

Request	Response
1. Please can I receive a copy of the recent Ashton Transport Study that is eluded to within the Local Plan documents on the council's website.	1. Please see referenced attachment.



Wigan
Council



Ashton in Makerfield Town Centre Transport Study

September 2024

1. INTRODUCTION

WSP was commissioned by Wigan Council to undertake a town centre transport feasibility study for Ashton-in-Makerfield (Ashton), to assess options to improve access to, and around, the town centre. We were directed to explore opportunities which could be offered by adapting the current road layout. The Council has been keen to understand if an alternative configuration could be more efficient for cars and buses, and resolve some of the existing safety and severance issues which impact the town.

Ashton is Wigan Borough's third largest town, located in the south-west, close to the A580, and to M6 Junction 24 which has north-facing slip roads only. It is formed around the intersection of two principal routes; the A49 (Wigan Road / Warrington Road) running north-south between Wigan and Warrington, and A58 (Bolton Road / Liverpool Road) running east-west route between Bolton and St Helens. These routes both pass through the centre of the town. There is no rail station in Ashton (Bryn is the closest rail station) and bus services all operate from on-street stops around the town centre road network. The town centre offers a vibrant mix of retail and hospitality premises.

Ashton town centre suffers from high levels of traffic congestion. The nearby access to the M6 is a contributing factor. The proximity of several industrial areas also gives rise to a relatively high proportion of heavy goods vehicle (HGV) traffic passing through the town centre. Kerbside space in the town centre is at a premium but could perhaps be better used.

The Council has previously shown support for the proposition of introducing north-facing slip roads at M6 J25. This could relieve some of the pressure at M6 J24, including providing routes for HGVs to avoid Ashton town centre. In the future, it could also be appropriate to consider upgrades at M6 J23, which may facilitate the ultimate full closure of M6 J24. These longer term ambitions would require the support of National Highways, who are responsible for the strategic road network, as well as St Helens Council as the neighbouring authority.

The Ashton town centre local road network is effectively a three sided triangle comprising Gerard Street, Bryn Street and Wigan Road. These routes all operate two-way with complex signal controlled junction arrangements at each intersection where they meet. The current town centre road layout is presented in **Figure 1**. There has been a longstanding ambition to explore whether the local town centre road network could operate more efficiently as a one-way gyratory arrangement.

A further driver for this study is the increasing focus which is being placed by the Council on public realm and active travel infrastructure within town centres. There is therefore interest in whether an alternative configuration could offer an acceptable level of highway capacity whilst also enabling some existing carriageway space to be reallocated for other uses such as wider footways and improved place-making.

The study brief called for optioneering of different highway layouts, supported by testing within a Vissim microsimulation traffic model for the Ashton town centre area. This Technical Note (TN) provides a summary of the work undertaken through the study, including details of the modelling work. This TN concludes by suggesting potential next steps.

This study was undertaken in co-ordination with the Council's #OurFutureAshton Levelling Up Fund project (which is funding the transformation of a markets space on Garswood Street car parking, and improved public realm on Gerard Street), albeit there was no direct relation between the two projects.

Figure 1 - Ashton-in-Makerfield Town Centre Current Road Layout



2. 2023 BASE VISSIM MODEL

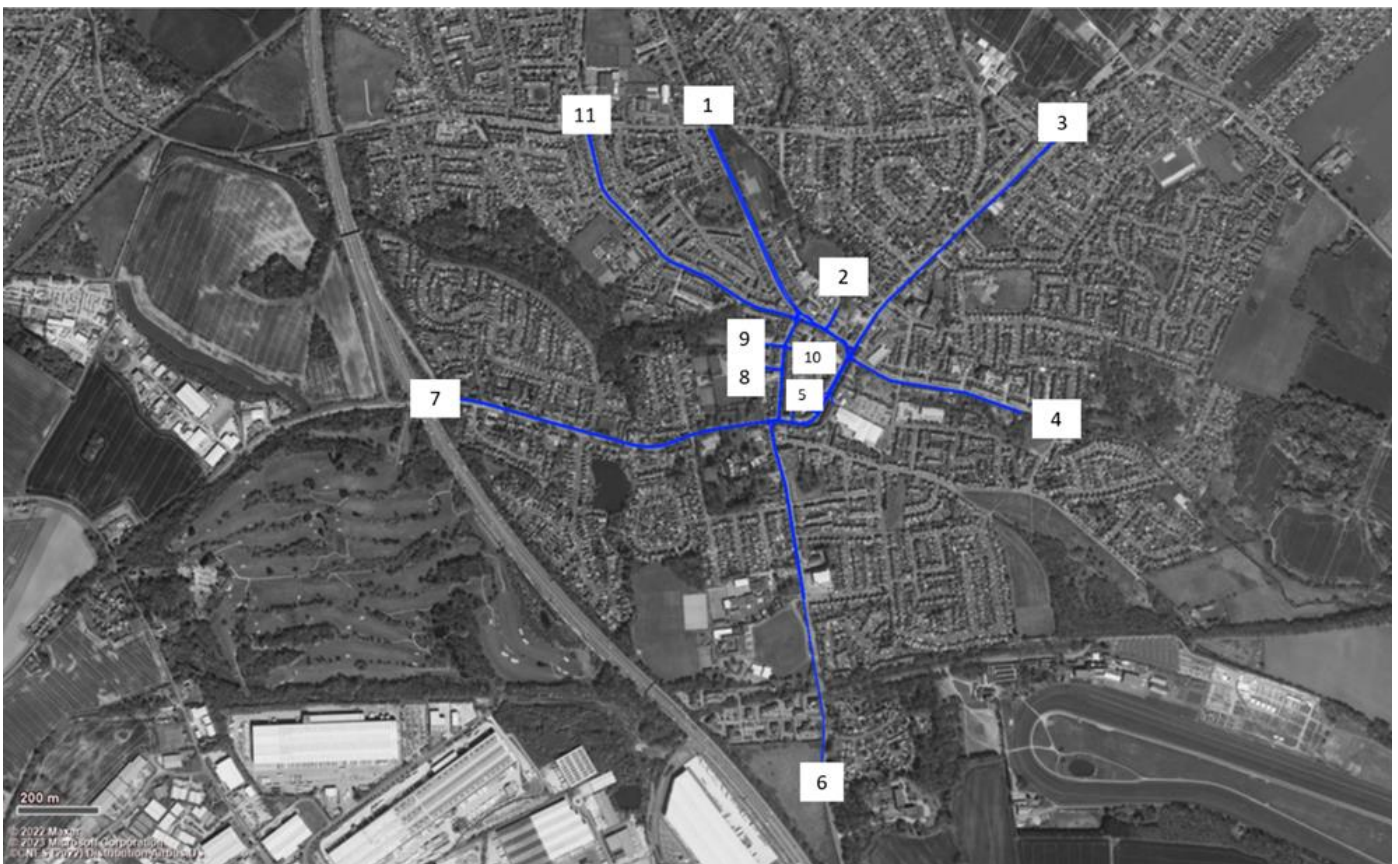
A 2023 base Vissim model was developed using the following data collected in support of the study:

- Manual Classified Counts.
- Traffic Signal Data.
- TomTom Journey Time Data.
- Site visit of study area on a typical weekday.

The extents of the 2023 base Vissim model are shown in **Figure 2**. Eleven zones replicate the entry and exit points to the local road network for vehicles. The Vissim model was calibrated to traffic flows, and validated to journey times, meeting the criteria set out for calibration and validation in DfT's TAG Unit M3.1.

A report detailing the development and validation of the base model is attached as **Appendix A** to this TN.

Figure 2 - Ashton-in-Makerfield Town Centre Vissim Model Extents



3. OPTIONS IDENTIFICATION AND SELECTION

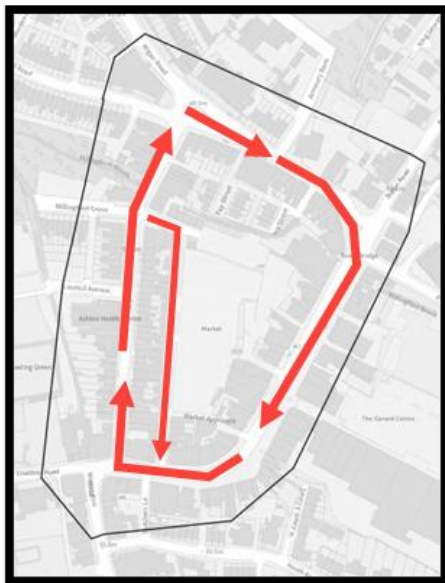
A comprehensive series of alternative highway layout options (Options A to L) were considered by the project team (in consultation with Council officers, including on-site discussions) over the course of the study. The alternative network configurations (which in places may require some land outside of the highway boundary), can be broadly summarised as comprising a combination of:

- one-way sections or road, to either reduce traffic on individual links or simplify junction layouts;
- additional pedestrian crossing facilities;
- restricted turning movements at junctions; and
- alternative traffic signals arrangements and staging.

Within each option, sub-components were discussed. These included the provision of additional footways at the Liverpool Road / Warrington Road junction, to enable pedestrian crossing facilities to be installed on all arms. Options for different signal staging configurations were also investigated, such as the potential implications of running the eastern and western approach arms together or separately at the Liverpool Road / Warrington Road junction.

Each option was considered under the assumption that the #OurFutureAshton Levelling Up Fund project is in place. Whilst this does not propose any changes to the highway layout, it does change the supply of off-road town centre parking, with the capacity of Garswood Street car park being reduced.

A brief description of each option (A to L) is set out below.



A – A full one-way clockwise gyratory



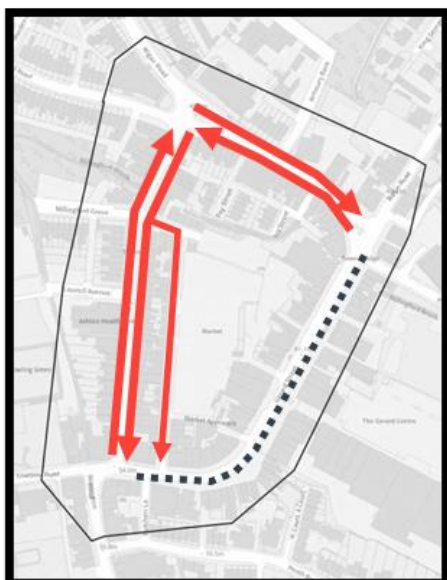
B - A full one-way anti-clockwise gyratory



C - A simple clockwise gyratory, but where two-way flow is permitted at the northern end of Bryn Street (as far as Millingford Grove).



D - A simple clockwise gyratory, but where two-way flow is permitted at the northern end of Bryn Street (as far as Council Avenue).



E - Two-way flow is retained on Bryn Street and Wigan Road, but Gerard Street is closed to traffic (pedestrianisation, though bus and loading access could be retained)



F - Two-way flow is retained on Bryn Street and Wigan Road, but Gerard Street is substantially closed to traffic (pedestrianisation, though bus and loading access could be retained)



G - Two-way flow is retained on Bryn Street and Wigan Road, but Gerard Street is operating one-way southbound only



H - Two-way flow is retained on Bryn Street and Wigan Road, but Gerard Street is operating one-way northbound only



I - Two-way flow is retained on Wigan Road and on the northern section of Bryn Street (to Council Avenue), with the southern section operating one-way southbound only. Gerard Street is operating one-way southbound only.



J - Two-way flow is retained on Wigan Road and on the northern section of Bryn Street (to Council Avenue), with the southern section operating one-way southbound only. Gerard Street is operating one-way northbound only.



K - Two-way flow is retained on Wigan Road and on the northern section of Bryn Street (to Millingford Avenue), with the southern section operating one-way northbound only. Gerard Street is operating one-way southbound only.



L - Two-way flow is retained on Wigan Road, with Bryn Street operating one way northbound only and Gerard Street operating one-way southbound only.

Of these options, the following three were chosen for Do-Something model testing within the Vissim model.

- **Do Something 1 (DS1):** A full one-way clockwise gyratory (Option A)¹
- **Do Something 2 (DS2):** Gerard Street one-way (southbound), and Bryn Street one-way (northbound) to Council Avenue, with Bryn Street north of Council Avenue and Wigan Road remaining two-way (Option J).
- **Do Something 3 (DS3):** Gerard Street one-way southbound, with Bryn Street and Wigan Road remaining two-way. (Option G)

Further details of the modelling assumptions which have been applied in the testing of these three options is provided on the following pages.

¹ A full anti-clockwise gyratory option (Option B) was also considered but ruled out for model testing because:

- The heavy Bolton Road approach arm demand would be forced to turn right onto Wigan Road. This traffic would therefore either have to give way to northbound Gerard Street traffic, or run in its own stage. Either way, it was felt it would make this junction more inefficient.
- Efficiencies would not be realised at the Liverpool Road/Gerard Street junction, as the Bryn Street stage would still be required, and therefore the junction would be likely to become more inefficient with the implementation of the additional and required signalised crossings.

The performance of the town centre network is principally driven by how well each of the three signalised junctions can operate. Flows can either be allowed to queue within the town centre network, or be held back along the approach arms. The configuration of the traffic signals timings can be used to adjust this balance. Extended queues within the town centre network will eventually cause the network to ‘lock up’ which creates effective ‘gridlock’.

The layout of the highway network in the town centre is effectively a three sided triangle. Therefore, the key factor behind the modelling results is which turning movements are permitted at each signalised junction. Where an option imposes a one-way restriction on a particular street, this naturally has the effect of increasing the volume of traffic making other turning movements elsewhere within the network, as all vehicles are still seeking the most efficient route to travel from origin zone to destination zone.

Further to discussions with the project group through the course of the project, we feel these three DS tests cover a broad range of possible configurations, and through investigating and interpreting the results of these model tests we can also see patterns which indicate the operational challenges and constraints that are likely to be present if we were to have tested further layout permutations within the model.

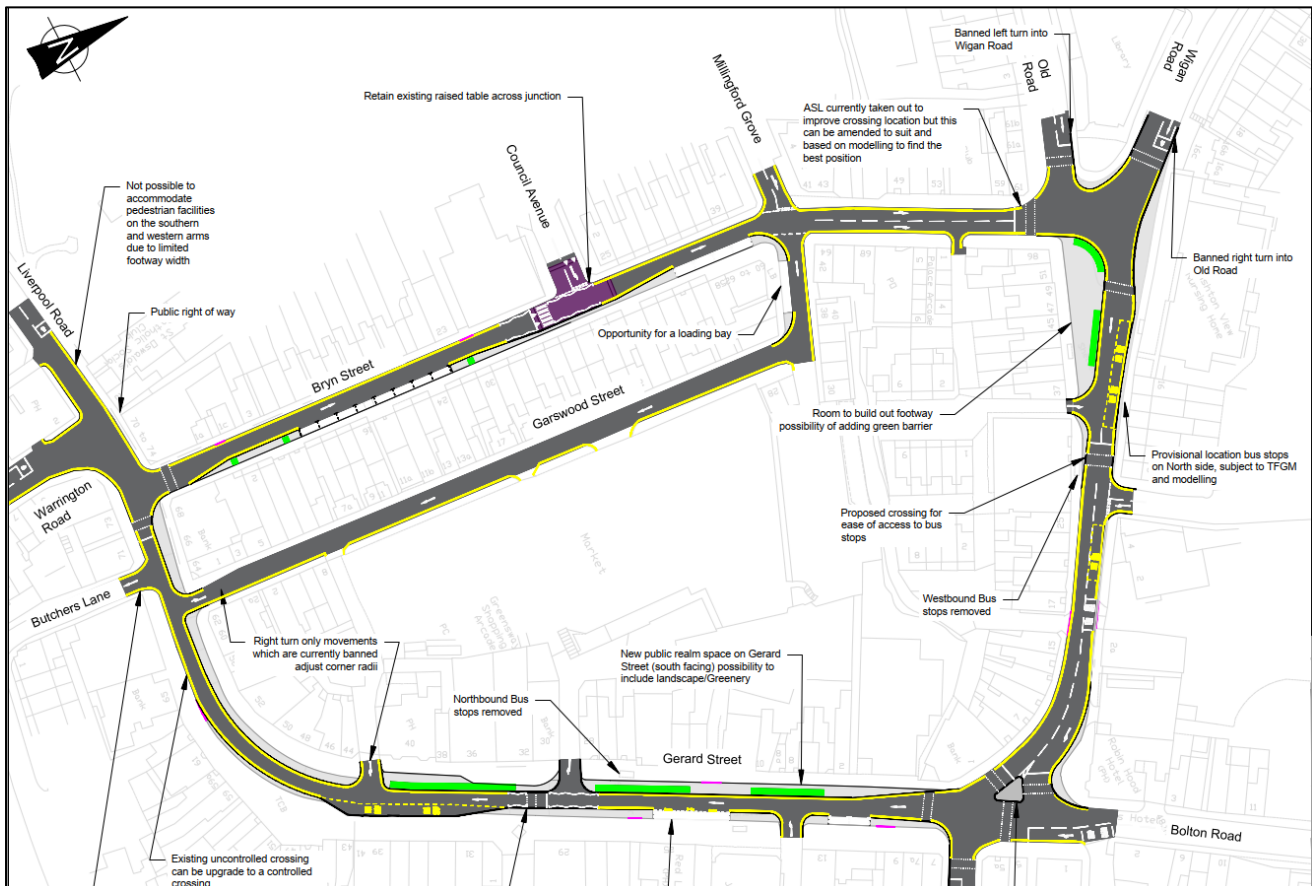
Further commentary on this is provided within the Modelling Outputs section of this TN.

DS1 Test (Option A)

- A full one-way clockwise gyratory

A high-level highway layout sketch of the DS1 option was drawn as part of the study. This is presented in **Figure 3**.

Figure 3 – DS1 Test (Option A) Highway Layout Sketch



In summary, DS1 incorporated the following features:

- One-way clockwise gyratory on Gerard Street, Bryn Street and Wigan Road.
- Two lane approach on Bryn Street approach to junction with Wigan Road.
- Signalised crossing provided across Gerard Street westbound approach and Bryn Street exit from the Gerard Street/Liverpool Road/Bryn Street/Warrington Road junction.
- Signalised pedestrian crossing on Wigan Road.
- Additional bus stops provided on Wigan Road, and bus layby on Gerard Street southbound.
- Refinements to the signal coding at the Gerard Street/Liverpool Road/Bryn Street/Warrington Road:
 - Removal of Bryn Street stage.
 - Incorporate a stage for the Bryn Street pedestrian crossing (called on demand).
 - Potential of running Gerard Street and Liverpool Road as separate stages, removing the give way requirement which currently exists.
- Refinements to the signal coding at Bryn Street/Wigan Road:
 - Bryn Street (left turn) to run with Wigan Road, whilst Bryn Street (right turn) runs in its own stage as a result of increased demand. With the current arrangement many vehicles turning right (to get to the final destination of Bolton Road) would be required to give way to southbound traffic from Wigan Road.
 - Old Road running in its own stage as the Wigan Road westbound phase is removed.
 - New pedestrian crossing on Wigan Road called at the same time as all red at junction.
- Refinements to signal coding at Bolton Road/Wigan Road/Gerard Street:
 - Wigan Road eastbound left turn running with Bolton Road southbound, and then running with Wigan Road eastbound right turn.

The following opportunities and constraints of this option are summarised below.

- Opportunities
 - Additional space on Gerard Street for public realm improvements.
 - Changes to the signals at the Gerard Street/Liverpool Road/Bryn Street/Warrington Road and Bolton Road/Wigan Road/Gerard Street with potential improvements to efficiencies of these junctions due to removal of give way requirements, and changes to staging.
 - Signalised pedestrian crossings provided at Gerard Street/Liverpool Road/Bryn Street/Warrington Road to allow for safe crossing. Currently the junction runs with a short all-red period which is activated by a key, there are no physical signalised crossings. On the site visit school related pedestrian movements were observed across Gerard Street, so signalised crossing facilities would benefit them.
 - Bolton Road southbound runs unopposed and therefore there is potential for improvement of operation on this arm, or reallocation of green time elsewhere.

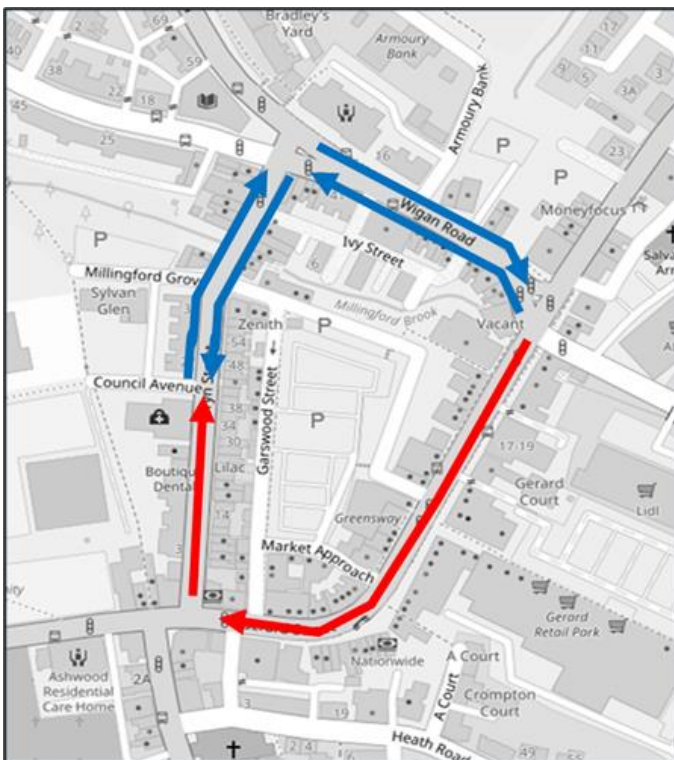
- Constraints
 - As a result of the clockwise gyratory, additional demand is required to travel northbound on Bryn Street, past the school on Council Avenue. This traffic will also travel through the zebra crossing on Bryn Street, which is widely used around School drop-off and pick-up times.
 - This additional demand means that Bryn Street requires its own stage, making the Bryn Street/Wigan Road junction more inefficient.

This option was tested with the 2023 base demand for the morning peak period.

DS2 Test (Option J)

- Gerard Street one-way southbound full length
- Bryn Street one-way northbound to Council Ave, then two-way at northern end
- Wigan Road retained as two-way full length

Figure 4 – DS2 Test Network (Option J) Schematic Layout



This option was only tested within the model and a scheme drawing was not produced. It was developed based on the DS1 results, with the aim being to explore a network change that was less significant than a full one-way gyratory (by retaining the two-way flows on Wigan Road and the northern part of Bryn Street) but also able to deliver a reduction in traffic flow on Gerard Street as the area of highest pedestrian footfall and the location of the town's prime retail frontages (by only permitting a single direction of traffic to pass).

In summary, DS2 incorporated the following features:

- One-way southbound on Gerard Street, and northbound on Bryn Street from the junction with Gerard Street to the junction with Council Avenue.

- Bryn Street north of Council Avenue and Wigan Road remaining two-way.
- Signalised crossing provided across Gerard Street westbound approach and Bryn Street exit from the Gerard Street/Liverpool Road/Bryn Street/Warrington Road junction.
- Refinements to the signal coding at the Gerard Street/Liverpool Road/Bryn Street/Warrington Road:
 - Removal of Bryn Street stage.
 - Incorporate a stage for the Bryn Street pedestrian crossing (called on demand).
 - Potential of running Gerard Street and Liverpool Road as separate stages, removing the give way requirement which currently exists.
- Refinement of linkage of signals between Bryn Street/Wigan Road and Bolton Road/Wigan Road, in an attempt to get vehicles from Bryn Street turning right, to run onto green turning left onto Bolton Road. This was tested with fixed green times in the model.

Through the process of testing DS2 the following iterative changes were made:

- Extension of the two lane approach on Wigan Road to the junction with Bolton Road. This was included because the right lane (for movements to Gerard Street and Princess Road) was filling up with traffic, preventing vehicles from Bryn Street getting into the left lane to turn left onto Bolton Road. This led to queues back through the network. The extension of the approach allowed for more stacking space for right turners, allowing vehicles from Bryn Street to generally flow into the left lane on the Wigan Road approach.
- Banning the right turn from Wigan Road onto Bryn Street. It was observed in the model that vehicles were queueing on Wigan Road westbound approach back towards the junction with Bolton Road. Banning this turn allowed for Wigan Road southbound and Wigan Road westbound to run in the same stage, with more green applied to this stage and less green given to the Old Road stage (which currently runs with Wigan Road westbound).

The following was tested in the model however was removed due to minimal impact:

- Two lanes southbound through the junction on Bolton Road, with a merge on exit on Gerard Street. This has minimal impact because the benefit of the additional lane was only realised when Bolton Road was on red, and vehicles queued at the stop line. When Bolton Road was on green, vehicles would tend to use the right lane on approach (as the road flares to the left) and then move across gradually for the merge on exit, meaning that the capacity of two lanes was not entirely realised.

The following opportunities and constraints of this option are summarised below.

- Opportunities
 - Additional space on Gerard Street for public realm improvements.
 - Changes to the signals at the Gerard Street/Liverpool Road/Bryn Street/Warrington Road and Bolton Road/Wigan Road/Gerard Street with potential improvements to efficiencies of these junctions due to removal of give way requirements, and changes to staging.
 - Signalised pedestrian crossings provided at Gerard Street/Liverpool Road/Bryn Street/Warrington Road to allow for safe crossing. Currently the junction runs with a short all-red period which is activated by a key, there are no physical signalised crossings. On the

site visit school related pedestrian movements were observed across Gerard Street, so signalised crossing facilities would benefit them.

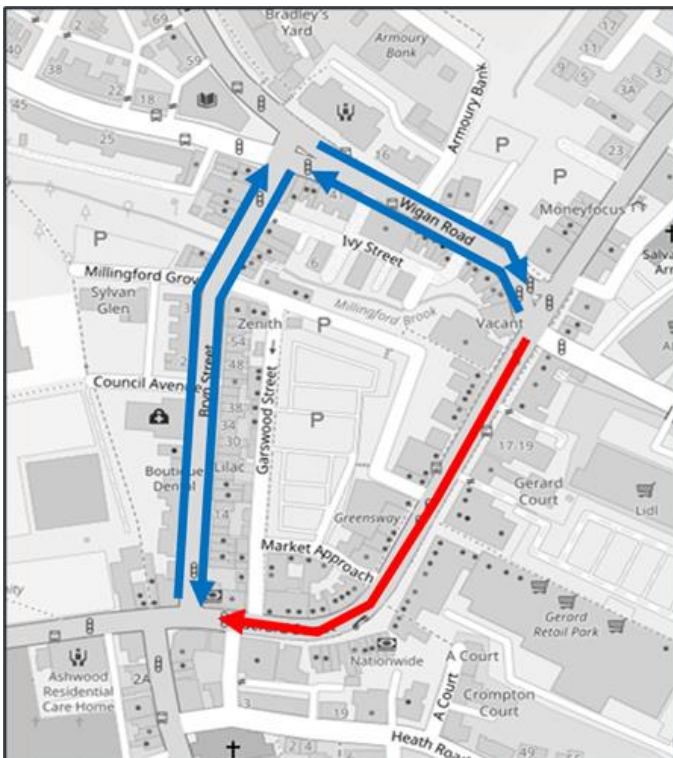
- Bolton Road southbound runs unopposed and therefore there is potential for improvement of operation on this arm, or reallocation of green time elsewhere.
- Refined linkage of signals between Bryn Street/Wigan Road and Bolton Road/Wigan Road.
- Constraints
 - As a result of the one-way system, additional demand is required to travel northbound on Bryn Street, past the school on Council Avenue. This traffic will also travel through the zebra crossing on Bryn Street, which is widely used around School drop-off and pick-up times.
 - Capacity constraints at the Bryn Street/Wigan Road junction as a result of high demand on Bryn Street meaning that it is required to run in its own traffic stage.

The DS2 test network was modelled with the 2023 demand for the morning peak period.

DS3 Test (Option G)

- **Gerard Street one-way southbound full length**
- **Bryn Road two-way full length**
- **Wigan Road two-way full length**

Figure 5 – DS3 Test Network



This option was only tested within the model and a scheme drawing was not produced. This option further expanded on the principles of DS2 by prioritising the reduction in traffic flows on Gerard Street but further minimising other network changes compared to the existing layout.

In summary, DS3 incorporated the following features:

- One-way southbound on Gerard Street.
- Refinement of linkage of signals between Bryn Street/Wigan Road and Bolton Road/Wigan Road, in an attempt to get vehicles from Bryn Street turning right, to run onto green turning left onto Bolton Road.
- Signalised crossing provided across Gerard Street westbound approach and Bryn Street exit from the Gerard Street/Liverpool Road/Bryn Street/Warrington Road junction.

The following constraints and opportunities of this option are summarised below:

- Opportunities
 - Additional space on Gerard Street for public realm improvements.
 - Signalised pedestrian crossings provided at Gerard Street/Liverpool Road/Bryn Street/Warrington Road to allow for safe crossing. Currently the junction runs with a short all-red period which is activated by a key, there are no physical signalised crossings. On the site visit school related pedestrian movements were observed across Gerard Street, so signalised crossing facilities would benefit them.
 - Bolton Road southbound runs unopposed and therefore there is potential for improvement of operation on this arm, or reallocation of green time elsewhere.
 - Refined linkage of signals between Bryn Street/Wigan Road and Bolton Road/Wigan Road.
- Constraints
 - As a result of the one-way southbound link on Gerard Street, additional demand is required to travel northbound on Bryn Street, past the school on Council Avenue. This traffic will also travel through the zebra crossing on Bryn Street, which is widely used around School drop-off and pick-up times. As Bryn Street is two-way in this option, the total level of traffic travelling through the zebra crossing is likely to be higher than in the Base, DS1 and DS2.
 - Capacity constraints at the Bryn Street/Wigan Road junction as a result of high demand on Bryn Street meaning that it is required to run in its own traffic stage.

The DS3 test network was modelled with the 2023 demand for the morning peak period.

DS3 Test with Reduced HGVs

Further to an initial review of the DS3 results, it was agreed with the project team that it was worth investigating how much more efficient the network could operate should HGV trips be removed. It could in theory be feasible for the Council to initiative weight restrictions (or similar) to prohibit larger vehicles from using the Ashton town centre routes. Due to its proximity to the M6 corridor, Ashton experiences a high volume of HGVs which have an unquestionable impact on the environment within the town centre due to the adverse noise, vibration and air quality impacts which they can cause.

Within the model inputs, external-to-external HGV trips were removed from the demand matrix where they were travelling on either Bryn Street or Gerard Street in the base model. HGV trips via other routes, including those with a destination internal to the study area, were retained.

This additional DS3 (Reduced HGV) test was modelled with the 2023 demand, for both the morning and evening peak periods.

4. MODELLING RESULTS AND FINDINGS

Network performance statistics, in the form of unmet demand (vehicles which cannot get into the network) and modelled delay, have been extracted from the Vissim models. A comparison of the morning peak results is provided in Figure 6 for unmet demand, and Figure 7 for modelled delay.

Figure 6 - Unmet Demand Results: Morning Peak

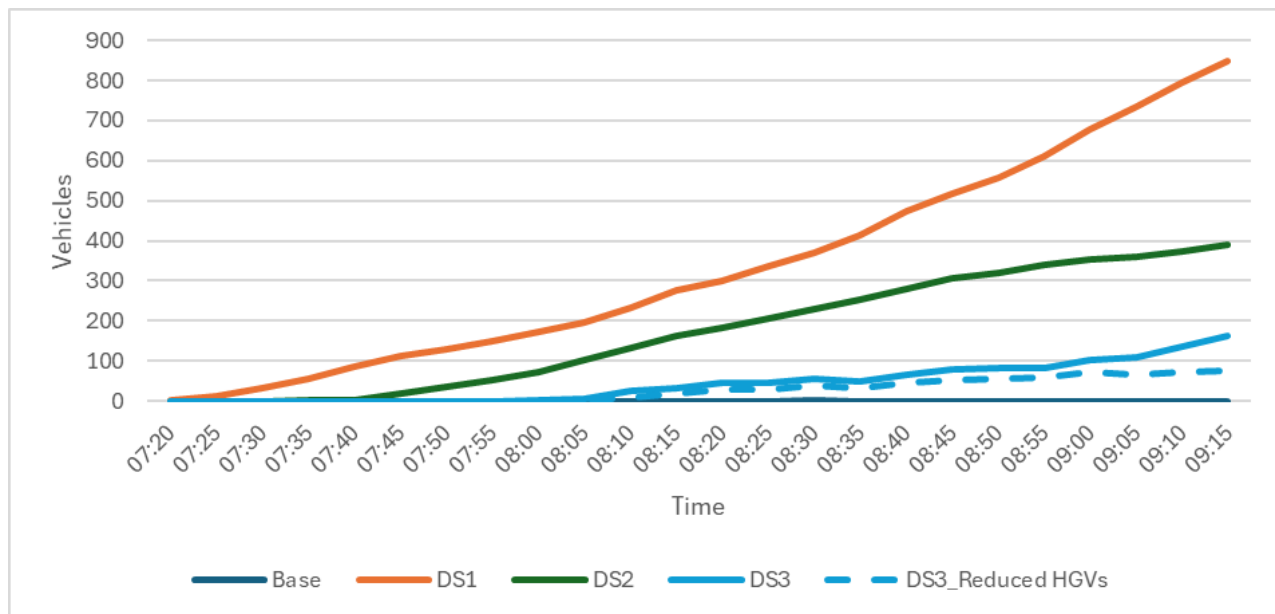
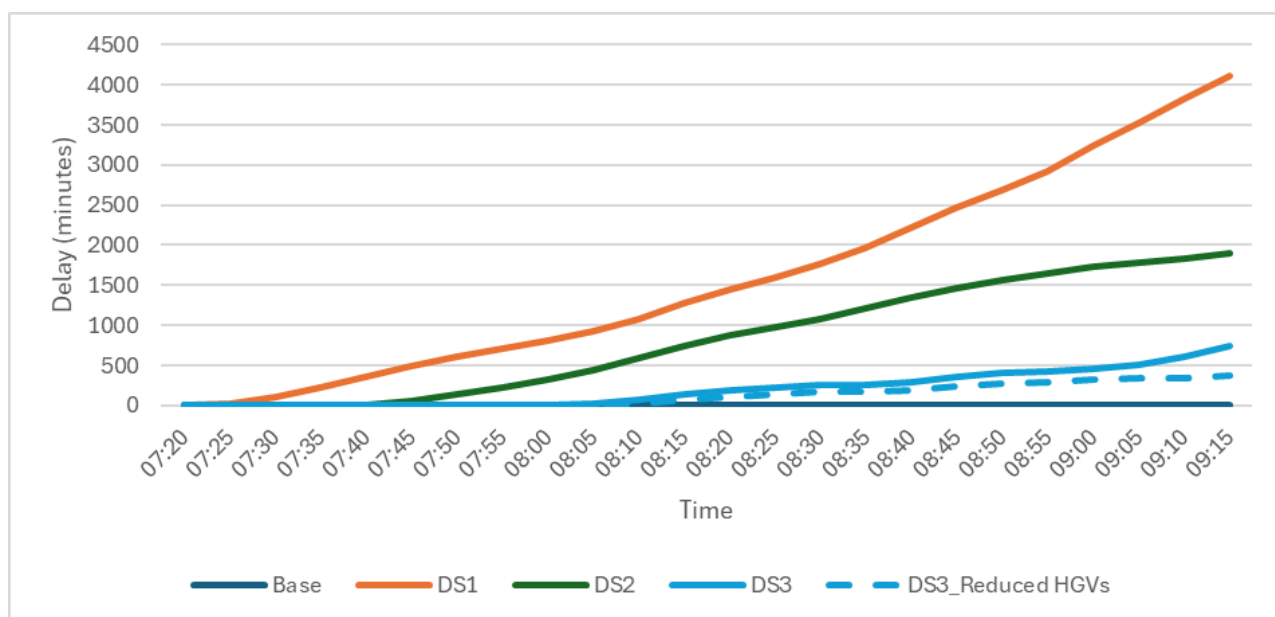


Figure 7 - Modelled Delay Results: Morning Peak



These results highlight that the base network is predicted to experience a lower level of unmet demand and modelled delay, than any of the DS options that have been tested. The highest delays are predicted in DS1, followed by DS2. DS3 was shown to perform to a comparable level to the base network for the first

hour of the morning peak period. Removing HGV through-traffic further improved the network performance of the DS3 option towards the end of the morning peak period.

Given the potential promise of the DS3 (Reduced HGVs) results for the morning peak period, this option was also tested for the evening peak period. A comparison of the network performance for this scenario (as well as the DS1 option which was also run for the evening peak period) is presented below in Figure 8 and Figure 9.

Figure 8 - Unmet Demand Results: Evening Peak

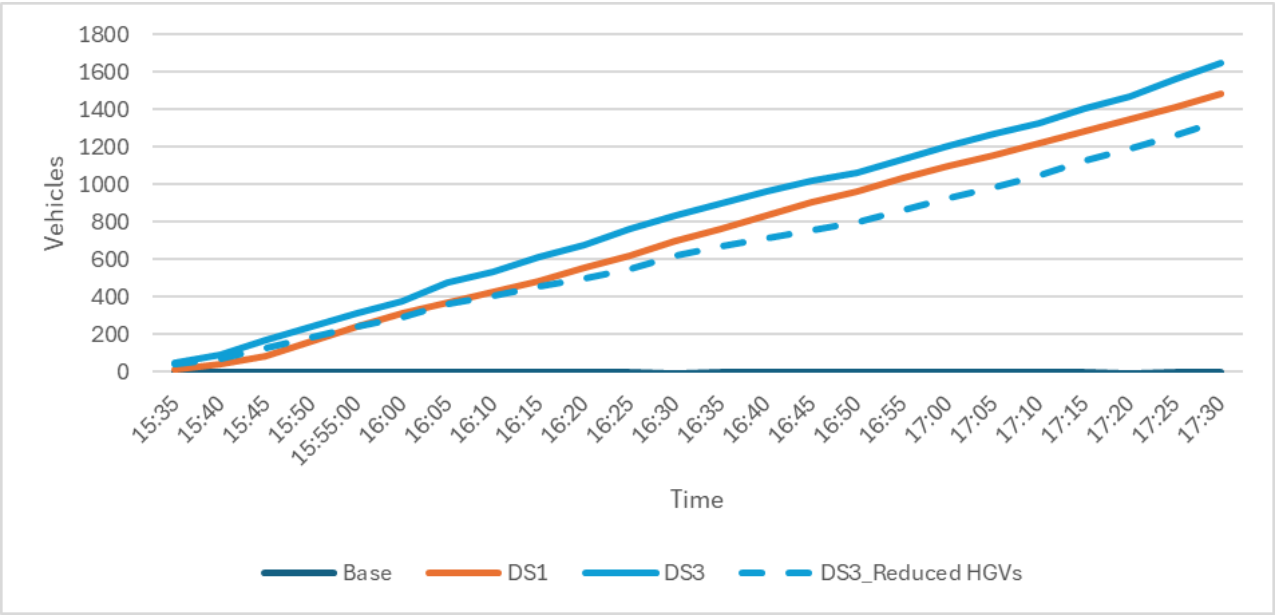
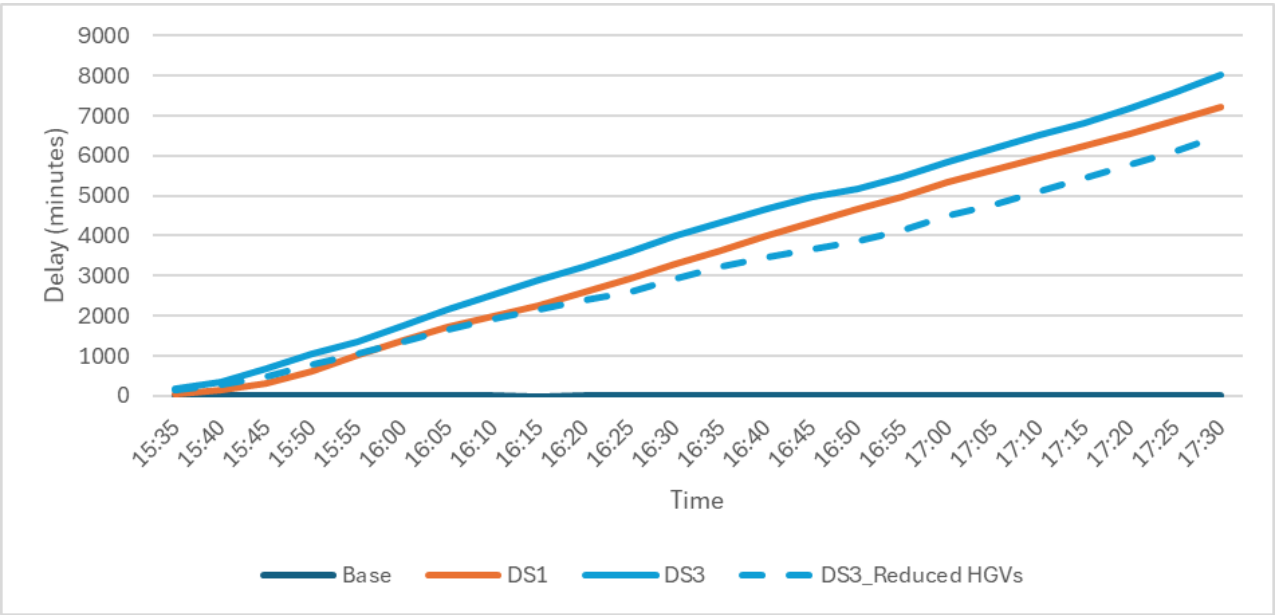


Figure 9 - Modelled Delay Results: Evening Peak



Through this exercise, it was shown that the DS3 (Reduced HGVs) test is predicted to not perform as well as the base for the evening peak period. Indeed, it is predicted to perform less well than the DS1 option during this time period. The reason for this is that northbound flows through the network are higher in the evening peak than in the morning. The DS3 layout forces all northbound traffic to use Bryn Street (as Gerard Street operates as a southbound only link). Bryn Street becomes severely congested, and traffic queues propagate back to the Liverpool Road / Warrington Road junction and through the rest of the network, effectively creating 'gridlock'.

5. PROJECT SUMMARY AND POTENTIAL NEXT STEPS

WSP has undertaken a feasibility assessment of potential options to reconfigure the highway layout within Ashton-in-Makerfield town centre. The transport feasibility study called for optioneering and an assessment of alternative town centre highway layout arrangements, supported by a Vissim microsimulation traffic model of the town centre area.

A principal consideration of the optioneering process was the placemaking potential for Gerard Street. Gerard Street has the town's prime retail frontage with highest pedestrian footfall, and would therefore most benefit from a less trafficked environment should this be feasible. With this in mind, a comprehensive series of alternative highway layout options were considered by the project team (in consultation with Council officers, including on-site discussions), which comprised varying combinations of: one-way sections or road by direction; additional pedestrian crossing facilities; restricted turns at junctions; and alternative traffic signals layouts. In some places land outside of the highway boundary may be required.

Through a decremental modelling process, three options were taken forward for testing: starting with the most ambitious full one-way gyratory arrangement, and finishing with a more scaled-back level of ambition involving converting Gerard Street only to one-way operation. Taken together the three test options modelled provide a robust evidence base as to likely challenges and constraints associated with making any material modification to the town centre road network from an operational perspective.

Disappointingly, the Vissim modelling demonstrated that all three of the alternative highway layout options tested performed poorly compared to existing conditions at peak times of the day, such that any environmental benefits generated on Gerard Street would not be capable of offsetting some very significant increases in delay and congestion. Rather than ease current pressures on the town centre's busy road network, the alternative highway layouts tested would, if implemented, significantly exacerbate these problems - a situation that would ultimately be unacceptable to the Council, businesses and general public alike.

Furthermore, the Vissim model testing found that even the removal of a proportion of existing heavy goods vehicle traffic (through some form of TROs) from passing through the town centre, over and above the highway layout changes tested, would not sufficiently tip the balance towards a workable solution.

Ashton-in-Makerfield's close proximity to the M6 corridor, and its intersection between the two of the borough's principal routes in the A49/A58, means that high proportion of the traffic using Bryn Street and Gerard Street is through traffic that has neither an origin nor destination within Ashton. These journeys could potentially therefore be encouraged to use alternative routes which avoid the town centre. Should the Council wish to investigate the underlying traffic patterns using routes which pass through Ashton town centre then we can recommend potential data sources (such as TomTom) and select link analysis techniques that would provide a greater understanding. If pursued this could help to identify other more strategic transport solutions that may have the potential to work in tandem with some of the town centre access options considered in this transport feasibility study.



APPENDIX A – BASE MODEL DEVELOPMENT AND VALIDATION REPORT



Wigan Council

ASHTON TOWN CENTRE STUDY

Local Model Validation Report (LMVR)





Wigan Council

ASHTON TOWN CENTRE STUDY

Local Model Validation Report (LMVR)

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

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DATE: MAY 2024

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First issue			
Date				
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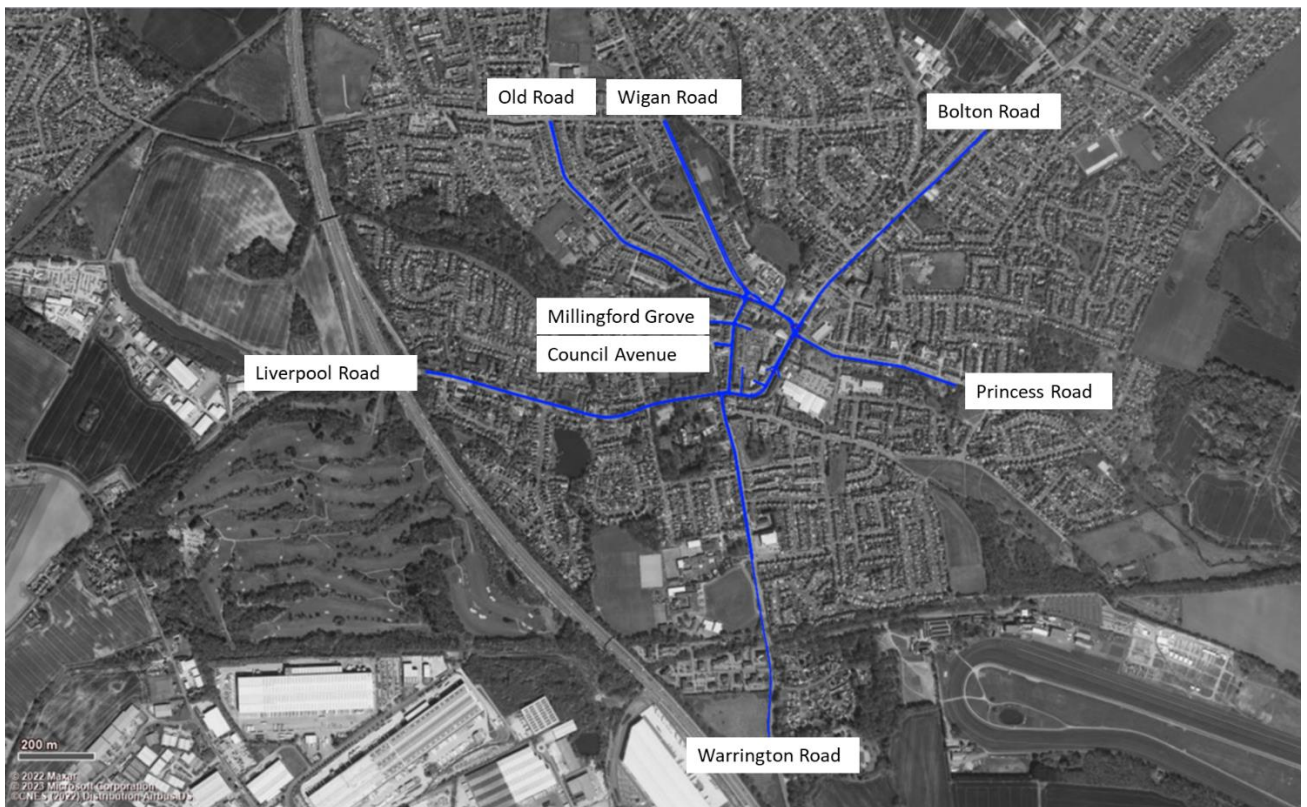
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1 INTRODUCTION

- 1.1.1. WSP has been commissioned by Wigan Council to develop a microsimulation Vissim model for the town centre of Ashton-in-Makerfield. The purpose of the task is to develop a 2023 based Vissim traffic model, which can be used for option testing within the Town Centre.
- 1.1.2. The Vissim model has been developed for morning, interpeak and evening peak periods based on traffic survey data corresponding to November 2023 and February 2024. The extent of Vissim network considered for modelling is shown in Figure 1-1, with key focus on the following three junctions:
 - A58 Gerard Street / A49 Warrington Road / A49 Liverpool Road / A49 Bryn Street
 - Old Road / A49 Wigan Rd (SE)/ Bryn Street / A49 Wigan Road (NW)
 - A58 Bolton Road / Princess Road / A58 Gerard Street / A49 Wigan Road (NW)

Figure 1-1: Network Extent



- 1.1.3. This document describes the process for the development of a calibrated and validated base Vissim traffic model, and also describes the use of the model to assess the impact of the possible schemes in the Ashton-in-Makerfield Town Centre to aid the design process.
- 1.1.4. The remainder of this report is structured as follows:
 - **Chapter 2** – describes the data collection and analysis of data,
 - **Chapter 3** – describes the development, calibration and validation of the Vissim traffic model,
 - **Chapter 4** – presents a summary of the base model development.

2 DATA COLLECTION

2.1 OUTLINE

2.1.1. Data has been collected in support of the project and to aid the traffic model development, including:

- Manual Classified Counts;
- Queue Length Surveys;
- Pedestrian Count Surveys;
- Car Parking Survey;
- Traffic Signal Data;
- Journey Time Data;
- Site Visit observation.

2.1.2. The following subsections will summarise the data collection process.

2.2 MANUAL CLASSIFIED COUNTS AND QUEUE LENGTH SURVEYS

2.2.1. Manual Classified Count (MCC) and queue length surveys were conducted at locations listed in Table 2-1 shown in Figure 2-1. The MCC data and queue lengths were collected for every 15 minutes and 5 minutes during the survey period respectively. The survey data for the three key junctions was collected in November 2023, with additional data collection undertaken in February 2024 to supplement the 2023 surveys.

Table 2-1: MCC Survey Locations

Site No	Site Name	Description	Date	Duration
1	A58 Gerard Street/A49 Warrington Road/A49 Liverpool Road/A49 Bryn Street	Signalised 4-arm intersection	07 – 11 – 2023	06:00 to 24:00
			08 – 11 – 2023	06:00 to 24:00
			09 – 11 – 2023	06:00 to 24:00
2	Old Road/A49 Wigan Road (SE)/Bryn Street/A49 Wigan Road (NW)	Signalised 4-arm intersection	07 – 11 – 2023	06:00 to 24:00
			08 – 11 – 2023	00:00 to 24:00
			09 – 11 – 2023	00:00 to 20:00
3	A58 Bolton Road/ Princess Road/A58 Gerard Streer/A49 Wigan Road (NW)	Signalised 4-arm intersection	07 – 11 – 2023	06:00 to 24:00
			08 – 11 – 2023	00:00 to 24:00
			09 – 11 – 2023	00:00 to 20:00
4	A49 Bryn Street(N)/Millingford Grove/A49 Bryn Street(S)/Garswood Street	Priority-controlled 4-arm intersection	06 – 02 – 2024	07:00 to 19:00
5	A49 Bryn Street (N)/Council Avenue/A49 Bryn Street (S)	Priority-controlled 3-arm intersection	06 – 02 – 2024	07:00 to 19:00

Figure 2-1: MCC Site Locations



2.2.2. The queue data was reviewed against journey time data, the site visit and survey footage, which suggests that the queue data covers the available view from the cameras, and therefore it is unlikely that the data covers the actual full length of the queues. Therefore, at this time, the queue data has not been used in conjunction with the model validation, instead using the obtained journey time data and manual checks against the survey footage.

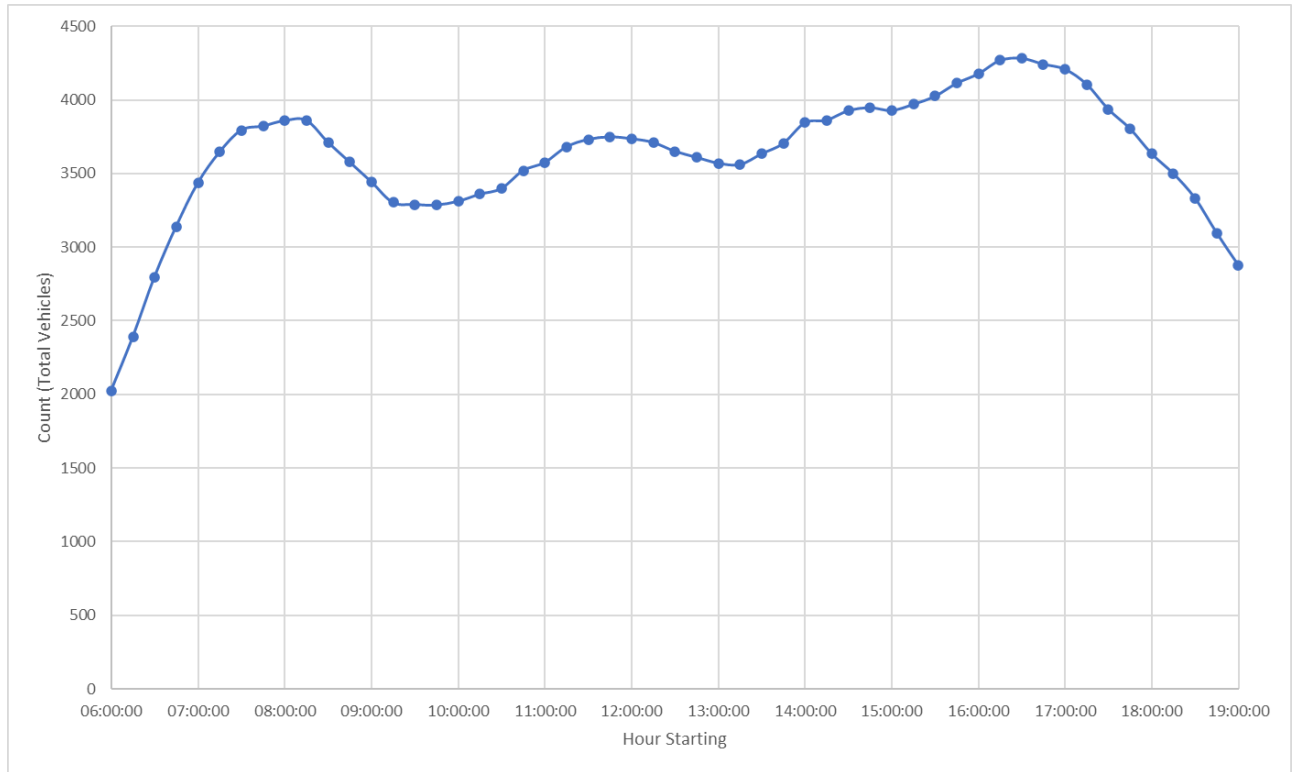
MANUAL CLASSIFIED COUNT ANALYSIS

2.2.3. The MCC data collected at Sites 1 to 3 were used to calculate the rolling hour vehicle totals to identify the peak hours for use within the model, with the surveyed flows across the three days averaged. The morning, interpeak and evening peak periods identified are:

- Morning Peak – 07:15 to 09:15
- Interpeak – 10:45 to 12:45
- Evening Peak – 15:30 to 17:30

2.2.4. Figure 2-2 summarises the rolling hourly number of total vehicles across the three sites, with the figure highlighting a morning peak hour of 08:15-09:15, interpeak hour of 11:45-12:45 and evening peak hour of 16:30-17:30.

Figure 2-2: Rolling hourly total vehicles



2.3 PEDESTRIAN COUNT SURVEY

- 2.3.1. Pedestrian surveys were conducted at the Bryn Street zebra crossing, to the south of the Council Avenue as shown in Figure 2-3. The pedestrian surveys were undertaken on Tuesday 6th February 2024, between 07:00 and 19:00, with the survey recorded the number of crossings, by direction, each 15-minutes. The count, by direction, for the modelled peak hours is summarised in Table 2-2. The table highlights that the highest count occurred 08:15-09:15 westbound and 15:30-16:30 eastbound, which are both related to school drop off and pick up times. Outside of these time periods, the highest number of crossings recorded in an hour within the other modelled time periods was 27.

Figure 2-3 Pedestrian Survey Location



Table 2-2 Peak hour Pedestrian Count

Direction	07:15-08:15	08:15-09:15	10:45-11:45	11:45-12:45	15:30-16:30	16:30-17:30
Eastbound	3	66	27	22	162	21
Westbound	21	162	12	8	22	9

2.4 CAR PARKING SURVEY

2.4.1. Car Parking surveys were undertaken Tuesday 12th to Saturday 16th December 2024, for the following locations:

- Garswood Street Car Park;
- Euro Parks Car Park (Garswood Street);
- Greensway Car Park;
- Bolton Road/Albert Street Car Park;
- Millingford Grove Car Park;
- Gerard Centre Car Park;
- Lidl Car Park;
- Aldi Car Park;
- Hilton Street Car Park.

2.4.2. The surveys include an inbound and outbound count, in addition to an accumulation within the car park, and percentage occupancy of the car park for 15-minute periods between 06:00 and 20:00.

2.5 TRAFFIC SIGNAL DATA

2.5.1. Traffic Signal data was obtained from Transport for Greater Manchester (TfGM) by Wigan Council for the signalised junctions and pedestrian crossings in the modelled area. This included the following data:

- Signal specification
- Signal timing data

2.5.2. The signal timing data was provided for Wednesday 17th January 2024, to give an indication of the signal timings which the network was running, to provide a starting point for the model build.

2.5.3. The locations of the signalised junctions and signalised pedestrian crossings are listed below:

- A58 Gerard Street / A49 Warrington Road / A49 Liverpool Road / A49 Bryn Street
- Old Road / A49 Wigan Road (SE)/ Bryn Street / A49 Wigan Road (NW)
- A58 Bolton Road / Princess Road / A58 Gerard Street / A49 Wigan Road (NW)
- Controlled Pedestrian crossing Gerard Street.

2.6 JOURNEY TIME DATA AND ANALYSIS

2.6.1. Journey time data was extracted from TomTom for the month of November 2023 as most of the traffic surveys were carried out during this period. The data corresponding to weekdays of Tuesday, Wednesday and Thursday were collected for each 15 minute interval and analysed for routes mentioned in Table 2-3 and shown in Figure 2-4.

Table 2-3: Journey Time Routes

S. No.	Route	Start Point	End Point
1	Route 1	Wigan Road SB	Wigan Road/Bolton Road
2	Route 2	Liverpool Road/Woodedge	Gerard Street/Princess Road
3	Route 3	Warrington Road/Violet Street	Wigan Road/Old Road
4	Route 4	Wigan Road/Old Road	Warrington Road/Violet Street
5	Route 5	Bolton Road/Edward Drive	Liverpool Road/Woodedge
6	Route 6	Gerard Street/Wigan Road	Wigan Road NB

Figure 2-4: Journey Time Routes



2.6.2. The average journey time along the routes mentioned in Table 2-3 are summarised in Table 2-4. These journey times are the target journey times for the model to validate against. The data suggests the following:

- The morning peak experiences the highest journey times for the following routes:
 - Warrington Road/Bryn Street northbound (Route 3);
 - Bryn Street/Warrington Road southbound (Route 4);
 - Bolton Road/Liverpool Road southbound (Route 5);
 - Wigan Road northbound (Route 6).
- The evening peak experiences the highest journey times for the following routes:
 - Wigan Road southbound (Route 1);
 - Liverpool Road/Gerard Street eastbound (Route 2).

Table 2-4: Journey Time Summary

S. No.	Route	Journey Time (seconds)					
		07:15-08:15	08:15-09:15	10:45-11:45	11:45-12:45	15:30-16:30	16:30-17:30
1.	Route 1	83	97	106	107	113	112
2.	Route 2	211	338	197	201	372	357
3.	Route 3	238	234	134	135	170	165
4.	Route 4	227	138	125	128	174	179
5.	Route 5	236	304	207	209	266	251
6.	Route 6	90	68	60	58	63	63

2.7 SITE VISIT

2.7.1. A site visit was undertaken on Wednesday 28th February 2024, to gain a greater understanding of the network conditions and vehicle behaviours across the day. The following observations were made from the site visit:

- The constraints to traffic appeared to generally originate from the A58 Gerard Street / A49 Warrington Road / A49 Liverpool Road / A49 Bryn Street junction, including the following:
 - Vehicles turning right into Warrington Road from Liverpool Road generally blocked vehicles travelling ahead through the junction as a result of the small right turn box, and the requirement to give way to westbound traffic. This resulted in several signal cycles allowing a minimal number of vehicles through the junction from Liverpool Road.
 - Vehicles often adhered to the keep clear box on the Liverpool Road westbound approach, which is located just upstream of the stopline.
 - In the morning peak period, the all-red phase was generally called every cycle to allow for pedestrians (generally school children) to cross the junction.
 - There were occasions of the crossing patrol using the intergreens between stages to allow for crossing the road, potentially impacting throughput (generally from Warrington Road).
 - In the early morning peak, there is a high demand on Bryn Street, however appears to get a limited level of green time, therefore generating queues.
- The Keep Clear boxes on Warrington Road northbound were generally well adhered to.
- In the first morning peak hour, there was limited use of the zebra crossing on Bryn Street, with greater use in the second peak hour, predominantly by pedestrians travelling to/from St Oswald's School. In the evening peak, the crossing was used most later afternoon (early evening), coinciding with the end to the school day.
- The pedestrian crossing on Gerard Street was more readily used during the interpeak and evening peak periods.

- Whilst the Gerard Street northbound two-lane section on approach to the Wigan Road junction was generally kept clear throughout the day, it was observed that on occasion vehicles would pull up and wait, limiting the ability to use both lanes.

3 VISSIM BASE MODEL DEVELOPMENT

3.1 MODEL SPECIFICATION

- 3.1.1. The model was developed in the Vissim software and version 2024 (SP 02). Vissim is a microscopic, behaviour-based, multi-purpose traffic simulation program developed by PTV. The model uses the psycho-physical car-following model, developed by Wiedemann, and a related lane-changing model.
- 3.1.2. The model evaluation results were presented as an average of twenty random seed runs, with an initial random seed of 10 and increasing in intervals of 1.
- 3.1.3. The 2024 base year models have been developed to the following specifications:
- Peak Hours
 - Morning Peak: 07:15 - 09:15
 - Interpeak: 10:45 – 12:45
 - Evening Peak 15:30 - 17:30
 - Warm up and cool down of 15 minutes each.
 - Vehicle Types
 - Car
 - LGV
 - Heavies (OGV1 and OGV2)
 - Buses

3.2 NETWORK DEVELOPMENT

- 3.2.1. The Vissim highway network was developed based on Ordinance Survey (OS) and online mapping information (Bing maps in-built to Vissim, supported by Google aerial images and street view). Vissim's in-built Bing Maps were used as background to ensure that lanes across the network and lane allocations, on the approach to junctions, are accurately represented within the model.
- 3.2.2. The network is made up of a series of links, joined together by connectors. A link is a unidirectional representation of a section of highway; each link has a set of attributes (such as lane width, link length, link speed and number of lanes) that can affect vehicle performance. A connector is a unidirectional section of highway that joins two links.
- 3.2.3. Desired Speeds have been coded at each point, within the network, where speeds are observed as changing on the ground. Reduced Speed Areas (RSAs) are included in the model to reflect reduction in speed when negotiating the geometry of the road network, where realistic vehicle speeds are lower than the actual speed limits and are specified separately by vehicle type. Reduced speed areas were added at locations of tight curves, such as turns at a junction.
- 3.2.4. Priority rule markers have been used to control traffic flows at priority junctions, using a determined gap time to decide upon whether vehicles giving way are able to enter the junction. Priority rules have also been included within the model to reflect yellow box behaviour, either at locations where a physical yellow box exists, or at locations where vehicles wait when there is queuing within the network.

- 3.2.5. Priority rules have also been used on Bryn Street to code the zebra crossing, to the south of Council Avenue. The priority rules detect when there is demand waiting to cross the road, causing vehicles to stop and allow pedestrians to cross.
- 3.2.6. Bus routes have been modelled using publicly available routes and timetable data, published on the website, bustimes.org.
- 3.2.7. The bus routes that operate during the modelling period and considered in the model development are listed in Table 3-1.

Table 3-1: Bus Routes Coded in Vissim Model

S. No.	Bus Number	S. No.	Bus Number
1	10	11	652
2	10A	12	657
3	22	13	665
4	35	14	666
5	156	15	742
6	157	16	950
7	320	17	951
8	559	18	970
9	602	19	WVR3
10	603		

- 3.2.8. The available data has been used to model the routing of buses through the model network, including identifying which bus stops each route uses.
- 3.2.9. The bus stops that are coded in the network are listed in Table 3-2.

Table 3-2: Bus Stops Coded in Vissim Model

S. No.	Bus Stop	S. No.	Bus Stop
1	Ashton Library N	8	St Oswald's RC Church W
2	Ashton Library W	9	St Oswald's RC Church E
3	Ashton Library E	10	St Thomas Church N
4	Ashton View (Stop B)	11	St Thomas Church S
5	Ashton View (Stop C)	12	Old Hall Drive W
6	The Gerard Centre (Stop E)	13	Old Hall Drive E
7	The Gerard Centre (Stop D)	14	Ashton View (Stop A)

- 3.2.10. Bus dwell times are included in the model and inform how long buses stop at each stop for. The dwell time distribution has a lower bound of 0s, a mean of 20s, and a standard deviation of 2.

3.3 VISSIM ZONE STRUCTURE

- 3.3.1. In Vissim, a 'zone' is defined as a point at which the vehicles enter or exit the model, so where links are truncated at the extremities of the model, a zone is defined.
- 3.3.2. The zone structure in Vissim shown in Figure 3-1, with the corresponding locations of the zones presented in Table 3-3.

Figure 3-1 Location of zones

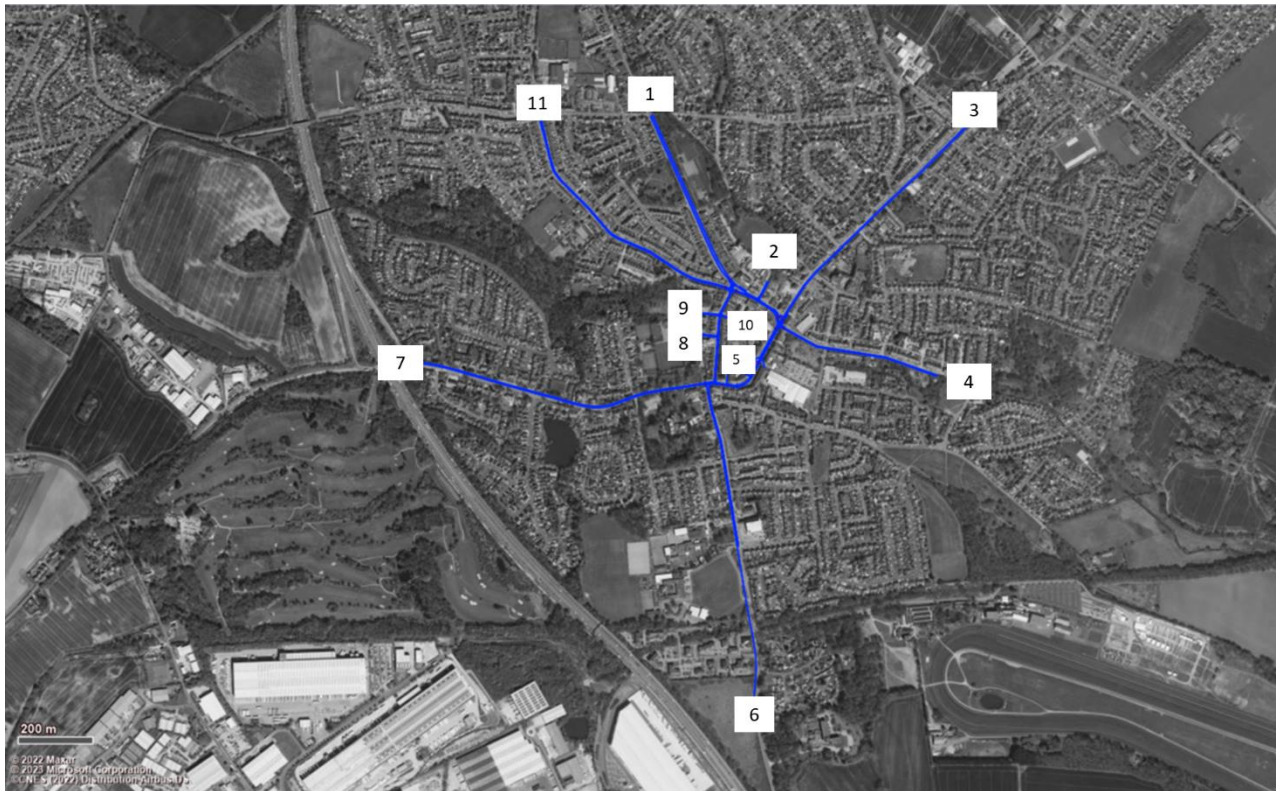


Table 3-3: Vissim Zone List

S. No.	Zone	S. No.	Zone
1	A49 Wigan Road (NW)	7	A58 Liverpool Road
2	Armoury Bank	8	Council Avenue
3	A58 Bolton Road	9	Millingford Grove
4	Princess Road	10	Garswood Street
5	Market Approach	11	Old Road

3.4 SIGNAL CODING

- 3.4.1. The signals were coded into the model using the VAP function within Vissim, with signal information from the provided specifications and signal timing information coded into the model. The signals for the junctions were coded by developing programs of signal timings based upon the provided signal timing information, with different programs developed for the 15-minute time slices within the peak periods. The pedestrian crossings at the junctions were coded with demand dependency, based upon the information provided, with the pedestrian stages only being called when demand was present. The signalised crossing on Gerard Street was also coded to only activate the pedestrian stage when demand was present, and the model include a variable pedestrian intergreen based on walking speeds replicating the observed operation.

3.5 DEMAND MATRIX DEVELOPMENT

- 3.5.1. Demand matrices were estimated for every 15 minutes to be used in the Vissim model to replicate variation in traffic demand within the peak hours, warm-up and cool down periods. Based upon the traffic survey data, network diagrams were developed for the individual vehicle types. These network diagrams were balanced on Bryn Street, due to the differences in survey dates. The information from the network diagrams were inserted into a Matrix Estimation LinSig model to generate initial Origin-Destination (OD) matrices for Cars, LGVs and Heavy vehicle classes for every hour of each peak period. The initial matrices were then incorporated into the model and iterated through the model calibration process.
- 3.5.2. The warm-up matrices are assigned to the model to allow the built up of adequate queuing in the network and for the traffic conditions in the model to be reflective of observed conditions at the start of the peak hour. Through the analysis of journey time data, it was established that at the start of the evening peak period in particular, that there was congestion within the network. Therefore, additional demand was incorporated within the warm up to ensure that the congestion in the network at the start of the peak hour was appropriate.
- 3.5.3. The model also includes a cool-down/ post peak period, allowing all vehicles to complete their journeys that were still within the model at the end of the peak hour.
- 3.5.4. As a result of the matrix development process, ten 15-minute matrices were developed for each peak period, covering the peak hours, and 15 minutes before and after. For each peak period, matrices were developed for Cars, LGV and Heavies separately.

3.6 TRAFFIC DYNAMIC ASSIGNMENT

- 3.6.1. In dynamic assignment technique vehicles are loaded onto the network in the form of a matrix specific to a vehicle type and specified time interval. Each individual vehicle is then able to choose its own route between the given origin and destination.
- 3.6.2. Route choice is determined by a comparison of the generalised cost of travelling alternative routes, with higher cost routes used by a smaller proportion of traffic. However, the Vissim model had only minimal route choices and hence no adjustments to link costs were necessary.

3.7 MODEL CONVERGENCE

- 3.7.1. Model convergence is an iterative process whereby, at the end of each model run, the travel time costs are adjusted; for the subsequent model run the adjusted generalised cost figures are used for

each route, when traffic distribution is calculated. Ideally, after each convergence model run, the traffic volumes and travel times on each route will change less until, eventually, they will not yield significant differences in respect of flow and travel time results. The network can then be described as converged, in that it is behaving in a consistent manner and the operational performance of the model will not change if further runs are carried out.

- 3.7.2. For microsimulation modelling, the Traffic Modelling Guidelines document (Version 4.0, TfL, 2021) is considered as the most comprehensive and widely accepted guideline document. In Section 7.4.4.2.1 the guideline states that:

“Convergence and model stability will be deemed to have been satisfactorily achieved when the following criteria have been met over the modelled peak hour:

- *95% of all path traffic volumes change by less than 5% for at least four consecutive iterations;*
- and*
- *95% of travel times on all paths change by less than 20% for at least four consecutive iterations.”*

- 3.7.3. These convergence criteria have been based on TfL acceptability guidelines for highway assessment models and aim to confirm a stable and converged assignment.

3.8 MODEL CALIBRATION

- 3.8.1. Model calibration ensures that the model represents the on-site observed conditions by adjustment of model inputs and parameters. This process involved examination of the network and improving the performance of the model in terms of comparisons with observed data. The adjustments include, but are not limited to:

- Checking priority rules to replicate observed driving behaviour,
- Separate priority rules for the heavies vehicle class to account the larger size of such vehicles and hence their greater potential to block opposing traffic,
- Adjust link and connector structure to better reflect lane-changing and vehicle interaction,
- Place and adjust reduced speed areas onto sections of links to ensure traffic behaviour is realistic,
- Add desired speed decisions around the network to ensure traffic adhere to the relevant speed limit for specific roads.

3.9 DRIVING BEHAVIOURS

- 3.9.1. Vissim has a default set of driving behaviours, contained in a detailed array of parameters, which can be edited to reflect network specific conditions more accurately. These parameters affect the car following and lane change performance of vehicles, lateral behaviour and vehicular reaction to traffic signals. These sets of parameters are associated with link types, so that all vehicles travelling along a specific link displays the same driving behaviour properties specified.
- 3.9.2. The default driving behaviours in Vissim have been found to be appropriate for urban motorised behaviour and have been adopted for the model.

3.10 MODEL VALIDATION

- 3.10.1. The process of model validation is iterative with calibration in the sense that, if the validation criteria is not met after a set of model runs, further adjustments are made to either the network or the traffic matrices to achieve model validation.

- 3.10.2. Acceptability criteria, for the calibration and validation of the traffic models, are set out in Table 2 of TAG Unit M3-1 'Highway Assignment Modelling' (May 2020); these criteria are shown in Table 3-4.
- 3.10.3. Where traffic volumes for modelled and observed situations can be compared, a statistical formula is used, known as the GEH statistic. The GEH statistic, formulated by Geoffrey E. Havers, is accepted as the main indicator of the extent to which modelled flows match corresponding observed values. It is defined in WebTAG as:

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

M = modelled value

C = observed value

- 3.10.4. The GEH statistic considers the magnitude of flow when determining whether another flow value is significantly different from it. This means large numbers can have larger deviations than smaller numbers and still be acceptably close to one another. Flows are considered acceptably close when their GEH is below the value of 5.

Table 3-4: TAG Validation Criteria and Acceptability Guidelines

Criteria	Description of criteria	Acceptability guideline
Flow	Individual flows within 100 veh/h of counts, for flows less than 700 veh/h	>85% of cases
	Individual flows within 15% of counts, for flows from 700 to 2700 veh/h	>85% of cases
	Individual flows within 400 veh/h of counts, for flows more than 2700 veh/h	>85% of cases
GEH	GEH < 5 for individual flows	>85% of cases

- 3.10.5. For this model, the GEH criteria has been used to calibrate the model.

3.11 TRAFFIC FLOW CALIBRATION RESULTS

- 3.11.1. The turning movements from the Vissim model were compared to observed turning flows from the survey data during the calibration process. The summary results of the junction turning flow validation are shown in Table 3-5 for the morning peak, interpeak and evening peak hours.

Table 3-5: Traffic Flow Calibration Results

Peak	Count	GEH < 5	% GEH < 5	GEH < 3	% GEH <3
Car					
07:15-08:15	54	54	100.0%	53	98.1%
08:15-09:15	54	54	100.0%	53	98.1%
10:45-11:45	54	54	100.0%	52	96.3%
11:45-12:45	54	54	100.0%	51	94.4%
15:30-16:30	54	54	100.0%	54	100.0%
16:30-17:30	54	54	100.0%	53	98.1%
LGV					
07:15-08:15	54	54	100.0%	53	98.1%
08:15-09:15	54	54	100.0%	53	98.1%
10:45-11:45	54	54	100.0%	54	100.0%
11:45-12:45	54	54	100.0%	51	94.4%
15:30-16:30	54	54	100.0%	54	100.0%
16:30-17:30	54	54	100.0%	53	98.1%
Heavy Vehicles					
07:15-08:15	54	54	100.0%	54	100.0%
08:15-09:15	54	54	100.0%	54	100.0%
10:45-11:45	54	54	100.0%	53	98.1%
11:45-12:45	54	54	100.0%	54	100.0%
15:30-16:30	54	54	100.0%	54	100.0%
16:30-17:30	54	54	100.0%	53	98.1%
Total Vehicles					
07:15-08:15	54	54	100.0%	51	94.4%
08:15-09:15	54	54	100.0%	53	98.1%
10:45-11:45	54	54	100.0%	54	100.0%
11:45-12:45	54	54	100.0%	53	98.1%
15:30-16:30	54	54	100.0%	54	100.0%
16:30-17:30	54	54	100.0%	52	96.3%

- 3.11.2. The model exceeds the validation criteria in all peak hours, with 100% of modelled movements within 5 GEH of observed counts for all vehicle types. This satisfies the WebTAG requirements whereby 85% of modelled movements should obtain a GEH score of less than 5. In addition, the vast majority of comparisons fall within a GEH of 3, showing a good closeness of fit between the modelled and surveyed data.

3.11.3. The full turning flow calibration statistics are shown in Appendix A.

3.12 JOURNEY TIME VALIDATION RESULTS

3.12.1. Journey time data from TomTom were used to validate the Vissim model. Modelled journey times were recorded using vehicle travel time paths coded in the Vissim model; this records every vehicle trip along a specified route that starts within the set modelling peak period. All trips in the peak hours have been analysed, and the data has been averaged across 20 random seed runs. The journey time routes have been coded in subsections, to ensure the model can replicate the observed journey times for each section as closely as possible.

3.12.2. WebTAG requires that modelled journey times should fall within 15% or 1 minute (whichever is greater) of the observed average, for 85% of surveyed journey time routes, albeit the 1 minute rule should only be applied to routes longer than 3kms and therefore in this model a reduced threshold of 30 seconds has been considered.

3.12.3. The modelled outputs were compared against the observed journey times to quantify the level of validation achieved by the model developed for each peak.

3.12.4. The journey time validation for the model is presented in the following tables:

- Morning Peak: Table 3-6 and Table 3-7;
- Interpeak: Table 3-8 and Table 3-9;
- Evening Peak: Table 3-10 and Table 3-11.

Table 3-6: Journey Time Validation - 07:15-08:15

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 1	83	93	10	12.6%	TRUE
Route 2	212	241	29	13.6%	TRUE
Route 3	238	232	-6	-2.4%	TRUE
Route 4	228	207	-21	-9.3%	TRUE
Route 5	236	221	-15	-6.2%	TRUE
Route 6	89	80	-9	-10.1%	TRUE

Table 3-7: Journey Time Validation - 08:15-09:15

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 1	97	107	10	10.3%	TRUE
Route 2	338	344	6	1.9%	TRUE
Route 3	234	248	14	5.9%	TRUE
Route 4	139	141	2	1.1%	TRUE

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 5	304	305	1	0.2%	TRUE
Route 6	68	78	10	14.6%	TRUE

Table 3-8: Journey Time Validation - 10:45-11:45

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 1	106	119	13	11.8%	TRUE
Route 2	197	187	-10	-5.3%	TRUE
Route 3	134	147	13	9.5%	TRUE
Route 4	125	118	-7	-5.5%	TRUE
Route 5	208	195	-13	-6.4%	TRUE
Route 6	59	64	5	8.8%	TRUE

Table 3-9: Journey Time Validation - 11:45-12:45

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 1	107	95	-12	-11.3%	TRUE
Route 2	202	223	21	10.2%	TRUE
Route 3	134	153	19	14.4%	TRUE
Route 4	127	123	-4	-3.3%	TRUE
Route 5	208	200	-8	-3.7%	TRUE
Route 6	58	66	8	13.5%	TRUE

Table 3-10: Journey Time Validation - 15:30-16:30

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 1	113	116	3	2.4%	TRUE
Route 2	372	377	5	1.3%	TRUE
Route 3	170	189	19	11.0%	TRUE
Route 4	173	172	-1	-0.8%	TRUE
Route 5	267	239	-28	-10.4%	TRUE
Route 6	63	70	7	11.2%	TRUE

Table 3-11: Journey Time Validation - 16:30-17:30

Route	Observed (s)	Modelled (s)	Diff (s)	% Diff	WebTAG
Route 1	112	119	7	6.4%	TRUE
Route 2	357	375	18	5.0%	TRUE
Route 3	165	182	17	10.3%	TRUE
Route 4	179	160	-19	-10.8%	TRUE
Route 5	252	247	-5	-2.0%	TRUE
Route 6	63	84	21	32.9%	TRUE

3.12.5. It is observed that all routes within all hours meet the required validation criteria of 15%, with the exception of Route 6 in the 16:30-17:30 time period which is only 21 seconds too slow within the model.

3.12.6. The sectional journey time validation details and graphs are provided in Appendix B.

3.13 DEMAND DEPENDENT STAGE CALLS CALIBRATION

3.13.1. Demand dependency data gives us a record of the number of times a particular phase turns green within a given period as a result of the vehicle/pedestrian demand in that stage. Comparing the observed and modelled demand dependency helps us to identify if the modelled signals are replicated the observed signal operation.

3.13.2. The demand dependency for the pedestrian phases at all signalised junctions/pedestrian crossings are checked with respect to the Signal Log data received. All the pedestrian phases have similar demand dependency in the model compared to that of the observed, with all modelled demand dependencies falling within 10% of the observed.

3.13.3. The demand dependency comparison between observed and modelled are given in detail in Appendix C

3.13.4. MODEL VARIABILITY CHECK

3.13.5. A t-test was completed to determine the required number of seed runs to ensure sufficient confidence that the average of the runs are representative of conditions across the model network. For this model, the requirements for sufficient confidence in the seed average were defined as having margin of error within 15% of the sample mean for a 95% confidence interval for the route journey times, in the morning, interpeak and evening peak hours.

3.13.6. The required minimum number of runs was calculated based on 20 random seed results as follows:

$$\text{Minimum required runs} = \left(\frac{Z_{1-\alpha/2\sigma}}{\bar{x}E} \right)^2$$

3.13.7. The results of the t-test are summarised highlighted that the maximum number of runs required was 20, which was flagged from Route 2 (Liverpool Road eastbound) in the second morning peak hour.

4 SUMMARY

- 4.1.1. WSP has been commissioned by Wigan Council to develop a microsimulation Vissim model for Ashton-in-Makerfield Town Centre. A 2023 base model has been developed in Vissim version 2024 to allow for testing of proposed schemes within the study area.
- 4.1.2. The model has been developed and assessed for the following peak hours:
- Morning Peak – 07:15 to 09:15
 - Interpeak – 10:45 to 12:45
 - Evening Peak – 15:30 to 17:30
- 4.1.3. The model has been calibrated to turning flows by individual vehicle type, with all comparisons falling within the TAG acceptability criteria of having a GEH less than 5, exceeding the requirement for 85% of cases to achieve this criteria. Furthermore, the majority of comparisons fall within a GEH of 3 (94.4% +), suggesting a strong closeness of fit between the observed and modelled journey times.
- 4.1.4. The model has been validated to journey times for six routes, with all routes falling within the 15% TAG criteria, with the exception of one route in the 16:30-17:30 time period, which operates only 21 seconds too slow in the model. The model therefore exceeds the TAG acceptability criteria for journey times.
- 4.1.5. As the model meets TAG calibration and validation criteria, it has been taken forwards for forecasting.

Appendix A

BASE MODEL FLOW CALIBRATION





07:15-08:15

Vehicle Flow Information
Calibration Statistics
Car Vehicles
AM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	1	0	-1	-77.5%	0.8
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	192	174	-18	-9.3%	1.3
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	70	69	-1	-1.2%	0.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	4	0	-4	-100.0%	2.8
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	185	175	-11	-5.8%	0.8
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	227	208	-20	-8.6%	1.3
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	68	74	6	8.6%	0.7
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	61	57	-4	-6.1%	0.5
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	45	45	0	-0.1%	0.0
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	45	43	-3	-6.3%	0.4
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	120	117	-3	-2.5%	0.3
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	52	46	-6	-11.2%	0.8
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	136	113	-23	-16.8%	2.0
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	237	239	2	0.7%	0.1
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	3	4	1	23.3%	0.4
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	55	47	-8	-13.9%	1.1
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	24	30	6	26.8%	1.2
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	46	48	2	5.3%	0.4
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	71	71	0	-0.6%	0.0
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	8	19	11	134.4%	2.9
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	28	21	-8	-27.3%	1.6
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	3	3	0	-11.7%	0.2
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	51	60	9	17.1%	1.2
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	69	51	-18	-25.8%	2.3
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	62	59	-3	-4.4%	0.4
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	363	353	-10	-2.8%	0.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	57	53	-3	-6.0%	0.5
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	66	69	4	5.4%	0.4
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	8	7	-1	-13.3%	0.4
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	68	67	-1	-1.5%	0.1
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	181	163	-18	-9.7%	1.3
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	8	5	-3	-34.4%	1.1
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	11	17	6	58.2%	1.7
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	51	63	12	22.9%	1.6
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	80	76	-4	-5.3%	0.5
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	58	43	-15	-26.4%	2.2
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	2	0	-2	-100.0%	2.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	254	272	18	7.0%	1.1
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	42	46	4	10.5%	0.7
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	2	2	0	-2.5%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	1	1	0	-5.0%	0.1
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	102	107	5	4.6%	0.5
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	5	6	1	12.0%	0.3
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	6	0	-6	-100.0%	3.5
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	2	3	1	50.0%	0.6
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	1	0	-1	-100.0%	1.4
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	21	21	0	-0.5%	0.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	233	247	14	5.8%	0.9
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	15	8	-7	-46.7%	2.1
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	6	5	-1	-17.5%	0.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	101	105	4	3.7%	0.4
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	11	11	0	2.7%	0.1



07:15-08:15

Vehicle Flow Information
Calibration Statistics
LGV Vehicles
AM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0		0.0
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	41	40	-1	-3.0%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	17	18	2	10.4%	0.4
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	0	-1	-100.0%	1.2
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	49	48	-1	-2.3%	0.2
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	60	56	-4	-6.3%	0.5
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	9	10	1	8.8%	0.3
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	13	14	1	3.8%	0.1
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	10	10	0	4.0%	0.1
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	10	5	-5	-49.0%	1.8
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	34	34	0	-1.3%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	9	9	0	-2.2%	0.1
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	19	15	-4	-20.4%	0.9
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	46	46	1	1.6%	0.1
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	1	0	-1	-100.0%	1.4
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	8	9	1	14.1%	0.4
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	5	2	-3	-59.7%	1.6
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	4	4	0	-5.4%	0.1
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	14	13	-1	-8.6%	0.3
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	3	6	2	71.0%	1.1
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	3	0	-3	-100.0%	2.6
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0		0.0
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	8	12	4	55.9%	1.4
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	12	11	-1	-10.8%	0.4
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	9	9	0	5.0%	0.1
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	95	94	-1	-1.3%	0.1
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	7	7	0	5.7%	0.1
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	10	10	0	2.5%	0.1
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	3	0	-3	-100.0%	2.6
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	6	5	-1	-21.1%	0.6
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	44	44	0	-0.9%	0.1
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	1	0	-1	-100.0%	1.4
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	1	3	2	117.5%	1.1
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	10	14	4	35.5%	1.0
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	10	10	0	-0.7%	0.0
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	7	9	1	17.3%	0.4
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0		0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	43	52	9	20.9%	1.3
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	10	8	-3	-25.0%	0.8
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	18	18	0	-2.5%	0.1
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	1	0	-1	-100.0%	1.4
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	1	1	0	0.0%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	4	5	1	25.0%	0.5
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	2	2	0	7.5%	0.1
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	41	55	14	33.3%	2.0
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	3	2	-1	-33.3%	0.6
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	5	5		3.1
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	17	16	-1	-8.5%	0.4
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	1	0	-1	-100.0%	1.4



07:15-08:15

Vehicle Flow Information
Calibration Statistics
Heavies Vehicles
AM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0		0.0
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	5	4	0	-4.6%	0.1
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	5	2	-2	-49.6%	1.2
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	0	0	0	-100.0%	0.8
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	15	15	0	-0.1%	0.0
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	20	19	-1	-3.4%	0.2
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	3	3	0	18.1%	0.3
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	11	11	0	3.2%	0.1
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	5	6	1	18.0%	0.4
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	2	1	-1	-44.3%	0.8
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	20	21	0	2.0%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	2	3	1	80.0%	0.9
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	5	8	2	45.3%	0.9
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	8	6	-2	-21.9%	0.7
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	1	1	0	-30.0%	0.3
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	2	3	1	40.0%	0.5
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	0	0	0	-100.0%	0.8
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	2	2	0	-20.0%	0.3
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	1	3	2	195.0%	1.4
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	3	1	-2	-62.5%	1.2
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0		0.0
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	1	2	1	207.5%	1.2
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	2	1	-1	-59.3%	1.1
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	3	4	1	15.5%	0.3
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	36	36	0	0.8%	0.0
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	0	0	0	-100.0%	0.8
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	2	3	1	68.0%	0.8
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	1	0	-1	-100.0%	1.2
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	3	3	0	-1.7%	0.0
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	32	31	-1	-2.7%	0.2
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	1	0	-1	-100.0%	1.2
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	1	1	-1	-47.5%	0.6
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	3	7	4	155.0%	1.9
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	3	4	0	8.0%	0.1
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	2	2	0	20.0%	0.2
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0		0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	8	10	2	23.8%	0.6
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	1	0	-1	-100.0%	1.4
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	4	5	1	13.8%	0.3
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	1	0	-1	-100.0%	1.4
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	1	1	0	0.0%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0		0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	3	3		2.3
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	6	7	1	15.8%	0.4
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	1	0	-1	-100.0%	1.4
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	2	5	3	127.5%	1.4
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0		0.0



07:15-08:15

Vehicle Flow Information
Calibration Statistics
All Vehicles
AM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	1	0	-1	-77.5%	0.8
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	238	219	-19	-8.1%	1.3
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	91	90	-1	-1.5%	0.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	5	0	-5	-100.0%	3.2
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	249	237	-12	-4.8%	0.8
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	307	283	-24	-7.8%	1.4
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	80	87	7	9.0%	0.8
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	85	82	-3	-3.4%	0.3
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	60	62	1	2.1%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	58	49	-9	-15.2%	1.2
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	175	172	-3	-1.8%	0.2
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	62	58	-5	-7.4%	0.6
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	160	135	-24	-15.2%	2.0
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	291	292	1	0.2%	0.0
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	4	4	0	-7.5%	0.2
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	64	57	-7	-10.8%	0.9
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	31	35	4	12.7%	0.7
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	50	52	2	3.7%	0.3
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	87	85	-2	-2.3%	0.2
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	12	27	15	122.2%	3.4
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	34	22	-13	-37.1%	2.4
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	3	3	0	-11.7%	0.2
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	60	74	14	24.2%	1.8
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	84	63	-21	-24.5%	2.4
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	74	73	-2	-2.4%	0.2
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	494	483	-11	-2.2%	0.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	64	61	-3	-5.2%	0.4
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	77	82	5	6.4%	0.6
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	12	7	-5	-43.0%	1.7
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	78	75	-2	-3.1%	0.3
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	257	238	-19	-7.3%	1.2
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	10	5	-4	-45.7%	1.6
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	14	21	7	53.7%	1.8
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	64	83	19	30.4%	2.3
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	93	89	-4	-4.4%	0.4
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	67	54	-14	-20.5%	1.8
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	2	0	-2	-100.0%	2.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	305	334	29	9.4%	1.6
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	53	54	1	1.7%	0.1
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	2	2	0	-2.5%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	1	1	0	-5.0%	0.1
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	124	129	5	3.8%	0.4
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	5	6	1	12.0%	0.3
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	8	0	-8	-100.0%	4.0
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	4	5	1	25.0%	0.5
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	5	5	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	23	26	3	12.0%	0.6
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	280	308	28	10.1%	1.6
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	19	10	-9	-47.4%	2.4
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	6	10	4	64.2%	1.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	120	125	5	4.0%	0.4
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	12	11	-1	-5.8%	0.2



10:45-11:45

Vehicle Flow Information
Calibration Statistics
Car Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	6	9	3	46.1%	1.0
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	107	114	7	6.6%	0.7
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	52	60	8	15.6%	1.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	5	6	1	20.0%	0.4
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	115	145	30	25.7%	2.6
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	112	128	16	14.7%	1.5
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	96	98	2	2.5%	0.2
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	74	81	7	9.3%	0.8
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	48	46	-2	-4.5%	0.3
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	56	62	6	11.3%	0.8
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	112	118	6	5.0%	0.5
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	40	40	0	0.6%	0.0
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	142	156	14	10.1%	1.2
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	158	176	18	11.6%	1.4
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	1	0	-1	-100.0%	1.6
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	122	136	14	11.1%	1.2
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	75	72	-3	-3.5%	0.3
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	83	85	2	1.9%	0.2
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	82	82	0	-0.1%	0.0
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	20	22	2	12.0%	0.5
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	42	51	9	20.5%	1.3
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	9	8	-1	-12.1%	0.4
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	50	51	1	1.3%	0.1
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	63	65	2	3.1%	0.2
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	110	114	4	4.0%	0.4
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	192	218	26	13.7%	1.8
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	99	101	2	2.3%	0.2
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	74	74	1	0.9%	0.1
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	25	27	3	10.9%	0.5
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	110	110	0	-0.1%	0.0
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	182	215	33	17.9%	2.3
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	55	57	2	3.3%	0.2
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	72	77	5	6.3%	0.5
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	55	56	0	0.4%	0.0
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	145	145	0	-0.1%	0.0
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	12	27	15	122.1%	3.3
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	7	7	0	-4.3%	0.1
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	156	198	42	26.9%	3.2
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	103	108	5	5.2%	0.5
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	7	4	-3	-43.6%	1.3
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	2	2	0	0.0%	0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	1	1	0	-5.0%	0.1
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	139	145	6	4.0%	0.5
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	7	6	-1	-16.4%	0.5
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	57	51	-6	-11.3%	0.9
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	11	7	-4	-40.0%	1.5
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	10	9	-1	-6.0%	0.2
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	32	37	5	15.2%	0.8
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	137	172	35	25.9%	2.8
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	30	44	14	46.8%	2.3
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	8	13	5	63.1%	1.6
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	179	157	-22	-12.1%	1.7
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	11	8	-3	-25.9%	0.9



10:45-11:45

Vehicle Flow Information
Calibration Statistics
LGV Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	1	0	-1	-100.0%	1.4
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	20	20	0	0.0%	0.0
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	8	8	0	-4.6%	0.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	0	-1	-100.0%	1.6
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	24	24	0	1.5%	0.1
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	30	29	0	-1.4%	0.1
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	16	11	-5	-29.9%	1.3
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	19	20	2	9.3%	0.4
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	10	10	0	-4.7%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	13	10	-3	-22.2%	0.8
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	37	38	0	1.1%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	11	12	1	12.5%	0.4
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	11	10	-1	-5.5%	0.2
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	22	24	2	10.9%	0.5
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	1	0	-1	-100.0%	1.4
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	12	12	0	-0.1%	0.0
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	9	8	-1	-15.0%	0.5
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	7	9	2	25.5%	0.6
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	17	18	1	4.1%	0.2
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	2	1	-1	-57.1%	1.0
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	7	4	-3	-49.3%	1.5
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	1	0	-1	-100.0%	1.6
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	4	3	-1	-30.8%	0.7
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	8	9	1	15.4%	0.4
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	5	5	0	1.0%	0.0
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	50	49	-1	-1.2%	0.1
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	10	11	1	11.5%	0.4
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	6	6	0	3.3%	0.1
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	3	2	-1	-33.3%	0.6
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	7	4	-3	-47.5%	1.5
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	44	43	-1	-1.3%	0.1
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	6	6	0	-1.2%	0.0
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	13	13	0	3.8%	0.1
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	6	6	0	-6.8%	0.2
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	6	6	0	-6.1%	0.2
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	3	2	-1	-20.0%	0.4
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	1	0	-1	-100.0%	1.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	32	22	-10	-30.3%	1.9
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	19	19	0	-1.8%	0.1
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	1	1	0	0.0%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	2	1	-1	-50.0%	0.8
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	33	21	-12	-35.3%	2.2
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	8	3	-5	-67.5%	2.3
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	2	0	-2	-100.0%	2.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	1	0	-1	-100.0%	1.4
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	2	2	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	1	0	-1	-100.0%	1.4
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	42	25	-17	-39.9%	2.9
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	3	3	0	0.0%	0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	3	3		2.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	37	21	-16	-43.2%	3.0
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	2	0	-2	-100.0%	2.0



10:45-11:45

Vehicle Flow Information
Calibration Statistics
Heavies Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	1	0	140.0%	0.6
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	6	5	-1	-10.0%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	3	3	0	5.0%	0.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	0	-1	-100.0%	1.2
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	16	18	2	9.3%	0.4
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	17	19	3	15.5%	0.6
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	5	2	-3	-60.6%	1.7
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	13	14	1	8.2%	0.3
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	5	6	1	12.5%	0.3
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	2	1	-1	-52.5%	0.9
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	24	24	0	-1.6%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	4	4	0	-8.8%	0.2
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	3	5	2	70.0%	1.0
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	7	8	1	19.3%	0.5
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	0	0	0	-100.0%	0.8
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	3	6	3	106.7%	1.5
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	4	1	-3	-72.7%	1.7
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	0	0	0	-100.0%	0.8
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	5	5	0	8.2%	0.2
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	1	3	2	140.0%	1.2
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	2	0	-2	-100.0%	2.0
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0	-100.0%	0.8
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	0	0	0	-100.0%	0.8
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	0	0	0	-100.0%	0.0
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	2	2	0	17.0%	0.2
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	31	34	3	11.1%	0.6
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	3	5	2	45.5%	0.7
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	1	0	-1	-100.0%	1.4
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	2	0	-2	-100.0%	1.8
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	1	0	-1	-100.0%	1.2
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	35	35	0	0.4%	0.0
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	1	1	0	-45.0%	0.5
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	4	3	-1	-36.3%	0.8
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	2	6	4	187.5%	1.9
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	1	0	0	-32.5%	0.3
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	2	2	0	5.0%	0.1
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0	-100.0%	0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	7	8	1	13.6%	0.3
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	0	1	1	-100.0%	1.4
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0	-100.0%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0	-100.0%	0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0	-100.0%	0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	5	8	3	65.0%	1.3
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0	-100.0%	0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	1	0	-1	-100.0%	1.4
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	0	0	0	-100.0%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0	-100.0%	0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0	-100.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	0	0	-100.0%	0.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	9	8	-1	-11.7%	0.4
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	5	5	-100.0%	3.2
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	1	1	-100.0%	1.3
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	3	3	0	1.7%	0.0
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0	-100.0%	0.0



10:45-11:45

Vehicle Flow Information
Calibration Statistics
All Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	8	10	2	31.1%	0.8
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	133	139	6	4.9%	0.6
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	63	71	8	12.5%	1.0
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	7	6	-1	-14.3%	0.4
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	155	187	31	20.3%	2.4
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	158	177	19	11.8%	1.4
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	117	112	-6	-4.8%	0.5
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	106	115	10	9.2%	0.9
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	64	62	-2	-3.1%	0.3
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	70	73	2	3.4%	0.3
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	174	180	6	3.3%	0.4
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	55	56	1	2.2%	0.2
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	156	171	16	10.1%	1.2
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	187	209	22	11.8%	1.6
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	3	0	-3	-100.0%	2.3
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	137	154	17	12.2%	1.4
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	88	81	-7	-7.5%	0.7
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	91	94	3	3.4%	0.3
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	104	105	1	0.9%	0.1
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	24	27	3	12.4%	0.6
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	51	54	3	6.2%	0.4
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	11	8	-3	-25.5%	0.9
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	55	54	-1	-1.9%	0.1
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	70	73	3	4.4%	0.4
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	116	121	5	4.1%	0.4
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	273	302	29	10.7%	1.7
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	112	117	5	4.4%	0.5
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	81	81	0	-0.1%	0.0
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	29	29	0	0.1%	0.0
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	118	114	-4	-3.6%	0.4
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	261	293	32	12.4%	1.9
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	62	63	1	2.1%	0.2
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	89	93	4	4.0%	0.4
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	64	67	4	5.5%	0.4
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	152	152	-1	-0.5%	0.1
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	17	31	14	83.2%	2.9
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	8	7	-1	-16.3%	0.5
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	195	228	33	17.0%	2.3
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	122	128	6	5.0%	0.5
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	8	5	-3	-38.1%	1.2
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	4	3	-1	-25.0%	0.5
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	1	1	0	-5.0%	0.1
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	177	174	-3	-1.6%	0.2
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	7	6	-1	-16.4%	0.5
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	66	53	-13	-19.5%	1.7
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	13	7	-6	-49.2%	2.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	1	0	-1	-100.0%	1.4
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	12	11	-1	-5.0%	0.2
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	33	37	4	11.7%	0.7
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	188	206	18	9.4%	1.3
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	33	52	19	58.3%	2.9
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	8	17	9	110.0%	2.5
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	219	181	-38	-17.2%	2.7
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	13	8	-5	-37.3%	1.5



15:30-16:30

Vehicle Flow Information
Calibration Statistics
Car Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	7	7	0	2.0%	0.1
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	131	132	1	0.8%	0.1
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	73	73	1	1.0%	0.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	9	13	5	54.0%	1.4
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	112	125	13	11.9%	1.2
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	127	144	17	13.3%	1.5
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	173	165	-7	-4.2%	0.6
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	101	99	-2	-2.3%	0.2
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	60	58	-2	-3.0%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	57	57	0	-0.5%	0.0
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	151	156	5	3.5%	0.4
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	30	33	3	9.8%	0.5
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	141	139	-2	-1.1%	0.1
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	153	152	-1	-0.5%	0.1
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	2	1	-1	-52.9%	0.9
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	131	125	-7	-5.2%	0.6
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	53	48	-4	-8.0%	0.6
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	103	110	7	6.6%	0.7
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	154	158	5	3.1%	0.4
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	27	19	-8	-28.9%	1.6
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	86	75	-11	-12.8%	1.2
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	8	8	0	0.6%	0.0
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	69	73	4	5.3%	0.4
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	82	76	-6	-7.7%	0.7
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	91	96	5	5.3%	0.5
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	212	231	19	9.0%	1.3
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	94	97	3	2.9%	0.3
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	104	101	-3	-3.2%	0.3
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	20	21	2	7.8%	0.3
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	109	105	-4	-3.8%	0.4
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	255	271	16	6.3%	1.0
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	55	59	4	7.3%	0.5
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	77	82	5	6.5%	0.6
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	81	85	4	5.2%	0.5
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	130	131	1	0.6%	0.1
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	17	23	6	37.6%	1.4
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	3	0	-3	-100.0%	2.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	190	189	-1	-0.6%	0.1
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	79	90	11	13.4%	1.2
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	12	12	0	0.0%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	8	7	-1	-12.5%	0.4
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	2	2	0	0.0%	0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	228	226	-2	-1.0%	0.2
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	5	5	0	-6.0%	0.1
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	22	16	-6	-27.3%	1.4
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	14	14	0	-0.4%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	1	0	-1	-100.0%	1.4
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	4	0	-4	-100.0%	2.8
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	25	16	-9	-35.0%	1.9
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	188	183	-5	-2.7%	0.4
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	30	29	-1	-2.8%	0.2
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	14	26	12	86.1%	2.7
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	235	218	-17	-7.3%	1.1
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	8	17	9	110.6%	2.5



15:30-16:30

Vehicle Flow Information
Calibration Statistics
LGV Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0		0.0
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	16	17	1	4.7%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	11	12	1	6.8%	0.2
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	2	1	110.0%	0.9
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	27	29	1	5.4%	0.3
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	25	26	1	5.8%	0.3
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	32	27	-5	-15.2%	0.9
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	27	37	10	34.8%	1.7
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	10	10	0	1.4%	0.0
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	14	15	2	12.0%	0.4
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	55	55	0	-0.3%	0.0
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	8	8	0	3.8%	0.1
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	15	14	-2	-11.3%	0.5
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	17	17	0	-1.1%	0.0
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	1	0	-1	-100.0%	1.6
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	15	14	-1	-5.2%	0.2
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	7	6	-1	-12.1%	0.3
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	17	17	1	3.2%	0.1
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	22	22	0	0.2%	0.0
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	3	0	-3	-100.0%	2.6
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	21	20	-1	-3.2%	0.1
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	1	0	-1	-100.0%	1.2
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	6	6	1	12.1%	0.3
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	9	9	0	-0.6%	0.0
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	9	9	0	-5.2%	0.2
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	46	49	3	6.1%	0.4
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	9	9	0	-5.0%	0.2
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	9	9	0	3.9%	0.1
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	3	3	0	-6.7%	0.1
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	17	17	0	2.0%	0.1
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	75	80	5	6.2%	0.5
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	3	2	-1	-43.0%	0.9
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	12	13	1	5.0%	0.2
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	9	5	-4	-43.9%	1.5
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	12	12	0	-1.5%	0.1
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	4	3	-1	-13.8%	0.3
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	1	0	-1	-100.0%	1.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	31	28	-4	-11.3%	0.6
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	8	5	-3	-40.6%	1.3
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	1	1	0	-5.0%	0.1
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	34	40	6	18.1%	1.0
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	1	2	1	90.0%	0.7
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	0	0	0		0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	1	1	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	1	0	-1	-100.0%	1.4
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	24	29	5	20.2%	0.9
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	0	0		0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	29	42	13	45.5%	2.2
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	1	2	1	65.0%	0.6



15:30-16:30

Vehicle Flow Information
Calibration Statistics
Heavies Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0		0.0
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	2	2	0	17.5%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	2	1	-1	-37.5%	0.6
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	0	0	0		0.0
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	12	12	0	3.3%	0.1
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	11	12	1	10.0%	0.3
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	3	3	0	-2.5%	0.0
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	8	8	-1	-8.2%	0.2
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	2	2	0	-14.3%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	1	1	0	-25.0%	0.3
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	13	17	4	31.2%	1.0
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	1	2	1	65.0%	0.7
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	2	5	2	95.0%	1.2
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	2	3	1	72.5%	0.9
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	2	2	0	26.0%	0.3
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	0	0	0		0.0
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	0	0	0		0.5
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	4	3	-1	-14.1%	0.3
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	0	0	0		0.0
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	1	1	0	27.5%	0.2
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	1	1	0	50.0%	0.4
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	0	0	0	-100.0%	0.8
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	1	0	-1	-100.0%	1.2
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	3	4	2	57.5%	0.8
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	21	23	2	11.3%	0.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	1	1	1	80.0%	0.6
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	2	2	0	-15.0%	0.2
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	1	0	-1	-100.0%	1.4
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	0	0	0	-100.0%	0.8
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	20	22	2	11.9%	0.5
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	2	2	0	0.0%	0.0
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	0	1	1	200.0%	0.8
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	3	4	1	55.6%	0.8
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	1	0	-1	-100.0%	1.2
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	0	1	0	125.0%	0.6
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0		0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	1	3	2	245.0%	1.6
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	0	0	0		0.0
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	3	4	1	33.3%	0.5
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	0	0	0		0.0
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	0	0	0		0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0		0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	0	0		0.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	1	3	2	245.0%	1.6
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	0	0		0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	3	4	1	33.3%	0.5
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0		0.0



15:30-16:30

Vehicle Flow Information
Calibration Statistics
All Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	7	7	0	2.0%	0.1
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	150	152	2	1.4%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	86	86	1	0.9%	0.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	10	15	6	59.8%	1.6
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	151	166	15	10.1%	1.2
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	163	182	19	12.0%	1.5
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	208	196	-12	-5.9%	0.9
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	137	143	6	4.7%	0.5
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	72	70	-2	-2.8%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	72	73	1	1.5%	0.1
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	219	228	9	4.2%	0.6
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	39	43	4	10.5%	0.6
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	158	157	-1	-0.7%	0.1
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	172	173	1	0.3%	0.0
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	4	1	-3	-70.0%	1.7
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	148	141	-7	-4.8%	0.6
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	60	55	-5	-8.5%	0.7
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	120	128	8	6.3%	0.7
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	179	183	4	2.4%	0.3
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	30	19	-11	-36.8%	2.2
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	107	96	-11	-10.7%	1.1
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	9	9	0	-3.0%	0.1
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	75	79	4	5.3%	0.5
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	92	85	-7	-7.7%	0.7
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	103	109	6	5.7%	0.6
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	279	303	24	8.7%	1.4
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	104	107	3	2.7%	0.3
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	115	112	-3	-2.9%	0.3
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	24	24	0	1.4%	0.1
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	126	122	-4	-3.3%	0.4
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	350	373	23	6.6%	1.2
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	60	63	3	4.3%	0.3
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	89	95	6	7.0%	0.7
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	92	94	2	1.9%	0.2
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	143	143	0	0.0%	0.0
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	21	28	6	29.4%	1.3
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	4	0	-4	-100.0%	2.8
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	222	220	-2	-1.0%	0.2
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	87	94	7	8.4%	0.8
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	13	13	0	-0.4%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	8	7	-1	-12.5%	0.4
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	2	2	0	0.0%	0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	265	270	5	1.8%	0.3
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	5	5	0	-6.0%	0.1
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	23	18	-5	-22.2%	1.1
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	14	14	0	-0.4%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	1	0	-1	-100.0%	1.4
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	5	1	-4	-80.0%	2.3
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	26	16	-10	-37.5%	2.1
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	213	215	2	1.1%	0.2
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	30	29	-1	-2.8%	0.2
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	14	26	12	86.1%	2.7
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	267	264	-3	-1.1%	0.2
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	9	19	10	105.6%	2.6



08:15-09:15

Vehicle Flow Information
Calibration Statistics
Car Vehicles
AM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	5	5	0	-9.0%	0.2
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	202	199	-3	-1.7%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	69	76	7	10.2%	0.8
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	4	0	-4	-100.0%	2.8
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	98	91	-7	-7.1%	0.7
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	111	105	-7	-6.0%	0.6
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	110	117	7	6.8%	0.7
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	70	73	3	4.0%	0.3
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	35	38	3	9.3%	0.5
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	76	79	3	4.5%	0.4
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	102	101	-1	-0.7%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	29	29	0	-0.9%	0.0
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	147	130	-17	-11.7%	1.5
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	249	243	-6	-2.4%	0.4
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	3	4	1	40.0%	0.6
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	133	124	-9	-6.9%	0.8
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	85	94	9	10.6%	1.0
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	92	95	3	3.2%	0.3
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	121	132	11	8.7%	0.9
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	20	25	5	27.0%	1.1
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	49	42	-8	-15.8%	1.2
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	8	8	0	5.0%	0.1
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	80	81	1	1.8%	0.2
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	119	120	1	0.7%	0.1
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	79	79	-1	-0.8%	0.1
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	192	172	-21	-10.7%	1.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	115	119	4	3.9%	0.4
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	83	81	-2	-2.5%	0.2
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	7	0	-7	-93.9%	3.5
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	154	153	0	-0.2%	0.0
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	173	175	3	1.6%	0.2
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	20	21	1	5.7%	0.3
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	33	35	2	7.4%	0.4
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	75	85	10	13.4%	1.1
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	141	134	-7	-4.9%	0.6
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	15	12	-3	-21.7%	0.9
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	21	27	6	26.7%	1.1
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	278	288	10	3.4%	0.6
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	139	143	4	2.9%	0.3
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	12	13	1	8.7%	0.3
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	4	0	-4	-98.8%	2.8
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	1	0	-1	-100.0%	1.4
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	163	177	14	8.7%	1.1
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	8	2	-6	-70.0%	2.5
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	34	32	-2	-7.1%	0.4
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	9	8	-1	-11.7%	0.4
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	5	4	-1	-20.0%	0.5
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	38	39	1	2.0%	0.1
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	256	259	3	1.0%	0.2
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	35	38	3	9.3%	0.5
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	9	14	5	52.8%	1.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	170	173	3	1.6%	0.2
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	22	24	2	10.9%	0.5



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Vehicle Flow Information
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LGV Vehicles
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Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	1	0	-1	-100.0%	1.4
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	32	25	-6	-19.9%	1.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	13	20	7	50.0%	1.6
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	0	0	0	-100.0%	0.8
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	24	27	3	12.1%	0.6
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	39	31	-9	-21.7%	1.4
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	14	14	0	-1.4%	0.1
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	12	12	0	-0.3%	0.0
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	9	9	0	2.8%	0.1
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	13	13	0	1.1%	0.0
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	31	30	-1	-3.8%	0.2
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	10	13	3	28.5%	0.8
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	14	14	0	1.0%	0.0
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	36	35	-2	-4.4%	0.3
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	11	8	-3	-28.5%	1.0
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	10	4	-6	-58.6%	2.2
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	5	6	1	18.1%	0.4
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	15	16	1	5.0%	0.2
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:11	1	2	1	68.8%	0.7
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	8	6	-2	-20.4%	0.6
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0	-100.0%	0.8
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:11	4	3	-2	-37.5%	0.8
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	12	14	2	18.3%	0.6
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	10	11	1	9.0%	0.3
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	54	56	2	3.1%	0.2
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	9	1	-8	-89.8%	3.7
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	9	11	2	25.2%	0.7
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	2	0	-2	-100.0%	2.0
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	13	11	-2	-16.5%	0.6
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	41	40	0	-0.5%	0.0
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	0	0	0	-100.0%	0.8
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	7	10	3	43.6%	1.0
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	5	7	2	43.6%	0.9
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	10	10	1	6.0%	0.2
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	2	1	0	-13.0%	0.2
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	1	0	-1	-100.0%	1.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	41	40	-1	-2.1%	0.1
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	17	13	-5	-26.5%	1.2
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	19	24	5	27.1%	1.1
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	4	2	-2	-38.8%	0.9
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	2	0	-2	-100.0%	2.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	2	4	2	100.0%	1.2
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	0	0		0.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	43	44	1	3.4%	0.2
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	0	0		0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	19	27	8	40.3%	1.6
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0		0.0



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AM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0	-100.0%	0.8
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	5	3	-2	-36.0%	0.9
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	5	2	-2	-47.5%	1.2
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	0	0	0		0.0
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	20	20	0	-1.8%	0.1
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	31	28	-3	-10.2%	0.6
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	2	2	0	-3.6%	0.1
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	9	8	-1	-14.3%	0.5
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	4	6	2	38.8%	0.7
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	4	2	-2	-57.7%	1.3
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	22	25	3	11.5%	0.5
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	7	7	0	5.7%	0.1
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	3	1	-2	-70.0%	1.6
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	4	2	-2	-50.9%	1.1
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	1	0	-1	-100.0%	1.4
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	3	3	0	10.6%	0.2
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	2	0	-2	-91.4%	1.9
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	1	0	-1	-100.0%	1.2
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	5	2	-3	-66.8%	1.8
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	0	2	2		2.1
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	1	0	-1	-100.0%	1.2
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0	-100.0%	0.8
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	0	0	0		0.9
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	2	1	-2	-74.3%	1.4
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	3	4	1	38.3%	0.6
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	45	47	2	4.4%	0.3
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	1	0	-1	-100.0%	1.6
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	3	1	-2	-60.0%	1.2
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	1	0	-1	-100.0%	1.6
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	3	3	0	-5.0%	0.1
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	27	31	3	12.7%	0.6
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	2	2	0	-15.0%	0.2
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	2	0	-1	-88.0%	1.5
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	2	3	2	95.0%	1.0
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	1	0	0	-40.0%	0.4
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	2	0	-1	-88.0%	1.5
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0		0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	7	3	-4	-61.4%	2.0
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	2	0	-2	-100.0%	2.0
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	1	4	3	280.0%	1.8
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	3	0	-3	-100.0%	2.4
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	0	0	0		0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	3	3	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	0	0		0.8
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	7	6	-1	-19.3%	0.5
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	0	0		0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	3	4	1	26.7%	0.4
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0		0.0



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Calibration Statistics
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Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	6	5	-2	-28.2%	0.8
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	239	227	-12	-4.9%	0.8
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	87	99	12	13.2%	1.2
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	4	0	-4	-100.0%	2.9
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	142	138	-4	-3.1%	0.4
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	181	163	-18	-10.1%	1.4
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	126	134	7	5.7%	0.6
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	92	93	1	1.6%	0.2
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	48	53	5	10.6%	0.7
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	92	94	1	1.6%	0.2
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	155	156	1	0.4%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	46	49	3	6.5%	0.4
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(SE)	A	B	2:1:1	164	145	-19	-11.8%	1.6
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	289	280	-9	-3.3%	0.6
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	4	4	0	5.0%	0.1
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	147	135	-12	-8.3%	1.0
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	97	98	1	1.2%	0.1
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	98	101	3	3.3%	0.3
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	141	149	8	5.8%	0.7
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	21	30	9	40.2%	1.7
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	58	48	-10	-17.4%	1.4
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	8	8	0	-3.4%	0.1
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	84	84	0	0.4%	0.0
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	133	134	1	0.9%	0.1
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	92	94	1	1.5%	0.1
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	291	274	-17	-5.8%	1.0
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	126	120	-5	-4.2%	0.5
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	95	93	-2	-1.8%	0.2
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	11	0	-10	-95.8%	4.3
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	170	167	-3	-1.6%	0.2
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	241	247	6	2.5%	0.4
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	22	23	1	2.3%	0.1
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	42	46	4	9.7%	0.6
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	82	95	14	16.8%	1.5
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	151	144	-7	-4.4%	0.5
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	19	14	-5	-26.9%	1.2
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	22	27	5	20.9%	0.9
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	326	330	4	1.3%	0.2
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	158	156	-2	-1.6%	0.2
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	12	13	1	8.7%	0.3
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	4	0	-4	-98.8%	2.8
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	1	0	-1	-100.0%	1.4
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	183	205	22	12.1%	1.6
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	8	2	-6	-70.0%	2.5
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	41	34	-7	-17.0%	1.1
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	11	8	-3	-27.7%	1.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	10	11	1	10.0%	0.3
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	38	39	1	2.8%	0.2
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	306	309	3	0.8%	0.1
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	35	38	3	9.3%	0.5
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	9	14	5	53.9%	1.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	192	203	11	5.8%	0.8
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	22	24	2	10.9%	0.5



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Vehicle Flow Information
Calibration Statistics
Car Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	9	10	1	7.1%	0.2
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	109	103	-7	-6.1%	0.6
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	60	61	1	2.2%	0.2
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	10	0	-10	-100.0%	4.4
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	111	123	12	10.7%	1.1
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	131	135	4	3.3%	0.4
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	104	81	-24	-22.6%	2.5
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	90	100	10	10.9%	1.0
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	56	57	1	2.5%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	69	88	19	26.9%	2.1
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	147	139	-8	-5.6%	0.7
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	44	44	1	1.3%	0.1
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	131	159	28	21.3%	2.3
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	152	137	-15	-9.8%	1.2
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	2	2	0	0.0%	0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	147	154	7	4.7%	0.6
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	79	90	11	14.2%	1.2
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	92	92	-1	-0.6%	0.1
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	100	105	5	5.0%	0.5
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	17	13	-4	-21.1%	0.9
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	47	54	7	15.9%	1.0
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	6	6	0	-2.5%	0.1
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	59	55	-4	-7.0%	0.5
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	56	57	1	2.2%	0.2
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	112	118	6	5.4%	0.6
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	206	213	7	3.6%	0.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	93	106	12	13.1%	1.2
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	89	90	0	0.3%	0.0
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	33	29	-4	-12.4%	0.7
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	117	122	5	4.2%	0.5
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	224	224	-1	-0.2%	0.0
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	60	57	-4	-6.4%	0.5
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	91	95	3	3.7%	0.3
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	46	46	0	-0.2%	0.0
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	138	155	18	12.8%	1.5
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	15	20	5	30.7%	1.1
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	4	2	-2	-41.3%	0.9
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	166	170	4	2.3%	0.3
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	107	114	7	6.4%	0.6
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	10	8	-2	-19.5%	0.6
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	4	4	0	0.0%	0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	1	0	-1	-95.0%	1.3
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	135	146	11	7.9%	0.9
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	7	7	0	-2.1%	0.1
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	37	25	-12	-32.2%	2.1
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	22	21	-1	-5.9%	0.3
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	2	2	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	14	24	10	72.5%	2.3
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	166	152	-14	-8.4%	1.1
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	18	9	-9	-49.2%	2.4
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	7	19	12	171.4%	3.3
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	160	168	8	5.3%	0.7
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	7	0	-7	-94.3%	3.4



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Vehicle Flow Information
Calibration Statistics
LGV Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	1	0	-1	-100.0%	1.4
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	15	13	-2	-16.2%	0.7
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	14	11	-4	-26.7%	1.1
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	0	-1	-100.0%	1.6
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	24	25	1	3.8%	0.2
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	27	28	1	5.2%	0.3
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	16	9	-7	-42.4%	1.9
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	23	29	6	25.1%	1.1
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	10	10	1	6.0%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	13	8	-4	-35.3%	1.4
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	34	37	3	9.8%	0.6
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	10	11	1	8.5%	0.3
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	9	6	-2	-26.2%	0.8
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	21	21	1	3.8%	0.2
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	10	10	0	-0.3%	0.0
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	12	8	-4	-30.0%	1.1
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	5	8	3	67.0%	1.3
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	16	16	-1	-5.1%	0.2
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	1	0	-1	-100.0%	1.6
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	5	2	-3	-68.0%	1.9
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	1	0	-1	-100.0%	1.2
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	4	1	-4	-82.7%	2.2
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	6	9	3	52.5%	1.1
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	6	8	2	33.3%	0.8
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	43	45	2	4.3%	0.3
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	9	9	0	0.6%	0.0
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	8	8	0	-5.8%	0.2
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	4	6	1	32.7%	0.6
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	8	6	-2	-26.3%	0.8
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	43	45	2	4.2%	0.3
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	7	9	2	33.5%	0.8
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	11	12	1	12.3%	0.4
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	6	0	-6	-94.2%	3.2
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	8	4	-4	-45.9%	1.4
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	3	3	0	-11.7%	0.2
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	1	0	-1	-100.0%	1.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	39	23	-16	-41.7%	2.9
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	12	16	4	35.8%	1.1
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	1	0	-1	-100.0%	1.4
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	1	0	-1	-100.0%	1.4
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	26	13	-13	-49.0%	2.9
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	14	5	-9	-66.4%	3.0
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	4	4	0	-1.3%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0		0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	2	0	-2	-100.0%	2.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	32	23	-9	-28.8%	1.8
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	2	0	-2	-100.0%	2.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	2	0	-2	-97.5%	1.9
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	39	18	-21	-54.0%	3.9
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	1	0	-1	-100.0%	1.4



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Vehicle Flow Information
Calibration Statistics
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IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	1	0	-1	-100.0%	1.2
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	4	2	-2	-60.0%	1.4
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	3	2	-1	-26.9%	0.5
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	0	-1	-100.0%	1.2
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	19	19	0	1.8%	0.1
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	17	19	3	15.8%	0.6
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	6	1	-4	-77.9%	2.4
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	12	12	0	0.0%	0.0
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	7	9	2	30.0%	0.7
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	4	2	-2	-49.5%	1.1
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	26	26	0	1.5%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	4	5	1	36.4%	0.6
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	2	1	-1	-62.5%	1.1
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	4	3	-1	-22.7%	0.5
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	4	4	-1	-15.8%	0.3
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	2	0	-2	-100.0%	2.2
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	1	1	0	-25.0%	0.3
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	4	3	-1	-22.5%	0.5
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	2	0	-2	-100.0%	1.8
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	2	0	-2	-100.0%	2.0
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0	-100.0%	0.8
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	1	1	0	0.0%	0.0
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	0	0	0	-100.0%	0.8
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	1	1	0	57.5%	0.4
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	34	37	3	9.1%	0.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	2	2	0	7.5%	0.1
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	1	1	0	-25.0%	0.3
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	1	1	0	-25.0%	0.3
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	1	1	0	-25.0%	0.3
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	33	35	2	5.7%	0.3
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	2	2	0	0.0%	0.0
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	3	1	-2	-61.0%	1.3
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	2	0	-2	-91.4%	1.9
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	2	1	-1	-40.0%	0.6
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	0	1	0	125.0%	0.6
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0		0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	4	3	-1	-16.3%	0.3
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	0	0	0		0.0
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	10	3	-7	-69.0%	2.7
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	0	0	0		0.0
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	0	0	0		0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0		0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	0	0		0.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	3	3	0	11.7%	0.2
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	0	0		0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	7	3	-4	-55.7%	1.7
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0		0.0



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Vehicle Flow Information
Calibration Statistics
All Vehicles
IP Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	11	10	-1	-9.1%	0.3
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	129	117	-12	-9.0%	1.0
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	77	73	-3	-4.3%	0.4
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	12	0	-12	-100.0%	4.8
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	154	167	13	8.5%	1.0
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	174	183	8	4.8%	0.6
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	126	91	-35	-27.7%	3.3
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	125	141	16	12.5%	1.4
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	72	76	4	5.6%	0.5
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	85	98	12	14.4%	1.3
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	206	202	-4	-2.2%	0.3
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	57	60	3	4.8%	0.4
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(SE)	A	B	2:1:1	141	166	24	17.2%	2.0
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	177	162	-15	-8.6%	1.2
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	2	2	0	0.0%	0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	161	167	6	3.8%	0.5
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	93	99	5	5.7%	0.5
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	99	101	2	2.5%	0.2
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	121	124	3	2.7%	0.3
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	20	13	-7	-33.1%	1.6
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	54	56	2	3.8%	0.3
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	7	6	-1	-16.4%	0.5
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	65	57	-8	-11.9%	1.0
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	62	66	4	6.5%	0.5
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	118	127	8	7.2%	0.8
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	283	295	12	4.4%	0.7
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	104	117	12	11.9%	1.2
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	99	98	-1	-0.6%	0.1
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	39	36	-3	-7.8%	0.5
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	126	129	3	2.0%	0.2
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	300	304	3	1.1%	0.2
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	69	67	-2	-2.3%	0.2
33	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	C	D	25:24:23	106	108	3	2.5%	0.3
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	54	46	-8	-14.5%	1.1
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	147	161	14	9.2%	1.1
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	18	23	5	25.5%	1.0
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	5	2	-3	-53.0%	1.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	209	196	-13	-6.2%	0.9
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	119	130	11	9.3%	1.0
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	11	8	-3	-26.8%	1.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	5	4	-1	-20.0%	0.5
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	1	0	-1	-95.0%	1.3
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	171	162	-9	-5.2%	0.7
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	7	7	0	-2.1%	0.1
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	51	30	-21	-41.6%	3.3
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	26	25	-1	-5.2%	0.3
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0	0.0%	0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	2	2	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	16	24	8	50.9%	1.8
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	201	178	-23	-11.3%	1.7
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	20	9	-11	-54.3%	2.8
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	9	19	10	111.7%	2.7
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	206	189	-17	-8.0%	1.2
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	8	0	-8	-95.0%	3.7



16:30-17:30

Vehicle Flow Information
Calibration Statistics
Car Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	3	9	6	174.5%	2.3
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	128	131	2	1.8%	0.2
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	78	82	4	4.9%	0.4
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	8	9	1	11.6%	0.3
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	135	136	2	1.1%	0.1
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	160	158	-2	-1.5%	0.2
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	195	182	-13	-6.8%	1.0
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	140	157	17	12.2%	1.4
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	68	67	-1	-1.6%	0.1
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	72	65	-7	-9.5%	0.8
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	183	183	0	-0.1%	0.0
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	33	33	1	1.6%	0.1
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	154	151	-3	-2.0%	0.3
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	161	159	-3	-1.7%	0.2
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	3	4	1	25.0%	0.4
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	123	111	-12	-9.9%	1.1
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	45	50	5	10.8%	0.7
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	105	126	21	20.0%	2.0
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	179	174	-4	-2.4%	0.3
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	28	22	-7	-23.2%	1.3
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	96	74	-22	-23.0%	2.4
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	5	4	-1	-16.0%	0.4
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	85	91	5	6.4%	0.6
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	75	73	-2	-2.1%	0.2
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	85	84	-1	-1.3%	0.1
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	266	287	21	8.0%	1.3
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	93	96	2	2.4%	0.2
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	89	94	5	5.5%	0.5
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	19	12	-8	-39.5%	1.9
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	106	115	9	8.2%	0.8
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	321	309	-12	-3.8%	0.7
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	41	45	4	10.0%	0.6
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	71	69	-2	-3.0%	0.3
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	80	79	-1	-1.7%	0.1
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	160	168	8	5.0%	0.6
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	21	10	-11	-51.9%	2.7
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	3	0	-3	-100.0%	2.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	204	230	26	12.7%	1.8
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	45	51	6	13.0%	0.8
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	14	15	1	6.8%	0.2
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	5	0	-5	-100.0%	3.2
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	296	246	-50	-16.9%	3.0
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	3	3	0	6.7%	0.1
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	19	19	0	1.6%	0.1
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	15	12	-3	-20.0%	0.8
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	4	4	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	27	23	-4	-13.3%	0.7
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	188	210	22	11.6%	1.6
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	32	26	-6	-18.4%	1.1
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	22	10	-12	-55.0%	3.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	292	242	-50	-17.2%	3.1
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	13	15	2	14.6%	0.5



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Vehicle Flow Information
Calibration Statistics
LGV Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0	-100.0%	0.8
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	18	19	1	2.8%	0.1
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	9	11	2	17.8%	0.5
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	1	2	1	50.0%	0.4
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	19	21	2	12.9%	0.5
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	29	28	-1	-4.0%	0.2
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	26	25	0	-1.8%	0.1
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	29	33	4	14.7%	0.8
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	12	12	1	5.0%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	17	16	0	-1.3%	0.1
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	41	39	-2	-4.1%	0.3
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	4	4	0	-5.4%	0.1
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:1:1	19	18	-1	-5.5%	0.2
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:1:13	19	20	2	8.5%	0.4
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:1:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	15	11	-4	-23.7%	1.0
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	5	3	-2	-36.8%	0.9
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	13	15	2	18.0%	0.6
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	18	23	5	25.5%	1.0
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	3	0	-3	-100.0%	2.4
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	15	13	-2	-13.8%	0.5
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	1	0	-1	-100.0%	1.2
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	8	11	3	31.3%	0.8
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	10	9	-1	-14.5%	0.5
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	8	9	1	18.7%	0.5
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	41	48	8	18.5%	1.1
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	10	10	0	0.3%	0.0
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	8	8	0	0.8%	0.0
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	2	2	0	5.0%	0.1
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	12	10	-2	-20.4%	0.7
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	64	64	0	0.2%	0.0
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	4	4	0	6.4%	0.1
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	8	9	1	9.8%	0.3
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	8	8	0	-5.2%	0.2
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	19	18	0	-2.0%	0.1
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	4	2	-2	-53.8%	1.3
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	1	0	-1	-100.0%	1.4
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	26	28	2	6.2%	0.3
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	4	4	0	2.5%	0.0
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	1	0	-1	-95.0%	1.3
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	2	3	1	47.5%	0.6
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	38	34	-4	-10.9%	0.7
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	5	4	-1	-11.0%	0.3
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	2	2	0	0.0%	0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0		0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	5	5	-1	-10.0%	0.2
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	22	26	4	17.7%	0.8
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	4	0	-4	-100.0%	2.8
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	3	3		2.4
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	35	38	3	9.3%	0.5
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	5	5		3.3



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Vehicle Flow Information
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PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	0	0	0		0.0
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	2	3	1	50.0%	0.6
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	2	3	2	95.0%	1.0
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	0	0	0		0.0
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	7	6	-1	-15.5%	0.4
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	8	9	0	4.4%	0.1
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	2	0	-2	-100.0%	2.0
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	7	7	0	-3.9%	0.1
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	1	0	-1	-100.0%	1.4
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	1	0	-1	-100.0%	1.6
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	9	9	0	5.6%	0.2
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	1	1	0	-25.0%	0.3
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(S)	A	B	2:11:1	2	0	-2	-89.3%	1.8
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	2	4	2	97.5%	1.1
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	0	0	0		0.0
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	2	2	0	20.0%	0.2
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	1	1	0	30.0%	0.3
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	0	0	0	-100.0%	0.8
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	1	0	-1	-100.0%	1.6
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:11	1	0	-1	-100.0%	1.2
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	1	0	-1	-100.0%	1.4
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	0	0	0		0.0
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:11	0	1	1	200.0%	0.8
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	1	1	0	-25.0%	0.3
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	2	2	0	20.0%	0.2
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	12	14	2	13.5%	0.5
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	1	0	-1	-100.0%	1.4
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	1	1	0	35.0%	0.3
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	2	1	-1	-65.0%	1.1
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	2	3	2	98.0%	1.0
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	15	16	1	8.8%	0.3
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	0	0	0	-100.0%	0.8
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	1	0	-1	-100.0%	1.4
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:11:26	1	1	0	20.0%	0.2
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:11:30	1	0	-1	-100.0%	1.2
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:11:25	1	0	-1	-95.0%	1.3
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	0	0	0		0.0
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	1	6	5	525.0%	2.8
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	0	0	0		0.0
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	0	0	0		0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	0	0	0		0.0
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0		0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	6	0	-6	-100.0%	3.5
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	0	0	0		0.0
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	0	0	0		0.0
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	0	0	0		0.0
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0		0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	0	0	0		0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	0	0	0		0.0
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	1	6	5	525.0%	2.8
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	0	0	0		0.0
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	0	0	0		0.0
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	4	0	-4	-100.0%	2.8
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	0	0	0		0.0



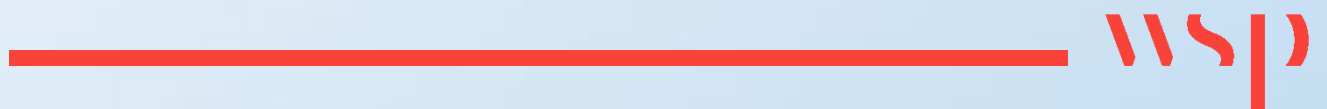
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Vehicle Flow Information
Calibration Statistics
All Vehicles
PM Peak

Index	Junction	Name	Origin	Destination	Reference	Observed Flow	Modelled Flow	Difference	% Difference	G.E.H. Value (using hourly flows)
1	Site 1	A49 Bryn St to A58 Gerard St	A	B	20:13:7	4	9	5	149.5%	2.2
2	Site 1	A49 Bryn St to A49 Warrington Rd	A	C	20:13:36	148	152	4	2.5%	0.3
3	Site 1	A49 Bryn St to A58 Liverpool Rd	A	D	20:13:14	89	96	7	7.9%	0.7
4	Site 1	A58 Gerard St to A49 Bryn St	B	A	20:25:11	9	11	1	15.7%	0.5
5	Site 1	A58 Gerard St to A49 Warrington Rd	B	C	20:25:36	161	164	3	1.8%	0.2
6	Site 1	A58 Gerard St to A58 Liverpool Rd	B	D	20:25:14	198	195	-3	-1.6%	0.2
7	Site 1	A49 Warrington Rd to A49 Bryn St	C	A	20:35:11	223	207	-16	-7.0%	1.1
8	Site 1	A49 Warrington Rd to A58 Gerard St	C	B	20:35:7	176	197	21	11.9%	1.5
9	Site 1	A49 Warrington Rd to A58 Liverpool Rd	C	D	20:35:14	80	79	-1	-1.8%	0.2
10	Site 1	A58 Liverpool Rd to A49 Bryn St	D	A	20:49:11	90	82	-8	-9.3%	0.9
11	Site 1	A58 Liverpool Rd to A58 Gerard St	D	B	20:49:7	233	231	-1	-0.6%	0.1
12	Site 1	A58 Liverpool Rd to A49 Warrington Rd	D	C	20:49:36	38	38	0	-0.1%	0.0
13	Site 2	A49 Wigan Rd(NW) to A49 Wigan Rd(SE)	A	B	2:11:1	175	169	-6	-3.6%	0.5
14	Site 2	A49 Wigan Rd(NW) to A49 Bryn St	A	C	2:11:13	182	183	1	0.4%	0.1
15	Site 2	A49 Wigan Rd(NW) to C Old Rd	A	D	2:11:18	3	4	1	25.0%	0.4
16	Site 2	A49 Wigan Rd(SE) to A49 Wigan Rd(NW)	B	A	2:17:12	140	124	-15	-11.0%	1.3
17	Site 2	A49 Wigan Rd(SE) to A49 Bryn St	B	C	2:17:13	50	54	3	6.8%	0.5
18	Site 2	A49 Wigan Rd(SE) to C Old Rd	B	D	2:17:18	118	141	23	19.5%	2.0
19	Site 2	A49 Bryn St to A49 Wigan Rd(NW)	C	A	2:11:12	198	197	-1	-0.5%	0.1
20	Site 2	A49 Bryn St to A49 Wigan Rd(SE)	C	B	2:11:1	32	22	-10	-32.0%	2.0
21	Site 2	A49 Bryn St to C Old Rd	C	D	2:11:18	112	87	-25	-22.4%	2.5
22	Site 2	C Old Rd to A49 Wigan Rd(NW)	D	A	2:19:12	6	4	-1	-25.9%	0.7
23	Site 2	C Old Rd to A49 Wigan Rd(SE)	D	B	2:19:1	94	102	9	9.2%	0.9
24	Site 2	C Old Rd to A49 Bryn St	D	C	2:19:13	86	83	-3	-3.9%	0.4
25	Site 3	A58 Bolton Rd to U Princess Rd	A	B	25:27:30	94	95	1	0.7%	0.1
26	Site 3	A58 Bolton Rd to A58 Gerard St	A	C	25:27:25	319	350	31	9.6%	1.7
27	Site 3	A58 Bolton Rd to A49 Wigan Rd(NW)	A	D	25:27:23	104	105	1	1.2%	0.1
28	Site 3	U Princess Rd to A58 Bolton Rd	B	A	25:29:26	98	103	5	5.4%	0.5
29	Site 3	U Princess Rd to A58 Gerard St	B	C	25:29:25	23	14	-9	-38.5%	2.1
30	Site 3	U Princess Rd to A49 Wigan Rd(NW)	B	D	25:29:23	120	128	8	6.6%	0.7
31	Site 3	A58 Gerard St to A58 Bolton Rd	C	A	25:24:26	399	388	-11	-2.7%	0.6
32	Site 3	A58 Gerard St to U Princess Rd	C	B	25:24:30	45	49	4	8.9%	0.6
33	Site 3	A58 Gerard St to A49 Wigan Rd(NW)	C	D	25:24:23	81	78	-2	-2.9%	0.3
34	Site 3	A49 Wigan Rd(NW) to A58 Bolton Rd	D	A	25:1:26	90	88	-2	-1.7%	0.2
35	Site 3	A49 Wigan Rd(NW) to U Princess Rd	D	B	25:1:30	179	186	7	3.9%	0.5
36	Site 3	A49 Wigan Rd(NW) to A58 Gerard St	D	C	25:1:25	26	12	-14	-53.8%	3.2
37	Site 4	A49 Bryn St(N) to Millingford Grove	A	B	17:13:53	4	0	-4	-100.0%	2.8
38	Site 4	A49 Bryn St(N) to A49 Bryn St(S)	A	C	17:13:13	231	264	33	14.2%	2.1
39	Site 4	A49 Bryn St(N) to Garswood St	A	D	17:13:44	49	55	6	12.1%	0.8
40	Site 4	Millingford Grove to A49 Bryn St(N)	B	A	17:43:11	15	15	0	0.0%	0.0
41	Site 4	Millingford Grove to A49 Bryn St(S)	B	C	17:43:13	7	3	-4	-57.9%	1.8
42	Site 4	Millingford Grove to Garswood St	B	D	17:43:44	0	0	0	0.0%	0.0
43	Site 4	A49 Bryn St(S) to A49 Bryn St(N)	C	A	17:11:11	340	280	-60	-17.7%	3.4
44	Site 4	A49 Bryn St(S) to Millingford Grove	C	B	17:11:53	3	3	0	6.7%	0.1
45	Site 4	A49 Bryn St(S) to Garswood St	C	D	17:11:44	24	24	0	-1.0%	0.1
46	Site 4	Garswood St to A49 Bryn St(N)	D	A	17:45:11	17	14	-3	-17.6%	0.8
47	Site 4	Garswood St to Millingford Grove	D	B	17:45:53	0	0	0	0.0%	0.0
48	Site 4	Garswood St to A49 Bryn St(S)	D	C	17:45:13	4	4	0	0.0%	0.0
49	Site 5	A49 Bryn St(N) to Council Ave	A	B	18:13:52	32	28	-4	-12.8%	0.7
50	Site 5	A49 Bryn St(N) to A49 Bryn St(S)	A	C	18:13:13	211	242	31	14.7%	2.1
51	Site 5	Council Ave to A49 Bryn St(N)	B	A	18:51:11	36	26	-10	-27.5%	1.8
52	Site 5	Council Ave to A49 Bryn St(S)	B	C	18:51:13	22	13	-9	-41.4%	2.2
53	Site 5	A49 Bryn St(S) to A49 Bryn St(N)	C	A	18:11:11	331	280	-51	-15.4%	2.9
54	Site 5	A49 Bryn St(S) to Council Ave	C	B	18:11:52	13	20	7	55.4%	1.8

Appendix B

JOURNEY TIME VALIDATION



07:15-08:15

15:30-16:30

10:45-11:45

Route	Observed AM	Modelled AM	Diff AM	Diff% AM	Observed PM	Modelled PM	Diff PM	Diff% PM	Observed IP	Modelled IP	Diff IP	Diff% IP
1 - Route 1A Wigan Rd SB to Wigan Rd/ Old Rd	21	36	15	69.4%	27	36	9	34.1%	30	34	4	12.1%
2 - Route 1B Wigan Rd/ Old Rd to Wigan Rd/ A58 Bolton Rd	62	58	-4	-6.7%	86	80	-6	-7.3%	76	85	9	11.7%
4 - Route 1 Wigan Rd SB to Bolton Road Full Route	83	93	10	12.6%	113	116	3	2.4%	106	119	13	11.8%
5 - Route 2A Liverpool Rd/Woodedge to Liverpool Rd/Warrington Rd	143	173	30	21.2%	253	262	8	3.3%	95	100	4	4.6%
6 - Route 2B Liverpool Rd/Warrington Rd to Ped Crossing of Gerard St	36	38	2	5.0%	68	63	-6	-8.6%	57	44	-13	-22.2%
7 - Route 2C Ped Crossing of Gerard St to Gerard St/Princess Rd	33	30	-2	-6.9%	51	53	2	3.8%	45	43	-2	-4.9%
8 - Route 2 Liverpool Rd/Woodedge to Gerard St/ Princess Rd Full Route	212	241	29	13.6%	372	377	5	1.3%	197	187	-10	-5.3%
9 - Route 3A Warrington Rd/Violet St to Warrington Rd/Liverpool Rd	186	175	-11	-5.9%	116	115	-1	-0.8%	78	80	2	2.3%
10 - Route 3B Warrington Rd/Liverpool Rd to Bryn St/ Council Ave	25	27	3	10.7%	23	32	8	36.3%	22	28	6	26.1%
11 - Route 3C Bryn St/ Council Ave to Bryn St/Millingford Grove/Garswood St	9	9	-1	-7.6%	11	11	0	1.4%	11	10	-2	-13.7%
12 - Route 3D Bryn St/Millingford Grove/Garswood St to Wigan Rd/ Old Rd	18	21	3	16.9%	20	31	11	54.1%	23	29	6	27.7%
13 - Route 3 Warrington Rd/Violet St to Wigan Rd/ Old Rd Full Route	238	232	-6	-2.4%	170	189	19	11.0%	134	147	13	9.5%
14 - Route 4A Wigan Rd/Old Rd to Bryn St/Millingford Grove/Garswood St	32	34	3	9.0%	17	19	2	9.6%	16	16	0	-1.5%
15 - Route 4B Bryn St/Millingford Grove/Garswood St to Bryn St/ Council Ave	45	35	-10	-23.0%	21	23	2	11.1%	12	9	-3	-24.2%
16 - Route 4C Bryn St/ Council Ave to Warrington Rd/Liverpool Rd	116	102	-14	-12.1%	104	97	-7	-6.5%	69	60	-9	-12.5%
17 - Route 4D Warrington Rd/Liverpool Rd to Warrington Rd/Violet St	35	36	1	3.3%	31	32	1	3.1%	28	33	5	16.6%
18 - Route 4 Wigan Rd/Old Rd to Warrington Rd/Violet St Full Route	228	207	-21	-9.3%	173	172	-1	-0.8%	125	118	-7	-5.5%
19 - Route 5A Bolton Rd/Bryn Rd to Bolton Rd/ Wigan Rd	74	67	-7	-9.4%	95	81	-14	-14.9%	82	73	-10	-11.6%
20 - Route 5B Bolton Rd/ Wigan Rd to Gerard St/Princess Rd	5	4	-1	-24.3%	6	4	-2	-39.7%	5	4	-2	-33.9%
21 - Route 5C Gerard St/Princess Rd to Ped Crossing on Gerard St	35	26	-9	-25.7%	31	21	-10	-31.2%	23	20	-3	-13.7%
22 - Route 5D Ped Crossing on Gerard St to Liverpool Rd/Warrington Rd	66	70	4	5.8%	78	81	3	4.0%	46	46	1	2.1%
23 - Route 5E Liverpool Rd/Warrington Rd to Liverpool Rd/Woodedge	56	54	-1	-2.4%	57	53	-4	-7.1%	52	52	1	1.6%
24 - Route 5 Bolton Rd/Bryn Rd to Liverpool Rd/Woodedge Full Route	236	221	-15	-6.2%	267	239	-28	-10.4%	208	195	-13	-6.4%
25 - Route 6A Gerard St/Wigan Rd to Wigan Rd/Old Rd	67	62	-5	-7.6%	50	54	4	8.7%	46	48	2	3.9%
26 - Route 6B Wigan Rd/Old Rd to Wigan Road NB	22	18	-4	-19.7%	13	16	3	24.9%	13	16	3	19.7%
27 - Route 6 Gerard St/Wigan Rd to Wigan Road NB Full Route	89	80	-9	-10.1%	63	70	7	11.2%	59	64	5	8.8%

08:15-09:15

16:30-17:30

11:45-12:45

Route	Observed AM	Modelled AM	Diff AM	Diff% AM	Observed PM	Modelled PM	Diff PM	Diff% PM	Observed IP	Modelled IP	Diff IP	Diff% IP
1 - Route 1A Wigan Rd SB to Wigan Rd/ Old Rd	28	38	10	35.8%	27	32	6	22.1%	31	33	2	6.2%
2 - Route 1B Wigan Rd/ Old Rd to Wigan Rd/ A58 Bolton Rd	69	69	0	0.3%	85	87	2	2.1%	76	62	-14	-18.4%
4 - Route 1 Wigan Rd SB to Bolton Road Full Route	97	107	10	10.3%	112	119	7	6.4%	107	95	-12	-11.3%
5 - Route 2A Liverpool Rd/Woodedge to Liverpool Rd/Warrington Rd	261	269	8	3.2%	237	264	26	11.1%	98	119	21	21.2%
6 - Route 2B Liverpool Rd/Warrington Rd to Ped Crossing of Gerard St	39	36	-3	-7.0%	69	56	-12	-17.9%	58	55	-2	-4.3%
7 - Route 2C Ped Crossing of Gerard St to Gerard St/Princess Rd	38	39	1	2.5%	51	55	4	7.9%	46	48	3	6.2%
8 - Route 2 Liverpool Rd/Woodedge to Gerard St/ Princess Rd Full Route	338	344	6	1.9%	357	375	18	5.0%	202	223	21	10.2%
9 - Route 3A Warrington Rd/Violet St to Warrington Rd/Liverpool Rd	175	178	2	1.3%	113	116	3	2.8%	79	88	9	11.1%
10 - Route 3B Warrington Rd/Liverpool Rd to Bryn St/ Council Ave	27	31	4	16.6%	23	29	6	27.5%	22	28	6	26.2%
11 - Route 3C Bryn St/ Council Ave to Bryn St/Millingford Grove/Garswood St	13	10	-3	-21.0%	10	9	-1	-8.5%	11	9	-2	-20.5%
12 - Route 3D Bryn St/Millingford Grove/Garswood St to Wigan Rd/ Old Rd	19	29	10	54.8%	19	28	9	45.5%	22	28	6	25.7%
13 - Route 3 Warrington Rd/Violet St to Wigan Rd/ Old Rd Full Route	234	248	14	5.9%	165	182	17	10.3%	134	153	19	14.4%
14 - Route 4A Wigan Rd/Old Rd to Bryn St/Millingford Grove/Garswood St	20	22	3	13.0%	17	17	0	1.2%	16	16	0	-2.2%
15 - Route 4B Bryn St/Millingford Grove/Garswood St to Bryn St/ Council Ave	18	18	0	2.4%	21	15	-6	-29.1%	12	9	-3	-27.4%
16 - Route 4C Bryn St/ Council Ave to Warrington Rd/Liverpool Rd	64	67	3	4.3%	110	95	-15	-13.5%	71	66	-5	-7.2%
17 - Route 4D Warrington Rd/Liverpool Rd to Warrington Rd/Violet St	37	33	-3	-9.3%	31	33	2	5.3%	28	32	4	14.6%
18 - Route 4 Wigan Rd/Old Rd to Warrington Rd/Violet St Full Route	139	141	2	1.1%	179	160	-19	-10.8%	127	123	-4	-3.3%
19 - Route 5A Bolton Rd/Bryn Rd to Bolton Rd/ Wigan Rd	92	105	13	14.4%	92	78	-14	-15.5%	82	76	-6	-7.7%
20 - Route 5B Bolton Rd/ Wigan Rd to Gerard St/Princess Rd	6	4	-2	-35.9%	6	4	-2	-37.1%	5	4	-2	-34.0%
21 - Route 5C Gerard St/Princess Rd to Ped Crossing on Gerard St	40	36	-4	-10.1%	27	23	-4	-14.8%	23	19	-4	-18.6%
22 - Route 5D Ped Crossing on Gerard St to Liverpool Rd/Warrington Rd	109	107	-2	-2.1%	70	90	20	28.2%	46	49	3	7.1%
23 - Route 5E Liverpool Rd/Warrington Rd to Liverpool Rd/Woodedge	57	53	-4	-7.7%	57	53	-4	-6.9%	52	53	1	1.7%
24 - Route 5 Bolton Rd/Bryn Rd to Liverpool Rd/Woodedge Full Route	304	305	1	0.2%	252	247	-5	-2.0%	208	200	-8	-3.7%
25 - Route 6A Gerard St/Wigan Rd to Wigan Rd/Old Rd	54	61	7	13.2%	50	67	17	33.7%	45	50	5	11.0%
26 - Route 6B Wigan Rd/Old Rd to Wigan Road NB	14	17	3	18.0%	13	17	4	29.4%	13	16	3	21.3%
27 - Route 6 Gerard St/Wigan Rd to Wigan Road NB Full Route	68	78	10	14.6%	63	84	21	32.9%	58	66	8	13.5%

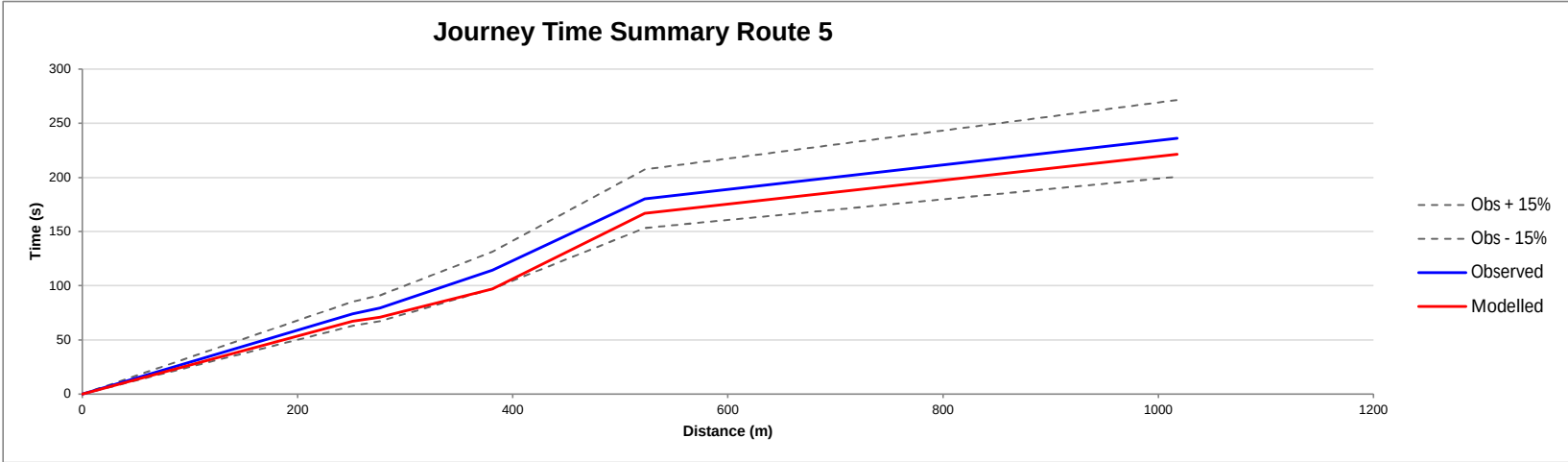
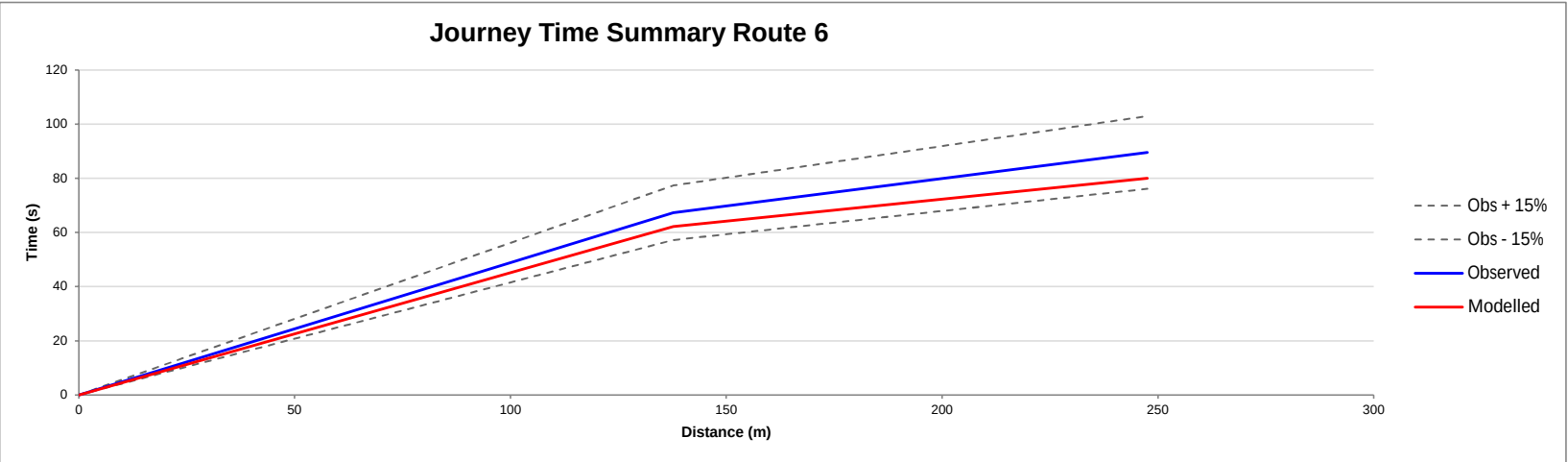
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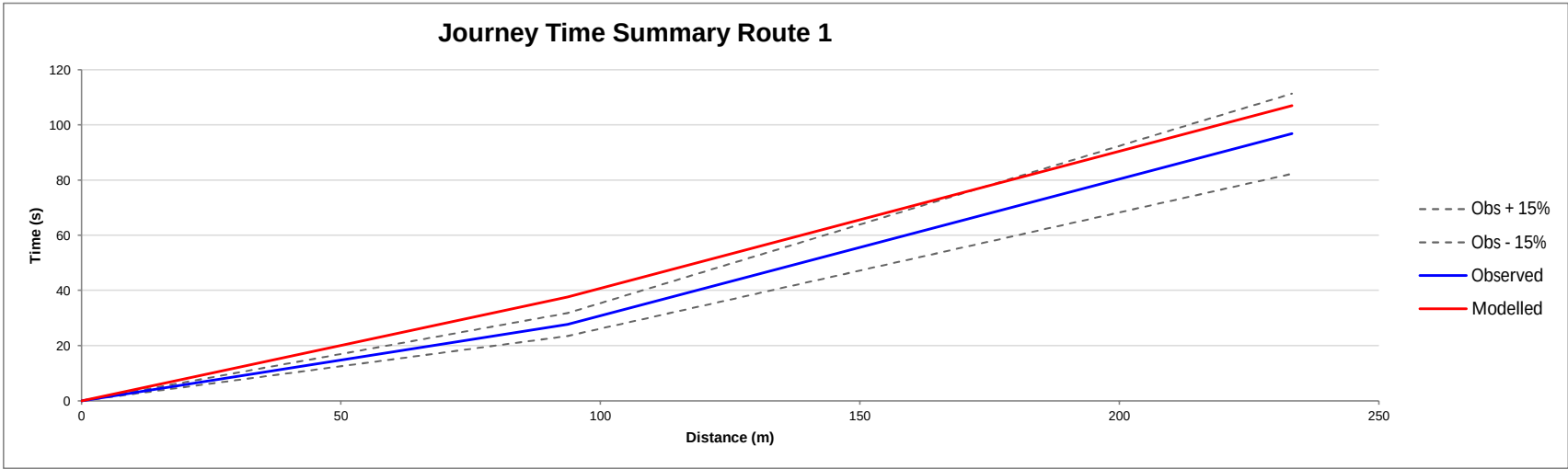
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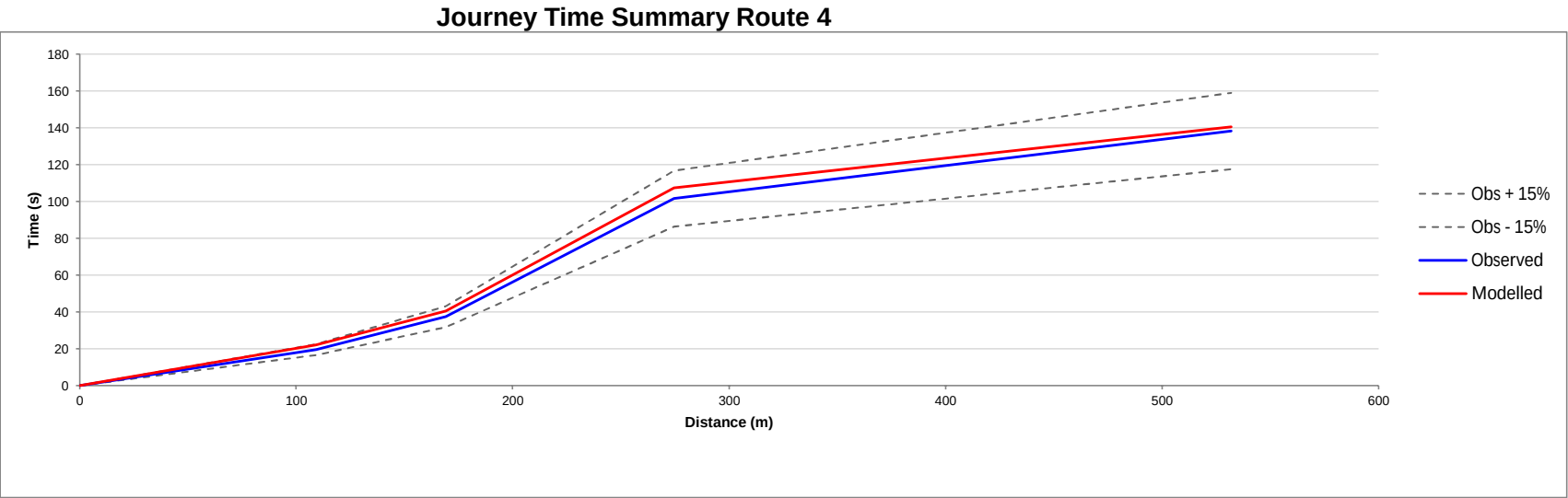
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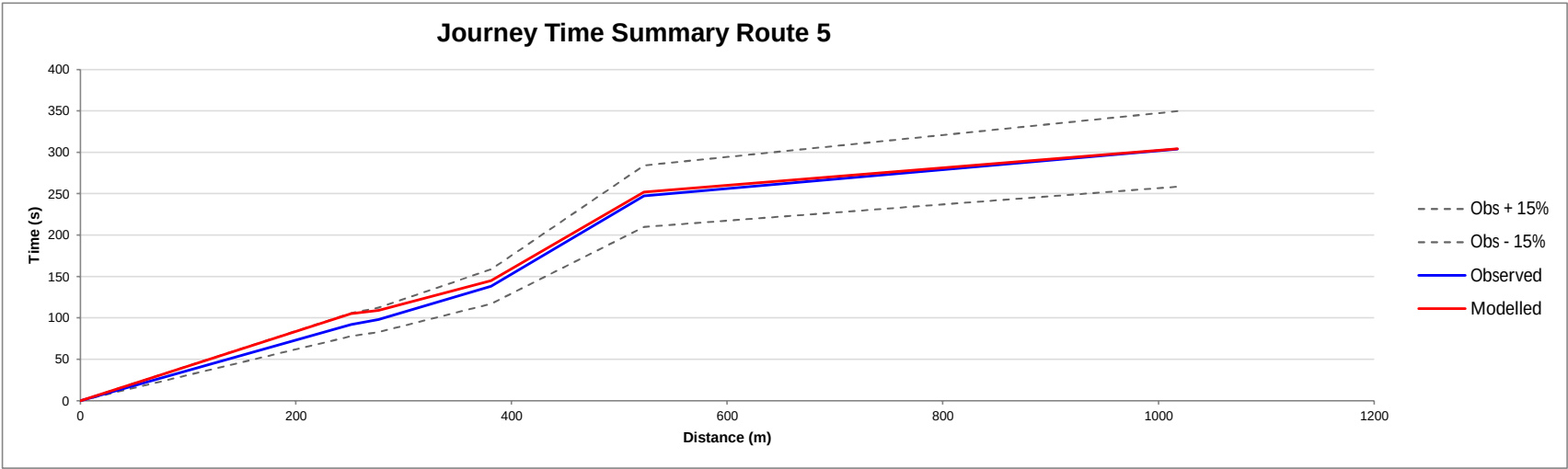
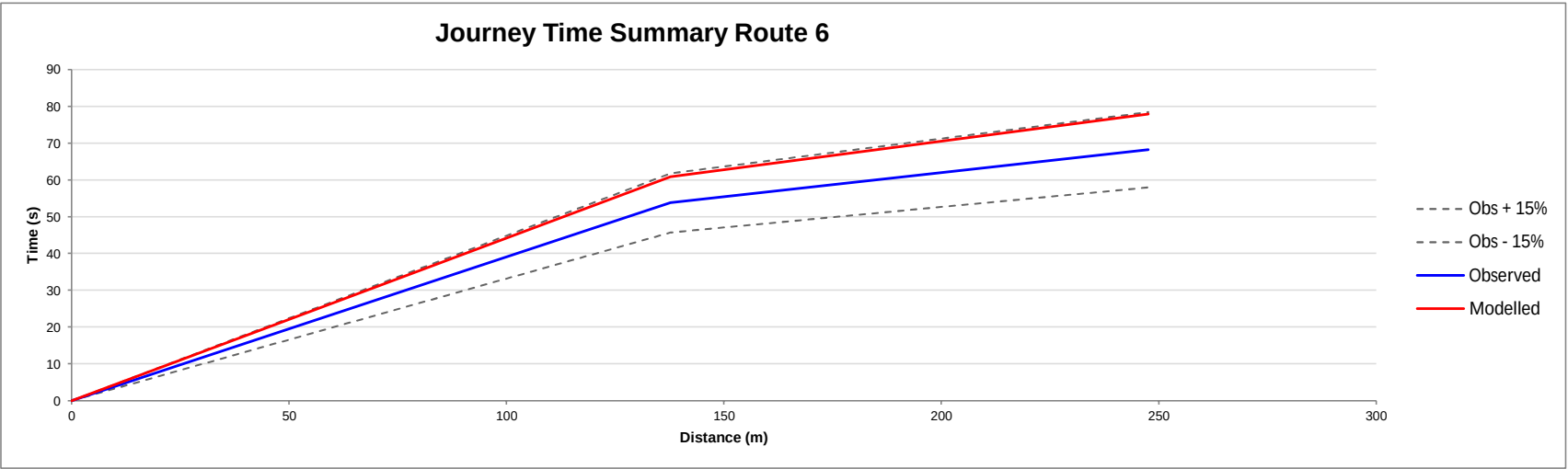
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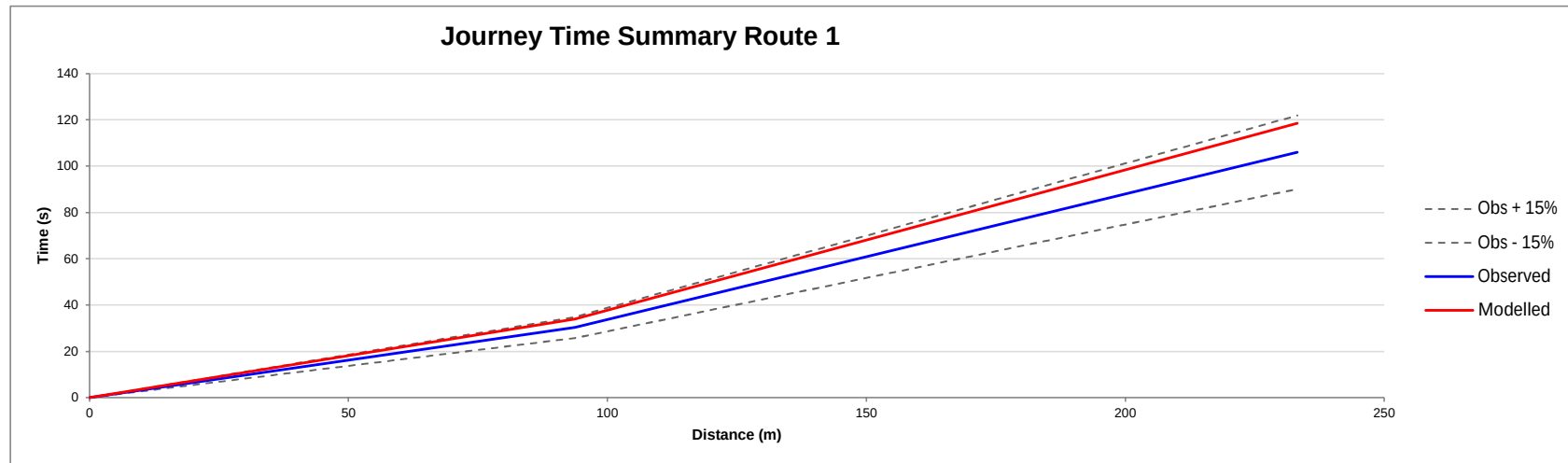
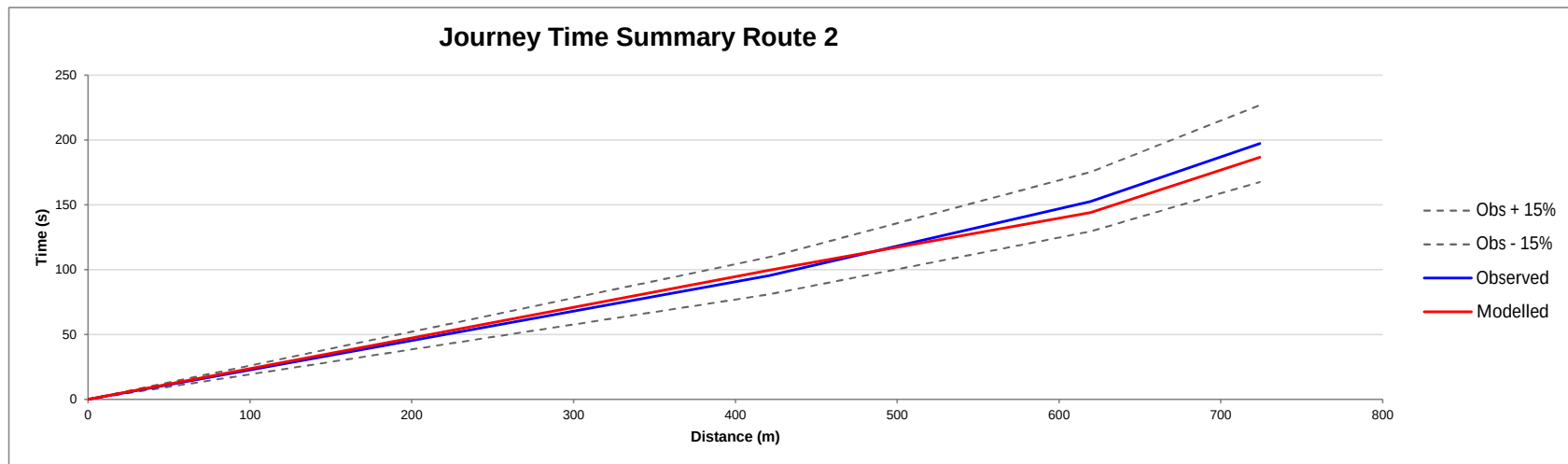
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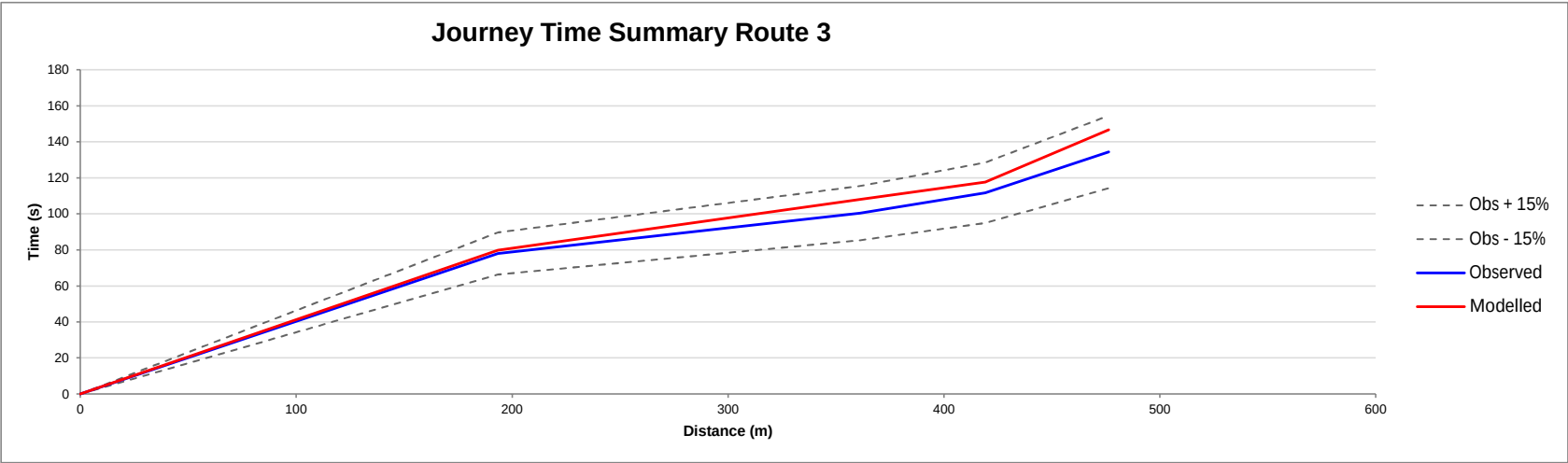
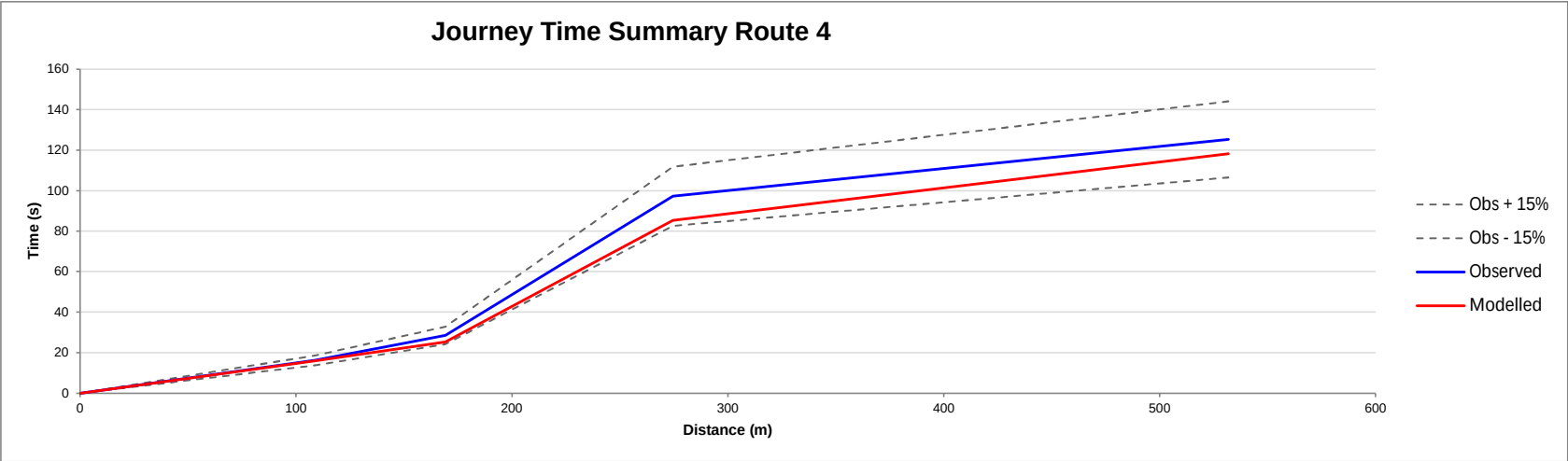
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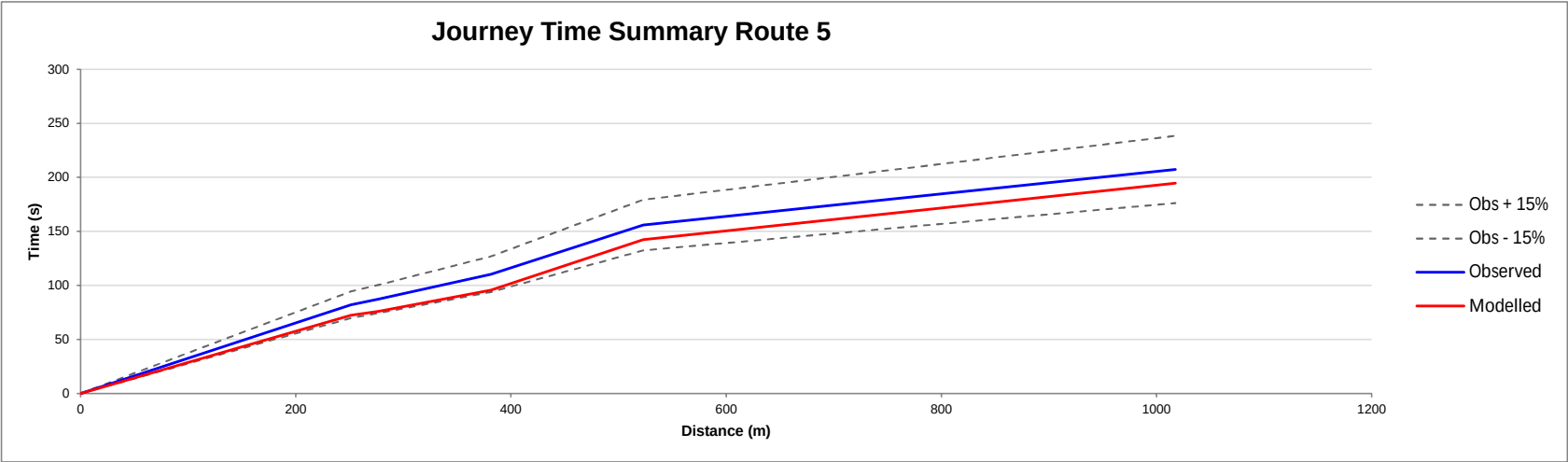
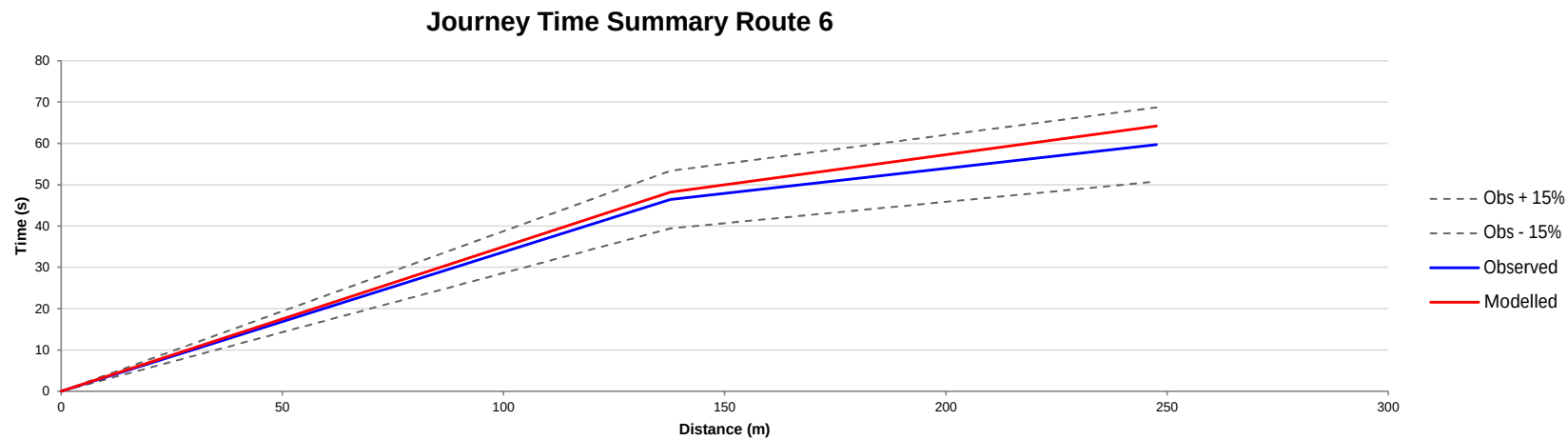
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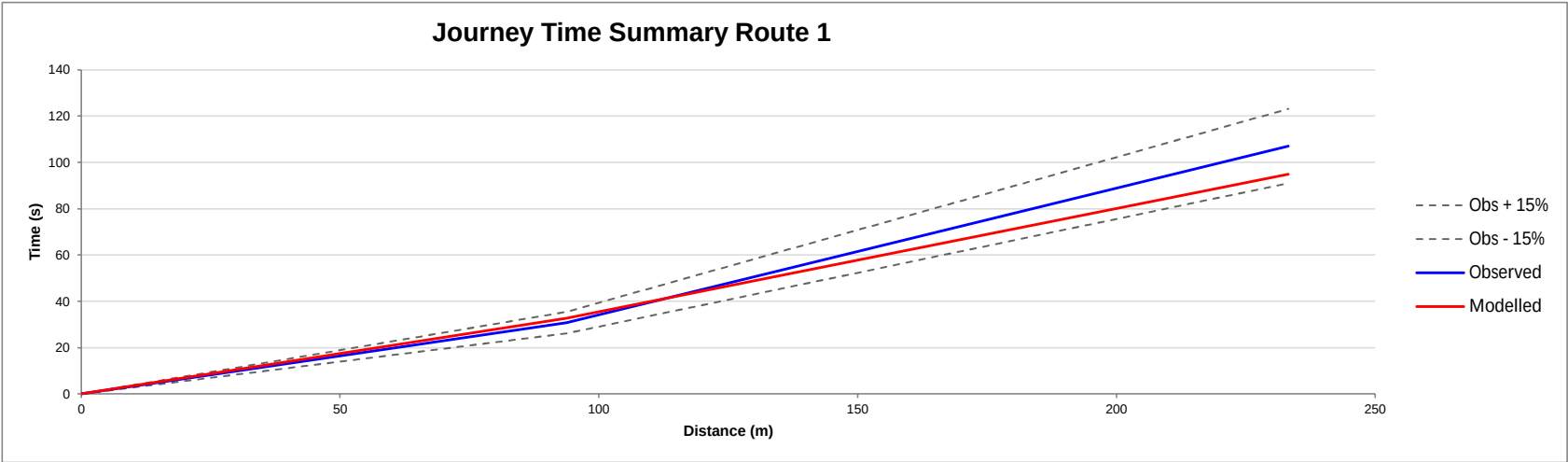
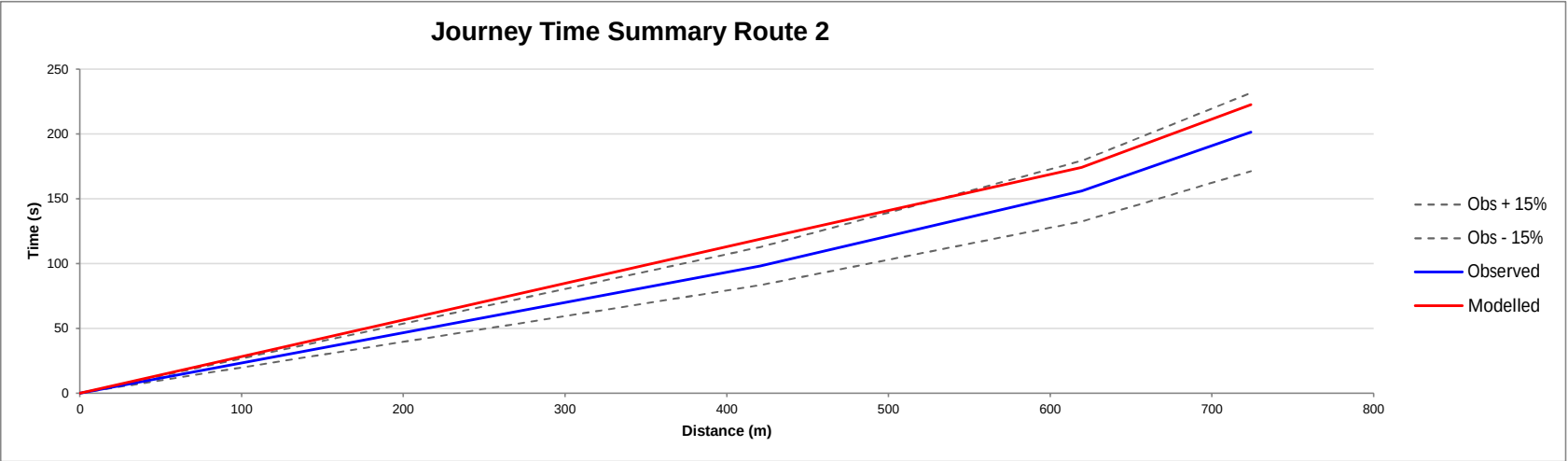
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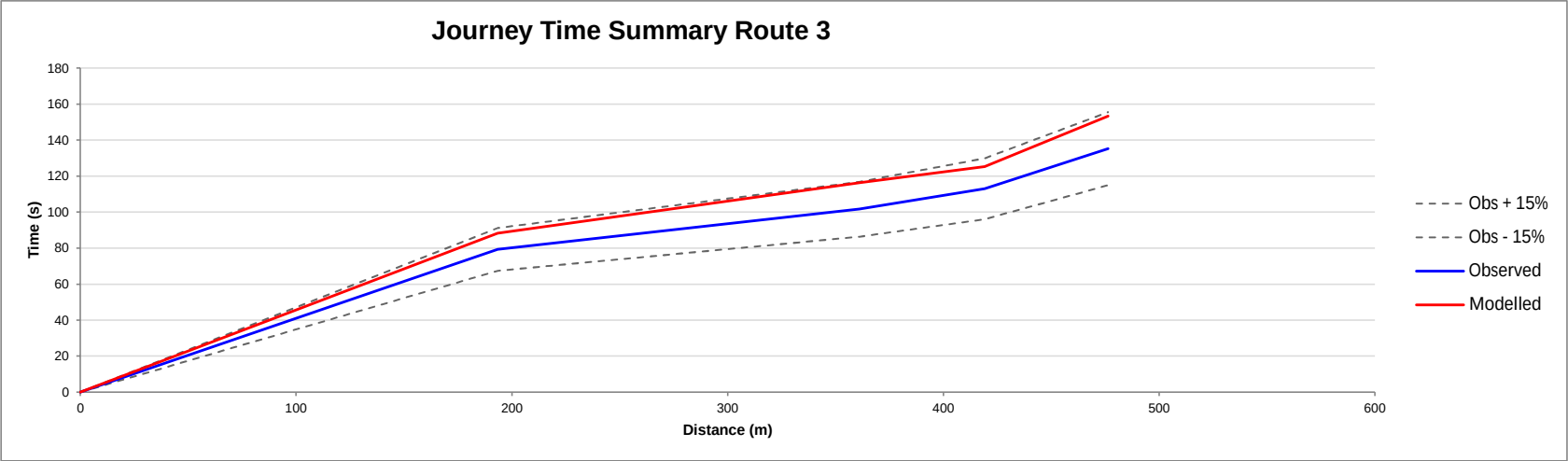
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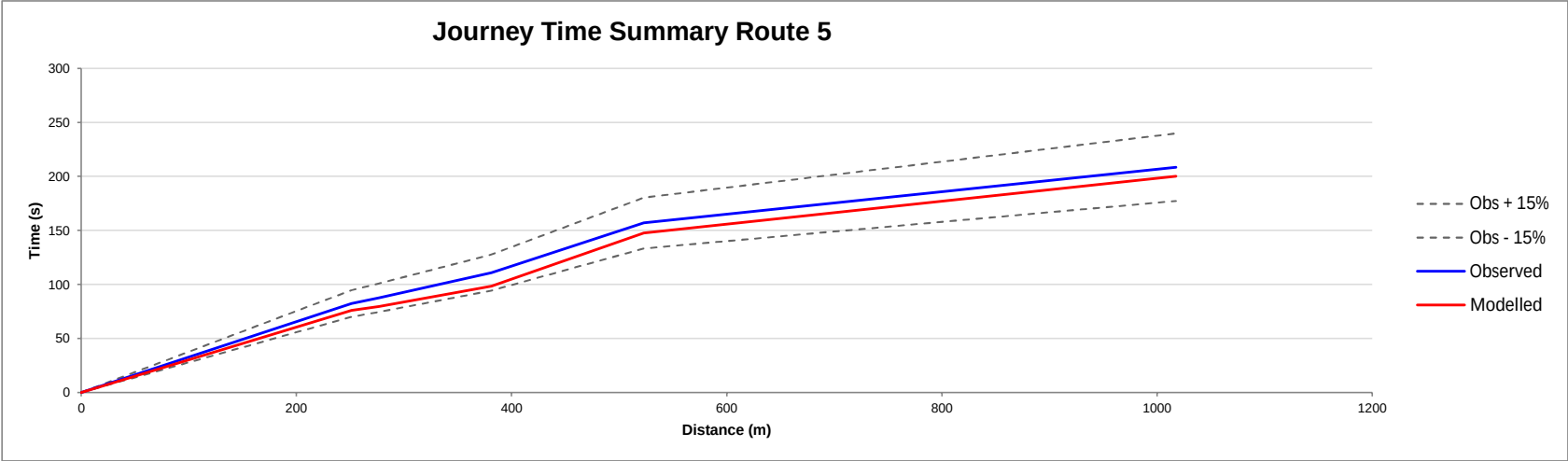
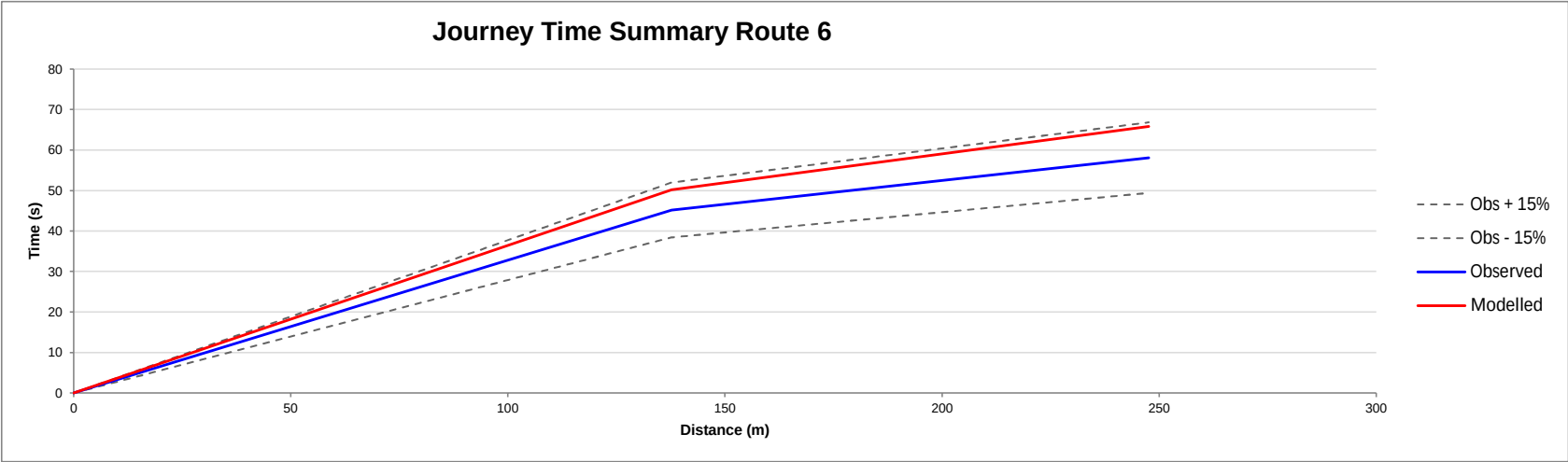
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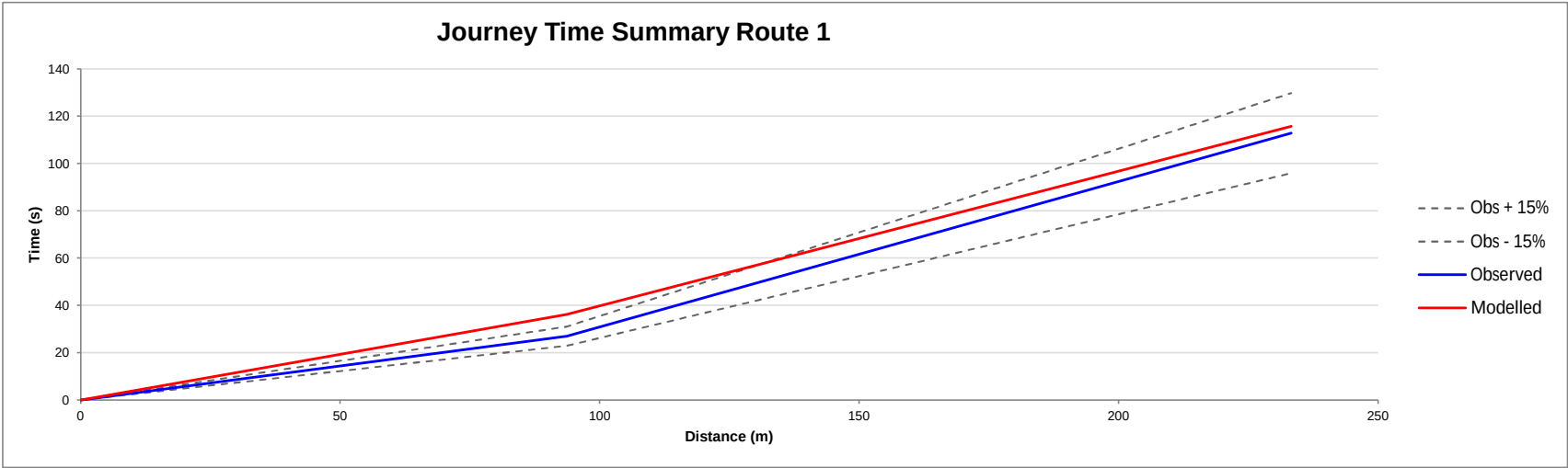
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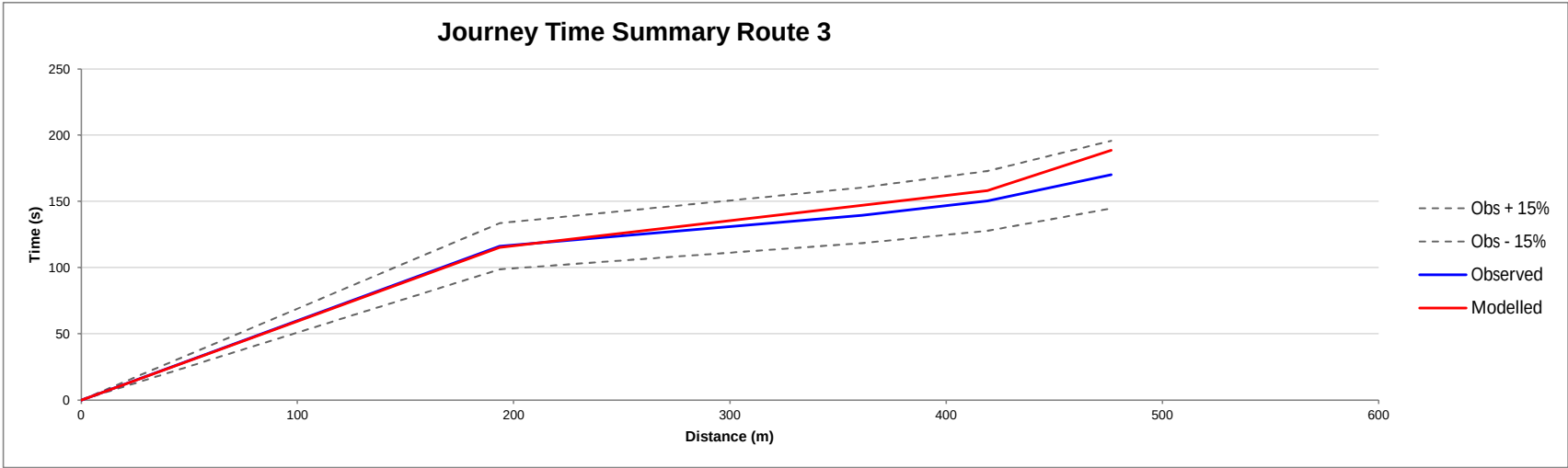
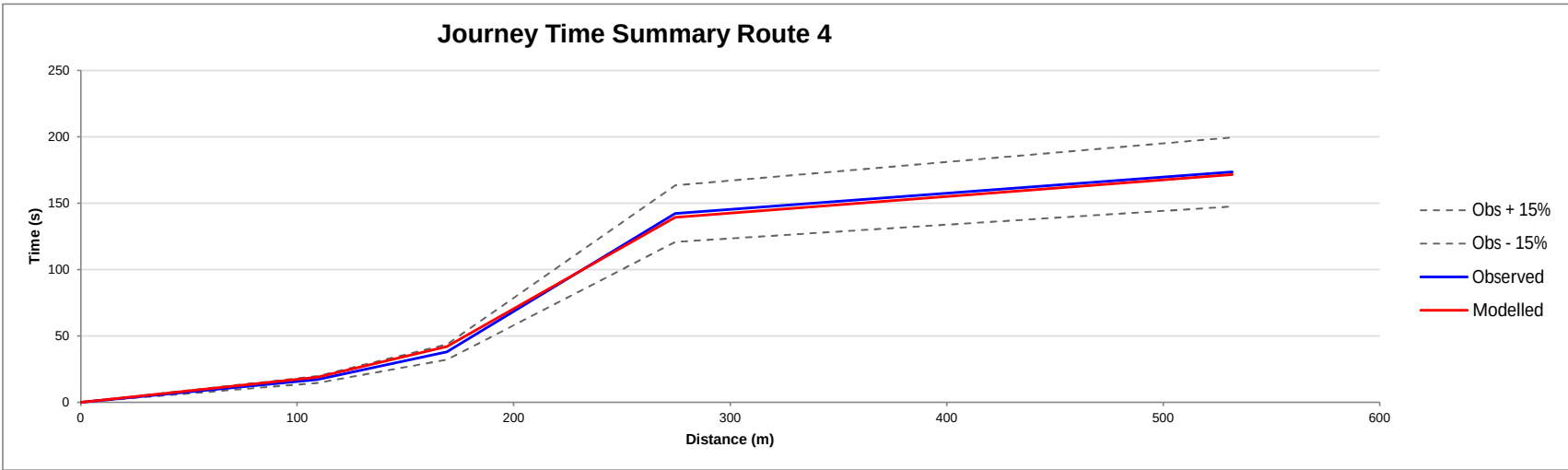
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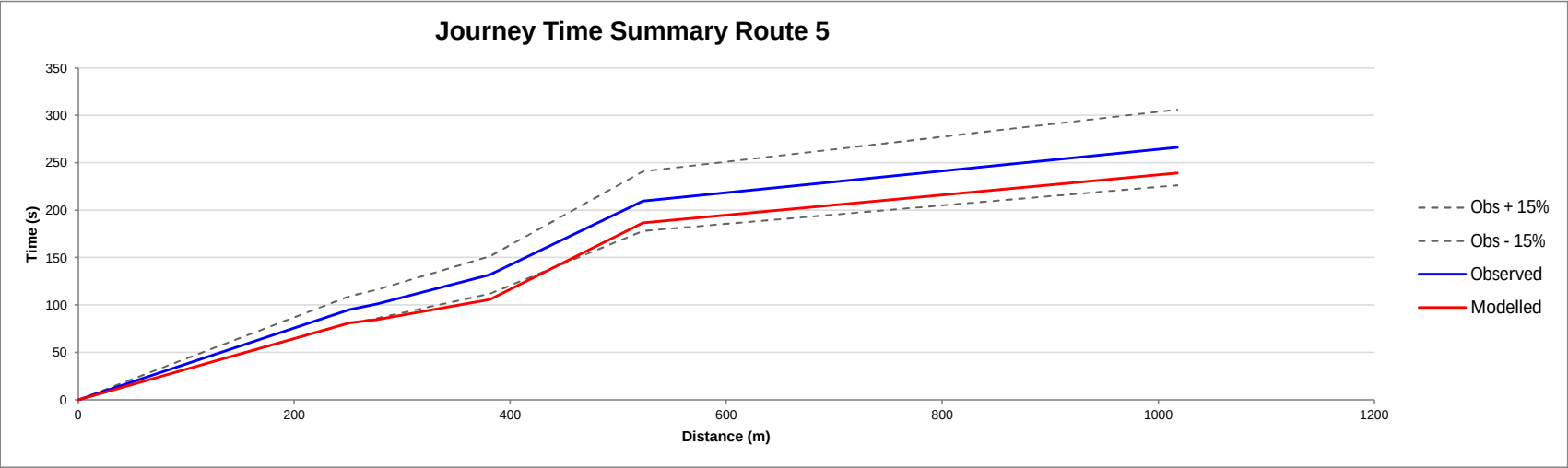
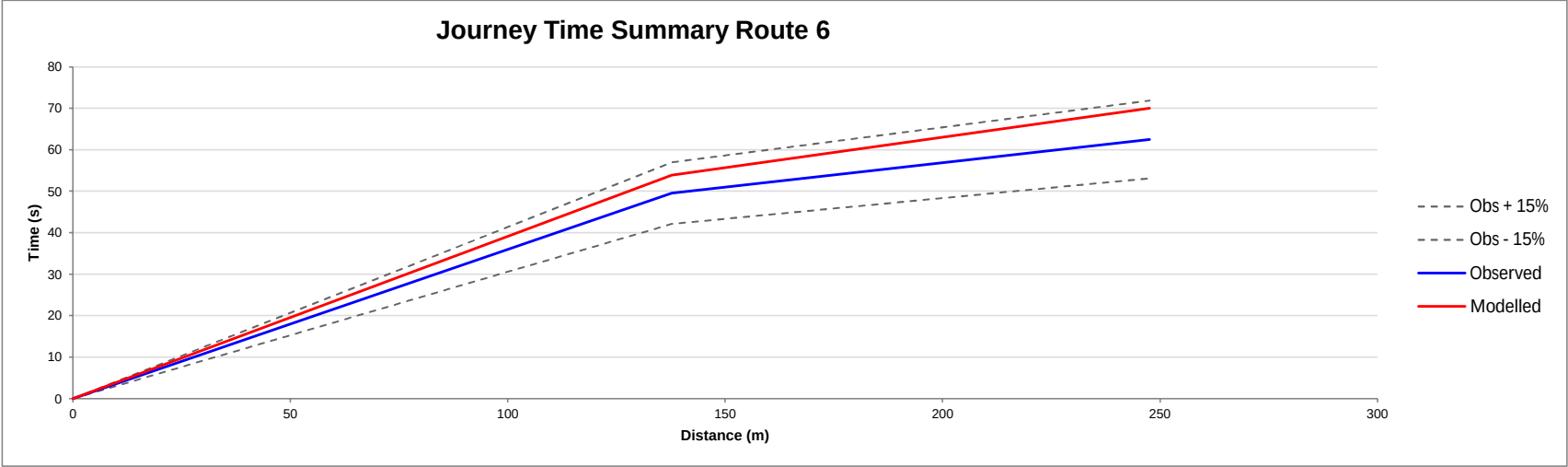
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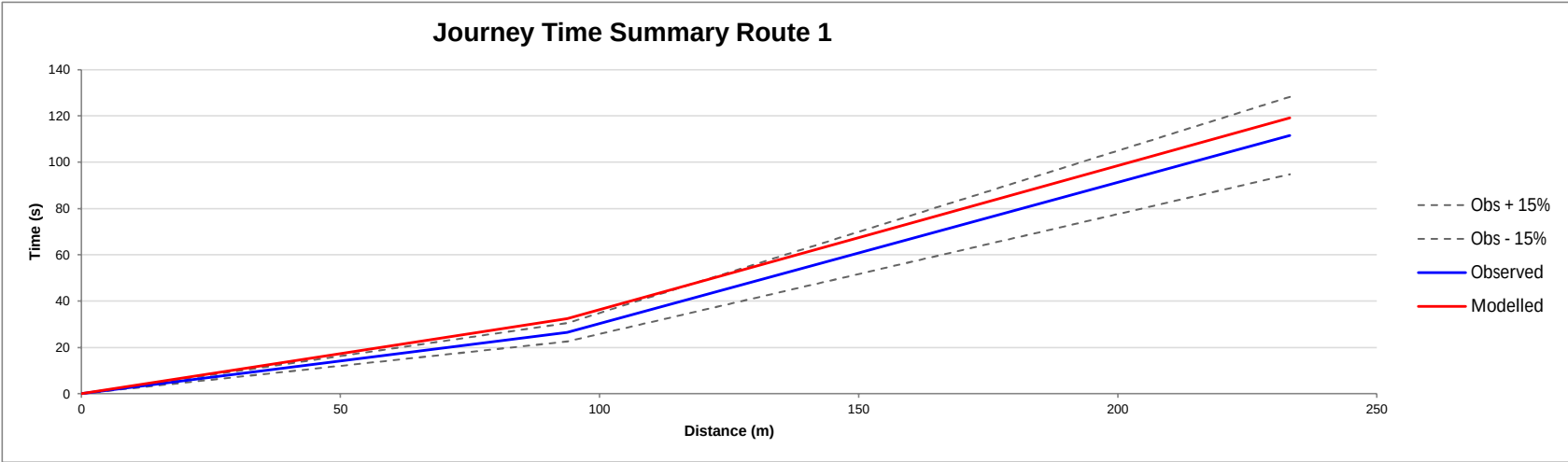
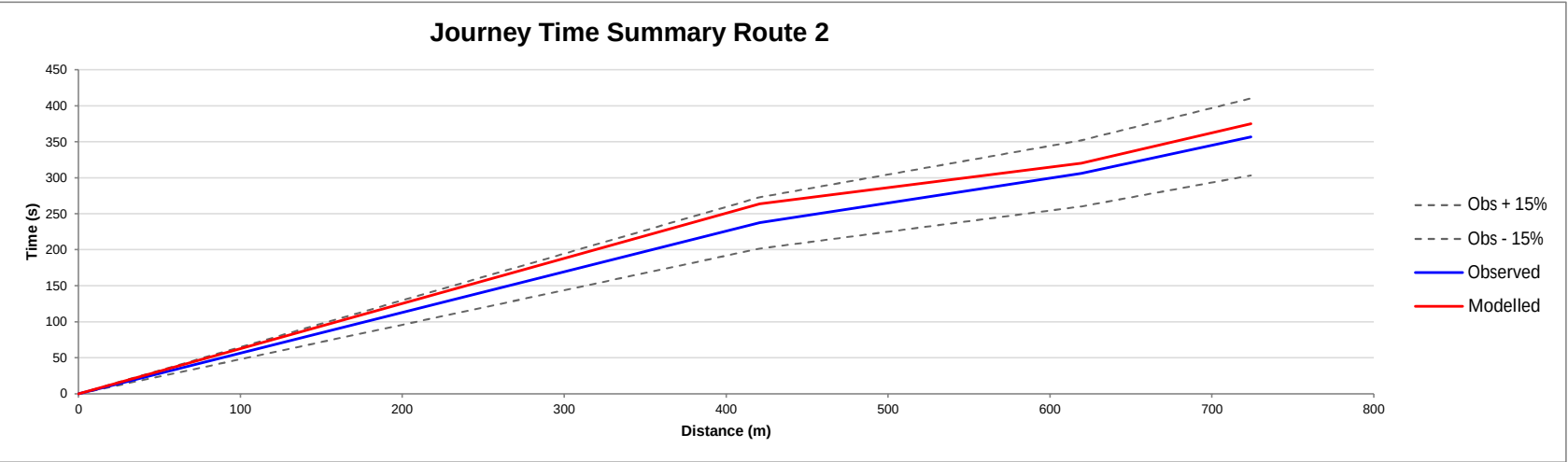
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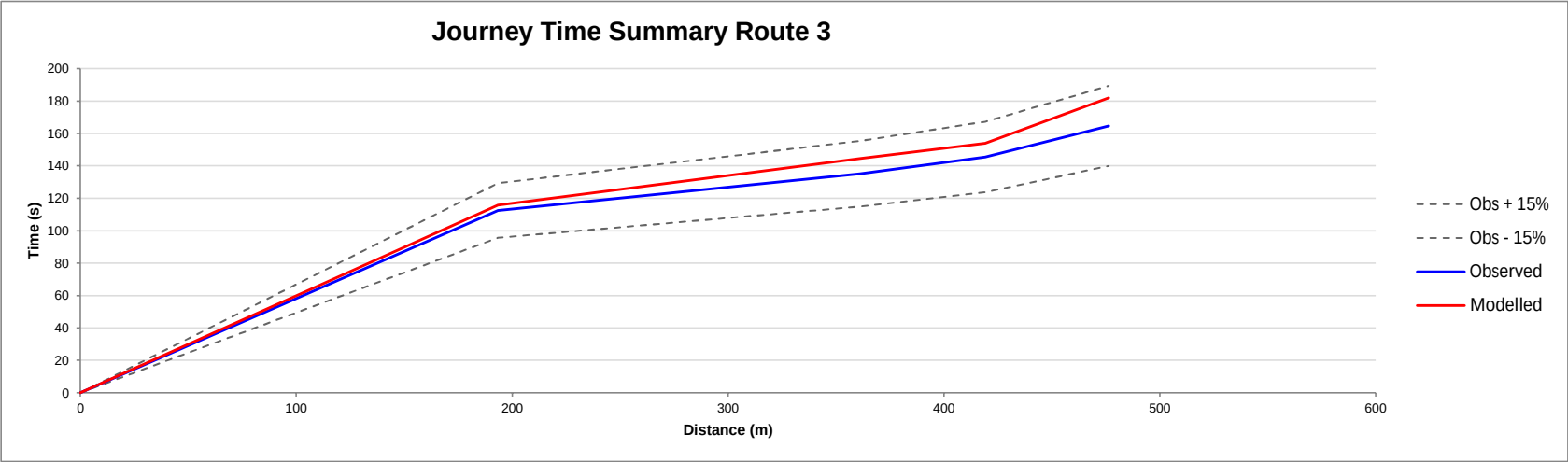
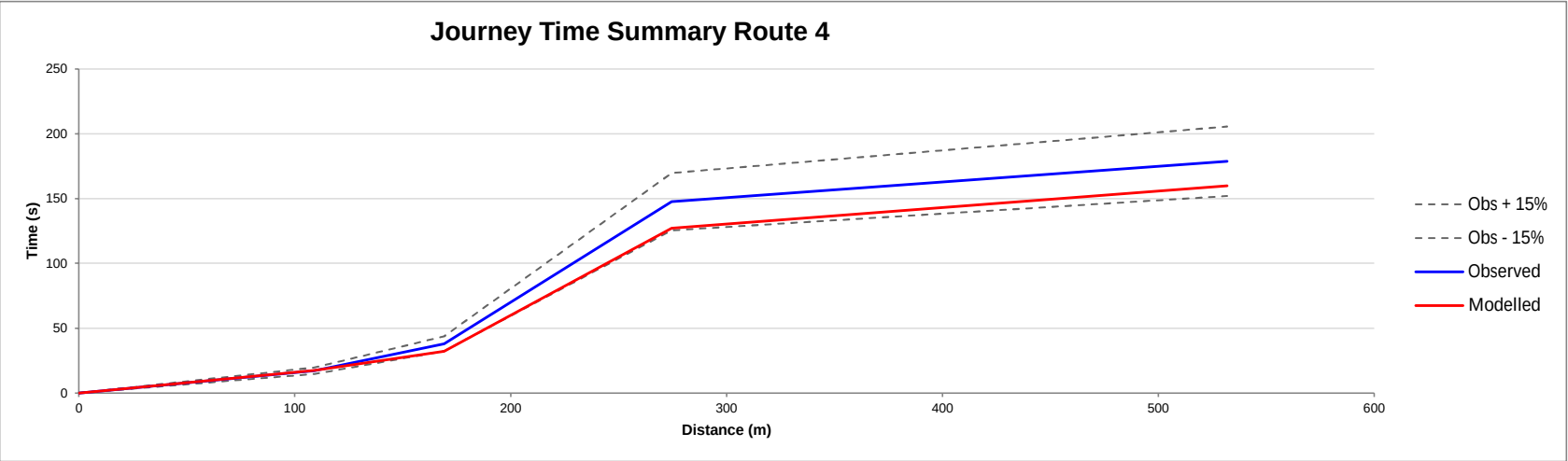
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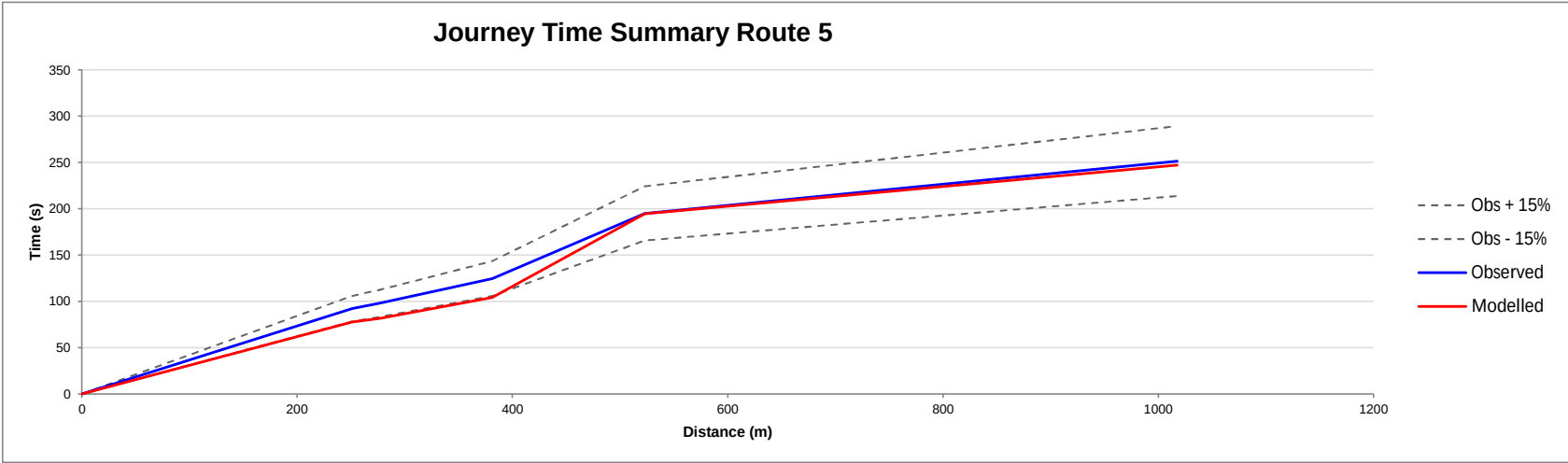
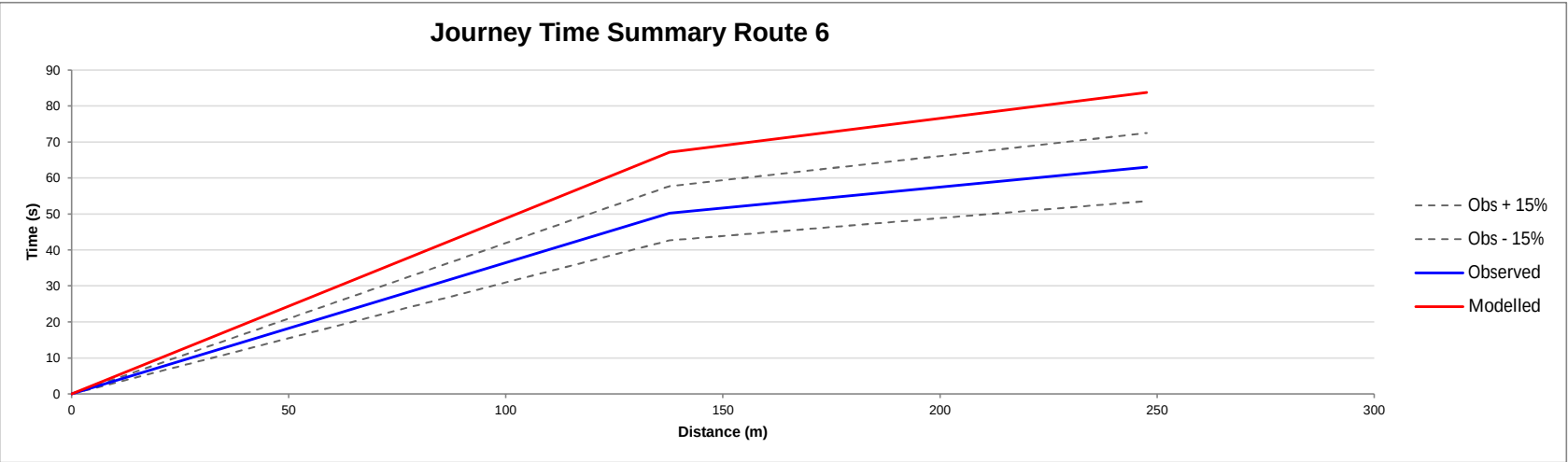
16:30-17:30



16:30-17:30



16:30-17:30



Appendix C

DEMAND DEPENDENCY





SC_SG	SC	AM Peak					IP Peak					PM Peak				
		Observed DD	Modelled DD	Acceptable Limits (+/- 10%)		Pass/Fail	Observed DD	Modelled DD	Acceptable Limits (+/- 10%)		Pass/Fail	Observed DD	Modelled DD	Acceptable Limits (+/- 10%)		Pass/Fail
				UB	LB				UB	LB				UB	LB	
1_1	2118 - Warrington Rd/Liverpool Rd/Gerard St/Bryn St	68	69	75	61	PASS	77	77	85	69	PASS	69	69	76	62	PASS
1_4	2118 - Warrington Rd/Liverpool Rd/Gerard St/Bryn St	38	38	42	34	PASS	1	1	1	1	PASS	8	8	9	7	PASS
2_1	2116 - Wigan Rd/Bryn St/Old Rd	70	69	77	63	PASS	76	77	84	68	PASS	68	70	75	61	PASS
2_6	2116 - Wigan Rd/Bryn St/Old Rd	45	46	50	41	PASS	42	45	46	38	PASS	49	49	54	44	PASS
3_2	2115 - Wigan Rd/Bolton Rd/Princess St/Gerard St	69	68	76	62	PASS	76	76	84	68	PASS	69	69	76	62	PASS
3_8	2115 - Wigan Rd/Bolton Rd/Princess St/Gerard St	41	43	45	37	PASS	59	56	65	53	PASS	54	51	59	49	PASS
4_2	2116 - Wigan Rd/Bolton Rd/Princess St/Gerard St	33	34	36	30	PASS	104	110	114	94	PASS	62	66	68	56	PASS
Passed Signal Groups																
Total Signal Groups																
Passed Signal Groups (%)																