Peel Hall VISSIM

Local Model Validation Report

Satnam Developments

11 October 2016

DRAFT

Quality information

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1. Introduction

1.1 Introduction and Background

The 2014 M62 J9 base year VISSIM model, (originally developed by AECOM for Highways England) has been updated and extended, and as agreed with Highways England and Warrington Borough Council (WBC), has been used by AECOM to assess the impact of the Peel Hall development on the highway network, including M62 Junction 9.

This Local Model Validation Report (LMVR) describes the methodology undertaken to update and validate the VISSIM base model on behalf of Highgate Transportation / SATNAM Developments in order to provide a suitable tool which an assessment of the proposed housing development at Peel Hall can be completed.

Given the extensive levels of queueing across the study area, in particular along the A49, it is important any traffic model used to assess the proposed Peel Hall development can replicate the impact of blocking back of queue traffic across certain strategically important junctions. VISSIM provides an excellent platform for modelling such behaviour and the interaction of vehicles which can result in further delays. In order to ensure the model is reflective of the extensive queueing across the network, an hour warm up and half an hour warm down period has been modelled alongside the AM (08:00-09:00) and PM (17:00-18:00) peak periods.

1.2 Model Area

Figure 1 below provides an overview of the extent of the modelled network in VISSIM, and the location of the proposed Peel Hall Development

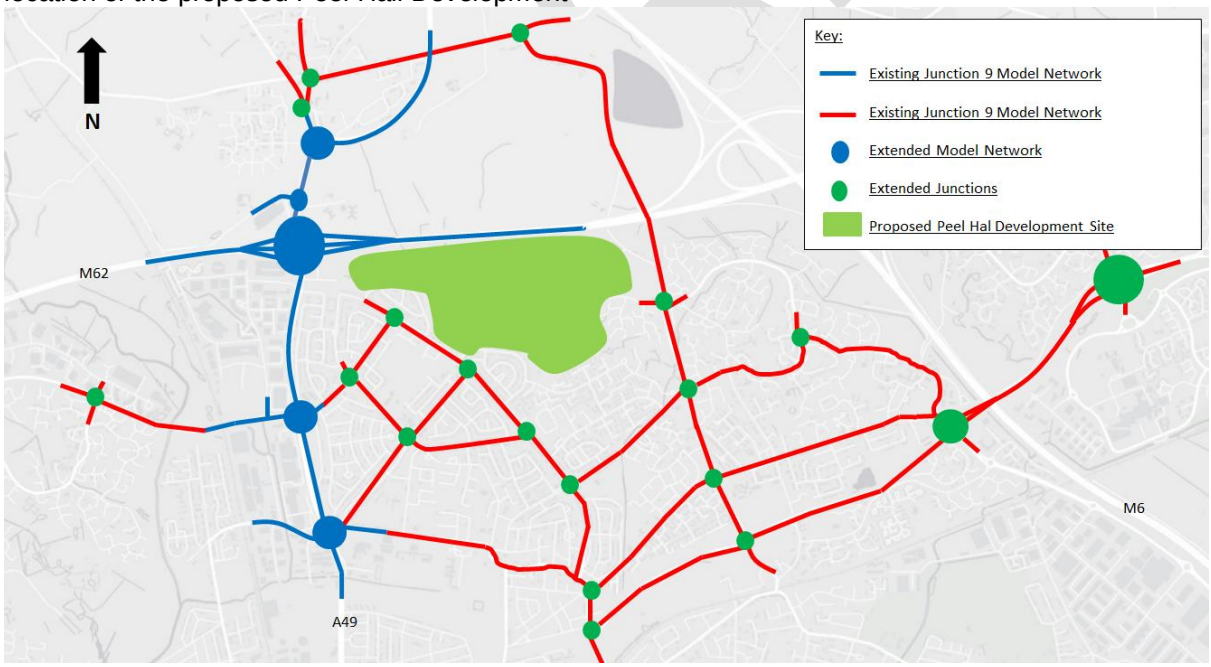

Figure 1. Extent of Modelled Network

A copy of the Peel Hall masterplan is contained within **Appendix A**, **Figure 1** as well as a larger copy of the **Figure 1** at the end of this report.

1.3 Structure of the Report

This introductory chapter is followed by five further chapters which are identified as follows:

- **Chapter 2 – Summary of Data Collection –** This chapter summaries all elements of data collected to inform the construction of the base model, this includes the locations of traffic counts, origin destination data, traffic signal data, journey time data, and other Data (Including information from Site Visits);
- **Chapter 3 – Base Model Development –** This chapter of the report presents the model description & specification including all elements of the model development such as, the Network, Matrices, and Assignment Process.
- **Chapter 4 - Model Audit –** This chapter of the report describes the iterations / improvements as a result of the model audit;
- **Chapter 5 – Base Model Calibration/Validation –** This chapter of the report presents the details of the calibration / validation process of the base model, and
- **Chapter 6 - Summary and Conclusion –** The report concludes with a summary and conclusions drawn from the results**.**

2. Summary of Data Collection

2.1 Traffic Count Data

The model has been developed utilising classified turning count data provided by Highgate Transportation. A significant proportion of the total traffic counts were collected on the 8th July 2014 for the periods 07:00 – 10:00 and 16:00 – 17:00.

A full summary list of the locations where junction traffic counts were completed, including dates undertaken, are presented below in **Table 1**.

Southworth Lane / Delph Lane / Myddleton Lane;	A49 / Golborne Road
Newton Road / A49 / Winwick Park Avenue;	
A49 Newton Road / Delph Lane;	***9th July 2014***
A49 / Birch Avenue;	Europa Boulevard / A574 / Callands Road
A49 / Sandy Lane West / A574;	Calver Road / A574
Cotswold Road / Cleveland Road / Sandy Lane / Sandy Lane West;	
Poplars Avenue / Cleveland Road;	***13th May 2014***
Poplars Avenue / Howson Road;	Junction 9 of the M62
Mill Lane / Enfield Park Road / Blackbrook Avenue / Ballater Drive;	
Blackbrook Avenue / Enfield Park Road / Capesthorne Road;	
Poplars Avenue / Capesthorne Road;	
A49 / Long Lane / Hawleys Lane;	
Blackbrook Avenue / Insall Road / Hilden Road;	
A50 / Hilden Road / Orford Road / Smith Drive;	
Blackbrook Avenue / A574;	
A50 / A574; and	
Crab Lane / A574 / Woolston Grange Avenue;	

Table 1. Summary of Junction Count Data

The sites above form the key traffic count inputs into the model build and calibration process. A plan detailing the location of each of the aforementioned counts is contained within **Appendix B** of this report.

2.2 Origin Destination Data

Since the count data did not provide any information on trip patterns (origins and destinations (OD)) another source was required. The Warrington Multi Modal Transport Model (WMMTM) was utilised as the best available source of OD data.

The aforementioned model is a VISUM model developed in 2008 by WBC in partnership with Highways England, the North West Development Agency (NWDA), Homes and Communities Agency (HCA) and Peel Holdings to provide an evidence base to support and aid decision making regarding spatial development, transport infrastructure and services within the Warrington area. The model uses the forecast future growth in employment, population and trends in travel choices to assess where people will work, live and what mode of transport they are likely to use in future to make their journeys. The model was constructed and validated in accordance with Webtag guidance produced by the Department for Transport (DfT)

A cordon of the study area was extracted from the model and a matrix of the OD movements for the AM and PM peak hours was obtained.

2.3 Traffic Signal Data

Traffic signal specifications were obtained from WBC traffic signals team for the following junctions;

- Junction 9 of the M62
- A49 Newton Road / A49 / Winwick Park Avenue;
- A49 / Sandy Lane West / A574;
- A49 / Long Lane / Hawleys Lane;
- Blackbrook Avenue / Insall Road / Hilden Road;
- Calver Road / A574;
- A50 Orford Road / A574 Birchwood Way
- A49 Newton Road / Delph Lane; and
- A50 Orford Green / Hallfields Road.

In addition to receiving the signal specifications several site visits were completed to observe the operation of traffic within the vicinity of the signalised junctions. In addition to general observations, green times and how many times certain stages, were called, were recorded.

2.4 Journey Time Data

Given the size of the VISSIM model, to ensure the model is reflective of the key routes across the study area, a number of journey times have been obtained. Utilising basemaps.co.uk analyst software, journey time data was extracted for an average of three neutral week days of the 12th, 13th, 14th, May 2015. The routes are shown below in **Figure 2** and a large plan is provided in **Appendix C**. The data extracted was for both directions of travel and for both AM and PM peak hour periods.

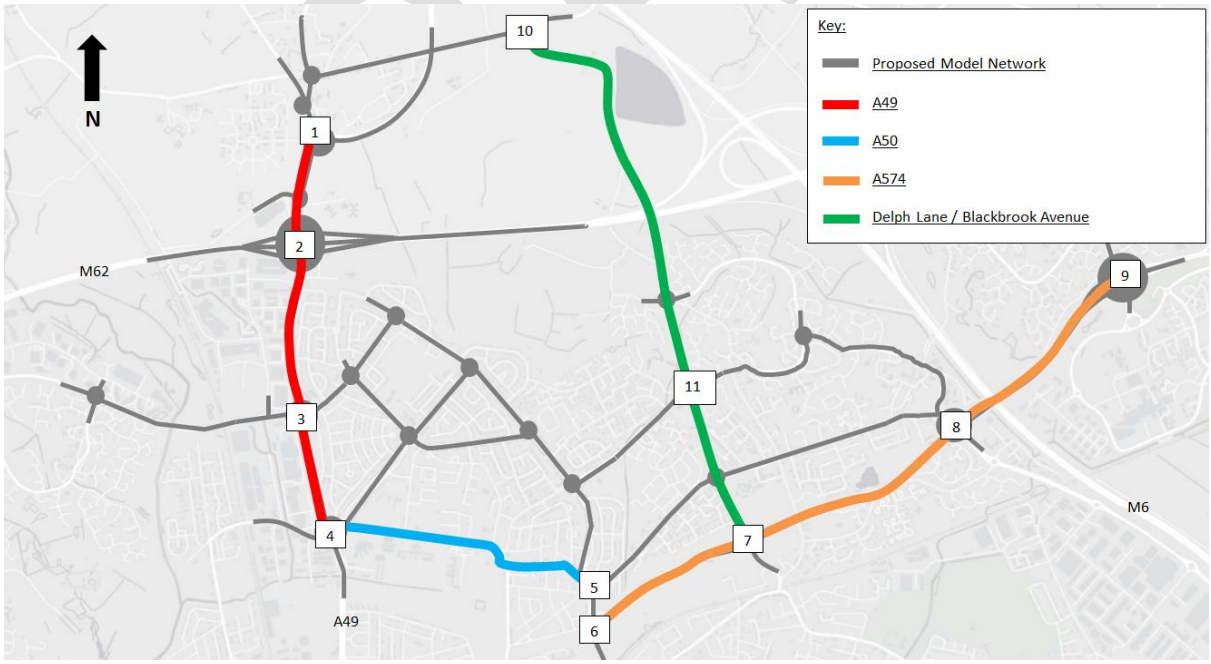

Figure 2. Proposed Journey Time Routes for Validation

The journey time routes shown in **Figure 2** overleaf are all two way and are summarised below:

- **Journey Time Route 1: (1 to 4)** - A49 north and southbound with intermediate points of 2 & 3;
- **Journey Time Route 2: (4 to 5)** – A50 between A49 to Hilden Road east and westbound;
- **Journey Time Route 3: (6 to 9)** – A574 Birchwood Way between A50 and Birchwood Park Ave with the intermediate points of 7 and 8; and
- **Journey Time Route 4: (10 to 7)** – Delph Lane / Blackbrook Avenue between Delph Lane and Birchwood Way with the intimidate point of 11.

In order to be able to understand if the model is reflective of journey times in shorter sections of the network, as well as obtaining two way end to end journey times, a number of intermediate points were also identified. These are identified in **Figure 2** overleaf and enable checks on specific sections of the network to be completed

2.5 Bus Timetables

Bus timetable information has been obtained from Network Warrington for the study area. Services identified as operating within the study area are presented in **Table 2** below.

Route Services	Service Number
Oakwood / Birchwood / Fearnhead / Warrington / Old Hall / Westbrook / Callends / Gemmi	17 – 17a – 17c – 18 – 18e
Leigh / Culcheth / Croft / Birchwood / Longbarn / Warrington	19 – 28 - 28a – 28e
Logford / Populars Avenue / Orford / Warrington	20 – 20a – 21 – 21a – 21e
Vulcan Village / Earlston / Newton-Le-Willows / Warrington	22 – 22e
Orange Grove / Cinnamon Brow / Orford / Padgate / Warrington	23 – 23a – 25a – 26 – 26e – 27 – 27e
Gorse Covert / Birchwood / Fearnhead / Greenwood Cresent / Hilden Road / Warrington	25 – 25a – 25b – 26 – 27

Table 2. Bus Services Obtained for Inclusion within the VISSIM Model

The timetables for each service are presented in **Appendix D** of this report.

2.6 Other Data (inc Site Visits)

To gain an understanding of driver behaviour and network conditions a number of site visits have been completed in both the AM and PM peak periods. Throughout all site visits photographs and notes on queue lengths, lane usage and estimations of vehicle speeds have been taken. Lane usage, driver aggression, routeing and how vehicles interact in response to highway features and other vehicles were all record.

The model area can suffer from significant congestion during either peak period particularly if an incident has occurred on the M62. Therefore the site visits and information collected have provided a valuable resource in calibrating the VISSIM base models.

3. Base Model Development

3.1 Model Description and Specification

As agreed with Highways England and WBC, the existing M62 J9 model (originally developed by AECOM for Highways England) has been extended in accordance with **Figure 1**.

Prior to commencement of the modelling work, a Model Scoping Report was produced which describes the process of decision making, and appropriateness of tool selected, to assess the impact of this development upon the surrounding highway network. This report was agreed with all parties, a copy of the report is presented within **Appendix E** at the end of this report.

VISSIM version 8.04 has been used for all models as at the time of development this formed the most up to date version of the software.

Model Periods
Agreed with Highways England and WBC and as in accordance with the recently developed VISSIM model for the OMEGA development at Junction 8 of the M62 the model covers the following periods;

- 07:00 – 09:30; and
- 16:00 – 18:30

A 2.5 hour model period has been developed to ensure the assessed model peak periods of 08:00 – 09:00 and 17:00 – 18:00 are reflective of the significant queueing and blocking back through junctions which is common place along the A49. The hour warm up ensures enough of a time period has been modelled to allow the build-up of said delays. The 30 minute warm down period again ensures the model reflects the dissipation of queueing traffic.

To replicate the profile of traffic correctly across the network traffic so queues build up as per reality demands for the aforementioned periods have been be split into 15 minute periods.

Vehicle Types
Vehicles types within the VISSIM model are as per those listed below:

- Cars;
- LGVs;
- HGVs; and
- Buses.

3.2 Network Coding

All model coding has been completed utilising CAD overlays of the study area, aerial images and notes taken during site visits.

Initially an audit of the existing Junction 9 model was completed to ensure it remained reflective of reality. The additional elements of the network were then added to the model so it was reflective of the key roads within the agreed study area.

During busy periods, particularly 17:00 – 18:00, drivers were observed completing extremely aggressive manoeuvres on the approach to certain junctions. The Northway approach to the A50 Long Lane priority junction and the Birchwood Way approach to the Oakwood Gate roundabout were both observed to experience vehicles approaching three abreast when queues occur, a direct a result of aggressive drivers. The model has not been calibrated to replicate this behaviour as it was not consistently observed throughout the peak periods but is worthy of note moving forward.

Utilising the Dynamic Assignment module within VISSIM has an impact on the coding of the VISSIM model. As vehicles traverse the network they choose specific paths which are made up of edges. Edges are located at any point in the network were a node has been placed, generally at any point a driver can make a decision to change route, typically junctions. The model has been coded to reflect this with nodes placed at all junctions and bus stops. The physical lane coding at each junction has been completed to reflect lane choice and driver behaviour observed during site visits at each of the junctions. Where edges are not considered reflective of realistic movements or were not observed onsite they have been closed.

Once the physical network was coded priority rules, reduced speed areas, traffic signals and other elements were added to the network. To remain consistent the initial inclusion of these items utilised the standard VISSIM parameters. However, at junctions or locations were observed driver behaviours differed significantly to standard parameters, these were then calibrated accordingly. Where parameters have been changed it is detailed within the following section.

Edges - Lane Utilisation

Edges within the model have been coded to reflect lane utilisation observed during site visits. Lane utilisation at the roundabout junctions of Crab Lane / A574 / Woolston Grange Avenue and Birchwood Park Ave / A574 Birchwood Way / Oakwood Gate was of particular concern throughout construction of the base models. Site observations at the roundabout junction of Crab Lane / A574 / Woolston Grange Avenue identified drivers will enter and exit the roundabout utilising both entry and exit lanes. The model has been coded to reflect this behaviour.

The roundabout junction of Birchwood Park Ave / A574 Birchwood Way / Oakwood Gate has recently benefited from the inclusion of traffic signals on the A574 Birch Wood Way and corresponding internal roundabout link. Therefore observations taken from site visits and local knowledge of the previous layout of the roundabout have been used to inform lane utilisation within the model. This is of particular relevance at the Oakwood Gate exit of the roundabout which during site visits vehicles where repeated observed exiting the roundabout from the offside circulatory lane to the offside lane on the exit arm. The A574 Birchwood Park Avenue was also observed to experience a small number of vehicles exiting the roundabout from the offside circulatory lane to the offside lane on the exit arm. However, anecdotal evidence from local residences and the modelling team highlighted prior to the recent pinch point scheme (signalisation), vehicles exiting the roundabout contravening the road markings was common place. The model has been coded to reflect this behaviour.

Priority Markers - Gap Times and Headways

Priority markers have been used throughout the model as opposed to conflict areas, as these can be calibrated more effectively to replicate give way behaviour. At all points vehicles give way at junctions or bus stops a priority marker has been placed to replicate such behaviour. The locations of these have been supported by observations made during site visits which identified locations where drivers may give way at a junction beyond a marked stop line.

To ensure the model is reflective of reality priority markers have been modelled by vehicle type. Therefore for each location three priority markers are placed on the network to reflect the following;

- Cars and LGVs - Gap Times;
- HGV and Bus - Gap Times; and
- All Vehicles – Headways

As per the OMEGA VISSIM model, gap times of 2.7 seconds for Cars / LGVs and 3.7 seconds for HGVs have been applied throughout the model. On site observations identified these remain reasonable values for use within the model for almost all stop lines.

Where drivers have been observed to be significantly more aggressive or hesitant the values have been altered accordingly to replicate such behaviour. This is true of the following stop line locations:

- Woolston Grange Avenue northbound approach to Crab Lane Roundabout– Cars and LGVs were observed to take significantly smaller gaps in traffic when entering the roundabout. The gap times for these vehicle types was reduced accordingly;
- A574, Birchwood Way eastbound approach – as a result of the geometry of the approach arm all drivers have to look over their shoulders when entering the roundabout from this arm resulting in all vehicle types observed to be noticeably more cautious at the stop line. The gap times for these vehicle types has been increased accordingly;
- Oakwood Gate northbound and the A574 Birchwood Park Avenue approach to Oakwood Gate roundabout – observations of both approaches to the roundabout identified drivers are more cautious when entering from either entry as some vehicles on the circulatory carriageway, which form the opposing movements are not required to turn and so carry more speed across the roundabout. The gap times for all vehicles have been increased accordingly; and
- A574 Birchwood Way eastbound – is now signalised, therefore observations of the behaviour was not possible. Anecdotal evidence from local residences and local experience from within the modelling team suggested drivers were more cautious at the stop line when accepting gaps in traffic. Therefore the gap times for all vehicle types have been increased accordingly.

Desired Speeds

A review of local speed limits identified all locations where speed limits changed and are signed. These locations were then coded into the model as Desired Speed Markers. No data on local vehicle speeds was available during the course of the study therefore desired speed distributions have been derived from the DfT's Vehicle Free Flow Speeds (SPE01) data set[1]. For each speed limit the corresponding desire speed distribution has been assigned. The use of the DfT data ensures vehicle speeds within the model are based upon observed data sets and are a better evidence base source than just the speed limit of a given road. Site visits suggest speeds across the study area are not consistent and so align well with the DfT data set.

Reduced Speed Areas

Reduced speed areas within the model have been coded to reflect points on the network where drivers have to slow down in response to highway features such as bends, junctions and traffic calming. Through driving across the study area notes on vehicle speeds at locations such as roundabouts were completed. These were then supplemented with observations of other vehicles on the network and estimations of likely speeds. These points and locations where then coded into the model as reduced speed areas.

To ensures vehicles correctly slowed in response to highway features, several smaller reduced speed areas on features such as roundabout lanes were coded into the model. Bends in the road and approaches to junctions also benefited from reduced speed areas to reflect drivers slowing on approach to certain junctions due to the local topography or limited visibility. An example of this is the westbound A574 Birchwood Way approach to the Woolston Grange roundabout where vehicles brake on approach to the roundabout due to 'rubble strip markings', a steep descent towards the junction and limited visibility at the roundabout.

Another significant feature within the study area is the extensive traffic calming measures located on the majority of the minor road network. To reflect the reduced speeds that drivers travel over the traffic calming measures, for each feature a reduced speed area has been coded. The desired speed distributions for traffic calming measures have been calibrated based on onsite observations. By driving each route an estimation as to the likely speed drivers will travel at when traversing the traffic calming features was estimated, additionally experienced developed as part of similar models elsewhere was also used when developing the desired speeds for traffic calming feature. To reflect the impact of traffic calming measures desired speeds have also been supplemented with reduced speed areas.

[1] https://www.gov.uk/government/statistical-data-sets/spe01-vehicle-speeds

Link Costs

Whilst traffic calming will reduce vehicle speeds and potentially reduce the volume of traffic which chooses to use a particular road. In reality drivers will also avoid roads / routes with traffic calming particular if the features, as installed across the minor road network within the study area, are those which benefit from significant vertical and horizontal defection as shown in **Figures 3** below.

Figure 3. Examples of Traffic Calming Measures across the Study Area

The significant traffic calming features could be perceived as causing damage to a car and / or provide a significant discomfort to any driver or passengers within a vehicle. As a result modelling the increase in journey times alone for drivers using the minor road network is not sufficient to replicate the route choice within the model. Therefore, costs have been applied to the appropriate links to best replicate the route choice within the model and drivers choices to avoid specific routes across the minor road network.

In order to calibrate link costs within the minor road network a set methodology was followed when developing costs for links. The costs applied within the model are as follows:

- All A roads / motorways / distributor roads (Blackbrook Avenue / Mill Avenue / Myddleton Lane) have no costs applied to ensure these remain the most attractive routes;
- Cleveland Road / Poplars Avenue / Sandy Lane West / Enfield Park Road / Northway / Crab Lane / Capesthorne Road / Hilden Road all have a cost of 20 per kilometre applied to each link;
- Sandy Lane and Statham Avenue have costs of 60 per kilometre and additional surcharges of 10 and 20 to replicate the disbenefit on street parking creates; and
- Fearnhead Lane has costs of 100 per kilometre applied to them and surcharges and 10 and 20.

All links in the minor road network identified above in points 2 - 4 had an initial set of costs, set at 1. Through the course of several model runs the costs were increased accordingly and so calibrated against routeing within the study area. An example of this is the significant costs and surcharges applied to the Fearnhead Road links 330 and 135. These are as a direct result of calibrating link costs and ensuring the route choose within the model is reflective of the delays and reasoning in reality as to why drivers choose to use / remain on the A574 which can experience noticeable queueing at certain junctions if travelling across the study area and not use the traffic calmed A574.

To ensure the costs are fair and do not bias future year routeing decisions in the forecast year models, once the incremental increases in costs on links over the course of several model runs were believed to identify a suitable reflection of route choice across the study area the costs were frozen. Once all costs had been calibrated on all links they were then reduced by the previous increment and ran again to provide a check on if this produced an unsuitable reflection of route choice. Completing such a test helped to ensure the costs on all links remain reasonable and have not been 'over egged'.

Signal Timings

Stage arrangements at all junctions have been coded as per the signal specifications provided by WMBC for the junctions identified in Section 2.3 of this report. Site visits have been completed at all junctions to obtain typical cycle times and an understanding of any offsets and the number of times demand dependant stages are called.

Despite some junctions operating on MOVA or Scoot due to the consistent volumes of traffic, particularly on the A49 cycle times and green times remained fairly consistent with only block changes in green times over the course of the 2.5 hour modelled period (i.e hourly changes as opposed to changes every cycle). Therefore, utilising VISSIM's VAP function the traffic signal timings have been modelled on fixed times for fixed periods with changes in those fixed times over the course of the modelled peaks at the A49 / Long Lane and Junction 9 M62 motorway junction junctions. All other signalised junctions have been modelled as operating on a fixed time basis using VISSIM's Vissig facility.

Driver Behaviour

Driver behaviour at the traffic signals, specifically the reaction to the amber period, has been calibrated within the model to replicate observations taken on site. All signals within the model have been modelled as drivers not crossing the stop line within the amber period by selecting the 'Stop 'same as red' option in the stop line behaviour settings. However, observations during site visits identified at some stop lines, particularly those which experience significant queues, drivers will take higher risks and use the amber period to cross the stop lines. To replicate this within the signal behaviour tab of VISSIM the reaction to the amber period has been modified to 'Go same as green'.

In conjunction with calibrating the reaction to the amber period on links approaching traffic signals the headways and car following behaviour have also been calibrated to replicate the more aggressive behaviour of drivers observed during site visits. The elements changed within the driver behaviour category are shown in **Table 3** below.

	Behaviour Categories			
	Standard	**1**	**2**	**3**
Average standstill distance	2	1	1	1.5
Additive part of safety distance	2	0.5	0.5	1.5
Multiplic. Part of safety distance	3	1	1	2.5
Amber Behaviour	Stop (same as red)	Go (same as green)	Stop (same as red)	

Table 3. Driver Behaviour Values Calibrated Following On Site Observations

The aforementioned calibration of driver behaviours identified in **Table 3** above have been modelled at the following approach links to stop lines:

- Hilden Road eastbound (1);
- Insall Road westbound (1);
- A49 Winwick Road north (1) and southbound (3) at its junction with the A50 Long Lane; and
- A49 Winwick Road southbound (3) west bound circulatory carriageway (1) and the left turn from Cromwell Avenue (2) at the Sandy Lane Junction.

Bus Stops and Routes

As identified in **Table 2** a number of bus routes run through the study are. To ensure these remain linked as the buses cross the study area a number of bus only links have been coded into the model. All routes have been coded as per those identified by Network Warrington. Dwell times across the study area have been modelled as 15 seconds for all stops. Buses have been coded as stopping at all stops, which during peak times was observed. Whilst dwell times may differ slightly, 15 seconds is considered a reasonable time based on observations during site visits which as an average reflects reality.

Buses have been coded on fixed routes and all laybys and bus stops are contained within the model. Where bus stops are in the main carriageway and do not benefit from a layby no overtaking has been modelled. This is particularly relevant for services along the A50 Long Lane which when a bus stopped to pick up or alight passengers, was observed to delay traffic as few opportunities to overtake the stationary bus existed.

3.3 Matrices

A AM and PM peak prior matrix was extracted from the strategic WMMTM by taking a cordon from the larger model. The zone structure of the wider strategic model is shown in **Figure 4** below; a larger version of the plan is presented within **Appendix F** of this report.

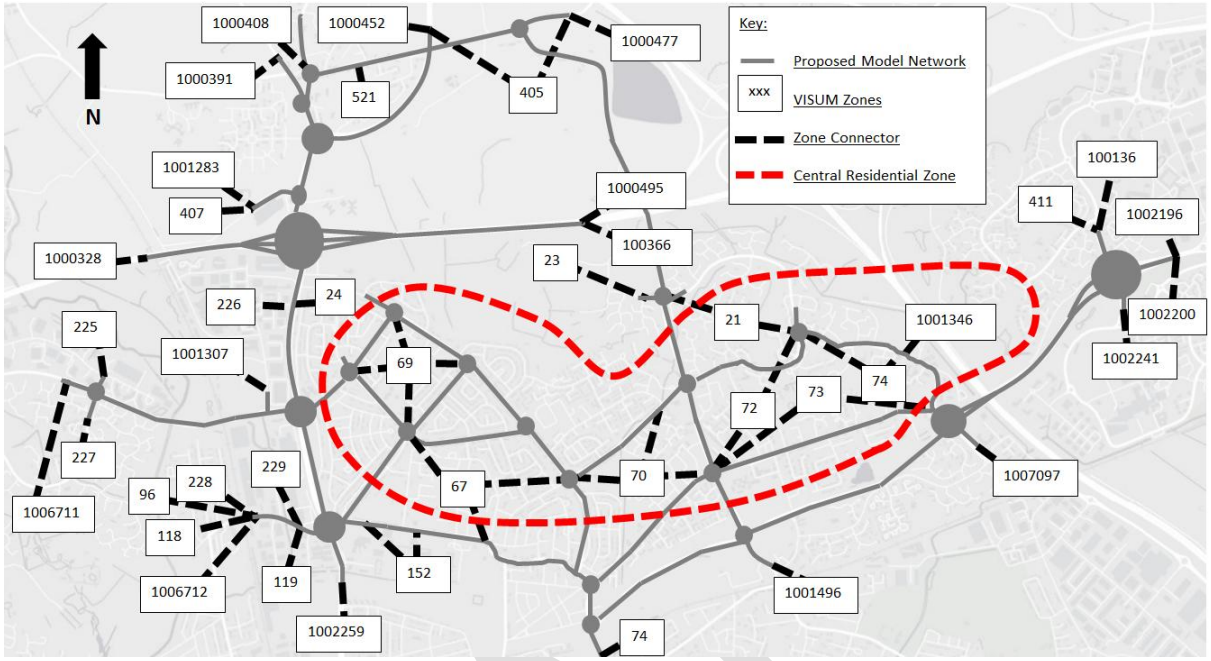

Figure 4. WMMTM VISUM Model Zone Structure

The prior matrix extracted from the larger WMMTM provided a strategic representation of vehicle movements across the study area. Generally all zones matched the key loading points within the model network. However, a number of the areas of residential and education land uses at the heart of model were represented by a single zone with multiple loading points. Whilst this zone structure can be replicated within VISSIM it would be hard to validate a model as movements would not be constant. For this reason zones located within the central residential and education land use area (within the red line boundary in **Figure 4** above) have been split out by area size and where each loading point feeds. Corresponding loading points to the VISUM model have been coded in the VISSIM model network. Checks on trip volumes were completed to ensure matrix totals remained as per the prior matrix.

The adjusted prior matrix and the extended and amended VISSIM network was input into VISUM, where VISUM's matrix estimation tool TFlowFuzzy was run. Again checks on matrix volumes and overall OD movements were completed to ensure they remain consistent and reasonable compared to the prior matrix. Any unreasonable changes were addressed manually, these remained small adjustments, predominately minor movements across the model.

3.4 Assignment Process

In order to ensure the assignment of traffic within the model is responsive to delays, traffic assignment within the model utilises the Dynamic Assignment module contained within VISSIM. Given the models significant size, in order to ensure all scenarios are comparable and that traffic is assigned to the network as an accurate reflection of route choice, it was necessary to ensure a consistent methodology for producing paths within VISSIM was followed.

As per advice provided by PTV, the developers of VISSIM, the paths file was developed incrementally over the course of 20 model runs. 20% of the overall demand was assigned into the model network for the first run with each subsequent run benefiting from 5% incremental increases in demand assigned to the network until 20 runs had been completed. Once 20 runs had been completed, and all traffic demands have been assigned to the model network, the test for convergence function was selected and the models ran until fully converged.

Convergence is fulfilled if the percentage change for journey times on paths across the model in all evaluation intervals is smaller than the specified threshold, the default value of 15% has been used. A summary of the level of convergence is provided in **Table 4** overleaf.

Model Period	Convergence Level	Convergence Level Achieved
AM Peak	Acceptable Convergence Criteria 15%	96% of paths fall within the 15% criteria
PM Peak		96% of paths fall within the 15% criteria

Table 4. Level of Convergence for AM and PM Peak Base Models

The corresponding convergence files are available on request and have been provided with each model for audit.

4. Model Audit

5. Base Model Calibration/Validation

5.1 Introduction

To ensure the VISSIM model is fully representative of the base year it is necessary to test the models calibration against turn counts and ultimately validate the model against journey time data as per guidance and criteria set out in Volume 12a of the Design Manual for Roads and Bridges (DMRB).

As agreed with Highways England and WBC and in line with the methodology completed when developing the OMEGA VISSIM model, calibration and validation have been completed for the AM Peak (08:00 -09:00) and PM Peak (17:00 – 18:00) hours. In line with the aforementioned methodology all data is an average taken from 5 runs of the base model utilising seeds 5, 10, 15, 20 and 25.

5.2 Calibration

Detailed in **Section 2** of this report an extensive number of traffic counts has been collected for calibrating the model against. The traffic counts have been factored to a common year of 2015 using the TEMpro, NTEM Dataset v6.2 growth factors for the output area of 00EU1 within Warrington. TEMpro v6.2 has recently been superseded by TEMpro 7, however when developing the model matrices TEMpro v6.2 was current and remains consistent with the growth factors applied within the existing Transport Assessment for Peel Hall.

As the study area contains a mixture of principle and minor roads an average of the growth factors for both road types has been used.

Described in Traffic Appraisal in Urban Areas – Chapter 4(DMRB Vol. 12a) the GEH statistic is used as the main indicator of the 'goodness of fit' of a model when comparing against observed traffic flows. In line with the aforementioned criteria **Table 5** below provides a summary of the GEH calibration statistics by vehicle type for both the AM and PM peak VISSIM models when comparing the modelled with observed turn movements at a number of junctions across the study area..

	AM Peak (0800 - 0900)			PM Peak (1700 - 1800)		
GEH	Cars	LGV	HGV	Cars	LGV	HGV
<5	171	177	194	178	194	196
<5	85%	88%	97%	89%	97%	98%
<10	197	201	201	198	201	201
<10	98%	100%	100%	99%	100%	100%
>10	4	0	0	3	0	0
>10	2%	0%	0%	1%	0%	0%
<20	201	201	201	201	201	201
>20	100%	100%	100%	100%	100%	100%

Table 5. Summary of Calibration Statistics for Comparison between the Observed and Modelled Traffic Flows

Table 5 above demonstrates for each vehicle type 85% or greater of the model turn counts calibrate against the observed turn count data. The full flow comparisons outputs are provided in **Appendix G** of this report.

5.3 Validation

Volume 12a of the DMRB states 85% of journey times must be within 15% or 60 seconds if higher, of the observed journey time data. A summary of the journey time validation is presented in **Table 6** below.

Time Period	Decription	Direction of Travel	Reference	Observed Journey Time	Model Journey	Absolute Difference	Percentage Difference	Validation Achieved
08:00 - 09:00	A49	NB	4 to 1	283	302	-20	-7%	Yes
		SB	1 to 4	571	564	6	1%	Yes
	A574	EB	6 to 9	502	441	61	12%	Yes
		WB	9 to 6	232	262	-30	-13%	Yes
	A50	EB	4 to 5	213	192	21	10%	Yes
		WB	5 to 4	305	378	-73	-24%	No
	Delph Lane / Black	NB	7 to 10	332	296	36	11%	Yes
		SB	10 to 7	319	352	-33	-10%	Yes
17:00 - 18:00	A49	NB	4 to 1	409	372	37	9%	Yes
		SB	1 to 4	485	530	-46	-9%	Yes
	A574	EB	6 to 9	221	261	-39	-18%	Yes
		WB	9 to 6	316	312	4	1%	Yes
	A50	EB	4 to 5	184	188	-5	-2%	Yes
		WB	5 to 4	393	354	39	10%	Yes
	Delph Lane / Black	NB	7 to 10	308	340	-32	-10%	Yes
		SB	10 to 7	310	341	-31	-10%	Yes

Table 6. Summary of Journey Time Validation Results

Table 6 above demonstrates that 85% of journey times from the VISSIM model validate within 15% of the observed data satisfying DMRB criteria. Therefore both the AM and PM base models are considered to replicate a 2015 base year and are appropriate for future year scenario testing.

A full breakdown of journey times with intermediate points is provided in **Appendix H** of this report.

6. Summary and Conclusion

Appendix A Peel Hall Development Masterplan

Notes

Do not scale from this drawing.

All dimensions are to be checked prior to construction and any discrepancies are to be identified to the Architect.

N

PROPOSED ACCOMMODATION SCHEDULE

RESIDENTIAL	335,960 sqm / 83.02 acres
EMPLOYMENT ZONE	24,868 sqm / 6.14 acres 7,500sqm GFA
CARE HOME	4,112 sqm / 1.02 acres -100beds
SCHOOL	11,883 sqm / 2.94 acres
LOCAL CENTRE	15,095 sqm / 4 acres Food Store 2,000sqm/20,940sqft Local Centre 600sqm/6,282sqft
APARTMENTS (mechanicaly ventilated within buffer zone)	14,755 sqm / 4 acres

Note, all areas based on OS data, not measured surveys.

EMPLOYMENT ZONE
24,863sqm / 2.48ha
7,500sqm WORKSPACE

RESIDENTIAL-
PLOT A
3,955sqm / 0.39ha

RESIDENTIAL-
PLOT B
2,205sqm / 0.22ha

RESIDENTIAL - PLOT C
28,267sqm / 2.82ha

RESIDENTIAL
PLOT D
5,935sqm / 0.59ha

APARTMENTS PLOT D
2,150sqm / 0.21ha

RESIDENTIAL
PLOT E
8,209sqm / 0.82ha

APARTMENTS PLOT E
2,328sqm / 0.23ha

RESIDENTIAL
PLOT F
28,765sqm / 2.87ha

APARTMENTS PLOT G
2,734sqm / 0.27ha

50m Buffer Zone Boundary Line

RESIDENTIAL
PLOT G
21,832sqm / 2.18ha

RESIDENTIAL
PLOT H
28,532sqm / 2.85ha

RESIDENTIAL
PLOT J
17,276sqm / 1.72ha

CARE
HOME
3 storey - 100 beds
4,112sqm / 0.41ha

LOCAL
CENTRE

FAMILY PUB
& RETAURANT

PROPOSED SCHOOL SITE
11,883sqm / 1.18ha

RESIDENTIAL
PLOT K
24,360sqm / 2.43ha

APARTMENTS PLOT G
2,233sqm / 0.22ha

50m Buffer Zone Boundary Line

Public Open Space

FORMAL SPORTS USE

IMPROVED FORMAL SPORTS USE

RESIDENTIAL
PLOT L
29,675/ 2.96ha

APARTMENTS PLOT M
5,092sqm / 0.5ha

RESIDENTIAL
PLOT M
19,723sqm / 1.97ha

RESIDENTIAL
PLOT N
17,217sqm / 1.72ha

RESIDENTIAL
PLOT P
25,348sqm / 2.53ha

RESIDENTIAL
PLOT Q
26,993sqm / 2.69ha

RESIDENTIAL
PLOT R
25,672sqm / 2.56ha

RESIDENTIAL
PLOT S
22,136sqm / 2.21ha

ISSUED FOR COMMENT / REVIEW

M	10.05.16	Plot N access amended	JHD
L	06.05.16	Plots areas & landscaping updated.	DW
K	04.05.16	Plots areas & Access roads amended.	JHD
J	14.03.16	Area Schedule & Boundary Line amended	JHD

Revisions

Client
Satnam

Project
Peel Hall Masterplan

Title
Illustrated Masterplan

Scale	Size	Date	Drawn	Checked
1:2500	A1	JUL. 15	AMZ	DB

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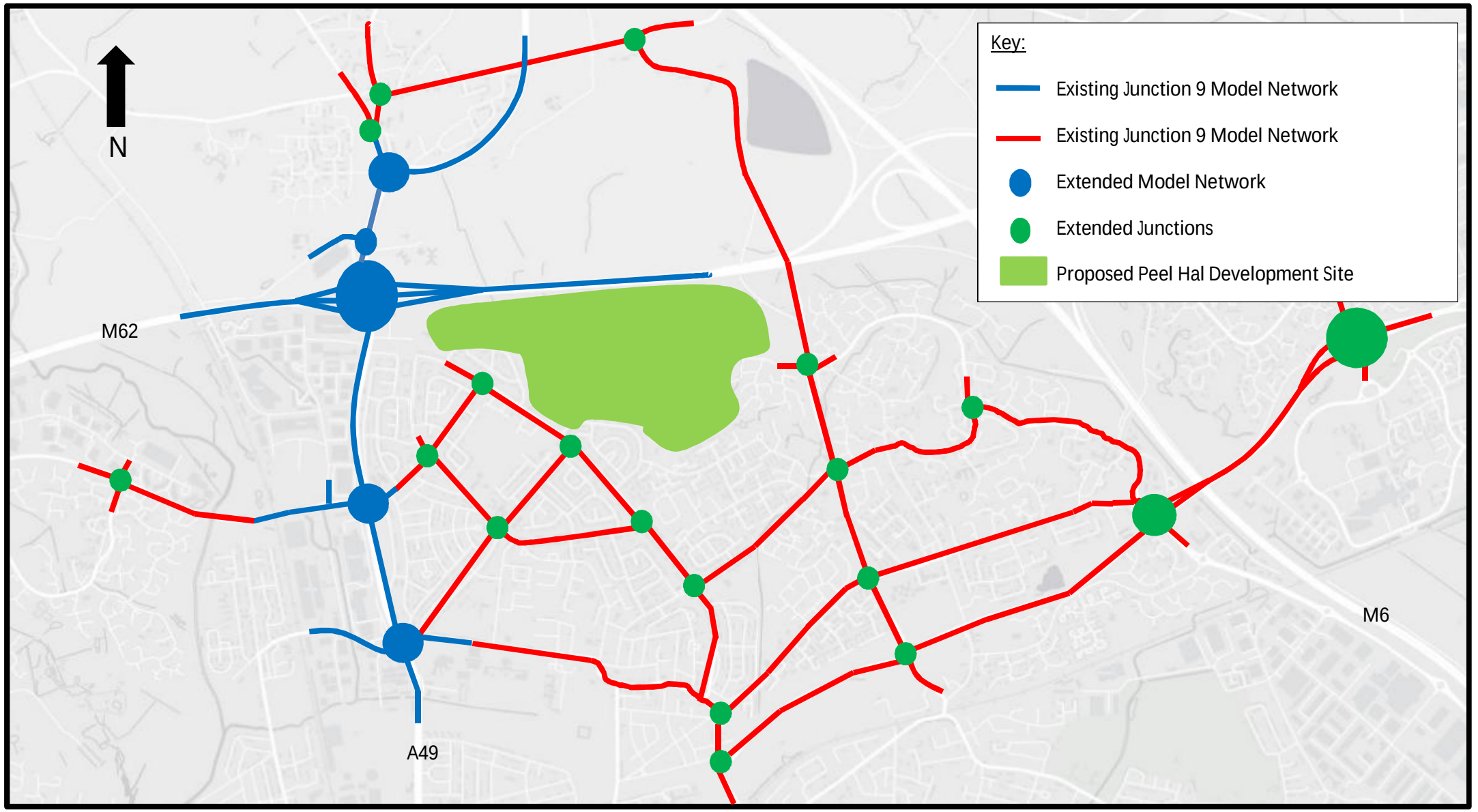
w : http://www.3dreid.com

Architecture Conservation
Interiors Masterplanning
Partnerships Sustainability

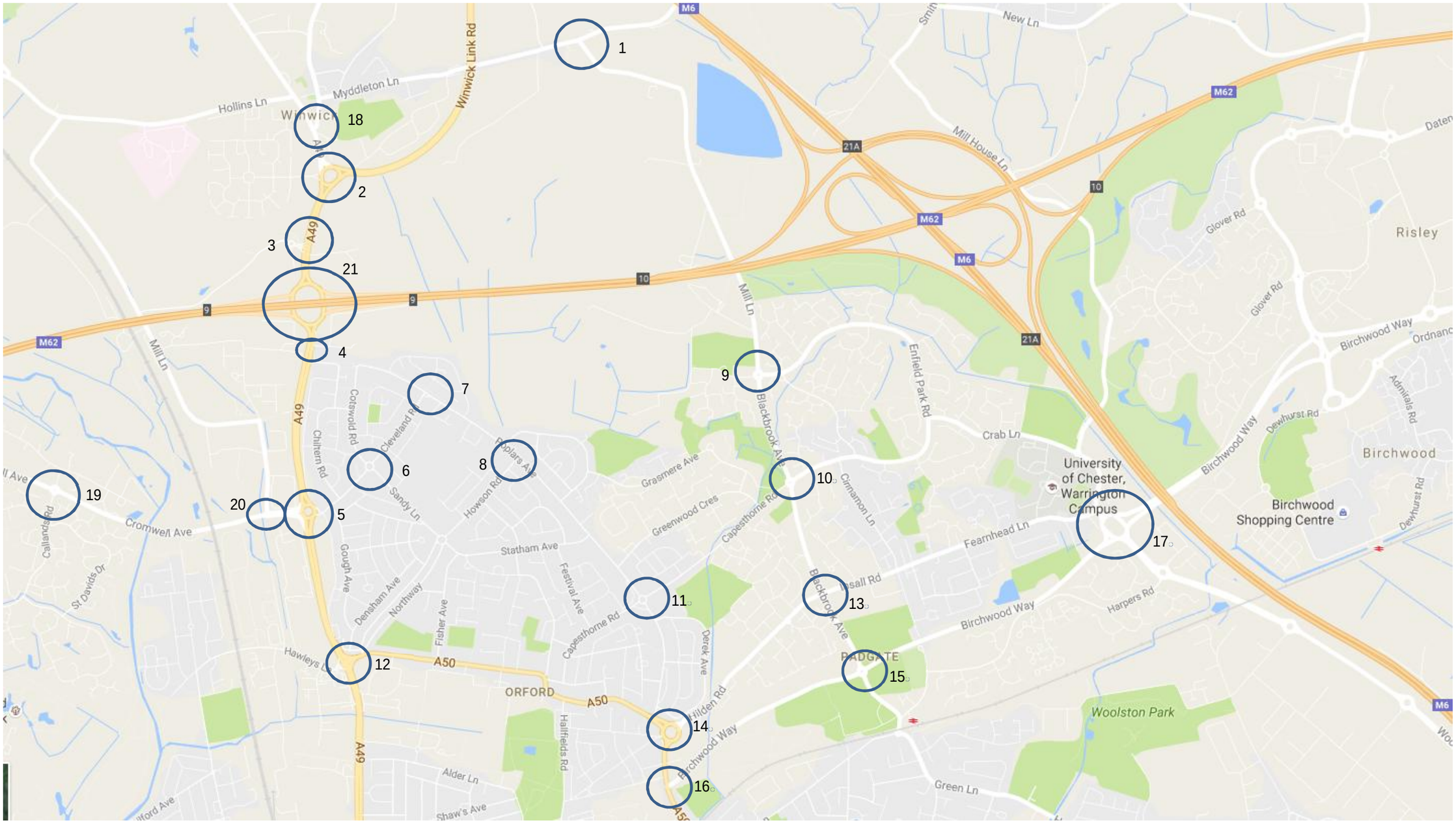
Drawing No.
140367 - B - 001

Rev.
M



Appendix A, Figure 2 – Model Study Area

Appendix B Plan of Traffic Count Locations



1. Southworth Lane / Delph Lane / Myddleton Lane
2. Newton Road / A49 / Winwick Park Avenue
3. A49 / Delph Lane
4. A49 / Birch Avenue
5. A49 / Sandy Lane West / A574
6. Cotswold Road / Cleveland Road / Sandy Lane / Sandy Lane West
7. Poplars Avenue / Cleveland Road
8. Poplars Avenue / Howson Road
9. Mill Lane / Enfield Park Road / Blackbrook Avenue / Ballater Drive
10. Blackbrook Avenue / Enfield Park Road / Capesthorne Road
11. Poplars Avenue / Capesthorne Road

12. A49 / Long Lane / Hawleys Lane

13. Blackbrook Avenue / Insall Road / Hilden Road

14. A50 / Hilden Road / Orford Road / Smith Drive

15. Blackbrook Avenue / A574

16. A50 / A574

17. Crab Lane / A574 / Woolston Grange Avenue

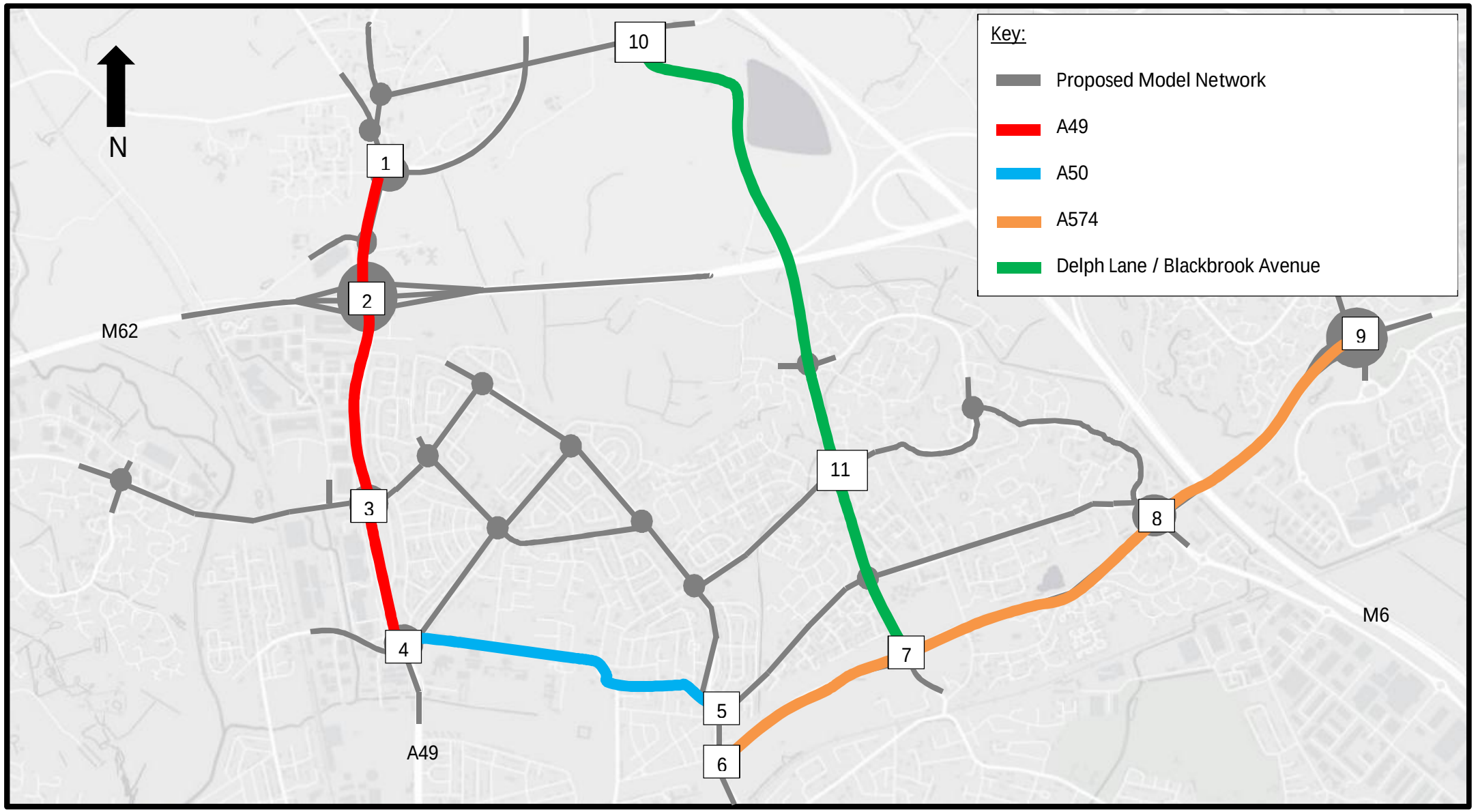
18. A49 / Golborne Road

19. Europa Boulevard / A574 / Callands Road

20. Calver Road / A574

21. M62 West

Appendix C Plan of Journey Times

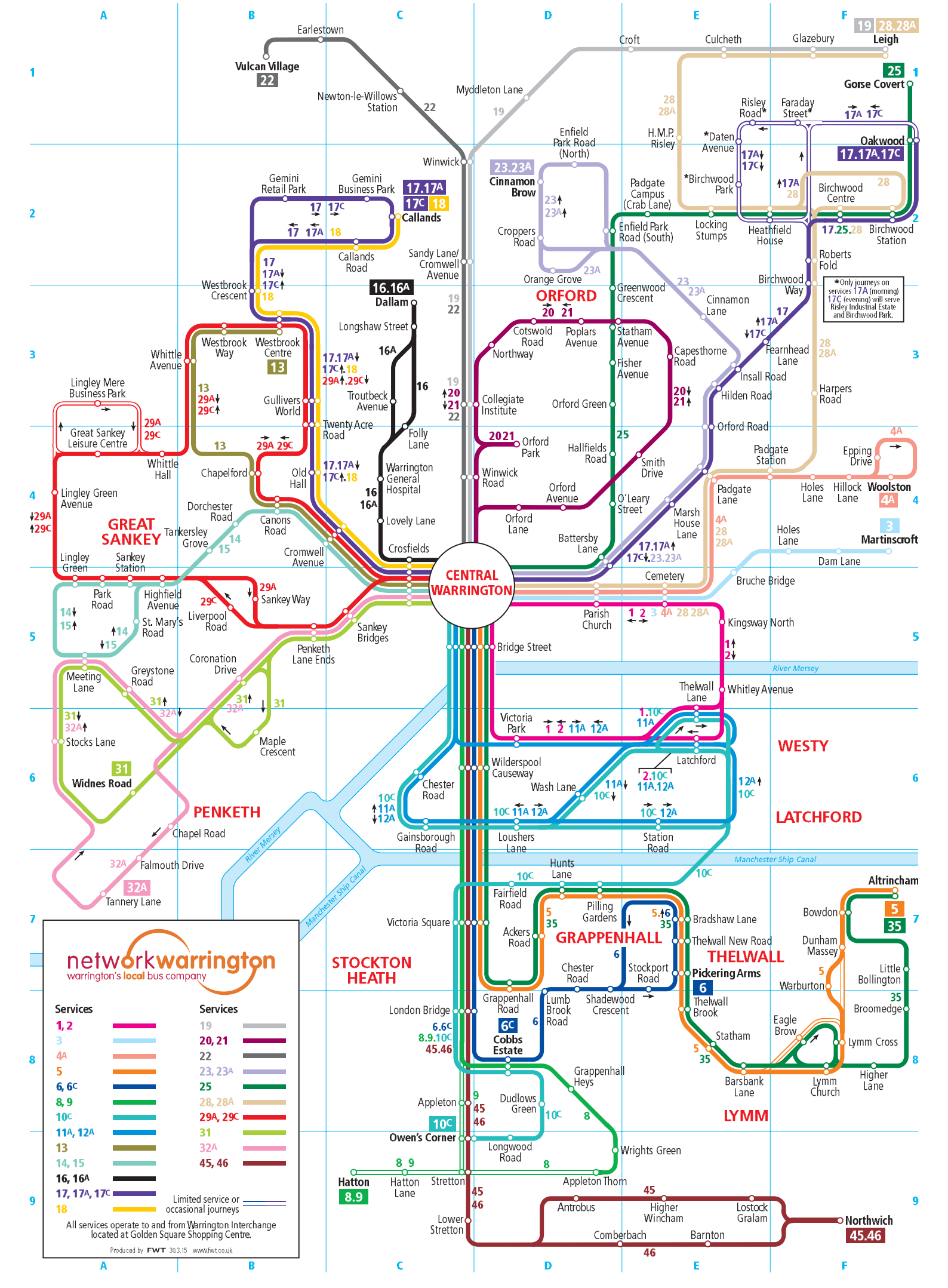


Appendix C – Model Validation Journey Time Routes

AECOM

Appendix D Bus Timetables

This map shows services that operate on Monday to Saturday between 7am and 7pm. We operate a number of other services not shown, these are either infrequent or run only during the mornings, evenings or on Sundays.



networkwarrington
warrington's local bus company

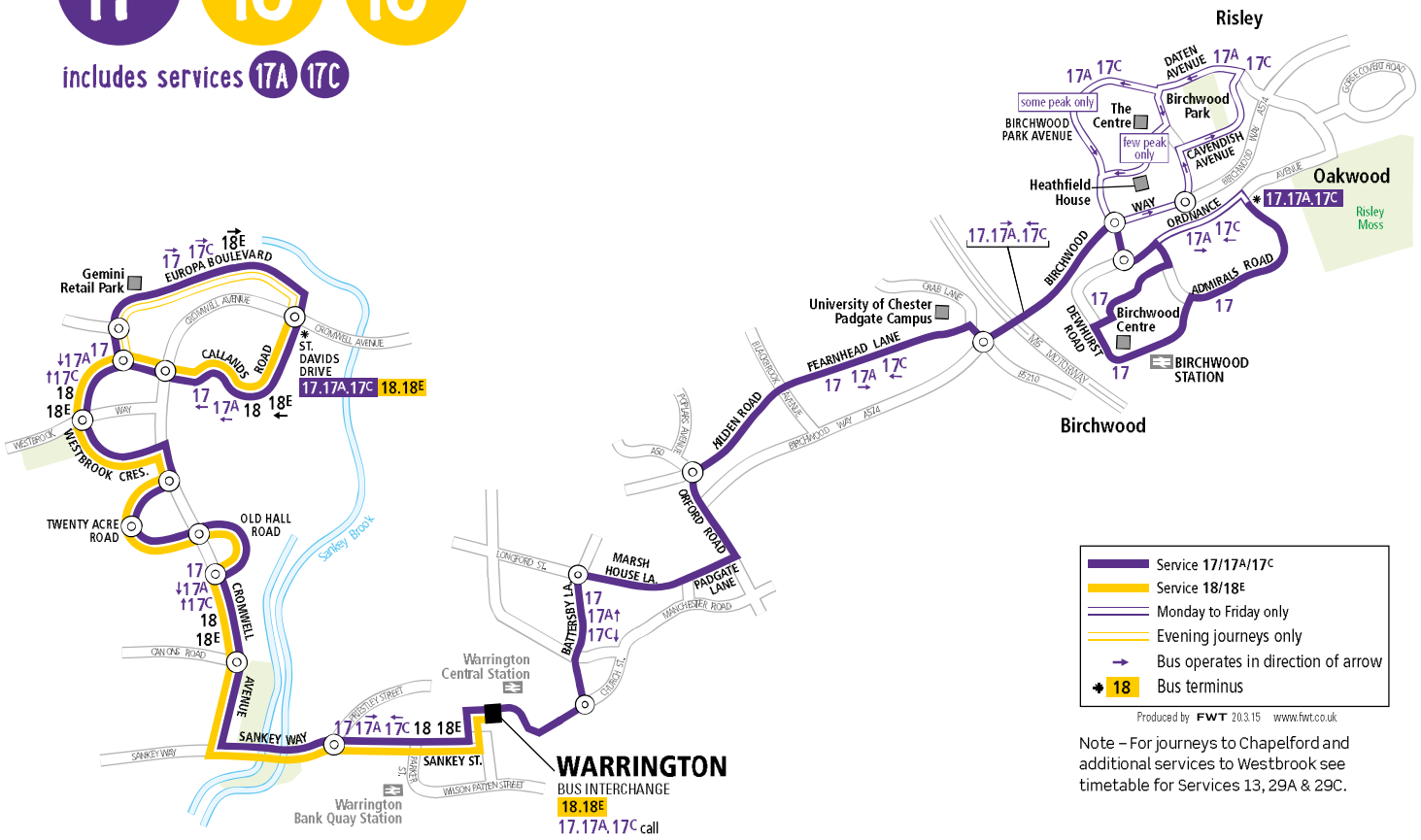
Services		Services	
1, 2		19	
3		20, 21	
4A		22	
5		23, 23A	
6, 6C		25	
8, 9		28, 28A	
10C		29A, 29C	
11A, 12A		31	
13		32A	
14, 15		45, 46	
16, 16A			
17, 17A, 17C		Limited service or occasional journeys	
18			

All services operate to and from Warrington Interchange located at Golden Square Shopping Centre.

Produced by FWT 30.3.15 www.fwt.co.uk

17 18 18E

includes services 17A 17C



- Service 17/17A/17C
- Service 18/18E
- Monday to Friday only
- Evening journeys only
- Bus operates in direction of arrow
- 18 Bus terminus

Produced by FWT 20.3.15 www.fwt.co.uk

Note – For journeys to Chapelford and additional services to Westbrook see timetable for Services 13, 29A & 29C.

WARRINGTON'S LOCAL BUS COMPANY

It's easy to get in touch with us...

W: networkwarrington.co.uk **T:** 01925 634296

Pop in to our **travel centre** at Warrington Interchange

networkwarrington
warrington's local bus company

17 18 18E

includes services 17A 17C

- OAKWOOD
- BIRCHWOOD
- FEARNHEAD
- WARRINGTON
- OLD HALL
- WESTBROOK
- CALLANDS
- GEMINI

Bus times

Map

from 20 April 2015

networkwarrington
warrington's local bus company

Edition 6 – 20.4.15

17 CALLANDS - WARRINGTON - PADGATE - BIRCHWOOD VIA WESTBROOK - HILDEN ROAD

17A CALLANDS - WARRINGTON - PADGATE - BIRCHWOOD PARK - BIRCHWOOD VIA WESTBROOK - HILDEN ROAD

18, 18E CALLANDS - WARRINGTON VIA WESTBROOK - OLD HALL

MONDAY TO FRIDAY [excluding Public Holidays]

R

	17A	18	17A	18	17A	18	17A	18	17A	18	17A	18	17A	18	17	18	17	18	17	18	17	18	17	18
Callands, St David's Drive	-	0610	0621	0636	0649	0704	0717	0730	0743	0758	0813	0830	0845	0900	0913	0928	0943	0953	1008	1023	1038	1053	1108	1123
Westbrook Centre, Asda	-	0615	0627	0642	0655	0710	0723	0736	0750	0805	0820	0837	0852	0906	0919	0934	0949	0959	1014	1029	1044	1059	1114	1129
Old Hall, Ross Close	-	0619	0631	0646	0659	0714	0727	0740	0754	0809	0824	0841	0856	0910	0923	0938	0953	1003	1018	1033	1048	1103	1118	1133
Warrington, Interchange (arr)	-	0628	0643	0658	0713	0728	0743	0758	0813	0828	0843	0858	0910	0922	0933	0948	1003	1013	1028	1043	1058	1113	1128	1143
Warrington, Interchange [12] (dep)	0618	-	0645	-	0718	-	0748	-	0818	-	0848	-	0915	-	0938	-	1008	-	1033	-	1103	-	1133	-
Padgate Stores	0631	-	0658	-	0731	-	0801	-	0831	-	0901	-	0928	-	0951	-	1021	-	1046	-	1116	-	1146	-
Insall Rd, Valiant Cl	0635	-	0702	-	0735	-	0805	-	0835	-	0905	-	0932	-	0955	-	1025	-	1050	-	1120	-	1150	-
Uni of Chester, Fearnhead Ln	0637	-	0704	-	0737	-	0807	-	0837	-	0907	-	0934	-	0957	-	1027	-	1052	-	1122	-	1152	-
Thomson House	0643	-	0710	-	0743	-	0813	-	0843	-	0912	-	0940	-	|	-	|	-	|	-	|	-	|	-
Daten Avenue, Leacroft Road	0646	-	0713	-	0746	-	0816	-	0846	-	0914	-	0943	-	|	-	|	-	|	-	|	-	|	-
Risley, Kelvin Close	0651	-	0718	-	0751	-	0821	-	0851	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-
Heathfield House	|	-	|	-	|	-	|	-	|	-	0917	-	0948	-	|	-	|	-	|	-	|	-	|	-
Birchwood Centre	|	-	|	-	|	-	|	-	|	-	|	-	|	-	1004	-	1034	-	1059	-	1129	-	1159	-
Birchwood, Railway Station	|	-	|	-	|	-	|	-	|	-	|	-	|	-	1005	-	1035	-	1100	-	1130	-	1200	-
Oakwood, Keyes Close	0701	-	0728	-	0801	-	0831	-	0901	-	0927	-	0958	-	1009	-	1039	-	1104	-	1134	-	1204	-

Notes: R Continues to Birchwood Railway Station arrive 1002.

MONDAY TO FRIDAY [excluding Public Holidays]

	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18
Callands, St David's Drive	1138	1153	1208	1223	1238	1253	1308	1323	1338	1353	1408	1423	1438	1453	1508	1526	1546	1601	1616	1631	1646	1701	1716	1731
Westbrook Centre, Asda	1144	1159	1214	1229	1244	1259	1314	1329	1344	1359	1414	1429	1444	1459	1514	1532	1552	1607	1622	1637	1652	1707	1722	1737
Old Hall, Ross Close	1148	1203	1218	1233	1248	1303	1318	1333	1348	1403	1418	1433	1448	1503	1518	1536	1556	1611	1626	1641	1656	1711	1726	1741
Warrington, Interchange (arr)	1158	1213	1228	1243	1258	1313	1328	1343	1358	1413	1428	1443	1458	1513	1528	1546	1608	1623	1638	1653	1708	1723	1738	1753
Warrington, Interchange [12] (dep)	1203	-	1233	-	1303	-	1333	-	1403	-	1433	-	1503	-	1533	-	1613	-	1643	-	1713	-	1743	-
Padgate Stores	1216	-	1246	-	1316	-	1346	-	1416	-	1446	-	1516	-	1546	-	1626	-	1656	-	1726	-	1756	-
Insall Rd, Valiant Cl	1220	-	1250	-	1320	-	1350	-	1420	-	1450	-	1520	-	1551	-	1631	-	1701	-	1731	-	1801	-
Uni of Chester, Fearnhead Ln	1222	-	1252	-	1322	-	1352	-	1422	-	1452	-	1522	-	1554	-	1634	-	1704	-	1734	-	1804	-
Birchwood Centre	1229	-	1259	-	1329	-	1359	-	1429	-	1459	-	1529	-	1605	-	1645	-	1715	-	1745	-	1815	-
Birchwood, Railway Station	1230	-	1300	-	1330	-	1400	-	1430	-	1500	-	1530	-	1607	-	1647	-	1717	-	1747	-	1817	-
Oakwood, Keyes Close	1234	-	1304	-	1334	-	1404	-	1434	-	1504	-	1534	-	1612	-	1652	-	1722	-	1752	-	1822	-

MONDAY TO FRIDAY [excluding Public Holidays]

	17	18	17	18	18	18	18	18E	18E	18E	18E	18E
Callands, St David's Drive	1746	1801	1816	1830	1845	1855	1910	1930	2030	2130	2230	2330
Westbrook Centre, Asda	1752	1807	1822	1836	1851	1900	1916	1935	2035	2135	2235	2335
Old Hall, Ross Close	1756	1811	1826	1840	1854	1904	1919	1939	2039	2139	2239	2339
Garven Place Alighting Only	|	|	|	|	|	|	|	|	|	|	|	2344
Warrington, Interchange (arr)	1808	1823	1838	1852	1903	1911	1928	1946	2046	2146	2246	-
Warrington, Interchange [12] (dep)	1813	-	1843	-	-	-	-	-	-	-	-	-
Padgate Stores	1826	-	1855	-	-	-	-	-	-	-	-	-
Insall Rd, Valiant Cl	1831	-	1859	-	-	-	-	-	-	-	-	-
Uni of Chester, Fearnhead Ln	1834	-	1901	-	-	-	-	-	-	-	-	-
Birchwood Centre	1843	-	1908	-	-	-	-	-	-	-	-	-
Birchwood, Railway Station	1845	-	1909	-	-	-	-	-	-	-	-	-
Oakwood, Keyes Close	1850	-	1913	-	-	-	-	-	-	-	-	-

17 BIRCHWOOD – PADGATE – WARRINGTON – CALLANDS VIA HILDEN ROAD – WESTBROOK – GEMINI

17C BIRCHWOOD – BIRCHWOOD PARK – PADGATE – WARRINGTON – CALLANDS VIA HILDEN ROAD – WESTBROOK – GEMINI

18 WARRINGTON – CALLANDS VIA OLD HALL – WESTBROOK

18E WARRINGTON – CALLANDS VIA OLD HALL – WESTBROOK – GEMINI

MONDAY TO FRIDAY [excluding Public Holidays]

	18	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18
Oakwood, Keyes Close	-	-	-	-	-	-	0703	-	0733	-	0803	-	0837	-	0907	-	0939	-	1009	-	1039	-	1109	-
Birchwood, Railway Station	-	-	-	-	-	-	0708	-	0738	-	0808	-	0842	-	0912	-	0943	-	1013	-	1043	-	1113	-
Birchwood Centre	-	-	-	-	-	-	0710	-	0740	-	0810	-	0844	-	0914	-	0944	-	1014	-	1044	-	1114	-
Uni of Chester, Fearnhead Ln	-	-	-	-	0649	-	0718	-	0748	-	0818	-	0852	-	0921	-	0951	-	1021	-	1051	-	1121	-
Insall Rd, Valiant Cl	-	-	-	-	0652	-	0721	-	0751	-	0821	-	0855	-	0923	-	0953	-	1023	-	1053	-	1123	-
Padgate Stores	-	-	-	-	0700	-	0729	-	0759	-	0829	-	0903	-	0930	-	1000	-	1030	-	1100	-	1130	-
Warrington, Interchange (arr)	-	-	-	-	0713	-	0742	-	0814	-	0844	-	0916	-	0941	-	1011	-	1041	-	1111	-	1141	-
Warrington, Interchange [18] (dep)	0604	0646	0653	0707	0717	0735	0747	0806	0819	0837	0849	0906	0921	0931	0946	1001	1016	1031	1046	1101	1116	1131	1146	1201
Old Hall, Ross Close	0611	0653	0702	0716	0726	0744	0756	0815	0828	0846	0858	0915	0930	0940	0955	1010	1025	1040	1055	1110	1125	1140	1155	1210
Westbrook Centre, Asda	0615	0657	0706	0720	0730	0748	0800	0819	0832	0850	0902	0919	0934	0945	0959	1015	1029	1045	1059	1115	1129	1145	1159	1215
Gemini Retail Park, M & S	|	|	0712	|	0736	|	0806	|	0838	|	0908	|	0938	|	1003	|	1033	|	1103	|	1133	|	1203	|
Callands, St David's Drive	0620	0702	0716	0728	0740	0756	0810	0827	0842	0858	0912	0927	0942	0952	1007	1022	1037	1052	1107	1122	1137	1152	1207	1222

MONDAY TO FRIDAY [excluding Public Holidays]

																			T					
	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18	17C	18	17C	18	17C	18
Oakwood, Keyes Close	1139	-	1209	-	1239	-	1309	-	1339	-	1409	-	1439	-	1509	-	1539	-	1558	-	1628	-	1658	-
Birchwood, Railway Station	1143	-	1213	-	1243	-	1313	-	1343	-	1413	-	1443	-	1513	-	1543	-	|	-	|	-	|	-
Birchwood Centre	1144	-	1214	-	1244	-	1314	-	1344	-	1414	-	1444	-	1514	-	1544	-	|	-	|	-	|	-
Thomson House	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	1608	-	1638	-	1708	-
Daten Avenue, Leacroft Road	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	1611	-	1641	-	1711	-
Heathfield House	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	1614	-	|	-	|	-
Risley, Kelvin Close	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	|	-	1644	-	1714	-
Uni of Chester, Fearnhead Ln	1151	-	1221	-	1251	-	1321	-	1351	-	1421	-	1452	-	1522	-	1552	-	1622	-	1652	-	1722	-
Insall Rd, Valiant Cl	1153	-	1223	-	1253	-	1323	-	1353	-	1423	-	1455	-	1525	-	1555	-	1625	-	1655	-	1725	-
Padgate Stores	1200	-	1230	-	1300	-	1330	-	1400	-	1430	-	1503	-	1533	-	1603	-	1633	-	1703	-	1733	-
Warrington, Interchange (arr)	1211	-	1241	-	1311	-	1341	-	1411	-	1441	-	1516	-	1546	-	1616	-	1646	-	1716	-	1746	-
Warrington, Interchange [18] (dep)	1216	1231	1246	1301	1316	1331	1346	1401	1416	1431	1446	1501	1521	1536	1551	1606	1621	1636	1651	1706	1721	1736	1751	1806
Old Hall, Ross Close	1225	1240	1255	1310	1325	1340	1355	1410	1425	1440	1455	1512	1532	1547	1602	1617	1632	1647	1702	1717	1732	1747	1802	1817
Westbrook Centre, Asda	1229	1245	1259	1315	1329	1345	1359	1415	1429	1445	1459	1517	1536	1552	1606	1622	1636	1652	1706	1722	1736	1752	1807	1822
Gemini Retail Park, M & S	1233	|	1303	|	1333	|	1403	|	1433	|	1503	|	1540	|	1610	|	1640	|	1710	|	1740	|	1810	|
Callands, St David's Drive	1237	1252	1307	1322	1337	1352	1407	1422	1437	1452	1507	1524	1544	1559	1614	1629	1644	1659	1714	1729	1744	1759	1814	1828

Notes: T Starts at Birchwood Railway Station at 1554.

MONDAY TO FRIDAY [excluding Public Holidays]

	17C	18	17C	17C	18E	17C	18E	18E	18E	18E
Oakwood, Keyes Close	1728	-	1758	1828	-	1858	-	-	-	-
Thomson House	1738	-	1808	1838	-	1908	-	-	-	-
Daten Avenue, Leacroft Road	1741	-	1811	1840	-	1910	-	-	-	-
Heathfield House	|	-	1814	1843	-	1913	-	-	-	-
Risley, Kelvin Close	1744	-	|	|	-	|	-	-	-	-
Uni of Chester, Fearnhead Ln	1752	-	1822	1848	-	1918	-	-	-	-
Insall Rd, Valiant Cl	1755	-	1825	1850	-	1920	-	-	-	-
Padgate Stores	1803	-	1833	1856	-	1926	-	-	-	-
Warrington, Interchange (arr)	1816	-	1844	1906	-	1936	-	-	-	-
Warrington, Interchange [18] (dep)	1821	1836	1849	-	1911	-	2011	2111	2211	2311
Old Hall, Ross Close	1830	1845	1858	-	1918	-	2018	2118	2218	2318
Westbrook Centre, Asda	1834	1849	1902	-	1922	-	2022	2122	2222	2322
Gemini Retail Park, M & S	1838	|	1906	-	1926	-	2026	2126	2226	2326
Callands, St David's Drive	1842	1854	1909	-	1929	-	2029	2129	2229	2329

17 CALLANDS - WARRINGTON - PADGATE - BIRCHWOOD VIA WESTBROOK - HILDEN ROAD

18, 18E CALLANDS - WARRINGTON VIA WESTBROOK - OLD HALL

SATURDAY

	17	17	17	18	17	18	17		18	17	18	17		18	17	18	17	18	18	18	18	18E	18E
Callands, St David's Drive	-	0718	0738	0753	0808	0823	0838		53	08	23	38		1653	1708	1723	1738	1753	1808	1820	1830	1900	1930	2030
Westbrook Centre, Asda	-	0724	0744	0759	0814	0829	0844		59	14	29	44		1659	1714	1729	1744	1759	1814	1825	1835	1905	1935	2035
Old Hall, Ross Close	-	0728	0748	0803	0818	0833	0848		03	18	33	48		1703	1718	1733	1748	1803	1817	1829	1839	1909	1939	2039
Warrington, Interchange (arr)	-	0737	0758	0813	0828	0843	0858		13	28	43	58		1713	1728	1743	1758	1813	1826	1836	1846	1916	1946	2046
Warrington, Interchange [12] (dep)	0709	0740	0803	-	0833	-	0903		-	33	-	03		-	1733	-	1803	-	-	-	-	-	-	-
Padgate Stores	0721	0752	0816	-	0846	-	0916		-	46	-	16		-	1746	-	1816	-	-	-	-	-	-	-
Insall Rd, Valiant Cl	0724	0755	0820	-	0850	-	0920		-	50	-	20		-	1750	-	1820	-	-	-	-	-	-	-
Uni of Chester, Fearnhead Ln	0726	0757	0822	-	0852	-	0922		-	52	-	22		-	1752	-	1822	-	-	-	-	-	-	-
Birchwood Centre	0731	0802	0829	-	0859	-	0929		-	59	-	29		-	1758	-	1828	-	-	-	-	-	-	-
Birchwood, Railway Station	0732	0803	0830	-	0900	-	0930		-	00	-	30		-	1759	-	1829	-	-	-	-	-	-	-
Oakwood, Keyes Close	0736	0807	0834	-	0904	-	0934		-	04	-	34		-	1803	-	1833	-	-	-	-	-	-	-

and then at these mins

past each hour until

SATURDAY

	18E	18E	18E
Callands, St David's Drive	2130	2230	2330
Westbrook Centre, Asda	2135	2235	2335
Old Hall, Ross Close	2139	2239	2339
Garven Place Alighting Only	|	|	2344
Warrington, Interchange (arr)	2146	2246	-

17 BIRCHWOOD - PADGATE - WARRINGTON - CALLANDS VIA HILDEN ROAD - WESTBROOK - GEMINI

18 WARRINGTON - CALLANDS VIA OLD HALL - WESTBROOK

18E WARRINGTON - CALLANDS VIA OLD HALL - WESTBROOK - GEMINI

SATURDAY

	17	18	17	18	17	18	17	18		17	18	17	18		17	18	17	18	17	17	17	18E	18E	18E
Oakwood, Keyes Close	-	-	-	-	0739	-	0809	-		39	-	09	-		1639	-	1709	-	1739	1805	1835	-	-	-
Birchwood, Railway Station	-	-	-	-	0743	-	0813	-		43	-	13	-		1643	-	1713	-	1743	1809	1839	-	-	-
Birchwood Centre	-	-	-	-	0744	-	0814	-		44	-	14	-		1644	-	1714	-	1744	1810	1840	-	-	-
Uni of Chester, Fearnhead Ln	-	-	0723	-	0751	-	0821	-		51	-	21	-		1651	-	1721	-	1750	1816	1846	-	-	-
Insall Rd, Valiant Cl	-	-	0725	-	0753	-	0823	-		53	-	23	-		1653	-	1723	-	1752	1818	1848	-	-	-
Padgate Stores	-	-	0731	-	0800	-	0830	-		00	-	30	-		1700	-	1730	-	1758	1824	1854	-	-	-
Warrington, Interchange (arr)	-	-	0741	-	0811	-	0841	-		11	-	41	-		1711	-	1741	-	1808	1834	1904	-	-	-
Warrington, Interchange [18] (dep)	0717	0731	0746	0801	0816	0831	0846	0901		16	31	46	01		1716	1731	1746	1801	1811	1841	-	1911	2011	2111
Old Hall, Ross Close	0726	0740	0755	0810	0825	0840	0855	0910		25	40	55	10		1725	1740	1755	1808	1820	1850	-	1918	2018	2118
Westbrook Centre, Asda	0729	0745	0758	0815	0829	0845	0859	0915		29	45	59	15		1729	1745	1759	1812	1823	1853	-	1922	2022	2122
Gemini Retail Park, M & S	0733	|	0802	|	0833	|	0903	|	33	|	03	|		1733	|	1803	|	1827	1857	-	1926	2026	2126
Callands, St David's Drive	0737	0752	0806	0822	0837	0852	0907	0922		37	52	07	22		1737	1752	1807	1818	1830	1900	-	1929	2029	2129

and then at these mins

past each hour until

SATURDAY

	18E	18E
Warrington, Interchange [18] (dep)	2211	2311
Old Hall, Ross Close	2218	2318
Westbrook Centre, Asda	2222	2322
Gemini Retail Park, M & S	2226	2326
Callands, St David's Drive	2229	2329

17 CALLANDS - WARRINGTON VIA WESTBROOK

SUNDAY & PUBLIC HOLIDAYS

Callands, St David's Drive	0923	1018	and then every hour until	1618	1731
Westbrook Centre, Asda	0928	1023		1623	1736
Old Hall, Ross Close	0931	1026		1626	1739
Warrington, Interchange	0941	1036		1636	1748

17 WARRINGTON - CALLANDS VIA WESTBROOK - GEMINI

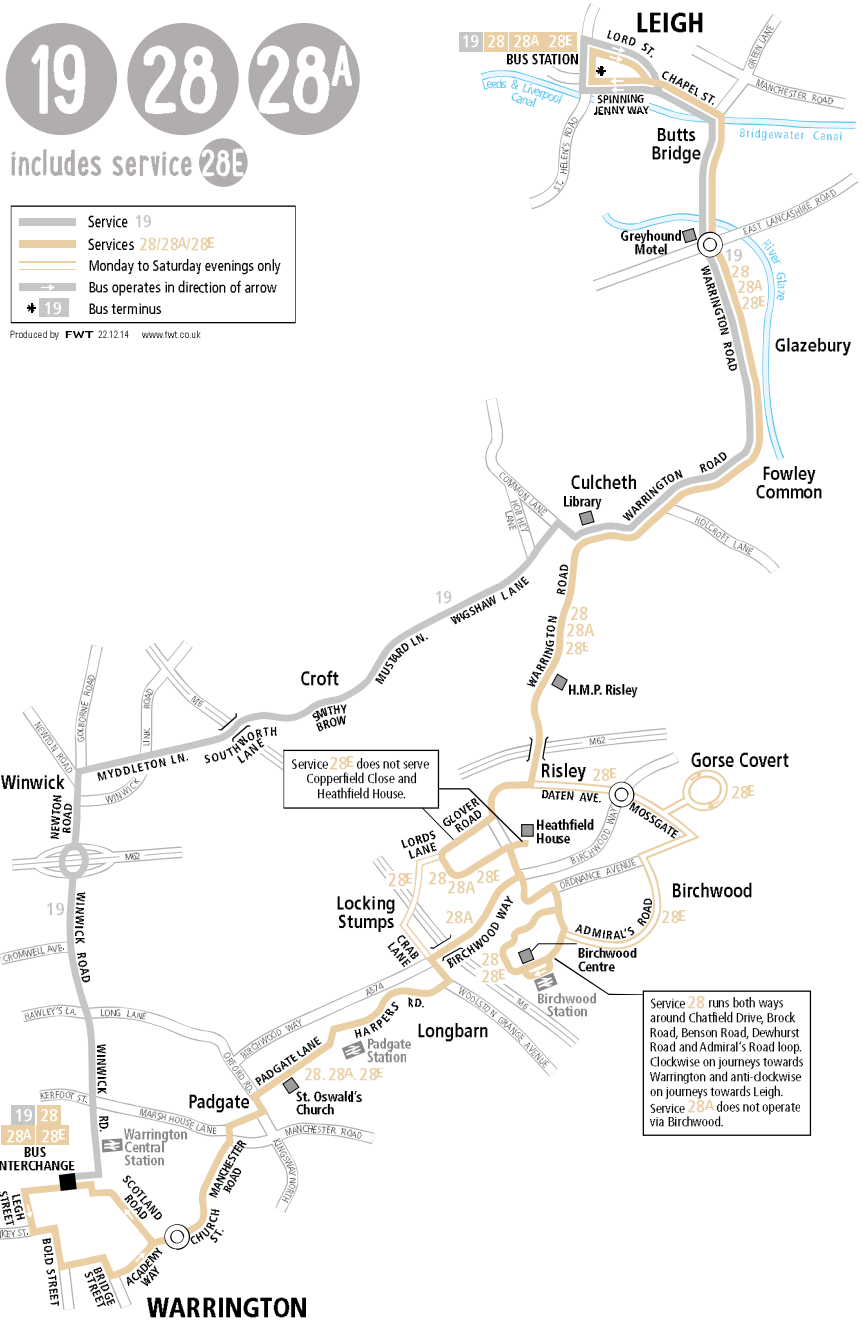
SUNDAY & PUBLIC HOLIDAYS

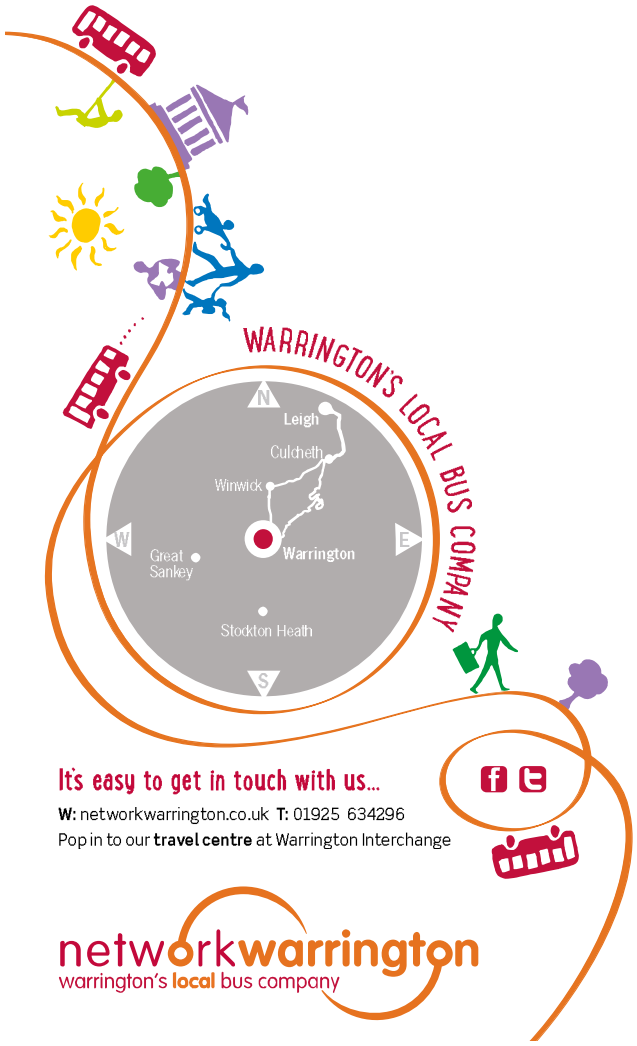
Warrington, Interchange [18] (dep)	0900	0955	and then every hour until	1555	1710
Old Hall, Ross Close	0909	1004		1604	1719
Westbrook Centre, Asda	0913	1008		1608	1723
Gemini Retail Park, M & S	0917	1012		1612	1727
Callands, St David's Drive	0921	1016		1616	1731

NO SUNDAY SERVICE ON SERVICE 17 BETWEEN WARRINGTON AND OAKWOOD, PLEASE SEE SERVICES 26/27 AND 28A WHICH SERVE PARTS OF THE ROUTE

19 28 28A

includes service 28E





It's easy to get in touch with us...

W: networkwarrington.co.uk **T:** 01925 634296

Pop in to our **travel centre** at Warrington Interchange

networkwarrington
warrington's local bus company

19 28 28A

includes service 28E

- LEIGH
- CULCHETH
- CROFT
- BIRCHWOOD
- LONGBARN
- WARRINGTON

Bus times

Map

from 26 January 2015

networkwarrington
warrington's local bus company

Edition 14 – 26.1.15

19 LEIGH – CULCHETH – WINWICK – WARRINGTON

28 LEIGH – CULCHETH – BIRCHWOOD – PADGATE – WARRINGTON

28A LEIGH – CULCHETH – PADGATE – WARRINGTON

28E LEIGH – WARRINGTON VIA CULCHETH – GORSE COVERT – BIRCHWOOD – PADGATE

MONDAY TO FRIDAY [excluding Public Holidays]

	19	28A	19	28	19	28A	19	28	19	28A	19		28	19		28	19	19	28	19	28A
Leigh, Bus Station [J]	0650	0710	0720	0740	0800	0820	0840	0900	0920	0935	0954		24	54		1424	-	1454	1514	1534	1554
Butts Bridge, Central Avenue	0655	0716	0726	0746	0806	0826	0846	0906	0926	0941	1000		30	00		1430	-	1500	1520	1540	1600
Warrington Rd, Greyhound Hotel	0702	0720	0734	0752	0810	0830	0850	0910	0930	0945	1004		34	04		1434	-	1504	1524	1544	1604
Culcheth, BP Garage	|	|	|	|	|	|	|	|	|	|	|		|	|		|	1509	|	|	|	|
Culcheth, Library (arr)	0708	0727	0741	0759	0817	0837	0857	0917	0937	0952	1011		41	11		1441	1511	1512	1531	1552	1611
Culcheth, Library (dep)	0712	0731	0744	0802	0821	0839	0900	0919	0939	0954	1013		43	13		1443	1515	1516	1533	1556	1613
Risley, H.M. Prison	|	0736	|	0808	|	0843	|	0923	|	0958	|	47	|	1447	|	|	1537	|	1617
Locking Stumps, Copperfield Cl	|	0739	|	0811	|	0846	|	0926	|	1001	|	50	|	1450	|	|	1540	|	1620
Glover Road, Turf & Feather	|	0740	|	0812	|	0847	|	0927	|	1002	|	51	|	1451	|	|	1541	|	1621
Heathfield House	|	0741	|	0813	|	0848	|	0929	|	1004	|	53	|	1453	|	|	1543	|	1623
Gorse Covert, Spar Store	|	|	|	|	|	|	|	|	|	|	|		|	|		|	|	|	|	|	|
Gorse Covert, Ashdown Lane	|	|	|	|	|	|	|	|	|	|	|		|	|		|	|	|	|	|	|
Oakwood, Keyes Close	|	|	|	|	|	|	|	|	|	|	|	and	|	|	mins	|	|	|	|	|	|
Birchwood, Railway Station	|	|	|	0820	|	|	|	0936	|	|	|	then	00	|	past	1500	|	|	1550	|	|
Birchwood Centre	|	|	|	0822	|	|	|	0937	|	|	|	at	01	|	each	1501	|	|	1551	|	|
Glover Road, Turf & Feather	|	|	|	|	|	|	|	|	|	|	|	these	|	|	hour	|	|	|	|	|	|
Crab Lane, Locking Stumps Lane	|	|	|	|	|	|	|	|	|	|	|		|	|	until	|	|	|	|	|	|
Longbarn, Blackburne Close	|	0750	|	0830	|	0857	|	0944	|	1010	|		08	|		1509	|	|	1559	|	1629
Padgate, Railway Station	|	0754	|	0834	|	0901	|	0948	|	1014	|		12	|		1513	|	|	1603	|	1633
Padgate Ln, St Oswald's Church	|	0758	|	0836	|	0905	|	0950	|	1016	|		14	|		1515	|	|	1605	|	1635
Croft, Horseshoe	0718	|	0752	|	0827	|	0907	|	0945	|	1019		|	19		|	1521	1522	|	1602	|
Winwick, Post Office	0724	|	0759	|	0833	|	0913	|	0951	|	1025		|	25		|	1527	1528	|	1608	|
Winwick, B&Q	0728	|	0804	|	0839	|	0917	|	0954	|	1028		|	28		|	1530	1531	|	1611	|
Winwick Road, Collegiate Inst	0734	|	0813	|	0848	|	0923	|	0959	|	1033		|	33		|	1536	1537	|	1617	|
Winwick Road, McDonalds	0737	|	0817	|	0852	|	0927	|	1001	|	1035		|	35		|	1538	1539	|	1619	|
Warrington, Central Station	0741	|	0820	|	0854	|	0929	|	1005	|	1039		|	39		|	1543	1544	|	1624	|
Warrington, Scotland Road	|	0810	|	0846	|	0915	|	1000	|	1026	|		24	|		1526	|	|	1616	|	1646
Warrington, Interchange	0744	0812	0824	0848	0858	0917	0932	1002	1007	1028	1041		26	41		1528	1545	1546	1618	1626	1648

	19	28	19	28A	19	28	19	28	19	28	B 28E	B 19	B 28E	B 28E	B 28E	B 28E
Leigh, Bus Station [J]	1614	1629	1649	1709	1729	1749	1804	1824	1837	-	1900	1930	2000	2100	2200	2300
Butts Bridge, Central Avenue	1620	1635	1655	1715	1735	1755	1810	1829	1843	-	1904	1936	2004	2104	2204	2304
Warrington Rd, Greyhound Hotel	1624	1639	1659	1719	1739	1759	1813	1831	1846	-	1906	1939	2006	2106	2206	2306
Culcheth, Library (arr)	1632	1646	1706	1726	1746	1806	1821	1837	1854	-	1913	1947	2013	2113	2213	2313
Culcheth, Library (dep)	1634	1648	1708	1728	1748	1808	1823	1839	1856	1900	1913	1949	2013	2113	2213	2313
Risley, H.M. Prison	|	1652	|	1732	|	1812	|	1843	|	1904	1917	|	2017	2117	2217	2317
Locking Stumps, Copperfield Cl	|	1655	|	1735	|	1815	|	1846	|	1907	|	|	|	|	|	|
Glover Road, Turf & Feather	|	1656	|	1736	|	1816	|	1847	|	1908	|	|	|	|	|	|
Heathfield House	|	1658	|	1738	|	1818	|	1848	|	1909	|	|	|	|	|	|
Gorse Covert, Spar Store	|	|	|	|	|	|	|	|	|	|	1922	|	2022	2122	2222	2322
Gorse Covert, Ashdown Lane	|	|	|	|	|	|	|	|	|	|	1924	|	2024	2124	2224	2324
Oakwood, Keyes Close	|	|	|	|	|	|	|	|	|	|	1927	|	2027	2127	2227	2327
Birchwood, Railway Station	|	1705	|	|	|	1825	|	1852	|	1913	1931	|	2031	2131	2231	2331
Birchwood Centre	|	1706	|	|	|	1826	|	1854	|	1915	1933	|	2033	2133	2233	2333
Glover Road, Turf & Feather	|	|	|	|	|	|	|	|	|	|	1938	|	2038	2138	2238	2338
Crab Lane, Locking Stumps Lane	|	|	|	|	|	|	|	|	|	|	1941	|	2041	2141	2241	2341
Longbarn, Blackburne Close	|	1715	|	1744	|	1833	|	1859	|	1920	1944	|	2044	2144	2244	2344
Padgate, Railway Station	|	1719	|	1748	|	1837	|	1902	|	1923	1947	|	2047	2147	2247	2347
Padgate Ln, St Oswald's Church	|	1721	|	1750	|	1839	|	1904	|	1925	1949	|	2049	2149	2249	2349
Croft, Horseshoe	1640	|	1713	|	1753	|	1828	|	1901	|	|	1954	|	|	|	|
Winwick, Post Office	1647	|	1720	|	1800	|	1834	|	1907	|	|	2000	|	|	|	|
Winwick, B&Q	1650	|	1723	|	1803	|	1836	|	1909	|	|	2002	|	|	|	|
Winwick Road, Collegiate Inst	1655	|	1729	|	1808	|	1841	|	1914	|	|	2007	|	|	|	|
Winwick Road, McDonalds	1659	|	1731	|	1810	|	1843	|	1916	|	|	2009	|	|	|	|
Warrington, Central Station	1704	|	1736	|	1815	|	1846	|	1919	|	|	2012	|	|	|	|
Warrington, Scotland Road	|	1733	|	1801	|	1849	|	1910	|	1931	1954	|	2054	2154	2254	|
Warrington, Interchange	1706	1735	1738	1803	1817	1851	1848	1912	1921	1933	1956	2014	2056	2156	2256	|
Wilderspool, St James Church	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2354

B departs from Stand B on Leigh Bus Station

19 WARRINGTON – WINWICK – CULCHETH – LEIGH

28 WARRINGTON – PADGATE – BIRCHWOOD – CULCHETH – LEIGH

28A WARRINGTON – PADGATE – CULCHETH – LEIGH

28E WARRINGTON – LEIGH VIA PADGATE – BIRCHWOOD – GORSE COVERT – CULCHETH

MONDAY TO FRIDAY [excluding Public Holidays]

	19	28	19	28A	19	28	19	28	19	28	19	28A	19		28	19		28	19	28	19
Warrington, Interchange [13]	0608	0614	0635	0649	0710	0712	0744	0746	0827	0828	0902	0928	1002		18	02		1318	1402	1408	1436
Warrington, Academy Way	|	0616	|	0651	|	0714	|	0748	|	0830	|	0930	|		20	|		1320	|	1410	|
Warrington, Central Station	0609	|	0636	|	0711	|	0745	|	0828	|	0903	|	1003		|	03		|	1403	|	1437
Winwick Road, McDonalds	0611	|	0638	|	0713	|	0747	|	0831	|	0906	|	1006		|	06		|	1406	|	1440
Winwick Road, Collegiate Inst	0614	|	0641	|	0716	|	0751	|	0833	|	0908	|	1008		|	08		|	1408	|	1442
Winwick, B&Q	0618	|	0645	|	0721	|	0757	|	0839	|	0914	|	1014		|	14		|	1414	|	1448
Winwick, Post Office	0620	|	0647	|	0723	|	0801	|	0841	|	0916	|	1016		|	16		|	1416	|	1450
Croft, Horseshoe	0624	|	0651	|	0728	|	0808	|	0848	|	0923	|	1023		|	23		|	1423	|	1457
Padgate Ln, St Oswald's Church	|	0623	|	0658	|	0723	|	0800	|	0841	|	0941	|		31	|		1331	|	1421	|
Padgate, Railway Station	|	0625	|	0700	|	0725	|	0802	|	0843	|	0943	|		33	|	mins	1333	|	1423	|
Longbarn, Blackburne Close	|	0628	|	0703	|	0728	|	0805	|	0846	|	0946	|	and	36	|	past	1336	|	1426	|
Crab Lane, Locking Stumps Lane	|	|	|	|	|	|	|	|	|	|	|	|	|	then	|	|	each	|	|	|	|
Glover Road, Turf & Feather	|	|	|	|	|	|	|	|	|	|	|	|	|	at	|	|	hour	|	|	|	|
Birchwood Centre	|	0633	|	|	|	0735	|	0814	|	0853	|	|	|	these	43	|	until	1343	|	1433	|
Birchwood, Railway Station	|	0634	|	|	|	0737	|	0816	|	0855	|	|	|		45	|		1345	|	1435	|
Heathfield House	|	0638	|	0707	|	0743	|	0823	|	0900	|	0950	|		50	|		1350	|	1440	|
Oakwood, Keyes Close	|	|	|	|	|	|	|	|	|	|	|	|	|		|	|		|	|	|	|
Gorse Covert, Spar Store	|	|	|	|	|	|	|	|	|	|	|	|	|		|	|		|	|	|	|
Gorse Covert, Ashdown Lane	|	|	|	|	|	|	|	|	|	|	|	|	|		|	|		|	|	|	|
Glover Road, Turf & Feather	|	0639	|	0708	|	0744	|	0824	|	0901	|	0951	|		51	|		1351	|	1441	|
Locking Stumps, Copperfield Cl	|	0640	|	0709	|	0746	|	0826	|	0903	|	0953	|		53	|		1353	|	1443	|
Risley, H.M. Prison	|	0644	|	0714	|	0751	|	0831	|	0906	|	0956	|		56	|		1356	|	1446	|
Culcheth, Library (arr)	0630	0648	0657	0718	0734	0755	0815	0835	0855	0910	0929	1000	1029		00	29		1400	1429	1450	1503
Culcheth, Library (dep)	0631	0650	0700	0720	0737	0757	0817	0837	0857	0912	0932	1002	1032		02	32		1402	1432	1452	1506
Warrington Rd, Greyhound Hotel	0637	0656	0706	0726	0743	0805	0825	0845	0905	0920	0940	1010	1040		10	40		1410	1440	1500	1518
Butts Bridge, Central Avenue	0639	0659	0709	0729	0746	0807	0828	0847	0907	0922	0942	1012	1042		12	42		1412	1442	1502	1520
Leigh, Bus Station	0645	0705	0715	0735	0755	0815	0835	0855	0915	0930	0950	1020	1050		20	50		1420	1450	1510	1530

	28	19	28A	28	19	19	28A	19	28	19	28A	28A	19	28E	28E	@@ 28E	@@ 28E	@@ 28E
Warrington, Interchange [13]	1446	1517	1531	1549	1550	1632	1640	1702	1711	1743	1751	1821	1840	1900	2000	2100	2200	2300
Warrington, Academy Way	1448	|	1533	1551	|	|	1642	|	1713	|	1753	1823	|	1902	2002	|	|	|
Warrington, Central Station	|	1518	|	|	1551	1633	|	1703	|	1744	|	|	1841	|	|	|	|	|
Winwick Road, McDonalds	|	1522	|	|	1555	1637	|	1707	|	1748	|	|	1844	|	|	|	|	|
Winwick Road, Collegiate Inst	|	1524	|	|	1559	1640	|	1713	|	1751	|	|	1846	|	|	|	|	|
Winwick, B&Q	|	1529	|	|	1606	1647	|	1720	|	1757	|	|	1852	|	|	|	|	|
Winwick, Post Office	|	1532	|	|	1609	1650	|	1723	|	1800	|	|	1854	|	|	|	|	|
Croft, Horseshoe	|	1538	|	|	1615	1656	|	1729	|	1806	|	|	1859	|	|	|	|	|
Padgate Ln, St Oswald's Church	1500	|	1545	1604	|	|	1655	|	1726	|	1806	1834	|	1909	2009	2109	2209	2309
Padgate, Railway Station	1502	|	1547	1606	|	|	1657	|	1728	|	1808	1836	|	1911	2011	2111	2211	2311
Longbarn, Blackburne Close	1505	|	1550	1609	|	|	1700	|	1731	|	1811	1839	|	1914	2014	2114	2214	2314
Crab Lane, Locking Stumps Lane	|	|	|	|	|	|	|	|	|	|	|	|	|	1916	2016	2116	2216	2316
Glover Road, Turf & Feather	|	|	|	|	|	|	|	|	|	|	|	|	|	1919	2019	2119	2219	2319
Birchwood Centre	1512	|	|	1617	|	|	|	|	1739	|	|	|	|	1924	2024	2124	2224	2324
Birchwood, Railway Station	1514	|	|	1619	|	|	|	|	1741	|	|	|	|	1926	2026	2126	2226	2326
Heathfield House	1519	|	1554	1625	|	|	1705	|	1747	|	1815	1844	|	|	|	|	|	|
Oakwood, Keyes Close	|	|	|	|	|	|	|	|	|	|	|	|	|	1929	2029	2129	2229	2329
Gorse Covert, Spar Store	|	|	|	|	|	|	|	|	|	|	|	|	|	1932	2032	2132	2232	2332
Gorse Covert, Ashdown Lane	|	|	|	|	|	|	|	|	|	|	|	|	|	1934	2034	2134	2234	2334
Glover Road, Turf & Feather	1520	|	1555	1626	|	|	1706	|	1748	|	1816	1845	|	|	|	|	|	-
Locking Stumps, Copperfield Cl	1522	|	1557	1628	|	|	1708	|	1750	|	1818	1847	|	|	|	|	|	-
Risley, H.M. Prison	1525	|	1600	1636	|	|	1718	|	1756	|	1823	1852	|	1939	2039	2139	2239	-
Culcheth, Library (arr)	1529	1544	1604	1640	1621	1702	1722	1735	1800	1812	1827	1856	1905	1943	2043	2143	2243	-
Culcheth, Library (dep)	1531	1547	1606	1642	1624	1704	1724	1737	1802	1814	1829	-	1906	1943	2043	2143	2243	-
Warrington Rd, Greyhound Hotel	1539	1557	1614	1652	1632	1712	1732	1745	1810	1822	1837	-	1914	1949	2049	2149	2249	-
Butts Bridge, Central Avenue	1541	1559	1616	1654	1634	1714	1734	1747	1812	1824	1839	-	1916	1951	2051	2151	2251	-
Leigh, Bus Station	1549	1609	1626	1704	1644	1724	1744	1755	1820	1832	1847	-	1924	1956	2056	2156	2256	-

@@ Does not stop at Rylands Street and Academy Way.

19 LEIGH - CULCHETH - WINWICK - WARRINGTON

28 LEIGH - CULCHETH - BIRCHWOOD - PADGATE - WARRINGTON

28A LEIGH - CULCHETH - PADGATE - WARRINGTON

28E LEIGH - CULCHETH - GORSE COVERT - BIRCHWOOD - PADGATE - WARRINGTON

SATURDAY

	19	28	19	28	19		28	19		28	19	28	19	28	19	28	28	B 28E	B 28E	B 28E	B 28E	B 28E
Leigh, Bus Station [J]	-	0724	0754	0824	0854		24	54		1524	1554	1630	1700	1730	1800	1830	-	1900	2000	2100	2200	2300
Butts Bridge, Central Avenue	-	0729	0800	0830	0900		30	00		1530	1600	1636	1706	1735	1806	1835	-	1904	2004	2104	2204	2304
Warrington Rd, Greyhound Hotel	-	0733	0804	0834	0904		34	04		1534	1604	1640	1710	1739	1810	1837	-	1906	2006	2106	2206	2306
Culcheth, Library (arr)	-	0740	0811	0841	0911		41	11		1541	1611	1647	1717	1746	1817	1843	-	1913	2013	2113	2213	2313
Culcheth, Library (dep)	0733	0742	0813	0843	0913		43	13		1543	1613	1649	1719	1748	1819	1845	1900	1913	2013	2113	2213	2313
Risley, H.M. Prison	|	0746	|	0847	|		47	|		1547	|	1653	|	1752	|	1849	1904	1917	2017	2117	2217	2317
Locking Stumps, Copperfield Cl	|	0749	|	0850	|		50	|		1550	|	1656	|	1755	|	1852	1907	|	|	|	|	|
Glover Road, Turf & Feather	|	0750	|	0851	|		51	|		1551	|	1657	|	1756	|	1853	1908	|	|	|	|	|
Heathfield House	|	0751	|	0853	|		53	|		1553	|	1659	|	1757	|	1854	1909	|	|	|	|	|
Gorse Covert, Spar Store	|	|	|	|	|		|	|		|	|	|	|	|	|	|	1922	2022	2122	2222	2322
Gorse Covert, Ashdown Lane	|	|	|	|	|		|	|		|	|	|	|	|	|	|	1924	2024	2124	2224	2324
Oakwood, Keyes Close	|	|	|	|	|		|	|		|	|	|	|	|	|	|	1927	2027	2127	2227	2327
Birchwood, Railway Station	|	0757	|	0900	|	and	00	|	mins	1600	|	1706	|	1803	|	1858	1913	1931	2031	2131	2231	2331
Birchwood Centre	|	0758	|	0901	|	then	01	|	past	1601	|	1707	|	1804	|	1900	1915	1933	2033	2133	2233	2333
Glover Road, Turf & Feather	|	|	|	|	|	at	|	|	each	|	|	|	|	|	|	|	|	1938	2038	2138	2238	2338
Crab Lane, Locking Stumps Ln	|	|	|	|	|	these	|	|	hour	|	|	|	|	|	|	|	|	1941	2041	2141	2241	2341
Longbarn, Blackburne Close	|	0805	|	0908	|		08	|	until	1608	|	1714	|	1811	|	1905	1920	1944	2044	2144	2244	2344
Padgate, Railway Station	|	0808	|	0912	|		12	|		1612	|	1718	|	1814	|	1908	1923	1947	2047	2147	2247	2347
Padgate Ln, St Oswald's Church	|	0810	|	0914	|		14	|		1614	|	1720	|	1816	|	1910	1925	1949	2049	2149	2249	2349
Croft, Horseshoe	0738	|	0819	|	0919		|	19		|	1619	|	1725	|	1825	|	|	|	|	|	|	|
Winwick, Post Office	0744	|	0825	|	0925		|	25		|	1625	|	1731	|	1831	|	|	|	|	|	|	|
Winwick, B&Q	0746	|	0828	|	0928		|	28		|	1628	|	1734	|	1834	|	|	|	|	|	|	|
Winwick Road, Collegiate Inst	0750	|	0833	|	0933		|	33		|	1633	|	1739	|	1839	|	|	|	|	|	|	|
Winwick Road, McDonalds	0752	|	0835	|	0935		|	35		|	1635	|	1741	|	1841	|	|	|	|	|	|	|
Warrington, Central Station	0755	|	0839	|	0939		|	39		|	1639	|	1745	|	1845	|	|	|	|	|	|	|
Warrington, Scotland Road	|	0818	|	0924	|		24	|		1624	|	1730	|	1824	|	1916	1931	1954	2054	2154	2254	|
Warrington, Interchange	0757	0820	0841	0926	0941		26	41		1626	1641	1732	1747	1826	1847	1918	1933	1956	2056	2156	2256	|
Wilderspool, St James Church	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	2354

B departs from Stand B on Leigh Bus Station

19 WARRINGTON - WINWICK - CULCHETH - LEIGH

28 WARRINGTON - PADGATE - BIRCHWOOD - CULCHETH - LEIGH

28A WARRINGTON - PADGATE - CULCHETH - LEIGH

28E WARRINGTON - PADGATE - BIRCHWOOD - GORSE COVERT - CULCHETH - LEIGH

SATURDAY

	28	28	19	28	19		28	19		28	19	28	19	28	19	28	19	28A	28E @@	28E @@	28E @@	28E @@	28E @@
Warrington, Interchange [13]	0629	0655	0706	0723	0802		18	02		1418	1502	1518	1605	1618	1705	1725	1805	1825	1900	2000	2100	2200	2300
Warrington, Academy Way	0631	0657	|	0725	|		20	|		1420	|	1520	|	1620	|	1727	|	1827	1902	2002	|	|	|
Warrington, Central Station	|	|	0707	|	0803		|	03		|	1503	|	1606	|	1706	|	1806	|	|	|	|	|	|
Winwick Road, McDonalds	|	|	0710	|	0806		|	06		|	1506	|	1609	|	1709	|	1809	|	|	|	|	|	|
Winwick Road, Collegiate Inst	|	|	0712	|	0808		|	08		|	1508	|	1611	|	1711	|	1811	|	|	|	|	|	|
Winwick, B&Q	|	|	0718	|	0814		|	14		|	1514	|	1617	|	1717	|	1817	|	|	|	|	|	|
Winwick, Post Office	|	|	0720	|	0816		|	16		|	1516	|	1619	|	1719	|	1819	|	|	|	|	|	|
Croft, Horseshoe	|	|	0725	|	0823		|	23		|	1523	|	1626	|	1726	|	1824	|	|	|	|	|	|
Padgate Ln, St Oswald's Church	0637	0703	|	0735	|		31	|		1431	|	1531	|	1631	|	1737	|	1837	1909	2009	2109	2209	2309
Padgate, Railway Station	0639	0705	|	0737	|		33	|		1433	|	1533	|	1633	|	1739	|	1839	1911	2011	2111	2211	2311
Longbarn, Blackburne Close	0642	0708	|	0740	|		36	|		1436	|	1536	|	1636	|	1742	|	1842	1914	2014	2114	2214	2314
Crab Lane, Locking Stumps Ln	|	|	|	|	|		|	|		|	|	|	|	|	|	|	|	|	1916	2016	2116	2216	2316
Glover Road, Turf & Feather	|	|	|	|	|		|	|		|	|	|	|	|	|	|	|	|	1919	2019	2119	2219	2319
Birchwood Centre	0649	0715	|	0747	|		43	|		1443	|	1543	|	1643	|	1749	|	|	1924	2024	2124	2224	2324
Birchwood, Railway Station	0651	0717	|	0749	|		45	|		1445	|	1545	|	1645	|	1751	|	|	1926	2026	2126	2226	2326
Oakwood, Keyes Close	|	|	|	|	|		|	|		|	|	|	|	|	|	|	|	|	1929	2029	2129	2229	2329
Gorse Covert, Spar Store	|	|	|	|	|		|	|		|	|	|	|	|	|	|	|	|	1932	2032	2132	2232	2332
Gorse Covert, Ashdown Lane	|	|	|	|	|		|	|		|	|	|	|	|	|	|	|	|	1934	2034	2134	2234	2334
Heathfield House	0656	0722	|	0754	|		50	|		1450	|	1550	|	1650	|	1756	|	1846	|	|	|	|	-
Glover Road, Turf & Feather	0657	0723	|	0755	|		51	|		1451	|	1551	|	1651	|	1757	|	1847	|	|	|	|	-
Locking Stumps, Copperfield Cl	0659	0725	|	0757	|		53	|		1453	|	1553	|	1653	|	1759	|	1849	|	|	|	|	-
Risley, H.M. Prison	0702	0728	|	0800	|		56	|		1456	|	1556	|	1656	|	1802	|	1852	1939	2039	2139	2239	-
Culcheth, Library (arr)	0704	0730	0731	0803	0829		00	29		1500	1529	1600	1632	1700	1732	1805	1830	1855	1943	2043	2143	2243	-
Culcheth, Library (dep)	0706	-	0732	0805	0832		02	32		1502	1532	1602	1635	1702	1735	1807	1832	-	1943	2043	2143	2243	-
Warrington Rd, Greyhound Hotel	0712	-	0740	0812	0840		10	40		1510	1540	1610	1643	1710	1743	1814	1839	-	1949	2049	2149	2249	-
Butts Bridge, Central Avenue	0714	-	0742	0814	0842		12	42		1512	1542	1612	1645	1712	1745	1816	1841	-	1951	2051	2151	2251	-
Leigh, Bus Station	0720	-	0750	0820	0850		20	50		1520	1550	1620	1653	1720	1753	1822	1847	-	1956	2056	2156	2256	-

and then at these — mins past each hour until

@@ Does not stop at Rylands Street and Academy Way.

19 CULCHETH - WINWICK - WARRINGTON

28A LEIGH - CULCHETH - PADGATE - WARRINGTON

SUNDAY & PUBLIC HOLIDAYS

	19	28A		19	28A		19	28A	19	28A
Leigh, Bus Station [B]	-	1000		-	00		-	1700	-	-
Butts Bridge, Central Avenue	-	1006		-	06		-	1706	-	-
Warrington Rd, Greyhound Hotel	-	1008		-	08		-	1708	-	-
Culcheth, Library (arr)	-	1016		-	16		-	1716	-	-
Culcheth, Library (dep)	0930	1018		30	18		1630	1718	1725	1741
Risley, H.M. Prison	|	1023		|	23	|	1723	|	1746
Locking Stumps, Copperfield Cl	|	1026		|	26	|	1726	|	1749
Glover Road, Turf & Feather	|	1027		|	27	|	1727	|	1750
Heathfield House	|	1028		|	28	|	1728	|	1751
Longbarn, Blackburne Close	|	1032		|	32	|	1732	|	1755
Padgate, Railway Station	|	1036		|	36	|	1736	|	1759
Padgate Ln, St Oswald's Church	|	1038		|	38	|	1738	|	1801
Croft, Horseshoe	0936	|		36	|		1636	|	1731	|
Winwick, Post Office	0943	|		43	|		1643	|	1738	|
Winwick, B&Q	0946	|		46	|		1646	|	1741	|
Winwick Road, Collegiate Inst	0950	|		50	|		1650	|	1745	|
Winwick Road, McDonalds	0952	|		52	|		1652	|	1747	|
Warrington, Central Station	0956	|		56	|		1656	|	1751	|
Warrington, Scotland Road	|	1045		|	45		|	1745	|	1808
Warrington, Interchange	0958	1047		58	47		1658	1747	1753	1810

and then at these — mins past each hour until

19 WARRINGTON - WINWICK - CULCHETH

28A WARRINGTON - PADGATE - CULCHETH - LEIGH

SUNDAY & PUBLIC HOLIDAYS

	19	28A	19		28A	19		28A	19	28A
Warrington, Interchange [13]	0852	0907	0952		07	52		1607	1652	1707
Warrington, Academy Way	|	0909	|		09	|		1609	|	1709
Warrington, Central Station	0853	|	0953		|	53		|	1653	|
Winwick Road, McDonalds	0856	|	0956		|	56		|	1656	|
Winwick Road, Collegiate Inst	0858	|	0958		|	58		|	1658	|
Winwick, B&Q	0902	|	1002		|	02		|	1702	|
Winwick, Post Office	0906	|	1006		|	06		|	1706	|
Croft, Horseshoe	0914	|	1014		|	14		|	1714	|
Padgate Ln, St Oswald's Church	|	0918	|	and	18	|	mins	1618	|	1718
Padgate, Railway Station	|	0920	|	then	20	|	past	1620	|	1720
Longbarn, Blackburne Close	|	0924	|	at	24	|	each	1624	|	1724
Heathfield House	|	0928	|	these	28	|	hour	1628	|	1728
Glover Road, Turf & Feather	|	0929	|		29	|	until	1629	|	1729
Locking Stumps, Copperfield Cl	|	0930	|		30	|		1630	|	1730
Risley, H.M. Prison	|	0933	|		33	|		1633	|	1733
Culcheth, Library (arr)	0922	0938	1022		38	22		1638	1722	1738
Culcheth, Library (dep)	-	0940	-		40	-		1640	-	-
Warrington Rd, Greyhound Hotel	-	0948	-		48	-		1648	-	-
Butts Bridge, Central Avenue	-	0950	-		50	-		1650	-	-
Leigh, Bus Station	-	0956	-		56	-		1656	-	-

20 21

including services 20A 21A & 21E

- Services 20/20A
- Services 21/21A/21E
- early mornings and Sundays only
- Monday to Saturday evenings only
- Bus operates in direction of arrow
- 20.20A Bus terminus

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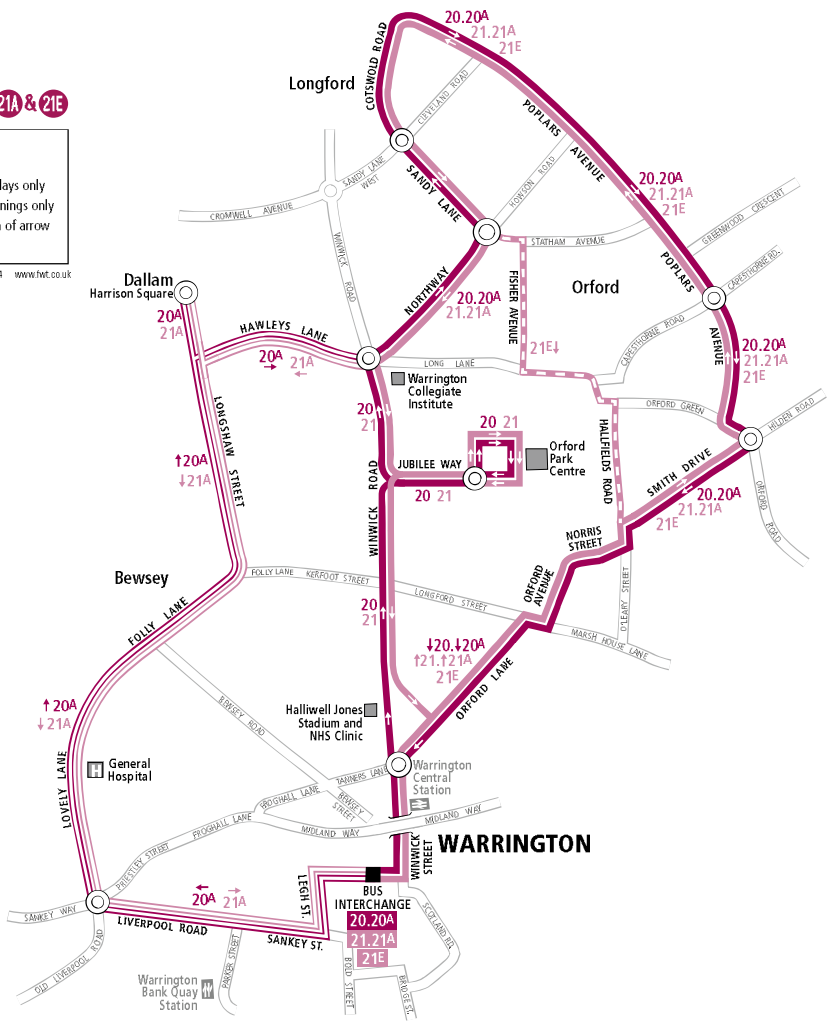

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Pop in to our **travel centre** at Warrington Interchange

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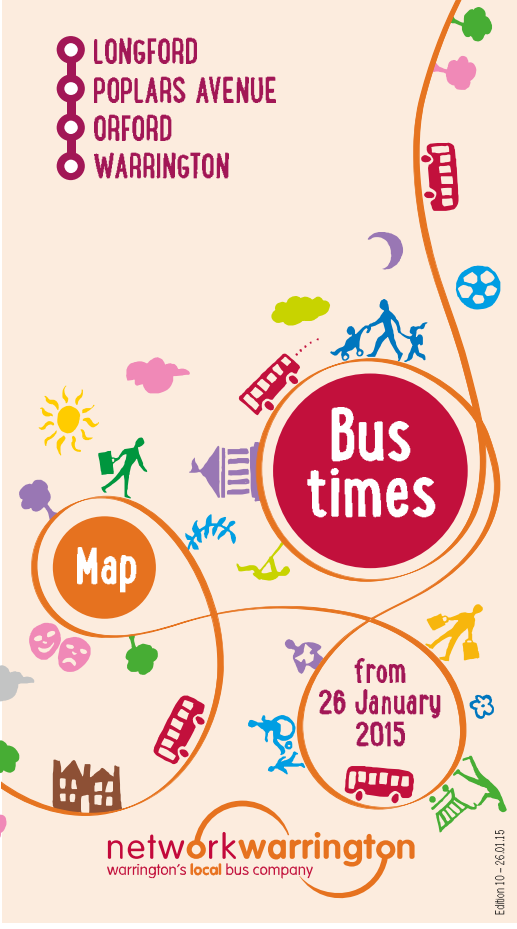
warrington's **local** bus company

20 21

including services 20A 21A & 21E

- LONGFORD
- POPLARS AVENUE
- ORFORD
- WARRINGTON



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Edition 10 – 26.01.15

20 WARRINGTON - LONGFORD/ORFORD (CIRCULAR) VIA ORFORD PARK CENTRE
20A WARRINGTON - LONGFORD/ORFORD (CIRCULAR) VIA WARRINGTON HOSPITAL - DALLAM

MONDAY TO FRIDAY [excluding Public Holidays]

	20A	20A	20	20	20	20	20	20	20	20	20		20	20	20	20	20		20	20	20
Warrington, Interchange [4]	0617	0645	0709	0724	0739	0754	0809	0824	0839	0854	0906		18	30	42	54	06		1418	1430	1442
Warrington, Central Station			0710	0725	0740	0755	0810	0825	0840	0855	0907		19	31	43	55	07		1419	1431	1443
Winwick Road, McDonalds			0712	0727	0742	0757	0812	0827	0842	0857	0909		21	33	45	57	09		1421	1433	1445
Orford Park Centre			0717	0732	0747	0802	0817	0832	0847	0902	0914		26	38	50	02	14		1426	1438	1450
Winwick Road, Collegiate Inst			0719	0734	0749	0804	0819	0834	0849	0904	0916		28	40	52	04	16		1428	1440	1452
General Hospital	0622	0650																			
Folly Lane, Tyrol House	0624	0652																			
Dallam, Harrison Square	0627	0655																			
Longford, Cotswold Road	0633	0701	0725	0740	0755	0810	0825	0840	0855	0910	0922		34	46	58	10	22		1434	1446	1458
Poplars Avenue, Cleveland Road	0635	0703	0727	0742	0757	0812	0827	0842	0857	0912	0924		36	48	00	12	24		1436	1448	1500
Orford Avenue	0641	0709	0734	0749	0804	0819	0834	0849	0904	0919	0931		43	55	07	19	31		1443	1455	1507
Warrington, Central Station	0650	0718	0745	0800	0815	0830	0845	0900	0915	0926	0938		50	02	14	26	38		1450	1502	1516
Warrington, Interchange	0651	0719	0746	0801	0816	0831	0846	0901	0916	0927	0939		51	03	15	27	39		1451	1503	1517

and then at these — minutes past each hour until

	20	20	20	20	20	20	20	20	20	20	20
Warrington, Interchange [4]	1455	1510	1525	40	55	10	25	1740	1755	1815	1845
Warrington, Central Station	1456	1511	1526	41	56	11	26	1741	1756	1816	1846
Winwick Road, McDonalds	1458	1514	1529	44	59	14	29	1744	1759	1818	1848
Orford Park Centre	1503	1520	1535	50	05	20	35	1750	1805	1821	1851
Winwick Road, Collegiate Inst	1505	1522	1537	52	07	22	37	1752	1807	1823	1853
Longford, Cotswold Road	1511	1528	1543	58	13	28	43	1758	1813	1828	1858
Poplars Avenue, Cleveland Road	1513	1530	1545	00	15	30	45	1800	1815	1830	1900
Orford Avenue	1520	1537	1552	07	22	37	52	1807	1822	1836	1906
Warrington, Central Station	1529	1546	1601	16	31	46	01	1816	1829	1841	1911
Warrington, Interchange	1530	1547	1602	17	32	47	02	1817	1830	1842	1912

and then at these — minutes past each hour *until*

20 WARRINGTON - LONGFORD/ORFORD (CIRCULAR) VIA ORFORD PARK CENTRE
20A WARRINGTON - LONGFORD/ORFORD (CIRCULAR) VIA WARRINGTON HOSPITAL - DALLAM

SATURDAY

	20A	20	20	20	20	20		20	20	20	20	20		20	20	20	20	20	20
Warrington, Interchange [4]	0645	0730	0800	0824	0848	0906		18	30	42	54	06		1718	1730	1742	1754	1815	1845
Warrington, Central Station		0731	0801	0825	0849	0907		19	31	43	55	07		1719	1731	1743	1755	1816	1846
Winwick Road, McDonalds		0733	0803	0827	0851	0909		21	33	45	57	09		1721	1733	1745	1757	1818	1848
Orford Park Centre		0736	0808	0832	0856	0914		26	38	50	02	14		1726	1738	1750	1802	1821	1851
Winwick Road, Collegiate Inst		0738	0810	0834	0858	0916		28	40	52	04	16		1728	1740	1752	1804	1823	1853
General Hospital	0652																		
Folly Lane, Tyrol House	0654																		
Dallam, Harrison Square	0657																		
Longford, Cotswold Road	0703	0743	0816	0840	0904	0922		34	46	58	10	22		1734	1746	1758	1809	1828	1858
Poplars Avenue, Cleveland Road	0705	0745	0818	0842	0906	0924		36	48	00	12	24		1736	1748	1800	1811	1830	1900
Orford Avenue	0711	0751	0825	0849	0913	0931		43	55	07	19	31		1743	1755	1806	1817	1836	1906
Warrington, Central Station	0716	0756	0832	0856	0920	0938		50	02	14	26	38		1750	1802	1811	1822	1841	1911
Warrington, Interchange	0717	0757	0833	0857	0921	0939		51	03	15	27	39		1751	1803	1812	1823	1842	1912

and then at these — minutes past each hour until

20 WARRINGTON - LONGFORD/ORFORD (CIRCULAR) VIA ORFORD PARK CENTRE

20A WARRINGTON - LONGFORD/ORFORD (CIRCULAR) VIA WARRINGTON HOSPITAL - DALLAM

SUNDAY & PUBLIC HOLIDAYS

	20A	20		20A	20		20A
Warrington, Interchange [4]	0915	0945		15	45		1715
Warrington, Central Station	|	0946		|	46		|
Winwick Road, McDonalds	|	0948		|	48		|
Orford Park Centre	|	0952		|	52		|
Winwick Road, Collegiate Inst	|	0954		|	54		|
General Hospital	0922	|	and then at these	22	|	minutes past each hour until	1722
Folly Lane, Tyrol House	0924	|		24	|		1724
Dallam, Harrison Square	0927	|		27	|		1727
Longford, Cotswold Road	0933	1000		33	00		1733
Poplars Avenue, Cleveland Road	0935	1002		35	02		1735
Orford Avenue	0942	1009		42	09		1742
Warrington, Central Station	0948	1015		48	15		1748
Warrington, Interchange	0949	1016		49	16		1749

21 WARRINGTON - ORFORD/LONGFORD (CIRCULAR) VIA ORFORD PARK CENTRE

21A WARRINGTON - ORFORD/LONGFORD (CIRCULAR) VIA DALLAM - WARRINGTON HOSPITAL

21E WARRINGTON - ORFORD/LONGFORD (CIRCULAR)

MONDAY TO FRIDAY [excluding Public Holidays]

	21A	21A	21A	21A	21	21	21	21	21	21	21	21	21	21		21	21	21	21	21
Warrington, Interchange [3]	0510	0540	0610	0640	0700	0715	0730	0745	0800	0815	0830	0845	0900	0912		24	36	48	00	12
Warrington, Central Station	0511	0541	0611	0641	0701	0716	0731	0746	0801	0816	0831	0846	0901	0913		25	37	49	01	13
Orford Avenue	0516	0546	0616	0646	0707	0722	0737	0752	0807	0822	0837	0852	0907	0919		31	43	55	07	19
Poplars Avenue, Cleveland Road	0523	0553	0623	0653	0714	0729	0744	0759	0814	0829	0844	0859	0914	0926		38	50	02	14	26
Longford, Cotswold Road	0525	0555	0625	0655	0716	0731	0746	0801	0816	0831	0846	0901	0916	0928		40	52	04	16	28
Winwick Road, Collegiate Inst	|	|	|	|	0722	0737	0752	0807	0822	0837	0852	0907	0922	0934	and then at these	46	58	10	22	34
Orford Park Centre	|	|	|	|	0725	0740	0755	0810	0825	0840	0855	0909	0924	0936		48	00	12	24	36
Winwick Road, McDonalds	|	|	|	|	0731	0746	0801	0816	0831	0846	0901	0914	0929	0941		53	05	17	29	41
Warrington, Central Station	|	|	|	|	0734	0749	0804	0819	0834	0849	0904	0917	0932	0944		56	08	20	32	44
Dallam, Harrison Square	0531	0601	0631	0701	|	|	|	|	|	|	|	|	|	|		|	|	|	|	|
Folly Lane, Tyrol House	0532	0602	0632	0702	|	|	|	|	|	|	|	|	|	|		|	|	|	|	|
General Hospital	0534	0604	0634	0704	|	|	|	|	|	|	|	|	|	|		|	|	|	|	|
Warrington, Interchange	0544	0614	0644	0714	0735	0750	0805	0820	0835	0850	0905	0918	0933	0945		57	09	21	33	45

	21	21	21	21	21		21	21	21	21		21	21	21	21	21E	21E	21E	21E	21E
Warrington, Interchange [3]	1424	1436	1448	1500	1515		30	45	00	15		1730	1745	1800	1830	1900	2000	2100	2200	2300
Warrington, Central Station	1425	1437	1449	1501	1516		31	46	01	16		1731	1746	1801	1831	1901	2001	2101	2201	2301
Orford Avenue	1431	1443	1455	1508	1523		38	53	08	23		1738	1753	1808	1838	1906	2006	2106	2206	2306
Poplars Avenue, Cleveland Road	1438	1450	1502	1516	1531		46	01	16	31		1746	1801	1816	1846	1912	2012	2112	2212	2312
Longford, Cotswold Road	1440	1452	1504	1518	1533		48	03	18	33		1748	1803	1818	1848	1913	2013	2113	2213	2313
Winwick Road, Collegiate Inst	1446	1458	1510	1524	1539		54	09	24	39		1754	1809	1824	1854	|	|	|	|	|
Orford Park Centre	1448	1500	1512	1526	1541		56	11	26	41		1756	1811	1826	1856	|	|	|	|	|
Winwick Road, McDonalds	1453	1505	1517	1531	1546		01	16	31	46		1801	1816	1831	1901	|	|	|	|	|
O'Leary Street	|	|	|	|	|		|	|	|		|	|	|		1919	2019	2119	2219	2319
Warrington, Central Station	1456	1508	1520	1534	1549		04	19	34	49		1804	1819	1833	1903	1924	2024	2124	2224	2324
Warrington, Interchange	1457	1509	1521	1535	1550		05	20	35	50		1805	1820	1834	1904	1925	2025	2125	2225	2325

and then at these

minutes past each hour until

21 WARRINGTON - ORFORD/LONGFORD (CIRCULAR) VIA ORFORD PARK CENTRE
21A WARRINGTON - ORFORD/LONGFORD (CIRCULAR) VIA DALLAM - WARRINGTON HOSPITAL
21E WARRINGTON - ORFORD/LONGFORD (CIRCULAR)

SATURDAY

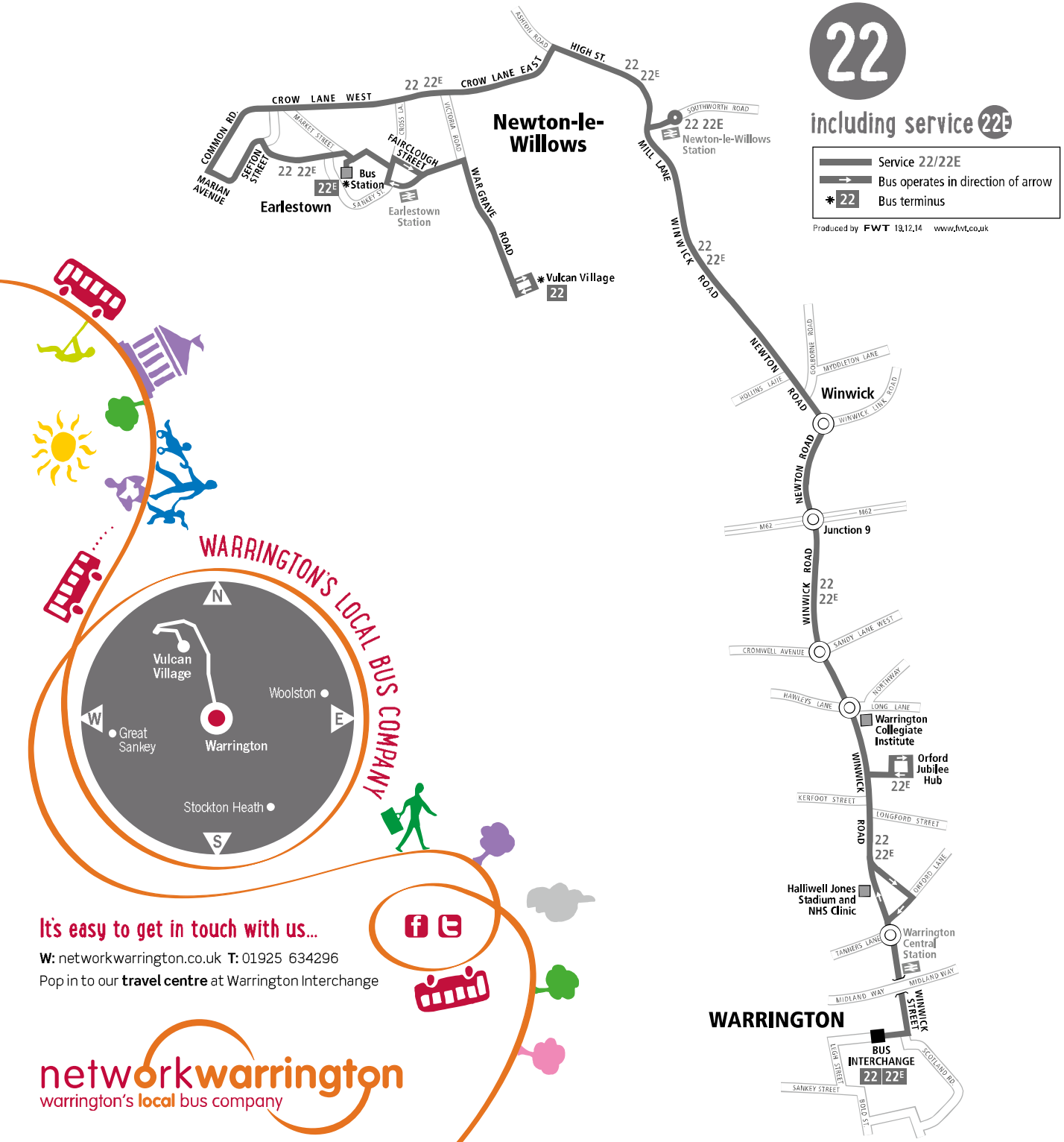
	21A	21	21	21	21	21	21		21	21	21	21	21		21	21	21	21	21	21E	21E
Warrington, Interchange [3]	0613	0715	0745	0812	0836	0900	0912		24	36	48	00	12		1724	1736	1748	1800	1830	1900	2000
Warrington, Central Station	0614	0716	0746	0813	0837	0901	0913		25	37	49	01	13		1725	1737	1749	1801	1831	1901	2001
Orford Avenue	0620	0721	0751	0819	0843	0907	0919		31	43	55	07	19		1731	1743	1755	1806	1836	1906	2006
Poplars Avenue, Cleveland Road	0627	0727	0757	0826	0850	0914	0926		38	50	02	14	26		1738	1750	1802	1812	1842	1912	2012
Longford, Cotswold Road	0629	0729	0759	0828	0852	0916	0928		40	52	04	16	28	min-	1740	1752	1804	1814	1844	1913	2013
Winwick Road, Collegiate Inst	|	0734	0804	0834	0858	0922	0934	and	46	58	10	22	34	utes	1746	1758	1809	1819	1849	|	|
Orford Park Centre	|	0736	0806	0836	0900	0924	0936	then	48	00	12	24	36	past	1748	1800	1811	1821	1851	|	|
Winwick Road, McDonalds	|	0739	0811	0841	0905	0929	0941	at	53	05	17	29	41	each	1753	1803	1814	1824	1854	|	|
O'Leary Street	|	|	|	|	|	|	|	these	|	|	|	|	|	hour	|	|	|	|	|	1919	2019
Warrington, Central Station	|	0741	0814	0844	0908	0932	0944		56	08	20	32	44	until	1756	1805	1816	1826	1856	1924	2024
Dallam, Harrison Square	0635	|	|	|	|	|	|		|	|	|	|	|		|	|	|	|	|	|	|
Folly Lane, Tyrol House	0636	|	|	|	|	|	|		|	|	|	|	|		|	|	|	|	|	|	|
General Hospital	0638	|	|	|	|	|	|		|	|	|	|	|		|	|	|	|	|	|	|
Warrington, Interchange	0647	0742	0815	0845	0909	0933	0945		57	09	21	33	45		1757	1806	1817	1827	1857	1925	2025

	21E	21E	21E
Warrington, Interchange [3]	2100	2200	2300
Warrington, Central Station	2101	2201	2301
Orford Avenue	2106	2206	2306
Poplars Avenue, Cleveland Road	2112	2212	2312
Longford, Cotswold Road	2113	2213	2313
O'Leary Street	2119	2219	2319
Warrington, Central Station	2124	2224	2324
Warrington, Interchange	2125	2225	2325

21 WARRINGTON - ORFORD/LONGFORD (CIRCULAR) VIA ORFORD PARK CENTRE
21A WARRINGTON - ORFORD/LONGFORD (CIRCULAR) VIA DALLAM - WARRINGTON HOSPITAL

SUNDAY & PUBLIC HOLIDAYS

	21A	21		21A	21		21A	21
Warrington, Interchange [3]	0900	0930		00	30		1700	1730
Warrington, Central Station	0901	0931		01	31		1701	1731
Orford Avenue	0907	0937		07	37		1707	1737
Poplars Avenue, Cleveland Road	0914	0944		14	44		1714	1744
Longford, Cotswold Road	0916	0946		16	46	min-	1716	1746
Winwick Road, Collegiate Inst	|	0952	and	|	52	utes	|	1752
Orford Park Centre	|	0954	then	|	54	past	|	1754
Winwick Road, McDonalds	|	0958	at	|	58	each	|	1758
Warrington, Central Station	|	1000	these	|	00	hour	|	1800
Dallam, Harrison Square	0922	|		22	|	until	1722	|
Folly Lane, Tyrol House	0925	|		25	|		1725	|
General Hospital	0927	|		27	|		1727	|
Warrington, Interchange	0934	1001		34	01		1734	1801



22

including service 22E

- VULCAN VILLAGE
- EARLESTOWN
- NEWTON-LE-WILLOWS
- WARRINGTON

Bus times

Map

from 26 January 2015

networkwarrington
warrington's local bus company

Edition 9 – 26.01.15

22E EARLESTOWN - WARRINGTON VIA NEWTON-LE-WILLOWS - WINWICK
22 VULCAN - WARRINGTON VIA EARLESTOWN - NEWTON-LE-WILLOWS - WINWICK

MONDAY TO FRIDAY [excluding Public Holidays]

	22	22	22	22	22	22	22	22	22	22	22	22	22E	22E	22E	22E	22E
Vulcan, Manchester Row	-	-	0930	1032	1132	1232	1332	1434	1542	1653	1806	1838	-	-	-	-	-
Wargrave, School	-	-	0931	1033	1133	1233	1333	1435	1543	1654	1807	1839	-	-	-	-	-
Earlestown, Bus Stn (Stand 2) [2]	0710	0807	0938	1040	1140	1240	1340	1442	1550	1701	1812	1844	1855	1938	2038	2138	2238
Sefton Street, Valentine Road	0714	0812	0942	1044	1144	1244	1344	1446	1554	1705	1816	1847	1857	1940	2040	2140	2240
Crow Lane West, Vista Road	0717	0816	0945	1047	1147	1247	1347	1449	1557	1708	1819	1850	1900	1943	2043	2143	2243
Newton-le-Willows, Railway Stn [C]	0726	0826	0955	1055	1155	1255	1355	1457	1606	1718	1826	1857	1906	1949	2049	2148	2248
Newton, Old Colliery Entrance	0728	0828	0957	1057	1157	1257	1357	1459	1608	1721	1828	1859	1908	1951	2051	2150	2250
Winwick, Church	0731	0833	1000	1100	1200	1300	1400	1502	1612	1726	1831	1901	1910	1953	2053	2152	2252
Winwick, B&Q	0734	0837	1002	1102	1202	1302	1402	1504	1615	1729	1833	1903	1912	1955	2055	2154	2254
Winwick Road, Collegiate Inst	0740	0847	1007	1107	1207	1307	1407	1509	1621	1735	1837	1907	1916	1959	2059	2158	2258
Orford Park Centre	|	|	|	|	|	|	|	|	|	|	|	|	1917	2000	2100	2159	2259
Winwick Road, McDonalds	0742	0850	1009	1109	1209	1309	1409	1511	1623	1737	1839	1909	1919	2002	2102	2201	2301
Warrington, Central Station	0747	0855	1013	1113	1213	1313	1413	1516	1628	1742	1842	1912	1922	2005	2105	2204	2304
Warrington, Interchange	0749	0857	1015	1115	1215	1315	1415	1518	1630	1744	1844	1914	1923	2006	2106	2205	2305

22 WARRINGTON - VULCAN VIA WINWICK - NEWTON-LE-WILLOWS - EARLESTOWN
22E WARRINGTON - EARLESTOWN VIA WINWICK - NEWTON-LE-WILLOWS

MONDAY TO FRIDAY [excluding Public Holidays]

NE

	22	22	22	22	22	22	22	22	22	22	22	22	22E	22E	22E	22E	22E
Warrington, Interchange [5]	0725	0843	0948	1048	1148	1248	1348	1448	1600	1710	1750	1820	1910	2010	2110	2210	2310
Warrington, Central Station	0726	0844	0949	1049	1149	1249	1349	1449	1601	1711	1751	1821	1911	2011	2111	2211	2311
Winwick Road, McDonalds	0729	0847	0952	1052	1152	1252	1352	1453	1605	1715	1755	1824	1914	2014	2114	2214	2314
Orford Park Centre	|	|	|	|	|	|	|	|	|	|	|	|	1916	2016	2116	2216	2316
Winwick Road, Collegiate Inst	0731	0849	0954	1054	1154	1254	1354	1455	1607	1721	1757	1826	1917	2017	2117	2217	2317
Winwick, B&Q	0737	0855	1000	1100	1200	1300	1400	1502	1614	1728	1803	1832	1921	2021	2121	2221	2321
Winwick, Church	0740	0858	1002	1102	1202	1302	1402	1505	1617	1730	1805	1834	1922	2022	2122	2222	2322
Newton, Old Colliery Entrance	0742	0900	1004	1104	1204	1304	1404	1507	1619	1732	1807	1836	1924	2024	2124	2224	2324
Newton-le-Willows, Railway Stn [D]	0746	0904	1007	1107	1207	1307	1407	1511	1623	1737	1812	1838	1926	2026	2126	2226	2326
Crow Lane West, Vista Road	0753	0911	1014	1114	1214	1314	1415	1520	1631	1745	1820	1845	1932	2032	2132	2232	-
Sefton Street, Valentine Road	0757	0914	1017	1117	1217	1317	1418	1523	1635	1749	1823	1847	1934	2034	2134	2234	-
Earlestown, Bus Stn (Stand 2) [2]	0803	|	|	|	|	|	|	|	|	|	|	1850	1937	2037	2137	2237	-
Earlestown, Bus Stn (Stand 1) [1]	-	0920	1022	1122	1222	1322	1424	1529	1641	1755	1828	-	-	-	-	-	-
Wargrave, School	-	0924	1026	1126	1226	1326	1428	1535	1645	1759	1832	-	-	-	-	-	-
Vulcan, Manchester Row	-	0927	1029	1129	1229	1329	1431	1538	1649	1803	1835	-	-	-	-	-	-

22E EARLESTOWN - WARRINGTON VIA NEWTON-LE-WILLOWS - WINWICK
22 VULCAN - WARRINGTON VIA EARLESTOWN - NEWTON-LE-WILLOWS - WINWICK

SATURDAY

	22	22	22	22	22	22	22	22	22	22	22	22E	22E	22E	22E	22E
Vulcan, Manchester Row	-	0928	1028	1132	1232	1332	1432	1535	1647	1759	1832	-	-	-	-	-
Wargrave, School	-	0929	1029	1133	1233	1333	1433	1536	1648	1800	1833	-	-	-	-	-
Earlestown, Bus Stn (Stand 2) [2]	0818	0936	1036	1140	1240	1340	1440	1543	1655	1806	1838	1903	1938	2038	2138	2238
Sefton Street, Valentine Road	0821	0940	1040	1144	1244	1344	1444	1547	1659	1808	1840	1905	1940	2040	2140	2240
Crow Lane West, Vista Road	0824	0944	1044	1147	1247	1347	1447	1550	1702	1811	1843	1908	1943	2043	2143	2243
Newton-le-Willows, Railway Stn [C]	0831	0953	1053	1155	1255	1355	1455	1558	1710	1818	1849	1914	1949	2049	2148	2248
Newton, Old Colliery Entrance	0833	0955	1055	1157	1257	1357	1457	1600	1712	1820	1851	1916	1951	2051	2150	2250
Winwick, Church	0835	0958	1058	1200	1300	1400	1500	1603	1715	1822	1853	1918	1953	2053	2152	2252
Winwick, B&Q	0836	1000	1100	1202	1302	1402	1502	1605	1717	1824	1855	1920	1955	2055	2154	2254
Winwick Road, Collegiate Inst	0841	1006	1106	1207	1307	1407	1507	1610	1722	1829	1900	1924	1959	2059	2158	2258
Orford Park Centre	|	|	|	|	|	|	|	|	|	|	|	1925	|	|	|	|
Winwick Road, McDonalds	0843	1008	1108	1209	1309	1409	1509	1612	1724	1831	1902	1927	2001	2101	2200	2300
Warrington, Central Station	0846	1013	1113	1213	1313	1413	1513	1616	1728	1834	1905	1930	2004	2104	2203	2303
Warrington, Interchange	0848	1015	1115	1215	1315	1415	1515	1618	1730	1836	1906	1931	2005	2105	2204	2304

22 WARRINGTON - VULCAN VIA WINWICK - NEWTON-LE-WILLOWS - EARLESTOWN

22E WARRINGTON - EARLESTOWN VIA WINWICK - NEWTON-LE-WILLOWS

SATURDAY

																	NE
	22	22	22	22	22	22	22	22	22	22	22	22	22E	22E	22E	22E	22E
Warrington, Interchange [5]	0743	0846	0946	1048	1148	1248	1348	1448	1600	1712	1748	1830	1910	2010	2110	2210	2310
Warrington, Central Station	0744	0847	0947	1049	1149	1249	1349	1449	1601	1713	1749	1831	1911	2011	2111	2211	2311
Winwick Road, McDonalds	0746	0849	0949	1052	1152	1252	1352	1452	1604	1716	1752	1834	1914	2014	2114	2214	2314
Orford Park Centre	|	|	|	|	|	|	|	|	|	|	|	|	1916	|	|	|	|
Winwick Road, Collegiate Inst	0748	0851	0951	1054	1154	1254	1354	1455	1607	1719	1754	1836	1917	2016	2116	2216	2316
Winwick, B&Q	0753	0856	0956	1100	1200	1300	1400	1501	1613	1725	1800	1842	1921	2020	2120	2220	2320
Winwick, Church	0755	0858	0958	1102	1202	1302	1402	1503	1615	1727	1802	1844	1922	2021	2121	2221	2321
Newton, Old Colliery Entrance	0757	0900	1000	1104	1204	1304	1404	1505	1617	1729	1804	1846	1924	2023	2123	2223	2323
Newton-le-Willows, Railway Stn [D]	0800	0903	1003	1107	1207	1307	1407	1508	1620	1732	1807	1848	1926	2025	2125	2225	2325
Crow Lane West, Vista Road	0806	0909	1009	1114	1214	1314	1414	1515	1627	1739	1814	1854	1932	2031	2131	2231	-
Sefton Street, Valentine Road	0809	0912	1012	1117	1217	1317	1417	1518	1630	1742	1817	1857	1934	2033	2133	2233	-
Earlestown, Bus Stn (Stand 2)	0814	|	|	|	|	|	|	|	|	|	|	1900	1937	2036	2136	2236	-
Earlestown, Bus Stn (Stand 1) [1]	-	0917	1017	1122	1222	1322	1422	1524	1636	1748	1822	-	-	-	-	-	-
Wargrave, School	-	0921	1021	1126	1226	1326	1426	1528	1640	1752	1826	-	-	-	-	-	-
Vulcan, Manchester Row	-	0924	1024	1129	1229	1329	1429	1531	1643	1755	1829	-	-	-	-	-	-

NE **Runs from Newton to Earlestown on request only**

22 EARLESTOWN - WARRINGTON VIA NEWTON & WINWICK

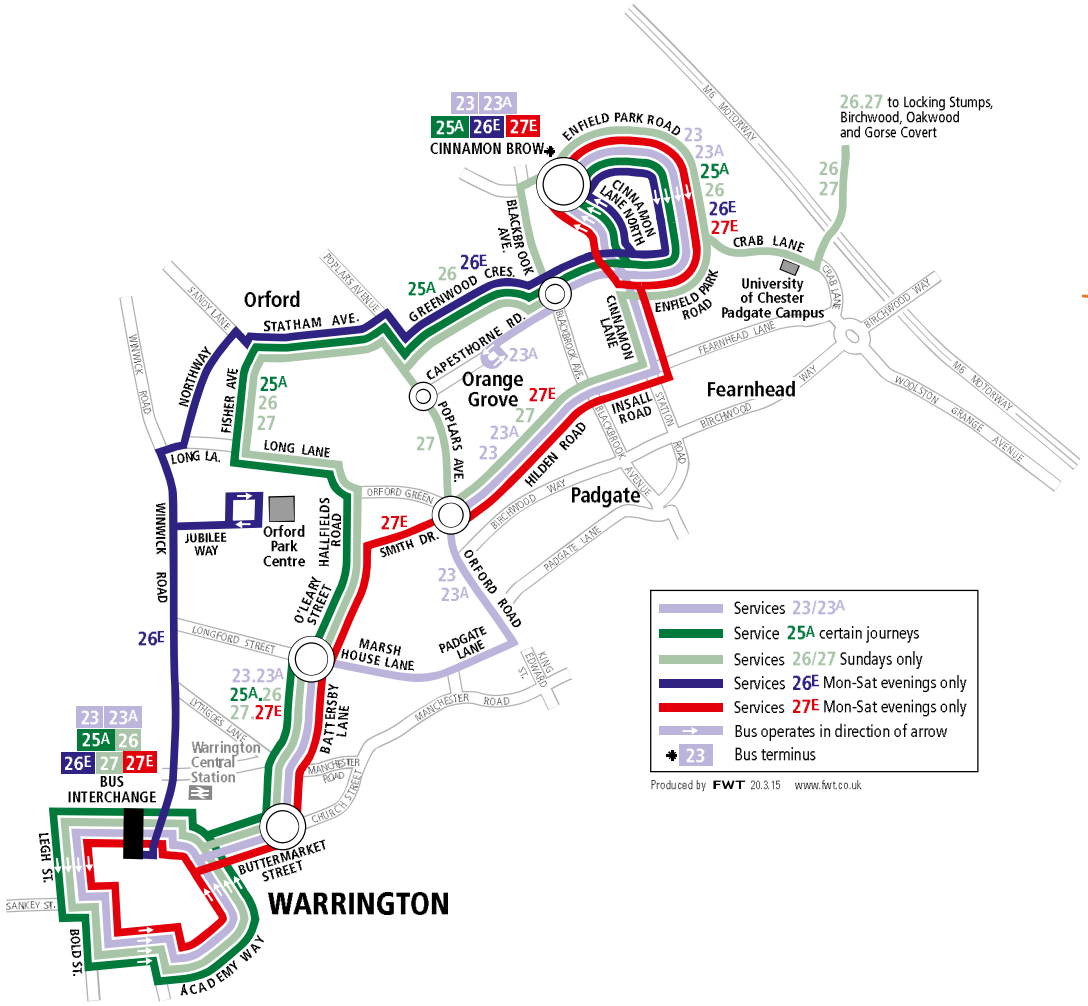
SUNDAY & PUBLIC HOLIDAYS

Earlestown, Bus Stn (Stand 2) [2]	0911	0951		1751
Sefton Street, Valentine Road	0914	0954		1754
Crow Lane West, Vista Road	0917	0957		1757
Newton-le-Willows, Railway Stn [C]	0924	1004	and	1804
Newton, Old Colliery Entrance	0926	1006	then	1806
Winwick, Church	0928	1008	every	1808
Winwick, B&Q	0930	1010	hour	1810
Winwick Road, Collegiate Inst	0934	1014	until	1814
Winwick Road, McDonalds	0936	1016		1816
Warrington, Central Station	0940	1020		1820
Warrington, Interchange	0942	1022		1822

22 WARRINGTON - EARLESTOWN VIA WINWICK & NEWTON

SUNDAY & PUBLIC HOLIDAYS

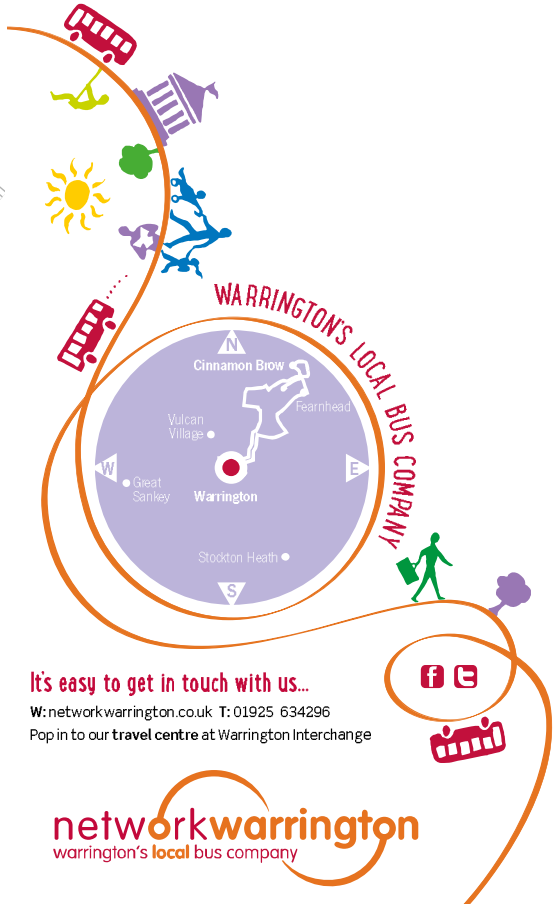
Warrington, Interchange [5]	0840	0920		1720
Warrington, Central Station	0841	0921		1721
Winwick Road, McDonalds	0844	0924		1724
Winwick Road, Collegiate Inst	0846	0926	and	1726
Winwick, B&Q	0850	0930	then	1730
Winwick, Church	0852	0932	every	1732
Newton, Old Colliery Entrance	0854	0934	hour	1734
Newton-le-Willows, Railway Stn [D]	0856	0936	until	1736
Crow Lane West, Vista Road	0902	0942		1742
Sefton Street, Valentine Road	0904	0944		1744
Earlestown, Bus Stn (Stand 2) [2]	0909	0949		1749



23 23A 25A

includes services 26 26E 27 27E

Note – see Service 17 timetable for services from Cinnamon Brow to Birchwood.



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warrington's **local** bus company

23 23A 25A

includes services 26 26E 27 27E

- ORANGE GROVE
- CINNAMON BROW
- ORFORD
- PADGATE
- WARRINGTON

Bus times

Map

from 20 April 2015

networkwarrington
warrington's **local** bus company

Edition 12 – 20.4.15

23 CINNAMON BROW - WARRINGTON VIA PADGATE
23A ORANGE GROVE - CINNAMON BROW - WARRINGTON VIA PADGATE

MONDAY TO FRIDAY [excluding Public Holidays]

	23	23	23	23	23A	23		23A	23		23A	23	23A	23	23	23	23	23	23
Orange Grove, Avery Close	-	-	-	-	0932	-		28	-		1428	-	1530	-	-	-	-	-	-
Cinnamon Lane North	0715	0749	0826	0859	0935	0958		31	01		1431	1501	1533	1603	1633	1708	1738	1808	1831
Cinnamon Brow, Millhouse Rdbt	0716	0750	0827	0900	0936	0959	and	32	02	mins	1432	1502	1534	1604	1634	1709	1739	1809	1832
Enfield Park Rd, Stirrup Cl	0718	0752	0829	0902	0938	1001	then	34	04	past	1434	1504	1536	1606	1636	1711	1741	1811	1834
Insall Road, Valiant Close	0721	0755	0832	0905	0941	1004	at	37	07	each	1437	1507	1539	1609	1639	1714	1744	1814	1837
Padgate Stores	0727	0801	0838	0911	0948	1011	these	43	13	hour	1443	1513	1545	1615	1645	1720	1750	1820	1843
Warrington, Interchange	0738	0816	0853	0922	1001	1024		54	24	until	1454	1526	1558	1628	1658	1733	1803	1833	1854

23 WARRINGTON - CINNAMON BROW VIA PADGATE
23A WARRINGTON - CINNAMON BROW VIA PADGATE - ORANGE GROVE

MONDAY TO FRIDAY [excluding Public Holidays]

	23	23	23	23	23A	23	23A		23	23A		23	23A	23	23	23	23	23	23
Warrington, Interchange [13]	0655	0728	0805	0838	0910	0937	1006		40	06		1440	1506	1540	1610	1645	1715	1745	1810
Padgate Stores	0706	0740	0817	0850	0922	0949	1018		52	18		1452	1520	1554	1624	1659	1729	1759	1822
Insall Road, Valiant Close	0712	0746	0823	0856	0928	0955	1024	and	58	24	mins	1458	1526	1600	1630	1705	1735	1805	1828
Orange Grove, Avery Close	|	|	|	|	0932	|	1028	then	|	28	past	|	1530	|	|	|	|	|	|
Cinnamon Lane North	0715	0749	0826	0859	0935	0958	1031	at	01	31	each	1501	1533	1603	1633	1708	1738	1808	1831
Cinnamon Brow, Millhouse Rdbt	0716	0750	0827	0900	0936	0959	1032	every	02	32	hour	1502	1534	1604	1634	1709	1739	1809	1832
Enfield Park Rd, Stirrup Cl	0718	0752	0829	0902	0938	1001	1034		04	34	until	1504	1536	1606	1636	1711	1741	1811	1834

23 CINNAMON BROW - WARRINGTON
23A ORANGE GROVE - CINNAMON BROW - WARRINGTON VIA PADGATE

SATURDAY

	23	23	23	23A		23	23A		23	23A	23	23	23	23	23	23
Orange Grove, Avery Close	-	-	-	0928		-	28		-	1528	-	-	-	-	-	-
Cinnamon Lane North	0802	0831	0901	0931		01	31		1501	1531	1557	1627	1657	1727	1756	1824
Cinnamon Brow, Millhouse Rdbt	0803	0832	0902	0932	and	02	32	mins	1502	1532	1558	1628	1658	1728	1757	1825
Enfield Park Rd, Stirrup Cl	0805	0834	0904	0934	then	04	34	past	1504	1534	1600	1630	1700	1730	1759	1827
Insall Road, Valiant Close	0808	0837	0907	0937	at	07	37	each	1507	1537	1603	1633	1703	1733	1802	1830
Padgate Stores	0813	0843	0913	0943	every	13	43	hour	1513	1543	1609	1639	1709	1739	1807	1835
Warrington, Interchange	0824	0854	0924	0954		24	54	until	1524	1554	1620	1650	1720	1750	1817	1845

23 WARRINGTON - CINNAMON BROW VIA PADGATE
23A WARRINGTON - CINNAMON BROW VIA PADGATE - ORANGE GROVE

SATURDAY

	23	23	23	23A		23	23A		23	23A	23	23	23	23	23	23
Warrington, Interchange [13]	0743	0810	0840	0906		40	06		1440	1506	1536	1606	1636	1706	1735	1805
Padgate Stores	0754	0822	0852	0918		52	18		1452	1518	1548	1618	1648	1718	1747	1816
Insall Road, Valiant Close	0759	0828	0858	0924	and	58	24	mins	1458	1524	1554	1624	1654	1724	1753	1821
Orange Grove, Avery Close	|	|	|	0928	then	|	28	past	|	1528	|	|	|	|	|	|
Cinnamon Lane North	0802	0831	0901	0931	at	01	31	each	1501	1531	1557	1627	1657	1727	1756	1824
Cinnamon Brow, Millhouse Rdbt	0803	0832	0902	0932	these	02	32	hour	1502	1532	1558	1628	1658	1728	1757	1825
Enfield Park Rd, Stirrup Cl	0805	0834	0904	0934		04	34	until	1504	1534	1600	1630	1700	1730	1759	1827

26E CINNAMON BROW - WARRINGTON VIA WINWICK ROAD
27E CINNAMON BROW - WARRINGTON VIA ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

	27E	27E	26E	27E	26E	27E	26E	27E	26E
Cinnamon Brow, Millhouse Rdbt	1911	1941	2010	2041	2110	2143	2213	2243	2313
Enfield Park Rd, Stirrup Cl	1913	1943	2012	2043	2112	2145	2215	2245	2315
Insall Road, Valiant Close	1915	1945	|	2045	|	2147	|	2247	|
Greenwood Crescent, Merrick Cl	|	|	2013	|	2113	|	2216	|	2316
Statham Avenue, Kirkstone Av	|	|	2016	|	2116	|	2219	|	2319
Winwick Road, Collegiate Inst	|	|	2018	|	2118	|	2221	|	2321
Orford Park Centre	|	|	2019	|	2119	|	2222	|	2322
O'Leary Street	1919	1949	|	2049	|	2151	|	2251	-
Warrington, Interchange	1926	1956	2027	2056	2127	2156	2228	2256	-

26E WARRINGTON - CINNAMON BROW VIA WINWICK ROAD
27E WARRINGTON - CINNAMON BROW VIA ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

					@@		@@		@@
	27E	26E	27E	26E	27E	26E	27E	26E	27E
Warrington, Interchange	1854	1923	1954	2023	2054	2127	2159	2227	2259
Orford Park Centre	|	1929	|	2029	|	2133	|	2233	|
Winwick Road, Collegiate Inst	|	1930	|	2030	|	2134	|	2234	|
O'Leary Street	1901	|	2001	|	2101	|	2206	|	2306
Insall Rd, Valiant Cl	1906	|	2006	|	2106	|	2210	|	2310
Statham Avenue, Kirkstone Av	|	1933	|	2033	|	2136	|	2236	|
Greenwood Crescent, Merrick Cl	|	1937	|	2038	|	2140	|	2240	|
Cinnamon Brow, Millhouse Rdbt	1911	1941	2010	2041	2110	2143	2213	2243	2313

@@ Does NOT operate via Rylands Street or Academy Way.

26E CINNAMON BROW - WARRINGTON VIA WINWICK ROAD
27E CINNAMON BROW - WARRINGTON VIA ORFORD

SATURDAY

	27E	27E	26E	27E	26E	27E	26E	27E	26E
Cinnamon Brow, Millhouse Rdbt	1911	1941	2010	2041	2110	2143	2213	2243	2313
Enfield Park Rd, Stirrup Cl	1913	1943	2012	2043	2112	2145	2215	2245	2315
Insall Road, Valiant Close	1915	1945	|	2045	|	2147	|	2247	|
Greenwood Crescent, Merrick Cl	|	|	2013	|	2113	|	2216	|	2316
Statham Avenue, Kirkstone Av	|	|	2016	|	2116	|	2219	|	2319
O'Leary Street	1919	1949	|	2049	|	2151	|	2251	|
Winwick Road, Collegiate Inst	|	|	2018	|	2118	|	2221	|	2321
Orford Park Centre	|	|	2019	|	|	|	|	|	|
Warrington, Interchange	1926	1956	2027	2056	2126	2156	2227	2256	-

26E WARRINGTON - CINNAMON BROW VIA WINWICK ROAD
27E WARRINGTON - CINNAMON BROW VIA ORFORD

SATURDAY

					@@		@@		@@
	27E	26E	27E	26E	27E	26E	27E	26E	27E
Warrington, Interchange [14]	1854	1923	1954	2023	2054	2129	2159	2229	2259
Orford Park Centre	|	1929	|	|	|	|	|	|	|
Winwick Road, Collegiate Inst	|	1930	|	2028	|	2134	|	2234	|
O'Leary Street	1901	|	2001	|	2101	|	2206	|	2306
Statham Avenue, Kirkstone Av	|	1933	|	2031	|	2136	|	2236	|
Greenwood Crescent, Merrick Cl	|	1937	|	2036	|	2140	|	2240	|
Insall Rd, Valiant Cl	1906	|	2006	|	2106	|	2210	|	2310
Cinnamon Brow, Millhouse Rdbt	1911	1941	2010	2041	2110	2143	2213	2243	2313

26 GORSE COVERT – WARRINGTON VIA BIRCHWOOD – LOCKING STUMPS – CINNAMON BROW – ORFORD
27 GORSE COVERT – WARRINGTON VIA BIRCHWOOD – LOCKING STUMPS – FEARNHEAD – ORFORD

SUNDAY & PUBLIC HOLIDAYS

	27	26	27	26	27	26	27	26	27	26
Gorse Covert, Spar Store	0908	1026	1124	1226	1324	1426	1524	1626	1724	1826
Oakwood, Keyes Close	0914	1032	1130	1232	1330	1432	1530	1632	1730	1832
Birchwood, Railway Station	0919	1037	1135	1237	1335	1437	1535	1637	1735	1837
Birchwood Centre	0920	1038	1136	1238	1336	1438	1536	1638	1736	1838
Heathfield House	0925	1043	1141	1243	1341	1443	1541	1643	1741	1843
Locking Stumps, Copperfield Cl	0928	1046	1144	1246	1344	1446	1544	1646	1744	1846
Crab Lane, Uni of Chester	0932	1050	1148	1250	1348	1450	1548	1650	1748	1850
Enfield Park Rd, Shetland Cl	|	1053	|	1253	|	1453	|	1653	|	1853
Greenwood Crescent, Merrick Cl	|	1055	|	1255	|	1455	|	1655	|	1855
Enfield Park Rd, Stirrup Cl	0934	|	1150	|	1350	|	1550	|	1750	|
Insall Road, Valiant Close	0937	|	1153	|	1353	|	1553	|	1753	|
Statham Avenue, Kirkstone Av	0942	1058	1158	1258	1358	1458	1558	1658	1758	1858
O'Leary Street	0948	1104	1204	1304	1404	1504	1604	1704	1804	1904
Warrington, Interchange	0954	1110	1210	1310	1410	1510	1610	1710	1810	1910

26 WARRINGTON – GORSE COVERT VIA ORFORD – CINNAMON BROW – LOCKING STUMPS – BIRCHWOOD
27 WARRINGTON – GORSE COVERT VIA ORFORD – FEARNHEAD – LOCKING STUMPS – BIRCHWOOD

SUNDAY & PUBLIC HOLIDAYS

	26	27	26	27	26	27	26	27	26	27
Warrington, Interchange [14]	0825	0941	1041	1141	1241	1341	1441	1541	1641	1741
O'Leary Street	0833	0949	1049	1149	1249	1349	1449	1549	1649	1749
Statham Avenue, Kirkstone Av	0839	0955	1055	1155	1255	1355	1455	1555	1655	1755
Greenwood Crescent, Merrick Cl	0842	|	1058	|	1258	|	1458	|	1658	|
Enfield Park Rd, Shetland Cl	0844	|	1100	|	1300	|	1500	|	1700	|
Insall Road, Valiant Close	|	1000	|	1200	|	1400	|	1600	|	1800
Enfield Park Rd, Stirrup Cl	|	1003	|	1203	|	1403	|	1603	|	1803
Crab Lane, Uni of Chester	0847	1005	1103	1205	1303	1405	1503	1605	1703	1805
Locking Stumps, Copperfield Cl	0851	1009	1107	1209	1307	1409	1507	1609	1707	1809
Heathfield House	0854	1012	1110	1212	1310	1412	1510	1612	1710	1812
Birchwood Centre	0859	1017	1115	1217	1315	1417	1515	1617	1715	1817
Birchwood, Railway Station	0901	1019	1117	1219	1317	1419	1517	1619	1717	1819
Oakwood, Keyes Close	0905	1023	1121	1223	1321	1423	1521	1623	1721	1823
Gorse Covert, Spar Store	0908	1026	1124	1226	1324	1426	1524	1626	1724	1826

25A CINNAMON BROW – WARRINGTON VIA ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

Cinnamon Brow, Millhouse Rdbt	0525	0625
Enfield Park Road, Stirrup Cl	0527	0627
Greenwood Crescent, Merrick Cl	0529	0629
Statham Avenue, Kirkstone Av	0531	0631
O'Leary Street	0536	0636
Warrington, Interchange	0542	0642

25A WARRINGTON – CINNAMON BROW VIA ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

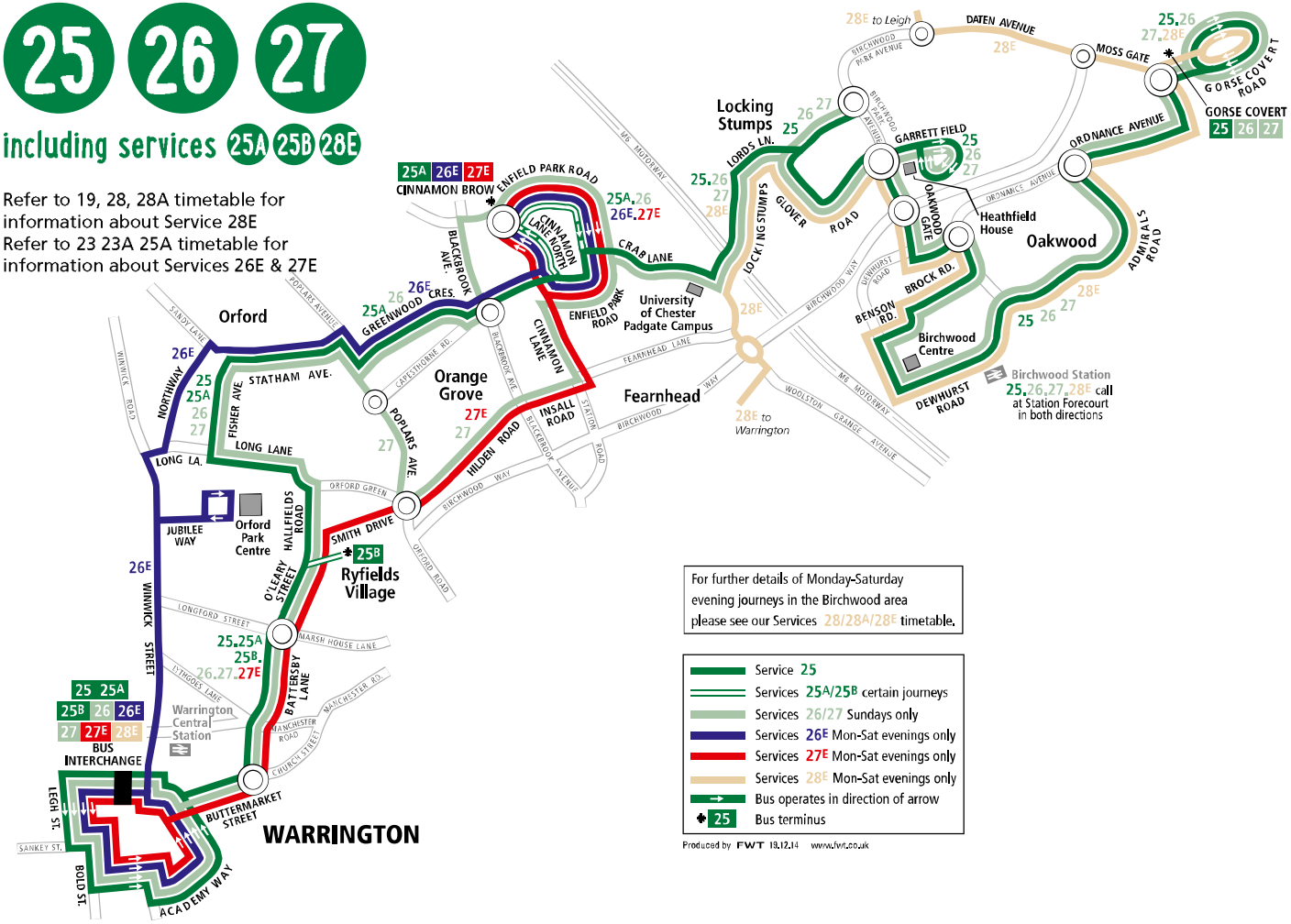
	D	
Warrington, Interchange [14]	-	0607
Wilderspool, St James Church	0509	|
O'Leary Street	0514	0614
Statham Avenue, Kirkstone Avenue	0520	0620
Greenwood Crescent, Merrick Close	0522	0622
Cinnamon Lane North	0524	0624
Cinnamon Brow, Enfield Pk Rd, Shetland Cl	0525	0625

D **From Wilderspool, St James Church (at 0509) via Warrington Bridge and Mersey Street to Fennel Street.**

25 26 27

including services 25A 25B 28E

Refer to 19, 28, 28A timetable for information about Service 28E
Refer to 23 23A 25A timetable for information about Services 26E & 27E



For further details of Monday-Saturday evening journeys in the Birchwood area please see our Services 28/28A/28E timetable.

- Service 25
- Services 25A/25B certain journeys
- Services 26/27 Sundays only
- Services 26E Mon-Sat evenings only
- Services 27E Mon-Sat evenings only
- Services 28E Mon-Sat evenings only
- Bus operates in direction of arrow
- 25 Bus terminus

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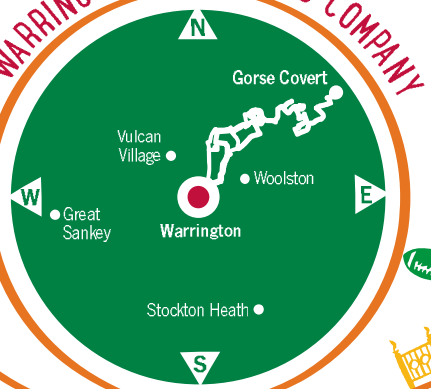
WARRINGTON'S LOCAL BUS COMPANY



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warrington's local bus company

25 26 27

including services 25A 25B 28E

- GORSE COVERT
- BIRCHWOOD
- FEARNHEAD
- GREENWOOD CRESCENT
- HILDEN ROAD
- WARRINGTON

Bus times

Map

from 26 January 2015

networkwarrington
warrington's local bus company

Edition 6 – 26.01.15

25 GORSE COVERT – WARRINGTON VIA BIRCHWOOD – LOCKING STUMPS – ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

Gorse Covert, Spar Store	0629	0646	0707	0723	0739	0759	0817	0844	0914	0944		14	44		1414	1444	1520	1550	1617
Gorse Covert, Ashdown Lane	0631	0648	0709	0725	0741	0801	0819	0846	0916	0946		16	46		1416	1446	1522	1552	1619
Oakwood, Keyes Close	0635	0652	0713	0729	0745	0805	0824	0851	0920	0950		20	50		1420	1450	1527	1556	1623
Birchwood, Railway Station	0639	0657	0717	0733	0750	0810	0830	0856	0924	0954		24	54		1424	1454	1532	1601	1628
Birchwood Centre	0640	0658	0718	0734	0751	0811	0831	0857	0925	0955		25	55		1425	1455	1533	1602	1629
Heathfield House	0646	0704	0724	0741	0758	0818	0838	0904	0932	1002		32	02		1432	1502	1542	1610	1636
Glover Road, Turf & Feather	0647	0705	0725	0742	0759	0819	0839	0905	0933	1003	and	33	03	min-	1433	1503	1543	1611	1637
Locking Stumps, Copperfield Cl	0650	0708	0728	0745	0803	0823	0843	0908	0936	1006	then	36	06	utes	1436	1506	1547	1615	1640
Crab Lane, Uni of Chester	0653	0711	0731	0748	0807	0827	0847	0912	0940	1009	at	39	09	past	1440	1510	1551	1619	1644
Enfield Park Rd, Stirrup Cl	0655	0713	0733	0750	0809	0829	0849	0914	0942	1011	these	41	11	each	1442	1512	1553	1621	1646
Greenwood Crescent, Merrick Cl	0657	0715	0735	0753	0812	0832	0852	0916	0944	1013		43	13	hour	1444	1515	1556	1624	1648
Statham Avenue, Kirkstone Av	0701	0719	0739	0757	0817	0837	0857	0920	0948	1017		47	17	until	1448	1519	1601	1628	1652
O'Leary Street	0706	0725	0745	0805	0825	0845	0905	0926	0954	1023		53	23		1454	1525	1609	1635	1659
Warrington, Scotland Road	0713	0733	0753	0813	0833	0853	0913	0933	1001	1029		59	29		1500	1532	1617	1643	1707
Warrington, Interchange	0715	0735	0755	0815	0835	0855	0915	0935	1003	1031		01	31		1502	1534	1619	1645	1709

Gorse Covert, Spar Store	1647	1723	1743	1800	1820	1836	1901	1931
Gorse Covert, Ashdown Lane	1649	1725	1745	1802	1822	1838	1903	1933
Oakwood, Keyes Close	1653	1729	1749	1806	1825	1841	1906	1936
Birchwood, Railway Station	1658	1734	1754	1810	1829	1844	1909	1939
Birchwood Centre	1659	1735	1755	1811	1830	1845	1910	1940
Heathfield House	1706	1742	1802	1818	1836	1851	1916	1946
Glover Road, Turf & Feather	1707	1743	1803	1819	1837	1852	1917	1947
Locking Stumps, Copperfield Cl	1710	1746	1806	1822	1840	1855	1920	1950
Crab Lane, Uni of Chester	1714	1750	1809	1825	1843	1858	1923	1953
Enfield Park Rd, Stirrup Cl	1716	1752	1811	1827	1845	1900	1925	1955
Greenwood Crescent, Merrick Cl	1718	1754	1813	1829	1847	1902	1927	1957
Statham Avenue, Kirkstone Av	1722	1758	1817	1833	1850	1905	1930	2000
O'Leary Street	1730	1806	1824	1838	1855	1910	1935	2005
Warrington, Scotland Road	1738	1813	1831	1844	1900	1915	1940	2010
Warrington, Interchange	1740	1815	1833	1846	1902	1917	1942	2012

25 WARRINGTON – GORSE COVERT VIA ORFORD – LOCKING STUMPS – BIRCHWOOD

MONDAY TO FRIDAY [excluding Public Holidays]

Warrington, Interchange	0545	0621	0638	0652	0709	0722	0745	0819	0855	0925		55	25		1355	1420	1450	1520	1550
Warrington, Academy Way	0546	0622	0639	0653	0710	0724	0747	0821	0857	0927		57	27		1357	1422	1452	1522	1552
O'Leary Street	0553	0629	0646	0700	0718	0732	0755	0829	0905	0935		05	35		1405	1430	1500	1531	1601
Statham Avenue, Kirkstone Av	0558	0634	0651	0705	0723	0738	0802	0836	0911	0941		11	41		1411	1436	1506	1537	1607
Greenwood Crescent, Merrick Cl	0602	0638	0655	0709	0727	0743	0807	0841	0915	0945		15	45	min-	1415	1441	1511	1542	1612
Enfield Park Rd, Stirrup Cl	0603	0639	0657	0711	0729	0745	0809	0843	0917	0947	and	17	47	utes	1417	1443	1513	1544	1614
Crab Lane, Uni of Chester	0605	0641	0659	0713	0731	0748	0812	0846	0919	0949	then	19	49	past	1419	1446	1516	1547	1617
Locking Stumps, Copperfield Cl	0609	0645	0703	0717	0735	0753	0817	0851	0923	0953	at	23	53	each	1423	1450	1520	1551	1621
Glover Road, Turf & Feather	0611	0647	0705	0719	0737	0755	0819	0853	0925	0955	these	25	55	hour	1425	1452	1522	1553	1623
Heathfield House	0612	0648	0706	0720	0738	0756	0820	0854	0926	0956		26	56	until	1426	1453	1523	1554	1624
Birchwood Centre	0617	0653	0712	0726	0744	0803	0827	0901	0932	1002		32	02		1432	1503	1533	1601	1631
Birchwood, Railway Station	0618	0654	0713	0727	0746	0805	0829	0903	0934	1004		34	04		1434	1505	1535	1604	1634
Oakwood, Keyes Close	0621	0657	0716	0730	0750	0809	0833	0907	0937	1007		37	07		1437	1509	1539	1608	1638
Gorse Covert, Spar Store	0625	0701	0720	0734	0754	0813	0837	0911	0941	1011		41	11		1441	1514	1544	1612	1642

Warrington, Interchange	1625	1645	1705	1725	1745	1815	1845
Warrington, Academy Way	1627	1647	1707	1727	1747	1817	1847
O'Leary Street	1636	1656	1717	1737	1756	1824	1854
Statham Avenue, Kirkstone Av	1642	1702	1723	1743	1802	1830	1900
Greenwood Crescent, Merrick Cl	1647	1707	1728	1748	1806	1833	1903
Enfield Park Rd, Stirrup Cl	1649	1709	1730	1750	1808	1835	1905
Crab Lane, Uni of Chester	1652	1712	1732	1752	1810	1837	1907
Locking Stumps, Copperfield Cl	1656	1717	1736	1756	1814	1841	1911
Glover Road, Turf & Feather	1658	1719	1738	1758	1816	1843	1913
Heathfield House	1659	1720	1739	1759	1817	1844	1914
Birchwood Centre	1706	1727	1746	1806	1823	1850	1920
Birchwood, Railway Station	1709	1730	1748	1808	1824	1851	1921
Oakwood, Keyes Close	1713	1734	1752	1812	1827	1854	1924
Gorse Covert, Spar Store	1717	1738	1756	1816	1831	1858	1928

25 GORSE COVERT – WARRINGTON VIA BIRCHWOOD – LOCKING STUMPS – ORFORD

SATURDAY

Gorse Covert, Spar Store	0719	0749	0814	0844		14	44		1714	1744	1814	1842	1912
Gorse Covert, Ashdown Lane	0721	0751	0816	0846		16	46		1716	1746	1816	1844	1914
Oakwood, Keyes Close	0724	0754	0820	0850		20	50		1720	1749	1819	1847	1917
Birchwood, Railway Station	0728	0758	0824	0854		24	54		1724	1753	1823	1850	1920
Birchwood Centre	0729	0759	0825	0855	and	25	55	min-	1725	1754	1824	1851	1921
Heathfield House	0735	0805	0832	0902	then	32	02	utes	1732	1800	1830	1857	1927
Glover Road, Turf & Feather	0736	0806	0833	0903	at	33	03	past	1733	1801	1831	1858	1928
Locking Stumps, Copperfield Cl	0739	0809	0836	0906	these	36	06	each	1736	1804	1834	1901	1931
Crab Lane, Uni of Chester	0742	0812	0839	0909		39	09	hour	1739	1807	1837	1904	1934
Enfield Park Rd, Stirrup Cl	0744	0814	0841	0911		41	11	until	1741	1809	1839	1906	1936
Greenwood Crescent, Merrick Cl	0746	0816	0843	0913		43	13		1743	1811	1841	1908	1938
Statham Avenue, Kirkstone Av	0749	0819	0847	0917		47	17		1747	1814	1844	1911	1941
O'Leary Street	0754	0824	0853	0923		53	23		1753	1819	1849	1916	1946
Warrington, Scotland Road	0759	0829	0859	0929		59	29		1759	1824	1854	1919	1951
Warrington, Interchange	0801	0831	0901	0931		01	31		1801	1826	1856	1921	1953

25 WARRINGTON – GORSE COVERT VIA ORFORD – LOCKING STUMPS – BIRCHWOOD

SATURDAY

Warrington, Interchange [14]	0634	0704	0729	0755	0825	0855		25	55		1725	1755	1825
Warrington, Academy Way	0636	0706	0731	0757	0827	0857		27	57		1727	1757	1827
O'Leary Street	0642	0712	0737	0805	0835	0905		35	05		1735	1803	1833
Statham Avenue, Kirkstone Av	0648	0718	0743	0811	0841	0911		41	11		1741	1809	1839
Greenwood Crescent, Merrick Cl	0651	0721	0746	0815	0845	0915		45	15	min-	1745	1812	1842
Enfield Park Rd, Stirrup Cl	0653	0723	0748	0817	0847	0917	and	47	17	utes	1747	1814	1844
Crab Lane, Uni of Chester	0655	0725	0750	0819	0849	0919	then	49	19	past	1749	1816	1846
Locking Stumps, Copperfield Cl	0659	0729	0754	0823	0853	0923	at	53	23	each	1753	1820	1850
Glover Road, Turf & Feather	0701	0731	0756	0825	0855	0925	these	55	25	hour	1755	1822	1852
Heathfield House	0702	0732	0757	0826	0856	0926		56	26	until	1756	1823	1853
Birchwood Centre	0707	0737	0802	0832	0902	0932		02	32		1802	1829	1859
Birchwood, Railway Station	0708	0738	0804	0834	0904	0934		04	34		1804	1830	1900
Oakwood, Keyes Close	0711	0741	0807	0837	0907	0937		07	37		1807	1833	1903
Gorse Covert, Spar Store	0715	0745	0811	0841	0911	0941		11	41		1811	1837	1907

25A CINNAMON BROW – WARRINGTON VIA ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

Cinnamon Brow, Millhouse Rdbt	0525	0625
Enfield Park Road, Stirrup Cl	0527	0627
Greenwood Crescent, Merrick Cl	0529	0629
Statham Avenue, Kirkstone Av	0531	0631
O'Leary Street	0536	0636
Warrington, Scotland Road	0540	0640
Warrington, Interchange	0542	0642

25A WARRINGTON – CINNAMON BROW VIA ORFORD

MONDAY TO FRIDAY [excluding Public Holidays]

	D	
Warrington, Interchange [14]	-	0607
Warrington, Academy Way	-	0609
Wilderspool, St James Church	0509	|
O'Leary Street	0514	0614
Statham Avenue, Kirkstone Av	0520	0620
Greenwood Crescent, Merrick Cl	0522	0622
Cinnamon Lane North	0524	0624
Cinnamon Brow, Millhouse Rdbt	0525	0625

D From Wilderspool, St James Church (at 0509) via Warrington Bridge and Mersey Street to Fennel Street.

25B RYFIELDS VILLAGE – WARRINGTON

MONDAY TO FRIDAY [excluding Public Holidays]

Ryfields Village	0940
O'Leary Street	0942
Warrington, Scotland Road	0946
Warrington, Interchange	0948

25B WARRINGTON – RYFIELDS VILLAGE

MONDAY TO FRIDAY [excluding Public Holidays]

Warrington, Interchange [14]	1150
Warrington, Academy Way	1152
O'Leary Street	1158
Ryfields Village	1200

26 GORSE COVERT – WARRINGTON VIA BIRCHWOOD – LOCKING STUMPS – CINNAMON BROW – ORFORD
27 GORSE COVERT – WARRINGTON VIA BIRCHWOOD – LOCKING STUMPS – FEARNHEAD – ORFORD

SUNDAY & PUBLIC HOLIDAYS

	27	26	27	26	27	26	27	26	27	26
Gorse Covert, Spar Store	0908	1026	1124	1226	1324	1426	1524	1626	1724	1826
Gorse Covert, Ashdown Lane	0911	1029	1127	1229	1327	1429	1527	1629	1727	1829
Oakwood, Keyes Close	0914	1032	1130	1232	1330	1432	1530	1632	1730	1832
Birchwood, Railway Station	0919	1037	1135	1237	1335	1437	1535	1637	1735	1837
Birchwood Centre	0920	1038	1136	1238	1336	1438	1536	1638	1736	1838
Heathfield House	0925	1043	1141	1243	1341	1443	1541	1643	1741	1843
Glover Road, Turf & Feather	0926	1044	1142	1244	1342	1444	1542	1644	1742	1844
Locking Stumps, Copperfield Cl	0928	1046	1144	1246	1344	1446	1544	1646	1744	1846
Crab Lane, Uni of Chester	0932	1050	1148	1250	1348	1450	1548	1650	1748	1850
Enfield Park Rd, Shetland Cl	|	1053	|	1253	|	1453	|	1653	|	1853
Greenwood Crescent, Merrick Cl	|	1055	|	1255	|	1455	|	1655	|	1855
Enfield Park Rd, Stirrup Cl	0934	|	1150	|	1350	|	1550	|	1750	|
Insall Road, Valiant Close	0937	|	1153	|	1353	|	1553	|	1753	|
Statham Avenue, Kirkstone Av	0942	1058	1158	1258	1358	1458	1558	1658	1758	1858
O'Leary Street	0948	1104	1204	1304	1404	1504	1604	1704	1804	1904
Warrington, Scotland Road	0952	1108	1208	1308	1408	1508	1608	1708	1808	1908
Warrington, Interchange	0954	1110	1210	1310	1410	1510	1610	1710	1810	1910

26 WARRINGTON – GORSE COVERT VIA ORFORD – CINNAMON BROW – LOCKING STUMPS – BIRCHWOOD
27 WARRINGTON – GORSE COVERT VIA ORFORD – FEARNHEAD – LOCKING STUMPS – BIRCHWOOD

SUNDAY & PUBLIC HOLIDAYS

	26	27	26	27	26	27	26	27	26	27
Warrington, Interchange [14]	0825	0941	1041	1141	1241	1341	1441	1541	1641	1741
Warrington, Academy Way	0827	0943	1043	1143	1243	1343	1443	1543	1643	1743
O'Leary Street	0833	0949	1049	1149	1249	1349	1449	1549	1649	1749
Statham Avenue, Kirkstone Av	0839	0955	1055	1155	1255	1355	1455	1555	1655	1755
Greenwood Crescent, Merrick Cl	0842	|	1058	|	1258	|	1458	|	1658	|
Enfield Park Rd, Shetland Cl	0844	|	1100	|	1300	|	1500	|	1700	|
Insall Road, Valiant Close	|	1000	|	1200	|	1400	|	1600	|	1800
Enfield Park Rd, Stirrup Cl	|	1003	|	1203	|	1403	|	1603	|	1803
Crab Lane, Uni of Chester	0847	1005	1103	1205	1303	1405	1503	1605	1703	1805
Locking Stumps, Copperfield Cl	0851	1009	1107	1209	1307	1409	1507	1609	1707	1809
Glover Road, Turf & Feather	0853	1011	1109	1211	1309	1411	1509	1611	1709	1811
Heathfield House	0854	1012	1110	1212	1310	1412	1510	1612	1710	1812
Birchwood Centre	0859	1017	1115	1217	1315	1417	1515	1617	1715	1817
Birchwood, Railway Station	0901	1019	1117	1219	1317	1419	1517	1619	1717	1819
Oakwood, Keyes Close	0905	1023	1121	1223	1321	1423	1521	1623	1721	1823
Gorse Covert, Spar Store	0908	1026	1124	1226	1324	1426	1524	1626	1724	1826

28E LEIGH – WARRINGTON VIA GORSE COVERT & BIRCHWOOD

MONDAY TO FRIDAY [excluding Public Holidays]

Leigh, Bus Station [B]	1900	2000	2100	2200	2300
Culcheth, Library (dep)	1913	2013	2113	2213	2313
Risley, H.M. Prison	1917	2017	2117	2217	2317
Gorse Covert, Spar Store	1922	2022	2122	2222	2322
Gorse Covert, Ashdown Lane	1924	2024	2124	2224	2324
Oakwood, Keyes Close	1927	2027	2127	2227	2327
Birchwood, Railway Station	1931	2031	2131	2231	2331
Birchwood Centre	1933	2033	2133	2233	2333
Glover Road, Turf & Feather	1938	2038	2138	2238	2338
Crab Lane, Locking Stumps Lane	1941	2041	2141	2241	2341
Longbarn, Blackburne Close	1944	2044	2144	2244	2344
Warrington, Interchange	1956	2056	2156	2256	|
Wilderspool, St James Church	-	-	-	-	2354

28E WARRINGTON – LEIGH VIA BIRCHWOOD & GORSE COVERT

MONDAY TO FRIDAY [excluding Public Holidays]

			NRA	NRA	NRA
Warrington, Interchange [13]	1900	2000	2100	2200	2300
Longbarn, Blackburne Close	1914	2014	2114	2214	2314
Crab Lane, Locking Stumps Lane	1916	2016	2116	2216	2316
Glover Road, Turf & Feather	1919	2019	2119	2219	2319
Birchwood Centre	1924	2024	2124	2224	2324
Birchwood, Railway Station	1926	2026	2126	2226	2326
Oakwood, Keyes Close	1929	2029	2129	2229	2329
Gorse Covert, Spar Store	1932	2032	2132	2232	2332
Gorse Covert, Ashdown Lane	1934	2034	2134	2234	2334
Risley, H.M. Prison	1939	2039	2139	2239	-
Culcheth, Library (arr)	1943	2043	2143	2243	-
Leigh, Bus Station	1956	2056	2156	2256	-

For more details of Service 28E, please see the leaflet for Services 19, 28, 28A

28E LEIGH – WARRINGTON VIA GORSE COVERT & BIRCHWOOD

SATURDAY

Leigh, Bus Station [B]	1900	2000	2100	2200	2300
Culcheth, Library (dep)	1913	2013	2113	2213	2313
Risley, H.M. Prison	1917	2017	2117	2217	2317
Gorse Covert, Spar Store	1922	2022	2122	2222	2322
Gorse Covert, Ashdown Lane	1924	2024	2124	2224	2324
Oakwood, Keyes Close	1927	2027	2127	2227	2327
Birchwood, Railway Station	1931	2031	2131	2231	2331
Birchwood Centre	1933	2033	2133	2233	2333
Glover Road, Turf & Feather	1938	2038	2138	2238	2338
Crab Lane, Locking Stumps Lane	1941	2041	2141	2241	2341
Longbarn, Blackburne Close	1944	2044	2144	2244	2344
Warrington, Interchange	1956	2056	2156	2256	|
Wilderspool, St James Church	-	-	-	-	2354

NRA Does NOT operate via Rylands Street or Academy Way.

28E WARRINGTON – LEIGH VIA BIRCHWOOD & GORSE COVERT

SATURDAY

			NRA	NRA	NRA
Warrington, Interchange [13]	1900	2000	2100	2200	2300
Longbarn, Blackburne Close	1914	2014	2114	2214	2314
Crab Lane, Locking Stumps Lane	1916	2016	2116	2216	2316
Glover Road, Turf & Feather	1919	2019	2119	2219	2319
Birchwood Centre	1924	2024	2124	2224	2324
Birchwood, Railway Station	1926	2026	2126	2226	2326
Oakwood, Keyes Close	1929	2029	2129	2229	2329
Gorse Covert, Spar Store	1932	2032	2132	2232	2332
Gorse Covert, Ashdown Lane	1934	2034	2134	2234	2334
Risley, H.M. Prison	1939	2039	2139	2239	-
Culcheth, Library (arr)	1943	2043	2143	2243	-
Leigh, Bus Station	1956	2056	2156	2256	-

Appendix E Model Scoping Report

Technical Note

AECOM

Project:	**Peel Hall Development Site, Warrington**	Job No:	**60487959**
Subject:	**Model Scoping Report**		
Prepared by:	**Catherine Zoeftig / Alistair Johnson**	Date:	**1st April 2016**
Checked & Approved by:	**Grigoria Argyropoulou / Frank Mohan**	Date:	**1st April 2016**

1. Introduction

A package of models is required to support the planning application for the Peel Hall development site in Warrington. This Technical Note has been prepared to inform all parties concerned in this project, of the decisions made, concerning the scope and depth of the network model analysis. The note will consider, in particular, the appropriateness of the tool selected, to assess the impact of this particular development site, upon the surrounding highway network. The aim of this note is to ensure communication between all parties, as well as transparency concerning the approach taken, as a record that can be held throughout the life of the project.

This note is intended for distribution among the following individuals / organisations:

SATNAM Development Group
Colin Griffiths

Highgate Transportation
Fiona Bennett
David Tighe

Warrington Borough Council
Alan Dickin
Richard Flood
Michelle Zenner

2. Consideration of the Appropriate Modelling Package / Tool

a. VISSIM

VISSIM is a commonly used package for microscopic traffic simulation, and allows exact simulation of traffic patterns, and displays all road users, and their interactions, in one motion model. Links and connectors are implemented to provide flexible input of model geometries, with any level of complexity. Driver and vehicle characteristics can be applied individually. In addition route choice within VISSIM can be further calibrated utilising the cost and surcharge facilities which directly influences driver decisions within the model.

Interfaces can provide seamless integration, with other systems for signal controllers, traffic management or emissions models. It has also been considered appropriate for this project, given its abilities to provide detailed results, coupled with 3D animation, as required, to present to both members of the public and key decision makers, within the local authority.

There is an existing VISSIM model available for Junction 9 of the M62, which was original developed by AECOM, on behalf of Highways England, and in agreement with both Highways England and Warrington Borough Council (WBC). The existing model covers most of the network required to be

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assessed for the purpose of the planning application for Peel Hall, and can be easily extended to cover the rest of the required network.

b. SATURN

SATURN is a detailed highway traffic assignment suite, however it is considered more suitable to strategic county or district wide studies, as well as detailed city models. It does have facilities for matrix manipulation, and demand estimation, from counts. SATURN can be used in several different roles including:

- As a conventional assignment model for regional or national models;
- As a pure junction simulation model to support the detailed design process;
- or more usually, as a combined simulation, and assignment model for the analysis of either large or small network changes, such as the introduction of one-way streets, changes to junction controls, bus-only streets, etc. and whose evaluation requires a detailed analysis of traffic behaviour at junctions.

Whilst SATURN provides a detailed traffic assignment suite, it is considered that it is more suited to more strategic studies, and that the outputs provided from the results, are in a format which is not necessarily conducive to our anticipated audience.

c. Dynameq

Dynameq provides a mesoscopic approach to modelling, providing both traffic simulation and dynamic traffic assignment, which can be used in evaluating congestion, relief strategies, corridor and lane management, construction mitigation, transit design, traffic impact studies, emissions modelling, and event planning. Both route choice and traffic patterns can be run under congested conditions.

As a mesoscopic tool, the level of detail is between that of a microscopic (e.g. VISSIM) and a macroscopic (e.g. SATURN) model. Queuing and blocking back is represented but the visualisation of queue lengths is not as detailed as microsimulation and it is not possible, for example, to see queue lengths by lane to the same detail.

The modelling is particularly targeted at larger networks and so it does not deal with the situation when the front of the queue dissipates first.

Summary

Based on the above synopsis of the various modelling tools available, it has been concluded that, given the network characteristics, availability of an existing model, the ability to calibrate / limit route choice to avoid a "grid locked" network scenario were appropriate, VISSIM is the most suitable tool, to model this network in, and obtain an appropriate assessment of the impacts of the development, upon the highway network.

3. VISSIM Model

a. Model Scenarios

The existing M62 J9 Model (Originally developed by AECOM for Highways England) will be extended, in accordance with the attached plan, and as agreed with WBC.

The following suite of model scenarios, (10 models), will be prepared. The AM and PM peak periods will be aligned with the existing M62 Junction 9 model, which has flows for 07:00 to 09:30 (Data recorded 08:00 to 09:00) and 16:00 to 18:30 (Data recorded 17:00 to 18:00):

1) Base Models (AM & PM) (2015)

2) Do Minimum (AM & PM) (Opening Year tbc) – 'full' build out of proposed development, internal network, and planned access arrangements, no mitigation works.

3) Do Minimum (AM & PM) (Design Year tbc) - As above (without mitigation), plus ten years. These models will be presented at a workshop, where mitigation will be agreed. The agreed mitigation requirements will then be tested (as the Do Something models).

4) Do Something (AM & PM) (Opening Year tbc) – 'full' build out of proposed development, internal network, and planned access arrangements. Mitigation included.

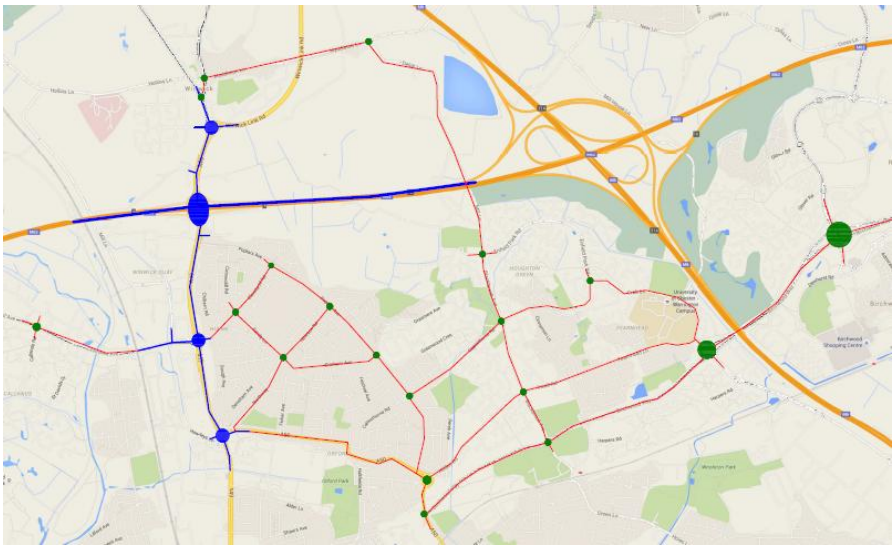
5) Do Something (AM & PM) (Design Year tbc) – As above, (including agreed mitigation), plus ten years.
All above models will be developed using a consistent version of VISSIM.

The models will be run multiple times in order to achieve route-decision convergence, and with random seeds 5, 10, 15, 20 and 25.
Given the size of the network within the model, traffic flows will be applied incrementally in order to achieve optimum route-decision convergence.
All lane coding / assignments at the junction intersections will be checked for appropriate driver behaviour.

b. Model Area

The area of the model that will be covered within this analysis is indicated within the figure following:

Figure 1 – Peel Hall Development VISSIM model area



c. Model Validation

To ensure the robustness of the base model, validation will be completed for the periods 08:00 to 09:00 and 17:00 to 18:00. The models will be appropriately checked against the required DMRB

Criteria, in terms of traffic flows, and journey time criteria (GEH statistic test, flow differences, journey times). This information will be presented within the Model Development Report.
Maximum and average queue length data will be collected and tabulated, and a model development report will be prepared, which will describe the development of the model, and validation.

4. Traffic Data

a. Count Data

It has been agreed that all count data required, to develop the models, will be provided by Highgate Transportation. Appropriate liaison will be undertaken with Highgate, to ensure that all required links, and junctions are covered, in order to satisfy the extent of the model, as indicated within the above figure.

There was limited ANPR data available from WBC, however data for both the A49 and Crab Lane, has now been extracted, this information will be used to supplement / validate the wider data sets.

Journey time data will be extracted from the Traffic Master database. A sub-user agreement has been signed, between WBC and AECOM, to extract Warrington' Traffic Master data using the BaseMap platform. Journey time route data will be extracted for average week day peak hour periods of 0800-0900 and 1700-1800s for the neutral month of May 2015 ($12^{th} – 14^{th}$).

The count data does not provide any information on trip patterns (origins and destinations (OD)) so another source is needed for this. Although it is older than maybe considered ideal, we would propose asking WBC to use the Warrington Multi Modal Transport Model (WMMTM) as a source of this OD data. If they are in agreement, then we would produce a cordon model covering our area of interest. We would then refine the zone system and add additional links so as to match the detail required within the VISSIM model. Matrix estimation techniques would then be run within VISUM using the turning counts you have provided to obtain a best estimate of trip patterns and volumes. This process will be undertaken both for the AM & PM. The trip matrices would then be passed from VISUM to VISSIM. As part of this process, there are likely to be some differences in the level of congestion and routings, as is always the case when taking demand matrices from a strategic model to a micro-sim model. The VISSIM model would therefore need to be calibrated accordingly using the count data, as before, supplemented by the journey time data from Traffic Master. If WBC is not content with the use for the WMMTM to provide an initial estimate of trip patterns, then a bespoke gravity model would need to be developed.

b. Development and Committed Development Traffic Data

Highgate will provide trip generations, for the following development mix, subsequent to completion of the final masterplan option:

- 7500 m sq. employment;
- 1200 houses;
- 100 bed care home;
- 2,000 sq. m foodstore;
- 600 sq. m local centre (small shops, healthcare, pharmacy);
- 1600 sq. m family restaurant; and

- 2 form entry primary school.

Highgate transport are responsible for defining the development traffic which should be forecast using the industry standard TRICS database, using the same parameters, as applied in the Trip Generation assessment, undertaken for the nearby OMEGA development.
The model will need to include traffic associated to local, committed developments, within the relevant modelling scenarios. Highgate Transportation would be responsible for confirming these with Mike Davies (WBC Planning). AECOM will be responsible for applying them to the assessments accordingly.

c. Traffic Growth.

Traffic growth will be applied to the assessments in accordance with the methodology applied to the assessments undertaken for the nearby OMEGA development. It is possible that the traffic 'growth' forecasts applied, to the future models, will initially result in exponential congestion, which will cause the models to lock-up. The growth forecasts may therefore need to be re-visited using an alternate tool. Highgate Transportation will hold discussions with WBC regarding appropriate traffic growth factors, and calculations.

5. Signal Specifications

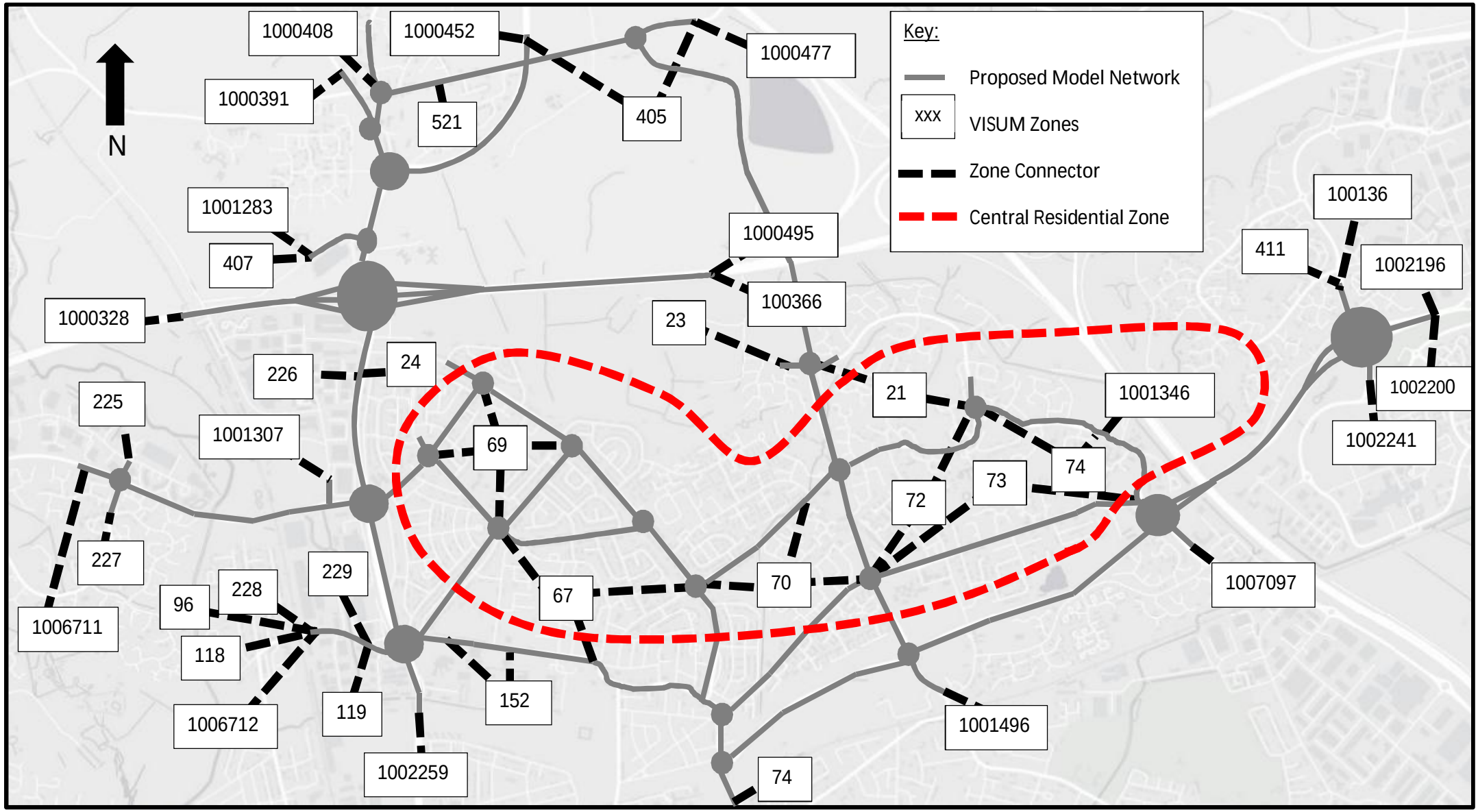
Highgate Transportation is responsible for obtaining the required signal specifications from WBC. The following junctions require signal information to support the model development:

- A574 Cromwell Avenue / Calver Road
- A49 / Cromwell Avenue / Sandy Lane West including the Pedestrians crossing to the south of the junction
- Delph Lane / A49 Newton Road
- A49 Newton Road / Winwick Park Avenue / Winwick Link Road
- A49 Winwick Road / Hawleys Lane / A50
- A50 Orford Green / Hallfields Road
- A50 Orford Road / Birchwood Way
- Hilden Road / Insall Road / Blackbrook Avenue

Summary and Conclusion

This note sets out how the existing M62 J9 VISSIM model (Originally developed by AECOM for Highways England), will be extended, to include the area illustrated in Figure 1. The model will be used to assess the impacts, and any mitigation requirements, resulting from the proposed Peel Hall residential led development. It also provides a critique of the modelling tools available, and considers why VISSIM has been selected as the most appropriate tool for this assessment. This note will be distributed, to all concerned parties, (including the developer Satnam, the developers consultant Highgate Transportation, and the Local Authority WBC), in order to provide transparency over the above approach. The aim of this approach is to capture any subsequent comments, at an early stage in the modelling process, in order to avoid any abortive work being undertaken.

Appendix F WMMTM VISUM Model Zone Structure



Appendix F – WMMTM VISUM Zone Structure

AECOM

Appendix G Calibration Outputs

Peel Hall

Am Peak Calibration

Time Period 0800 - 0900

Turn Counts
Calbration Statistics

GEH	Cars	LGV	HGV
<5	171	177	194
<5	85%	88%	97%
<10	197	201	201
<10	98%	100%	100%
>10	4	0	0
>10	2%	0%	0%
<20	201	201	201
>20	100%	100%	100%

Turn Counts

Junction	Road	Movement	Model				Observed				Difference				Percentage Difference				GEH		
			Cars	LGV	HGV	All Traffic	Cars	LGV	HGV	All Traffic	Cars	LGV	HGV	All Traffic	Cars	LGV	HGV	All Traffic	Cars	LGV	HGV
Southworth Lane / Delph Lane / Myddleton Lane	Southworth Lane	Left to Delph Lane	108	2	0	110	80	4	1	85	28	-2	-1	25	0.35	-0.50	-1.00	0.29	2.86	1.16	1.42
	Southworth Lane	W/B to Myddleton Lane	110	20	1	131	142	14	6	163	-32	6	-5	-32	-0.23	0.42	-0.83	-0.19	2.89	1.44	2.68
	Delph Lane	Left to Myddleton Lane	182	0	0	182	177	19	5	201	5	-19	-5	-19	0.03	-1.00	-1.00	-0.09	0.41	6.17	3.17
	Delph Lane	W/B to Myddleton Lane	29	0	0	29	58	3	0	61	-29	-3	0	-32	-0.50	-1.00	0.00	-0.53	4.42	2.45	0.00
	Myddleton Lane	E/B to Southworth Lane	322	39	8	369	335	17	7	359	-13	22	1	10	-0.04	1.29	0.14	0.03	0.72	4.15	0.36
	Myddleton Lane	Right to Delph Lane	264	20	2	286	328	29	5	362	-64	-9	-3	-76	-0.20	-0.31	-0.60	-0.21	3.72	1.84	1.61
Newton Road / A49 / Winwick Park Avenue	Newton Road	Left to A49 (East)	99	18	0	117	148	22	10	181	-49	-4	-10	-64	-0.33	-0.18	-1.00	-0.35	4.45	0.91	4.48
	Newton Road	S/B to A49 (South)	468	88	14	570	570	70	28	668	-102	18	-14	-98	-0.18	0.25	-0.50	-0.15	4.47	2.00	3.07
	Newton Road	Right to Winwick Park Avenue	26	0	0	26	25	5	0	30	1	-5	0	-4	0.04	-1.00	0.00	-0.14	0.18	3.17	0.00
	A49 (East)	Left to A49 (South)	458	96	48	602	446	107	53	607	12	-11	-5	-5	0.03	-0.11	-0.10	-0.01	0.54	1.12	0.73
	A49 (East)	W/B to Winwick Park Avenue	4	0	0	4	3	1	0	4	1	-1	0	0	0.33	-1.00	0.00	0.00	0.53	1.42	0.00
	A49 (East)	Right to Newton Road	63	0	0	63	75	9	3	87	-12	-9	-3	-24	-0.16	-1.00	-1.00	-0.28	1.47	4.25	2.45
	A49 (East)	U Turns	0	0	0	0	2	1	1	4	-2	-1	-1	-4	-1.00	-1.00	-1.00	-1.00	2.00	1.42	1.42
	A49 (South)	Left to Winwick Park Avenue	14	0	0	14	18	4	2	24	-4	-4	-2	-10	-0.22	-1.00	-1.00	-0.42	1.01	2.83	2.00
	A49 (South)	N/B to Newton Road	420	78	14	512	417	80	32	530	3	-2	-18	-18	0.01	-0.03	-0.56	-0.03	0.13	0.25	3.77
	A49 (South)	Right to A49 (East)	421	99	62	582	428	93	65	587	-7	6	-3	-5	-0.02	0.06	-0.05	-0.01	0.36	0.58	0.40
	Winwick Park Avenue	Left to Newton Road	91	0	0	91	70	2	1	73	21	-2	-1	18	0.30	-1.00	-1.00	0.24	2.31	2.00	1.42
	Winwick Park Avenue	E/B to A49 (East)	41	0	0	41	29	0	0	29	12	0	0	12	0.41	0.00	0.00	0.41	2.01	0.00	0.00
	Winwick Park Avenue	Right to A49 (South)	64	0	0	64	47	0	0	47	17	0	0	17	0.36	0.00	0.00	0.36	2.26	0.00	0.00
A49 / Delph Lane	A49 (North)	S/B to A49 (South)	946	180	62	1188	996	163	76	1235	-50	17	-14	-47	-0.05	0.11	-0.19	-0.04	1.61	1.34	1.71
	A49 (North)	Right to Delph Lane	47	4	0	51	67	15	5	87	-20	-11	-5	-36	-0.30	-0.73	-1.00	-0.42	2.67	3.58	3.17
	A49 (South)	Left to Delph Lane	169	46	0	215	130	41	3	175	39	5	-3	40	0.30	0.12	-1.00	0.23	3.15	0.74	2.45
	A49 (South)	N/B to A49 (North)	818	177	77	1072	802	143	97	1042	16	34	-20	30	0.02	0.23	-0.21	0.03	0.58	2.65	2.18
	Delph Lane	Left to A49 (North)	38	0	0	38	62	34	2	98	-24	-34	-2	-60	-0.39	-1.00	-1.00	-0.61	3.42	8.26	2.00
	Delph Lane	Right to A49 (South)	136	28	0	164	108	59	6	174	28	-31	-6	-10	0.26	-0.53	-1.00	-0.06	2.50	4.72	3.47
A49 / Birch Avenue	A49 (North)	Left to Birch Avenue	20	4	0	24	15	5	0	20	5	-1	0	4	0.33	-0.20	0.00	0.20	1.18	0.48	0.00
	A49 (North)	S/B to A49 (South)	1387	275	104	1766	1483	192	115	1790	-96	83	-11	-24	-0.06	0.44	-0.10	-0.01	2.53	5.46	1.09
	Birch Avenue	Left to A49 (South)	15	4	0	19	19	4	0	23	-4	0	0	-4	-0.21	0.00	0.00	-0.18	0.98	0.01	0.00
A49 / Sandy Lane West / A574	A49 (North)	Left to Sandy Lane West	83	10	2	95	153	25	3	182	-70	-15	-1	-87	-0.46	-0.60	-0.34	-0.48	6.48	3.60	0.64
	A49 (North)	S/B to A49 (South)	1017	207	79	1303	1086	144	92	1323	-69	63	-13	-20	-0.06	0.43	-0.14	-0.02	2.14	4.72	1.44
	A49 (North)	Right to A574	237	45	18	300	262	31	20	313	-25	14	-2	-13	-0.09	0.45	-0.10	-0.04	1.57	2.25	0.47
	Sandy Lane West	Left to A49 (South)	37	6	3	46	45	8	2	55	-8	-2	1	-9	-0.18	-0.25	0.50	-0.17	1.27	0.76	0.63
	Sandy Lane West	W/B to A574	166	11	3	180	192	16	2	210	-26	-5	1	-30	-0.13	-0.31	0.50	-0.14	1.91	1.37	0.63
	Sandy Lane West	Right to A49 (North)	98	2	5	105	160	24	5	189	-62	-22	0	-84	-0.39	-0.92	0.00	-0.44	5.42	6.11	0.01
	A49 (South)	Left to A574	229	50	10	289	339	38	20	397	-110	12	-10	-108	-0.32	0.31	-0.50	-0.27	6.53	1.79	2.60
	A49 (South)	N/B to A49 (North)	452	158	125	735	454	122	94	671	-2	36	31	64	-0.01	0.29	0.33	0.10	0.11	3.01	2.93
	A49 (South)	Right to Sandy Lane West	21	3	1	25	42	7	3	52	-21	-4	-2	-27	-0.50	-0.57	-0.67	-0.52	3.76	1.80	1.42
	A574	Left to A49 (North)	247	93	44	384	244	32	52	328	3	61	-8	56	0.01	1.90	-0.16	0.17	0.21	7.70	1.18
	A574	E/B to Sandy Lane West	218	10	0	228	230	23	2	255	-12	-13	-2	-27	-0.05	-0.57	-1.00	-0.11	0.78	3.21	2.00
	A574	Right to A49 (South)	445	67	7	519	493	52	28	573	-48	15	-21	-54	-0.10	0.28	-0.75	-0.09	2.20	1.92	5.03
	A574	U Turns	38	8	8	54	37	8	4	49	1	0	4	5	0.02	0.00	0.99	0.10	0.14	0.01	1.63
Cotswold Road / Cleveland Road / Sandy Lane / Sandy Lane West	Cotswold Road	Left to Cleveland Road	33	0	0	33	4	1	0	5	29	-1	0	28	7.22	-1.00	0.00	5.58	6.74	1.42	0.00
	Cotswold Road	S/B to Sandy Lane	36	0	2	38	49	5	5	59	-13	-5	-3	-21	-0.27	-1.00	-0.60	-0.36	2.02	3.17	1.61
	Cotswold Road	Right to Sandy Lane West	40	2	1	43	37	4	1	42	3	-2	0	1	0.08	-0.50	0.00	0.02	0.46	1.16	0.00
	Cleveland Road	Left to Sandy Lane	2	0	0	2	21	3	1	25	-19	-3	-1	-23	-0.91	-1.00	-1.00	-0.92	5.61	2.45	1.42
	Cleveland Road	W/B to Sandy Lane West	141	8	9	158	138	15	3	156	3	-7	6	2	0.02	-0.47	1.99	0.01	0.22	2.08	2.44
	Cleveland Road	Right to Cotswold Road	2	0	0	2	3	0	0	3	-1	0	0	-1	-0.34	0.00	0.00	-0.34	0.64	0.00	0.00
	Sandy Lane	Left to Sandy Lane West	106	5	2	113	107	15	2	124	-1	-10	0	-11	-0.01	-0.67	0.00	-0.09	0.13	3.17	0.00
	Sandy Lane	N/B to Cotswold Road	3	0	0	3	25	3	4	32	-22	-3	-4	-29	-0.88	-1.00	-1.00	-0.91	5.89	2.45	2.83
	Sandy Lane	Right to Cleveland Road	5	0	0	5	3	1	2	6	2	-1	-2	-1	0.66	-1.00	-1.00	-0.17	0.99	1.42	2.00
	Sandy Lane West	Left to Cotswold Road	13	0	1	14	28	1	0	29	-15	-1	1	-15	-0.54	-1.00	0.00	-0.52	3.33	1.42	1.41
	Sandy Lane West	E/B to Cleveland Road	184	15	2	201	154	21	2	178	30	-6	0	23	0.19	-0.29	0.00	0.13	2.27	1.43	0.00
	Sandy Lane West	Right to Sandy Lane	96	6	0	102	136	24	3	164	-40	-18	-3	-62	-0.30	-0.75	-1.00	-0.38	3.75	4.66	2.45
Poplars Avenue / Cleveland Road	Poplars Avenue (East)	Left to Cleveland Road	121	3	7	131	137	13	3	153	-16	-10	4	-22	-0.12	-0.77	1.33	-0.15	1.45	3.55	1.78
	Poplars Avenue (East)	W/B to Poplars Avenue (West)	20	0	0	20	28	5	4	37	-8	-5	-4	-17	-0.29	-1.00	-1.00	-0.46	1.65	3.17	2.83
	Cleveland Road	Left to Poplars Avenue (West)	0	0	0	0	2	1	1	4	-2	-1	-1	-4	-1.00	-1.00	-1.00	-1.00	2.00	1.42	1.42
	Cleveland Road	Right to Poplars Avenue (East)	185	15	2	202	196	19	2	217	-11	-4	0	-15	-0.05	-0.21	0.00	-0.07	0.77	0.98	0.00
	Poplars Avenue (West)	E/B to Poplars Avenue (East)	35	0	0	35	47	3	5	55	-12	-3	-5	-20	-0.26	-1.00	-1.00	-0.37	1.90	2.45	3.17
	Poplars Avenue (West)	Right to Cleveland Road	7	0	1	8	8	0	1	9	-1	0	0	-1	-0.13	0.00	0.00	-0.11	0.37	0.00	0.00
Poplars Avenue / Howson Road	Poplars Avenue (East)	Left to Howson Road	105	16	8	129	40	10	3	53	65	6	5	76	1.62	0.59	1.66	1.43	7.62	1.65	2.13
	Poplars Avenue (East)	W/B to Poplars Avenue (West)	133	3	6	142	124	19	4	147	9	-16	2	-5	0.07	-0.84	0.50	-0.04	0.76	4.84	0.89
	Howson Road	Left to Poplars Avenue (West)	8	0	0	8	24	4	0	28	-16	-4	0	-20	-0.67	-1.00	0.00	-0.72	4.01	2.83	0.00
	Howson Road	Right to Poplars Avenue (East)	86	10	0	96	48	11	0	59	38	-1	0	37	0.79	-0.09	0.00	0.62	4.62	0.32	0.00
	Poplars Avenue (West)	E/B to Poplars Avenue (East)	213	15	2	230	257	27	9	293	-44	-12	-7	-63	-0.17	-0.45	-0.78	-0.21	2.86	2.63	2.99
	Poplars Avenue (West)	Right to Howson Road	5	0	0	5	52	6	0	58	-47	-6	0	-53	-0.90	-1.00	0.00	-0.91	8.82	3.47	0.00
Mill Lane / Enfield Park Road / Blackbrook Avenue / Ballater Drive	Mill Lane	Left to Enfield Park Road	139	0	0	139	164	10	0	174	-25	-10	0	-35	-0.15	-1.00	0.00	-0.20	1.99	4.48	0.00
	Mill Lane	S/B to Blackbrook Avenue	282	30	2	314	287	37	4	328	-5	-7	-2	-14	-0.02	-0.19	-0.50	-0.04	0.29	1.23	1.16
	Mill Lane	Right to Ballater Drive	0	0	0	0	2	0	0	2	-2	0	0	-2	-1.00	0.00	0.00	-1.00	2.00	0.00	0.00
	Enfield Park Road	Left to Blackbrook Avenue	72	10	0	82	88	5	0	93	-16	5	0	-11	-0.18	0.99	0.00	-0.12	1.82	1.82	0.00
	Enfield Park Road	W/B to Ballater Drive	5	0	0	5	7	2	0	9	-2	-2	0	-4	-0.29	-1.00	0.00	-0.45	0.82	2.00	0.00
	Enfield Park Road	Right to Mill Lane	65	0	0	65	78	4	1	83	-13	-4	-1	-18	-0.17	-1.00	-1.00	-0.22	1.57	2.83	1.42
	Enfield Park Road	U Turns	0	0	0	0	0	0	5	5	0	0	-5	-5	0.00	0.00	-1.00	-1.00	0.00	0.00	3.17
	Blackbrook Avenue	Left to Ballater Drive	8	0	0	8	9	4	1	14	-1	-4	-1	-6	-0.11	-1.00	-1.00	-0.43	0.35	2.83	1.42
	Blackbrook Avenue	N/B to Mill Lane	104	0	0	104	151	20	5	177	-47	-20	-5	-73	-0.31	-1.00	-1.00	-0.41	4.20	6.33	3.17
	Blackbrook Avenue	Right to Enfield Park Road	24	0	0	24	20	3	1	24	4	-3	-1	0	0.20	-1.00	-1.00	0.00	0.84	2.45	1.42
	Ballater Drive	Left to Mill Lane	44	0	0	44	22	4	0	26	22	-4	0	18	0.99	-1.00	0.00	0.69	3.82	2.83	0.00
	Ballater Drive	E/B to Enfield Park Road	20	0	0	20	22	0	0	22	-2	0	0	-2	-0.09	0.00	0.00	-0.09	0.45	0.00	0.00
	Ballater Drive	Right to Blackbrook Avenue	25	0	0	25	26	3	0	29	-1	-3	0	-4	-0.04	-1.00	0.00	-0.14	0.21	2.45	0.00
Blackbrook Avenue / Enfield Park Road / Capesthorne Road	Blackbrook Avenue (North)	Left to Enfield Park Road	40	16	0	56	18	2	1	21	22	14	-1	35	1.22	6.97	-1.00	1.66	4.07	4.66	1.42
	Blackbrook Avenue (North)	S/B to Blackbrook Avenue (South)	230	17	2	249	244	29	3	276	-14	-12	-1	-27	-0.06	-0.42	-0.34	-0.10	0.89	2.52	0.64
	Blackbrook Avenue (North)	Right to Capesthorne Road	106	7	0	113	139	14	0	153	-33	-7	0	-40	-0.24	-0.50	0.00	-0.26	3.02	2.17	0.00
	Enfield Park Road	Left to Blackbrook Avenue (South)	78	9	0	87	124	8	1	133	-46	1	-1	-46	-0.37	0.12	-1.00	-0.35	4.61	0.33	1.42
	Enfield Park Road	W/B to Capesthorne Road	166	4	0	170	188	16	7	211	-22	-12	-7	-41	-0.12	-0.75	-1.00	-0.19	1.62	3.81	3.75
	Enfield Park Road	Right to Blackbrook Avenue (North)	12	0	0	12	28	3	1	32	-16	-3	-1	-20	-0.57	-1.00	-1.00	-0.63	3.59	2.45	1.42
	Blackbrook Avenue (South)	Left to Capesthorne Road	111	8	2	121	82	12	1	95	29	-4	1	26	0.35	-0.34	0.99	0.27	2.92	1.28	0.81
	Blackbrook Avenue (South)	N/B to Blackbrook Avenue (North)	105	0	0	105	102	22	4	128	3	-22	-4	-23	0.03	-1.00	-1.00	-0.18	0.26	6.64	2.83
	Blackbrook Avenue (South)	Right to Enfield Park Road	0	0	0	0	77	7	1	85	-77	-7	-1	-85	-1.00	-1.00	-1.00	-1.00	12.43	3.75	1.42
	Capesthorne Road	Left to Blackbrook Avenue (North)	19	0	0	19	49	2	2	53	-30	-2	-2	-34	-0.61	-1.00	-1.00	-0.64	5.14	2.00	2.00
	Capesthorne Road	E/B to Enfield Park Road	256	18	0	274	254	22	4	280	2	-4	-4	-6	0.01	-0.18	-1.00	-0.02	0.14	0.91	2.83
	Capesthorne Road	Right to Blackbrook Avenue (South)	70	12	0	82	82	10	2	94	-12	2	-2	-12	-0.15	0.20	-1.00	-0.13	1.41	0.59	2.00

Poplars Avenue / Capesthorne Road	Poplars Avenue (North)	Left to Capesthorne Road (East)	80	13	0	93	57	3	1	61	23	10	-1	32	0.40	3.32	-1.00	0.52	2.76	3.53	1.42
	Poplars Avenue (North)	S/B to Poplars Avenue (South)	136	16	2	154	154	9	1	165	-18	7	1	-11	-0.12	0.77	0.99	-0.06	1.53	1.97	0.81
	Poplars Avenue (North)	Right to Capesthorne Road (West)	25	0	0	25	50	2	0	52	-25	-2	0	-27	-0.50	-1.00	0.00	-0.52	4.10	2.00	0.00
	Capesthorne Road (East)	Left to Poplars Avenue (South)	78	11	0	89	42	7	1	50	36	4	-1	39	0.85	0.57	-1.00	0.77	4.63	1.33	1.42
	Capesthorne Road (East)	W/B to Capesthorne Road (West)	123	0	0	123	185	21	8	214	-62	-21	-8	-91	-0.34	-1.00	-1.00	-0.43	5.00	6.49	4.01
	Capesthorne Road (East)	Right to Poplars Avenue (North)	86	6	2	94	32	1	0	33	54	5	2	61	1.68	4.98	0.00	1.84	7.01	2.67	2.00
	Poplars Avenue (South)	Left to Capesthorne Road (West)	12	0	0	12	12	0	1	13	0	0	-1	-1	0.00	0.00	-1.00	-0.08	0.01	0.00	1.42
	Poplars Avenue (South)	N/B to Poplars Avenue (North)	83	8	7	98	45	6	2	53	38	2	5	45	0.84	0.33	2.49	0.84	4.73	0.75	2.35
	Poplars Avenue (South)	Right to Capesthorne Road (East)	66	10	0	76	43	2	1	46	23	8	-1	30	0.53	3.98	-1.00	0.65	3.10	3.26	1.42
	Capesthorne Road (West)	Left to Poplars Avenue (North)	13	0	0	13	20	5	0	25	-7	-5	0	-12	-0.35	-1.00	0.00	-0.48	1.74	3.17	0.00
	Capesthorne Road (West)	E/B to Capesthorne Road (East)	173	0	0	173	221	26	7	254	-48	-26	-7	-81	-0.22	-1.00	-1.00	-0.32	3.40	7.22	3.75
	Capesthorne Road (West)	Right to Poplars Avenue (South)	83	2	0	85	95	7	3	105	-12	-5	-3	-20	-0.13	-0.72	-1.00	-0.19	1.30	2.36	2.45
A49 / Long Lane / Hawleys Lane	A49 (North)	Left to Long Lane	162	34	2	198	146	23	8	178	16	11	-6	20	0.11	0.47	-0.75	0.12	1.25	2.05	2.69
	A49 (North)	S/B to A49 (South)	1194	246	72	1512	1290	148	94	1533	-96	98	-22	-21	-0.07	0.66	-0.24	-0.01	2.73	6.94	2.45
	A49 (North)	Right to Hawleys Lane	141	0	18	159	181	33	20	234	-40	-33	-2	-75	-0.22	-1.00	-0.10	-0.32	3.12	8.14	0.47
	Long Lane	Left to A49 (South)	411	23	12	446	345	29	14	388	66	-6	-2	58	0.19	-0.21	-0.15	0.15	3.39	1.19	0.57
	Long Lane	W/B to Hawleys Lane	135	0	0	135	124	20	6	150	11	-20	-6	-15	0.09	-1.00	-1.00	-0.10	0.93	6.33	3.47
	Long Lane	Right to A49 (North)	109	7	12	128	159	23	8	190	-50	-16	4	-62	-0.31	-0.70	0.50	-0.32	4.28	4.15	1.26
	A49 (South)	Left to Hawleys Lane	35	4	0	39	40	22	13	75	-5	-18	-13	-36	-0.13	-0.82	-1.00	-0.48	0.84	5.00	5.11
	A49 (South)	N/B to A49 (North)	444	162	98	704	512	106	77	695	-68	56	21	9	-0.13	0.52	0.27	0.01	3.09	4.81	2.22
	A49 (South)	Right to Long Lane	207	15	1	223	179	22	13	214	28	-7	-12	9	0.16	-0.32	-0.92	0.04	2.05	1.64	4.54
	Hawleys Lane	Left to A49 (North)	146	39	23	208	156	38	30	225	-10	1	-7	-17	-0.07	0.02	-0.24	-0.07	0.85	0.14	1.38
	Hawleys Lane	E/B to Long Lane	33	2	0	35	73	20	4	97	-40	-18	-4	-62	-0.55	-0.90	-1.00	-0.64	5.52	5.44	2.83
	Hawleys Lane	Right to A49 (South)	56	14	0	70	25	11	11	47	31	3	-11	23	1.23	0.27	-1.00	0.48	4.86	0.84	4.70
Blackbrook Avenue / Insall Road / Hilden Road	Blackbrook Avenue (North)	Left to Insall Road	4	0	0	4	42	5	0	47	-38	-5	0	-43	-0.91	-1.00	0.00	-0.92	7.94	3.17	0.00
	Blackbrook Avenue (North)	S/B to Blackbrook Avenue (South)	364	35	2	401	326	38	6	370	38	-3	-4	31	0.12	-0.08	-0.67	0.08	2.04	0.52	2.01
	Blackbrook Avenue (North)	Right to Hilden Road	10	1	0	11	77	6	0	83	-67	-5	0	-72	-0.87	-0.83	0.00	-0.87	10.18	2.68	0.00
	Insall Road	Left to Blackbrook Avenue (South)	72	10	0	82	128	8	5	141	-56	2	-5	-59	-0.44	0.25	-1.00	-0.42	5.63	0.66	3.17
	Insall Road	W/B to Hilden Road	92	2	0	94	106	9	4	119	-14	-7	-4	-25	-0.13	-0.78	-1.00	-0.21	1.44	2.99	2.83
	Insall Road	Right to Blackbrook Avenue (North)	6	0	0	6	20	4	1	25	-14	-4	-1	-19	-0.70	-1.00	-1.00	-0.76	3.90	2.83	1.42
	Blackbrook Avenue (South)	Left to Hilden Road	53	10	0	63	29	7	1	37	24	3	-1	26	0.82	0.42	-1.00	0.70	3.73	1.02	1.42
	Blackbrook Avenue (South)	N/B to Blackbrook Avenue (North)	123	13	2	138	188	30	3	221	-65	-17	-1	-83	-0.34	-0.57	-0.34	-0.37	5.18	3.68	0.64
	Blackbrook Avenue (South)	Right to Insall Road	66	0	0	66	110	6	4	120	-44	-6	-4	-54	-0.40	-1.00	-1.00	-0.45	4.72	3.47	2.83
	Hilden Road	Left to Blackbrook Avenue (North)	12	0	0	12	56	7	3	66	-44	-7	-3	-54	-0.79	-1.00	-1.00	-0.82	7.57	3.75	2.45
	Hilden Road	E/B to Insall Road	109	0	0	109	138	15	9	163	-29	-15	-9	-54	-0.21	-1.00	-1.00	-0.33	2.65	5.49	4.25
	Hilden Road	Right to Blackbrook Avenue (South)	43	4	0	47	42	6	2	50	1	-2	-2	-3	0.02	-0.34	-1.00	-0.06	0.13	0.90	2.00
A50 / Hilden Road / Orford Road / Smith Drive	A50	Left to Hilden Road	32	0	0	32	111	10	5	126	-79	-10	-5	-94	-0.71	-1.00	-1.00	-0.75	9.37	4.48	3.17
	A50	S/B to Orford Road	527	62	3	592	444	56	8	509	83	6	-5	83	0.19	0.10	-0.63	0.16	3.75	0.76	2.14
	A50	Right to Smith Drive	132	0	0	132	81	14	6	101	51	-14	-6	31	0.62	-1.00	-1.00	0.30	4.91	5.30	3.47
	Hilden Road	Left to Orford Road	24	4	0	28	45	6	5	56	-21	-2	-5	-28	-0.47	-0.34	-1.00	-0.50	3.60	0.90	3.17
	Hilden Road	W/B to Smith Drive	70	0	0	70	93	7	2	102	-23	-7	-2	-32	-0.25	-1.00	-1.00	-0.32	2.58	3.75	2.00
	Hilden Road	Right to A50	33	0	0	33	126	9	0	135	-93	-9	0	-102	-0.74	-1.00	0.00	-0.76	10.46	4.25	0.00
	Orford Road	Left to Smith Drive	48	0	0	48	22	3	1	26	26	-3	-1	22	1.17	-1.00	-1.00	0.84	4.38	2.45	1.42
	Orford Road	N/B to A50	581	42	10	633	413	41	13	467	168	1	-3	166	0.41	0.02	-0.23	0.35	7.52	0.13	0.90
	Orford Road	Right to Hilden Road	20	0	0	20	68	6	8	82	-48	-6	-8	-62	-0.71	-1.00	-1.00	-0.76	7.26	3.47	4.01
	Smith Drive	Left to A50	54	0	0	54	54	12	4	70	0	-12	-4	-16	0.00	-1.00	-1.00	-0.23	0.02	4.91	2.83
	Smith Drive	E/B to Hilden Road	102	0	0	102	94	8	0	102	8	-8	0	0	0.08	-1.00	0.00	0.00	0.78	4.01	0.00
	Smith Drive	Right to Orford Road	20	0	0	20	59	8	0	67	-39	-8	0	-47	-0.66	-1.00	0.00	-0.70	6.23	4.01	0.00
Blackbrook Avenue / A574	Blackbrook Avenue (North)	Left to A574 (East)	43	10	0	53	22	3	1	26	21	7	-1	27	0.95	2.32	-1.00	1.03	3.67	2.74	1.42
	Blackbrook Avenue (North)	S/B to Blackbrook Avenue (South)	379	28	2	409	397	41	10	448	-18	-13	-8	-39	-0.05	-0.32	-0.80	-0.09	0.93	2.23	3.27
	Blackbrook Avenue (North)	Right to A574 (West)	46	9	0	55	77	8	2	87	-31	1	-2	-32	-0.40	0.12	-1.00	-0.37	3.98	0.33	2.00
	A574 (East)	Left to Blackbrook Avenue (South)	215	39	5	259	128	12	7	147	87	27	-2	112	0.67	2.24	-0.29	0.76	6.61	5.34	0.82
	A574 (East)	W/B to A574 (West)	336	33	2	371	332	37	12	381	4	-4	-10	-10	0.01	-0.11	-0.83	-0.03	0.22	0.70	3.79
	A574 (East)	Right to Blackbrook Avenue (North)	39	16	0	55	21	3	2	26	18	13	-2	29	0.85	4.32	-1.00	1.11	3.27	4.21	2.00
	Blackbrook Avenue (South)	Left to A574 (West)	130	1	2	133	155	13	0	169	-25	-12	2	-36	-0.16	-0.92	0.00	-0.21	2.13	4.54	2.00
	Blackbrook Avenue (South)	N/B to Blackbrook Avenue (North)	187	8	2	197	279	36	4	319	-92	-28	-2	-122	-0.33	-0.78	-0.50	-0.38	6.02	5.99	1.16
	Blackbrook Avenue (South)	Right to A574 (East)	259	16	4	279	201	16	6	223	58	0	-2	56	0.29	0.00	-0.34	0.25	3.85	0.01	0.90
	A574 (West)	Left to Blackbrook Avenue (North)	16	0	0	16	27	4	2	33	-11	-4	-2	-17	-0.41	-1.00	-1.00	-0.52	2.39	2.83	2.00
	A574 (West)	E/B to A574 (East)	411	33	4	448	442	32	14	489	-31	1	-10	-41	-0.07	0.03	-0.72	-0.08	1.52	0.16	3.34
	A574 (West)	Right to Blackbrook Avenue (South)	113	5	3	121	164	19	2	185	-51	-14	1	-64	-0.31	-0.74	0.50	-0.34	4.30	4.05	0.63
A50 / A574	A50 (North)	Left to A574	257	13	3	273	321	33	5	359	-64	-20	-2	-86	-0.20	-0.61	-0.40	-0.24	3.77	4.19	1.01
	A50 (North)	S/B to A50 (South)	315	53	1	369	276	41	11	328	39	12	-10	41	0.14	0.29	-0.91	0.12	2.28	1.73	4.09
	A574	Left to A50 (South)	184	34	2	220	149	29	18	197	35	5	-16	23	0.23	0.17	-0.89	0.12	2.67	0.87	5.07
	A574	Right to A50 (North)	321	8	2	331	330	28	3	361	-9	-20	-1	-30	-0.03	-0.72	-0.34	-0.08	0.50	4.73	0.64
	A50 (South)	N/B to A50 (North)	326	34	8	368	302	39	19	360	24	-5	-11	8	0.08	-0.13	-0.58	0.02	1.36	0.85	3.01
	A50 (South)	Right to A574	283	26	4	313	312	24	11	347	-29	2	-7	-34	-0.09	0.08	-0.64	-0.10	1.68	0.38	2.57
Crab Lane / A574 / Woolston Grange Avenue	Crab Lane	Left to A574 (East)	137	24	0	161	187	28	8	223	-50	-4	-8	-62	-0.27	-0.15	-1.00	-0.28	3.90	0.80	4.01
	Crab Lane	S/B to Woolston Grange Avenue	142	9	0	151	172	22	3	197	-30	-13	-3	-46	-0.17	-0.59	-1.00	-0.23	2.36	3.32	2.45
	Crab Lane	Right to A574 (West)	83	3	0	86	38	1	1	40	45	2	-1	46	1.18	1.99	-1.00	1.14	5.77	1.41	1.42
	A574 (East)	Left to Woolston Grange Avenue	304	53	12	369	362	43	22	427	-58	10	-10	-58	-0.16	0.23	-0.46	-0.14	3.19	1.42	2.44
	A574 (East)	W/B to A574 (West)	405	52	7	464	485	47	9	541	-80	5	-2	-77	-0.16	0.10	-0.22	-0.14	3.77	0.69	0.72
	A574 (East)	Right to Crab Lane	75	0	11	86	81	11	6	98	-6	-11	5	-12	-0.08	-1.00	0.83	-0.13	0.71	4.70	1.71
	Woolston Grange Avenue	Left to A574 (West)	106	32	0	138	42	10	4	56	64	22	-4	82	1.52	2.19	-1.00	1.46	7.42	4.79	2.83
	Woolston Grange Avenue	N/B to Crab Lane	574	36	0	610	566	37	12	615	8	-1	-12	-5	0.01	-0.03	-1.00	-0.01	0.34	0.18	4.91
	Woolston Grange Avenue	Right to A574 (East)	492	49	16	557	493	31	19	543	-1	18	-3	14	0.00	0.58	-0.16	0.03	0.03	2.83	0.73
	A574 (West)	Left to Crab Lane	112	2	0	114	10	1	0	11	102	1	0	103	10.16	0.99	0.00	9.33	13.05	0.81	0.00
	A574 (West)	E/B to A574 (East)	508	46	8	562	620	37	20	677	-112	9	-12	-115	-0.18	0.24	-0.60	-0.17	4.72	1.38	3.22
	A574 (West)	Right to Woolston Grange Avenue	85	11	0	96	17	12	1	30	68	-1	-1	66	3.98	-0.09	-1.00	2.19	9.51	0.31	1.42
A49 / Golborne Road	A49 (North)	Left to Golborne Road	99	4	0	103	59	4	0	63	40	0	0	40	0.67	0.01	0.00	0.63	4.48	0.03	0.00
	A49 (North)	Ahead to A49 (South)	326	51	4	381	312	35	6	352	14	16	-2	29	0.05	0.48	-0.32	0.08	0.80	2.52	0.86
	Golborne Road	Left to A49 (South)	267	56	10	333	285	31	5	321	-18	25	5	12	-0.06	0.83	1.03	0.04	1.08	3.86	1.86
	Golborne Road	Right to A49 (North)	47	0	0	47	44	4	0	48	3	-4	0	-1	0.06	-1.00	0.00	-0.03	0.39	2.81	0.00
	A49 (South)	Ahead to A49 (North)	319	34	0	353	299	35	15	348	20	-1	-15	5	0.07	-0.01	-1.00	0.01	1.15	0.09	5.44
	A49 (South)	Right to Golborne Road	254	44	14	312	263	38	6	308	-9	6	8	4	-0.04	0.14	1.37	0.01	0.58	0.86	2.56
Europa Boulevard / A574 / Callands Road	Europa Boulevard	Left to A574 (East)	5	8	12	25	8	2	1	11	-3	6	11	14	-0.38	2.99	10.96	1.27	1.19	2.68	4.31
	Europa Boulevard	S/B to Callands Road	8	8	0	16	9	3	1	13	-1	5	-1	3	-0.11	1.66	-1.00	0.23	0.35	2.13	1.42
	Europa Boulevard	Right to A574 (West)	180	28	0	208	181	28	12	221	-1	0	-12	-13	0.00	0.00	-1.00	-0.06	0.04	0.02	4.91
	A574 (East)	Left to Callands Road	39	8	4	51	64	6	4	74	-25	2	0	-23	-0.39	0.33	0.00	-0.31	3.51	0.75	0.01
	A574 (East)	W/B to A574 (West)	254	65	13	332	294	28	12	334	-40	37	1	-2	-0.14	1.31	0.08	-0.01	2.41	5.41	0.27
	A574 (East)	Right to Europa Boulevard	195	28	12	235	223	28	12	263	-28	0	0	-28	-0.12	0.00	0.00	-0.11	1.92	0.02	0.01
	Callands Road	Left to A574 (West)	45	4	0	49	50	3	1	54	-5	1	-1	-5	-0.10	0.33	-1.00	-0.10	0.75	0.53	1.42
	Callands Road	N/B to Europa Boulevard	16	0	0	16	19	0	0	19	-3	0	0	-3	-0.16	0.00	0.00	-0.16	0.73	0.00	0.00
	Callands Road	Right to A574 (East)	300	33	4	337	292	19	4	315	8	14	0	22	0.03	0.73	0.00	0.07	0.47	2.73	0.01
	A574 (West)	Left to Europa Boulevard	4	0	0	4	1	1	0	2	3	-1	0	2	2.99	-1.00	0.00	0.99	1.89	1.42	0.00
	A574 (West)	E/B to A574 (East)	439	72	31	542	415	39	10	464	24	33	21	78	0.06	0.84	2.09	0.17	1.16	4.41	4.63
	A574 (West)	Right to Callands Road	8	0	0	8	4	2	0	6	4	-2	0	2	0.99	-1.00	0.00	0.33	1.63	2.00	0.00
Calver Road / A574	Calver Road	Left to A574 (East)	265	73	16	354	298	65	50	413	-33	8	-34	-59	-0.11	0.12	-0.68	-0.14	1.96	0.94	5.94
	A574 (East)	W/B to A574 (West)	491	100	30	621	502	62	28	592	-11	38	2	29	-0.02	0.61	0.07	0.05	0.49	4.20	0.35
	A574 (East)	Right to Calver Road	179	13	9	201	206	46	38	290	-27	-33	-29	-89	-0.13	-0.72	-0.76	-0.31	1.92	6.10	6.00
	A574 (West)	Left to Calver Road	61	8	5	74	86	19	3	108	-25	-11	2	-34	-0.29	-0.58	0.66	-0.32	2.95	3.01	0.99
	A574 (West)	E/B to A574 (East)	683	105	44	832	569	41	12	622	114	64	32	210	0.20	1.55	2.66	0.34	4.56	7.47	6.04
A49 North		left turn to M62 east	111	16	4	131	95	28	16	139	16	-12	-12	-8	0.17	-0.43	-0.75	-0.06	1.55	2.57	3.80
		Stright on to A49 South	600	113	44	757	745	110	48	903	-145	3	-4	-146	-0.19	0.02	-0.09	-0.16	5.58	0.26	0.61
		Right turn to M62 west	368	78	14	460	396	75	34	505	-28	3	-20	-45	-0.07	0.04	-0.59	-0.09	1.43	0.32	4.10
M62 East		left turn to A49 south	531	134	51	716	455	81	68	604	76	53	-17	112	0.17	0.65	-0.25	0.18	3.42	5.09	2.22
		right turn to A49 north	136	40	1	177	150	12	10	172	-14	28	-9	5	-0.10	2.33	-0.90	0.03	1.20	5.48	3.84
A49 South		left turn to M62 west	183	41	41	265	264	39	39	342	-81	2	2	-77	-0.31	0.05	0.05	-0.22	5.40	0.30	0.30
		straight on to A49 north	357	89	66	512	446	42	43	531	-89	47	23	-19	-0.20	1.11	0.53	-0.04	4.45	5.79	3.10
		right turn to M62 east	202	82	70	354	228	61	49	338	-26	21	21	16	-0.11	0.34	0.43	0.05	1.74	2.46	2.71
M62 West		left turn to A49 north	494	94	10	598	489	79	29	597	5	15	-19	1	0.01	0.19	-0.66	0.00	0.22	1.59	4.31
		right turn to A49 south	282	33	9	324	265	44	20	329	17	-11	-11	-5	0.07	-0.25	-0.55	-0.01	1.05	1.79	2.90

Peel Hall

Pm Peak Calibration

Time Period 1700 - 1800

Turn Counts
Calbration Statistics

GEH	Cars	LGV	HGV
<5	179	194	196
<5	89%	97%	98%
<10	199	201	201
<10	99%	100%	100%
>10	2	0	0
>10	1%	0%	0%
<20	201	201	201
>20	100%	100%	100%

Turn Counts

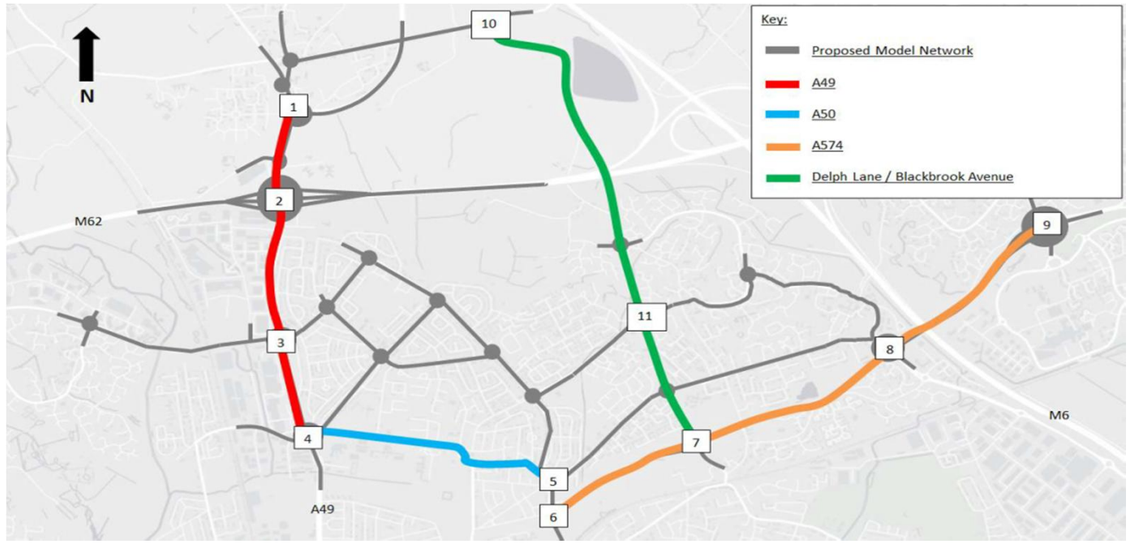
Junction	Road	Movement	Model				Observed				Difference				Percentage Difference				GEH		
			Cars	LGV	HGV	All Traffic	Cars	LGV	HGV	All Traffic	Cars	LGV	HGV	All Traffic	Cars	LGV	HGV	All Traffic	Cars	LGV	HGV
Southworth Lane / Delph Lane / Myddleton Lane	Southworth Lane	Left to Delph Lane	40	4	0	44	48	4	0	52	-8	0	0	-8	-0.17	0.00	0.00	-0.16	1.23	0.01	0.00
	Southworth Lane	W/B to Myddleton Lane	388	20	2	412	390	24	6	420	-2	-4	-4	-8	-0.01	-0.17	-0.67	-0.02	0.11	0.87	2.01
	Delph Lane	Left to Myddleton Lane	275	21	12	307	291	32	1	324	-16	-11	11	-17	-0.05	-0.35	10.96	-0.05	0.94	2.15	4.31
	Delph Lane	W/B to Myddleton Lane	16	0	0	16	23	4	0	27	-7	-4	0	-11	-0.31	-1.00	0.00	-0.41	1.60	2.83	0.00
	Myddleton Lane	E/B to Southworth Lane	147	12	0	159	157	17	3	178	-10	-5	-3	-19	-0.07	-0.30	-1.00	-0.10	0.85	1.33	2.45
	Myddleton Lane	Right to Delph Lane	289	15	3	307	302	32	2	336	-13	-17	1	-29	-0.04	-0.53	0.50	-0.09	0.75	3.52	0.63
Newton Road / A49 / Winwick Park Avenue	Newton Road	Left to A49 (East)	85	6	0	91	95	7	2	104	-10	-1	-2	-13	-0.11	-0.15	-1.00	-0.13	1.08	0.40	2.00
	Newton Road	S/B to A49 (South)	527	34	13	576	598	37	15	650	-71	-3	-2	-74	-0.12	-0.08	-0.14	-0.11	2.99	0.52	0.55
	Newton Road	Right to Winwick Park Avenue	40	4	0	44	53	2	0	55	-13	2	0	-11	-0.25	0.99	0.00	-0.20	1.93	1.15	0.00
	A49 (East)	Left to A49 (South)	607	65	24	696	557	66	28	651	50	-1	-4	45	0.09	-0.02	-0.15	0.07	2.08	0.15	0.80
	A49 (East)	W/B to Winwick Park Avenue	4	0	0	4	4	1	0	5	0	-1	0	-1	0.00	-1.00	0.00	-0.20	0.01	1.42	0.00
	A49 (East)	Right to Newton Road	171	20	0	192	159	23	9	192	12	-3	-9	0	0.07	-0.13	-1.00	0.00	0.90	0.66	4.25
	A49 (East)	U Turns	0	0	0	0	3	0	1	4	-3	0	-1	-4	-1.00	0.00	-1.00	-1.00	2.45	0.00	1.42
	A49 (South)	Left to Winwick Park Avenue	84	4	0	87	66	4	1	71	18	0	-1	16	0.27	0.00	-1.00	0.22	2.05	0.01	1.42
	A49 (South)	N/B to Newton Road	974	69	16	1062	1045	89	25	1160	-71	-20	-9	-98	-0.07	-0.23	-0.36	-0.08	2.24	2.28	2.00
	A49 (South)	Right to A49 (East)	556	53	13	622	500	51	10	561	56	2	3	61	0.11	0.04	0.30	0.11	2.46	0.26	0.87
	Winwick Park Avenue	Left to Newton Road	37	4	1	42	33	4	1	38	4	0	0	4	0.12	0.00	0.00	0.10	0.66	0.01	0.00
	Winwick Park Avenue	E/B to A49 (East)	4	4	0	8	4	2	0	6	0	2	0	2	0.00	0.99	0.00	0.33	0.01	1.15	0.00
	Winwick Park Avenue	Right to A49 (South)	32	4	0	36	23	3	1	27	9	1	-1	9	0.39	0.33	-1.00	0.33	1.70	0.53	1.42
A49 / Delph Lane	A49 (North)	S/B to A49 (South)	1099	99	37	1237	1099	98	40	1238	0	1	-3	-1	0.00	0.01	-0.08	0.00	0.01	0.07	0.50
	A49 (North)	Right to Delph Lane	97	8	0	105	78	8	4	90	19	0	-4	15	0.24	0.00	-1.00	0.16	2.00	0.01	2.83
	A49 (South)	Left to Delph Lane	199	40	0	239	151	41	4	197	48	-1	-4	42	0.31	-0.03	-1.00	0.22	3.59	0.18	2.83
	A49 (South)	N/B to A49 (North)	1493	110	24	1629	1472	127	35	1634	21	-17	-11	-5	0.01	-0.14	-0.32	0.00	0.56	1.60	2.04
	Delph Lane	Left to A49 (North)	118	16	6	140	139	17	1	157	-21	-1	5	-17	-0.15	-0.06	4.98	-0.11	1.89	0.26	2.67
	Delph Lane	Right to A49 (South)	191	20	0	211	128	9	1	138	63	11	-1	73	0.49	1.22	-1.00	0.52	4.95	2.88	1.42
A49 / Birch Avenue	A49 (North)	Left to Birch Avenue	16	0	0	16	19	2	0	21	-3	-2	0	-5	-0.16	-1.00	0.00	-0.24	0.73	2.00	0.00
	A49 (North)	S/B to A49 (South)	1117	106	46	1271	1207	135	86	1428	-90	-29	-40	-157	-0.07	-0.22	-0.47	-0.11	2.63	2.68	4.95
	Birch Avenue	Left to A49 (South)	12	4	0	16	18	2	0	20	-6	2	0	-4	-0.34	0.99	0.00	-0.20	1.56	1.15	0.00
A49 / Sandy Lane West / A574	A49 (North)	Left to Sandy Lane West	210	6	5	221	231	29	5	265	-21	-23	0	-44	-0.09	-0.79	0.00	-0.17	1.39	5.51	0.01
	A49 (North)	S/B to A49 (South)	616	79	24	720	636	80	48	764	-20	-1	-24	-44	-0.03	-0.02	-0.50	-0.06	0.80	0.14	4.02
	A49 (North)	Right to A574	295	25	19	338	286	30	30	346	9	-5	-11	-8	0.03	-0.17	-0.37	-0.02	0.54	0.97	2.24
	Sandy Lane West	Left to A49 (South)	18	1	0	19	53	2	1	56	-35	-1	-1	-37	-0.66	-0.50	-1.00	-0.66	5.89	0.82	1.42
	Sandy Lane West	W/B to A574	293	7	10	310	305	18	1	324	-12	-11	9	-14	-0.04	-0.61	8.97	-0.04	0.69	3.12	3.84
	Sandy Lane West	Right to A49 (North)	132	11	5	148	164	14	2	180	-32	-3	3	-32	-0.19	-0.22	1.49	-0.18	2.59	0.86	1.60
	A49 (South)	Left to A574	537	51	4	592	512	50	11	573	25	1	-7	19	0.05	0.02	-0.64	0.03	1.11	0.12	2.57
	A49 (South)	N/B to A49 (North)	1227	85	35	1350	1103	107	47	1258	124	-22	-12	92	0.11	-0.21	-0.26	0.07	3.62	2.28	1.90
	A49 (South)	Right to Sandy Lane West	55	1	0	56	110	8	4	122	-55	-7	-4	-66	-0.50	-0.88	-1.00	-0.54	6.09	3.31	2.83
	A574	Left to A49 (North)	360	8	16	384	363	17	14	394	-3	-9	2	-10	-0.01	-0.53	0.14	-0.03	0.16	2.56	0.50
	A574	E/B to Sandy Lane West	196	0	0	196	231	15	2	248	-35	-15	-2	-52	-0.15	-1.00	-1.00	-0.21	2.38	5.49	2.00
	A574	Right to A49 (South)	445	32	0	477	444	34	14	493	1	-2	-14	-16	0.00	-0.06	-1.00	-0.03	0.03	0.37	5.30
	A574	U Turns	88	4	0	92	81	7	1	89	7	-3	-1	3	0.08	-0.43	-1.00	0.03	0.73	1.29	1.42
Cotswold Road / Cleveland Road / Sandy Lane / Sandy Lane West	Cotswold Road	Left to Cleveland Road	22	0	0	22	6	0	1	7	16	0	-1	15	2.66	0.00	-1.00	2.13	4.27	0.00	1.42
	Cotswold Road	S/B to Sandy Lane	26	0	0	30	30	1	4	35	-4	-1	-4	-5	-0.14	-1.00	-1.00	-0.15	0.77	1.42	2.83
	Cotswold Road	Right to Sandy Lane West	24	0	3	26	37	6	1	44	-13	-6	2	-18	-0.35	-1.00	1.99	-0.41	2.37	3.47	1.41
	Cleveland Road	Left to Sandy Lane	4	0	0	4	13	0	0	13	-9	0	0	-9	-0.69	0.00	0.00	-0.69	3.10	0.00	0.00
	Cleveland Road	W/B to Sandy Lane West	203	15	11	230	184	18	2	204	19	-3	9	26	0.11	-0.17	4.48	0.13	1.40	0.75	3.53
	Cleveland Road	Right to Cotswold Road	15	3	0	18	1	0	0	1	14	3	0	17	13.95	0.00	0.00	16.94	4.95	2.45	0.00
	Sandy Lane	Left to Sandy Lane West	197	4	3	203	160	11	1	173	37	-7	2	30	0.23	-0.64	1.99	0.18	2.73	2.57	1.41
	Sandy Lane	N/B to Cotswold Road	23	1	0	28	30	7	4	41	-7	-6	-4	-13	-0.24	-0.86	-1.00	-0.32	1.38	3.01	2.83
	Sandy Lane	Right to Cleveland Road	11	0	0	11	3	1	2	6	8	-1	-2	5	2.66	-1.00	-1.00	0.83	3.02	1.42	2.00
	Sandy Lane West	Left to Cotswold Road	69	0	0	69	65	6	3	74	4	-6	-3	-5	0.06	-1.00	-1.00	-0.07	0.46	3.47	2.45
	Sandy Lane West	E/B to Cleveland Road	180	7	3	190	184	24	4	212	-4	-17	-1	-22	-0.02	-0.71	-0.25	-0.10	0.26	4.33	0.54
	Sandy Lane West	Right to Sandy Lane	145	0	1	146	158	20	1	180	-13	-20	0	-34	-0.09	-1.00	0.00	-0.19	1.09	6.33	0.00
Poplars Avenue / Cleveland Road	Poplars Avenue (East)	Left to Cleveland Road	195	19	9	223	198	19	1	218	-3	0	8	5	-0.01	0.00	7.97	0.02	0.19	0.01	3.58
	Poplars Avenue (East)	W/B to Poplars Avenue (West)	48	0	0	53	61	5	6	72	-13	-5	-6	-19	-0.22	-1.00	-1.00	-0.27	1.78	3.17	3.47
	Cleveland Road	Left to Poplars Avenue (West)	1	0	0	1	4	1	0	5	-3	-1	0	-4	-0.75	-1.00	0.00	-0.80	1.90	1.42	0.00
	Cleveland Road	Right to Poplars Avenue (East)	186	8	3	196	199	26	3	228	-13	-18	0	-32	-0.06	-0.69	0.00	-0.14	0.91	4.38	0.01
	Poplars Avenue (West)	E/B to Poplars Avenue (East)	44	0	0	48	48	1	5	54	-4	-1	-5	-6	-0.09	-1.00	-1.00	-0.11	0.61	1.42	3.17
	Poplars Avenue (West)	Right to Cleveland Road	4	0	0	4	8	1	1	10	-4	-1	-1	-6	-0.50	-1.00	-1.00	-0.60	1.64	1.42	1.42
Poplars Avenue / Howson Road	Poplars Avenue (East)	Left to Howson Road	129	6	2	138	32	5	0	37	97	1	2	101	3.02	0.20	0.00	2.72	10.80	0.42	2.00
	Poplars Avenue (East)	W/B to Poplars Avenue (West)	235	19	8	266	267	26	5	298	-32	-7	3	-32	-0.12	-0.27	0.60	-0.11	2.01	1.49	1.17
	Howson Road	Left to Poplars Avenue (West)	9	0	1	10	32	2	1	35	-23	-2	0	-25	-0.72	-1.00	0.00	-0.72	5.10	2.00	0.00
	Howson Road	Right to Poplars Avenue (East)	95	10	2	107	40	7	2	49	55	3	0	58	1.37	0.42	0.00	1.18	6.68	1.02	0.00
	Poplars Avenue (West)	E/B to Poplars Avenue (East)	197	7	2	211	217	24	9	250	-20	-17	-7	-39	-0.09	-0.71	-0.78	-0.16	1.37	4.33	2.99
	Poplars Avenue (West)	Right to Howson Road	34	0	0	34	38	2	0	40	-4	-2	0	-6	-0.11	-1.00	0.00	-0.15	0.69	2.00	0.00
Mill Lane / Enfield Park Road / Blackbrook Avenue / Ballater Drive	Mill Lane	Left to Enfield Park Road	129	0	0	129	129	8	0	137	0	-8	0	-8	0.00	-1.00	0.00	-0.06	0.03	4.01	0.00
	Mill Lane	S/B to Blackbrook Avenue	194	19	3	216	200	29	2	231	-6	-10	1	-15	-0.03	-0.35	0.50	-0.06	0.40	2.06	0.63
	Mill Lane	Right to Ballater Drive	10	0	0	10	17	0	0	17	-7	0	0	-7	-0.41	0.00	0.00	-0.41	1.92	0.00	0.00
	Enfield Park Road	Left to Blackbrook Avenue	36	4	0	40	50	6	0	56	-14	-2	0	-16	-0.28	-0.34	0.00	-0.29	2.16	0.90	0.00
	Enfield Park Road	W/B to Ballater Drive	32	4	0	36	30	6	1	37	2	-2	-1	-1	0.06	-0.34	-1.00	-0.03	0.34	0.90	1.42
	Enfield Park Road	Right to Mill Lane	149	8	0	157	158	11	1	171	-9	-3	-1	-14	-0.06	-0.27	-1.00	-0.08	0.77	0.98	1.42
	Enfield Park Road	U Turns	0	0	0	0	0	0	5	5	0	0	-5	-5	0.00	0.00	-1.00	-1.00	0.00	0.00	3.17
	Blackbrook Avenue	Left to Ballater Drive	33	0	0	33	45	6	0	51	-12	-6	0	-18	-0.27	-1.00	0.00	-0.35	1.94	3.47	0.00
	Blackbrook Avenue	N/B to Mill Lane	160	12	12	184	175	23	0	198	-15	-11	12	-14	-0.08	-0.48	0.00	-0.07	1.12	2.64	4.90
	Blackbrook Avenue	Right to Enfield Park Road	66	0	0	66	83	6	1	90	-17	-6	-1	-24	-0.21	-1.00	-1.00	-0.27	2.00	3.47	1.42
	Ballater Drive	Left to Mill Lane	0	0	0	0	8	2	0	10	-8	-2	0	-10	-1.00	-1.00	0.00	-1.00	4.01	2.00	0.00
	Ballater Drive	E/B to Enfield Park Road	0	0	0	0	10	3	0	13	-10	-3	0	-13	-1.00	-1.00	0.00	-1.00	4.48	2.45	0.00
	Ballater Drive	Right to Blackbrook Avenue	20	0	0	20	21	4	1	26	-1	-4	-1	-6	-0.05	-1.00	-1.00	-0.23	0.23	2.83	1.42
Blackbrook Avenue / Enfield Park Road / Capesthorne Road	Blackbrook Avenue (North)	Left to Enfield Park Road	12	4	0	15	29	3	0	32	-17	1	0	-17	-0.59	0.33	0.00	-0.53	3.77	0.53	0.00
	Blackbrook Avenue (North)	S/B to Blackbrook Avenue (South)	161	20	3	184	177	26	1	204	-16	-6	2	-20	-0.09	-0.23	1.99	-0.10	1.20	1.27	1.41
	Blackbrook Avenue (North)	Right to Capesthorne Road	77	0	0	77	65	10	2	77	12	-10	-2	0	0.18	-1.00	-1.00	0.00	1.40	4.48	2.00
	Enfield Park Road	Left to Blackbrook Avenue (South)	99	1	0	100	85	5	0	90	14	-4	0	10	0.16	-0.80	0.00	0.11	1.43	2.32	0.00
	Enfield Park Road	W/B to Capesthorne Road	322	8	0	332	293	24	3	320	29	-16	-3	12	0.10	-0.67	-1.00	0.04	1.66	4.01	2.45
	Enfield Park Road	Right to Blackbrook Avenue (North)	19	5	3	27	24	1	0	25	-5	4	3	2	-0.21	3.98	0.00	0.08	1.09	2.31	2.45
	Blackbrook Avenue (South)	Left to Capesthorne Road	118	4	3	125	112	17	3	132	6	-13	0	-7	0.05	-0.77	0.00	-0.06	0.53	4.02	0.01
	Blackbrook Avenue (South)	N/B to Blackbrook Avenue (North)	165	8	9	181	207	19	1	227	-42	-11	8	-46	-0.20	-0.58	7.97	-0.20	3.05	3.01	3.58
	Blackbrook Avenue (South)	Right to Enfield Park Road	0	0	0	0	81	3	0	84	-81	-3	0	-84	-1.00	-1.00	0.00	-1.00	12.75	2.45	0.00
	Capesthorne Road	Left to Blackbrook Avenue (North)	76	0	0	76	72	15	0	87	4	-15	0	-11	0.05	-1.00	0.00	-0.13	0.44	5.49	0.00
	Capesthorne Road	E/B to Enfield Park Road	190	20	0	213	143	16	4	164	47	4	-4	49	0.32	0.25	-1.00	0.30	3.61	0.93	2.83
	Capesthorne Road	Right to Blackbrook Avenue (South)	95	11	3	109	92	12	1	105	3	-1	2	4	0.03	-0.09	1.99	0.03	0.28	0.31	1.41

Poplars Avenue / Capesthorne Road	Poplars Avenue (North)	Left to Capesthorne Road (East)	67	10	3	80	28	5	0	33	39	5	3	47	1.39	0.99	0.00	1.42	5.64	1.82	2.45
	Poplars Avenue (North)	S/B to Poplars Avenue (South)	71	2	1	79	73	10	1	84	-2	-8	0	-5	-0.03	-0.80	0.00	-0.06	0.26	3.27	0.00
	Poplars Avenue (North)	Right to Capesthorne Road (West)	52	0	0	52	65	4	0	69	-13	-4	0	-17	-0.20	-1.00	0.00	-0.25	1.72	2.83	0.00
	Capesthorne Road (East)	Left to Poplars Avenue (South)	68	0	0	68	34	7	0	41	34	-7	0	27	0.99	-1.00	0.00	0.65	4.74	3.75	0.00
	Capesthorne Road (East)	W/B to Capesthorne Road (West)	263	2	0	265	330	28	6	364	-67	-26	-6	-99	-0.20	-0.93	-1.00	-0.27	3.89	6.73	3.47
	Capesthorne Road (East)	Right to Poplars Avenue (North)	113	10	3	126	30	5	1	36	83	5	2	90	2.76	0.99	1.99	2.49	9.80	1.82	1.41
	Poplars Avenue (South)	Left to Capesthorne Road (West)	62	6	0	68	17	2	0	19	45	4	0	49	2.64	1.99	0.00	2.57	7.15	2.00	0.00
	Poplars Avenue (South)	N/B to Poplars Avenue (North)	79	12	4	99	53	2	1	56	26	10	3	43	0.49	4.98	2.99	0.76	3.18	3.78	1.89
	Poplars Avenue (South)	Right to Capesthorne Road (East)	87	6	0	93	45	2	0	47	42	4	0	46	0.93	1.99	0.00	0.97	5.15	2.00	0.00
	Capesthorne Road (West)	Left to Poplars Avenue (North)	48	0	0	48	34	3	1	38	14	-3	-1	10	0.41	-1.00	-1.00	0.26	2.17	2.45	1.42
	Capesthorne Road (West)	E/B to Capesthorne Road (East)	170	11	0	181	206	25	6	237	-36	-14	-6	-56	-0.17	-0.56	-1.00	-0.24	2.60	3.31	3.47
	Capesthorne Road (West)	Right to Poplars Avenue (South)	78	1	0	79	70	10	1	81	8	-9	-1	-2	0.11	-0.90	-1.00	-0.03	0.90	3.85	1.42
A49 / Long Lane / Hawleys Lane	A49 (North)	Left to Long Lane	177	11	5	127	207	18	2	227	-30	-7	3	-100	-0.14	-0.39	1.49	-0.44	2.14	1.85	1.60
	A49 (North)	S/B to A49 (South)	758	82	2	843	761	78	43	883	-3	4	-41	-40	0.00	0.05	-0.95	-0.04	0.12	0.42	8.66
	A49 (North)	Right to Hawleys Lane	141	17	18	175	160	21	20	202	-19	-4	-2	-27	-0.12	-0.19	-0.10	-0.13	1.59	0.93	0.47
	Long Lane	Left to A49 (South)	237	15	0	224	251	19	6	276	-14	-4	-6	-52	-0.05	-0.21	-1.00	-0.19	0.88	0.98	3.47
	Long Lane	W/B to Hawleys Lane	82	9	0	89	104	16	2	122	-22	-7	-2	-33	-0.21	-0.44	-1.00	-0.27	2.31	1.99	2.00
	Long Lane	Right to A49 (North)	214	14	5	170	238	21	3	262	-24	-7	2	-92	-0.10	-0.34	0.66	-0.35	1.58	1.69	0.99
	A49 (South)	Left to Hawleys Lane	71	4	0	75	66	2	6	74	5	2	-6	1	0.07	0.99	-1.00	0.01	0.58	1.15	3.47
	A49 (South)	N/B to A49 (North)	1278	101	23	1405	1129	115	28	1273	149	-14	-5	132	0.13	-0.12	-0.18	0.10	4.28	1.38	1.01
	A49 (South)	Right to Long Lane	204	12	0	173	175	18	6	199	29	-6	-6	-26	0.17	-0.34	-1.00	-0.13	2.14	1.56	3.47
	Hawleys Lane	Left to A49 (North)	317	21	8	347	355	30	31	416	-38	-9	-23	-69	-0.11	-0.30	-0.74	-0.17	2.08	1.80	5.22
	Hawleys Lane	E/B to Long Lane	142	4	0	106	124	11	1	136	18	-7	-1	-30	0.14	-0.64	-1.00	-0.22	1.53	2.57	1.42
	Hawleys Lane	Right to A49 (South)	73	4	0	77	75	5	4	84	-2	-1	-4	-7	-0.03	-0.20	-1.00	-0.09	0.26	0.48	2.83
Blackbrook Avenue / Insall Road / Hilden Road	Blackbrook Avenue (North)	Left to Insall Road	34	7	0	41	44	1	0	45	-10	6	0	-4	-0.23	5.98	0.00	-0.09	1.62	3.00	0.00
	Blackbrook Avenue (North)	S/B to Blackbrook Avenue (South)	319	26	5	350	263	33	2	298	56	-7	3	52	0.21	-0.21	1.49	0.17	3.29	1.31	1.60
	Blackbrook Avenue (North)	Right to Hilden Road	2	0	0	2	53	8	0	61	-51	-8	0	-59	-0.96	-1.00	0.00	-0.97	9.74	4.01	0.00
	Insall Road	Left to Blackbrook Avenue (South)	70	0	0	70	86	7	1	94	-16	-7	-1	-24	-0.19	-1.00	-1.00	-0.26	1.84	3.75	1.42
	Insall Road	W/B to Hilden Road	107	0	0	111	175	19	2	196	-68	-19	-2	-85	-0.39	-1.00	-1.00	-0.43	5.69	6.17	2.00
	Insall Road	Right to Blackbrook Avenue (North)	30	0	4	34	55	8	2	65	-25	-8	2	-31	-0.46	-1.00	0.99	-0.48	3.86	4.01	1.15
	Blackbrook Avenue (South)	Left to Hilden Road	57	0	0	57	49	7	0	56	8	-7	0	1	0.16	-1.00	0.00	0.01	1.08	3.75	0.00
	Blackbrook Avenue (South)	N/B to Blackbrook Avenue (North)	196	12	7	216	222	20	2	244	-26	-8	5	-28	-0.12	-0.40	2.49	-0.11	1.78	2.01	2.35
	Blackbrook Avenue (South)	Right to Insall Road	76	4	0	80	89	6	2	97	-13	-2	-2	-17	-0.15	-0.34	-1.00	-0.18	1.46	0.90	2.00
	Hilden Road	Left to Blackbrook Avenue (North)	69	0	0	69	97	9	0	106	-28	-9	0	-37	-0.29	-1.00	0.00	-0.35	3.10	4.25	0.00
	Hilden Road	E/B to Insall Road	61	1	0	66	120	15	4	139	-59	-14	-4	-73	-0.49	-0.93	-1.00	-0.53	6.23	4.96	2.83
	Hilden Road	Right to Blackbrook Avenue (South)	57	4	0	61	37	4	0	41	20	0	0	20	0.54	0.00	0.00	0.48	2.90	0.01	0.00
A50 / Hilden Road / Orford Road / Smith Drive	A50	Left to Hilden Road	40	1	0	41	101	13	0	114	-61	-12	0	-73	-0.61	-0.92	0.00	-0.64	7.29	4.54	0.00
	A50	S/B to Orford Road	455	32	4	492	437	44	4	485	18	-12	0	7	0.04	-0.27	0.00	0.01	0.84	1.97	0.01
	A50	Right to Smith Drive	152	0	0	156	112	8	2	122	40	-8	-2	34	0.35	-1.00	-1.00	0.27	3.45	4.01	2.00
	Hilden Road	Left to Orford Road	26	0	0	30	36	5	3	44	-10	-5	-3	-14	-0.28	-1.00	-1.00	-0.32	1.81	3.17	2.45
	Hilden Road	W/B to Smith Drive	32	0	0	32	56	5	1	62	-24	-5	-1	-30	-0.43	-1.00	-1.00	-0.49	3.64	3.17	1.42
	Hilden Road	Right to A50	69	4	0	73	148	14	0	162	-79	-10	0	-89	-0.54	-0.72	0.00	-0.55	7.62	3.34	0.00
	Orford Road	Left to Smith Drive	36	4	0	40	37	5	0	42	-1	-1	0	-2	-0.03	-0.20	0.00	-0.05	0.18	0.48	0.00
	Orford Road	N/B to A50	627	31	7	664	502	44	6	552	125	-13	1	112	0.25	-0.30	0.16	0.20	5.28	2.14	0.38
	Orford Road	Right to Hilden Road	58	8	0	70	57	10	4	71	1	-2	-4	-1	0.01	-0.20	-1.00	-0.02	0.11	0.68	2.83
	Smith Drive	Left to A50	96	12	0	112	118	11	6	135	-22	1	-6	-23	-0.19	0.09	-1.00	-0.17	2.16	0.28	3.47
	Smith Drive	E/B to Hilden Road	143	8	0	151	150	13	2	166	-7	-5	-2	-15	-0.05	-0.39	-1.00	-0.09	0.62	1.55	2.00
	Smith Drive	Right to Orford Road	72	2	0	74	81	5	0	86	-9	-3	0	-12	-0.11	-0.60	0.00	-0.14	1.06	1.61	0.00
Blackbrook Avenue / A574	Blackbrook Avenue (North)	Left to A574 (East)	39	2	0	41	24	1	1	26	15	1	-1	15	0.62	0.99	-1.00	0.57	2.66	0.81	1.42
	Blackbrook Avenue (North)	S/B to Blackbrook Avenue (South)	361	28	5	394	313	36	2	351	48	-8	3	43	0.15	-0.22	1.49	0.12	2.62	1.43	1.60
	Blackbrook Avenue (North)	Right to A574 (West)	48	0	0	48	49	7	0	56	-1	-7	0	-8	-0.02	-1.00	0.00	-0.15	0.17	3.75	0.00
	A574 (East)	Left to Blackbrook Avenue (South)	170	15	2	188	230	9	2	241	-60	6	0	-53	-0.26	0.66	0.00	-0.22	4.22	1.72	0.00
	A574 (East)	W/B to A574 (West)	614	14	0	629	527	23	4	554	87	-9	-4	75	0.17	-0.39	-1.00	0.14	3.66	2.11	2.83
	A574 (East)	Right to Blackbrook Avenue (North)	45	5	0	50	31	4	0	35	14	1	0	15	0.45	0.25	0.00	0.42	2.25	0.47	0.00
	Blackbrook Avenue (South)	Left to A574 (West)	139	8	3	149	176	10	2	188	-37	-2	1	-39	-0.21	-0.20	0.50	-0.21	2.91	0.68	0.63
	Blackbrook Avenue (South)	N/B to Blackbrook Avenue (North)	229	7	7	244	243	24	2	269	-14	-17	5	-25	-0.06	-0.71	2.49	-0.09	0.89	4.33	2.35
	Blackbrook Avenue (South)	Right to A574 (East)	162	19	0	181	137	23	0	160	25	-4	0	21	0.18	-0.18	0.00	0.13	2.01	0.89	0.00
	A574 (West)	Left to Blackbrook Avenue (North)	59	4	0	63	86	5	2	93	-27	-1	-2	-30	-0.32	-0.20	-1.00	-0.32	3.20	0.48	2.00
	A574 (West)	E/B to A574 (East)	388	15	6	409	366	20	2	388	22	-5	4	21	0.06	-0.25	1.99	0.05	1.13	1.21	2.00
	A574 (West)	Right to Blackbrook Avenue (South)	175	4	4	184	189	13	0	202	-14	-9	4	-18	-0.07	-0.69	0.00	-0.09	1.01	3.10	2.83
A50 / A574	A50 (North)	Left to A574	289	15	4	308	340	22	0	362	-51	-7	4	-54	-0.15	-0.32	0.00	-0.15	2.88	1.64	2.83
	A50 (North)	S/B to A50 (South)	263	20	0	287	241	27	7	275	22	-7	-7	12	0.09	-0.26	-1.00	0.04	1.40	1.46	3.75
	A574	Left to A50 (South)	475	8	0	483	386	11	3	400	89	-3	-3	83	0.23	-0.27	-1.00	0.21	4.28	0.98	2.45
	A574	Right to A50 (North)	325	14	3	342	393	24	6	423	-68	-10	-3	-81	-0.17	-0.42	-0.50	-0.19	3.60	2.31	1.42
	A50 (South)	N/B to A50 (North)	390	28	4	426	374	44	8	426	16	-16	-4	0	0.04	-0.37	-0.50	0.00	0.81	2.69	1.64
	A50 (South)	Right to A574	331	8	6	345	304	18	4	326	27	-10	2	19	0.09	-0.56	0.50	0.06	1.52	2.79	0.89
Crab Lane / A574 / Woolston Grange Avenue	Crab Lane	Left to A574 (East)	145	5	0	152	200	12	3	215	-55	-7	-3	-63	-0.27	-0.58	-1.00	-0.29	4.16	2.41	2.45
	Crab Lane	S/B to Woolston Grange Avenue	193	2	0	195	189	17	1	207	4	-15	-1	-12	0.02	-0.88	-1.00	-0.06	0.32	4.88	1.42
	Crab Lane	Right to A574 (West)	172	7	0	179	122	6	0	128	50	1	0	51	0.41	0.16	0.00	0.39	4.09	0.38	0.00
	A574 (East)	Left to Woolston Grange Avenue	733	35	10	778	717	33	20	770	16	2	-10	8	0.02	0.06	-0.50	0.01	0.59	0.33	2.60
	A574 (East)	W/B to A574 (West)	514	23	2	539	535	27	5	567	-21	-4	-3	-28	-0.04	-0.15	-0.60	-0.05	0.90	0.82	1.61
	A574 (East)	Right to Crab Lane	267	12	0	281	236	9	3	248	31	3	-3	33	0.13	0.33	-1.00	0.13	1.97	0.92	2.45
	Woolston Grange Avenue	Left to A574 (West)	145	4	0	149	96	3	1	100	49	1	-1	49	0.51	0.33	-1.00	0.49	4.43	0.53	1.42
	Woolston Grange Avenue	N/B to Crab Lane	131	32	0	164	116	40	2	158	15	-8	-2	6	0.13	-0.20	-1.00	0.03	1.32	1.35	2.00
	Woolston Grange Avenue	Right to A574 (East)	430	44	19	494	563	54	20	637	-133	-10	-1	-143	-0.24	-0.19	-0.05	-0.22	5.96	1.45	0.24
	A574 (West)	Left to Crab Lane	115	0	0	115	40	2	0	42	75	-2	0	73	1.87	-1.00	0.00	1.73	8.50	2.00	0.00
	A574 (West)	E/B to A574 (East)	406	30	6	442	458	43	1	503	-52	-13	5	-61	-0.11	-0.30	4.98	-0.12	2.52	2.17	2.67
	A574 (West)	Right to Woolston Grange Avenue	72	6	0	78	39	1	2	42	33	5	-2	36	0.84	4.98	-1.00	0.85	4.41	2.67	2.00
A49 / Golborne Road	A49 (North)	Left to Golborne Road	43	4	0	47	50	5	0	55	-7	-1	0	-8	-0.15	-0.19	0.00	-0.15	1.07	0.44	0.00
	A49 (North)	Ahead to A49 (South)	330	24	0	354	265	38	3	307	65	-14	-3	47	0.24	-0.38	-1.00	0.15	3.75	2.59	2.43
	Golborne Road	Left to A49 (South)	324	20	13	359	278	34	0	312	46	-14	13	47	0.16	-0.40	0.00	0.15	2.64	2.62	5.10
	Golborne Road	Right to A49 (North)	11	4	10	25	34	1	0	35	-23	3	10	-10	-0.67	3.06	0.00	-0.28	4.78	1.91	4.47
	A49 (South)	Ahead to A49 (North)	737	62	9	808	628	60	26	715	109	2	-17	93	0.17	0.03	-0.66	0.13	4.16	0.20	4.12
	A49 (South)	Right to Golborne Road	445	33	8	487	610	56	9	674	-165	-23	-1	-187	-0.27	-0.41	-0.09	-0.28	7.17	3.44	0.27
Europa Boulevard / A574 / Callands Road	Europa Boulevard	Left to A574 (East)	0	0	0	0	3	0	0	3	-3	0	0	-3	-1.00	0.00	0.00	-1.00	2.45	0.00	0.00
	Europa Boulevard	S/B to Callands Road	16	4	0	20	19	3	0	22	-3	1	0	-2	-0.16	0.33	0.00	-0.09	0.73	0.53	0.00
	Europa Boulevard	Right to A574 (West)	214	4	6	224	276	5	6	287	-62	-1	0	-63	-0.22	-0.20	0.00	-0.22	3.95	0.48	0.01
	A574 (East)	Left to Callands Road	198	28	0	226	231	21	1	253	-33	7	-1	-27	-0.14	0.33	-1.00	-0.11	2.24	1.40	1.42
	A574 (East)	W/B to A574 (West)	688	48	13	749	647	34	6	687	41	14	7	62	0.06	0.41	1.16	0.09	1.59	2.17	2.26
	A574 (East)	Right to Europa Boulevard	30	8	0	38	40	7	8	55	-10	1	-8	-17	-0.25	0.14	-1.00	-0.31	1.71	0.36	4.01
	Callands Road	Left to A574 (West)	28	4	2	34	54	3	0	57	-26	1	2	-23	-0.48	0.33	0.00	-0.41	4.08	0.53	2.00
	Callands Road	N/B to Europa Boulevard	8	4	0	12	9	1	0	10	-1	3	0	2	-0.11	2.99	0.00	0.20	0.35	1.89	0.00
	Callands Road	Right to A574 (East)	100	4	0	105	82	9	2	93	18	-5	-2	12	0.22	-0.56	-1.00	0.13	1.86	1.97	2.00
	A574 (West)	Left to Europa Boulevard	4	0	0	4	3	0	0	3	1	0	0	1	0.33	0.00	0.00	0.33	0.53	0.00	0.00
	A574 (West)	E/B to A574 (East)	598	28	26	652	452	34	10	497	146	-6	16	155	0.32	-0.18	1.59	0.31	6.35	1.10	3.76
	A574 (West)	Right to Callands Road	24	4	0	28	28	2	2	32	-4	2	-2	-4	-0.15	0.99	-1.00	-0.13	0.80	1.15	2.00
Calver Road / A574	Calver Road	Left to A574 (East)	493	21	0	514	436	41	22	500	57	-20	-22	14	0.13	-0.49	-1.00	0.03	2.63	3.61	6.64
	A574 (East)	W/B to A574 (West)	914	83	12	1010	918	62	15	995	-4	21	-3	15	0.00	0.33	-0.20	0.02	0.13	2.44	0.83
	A574 (East)	Right to Calver Road	300	4	21	324	398	30	31	459	-98	-26	-10	-135	-0.25	-0.87	-0.32	-0.29	5.26	6.32	1.98
	A574 (West)	Left to Calver Road	97	8	10	115	97	4	5	106	0	4	5	9	0.00	0.99	0.99	0.08	0.03	1.63	1.82
	A574 (West)	E/B to A574 (East)	595	24	16	635	448	39	7	495	147	-15	9	140	0.33	-0.39	1.28	0.28	6.42	2.69	2.65
A49 North		left turn to M62 east	145	12	4	161	128	10	4	142	17	2	0	19	0.13	0.20	0.00	0.13	1.43	0.60	0.00
		Stright on to A49 South	555	46	11	614	584	64	24	673	-29	-18	-13	-59	-0.05	-0.28	-0.54	-0.09	1.23	2.45	3.12
		Right turn to M62 west	594	59	23	676	560	53	14	627	34	6	9	49	0.06	0.11	0.64	0.08	1.40	0.78	2.08
M62 East		left turn to A49 south	352	34	29	416	343	47	39	429	9	-13	-10	-13	0.03	-0.28	-0.26	-0.03	0.49	2.06	1.73
		right turn to A49 north	200	31	5	236	215	40	9	265	-15	-9	-4	-29	-0.07	-0.23	-0.45	-0.11	1.08	1.53	1.52
A49 South		left turn to M62 west	394	14	12	420	433	32	14	479	-39	-18	-2	-59	-0.09	-0.56	-0.14	-0.12	1.92	3.77	0.56
		straight on to A49 north	903	56	11	973	979	68	26	1073	-76	-12	-15	-100	-0.08	-0.18	-0.58	-0.09	2.49	1.54	3.50
		right turn to M62 east	413	32	35	480	453	56	34	543	-40	-24	1	-63	-0.09	-0.43	0.03	-0.12	1.92	3.64	0.16
M62 West		left turn to A49 north	586	62	8	656	568	58	9	635	18	4	-1	21	0.03	0.07	-0.11	0.03	0.74	0.50	0.35
		righ tturn to A49 south	226	26	6	259	288	41	12	341	-62	-15	-6	-82	-0.21	-0.37	-0.50	-0.24	3.85	2.61	2.01

Appendix H Validation Outputs

Time Period	Decription	Route Type	Direction of Travel	Reference	Observed Journey Time	Model Journey Time	Absolute Difference	Validation Achieved
08:00 - 09:00	A49	Whole	NB	4 to 1	282.65	**302.45**	**-19.8**	**-7%**
		Intermediate		4 to 3	96.46	**87.04**	**9.42**	**10%**
		Intermediate		3 to 2	77.53	**82.6**	**-5.07**	**-7%**
		Intermediate		2 to 1	78.66	**81.41**	**-2.75**	**-3%**
		Whole	SB	1 to 4	570.87	**564.41**	**6.46**	**1%**
		Intermediate		1 to 2	136.35	**102.04**	**34.31**	**25%**
		Intermediate		2 to 3	193.07	**196.4**	**-3.33**	**-2%**
		Intermediate		3 to 4	204.93	**201.19**	**3.74**	**2%**
	A574	Whole	EB	6 to 9	501.77	**440.82**	**60.95**	**12%**
		Intermediate		6 to 7	91.08	**73.57**	**17.51**	**19%**
		Intermediate		7 to 8	187.62	**150.34**	**37.28**	**20%**
		Intermediate		8 to 9	204.65	**181.54**	**23.11**	**11%**
		Whole	WB	9 to 6	231.89	**261.68**	**-29.79**	**-13%**
		Intermediate		9 to 8	66.15	**63.35**	**2.8**	**4%**
		Intermediate		8 to 7	77.48	**95.18**	**-17.7**	**-23%**
		Intermediate		7 to 6	78.11	**82.75**	**-4.64**	**-6%**
	A50	Whole	EB	4 to 5	212.84	**192.07**	**20.77**	**10%**
		Whole	WB	5 to 4	305.13	**377.66**	**-72.53**	**-24%**
	Delph Lane / Black	Whole	NB	7 to 10	331.75	**295.71**	**36.04**	**11%**
		Intermediate		7 to 11	185.19	**157.36**	**27.83**	**15%**
		Intermediate		11 to 10	136.56	**138.35**	**-1.79**	**-1%**
		Whole	SB	10 to 7	319.41	**352.2**	**-32.79**	**-10%**
		Intermediate		10 to 11	123.72	**148.99**	**-25.27**	**-20%**
		Intermediate		11 to 7	189.69	**203.21**	**-13.52**	**-7%**

Time Period	Decription	Route Type	Direction of Travel	Reference	Observed Journey Time	Model Journey Time	Absolute Difference	Validation Achieved
17:00 - 18:00	A49	Whole	NB	4 to 1	409	**372**	**37**	**9%**
		Intermediate		4 to 3	135	**105**	**30**	**23%**
		Intermediate		3 to 2	148	**127**	**21**	**14%**
		Intermediate		2 to 1	79	**87**	**-8**	**-11%**
		Whole	SB	1 to 4	485	**530**	**-46**	**-9%**
		Intermediate		1 to 2	171	**136**	**35**	**20%**
		Intermediate		2 to 3	145	**177**	**-32**	**-22%**
		Intermediate		3 to 4	110	**174**	**-64**	**-59%**
	A574	Whole	EB	6 to 9	221	**261**	**-39**	**-18%**
		Intermediate		6 to 7	62	**74**	**-11**	**-18%**
		Intermediate		7 to 8	82	**94**	**-11**	**-14%**
		Intermediate		8 to 9	66	**94**	**-28**	**-43%**
		Whole	WB	9 to 6	316	**312**	**4**	**1%**
		Intermediate		9 to 8	113	**110**	**3**	**2%**
		Intermediate		8 to 7	117	**113**	**4**	**4%**
		Intermediate		7 to 6	75	**88**	**-13**	**-17%**
	A50	Whole	EB	4 to 5	184	**188**	**-5**	**-2%**
		Whole	WB	5 to 4	393	**354**	**39**	**10%**
	Delph Lane / Black	Whole	NB	7 to 10	308	**339**	**-31**	**-10%**
		Intermediate		7 to 11	139	**177**	**-37**	**-27%**
		Intermediate		11 to 10	160	**154**	**6**	**3%**
		Whole	SB	10 to 7	310	**341**	**-31**	**-10%**
		Intermediate		10 to 11	138	**153**	**-15**	**-10%**
		Intermediate		11 to 7	161	**179**	**-18**	**-11%**



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