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Chelmsford Traffic and Access Strategy

Essex County Council

Local Model Validation Report

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ECC

Chelmsford Traffic and Access Strategy

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Executive Summary

Over the next decade, Chelmsford will face significant growth and the challenge of meeting increasing travel demand whilst actively encouraging economic growth. In order to facilitate this, Essex County Council needs to be in a position to understand the current and future transport problems in Chelmsford to successfully bid for funding that will be made available via the Local Enterprise Partnership (LEP), and via national funding sources such as Pinch Point and Major Transport Schemes funding.

To be in a position to make the case for national funding allocations, in accordance with Government's technical guidance such as the Department for Transport (DfT) Transport Analysis Guidance document (WebTAG) or the Design Manual for Roads and Bridges (DMRB), it is essential to provide highly quantitative evidence on travel demand. These outputs will eventually be fed into business-case procedures to make the case for investment in accordance with DfT guidance.

Jacobs was commissioned by Essex County Council to construct a mobile phone based multi-modal strategic transport model for the city of Chelmsford, to better understand present and future travel patterns, travels costs, as well as traveller's choice in the base year (2014) and in the forecast years (2021 and 2036).

The model includes private transport (Car, LGVs and HGVs), public transport, (Rail and Bus), and cyclists. In addition, cars, rail and bus trips were further divided into three separate trip purposes (commute, business and other), in keeping with guidance and allowing model outputs to be used for Economic Assessments.

The model performance against the WebTAG assessment criteria is summarised in this report, providing reassurance that the model is representative of the existing transport network and current traffic conditions. In addition, extensive checks have been carried out to ensure that routing through the model is accurate and delays occur at the correct junctions within the model.

The private and public transport model has been developed, calibrated and validated according the aforementioned guidance. It is therefore expected that a high degree of confidence will be placed in the model for the purposes of assessment, economic and environmental appraisal of any new scheme or intervention.

At the writing of this report, the full cycling travel data set was not yet available. Therefore, the cycling model validation report will be issued as a standalone document at a later date.

1. Introduction

1.1 Background

1.1.1 Chelmsford City is facing the challenge of meeting increasing travel demands whilst actively encouraging economic growth. Jacobs has been commissioned to build a multi-modal transport model for the city of Chelmsford, and its administrative area, in order to understand the current and future transport problems in Chelmsford and successfully bid for funding that will be made available via the Local Enterprise Partnership (LEP) and national funding sources.

1.1.2 Further background to the study is provided by Essex County Council's "Essex County Growth Deal", which forms part of the South East Local Enterprise Partnership's (SELEP) £1.2 Billion bid to Government to leverage £10 Billion of investment into the South East. The Essex County Growth Deal identifies a number of transport schemes and initiatives to help realise and promote the growth planned for the city of Chelmsford.

1.1.3 In March 2014 the County Council submitted an initial Business Case proposal to SELEP in support of the bid for funding major transport schemes and initiatives in Chelmsford. The total cost of the package of Chelmsford schemes included in the SELEP Business Case submission was £48.5m and comprised of:

- Passenger Transport Improvements: £12m
- Widford Park and Ride: £7m
- Station Square (including Mill Yard): £7.5m
- Central Corridor, inner ring and Army and Navy improvements: £12m
- Access to Waterside: £10m

Figure 1 Study Area: Chelmsford city and administrative area

1.1.4 Programme priority has been given to the Station Square, PuT radial corridor and the Central Corridor, inner ring and Army and Navy improvements. The Widford Park and Ride and the Access to Waterside are longer term proposals.

1.1.5 The scale of the potential proposals is such that the funding approval process was identified as requiring the development of WebTAG compliant transport models such as: a detailed highway micro-simulation model, to assess the highway proposals affecting the city centre network, and also a strategic multi-modal model, to assess the strategic transport impacts of the package across the city. PTV Vissim and VISUM software was used for modelling purposes in order to ensure compatibility with the simulation and maximise the quality of the final output.

1.1.6 The strategic transport model provides detailed spatial and network coverage of the whole Chelmsford Administrative area, extending beyond its boundaries to ensure detailed representation of the key adjacent areas. Model resolution gradually decreases further away from Essex County. See Figure 1 for further details of the project's study area.

1.1.7 The modelling approach proposed is consistent with the procedures for travel demand forecasting set out in national guidance.

1.1.8 Travel demand information for the development of OD trip matrices was based on anonymised mobile phone data collected for any trip that reported to enter or stay within the limits of Chelmsford administrative area for the whole month of June 2014. In addition, Jacobs post-processed this data to distribute trips across different modes and purposes based movement analytics, duration of stay and land use data, read chapter 3.5 on the Traffic Data Collection Report and the Demand Data Verification Report for further information.

1.1.9 To satisfy DfT and other interested parties that the model was informed by all available local data sources, our proposed approach aimed to take full account of:

- National and local planning data and economic growth forecasts to inform travel demand matrices (base and future years) to provide a sound link to local planning data and forecasts
- Highway Agency (HA), DfT and ECC traffic count data to inform calibration and validation of network assignments, to ensure that modelled traffic flows in the base year pass the defined tests in DMRB guidance
- Traffic Master data on local network speeds for the modelled month to inform link-speed definition as well as journey time validation of the highway network

1.1.10 A forecast model will also developed for the years 2021 and 2036, supported by planning data and infrastructure development information from the County. This will be reported in detail in the Forecast Model Validation Report.

1.1.11 PTV VISUM software was chosen as the preferred platform to ensure compatibility with ECC's existing local models.

1.2 Purpose of this Report

1.2.1 This report is intended to provide a summary of the base year matrices accuracy, demonstrate the level to which the model has been able to reproduce the observed situation and its suitability to be used as a tool for assessing proposed future schemes within the boundaries of Chelmsford Administrative area.

1.2.2 Within the following chapters and sub-chapters this report summarises the model's performance against the modelling assessment criteria from WebTAG providing reassurance that it is representative of the current conditions. In addition, extensive checks have been carried out to ensure that routing through the model is accurate and delays are at the correct junctions within the model.

1.3 Report Structure

1.3.1 The following sections of this report cover:

- Chapter 2: Model Description
- Chapter 3: Data Summary
- Chapter 4: Network Model Development
- Chapter 5: Demand Matrix Development
- Chapter 6: Assignment
- Chapter 7: Highway Assignment, Calibration and Validation
- Chapter 8: Public Transport Validation

2. Model Description

2.1 Proposed Use of the Model

2.1.1 The multi-modal transport model here described represents an attempt to understand the current and future transport problems within Chelmsford Administrative Area and provide relevant information and forecasts to be used when bidding for funding via the Local Enterprise Partnership (LEP) and national funding sources.

2.1.2 Once approved the multimodal model will be able to reliably test the following:

- Model mode, time and destination choice impacts of schemes
- Model route choice impacts of schemes
- Model various population, employment and car ownership level alternatives
- Test strategic impacts of schemes, including impacts of roadway, public transport and slow modes (bicycle) improvements

2.1.3 Due to its nature, the model has limitations on performing micro-simulation specific tasks, see list below, while it still provides matrix level inputs for undertaking further evaluation analysis.

- Evaluating impacts of localised turn bans
- Evaluating impacts of localised link bans
- Evaluating changes in signal times
- Signal optimisations
- Evaluating impacts derived from junction re-design

2.2 Key Model Design Considerations

2.2.1 In order to be in a position to test the strategic impacts of any potential transport development or scheme within the area of interest, the model extends to an area that is sufficient to assess strategic movements and key route choices as well as local movements within Chelmsford.

2.2.2 The model has been built to comply with guidance given in the Department for Transport (DfT) Web-based transport Analysis Guidance (WebTAG). The support of key stakeholders, including Highways England, was required during its development to ensure that the model was an acceptable tool for use in evaluating a range of planning scenarios. The scenarios will be developed with advice from the local planning authorities to ascertain the level of certainly around each planned development element.

2.2.3 In addition to the 2014 base year model two design year forecast models will need to be developed, 2021 and 2036. The forecast matrices will cover a number of options, with the capability to assess a range of uncertainty levels. The model will ultimately be used to identify trigger points when specific infrastructure becomes necessary and the level of development which would be acceptable up to each stage.

2.2.4 An appropriate modelling package needs to be used for construction of the model and assignment. VISUM has been chosen for this purpose not only due to its ability to effectively carry out highways and public transport assignments but for its compatibility with other stages of the modelling such as the VISSIM study previously executed.

2.3 Fully Modelled Area and External Area

2.3.1 WebTAG unit M3.1 on its chapter 2.2 provides guidance on the requirements for the modelling, stating that the geographic coverage of highway assignment models generally needs to:

- Allow for the strategic re-routing derived from impacts or implementations

- Ensure that areas outside the main area of interest, which are potential alternative destinations are properly represented
- Ensure that the full length of trips is represented for the purpose of deriving costs

2.3.2 In line with the previously stated WebTAG guidance, the proposed network made use of a three stage structure reducing the level of detail as we move away from the centre of the study area. The breakdown of the proposed network structure is outlined below:

- Fully modelled area
  - Area of detailed modelling
  - Rest of fully area
- External Area

2.3.3 The area of detailed modelling was defined as the area where the level of impact is expected to be certain and significant, for the purpose of the model, and, as such, the detail within the network and demand matrices is at its greatest.

2.3.4 The rest of the fully modelled area is where the level of detail is not as great but capacity restrains are still modelled.

2.3.5 The external part of the model has the lowest level of detail to include any trip to or from the fully modelled area. The network on this area is characterised for being just a skeleton of key roads where the impact of any tested scheme was deemed to be negligible.

2.3.6 Longer distance trips that have a trip end in or passing through the detailed modelled area were included in the mobile phone data collection. Within the fully modelled area speed flow curves and link capacities were applied to links on an attempt to ensure that long range routing was logical, reflected reality and that any long range re-routing that has an effect on the detailed modelled area was captured.

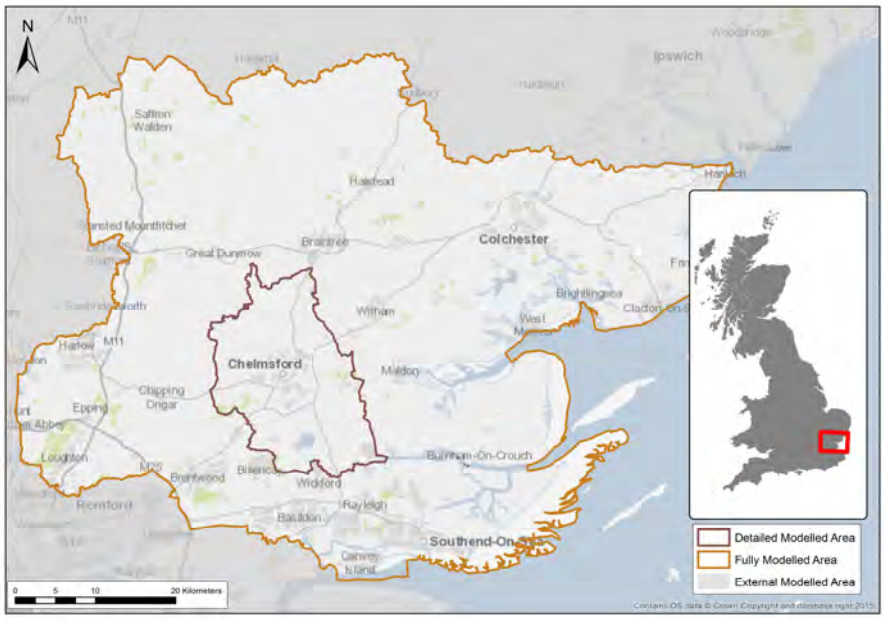


Figure 2 Detailed of modelled areas

2.4 Zoning System

2.4.1 The first step in generating the modelled demand required defining the model zone system. For this purpose, a hierarchical system was designed in which the greatest level of spatial detail was used within the Chelmsford administrative area with detail becoming less with greater distance from the study area.

2.4.2 The key considerations which informed the definition of the zone structure were:

- Consistency with current guidance and best practice (DMRB, WebTAG Unit M3.1 Section 2.3)
- Correspondence with statistical areas: Census Output Areas (OAs), Lower layer Super Output Areas (LSOA) and Middle layer Super Output Areas (MSOA))
- Correspondence with National Trip End Model (NTEM) zones to enable internal data handling
- Ability to aggregate zonal results for reporting at District or County level
- Use of geographical boundaries and separators such as rivers, railways and motorways where appropriate

2.4.3 Zone boundaries were based on aggregations of Census output areas in order to make the process of calculating land uses easier; these are small areas comprising around 200 houses and are the finest level of detail at which Census data is reported. Zones further away from the study area were based on aggregations of larger census reporting boundaries such as the lower and middle super output area layers. The level of zonal detail of the model varies as follows; see Figure 3 for further reference:

- Chelmsford Administrative Area used Lower Super Output Areas (LSOA) and Middle Super Output Areas (MSOA) to define the zonal system. Infrastructure topology and land use were taken into account and further divisions were added on these bases.
- Middle layer Super Output Areas (MSOA) were used to define the zonal system immediately surrounding Chelmsford Administrative Area
- District or Unitary Authority (UA) level for the remaining area within Essex County boundaries
- County or Regional level for the rest of mainland United Kingdom, with the exception of London, where zones are at aggregated borough level

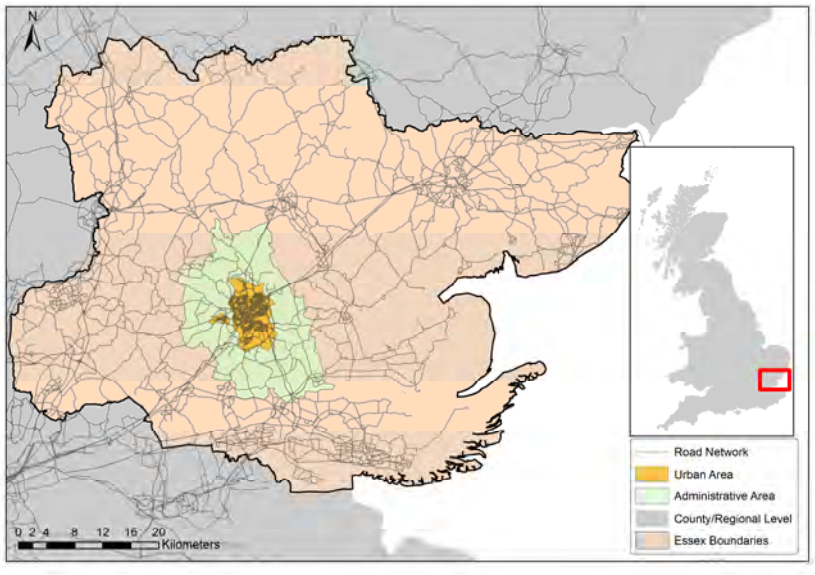


Figure 3 Zonal structure level of detail

2.4.4 In the above figure the detailed LSOA/MSOA-based model area is shown in yellow, (urban), and green, (rest of administrative area).The District / UA level is shown in salmon corresponding with the Essex County boundaries, and the County/Regional level in grey (all of which correspond to the external model area).

2.4.5 The detailed strategic model area covers the Chelmsford Administrative Area (see Figure 4 for further details) where LSOA/MSOA disaggregated level zonal detail were used. Disaggregation was needed due to heterogeneous land use types within a single OA (such as: residential, office, commercial, and industrial) or based on infrastructure topology.

2.4.6 The zone system is denser in urban areas as accurate land use and network representation requires a more detailed zone system.

2.4.7 In addition, model zones were defined in such a way that they nest within the National Trip End Model zone structure, to ease data transfer and data manipulation.

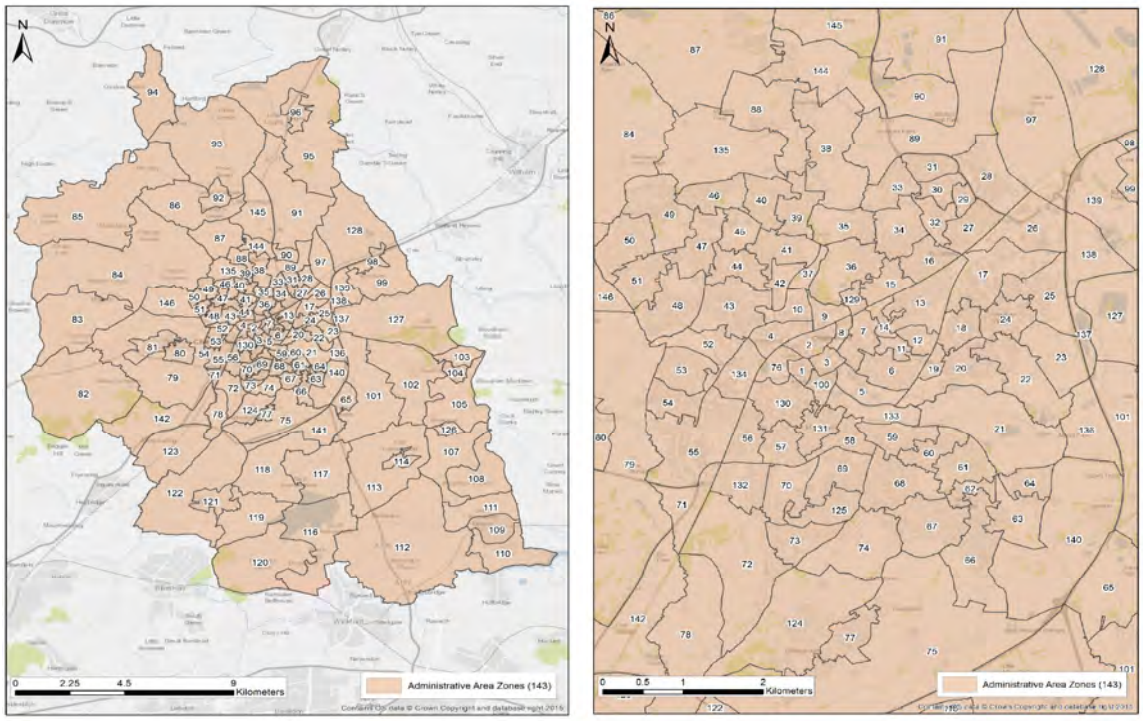


Figure 4 Zonal structure within Chelmsford Administrative Area

2.4.8 The intermediate model area contains the remaining territory of Essex County outside of Chelmsford Administrative area, as shown in Figure 5. Different parts of this intermediate model area were coded at different levels of resolution, such as MSOA level for zones immediately surrounding Chelmsford Administrative area, while areas further away used District or Unitary Authority definitions.

2.4.9 Given the nature of interactions between Chelmsford Administrative area and its neighbouring areas, the MSOA-level zonal system provides an adequate accuracy to model travel patterns and the potential impacts of infrastructure improvements. A number of major communities on the border of and outside the Administrative area boundary were assigned a more detailed 'below' MSOA level zonal system.

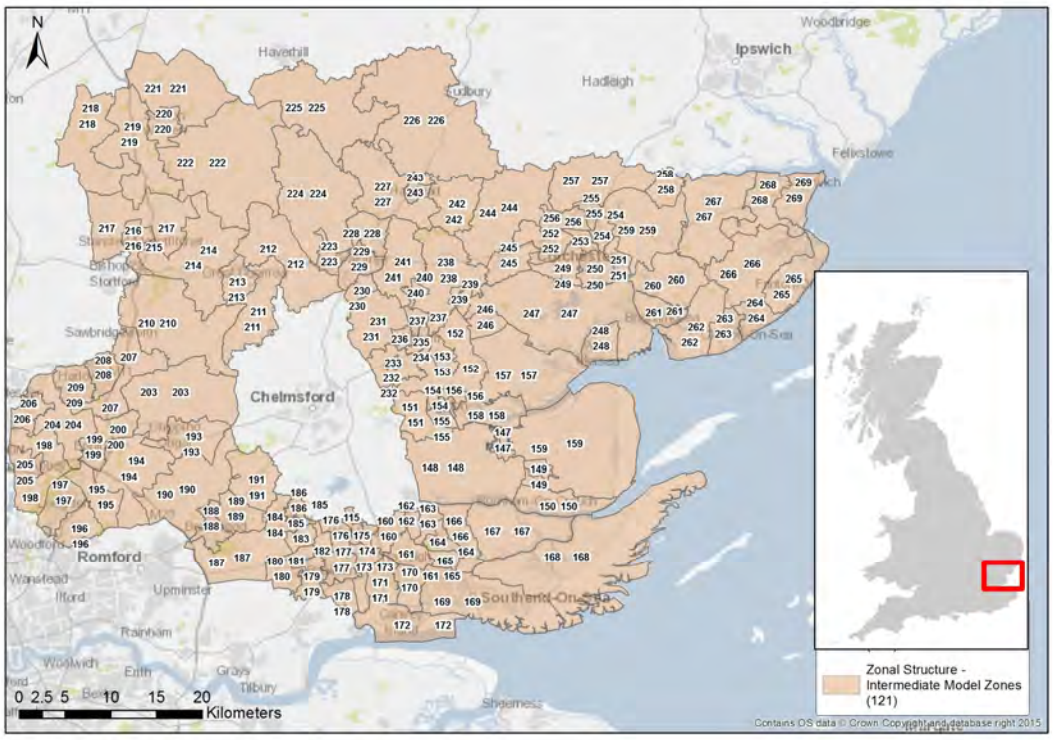


Figure 5 Zonal structure within intermediate model area

2.4.10 The external model area covers the territory of mainland United Kingdom outside of Essex County boundaries, see Figure 6 for further details. Different parts of the external model area were coded at different levels of resolution from County to Regional level depending on their proximity to the detailed strategic model area. Greater London was modelled at aggregated borough level, except for the South region of London which was aggregated into a larger zone.

2.4.11 The zonal structure by geographic area is summarised in the table below:

Geographic Area	Zone ID	Number of Zones
Chelmsford Urban Area	1-146 (excluding 115)	98
Rest of Chelmsford Administrative area	1-146 (excluding 115)	45
Essex Area (excluding Administrative area)	147-269 (including 115)	122
Rest of mainland UK	301-321	21
Total		**286**

Table 1 Zonal structure summary table

Figure 6 Zonal structure of the rest of mainland United Kingdom

2.5 Centroid Connectors

2.5.1 Zone connectors should represent 'real' junctions within the highway network and not load directly onto links, where possible. In line with WebTAG Unit M3.1 guidance the number of centroid connectors was minimised in order to reduce convergence problems.

2.5.2 The zone centroid and loading nodes were selected based upon professional judgment as the most representative place for demand to enter and exit the network always trying to best capture representative costs when trips enter or leave the network.

2.5.3 Please read sections 4.1.41 to 4.1.45 and 4.2.32 to 4.2.36 for further details on the connectors used and their characteristics.

2.6 Time Periods

2.6.1 The model was developed for three time periods. The modelled hours were derived by analysis of 36 directional specific traffic counts within the Chelmsford Administrative Area. These counts were all ATCs carried out in neutral days over June 2014 with a minimum collection period of two weeks. For full details on the data used and its collection please refer to the Traffic Data Collection Report.

2.6.2 Analysis of the collected data demonstrated that, in line with WebTAG unit M3.1 guidance, the following time periods should be assessed:

- AM peak hour between 08:00 and 09:00
- Inter-peak between 12:00 and 13:00
- PM peak hour between 17:00 and 18:00

2.6.3 For the Inter-peak case mobile phone data was collected for the full Inter-peak period, 10:00 to 16:00, and averaged to obtain an average IP modelled hour.

2.7 Travel Modes

2.7.1 The model was developed for private and public transport modes. Within private transport modes cars and bicycles were modelled. In the public transport, bus and rail trips were modelled. (A public transport trip is considered as rail (bus) trip if the main mode of travel was rail (bus)).

2.7.2 In addition, the freight modes are represented by modelling LGVs and HGVs.

2.8 Journey Purpose, User Class and Vehicle Class

2.8.1 The following journey purpose segmentation was used for the demand model following guidance from WebTAG unit M2.

<table>
<tr><th>Purpose</th><th>User Class (UC)</th><th>Vehicle Class (VC)</th></tr>
<tr><td>Home Based Work (HBW)</td><td>UC1: Commute</td><td rowspan="5">VC1:Car</td></tr>
<tr><td>Home Based Employer’s Business (HBEB)</td><td rowspan="2">UC2: Business</td></tr>
<tr><td>Non-Home Based Employer’s Business (NHBEB)</td></tr>
<tr><td>Home Based Other (HBO)</td><td rowspan="2">UC3: Other</td></tr>
<tr><td>Non-Home Based Other (NHBO)</td></tr>
<tr><td>LGV (All Trips)</td><td>UC4: LGV</td><td>VC2: LGV</td></tr>
<tr><td>HGV (All Trips)</td><td>UC5: HGV</td><td>VC3: HGV</td></tr>
</table>

Table 2 Purpose, user class and vehicle class relationships

2.8.2 Within the assignment model, five user classes have been used. These each have, as required, different values of time within the assignment. See chapter 5.2 for further details.

2.9 Assignment Methodology

2.9.1 The assignment method used in VISUM is known as “Assignment with ICA” or Intersection Capacity Analysis, which includes flow metering and blocking back. Please refer to HCM 2010 [1]for further details.

[1] “Highway Capacity Manual (HCM) 2010”, US Transportation Research Board, Volume 3.

2.9.2 The “Assignment with ICA” method is an iterative process for which, within each iteration, an equilibrium assignment, which does not include flow metering, is run to convergence, before flow metering and blocking back is then applied. Subsequent iterations then consider the delay caused by flow metering and blocking back when choosing routes.

2.9.3 This process therefore includes the “inner iterations” of the equilibrium assignment and the “outer iterations” of the assignment with flow metering and blocking back.

2.9.4 WebTAG M3.1, chapter 3.3, specifies a number of variables for measuring convergence, however, of these, only %GAP is reported in VISUM.

2.9.5 Read Chapter 6 Assignment for further details on how the assignment was set and the convergence criteria.

2.10 Generalised Cost Formulations and Parameters

2.10.1 Generalised cost combines journey times and distance into a standard unit of generalised time based on these two parameters. Within the assignment, two parameters are defined foe each user class to calculate generalised cost

2.10.2 The two parameters are the pence per minute, ppm, and the pence per kilometre, ppk, associated with each defined user class, see following formula:

$$GeneralisedCosts_{minutes} = JourneyTime_{minutes} + \left(\frac{ppk}{ppm}\right) * JourneyDistance_{km} + \left(\frac{1}{ppm}\right) * Toll_{pence}$$

2.10.3 The values of the ppm and ppk parameters used for the assignment were selected based on the latest WebTAG guidance.

3. Data Summary

3.1 Model Data Sources

3.1.1 An array of data sources were used in building the model specific to each aspect of the model. The data sources used are described below for each part of the model building process.

3.2 Highway Network

3.2.1 The bases of the model highway network consisted in digital mapping databases such as:

- ITN digital maps
- Open source digital maps
- Field Observations

3.2.2 These data sources are available from Ordnance Survey, and are open data, free for anyone to use. A detailed description of the way this data was used in the model is given in Section 4.1.

3.2.3 For the detail of the number of lanes on a link, locations of one way links, turn bans, number of stop line lanes and junction coding, a combination of site visits, local knowledge, Google Earth and Google Street View were used. In addition, some link attributes such as link lengths, speed and capacity were extracted from existing town models and digital mapping data. They were checked against recent satellite imagery (Google Earth and Street View).

3.2.4 For signalised junction, updated cycle times were collected from local authorities. It is important to note that pedestrian crossings were also coded in the modelled area, by manually recording average cycle times and imputing them into the model

3.2.5 The Cost Benefit Analysis (COBA) manual and Highways Capacity Manual (HCM) were used to derive the performance characteristics defined by Volume-Delay Functions (VDF) for the different link types.

3.3 Public Transport Network

3.3.1 The Public Transport (PuT) network used the same nodes and links as the highway network. The model includes every PuT service, rail, coach and local buses, which serve the modelled area (Chelmsford Administrative Area).

3.3.2 The public transport supply model (PuT network) was derived from a range of available data sets, including:

- ATCO Cif files for local bus routes/timetables
- National public transport access nodes data (NaPTAN) for railway stations
- Public National Rail network and timetable data
- Public data on underground and bus lines
- Bus fares information from operators (via websites and published literature)

3.3.3 The auxiliary network components which comprise of walk/cycle/drive access/egress connectors and links were coded in the model using local knowledge of commuting patterns and year 2011 Census travel to work data. A detailed description of the way this data was used in the model is given in Section 0.

3.4 Walking and Cycling Network

3.4.1 All links are appropriately coded for the different transport systems allowing for cycles and pedestrians to access the road where appropriate, (making sure no redundancy and duplication of objects occurs).

3.4.2 The basis of the model walk/cycle network was made of digital mapping databases and field observations (converted in the model network using mapping software).

3.5 Highway and Public Transport Travel Demand

3.5.1 The demand model building approach relied on mobile phone data avoiding reliance on costly origin/destination survey programmes and so enabling model development timescales to be markedly reduced. Data was provided by INRIX, a subsidiary company of O2, for the modelling month of June 2014.

3.5.2 The methodology consisted on a serious of steps starting from the collection of anonymised phone data which was then used to identify movements between zones to ultimately obtain origin/destination trip matrices for different times of day (AM Peak, Interpeak (IP), PM Peak).

3.5.3 Post-processing of the data was required in order to distribute trips across different modes and purposes, based on movement analytics, duration of stay and land use data. Detailed information on this process is provided in Section 5.

3.6 Highway Traffic Counts

3.6.1 The process of calibrating and validating the highway assignment, in correspondence with WebTAG M3-1, consists on a series of checks on the model's representation of traffic flows, delays and journey times against real life observations.

3.6.2 Traffic counts were obtained from the following sources:

- Essex County Council (ATC, CLC data)
- DfT data (TRADS and CLC data)
- Data Surveys performed for this project (ATC, CLC)

3.6.3 Highway journey time observations were obtained from DfT's Traffic Master Dataset which records data using Satellite Navigation devices installed in cars and other vehicles.

3.6.4 More detail on the counts and journey times used in the model is provided in the Traffic Data Collection Report.

3.7 Public Transport Passenger Counts

3.7.1 Public transport assignment validation was based on comparing the model's representation of passenger boarding and alighting at bus stops and railway and underground stations with observed stop or station entry and exit data. Annual data was converted to daily values by using daily factors.

3.7.2 More detail on the counts and journey times used in the model is provided in the Traffic Data Collection Report.

4. Network Model Development

4.1 Highway Network

4.1.1 This section describes the process and methodologies used in building the modelled network. In creating the network, consideration was given to the level of spatial detail required at different locations within and outside the study area; the required level of detail in the model was discussed in Section 2.3 above.

Highway Network Basis

4.1.2 The modelled network was originally created using two Ordnance Survey datasets; the Integrated Transport Network (ITN) and Meridian 2. Within Chelmsford Administrative area and surrounding areas, the ITN network was used as a basis for the modelled network; beyond this, Meridian 2 layers were used.

4.1.3 ITN segregates links into motorways, A-roads, B-roads, minor roads, local streets, private roads, and alleys, in descending order of importance. The highway network inside Chelmsford Urban Area includes all streets and roads that are to be used by vehicles.

4.1.4 The Administrative Area also includes all major and minor roads with proportional treatment of local streets. Outside of Chelmsford Administrative Area major and minor roads are coded while the model gradually reduces its resolution as we move further away from the Essex County boundaries. Figure 3 contains a schematic map of the different mentioned areas.

4.1.5 The basis of the model highway network was built on digital mapping databases, which are converted into model network using ArcGIS software:

- ITN digital maps
- Open source digital maps
- Field Observations

4.1.6 The detailed model network was imported into VISUM using the latest digital mapping data which contains highway network types. The model accommodates all paved inter-urban traffic roads, in order to meet the criteria of including all inter-urban roads.

4.1.7 A total of 96 different highways classes or types were coded in the model, following guidance from COBA Volume 13 Section 1 part 5, classifying roads based on characteristics such as: road class, number of lanes, speeds, modes allowed, etc. a full list of all the defined link types can be found in Appendix A, however, the main classes considered on the analysis can be seen below:

- Motorways
- Rural single carriageway
- Rural double carriageway
- Urban non-central
- Urban central
- Small town
- Suburban single carriageway
- Suburban dual carriageway
- Residential road
- Roundabouts

4.1.8 The first three classes were assigned for all-purpose roads and motorways that are generally not subject to a local speed limit. Urban central and non-central were used for roads in large towns or conurbations typically subject to 30 mph speed limits. Small town was used as the link type in small towns or villages, while suburban was used for major routs though towns and cities which are generally subject to 40 mph speed limits. Please see the map below for further reference.

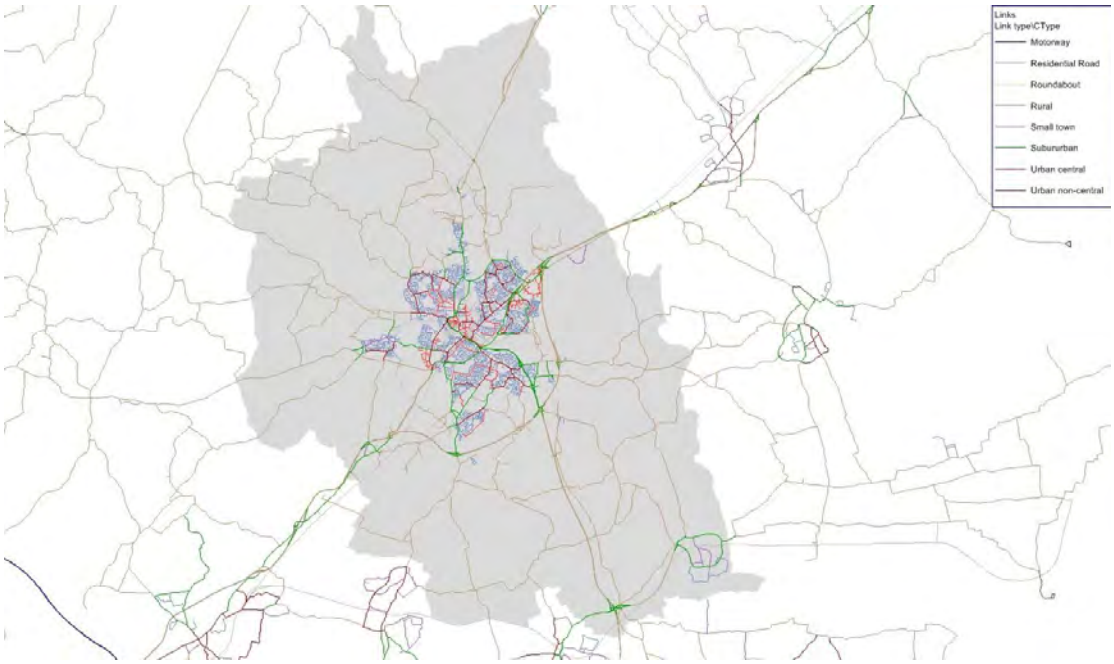


Figure 7 Summary of link types used

4.1.9 In the external model area, only major highways (selected Motorways, A roads and B roads) were coded in order to guarantee good levels of accessibility to the Essex and Chelmsford Administrative areas. Network topology was coded according to design, but physical attributes were coded notionally to accommodate traffic volumes to and from the external areas.

Nodes to Accommodate Bus Stops

4.1.10 For the purposes of the Public Transport coding, it was important that all bus stops served by bus routes within the model were included in the PT network. The locations of all these bus stops were specified using ATCO CIF data, provided by Essex County Council, and transferred into the highway model.

4.1.11 Bus stops were included as highway network nodes, and as they were invariably not located at junctions, new nodes were required in order to accommodate them. These nodes effectively split existing highway links in two and served no purpose within the highway assignment itself, however it ensured that a single modelled network could serve the purposes of both the highway and public transport assignment, ensuring a consistent link topology between the two.

4.1.12 The consistent topology is critical when transferring data between the PT and highway assignments, for example when updating PT in vehicle travel times data from the highway assignment or reducing capacity of the highway links based on the number of buses and their frequencies.

Link Coding

4.1.13 In urban areas, physical properties such as links' length and number of lanes, speed and capacity were taken from the existing town models, where available, and were checked using recent satellite imagery (Google Earth and Google Street View).

4.1.14 In rural areas, physical properties of the road system were taken from digital mapping data, and were checked against recent satellite imagery (Google Earth and Google Street View).

4.1.15 Highway attributes data, such as link class, user class restrictions, and turning movement restrictions were also coded using Google Earth, Google Street View, local knowledge and field observations.

4.1.16 96 unique network link types were defined according to the following link attributes; see Appendix A for further details:

- Roadway functional class (e.g. motorway, trunk road, residential street)
- Roadway location (urban, suburban, rural)
- Roadway geometry, lane width, number of lanes
- User type prohibitions (bus links, HGV, LGV, general traffic, etc.)

4.1.17 The physical attributes and location of each link in the model (i.e. urban or rural) were used to inform the performance characteristics that are attributed to them. These performance characteristics are defined by 'Volume-Delay Functions' (VDF). The VDF, specific to each link type within COBA, define the key determinants of a link's performance, such as its saturation capacity, the speed that vehicles will travel at this level of saturation, the speed that vehicles will travel in free-flow conditions, etc. The VDF functions were derived from the COBA link classifications (as in the COBA Manual in DMRB Volume 13, Section 1, Part 5).

4.1.18 The Volume-delay functions used an 'adjusted BPR' function, the formulation was developed by the US Bureau of Public Roads and is repeated below for reference:

$$t_{cur} = \begin{cases} t_0\left(1 + a \cdot \left(\frac{q}{q_{max} \cdot c}\right)^{b}\right), & \frac{q}{q_{max} \cdot c} \leq 1 \\ t_0\left(1 + a \cdot \left(\frac{q}{q_{max} \cdot c}\right)^{b'}\right), & \frac{q}{q_{max} \cdot c} > 1 \end{cases}$$

Where tcur is the calculated link travel time, t0 is the link travel time at free flow conditions, q is the flow on the link, qmax is the link capacity, and a, b, b', and c are parameters specific to each link type.

4.1.19 The full list of link types, along with free flow speed, capacity, and parameters for the volume-delay function are given in Appendix A whilst the Volume-Delay functions are plotted in Figure 9.

4.1.20 Outside the detailed modelling area speed flow curves have not been used but instead a detailed time period specific analysis of Traffic Masters (TFM) speeds along corridors was developed and attributes coded appropriately on links, please refer to the map below for a quick reference to the links that have been coded with COBA based speeds (blue) versus with time period specific TFM average speeds (grey).

4.1.21 For HGV's, the volume-delay functions were adjusted such that HGVs have a maximum speed of 80km/h. This is achieved by setting a maximum speed limit for this vehicle type for each particular link type.

4.1.22 Link lengths were automatically calculated by the VISUM software, based on the scale length of the polyline representing the modelled link.

4.1.23 Several links added to the model needed to be coded as one-way links, as they represented one of the following:

- Actual one-way roads
- Circulating carriageway of a roundabout
- Either side of a traffic island
- Separate sides of a dual carriageway

Figure 8 COBA based vs TFM average speed coding

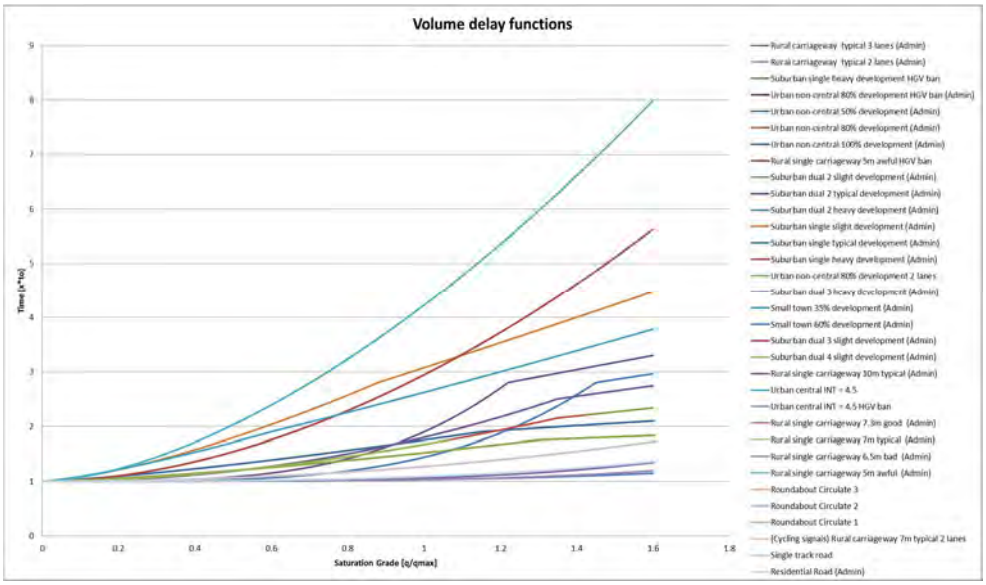


Figure 9 Volume-Delay functions used in the model

4.1.24 In the first case, actual one-way roads were identified by local knowledge and/or visual inspection using Google Earth or Google Street View, as part of the junction coding described in the following section.

4.1.25 In the other three cases, ITN contains an attribute to identify if the links fall into any of the three categories, and by using that attribute the relevant links within the model could be identified and assigned the link type '0' which blocks all movements on the link's opposite direction.

4.1.26 Roads considered unsuitable for HGVs or prohibited (due to weight or height limits) to HGVs were identified and coded as such. A set of link types explicitly banning HGVs, but in all other ways identical to their 'HGVs allowed' equivalents was created in order to model the HGV restrictions.

4.1.27 For the purposes of the Public Transport model, any highway links which also contained bus lanes were identified from local knowledge and Google Street View. Those modelled links were given an attribute to indicate the presence of a bus lane, which therefore gave the option for bus lanes to be considered in the Public Transport Assignment.

Capacity Restraint Mechanisms and Urban Speeds

4.1.28 Two key features of the VISUM model are "blocking back" and "flow metering". The former ensures that delays at one junction, that affect the previous junction, are also taken into account, while flow metering ensures that the capacity of either existing roads, or any new roads, is not higher than its actual capacity. Both features have been incorporated into the model.

Junction Coding

4.1.29 In order to ensure that delays are fully represented in the model, it was necessary to code all junctions which had the potential to generate traffic delays. In the detailed model area, (Administrative Area), all junctions were modelled explicitly while the remaining junctions use the default VISUM control type, (uncontrolled).

4.1.30 For those junctions within the Chelmsford's Administrative Area junction modelling will be calculated within VISUM based on the following guidance from HCM 2010 and WebTAG.

4.1.31 The following junction types were coded:

- Signalised junctions
- Two-way yield junctions
- Two-way stop junctions
- Uncontrolled junctions

4.1.32 Those junctions that were not coded as uncontrolled had the following attributes coded:

- Junction type (control type)
- Major flow (i.e. which turning movements have priority)
- Banned turns
- Number of lanes at stop lines
- Turn type (i.e. straight on, left turn, right turn)
- Lane allocations (i.e. which turns are made from which lanes)
- Signal timings (for signalised junctions)

4.1.33 These required geometric information as well as signal timings to be coded in order to provide saturation flows within VISUM's Intersection Capacity analysis (ICA) Modules. Junction coding was undertaken with reference to recent satellite imagery (Google Earth and Google Street View) and field observations in order to determine junction control type (signal, give-way etc.).

4.1.34 Signal timings have been obtained from ECC to accurately reflect junction delays through the Administrative Area. The location of all coded junctions can be seen in Figure 10 and Figure 11 below.

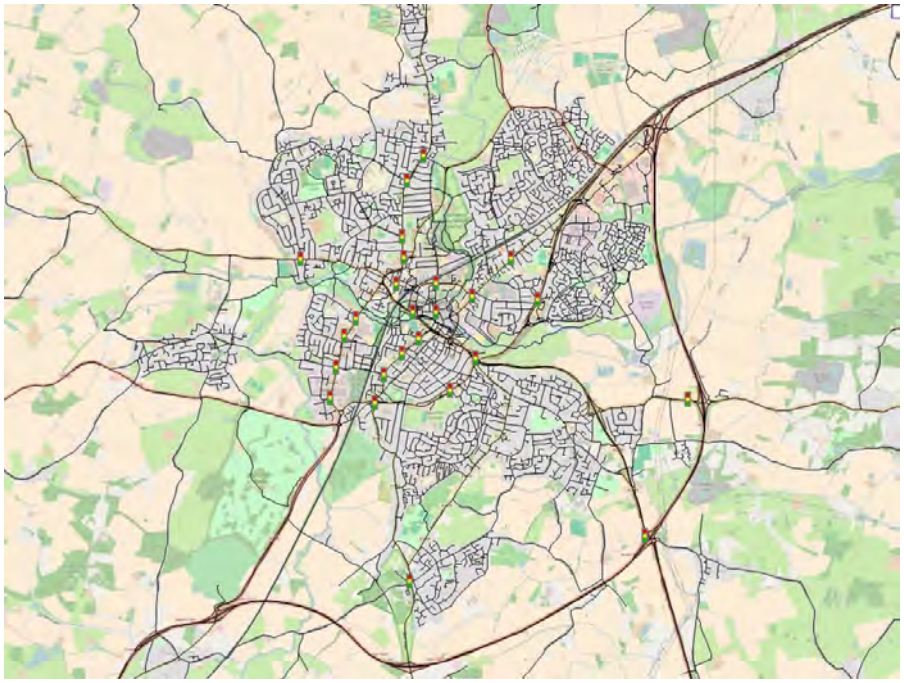


Figure 10 Detail of signalised junctions

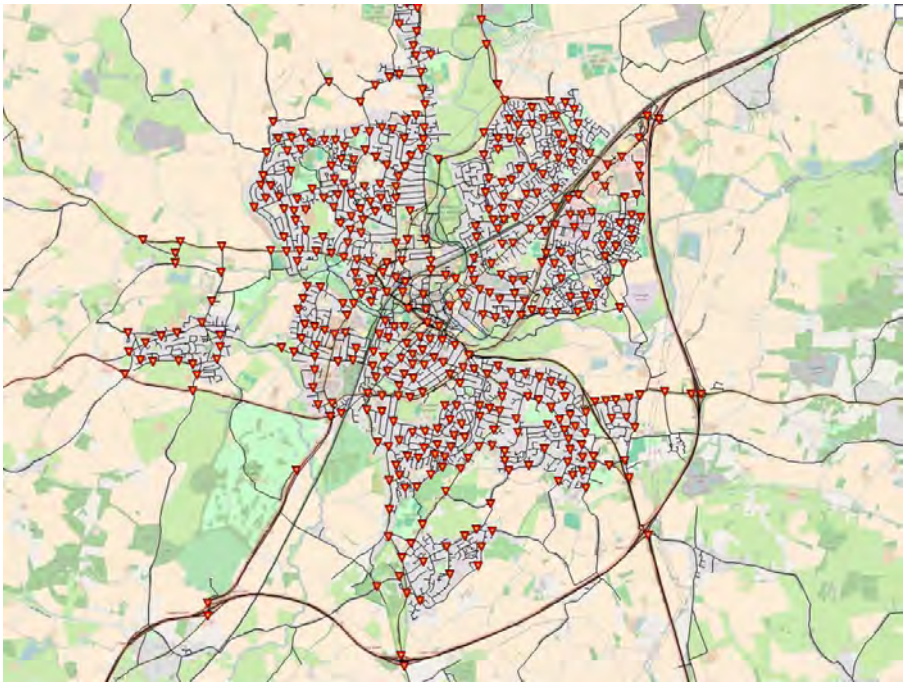


Figure 11 Detail of two-way yield junctions

4.1.35 Junction type “Roundabout” was not used. Rather, roundabouts were coded as a series of two-way yield and uncontrolled junctions, using a number of modelled nodes. An example of this coding can be seen in the figure below:

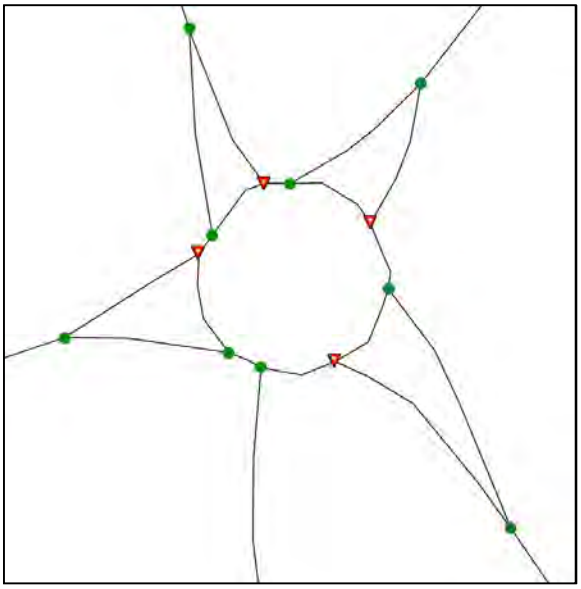


Figure 12 Roundabout coding example

4.1.36 In the image above, the green dots represent uncontrolled junctions, where there are no conflicting traffic movements. The red triangles are, of course, two-way yields at each entry leg.

4.1.37 For all coded junctions, with the exception of "uncontrolled", junction capacities and delays were modelled using the Intersection Capacity Analysis (ICA) module within VISUM. This module uses formulas set by the 2010 edition of the Highway Capacity Manual, published by the US Transportation Research Board; which are specific to the junction type.

4.1.38 ICA relies on the input attributes identified above, and uses a number of default global values, to calculate the capacity and delay for each movement at a modelled junction. The default values cover aspects such as saturation flows per lane for each junction type and turn type and gap acceptance values for vehicles on a minor arm. These default values are identified below:

Junction & turn type	Saturation flow	Critical headway (seconds)	Critical follow up (seconds)
Signalised – all turns	1,900 veh/hr/lane	n/a	n/a
Priority junction – right turn from major arm	n/a	4.1	2.2
Priority junction – left turn from minor arm	n/a	6.2	3.3
Priority junction – straight on movement from minor arm	n/a	6.5	4.0
Priority junction – right turn from minor arm	n/a	7.1	3.5

Table 3 Default values used in ICA

4.1.39 The network and assignment calibration process identified particular junctions for which the global default values were not appropriate; manual overrides where applied for those junctions by adjusting the Critical Gap and Follow-up times on each node individually depending in the number of accessing lanes, see graph below:

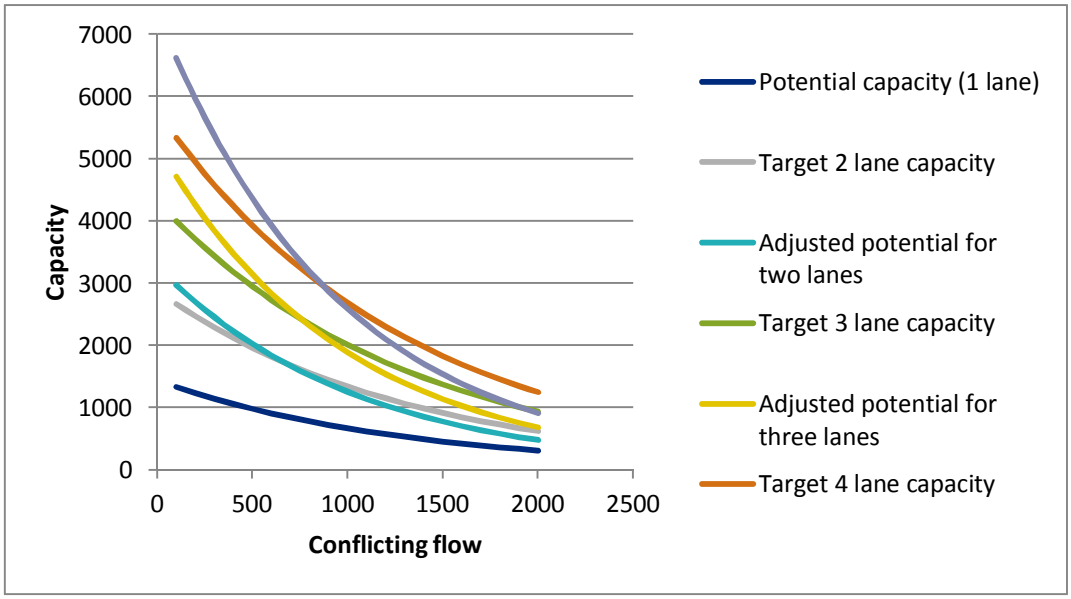


Figure 13 Capacity at two-way yield junctions for roundabouts.

4.1.40 During the process of identifying and coding modelled junctions, the link type of all the arms of each junction were checked again to ensure they were appropriate.

Zone Connectors

4.1.41 Centroid connectors were designed, where possible, to represent actual means of access to and egress from the modelled network, while making sure they did not cross real existing barriers to vehicles.

4.1.42 Following WebTAG guidance, direct connection of centroids into main links and modelled junctions was avoided for the Detailed Model Area and, where needed, specific arms were coded into the junction in order to accommodate the movements.

4.1.43 In addition, centroid connectors from adjacent zones were double checked to ensure that no direct connection between neighbour zones occurred resulting on trips not being loaded into the network.

4.1.44 In order to minimise the number of centroid connectors without compromising reliability of the Variable Demand Model and PuT assignment, two different sets of connectors were implemented: Private Transport system of connectors, described here, and Public Transport system of connectors, see chapter 4.2.32 for more details.

4.1.45 The Private Transport system of connectors consists of 4 different connector types with different coded access speeds, times and vehicle classes, in an attempt to better capture average costs of accessing the network, see Table 4 and Figure 14, Figure 15 and Figure 16.

Type	Mode	Description
1	Car, LGV, HGV and Cycling	Connectors for external model area. Time or speed constant flat value for all the transport systems: Cyclists: 15 mins Cars and GVs: 80 km/h Connectors load directly into main links.
3	Car, LGV, HGV and Cycling	Connectors for intermediate model area. Time or speed constant flat value for all the transport systems: Cyclists: 15 km/h Cars and GVs: 30 km/h
5	Car, LGV and HGV	Connectors for detailed model area. Time or speed constant flat value for all the transport systems: Cyclists: 4 km/h Cars and GVs: 15 km/h Connectors loaded to approximated origins of trips. (Residential or Service Roads)
6	HGV	Due to characteristics of some links within Urban Area, HGV connectors were created to allow accurate representation of their access/egress points

Table 4 Private Transport system of connectors

4.1.46 For modelling connectors Visum offers two different alternatives, Proportional Distribution, used for the detailed model area, and Free Distribution, chosen as the main approach for the rest of the model.

4.1.47 Free Distribution implies that connectors are not limited by capacity and impedance for assignment regards only the travel costs disregarding any type of capacity limitations. This type was selected for intermediate and external model areas where the network will never experience capacity issues.

4.1.48 Proportional Distribution was the option selected within the detailed model area. This option makes use of user defined weights or shares to distribute the demand of a zone. Within this option, the OD pair sub-option was selected to avoid users from choosing their connector depending on their routing.

4.1.49 Weights or shares where separately calculated for each connector by making used of code point detailed Address Base Premium Data, provided by ECC, and GIS special tools such as the Voronoi or Thiessen polygons. This method allowed us to automatically generate subzones within each zone and adequately identify connecting points and weights.

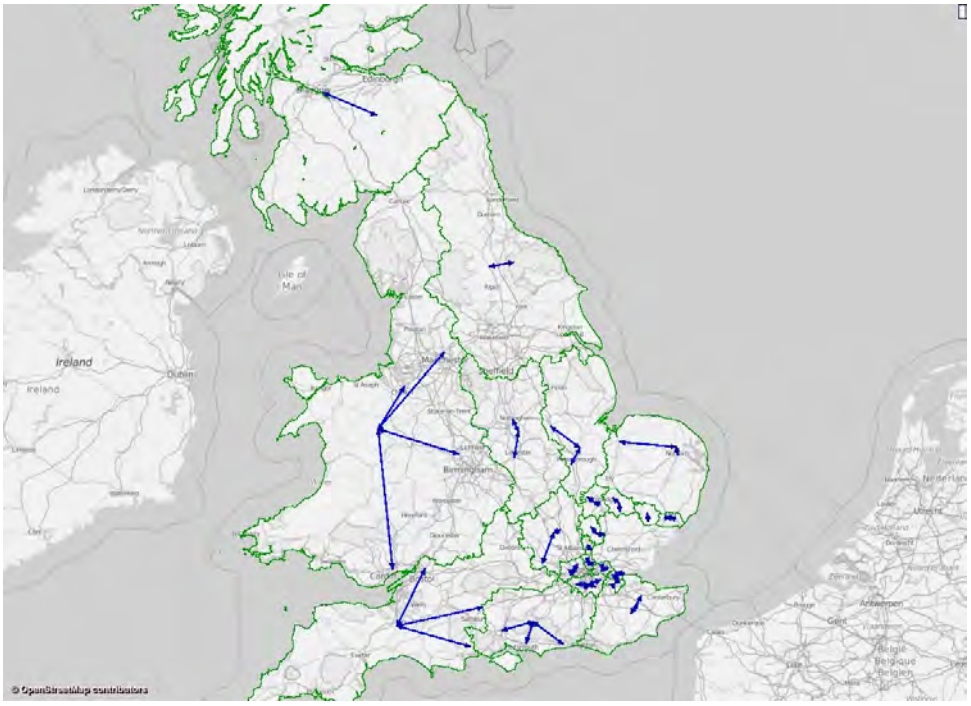


Figure 14 External model area connectors, Type 1.

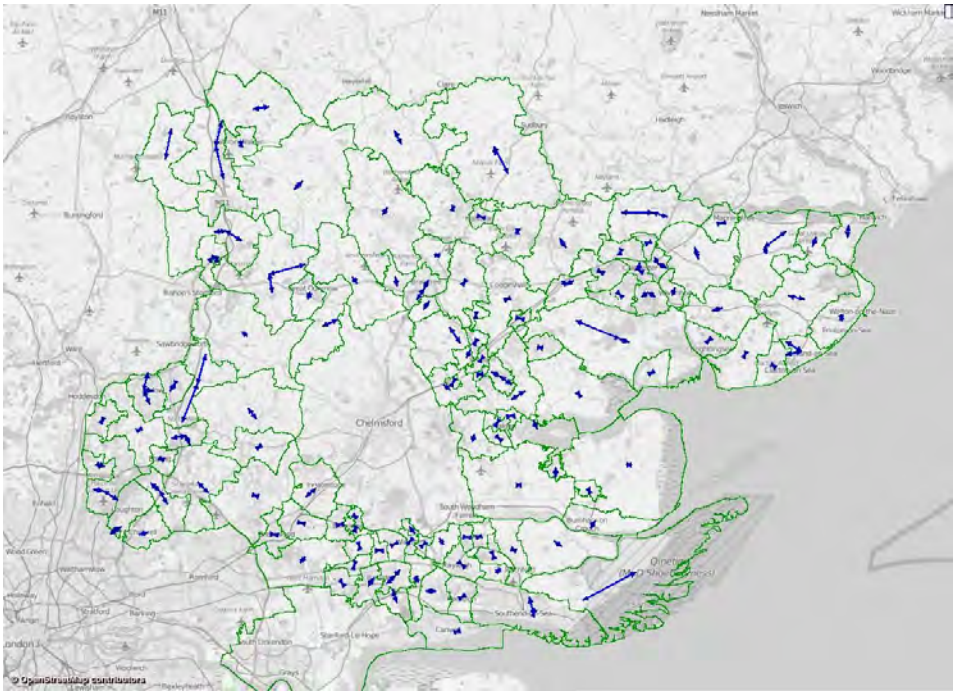


Figure 15 Intermediate model area connectors, Type 3.

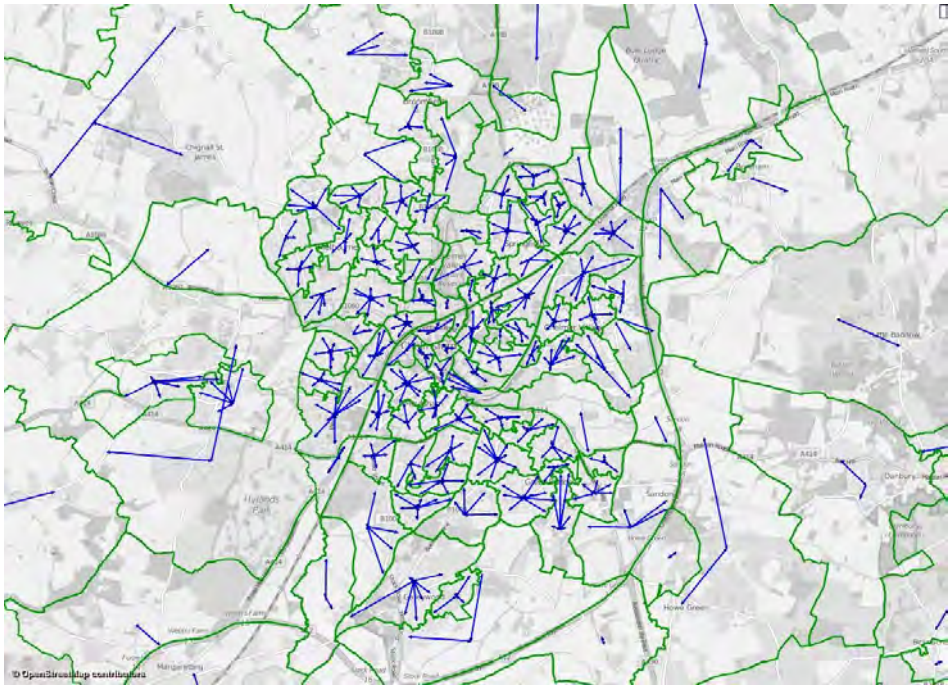


Figure 16 Detailed model area connectors, Type 5 and 6.

Network Checking and Calibration

4.1.50 The highway network was checked according to a systematic checklist informed by the WebTAG Unit M3-1. The checks were separated into those which could be done without an assigned trip matrix, and those which required an assignment. At this stage, the raw trip matrix was assigned for this purpose, as it was understood the matrix was sufficient for these relatively high level network checks.

4.1.51 Following completion of the checks identified above, and the subsequent corrections, an initial highway trip matrix was assigned. The assignment itself served as a check on zone to zone connectivity (any unconnected zones would abort the assignment). Following the assignment, the following network checks were made.

4.1.52 In addition to the checks stated in Table 5, further checks were carried out by inspecting routing and travel times taken by selected traffic movements for a series of randomly selected Origin and Destinations pairs within Chelmsford Administrative Area. For this purpose the “Shortest Path” graphic tool within VISUM was used, before and after assigning the matrices, and outputs verified against Google travelling recommendations. This exercise was executed for each time period and user class independently.

Check	Outcome
VISUM network check (performed by the modelling software)	Some dead-end roads and links with no succeeding link were found. These links were originally intended for a centroid connector but not used in the end. Leaving them in did not affect the assignment. Succeeding link errors referred to HGVs where some links were banned to HGVs, but the upstream link was not. Again this did not affect the assignment and these were left in.
Checking that modelled link lengths were correct	All modelled link lengths were calculated automatically on importing from a shape file, based on the length of the link's polyline. Some network adjustments resulting in changes to the link lengths, so all lengths were recalculated again, based on the polyline length.
Banned turns – VISUM prevents banned turns from being used in the assignment. This check focused on ensuring that these high delays only occurred on turns that were banned, and vice versa.	Some turns that were banned did not have unrealistic turn delays, and some that were not, did. Reasons for this were not clear at the time; however these were corrected by re-setting and re-coding the junction, which re-set the calculated delays appropriately.
Links with different link types in opposite directions	Some connected links were found to have different link type by direction. In some cases these errors and were corrected, the rest were links where there were different numbers of lanes in each direction, and therefore correctly had different link types.
Free flow link speeds – checked by plotting a thematic map of the link speeds in GIS	A number of rural links were found to have a link speed that was too low. Correct re-coding of link type was introduced for those cases. (See Figure 17)
Number of lanes on a link – checked by plotting a thematic map	A very small number of links within the county had two lanes when they should have had one. These were corrected by changing to an appropriate link type. Outside the county, a number of motorway links had an incorrect number of lanes. This was corrected by changing the link type to an appropriate value. (See Figure 18)
Link capacities – checked by plotting a thematic map showing link capacity in bands of 500 pcus.	The thematic map showed most urban areas with link capacities adequately coded, in those cases were they were too high, these were therefore corrected by changing to an appropriate link type.
Centroid connector lengths	Link lengths in urban areas were found to be relatively short, increasing in length in rural areas, and increasing outside of the county. All as expected, and no changes required.
Signalised junction cycle times	Using the timings given by ECC, some junctions had cycle times greater than two minutes. Noted that these were quite high but no changes made as lack of evidence that these are incorrect.
Link capacity greater than observed flow	On modelled links for which observed traffic count data was available, a comparison of the average observed flow against the modelled link capacity was made. For a small number of links, the capacity was found to be lower than the observed flow. The link capacity was therefore increased by changing to a different link type. This was done for the link in question and nearby links of a similar standard.

Table 5 Network checks made without an assignment

Figure 17 Free flow speeds map Chelmsford Administrative area

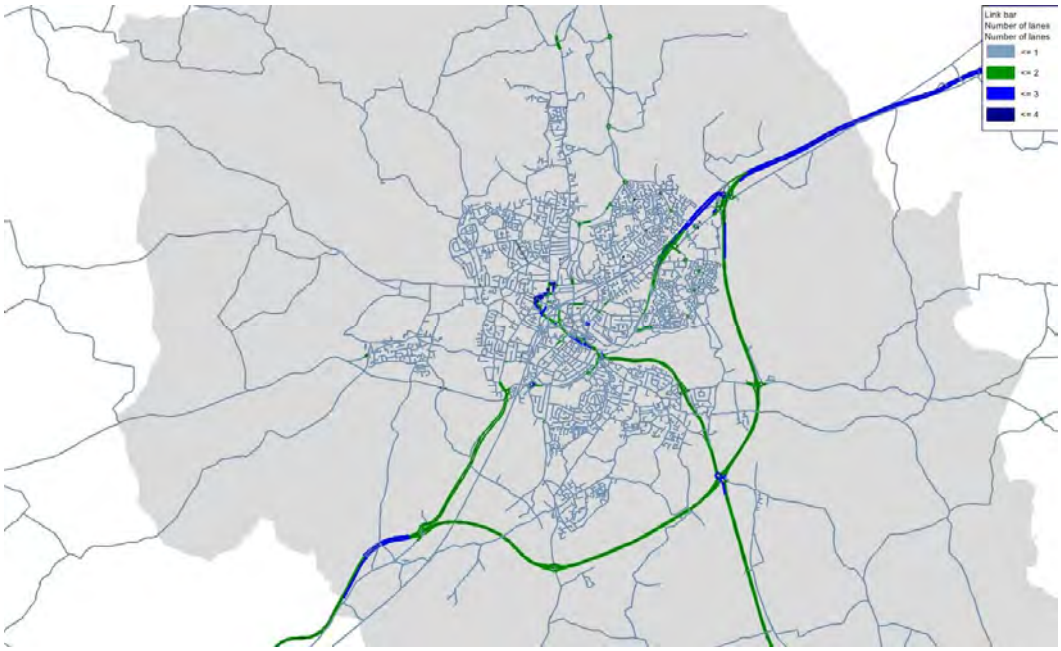


Figure 18 Number of lanes per link map Chelmsford Administrative area

4.2 Public Transport Network

4.2.1 The model includes every PuT service, rail, coach and local buses, which serve the modelled area (Chelmsford Administrative Area). Individual lines and timetables were coded in the model guaranteeing that, for the modelled area, each line route, under its different variations, does, in fact, run along the real route and stops at every stop at the expected time.

4.2.2 Services that are either partially inside the Chelmsford Administrative Area or within the Essex County boundaries are also fully represented in order to ensure adequate accessibility was provided. PuT services were coded using real 2014 timetables with a detailed layout of the links and stops used by the route.

4.2.3 Services that are partially inside the county or in the external model (the rest of mainland United Kingdom), were coded by using headway based timetables, including National Rail, London Underground services or key long distance buses. The selection of which services to code was based on accessibility criteria, and depending on the detail of the zonal system.

Bus Network

4.2.4 Bus stops, service routes and timetable information were sourced from ATCO Cif files from Essex County Council. The ATCO Cif data represented the bus network for 2014 and contains detailed service data. Jacobs ATCO Cif file transfer programme enabled all the line routes and their individual timetables to be imported into VISUM. The advantage of this process relates to the complete time-profile information within the resultant model which enables detailed modelling of time segments throughout the day.

4.2.5 The highway network was used as the basis for the bus network. An analysis of the bus service maps identified extra coding (links and nodes) to be added to the highway network to accommodate bus services. New links and nodes were coded into the highway network together with the bus stops.

Bus Services and Timetables

4.2.6 ATCO-CIF data was made available for each of the following operators:

- First
- Fords Coaches
- Panther Travel
- NIBS
- Network Colchester
- Network Harlow
- Stephensons of Essex
- H.C. Chambers & Son
- Hedingham Omnibuses
- New Horizon Travel Ltd
- Acme Transport Services
- Amber Coaches Limited
- Regal Bus Ways
- SX Connect
- Arrival London
- Blue Triangle
- EOS
- Townlink Buses
- Freedom Travel Coaches
- J.W. Lodge & Sons
- Carters Coach Services
- Arriva Southend
- Go Ahead
- East London
- TGM Stansted Ltd
- Meridian Line Travel
- De Vere Travel
- Centre Bus
- Epping Forest Community
- Viceroy of Essex
- The London Bus Company
- Galleon Travel
- Four Ways Coaches
- Richmonds Coaches
- Turners of Essex
- Docklands Buses
- Arrow Taxis
- University Bus Ltd
- Green Line
- Olympian Coaches
- Go Ride Community Interest
- Stage Coachin Cambridge
- London General Transport
- Brentwood Community Transport
- Ensign Bus Company
- CC Cars
- Chelmsford Community Transport
- Coggeshall Community Bus

- Flag Finders
- Constable Coaches
- National Express
- Arriva the Shires & Essex
- Roadrunner Coaches
- Go Whippet
- Harwich Connexions Transport
- British Airports Authority
- LCB Travel
- Basildon District Volunteer Services

4.2.7 The first stage was to convert the ATCO-Cif data into VISUM Network format. Each operator's data was converted using the Jacobs conversion tool. The conversion tool creates "dummy" nodes and stop data for each route. These dummy nodes are converted to nodes in the highway model using the same correspondence file used for clustering bus stops.

4.2.8 The network that is generated by the Cif converter creates links between nodes based on the route information in the timetables, i.e. direct links between nodes. As the Chelmsford model is based on a link and node highway model (with the lines running on top of these) the link information in the Cif model is not used. The data which is transferred into the model is therefore just the bus route and timetable information.

4.2.9 The route information was imported into the base highway network by operator. In VISUM each service is made up of line routes, time profiles and vehicle journeys. Line routes define the stopping patterns of each service. Each service (or Line in VISUM) has at least one line route (for a loop service) or two line routes (inbound and outbound). Any variants have a separate line route.

4.2.10 Time profiles contain the timing between stops (varying by time of day) and vehicle journeys contain departure times and stop served by each departure. In the ATCO-Cif data each vehicle journey had a line route and a time profile.

4.2.11 To simply the checking of the services the line routes and time profiles were aggregated, so that all departures with a common stopping pattern and timings shared the same line route and time profile. The settings for the aggregation were as shown in Figure 19 below, ensuring only matching line routes and/or time profiles are aggregated.

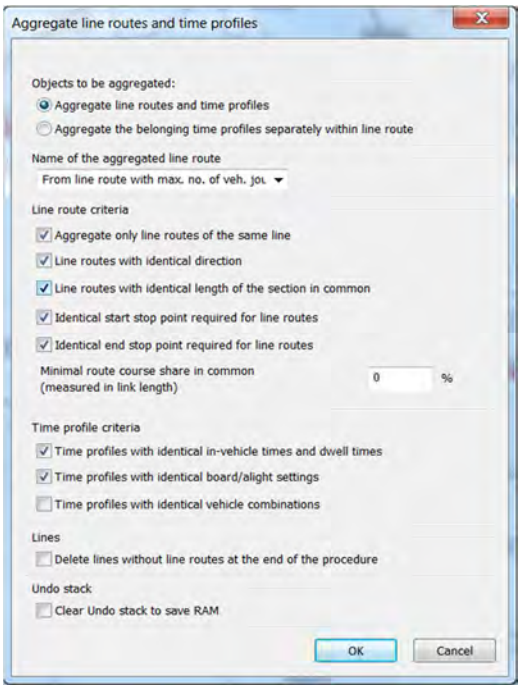


Figure 19 Line routes and time profile aggregation settings.

4.2.12 Following the import, the routes for each service were checked against the published bus maps and amended where necessary, including additional bus stop coding.

4.2.13 ATCO-CIF data included weekend and bank holiday service departures. These were filtered and removed from the timetables, leaving the Monday to Saturday services.

4.2.14 A comparison was made between the coded bus network and the school bus services and any additional services coded. Any services not operating Monday to Friday (for example, any Tuesday only services, etc.) were ignored Figure 20 and Figure 21 below show the bus services coded.

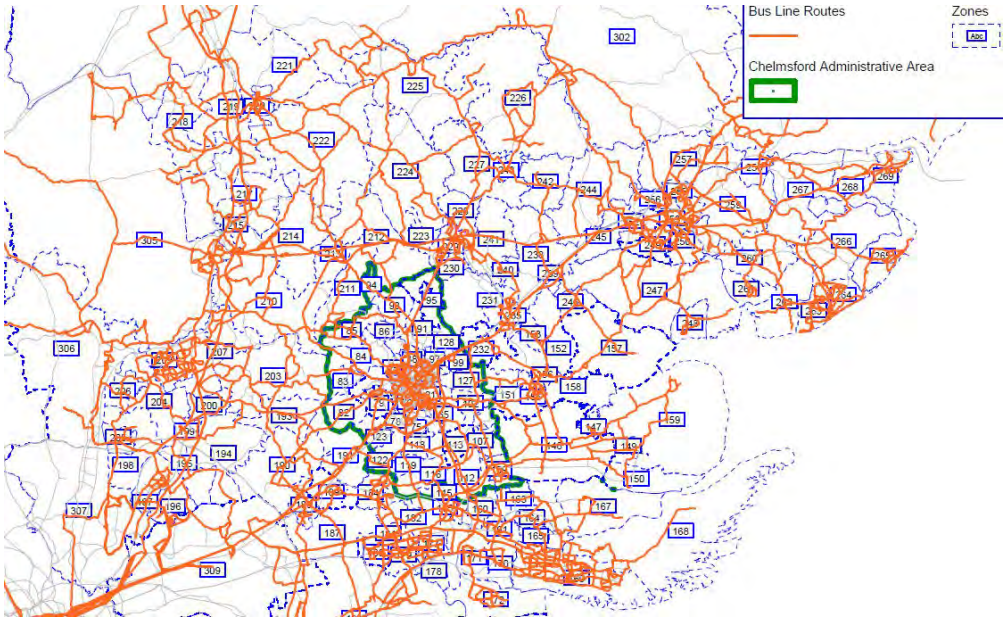


Figure 20 Coded bus services in Essex

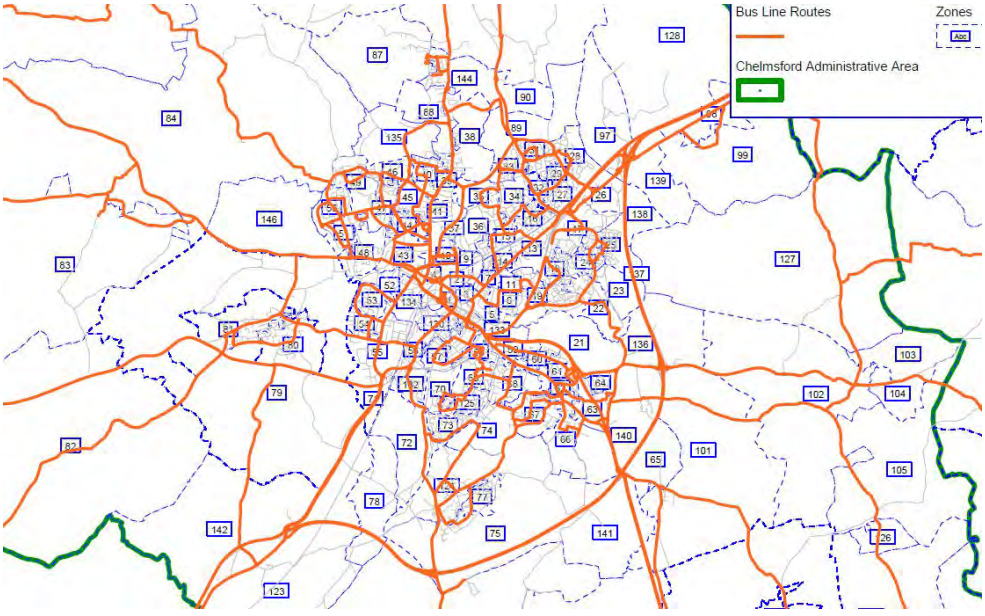


Figure 21 Coded bus services in Chelmsford Administrative area

Rail Network

4.2.15 Railway station details were sourced from NaPTAN data. For stations within Essex, all stations were coded. For external areas, only stations connected to zones were coded.

4.2.16 Shape files of the National Rail network were used to define services while the network was simplified for external model areas.

4.2.17 Train operators which operate within Essex and the Halo area have been coded in detail, including detailed timetable information. As the level of detail decreases, rail services generally provide longer distance inter-city connections and interchange opportunities across the network. These operating companies were coded nominally, with only key stations and services. The full list of coded train operators is as follows:

- C2C
- Chiltern
- Cov-Leam
- Cross Country
- East Coast Mainline
- East Midland Trains
- First Capital Connect
- First Great Western
- Virgin Trains
- First Trans Pennine Express
- Gatwick Express
- Greater Anglia
- Heathrow Connect
- London Midland
- South West Trains
- South Eastern
- Southern

4.2.18 As the rail services were to be incorporated into the bus and highway mode, the network already included a high number of links and nodes. In order to reduce the number of additional links in the network, nodes between stations were removed and their associated links merged. In addition, stations (and associated links) in North Scotland or South East England were removed after the last station connected to a zone.

4.2.19 The timetables used for the rail services were the 2014 timetables for all the relevant rail operating companies. These were downloaded from the Network Rail and Operator Websites and manually coded into the model. For some services that had been coded nominally, timetables were simplified, including merging of time profiles for external areas (where not all stations are coded). To improve connectivity some long distance services journeys were coded from the first station in the service after 6am, this enabled the services to be used within the assignments.

4.2.20 Figure 22 and Figure 23 below show the extent of the rail network included within the model. As shown, the rail network covers as far as Glasgow to the north, to Holyhead and Cardiff in Wales, to Exeter in the south west, to the south to Southampton and Brighton/Hove, south east to Ashford (Kent) and north east to Norwich.

4.2.21 Appendix C has a summary of the rail routes which have been coded into the model and the number of departures for each of the assignment time periods by operator.

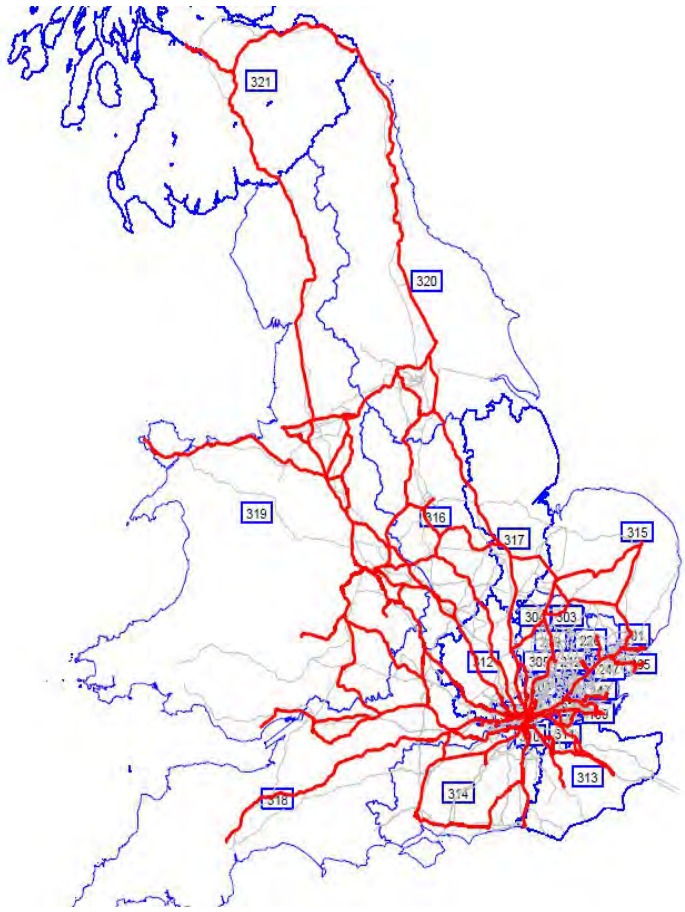


Figure 22 Rail network

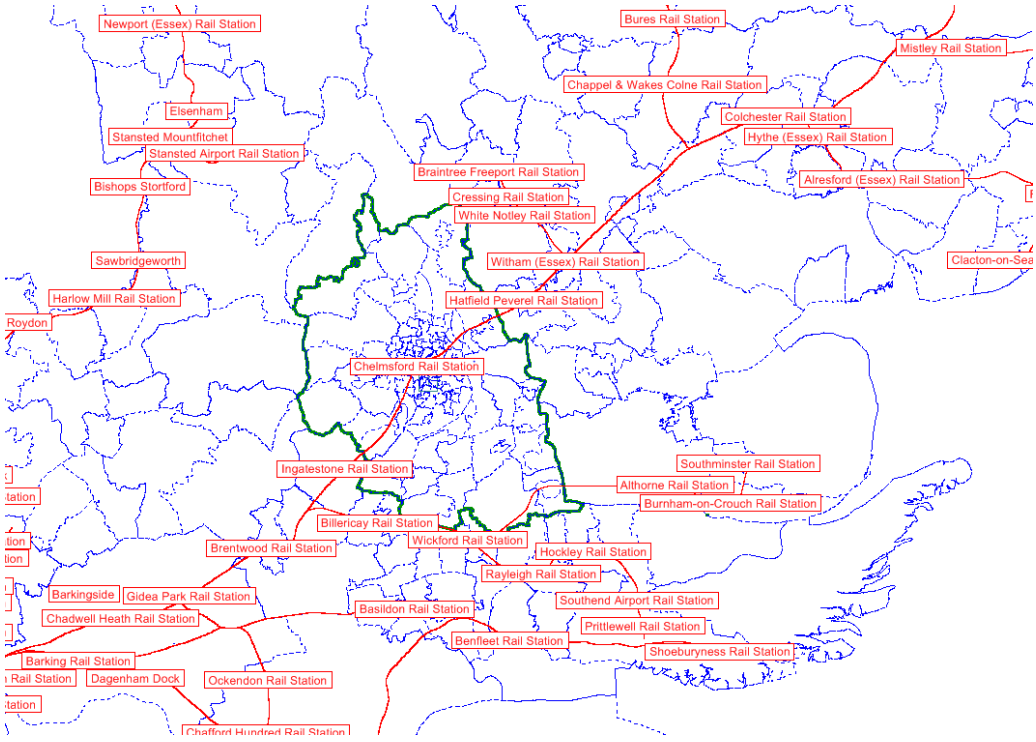


Figure 23 Essex railway stations and lines

London Underground

4.2.22 The London Underground network was simplified within the Chelmsford model, not all stations were coded and services were simplified, as discussed below.

4.2.23 Strategic interchange stations for London Underground were included within the model, as well as all stations which were connected to a zone. For the District and Central lines, which operate into Essex, all stations were coded.

4.2.24 London DLR services were also included as part of the Underground Network as they provide critical connectivity into Stratford Station which represents a commuting hub for Chelmsford and Essex.

4.2.25 GIS shape files of the London Underground network were used to define services. Underground lines are not coded in full detail with services operating from/to key stations where other underground and/or rail services takes place and also stations that are connected to zones.

4.2.26 The district and central lines, due to their proximity to Essex County, where coded in detail with accurate timetables that replicate the situation in June 2014.

Figure 24 London underground services

4.2.27 Figure 24 London underground services has a summary of the Underground services which have been coded and the number of departures for each of the assignment time periods.

Walking and Cycling Network

4.2.28 The already mentioned highway links and connectors were be coded for the different transport systems allowing for cycles and pedestrians to access the road where appropriate making sure no redundancy and duplication of objects occurs.

4.2.29 In addition, the walking and cycling network were carefully coded and reviewed to guarantee that all cycling paths and most of the walking links, enough to provide a real representation of interzonal walking trips, are included for the Administrative Area, Figure 25 contains a map of the multi-modal network on the Chelmsford city centre as an example.

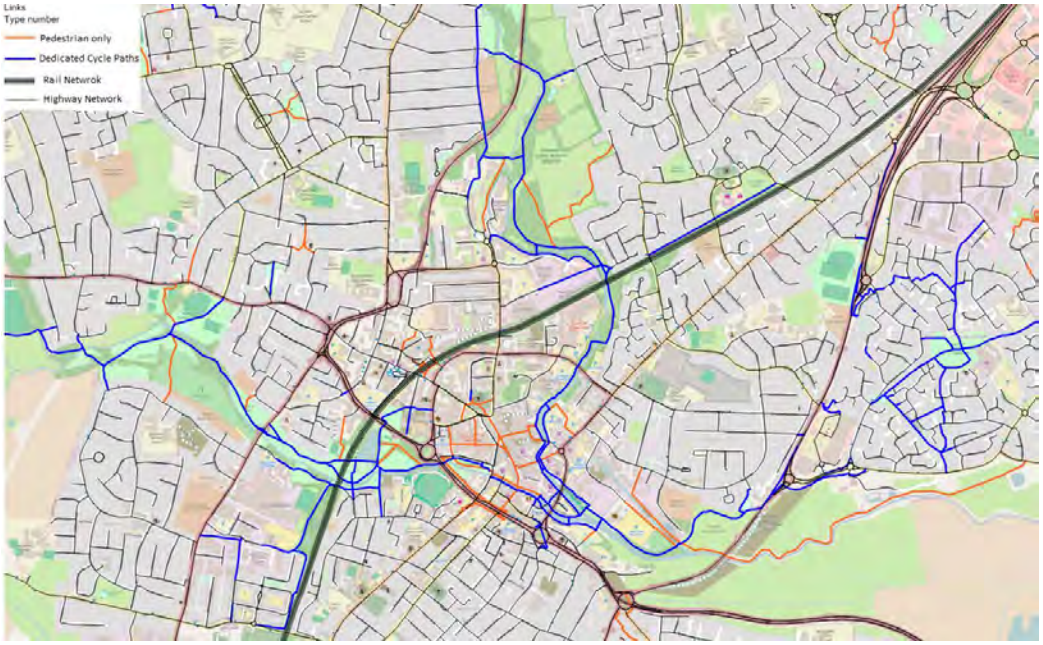


Figure 25 Multi-modal network - Chelmsford city centre

4.2.30 The bases of the model walk/cycle network were digital mapping databases and field observation, which were converted into model network by using ArcGIS software.

4.2.31 Outside of Chelmsford Administrative Area the model provides enough walk/cycling connectivity to access main highway/PuT network supply.

Public Transport Connectivity

4.2.32 In the public transport network, zone connectors represent walk access to/from public transport services. It is important that these reflect a realistic distance and time to a node, bus stop, railway station or underground station (LU).

4.2.33 Walk access/egress connectors and links were carefully coded between zones and railway stations or bus stops within urban areas inside of the Essex County boundaries. They provide access for zones such that the walking/cycling time is as close as possible to reality. Drive access/egress connectors were coded to provide connectivity between rural zones and railway stations.

4.2.34 Walk links were coded into the model between public transport nodes to allow interchange between public transport services. Walk links enable interchange at locations where the buses do not serve the same stops (e.g. at highway junctions) and between the bus and rail services at railway stations. Whilst VISUM can allow passengers to walk on the highway network it is impractical to allow this throughout the whole network due to model run time implications.

4.2.35 As many of the London Underground stations are close together, especially within Central London, walk links were coded in order to replicate interchanges which could be made by walking.

4.2.36 Walk links were also used to allow internal interchanges between London Underground lines at large stations such as Waterloo, Euston, Kings Cross and Paddington. Walk links were used to replicate the interchange times between platforms.

Type	Mode	Description
1	Walking and Cycling	Connectors for external model area. Time or speed constant flat value for all the transport systems to access PuT: Cyclists: 15 mins Walking: 25 mins Connectors load directly into main Train or Underground Stations.
3	Walking and Cycling	Connectors for intermediate model area. Time or speed constant flat value for all the transport systems to access PuT: Cyclists: 15 km/h Walking: 10 km/h
5	Walking and Cycling	Connectors for detailed model area. Time or speed constant flat value for all the transport systems: Cyclists: 4 km/h Walking: 4 km/h Connectors loaded to approximated origins of trips. (Residential or Service Roads)

Table 6 PuT system of connectors

Public Transport Fares

4.2.38 For the Public Transport Assignment, and following guidance from WebTAG Unit M3.2, see below, Public Transport fares were not included as part of the assignment provided that they are not thought as to affect route choice.

"Where fares can influence route choice then it is essential to include them in the assignment. It is accepted that the complexity of some fare systems may prevent them from being represented exactly in the assignment model, but the model representation needs to be 'acceptable'. Acceptability can be gauged from whether the assignment model validates or not ".

4.2.39 However, matrices of fares will be added to the later Variable Demand Model and added to the generalised cost as they will be an important influence on mode choice for some trips.

4.2.40 For this purpose four different fare systems have been coded into the model:

- Rail
- London Underground
- Local Bus, within Chelmsford Administrative area
- Longer Distance Bus

4.2.41 More detail will be given once the Variable Demand Model is developed.

Network and Service Checking

4.2.42 The full public transport network was checked with reference to WebTAG guidance by performing the following verifications:

- Comparing the routing for each service in the model against routing on the Chelmsford and Essex County Council public transport map and/or local area maps. Where necessary the

routes were amended to represent the reality. In general, these changes related to new links and/or nodes that needed to be added to the highway network typology.

- Comparison of bus stop locations by route in the model against information held on the Google mapping and local sources of information. Any missing stops were added to the network.

4.2.43 In addition, VISUM includes some useful network check parameters for public transport networks. The key checks used for the Chelmsford model are shown below:

Check	Outcome
Zones not connected for PuT	This check identifies any zones that are not connected to a public transport node that is used by a service. Relevant zones were identified and amended
Links traverser multiple times by a line route	Identification of links which a link route traverses more than once. In some cases this can be loop services or others services that pass through the same stop twice. Other instances arise from errors with the ATCO-Cif import of the bus services onto the highway network and these are checked and amended.
PuT connector nodes without stop area	In the public transport assignment zones must be connected to nodes with a stop area, if not the trips will not assign. Any identified connector nodes without stops areas were amended.

Table 7 Pre-assignment network checks PuT.

5. Demand Matrix Development

5.1 Introduction

5.1.1 Anonymised phone data was collected for any trip that reported to enter or stay within the limits of Chelmsford Administrative area for the whole month of June 2014 was collected and used to develop observed origin-destination trip matrices.

5.1.2 Each movement is defined by a single matrix entry that identifies movement between zone A and zone B. Zone B was identified as trip end only if the stopping time was longer than 30 minutes, for shorter dwelling periods B only represented an intermediate stop of a longer trip and was not collected.

5.1.3 Thus, to construct a highway traffic matrix, all captured mobile phone data was processed and converted into equivalent vehicular movements. This was then expanded based on the expansion factors derived from a data fusion process to estimate all of the traffic within the modelled area, how it traverses the zones and then converts it into traffic matrices.

5.1.4 The selection of the mobile signal was based on data from Monday to Friday. Hourly and daily comparisons were also performed to ensure no unusual fluctuations of mobile signal data were included.

5.1.5 The mobile phone signal data for the development of OD trip matrices for this study was provided by INRIX for June 2014 who distributed the initial mobile phone raw data into different origins, destinations and times of the day.

5.1.6 In addition Jacobs post-processed this data to distribute trips across different modes and purposes based movement analytics, duration of stay and land use data.

5.1.7 The methodology employed in creating the mobile phone based demand matrices for both the highway and Public Transport Trips is detailed below.

5.2 Demand Segmentation

5.2.1 Journeys are undertaken for a variety of purposes and different journey purposes are associated with different rates of trip making and patterns of travel. It is anticipated that trips made by different purpose may respond differently to specific interventions. It was therefore necessary to ensure the modelled demand reflected the different segmentation s of trip purpose.

5.2.2 For similar reasons, it was necessary to ensure that the highway model further distinguished between cars, light goods vehicles (LGVs) and heavy goods vehicles (HGVs).

5.2.3 As certain trip purposes have similar characteristics (value of time and other parameters), it is appropriate to group these together for purposes of assignment. These groupings are known as “User Classes”.

5.2.4 The relationships between purpose, vehicle class and user class are given in Table 2 Purpose, user class and vehicle class relationships, and are expanded below:

- **Vehicle Class definitions:**
  - Vehicle Class 1 (VC1): Cars
  - Vehicle Class 2 (VC2): Light Goods Vehicles (LGVs)
  - Vehicle Class 3 (VC3): Heavy Goods Vehicles (HGVs)
- **User Class definitions**:
  - User Class 1 (UC1): Cars used for Commuting
  - User Class 2 (UC2): Cars used for Business purposes

- User Class 3 (UC3): Cars used for Other purposes
- User Class 4 (UC4): Light Goods Vehicles (LGVs) for Employer's Business
- User Class 5 (UC5): Heavy Goods Vehicles (HGVs) for Employer's Business

5.2.5 In the assignment, trips were assigned as "Passenger Car Units" (PCUs) which ensures that the impact a particular vehicle type has on the highway is well reflected in the model. All user classes have a PCU factor of 1 with the exception of User Class 5 (HGV), for which an average PCU factor of 2.3 was applied. This is reflects the greater size of HGVs in comparison with cars; the assumption being that a single HGV has 2.3 times the impact of a car, in terms of road space and capacity.

5.3 Mobile Phone Data Collection

5.3.1 The area of mobile phone data collection was equivalent to the detailed modelled area, therefore recording every trip starting, leaving or passing through this one. The extent of the detailed modelled area and fully modelled area are shown in Figure 2.

5.3.2 The methodology applied was based on tracking phone movement data in and across the mobile network cells and then matching these to the road or public transport network using strategic model network data.

5.3.3 A snapping process of the recorded trips to the road or public transport network was executed to improve the traceability of trips through the cell network and provide additional geolocation accuracy than from mobile data alone. See figure below where "wrong" locations are corrected as part of the snapping process.

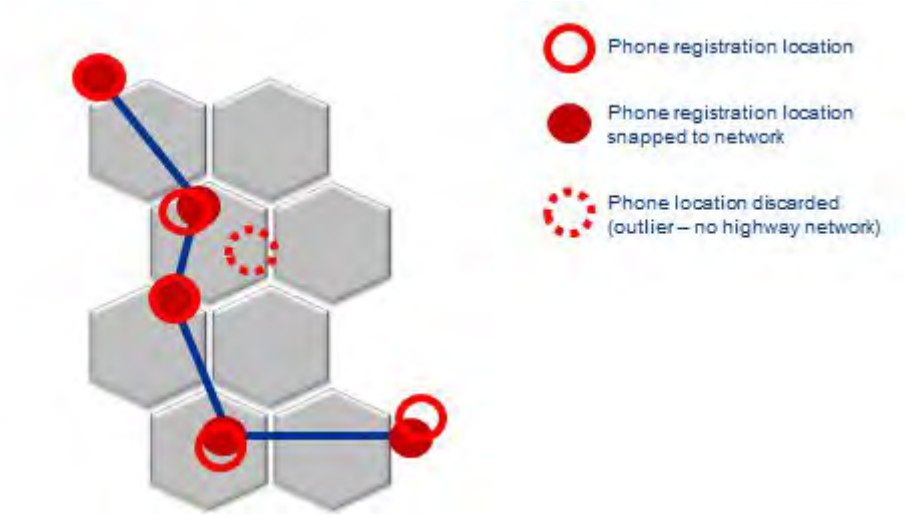


Figure 26 Snapping process

5.3.4 Snapping' to the network helped validate the mobile phone signal data and provided additional geolocation accuracy, particularly in rural areas where cell spacing is large. Each mobile phone was given an anonymous identifier by the phone operator (for a 24hr period from midnight) and its movement monitored spatially through each day.

5.3.5 By tracking distance over time, the speed profile for each phone was derived. A change in phone ID location with an estimated speed of above 4kph between recorded locations triggered that an actual trip was being made and the above data then allows individual trip movements to be tracked across the cell network. It safe to assume that anything discarded through this process was either a walking trip or an anomaly of the cell system, which did not represent an actual trip.

5.4 Mode and Vehicle Type Identification

5.4.1 The second stage in the process was to identify the mode of travel of each trip throughout the day. Trips were separated into car trips, rail trips, bus trips, LGV trips and HGV trips. In case of combined trips, the mode of travel was defined according to the main mode.

5.4.2 Rail trips through the study area were identified by snapping the mobile phone data movements to a rail network GIS file. Where a straight line movement matched a rail line, this part of the trip chain was allocated as a rail journey.

5.4.3 Bus trips identification was based on route information, movement analysis, phone signal grouping and speed profiles. See Figure 27 for an example of signal clustering.

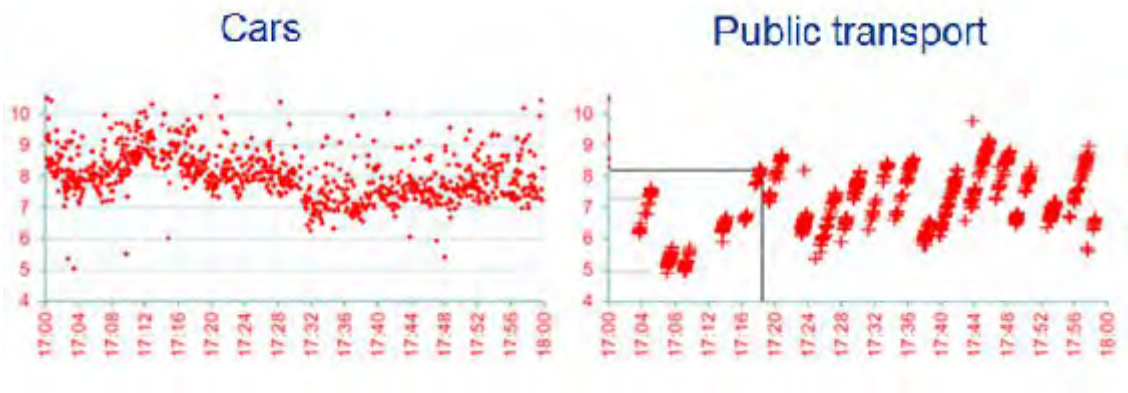


Figure 27 Trip clustering examples by mode.

5.4.4 In a separate process, vehicle identification was undertaken. Speed and trajectories were analysed by 15 minute period. Two filters helped classify the data based on speed trajectory. A speed above 4kph triggered that an actual trip was being made while a speed in excess of 15kph qualified the data as a motorised highway movement. If the speed in the first 15 minute period remained between 4kph and 15kph but the trip continued into a second or third time period, the trip was re-examined in the following two periods. A speed in excess of 15kph in any interval indicated a motorised trip. Where the speed remained below 15kph throughout the 45 minute analysis period then the trip was considered to be non-motorised.

5.4.5 Once a trip was identified as a motorised movement, it was then reviewed over its entire journey to verify this mode. For example, a car can be slowed down to the speed of a pedestrian / cyclist in a congested network but will have a higher speed where congestion is relieved. Conversely a cyclist may exceed speeds of 15kph downhill sections of their journey but will be slower throughout most of the trip. Overall end to end speed profiles were therefore used to verify that speeds (maximum, minimum and median speed) were appropriate for the motorised trip.

5.4.6 A filter was applied to each identified motorised movement in order to distinguish between cars and HGVs. A speed-space cluster analysis was undertaken, using known vehicle speed-space profiles, to distinguish between cars and LGVs.

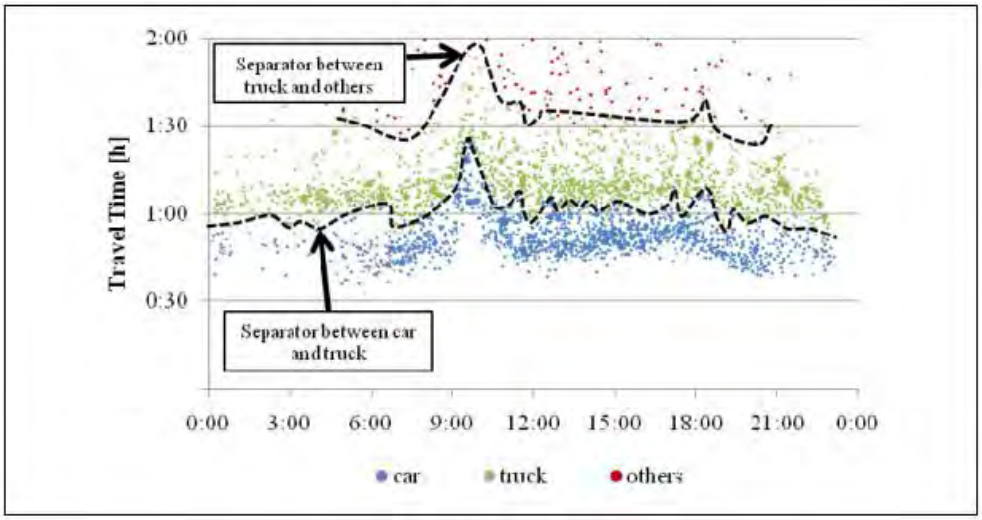


Figure 28 Example of speed profiles for mode identification

5.5 Identification of Final Destinations and Trip Chains

5.5.1 Each vehicle journey was tracked over its entire journey to validate the trip routing against the roadway network and to assign origin and destination zones.

5.5.2 Observed trips' IDs were already assigned to a 24 hour period. Each vehicle journey was tracked through the mobile cell system. A journey was assigned an origin location when it was confirmed as a valid movement with a speed exceeding 4kph.

5.5.3 The movements were followed from one cell to the next. The trip was checked to ensure that it was a valid registration event (and not noise as phones may switch intermittently between mobile cells) and its status updated. Once confirmed as being a valid trip, all information was updated including the new cell reference, location and time of the registration event and the process repeated. All registration events were then 'snapped' to the network, as explained before.

5.5.4 Registration events were tracked throughout each journey, often across a whole day period. Figure 29 demonstrates the profile of registration events (represented by a blue dot) for an example device. Events circled in red make up stationary periods, whereas events circled in yellow form trips.

5.5.5 Tracking each device enabled break points to be identified based on the duration of the stationary position. If the stationary duration was less than or equal to 15 minutes then the following stage of the trip was assumed to be part of a trip chain. If the stationary duration was more than 15 minutes, then the stationary location was allocated as its final destination. Stages of trip chains were collated to form one trip, starting at the origin of the first stage and ending at the destination of the final stage.

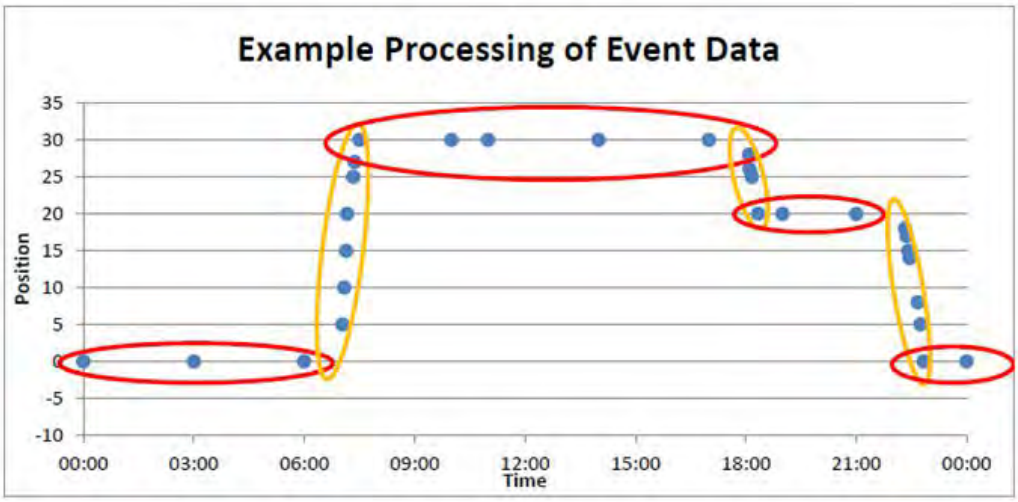


Figure 29 Processing of event data

5.6 Trip Matrices Post-Processing

Mobile Phone Data Considerations and Verification Approach

5.6.1 This study uses mobile phone data as its primary data source for building travel demand matrices. The methods used in the development of travel matrices for this study did not follow conventional approaches described in DMRB where synthesised demand matrices and road side interview data are merged to create demand matrices.

5.6.2 The approaches to using such datasets are innovative, with exploration of the dataset's qualities and use of third party data to overcome limitations all playing key roles.

5.6.3 It is recognised that tracing of more recent mobile phones is spatially more accurate. Third generation (3G) handsets in passive mode are detected when they move between the cells covered by different mobile phone transmitter masts, affording a good level of locational accuracy. Second generation is, however, less accurate with events recorded when a phone moves from one group of masts to another adjacent group.

5.6.4 In addition the range covered by each mobile phone transmitter can also contribute to the trip "misplacement". As the terrain in Chelmsford Administrative Area is generally flat, telecommunication masts tend to operate over long distances. As cell boundaries are not rigidly defined those masts with longer range would record more movement ends at the expense of those adjacent masts in less prominent locations. This can cluster third generation phone traces and accentuate the trip "misplacement" into the bigger masts.

5.6.5 A number of zones were identified in the Model which had inappropriate numbers of origins or destinations but did not have the population or employment to support this level of travel activity. For residential zones, observed movements per household were used to guide this identification work, while for Commercial or Industrial zones workplace population was the index introduced.

5.6.6 In addition, and although most zones in the study area had some originating and terminating trips, a few zones had no trip ends in one or more of the modelled periods. As these zones typically had significant populations and/or employment corrective action was considered appropriate.

5.6.7 It is also important to understand that, due to the characteristics of the data, short distance trips may go unrecorded (when there is no event changing location areas during the journey); the same may apply to very local return trips with short stop-overs (e.g. home to drop children at school and return). Such under recording will result in shortages of such trips in demand matrices.

5.6.8 In order to guarantee that the base year model realistically represented the current conditions, the mobile phone dataset was reviewed, and corrected where appropriate, to identify potential problems on its use. For this purpose the following data sources were used:

- 2011 Census Population and Journey to work data
- TEMPRO trip ends data by time period and trip purpose
- Local surveys and historic counts
- Other third party data sources, such as business location, size, no of employees and type of employment (OS Address Base Premium Data)

5.6.9 As mentioned a series of verification comparisons against different data sources were executed and amendments introduced to overcome the limitations on the data when required. The following series of steps were followed:

- Verification and adjustments using TEMPRO data at sector level
- Verification and adjustments using Census data at zone level
- External model zones' trips spreading based in OS Address Based Premium Data
- User class splitting
- Goods Vehicles demand splitting

Verification and Adjustments Using TEMPRO Data at Sector Level

5.6.10 A series of spatial analysis steps were carried out in order to accommodate the NTEM Tempro zone-related trips into the Model Zone system, please read the Demand Data Verification Report, DDVR, for further details on this.

5.6.11 Due to the characteristics of the NTEM zone system, among other reasons[2], a redesign of the zone system was required in order to adequately represent the needs of the Model, see picture and table below

Geographic Area	Zone ID	Number of zones before re-zoning	Number of zones after re-zoning
Chelmsford Administrative area	1-146	128	143
Essex Area (excluding Administrative area)	147-269	121	122
Rest of mainland UK	301-321	21	21
Total		270	286

Table 8 Zone structure summary table before and after re-zoning

[2] Planning data received from ECC and CCC in January 2014.

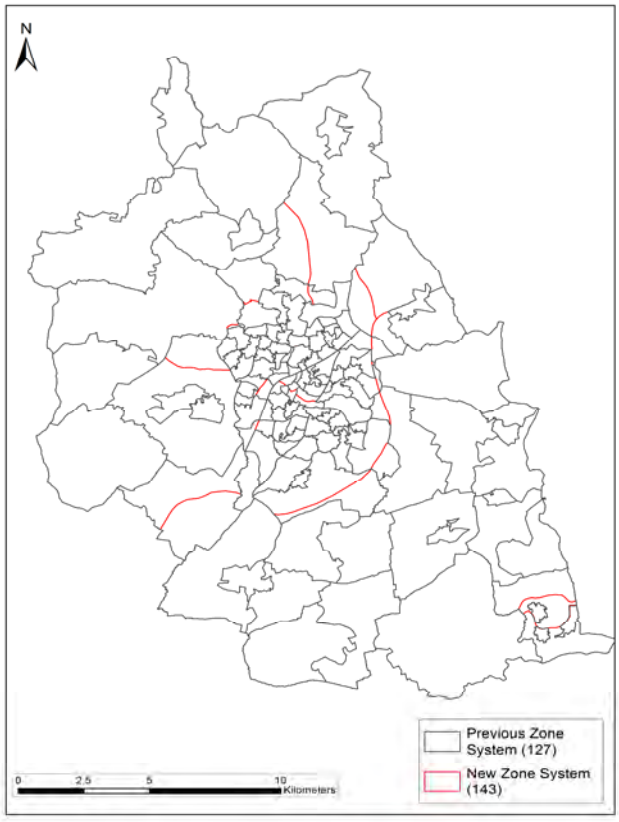


Figure 30 Zone structure before and after re-zoning

5.6.12 Mobile phone based trip data was aggregated into matrices that were consistent with the Tempro Trip-end Database in terms of time periods, modes and purposes. Subsequently, Tempro Trip end matrices were extracted and post-processed according to the zone system characteristics and granularity.

5.6.13 Due to the lack of reliability and evidence on the split between HBO and HBEB and NHBO and NHBEB trips these trip purposes were aggregated into HBO* and NHB* for comparison purposes and later on disaggregated by using TEMPRO specific proportion for the area of interest.

5.6.14 Sector level comparisons were made between provisional trip matrices and Tempro Trip-ends for the entire Administrative area for better understanding of the trip recording and identification. See figure below for further details on the sectors.

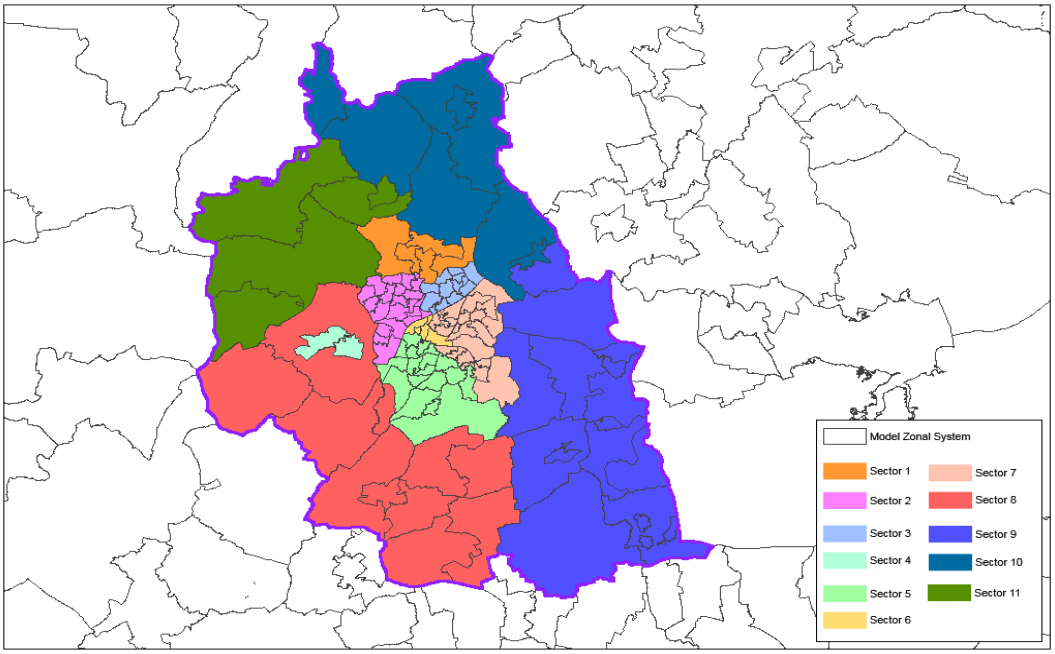


Figure 31 Sectors layout within Chelmsford Administrative area

5.6.15 The sector level approach demonstrated, as expected, that the preliminary amount of trips recorded was below TEMPRO. The reasons for this could be various, as it has been explained within the limitations of the mobile phone data. The mobile phone matrices were expanded to adequately meet trips from the total population, see Table 9 and Table 10 below for further details on the total trips, before and after expansion.

Administrative Area - Lights		Origin (Trips)			Destination (Trips)		
Trip Purpose	Data source	AM	IP	PM	AM	IP	PM
HBW	Tempro	35,601	17,125	30,707	35,467	17,184	30,772
	MobilePhone	27,848	30,132	19,161	31,036	24,367	19,317
	%Difference	-22%	76%	-38%	-12%	42%	-37%
HBO*	Tempro	34,741	97,375	49,970	36,037	95,265	49,429
	MobilePhone	16,698	23,264	11,409	20,006	23,614	11,594
	%Difference	-52%	-76%	-77%	-44%	-75%	-77%
NHB	Tempro	6,672	24,143	8,138	6,711	23,647	7,840
	MobilePhone	16,015	24,721	10,161	16,135	26,138	9,963
	%Difference	140%	2%	25%	140%	11%	27%
Total	Tempro	77,014	138,643	88,815	78,215	136,096	88,042
	MobilePhone	60,560	78,116	40,730	67,176	74,119	40,874
	%Difference	-21%	-44%	-54%	-14%	-46%	-54%

Table 9 Prior matrices vs TEMPRO trip ends

Mobile Phones After Adjustment Vs Tempro							
Administrative Area - Ligths		Origin (Trips)			Destination (Trips)		
Trip Purpose	Data source	AM	IP	PM	AM	IP	PM
HBW	Tempro	35,782	17,183	30,779	35,546	17,252.1	30,925
	MobilePhone	35,387	17,710.0	31,589.2	36,869	17,397.5	31,450.9
	%Difference	-1.1%	3.1%	2.6%	3.7%	0.8%	1.7%
HBO*	Tempro	34,911	97,767	50,169	36,148	95,675	49,653
	MobilePhone	34,626	98,096	49,679	36,462	96,618	49,427
	%Difference	-0.8%	0.3%	-1.0%	0.9%	1.0%	-0.5%
NHB	Tempro	6,690	24,208	8,162	6,729	23,709	7,861
	MobilePhone	6,795	23,724	8,061	6,673	24,489	7,765
	%Difference	1.6%	-2.0%	-1.2%	-0.8%	3.3%	-1.2%
Total	Tempro	77,384	139,158	89,110	78,422	136,636	88,439
	MobilePhone	76,828	139,530	89,318	80,036	138,505	88,684
	%Difference	-0.7%	0.3%	0.2%	2.1%	1.4%	0.3%

Table 10 Adjusted matrices vs TEMPRO trip ends

5.6.16 In addition, the process also allowed identifying and correcting problems such as: misplacement of trips into neighbouring sectors and wrong purpose identification in a particular trip time period or mode. From Table 12 and Table 13 below, (summarising the results before and after this process was executed for the AM period), it is easy to see how NHB trips were initially over estimated while HBO* and HBW were underestimated, this misidentified trips were adequately replaced and incorporated into the HBO* matrices.

5.6.17 Zone level analysis has also been developed to verify that no unreasonable trip ends existed with regards to TEMPRO, see Table 11 for details on zone level statistics.

Administrative	HBW		HBO*		NHB	
Time Period	Origin	Destination	Origin	Destination	Origin	Destination
AM	0.9884	0.8380	0.9594	0.9277	0.7936	0.9327
IP	0.8515	0.8949	0.8689	0.8939	0.9840	0.9501
PM	0.8563	0.9891	0.9744	0.9728	0.9524	0.9350
Metropolitan	**HBW**		**HBO***		**NHB**	
Time Period	**Origin**	**Destination**	**Origin**	**Destination**	**Origin**	**Destination**
AM	0.9602	0.8127	0.8651	0.9122	0.7713	0.9244
IP	0.7016	0.7489	0.7102	0.7486	0.9817	0.9448
PM	0.8328	0.9623	0.9679	0.9192	0.9455	0.9264

Table 11 Regression analysis - mobile phone data vs TEMPRO trip ends

AM				Origins - Ligths (Trips)								
Population				HBW			HBO*			NHB		
Residential	WorkPlace	Sector ID	Sector Name	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff
4257	6738	1	UrbanN	901	513	-43%	881	341	-61%	77	365	375%
31992	15558	2	UrbanNW	6774	3083	-54%	6622	1959	-70%	1404	1947	39%
16450	3968	3	UrbanNE	3483	2506	-28%	3405	2290	-33%	130	2258	1635%
4390	1032	4	UrbanW	901	594	-34%	884	305	-65%	70	751	972%
33475	10806	5	UrbanSW	7088	4613	-35%	6929	1792	-74%	1059	1469	39%
1046	12005	6	UrbanCentral	221	819	270%	216	317	46%	1415	204	-86%
22775	12291	7	UrbanSE	4823	6098	26%	4714	3526	-25%	999	3848	285%
7951	4034	8	Administrative SW	1710	3562	108%	1748	2391	37%	344	2179	533%
30893	11680	9	Administrative SE	7396	3693	-50%	7043	1918	-73%	898	1426	59%
7437	3100	10	Administrative NE	1612	2120	31%	1592	1564	-2%	181	1239	586%
3214	977	11	Administrative NW	691	248	-64%	707	296	-58%	94	330	252%
163879	82189		**Total**	35601	27848	-22%	34741	16698	-52%	6672	16015	140%
AM				Destinations - Ligths (Trips)								
Population				HBW			HBO*			NHB		
Residential	WorkPlace	Sector ID	Sector Name	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff
4257	6738	1	UrbanN	407	622	53%	398	452	13%	78	457	486%
31992	15558	2	UrbanNW	7468	4274	-43%	7316	2611	-64%	1432	2296	60%
16450	3968	3	UrbanNE	687	2685	291%	673	1898	182%	132	1591	1108%
4390	1032	4	UrbanW	393	398	1%	547	342	-37%	68	382	462%
33475	10806	5	UrbanSW	5607	4608	-18%	5493	2626	-52%	1075	2481	131%
1046	12005	6	UrbanCentral	7400	859	-88%	7249	901	-88%	1419	655	-54%
22775	12291	7	UrbanSE	5315	5219	-2%	5206	2876	-45%	1019	2741	169%
7951	4034	8	Administrative SW	1843	5537	201%	1919	4136	116%	337	2203	553%
30893	11680	9	Administrative SE	4847	3332	-31%	5608	2098	-63%	878	1602	82%
7437	3100	10	Administrative NE	999	3027	203%	1106	1775	60%	180	1380	668%
3214	977	11	Administrative NW	501	476	-5%	522	292	-44%	92	346	277%
163879	82189		**Total**	35467	31036	-12%	36037	20006	-44%	6711	16135	140%

Table 12 Prior matrices sector level comparison vs TEMPRO

AM				Origins - Ligths (Trips)								
Population				HBW			HBO*			NHB		
Residential	WorkPlace	Sector ID	Sector Name	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff
4257	6738	1	Urban N	900	1134	26%	880	1423	62%	77	171	123%
31992	15558	2	Urban NW	6766	6722	-1%	6616	6521	-1%	1403	1677	19%
16450	3968	3	Urban NE	3479	3446	-1%	3402	3376	-1%	130	158	22%
4390	1032	4	Urban W	900	865	-4%	883	896	1%	70	62	-11%
33475	10806	5	Urban SW	7062	6663	-6%	6906	6560	-5%	1056	928	-12%
1046	12005	6	Urban Central	221	240	9%	216	242	12%	1414	1271	-10%
22775	12291	7	Urban SE	4817	4701	-2%	4710	4518	-4%	999	1075	8%
7951	4034	8	Administrative SW	1725	1696	-2%	1764	1701	-4%	347	310	-11%
30893	11680	9	Administrative SE	7632	7535	-1%	7259	7097	-2%	937	911	-3%
7437	3100	10	Administrative NE	1590	1571	-1%	1569	1598	2%	163	145	-11%
3214	977	11	Administrative NW	690	813	18%	706	694	-2%	94	86	-8%
163879	82189		**Total**	35782	35387	-1%	34911	34626	-1%	6690	6795	2%
AM				Destinations - Ligths (Trips)								
Population				HBW			HBO*			NHB		
Residential	WorkPlace	Sector ID	Sector Name	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff	Tempro	Mobile Phones	%Diff
4257	6738	1	Urban N	406	2524	521%	398	1720	332%	78	216	178%
31992	15558	2	Urban NW	7460	7073	-5%	7309	6804	-7%	1432	1491	4%
16450	3968	3	Urban NE	686	831	21%	672	817	22%	132	145	10%
4390	1032	4	Urban W	393	397	1%	547	544	0%	68	67	-1%
33475	10806	5	Urban SW	5585	5292	-5%	5472	5115	-7%	1072	1016	-5%
1046	12005	6	Urban Central	7392	6966	-6%	7243	6760	-7%	1419	1174	-17%
22775	12291	7	Urban SE	5309	5356	1%	5201	5320	2%	1019	1047	3%
7951	4034	8	Administrative SW	1857	1881	1%	1933	1965	2%	340	339	0%
30893	11680	9	Administrative SE	5053	5123	1%	5843	5860	0%	916	921	1%
7437	3100	10	Administrative NE	904	915	1%	1008	998	-1%	162	164	1%
3214	977	11	Administrative NW	501	508	1%	522	560	7%	92	91	-1%
163879	82189		**Total**	35546	36869	4%	36148	36462	1%	6729	6673	-1%

Table 13 Adjusted matrices sector level comparison vs TEMPRO

5.6.18 Please refer to the Demand Data Verification Report for further details on the rest of the time periods and description of the complete analysis

Verification and Adjustments using Census Data at Zone Level

5.6.19 Census Journey to Work, Census Population and Census Workplace Population data were obtained from the Office for National Statistics from its latest and most updated version.

5.6.20 The Census Journey to Work dataset contains the census of residents that have reported their typical commuting patterns at an MSOA level by mode of transport, and therefore provides an excellent source of information to double check HBW Origins and Destinations.

5.6.21 Address Base Premium Data, ABPD, and Census Population data were used as the main source of residential population which was used to compare home based trip ends from the mobile phone matrices. Total residential population was matched against HBW, HBEB and HBO origins for the AM period and destinations for the PM.

5.6.22 Mobile phone trip matrices were compared against Census Workplace Population from the Office for National Statistics. Total values of residential workplace population were collected for the different mentioned areas and compared against work based trip ends from the mobile phone matrices. Therefore, total workplace population was matched against HBW, HBEB and HBO destinations for the AM period and origins for the PM period for light vehicles. Please refer to the DDVR for further details on this analysis.

5.6.23 In addition, all this analysis was executed not only at an aggregated level but also at zone level. Regression plots of the calculated data were obtained and appropriate statistics analysed researching the data for “spikes”, this is, zones of the model where the trips were inadequately high or low.

5.6.24 Zone 87, which contains Broomfield Hospital, was identified as to be clearly underestimated, while a series of other zones within Chelmsford Administrative Area were overestimated, zones 1, 4, 17, 55, 100 and 130. These data “spikes” where therefore identified and their trips re-allocated to neighbouring zones in order to better match surveyed reality.

External Model Zones’ trips Spreading Based in OS Address Base Premium Data

5.6.25 Once the matrices’ overall control totals and zone trip ends, origins and destinations, were verified for the Administrative Area, the next step was to evaluate the quality of the matrices for the rest of the model.

5.6.26 Due to the characteristics of the data and the zone system some misplacement of the trips’ starting and ending points was expected for the intermediate model area.

5.6.27 Recorded trips which originated or terminated in zones on the edge of the study area, Essex County Council, were in many cases coupled together into one zone only along the main route corridor resulting in a correct amount of total trips being produced or attracted but an incorrect distribution. Please see Figure 32 where the mentioned situation is shown for the AM case, very similar patterns where found for the remaining of the scenarios.

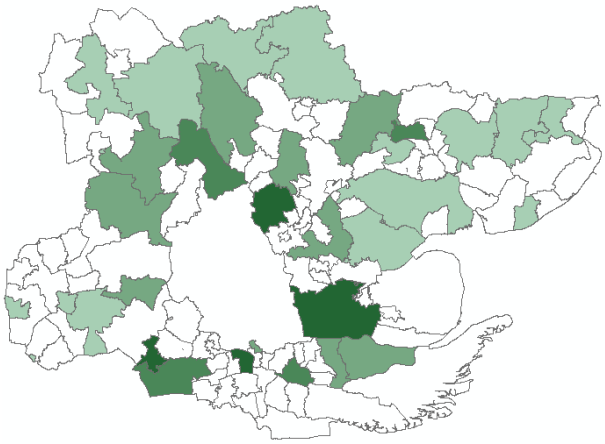


Figure 32 AM trip destinations to Intermediate model area, Essex County

5.6.28 As a result, a series of zones were identified which had large or small numbers of originating or terminating movements but did not have the population or employment to support this level of travel activity.

5.6.29 Although overall the total number of trip ends was correct individual zone trip ends must also be accurate in order to accurately model routing and impacts of potential future developments on the forecast year scenarios.

5.6.30 With the intention of solving this limitation on the data, an automatic process was introduced to have zones, whose trips were in excess or shortage, being redistributed into their neighbours where appropriate.

5.6.31 For this purpose, and based on the fact that overall total numbers were correct, a series of 8 self-containing sectors were created based on UK sectors and network topology, see figure below, and trips within them were first aggregated and then appropriately distributed based on Address Base Premium Data parcel level information. See for the map below for details on the sectors used.

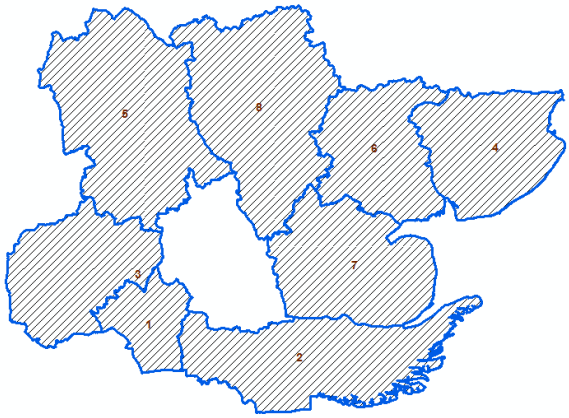


Figure 33 System of sectors used for GIS spreading

5.6.32 This methodology was only implemented for HB trips. However, due to the characteristics of the NHB matrices the process could not be replicated.

Goods Vehicles Demand Splitting

5.6.33 During the mobile phone data collection process and the post processing, LGVs and Cars were aggregated into the same matrices due to the difficulty to differentiate between this two vehicle types. A splitting process was therefore executed in order to obtain appropriate matrices to be assigned to each vehicle type individually.

5.6.34 For the purpose of the LGVs' matrix generation, real traffic data collected for the modelled month of June 2014 was used. Adequate share proportions between Cars and LGVs were extracted from all the available count sites, for the Chelmsford Administrative area, and used to split the enhanced light vehicle matrices into Cars and LGVs. Please see Appendix L for a full reference list of the counts used.

5.6.35 As part of the mobile phone data collection, HGVs matrices were also received. However, these matrices, when compared against Census Journey to Work, Census Work-Population and TEMPRO data, did not comply with the minimum requirements and were therefore dismissed.

5.6.36 HGVs' trips were synthesised by developing a Gravity Model as part of the Kalibri option provided within the modelling software. For this purpose, Work Place Population data by zone level was used as a first estimate of typical HGV trip rates by zone, in addition to standard HGV Trip Length Distribution and calculated Skim matrices.

5.6.37 The resulting HGV flows were just a first estimate of the distribution which did not yet reflected overall flows. For this purpose matrices were then calibrated against Screenlines and Cordons and projected to meet overall levels of traffic for the Chelmsford Administrative Area and through trips. Regular Calibration and Validation procedures were then followed to verify the assignment as suggested by WebTAG guidance, see Chapter 7 for further details on Calibration and Validation.

6. Assignment

6.1 Highway Assignment Methodology

6.1.1 The assignment methodology used within the VISUM model was “Assignment with ICA”. This methodology ensures that Intersection Capacity Analysis, The methodology for calculating delays at junctions, as mentioned in Chapter 2.9, is included within the assignment. This is critical when trying to understand in urban areas such as Chelmsford.

6.2 Convergence Criteria and Standards

6.2.1 A high level of model convergence is key to ensuring that the results contained within the model are a true reflection of the demand and modelled network. A model that is not sufficiently converged will include a large amount of random bias and white noise due to appropriate trip routing not yet having been arrived at. To avoid that situation, the modelled assignments have been run with the intention to achieve a high level of convergence.

6.2.2 As a minimum target, the convergence criteria stipulated within WebTAG was applied, however, the assignment parameters were chosen to exceed the WebTAG criteria, as far as model run times allowed.

6.2.3 Appropriate checks were undertaken to ensure that the model runs were, at all time, running for one further iteration until flows on each link would not change significantly, on an attempt to obey Wardrop's First Principle of Traffic Equilibrium as per WebTAG U3.1 2.7.3:

"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."

6.2.4 In order to meet WebTAG criteria, Unit 3.1 Chapter 3.3, the convergence analysis was done by using the following measures of convergence:

- Proximity to the assignment objective
- Stability of model outputs between consecutive iterations

6.2.5 Proximity to the assignment objective is measures as to how close the model is to a particular converged solution. This of course varies depending on the software package being used. In VISUM this equates to how close the model is to Wardrop’s Principle of Equilibrium and is measured using the Gap function. Gap (denoted ð) is calculated below:

$$\delta = \frac{\sum T_{pij}(C_{pij} - C^*_{ij})}{\sum T_{ij} C^*_{ij}}$$

Where:

T_{pij}	is the flow on route p from origin to destination
T_{ij}	is the total travel from I to j
C_{pij}	is the congested cost of travelling from i to j on path p
C^*_{ij}	is the minimum cost of travelling from I to j

6.2.6 The gap value therefore represents the excess cost incurred by failing to travel on the route with the lowest generalised cost and is expressed relative to that minimum route cost. The excess cost is summed over each route between each origin-destination (O/D) pair and multiplied by the number of trips between each O/D pair. This is divided by the minimum cost summed over each route between each O/D pair, also multiplied by the number of trips between each O/D pair.

6.2.7 The stability measure demonstrates the level of flow change on links between iterations. WebTAG unit M3.1 provides the convergence criteria that traffic models should aim to achieve in order to provide stable, consistent and robust results. Table 14 presents the acceptable levels of convergence required for the base model.

Measure of Convergence	Base Model Acceptable Values
Delta and %Gap	Less than 0.1% or at least with convergence fully documented and all other criteria met
Percentage of links with flow change < 1%	Four consecutive iterations greater than 98%
Percentage of links with cost change < 1%	Four consecutive iterations greater than 98%

Table 14 WebTAG convergence measures

6.2.8 WebTAG advises that %GAP is used to measure convergence and this can be checked in VISUM. However, the software does not generate outputs consistent with the WebTAG guidance with regards to the remaining parameters. GEH between turning flows in the model on each iteration has been compared instead and used as an indicator of the model's stability.

6.3 Public Transport Assignment

6.3.1 The following section describes the assignment procedures and parameters used for the public transport assignments, including the algorithms and generalised cost weightings.

3.2.6 There are two main public transport assignment algorithms commonly found in public transport models, these are:

- Frequency (or headway) based assignment
- Scheduled (or timetable) based assignment

6.3.2 Table 1 in WebTAG unit M3.2: Public Transport Assignment provides some guidance on selecting the appropriate public transport assignment algorithm. This is reproduced below along with comments for the Chelmsford model case.

		Scheduled based (SB) or Frequency based (FB)	Characteristics in Chelmsford
Service Frequency	High		
	Low	SB	Low
Passenger Information and Service Punctuality	High	SB	High
	Low	FB	
Transfer Choice Making by Travellers	Pre-trip	SB	Pre-trip
	On-route	FB	
Regular Schedule	Yes		Yes
	No	SB	
Crowding/Congestion	Yes	SB	
	No		No
Capacity Problems	Yes	SB	
	No		No
Scale of Network	Large	FB	
	Small		Small
Day-by-Day Variations	Yes	SB	
	No		No
Significant Dispersion of Behaviour	Yes		
	No		No

Table 15 Summary of recommendations for PT assignment model applicability from WebTAG U3.2

6.3.3 Following advice from WebTAG U3.2 Table 1Whilst the WebTAG guidance indicates that either approach could be used for the Chelmsford multi modal model, it also suggests that a Timetable based approach may be more appropriate, particularly considering the public transport network characteristics such as frequency and information. As a result, the Timetable based approach has been adopted.

6.3.4 In VISUM's assignment, the model seeks to minimise the perceived journey time (PJT) between origin and destination pairs. The PJT refers to the whole journey and includes not only the time travelling on the public transport service, but also access times, time waiting for services, fares etc. The model accounts for the following elements of a journey:

- Access Time (AT) – Time from origin to stop/station
- Egress Time (ET) – Time from stop/station to destination
- Walking Time (WT) – Time transferring between services
- Origin Wait time (OWT) – Time waiting for first service on journey
- Transfer Wait Time (TWT) – Time waiting for subsequent services on journey
- In-Vehicle Time (IVT) – Time on vehicle(s) on journey
- Transfer Penalty (TF) – penalty (min) applied to each transfer
- Fare

6.3.5 In addition PJT informs the path search mechanism in VISUM to select the most attractive paths for each origin destination pair, see formula below showing how PJT is calculated:

GJT = x1 * IVT + x2 * AT + x3 * ET + x4 * WT + x5 * OWT + x6 * TWT + TF + Fare, where x1 - x6 are relative weights.

6.3.6 Each element of the public transport journey is given a relative weight to reflect the perceived time spent at each step of the journey. The weights are in reference to the in vehicle time as passenger would rather be travelling on the service as opposed to walking, interchanging or waiting for services. For the Chelmsford model the relative weights assigned to each PJT element have been selected in accordance with WebTAG (Unit M3.2, section 3.1.5). The factors adopted in the model are shown in the table below.

Perceived journ. time PJT =

	Coefficient	Attribute			BoxCox	Lambda
	1.00	In-vehicle time	*	1.0	☐	1.00
+	1.00	PuT-Aux ride time	*	1.0	☐	1.00
+	2.00	Access time			☐	1.00
+	2.00	Egress time			☐	1.00
+	2.00	Walk time			☐	1.00
+	2.00	Origin wait time		Parameters	☐	1.00
+	2.00	Transfer wait time		Parameters	☐	1.00
+	2min	Number of transfers	*	Formula	☐	1.00
+	0min	Number of operator chan		Parameters	☐	1.00
+	0.00	Extended impedance	*	Formula	☐	1.00

Table 16 Public transport impedance parameters used

6.3.7 A series of other general assignments settings have been introduced into the public transport part of the model.

General Assignments Settings

6.3.8 Figure 34 shows the general settings used for the public transport assignments. Some key aspects for the Chelmsford model were:

- Number of Decimal Places – In VISUM's paths-leg file, which displays how trips from each O-D pair are assigned, trips are rounded to two decimal places and any trips less than this are not displayed (even though they are assigned). However, by setting decimal points to 6 places all O-D pairs are displayed in the paths-leg. This is important when checking the route choices in the assignments.
- Maximum Walk Time – The maximum walk link time is set to 30 minutes, as recommended in the VISUM manual. This ensures unrealistic connector walk times are not used.
- Walk links to/from Connectors – This is set as "walk links between zones not permitted". This ensures no trips are assigned using connectors only.

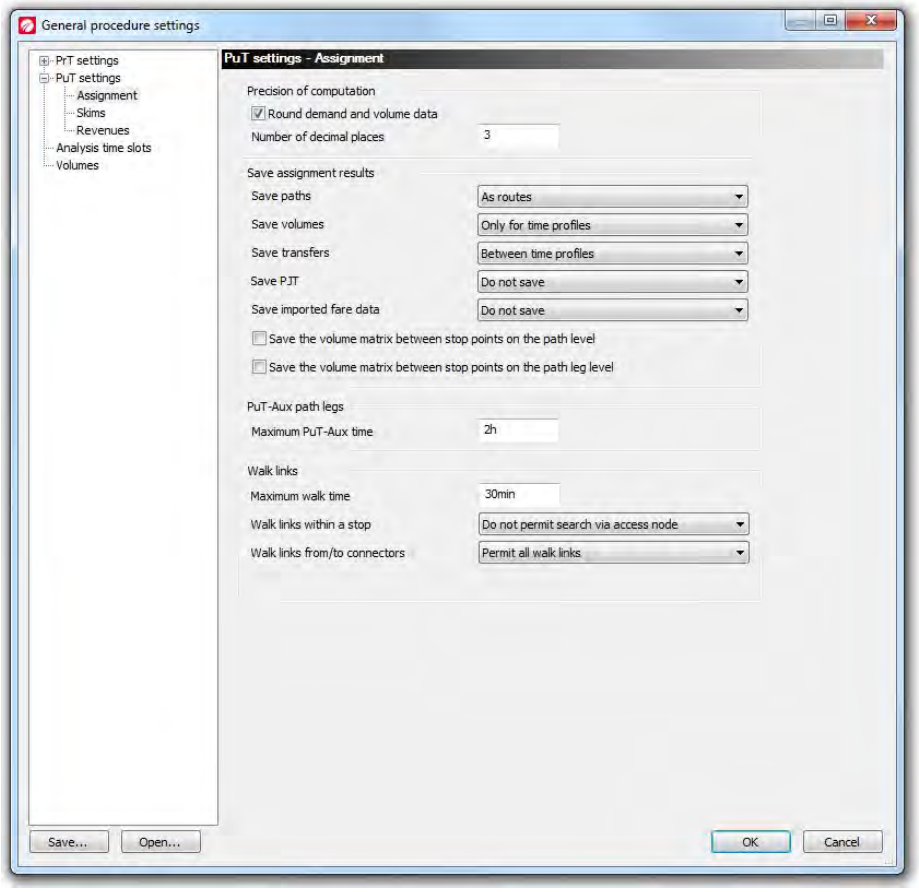


Figure 34 General Public Transport Assignment Settings

Detailed Assignments Settings

6.3.9 Key detailed assignment settings are illustrated on the following figures. Figure 35 shows the "basis" tab of the assignments settings, where the time period to be modelled is defined. The modelled time periods are the same as used for the highway model and are as follows:

- AM Peak - 08:00 – 09:00
- Inter Peak - 12:00 – 13:00
- PM Peak - 17:00 – 18:00

6.3.10 In timetable based assignments the modelled time period becomes more important as the assignment takes into account the actual departure time of public transport services, including both the first service boarded and any transfer to other services. A person can only use a service if it departs after they reach a particular boarding location, i.e. after accessing the first stop or station, or if interchanging, can only change to another service that departs after arrival at that particular location.

6.3.11 The Chelmsford model includes at a simplified level the full UK rail network. This means that long trips may not have time to complete their journey in the modelled periods. VISUM includes the option to add an "extension" period to the assigned time period. As shown in Figure 35 a 3 hour extension period has been modelled.

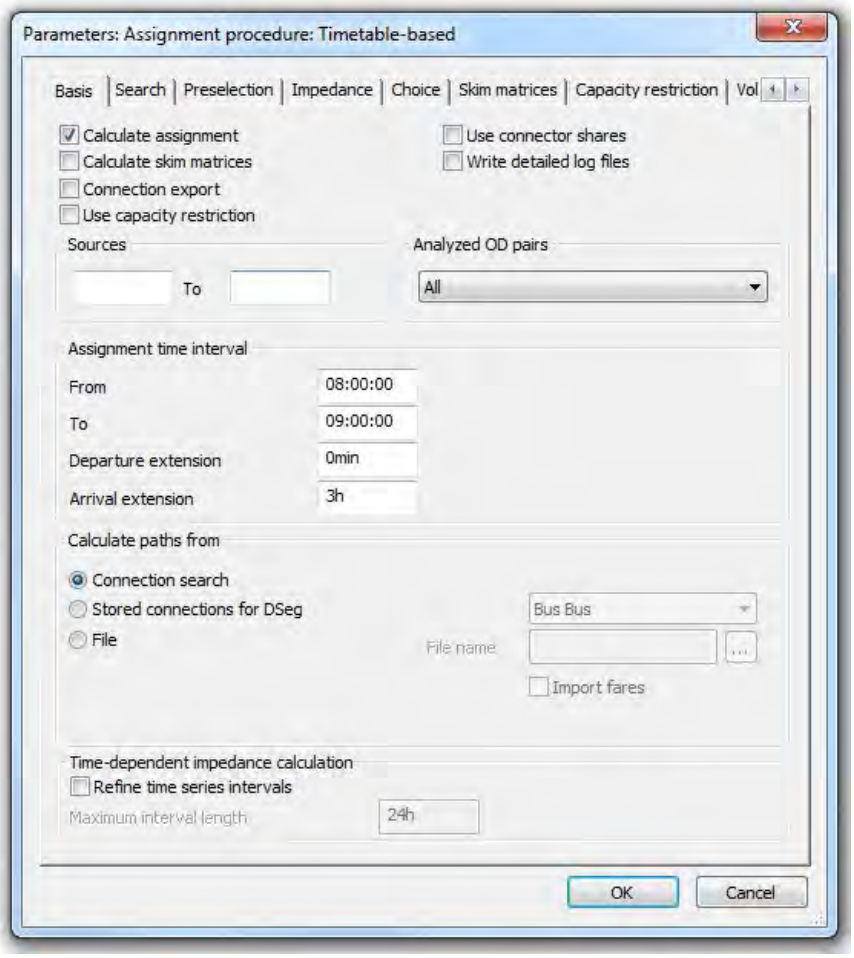


Figure 35 Public transport assignment settings - Basis tab

6.3.12 Figure 36 illustrates the “Search” parameter settings used in the assignment. As shown the Branch and Bound Search option was used for the assignment. In this option all possible connections across the time period are calculated. In this way not only the best connections are found, but potentially a large number of good connections. The approach excludes connections that differ considerably from the optimum in relation to search, journey time or number of transfers.

6.3.13 The figure also shows that for the Chelmsford model the maximum no. of transfers between services for a trip has been set at 5.

6.3.14 Figure 37 illustrates the “Preselection” parameter settings used in the assignment. The “Preselection” procedure evaluates and compares all connections in order to identify and delete the less attractive ones. Only convenient connections are presented to the passenger in connection choice. Any connection that makes no use of public transport (i.e., walk only) is deleted.

6.3.15 The Logit mode choice model was utilised for the assignment. This is the most commonly used discreet choice model, where passengers are distributed over a set of paths according to the absolute difference in cost between the paths. The settings for this procedure are shown on Figure 38.

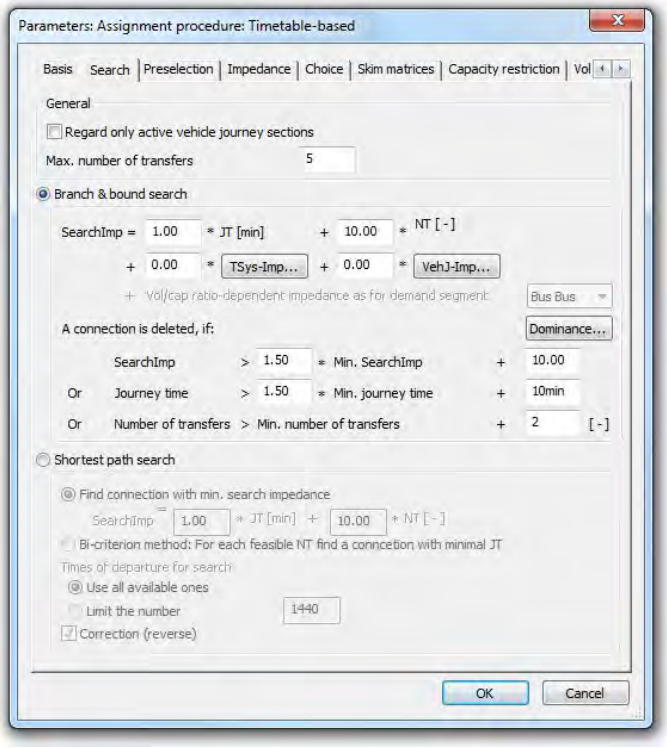


Figure 36 Public transport assignment setting – Search

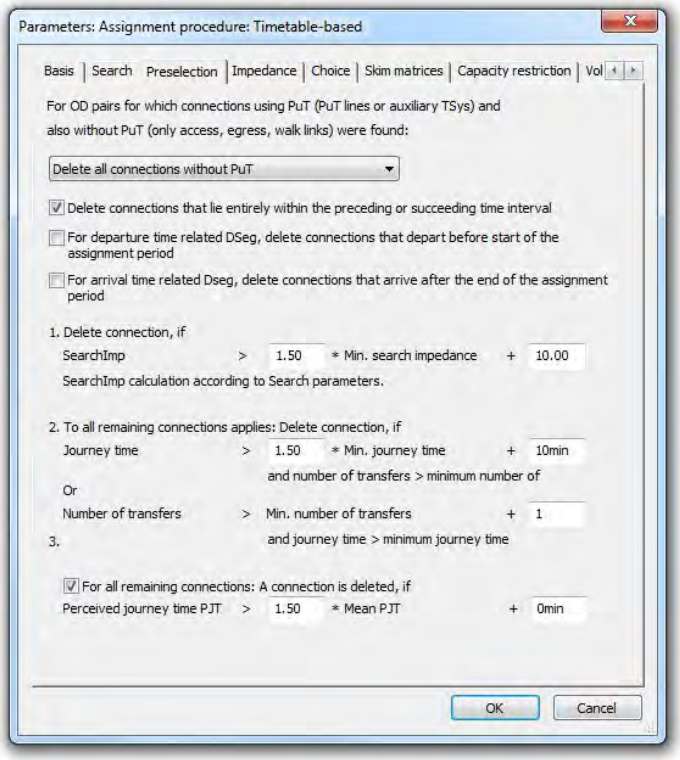


Figure 37 Public Transport assignment setting – Preselection

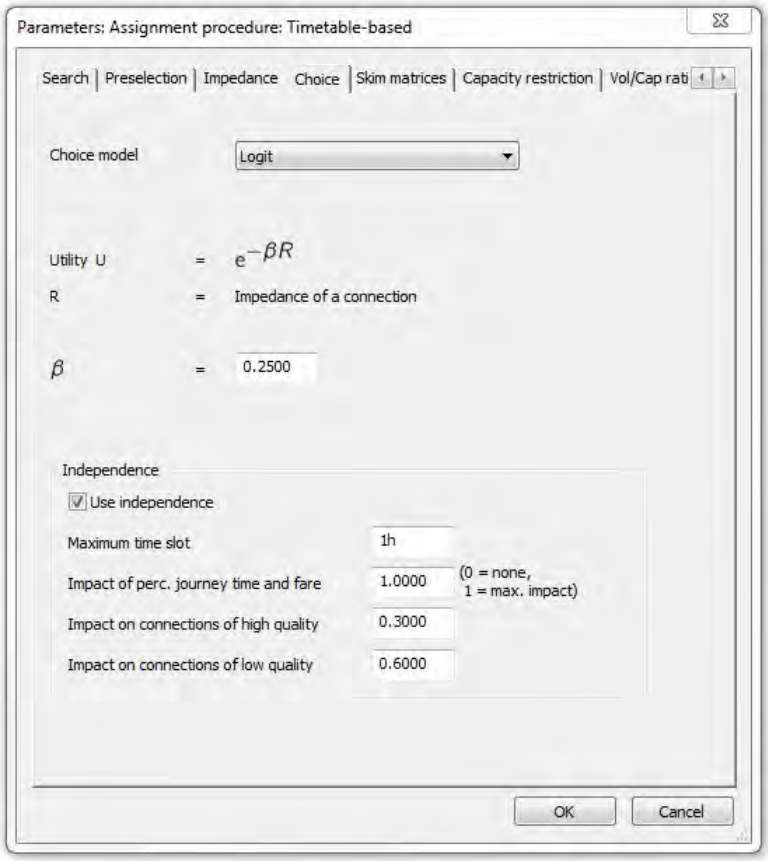


Figure 38 Choice procedure settings

6.4 Cyclists Assignment

6.4.1 Cyclists' data collection for the demand matrix generation is still undergoing, for this reason this component of the model will not be addressed within this document. A separate report will be produced on later stages of this project to address this element.

7. Highway Assignment Calibration and Validation

7.1 Calibration ad Validation Data

7.1.1 An array of survey data was collected in order to provide a complete picture of traffic condition in the base year. This chapter briefly outlines the main data sources used and the type of data collected. For further details on each of them please refer to the Traffic Data Collection Report, TDCR, previously submitted.

Traffic Counts

7.1.2 In order to improve and understand how well the model replicated observed traffic flows, and therefore reality, it was necessary to use traffic counts in matrix estimation and compare modelled flows against traffic counts. To this end, several traffic counts have been downloaded, requested or surveyed within the study area.

7.1.3 Available traffic counts were collected from Essex County Council and the DfT Count sites. The majority of counts used were undertaken during 2014; however older counts were used and adequately factored where 2014 data for a specific location was not available, see Appendix L for further details on the counts used and the factors employed.

7.1.4 New traffic counts commissioned specifically for this model were carried out and undertaken during July and October 2014. Please refer to the Traffic Data Collection Report document for further details.

7.1.5 As a last step, all counts initially identified within the TDCR were checked for consistency on their flows. It was found that a small number of counts, among those initially identified, were inconsistent with others at nearby locations. These counts were therefore excluded from the final used dataset. See Figure 39 for details on the location of the used counts.

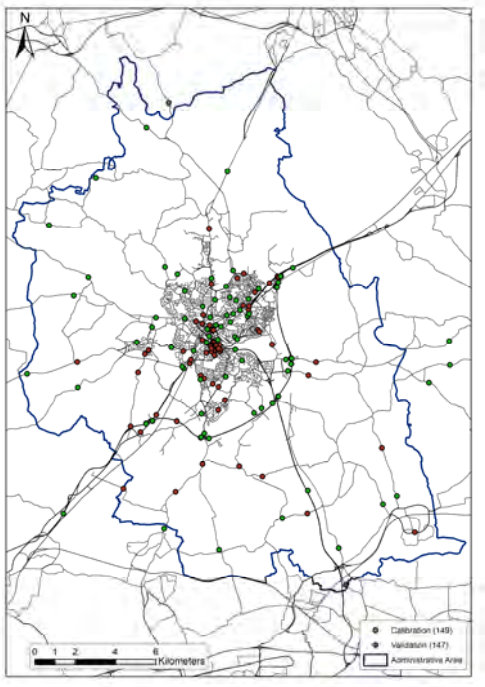


Figure 39 Location of count sites used for calibration and validation purposes

Journey Time Surveys

7.1.6 WebTAG requires the use of Journey Time data to be used to check the delays and travel times calculated by the model against reality. Journey time data has been obtained from TrafficMaster's dataset provided by DfT and its agreement with Essex County council. (This dataset is made available to local authorities and is based on data gathered using satellite navigation devices installed in cars and other vehicles).

7.1.7 TrafficMaster's data specifies travel times for links in the Integrated Transport Network (ITN). Times along a set route were collated by aggregating the times for each of the ITN links along the route.

7.1.8 A total of 6 inter-urban and 5 intra-urban travel routes were chosen and data extracted for weekdays for the modelled month, June 2014, please report to TDCR for further details on the data cleaning and the methodology followed. Please refer to Figure 40 and Figure 41 for an outlay of them and to the TDCR for further on the data and the process followed.

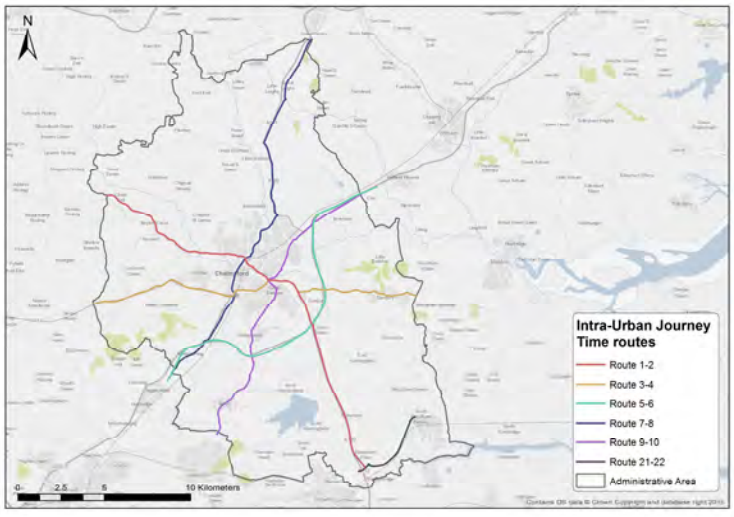


Figure 40 Inter-Urban Journey Time routes

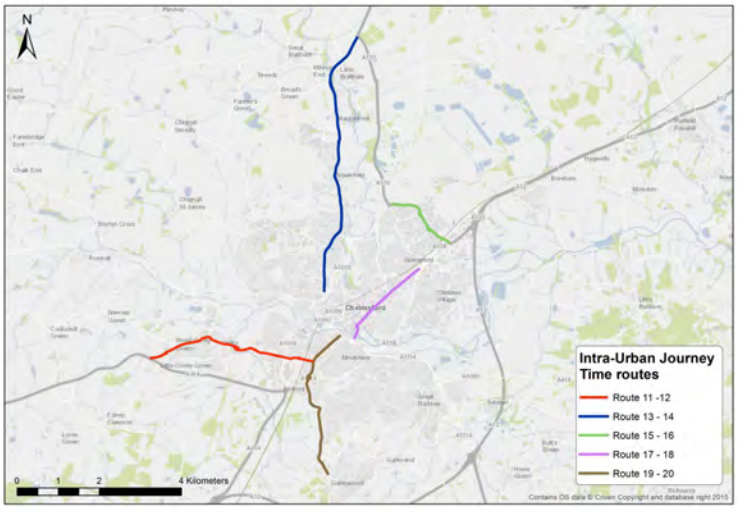


Figure 41 Intra-Urban Journey Time routes

7.2 Calibration and Validation Criteria and Acceptability Guidance

7.2.1 The adequacy of the Chelmsford Multi-modal Transport Model to assess the impact of potential developments into the Chelmsford Administrative area has been measured against the following guidance document:

- WebTAG unit M3.1 Highway Assignment Modelling May 2014

7.2.2 WebTAG sets out a series of measures to compare the base year model against observed independent data to quantify the level of fit. The validation of the highway assignment has been quantified using the following measures taken from WebTAG unit M3.1:

- Assigned flows and counts totalled for each screenline or cordon, as a check on the quality of the trip matrices
- Assigned flows and counts on individual links and turning movements at junctions as a check on the quality of the assignment
- Modelled and observed journey times along routes, as a check on the quality of the network and the assignment.

7.2.3 The following chapters attempt to summarise the Model's performance against the different requirements from WebTAG Unit M3.1.

7.3 Trip Matrix Validation - Screenline Flow Criteria

7.3.1 AS described by WebTAG, base matrix validation is the comparison of modelled and observed flows along screenlines within the model, see Table 17 below for further details on the Screenline flow validation criterion and acceptability guidelines from WebTAG U3.1 section 3.2.5 .

Criterion	Acceptability Guidance
Differences between modelled flows and counts should be less than 5% of the counts	All or nearly all screenlines

Table 17 Screenline flow validation criterion and acceptability guidelines from WebTAG U3.1 section 3.2.5

7.3.2 In addition, as per point 3.2.6 in WebTAG Unit M3.1, the following points were noted:

- Screenlines should normally consist of 5 or more links
- The comparison of modelled and observed flows for screenlines containing high flow routes (such as motorways) should be presented both with and without such routes
- The comparison should be presented separately for:
  - Roadside interview screenlines
  - Other screenlines used as constraints in matrix estimation
  - Screenlines used as independent validation
- The comparison should be presented by vehicle type, i.e. for car, LGV and HGV traffic

7.3.3 As detailed within Section 5, the observed matrices for this model have not been developed through roadside interviews but through the use of mobile phone data. As such traditional screenlines across watertight roadside interview sites have not been set up. However, due to the need to potentially calibrate the model through sector adjustments, calibration screenlines and additional independent validation screenlines have been placed to ensure the accuracy of the model matrices.

7.3.4 A total of 7 "bidirectional" screenlines or cordons were examined in the model on an attempt to appropriately capture flows along the Chelmsford Administrative Area.

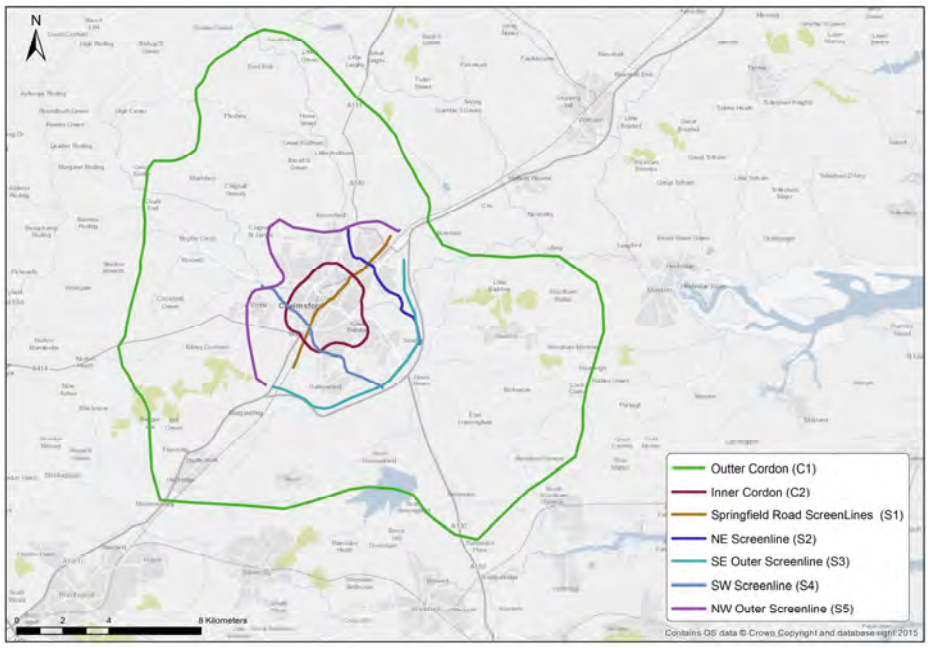


Figure 42 Location of screenlines and cordons

7.3.5 Calibration and validation screenlines and cordons were analysed as requested by WebTAG Unit M3.1 3.2.6. Table 18 Calibration results for Screenline/Cordon flow summarises the percentages in flow difference for each of the mentioned screenline and cordon by direction, mode and time period, with Motorways.

Screenline / Cordon ID	Cal / Val	AM Peak Hour				IP Average Hour				PM Peak Hour			
		% Flow Diference				% Flow Diference				% Flow Diference			
		Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total
Springfield Road Screen Line-NW	Calibration	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Springfield Road Screen Line-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-SW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-NE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-NW	Calibration	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SW Screenline-NE	Validation	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail
SW Screenline-SW	Validation	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
NW Outer Screenline-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NW Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Percentage Satisfying criteria		93%	100%	100%	86%	93%	100%	100%	93%	93%	100%	100%	93%

Table 18 Calibration results for Screenline/Cordon flow difference (WebTAG criteria)

7.3.6 As demonstrated in Table 18, most of the screenlines/cordons meet the requested criteria not only when used for calibration purposes but also when used for validation.

7.3.7 In addition, a small summary of the numerical results by screenline/cordon, vehicle type and time period including Motorway flows can be seen below. Please refer to Appendix E for the whole set of calculations including not only flow difference but also GEH analysis. Please note the following two elements within followed methodology:

- GEH was calculated for each screenline and cordon and a maximum value of 4% targeted, following recommendations from DMRB on its latest version, in addition to the standard WebTAG requirements. The Model has shown to perform well with regards to this comparison and even exceeds requirements.
- Percentage of Flow Difference acceptance criteria was adopted for LGVs and HGVs, by following Table 22 due to small flows goods vehicle volumes, typical in the urban setting.

AM							
Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	3714	3497	-5.8%	Fail	3.6	Pass
Springfield Road Screen Line-SE	Calibration	3092	3048	-1.4%	Pass	0.8	Pass
NE Screenline-SW	Calibration	3060	2920	-4.6%	Pass	2.6	Pass
NE Screenline-NE	Calibration	2222	2204	-0.8%	Pass	0.4	Pass
SE Outer Screenline-NW	Calibration	1186	1211	2.1%	Pass	0.7	Pass
SE Outer Screenline-SE	Calibration	1226	1244	1.5%	Pass	0.5	Pass
SW Screenline-NE	Validation	2018	1951	-3.3%	Pass	1.5	Pass
SW Screenline-SW	Validation	2265	2293	1.2%	Pass	0.6	Pass
NW Outer Screenline-NW	Calibration	2665	2654	-0.4%	Pass	0.2	Pass
NW Outer Screenline-SE	Calibration	2670	2682	0.4%	Pass	0.2	Pass
Outer Cordon-IN	Calibration	11630	11539	-0.8%	Pass	0.8	Pass
Outer Cordon-OUT	Calibration	10496	10583	0.8%	Pass	0.8	Pass
Inner Cordon-IN	Calibration	7512	7487	-0.3%	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	6090	6066	-0.4%	Pass	0.3	Pass
IP							
Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	3468	3399	-2.0%	Pass	1.2	Pass
Springfield Road Screen Line-SE	Calibration	3372	3365	-0.2%	Pass	0.1	Pass
NE Screenline-SW	Calibration	2541	2548	0.3%	Pass	0.1	Pass
NE Screenline-NE	Calibration	2415	2429	0.6%	Pass	0.3	Pass
SE Outer Screenline-NW	Calibration	1079	1081	0.2%	Pass	0.1	Pass
SE Outer Screenline-SE	Calibration	1095	1094	-0.1%	Pass	0.0	Pass
SW Screenline-NE	Validation	1887	1822	-3.4%	Pass	1.5	Pass
SW Screenline-SW	Validation	2000	1865	-6.7%	Fail	3.1	Pass
NW Outer Screenline-NW	Calibration	2284	2302	0.8%	Pass	0.4	Pass
NW Outer Screenline-SE	Calibration	2256	2268	0.5%	Pass	0.2	Pass
Outer Cordon-IN	Calibration	7706	7734	0.4%	Pass	0.3	Pass
Outer Cordon-OUT	Calibration	7460	7471	0.1%	Pass	0.1	Pass
Inner Cordon-IN	Calibration	5947	6063	2.0%	Pass	1.5	Pass
Inner Cordon-OUT	Calibration	6096	6226	2.1%	Pass	1.7	Pass
PM							
Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	3889	3970	2.1%	Pass	1.3	Pass
Springfield Road Screen Line-SE	Calibration	4206	4281	1.8%	Pass	1.1	Pass
NE Screenline-SW	Calibration	2638	2601	-1.4%	Pass	0.7	Pass
NE Screenline-NE	Calibration	3627	3454	-4.8%	Pass	2.9	Pass
SE Outer Screenline-NW	Calibration	1473	1478	0.4%	Pass	0.1	Pass
SE Outer Screenline-SE	Calibration	1425	1440	1.0%	Pass	0.4	Pass
SW Screenline-NE	Validation	2497	2243	-10.2%	Fail	5.2	Fail
SW Screenline-SW	Validation	2407	2414	0.3%	Pass	0.2	Pass
NW Outer Screenline-NW	Calibration	2923	2933	0.3%	Pass	0.2	Pass
NW Outer Screenline-SE	Calibration	2932	2949	0.6%	Pass	0.3	Pass
Outer Cordon-IN	Calibration	10427	10291	-1.3%	Pass	1.3	Pass
Outer Cordon-OUT	Calibration	10660	10831	1.6%	Pass	1.7	Pass
Inner Cordon-IN	Calibration	6732	6725	-0.1%	Pass	0.1	Pass
Inner Cordon-OUT	Calibration	8479	8617	1.6%	Pass	1.5	Pass

Table 19 Screenline and cordon calibration results cars (WebTAG and DMRB criteria)

AM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	453	450	Pass	0.2	Pass
Springfield Road Screen Line-SE	Calibration	366	339	Pass	1.4	Pass
NE Screenline-SW	Calibration	402	376	Pass	1.4	Pass
NE Screenline-NE	Calibration	280	291	Pass	0.7	Pass
SE Outer Screenline-NW	Calibration	118	132	Pass	1.2	Pass
SE Outer Screenline-SE	Calibration	120	134	Pass	1.2	Pass
SW Screenline-NE	Validation	251	274	Pass	1.4	Pass
SW Screenline-SW	Validation	358	340	Pass	0.9	Pass
NW Outer Screenline-NW	Calibration	267	306	Pass	2.3	Pass
NW Outer Screenline-SE	Calibration	287	316	Pass	1.6	Pass
Outer Cordon-IN	Calibration	1871	1928	Pass	1.3	Pass
Outer Cordon-OUT	Calibration	1739	1853	Pass	2.7	Pass
Inner Cordon-IN	Calibration	976	967	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	807	805	Pass	0.1	Pass
IP						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	350	350	Pass	0.0	Pass
Springfield Road Screen Line-SE	Calibration	311	320	Pass	0.5	Pass
NE Screenline-SW	Calibration	255	272	Pass	1.1	Pass
NE Screenline-NE	Calibration	244	255	Pass	0.7	Pass
SE Outer Screenline-NW	Calibration	95	119	Pass	2.3	Pass
SE Outer Screenline-SE	Calibration	97	127	Pass	2.9	Pass
SW Screenline-NE	Validation	227	218	Pass	0.6	Pass
SW Screenline-SW	Validation	214	215	Pass	0.1	Pass
NW Outer Screenline-NW	Calibration	203	221	Pass	1.2	Pass
NW Outer Screenline-SE	Calibration	191	213	Pass	1.6	Pass
Outer Cordon-IN	Calibration	1071	1235	Pass	4.8	Fail
Outer Cordon-OUT	Calibration	1073	1198	Pass	3.7	Pass
Inner Cordon-IN	Calibration	625	648	Pass	0.9	Pass
Inner Cordon-OUT	Calibration	611	634	Pass	0.9	Pass
PM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	544	576	Pass	1.4	Pass
Springfield Road Screen Line-SE	Calibration	513	535	Pass	1.0	Pass
NE Screenline-SW	Calibration	362	358	Pass	0.2	Pass
NE Screenline-NE	Calibration	511	532	Pass	0.9	Pass
SE Outer Screenline-NW	Calibration	178	186	Pass	0.6	Pass
SE Outer Screenline-SE	Calibration	173	181	Pass	0.6	Pass
SW Screenline-NE	Validation	396	341	Pass	2.9	Pass
SW Screenline-SW	Validation	377	356	Pass	1.1	Pass
NW Outer Screenline-NW	Calibration	364	383	Pass	1.0	Pass
NW Outer Screenline-SE	Calibration	352	397	Pass	2.3	Pass
Outer Cordon-IN	Calibration	1754	1815	Pass	1.4	Pass
Outer Cordon-OUT	Calibration	1828	1923	Pass	2.2	Pass
Inner Cordon-IN	Calibration	950	956	Pass	0.2	Pass
Inner Cordon-OUT	Calibration	1149	1184	Pass	1.0	Pass

Table 20 Screenline and cordon calibration results LGVs (WebTAG and DMRB criteria)

AM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	171	170	Pass	0.1	Pass
Springfield Road Screen Line-SE	Calibration	102	104	Pass	0.2	Pass
NE Screenline-SW	Calibration	145	132	Pass	1.1	Pass
NE Screenline-NE	Calibration	104	104	Pass	0.1	Pass
SE Outer Screenline-NW	Calibration	40	71	Pass	4.2	Fail
SE Outer Screenline-SE	Calibration	44	48	Pass	0.7	Pass
SW Screenline-NE	Validation	73	135	Pass	6.1	Fail
SW Screenline-SW	Validation	74	138	Pass	6.2	Fail
NW Outer Screenline-NW	Calibration	95	101	Pass	0.7	Pass
NW Outer Screenline-SE	Calibration	100	117	Pass	1.6	Pass
Outer Cordon-IN	Calibration	950	967	Pass	3.0	Pass
Outer Cordon-OUT	Calibration	888	904	Pass	0.5	Pass
Inner Cordon-IN	Calibration	322	331	Pass	0.5	Pass
Inner Cordon-OUT	Calibration	238	269	Pass	2.0	Pass
IP						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	114	114	Pass	0.0	Pass
Springfield Road Screen Line-SE	Calibration	60	59	Pass	0.1	Pass
NE Screenline-SW	Calibration	77	83	Pass	0.7	Pass
NE Screenline-NE	Calibration	73	71	Pass	0.2	Pass
SE Outer Screenline-NW	Calibration	30	31	Pass	0.2	Pass
SE Outer Screenline-SE	Calibration	30	39	Pass	1.5	Pass
SW Screenline-NE	Validation	35	48	Pass	1.9	Pass
SW Screenline-SW	Validation	42	45	Pass	0.5	Pass
NW Outer Screenline-NW	Calibration	54	59	Pass	0.7	Pass
NW Outer Screenline-SE	Calibration	53	56	Pass	0.5	Pass
Outer Cordon-IN	Calibration	419	451	Pass	2.9	Pass
Outer Cordon-OUT	Calibration	423	426	Pass	0.2	Pass
Inner Cordon-IN	Calibration	157	161	Pass	0.2	Pass
Inner Cordon-OUT	Calibration	131	130	Pass	0.1	Pass
PM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	208	210	Pass	0.1	Pass
Springfield Road Screen Line-SE	Calibration	143	147	Pass	0.3	Pass
NE Screenline-SW	Calibration	133	142	Pass	0.8	Pass
NE Screenline-NE	Calibration	185	179	Pass	0.5	Pass
SE Outer Screenline-NW	Calibration	59	80	Pass	2.5	Pass
SE Outer Screenline-SE	Calibration	57	69	Pass	1.5	Pass
SW Screenline-NE	Validation	98	139	Pass	3.7	Pass
SW Screenline-SW	Validation	92	144	Pass	4.9	Fail
NW Outer Screenline-NW	Calibration	121	144	Pass	2.0	Pass
NW Outer Screenline-SE	Calibration	115	124	Pass	0.8	Pass
Outer Cordon-IN	Calibration	1232	1250	Pass	3.3	Pass
Outer Cordon-OUT	Calibration	1238	1256	Pass	0.5	Pass
Inner Cordon-IN	Calibration	324	330	Pass	0.4	Pass
Inner Cordon-OUT	Calibration	357	355	Pass	0.1	Pass

Table 21 Screenline and cordon calibration results HGVs (WebTAG and DMRB criteria)

7.3.8 In general we can conclude that the model meets the criteria for nearly all the screenlines and therefore achieves the criteria and requirements stated in Table 17.

7.4 Link Flow Movement Validation

7.4.1 In addition to validation of total screenline and cordon flows, WebTAG Unit M3.1 chapter 3.2 also contains guidelines on the validation criteria for individual links or turning movements. These criteria are detailed in Table 22 presented below and include reference to the GEH statistic measuring the difference between modelled and observed flows. The GEH statistic is of the form:

$$GEH = \sqrt{\frac{(M-C)^2}{(M+C)/2}}$$

Where M is the modelled flow and C is the observed count.

Criteria	Description of Criteria	Acceptability Guideline
1	Individual flows within 100 veh/hr of counts for flows less than 700 veh/hr	> 85% of cases
	Individual flows within 15% of counts for flows from 700 veh/hr to 2,700 veh/hr	> 85% of cases
	Individual flows within 400 veh/hr of counts for flows more than 2,700 veh/hr	> 85% of cases
2	GEH < 5 for individual flows	> 85% of cases

Table 22 Link flow validation criteria and acceptability guidelines

7.4.2 WebTAG guidance unit M3.1 3.2.7 states that these two measures presented in Table 22 are broadly consistent and link flows that meet either criterion should be regarded as satisfactory.

7.4.3 In addition, the above comparison of modelled and observed flows should be presented by vehicle type, unless there is evidence of inaccuracy on the LGV and HGV vehicle split, case in which cars and all vehicles can be used as the two main classes. In addition this information should be presented by time period and link. Please refer to Appendix F for full results.

7.4.4 Data collection sites used in the validation of the base year, as well as those sites used in the development of the base year model, are detailed within the previously submitted TDCR.

7.4.5 Table 23 summarises the results of the link flow validation process. Overall the model exceeds validation criteria, as stated on Table 22, for all the scenarios.

	AM		IP		PM	
Cars	Pass	Fail	Pass	Fail	Pass	Fail
Cars	126	21	128	19	128	19
GVs	145	2	146	1	144	3
Total	125	22	125	22	125	22
	AM		IP		PM	
Cars	Pass	Fail	Pass	Fail	Pass	Fail
Cars	86%	14%	87%	13%	87%	13%
GVs	99%	1%	99%	1%	98%	2%
Total	85%	15%	85%	15%	85%	15%

Table 23 Total acceptability of link flow validation criteria

7.5 Journey Time Validation Results

7.5.1 WebTAG also contains acceptability guidelines for the validation of journey times. The acceptability criterion for journey time validation is given in Table 24.

Criterion	Acceptability Guidance
Modelled times along routes should be within 15% of surveyed times, or 1 minute if higher	> 85% of routes

Table 24 Journey Time routes validation criteria

7.5.2 WebTAG unit M3.1 3.2.10 and 3.2.11 state that the speeds within the road network should be based upon separate relationships for light and other vehicle types.

7.5.3 Journey time validation was undertaken for 22 key routes in, through and out of the Chelmsford Urban Area. The routes were selected with the intention of fully capturing main corridors along the Chelmsford Administrative Area; please report to TDCR or Figure 40 and Figure 41 for further details on the routes.

	CARS			GVs		
	AM	IP	PM	AM	IP	PM
No of routes	22	22	22	22	22	22
Number of routes with Modelled Journey Times within 15% of Observed	22	22	19	20	22	20
%of routes with Modelled Journey Times within 15% of Observed	100%	100%	86%	91%	100%	91%

Table 25 Summary of Journey Time acceptability criteria by mode and time period

7.5.4 In general we can conclude that the model meets the criteria for nearly all the selected routes widely exceeding WebTAG requirements.

7.5.5 The journey time validation of the 22 routes is individually illustrated in Appendix I for all the peak periods and modes separately.

7.6 Modelled Flow Validation Results

7.6.1 The following figures demonstrate the comparison between the modelled flows and the observed flows in series of count locations within Chelmsford and outside the Administrative Area boundaries, (the boundary is included for reference). The flow comparison has been made for AM peak, Interpeak and PM peak hours for each vehicle type individually (Cars, LGV's, HGV's).

7.6.2 The following three figures show the modelled and observed flow comparison for the AM peak hour for car, HGV and LGV traffic, respectively.

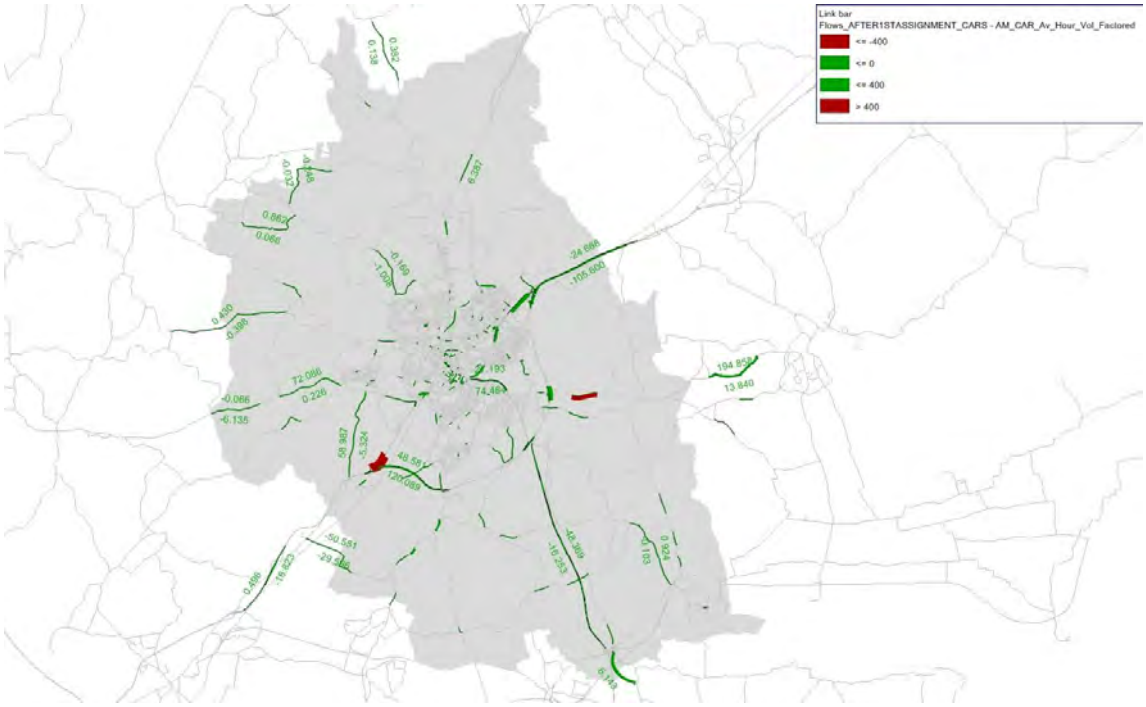


Figure 43 Difference between modelled and observed Car flows - AM Peak hour

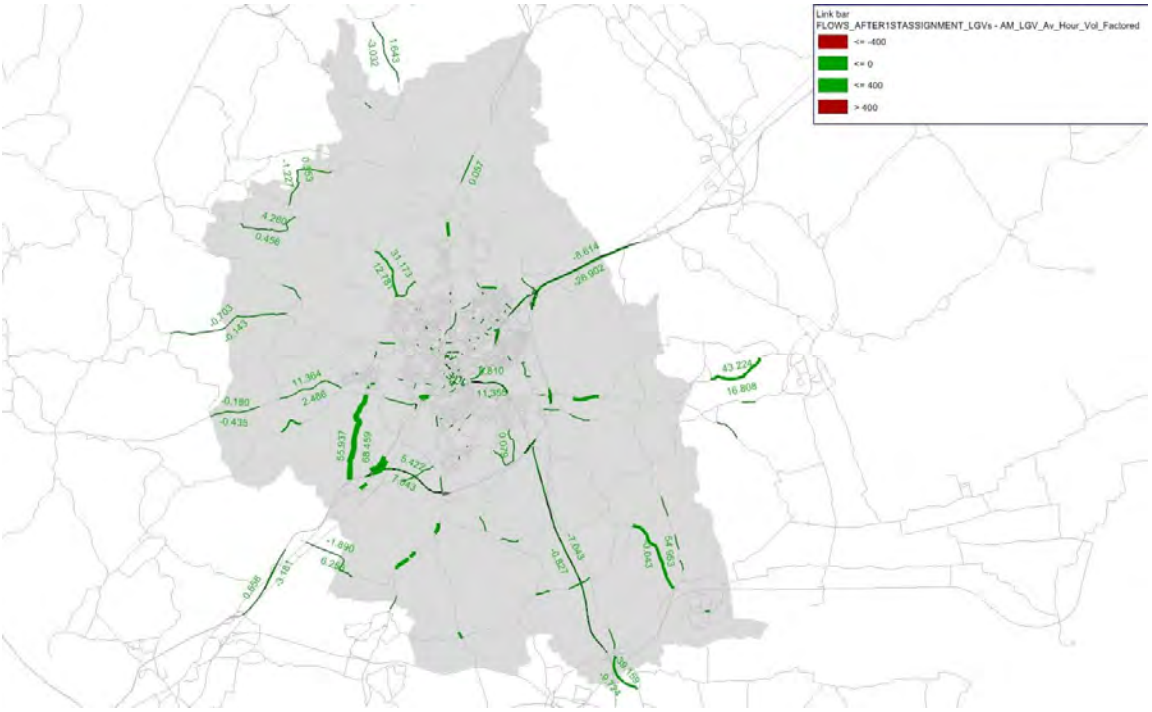


Figure 44 Difference between modelled and observed LGVs flows - AM Peak hour

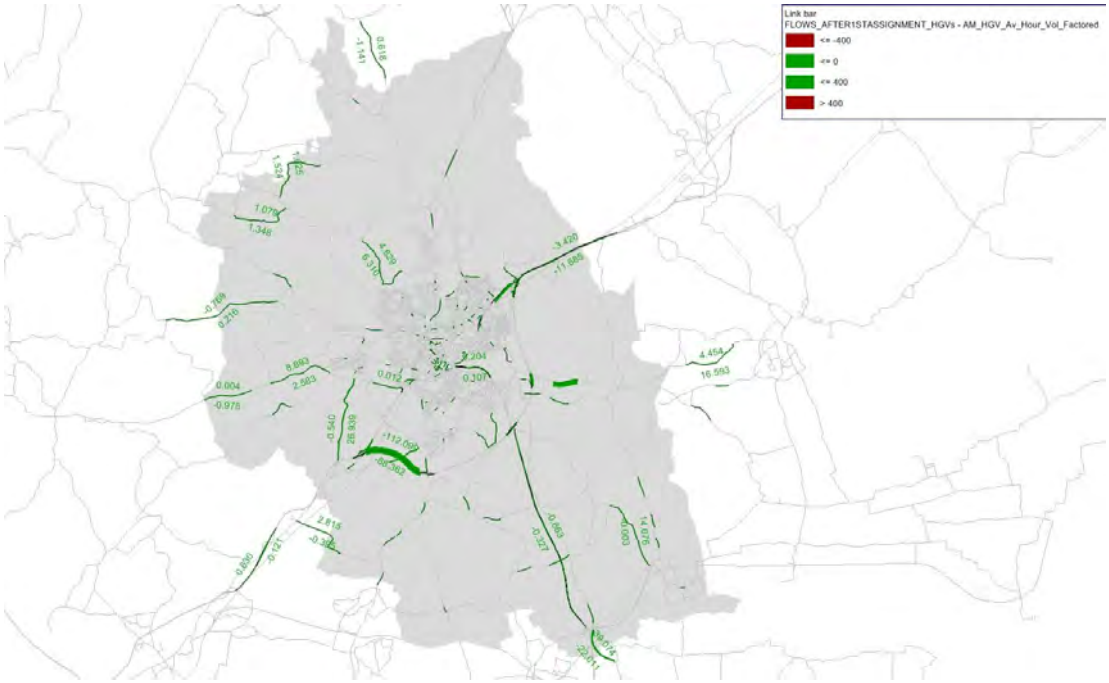


Figure 45 Difference between modelled and observed HGVs flows - AM Peak hour

7.6.3 In general differences between the modelled and observed flows are not significant. For the HGVs, the flow difference on the A12's section between junctions 15 and 16 is somewhat higher while still meeting all the remaining section, this was identified to be due to an inconstancy on the existing counts and still not significant. Therefore we can conclude that the modelled link flows are well calibrated on the majority of the model during the AM peak hour. This situation proved to be constant along the remaining time periods. Please refer to Appendix K for plots on the remaining time periods.

7.7 Assignment Convergence

7.7.1 A summary of the assignment methods used and the required convergence levels, as defined by WebTAG, were summarised in Section 6.2.

7.7.2 A summary of convergence statistics for each time period are given below in Table 26, Table 27 and Table 28.

7.7.3 The results below demonstrate how the AM, IP and PM models have all achieved the required level of convergence to satisfy WebTAG criteria. Results are stable for at least 4 consecutive assignment or simulation loops achieving 0.98 for each of the first three criteria. Please note that the used criteria consider GEH differences between turn flows instead of link flow differences, this is a limitation due to the modelling software used as it has been stated in Section 6.2.8.

7.7.4 In addition to model stability we can also be confident that the model achieves a good level of proximity to the assignment objective. For all time periods the %GAP statistic, which measures this aspect of convergence is well within the 0.01% target that WebTAG recommends.

Outer Iteration	Proportion of turns with GEH <= 1 between current and previous iteration	Proportion of turns with GEH <= 1 between current iteration and smoothed ICA assignment	Proportion of turns with relative gap between ICA wait time and VDF wait time <= 0.05	Total queues on links	Total queues on connectors	Final %GAP value	Number of inner iterations
1	0.386	1.000	0.494	0	0	0.000048	7
2	0.716	0.873	0.895	0	0	0.000065	5
3	0.946	0.975	0.947	890	0	0.000033	7
4	0.975	0.988	0.984	583	0	0.000036	3
5	0.986	0.995	0.994	536	0	0.000041	3
6	0.990	0.997	0.995	512	0	0.000033	3
7	0.999	1.000	0.997	489	0	0.000016	3
8	0.997	1.000	0.998	473	0	0.000014	3
9	0.998	1.000	0.998	445	0	0.000015	3
10	0.999	1.000	0.998	431	0	0.000019	3

Table 26 AM Model convergence summary

Outer Iteration	Proportion of turns with GEH <= 1 between current and previous iteration	Proportion of turns with GEH <= 1 between current iteration and smoothed ICA assignment	Proportion of turns with relative gap between ICA wait time and VDF wait time <= 0.05	Total queues on links	Total queues on connectors	Final %GAP value	Number of inner iterations
1	0.378	1.000	0.495	0	0	0.000035	6
2	0.762	0.918	0.926	0	0	0.000036	5
3	0.973	0.980	0.964	0	0	0.000039	3
4	0.972	0.989	0.986	0	0	0.000032	4
5	0.993	0.997	0.996	0	0	0.000015	3
6	0.994	0.998	0.997	0	0	0.000038	2
7	0.999	1.000	0.998	0	0	0.000015	2

Table 27 IP Model convergence summary

Outer Iteration	Proportion of turns with GEH <= 1 between current and previous iteration	Proportion of turns with GEH <= 1 between current iteration and smoothed ICA assignment	Proportion of turns with relative gap between ICA wait time and VDF wait time <= 0.05	Total queues on links	Total queues on connectors	Final %GAP value	Number of inner iterations
1	0.379	1.000	0.492	0	0	0.000029	7
2	0.679	0.857	0.866	81	0	0.000056	6
3	0.890	0.964	0.929	1520	14	0.000069	15
4	0.893	0.979	0.963	86	0	0.000046	5
5	0.978	0.991	0.984	60	0	0.000048	3
6	0.986	0.997	0.991	67	0	0.000036	4
7	0.996	0.998	0.997	62	0	0.000020	3
8	0.996	1.000	0.998	63	0	0.000033	3
9	0.997	1.000	0.999	54	0	0.000019	3
10	0.999	1.000	0.999	48	0	0.000032	2

Table 28 PM Model convergence summary

7.8 Assignment Results

7.8.1 Traffic assignments were created for the Base Year scenario of 2014 for AM, IP, PM peak hours. The following figures show Year 2014 traffic assignments for all vehicle types combined.

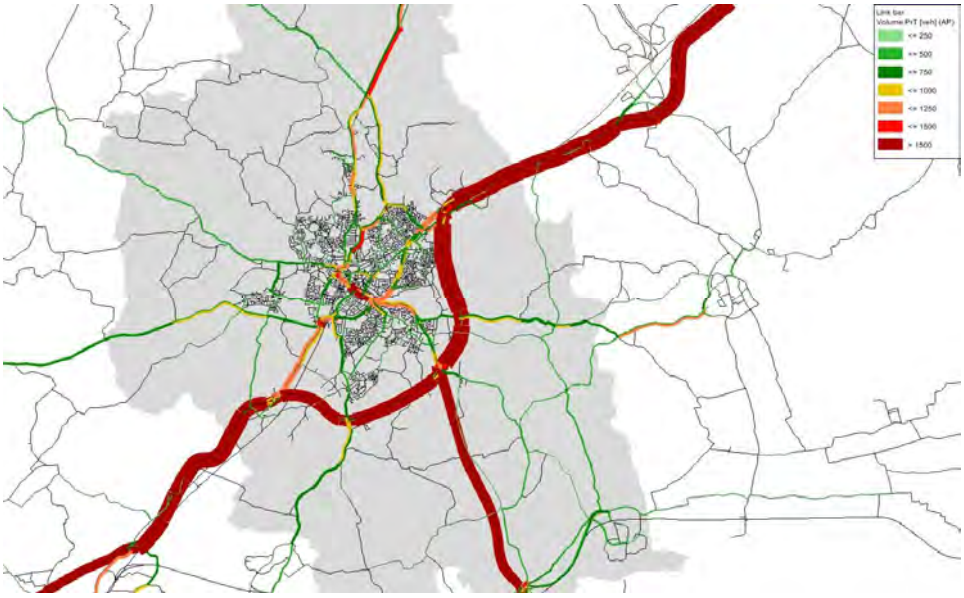


Figure 46 Highway assignment in the AM hour (veh/hour/direction)

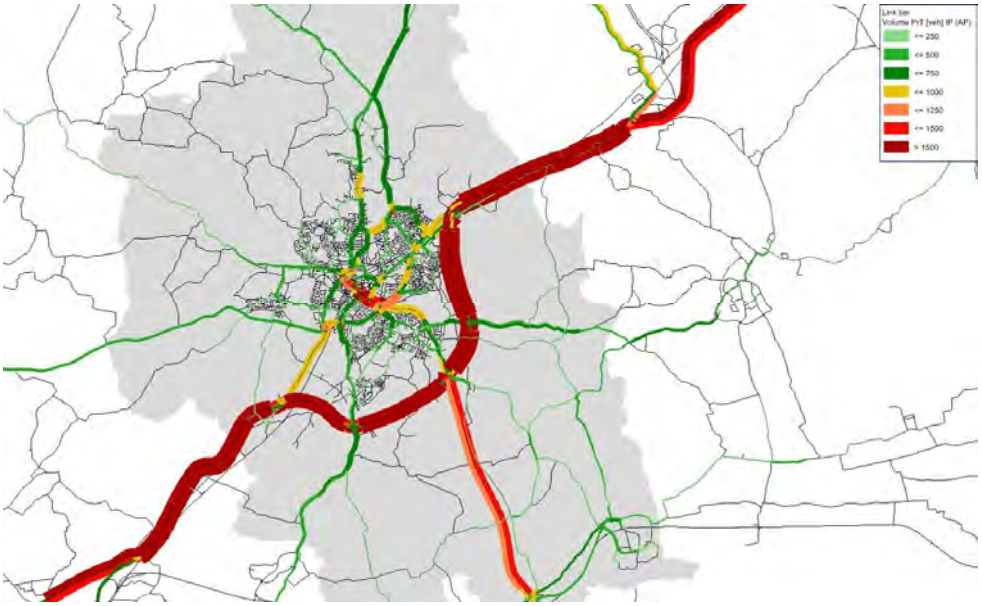


Figure 47 Highway assignment in the IP average hour (veh/hour/direction)

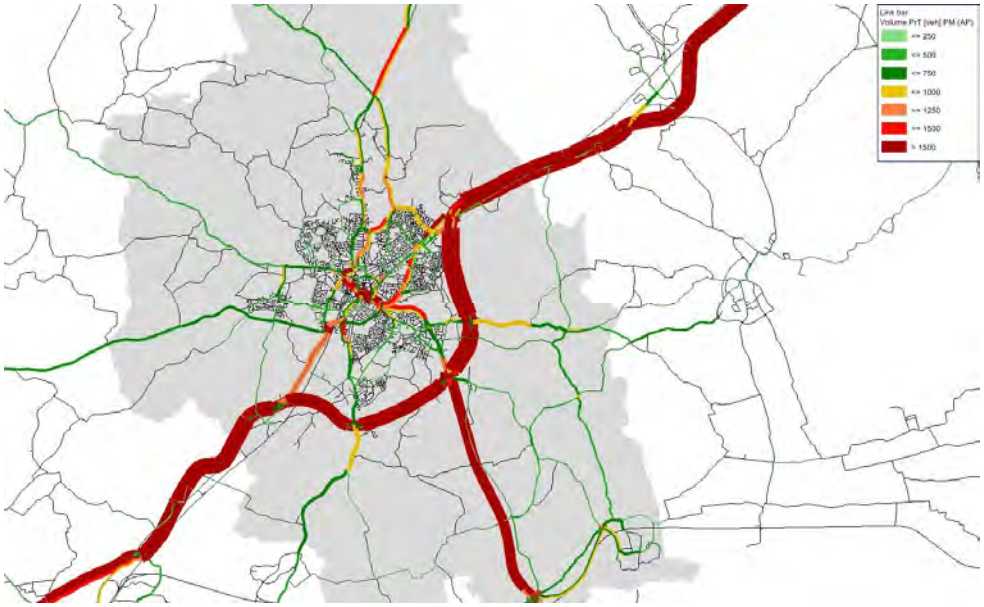


Figure 48 Highway assignment in the PM hour (veh/hour/direction)

7.8.2 The following figures demonstrate level of congestion in AM peak hour, IP hour and PM peak hour assignments. The measure 'Volume over Capacity' (VOC) reflects the percentage of capacity utilised by the traffic flow on any give road section. The higher the VOC value, the more congested the roadway section is.

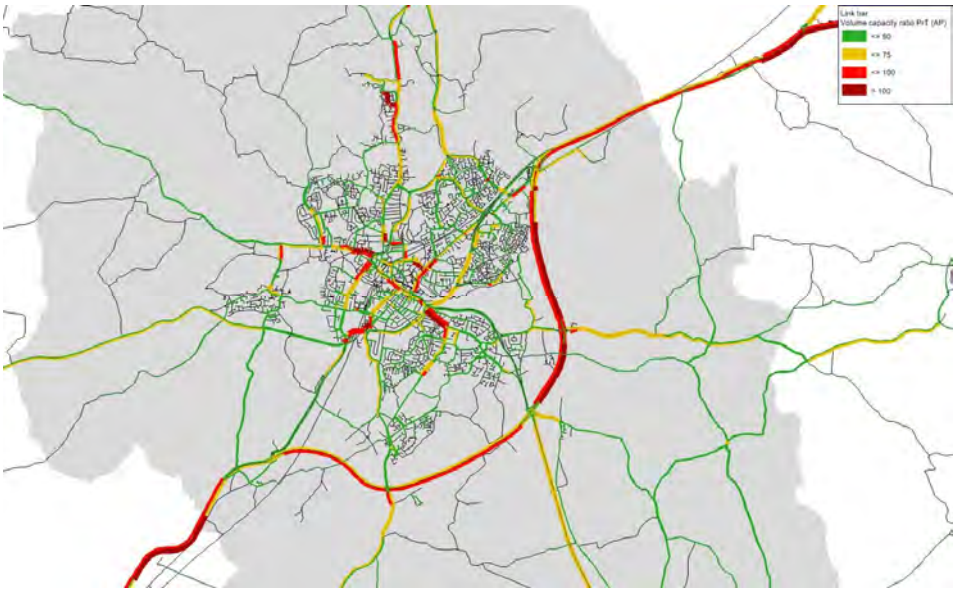


Figure 49 Level of congestion in the AM peak hour (Volume over capacity in %)

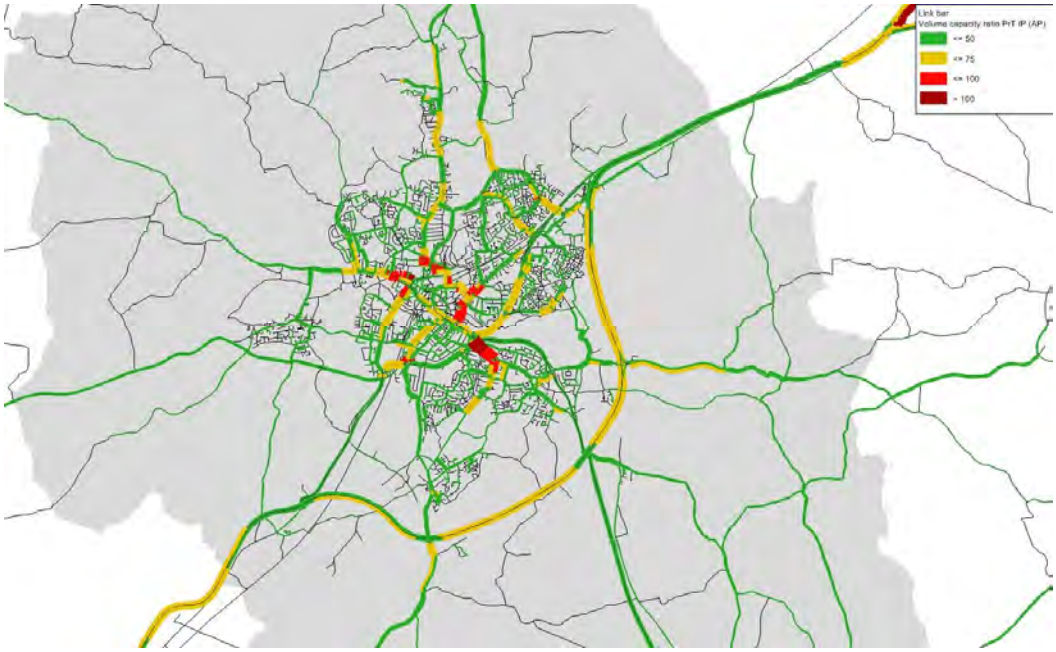


Figure 50 Level of congestion in the IP average hour (Volume over capacity in %)

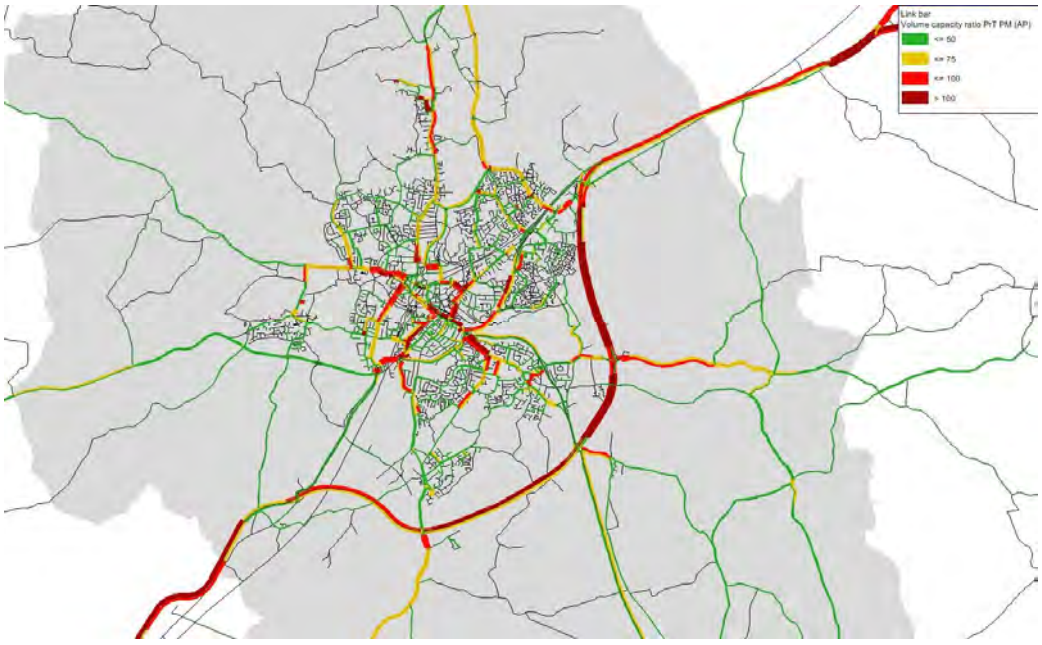


Figure 51 Level of congestion in the PM peak hour (Volume over capacity in %)

8. Public Transport Validation

8.1.1 WebTAG Unit M3.2 specifies validation criteria for public transport models, modelled flows on screenlines and also on individual links.

8.1.2 No historic public transport count data was available for the project at the temporal resolution required for calibration, i.e. only annual statistics was available from the operators. A full public transport passenger survey was out of scope of the commission due to budget constraints.

8.1.3 In order to establish passenger count data for rail and bus matrix validation, existing data was obtained from local bus operators and passenger surveys were carried out at Chelmsford railway station and at selected bus stops in Chelmsford city centre.

8.1.4 The station passenger surveys were executed by Jacobs, during a fully representative neutral weekday in June 2014 at Chelmsford Rail Station. The surveys consisted on a detailed count and analysis of the total number of pedestrians entering or leaving the station by the main and side entrances. Please refer to TDCR for further details.

8.1.5 Total annual passenger boarding and alighting counts at main bus stops were provided by First, main bus operator within Chelmsford Administrative area, for the period between October 2013 and October 2014. The level of disaggregation or detail of the data was not sufficient to perform screenline or a cordon analysis.

8.1.6 A post-process and analysis was executed on this data to identify total numbers of passengers boarding/alighting at specific bus stops and/or travelling through main corridors. Please refer to DDVR where there is a detail description of this process.

8.1.7 Bus stop surveys were also executed by Jacobs, in order to quantify boarding and alighting at selected bus stops within the city centre. Since these surveys were not comprehensive, they were used to validate the disaggregation of the bus data, provided by First.

8.1.8 Rail and bus counts were compared against Public Transport mobile phone matrices for validation purposes. As it can be seen in Table 29 and Table 30 , differences between assigned trips and reported trips remain in every case within reasonable values. In case of rail the discrepancy is below 5%. In case of buses, the differences were slightly higher, nevertheless, still acceptable, as shown in Table 30.

Time period	Trips							
	AM		IP		PM		Total	
	O	D	O	D	O	D	O	D
Mobile Phone Matrices (Catchment Area)	6578	2779	3526	2997	2590	3439	12694	9216
	Entries	Exits	Entries	Exits	Entries	Exits	Entries	Exits
Rail Station Passenger counts	6596	2764	3463	3049	2533	3443	12592	9256
Difference	-0.3%	0.6%	1.8%	-1.7%	2.3%	-0.1%	0.8%	-0.4%

Table 29 Rail station passenger counts vs Mobile Phone matrices by time period

Matrix Origins vs. Total Passengers Boarding by time period				
	AM	IP	PM	Total
Mobile	10,846	10,510	6,073	27,429
First	10,627	11,220	6,203	28,051
Tempro	8,761	13,337	5,761	27,858
Mobile vs First	2.1%	-6.3%	-2.1%	-2.2%
Mobile vs Tempro	23.8%	-21.2%	5.4%	-1.5%

Table 30 First counts vs. TEMPRO trip-ends vs mobile phone matrix trip origins by time period

8.1.9 In line with WebTAG guidance, validation of the network for accuracy of the coded geometry, times and speeds was undertaken. Please refer to paragraph 4.2.43 for further details on the network checks.

8.1.10 As a last stage, validation of the assignment was validated by comparing modelled and observed flows of rail and bus trips. Due to the same limitation previously explained, this analysis was done at Chelmsford Rail Station, for rail, and as an overall value of boarding passengers within the administrative area for buses. The following tables summarise the results from this comparison.

Time period	Rail Boarding Alighting Trips							
	AM		IP		PM		Total	
	Boarding	Alighting	Boarding	Alighting	Boarding	Alighting	Boarding	Alighting
Assignment	6613	2823	3204	3204	2470	3529	12287	9556
	Entries	Exits	Entries	Exits	Entries	Exits	Entries	Exits
Rail Station Passenger counts	6596	2764	3463	3049	2533	3443	12592	9256
Difference	0%	2%	-7%	5%	-2%	3%	-2%	3%

Table 31 Validation of rail assignment vs station counts by time period

Total Origins / Total Passengers Boarding Buses				
	AM	IP	PM	Total
First Counts	10,627	11,220	6,203	28,051
Tempro	8,761	13,337	5,761	27,858
Model	10,638	11,520	6,149	28,307
Model Vs First (%)	0.10%	2.67%	-0.87%	1%
Model Vs Tempro (%)	21.43%	-13.62%	6.73%	1.61%

Table 32 Validation of bus assignment vs boarding by First vs. TEMPRO trip-ends by time period

8.1.11 Overall the observed differences between the bus data sets are all within acceptable limits and peak periods were properly captured.

8.1.12 Validated peak period matrices were converted into peak hour matrices by using daily profiles available from the hourly mobile phone trip matrices.

8.2 Assignment Results

8.2.1 Combined bus and rail assignments were created for the Base Year for AM, IP, PM peak hours for June 2014. The results are shown in Figure 52, Figure 53 and Figure 54.

8.2.2 The assignment of rail network is dominated by travelling towards London in the morning and returning from London in the PM peak. Buses travel shows a fairly consistent pattern across the time periods, with strong flows to/from north and east of the city.

Figure 52 Public transport assignment AM peak hour (passenger/hour/direction)

Figure 53 Public transport assignment IP average hour (passenger/hour/direction)

Figure 54 Public transport assignment PM peak hour (passenger/hour/direction)

Appendix A. Additional Information

Link type no.	Description	Available Transport system	No. lanes	Cap (pcus/ hr)	Free-flow speed	Volume-Delay function parameters			
						a	b	c	b'
0	Blocked opposite direction	0	0	0	0	1.15	4	2.5	0.8
1	Rural dual 4 motorway	B,Car,HGV,LGV	4	10080	116	Constant	Constant	Constant	Constant
2	Rural dual 3 motorway	B,Car,HGV,LGV	3	5636	116	Constant	Constant	Constant	Constant
3	Rural dual 2 motorway	B,Car,HGV,LGV	2	3818	113	Constant	Constant	Constant	Constant
4	Rural dual 3 all purpose	B,Car,HGV,LGV,W	3	3454	109	Constant	Constant	Constant	Constant
5	Rural dual 5 motorway	B,Car,HGV,LGV	5	12600	116	Constant	Constant	Constant	Constant
6	Rural dual 6 motorway	B,Car,HGV,LGV	6	15120	116	Constant	Constant	Constant	Constant
7	Rural dual 1 motorway slip	B,Car,HGV,LGV	1	1909	113	Constant	Constant	Constant	Constant
8	Rural carriageway typical 2 lanes (Admin)	B,Car,Cycle,HGV,LGV,W	2	3750	105	1.15	2.1	2	0.81
9	Rural carriageway typical 3 lanes (Admin)	B,Car,Cycle,HGV,LGV,W	3	5625	105	1.15	2.1	2	0.81
10	Suburban dual 2 slight development	B,Car,Cycle,HGV,LGV,W	2	3750	77	Constant	Constant	Constant	Constant
11	Suburban dual 2 typical development	B,Car,Cycle,HGV,LGV,W	2	3000	71	Constant	Constant	Constant	Constant
12	Suburban dual 2 heavy development	B,Car,Cycle,HGV,LGV,W	2	2550	68	Constant	Constant	Constant	Constant
13	Suburban single slight development	B,Car,Cycle,HGV,LGV,W	1	1875	68	Constant	Constant	Constant	Constant
14	Suburban single typical development	B,Car,Cycle,HGV,LGV,W	1	1500	61	Constant	Constant	Constant	Constant
15	Suburban single heavy development	B,Car,Cycle,HGV,LGV,W	1	1275	58	Constant	Constant	Constant	Constant
16	Suburban dual 3 heavy development	B,Car,Cycle,HGV,LGV,W	3	3825	68	Constant	Constant	Constant	Constant
17	Suburban dual 3 slight development	B,Car,Cycle,HGV,LGV,W	3	5625	77	Constant	Constant	Constant	Constant
18	Suburban dual 4 slight development	B,Car,Cycle,HGV,LGV,W	4	7500	77	Constant	Constant	Constant	Constant
19	Suburban single slight development HGV ban	B,Car,Cycle,LGV,W	1	1875	68	Constant	Constant	Constant	Constant
20	Suburban single typical development HGV ban	B,Car,Cycle,LGV,W	1	1500	61	Constant	Constant	Constant	Constant
21	Suburban single heavy development HGV ban	B,Car,Cycle,LGV,W	1	1275	58	7	1.85	2	2
22	Rural carriageway typical 3 lanes	B,Car,Cycle,HGV,LGV,W	3	5625	105	Constant	Constant	Constant	Constant
23	Rural single carriageway 10m good	B,Car,Cycle,HGV,LGV,W	1	2132	105	Constant	Constant	Constant	Constant
24	Rural single carriageway 10m typical	B,Car,Cycle,HGV,LGV,W	1	1705	92	Constant	Constant	Constant	Constant
25	Rural single carriageway 7.3m good	B,Car,Cycle,HGV,LGV,W	1	1470	87	Constant	Constant	Constant	Constant
26	Rural single carriageway 7m typical	B,Car,Cycle,HGV,LGV,W	1	1176	84	Constant	Constant	Constant	Constant
27	Rural single carriageway 6.5m bad	B,Car,Cycle,HGV,LGV,W	1	1000	77	Constant	Constant	Constant	Constant
28	Rural single carriageway 5m awful	B,Car,Cycle,HGV,LGV,W	1	850	56	Constant	Constant	Constant	Constant
29	Urban non-central 80% development HGV ban (Admin)	B,Car,Cycle,LGV,W	1	780	48	0.75	1.4	1.3	0.5
30	Urban non-central 50% development (Admin)	B,Car,Cycle,HGV,LGV,W	1	980	50	0.9	1.3	1.15	0.6
31	Urban non-central 80% development (Admin)	B,Car,Cycle,HGV,LGV,W	1	780	44	0.75	1.4	1.3	0.5
32	Urban non-central 100% development (Admin)	B,Car,Cycle,HGV,LGV,W	1	500	41	0.9	1.3	1.15	0.6
33	Rural carriageway typical 2 lanes	B,Car,Cycle,HGV,LGV,W	2	3750	105	Constant	Constant	Constant	Constant
34	Rural single carriageway 5m awful HGV ban	B,Car,Cycle,LGV,W	1	850	56	1.15	4	2.5	0.8
35	Suburban dual 2 slight development (Admin)	B,Car,Cycle,HGV,LGV,W	2	3750	77	1.15	1.8	1.35	0.88
36	Suburban dual 2 typical development (Admin)	B,Car,Cycle,HGV,LGV,W	2	3000	71	1.8	3.5	1.22	0.9
37	Suburban dual 2 heavy development (Admin)	B,Car,Cycle,HGV,LGV,W	2	2550	68	1.5	2.1	1.35	0.88
38	Suburban single slight development (Admin)	B,Car,Cycle,HGV,LGV,W	1	1875	68	1.8	1.45	0.88	1.1
39	Suburban single typical development (Admin)	B,Car,Cycle,HGV,LGV,W	1	1500	61	1.8	3.8	1.45	0.88

40	Suburban single heavy development (Admin)	B,Car,Cycle,HGV,LGV,W	1	1275	58	7	1.85	2	2
41	Urban non-central 50% development	B,Car,Cycle,HGV,LGV,W	1	980	50	Constant	Constant	Constant	Constant
42	Urban non-central 80% development	B,Car,Cycle,HGV,LGV,W	1	780	44	Constant	Constant	Constant	Constant
43	Urban non-central 100% development	B,Car,Cycle,HGV,LGV,W	1	500	41	Constant	Constant	Constant	Constant
44	Urban non-central 50% development HGV ban	B,Car,Cycle,LGV,W	1	980	55	Constant	Constant	Constant	Constant
45	Urban non-central 80% development HGV ban	B,Car,Cycle,LGV,W	1	780	48	Constant	Constant	Constant	Constant
46	Urban non-central 100% development HGV ban	B,Car,Cycle,LGV,W	1	500	48	Constant	Constant	Constant	Constant
47	Urban non-central 80% development 2 lanes (Admin)	B,Car,Cycle,HGV,LGV,W	2	1560	48	0.75	1.4	1.3	0.5
48	Urban non-central 80% development 2 lanes HGV ban	B,Car,Cycle,LGV,W	2	1560	48	Constant	Constant	Constant	Constant
49	Urban non-central 80% development 3 lanes	B,Car,Cycle,HGV,LGV,W	3	2340	48	Constant	Constant	Constant	Constant
50	Suburban dual 3 heavy development (Admin)	B,Car,Cycle,HGV,LGV,W	3	3825	68	1.5	2.1	1.35	0.88
51	Small town 35% development	B,Car,Cycle,HGV,LGV,W	1	1300	66	Constant	Constant	Constant	Constant
52	Small town 60% development	B,Car,Cycle,HGV,LGV,W	1	1000	48	Constant	Constant	Constant	Constant
53	Small town 90% development	B,Car,Cycle,HGV,LGV,W	1	450	29	Constant	Constant	Constant	Constant
54	Small town 35% development (Admin)	B,Car,Cycle,HGV,LGV,W	1	1300	66	0.9	1.3	0.6	1.15
55	Small town 60% development (Admin)	B,Car,Cycle,HGV,LGV,W	1	1000	48	0.7	3.5	2.5	0.7
56	Suburban dual 4 heavy development (Admin)	B,Car,Cycle,HGV,LGV,W	4	5100	63	Constant	Constant	Constant	Constant
57	Suburban dual 3 slight development (Admin)	B,Car,Cycle,HGV,LGV,W	3	5625	77	1.15	1.8	1.35	0.88
58	Suburban dual 4 slight development (Admin)	B,Car,Cycle,HGV,LGV,W	4	7500	77	1.15	1.8	1.35	0.88
59	Rural single carriageway 10m typical (Admin)	B,Car,Cycle,HGV,LGV,W	1	1705	92	1.15	3.8	2.2	0.8
60	Urban central INT = 2	B,Car,Cycle,HGV,LGV,W	1	740	45	Constant	Constant	Constant	Constant
61	Urban central INT = 4.5	B,Car,Cycle,HGV,LGV,W	1	650	37	7	1.65	1.6	2
62	Urban central INT = 9	B,Car,Cycle,HGV,LGV,W	1	630	34	Constant	Constant	Constant	Constant
63	Urban central INT = 2 HGV ban	B,Car,Cycle,LGV,W	1	740	45	Constant	Constant	Constant	Constant
64	Urban central INT = 4.5 HGV ban	B,Car,Cycle,LGV,W	1	650	37	7	1.65	1.6	2
65	Urban central INT = 9 HGV ban	B,Car,Cycle,LGV,W	1	630	34	Constant	Constant	Constant	Constant
66	Rural single carriageway 7.3m good (Admin)	B,Car,Cycle,HGV,LGV,W	1	1470	87	1.15	2.1	2	0.81
67	Rural single carriageway 7m typical (Admin)	B,Car,Cycle,HGV,LGV,W	1	1176	84	1.15	2.1	2	0.81
68	Rural single carriageway 6.5m bad (Admin)	B,Car,Cycle,HGV,LGV,W	1	1000	77	1.15	2.1	2	0.81
69	Rural single carriageway 5m awful (Admin)	B,Car,Cycle,HGV,LGV,W	1	850	56	1.15	4	2.5	0.8
70	Roundabout Circulate 4	B,Car,Cycle,HGV,LGV,W	4	9375	45	Constant	Constant	Constant	Constant
71	Roundabout Circulate 3	B,Car,Cycle,HGV,LGV,W	3	5625	40	1.15	2.1	2	0.81
72	Roundabout Circulate 2	B,Car,Cycle,HGV,LGV,W	2	3750	35	1.15	2.1	2	0.81
73	Roundabout Circulate 1	B,Car,Cycle,HGV,LGV,W	1	1875	30	1.15	2.1	2	0.81
74									
75	M25 dual 4	B,Car,HGV,LGV	4	10080	116	Constant	Constant	Constant	Constant
76	M25 dual 3	B,Car,HGV,LGV	3	5636	116	Constant	Constant	Constant	Constant
77	M25 dual 2	B,Car,HGV,LGV	2	3818	113	Constant	Constant	Constant	Constant
78	Walk Links (Cycle dismount)	Cycle,W	1	99999	50	Constant	Constant	Constant	Constant
79	Walk Links Stations Access (Cycle dismount)	Cycle,W	1	99999	50	Constant	Constant	Constant	Constant
80	Walk Links	Cycle,W	1	99999	0	Constant	Constant	Constant	Constant
81	Residential Road	B,Car,Cycle,LGV,W	1	400	30	Constant	Constant	Constant	Constant
82	Cycling Paths	Cycle,W	1	99999	0	Constant	Constant	Constant	Constant
83	(Cycling signals) Urban central INT = 4.5 HGV ban	B,Car,Cycle,LGV,W	1	650	37	7	1.65	1.6	2
84	(Cycling signals) Residential Road	B,Car,Cycle,LGV,W	1	400	30	0.7	3	2	0.7

85	(Cycling signals) Suburban single heavy development	B,Car,Cycle,HGV,LGV,W	1	1275	50	7	1.85	2	2
86	(Cycling signals) Rural carriageway 7m typical 2 lanes	B,Car,Cycle,HGV,LGV,W	2	2352	84	1.15	2.1	2	0.81
87	(Cycling signals) Suburban dual 2 heavy development	B,Car,Cycle,HGV,LGV,W	2	2550	68	1.5	2.1	1.35	0.88
88	(Cycling signals) Urban non-central 80% development	B,Car,Cycle,HGV,LGV,W	1	780	48	0.75	1.4	1.3	0.5
89	(Cycling signals) Suburban dual 4 slight development	B,Car,Cycle,HGV,LGV,W	4	7500	77	1.15	1.8	1.35	0.88
90	Single track road	B,Car,Cycle,LGV,W	1	200	40	1.15	2.1	2	0.81
91	Urban non-central 100% development 2 lanes (Admin)	B,Car,Cycle,HGV,LGV,W	2	1000	41	0.9	1.3	1.15	0.6
92	Residential Road (Admin)	B,Car,Cycle,LGV,W	1	400	30	0.7	3	2	0.7
93									
94	Rural single carriageway 5m extremely bad (Admin)	B,Car,Cycle,HGV,LGV,W	1	250	20	1.15	4	2.5	0.8
95	Bus only	B,Cycle,W	1	99999	48	7	1.85	2	2
96	Car Park	Car,Cycle,LGV	1	100	48	Constant	Constant	Constant	Constant
97	Rail Link	C+Train,Cycle+Train,T	1	99999	50	Constant	Constant	Constant	Constant
98	LU Links	U	1	99999	50	Constant	Constant	Constant	Constant
99									

Appendix B. Bus Services

Route	Operator	Departures by service		
		AM peak	Interpeak	PM peak
		0800-0900	Av Hr	1700-1800
100X_FT2_BUS	First	2	0	1
100_FT2_BUS	First	30	25	24
101_FT_BUS	First	0	0	0
102_FC_BUS	Fords Coaches	1	0	0
103_FT_BUS	First	4	4	4
103_PT_BUS	Panther Travel	1	0	0
104_FT_BUS	First	5	4	4
104_NB_BUS	NIBS	0	3	0
105_NC_BUS	Network Colchester	0	2	0
106_FT_BUS	First	0	0	0
106_NB_BUS	NIBS	0	0	4
107_NC_BUS	Network Colchester	1	0	1
109_NC_BUS	Network Colchester	1	0	1
10_FT4_BUS	First	4	4	4
10_NE_BUS	Network Harlow	10	6	10
10_SE_BUS	Stephensons of Essex	2	0	2
111_CH_BUS	H.C. Chambers & Son	0	0	2
115_NC_BUS	Network Colchester	1	0	0
117_FT_BUS	First	1	0	0
118_HO_BUS	Hedingham Omnibuses	1	0	0
119A_NH_BUS	New Horizon Travel Ltd	1	0	0
11_ACME_BUS	Acme Transport Services	1	0	0
11_AMB_BUS	Amber Coaches Limited	5	2	4
11_FT_BUS	First	2	2	2
11_HO_BUS	Hedingham Omnibuses	1	0	1
11_RB1_BUS	Regal Bus Ways	0	1	2
120_FT_BUS	First	0	0	6
12_FT_BUS	First	6	6	6
12_RB1_BUS	Regal Bus Ways	2	2	0
130_HO_BUS	Hedingham Omnibuses	0	6	0
131_FT_BUS	First	3	0	1
132_FT_BUS	First	11	16	15
133_AI_BUS	SX Connect	5	6	6
134_HO_BUS	Hedingham Omnibuses	0	2	0
135_HO_BUS	Hedingham Omnibuses	0	2	0
137_HO_BUS	Hedingham Omnibuses	4	6	6
13_RB1_BUS	Regal Bus Ways	2	1	2
146_RB_BUS	Regal Bus Ways	0	1	0

14_FT_BUS	First	2	2	2
14_SE_BUS	Stephensons of Essex	1	2	2
150_AL_BUS	Arrival London	20	19	19
15A_FT2_BUS	First	7	8	6
15A_FT_BUS	First	1	0	1
15B_FT2_BUS	First	1	0	0
15_FT2_BUS	First	5	8	8
15_FT4_BUS	First	0	0	1
15_FT_BUS	First	1	2	1
167_BT_BUS	Blue Triangle	25	24	26
16A_HO1_BUS	Hedingham Omnibuses	1	0	0
16_HO1_BUS	Hedingham Omnibuses	1	0	0
16_HO_BUS	Hedingham Omnibuses	1	1	2
16_SW_BUS	EOS	1	1	1
16_TK_BUS	Townlink Buses	4	4	4
175_FT_BUS	First	2	1	1
177_NH_BUS	New Horizon Travel Ltd	1	0	0
17_FT_BUS	First	4	2	2
17_HO2_BUS	Hedingham Omnibuses	1	0	0
17_SE_BUS	Stephensons of Essex	0	2	1
18_FD_BUS	Freedom Travel Coaches	2	1	2
18_FT_BUS	First	2	4	4
18_LO_BUS	J.W. Lodge & Sons	0	0	0
193_CC_BUS	Carters Coach Services	1	0	0
194_CC_BUS	Carters Coach Services	1	0	0
19_TK_BUS	Townlink Buses	19	18	11
1A_FT_BUS	First	0	0	0
1A_NC_BUS	Network Colchester	9	9	9
1A_RB_BUS	Regal Bus Ways	0	1	1
1B_NE_BUS	Network Harlow	0	0	0
1_ACME_BUS	Acme Transport Services	1	0	0
1_AS_BUS	Arriva Southend	26	26	24
1_NC_BUS	Network Colchester	10	10	9
1_RB_BUS	Regal Bus Ways	1	0	0
1_SE_BUS	Stephensons of Essex	0	2	0
200X_FT1_BUS	First	2	0	0
200_FT1_BUS	First	6	8	8
20X_SE_BUS	Stephensons of Essex	1	0	0
20_FT2_BUS	First	19	16	16
20_GA_BUS	Go Ahead	17	16	16
20_TK_BUS	Townlink Buses	23	12	27
211_RB_BUS	Regal Bus Ways	1	2	0
212_RB_BUS	Regal Bus Ways	1	0	1

213_RB_BUS	Regal Bus Ways	2	3	3
215_EL_BUS	East London	8	8	8
21A_FT2_BUS	First	1	5	0
21A_FT_BUS	First	0	0	4
21B_FT2_BUS	First	0	0	0
21C_FT_BUS	First	0	3	0
21X_FT2_BUS	First	1	0	3
21_FT1_BUS	First	2	0	2
21_FT2_BUS	First	12	6	12
21_FT_BUS	First	6	8	3
21_NB_BUS	NIBS	0	2	0
21_TK_BUS	Townlink Buses	12	15	13
221_NB_BUS	NIBS	3	4	6
222_NB_BUS	NIBS	3	3	3
223_FF_BUS	Flag Finders	1	0	0
225_NB_BUS	NIBS	0	1	0
22_FT2_BUS	First	11	15	13
236_BE_BUS	Constable Coaches	4	3	3
236_NB_BUS	NIBS	0	0	0
237_NB_BUS	NIBS	1	1	2
23_FT2_BUS	First	1	4	0
247A_SE_BUS	Stephensons of Essex	0	0	1
247_SE_BUS	Stephensons of Essex	2	1	1
24_FT_BUS	First	7	7	7
250_NX_BUS	National Express	2	2	2
250_RB_BUS	Regal Bus Ways	0	0	0
251_AE_BUS	Arriva the Shires & Essex	12	10	12
251_RB_BUS	Regal Bus Ways	0	0	0
254_RR_BUS	Roadrunner Coaches	1	0	0
255_RR_BUS	Roadrunner Coaches	12	17	17
25A_FT2_BUS	First	6	11	7
25B_FT2_BUS	First	2	0	1
25_FT2_BUS	First	15	10	12
261_AMB_BUS	Amber Coaches Limited	2	2	2
265_AMB_BUS	Amber Coaches Limited	0	3	2
268_AMB_BUS	Amber Coaches Limited	1	0	1
269_AMB_BUS	Amber Coaches Limited	3	2	3
26_FT2_BUS	First	3	6	5
275_FT_BUS	First	1	0	0
27X_FT2_BUS	First	3	0	2
27_FT2_BUS	First	17	19	18
288_SE_BUS	Stephensons of Essex	0	1	2
28_FT2_BUS	First	18	18	17
29_AS_BUS	Arriva Southend	9	9	8
2_FT4_BUS	First	2	4	2
2_FT_BUS	First	0	0	0

2_HO_BUS	Hedingham Omnibuses	2	2	1
2_NB_BUS	NIBS	1	0	0
2_NC_BUS	Network Colchester	11	15	13
2_NE_BUS	Network Harlow	11	7	12
300_FT_BUS	First	1	0	0
301_TG_BUS	TGM Stansted Ltd	4	4	4
302_PT_BUS	Panther Travel	1	0	0
305_NX_BUS	National Express	1	2	2
306_ACME_BUS	Acme Transport Services	1	0	1
308_TG_BUS	TGM Stansted Ltd	7	6	6
309_TG_BUS	TGM Stansted Ltd	0	0	0
30_FT_BUS	First	6	6	6
312_SE_BUS	Stephensons of Essex	0	0	0
313_SE_BUS	Stephensons of Essex	3	1	2
319_LO_BUS	J.W. Lodge & Sons	1	0	0
31A_RB_BUS	Regal Bus Ways	1	1	1
31C_FT_BUS	First	1	0	2
31X_FT_BUS	First	8	9	8
31_FT_BUS	First	0	0	0
31_MT_BUS	Meridian Line Travel	3	0	1
322_RB_BUS	Regal Bus Ways	1	0	0
32_SE_BUS	Stephensons of Essex	2	1	2
330_DV_BUS	De Vere Travel	1	0	0
341_CB_BUS	Centre Bus	0	0	0
347_EP_BUS	epping Forest Community	0	1	0
347_FT_BUS	First	0	0	0
34A_HO_BUS	Hedingham Omnibuses	2	2	2
34_HO_BUS	Hedingham Omnibuses	2	2	2
34_VE_BUS	Viceroy of Essex	1	2	1
350_NX_BUS	National Express	3	3	4
351_FT_BUS	First	5	7	4
351_RR_BUS	Roadrunner Coaches	4	1	2
352_FT_BUS	First	0	0	0
36X_FT_BUS	First	1	0	0
36_FT_BUS	First	8	7	7
374_AMB_BUS	Amber Coaches Limited	4	2	4
375_AS_BUS	Arriva Southend	1	2	2
37_AMB_BUS	Amber Coaches Limited	0	0	0
380_RB_BUS	Regal Bus Ways	0	0	0
381_LN_BUS	The London Bus Company	0	2	0
381_RB_BUS	Regal Bus Ways	1	1	2
382_RB_BUS	Regal Bus Ways	1	1	0

383_RB_BUS	Regal Bus Ways	1	0	0
38_SE_BUS	Stephensons of Essex	4	5	5
390_RB_BUS	Regal Bus Ways	1	0	0
391_RB_BUS	Regal Bus Ways	0	2	0
392_GN_BUS	Galleon Travel	4	4	4
397_AL_BUS	Arrival London	10	8	8
39_SE_BUS	Stephensons of Essex	2	2	2
3A_NE_BUS	Network Harlow	0	0	0
3A_RB_BUS	Regal Bus Ways	0	0	1
3B_RB_BUS	Regal Bus Ways	1	0	1
3C_RB_BUS	Regal Bus Ways	0	0	0
3D_RB_BUS	Regal Bus Ways	0	0	1
3E_RB_BUS	Regal Bus Ways	1	0	0
3_FC_BUS	Fords Coaches	0	0	0
3_FT_BUS	First	5	2	2
3_NB_BUS	NIBS	1	0	0
3_NE_BUS	Network Harlow	11	8	11
3_RB_BUS	Regal Bus Ways	1	4	1
407_AS_BUS	Arriva Southend	2	0	0
40_FT_BUS	First	9	7	11
410A_GN_BUS	Galleon Travel	4	4	2
410X_GN_BUS	Galleon Travel	3	0	2
410_GN_BUS	Galleon Travel	5	8	10
417_HO_BUS	Hedingham Omnibuses	1	0	0
418_HO_BUS	Hedingham Omnibuses	1	0	0
418_SE_BUS	Stephensons of Essex	1	0	0
419_HO_BUS	Hedingham Omnibuses	1	0	0
419_SE_BUS	Stephensons of Essex	1	0	0
41_FT_BUS	First	5	6	6
41_NB_BUS	NIBS	1	0	0
42A_FT_BUS	First	7	6	7
42_FT_BUS	First	22	16	22
431_FWC_BUS	Four Ways Coaches	0	0	0
433_NB_BUS	NIBS	1	0	0
434_NB_BUS	NIBS	1	0	0
435_NB_BUS	NIBS	1	0	0
436_NB_BUS	NIBS	1	0	0
437_NB_BUS	NIBS	1	0	0
43_RC_BUS	Richmonds Coaches	2	0	1
444_VE_BUS	Viceroy of Essex	1	0	0
445_VE_BUS	Viceroy of Essex	1	0	0
446B_TG_BUS	TGM Stansted Ltd	1	0	0
446_TG_BUS	TGM Stansted Ltd	1	0	0
44_NB_BUS	NIBS	1	0	0

44_TE_BUS	Turners of Essex	1	1	0
45_FT_BUS	First	25	16	15
45_NB_BUS	NIBS	0	0	0
45_RB_BUS	Regal Bus Ways	0	0	0
462_BT_BUS	Blue Triangle	29	28	28
46A_FT_BUS	First	0	0	0
46_FT_BUS	First	2	1	2
46_NB_BUS	NIBS	1	0	0
471_NB_BUS	NIBS	1	0	0
473_NB_BUS	NIBS	1	0	0
474_NB_BUS	NIBS	1	0	0
477_NB_BUS	NIBS	1	0	0
47_FT_BUS	First	8	8	5
47_NB_BUS	NIBS	1	0	0
47_RB_BUS	Regal Bus Ways	0	0	0
481_NX_BUS	National Express	2	2	0
484_FWC_BUS	Four Ways Coaches	1	0	0
484_NX_BUS	National Express	1	1	0
489_NB_BUS	NIBS	1	0	0
48_NB_BUS	NIBS	1	0	0
497_NX_BUS	National Express	0	1	1
498_BT_BUS	Blue Triangle	9	9	10
49_NB_BUS	NIBS	1	0	0
4A_AS_BUS	Arriva Southend	4	2	4
4_AS_BUS	Arriva Southend	1	3	2
4_FT_BUS	First	1	2	0
4_NC_BUS	Network Colchester	0	1	0
4_NE_BUS	Network Harlow	8	9	8
502_FT2_BUS	First	1	0	0
503_SE_BUS	Stephensons of Essex	1	0	0
504_SE_BUS	Stephensons of Essex	1	0	1
505_FWC_BUS	Four Ways Coaches	1	0	0
505_NE_BUS	Network Harlow	6	4	4
506_RB_BUS	Regal Bus Ways	1	0	0
506_SE_BUS	Stephensons of Essex	1	0	0
507_RB_BUS	Regal Bus Ways	1	0	0
508_FT2_BUS	First	1	0	1
509_AI_BUS	SX Connect	12	8	13
509_FT2_BUS	First	1	0	0
509_SE_BUS	Stephensons of Essex	1	0	0
50_HO_BUS	Hedingham Omnibuses	0	2	1
50_NB_BUS	NIBS	1	0	0
510_AI_BUS	SX Connect	12	8	12
510_SE_BUS	Stephensons of Essex	1	0	1
511_FT_BUS	First	1	0	0
511_RR_BUS	Roadrunner Coaches	9	12	9
512_FT2_BUS	First	1	0	1

512_RR_BUS	Roadrunner Coaches	2	0	0
513_SE_BUS	Stephensons of Essex	1	0	0
514_SE_BUS	Stephensons of Essex	1	0	0
515_SE_BUS	Stephensons of Essex	1	0	0
51_FT_BUS	First	7	7	6
51_SE_BUS	Stephensons of Essex	1	0	0
524_TK_BUS	Townlink Buses	4	4	4
52_RB_BUS	Regal Bus Ways	1	1	1
52_SE_BUS	Stephensons of Essex	1	0	0
53_SE_BUS	Stephensons of Essex	1	0	0
541_GN_BUS	Galleon Travel	5	4	5
542_FT_BUS	First	1	0	1
542_GN_BUS	Galleon Travel	1	1	1
543_GN_BUS	Galleon Travel	1	1	1
549_DB_BUS	Docklands Buses	2	2	2
54A_FT_BUS	First	1	0	0
54C_FT_BUS	First	0	0	0
54_FT_BUS	First	10	10	11
552_RB_BUS	Regal Bus Ways	0	0	0
553_RB_BUS	Regal Bus Ways	1	0	1
55_FT_BUS	First	1	0	0
560_SE_BUS	Stephensons of Essex	1	0	0
561_FT2_BUS	First	2	0	1
565_RB_BUS	Regal Bus Ways	5	3	2
56A_FT_BUS	First	2	0	0
56_FT_BUS	First	10	11	13
575_GA_BUS	Go Ahead	0	0	0
590_VE_BUS	Viceroy of Essex	0	0	2
593_SE_BUS	Stephensons of Essex	0	0	1
594_SE_BUS	Stephensons of Essex	0	0	0
59_AI_BUS	SX Connect	2	4	4
59_SE_BUS	Stephensons of Essex	2	1	4
59_VE_BUS	Viceroy of Essex	2	0	0
5A_FT_BUS	First	0	1	1
5_AR_BUS	Arrow Taxis	4	4	4
5_AS_BUS	Arriva Southend	8	9	9
5_FT1_BUS	First	17	17	17
5_FT_BUS	First	4	3	4
5_NE_BUS	Network Harlow	8	6	9
5_SE1_BUS	Stephensons of Essex	4	4	4
602_NC_BUS	Network Colchester	1	0	0
608_BT_BUS	Blue Triangle	3	0	0
60_SE_BUS	Stephensons of Essex	2	2	3
61_FT_BUS	First	10	10	11
61_SE_BUS	Stephensons of Essex	2	3	2

620_SE_BUS	Stephensons of Essex	1	0	0
621_SE_BUS	Stephensons of Essex	1	0	0
623_SE_BUS	Stephensons of Essex	1	0	0
62A_FT_BUS	First	0	0	0
62_FT_BUS	First	14	18	18
630_SE_BUS	Stephensons of Essex	1	0	0
637_SE_BUS	Stephensons of Essex	1	0	0
63_FT_BUS	First	9	9	9
64A_FT_BUS	First	10	10	10
64_FT_BUS	First	9	9	8
65_FT_BUS	First	28	24	22
667_BT_BUS	Blue Triangle	2	0	0
66A_FT_BUS	First	6	6	6
66A_SW_BUS	EOS	2	3	1
66_FT_BUS	First	8	8	8
66_SW_BUS	EOS	7	5	6
676_SE_BUS	Stephensons of Essex	1	0	0
67A_FT_BUS	First	2	2	2
67B_FT_BUS	First	0	0	0
67D_FT_BUS	First	0	0	0
67E_FT_BUS	First	1	0	0
67_FT_BUS	First	4	4	4
6A_AS_BUS	Arriva Southend	0	5	0
6A_NE_BUS	Network Harlow	0	0	0
6A_SE_BUS	Stephensons of Essex	1	0	2
6_FC_BUS	Fords Coaches	0	0	0
6_NC_BUS	Network Colchester	0	4	0
6_NE_BUS	Network Harlow	1	3	0
6_SE1_BUS	Stephensons of Essex	6	5	6
700_UN_BUS	University Bus Ltd	2	2	2
701_SE_BUS	Stephensons of Essex	1	0	0
702_SE_BUS	Stephensons of Essex	1	0	0
703_SE_BUS	Stephensons of Essex	1	0	0
704_SE_BUS	Stephensons of Essex	1	0	0
70X_FT_BUS	First	2	0	2
70_FT_BUS	First	48	36	31
70_RB_BUS	Regal Bus Ways	0	0	0
716A_FF_BUS	Flag Finders	1	0	0
716_FF_BUS	Flag Finders	1	0	0
71A_FT_BUS	First	6	4	4
71C_FT_BUS	First	0	0	0
71C_SE_BUS	Stephensons of Essex	0	0	0
71X_FT_BUS	First	0	0	0
71_FT_BUS	First	5	6	7
71_SE_BUS	Stephensons of Essex	2	1	2
724_GL_BUS	Green Line	8	8	7
725_GL_BUS	Green Line	1	0	0
727_NX_BUS	National Express	9	10	9

72_FT_BUS	First	3	0	5
72_SE_BUS	Stephensons of Essex	0	1	0
737_NX_BUS	National Express	2	4	4
73_FT4_BUS	First	2	2	1
73_FT_BUS	First	12	11	12
741A_OC_BUS	Olympian Coaches	0	0	1
741_OC_BUS	Olympian Coaches	3	0	3
741_SE_BUS	Stephensons of Essex	1	0	0
742_OC_BUS	Olympian Coaches	1	0	0
747_HO_BUS	Hedingham Omnibuses	1	0	0
748_HO_BUS	Hedingham Omnibuses	1	0	0
74B_FT_BUS	First	0	0	0
74_FT_BUS	First	5	4	4
754_CH_BUS	H.C. Chambers & Son	3	4	4
755_CH_BUS	H.C. Chambers & Son	1	0	0
75A_FT_BUS	First	0	0	0
75_FT_BUS	First	9	10	9
75_RB_BUS	Regal Bus Ways	0	0	0
76_FT_BUS	First	4	2	4
777_NX_BUS	National Express	5	4	4
77_NH_BUS	New Horizon Travel Ltd	2	2	2
78A_NH_BUS	New Horizon Travel Ltd	3	3	1
78_NH_BUS	New Horizon Travel Ltd	7	2	5
79_GR_BUS	Go Ride Community Interest	2	2	2
7A_ACME_BUS	Acme Transport Services	2	2	0
7_ACME_BUS	Acme Transport Services	2	2	4
7_AS_BUS	Arriva Southend	20	17	17
7_FT_BUS	First	6	7	5
7_NE_BUS	Network Harlow	4	2	4
7_RB_BUS	Regal Bus Ways	0	0	0
7_SC_BUS	Stage Coachin Cambridge	10	10	10
7_SE_BUS	Stephensons of Essex	0	7	2
801_NC_BUS	Network Colchester	0	1	0
802_NC_BUS	Network Colchester	0	1	0
803_NC_BUS	Network Colchester	0	1	0
804_LG_BUS	London General Transport	1	0	0
806_SE_BUS	Stephensons of Essex	0	0	0
807_SE_BUS	Stephensons of Essex	0	0	0
808_BCT_BUS	Brentwood Community Transport	2	2	1

808_SE_BUS	Stephensons of Essex	0	0	0
809_SE_BUS	Stephensons of Essex	0	0	0
80_SE_BUS	Stephensons of Essex	0	2	0
810_SE_BUS	Stephensons of Essex	0	0	0
811_SE_BUS	Stephensons of Essex	0	0	0
812_SE_BUS	Stephensons of Essex	0	0	0
813_SE_BUS	Stephensons of Essex	0	0	0
814_SE_BUS	Stephensons of Essex	1	0	0
815_SE_BUS	Stephensons of Essex	1	0	0
816_SE_BUS	Stephensons of Essex	1	0	0
81_ENS_BUS	Ensign Bus Company	5	3	5
820_FT2_BUS	First	1	0	0
822_FT2_BUS	First	1	0	0
825_FT2_BUS	First	1	0	1
827_FT2_BUS	First	1	0	0
83_FT_BUS	First	0	1	1
84A_CH_BUS	H.C. Chambers & Son	1	0	0
84_CH_BUS	H.C. Chambers & Son	6	2	5
87A_HO_BUS	Hedingham Omnibuses	0	0	0
87_HO_BUS	Hedingham Omnibuses	6	7	8
88A_FT_BUS	First	1	0	0
88B_HO_BUS	Hedingham Omnibuses	0	0	2
88C_FT_BUS	First	0	2	0
88_FT_BUS	First	5	4	5
88_HO1_BUS	Hedingham Omnibuses	10	10	9
898_BCT_BUS	Brentwood Community Transport	2	2	1
89A_HO_BUS	Hedingham Omnibuses	0	0	0
89_HO_BUS	Hedingham Omnibuses	7	6	6
89_RB_BUS	Regal Bus Ways	0	0	0
8A_FT2_BUS	First	10	10	10
8A_NE_BUS	Network Harlow	0	0	0
8E_FT_BUS	First	0	0	0
8_AS_BUS	Arriva Southend	3	7	4
8_FT2_BUS	First	10	10	10
8_FT_BUS	First	6	6	5
8_NC_BUS	Network Colchester	18	17	18
8_NE_BUS	Network Harlow	14	10	8
900_NE_BUS	Network Harlow	1	0	0
900_RB_BUS	Regal Bus Ways	0	6	6
901_NE_BUS	Network Harlow	2	0	0
90_NX_BUS	National Express	1	0	0
90_SE_BUS	Stephensons of Essex	8	8	8
91A_HO_BUS	Hedingham	2	0	0

	Omnibuses			
91B_HO_BUS	Hedingham Omnibuses	0	0	0
91_HO_BUS	Hedingham Omnibuses	0	1	3
91_SE1_BUS	Stephensons of Essex	0	0	1
91_SE_BUS	Stephensons of Essex	1	0	0
92A_HO1_BUS	Hedingham Omnibuses	0	0	0
92A_HO_BUS	Hedingham Omnibuses	1	0	2
92B_HO1_BUS	Hedingham Omnibuses	0	0	1
92_CC_BUS	Carters Coach Services	1	2	1
92_HO1_BUS	Hedingham Omnibuses	2	2	2
93C_CC_BUS	Carters Coach Services	2	0	0
94_CC_BUS	Carters Coach Services	0	2	0
94_SE_BUS	Stephensons of Essex	1	0	0
95A_HO_BUS	Hedingham Omnibuses	1	0	0
95_HO_BUS	Hedingham Omnibuses	2	1	1
95_SE_BUS	Stephensons of Essex	0	0	1
96C_CC_BUS	Carters Coach Services	0	0	0
971_BE_BUS	Constable Coaches	1	0	1
99_AR_BUS	Arrow Taxis	0	0	1
9A_FT2_BUS	First	1	0	3
9_AS_BUS	Arriva Southend	19	23	20
9_FT2_BUS	First	12	10	8
9_FT4_BUS	First	0	1	0
9_SE_BUS	Stephensons of Essex	1	4	2
A6_NX_BUS	National Express	17	22	19
A7_NX_BUS	National Express	0	0	0
A9_NX_BUS	National Express	8	8	8
AX1_CCA_BUS	CC Cars	5	5	5
B2_RB_BUS	Regal Bus Ways	1	0	1
C4_FWC_BUS	Four Ways Coaches	1	0	1
CCT1_CCT_BUS	Chelmsford Community Transport	5	11	6
COG1_CCB_BUS	Coggeshall Community Bus	2	0	2
C_LO_BUS	J.W. Lodge & Sons	1	0	0
D1_SE_BUS	Stephensons of Essex	2	1	1
D2_SE_BUS	Stephensons of Essex	1	1	2
D4_SE_BUS	Stephensons of Essex	4	2	3
D6_SE_BUS	Stephensons of Essex	0	0	0
D7_SE_BUS	Stephensons of Essex	1	0	0
D_LO_BUS	J.W. Lodge & Sons	1	0	0
E_WH_BUS	Go Whippet	0	0	1

FC01_FC_BUS	Fords Coaches	1	0	0
FC02_FC_BUS	Fords Coaches	1	0	0
FC03_FC_BUS	Fords Coaches	1	0	0
FC04_FC_BUS	Fords Coaches	1	0	0
FC05_FC_BUS	Fords Coaches	1	0	0
FC06_FC_BUS	Fords Coaches	1	0	0
FC07_FC_BUS	Fords Coaches	1	0	0
HH1_HA_BUS	Harwich Connexions Transport	0	1	1
HILT_BAA_BUS	British Airports Authority	4	4	4
HOLI_BAA_BUS	British Airports Authority	4	4	4
LCB1_LC_BUS	LCB Travel	0	2	0
LCB2_LC_BUS	LCB Travel	0	2	0
M1_LO_BUS	J.W. Lodge & Sons	1	0	0
P1_FT_BUS	First	12	7	9
P2_FT_BUS	First	8	8	8
P_LO_BUS	J.W. Lodge & Sons	1	0	0
SB81_BDV_BUS	Basildon Dsitrict Volunteer Services	0	1	0
S_LO_BUS	J.W. Lodge & Sons	1	0	0
T15_TK_BUS	Townlink Buses	4	7	5
X30_FT2_BUS	First	3	3	4
X30_FT_BUS	First	2	2	2
X81_ENS_BUS	Ensign Bus Company	0	0	0
X88_HO1_BUS	Hedingham Omnibuses	1	0	1
X93_CC_BUS	Carters Coach Services	0	0	0
ZIP1_LC_BUS	LCB Travel	3	2	3
Total		1606	1437	1459

Appendix C. Rail Services

Route	Departures by service		
	AM peak	Interpeak	PM peak
	0800-0900	Av Hr	1700-1800
c2c	65	35	64
Chiltern	42	34	44
Cov-Leam	2	2	2
Cross Country	40	51	52
East Coast Mainline	18	25	26
East_Midland_Trains	23	25	25
First Capital Connect	81	84	84
First Great Western	115	103	110
FirstTransPennineExpress	14	15	15
Gatwick Express	15	12	14
Greater_Anglia	206	153	195
Heathrow Connect	6	6	6
London_Midland	45	44	45
South West Trains	56	56	59
Southeastern	88	79	110
Southern	19	18	18
Virgin Trains	71	75	78
Total	906	817	947

Appendix D. Underground Services

Route	Departures by service		
	AM peak	Interpeak	PM peak
	0800-0900	Av Hr	1700-1800
Circle_Line	44	26	44
District_Line	178	146	178
Central_Line	106	138	138
Hammersmith&City_Line	40	24	40
Jubilee_Line	36	21	36
Metropolitan_Line	84	61	77
Northern_Line	69	40	69
Piccadilly_Line	88	54	88
Victoria_Line	30	18	30
Bakerloo_Line	35	20	35
DLR	104	104	108
Total	814	652	843

Appendix E. Screenline and Cordon Calibration and Validation Analysis

Screenline and Cordons %Flow Difference Summary Table With Motorways

Screenline / Cordon ID	Cal / Val	AM Peak Hour				IP Average Hour				PM Peak Hour			
		% Flow Diference				% Flow Diference				% Flow Diference			
		Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total
Springfield Road Screen Line-NW	Calibration	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Springfield Road Screen Line-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-SW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-NE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-NW	Calibration	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SW Screenline-NE	Validation	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail
SW Screenline-SW	Validation	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
NW Outer Screenline-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NW Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Percentage Satisfying criteria		93%	100%	100%	86%	93%	100%	100%	93%	93%	100%	100%	93%

Screenline and Cordons %Flow Difference Summary Table Without Motorways

Screenline / Cordon ID	Cal / Val	AM Peak Hour				IP Average Hour				PM Peak Hour			
		% Flow Diference				% Flow Diference				% Flow Diference			
		Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total
Springfield Road Screen Line-NW	Calibration	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Springfield Road Screen Line-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-SW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-NE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-NW	Calibration	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SW Screenline-NE	Validation	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail
SW Screenline-SW	Validation	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
NW Outer Screenline-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NW Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Percentage Satisfying criteria		93%	100%	100%	86%	93%	86%	100%	93%	93%	100%	100%	93%

Screenline and Cordons GEH Summary Table With Motorways

Screenline / Cordon ID	Cal / Val	AM Peak Hour				IP Average Hour				PM Peak Hour			
		GEH				GEH				GEH			
		Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total
Springfield Road Screen Line-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Springfield Road Screen Line-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-SW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-NE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-NW	Calibration	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SW Screenline-NE	Validation	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail
SW Screenline-SW	Validation	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass
NW Outer Screenline-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NW Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Percentage Satisfying criteria		100%	100%	79%	100%	100%	93%	100%	100%	93%	100%	93%	93%

Screenline and Cordons GEH Summary Table Without Motorways

Screenline / Cordon ID	Cal / Val	AM Peak Hour				IP Average Hour				PM Peak Hour			
		GEH				GEH				GEH			
		Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total	Cars	LGVs	HGVs	Total
Springfield Road Screen Line-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Springfield Road Screen Line-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-SW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NE Screenline-NE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-NW	Calibration	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SE Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SW Screenline-NE	Validation	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail
SW Screenline-SW	Validation	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass
NW Outer Screenline-NW	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NW Outer Screenline-SE	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outer Cordon-IN	Calibration	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Fail	Pass
Outer Cordon-OUT	Calibration	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-IN	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Inner Cordon-OUT	Calibration	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Percentage Satisfying criteria		100%	93%	71%	100%	100%	86%	93%	100%	93%	100%	86%	93%

Screenline and Cordons %Flow Difference and GEH Summary Tables for Cars with Motorways

CARS							
AM							
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**% (Actual Flow)**	**-5%<Flow<5%**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	3714	3497	-5.8%	Fail	3.6	Pass
Springfield Road Screen Line-SE	Calibration	3092	3048	-1.4%	Pass	0.8	Pass
NE Screenline-SW	Calibration	3060	2920	-4.6%	Pass	2.6	Pass
NE Screenline-NE	Calibration	2222	2204	-0.8%	Pass	0.4	Pass
SE Outer Screenline-NW	Calibration	1186	1211	2.1%	Pass	0.7	Pass
SE Outer Screenline-SE	Calibration	1226	1244	1.5%	Pass	0.5	Pass
SW Screenline-NE	Validation	2018	1951	-3.3%	Pass	1.5	Pass
SW Screenline-SW	Validation	2265	2293	1.2%	Pass	0.6	Pass
NW Outer Screenline-NW	Calibration	2665	2654	-0.4%	Pass	0.2	Pass
NW Outer Screenline-SE	Calibration	2670	2682	0.4%	Pass	0.2	Pass
Outer Cordon-IN	Calibration	11630	11539	-0.8%	Pass	0.8	Pass
Outer Cordon-OUT	Calibration	10496	10583	0.8%	Pass	0.8	Pass
Inner Cordon-IN	Calibration	7512	7487	-0.3%	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	6090	6066	-0.4%	Pass	0.3	Pass
IP							
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**% (Actual Flow)**	**-5%<Flow<5%**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	3468	3399	-2.0%	Pass	1.2	Pass
Springfield Road Screen Line-SE	Calibration	3372	3365	-0.2%	Pass	0.1	Pass
NE Screenline-SW	Calibration	2541	2548	0.3%	Pass	0.1	Pass
NE Screenline-NE	Calibration	2415	2429	0.6%	Pass	0.3	Pass
SE Outer Screenline-NW	Calibration	1079	1081	0.2%	Pass	0.1	Pass
SE Outer Screenline-SE	Calibration	1095	1094	-0.1%	Pass	0.0	Pass
SW Screenline-NE	Validation	1887	1822	-3.4%	Pass	1.5	Pass
SW Screenline-SW	Validation	2000	1865	-6.7%	Fail	3.1	Pass
NW Outer Screenline-NW	Calibration	2284	2302	0.8%	Pass	0.4	Pass
NW Outer Screenline-SE	Calibration	2256	2268	0.5%	Pass	0.2	Pass
Outer Cordon-IN	Calibration	7706	7734	0.4%	Pass	0.3	Pass
Outer Cordon-OUT	Calibration	7460	7471	0.1%	Pass	0.1	Pass
Inner Cordon-IN	Calibration	5947	6063	2.0%	Pass	1.5	Pass
Inner Cordon-OUT	Calibration	6096	6226	2.1%	Pass	1.7	Pass
PM							
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**% (Actual Flow)**	**-5%<Flow<5%**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	3889	3970	2.1%	Pass	1.3	Pass
Springfield Road Screen Line-SE	Calibration	4206	4281	1.8%	Pass	1.1	Pass
NE Screenline-SW	Calibration	2638	2601	-1.4%	Pass	0.7	Pass
NE Screenline-NE	Calibration	3627	3454	-4.8%	Pass	2.9	Pass
SE Outer Screenline-NW	Calibration	1473	1478	0.4%	Pass	0.1	Pass
SE Outer Screenline-SE	Calibration	1425	1440	1.0%	Pass	0.4	Pass
SW Screenline-NE	Validation	2497	2243	-10.2%	Fail	5.2	Fail
SW Screenline-SW	Validation	2407	2414	0.3%	Pass	0.2	Pass
NW Outer Screenline-NW	Calibration	2923	2933	0.3%	Pass	0.2	Pass
NW Outer Screenline-SE	Calibration	2932	2949	0.6%	Pass	0.3	Pass
Outer Cordon-IN	Calibration	10427	10291	-1.3%	Pass	1.3	Pass
Outer Cordon-OUT	Calibration	10660	10831	1.6%	Pass	1.7	Pass
Inner Cordon-IN	Calibration	6732	6725	-0.1%	Pass	0.1	Pass
Inner Cordon-OUT	Calibration	8479	8617	1.6%	Pass	1.5	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for LGVs with Motorways

LGV

AM

Screenline / Cordon ID	Cal / Val	Counts	Model	Flow Difference WebTAG Criteria	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	453	450	Pass	0.2	Pass
Springfield Road Screen Line-SE	Calibration	366	339	Pass	1.4	Pass
NE Screenline-SW	Calibration	402	376	Pass	1.4	Pass
NE Screenline-NE	Calibration	280	291	Pass	0.7	Pass
SE Outer Screenline-NW	Calibration	118	132	Pass	1.2	Pass
SE Outer Screenline-SE	Calibration	120	134	Pass	1.2	Pass
SW Screenline-NE	Validation	251	274	Pass	1.4	Pass
SW Screenline-SW	Validation	358	340	Pass	0.9	Pass
NW Outer Screenline-NW	Calibration	267	306	Pass	2.3	Pass
NW Outer Screenline-SE	Calibration	287	316	Pass	1.6	Pass
Outer Cordon-IN	Calibration	1871	1928	Pass	1.3	Pass
Outer Cordon-OUT	Calibration	1739	1853	Pass	2.7	Pass
Inner Cordon-IN	Calibration	976	967	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	807	805	Pass	0.1	Pass

IP

Screenline / Cordon ID	Cal / Val	Counts	Model	Flow Difference WebTAG Criteria	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	350	350	Pass	0.0	Pass
Springfield Road Screen Line-SE	Calibration	311	320	Pass	0.5	Pass
NE Screenline-SW	Calibration	255	272	Pass	1.1	Pass
NE Screenline-NE	Calibration	244	255	Pass	0.7	Pass
SE Outer Screenline-NW	Calibration	95	119	Pass	2.3	Pass
SE Outer Screenline-SE	Calibration	97	127	Pass	2.9	Pass
SW Screenline-NE	Validation	227	218	Pass	0.6	Pass
SW Screenline-SW	Validation	214	215	Pass	0.1	Pass
NW Outer Screenline-NW	Calibration	203	221	Pass	1.2	Pass
NW Outer Screenline-SE	Calibration	191	213	Pass	1.6	Pass
Outer Cordon-IN	Calibration	1071	1235	Pass	4.8	Fail
Outer Cordon-OUT	Calibration	1073	1198	Pass	3.7	Pass
Inner Cordon-IN	Calibration	625	648	Pass	0.9	Pass
Inner Cordon-OUT	Calibration	611	634	Pass	0.9	Pass

PM

Screenline / Cordon ID	Cal / Val	Counts	Model	Flow Difference WebTAG Criteria	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	544	576	Pass	1.4	Pass
Springfield Road Screen Line-SE	Calibration	513	535	Pass	1.0	Pass
NE Screenline-SW	Calibration	362	358	Pass	0.2	Pass
NE Screenline-NE	Calibration	511	532	Pass	0.9	Pass
SE Outer Screenline-NW	Calibration	178	186	Pass	0.6	Pass
SE Outer Screenline-SE	Calibration	173	181	Pass	0.6	Pass
SW Screenline-NE	Validation	396	341	Pass	2.9	Pass
SW Screenline-SW	Validation	377	356	Pass	1.1	Pass
NW Outer Screenline-NW	Calibration	364	383	Pass	1.0	Pass
NW Outer Screenline-SE	Calibration	352	397	Pass	2.3	Pass
Outer Cordon-IN	Calibration	1754	1815	Pass	1.4	Pass
Outer Cordon-OUT	Calibration	1828	1923	Pass	2.2	Pass
Inner Cordon-IN	Calibration	950	956	Pass	0.2	Pass
Inner Cordon-OUT	Calibration	1149	1184	Pass	1.0	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for HGVs with Motorways

HGV						
AM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	171	170	Pass	0.1	Pass
Springfield Road Screen Line-SE	Calibration	102	104	Pass	0.2	Pass
NE Screenline-SW	Calibration	145	132	Pass	1.1	Pass
NE Screenline-NE	Calibration	104	104	Pass	0.1	Pass
SE Outer Screenline-NW	Calibration	40	71	Pass	4.2	Fail
SE Outer Screenline-SE	Calibration	44	48	Pass	0.7	Pass
SW Screenline-NE	Validation	73	135	Pass	6.1	Fail
SW Screenline-SW	Validation	74	138	Pass	6.2	Fail
NW Outer Screenline-NW	Calibration	95	101	Pass	0.7	Pass
NW Outer Screenline-SE	Calibration	100	117	Pass	1.6	Pass
Outer Cordon-IN	Calibration	950	967	Pass	3.0	Pass
Outer Cordon-OUT	Calibration	888	904	Pass	0.5	Pass
Inner Cordon-IN	Calibration	322	331	Pass	0.5	Pass
Inner Cordon-OUT	Calibration	238	269	Pass	2.0	Pass
IP						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	114	114	Pass	0.0	Pass
Springfield Road Screen Line-SE	Calibration	60	59	Pass	0.1	Pass
NE Screenline-SW	Calibration	77	83	Pass	0.7	Pass
NE Screenline-NE	Calibration	73	71	Pass	0.2	Pass
SE Outer Screenline-NW	Calibration	30	31	Pass	0.2	Pass
SE Outer Screenline-SE	Calibration	30	39	Pass	1.5	Pass
SW Screenline-NE	Validation	35	48	Pass	1.9	Pass
SW Screenline-SW	Validation	42	45	Pass	0.5	Pass
NW Outer Screenline-NW	Calibration	54	59	Pass	0.7	Pass
NW Outer Screenline-SE	Calibration	53	56	Pass	0.5	Pass
Outer Cordon-IN	Calibration	419	451	Pass	2.9	Pass
Outer Cordon-OUT	Calibration	423	426	Pass	0.2	Pass
Inner Cordon-IN	Calibration	157	161	Pass	0.2	Pass
Inner Cordon-OUT	Calibration	131	130	Pass	0.1	Pass
PM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	208	210	Pass	0.1	Pass
Springfield Road Screen Line-SE	Calibration	143	147	Pass	0.3	Pass
NE Screenline-SW	Calibration	133	142	Pass	0.8	Pass
NE Screenline-NE	Calibration	185	179	Pass	0.5	Pass
SE Outer Screenline-NW	Calibration	59	80	Pass	2.5	Pass
SE Outer Screenline-SE	Calibration	57	69	Pass	1.5	Pass
SW Screenline-NE	Validation	98	139	Pass	3.7	Pass
SW Screenline-SW	Validation	92	144	Pass	4.9	Fail
NW Outer Screenline-NW	Calibration	121	144	Pass	2.0	Pass
NW Outer Screenline-SE	Calibration	115	124	Pass	0.8	Pass
Outer Cordon-IN	Calibration	1232	1250	Pass	3.3	Pass
Outer Cordon-OUT	Calibration	1238	1256	Pass	0.5	Pass
Inner Cordon-IN	Calibration	324	330	Pass	0.4	Pass
Inner Cordon-OUT	Calibration	357	355	Pass	0.1	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for Totals with Motorways

Totals

AM

Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	4339	4116	-5.1%	Fail	3.4	Pass
Springfield Road Screen Line-SE	Calibration	3560	3491	-1.9%	Pass	1.2	Pass
NE Screenline-SW	Calibration	3607	3427	-5.0%	Pass	3.0	Pass
NE Screenline-NE	Calibration	2605	2600	-0.2%	Pass	0.1	Pass
SE Outer Screenline-NW	Calibration	1344	1414	5.2%	Fail	1.9	Pass
SE Outer Screenline-SE	Calibration	1390	1426	2.6%	Pass	1.0	Pass
SW Screenline-NE	Validation	2342	2360	0.8%	Pass	0.4	Pass
SW Screenline-SW	Validation	2697	2771	2.7%	Pass	1.4	Pass
NW Outer Screenline-NW	Calibration	3027	3061	1.1%	Pass	0.6	Pass
NW Outer Screenline-SE	Calibration	3057	3115	1.9%	Pass	1.0	Pass
Outer Cordon-IN	Calibration	14450	14434	-0.1%	Pass	0.1	Pass
Outer Cordon-OUT	Calibration	13123	13339	1.6%	Pass	1.9	Pass
Inner Cordon-IN	Calibration	8810	8784	-0.3%	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	7135	7141	0.1%	Pass	0.1	Pass

IP

Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	3931	3863	-1.7%	Pass	1.1	Pass
Springfield Road Screen Line-SE	Calibration	3743	3744	0.0%	Pass	0.0	Pass
NE Screenline-SW	Calibration	2873	2903	1.1%	Pass	0.6	Pass
NE Screenline-NE	Calibration	2731	2755	0.9%	Pass	0.5	Pass
SE Outer Screenline-NW	Calibration	1204	1230	2.2%	Pass	0.8	Pass
SE Outer Screenline-SE	Calibration	1222	1260	3.1%	Pass	1.1	Pass
SW Screenline-NE	Validation	2150	2088	-2.9%	Pass	1.3	Pass
SW Screenline-SW	Validation	2256	2124	-5.8%	Fail	2.8	Pass
NW Outer Screenline-NW	Calibration	2541	2582	1.6%	Pass	0.8	Pass
NW Outer Screenline-SE	Calibration	2500	2537	1.5%	Pass	0.7	Pass
Outer Cordon-IN	Calibration	9197	9420	2.4%	Pass	2.3	Pass
Outer Cordon-OUT	Calibration	8956	9096	1.6%	Pass	1.5	Pass
Inner Cordon-IN	Calibration	6730	6871	2.1%	Pass	1.7	Pass
Inner Cordon-OUT	Calibration	6839	6990	2.2%	Pass	1.8	Pass

PM

Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	4641	4756	2.5%	Pass	1.7	Pass
Springfield Road Screen Line-SE	Calibration	4863	4963	2.1%	Pass	1.4	Pass
NE Screenline-SW	Calibration	3133	3101	-1.0%	Pass	0.6	Pass
NE Screenline-NE	Calibration	4323	4165	-3.6%	Pass	2.4	Pass
SE Outer Screenline-NW	Calibration	1711	1745	2.0%	Pass	0.8	Pass
SE Outer Screenline-SE	Calibration	1655	1689	2.1%	Pass	0.8	Pass
SW Screenline-NE	Validation	2991	2723	-9.0%	Fail	5.0	Fail
SW Screenline-SW	Validation	2876	2915	1.4%	Pass	0.7	Pass
NW Outer Screenline-NW	Calibration	3408	3459	1.5%	Pass	0.9	Pass
NW Outer Screenline-SE	Calibration	3399	3470	2.1%	Pass	1.2	Pass
Outer Cordon-IN	Calibration	13413	13355	-0.4%	Pass	0.5	Pass
Outer Cordon-OUT	Calibration	13725	14011	2.1%	Pass	2.4	Pass
Inner Cordon-IN	Calibration	8005	8011	0.1%	Pass	0.1	Pass
Inner Cordon-OUT	Calibration	9984	10155	1.7%	Pass	1.7	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for Cars without Motorways

CARS							
AM							
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**% (Actual Flow)**	**-5%<Flow<5%**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	3714	3497	-5.8%	Fail	3.6	Pass
Springfield Road Screen Line-SE	Calibration	3092	3048	-1.4%	Pass	0.8	Pass
NE Screenline-SW	Calibration	3060	2920	-4.6%	Pass	2.6	Pass
NE Screenline-NE	Calibration	2222	2204	-0.8%	Pass	0.4	Pass
SE Outer Screenline-NW	Calibration	1186	1211	2.1%	Pass	0.7	Pass
SE Outer Screenline-SE	Calibration	1226	1244	1.5%	Pass	0.5	Pass
SW Screenline-NE	Validation	2018	1951	-3.3%	Pass	1.5	Pass
SW Screenline-SW	Validation	2265	2293	1.2%	Pass	0.6	Pass
NW Outer Screenline-NW	Calibration	2665	2654	-0.4%	Pass	0.2	Pass
NW Outer Screenline-SE	Calibration	2670	2682	0.4%	Pass	0.2	Pass
Outer Cordon-IN	Calibration	6746	6761	0.2%	Pass	0.2	Pass
Outer Cordon-OUT	Calibration	5742	5870	2.2%	Pass	1.7	Pass
Inner Cordon-IN	Calibration	7512	7487	-0.3%	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	6090	6066	-0.4%	Pass	0.3	Pass
IP							
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**% (Actual Flow)**	**-5%<Flow<5%**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	3468	3399	-2.0%	Pass	1.2	Pass
Springfield Road Screen Line-SE	Calibration	3372	3365	-0.2%	Pass	0.1	Pass
NE Screenline-SW	Calibration	2541	2548	0.3%	Pass	0.1	Pass
NE Screenline-NE	Calibration	2415	2429	0.6%	Pass	0.3	Pass
SE Outer Screenline-NW	Calibration	1079	1081	0.2%	Pass	0.1	Pass
SE Outer Screenline-SE	Calibration	1095	1094	-0.1%	Pass	0.0	Pass
SW Screenline-NE	Validation	1887	1822	-3.4%	Pass	1.5	Pass
SW Screenline-SW	Validation	2000	1865	-6.7%	Fail	3.1	Pass
NW Outer Screenline-NW	Calibration	2284	2302	0.8%	Pass	0.4	Pass
NW Outer Screenline-SE	Calibration	2256	2268	0.5%	Pass	0.2	Pass
Outer Cordon-IN	Calibration	4291	4291	0.0%	Pass	0.0	Pass
Outer Cordon-OUT	Calibration	3937	3944	0.2%	Pass	0.1	Pass
Inner Cordon-IN	Calibration	5947	6063	2.0%	Pass	1.5	Pass
Inner Cordon-OUT	Calibration	6096	6226	2.1%	Pass	1.7	Pass
PM							
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**% (Actual Flow)**	**-5%<Flow<5%**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	3889	3970	2.1%	Pass	1.3	Pass
Springfield Road Screen Line-SE	Calibration	4206	4281	1.8%	Pass	1.1	Pass
NE Screenline-SW	Calibration	2638	2601	-1.4%	Pass	0.7	Pass
NE Screenline-NE	Calibration	3627	3454	-4.8%	Pass	2.9	Pass
SE Outer Screenline-NW	Calibration	1473	1478	0.4%	Pass	0.1	Pass
SE Outer Screenline-SE	Calibration	1425	1440	1.0%	Pass	0.4	Pass
SW Screenline-NE	Validation	2497	2243	-10.2%	Fail	5.2	Fail
SW Screenline-SW	Validation	2407	2414	0.3%	Pass	0.2	Pass
NW Outer Screenline-NW	Calibration	2923	2933	0.3%	Pass	0.2	Pass
NW Outer Screenline-SE	Calibration	2932	2949	0.6%	Pass	0.3	Pass
Outer Cordon-IN	Calibration	5728	5742	0.2%	Pass	0.2	Pass
Outer Cordon-OUT	Calibration	6049	6226	2.9%	Pass	2.3	Pass
Inner Cordon-IN	Calibration	6732	6725	-0.1%	Pass	0.1	Pass
Inner Cordon-OUT	Calibration	8479	8617	1.6%	Pass	1.5	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for LGVs without Motorways

AM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	453	450	Pass	0.2	Pass
Springfield Road Screen Line-SE	Calibration	366	339	Pass	1.4	Pass
NE Screenline-SW	Calibration	402	376	Pass	1.4	Pass
NE Screenline-NE	Calibration	280	291	Pass	0.7	Pass
SE Outer Screenline-NW	Calibration	118	132	Pass	1.2	Pass
SE Outer Screenline-SE	Calibration	120	134	Pass	1.2	Pass
SW Screenline-NE	Validation	251	274	Pass	1.4	Pass
SW Screenline-SW	Validation	358	340	Pass	0.9	Pass
NW Outer Screenline-NW	Calibration	267	306	Pass	2.3	Pass
NW Outer Screenline-SE	Calibration	287	316	Pass	1.6	Pass
Outer Cordon-IN	Calibration	838	920	Pass	2.8	Pass
Outer Cordon-OUT	Calibration	733	859	Pass	4.5	Fail
Inner Cordon-IN	Calibration	976	967	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	807	805	Pass	0.1	Pass
IP						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	350	350	Pass	0.0	Pass
Springfield Road Screen Line-SE	Calibration	311	320	Pass	0.5	Pass
NE Screenline-SW	Calibration	255	272	Pass	1.1	Pass
NE Screenline-NE	Calibration	244	255	Pass	0.7	Pass
SE Outer Screenline-NW	Calibration	95	119	Pass	2.3	Pass
SE Outer Screenline-SE	Calibration	97	127	Pass	2.9	Pass
SW Screenline-NE	Validation	227	218	Pass	0.6	Pass
SW Screenline-SW	Validation	214	215	Pass	0.1	Pass
NW Outer Screenline-NW	Calibration	203	221	Pass	1.2	Pass
NW Outer Screenline-SE	Calibration	191	213	Pass	1.6	Pass
Outer Cordon-IN	Calibration	423	581	Fail	7.1	Fail
Outer Cordon-OUT	Calibration	404	529	Fail	5.8	Fail
Inner Cordon-IN	Calibration	625	648	Pass	0.9	Pass
Inner Cordon-OUT	Calibration	611	634	Pass	0.9	Pass
PM						
Screenline / Cordon ID	**Cal / Val**	**Counts**	**Model**	**Flow Difference WebTAG Criteria**	**GEH**	**GEH < 4**
Springfield Road Screen Line-NW	Calibration	544	576	Pass	1.4	Pass
Springfield Road Screen Line-SE	Calibration	513	535	Pass	1.0	Pass
NE Screenline-SW	Calibration	362	358	Pass	0.2	Pass
NE Screenline-NE	Calibration	511	532	Pass	0.9	Pass
SE Outer Screenline-NW	Calibration	178	186	Pass	0.6	Pass
SE Outer Screenline-SE	Calibration	173	181	Pass	0.6	Pass
SW Screenline-NE	Validation	396	341	Pass	2.9	Pass
SW Screenline-SW	Validation	377	356	Pass	1.1	Pass
NW Outer Screenline-NW	Calibration	364	383	Pass	1.0	Pass
NW Outer Screenline-SE	Calibration	352	397	Pass	2.3	Pass
Outer Cordon-IN	Calibration	794	885	Pass	3.2	Pass
Outer Cordon-OUT	Calibration	885	979	Pass	3.1	Pass
Inner Cordon-IN	Calibration	950	956	Pass	0.2	Pass
Inner Cordon-OUT	Calibration	1149	1184	Pass	1.0	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for HGVs without Motorways

HGV

AM

Screenline / Cordon ID	Cal / Val	Counts	Model	Flow Difference WebTAG Criteria	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	171	170	Pass	0.1	Pass
Springfield Road Screen Line-SE	Calibration	102	104	Pass	0.2	Pass
NE Screenline-SW	Calibration	145	132	Pass	1.1	Pass
NE Screenline-NE	Calibration	104	104	Pass	0.1	Pass
SE Outer Screenline-NW	Calibration	40	71	Pass	4.2	Fail
SE Outer Screenline-SE	Calibration	44	48	Pass	0.7	Pass
SW Screenline-NE	Validation	73	135	Pass	6.1	Fail
SW Screenline-SW	Validation	74	138	Pass	6.2	Fail
NW Outer Screenline-NW	Calibration	95	101	Pass	0.7	Pass
NW Outer Screenline-SE	Calibration	100	117	Pass	1.6	Pass
Outer Cordon-IN	Calibration	271	299	Pass	6.1	Fail
Outer Cordon-OUT	Calibration	227	246	Pass	1.3	Pass
Inner Cordon-IN	Calibration	322	331	Pass	0.5	Pass
Inner Cordon-OUT	Calibration	238	269	Pass	2.0	Pass

IP

Screenline / Cordon ID	Cal / Val	Counts	Model	Flow Difference WebTAG Criteria	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	114	114	Pass	0.0	Pass
Springfield Road Screen Line-SE	Calibration	60	59	Pass	0.1	Pass
NE Screenline-SW	Calibration	77	83	Pass	0.7	Pass
NE Screenline-NE	Calibration	73	71	Pass	0.2	Pass
SE Outer Screenline-NW	Calibration	30	31	Pass	0.2	Pass
SE Outer Screenline-SE	Calibration	30	39	Pass	1.5	Pass
SW Screenline-NE	Validation	35	48	Pass	1.9	Pass
SW Screenline-SW	Validation	42	45	Pass	0.5	Pass
NW Outer Screenline-NW	Calibration	54	59	Pass	0.7	Pass
NW Outer Screenline-SE	Calibration	53	56	Pass	0.5	Pass
Outer Cordon-IN	Calibration	103	130	Pass	5.1	Fail
Outer Cordon-OUT	Calibration	97	100	Pass	0.3	Pass
Inner Cordon-IN	Calibration	157	161	Pass	0.2	Pass
Inner Cordon-OUT	Calibration	131	130	Pass	0.1	Pass

PM

Screenline / Cordon ID	Cal / Val	Counts	Model	Flow Difference WebTAG Criteria	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	208	210	Pass	0.1	Pass
Springfield Road Screen Line-SE	Calibration	143	147	Pass	0.3	Pass
NE Screenline-SW	Calibration	133	142	Pass	0.8	Pass
NE Screenline-NE	Calibration	185	179	Pass	0.5	Pass
SE Outer Screenline-NW	Calibration	59	80	Pass	2.5	Pass
SE Outer Screenline-SE	Calibration	57	69	Pass	1.5	Pass
SW Screenline-NE	Validation	98	139	Pass	3.7	Pass
SW Screenline-SW	Validation	92	144	Pass	4.9	Fail
NW Outer Screenline-NW	Calibration	121	144	Pass	2.0	Pass
NW Outer Screenline-SE	Calibration	115	124	Pass	0.8	Pass
Outer Cordon-IN	Calibration	266	305	Pass	8.2	Fail
Outer Cordon-OUT	Calibration	290	309	Pass	1.1	Pass
Inner Cordon-IN	Calibration	324	330	Pass	0.4	Pass
Inner Cordon-OUT	Calibration	357	355	Pass	0.1	Pass

Screenline and Cordons %Flow Difference and GEH Summary Tables for Totals without Motorways

Totals

AM

Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	4339	4116	-5.1%	Fail	3.4	Pass
Springfield Road Screen Line-SE	Calibration	3560	3491	-1.9%	Pass	1.2	Pass
NE Screenline-SW	Calibration	3607	3427	-5.0%	Pass	3.0	Pass
NE Screenline-NE	Calibration	2605	2600	-0.2%	Pass	0.1	Pass
SE Outer Screenline-NW	Calibration	1344	1414	5.2%	Fail	1.9	Pass
SE Outer Screenline-SE	Calibration	1390	1426	2.6%	Pass	1.0	Pass
SW Screenline-NE	Validation	2342	2360	0.8%	Pass	0.4	Pass
SW Screenline-SW	Validation	2697	2771	2.7%	Pass	1.4	Pass
NW Outer Screenline-NW	Calibration	3027	3061	1.1%	Pass	0.6	Pass
NW Outer Screenline-SE	Calibration	3057	3115	1.9%	Pass	1.0	Pass
Outer Cordon-IN	Calibration	7854	7980	1.6%	Pass	1.4	Pass
Outer Cordon-OUT	Calibration	6702	6975	4.1%	Pass	3.3	Pass
Inner Cordon-IN	Calibration	8810	8784	-0.3%	Pass	0.3	Pass
Inner Cordon-OUT	Calibration	7135	7141	0.1%	Pass	0.1	Pass

IP

Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	3931	3863	-1.7%	Pass	1.1	Pass
Springfield Road Screen Line-SE	Calibration	3743	3744	0.0%	Pass	0.0	Pass
NE Screenline-SW	Calibration	2873	2903	1.1%	Pass	0.6	Pass
NE Screenline-NE	Calibration	2731	2755	0.9%	Pass	0.5	Pass
SE Outer Screenline-NW	Calibration	1204	1230	2.2%	Pass	0.8	Pass
SE Outer Screenline-SE	Calibration	1222	1260	3.1%	Pass	1.1	Pass
SW Screenline-NE	Validation	2150	2088	-2.9%	Pass	1.3	Pass
SW Screenline-SW	Validation	2256	2124	-5.8%	Fail	2.8	Pass
NW Outer Screenline-NW	Calibration	2541	2582	1.6%	Pass	0.8	Pass
NW Outer Screenline-SE	Calibration	2500	2537	1.5%	Pass	0.7	Pass
Outer Cordon-IN	Calibration	4817	5003	3.9%	Pass	2.6	Pass
Outer Cordon-OUT	Calibration	4438	4573	3.0%	Pass	2.0	Pass
Inner Cordon-IN	Calibration	6730	6871	2.1%	Pass	1.7	Pass
Inner Cordon-OUT	Calibration	6839	6990	2.2%	Pass	1.8	Pass

PM

Screenline / Cordon ID	Cal / Val	Counts	Model	% (Actual Flow)	-5%<Flow<5%	GEH	GEH < 4
Springfield Road Screen Line-NW	Calibration	4641	4756	2.5%	Pass	1.7	Pass
Springfield Road Screen Line-SE	Calibration	4863	4963	2.1%	Pass	1.4	Pass
NE Screenline-SW	Calibration	3133	3101	-1.0%	Pass	0.6	Pass
NE Screenline-NE	Calibration	4323	4165	-3.6%	Pass	2.4	Pass
SE Outer Screenline-NW	Calibration	1711	1745	2.0%	Pass	0.8	Pass
SE Outer Screenline-SE	Calibration	1655	1689	2.1%	Pass	0.8	Pass
SW Screenline-NE	Validation	2991	2723	-9.0%	Fail	5.0	Fail
SW Screenline-SW	Validation	2876	2915	1.4%	Pass	0.7	Pass
NW Outer Screenline-NW	Calibration	3408	3459	1.5%	Pass	0.9	Pass
NW Outer Screenline-SE	Calibration	3399	3470	2.1%	Pass	1.2	Pass
Outer Cordon-IN	Calibration	6788	6932	2.1%	Pass	1.7	Pass
Outer Cordon-OUT	Calibration	7224	7515	4.0%	Pass	3.4	Pass
Inner Cordon-IN	Calibration	8005	8011	0.1%	Pass	0.1	Pass
Inner Cordon-OUT	Calibration	9984	10155	1.7%	Pass	1.7	Pass

Appendix F. Link Flow Calibration and Validation Results – AM

					Observed				Model				Flow				GEH<5				WebTAG Compliant			
	Cal_Val	ID	DIR	Road Name	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total
1	Calibration	Site37-NB	NB	White Hart Lane / Northbound	539	83	27	648	512	78	24	614	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
2	Calibration	Site37-SB	SB	White Hart Lane / Southbound	582	89	29	700	571	72	29	672	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
3	Calibration	Site25-NB	NB	Stump Ln / Northbound	23	2	1	26	22	1	2	26	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
4	Calibration	Site25-SB	SB	Stump Ln / Southbound	103	10	4	117	80	0	2	83	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
5	Calibration	Site30-NB	NB	Springfield Green / Northbound	201	19	9	228	189	17	8	214	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
6	Calibration	Site30-SB	SB	Springfield Green / Southbound	205	19	9	233	277	20	9	306	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
7	Calibration	Site17-NB	NB	Pump Lane / Northbound	254	24	11	289	249	24	11	285	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
8	Calibration	Site17-SB	SB	Pump Lane / Southbound	397	37	17	451	368	35	17	420	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
9	Calibration	14528-13-EB	EB	Writtle Rd / Eastbound	211	20	9	240	200	20	10	229	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
10	Calibration	14528-13-WB	WB	Writtle Rd / Westbound	195	18	8	222	200	17	9	226	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
11	Calibration	28478-NB	NB	A1060/Parkway	1834	235	105	2174	1696	233	105	2034	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
12	Calibration	28478-SB	SB	A1060/Parkway	1397	182	32	1611	1344	182	32	1558	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
13	Calibration	12001-04-NB	NB	ATC04 A1099 Victoria Road South north of library	668	73	11	752	628	79	11	718	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
14	Calibration	12001-04-SB	SB	ATC04 A1099 Victoria Road South north of library	198	10	2	209	207	12	5	223	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
15	Calibration	Site27-NB	NB	Bodmin Rd / Northbound	23	2	1	26	23	3	0	26	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
16	Calibration	Site27-SB	SB	Bodmin Rd / Southbound	36	3	2	41	33	2	0	35	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
17	Calibration	14528-35-NB	NB	New Dukes Way / Northbound	273	25	12	310	279	25	7	311	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
18	Calibration	14528-35-SB	SB	New Dukes Way / Southbound	220	20	9	250	221	21	9	252	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
19	Calibration	02008271-NE	NE	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	569	87	28	684	558	82	28	669	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
20	Calibration	02008271-SW	SW	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	999	153	50	1202	958	153	49	1161	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
21	Calibration	Site22-NB	NB	Lawn Lane / Northbound	181	17	8	206	187	15	8	211	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
22	Calibration	Site22-SB	SB	Lawn Lane / Southbound	182	17	8	207	241	18	8	267	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
23	Calibration	14528-40-EB	EB	Maldon Road / Eastbound	451	42	19	512	454	49	19	523	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
24	Calibration	14528-40-WB	WB	Maldon Road / Westbound	458	43	20	520	492	46	19	557	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
25	Calibration	Site41-EB	EB	Woodhill Road / Eastbound	82	8	4	93	84	20	8	112	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
26	Calibration	Site41-WB	WB	Woodhill Road / Westbound	208	19	9	237	209	19	9	238	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
27	Calibration	87548755-SB	SB	N of New Dukes Way RAB, CHELMER ROAD	956	147	48	1150	766	116	37	919	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
28	Calibration	87548755-NB	NB	N of New Dukes Way RAB, CHELMER ROAD	643	98	32	773	620	96	33	749	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
29	Calibration	14528-38-NB	NB	West Hanningfield Road / Northbound	30	3	1	34	27	3	0	30	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
30	Calibration	14528-38-SB	SB	West Hanningfield Road / Southbound	38	4	2	44	38	2	0	40	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
31	Calibration	14528-40-EB	EB	Maldon Road / Eastbound	451	42	19	512	454	49	19	523	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
32	Calibration	14528-40-WB	WB	Maldon Road / Westbound	458	43	20	520	492	46	19	557	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
33	Calibration	Site16-NB	NB	Stock Road B1007 / Northbound	489	51	12	553	469	53	12	534	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
34	Calibration	Site16-SB	SB	Stock Road B1007 / Southbound	448	47	11	506	458	48	11	517	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
35	Calibration	941217-EB	EB	Margaretting Road, Chelmsford	70	7	2	79	73	11	5	88	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
36	Calibration	941217-WB	WB	Margaretting Road, Chelmsford	118	12	3	134	129	9	29	167	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
37	Calibration	14528-36-NB	NB	Brook Lane / Northbound	9	1	0	10	9	2	3	14	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
38	Calibration	14528-36-SB	SB	Brook Lane / Southbound	11	1	0	12	13	5	3	20	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
39	Calibration	Site41-EB	EB	Woodhill Road / Eastbound	82	8	4	93	84	20	8	112	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
40	Calibration	Site41-WB	WB	Woodhill Road / Westbound	208	19	9	237	209	19	9	238	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
41	Validation	38635-EB	EB	London Road, Chelmsford	817	108	31	957	734	127	54	914	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
42	Validation	38635-WB	WB	London Road, Chelmsford	1186	230	35	1451	968	151	37	1156	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
43	Validation	Site12-NB	NB	Widford Road / Northbound	11	1	0	13	30	3	0	33	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
44	Validation	Site12-SB	SB	Widford Road / Southbound	16	2	1	18	26	4	0	30	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
45	Validation	Site20-NB	NB	Beehive Lane / Northbound	91	10	2	103	117	13	9	139	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
46	Validation	Site20-SB	SB	Beehive Lane / Southbound	144	15	4	163	368	48	13	429	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
47	Validation	Site21-EB	EB	Watchhouse Road / Eastbound	120	11	5	137	129	19	15	162	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
48	Validation	Site21-WB	WB	Watchhouse Road / Westbound	137	13	6	155	165	19	28	211	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
49	Validation	Site11-NB	NB	WestWay / Northbound	375	57	19	451	283	48	35	366	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
50	Validation	Site11-SB	SB	WestWay / Southbound	345	53	17	415	301	50	37	388	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
51	Validation	03007141-NB	NB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	603	63	15	682	658	64	23	746	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
52	Validation	03007141-SB	SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	438	46	11	495	465	69	22	557	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
53	Calibration	941176-NB	NB	C/HOLLOW LANE	24	2	1	27	25	19	3	46	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
54	Calibration	941176-SB	SB	C/HOLLOW LANE	22	4	0	26	23	1	13	37	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
55	Calibration	Site24-NB	NB	Essex Regiment Way / Northbound	652	100	32	784	653	96	31	780	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
56	Calibration	Site24-SB	SB	Essex Regiment Way / Southbound	796	122	40	958	831	108	40	979	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
57	Calibration	Site09-NB	NB	Chignal Road / Northbound	92	9	4	104	91	21	10	122	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
58	Calibration	Site09-SB	SB	Chignal Road / Southbound	35	3	1	40	35	34	6	75	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
59	Calibration	14528-07-NB	NB	LordShip Rd / Northbound	436	41	19	495	457	41	19	517	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
60	Calibration	14528-07-SB	SB	LordShip Rd / Southbound	646	60	28	734	621	72	28	721	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
61	Calibration	Site04-EB	EB	Ongar Road / Eastbound	156	15	7	177	156	14	7	177	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
62	Calibration	Site04-WB	WB	Ongar Road / Westbound	178	17	8	202	175	16	8	199	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
63	Calibration	14328-01-NB	NB	PV2 - B1008 Main Road, Broomfield	777	22	6	805	760	23	6	789	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
64	Calibration	14328-01-SB	SB	PV2 - B1008 Main Road, Broomfield	665	30	6	701	659	33	6	698	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
65	Calibration	72537254-EB	EB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	350	54	17	420	358	53	17	428	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
66	Calibration	72537254-WB	WB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	506	77	25	608	494	90	25	609	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
67	Calibration	14528-03-EB	EB	The St / Eastbound	26	2	1	30	26	1	3	30	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
68	Calibration	14528-03-WB	WB	The St / Westbound	24	2	1	27	23	3	3	29	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
69	Calibration	14528-01-NEB	NB	A12 Ingatestone By-P / Northbound	1765	373	245	2384	1765	374	246	2386	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
70	Calibration	14528-01-SWB	SB	A12 Ingatestone By-P / Southbound	2524	534	351	3409	2507	531	351	3389	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
71	Calibration	14528-42-EB	EB	A12 Boreham / Eastbound	2230	472	310	3012	2205	463	307	2975	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
72	Calibration	14528-42-WB	WB	A12 Boreham / Westbound	3119	660	434	4212	3013	633	422	4068	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
73	Calibration	Site02-EB	EB	Elms Rd / Eastbound	19	2	1	22	20	1	0	21	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

74	Calibration	Site02-WB	WB	Elms Rd / Westbound	19	2	1	21	19	2	1	21	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
75	Calibration	03006037-EB	EB	270m W of Radley Green Road	365	56	18	439	365	56	18	438	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
76	Calibration	03006037-WB	WB	270m W of Radley Green Road	627	96	31	754	621	96	30	746	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
77	Calibration	14528-44-NB	NB	Willow Grove / Northbound	217	20	9	246	217	20	9	246	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
78	Calibration	14528-44-SB	SB	Willow Grove / Southbound	103	10	4	117	104	65	18	187	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
79	Calibration	941066-EB	EB	B1010/BURNHAM ROAD	97	27	5	128	94	26	2	122	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
80	Calibration	941066-WB	WB	B1010/BURNHAM ROAD	59	26	5	90	59	26	1	87	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
81	Calibration	Site46-NB	NB	Old London Rd / Northbound	5	0	0	6	200	44	5	248	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
82	Calibration	Site46-SB	SB	Old London Rd / Southbound	45	4	2	51	59	21	19	98	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass
83	Calibration	Site10-NB	NB	B1417 Chelmsford Road / Northbound	79	8	2	89	79	5	1	85	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
84	Calibration	Site10-SB	SB	B1417 Chelmsford Road / Southbound	33	3	1	37	33	5	1	40	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
85	Calibration	03006170-NEB	NEB	A131	607	93	30	730	605	92	30	727	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
86	Calibration	03006170-SWB	SWB	A131	1223	187	61	1471	1229	187	61	1477	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
87	Calibration	12026-02-EB	EB	ATC02 - A414 Maldon Rd, Woodham Mortimer	445	28	4	477	441	28	2	471	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
88	Calibration	12026-02-WB	WB	ATC02 - A414 Maldon Rd, Woodham Mortimer	947	52	16	1015	939	52	16	1007	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
89	Calibration	13084-07-EB	EB	ATC07 - Souther Cross Road, Good Easter	22	2	1	26	23	6	2	32	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
90	Calibration	13084-07-WB	WB	ATC07 - Souther Cross Road, Good Easter	12	3	1	16	13	3	2	18	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
91	Calibration	13086-01-NB	NB	ATC01 - B1008 Sandon Hill, Ford End	426	39	10	476	415	39	10	465	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
92	Calibration	13086-01-SB	SB	ATC01 - B1008 Sandon Hill, Ford End	396	26	10	433	402	27	10	440	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
93	Calibration	14528-43-NB	NB	Main Road / Northbound	298	28	13	338	313	28	13	354	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
94	Calibration	14528-43-SB	SB	Main Road / Southbound	278	26	12	316	233	26	12	271	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
95	Calibration	Site45-NB	NB	B1418 Main Road / Northbound	321	34	8	363	321	34	8	363	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
96	Calibration	Site45-SB	SB	B1418 Main Road / Southbound	312	33	8	353	360	33	8	400	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
97	Calibration	77130-NB	NB	A130, Chelmsford	1822	279	91	2192	1806	278	90	2174	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
98	Calibration	77130-SB	SB	A130, Chelmsford	1558	239	77	1875	1510	232	77	1819	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
99	Calibration	02008991-NEB	NEB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	64	6	3	72	65	27	10	102	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
100	Calibration	02008991-SWB	SWB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	177	16	8	201	175	16	8	199	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
101	Calibration	14331-01-NEB	NEB	ATC01 - Highwood Road, Loves Green, Chelmsford	74	10	2	87	69	10	6	86	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
102	Calibration	14331-01-SWB	SWB	ATC01 - Highwood Road, Loves Green, Chelmsford	109	8	2	119	107	35	5	147	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
103	Calibration	03006014-NWB	NWB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	265	41	13	319	273	41	13	327	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
104	Calibration	03006014-SEB	SEB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	270	41	13	325	271	40	13	325	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
105	Calibration	atc12-b1007-SB	SB	ATC12 - B1007 Stock Rd, Billericay	521	55	13	589	521	53	13	588	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
106	Calibration	atc12-b1007-NB	NB	ATC12 - B1007 Stock Rd, Billericay	499	53	13	565	497	52	13	562	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
107	Calibration	02008325-SE	SEB	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	79	7	3	89	79	20	6	106	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
108	Calibration	02008325-NW	NWB	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	47	4	2	54	47	47	5	99	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
109	Calibration	14528-23-NB	NB	Springfield Rd / Northbound	172	18	4	194	185	19	26	230	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
110	Calibration	14528-23-SB	SB	Springfield Rd / Southbound	373	39	9	422	425	45	11	480	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
111	Calibration	Site26-EB	EB	Byron Road / Eastbound	28	3	1	32	25	2	0	27	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
112	Calibration	Site26-WB	WB	Byron Road / Westbound	86	8	4	98	79	11	0	89	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
113	Calibration	Site31-EB	EB	Baddow Road / Eastbound	350	33	15	397	308	31	15	354	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
114	Calibration	Site31-WB	WB	Baddow Road / Westbound	206	19	9	234	213	9	9	230	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
115	Calibration	941148-NB	NB	B1009/BEEHIVE LANE	258	33	5	296	284	41	14	339	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
116	Calibration	941148-SB	SB	B1009/BEEHIVE LANE	312	39	4	355	304	40	11	355	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
117	Calibration	03005534-EB	EB	85M W OF RAB, WRITTLE BYPASS	403	62	20	484	400	61	20	481	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
118	Calibration	03005534-WB	WB	85M W OF RAB, WRITTLE BYPASS	608	93	30	732	564	90	29	683	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
119	Calibration	54175418-NEB	NEB	Near River Bridge, CHELMER ROAD	869	133	43	1045	861	131	45	1036	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
120	Calibration	54175418-SWB	SWB	Near River Bridge, CHELMER ROAD	1131	173	56	1360	959	156	51	1166	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass
121	Calibration	13183-01-NB	NB	ATC01 - Arbour Lane (nth), Chelmsford	192	11	1	204	195	10	4	209	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
122	Calibration	13183-01-SB	SB	ATC01 - Arbour Lane (nth), Chelmsford	179	13	1	193	247	15	6	268	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
123	Calibration	03007165-EB	EB	W OF SAVERNAKE ROAD, WRITTLE ROAD	366	34	16	416	360	34	16	410	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
124	Calibration	03007165-WB	WB	W OF SAVERNAKE ROAD, WRITTLE ROAD	251	23	11	285	255	23	11	289	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
125	Calibration	Site14-NB	NB	Broomfield Rd / Northbound	327	34	8	370	342	35	8	385	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
126	Calibration	Site14-SB	SB	Broomfield Rd / Southbound	357	38	9	403	381	41	9	431	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
127	Calibration	26681-WB	WB	Essex Yeomanry Way, Chelmsford	896	115	51	1062	971	126	51	1148	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
128	Calibration	941136-NB	NB	B1007/GALLEYWOOD ROAD	607	62	23	692	658	64	23	746	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
129	Calibration	941136-SB	SB	B1007/GALLEYWOOD ROAD	405	65	22	492	465	69	22	557	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
130	Calibration	03006132-NB	NB	Just S of river, CHELMER VALLEY ROAD	574	88	29	690	551	78	28	657	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
131	Calibration	03006132-SB	SB	Just S of river, CHELMER VALLEY ROAD	1128	173	56	1357	1044	162	56	1262	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
132	Calibration	77151-NW	NWB	119 Rainsford Road, Chelmsford	497	52	13	562	483	51	13	548	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
133	Calibration	77151-SE	SEB	119 Rainsford Road, Chelmsford	531	56	13	600	530	52	13	596	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
134	Calibration	26681-EB	EB	Essex Yeomanry Way, Chelmsford	683	89	16	787	710	98	16	824	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
135	Calibration	18372-NB	NB	London Road, Chelmsford	992	152	49	1193	938	149	51	1138	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
136	Calibration	18372-SB	SB	London Road, Chelmsford	823	126	41	990	818	129	40	987	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
137	Validation	Site29-NB	NB	Pump Ln / Northbound	230	21	10	261	204	31	7	242	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
138	Validation	Site29-SB	SB	Pump Ln / Southbound	148	14	6	168	149	14	4	166	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
139	Validation	02008624-NB	NB	240m N of A130/A139 RAB, N/B ON SLIP	216	33	11	260	212	40	37	289	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
140	Validation	14327-01-SB	SB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	691	30	4	726	665	35	6	705	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
141	Validation	14327-01-NB	NB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	778	27	11	816	694	22	8	725	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
142	Validation	14333-02-SWB	SWB	ATC02 - Petunia Crescent, Springfield, Chelmsford	13	1	1	15	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
143	Validation	14333-02-NEB	NEB	ATC02 - Petunia Crescent, Springfield, Chelmsford	16	2	0	19	2	0	0	2	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
144	Validation	Site32-NB	NB	Falmouth Rd / Northbound	9	1	0	10	1	0	0	1	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
145	Validation	Site32-SB	SB	Falmouth Rd / Southbound	30	3	1	34	7	1	0	8	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
146	Validation	Site34-NB	NB	A138 OFFSLIP to B113 / Northbound	230	35	11	276	223	18	12	253	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
147	Validation	05300531-SB	SB	36m E of Maltese Road, RAINSFORD ROAD	720	110	36	867	767	92	33	892	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
148	Validation	05300531-NB	NB	36m E of Maltese Road, RAINSFORD ROAD	570	87	28	685	554	55	39	648	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

149	Validation	14337-01-SB	SB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	35	2	1	37	58	12	0	71	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
150	Validation	14337-01-NB	NB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	21	2	0	23	19	2	0	22	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
151	Validation	12001-10-EB	EB	ATC10 Tindal Square	142	6	2	151	66	6	0	72	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
152	Validation	12001-10-WB	WB	ATC10 Tindal Square	132	4	3	139	174	5	0	178	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
153	Validation	02008722-NWB	NWB	31m NW of Roman Road, HALL STREET	79	7	3	90	91	9	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
154	Validation	02008723-NEB	NEB	30m SW of Hall Street, ROMAN ROAD	5	0	0	5	30	5	0	35	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
155	Validation	02008723-SWB	SWB	30m SW of Hall Street, ROMAN ROAD	10	1	0	12	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
156	Validation	02008737-SEB	SEB	31m NW of Upper Roman Road, GROVE ROAD	21	2	1	24	69	12	0	81	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
157	Validation	02008737-NWB	NWB	31m NW of Upper Roman Road, GROVE ROAD	31	3	1	35	13	1	0	14	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
158	Validation	02008732-SEB	SEB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	25	2	1	28	46	6	0	52	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
159	Calibration	02008732-NWB	NWB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	66	6	3	75	74	12	0	86	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
160	Calibration	02008726-NEB	NEB	52m NE of Grove Road, MILDMAY ROAD	122	11	5	138	124	16	0	140	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
161	Validation	02008726-SWB	SWB	52m NE of Grove Road, MILDMAY ROAD	28	3	1	32	42	9	0	51	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
162	Validation	02008724-NEB	NEB	53 NE of Hamlet Road, UPPER ROMAN ROAD	4	0	0	5	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
163	Validation	02008724-SWB	SWB	53 NE of Hamlet Road, UPPER ROMAN ROAD	3	0	0	3	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
164	Validation	13182-03-SEB	SEB	ATC03 - Hamlet Road, Moulsham, Chelmsford	12	1	0	12	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
165	Validation	13182-03-NWB	NWB	ATC03 - Hamlet Road, Moulsham, Chelmsford	47	1	0	48	19	9	0	29	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
166	Validation	02008731-NEB	NEB	131m SW of Goldlay Road, MANOR ROAD	31	3	1	35	88	14	0	102	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
167	Validation	02008731-SWB	SWB	131m SW of Goldlay Road, MANOR ROAD	37	3	2	42	20	1	0	21	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
168	Validation	13182-02-SEB	SEB	ATC02 - Lady Lane, Moulsham, Chelmsford	87	3	0	90	71	9	0	80	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
169	Validation	13182-02-NWB	NWB	ATC02 - Lady Lane, Moulsham, Chelmsford	72	3	0	75	107	16	0	123	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
170	Validation	02008729-NWB	NWB	30m NW of Burns Crescent, LADY LANE	66	6	3	75	95	14	0	109	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
171	Validation	02008729-SEB	SEB	30m NW of Burns Crescent, LADY LANE	93	9	4	105	167	23	0	190	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
172	Validation	02008736-NEB	NEB	82m NE of St Johns Road, BOUVERIE ROAD	6	1	0	7	39	8	0	47	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
173	Validation	02008736-SWB	SWB	82m NE of St Johns Road, BOUVERIE ROAD	11	1	0	13	57	6	0	63	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
174	Validation	02008735-NEB	NEB	74m NE of St Johns Road, ROSEBERY ROAD	12	1	1	13	112	17	0	129	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
175	Validation	02008735-SWB	SWB	74m NE of St Johns Road, ROSEBERY ROAD	12	1	1	14	4	0	0	4	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
176	Validation	13182-04-SEB	SEB	ATC04 - St Johns Road, Moulsham, Chelmsford	30	2	0	32	100	15	0	115	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
177	Validation	13182-04-NWB	NWB	ATC04 - St Johns Road, Moulsham, Chelmsford	31	3	0	34	10	1	0	11	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
178	Validation	Site15-EB	EB	Linnet Drive / Eastbound	54	5	2	61	97	14	0	112	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
179	Validation	Site15-WB	WB	Linnet Drive / Westbound	109	10	5	124	53	14	0	67	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
180	Validation	02008902-EB	EB	90 m E of Hullbridge Road, FERRERS ROAD	348	32	15	395	339	67	36	441	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
181	Validation	02008902-WB	WB	90 m E of Hullbridge Road, FERRERS ROAD	427	40	18	485	299	36	36	371	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
182	Validation	14335-02-WB	WB	ATC02 - Lodge Road, Writtle, Chelmsford	227	7	4	238	224	51	5	280	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
183	Validation	14335-02-EB	EB	ATC02 - Lodge Road, Writtle, Chelmsford	186	10	3	199	119	14	1	134	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
184	Validation	14335-01-NB	NB	ATC01 - Margaretting Road, Writtle, Chelmsford	155	15	1	172	188	30	1	219	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
185	Validation	14335-01-SB	SB	ATC01 - Margaretting Road, Writtle, Chelmsford	287	14	1	302	284	68	5	357	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
186	Validation	30013339-NB	NB	A12 northbound within the A414 near Chelmsford	1917	406	311	2633	1805	383	311	2499	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
187	Validation	13176-01-NB	NB	ATC01 - Barnard road, Galleywood, Chelmsford	111	15	1	127	34	5	0	39	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
188	Validation	13176-01-SB	SB	ATC01 - Barnard road, Galleywood, Chelmsford	61	3	1	66	18	2	0	20	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
189	Validation	Site19-NB	NB	Goshawk Drive / Northbound	41	4	2	47	32	5	0	37	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
190	Validation	Site19-SB	SB	Goshawk Drive / Southbound	43	4	2	49	29	4	0	33	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
191	Validation	30013341-SB	SB	A12 southbound within the A414 near Chelmsford	2170	459	364	2993	2534	481	298	3312	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass
192	Validation	6134-NB	NB	NB, A12, SOUTH OF CHELMSFORD	1335	282	345	1962	1383	288	232	1904	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass
193	Validation	6135-SB	SB	SB, A12, SOUTH OF CHELMSFORD	2000	423	374	2797	2120	430	285	2836	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
194	Validation	30013329-NB	NB	A12 northbound within the B1007 junction	1248	264	233	1745	1224	254	217	1695	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
195	Validation	02008625-SWB	SWB	102m NE of A138/A130 RAB, GENERALS LANE	90	8	4	102	68	9	16	93	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
196	Validation	02008625-NEB	NEB	102m NE of A138/A130 RAB, GENERALS LANE	80	7	3	91	67	10	12	89	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
197	Validation	03006204-SB	SB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	571	87	28	687	333	48	67	449	Fail	Pass	Pass	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Fail
198	Validation	03006204-NB	NB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	560	86	28	674	566	76	6	648	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
199	Validation	38471-EB	EB	A138	889	155	44	1087	866	170	49	1084	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
200	Validation	38471-WB	WB	A138	1264	151	38	1452	929	149	107	1185	Fail	Pass	Pass	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Fail
201	Validation	66266627-EB	EB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	107	10	5	121	57	7	0	64	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
202	Validation	66266627-WB	WB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	95	9	4	108	69	8	0	77	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
203	Validation	14337-02-WB	WB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	39	2	3	44	84	18	0	102	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Fail	Pass	Pass	Pass	Pass
204	Validation	14337-02-EB	EB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	138	5	0	143	24	3	0	27	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
205	Validation	02008730-SEB	SEB	8m SE of Goldlay Avenue, LADY LANE	197	18	8	224	116	17	0	133	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
206	Validation	02008730-NWB	NWB	8m SE of Goldlay Avenue, LADY LANE	105	10	5	120	307	39	0	347	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
207	Validation	12001-09-NB	NB	ATC09 New Street	144	8	2	154	58	4	0	62	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
208	Validation	12001-09-SB	SB	ATC09 New Street	144	8	2	154	177	5	0	182	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
209	Validation	Site12-NB	NB	Widford Road / Northbound	11	1	0	13	30	3	0	33	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
210	Validation	Site12-SB	SB	Widford Road / Southbound	16	2	1	18	26	4	0	30	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
211	Validation	12001-08-SEB	SEB	ATC08 Duke Street (one way)	269	77	5	351	163	36	0	199	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
212	Validation	02008734-NEB	NEB	106m NE of Lady Lane, GOLDLAY AVENUE	7	1	0	8	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
213	Validation	02008734-SWB	SWB	106m NE of Lady Lane, GOLDLAY AVENUE	16	2	1	18	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
214	Validation	02008990-SEB	SEB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	25	2	1	28	29	6	3	38	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
215	Validation	02008990-NWB	NWB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	16	1	1	18	20	3	3	26	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
216	Validation	02008741-SWB	SWB	85m SW of Wyses Road, ONGAR ROAD WEST	641	98	32	771	641	101	34	776	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
217	Validation	02008741-NEB	NEB	85m SW of Wyses Road, ONGAR ROAD WEST	287	44	14	345	359	55	23	437	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
218	Validation	67166717-NB	NB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	545	51	23	620	369	49	37	454	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
219	Validation	67166717-SB	SB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	779	73	33	885	680	73	28	781	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
220	Validation	Site08-SB	SB	A414 / Southbound	420	64	21	505	901	168	29	1098	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Fail
221	Validation	12001-03-WB	WB	ATC03 A1099 Victoria Road adjacent to YMCA	427	21	9	457	471	17	8	496	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
222	Validation	12001-03-EB	EB	ATC03 A1099 Victoria Road adjacent to YMCA	259	12	6	278	199	10	7	216	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
223	Validation	13182-05-NEB	NEB	ATC05 - Vicarage Road, Moulsham, Chelmsford	67	3	3	73	104	2	0	106	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

224	Validation	13182-05-SWB	SWB	ATC05 - Vicarage Road, Moulsham, Chelmsford	58	3	1	62	36	3	0	39	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
225	Validation	Site21-EB	EB	Watchhouse Road / Eastbound	120	11	5	137	129	19	15	162	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
226	Validation	Site21-WB	WB	Watchhouse Road / Westbound	137	13	6	155	165	19	28	211	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
227	Validation	13182-01-SWB	SWB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	44	2	1	47	24	4	0	28	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
228	Validation	13182-01-NEB	NEB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	48	2	4	54	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
229	Validation	Site08-NB	NB	A414 / Northbound	479	73	24	577	938	149	51	1138	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
230	Validation	12008-01-SB	SB	ATC01 Broomfield Rd	51	11	4	66	102	19	0	121	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
231	Validation	12008-01-NB	NB	ATC01 Broomfield Rd	37	17	3	56	77	7	0	84	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
232	Validation	02008733-NEB	NEB	112m NE of Lady Lane, LYNMOUTH AVENUE	41	4	2	47	8	1	0	9	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
233	Validation	02008733-SWB	SWB	112m NE of Lady Lane, LYNMOUTH AVENUE	33	3	1	38	46	6	0	52	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
234	Validation	Site20-NB	NB	Beehive Lane / Northbound	91	10	2	103	117	13	9	139	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
235	Validation	Site20-SB	SB	Beehive Lane / Southbound	144	15	4	163	368	48	13	429	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
236	Validation	Site11-SB	SB	WestWay / Southbound	345	53	17	415	301	50	37	388	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
237	Validation	Site11-NB	NB	WestWay / Northbound	375	57	19	451	283	48	35	366	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
238	Validation	02008727-SWB	SWB	43m SW of Lady Lane, MILDMAY ROAD	47	4	2	53	2	0	0	2	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
239	Validation	02008727-NEB	NEB	43m SW of Lady Lane, MILDMAY ROAD	172	16	7	195	129	13	0	141	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
240	Validation	03007141-SB	SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	438	46	11	495	465	69	22	557	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
241	Validation	03007141-NB	NB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	603	63	15	682	658	64	23	746	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
242	Validation	03001120-NB	NB	446m NW Lodge Road, MAIN ROAD	342	36	9	387	335	37	18	390	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
243	Validation	03001120-SB	SB	446m NW Lodge Road, MAIN ROAD	338	36	9	382	357	33	12	402	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
244	Validation	Site06-SB	SB	B1002 Main Road / Southbound	161	17	4	182	290	81	25	396	Fail	Pass	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Pass	Fail
245	Validation	Site06-NB	NB	B1002 Main Road / Northbound	124	13	3	141	146	10	16	172	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
246	Validation	13167-01-WB	WB	ATC01 - Church Road / Middlemead, West Hanningfield	71	6	1	77	16	2	1	18	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
247	Validation	13167-01-EB	EB	ATC01 - Church Road / Middlemead, West Hanningfield	42	5	1	48	22	4	3	29	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
248	Validation	14334-02-SWB	SWB	ATC02 - B1007 High Street, Stock	581	39	5	625	427	62	16	505	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass
249	Validation	14334-02-NEB	NEB	ATC02 - B1007 High Street, Stock	512	19	5	535	599	86	21	707	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail
250	Validation	1039182-04-NB	NB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	340	27	2	368	459	35	11	505	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
251	Validation	1039182-04-SB	SB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	903	41	4	948	951	94	28	1073	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass
252	Validation	14332-01-EB	EB	ATC01 - Highwood Road, Edney Common, Chelmsford	77	6	2	85	69	10	6	86	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
253	Validation	14332-01-WB	WB	ATC01 - Highwood Road, Edney Common, Chelmsford	98	6	2	106	107	35	5	147	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
254	Validation	13155-01-SB	SB	ATC01 - Main Road, Woodham Ferrers	333	29	7	368	358	33	9	401	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
255	Validation	13155-01-NB	NB	ATC01 - Main Road, Woodham Ferrers	354	28	4	385	329	36	8	373	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
256	Validation	13167-02-WB	WB	ATC02 - Church Road, West Hanningfield	65	5	0	70	16	2	1	18	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
257	Validation	13167-02-EB	EB	ATC02 - Church Road, West Hanningfield	35	5	2	42	22	4	3	29	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
258	Validation	02008988-NWB	NWB	127m NW of Garrettlands, WOODHILL ROAD	296	28	13	337	209	19	9	238	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
259	Validation	02008988-SEB	SEB	127m NW of Garrettlands, WOODHILL ROAD	84	8	4	95	84	20	8	112	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
260	Validation	03006146-EB	EB	1.1km W of Riffhams Lane, MAIN ROAD	518	79	26	624	579	89	45	713	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
261	Validation	03006146-WB	WB	1.1km W of Riffhams Lane, MAIN ROAD	984	151	49	1184	550	87	191	828	Fail	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Fail	Fail
262	Validation	03006147-NB	NB	57m S of Ship Road, STOCK ROAD	632	66	16	714	649	134	33	815	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
263	Validation	03006147-SB	SB	57m S of Ship Road, STOCK ROAD	703	74	18	795	532	85	26	643	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
264	Validation	12001-05-EB	EB	ATC05 Waterloo Lane	93	2	1	96	22	3	0	25	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
265	Validation	12001-05-WB	WB	ATC05 Waterloo Lane	47	3	2	52	10	1	0	11	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
266	Validation	03006133-EB	EB	E of Nabbotts Farm RAB, WHITE HART LANE	553	85	27	665	400	50	28	478	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
267	Validation	03006133-WB	WB	E of Nabbotts Farm RAB, WHITE HART LANE	625	96	31	752	629	95	34	758	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
268	Validation	02008621-SB	SB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	210	20	9	239	97	28	25	150	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass
269	Validation	02008621-NB	NB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	113	11	5	129	76	4	15	95	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
270	Validation	02008993-SWB	SWB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	168	16	7	191	197	21	10	228	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
271	Validation	02008993-NEB	NEB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	70	7	3	80	66	28	12	107	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
272	Validation	14334-01-NEB	NEB	ATC01 - B1007 High Street, Stock	494	15	4	513	492	62	14	569	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
273	Validation	14334-01-SWB	SWB	ATC01 - B1007 High Street, Stock	588	28	4	620	557	68	11	636	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
274	Validation	13179-01-EB	EB	ATC01 - Sandford Mill Road, Chelmer Village	1	1	0	2	27	3	0	30	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
275	Validation	13179-01-NWB	NWB	ATC01 - Sandford Mill Road, Chelmer Village	2	0	0	3	33	2	0	35	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
276	Validation	14528-05-SB	SB	Margaretting Road / Southbound	213	20	9	242	245	76	35	356	Pass	Pass	Pass	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Fail
277	Validation	14528-05-NB	NB	Margaretting Road / Northbound	148	14	6	168	242	68	1	311	Pass	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Pass	Pass	Pass	Fail
278	Validation	13181-01-NB	NB	ATC01 - Writtle Road, Margaretting	183	12	2	196	242	68	1	311	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail
279	Validation	13181-01-SB	SB	ATC01 - Writtle Road, Margaretting	250	7	8	266	245	76	35	356	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass
280	Validation	13010-02-NWB	NWB	ATC02 - Stock Lane (SE), Ingatestone	129	6	1	136	100	12	1	112	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
281	Validation	13010-02-SEB	SEB	ATC02 - Stock Lane (SE), Ingatestone	88	4	1	93	37	3	4	44	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
282	Validation	38635-WB	WB	London Road, Chelmsford	1186	230	35	1451	968	151	37	1156	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
283	Validation	38635-EB	EB	London Road, Chelmsford	817	108	31	957	734	127	54	914	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
284	Validation	14245-01-NEB	NEB	PV2-01 Springfield Road, Springfield	467	10	11	488	260	44	35	339	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
285	Validation	14245-01-SWB	SWB	PV2-01 Springfield Road, Springfield	611	25	4	640	536	61	17	614	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass

Appendix G. Link Flow Calibration and Validation Results - IP

					Observed				Model				Flow				GEH<5				WebTAG Compliant			
	Cal_Val	ID	DIR	Road Name	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total
1	Calibration	Site37-NB	NB	White Hart Lane / Northbound	735	84	19	837	729	83	19	832	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
2	Calibration	Site37-SB	SB	White Hart Lane / Southbound	687	78	18	783	710	78	19	807	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
3	Calibration	Site25-NB	NB	Stump Ln / Northbound	29	2	1	33	30	2	1	33	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
4	Calibration	Site25-SB	SB	Stump Ln / Southbound	91	7	3	102	78	0	1	79	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
5	Calibration	Site30-NB	NB	Springfield Green / Northbound	171	14	6	191	168	14	6	188	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
6	Calibration	Site30-SB	SB	Springfield Green / Southbound	143	12	5	160	152	12	5	169	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
7	Calibration	Site17-NB	NB	Pump Lane / Northbound	378	31	14	422	372	32	14	418	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
8	Calibration	Site17-SB	SB	Pump Lane / Southbound	396	32	14	442	365	32	14	411	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
9	Calibration	14528-13-EB	EB	Writtle Rd / Eastbound	209	17	8	233	209	17	7	233	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
10	Calibration	14528-13-WB	WB	Writtle Rd / Westbound	228	19	8	255	225	19	9	252	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
11	Calibration	28478-NB	NB	A1060/Parkway	1430	149	60	1639	1412	149	60	1621	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
12	Calibration	28478-SB	SB	A1060/Parkway	1668	161	10	1838	1670	159	11	1840	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
13	Calibration	12001-04-NB	NB	ATC04 A1099 Victoria Road South north of library	497	52	6	554	463	51	6	520	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
14	Calibration	12001-04-SB	SB	ATC04 A1099 Victoria Road South north of library	180	4	1	184	181	22	3	206	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
15	Calibration	Site27-NB	NB	Bodmin Rd / Northbound	36	3	1	41	37	4	0	41	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
16	Calibration	Site27-SB	SB	Bodmin Rd / Southbound	38	3	1	43	37	3	0	40	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
17	Calibration	14528-35-NB	NB	New Dukes Way / Northbound	184	15	7	205	187	15	7	209	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
18	Calibration	14528-35-SB	SB	New Dukes Way / Southbound	286	23	10	320	287	24	10	322	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
19	Calibration	02008271-NE	NE	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	750	85	20	855	736	86	20	841	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
20	Calibration	02008271-SW	SW	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	774	88	20	883	760	88	20	869	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
21	Calibration	Site22-NB	NB	Lawn Lane / Northbound	200	16	7	224	212	15	7	235	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
22	Calibration	Site22-SB	SB	Lawn Lane / Southbound	205	17	7	230	227	17	7	252	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
23	Calibration	14528-40-EB	EB	Maldon Road / Eastbound	464	38	17	518	466	41	17	524	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
24	Calibration	14528-40-WB	WB	Maldon Road / Westbound	468	38	17	523	480	42	17	540	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
25	Calibration	Site41-EB	EB	Woodhill Road / Eastbound	82	7	3	91	81	17	2	101	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
26	Calibration	Site41-WB	WB	Woodhill Road / Westbound	83	7	3	93	87	24	10	121	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
27	Calibration	87548755-SB	SB	N of New Dukes Way RAB, CHELMER ROAD	686	78	18	782	669	74	18	761	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
28	Calibration	87548755-NB	NB	N of New Dukes Way RAB, CHELMER ROAD	699	79	18	796	710	76	18	804	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
29	Calibration	14528-38-NB	NB	West Hanningfield Road / Northbound	26	2	1	29	25	2	0	27	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
30	Calibration	14528-38-SB	SB	West Hanningfield Road / Southbound	26	2	1	29	25	2	0	27	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
31	Calibration	14528-40-EB	EB	Maldon Road / Eastbound	464	38	17	518	466	41	17	524	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
32	Calibration	14528-40-WB	WB	Maldon Road / Westbound	468	38	17	523	480	42	17	540	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
33	Calibration	Site16-NB	NB	Stock Road B1007 / Northbound	437	42	8	487	427	41	8	475	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
34	Calibration	Site16-SB	SB	Stock Road B1007 / Southbound	467	45	8	520	457	46	9	511	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
35	Calibration	941217-EB	EB	Margaretting Road, Chelmsford	46	4	1	51	48	12	1	61	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
36	Calibration	941217-WB	WB	Margaretting Road, Chelmsford	57	6	1	64	58	15	3	76	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
37	Calibration	14528-36-NB	NB	Brook Lane / Northbound	9	1	0	10	9	1	1	12	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
38	Calibration	14528-36-SB	SB	Brook Lane / Southbound	10	1	0	11	11	3	2	16	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
39	Calibration	Site41-EB	EB	Woodhill Road / Eastbound	82	7	3	91	81	17	2	101	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
40	Calibration	Site41-WB	WB	Woodhill Road / Westbound	83	7	3	93	87	24	10	121	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
41	Validation	38635-EB	EB	London Road, Chelmsford	708	109	8	825	717	94	18	829	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
42	Validation	38635-WB	WB	London Road, Chelmsford	824	96	14	934	742	89	18	849	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
43	Validation	Site12-NB	NB	Widford Road / Northbound	16	1	1	18	21	3	0	24	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
44	Validation	Site12-SB	SB	Widford Road / Southbound	17	1	1	19	27	3	0	30	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
45	Validation	Site20-NB	NB	Beehive Lane / Northbound	163	16	3	182	165	22	2	188	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
46	Validation	Site20-SB	SB	Beehive Lane / Southbound	175	17	3	195	168	19	2	189	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
47	Validation	Site21-EB	EB	Watchhouse Road / Eastbound	154	13	6	172	159	18	3	181	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
48	Validation	Site21-WB	WB	Watchhouse Road / Westbound	142	12	5	159	140	19	4	163	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
49	Validation	Site11-NB	NB	WestWay / Northbound	431	49	11	491	320	31	10	361	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
50	Validation	Site11-SB	SB	WestWay / Southbound	421	48	11	480	333	36	11	381	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
51	Validation	03007141-NB	NB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	415	40	8	462	440	51	14	506	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
52	Validation	03007141-SB	SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	422	40	8	470	455	48	9	513	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
53	Calibration	941176-NB	NB	C/HOLLOW LANE	18	1	1	20	17	8	1	26	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
54	Calibration	941176-SB	SB	C/HOLLOW LANE	20	2	0	22	25	8	3	36	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
55	Calibration	Site24-NB	NB	Essex Regiment Way / Northbound	699	80	18	797	696	79	18	794	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
56	Calibration	Site24-SB	SB	Essex Regiment Way / Southbound	669	76	17	762	660	76	17	754	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
57	Calibration	Site09-NB	NB	Chignal Road / Northbound	45	4	2	51	45	16	4	66	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
58	Calibration	Site09-SB	SB	Chignal Road / Southbound	44	4	2	49	44	21	2	67	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
59	Calibration	14528-07-NB	NB	LordShip Rd / Northbound	351	29	13	392	354	28	13	394	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
60	Calibration	14528-07-SB	SB	LordShip Rd / Southbound	336	27	12	375	339	28	12	379	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
61	Calibration	Site04-EB	EB	Ongar Road / Eastbound	168	14	6	188	168	14	6	188	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
62	Calibration	Site04-WB	WB	Ongar Road / Westbound	170	14	6	190	168	14	6	188	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
63	Calibration	14328-01-NB	NB	PV2 - B1008 Main Road, Broomfield	580	28	4	612	595	29	6	630	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
64	Calibration	14328-01-SB	SB	PV2 - B1008 Main Road, Broomfield	604	20	5	629	610	20	6	635	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
65	Calibration	72537254-EB	EB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	417	47	11	475	422	46	11	479	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
66	Calibration	72537254-WB	WB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	420	48	11	479	426	48	11	485	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
67	Calibration	14528-03-EB	EB	The St / Eastbound	15	1	1	16	14	3	0	18	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
68	Calibration	14528-03-WB	WB	The St / Westbound	14	1	1	16	14	2	0	16	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
69	Calibration	14528-01-NEB	NB	A12 Ingatestone By-P / Northbound	1565	297	145	2007	1586	299	147	2032	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
70	Calibration	14528-01-SWB	SB	A12 Ingatestone By-P / Southbound	1638	311	151	2100	1652	311	153	2117	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
71	Calibration	14528-42-EB	EB	A12 Boreham / Eastbound	1885	358	174	2418	1876	358	173	2407	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
72	Calibration	14528-42-WB	WB	A12 Boreham / Westbound	1850	351	171	2373	1857	355	174	2385	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

73	Calibration	Site02-EB	EB	Elms Rd / Eastbound	24	2	1	27	24	0	0	25	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
74	Calibration	Site02-WB	WB	Elms Rd / Westbound	22	2	1	25	22	0	1	23	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
75	Calibration	03006037-EB	EB	270m W of Radley Green Road	308	35	8	351	307	35	8	350	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
76	Calibration	03006037-WB	WB	270m W of Radley Green Road	306	35	8	349	304	35	8	347	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
77	Calibration	14528-44-NB	NB	Willow Grove / Northbound	83	7	3	93	83	67	11	162	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
78	Calibration	14528-44-SB	SB	Willow Grove / Southbound	76	6	3	85	79	62	4	144	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
79	Calibration	941066-EB	EB	B1010/BURNHAM ROAD	56	19	3	78	57	19	1	77	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
80	Calibration	941066-WB	WB	B1010/BURNHAM ROAD	66	13	1	80	66	13	2	80	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
81	Calibration	Site46-NB	NB	Old London Rd / Northbound	12	1	0	14	13	19	1	33	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
82	Calibration	Site46-SB	SB	Old London Rd / Southbound	32	3	1	36	32	35	13	80	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
83	Calibration	Site10-NB	NB	B1417 Chelmsford Road / Northbound	61	6	1	67	61	6	0	67	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
84	Calibration	Site10-SB	SB	B1417 Chelmsford Road / Southbound	52	5	1	58	53	10	1	63	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
85	Calibration	03006170-NEB	NEB	A131	596	68	16	679	601	68	16	684	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
86	Calibration	03006170-SWB	SWB	A131	637	72	17	726	638	73	17	727	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
87	Calibration	12026-02-EB	EB	ATC02 - A414 Maldon Rd, Woodham Mortimer	221	13	2	236	221	13	0	235	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
88	Calibration	12026-02-WB	WB	ATC02 - A414 Maldon Rd, Woodham Mortimer	553	29	8	590	551	29	8	587	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
89	Calibration	13084-07-EB	EB	ATC07 - Souther Cross Road, Good Easter	13	2	0	15	13	4	0	18	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
90	Calibration	13084-07-WB	WB	ATC07 - Souther Cross Road, Good Easter	14	1	0	15	14	5	0	19	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
91	Calibration	13086-01-NB	NB	ATC01 - B1008 Sandon Hill, Ford End	264	14	4	283	268	14	6	288	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
92	Calibration	13086-01-SB	SB	ATC01 - B1008 Sandon Hill, Ford End	241	19	6	265	243	19	6	267	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
93	Calibration	14528-43-NB	NB	Main Road / Northbound	179	15	6	200	179	15	7	200	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
94	Calibration	14528-43-SB	SB	Main Road / Southbound	180	15	7	201	179	15	7	200	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
95	Calibration	Site45-NB	NB	B1418 Main Road / Northbound	214	20	4	238	213	20	9	243	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
96	Calibration	Site45-SB	SB	B1418 Main Road / Southbound	221	21	4	246	221	21	5	248	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
97	Calibration	77130-NB	NB	A130, Chelmsford	1074	122	28	1225	1076	123	28	1227	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
98	Calibration	77130-SB	SB	A130, Chelmsford	1113	127	29	1269	1109	127	29	1265	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
99	Calibration	02008991-NEB	NEB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	71	6	3	80	72	20	3	95	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
100	Calibration	02008991-SWB	SWB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	68	6	2	76	68	15	3	86	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
101	Calibration	14331-01-NEB	NEB	ATC01 - Highwood Road, Loves Green, Chelmsford	71	7	2	80	71	4	2	77	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
102	Calibration	14331-01-SWB	SWB	ATC01 - Highwood Road, Loves Green, Chelmsford	67	6	2	76	67	8	1	76	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
103	Calibration	03006014-NWB	NWB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	157	18	4	178	159	18	5	182	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
104	Calibration	03006014-SEB	SEB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	165	19	4	188	165	19	4	188	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
105	Calibration	atc12-b1007-SB	SB	ATC12 - B1007 Stock Rd, Billericay	417	40	8	465	417	40	8	464	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
106	Calibration	atc12-b1007-NB	NB	ATC12 - B1007 Stock Rd, Billericay	426	41	8	474	423	40	8	471	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
107	Calibration	02008325-SE	SEB	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	71	6	3	80	71	44	4	119	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
108	Calibration	02008325-NW	NWB	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	67	5	2	75	67	53	3	124	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
109	Calibration	14528-23-NB	NB	Springfield Rd / Northbound	309	30	6	344	300	30	6	336	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
110	Calibration	14528-23-SB	SB	Springfield Rd / Southbound	344	33	6	383	355	33	6	394	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
111	Calibration	Site26-EB	EB	Byron Road / Eastbound	88	7	3	98	89	2	0	91	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
112	Calibration	Site26-WB	WB	Byron Road / Westbound	80	7	3	90	80	1	0	82	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
113	Calibration	Site31-EB	EB	Baddow Road / Eastbound	347	28	13	388	292	30	13	334	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
114	Calibration	Site31-WB	WB	Baddow Road / Westbound	282	23	10	315	281	20	10	311	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
115	Calibration	941148-NB	NB	B1009/BEEHIVE LANE	220	30	1	251	259	36	4	299	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
116	Calibration	941148-SB	SB	B1009/BEEHIVE LANE	242	21	2	265	254	24	2	280	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
117	Calibration	03005534-EB	EB	85M W OF RAB, WRITTLE BYPASS	375	43	10	427	372	42	10	424	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
118	Calibration	03005534-WB	WB	85M W OF RAB, WRITTLE BYPASS	381	43	10	434	376	43	10	429	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
119	Calibration	54175418-NEB	NEB	Near River Bridge, CHELMER ROAD	980	111	26	1117	1006	108	25	1138	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
120	Calibration	54175418-SWB	SWB	Near River Bridge, CHELMER ROAD	969	110	25	1104	953	105	25	1084	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
121	Calibration	13183-01-NB	NB	ATC01 - Arbour Lane (nth), Chelmsford	177	6	1	184	190	24	4	218	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
122	Calibration	13183-01-SB	SB	ATC01 - Arbour Lane (nth), Chelmsford	161	8	1	170	186	28	4	218	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
123	Calibration	03007165-EB	EB	W OF SAVERNAKE ROAD, WRITTLE ROAD	232	19	8	259	228	20	8	256	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
124	Calibration	03007165-WB	WB	W OF SAVERNAKE ROAD, WRITTLE ROAD	232	19	8	260	232	19	8	259	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
125	Calibration	Site14-NB	NB	Broomfield Rd / Northbound	404	39	7	450	434	39	7	480	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
126	Calibration	Site14-SB	SB	Broomfield Rd / Southbound	383	37	7	427	411	39	7	457	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
127	Calibration	26681-WB	WB	Essex Yeomanry Way, Chelmsford	699	73	29	801	730	80	29	838	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
128	Calibration	941136-NB	NB	B1007/GALLEYWOOD ROAD	419	49	14	482	440	51	14	506	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
129	Calibration	941136-SB	SB	B1007/GALLEYWOOD ROAD	417	42	10	469	455	48	9	513	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
130	Calibration	03006132-NB	NB	Just S of river, CHELMER VALLEY ROAD	549	62	14	626	543	62	14	619	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
131	Calibration	03006132-SB	SB	Just S of river, CHELMER VALLEY ROAD	627	71	16	714	598	68	16	683	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
132	Calibration	77151-NW	NWB	119 Rainsford Road, Chelmsford	450	43	8	501	448	43	8	500	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
133	Calibration	77151-SE	SEB	119 Rainsford Road, Chelmsford	490	47	9	546	495	46	9	550	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
134	Calibration	26681-EB	EB	Essex Yeomanry Way, Chelmsford	815	78	5	898	893	81	5	979	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
135	Calibration	18372-NB	NB	London Road, Chelmsford	667	76	17	760	675	77	17	769	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
136	Calibration	18372-SB	SB	London Road, Chelmsford	706	80	18	804	714	80	19	813	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
137	Validation	Site29-NB	NB	Pump Ln / Northbound	201	16	7	225	209	23	3	235	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
138	Validation	Site29-SB	SB	Pump Ln / Southbound	174	14	6	195	124	12	1	138	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
139	Validation	02008624-NB	NB	240m N of A130/A139 RAB, N/B ON SLIP	294	33	8	336	184	45	14	242	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass
140	Validation	14327-01-SB	SB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	624	23	2	649	616	23	6	645	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
141	Validation	14327-01-NB	NB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	606	33	6	644	591	30	8	629	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
142	Validation	14333-02-SWB	SWB	ATC02 - Petunia Crescent, Springfield, Chelmsford	11	1	1	13	12	1	0	13	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
143	Validation	14333-02-NEB	NEB	ATC02 - Petunia Crescent, Springfield, Chelmsford	11	1	0	13	12	1	0	13	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
144	Validation	Site32-NB	NB	Falmouth Rd / Northbound	15	1	1	17	4	0	0	4	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
145	Validation	Site32-SB	SB	Falmouth Rd / Southbound	28	2	1	32	3	0	0	4	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
146	Validation	Site34-NB	NB	A138 OFFSLIP to B113 / Northbound	349	40	9	397	318	25	9	352	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
147	Validation	05300531-SB	SB	36m E of Maltese Road, RAINSFORD ROAD	583	66	15	664	697	62	11	771	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

148	Validation	05300531-NB	NB	36m E of Maltese Road, RAINSFORD ROAD	573	65	15	653	417	56	15	488	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
149	Validation	14337-01-SB	SB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	39	1	0	40	53	5	0	59	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
150	Validation	14337-01-NB	NB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	36	1	1	38	60	6	0	66	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
151	Validation	12001-10-EB	EB	ATC10 Tindal Square	105	5	2	112	53	6	0	59	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
152	Validation	12001-10-WB	WB	ATC10 Tindal Square	117	3	1	121	133	27	0	160	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
153	Validation	02008722-NWB	NWB	31m NW of Roman Road, HALL STREET	68	6	2	76	68	8	0	76	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
154	Validation	02008723-NEB	NEB	30m SW of Hall Street, ROMAN ROAD	7	1	0	8	17	0	0	17	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
155	Validation	02008723-SWB	SWB	30m SW of Hall Street, ROMAN ROAD	9	1	0	10	1	0	0	1	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
156	Validation	02008737-SEB	SEB	31m NW of Upper Roman Road, GROVE ROAD	45	4	2	51	70	7	0	77	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
157	Validation	02008737-NWB	NWB	31m NW of Upper Roman Road, GROVE ROAD	28	2	1	31	3	0	0	4	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
158	Validation	02008732-SEB	SEB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	28	2	1	32	37	5	0	42	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
159	Calibration	02008732-NWB	NWB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	33	3	1	37	58	7	0	65	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
160	Calibration	02008726-NEB	NEB	52m NE of Grove Road, MILDMAY ROAD	90	7	3	101	85	10	0	95	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
161	Validation	02008726-SWB	SWB	52m NE of Grove Road, MILDMAY ROAD	26	2	1	29	82	13	0	96	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
162	Validation	02008724-NEB	NEB	53 NE of Hamlet Road, UPPER ROMAN ROAD	4	0	0	4	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
163	Validation	02008724-SWB	SWB	53 NE of Hamlet Road, UPPER ROMAN ROAD	3	0	0	3	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
164	Validation	13182-03-SEB	SEB	ATC03 - Hamlet Road, Moulsham, Chelmsford	24	2	0	26	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
165	Validation	13182-03-NWB	NWB	ATC03 - Hamlet Road, Moulsham, Chelmsford	23	1	1	25	22	7	0	29	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
166	Validation	02008731-NEB	NEB	131m SW of Goldlay Road, MANOR ROAD	18	1	1	20	29	5	0	34	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
167	Validation	02008731-SWB	SWB	131m SW of Goldlay Road, MANOR ROAD	35	3	1	39	31	4	0	36	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
168	Validation	13182-02-SEB	SEB	ATC02 - Lady Lane, Moulsham, Chelmsford	114	4	1	119	99	9	0	109	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
169	Validation	13182-02-NWB	NWB	ATC02 - Lady Lane, Moulsham, Chelmsford	63	2	2	66	73	7	0	80	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
170	Validation	02008729-NWB	NWB	30m NW of Burns Crescent, LADY LANE	47	4	2	53	62	7	0	69	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
171	Validation	02008729-SEB	SEB	30m NW of Burns Crescent, LADY LANE	98	8	4	110	195	21	0	216	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Fail
172	Validation	02008736-NEB	NEB	82m NE of St Johns Road, BOUVERIE ROAD	5	0	0	5	12	4	0	16	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
173	Validation	02008736-SWB	SWB	82m NE of St Johns Road, BOUVERIE ROAD	9	1	0	10	57	7	0	64	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
174	Validation	02008735-NEB	NEB	74m NE of St Johns Road, ROSEBERY ROAD	11	1	0	12	117	12	0	129	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
175	Validation	02008735-SWB	SWB	74m NE of St Johns Road, ROSEBERY ROAD	9	1	0	10	11	0	0	11	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
176	Validation	13182-04-SEB	SEB	ATC04 - St Johns Road, Moulsham, Chelmsford	21	2	1	24	117	15	0	131	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Fail
177	Validation	13182-04-NWB	NWB	ATC04 - St Johns Road, Moulsham, Chelmsford	51	3	1	54	3	2	0	5	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
178	Validation	Site15-EB	EB	Linnet Drive / Eastbound	58	5	2	65	116	16	0	132	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
179	Validation	Site15-WB	WB	Linnet Drive / Westbound	61	5	2	68	77	10	0	87	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
180	Validation	02008902-EB	EB	90 m E of Hullbridge Road, FERRERS ROAD	335	27	12	375	300	63	5	369	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
181	Validation	02008902-WB	WB	90 m E of Hullbridge Road, FERRERS ROAD	336	28	12	376	215	57	11	283	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass
182	Validation	14335-02-WB	WB	ATC02 - Lodge Road, Writtle, Chelmsford	141	4	3	147	149	16	2	167	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
183	Validation	14335-02-EB	EB	ATC02 - Lodge Road, Writtle, Chelmsford	158	10	1	169	132	16	0	149	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
184	Validation	14335-01-NB	NB	ATC01 - Margaretting Road, Writtle, Chelmsford	140	9	1	150	202	30	1	232	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass
185	Validation	14335-01-SB	SB	ATC01 - Margaretting Road, Writtle, Chelmsford	135	5	1	141	193	25	2	219	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
186	Validation	30013339-NB	NB	A12 northbound within the A414 near Chelmsford	1604	305	199	2108	1480	296	186	1962	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
187	Validation	13176-01-NB	NB	ATC01 - Barnard road, Galleywood, Chelmsford	79	10	0	90	24	4	0	28	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
188	Validation	13176-01-SB	SB	ATC01 - Barnard road, Galleywood, Chelmsford	67	2	0	69	29	3	0	32	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
189	Validation	Site19-NB	NB	Goshawk Drive / Northbound	46	4	2	52	31	4	0	35	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
190	Validation	Site19-SB	SB	Goshawk Drive / Southbound	48	4	2	54	28	3	0	31	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
191	Validation	30013341-SB	SB	A12 southbound within the A414 near Chelmsford	1658	315	173	2146	1782	292	131	2206	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
192	Validation	6134-NB	NB	NB, A12, SOUTH OF CHELMSFORD	1280	243	208	1732	1309	240	141	1690	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
193	Validation	6135-SB	SB	SB, A12, SOUTH OF CHELMSFORD	1342	255	196	1793	1400	267	149	1815	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
194	Validation	30013329-NB	NB	A12 northbound within the B1007 junction	1207	229	138	1575	1150	213	134	1497	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
195	Validation	02008625-SWB	SWB	102m NE of A138/A130 RAB, GENERALS LANE	91	7	3	102	51	5	4	60	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
196	Validation	02008625-NEB	NEB	102m NE of A138/A130 RAB, GENERALS LANE	67	5	2	74	55	7	6	67	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
197	Validation	03006204-SB	SB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	405	46	11	462	283	29	25	338	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
198	Validation	03006204-NB	NB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	439	50	11	501	248	28	2	279	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
199	Validation	38471-EB	EB	A138	619	74	13	706	823	127	20	969	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
200	Validation	38471-WB	WB	A138	658	97	12	767	617	96	41	754	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
201	Validation	66266627-EB	EB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	79	6	3	89	65	7	0	72	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
202	Validation	66266627-WB	WB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	85	7	3	95	78	9	0	87	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
203	Validation	14337-02-WB	WB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	62	2	5	68	77	8	0	85	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
204	Validation	14337-02-EB	EB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	85	2	0	87	87	9	0	96	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
205	Validation	02008730-SEB	SEB	8m SE of Goldlay Avenue, LADY LANE	175	14	6	196	142	17	0	159	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
206	Validation	02008730-NWB	NWB	8m SE of Goldlay Avenue, LADY LANE	75	6	3	84	272	30	0	302	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
207	Validation	12001-09-NB	NB	ATC09 New Street	125	5	1	131	51	5	0	56	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
208	Validation	12001-09-SB	SB	ATC09 New Street	125	5	1	131	120	25	0	145	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
209	Validation	Site12-NB	NB	Widford Road / Northbound	16	1	1	18	21	3	0	24	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
210	Validation	Site12-SB	SB	Widford Road / Southbound	17	1	1	19	27	3	0	30	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
211	Validation	12001-08-SEB	SEB	ATC08 Duke Street (one way)	218	67	3	288	119	18	0	137	Pass	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Pass	Pass	Pass	Fail
212	Validation	02008734-NEB	NEB	106m NE of Lady Lane, GOLDLAY AVENUE	8	1	0	9	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
213	Validation	02008734-SWB	SWB	106m NE of Lady Lane, GOLDLAY AVENUE	14	1	0	15	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
214	Validation	02008990-SEB	SEB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	24	2	1	27	18	4	2	24	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
215	Validation	02008990-NWB	NWB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	10	1	0	11	18	2	1	22	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
216	Validation	02008741-SWB	SWB	85m SW of Wyses Road, ONGAR ROAD WEST	319	36	8	364	322	38	9	369	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
217	Validation	02008741-NEB	NEB	85m SW of Wyses Road, ONGAR ROAD WEST	203	23	5	232	308	35	9	351	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
218	Validation	67166717-NB	NB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	527	43	19	590	543	49	14	606	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
219	Validation	67166717-SB	SB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	505	41	18	564	610	52	10	672	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
220	Validation	Site08-SB	SB	A414 / Southbound	321	37	8	366	659	81	11	751	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
221	Validation	12001-03-WB	WB	ATC03 A1099 Victoria Road adjacent to YMCA	244	8	1	253	279	29	3	311	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
222	Validation	12001-03-EB	EB	ATC03 A1099 Victoria Road adjacent to YMCA	247	7	7	261	235	16	3	254	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

223	Validation	13182-05-NEB	NEB	ATC05 - Vicarage Road, Moulsham, Chelmsford	43	1	0	45	26	2	0	27	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
224	Validation	13182-05-SWB	SWB	ATC05 - Vicarage Road, Moulsham, Chelmsford	42	2	1	45	41	3	0	45	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
225	Validation	Site21-EB	EB	Watchhouse Road / Eastbound	154	13	6	172	159	18	3	181	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
226	Validation	Site21-WB	WB	Watchhouse Road / Westbound	142	12	5	159	140	19	4	163	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
227	Validation	13182-01-SWB	SWB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	35	1	0	36	14	2	0	16	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
228	Validation	13182-01-NEB	NEB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	39	2	1	43	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
229	Validation	Site08-NB	NB	A414 / Northbound	324	37	8	369	675	77	17	769	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
230	Validation	12008-01-SB	SB	ATC01 Broomfield Rd	61	10	3	74	60	7	0	67	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
231	Validation	12008-01-NB	NB	ATC01 Broomfield Rd	50	10	2	63	32	4	0	35	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
232	Validation	02008733-NEB	NEB	112m NE of Lady Lane, LYNMOUTH AVENUE	30	2	1	34	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
233	Validation	02008733-SWB	SWB	112m NE of Lady Lane, LYNMOUTH AVENUE	31	3	1	35	37	5	0	42	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
234	Validation	Site20-NB	NB	Beehive Lane / Northbound	163	16	3	182	165	22	2	188	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
235	Validation	Site20-SB	SB	Beehive Lane / Southbound	175	17	3	195	168	19	2	189	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
236	Validation	Site11-SB	SB	WestWay / Southbound	421	48	11	480	333	36	11	381	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
237	Validation	Site11-NB	NB	WestWay / Northbound	431	49	11	491	320	31	10	361	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
238	Validation	02008727-SWB	SWB	43m SW of Lady Lane, MILDMAY ROAD	38	3	1	42	35	5	0	40	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
239	Validation	02008727-NEB	NEB	43m SW of Lady Lane, MILDMAY ROAD	126	10	5	141	76	7	0	84	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
240	Validation	03007141-SB	SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	422	40	8	470	455	48	9	513	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
241	Validation	03007141-NB	NB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	415	40	8	462	440	51	14	506	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
242	Validation	03001120-NB	NB	446m NW Lodge Road, MAIN ROAD	218	21	4	243	220	23	10	253	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
243	Validation	03001120-SB	SB	446m NW Lodge Road, MAIN ROAD	218	21	4	243	247	24	4	274	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
244	Validation	Site06-SB	SB	B1002 Main Road / Southbound	175	17	3	194	147	37	11	196	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
245	Validation	Site06-NB	NB	B1002 Main Road / Northbound	170	16	3	189	163	6	10	178	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
246	Validation	13167-01-WB	WB	ATC01 - Church Road / Middlemead, West Hanningfield	34	4	0	38	12	1	0	14	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
247	Validation	13167-01-EB	EB	ATC01 - Church Road / Middlemead, West Hanningfield	37	3	0	41	12	3	2	17	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
248	Validation	14334-02-SWB	SWB	ATC02 - B1007 High Street, Stock	338	16	3	356	425	48	11	484	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail
249	Validation	14334-02-NEB	NEB	ATC02 - B1007 High Street, Stock	350	13	2	364	464	52	13	529	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
250	Validation	1039182-04-NB	NB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	385	17	2	403	515	44	4	563	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
251	Validation	1039182-04-SB	SB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	439	24	2	465	494	43	7	544	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
252	Validation	14332-01-EB	EB	ATC01 - Highwood Road, Edney Common, Chelmsford	72	4	1	77	71	4	2	77	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
253	Validation	14332-01-WB	WB	ATC01 - Highwood Road, Edney Common, Chelmsford	70	4	1	75	67	8	1	76	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
254	Validation	13155-01-SB	SB	ATC01 - Main Road, Woodham Ferrers	217	13	3	233	235	23	4	262	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
255	Validation	13155-01-NB	NB	ATC01 - Main Road, Woodham Ferrers	214	15	1	229	215	22	8	245	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
256	Validation	13167-02-WB	WB	ATC02 - Church Road, West Hanningfield	31	2	0	33	12	1	0	14	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
257	Validation	13167-02-EB	EB	ATC02 - Church Road, West Hanningfield	32	3	2	38	12	3	2	17	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
258	Validation	02008988-NWB	NWB	127m NW of Garrettlands, WOODHILL ROAD	71	6	3	80	87	24	10	121	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
259	Validation	02008988-SEB	SEB	127m NW of Garrettlands, WOODHILL ROAD	66	5	2	74	81	17	2	101	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
260	Validation	03006146-EB	EB	1.1km W of Riffhams Lane, MAIN ROAD	567	65	15	647	420	64	13	496	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
261	Validation	03006146-WB	WB	1.1km W of Riffhams Lane, MAIN ROAD	642	73	17	731	477	98	117	692	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass
262	Validation	03006147-NB	NB	57m S of Ship Road, STOCK ROAD	412	39	7	459	551	95	22	669	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
263	Validation	03006147-SB	SB	57m S of Ship Road, STOCK ROAD	396	38	7	441	488	78	20	586	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail
264	Validation	12001-05-EB	EB	ATC05 Waterloo Lane	79	3	2	83	20	3	0	22	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
265	Validation	12001-05-WB	WB	ATC05 Waterloo Lane	70	1	1	72	31	3	0	34	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
266	Validation	03006133-EB	EB	E of Nabbotts Farm RAB, WHITE HART LANE	547	62	14	624	463	58	16	538	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
267	Validation	03006133-WB	WB	E of Nabbotts Farm RAB, WHITE HART LANE	564	64	15	643	564	66	19	649	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
268	Validation	02008621-SB	SB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	127	10	5	142	54	5	12	70	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
269	Validation	02008621-NB	NB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	130	11	5	146	94	4	4	102	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
270	Validation	02008993-SWB	SWB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	73	6	3	81	70	16	4	90	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
271	Validation	02008993-NEB	NEB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	76	6	3	85	74	21	4	99	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
272	Validation	14334-01-NEB	NEB	ATC01 - B1007 High Street, Stock	337	14	2	353	440	48	9	496	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
273	Validation	14334-01-SWB	SWB	ATC01 - B1007 High Street, Stock	330	13	3	346	413	43	7	463	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail
274	Validation	13179-01-EB	EB	ATC01 - Sandford Mill Road, Chelmer Village	2	1	0	3	33	3	0	36	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
275	Validation	13179-01-NWB	NWB	ATC01 - Sandford Mill Road, Chelmer Village	3	0	0	3	69	6	0	75	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
276	Validation	14528-05-SB	SB	Margaretting Road / Southbound	90	7	3	101	98	17	4	119	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
277	Validation	14528-05-NB	NB	Margaretting Road / Northbound	96	8	3	107	130	33	2	165	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
278	Validation	13181-01-NB	NB	ATC01 - Writtle Road, Margaretting	121	6	1	128	130	33	2	165	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
279	Validation	13181-01-SB	SB	ATC01 - Writtle Road, Margaretting	108	2	5	115	98	17	4	119	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
280	Validation	13010-02-NWB	NWB	ATC02 - Stock Lane (SE), Ingatestone	72	3	1	77	12	2	0	15	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
281	Validation	13010-02-SEB	SEB	ATC02 - Stock Lane (SE), Ingatestone	70	3	1	74	17	2	1	20	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
282	Validation	38635-WB	WB	London Road, Chelmsford	824	96	14	934	742	89	18	849	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
283	Validation	38635-EB	EB	London Road, Chelmsford	708	109	8	825	717	94	18	829	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
284	Validation	14245-01-NEB	NEB	PV2-01 Springfield Road, Springfield	430	9	10	450	515	46	12	574	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail
285	Validation	14245-01-SWB	SWB	PV2-01 Springfield Road, Springfield	430	10	3	443	325	42	11	378	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Pass	Pass	Pass

Appendix H. Link Flow Calibration and Validation Results - PM

					Observed				Model				Flow				GEH<5				WebTAG Compliant			
	Cal_Val	ID	DIR	Road Name	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total
1	S1	Site37-NB	NB	White Hart Lane / Northbound	757	118	41	916	768	118	41	926	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
2	S1	Site37-SB	SB	White Hart Lane / Southbound	686	107	37	830	714	108	32	854	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
3	S1	Site25-NB	NB	Stump Ln / Northbound	34	4	2	39	47	5	2	54	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
4	S1	Site25-SB	SB	Stump Ln / Southbound	84	10	4	98	72	1	2	75	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
5	S1	Site30-NB	NB	Springfield Green / Northbound	245	28	11	284	243	27	12	282	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
6	S1	Site30-SB	SB	Springfield Green / Southbound	180	21	8	209	197	22	9	228	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
7	S1	Site17-NB	NB	Pump Lane / Northbound	492	57	23	572	464	54	23	540	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
8	S1	Site17-SB	SB	Pump Lane / Southbound	399	46	19	463	357	39	17	413	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
9	S1	14528-13-EB	EB	Writtle Rd / Eastbound	275	32	13	319	281	31	13	326	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
10	S1	14528-13-WB	WB	Writtle Rd / Westbound	275	32	13	319	290	33	13	336	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
11	S1	28478-NB	NB	A1060/Parkway	1577	221	113	1910	1650	255	113	2018	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
12	S1	28478-SB	SB	A1060/Parkway	2310	285	60	2654	2381	317	66	2765	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
13	S1	12001-04-NB	NB	ATC04 A1099 Victoria Road South north of library	510	85	6	601	509	84	6	599	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
14	S1	12001-04-SB	SB	ATC04 A1099 Victoria Road South north of library	273	14	3	289	278	16	8	303	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
15	S2	Site27-NB	NB	Bodmin Rd / Northbound	45	5	2	52	52	5	0	57	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
16	S2	Site27-SB	SB	Bodmin Rd / Southbound	34	4	2	39	34	1	0	36	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
17	S2	14528-35-NB	NB	New Dukes Way / Northbound	183	21	9	212	169	21	9	199	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
18	S2	14528-35-SB	SB	New Dukes Way / Southbound	364	42	17	422	350	44	17	411	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
19	S2	02008271-NE	NE	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	1112	174	60	1345	1069	171	53	1293	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
20	S2	02008271-SW	SW	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	738	115	40	893	710	113	40	863	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
21	S2	Site22-NB	NB	Lawn Lane / Northbound	239	27	11	278	295	30	12	337	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
22	S2	Site22-SB	SB	Lawn Lane / Southbound	232	27	11	269	230	27	11	268	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
23	S2	14528-40-EB	EB	Maldon Road / Eastbound	627	72	29	728	632	74	31	738	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
24	S2	14528-40-WB	WB	Maldon Road / Westbound	491	56	23	571	510	63	23	596	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
25	S2	Site41-EB	EB	Woodhill Road / Eastbound	249	29	12	289	237	28	12	277	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
26	S2	Site41-WB	WB	Woodhill Road / Westbound	93	11	4	108	98	11	14	122	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
27	S2	87548755-SB	SB	N of New Dukes Way RAB, CHELMER ROAD	687	107	37	831	669	98	38	805	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
28	S2	87548755-NB	NB	N of New Dukes Way RAB, CHELMER ROAD	1172	183	63	1418	1000	201	63	1265	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
29	S3	14528-38-NB	NB	West Hanningfield Road / Northbound	53	6	2	61	53	4	0	56	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
30	S3	14528-38-SB	SB	West Hanningfield Road / Southbound	27	3	1	31	26	4	0	29	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
31	S3	14528-40-EB	EB	Maldon Road / Eastbound	627	72	29	728	632	74	31	738	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
32	S3	14528-40-WB	WB	Maldon Road / Westbound	491	56	23	571	510	63	23	596	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
33	S3	Site16-NB	NB	Stock Road B1007 / Northbound	578	74	19	671	564	77	19	660	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
34	S3	Site16-SB	SB	Stock Road B1007 / Southbound	541	70	18	628	544	71	18	633	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
35	S3	941217-EB	EB	Margaretting Road, Chelmsford	125	16	4	146	126	15	2	143	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
36	S3	941217-WB	WB	Margaretting Road, Chelmsford	86	11	3	100	98	11	22	130	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
37	S3	14528-36-NB	NB	Brook Lane / Northbound	17	2	1	20	16	4	6	26	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
38	S3	14528-36-SB	SB	Brook Lane / Southbound	13	1	1	15	14	6	5	25	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
39	S3	Site41-EB	EB	Woodhill Road / Eastbound	249	29	12	289	237	28	12	277	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
40	S3	Site41-WB	WB	Woodhill Road / Westbound	93	11	4	108	98	11	14	122	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
41	S4 - Valida	38635-EB	EB	London Road, Chelmsford	1137	213	41	1391	845	141	61	1046	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
42	S4 - Valida	38635-WB	WB	London Road, Chelmsford	890	172	30	1092	832	135	54	1022	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
43	S4 - Valida	Site12-NB	NB	Widford Road / Northbound	21	2	1	24	29	5	0	33	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
44	S4 - Valida	Site12-SB	SB	Widford Road / Southbound	14	2	1	17	28	4	0	32	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
45	S4 - Valida	Site20-NB	NB	Beehive Lane / Northbound	189	24	6	219	236	29	5	270	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
46	S4 - Valida	Site20-SB	SB	Beehive Lane / Southbound	180	23	6	209	183	25	7	215	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
47	S4 - Valida	Site21-EB	EB	Watchhouse Road / Eastbound	225	26	10	261	142	19	7	169	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
48	S4 - Valida	Site21-WB	WB	Watchhouse Road / Westbound	174	20	8	202	178	25	17	220	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
49	S4 - Valida	Site11-NB	NB	WestWay / Northbound	436	68	23	527	465	72	43	580	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
50	S4 - Valida	Site11-SB	SB	WestWay / Southbound	459	72	25	555	367	62	36	465	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
51	S4 - Valida	03007141-NB	NB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	490	63	16	569	527	74	23	624	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
52	S4 - Valida	03007141-SB	SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	691	89	22	802	826	105	30	961	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
53	S5	941176-NB	NB	C/HOLLOW LANE	25	3	1	29	27	8	2	37	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
54	S5	941176-SB	SB	C/HOLLOW LANE	30	5	0	35	43	19	7	69	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
55	S5	Site24-NB	NB	Essex Regiment Way / Northbound	895	140	48	1083	906	136	48	1090	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
56	S5	Site24-SB	SB	Essex Regiment Way / Southbound	751	117	40	909	753	118	40	911	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
57	S5	Site09-NB	NB	Chignal Road / Northbound	66	8	3	76	61	25	14	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
58	S5	Site09-SB	SB	Chignal Road / Southbound	63	7	3	73	57	35	5	97	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
59	S5	14528-07-NB	NB	LordShip Rd / Northbound	676	78	32	785	655	78	31	765	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
60	S5	14528-07-SB	SB	LordShip Rd / Southbound	495	57	23	575	506	57	24	587	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
61	S5	Site04-EB	EB	Ongar Road / Eastbound	230	26	11	267	266	27	11	304	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
62	S5	Site04-WB	WB	Ongar Road / Westbound	193	22	9	224	208	22	9	239	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
63	S5	14328-01-NB	NB	PV2 - B1008 Main Road, Broomfield	609	42	4	655	615	42	15	672	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
64	S5	14328-01-SB	SB	PV2 - B1008 Main Road, Broomfield	791	50	7	848	767	50	6	823	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
65	S5	72537254-EB	EB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	571	89	31	691	557	90	31	678	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
66	S5	72537254-WB	WB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	460	72	25	557	460	72	25	557	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
67	C1	14528-03-EB	EB	The St / Eastbound	26	3	1	30	26	3	1	30	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
68	C1	14528-03-WB	WB	The St / Westbound	21	2	1	25	22	1	1	24	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
69	C1	14528-01-NEB	NB	A12 Ingatestone By-P / Northbound	2313	473	475	3261	2330	472	485	3287	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
70	C1	14528-01-SWB	SB	A12 Ingatestone By-P / Southbound	1791	366	368	2526	1801	367	368	2536	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
71	C1	14528-42-EB	EB	A12 Boreham / Eastbound	2820	576	580	3976	2804	577	579	3960	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
72	C1	14528-42-WB	WB	A12 Boreham / Westbound	2386	488	491	3365	2218	457	460	3136	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
73	C1	Site02-EB	EB	Elms Rd / Eastbound	23	3	1	26	22	1	0	23	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

74	C1	Site02-WB	WB	Elms Rd / Westbound	24	3	1	28	23	2	2	26	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
75	C1	03006037-EB	EB	270m W of Radley Green Road	582	91	31	704	582	91	31	704	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
76	C1	03006037-WB	WB	270m W of Radley Green Road	381	60	20	461	384	60	20	464	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
77	C1	14528-44-NB	NB	Willow Grove / Northbound	78	9	4	90	77	72	19	168	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
78	C1	14528-44-SB	SB	Willow Grove / Southbound	231	27	11	269	233	26	11	270	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
79	C1	941066-EB	EB	B1010/BURNHAM ROAD	76	28	5	110	75	28	5	109	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
80	C1	941066-WB	WB	B1010/BURNHAM ROAD	70	25	11	105	69	25	11	104	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
81	C1	Site46-NB	NB	Old London Rd / Northbound	6	1	0	6	165	34	8	208	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
82	C1	Site46-SB	SB	Old London Rd / Southbound	29	3	1	34	29	22	20	72	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass
83	C1	Site10-NB	NB	B1417 Chelmsford Road / Northbound	46	6	1	54	47	7	2	56	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
84	C1	Site10-SB	SB	B1417 Chelmsford Road / Southbound	75	10	2	88	76	3	1	80	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
85	C1	03006170-NEB	NEB	A131	1119	175	60	1354	1122	172	60	1355	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
86	C1	03006170-SWB	SWB	A131	688	107	37	832	689	107	37	833	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
87	C1	12026-02-EB	EB	ATC02 - A414 Maldon Rd, Woodham Mortimer	267	28	4	299	267	28	4	299	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
88	C1	12026-02-WB	WB	ATC02 - A414 Maldon Rd, Woodham Mortimer	599	50	13	662	598	50	13	661	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
89	C1	13084-07-EB	EB	ATC07 - Souther Cross Road, Good Easter	15	3	1	18	15	4	1	20	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
90	C1	13084-07-WB	WB	ATC07 - Souther Cross Road, Good Easter	20	3	1	24	20	7	1	28	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
91	C1	13086-01-NB	NB	ATC01 - B1008 Sandon Hill, Ford End	349	49	18	416	353	48	18	420	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
92	C1	13086-01-SB	SB	ATC01 - B1008 Sandon Hill, Ford End	422	49	21	492	417	49	21	487	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
93	C1	14528-43-NB	NB	Main Road / Northbound	274	31	13	318	273	31	13	318	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
94	C1	14528-43-SB	SB	Main Road / Southbound	223	26	10	259	219	29	10	258	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
95	C1	Site45-NB	NB	B1418 Main Road / Northbound	314	40	10	364	321	40	10	371	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
96	C1	Site45-SB	SB	B1418 Main Road / Southbound	344	44	11	400	350	44	11	406	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
97	C1	77130-NB	NB	A130, Chelmsford	1368	213	74	1655	1382	214	74	1670	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
98	C1	77130-SB	SB	A130, Chelmsford	1905	297	102	2305	1914	285	100	2298	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
99	C1	02008991-NEB	NEB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	159	18	7	184	159	21	7	187	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
100	C1	02008991-SWB	SWB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	74	9	3	86	74	22	9	106	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
101	C1	14331-01-NEB	NEB	ATC01 - Highwood Road, Loves Green, Chelmsford	97	15	3	116	96	15	8	119	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
102	C1	14331-01-SWB	SWB	ATC01 - Highwood Road, Loves Green, Chelmsford	84	10	3	98	80	10	2	93	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
103	C1	03006014-NWB	NWB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	265	41	14	320	258	41	14	314	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
104	C1	03006014-SEB	SEB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	259	40	14	313	262	41	14	316	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
105	C1	atc12-b1007-SB	SB	ATC12 - B1007 Stock Rd, Billericay	532	68	17	617	538	68	17	623	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
106	C1	atc12-b1007-NB	NB	ATC12 - B1007 Stock Rd, Billericay	569	73	18	661	567	73	18	658	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
107	C1	02008325-SE	SEB	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	81	9	4	94	82	65	11	159	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
108	C1	02008325-NW	NWB	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	81	9	4	94	81	23	5	109	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
109	C2	14528-23-NB	NB	Springfield Rd / Northbound	372	48	12	432	442	26	18	485	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
110	C2	14528-23-SB	SB	Springfield Rd / Southbound	281	36	9	326	260	36	8	305	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
111	C2	Site26-EB	EB	Byron Road / Eastbound	113	13	5	131	110	14	0	124	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
112	C2	Site26-WB	WB	Byron Road / Westbound	68	8	3	78	64	1	0	65	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
113	C2	Site31-EB	EB	Baddow Road / Eastbound	436	50	20	506	444	59	9	512	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
114	C2	Site31-WB	WB	Baddow Road / Westbound	320	37	15	372	346	31	15	392	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
115	C2	941148-NB	NB	B1009/BEEHIVE LANE	303	41	6	350	323	44	6	373	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
116	C2	941148-SB	SB	B1009/BEEHIVE LANE	324	39	6	370	307	38	6	352	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
117	C2	03005534-EB	EB	85M W OF RAB, WRITTLE BYPASS	560	87	30	678	572	86	30	688	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
118	C2	03005534-WB	WB	85M W OF RAB, WRITTLE BYPASS	443	69	24	536	421	68	24	513	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
119	C2	54175418-NEB	NEB	Near River Bridge, CHELMER ROAD	1312	205	71	1587	1171	227	71	1468	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
120	C2	54175418-SWB	SWB	Near River Bridge, CHELMER ROAD	988	154	53	1195	965	148	54	1166	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
121	C2	13183-01-NB	NB	ATC01 - Arbour Lane (nth), Chelmsford	242	15	1	258	303	20	5	328	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
122	C2	13183-01-SB	SB	ATC01 - Arbour Lane (nth), Chelmsford	184	15	2	201	204	16	7	226	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
123	C2	03007165-EB	EB	W OF SAVERNAKE ROAD, WRITTLE ROAD	298	34	14	346	298	36	14	347	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
124	C2	03007165-WB	WB	W OF SAVERNAKE ROAD, WRITTLE ROAD	353	40	16	409	355	40	16	412	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
125	C2	Site14-NB	NB	Broomfield Rd / Northbound	488	63	16	567	531	66	16	613	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
126	C2	Site14-SB	SB	Broomfield Rd / Southbound	369	47	12	429	380	46	12	438	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
127	C2	26681-WB	WB	Essex Yeomanry Way, Chelmsford	770	108	55	933	775	126	55	956	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
128	C2	941136-NB	NB	B1007/GALLEYWOOD ROAD	497	70	23	591	527	74	23	624	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
129	C2	941136-SB	SB	B1007/GALLEYWOOD ROAD	677	81	30	788	826	105	30	961	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
130	C2	03006132-NB	NB	Just S of river, CHELMER VALLEY ROAD	976	152	52	1181	876	143	46	1065	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
131	C2	03006132-SB	SB	Just S of river, CHELMER VALLEY ROAD	657	103	35	795	631	104	35	771	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
132	C2	77151-NW	NWB	119 Rainsford Road, Chelmsford	623	80	20	723	629	81	20	730	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
133	C2	77151-SE	SEB	119 Rainsford Road, Chelmsford	534	69	17	620	502	69	17	589	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
134	C2	26681-EB	EB	Essex Yeomanry Way, Chelmsford	1129	139	29	1297	1198	139	41	1378	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
135	C2	18372-NB	NB	London Road, Chelmsford	902	141	48	1091	878	139	54	1071	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
136	C2	18372-SB	SB	London Road, Chelmsford	990	154	53	1198	1004	158	54	1216	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
137	Vali	Site29-NB	NB	Pump Ln / Northbound	234	27	11	271	213	28	10	252	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
138	Vali	Site29-SB	SB	Pump Ln / Southbound	242	28	11	281	124	18	3	145	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
139	Vali	02008624-NB	NB	240m N of A130/A139 RAB, N/B ON SLIP	354	55	19	428	546	185	53	784	Fail	Fail	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Fail
140	Vali	14327-01-SB	SB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	797	49	3	850	748	49	7	804	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
141	Vali	14327-01-NB	NB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	641	47	6	694	615	44	17	676	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
142	Vali	14333-02-SWB	SWB	ATC02 - Petunia Crescent, Springfield, Chelmsford	17	4	1	23	6	1	0	6	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
143	Vali	14333-02-NEB	NEB	ATC02 - Petunia Crescent, Springfield, Chelmsford	16	3	0	19	6	1	0	7	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
144	Vali	Site32-NB	NB	Falmouth Rd / Northbound	20	2	1	23	18	3	0	21	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
145	Vali	Site32-SB	SB	Falmouth Rd / Southbound	27	3	1	32	2	0	0	3	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
146	Vali	Site34-NB	NB	A138 OFFSLIP to B113 / Northbound	384	60	21	465	377	45	17	439	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
147	Vali	05300531-SB	SB	36m E of Maltese Road, RAINSFORD ROAD	638	100	34	772	596	95	28	719	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
148	Vali	05300531-NB	NB	36m E of Maltese Road, RAINSFORD ROAD	767	120	41	927	499	89	33	621	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail

149	Vali	14337-01-SB	SB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	34	2	1	36	27	4	0	30	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
150	Vali	14337-01-NB	NB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	47	3	0	51	58	9	0	67	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
151	Vali	12001-10-EB	EB	ATC10 Tindal Square	106	8	2	116	40	7	0	48	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
152	Vali	12001-10-WB	WB	ATC10 Tindal Square	169	8	2	179	130	12	0	142	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
153	Vali	02008722-NWB	NWB	31m NW of Roman Road, HALL STREET	73	8	3	84	45	7	0	52	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
154	Vali	02008723-NEB	NEB	30m SW of Hall Street, ROMAN ROAD	5	1	0	6	10	1	0	12	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
155	Vali	02008723-SWB	SWB	30m SW of Hall Street, ROMAN ROAD	7	1	0	8	1	0	0	2	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
156	Vali	02008737-SEB	SEB	31m NW of Upper Roman Road, GROVE ROAD	47	5	2	54	108	15	0	123	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
157	Vali	02008737-NWB	NWB	31m NW of Upper Roman Road, GROVE ROAD	23	3	1	27	2	0	0	3	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
158	Vali	02008732-SEB	SEB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	36	4	2	42	76	15	0	92	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
159	Independe	02008732-NWB	NWB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	43	5	2	50	48	10	0	58	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
160	Independe	02008726-NEB	NEB	52m NE of Grove Road, MILDMAY ROAD	122	14	6	142	129	22	0	151	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
161	Vali	02008726-SWB	SWB	52m NE of Grove Road, MILDMAY ROAD	28	3	1	32	212	18	0	231	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
162	Vali	02008724-NEB	NEB	53 NE of Hamlet Road, UPPER ROMAN ROAD	3	0	0	3	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
163	Vali	02008724-SWB	SWB	53 NE of Hamlet Road, UPPER ROMAN ROAD	3	0	0	3	0	0	0	0	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
164	Vali	13182-03-SEB	SEB	ATC03 - Hamlet Road, Moulsham, Chelmsford	25	2	0	28	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
165	Vali	13182-03-NWB	NWB	ATC03 - Hamlet Road, Moulsham, Chelmsford	23	2	0	25	6	1	0	7	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
166	Vali	02008731-NEB	NEB	131m SW of Goldlay Road, MANOR ROAD	27	3	1	32	9	2	0	12	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
167	Vali	02008731-SWB	SWB	131m SW of Goldlay Road, MANOR ROAD	40	5	2	47	56	25	0	81	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
168	Vali	13182-02-SEB	SEB	ATC02 - Lady Lane, Moulsham, Chelmsford	181	9	2	192	174	17	0	191	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
169	Vali	13182-02-NWB	NWB	ATC02 - Lady Lane, Moulsham, Chelmsford	75	5	2	82	57	2	0	60	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
170	Vali	02008729-NWB	NWB	30m NW of Burns Crescent, LADY LANE	51	6	2	60	51	2	0	53	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
171	Vali	02008729-SEB	SEB	30m NW of Burns Crescent, LADY LANE	136	16	6	157	258	33	0	291	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
172	Vali	02008736-NEB	NEB	82m NE of St Johns Road, BOUVERIE ROAD	6	1	0	6	0	1	0	1	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
173	Vali	02008736-SWB	SWB	82m NE of St Johns Road, BOUVERIE ROAD	8	1	0	9	75	22	0	97	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Fail	Pass	Pass	Pass	Pass
174	Vali	02008735-NEB	NEB	74m NE of St Johns Road, ROSEBERY ROAD	13	2	1	15	99	17	0	115	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
175	Vali	02008735-SWB	SWB	74m NE of St Johns Road, ROSEBERY ROAD	10	1	0	12	10	0	0	10	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
176	Vali	13182-04-SEB	SEB	ATC04 - St Johns Road, Moulsham, Chelmsford	27	2	1	30	119	22	0	141	Pass	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Pass	Pass	Pass	Fail
177	Vali	13182-04-NWB	NWB	ATC04 - St Johns Road, Moulsham, Chelmsford	72	7	1	80	0	1	0	1	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
178	Vali	Site15-EB	EB	Linnet Drive / Eastbound	117	13	5	136	184	32	0	216	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
179	Vali	Site15-WB	WB	Linnet Drive / Westbound	70	8	3	81	34	4	0	38	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass
180	Vali	02008902-EB	EB	90 m E of Hullbridge Road, FERRERS ROAD	562	65	26	653	522	74	14	611	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
181	Vali	02008902-WB	WB	90 m E of Hullbridge Road, FERRERS ROAD	381	44	18	443	420	93	21	534	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
182	Vali	14335-02-WB	WB	ATC02 - Lodge Road, Writtle, Chelmsford	210	12	5	226	263	48	6	317	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Pass
183	Vali	14335-02-EB	EB	ATC02 - Lodge Road, Writtle, Chelmsford	261	23	3	286	87	8	0	96	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
184	Vali	14335-01-NB	NB	ATC01 - Margaretting Road, Writtle, Chelmsford	285	28	3	316	174	31	0	205	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
185	Vali	14335-01-SB	SB	ATC01 - Margaretting Road, Writtle, Chelmsford	175	14	2	191	301	55	6	363	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
186	Vali	30013339-NB	NB	A12 northbound within the A414 near Chelmsford	2023	414	547	2983	1938	399	513	2850	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
187	Vali	13176-01-NB	NB	ATC01 - Barnard road, Galleywood, Chelmsford	93	18	1	112	23	3	0	27	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
188	Vali	13176-01-SB	SB	ATC01 - Barnard road, Galleywood, Chelmsford	107	6	1	115	40	5	0	44	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
189	Vali	Site19-NB	NB	Goshawk Drive / Northbound	53	6	2	62	52	7	0	59	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
190	Vali	Site19-SB	SB	Goshawk Drive / Southbound	57	7	3	66	23	2	0	26	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
191	Vali	30013341-SB	SB	A12 southbound within the A414 near Chelmsford	1959	401	470	2830	2157	405	335	2897	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass
192	Vali	6134-NB	NB	NB, A12, SOUTH OF CHELMSFORD	1960	401	683	3044	2048	409	498	2956	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass
193	Vali	6135-SB	SB	SB, A12, SOUTH OF CHELMSFORD	1348	275	368	1991	1448	294	295	2037	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
194	Vali	30013329-NB	NB	A12 northbound within the B1007 junction	1788	365	496	2649	1729	344	466	2539	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
195	Vali	02008625-SWB	SWB	102m NE of A138/A130 RAB, GENERALS LANE	97	11	4	112	79	10	12	101	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
196	Vali	02008625-NEB	NEB	102m NE of A138/A130 RAB, GENERALS LANE	22	3	1	26	74	9	9	92	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
197	Vali	03006204-SB	SB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	609	95	33	737	586	89	89	765	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
198	Vali	03006204-NB	NB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	667	104	36	806	553	89	3	645	Fail	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Fail
199	Vali	38471-EB	EB	A138	1095	191	82	1368	1217	239	78	1535	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
200	Vali	38471-WB	WB	A138	826	126	57	1008	613	111	105	830	Fail	Pass	Pass	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Fail
201	Vali	66266627-EB	EB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	99	11	5	115	26	3	0	29	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
202	Vali	66266627-WB	WB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	148	17	7	172	148	21	0	170	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
203	Vali	14337-02-WB	WB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	102	4	8	114	32	4	0	36	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
204	Vali	14337-02-EB	EB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	89	6	1	96	86	14	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
205	Vali	02008730-SEB	SEB	8m SE of Goldlay Avenue, LADY LANE	219	25	10	254	159	20	0	180	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
206	Vali	02008730-NWB	NWB	8m SE of Goldlay Avenue, LADY LANE	92	11	4	107	299	41	0	340	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
207	Vali	12001-09-NB	NB	ATC09 New Street	140	12	2	154	54	8	0	62	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
208	Vali	12001-09-SB	SB	ATC09 New Street	142	11	2	154	85	2	0	87	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
209	Vali	Site12-NB	NB	Widford Road / Northbound	21	2	1	24	29	5	0	33	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
210	Vali	Site12-SB	SB	Widford Road / Southbound	14	2	1	17	28	4	0	32	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
211	Vali	12001-08-SEB	SEB	ATC08 Duke Street (one way)	217	84	3	304	53	15	0	67	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
212	Vali	02008734-NEB	NEB	106m NE of Lady Lane, GOLDLAY AVENUE	17	2	1	19	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
213	Vali	02008734-SWB	SWB	106m NE of Lady Lane, GOLDLAY AVENUE	14	2	1	17	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
214	Vali	02008990-SEB	SEB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	34	4	2	40	29	8	5	42	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
215	Vali	02008990-NWB	NWB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	12	1	1	14	31	5	6	42	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
216	Vali	02008741-SWB	SWB	85m SW of Wyses Road, ONGAR ROAD WEST	389	61	21	471	442	69	23	534	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
217	Vali	02008741-NEB	NEB	85m SW of Wyses Road, ONGAR ROAD WEST	291	45	16	352	519	75	33	628	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
218	Vali	67166717-NB	NB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	790	91	37	917	740	95	32	866	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
219	Vali	67166717-SB	SB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	561	64	26	651	451	56	23	531	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
220	Vali	Site08-SB	SB	A414 / Southbound	954	149	51	1154	861	147	46	1055	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
221	Vali	12001-03-WB	WB	ATC03 A1099 Victoria Road adjacent to YMCA	334	23	4	361	341	18	7	366	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
222	Vali	12001-03-EB	EB	ATC03 A1099 Victoria Road adjacent to YMCA	302	19	6	327	337	31	4	371	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
223	Vali	13182-05-NEB	NEB	ATC05 - Vicarage Road, Moulsham, Chelmsford	61	4	2	66	19	3	0	22	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass

224	Vali	13182-05-SWB	SWB	ATC05 - Vicarage Road, Moulsham, Chelmsford	61	5	1	67	142	19	0	161	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
225	Vali	Site21-EB	EB	Watchhouse Road / Eastbound	225	26	10	261	142	19	7	169	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
226	Vali	Site21-WB	WB	Watchhouse Road / Westbound	174	20	8	202	178	25	17	220	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
227	Vali	13182-01-SWB	SWB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	51	4	1	56	9	1	0	10	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
228	Vali	13182-01-NEB	NEB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	53	4	5	62	0	0	0	0	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
229	Vali	Site08-NB	NB	A414 / Northbound	846	132	45	1023	878	139	54	1071	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
230	Vali	12008-01-SB	SB	ATC01 Broomfield Rd	76	12	2	91	136	20	0	156	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
231	Vali	12008-01-NB	NB	ATC01 Broomfield Rd	59	18	3	79	33	4	0	37	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass
232	Vali	02008733-NEB	NEB	112m NE of Lady Lane, LYNMOUTH AVENUE	31	4	1	36	2	0	0	2	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
233	Vali	02008733-SWB	SWB	112m NE of Lady Lane, LYNMOUTH AVENUE	38	4	2	44	76	15	0	92	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
234	Vali	Site20-NB	NB	Beehive Lane / Northbound	189	24	6	219	236	29	5	270	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
235	Vali	Site20-SB	SB	Beehive Lane / Southbound	180	23	6	209	183	25	7	215	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
236	Vali	Site11-SB	SB	WestWay / Southbound	459	72	25	555	367	62	36	465	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
237	Vali	Site11-NB	NB	WestWay / Northbound	436	68	23	527	465	72	43	580	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
238	Vali	02008727-SWB	SWB	43m SW of Lady Lane, MILDMAY ROAD	43	5	2	50	121	12	0	132	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
239	Vali	02008727-NEB	NEB	43m SW of Lady Lane, MILDMAY ROAD	198	23	9	230	92	16	0	108	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
240	Vali	03007141-SB	SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	691	89	22	802	826	105	30	961	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
241	Vali	03007141-NB	NB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	490	63	16	569	527	74	23	624	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
242	Vali	03001120-NB	NB	446m NW Lodge Road, MAIN ROAD	337	43	11	392	306	38	14	359	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
243	Vali	03001120-SB	SB	446m NW Lodge Road, MAIN ROAD	359	46	12	417	387	52	12	451	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
244	Vali	Site06-SB	SB	B1002 Main Road / Southbound	208	27	7	241	151	41	27	219	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
245	Vali	Site06-NB	NB	B1002 Main Road / Northbound	180	23	6	209	207	18	29	255	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
246	Vali	13167-01-WB	WB	ATC01 - Church Road / Middlemead, West Hanningfield	35	5	1	40	16	3	0	19	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
247	Vali	13167-01-EB	EB	ATC01 - Church Road / Middlemead, West Hanningfield	65	10	1	76	21	6	5	32	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
248	Vali	14334-02-SWB	SWB	ATC02 - B1007 High Street, Stock	534	56	6	595	611	86	25	722	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
249	Vali	14334-02-NEB	NEB	ATC02 - B1007 High Street, Stock	573	45	5	623	605	87	44	736	Pass	Pass	Pass	Fail	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass
250	Vali	1039182-04-NB	NB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	734	59	5	799	829	99	14	942	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
251	Vali	1039182-04-SB	SB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	416	27	2	445	494	43	16	554	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
252	Vali	14332-01-EB	EB	ATC01 - Highwood Road, Edney Common, Chelmsford	94	10	3	107	96	15	8	119	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
253	Vali	14332-01-WB	WB	ATC01 - Highwood Road, Edney Common, Chelmsford	83	7	3	93	80	10	2	93	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
254	Vali	13155-01-SB	SB	ATC01 - Main Road, Woodham Ferrers	338	39	9	386	381	50	10	442	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
255	Vali	13155-01-NB	NB	ATC01 - Main Road, Woodham Ferrers	335	38	7	380	312	40	10	362	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
256	Vali	13167-02-WB	WB	ATC02 - Church Road, West Hanningfield	32	5	1	38	16	3	0	19	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
257	Vali	13167-02-EB	EB	ATC02 - Church Road, West Hanningfield	58	7	4	68	21	6	5	32	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
258	Vali	02008988-NWB	NWB	127m NW of Garrettlands, WOODHILL ROAD	73	8	3	85	98	11	14	122	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
259	Vali	02008988-SEB	SEB	127m NW of Garrettlands, WOODHILL ROAD	280	32	13	326	237	28	12	277	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
260	Vali	03006146-EB	EB	1.1km W of Riffhams Lane, MAIN ROAD	842	131	45	1019	683	118	83	884	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass
261	Vali	03006146-WB	WB	1.1km W of Riffhams Lane, MAIN ROAD	634	99	34	766	417	89	276	782	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass
262	Vali	03006147-NB	NB	57m S of Ship Road, STOCK ROAD	664	85	22	771	681	111	58	849	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
263	Vali	03006147-SB	SB	57m S of Ship Road, STOCK ROAD	646	83	21	749	679	136	46	862	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
264	Vali	12001-05-EB	EB	ATC05 Waterloo Lane	66	3	1	70	3	1	0	4	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
265	Vali	12001-05-WB	WB	ATC05 Waterloo Lane	98	5	2	105	62	11	0	73	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
266	Vali	03006133-EB	EB	E of Nabbotts Farm RAB, WHITE HART LANE	701	109	38	848	692	108	36	836	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
267	Vali	03006133-WB	WB	E of Nabbotts Farm RAB, WHITE HART LANE	682	106	37	825	627	107	41	775	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
268	Vali	02008621-SB	SB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	170	19	8	197	39	6	25	70	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
269	Vali	02008621-NB	NB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	218	25	10	253	173	27	16	217	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
270	Vali	02008993-SWB	SWB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	80	9	4	93	77	24	14	115	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
271	Vali	02008993-NEB	NEB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	159	18	7	184	168	22	9	199	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
272	Vali	14334-01-NEB	NEB	ATC01 - B1007 High Street, Stock	536	42	6	584	605	85	35	724	Pass	Pass	Pass	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Fail
273	Vali	14334-01-SWB	SWB	ATC01 - B1007 High Street, Stock	531	44	6	580	507	70	16	593	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
274	Vali	13179-01-EB	EB	ATC01 - Sandford Mill Road, Chelmer Village	2	0	0	2	18	2	0	19	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
275	Vali	13179-01-NWB	NWB	ATC01 - Sandford Mill Road, Chelmer Village	2	0	0	2	77	7	0	84	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
276	Vali	14528-05-SB	SB	Margaretting Road / Southbound	129	15	6	150	188	42	31	261	Pass	Pass	Pass	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Fail
277	Vali	14528-05-NB	NB	Margaretting Road / Northbound	215	25	10	250	118	29	3	150	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
278	Vali	13181-01-NB	NB	ATC01 - Writtle Road, Margaretting	261	27	4	293	118	29	3	150	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
279	Vali	13181-01-SB	SB	ATC01 - Writtle Road, Margaretting	144	5	7	157	188	42	31	261	Pass	Pass	Pass	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Fail
280	Vali	13010-02-NWB	NWB	ATC02 - Stock Lane (SE), Ingatestone	75	7	1	83	44	4	1	49	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
281	Vali	13010-02-SEB	SEB	ATC02 - Stock Lane (SE), Ingatestone	116	10	2	128	128	10	18	156	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass
282	Vali	38635-WB	WB	London Road, Chelmsford	890	172	30	1092	832	135	54	1022	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
283	Vali	38635-EB	EB	London Road, Chelmsford	1137	213	41	1391	845	141	61	1046	Fail	Pass	Pass	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail
284	Vali	14245-01-NEB	NEB	PV2-01 Springfield Road, Springfield	597	21	10	628	430	41	26	497	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Fail
285	Vali	14245-01-SWB	SWB	PV2-01 Springfield Road, Springfield	483	21	5	508	456	62	19	537	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass

Appendix I. Journey Time Validation Results

AM – Cars

Cars								
Section	Name	Description	Length	Observed (s)	Modelled (s)	Difference		
						Total	%	Difference<15%
Major	Route 1	A1060/A130 from Chalk End to Battlesbridge	24279	1291	1371	1.3	6.2%	Pass
Major	Route 2	A1060/A130 from Battlesbridge to Chalk End	24457	1364	1453	1.5	6.5%	Pass
Major	Route 3	A414/A1016/A1114 from Nortin Heath to Woodham Mortimer	20449	1293	1197	-1.6	-7.4%	Pass
Major	Route 4	A414/A1016/A1114 from Woodham Mortimer to Nortin Heath	20587	1326	1351	0.4	1.9%	Pass
Major	Route 5	A12 from Hatfield Peverel to Ingatestone	22792	785	837	0.9	6.6%	Pass
Major	Route 6	A12 from Ingatestone to Hatfield Peverel	20788	741	702	-0.6	-5.2%	Pass
Major	Route 7	A131/A130/A1016/A414 from Great Notley to Ingatestone	22699	1529	1651	2.0	8.0%	Pass
Major	Route 8	A131/A130/A1016/A414 from Ingatestone to Great Notley	22588	1501	1446	-0.9	-3.6%	Pass
Major	Route 9	B1137/A130/B137/A138/B1009/B1007 from Hatfield Peverel to West Hanningfield	18336	1420	1606	3.1	13.1%	Pass
Major	Route 10	B1137/A130/B137/A138/B1009/B1007 from West Hanningfield to Hatfield Peverel	18781	1459	1541	1.4	5.7%	Pass
Major	Route 21	B1012/A132/Runwell Road from A130 to South Woorham Ferrers	5064	281	263	-0.3	-6.5%	Pass
Major	Route 22	B1012/A132/Runwell Road from South Woorham Ferrers to A130	4996	278	240	-0.6	-13.6%	Pass
Minor	Route 11	From A14 to New London Road B1007, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4312	456	406	-0.8	-10.9%	Pass
Minor	Route 12	From New London Road B1007 to A14, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4292	452	411	-0.7	-9.2%	Pass
Minor	Route 13	B1008 from Essex Regiment Way to A1016	6664	545	542	-0.1	-0.6%	Pass
Minor	Route 14	B1008 from A1016 to Essex Regiment Way	6674	548	492	-0.9	-10.2%	Pass
Minor	Route 15	A130 from A130 Sainsburys' to A1016	1851	155	135	-0.3	-12.5%	Pass
Minor	Route 16	A130 from A1016 to A130 Sainsburys'	1888	154	142	-0.2	-8.2%	Pass
Minor	Route 17	Springfield Road from A1060 to A138	2415	243	246	0.0	1.2%	Pass
Minor	Route 18	Springfield Road from A138 to A1060	2384	231	256	0.4	10.9%	Pass
Minor	Route 19	B1007 from Parkway A1060 to Galleywood	3975	354	330	-0.4	-6.9%	Pass
Minor	Route 20	B1007 from Galleywood to Parkway A1060	3983	355	351	-0.1	-1.1%	Pass
							Total	100%

AM – GVs

GVs								
Section	Name	Description	Length	Observed	Modelled	Difference		
						Total	%	Difference<15%
Major	Route 1	A1060/A130 from Chalk End to Battlesbridge	24279	1296	1379	1.4	6.4%	Pass
Major	Route 2	A1060/A130 from Battlesbridge to Chalk End	24457	1382	1453	1.2	5.2%	Pass
Major	Route 3	A414/A1016/A1114 from Nortin Heath to Woodham Mortimer	20449	1312	1197	-1.9	-8.7%	Pass
Major	Route 4	A414/A1016/A1114 from Woodham Mortimer to Nortin Heath	20587	1349	1352	0.0	0.2%	Pass
Major	Route 5	A12 from Hatfield Peverel to Ingatestone	22792	806	837	0.5	3.8%	Pass
Major	Route 6	A12 from Ingatestone to Hatfield Peverel	20788	756	705	-0.9	-6.8%	Pass
Major	Route 7	A131/A130/A1016/A414 from Great Notley to Ingatestone	22699	1530	1668	2.3	9.0%	Pass
Major	Route 8	A131/A130/A1016/A414 from Ingatestone to Great Notley	22588	1492	1457	-0.6	-2.3%	Pass
Major	Route 9	B1137/A130/B137/A138/B1009/B1007 from Hatfield Peverel to West Hanningfield	18336	1437	1606	2.8	11.8%	Pass
Major	Route 10	B1137/A130/B137/A138/B1009/B1007 from West Hanningfield to Hatfield Peverel	18781	1488	1541	0.9	3.6%	Pass
Major	Route 21	B1012/A132/Runwell Road from A130 to South Woorham Ferrers	5064	287	263	-0.4	-8.2%	Pass
Major	Route 22	B1012/A132/Runwell Road from South Woorham Ferrers to A130	4996	275	240	-0.6	-12.7%	Pass
Minor	Route 11	From A14 to New London Road B1007, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4312	419	406	-0.2	-3.0%	Pass
Minor	Route 12	From New London Road B1007 to A14, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4292	414	411	-0.1	-0.9%	Pass
Minor	Route 13	B1008 from Essex Regiment Way to A1016	6664	558	542	-0.3	-2.9%	Pass
Minor	Route 14	B1008 from A1016 to Essex Regiment Way	6674	561	492	-1.1	-12.2%	Pass
Minor	Route 15	A130 from A130 Sainsburys' to A1016	1851	165	135	-0.5	-18.2%	Fail
Minor	Route 16	A130 from A1016 to A130 Sainsburys'	1888	167	142	-0.4	-15.4%	Fail
Minor	Route 17	Springfield Road from A1060 to A138	2415	242	246	0.1	1.3%	Pass
Minor	Route 18	Springfield Road from A138 to A1060	2384	230	256	0.4	11.3%	Pass
Minor	Route 19	B1007 from Parkway A1060 to Galleywood	3975	372	330	-0.7	-11.4%	Pass
Minor	Route 20	B1007 from Galleywood to Parkway A1060	3983	371	351	-0.3	-5.4%	Pass
							Total	91%

IP – Cars

Cars								
Section	Name	Description	Length	Observed (s)	Modelled (s)	Difference		
						Total	%	Difference<15%
Major	Route 1	A1060/A130 from Chalk End to Battlesbridge	24279	1263	1330	1.1	5.3%	Pass
Major	Route 2	A1060/A130 from Battlesbridge to Chalk End	24457	1276	1300	0.4	1.9%	Pass
Major	Route 3	A414/A1016/A1114 from Nortin Heath to Woodham Mortimer	20449	1346	1168	-3.0	-13.3%	Pass
Major	Route 4	A414/A1016/A1114 from Woodham Mortimer to Nortin Heath	20587	1371	1209	-2.7	-11.8%	Pass
Major	Route 5	A12 from Hatfield Peverel to Ingatestone	22792	708	738	0.5	4.2%	Pass
Major	Route 6	A12 from Ingatestone to Hatfield Peverel	20788	733	667	-1.1	-9.1%	Pass
Major	Route 7	A131/A130/A1016/A414 from Great Notley to Ingatestone	22699	1431	1469	0.6	2.7%	Pass
Major	Route 8	A131/A130/A1016/A414 from Ingatestone to Great Notley	22588	1405	1411	0.1	0.4%	Pass
Major	Route 9	B1137/A130/B137/A138/B1009/B1007 from Hatfield Peverel to West Hanningfield	18336	1390	1316	-1.2	-5.3%	Pass
Major	Route 10	B1137/A130/B137/A138/B1009/B1007 from West Hanningfield to Hatfield Peverel	18781	1447	1330	-2.0	-8.1%	Pass
Major	Route 21	B1012/A132/Runwell Road from A130 to South Woorham Ferrers	5064	283	261	-0.4	-7.8%	Pass
Major	Route 22	B1012/A132/Runwell Road from South Woorham Ferrers to A130	4996	268	237	-0.5	-11.6%	Pass
Minor	Route 11	From A14 to New London Road B1007, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4312	404	365	-0.7	-9.7%	Pass
Minor	Route 12	From New London Road B1007 to A14, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4292	401	405	0.1	1.1%	Pass
Minor	Route 13	B1008 from Essex Regiment Way to A1016	6664	536	499	-0.6	-7.1%	Pass
Minor	Route 14	B1008 from A1016 to Essex Regiment Way	6674	533	475	-1.0	-11.0%	Pass
Minor	Route 15	A130 from A130 Sainsburys' to A1016	1851	141	141	0.0	0.1%	Pass
Minor	Route 16	A130 from A1016 to A130 Sainsburys'	1888	142	151	0.1	6.0%	Pass
Minor	Route 17	Springfield Road from A1060 to A138	2415	285	262	-0.4	-7.9%	Pass
Minor	Route 18	Springfield Road from A138 to A1060	2384	275	248	-0.5	-9.8%	Pass
Minor	Route 19	B1007 from Parkway A1060 to Galleywood	3975	376	332	-0.7	-11.8%	Pass
Minor	Route 20	B1007 from Galleywood to Parkway A1060	3983	376	364	-0.2	-3.2%	Pass
							Total	100.0%

IP – GVs

GVs								
Section	Name	Description	Length	Observed	Modelled	Difference		
						Total	%	Difference<15%
Major	Route 1	A1060/A130 from Chalk End to Battlesbridge	24279	1328	1348	0.3	1.5%	Pass
Major	Route 2	A1060/A130 from Battlesbridge to Chalk End	24457	1317	1319	0.0	0.1%	Pass
Major	Route 3	A414/A1016/A1114 from Nortin Heath to Woodham Mortimer	20449	1364	1168	-3.3	-14.4%	Pass
Major	Route 4	A414/A1016/A1114 from Woodham Mortimer to Nortin Heath	20587	1385	1210	-2.9	-12.6%	Pass
Major	Route 5	A12 from Hatfield Peverel to Ingatestone	22792	732	757	0.4	3.4%	Pass
Major	Route 6	A12 from Ingatestone to Hatfield Peverel	20788	753	678	-1.3	-10.0%	Pass
Major	Route 7	A131/A130/A1016/A414 from Great Notley to Ingatestone	22699	1475	1488	0.2	0.9%	Pass
Major	Route 8	A131/A130/A1016/A414 from Ingatestone to Great Notley	22588	1451	1423	-0.5	-1.9%	Pass
Major	Route 9	B1137/A130/B137/A138/B1009/B1007 from Hatfield Peverel to West Hanningfield	18336	1398	1316	-1.4	-5.9%	Pass
Major	Route 10	B1137/A130/B137/A138/B1009/B1007 from West Hanningfield to Hatfield Peverel	18781	1456	1330	-2.1	-8.6%	Pass
Major	Route 21	B1012/A132/Runwell Road from A130 to South Woorham Ferrers	5064	286	261	-0.4	-8.8%	Pass
Major	Route 22	B1012/A132/Runwell Road from South Woorham Ferrers to A130	4996	272	237	-0.6	-12.7%	Pass
Minor	Route 11	From A14 to New London Road B1007, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4312	421	365	-0.9	-13.2%	Pass
Minor	Route 12	From New London Road B1007 to A14, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4292	417	405	-0.2	-2.9%	Pass
Minor	Route 13	B1008 from Essex Regiment Way to A1016	6664	544	499	-0.8	-8.3%	Pass
Minor	Route 14	B1008 from A1016 to Essex Regiment Way	6674	539	475	-1.1	-12.0%	Pass
Minor	Route 15	A130 from A130 Sainsburys' to A1016	1851	143	141	0.0	-1.2%	Pass
Minor	Route 16	A130 from A1016 to A130 Sainsburys'	1888	144	151	0.1	4.9%	Pass
Minor	Route 17	Springfield Road from A1060 to A138	2415	293	262	-0.5	-10.5%	Pass
Minor	Route 18	Springfield Road from A138 to A1060	2384	284	248	-0.6	-12.5%	Pass
Minor	Route 19	B1007 from Parkway A1060 to Galleywood	3975	382	332	-0.8	-13.3%	Pass
Minor	Route 20	B1007 from Galleywood to Parkway A1060	3983	383	364	-0.3	-4.9%	Pass
							Total	100.0%

PM – Cars

Lights								
Section	Name	Description	Length	Observed (s)	Modelled (s)	Difference		
						Total	%	Difference<15%
Major	Route 1	A1060/A130 from Chalk End to Battlesbridge	24279	1291	1439	2.5	11.4%	Pass
Major	Route 2	A1060/A130 from Battlesbridge to Chalk End	24457	1364	1437	1.2	5.3%	Pass
Major	Route 3	A414/A1016/A1114 from Nortin Heath to Woodham Mortimer	20449	1293	1296	0.1	0.2%	Pass
Major	Route 4	A414/A1016/A1114 from Woodham Mortimer to Nortin Heath	20587	1326	1298	-0.5	-2.1%	Pass
Major	Route 5	A12 from Hatfield Peverel to Ingatestone	22792	785	786	0.0	0.2%	Pass
Major	Route 6	A12 from Ingatestone to Hatfield Peverel	20788	741	783	0.7	5.7%	Pass
Major	Route 7	A131/A130/A1016/A414 from Great Notley to Ingatestone	22699	1529	1555	0.4	1.7%	Pass
Major	Route 8	A131/A130/A1016/A414 from Ingatestone to Great Notley	22588	1501	1628	2.1	8.5%	Pass
Major	Route 9	B1137/A130/B137/A138/B1009/B1007 from Hatfield Peverel to West Hanningfield	18336	1420	1464	0.7	3.0%	Pass
Major	Route 10	B1137/A130/B137/A138/B1009/B1007 from West Hanningfield to Hatfield Peverel	18781	1459	1456	0.0	-0.2%	Pass
Major	Route 21	B1012/A132/Runwell Road from A130 to South Woorham Ferrers	5064	281	266	-0.3	-5.4%	Pass
Major	Route 22	B1012/A132/Runwell Road from South Woorham Ferrers to A130	4996	278	244	-0.6	-12.3%	Pass
Minor	Route 11	From A14 to New London Road B1007, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4312	456	390	-1.1	-14.5%	Pass
Minor	Route 12	From New London Road B1007 to A14, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4292	452	464	0.2	2.7%	Pass
Minor	Route 13	B1008 from Essex Regiment Way to A1016	6664	545	527	-0.3	-3.3%	Pass
Minor	Route 14	B1008 from A1016 to Essex Regiment Way	6674	548	516	-0.5	-5.9%	Pass
Minor	Route 15	A130 from A130 Sainsburys' to A1016	1851	155	147	-0.1	-4.6%	Pass
Minor	Route 16	A130 from A1016 to A130 Sainsburys'	1888	154	161	0.1	4.3%	Pass
Minor	Route 17	Springfield Road from A1060 to A138	2415	243	284	0.7	16.8%	Fail
Minor	Route 18	Springfield Road from A138 to A1060	2384	231	274	0.7	18.9%	Fail
Minor	Route 19	B1007 from Parkway A1060 to Galleywood	3975	354	408	0.9	15.3%	Fail
Minor	Route 20	B1007 from Galleywood to Parkway A1060	3983	355	337	-0.3	-5.0%	Pass
							Total	86%

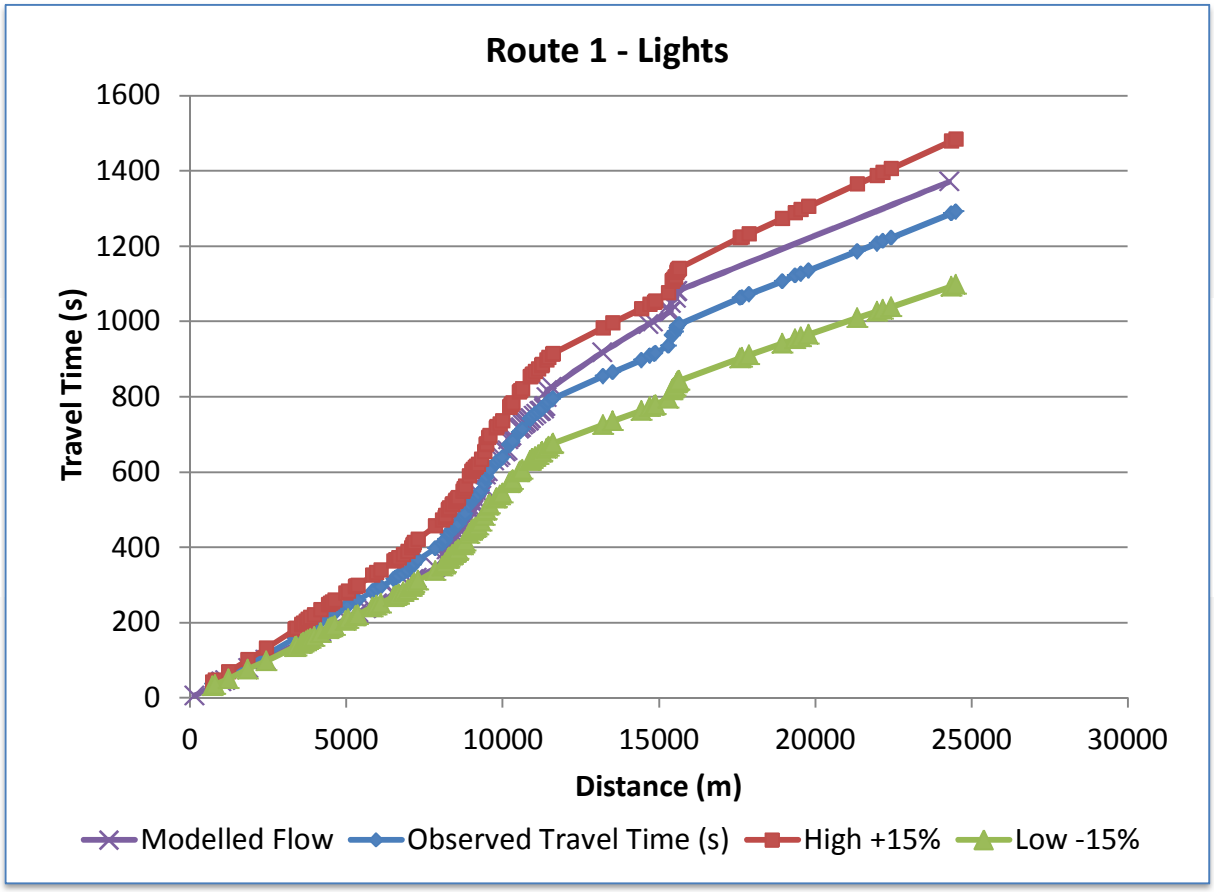
JACOBS

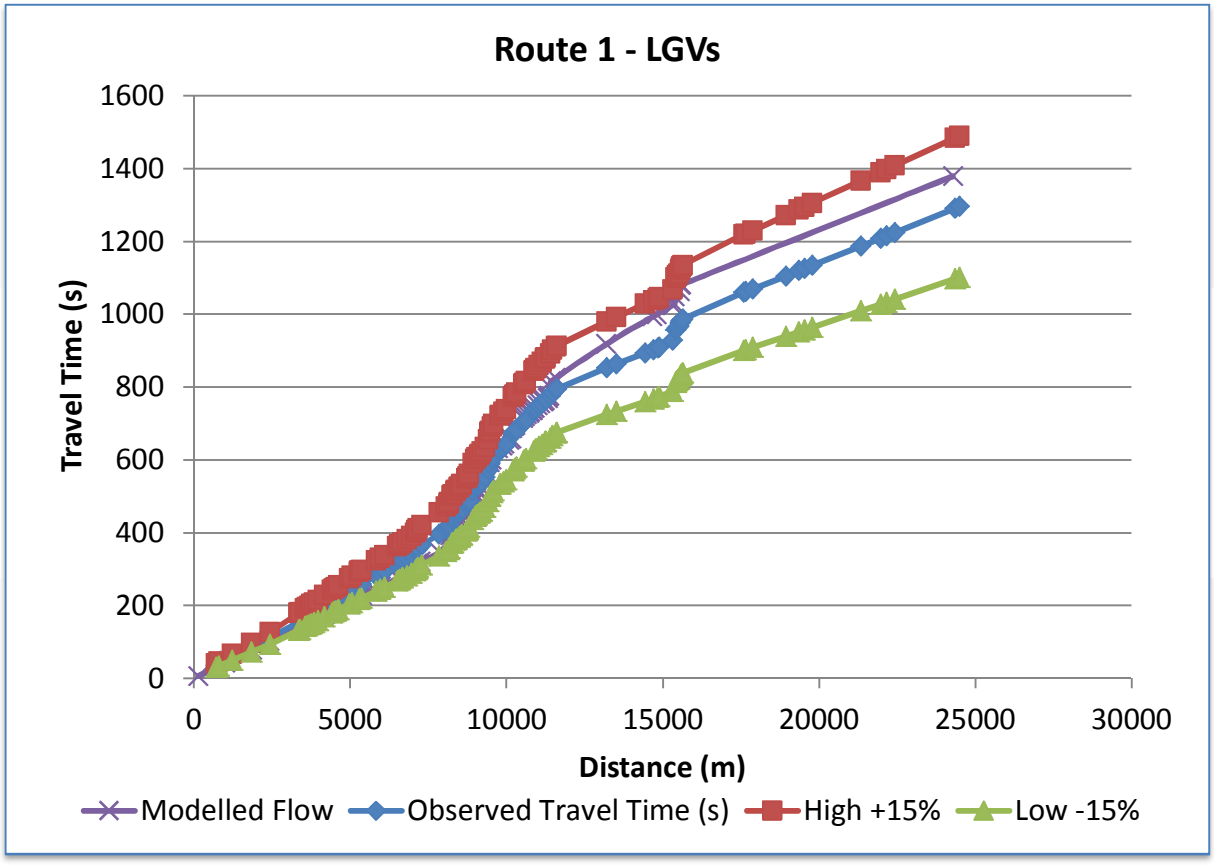
PM – GVs

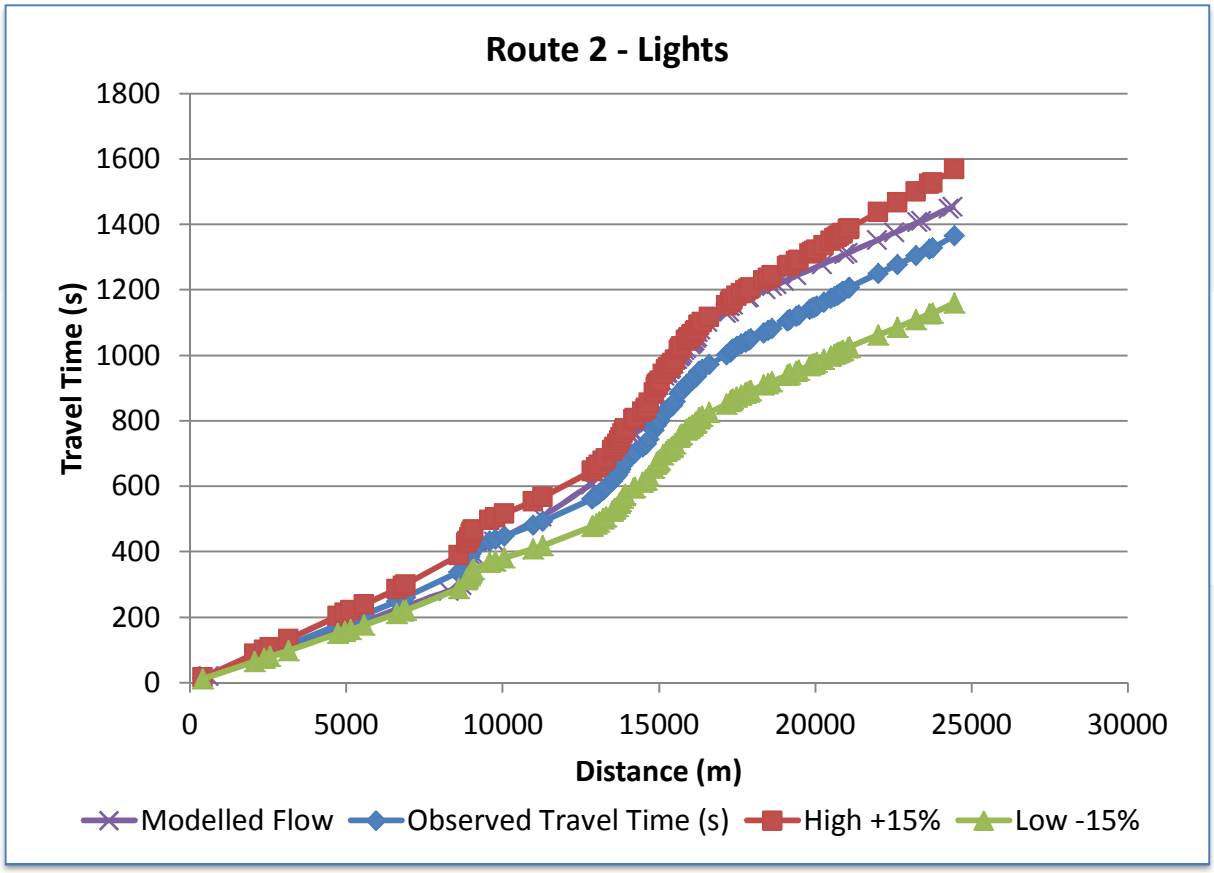
GVs								
Section	Name	Description	Length	Observed	Modelled	Difference		
						Total	%	Difference<15%
Major	Route 1	A1060/A130 from Chalk End to Battlesbridge	24279	1296	1439	2.4	11.0%	Pass
Major	Route 2	A1060/A130 from Battlesbridge to Chalk End	24457	1382	1448	1.1	4.8%	Pass
Major	Route 3	A414/A1016/A1114 from Nortin Heath to Woodham Mortimer	20449	1312	1296	-0.3	-1.2%	Pass
Major	Route 4	A414/A1016/A1114 from Woodham Mortimer to Nortin Heath	20587	1349	1299	-0.8	-3.7%	Pass
Major	Route 5	A12 from Hatfield Peverel to Ingatestone	22792	806	788	-0.3	-2.2%	Pass
Major	Route 6	A12 from Ingatestone to Hatfield Peverel	20788	756	783	0.4	3.5%	Pass
Major	Route 7	A131/A130/A1016/A414 from Great Notley to Ingatestone	22699	1530	1572	0.7	2.8%	Pass
Major	Route 8	A131/A130/A1016/A414 from Ingatestone to Great Notley	22588	1492	1639	2.5	9.9%	Pass
Major	Route 9	B1137/A130/B137/A138/B1009/B1007 from Hatfield Peverel to West Hanningfield	18336	1437	1464	0.4	1.8%	Pass
Major	Route 10	B1137/A130/B137/A138/B1009/B1007 from West Hanningfield to Hatfield Peverel	18781	1488	1456	-0.5	-2.1%	Pass
Major	Route 21	B1012/A132/Runwell Road from A130 to South Woorham Ferrers	5064	287	266	-0.3	-7.1%	Pass
Major	Route 22	B1012/A132/Runwell Road from South Woorham Ferrers to A130	4996	275	244	-0.5	-11.3%	Pass
Minor	Route 11	From A14 to New London Road B1007, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4312	419	390	-0.5	-6.9%	Pass
Minor	Route 12	From New London Road B1007 to A14, via Writtle (Ongar Road, Chelmsford Road, Writtle Road)	4292	414	464	0.8	12.1%	Pass
Minor	Route 13	B1008 from Essex Regiment Way to A1016	6664	558	527	-0.5	-5.5%	Pass
Minor	Route 14	B1008 from A1016 to Essex Regiment Way	6674	561	516	-0.8	-8.1%	Pass
Minor	Route 15	A130 from A130 Sainsburys' to A1016	1851	165	147	-0.3	-10.8%	Pass
Minor	Route 16	A130 from A1016 to A130 Sainsburys'	1888	167	161	-0.1	-3.8%	Pass
Minor	Route 17	Springfield Road from A1060 to A138	2415	242	284	0.7	17.0%	Fail
Minor	Route 18	Springfield Road from A138 to A1060	2384	230	274	0.7	19.3%	Fail
Minor	Route 19	B1007 from Parkway A1060 to Galleywood	3975	372	408	0.6	9.7%	Pass
Minor	Route 20	B1007 from Galleywood to Parkway A1060	3983	371	337	-0.6	-9.2%	Pass
							Total	91%

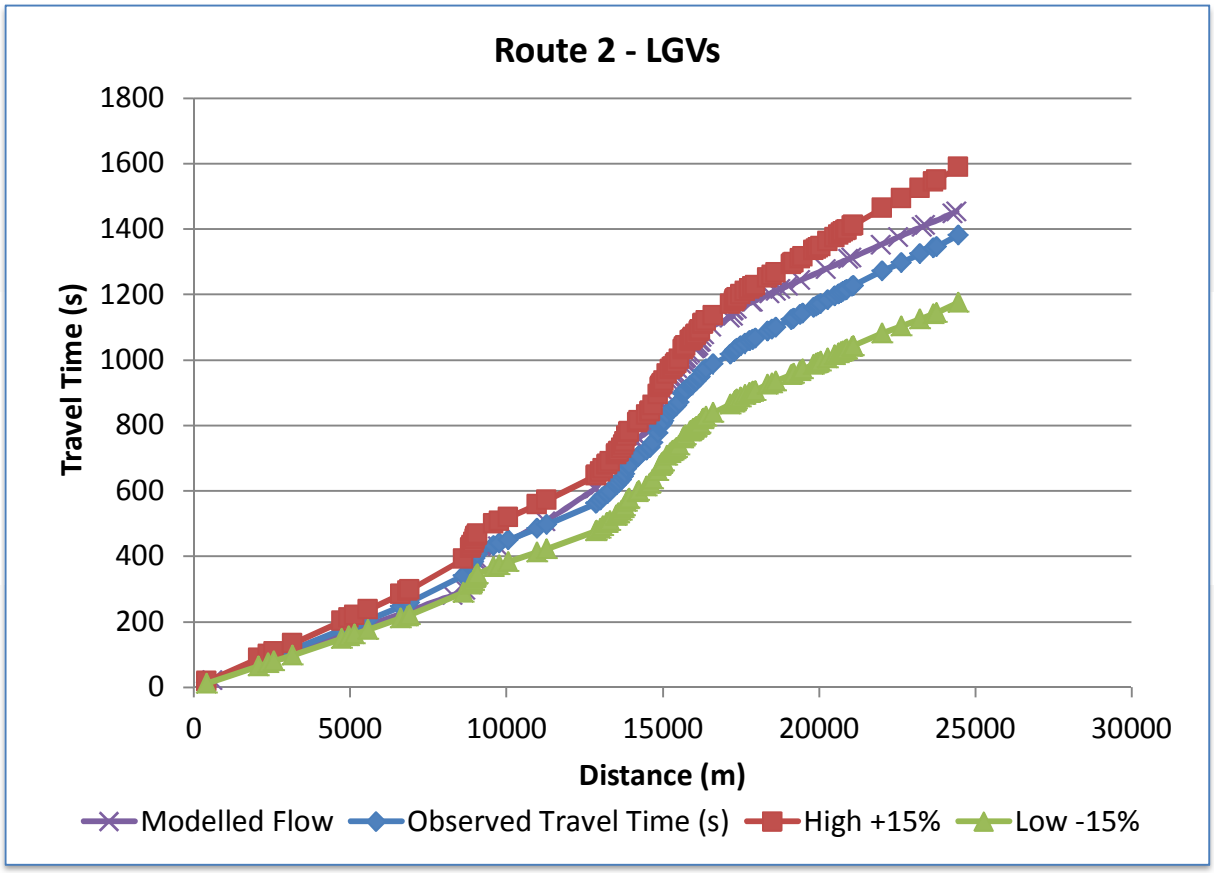
Appendix J. Journey Time Validation Results Route Profiles

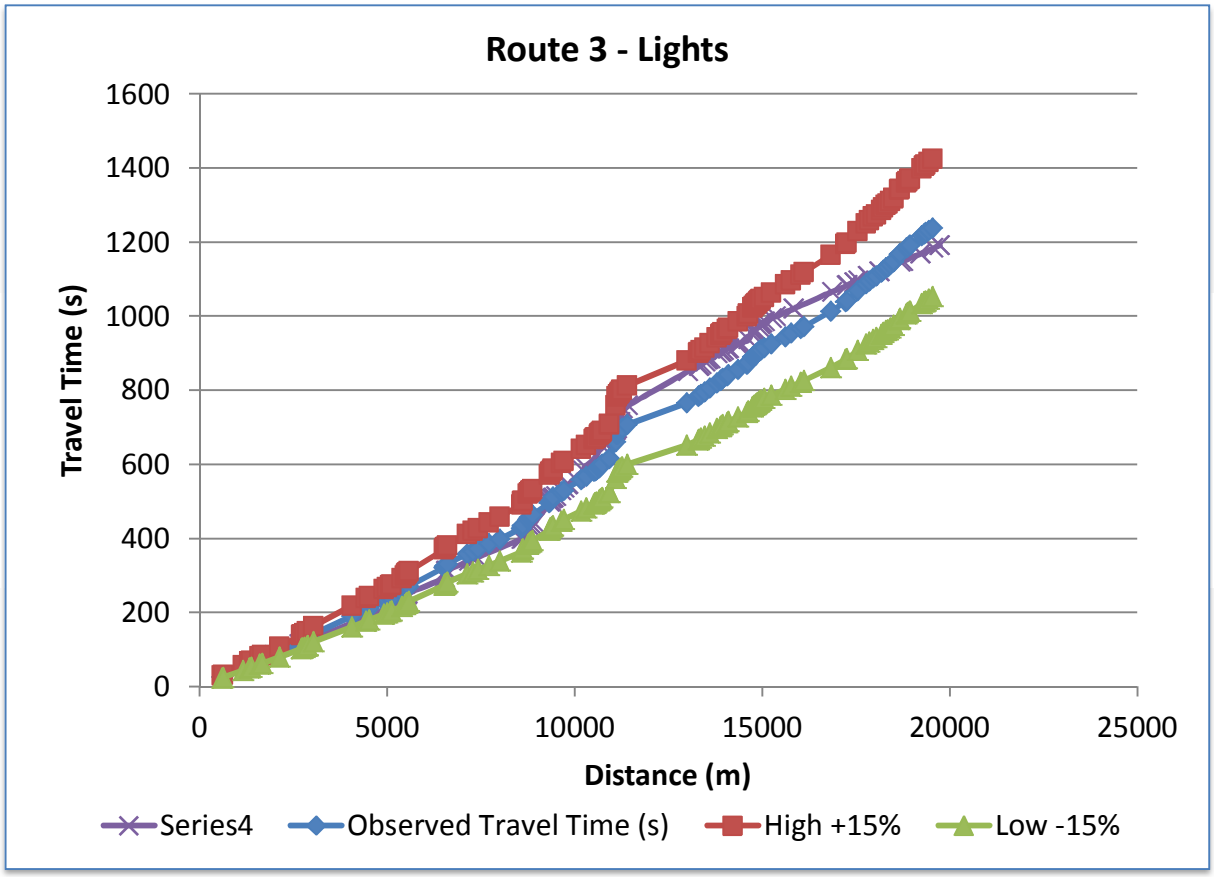
AM

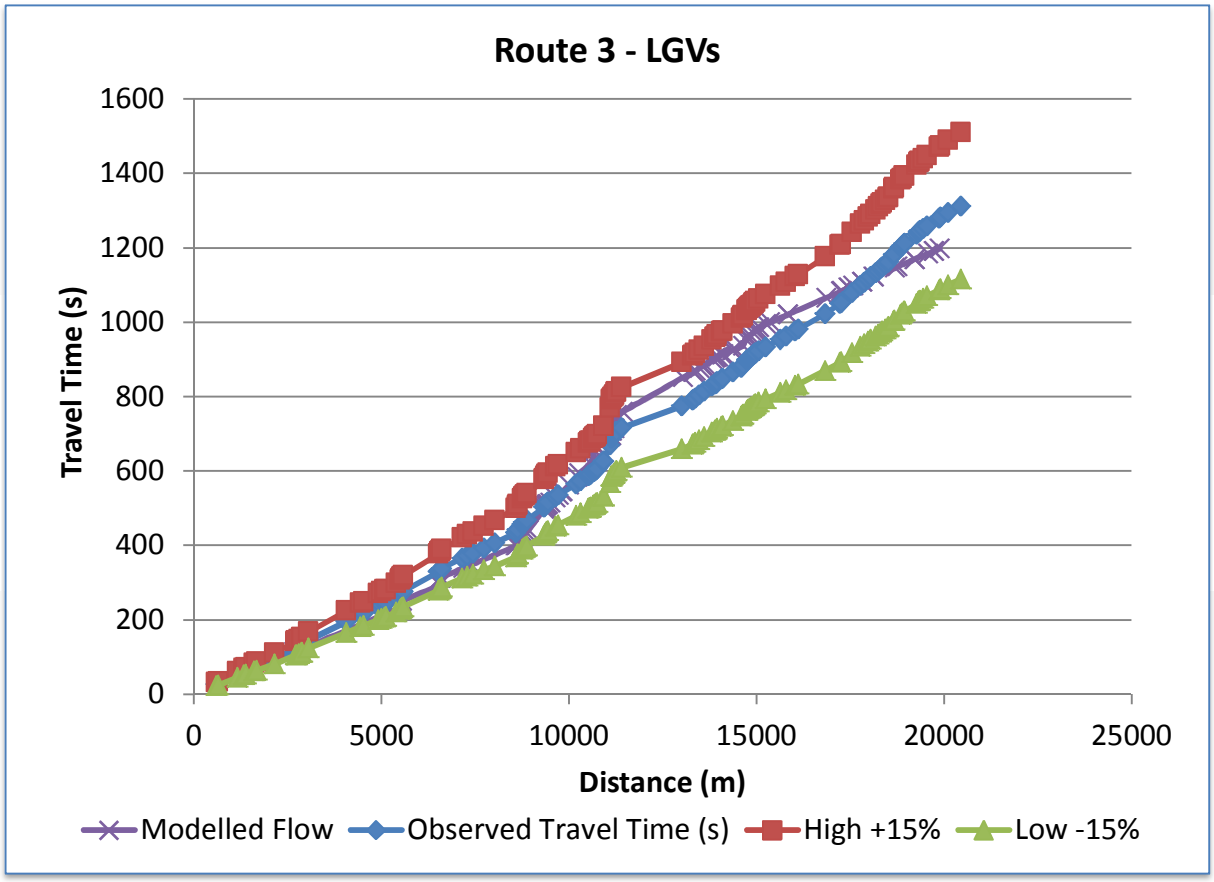

Route 1 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

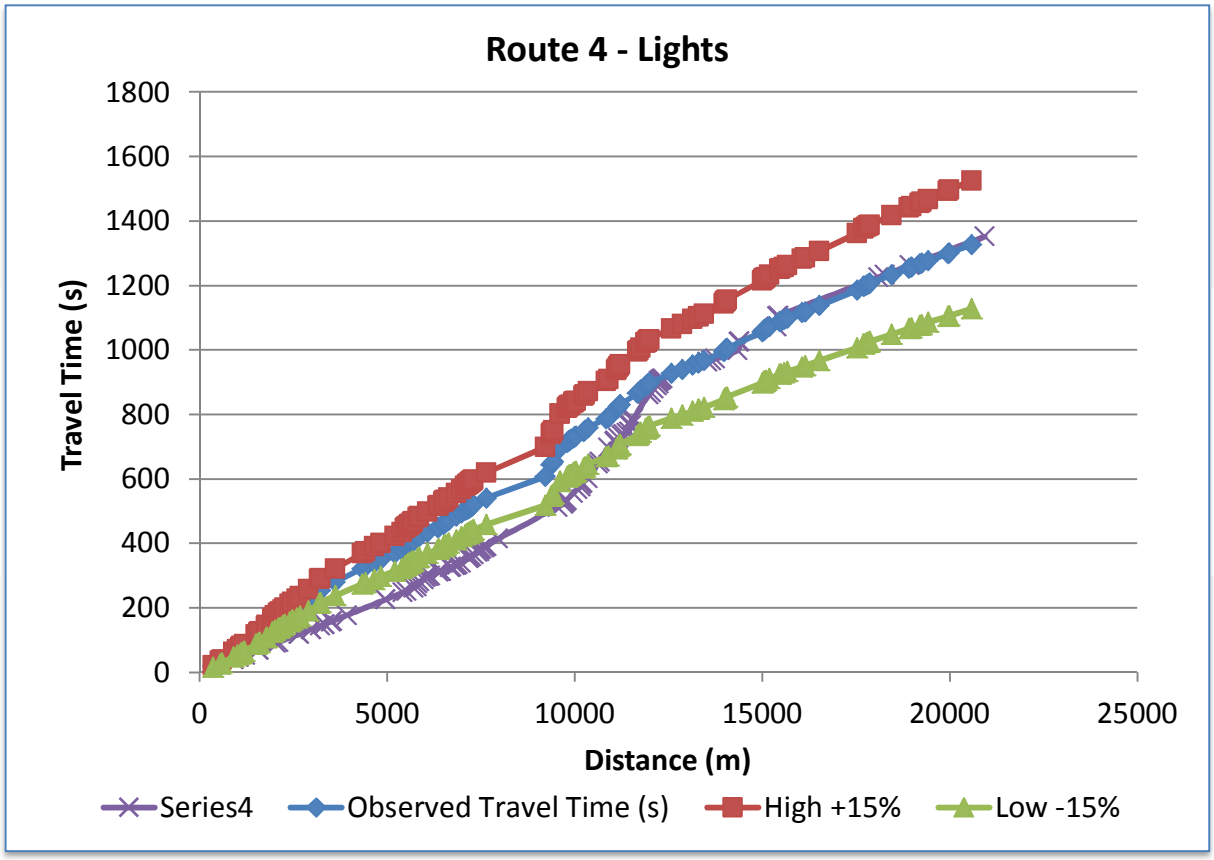

Route 1 - LGVs
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

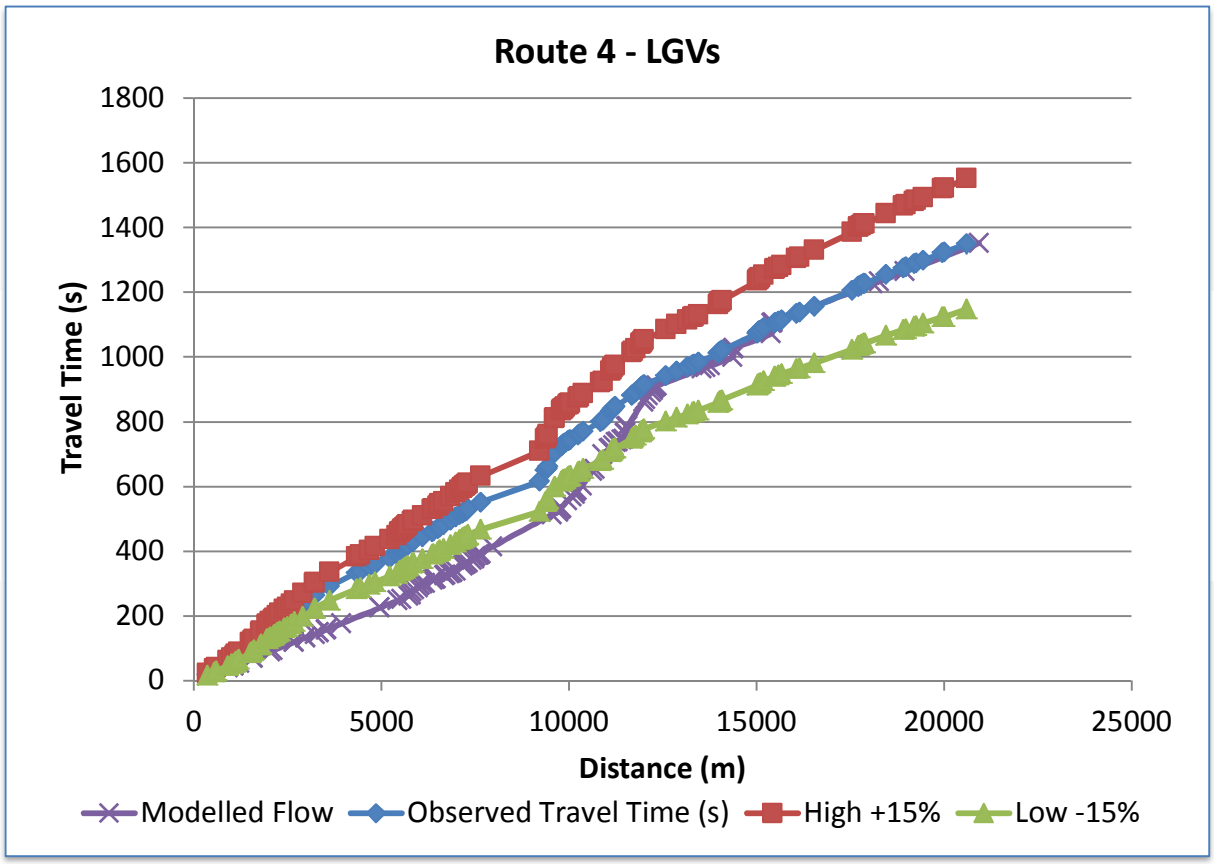

Route 2 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

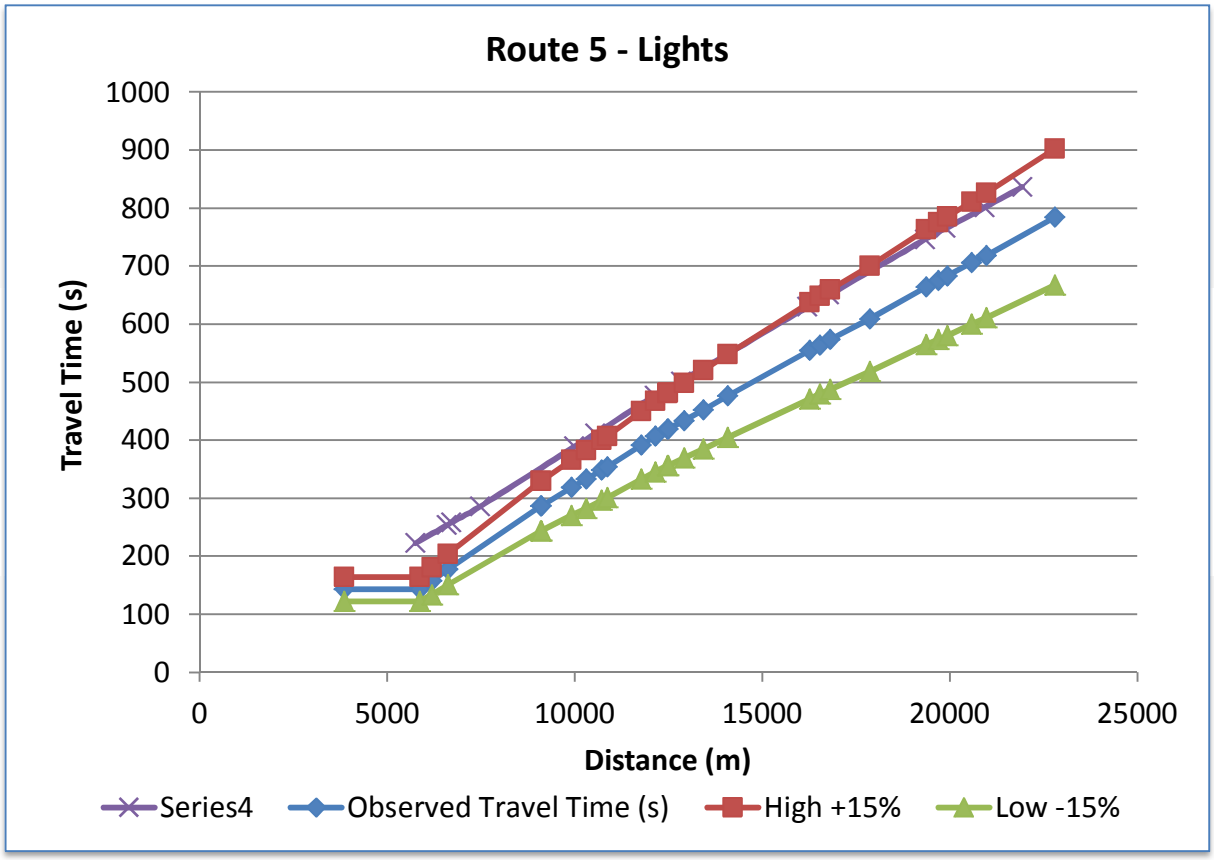

Route 2 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

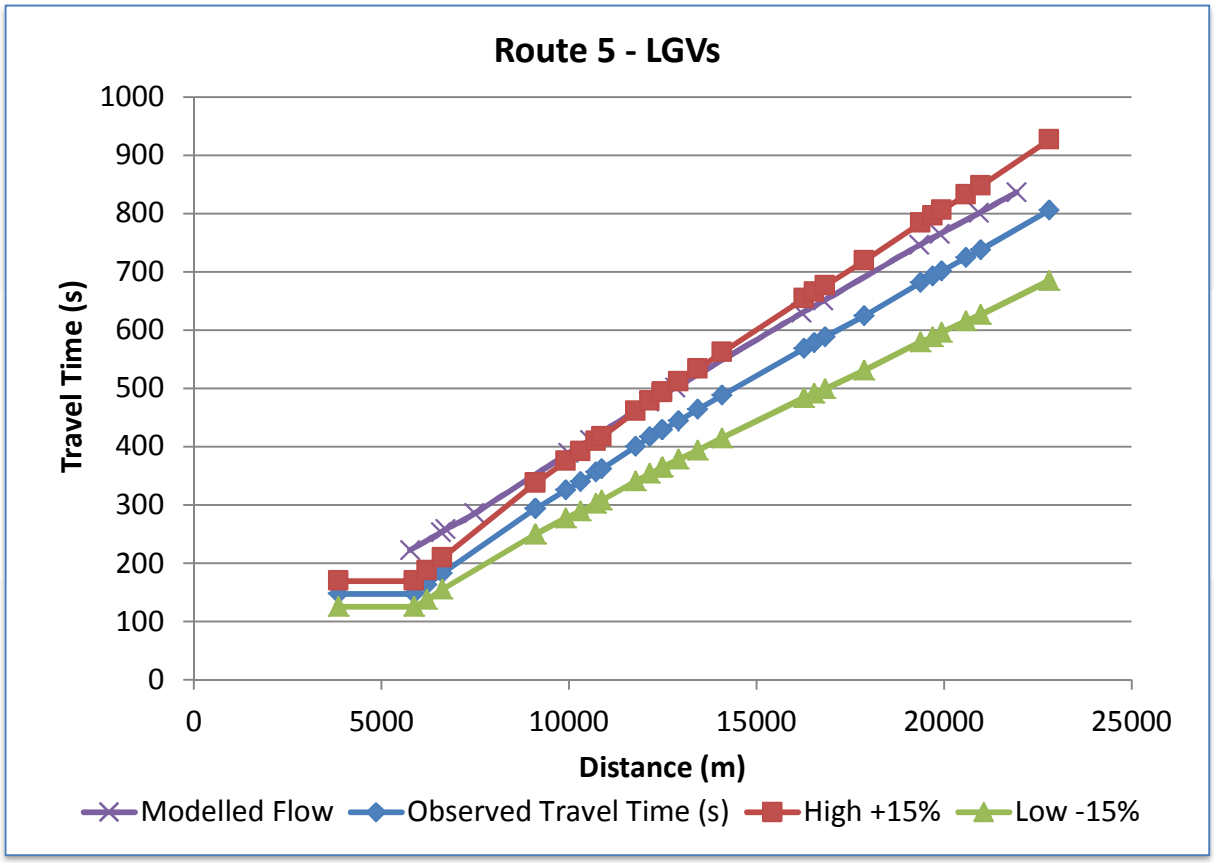

Route 3 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

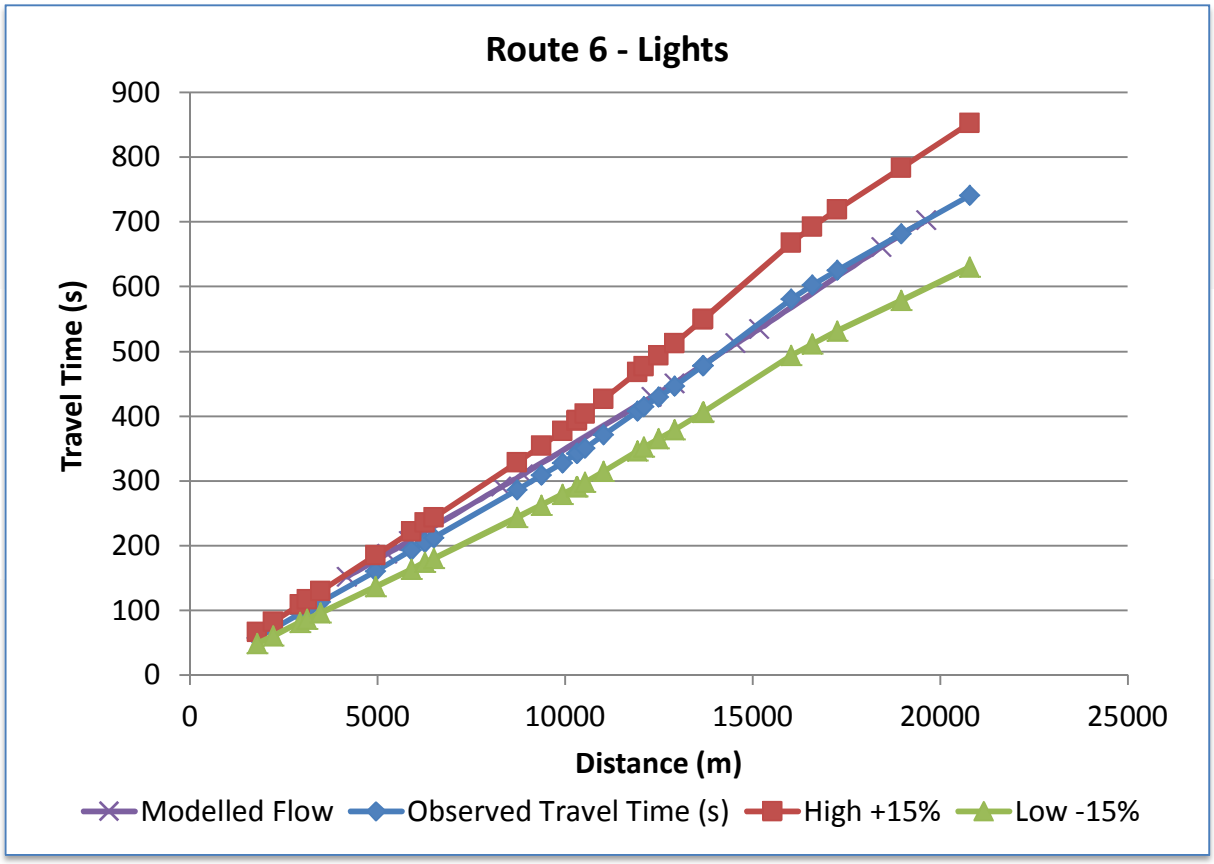

Route 3 - LGVs
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

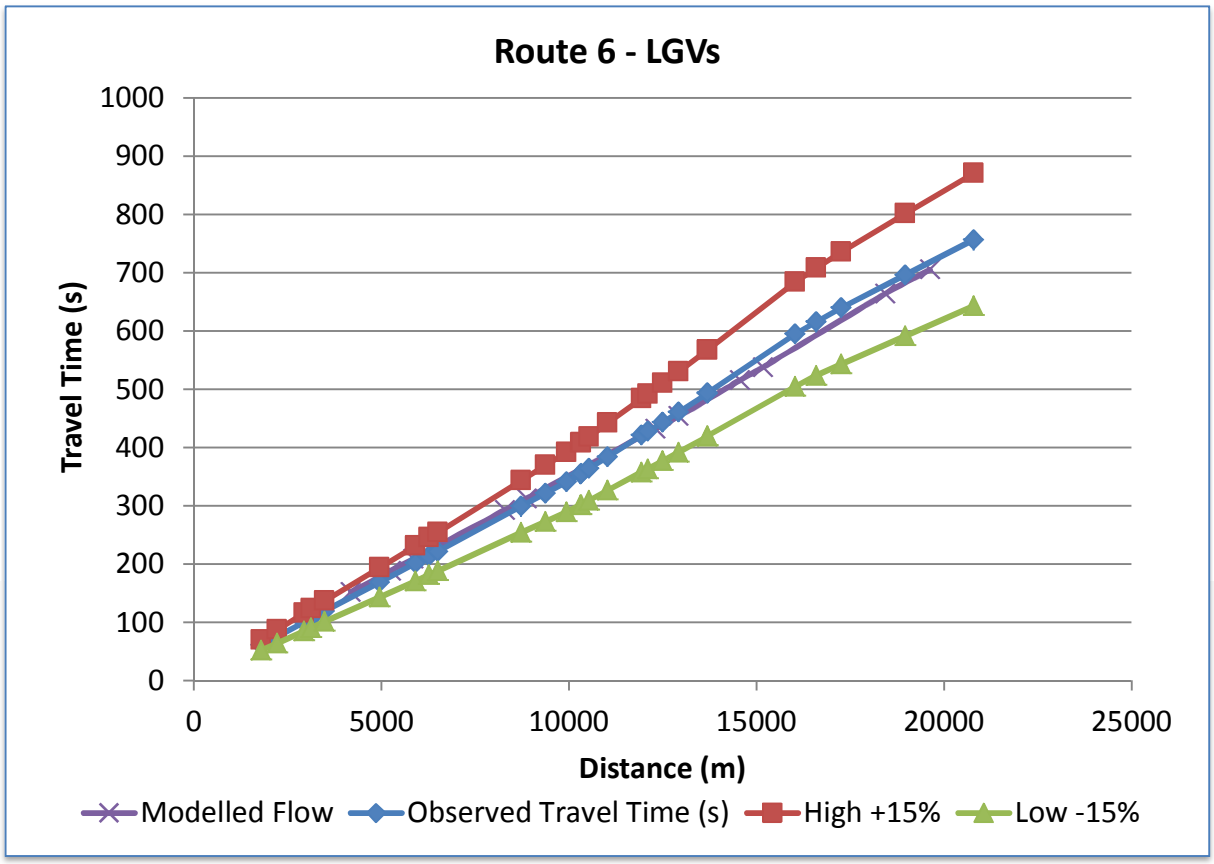

Route 4 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

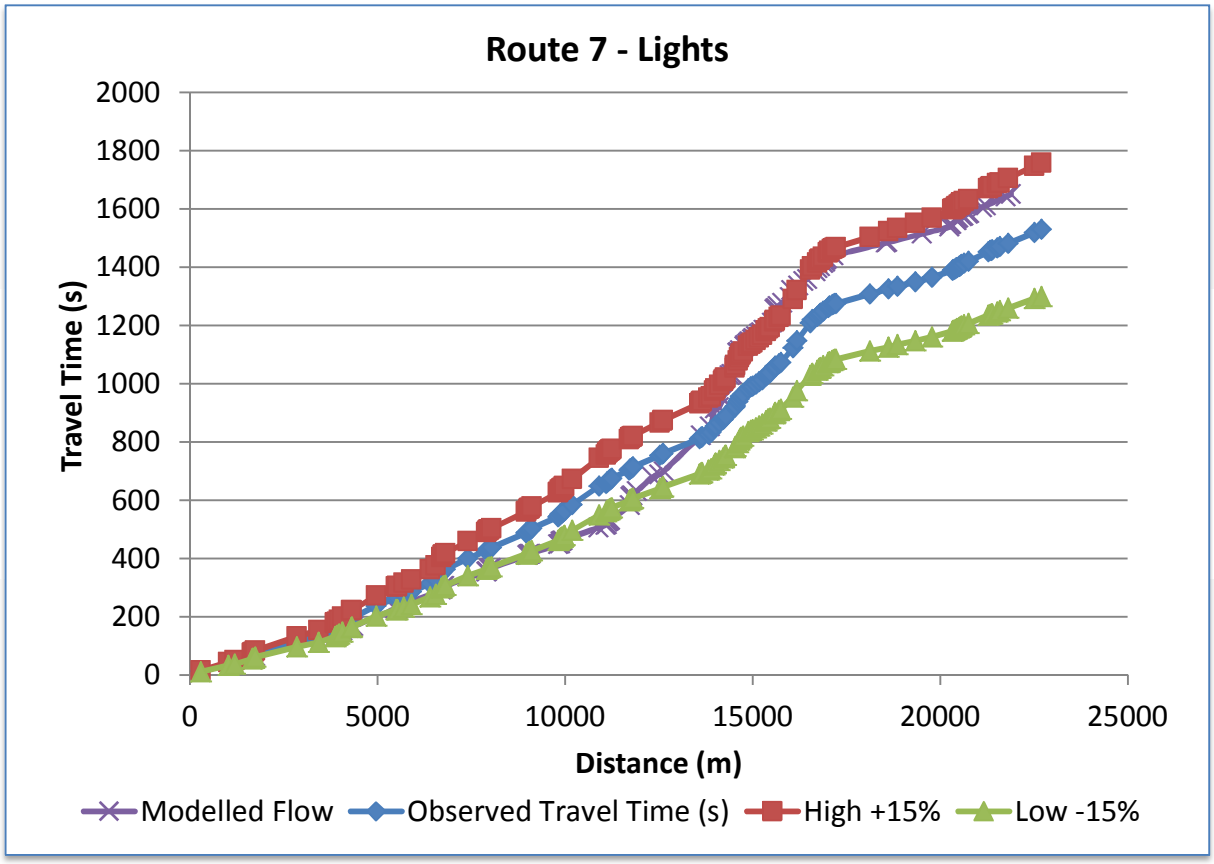

Route 4 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

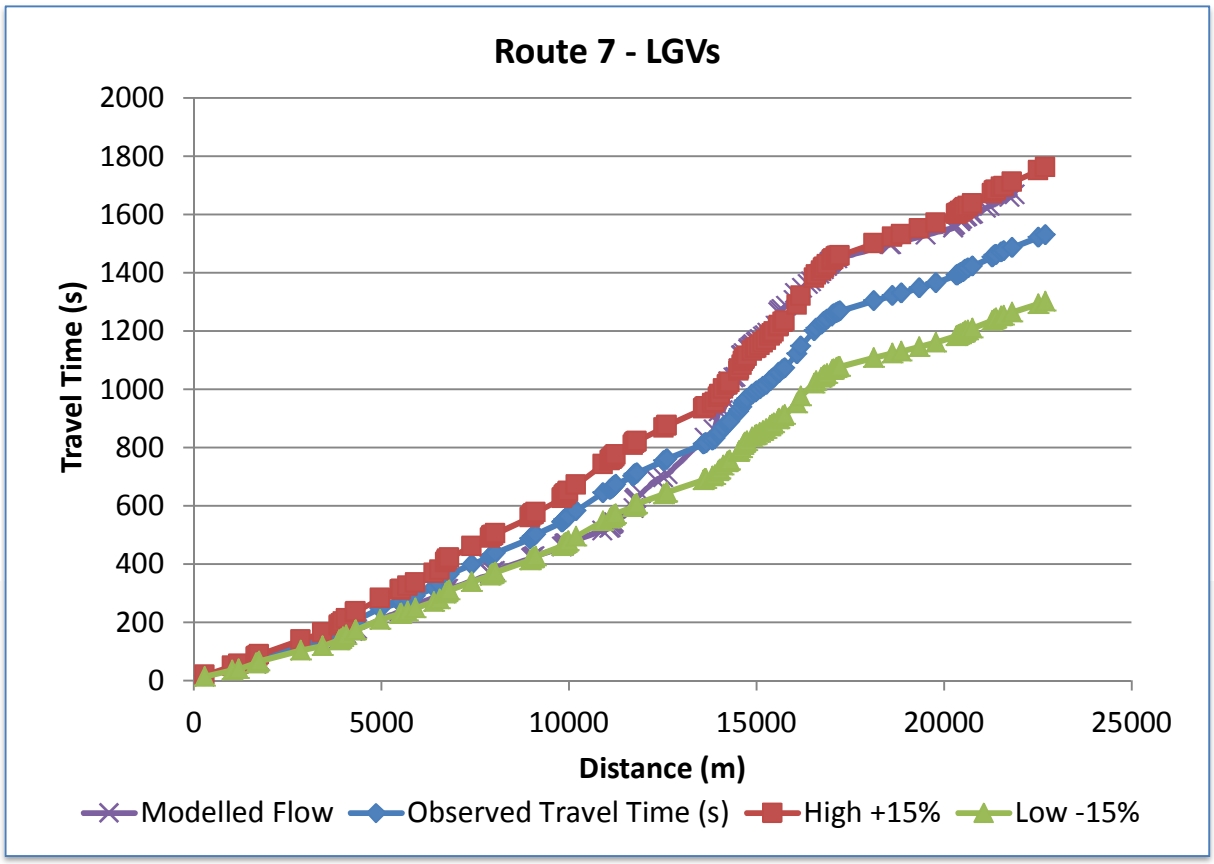

Route 5 - Lights
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

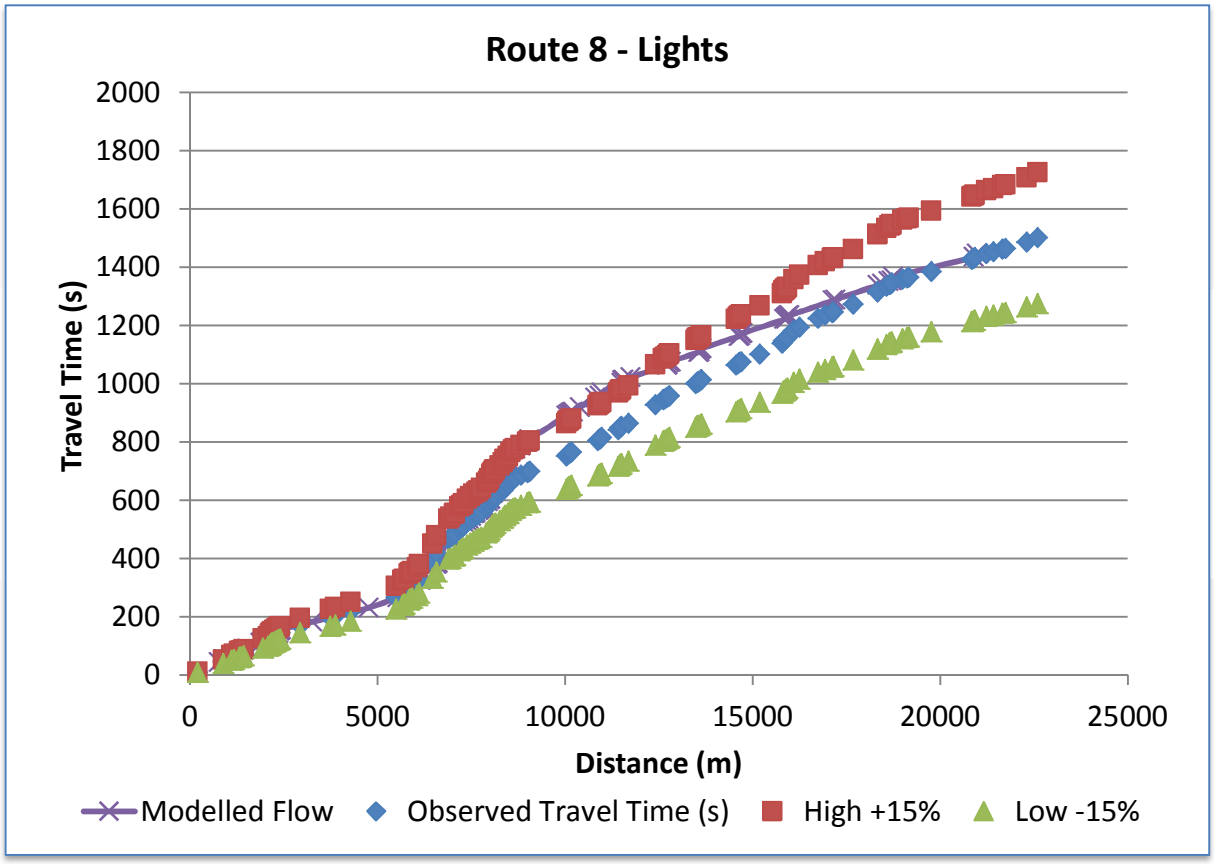

Route 5 - LGVs
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

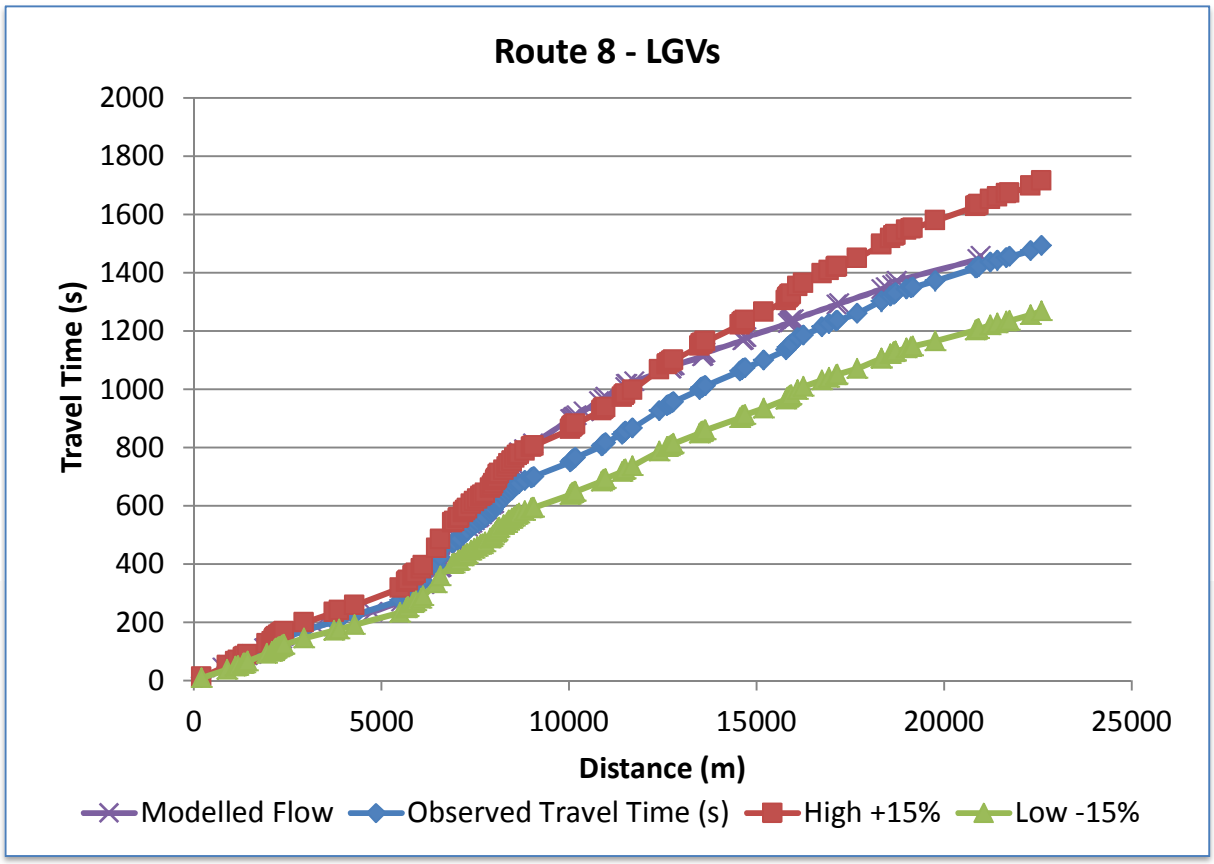

Route 6 - Lights
Travel Time (s)
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

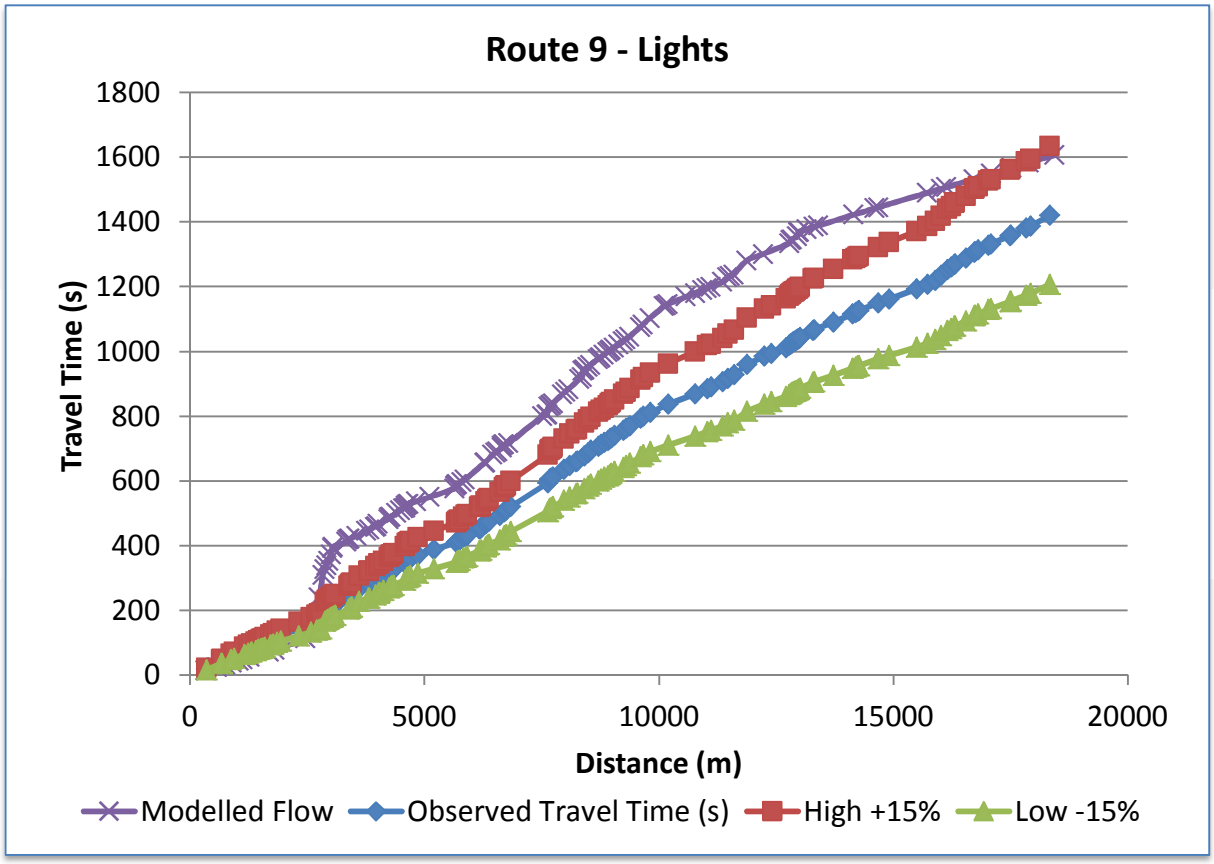

Route 6 - LGVs
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

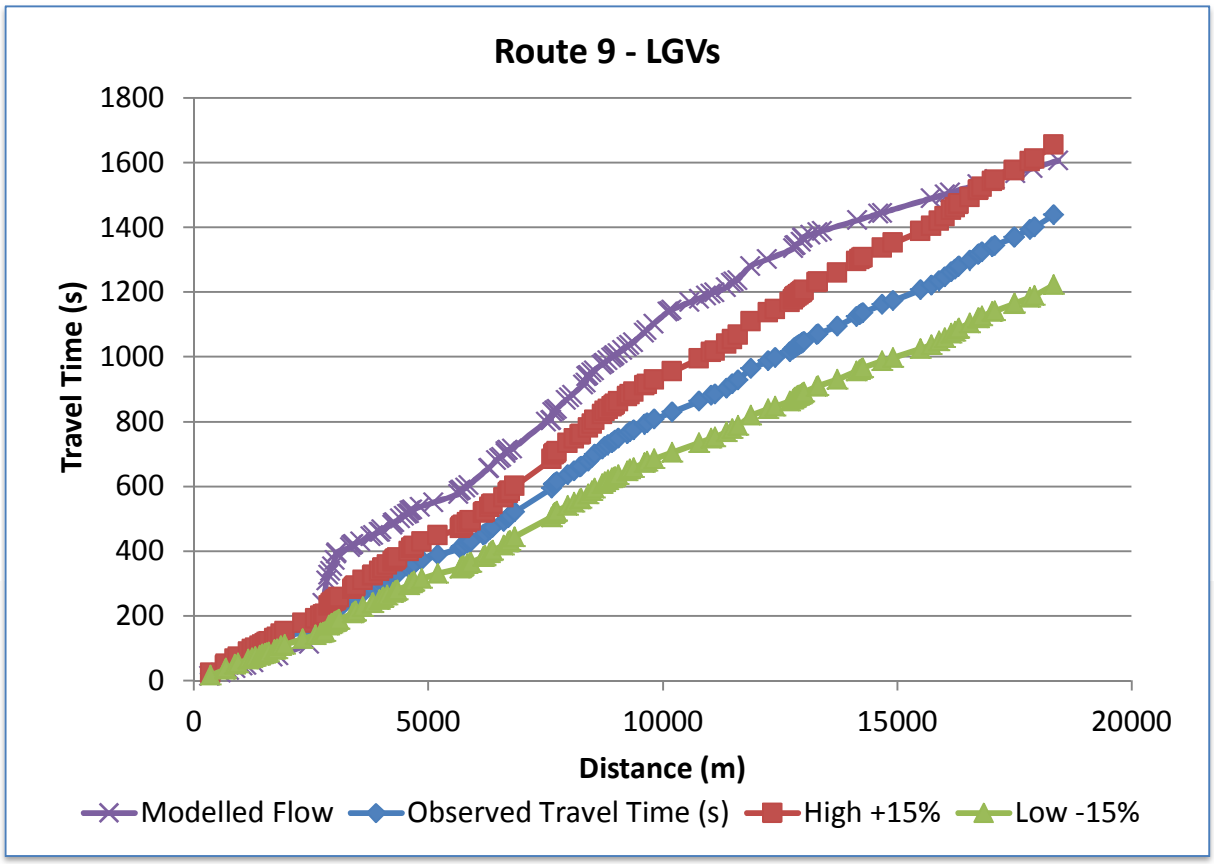

Route 7 - Lights
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

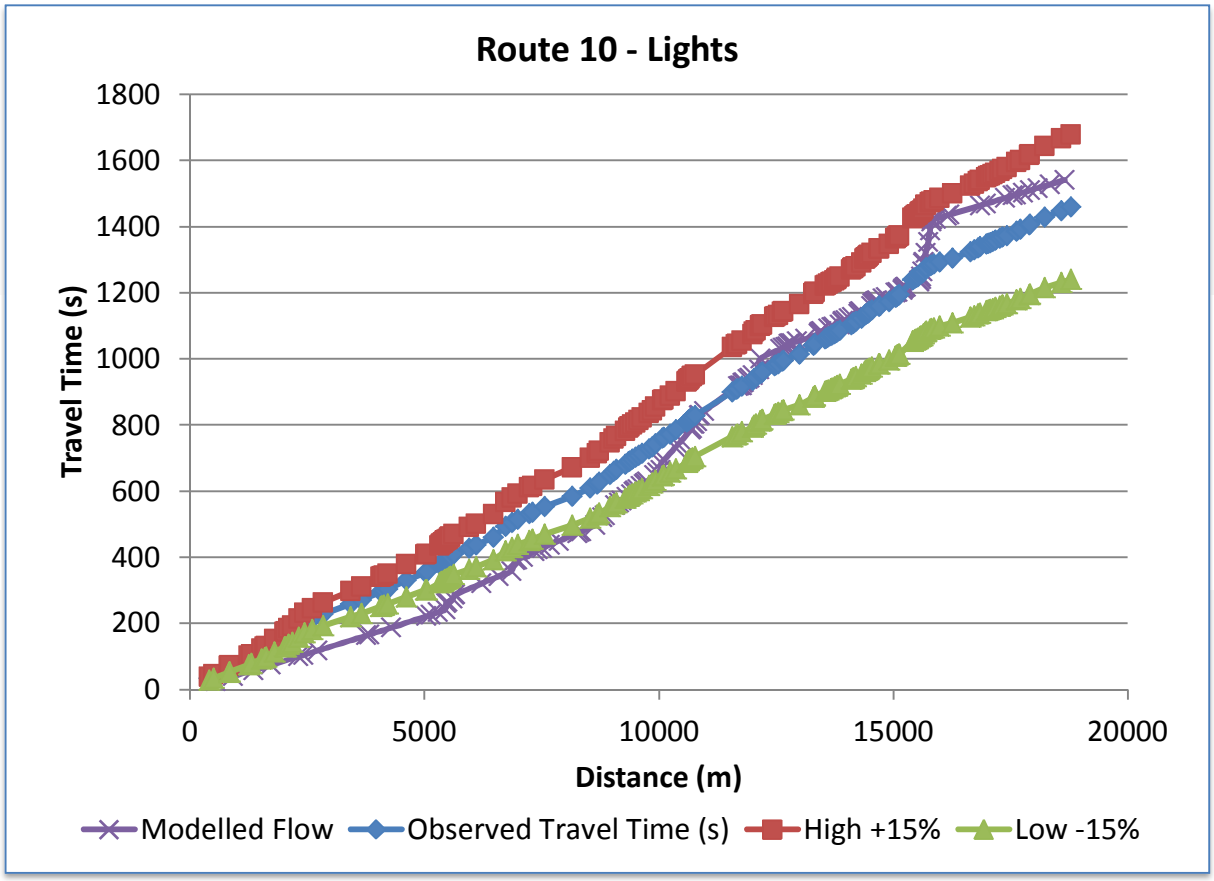

Route 7 - LGVs
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

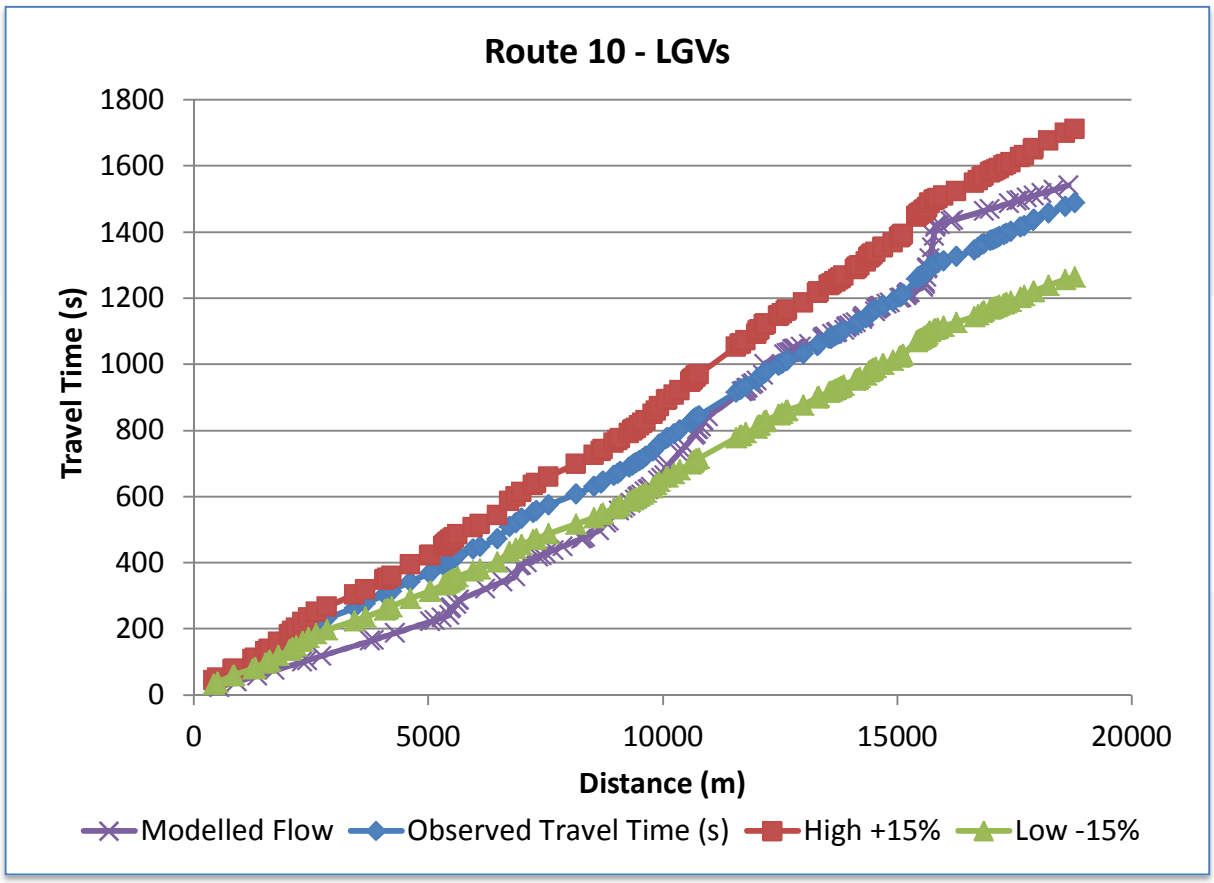

Route 8 - Lights
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

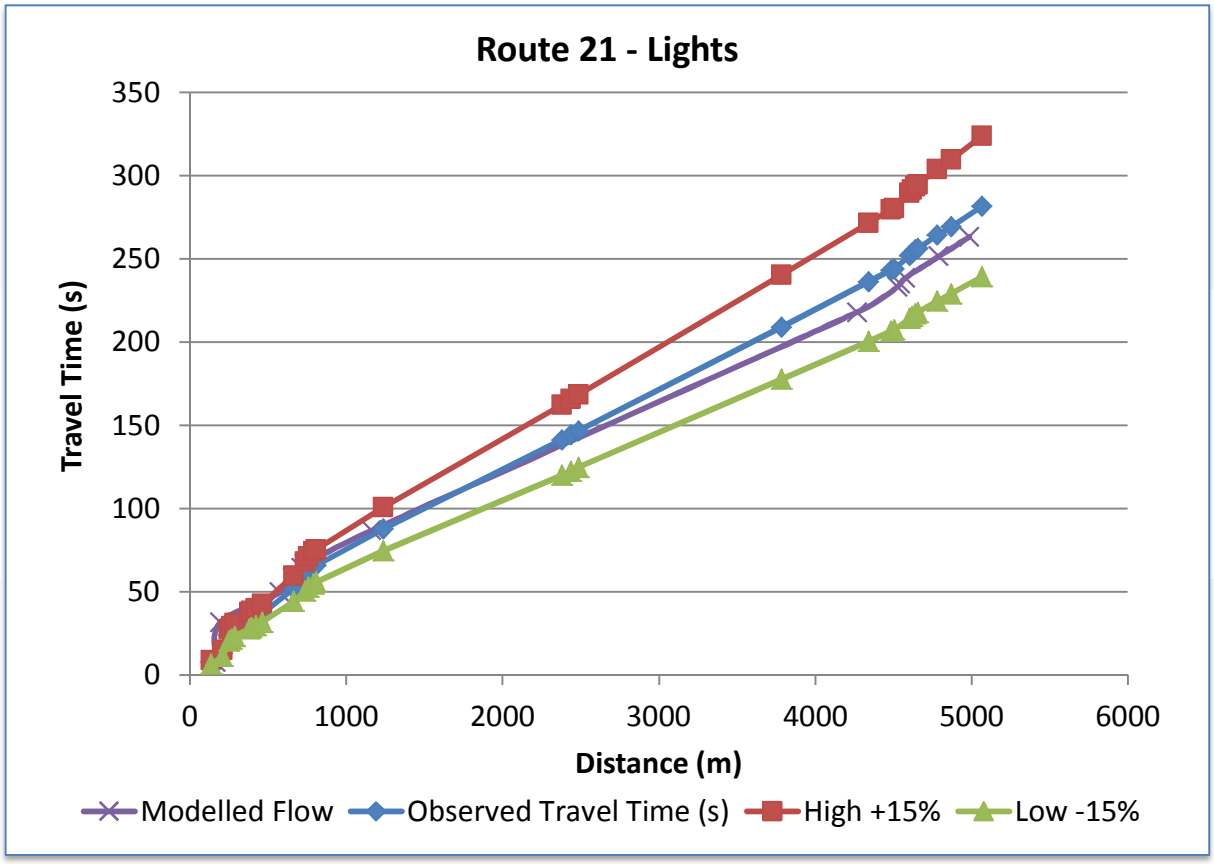

Route 8 - LGVs
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

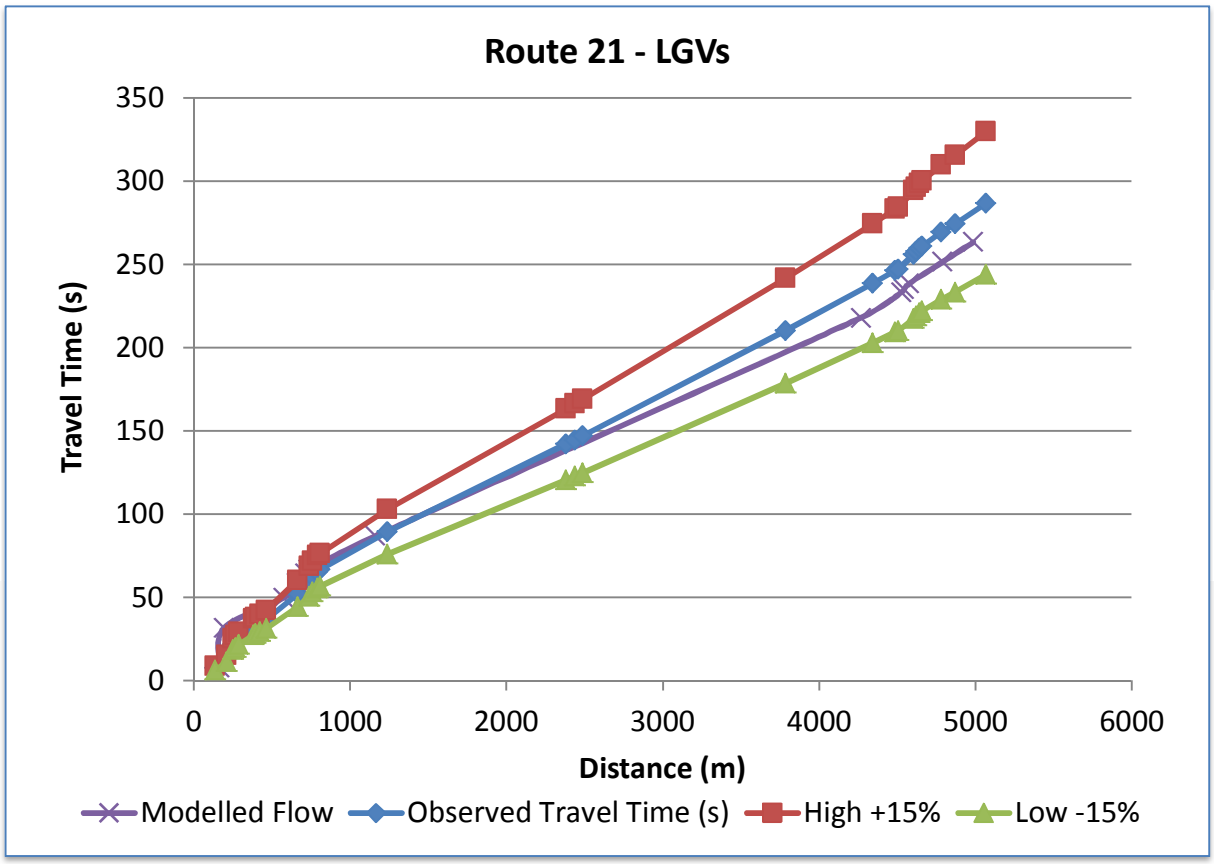

Route 9 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

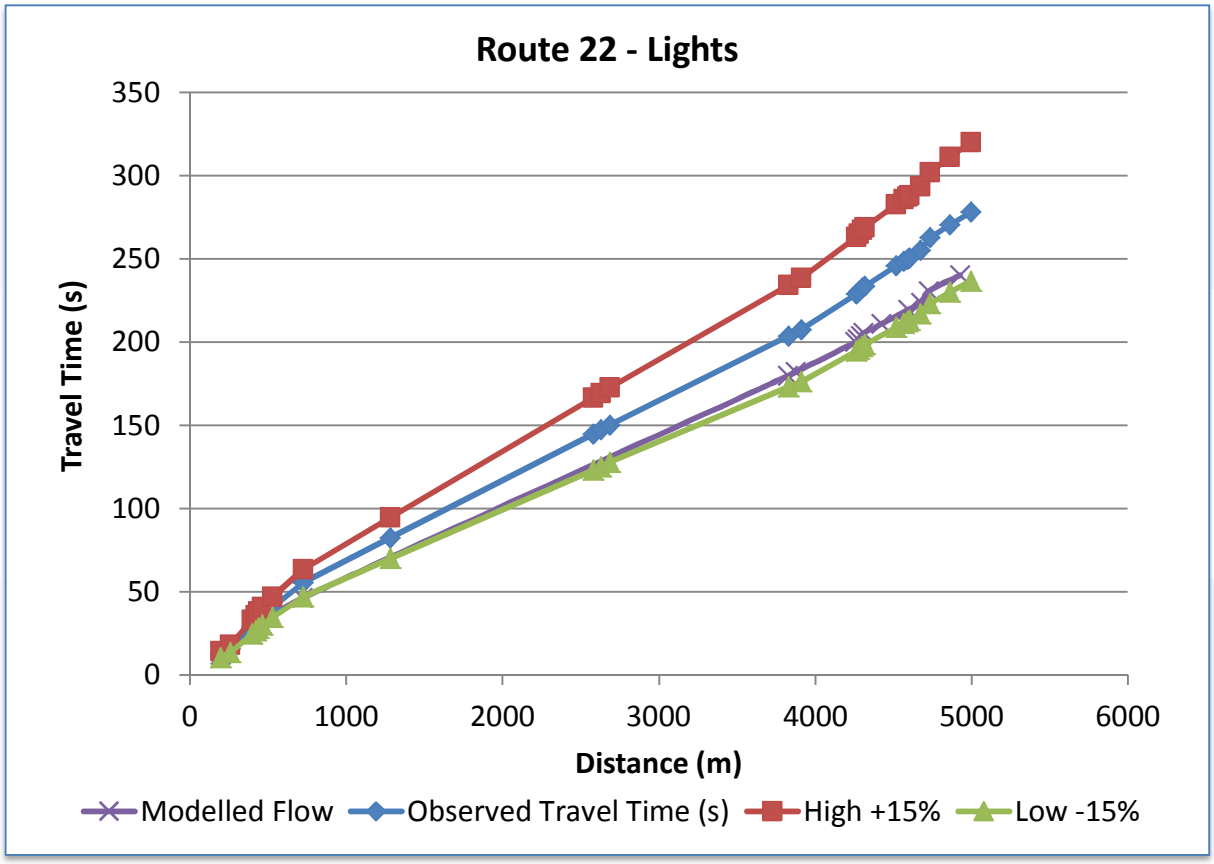

Route 9 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

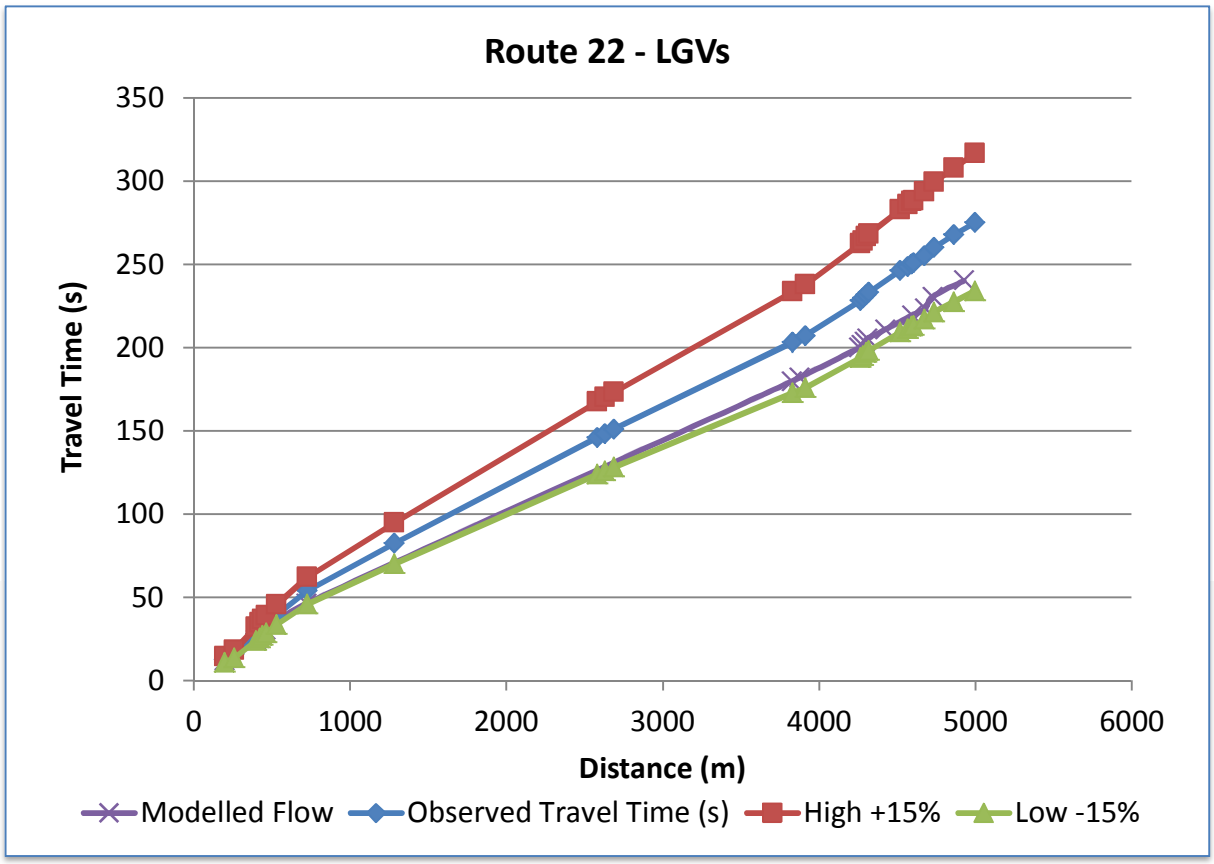

Route 10 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

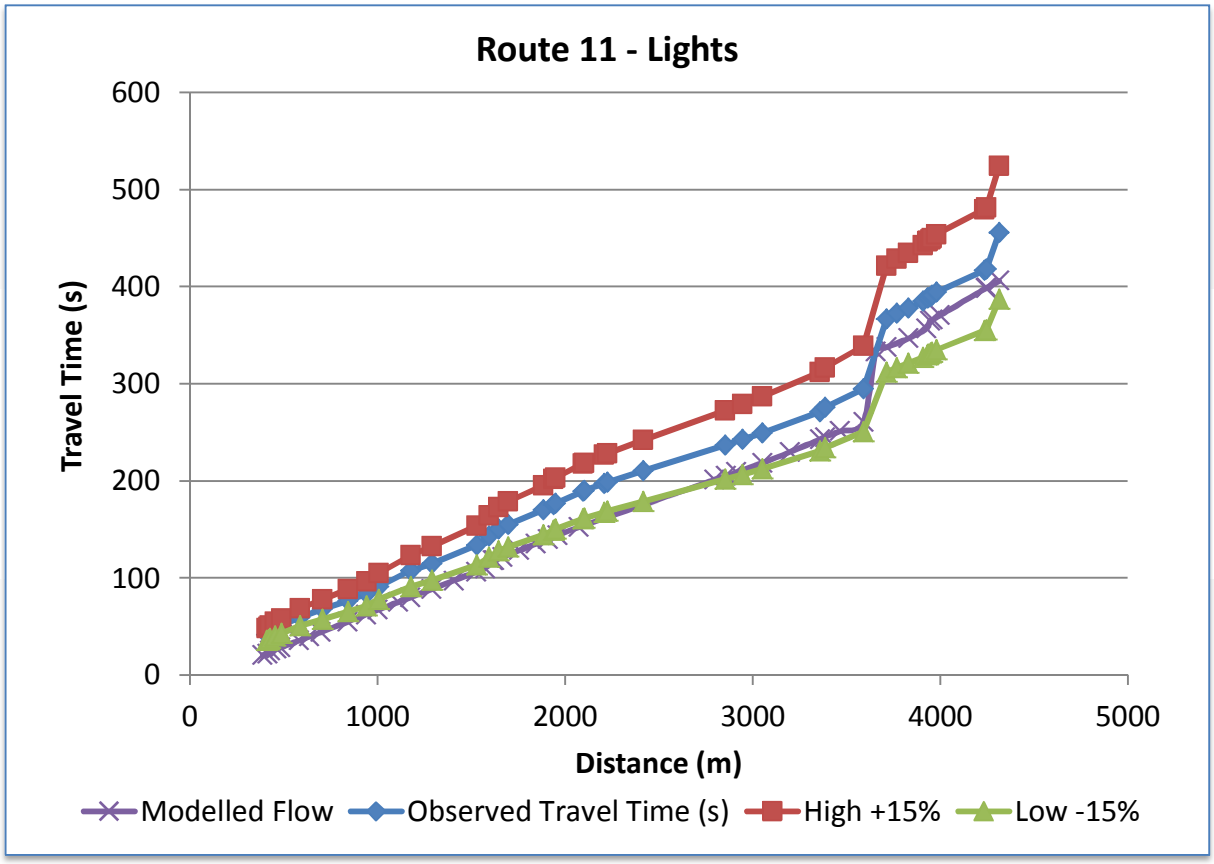

Route 10 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

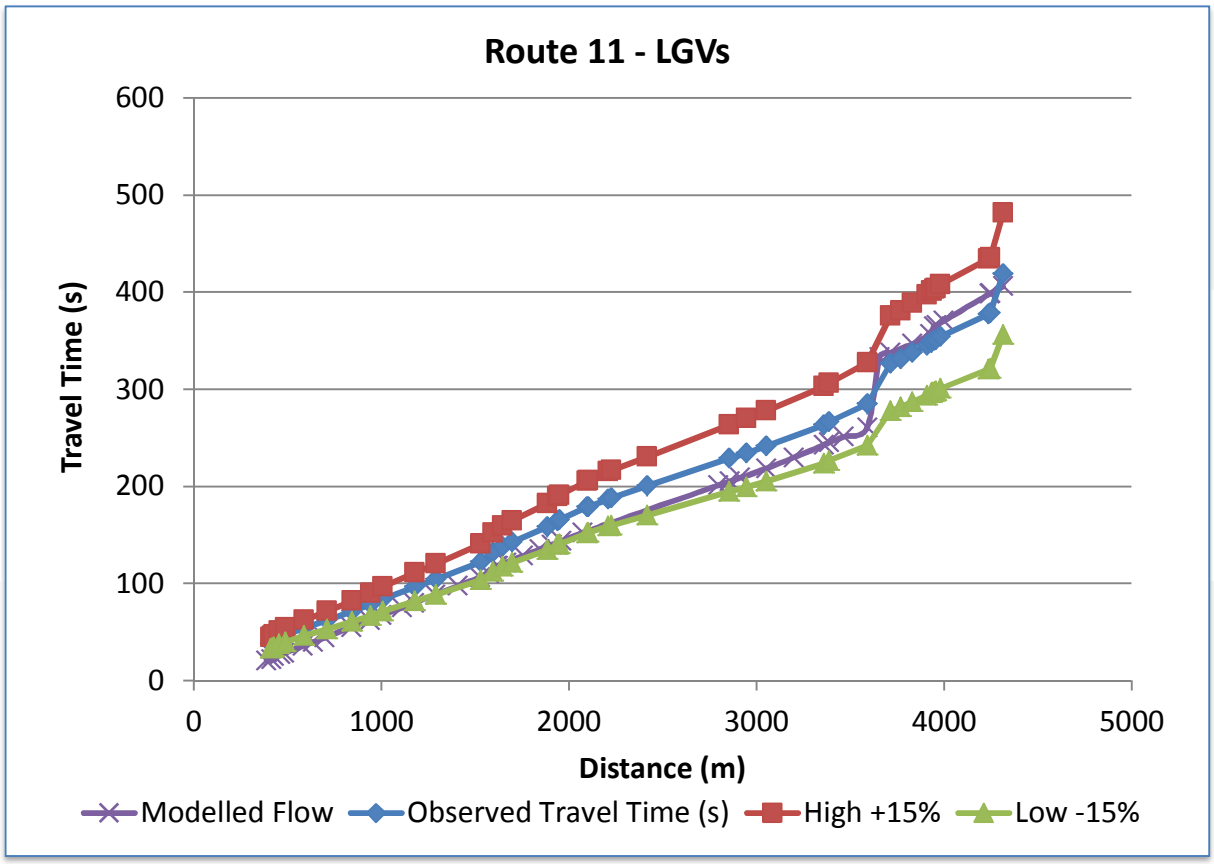

Route 21 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

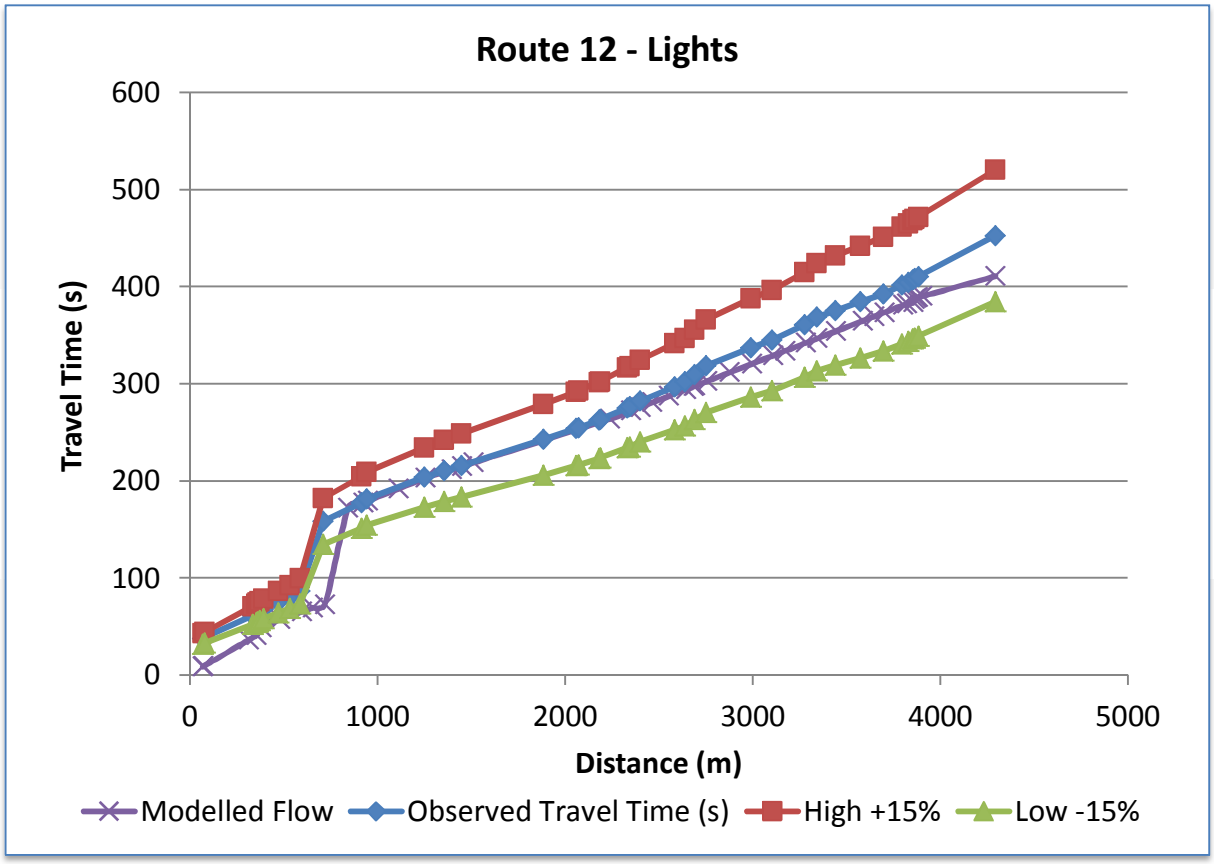

Route 21 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

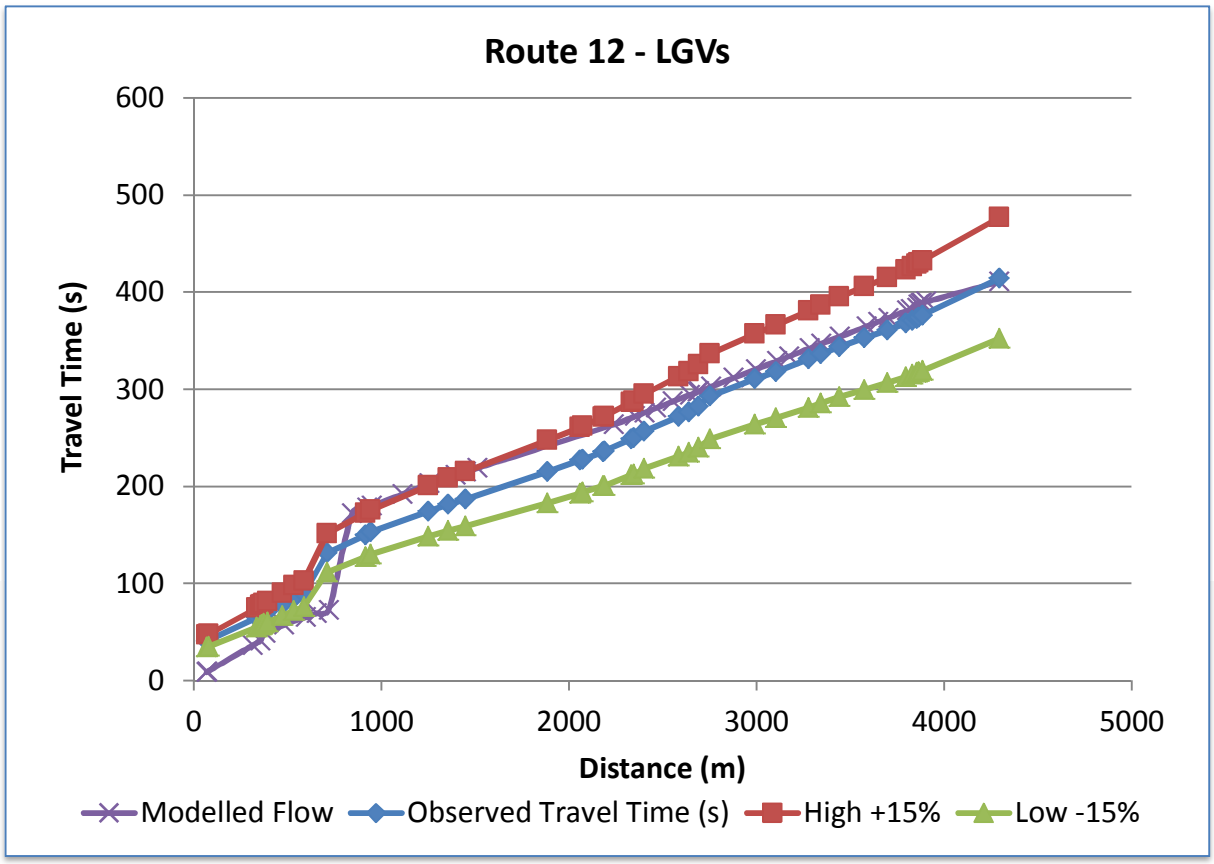

Route 22 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

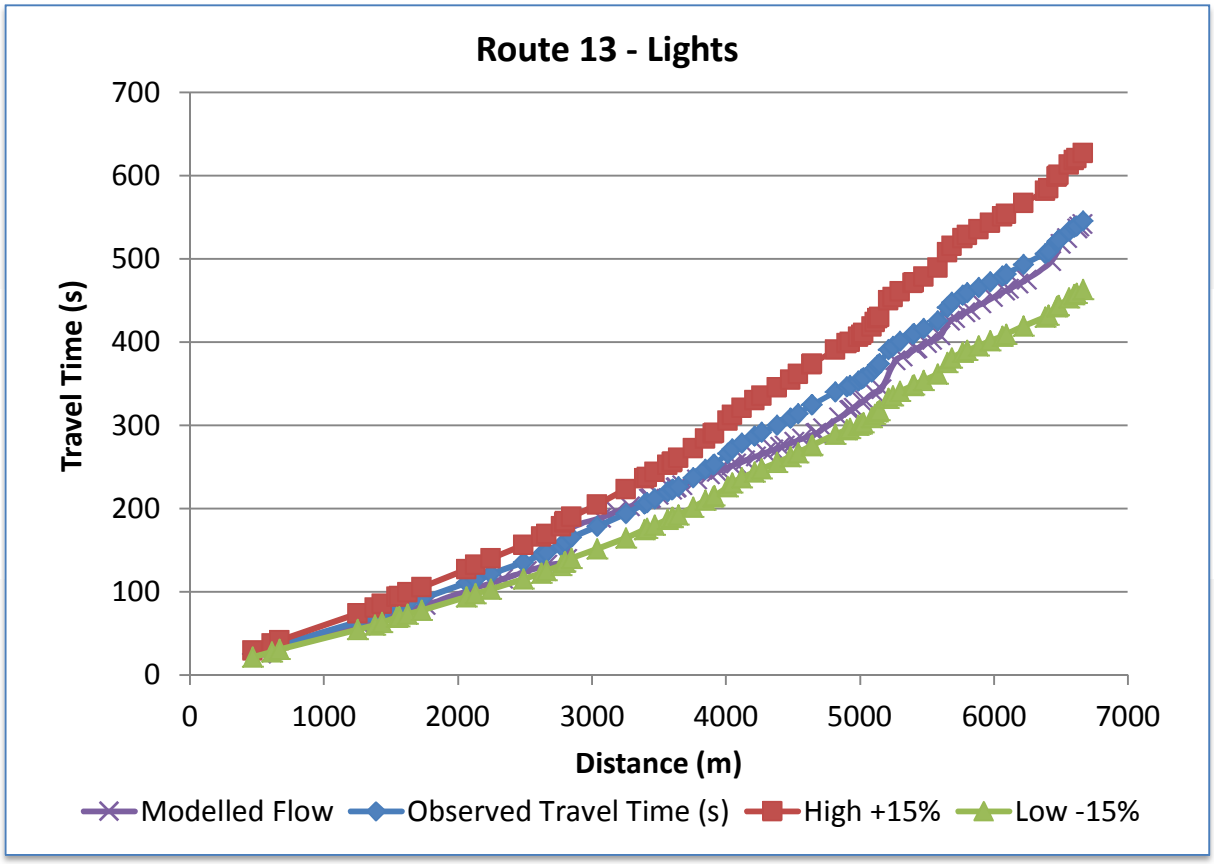

Route 22 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

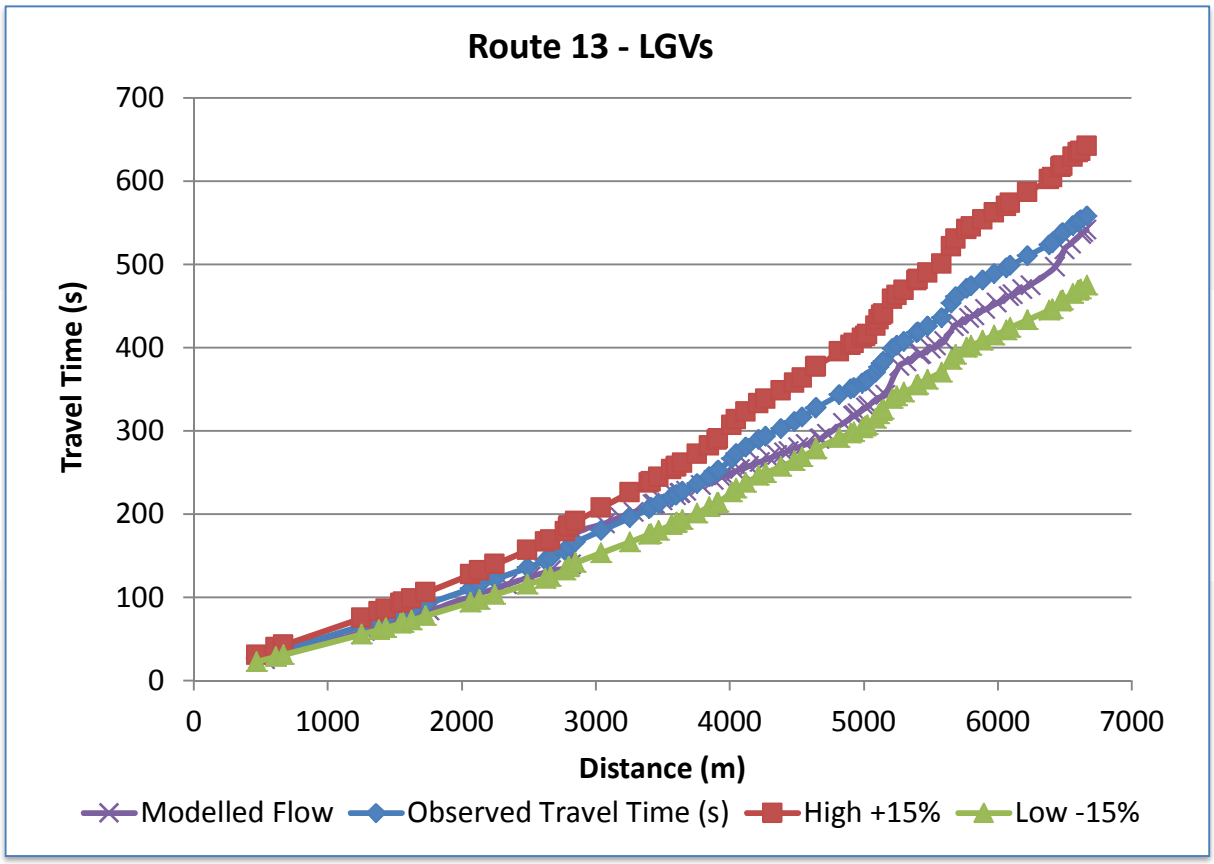

Route 11 - Lights
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

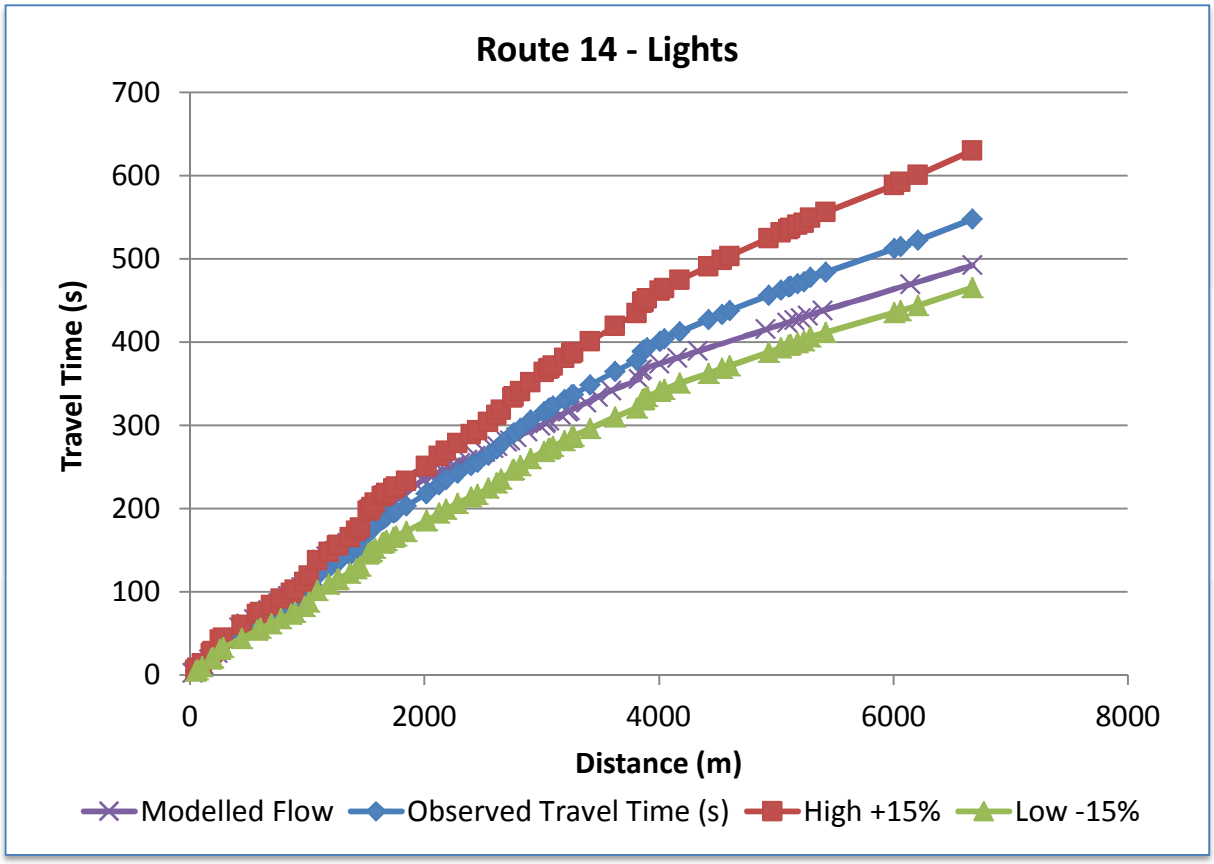

Route 11 - LGVs
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

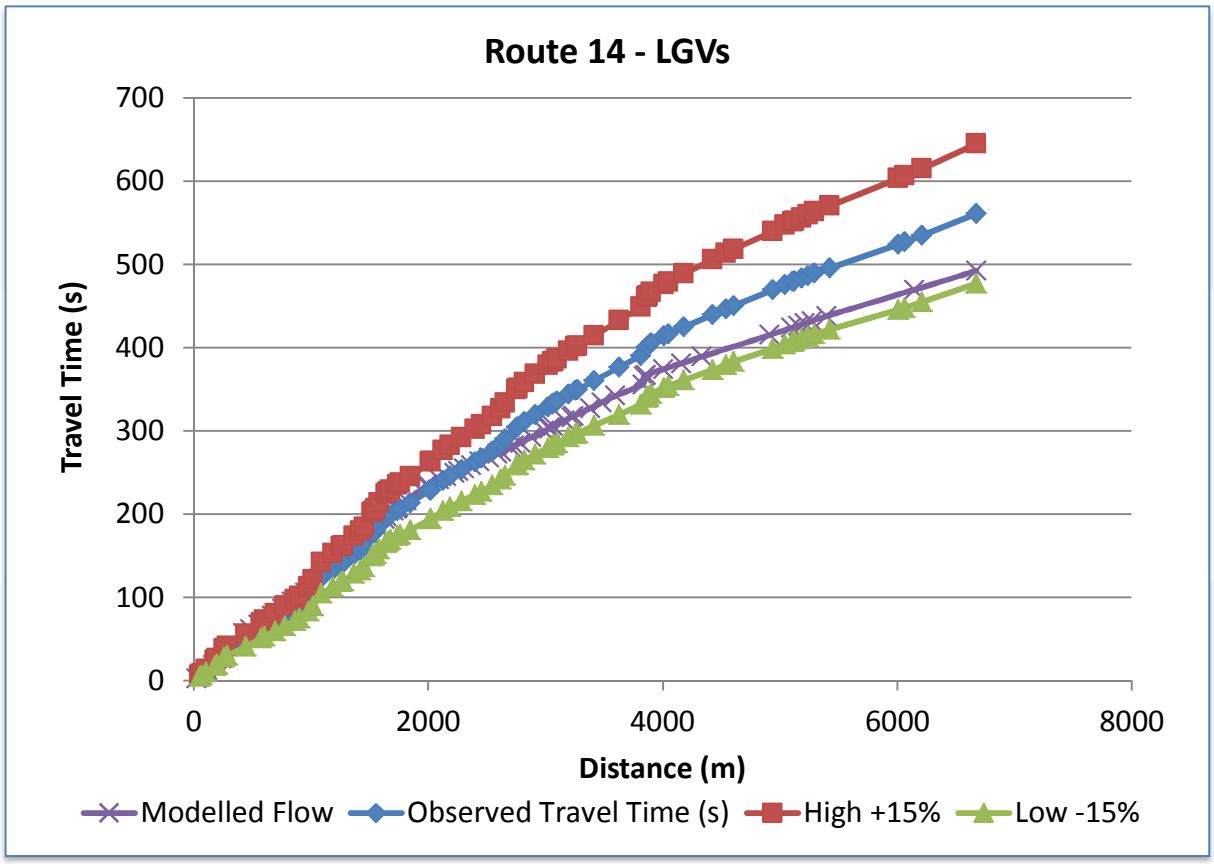

Route 12 - Lights
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

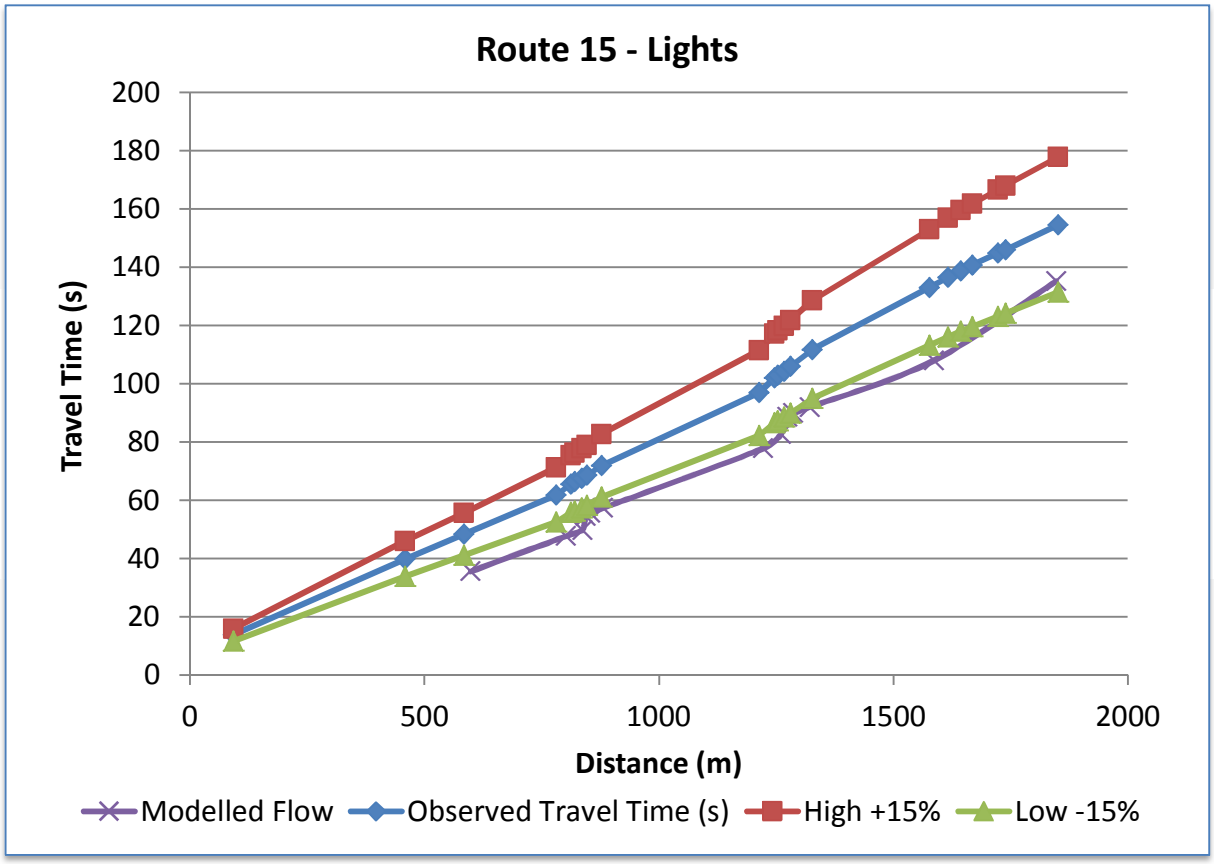

Route 12 - LGVs
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

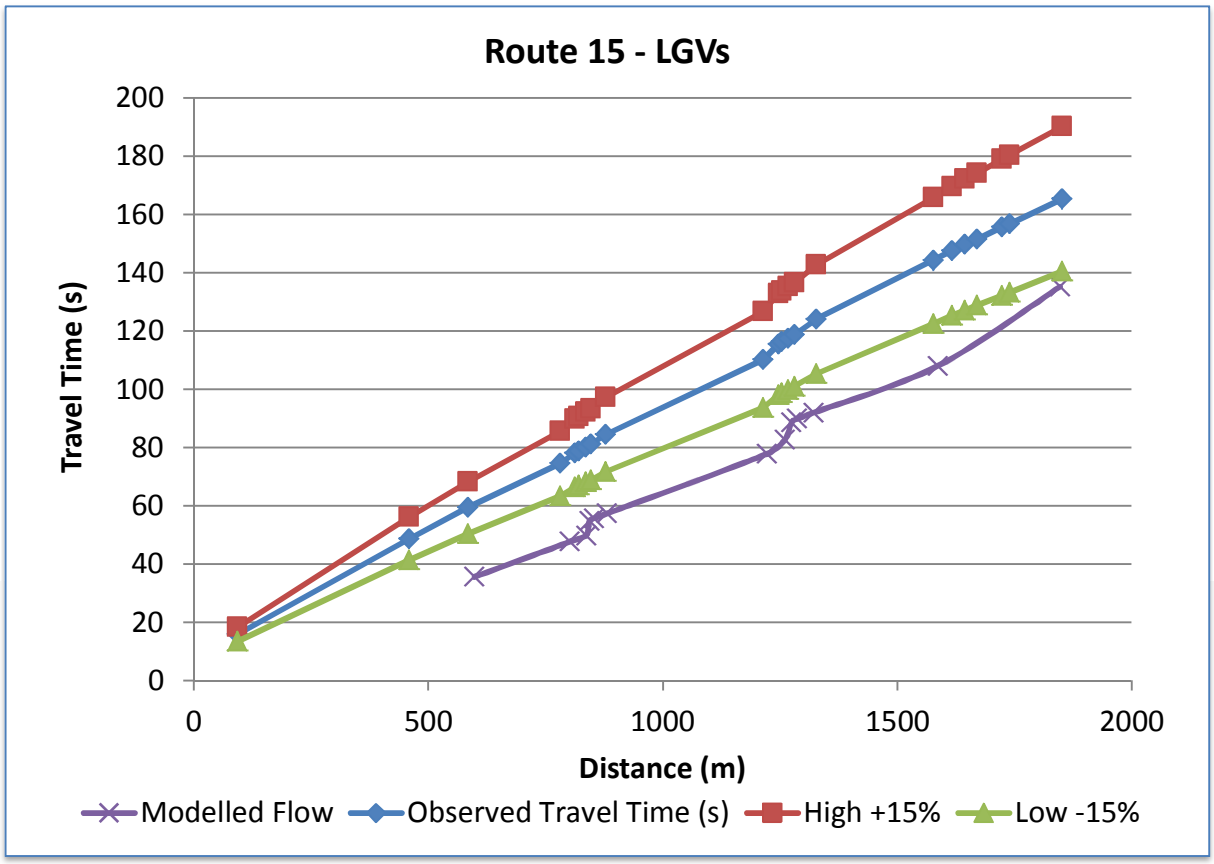

Route 13 - Lights
Travel Time (s)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

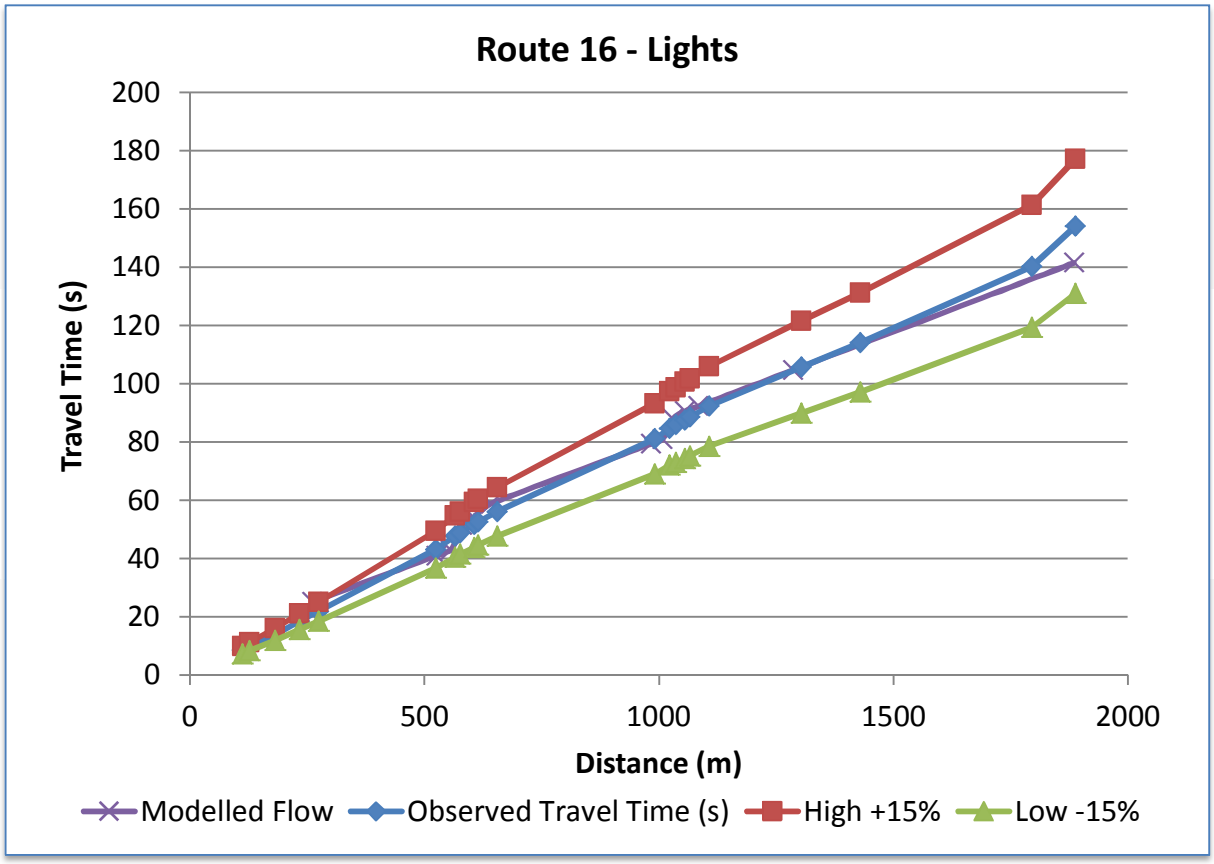

Route 13 - LGVs
Travel Time (s)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

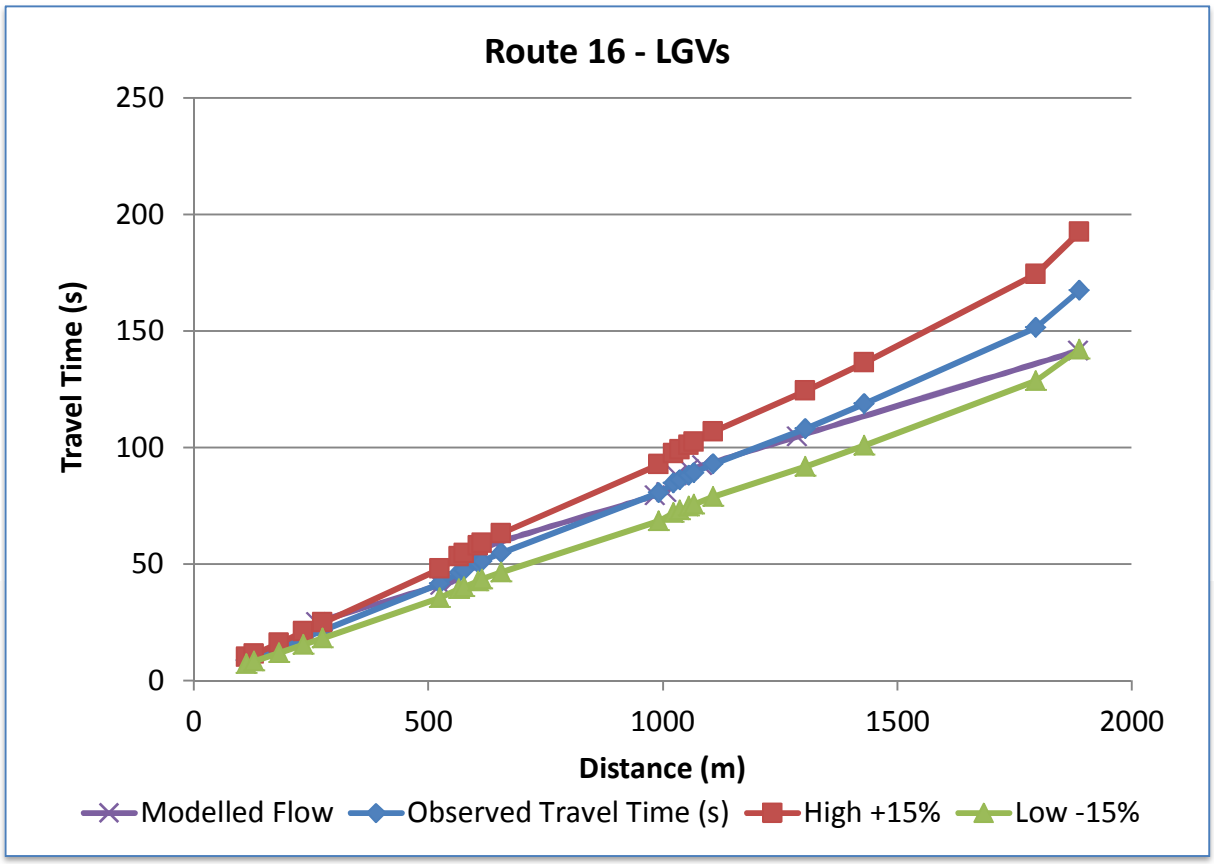

Route 14 - Lights
Travel Time (s)
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

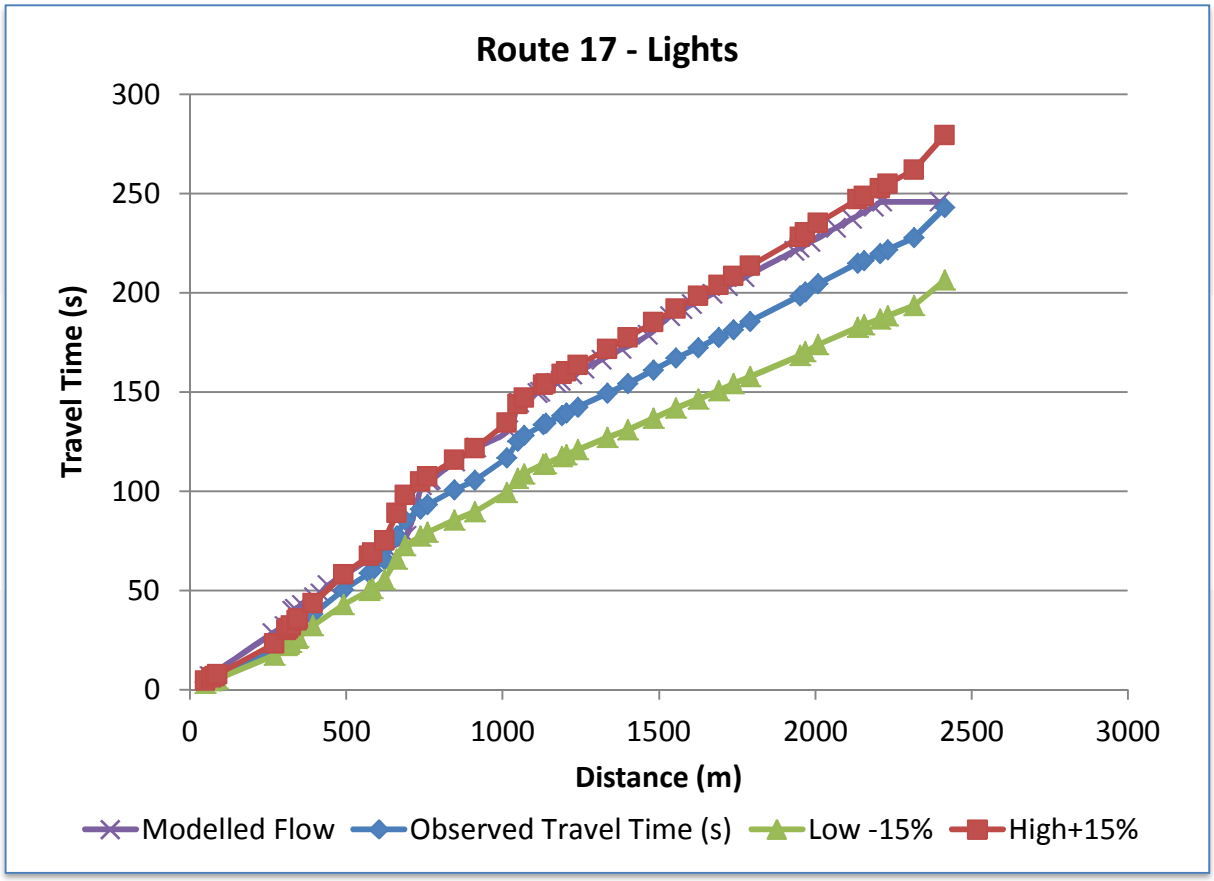

Route 14 - LGVs
Travel Time (s)
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

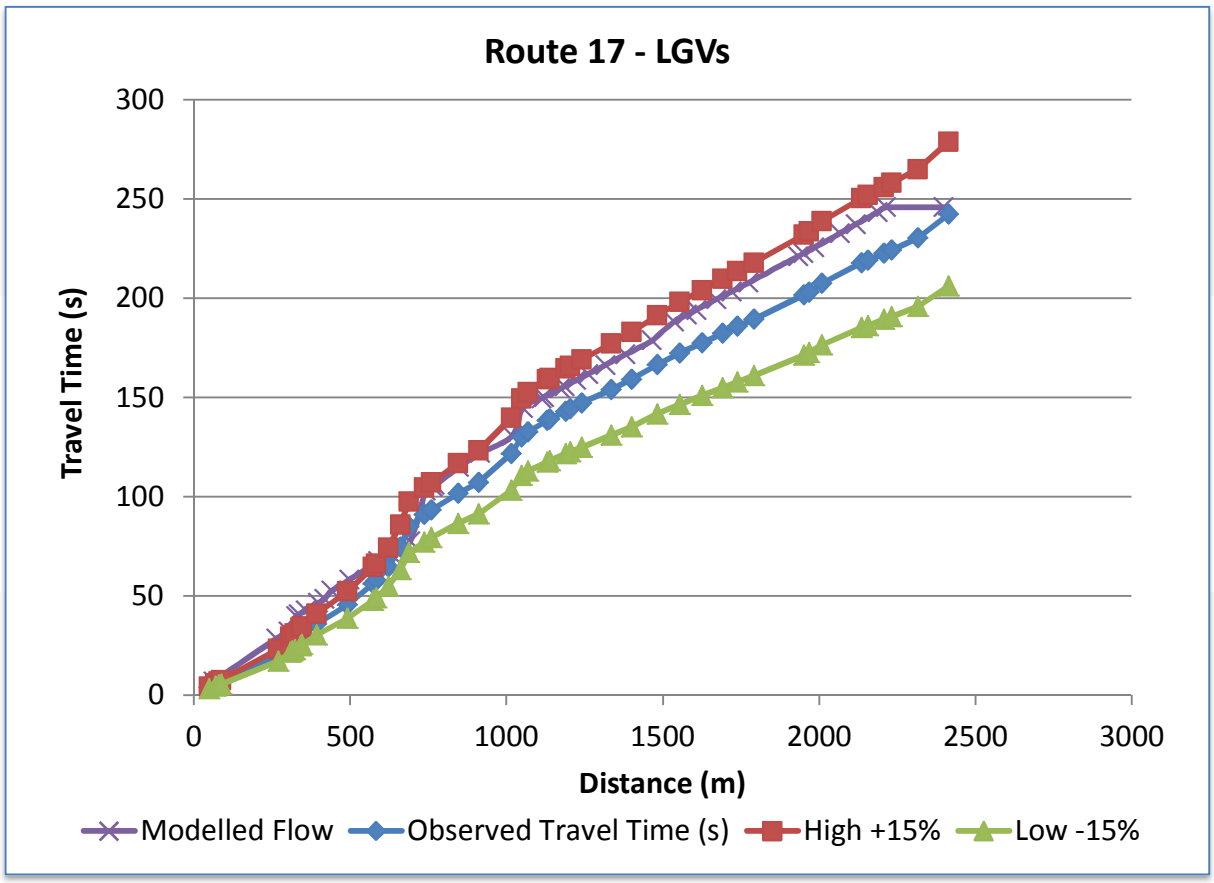

Route 15 - Lights
Travel Time (s)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

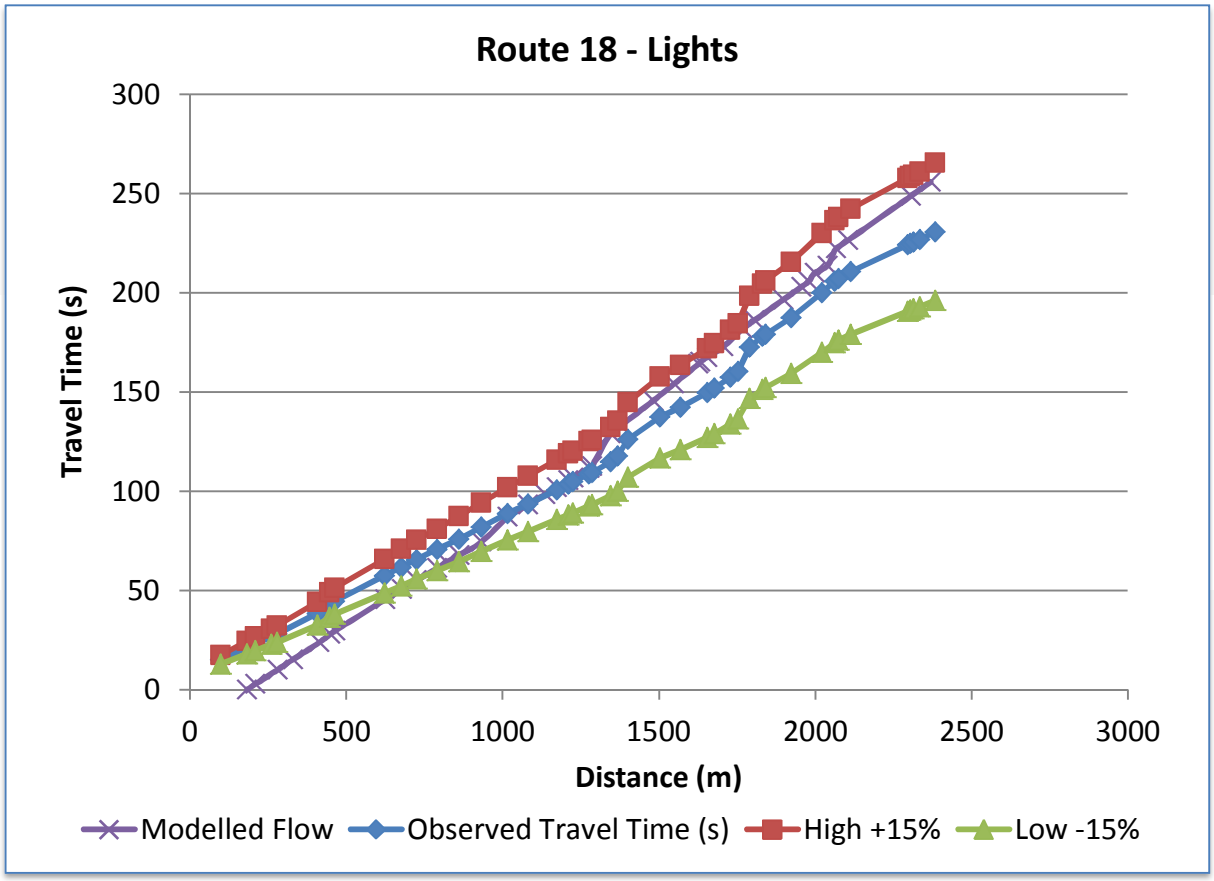

Route 15 - LGVs
Travel Time (s)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

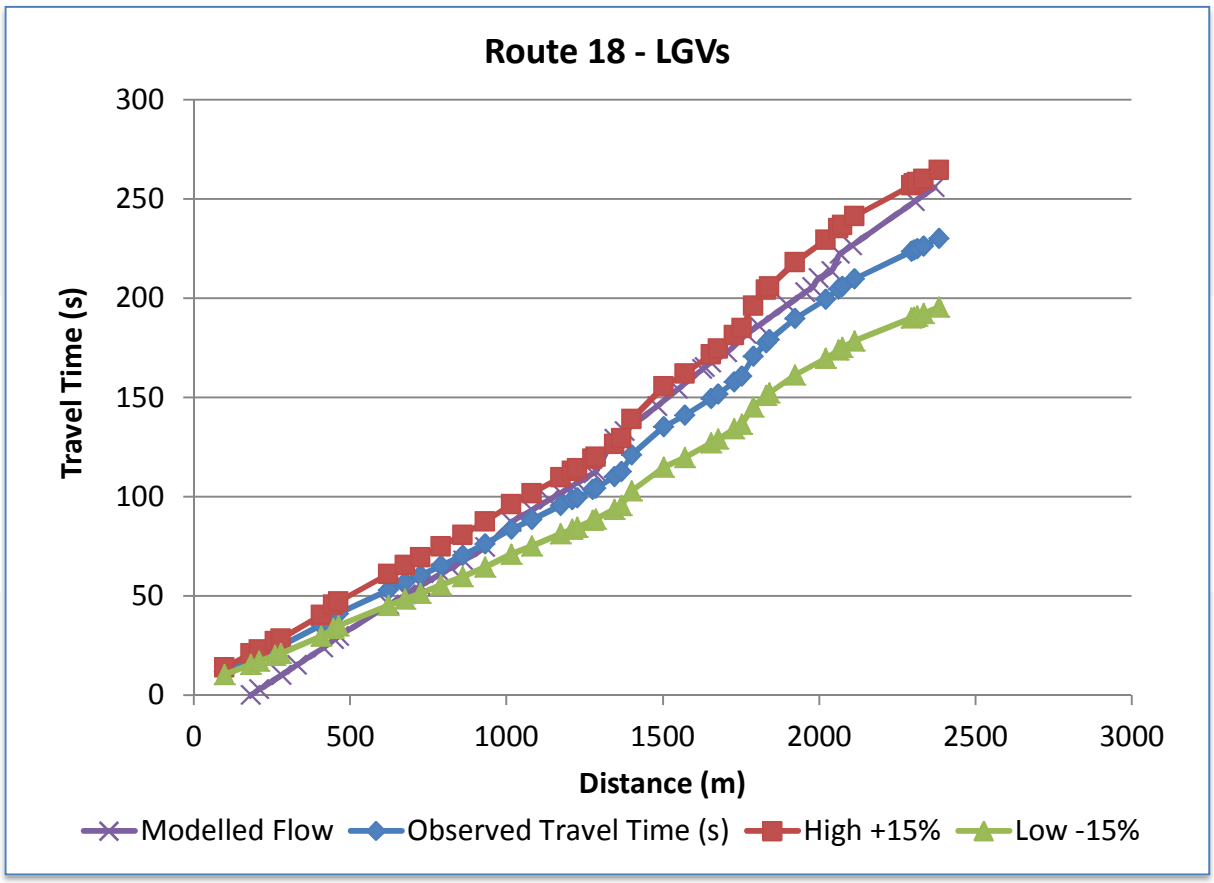

Route 16 - Lights
Travel Time (s)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

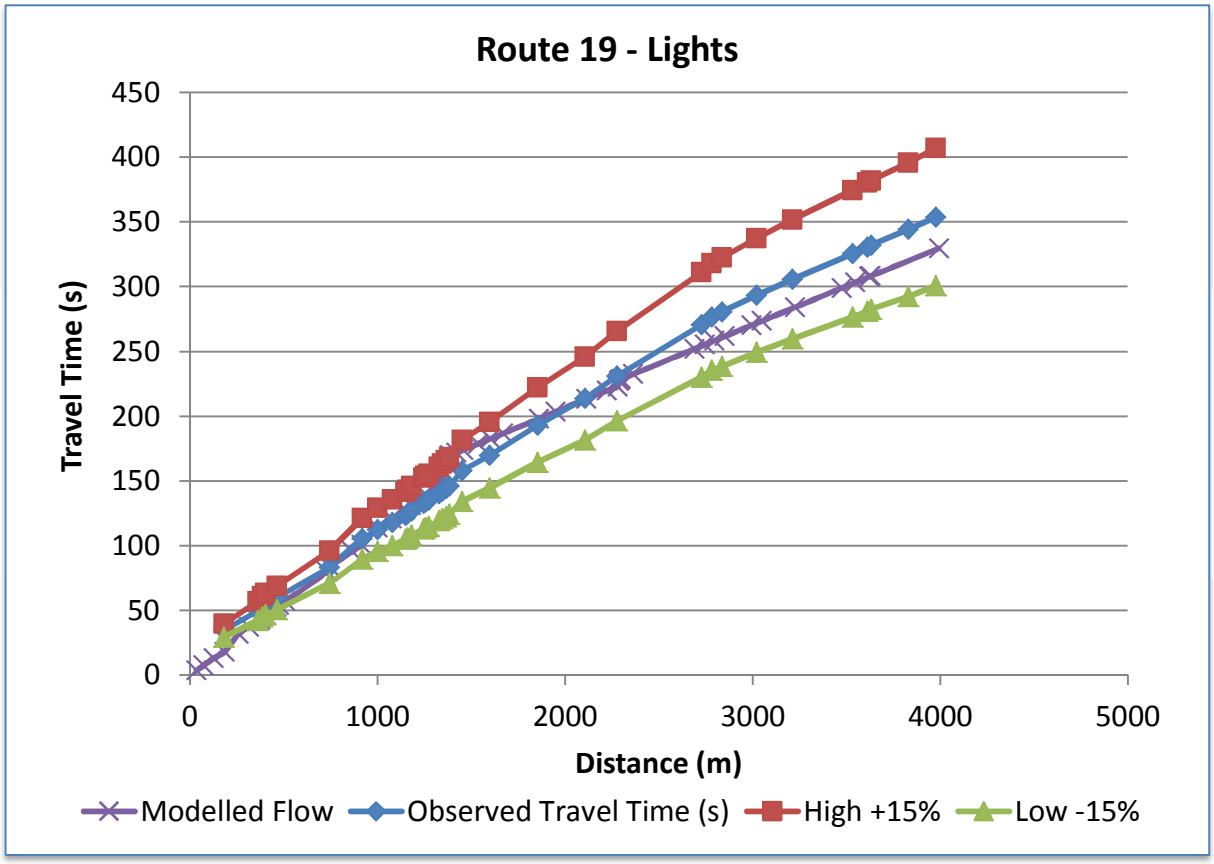

Route 16 - LGVs
Travel Time (s)
250
200
150
100
50
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

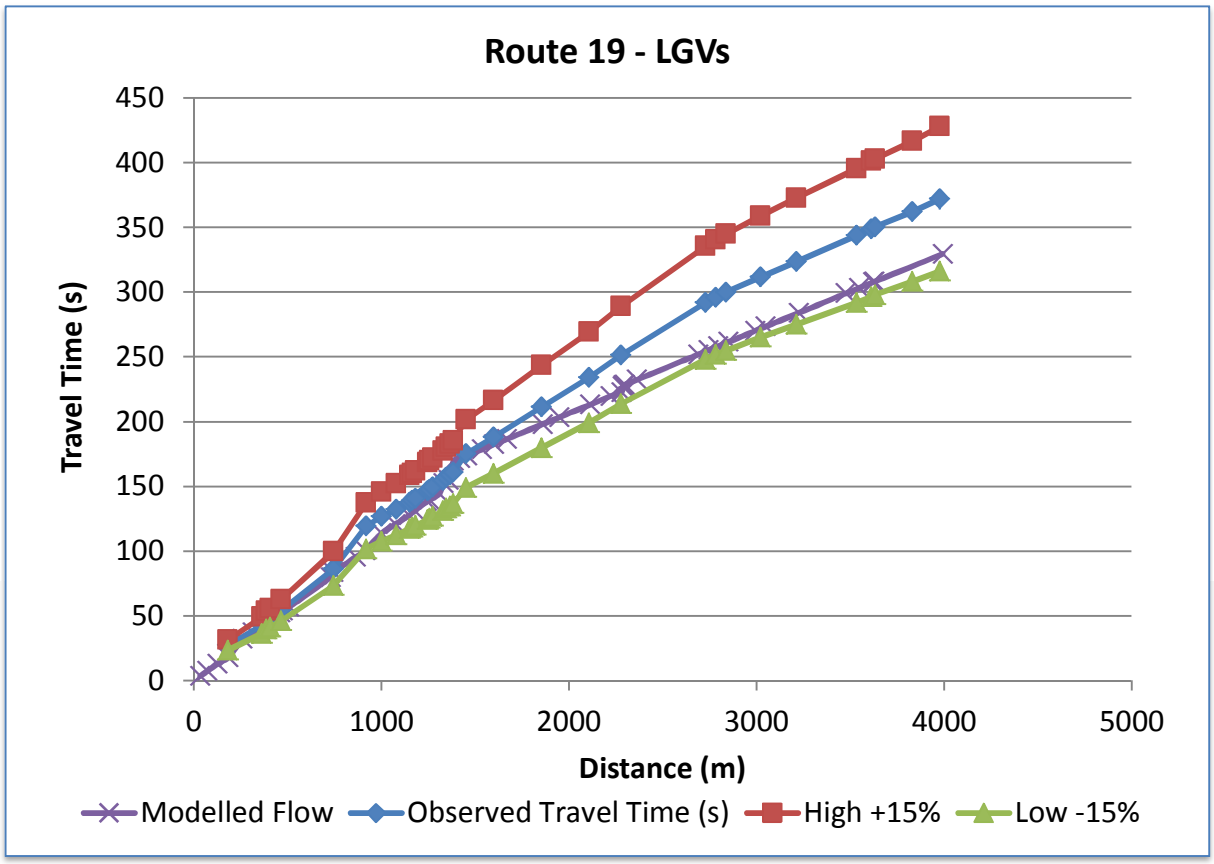

Route 17 - Lights
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
Low -15%
High+15%

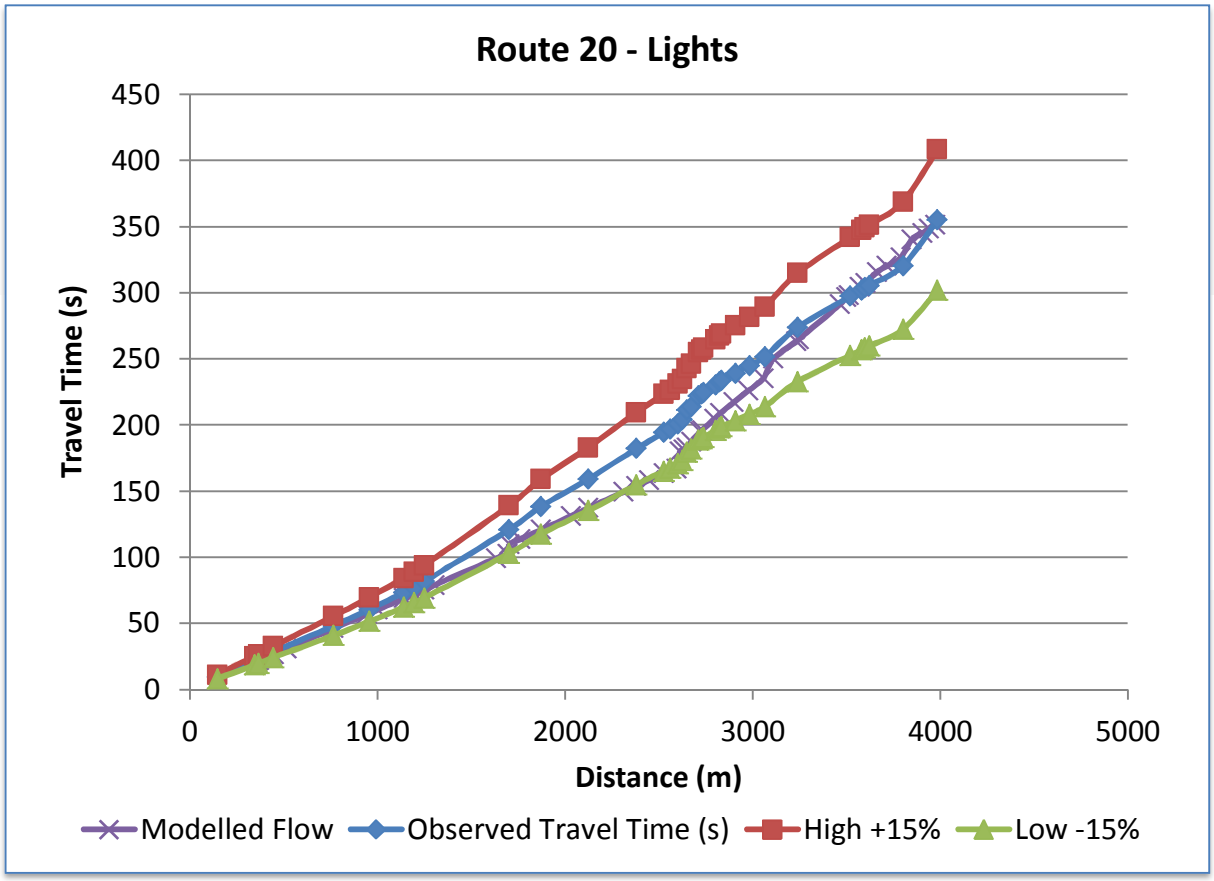

Route 17 - LGVs
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

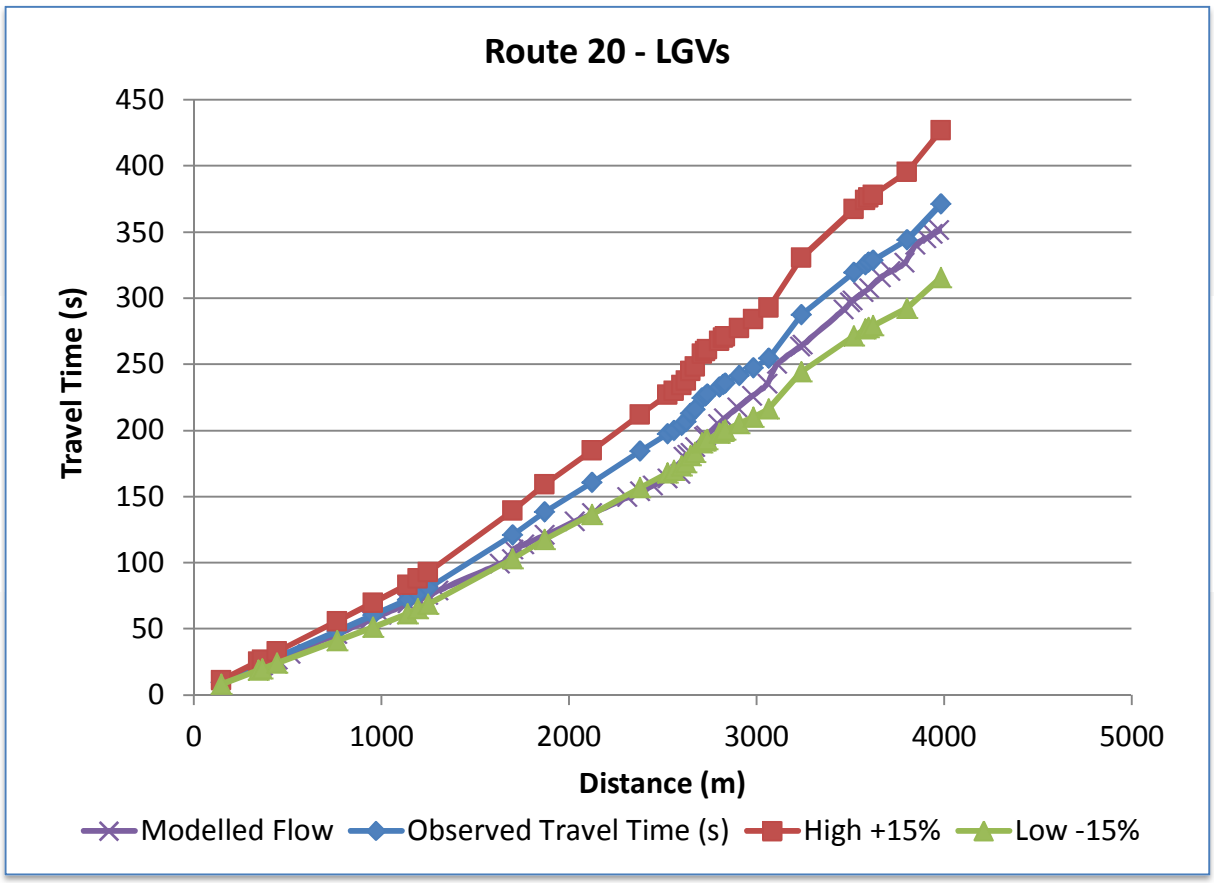

Route 18 - Lights
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%


Route 18 - LGVs
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

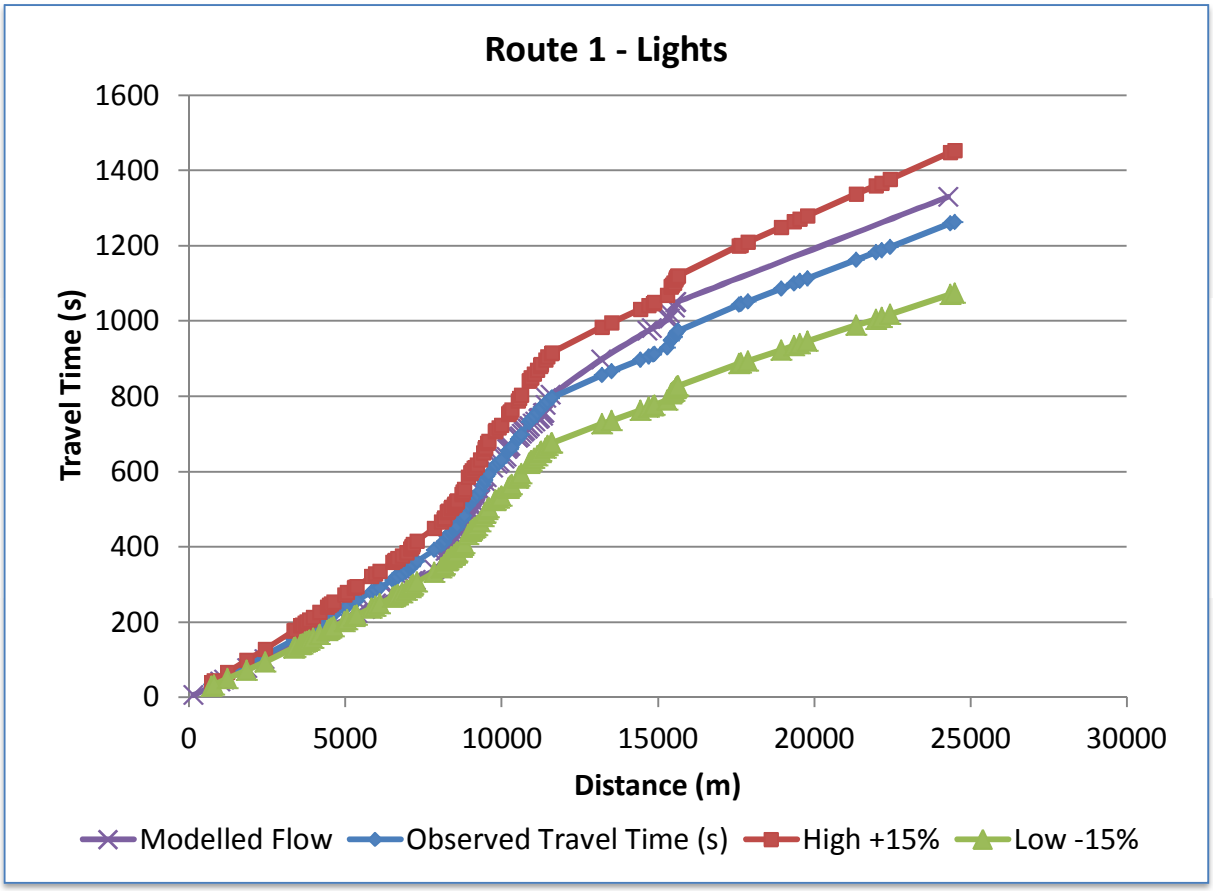

Route 19 - Lights
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

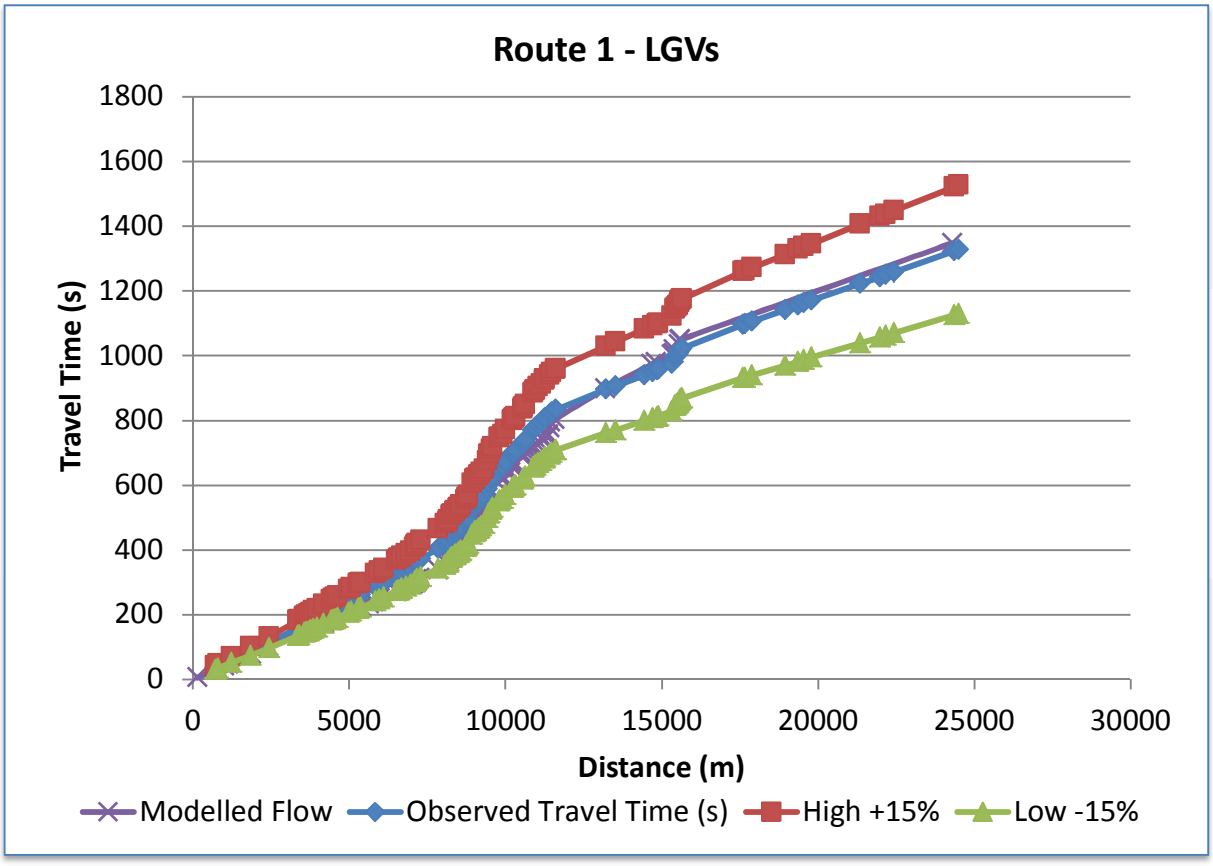

Route 19 - LGVs
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

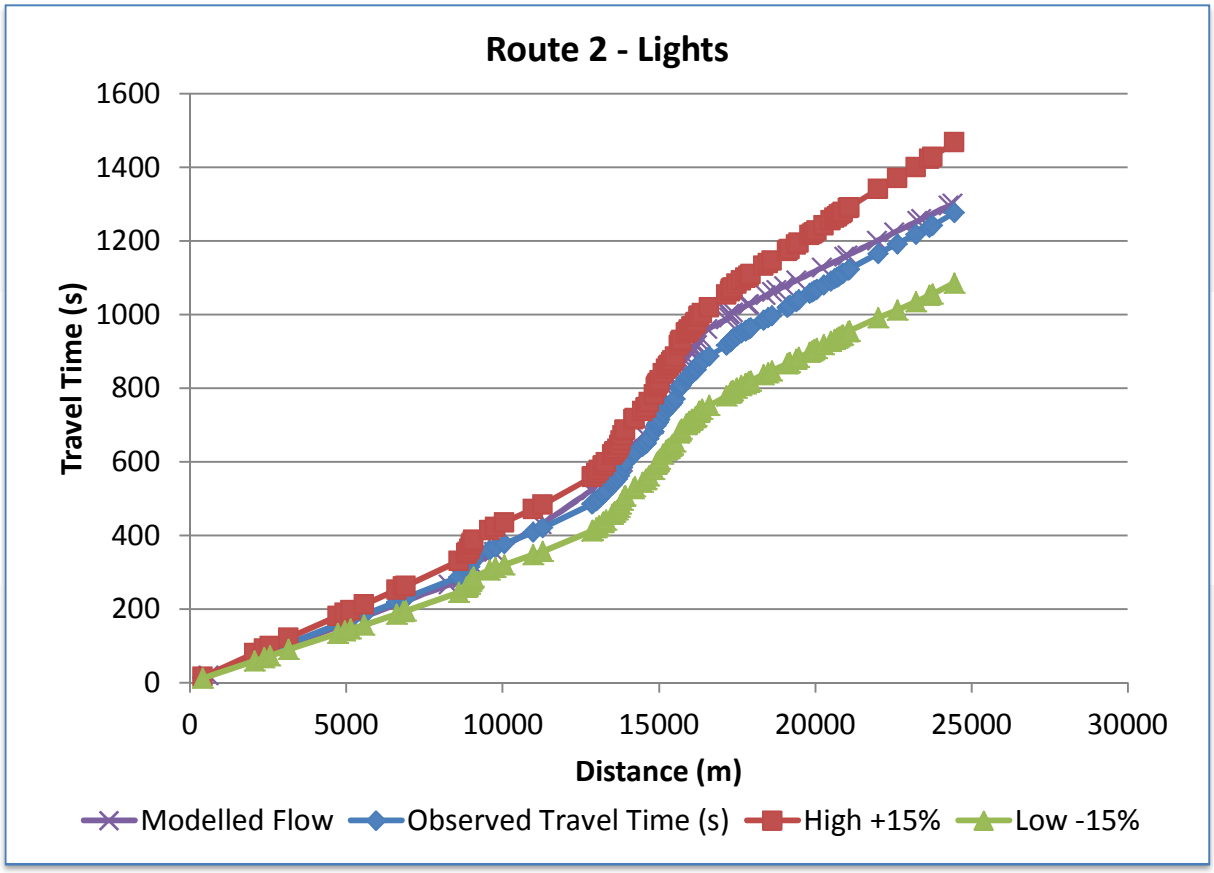

Route 20 - Lights
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

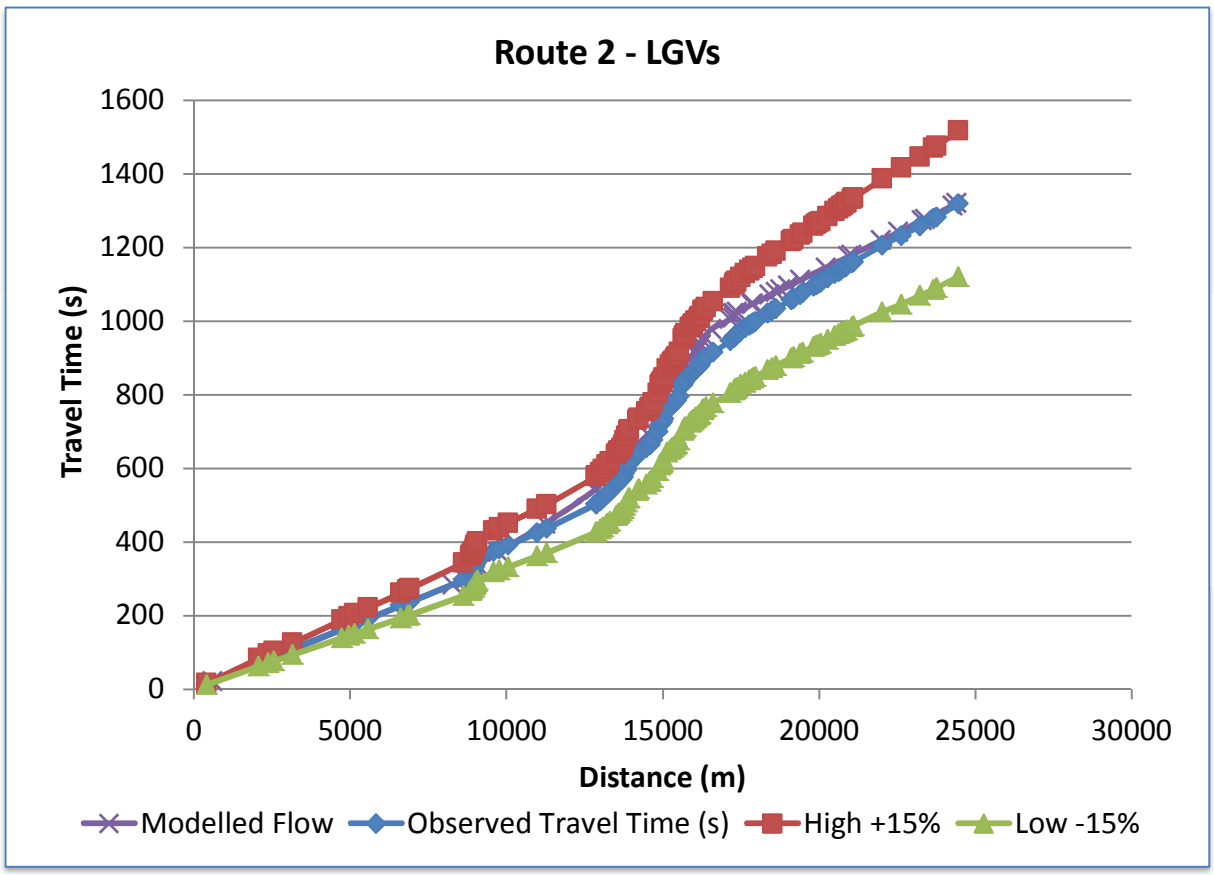

Route 20 - LGVs
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

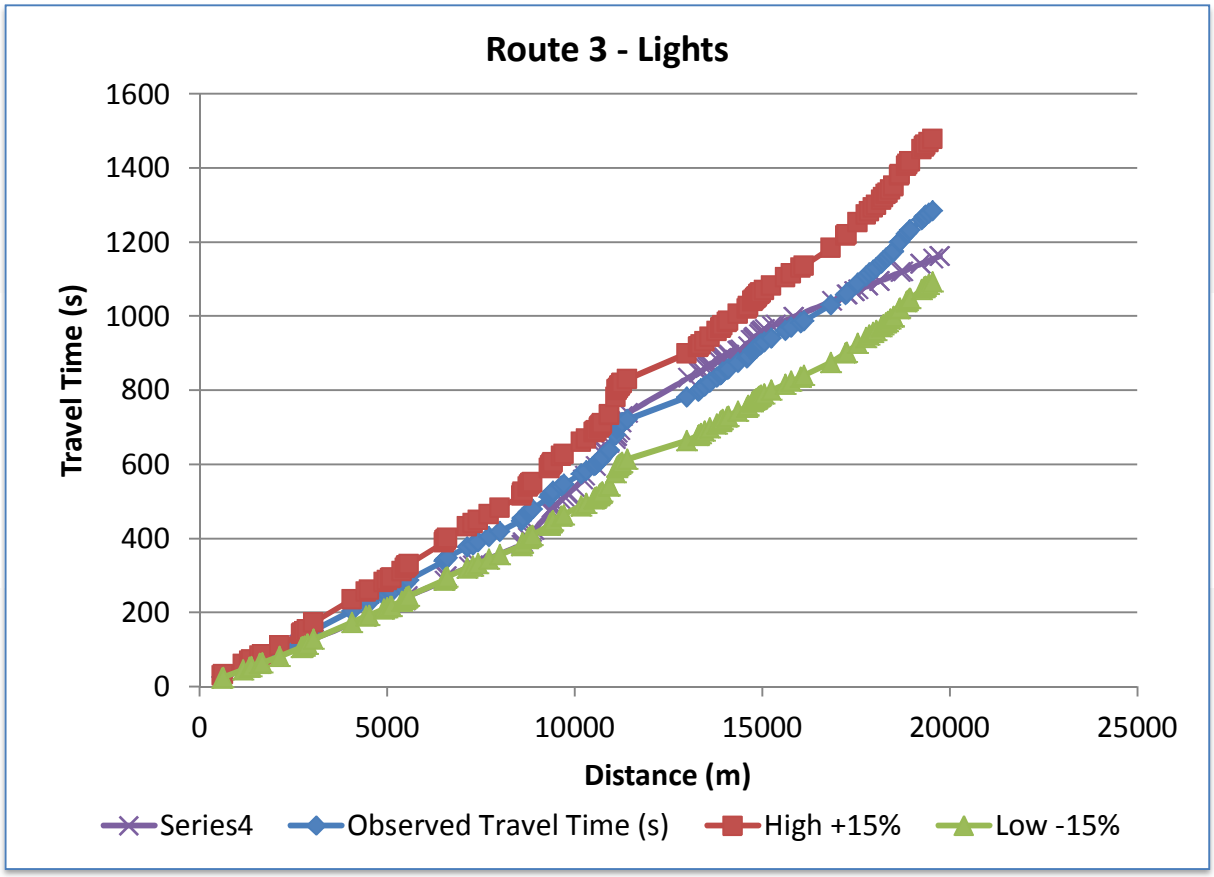
IP

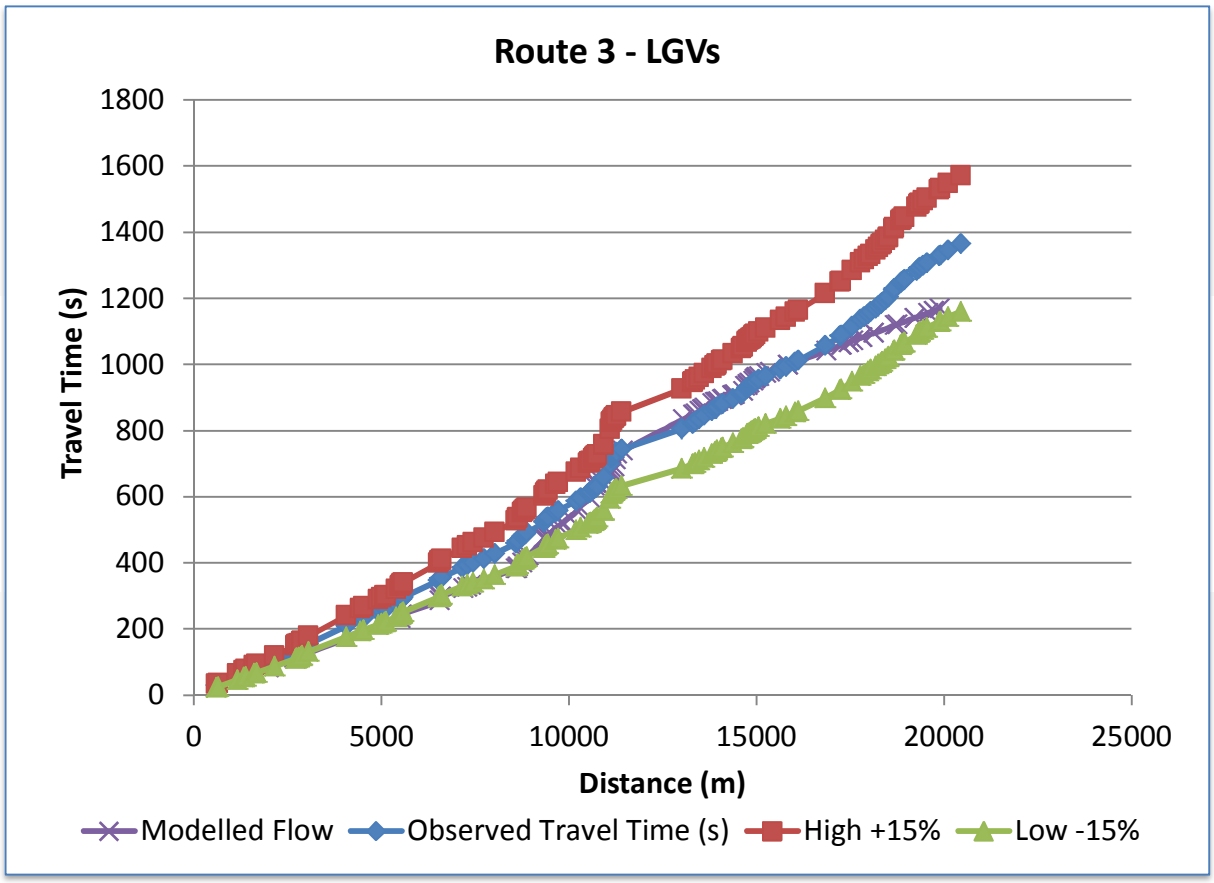

Route 1 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

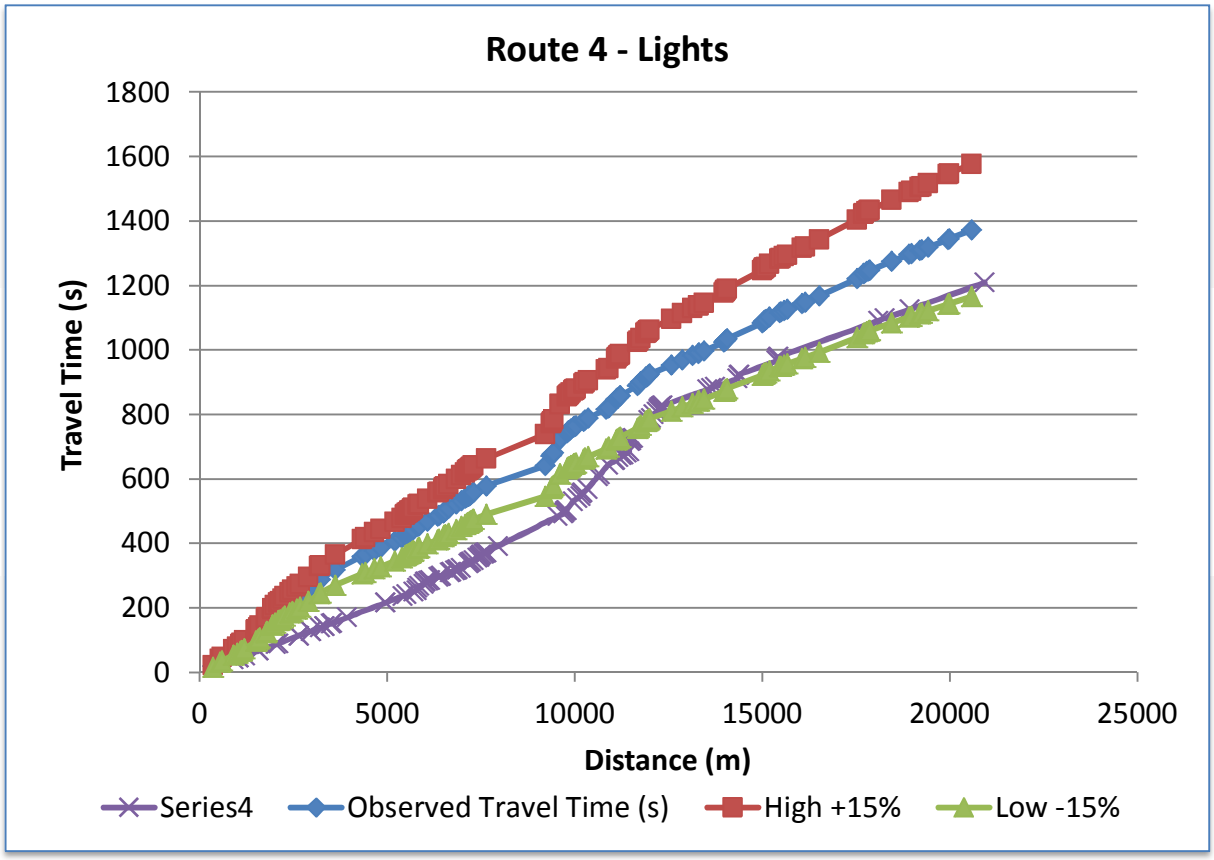

Route 1 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

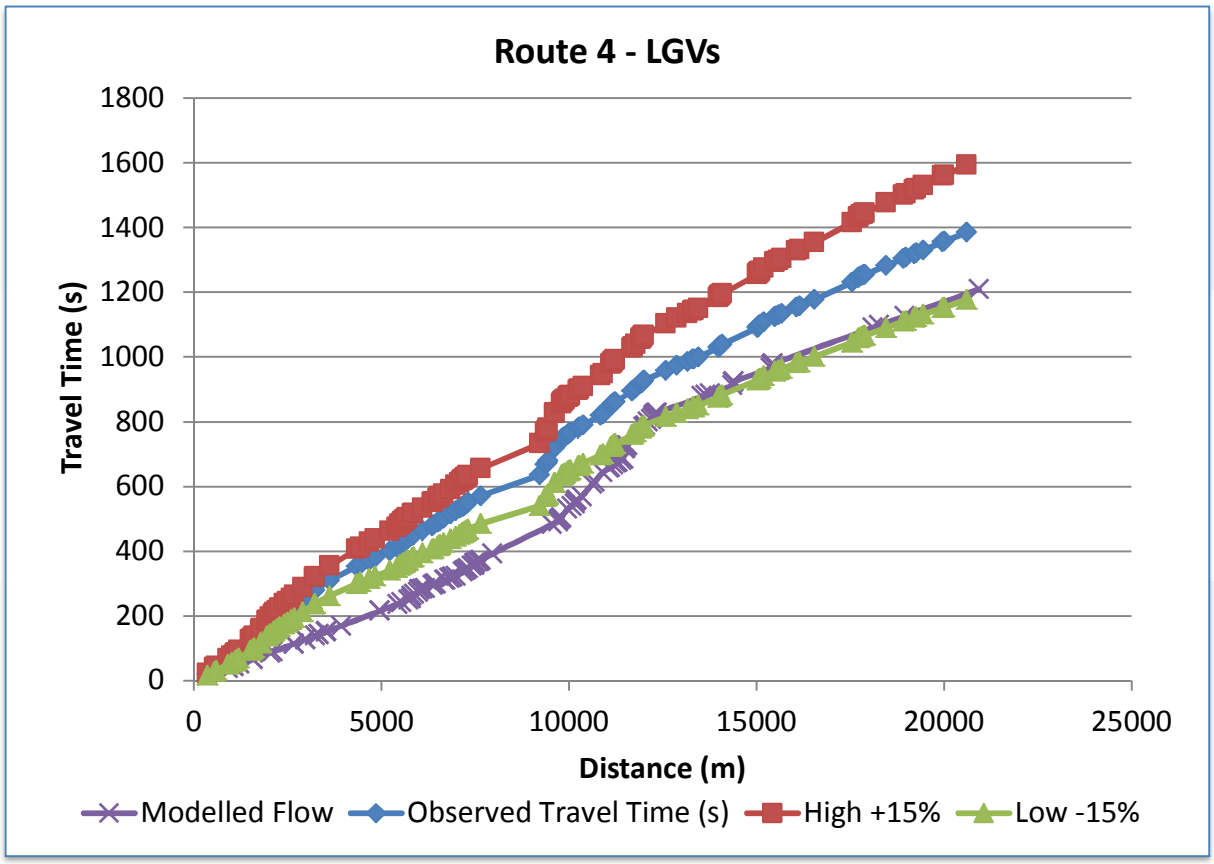

Route 2 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

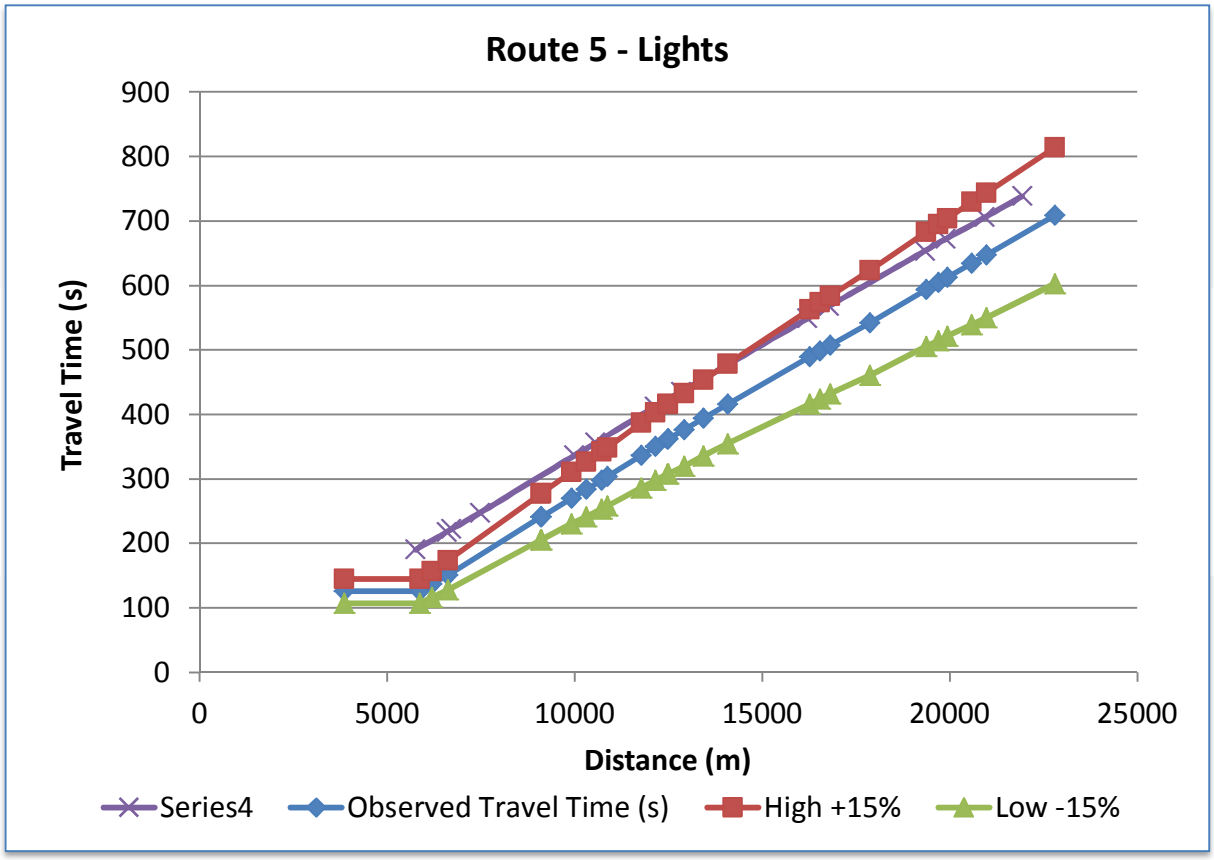

Route 2 - LGVs
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

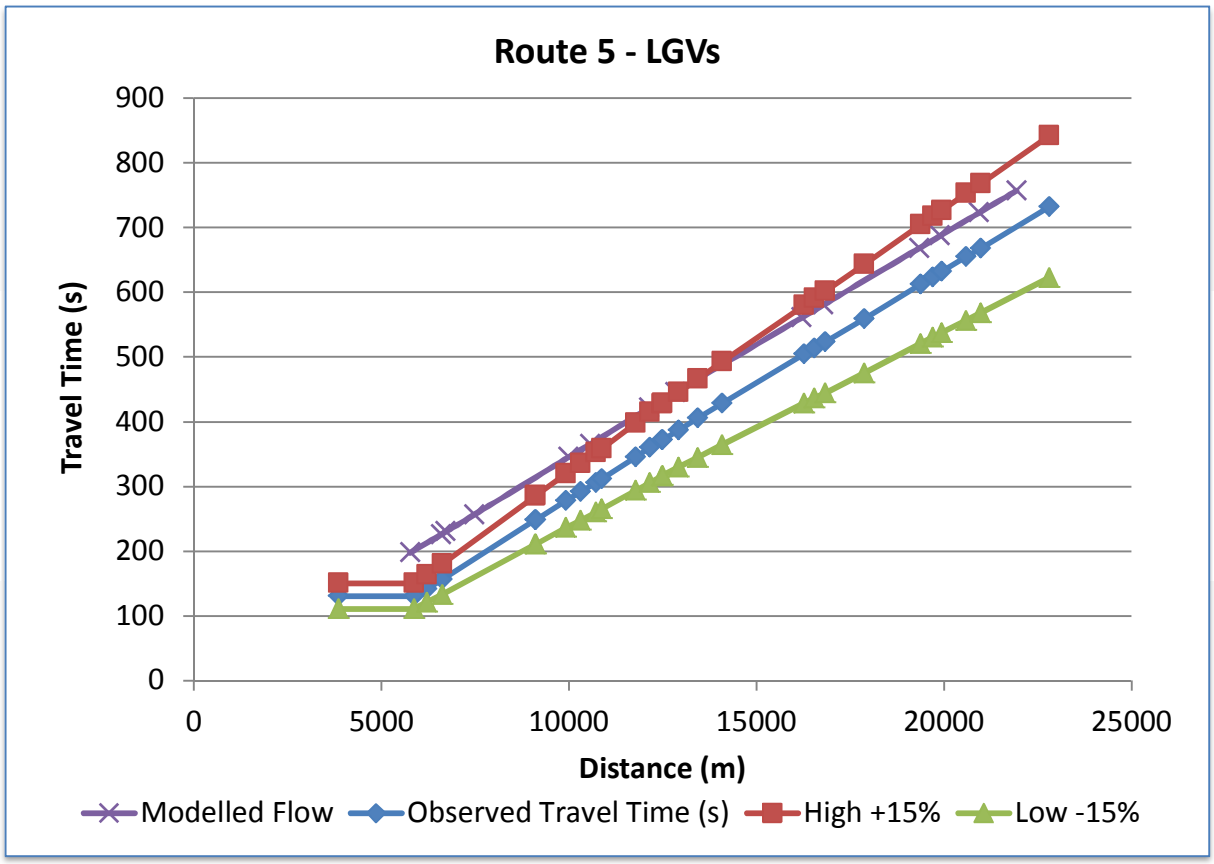

Route 3 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

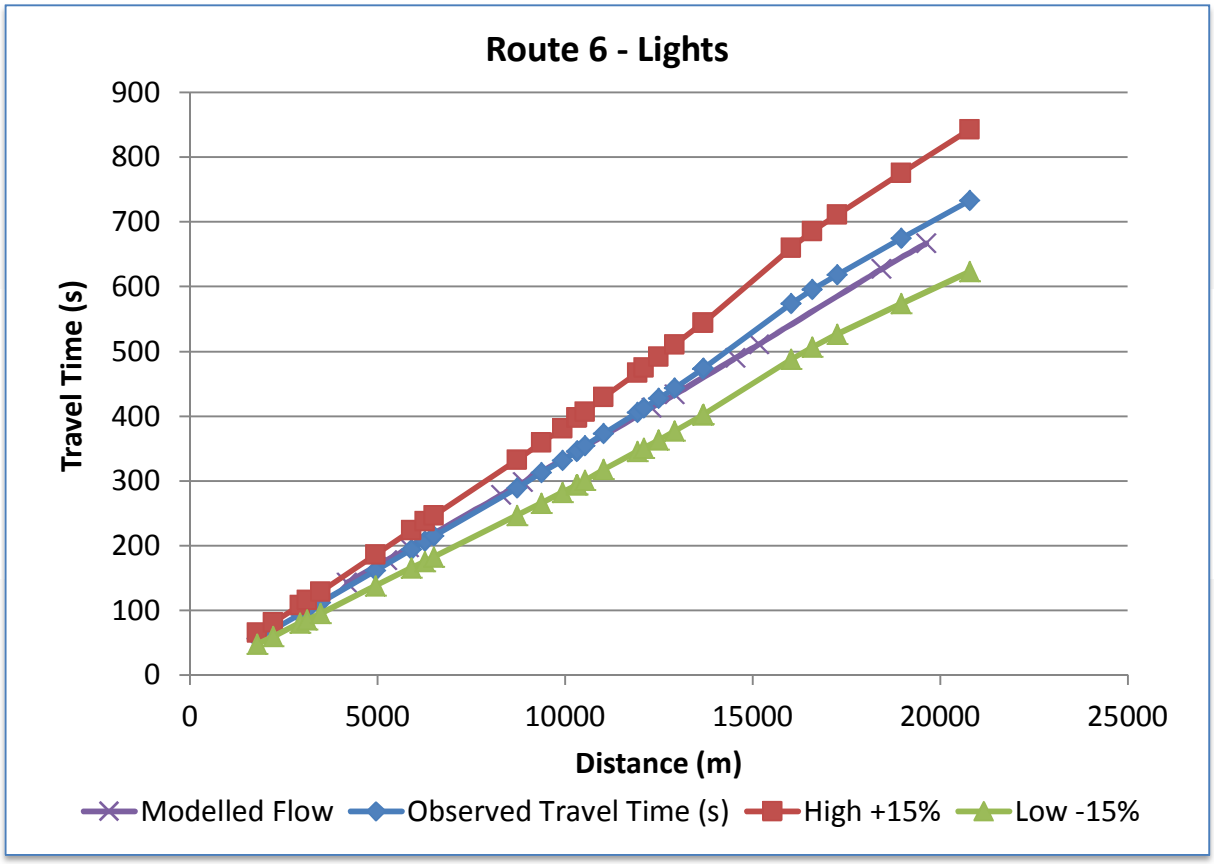

Route 3 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

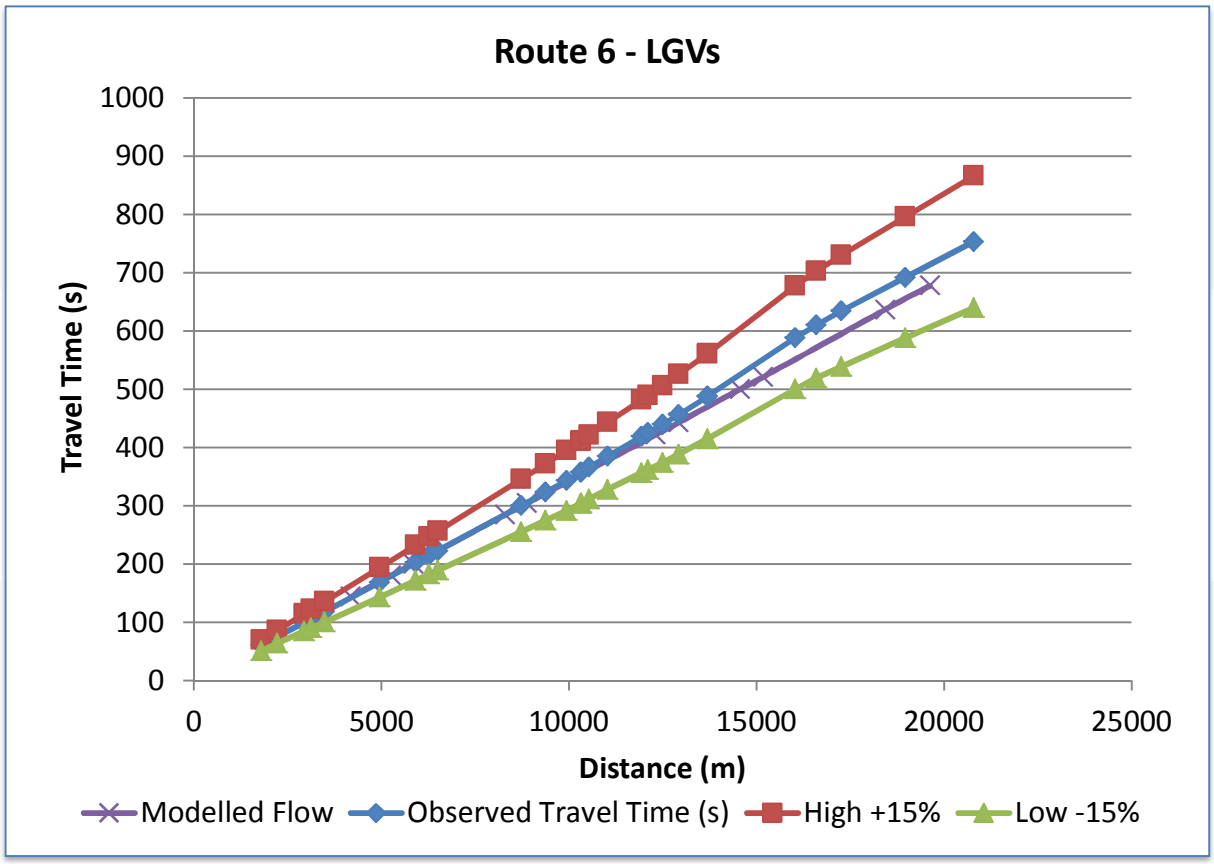

Route 4 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

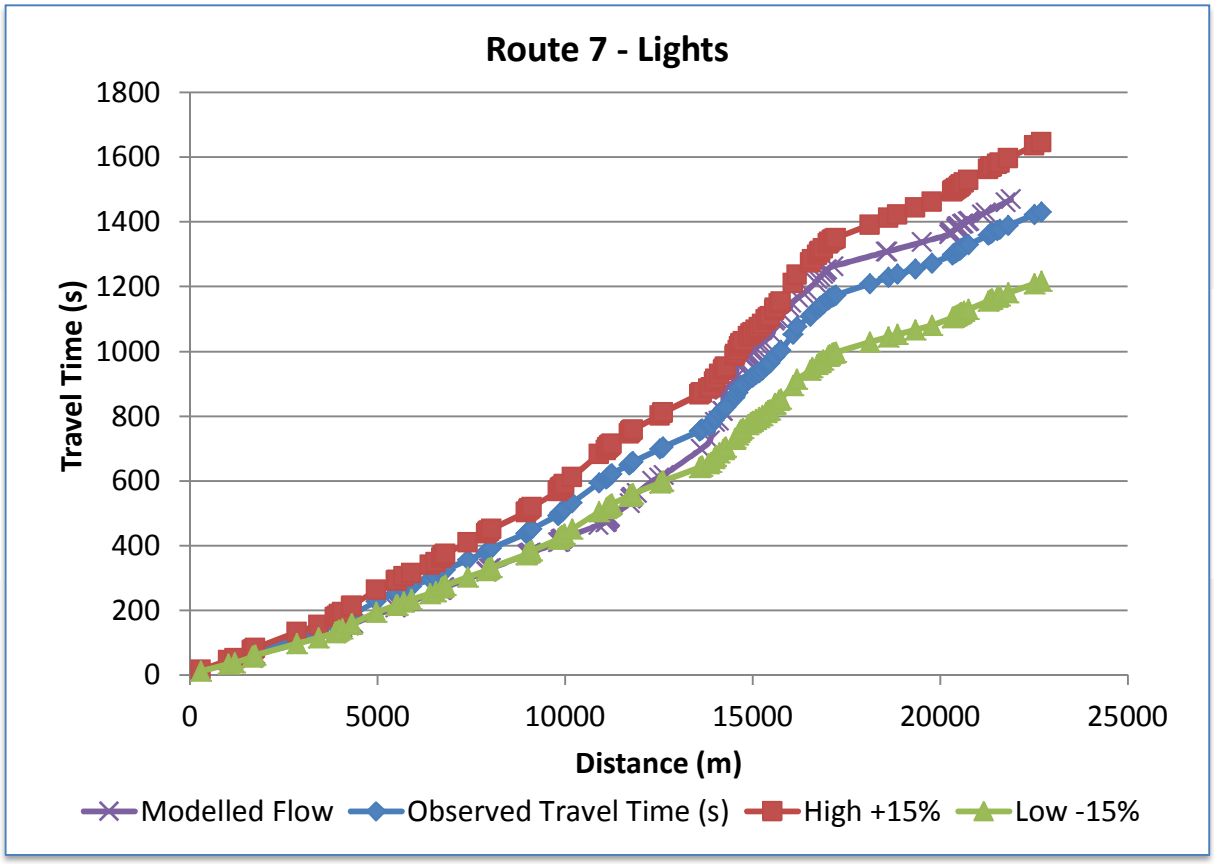

Route 4 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

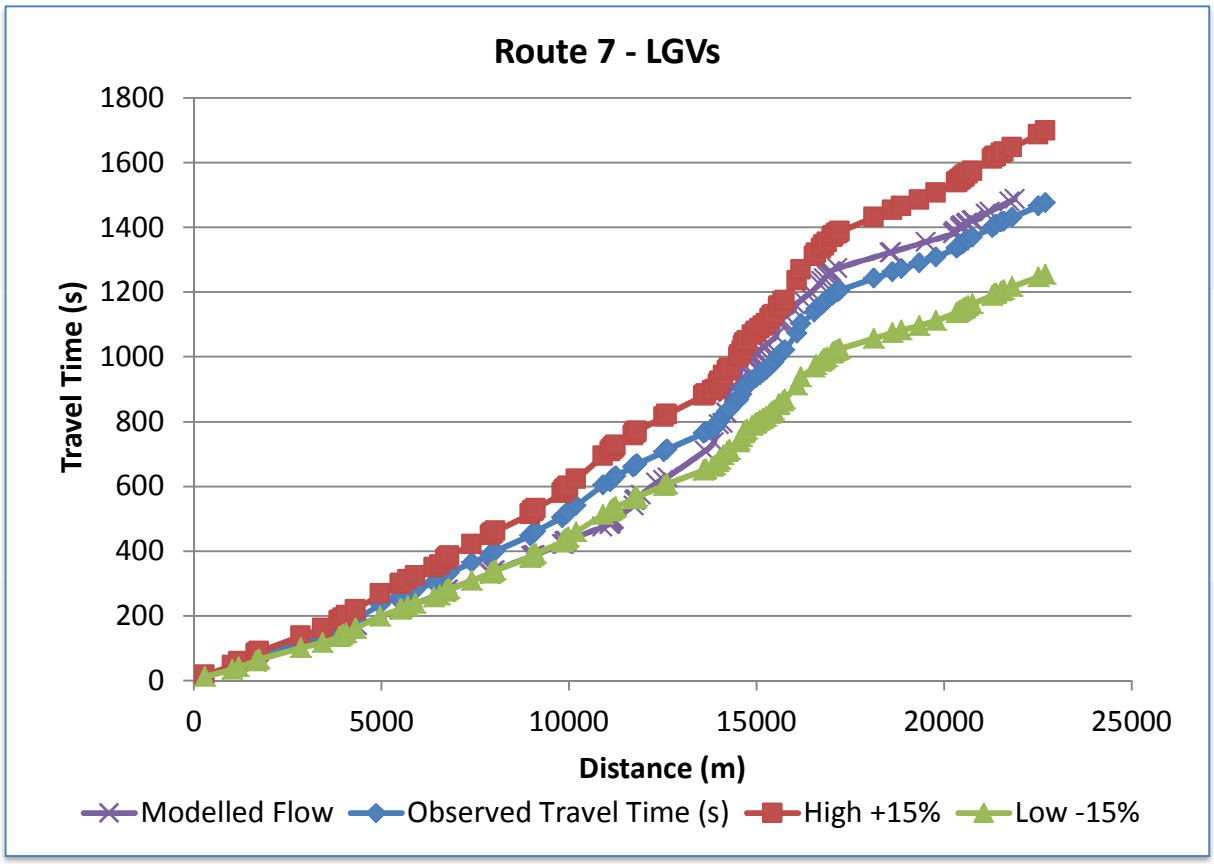

Route 5 - Lights
Travel Time (s)
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

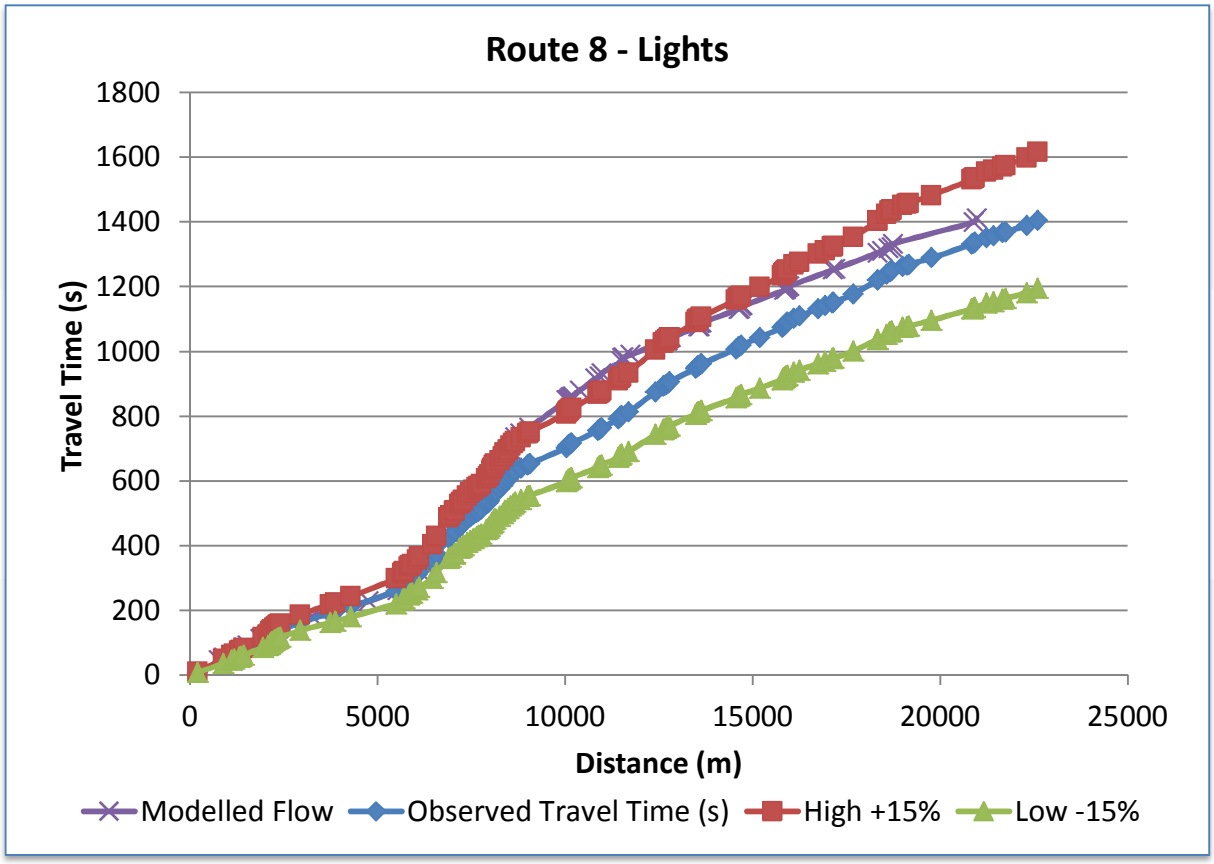

Route 5 - LGVs
Travel Time (s)
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

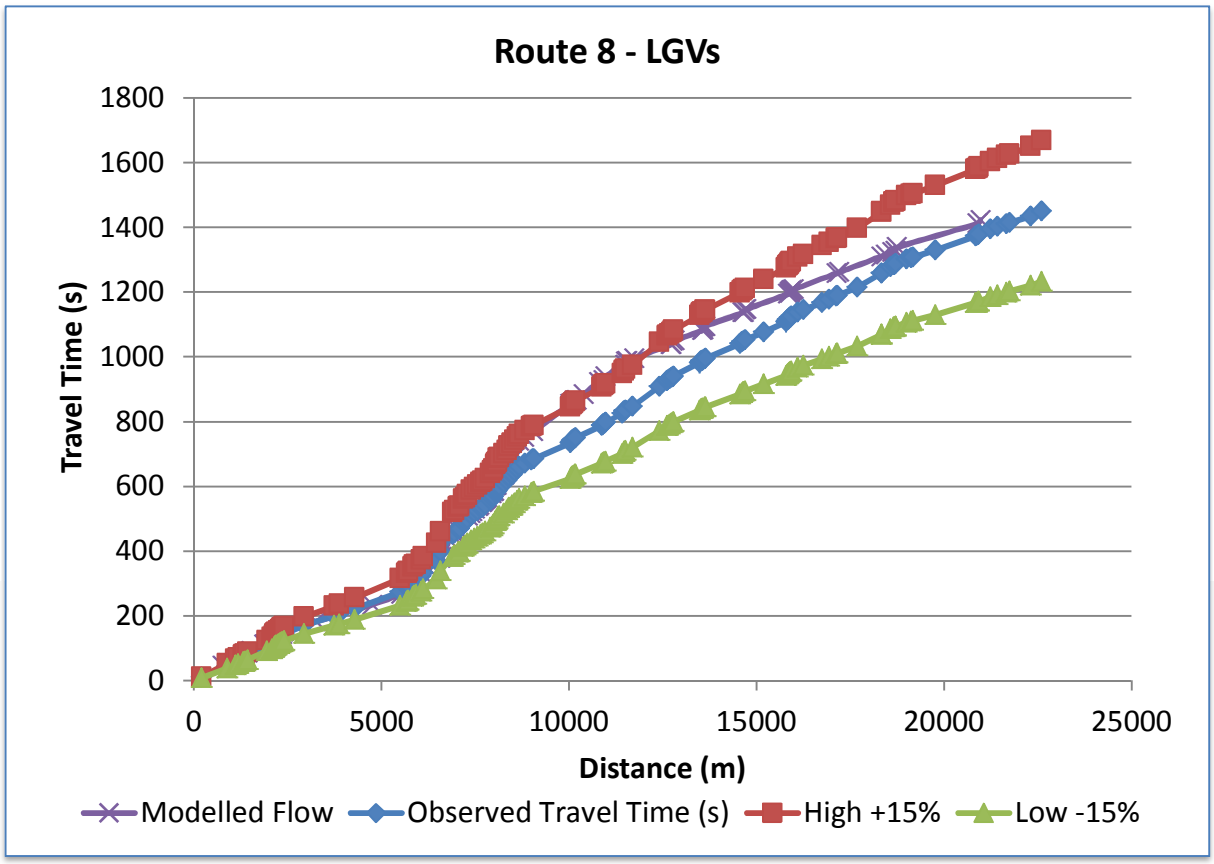

Route 6 - Lights
Travel Time (s)
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

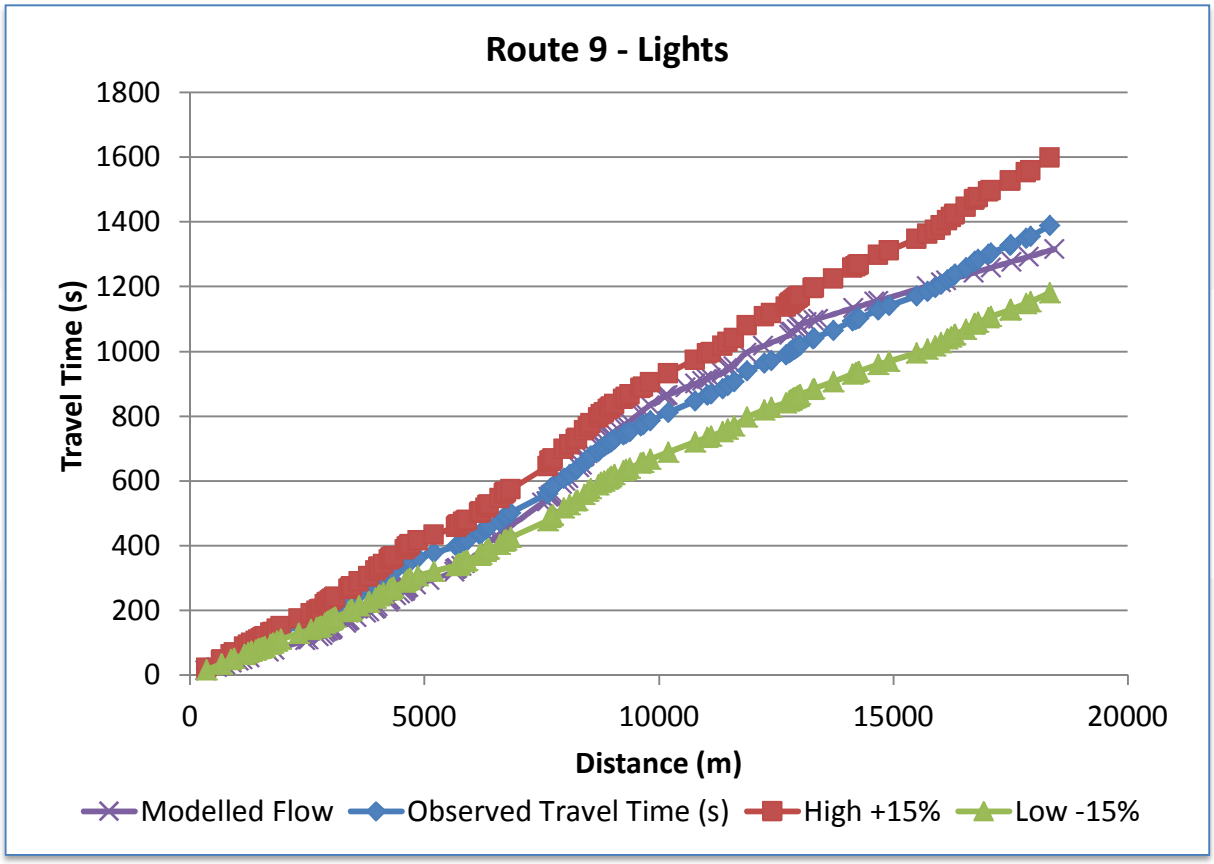

Route 6 - LGVs
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

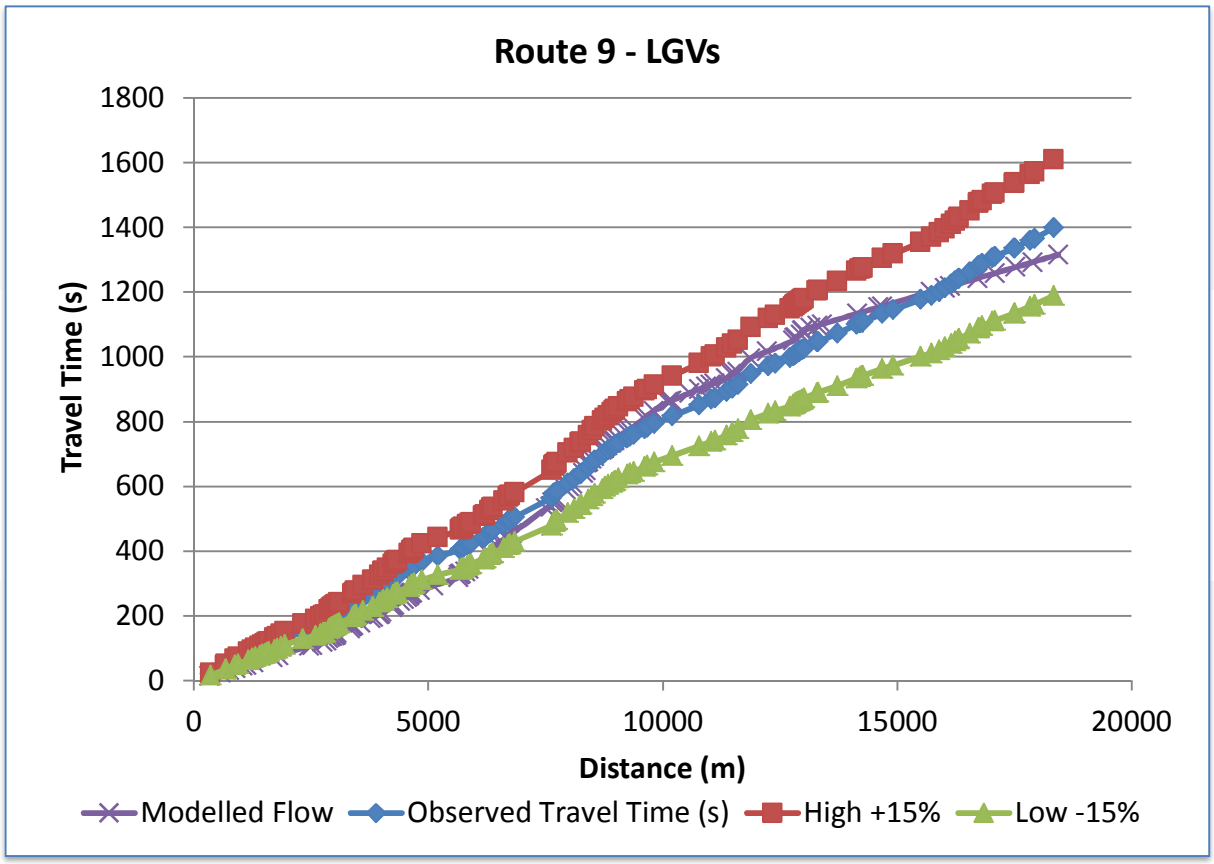

Route 7 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

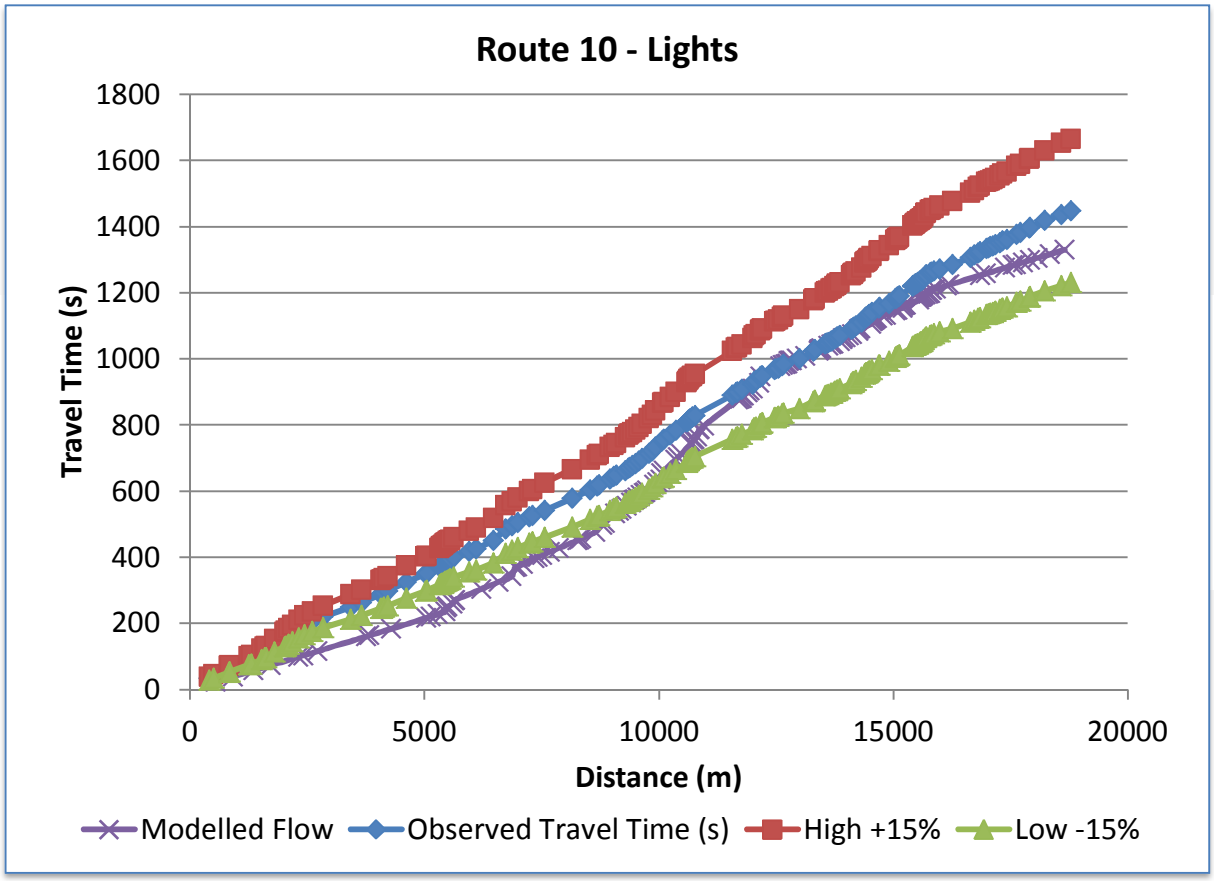

Route 7 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

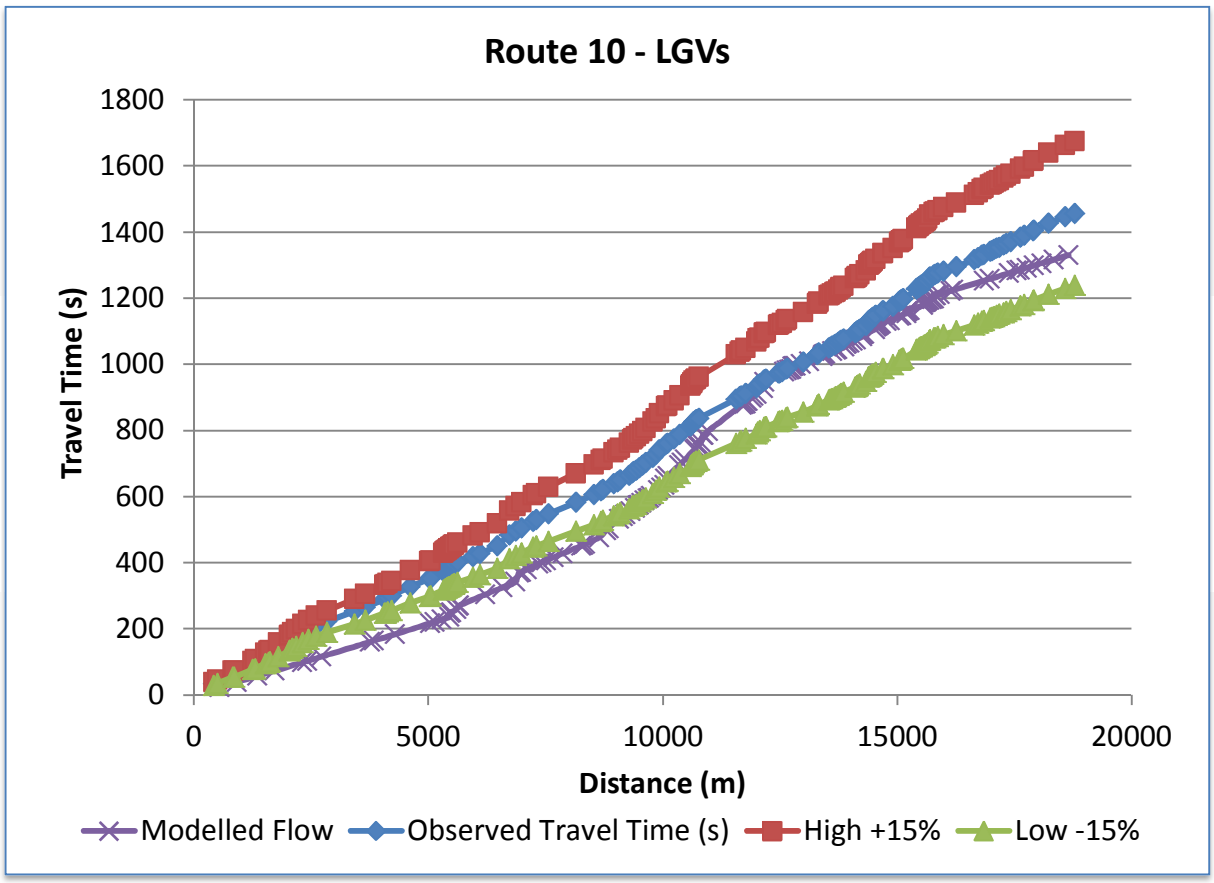

Route 8 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

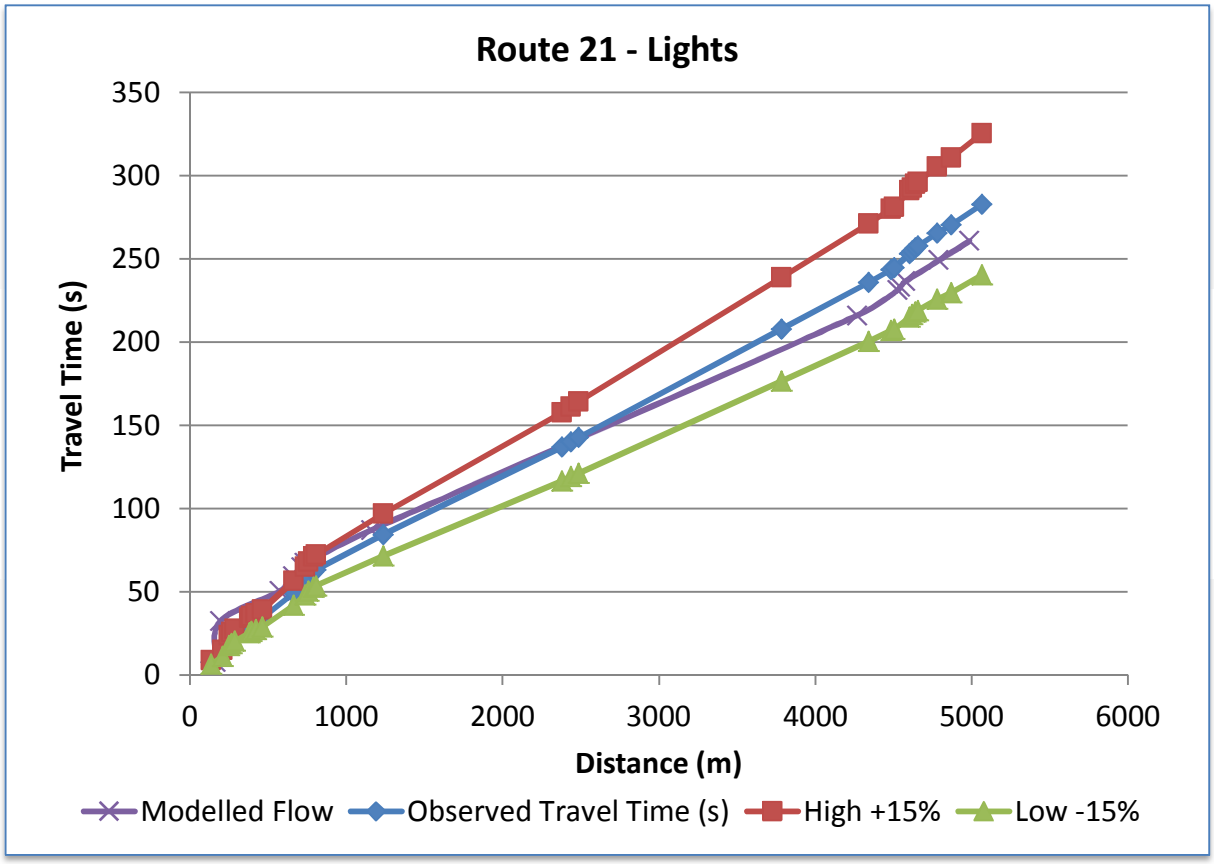

Route 8 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

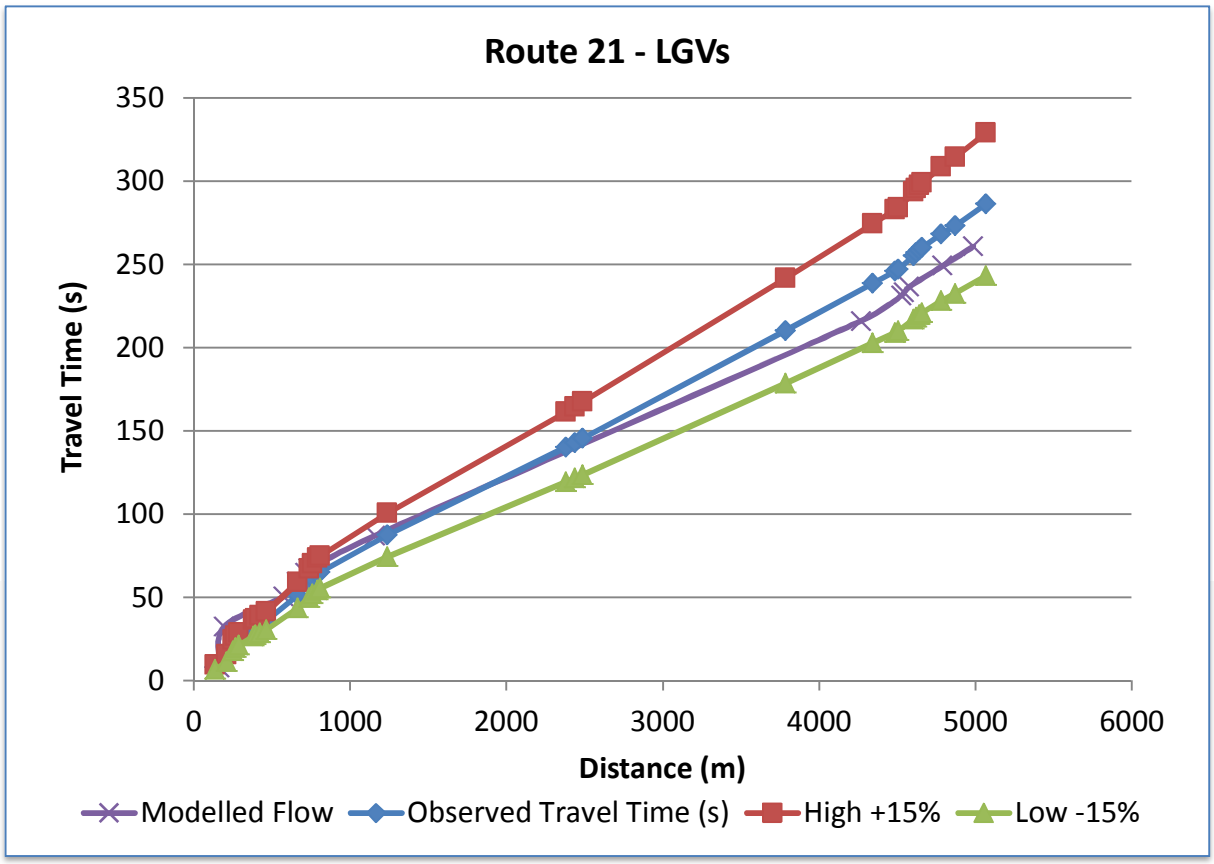

Route 9 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

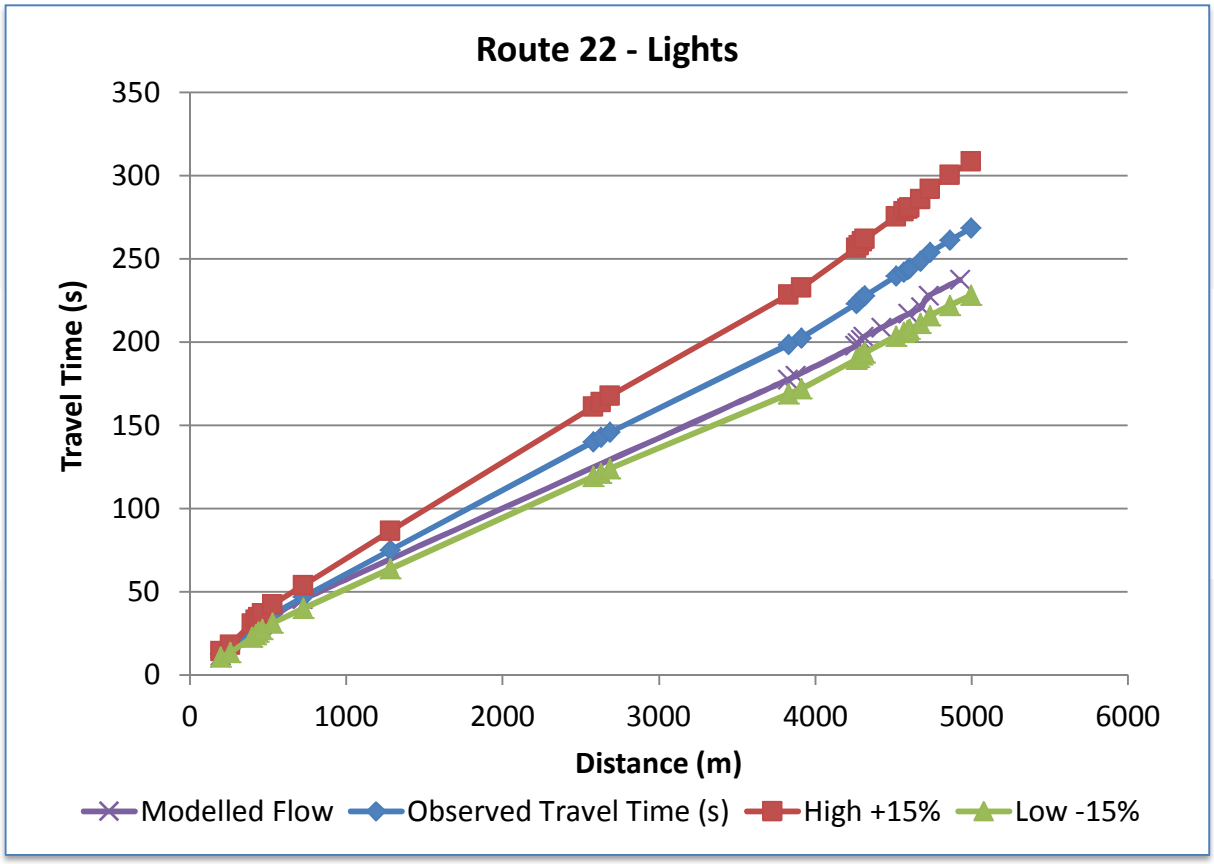

Route 9 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

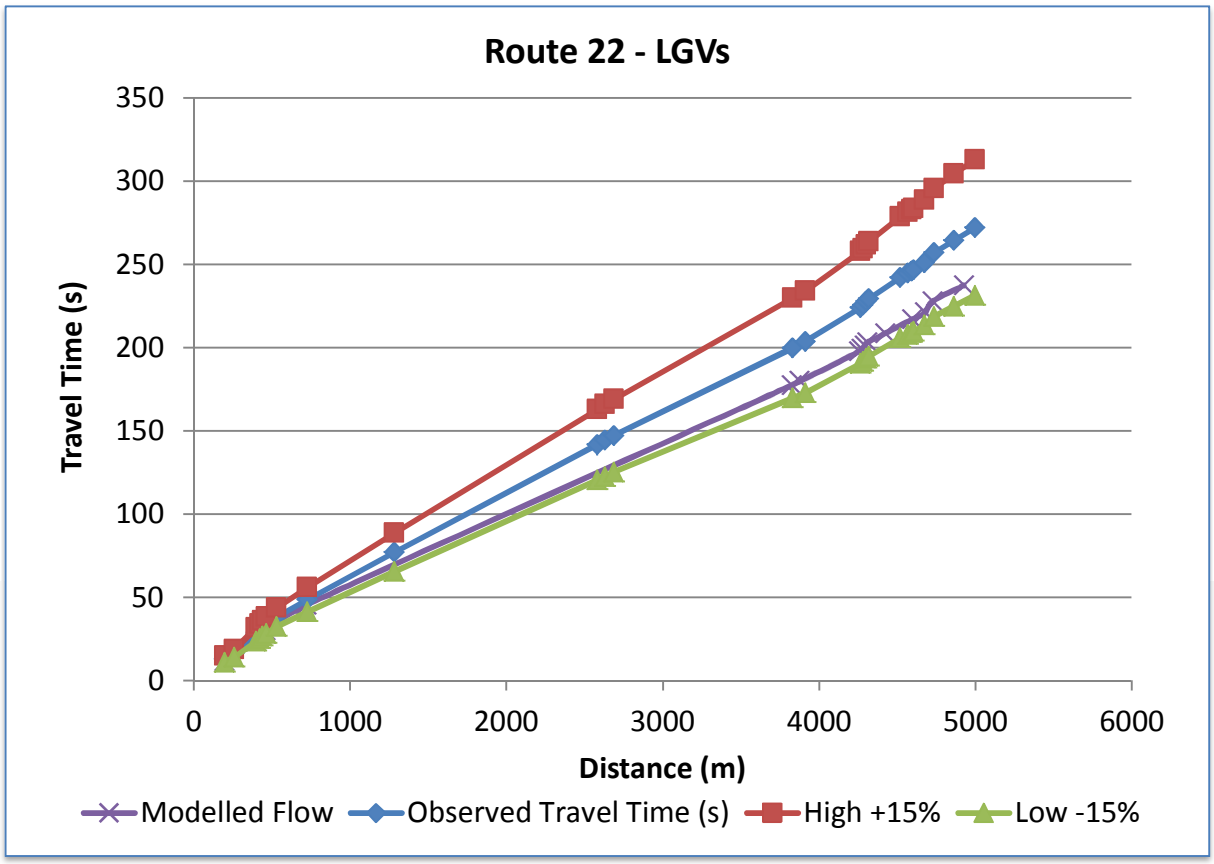

Route 10 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

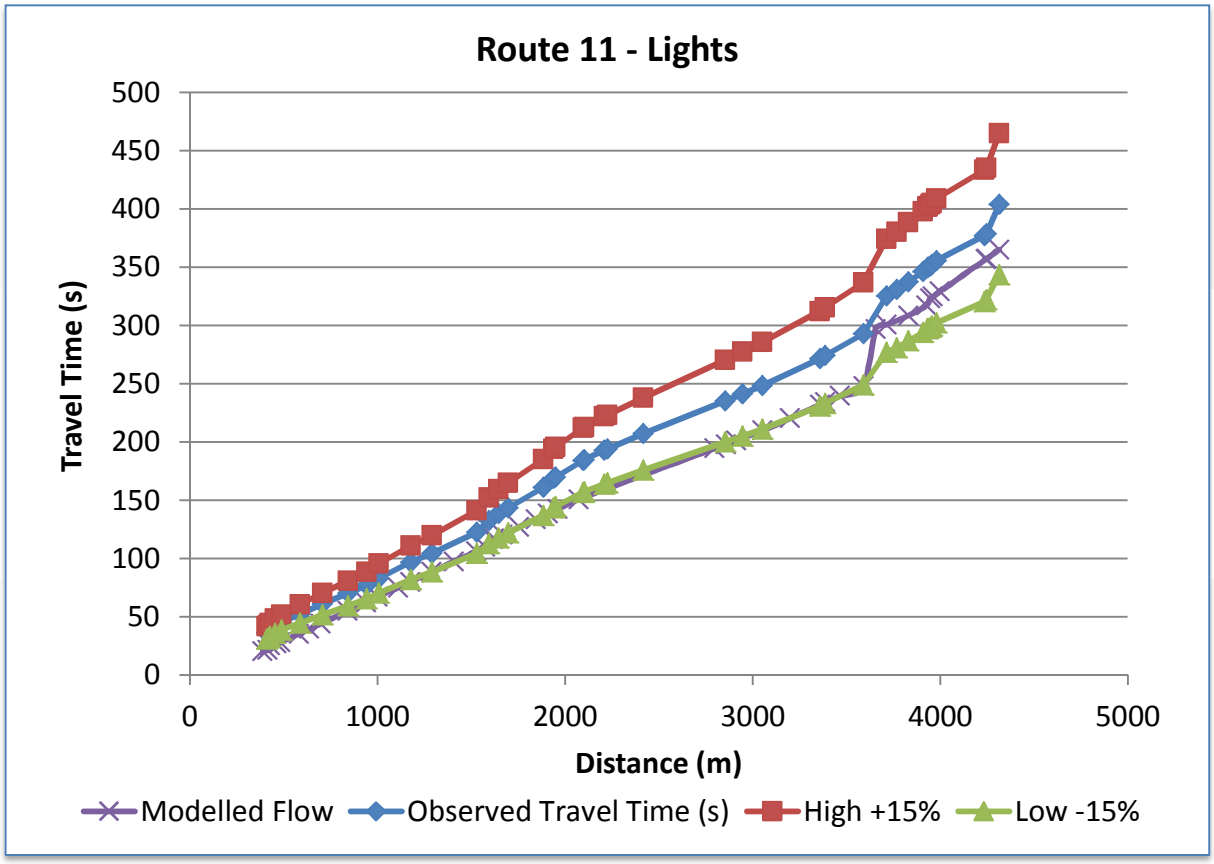

Route 10 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

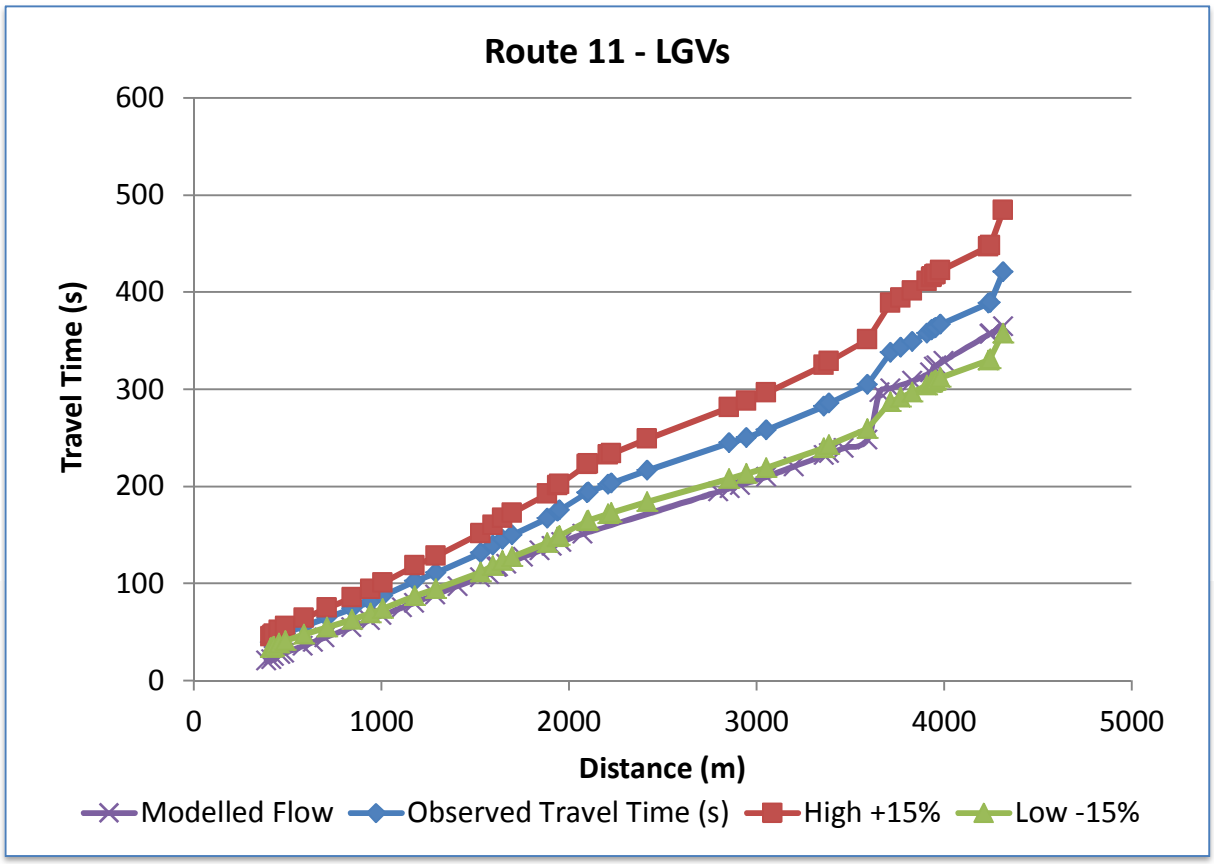

Route 21 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

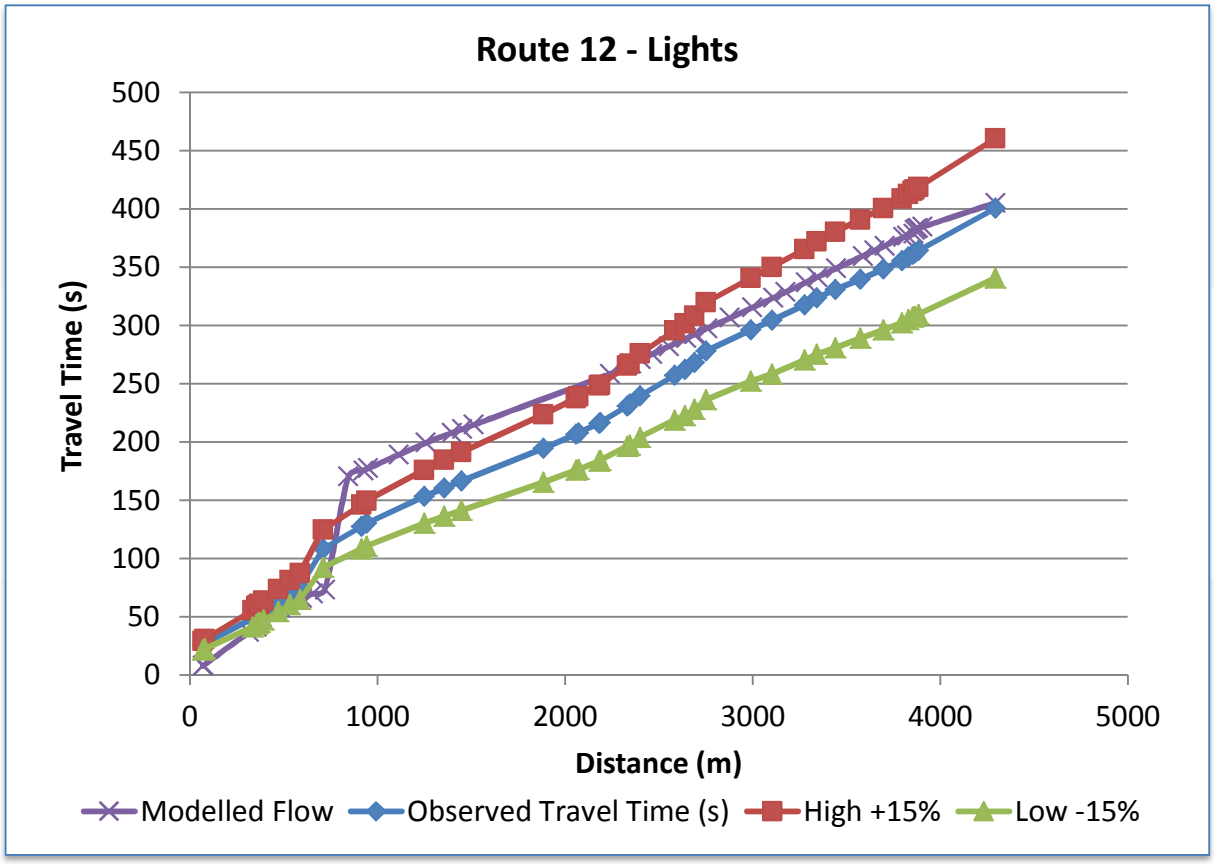

Route 21 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

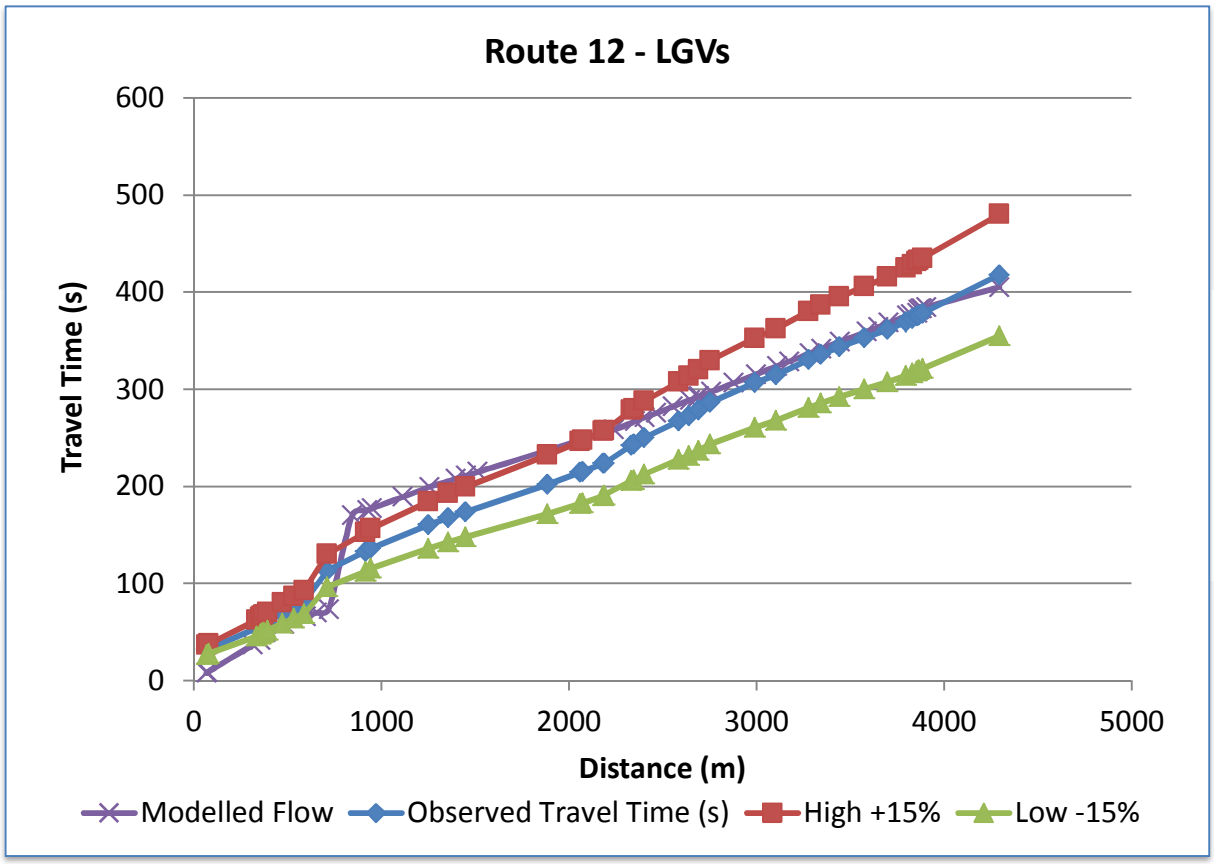

Route 22 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

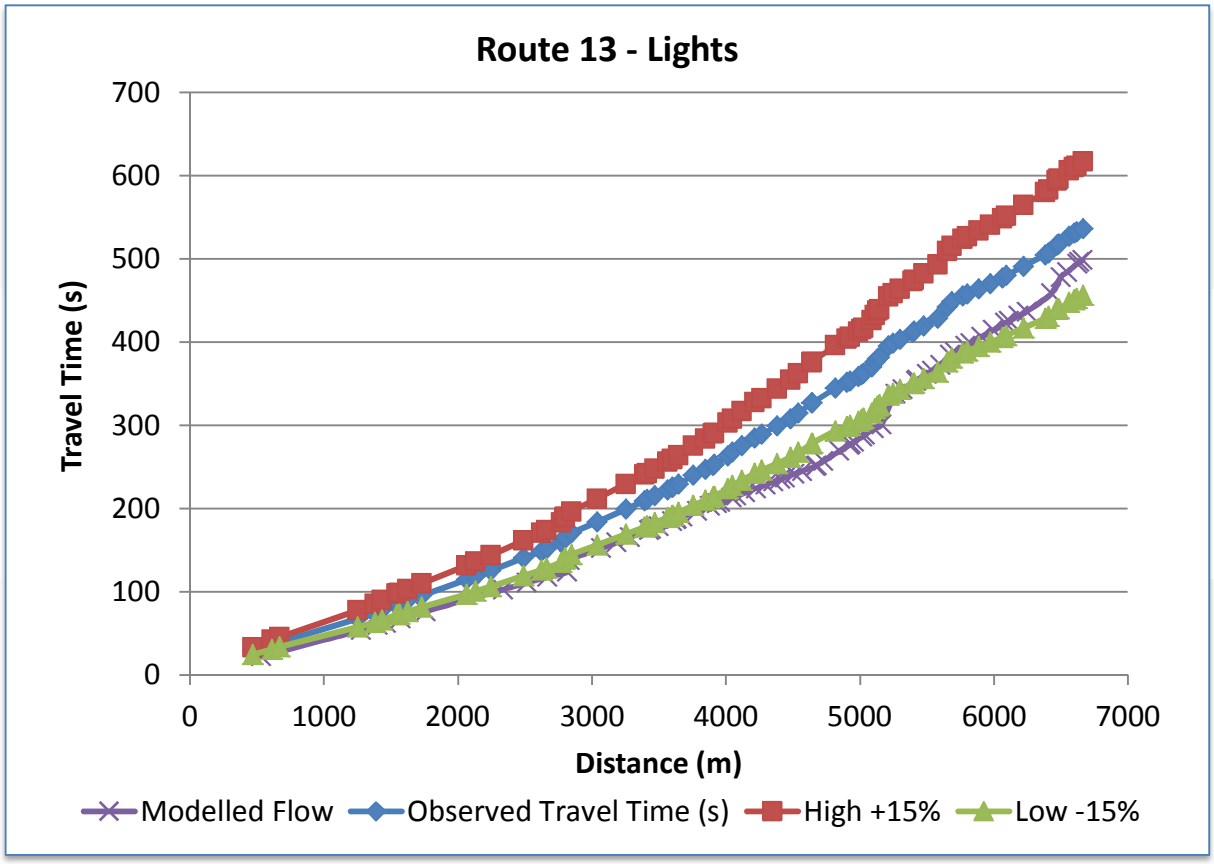

Route 22 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

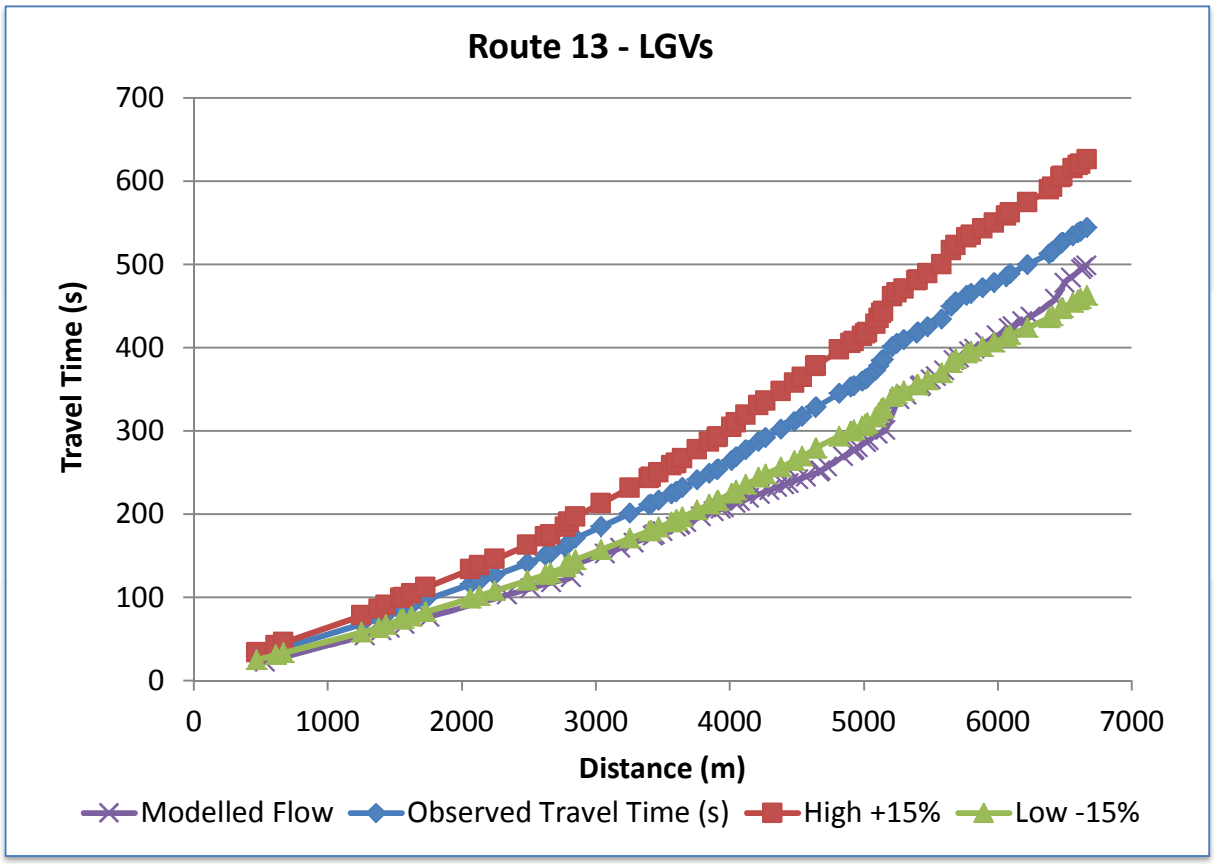

Route 11 - Lights
Travel Time (s)
500
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

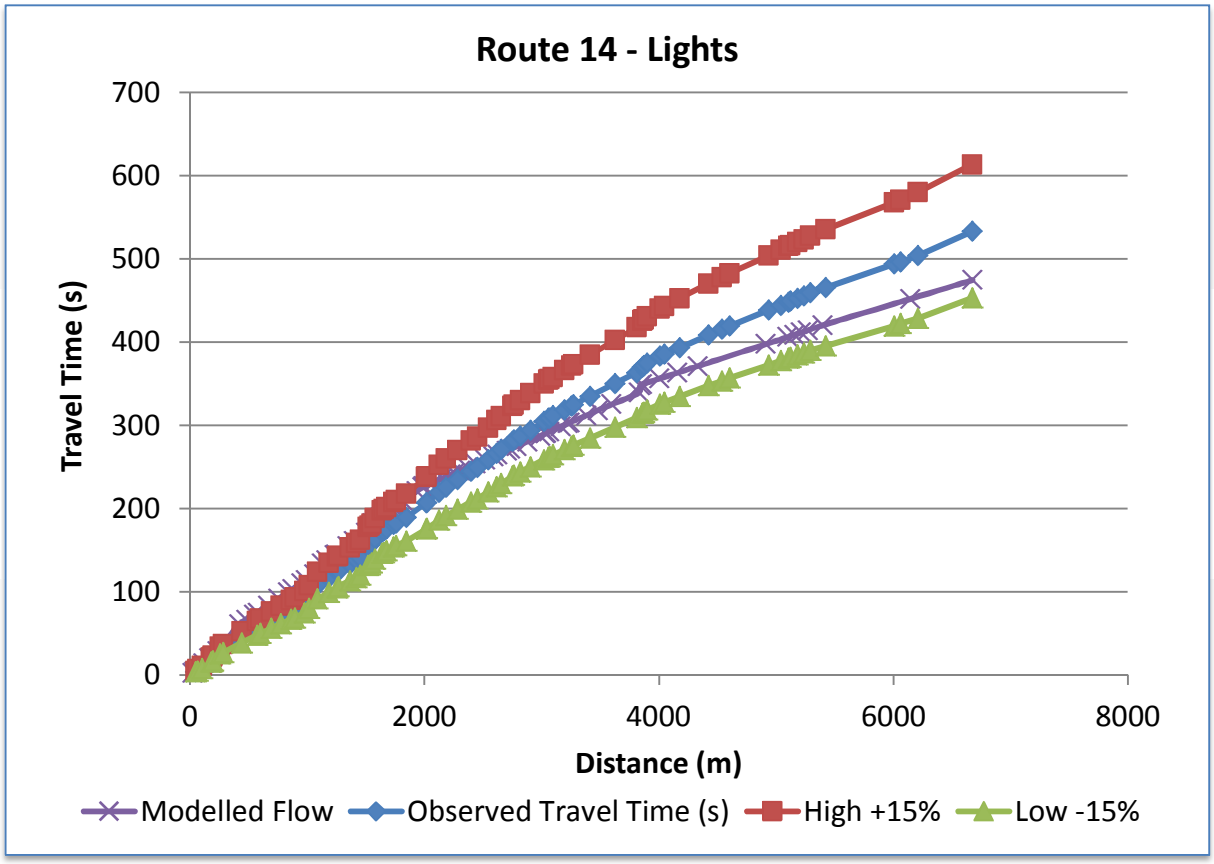

Route 11 - LGVs
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

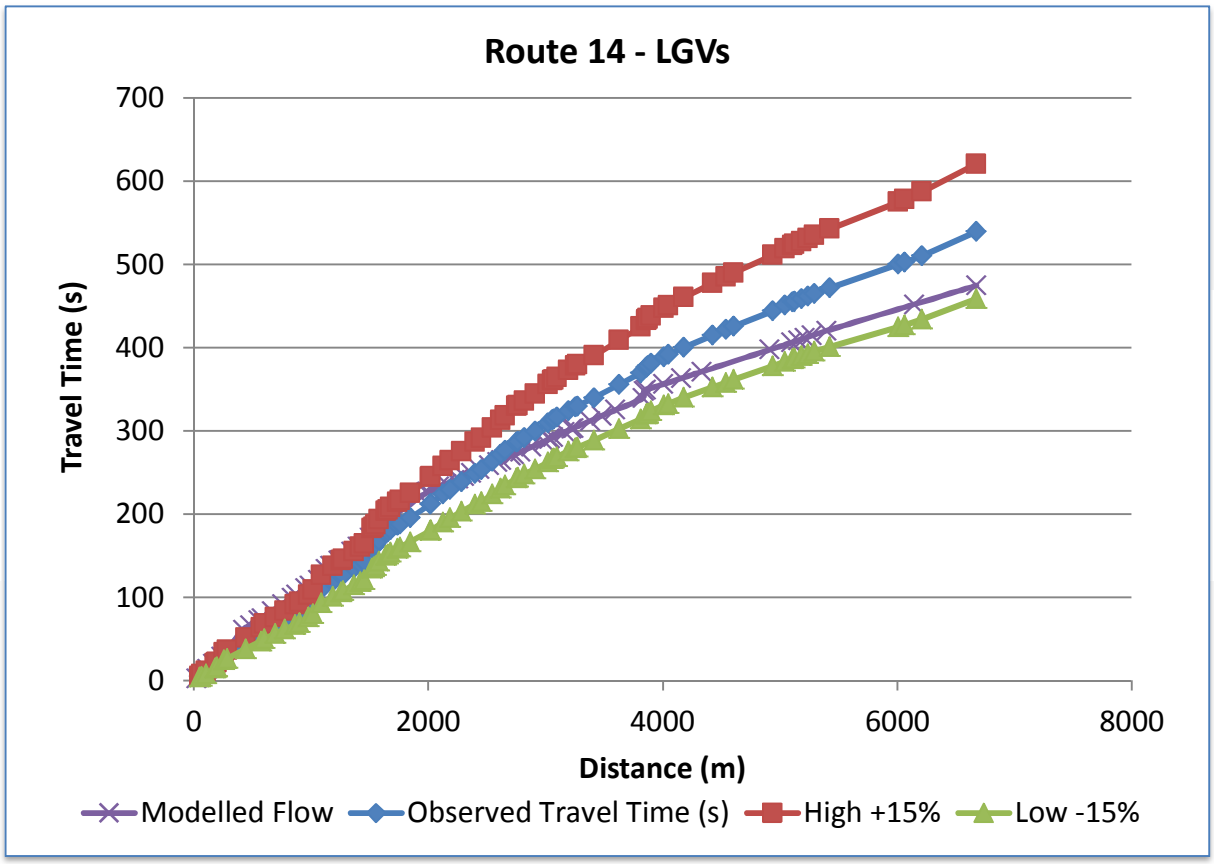

Route 12 - Lights
Travel Time (s)
500
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

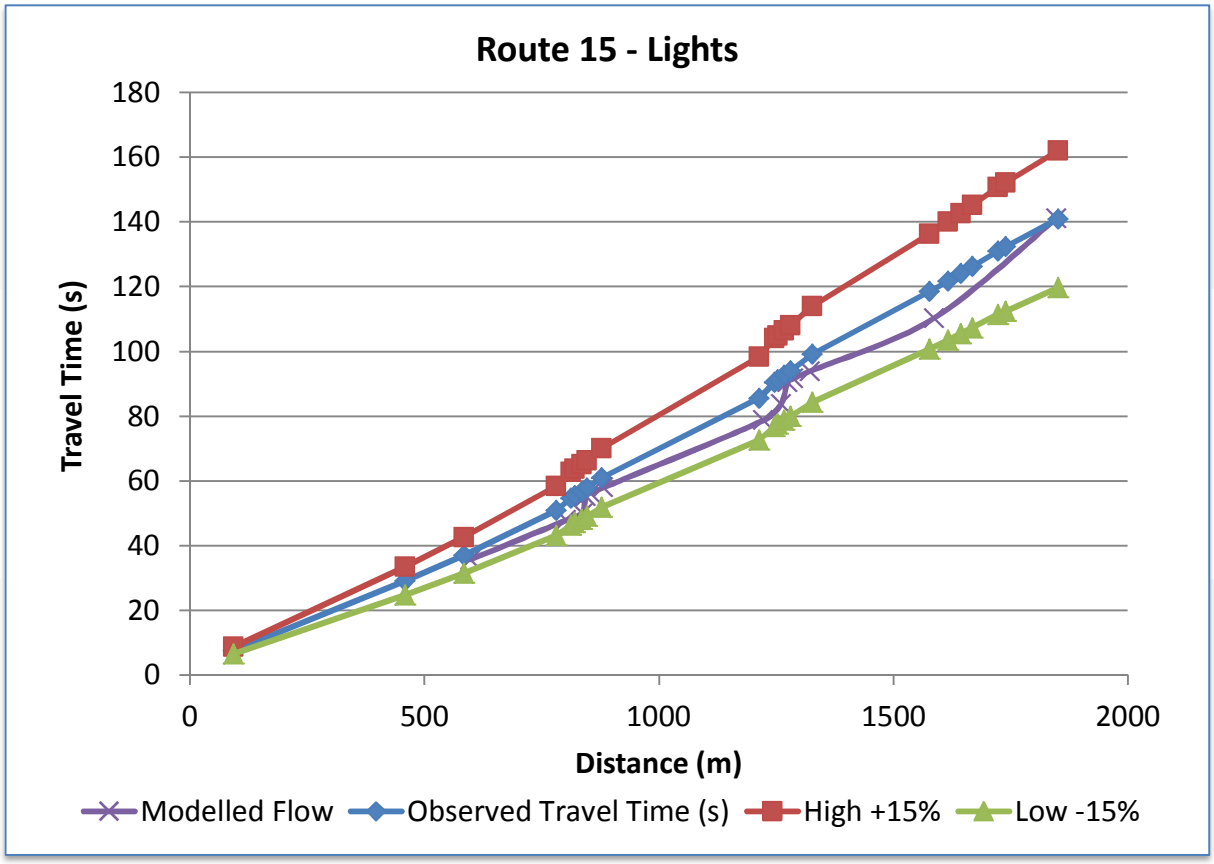

Route 12 - LGVs
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

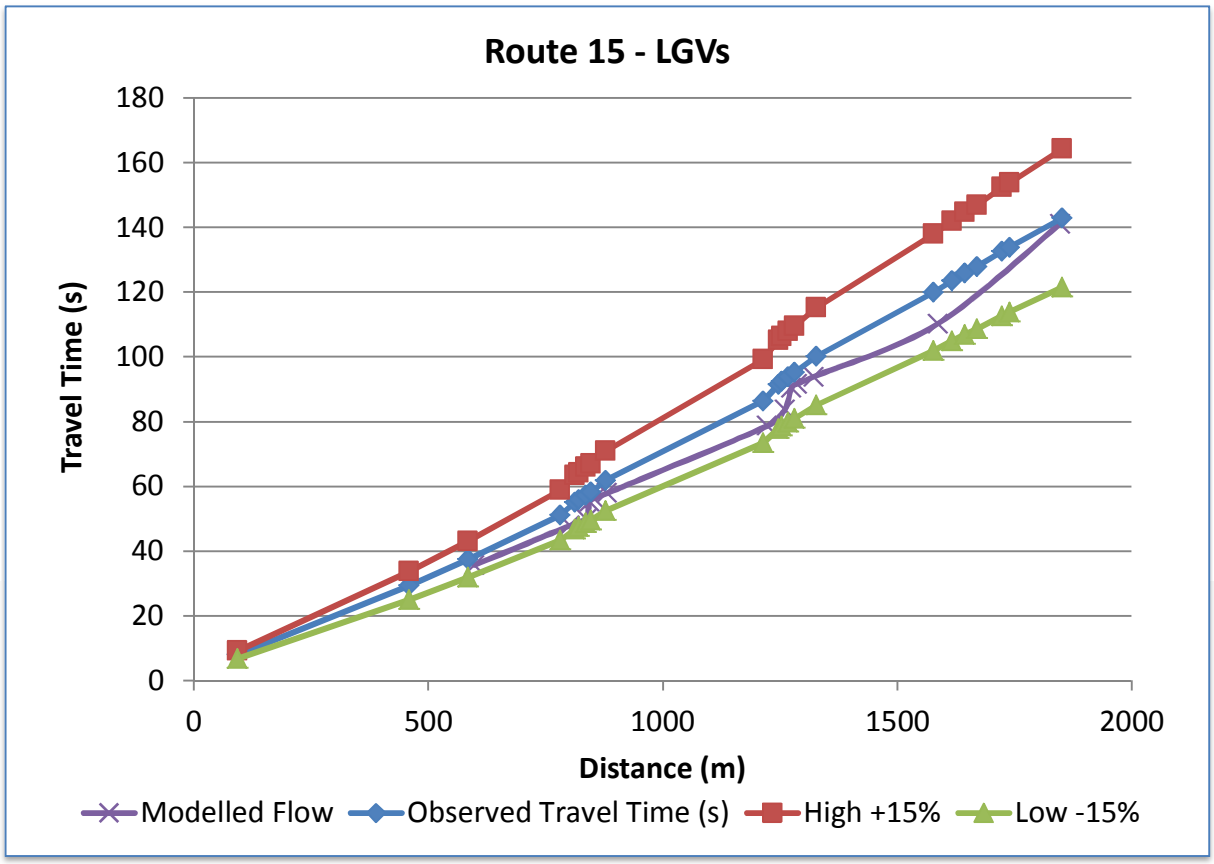

Route 13 - Lights
Travel Time (s)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

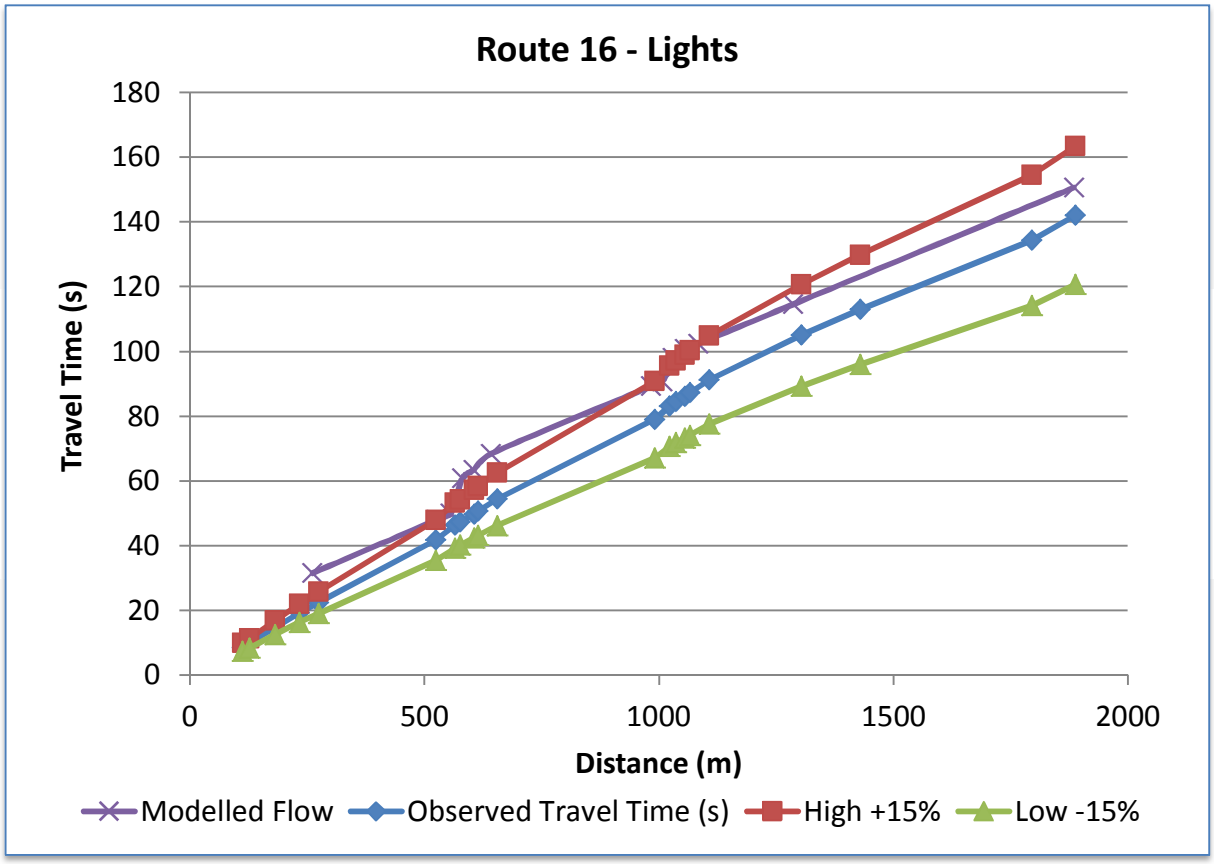

Route 13 - LGVs
Travel Time (s)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

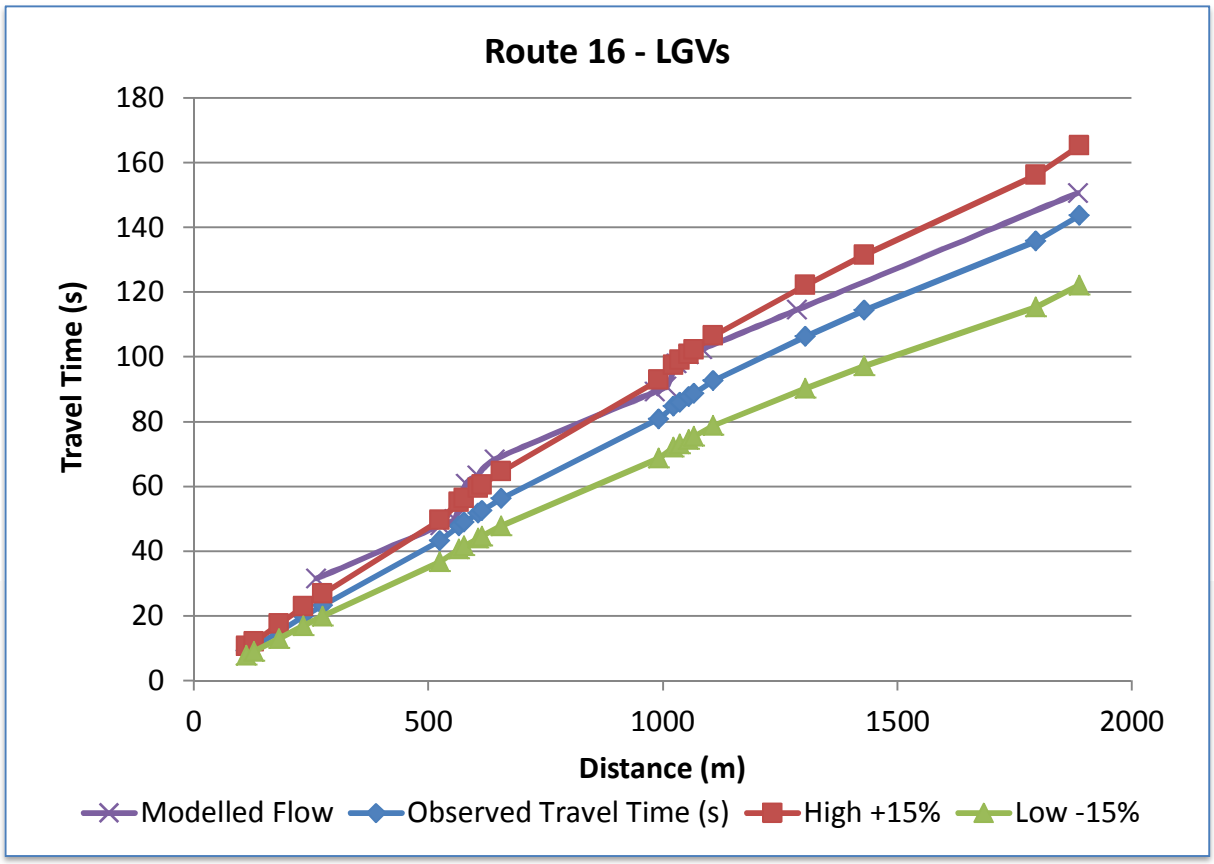

Route 14 - Lights
Travel Time (s)
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

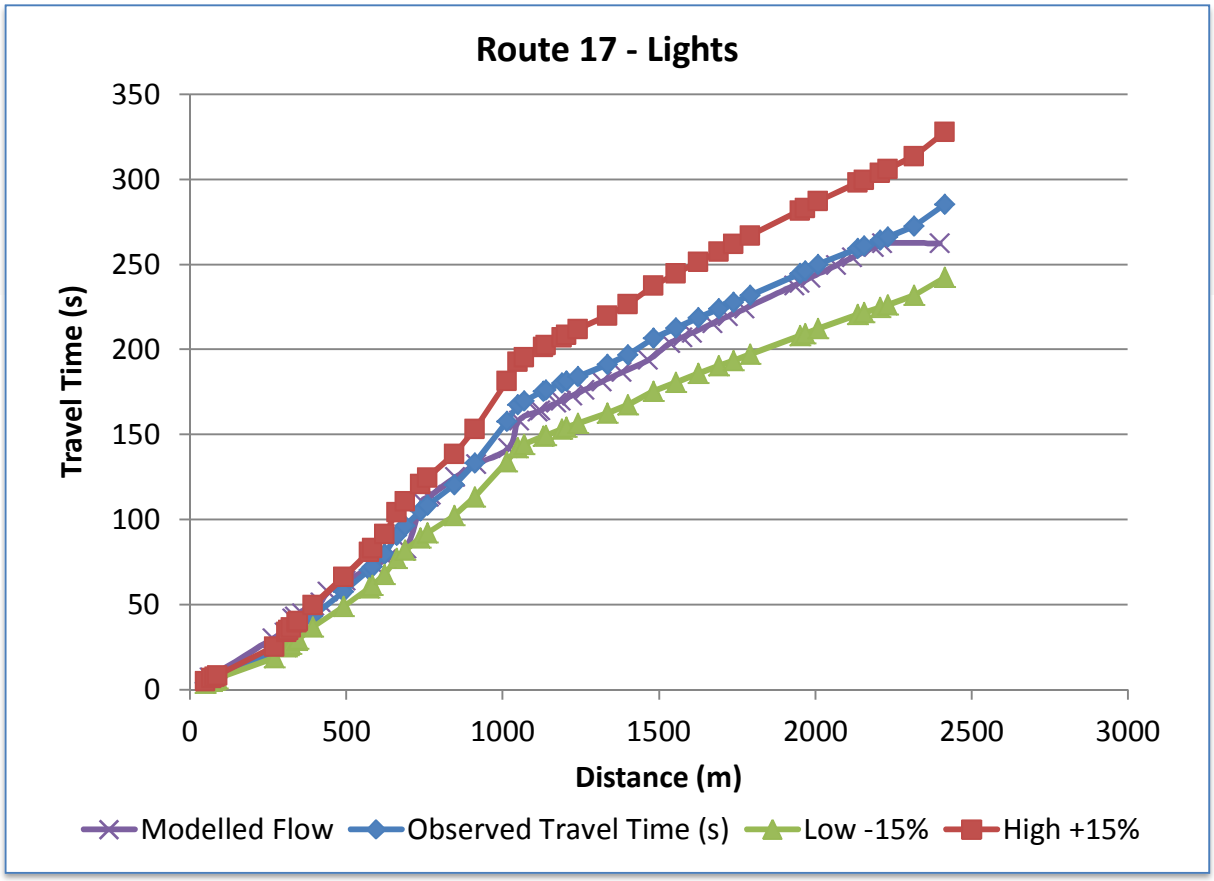

Route 14 - LGVs
Travel Time (s)
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

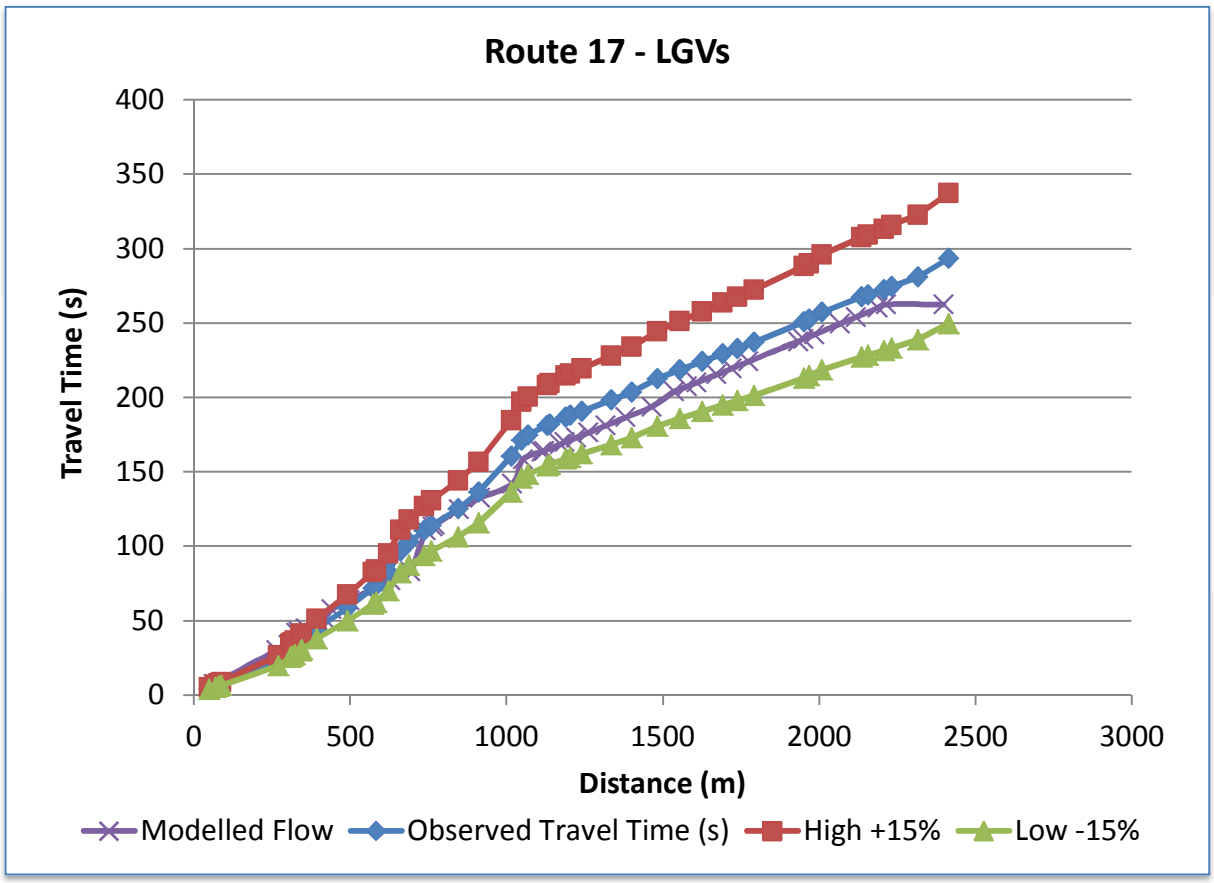

Route 15 - Lights
Travel Time (s)
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

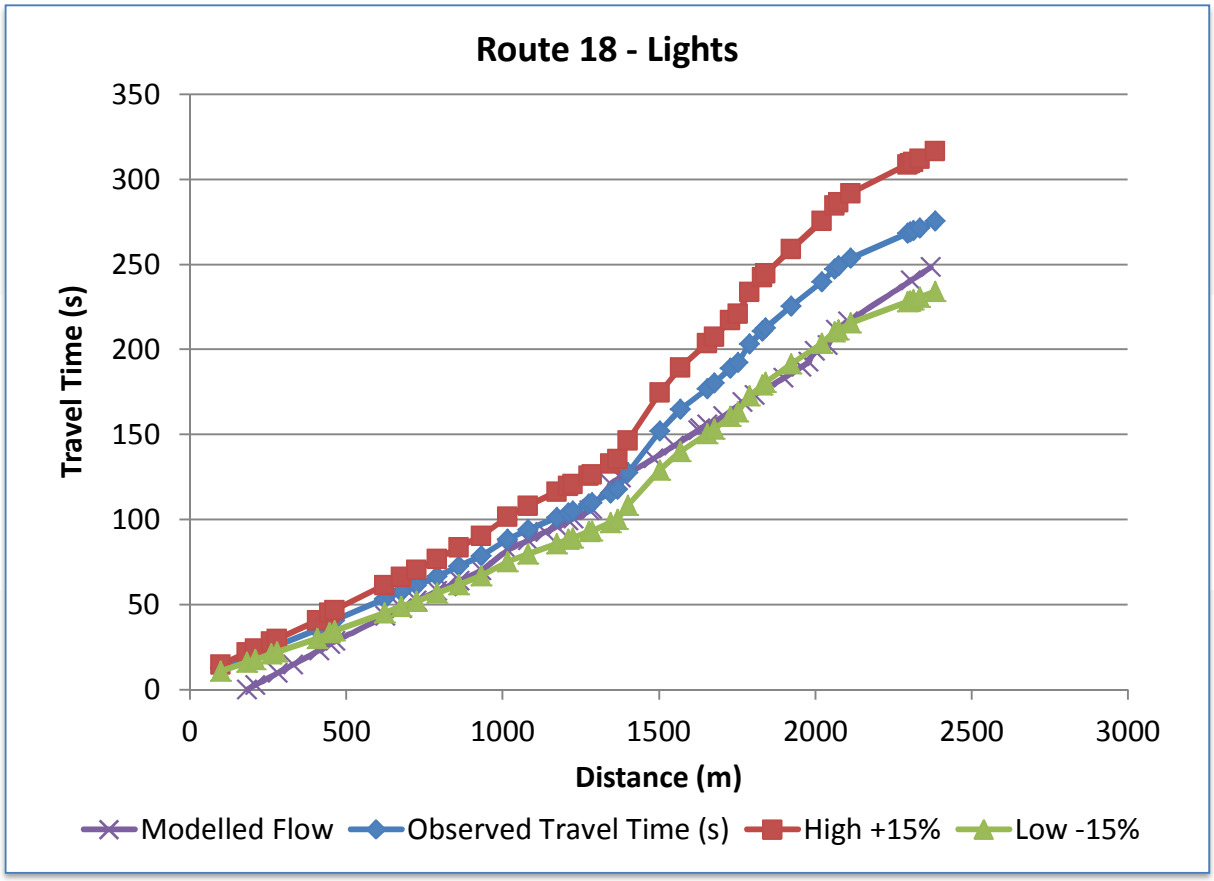

Route 15 - LGVs
Travel Time (s)
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

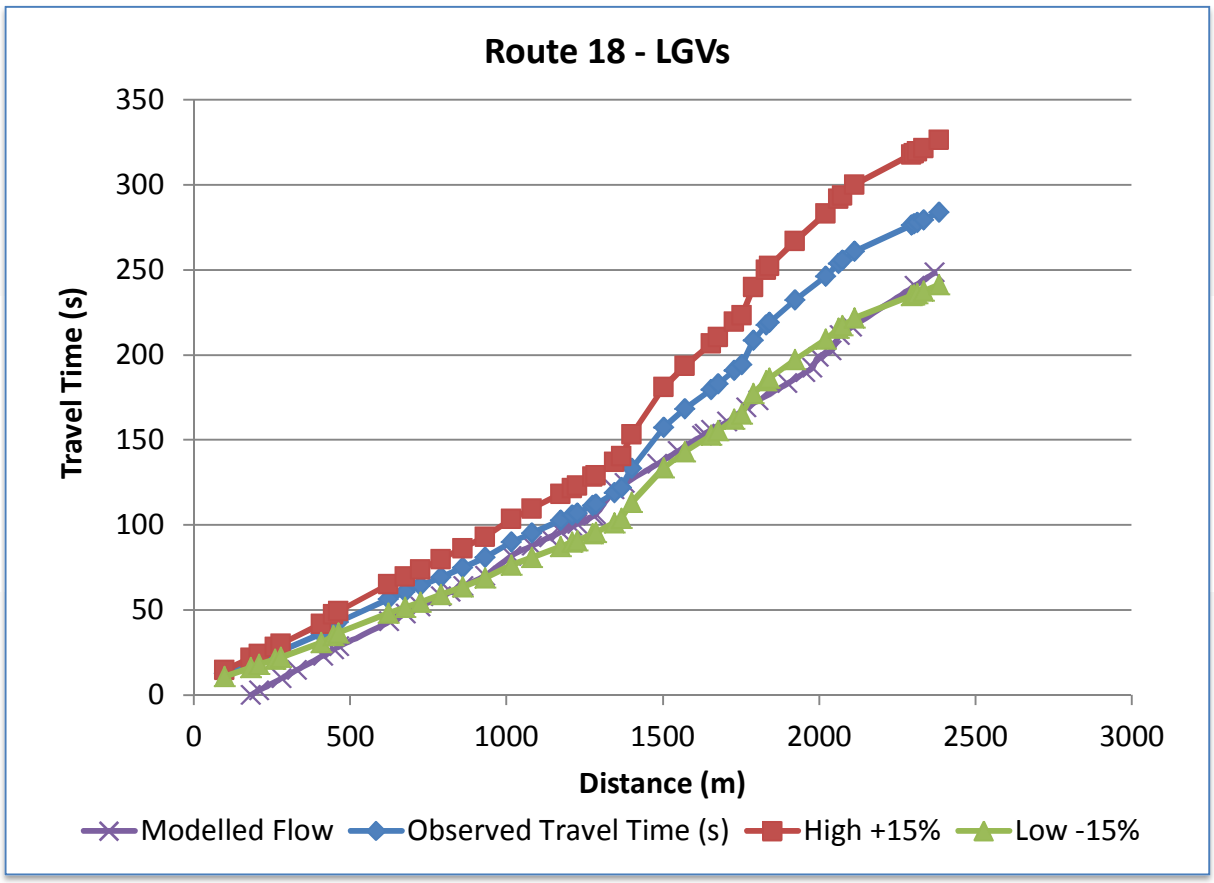

Route 16 - Lights
Travel Time (s)
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

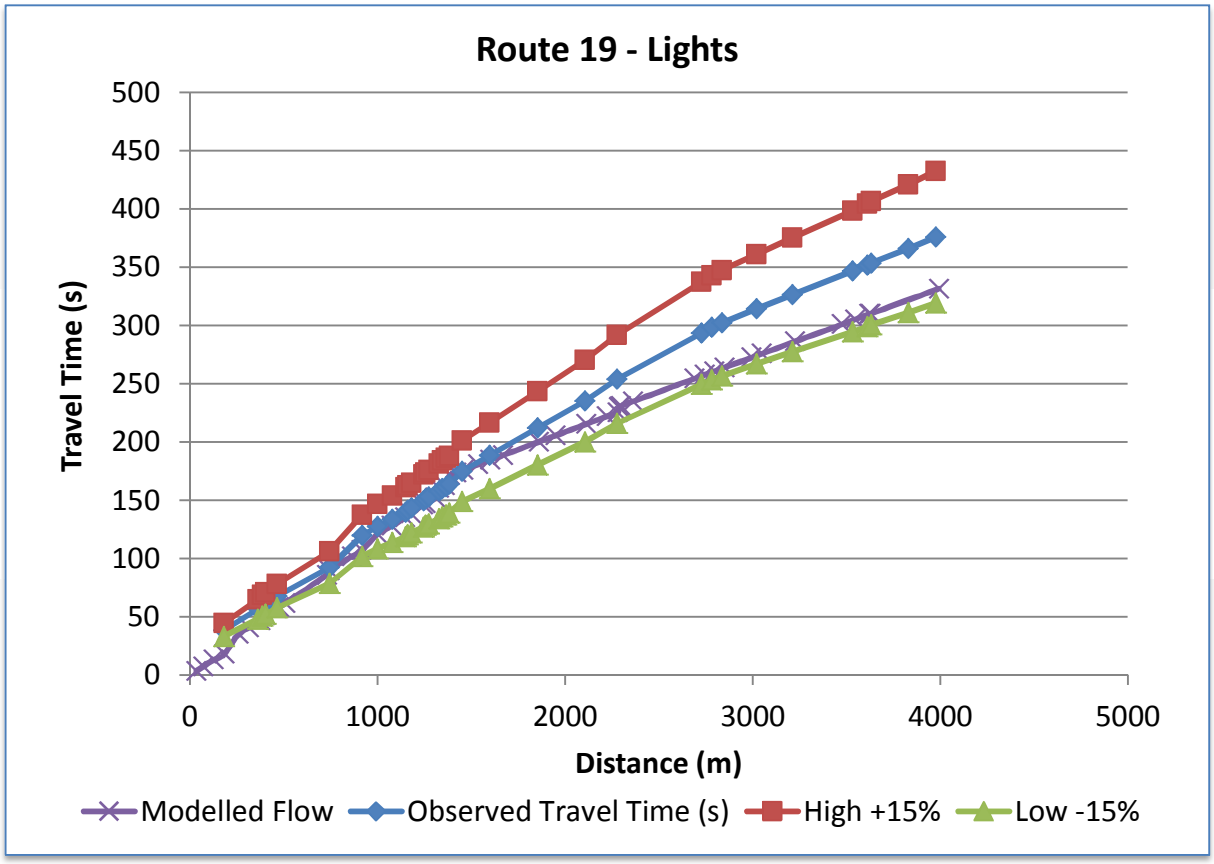

Route 16 - LGVs
Travel Time (s)
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

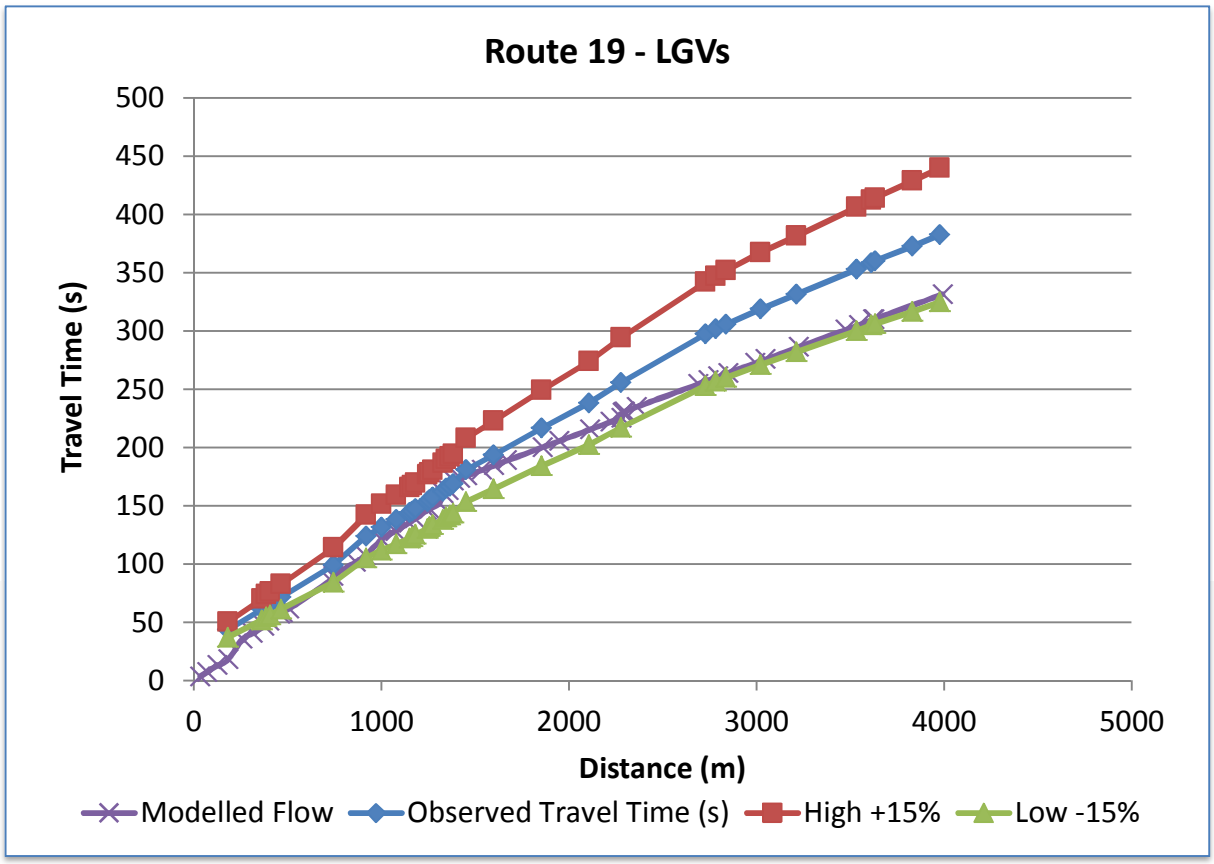

Route 17 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
Low -15%
High +15%

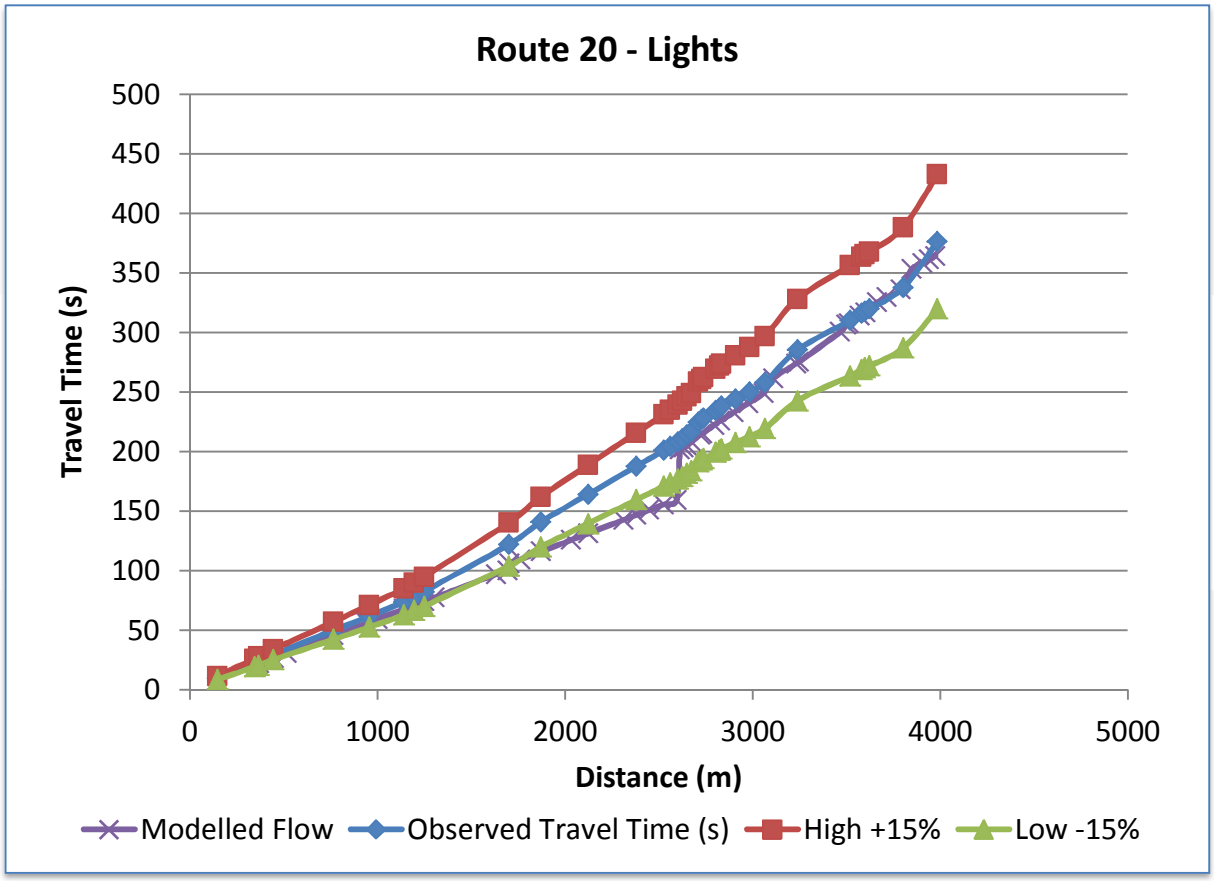

Route 17 - LGVs
Travel Time (s)
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

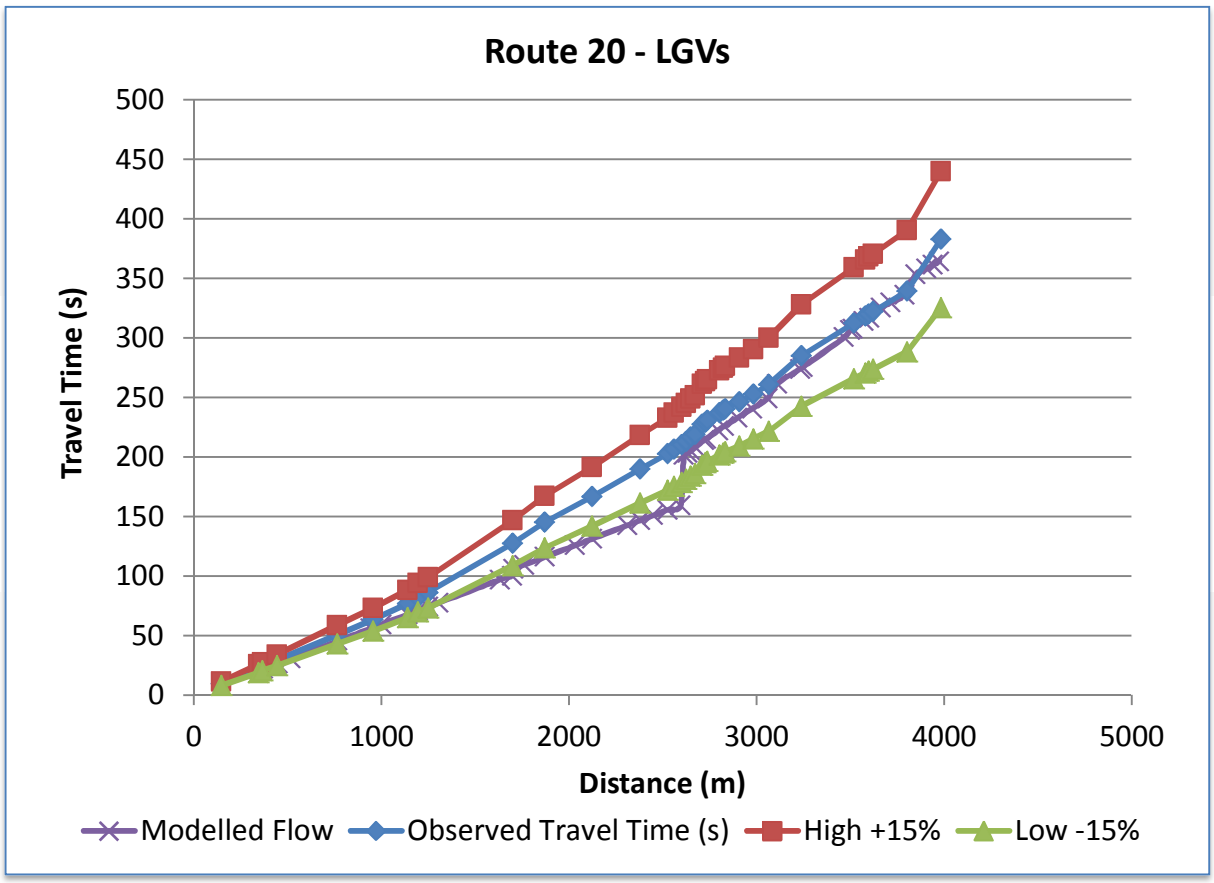

Route 18 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%


Route 18 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

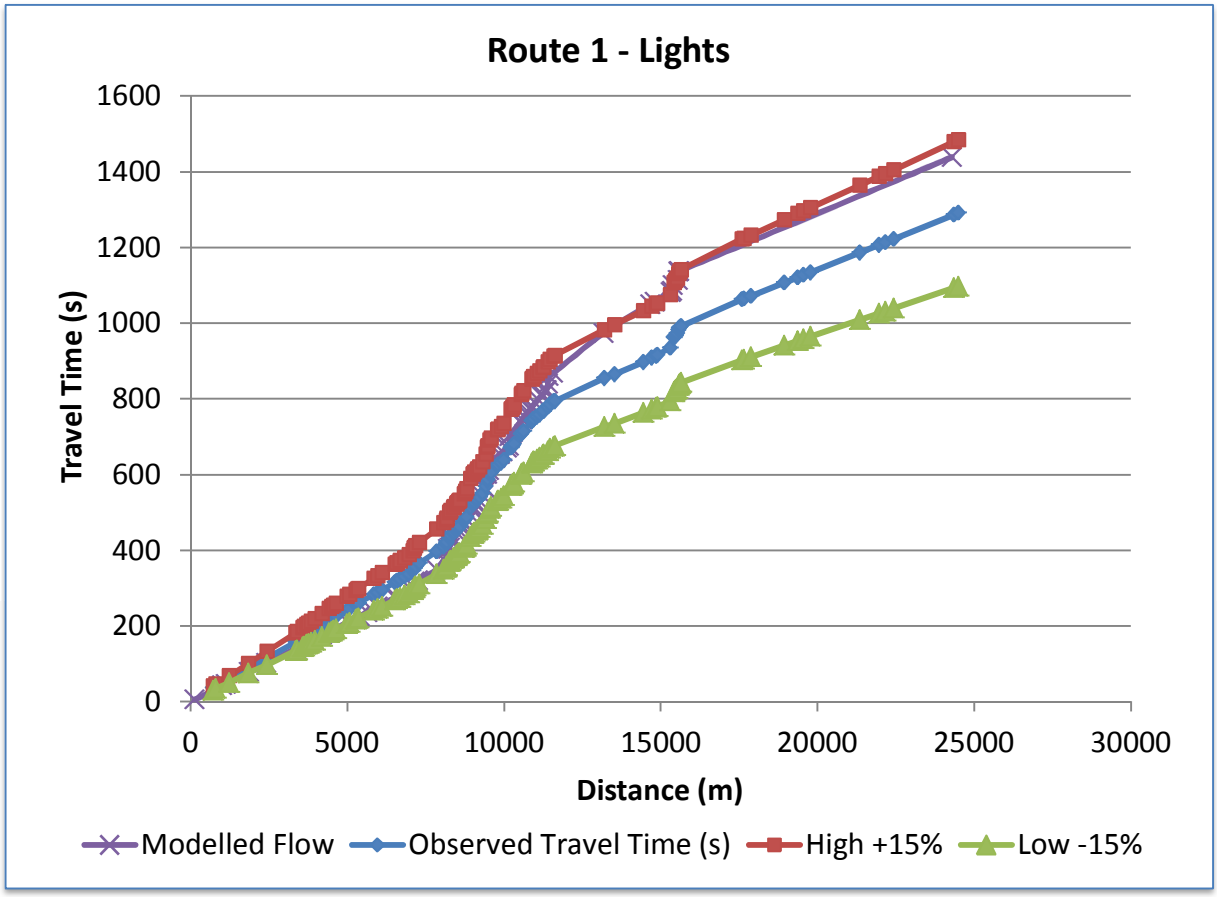

Route 19 - Lights
Travel Time (s)
500
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

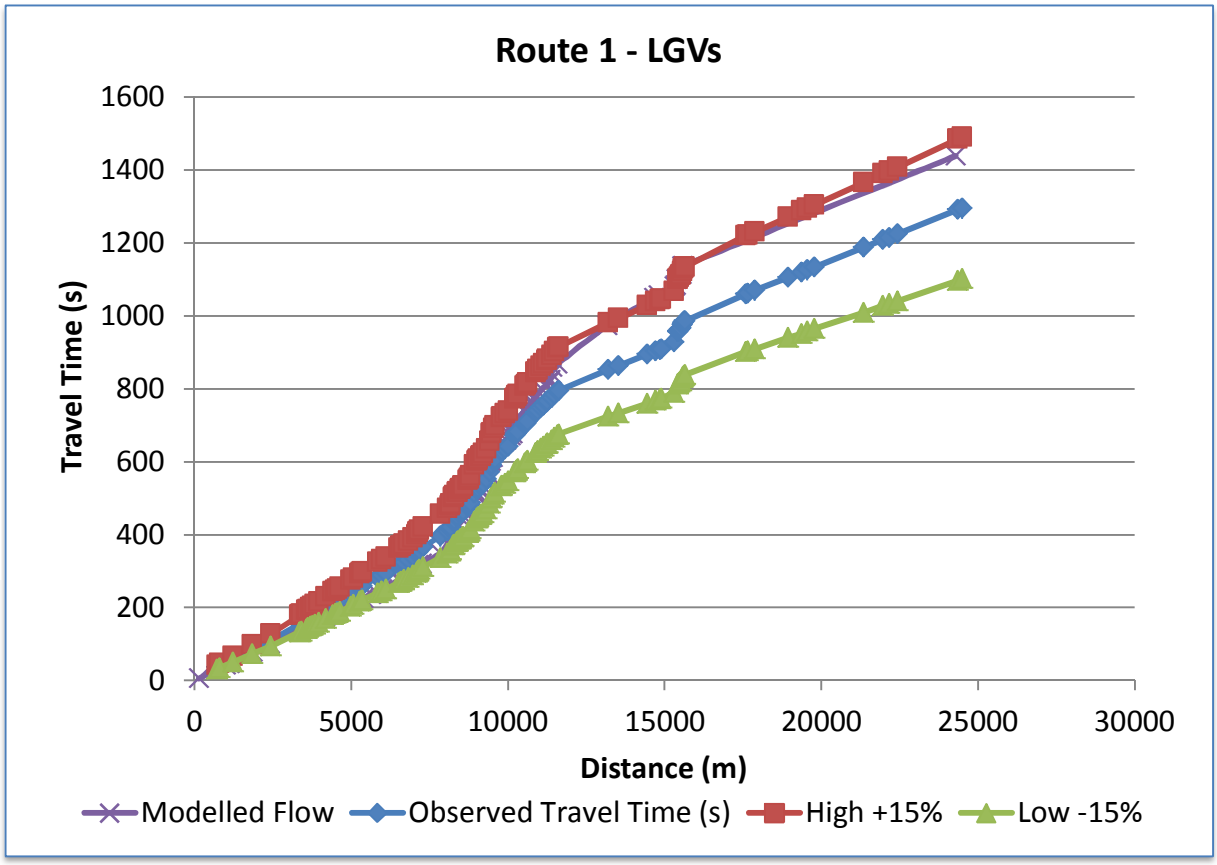

Route 19 - LGVs
Travel Time (s)
500
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

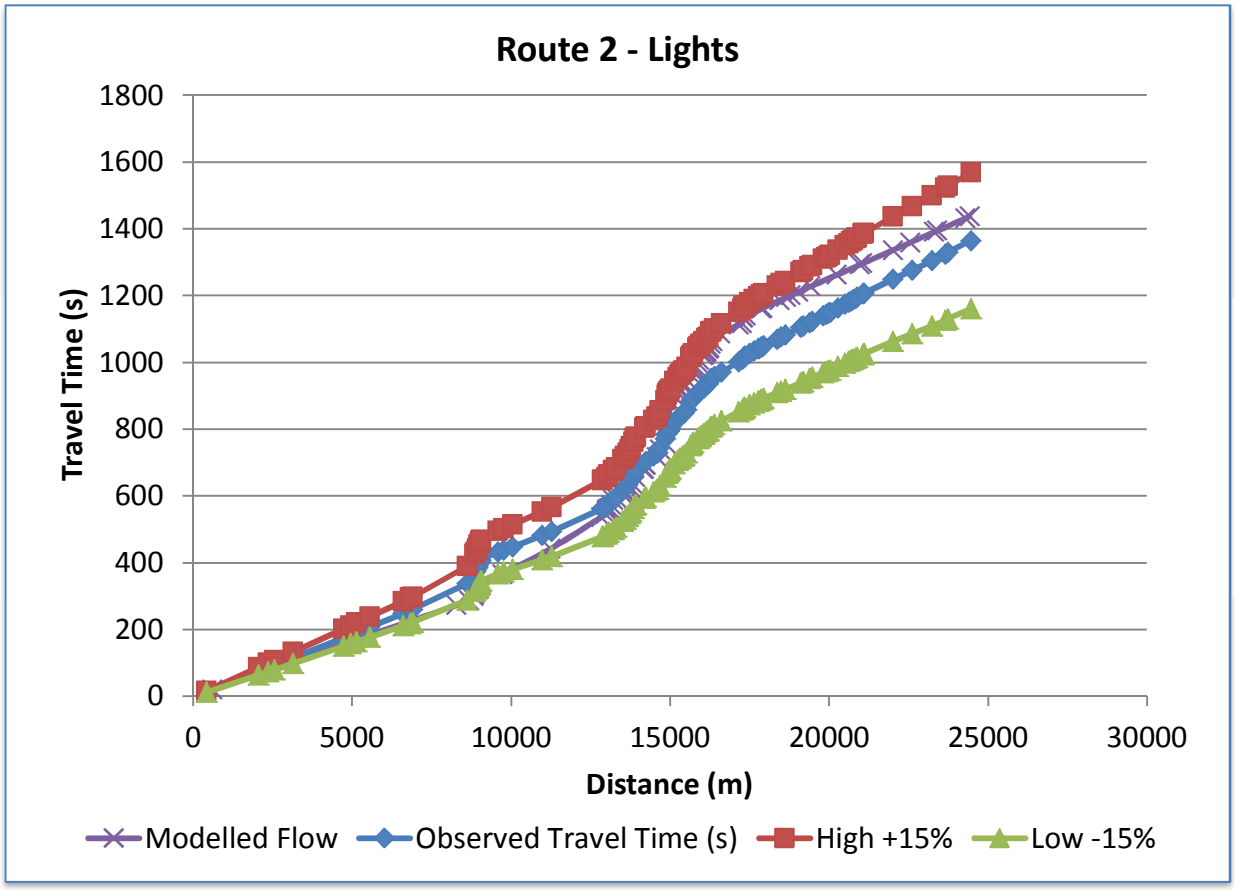

Route 20 - Lights
Travel Time (s)
500
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

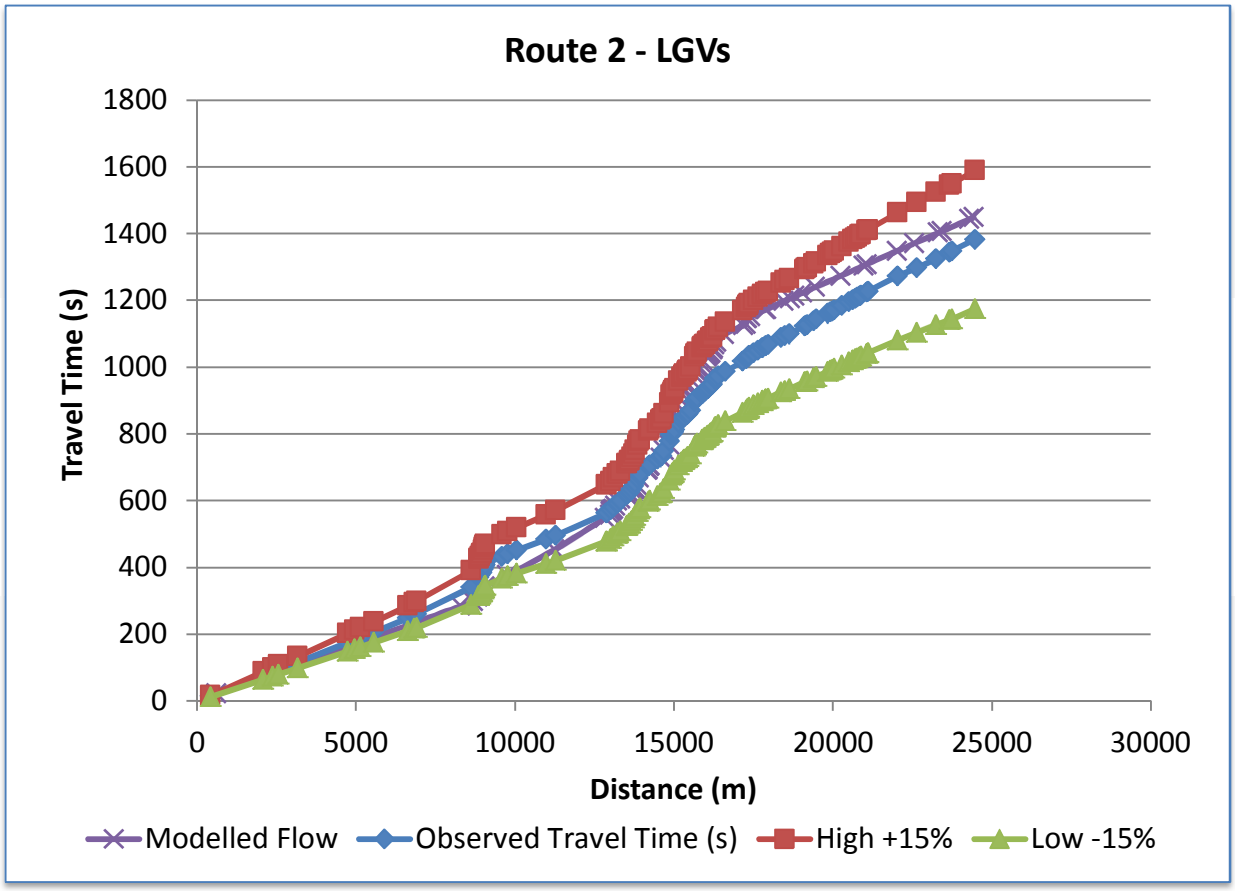

Route 20 - LGVs
Travel Time (s)
500
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

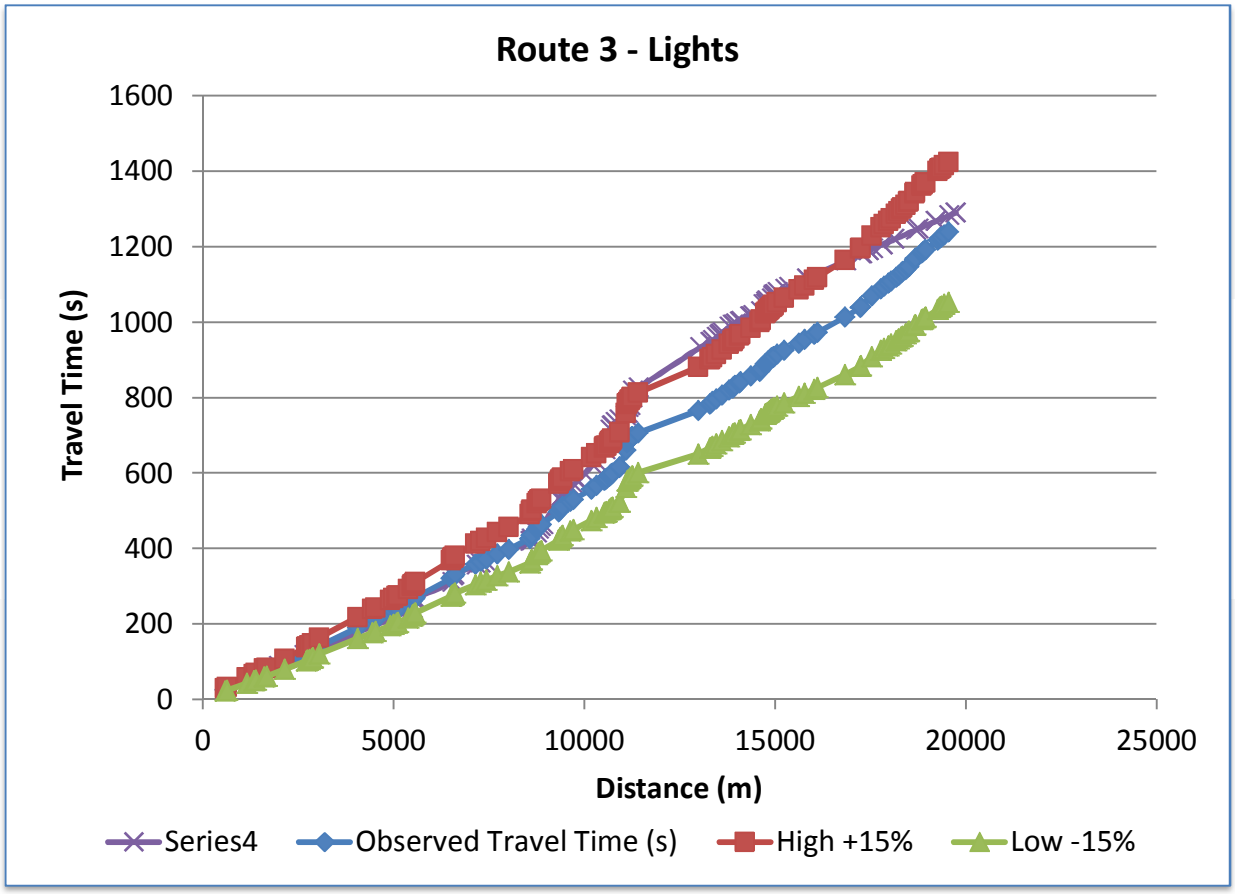
PM

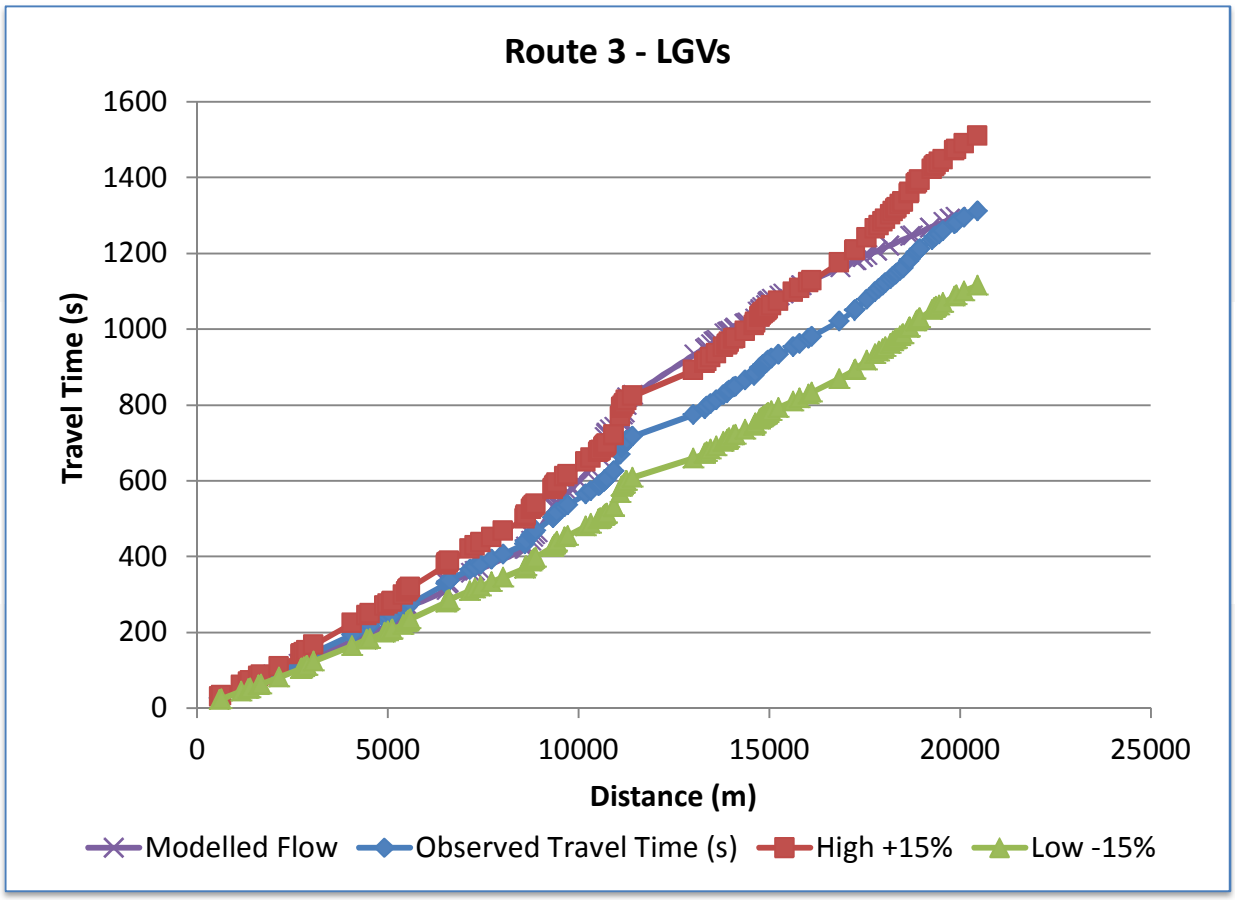

Route 1 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

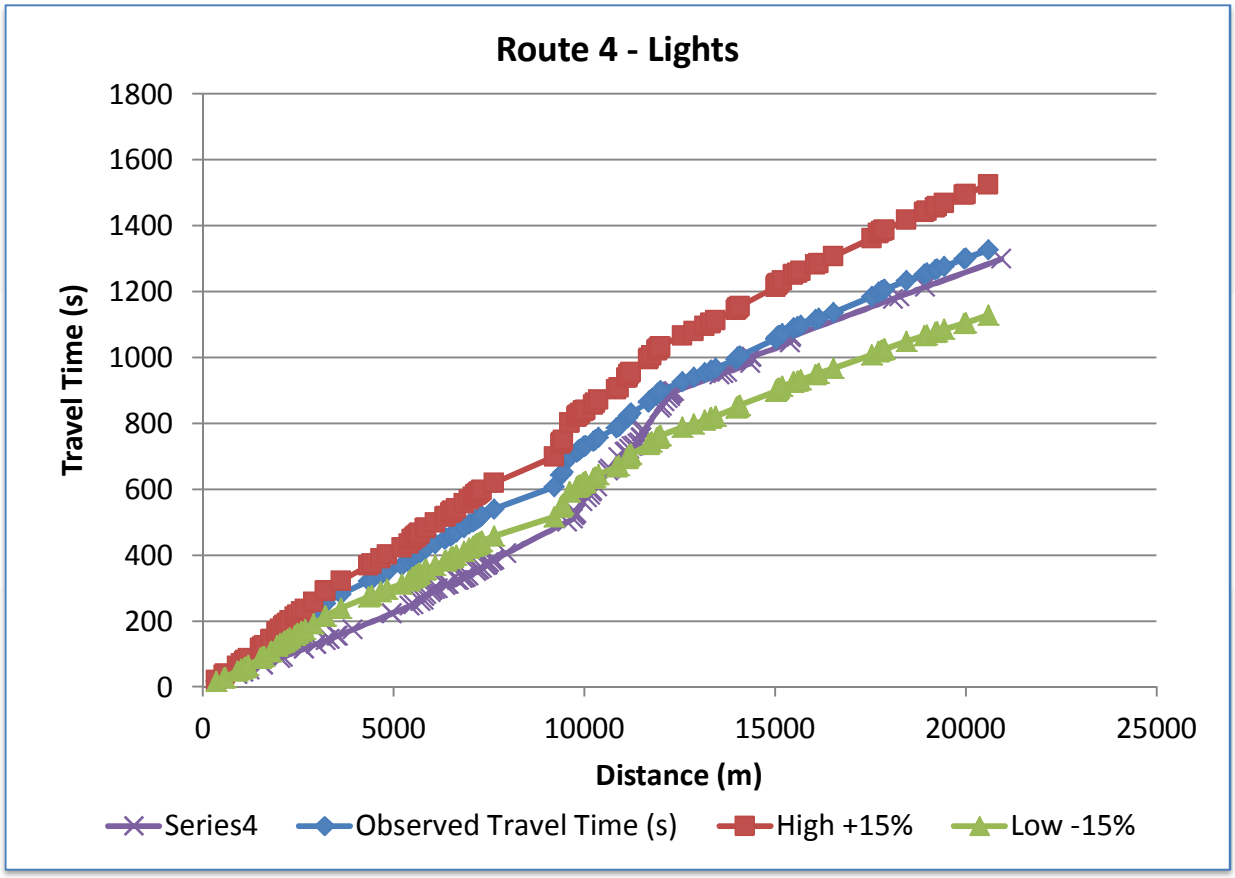

Route 1 - LGVs
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

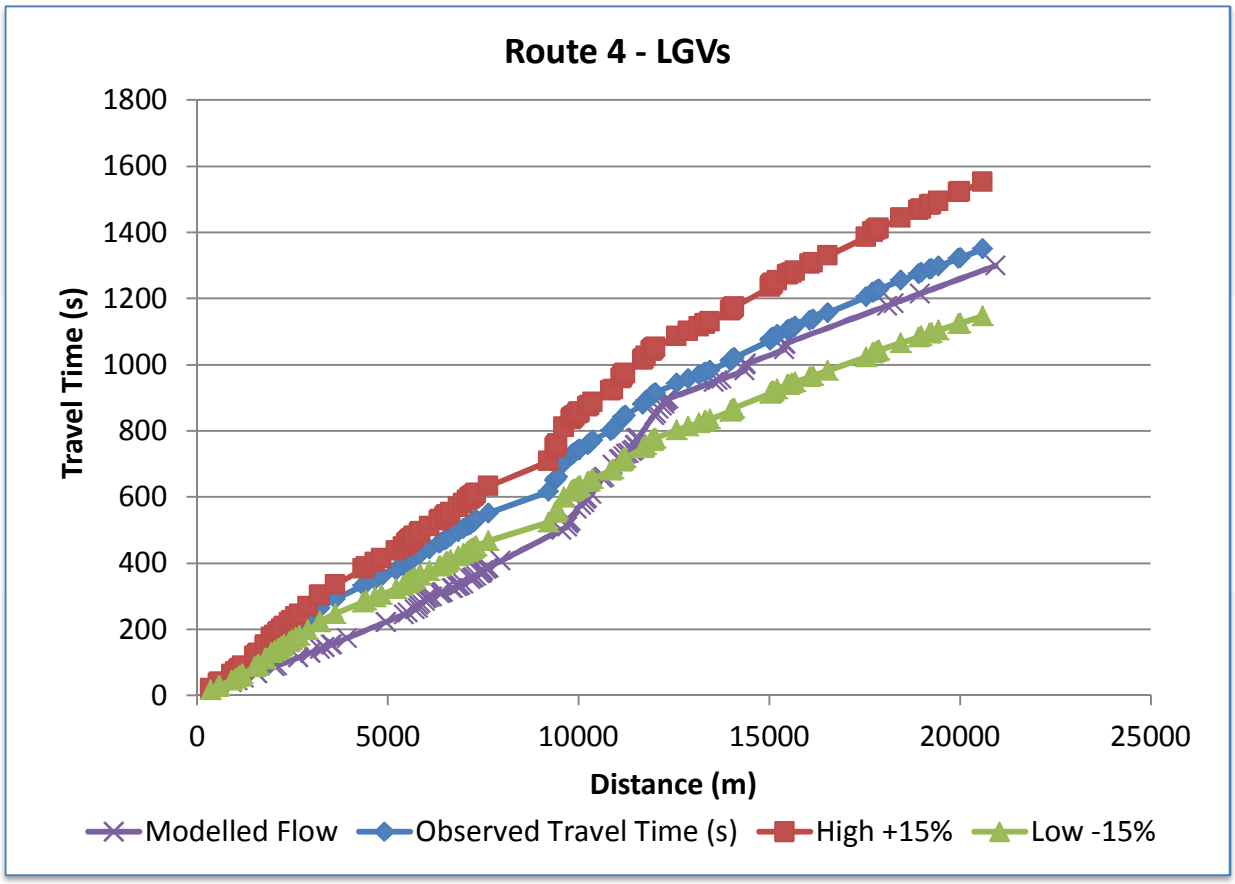

Route 2 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

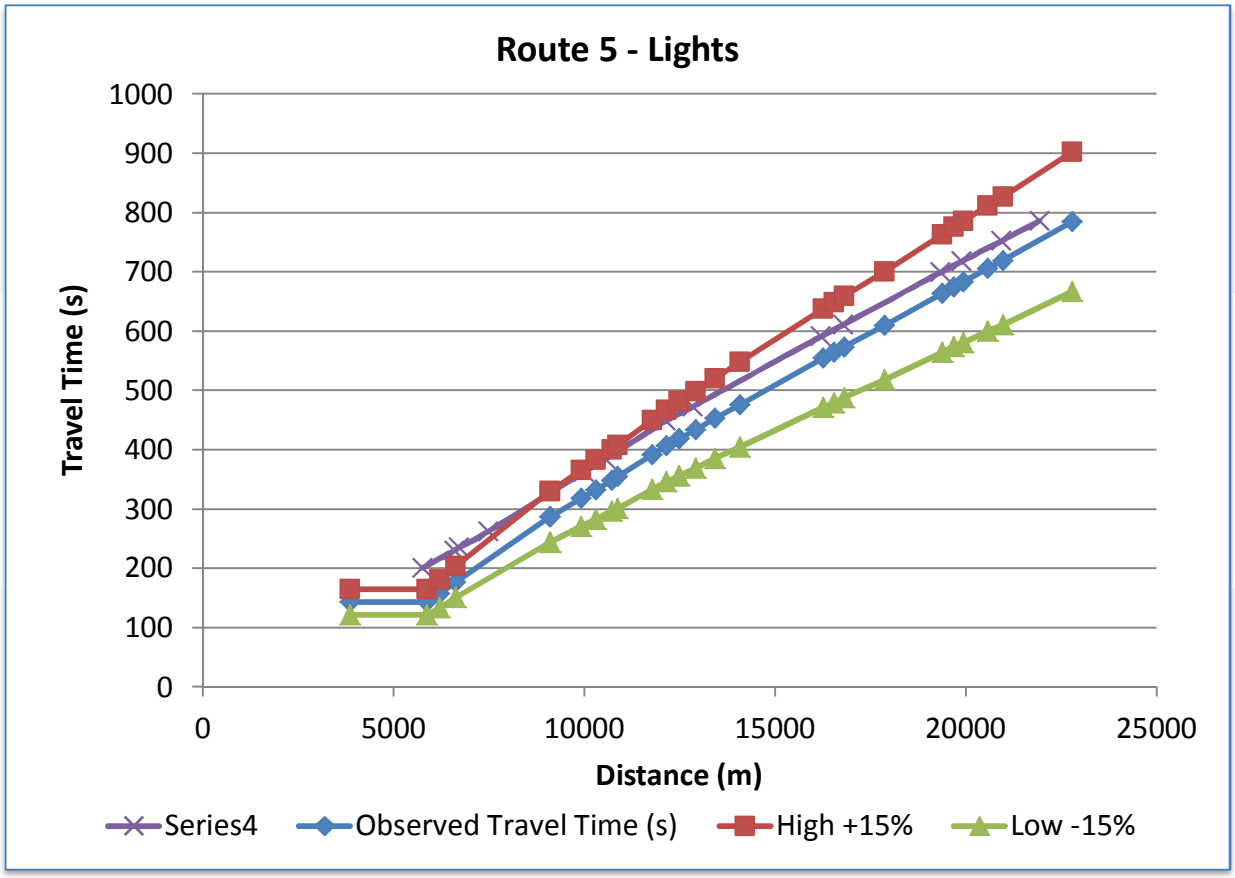

Route 2 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

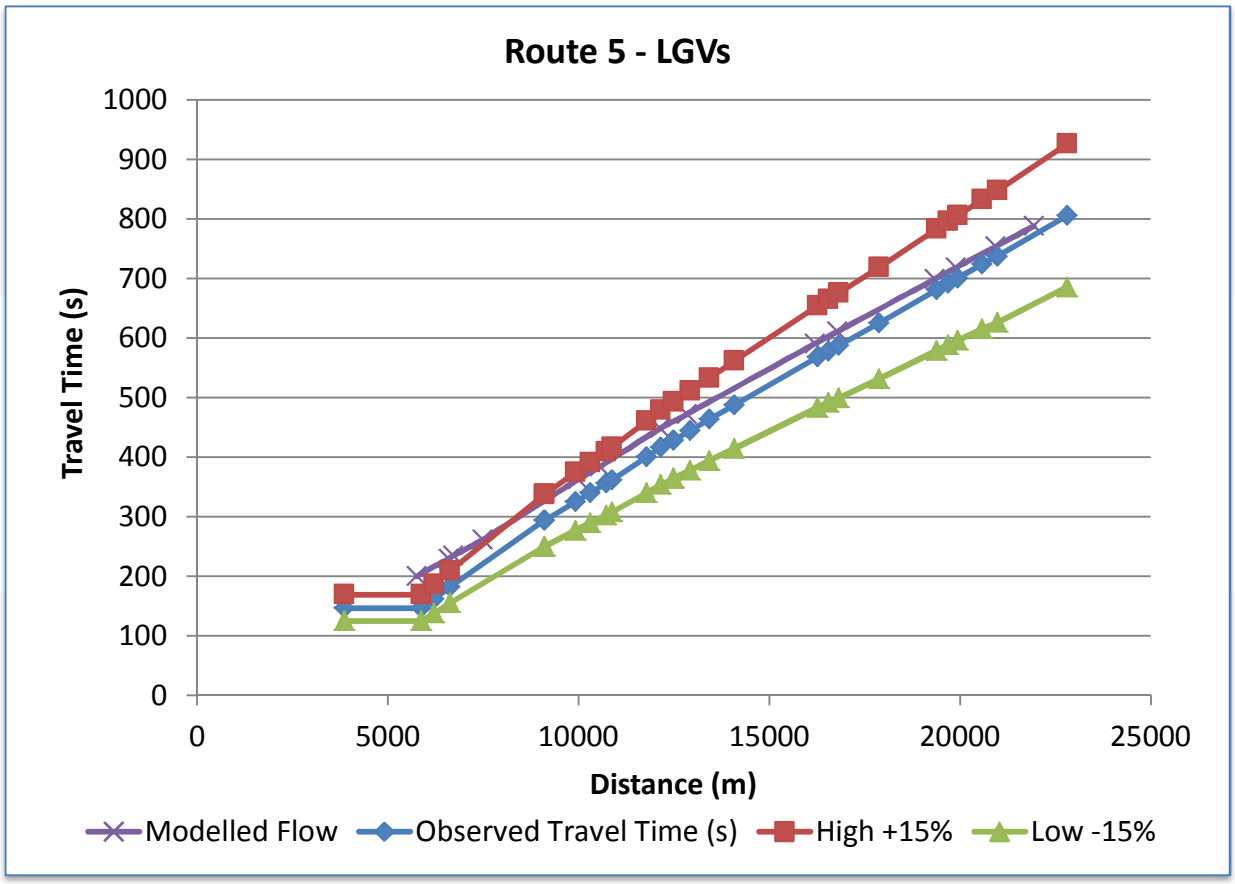

Route 3 - Lights
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

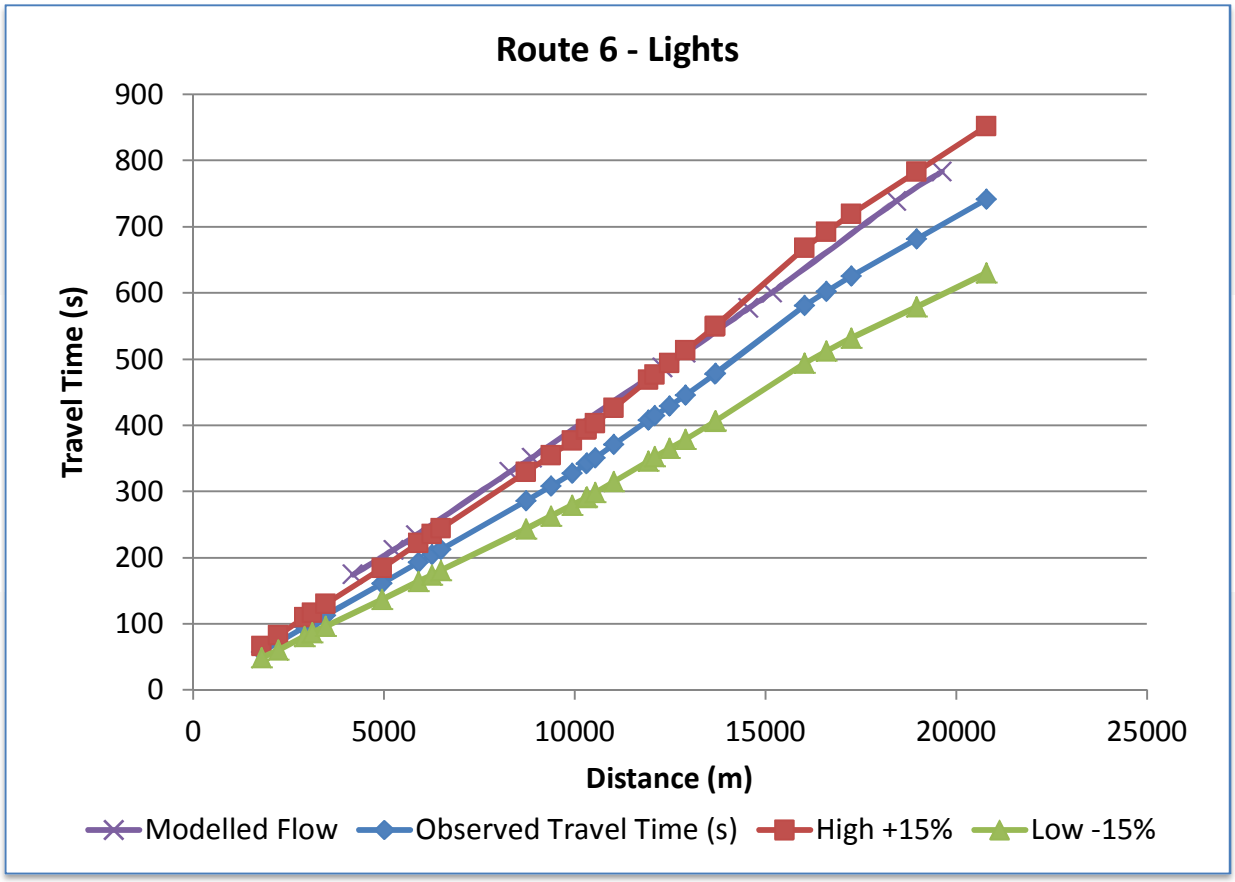

Route 3 - LGVs
Travel Time (s)
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

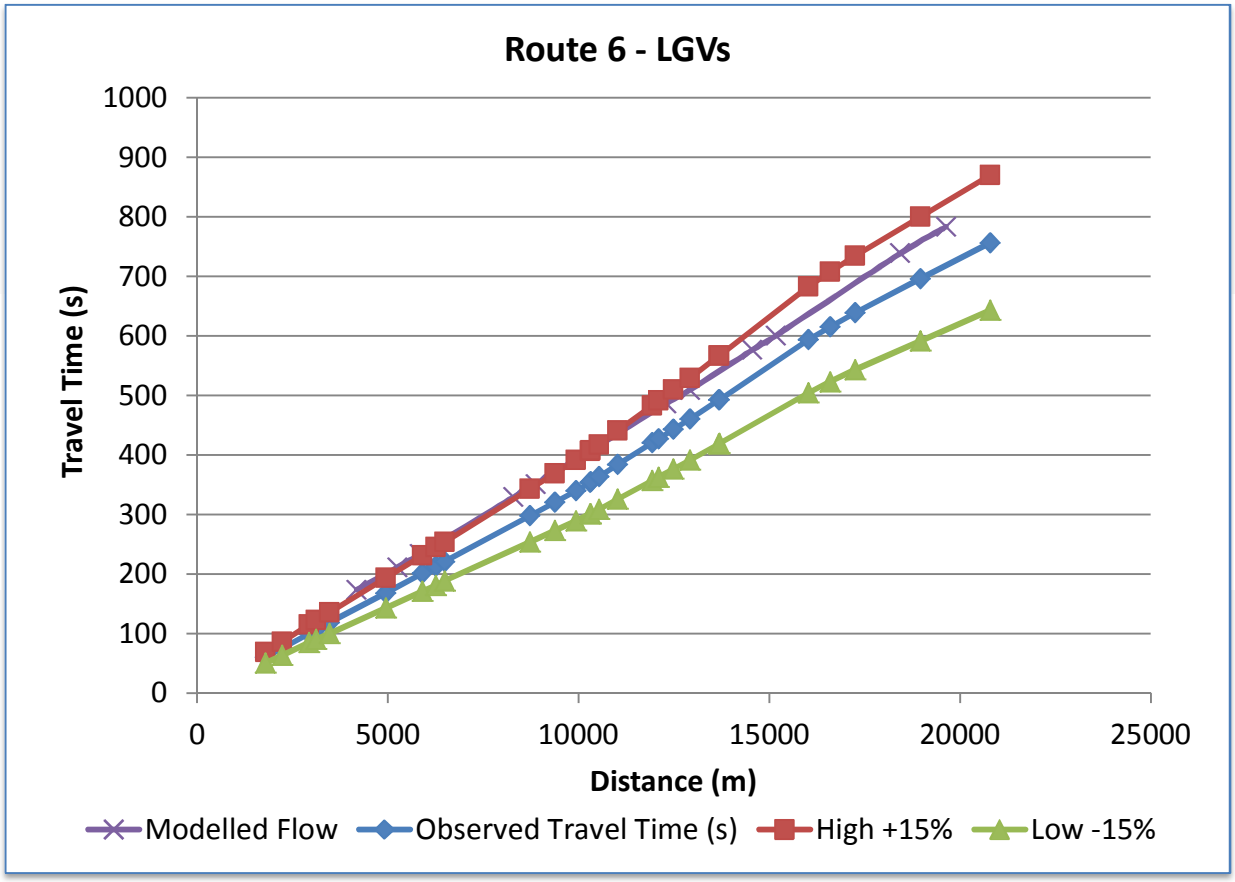

Route 4 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

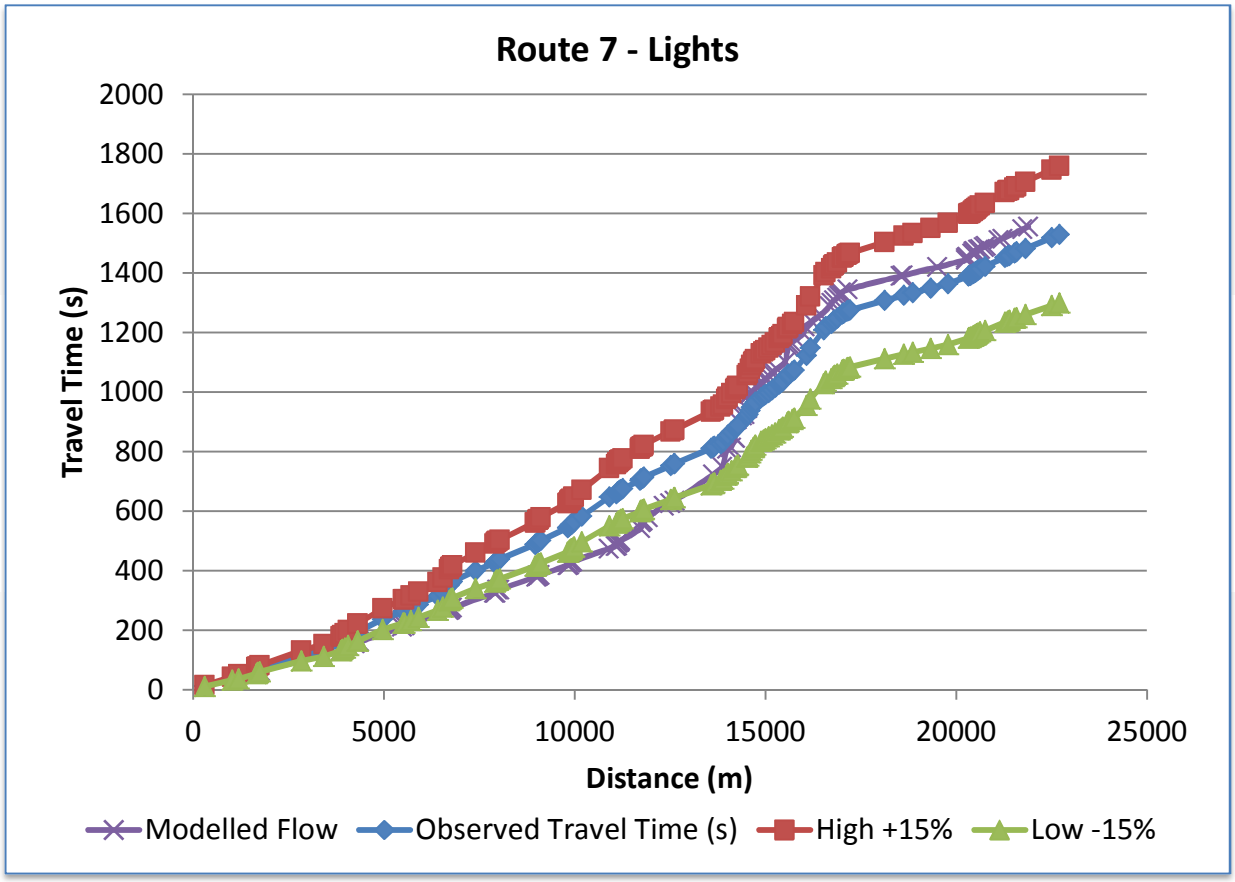

Route 4 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

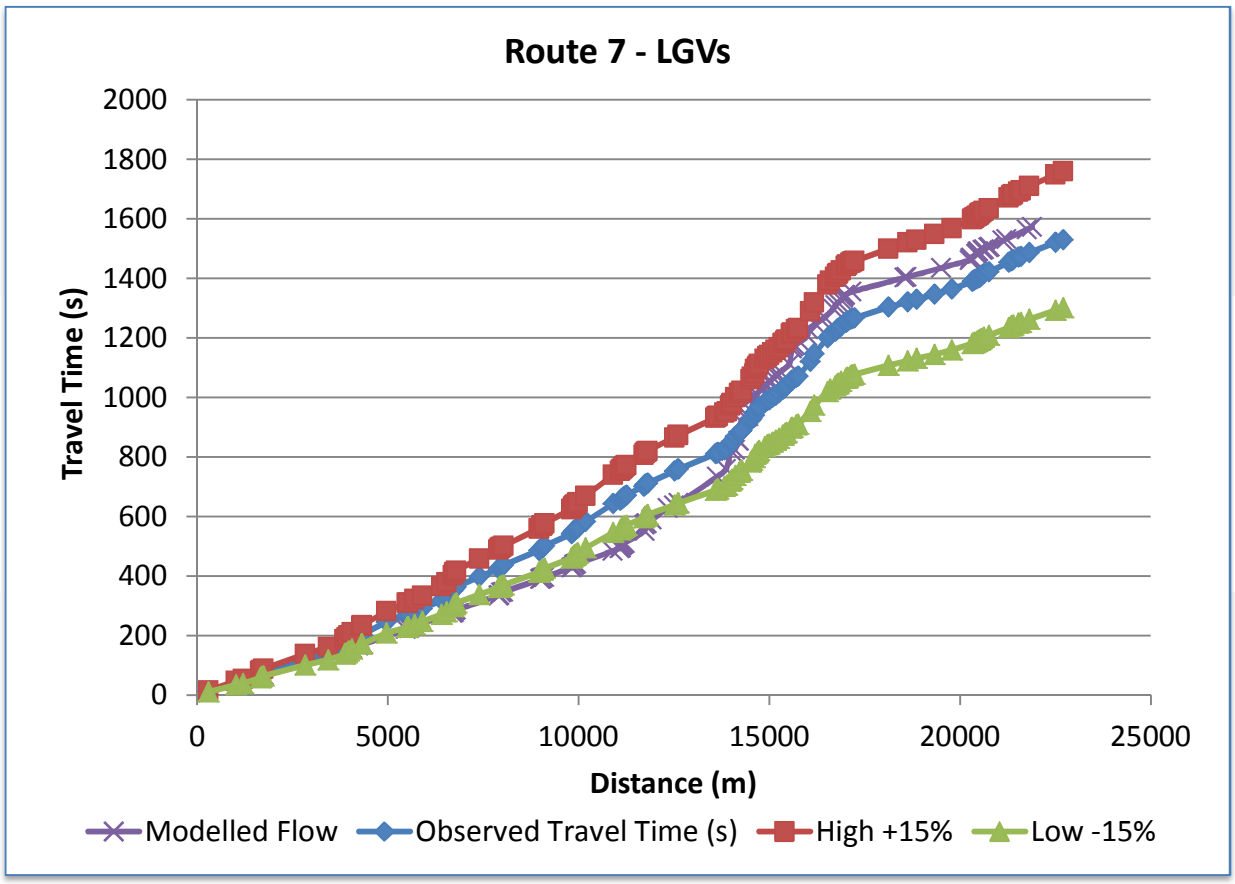

Route 5 - Lights
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Series4
Observed Travel Time (s)
High +15%
Low -15%

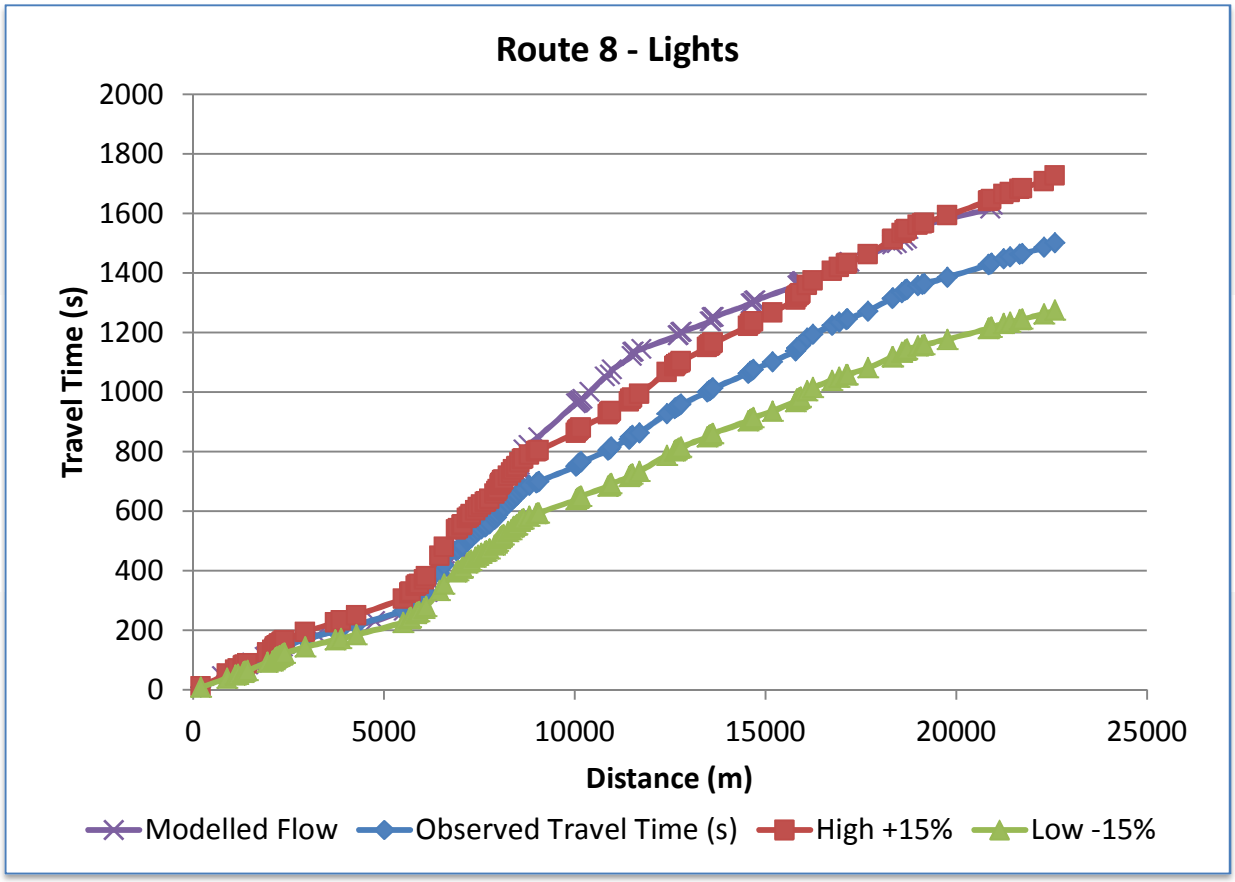

Route 5 - LGVs
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

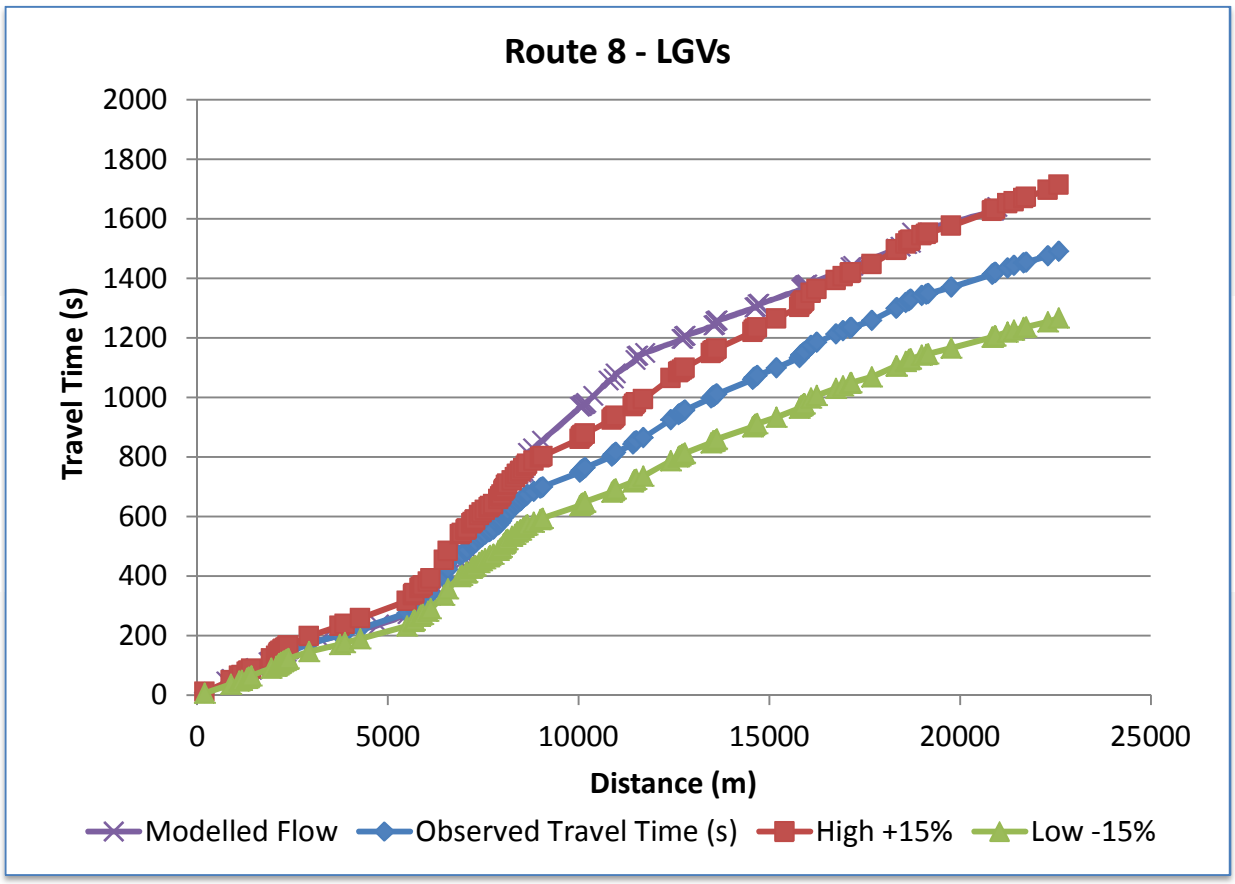

Route 6 - Lights
Travel Time (s)
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

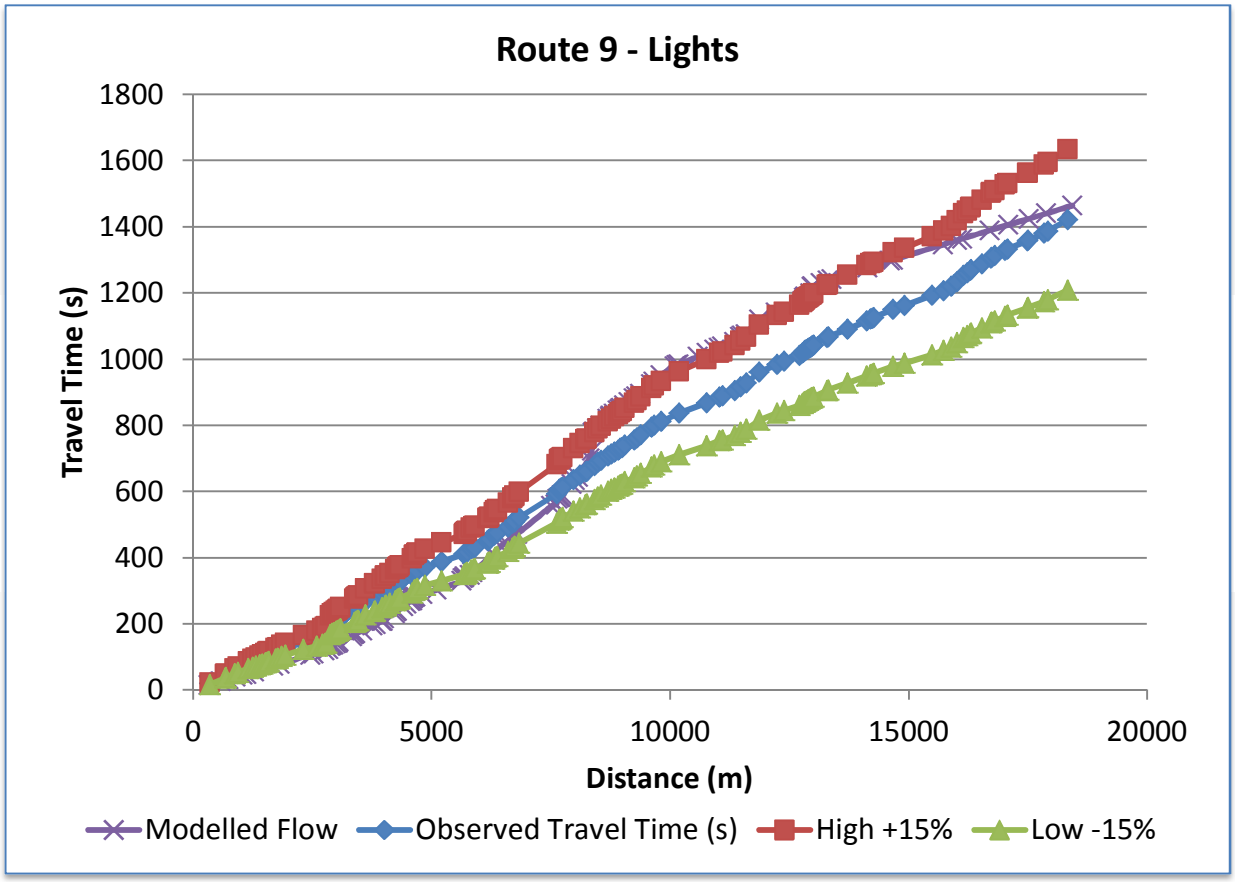

Route 6 - LGVs
Travel Time (s)
1000
900
800
700
600
500
400
300
200
100
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

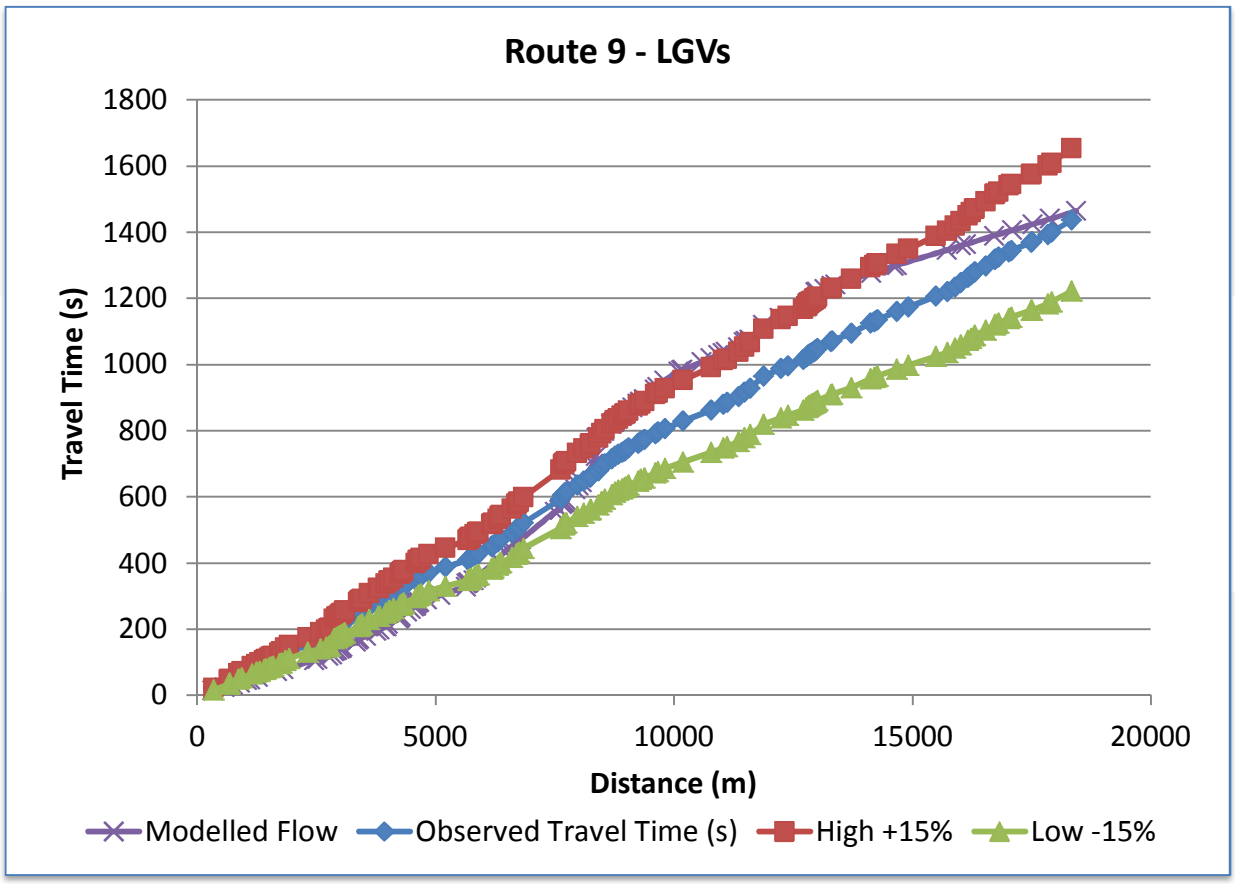

Route 7 - Lights
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

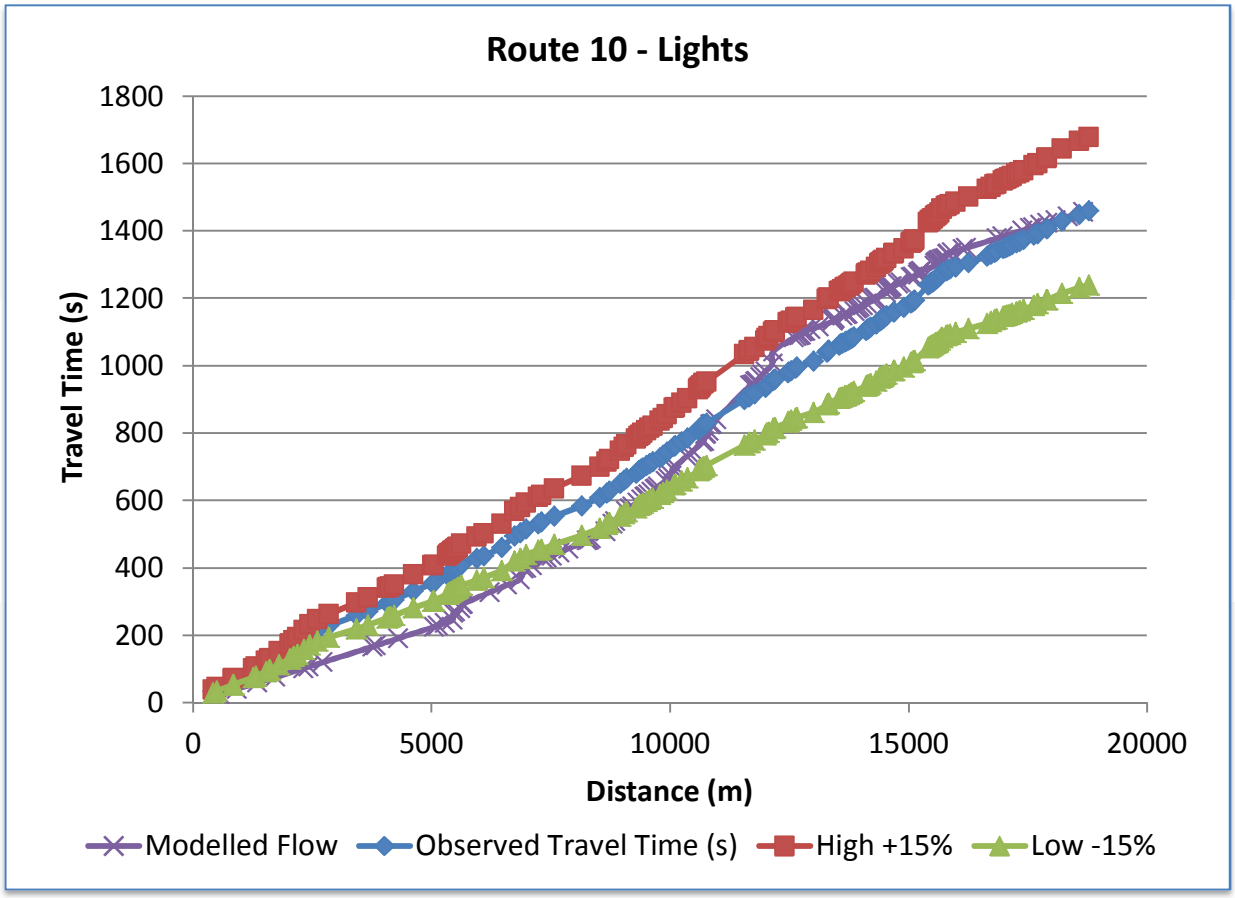

Route 7 - LGVs
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

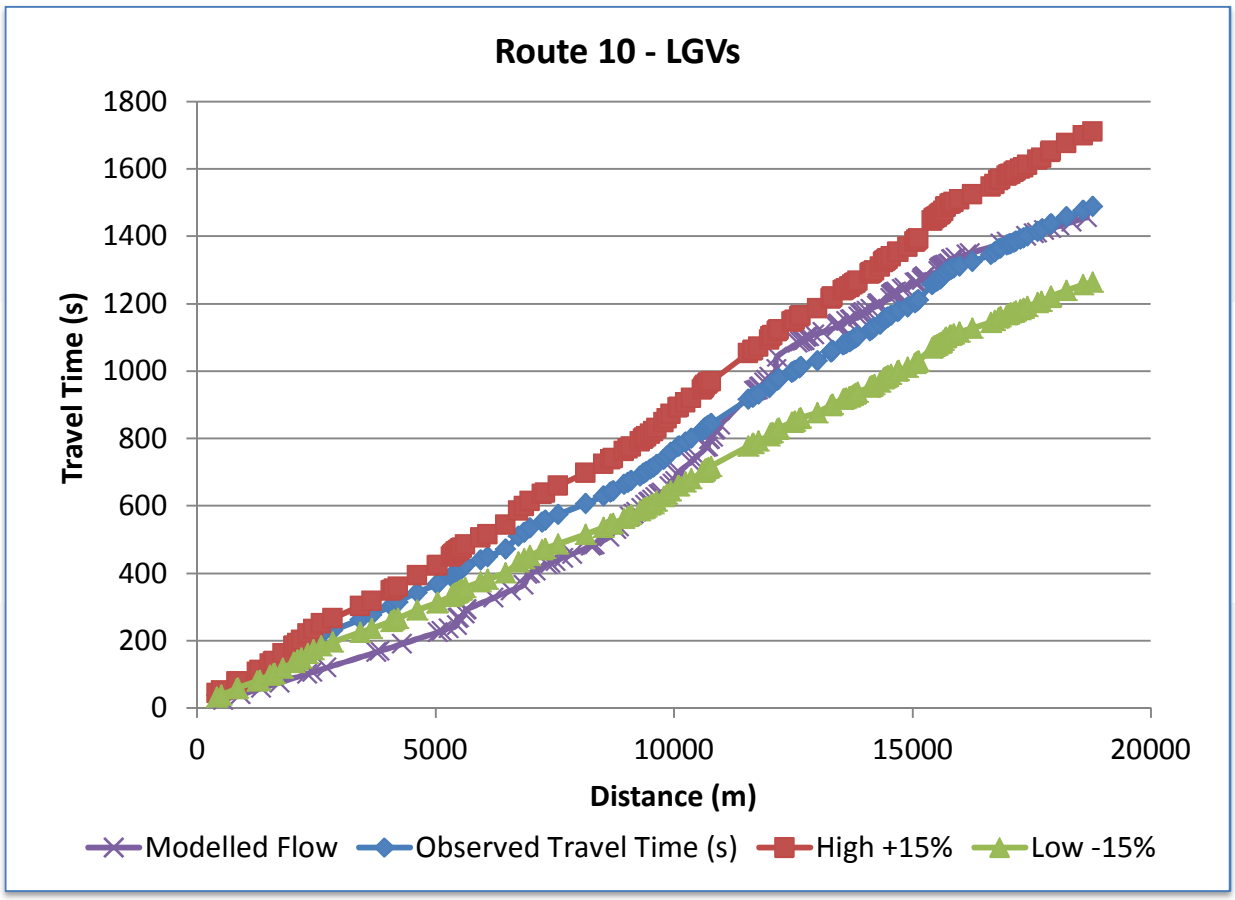

Route 8 - Lights
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

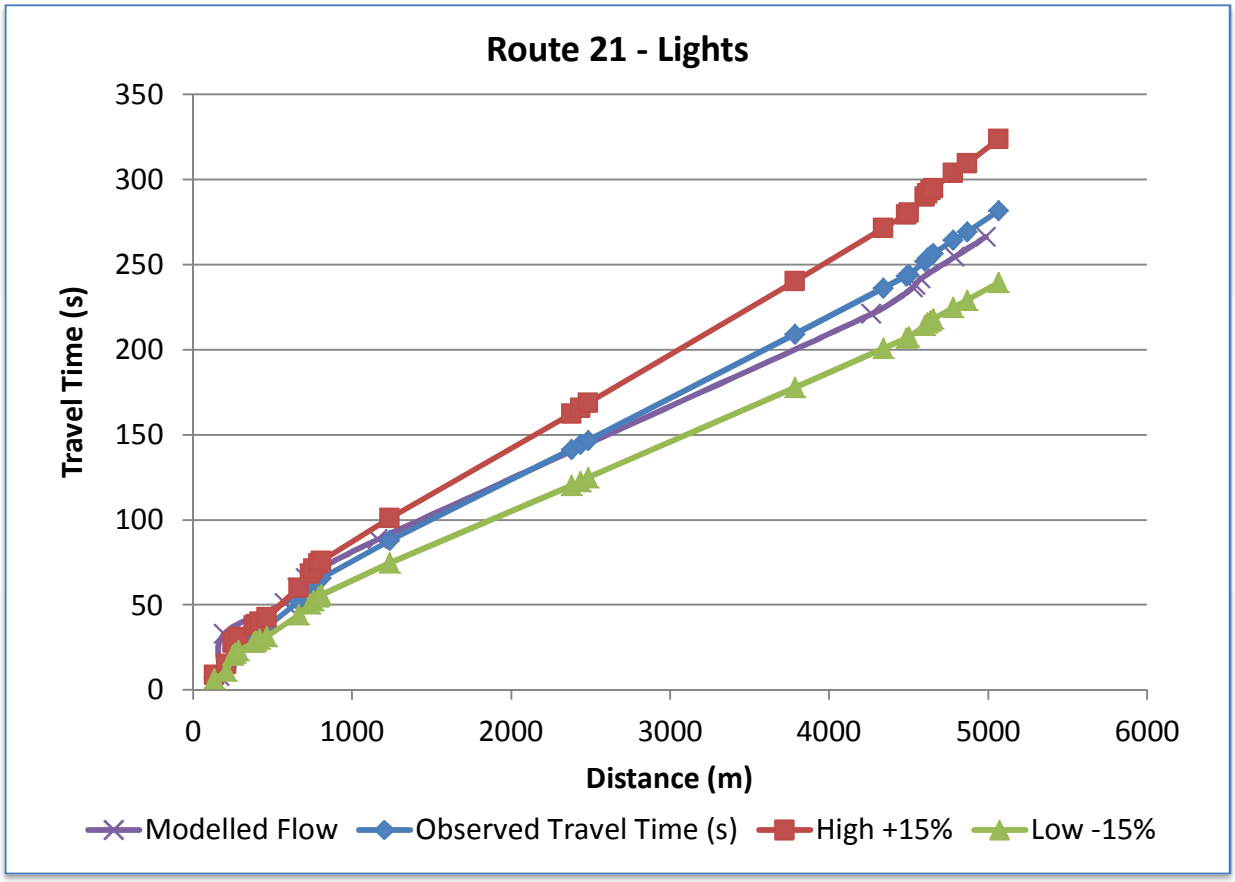

Route 8 - LGVs
Travel Time (s)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

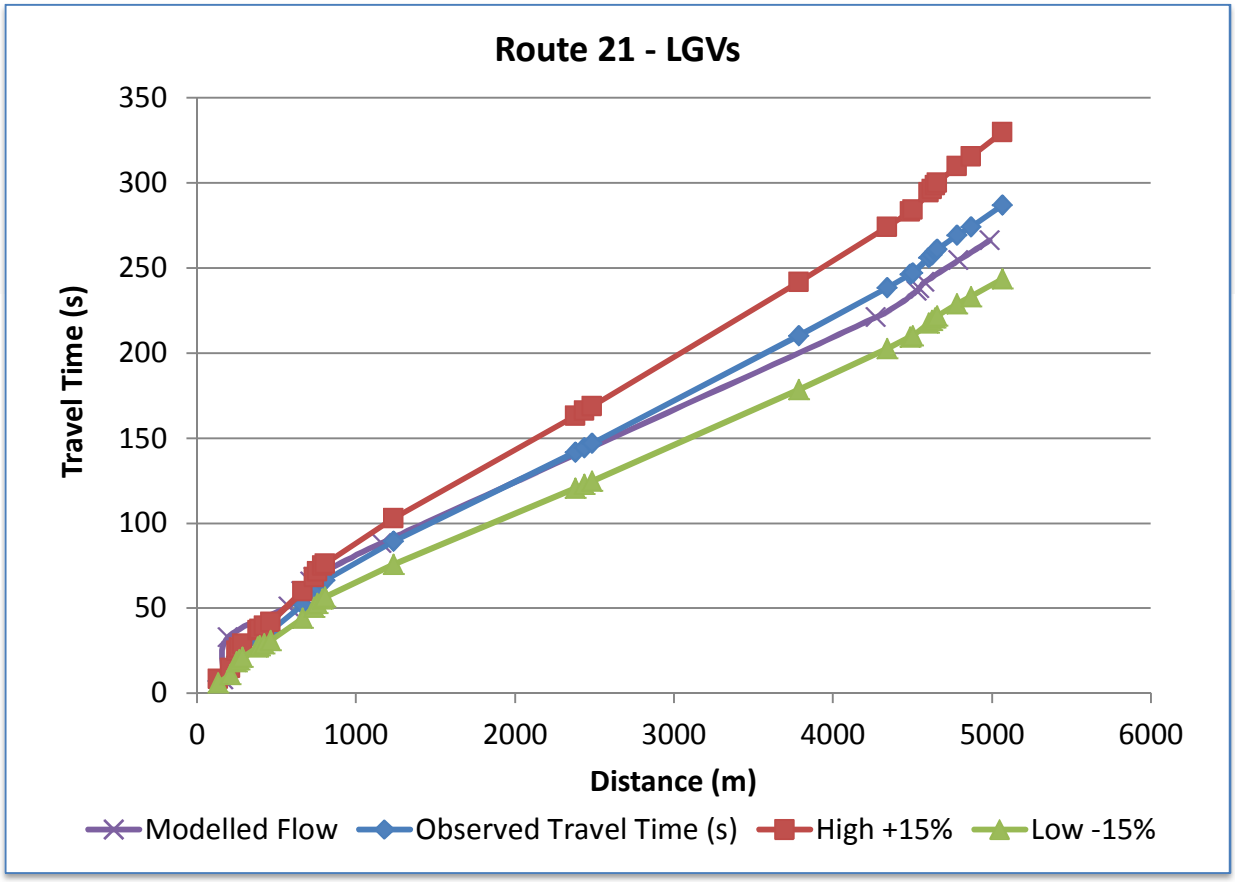

Route 9 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

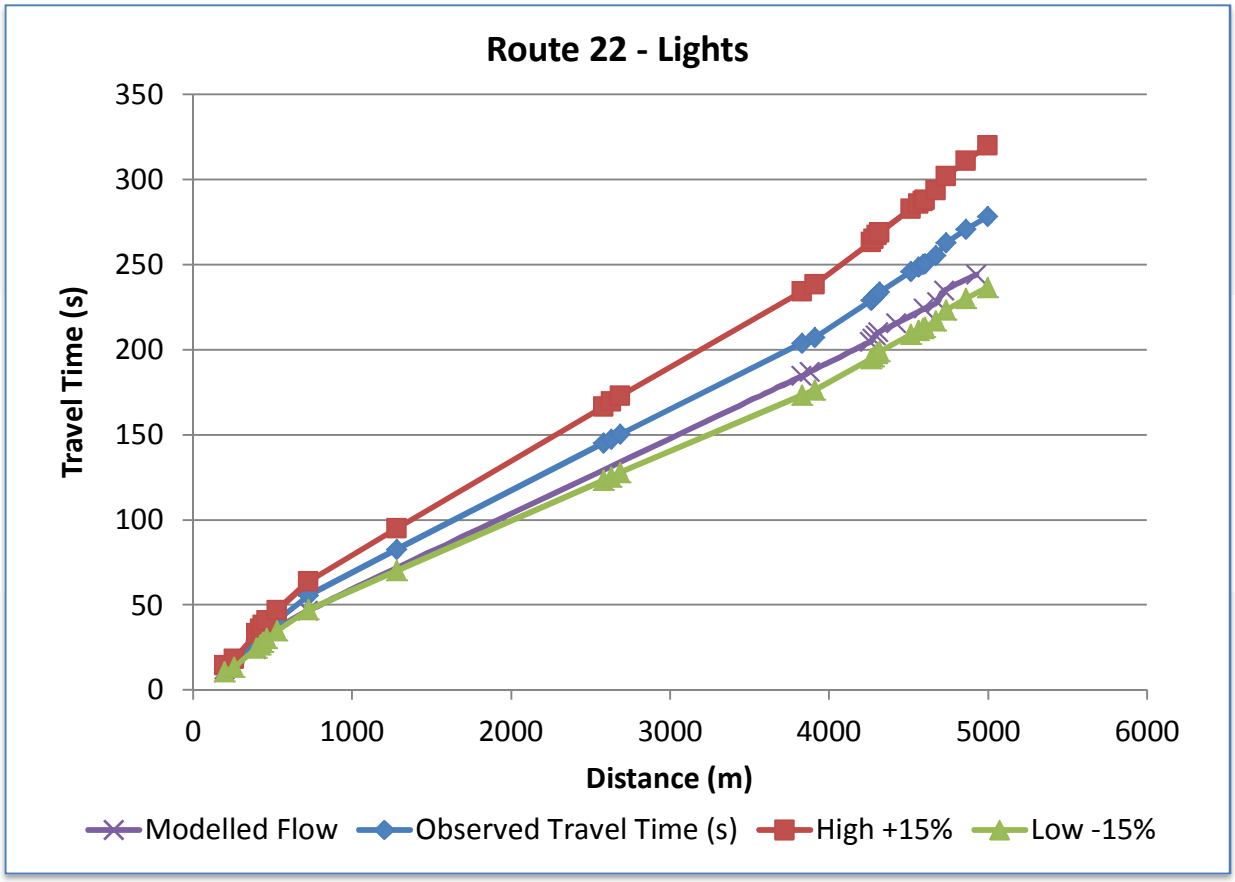

Route 9 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

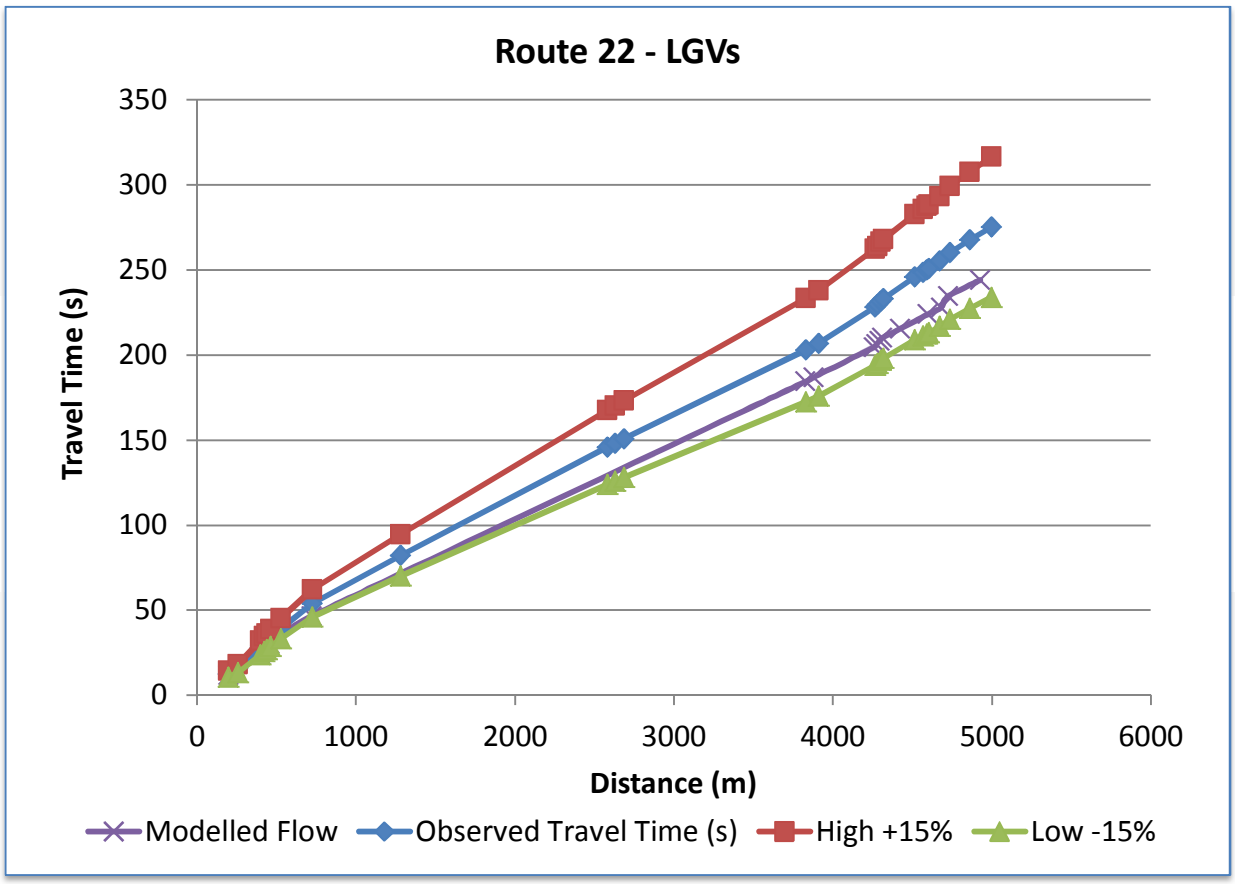

Route 10 - Lights
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

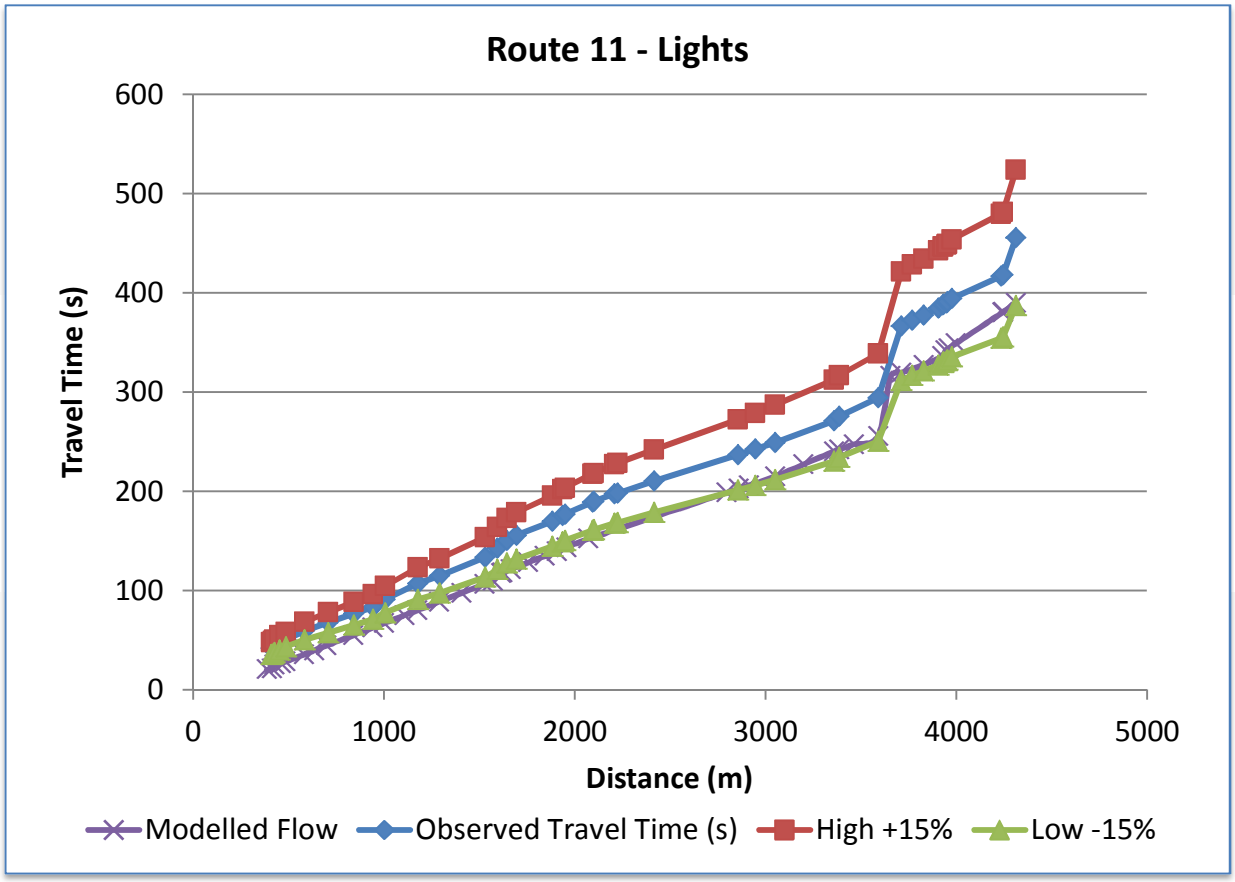

Route 10 - LGVs
Travel Time (s)
1800
1600
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

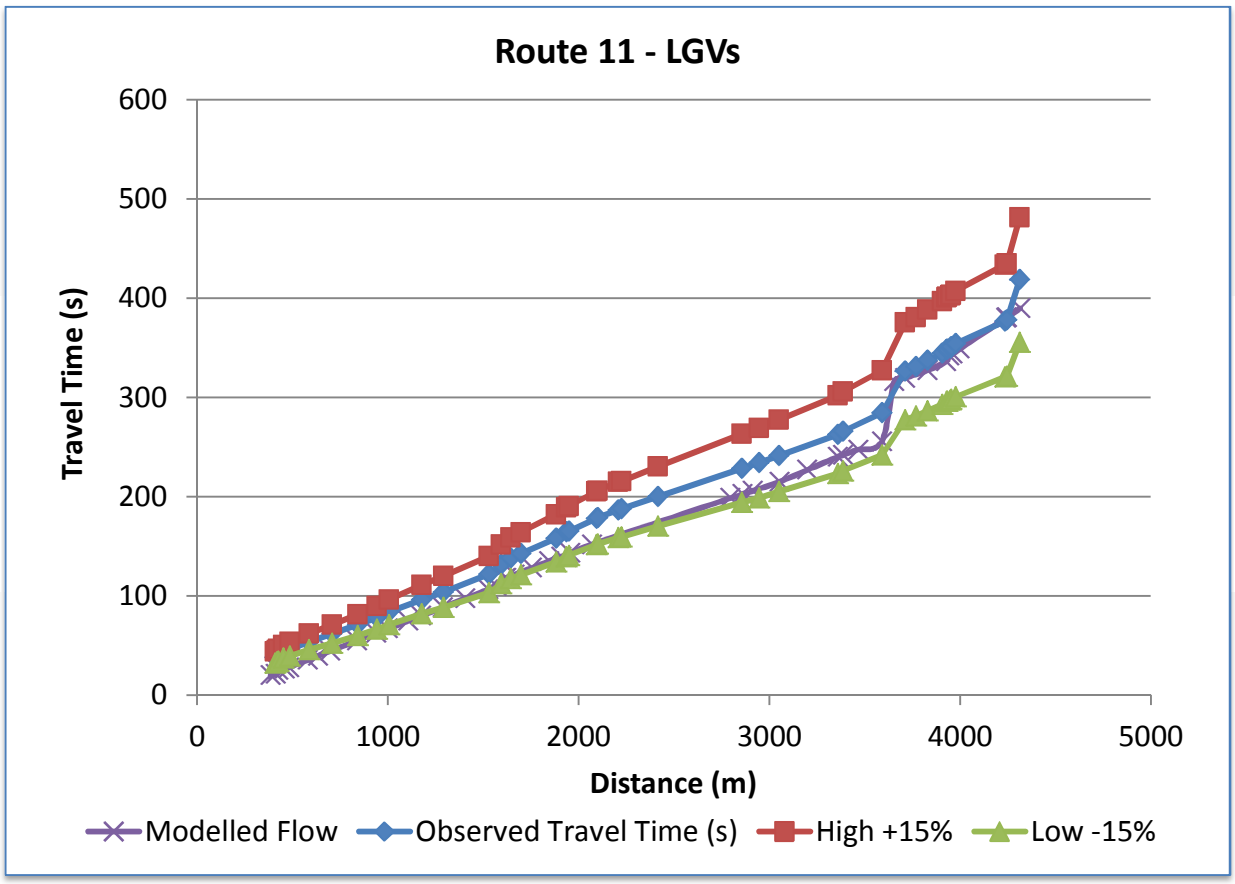

Route 21 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

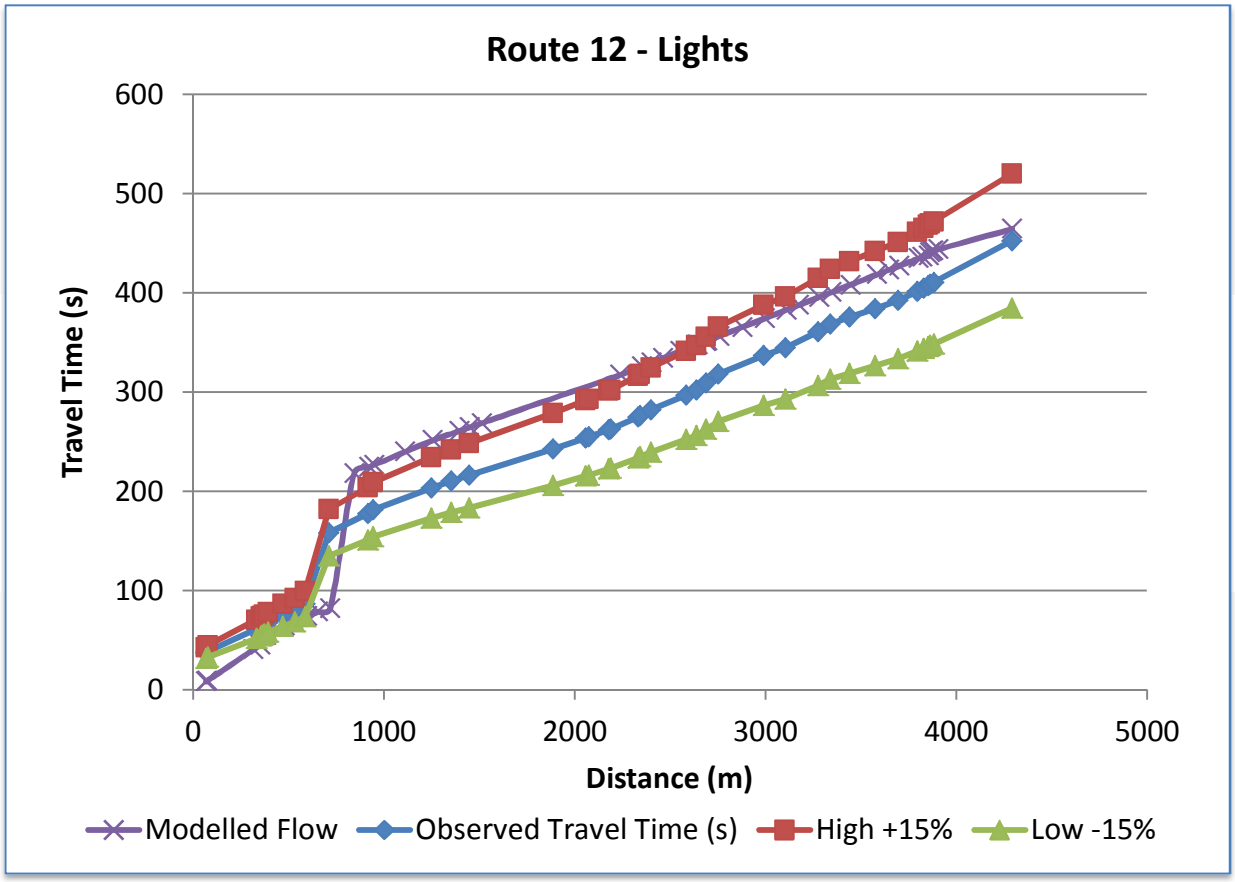

Route 21 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

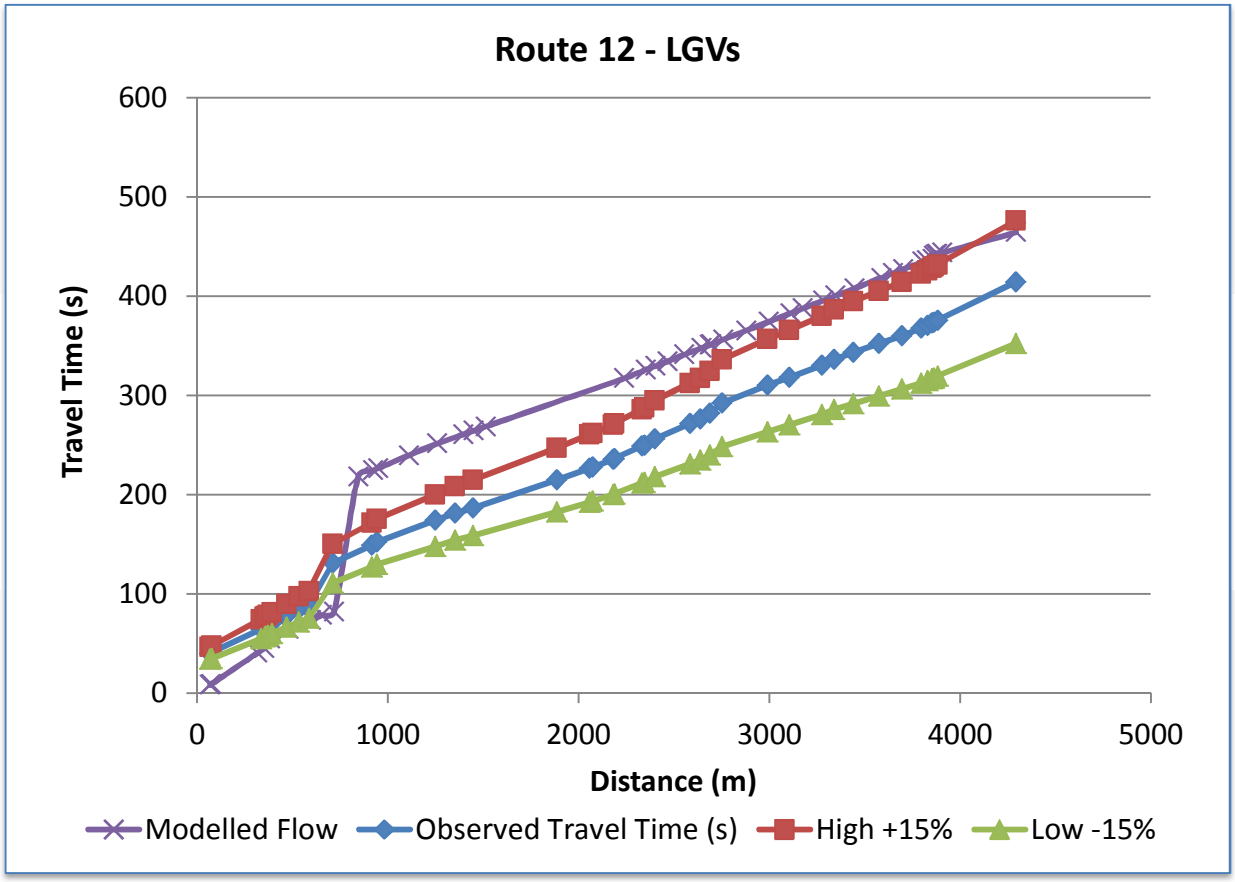

Route 22 - Lights
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

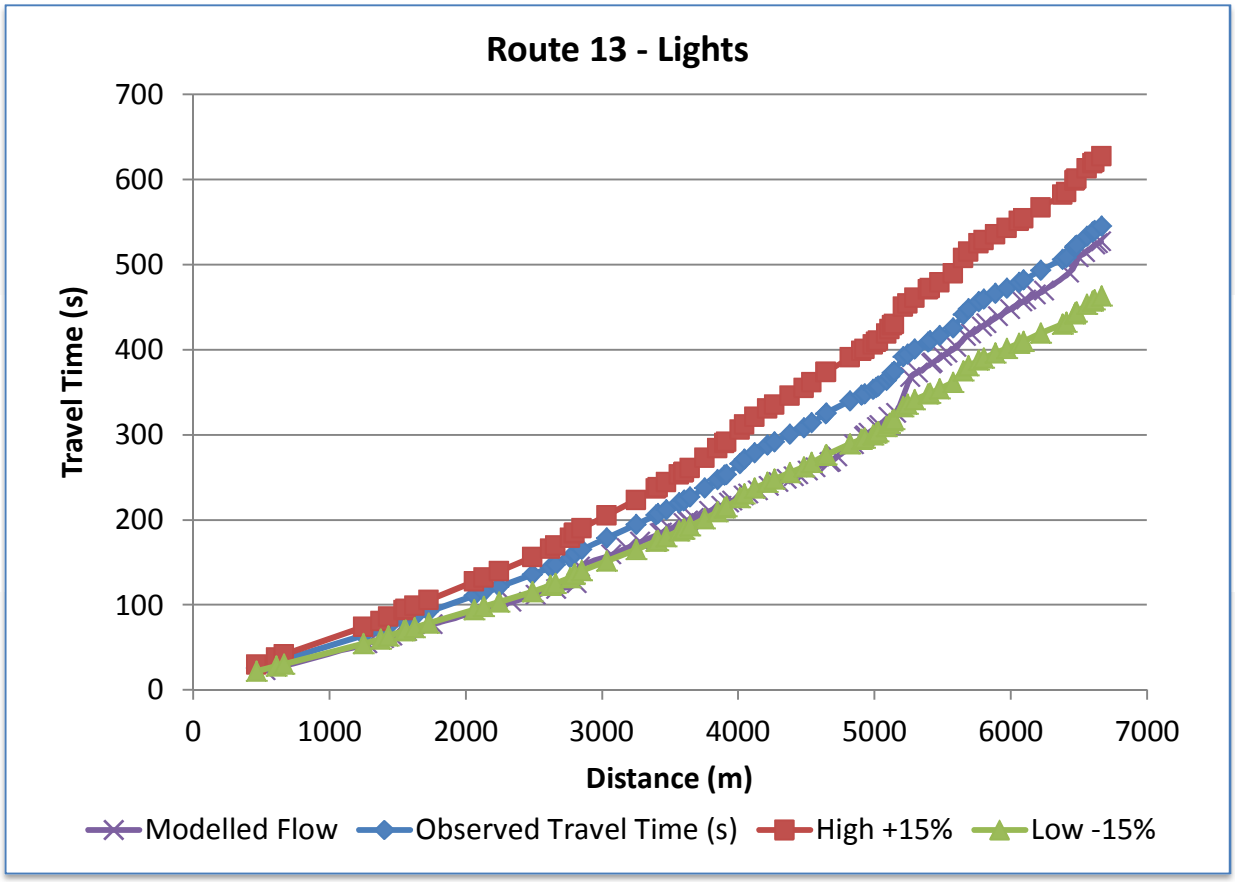

Route 22 - LGVs
Travel Time (s)
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
6000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

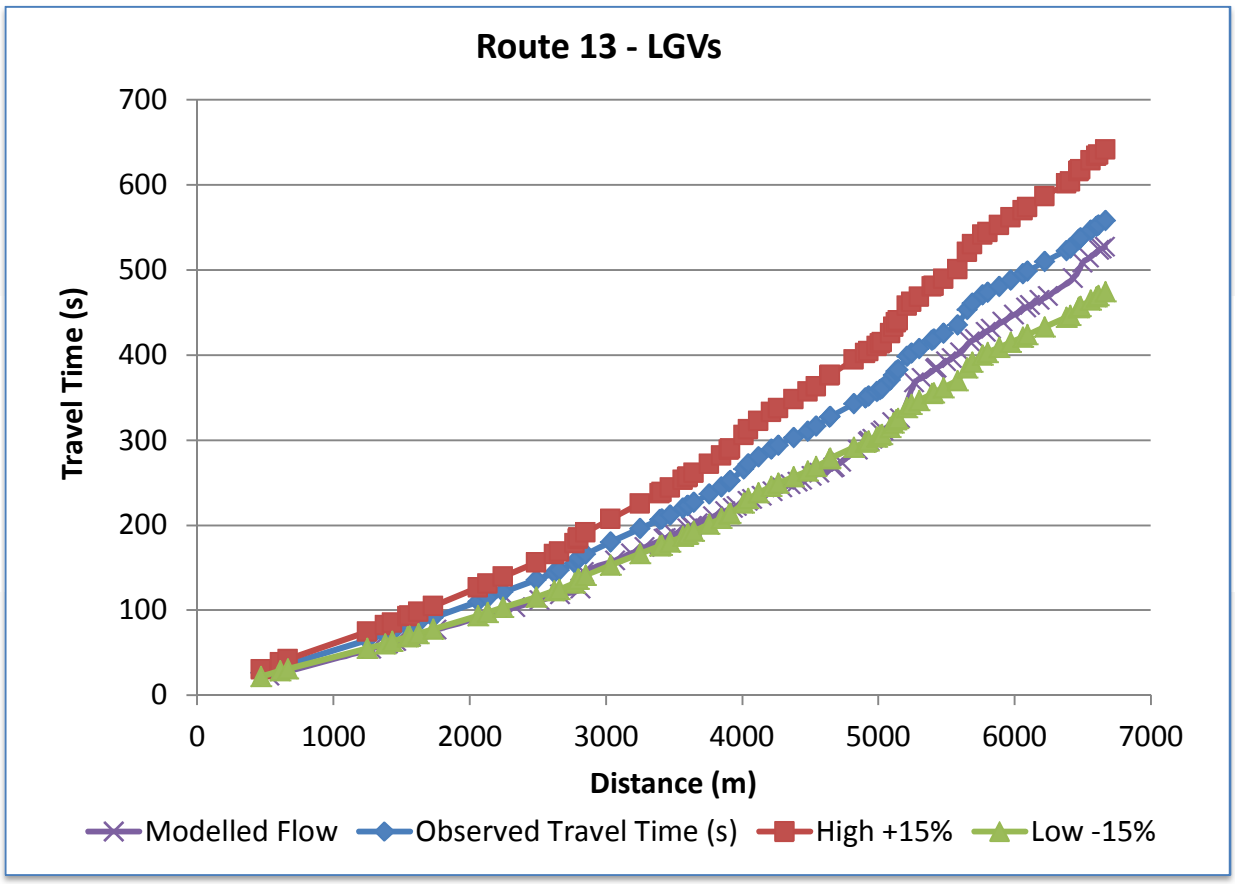

Route 11 - Lights
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

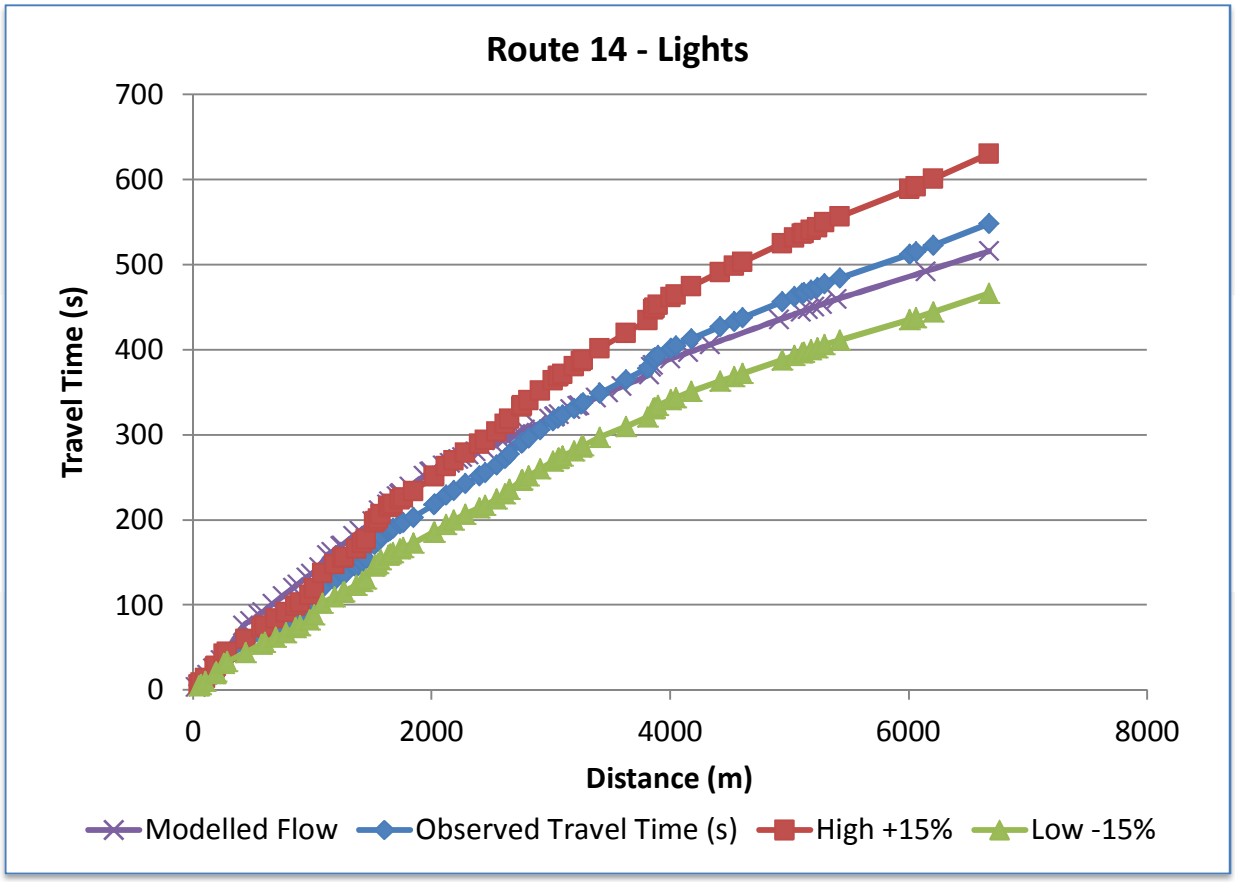

Route 11 - LGVs
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

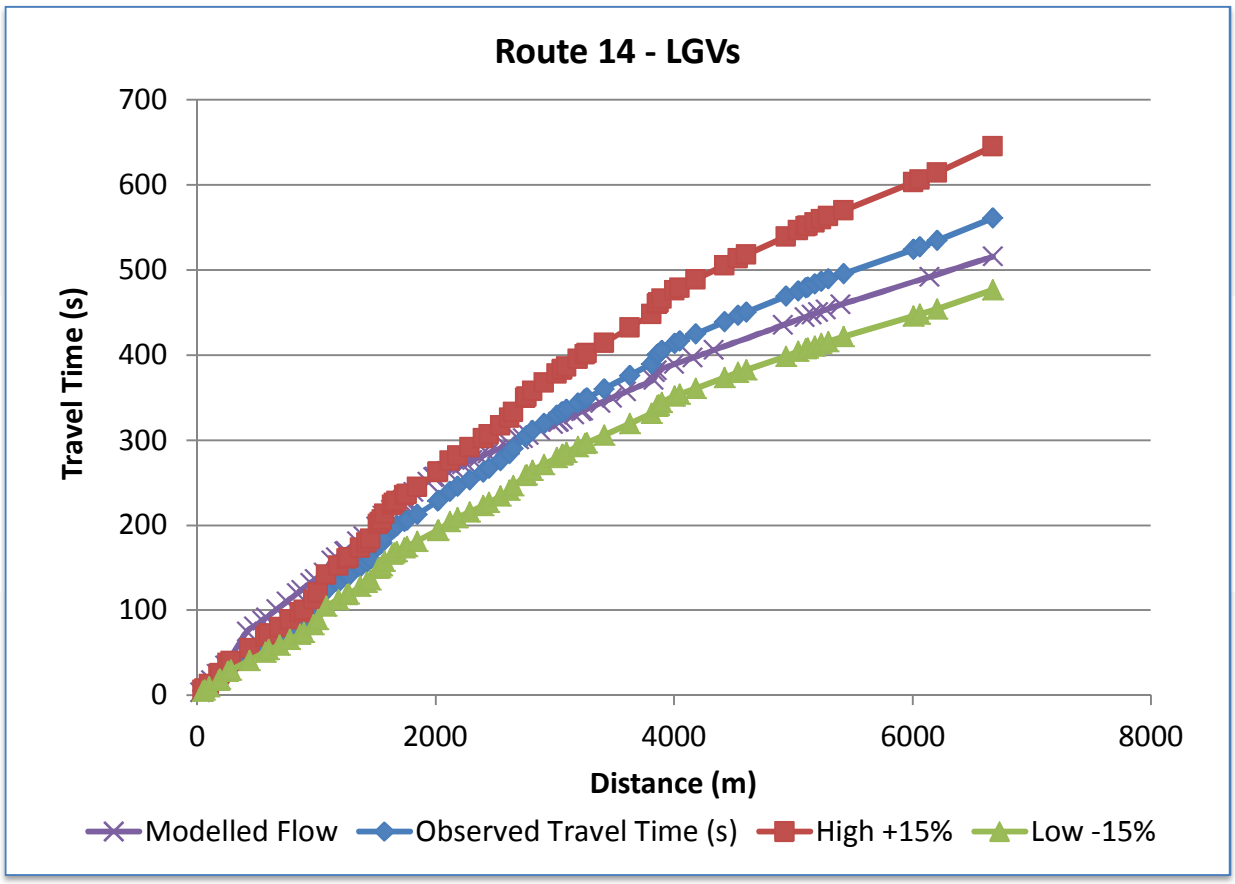

Route 12 - Lights
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

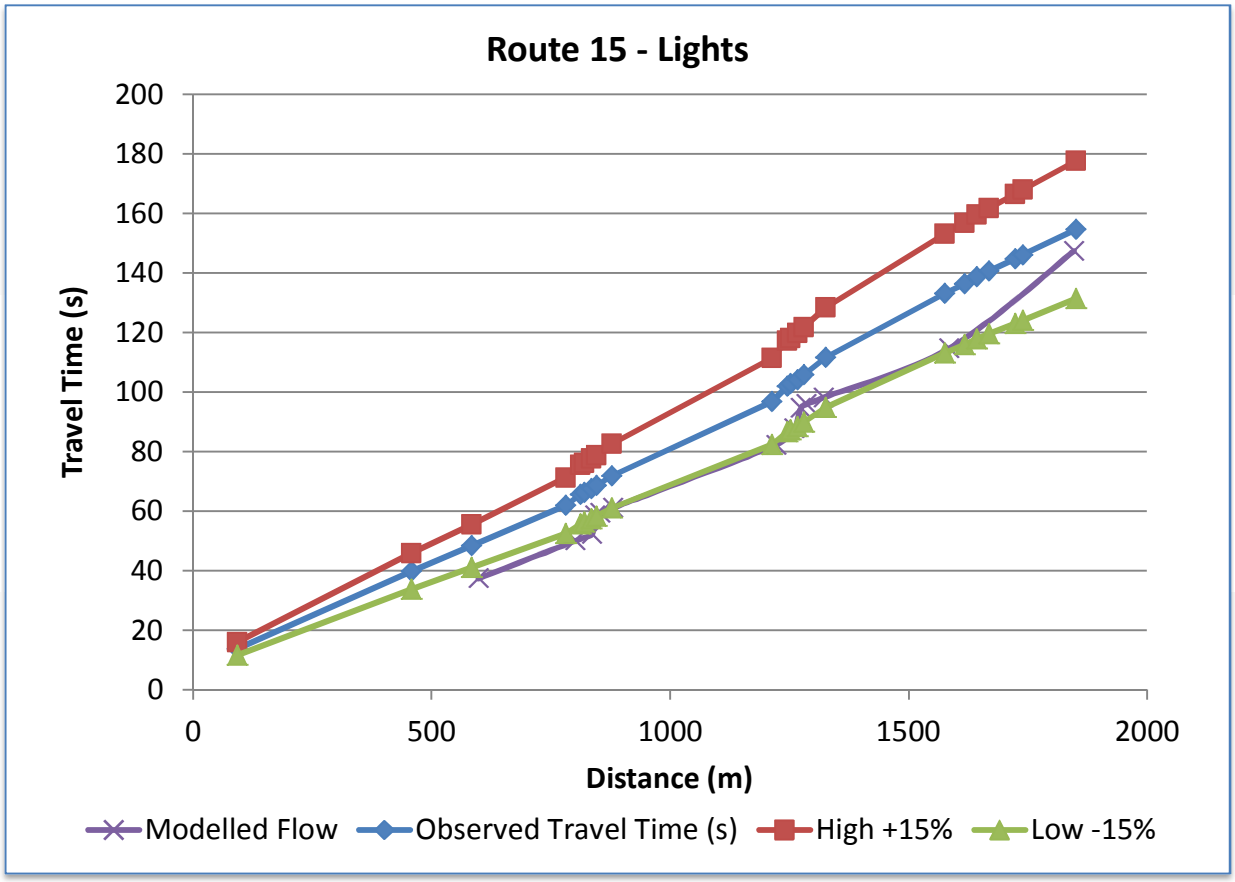

Route 12 - LGVs
Travel Time (s)
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

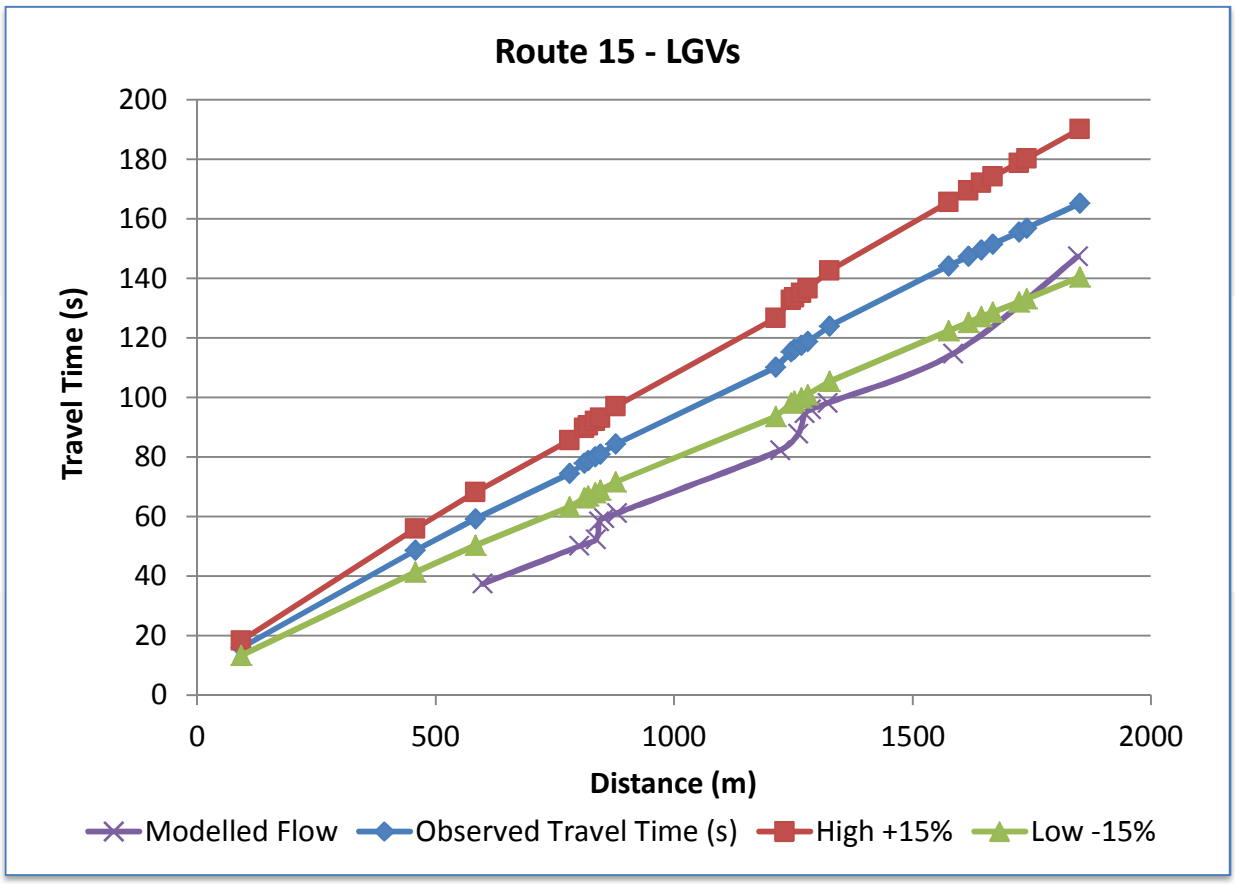

Route 13 - Lights
Travel Time (s)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

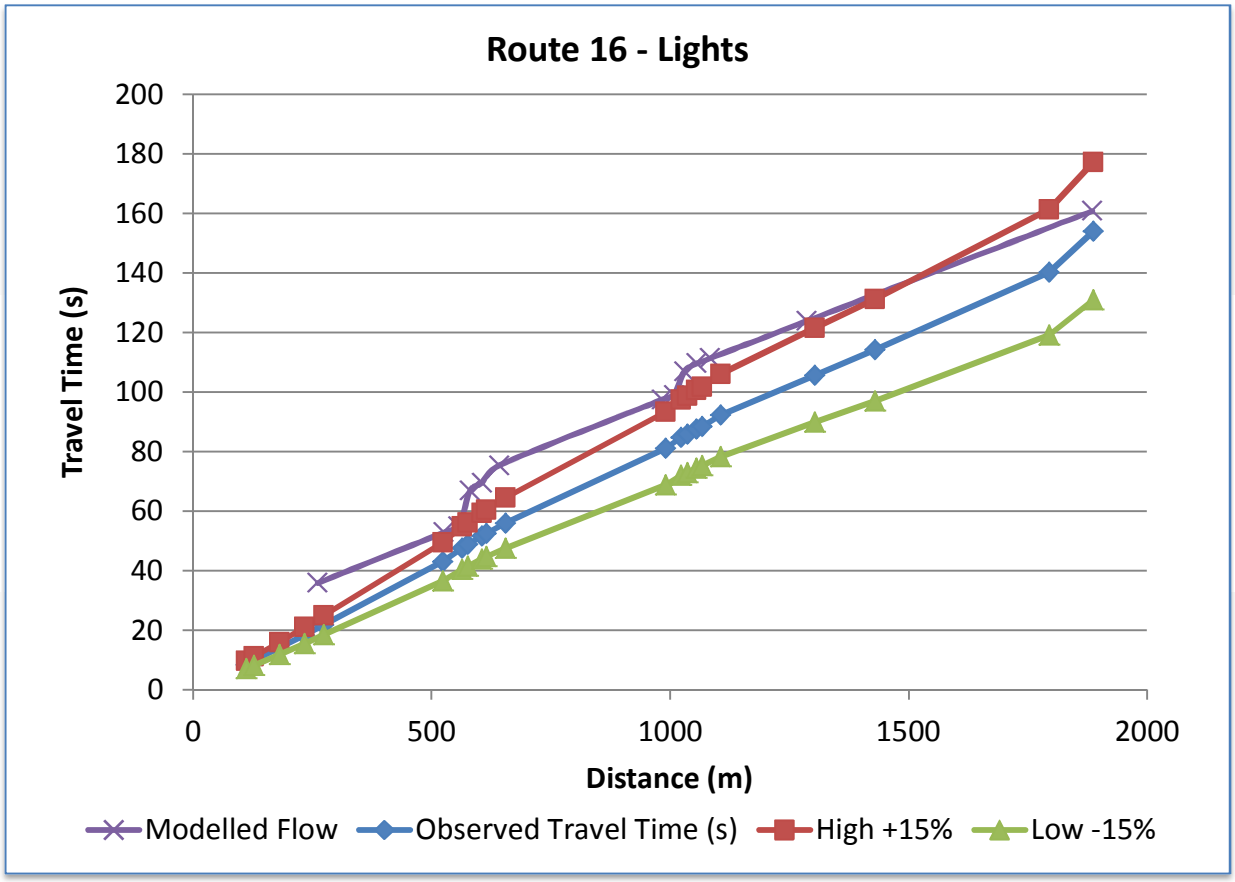

Route 13 - LGVs
Travel Time (s)
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

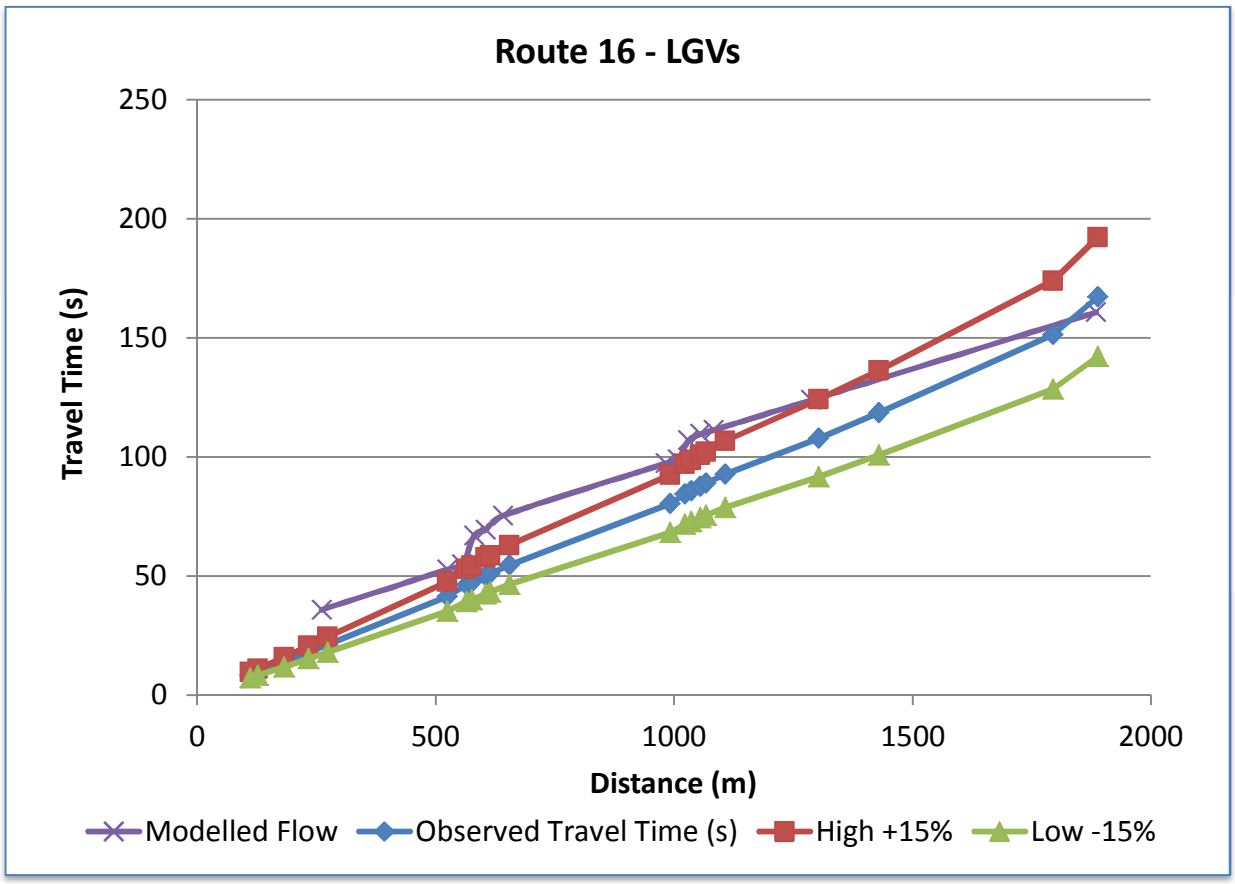

Route 14 - Lights
Travel Time (s)
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

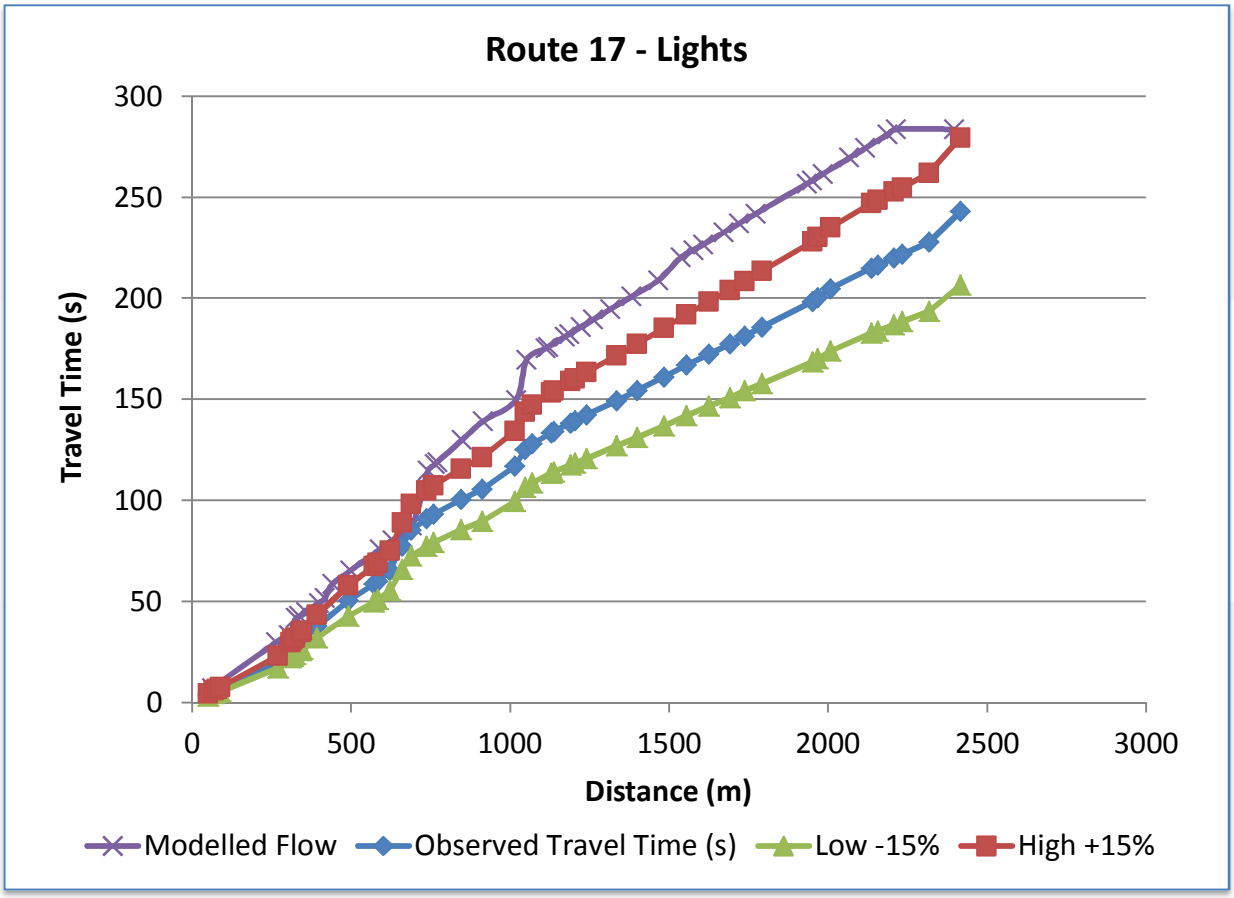

Route 14 - LGVs
Travel Time (s)
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

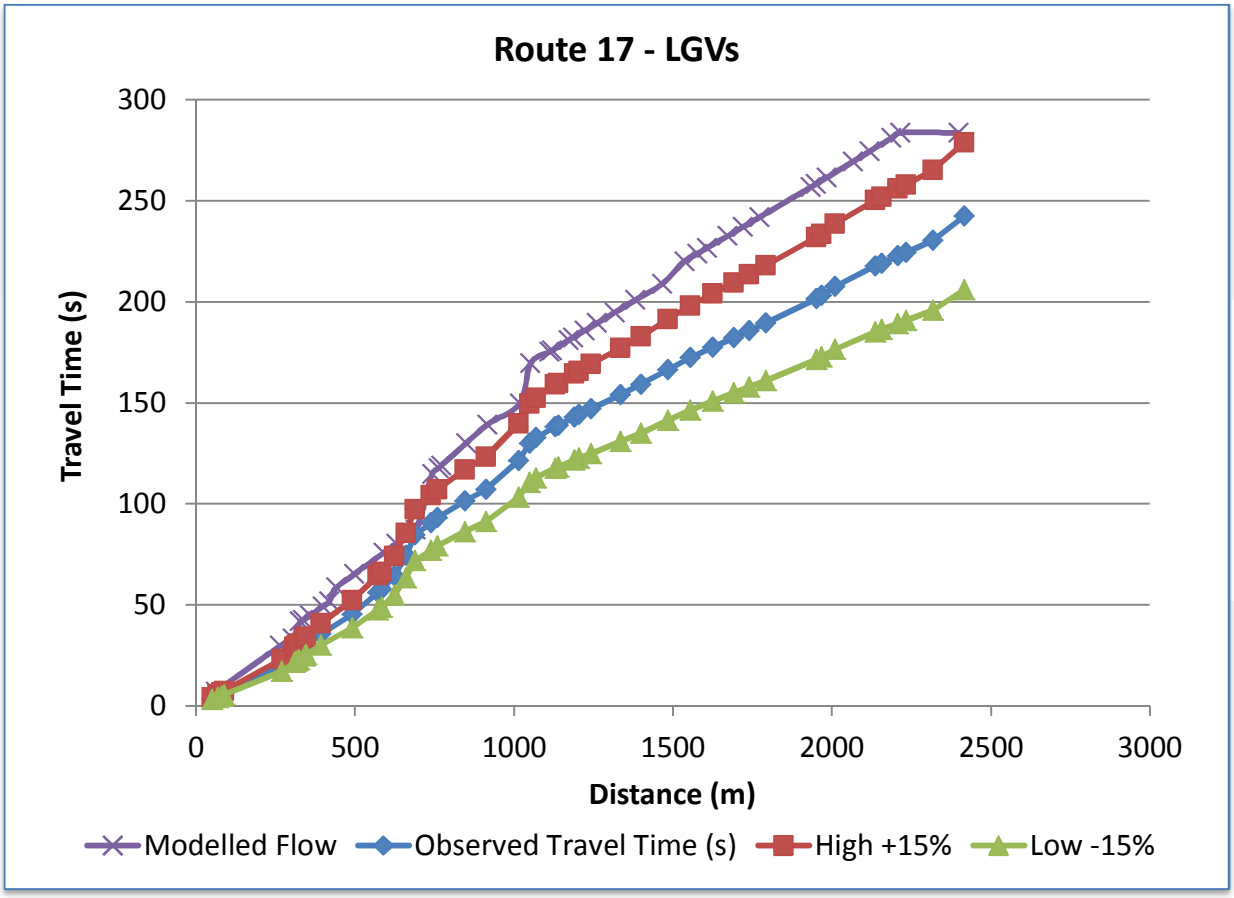

Route 15 - Lights
Travel Time (s)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

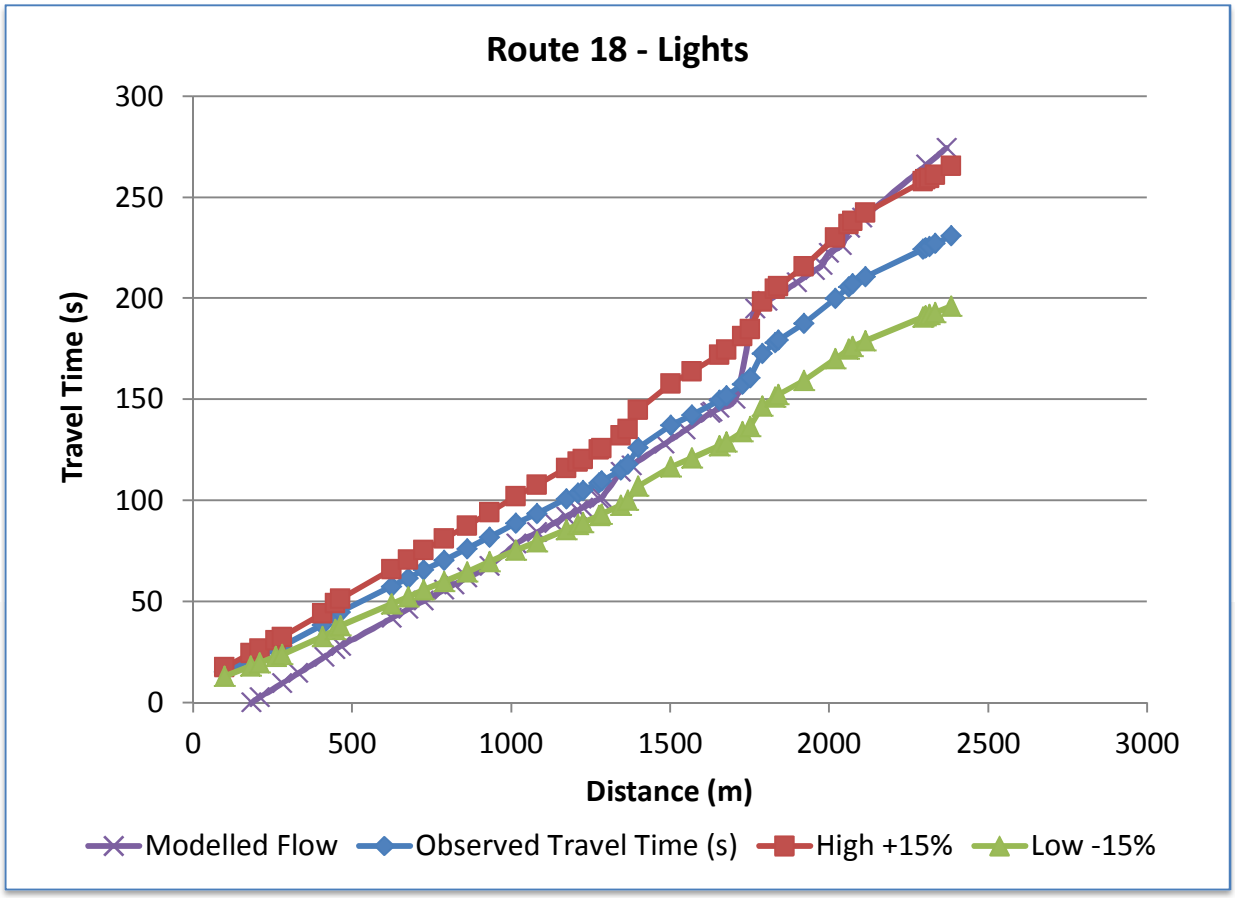

Route 15 - LGVs
Travel Time (s)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

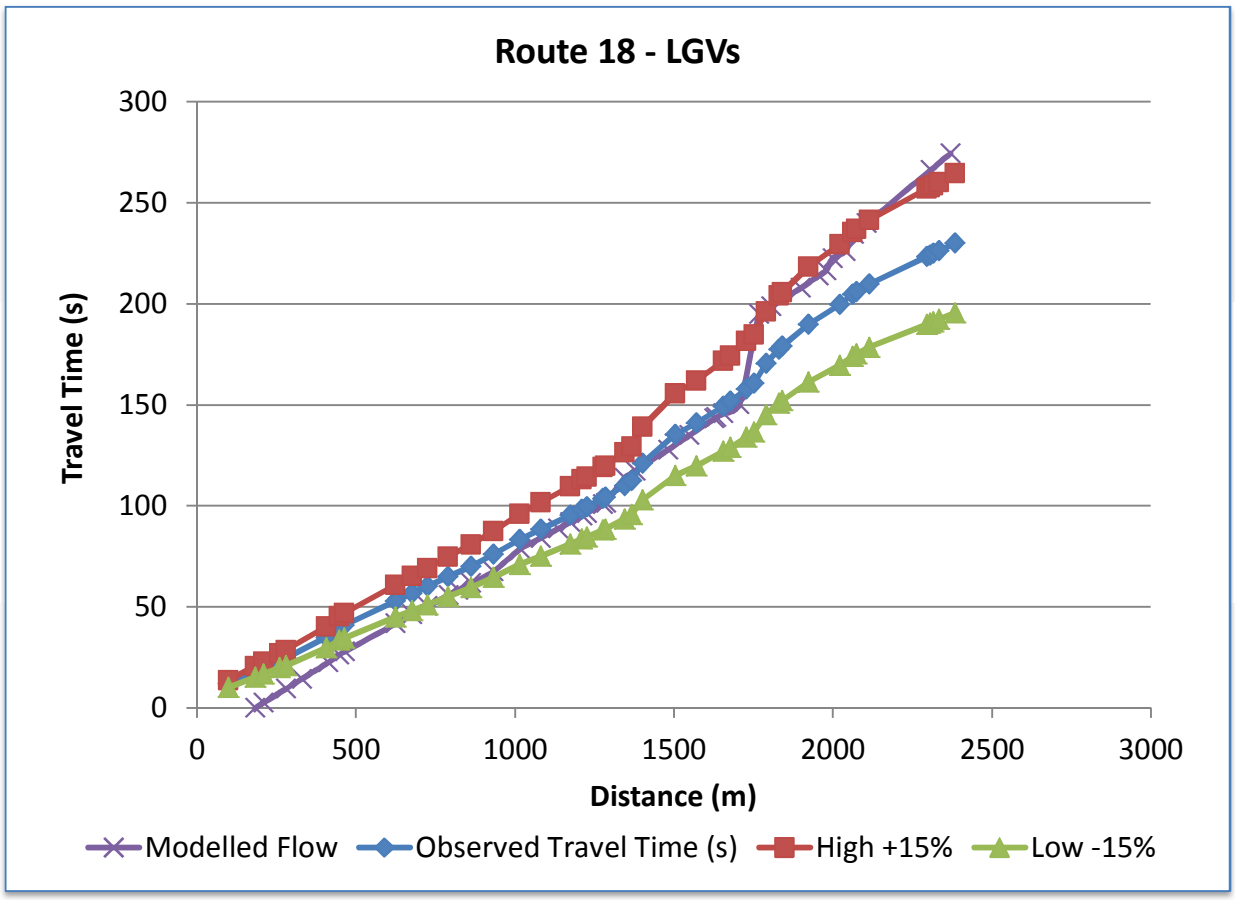

Route 16 - Lights
Travel Time (s)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

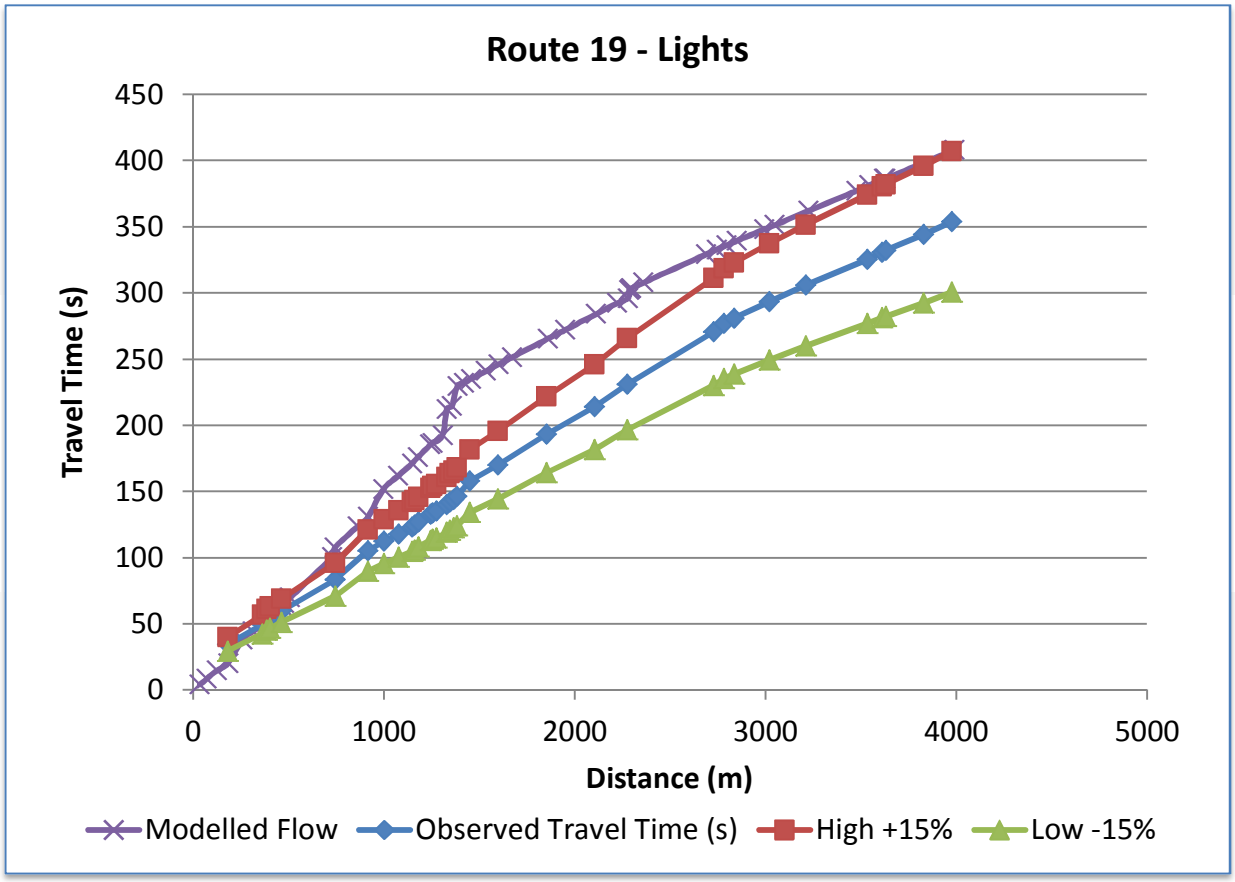

Route 16 - LGVs
Travel Time (s)
250
200
150
100
50
0
0
500
1000
1500
2000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

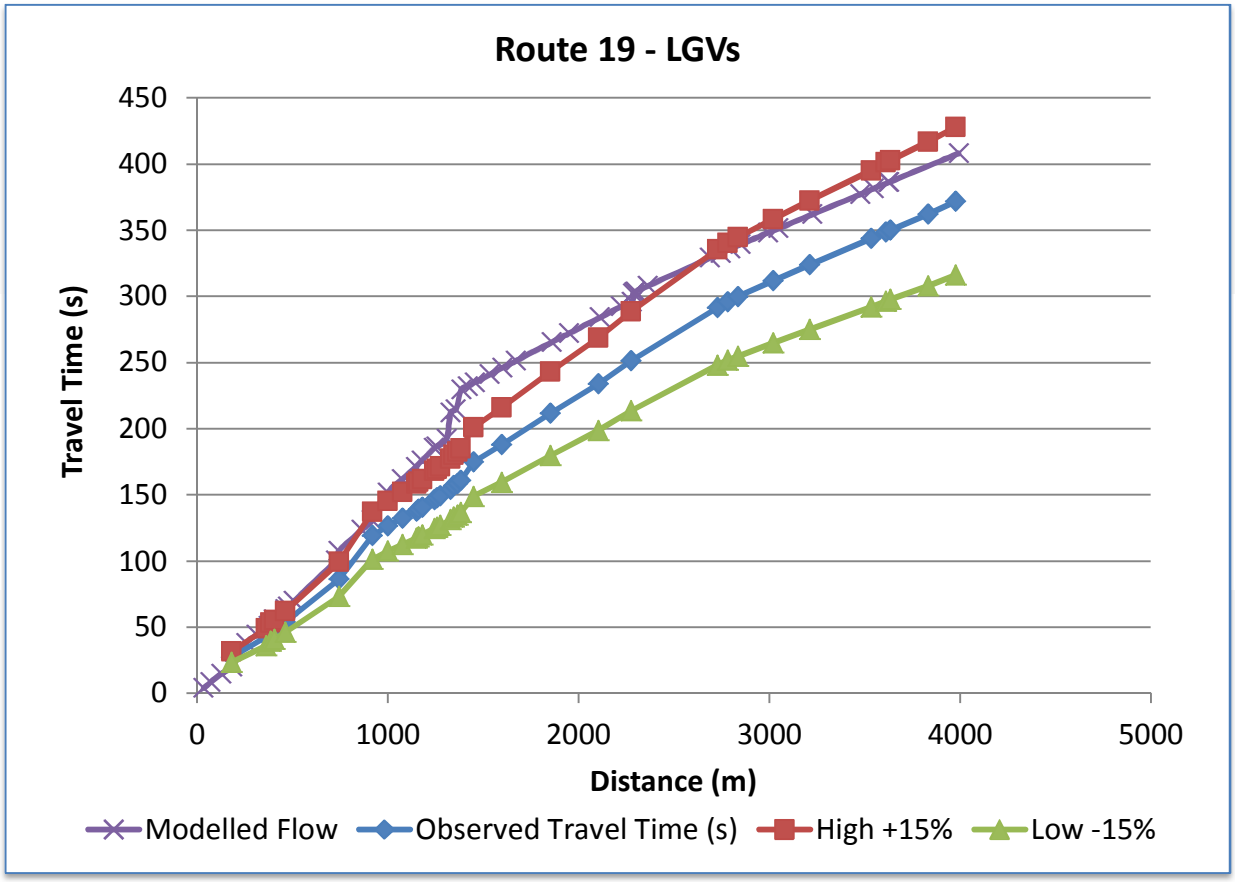

Route 17 - Lights
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
Low -15%
High +15%

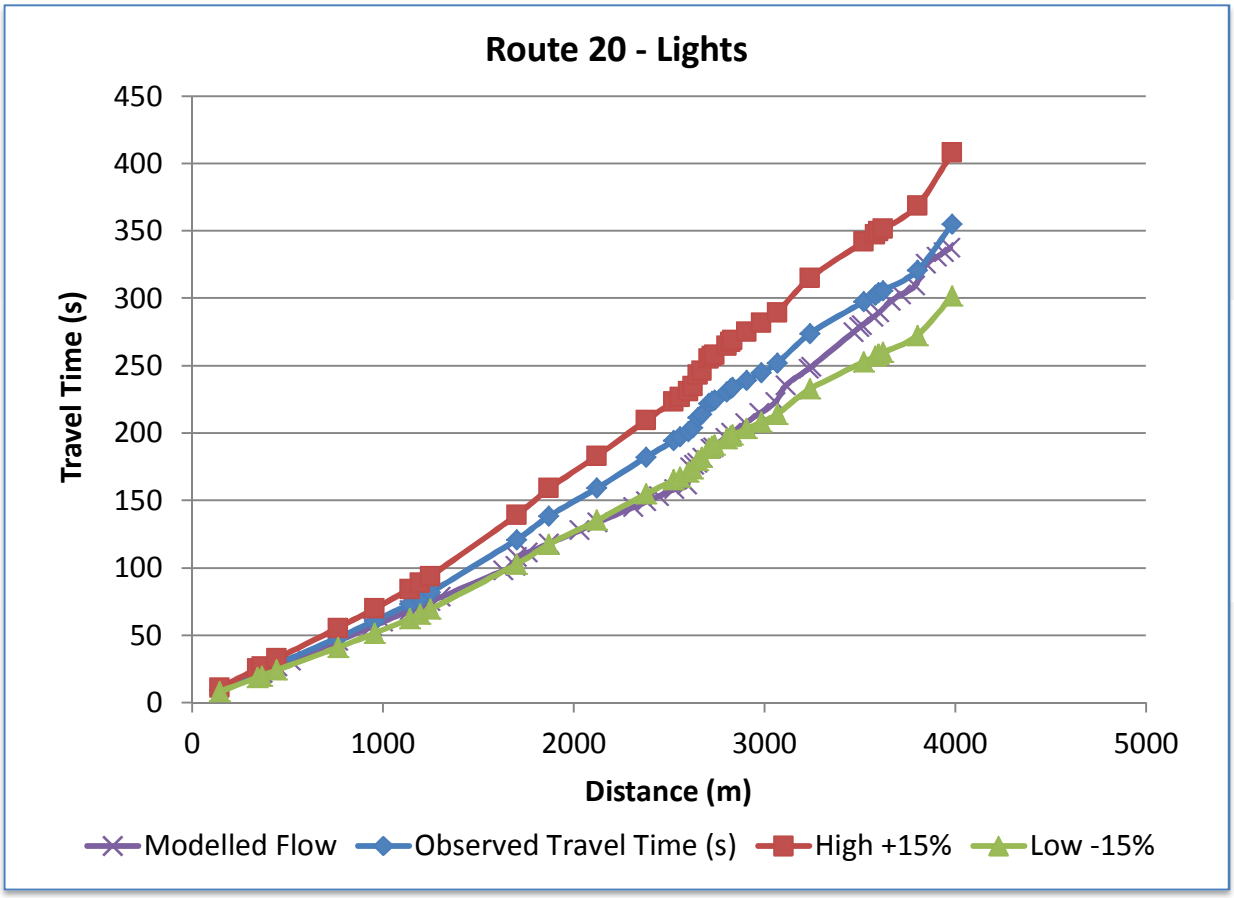

Route 17 - LGVs
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

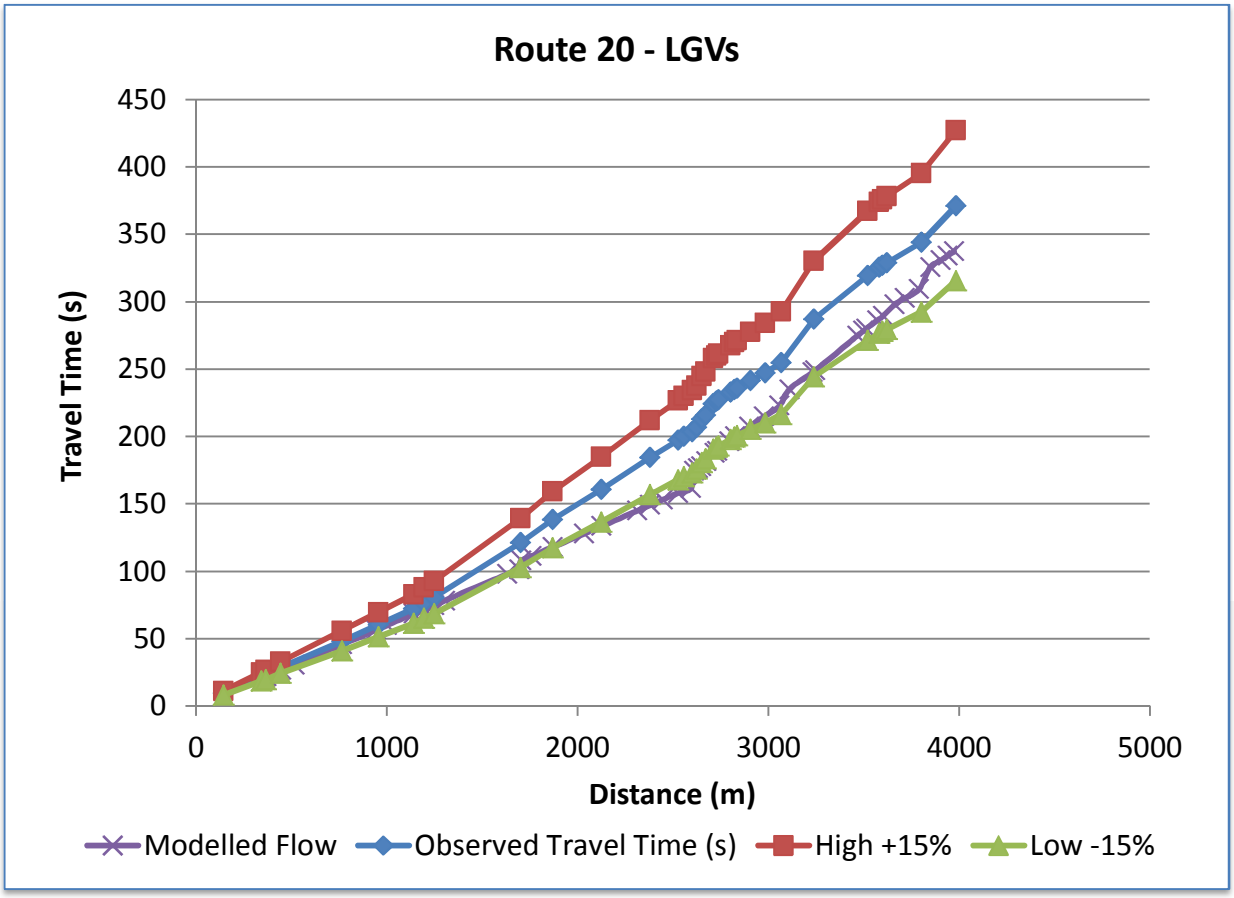

Route 18 - Lights
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%


Route 18 - LGVs
Travel Time (s)
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%


Route 19 - Lights
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

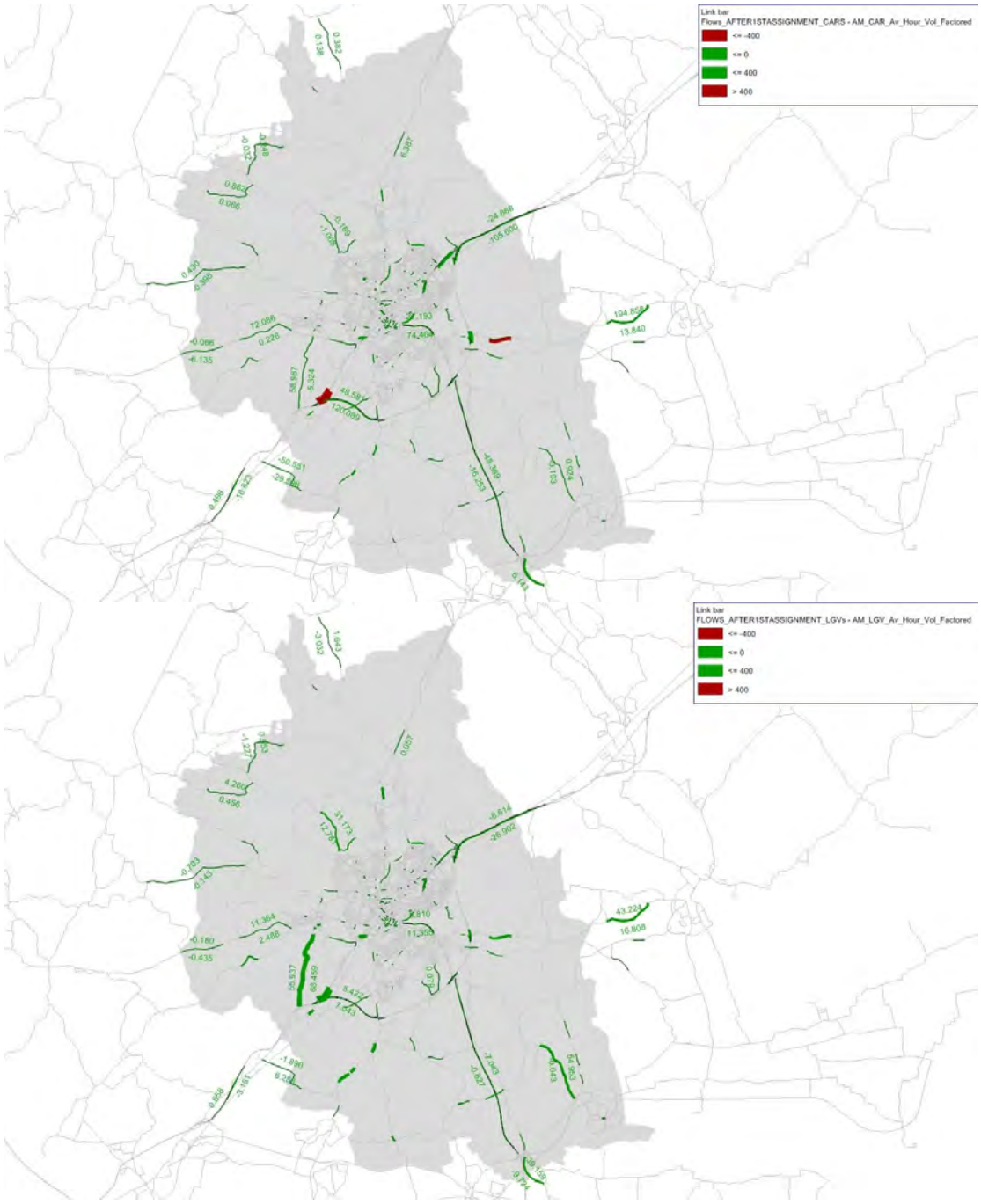

Route 19 - LGVs
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

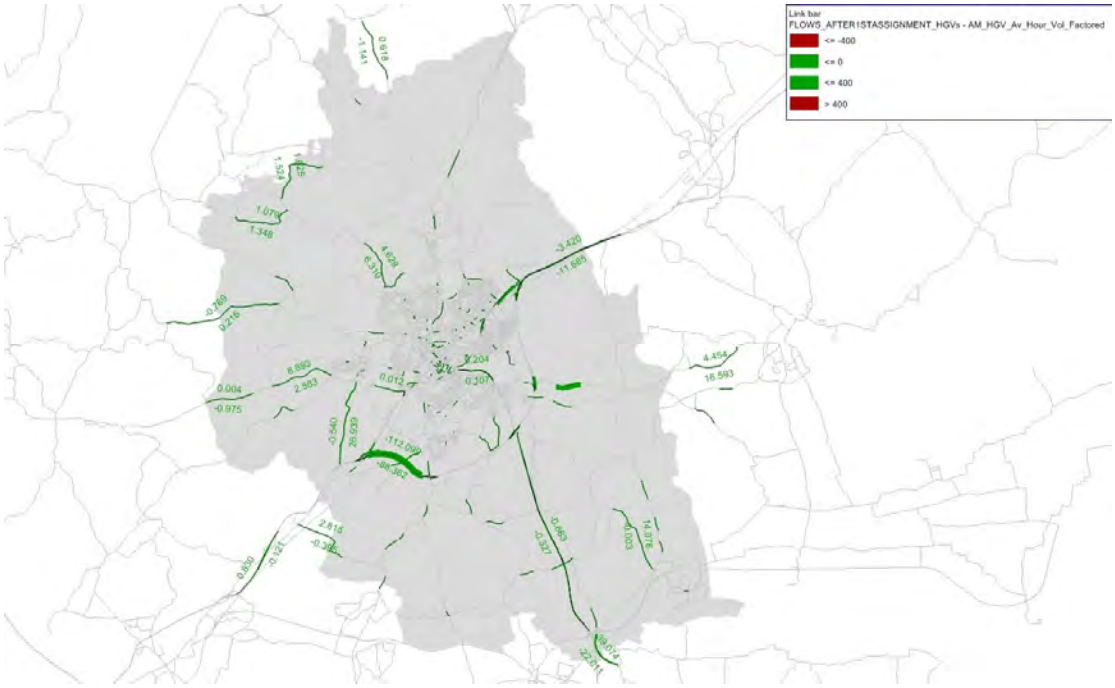

Route 20 - Lights
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%


Route 20 - LGVs
Travel Time (s)
450
400
350
300
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
Distance (m)
Modelled Flow
Observed Travel Time (s)
High +15%
Low -15%

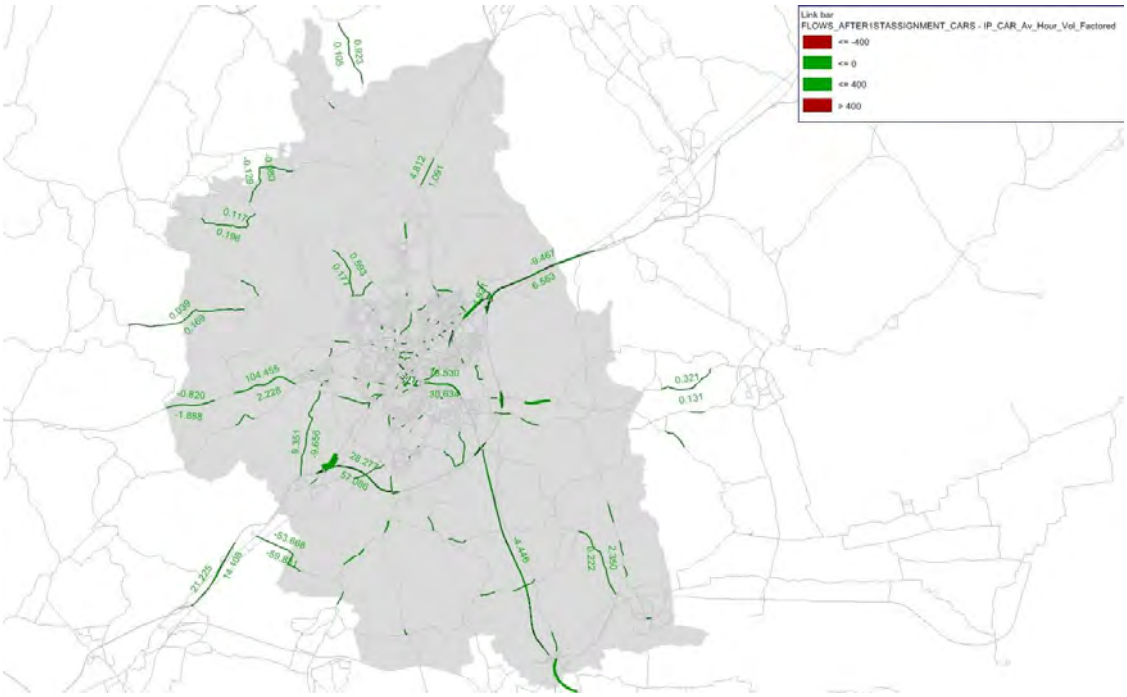
Appendix K. Modelled Flows Validation Results

AM




Link bar
FLOWS_AFTER1STASSIGNMENT_HGVs - AM_HGV_Av_Hour_Vol_Factored
<= -400
<= 0
<= 400
> 400

IP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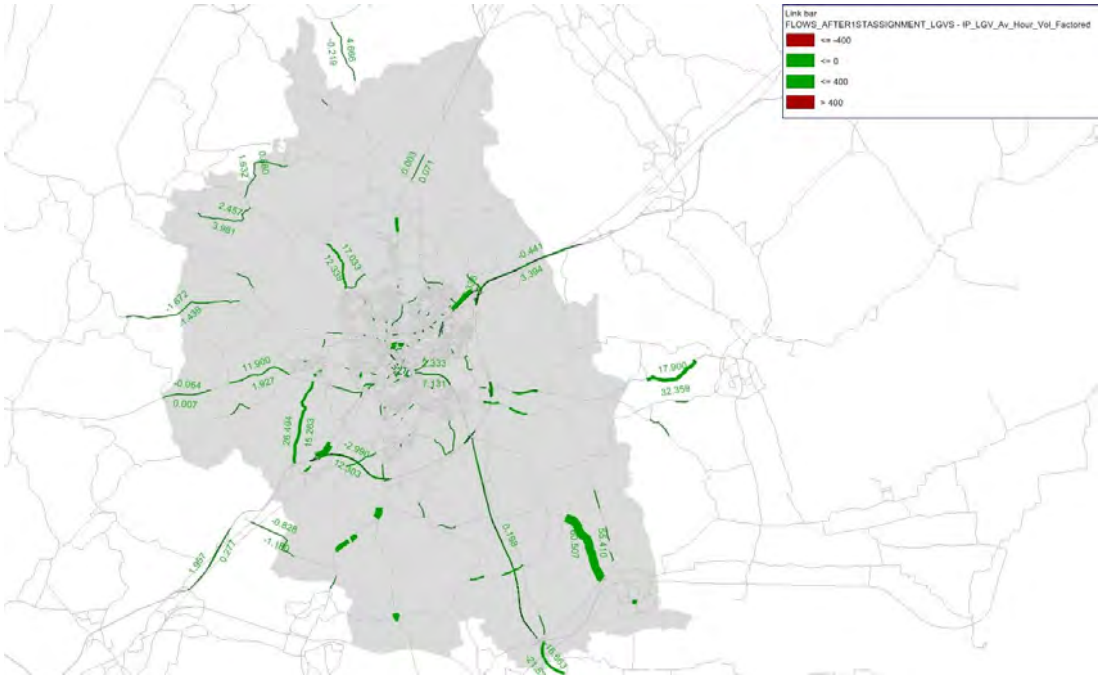
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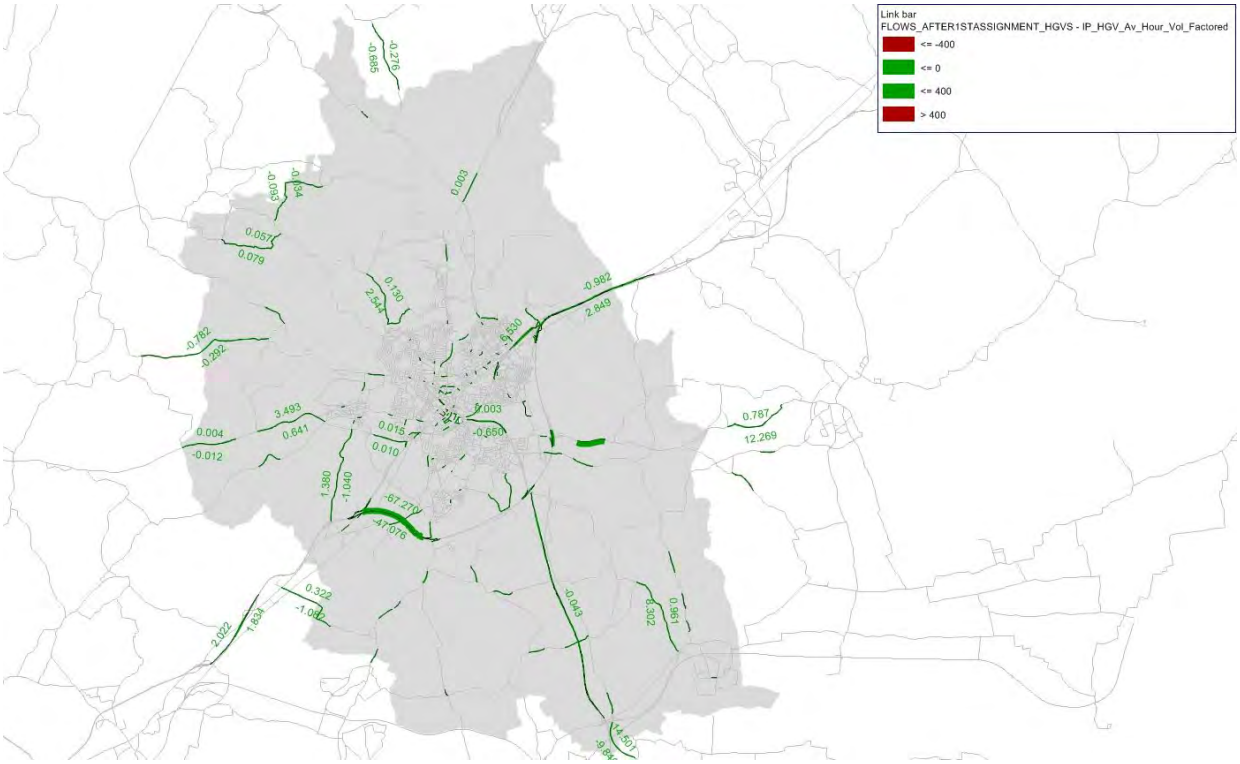
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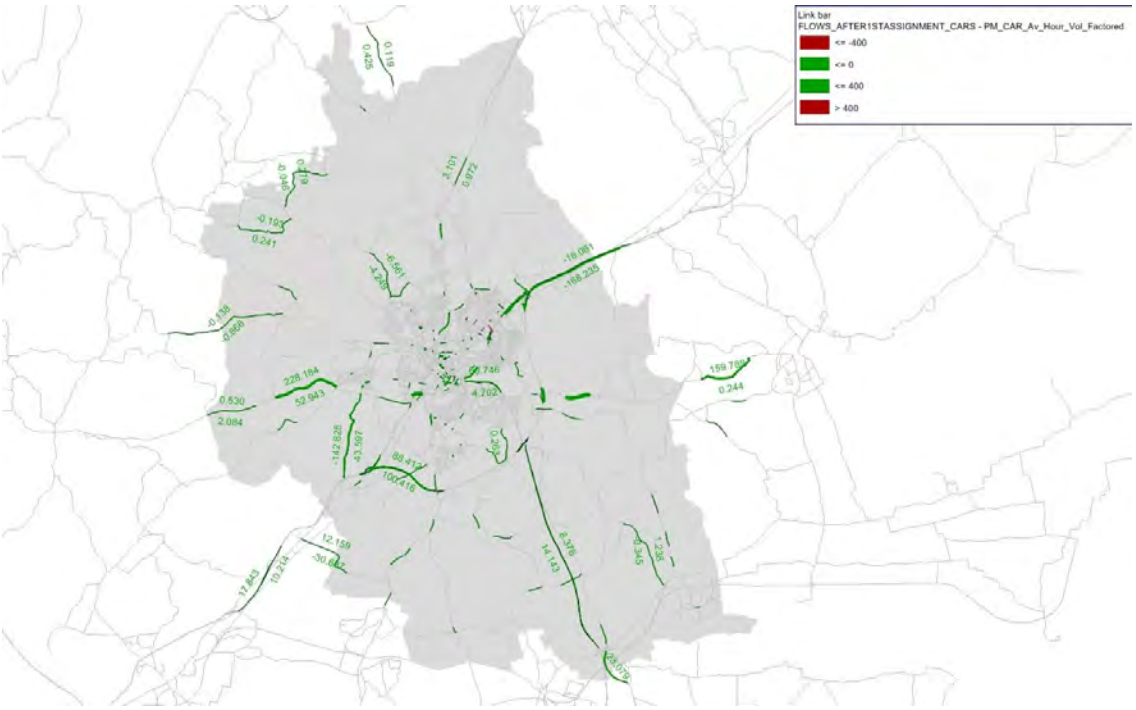
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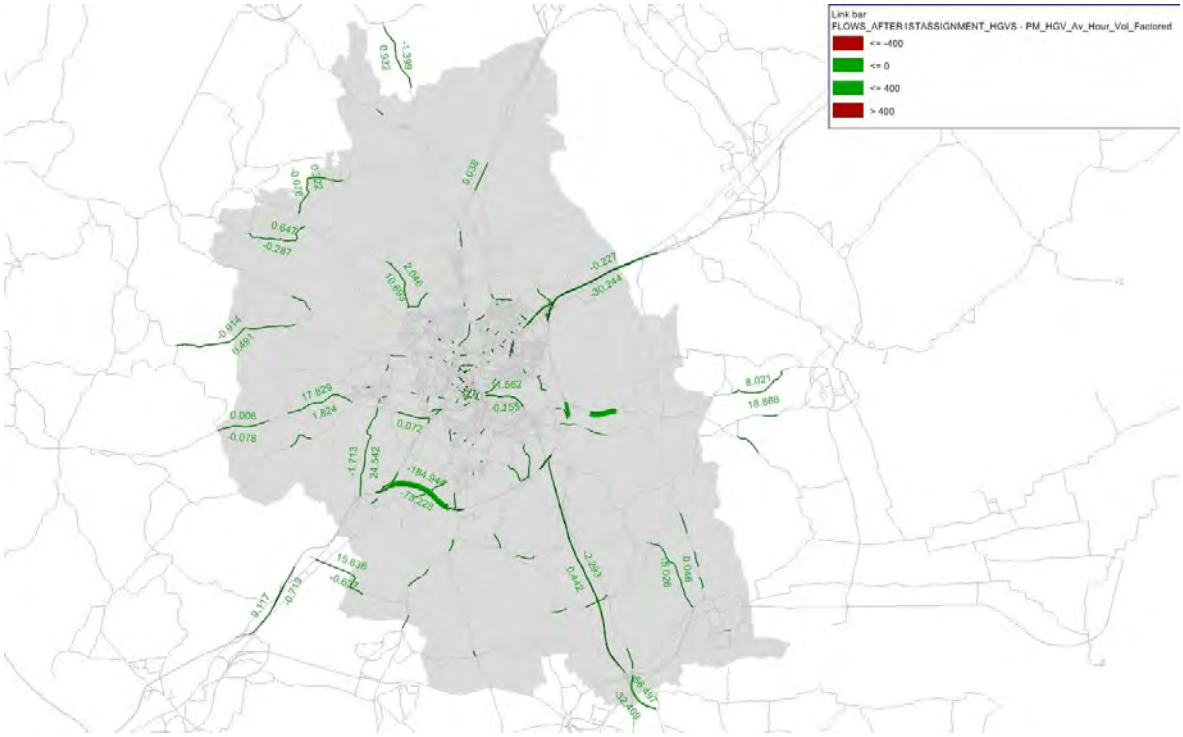
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Appendix L. Collected Traffic Counts and Applied Factors

Site_ID	Site_ID	Road Name	Road Type	Year	Annual Growth Rate
Site 5	05-WB	A1099 Victoria Road	A Road	2014	1.000
28478	28478-NB	A1060/Parkway	A Road	2014	1.000
38471	38471-WB	A138	A Road	2014	1.000
941066	941066-WB	B1010/BURNHAM ROAD	B Road	2014	1.000
941136	941136-SB	B1007/GALLEYWOOD ROAD	B Road	2014	1.000
941148	941148-SB	B1009/BEEHIVE LANE	B Road	2014	1.000
941176	941176-SB	C/HOLLOW LANE	Local Road	2014	1.000
46687	46687-WB	620 Rayleigh Road, Billericay, Brentwood	A Road	2012	0.963
38635	38635-WB	London Road, Chelmsford	A Road	2010	0.990
56777	56777-WB	134 Lawford Lane, Writtle, Chelmsford	A Road	2011	0.985
77130	77130-NB	A130, Chelmsford	A Road	2011	0.985
18372	18372-NB	London Road, Chelmsford	A Road	2011	0.985
941217	941217-WB	Margaretting Road, Chelmsford	B Road	2010	0.990
77151	77151-WB	119 Rainsford Road, Chelmsford	B Road	2010	0.990
30013332	30013332-NB	A12 northbound exit for A414 near Chelmsford	Motorway	2014	1.000
30013331	30013331-NB	A12 northbound within the A414 near Chelmsford	Motorway	2014	1.000
30013333	30013333-SB	A12 southbound within the A414 near Chelmsford	Motorway	2014	1.000
30013334	30013334-SB	A12 southbound exit for A414 near Chelmsford	Motorway	2014	1.000
6135	6135-SB	SB, A12, SOUTH OF CHELMSFORD	Motorway	2014	1.000
6134	6134-NB	NB, A12, SOUTH OF CHELMSFORD	Motorway	2014	1.000
30013329	30013329-NB	A12 northbound within the B1007 junction	Motorway	2014	1.000
30013330	30013330-NB	A12 northbound exit for B1007	Motorway	2014	1.000
30013328	30013328-SB	A12 southbound exit for B1007	Motorway	2014	1.000
30013336	30013336-NB	A12 northbound exit for A1114/A130	Motorway	2014	1.000
30013335	30013335-NB	A12 northbound within the A1114/A130 junction	Motorway	2014	1.000
30013337	30013337-SB	A12 southbound within the A1114/A130 junction	Motorway	2014	1.000
30013338	30013338-SB	A12 southbound exit for A1114/A130	Motorway	2014	1.000
30013340	30013340-NB	A12 northbound exit for A414 near Chelmsford	Motorway	2014	1.000
30013339	30013339-NB	A12 northbound within the A414 near Chelmsford	Motorway	2014	1.000
30013341	30013341-SB	A12 southbound within the A414 near Chelmsford	Motorway	2014	1.000
30013342	30013342-SB	A12 southbound exit for A414 near Chelmsford	Motorway	2014	1.000
30013344	30013344-NB	A12 northbound exit for A138/A130	Motorway	2014	1.000
30013343	30013343-NB	A12 northbound within the A138/A130 junction	Motorway	2014	1.000
30013345	30013345-SB	A12 southbound within the A138/A130 junction	Motorway	2013	0.971
30013346	30013346-SB	TMU site 6262/1 on A12 southbound exit for A138/A130	Motorway	2013	0.971
2008741	02008741-SWB	85m SW of Wyses Road, ONGAR ROAD WEST	A Road	2010	0.990
14331	14331-01-SWB	ATC01 - Highwood Road, Loves Green, Chelmsford	Local Road	2014	1.000
3006014	03006014-SEB	210M NW OF BOYTON CROSS LANE, ROXWELL ROAD	A Road	2014	1.000
14332	14332-01-WB	ATC01 - Highwood Road, Edney Common, Chelmsford	Local road	2014	1.000
1303B	13010-02-SEB	ATC02 - Stock Lane (SE), Ingatestone	Local road	2013	0.969
13181-01	13181-01-SB	ATC01 - Writtle Road, Margaretting	Local road	2013	0.969
13181-02	13181-02-SWB	ATC02 - B1008 Main Road, Margaretting	B Road	2013	0.969
14335-01	14335-01-SB	ATC01 - Margaretting Road, Writtle, Chelmsford	Local road	2014	1.000
14335-02	14335-02-WB	ATC02 - Lodge Road, Writtle, Chelmsford	Local road	2014	1.000
3001330	03001330-WB	150M W OF CHIGNALL RD, ROXWELL ROAD	A Road	2010	0.990
13158	13158-01-WB	ATC01 - Roxwell Road, Chelmsford	A Road	2013	0.969
13158	13158-01-EB	ATC01 - Roxwell Road, Chelmsford	A Road	2013	0.969
14334-01	14334-01-SWB	ATC01 - B1007 High Street, Stock	B Road	2014	1.000
14334-02	14334-02-SWB	ATC02 - B1007 High Street, Stock	B Road	2014	1.000
2008968	02008968-SEB	395 m NW of Lucks Lane, MAIN ROAD - ZU26368	Local road	2011	0.985
2008677	02008677-SB	19m S of Pipchin Road, OLIVER WAY	Local road	2010	0.990
2008711	02008711-SWB	47m SW of Meteor Way, WATERHOUSE LANE	A Road	2010	0.990
67406741	67406741	100M SW OF ANDREWS PLACE, WATERHOUSE LANE	A Road	2010	0.990
3005413	03005413-SWB	130M N OF METOERO WAY, RAINSFORD LANE	A Road	2010	0.990
13180	13180-01-SB	North Avenue, Chelmsford	Local road	2013	0.969
5300531	05300531-SB	36m E of Maltese Road, RAINSFORD ROAD	A Road	2010	0.990
3007141	03007141-SB	30M SW OF WOOD ST/LONGSTOMPS RAB, GALLEYWOOD ROAD	B Road	2014	1.000
1206J	12008-01-SB	ATC01 Broomfield Rd	Local road	2012	0.963
66266627	66266627-WB	15M W OF STAPLEFORD CLOSE, NEW WRITTLE STREET	Local road	2010	0.990
3006147	03006147-SB	57m S of Ship Road, STOCK ROAD	B Road	2014	1.000
67166717	67166717-SB	30M N OF WESTFIELD AVENUE, BROOMFIELD ROAD	Local road	2010	0.990
3008746	03008746-SB	25M S OF FIFTH AVENUE, BROOMFIELD ROAD	B Road	2014	1.000
13182-07	13182-07-SWB	ATC07 - Moulsham Street, Moulsham, Chelmsford	Local road	2013	0.969
13182-05	13182-05-SWB	ATC05 - Vicarage Road, Moulsham, Chelmsford	Local road	2013	0.969
67356736	67356736-SB	99M S of NEW WRITTLE STREET, NEW LONDON ROAD	B Road	2010	0.990
2008728	02008728-SWB	43m NE of Queen Street, MOULSHAM STREET	Local road	2010	0.990
1202A-04	12001-04-SB	ATC04 A1099 Victoria Road South north of library	Local road	2012	0.963
13182-06	13182-06-SWB	ATC06 - Moulsham Street, Moulsham, Chelmsford	Local road	2013	0.969
1202A-06	12001-06-WB	ATC06 Market Road adjacent to library (one way)	Local road	2012	0.963
13177	13177-01-WB	ATC01 - Heath Road, Ramsden Heath	Local road	2013	0.969
1202A-08	12001-08-SEB	ATC08 Duke Street (one way)	Local road	2012	0.963
2008738	02008738-SWB	40m SW of Godfreys Mews, MOULSHAM STREET	Local road	2010	0.990
54145415	54145415-SEB	100m SE of Multistory Car park, PARKWAY	A Road	2010	0.990
1039182-04	1039182-04-SB	ATC04 - B1008 Blansford Hill, Little Waltham, north of Broomfield	B Road	2011	0.985
1202A-03	12001-03-WB	ATC03 A1099 Victoria Road adjacent to YMCA	A Road	2012	0.963
2008725	02008725-SEB	43m NW of Upper Roman Road, HAMLET ROAD	Local road	2010	0.990
13182-03	13182-03-SEB	ATC03 - Hamlet Road, Moulsham, Chelmsford	Local road	2013	0.969
14327	14327-01-SB	ATC01 - B1008 Main Road, Broomfield, Chelmsford	B Road	2014	1.000
13182-04	13182-04-SEB	ATC04 - St Johns Road, Moulsham, Chelmsford	Local road	2013	0.969
2008724	02008724-SWB	53 NE of Hamlet Road, UPPER ROMAN ROAD	Local road	2010	0.990
2008727	02008727-SWB	43m SW of Lady Lane, MILDMAY ROAD	Local road	2010	0.990
2008737	02008737-SEB	31m NW of Upper Roman Road, GROVE ROAD	Local road	2010	0.990
1202A-10	12001-10-WB	ATC10 Tindal Square	Local road	2012	0.963
1202A-07	12001-07-SB	ATC07 Tindal Street	Local road	2012	0.963
2008721	02008721-SWB	20m NE of Hall Street, MOULSHAM STREET	Local road	2010	0.990
2008736	02008736-SWB	82m NE of St Johns Road, BOUVERIE ROAD	Local road	2010	0.990
1202A-09	12001-09-SB	ATC09 New Street	Local road	2012	0.963
2008722	02008722-SEB	31m NW of Roman Road, HALL STREET	Local road	2010	0.990
1202A-01	12001-01-SB	ATC01 B1008 New Street adjacent to railway bridge	B Road	2012	0.963
2008723	02008723-SWB	30m SW of Hall Street, ROMAN ROAD	Local road	2010	0.990
2008735	02008735-SWB	74m NE of St Johns Road, ROSEBERY ROAD	Local road	2010	0.990
1202A-05	12001-05-WB	ATC05 Waterloo Lane	Local road	2012	0.963
2008726	02008726-SWB	52m NE of Grove Road, MILDMAY ROAD	Local road	2010	0.990
13182-02	13182-02-SEB	ATC02 - Lady Lane, Moulsham, Chelmsford	Local road	2013	0.969
13182-01	13182-01-SWB	ATC01 - Moulsham Drive, Moulsham, Chelmsford	Local road	2013	0.969
3006132	03006132-SB	Just S of river, CHELMER VALLEY ROAD	A Road	2014	1.000
1202A-02	12001-02-WB	ATC02 A1099 Victoria Road adjacent to Post Office	A Road	2012	0.963
2008731	02008731-SWB	131m SW of Goldlay Road, MANOR ROAD	Local road	2010	0.990
2008729	02008729-SEB	30m NW of Burns Crescent, LADY LANE	Local road	2010	0.990
3005416	03005416-SWB	85M N OF PARKWAY, HIGH BRIDGE ROAD	A Road	2010	0.990
13176	13176-01-SB	ATC01 - Barnard road, Galleywood, Chelmsford	Local road	2013	0.969
13176	13176-01-NB	ATC01 - Barnard road, Galleywood, Chelmsford	Local road	2013	0.969
2008733	02008733-SWB	112m NE of Lady Lane, LYNMOUTH AVENUE	Local road	2010	0.990
67316732	67316732	250M NW of Lynmouth Avenue, PARKWAY	A Road	2010	0.990

2008732	02008732-SEB	49m SE of Lynmouth Avenue, LYNMOUTH GARDENS	Local road	2010	0.990
2008730	02008730-SEB	8m SE of Goldlay Avenue, LADY LANE	Local road	2010	0.990
14330	14330-01-SWB	ATC01 - Watchouse Road, Galleywood, Chelmsford	Local road	2014	1.000
2008734	02008734-SWB	106m NE of Lady Lane, GOLDLAY AVENUE	Local road	2010	0.990
67186719	67186719	28M S of Navigation Road, SPRINGFIELD ROAD	B Road	2010	0.990
1039182-03	1039182-03-WB	ATC03 - Back Lane, Little Waltham, west of P&R roundabout	Local road	2012	0.963
3008706	03008706-SEB	35M W OF MEADGATE AVE, BADDOW ROAD	B Road	2010	0.990
1039182-02	1039182-02-SB	ATC02 - A130 Essex Regiment Way, Little Waltham, south of P&R roundabout	A Road	2011	0.985
1039182-01	1039182-01-SB	ATC01 - A130 Essex Regiment Way, Little Waltham, north of P&R roundabout	A Road	2011	0.985
2008990	02008990-SEB	78m NW of Ship Road, WEST HANNINGFIELD ROAD	Local road	2012	0.963
3006133	03006133-WB	E of Nabbotts Farm RAB, WHITE HART LANE	A Road	2014	1.000
87548755	87548755-SB	N of New Dukes Way RAB, CHELMER ROAD	A Road	2010	0.990
8724	8724	SPRINGFIELD ROAD	B Road	2008	#N/A
3008724	03008724-SWB	124M N OF THE LEYS, SPRINGFIELD ROAD	B Road	2014	1.000
14245	14245-01-SWB	PV2-01 Springfield Road, Springfield	B Road	2014	1.000
13167-01	13167-01-WB	ATC01 - Church Road / Middlemead, West Hanningfield	Local road	2013	0.969
14337-01	14337-01-SB	ATC01 - Hopkins Mead, Chelmer Village, Chelmsford	Local road	2014	1.000
13184	13184-01-WB	ATC01 - Pollards Green, Chelmer Village	Local road	2013	0.969
14337-02	14337-02-WB	ATC02 - Pollards Green, Chelmer Village, Chelmsford	Local road	2014	1.000
13167-02	13167-02-WB	ATC02 - Church Road, West Hanningfield	Local road	2013	0.969
2008622	02008622-SWB	25m NE of Fordson Road, COLCHESTER ROAD RAB	A Road	2010	0.990
2008766	2008766	DROVERS WAY	Local road	2012	0.963
13179	13179-01-NWB	ATC01 - Sandford Mill Road, Chelmer Village	Local road	2013	0.969
2008623	02008623-WB	150m W of A130/A138 RAB, CHELMER ROAD	A Road	2010	0.990
2008621	02008621-SB	75m S of B1137 Colchester Rd RAB, WINSFORD WAY	Local road	2010	0.990
2008620	02008620-NB	350m E of B1137 Colchester Rd RAB, N/B OFF SLIP	A Road	2010	0.990
2008624	02008624-NB	240m N of A130/A139 RAB, N/B ON SLIP	A Road	2010	0.990
2008619	02008619-SB	150m S of B1137 RAB, S/B ON SLIP	A Road	2010	0.990
2008625	02008625-SWB	102m NE of A138/A130 RAB, GENERALS LANE	Local road	2010	0.990
2008617	02008617-SB	2m N of B1137 RAB, S/B OFF SLIP	B Road	2010	0.990
2008991	02008991-SWB	145m SW of Church Lane, SOUTH HANNINGFIELD ROAD	Local road	2012	0.963
2008618	02008618-SWB	183m NE of B1137 RAB, MAIN ROAD	B Road	2010	0.990
2008992	02008992-WB	480m W of Chalk Street, SOUTH HANNINGFIELD ROAD	Local road	2012	0.963
2008967	02008967-SEB	46 m NW Brent Hall Lodge, WALTHAM ROAD	Local road	2011	0.985
1308M	13078-01-SB	ATC01 - Hulls Lane, Sandon	Local road	2013	0.969
2008966	02008966-SEB	375 m N of Wallaces Lane, WALTHAM ROAD	Local road	2011	0.985
2008993	02008993-SWB	60m NE of Chalk Street, SOUTH HANNINGFIELD ROAD	Local road	2012	0.963
2008988	02008988-SEB	127m NW of Garrettlands, WOODHILL ROAD	Local road	2012	0.963
2008994	02008994-SEB	33m SE of South Hanningfield Road, CHALK STREET	Local road	2012	0.963
3006146	03006146-WB	1.1km W of Riffhams Lane, MAIN ROAD	A Road	2014	1.000
2008965	02008965-SB	78 m S of Old School House, WALTHAM ROAD	Local road	2011	0.985
1304A	13021-01-SEB	ATC01 - Church Rd, Little Baddow, Chelmsford	Local road	2013	0.969
3006204	03006204-SB	114m NW of River Crouch, BATTLESBRIDGE BYPASS	A Road	2014	1.000
13155-02	13155-02-SB	ATC02 - Bicknacre Road, Bicknacre	Local road	2013	0.969
13178	13178-01-WB	ATC01 - Lodge Road, Bicknacre	Local road	2013	0.969
3001120	03001120-SB	446m NW Lodge Road, MAIN ROAD	B Road	2014	1.000
13155-01	13155-01-SB	ATC01 - Main Road, Woodham Ferrers	B Road	2013	0.969
2008757	2008757	Attached to fence on exit road, FERRERS ROAD	Local road	2012	0.963
2008902	02008902-WB	90 m E of Hullbridge Road, FERRERS ROAD	Local road	2012	0.963
54175418	54175418-SWB	Near River Bridge, CHELMER ROAD	A Road	2010	0.990
3006037	03006037-WB	270m W of Radley Green Road	A Road	2014	1.000
1210F	12026-02-EB	ATC02 - A414 Maldon Rd, Woodham Mortimer	A Road	2012	0.963
60446045	60446045-SB	81m SW of Widford RAB, THREE MILE HILL	A Road	2014	1.000
3005534	03005534-WB	85M W OF RAB, WRITTLE BYPASS	A Road	2014	1.000
3007165	03007165-WB	W OF SAVERNAKE ROAD, WRITTLE ROAD	Local road	2014	1.000
1309A	13084-07-WB	ATC07 - Souther Cross Road, Good Easter	Local road	2013	0.969
3009019	03009019-WB	Clingoe Hill, 400m East of New Access, Colchester	A Road	2014	1.000
1309C	13086-01-SB	ATC01 - B1008 Sandon Hill, Ford End	B Road	2013	0.969
13183	13183-01-SB	ATC01 - Arbour Lane (nth), Chelmsford	Local road	2013	0.969
3007141	03007141-SB	GALLEYWOOD ROAD	B Road	2014	1.000
13185	13185-01-WB	ATC01 - Heath Road (west), Ramsden Heath	Local road	2014	1.000
14333	14333-02-SWB	ATC02 - Petunia Crescent, Springfield, Chelmsford	Local road	2014	1.000
14328	14328-01-SB	PV2 - B1008 Main Road, Broomfield	B Road	2014	1.000
3006170	03006170-SWB	A131	A Road	2014	1.000
1037190	atc12-b1007-SB	ATC12 - B1007 Stock Rd, Billericay	B Road	2011	0.985
2008325	02008325-SE	DOWSETTS LANE RAMSDEN HEATH 110m SE Allens Road	Local road	2010	0.990
72537254	72537254-EB	Roxwell Rd, Writtle, Chelmsford, Essex CM1, UK	A Road	2015	1.003
2009009	02009009-NE	46 m NE Roman Close, ROMAN ROAD	B Road	2012	0.963
2008271	02008271-NE	558m NE of Valley Bridge RAB, CHELMER VALLEY ROAD	A Road	2010	0.990
01	14528-01-NEB	A12 Ingatestone By-P / Northbound	Motorway	2014	1.000
02	Site02-EB	Elms Rd / Eastbound	Local road	2014	1.000
03	14528-03-EB	The St / Eastbound	Local road	2014	1.000
04	Site04-WB	Ongar Road / Westbound	Local road	2014	1.000
05	14528-05-NB	Margaretting Road / Northbound	Local road	2014	1.000
06	Site06-NB	B1002 Main Road / Northbound	B Road	2014	1.000
07	14528-07-SB	LordShip Rd / Southbound	Local road	2014	1.000
08	Site08-NB	A414 / Northbound	A Road	2014	1.000
09	Site09-SB	Chignal Road / Southbound	Local road	2014	1.000
10	Site10-NB	B1417 Chelmsford Road / Northbound	B Road	2014	1.000
11	Site11-SB	WestWay / Southbound	A Road	2014	1.000
12	Site12-NB	Widford Road / Northbound	Local road	2014	1.000
13	14528-13-EB	Writtle Rd / Eastbound	Local road	2014	1.000
14	Site14-SB	Broomfield Rd / Southbound	B Road	2014	1.000
15	Site15-EB	Linnet Drive / Eastbound	Local road	2014	1.000
16	Site16-SB	Stock Road B1007 / Southbound	B Road	2014	1.000
17	Site17-NB	Pump Lane / Northbound	Local road	2014	1.000
18	14528-18-NB	Felstead Rd / Northbound	Local road	2014	1.000
19	Site19-SB	Goshawk Drive / Southbound	Local road	2014	1.000
20	Site20-SB	Beehive Lane / Southbound	B Road	2014	1.000
21	Site21-EB	Watchhouse Road / Eastbound	Local road	2014	1.000
22	Site22-NB	Lawn Lane / Northbound	Local road	2014	1.000
23	14528-23-NB	Springfield Rd / Northbound	B Road	2014	1.000
24	Site24-SB	Essex Regiment Way / Southbound	A Road	2014	1.000
25	Site25-SB	Stump Ln / Southbound	Local road	2014	1.000
26	Site26-EB	Byron Road / Eastbound	Local road	2014	1.000
27	Site27-NB	Bodmin Rd / Northbound	Local road	2014	1.000
28	Site28-SB	Main Rd / Southbound	Local road	2014	1.000
29	Site29-NB	Pump Ln / Northbound	Local road	2014	1.000
30	Site30-SB	Springfield Green / Southbound	Local road	2014	1.000
31	Site31-EB	Baddow Road / Eastbound	Local road	2014	1.000
32	Site32-NB	Falmouth Rd / Northbound	Local road	2014	1.000
33	Site33-EB	B1008 Rectory Lane / Eastbound	B Road	2014	1.000
34	Site34-NB	A138 OFFSLIP to B113 / Northbound	A Road	2014	1.000

35	14528-35-SB	New Dukes Way / Southbound	Local road	2014	1.000
36	14528-36-SB	Brook Lane / Southbound	Local road	2014	1.000
37	Site37-NB	White Hart Lane / Northbound	A Road	2014	1.000
38	14528-38-SB	West Hanningfield Road / Southbound	Local road	2014	1.000
39	Site39-EB	Brook Lane / Eastbound	Local road	2014	1.000
40	14528-40-EB	Maldon Road / Eastbound	Local road	2014	1.000
41	Site41-WB	Woodhill Road / Westbound	Local road	2014	1.000
42	14528-42-WB	A12 Boreham / Westbound	Motorway	2014	1.000
43	14528-43-NB	Main Road / Northbound	Local road	2014	1.000
44	14528-44-NB	Willow Grove / Northbound	Local road	2014	1.000
45	Site45-SB	B1418 Main Road / Southbound	B Road	2014	1.000
46	Site46-NB	Old London Rd / Northbound	Local road	2014	1.000