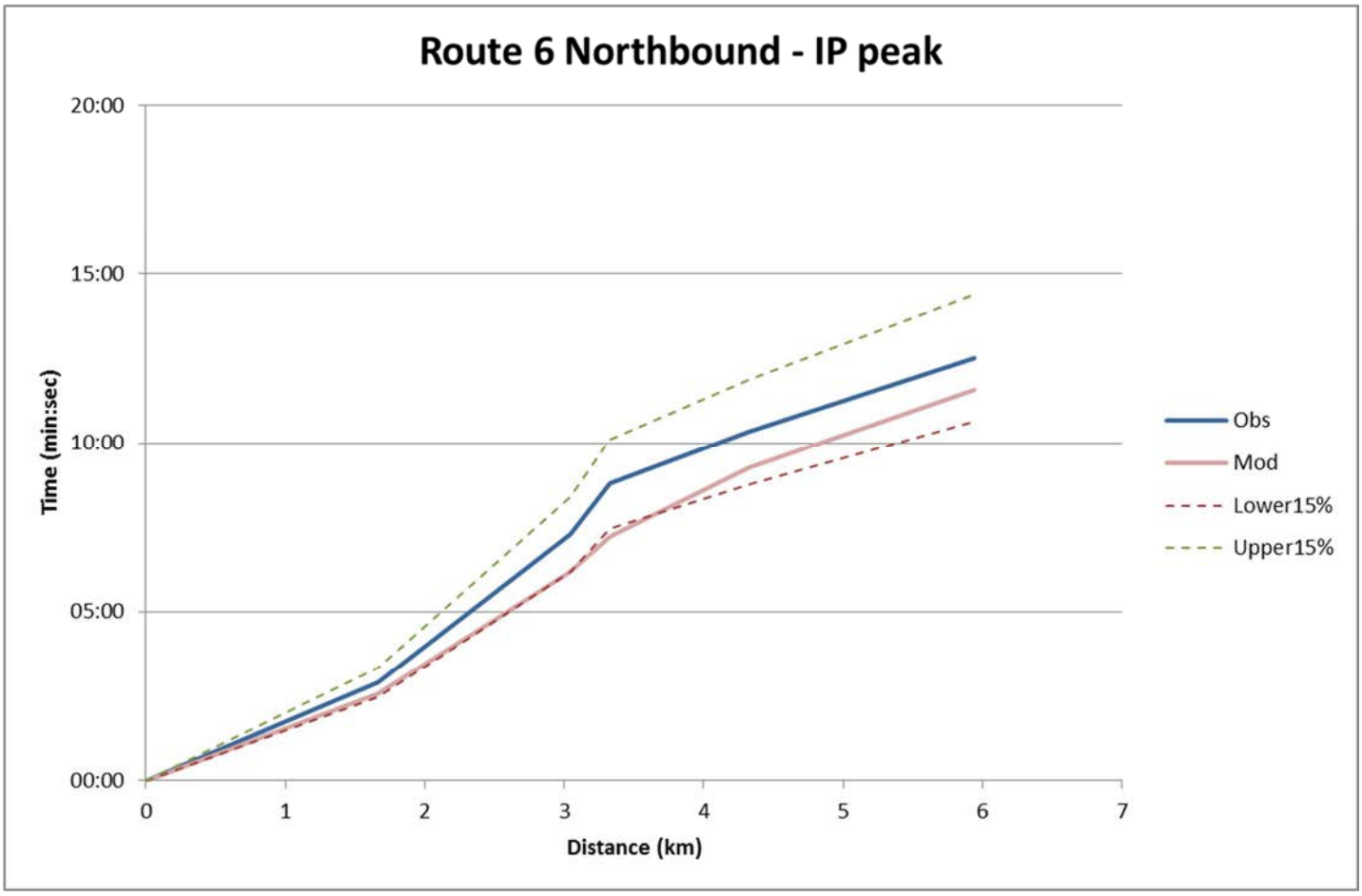

Route 4 Eastbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

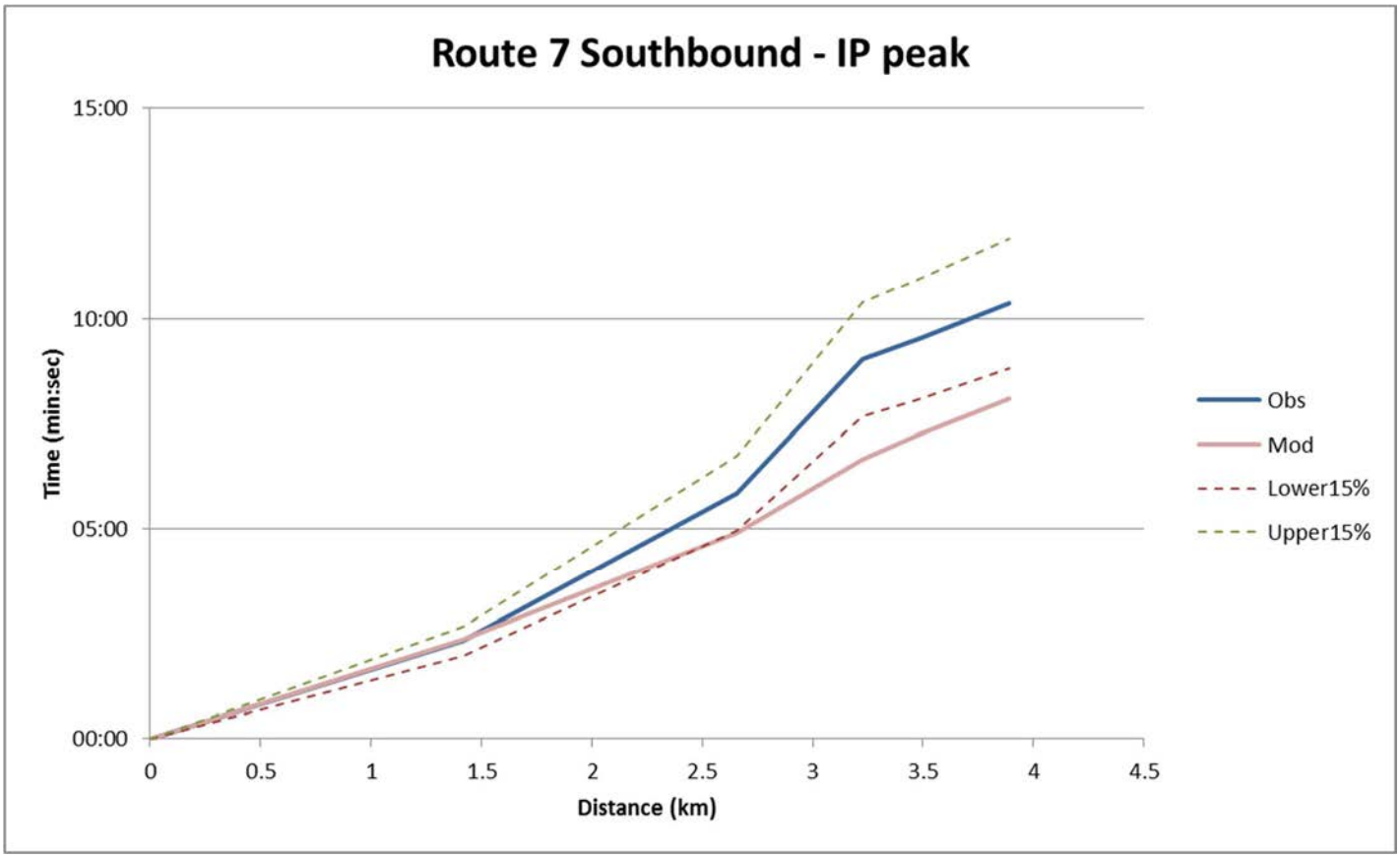

Route 4 Westbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

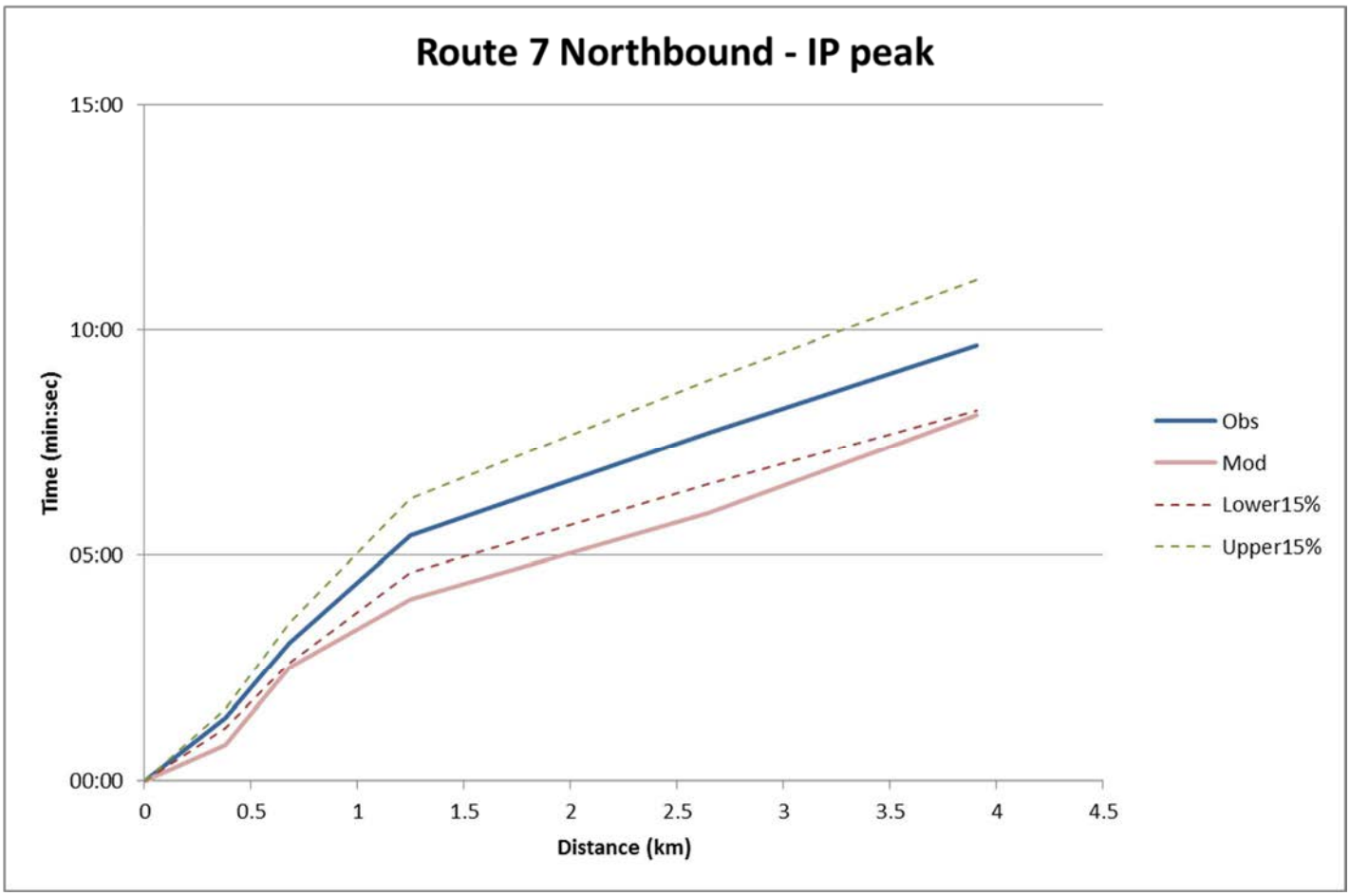

Route 5 Eastbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

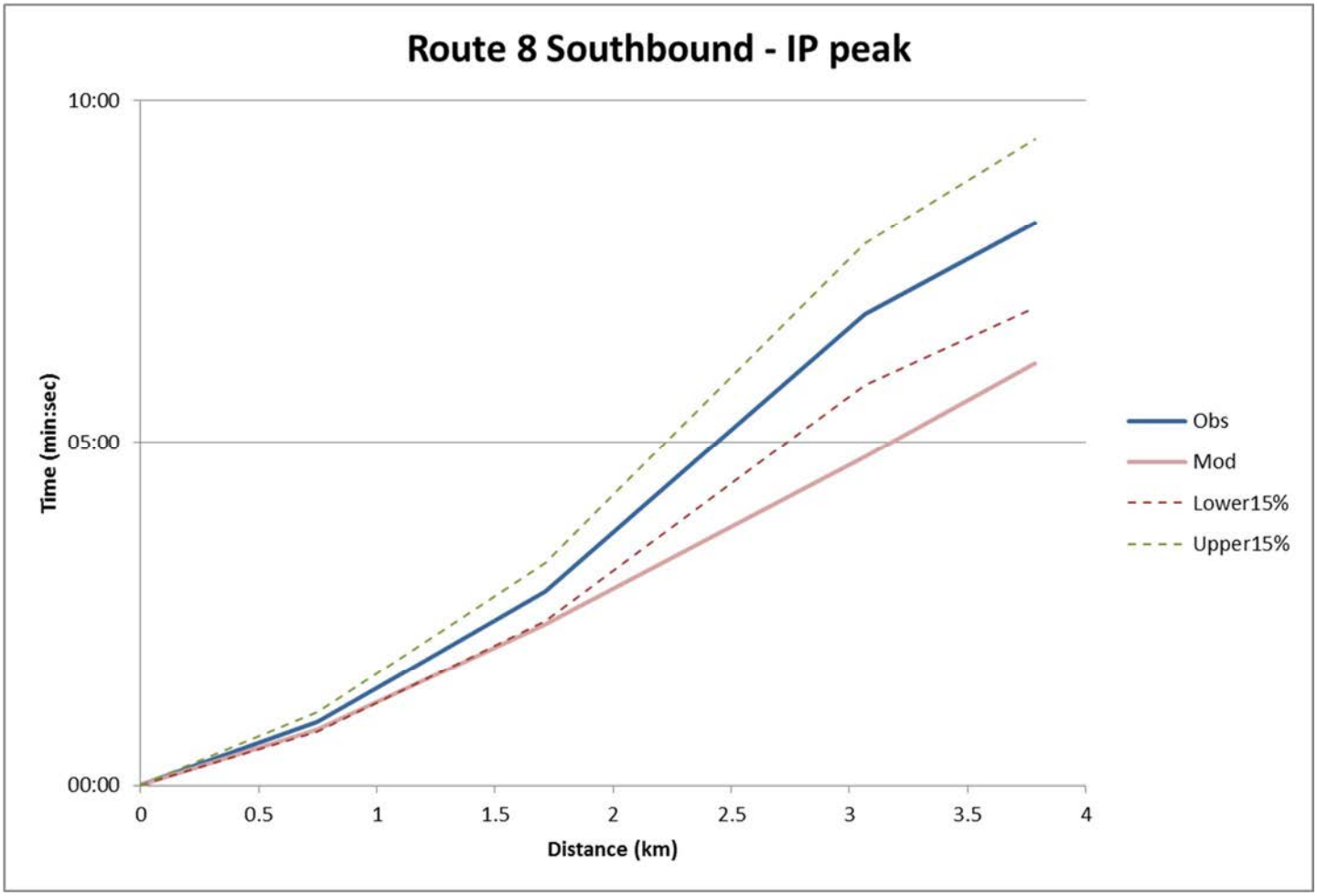

Route 5 Westbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

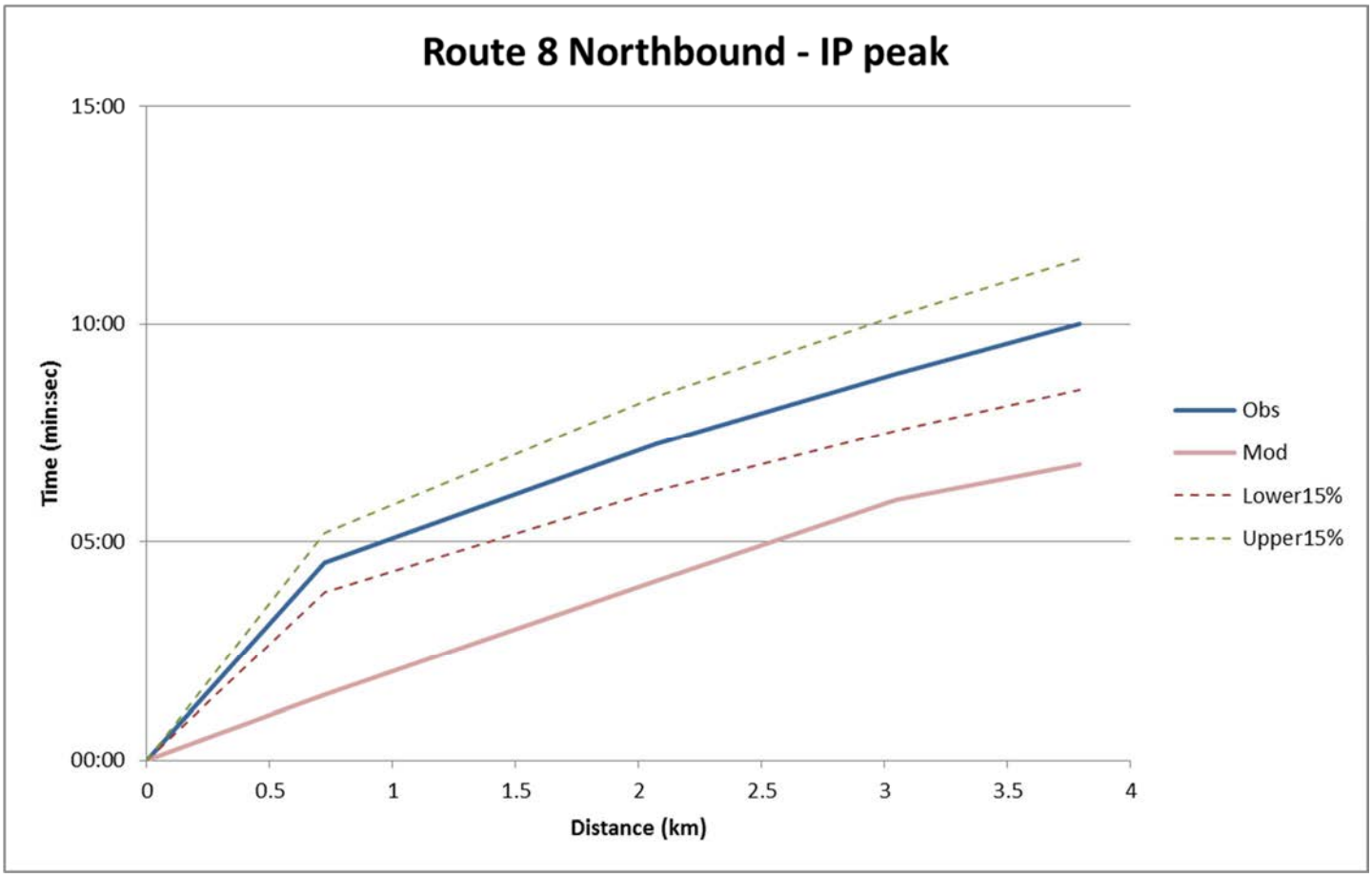

Route 6 Southbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

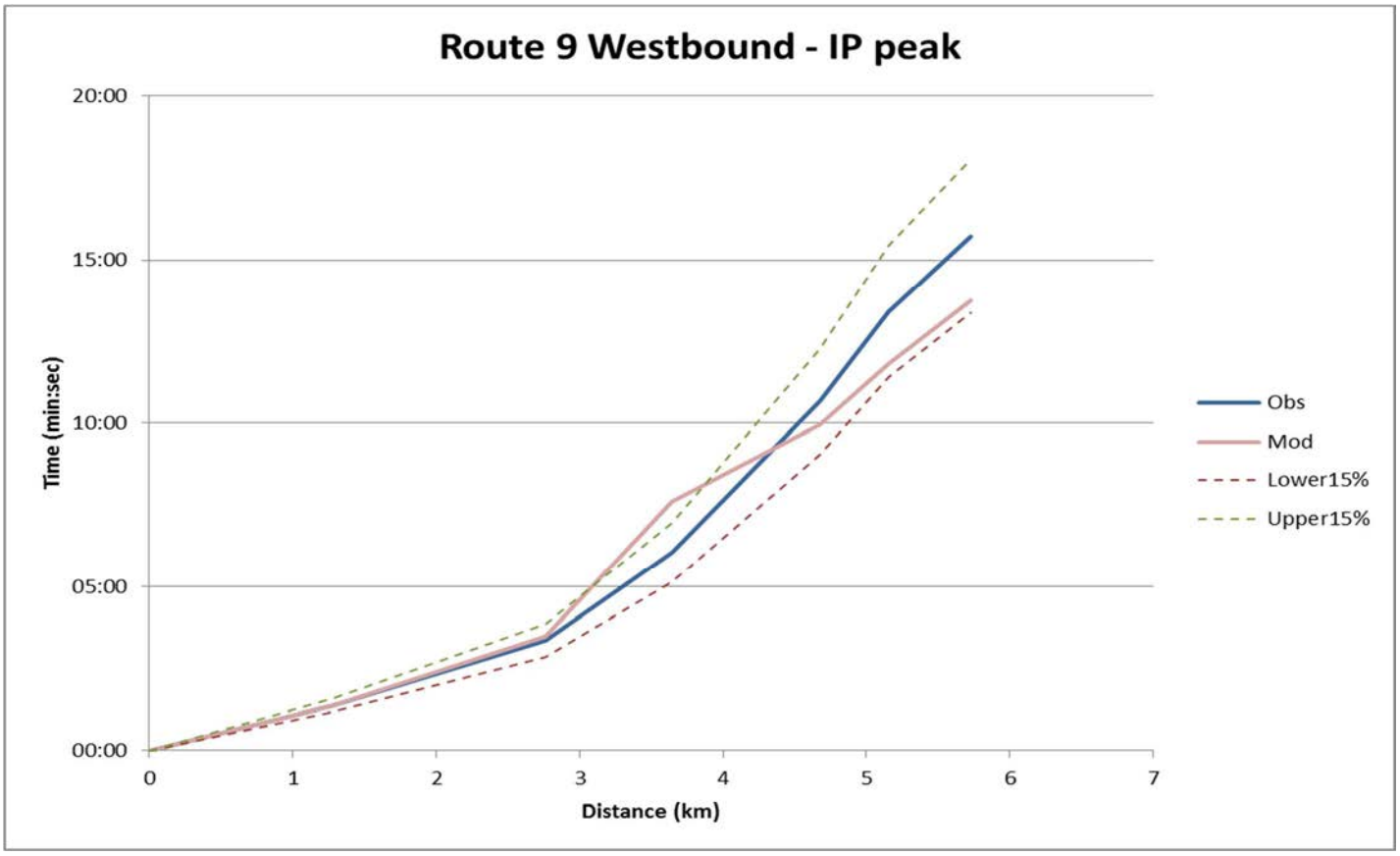

Route 6 Northbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

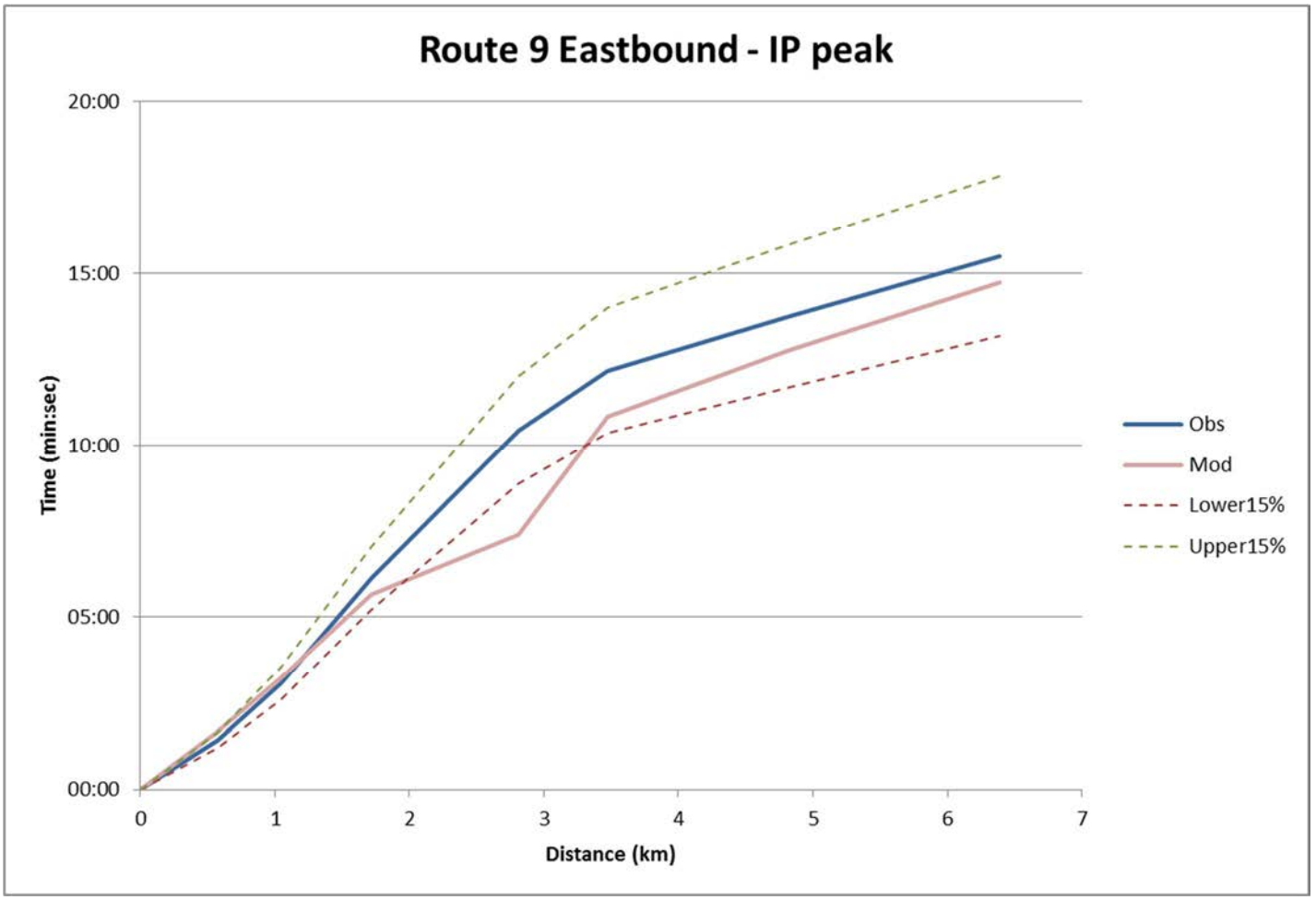

Route 7 Southbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

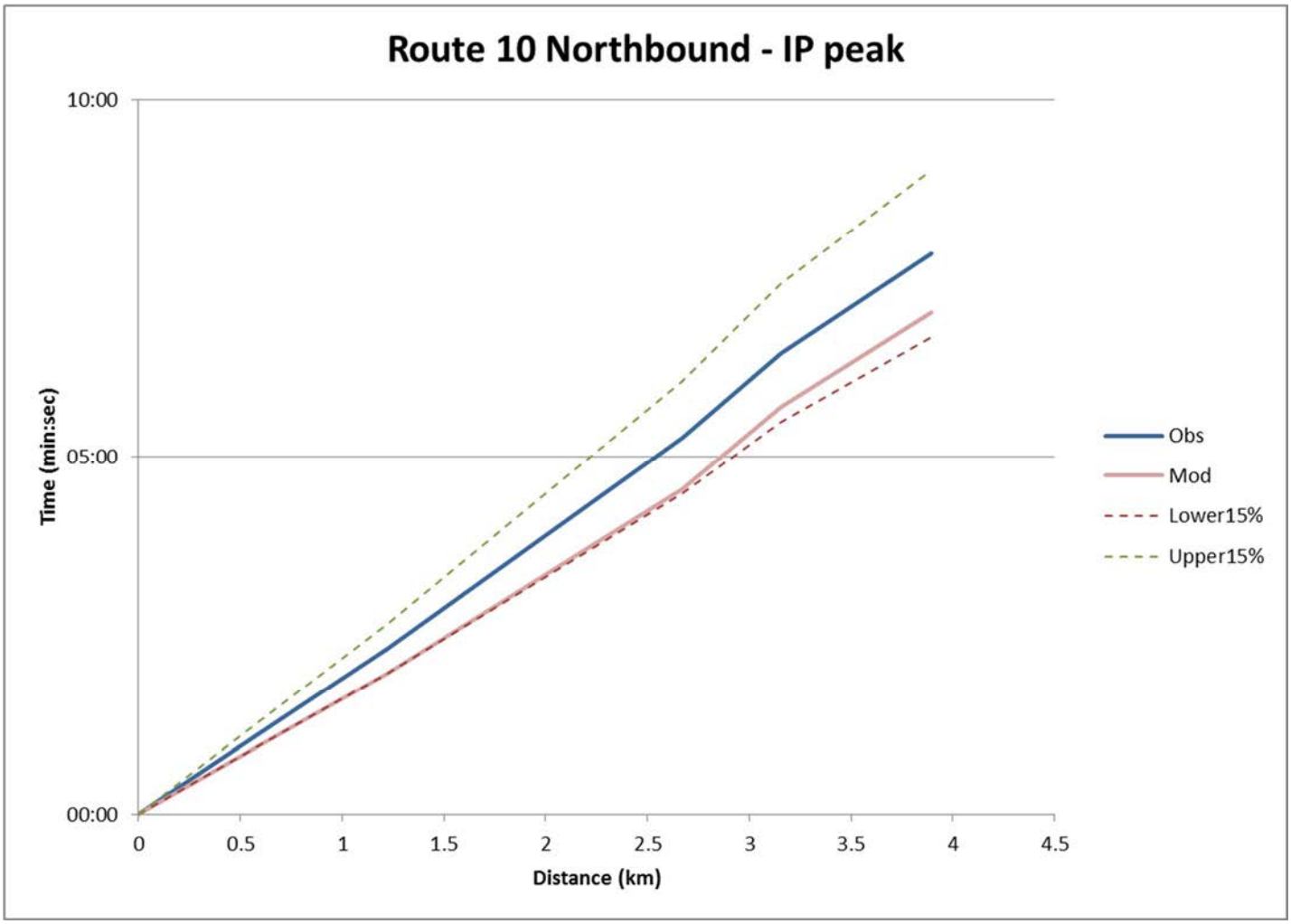

Route 7 Northbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

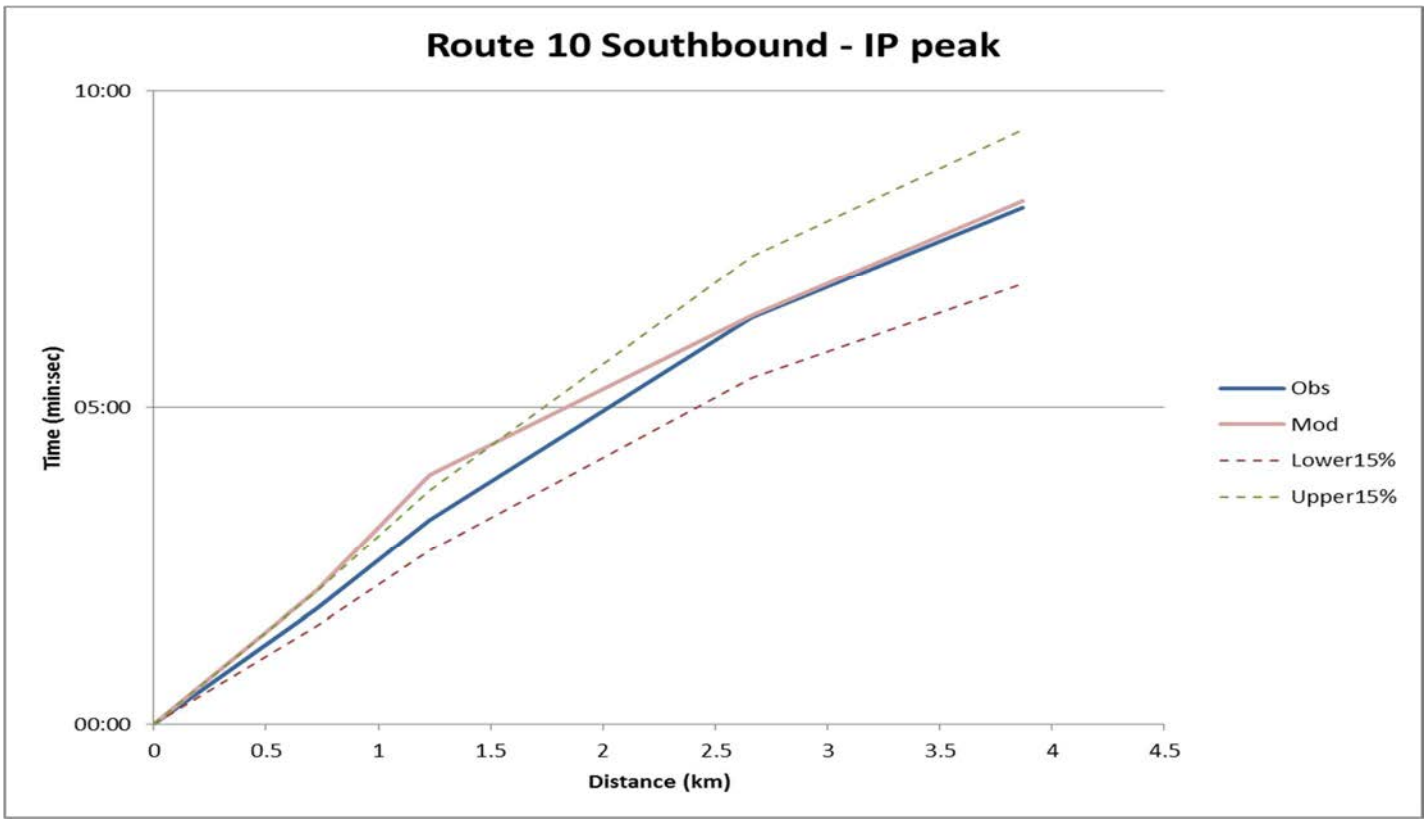

Route 8 Southbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

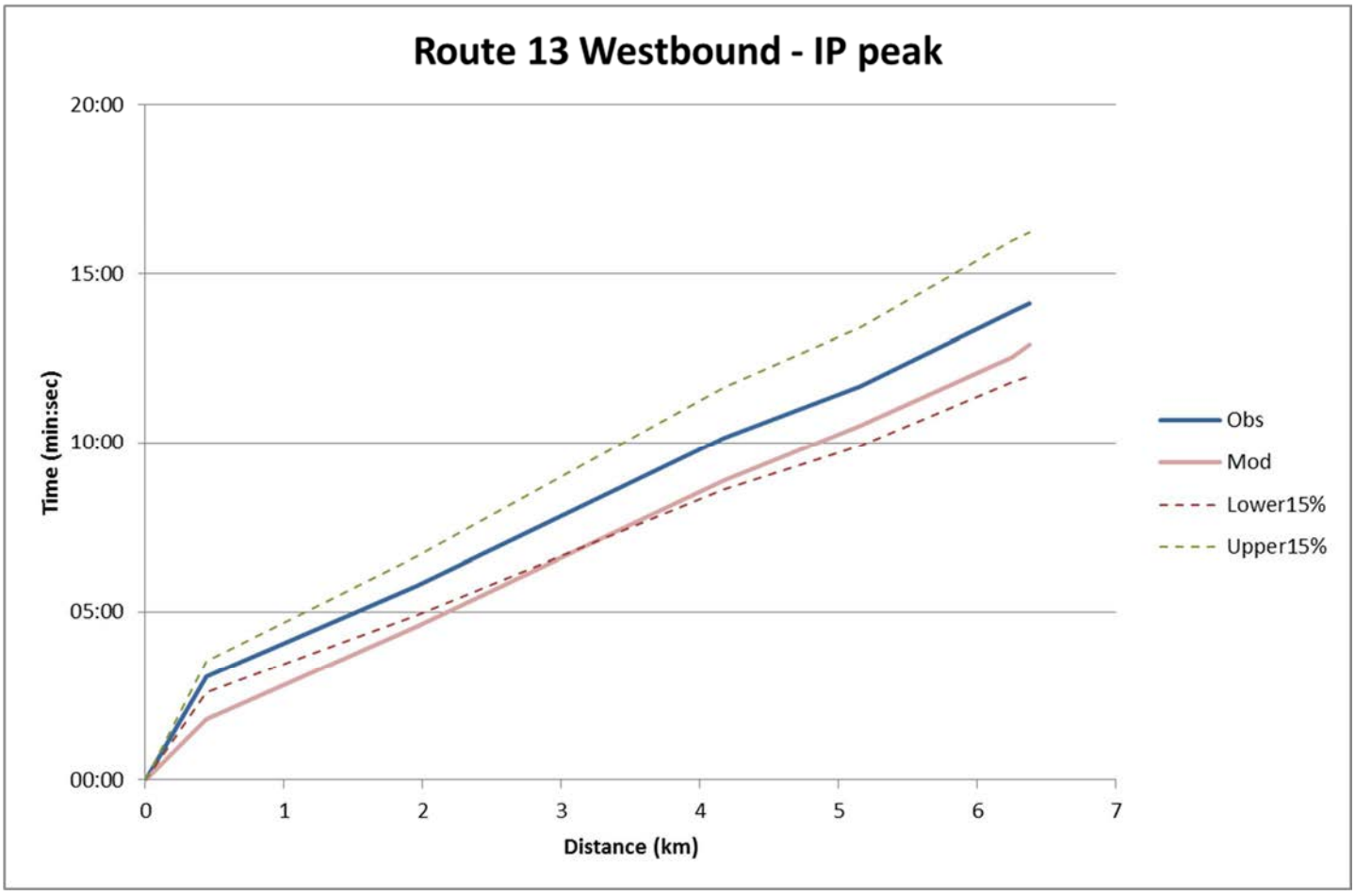

Route 8 Northbound - IP peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

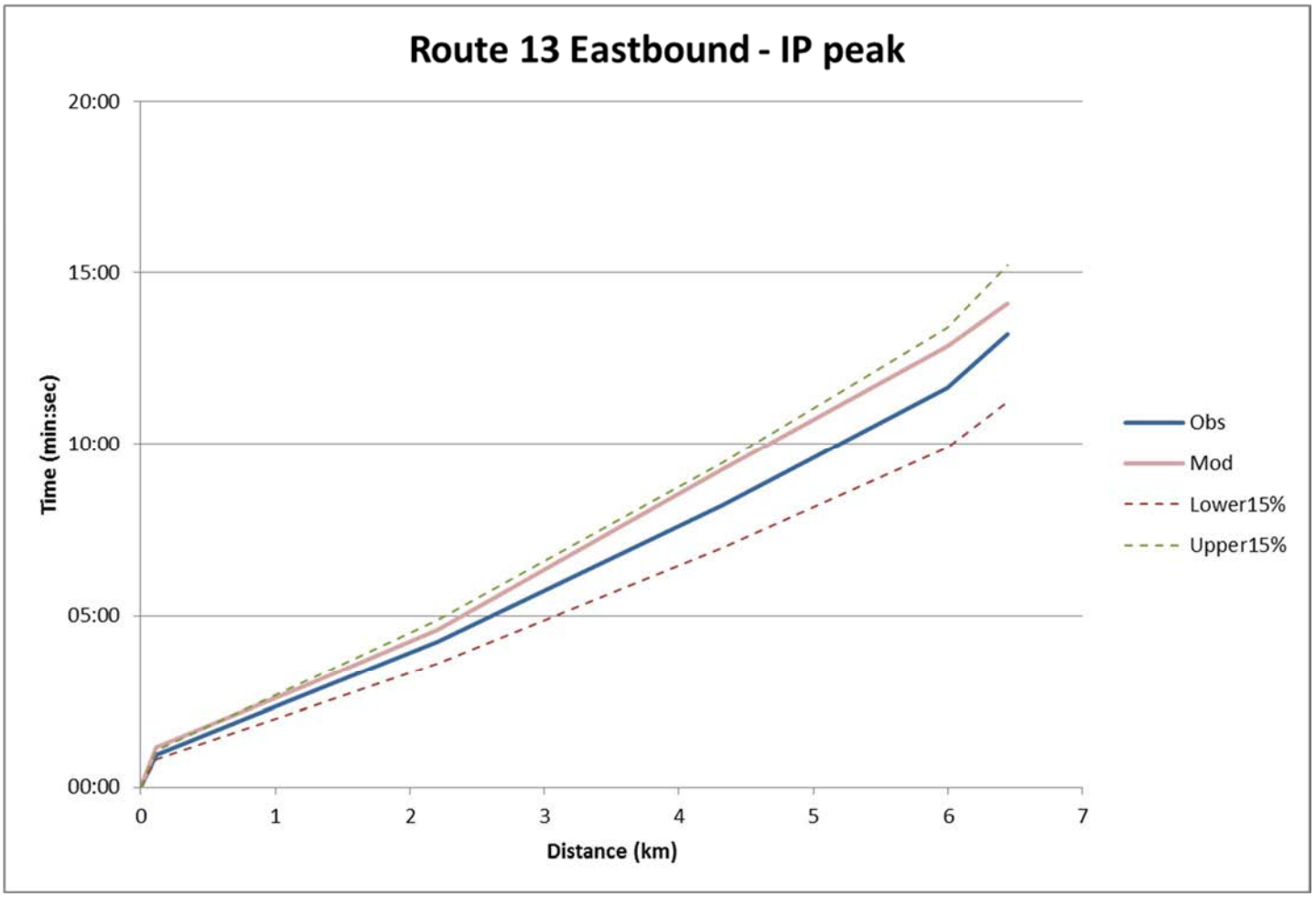

Route 9 Westbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

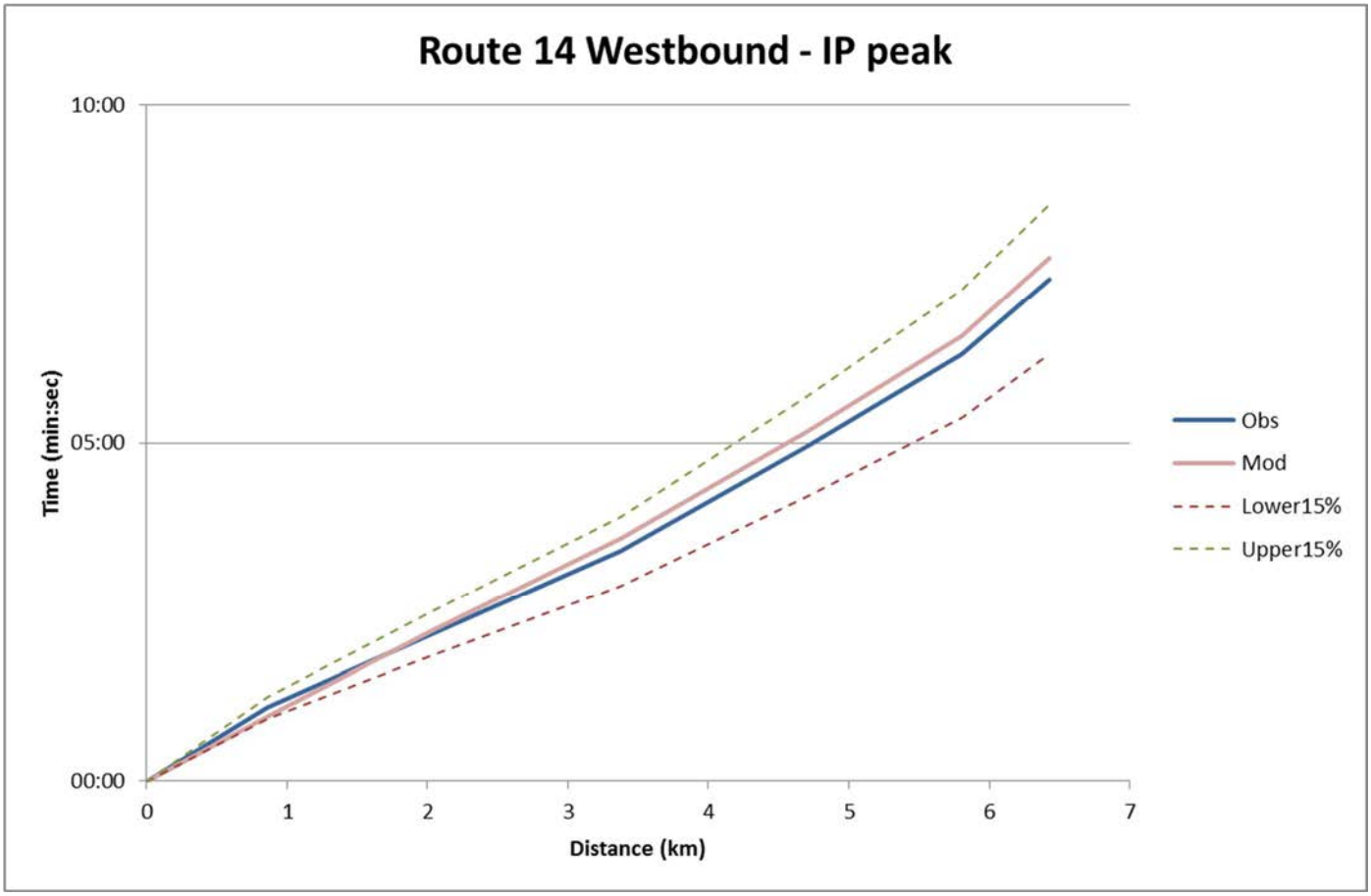

Route 9 Eastbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

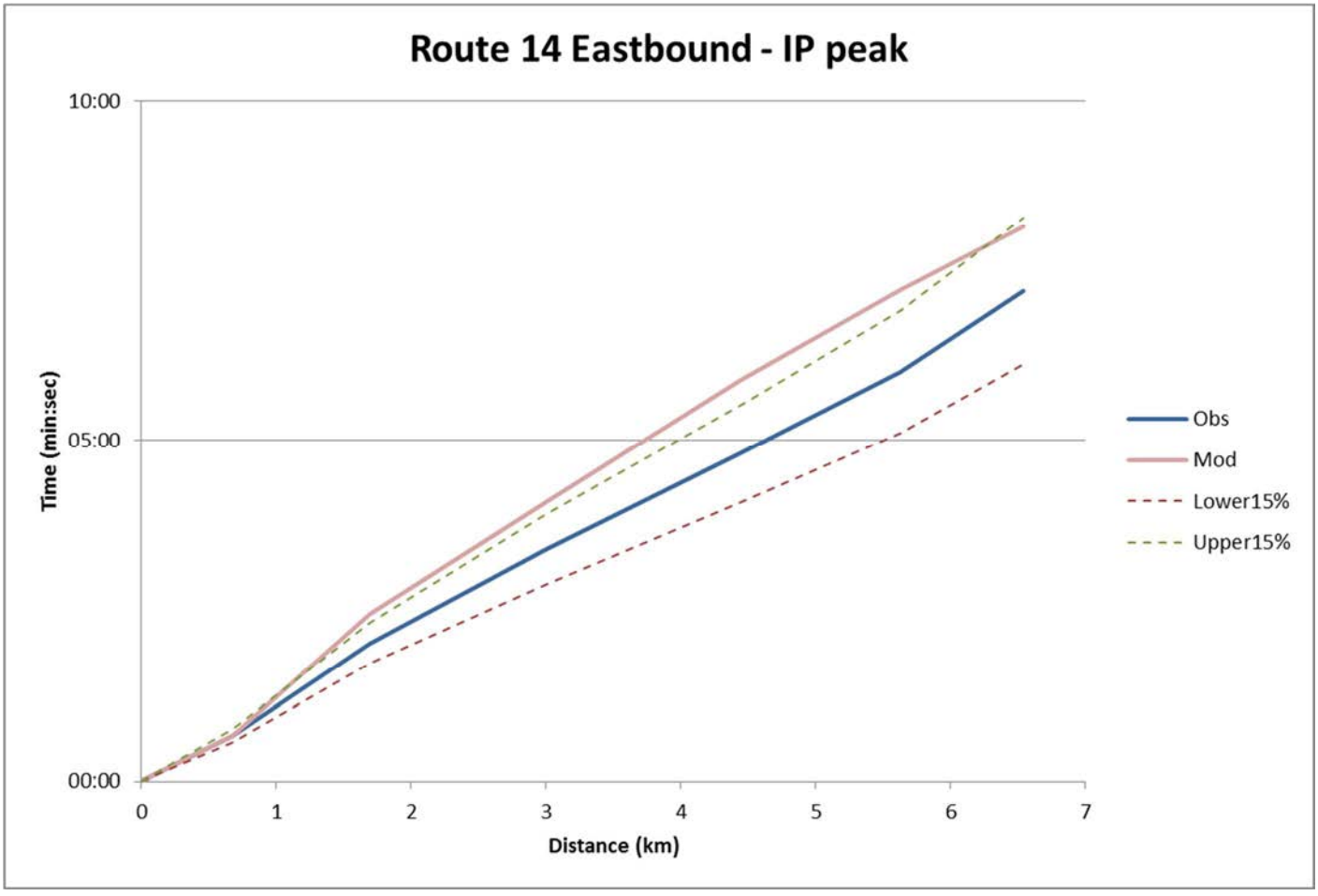

Route 10 Northbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

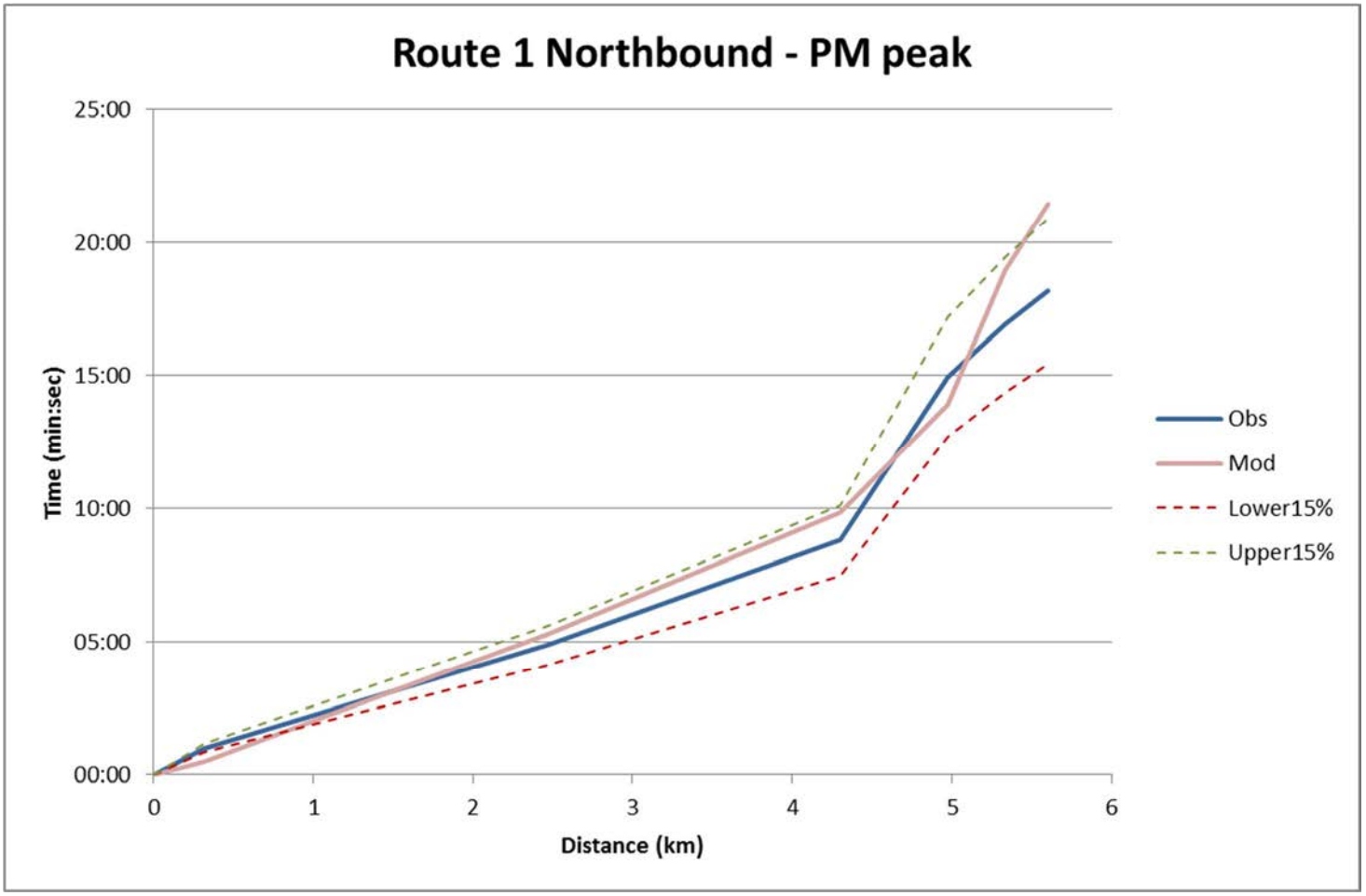

Route 10 Southbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

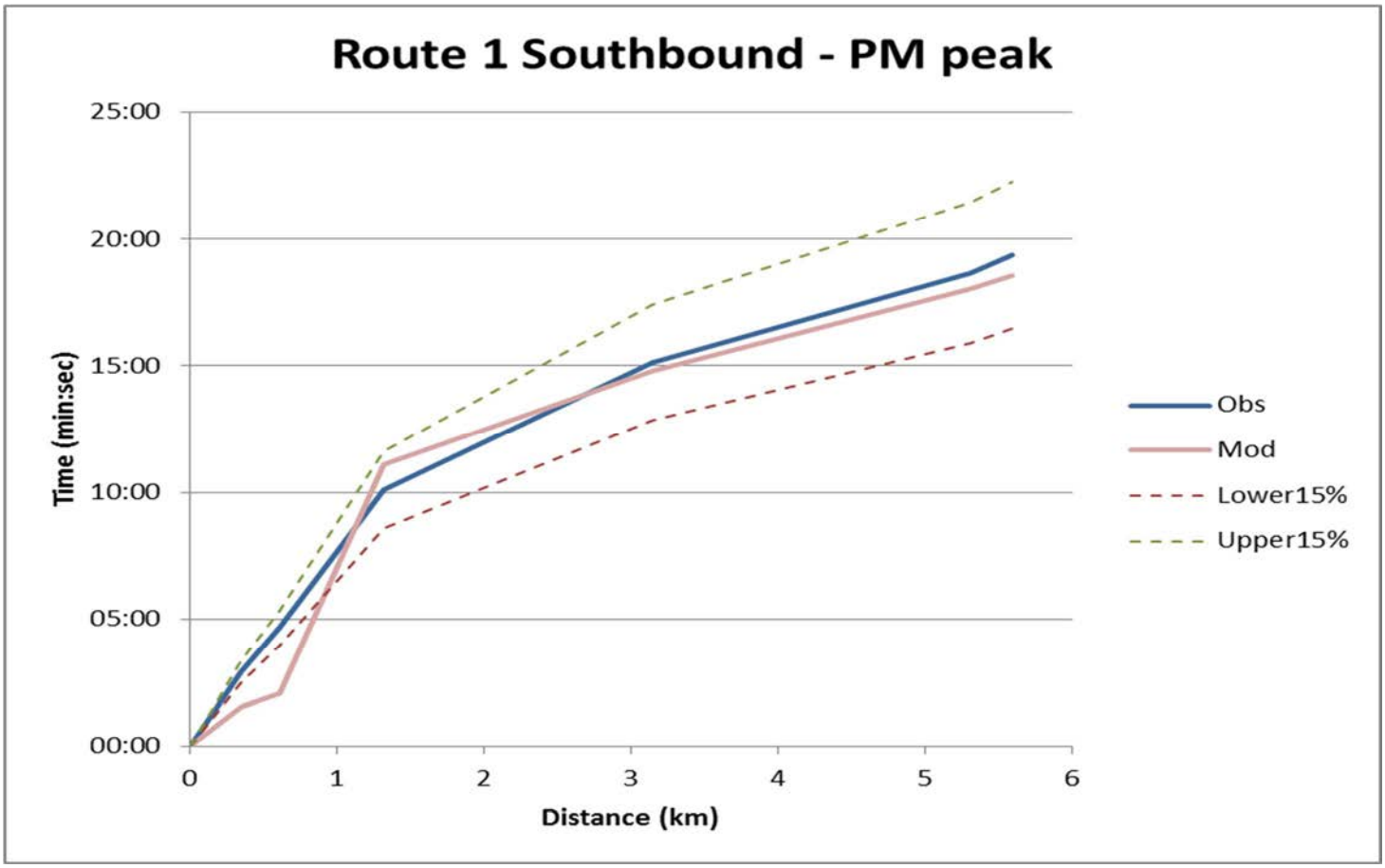

Route 13 Westbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

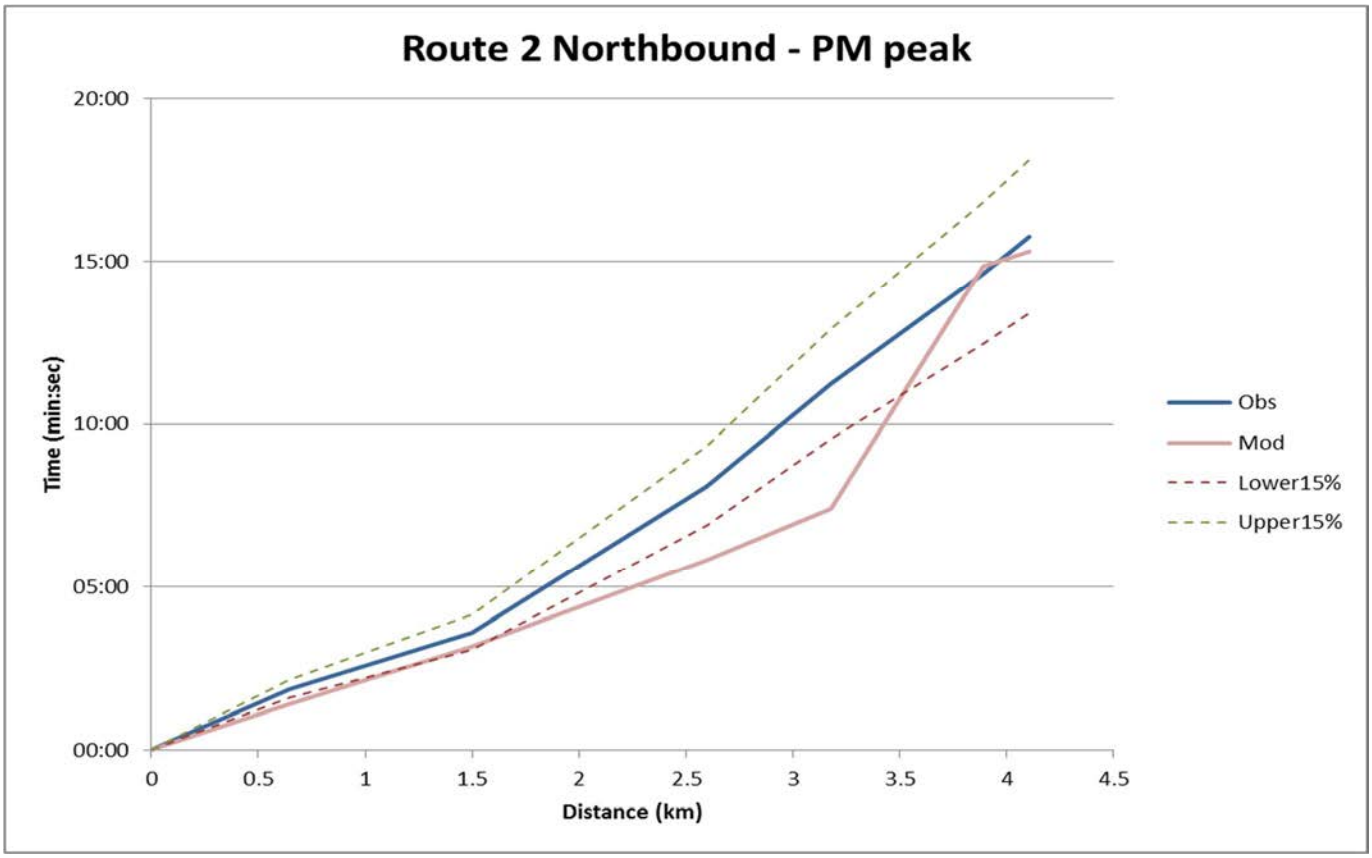

Route 13 Eastbound - IP peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

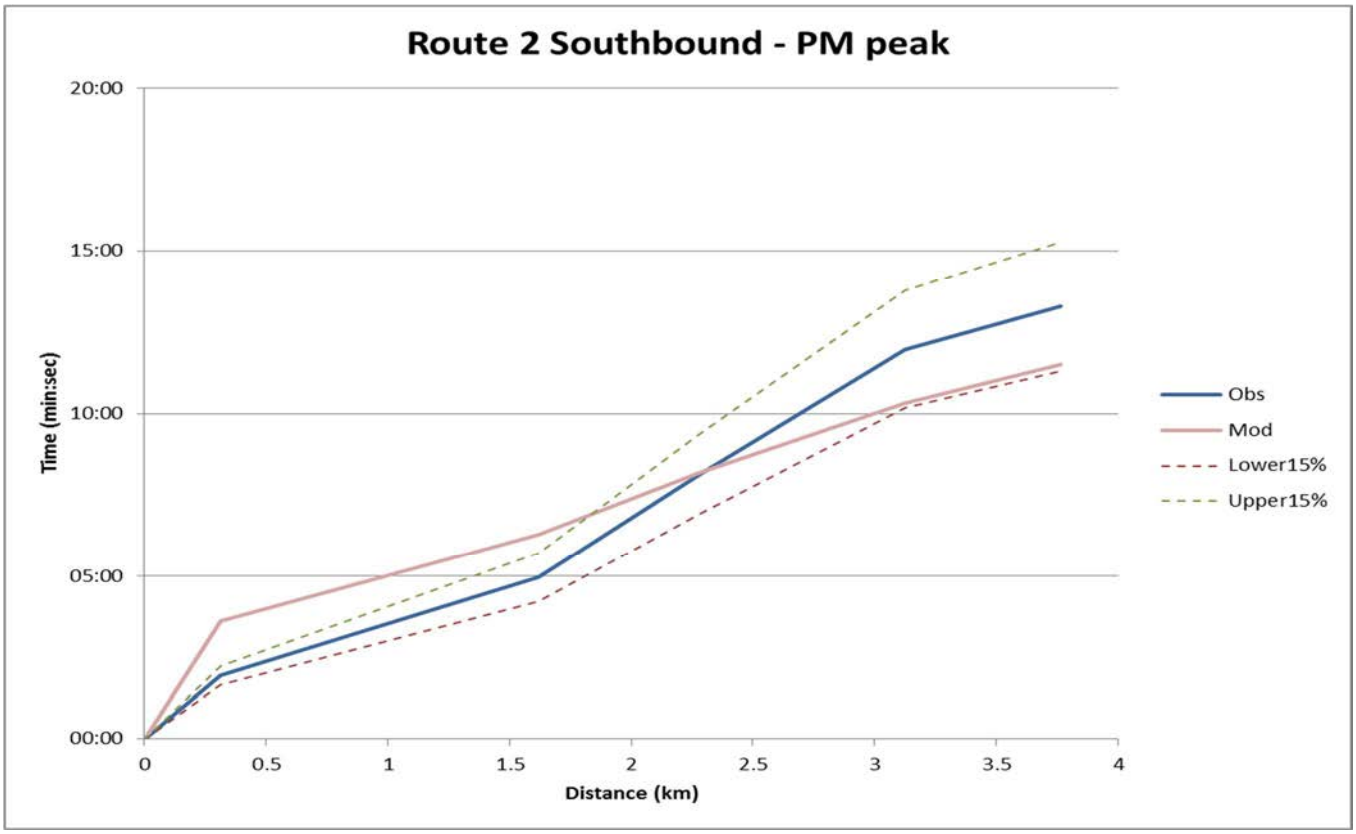

Route 14 Westbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

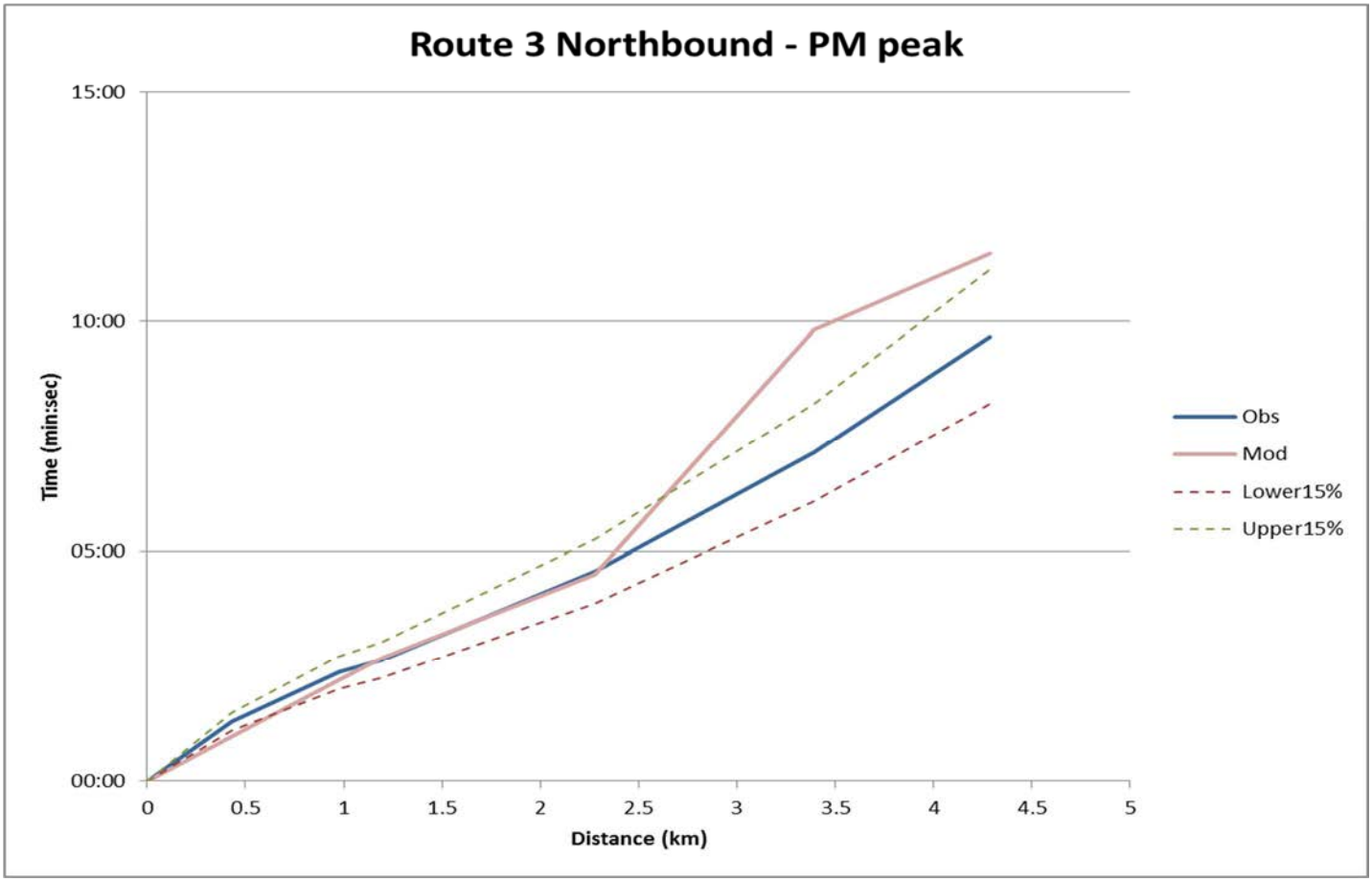

Route 14 Eastbound - IP peak
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

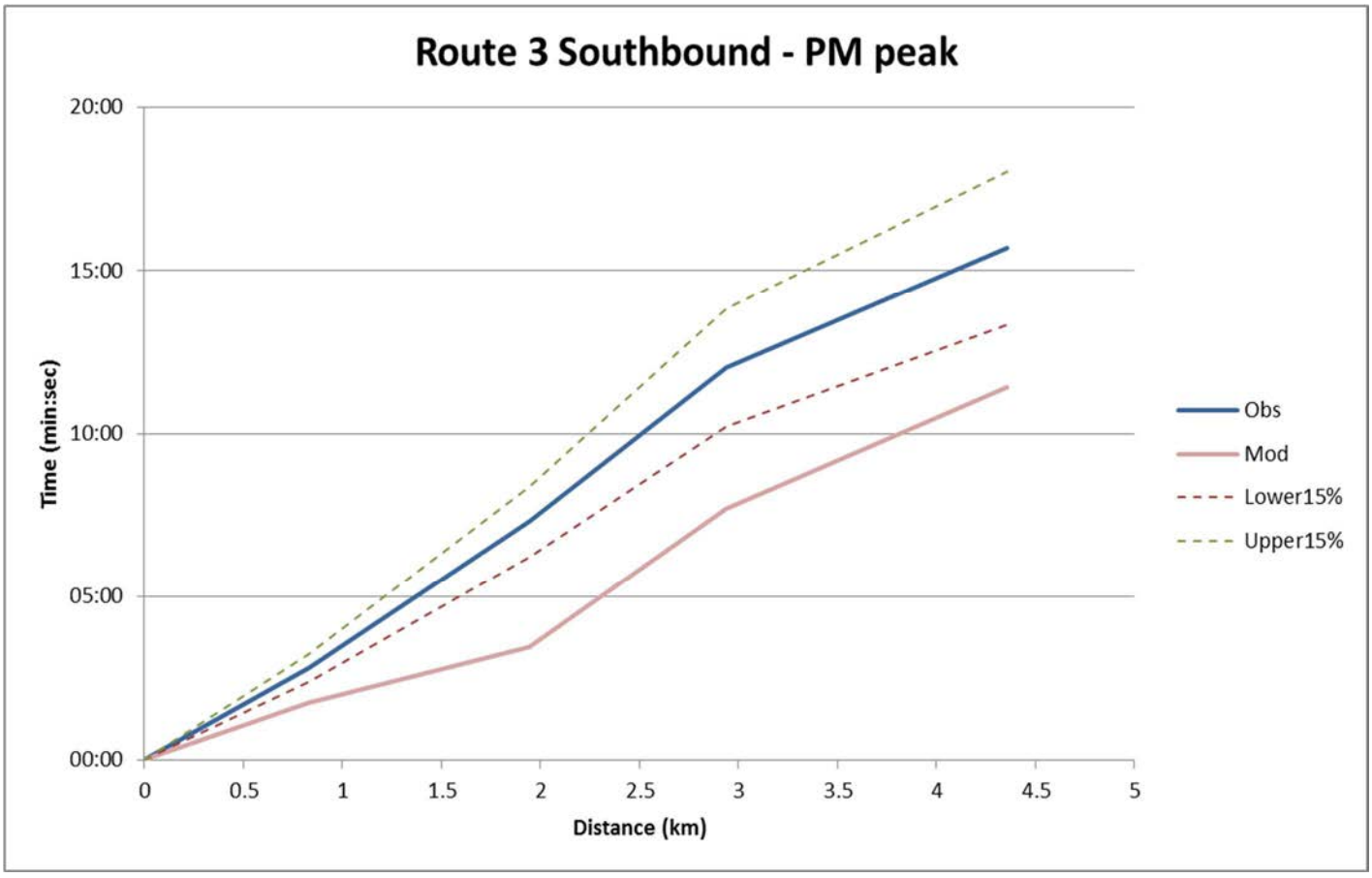

Route 1 Northbound - PM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

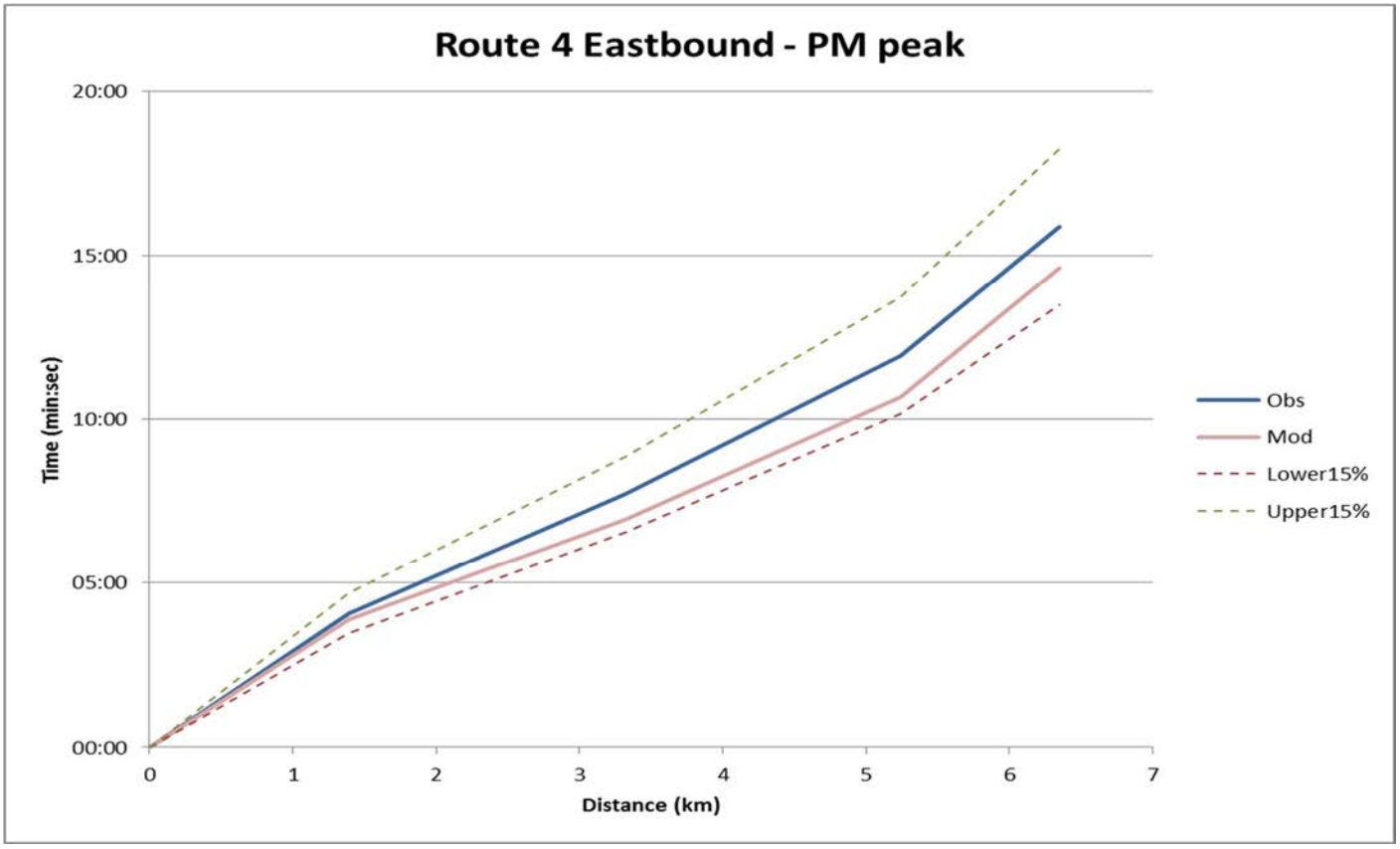

Route 1 Southbound - PM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

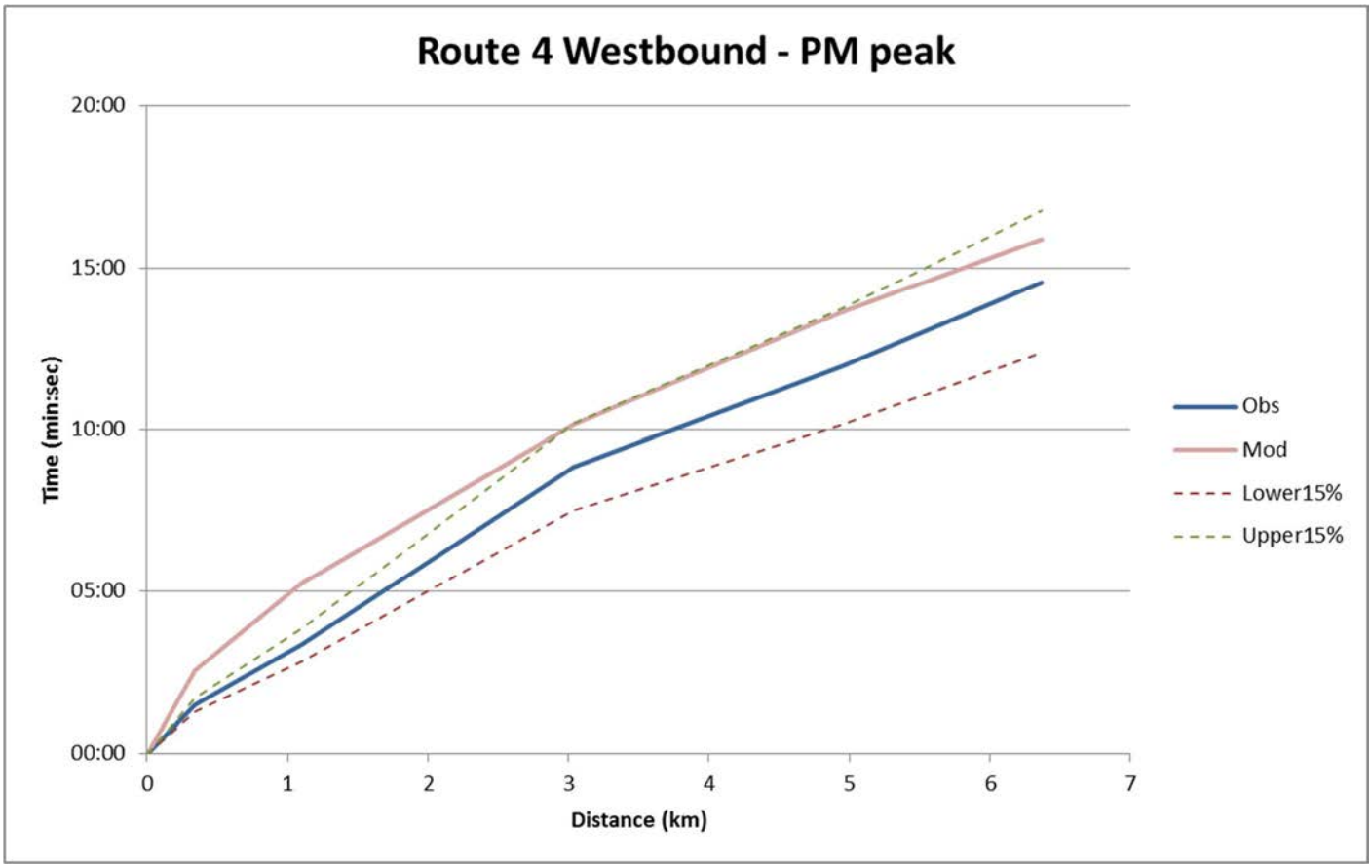

Route 2 Northbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

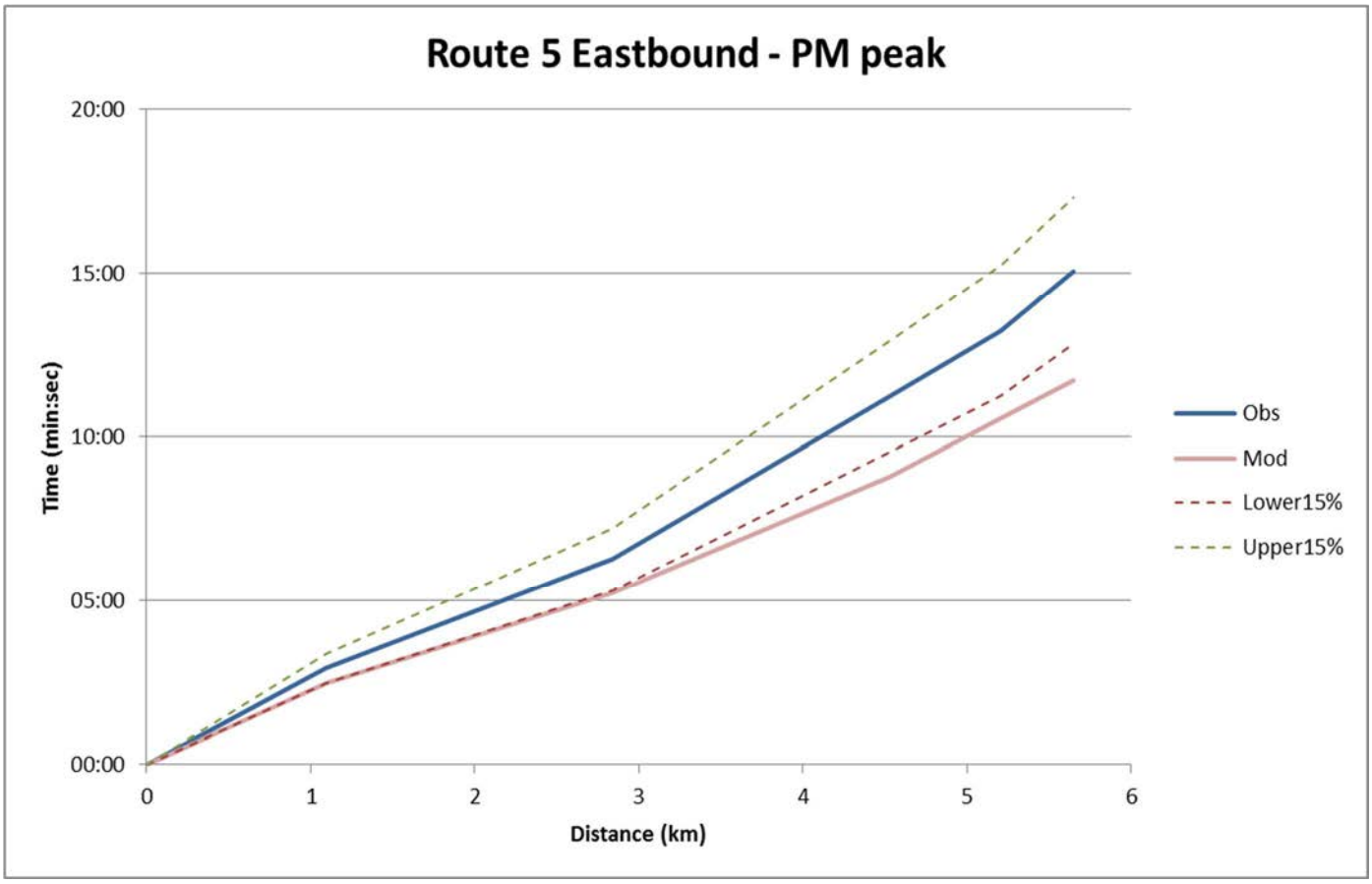

Route 2 Southbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

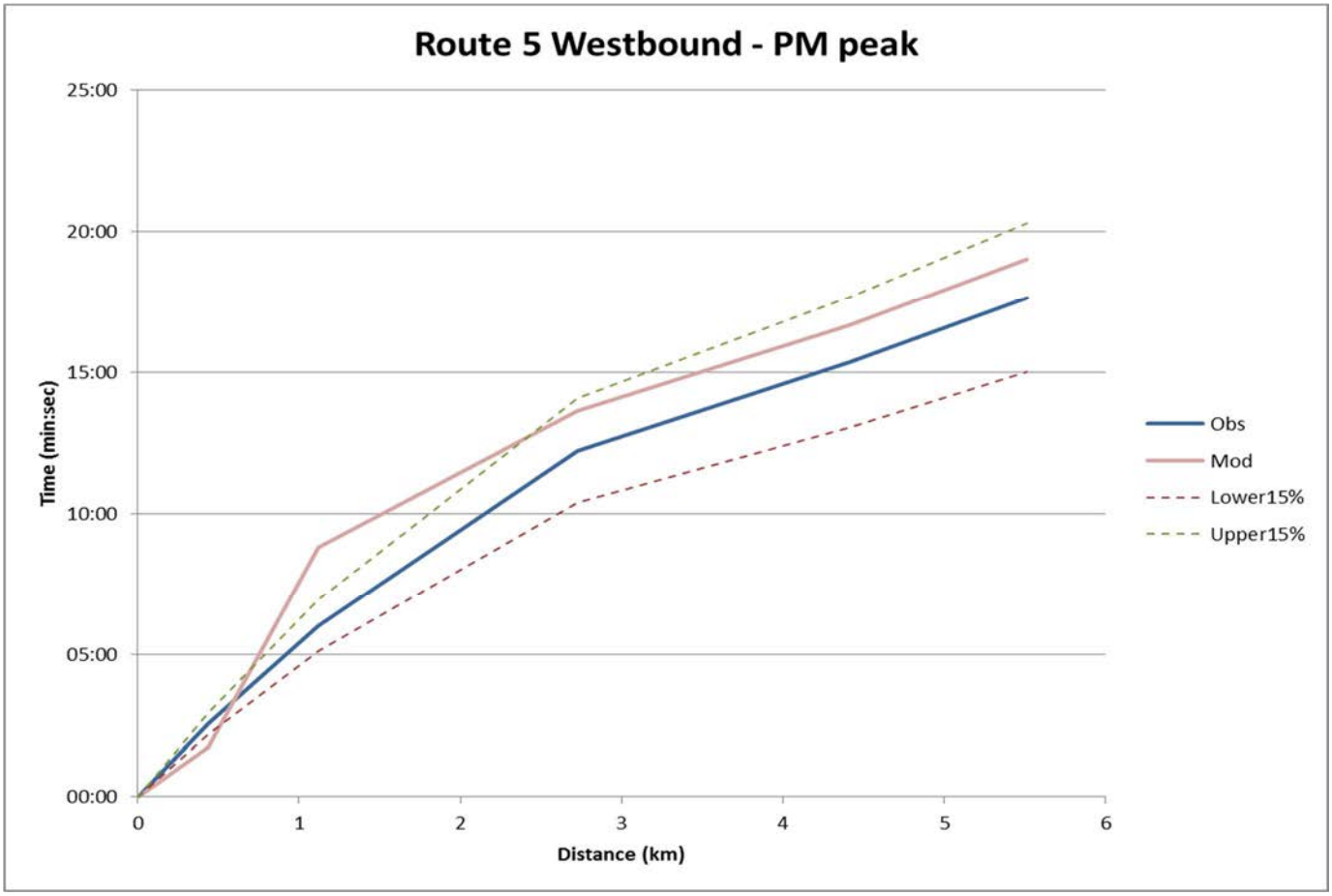

Route 3 Northbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Distance (km)
Obs
Mod
Lower15%
Upper15%

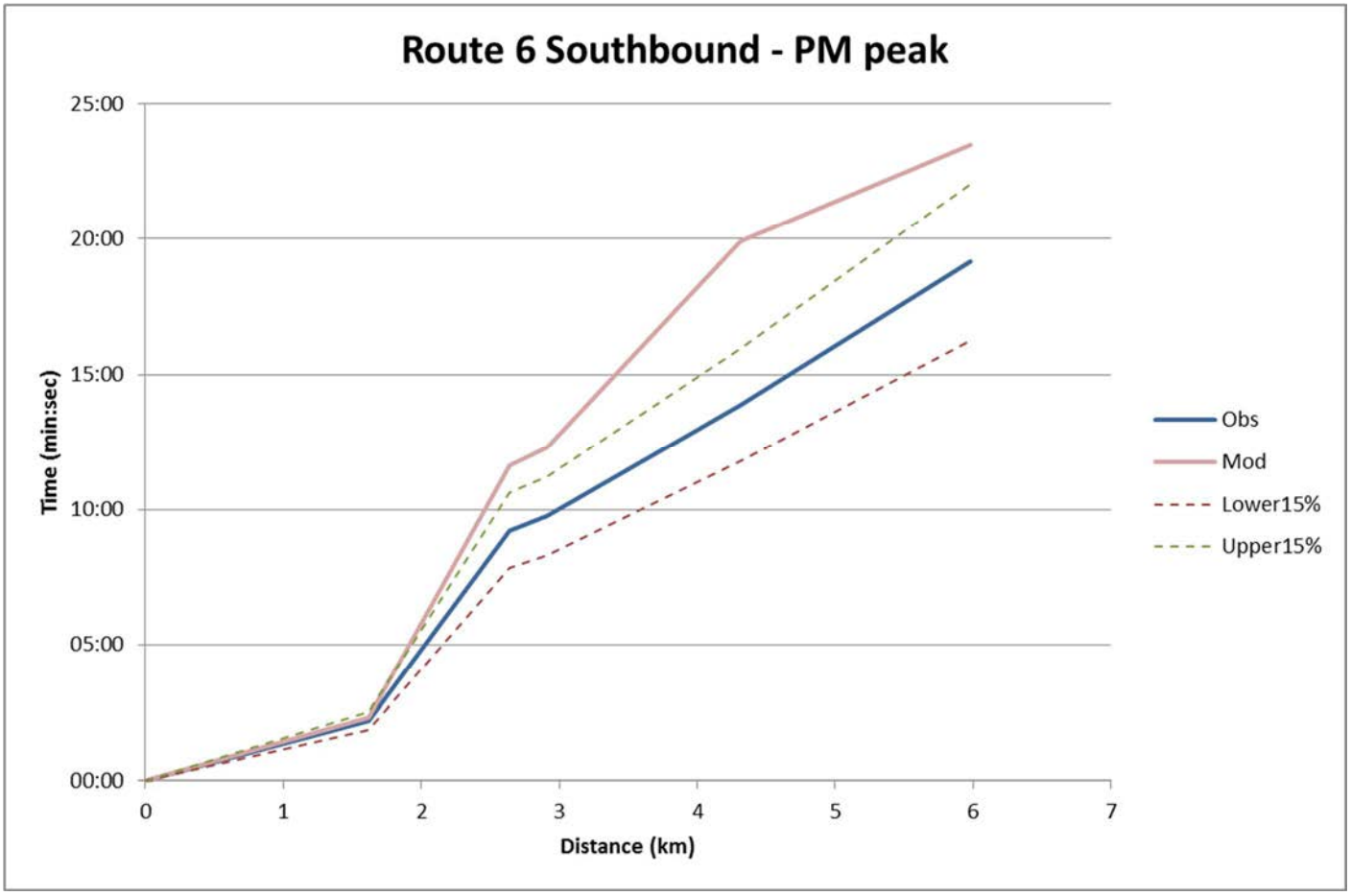

Route 3 Southbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Distance (km)
Obs
Mod
Lower15%
Upper15%

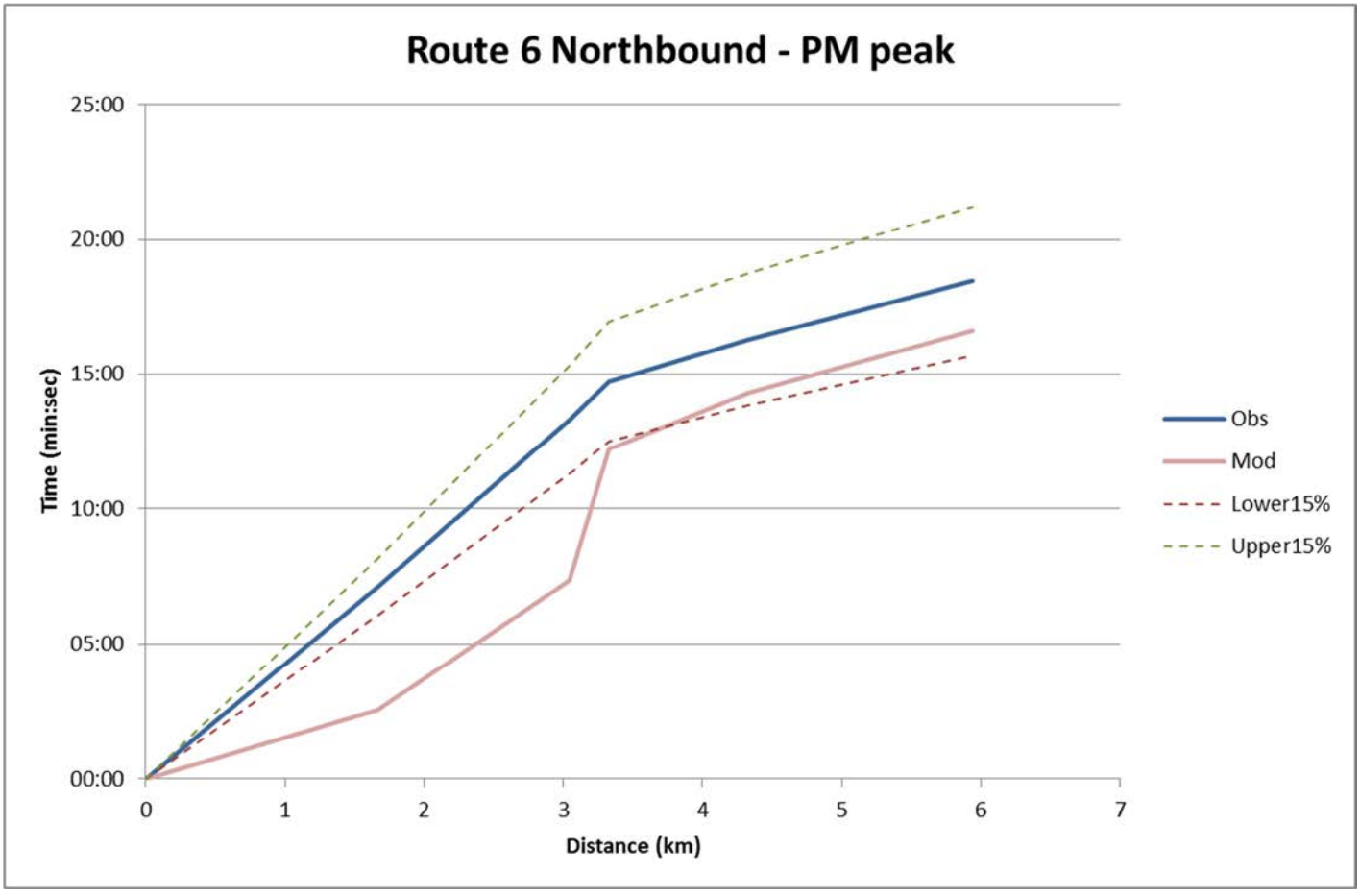

Route 4 Eastbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

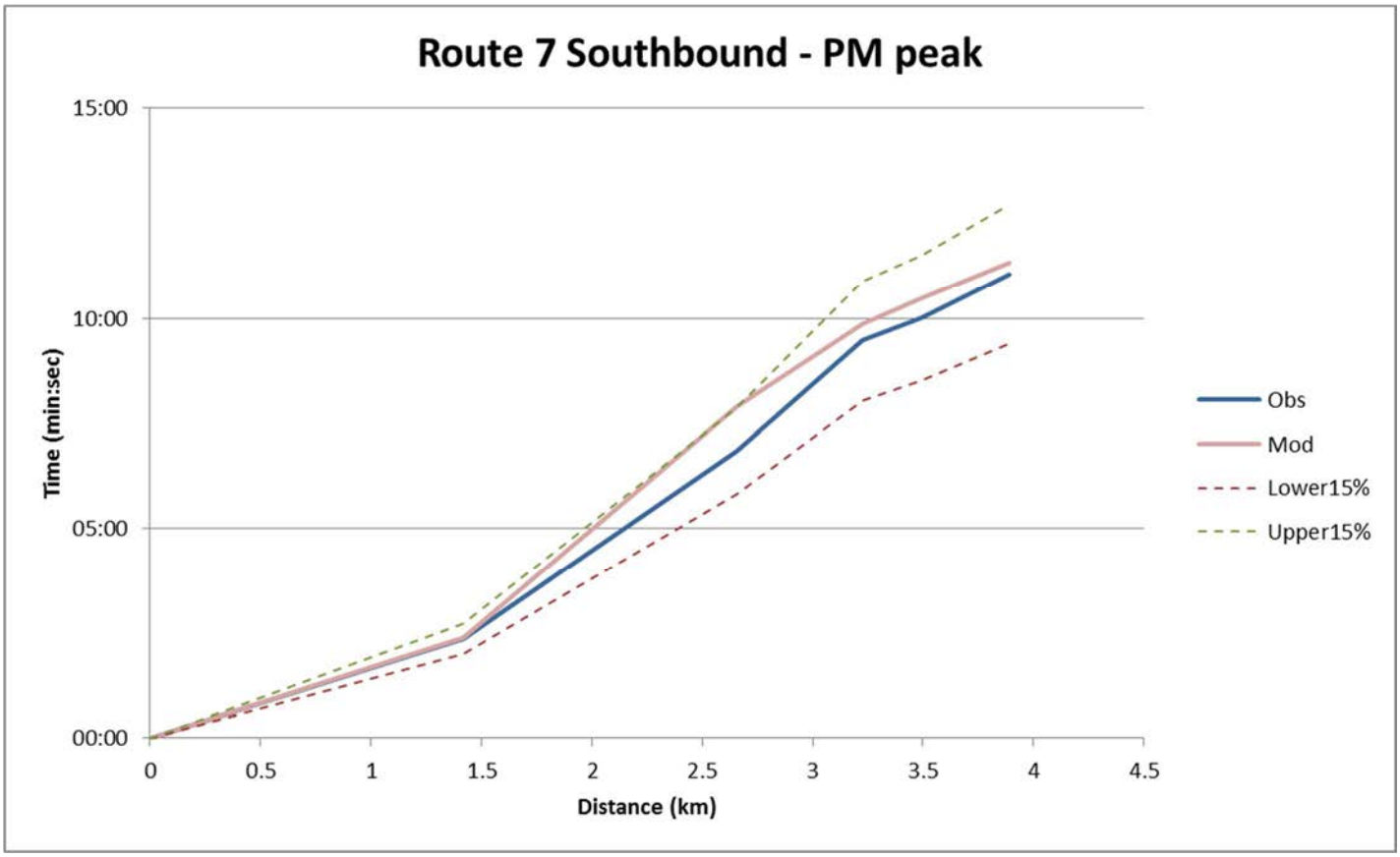

Route 4 Westbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

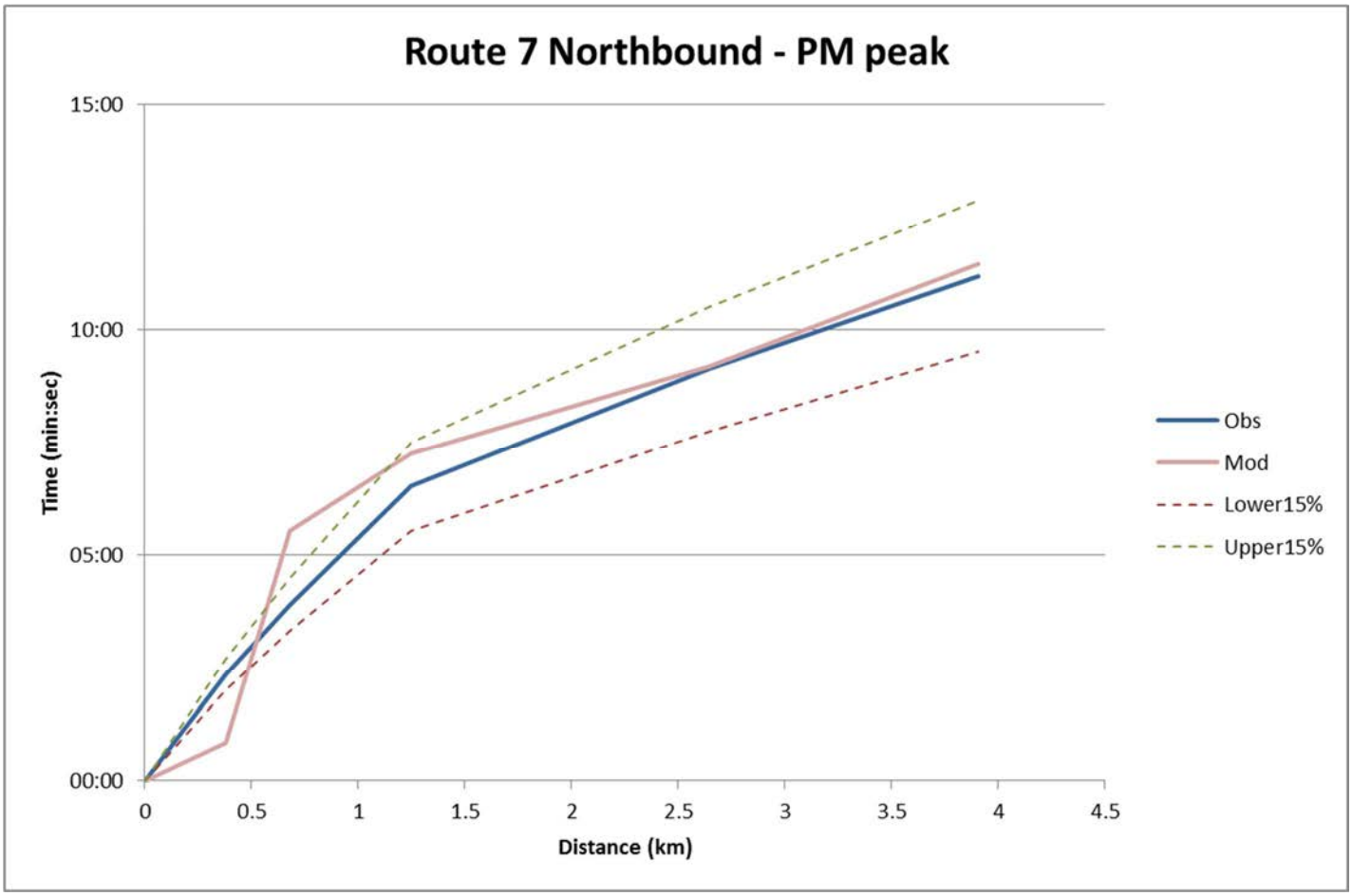

Route 5 Eastbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

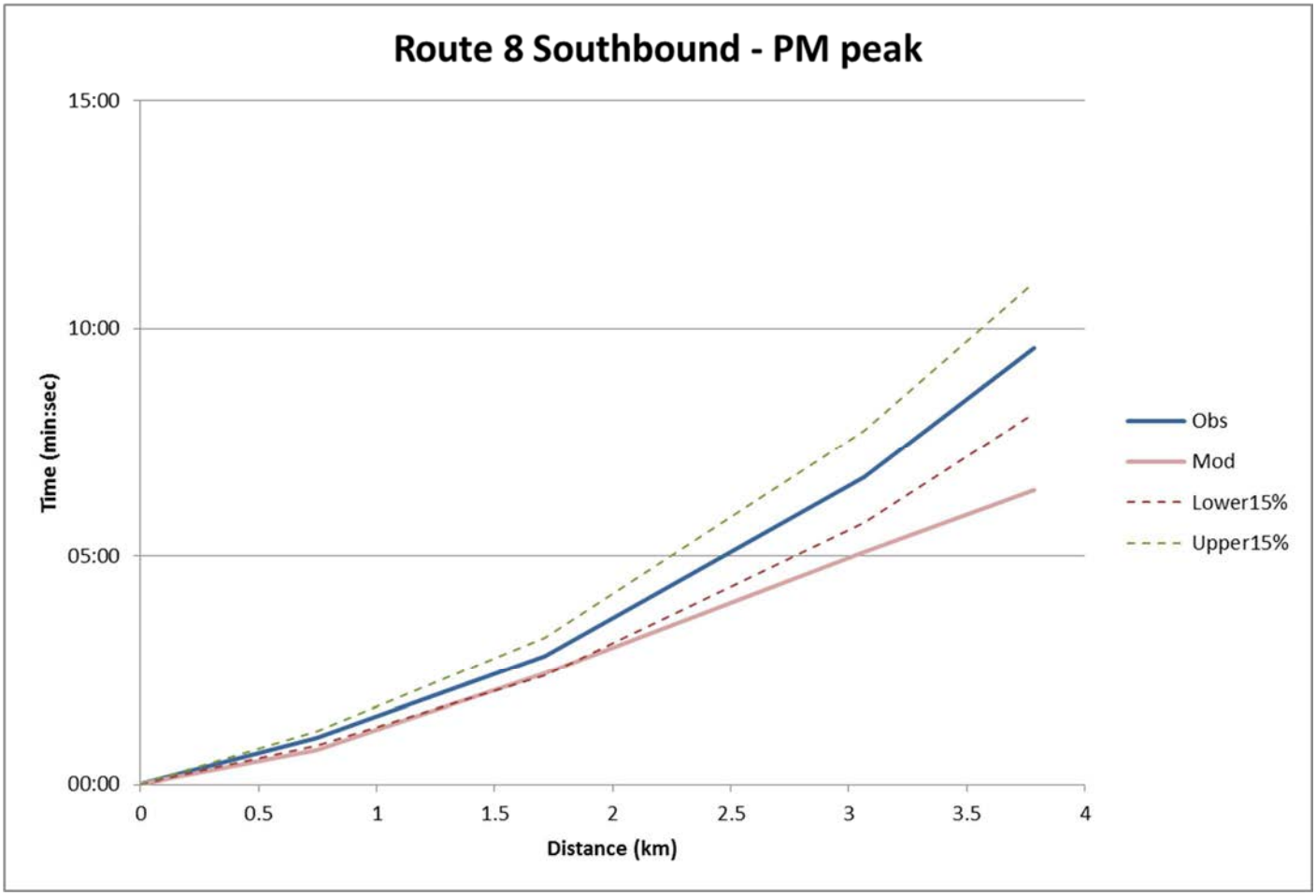

Route 5 Westbound - PM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
Distance (km)
Obs
Mod
Lower15%
Upper15%

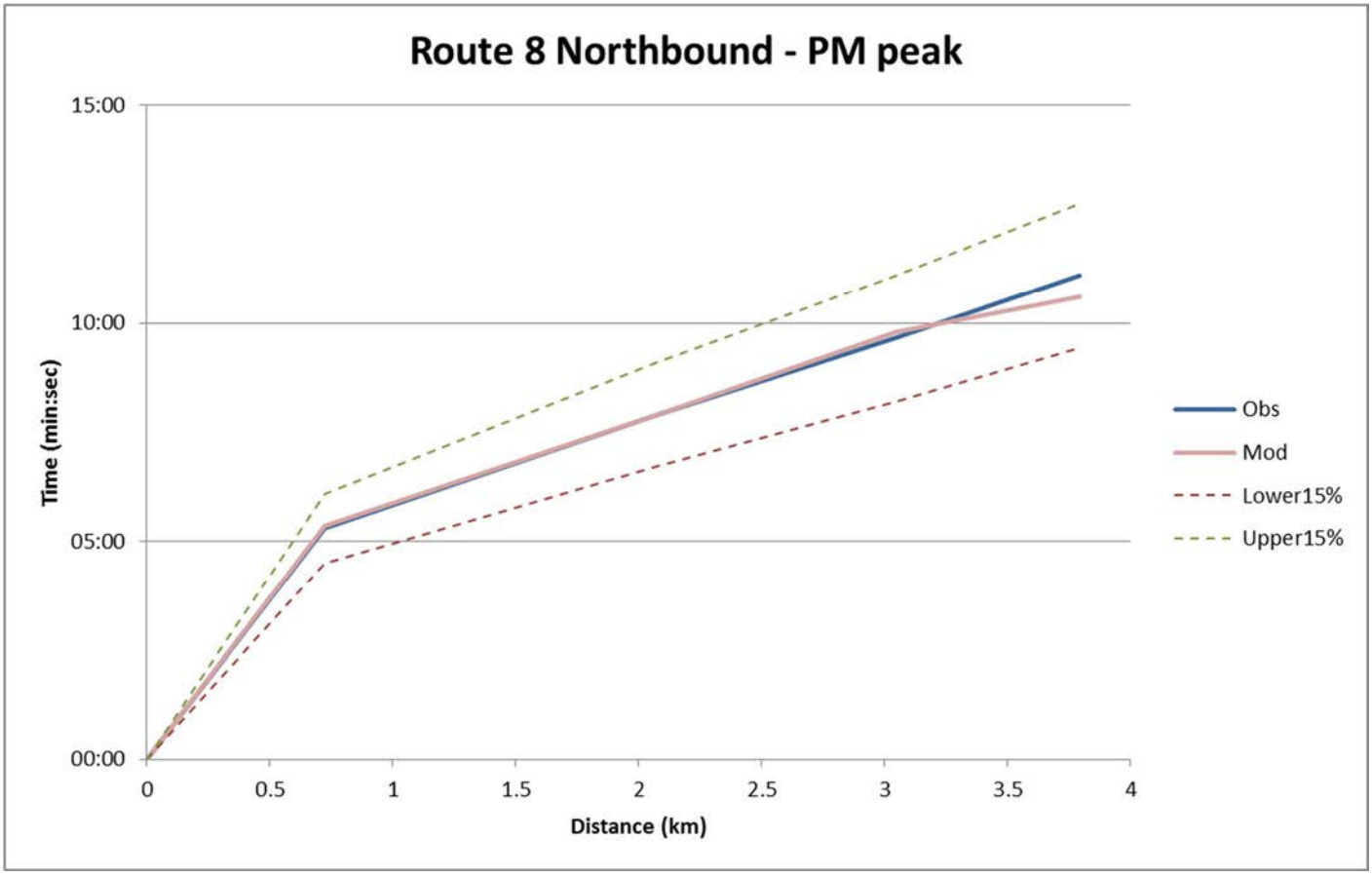

Route 6 Southbound - PM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

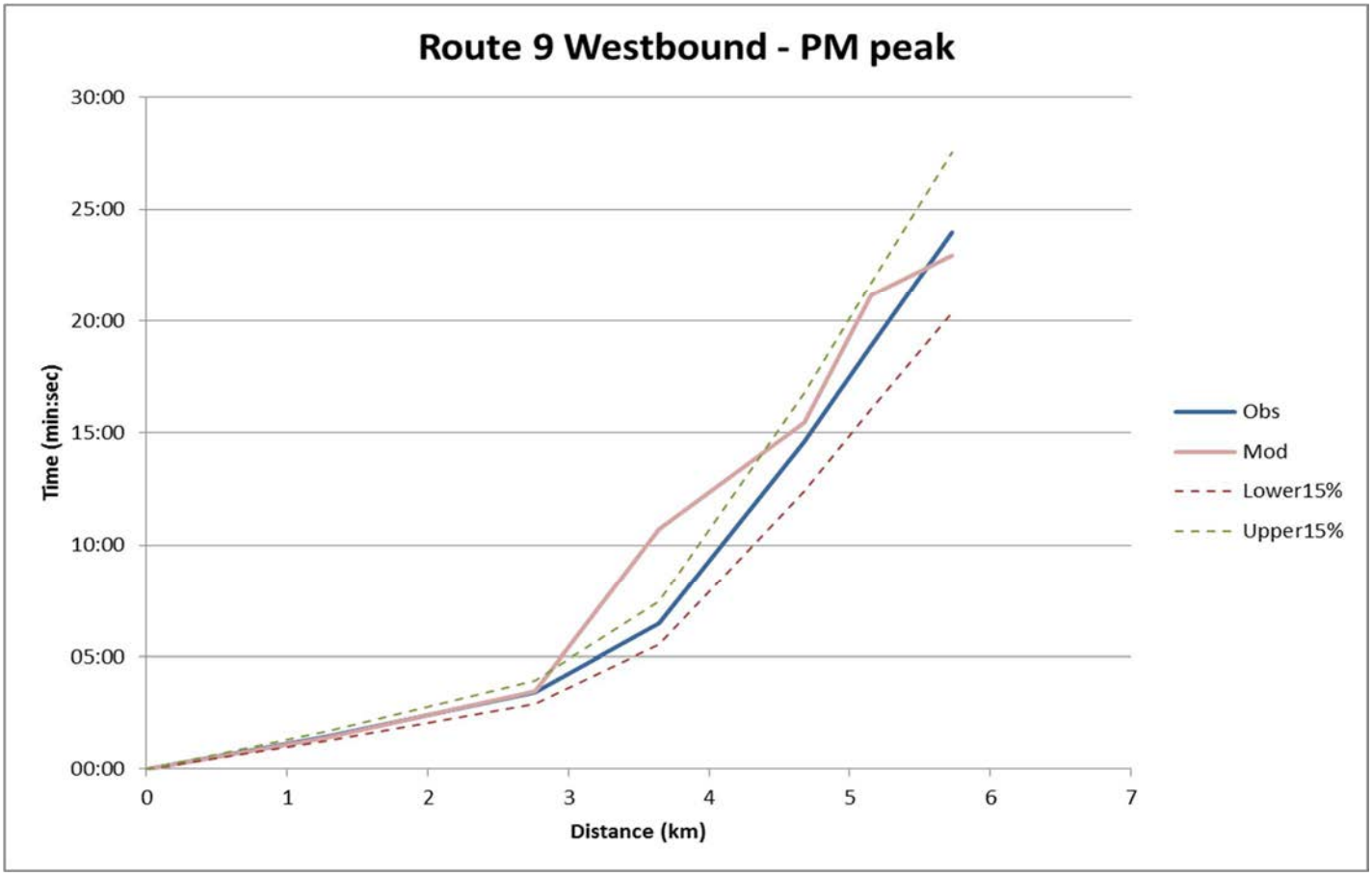

Route 6 Northbound - PM peak
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

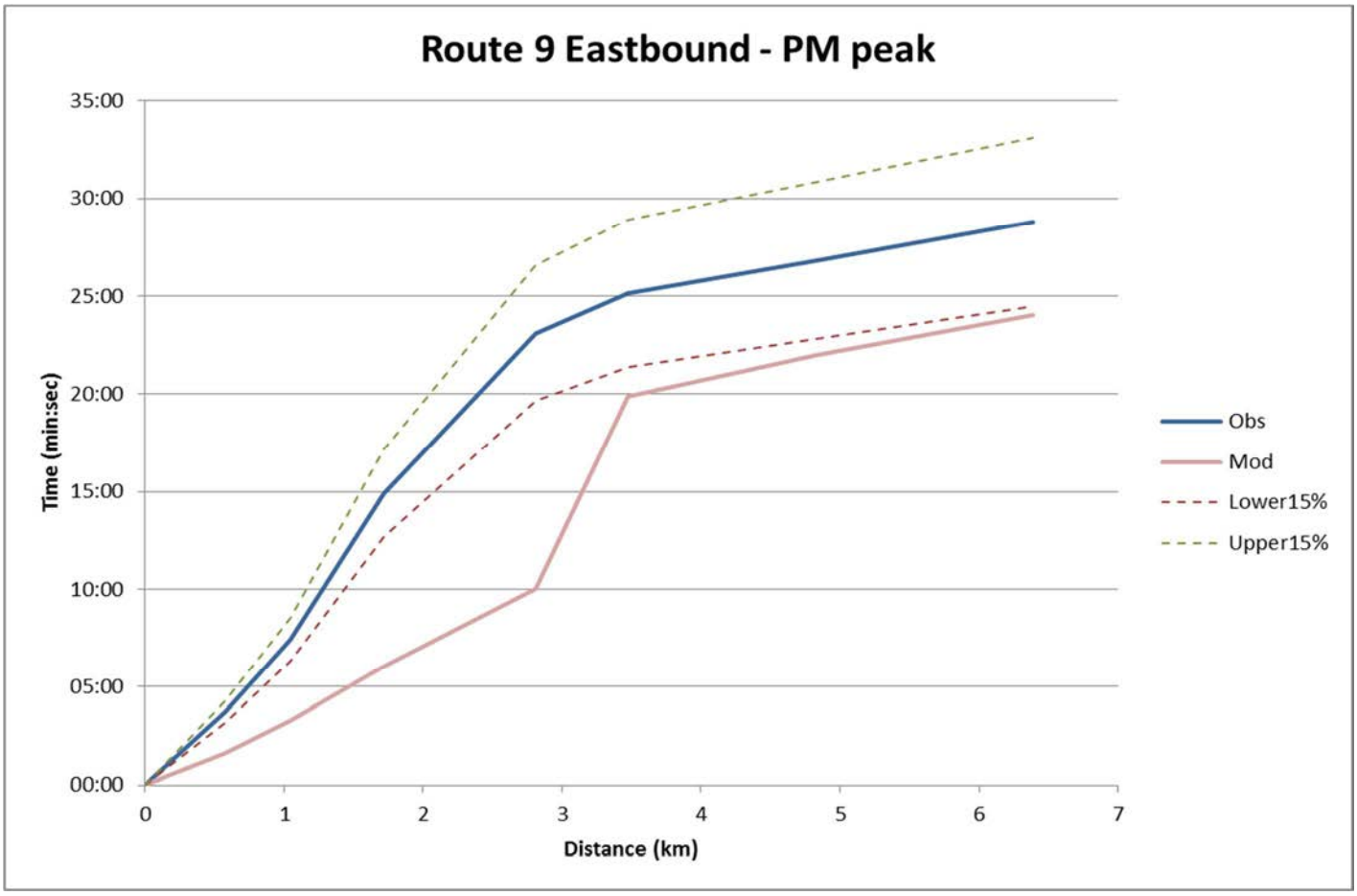

Route 7 Southbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

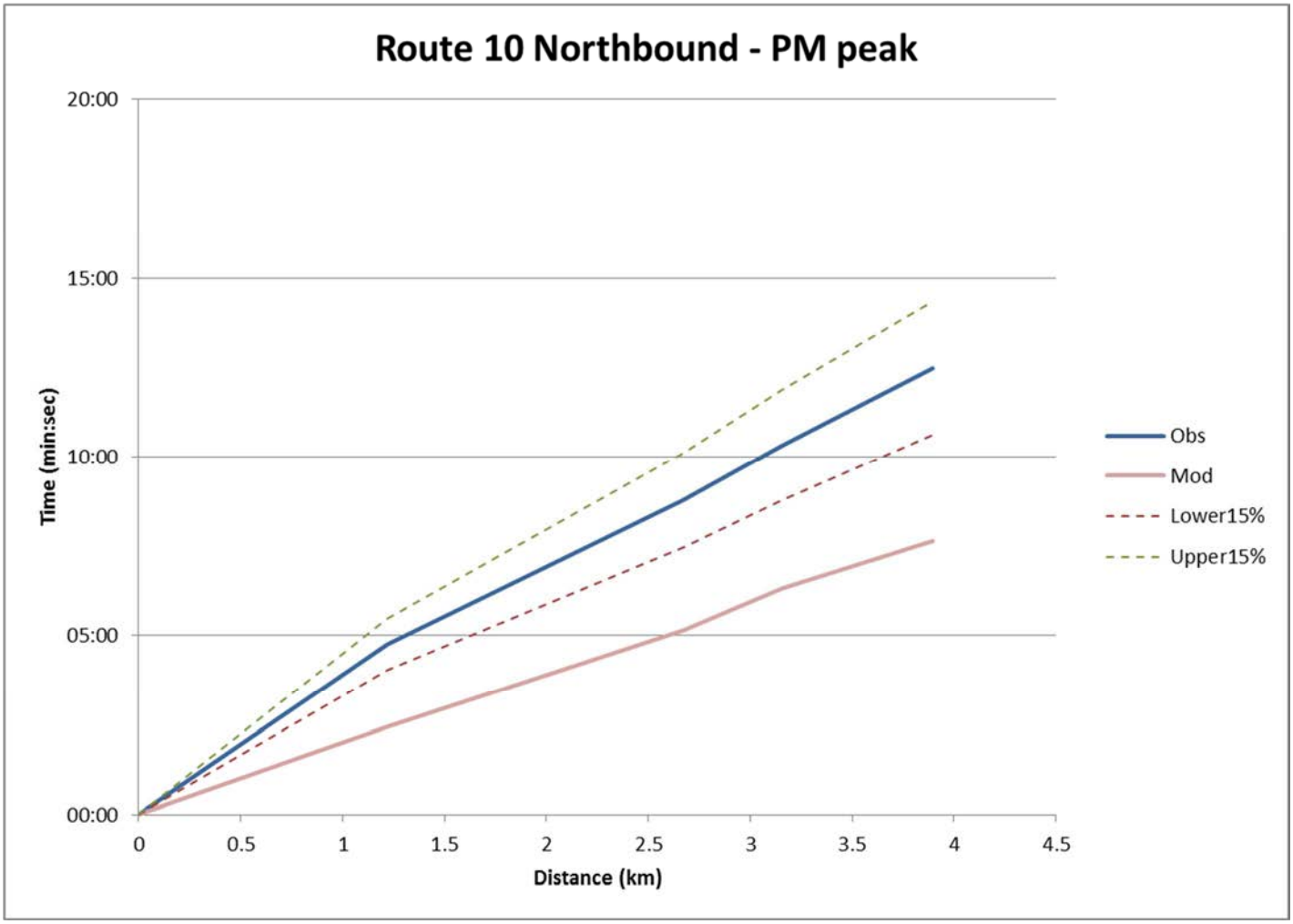

Route 7 Northbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%

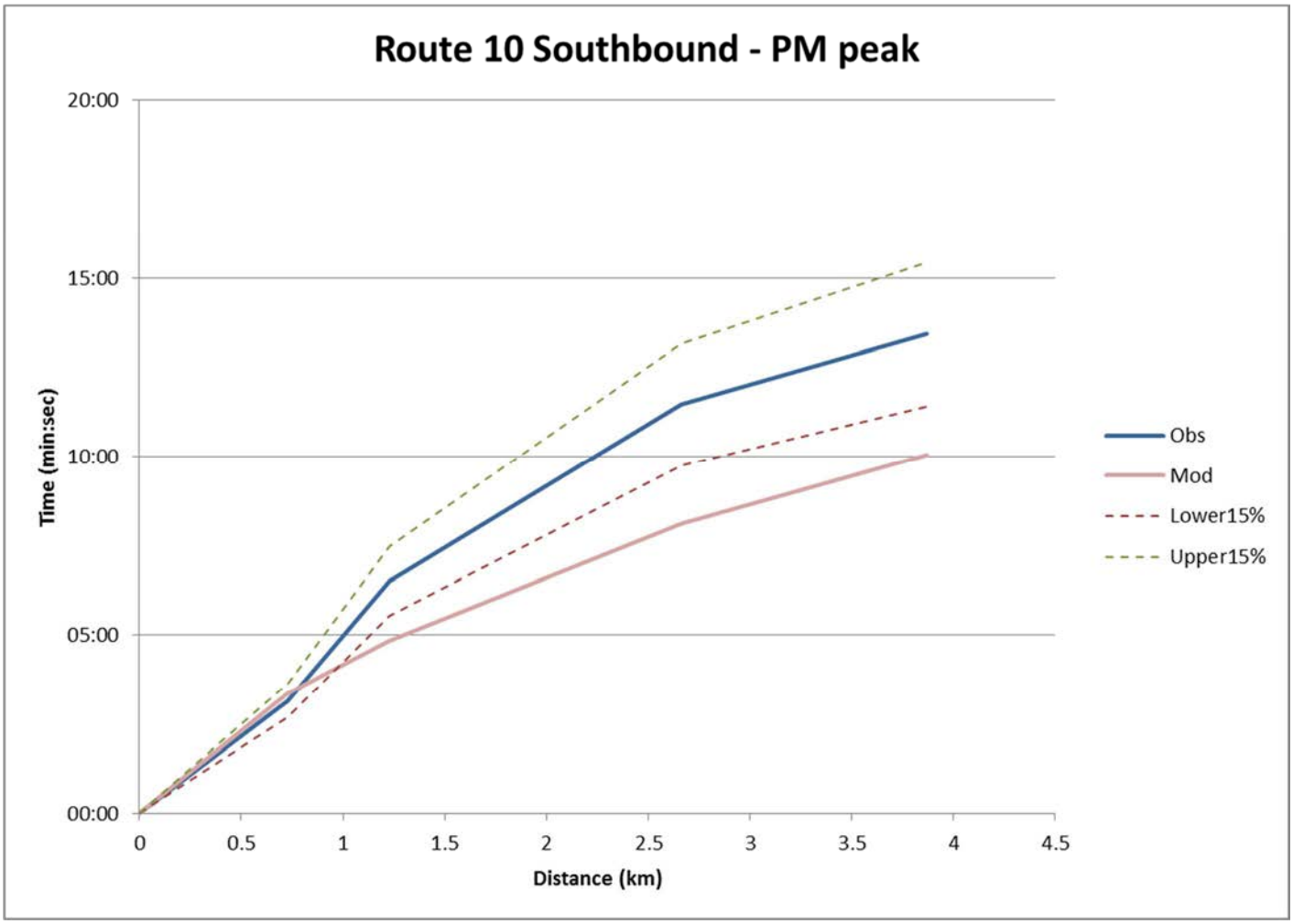

Route 8 Southbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

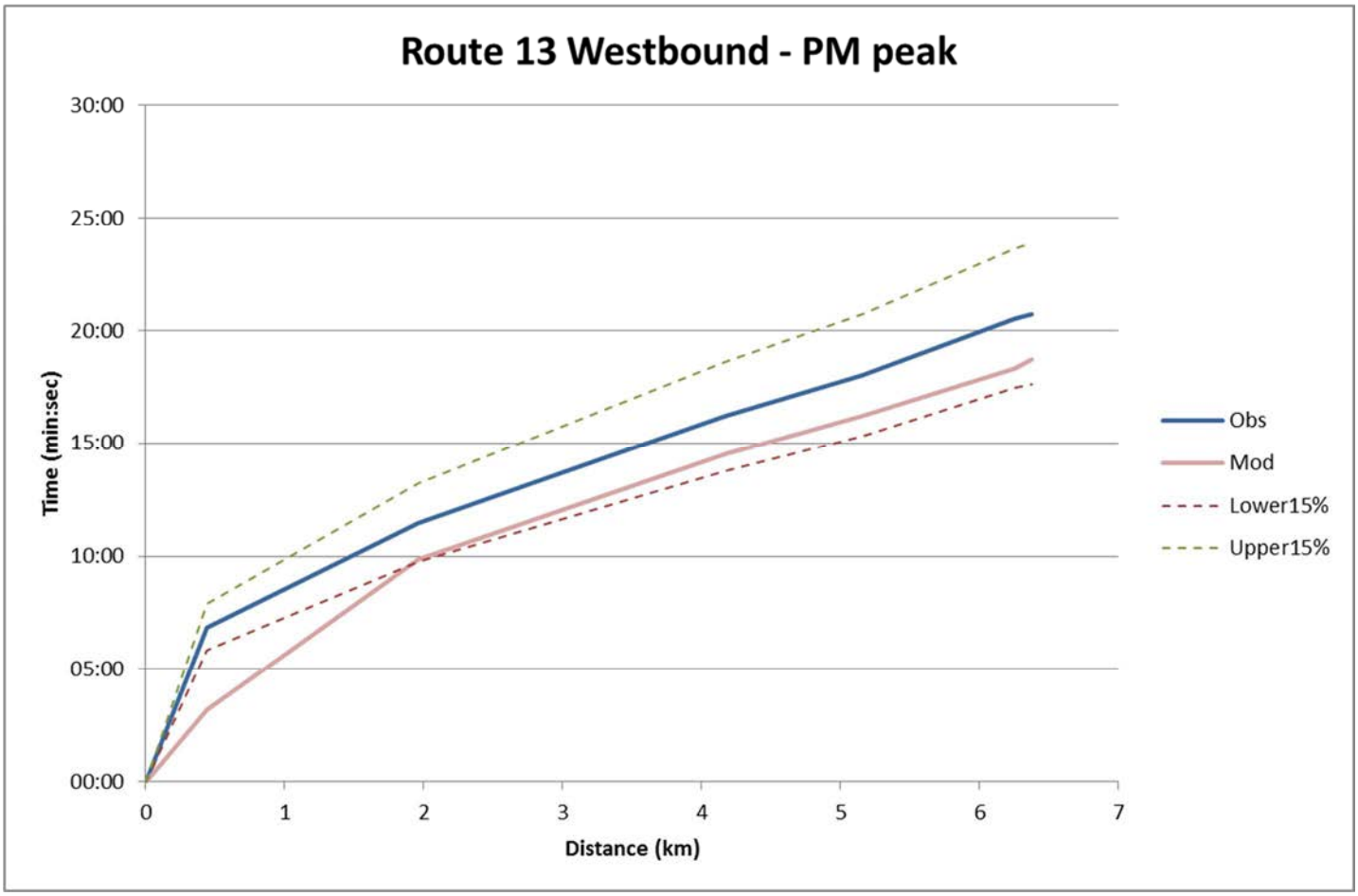

Route 8 Northbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (km)
Obs
Mod
Lower15%
Upper15%

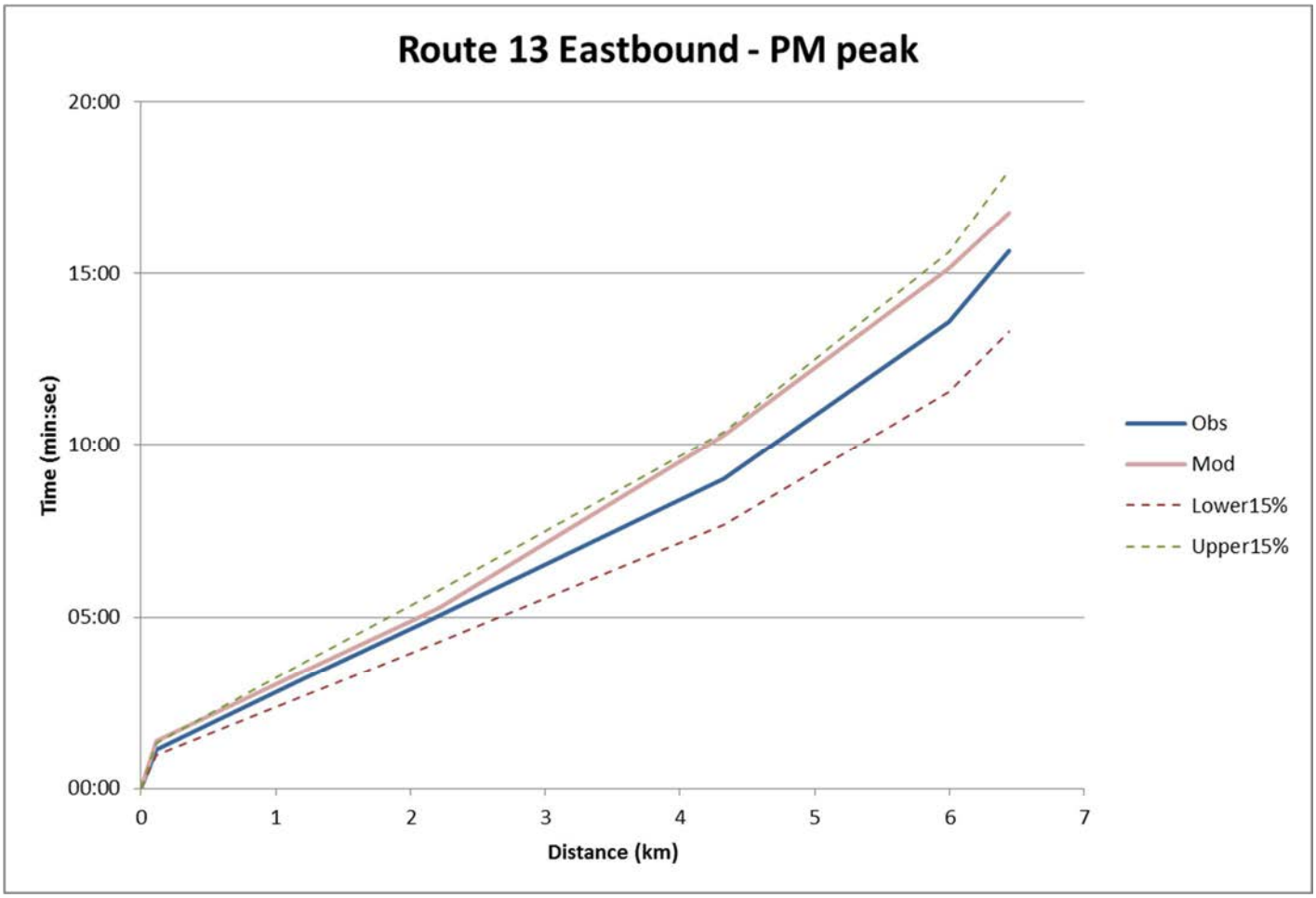

Route 9 Westbound - PM peak
30:00
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

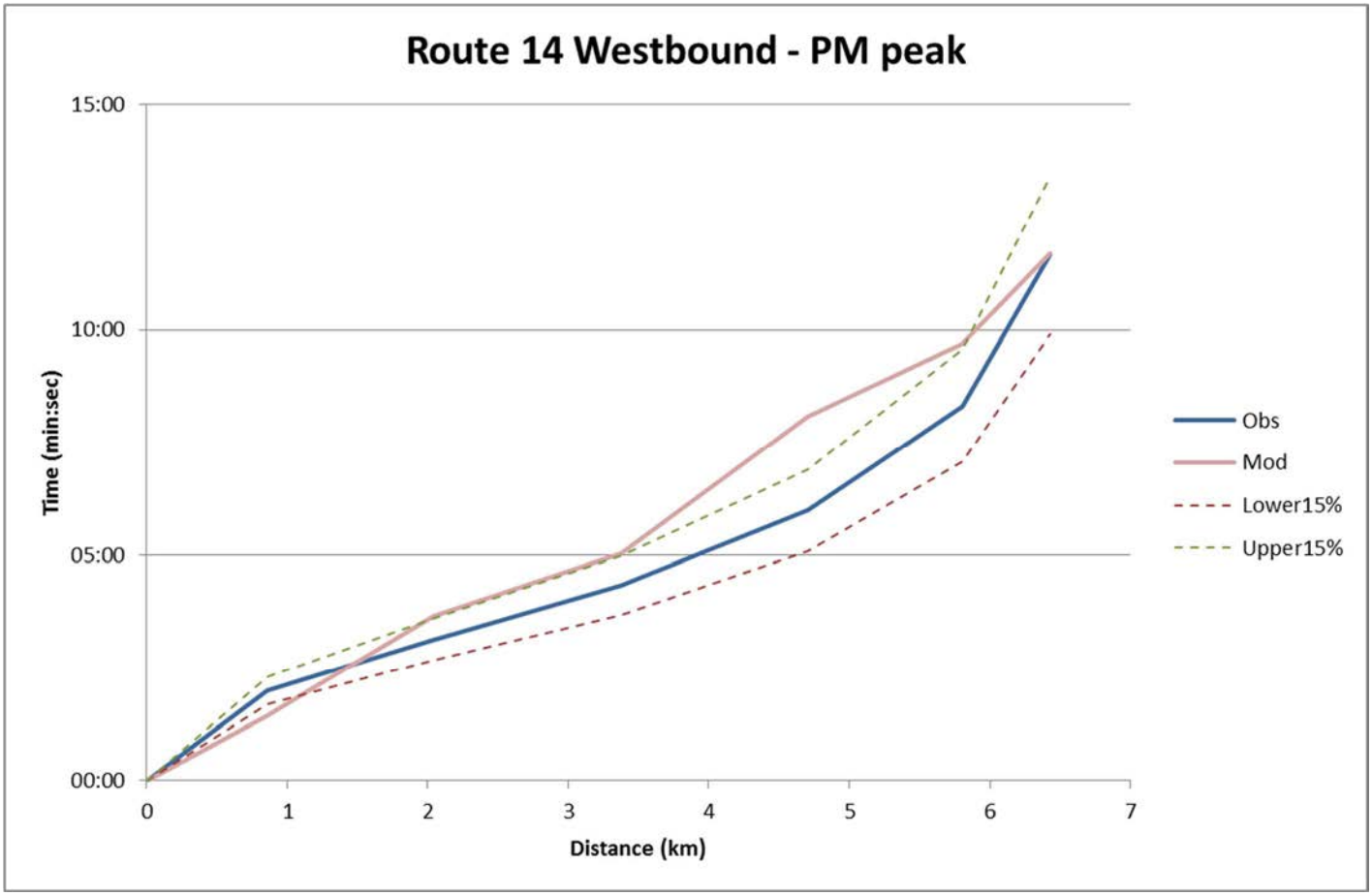

Route 9 Eastbound - PM peak
35:00
30:00
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%

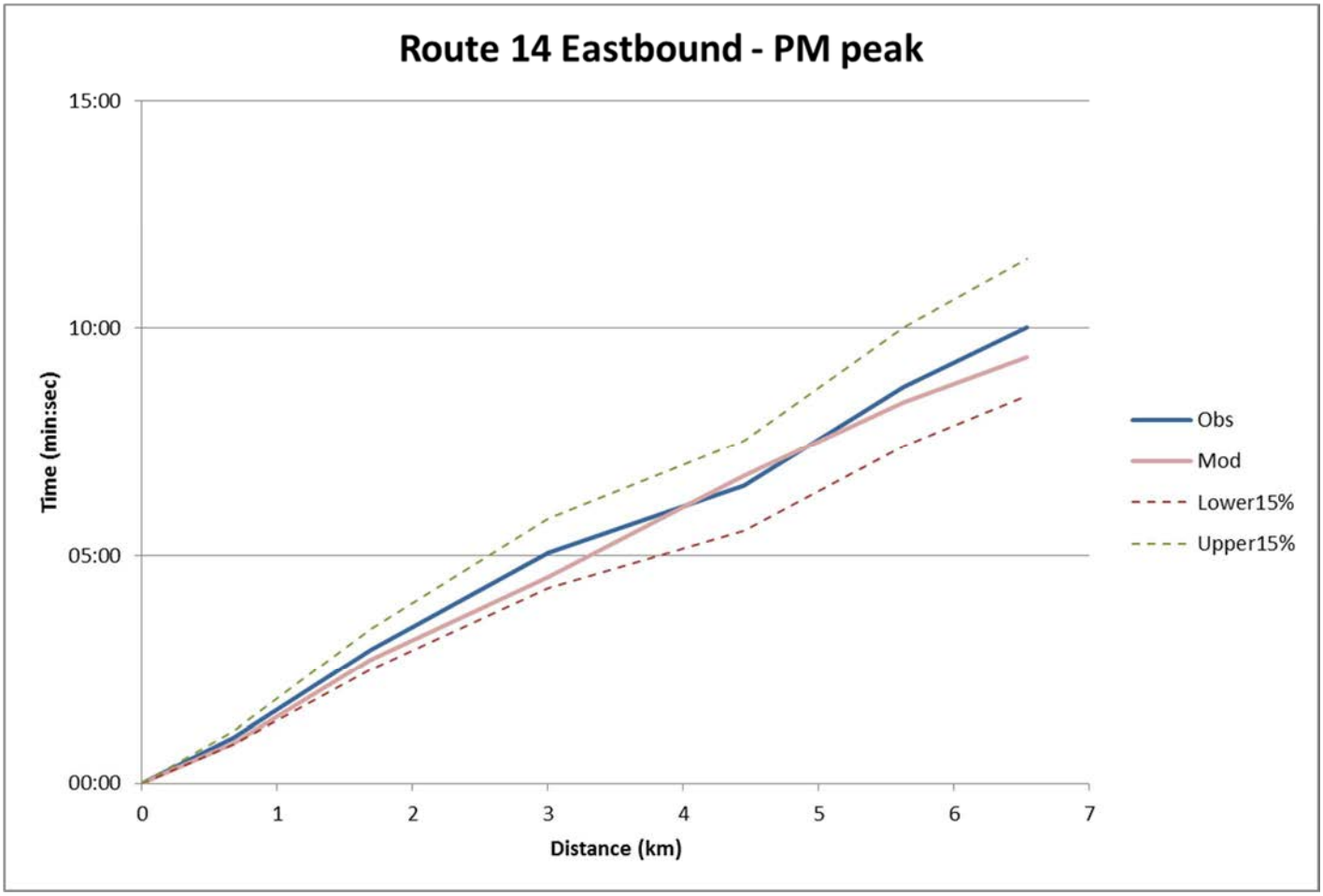

Route 10 Northbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%


Route 10 Southbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Distance (km)
Obs
Mod
Lower15%
Upper15%


Route 13 Westbound - PM peak
30:00
25:00
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%


Route 13 Eastbound - PM peak
20:00
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%


Route 14 Westbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%


Route 14 Eastbound - PM peak
15:00
10:00
05:00
00:00
Time (min:sec)
0
1
2
3
4
5
6
7
Distance (km)
Obs
Mod
Lower15%
Upper15%