Transport Assessment

Harworth Estates Investments Ltd

Erlas Park, Wrexham

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Doc Ref: VN232881TA01

SLR Project No.: 432.001938.00001

20 January 2025

Revision: 04

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	1 March 2024	Adelaide Tsim / Tom Reader	Tom Reader	Phil Tilby
2	28 March 2024	Adelaide Tsim / Tom Reader	Tom Reader	Phil Tilby
3	17 January 2025	Emilia Gosden / Matt Rudman	Matt Rudman	Matt Rudman
4	20 January 2025	Emilia Gosden / Matt Rudman	Matt Rudman	Matt Rudman

Basis of Report

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Table of Contents

1.0 Introduction....1
2.0 Local Context....8
3.0 Policy and Guidance....27
4.0 Proposed Development....34
5.0 Active Travel and Public Transport Trip Forecasts....42
6.0 Vehicle Trip Generation and Distribution....50
7.0 Local Development Plan Traffic Modelling and Mitigation Strategy....56
8.0 Proposed Site Access Capacity Testing....72
9.0 Summary and Conclusions....79

Drawings

VN232881-D100 Rev B Proposed Access Arrangement Overview Plan
VN232881-D101 Rev E Proposed Access Southern Primary and Secondary Junction
VN232881-D103 Rev B Proposed Access Arrangement Northern Parcel
VN232881-D201 Greyhound Roundabout Junction Improvement

Appendices

Appendix A Wrexham LDP EiP Statement of Common Ground – KSS2 Appendix B Traffic Flow Comparison Note
Appendix C Illustrative Masterplan
Appendix D TRICS Total Person Trip Rate Report
Appendix E National Travel Survey Data
Appendix F TRICS Vehicle Trip Rate Report
Appendix G VISSIM Forecasting Report 2019
Appendix H Link Road Testing Results Note
Appendix I Northern Access JUNCTIONS Results Output
Appendix J Southern Primary Access LinSig Results Output
Appendix K Southern Secondary Access JUNCTIONS Results Output
Appendix L Highway Comments (June 2024)
Appendix M SLR Highway Response to DMO & Active Travel Comments

1.0 Introduction

Background

1.1 SLR has been instructed by Harworth Estates Investments Ltd to provide transport and mobility advice in relation to a proposed residential development on land to the east of Cefn Road in Wrexham. The proposed development is within the administrative area authority of Wrexham County Borough Council (WCBC).

1.2 The proposed development is part of a wider site allocation known as Key Strategic Site 2 (KSS2) within the adopted Wrexham Local Development Plan (LDP) 2013 – 2028. The whole of the site allocation within the LDP is intended to deliver a total of up to 1,680 new dwellings across the entire site, 100 of which will be delivered in the subsequent plan period.

1.3 The site's inclusion in the Wrexham LDP has been based upon an extensive evidence base including highways capacity testing that has been agreed with WCBC Highways and presented to the Planning Inspector at the LDP Examination in Public (EiP) in 2019. Details of the highways and transport evidence and agreements will be provided within this Transport Assessment (TA) report.

1.4 The northern part of the KSS2 site is being brought forward by Bloor and Barratt Homes, proposing 600 homes (application reference P/2021/0436), whilst Harworth is proposing to gain approval for 900 dwellings of the allocation through this planning application. This leaves a balance of 180 dwellings for the site allocation which could be delivered in the future on land that lies between the Harworth and Bloor / Barratt sites. This area does not fall within the application boundaries of Harworth and Bloor / Barratt, but it does lie within the allocated site.

1.5 The description of the proposed development is as follows:

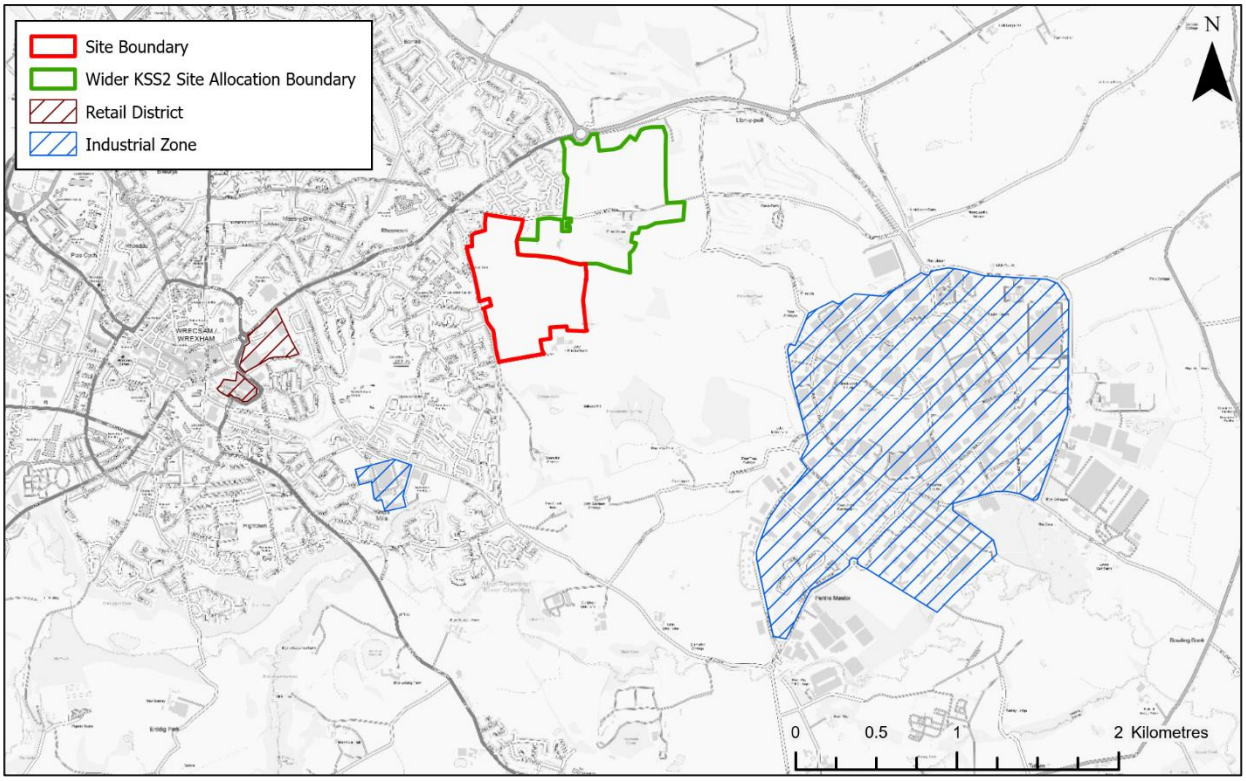
"Outline Planning Application for Residential development for the construction of up to 900 residential dwellings with associated infrastructure (playing fields, open space and SUDs attenuation) with all matters reserved except for detailed means of primary highway access"

1.6 The proposed development (and site allocation) is located to the eastern side of Wrexham. Wrexham is the largest town in North Wales and is an administrative, commercial, retail and educational centre. It is situated alongside the border with England and provides connections to strategic locations on both sides of the border.

1.7 The site location in the wider context is shown in **Figure 1.1**, which also shows the wider KSS2 site allocation. **Figure 1.2** presents a more local context. It can be seen that the application site is bordered to the west by Cefn Road, and Bryn Estyn Road and Wrexham Rugby Club form the northern edge of the site. Immediately to the east and south lies agricultural land. The Erlas Victorian Walled Garden and The Erlas Centre lie to the north-east of the site.

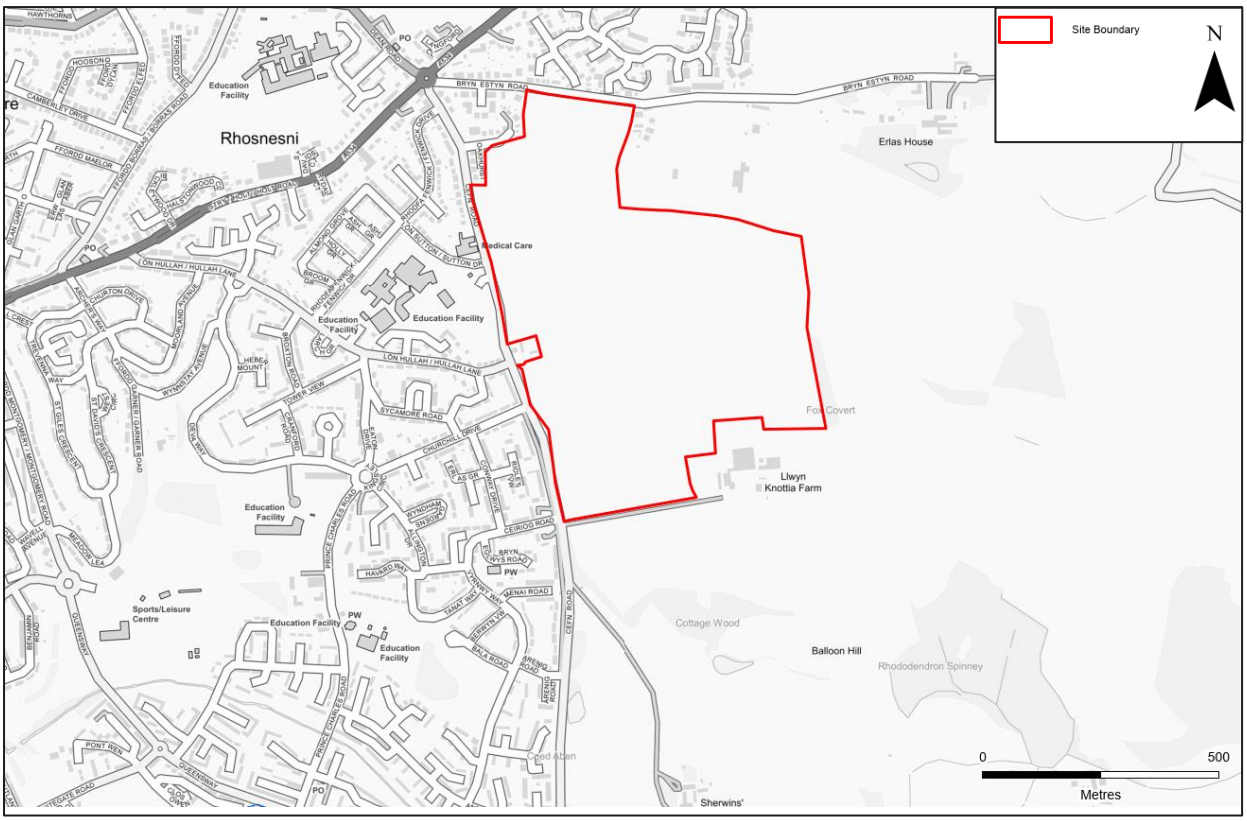
1.8 The built-up areas of Caia Park and Rhosnesni, which are residential suburbs of Wrexham, lie to the west and north of the site. Wrexham Industrial Estate lies approximately 2km to the east of the site and is as a key employment location in the local area.

Figure 1.1: Site Location Wider Context



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Figure 1.2: Site Location Local Context



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KSS2 Site Allocation Agreed Highways Position

1.9 A Statement of Common Ground (SoCG) was prepared by the key KSS2 stakeholders including WCBC, to inform the Local Plan Examination in Public (EiP). The SoCG set out the agreed position of the Council and the Developers in relation to highway matters confirming that agreement had been reached regarding the highways impacts and infrastructure requirements to support the site allocation following the outcome of a traffic modelling assessment exercise. A copy of the SoCG is provided at **Appendix A** to this report.

Pre-Application Scoping Correspondence

1.10 Pre-application scoping has been undertaken with WCBC Highways and Transport Officers to agree the principles of the access strategy and the approach to the Transport Assessment (TA) and associated submission requirements. A summary of the pre-application meetings is provided in **Table 1.1**.

1.11 A response to the Environmental Impact Assessment (EIA) scoping was also provided by Welsh Government Trunk Roads, who asked for the A483 Junction 6 to be considered in the TA.

Table 1.1: Pre-Application Transport Scoping with WCBC

Date	Meeting Attendees	Summary
14th December 2023	WCBC Highways WCBC Planning SLR J10 Planning	Subject to presentation of updated survey data, the VISSIM modelling undertaken in support of the Local Plan and associated EIP process would be accepted by WCBC in support of the planning application. WCBC confirmed which committed developments should be considered as part of the TA. Person trip rate approach to be adopted in the TA. Principles of proposed access strategy discussed and agreed, and that there would be no vehicle access to the site from Bryn Estyn Road other than for emergency vehicles. Provision for active travel and public transport modes are key considerations for the proposed development.

21st December 2023	WCBC Active Travel WCBC Public Transport WCBC Rights of Way SLR	Principles of bus access strategy discussed for the pre-link road and link road scenarios. New cycle & pedestrian infrastructure to be informed by the Active Travel Act Wales guidance, and a corridor strategy is needed for Cefn Road to serve the proposed development. Lack of crossing facilities on Cefn Road is a key concern for the Council with this proposed development site, including enhancing linkages to the nearby secondary school. Council has preliminary / concept proposals for improvements to active travel along the Holt Road corridor which will be shared with SLR. Council will undertake an audit of active travel provision on Bryn Estyn Road in 2024. Rural character of the existing east-west Public Right of Way (PRoW) should be maintained and any diversions of existing PRoW routes at the site to be identified.

6th February 2024	WCBC Highways WCBC Planning SLR J10 Planning Harworth	Additional VISSIM testing undertaken by SLR explained to officers focusing on the operation of the Greyhound roundabout and the pre-link road network capacity. Potential capacity improvement scheme at Greyhound roundabout presented by SLR and discussed. Appropriate strategy for the Greyhound roundabout is needed, which proposes a balance of highway capacity improvements and active travel facilities / infrastructure. Signal control is the preferred form of access junction for the southern parcel by WCBC Highways, and signalised crossing facilities should be considered for Cefn Road on key desire lines. During this meeting it was agreed that the Local Plan VISSIM modelling work would be considered fit for purpose by the LA to support the planning application at KSS2 South, subject to presentation of the traffic survey data that would show that current traffic flows on the network are the same or lower than those used as the baseline flows for the Local Plan modelling work. This would be consistent with the position taken by WCBC Highways in relation to the application at KSS2 North. It was also acknowledged and agreed that the scope of the assessment for the Local Plan modelling work would be appropriate to support the KSS2 South application, which ultimately proposes a lower quantum of development than that assessed for the KSS2 South site in the Local Plan modelling work (*900 dwellings vs 1,080 dwelllings*). This meeting set out a clear agreement between SLR and the Council as to the methodology and scope of the assessment which would be utilised in the TA work.

Current Position & Highway Comments

1.12 SLR Consulting prepared a Transport Assessment (TA) and Travel Plan (TP), dated March 2024, that was submitted to WCBC.

1.13 On 6th June 2024, WCBC Highways provided comments in response to the documents and highlighted issues that they felt required further clarification or substantiation as part of any planning submission (**Appendix L**).

1.14 SLR provided a formal response note to the highway comments in July 2024 (**Appendix M**), with this TA (dated January 2025), having been updated to reflect the contents within this highway response and provides additional clarification / substantiation for this subsequent planning submission.

Scope of Assessment

1.15 This TA references guidance in local and national planning policy, including Planning Policy Wales that supports and encourages housing growth and adopts a presumption in favour of plan-led sustainable development which provides benefits in terms of climate, health and the economy.

1.16 The key objectives of this TA are to:

- Identify opportunities for non-car-based travel and socially inclusive transport links in line with current best practice and local and national policy;
- Determine suitable sustainable accessibility and transport measures to maximise the development's accessibility, and connectivity, and to manage the characteristics associated with delivering this site in the context of planning policy;
- Establish the quantum of traffic demand generated by the proposed development; and
- Demonstrate that the development proposals can be suitably accommodated on the local highway network in line with the traffic modelling undertaken as part of the LDP evidence base.

1.17 The remainder of the TA is structured as follows:

- **Section 2: Local Context** – sets out the current position of the proposed development and includes an accessibility audit which reviews the accessibility by all viable modes of transport, and describes the current position in terms of road safety;
- **Section 3: Policy Context** – describes the local and national planning policy and guidance pertinent to the proposed development;
- **Section 4: Proposed Development** – sets out the development proposals including access arrangements;
- **Section 5: Active Travel and Public Transport Trip Forecasts** – details the trips by non-car modes that can be expected to be generated by the development;
- **Section 6: Trip Generation and Distribution** – sets out the trip generation and distribution methodology adopted for the highway assessment exercise that supports the proposed development within the KSS2 site allocation, and presents the peak hour traffic forecasts for Phases 1 and 2 of the proposed development;

- **Section 7: Local Development Plan Traffic Modelling and Mitigation Strategy** – presents the findings of the Local Development Plan Traffic Modelling in relation to the proposed development Phases 1 and 2, demonstrating that the proposals fall within the parameters of the modelling of the wider site allocation. This section also presents the outcomes of additional testing that has been undertaken using the approved traffic model with regard to the pre-link road network capacity and a proposed improvement scheme at the Greyhound roundabout.
- **Section 8: Proposed Site Access Capacity Testing** – presents the results of the detailed capacity assessments for the proposed site access junctions on Cefn Road.
- **Section 9: Summary and Conclusions** – summarises the key findings and provides the report conclusions.

2.0 Local Context

Site Location

2.1 The site is located approximately 2km north-east of the centre of Wrexham at the edge of the existing built form and around 2km to the north-west of Wrexham Industrial Estate. The site is generally flat and predominantly in agricultural use with existing field boundaries marked by hedgerows.

2.2 To the north and west lies the established residential areas of Borras, Rhosnesni and Caia Park which have a range of services including numerous schools, shops, health and care facilities and sports facilities.

2.3 Cefn Road forms the western boundary of the site and forms a north-south route along the eastern side of Wrexham, providing access to the Caia Park residential area and providing connections for the A534 to the north and A525 to the south.

2.4 Bryn Estyn Road is to the site's northern boundary and is a rural lane providing limited vehicle access to a small number of properties but it also serves as an east-west route for pedestrians and cyclists linking to Wrexham Industrial Estate.

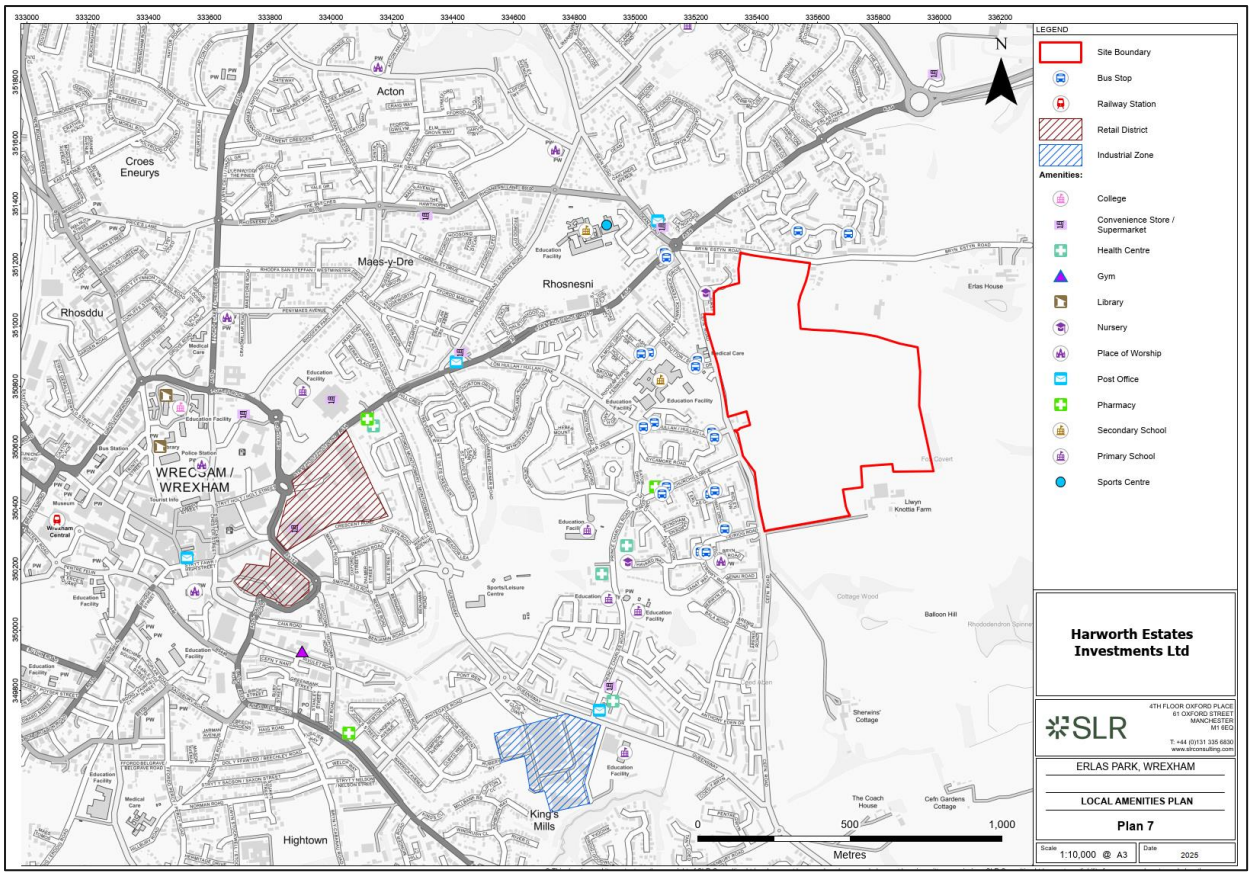
Local Facilities and Indicative Active Travel Catchments

2.5 Contemporary local and national transport policy states that new developments should be focused on locations which are, or can be made, sustainable. Providing travel choice is policy compliant and essential in today's modern and dynamic society. This focus maximises social inclusion, minimises the number of single occupancy private car trips, limits the need to travel, helps reduce congestion and helps to improve air quality and health.

2.6 One of the primary factors when considering the suitability of a new development is its proximity, accessibility, and connectivity in relation to key local facilities by non-car modes. Within this context, the development should give priority first to pedestrian and cycle movements both within the scheme and with neighbouring areas.

2.7 The highly sustainable nature of the KSS2 site location has already been established through the LDP site allocation process given that it benefits from proximity to a wide range of local facilities providing the potential to make it a very well-connected development. Such facilities are located in Borras to the north and Rhosnesni and Caia Park to the west, as illustrated in **Figure 2.1**.

Figure 2.1: Local Facilities



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2.8 Specific guidance on the distances that children are expected to be able to walk to school is found in the Welsh Government's 'Learner Travel Statutory Provision and Operational Guidance' document 2014, which identifies the walkable threshold for primary schools as 2 miles (3.2km) and for secondary schools as 3 miles (4.8km).

2.9 In addition, A White Young Green (WYG) report entitled 'Accessibility – How Far Do People Walk and Cycle' uses National Travel Survey (NTS) data for the UK as whole, excluding London, and provides an 85th percentile walk distance for:

- All journey purposes – 1,950 metres;
- Commuting – 2,400 metres;
- Shopping – 1,600 metres;
- Education – 3,200 metres or 4,800 metres; and
- Personal Business – 1,600 metres.

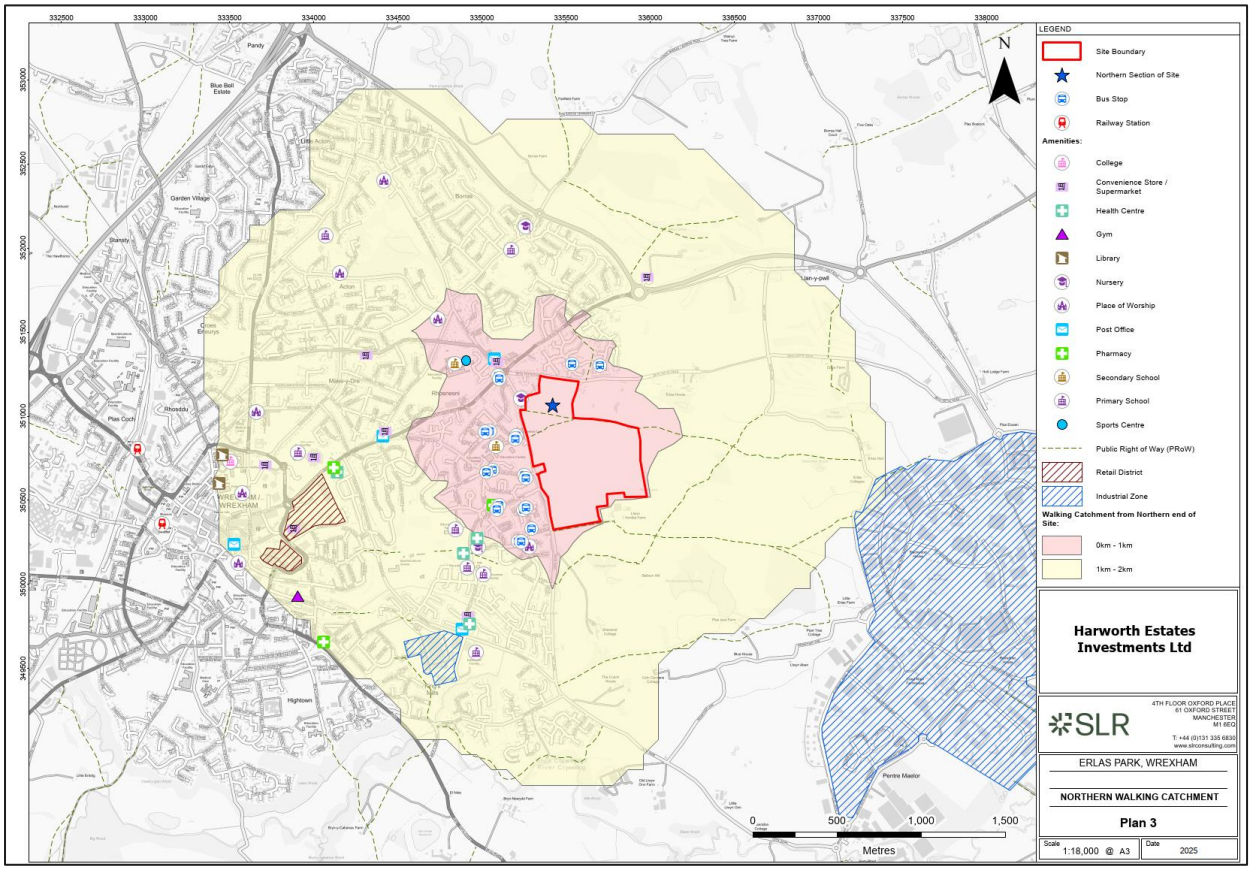
2.10 In terms of time, this equates, for instance, to approximately 30 minutes for commuting. **Table 2.1** provides a sample list of local facilities and services located within the local area along with their approximate distances from the centre of the each of the northern and southern site areas.

Table 2.1: Walk Distance to Local Services and Amenities

Local Amenity	Distance From Centre Of Northern Site Area	Distance From Centre Of Southern Site Area
Childcare and Education		
Ysgol Rhosnesni High School	750m	1,200m
Abbeyfield Day Nursery	150m	550m
Hafod Y Wern Community	1100m	450m
Rhosnesni High School	750m	1,600m
St Anne's Catholic Primary	1,400m	800m
Ysgol Cae'r Gwenyn Early	1,400m	700m
The Venture Integrated	1,500m	1,000m
Health and Social Care		
Caia Park Surgery	1,300m	700m
Plas Rhosnesni Care Home	260m	500m
Hillcrest Medical Centre	1,500m	1,500m
Pharmacy – Churchill Drive	1,000m	800m
Sport and Leisure		
Wrexham Athletics Club &	1,900m	1,500m
Borras Park Albion Football	450m	1,100m
Acton Park	1,200m	1,800m
Places of Worship		
St Mark's Church	1,100m	350m
St Anne's RC Church	1,400m	800m
St John's Church, Rhosnesni	850m	1,400m
Shops, Pubs and Eateries		
The Greyhound Inn	450m	1,200m
McColl's Convenience Store –	400m	1,300m
The Gate Hangs High	600m	1,200m
Premier Stores – Churchill Drive	1,000m	400m
Nisa Local – Stryt Holt	450m	850m
The Diner	1,800m	1,200m

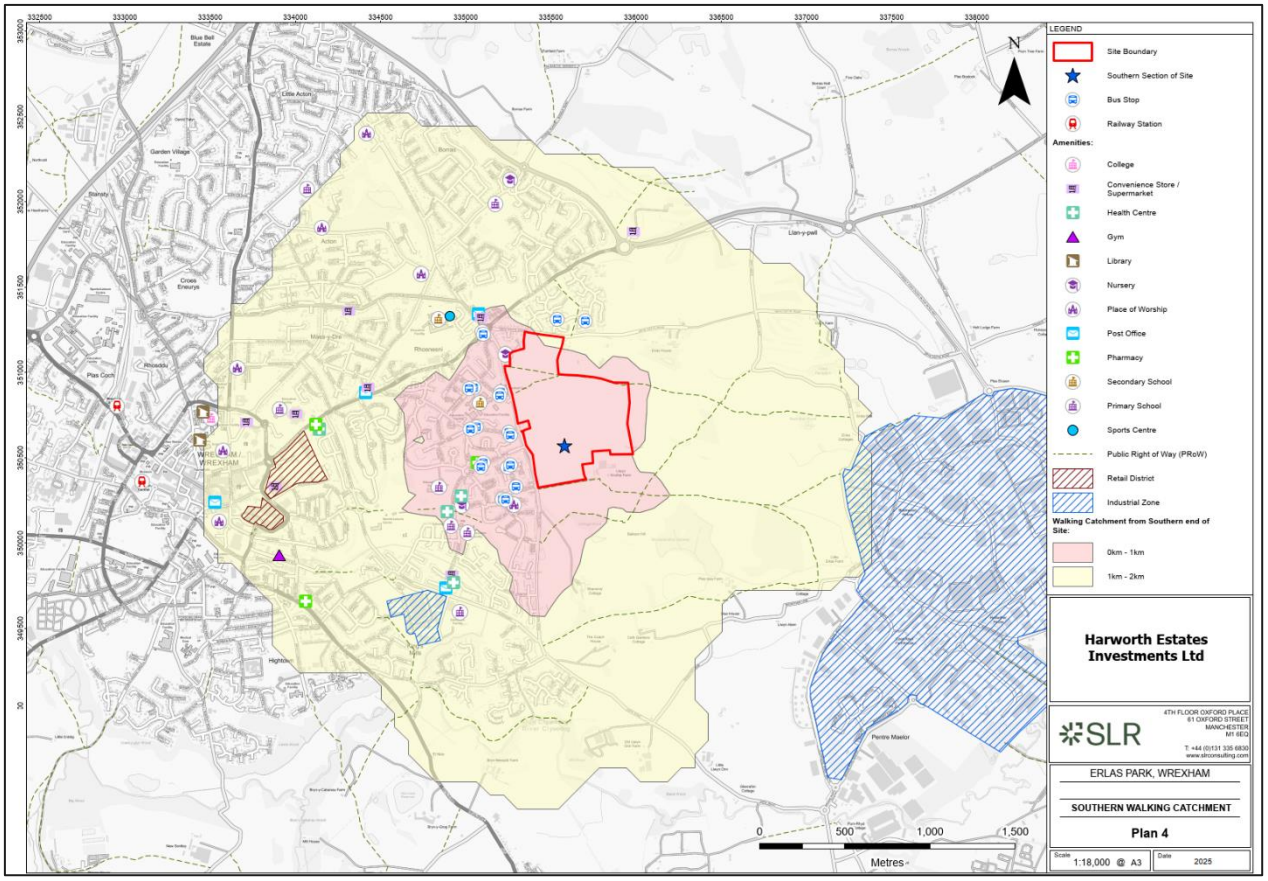
2.11 **Figures 2.2 and 2.3** illustrate 1km and 2km catchments from each of the northern and southern site areas respectively. These walk catchments show that the site is within a walking distance of a wide range of facilities and amenities in the surrounding area.

Figure 2.2: 1km and 2km Catchments – Site Northern Area



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Figure 2.3: 1km and 2km Catchments – Site Southern Area



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2.12 **Table 2.1** and the above figures highlight that the proposed development is very well connected and accessible for pedestrians to a wide range of local amenities within the surrounding areas of Caia Park, Rhosnesni and Borras. Wrexham City Centre is also within a reasonable walk catchment of 2km. This is consistent with the planning authority's judgement that this is a sustainable location, warranting its inclusion as a significant allocation for new housing development within the Local Plan.

2.13 It should be noted that the development proposals will include significant areas of open space with plentiful greenspace provided across the site, with community orchard and/or allotments, formal and informal leisure and recreation play spaces. This will ensure that many leisure and recreational activities can occur within the site, further reducing the need to travel.

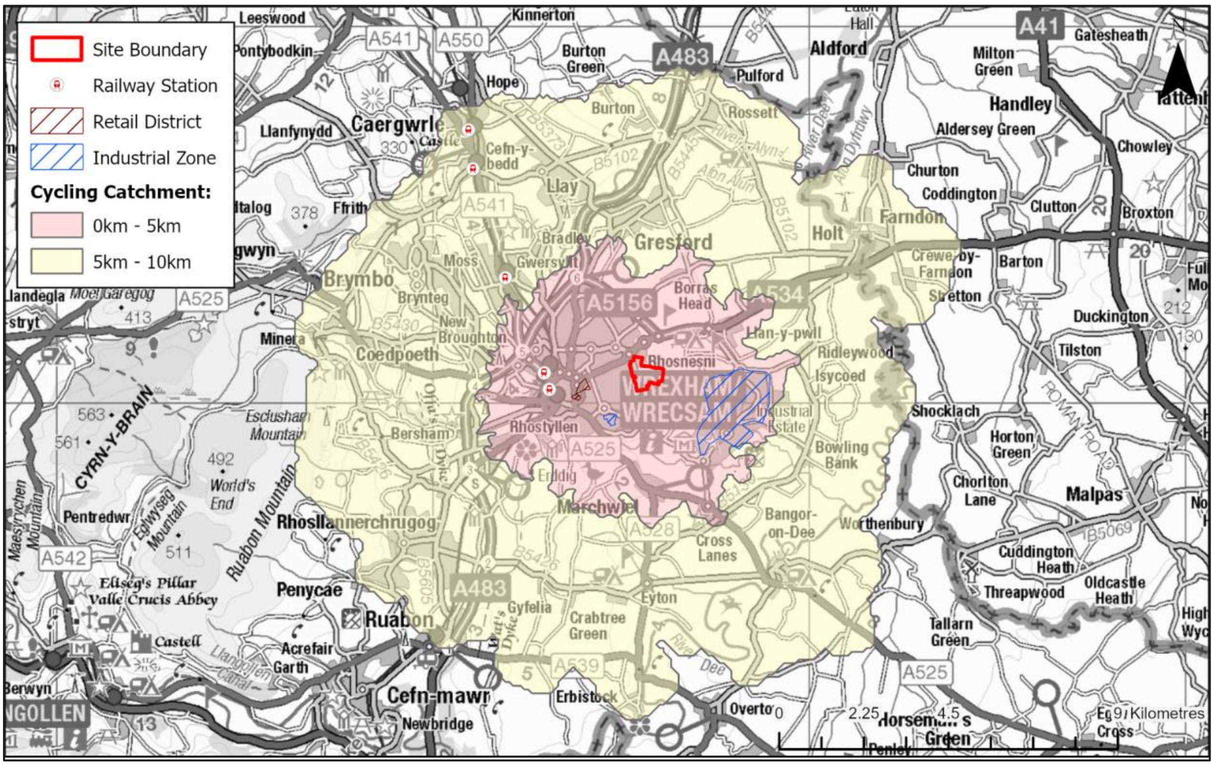
2.14 Future phases of the KSS2 development site are also set to deliver a 420-place primary school which will further enhance the sustainability of the site, through internalising a proportion of education trips, particularly those associated with school journeys during the morning peak period, albeit there are already several schools (primary and secondary) within walking distance of the site.

2.15 It should be noted that accessibility is not exclusively a function of distance; it being also related to the quality of the local environment and peer culture. For example, with reference to cycle journeys, the tendency for people to choose this mode is related to quality of route, barriers, whether the bike is electrically assisted, attitude to health, the journey purpose, the facilities at either end and personal matters. A half hour journey by bike at a comfortable pace,

on typical streets without cycle priority, will encompass a distance of approximately 8km, which is an average speed of around 10mph.

2.16 **Figure 2.4** presents 5km and 10km cycle catchments from the proposed development site.

Figure 2.4: 5km and 10km Cycle Catchments



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2.17 It can be seen from **Figure 2.4** that the 5km cycle catchment encompasses all of Wrexham City Centre and Wrexham Industrial Estate, therefore there is excellent opportunity for trips to these key locations to be made by cycle.

Active Travel Links for Local Living

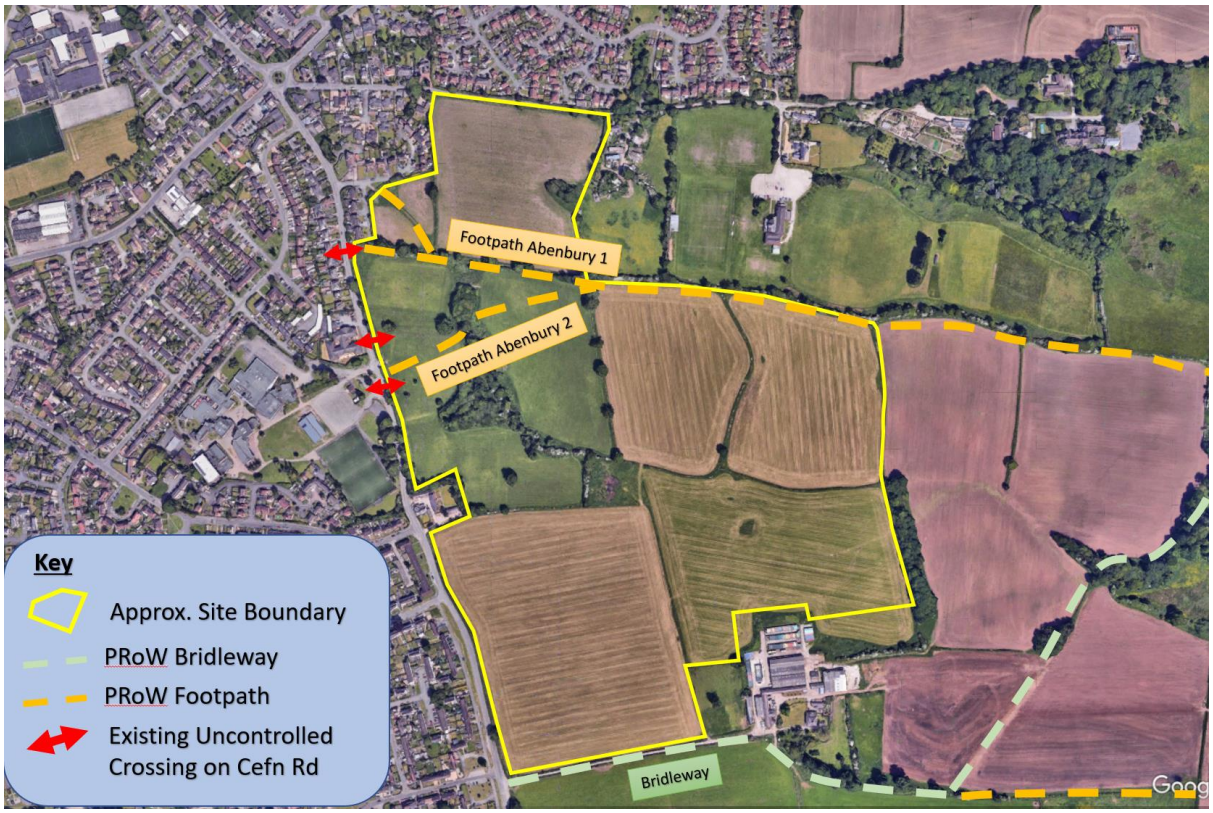
2.18 The pedestrian facilities in the vicinity of the proposed development include formal footways, shared footways/cycleways, and Public Rights of Way (PRoW). As shown in **Figures 2.2 and 2.3**, there are currently two PRoW footpaths that pass through the northern part of the site and a bridleway passes along the southern boundary of the site.

2.19 The PRoW routes passing through northern part of the site provide an east-west link between the site (Cefn Road) and Erlas Lane, facilitating another route on foot to Wrexham Industrial Estate. The bridleway that runs to the south of the site provides other west-east connection between Cefn Road and Wrexham Industrial Estate, including linking to the aforementioned footpaths and other PRoW routes in the surrounding area.

2.20 There is continuous footway provision along the western side of Cefn Road. There is footway provision along the eastern side of Cefn Road to serve the existing properties and PRoW connections on this side of the road, however the existing footway does not currently extend all the way along Cefn Road on this side.

2.21 There are three uncontrolled crossing points on Cefn Road along the site frontage as shown in **Figure 2.5**. These are towards the northern end of the site. Cefn Road has a 20mph speed limit which helps to create a pedestrian-friendly environment, assisting with crossing safety and comfort for pedestrians.

Figure 2.5: Existing PRoWs and Crossing Points on Cefn Road

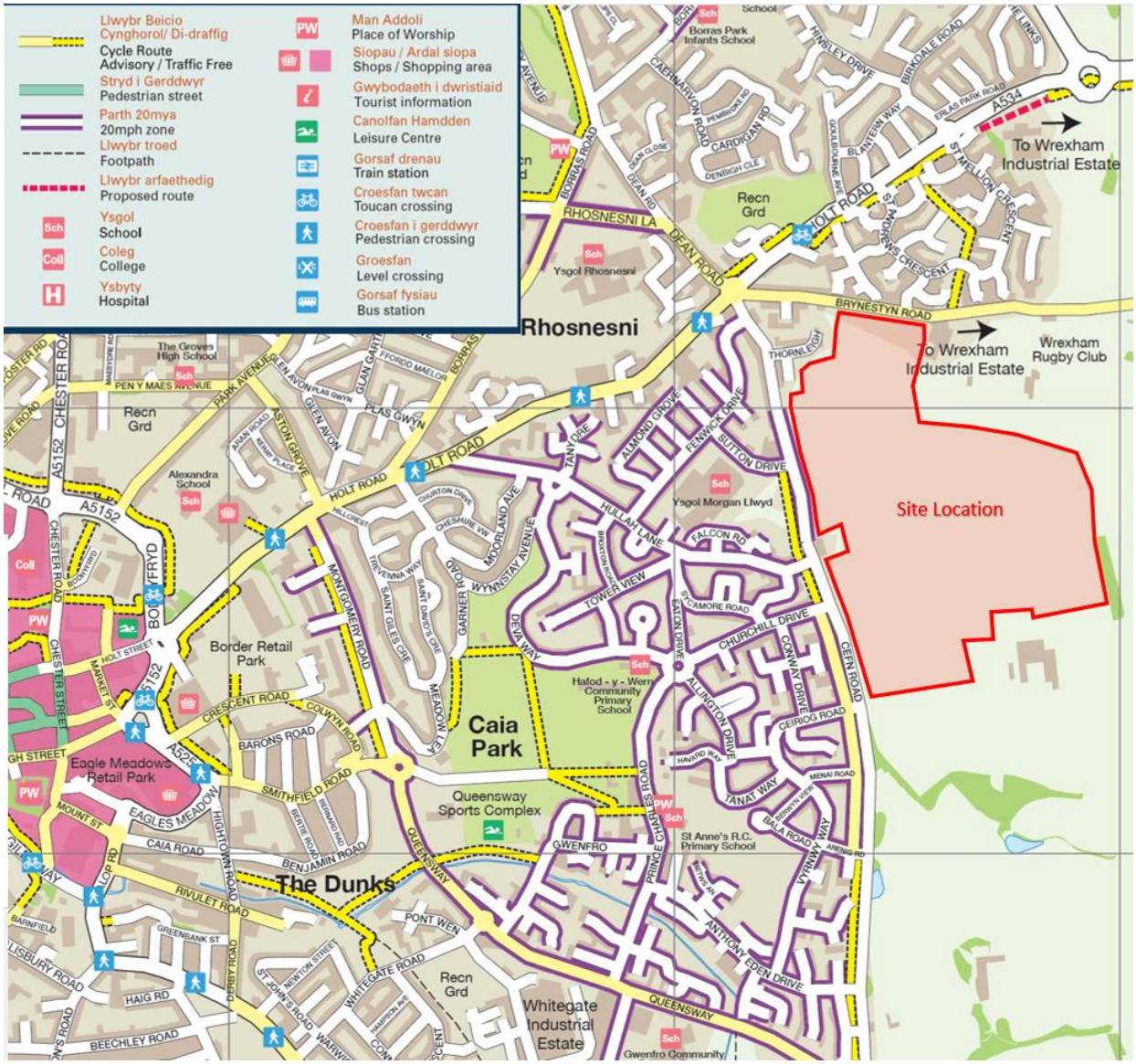


2.22 The uncontrolled crossing points on Cefn Road provide dropped kerbs and tactile paving, with the southernmost crossing also being on a raised table that helps to increase the visibility of the crossing.

2.23 In the wider area, pedestrian infrastructure in the Caia Park, Rhosnesni and Borras residential areas is generally at a good standard with an established network of footways and rights of way. This existing network of footways also allows for connections for pedestrians to Wrexham City Centre to the west.

2.24 **Figure 2.6** shows an extract from the Sustrans Wrexham Cycle map, showing the site in relation to the surrounding cycle infrastructure.

Figure 2.6: Extract from Wrexham Cycle Map (2014)



2.25 Bryn Estyn Road is an advisory cycle route that leads to Wrexham Industrial Estate and there will be an access point onto Bryn Estyn Road from the site facilitating direct access for cyclists between the site and this cycle route to the Industrial Estate.

2.26 Much of Cefn Road is designated as an advisory cycle route with a shared footway / cycleway running along part of the western side of the road and it is all now a 20mph zone, helping to encourage a cyclist-friendly environment. The Caia Park Estate is also a 20mph zone and this along with the advisory route along Holt Road provides for cycle connections between the site and Wrexham City Centre.

Shared Travel Links

2.27 Chartered Institution of Highways & Transportation (CIHT) guidance indicates that for commuting purposes bus stops should be within a 400 metre walk of residential development. There are several bus stops located within a 400 metre walk from the site. The closest bus

stops are located on Hullah Lane and Sutton Drive outside Morgan Llwyd School, with stops also located close by to the north on St Andrews Crescent. A summary of the services available from the stops in the area is provided in **Table 2.2**.

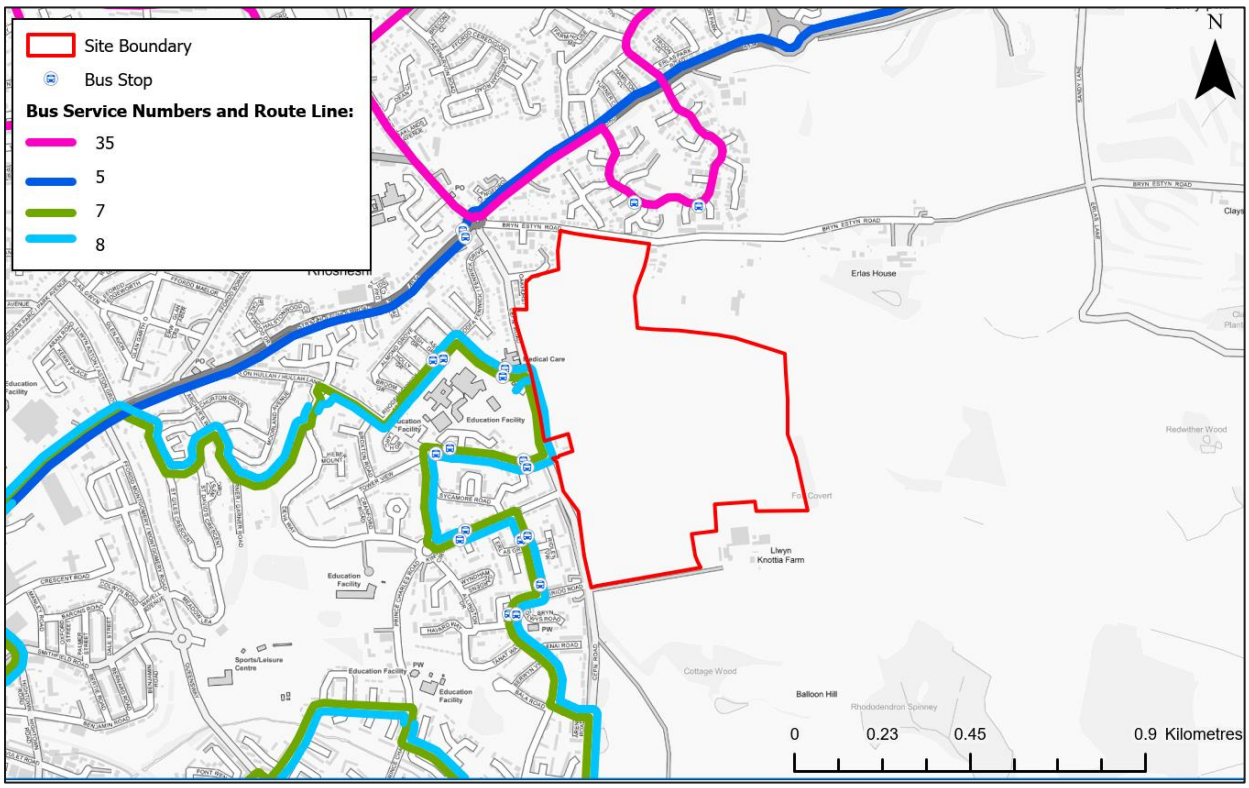
Table 2.2: Summary of Bus Services and Frequencies

Service Number	Route	Approximate Frequency (Per Hour)			
		Mon – Fri		Sat	Sun
		Day	Evening		
Sutton Drive and Hullah Lane					
7	Wrexham - Caia Park (clockwise)	2	1	2	Every 2 hours
8	Wrexham - Caia Park (anticlockwise)	2	2	2	Every 2 hours
St Andrews Crescent					
35	Wrexham - Plas Goulbourne – Sunningdale Estate	2	2	2	1
Holt Road					
5	Chester - Wrexham	Every 90 mins	Every 90 mins	Every 90 mins	-
35	Wrexham - Plas Goulbourne – Sunningdale Estate	2	1	2	1

2.28 Routes 7, 8 and 35 are all circular routes operating from Wrexham Bus Station and provide good accessibility during the day to Wrexham City Centre. All services start and terminate at Wrexham Bus Station. Service numbers 7 and 8 follow the same route with bus route 7 running clockwise from Wrexham and the No. 8 running anti-clockwise.

2.29 **Figure 2.7** illustrates the route line for each service number described in **Table 2.2.**

Figure 2.7: Bus Services and Route Line



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2.30 Whilst the bus stops on Holt Road are further away from the site they provide connections to destinations other than Wrexham City Centre including Chester. These bus stops can be accessed using the shared path connecting Gleneagles/Carden Park Way to Bryn Estyn Road and Holt Road.

2.31 The combination of three circular routes from the site to Wrexham City Centre provides good bus connectivity during weekdays and on Saturdays.

2.32 The site is therefore well located for access to bus travel, for commuting and school journeys but also for access to the other facilities and transport links available in Wrexham City Centre. It should be noted that there is an intention that the wider KSS2 site allocation once complete could potentially accommodate bus movements through the site linking Cefn Road and the A534 and serving the KSS2 site more directly. The development proposals do not prejudice the delivery of such a strategy, with the potential future link road through the KSS2 site having been anticipated and facilitated within the proposed masterplan design.

2.33 There are two railway stations – Wrexham Central and Wrexham General – located on the western side of Wrexham City Centre and they are both approximately 4 kilometres from the site. Both stations can be reached by taking a bus to Wrexham Bus Station in the city centre and walking approximately 260 metres to Wrexham Central or around 550 metres to Wrexham General.

2.34 Wrexham Central is the southern terminus of the Wrexham to Bidston Line (Borderlines Line) and connects North Wales to Merseyside with a service operated on an hourly frequency Monday to Saturday, and every 2 hours on Sundays. Services are run by Transport for Wales

(TfW). These services also stop at Wrexham General before continuing onto Wrexham Central.

2.35 Wrexham General is a main line railway station and the main station serving Wrexham and north-east Wales. It is operated by TfW but services are also provided by Avanti West Coast, which operates a service to London Euston with a change in Chester. Wrexham General provides connections to Cardiff, Holyhead, Chester and Birmingham, as well as stations along the North Wales train line. The site is therefore well located to present opportunities for travel by rail as part of a public transport journey chain or a linked trip including active travel modes.

Local Highway Network

Cefn Road

2.36 Cefn Road forms the western boundary of the site and provides a north-south route along the eastern side of Wrexham, providing access to the Caia Park residential area and providing connections for the A534 to the north and A525 to the south.

2.37 It is subject to a 20mph speed limit and there are raised table traffic calming measures in place to help enforce the lower speeds, including in the vicinity of the Sutton Drive junction and the Morgan Llwyd School.

2.38 Cefn Road is typically around 6.5m in width and is street-lit, with a central hatched median strip along much of the route north of the Hullah Lane junction to encourage low vehicle speeds. It accommodates bus movements as it forms part of the route for the 7/8 bus service.

Bryn Estyn Road

2.39 Bryn Estyn Road runs along the northern edge of the site. It has the character of a rural lane and connects the Greyhound Roundabout in the west to the industrial estate to the east. It also provides access to the Erlas Victorian Walled Garden. To the east of the Walled Garden the road is closed to motor vehicles so the connection to the east is for cyclists and pedestrians only.

Greyhound Roundabout

2.40 Cefn Road forms a five-arm priority roundabout with Holt Road, Dean Road and Bryn Estyn Road, known as the Greyhound Roundabout. The roundabout has a diameter of approximately 35m and all arms have single lane approaches. Facilities for pedestrians at the junction are limited, however there is a signalised pedestrian crossing on the Holt Road western arm around 50m from the roundabout.

A534 Holt Road and A5156

2.41 The A534 Holt Road is the main arterial route serving the eastern side of Wrexham. It links with the city centre road network at the Tesco's roundabout and then runs through the eastern residential areas of the town to its junction with the A5156. The road through this section is single carriageway with footways and subject to a 30mph speed limit. The road is urban in nature with frontage access, side road junctions and several controlled pedestrian crossing points.

2.42 The junction of Holt Road and A5156 is a large roundabout with a diameter of circa 90m, and subject to the national speed limit. The A534 continues to the east of the junction and the A5156 forms the northern arm of the roundabout. There is also a local access to Wrexham Golf Club and a roadside services area between the A5156 and A534 (east) approaches. There is no connection to the southern side of the roundabout which is where access to the northern part of the wider KSS2 site (being brought forward by Bloor and Barratt Homes) is proposed to be taken, and where the link road through the KSS2 site from Cefn Road would emerge if this comes forward in the future.

2.43 The A5156 is a dual carriageway extending north from the A534 roundabout and connects with the A483 Trunk Road at Junction 6. The road is derestricted and unlit. The A483 is part of the Strategic Road Network (SRN) that connects Wrexham with North Wales and Northwest England via the A55, M53 and M56.

Highway Conditions & the VISSIM Model

VISSIM Modelling

2.44 Peak hour traffic surveys were undertaken in 2017 and 2018 which informed the VISSIM modelling that has been undertaken in support of the KSS2 site allocation.

2.45 The VISSIM modelling work undertaken in support of KSS2 involved extensive data gathering and assessment work, which was endorsed by WCBC who jointly commissioned the work. Notably, the use of the industry standard VISSIM traffic modelling programme to assess the traffic effects of the KSS2 development as part of the Local Plan evidence base was selected because it provides a network wide assessment of the potential traffic generation of the site, that allows a more realistic assessment of the interaction of traffic passing between junctions on the network than the use of standalone junction models such as ARCADY and LinSig.

2.46 WCBC was satisfied with this being the case in support of the Local Plan process as is evident in their commissioning of the Local Plan VISSIM work, and the confidence invested by WCBC in the findings of that work to the extent that it was considered a sound basis upon which to allocate the KSS2 site within the Local Plan, which has now been adopted.

2.47 It is further noted that WCBC Highways have accepted the use of the Local Plan VISSIM work in support of the planning application for development at KSS2 North, both in terms of the extent of the assessment and the parameters used within the VISSIM model, such as trip rates. No additional standalone junction models were requested for that application nor was there any request from WCBC Highways to consider detailed assessment of any junction outside of the VISSIM model network.

Assessment Periods (2017, 2018 & 2023)

2.48 The peak hours assessed in the model are 08:00-09:00 and 16:30 to 17:30 and the corresponding survey flows on each of the local roads are shown in **Figures 2.8 and 2.9**.

2.49 The flows at the A5156 / Borras Park Road roundabout are from surveys undertaken in June 2017. The flows at the Greyhound Roundabout and A534 Holt Road / A5156 roundabout are from surveys undertaken in March 2018.

2.50 A Repeat of the set of surveys that were undertaken to inform the VISSIM modelling, has been undertaken in November 2023. The purpose of the exercise was to determine whether the VISSIM model is fit for purpose, and that the existing 2018 base model is robust and can still be relied upon.

2.51 The comparison exercise has been undertaken by SLR's modelling team (formerly Vectos Microsim who undertook the VISSIM Modelling for the Local Development Plan work) and is presented within a Technical Note at **Appendix B** to this report.

2.52 In summary, the comparisons show that the 2023 weekday AM and PM peak hours are the same as were found in the 2018 surveys. Network traffic flows however have fallen between 2018-23 by approximately 5%.

2.53 At the Greyhound Roundabout in particular, traffic flows have fallen by approximately 11% in both the AM and PM peak hours. The comparison for the Greyhound Roundabout is shown in **Table 2.3**.

Table 2.3: Summary of Traffic Flow Changes at Greyhound Roundabout 2018-2023

	AM			PM		
	2018	2023	Difference	2018	2023	Difference
Dean Rd	450	453	3	299	307	8
Holt Rd (E)	636	592	-44	822	692	-130
Bryn Estyn Rd	33	15	-18	52	29	-23
Cefn Rd	507	458	-49	447	450	3
Holt Rd (W)	419	320	-99	517	421	-96
Total	2045	1838	-207	2137	1899	-238
			-10%			-11%

2.54 It can be seen from **Table 2.3** that the overall traffic flows at the Greyhound Roundabout have reduced by around 10% in the morning peak hour and 11% in the evening peak hour between 2018 and 2023. There were 207 fewer vehicle movements through the junction in the AM peak hour and 238 fewer vehicle movements through the junction in the PM peak hour.

2.55 Not all arms of the Greyhound Roundabout showed a reduction in traffic flows since 2017/18, with marginal increases in traffic on the Dean Road and Cefn Road arms. However, these marginal increases are negligible. For example in the morning peak hour, Cefn Road shows a reduction of 49 vehicles. Dean Road shows an increase of 3 vehicles, which is not significant in the context of the total junction flow of 1,838 for that hour, which is 10% lower than the flow at the junction recorded in 2018 and would not change the conclusions of any modelling work.

2.56 In the evening peak hour, Dean Road shows an increase of 8 vehicles when compared to the 2017/18 flows whilst Cefn Road shows an increase of 3 vehicles. Such variations in traffic flows are insignificant in the context of the total hourly junction throughput flow of 1,899 for that hour, which is 11% lower than the flow at the junction recorded in 2018, and would not materially change the conclusions of any modelling work.

2.57 It should be noted that the applicant for the KSS2 North site has also separately undertaken updated traffic surveys in October 2023, covering four key junctions in the area:

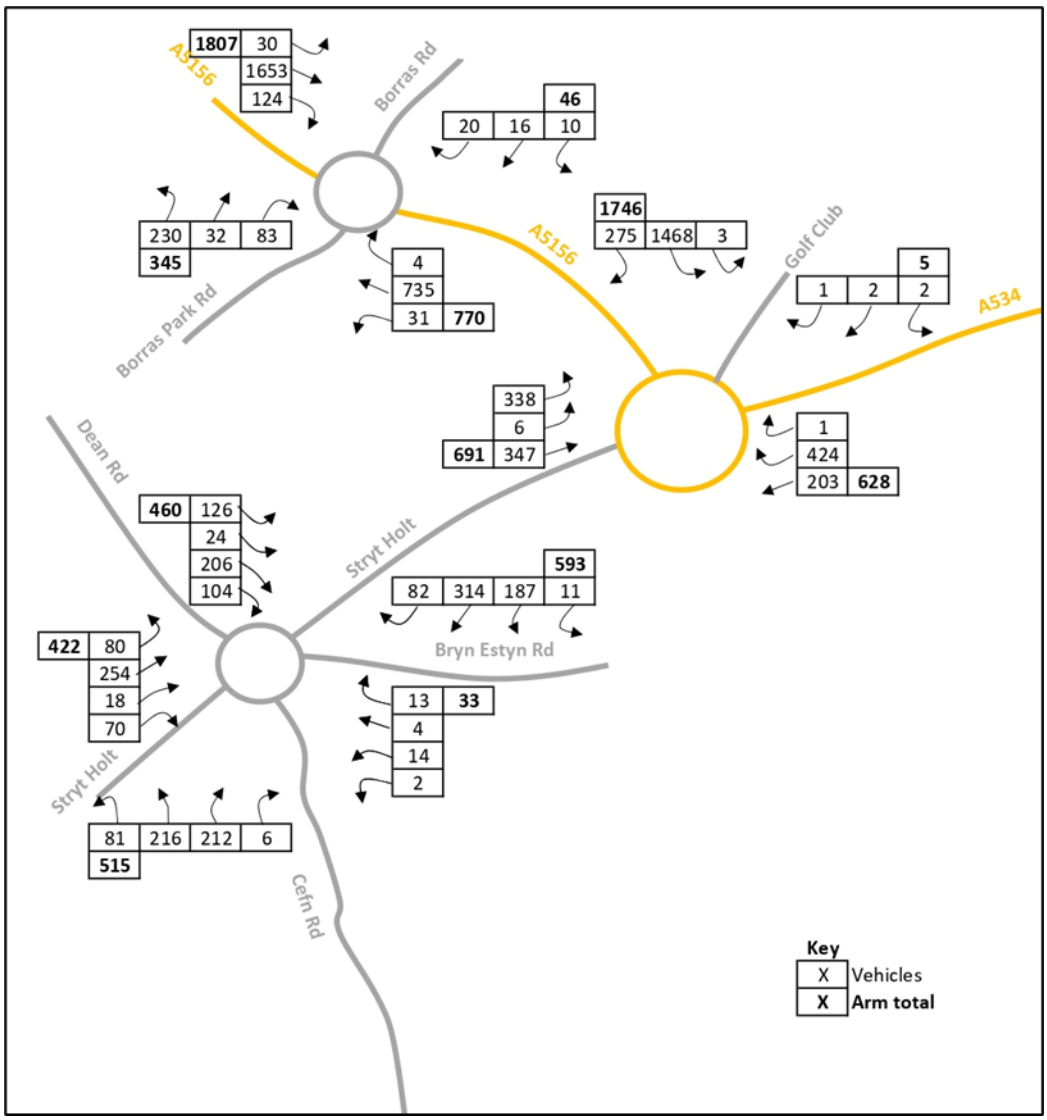
- The Greyhound Roundabout (A534 Holt Road / Cefn Road junction)
- The A534 / A5156 Roundabout (where the site access will be taken from)
- The A534 / Industrial Estate Roundabout
- The A5156 / Borras Park Road Junction.

2.58 Those surveys showed that the morning and evening peak hour total traffic flows through the junctions were lower in 2023 than in 2017/18. The highways information submitted in support of the KSS2 North application also concluded that the VISSIM modelling, which is based on the 2017/18 base flows is therefore still fit for purpose as a tool for assessing the KSS2 development proposals.

2.59 The above survey comparison exercise demonstrates that the Base model and the future year assessments from the VISSIM modelling undertaken for the Wrexham LDP remain a strong evidence base for development control, and the proposed mitigation measures identified in the 2019 assessment would be able to accommodate future traffic in light of new 2023 traffic survey data. Whilst comparable baseline flows have reduced, it is also likely that the forecasting exercise undertaken in 2019 has resulted in higher traffic growth percentages up to the forecast years than would be observed if the exercise was repeated now, due to the National Trip End Model (NTEM) being updated to version 8 to account for the latest Office for Budget Responsibility (OBR) employment and economic growth projections, further evidencing the strength and soundness of that assessment.

2.60 As a result, it can be concluded that the 2019 traffic modelling assessment in relation to the KSS2 allocation remains robust and therefore the associated VISSIM model is considered to be fit for purpose. The weekday peak hour flows that have informed the VISSIM modelling are shown in **Figure 2.8 and 2.9.**

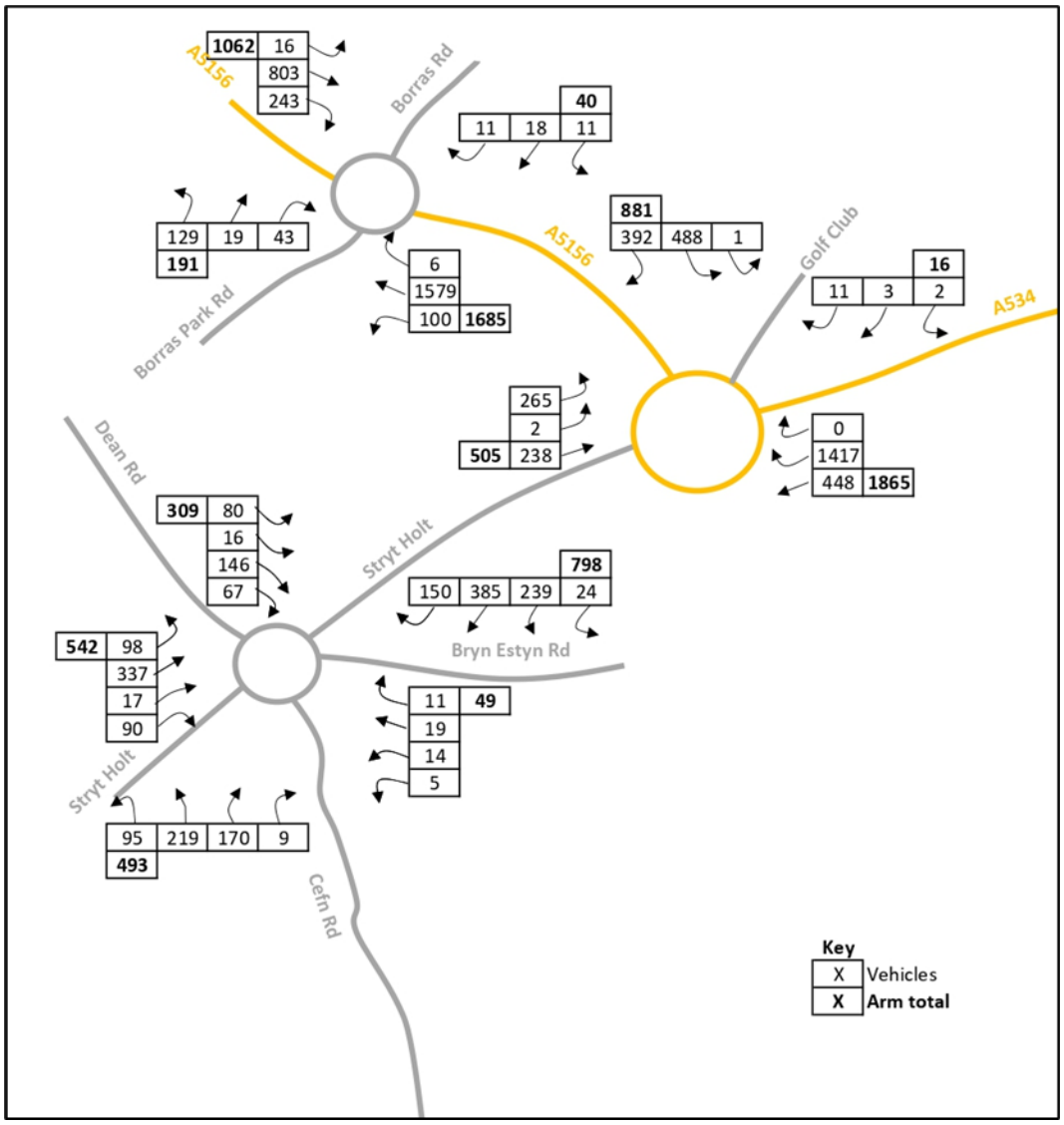
Figure 2.8: Surveyed Traffic Flows – Weekday Morning Peak Hour (2017/18)



2.61 It can be seen from **Figure 2.8** that two-way traffic flows on Cefn Road were recorded at 980 vehicles in the weekday morning peak hour. Flows along Bryn Estyn were much lower at 92 two-way movements. Holt Road had two-way traffic flows of around 1,200 vehicles in the morning peak hour.

2.62 There is a large traffic movement from the A5156 to the east towards Wrexham Industrial Estate in the morning peak reflecting the draw of this major employment area.

Figure 2.9: Surveyed Traffic Flows – Weekday Evening Peak Hour (2017/18)



2.63 It can be seen from **Figure 2.9** that two-way traffic flows on Cefn Road were recorded at 973 vehicles in the weekday evening peak hour, which is very similar to the traffic flows in the morning peak hour. Flows along Bryn Estyn were recorded at 115 two-way movements. Holt Road had two-way traffic flows of around 1,400 vehicles in the evening peak hour.

2.64 The large movement of vehicles from the A5156 to the A534 east that was in evidence in the morning peak hour is reversed in the evening peak hour, reflecting the commuting patterns associated with Wrexham Industrial Estate.

2.65 Observations of the local highway network undertaken in 2017 and 2024 reveal that the Greyhound junction operates under generally free flow conditions during the weekday morning and evening peak periods, but with occasional queues forming on Cefn Road and Holt Road North during these peak hours. It was observed that the queues would clear within a short space of time and would not persist for prolonged periods, and this assessment is supported by queue surveys.

2.66 Traffic conditions on Holt Road are heavily influenced by Wrexham Industrial Estate, with some congestion in evidence during the traditional commuting peaks at the beginning and end

of the working day, however for the majority of the day this part of the network operates with significant spare capacity and provides the industrial estate with an excellent connection to the SRN to the north and Wrexham.

Personal Injury Accident Record

2.67 A review of highway safety on the local road network has been undertaken via reference to the CrashMap online database. The analysis has been undertaken to include Cefn Road and Bryn Estyn Road in the vicinity of the site, along with the Greyhound Roundabout. The five-year period from 2018-2022 has been reviewed and the accident plot is shown in **Figure 2.10**.

Figure 2.10: Accident Location Plot (2018-2022)



2.68 It can be seen from **Figure 2.10** that there has been one accident on Cefn Road, resulting in slight injury. This occurred to the north of the junction with Ceiriog Road. The incident did not involve any vulnerable road users. There have been no accidents recorded on Bryn Estyn Road in the five-year period reviewed.

2.69 No injury accidents have occurred at the Greyhound Roundabout.

2.70 The recent implementation of the 20mph speed limit across all the roads in the area will help to reduce the risk of any collisions, reduce the risk of injury from any collision and improve the road environment for active travel users.

2.71 The safety record on this local network can be considered to be good, given the levels of traffic and presence of other road users in this area, and it does not show any trends that would call into question the proposed development.

Summary

2.72 The proposed development is located approximately 2km north-east of the centre of Wrexham at the edge of the existing built form and around 2km to the north-west of Wrexham Industrial Estate. The site is generally flat and predominantly in agricultural use with existing field boundaries marked by hedgerows.

2.73 The highly sustainable nature of the KSS2 site location has already been established through the LDP site allocation process given that it benefits from proximity to a wide range of local facilities providing the potential to make it a very well-connected development. These local active travel connections to key facilities have been explored in detail within this report, and it has been demonstrated that walking and cycling will be highly attractive modes for access to and from the development.

2.74 There are several bus stops located within a 400 metre walk from the site served by buses that provide direct connections during the day to Wrexham City Centre. Bus stops on Holt Road provide connections to Chester. The site is therefore well located for access to bus travel, for commuting and school journeys but also for access to the other facilities and transport links available in Wrexham City Centre. It should be noted that there is an intention that the wider KSS2 site allocation once complete could potentially accommodate bus movements through the site linking Cefn Road and the A534 and serving the KSS2 site more directly. The development proposals do not prejudice the delivery of such a strategy, with the potential future link road through the KSS2 site having been anticipated and facilitated within the proposed masterplan design.

2.75 There are two railway stations – Wrexham Central and Wrexham General – located on the western side of Wrexham City Centre both approximately 4 kilometres from the site. Both stations can be reached by taking a bus to Wrexham Bus Station in the city centre and walking approximately 260 metres to Wrexham Central or 550 metres to Wrexham General. The site is therefore well located to present opportunities for travel by rail as part of a public transport journey chain or a linked trip including active travel modes.

2.76 The surrounding highway network has been reviewed in relation to traffic flows and general traffic conditions. A repeat of the set of traffic surveys that were undertaken to inform the VISSIM modelling in 2017/18 has been undertaken in November 2023. The exercise has demonstrated that peak hour traffic flows across the network have reduced by around 5% since the development of the VISSIM model, and by up to 11% at the Greyhound Roundabout, and therefore the existing 2018 base model can still be relied upon and the outcomes of that assessment are still valid.

2.77 Observations of the local highway network reveal that the Greyhound junction operates under generally free flow conditions during the morning and evening peak periods, but with occasional queues forming on Cefn Road and Holt Road North during these peak hours, and on Holt Road South during the evening peak. It was observed that the queues would clear within a short space of time and would not persist for prolonged periods, and this assessment is supported by queue surveys undertaken for the VISSIM modelling.

2.78 The highway safety record has been reviewed in relation to recorded personal injury accidents and it has been found that the safety record on the local network can be considered to be good, and this does not show any trends that would call into question the proposed development.

3.0 Policy and Guidance

3.1 This section considers the relevant national and local transport planning policy and design standards that should inform the development of the site and the overall strategy for access and movement within the site. The specific policy and guidance documents considered include:

- Planning Policy Wales (PPW) Edition 12, February 2024;
- The Wales Transport Strategy 2021;
- Active Travel Act Guidance July 2021;
- Technical Advice Note 18 (TAN 18): Transport, March 2007;
- Joint North Wales Local Transport Plan (LTP), January 2015;
- Wrexham Local Development Plan (LDP) 2013 to 2028; and
- Wrexham Residential Design Guide, June 2009.

3.2 A key theme of current national and local policies is to promote and deliver sustainable transport objectives, and this plays an important role in defining the access strategy for the proposed development.

National Planning Policies and Guidance

Planning Policy Wales

3.3 Planning Policy Wales (PPW) Edition 12, was published in February 2024, and sets out the land use planning policies of the Welsh Government. It translates the Government's commitment to sustainable development into the planning system to ensure that it plays an appropriate role in moving towards sustainability.

3.4 The PPW is supplemented by a series of Technical Advice Notes (TAN's) with procedural advice given in circulars and policy clarification letters.

3.5 At the heart of the PPW is the key theme of sustainable development and the PPW highlights the need for the planning system to play an active role in guiding development to sustainable solutions. It highlights that the planning system should reconcile the needs of development and conservation, securing economy, efficiency and amenity in the use of land, and protecting natural resources and the historic environment. It maintains that a well-functioning planning system is fundamental for sustainable development.

3.6 The Welsh Government was one of the first administrations in the world to have a distinctive statutory duty in relation to sustainable development. The Well-being of Future Generations (Wales) Act 2015 places a duty on public bodies that they must carry out sustainable development. The PPW addresses each of the seven goals of the Well-being of Future Generations Act, which are:

- A Prosperous Wales;
- A Resilient Wales;
- A More Equal Wales;

- A Healthier Wales;
- A Wales of Cohesive Communities;
- A Wales of Vibrant Culture and Thriving Welsh Language; and
- A Globally Responsible Wales.

3.7 Transport plays a key part in promoting and ensuring sustainable development and meeting each of these themes. Well-designed sustainable transport solutions can ensure access to employment, services and amenities, promotes social inclusion, and promotes a healthy society whilst minimising the impact of development on the environment.

3.8 Section 4 of the PPW concerns Active and Social Places and highlights that:

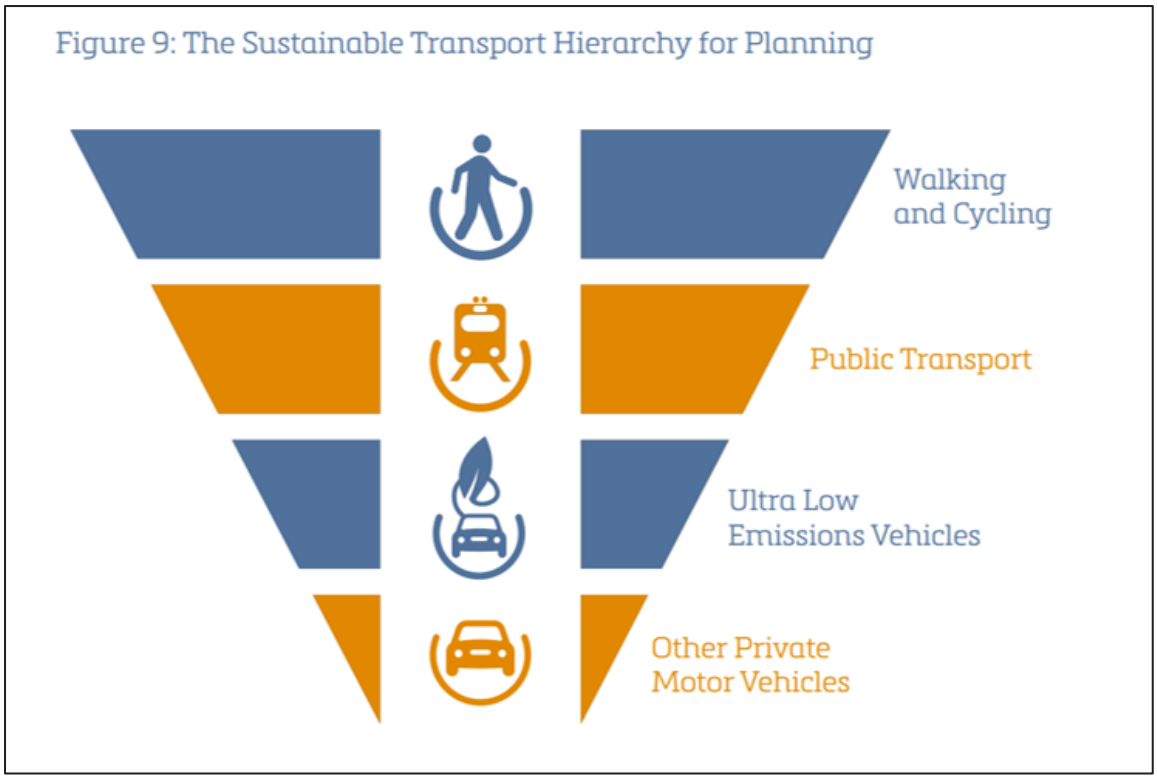
> "*Active and Social Places are those which promote our social, economic, environmental and cultural well-being by providing well-connected cohesive communities. Places which are active and social contribute to the seven goals of the Well-being of Future Generations Act*".

3.9 It goes on to state that:

> *"Development proposals must seek to maximise accessibility by walking, cycling and public transport, by prioritising the provision of appropriate on-site infrastructure and, where necessary, mitigating transport impacts through provision of off-site measures, such as the development of active travel routes, bus priority infrastructure and financial support for public transport services. Importantly, sustainable transport infrastructure and services should be prioritised and put in place from the outset, before people have moved in and travel patterns have been established".*

3.10 The document provides an illustration of the hierarchy to be applied in development planning, and this is reproduced in **Figure 3.1**.

Figure 3.1: PPW Extract – Figure 9: The Sustainable Transport Hierarchy for Planning



3.11 In relation to design standards, PPW notes that the design of new or enhanced streets should respond to urban design principles, including those in Manual for Streets and the Active Travel Act Guidance, and not adhere to rigid standards.

3.12 It goes on to state that:

> *"Planning authorities must support active travel by ensuring new development is fully accessible by walking and cycling. The aim should be to create walkable neighbourhoods, where a range of facilities are within walking distance of most residents, and the streets are safe, comfortable and enjoyable to walk and cycle."*

LLwybr Newydd: The Wales Transport Strategy 2021

3.13 The Wales Transport Strategy 2021 has been prepared to set out a new way of thinking that places people and climate change at the front and centre of the transport system in Wales. This is part of the aim of achieving net zero by 2050 and it states that the intention is to, "*change the way we travel... we need fewer cars on our roads, and more people using public transport, walking or cycling*".

3.14 The Strategy identifies three headline priorities for the next five years:

- Priority 1: Bring services to people in order to reduce the need to travel;
- Priority 2: Allow people and goods to move easily from door to door by accessible, sustainable and efficient transport services and infrastructure; and
- Priority 3: Encourage people to make the change to more sustainable transport.

Active Travel Act Guidance 2021

3.15 Active travel is a key priority in the Welsh Transport Strategy and the Active Travel Act Guidance document provides the mandate to act on the imperative to deliver high quality active travel networks and schemes that maximise the benefit of investment. Where appropriate, the guidance aligns with the Department for Transport's LTN1/20 on cycling infrastructure design.

3.16 In relation to new developments, the guidance notes that the design of development proposals shall, in accordance with the sustainable transport hierarchy, start with identifying the shortest, most attractive walking and cycling connections and then addressing the other transport needs.

3.17 The guidance identifies that:

> *"Walking is most suitable for journeys of less than two miles whilst cycling is also convenient for longer journeys, typically up to five miles for regular utility journeys (although a rise in popularity of e-cycles can increase the distances covered). Both modes can contribute to part of a longer journey, for example as the first/last leg of a public transport journey".*

3.18 The guidance document contains detailed specifications for the design of footways and cycleways, and these have informed the design development of the proposals.

Technical Advice Note 18 (TAN18): Transport

3.19 Technical Advice Note 18 (TAN 18) should be read in conjunction with the PPW and is intended as a supplementary document. TAN 18 outlines how to integrate land use and transport planning and explains how transport impacts should be assessed and mitigated.

3.20 It includes advice on transport related issues when planning for new development including integration between land use planning and transport, location of development and design of development. It provides the standards to be applied in terms of visibility splays at junctions and these are in accordance with those set out in Manual for Streets.

3.21 TAN 18 highlights that an efficient and sustainable transport system is a requirement for a modern, prosperous and inclusive society. However, transport, particularly road traffic, can also have negative impacts on human health and the environment. It highlights that the overarching aim of transport policy in Wales is aimed at reducing road traffic.

3.22 TAN 18 outlines a number of objectives to achieve sustainable transport. These objectives include:

- Promoting resource and travel efficient settlement patterns;
- Ensuring new development is located where there is, or will be, good access by public transport, walking and cycling, minimising the need for travel and fostering social inclusion;
- Managing parking provision;
- Ensuring that new developments include appropriate provision for pedestrians;

- Encouraging the location of development near other related uses to encourage multi-purpose trips;
- Promoting cycling and walking;
- Supporting the provision of high quality, inclusive public transport; and
- Encouraging good quality design of streets that provide a safe public realm and a distinct sense of place.

3.23 TAN 18 highlights that local authorities should seek to maximise relative accessibility rather than ensuring everyone can travel everywhere. In this instance accessibility refers to the relative ability to take up services, markets or facilities. The Welsh Government argues that focusing on accessibility is important in addressing social exclusion and for maximising choice in services, employment and recreation opportunities.

Local Policies and Guidance

Joint North Wales Local Transport Plan

3.24 The Joint North Wales Local Transport Plan (LTP) has been jointly prepared by the six North Wales Local Authorities of Conwy County Borough Council, Denbighshire County Council, Flintshire County Council, Gwynedd Council, Isle of Anglesey County Council and Wrexham County Borough Council. The joint authority is commonly referred to as Taith.

3.25 Taith has responsibility for the development and delivery of the LTP in North Wales. The underlying theme and objectives of the LTP are to promote policies and measures to foster and achieve improved opportunities for travel choices by non-car modes. This provides the context for specific local measures to be considered, promoted and introduced.

3.26 The LTP covers a detailed programme from 2015 to 2020 and provides a framework for schemes until 2030. It sets out a range of interventions for all modes of travel with schemes responding to the issues of transport in the region and complementing those being developed at the national level and across borders.

3.27 The LTP aims to improve connections to key destinations and markets, enhance access to employment and services, increase the level of walking and cycling, bring improved safety and security and at the same time bring benefits and minimised impacts on the environment.

Wrexham Local Development Plan

3.28 The Wrexham Local Development Plan 2013-2028 (‘LDP’) was adopted in December 2023. The proposed development falls within land for allocation in the LDP known as Key Strategic Site 2: Land east of Cefn Road, Wrexham. Policy SP4 KSS2: Land east of Cefn Road, Wrexham, of the LDP allocates KSS2 for development and the extent of the site is identified in the Local Plan Figure 6: KSS2 masterplan framework.

3.29 Four of the Strategic Objectives of the Plan are relevant to the development of KSS2 in the context of accessibility and transport.

- Strategic Objective 4: Promote active travel and use of public transport by locating new development in the most accessible and sustainable locations; and seek to alleviate

known highway infrastructure capacity constraints on the road network within the County Borough;

- Strategic Objective 6: Promote and encourage a healthy, active and safe lifestyle;
- Strategic Objective 8: Ensure all development is supported by the necessary provision of, or improvements to infrastructure, services and facilities in an effective and timely manner to make development sustainable and minimise its effect upon existing communities; and
- Strategic Objective 10: Reduce carbon emissions and maximise our resilience to and mitigate and adapt to the impact of climate change.

Wrexham Residential Design Guide

3.30 This guidance note reinforces policies on encouraging good design and outlines the Council's requirements for sustainable buildings and forms a material consideration in the determination of all planning applications.

3.31 This guidance highlights that sustainable development is a key objective of planning, and all residential schemes must be environmentally sustainable. In achieving environmentally sustainable design solutions new developments should maximise the least harmful forms of movement and transport, prioritising sustainable transport options.

3.32 A three-step process is encouraged within the Design Guide to ensure high standards of design are achieved in new residential developments. The aim of this process is to ensure that design principles are considered from the start and ensure flexibility in design to allow for sustainable measures to be implemented sooner rather than later.

3.33 The first stage of this process is the site appraisal which aims to consider the existing key features and surroundings which contribute to its character and local distinctiveness as well as those factors which constrain development. The site appraisal should address the following transport planning issues:

- Footways and Public Rights of Way;
- Roads – to include an analysis of the width, class and distance to main junction;
- Visibility at junctions; and
- Public transport routes to the site.

3.34 The guidance also contains the parking standards applicable to new developments in the area.

Principles of the Access Strategy

3.35 The proposed access strategy for the development provides the means to achieve the identified policy objectives by optimising the opportunity for access to/from the site by non-car modes. This is in accordance with all local, regional and national policies. The preceding chapter detailed the existing accessibility of the site for those travelling on foot and cycle, along with the accessibility of the site by public transport, highlighting the excellent opportunities to integrate with these existing active travel and sustainable transport links and provide enhancements to improve connectivity in the surrounding area.

3.36 The proposed access strategy for the development reflects the need to appropriately consider and enable provision for the movement of people and goods, acknowledging the context of the wider area. Consideration has been given to:

- The permeability of the site and the connections to the surrounding area, for all modes of transport;
- Appropriate vehicular access points to the site, and potential routeing of trips to external linkages; and
- Internal access arrangements.

3.37 The main spine road running through the southern development parcel has been designed to potentially provide a future transport link through the wider KSS2 site to link Cefn Road with the A534. The provision of connectivity between the northern and southern parts of the KSS2 site is a LDP policy requirement for KSS2 (Policy SP4).

Summary

3.38 In summary, the development proposals align well with the overall national and local policy guidance, with the site being located close to a range of amenities, employment opportunities and public transport links that will help to encourage trips by foot, cycle and public transport. The proposals are therefore consistent with national and local transport policy objectives.

4.0 Proposed Development

Development Scale and Overview

4.1 The description of the development is as follows:

"Outline Planning Application for Residential development for the construction of up to 900 residential dwellings with associated infrastructure (playing fields, open space and SUDs attenuation) with all matters reserved except for detailed means of primary highway access".

4.2 The proposed development is part of a wider site allocation known as KSS2 within the adopted Wrexham LDP 2013 – 2028.

4.3 The planning application is made in outline with all matters reserved other than the proposed points of access onto Cefn Road. The indicative masterplan is shown at **Appendix C.**

4.4 A primary school will be provided on Council-owned land within the wider allocation area.

4.5 The residential mix will include affordable homes and there will be new public open space provided and plentiful greenspace provided across the site, with dedicated pedestrian and cycle infrastructure to promote active travel trips.

Phasing

4.6 The proposed development would be delivered in two phases, which are linked to the delivery of the main internal spine road through the site which could provide a future connection to KSS2 North.

4.7 Phase 1 is for up to 600 homes and can be delivered prior to the delivery of the main internal road through the southern parcel of the development site.

4.8 Phase 2 would deliver the remaining 300 dwellings and would be delivered once the main internal road is in place up to the northern boundary.

4.9 The proposed phasing plan is shown in **Figure 4.1**. Phase 1 would comprise a northern and southeastern parcel for residential development, fronting Cefn Road. The northern parcel of Phase 1 would comprise of up to 148 dwellings and the southern parcel around 400 dwellings (but up to 452), although exact numbers would be determined at the reserved matters stage.

4.10 Phase 2 would comprise a parcel further east within the site for residential development of around 300 dwellings.

4.11 The masterplan phasing plan allows for buses to route within the site prior to the link road being delivered, meaning that buses would be able to enter the site from the Cefn Road primary southern access and serve areas within Phase 1 south, looping back to exit again onto Cefn Road. This strategy has been discussed with the WCBC public transport officer and demonstrates that the proposed phasing strategy would not leave areas to the east of the site without acceptable access to public transport prior to delivery of the link road.

Figure 4.1: Proposed Phasing Plan



The Transport and Mobility Strategy

4.12 The Transport Strategy focuses on four key areas to create a socially inclusive community which supports national and local planning policy, encouraging non-motorised travel modes and prioritising walking and cycling followed by public transport modes. The four key areas that inform the transport and mobility strategy are as follows:

- **Design**. Through good, thoughtful design, creating communities where local living and public interaction, outdoor and indoor, is the norm and where it is not an automatic reaction when leaving home to get into a car. The site is well placed to take advantage of the proximity of a wide range of day-to-day facilities in the area and the design of the scheme looks to capitalise on this with convenient connections into the existing active travel networks;
- **Choice**. Providing the infrastructure and facilities to minimise reliance on any single option of transport. This assists in widening social inclusion and makes car use more of a choice and less of a necessity. Increased choice provides the opportunity to change behaviour and the proposals will provide appropriately for active travel modes;
- **Behaviour**. Educating people in the options and consequences for mobility to bring awareness of health, environment, and personal convenience. Travel Planning and Personalised Travel Planning can be significant factors in encouraging behavioural change, and a Framework Travel Plan accompanies the planning application; and

- **Network Management**. Managing the road network in accordance with national and local policy, with walking at the top of the hierarchy followed by cycling, public transport and finally car. Car travel is the lowest capacity network in terms of space occupied per person and occupies the lowest priority in the user hierarchy. This means prioritising the reliability and speed of bus and cycle movements over that of cars in the commuter peaks. As such, the objective of the Transport Strategy is not to follow a predict and provide approach to delivering more road capacity to the detriment of investment for other modes of travel choice.

Proposed Vehicular Site Access Strategy

4.13 Vehicle access to the site will be via Cefn Road only, making use of the significant site frontage along the eastern side of this road. Whilst the northern part of the site also has frontage with Bryn Estyn Road, it is not appropriate to form a vehicle access onto this road due to its more rural nature.

4.14 Two primary points of access are proposed to serve the residential development off Cefn Road – one at the north-western end of the site (northern access) and one at the south-western end of the site (southern primary access). A secondary southern access is also proposed to the south of the southern primary access on Cefn Road, to provide additional permeability and a dedicated emergency access.

4.15 An overview of all of the proposed three accesses along Cefn Road is shown in **Drawing VN232881-D100 Rev B**.

Northern Access

4.16 The proposed access arrangement for the northern development parcel is presented in **Drawing VN232881-D103 Rev B**. It can be seen from this drawing that a simple priority arrangement is proposed and suitable visibility splays of 2.4m x 43m can be provided at the access junction, appropriate for the 30mph speed limit of Cefn Road in accordance with guidance in Manual for Streets (MfS) and other relevant design guidance.

4.17 The access road will be 5.5m in width and footways of 2m will be provided along both sides of the access road leading into the site. Footway provision will extend south from the access along the eastern side of Cefn Road, linking to a proposed new controlled pedestrian crossing point to help facilitate safe crossing movements on Cefn Road.

4.18 To the north of the proposed access, there is not proposed to be any new footway adjacent to the Cefn Road carriageway. However, the proposed extent of the new footway along the site frontage has been carefully considered taking into account various constraints including arboricultural constraints. There are significant trees and hedgerows to the north of the proposed site access and there is a strong desire to retain these from an arboricultural perspective. As such, a route for pedestrians has been shown on the masterplan within the site running to the north of the site access to link to the existing footway on Cefn Road further north, including the existing dropped kerb crossing on Cefn Road. This route would be designed as an attractive pedestrian path and would be segregated from traffic, increasing its appeal for pedestrians.

4.19 This arrangement will also preserve the existing hedgerow and trees to the north of the proposed access, whilst still providing for north-south pedestrian connections along the eastern side of Cefn Road.

4.20 The proposed access junction has been tested in terms of capacity using industry standard modelling software and it has been found to provide suitable capacity for the anticipated traffic levels. Further detail is provided in Section 8.

Southern Primary and Secondary Access

4.21 The proposed access arrangement for the southern primary and secondary access junctions is presented in **Drawing VN232881-D101 Rev E**. It can be seen from this drawing that the primary access is designed as a signal-controlled junction with single lane approaches. This would be the end of the main internal spine road that runs through the development site serving phases 1 and 2 on the southeastern parcel of the site, and it could also facilitate a potential future link road connecting to the KSS2 North site. The signal arrangement is appropriate for both scenarios and has been tested in terms of capacity using industry standard modelling software (see section 8 for details). It should be noted that capacity testing has demonstrated that this access junction would also have a satisfactory operation without the signal control, however the signals have been proposed in response to pre-application feedback from WCBC Highways and these discussions informed a signal control arrangement to assist with active travel crossings in the vicinity of the junction.

4.22 The primary access will include segregated shared footway / cycleway provision along both sides of the road leading into the site. It is designed to provide sufficient space to accommodate bus turning manoeuvres in anticipation of the road providing access for bus services to route into the development in the future.

4.23 The crossings have been designed as toucan crossings to allow pedestrians and cyclists to cross the site access road and Cefn Road under signal control in this location. This will allow cyclists and pedestrians to safely access the existing footway / cycleway on the western side of Cefn Road.

4.24 To the north of the primary access along the site frontage the footway will be as per the existing arrangement that provides a circa 2m footway up to a point just north of Hullah Farm. To the south of the primary access, it is proposed that there is new footway / cycleway for around 60m before it ties into the existing footway provision along the site frontage and cyclists continue on the carriageway in line with the existing on-carriageway provision on the eastern side of Cefn Road south of the site boundary. The proposals will include the extension of the on-carriageway cycle lane markings to the north to tie in with the site access arrangements.

4.25 For the southern secondary access, a simple priority arrangement is proposed as shown in **Drawing VN232881-D101 Rev E**. It is anticipated that this access would serve a relatively limited portion of the site. It is anticipated that it would be possible for vehicles to be able to route through to the main internal road from this access, particularly emergency vehicles, however this would not be designed to be a convenient choice so as to discourage use as a through route.

4.26 To prevent inappropriate through traffic (rat-running) from the secondary access road onto the main spine route, appropriate traffic calming measures will be implemented. These will include

features such as vertical speed ramps and raised tables along the secondary access road route to the main internal spine road, which will discourage use of the road as a through route.

4.27 The secondary access is designed in accordance with the relevant standards and design guidance providing suitable visibility splays of 2.4m x 43m, appropriate for the 30mph speed limit of Cefn Road in accordance with MfS. The access road will be 5.5m in width and footways of 2m width will be provided along both sides of the access road leading into the site.

Active Travel Access

4.28 SLR engaged with Gwen Thomas, the Council's Active Travel Officer during the scoping process which has helped form the active travel networks around the site.

4.29 The development proposals will integrate well with the surrounding active travel networks, providing several new routes for these users to access the site and travel safely through the area. The main spine road running through the southern part of the site will have segregated shared footway / cycleway provision and the internal roads will be 20mph roads with appropriate public realm design to help foster a comfortable environment for pedestrians and cyclists.

4.30 New cycle routes within the site will ultimately provide for north-south connections linking Bryn Estyn Road with Cefn Road, as well as facilitating the opportunity to provide an active travel link to KSS2 North via the potential future link road.

4.31 Two separate connections will be provided from the site to Bryn Estyn Road for pedestrians and cyclists. This will enable convenient access to the cycle route along Bryn Estyn Road which links to Wrexham Industrial Estate to the east. There will be no vehicle access to the site from Bryn Estyn Road.

4.32 Bryn Estyn Road is a key active travel route that will serve east-west trips between the site and the Wrexham Industrial Estate. It is understood that WCBC has / is undertaking an audit of the route which will feed into recommendations for improvements to the active travel provision. It is considered that it would be appropriate for the Applicant to make some level of contribution towards identified improvements on Bryn Estyn Lane, and this would be agreed during the course of the planning application through discussions with the Council.

4.33 A new pedestrian / cycle connection into the site will also be formed from Thornleigh at the north-western corner of the site, providing an alternative route for pedestrians and cyclists between the site and the north, and linking to the PRoW Footpath Abenbury 1 that will be retained running through the site and which will benefit from improved surfacing. A footpath connection will extend south from Footpath Abenbury 1 to connect to the northern access road. The proposed pedestrian / cycle link connecting to Thornleigh is shown by the white dotted line on the site masterplan.

4.34 Another improved route into the site for pedestrians from Cefn Road will also be provided to the south of the proposed northern site access junction, approximately opposite the Plas Rhosnesni Care Home linking to Footpath Abenbury 2. A new signal-controlled pedestrian crossing is proposed to assist safe crossing of Cefn Road for pedestrians on this key desire line helping to link the northern part of the site with the Caia Park Estate and Morgan Llwyd School.

4.35 In the vicinity of the school, the existing surface crossing point on Cefn Road which provides a raised table and tactile paving would be retained. A new footpath route would connect the crossing to the retained pitches proposed sports pitch and would extend south to emerge at the existing footway just to the north of Hullah Farm.

4.36 On the west side of Cefn Road cyclists will be accommodated in the carriageway from the north of Churchill Drive, and to the south of this location there is a shared footway / cycleway which will be linked to the proposed crossing facilities at the signal-controlled access junction. Cyclists will also be accommodated in the carriageway on the east side of Cefn Road. The development site will provide connectivity to the shared footway / cycleway provision along the main internal spine road and the on-carriageway cycle lane, with opportunities for cyclists to also utilise connected residential streets to the south of the sports pitches as a north-south route adjacent to Cefn Road.

4.37 The proposals will be built out in a phased manner and it is the intention that all future phases will be fully integrated to ensure comprehensive permeability through the whole site for active travel modes, ultimately facilitating more direct and pleasant routes for residents at the site and also others that travel through the area as pedestrians and cyclists. It must be noted that active travel routes through the site will be in place between KSS2 North and South such as via Bryn Estyn Road that will not be dependent upon the link road and will be in place from Phase 1.

4.38 At the southern primary access, signal control is proposed on all arms of the junction to provide toucan crossing facilities. This will provide for safe crossing of Cefn Road and the site access arm for pedestrians and cyclists. The crossings will allow these users to access the existing footway / cycleway route on the western side of Cefn Road.

PRoW & Section 257

4.39 The existing PRoW routes are shown in this TA (TA Figure 2.5). In terms of the proposed routes, one of the routes is proposed to be diverted – this being the circa 120m section between Thornleigh and Footpath Abenbury 1. The diversion would follow the white dotted line as shown on the masterplan. The principle of the diversion has already been discussed and was deemed as agreeable with the Council's PRoW officer and will be secured under a Section 257 agreement of the Town & Country Planning Act (or similar statutory instrument).

4.40 The other PRoW routes within the site would remain on their current alignment. The detail of these routes would be determined at Reserved Matters stage.

Internal Site Layout and Car Parking

4.41 The detail of the internal layout is not for determination as part of this planning application, however the internal road network will provide a suitable hierarchy acknowledging national design criteria to promote enhanced streets, informal streets and pedestrian-priority streets with appropriate active frontage in parts to reinforce a low-speed residential environment. The overarching concept which underpins the access and movement strategy is that planning for people creates places for people, in contrast to planning for cars which has always historically resulted in places dominated by cars.

4.42 The main internal spine road running through the south parcel will have segregated shared footway / cycleway provision along at least one side and all the internal roads will be designed as 20mph roads to help foster a comfortable environment for pedestrians and cyclists. The spine road running through the southern part of site has been designed to facilitate a potential future link through to the northern section of KSS2, and could ultimately provide part of a new link road to the A534 at the roundabout with the A5156. The provision of connectivity between the northern and southern parts of the wider KSS2 site is a LDP policy requirement for KSS2 (Policy SP4). The provision of a future link road would provide a traffic route to relieve the existing road network, most notably the Greyhound roundabout, as well as provide a potential opportunity for buses to route through the site.

4.43 The northern development parcel will provide footways along the main access road and all roads would be designed for 20mph speed limits which will make them suitable for cyclist use given the predicted low vehicle flows.

4.44 As described above, there will be a comprehensive network of pedestrian and cycle routes connecting the proposed development to the surrounding area to maximise connectivity by these active travel modes. These can be seen on the strategic masterplan drawing at **Appendix C**.

4.45 The car parking provision for the residential dwellings will be considered in the context of Wrexham's parking standards. The standards are reproduced in **Table 4.1**.

Table 4.1: Wrexham Council Parking Standards

		Car Parking Standard	Cycle Parking Standard
C3 Dwellings	1 bedroom	1.5 car space per unit	Sufficient space to provide at least 2 secure cycle parking spaces per dwelling. In the case of flats, this should be provided via safe and secure communal cycle parking areas.
	2 bedrooms	2 car spaces per unit	
	3/4 bedrooms	3 car spaces per unit	
	5 or more bedrooms	4 car spaces per unit	

4.46 Full parking provision for the proposed development will be determined at the reserved matters stage, however the scheme will be designed based on the requirement for minimising off-site impacts of the development. The parking provision will be prepared in accordance with local guidance. Electric vehicle charging points will also be provided which will encourage the use of more environmentally friendly vehicles.

Public Transport Strategy

4.47 As shown in **Figure 2.7** of this report, much of the site is within a 400m catchment of existing bus stops in the area including all of the northern part of the site and the majority of the phase 1 southern parcel. The masterplan is designed to accommodate a bus loop in phase 2 of development with the route passing on the south side of the school plot.

4.48 The future link through to the KSS2 North site would provide the potential opportunity for buses to route along the link road between Cefn Road and the A534 / A5156 roundabout. That scenario would provide for convenient access to bus services for the southern parts of the site.

4.49 For the northern parcel, the presence of existing bus stops on St Andrews Crescent to the north and Sutton Drive to the south-west means that this area of the site would be within a 400m walk of existing services, and it is therefore not proposed that buses would route into the northern part of the site.

4.50 As described earlier in this section, the southern primary access has been designed to accommodate bus manoeuvres and the main spine road has been designed to accommodate buses as it is proposed to be a minimum carriageway width of 6.75m.

4.51 SLR have engaged with the WCBC Public Transport Officer to discuss the potential options for a bus strategy to serve the site according to the principles described above, including the consideration of the infrastructure at existing bus stops that will serve the site. Further discussions will take place as part of this planning application, including with Arriva, as the proposed development progresses.

Travel Plan

4.52 The developer is committed to providing a comprehensive Travel Plan for the site, and the transport submission includes a Framework Travel Plan to set out a future strategy for the proposed development.

Construction

4.53 It is anticipated that construction vehicle access will be coordinated to occur from Cefn Road and utilise the strategic A-road network at the earliest opportunity via the A534 Holt Road. The impact of construction vehicles will be controlled via an agreed Construction Environmental Management Plan (CEMP). The CEMP will set out how construction traffic will be managed on the local highway network during the anticipated construction period. The purpose of a CEMP is to ensure that the effect of construction traffic is mitigated against, particularly in relation to local residents and any air quality issues. The CEMP will control the timings, routing and volume of traffic entering/leaving the site during this period.

4.54 The management of construction traffic will be secured through a Construction Traffic Management Plan that would be agreed with the Council and secured as a condition prior to any construction starting on site.

5.0 Active Travel and Public Transport Trip Forecasts

Key Principles

5.1 The proposed development comprises the delivery of up to 900 residential units, along with a primary school and would sit adjacent to the remainder of the allocated KSS2 site and at the edge of the existing urban area that is to the west and north, with a range of facilities and amenities as already described within this report.

5.2 This is important to note, since a number of trips will be internalised within the local community, which includes the existing communities into which this development sits, as well as by the proposed development's provision of a new educational facility and recreation spaces. This helps to maximise accessibility and local living, the primary aims when considering climate and health. It also minimises unfettered demand on the local highway network at busy times compared with ad hoc development growth in smaller parcels.

5.3 This section will consider the trips by non-car modes that can be expected to be generated by the development, to help inform judgements regarding pedestrian, cycle and public transport infrastructure.

Non-Car Mode Trip Forecasts

5.4 To begin understanding the potential demand from the proposed development in terms of non-car trips, the number of person trips generated by the proposed residential development of 900 dwellings has been estimated. To achieve this, the TRICS database has been interrogated, selecting the appropriate parameters as below:

- Main Land Use – 03 Residential, Sub Land Use – A Houses Privately Owned;
- Number of dwellings 200 to 1,817;
- Excluded Greater London and Ireland; and
- Selected Edge of Town locations.

5.5 The person trip rates, and associated trips are presented in **Table 5.1**. The full TRICS output files are provided at **Appendix D**.

Table 5.1: Average Total Person Trip Rates and Trips

Time	Trip Rate (per dwelling)			Trips (900 dwellings)		
	Arrive	Depart	Two-way	Arrive	Depart	Two-way
07:00 - 08:00	0.109	0.479	0.588	98	431	529
08:00 - 09:00	0.227	0.763	0.99	204	687	891
09:00 - 10:00	0.192	0.245	0.437	173	221	393
10:00 - 11:00	0.159	0.191	0.35	143	172	315
11:00 - 12:00	0.184	0.193	0.377	166	174	339
12:00 - 13:00	0.213	0.201	0.414	192	181	373
13:00 - 14:00	0.208	0.185	0.393	187	167	354
14:00 - 15:00	0.234	0.242	0.476	211	218	428
15:00 - 16:00	0.501	0.251	0.752	451	226	677
16:00 - 17:00	0.473	0.253	0.726	426	228	653
17:00 - 18:00	0.559	0.263	0.822	503	237	740
18:00 - 19:00	0.478	0.265	0.743	430	239	669

5.6 To understand the mode split of these trips and in turn the number of trips generated by the site via non-car modes, consideration has been given to the journey purpose of trips from residential areas using the National Travel Survey (NTS). The NTS consists of face-to-face interviews and a seven day self-completed written travel diary with database number 0502 providing a review of the trip start time by trip purpose for England. There is currently no Welsh equivalent to the NTS, therefore the English version is used as a reasonable proxy. **Table 5.2** provides a summary of this information with **Appendix E** providing the raw NTS data.

Table 5.2: Trips by Journey Purpose – Commuting, Education, Recreation / Leisure

	Commuting	Education	Recreation / Leisure
07:00 - 08:00	45.4	22.2	32.4
08:00 - 09:00	19.8	53.7	26.6
09:00 - 10:00	12.6	7.6	79.8
10:00 - 11:00	6.7	1.8	91.5
11:00 - 12:00	7.0	2.3	90.7
12:00 - 13:00	9.2	2.6	88.2
13:00 - 14:00	12.1	2.5	85.5
14:00 - 15:00	11.5	17.1	71.3
15:00 - 16:00	8.6	47.2	44.2
16:00 - 17:00	25.1	13.0	61.9
17:00 - 18:00	31.8	5.9	62.4
18:00 - 19:00	18.6	2.0	79.4

5.7 The total number of person trips summarised in **Table 5.1** broken down by the journey purpose summarised in **Table 5.2**, results in a breakdown of trips by journey purposes as summarised in **Table 5.3**.

Table 5.3: Total Trips by Journey Purpose

Time	Commuting		Education		Recreation/Leisure	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	45	196	22	96	32	140
08:00 - 09:00	40	136	110	369	54	183
09:00 - 10:00	22	28	13	17	138	176
10:00 - 11:00	10	12	3	3	131	157
11:00 - 12:00	12	12	4	4	150	158
12:00 - 13:00	18	17	5	5	169	160
13:00 - 14:00	23	20	5	4	160	142
14:00 - 15:00	24	25	36	37	150	155
15:00 - 16:00	39	19	213	107	199	100
16:00 - 17:00	107	57	55	30	264	141
17:00 - 18:00	160	75	30	14	314	148
18:00 - 19:00	80	44	9	5	342	189

5.8 The following paragraphs outline how the person trips presented in **Table 5.3** have been assigned a mode split to consider the non-car trip generation of the development proposals.

Non-Car Commuting Trips

5.9 For commuting trips, the mode split exercise considered how people travelled to work using the 2011 Census database. This exercise considered how people travelled to work from the Middle Super Output Area (MSOA) within which the site is located. The Census Journey to Work mode share is shown in **Table 5.4**.

Table 5.4: Commuting Trips Mode Split

Method of Travel to Work	
Drive	63%
Passenger / taxi	11%
Walk	18%
Cycle	2%
Public Transport	6%

5.10 Applying the mode split in **Table 5.4** to the commuting trips presented in **Table 5.3** results in an active travel and public transport trip demand as summarised in **Table 5.5.**

Table 5.5: Non-Car Commuting Multi-Modal Trip Demand

Time	Walk		Cycle		Public Transport	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	8	35	1	3	3	11
08:00 - 09:00	7	25	1	2	2	8
09:00 - 10:00	4	5	0	0	1	2
10:00 - 11:00	2	2	0	0	1	1
11:00 - 12:00	2	2	0	0	1	1
12:00 - 13:00	3	3	0	0	1	1
13:00 - 14:00	4	4	0	0	1	1
14:00 - 15:00	4	5	0	0	1	1
15:00 - 16:00	7	4	1	0	2	1
16:00 - 17:00	19	10	2	1	6	3
17:00 - 18:00	29	14	3	1	9	4
18:00 - 19:00	15	8	1	1	4	2

Non-Car Education Trips

5.11 For education trips, the mode split of trips was considered using two data sources:

- For primary schools the Sustrans 'School Journeys – Children's Commissioner for Wales Special Mission: School Journeys Survey Findings and Report' (2015) was used, taking the surveyed mode share for metropolitan areas; and
- For secondary schools, the NTS database 0614 which provides an education mode split by journey distance – selecting secondary age students travelling between 1 and 2 miles.

5.12 A review of the schools near the site indicated that there are three existing primary schools within 1 mile of the site (four once the proposed primary school within the site is delivered) and two secondary schools within 1 mile of the site. For the purposes of this exercise, the primary school mode share has been applied to school trips within 1 mile of the site and the secondary school mode share to school trips outside 1 mile.

5.13 **Table 5.6** provides a summary of the resulting mode split for education trips.

Table 5.6: Education Mode Split

Method of Travel to Education	Primary School	Secondary School
Car/van	40%	19%
Walk	51%	62%
Cycle	8%	7%
Public Transport	1%	12%

5.14 It has been assumed that 70% of education trips would be to schools within 1 mile and 30% to schools outside of the 1 mile catchment area. This is reasonable given the high number of schools within 1 mile of the site. The resultant trips are presented in **Table 5.7** for trips within 1 mile and **Table 5.8** for trips outside 1 mile.

Table 5.7: Non-Car Education Multi-Modal Trip Demand (Schools Within 1 Mile)

Time	Walk		Cycle		Public Transport	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	8	34	1	5	0	1
08:00 - 09:00	39	132	6	21	1	3
09:00 - 10:00	5	6	1	1	0	0
10:00 - 11:00	1	1	0	0	0	0
11:00 - 12:00	1	1	0	0	0	0
12:00 - 13:00	2	2	0	0	0	0
13:00 - 14:00	2	1	0	0	0	0
14:00 - 15:00	13	13	2	2	0	0
15:00 - 16:00	76	38	12	6	1	1
16:00 - 17:00	20	11	3	2	0	0
17:00 - 18:00	11	5	2	1	0	0
18:00 - 19:00	3	2	0	0	0	0

Table 5.8: Non-Car Education Multi-Modal Trip Demand (Schools Outside 1 Mile)

Time	Walk		Cycle		Public Transport	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	4	18	0	2	1	3
08:00 - 09:00	20	69	2	8	4	13
09:00 - 10:00	2	3	0	0	0	1
10:00 - 11:00	0	1	0	0	0	0
11:00 - 12:00	1	1	0	0	0	0
12:00 - 13:00	1	1	0	0	0	0
13:00 - 14:00	1	1	0	0	0	0
14:00 - 15:00	7	7	1	1	1	1
15:00 - 16:00	40	20	4	2	8	4
16:00 - 17:00	10	6	1	1	2	1
17:00 - 18:00	6	3	1	0	1	1
18:00 - 19:00	2	1	0	0	0	0

5.15 The combined education trips by mode are shown in **Table 5.9**.

Table 5.9: Non-Car Education Multi-Modal Trip Demand Total

Time	Walk		Cycle		Public Transport	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	12	52	2	7	1	4
08:00 - 09:00	60	200	8	28	5	16
09:00 - 10:00	7	9	1	1	1	1
10:00 - 11:00	1	2	0	0	0	0
11:00 - 12:00	2	2	0	0	0	0
12:00 - 13:00	3	3	0	0	0	0
13:00 - 14:00	3	2	0	0	0	0
14:00 - 15:00	20	20	3	3	2	2
15:00 - 16:00	116	58	16	8	9	5
16:00 - 17:00	30	16	4	2	2	1
17:00 - 18:00	16	8	2	1	1	1
18:00 - 19:00	5	3	1	0	0	0

Non-Car Recreation / Leisure Trips

5.16 The NTS data demonstrates that in the weekday AM peak around 20% of journeys are undertaken for the purposes of leisure / recreation (i.e. walking the dog, visiting friends, day to day shopping such as for a pint of milk, other shopping, personal business, holiday, day trips etc). This number increases to 91% in the interpeak period and 62% in the PM peak period.

5.17 As there is no NTS database that provides mode splits for leisure / recreation trips we have applied the same mode split used to distribute commuting trips as summarised in **Table 5.4**. A breakdown of the external leisure / recreation trips is provided in **Table 5.10**.

Table 5.10: Non-Car Recreation / Leisure Multi-Modal Trip Demand Total

Time	Walk		Cycle		Public Transport	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	4	16	6	25	1	2
08:00 - 09:00	6	21	10	33	1	3
09:00 - 10:00	15	20	25	32	2	3
10:00 - 11:00	15	18	24	29	2	3
11:00 - 12:00	17	18	27	29	2	3
12:00 - 13:00	19	18	31	29	3	3
13:00 - 14:00	18	16	29	26	3	2
14:00 - 15:00	17	17	27	28	2	3
15:00 - 16:00	22	11	36	18	3	2
16:00 - 17:00	30	16	48	26	4	2
17:00 - 18:00	35	17	57	27	5	2
18:00 - 19:00	38	21	62	34	6	3

Non-Car Total Trips

5.18 Combining the non-car trip forecasts for commuting, education and recreation / leisure, the total development sustainable mode trip generation forecast is shown in **Table 5.11**.

Table 5.11: Non-Car Trip Demand Total

Time	Walk		Cycle		Public Transport	
	Arrive	Depart	Arrive	Depart	Arrive	Depart
07:00 - 08:00	26	113	3	13	5	23
08:00 - 09:00	77	258	10	34	10	34
09:00 - 10:00	36	46	4	5	10	12
10:00 - 11:00	27	32	3	3	8	10
11:00 - 12:00	31	33	3	3	9	10
12:00 - 13:00	37	35	3	3	11	10
13:00 - 14:00	36	32	3	3	10	9
14:00 - 15:00	51	53	6	6	11	12
15:00 - 16:00	159	80	20	10	23	11
16:00 - 17:00	97	52	10	6	23	12
17:00 - 18:00	102	48	10	5	28	13
18:00 - 19:00	81	45	8	4	24	13
Total	759	826	83	94	172	170

5.19 **Table 5.11** shows that pedestrian trips are expected to dominate the non-car trip mode share throughout the day with around 1,500 movements across the core 12-hour daytime period. Trips by cycle could be expected to total around 180 and trips by public transport around 340. There would be a proportion of pedestrian and cycle trips in particular that would be internal to the site, for example trips to the school on site, or trips to recreations areas within the site. Not all of the trips would therefore be onto the external pedestrian and cycle networks.

5.20 It should be noted that these forecasts are based upon existing modal share data surveys and there is considered to be excellent scope to achieve higher non-car modal share for many journeys to and from the Erlas Park development, owing to it's highly sustainable location.

5.21 The proposed improvements to active travel infrastructure described in section 4 including the connectivity to the existing external networks are considered appropriate to help accommodate the forecast trips by these modes as set out above, providing for safe pedestrian and cycle links to key local facilities, amenities and employment areas.

5.22 Non-car trips generated by the proposed primary school have not been calculated separately, as many of the education trips forecast in this exercise will be to/from the primary school. Trips associated with the sports pitches on the site would not be new to the area as sports pitches are already present on the site and will be generating trips accordingly. Access to the sports pitches would be connected via footway links from around the site, with vehicular access to the pitches gained via the primary southern signalised access

Summary

5.23 The number of trips by sustainable travel modes that could be generated by the proposed development throughout a typical day has been calculated. Pedestrian trips are expected to dominate the non-car trip mode share throughout the day with around 1,500 movements across the core 12-hour daytime period. Trips by cycle could be expected to total around 180 and trips by public transport around 340. There would be a proportion of pedestrian and cycle trips in particular that would be internal to the site, and therefore not all of the trips would be onto the external pedestrian and cycle networks.

5.24 The proposed improvements to active travel infrastructure as part of this development scheme are considered appropriate to help accommodate the forecast trips by these modes, providing for safe pedestrian and cycle links to key local facilities, amenities and employment areas.

6.0 Vehicle Trip Generation and Distribution

Key Principles

6.1 A set of vehicle trip rates appropriate for forecasting traffic generation at the KSS2 site was agreed with WCBC and used as part of the LDP VISSIM traffic modelling exercise that was previously undertaken in support of the KSS2 allocation. Separate trip rates were derived for private (open market value) and affordable housing, and the assumption applied in the VISSIM exercise was that there would be a split of 80% open market value and 20% affordable properties across the site.

6.2 These agreed trip rates will be referenced within this TA report, and they are considered to remain appropriate for traffic forecasting purposes for the proposed Erlas Park development.

Vehicle Trip Generation Methodology

6.3 The trip rates used to inform the VISSIM assessment were agreed by WCBC Highways in advance of the Local Plan evidence base assessment work, which has been used to inform the allocation of the KSS2 site in the Local Plan. Those trip rates were selected as appropriate for the KSS2 site taking into account the locational characteristics of the site, within a highly sustainable location, and the expected mix of full market value and affordable dwellings.

6.4 It must also be acknowledged that it is standard practice to apply a separate trip rate for affordable housing where this element of a scheme is known and it should be noted that WCBC Highways did not query the trip rate parameters used in the Local Plan modelling for KSS2 in their review and accepted the below trip generation forecasts presented for that planning application, which as is shown were based upon a mix of affordable and private dwellings.

6.5 The trip rates used in the VISSIM modelling were derived from the TRICS (v 7.5.1) trip rate database in 2018 and were agreed with WCBC Highways officers as appropriate for use as part of the pre-application scoping discussions. TRICS is the industry standard source of information on trip generation from development. These agreed weekday peak hour trip rates are shown in Table 6.1, with the full TRICS outputs provided at **Appendix F**.

Table 6.1: Agreed Peak Hour Trip Rates

	Weekday Morning Peak Hour (08:00-09:00)		Weekday Evening Peak Hour (16:30-17:30)	
	Arr	Dep	Arr	Dep
Residential (private)	0.134	0.403	0.347	0.180
Residential (affordable)	0.170	0.251	0.243	0.178

6.6 The latest version of the TRICS database has been reviewed and there is no significant difference in these land use trip rates between the two versions of the database, therefore the set of agreed trip rates presented above are consistent with the latest information within TRICS.

6.7 The affordable development shall be secured by a S.106 legal agreement that will ensure this tenure and quantum will be secured "in perpetuity" – therefore there is a mechanism to safeguard this, and the applicant therefore considers that the modelling and rationale for it and the derived trip rates to be sound, a position agreed previously by WCBC's transport officers.

Phase 1 Trip Generation

6.8 Applying the trip rates above to the proposed 600 dwellings for Erlas Park Phase 1 results in the trip forecasts shown in **Table 6.2**. These are shown for the North and Southeastern parcels and the combined total. The Phase 1 North parcel will provide up to 148 dwellings whilst the Phase 1 Southeastern parcel is assumed to provide around 400 dwellings (but up to 452). The exact split of dwellings across the two parcels will be determined through reserved matters applications, but this is considered to be a reasonable assumption to inform the trip generation and assignment exercise.

6.9 It is important to note that the northern parcel will not exceed 148 dwellings in this area, although the trip generation and junction modelling has been based on a 200-dwelling forecast, for robustness.

Table 6.2: Forecast Phase 1 Development Peak Hour Trips

	Weekday Morning Peak Hour (08:00-09:00)		Weekday Evening Peak Hour (16:30-17:30)	
	Arr	Dep	Arr	Dep
Phase 1 North				
Residential (private)	21	64	56	29
Residential (affordable)	7	10	10	7
Phase 1 North Total	28	75	65	36
Phase 1 South				
Residential (private)	43	129	111	58
Residential (affordable)	14	20	19	14
Phase 1 South Total	56	149	130	72
Phase 1 Total (N+S)				
Residential (private)	64	193	167	86
Residential (affordable)	20	30	29	21
Phase 1 Total	84	223	196	107

6.10 It can be seen from **Table 6.2** that the Phase 1 development is expected to generate a total of just over 300 two-way vehicle trips in the weekday morning and evening peak hours. The Phase 1 South site will generate more traffic than the Phase 1 North site as it will accommodate more homes.

Phase 2 and Total Development Trip Generation

6.11 Phase 2 would deliver an additional 300 dwellings to the Phase 1 development, giving 900 units in total. The trip generation associated with the Phase 2 proposals and the development as a whole (Phase 1 + Phase 2) is shown in **Table 6.3**.

Table 6.3: Forecast Phase 2 and Total Development Peak Hour Trips

	Weekday Morning Peak Hour (08:00-09:00)		Weekday Evening Peak Hour (16:30-17:30)	
	Arr	Dep	Arr	Dep
Phase 2				
Residential (private)	32	97	83	43
Residential (affordable)	10	15	15	11
Phase 2 Total	42	112	98	54
Phase 1 + Phase 2				
Residential (private)	96	290	250	129
Residential (affordable)	30	45	44	32
Phase 1+2 Total	126	335	294	161

6.12 The proposed primary school for the site will be developed as part of the wider site allocation. It will be located on a separate parcel of land outside the red line boundary. The school is planned to be delivered concurrently with Phase 2 and will cater to a local catchment area, primarily serving the surrounding KSS2 site. As a result, most journeys to and from the school are expected to be made using active travel modes (walking or cycling).

6.13 It should be noted that the VISSIM modelling exercise for the Local Plan assumed a development quantum of 1,680 dwellings across the KSS2 site, including KSS2 North and KSS2 South. It is understood that 600 dwellings are being brought forward for KSS2 North under a separate planning application by Bloor and Barratt Homes. The proposed development for KSS2 South is for 900 dwellings, therefore a balance of 180 dwellings from the site allocation would remain to be delivered through a future planning application(s). The VISSIM assessment assumed a development quantum of 1,080 dwellings on KSS2 South i.e. 180 more than is being applied for under this planning application. The results of the VISSIM modelling that was undertaken for the full development scenario are therefore considered to be robust.

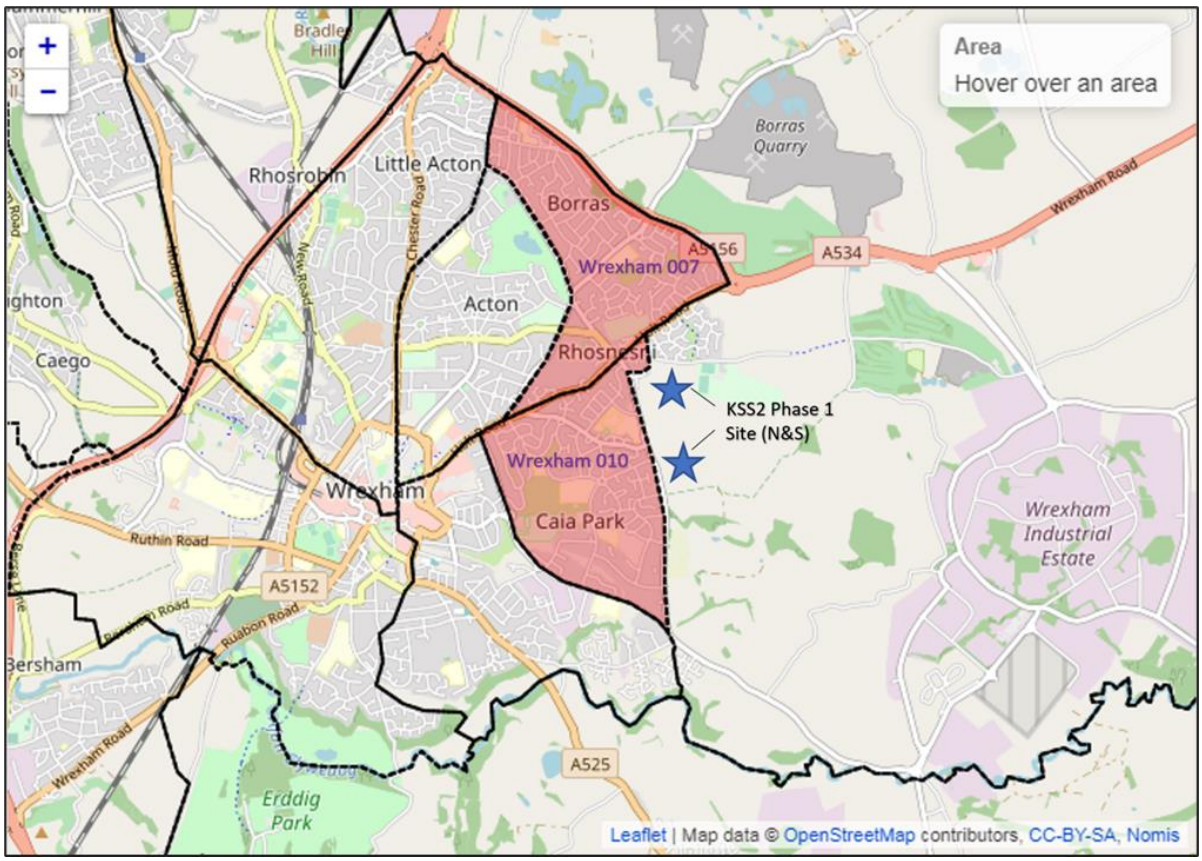
Trip Distribution Methodology

6.14 Census (2011) Journey to Work data has been used to derive a trip distribution for the KSS2 South site. Following a review of the Census super output area – mid layers for Wrexham, it was considered that using an average of two output areas in the vicinity of the site would provide the most appropriate proxy for the proposed development site journey to work distribution. This is based on geographical location and demographics. The two output areas are:

- Wrexham 007; and
- Wrexham 010.

6.15 These are shown in **Figure 6.1**.

Figure 6.1: Wrexham 007 and Wrexham 010 Super Output Areas



6.16 It can be seen from **Figure 6.1** that the super output area within which the site lies contains very little residential development and therefore would provide a poor dataset upon which to base a trip distribution approach. However, the super output areas used lie directly adjacent to the site and contain large areas of residential development. These are therefore considered to provide the most suitable proxy for a journey to work distribution for the site.

6.17 The Census data was extracted from the NOMIS website using the 'WU03EW – Location of usual residence and place of work by method of travel to work (MSOA level)' dataset. The work destinations were refined to a circa one-hour drivetime from the site and included all of the Wrexham Local Authority District, along with six other districts: Cheshire West and Chester, Cheshire East, Liverpool, Conwy, Denbighshire and Flintshire.

6.18 The journeys from the proposed site access on Cefn Road were then assigned to the network and the zones as used within the VISSIM model. This assignment exercise was informed by the Google Maps directions tool that shows route options for travel between two locations at different times of the day. Peak hour routeing options were taken into account.

6.19 This analysis identified the trip distribution for the KSS2 South site as shown in **Table 6.4.**

Table 6.4: Development Traffic Distribution and Assignment

Route	Origin / Destination	Assignment
A534 (West)	Central Wrexham including City Centre, Hospital and University	26%
Cefn Road South	South Wrexham	18%
Dean Road	Central North Wrexham	14%
Industrial Estate	Industrial Estate	12%
A534 East	Part of Cheshire West and Cheshire East	3%
A5156 North	North Wales, Chester, West Wrexham and A484 South	27%
		100%

Trip Assignment

6.20 Taking the trip forecasts shown in **Table 6.3** and the distribution information in **Table 6.4**, **Figures 6.2 and 6.3** have been prepared to show indicatively the development traffic flows on the surrounding highway network in the weekday morning and evening peak hours for Phase 1.

Figure 6.2: Indicative Phase 1 Development Trip Assignment AM Peak

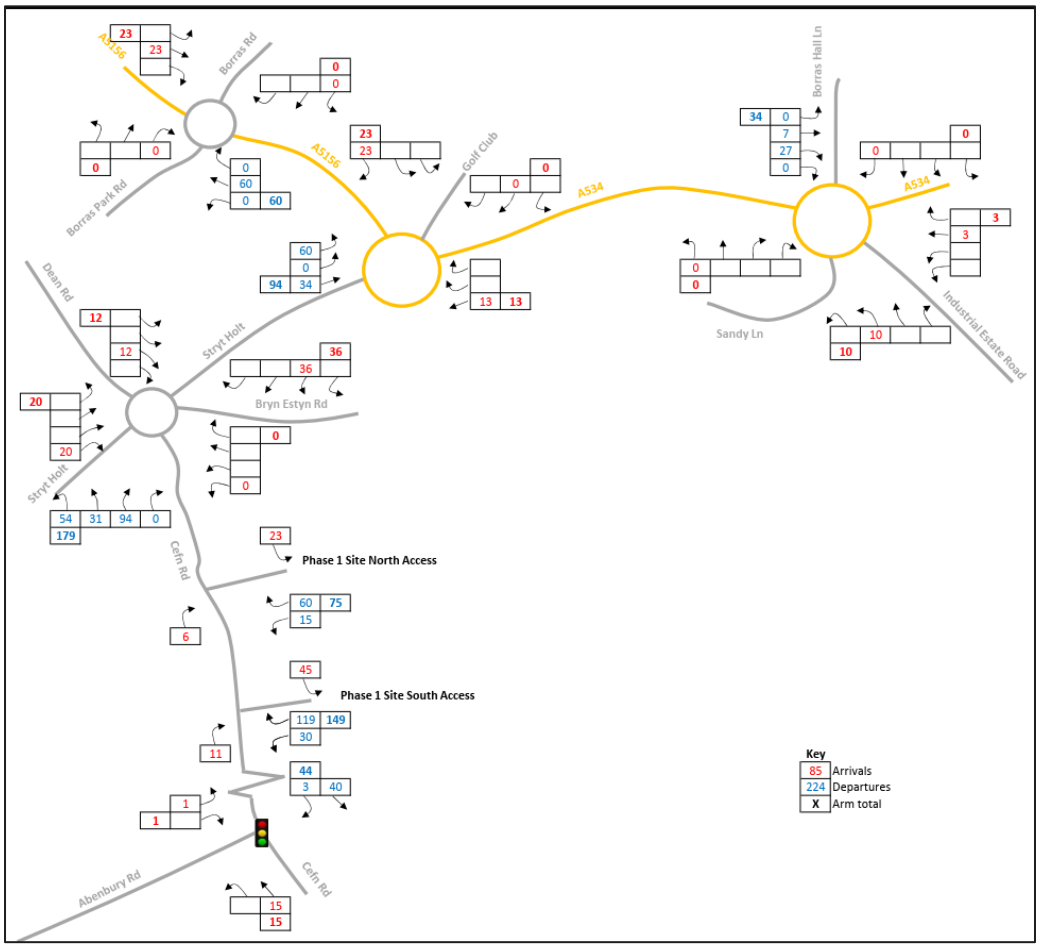
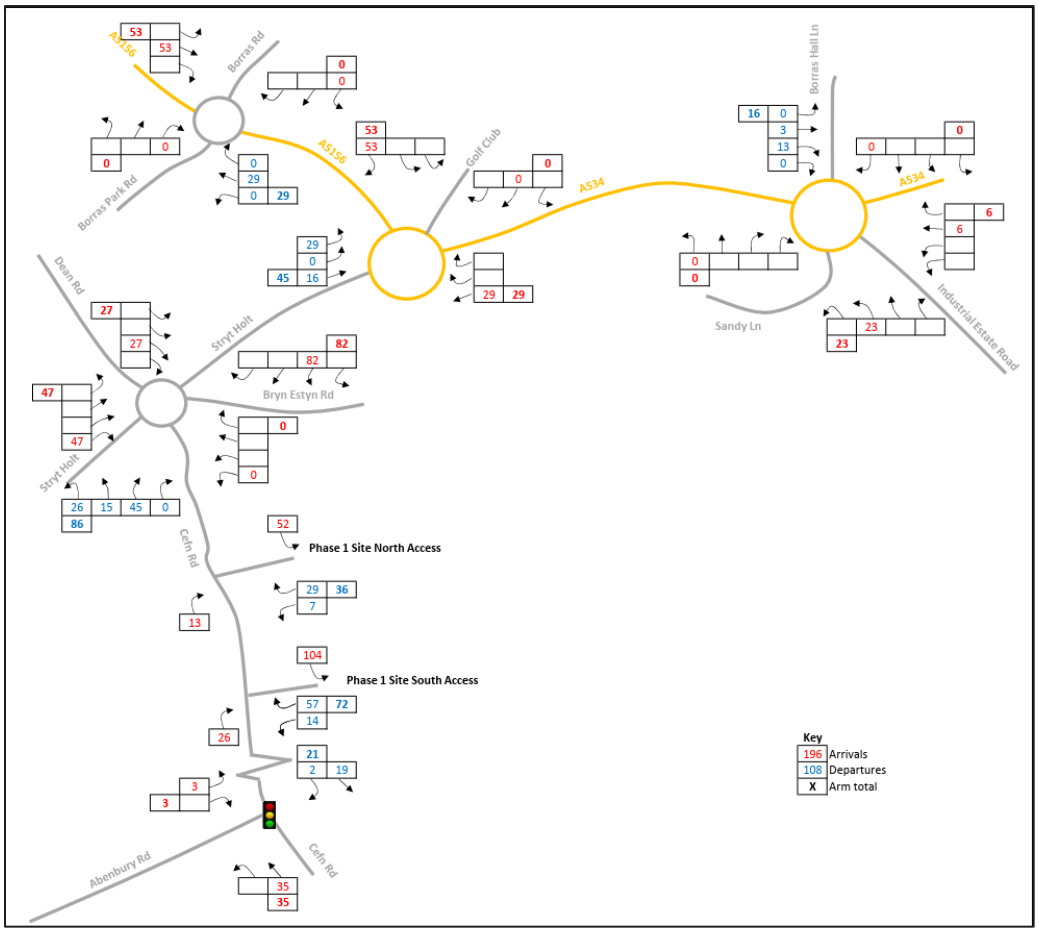


Figure 6.3: Indicative Phase 1 Development Trip Assignment PM Peak Summary



6.21 The trip forecasts for the Phase 1 (pre-link road) development have been derived using the agreed trip rates used in the LDP traffic assessment modelling of the KSS2 and KSS3 site allocations. It is appropriate to use these trip rates to inform the Phase 1 development traffic forecasts as they were agreed as suitable by WCBC Highways, and this approach has been agreed with WCBC during pre-application scoping. The total development trip forecasts would be a 'with link road' scenario and this assignment has been undertaken through the VISSIM modelling.

6.22 The Phase 1 development in total is expected to generate in the order of 300 two-way vehicle trips in each of the morning and evening peak hours. The Phase 1 Southeast site will generate more traffic than the Phase 1 North site, as it will accommodate more homes than the Phase 1 North site.

6.23 This section of the report has described the trip distribution methodology, and this is the same as applied in the LDP traffic assessment modelling of the KSS2 and KSS3 site allocations.

7.0 Local Development Plan Traffic Modelling and Mitigation Strategy

Overview

7.1 WCBC commissioned a detailed traffic modelling exercise as part of the evidence base for the LDP looking specifically at the traffic impact and mitigation requirements for the two proposed strategic allocations on the east side of Wrexham, namely KSS2 and KSS3 – KSS3 being the large employment allocation at Wrexham Industrial Estate. This traffic modelling work was part funded by the developers of KSS2 North and the then developer of KSS2 South.

7.2 The modelling work was concluded in September 2019 and included recommendations for a number of highway improvement schemes that would be required to mitigate the impact of the cumulative development and information pertinent to the provision of the KSS2 link road.

7.3 An Examination in Public (EiP) was held for the Wrexham LDP and a Statement of Common Ground (SoCG) was prepared by the key KSS2 stakeholders including WCBC, to inform the EiP. The SoCG set out the agreed position of the Council and the Developers in relation to highway matters confirming that agreement had been reached regarding the highways impacts and infrastructure requirements to support the site allocation following the outcome of a traffic modelling assessment exercise.

7.4 The traffic modelling was undertaken by Vectos Microsim (VM) – now part of SLR) and their detailed Forecasting, Mitigation Proposals & Summary Results Report (September 2019) is provided at **Appendix G** to this report. The outcomes of the approved Local Plan modelling are described within this section, generally referred to as the 'Local Plan modelling'.

7.5 Following the presentation of the Local Plan modelling conclusions, this section also presents the outcomes of additional testing that has been undertaken using the approved traffic model, to assess the following scenarios relevant to this planning application:

- An increase in the number of dwellings at the Erlas Park development (KSS2 South) in the pre-link road scenario above that tested previously in the VISSIM model; and
- A highway improvement scheme at the Greyhound Roundabout.

7.6 The additional testing of the above scenarios ultimately supports the proposed phasing strategy for the planning application, which proposes to deliver 600 dwellings on the site in the pre-link road scenario. It then demonstrates that a highway improvement scheme at the Greyhound Roundabout can mitigate the effects of around an additional 200 dwellings on the site prior to the link road between Cefn Road and the A534 / A5156 roundabout being delivered.

Study Area

7.7 The extent of the VISSIM model network is shown in Figure 1 of the VM Report at **Appendix G**. The model includes the A534 Holt Road corridor from the A5152 / Tesco Roundabout in the city centre to the Industrial Estate roundabout on the eastern edge of Wrexham. It also

includes the Cefn Road / Dean Road / Jeffreys Road north-south corridor that intercepts with the Holt Road corridor at the Greyhound Roundabout.

7.8 In addition to these main east-west and north-south corridors the model includes Queensway / Ffordd Montgomery and Hullah Lane which provide alternative routes between Cefn Road and Holt Road, and Borras Road / Borras Park Road which provides an alternative route between Holt Road and the A5156.

7.9 The following key junctions are within this modelled network:

- A5156 / A534 Holt Road Roundabout;
- Greyhound Roundabout (junction of the A534 Holt Road / Dean Road / Cefn Road);
- Tesco Roundabout (junction of the A534 Holt Road with the city centre road network);
- Wrexham Industrial Estate Roundabout (junction of the A534 and the industrial estate access road); and
- A5156 / Borras Park Road Roundabout.

7.10 This modelled network extent was agreed with Council officers who agreed that the model did not need to include the A5156 north of the Borras Park Road junction, and therefore it did not include the A483 Junction 6. This is noted in the SoCG which states at paragraph 4.6:

> *"The northern extent of the model is the roundabout on the A5156 with Borras Park Road. Traffic on the A5156 is dominated by the Industrial Estate. In the morning commuter peak southbound (towards the industrial estate) traffic is much higher than northbound and vice versa in the evening. In this context KSS2 traffic is counter peak with the highest flows being northbound in the morning and southbound in the evening. On this basis the impacts of KSS2 traffic to the north of the Borras Park Road junction are not expected to be significant".*

Forecast Demand Scenarios – Local Plan Modelling

7.11 The traffic modelling exercise considered two forecast years, 2023 and 2028. 2028 was selected as this is the end of the LDP plan period, and 2023 reflected the midpoint between 2028 and the modelled base year which is 2018.

7.12 The future years that are included in the modelling (2023 and 2028) are more tests of different development levels and less tests of traffic levels at specific years and this is appropriate as there is no sustained year on year traffic growth occurring on the network (as evidenced in Section 2 of the TA), and therefore the background traffic growth and 2023 and 2028 years that is included in the Local Plan modelling is a robust methodology for this development.

7.13 For these two forecast years, three scenarios were developed:

- Do–nothing (DN) which assumes no development on KSS2 or KSS3 with background growth calculated using TEMPRO growth assumptions. For both 2023 and 2028 the modelled DN network was as existing;
- Do-minimum (DM) which assumes development on KSS2 and KSS3 with TEMPRO included but adjusted to take account of the levels of development on the strategic sites to reduce the level of double counting. In the modelling at 2023, traffic from 250 units on

KSS2 North; 460 on KSS2 South and half of KSS3 was included. At 2028 traffic from the full development of KSS2 and KSS3 was included. The 2023 DM model was based on the existing network, but the 2028 DM model included the mitigation works identified from the 2023 Do-something model; and

- Do-something (DS) which uses the same level of traffic demand as the DM but includes highway mitigation measures.

7.14 The assumptions on traffic growth, including the use of adjusted TEMPRO in the DM and DS models were agreed with the Council. The inclusion of TEMPRO in the modelling represents a robust approach in that sustained year on year traffic growth is no longer occurring (as evidenced in section 2 of this report), the trend for car ownership is falling and people are travelling less. In this context we consider it would have been more appropriate to run the modelling on a no background growth assumption which just tested the impacts of the development.

7.15 In this context it follows that the two assessment scenarios (2023 – 250 units on KSS2 North; 460 on KSS2 South and half of KSS3 and 2028 – full development on all sites) are more tests of different development levels and less tests of traffic levels at specific years. The uncertainties that have arisen over future traffic levels post-pandemic mean the specific years the models have been tested at are even less relevant.

7.16 On this basis, the fact that the level of development included in the 2023 model can no longer materialise in this timeframe, as it has passed, will not have an impact on the findings of the modelling or the mitigation strategy. In other words, if it takes 2 or 3 more years for the levels of development in the 2023 models to come forward this would not change the level of highway works required to mitigate the impacts of the levels of development included in these models.

KSS Development Traffic Assumptions – Local Plan Modelling

7.17 The trip rates and associated development traffic used in the modelling was agreed with the Council. The KSS2 residential trip generation is based on trip rates from the TRICS database as detailed in chapter 6 of this report.

7.18 The KSS3 employment trip generation is based on trip rates from large sites in the TRICS “industrial estate” category.

7.19 Based on the levels of development included in the 2023 and 2028 models, the traffic generation from the three sites in the weekday peak hours is set out in **Tables 7.1 and 7.2**.

Table 7.1: 2023 Modelled Peak Hour Traffic Generation

	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	Arr	Dep	Arr	Dep
KSS2 North (250 Units)	35	93	81	45
KSS2 South (460 Units)	65	171	150	82
KSS3 (50% developed)	177	69	71	186

Table 7.2: 2028 Modelled Peak Hour Traffic Generation

	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	Arr	Dep	Arr	Dep
KSS2 North (600 Units)	85	224	195	108
KSS2 South (1,080 Units)	152	402	352	194
KSS3 (100% developed)	355	137	142	371

7.20 The trip distribution used in the VISSIM modelling for the residential development on KSS2 is based on local journey to work patterns derived from the 2011 Census data. Further detail on this is provided earlier in Section 6.

7.21 The trip distribution used in the modelling for the employment development on KSS3 is based on the distribution to and from the industrial estate zone in the base model, and therefore reflects that of the current industrial estate traffic. The trip distribution methodology was agreed with the Council as part of the Local Plan modelling.

Committed / Planned Developments

7.22 As described above, the Local Plan VISSIM modelling included KSS2 North and KSS3 developments in the future forecast development scenarios for both 2023 and 2028 scenarios. Whilst not committed developments at the time, both sites are now subject to live planning applications. The Local Plan modelling therefore effectively includes the committed development summarised in **Table 7.3**.

Table 7.3: Committed / Planned Development Included in the Local Plan Modelling

	Pre-link road scenario (2023 Model Scenario)	Link road scenario (2028 Model Scenario)
Residential Development	250 residential dwellings on the wider KSS2 North	780 residential dwellings on the wider KSS2 site (600 on KSS2 North and 180 on the balance of the allocated site)
Employment Development	50% of KSS3 i.e. 142,500sqm	100% of KSS3 i.e. 285,000sqm

7.23 In addition to the above committed developments, the modelling included an element of background traffic growth which increased the 2018 baseline in accordance with projections for increases in traffic informed by TEMPRO. As described earlier in this report, those background traffic forecast uplifts have not occurred in reality, with 2023 traffic levels actually lower than the baseline traffic in 2017/18. The inclusion of these background traffic uplifts in the modelling, along with retention of the higher baseline traffic flows than are currently experienced on the network means that there is a significant element of robustness built into the traffic flow scenarios in the VISSIM model.

7.24 Notwithstanding, SLR has considered current committed developments in the area that may be relevant to the assessment, and these are summarised below.

Table 7.4: Committed / Planned Development Additional to Local Plan Modelling

Planning Application	Approved	Development	Commentary
P/2018/0673	2021	Up to 74 dwellings together with vehicular / pedestrian access from Holt Road.	The proposals were estimated to result in a 1% increase in traffic flows at the Greyhound Roundabout, however this was against pre-Covid traffic levels and traffic flows at the roundabout have been shown to be around 10% reduced since then. The Local Plan modelling therefore effectively includes for any traffic generated by this site.
P/2023/0280	Pending	93,019sqm B8 Industrial Floorspace within Wrexham Industrial Estate.	Trips generated by this development primarily affect the industrial estate roundabout. The Local Plan modelling is based on 2017/18 traffic surveys, which are around 6-9% higher than the current traffic flows at this location in the peaks. This will therefore account for any trips generated by this proposal, along with the background traffic growth within the VISSIM model for the future year scenarios.
P/2022/0668	Pending	14,147sqm B8 warehouse development within Wrexham Industrial Estate.	Trips generated by this proposal are forecast to be relatively minor (net increase of under 30 trips in each peak hour) and the Industrial Estate roundabout is not included in their assessment area. The Local Plan modelling will therefore account for any trips generated by this proposal.

7.25 Based on the above review, it is concluded that the Local Plan modelling includes traffic levels that would account for the latest committed / planned development in the area that WCBC Highways has requested be considered as part of this assessment.

2023 Model Results – Local Plan Modelling

7.26 The 2023 DM model runs showed that the addition of KSS2 and KSS3 traffic has some impact on the local road network.

7.27 In the weekday morning peak the average delay per vehicle increases by circa 17 seconds compared to the DN scenario, which is not a significant level of increase. There are some increases in queue lengths at the Greyhound roundabout; the A5156 approach to the A534 Holt Road roundabout and the A534 westbound (Wrexham Road) approach to the Industrial Estate roundabout but the model shows that queues do not persist for prolonged periods and dissipate quickly enough to ensure the network continues to operate efficiently – which is reflected in the relatively small increase in average journey time. Based upon these findings,

the conclusion reached by VM was that mitigation was not required to mitigate impacts at 2023 in the morning peak.

7.28 In the weekday evening peak the average delay per vehicle is about 40 seconds, which is still not that significant but the increase in delay is almost exclusively on the industrial estate approach to the Industrial Estate roundabout (i.e. people leaving work in the evening), where the model indicates an increase in delay of circa 2 minutes with a corresponding queue length increase of around 100 vehicles.

7.29 On this basis VM recommended a partial signalisation improvement scheme at the Industrial Estate roundabout is implemented at 2023 to address the impact in the evening peak. The scheme includes signalisation of the industrial estate approach to the roundabout and signalisation of the two A534 approaches to better manage traffic flow through the roundabout.

7.30 These improvements were developed into the improvement scheme shown in CBO (transport consultant for the Bloor and Barratt Homes site) drawing CBO-0322-015, which was included in the EiP SoCG.

7.31 The modelling showed that the improvement to the Industrial Estate roundabout released more traffic onto the A534 westbound approach to the A534 / A5156 roundabout to the extent that an improvement would be required here as well. On this basis VM recommended a widening scheme on the A534 westbound approach to this roundabout, widening from 2 lanes to 3, and corresponding widening of the roundabout.

7.32 This improvement was developed into the improvement scheme shown in CBO drawing CBO-0322-014, which was included in the EiP SoCG.

7.33 With these improvements in place the 2023 DS model runs showed the impacts of the KSS2 and KSS3 would be mitigated.

7.34 In the morning peak the implementation of the traffic signals at the Industrial Estate roundabout actually increases the average delay compared to the DM (some traffic is stopped at the signals when in the DM it free flows), but the increase is only 21 seconds.

7.35 In the evening peak the implementation of the improvement schemes reduces the increase in delay between the DS and DM to 5 seconds. On the industrial estate approach the 2023 journey time is lower than in the 2018 base.

2028 Model Results – Local Plan Modelling

7.36 The traffic from the full development of KSS2 and KSS3 has a significant impact on the DM network even allowing for the improvements to the industrial estate and A534 / A5156 roundabouts outlined above, and further mitigation is required in both the weekday morning and evening peaks.

7.37 VM undertook a set of DS model runs that included a link road running through the KSS2 site. Inclusion of the link road provides an alternative route from the south to the A5156 / A534 roundabout. This means that traffic from the southern KSS2 site travelling to the A5156 / A534 junction no longer has to travel northbound on Cefn Road towards Greyhound Roundabout but can use the link road instead. This also applies to base level trips, background growth and

KSS3 trips as well, all of which are afforded an alternative route which avoids passing through Greyhound Roundabout.

7.38 Likewise, traffic travelling towards Cefn Road south from the north or east of the model can use the link road southbound rather than travelling westwards towards the Greyhound junction and then southbound along Cefn Road.

7.39 The modelling with the inclusion of the link road showed that some of the impact of development was mitigated but further improvements were required at the A5156 / A534 roundabout.

7.40 On this basis a second DS model run was undertaken which included widening from 2 lanes to 3, signalisation of the A5156 approach and signalisation of the A534 westbound approach – this approach had already been widened from 2 lanes to 3 in the 2023 mitigation scheme.

7.41 These improvements were developed into the improvement scheme shown in CBO drawing CBO-0322-016, which was included in the EiP SoCG.

7.42 With the link road in place and with these improvements to the A534 / A5156 roundabout the modelling shows the impacts of the KSS2 and KSS3 traffic are mitigated. The average delay per vehicle in the morning peak hour only increases by 13 seconds relative to the 2028 DN model, despite there being over 1,000 more trips completed.

7.43 In the evening peak hour the average delay per vehicle is only 14 seconds higher than the 2028 DN model, despite there being circa 950 more trips completed.

Timing of Improvements and Proposed Mitigation – Local Plan Modelling

Improvements to A534 Holt Road / A5156 and Industrial Estate Roundabouts

7.44 Traffic flows at the A534 Holt Road / A5156 and industrial estate roundabouts are dominated by industrial estate traffic heading to and from the A483. In the weekday morning peak the south and eastbound flows are much higher than the west and north, and vice versa in the weekday evening peak.

7.45 As explained above, the improvements at these junctions required in 2023 are primarily aimed at dealing with traffic flows leaving the industrial estate in the evening peak. Similarly, in 2028 the improvement on the A5156 approach to the A534 Holt Road roundabout is aimed at dealing with traffic heading towards the industrial estate in the morning peak with the additional improvement to the A534 westbound approach required to accommodate traffic leaving the industrial estate in the evening.

7.46 In this context it appears likely that the traffic from KSS3 is highly significant in determining the timing of these improvements.

7.47 **Table 7.5** sets out the total traffic flows on these key links during the critical time periods and provides a breakdown of traffic associated with KSS2 and KSS3. It confirms how significant KSS3 is to the timing of the improvements at these junctions.

Table 7.5: Traffic on Approaches to A534/A5156 and Industrial Estate Roundabouts

	Industrial Estate Access Road Approach To Industrial Estate Rbt		A534 Westbound Approach To A534/A5156 Rbt		A5156 Approach To A534/A5156 Rbt	
Traffic Flow	2023 PM	2028 PM	2023 PM	2028 PM	2023 PM	2028 PM
Total	2038	2195	2206	2365	1963	2014
KSS2	36	85	42	97	25	69
KSS3	181	348	152	290	146	286

7.48 On this basis if development on KSS3 does not come forward as quickly as anticipated in the modelling work (or at all in the plan period) then the need for the improvements, or the improvements at the scale identified in the modelling work, would likely not be required.

7.49 It is understood that the KSS2 North developer proposes to implement specific improvements at the A534 Holt Road / A5156 roundabout which are in line with the overall mitigation strategy, in conjunction with the development of the KSS2 North site. This scheme involves the widening of the A534 Holt Road westbound approach and the southern section of the circulatory carriageway, as well as the provision of the site access itself.

7.50 This is the same scheme identified through the VISSIM modelling to address the impacts of development on the A534 Holt Road / A5156 roundabout in 2023, albeit the extent of widening on the A534 westbound approach has been reduced from 100m to 50m. The lesser degree of widening reflects the fact that KSS2 North traffic represents a relatively small proportion of the total development traffic on the A534 westbound approach which necessitates the longer widening scheme.

7.51 Appropriate delivery of agreed mitigation schemes will be clarified following further discussions with the Council, which are currently ongoing.

Additional Model Testing and Link Road Timing

7.52 The Local Plan modelling shows that the KSS2 link road provides benefits primarily in relation to the operation of the Greyhound Roundabout in 2028, and the need for the link road is therefore more likely to be influenced by the levels of development on the north and south parts of KSS2, which are closer to the Greyhound Roundabout than KSS3. The Local Plan modelling runs for 2023 were based on 250 units on KSS2 north and 460 on KSS2 south, 710 dwellings in total.

7.53 Therefore, the Local Plan modelling demonstrated that at least 250 dwellings on KSS2 North and 460 dwellings on KSS2 South can be accommodated prior to the completion of the link road.

7.54 Additional tests have now been carried out by SLR using the approved VISSIM model to assess the effect of increasing the number of dwellings on KSS2 South in the pre-link road scenario i.e. the 2023 DS model described earlier in this section, to consider whether an increase above the 460 dwellings tested for the Local Plan process would have any material

effect upon the operation of the highway network. The results of this exercise are described below.

Pre-Link Road Additional Dwellings Testing

7.55 The testing has considered increasing the number of dwellings on KSS2 South incrementally, whilst holding all other inputs and parameters in the 2023 DS model the same. From the approved position of 460 dwellings on KSS2 South in the pre-link road scenario, additional levels of development have been tested increasing incrementally by 100 dwellings from 500 dwellings to 900 dwellings.

7.56 The results of each test have been reviewed in comparison to the approved 2023 DS model results. A report to present the results has been prepared by SLR's modelling team and is provided at **Appendix H** to this report.

7.57 Based on the results of the additional testing SLR has concluded that delivering around 600 dwellings on KSS2 South (an increase of 140 above that tested previously for the pre-link road scenario for the Wrexham LDP) would not result in any material change to the network performance when compared to the accepted Local Plan modelling position, and no significant change to the operation of the Greyhound Roundabout.

7.58 The additional peak hour trip generation associated with a 600-dwelling scenario compared to the 460-dwelling scenario is shown in **Table 7.6**. This is based upon the agreed trip rates used to inform the modelling for the Local Plan, as presented in **Table 6.1** of this report.

Table 7.6: Additional Trips from KSS2 South – 600 Dwelling Test

	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	Arr	Dep	Arr	Dep
Residential (private)	15	45	39	20
Residential (affordable)	5	7	7	5
Total	20	52	46	25

7.59 **Table 7.6** shows that in the weekday AM peak hour the additional 140 dwellings included in the 600-dwelling test for KSS2 South would have a trip generation of 72 two-way trips, and in the weekday PM peak hour this would be 71 two-way trips, or roughly one every minute in each of the peak hours.

7.60 The VISSIM results show that in terms of the network statistics, in the AM peak the average delay per vehicle increases by only 6.7 seconds (9% increase) when compared to the 460-dwelling scenario. Average speed per vehicle changes from 27.8mph to 27.1mph – a change of 0.7mph, which is not considered to be a significant change.

7.61 In the PM peak the average delay per vehicle increases by only 9.4 seconds (10% increase) when compared to the 460-dwelling scenario. Average speed per vehicle changes from 25.9mph to 25.1mph – a change of 0.8mph, which is also not a significant change.

7.62 In terms of the operation of the Greyhound Roundabout, the 600 dwellings scenario does not have any material effect upon queue length when compared to the 460 dwellings scenario. For example, on the Cefn Road approach in the AM peak, the additional average queue length equates to around five vehicles when compared to the 460 dwellings scenario. Queue length on Holt Road east increases by around three vehicles.

7.63 In the PM peak the increase in average queue length on Cefn Road is around two vehicles and on Holt Road East around six vehicles.

7.64 The effect at other roundabouts is negligible. For example, at the Golf Club roundabout only the A5156 arm experiences any increase in queuing, of around five vehicles in the AM peak. Also, there is no effect on queues at the Industrial Estate roundabout in the AM peak.

7.65 In the PM peak there is no effect greater than around one vehicle in terms of average queue length on any arm of the Golf Club roundabout or Industrial Estate roundabout.

7.66 Looking at journey times, the effect of the additional 140 dwellings on KSS2 South is shown to be negligible. For the four main journey time routes reported in the original 2019 VISSIM forecasting report, the 600 dwellings scenario shows no more than a 12 second increase on any single route when compared to the 460 dwellings scenario in the AM peak.

7.67 In the PM peak the journey time changes are similarly small, with some routes reporting a reduction in journey time and only the Holt Road eastbound corridor route showing an increase greater than seven seconds.

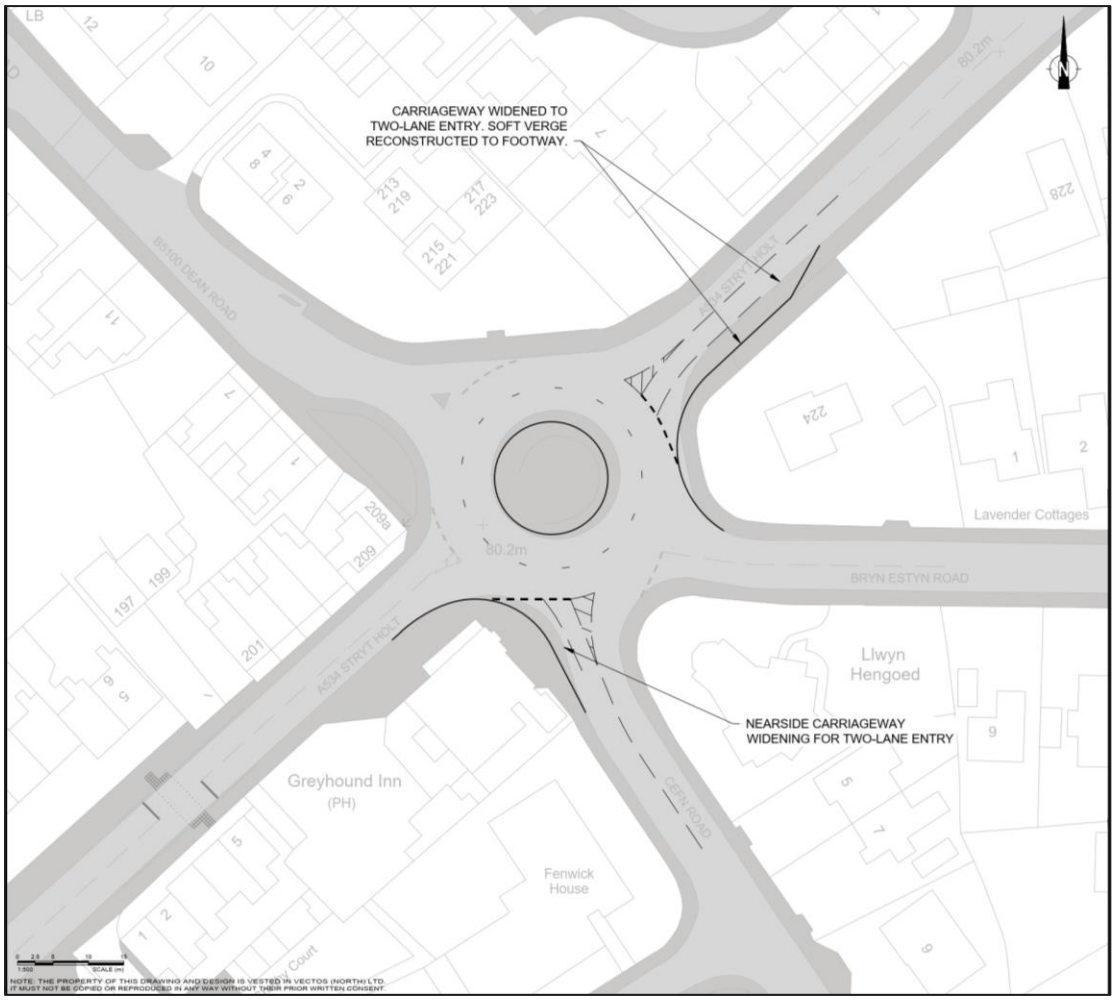
7.68 Overall, the addition of the 140 dwellings on KSS2 South does not materially impact upon the performance of the highway network modelled in VISSIM when compared to the 460 dwelling scenario, without changing the conclusions of the assessment in terms of the mitigation requirements. It is also relevant that the model is based on 2017/2018 surveyed flows which have been shown to be around 5% higher than current network flows (c.10% higher at the Greyhound Roundabout) due to the long-term effects of Covid upon travel habits and patterns of working, and there is also background traffic growth included which is likely to be overestimating traffic demand on the network. It is therefore considered that the results reported in the VISSIM model are likely to be an overly pessimistic forecast.

Greyhound Roundabout Highway Improvement

7.69 Whilst the modelling has shown that 600 dwellings could be delivered on KSS2 South prior to the link road being delivered without any material change to network performance compared to the 460-dwelling situation, a potential highway improvement scheme at the Greyhound Roundabout has been developed and tested in the VISSIM model to understand what benefits intervention at this key local node could deliver in terms of network operation prior to the link road being delivered.

7.70 The highway improvement scheme at the Greyhound Roundabout is shown in **Drawing VN232881-D201** and in **Figure 7.1**.

Figure 7.1: Greyhound Roundabout Potential Highway Improvement Scheme



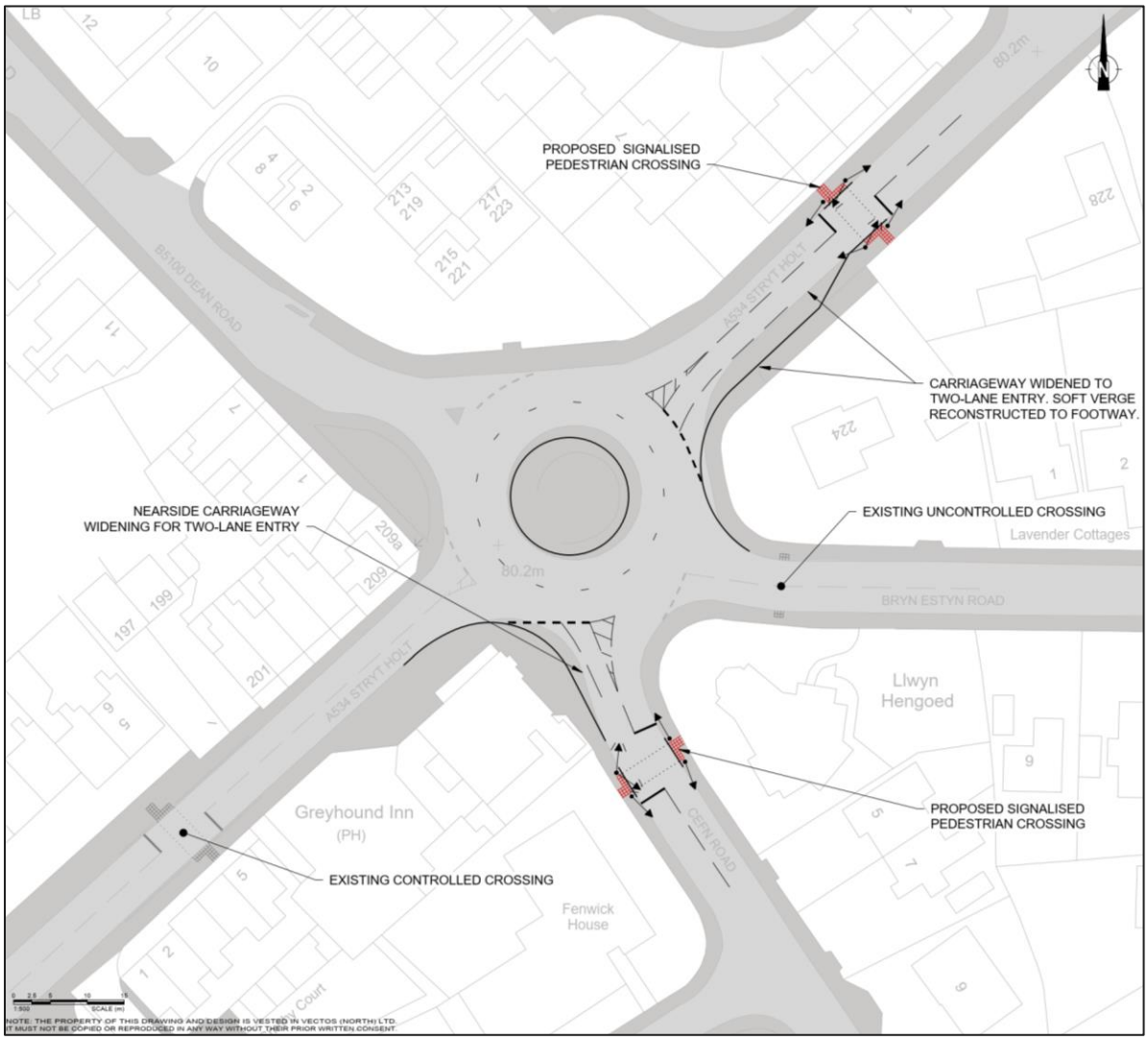
7.71 It comprises a relatively short section of widening on the Cefn Road approach to the roundabout and the Holt Road East approach, along with a widening of the circulatory to provide two circulating lanes. This can all be delivered within the adopted highway boundary, as shown on the drawing, and continuous footway or footway / cycleway provision adjacent to the junction arms can still be provided.

7.72 A version of the approved 2023 DS VISSIM model has been developed that includes these potential changes at the Greyhound Roundabout. All other aspects of the model have been kept the same, the only difference is the inclusion of the proposed changes at the Greyhound Roundabout.

7.73 Different levels of development in terms of the number of dwellings on KSS2 South have then been tested in the VISSIM model to understand the effects of the Greyhound Roundabout improvement scheme. The results of this exercise are presented in the SLR Modelling report at **Appendix H**. The results show that a development of around 800 dwellings on KSS2 South with the Greyhound Roundabout improvement scheme in place would deliver a similar level of network performance to that under the scenario for 600 dwellings without the Greyhound Roundabout improvement scheme in place, which has been shown to be not materially different to the pre-link road scenario accepted through the Local Plan modelling process.

7.74 Furthermore, it is considered that the proposed improvement scheme at the Greyhound Roundabout would not prejudice the delivery of active travel improvements at the junction, which WCBC is exploring as part of their study of the Holt Road corridor. To demonstrate, **Figure 7.2** shows that new signal-controlled pedestrian crossings could be provided on the Cefn Road and Holt Road East arms of the junction with the highway improvement scheme in place.

Figure 7.2: Greyhound Roundabout Potential Improvement Scheme Showing Deliverability of Potential Active Travel Enhancements



7.75 To summarise, the modelling presented in this TA, which is all undertaken using the approved Local Plan model, shows that the delivery of 600 dwellings on the KSS2 South site (Phase 1) can be accommodated on the highway network without material change to the accepted position that was adopted by WCBC in the Statement of Common Ground that informed the Local Plan Examination in Public. That accepted position did not include any mitigation at the Greyhound Roundabout.

7.76 The second phase of development on the KSS2 South site would deliver the remaining 300 dwellings once the main internal road is in place up to the northern boundary.

7.77 To be clear, whilst this TA presents the results of a modelling test that considers the effect of a capacity improvement at the Greyhound Roundabout, this is presented for information only and is not considered necessary to support the proposed phasing strategy. The results of that test however, show that the capacity improvement at the Greyhound Roundabout would allow up to 800 dwellings on the KSS2 South site without material change to the highway network operation results found under the 600-dwelling scenario.

Additional Testing Conclusions

7.78 Following the additional testing in the VISSIM model as detailed above, it is SLR's conclusion that around 600 dwellings can be delivered on KSS2 South prior to the link road being delivered on the basis of the highway mitigation proposals specified in the 2023 DS test for the Wrexham LDP, without materially altering the performance of the highway network compared to the currently accepted 2023 DS scenario i.e. pre link road position.

7.79 Further, if the Greyhound Roundabout improvement scheme is delivered, an additional 200 dwellings (800 in total) could be delivered on KSS2 South without materially altering the performance of the highway network compared to the accepted 2023 DS position.

7.80 Therefore, it is considered that the proposed phasing strategy for 600 dwellings as part of phase 1 (pre-link road) is supported by the VISSIM modelling. Further dwellings could be delivered in the pre-link road scenario if the highway improvement scheme at the Greyhound Roundabout was implemented, as the modelling shows that the capacity improvement scheme mitigates the effect of around an additional 200 dwellings on the site (800 dwellings in total).

7.81 Whilst this planning application does not seek permission for a phase 1 of 800 dwellings, the above information has been presented to inform WCBC regarding the potential highway capacity benefits of a relatively modest improvement scheme at the Greyhound Roundabout, to assist future discussions regarding infrastructure enhancements in this area. In addition, it is considered that the proposed highway scheme for Greyhound Roundabout could potentially accommodate active travel improvements including signal-controlled pedestrian crossings on the Cefn Road and Holt Road East arms of the junction.

7.82 As outlined earlier in this report, the masterplan makes provision for the delivery of the link road at KSS2 by allowing an appropriate corridor through the site of sufficient width to serve as the future link road, and allowing for bus movements. It connects to the adjoining land to the north at a suitable location to allow for the future connection to KSS2 North. It also provides a suitable junction form at the southern parcel main access with Cefn Road to serve as the southern end of the link road in the future. The Applicant is therefore committed to providing the section of link road through the land under their control and will continue to work pro-actively with the other stakeholders to progress the feasibility of the link road.

A483 Junction 6

7.83 As noted earlier in this section, the modelled network extent was agreed with Council officers who agreed that the VISSIM model did not need to include the A5156 north of the Borras Park Road junction, and therefore it did not include the A483 Junction 6 (which is located around 4km from the site). It must be noted that this junction was scoped out of the Local Plan modelling assessment, which was commissioned by WCBC in support of the site allocation in

the Local Plan, and furthermore, there was no request from WCBC Highways to include the junction in the assessment during any scoping discussions, even when the junction was specifically discussed in the meeting on 6th February 2024.

7.84 However, despite the above, an assessment of the number of proposed development trips at Junction 6 has been undertaken, at the request of the Welsh Government in their scoping response to the Environmental Assessment work that supports the planning application.

7.85 The A483 forms part of the Trunk Road network in Wales and is under the control of the Welsh Government, including the on and off slips at Junction 6. It follows a broadly north-south alignment running along the western side of Wrexham and comprises a dual carriageway standard road. Junction 6 lies to the north of Wrexham and comprises a grade separated roundabout arrangement with connections to the A5156, the A5152 Chester Road, the B5445 Chester Road, Blue Bell Lane, and the access to Gresford Industrial Park. The roundabout is partially signalised.

7.86 The traffic generation impact of the proposed KSS2 development has been assessed using the outputs from the VISSIM model focusing upon KSS2 development trips at the A5156 arm of the Junction 6 roundabout. These are effectively contiguous with the entry and exit flows at the A5156 western arm of the Borras Park Road roundabout as extracted from the VISSIM model.

7.87 To consider the impact of the proposed KSS2 development on the A483, an assessment has been made of the proportional increase in traffic level in comparison to baseline flows at the A483 junction. The additional KSS2 traffic is taken from the northbound flow on the A5156 which will enter the A483 junction. This has been compared with the existing northbound (entry) flow on this arm of the junction and also the total entry flows into the junction from all arms. Baseline traffic flows for the A483 junction were obtained from the Transport Assessment for a proposed development at Wrexham Industrial Estate (Utopia City – Ref P/2023/0497), which had undertaken a traffic count on 22 March 2023.

7.88 Whilst the VISSIM model provides outputs in terms of the number of KSS2 trips at this part of the network, this includes both KSS2 South and KSS2 North (1,680 dwellings in total). As the proposed development of 900 dwellings is 54% of that KSS2 total, the KSS2 trips have been factored down accordingly.

7.89 The results are presented in **Table 7.7**. In comparison with the total traffic flows at the junction as recorded in the 2023 survey, the development flows would represent only a 2.4% increase and 1.1% increase in the weekday AM and PM peaks respectively. This change in trips is not considered to be material and would not warrant any further assessment of junction operation.

Table 7.7: A483 Junction 6 Assessment Summary

Arm	2023 Traffic		KSS2 (900 units)		KSS2 % Impact	
	AM	PM	AM	PM	AM	PM
A483 (South)	897	825				
Blue Bell Lane	405	357				
Ind Estate Access	15	88				
A483 (North)	365	295				
B5445 Chester Road	819	684				
A5156	803	1421	95	46	11.88%	3.24%
A5152 Chester Road	639	633				
Total	3943	4303	95	46	2.42%	1.07%

7.90 The Welsh Government were provided with this data in the 2024 and they raised no further comment on the proposals following this information, demonstrating their satisfaction with the information submitted in relation to the junction and its operation.

Summary

7.91 The site's inclusion in the Wrexham LDP has been based upon an extensive evidence base including highways capacity testing that has been agreed with WCBC Highways and presented to the Planning Inspector at the LDP EiP in 2019. The Erlas Park proposals are within the parameters of the modelling exercise that considered the impacts of the development of KSS2 in future year scenarios with different amounts of development and mitigation in place.

7.92 The Local Plan modelling demonstrates that at least 250 dwellings on KSS2 North and 460 dwellings on KSS2 South can be accommodated prior to the completion of the KSS2 link road.

7.93 The other mitigation that was identified through the agreed modelling exercise affects the Industrial Estate roundabout and the A534 / A5156 roundabout and is linked primarily with the KSS3 development trips, rather than the KSS2 trips. Notwithstanding, it is noted that the KSS2 North developer proposes to implement specific improvements at the A534 Holt Road / A5156 roundabout which are in line with the overall mitigation strategy, in conjunction with the development of the KSS2 North site.

7.94 Additional tests have now been carried out using the approved VISSIM model to assess the effect of increasing the number of dwellings on KSS2 South in the pre-link road scenario to consider whether an increase above the 460 dwellings tested for the Local Plan process would have any material effect upon the operation of the highway network.

7.95 Based on the additional testing using the VISSIM model it is SLR's conclusion that around 600 dwellings can be delivered on KSS2 South prior to the link road being required on the basis of the highway mitigation proposals specified in the 2023 DS test for the Wrexham LDP, without materially altering the performance of the highway network compared to the accepted 2023 DS scenario i.e. pre link road position.

7.96 Therefore, it is considered that the proposed phasing strategy for 600 dwellings as part of phase 1 (pre-link road) is supported by the VISSIM modelling. Further dwellings could be delivered in the pre-link road scenario if the highway improvement scheme at the Greyhound Roundabout was implemented, as the modelling shows that the improvement scheme mitigates the effect of around an additional 200 dwellings on the site (800 dwellings in total).

7.97 Whilst this planning application does not seek permission for a phase 1 of 800 dwellings, the above information has been presented to inform WCBC regarding the potential highway capacity benefits of a relatively modest scheme at the Greyhound Roundabout, to assist future discussions regarding infrastructure enhancements in this area. In addition, it is considered that the proposed highway scheme for Greyhound Roundabout could potentially accommodate active travel improvements including signal-controlled pedestrian crossings on the Cefn Road and Holt Road East arms of the junction.

7.98 As outlined earlier in this report, the masterplan makes provision for the delivery of the link road by allowing an appropriate corridor through the site of sufficient width to serve as the link road, and allowing for bus movements. It connects to the adjoining land to the north at a suitable location to allow for the future connection to KSS2 North. It also provides a suitable junction form at the southern parcel main access with Cefn Road to serve as the southern end of the link road in the future. The Applicant is therefore committed to providing the section of link road through the land under their control and will continue to work pro-actively with the other stakeholders to progress the feasibility of the link road.

7.99 An assessment of the number of proposed development trips at the A483 Junction 6 has been undertaken, at the request of the Welsh Government. The traffic generation impact of the proposed KSS2 development has been assessed using the outputs from the VISSIM model focusing upon KSS2 development trips at the A5156 arm of the Junction 6 roundabout.

In comparison with the total traffic flows at Junction 6, as recorded in a 2023 survey, the development flows would represent only a 2.4% increase and 1.1% increase in the weekday AM and PM peaks respectively. This change in trips is not considered to be material and would not warrant any further assessment of junction operation.

8.0 Proposed Site Access Capacity Testing

Introduction

8.1 To complement the VISSIM modelling, the proposed site access junctions with Cefn Road have been tested further in capacity terms using the JUNCTIONS software package for the northern access and secondary southern access, and LinSig software for the primary southern access.

Northern Access

8.2 The northern site access onto Cefn Road will serve the northern parcel of the residential development, which will not accommodate any more than 148 dwellings and is a discrete parcel of development, not connected by road to the rest of the site although there will be active travel links. This level of development has therefore been tested for the proposed northern access junction, considering both the pre-link road scenario and the link road scenario. The junction is designed as a simple priority junction and is tested as such for both scenarios.

8.3 The junction has been tested using the industry-standard JUNCTIONS modelling software package, with a 200-dwelling forecast tested, for absolute robustness.

Pre-Link Road Scenario

8.4 In the pre-link road scenario, the northern access will only accommodate up to 148 dwellings (but tested at 200 dwellings for robustness). The traffic flows associated with this level of development are presented in **Table 6-1** of this report. The flows have been distributed north and south of the proposed access according to the distribution exercise described in section 6 of this report.

8.5 Flows on Cefn Road for the pre-link road scenario have been extracted from the VISSIM modelling taking the 2023 DN flows to avoid double counting of KSS2 traffic. It should be noted that the 2023 flows in the VISSIM model include some background traffic growth although none has occurred in practice, as revealed through the traffic survey comparison work described in this report. Traffic generated by KSS2 in the pre-link road scenario to/from the southern access points (i.e. 400 dwellings on the southern parcel) has been added to the 2023 DN flows on Cefn Road. The resulting flows at the junction are shown in **Figure 8.1**.

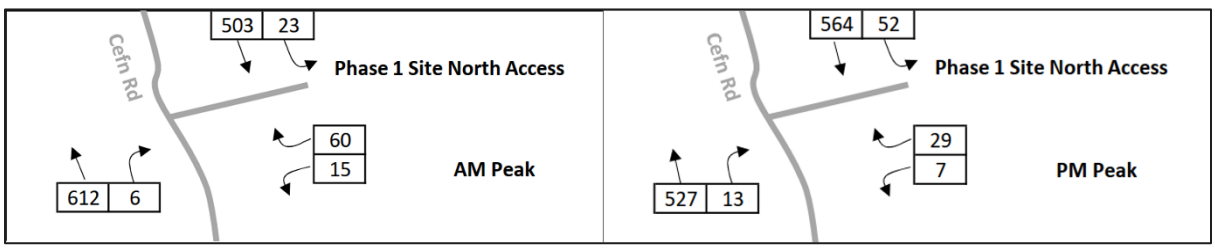


Figure 8-1: Proposed Northern Site Access Assessment Flows Pre-Link Road

8.6 JUNCTIONS model results provide a Ratio of flow to capacity (RFC) value along with an estimation of the likely traffic queues. RFC values between 0.00 and 0.85 are generally accepted as representing stable and acceptable operation conditions. Values between 0.85

and one represents variable operation (i.e. possible queues building up at the junction during the period under consideration and increase in vehicular delay moving through the junction). RFC values in excess of one represents overload conditions (i.e. congested conditions).

8.7 The results of the junction assessment are summarised in **Table 8.1** with the full model outputs provided at **Appendix I**.

Table 8.1: Phase 1 Northern Access Capacity Testing Results Summary Pre-Link Road

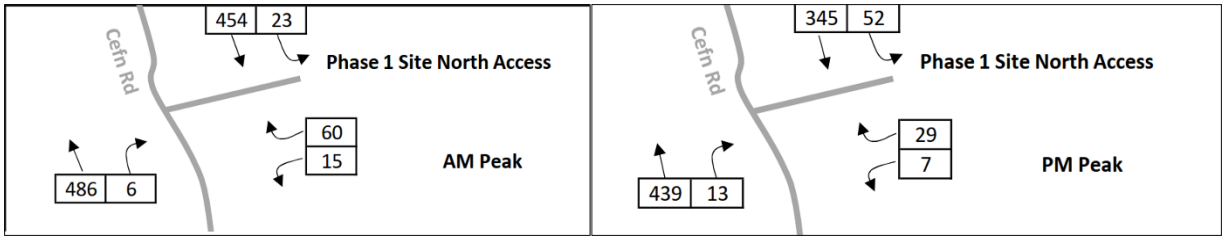
	AM		PM	
	RFC	Queue	RFC	Queue
Phase 1 North Access				
Site Access	0.28	0	0.14	0
Cefn Road Right Turn into Site	0.02	0	0.05	0

8.8 It can be seen from **Table 8.1** that the proposed northern site access would operate with significant spare capacity in the phase 1 (pre-link road) scenario with no queueing.

Link Road Scenario

8.9 In the scenario with the link road in place and all of KSS2 delivered, the proposed Northern site access flows for assessment are shown in **Figure 8.2**. The flows in and out of the junction are the same as for the pre-link road scenario however the flows on Cefn Road have been extracted from the VISSIM model, taking the 2028 DS2 scenario flows on Cefn Road. This is robust as it will double count some of the KSS2 south trips through the junction. The resulting flows at the junction are shown in **Figure 8.2**.

Figure 8-2: Proposed Northern Site Access Assessment Flows with Link Road



8.10 The results of the junction assessment are summarised in **Table 8.2** with the full model outputs provided at **Appendix I**.

Table 8.2: Phase 1 Northern Access Capacity Testing Results Summary Link Road Scenario

	AM		PM	
	RFC	Queue	RFC	Queue
Phase 1 North Access				
Site Access	0.26	0	0.11	0
Cefn Road Right Turn into Site	0.02	0	0.04	0

8.11 It can be seen from **Table 8.2** that the proposed northern site access would operate with significant spare capacity in the phase 2 (link road) scenario, with no queueing.

Southern Primary Access

8.12 The southern primary site access onto Cefn Road will serve the southern parcel of development and would also be the terminus of the link road through the KSS2. The junction is designed as a signal-controlled junction with pedestrian and cycle crossing phases and is tested as such for both scenarios. The provision of a signal junction provides benefits for active travel users, with a dedicated pedestrian and cycle crossing phase on each arm of the junction.

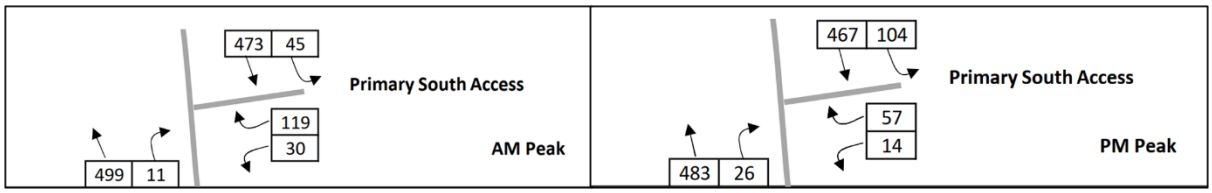
8.13 The junction has been tested using the industry-standard LinSig modelling software package. The signal junction has been tested with an all-red phase for the pedestrian crossings and it has been assumed that the crossings are called every cycle. In practice this may not occur, particularly in the PM peak when school trips would have reduced to low levels, and there would be more green time for traffic phases than assumed in the modelling. The model results therefore present a pessimistic scenario in terms of traffic delay.

Pre-Link Road Scenario

8.14 In the pre link road scenario, for the purposes of assessment, it has been assumed that the southern parcel accommodate 400 dwellings, commensurate with a total development quantum of 600 dwellings across the Erlas Park site. The traffic flows associated with this level of development are presented in **Table 6.1** of this report. The flows have been distributed north and south of the proposed access according to the distribution exercise described in section 5 of this report.

8.15 Flows on Cefn Road for the pre-link road scenario have been extracted from the VISSIM modelling taking the 2023 DN flows to avoid double counting of KSS2 traffic. It should be noted that the 2023 flows in the model include some background traffic growth although none has occurred in practice as revealed through the traffic survey comparison work described in this report. Traffic generated by KSS2 in the pre-link road scenario to/from the northern access point has been added to the 2023 DN flows on Cefn Road. The resulting flows at the junction are shown in **Figure 8.3**.

Figure 8-3: Proposed Primary South Site Access Assessment Flows Pre-Link Road



8.16 LinSig provides results in terms of degree of saturation (DoS), mean max queue (MMQ) and practical reserve capacity (PRC).

8.17 A signalised junction is considered to be at capacity when the Degree of Saturation on any lane is at around 90%. LinSig sets the theoretical capacity of a lane at 90%. However in practice signal junctions can operate within capacity up to a DoS of 100%.

8.18 The MMQ represents the worst queue by lane in the modelled time period. The 'Mean' refers to the fact that it is the mean over a number of cycles of the maximum queue occurring each cycle.

8.19 PRC represents the additional traffic that a signalised junction could accommodate based on the worst performing lane assuming a DoS of 90% as being at capacity. A negative PRC indicates that the junction is over its theoretical capacity.

8.20 The results of the LinSig assessment of the primary southern access for the pre link road scenario are summarised in **Table 8.3**, with the full LinSig model outputs provided at **Appendix J**.

Table 8.3: Phase 1 Primary Southern Access Capacity Testing Results Summary Pre-Link Road Scenario

	AM		PM	
	DoS	Queue	DoS	Queue
Phase 1				
Cefn Road North	50.5	8	53.5	9
Site Access	65.9	4	39.2	2
Cefn Road South	70.1	11	67.8	10
PRC	28%		33%	

8.21 It can be seen from **Table 8.3** that the proposed southern primary site access would operate with spare capacity in the phase 1 (pre-link road) scenario. The maximum DoS is 70.1 on the Cefn Road south approach in the morning peak.

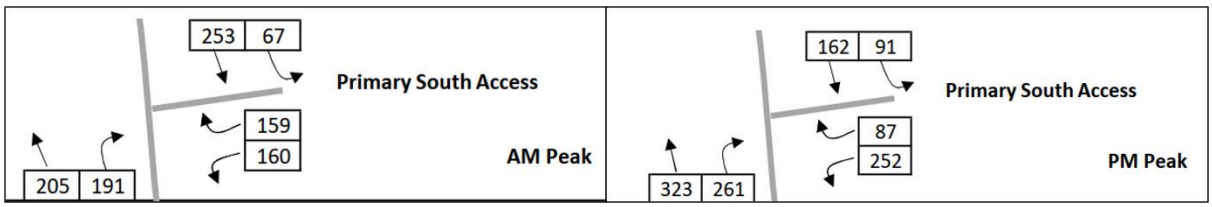
8.22 It should be noted that, for the purposes of the VISSIM testing, a single point of access to the KSS2 South site was included in the model for the 2023 and 2028 DS scenarios. This access point was coded in as a priority junction in the approximate location of the proposed Phase 1 Southern Parcel primary access. The VISSIM results showed that this junction operated within capacity in 2023 and 2028 DS scenarios, with average queues at the junction no greater than

2 vehicles on any single approach across the scenarios and average delay on any single approach no greater than 8 seconds.

Link Road Scenario

8.23 In the link road scenario, flows for the primary southern access have been extracted from the VISSIM model using the 2028 DS2 scenario results. This represents the forecast situation with the link road in place and all of the KSS2 and KSS3 sites occupied, along with an element of background traffic growth. The assessment flows are shown in **Figure 8.4**.

Figure 8.4: Proposed Primary South Site Access Assessment Flows Link Road



8.24 The results of the LinSig assessment of the primary southern access for the link road scenario are summarised in **Table 8.4**, with the full LinSig model outputs provided at **Appendix J**.

Table 8.4: Primary Southern Access Capacity Testing Results Summary Link Road Scenario

	AM		PM	
	DoS	Queue	DoS	Queue
Phase 2				
Cefn Road North	67.7	8	54.1	6
Site Access	69.0	8	84.3	11
Cefn Road South	69.9	10	84.3	16
PRC	29%		7%	

8.25 It can be seen from **Table 8.4** that the proposed signal junction arrangement would operate within capacity in the link road scenario. It should be noted that the flows used to test this scenario are robust as they do not include any discount to account for the presence of the southern secondary access junction further south. In practice this would remove some trips from the signal junction.

Southern Secondary Access

8.26 The southern secondary access is designed as a simple priority arrangement with Cefn Road and would serve a relatively limited portion of the site. This route would feature traffic calming measures to discourage use of this access as a cut through to the main spine road.

8.27 The junction has been tested using the industry-standard JUNCTIONS modelling software package.

Pre-Link Road Scenario

8.28 In the pre-link road scenario, the access is assumed to accommodate 200 dwellings as a robust test. The traffic flows associated with this level of development are presented in **Table 6.1** of this report. The flows have been distributed north and south of the proposed access according to the distribution exercise described in section 6 of this report.

8.29 Ahead flows on Cefn Road have been taken as the northbound and southbound flows on the primary southern access junction Cefn Road south arm.

8.30 The results of the junction assessment are summarised in **Table 8.5** with the full model outputs provided at **Appendix K**.

Table 8.5: Secondary Southern Access Capacity Testing Results Summary Pre-Link Road Scenario

	AM		PM	
	RFC	Queue	RFC	Queue
Phase 1				
Site Access	0.25	0	0.12	0
Cefn Road Right Turn into Site	0.02	0	0.04	0

8.31 It can be seen from **Table 8.5** that the junction is expected to operate with significant spare capacity, with no queueing.

Link Road Scenario

8.32 In the scenario with the link road in place and all of KSS2 delivered, the flows in and out of the junction are the same as for the pre-link road scenario however the ahead flows on Cefn Road are as per the northbound and southbound flows on the primary southern access junction Cefn Road south arm for the link road scenario.

8.33 The results of the junction assessment are summarised in **Table 8.6** with the full model outputs provided at **Appendix K**.

Table 8.6: Secondary Southern Access Capacity Testing Results Summary Link Road Scenario

	AM		PM	
	RFC	Queue	RFC	Queue
Phase 2				
Site Access	0.22	0	0.12	0
Cefn Road Right Turn into Site	0.02	0	0.05	0

8.34 It can be seen from **Table 8.6** that the junction is expected to operate with significant spare capacity, with no queueing.

Summary

8.35 To complement the VISSIM modelling, the proposed site access junctions with Cefn Road have been tested further in capacity terms and it has been demonstrated that the proposed access junctions will operate within capacity both in the pre-link road scenario, and with the link road in place.

9.0 Summary and Conclusions

Summary

9.1 Vectos has been instructed by Harworth Estates Investments Ltd to provide transport and mobility advice in relation to a proposed residential development on land to the east of Cefn Road in Wrexham. The proposed development is part of a wider site allocation known as Key Strategic Site 2 (KSS2) within the emerging Wrexham Local Development Plan (LDP) 2013 – 2028. The whole of the site allocation within the LDP is intended to deliver a total of 1,680 new dwellings across the entire site, 100 of which will be delivered in the subsequent plan period.

9.2 The proposed development is located approximately 2km north-east of the centre of Wrexham at the edge of the existing built form and around 2km to the north-west of Wrexham Industrial Estate. The site is generally flat and predominantly in agricultural use with existing field boundaries marked by hedgerows.

9.3 The highly sustainable nature of the KSS2 site location has already been established through the LDP site allocation process given that it benefits from proximity to a wide range of local facilities providing the potential to make it a very well-connected development. These local active travel connections to key facilities have been explored in detail within this report and it has been demonstrated that walking and cycling will be highly attractive modes for access to and from the development.

9.4 There are several bus stops located within a 400 metre walk from the site served by buses that provide direct connections during the day to Wrexham City Centre. Bus stops on Holt Road provide connections to Chester.

9.5 The site is therefore well located for access to bus travel, for commuting and school journeys but also for access to the other facilities and transport links available in Wrexham City Centre. It should be noted that there is an intention that the wider KSS2 site allocation once complete could accommodate bus movements through the site linking Cefn Road and the A534 and serving the KSS2 site more directly. The development proposals do not prejudice the delivery of such a strategy, with the future link road through the KSS2 site having been anticipated and accommodated within the design.

9.6 There are two railway stations – Wrexham Central and Wrexham General – located on the western side of Wrexham City Centre both approximately 4 kilometres from the site. Both stations can be reached by taking a bus to Wrexham Bus Station and walking approximately 260 metres to Wrexham Central or 550 metres to Wrexham General.

9.7 The site is therefore well located to present opportunities for travel by rail as part of a public transport journey chain.

9.8 The surrounding highway network has been reviewed in relation to traffic flows and general traffic conditions. A repeat of the set of surveys that were undertaken to inform the VISSIM modelling in 2017/18 has been undertaken in November 2023. The exercise has demonstrated that peak hour traffic flows across the network have reduced by around 5% since the VISSIM exercise, and by up to 11% at the Greyhound Roundabout, and therefore the existing 2018 base model can still be relied upon, and the outcomes of that assessment are still valid.

9.9 Observations of the local highway network reveal that the Greyhound junction operates under generally free flow conditions during the morning and evening peak periods, but with occasional queues forming on Cefn Road and Holt Road North during the morning peak and evening peak hour, and on Holt Road South during the evening peak. It was observed that the queues would clear within a short space of time and would not persist for prolonged periods, and this assessment is supported by queue surveys undertaken for the VISSIM modelling.

9.10 The highway safety record has been reviewed in relation to recorded personal injury accidents and it has been found that the safety record on this local network can be considered to be good, and does not show any trends that would call into question the proposed development.

9.11 The development proposals align well with the overall national and local policy guidance, being located close to a range of amenities, employment opportunities and public transport links that will help to encourage trips by foot, cycle and public transport. The proposals are therefore consistent with national and local transport policy objectives.

9.12 The number of trips by sustainable travel modes that could be generated by the proposed development throughout a typical day has been calculated. Pedestrian trips are expected to dominate the non-car trip mode share throughout the day with around 1,500 movements across the core 12-hour daytime period. Trips by cycle could be expected to total around 180 and trips by public transport around 340. There would be some pedestrian and cycle trips in particular that would be internal to the site, for example trips to the school on site, or trips to recreations areas within the site. Not all of the trips would therefore be onto the external pedestrian and cycle networks.

9.13 The proposed improvements to active travel infrastructure described in section 4 are appropriate to help accommodate the forecast trips by these modes providing for safe pedestrian and cycle links to key local facilities, amenities and employment areas.

9.14 The site's inclusion in the Wrexham LDP has been based upon an extensive evidence base including highways capacity testing that has been agreed with WCBC Highways and presented to the Planning Inspector at the LDP Examination in Public (EiP) in 2019. The Erlas Park proposals are within the parameters of the modelling exercise that considered the impacts of the development of KSS2 in future year scenarios with different amounts of development and mitigation in place.

9.15 The Local Plan modelling demonstrates that at least 250 dwellings on KSS2 North and 460 dwellings on KSS2 South can be accommodated prior to the completion of the Link Road.

9.16 The other mitigation that was identified through the agreed modelling exercise affects the Industrial Estate roundabout and the A534 / A5156 roundabout and is linked primarily with the KSS3 development trips, rather than the KSS2 trips. Notwithstanding, it is noted that the KSS2 North developer proposes to implement specific improvements at the A534 Holt Road / A5156 roundabout which are in line with the overall mitigation strategy, in conjunction with the development of the KSS2 North site.

9.17 Tests have now been carried out using the approved VISSIM model to assess the effect of increasing the number of dwellings on KSS2 south in the pre-link road scenario to consider whether an increase above the 460 dwellings tested for the Local Plan process would have any material effect upon the operation of the highway network.

9.18 Based on the testing, it is SLR's conclusion that 600 dwellings can be delivered on KSS2 South prior to the link road being delivered on the basis of the highway mitigation proposals specified in the 2023 DS scenario, without materially altering the performance of the highway network compared to the accepted 2023 DS i.e. pre link road position.

9.19 Therefore, the proposed phasing strategy for 600 dwellings as part of phase 1 (pre-link road) is supported by the VISSIM modelling. Further dwellings could be delivered in the pre-link road scenario if the capacity improvement scheme at the Greyhound Roundabout was implemented as the modelling shows that the capacity improvement scheme mitigates the effect of an additional 200 dwellings on the site (800 dwellings in total).

9.20 Whilst this application does not seek permission for a phase 1 of 800 dwellings, the above information has been presented to inform WCBC regarding the potential highway capacity benefits of a relatively modest scheme at the Greyhound Roundabout, to assist future discussions regarding infrastructure enhancements in this area.

9.21 As outlined earlier in this report, the masterplan makes appropriate provision for the delivery of the link road by allowing an appropriate corridor through the site of sufficient width to serve as the link road, and allowing for bus movements. It also connects to the adjoining land to the north at a suitable location to allow for the future connection to KSS2 North. It also provides a suitable junction form at the southern parcel main access with Cefn Road to serve as the southern end of the link road in the future. The Applicant is therefore committed to providing the section of link road through the land under their control and will continue to work pro-actively with the other stakeholders to progress the delivery of the link road.

9.22 An assessment of the number of proposed development trips at junction 6 has been undertaken, at the request of the Welsh Government. The traffic impact of the proposed KSS2 development has been assessed using the outputs from the VISSIM model focusing upon KSS2 development trips at the A5156 arm of the Junction 6 roundabout.

9.23 In comparison with the total traffic flows at the junction as recorded in a 2023 survey, the development flows would represent only a 2.4% increase and 1.1% increase in the AM and PM peak respectively. This change in trips is not material and would not warrant any further assessment of junction operation.

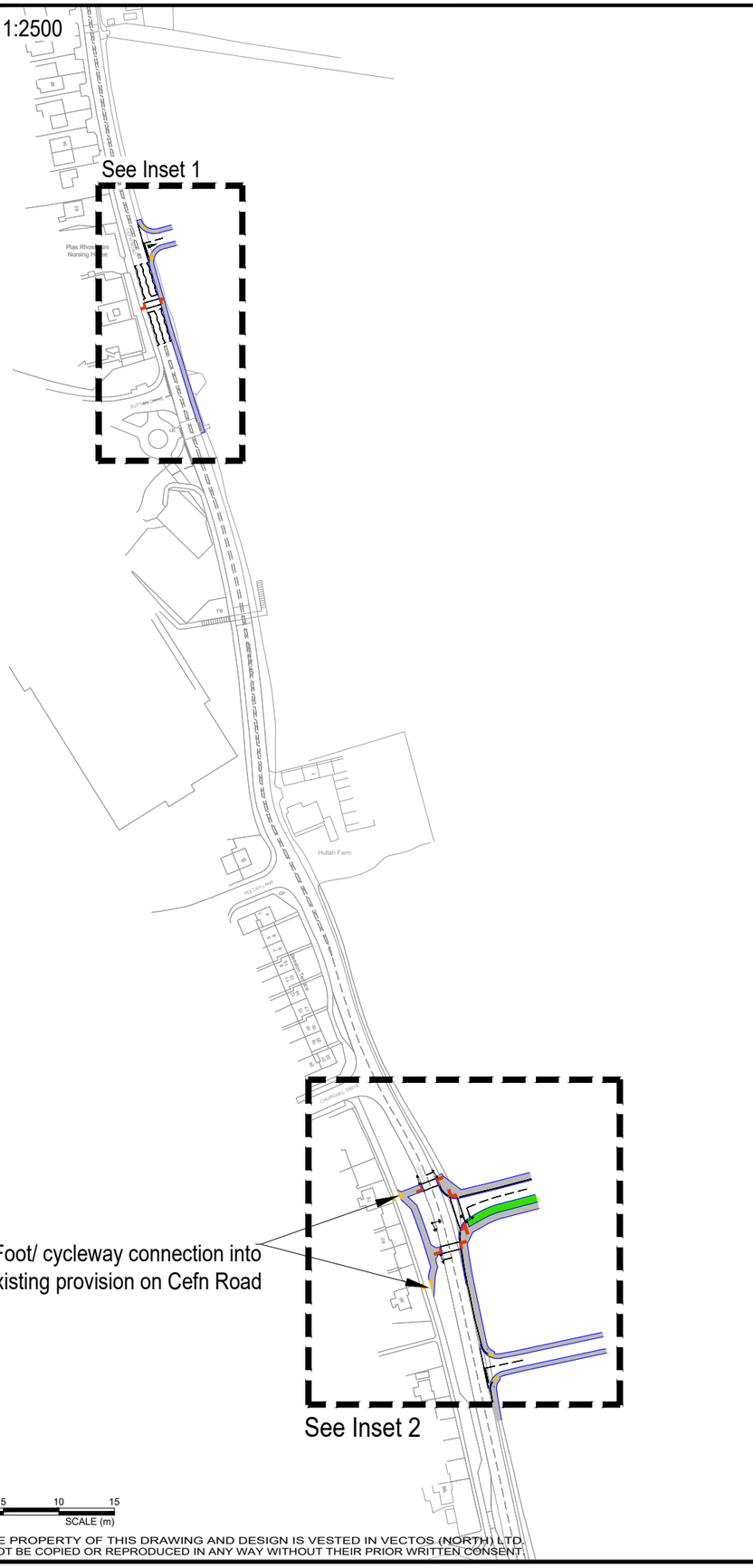
9.24 To complement the VISSIM modelling, the proposed site access junctions with Cefn Road have been tested further in capacity terms and it has been demonstrated that the proposed access junctions will operate within capacity both in the pre-link road scenario, and with the link road in place.

Conclusion

9.25 It is concluded that there are no highways or transportation grounds for refusal of the planning application for Erlas Park.

Drawings

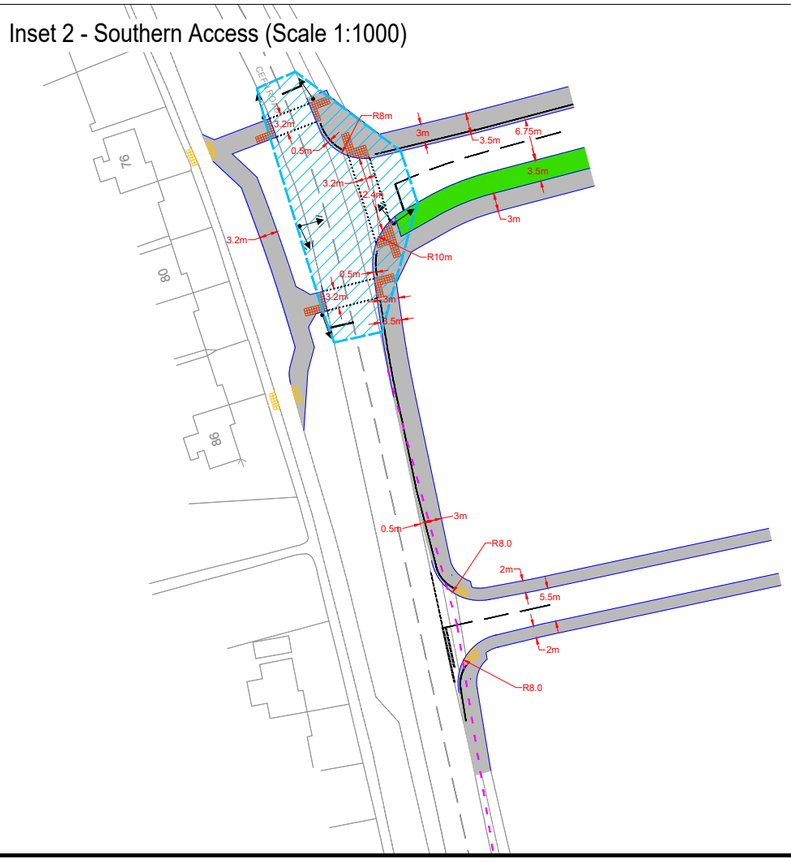
Scale 1:2500



Inset 1 - Northern Access (Scale 1:1000)



Inset 2 - Southern Access (Scale 1:1000)



Notes:
1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.

2.4 x 43m Visibility Splays

Junction Intervisibility Zone

REV.	DETAILS	DRAWN	CHECKED	DATE
B	Amendments made to layout	YF/EG	MR	09.01.25
A	Amendments made to layout	WD	TR	27.02.24

CLIENT:
Harworth Estates Investments Ltd

PROJECT:
Erlas Park, Wrexham

DRAWING TITLE:
Proposed Arrangement Along Cefn Road (Overview Plan)

SCALES:
1:500 at A3 - Unless Shown

DRAWN:	CHECKED:	DATE:
YF/EG	MR	09.01.25

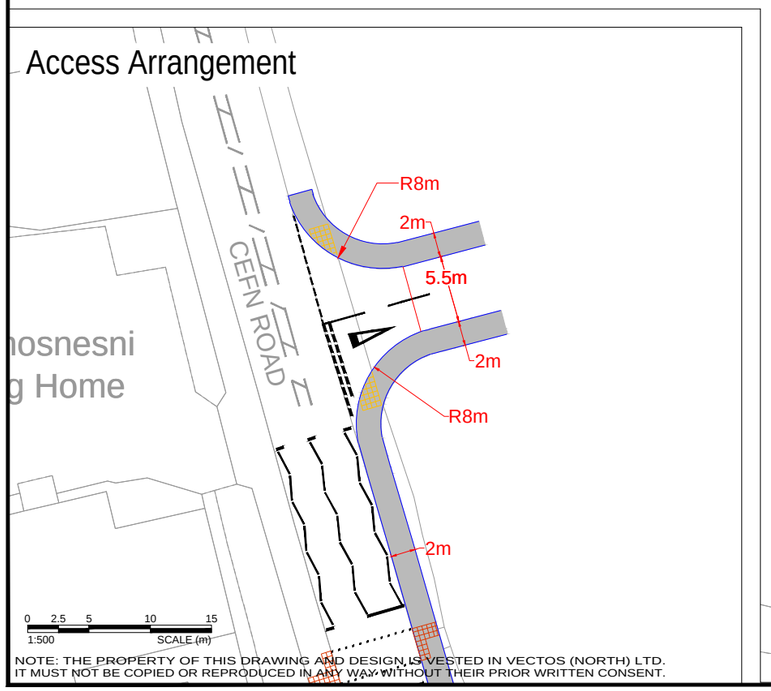
SLR

DRAWING NUMBER: VN232881-D100

REVISION: B

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Notes:

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2. White lining is indicative only.

2.4 x 43m Visibility Splays

REV.	DETAILS	DRAWN	CHECKED	DATE
B	Amendments made to layout	YF/EG	MR	09.01.25
A	Amendments made to layout	WD	TR	28.02.24

CLIENT:
Harworth Estates Investments Ltd

PROJECT:
Erlas Park, Wrexham

DRAWING TITLE:
Proposed Northern Access Arrangement

SCALES:
1:500 at A3

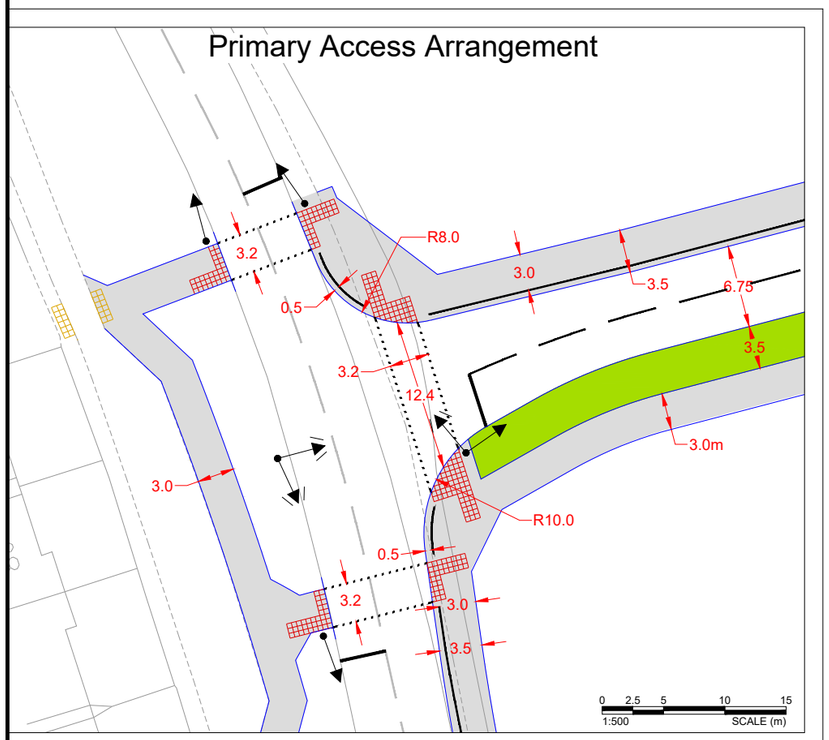
DRAWN:	CHECKED:	DATE:
YF/EG	MR	09.01.25

SLR

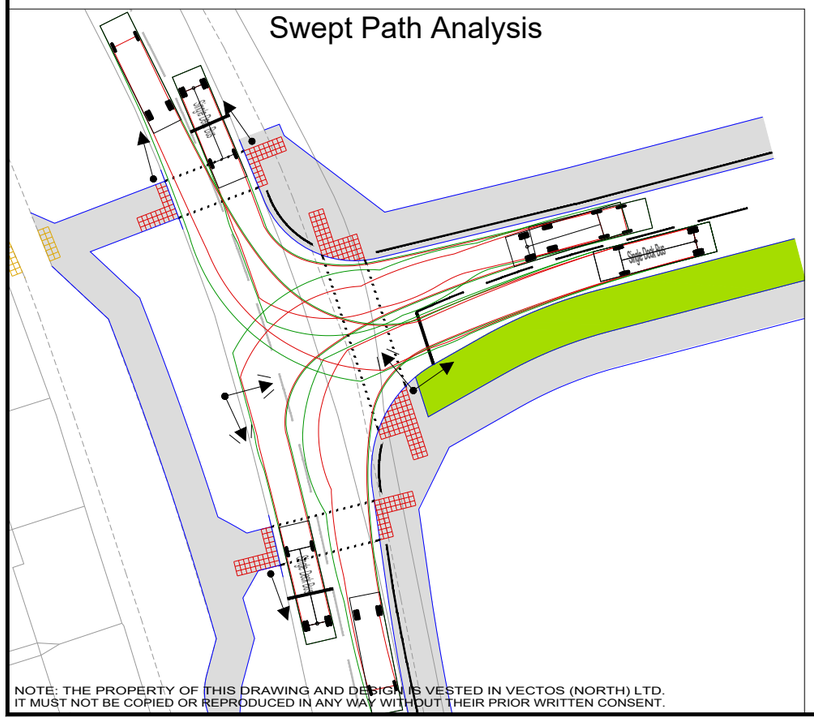
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REVISION: B

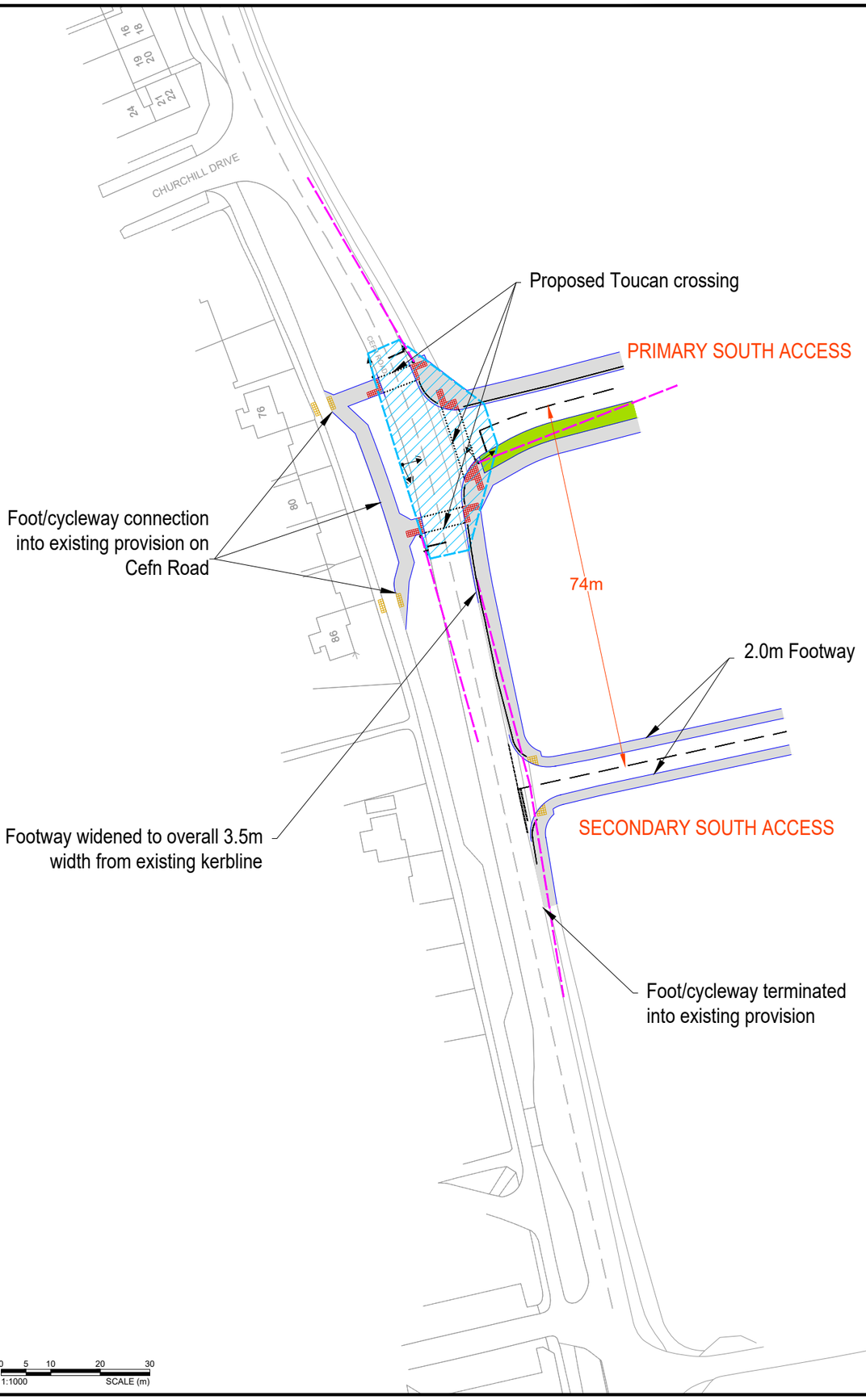
Primary Access Arrangement



Swept Path Analysis



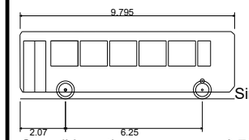
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Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. All dimensions in metres unless stated otherwise.

43m Stopping Sight Distance
Junction Intervisibility Zone



Single Deck Bus

Overall Length	9.795m
Overall Width	2.500m
Overall Body Height	3.070m
Min Body Ground Clearance	0.306m
Track Width	2.322m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	10.111m

REV.	DETAILS	DRAWN	CHECKED	DATE
E	Amends made from highway comments	YF/EG	MR	09.01.25
D	Soft verge removed from Primary access, Secondary access moved 15m south.	DLB	TR	27.02.24
C	Cefn Rd crossing arrangements modified.	DLB	TR	20.02.24
B	Access amended to signal control, SPA. Secondary access added.	DLB	TR	12.02.24
A	Amendments made to access location	WD	TR	5.02.24

CLIENT:
Harworth Estates Investments Ltd

PROJECT:
Erlas Park, Wrexham

DRAWING TITLE:
Proposed Access Arrangement
Southern Parcel
Primary Junction (Signals) & Secondary Junction (Priority)

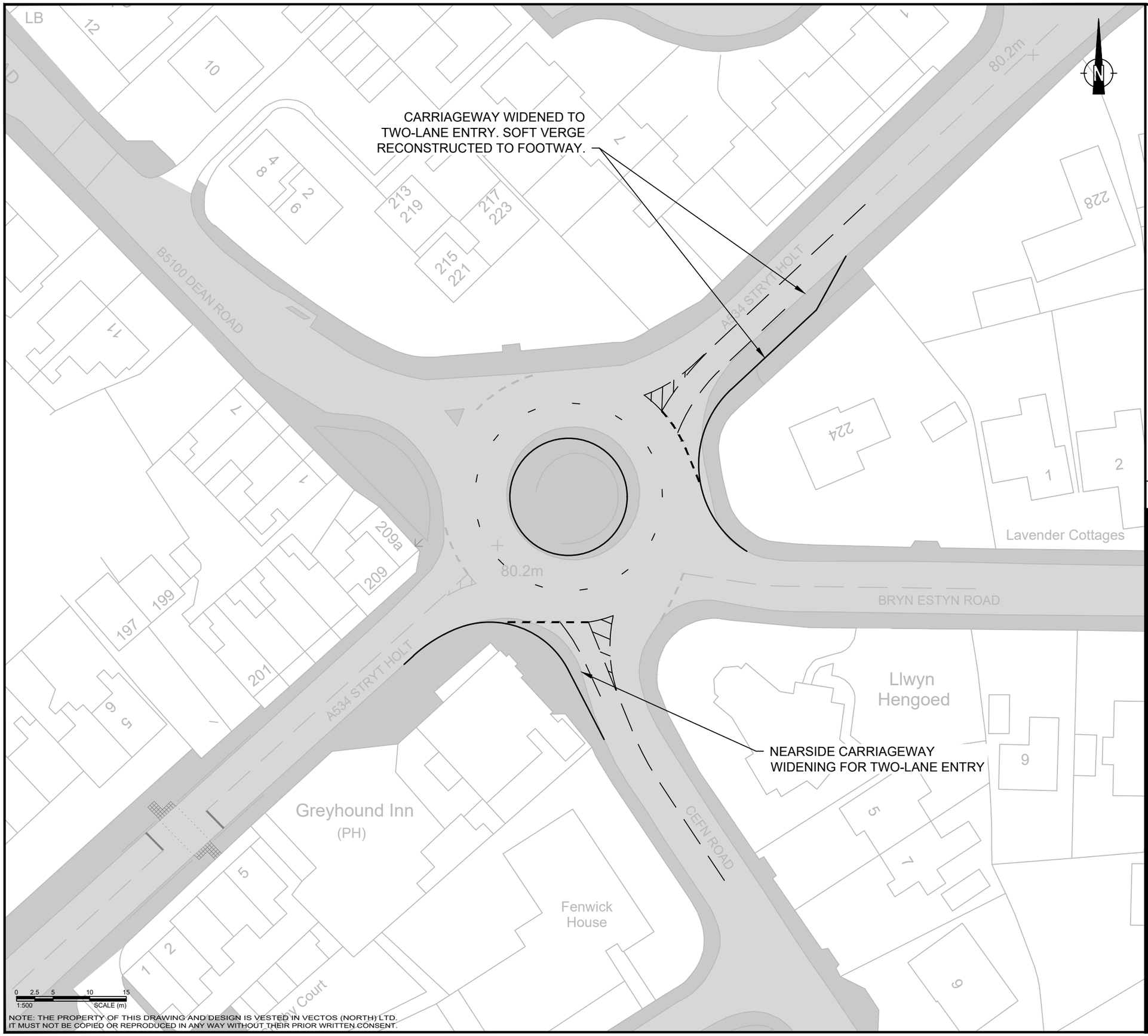
SCALES:
As shown at A3

DRAWN:	CHECKED:	DATE:
YF/EG	MR	09.01.25

SLR

DRAWING NUMBER: VN232881-D101

REVISION: E



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Notes:

1. THE HIGHWAY AUTHORITY IS WREXHAM COUNTY BOROUGH COUNCIL (WCBC).
2.

KEY

ADOPTED HIGHWAY

REV.	DETAILS	DRAWN	CHECKED	DATE
A	-	.	.	.

CLIENT:

Harworth Estates Investments Ltd

PROJECT:

Erlas Park, Wrexham

DRAWING TITLE:

A534 / B5100 (Greyhound Roundabout) Proposed Junction Improvement

SCALES:

1:500 at A3

DRAWN:	CHECKED:	DATE:
DLB	TR	FEB 2024

SLR

DRAWING NUMBER:	REVISION:
VN232881-D201	·

Appendices

Appendix A Wrexham LDP EiP Statement of Common Ground – KSS2

Wrexham Local Development Plan 2013 - 2028 EXAMINATION

SoCG002

housing | open space | employment | community | transport | education

Statement of Common Ground:

Key Strategic Site 2, Land East of Cefn Road, Wrexham.



Matter 6: Housing Allocations

This leaflet is available in accessible formats

Local Development Plan (2013-2028) Examination in Public

Key Strategic Site 2: Land east of Cefn Road, Wrexham

Statement of Common Ground: **SOCG002**

Prepared by:
Wrexham County Borough Council
Barratt Homes
Bloor Homes
Countryside Properties
MD Developments

10 September 2019

Contents:

1.0	Introduction	3
2.0	A Joint Vision for KSS2	4
3.0	Current Planning Status	4
4.0	KSS2 Infrastructure Delivery	5
5.0	Viability and Affordable Housing	10
6.0	Minerals Safeguarding	11
7.0	Development Trajectory	11

Appendix 1 – Infrastructure Contributions Model

Appendix 2 – KSS2 VISSIM Modelling Report

Appendix 3 – Highway Mitigation Schemes

1.0 Introduction

1.1 This Statement of Common Ground has been prepared to inform the Examination of the Wrexham Local Development Plan 2013-2028 ('LDP') and relates to land proposed for allocation in the LDP known as Key Strategic Site 2: *Land east of Cefn Road, Wrexham* (hereafter referred to as 'KSS2' or 'the Site'). Policies SP3 Key Strategic Housing Sites and SP5 KSS2: Land east of Cefn Road, Wrexham of the LDP allocate KSS2 for development and the extent of the Site is identified in *Figure 6: KSS2 masterplan framework* of the LDP. These policies should be cross referenced with the Infrastructure Plan (EB101), a living document which sits alongside the LDP.

1.2 The Statement has been prepared jointly by Wrexham County Borough Council (the Council) and Barratt Homes, Bloor Homes, Countryside Properties and MD Developments (the Developers). The Developers have been working collaboratively with the Council over a number of years in the promotion of KSS2 through the statutory LDP process. Furthermore, the Developers themselves have been working in partnership to prepare workable solutions to the Site's key issues and infrastructure requirements, to ensure its delivery within the LDP plan period.

1.3 Barratt Homes and Bloor Homes are in control of land within KSS2 that falls to the north of Bryn Estyn Road and to the south of Holt Road (Northern Parcel). Land within KSS2 to the south of Bryn Estyn Road is under various ownerships, but is within the overall control of the Council, Countryside Properties and MD Developments (Southern Parcel). Crucially, KSS2 in its entirety will be delivered by the developers who are promoting it.

1.4 This Statement sets out the agreed position of the Council and Developers in relation to the following:

- the joint vision for KSS2;
- the current stage of planning in response of the proposals for the Site;
- how the Site will deliver the requirements of policy SP5 of the LDP;
- viability and affordable housing;
- minerals safeguarding; and
- development trajectory.

2.0 A Joint Vision for KSS2

2.1 KSS2 will make a significant contribution to meeting Wrexham's housing needs to 2028, whilst achieving a number of the LDP's Strategic Objectives. Delivering the required number of homes in the right locations is key to sustaining the economic prosperity of the County Borough. KSS2 presents an opportunity to create a community of high quality housing, including an element of affordable housing, in a sustainable location on the edge of Wrexham Town, where it can make the best use of existing infrastructure and services, allowing homes, jobs and other facilities to be in close proximity to each other, reducing the need to travel by car.

2.2 High quality green infrastructure, in the form of extensive public open space, playing fields and a network of multi-function green spaces and corridors will be a key feature of KSS2. Other important infrastructure will include a new primary school, determined on the basis of the need arising from the development, a spine road linking northern and southern parcels of the Site, which will not only serve the development's needs, but also assist in alleviating pressure elsewhere on the highway network.

2.3 Importantly, the Site promoters and the Council have a strong desire to see homes delivered on KSS2 at the earliest opportunity, with 1,580 new homes completed by 2028.

3.0 Current Planning Status

3.1 The Developers have been working extensively with their appointed professional teams and with the Council throughout the preparation of the LDP, in order to establish a sound strategy for the Site's delivery and to inform the masterplan framework (LDP Figure 6). An extensive range of technical surveys and assessments have been undertaken over a number of years to inform the Developers' emerging masterplans and ultimately allow the Council and other key stakeholders to fully understand what the impact of the development of KSS2 will be and of the opportunities it presents. This has included ecological surveys, flood risk assessment and drainage analysis, ground conditions testing, arboricultural surveys, landscape and visual assessment, traffic surveys and simulation modelling, utilities assessments, air quality assessment, noise surveys, testing of mineral deposits and agricultural quality.

3.2 In January 2019 Barratt Homes and Bloor Homes submitted an outline planning application for the development of up to 600 dwellings on 28.5ha of land forming the Northern Parcel of KSS2 (Application reference: P/2019/0005). The planning application includes details of the principal northern access into the Site, but all other matters are reserved for future detailed approval. The submission of the planning application followed extensive engagement with various Council departments, as well as consultation with local stakeholders and the general public, including through formal Pre-Application Consultation on the proposals in September and October 2018. At the time of this Statement the planning application is pending determination, and it is anticipated that the Council's Planning Committee will consider the proposals before the end of 2019. This demonstrates a clear commitment to the delivery of the site.

3.3 Countryside Properties is in the process of preparing for statutory Pre-Application Consultation, which is expected to take place in Winter 2019, with formal submission of a planning application in late 2019/early 2020.

4.0 KSS2 Necessary Infrastructure Delivery

4.1 LDP Policy SP5 "KSS2: Land east of Cefn Road, Wrexham" identifies the necessary infrastructure that the Site will need to deliver as follows:

- Highway improvements to address known infrastructure capacity constraints at the Greyhound roundabout;
- Ensuring connectivity between the land north and south of Bryn Estyn Road;
- Education: on-site provision of a 420-place primary school, contributions towards secondary provision in the vicinity of the Site and the retention of existing (65,393m^2) of playing fields for Ysgol Morgan Llwyd;
- Public open space;
- Community and leisure facilities, including the retention of the Erlas Victorian Walled Garden;
- Active Travel; and
- Public Transport.

4.2 Much of the extensive engagement that has taken place between the Council and the Developers to date has revolved around how the infrastructure requirements of policy SP5 will be delivered. Further detail of this is provided below and Appendix 1 contains a draft Infrastructure Contributions Model, which has been agreed between the Developers and the Council as an appropriate delivery mechanism that will be reflected in future S106 agreements.

<u>Addressing highway infrastructure capacity constraints</u>

4.3 The Council and the Developers have commissioned consultants to develop an extensive VISSIM model that provides a clear understanding of the implications of traffic growth associated with the development of KSS2 for 1,680 dwellings.

4.4 The extent of the model includes the network over which KSS2 traffic would have an impact. It includes the A534 Holt Road corridor from the A5152 (Tesco) roundabout on the east side of the town centre to the Industrial Estate access roundabout and includes the Greyhound junction - which is a key node in the local area and specifically referenced in Policy SP5 - and the A5156 roundabout from which the northern part of the site would be accessed.

4.5 The model also includes the Cefn Road corridor which runs south from the Greyhound junction and from which the southern part of the Site would be accessed. Other local road links are also included in the model.

4.6 The northern extent of the model is the roundabout on the A5156 with Borras Park Road. Traffic on the A5156 is dominated by the Industrial Estate. In the morning commuter peak southbound (towards the industrial estate) traffic is much higher than northbound and vice versa in the evening. In this context KSS2 traffic is counter peak with the highest flows being northbound in the morning and southbound in the evening. On this basis the impacts of KSS2 traffic to the north of the Borras Park Road junction are not expected to be significant.

4.7 Appendix 2 provides a report on the KSS2 VISSIM Modelling work, the parameters, methodology, and outputs for which having been agreed between the parties. The VISSIM modelling also specifically assesses the highway impacts of KSS3 (Policy SP11 of the Local Plan), which will deliver 28 ha of employment land at Wrexham Industrial Estate.

4.8 The delivery of a spine road through the Site, linking the Northern and Southern parcels, alongside associated off-site improvements, will be an important piece of infrastructure that will ensure access to the local highway network from all parts of the Site. The results of the traffic modelling show that the spine road will also be a key piece of transport infrastructure that will assist in mitigating the impact of

the development upon parts of the local highway network, notably at the Greyhound roundabout.

4.9 The traffic modelling has shown that at least 250 dwellings on the Northern Parcel and 460 dwellings on the Southern Parcel can be accommodated on the highway network prior to completion of the spine road.

4.10 To accommodate this level of development on KSS2, and other developments proposed in the LDP, the following mitigation is, however, required:

- Widening of the westbound approach to the A5156/A534/KSS2 (northern) Site Access roundabout to three lanes and widening the southern section of the circulatory carriageway to three lanes; and

- Partial signalisation of the A534/Industrial Estate Road Roundabout.

These mitigation schemes are shown in drawings CBO-0322-014 and 015 in Appendix 3.

4.11 Following completion of the spine road, to accommodate up to 1,680 dwellings on the Site, additional works are required to the A5156/A534/KSS2(Northern) Site Access roundabout, consisting of widening the northern circulatory carriageway to three lanes and widening the southbound approach to three lanes. In addition, traffic signal control is proposed to be introduced on the A534 westbound approach, and the A5156 southbound approach.

4.12 This mitigation scheme is included in drawing CBO-0322-016 in Appendix 3.

North-South Connectivity

4.13 The precise point at which the spine road will cross Bryn Estyn Road, and meet at the convergence of the Northern and Southern Parcels, is still to be finalised. However, there are three potential options, all of which are considered feasible.

4.14 In addition to the completion of the spine road through KSS2, a range of pedestrian and cycle connections will be provided between the Northern and Southern Parcels. This will allow for accessible linkages across KSS2 as well as enabling access to the existing Bryn Estyn Road foot/cycle that connects Wrexham Town to Wrexham Industrial Estate. Barratt and Bloor Homes' planning application demonstrates a commitment to delivering these linkages, alongside the masterplan that is being developed by Countryside Properties.

4.15 TheSite is already well served by public transport. Completion of the new spine road, which has been designed to accommodate bus services, will allow bus penetration through the Site to benefit public transport accessibility and increase patronage in the local area.

Education

Primary Education

4.16 Policy SP5 of the LDP requires the provision on site of a new primary school to meet the needs of KSS2 providing up to 420 places. Extensive discussions between the Council and the Developers has led to the identification of two possible options for the location of a primary school, either on land controlled by the Council or by the Developers. A suitable location for the primary school will be conveniently accessible to residents of KSS2 and the surrounding existing residential area on foot, bicycle, public transport and via a network of safe streets.

4.17 The cost of developing a new 420-place primary school has been estimated at £5.2m. The Developers agree in principle to the provision of a new school if it is

required but would expect the contributions to be determined on the basis of the need arising from the development.

4.18 Without prejudice, the Council's Education Department has indicated that subject to the relevant statutory/regulated processes including Planning and School Organisation the preferred site for the school, which has the advantage of allowing shared facilities, is located off Cefn Road. The Council will be responsible for the delivery of the primary school. The process of delivering a primary school will involve, at the appropriate time, the Education Department undertaking a full consultation under the School Organisation Code 2018 which will take approximately 12 months. Subject to demonstrated need and the proposal to establish the school being approved by the Council's Executive Board, without prejudice to the Council, the primary school would be available for intake at 2023 at the earliest.

Secondary Education

4.19 Policy SP5 requires contributions towards secondary education in the vicinity of the Site. In the event that the Council predicts insufficient capacity within local secondary schools to serve the development of KSS2, and that this is founded upon a robust evidence base and demonstrated need, S.106 contributions will be secured to increase capacity to ensure that places are available at accessibly located secondary schools for future residents

Ysgol Morgan Llwyd Playing Fields

4.20 Policy SP5 seeks the retention of the existing playing fields serving Ysgol Morgan Llwyd to the West of Cefn Road. The playing fields are presently located in the Southern Parcel and their retention and/or the provision of an area of playing fields (quantum to be agreed) in an equally accessible location to the school, will be provided for within the Developers' masterplan.

4.21 Through discussions between the Council and Developers it has been agreed that the area of retained or replaced playing fields will be at least 40,000 sqm of the Site, where it is supported by a robust evidence base and demonstrated need

Public Open Space

4.22 KSS2 will deliver high quality integrated green infrastructure, including public open space, in accordance with Policy CF2 Provision of New Open Space of the LDP. Public open space will be formed by a combination of formal and informal play space, naturalistic open space and informal green infrastructure that is accessible to all parts of the development. The Site's existing landscape and woodland features will be retained and enhanced where possible to create a development that is truly landscape led. Woodland buffers and green corridors will be used to enhance biodiversity.

Community and Leisure Facilities

4.23 Erlas Victorian Walled Garden is located immediately to the south of Bryn Estyn Road. It is recognised for its visitor experience and important community work. It is anticipated that the development of KSS2 will bring benefits to the Walled Garden through increased patronage from new residents in close proximity.

Active Travel

4.24 KSS2 will embrace the principles of Active Travel, as set out in PPW10 and Policy T2 'Active Travel' of the LDP. KSS2 will provide convenient and accessible new walking and cycling infrastructure, whilst enhancing existing routes, such as Bryn Estyn Road. The Developers will introduce measures to actively promote and facilitate sustainable travel choices through Travel Plans.

Public Transport

4.25 The spine road is to be designed to a standard that is suitable for bus use. The primary estate roads will also provide the potential for route diversions through other parts of the Site. Early discussions have taken place with Wrexham's bus operators and KSS2 is considered to provide a quantum of development that is sufficient to attract a new bus route, or route diversion, through the Site, without the need for additional funding once the key infrastructure is in place.

4.26 Prior to completion of the spine road there are opportunities to access existing bus services around the Site on Cefn Road and St Mellion Crescent.

Design

4.27 The developers are committed to delivering a high standard of design through the use of a variety of house types, materials and variation in built form to ensure the Site has a sense of place and distinctiveness.

5.0 Viability and Affordable Housing

5.1 Large-scale strategic development sites often perform differently, in viability terms, to smaller scale, more conventional development sites. KSS2 is no exception. The combined costs of "opening-up" the Site, delivering its key infrastructure and expected developer contributions, are significant. A balance therefore needs to be struck between the funding and phasing of on-site and off-site infrastructure, and the need to deliver affordable housing.

5.2 The District Valuers Service have been commissioned by the Council to consider the viability of the LDP affordable housing targets across the County Borough. The present target for KSS2 is 40% according to LDP policy H2, and in light of

this the Developers have commissioned a joint site-specific viability assessment of KSS2. The intention of the site-specific viability assessment is to ensure that the affordable housing requirement for KSS2 is viable.

5.3 The findings of the District Valuers Service assessment have not been published at the time of submission of this Statement. Once it is published the Developers joint viability assessment may need to be revisited so that all parties can seek to agree a position in advance of the relevant LDP Hearing Session.

6.0 Minerals Safeguarding

6.1 According to the British Geological Survey Aggregates Safeguarding map (2012) KSS2, like the majority of land surrounding the built-up area of Wrexham Town, is within a Category 1 Aggregates Safeguarding Area for sand and gravel. As a consequence, any planning applications for the development of the KSS2 must be accompanied by a Prior Extraction Assessment.

6.2 In the event that the extraction of the mineral deposit beneath KSS2 is found to be commercial feasible, prior extraction in advance of the Site's development will only be required for material that lies above a development platform and that is not otherwise required for the regrading of the Site in the process of its development.

6.3 It will not be possible to understand the potential for prior extraction of mineral from the Site until the detailed development proposals are at a more advanced stage, at which point detailed Prior Extraction Assessments will be undertaken.

7.0 Development Trajectory

7.1 The Developers consider the following housing completions trajectory to be achievable on KSS2, ensuring the delivery of 1,580 dwellings over the Plan

period, with an additional 100 units that will come forward post-2028, thus reflecting Policy SP5. This has been updated to reflect the current 2019 trajectory position.

Timescale	Dwellings Completed (Northern Parcel)	Dwellings Completed (Southern Parcel)
2019-20	0	0
2020-21	0	40
2021-22	50	140
2022-23	100	140
2023-24	100	140
2024-25	100	130
2025-26	100	130
2026-27	100	130
2027-28	50	130
2028-29	0	100
Total	600	1,080

Appendix 1: Infrastructure Contributions Model: to ensure infrastructure obligations are delivered and fairly equalised across KSS2

LDP Policy SP5 "KSS2: Land east of Cefn Road, Wrexham" : this policy identifies the necessary infrastructure requirements:

- Highway improvements to address known infrastructure capacity constraints at the Greyhound roundabout;
- Ensuring connectivity between the land north and south of Bryn Estyn Road;
- Education: on site provision of a 420-place primary school, contributions towards secondary provision in the vicinity of the site and the retention of existing (65,393 m²) of playing fields for Ysgol Morgan Llwyd;
- Public open space;
- Community and leisure facilities, including the retention of the Erlas Victorian Walled Garden;
- Active Travel; and
- Public transport.

The promoters of KSS2 support this ambition and are keen to deliver these commitments where robustly evidenced and proportionate to the KSS2 development.

Assumptions: Housing Delivery

- 1,680 dwellings across the KSS2 area
- Bloor / Barratt: an outline planning application (ref. P/2019/0005) proposes up to 600 dwellings; which is pending determination at the time this Model is prepared; with the balance of 1,080 dwellings to be provided on the southern part of the KSS south of Bryn Estyn Road.
- This (**presently**) equates to a 35% (north) and 65% (south) split in housing delivery provision;
- Draft Housing Trajectory information has been supplied to the Local Planning Authority by the promoters, which demonstrates the delivery of KSS2 within the plan period (with the exception of 100 dwellings in the southern parcel of KSS2 post 2028).

Other (emerging) LDP Policy Considerations

Policy SP6 "Planning Obligations": states that planning obligations will be sought to mitigate any impacts of development, with examples of the types of obligations that could be sought as follows (noting that they are not necessarily limited to these):

- Education provision / facilities;
- Active travel, public transport and highway improvements;
- Public Open Space and Green Infrastructure;
- Community facilities;
- Affordable Housing;
- Ecological mitigation;
- Health; and
- Preservation and enhancement of heritage assets.

Policy H2 "Affordable Housing": seeks affordable housing delivery at a rate of 40% in this location.

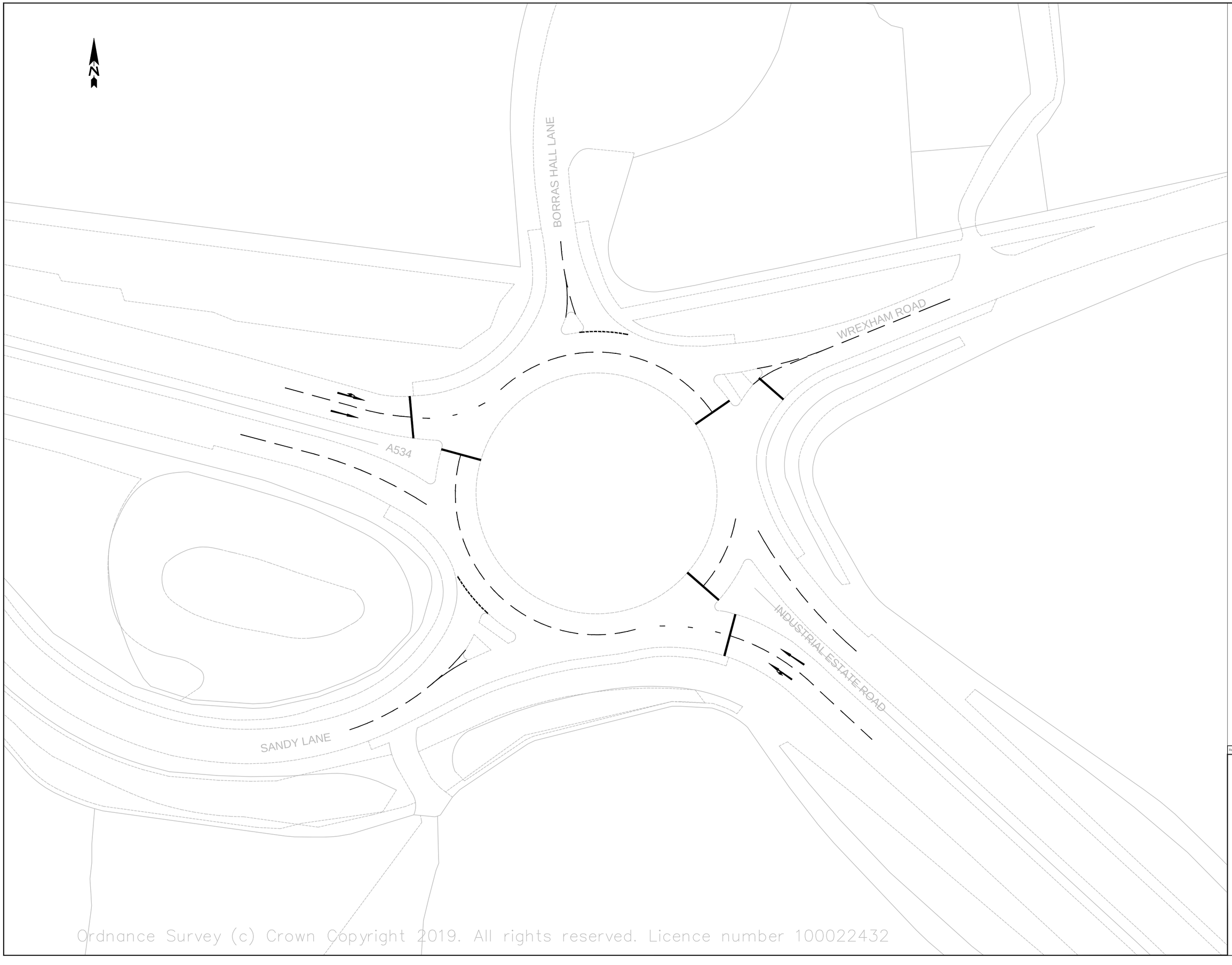
The viability of Policy H2 is currently being reviewed by the District Valuer, in response to concerns raised by Welsh Government. The promoters of KSS2 have commissioned a site-specific viability appraisal that will determine what quantum of affordable housing can be delivered on-site, with the aim of such provision being written into the LDP as acknowledgement of the significant infrastructure costs associated with the delivery of KSS2. To date this information (both in respect of the site-specific viability appraisal or wider Council viability report has not been provided).

Proposed Infrastructure Triggers

Contribution Item	Comments	Delivered	Bloor / Barratt	Countryside	LDP Policy Source
Greyhound Roundabout improvements	Traffic modelling has revealed that with the delivery of mitigation in the form of the Spine Road, no improvements are necessary at the Greyhound Roundabout. Instead, in addition to forming the northern site access, further improvements will be needed to the A534/A5156 Roundabout. The phasing of such works is to be investigated, likewise the contribution to be made by the promoters of KSS3. The modelling has also identified the need for mitigation at the industrial estate roundabout on the A534.	The modelling has demonstrated that at least 250 dwellings to the north of Bryn Estyn Road and 460 dwellings to the south of Bryn Estyn Road can be accommodated prior to the completion of the link road. Widening of the westbound approach to the A5156/A534/KSS2 (northern) Site Access roundabout to three lanes and widening the southern section of the circulatory carriageway to three lanes; and Partial signalisation of the A534/Industrial Estate Road Roundabout.	35% of improvement costs (pending modelling mitigation assessment and any contribution by KSS3 promoters).	65% of improvement costs (pending modelling mitigation assessment and any contribution by KSS3 promoters).	SP5 T1 T6
Spine Road connectivity		Must be delivered to the north of Bryn Estyn Road ("Northern Section") not later than upon occupation of the 250th dwelling to the north of Bryn Estyn Road. Must be delivered to the south of Bryn Estyn Road ("Southern Section") not later than upon occupation of the 460th dwelling to the south of Bryn Estyn Road. The Northern and Southern Sections of the road to be linked and the	Responsible for delivery on land north of Bryn Estyn Road and 35% of any cost involved over highway authority / WCBC land.	Responsible for delivery on land south of Bryn Estyn Road and 65% of any cost involved over highway authority / WCBC land.	SP5

		Spine Road operational upon completion of whichever Section is completed last.			
Primary School	Needs quantum of new residents therefore new dwellings need to be occupied where the need has been demonstrated The Council estimate the cost of the new school to be £5.2m and the suggested location is = off Cefn Road.	WCBC has confirmed that the earliest a new school can be delivered is 2023 Highway access to the site will be required and may be dependent upon the phased delivery of KSS2 housing and the joining of a spine road.	35% of the cost /contribution.	If located on Council land 65% of the cost /contribution. If located on Countryside land then a reduced contribution will be levied.	SP5
Secondary school contributions	WCBC Education to confirm whether a contribution is required and need is evidenced.				SP5
Retention of playing fields	Playing fields should be accessible to Morgan Llwyd Secondary School, existing neighbourhoods and both the north and south parts of the KSS; and also to the new Primary School. The quantum and form of playing field requirement has been identified by the LPA as at least 40,000 sqm. This need will have to be demonstrated and justified Noting here that the Rugby Club and its associated playing fields may provide a resource to address this need.	Land safeguarded at start; land made available for operational use upon occupation of 300th dwelling to the south.		If located to the south, then a reduced POS requirement be provided in the southern area combined with reduced contributions.	SP5 CF1
Public open space	POS sought at a rate of 0.25 ha		Provision of high quality	If playing fields located	SP5 CF2

	per 50 dwellings (50 sqm per dwelling).		and accessible POS in accordance with the outline planning application.	to the south, then a reduced POS rate be provided in the southern area.	
Green Infrastructure (incl. SUDs), ecology					SP5 SP20 NE3 NE6
Retention of Walled Garden	To be retained, subject to spine road route.				SP5
Active Travel improvements	Associated with pedestrian and cycle provision and connectivity.		Site Travel Plan.	Site Travel Plan.	SP5 SP12 T2
Public Transport	Initial contact has been made with a local bus operator. It is considered the scale of KSS2 and the provision of the link road will sustain public transport provision to the site in the long term. Funding may be required to provide public transport to the site during the development of the site. This will be discussed further with WCBC and the bus operator in line with the proposed phasing.	A scheme to be operational upon the delivery of the spine road (which ought to tie in with the occupation of the 750th dwelling).			SP5 SP12 T3
Affordable Housing	Delivered as a negotiated (viable and deliverable) percentage of each Detailed Planning Application phase coming forward. The rate will be determined through viability assessment.				H2



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Rev.	Date	Revision Details	Drawn	Check	App.

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Client

Barratt Homes and Bloor Homes North West

Project

KSS2 / KSS3

Drawing Title

Industrial Estate Roundabout Improvement Scheme

Drawn	Checked	Approved
LPB	PC	PC

Scale / Size	Date
1:500 @ A2	25.08.2019

Status	Drg No	Rev
Information	CBO-0322-015	

A5156 APPROACH
WIDENED TO 3 LANES

TRAFFIC SIGNALS
INSTALLATION ON
A5156 APPROACH

CIRCULATORY CARRIAGEWAY
WIDENED TO 3 LANES

A534 APPROACH WIDENED
TO 3 LANES

TRAFFIC SIGNALS INSTALLATION
ON A534 WEST APPROACH

KSS2 SITE ACCESS

A5156

A534 EASTBOUND

A534 WESTBOUND

A534

HOLT ROAD

3.0
7.3
3.0

Rev.	Date	Revision Details	Drawn	Check	App.

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Project
KSS2 / KSS3

Drawing Title
A5156/A534 Roundabout Full Improvement Scheme

Drawn	Checked	Approved
SFB	PC	PC

Scale / Size	Date
1:500 @ A2	25.08.2019

Status	Drg No	Rev
Information	CBO-0322-016	

EXISTING 2 LANE ARRANGEMENT MAINTAINED

CIRCULATORY CARRIAGEWAY WIDENED TO 3 LANES

A534 APPROACH WIDENED TO 3 LANES

A5156

A534

HOLT ROAD

A5156

A534

3.6

7.3

3.6

Rev.	Date	Revision Details	Drawn	Check	App.

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Project	
KSS2 / KSS3	
Drawing Title	
A5156/A534 Roundabout Interim Improvement Scheme	

Drawn	Checked	Approved
SFB	PC	PC
Scale / Size		**Date**
1:500 @ A2		22.08.2019
Status	**Drg No**	**Rev**
Information	CBO-0322-014	

Appendix B Traffic Flow Comparison Note

Survey Comparison 2018 to 2023

KSS2 Testing Wrexham VISSIM

Prepared by:

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SLR Project No.: 431.000223.00001

20 December 2023

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	20 December 2023	AH	JE	JE
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

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Table of Contents

1.0 Introduction 1
2.0 2023 Surveys 2
3.0 Survey Comparison 4
4.0 Summary 5

Figures in Text

Figure A: 2023 MCC Survey Locations 3

1.0 Introduction

1.1 SLR Consulting Ltd (SLR) has been advising Harworth as part of a renewed application for delivery of an allocated Site in Wrexham known as Key Strategic Site 2 (KSS2), Policy SP5, Land East of Cefn Road.

1.2 Integrated Transport Planning (ITP) on behalf of Wrexham County Borough Council (WCBC) developed a Base VISSIM model in 2018 to support the decision-making process for the Local Plan. Both and AM and PM peak hour Base model was developed using hours 08:00-09:00 and 16:30-17:30.

1.3 SLR (formerly Vectos Microsim) carried out a series of assessments in 2019 using that agreed Base model, which adopted a collaborative approach between promotors for Sites KSS2 and KSS3 along with WCBC.

1.4 The ITP Local Model Validation Report (LMVR), which underpins the Base modelling and provides details of model build, data/survey requirements and results is provided in Appendix A of this Note. The SLR Forecasting Report, which contains the forecasting methodology along with a series of proposed highway interventions to support delivery of KSS2 and KSS3, is provided in Appendix B.

1.5 Harworth commissioned SLR in late 2023 to arrange for new surveys to be carried out in order to inform flow changes at a number of key junctions across the model extent. The purpose of the exercise was to determine whether the existing 2018 Base model can still be relied upon, and the outcomes of that assessment are still valid.

1.6 This Note sets out analysis of the new 2023 survey counts compared with the counts used for the 2018 Base modelling.

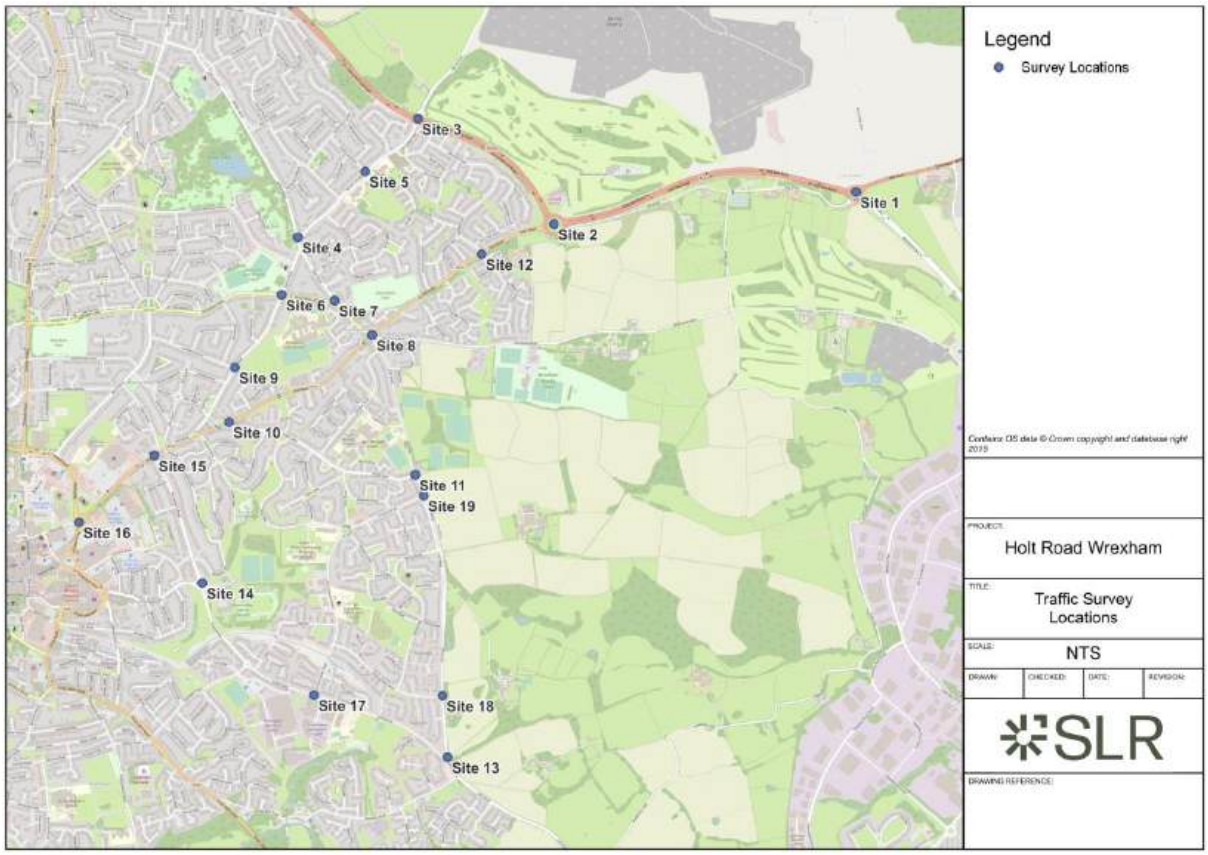
2.0 2023 Surveys

2.1 SLR developed a survey specification to be provided to a number of survey companies, and ultimately commissioned The Severnside Group to carry out Manual Classified Count surveys at a total of 19 locations across the model extent:

1) A534 / Borras Hall Lane / Sandy Lane / Industrial Estate Road
2) A534 / A5156 / Holt Road
3) A5156 / Borras Park Road
4) Borras Park Road / Jeffreys Road
5) Borras Park Road / Cherry Hill Drive
6) Borras Road / Rhosnesni Lane
7) Dean Road / Rhosnesni Lane
8) Holt Road / Dean Road / Bryn Estate Road / Cefn Road
9) Borras Road / Camberley Drive
10) Holt Road / Hullah Lane
11) Cefn Road / Hullah Lane
12) Holt Road / Birkdale Road / St Mellion Crescent
13) Holt Road / Queensway
14) Ffordd Montgomery / Queensway / Smithfield Road
15) Ffordd Montgomery / Holt Road
16) A5152 / Holt Road / Retail Park Access / Holt Street
17) Queensway / Prince Charles Road
18) Cefn Road / Anthony Eden Drive
19) Queensway / Prince Charles Road

2.2 These junctions are illustrated below:

Figure A: 2023 MCC Survey Locations



3.0 Survey Comparison

3.1 Observed traffic counts as reported within the 2018 ITP LMVR have been collated and presented against the updated 2023 survey counts.

3.2 Key conclusions of the analysis are provided below:

a) Traffic flows at Greyhound Roundabout have fallen by approximately 11% between 2018 and 2023 in both AM and PM peak hours

b) Traffic flows at Site 2 have fallen by approximately 3% and 5% in the AM and PM peak respectively between 2018 and 2023

c) Traffic flows leaving Site 1 towards Wrexham Industrial Estate have fallen by ~200 vehicles (13%) in the AM peak

d) Traffic flows leaving the Wrexham Industrial Estate towards Site 1 have fallen by ~100 vehicles (5%) in the PM peak

e) Traffic flows travelling southbound along A5156 have fallen by ~250 vehicles (15%) in the AM peak, with total junction flows at Site 3 falling by ~8%

f) Total junction flows at Site 3 in the PM peak have fallen by approximately 3%

g) Junction flows at Site 11, which represents the location closest to the proposed Cefn Road/Link Road Access Junction, have remained very similar in the AM peak. In the PM peak, flows have reduced by ~100 vehicles (~11%)

h) Across all junctions for which there are 2018 and 2023 to compare, network-wide demands have fallen by approximately 5% in the AM and 4% in the PM

3.3 Full presentation of outputs is provided within Appendix C.

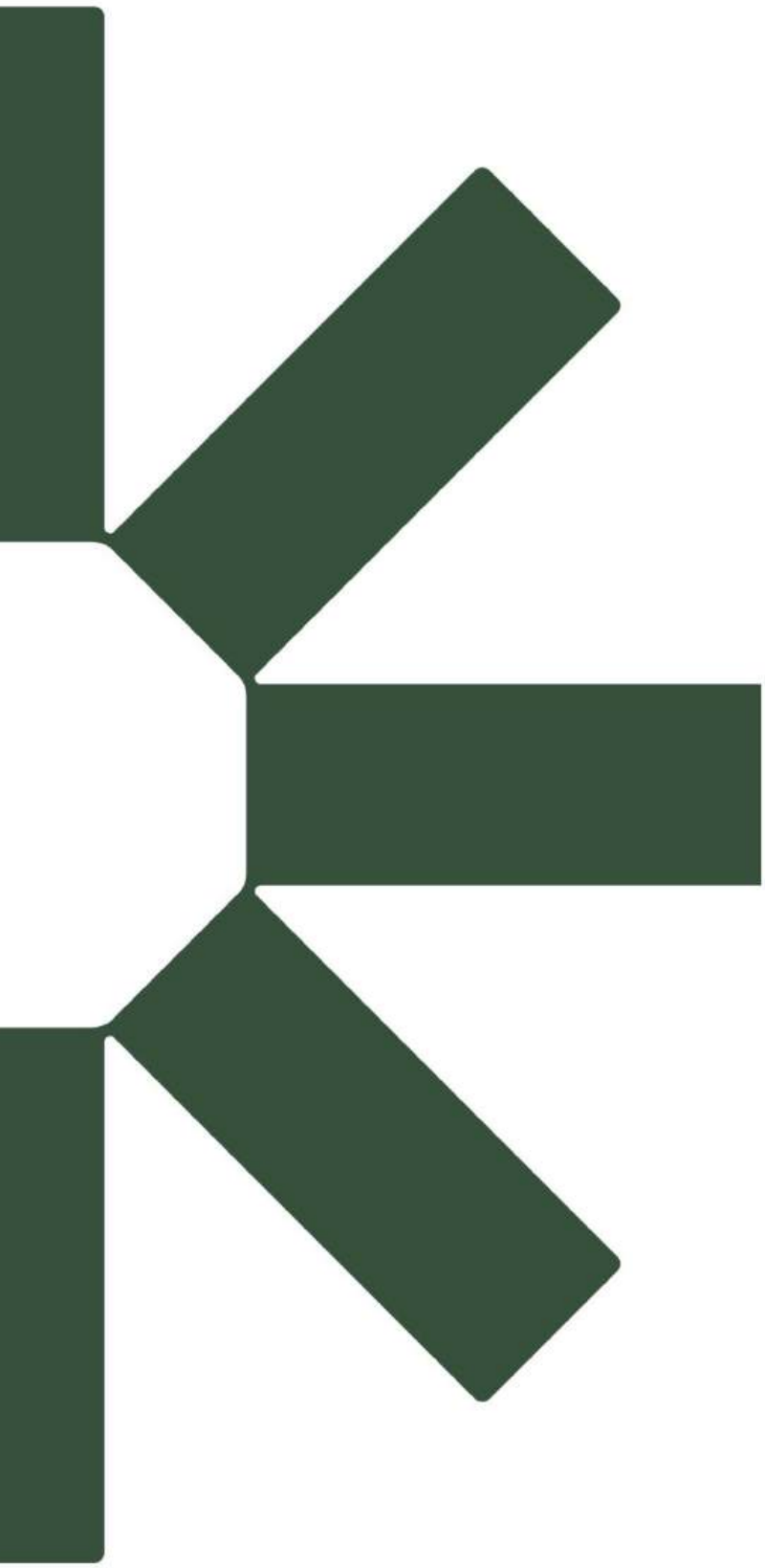
4.0 Summary

4.1 Updated 2023 MCC survey counts have been undertaken at key locations across the extent of the 2018 VISSIM model. The purpose is to understand how traffic flows have changed in the period since the existing Base model was developed.

4.2 Comparisons show that network traffic flows have fallen between 2018-2023 by approximately 5%. Greyhound Roundabout in particular, which is a key consideration in the context of the KSS2 assessment due to proximity and proposals for a link road to bypass this junction, shows traffic flows have fallen by approximately 11% in both AM and PM peak hours.

4.3 This exercise demonstrates that the Base model and the future year assessments that followed remain a strong evidence base for development control, and proposed mitigation measures identified in the 2019 assessment would be able to accommodate future traffic in light of new 2023 survey data. Whilst comparable baseline flows have reduced it is also likely that the forecasting exercise undertaken in 2019 has resulted in higher traffic growth percentages up to the forecast years than would be observed if the exercise was repeated now, due to the National Trip End Model (NTEM) being updated to version 8 to account for the latest OBR employment and economic growth projections, further evidencing the strength of that assessment.

4.4 As a result it can be concluded that the 2019 assessment in relation to KSS2 remains robust, and therefore the associated VISSIM model is considered to be fit for purpose.



Making Sustainability Happen

Appendix A

ITP Base Model LMVR

Wrexham County Borough Council

Wrexham KSS2 VISSIM

Local Model Validation Report

October 2018

Wrexham KSS2 VISSIM
Local Model Validation Report

Version 1-1

October 2018

Produced by:

For:

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Project Information Sheet

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Start Date	24th August 2018
File Location	2500-2599\2563 Wrexham VISSIM\Project Files

Document Control Sheet

Ver.	Project Folder	Description	Prep.	Rev.	App.	Date
V1-1	2500-2599\2563 Wrexham VISSIM\Project Files	Rev A	CE	DP	DP	06/12/2018
V1-0	2500-2599\2563 Wrexham VISSIM\Project Files	Issue	CE	KM	DP	19/11/2018

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Table of Contents

1. Executive Summary 7
2. Introduction 8
Project Overview 8
Report Structure 11
3. Data Collection 12
Introduction 12
Traffic Counts 12
Junction Turning Counts 12
Automatic Traffic Counts (ATC) 14
Journey Time Data 15
Data Application 17
4. Model Development 18
Introduction 18
Network 18
Matrix Development 18
Speed Limits and Desired Speed Distributions 19
Traffic Signals 20
Driver Behaviour 20
Additional Model Parameters 20
Model Assignment and Convergence 21
5. Model Calibration 22
Introduction 22
Traffic Flow Calibration Results 22
Key Junction Counts 23
Calibration Summary 25
6. Model Validation 26
Introduction 26
Traffic Flow Validation Results 27
Journey Time Validation Results 28

DRAFT

Validation Summary 31
7. Conclusion 32

DRAFT

List of Tables

Table 5-1: Total Traffic Flow Calibration (Peak Hours) 23
Table 5-2: Link Count Calibration Variation 24
Table 5-3: Traffic Calibration Junction Volume Comparison Modelled and Survey 24
Table 6-1: Total Traffic Volume – Link Count Validation 27
Table 6-2: AM peak journey time analysis 29
Table 6-3: PM peak journey time analysis 30

List of Figures

Figure 2-1: Wrexham KSS2 VISSIM model extent 9
Figure 3-1: Wrexham KSS2 junction count locations 13
Figure 3-2: Wrexham KSS2 ATC locations 14
Figure 3-3: Wrexham KSS2 journey time corridors 16

Appendices

Appendix A Link Flow Calibration Results – AM and PM peak hours
Appendix B Turn Flow Calibration Results – AM and PM peak hours
Appendix C Link Flow Validation Results – AM and PM peak hours
Appendix D Journey Time Validation Results – AM and PM peak hours

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1. Executive Summary

1.1 This report summarises the build of the 2018 Wrexham KSS2 VISSIM base models. IT covers the model and matrix development methodology, assumptions, calibration and validation results.

1.2 The model calibration and validation results were good in both the AM and PM peak, even though in some sections they did not meet WebTAG guidelines. ITP consider the model to be fit for purpose.

1.3 The VISSIM models calibrated to the following standards:

- AM peak model:
  - Link flows calibrated at 95% to GEH <5 and 95% to the absolute flow criteria; and
  - Turn flows calibrated at 92% to GEH <5 and 99% absolute flow criteria.
- PM peak model:
  - Link flows calibrated at 85% to GEH <5 and 82% to the absolute flow criteria; and
  - Turn flows calibrated at 88% to GEH <5 and 96% absolute flow criteria.

1.4 The models validated to the following standards:

- AM peak model:
  - Link flows validated at 75% to GEH <5 and 94% absolute flow criteria; and
  - Journey times validated to 100% to below <15% or 60 seconds difference.
- PM peak model:
  - Link flows validated at 69% to GEH <5 and 81% absolute flow criteria; and
  - Journey times validated to 88% to below <15% or 60 seconds difference.

1.5 Both the AM and PM models either exceed WebTAG guidelines for operation or are within a reasonable tolerance given the size and complexity of the model.

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2. Introduction

Project Overview

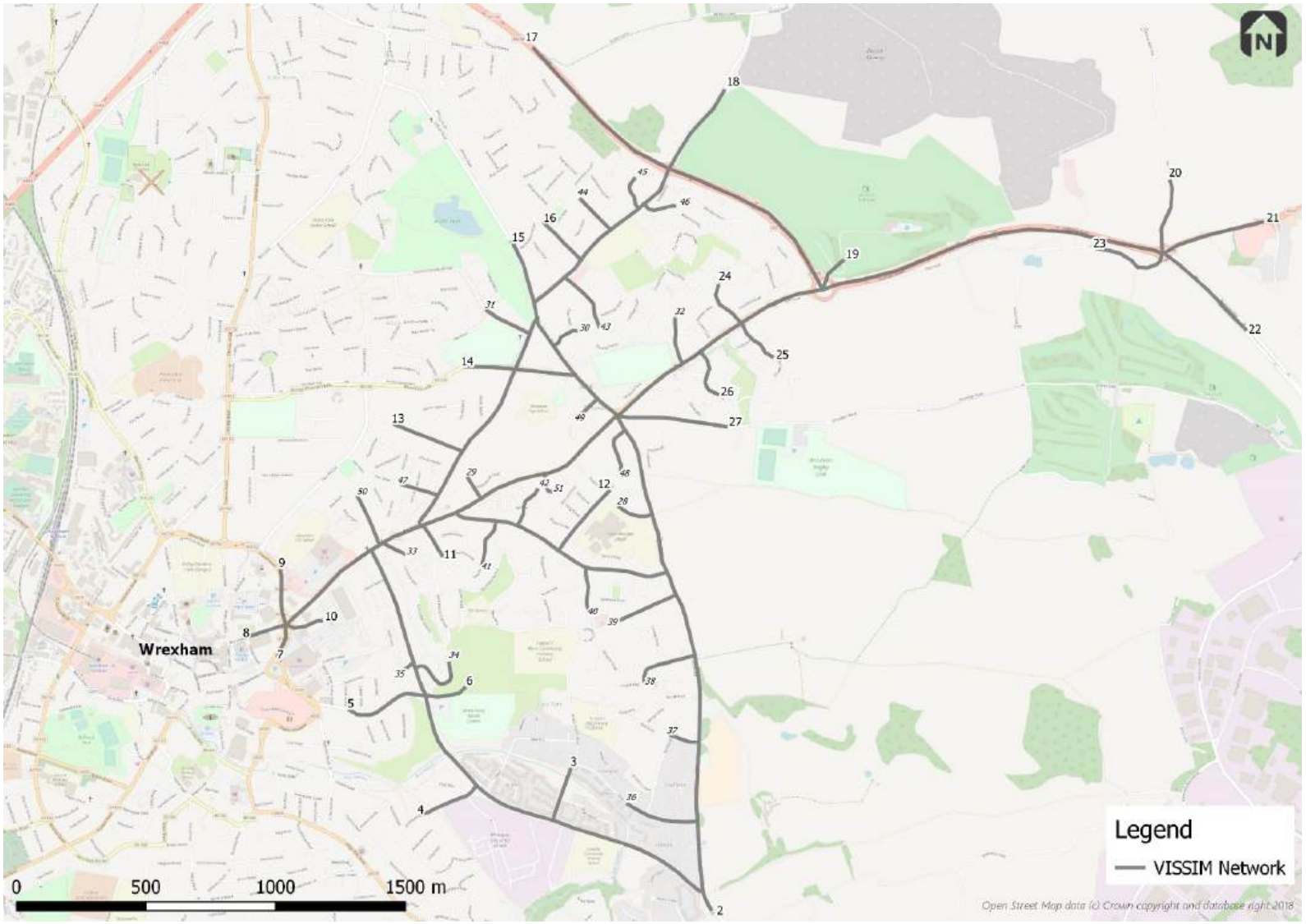
2.1 Integrated Transport Planning Ltd (ITP) has been commissioned by Wrexham County Borough Council to produce a present year (2018) validated VISSIM model of the local network surrounding the proposed KSS2 development site, as part of the Local Development Plan (LDP) process.

2.2 This Local Model Validation Report (LMVR) presents the 2018 base year VISSIM modelling, along with the model calibration and validation results using dynamic assignment. Figure 2-1 shows the extent of the model, this model extent has been agreed with highways officers at Wrexham County Borough Council (WCBC).

2.3 For clarity, this will be referred to as 'the model' for the remainder of this report.

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Figure 2-1: Wrexham KSS2 VISSIM model extent



2.4 As demonstrated in Figure 2-1 above, the model covers a large extent of the local highway network across Wrexham including:

- Greyhound roundabout (Holt Road / Bryn Estyn Road / Cefn Road / Dean Road);
- A5156 / Wrexham Golf Club / A534 Bypass / Holt Road roundabout;
- Cefn Road / Hullah Lane;
- A534 Bypass / Borras Hall Lane / A534 Wrexham Road / Wrexham Industrial Estate / Sandy Lane;
- A5156 / Borras Rd / Borras Park Road;
- Bodhyfryd / Holt Road / Tesco Access / Farndon Street / Holt Street;
- Cefn Road / Queensway;
- Holt Road / Montgomery Road;
- Holt Road / Hullah Lane;
- Rhosnesni Lane / Borras Road;
- Jeffrey's Road / Borras Road / Dean Road; and
- Montgomery Road / Queensway Sports Centre / Queensway / Smithfield Road.

2.5 In order to develop an accurate representation of the traffic conditions within the Wrexham KSS2 modelled area during the working day, the following time periods derived from the traffic count data have been included in the model assessment:

- AM peak period 08:00 – 09:00 (model duration 07:30 – 09:30); and
- PM peak period 16:30 – 17:30 (model duration 16:00 – 18:00).

2.6 The focus of the model evaluation is the peak periods within the above model duration.

2.7 The VISSIM model has been developed to replicate, as far as reasonable, the multi-model interactions within Wrexham, including:

- Cars;
- Light Goods Vehicles (LGV);
- Other Goods Vehicles Class 1 (OGV1);
- Other Goods Vehicles Class 2 (OGV2); and
- Buses.

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2.8 The following LMVR provides an overview of the VISSIM model development and demonstrates the model's 'fit for purpose' status in accordance with the Department for Transport (DfT) and Welsh Transport Planning and Appraisal Guidance modelling standards, as outlined in DfT Transport Appraisal Guidance (TAG) and the Design Manual for Roads and Bridges (DMRB). WebTAG guidance is used in Wales and will form the basis for the methodology of developing and analysing this base model.

2.9 It should be noted that the network is large for a VISSIM model, this creates some challenges with calibration and validation. The data collected is unlikely to represent an average day in all areas of the model, and it cannot cover every junction in the model area, so there are some unknowns which have been completed through matrix estimation. Additionally, the model has a lot of route choice which can make convergence difficult to achieve and lessens the likelihood of meeting WebTAG calibration and validation guidelines.

2.10 The model network chosen was done so to allow for route choice this is due to the forecast modelling needing the highly detailed information that VISSIM provides on junction operation and route choice changes across a network.

Report Structure

2.11 The structure of the report is as follows:

- **Section 1** – introduces the purpose of the report and modelling commissioned;
- **Section 2** – provides a summary of the data collection;
- **Section 3** – provides an overview of the VISSIM modelling approach and development;
- **Section 4 –** details the results of the model calibration;
- **Section 5 –** details the results of the model validation; and
- **Section 6 –** concludes the report.

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3. Data Collection

Introduction

3.1 In accordance with DfT modelling guidelines, ITP undertook a data collection exercise including the commissioning of a study specific traffic survey programme in March 2018 and using the data from a previous collection in June 2017.

3.2 The following section provides an overview of the information collected for the model development, calibration and validation, including:

- Junction turning counts;
- Automatic Traffic Counts (ATC); and
- TomTom Traffic Stats journey time data.

3.3 Each of the above data sets has been applied in the model development as either part of the model calibration or applied as an independent dataset for model validation. Each data set is described in further detail below.

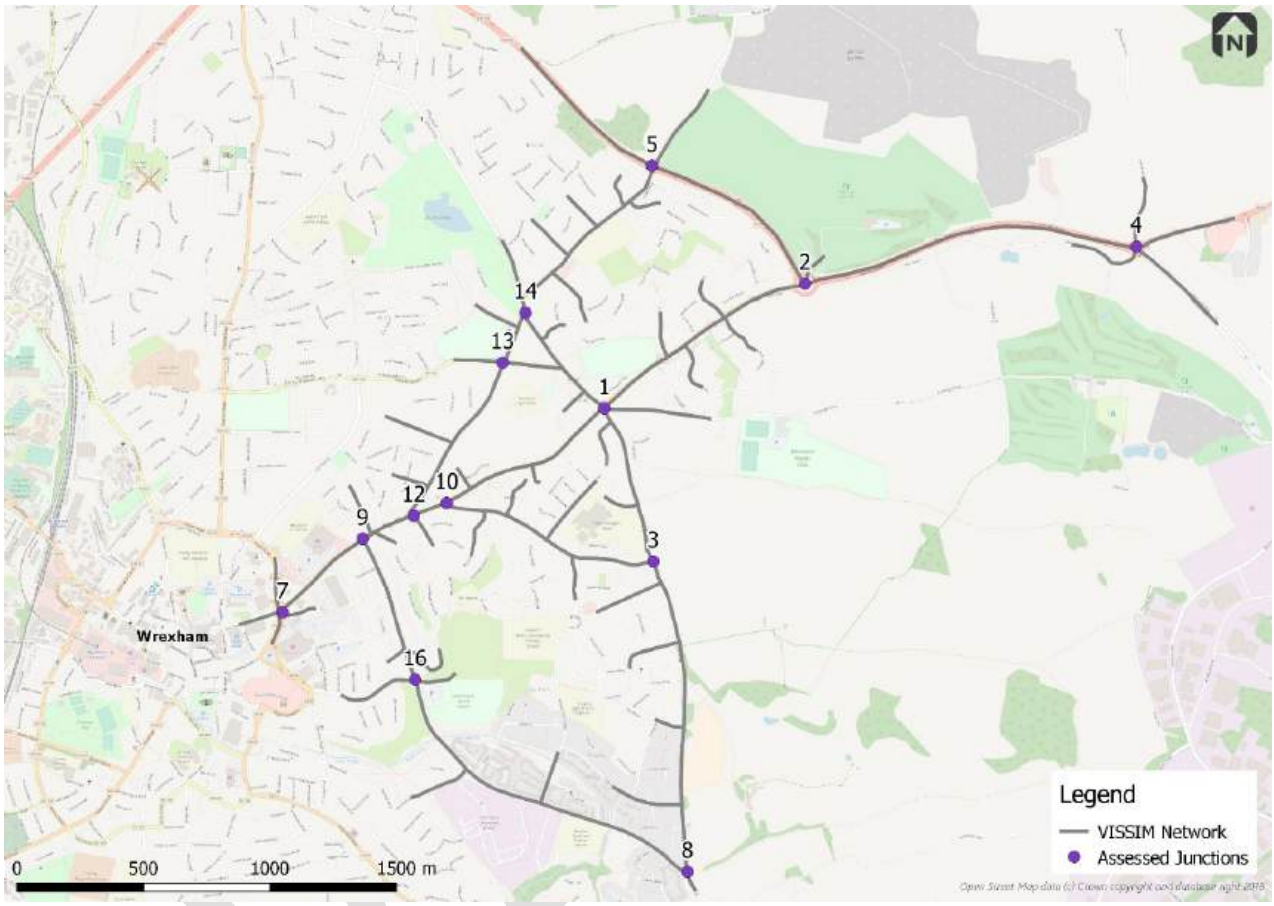
Traffic Counts

Junction Turning Counts

3.4 The traffic flows for 10 isolated junctions were collected as part of the model development process between 20th and 22nd March 2018. Additionally, data from the CBO Transport (surveyed on 22nd June 2017) was used for 3 isolated junctions (number 4, 5 and 7). This covered all key junctions in the network identified as part of the initial modelling assessment. These are shown in Figure 3-1 below.

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Figure 3-1: Wrexham KSS2 junction count locations



3.5 The traffic count data is vehicle classified data, including 4 vehicle classes; Cars, Light Goods Vehicles (LGVs), Other Good Vehicles (OGVs); class 1 and class 2. This is presented in 15-minute intervals for the:

- AM Peak Period (08:00 – 09:00); and
- PM Peak Period (16:30 – 17:30).

3.6 The junction count information is used to determine the junction entry and exit flow (links) and junction turning volumes, as part of the model development and calibration, in accordance with DfT TAG guidance. Based on the information collated, the following comparisons have been identified for the model calibration:

- 99 link counts; and
- 147 turn counts.

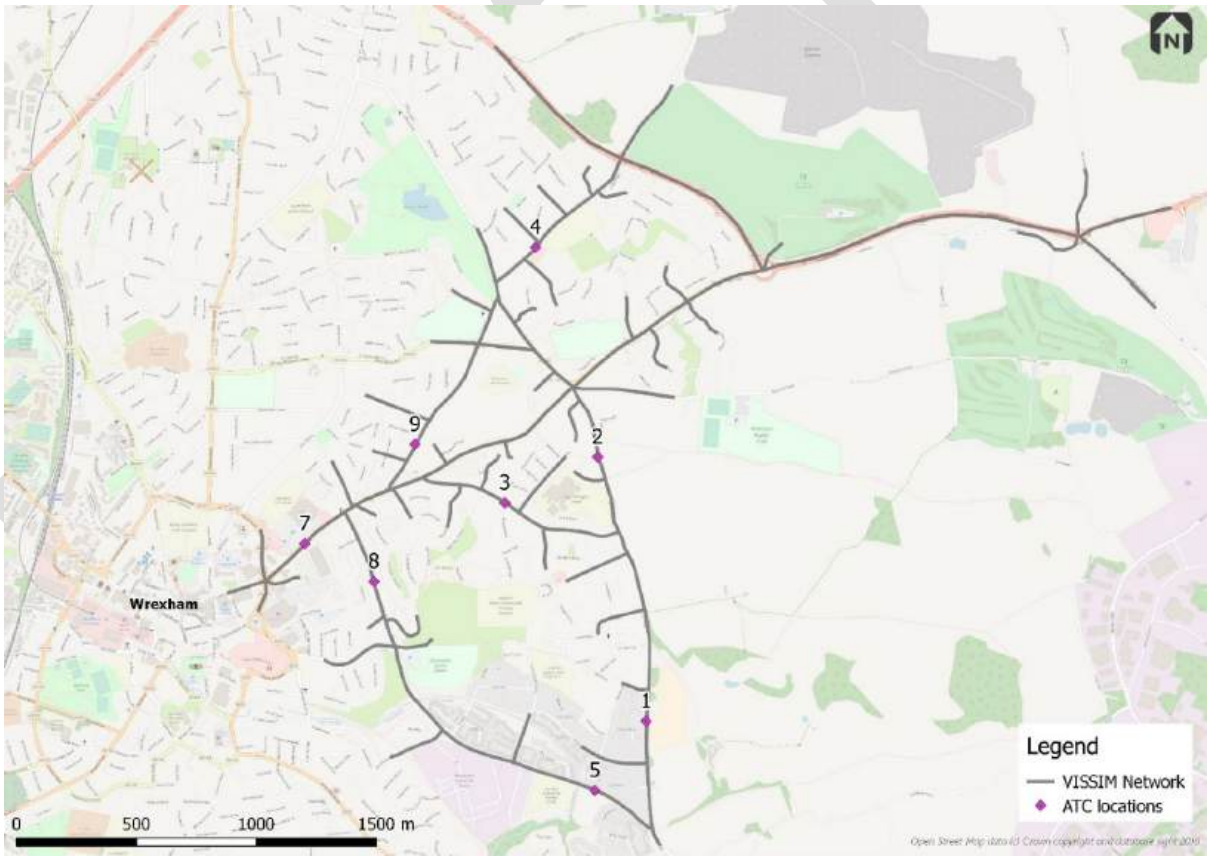
Automatic Traffic Counts (ATC)

3.7 In order to ensure the model is representative of the average weekday traffic conditions (Monday – Friday) data from a series of independent Automatic Traffic Counts (ATC) has been collected. This data represents the average weekday flows for the modelled periods by direction.

3.8 ATCs were commissioned for a one-week period between the 21st and the 27th March 2018, in order to coincide with the junction turning counts, and the counts are segregate into light vehicles (Car and LGV) and heavy vehicles (OGV1 and OGV2).

3.9 The locations of where the Automatic Traffic Counts were undertaken is shown in Figure 3-2 below.

Figure 3-2: Wrexham KSS2 ATC locations



3.10 The ATC data is used to determine network link volumes as part of the independent validation of the model, in accordance with DfT TAG guidance. Based on the traffic counts, there are:

- 16 one-way validation counts.

Journey Time Data

3.11 Journey time data is considered an independent set of data which can be used to demonstrate that the modelled network conditions are representative of the observed conditions, in accordance with DfT TAG modelling guidance.

3.12 Primary data collected by TomTom provides an average travel time for each individual link within the Integrated Transport Network (ITN), which is a representation of the highway network in a geographical information system (GIS) format.

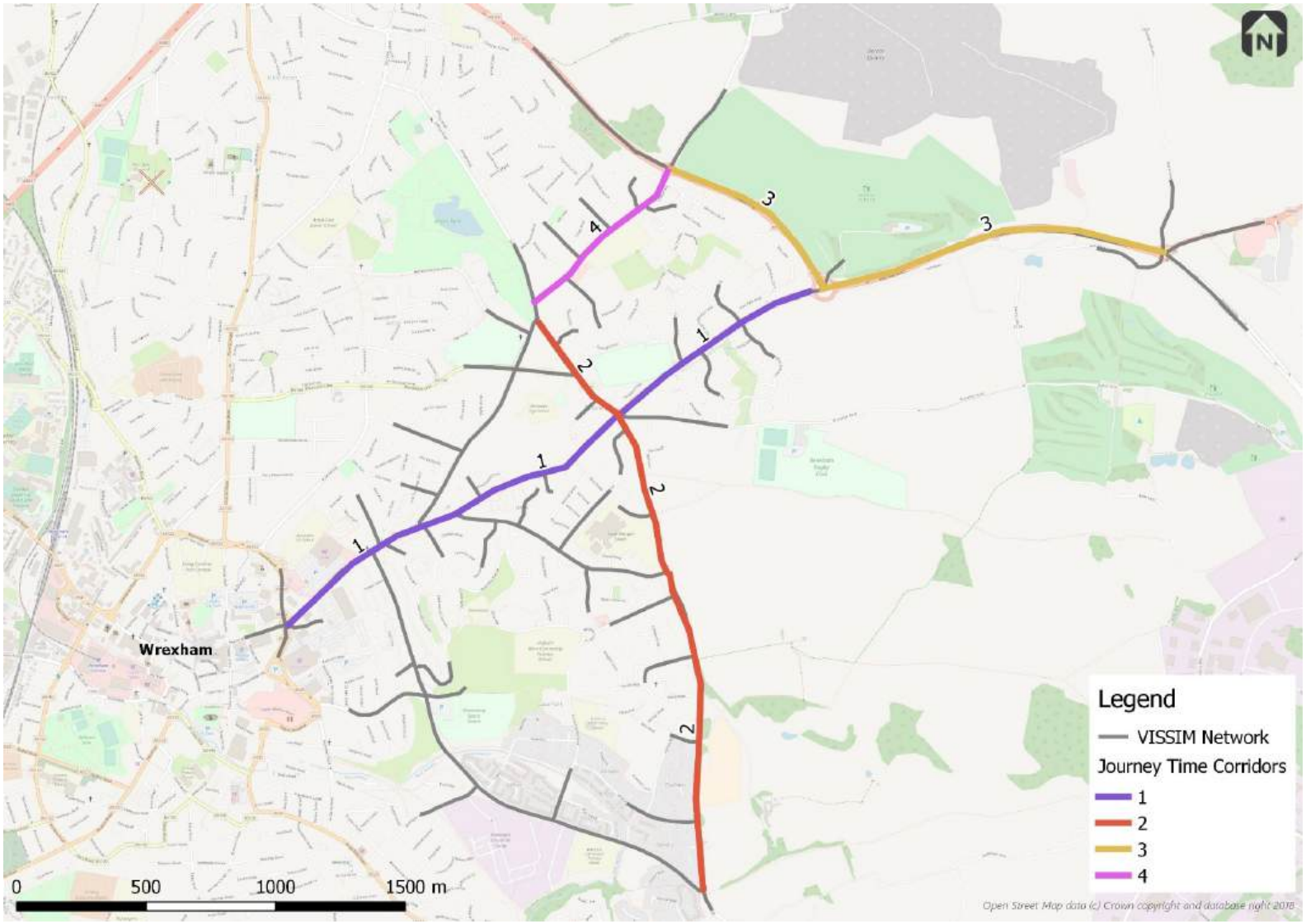
3.13 The data covers 4th April 2017 to 30th November 2017 (excluding school holidays) and is based on the records collected from GPS devices. Information is provided for weekdays in hourly intervals over a 24-hour period. The data has been derived by the collation of ITN links into route sections. An average travel time for each route section has then been calculated for journeys within the modelled peak hours, based on observations for all vehicle classes.

3.14 This approach enables the journey time analysis to be representative of the average travel time which is based on thousands of records over multiple days, rather than a set of fixed runs over a limited time period.

3.15 Figure 3-3 below provides the location of the journey time corridors analysed for validation purposes. Corridors have been analysed in both directions for the AM and PM peak periods.

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Figure 3-3: Wrexham KSS2 journey time corridors



Data Application

3.16 The data collated is applied in the modelling calibration and validation process as follows:

Calibration

- 99 link counts; and
- 147 turn counts.

Validation

- 16 one-way link counts; and
- 4 journey time routes, 8 by direction.

3.17 This data set includes a widespread set of traffic volume information for the calibration of the network demand, including an independent validation set based on ATC data, in accordance with DfT TAG modelling guidance.

3.18 It is considered that this array of data sources provides the mix of information required to demonstrate that the model is representative of the observed average daily network conditions during the modelled periods.

3.19 The results of the model calibration are presented in Section 4, and the model validation results are presented in Section 5.

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4. Model Development

Introduction

4.1 The following section provides an overview of the development of the model, including a brief description of the approach and parameters used in the model, such as:

- Assignment;
- Matrix development;
- Speed limits and desired speed distributions;
- Traffic signals; and
- Driver behaviour.

Network

4.2 Figure 2-1 presents the model network, which consists of 51 zones.

4.3 The VISSIM model structure is designed to replicate the strategic movement of cars on the main network surrounding the Wrexham KSS2 site.

4.4 The model was coded from publicly available imagery which was verified by a number of site visits.

4.5 Gradients were not included in the model, with Journey Time data providing the basis for changes to speeds across the network.

Matrix Development

4.6 Modelled peak hours were calculated from the ATC and turning count flow data as part of the survey process. This included the warm-up and cool-down period either side of the peak hour. Therefore, each modelled period consists of eight 15-minute intervals. Model results were taken for the peak hours only.

- AM Peak Period (08:00 – 09:00); and
- PM Peak Period (16:30 – 17:30).

DRAFT

4.7 The PTV package VISUM has been used to create the base year matrix for both the AM and PM VISSIM models. Matrix calibration used the classified turning count surveys and the ATCs to provide targets which the starting matrices would be adjusted to meet. This process was done in VISUM using the inbuilt TFlowFuzzy matrix estimation tool. This methodology was agreed with highways officers at WCBC.

4.8 Based on the information available, separate matrices were produced for four vehicle classifications:

- Cars;
- Light Goods Vehicles (LGV);
- Other Goods Vehicles class 1 (OGV1); and
- Other Goods Vehicles class 2 (OGV2).

4.9 Each of the above vehicle classifications has been assigned with individual matrices in 15-minute intervals, as per the modelled periods previously described. The output matrices from VISUM have then been input into VISSIM.

4.10 Bus frequency and stops were added into the VISSIM network using timetable information.

Speed Limits and Desired Speed Distributions

4.11 The speed distributions represent the desired travel speeds for vehicles related to the road classification and speed limit of the network. A range of desired speed flow distributions by road type, speed limit and vehicle type, have been defined, based on DfT statistics for Free Flow Vehicle Speeds:

- Table SPE0111 - Free-flow vehicle speeds on non-built-up roads by road type and vehicle type in Great Britain, 2018;
- SPE0102 - Free-flow vehicle speeds on non-built-up roads by road type and vehicle type in Great Britain, 2014; and
- Table SPE0111 - Free-flow vehicle speeds on non-built-up roads by road type and vehicle type in Great Britain, 2009.

4.12 The updated desired speed distributions have been incorporated into the model structure, based on network characteristics such as road type and speed limit, in order to improve the realism of the model assignment, in line with DfT statistics.

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Traffic Signals

4.13 There are no traffic signal controlled junctions within the modelled network.

4.14 There are three signalised Pedestrian crossings throughout the network along Holt Road. These were represented in the model using VisVAP signalisation. Due to the limited and variable pedestrian demand on a day by day basis, and based on the information observed on site visits, the pedestrian crossings have been modelled assuming they are called on average once every 2 minutes within the peak hours.

Driver Behaviour

4.15 In reality, driving behaviour is dependent upon road type and position; for example, drivers will exhibit different driving behaviours when travelling along a motorway compared to merging onto or leaving a motorway. Different default link behaviours have been applied for the dual carriageway roads and the local roads on the network. This is based on modelling experience and observations from the site visit.

Additional Model Parameters

4.16 In addition to the standard model parameters as previously described, the detail in the VISSIM modelling is in the network coding. This controls the way traffic operates around the key junctions, such as for example gap time and headway between vehicles at give way priority junctions.

4.17 The following parameters below have been defined throughout the model as part of the model development and calibration process:

- Gap acceptance;
- Conflict areas;
- Reduced speed areas;
- Lane allocations and restrictions; and
- Lane change decision distances.

4.18 In order to maintain consistency in the model structure, these parameters are consistent, as far as possible, in both the AM peak hour and PM peak hour assignments.

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Model Assignment and Convergence

4.19 In line with current 'best practice', the model has been set to a dynamic route choice assignment. A dynamic model is based on a matrix of origin and destination movements, which route according to the network conditions based on 15-minute profiles.

4.20 The objective of the assignment is to minimise the generalised cost in the network, which is a product of travel time and distance. Convergence represents a monitor of a model's stability in the assignment over multiple iterations. In VISSIM this is monitored through multiple criteria. In the instance of the model, this is defined as the change in the travel time on paths within each 15 minute interval, with criteria of less than 15% change in travel time from one model iteration to the next.

4.21 The model is initially converged for each time period individually, based on the above criteria, to generate a stable cost and path file. The final results are based on the assignment of the model based on these fixed parameters, in order to ensure the results are based on stabilised values.

4.22 The choice and time at which vehicles enter the network within each 15-minute matrix is determined by stochastic assignment of random numbers. Using the assignment 'random seed' you represent the variation that you get on a day-to-day basis. There is a risk that random seed could be bias because of the stochastic assignment, so each model is run for ten random seeds and the results are averaged. The consistency of the results is also checked to verify that they are sensible.

4.23 The model has achieved a share of convergence for 4 runs of:

- AM peak convergence:
  - Travel time on paths = 95%
  - Volume on edges = 96%
- PM peak convergence:
  - Travel time on paths = 96%
  - Volume on edges = 96%

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5. Model Calibration

Introduction

5.1 Model calibration is the process of adjusting the key model parameters so that these parameters reflect an appropriate proxy to the observed traffic conditions.

5.2 This section provides a summary of the outcome of the model calibration process, in accordance with the DfT TAG Unit M3.1 – Highway Assignment Modelling guidance, including both turn and link count calibration, based on the junction count data.

5.3 In addition, the model has been independently validated against a range of data types as mentioned in Section 2, including link flows and journey times, which are discussed in Section 5.

Traffic Flow Calibration Results

5.4 Flow calibration is a process whereby modelled flow outputs are compared and calibrated to match observed traffic flows throughout the network. In this instance this refers to link and turning counts.

5.5 The Design Manual for Roads and Bridges (DMRB), Volume 12, provides the guidance on the acceptable criteria when comparing modelled link flows against observed counts. For this assessment the link flow criteria has also been applied for the turning movement calibration, as required in TAG Unit M3.1 – Highway Assignment Modelling.

5.6 The Geoffrey E. Havers (GEH) statistic is a standard way of comparing the observed and modelled flows, as defined in DMRB, Volume 12, Chapter 4. The GEH value is similar to a chi-squared test and also incorporates both relative and absolute errors in order to give an overall measure of the accuracy of the modelled flow.

5.7 The GEH statistic has the benefit of removing bias that exists when comparing flows of different magnitudes using percentages, such that a difference of 10 in a flow of 100 vehicles per hour (vph) is less significant (GEH = 1) than a difference of 100 in a flow of 1000 vph (GEH = 3.2).

5.8 The GEH statistic is calculated by:

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

Where: GEH = GEH statistic, M = modelled flow & C = observed flow.

DRAFT

5.9 The TAG and DMRB guidance indicate that the GEH statistics should be less than 5.0 for 85% of modelled hourly flows, both on link and turn volumes.

5.10 Furthermore, the percentage difference is also examined between observed and modelled flows.

5.11 The DMRB also provides guidance for the observed vehicles per hour (vph):

- For observed flows 700-2,700 vph, modelled flow within 15% of observed flow;
- For observed flows < 700 vph, modelled flow within 100 vph of observed flow; and
- For observed flows >2,700 vph, modelled flow within 400 vph of observed flow.

5.12 Again, 85% of hourly flows should be within these criteria.

Key Junction Counts

5.13 Table 5-1 and Table 5-2 present the junction calibration count results for the 13 key junctions in the Wrexham KSS2 VISSIM model, for the peak hours within the modelled periods, based on link flows (entry & exit flows) and turning movement flows.

5.14 Table 5-1 demonstrates that at both the junction link and turn count level, the AM and PM periods exceed the criteria of 85% for either GEH or flow, with both modelled periods having a strong correlation with the observed flows.

Table 5-1: Total Traffic Flow Calibration (Peak Hours)

Modelled Period	Link Counts (99)		Turn Counts (147)	
	% GEH Criteria (<5)	% Flow Criteria	% GEH Criteria (<5)	% Flow Criteria
AM Peak Hour (08:00 – 09:00)	95%	95%	92%	99%
PM Peak Hour (16:30 – 17:30)	84%	86%	88%	96%

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5.15 Table 5-2 provides further details regarding the results which fall outside the GEH criteria, based on additional bandwidths of GEH <10 and GEH <15. Comparisons falling within these criteria represent a clear variation between the observed and the modelled traffic volumes. The overall result demonstrates the calibration results outside the criteria are within an acceptable standard based on the scale of discrepancy in the GEH value and the overall magnitude of model calibration data.

Table 5-2: Link Count Calibration Variation

Criteria	Link Counts (99)	
	AM Peak Hour (08:00 – 09:00)	PM Peak Hour (16:30 – 17:30)
% GEH <5	95%	84%
% GEH <10	100%	95%
% GEH <15	100%	100%

5.16 Table 5-3 provides a comparison of the observed traffic volumes and modelled volumes at the 13 key junctions, based on the two generalised vehicle types (lights and heavies).

5.17 This analysis demonstrates that the modelled periods are within a tolerance of the observed volumes with a difference less than 4% and is subject to variations on a daily basis.

5.18 It should be noted that the traffic flow calibration is based on an individual days' observations, whereas the independent validation considers the average weekday flow.

Table 5-3: Traffic Calibration Junction Volume Comparison Modelled and Survey

Vehicle Class	AM Peak Hour (08:00 – 09:00)			PM Peak Hour (16:30 – 17:30)		
	Survey	Modelled	% Diff	Survey	Modelled	% Diff
Total	20,360	19,547	-4%	21,772	21,496	-1%

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5.19 Full disclosure of the individual count calibration results can be found in the following appendices:

- Appendix A– Link Flow Calibration Results – AM and PM peak hours; and
- Appendix B – Turn Flow Calibration Results – AM and PM peak hours.

Calibration Summary

5.20 In summary, the model calibration exercise has been implemented in accordance with DfT TAG transport modelling guidelines, Highways England and DMRB guidelines. The adopted approach is designed to maximise the application of the available data set to establish a robust baseline operational assessment model. The model is calibrated to WebTAG guidance in both the AM and PM peaks.

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6. Model Validation

Introduction

6.1 Model validation is the process of comparing the model performance against a set of data which is independent of the model calibration process. The validation process is designed to demonstrate that the model is capable of simulating traffic conditions which are representative of the actual conditions, based on the performance observations.

6.2 DfT TAG M3.1 guidelines set out the requirement for the model to be independently validated against a set of data, which is not included in the calibration process, including a set which is representative of the network conditions.

6.3 In the context of the Wrexham KSS2 VISSIM model, the following data sets have been identified for the validation of the models:

- Independent traffic counts; and
- Journey times.

6.4 The following section provides a summary of the validation results based on the above data sets.

6.5 The traffic flow validation is assessed based on the GEH and flow criteria, as per the calibration of traffic flows. In accordance with DfT TAG M3.1 guidance the GEH statistics should be less than 5.0 for 85% of modelled hourly flows.

6.6 In the context of the journey time validation, DfT TAG M3.1 Table 3 specifies that 85% of the observed routes should be within the following criteria:

- Modelled times along the route should be within 15% of the surveyed time (or 1 minute, if higher).

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Traffic Flow Validation Results

6.7 In addition to the junction counts used for calibration of the model, additional traffic volume information has been collected through one-week Automatic Traffic Counts (ATCs), as previously described in Section 2. Using this information, link count validation has been undertaken. Table 6-1 presents the results for the validation of the link flows and demonstrates that both the AM and PM peak periods have a strong correlation between the observed and modelled flows.

Table 6-1: Total Traffic Volume – Link Count Validation

Criteria	Link Counts (16 one-way)		
	% GEH Criteria (<5)	% GEH Criteria (<10)	% Flow Criteria
AM Peak Hour (08:00 – 09:00)	75%	94%	94%
PM Peak Hour (16:30 – 17:30)	69%	81%	81%

6.8 It should be noted that the model calibration and validation are independent processes. Therefore, the validation is compared to the model independently of the demand development process, which is based on the calibration data set. It is likely that variations exist between the calibration and validation observed data.

6.9 The main discrepancy between observed and modelled data in both the AM and PM peak models is along Borras Park Road in both directions. This is due to the nature of the route choice in the model and the difference between the observed data on the neutral days making the calibration survey's and validation surveys along this road difficult to have both achieving a good GEH value. The raw data shows a total vehicle discrepancy between the observed Tuesday and Wednesday of 28% (1,010 vehicles) northbound and 29% (1,669 vehicles) southbound. This should be taken into account when looking at Borras Park Road in any future year assessment.

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Journey Time Validation Results

6.10 Journey time validation has been undertaken along four corridors within the model. The full routes used for journey time validation are defined in Figure 3-3.

6.11 DMRB criteria for validating journey times states that over 85% of the routes should have a modelled journey time within 15% or 1 minute of the observed time, dependent on which is greater.

The results for the AM and PM peak hour journey time analysis are presented below in Table 6-2 and

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6.12 Table 6-3 respectively.

Table 6-2: AM peak journey time analysis

Route	Direction	Observed (secs)	Modelled (secs)	Difference (%)	Difference (secs)	Result
Corridor 1	Southbound	250	295	18%	-45	**PASS**
	Northbound	236	272	15%	-36	**PASS**
Corridor 2	Southbound	228	253	11%	-25	**PASS**
	Northbound	244	261	7%	-17	**PASS**
Corridor 3	Eastbound	103	110	7%	-7	**PASS**
	Westbound	116	113	-3%	3	**PASS**
Corridor 4	Southbound	110	129	18%	-19	**PASS**
	Northbound	104	154	48%	-50	**PASS**

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Table 6-3: PM peak journey time analysis

Route	Direction	Observed (secs)	Modelled (secs)	Difference (%)	Difference (secs)	Result
Corridor 1	Southbound	262	318	21%	-56	**PASS**
	Northbound	272	307	13%	-35	**PASS**
Corridor 2	Southbound	229	258	13%	-29	**PASS**
	Northbound	261	261	0%	0	**PASS**
Corridor 3	Eastbound	99	101	3%	-2	**PASS**
	Westbound	120	167	39%	-47	**PASS**
Corridor 4	Southbound	121	159	31%	-38	**PASS**
	Northbound	118	201	70%	-83	**FAIL**

6.13 In the AM peak all modelled journey times were within 15% of the observed journey times and therefore the model successfully meets DMRB criteria. In the PM peak, corridor 4 in the northbound direction did not meet the DMRB criteria.

6.14 It should be noted with any future year testing, across the model journey times are generally higher than the times observed in the survey data.

6.15 Full disclosure of the individual count validation results can be found in the following appendices:

- Appendix C – Link Flow Validation Results – AM and PM peak hours.
- Appendix D – Journey Time Validation Results – AM and PM peak hours.

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Validation Summary

6.16 In summary, the model validation approach has evaluated the 2018 Wrexham KSS2 model against a series of independent data, demonstrating that the model aligns with the required standards specified in DfT TAG Unit M3.1 for journey times in both AM and PM peaks. Although the model does not meet WebTAG criteria for the PM peak in link validation it is close, and the calibration of the model suggests that it is fit for purpose.

6.17 The independent data includes both demand-based information and indicators of the network conditions.

6.18 Based on the results presented within this section, the model is considered to be validated and suitable for testing the impact and therefore deliverability of KSS2 on the local highway network

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7. Conclusion

7.1 Integrated Transport Planning Ltd was commissioned by Wrexham County Borough Council (WCBC) to produce a 2018 Wrexham KSS2 base year VISSIM model to input into the Local Development Plan process.

7.2 The model was successfully calibrated and validated to DMRB guidelines for the AM (08:00 – 9:00) and PM (16:30 – 17:30) peak hours.

7.3 It is considered that the information presented throughout this document demonstrates that the 2018 Wrexham KSS2 VISSIM base model has been developed in accordance with current guidance and is representative of the observed network conditions, based on multiple criteria, including independent validation data.

7.4 The model exceeds WebTAG guidance in the AM and PM peaks for the calibration data. In the AM peak the model meets WebTAG guidance for the validation data and is within a reasonable tolerance in the PM peak. Given the scale and complexity of the model it is deemed to be a robust base for use in forecasting. It is therefore fit for purpose to test the deliverability of the KSS2 site on the local highway network.

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Appendix A

Link Flow Calibration Results – AM and PM peak hours

Link Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - All Traffic (Class1-6) - Link Calibration

								PASS	FAIL	Criteria	%	Flow Test	
								94	5	% GEH <5	95%	% PASS	94
Counts	99							99	0	% GEH <10	100%		95%
								99	0	% GEH <15	100%		
Site	ID	Arm	Ref	Location	Dir	Survey	Model	Diff (S-M)	% Diff	GEH	Flow Test Criteria	Flow Test PASS/FAIL	
1	1	1	1-1<	Cefn Rd	SB	480	431	49	11%	2.3	100	PASS	
1	2	1	1-1>	Cefn Rd	NB	507	495	12	2%	0.5	100	PASS	
1	3	2	1-2<	Holt Rd South	SB	533	435	98	23%	4.5	100	PASS	
1	4	2	1-2>	Holt Rd South	NB	419	391	28	7%	1.4	100	PASS	
1	5	3	1-3<	Dean Rd	NB	373	493	-120	-24%	5.8	100	FAIL	
1	6	3	1-3>	Dean Rd	SB	450	384	66	17%	3.2	100	PASS	
1	7	4	1-4<	Holt Rd North	NB	598	546	52	10%	2.2	100	PASS	
1	8	4	1-4>	Holt Rd North	SB	636	652	-16	-2%	0.6	100	PASS	
1	9	5	1-5<	Bryn Estyn Rd	EB	61	57	4	7%	0.5	100	PASS	
1	10	5	1-5>	Bryn Estyn Rd	WB	33	40	-7	-18%	1.2	100	PASS	
2	11	1	2-1<	A5156	NB	760	732	28	4%	1.0	114	PASS	
2	12	1	2-1>	A5156	SB	1,764	1,829	-66	-4%	1.5	265	PASS	
2	13	2	2-2<	Wrexham Golf Club	NB	25	31	-7	-21%	1.2	100	PASS	
2	14	2	2-2>	Wrexham Golf Club	SB	3	11	-8	-73%	3.0	100	PASS	
2	15	3	2-3<	A534 Bypass	EB	1,808	1,846	-39	-2%	0.9	271	PASS	
2	16	3	2-3>	A534 Bypass	WB	618	642	-25	-4%	1.0	100	PASS	
2	17	4	2-4<	Holt Rd	WB	482	528	-47	-9%	2.1	100	PASS	
2	18	4	2-4>	Holt Rd	EB	690	655	35	5%	1.3	100	PASS	
3	19	1	3-1<	Cefn Rd North	NB	385	380	5	1%	0.3	100	PASS	
3	20	1	3-1>	Cefn Rd North	SB	333	284	49	17%	2.8	100	PASS	
3	21	2	3-2<	Cefn Rd South	SB	331	292	39	13%	2.2	100	PASS	
3	22	2	3-2>	Cefn Rd South	NB	389	360	29	8%	1.5	100	PASS	
3	23	3	3-3<	Hullah Ln	WB	39	59	-20	-34%	2.9	100	PASS	
3	24	3	3-3>	Hullah Ln	EB	33	87	-54	-62%	7.0	100	PASS	
4	25	1	4-1<	A534 Bypass	WB	646	631	15	2%	0.6	100	PASS	
4	26	1	4-1>	A534 Bypass	EB	1,924	1,869	55	3%	1.3	289	PASS	
4	27	2	4-2<	Borras Hall Ln	NB	17	23	-6	-26%	1.3	100	PASS	
4	28	2	4-2>	Borras Hall Ln	SB	70	68	2	3%	0.2	100	PASS	
4	29	3	4-3<	A534 Holt Rd	NB	501	446	55	12%	2.5	100	PASS	
4	30	3	4-3>	A534 Wrexham Rd	SB	396	342	54	16%	2.8	100	PASS	
4	31	4	4-4<	Wrexham Industrial Estate	EB	1,618	1,525	93	6%	2.3	243	PASS	
4	32	4	4-4>	Wrexham Industrial Estate	WB	402	353	49	14%	2.5	100	PASS	
4	33	5	4-5<	Sandy Ln	SB	14	19	-5	-26%	1.2	100	PASS	
4	34	5	4-5>	Sandy Ln	NB	4	12	-8	-67%	2.8	100	PASS	
5	35	1	5-1<	A5156 West	WB	1,020	903	117	13%	3.8	153	PASS	
5	36	1	5-1>	A5156 West	EB	1,922	1,801	121	7%	2.8	288	PASS	
5	37	2	5-2<	Borras Rd	NB	64	86	-22	-26%	2.5	100	PASS	
5	38	2	5-2>	Borras Rd	SB	46	38	8	21%	1.2	100	PASS	
5	39	3	5-3<	A5156 East	EB	1,862	1,824	38	2%	0.9	279	PASS	
5	40	3	5-3>	A5156 East	WB	804	736	68	9%	2.5	121	PASS	
5	41	4	5-4<	Borras Park Rd	SB	169	156	13	8%	1.0	100	PASS	
5	42	4	5-4>	Borras Park Rd	NB	343	394	-51	-13%	2.7	100	PASS	
7	43	1	7-1<	Bodhyfryd	NB	439	377	62	16%	3.1	100	PASS	
7	44	1	7-1>	Bodhyfryd	SB	582	520	62	12%	2.6	100	PASS	
7	45	2	7-2<	Holt Rd	NB	333	428	-95	-22%	4.9	100	PASS	
7	46	2	7-2>	Holt Rd	SB	565	606	-41	-7%	1.7	100	PASS	
7	47	3	7-3<	Tesco	EB	258	235	23	10%	1.5	100	PASS	
7	48	3	7-3>	Tesco	WB	252	223	29	13%	1.9	100	PASS	
7	49	4	7-4<	Farndon St	SB	627	523	104	20%	4.3	100	FAIL	
7	50	4	7-4>	Farndon St	NB	319	283	36	13%	2.1	100	PASS	
7	51	5	7-5<	Holt St	WB	137	146	-9	-6%	0.8	100	PASS	
7	52	5	7-5>	Holt St	EB	76	77	-1	-1%	0.1	100	PASS	
8	53	1	8-1<	Cefn Rd North	NB	323	316	7	2%	0.4	100	PASS	
8	54	1	8-1>	Cefn Rd North	SB	258	229	29	13%	1.9	100	PASS	
8	55	2	8-2<	Cefn Rd South	SB	272	231	41	18%	2.6	100	PASS	
8	56	2	8-2>	Cefn Rd South	NB	423	410	13	3%	0.6	100	PASS	
8	57	3	8-3<	Queensway	WB	141	169	-28	-17%	2.2	100	PASS	
8	58	3	8-3>	Queensway	EB	55	77	-22	-29%	2.7	100	PASS	
9	59	1	9-1<	Holt Rd South	WB	706	610	96	16%	3.7	106	PASS	
9	60	1	9-1>	Holt Rd South	EB	462	421	41	10%	2.0	100	PASS	
9	61	2	9-2<	Holt Rd North	EB	503	459	44	10%	2.0	100	PASS	
9	62	2	9-2>	Holt Rd North	WB	722	659	63	10%	2.4	108	PASS	
9	63	3	9-3<	Montgomery Rd	SB	156	207	-51	-25%	3.8	100	PASS	
9	64	3	9-3>	Montgomery Rd	NB	181	196	-15	-8%	1.1	100	PASS	
10	65	1	10-1<	Holt Rd South	WB	677	569	108	19%	4.3	100	FAIL	
10	66	1	10-1>	Holt Rd South	EB	461	461	0	0%	0.0	100	PASS	
10	67	2	10-2<	Holt Rd North	EB	374	376	-2	-1%	0.1	100	PASS	
10	68	2	10-2>	Holt Rd North	WB	503	420	83	20%	3.9	100	PASS	
10	69	3	10-3<	Hullah Ln	SB	112	163	-51	-31%	4.3	100	PASS	
10	70	3	10-3>	Hullah Ln	NB	199	227	-28	-12%	1.9	100	PASS	
12	71	1	12-1<	Holt Rd South	WB	738	674	64	9%	2.4	111	PASS	
12	72	1	12-1>	Holt Rd South	EB	498	472	26	6%	1.2	100	PASS	
12	73	2	12-2<	Borras Rd	NB	85	111	-26	-23%	2.6	100	PASS	
12	74	2	12-2>	Borras Rd	SB	93	189	-96	-51%	8.1	100	PASS	
12	75	3	12-3<	Holt Rd North	EB	470	464	6	1%	0.3	100	PASS	
12	76	3	12-3>	Holt Rd North	WB	690	567	123	22%	4.9	100	FAIL	
12	77	4	12-4<	Archer's Way	SB	29	41	-12	-29%	2.0	100	PASS	
12	78	4	12-4>	Archer's Way	NB	41	62	-21	-34%	2.9	100	PASS	
13	79	1	13-1<	Rhosnesni Ln West	WB	324	300	24	8%	1.4	100	PASS	
13	80	1	13-1>	Rhosnesni Ln West	EB	213	193	20	10%	1.4	100	PASS	
13	81	2	13-2<	Borras Rd North	NB	328	380	-52	-14%	2.8	100	PASS	
13	82	2	13-2>	Borras Rd North	SB	211	197	14	7%	1.0	100	PASS	
13	83	3	13-3>	Rhosnesni Ln East	WB	232	351	-119	-34%	7.0	100	FAIL	
13	84	4	13-4<	Borras Rd South	SB	85	167	-82	-49%	7.3	100	PASS	
13	85	4	13-4>	Borras Rd South	NB	81	106	-25	-24%	2.6	100	PASS	
14	86	1	14-1<	Jeffery's Rd	NB	387	383	4	1%	0.2	100	PASS	
14	87	1	14-1>	Jeffery's Rd	SB	533	466	67	14%	3.0	100	PASS	
14	88	2	14-2<	Borras Rd	SB	289	218	71	33%	4.5	100	PASS	
14	89	2	14-2>	Borras Rd	NB	489	468	21	4%	1.0	100	PASS	
14	90	3	14-3<	Dean Rd	SB	556	496	60	12%	2.6	100	PASS	
14	91	3	14-3>	Dean Rd	NB	210	163	47	29%	3.4	100	PASS	
16	92	1	16-1<	Montgomery Rd	NB	166	181	-15	-8%	1.1	100	PASS	
16	93	1	16-1>	Montgomery Rd	SB	175	165	10	6%	0.8	100	PASS	
16	94	2	16-2<	Queensway Sports Centre	EB	9	11	-2	-18%	0.6	100	PASS	
16	95	2	16-2>	Queensway Sports Centre	WB	0	10	-10	-100%	4.5	100	PASS	
16	96	3	16-3<	Queensway	SB	195	151	44	29%	3.3	100	PASS	
16	97	3	16-3>	Queensway	NB	357	301	56	19%	3.1	100	PASS	
16	98	4	16-4<	Smithfield Rd	WB	239	214	25	12%	1.7	100	PASS	
16	99	4	16-4>	Smithfield Rd	EB	77	81	-4	-5%	0.5	100	PASS	
					Total	41,485	40,086	1,399	3%	2.3	Ave		

Wrehxam VISSIM BY 2563

Link Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 1 - Car Volume - Link Calibration

CAR

																% GEH <5	90%	87%	85%	86%	93%
																% GEH <10	99%	100%	100%	99%	100%
																% GEH <15	100%	100%	100%	100%	100%
Counts		99			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
					Survey					Model					% Diff	GEH (Based Hourly Flows)				
Site	ID	Ref	Location	Dir	08:00	08:15	08:30	08:45	Pk Hr	08:00	08:15	08:30	08:45	Pk Hr	Pk Hr	08:00	08:15	08:30	08:45	Pk Hr
1	1	1-1<	Cefn Rd	SB	68	110	142	108	428	72	100	128	116	416	-3%	1.0	2.0	2.4	1.5	0.6
1	2	1-1>	Cefn Rd	NB	95	100	147	114	456	96	103	133	133	465	2%	0.2	0.6	2.4	3.4	0.4
1	3	1-2<	Holt Rd South	SB	89	118	124	135	466	69	83	107	118	377	-19%	4.5	7.0	3.2	3.0	4.3
1	4	1-2>	Holt Rd South	NB	79	86	90	89	344	77	85	88	84	334	-3%	0.5	0.2	0.4	1.1	0.5
1	5	1-3<	Dean Rd	NB	76	90	95	80	341	94	114	126	127	461	35%	3.9	4.8	5.9	9.2	6.0
1	6	1-3>	Dean Rd	SB	69	107	136	110	422	68	90	115	104	377	-11%	0.2	3.4	3.7	1.2	2.3
1	7	1-4<	Holt Rd North	NB	119	111	138	126	494	119	112	122	114	467	-5%	0.0	0.2	2.8	2.2	1.2
1	8	1-4>	Holt Rd North	SB	111	136	136	150	533	115	130	155	166	566	6%	0.8	1.0	3.2	2.5	1.4
1	9	1-5<	Bryn Estyn Rd	EB	7	8	16	24	55	7	9	14	23	53	-4%	0.0	0.7	1.0	0.4	0.3
1	10	1-5>	Bryn Estyn Rd	WB	5	8	6	10	29	5	10	6	11	32	10%	0.0	1.3	0.0	0.6	0.5
2	11	2-1<	A5156	NB	131	127	148	127	532	147	150	144	125	566	6%	2.8	3.9	0.7	0.3	1.5
2	12	2-1>	A5156	SB	390	455	360	303	1508	450	458	459	320	1,687	12%	5.9	0.3	9.8	2.0	4.5
2	13	2-2<	Wrexham Golf Club	NB	2	6	6	9	22	2	7	5	9	23	5%	0.0	0.8	0.4	0.3	0.2
2	14	2-2>	Wrexham Golf Club	SB	1	0	0	2	3	1	2	3	2	8	220%	0.0	0.0	0.0	0.8	2.4
2	15	2-3<	A534 Bypass	EB	417	460	370	317	1563	464	450	450	313	1,677	7%	4.5	0.9	8.0	0.5	2.8
2	16	2-3>	A534 Bypass	WB	88	98	101	115	401	90	113	108	122	433	8%	0.5	3.0	1.4	1.4	1.6
2	17	2-4<	Holt Rd	WB	79	108	97	99	382	83	113	117	118	431	13%	1.0	1.0	4.0	3.7	2.5
2	18	2-4>	Holt Rd	EB	149	148	159	132	588	155	147	146	121	569	-3%	1.0	0.2	2.0	2.0	0.8
3	19	3-1<	Cefn Rd North	NB	70	85	113	73	341	65	82	113	87	347	2%	1.2	0.7	0.0	3.1	0.3
3	20	3-1>	Cefn Rd North	SB	59	69	73	86	287	56	61	70	82	269	-6%	0.8	2.0	0.7	0.9	1.1
3	21	3-2<	Cefn Rd South	SB	61	72	72	79	284	58	66	72	81	277	-2%	0.8	1.4	0.0	0.4	0.4
3	22	3-2>	Cefn Rd South	NB	68	81	116	75	340	60	74	106	83	323	-5%	2.0	1.6	1.9	1.8	0.9
3	23	3-3<	Hullah Ln	WB	4	3	13	13	33	10	8	18	19	55	67%	4.5	4.3	2.5	3.0	3.3
3	24	3-3>	Hullah Ln	EB	8	10	9	4	31	17	21	27	22	87	181%	5.1	5.6	8.5	10.0	7.3
4	25	4-1<	A534 Bypass	WB	89	120	103	99	411	87	113	109	120	429	4%	0.4	1.3	1.2	4.0	0.9
4	26	4-1>	A534 Bypass	EB	454	472	376	276	1578	469	450	451	326	1,696	7%	1.4	2.0	7.4	5.8	2.9
4	27	4-2<	Borras Hall Ln	NB	1	5	5	2	13	1	5	6	4	16	23%	0.0	0.0	0.9	2.3	0.8
4	28	4-2>	Borras Hall Ln	SB	13	17	16	13	59	12	17	15	11	55	-7%	0.6	0.0	0.5	1.2	0.5
4	29	4-3<	A534 Holt Rd	NB	111	113	110	67	401	118	108	118	79	423	5%	1.3	1.0	1.5	2.8	1.1
4	30	4-3>	A534 Wrexham Rd	SB	67	84	87	66	304	67	80	87	66	300	-1%	0.0	0.9	0.0	0.0	0.2
4	31	4-4<	Wrexham Industrial Estate	EB	375	399	310	240	1324	387	382	367	259	1,395	5%	1.2	1.7	6.2	2.4	1.9
4	32	4-4>	Wrexham Industrial Estate	WB	42	65	51	54	212	40	61	50	55	206	-3%	0.6	1.0	0.3	0.3	0.4
4	33	4-5<	Sandy Ln	SB	0	1	3	1	5	0	1	4	1	6	20%	0.0	0.0	1.1	0.0	0.4
4	34	4-5>	Sandy Ln	NB	0	0	1	0	1	5	1	1	5	12	1100%	0.0	0.0	0.0	0.0	4.3
5	35	5-1<	A5156 West	WB	216	188	187	157	748	208	196	185	161	750	0%	1.1	1.2	0.3	0.6	0.1
5	36	5-1>	A5156 West	EB	444	484	362	289	1579	444	453	446	301	1,644	4%	0.0	2.9	8.4	1.4	1.6
5	37	5-2<	Borras Rd	NB	10	13	16	9	48	11	12	17	9	49	2%	0.6	0.6	0.5	0.0	0.1
5	38	5-2>	Borras Rd	SB	7	10	9	6	32	8	10	9	8	35	9%	0.7	0.0	0.0	1.5	0.5
5	39	5-3<	A5156 East	EB	440	468	368	261	1537	450	459	459	313	1,681	9%	0.9	0.8	9.0	6.1	3.6
5	40	5-3>	A5156 East	WB	150	133	144	129	556	146	151	144	128	569	2%	0.7	3.0	0.0	0.2	0.5
5	41	5-4<	Borras Park Rd	SB	32	47	8	50	137	30	41	24	39	134	-2%	0.7	1.8	8.0	3.3	0.3
5	42	5-4>	Borras Park Rd	NB	97	89	64	53	303	101	94	86	85	366	21%	0.8	1.0	5.1	7.7	3.4
7	43	7-1<	Bodhyfryd	NB	88	78	119	86	371	76	79	104	100	359	-3%	2.7	0.2	2.8	2.9	0.6
7	44	7-1>	Bodhyfryd	SB	90	111	136	159	496	89	108	130	159	486	-2%	0.2	0.6	1.0	0.0	0.5
7	45	7-2<	Holt Rd	NB	55	62	65	93	275	87	90	81	108	366	33%	7.6	6.4	3.7	3.0	5.1
7	46	7-2>	Holt Rd	SB	95	115	163	122	495	102	130	165	153	550	11%	1.4	2.7	0.3	5.3	2.4
7	47	7-3<	Tesco	EB	55	48	57	60	220	56	42	56	59	213	-3%	0.3	1.8	0.3	0.3	0.5
7	48	7-3>	Tesco	WB	55	51	41	66	213	53	51	42	63	209	-2%	0.5	0.0	0.3	0.7	0.3
7	49	7-4<	Farndon St	SB	97	135	153	150	535	84	124	152	151	511	-4%	2.7	1.9	0.2	0.2	1.0
7	50	7-4>	Farndon St	NB	63	60	63	67	253	62	60	64	64	250	-1%	0.3	0.0	0.3	0.7	0.2
7	51	7-5<	Holt St	WB	20	29	30	47	126	17	27	30	44	118	-6%	1.4	0.8	0.0	0.9	0.7
7	52	7-5>	Holt St	EB	12	15	21	22	70	14	13	22	23	72	3%	1.1	1.1	0.4	0.4	0.2
8	53	8-1<	Cefn Rd North	NB	61	67	89	72	289	55	65	87	73	280	-3%	1.6	0.5	0.4	0.2	0.5
8	54	8-1>	Cefn Rd North	SB	56	48	55	60	219	51	50	55	57	213	-3%	1.4	0.6	0.0	0.8	0.4
8	55	8-2<	Cefn Rd South	SB	63	50	56	57	226	59	53	55	55	222	-2%	1.0	0.8	0.3	0.5	0.3
8	56	8-2>	Cefn Rd South	NB	70	83	129	94	376	67	79	126	95	367	-2%	0.7	0.9	0.5	0.2	0.5
8	57	8-3<	Queensway	WB	19	24	48	33	124	24	28	58	43	153	23%	2.2	1.6	2.7	3.2	2.5
8	58	8-3>	Queensway	EB	17	10	9	8	44	20	17	19	19	75	70%	1.4	3.8	5.3	6.0	4.0
9	59	9-1<	Holt Rd South	WB	114	150	181	185	630	105	131	167	152	555	-12%	1.7	3.2	2.1	5.1	3.1
9	60	9-1>	Holt Rd South	EB	71	104	102	114	391	85	91	81	108	365	-7%	3.2	2.6	4.4	1.1	1.3
9	61	9-2<	Holt Rd North	EB	77	110	121	120	428	75	101	97	121	394	-8%	0.5	1.8	4.6	0.2	1.7
9	62	9-2>	Holt Rd North	WB	126	158	171	185	640	105	135	174	170	584	-9%	3.9	3.8	0.5	2.3	2.3
9	63	9-3<	Montgomery Rd	SB	41	30	25	40	136	46	36	39	48	169	24%	1.5	2.1	4.9	2.4	2.7
9	64	9-3>	Montgomery Rd	NB	35	28	54	46	163	36	42	48	43	169	4%	0.3	4.7	1.7	0.9	0.5
10	65	10-1<	Holt Rd South	WB	105	156	166	179	606	82	113	151	159	505	-17%	4.8	7.4	2.4	3.1	4.3
10	66	10-1>	Holt Rd South	EB	77	103	93	110	383	83	107	103	113	406	6%	1.3	0.8	2.0	0.6	1.2
10	67	10-2<	Holt Rd North	EB	66	83	79	76	304	71	85	86	80	322	6%	1.2	0.4	1.5	0.9	1.0
10	68	10-2>	Holt Rd North	WB	84	121	118	121	444	63	82	103	112	360	-19%	4.9	7.7	2.9	1.7	4.2
10	69	10-3<	Hullah Ln	SB	14	27	22	38	101	28	42	39	53	162	60%	6.1	5.1	6.2	4.4	5.3
10	70	10-3>	Hullah Ln	NB	24	42	56	62	184	35	51	70	67	223	21%	4.1	2.6	3.5	1.2	2.7
12	71	12-1<	Holt Rd South	WB	117	166	180	191	654	104	135	177	185	601	-8%	2.5	5.1	0.4	0.9	2.1
12	72	12-1>	Holt Rd South	EB	77	111	112	121	421	76	105	106	117	404	-4%	0.2	1.2	1.1	0.7	0.8
12	73	12-2<	Borras Rd	NB	10	18	38	15	81	18	23	35	26	102	26%	4.3	2.2	1.0	4.9	2.2
12	74	12-2>	Borras Rd	SB	20	21	22	18	81	35	46	52	42	175	116%	5.7	8.6	9.9	8.8	8.3
12	75	12-3<	Holt Rd North	EB	79	105	94	117	395	82	108	104	114	408	3%	0.7	0.6	2.0	0.6	0.6
12	76	12-3>	Holt Rd North	WB	106	153	171	188	618	81	112	149	161	503	-19%	5.2	7.1	3.5	4.1	4.9
12	77	12-4<	Archer's Way	SB	2	5	5	14	26	2	10	8	13	33	27%	0.0	3.7	2.4	0.5	1.3
12	78	12-4>	Archer's Way	NB	5	9	12	10	36	14	13	17	18	62	72%	5.8	2.4	2.6	4.3	3.7
13	79	13-1<	Rhosnesni Ln West	WB	37	68	118	76	299	36	61	105	81	283	-5%	0.3	1.7	2.5	1.1	0.9
13	80	13-1>	Rhosnesni Ln West	EB	27	63	62	34	186	28	59	64	34	185	-1%	0.4	1.0	0.5	0.0	0.1
13	81	13-2<	Borras Rd North	NB	42	87	115	52	296	67	98	99	78	342	16%	6.8	2.3	3.1	6.4	2.6
13	82	13-2>	Borras Rd North	SB	32	49	65	49	195	31	47	59	43	180	-8%	0.4	0.6	1.5	1.8	1.1
13	83	13-3>	Rhosnesni Ln East	WB	23	48	92	47	210	57	74	95	89	315	50%	10.8	6.7	0.6	10.2	6.5
13	84	13-4<	Borras Rd South	SB	14	21	22	17	74	30	42	45	34	151	104%	6.8	7.5	7.9	6.7	7.3
13	85	13-4>	Borras Rd South	NB	11	16	36	15	78	17	21	31	27	96	23%	3.2	2.3	1.7	5.2	1.9
14	86	14-1<	Jeffery's Rd	NB	80	81	108	89	358	77	77	96	96	346	-3%	0.7	0.9	2.4	1.5	0.6
14	87	14-1>	Jeffery's Rd	SB	91	135	163	113	502	77	107	142	104	430	-14%	3.1	5.1	3.4	1.7	3.3
14	88	14-2<	Borras Rd	SB	48	74	88	58	268	36	54	67	44	201	-25%	3.7	5.0	4.8	3.9	4.4
14	89	14-2>	Borras Rd	NB	77	126	147	101	451	83	115	130	101	429	-5%	1.3	2.0	2.9	0.0	1.0
14	90	14-3<	Dean Rd	SB	86	143	175	121	525	79	123	151	113	466	-11%	1.5	3.5	3.8	1.5	2.7
14	91	14-3>	Dean Rd	NB	46	37	61	54	198	32	32	42	48	154	-22%	4.5	1.7	5.3	1.7	3.3
16	92	16-1<	Montgomery Rd	NB	28	34	45	38	145	30	38	42	42	152	5%	0.7	1.3	0.9	1.3	0.6
16	93	16-1>	Montgomery Rd	SB	39	32	39	44	154	37	27	31	33	128	-17%	0.6	1.8	2.7	3.5	2.2
16	94	16-2<	Queensway Sports Centre	EB	1	1	0	6	8	0	0	0	0	0	-100%	2.8	2.8	0.0	6.9	4.0
16	95	16-2>	Queensway Sports Centre	WB	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	96	16-3<	Queensway	SB	45	39	37	44	165	42	31	30	35	138	-16%	0.9	2.7	2.4	2.9	2.2
16	97	16-3>	Queensway	NB	44	66	98	106	314	42	60	88	103	293	-7%	0.6	1.5	2.1	0.6	1.2
16	98	16-4<	Smithfield Rd	WB	20	39	70	79	208	18	32	62	77	189	-9%	0.9	2.3	2.0	0.5	1.3
16	99	16-4>	Smithfield Rd	EB	11	15	15	17	58	11	14	15	18	58	0%	0.0	0.5	0.0	0.5	0.0
				Total	7,759	9,163	9,497	8,455	34,874	7,936	8,918	9,856	8,838	35,548	2%	1.9	2.2	2.5	2.3	1.9

Wrehxam VISSIM BY 2018 2563

Link Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 2 - LGV Volume - Link Calibration

LGV

																% GEH <5	72%	78%	69%	57%	**78%**
																% GEH <10	95%	91%	92%	90%	**94%**
																% GEH <15	99%	95%	96%	97%	**98%**
Counts		**99**			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	**Pk Q1**	**Pk Q2**	**Pk Q3**	**Pk Q4**	**Pk Hr**
					Survey					**Model**					**% Diff**	**GEH (Based Hourly Flows)**				
Site	**ID**	**Ref**	**Location**	**Dir**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**
1	1	1-1<	Cefn Rd	SB	9	6	14	11	40	1	2	1	1	5	**-88%**	7.2	4.0	9.5	8.2	**7.4**
1	2	1-1>	Cefn Rd	NB	11	11	6	12	40	5	5	7	4	21	**-48%**	4.2	4.2	0.8	5.7	**3.4**
1	3	1-2<	Holt Rd South	SB	15	17	11	12	55	11	14	12	7	44	**-20%**	2.2	1.5	0.6	3.2	**1.6**
1	4	1-2>	Holt Rd South	NB	11	16	16	21	64	10	12	9	7	38	**-41%**	0.6	2.1	4.0	7.5	**3.6**
1	5	1-3<	Dean Rd	NB	8	4	7	11	30	4	4	3	2	13	**-57%**	3.3	0.0	3.6	7.1	**3.7**
1	6	1-3>	Dean Rd	SB	7	7	8	3	25	1	1	1	4	7	**-72%**	6.0	6.0	6.6	1.1	**4.5**
1	7	1-4<	Holt Rd North	NB	19	22	19	24	84	13	15	13	10	51	**-39%**	3.0	3.3	3.0	6.8	**4.0**
1	8	1-4>	Holt Rd North	SB	22	16	22	23	83	14	18	13	6	51	**-39%**	3.8	1.0	4.3	8.9	**3.9**
1	9	1-5<	Bryn Estyn Rd	EB	0	1	2	1	4	1	1	1	1	4	**0%**	0.0	0.0	1.6	0.0	**0.0**
1	10	1-5>	Bryn Estyn Rd	WB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
2	11	2-1<	A5156	NB	29	30	32.5	29	120.5	34	23	19	8	84	**-30%**	1.8	2.7	5.3	9.8	**3.6**
2	12	2-1>	A5156	SB	39	47	43.5	39	168.5	28	4	6	2	40	**-76%**	3.8	17.0	15.1	16.3	**12.6**
2	13	2-2<	Wrexham Golf Club	NB	0	0	1	1.5	2.5	3	1	1	1	6	**140%**	0.0	0.0	0.0	0.9	**1.7**
2	14	2-2>	Wrexham Golf Club	SB	0	0	0.5	0	0.5	0	0	0	3	3	**500%**	0.0	0.0	2.0	0.0	**1.9**
2	15	2-3<	A534 Bypass	EB	37.5	43	50	32	162.5	25	9	12	6	52	**-68%**	4.5	13.3	13.7	11.9	**10.7**
2	16	2-3>	A534 Bypass	WB	27.5	29.5	30.5	24	111.5	37	34	27	5	103	**-8%**	3.3	1.6	1.3	10.0	**0.8**
2	17	2-4<	Holt Rd	WB	17	23.5	18.5	21.5	80.5	24	19	14	5	62	**-23%**	3.1	2.0	2.2	9.1	**2.2**
2	18	2-4>	Holt Rd	EB	17	20	27.5	21	85.5	21	14	13	10	58	**-32%**	1.8	2.9	6.4	5.6	**3.2**
3	19	3-1<	Cefn Rd North	NB	8	8	6	11	33	5	5	7	4	21	**-36%**	2.4	2.4	0.8	5.1	**2.3**
3	20	3-1>	Cefn Rd North	SB	9	6	11	8	34	1	2	1	1	5	**-85%**	7.2	4.0	8.2	6.6	**6.6**
3	21	3-2<	Cefn Rd South	SB	9	7	11	8	35	1	2	1	1	5	**-86%**	7.2	4.7	8.2	6.6	**6.7**
3	22	3-2>	Cefn Rd South	NB	9	9	5	13	36	6	6	7	4	23	**-36%**	2.2	2.2	1.6	6.2	**2.4**
3	23	3-3<	Hullah Ln	WB	1	1	0	2	4	1	1	0	0	2	**-50%**	0.0	0.0	0.0	4.0	**1.2**
3	24	3-3>	Hullah Ln	EB	0	1	1	0	2	0	0	0	0	0	**-100%**	0.0	2.8	2.8	0.0	**2.0**
4	25	4-1<	A534 Bypass	WB	27	30	39	29	125	38	33	26	3	100	**-20%**	3.9	1.1	4.6	13.0	**2.4**
4	26	4-1>	A534 Bypass	EB	69	62	62	39	232	29	9	12	7	57	**-75%**	11.4	17.8	16.4	13.3	**14.6**
4	27	4-2<	Borras Hall Ln	NB	1	0	1	0	2	3	1	2	1	7	**250%**	2.8	0.0	1.6	0.0	**2.4**
4	28	4-2>	Borras Hall Ln	SB	2	3	3	2	10	1	11	1	0	13	**30%**	1.6	6.0	2.8	4.0	**0.9**
4	29	4-3<	A534 Holt Rd	NB	16	26	18	13	73	8	2	4	2	16	**-78%**	4.6	12.8	8.4	8.0	**8.5**
4	30	4-3>	A534 Wrexham Rd	SB	14	20	15	7	56	5	19	7	1	32	**-43%**	5.8	0.5	4.8	6.0	**3.6**
4	31	4-4<	Wrexham Industrial Estate	EB	59	47	49	30	185	12	3	4	2	21	**-89%**	15.8	17.6	17.5	14.0	**16.2**
4	32	4-4>	Wrexham Industrial Estate	WB	19	19	27	23	88	32	3	18	2	55	**-38%**	5.1	9.6	3.8	11.9	**3.9**
4	33	4-5<	Sandy Ln	SB	1	1	0	0	2	6	3	2	2	13	**550%**	5.3	2.8	0.0	0.0	**4.0**
4	34	4-5>	Sandy Ln	NB	0	0	0	1	1	0	0	0	0	0	**-100%**	0.0	0.0	0.0	2.8	**1.4**
5	35	5-1<	A5156 West	WB	41	46	26	37	150	42	11	15	11	79	**-47%**	0.3	13.1	4.9	10.6	**6.6**
5	36	5-1>	A5156 West	EB	67	61	48	49	225	35	6	11	1	53	**-76%**	9.0	19.0	13.6	19.2	**14.6**
5	37	5-2<	Borras Rd	NB	6	4	2	3	15	3	16	8	0	27	**80%**	2.8	7.6	5.4	4.9	**2.6**
5	38	5-2>	Borras Rd	SB	2	5	1	5	13	2	0	0	0	2	**-85%**	0.0	6.3	2.8	6.3	**4.0**
5	39	5-3<	A5156 East	EB	62	56	46	45	209	27	4	7	2	40	**-81%**	10.5	19.0	15.2	17.7	**15.1**
5	40	5-3>	A5156 East	WB	36	36	26	29	127	34	23	20	8	85	**-33%**	0.7	4.8	2.5	9.8	**4.1**
5	41	5-4<	Borras Park Rd	SB	9	8	7	6	30	11	3	5	0	19	**-37%**	1.3	4.3	1.6	6.9	**2.2**
5	42	5-4>	Borras Park Rd	NB	13	12	6	8	39	12	5	4	4	25	**-36%**	0.6	4.8	1.8	3.3	**2.5**
7	43	7-1<	Bodhyfryd	NB	10	15	17	10	52	4	7	5	2	18	**-65%**	4.5	4.8	7.2	6.5	**5.7**
7	44	7-1>	Bodhyfryd	SB	24	20	12	8	64	3	13	1	0	17	**-73%**	11.4	3.4	8.6	8.0	**7.4**
7	45	7-2<	Holt Rd	NB	11	15	11	11	48	4	26	3	0	33	**-31%**	5.1	4.9	6.0	9.4	**2.4**
7	46	7-2>	Holt Rd	SB	12	17	13	11	53	15	14	13	9	51	**-4%**	1.6	1.5	0.0	1.3	**0.3**
7	47	7-3<	Tesco	EB	7	8	9	5	29	4	7	3	2	16	**-45%**	2.6	0.7	4.9	3.2	**2.7**
7	48	7-3>	Tesco	WB	9	11	12	3	35	1	7	1	0	9	**-74%**	7.2	2.7	8.6	4.9	**5.5**
7	49	7-4<	Farndon St	SB	26	23	18	9	76	5	2	2	3	12	**-84%**	10.7	11.9	10.1	4.9	**9.6**
7	50	7-4>	Farndon St	NB	10	17	18	13	58	1	16	1	0	18	**-69%**	7.7	0.5	11.0	10.2	**6.5**
7	51	7-5<	Holt St	WB	1	6	1	1	9	3	9	3	2	17	**89%**	2.8	2.2	2.8	1.6	**2.2**
7	52	7-5>	Holt St	EB	0	2	1	1	4	0	1	0	0	1	**-75%**	0.0	1.6	2.8	2.8	**1.9**
8	53	8-1<	Cefn Rd North	NB	4	8	3	8	23	4	8	7	4	23	**0%**	0.0	0.0	3.6	3.3	**0.0**
8	54	8-1>	Cefn Rd North	SB	10	4	7	8	29	1	3	1	1	6	**-79%**	7.7	1.1	6.0	6.6	**5.5**
8	55	8-2<	Cefn Rd South	SB	14	6	8	7	35	1	2	1	1	5	**-86%**	9.5	4.0	6.6	6.0	**6.7**
8	56	8-2>	Cefn Rd South	NB	8	10	7	10	35	5	10	8	4	27	**-23%**	2.4	0.0	0.7	4.5	**1.4**
8	57	8-3<	Queensway	WB	4	2	4	4	14	1	3	2	1	7	**-50%**	3.8	1.3	2.3	3.8	**2.2**
8	58	8-3>	Queensway	EB	4	2	1	1	8	0	0	1	1	2	**-75%**	5.7	4.0	0.0	0.0	**2.7**
9	59	9-1<	Holt Rd South	WB	16	21	14	16	67	14	14	13	9	50	**-25%**	1.0	3.3	0.5	4.0	**2.2**
9	60	9-1>	Holt Rd South	EB	13	17	19	11	60	4	24	4	0	32	**-47%**	6.2	3.1	8.8	9.4	**4.1**
9	61	9-2<	Holt Rd North	EB	13	17	19	16	65	5	23	8	8	44	**-32%**	5.3	2.7	6.0	4.6	**2.8**
9	62	9-2>	Holt Rd North	WB	20	21	12	18	71	17	17	16	10	60	**-15%**	1.4	1.8	2.1	4.3	**1.4**
9	63	9-3<	Montgomery Rd	SB	6	3	5	3	17	5	10	6	4	25	**47%**	0.9	5.5	0.9	1.1	**1.7**
9	64	9-3>	Montgomery Rd	NB	2	3	7	6	18	3	6	7	11	27	**50%**	1.3	2.8	0.0	3.4	**1.9**
10	65	10-1<	Holt Rd South	WB	14	17	14	16	61	12	15	14	7	48	**-21%**	1.1	1.0	0.0	5.3	**1.8**
10	66	10-1>	Holt Rd South	EB	15	16	21	16	68	6	15	7	7	35	**-49%**	5.6	0.5	7.5	5.3	**4.6**
10	67	10-2<	Holt Rd North	EB	15	12	19	14	60	6	14	7	7	34	**-43%**	5.6	1.1	6.7	4.3	**3.8**
10	68	10-2>	Holt Rd North	WB	12	13	12	12	49	11	14	13	7	45	**-8%**	0.6	0.5	0.6	3.2	**0.6**
10	69	10-3<	Hullah Ln	SB	1	5	3	2	11	0	1	0	0	1	**-91%**	2.8	4.6	4.9	4.0	**4.1**
10	70	10-3>	Hullah Ln	NB	3	5	3	4	15	1	1	1	0	3	**-80%**	2.8	4.6	2.8	5.7	**4.0**
12	71	12-1<	Holt Rd South	WB	19	22	14	18	73	17	17	15	10	59	**-19%**	0.9	2.3	0.5	4.3	**1.7**
12	72	12-1>	Holt Rd South	EB	15	15	21	17	68	7	22	9	9	47	**-31%**	4.8	3.3	6.2	4.4	**2.8**
12	73	12-2<	Borras Rd	NB	1	0	3	0	4	1	5	2	1	9	**125%**	0.0	0.0	1.3	0.0	**2.0**
12	74	12-2>	Borras Rd	SB	3	4	3	2	12	6	3	3	2	14	**17%**	2.8	1.1	0.0	0.0	**0.6**
12	75	12-3<	Holt Rd North	EB	14	15	20	17	66	6	15	7	8	36	**-45%**	5.1	0.0	7.1	5.1	**4.2**
12	76	12-3>	Holt Rd North	WB	16	17	13	16	62	11	16	13	8	48	**-23%**	2.7	0.5	0.0	4.6	**1.9**
12	77	12-4<	Archer's Way	SB	0	2	0	1	3	0	4	1	0	5	**67%**	0.0	2.3	0.0	2.8	**1.0**
12	78	12-4>	Archer's Way	NB	0	3	0	1	4	0	0	0	0	0	**-100%**	0.0	4.9	0.0	2.8	**2.8**
13	79	13-1<	Rhosnesni Ln West	WB	6	9	2	7	24	2	1	1	0	4	**-83%**	4.0	7.2	1.6	7.5	**5.3**
13	80	13-1>	Rhosnesni Ln West	EB	9	9	5	3	26	0	0	0	0	0	**-100%**	8.5	8.5	6.3	4.9	**7.2**
13	81	13-2<	Borras Rd North	NB	9	8	7	6	30	8	6	5	2	21	**-30%**	0.7	1.5	1.6	4.0	**1.8**
13	82	13-2>	Borras Rd North	SB	3	10	0	2	15	5	2	1	1	9	**-40%**	2.0	6.5	0.0	1.6	**1.7**
13	83	13-3>	Rhosnesni Ln East	WB	5	2	4	10	21	10	5	5	2	22	**5%**	3.7	3.2	0.9	6.5	**0.2**
13	84	13-4<	Borras Rd South	SB	2	5	1	3	11	7	4	3	2	16	**45%**	4.7	0.9	2.8	1.3	**1.4**
13	85	13-4>	Borras Rd South	NB	0	1	1	1	3	2	4	3	1	10	**233%**	0.0	3.8	2.8	0.0	**2.7**
14	86	14-1<	Jeffery's Rd	NB	9	8	4	5	26	10	6	5	2	23	**-12%**	0.6	1.5	0.9	3.2	**0.6**
14	87	14-1>	Jeffery's Rd	SB	3	16	4	4	27	12	4	5	6	27	**0%**	6.6	7.6	0.9	1.8	**0.0**
14	88	14-2<	Borras Rd	SB	2	10	1	5	18	5	2	1	1	9	**-50%**	3.2	6.5	0.0	4.6	**2.4**
14	89	14-2>	Borras Rd	NB	10	12	5	8	35	9	6	5	2	22	**-37%**	0.6	4.0	0.0	5.4	**2.4**
14	90	14-3<	Dean Rd	SB	6	11	7	4	28	8	3	5	5	21	**-25%**	1.5	6.0	1.6	0.9	**1.4**
14	91	14-3>	Dean Rd	NB	4	1	3	2	10	2	1	1	0	4	**-60%**	2.3	0.0	2.8	4.0	**2.3**
16	92	16-1<	Montgomery Rd	NB	4	5	7	5	21	3	7	7	12	29	**38%**	1.1	1.6	0.0	4.8	**1.6**
16	93	16-1>	Montgomery Rd	SB	6	4	4	4	18	4	10	6	5	25	**39%**	1.8	4.5	1.8	0.9	**1.5**
16	94	16-2<	Queensway Sports Centre	EB	0	0	0	0	0	0	7	4	0	11	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	95	16-2>	Queensway Sports Centre	WB	0	0	0	0	0	0	0	0	10	10	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	96	16-3<	Queensway	SB	8	7	8	5	28	0	2	2	2	6	**-79%**	8.0	4.7	5.4	3.2	**5.3**
16	97	16-3>	Queensway	NB	9	9	9	10	37	1	2	2	2	7	**-81%**	7.2	6.0	6.0	6.5	**6.4**
16	98	16-4<	Smithfield Rd	WB	7	6	4	8	25	5	4	3	7	19	**-24%**	1.6	1.8	1.1	0.7	**1.3**
16	99	16-4>	Smithfield Rd	EB	4	5	6	4	19	3	8	8	4	23	**21%**	1.1	2.4	1.5	0.0	**0.9**
				Total	**1207**	**1293**	**1166**	**1066**	**4,732**	**826**	**792**	**584**	**342**	**2,544**	**-46%**	**3.5**	**4.0**	**3.9**	**5.2**	**3.6**

Wrehxam VISSIM B' 2563

Link Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 3 - OGV1 Volume - Link Calibration

OGV1

																% GEH <5	97%	99%	97%	94%	**97%**
																% GEH <10	100%	100%	100%	100%	**100%**
																% GEH <15	100%	100%	100%	100%	**100%**
Counts		**99**			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	**Pk Q1**	**Pk Q2**	**Pk Q3**	**Pk Q4**	**Pk Hr**
					Survey					**Model**					**% Diff**	**GEH (Based Hourly Flows)**				
Site	**ID**	**Ref**	**Location**	**Dir**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**
1	1	1-1<	Cefn Rd	SB	2	3	1	0	6	2	2	1	1	6	**0%**	0.0	1.3	0.0	0.0	**0.0**
1	2	1-1>	Cefn Rd	NB	3	0	1	2	6	1	1	2	1	5	**-17%**	2.8	0.0	1.6	1.6	**0.4**
1	3	1-2<	Holt Rd South	SB	4	3	1	4	12	2	2	1	2	7	**-42%**	2.3	1.3	0.0	2.3	**1.6**
1	4	1-2>	Holt Rd South	NB	4	4	0	3	11	2	2	0	1	5	**-55%**	2.3	2.3	0.0	2.8	**2.1**
1	5	1-3<	Dean Rd	NB	1	0	0	1	2	1	2	4	4	11	**450%**	0.0	0.0	0.0	3.8	**3.5**
1	6	1-3>	Dean Rd	SB	1	0	2	0	3	0	0	0	0	0	**-100%**	2.8	0.0	4.0	0.0	**2.4**
1	7	1-4<	Holt Rd North	NB	5	4	1	5	15	4	3	1	2	10	**-33%**	0.9	1.1	0.0	3.2	**1.4**
1	8	1-4>	Holt Rd North	SB	5	6	1	2	14	4	6	4	3	17	**21%**	0.9	0.0	3.8	1.3	**0.8**
1	9	1-5<	Bryn Estyn Rd	EB	1	0	1	0	2	0	0	0	0	0	**-100%**	2.8	0.0	2.8	0.0	**2.0**
1	10	1-5>	Bryn Estyn Rd	WB	0	0	0	3	3	2	0	1	4	7	**133%**	0.0	0.0	0.0	1.1	**1.8**
2	11	2-1<	A5156	NB	15	11.5	9.5	12	48	12	14	11	12	49	**2%**	1.6	1.4	0.9	0.0	**0.1**
2	12	2-1>	A5156	SB	8.5	10.5	10.5	9	38.5	11	13	14	13	51	**32%**	1.6	1.5	2.0	2.4	**1.9**
2	13	2-2<	Wrexham Golf Club	NB	0	0	0	0	0	0	1	1	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	14	2-2>	Wrexham Golf Club	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	15	2-3<	A534 Bypass	EB	8.5	8	11.5	11.5	39.5	12	14	14	13	53	**34%**	2.2	3.6	1.4	0.9	**2.0**
2	16	2-3>	A534 Bypass	WB	15	12.5	8.5	14	50	13	17	14	15	59	**18%**	1.1	2.3	3.3	0.5	**1.2**
2	17	2-4<	Holt Rd	WB	3.5	5	1.5	3	13	4	6	4	4	18	**38%**	0.5	0.9	3.0	1.1	**1.3**
2	18	2-4>	Holt Rd	EB	3.5	1.5	3.5	3.5	12	4	5	2	1	12	**0%**	0.5	3.9	1.8	3.3	**0.0**
3	19	3-1<	Cefn Rd North	NB	2	1	1	2	6	2	2	2	2	8	**33%**	0.0	1.6	1.6	0.0	**0.8**
3	20	3-1>	Cefn Rd North	SB	1	4	1	0	6	2	2	1	1	6	**0%**	1.6	2.3	0.0	0.0	**0.0**
3	21	3-2<	Cefn Rd South	SB	1	4	1	0	6	2	2	1	1	6	**0%**	1.6	2.3	0.0	0.0	**0.0**
3	22	3-2>	Cefn Rd South	NB	2	2	1	3	8	2	2	3	2	9	**13%**	0.0	0.0	2.8	1.3	**0.3**
3	23	3-3<	Hullah Ln	WB	0	1	0	1	2	0	0	1	0	1	**-50%**	0.0	2.8	0.0	2.8	**0.8**
3	24	3-3>	Hullah Ln	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	25	4-1<	A534 Bypass	WB	14	17	16	19	66	12	17	13	15	57	**-14%**	1.1	0.0	1.6	1.9	**1.1**
4	26	4-1>	A534 Bypass	EB	12	16	12	13	53	11	14	14	13	52	**-2%**	0.6	1.0	1.1	0.0	**0.1**
4	27	4-2<	Borras Hall Ln	NB	0	0	0	1	1	0	0	0	0	0	**-100%**	0.0	0.0	0.0	2.8	**1.4**
4	28	4-2>	Borras Hall Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	29	4-3<	A534 Holt Rd	NB	1	2	2	7	12	0	0	0	0	0	**-100%**	2.8	4.0	4.0	7.5	**4.9**
4	30	4-3>	A534 Wrexham Rd	SB	1	7	5	4	17	0	2	1	1	4	**-76%**	2.8	4.7	4.6	3.8	**4.0**
4	31	4-4<	Wrexham Industrial Estate	EB	11	19	12	9	51	11	14	14	13	52	**2%**	0.0	2.5	1.1	2.4	**0.1**
4	32	4-4>	Wrexham Industrial Estate	WB	13	16	13	18	60	12	15	12	14	53	**-12%**	0.6	0.5	0.6	2.0	**0.9**
4	33	4-5<	Sandy Ln	SB	0	1	0	0	1	0	0	0	0	0	**-100%**	0.0	2.8	0.0	0.0	**1.4**
4	34	4-5>	Sandy Ln	NB	0	0	0	1	1	0	0	0	0	0	**-100%**	0.0	0.0	0.0	2.8	**1.4**
5	35	5-1<	A5156 West	WB	16	21	15	22	74	10	12	9	13	44	**-41%**	3.3	4.4	3.5	4.3	**3.9**
5	36	5-1>	A5156 West	EB	11	14	17	13	55	11	13	14	13	51	**-7%**	0.0	0.5	1.5	0.0	**0.5**
5	37	5-2<	Borras Rd	NB	0	0	0	0	0	2	2	2	1	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	38	5-2>	Borras Rd	SB	1	0	0	0	1	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	39	5-3<	A5156 East	EB	12	13	16	13	54	11	13	14	13	51	**-6%**	0.6	0.0	1.0	0.0	**0.4**
5	40	5-3>	A5156 East	WB	16	21	15	21	73	12	14	11	13	50	**-32%**	2.1	3.3	2.2	3.9	**2.9**
5	41	5-4<	Borras Park Rd	SB	0	1	1	0	2	1	0	1	1	3	**50%**	0.0	2.8	0.0	0.0	**0.6**
5	42	5-4>	Borras Park Rd	NB	0	0	0	1	1	0	0	1	2	3	**200%**	0.0	0.0	0.0	1.6	**1.4**
7	43	7-1<	Bodhyfryd	NB	5	3	1	7	16	0	0	0	0	0	**-100%**	6.3	4.9	2.8	7.5	**5.7**
7	44	7-1>	Bodhyfryd	SB	4	5	5	8	22	0	1	0	2	3	**-86%**	5.7	4.6	6.3	5.4	**5.4**
7	45	7-2<	Holt Rd	NB	2	3	3	2	10	3	4	0	3	10	**0%**	1.3	1.1	4.9	1.3	**0.0**
7	46	7-2>	Holt Rd	SB	5	4	2	6	17	1	1	0	1	3	**-82%**	4.6	3.8	4.0	5.3	**4.4**
7	47	7-3<	Tesco	EB	1	1	2	5	9	0	0	0	0	0	**-100%**	2.8	2.8	4.0	6.3	**4.2**
7	48	7-3>	Tesco	WB	1	1	0	2	4	0	0	0	0	0	**-100%**	2.8	2.8	0.0	4.0	**2.8**
7	49	7-4<	Farndon St	SB	6	4	1	5	16	0	0	0	0	0	**-100%**	6.9	5.7	2.8	6.3	**5.7**
7	50	7-4>	Farndon St	NB	4	2	0	2	8	4	3	0	2	9	**13%**	0.0	1.3	0.0	0.0	**0.3**
7	51	7-5<	Holt St	WB	1	1	0	0	2	2	1	0	2	5	**150%**	1.6	0.0	0.0	0.0	**1.6**
7	52	7-5>	Holt St	EB	1	0	0	1	2	0	0	0	0	0	**-100%**	2.8	0.0	0.0	2.8	**2.0**
8	53	8-1<	Cefn Rd North	NB	2	2	2	1	7	2	2	3	1	8	**14%**	0.0	0.0	1.3	0.0	**0.4**
8	54	8-1>	Cefn Rd North	SB	0	1	2	0	3	1	2	2	1	6	**100%**	0.0	1.6	0.0	0.0	**1.4**
8	55	8-2<	Cefn Rd South	SB	0	0	3	1	4	1	1	1	0	3	**-25%**	0.0	0.0	2.8	2.8	**0.5**
8	56	8-2>	Cefn Rd South	NB	1	2	4	1	8	2	2	3	1	8	**0%**	1.6	0.0	1.1	0.0	**0.0**
8	57	8-3<	Queensway	WB	0	1	2	0	3	0	1	1	1	3	**0%**	0.0	0.0	1.6	0.0	**0.0**
8	58	8-3>	Queensway	EB	1	0	1	1	3	0	0	0	0	0	**-100%**	2.8	0.0	2.8	2.8	**2.4**
9	59	9-1<	Holt Rd South	WB	3	0	1	4	8	1	1	0	1	3	**-63%**	2.8	0.0	2.8	3.8	**2.1**
9	60	9-1>	Holt Rd South	EB	4	2	1	3	10	3	3	1	2	9	**-10%**	1.1	1.3	0.0	1.3	**0.3**
9	61	9-2<	Holt Rd North	EB	3	2	1	3	9	3	3	1	2	9	**0%**	0.0	1.3	0.0	1.3	**0.0**
9	62	9-2>	Holt Rd North	WB	4	1	1	4	10	2	2	1	3	8	**-20%**	2.3	1.6	0.0	1.1	**0.7**
9	63	9-3<	Montgomery Rd	SB	2	1	0	0	3	1	1	1	2	5	**67%**	1.6	0.0	0.0	0.0	**1.0**
9	64	9-3>	Montgomery Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	65	10-1<	Holt Rd South	WB	3	2	1	3	9	2	2	1	3	8	**-11%**	1.3	0.0	0.0	0.0	**0.3**
10	66	10-1>	Holt Rd South	EB	3	2	0	4	9	2	3	0	2	7	**-22%**	1.3	1.3	0.0	2.3	**0.7**
10	67	10-2<	Holt Rd North	EB	3	2	0	4	9	2	3	0	2	7	**-22%**	1.3	1.3	0.0	2.3	**0.7**
10	68	10-2>	Holt Rd North	WB	3	2	1	3	9	2	2	1	3	8	**-11%**	1.3	0.0	0.0	0.0	**0.3**
10	69	10-3<	Hullah Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	70	10-3>	Hullah Ln	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	71	12-1<	Holt Rd South	WB	4	2	1	3	10	2	2	1	2	7	**-30%**	2.3	0.0	0.0	1.3	**1.0**
12	72	12-1>	Holt Rd South	EB	3	2	0	3	8	2	4	0	2	8	**0%**	1.3	2.3	0.0	1.3	**0.0**
12	73	12-2<	Borras Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	74	12-2>	Borras Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	75	12-3<	Holt Rd North	EB	3	2	0	3	8	2	3	0	2	7	**-13%**	1.3	1.3	0.0	1.3	**0.4**
12	76	12-3>	Holt Rd North	WB	3	2	1	3	9	2	3	1	3	9	**0%**	1.3	1.3	0.0	0.0	**0.0**
12	77	12-4<	Archer's Way	SB	0	0	0	0	0	0	2	0	1	3	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	78	12-4>	Archer's Way	NB	1	0	0	0	1	0	0	0	0	0	**-100%**	2.8	0.0	0.0	0.0	**1.4**
13	79	13-1<	Rhosnesni Ln West	WB	0	0	0	1	1	2	2	2	2	8	**700%**	0.0	0.0	0.0	1.6	**3.3**
13	80	13-1>	Rhosnesni Ln West	EB	0	0	0	1	1	1	1	1	1	4	**300%**	0.0	0.0	0.0	0.0	**1.9**
13	81	13-2<	Borras Rd North	NB	1	0	0	1	2	2	2	2	2	8	**300%**	1.6	0.0	0.0	1.6	**2.7**
13	82	13-2>	Borras Rd North	SB	0	0	0	1	1	1	1	1	1	4	**300%**	0.0	0.0	0.0	0.0	**1.9**
13	83	13-3>	Rhosnesni Ln East	WB	1	0	0	0	1	2	2	2	2	8	**700%**	1.6	0.0	0.0	0.0	**3.3**
13	84	13-4<	Borras Rd South	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	85	13-4>	Borras Rd South	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	86	14-1<	Jeffery's Rd	NB	1	0	0	2	3	1	1	2	3	7	**133%**	0.0	0.0	0.0	1.3	**1.8**
14	87	14-1>	Jeffery's Rd	SB	0	1	2	1	4	2	1	1	1	5	**25%**	0.0	0.0	1.6	0.0	**0.5**
14	88	14-2<	Borras Rd	SB	0	1	1	1	3	1	1	1	1	4	**33%**	0.0	0.0	0.0	0.0	**0.5**
14	89	14-2>	Borras Rd	NB	1	0	1	1	3	2	2	2	2	8	**167%**	1.6	0.0	1.6	1.6	**2.1**
14	90	14-3<	Dean Rd	SB	1	0	2	0	3	2	1	1	1	5	**67%**	1.6	0.0	1.6	0.0	**1.0**
14	91	14-3>	Dean Rd	NB	1	0	0	1	2	0	0	1	2	3	**50%**	2.8	0.0	0.0	1.6	**0.6**
16	92	16-1<	Montgomery Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	93	16-1>	Montgomery Rd	SB	1	0	2	0	3	2	1	1	2	6	**100%**	1.6	0.0	1.6	0.0	**1.4**
16	94	16-2<	Queensway Sports Centre	EB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
16	95	16-2>	Queensway Sports Centre	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	96	16-3<	Queensway	SB	1	0	1	0	2	1	0	0	1	2	**0%**	0.0	0.0	2.8	0.0	**0.0**
16	97	16-3>	Queensway	NB	0	0	6	0	6	0	0	0	0	0	**-100%**	0.0	0.0	6.9	0.0	**3.5**
16	98	16-4<	Smithfield Rd	WB	0	0	6	0	6	1	1	1	1	4	**-33%**	0.0	0.0	5.3	0.0	**0.9**
16	99	16-4>	Smithfield Rd	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
				Total	**278**	**283**	**239**	**313**	**1,113**	**238**	**280**	**224**	**260**	**1,002**	**-10%**	**1.1**	**1.0**	**1.1**	**1.3**	**1.2**

Wrehxam VISSIM B' 2563

Link Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 3 - OGV1 Volume - Link Calibration

OGV2

																	% GEH <5	99%	100%	100%	99%	**100%**
																	% GEH <10	100%	100%	100%	100%	**100%**
																	% GEH <15	100%	100%	100%	100%	**100%**
Counts		**99**			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	**Pk Q1**	**Pk Q2**	**Pk Q3**	**Pk Q4**	**Pk Hr**
					Survey					**Model**					**% Diff**	**GEH (Based Hourly Flows)**				
Site	**ID**	**Ref**	**Location**	**Dir**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**
1	1	1-1<	Cefn Rd	SB	0	1	1	4	6	1	1	0	2	4	**-33%**	0.0	0.0	2.8	2.3	**0.9**
1	2	1-1>	Cefn Rd	NB	3	1	1	0	5	2	1	1	0	4	**-20%**	1.3	0.0	0.0	0.0	**0.5**
1	3	1-2<	Holt Rd South	SB	0	0	0	0	0	1	1	1	4	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	4	1-2>	Holt Rd South	NB	0	0	0	0	0	3	4	3	4	14	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	5	1-3<	Dean Rd	NB	0	0	0	0	0	3	2	2	1	8	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	6	1-3>	Dean Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	7	1-4<	Holt Rd North	NB	3	1	1	0	5	5	5	4	4	18	**260%**	2.0	4.6	3.8	0.0	**3.8**
1	8	1-4>	Holt Rd North	SB	0	1	1	4	6	5	4	3	6	18	**200%**	0.0	3.8	2.8	1.8	**3.5**
1	9	1-5<	Bryn Estyn Rd	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	10	1-5>	Bryn Estyn Rd	WB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	11	2-1<	A5156	NB	20	14	15	11	60	9	10	7	7	33	**-45%**	5.6	2.3	4.8	2.7	**3.9**
2	12	2-1>	A5156	SB	12	10	13	14	49	12	13	14	12	51	**4%**	0.0	1.8	0.5	1.1	**0.3**
2	13	2-2<	Wrexham Golf Club	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	14	2-2>	Wrexham Golf Club	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	15	2-3<	A534 Bypass	EB	12	9	12	11	43	14	17	17	16	64	**49%**	1.1	4.8	2.6	3.0	**2.9**
2	16	2-3>	A534 Bypass	WB	18	13	14	11	56	11	13	11	12	47	**-15%**	3.7	0.0	1.7	0.9	**1.2**
2	17	2-4<	Holt Rd	WB	1	2	1	4	7	4	4	4	5	17	**162%**	4.7	3.0	3.8	1.5	**3.1**
2	18	2-4>	Holt Rd	EB	2	1	1	1	5	4	5	3	4	16	**256%**	2.3	4.6	2.8	4.7	**3.6**
3	19	3-1<	Cefn Rd North	NB	3	1	1	0	5	2	1	1	0	4	**-20%**	1.3	0.0	0.0	0.0	**0.5**
3	20	3-1>	Cefn Rd North	SB	0	0	2	4	6	1	1	0	2	4	**-33%**	0.0	0.0	4.0	2.3	**0.9**
3	21	3-2<	Cefn Rd South	SB	0	0	2	4	6	1	1	0	2	4	**-33%**	0.0	0.0	4.0	2.3	**0.9**
3	22	3-2>	Cefn Rd South	NB	3	1	1	0	5	2	1	1	1	5	**0%**	1.3	0.0	0.0	0.0	**0.0**
3	23	3-3<	Hullah Ln	WB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
3	24	3-3>	Hullah Ln	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	25	4-1<	A534 Bypass	WB	10	13	10	11	44	11	11	11	12	45	**2%**	0.6	1.2	0.6	0.6	**0.1**
4	26	4-1>	A534 Bypass	EB	18	16	12	15	61	15	18	15	16	64	**5%**	1.5	1.0	1.6	0.5	**0.4**
4	27	4-2<	Borras Hall Ln	NB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
4	28	4-2>	Borras Hall Ln	SB	0	1	0	0	1	0	0	0	0	0	**-100%**	0.0	2.8	0.0	0.0	**1.4**
4	29	4-3<	A534 Holt Rd	NB	5	3	1	6	15	2	3	1	1	7	**-53%**	3.2	0.0	0.0	5.3	**2.4**
4	30	4-3>	A534 Wrexham Rd	SB	4	5	6	4	19	1	1	2	2	6	**-68%**	3.8	4.6	4.0	2.3	**3.7**
4	31	4-4<	Wrexham Industrial Estate	EB	15	17	12	14	58	13	15	14	15	57	**-2%**	1.1	1.0	1.1	0.5	**0.1**
4	32	4-4>	Wrexham Industrial Estate	WB	10	11	7	14	42	10	10	9	10	39	**-7%**	0.0	0.6	1.4	2.3	**0.5**
4	33	4-5<	Sandy Ln	SB	2	1	1	2	6	0	0	0	0	0	**-100%**	4.0	2.8	2.8	4.0	**3.5**
4	34	4-5>	Sandy Ln	NB	0	1	0	0	1	0	0	0	0	0	**-100%**	0.0	2.8	0.0	0.0	**1.4**
5	35	5-1<	A5156 West	WB	8	13	14	13	48	8	8	7	7	30	**-38%**	0.0	3.1	4.3	3.8	**2.9**
5	36	5-1>	A5156 West	EB	16	14	12	21	63	13	14	14	12	53	**-16%**	1.6	0.0	1.1	4.4	**1.3**
5	37	5-2<	Borras Rd	NB	0	0	0	1	1	2	0	1	0	3	**200%**	0.0	0.0	0.0	2.8	**1.4**
5	38	5-2>	Borras Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	39	5-3<	A5156 East	EB	16	14	12	20	62	12	14	14	12	52	**-16%**	2.1	0.0	1.1	4.0	**1.3**
5	40	5-3>	A5156 East	WB	8	13	14	13	48	9	8	8	7	32	**-33%**	0.7	3.1	3.6	3.8	**2.5**
5	41	5-4<	Borras Park Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	42	5-4>	Borras Park Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	43	7-1<	Bodhyfryd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	44	7-1>	Bodhyfryd	SB	0	0	0	0	0	2	3	2	7	14	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	45	7-2<	Holt Rd	NB	0	0	0	0	0	4	4	3	8	19	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	46	7-2>	Holt Rd	SB	0	0	0	0	0	1	0	0	1	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	47	7-3<	Tesco	EB	0	0	0	0	0	1	2	1	2	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	48	7-3>	Tesco	WB	0	0	0	0	0	1	1	0	3	5	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	49	7-4<	Farndon St	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	50	7-4>	Farndon St	NB	0	0	0	0	0	1	1	1	3	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	51	7-5<	Holt St	WB	0	0	0	0	0	1	0	0	5	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	52	7-5>	Holt St	EB	0	0	0	0	0	1	1	1	1	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	53	8-1<	Cefn Rd North	NB	2	1	1	0	4	2	1	1	1	5	**25%**	0.0	0.0	0.0	0.0	**0.5**
8	54	8-1>	Cefn Rd North	SB	1	0	2	4	7	1	1	0	2	4	**-43%**	0.0	0.0	4.0	2.3	**1.3**
8	55	8-2<	Cefn Rd South	SB	1	0	2	4	7	0	0	0	1	1	**-86%**	2.8	0.0	4.0	3.8	**3.0**
8	56	8-2>	Cefn Rd South	NB	2	1	1	0	4	2	1	1	4	8	**100%**	0.0	0.0	0.0	0.0	**1.6**
8	57	8-3<	Queensway	WB	0	0	0	0	0	1	1	0	4	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	58	8-3>	Queensway	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	59	9-1<	Holt Rd South	WB	0	1	0	0	1	1	0	0	1	2	**100%**	0.0	2.8	0.0	0.0	**0.8**
9	60	9-1>	Holt Rd South	EB	1	0	0	0	1	3	3	3	6	15	**1400%**	2.8	0.0	0.0	0.0	**4.9**
9	61	9-2<	Holt Rd North	EB	1	0	0	0	1	3	3	3	3	12	**1100%**	2.8	0.0	0.0	0.0	**4.3**
9	62	9-2>	Holt Rd North	WB	0	1	0	0	1	2	0	1	4	7	**600%**	0.0	2.8	0.0	0.0	**3.0**
9	63	9-3<	Montgomery Rd	SB	0	0	0	0	0	1	0	1	6	8	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	64	9-3>	Montgomery Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	65	10-1<	Holt Rd South	WB	1	0	0	0	1	1	1	1	5	8	**700%**	0.0	0.0	0.0	0.0	**3.3**
10	66	10-1>	Holt Rd South	EB	1	0	0	0	1	3	4	3	3	13	**1200%**	2.8	0.0	0.0	0.0	**4.5**
10	67	10-2<	Holt Rd North	EB	1	0	0	0	1	3	4	3	3	13	**1200%**	2.8	0.0	0.0	0.0	**4.5**
10	68	10-2>	Holt Rd North	WB	1	0	0	0	1	1	1	1	4	7	**600%**	0.0	0.0	0.0	0.0	**3.0**
10	69	10-3<	Hullah Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	70	10-3>	Hullah Ln	NB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	71	12-1<	Holt Rd South	WB	0	1	0	0	1	1	1	1	4	7	**600%**	0.0	0.0	0.0	0.0	**3.0**
12	72	12-1>	Holt Rd South	EB	1	0	0	0	1	3	4	3	3	13	**1200%**	2.8	0.0	0.0	0.0	**4.5**
12	73	12-2<	Borras Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	74	12-2>	Borras Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	75	12-3<	Holt Rd North	EB	1	0	0	0	1	3	4	3	3	13	**1200%**	2.8	0.0	0.0	0.0	**4.5**
12	76	12-3>	Holt Rd North	WB	0	1	0	0	1	1	1	1	4	7	**600%**	0.0	0.0	0.0	0.0	**3.0**
12	77	12-4<	Archer's Way	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	78	12-4>	Archer's Way	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	79	13-1<	Rhosnesni Ln West	WB	0	0	0	0	0	1	1	2	1	5	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	80	13-1>	Rhosnesni Ln West	EB	0	0	0	0	0	1	1	1	1	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	81	13-2<	Borras Rd North	NB	0	0	0	0	0	3	2	2	2	9	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	82	13-2>	Borras Rd North	SB	0	0	0	0	0	1	1	1	1	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	83	13-3>	Rhosnesni Ln East	WB	0	0	0	0	0	2	1	2	1	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	84	13-4<	Borras Rd South	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	85	13-4>	Borras Rd South	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	86	14-1<	Jeffery's Rd	NB	0	0	0	0	0	2	1	2	2	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	87	14-1>	Jeffery's Rd	SB	0	0	0	0	0	1	1	1	1	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	88	14-2<	Borras Rd	SB	0	0	0	0	0	1	1	1	1	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	89	14-2>	Borras Rd	NB	0	0	0	0	0	3	2	2	2	9	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	90	14-3<	Dean Rd	SB	0	0	0	0	0	1	1	1	1	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	91	14-3>	Dean Rd	NB	0	0	0	0	0	0	0	1	1	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	92	16-1<	Montgomery Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	93	16-1>	Montgomery Rd	SB	0	0	0	0	0	0	0	0	6	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	94	16-2<	Queensway Sports Centre	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	95	16-2>	Queensway Sports Centre	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	96	16-3<	Queensway	SB	0	0	0	0	0	0	0	0	5	5	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	97	16-3>	Queensway	NB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	98	16-4<	Smithfield Rd	WB	0	0	0	0	0	0	0	0	2	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	99	16-4>	Smithfield Rd	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
				Total	**202**	**182**	**174**	**208**	**766**	**236**	**240**	**218**	**298**	**992**	**30%**	**0.6**	**0.5**	**0.7**	**0.6**	**1.0**

Wrehxam VISSIM BY 2018 2563

Link Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - All Traffic (Class1-6) - Link Calibration

							PASS	FAIL	Criteria	%	Flow Test	
							83	16	% GEH <5	84%	% PASS	85
							94	5	% GEH <10	95%		86%
Counts	99						99	0	% GEH <15	100%		
Site	ID	Arm	Ref	Location	Dir	Survey	Model	Diff (S-M)	% Diff	GEH	Flow Test Criteria	Flow Test PASS/FAIL
1	1	1	1-1<	Cefn Rd	SB	439	449	-10	-2%	0.5	100	PASS
1	2	1	1-1>	Cefn Rd	NB	447	491	-44	-9%	2.0	100	PASS
1	3	2	1-2<	Holt Rd South	SB	586	497	89	18%	3.8	100	PASS
1	4	2	1-2>	Holt Rd South	NB	517	539	-22	-4%	1.0	100	PASS
1	5	3	1-3<	Dean Rd	NB	437	502	-65	-13%	3.0	100	PASS
1	6	3	1-3>	Dean Rd	SB	299	366	-67	-18%	3.7	100	PASS
1	7	4	1-4<	Holt Rd North	NB	601	596	5	1%	0.2	100	PASS
1	8	4	1-4>	Holt Rd North	SB	822	678	144	21%	5.3	123	FAIL
1	9	5	1-5<	Bryn Estyn Rd	EB	74	55	19	35%	2.4	100	PASS
1	10	5	1-5>	Bryn Estyn Rd	WB	52	25	27	108%	4.4	100	PASS
2	11	1	2-1<	A5156	NB	1,526	1,585	-59	-4%	1.5	229	PASS
2	12	1	2-1>	A5156	SB	919	626	293	47%	10.5	138	FAIL
2	13	2	2-2<	Wrexham Golf Club	NB	11	27	-17	-61%	3.8	100	PASS
2	14	2	2-2>	Wrexham Golf Club	SB	17	11	6	55%	1.6	100	PASS
2	15	3	2-3<	A534 Bypass	EB	767	452	315	70%	12.8	115	FAIL
2	16	3	2-3>	A534 Bypass	WB	1,694	1,855	-161	-9%	3.8	254	PASS
2	17	4	2-4<	Holt Rd	WB	819	795	24	3%	0.8	123	PASS
2	18	4	2-4>	Holt Rd	EB	493	367	126	34%	6.1	100	FAIL
3	19	1	3-1<	Cefn Rd North	NB	367	428	-61	-14%	3.1	100	PASS
3	20	1	3-1>	Cefn Rd North	SB	371	356	15	4%	0.8	100	PASS
3	21	2	3-2<	Cefn Rd South	SB	365	339	26	8%	1.4	100	PASS
3	22	2	3-2>	Cefn Rd South	NB	380	402	-22	-5%	1.1	100	PASS
3	23	3	3-3<	Hullah Ln	WB	57	59	-2	-3%	0.3	100	PASS
3	24	3	3-3>	Hullah Ln	EB	38	68	-30	-44%	4.1	100	PASS
4	25	1	4-1<	A534 Bypass	WB	1,850	1,975	-125	-6%	2.9	278	PASS
4	26	1	4-1>	A534 Bypass	EB	701	441	260	59%	10.9	105	FAIL
4	27	2	4-2<	Borras Hall Ln	NB	95	118	-23	-19%	2.2	100	PASS
4	28	2	4-2>	Borras Hall Ln	SB	27	26	1	4%	0.2	100	PASS
4	29	3	4-3<	A534 Holt Rd	NB	469	469	0	0%	0.0	100	PASS
4	30	3	4-3>	A534 Wrexham Rd	SB	479	483	-4	-1%	0.2	100	PASS
4	31	4	4-4<	Wrexham Industrial Estate	EB	410	164	246	150%	14.5	100	FAIL
4	32	4	4-4>	Wrexham Industrial Estate	WB	1,602	1,782	-180	-10%	4.4	240	PASS
4	33	5	4-5<	Sandy Ln	SB	6	23	-17	-74%	4.5	100	PASS
4	34	5	4-5>	Sandy Ln	NB	21	17	4	24%	0.9	100	PASS
5	35	1	5-1<	A5156 West	WB	1,466	1,491	-25	-2%	0.7	220	PASS
5	36	1	5-1>	A5156 West	EB	1,093	904	189	21%	6.0	164	FAIL
5	37	2	5-2<	Borras Rd	NB	44	98	-54	-55%	6.4	100	PASS
5	38	2	5-2>	Borras Rd	SB	31	38	-7	-18%	1.2	100	PASS
5	39	3	5-3<	A5156 East	EB	871	634	237	37%	8.6	131	FAIL
5	40	3	5-3>	A5156 East	WB	1,461	1,583	-122	-8%	3.1	219	PASS
5	41	4	5-4<	Borras Park Rd	SB	378	423	-45	-11%	2.2	100	PASS
5	42	4	5-4>	Borras Park Rd	NB	174	121	53	44%	4.4	100	PASS
7	43	1	7-1<	Bodhyfryd	NB	669	652	17	3%	0.7	100	PASS
7	44	1	7-1>	Bodhyfryd	SB	691	674	17	3%	0.7	100	PASS
7	45	2	7-2<	Holt Rd	NB	548	670	-122	-18%	4.9	100	FAIL
7	46	2	7-2>	Holt Rd	SB	437	586	-149	-25%	6.6	100	FAIL
7	47	3	7-3<	Tesco	EB	415	422	-7	-2%	0.3	100	PASS
7	48	3	7-3>	Tesco	WB	443	425	18	4%	0.9	100	PASS
7	49	4	7-4<	Farndon St	SB	650	626	24	4%	1.0	100	PASS
7	50	4	7-4>	Farndon St	NB	533	528	5	1%	0.2	100	PASS
7	51	5	7-5<	Holt St	WB	140	147	-7	-5%	0.6	100	PASS
7	52	5	7-5>	Holt St	EB	318	304	14	5%	0.8	100	PASS
8	53	1	8-1<	Cefn Rd North	NB	340	364	-24	-7%	1.3	100	PASS
8	54	1	8-1>	Cefn Rd North	SB	290	277	13	5%	0.8	100	PASS
8	55	2	8-2<	Cefn Rd South	SB	328	285	43	15%	2.5	100	PASS
8	56	2	8-2>	Cefn Rd South	NB	455	531	-76	-14%	3.4	100	PASS
8	57	3	8-3<	Queensway	WB	157	273	-116	-42%	7.9	100	FAIL
8	58	3	8-3>	Queensway	EB	80	114	-34	-30%	3.5	100	PASS
9	59	1	9-1<	Holt Rd South	WB	647	588	59	10%	2.4	100	PASS
9	60	1	9-1>	Holt Rd South	EB	745	666	79	12%	3.0	112	PASS
9	61	2	9-2<	Holt Rd North	EB	816	744	72	10%	2.6	122	PASS
9	62	2	9-2>	Holt Rd North	WB	670	583	87	15%	3.5	100	PASS
9	63	3	9-3<	Montgomery Rd	SB	197	219	-22	-10%	1.5	100	PASS
9	64	3	9-3>	Montgomery Rd	NB	245	302	-57	-19%	3.4	100	PASS
10	65	1	10-1<	Holt Rd South	WB	648	557	91	16%	3.7	100	PASS
10	66	1	10-1>	Holt Rd South	EB	598	651	-53	-8%	2.1	100	PASS
10	67	2	10-2<	Holt Rd North	EB	488	548	-60	-11%	2.6	100	PASS
10	68	2	10-2>	Holt Rd North	WB	543	493	50	10%	2.2	100	PASS
10	69	3	10-3<	Hullah Ln	SB	147	168	-21	-13%	1.7	100	PASS
10	70	3	10-3>	Hullah Ln	NB	142	129	13	10%	1.1	100	PASS
12	71	1	12-1<	Holt Rd South	WB	690	641	49	8%	1.9	100	PASS
12	72	1	12-1>	Holt Rd South	EB	674	724	-50	-7%	1.9	100	PASS
12	73	2	12-2<	Borras Rd	NB	113	105	8	8%	0.8	100	PASS
12	74	2	12-2>	Borras Rd	SB	89	133	-44	-33%	4.2	100	PASS
12	75	3	12-3<	Holt Rd North	EB	603	652	-49	-8%	2.0	100	PASS
12	76	3	12-3>	Holt Rd North	WB	654	563	91	16%	3.7	100	PASS
12	77	4	12-4<	Archer's Way	SB	53	73	-20	-27%	2.5	100	PASS
12	78	4	12-4>	Archer's Way	NB	42	51	-9	-18%	1.3	100	PASS
13	79	1	13-1<	Rhosnesni Ln West	WB	237	180	57	32%	3.9	100	PASS
13	80	1	13-1>	Rhosnesni Ln West	EB	196	154	42	27%	3.2	100	PASS
13	81	2	13-2<	Borras Rd North	NB	330	320	10	3%	0.6	100	PASS
13	82	2	13-2>	Borras Rd North	SB	124	203	-79	-39%	6.2	100	PASS
13	83	3	13-3>	Rhosnesni Ln East	WB	198	185	13	7%	0.9	100	PASS
13	84	4	13-4<	Borras Rd South	SB	66	128	-62	-48%	6.3	100	PASS
13	85	4	13-4>	Borras Rd South	NB	115	86	29	34%	2.9	100	PASS
14	86	1	14-1<	Jeffery's Rd	NB	470	361	109	30%	5.3	100	FAIL
14	87	1	14-1>	Jeffery's Rd	SB	351	509	-158	-31%	7.6	100	FAIL
14	88	2	14-2<	Borras Rd	EB	246	232	14	6%	0.9	100	PASS
14	89	2	14-2>	Borras Rd	WB	406	380	26	7%	1.3	100	PASS
14	90	3	14-3<	Dean Rd	SB	322	542	-220	-41%	10.6	100	FAIL
14	91	3	14-3>	Dean Rd	NB	281	246	35	14%	2.2	100	PASS
16	92	1	16-1<	Montgomery Rd	NB	257	251	6	2%	0.4	100	PASS
16	93	1	16-1>	Montgomery Rd	SB	202	212	-10	-5%	0.7	100	PASS
16	94	2	16-2<	Queensway Sports Centre	EB	116	85	31	36%	3.1	100	PASS
16	95	2	16-2>	Queensway Sports Centre	WB	66	54	12	22%	1.5	100	PASS
16	96	3	16-3<	Queensway	SB	201	200	1	1%	0.1	100	PASS
16	97	3	16-3>	Queensway	NB	406	447	-41	-9%	2.0	100	PASS
16	98	4	16-4<	Smithfield Rd	WB	240	284	-44	-15%	2.7	100	PASS
16	99	4	16-4>	Smithfield Rd	EB	140	107	33	31%	3.0	100	PASS
					Total	43,543	42,992	551	1%	3.0	Ave	

Wrehxam VISSIM BY 2563

Link Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 1 - Car Volume - Link Calibration

CAR

																% GEH <5	58%	72%	63%	68%	78%
																% GEH <10	92%	93%	93%	94%	95%
																% GEH <15	97%	97%	95%	99%	99%
Counts		99			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
					Survey					Model					% Diff	GEH (Based Hourly Flows)					
Site	ID	Ref	Location	Dir	16:30	16:45	17:00	17:15	Pk Hr	16:30	16:45	17:00	17:15	Pk Hr	Pk Hr	16:30	16:45	17:00	17:15	Pk Hr
1	1	1-1<	Cefn Rd	SB	107	112	109	77	405	95	95	101	107	398	-2%	2.4	3.3	1.6	6.3	0.3
1	2	1-1>	Cefn Rd	NB	103	128	84	93	408	110	99	104	125	438	7%	1.4	5.4	4.1	6.1	1.5
1	3	1-2<	Holt Rd South	SB	129	123	144	132	528	96	107	104	105	412	-22%	6.2	3.0	7.2	5.0	5.4
1	4	1-2>	Holt Rd South	NB	133	111	105	127	476	117	129	117	121	484	2%	2.9	3.3	2.3	1.1	0.4
1	5	1-3<	Dean Rd	NB	106	122	67	103	398	110	104	112	133	459	15%	0.8	3.4	9.5	5.5	2.9
1	6	1-3>	Dean Rd	SB	59	81	72	65	277	86	85	72	91	334	21%	6.3	0.9	0.0	5.9	3.3
1	7	1-4<	Holt Rd North	NB	135	137	131	148	551	128	125	115	144	512	-7%	1.2	2.1	2.9	0.7	1.7
1	8	1-4>	Holt Rd North	SB	191	181	192	177	741	117	127	151	162	557	-25%	11.9	8.7	6.3	2.3	7.2
1	9	1-5<	Bryn Estyn Rd	EB	22	21	15	13	71	5	11	17	18	51	-28%	9.3	5.0	1.0	2.5	2.6
1	10	1-5>	Bryn Estyn Rd	WB	13	14	13	11	51	4	2	5	8	19	-63%	6.2	8.5	5.3	1.9	5.4
2	11	2-1<	A5156	NB	417	368	313	251	1348	360	333	339	317	1,349	0%	5.7	3.7	2.9	7.9	0.0
2	12	2-1>	A5156	SB	179	207	237	161	784	80	99	143	187	509	-35%	17.3	17.5	13.6	3.9	10.8
2	13	2-2<	Wrexham Golf Club	NB	0	4	3	4	10	2	3	10	6	21	110%	0.0	1.1	6.0	2.3	2.8
2	14	2-2>	Wrexham Golf Club	SB	3	5	4	6	16	4	1	2	3	10	-38%	1.7	4.2	1.8	2.4	1.7
2	15	2-3<	A534 Bypass	EB	139	168	214	136	656	68	70	74	130	342	-48%	14.0	17.9	23.3	1.0	14.0
2	16	2-3>	A534 Bypass	WB	461	414	359	273	1507	400	406	375	379	1,560	4%	5.8	0.8	1.7	11.7	1.4
2	17	2-4<	Holt Rd	WB	189	203	194	150	736	133	162	173	199	667	-9%	8.8	6.1	3.0	7.4	2.6
2	18	2-4>	Holt Rd	EB	103	117	123	100	443	79	62	76	83	300	-32%	5.0	11.5	9.4	3.6	7.4
3	19	3-1<	Cefn Rd North	NB	105	94	70	65	334	98	86	99	91	374	12%	1.4	1.7	6.3	5.9	2.1
3	20	3-1>	Cefn Rd North	SB	77	99	92	72	340	75	75	72	86	308	-9%	0.5	5.1	4.4	3.2	1.8
3	21	3-2<	Cefn Rd South	SB	71	101	93	70	335	68	68	71	86	293	-13%	0.7	7.2	4.9	3.6	2.4
3	22	3-2>	Cefn Rd South	NB	110	96	72	68	346	86	74	97	93	350	1%	4.8	4.8	5.4	5.6	0.2
3	23	3-3<	Hullah Ln	WB	17	14	12	9	52	13	13	15	10	51	-2%	2.1	0.5	1.6	0.6	0.1
3	24	3-3>	Hullah Ln	EB	6	14	11	4	35	18	18	16	8	60	71%	6.9	2.0	2.7	3.3	3.6
4	25	4-1<	A534 Bypass	WB	489	426	397	290	1602	415	394	432	420	1,661	4%	7.0	3.2	3.4	13.8	1.5
4	26	4-1>	A534 Bypass	EB	145	143	174	130	592	68	70	72	126	336	-43%	14.9	14.1	18.4	0.7	11.9
4	27	4-2<	Borras Hall Ln	NB	29	30	13	13	85	21	28	27	30	106	25%	3.2	0.7	6.3	7.3	2.1
4	28	4-2>	Borras Hall Ln	SB	5	9	4	2	20	4	4	4	8	20	0%	0.9	3.9	0.0	5.4	0.0
4	29	4-3<	A534 Holt Rd	NB	127	101	124	77	429	99	99	115	108	421	-2%	5.3	0.4	1.6	6.4	0.4
4	30	4-3>	A534 Wrexham Rd	SB	102	99	109	103	413	90	102	102	97	391	-5%	2.4	0.6	1.4	1.2	1.1
4	31	4-4<	Wrexham Industrial Estate	EB	79	82	94	62	317	6	8	13	63	90	-72%	22.4	22.1	22.1	0.3	15.9
4	32	4-4>	Wrexham Industrial Estate	WB	465	387	340	205	1397	385	359	404	391	1,539	10%	7.8	2.9	6.6	21.5	3.7
4	33	4-5<	Sandy Ln	SB	5	0	0	0	5	7	6	6	1	20	300%	1.6	0.0	0.0	0.0	4.2
4	34	4-5>	Sandy Ln	NB	12	1	1	2	16	1	0	11	0	12	-25%	8.6	2.8	8.2	4.0	1.1
5	35	5-1<	A5156 West	WB	411	292	311	246	1260	345	325	322	308	1,300	3%	6.8	3.8	1.2	7.5	1.1
5	36	5-1>	A5156 West	EB	232	236	241	233	942	153	175	202	228	758	-20%	11.4	8.5	5.2	0.7	6.3
5	37	5-2<	Borras Rd	NB	8	15	5	11	39	8	12	9	16	45	15%	0.0	1.6	3.0	2.7	0.9
5	38	5-2>	Borras Rd	SB	9	4	2	11	26	9	9	10	5	33	27%	0.0	3.9	6.5	4.2	1.3
5	39	5-3<	A5156 East	EB	180	184	194	183	741	80	101	149	188	518	-30%	17.5	13.9	6.9	0.7	8.9
5	40	5-3>	A5156 East	WB	406	295	310	246	1257	354	340	337	319	1,350	7%	5.3	5.1	3.0	8.7	2.6
5	41	5-4<	Borras Park Rd	SB	85	77	90	88	340	108	113	94	61	376	11%	4.7	7.4	0.8	6.3	1.9
5	42	5-4>	Borras Park Rd	NB	37	33	47	38	155	25	27	25	21	98	-37%	4.3	2.2	7.3	6.3	5.1
7	43	7-1<	Bodhyfryd	NB	134	139	173	150	596	130	138	165	149	582	-2%	0.7	0.2	1.2	0.2	0.6
7	44	7-1>	Bodhyfryd	SB	147	150	158	178	633	143	145	149	174	611	-3%	0.7	0.8	1.5	0.6	0.9
7	45	7-2<	Holt Rd	NB	123	113	130	127	493	152	151	158	156	617	25%	4.9	6.6	4.7	4.9	5.3
7	46	7-2>	Holt Rd	SB	95	84	106	89	374	123	133	134	122	512	37%	5.4	9.4	5.1	6.4	6.6
7	47	7-3<	Tesco	EB	97	84	100	98	379	94	92	91	102	379	0%	0.6	1.7	1.8	0.8	0.0
7	48	7-3>	Tesco	WB	102	95	90	110	397	105	94	95	98	392	-1%	0.6	0.2	1.0	2.4	0.3
7	49	7-4<	Farndon St	SB	129	141	142	163	575	130	136	143	153	562	-2%	0.2	0.8	0.2	1.6	0.5
7	50	7-4>	Farndon St	NB	102	108	142	122	474	102	108	141	121	472	0%	0.0	0.0	0.2	0.2	0.1
7	51	7-5<	Holt St	WB	31	32	31	39	133	31	31	36	33	131	-2%	0.0	0.4	1.7	2.0	0.2
7	52	7-5>	Holt St	EB	68	72	80	78	298	64	68	74	78	284	-5%	1.0	1.0	1.4	0.0	0.8
8	53	8-1<	Cefn Rd North	NB	106	85	61	56	308	78	63	97	81	319	4%	5.8	5.1	8.1	6.0	0.6
8	54	8-1>	Cefn Rd North	SB	48	83	66	65	262	57	50	55	72	234	-11%	2.5	8.1	2.8	1.7	1.8
8	55	8-2<	Cefn Rd South	SB	56	92	80	70	298	63	54	54	74	245	-18%	1.8	8.9	6.4	0.9	3.2
8	56	8-2>	Cefn Rd South	NB	157	114	78	66	415	111	94	150	115	470	13%	7.9	3.9	13.5	10.3	2.6
8	57	8-3<	Queensway	WB	57	43	23	20	143	51	49	76	62	238	66%	1.6	1.8	15.1	13.1	6.9
8	58	8-3>	Queensway	EB	14	23	20	15	72	24	22	22	30	98	36%	4.6	0.4	0.9	6.3	2.8
9	59	9-1<	Holt Rd South	WB	151	148	157	142	598	124	133	135	123	515	-14%	4.6	2.5	3.6	3.3	3.5
9	60	9-1>	Holt Rd South	EB	205	172	167	164	708	151	150	155	159	615	-13%	8.1	3.5	1.9	0.8	3.6
9	61	9-2<	Holt Rd North	EB	224	184	182	176	766	166	167	173	172	678	-11%	8.3	2.6	1.4	0.6	3.3
9	62	9-2>	Holt Rd North	WB	140	147	161	167	615	118	128	126	113	485	-21%	3.9	3.2	5.8	9.1	5.5
9	63	9-3<	Montgomery Rd	SB	35	37	45	66	183	47	43	42	44	176	-4%	3.7	1.9	0.9	5.9	0.5
9	64	9-3>	Montgomery Rd	NB	65	50	56	53	224	68	65	69	67	269	20%	0.7	4.0	3.3	3.6	2.9
10	65	10-1<	Holt Rd South	WB	149	142	157	153	601	110	121	122	113	466	-22%	6.9	3.7	5.9	6.9	5.8
10	66	10-1>	Holt Rd South	EB	162	136	125	140	563	149	158	141	142	590	5%	2.1	3.6	2.8	0.3	1.1
10	67	10-2<	Holt Rd North	EB	134	107	102	115	458	119	128	118	125	490	7%	2.7	3.9	3.1	1.8	1.5
10	68	10-2>	Holt Rd North	WB	122	124	127	127	500	92	107	104	103	406	-19%	5.8	3.2	4.3	4.5	4.4
10	69	10-3<	Hullah Ln	SB	41	35	28	32	136	46	49	36	28	159	17%	1.5	4.3	2.8	1.5	1.9
10	70	10-3>	Hullah Ln	NB	40	24	35	33	132	34	33	31	21	119	-10%	2.0	3.4	1.4	4.6	1.2
12	71	12-1<	Holt Rd South	WB	154	149	176	163	642	132	141	143	126	542	-16%	3.7	1.3	5.2	6.2	4.1
12	72	12-1>	Holt Rd South	EB	158	158	157	159	632	158	163	165	168	654	3%	0.0	0.8	1.3	1.4	0.9
12	73	12-2<	Borras Rd	NB	9	27	32	36	104	20	19	30	25	94	-10%	5.8	3.3	0.7	4.0	1.0
12	74	12-2>	Borras Rd	SB	19	19	26	22	86	36	32	29	16	113	31%	6.5	5.1	1.1	2.8	2.7
12	75	12-3<	Holt Rd North	EB	156	141	131	138	566	150	158	141	142	591	4%	1.0	2.8	1.7	0.7	1.0
12	76	12-3>	Holt Rd North	WB	151	140	164	152	607	111	120	125	114	470	-23%	7.0	3.5	6.5	6.6	5.9
12	77	12-4<	Archer's Way	SB	16	10	17	9	52	12	11	16	15	54	4%	2.1	0.6	0.5	3.5	0.3
12	78	12-4>	Archer's Way	NB	7	10	9	13	39	9	14	11	10	44	13%	1.4	2.3	1.3	1.8	0.8
13	79	13-1<	Rhosnesni Ln West	WB	50	56	53	65	224	40	45	42	51	178	-21%	3.0	3.1	3.2	3.7	3.2
13	80	13-1>	Rhosnesni Ln West	EB	50	38	49	45	182	39	35	43	35	152	-16%	3.3	1.0	1.8	3.2	2.3
13	81	13-2<	Borras Rd North	NB	76	68	87	79	310	58	55	88	84	285	-8%	4.4	3.3	0.2	1.1	1.4
13	82	13-2>	Borras Rd North	SB	30	27	27	33	117	49	49	47	44	189	62%	6.0	7.1	6.6	3.5	5.8
13	83	13-3>	Rhosnesni Ln East	WB	44	47	41	53	185	35	34	44	49	162	-12%	2.9	4.1	0.9	1.1	1.7
13	84	13-4<	Borras Rd South	SB	21	12	11	16	60	37	31	27	18	113	88%	5.9	8.2	7.3	1.0	5.7
13	85	13-4>	Borras Rd South	NB	23	24	34	29	110	12	13	23	25	73	-34%	5.3	5.1	4.1	1.5	3.9
14	86	14-1<	Jeffery's Rd	NB	108	92	122	110	432	60	71	90	98	319	-26%	10.5	4.7	6.2	2.4	5.8
14	87	14-1>	Jeffery's Rd	SB	80	81	72	87	320	112	127	121	109	469	47%	6.5	9.0	10.0	4.4	7.5
14	88	14-2<	Borras Rd	EB	58	53	52	61	224	55	57	53	53	218	-3%	0.8	1.1	0.3	2.1	0.4
14	89	14-2>	Borras Rd	WB	84	85	103	100	372	59	77	113	95	344	-8%	5.9	1.8	1.9	1.0	1.5
14	90	14-3<	Dean Rd	SB	68	69	65	85	287	102	132	150	126	510	78%	7.4	12.6	16.4	8.0	11.2
14	91	14-3>	Dean Rd	NB	70	48	64	69	251	46	56	59	73	234	-7%	6.3	2.2	1.3	0.9	1.1
16	92	16-1<	Montgomery Rd	NB	65	56	55	61	237	54	53	62	56	225	-5%	2.9	0.8	1.8	1.3	0.8
16	93	16-1>	Montgomery Rd	SB	39	41	44	67	191	45	42	44	42	173	-9%	1.9	0.3	0.0	6.8	1.3
16	94	16-2<	Queensway Sports Centre	EB	10	27	20	56	113	23	11	11	22	67	-41%	6.4	7.3	4.6	10.9	4.8
16	95	16-2>	Queensway Sports Centre	WB	10	8	31	16	65	22	11	9	8	50	-23%	6.0	1.9	9.8	4.6	2.0
16	96	16-3<	Queensway	SB	41	41	55	50	187	49	46	44	42	181	-3%	2.4	1.5	3.1	2.4	0.4
16	97	16-3>	Queensway	NB	113	104	60	94	371	101	86	104	115	406	9%	2.3	3.7	9.7	4.1	1.8
16	98	16-4<	Smithfield Rd	WB	64	62	42	52	220	67	54	62	70	253	15%	0.7	2.1	5.5	4.6	2.1
16	99	16-4>	Smithfield Rd	EB	18	33	37	42	130	25	25	22	25	97	-25%	3.0	3.0	5.5	5.9	3.1
				Total	10,425	9,836	9,841	9,029	39,131	8,930	9,004	9,604	9,768	37,306	-5%	4.6	4.2	4.6	4.0	3.1

Wrehxam VISSIM BY 2018 2563

Link Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 2 - LGV Volume - Link Calibration

LGV

																% GEH <5	90%	92%	94%	93%	**99%**
																% GEH <10	100%	100%	100%	100%	**100%**
																% GEH <15	100%	100%	100%	100%	**100%**
Counts		**99**			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	**Pk Q1**	**Pk Q2**	**Pk Q3**	**Pk Q4**	**Pk Hr**
					Survey					**Model**					**% Diff**	**GEH (Based Hourly Flows)**				
Site	**ID**	**Ref**	**Location**	**Dir**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**	**Pk Hr**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**
1	1	1-1<	Cefn Rd	SB	3	14	10	6	33	12	18	9	10	49	**48%**	6.6	2.0	0.6	2.8	**2.5**
1	2	1-1>	Cefn Rd	NB	7	12	10	3	32	16	10	8	9	43	**34%**	5.3	1.2	1.3	4.9	**1.8**
1	3	1-2<	Holt Rd South	SB	16	14	12	11	53	12	14	10	9	45	**-15%**	2.1	0.0	1.2	1.3	**1.1**
1	4	1-2>	Holt Rd South	NB	7	11	14	7	39	16	12	8	9	45	**15%**	5.3	0.6	3.6	1.4	**0.9**
1	5	1-3<	Dean Rd	NB	8	9	13	5	35	16	11	6	6	39	**11%**	4.6	1.3	4.5	0.9	**0.7**
1	6	1-3>	Dean Rd	SB	7	5	5	4	21	5	11	7	7	30	**43%**	1.6	4.2	1.6	2.6	**1.8**
1	7	1-4<	Holt Rd North	NB	13	12	12	8	45	20	17	13	14	64	**42%**	3.4	2.6	0.6	3.6	**2.6**
1	8	1-4>	Holt Rd North	SB	19	21	18	18	76	24	28	15	14	81	**7%**	2.2	2.8	1.5	2.0	**0.6**
1	9	1-5<	Bryn Estyn Rd	EB	0	0	1	2	3	2	1	0	0	3	**0%**	0.0	0.0	2.8	4.0	**0.0**
1	10	1-5>	Bryn Estyn Rd	WB	0	0	1	0	1	1	0	0	0	1	**0%**	0.0	0.0	2.8	0.0	**0.0**
2	11	2-1<	A5156	NB	44	31	29.5	28	132.5	54	53	39	44	190	**43%**	2.9	6.8	3.2	5.3	**4.5**
2	12	2-1>	A5156	SB	26.5	26.5	16.5	20.5	90	36	30	29	17	112	**24%**	3.4	1.3	5.2	1.6	**2.2**
2	13	2-2<	Wrexham Golf Club	NB	0	0.5	0	0	0.5	2	2	0	1	5	**900%**	0.0	2.7	0.0	0.0	**2.7**
2	14	2-2>	Wrexham Golf Club	SB	0	0.5	0	0.5	1	1	0	0	0	1	**0%**	0.0	2.0	0.0	2.0	**0.0**
2	15	2-3<	A534 Bypass	EB	21	18	15.5	11.5	66	29	25	29	17	100	**52%**	3.2	3.0	5.7	2.9	**3.7**
2	16	2-3>	A534 Bypass	WB	46.5	37	34.5	27.5	145.5	58	65	43	50	216	**48%**	3.2	7.8	2.7	7.2	**5.2**
2	17	2-4<	Holt Rd	WB	21	23.5	18	17.5	80	28	29	14	15	86	**8%**	2.8	2.1	2.0	1.2	**0.7**
2	18	2-4>	Holt Rd	EB	13	9	12	8.5	42.5	18	14	10	10	52	**22%**	2.5	2.9	1.2	1.0	**1.4**
3	19	3-1<	Cefn Rd North	NB	6	8	8	4	26	17	10	8	9	44	**69%**	6.5	1.3	0.0	3.9	**3.0**
3	20	3-1>	Cefn Rd North	SB	5	11	9	5	30	11	18	10	8	47	**57%**	4.2	3.7	0.6	2.4	**2.7**
3	21	3-2<	Cefn Rd South	SB	5	11	8	5	29	10	18	9	8	45	**55%**	3.7	3.7	0.7	2.4	**2.6**
3	22	3-2>	Cefn Rd South	NB	8	8	8	3	27	16	10	8	8	42	**56%**	4.6	1.3	0.0	4.3	**2.6**
3	23	3-3<	Hullah Ln	WB	3	0	2	0	5	2	2	2	2	8	**60%**	1.3	0.0	0.0	0.0	**1.2**
3	24	3-3>	Hullah Ln	EB	1	0	1	1	3	2	2	1	3	8	**167%**	1.6	0.0	0.0	2.8	**2.1**
4	25	4-1<	A534 Bypass	WB	57	56	41	42	196	60	61	51	56	228	**16%**	0.8	1.3	2.9	4.0	**2.2**
4	26	4-1>	A534 Bypass	EB	28	13	12	11	64	27	25	28	18	98	**53%**	0.4	5.5	7.2	3.7	**3.8**
4	27	4-2<	Borras Hall Ln	NB	5	2	1	2	10	2	1	3	4	10	**0%**	3.2	1.6	2.8	2.3	**0.0**
4	28	4-2>	Borras Hall Ln	SB	2	1	2	1	6	0	2	2	2	6	**0%**	4.0	1.6	0.0	1.6	**0.0**
4	29	4-3<	A534 Holt Rd	NB	11	7	6	4	28	12	14	12	9	47	**68%**	0.6	4.3	4.0	3.9	**3.1**
4	30	4-3>	A534 Wrexham Rd	SB	19	15	9	6	49	18	24	19	15	76	**55%**	0.5	4.1	5.3	5.6	**3.4**
4	31	4-4<	Wrexham Industrial Estate	EB	22	10	9	8	49	20	16	22	13	71	**45%**	0.9	3.3	6.6	3.1	**2.8**
4	32	4-4>	Wrexham Industrial Estate	WB	43	46	34	38	161	50	41	36	47	174	**8%**	2.1	1.5	0.7	2.8	**1.0**
4	33	4-5<	Sandy Ln	SB	0	0	0	0	0	1	1	0	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	34	4-5>	Sandy Ln	NB	3	0	0	0	3	0	1	3	0	4	**33%**	4.9	0.0	0.0	0.0	**0.5**
5	35	5-1<	A5156 West	WB	47	44	35	27	153	56	54	40	40	190	**24%**	2.5	2.9	1.6	4.5	**2.8**
5	36	5-1>	A5156 West	EB	38	22	29	23	112	39	31	38	25	133	**19%**	0.3	3.5	3.1	0.8	**1.9**
5	37	5-2<	Borras Rd	NB	0	2	1	1	4	1	1	1	2	5	**25%**	0.0	1.6	0.0	1.6	**0.5**
5	38	5-2>	Borras Rd	SB	1	1	1	2	5	3	1	0	1	5	**0%**	2.8	0.0	2.8	1.6	**0.0**
5	39	5-3<	A5156 East	EB	33	18	22	18	91	36	31	28	16	111	**22%**	1.0	5.3	2.4	1.0	**2.0**
5	40	5-3>	A5156 East	WB	45	45	37	24	151	55	52	40	42	189	**25%**	2.8	2.0	1.0	6.3	**2.9**
5	41	5-4<	Borras Park Rd	SB	8	10	13	7	38	9	7	12	12	40	**5%**	0.7	2.1	0.6	3.2	**0.3**
5	42	5-4>	Borras Park Rd	NB	4	6	4	4	18	5	9	3	2	19	**6%**	0.9	2.2	1.1	2.3	**0.2**
7	43	7-1<	Bodhyfryd	NB	14	13	21	11	59	15	11	24	11	61	**3%**	0.5	1.2	1.3	0.0	**0.3**
7	44	7-1>	Bodhyfryd	SB	14	12	18	9	53	14	13	17	10	54	**2%**	0.0	0.6	0.5	0.6	**0.1**
7	45	7-2<	Holt Rd	NB	10	11	17	10	48	10	11	7	7	35	**-27%**	0.0	0.0	5.8	2.1	**2.0**
7	46	7-2>	Holt Rd	SB	15	9	12	13	49	16	13	10	10	49	**0%**	0.5	2.4	1.2	1.8	**0.0**
7	47	7-3<	Tesco	EB	11	8	7	5	31	13	9	7	5	34	**10%**	1.2	0.7	0.0	0.0	**0.5**
7	48	7-3>	Tesco	WB	12	10	8	8	38	12	9	4	6	31	**-18%**	0.0	0.6	3.3	1.5	**1.2**
7	49	7-4<	Farndon St	SB	18	16	18	12	64	17	19	17	11	64	**0%**	0.5	1.4	0.5	0.6	**0.0**
7	50	7-4>	Farndon St	NB	10	12	19	7	48	11	12	19	7	49	**2%**	0.6	0.0	0.0	0.0	**0.1**
7	51	7-5<	Holt St	WB	3	1	0	2	6	3	2	1	2	8	**33%**	0.0	1.6	0.0	0.0	**0.8**
7	52	7-5>	Holt St	EB	5	6	6	3	20	5	5	6	3	19	**-5%**	0.0	0.9	0.0	0.0	**0.2**
8	53	8-1<	Cefn Rd North	NB	9	8	7	4	28	12	7	8	8	35	**25%**	1.9	0.7	0.7	3.3	**1.2**
8	54	8-1>	Cefn Rd North	SB	6	10	6	4	26	11	15	10	6	42	**62%**	3.4	2.8	2.8	1.8	**2.7**
8	55	8-2<	Cefn Rd South	SB	7	11	4	6	28	8	13	9	9	39	**39%**	0.7	1.2	3.9	2.2	**1.9**
8	56	8-2>	Cefn Rd South	NB	12	10	9	5	36	18	8	13	10	49	**36%**	3.1	1.3	2.4	3.7	**2.0**
8	57	8-3<	Queensway	WB	5	3	5	1	14	12	6	11	4	33	**136%**	4.8	2.8	4.2	3.8	**3.9**
8	58	8-3>	Queensway	EB	3	2	1	2	8	3	3	5	5	16	**100%**	0.0	1.3	4.6	3.2	**2.3**
9	59	9-1<	Holt Rd South	WB	11	15	8	10	44	15	13	10	10	48	**9%**	2.2	1.1	1.3	0.0	**0.6**
9	60	9-1>	Holt Rd South	EB	7	11	8	10	36	10	11	8	6	35	**-3%**	2.1	0.0	0.0	2.8	**0.2**
9	61	9-2<	Holt Rd North	EB	12	15	10	11	48	15	15	11	11	52	**8%**	1.6	0.0	0.6	0.0	**0.6**
9	62	9-2>	Holt Rd North	WB	14	13	9	14	50	17	16	14	12	59	**18%**	1.5	1.6	2.9	1.1	**1.2**
9	63	9-3<	Montgomery Rd	SB	5	2	2	5	14	7	8	6	6	27	**93%**	1.6	5.4	4.0	0.9	**2.9**
9	64	9-3>	Montgomery Rd	NB	7	8	3	2	20	10	9	5	9	33	**65%**	2.1	0.7	2.0	6.0	**2.5**
10	65	10-1<	Holt Rd South	WB	13	11	7	11	42	13	14	12	9	48	**14%**	0.0	1.7	3.2	1.3	**0.9**
10	66	10-1>	Holt Rd South	EB	4	14	9	6	33	17	13	9	11	50	**52%**	8.0	0.5	0.0	3.4	**2.6**
10	67	10-2<	Holt Rd North	EB	3	11	9	5	28	18	11	8	10	47	**68%**	9.3	0.0	0.7	3.7	**3.1**
10	68	10-2>	Holt Rd North	WB	13	10	8	7	38	12	13	11	8	44	**16%**	0.6	1.8	1.9	0.7	**0.9**
10	69	10-3<	Hullah Ln	SB	3	5	2	1	11	2	2	2	3	9	**-18%**	1.3	3.2	0.0	2.8	**0.6**
10	70	10-3>	Hullah Ln	NB	2	3	1	4	10	4	1	2	3	10	**0%**	2.3	2.8	1.6	1.1	**0.0**
12	71	12-1<	Holt Rd South	WB	10	13	10	10	43	17	16	14	12	59	**37%**	3.8	1.6	2.3	1.2	**2.2**
12	72	12-1>	Holt Rd South	EB	7	14	11	8	40	17	15	12	11	55	**38%**	5.8	0.5	0.6	1.9	**2.2**
12	73	12-2<	Borras Rd	NB	2	3	2	2	9	3	2	2	1	8	**-11%**	1.3	1.3	0.0	1.6	**0.3**
12	74	12-2>	Borras Rd	SB	0	2	1	0	3	5	4	3	4	16	**433%**	0.0	2.3	2.8	0.0	**4.2**
12	75	12-3<	Holt Rd North	EB	6	13	10	6	35	17	13	9	11	50	**43%**	6.5	0.0	0.6	3.4	**2.3**
12	76	12-3>	Holt Rd North	WB	12	12	8	10	42	13	14	12	9	48	**14%**	0.6	1.1	2.5	0.6	**0.9**
12	77	12-4<	Archer's Way	SB	1	0	0	0	1	2	2	2	1	7	**600%**	1.6	0.0	0.0	0.0	**3.0**
12	78	12-4>	Archer's Way	NB	0	1	2	0	3	4	0	0	1	5	**67%**	0.0	2.8	4.0	0.0	**1.0**
13	79	13-1<	Rhosnesni Ln West	WB	3	3	3	3	12	1	1	0	0	2	**-83%**	2.8	2.8	4.9	4.9	**3.8**
13	80	13-1>	Rhosnesni Ln West	EB	3	3	3	2	11	1	0	0	1	2	**-82%**	2.8	4.9	4.9	1.6	**3.5**
13	81	13-2<	Borras Rd North	NB	5	5	4	3	17	13	9	4	5	31	**82%**	5.3	3.0	0.0	2.0	**2.9**
13	82	13-2>	Borras Rd North	SB	1	3	2	1	7	3	3	3	3	12	**71%**	2.8	0.0	1.3	2.8	**1.6**
13	83	13-3>	Rhosnesni Ln East	WB	4	3	1	3	11	11	8	2	1	22	**100%**	5.1	4.3	1.6	2.8	**2.7**
13	84	13-4<	Borras Rd South	SB	1	3	0	1	5	4	3	3	3	13	**160%**	3.8	0.0	0.0	2.8	**2.7**
13	85	13-4>	Borras Rd South	NB	1	2	1	1	5	3	2	2	3	10	**100%**	2.8	0.0	1.6	2.8	**1.8**
14	86	14-1<	Jeffery's Rd	NB	8	12	5	9	34	14	11	5	4	34	**0%**	3.6	0.6	0.0	3.9	**0.0**
14	87	14-1>	Jeffery's Rd	SB	7	9	4	7	27	7	14	8	7	36	**33%**	0.0	2.9	3.3	0.0	**1.6**
14	88	14-2<	Borras Rd	EB	7	4	5	5	21	3	3	3	3	12	**-43%**	3.6	1.1	2.0	2.0	**2.2**
14	89	14-2>	Borras Rd	WB	6	9	8	4	27	12	9	5	5	31	**15%**	4.0	0.0	2.4	0.9	**0.7**
14	90	14-3<	Dean Rd	SB	6	8	7	5	26	5	11	7	7	30	**15%**	0.9	1.9	0.0	1.6	**0.8**
14	91	14-3>	Dean Rd	NB	8	6	5	8	27	3	2	2	2	9	**-67%**	4.3	4.0	3.2	5.4	**4.2**
16	92	16-1<	Montgomery Rd	NB	6	6	6	1	19	8	6	4	8	26	**37%**	1.5	0.0	1.8	6.6	**1.5**
16	93	16-1>	Montgomery Rd	SB	2	2	3	4	11	6	8	7	4	25	**127%**	4.0	5.4	3.6	0.0	**3.3**
16	94	16-2<	Queensway Sports Centre	EB	1	0	0	2	3	3	1	1	0	5	**67%**	2.8	0.0	0.0	4.0	**1.0**
16	95	16-2>	Queensway Sports Centre	WB	0	0	1	0	1	1	2	0	1	4	**300%**	0.0	0.0	2.8	0.0	**1.9**
16	96	16-3<	Queensway	SB	2	5	3	4	14	4	5	5	5	19	**36%**	2.3	0.0	2.0	0.9	**1.2**
16	97	16-3>	Queensway	NB	12	6	9	4	31	13	10	10	8	41	**32%**	0.6	2.8	0.6	3.3	**1.7**
16	98	16-4<	Smithfield Rd	WB	6	2	6	3	17	9	8	8	5	30	**76%**	2.2	5.4	1.5	2.0	**2.7**
16	99	16-4>	Smithfield Rd	EB	1	5	2	2	10	4	0	1	5	10	**0%**	3.8	6.3	1.6	3.2	**0.0**
				Total	**1022**	**994**	**870**	**710**	**3,596**	**1,328**	**1,236**	**1,016**	**916**	**4,496**	**25%**	**2.3**	**1.9**	**1.9**	**2.2**	**1.7**

Wrehxam VISSIM B' 2563

Link Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 3 - OGV1 Volume - Link Calibration

OGV1

																% GEH <5	95%	94%	94%	96%	**95%**
																% GEH <10	100%	100%	100%	100%	**100%**
																% GEH <15	100%	100%	100%	100%	**100%**
Counts		**99**			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	**Pk Q1**	**Pk Q2**	**Pk Q3**	**Pk Q4**	**Pk Hr**
					Survey					**Model**					**% Diff**	**GEH (Based Hourly Flows)**				
Site	**ID**	**Ref**	**Location**	**Dir**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**	**Pk Hr**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**
1	1	1-1<	Cefn Rd	SB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
1	2	1-1>	Cefn Rd	NB	1	1	1	1	4	0	1	1	1	3	**-25%**	2.8	0.0	0.0	0.0	**0.5**
1	3	1-2<	Holt Rd South	SB	0	2	1	1	4	4	4	4	5	17	**325%**	0.0	2.3	3.8	4.6	**4.0**
1	4	1-2>	Holt Rd South	NB	0	0	0	0	0	2	1	3	4	10	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	5	1-3<	Dean Rd	NB	1	1	0	0	2	1	0	1	1	3	**50%**	0.0	2.8	0.0	0.0	**0.6**
1	6	1-3>	Dean Rd	SB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
1	7	1-4<	Holt Rd North	NB	0	0	1	1	2	3	3	4	4	14	**600%**	0.0	0.0	3.8	3.8	**4.2**
1	8	1-4>	Holt Rd North	SB	0	2	1	1	4	4	3	4	6	17	**325%**	0.0	1.3	3.8	5.3	**4.0**
1	9	1-5<	Bryn Estyn Rd	EB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	10	1-5>	Bryn Estyn Rd	WB	0	0	0	0	0	2	2	1	0	5	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	11	2-1<	A5156	NB	4	3.5	4.5	4.5	16.5	3	5	7	7	22	**33%**	1.1	1.5	2.1	2.1	**1.3**
2	12	2-1>	A5156	SB	6	3.5	6	2	17.5	0	0	0	0	0	**-100%**	6.9	5.3	6.9	4.0	**5.9**
2	13	2-2<	Wrexham Golf Club	NB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	14	2-2>	Wrexham Golf Club	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	15	2-3<	A534 Bypass	EB	5.5	4	6.5	2	18	1	1	1	1	4	**-78%**	5.0	3.8	5.7	1.6	**4.2**
2	16	2-3>	A534 Bypass	WB	4	3.5	4.5	4.5	16.5	4	8	10	11	33	**100%**	0.0	3.8	4.1	4.7	**3.3**
2	17	2-4<	Holt Rd	WB	1	0.5	0.5	0.5	2.5	2	4	5	5	16	**540%**	1.6	4.7	5.4	5.4	**4.4**
2	18	2-4>	Holt Rd	EB	0.5	1	1	0.5	3	2	2	3	3	10	**233%**	2.7	1.6	2.8	3.8	**2.7**
3	19	3-1<	Cefn Rd North	NB	1	1	1	1	4	0	1	1	1	3	**-25%**	2.8	0.0	0.0	0.0	**0.5**
3	20	3-1>	Cefn Rd North	SB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
3	21	3-2<	Cefn Rd South	SB	0	0	1	0	1	0	0	0	0	0	**-100%**	0.0	0.0	2.8	0.0	**1.4**
3	22	3-2>	Cefn Rd South	NB	1	1	1	1	4	0	1	1	1	3	**-25%**	2.8	0.0	0.0	0.0	**0.5**
3	23	3-3<	Hullah Ln	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
3	24	3-3>	Hullah Ln	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	25	4-1<	A534 Bypass	WB	5	5	3	3	16	3	9	12	13	37	**131%**	2.0	3.0	6.6	7.1	**4.1**
4	26	4-1>	A534 Bypass	EB	2	5	6	3	16	0	0	2	1	3	**-81%**	4.0	6.3	4.0	2.8	**4.2**
4	27	4-2<	Borras Hall Ln	NB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	28	4-2>	Borras Hall Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	29	4-3<	A534 Holt Rd	NB	2	2	1	0	5	0	0	0	0	0	**-100%**	4.0	4.0	2.8	0.0	**3.2**
4	30	4-3>	A534 Wrexham Rd	SB	2	1	1	1	5	0	1	1	3	5	**0%**	4.0	0.0	0.0	2.8	**0.0**
4	31	4-4<	Wrexham Industrial Estate	EB	2	4	5	3	14	0	0	1	1	2	**-86%**	4.0	5.7	4.6	2.8	**4.2**
4	32	4-4>	Wrexham Industrial Estate	WB	5	5	2	2	14	3	8	11	10	32	**129%**	2.0	2.4	7.1	6.5	**3.8**
4	33	4-5<	Sandy Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	34	4-5>	Sandy Ln	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	35	5-1<	A5156 West	WB	4	6	7	3	20	0	0	0	0	0	**-100%**	5.7	6.9	7.5	4.9	**6.3**
5	36	5-1>	A5156 West	EB	4	6	3	3	16	0	0	0	0	0	**-100%**	5.7	6.9	4.9	4.9	**5.7**
5	37	5-2<	Borras Rd	NB	1	0	0	0	1	4	4	7	8	23	**2200%**	3.8	0.0	0.0	0.0	**6.4**
5	38	5-2>	Borras Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	39	5-3<	A5156 East	EB	4	6	3	3	16	0	0	0	0	0	**-100%**	5.7	6.9	4.9	4.9	**5.7**
5	40	5-3>	A5156 East	WB	4	6	7	3	20	3	4	7	7	21	**5%**	1.1	1.8	0.0	3.6	**0.2**
5	41	5-4<	Borras Park Rd	SB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	42	5-4>	Borras Park Rd	NB	1	0	0	0	1	1	0	1	1	3	**200%**	0.0	0.0	0.0	0.0	**1.4**
7	43	7-1<	Bodhyfryd	NB	4	2	4	1	11	1	1	2	1	5	**-55%**	3.8	1.6	2.3	0.0	**2.1**
7	44	7-1>	Bodhyfryd	SB	1	0	3	1	5	0	2	3	3	8	**60%**	2.8	0.0	0.0	2.8	**1.2**
7	45	7-2<	Holt Rd	NB	0	2	3	0	5	0	3	8	6	17	**240%**	0.0	1.3	4.3	0.0	**3.6**
7	46	7-2>	Holt Rd	SB	2	4	3	1	10	3	2	4	3	12	**20%**	1.3	2.3	1.1	2.8	**0.6**
7	47	7-3<	Tesco	EB	2	0	2	1	5	1	1	1	1	4	**-20%**	1.6	0.0	1.6	0.0	**0.5**
7	48	7-3>	Tesco	WB	1	2	3	2	8	0	0	1	1	2	**-75%**	2.8	4.0	2.8	1.6	**2.7**
7	49	7-4<	Farndon St	SB	1	2	3	2	8	0	0	0	0	0	**-100%**	2.8	4.0	4.9	4.0	**4.0**
7	50	7-4>	Farndon St	NB	3	1	3	0	7	0	1	4	2	7	**0%**	4.9	0.0	1.1	0.0	**0.0**
7	51	7-5<	Holt St	WB	0	1	0	0	1	1	0	2	1	4	**300%**	0.0	2.8	0.0	0.0	**1.9**
7	52	7-5>	Holt St	EB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	53	8-1<	Cefn Rd North	NB	2	0	1	1	4	0	1	1	1	3	**-25%**	4.0	0.0	0.0	0.0	**0.5**
8	54	8-1>	Cefn Rd North	SB	0	0	1	1	2	0	0	0	0	0	**-100%**	0.0	0.0	2.8	2.8	**2.0**
8	55	8-2<	Cefn Rd South	SB	0	0	1	1	2	0	0	0	0	0	**-100%**	0.0	0.0	2.8	2.8	**2.0**
8	56	8-2>	Cefn Rd South	NB	2	0	1	1	4	0	1	1	1	3	**-25%**	4.0	0.0	0.0	0.0	**0.5**
8	57	8-3<	Queensway	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	58	8-3>	Queensway	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	59	9-1<	Holt Rd South	WB	0	1	2	1	4	3	2	3	3	11	**175%**	0.0	1.6	1.3	2.8	**2.6**
9	60	9-1>	Holt Rd South	EB	0	0	0	0	0	1	2	6	6	15	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	61	9-2<	Holt Rd North	EB	0	0	0	0	0	1	2	5	5	13	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	62	9-2>	Holt Rd North	WB	0	1	2	1	4	5	3	4	5	17	**325%**	0.0	2.8	2.3	4.6	**4.0**
9	63	9-3<	Montgomery Rd	SB	0	0	0	0	0	2	1	2	3	8	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	64	9-3>	Montgomery Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	65	10-1<	Holt Rd South	WB	0	2	1	1	4	5	4	5	5	19	**375%**	0.0	2.3	4.6	4.6	**4.4**
10	66	10-1>	Holt Rd South	EB	0	0	0	0	0	2	1	3	4	10	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	67	10-2<	Holt Rd North	EB	0	0	0	0	0	2	1	3	4	10	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	68	10-2>	Holt Rd North	WB	0	2	1	1	4	5	4	5	5	19	**375%**	0.0	2.3	4.6	4.6	**4.4**
10	69	10-3<	Hullah Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	70	10-3>	Hullah Ln	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	71	12-1<	Holt Rd South	WB	0	2	1	1	4	5	3	4	5	17	**325%**	0.0	1.3	3.8	4.6	**4.0**
12	72	12-1>	Holt Rd South	EB	0	0	0	0	0	1	1	5	6	13	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	73	12-2<	Borras Rd	NB	0	0	0	0	0	0	0	1	1	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	74	12-2>	Borras Rd	SB	0	0	0	0	0	0	0	0	1	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	75	12-3<	Holt Rd North	EB	0	0	0	0	0	2	1	3	4	10	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	76	12-3>	Holt Rd North	WB	0	2	1	1	4	6	4	5	5	20	**400%**	0.0	2.3	4.6	4.6	**4.6**
12	77	12-4<	Archer's Way	SB	0	0	0	0	0	2	1	2	2	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	78	12-4>	Archer's Way	NB	0	0	0	0	0	2	0	0	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	79	13-1<	Rhosnesni Ln West	WB	0	0	0	1	1	0	0	0	0	0	**-100%**	0.0	0.0	0.0	2.8	**1.4**
13	80	13-1>	Rhosnesni Ln West	EB	1	1	0	0	2	0	0	0	0	0	**-100%**	2.8	2.8	0.0	0.0	**2.0**
13	81	13-2<	Borras Rd North	NB	1	1	0	0	2	2	0	0	1	3	**50%**	1.6	2.8	0.0	0.0	**0.6**
13	82	13-2>	Borras Rd North	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	83	13-3>	Rhosnesni Ln East	WB	1	0	0	1	2	1	0	0	0	1	**-50%**	0.0	0.0	0.0	2.8	**0.8**
13	84	13-4<	Borras Rd South	SB	1	0	0	0	1	0	0	0	0	0	**-100%**	2.8	0.0	0.0	0.0	**1.4**
13	85	13-4>	Borras Rd South	NB	0	0	0	0	0	1	0	0	1	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	86	14-1<	Jeffery's Rd	NB	1	0	0	0	1	2	0	2	1	5	**400%**	1.6	0.0	0.0	0.0	**2.3**
14	87	14-1>	Jeffery's Rd	SB	2	1	0	0	3	0	0	0	0	0	**-100%**	4.0	2.8	0.0	0.0	**2.4**
14	88	14-2<	Borras Rd	EB	0	0	0	1	1	0	0	0	0	0	**-100%**	0.0	0.0	0.0	2.8	**1.4**
14	89	14-2>	Borras Rd	WB	4	1	0	0	5	1	0	1	1	3	**-40%**	3.8	2.8	0.0	0.0	**1.0**
14	90	14-3<	Dean Rd	SB	5	2	0	0	7	0	0	0	0	0	**-100%**	6.3	4.0	0.0	0.0	**3.7**
14	91	14-3>	Dean Rd	NB	0	0	0	1	1	1	0	1	0	2	**100%**	0.0	0.0	0.0	2.8	**0.8**
16	92	16-1<	Montgomery Rd	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	93	16-1>	Montgomery Rd	SB	0	0	0	0	0	2	1	2	2	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	94	16-2<	Queensway Sports Centre	EB	0	0	0	0	0	2	1	2	2	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	95	16-2>	Queensway Sports Centre	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	96	16-3<	Queensway	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	97	16-3>	Queensway	NB	1	1	1	0	3	0	0	0	0	0	**-100%**	2.8	2.8	2.8	0.0	**2.4**
16	98	16-4<	Smithfield Rd	WB	1	1	1	0	3	0	0	0	0	0	**-100%**	2.8	2.8	2.8	0.0	**2.4**
16	99	16-4>	Smithfield Rd	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
				Total	**97**	**102**	**109**	**66**	**374**	**104**	**106**	**182**	**188**	**580**	**55%**	**1.3**	**1.2**	**1.4**	**1.3**	**1.6**

Wrehxam VISSIM B' 2563

Link Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 3 - OGV1 Volume - Link Calibration

OGV2

																% GEH <5	89%	98%	92%	95%	**87%**
																% GEH <10	100%	99%	100%	100%	**100%**
																% GEH <15	100%	100%	100%	100%	**100%**
Counts		**99**			Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	**Pk Q1**	**Pk Q2**	**Pk Q3**	**Pk Q4**	**Pk Hr**
					Survey					**Model**					**% Diff**	**GEH (Based Hourly Flows)**				
Site	**ID**	**Ref**	**Location**	**Dir**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**	**Pk Hr**	**16:30**	**16:45**	**17:00**	**17:15**	**Pk Hr**
1	1	1-1<	Cefn Rd	SB	0	0	0	0	0	0	1	1	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	2	1-1>	Cefn Rd	NB	1	1	1	0	3	2	2	2	1	7	**133%**	1.6	1.6	1.6	0.0	**1.8**
1	3	1-2<	Holt Rd South	SB	1	0	0	0	1	5	6	7	5	23	**2200%**	4.6	0.0	0.0	0.0	**6.4**
1	4	1-2>	Holt Rd South	NB	1	1	0	0	2	0	0	0	0	0	**-100%**	2.8	2.8	0.0	0.0	**2.0**
1	5	1-3<	Dean Rd	NB	1	1	0	0	2	0	0	1	0	1	**-50%**	2.8	2.8	0.0	0.0	**0.8**
1	6	1-3>	Dean Rd	SB	0	0	0	0	0	0	1	1	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	7	1-4<	Holt Rd North	NB	1	1	1	0	3	2	2	1	1	6	**100%**	1.6	1.6	0.0	0.0	**1.4**
1	8	1-4>	Holt Rd North	SB	1	0	0	0	1	5	6	7	5	23	**2200%**	4.6	0.0	0.0	0.0	**6.4**
1	9	1-5<	Bryn Estyn Rd	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	10	1-5>	Bryn Estyn Rd	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	11	2-1<	A5156	NB	8	10	6	7	30	7	7	5	5	24	**-19%**	0.7	1.7	0.4	1.3	**1.1**
2	12	2-1>	A5156	SB	9	8	7	5	28	0	5	0	0	5	**-82%**	8.2	2.4	7.2	6.3	**5.7**
2	13	2-2<	Wrexham Golf Club	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	14	2-2>	Wrexham Golf Club	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	15	2-3<	A534 Bypass	EB	8	8	7	5	28	1	3	1	1	6	**-78%**	6.6	4.3	5.7	4.6	**5.3**
2	16	2-3>	A534 Bypass	WB	7	8	4	7	26	12	12	11	11	46	**80%**	3.2	2.5	5.1	3.0	**3.4**
2	17	2-4<	Holt Rd	WB	1	0	0	0	1	6	8	6	6	26	**2500%**	5.3	0.0	0.0	0.0	**6.8**
2	18	2-4>	Holt Rd	EB	2	2	2	0	5	2	1	1	1	5	**11%**	0.8	0.9	0.9	0.0	**0.2**
3	19	3-1<	Cefn Rd North	NB	2	0	1	0	3	2	2	2	1	7	**133%**	0.0	0.0	1.6	0.0	**1.8**
3	20	3-1>	Cefn Rd North	SB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
3	21	3-2<	Cefn Rd South	SB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
3	22	3-2>	Cefn Rd South	NB	2	0	1	0	3	2	2	2	1	7	**133%**	0.0	0.0	1.6	0.0	**1.8**
3	23	3-3<	Hullah Ln	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
3	24	3-3>	Hullah Ln	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	25	4-1<	A534 Bypass	WB	8	14	8	6	36	12	12	13	12	49	**36%**	2.5	1.1	3.1	4.0	**2.0**
4	26	4-1>	A534 Bypass	EB	9	7	7	6	29	0	4	0	0	4	**-86%**	8.5	2.6	7.5	6.9	**6.2**
4	27	4-2<	Borras Hall Ln	NB	0	0	0	0	0	0	1	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	28	4-2>	Borras Hall Ln	SB	1	0	0	0	1	0	0	0	0	0	**-100%**	2.8	0.0	0.0	0.0	**1.4**
4	29	4-3<	A534 Holt Rd	NB	3	1	2	1	7	0	1	0	0	1	**-86%**	4.9	0.0	4.0	2.8	**3.0**
4	30	4-3>	A534 Wrexham Rd	SB	3	5	2	2	12	3	2	3	3	11	**-8%**	0.0	3.2	1.3	1.3	**0.3**
4	31	4-4<	Wrexham Industrial Estate	EB	9	7	7	7	30	0	1	0	0	1	**-97%**	8.5	6.0	7.5	7.5	**7.4**
4	32	4-4>	Wrexham Industrial Estate	WB	8	10	8	4	30	9	10	10	8	37	**23%**	0.7	0.0	1.3	3.3	**1.2**
4	33	4-5<	Sandy Ln	SB	1	0	0	0	1	0	1	0	0	1	**0%**	2.8	0.0	0.0	0.0	**0.0**
4	34	4-5>	Sandy Ln	NB	0	0	0	2	2	0	0	0	1	1	**-50%**	0.0	0.0	0.0	1.6	**0.8**
5	35	5-1<	A5156 West	WB	6	14	11	2	33	1	0	0	0	1	**-97%**	5.3	10.6	9.4	4.0	**7.8**
5	36	5-1>	A5156 West	EB	7	5	5	6	23	0	11	2	0	13	**-43%**	7.5	4.2	3.2	6.9	**2.4**
5	37	5-2<	Borras Rd	NB	0	0	0	0	0	6	9	5	5	25	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	38	5-2>	Borras Rd	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	39	5-3<	A5156 East	EB	7	5	5	6	23	0	5	0	0	5	**-78%**	7.5	0.0	6.3	6.9	**4.8**
5	40	5-3>	A5156 East	WB	6	14	11	2	33	7	7	4	5	23	**-30%**	0.8	4.3	5.1	3.2	**1.9**
5	41	5-4<	Borras Park Rd	SB	0	0	0	0	0	1	4	1	0	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	42	5-4>	Borras Park Rd	NB	0	0	0	0	0	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	43	7-1<	Bodhyfryd	NB	2	1	0	0	3	1	1	1	1	4	**33%**	1.6	0.0	0.0	0.0	**0.5**
7	44	7-1>	Bodhyfryd	SB	0	0	0	0	0	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	45	7-2<	Holt Rd	NB	0	0	0	2	2	1	0	0	0	1	**-50%**	0.0	0.0	0.0	4.0	**0.8**
7	46	7-2>	Holt Rd	SB	2	1	1	0	4	3	4	4	2	13	**225%**	1.3	3.8	3.8	0.0	**3.1**
7	47	7-3<	Tesco	EB	0	0	0	0	0	1	2	1	1	5	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	48	7-3>	Tesco	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	49	7-4<	Farndon St	SB	1	1	1	0	3	0	0	0	0	0	**-100%**	2.8	2.8	2.8	0.0	**2.4**
7	50	7-4>	Farndon St	NB	1	1	0	2	4	0	0	0	0	0	**-100%**	2.8	2.8	0.0	4.0	**2.8**
7	51	7-5<	Holt St	WB	0	0	0	0	0	1	1	2	0	4	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	52	7-5>	Holt St	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	53	8-1<	Cefn Rd North	NB	0	0	0	0	0	1	3	2	1	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	54	8-1>	Cefn Rd North	SB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	55	8-2<	Cefn Rd South	SB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	56	8-2>	Cefn Rd South	NB	0	0	0	0	0	2	4	2	1	9	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	57	8-3<	Queensway	WB	0	0	0	0	0	1	1	0	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	58	8-3>	Queensway	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	59	9-1<	Holt Rd South	WB	1	0	0	0	1	3	4	5	2	14	**1300%**	2.8	0.0	0.0	0.0	**4.7**
9	60	9-1>	Holt Rd South	EB	1	0	0	0	1	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	61	9-2<	Holt Rd North	EB	1	1	0	0	2	1	0	0	0	1	**-50%**	0.0	2.8	0.0	0.0	**0.8**
9	62	9-2>	Holt Rd North	WB	1	0	0	0	1	5	5	8	4	22	**2100%**	4.6	0.0	0.0	0.0	**6.2**
9	63	9-3<	Montgomery Rd	SB	0	0	0	0	0	2	1	3	2	8	**0%**	0.0	0.0	0.0	0.0	**0.0**
9	64	9-3>	Montgomery Rd	NB	0	1	0	0	1	0	0	0	0	0	**-100%**	0.0	2.8	0.0	0.0	**1.4**
10	65	10-1<	Holt Rd South	WB	1	0	0	0	1	6	6	7	5	24	**2300%**	5.3	0.0	0.0	0.0	**6.5**
10	66	10-1>	Holt Rd South	EB	1	1	0	0	2	1	0	0	0	1	**-50%**	0.0	2.8	0.0	0.0	**0.8**
10	67	10-2<	Holt Rd North	EB	1	1	0	0	2	1	0	0	0	1	**-50%**	0.0	2.8	0.0	0.0	**0.8**
10	68	10-2>	Holt Rd North	WB	1	0	0	0	1	6	6	7	5	24	**2300%**	5.3	0.0	0.0	0.0	**6.5**
10	69	10-3<	Hullah Ln	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
10	70	10-3>	Hullah Ln	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	71	12-1<	Holt Rd South	WB	1	0	0	0	1	5	6	8	4	23	**2200%**	4.6	0.0	0.0	0.0	**6.4**
12	72	12-1>	Holt Rd South	EB	1	1	0	0	2	2	0	0	0	2	**0%**	1.6	2.8	0.0	0.0	**0.0**
12	73	12-2<	Borras Rd	NB	0	0	0	0	0	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	74	12-2>	Borras Rd	SB	0	0	0	0	0	0	1	2	0	3	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	75	12-3<	Holt Rd North	EB	1	1	0	0	2	1	0	0	0	1	**-50%**	0.0	2.8	0.0	0.0	**0.8**
12	76	12-3>	Holt Rd North	WB	1	0	0	0	1	6	7	7	5	25	**2400%**	5.3	0.0	0.0	0.0	**6.7**
12	77	12-4<	Archer's Way	SB	0	0	0	0	0	1	2	1	1	5	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	78	12-4>	Archer's Way	NB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	79	13-1<	Rhosnesni Ln West	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	80	13-1>	Rhosnesni Ln West	EB	1	0	0	0	1	0	0	0	0	0	**-100%**	2.8	0.0	0.0	0.0	**1.4**
13	81	13-2<	Borras Rd North	NB	1	0	0	0	1	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	82	13-2>	Borras Rd North	SB	0	0	0	0	0	0	1	1	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	83	13-3>	Rhosnesni Ln East	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	84	13-4<	Borras Rd South	SB	0	0	0	0	0	0	1	1	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	85	13-4>	Borras Rd South	NB	0	0	0	0	0	1	0	0	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	86	14-1<	Jeffery's Rd	NB	0	0	1	2	3	1	1	1	0	3	**0%**	0.0	0.0	0.0	4.0	**0.0**
14	87	14-1>	Jeffery's Rd	SB	1	0	0	0	1	0	2	2	0	4	**300%**	2.8	0.0	0.0	0.0	**1.9**
14	88	14-2<	Borras Rd	EB	0	0	0	0	0	0	1	1	0	2	**0%**	0.0	0.0	0.0	0.0	**0.0**
14	89	14-2>	Borras Rd	WB	1	0	0	1	2	1	1	0	0	2	**0%**	0.0	0.0	0.0	2.8	**0.0**
14	90	14-3<	Dean Rd	SB	2	0	0	0	2	0	1	1	0	2	**0%**	4.0	0.0	0.0	0.0	**0.0**
14	91	14-3>	Dean Rd	NB	0	0	1	1	2	0	0	1	0	1	**-50%**	0.0	0.0	0.0	2.8	**0.8**
16	92	16-1<	Montgomery Rd	NB	0	1	0	0	1	0	0	0	0	0	**-100%**	0.0	2.8	0.0	0.0	**1.4**
16	93	16-1>	Montgomery Rd	SB	0	0	0	0	0	2	1	3	1	7	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	94	16-2<	Queensway Sports Centre	EB	0	0	0	0	0	2	1	2	1	6	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	95	16-2>	Queensway Sports Centre	WB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	96	16-3<	Queensway	SB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	97	16-3>	Queensway	NB	0	1	0	0	1	0	0	0	0	0	**-100%**	0.0	2.8	0.0	0.0	**1.4**
16	98	16-4<	Smithfield Rd	WB	0	0	0	0	0	0	0	1	0	1	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	99	16-4>	Smithfield Rd	EB	0	0	0	0	0	0	0	0	0	0	**0%**	0.0	0.0	0.0	0.0	**0.0**
				Total	**136**	**133**	**98**	**75**	**442**	**148**	**190**	**164**	**108**	**610**	**38%**	**1.4**	**0.9**	**0.8**	**0.8**	**1.4**

Appendix B

Turn Flow Calibration Results – AM and PM peak hours

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - All Traffic (Class1-6) - Turn Calibration

All:

PASS	FAIL	Criteria	%	Flow Test	
126	21	% GEH <4	86%		145
135	12	% GEH <5	92%	% PASS	99%
147	0	% GEH <10	100%		

Counts 147

Site	Count	From Arm	From Ref	From	To Arm	To Ref	To	Count Ref	Survey	Model	Diff (S-M)	% Diff	GEH	Flow Test Criteria	Flow Test PASS / FAIL
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2	79	61	18	30%	2.2	100	PASS
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3	214	260	-46	-18%	3.0	100	PASS
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4	208	160	48	30%	3.5	100	PASS
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5	6	14	-8	-57%	2.5	100	PASS
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1	70	74	-4	-5%	0.5	100	PASS
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3	79	59	20	34%	2.4	100	PASS
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4	252	238	14	6%	0.9	100	PASS
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5	18	20	-2	-10%	0.5	100	PASS
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1	202	177	25	14%	1.8	100	PASS
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2	103	49	54	110%	6.2	100	PASS
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4	125	141	-16	-11%	1.4	100	PASS
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5	20	17	3	18%	0.7	100	PASS
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1	206	175	31	18%	2.2	100	PASS
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2	337	308	29	9%	1.6	100	PASS
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3	76	163	-87	-53%	8.0	100	PASS
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5	17	6	11	183%	3.2	100	PASS
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1	2	5	-3	-60%	1.6	100	PASS
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2	14	17	-3	-18%	0.8	100	PASS
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3	4	11	-7	-64%	2.6	100	PASS
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4	13	7	6	86%	1.9	100	PASS
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2	14	15	-2	-10%	0.4	100	PASS
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3	1,466	1,535	-69	-4%	1.8	220	PASS
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4	284	279	5	2%	0.3	100	PASS
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1	1	1	0	0%	0.0	100	PASS
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3	1	0	1	0%	1.4	100	PASS
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4	1	10	-9	-90%	3.8	100	PASS
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1	421	403	18	4%	0.9	100	PASS
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2	1	0	1	0%	1.0	100	PASS
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4	197	239	-43	-18%	2.9	100	PASS
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1	339	328	11	3%	0.6	100	PASS
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2	11	16	-6	-34%	1.5	100	PASS
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3	341	311	30	9%	1.6	100	PASS
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2	318	261	57	22%	3.4	100	PASS
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3	15	23	-8	-35%	1.8	100	PASS
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1	365	324	41	13%	2.2	100	PASS
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3	24	36	-12	-33%	2.2	100	PASS
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1	20	56	-36	-64%	5.8	100	PASS
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2	13	31	-18	-58%	3.8	100	PASS
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2	4	19	-15	-79%	4.4	100	PASS
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3	441	416	25	6%	1.2	100	PASS
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4	1,474	1,419	55	4%	1.4	221	PASS
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5	5	15	-10	-67%	3.2	100	PASS
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1	4	27	-23	-85%	5.8	100	PASS
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3	14	9	5	56%	1.5	100	PASS
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4	52	32	20	63%	3.1	100	PASS
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5	0	0	0	0%	0.0	100	PASS
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1	294	264	30	11%	1.8	100	PASS
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2	4	1	3	300%	1.9	100	PASS
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4	92	74	18	24%	2.0	100	PASS
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5	6	3	3	100%	1.4	100	PASS
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1	345	328	17	5%	0.9	100	PASS
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2	9	3	6	200%	2.4	100	PASS
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3	45	21	24	114%	4.2	100	PASS
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5	3	1	2	200%	1.4	100	PASS
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1	3	12	-9	-75%	3.3	100	PASS
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2	0	0	0	0%	0.0	100	PASS
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3	1	0	1	0%	1.4	100	PASS
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4	0	0	0	0%	0.0	100	PASS
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2	30	35	-5	-14%	0.9	100	PASS
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3	1,769	1,654	115	7%	2.8	265	PASS
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4	123	112	11	10%	1.0	100	PASS
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1	20	9	11	122%	2.9	100	PASS
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3	10	17	-7	-41%	1.9	100	PASS
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4	16	12	4	33%	1.1	100	PASS
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1	770	669	101	15%	3.8	116	PASS
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2	4	35	-31	-89%	7.0	100	PASS
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4	30	32	-2	-6%	0.4	100	PASS
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1	230	225	5	2%	0.3	100	PASS
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2	30	16	14	88%	2.9	100	PASS
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3	83	153	-70	-46%	6.4	100	PASS
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2	158	185	-27	-15%	2.1	100	PASS
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3	118	85	33	39%	3.3	100	PASS
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4	278	225	53	24%	3.3	100	PASS
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5	28	25	3	12%	0.6	100	PASS
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1	203	197	6	3%	0.4	100	PASS
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3	57	96	-39	-41%	4.5	100	PASS
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4	229	218	11	5%	0.7	100	PASS
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5	76	95	-19	-20%	2.1	100	PASS
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1	68	51	17	33%	2.2	100	PASS
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2	49	80	-31	-39%	3.9	100	PASS
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4	109	74	35	47%	3.7	100	PASS
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5	26	18	8	44%	1.7	100	PASS
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1	145	115	30	26%	2.6	100	PASS
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2	100	114	-14	-12%	1.4	100	PASS
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3	67	46	21	46%	2.8	100	PASS
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5	7	8	-1	-13%	0.4	100	PASS
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1	23	14	9	64%	2.1	100	PASS
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2	26	49	-23	-47%	3.8	100	PASS
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3	16	8	8	100%	2.3	100	PASS
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4	11	6	5	83%	1.7	100	PASS
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2	231	189	42	22%	2.9	100	PASS
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3	27	40	-13	-33%	2.2	100	PASS
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1	309	281	28	10%	1.6	100	PASS
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3	114	129	-15	-12%	1.4	100	PASS
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1	14	35	-21	-60%	4.2	100	PASS
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2	41	42	-1	-2%	0.2	100	PASS
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2	413	355	58	16%	3.0	100	PASS
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3	49	66	-17	-26%	2.2	100	PASS
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1	615	518	97	19%	4.1	100	PASS
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3	107	141	-34	-24%	3.1	100	PASS
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1	91	92	-1	-1%	0.1	100	PASS
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2	90	104	-14	-13%	1.4	100	PASS
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2	355	337	18	5%	1.0	100	PASS
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3	106	124	-18	-15%	1.7	100	PASS
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1	497	381	116	30%	5.5	100	FAIL
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3	6	39	-33	-85%	7.0	100	PASS
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1	180	188	-8	-4%	0.6	100	PASS
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2	19	39	-20	-51%	3.7	100	PASS
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2	54	72	-18	-25%	2.3	100	PASS
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3	430	384	46	12%	2.3	100	PASS
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4	14	16	-2	-13%	0.5	100	PASS
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1	59	139	-80	-58%	8.0	100	PASS
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3	28	50	-22	-44%	3.5	100	PASS
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4	6	0	6	0%	3.5	100	PASS
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1	657	508	149	29%	6.2	100	FAIL
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2	24	34	-10	-29%	1.9	100	PASS
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4	9	25	-16	-64%	3.9	100	PASS
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1	22	27	-5	-19%	1.0	100	PASS
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2	7	5	2	40%	0.8	100	PASS
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3	12	30	-18	-60%	3.9	100	PASS
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2	198	161	37	23%	2.8	100	PASS
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4	15	32	-17	-53%	3.5	100	PASS
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1	162	115	47	41%	4.0	100	PASS
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4	49	82	-33	-40%	4.1	100	PASS
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1	148	164	-16	-10%	1.3	100	PASS
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2	63	134	-71	-53%	7.2	100	PASS
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4	21	53	-32	-60%	5.3	100	PASS
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1	14	21	-7	-33%	1.7	100	PASS
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2	67	85	-18	-21%	2.1	100	PASS
14	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2	249	177	72	41%	4.9	100	PASS
14	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3	284	289	-5	-2%	0.3	100	PASS
14	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1	217	261	-44	-17%	2.8	100	PASS
14	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3	272	207	65	31%	4.2	100	PASS
14	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1	170	122	48	39%	4.0	100	PASS
14	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2	40	41	-1	-2%	0.2	100	PASS
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2	3	8	-5	-63%	2.1	100	PASS
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3	142	110	32	29%	2.9	100	PASS
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4	30	47	-17	-36%	2.7	100	PASS
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1	0	8	-8	-100%	4.0	100	PASS
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3	0	0	0	0%	0.0	100	PASS
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4	0	2	-2	-100%	2.0	100	PASS
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1	145	134	11	8%	0.9	100	PASS
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2	3	2	1	50%	0.6	100	PASS
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4	209	165	44	27%	3.2	100	PASS
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1	21	39	-18	-46%	3.3	100	PASS
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2	3	1	2	200%	1.4	100	PASS
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3	53	41	12	29%	1.8	100	PASS
								Total	20,743	20,043	700	3%	2.4		

[Wrehxam VISSIM BY 2018](#)

2563

Turn Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 1 - Car Volume - Turn Calibration

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	86%	84%	84%	82%	86%
% GEH <5	92%	90%	88%	88%	93%
% GEH <10	99%	100%	100%	99%	100%

CAR

Counts		147						Count Ref	Survey 5 Pk Q1	6 Pk Q2	7 Pk Q3	8 Pk Q4	21 Pk Hr	Model 4 Pk Q1	5 Pk Q2	6 Pk Q3	7 Pk Q4	10 Pk Hr	% Diff Pk Hr	GEH (Based Hourly Flows) Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
Site	Count	Arm	From Ref	From	Arm	To Ref	To		08:00	08:15	08:30	08:45	Pk Hr	08:00	08:15	08:30	08:45	Pk Hr	Pk Hr	08:00	08:15	08:30	08:45	09:00
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 CAR	12	20	21	20	**73**	11	10	18	20	**59**	**-19%**	0.6	5.2	1.4	0.0	**1.7**
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 CAR	35	47	66	53	**201**	45	57	78	75	**255**	**27%**	3.2	2.8	2.8	5.5	**3.6**
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 CAR	47	32	59	39	**177**	38	34	34	31	**137**	**-23%**	2.8	0.7	7.3	2.7	**3.2**
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 CAR	1	1	1	2	**5**	2	2	3	7	**14**	**180%**	1.6	1.6	2.8	4.7	**2.9**
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 CAR	10	15	27	11	**63**	11	21	25	17	**74**	**17%**	0.6	2.8	0.8	3.2	**1.3**
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 CAR	23	19	16	13	**71**	15	17	11	13	**56**	**-21%**	3.7	0.9	2.7	0.0	**1.9**
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 CAR	43	50	41	58	**192**	49	44	48	47	**188**	**-2%**	1.8	1.8	2.1	3.0	**0.3**
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 CAR	3	2	6	7	**18**	2	3	4	7	**16**	**-11%**	1.3	1.3	1.8	0.0	**0.5**
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 CAR	24	54	69	46	**193**	27	42	59	49	**177**	**-8%**	1.2	3.5	2.5	0.9	**1.2**
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 CAR	16	24	27	29	**96**	8	12	12	15	**47**	**-51%**	4.6	5.7	6.8	6.0	**5.8**
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 CAR	27	27	34	27	**115**	31	33	38	34	**136**	**18%**	1.5	2.2	1.3	2.5	**1.9**
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 CAR	2	2	6	8	**18**	2	3	6	6	**17**	**-6%**	0.0	1.3	0.0	1.5	**0.2**
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 CAR	34	40	46	50	**170**	33	35	43	49	**160**	**-6%**	0.3	1.6	0.9	0.3	**0.8**
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 CAR	59	69	75	81	**284**	48	56	75	78	**257**	**-10%**	3.0	3.3	0.0	0.7	**1.6**
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 CAR	17	24	12	12	**65**	33	38	36	36	**143**	**120%**	6.4	5.0	9.8	9.8	**7.6**
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 CAR	1	3	3	7	**14**	1	1	1	3	**6**	**-57%**	0.0	2.8	2.8	3.6	**2.5**
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 CAR	0	1	0	1	**2**	1	2	1	1	**5**	**150%**	0.0	1.6	0.0	0.0	**1.6**
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 CAR	2	5	1	5	**13**	2	5	2	5	**14**	**8%**	0.0	0.0	1.6	0.0	**0.3**
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 CAR	1	0	1	2	**4**	1	2	1	3	**7**	**75%**	0.0	0.0	0.0	1.3	**1.3**
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 CAR	2	2	4	2	**10**	1	1	2	2	**6**	**-40%**	1.6	1.6	2.3	0.0	**1.4**
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 CAR	2	4	2	5	**12**	1	4	2	6	**13**	**8%**	0.9	0.5	0.0	0.9	**0.3**
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 CAR	343	386	299	243	**1270**	394	382	389	246	**1,411**	**11%**	5.4	0.4	9.8	0.4	**3.9**
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 CAR	46	66	60	55	**226**	55	72	68	68	**263**	**16%**	2.5	1.4	2.1	3.4	**2.4**
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 CAR	1	0	0	0	**1**	0	0	0	0	**0**	**-100%**	2.8	0.0	0.0	0.0	**1.4**
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 CAR	0	0	0	1	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	0.0	2.0	**1.0**
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 CAR	0	0	0	1	**1**	1	2	3	2	**8**	**700%**	0.0	0.0	0.0	1.6	**3.3**
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 CAR	55	56	64	71	**246**	63	74	62	74	**273**	**11%**	2.1	4.6	0.5	0.7	**1.7**
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 CAR	0	0	0	1	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	0.0	2.0	**1.0**
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 CAR	33	42	37	43	**155**	27	39	46	48	**160**	**4%**	2.0	0.9	2.8	1.5	**0.4**
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 CAR	75	72	84	56	**286**	84	76	82	51	**293**	**3%**	2.1	1.0	0.4	1.2	**0.4**
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 CAR	1	3	4	3	**10**	1	3	3	3	**10**	**5%**	1.2	0.6	0.6	0.0	**0.2**
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 CAR	74	74	71	74	**293**	70	68	61	67	**266**	**-9%**	0.9	1.4	2.5	1.6	**1.6**
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 CAR	58	68	68	78	**272**	51	58	64	73	**246**	**-10%**	1.9	2.5	1.0	1.2	**1.6**
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 CAR	1	1	5	8	**15**	5	3	6	9	**23**	**53%**	4.6	2.8	0.9	0.7	**1.8**
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 CAR	65	79	108	70	**322**	55	69	94	73	**291**	**-10%**	2.6	2.3	2.8	0.7	**1.8**
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 CAR	3	2	8	5	**18**	5	5	12	10	**32**	**78%**	2.0	3.2	2.5	3.7	**2.8**
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 CAR	5	6	5	3	**19**	10	13	19	14	**56**	**195%**	3.7	4.5	8.1	7.5	**6.0**
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 CAR	3	4	4	1	**12**	7	8	8	8	**31**	**158%**	3.6	3.3	3.3	6.6	**4.1**
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 CAR	0	1	1	1	**3**	1	3	4	4	**12**	**300%**	0.0	2.8	3.8	3.8	**3.3**
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 CAR	103	104	97	63	**367**	109	99	108	77	**393**	**7%**	1.2	1.0	2.2	3.3	**1.3**
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 CAR	351	366	278	212	**1207**	359	347	338	245	**1,289**	**7%**	0.8	2.0	6.8	4.4	**2.3**
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 CAR	0	1	0	0	**1**	0	1	1	0	**2**	**100%**	0.0	0.0	0.0	0.0	**0.8**
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 CAR	0	1	0	1	**2**	1	5	3	5	**14**	**600%**	0.0	4.6	0.0	4.6	**4.2**
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 CAR	3	3	5	1	**12**	3	2	4	0	**9**	**-25%**	0.0	1.3	0.9	2.8	**0.9**
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 CAR	10	13	11	11	**45**	8	10	8	6	**32**	**-29%**	1.3	1.8	1.9	3.4	**2.1**
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 CAR	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 CAR	53	63	62	48	**226**	47	55	63	57	**222**	**-2%**	1.7	2.1	0.3	2.5	**0.3**
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 CAR	0	1	2	0	**3**	0	0	1	0	**1**	**-67%**	0.0	2.8	1.6	0.0	**1.4**
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 CAR	14	20	21	17	**72**	20	25	21	8	**74**	**3%**	2.9	2.1	0.0	5.1	**0.2**
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 CAR	0	0	2	1	**3**	0	0	2	1	**3**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 CAR	36	56	41	50	**183**	34	52	42	53	**181**	**-1%**	0.7	1.1	0.3	0.8	**0.1**
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 CAR	1	3	2	1	**7**	0	2	1	0	**3**	**-57%**	2.8	1.3	1.6	2.8	**1.8**
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 CAR	5	6	7	3	**21**	6	7	6	2	**21**	**0%**	0.9	0.8	0.8	1.3	**0.0**
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 CAR	0	0	1	0	**1**	0	0	1	0	**1**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 CAR	0	0	0	0	**0**	5	1	1	5	**12**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 CAR	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 CAR	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	0.0	**1.4**
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 CAR	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 CAR	5	4	11	5	**25**	6	8	14	5	**33**	**32%**	0.9	3.3	1.7	0.0	**1.5**
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 CAR	415	441	351	244	**1451**	414	412	417	271	**1,514**	**4%**	0.1	2.8	6.7	3.4	**1.6**
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 CAR	24	39	0	40	**103**	24	33	15	25	**97**	**-6%**	0.0	2.0	0.0	5.3	**0.6**
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 CAR	4	3	4	2	**13**	3	3	2	1	**9**	**-31%**	1.1	0.0	2.3	1.6	**1.2**
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 CAR	1	4	2	1	**8**	4	6	3	3	**16**	**100%**	3.8	1.8	1.3	2.8	**2.3**
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 CAR	2	3	3	3	**11**	1	1	4	4	**10**	**-9%**	1.6	2.8	1.1	1.1	**0.3**
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 CAR	144	126	138	121	**529**	140	142	137	116	**535**	**1%**	0.7	2.8	0.2	0.9	**0.3**
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 CAR	0	2	1	1	**4**	1	2	2	2	**7**	**75%**	0.0	0.0	1.6	1.6	**1.3**
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 CAR	6	5	5	7	**23**	5	7	5	10	**27**	**17%**	0.9	1.6	0.0	2.1	**0.8**
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 CAR	68	59	45	34	**206**	65	51	46	44	**206**	**0%**	0.7	2.2	0.3	3.2	**0.0**
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 CAR	5	7	4	3	**19**	4	2	1	2	**9**	**-53%**	0.9	4.7	3.8	1.3	**2.7**
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 CAR	24	23	15	16	**78**	32	41	39	39	**151**	**94%**	3.0	6.4	9.2	8.8	**6.8**
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 CAR	26	28	32	48	**134**	39	39	33	53	**164**	**22%**	4.6	3.8	0.4	1.4	**2.5**
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 CAR	28	21	21	28	**98**	20	16	18	24	**78**	**-20%**	3.3	2.3	1.4	1.6	**2.1**
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 CAR	35	58	75	70	**238**	30	50	73	71	**224**	**-6%**	1.8	2.2	0.5	0.2	**0.9**
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 CAR	1	4	8	13	**26**	0	3	6	11	**20**	**-23%**	2.8	1.1	1.5	1.2	**1.3**
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 CAR	42	32	69	35	**178**	35	39	56	52	**182**	**2%**	2.3	2.3	3.3	5.2	**0.3**
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 CAR	4	13	17	17	**51**	19	17	24	23	**83**	**63%**	8.8	2.1	3.1	2.7	**3.9**
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 CAR	36	54	58	48	**196**	34	56	63	54	**207**	**6%**	0.7	0.5	1.3	1.7	**0.8**
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 CAR	13	16	19	22	**70**	14	18	22	24	**78**	**11%**	0.5	1.0	1.3	0.8	**0.9**
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 CAR	19	12	13	13	**57**	17	10	12	11	**50**	**-12%**	0.9	1.2	0.6	1.2	**1.0**
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 CAR	7	10	9	13	**39**	15	19	15	20	**69**	**77%**	4.8	4.7	3.5	3.4	**4.1**
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 CAR	25	21	17	29	**92**	19	17	14	24	**74**	**-20%**	2.6	1.8	1.5	1.9	**2.0**
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 CAR	4	8	2	11	**25**	2	5	1	8	**16**	**-36%**	2.3	2.4	1.6	1.9	**2.0**
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 CAR	23	30	29	33	**115**	22	28	30	33	**113**	**-2%**	0.4	0.7	0.4	0.0	**0.2**
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 CAR	18	20	17	21	**76**	24	24	21	20	**89**	**17%**	2.6	1.7	1.8	0.4	**1.4**
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 CAR	20	9	16	12	**57**	15	7	12	10	**44**	**-23%**	2.4	1.4	2.1	1.2	**1.8**
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 CAR	2	1	1	1	**5**	1	1	1	1	**4**	**-20%**	1.6	0.0	0.0	0.0	**0.5**
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 CAR	4	4	8	5	**21**	2	2	6	4	**14**	**-33%**	2.3	2.3	1.5	0.9	**1.7**
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 CAR	4	4	7	11	**26**	9	8	12	15	**44**	**69%**	3.9	3.3	3.2	2.2	**3.0**
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 CAR	3	5	3	3	**14**	2	2	2	2	**8**	**-43%**	1.3	3.2	1.3	1.3	**1.8**
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 CAR	1	2	3	3	**9**	1	1	2	2	**6**	**-33%**	0.0	1.6	1.3	1.3	**1.1**
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 CAR	51	41	50	53	**195**	44	43	46	47	**180**	**-8%**	2.0	0.6	1.2	1.7	**1.1**
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 CAR	5	7	5	7	**24**	7	7	9	10	**33**	**38%**	1.6	0.0	3.0	2.1	**1.7**
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 CAR	56	66	86	68	**276**	50	58	77	62	**247**	**-11%**	1.6	2.0	2.0	1.5	**1.8**
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 CAR	14	17	43	26	**100**	17	21	49	33	**120**	**20%**	1.5	1.8	1.8	2.6	**1.9**
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 CAR	5	1	3	4	**13**	5	7	10	11	**33**	**154%**	0.0	6.0	5.5	5.1	**4.2**
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 CAR	12	9	6	4	**31**	15	10	9	8	**42**	**35%**	1.6	0.6	2.2	3.3	**1.8**
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 CAR	57	96	95	100	**348**	60	79	73	97	**309**	**-11%**	0.8	3.6	4.8	0.6	**2.2**
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 CAR	14	8	7	14	**43**	25	12	8	11	**56**	**30%**	5.0	2.5	0.7	1.7	**1.8**
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 CAR	99	136	153	159	**547**	84	111	143	133	**471**	**-14%**	3.1	4.5	1.6	4.3	**3.4**
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 CAR	27	22	18	26	**93**	21	24	31	37	**113**	**22%**	2.4	0.8	5.3	3.9	**2.0**
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 CAR	15	14	28	26	**83**	21	20	24	19	**84**	**1%**	2.8	2.9	1.6	3.0	**0.1**
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 CAR	20	14	26	20	**80**	15	22	24	24	**85**	**6%**	2.4	3.8	0.8	1.7	**0.6**
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 CAR	64	77	72	74	**287**	63	74	74	72	**283**	**-1%**	0.3	0.7	0.5	0.5	**0.2**
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 CAR	13	26	21	36	**96**	20	33	29	41	**123**	**28%**	3.4	2.6	3.2	1.6	**2.6**
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 CAR	83	120	117	119	**439**	55	73	93	100	**321**	**-27%**	6.7	9.6	4.7	3.6	**6.1**
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 CAR	1	1	1	2	**5**	8	9	10	12	**39**	**680%**	6.6	7.2	7.7	7.6	**7.2**
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 CAR	22	36	49	60	**167**	27	40	58	59	**184**	**10%**	2.0	1.3	2.5	0.3	**1.3**
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 CAR	2	6	7	2	**17**	8	11	12	8	**39**	**129%**	5.4	3.4	3.2	5.4	**4.2**
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 CAR	6	10	25	10	**51**	12	13	22	16	**63**	**24%**	4.0	1.8	1.2	3.3	**1.6**
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 CAR	71	97	86	105	**359**	64	87	82	95	**328**	**-9%**	1.7	2.1	0.9	2.0	**1.7**
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 CAR	0	4	1	6	**11**	0	5	2	6	**13**	**18%**	0.0	0.9	1.6	0.0	**0.6**
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 CAR	14	15	14	7	**50**	26	32	37	30	**125**	**150%**	5.4	7.0	9.1	10.7	**8.0**
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 CAR	5	6	6	8	**25**	9	14	15	12	**50**	**100%**	3.0	5.1	5.6	2.5	**4.1**
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 CAR	1	0	2	3	**6**	0	0	0	0	**0**	**-100%**	2.8	0.0	4.0	4.9	**3.5**
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 CAR	102	144	161	179	**586**	75	97	132	145	**449**	**-23%**	5.7	8.6	4.8	5.3	**6.0**
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 CAR	3	8	8	4	**23**	4	10	11	9	**34**	**48%**	1.1	1.3	1.9	3.9	**2.1**
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 CAR	1	1	2	5	**9**	2	5	6	7	**20**	**122%**	1.6	4.6	4.0	1.6	**2.9**
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 CAR	1	7	5	5	**18**	3	6	8	10	**27**	**50%**	2.8	0.8	2.4	3.7	**1.9**
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 CAR	1	0	5	1	**7**	2	0	2	1	**5**	**-29%**	1.6	0.0	3.2	0.0	**0.8**
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 CAR	3	2	2	4	**11**	9	7	7	7	**30**	**173%**	4.9	4.7	4.7	2.6	**4.2**
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 CAR	25	58	58	33	**174**	26	53	47	27	**153**	**-12%**	0.4	1.3	3.0	2.2	**1.6**
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 CAR	2	5	4	1	**12**	2	6	17	7	**32**	**167%**	0.0	0.9	8.0	6.0	**4.3**
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 CAR	23	37	51	39	**150**	12	23	42	30	**107**	**-29%**	5.3	5.1	2.6	3.1	**3.8**
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 CAR	9	12	14	10	**45**	19	24	17	13	**73**	**62%**	5.3	5.7	1.5	1.8	**3.6**
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 CAR	14	31	57	33	**135**	22	31	55	47	**155**	**15%**	3.8	0.0	0.5	4.4	**1.7**
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 CAR	6	13	31	8	**58**	26	31	29	28	**114**	**97%**	10.0	7.7	0.7	9.4	**6.0**
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 CAR	3	4	4	6	**17**	9	12	11	14	**46**	**171%**	4.9	5.7	5.1	5.1	**5.2**
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 CAR	0	0	10	4	**14**	2	7	8	4	**21**	**50%**	0.0	0.0	1.3	0.0	**1.7**
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 CAR	11	16	26	11	**64**	15	14	23	23	**75**	**17%**	2.2	1.0	1.2	5.8	**1.3**
14	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 CAR	41	66	75	49	**231**	28	42	55	35	**160**	**-31%**	4.4	6.5	5.0	4.3	**5.1**
14	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 CAR	50	69	88	64	**271**	49	65	87	69	**270**	**0%**	0.3	1.0	0.2	1.2	**0.1**
14	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 CAR	41	52	60	44	**197**	53	57	66	57	**233**	**18%**	3.5	1.4	1.5	3.7	**2.5**
14	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 CAR	36	74	87	57	**254**	30	58	64	44	**196**	**-23%**	2.1	3.9	5.3	3.7	**3.9**
14	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 CAR	39	29	48	45	**161**	24	20	30	39	**113**	**-30%**	5.3	3.6	5.8	1.9	**4.1**
14	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 CAR	7	8	13	9	**37**	8	12	12	9	**41**	**11%**	0.7	2.5	0.6	0.0	**0.6**
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 CAR	0	0	0	3	**3**	0	0	0	0	**0**	**-100%**	0.0	0.0	0.0	4.9	**2.4**
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 CAR	37	29	27	33	**126**	32	22	22	24	**100**	**-21%**	1.7	2.8	2.0	3.4	**2.4**
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 CAR	2	3	12	8	**25**	5	5	9	9	**28**	**12%**	3.2	2.0	1.9	0.7	**0.6**
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 CAR	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 CAR	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 CAR	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 CAR	26	29	40	34	**129**	29	33	35	35	**132**	**2%**	1.1	1.4	1.6	0.3	**0.3**
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 CAR	0	1	0	1	**2**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	2.8	**2.0**
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 CAR	18	36	58	71	**183**	13	27	53	68	**161**	**-12%**	2.5	3.2	1.3	0.7	**1.7**
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 CAR	2	5	5	4	**16**	1	5	7	7	**20**	**25%**	1.6	0.0	1.6	2.6	**0.9**
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 CAR	1	0	0	2	**3**	0	0	0	0	**0**	**-100%**	2.8	0.0	0.0	4.0	**2.4**
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 CAR	8	10	10	11	**39**	10	9	8	11	**38**	**-3%**	1.3	0.6	1.3	0.0	**0.2**
								Total	**3,880**	**4,582**	**4,749**	**4,228**	**17,437**	**3,968**	**4,459**	**4,928**	**4,419**	**17,774**	**2%**	**2.0**	**2.2**	**2.2**	**2.3**	**2.0**

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 2 - LGV Volume - Turn Calibration

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	76%	77%	79%	68%	**84%**
% GEH <5	84%	88%	86%	84%	**90%**
% GEH <10	99%	97%	98%	97%	**98%**

LGV

Counts		147						Count Ref	Survey 5 Pk Q1	6 Pk Q2	7 Pk Q3	8 Pk Q4	21 Pk Hr	Model 4 Pk Q1	5 Pk Q2	6 Pk Q3	7 Pk Q4	10 Pk Hr	% Diff Pk Hr	GEH (Based Hourly Flows) Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
Site	**Count**	**Arm**	**From Ref**	**From**	**Arm**	**To Ref**	**To**		**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**Pk Hr**	**Pk Hr**	**08:00**	**08:15**	**08:30**	**08:45**	**09:00**
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 LGV	1	2	0	2	**5**	0	0	1	1	**2**	**-60%**	2.8	4.0	0.0	1.6	**1.6**
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 LGV	4	1	2	5	**12**	1	1	1	1	**4**	**-67%**	3.8	0.0	1.6	4.6	**2.8**
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 LGV	6	8	3	5	**22**	4	4	5	2	**15**	**-32%**	1.8	3.3	2.0	3.2	**1.6**
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 LGV	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	0.0	**1.4**
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 LGV	1	1	2	2	**6**	0	0	0	0	**0**	**-100%**	2.8	2.8	4.0	4.0	**3.5**
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 LGV	0	2	3	2	**7**	1	1	1	0	**3**	**-57%**	0.0	1.6	2.8	4.0	**1.8**
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 LGV	10	13	11	17	**51**	8	10	7	6	**31**	**-39%**	1.3	1.8	2.7	6.5	**3.1**
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 LGV	0	0	0	0	**0**	1	1	1	1	**4**	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 LGV	2	0	4	1	**7**	0	0	0	0	**0**	**-100%**	4.0	0.0	5.7	2.8	**3.7**
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 LGV	2	5	0	0	**7**	0	0	0	2	**2**	**-71%**	4.0	6.3	0.0	0.0	**2.4**
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 LGV	3	1	4	2	**10**	1	1	1	2	**5**	**-50%**	2.8	0.0	3.8	0.0	**1.8**
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 LGV	0	1	0	0	**1**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	0.0	**1.4**
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 LGV	6	5	8	8	**27**	1	2	1	1	**5**	**-81%**	5.3	3.2	6.6	6.6	**5.5**
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 LGV	12	10	11	10	**43**	11	14	11	4	**40**	**-7%**	0.6	2.3	0.0	4.5	**0.5**
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 LGV	4	1	2	4	**11**	2	2	1	1	**6**	**-45%**	2.3	1.6	1.6	3.8	**1.7**
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 LGV	0	0	1	1	**2**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	2.8	**2.0**
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 LGV	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	0.0	**1.4**
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 LGV	0	0	1	1	**2**	2	0	0	0	**2**	**33%**	0.0	0.0	2.0	2.8	**0.4**
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 LGV	29	33	34	25	**121**	16	2	4	1	**23**	**-81%**	5.5	14.8	13.8	13.3	**11.5**
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 LGV	10	14	9	13	**46**	10	2	2	1	**15**	**-67%**	0.0	8.5	6.0	9.1	**5.6**
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 LGV	0	0	0	0	**0**	0	0	0	1	**1**	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 LGV	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.0	0.0	**1.0**
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 LGV	0	0	0	0	**0**	0	0	0	2	**2**	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 LGV	21	20	21	16	**77**	23	17	15	3	**58**	**-25%**	1.1	1.4	2.8	8.2	**2.3**
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 LGV	7	10	10	9	**35**	14	17	12	2	**45**	**30%**	4.3	4.1	1.5	5.7	**1.7**
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 LGV	9	10	12	14	**44**	11	6	4	4	**25**	**-43%**	1.6	2.8	5.4	6.4	**3.2**
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 LGV	0	0	1	1	**1**	1	1	1	1	**4**	**300%**	0.0	0.0	1.2	1.2	**1.9**
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 LGV	9	10	16	7	**41**	9	7	8	5	**29**	**-29%**	0.3	2.1	4.4	1.6	**2.0**
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 LGV	9	6	11	8	**34**	1	2	1	1	**5**	**-85%**	7.2	4.0	8.2	6.6	**6.6**
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 LGV	8	8	5	11	**32**	5	5	7	4	**21**	**-34%**	2.4	2.4	1.6	5.1	**2.1**
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 LGV	1	1	0	2	**4**	1	1	0	0	**2**	**-50%**	0.0	0.0	0.0	4.0	**1.2**
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 LGV	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	0.0	**1.4**
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 LGV	0	1	0	0	**1**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	0.0	**1.4**
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 LGV	0	0	0	0	**0**	3	1	2	1	**7**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 LGV	12	21	15	11	**59**	8	2	4	2	**16**	**-73%**	2.5	11.2	7.1	7.1	**7.0**
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 LGV	56	41	47	28	**172**	12	3	4	2	**21**	**-88%**	15.1	16.2	17.0	13.4	**15.4**
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 LGV	1	0	0	0	**1**	6	3	2	2	**13**	**1200%**	5.3	0.0	0.0	0.0	**4.5**
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 LGV	0	1	1	0	**2**	1	11	1	0	**13**	**550%**	0.0	8.2	0.0	0.0	**4.0**
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 LGV	0	2	0	0	**2**	0	0	0	0	**0**	**-100%**	0.0	4.0	0.0	0.0	**2.0**
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 LGV	2	0	2	2	**6**	0	0	0	0	**0**	**-100%**	4.0	0.0	4.0	4.0	**3.5**
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 LGV	12	14	15	7	**48**	5	19	7	1	**32**	**-33%**	4.8	2.5	4.8	6.0	**2.5**
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 LGV	1	0	0	0	**1**	0	0	0	0	**0**	**-100%**	2.8	0.0	0.0	0.0	**1.4**
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 LGV	1	6	0	0	**7**	0	0	0	0	**0**	**-100%**	2.8	6.9	0.0	0.0	**3.7**
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 LGV	15	15	23	21	**74**	32	3	18	2	**55**	**-26%**	7.0	8.0	2.2	11.2	**2.4**
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 LGV	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	0.0	**1.4**
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 LGV	4	3	3	2	**12**	0	0	0	0	**0**	**-100%**	5.7	4.9	4.9	4.0	**4.9**
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 LGV	0	1	0	0	**1**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	0.0	**1.4**
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 LGV	0	0	0	1	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	0.0	2.8	**1.4**
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 LGV	0	1	1	2	**4**	1	0	0	0	**1**	**-75%**	0.0	2.8	2.8	4.0	**1.9**
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 LGV	61	55	43	44	**203**	25	4	7	1	**37**	**-82%**	11.0	18.8	14.4	18.1	**15.2**
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 LGV	6	5	4	3	**18**	9	2	4	0	**15**	**-17%**	2.2	3.2	0.0	4.9	**0.7**
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 LGV	2	2	0	3	**7**	0	0	0	0	**0**	**-100%**	4.0	4.0	0.0	4.9	**3.7**
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 LGV	0	0	1	0	**1**	1	0	0	0	**1**	**0%**	0.0	0.0	2.8	0.0	**0.0**
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 LGV	0	3	0	2	**5**	1	0	0	0	**1**	**-80%**	0.0	4.9	0.0	4.0	**2.3**
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 LGV	33	36	23	28	**120**	32	8	14	8	**62**	**-48%**	0.4	11.9	4.2	9.4	**6.1**
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 LGV	0	0	0	0	**0**	1	14	5	0	**20**	**0%**	0.0	0.0	0.0	0.0	**0.0**
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 LGV	3	0	3	1	**7**	1	1	1	0	**3**	**-57%**	2.8	0.0	2.8	2.8	**1.8**
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 LGV	6	8	3	6	**23**	10	3	1	3	**17**	**-26%**	2.8	4.3	2.8	2.8	**1.3**
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 LGV	6	3	1	1	**11**	1	2	3	0	**6**	**-45%**	5.3	1.3	2.8	2.8	**1.7**
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 LGV	1	1	2	1	**5**	1	0	0	1	**2**	**-60%**	0.0	2.8	4.0	0.0	**1.6**
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 LGV	7	7	1	3	**18**	2	10	1	0	**13**	**-28%**	4.7	2.1	0.0	4.9	**1.3**
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 LGV	5	4	2	2	**13**	0	1	0	0	**1**	**-92%**	6.3	3.8	4.0	4.0	**4.5**
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 LGV	12	8	9	3	**32**	1	0	0	0	**1**	**-97%**	8.6	8.0	8.5	4.9	**7.6**
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 LGV	0	1	0	0	**1**	0	2	0	0	**2**	**100%**	0.0	1.6	0.0	0.0	**0.8**
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 LGV	4	3	7	4	**18**	4	4	5	2	**15**	**-17%**	0.0	1.1	1.6	2.3	**0.7**
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 LGV	0	1	2	2	**5**	4	4	3	2	**13**	**160%**	0.0	3.8	1.3	0.0	**2.7**
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 LGV	7	10	4	4	**25**	4	2	2	3	**11**	**-56%**	2.6	6.5	2.3	1.1	**3.3**
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 LGV	1	3	0	1	**5**	3	4	3	2	**12**	**140%**	2.8	1.1	0.0	1.6	**2.4**
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 LGV	1	4	3	0	**8**	0	1	0	0	**1**	**-88%**	2.8	3.8	4.9	0.0	**3.3**
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 LGV	1	2	4	2	**9**	1	5	1	0	**7**	**-22%**	0.0	3.2	3.8	4.0	**0.7**
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 LGV	7	4	5	1	**17**	0	0	0	0	**0**	**-100%**	7.5	5.7	6.3	2.8	**5.8**
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 LGV	0	1	0	0	**1**	0	1	0	0	**1**	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 LGV	5	8	7	6	**26**	0	2	0	0	**2**	**-92%**	6.3	5.4	7.5	6.9	**6.4**
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 LGV	3	6	6	6	**21**	1	10	1	0	**12**	**-43%**	2.8	2.8	5.3	6.9	**2.2**
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 LGV	2	2	4	1	**9**	0	2	0	0	**2**	**-78%**	4.0	0.0	5.7	2.8	**3.0**
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 LGV	0	1	1	0	**2**	0	2	0	0	**2**	**0%**	0.0	1.6	2.8	0.0	**0.0**
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 LGV	0	0	0	0	**0**	0	1	0	0	**1**	**0%**	0.0	0.0	0.0	0.0	**0.0**
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 LGV	0	1	1	0	**2**	0	0	0	0	**0**	**-100%**	0.0	2.8	2.8	0.0	**2.0**
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 LGV	0	1	0	1	**2**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	2.8	**2.0**
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 LGV	10	4	7	6	**27**	1	2	1	1	**5**	**-81%**	7.7	2.3	6.0	5.3	**5.5**
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 LGV	0	0	0	2	**2**	0	1	0	0	**1**	**-50%**	0.0	0.0	0.0	4.0	**0.8**
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 LGV	4	8	3	8	**23**	4	8	6	3	**21**	**-9%**	0.0	0.0	2.8	4.3	**0.4**
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 LGV	4	2	4	2	**12**	1	2	2	1	**6**	**-50%**	3.8	0.0	2.3	1.6	**2.0**
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 LGV	0	0	0	0	**0**	0	0	1	1	**2**	**0%**	0.0	0.0	0.0	0.0	**0.0**
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 LGV	4	2	1	1	**8**	0	0	0	0	**0**	**-100%**	5.7	4.0	2.8	2.8	**4.0**
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 LGV	12	16	16	11	**55**	3	19	3	0	**25**	**-55%**	6.6	1.4	8.4	9.4	**4.7**
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 LGV	1	1	3	0	**5**	1	5	1	0	**7**	**40%**	0.0	4.6	2.8	0.0	**0.8**
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 LGV	15	19	10	15	**59**	13	12	11	6	**42**	**-29%**	1.1	3.6	0.6	5.6	**2.4**
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 LGV	5	2	2	3	**12**	4	5	5	4	**18**	**50%**	0.9	3.2	3.2	1.1	**1.5**
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 LGV	1	2	4	1	**8**	1	2	2	3	**8**	**0%**	0.0	0.0	2.3	2.8	**0.0**
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 LGV	1	1	3	5	**10**	2	4	5	8	**19**	**90%**	1.6	3.8	2.0	2.4	**2.4**
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 LGV	14	12	18	14	**58**	6	14	7	7	**34**	**-41%**	5.1	1.1	6.2	4.3	**3.5**
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 LGV	1	4	3	2	**10**	0	1	0	0	**1**	**-90%**	2.8	3.8	4.9	4.0	**3.8**
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 LGV	12	12	12	12	**48**	11	14	13	7	**45**	**-6%**	0.6	1.1	0.6	3.2	**0.4**
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 LGV	0	1	0	0	**1**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	0.0	**1.4**
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 LGV	2	5	2	4	**13**	1	1	1	0	**3**	**-77%**	1.6	4.6	1.6	5.7	**3.5**
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 LGV	1	0	1	0	**2**	0	0	0	0	**0**	**-100%**	2.8	0.0	2.8	0.0	**2.0**
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 LGV	1	0	2	0	**3**	1	5	2	1	**9**	**200%**	0.0	0.0	0.0	0.0	**2.4**
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 LGV	14	13	19	16	**62**	6	15	7	8	**36**	**-42%**	5.1	1.1	6.7	4.6	**3.7**
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 LGV	0	2	0	1	**3**	0	2	0	0	**2**	**-33%**	0.0	0.0	0.0	2.8	**0.6**
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 LGV	3	3	2	1	**9**	6	3	3	2	**14**	**56%**	2.8	0.0	1.3	1.6	**1.5**
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 LGV	0	1	1	1	**3**	0	0	0	0	**0**	**-100%**	0.0	2.8	2.8	2.8	**2.4**
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 LGV	16	17	12	16	**61**	11	14	12	8	**45**	**-26%**	2.7	1.5	0.0	4.6	**2.2**
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 LGV	0	0	1	0	**1**	0	0	0	0	**0**	**-100%**	0.0	0.0	2.8	0.0	**1.4**
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 LGV	0	0	0	0	**0**	0	2	1	0	**3**	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 LGV	0	2	0	1	**3**	0	0	0	0	**0**	**-100%**	0.0	4.0	0.0	2.8	**2.4**
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 LGV	0	1	0	0	**1**	0	0	0	0	**0**	**-100%**	0.0	2.8	0.0	0.0	**1.4**
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 LGV	8	7	5	3	**23**	0	0	0	0	**0**	**-100%**	8.0	7.5	6.3	4.9	**6.8**
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 LGV	1	2	0	0	**3**	0	0	0	0	**0**	**-100%**	2.8	4.0	0.0	0.0	**2.4**
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 LGV	2	7	0	2	**11**	0	0	0	0	**0**	**-100%**	4.0	7.5	0.0	4.0	**4.7**
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 LGV	1	3	0	0	**4**	5	2	1	1	**9**	**125%**	4.6	1.3	0.0	0.0	**2.0**
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 LGV	4	2	2	5	**13**	2	1	1	0	**4**	**-69%**	2.3	1.6	1.6	6.3	**3.1**
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 LGV	1	0	1	2	**4**	6	2	2	1	**11**	**175%**	5.3	0.0	1.6	1.6	**2.6**
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 LGV	0	0	1	3	**4**	2	2	2	1	**7**	**75%**	0.0	0.0	1.6	2.8	**1.3**
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 LGV	0	1	1	1	**3**	2	4	3	1	**10**	**233%**	0.0	3.8	2.8	0.0	**2.7**
130	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 LGV	1	10	0	4	15	5	2	1	1	**9**	**-40%**	4.6	6.5	0.0	3.8	**1.7**
131	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 LGV	2	6	4	0	12	7	2	4	5	**18**	**50%**	4.7	4.0	0.0	0.0	**1.5**
132	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 LGV	6	7	2	4	19	8	5	4	2	**19**	**0%**	1.5	1.6	2.3	2.3	**0.0**
133	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 LGV	4	5	3	4	16	1	1	1	0	**3**	**-81%**	3.8	4.6	2.8	5.7	**4.2**
134	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 LGV	3	1	2	1	7	2	1	1	0	**4**	**-43%**	1.3	0.0	1.6	2.8	**1.3**
135	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 LGV	1	0	1	1	3	0	0	0	0	**0**	**-100%**	2.8	0.0	2.8	2.8	**2.4**
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 LGV	0	0	0	0	0	0	5	3	0	**8**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 LGV	4	4	4	2	**14**	0	1	1	1	**3**	**-79%**	5.7	3.8	3.8	1.6	**3.8**
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 LGV	2	0	0	2	**4**	4	4	2	4	**14**	**250%**	2.3	0.0	0.0	2.3	**3.3**
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 LGV	0	0	0	0	**0**	0	0	0	8	**8**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 LGV	0	0	0	0	**0**	0	0	0	0	**0**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 LGV	0	0	0	0	**0**	0	0	0	2	**2**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 LGV	4	3	5	4	**16**	0	1	0	1	**2**	**-88%**	5.7	2.8	6.3	3.8	**4.7**
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 LGV	0	0	0	0	**0**	0	1	1	0	**2**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 LGV	5	6	4	6	**21**	1	0	1	1	**3**	**-86%**	4.6	6.9	3.8	5.3	**5.2**
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 LGV	0	2	2	1	**5**	3	6	7	3	**19**	**280%**	0.0	4.0	4.7	2.8	**4.0**
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 LGV	0	0	0	0	**0**	0	1	0	0	**1**	**0%**	0.0	0.0	0.0	0.0	**0.0**
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 LGV	4	3	4	3	**14**	0	1	1	1	**3**	**-79%**	5.7	2.8	3.8	2.8	**3.8**
								Total	**604**	**647**	**583**	**533**	**2,366**	**413**	**396**	**292**	**171**	**1,272**	**-46%**	**2.1**	**2.4**	**2.3**	**2.6**	**2.3**

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	98%	96%	95%	93%	98%
% GEH <5	100%	99%	99%	98%	100%
% GEH <10	100%	100%	100%	100%	100%

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 3 - OGV1 Volume - Turn Calibration

OGV1

Counts		147						Count Ref	5	6	7	8	21	4	5	6	7	10						
									Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
									Survey					Model					% Diff	GEH (Based Hourly Flows)				
Site	Count	Arm	From Ref	From	Arm	To Ref	To		08:00	08:15	08:30	08:45	Pk Hr	08:00	08:15	08:30	08:45	Pk Hr	Pk Hr	08:00	08:15	08:30	08:45	09:00
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 OGV1	1	0	0	0	1	0	0	1	0	1	0%	2.8	0.0	0.0	0.0	0.0
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 OGV1	2	0	1	1	4	1	1	1	1	4	0%	1.6	0.0	0.0	0.0	0.0
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 OGV1	3	4	0	2	9	2	2	0	1	5	-44%	1.3	2.3	0.0	1.6	1.5
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 OGV1	1	0	1	0	2	0	0	0	0	0	-100%	2.8	0.0	2.8	0.0	2.0
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 OGV1	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 OGV1	0	3	0	0	3	2	2	1	1	6	100%	0.0	1.3	0.0	0.0	1.4
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 OGV1	4	3	1	2	10	1	2	1	1	5	-50%	3.8	1.3	0.0	1.6	1.8
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 OGV1	0	0	0	0	0	1	2	2	1	6	0%	0.0	0.0	0.0	0.0	0.0
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 OGV1	0	0	0	1	1	1	0	0	1	2	100%	0.0	0.0	0.0	0.0	0.8
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 OGV1	0	0	0	0	0	0	0	1	3	4	0%	0.0	0.0	0.0	0.0	0.0
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 OGV1	0	0	0	2	2	1	0	0	0	1	-50%	0.0	0.0	0.0	4.0	0.8
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 OGV1	7	7	10	9	33	11	13	14	13	51	57%	2.7	3.8	2.6	2.4	2.9
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 OGV1	2	4	1	0	6	0	0	0	0	0	-100%	3.5	5.3	2.8	0.0	3.5
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 OGV1	13	11	8	11	43	9	11	10	11	41	-5%	2.4	0.0	1.3	0.0	0.3
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 OGV1	2	2	1	3	7	4	6	4	4	18	157%	2.3	4.6	4.7	1.1	3.1
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 OGV1	2	1	2	1	5	3	3	1	1	8	60%	1.3	3.8	0.9	0.0	1.2
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 OGV1	0	0	0	0	0	0	1	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 OGV1	2	1	2	3	7	1	1	0	0	2	-71%	0.9	0.0	4.0	4.5	2.4
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 OGV1	1	4	1	0	6	2	2	1	1	6	0%	1.6	2.3	0.0	0.0	0.0
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 OGV1	2	1	1	2	6	2	2	2	2	8	33%	0.0	1.6	1.6	0.0	0.8
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 OGV1	0	1	0	1	2	0	0	1	0	1	-50%	0.0	2.8	0.0	2.8	0.8
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 OGV1	1	1	0	5	7	0	0	0	0	0	-100%	2.8	2.8	0.0	6.3	3.7
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 OGV1	11	15	12	7	45	11	14	14	13	52	16%	0.0	0.5	1.1	3.8	1.0
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 OGV1	1	2	5	2	10	0	2	1	1	4	-60%	2.8	0.0	4.6	1.6	2.3
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 OGV1	0	4	0	2	6	0	0	0	0	0	-100%	0.0	5.7	0.0	4.0	3.5
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 OGV1	0	1	0	0	1	0	0	0	0	0	-100%	0.0	2.8	0.0	0.0	1.4
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 OGV1	13	15	11	16	55	12	15	12	14	53	-4%	0.6	0.0	0.6	1.0	0.3
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 OGV1	0	1	2	2	5	0	0	0	0	0	-100%	0.0	2.8	4.0	4.0	3.2
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 OGV1	11	13	16	13	53	11	13	14	13	51	-4%	0.0	0.0	1.0	0.0	0.3
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 OGV1	0	1	1	0	2	0	0	0	0	0	-100%	0.0	2.8	2.8	0.0	2.0
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 OGV1	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 OGV1	16	21	15	21	73	10	12	9	11	42	-42%	3.3	4.4	3.5	5.0	4.1
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 OGV1	0	0	0	0	0	2	2	1	1	6	0%	0.0	0.0	0.0	0.0	0.0
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 OGV1	0	0	0	0	0	0	0	1	1	2	0%	0.0	0.0	0.0	0.0	0.0
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 OGV1	0	0	0	1	1	0	0	0	2	2	100%	0.0	0.0	0.0	1.6	0.8
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 OGV1	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 OGV1	0	2	3	1	6	0	1	0	1	2	-67%	0.0	1.6	4.9	0.0	2.0
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 OGV1	0	1	2	4	7	0	0	0	0	0	-100%	0.0	2.8	4.0	5.7	3.7
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 OGV1	3	2	0	3	8	0	0	0	0	0	-100%	4.9	4.0	0.0	4.9	4.0
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 OGV1	1	0	0	0	1	0	0	0	1	1	0%	2.8	0.0	0.0	0.0	0.0
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 OGV1	2	1	1	3	7	0	0	0	0	0	-100%	4.0	2.8	2.8	4.9	3.7
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 OGV1	3	2	1	2	8	0	0	0	0	0	-100%	4.9	4.0	2.8	4.0	4.0
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 OGV1	0	1	0	0	1	1	1	0	1	3	200%	0.0	0.0	0.0	0.0	1.4
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 OGV1	1	1	0	1	3	0	0	0	0	0	-100%	2.8	2.8	0.0	2.8	2.4
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 OGV1	1	1	0	2	4	0	0	0	0	0	-100%	2.8	2.8	0.0	4.0	2.8
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 OGV1	2	1	0	0	3	3	3	0	2	8	167%	1.3	2.8	0.0	0.0	2.1
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 OGV1	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 OGV1	1	0	0	1	2	0	0	0	0	0	-100%	2.8	0.0	0.0	2.8	2.0
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 OGV1	0	0	2	0	2	1	1	1	0	3	50%	0.0	0.0	1.6	0.0	0.6
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 OGV1	0	1	0	0	1	0	1	1	1	3	200%	0.0	0.0	0.0	0.0	1.4
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 OGV1	1	2	2	1	6	2	2	3	1	8	33%	1.6	0.0	1.3	0.0	0.8
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 OGV1	0	0	2	0	2	0	0	0	0	0	-100%	0.0	0.0	4.0	0.0	2.0
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 OGV1	0	0	1	1	2	0	0	0	0	0	-100%	0.0	0.0	2.8	2.8	2.0
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 OGV1	3	2	1	3	9	3	3	1	2	9	0%	0.0	1.3	0.0	1.3	0.0
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 OGV1	3	0	1	4	8	1	1	0	1	3	-63%	2.8	0.0	2.8	3.8	2.1
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 OGV1	1	1	0	0	2	1	1	1	2	5	150%	0.0	0.0	0.0	0.0	1.6
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 OGV1	3	2	0	4	9	2	3	0	2	7	-22%	1.3	1.3	0.0	2.3	0.7
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 OGV1	3	2	1	3	9	2	2	1	3	8	-11%	1.3	0.0	0.0	0.0	0.3
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 OGV1	3	2	0	3	8	2	3	0	2	7	-13%	1.3	1.3	0.0	1.3	0.4
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 OGV1	0	0	0	0	0	0	1	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 OGV1	3	2	1	3	9	2	2	1	2	7	-22%	1.3	0.0	0.0	1.3	0.7
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 OGV1	0	0	0	0	0	0	1	0	1	2	0%	0.0	0.0	0.0	0.0	0.0
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 OGV1	0	0	0	1	1	1	1	1	1	4	300%	0.0	0.0	0.0	0.0	1.9
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 OGV1	0	0	0	1	1	1	1	1	1	4	300%	0.0	0.0	0.0	0.0	1.9
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 OGV1	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 OGV1	1	0	0	0	1	1	1	1	1	4	300%	0.0	0.0	0.0	0.0	1.9
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
130	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 OGV1	0	1	1	1	3	1	1	1	1	4	33%	0.0	0.0	0.0	0.0	0.5
131	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 OGV1	0	0	1	0	1	1	0	0	0	1	0%	0.0	0.0	2.8	0.0	0.0
132	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 OGV1	0	0	0	1	1	1	1	1	1	4	300%	0.0	0.0	0.0	0.0	1.9
133	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 OGV1	1	0	1	0	2	1	1	1	1	4	100%	0.0	0.0	0.0	0.0	1.2
134	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 OGV1	1	0	0	1	2	0	0	1	2	3	50%	2.8	0.0	0.0	1.6	0.6
135	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 OGV1	1	0	1	0	2	1	0	0	1	2	0%	0.0	0.0	2.8	0.0	0.0
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 OGV1	0	0	1	0	1	1	1	1	1	4	300%	0.0	0.0	0.0	0.0	1.9
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 OGV1	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 OGV1	0	0	5	0	5	0	0	0	0	0	-100%	0.0	0.0	6.3	0.0	3.2
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
								Total	**139**	**142**	**120**	**157**	**557**	**119**	**140**	**112**	**130**	**501**	**-10%**	**0.6**	**0.5**	**0.6**	**0.7**	**0.8**

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Class 3 - OGV1 Volume - Turn Calibration

OGV2

% GEH <4	99%	99%	97%	97%	**97%**
% GEH <5	99%	100%	100%	99%	**99%**
% GEH <10	100%	100%	100%	100%	**100%**

Counts		147						Count Ref	Pk Q1 (5)	Pk Q2 (6)	Pk Q3 (7)	Pk Q4 (8)	Pk Hr (21)	Pk Q1 (4)	Pk Q2 (5)	Pk Q3 (6)	Pk Q4 (7)	Pk Hr (10)	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
									Survey					Model					% Diff	GEH (Based Hourly Flows)				
Site	Count	Arm	From Ref	From	Arm	To Ref	To		08:00	08:15	08:30	08:45	Pk Hr	08:00	08:15	08:30	08:45	Pk Hr	Pk Hr	08:00	08:15	08:30	08:45	09:00
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 OGV2	3	1	1	0	5	2	1	1	0	4	-20%	1.3	0.0	0.0	0.0	0.5
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 OGV2	0	0	0	0	0	3	4	3	4	14	0%	0.0	0.0	0.0	0.0	0.0
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 OGV2	0	1	1	4	6	1	1	0	2	4	-33%	0.0	0.0	2.8	2.3	0.9
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 OGV2	0	0	0	0	0	1	1	1	3	6	0%	0.0	0.0	0.0	0.0	0.0
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 OGV2	0	0	0	0	0	3	2	2	1	8	0%	0.0	0.0	0.0	0.0	0.0
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 OGV2	12	9	12	11	43	11	13	14	12	50	16%	0.6	2.7	1.1	0.9	1.0
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 OGV2	0	2	1	4	6	1	0	0	0	1	-83%	0.0	3.5	2.8	5.3	2.7
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 OGV2	18	13	14	11	55	8	9	7	7	31	-44%	5.3	2.4	4.3	2.4	3.7
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 OGV2	1	0	0	0	1	3	4	4	5	16	3100%	3.8	0.0	0.0	0.0	5.4
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 OGV2	2	1	1	1	5	1	1	0	0	2	-56%	1.6	0.0	2.8	2.0	1.4
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 OGV2	0	0	0	0	0	3	4	3	4	14	0%	0.0	0.0	0.0	0.0	0.0
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 OGV2	0	0	2	4	6	1	1	0	2	4	-33%	0.0	0.0	4.0	2.3	0.9
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 OGV2	3	1	1	0	5	2	1	1	0	4	-20%	1.3	0.0	0.0	0.0	0.5
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 OGV2	4	1	1	2	8	2	3	1	1	7	-13%	2.3	2.8	0.0	1.6	0.4
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 OGV2	13	15	10	12	50	13	15	14	15	57	14%	0.0	0.0	2.3	1.6	1.0
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 OGV2	1	0	1	1	3	0	0	0	0	0	-100%	2.8	0.0	2.8	2.8	2.4
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 OGV2	0	1	0	0	1	0	0	0	0	0	-100%	0.0	2.8	0.0	0.0	1.4
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 OGV2	2	3	4	1	10	1	1	2	2	6	-40%	1.6	2.8	2.3	1.6	1.4
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 OGV2	2	1	2	2	7	0	0	0	0	0	-100%	4.0	2.8	4.0	4.0	3.7
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 OGV2	0	1	0	1	2	0	0	0	0	0	-100%	0.0	2.8	0.0	2.8	2.0
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 OGV2	8	9	6	10	33	10	10	9	10	39	18%	1.3	0.6	2.2	0.0	1.0
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 OGV2	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 OGV2	1	2	0	4	7	0	0	0	0	0	-100%	2.8	4.0	0.0	5.7	3.7
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 OGV2	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 OGV2	0	1	0	0	1	0	0	0	0	0	-100%	0.0	2.8	0.0	0.0	1.4
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 OGV2	0	0	0	1	1	1	0	0	0	1	0%	0.0	0.0	0.0	2.8	0.0
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 OGV2	16	14	12	20	62	12	14	14	12	52	-16%	2.1	0.0	1.1	4.0	1.3
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 OGV2	8	13	14	13	48	8	8	7	7	30	-38%	0.0	3.1	4.3	3.8	2.9
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 OGV2	0	0	0	0	0	1	0	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 OGV2	0	0	0	0	0	1	1	1	3	6	0%	0.0	0.0	0.0	0.0	0.0
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 OGV2	0	0	0	0	0	1	2	1	2	6	0%	0.0	0.0	0.0	0.0	0.0
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 OGV2	0	0	0	0	0	0	0	0	2	2	0%	0.0	0.0	0.0	0.0	0.0
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 OGV2	0	0	0	0	0	1	0	0	1	2	0%	0.0	0.0	0.0	0.0	0.0
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 OGV2	0	0	0	0	0	1	1	0	2	4	0%	0.0	0.0	0.0	0.0	0.0
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 OGV2	0	0	0	0	0	1	1	1	2	5	0%	0.0	0.0	0.0	0.0	0.0
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 OGV2	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 OGV2	1	0	2	4	7	0	0	0	1	1	-86%	2.8	0.0	4.0	3.8	3.0
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 OGV2	0	0	0	0	0	1	1	0	1	3	0%	0.0	0.0	0.0	0.0	0.0
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 OGV2	2	1	1	0	4	2	1	1	1	5	25%	0.0	0.0	0.0	0.0	0.5
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 OGV2	0	0	0	0	0	0	0	0	3	3	0%	0.0	0.0	0.0	0.0	0.0
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 OGV2	1	0	0	0	1	3	3	3	3	12	1100%	2.8	0.0	0.0	0.0	4.3
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 OGV2	0	0	0	0	0	0	0	0	3	3	0%	0.0	0.0	0.0	0.0	0.0
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 OGV2	0	1	0	0	1	1	0	0	1	2	100%	0.0	2.8	0.0	0.0	0.8
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 OGV2	0	0	0	0	0	1	0	1	3	5	0%	0.0	0.0	0.0	0.0	0.0
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 OGV2	1	0	0	0	1	3	4	3	3	13	1200%	2.8	0.0	0.0	0.0	4.5
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 OGV2	1	0	0	0	1	1	1	1	4	7	600%	0.0	0.0	0.0	0.0	3.0
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 OGV2	1	0	0	0	1	3	4	3	3	13	1200%	2.8	0.0	0.0	0.0	4.5
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 OGV2	0	1	0	0	1	1	1	1	4	7	600%	0.0	0.0	0.0	0.0	3.0
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 OGV2	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 OGV2	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 OGV2	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 OGV2	0	0	0	0	0	2	1	1	1	5	0%	0.0	0.0	0.0	0.0	0.0
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
130	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 OGV2	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
131	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
132	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 OGV2	0	0	0	0	0	2	1	1	1	5	0%	0.0	0.0	0.0	0.0	0.0
133	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 OGV2	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
134	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 OGV2	0	0	0	0	0	0	0	1	1	2	0%	0.0	0.0	0.0	0.0	0.0
135	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 OGV2	0	0	0	0	0	0	0	0	5	5	0%	0.0	0.0	0.0	0.0	0.0
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 OGV2	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
								Total	**101**	**91**	**87**	**104**	**383**	**118**	**120**	**109**	**149**	**496**	**30%**	**0.3**	**0.2**	**0.3**	**0.3**	**0.4**

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - All Traffic (Class1-6) - Turn Calibration

All:

PASS	FAIL	Criteria	%	Flow Test	
120	27	% GEH <4	82%		141
130	17	% GEH <5	88%	% PASS	96%
144	3	% GEH <10	98%		

Counts	147

Site	Count	From Arm	From Ref	From	To Arm	To Ref	To	Count Ref	Survey	Model	Diff (S-M)	% Diff	GEH	Flow Test Criteria	Flow Test PASS / FAIL
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2	89	50	39	78%	4.7	100	PASS
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3	187	231	-44	-19%	3.0	100	PASS
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4	163	199	-36	-18%	2.7	100	PASS
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5	8	11	-3	-27%	1.0	100	PASS
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1	73	93	-20	-22%	2.2	100	PASS
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3	88	125	-37	-30%	3.6	100	PASS
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4	341	283	58	20%	3.3	100	PASS
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5	15	38	-23	-61%	4.5	100	PASS
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1	122	174	-52	-30%	4.3	100	PASS
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2	72	82	-10	-12%	1.1	100	PASS
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4	83	107	-24	-22%	2.5	100	PASS
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5	22	3	19	633%	5.4	100	PASS
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1	239	182	57	31%	3.9	100	PASS
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2	408	357	51	14%	2.6	100	PASS
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3	146	136	10	7%	0.8	100	PASS
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5	29	3	26	867%	6.5	100	PASS
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1	5	0	5	0%	3.2	100	PASS
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2	17	8	9	113%	2.5	100	PASS
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3	16	10	6	60%	1.7	100	PASS
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4	14	7	7	100%	2.2	100	PASS
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2	5	10	-5	-50%	1.8	100	PASS
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3	531	297	234	79%	11.5	100	FAIL
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4	384	319	65	20%	3.4	100	PASS
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1	9	4	5	125%	2.0	100	PASS
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3	3	0	3	0%	2.2	100	PASS
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4	6	7	-2	-21%	0.6	100	PASS
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1	1,264	1,386	-122	-9%	3.4	190	PASS
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2	0	0	0	0%	0.0	100	PASS
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4	430	469	-39	-8%	1.8	100	PASS
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1	253	195	58	30%	3.9	100	PASS
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2	6	17	-12	-68%	3.4	100	PASS
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3	234	155	79	51%	5.7	100	PASS
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2	345	322	23	7%	1.3	100	PASS
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3	26	34	-8	-24%	1.5	100	PASS
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1	349	377	-28	-7%	1.5	100	PASS
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3	31	25	6	24%	1.1	100	PASS
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1	18	51	-33	-65%	5.6	100	PASS
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2	20	17	3	18%	0.7	100	PASS
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2	8	9	-1	-11%	0.3	100	PASS
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3	334	289	45	16%	2.5	100	PASS
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4	358	126	232	184%	14.9	100	FAIL
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5	1	17	-16	-94%	5.3	100	PASS
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1	6	17	-11	-65%	3.2	100	PASS
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3	3	4	-1	-25%	0.5	100	PASS
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4	18	5	13	260%	3.8	100	PASS
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5	0	0	0	0%	0.0	100	PASS
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1	438	441	-3	-1%	0.1	100	PASS
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2	4	6	-2	-33%	0.9	100	PASS
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4	34	33	1	3%	0.2	100	PASS
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5	3	3	0	0%	0.0	100	PASS
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1	1,390	1,503	-113	-8%	3.0	209	PASS
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2	80	102	-22	-22%	2.3	100	PASS
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3	130	174	-44	-25%	3.6	100	PASS
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5	2	3	-1	-33%	0.6	100	PASS
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1	16	14	2	14%	0.5	100	PASS
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2	3	1	2	200%	1.4	100	PASS
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3	2	2	0	0%	0.0	100	PASS
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4	0	0	0	0%	0.0	100	PASS
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2	15	12	3	25%	0.8	100	PASS
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3	811	590	221	37%	8.4	122	FAIL
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4	267	302	-35	-12%	2.1	100	PASS
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1	14	8	6	75%	1.8	100	PASS
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3	7	18	-11	-61%	3.1	100	PASS
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4	10	12	-2	-17%	0.6	100	PASS
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1	1,351	1,413	-62	-4%	1.7	203	PASS
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2	9	61	-52	-85%	8.8	100	PASS
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4	101	109	-8	-7%	0.8	100	PASS
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1	101	70	31	44%	3.4	100	PASS
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2	20	25	-5	-20%	1.1	100	PASS
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3	53	26	27	104%	4.3	100	PASS
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2	236	284	-48	-17%	3.0	100	PASS
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3	182	152	30	20%	2.3	100	PASS
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4	242	213	29	14%	1.9	100	PASS
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5	31	25	6	24%	1.1	100	PASS
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1	129	168	-39	-23%	3.2	100	PASS
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3	100	156	-56	-36%	4.9	100	PASS
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4	143	176	-33	-19%	2.6	100	PASS
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5	65	86	-21	-24%	2.4	100	PASS
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1	135	125	10	8%	0.9	100	PASS
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2	62	82	-20	-24%	2.4	100	PASS
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4	211	190	21	11%	1.5	100	PASS
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5	35	28	7	25%	1.2	100	PASS
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1	279	247	32	13%	2.0	100	PASS
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2	146	189	-43	-23%	3.3	100	PASS
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3	99	84	15	18%	1.6	100	PASS
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5	9	8	1	13%	0.3	100	PASS
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1	126	112	14	13%	1.3	100	PASS
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2	104	115	-11	-10%	1.1	100	PASS
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3	34	30	4	13%	0.7	100	PASS
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4	54	47	7	15%	1.0	100	PASS
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2	269	229	40	17%	2.5	100	PASS
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3	21	48	-27	-56%	4.6	100	PASS
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1	319	306	13	4%	0.7	100	PASS
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3	136	225	-89	-40%	6.6	100	PASS
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1	21	58	-37	-64%	5.9	100	PASS
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2	59	56	3	5%	0.4	100	PASS
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2	679	599	80	13%	3.2	100	PASS
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3	66	67	-1	-1%	0.1	100	PASS
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1	539	431	108	25%	4.9	100	FAIL
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3	131	152	-21	-14%	1.8	100	PASS
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1	108	157	-49	-31%	4.3	100	PASS
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2	137	145	-8	-6%	0.7	100	PASS
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2	479	534	-55	-10%	2.4	100	PASS
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3	119	117	2	2%	0.2	100	PASS
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1	515	442	73	17%	3.3	100	PASS
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3	28	51	-23	-45%	3.7	100	PASS
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1	133	115	18	16%	1.6	100	PASS
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2	9	14	-5	-36%	1.5	100	PASS
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2	81	79	2	3%	0.2	100	PASS
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3	563	612	-49	-8%	2.0	100	PASS
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4	30	33	-3	-9%	0.5	100	PASS
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1	52	112	-60	-54%	6.6	100	PASS
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3	30	21	9	43%	1.8	100	PASS
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4	7	0	7	0%	3.7	100	PASS
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1	614	498	116	23%	4.9	100	FAIL
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2	24	25	-1	-4%	0.2	100	PASS
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4	16	40	-24	-60%	4.5	100	PASS
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1	24	31	-7	-23%	1.3	100	PASS
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2	8	1	7	700%	3.3	100	PASS
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3	10	19	-9	-47%	2.4	100	PASS
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2	190	146	44	30%	3.4	100	PASS
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4	6	8	-2	-25%	0.8	100	PASS
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1	80	92	-12	-13%	1.3	100	PASS
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4	44	111	-67	-60%	7.6	100	PASS
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1	152	88	64	73%	5.8	100	PASS
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2	30	88	-58	-66%	7.6	100	PASS
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4	16	9	7	78%	2.0	100	PASS
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1	5	0	5	0%	3.2	100	PASS
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2	110	86	24	28%	2.4	100	PASS
14	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2	180	168	12	7%	0.9	100	PASS
14	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3	171	341	-170	-50%	10.6	100	FAIL
14	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1	255	179	76	42%	5.2	100	PASS
14	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3	151	201	-50	-25%	3.8	100	PASS
14	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1	215	182	33	18%	2.3	100	PASS
14	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2	66	64	2	3%	0.2	100	PASS
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2	66	44	22	50%	3.0	100	PASS
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3	108	127	-19	-15%	1.8	100	PASS
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4	28	41	-13	-32%	2.2	100	PASS
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1	31	25	6	24%	1.1	100	PASS
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3	14	15	-1	-7%	0.3	100	PASS
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4	21	14	7	50%	1.7	100	PASS
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1	190	192	-2	-1%	0.1	100	PASS
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2	25	26	-1	-4%	0.2	100	PASS
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4	191	229	-38	-17%	2.6	100	PASS
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1	36	34	2	6%	0.3	100	PASS
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2	25	15	10	67%	2.2	100	PASS
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3	79	58	21	36%	2.5	100	PASS
								Total	21,772	21,496	276	1%	2.6		

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 1 - Car Volume - Turn Calibration

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	68%	68%	65%	71%	80%
% GEH <5	80%	78%	76%	78%	86%
% GEH <10	97%	97%	96%	97%	98%

CAR

Counts		147						Count Ref	Survey 13 Pk Q1	Survey 14 Pk Q2	Survey 15 Pk Q3	Survey 16 Pk Q4	Survey 22 Pk Hr	Model 4 Pk Q1	Model 5 Pk Q2	Model 6 Pk Q3	Model 7 Pk Q4	Model 10 Pk Hr	% Diff Pk Hr	GEH (Based Hourly Flows) Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
Site	Count	Arm	From Ref	From	Arm	To Ref	To		16:30	16:45	17:00	17:15	Pk Hr	16:30	16:45	17:00	17:15	Pk Hr	Pk Hr	16:30	16:45	17:00	17:15	17:30
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 CAR	21	27	18	17	83	14	17	9	5	45	-46%	3.3	4.3	4.9	7.2	4.8
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 CAR	44	60	24	40	168	50	47	49	68	214	27%	1.8	3.6	8.3	7.6	3.3
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 CAR	36	38	41	34	149	45	33	43	48	169	13%	2.8	1.7	0.6	4.4	1.6
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 CAR	2	3	1	2	8	1	2	3	4	10	25%	1.6	1.3	2.8	2.3	0.7
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 CAR	19	16	17	15	67	17	22	29	23	91	36%	0.9	2.8	5.0	3.7	2.7
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 CAR	26	23	13	21	83	36	28	25	28	117	41%	3.6	2.0	5.5	2.8	3.4
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 CAR	82	70	71	89	312	61	71	51	58	241	-23%	5.0	0.2	5.1	7.2	4.3
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 CAR	6	2	4	2	14	3	8	12	12	35	150%	2.8	5.4	5.7	7.6	4.2
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 CAR	25	32	33	24	114	45	42	34	40	161	41%	6.8	3.3	0.3	5.7	4.0
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 CAR	18	16	18	13	65	20	21	17	14	72	11%	0.9	2.3	0.5	0.5	0.8
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 CAR	12	25	16	23	76	20	21	20	37	98	29%	4.0	1.7	1.9	5.1	2.4
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 CAR	4	8	5	5	22	1	1	1	0	3	-86%	3.8	6.6	4.6	6.3	5.4
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 CAR	61	62	58	38	219	33	31	38	44	146	-33%	8.2	9.1	5.8	1.9	5.4
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 CAR	87	75	105	97	364	62	68	77	82	289	-21%	5.8	1.7	5.9	3.2	4.2
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 CAR	33	36	24	38	131	22	28	35	34	119	-9%	4.2	2.8	4.1	1.3	1.1
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 CAR	10	8	5	4	27	0	0	1	2	3	-89%	8.9	8.0	4.6	2.3	6.2
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 CAR	2	2	1	0	5	0	0	0	0	0	-100%	4.0	4.0	2.8	0.0	3.2
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 CAR	3	5	3	5	16	0	1	1	4	6	-63%	4.9	4.6	2.8	0.9	3.0
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 CAR	3	3	6	4	16	2	1	3	3	9	-44%	1.3	2.8	2.8	1.1	2.0
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 CAR	5	4	3	2	14	2	0	1	1	4	-71%	3.2	5.7	2.8	1.6	3.3
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 CAR	0	2	1	2	5	1	2	4	2	9	100%	0.0	0.8	3.8	0.0	1.7
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 CAR	92	111	144	89	436	36	43	45	95	219	-50%	14.0	15.5	20.3	1.3	12.0
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 CAR	87	95	93	70	344	43	54	94	90	281	-18%	10.8	9.4	0.3	4.5	3.5
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 CAR	2	3	1	3	9	2	0	1	1	4	-53%	0.8	4.9	0.0	2.8	1.8
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 CAR	1	0	1	1	3	0	0	0	0	0	-100%	2.0	0.0	2.8	2.8	2.2
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 CAR	1	2	2	2	5	2	1	1	2	6	20%	2.7	0.9	0.9	0.8	0.4
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 CAR	359	307	260	195	1120	312	299	297	272	1,180	5%	5.1	0.9	4.5	10.1	1.8
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 CAR	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 CAR	102	107	100	79	387	88	107	78	107	380	-2%	2.9	0.0	4.6	5.9	0.4
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 CAR	57	58	53	53	220	46	34	41	44	165	-25%	2.9	6.9	3.4	2.6	3.9
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 CAR	0	3	2	2	6	1	1	6	4	12	118%	0.0	2.3	4.6	3.0	2.2
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 CAR	47	57	69	46	218	32	27	29	35	123	-43%	4.6	9.1	11.4	3.3	7.2
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 CAR	70	93	85	68	316	65	65	66	82	278	-12%	1.2	6.3	4.4	3.2	2.2
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 CAR	7	6	7	4	24	10	10	6	4	30	25%	2.1	2.8	0.8	0.0	1.2
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 CAR	100	88	67	63	318	83	71	88	87	329	3%	3.6	3.8	4.8	5.5	0.6
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 CAR	10	8	5	5	28	3	3	9	6	21	-25%	5.5	4.3	3.0	0.9	1.4
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 CAR	5	6	3	2	16	15	15	11	4	45	181%	6.3	5.6	6.0	2.3	5.3
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 CAR	1	8	8	2	19	3	3	5	4	15	-21%	2.8	4.3	2.4	2.3	1.0
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 CAR	0	2	1	3	6	2	2	0	1	5	-17%	0.0	0.0	2.8	2.8	0.4
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 CAR	80	72	90	69	311	59	62	71	66	258	-17%	5.0	2.4	4.2	0.7	3.1
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 CAR	65	69	83	58	275	0	0	0	59	59	-79%	22.8	23.5	25.8	0.3	16.7
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 CAR	0	0	0	0	0	7	6	1	0	14	0%	0.0	0.0	0.0	0.0	0.0
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 CAR	0	4	0	1	5	3	3	2	7	15	200%	0.0	1.1	0.0	6.0	3.2
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 CAR	0	1	0	0	1	1	1	0	0	2	100%	0.0	0.0	0.0	0.0	0.8
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 CAR	5	4	4	1	14	0	0	2	1	3	-79%	6.3	5.7	2.3	0.0	3.8
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 CAR	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 CAR	88	90	102	99	379	82	93	86	94	355	-6%	1.3	0.6	3.3	1.0	1.3
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 CAR	2	0	0	1	3	2	1	2	0	5	67%	0.0	0.0	0.0	2.8	1.0
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 CAR	9	9	7	3	28	6	8	11	3	28	0%	2.2	0.7	2.7	0.0	0.0
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 CAR	3	0	0	0	3	0	0	3	0	3	0%	4.9	0.0	0.0	0.0	0.0
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 CAR	392	332	294	188	1206	329	298	335	319	1,281	6%	6.6	3.8	4.6	16.5	2.1
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 CAR	25	27	12	9	73	17	25	24	29	95	30%	3.5	0.8	5.7	9.2	2.4
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 CAR	46	28	34	8	116	39	36	43	42	160	38%	2.1	2.8	2.9	13.6	3.7
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 CAR	2	0	0	0	2	0	0	2	1	3	50%	4.0	0.0	0.0	0.0	0.6
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 CAR	9	0	1	2	12	1	0	9	0	10	-17%	7.2	0.0	7.2	4.0	0.6
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 CAR	2	1	0	0	3	0	0	1	0	1	-67%	4.0	2.8	0.0	0.0	1.4
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 CAR	1	0	0	0	1	0	0	1	0	1	0%	2.8	0.0	0.0	0.0	0.0
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 CAR	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 CAR	2	6	1	3	12	1	2	1	3	7	-42%	1.6	4.0	0.0	0.0	1.6
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 CAR	171	176	174	167	688	72	92	140	182	486	-29%	18.0	14.5	5.4	2.3	8.3
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 CAR	59	54	66	63	242	80	81	61	43	265	10%	5.0	6.6	1.3	5.5	1.4
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 CAR	4	2	1	5	12	2	1	4	1	8	-33%	2.3	1.6	3.8	4.6	1.3
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 CAR	3	0	0	2	5	4	6	2	3	15	200%	1.1	0.0	0.0	1.3	3.2
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 CAR	2	2	1	4	9	3	2	4	1	10	11%	1.3	0.0	3.8	3.8	0.3
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 CAR	381	271	287	221	1160	328	308	303	290	1,229	6%	5.6	4.3	1.9	8.6	2.0
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 CAR	1	3	0	4	8	1	2	5	12	20	150%	0.0	1.3	0.0	5.7	3.2
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 CAR	24	21	23	21	89	25	30	29	17	101	13%	0.4	3.6	2.4	1.8	1.2
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 CAR	26	19	23	20	88	15	16	15	17	63	-28%	4.9	1.4	3.7	1.4	2.9
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 CAR	5	6	4	4	19	6	8	3	1	18	-5%	0.9	1.5	1.1	3.8	0.2
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 CAR	6	8	20	14	48	4	3	7	3	17	-65%	1.8	4.3	7.1	7.5	5.4
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 CAR	58	48	49	63	218	67	62	58	74	261	20%	2.3	3.8	2.5	2.7	2.8
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 CAR	39	41	45	44	169	32	35	37	38	142	-16%	2.3	1.9	2.5	1.9	2.2
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 CAR	43	54	55	64	216	38	43	47	56	184	-15%	1.6	3.2	2.2	2.1	2.3
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 CAR	7	7	9	7	30	6	5	7	6	24	-20%	0.8	1.6	1.4	0.8	1.2
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 CAR	23	23	31	25	102	27	39	40	36	142	39%	1.6	5.7	3.0	4.0	3.6
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 CAR	27	15	32	18	92	38	33	33	33	137	49%	3.9	7.3	0.4	5.9	4.2
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 CAR	28	29	33	30	120	38	41	43	38	160	33%	3.5	4.1	3.2	2.7	3.4
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 CAR	17	17	10	16	60	20	20	18	15	73	22%	1.4	1.4	4.3	0.5	1.6
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 CAR	38	28	29	26	121	37	27	29	22	115	-5%	0.3	0.4	0.0	1.6	0.6
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 CAR	10	15	12	16	53	18	20	17	20	75	42%	4.3	2.4	2.6	1.9	2.8
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 CAR	50	44	39	56	189	47	41	40	47	175	-7%	0.9	0.9	0.3	2.5	1.0
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 CAR	4	8	10	12	34	3	6	9	9	27	-21%	1.1	1.5	0.6	1.9	1.3
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 CAR	44	62	80	69	255	39	49	68	64	220	-14%	1.6	3.5	2.8	1.2	2.3
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 CAR	30	27	40	26	123	42	43	53	34	172	40%	4.0	5.4	3.8	2.9	4.0
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 CAR	25	19	20	23	87	19	16	18	20	73	-16%	2.6	1.4	0.9	1.3	1.6
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 CAR	3	0	2	4	9	2	0	2	3	7	-22%	1.3	0.0	0.0	1.1	0.7
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 CAR	29	26	33	30	118	27	23	28	27	105	-11%	0.8	1.2	1.8	1.1	1.2
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 CAR	25	23	29	22	99	25	26	30	28	109	10%	0.0	1.2	0.4	2.4	1.0
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 CAR	6	9	3	13	31	5	8	3	11	27	-13%	0.9	0.7	0.0	1.2	0.7
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 CAR	8	14	15	13	50	7	11	13	12	43	-14%	0.7	1.7	1.1	0.6	1.0
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 CAR	46	75	64	59	244	51	43	44	60	198	-19%	1.4	8.3	5.4	0.3	3.1
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 CAR	2	8	2	6	18	6	7	11	12	36	100%	4.0	0.7	7.1	4.0	3.5
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 CAR	102	79	57	52	290	66	52	85	65	268	-8%	7.9	6.7	6.6	3.4	1.3
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 CAR	55	35	21	14	125	45	42	65	50	202	62%	2.8	2.3	13.4	12.7	6.0
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 CAR	4	6	4	4	18	12	11	12	16	51	183%	5.7	3.4	5.7	7.6	5.6
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 CAR	10	17	16	11	54	12	11	10	14	47	-13%	1.2	3.2	3.3	1.7	1.0
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 CAR	190	156	156	143	645	133	138	143	142	556	-14%	9.0	3.0	2.1	0.2	3.6
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 CAR	15	16	11	21	63	18	12	12	17	59	-6%	1.5	2.1	0.6	1.8	0.5
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 CAR	120	126	127	122	495	89	97	96	86	368	-26%	6.1	5.5	5.9	7.1	6.1
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 CAR	20	21	34	45	120	29	31	30	27	117	-3%	3.6	3.9	1.4	6.0	0.3
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 CAR	31	22	30	20	103	35	36	39	37	147	43%	1.4	5.2	3.1	6.4	3.9
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 CAR	34	28	26	33	121	33	29	30	30	122	1%	0.3	0.4	1.5	1.1	0.1
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 CAR	131	107	101	112	451	117	124	116	122	479	6%	2.5	3.2	2.9	1.8	1.3
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 CAR	31	29	24	28	112	32	34	25	20	111	-1%	0.4	1.8	0.4	3.3	0.1
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 CAR	112	118	123	123	476	78	92	93	95	358	-25%	7.0	5.1	5.8	5.4	5.8
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 CAR	10	6	4	4	24	14	15	11	8	48	100%	2.3	5.6	5.1	3.3	4.0
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 CAR	37	24	34	30	125	32	29	29	18	108	-14%	1.7	1.9	1.8	4.9	1.6
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 CAR	3	0	1	3	7	2	4	2	3	11	57%	1.3	0.0	1.6	0.0	1.3
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 CAR	0	22	28	25	75	12	13	23	21	69	-8%	0.0	4.3	2.0	1.7	0.7
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 CAR	151	130	119	127	527	140	145	132	139	556	6%	1.8	2.6	2.3	2.1	1.2
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 CAR	7	6	10	7	30	6	5	10	8	29	-3%	0.8	0.9	0.0	0.7	0.2
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 CAR	13	8	17	12	50	30	25	25	15	95	90%	7.3	8.4	3.5	1.6	5.3
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 CAR	4	8	9	8	29	6	7	4	1	18	-38%	1.8	0.7	3.9	6.6	2.3
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 CAR	2	3	0	2	7	0	0	0	0	0	-100%	4.0	4.9	0.0	4.0	3.7
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 CAR	138	135	154	143	570	97	108	112	103	420	-26%	7.6	4.9	7.3	7.2	6.7
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 CAR	6	4	3	9	22	8	6	7	4	25	14%	1.5	1.8	3.6	3.9	0.6
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 CAR	7	1	7	0	15	6	6	6	7	25	67%	0.8	5.3	0.8	0.0	2.2
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 CAR	3	6	5	8	22	5	8	6	8	27	23%	2.0	1.5	0.9	0.0	1.0
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 CAR	3	1	1	2	7	0	0	0	0	0	-100%	4.9	2.8	2.8	4.0	3.7
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 CAR	1	3	3	3	10	4	6	5	2	17	70%	3.8	2.8	2.0	1.3	1.9
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 CAR	48	35	49	44	176	36	33	42	33	144	-18%	3.7	0.7	2.1	3.5	2.5
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 CAR	2	3	0	1	6	3	2	1	2	8	33%	1.3	1.3	0.0	1.6	0.8
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 CAR	17	20	17	23	77	19	22	22	29	92	19%	0.9	0.9	2.3	2.4	1.6
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 CAR	13	7	10	10	40	30	27	25	15	97	143%	7.3	9.7	7.2	2.8	6.9
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 CAR	33	36	34	39	142	21	23	20	22	86	-39%	4.6	4.8	5.4	6.2	5.2
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 CAR	5	9	6	9	29	10	9	23	26	68	134%	3.7	0.0	8.9	8.1	5.6
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 CAR	6	2	1	5	14	4	2	1	1	8	-43%	1.8	0.0	0.0	4.6	1.8
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 CAR	0	0	2	3	5	0	0	0	0	0	-100%	0.0	0.0	4.0	4.9	3.2
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 CAR	23	24	32	26	105	12	13	23	25	73	-30%	5.3	5.1	3.4	0.4	3.4
14	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 CAR	40	42	42	43	167	43	45	39	27	154	-8%	0.9	0.9	0.9	5.4	1.0
14	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 CAR	40	39	30	44	153	69	82	82	82	315	106%	7.9	11.1	13.9	9.6	10.6
14	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 CAR	56	55	68	59	238	26	27	45	51	149	-37%	9.4	8.7	6.1	2.2	6.4
14	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 CAR	28	30	35	41	134	33	50	68	44	195	46%	1.8	6.3	9.2	0.9	4.8
14	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 CAR	52	37	54	51	194	34	44	45	47	170	-12%	5.5	2.2	2.6	1.1	1.8
14	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 CAR	18	11	10	18	57	12	12	14	26	64	12%	3.1	0.6	2.3	3.4	0.9
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 CAR	6	13	11	34	64	10	4	5	8	27	-58%	2.8	6.2	4.2	11.3	5.5
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 CAR	29	22	23	27	101	27	28	30	27	112	11%	0.8	2.4	2.7	0.0	1.1
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 CAR	4	6	10	6	26	8	10	9	7	34	31%	3.3	2.8	0.6	0.8	1.5
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 CAR	4	4	12	10	30	9	5	4	5	23	-23%	3.9	0.9	5.7	3.7	1.4
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 CAR	2	2	8	2	14	7	3	3	2	15	7%	4.7	1.3	4.3	0.0	0.3
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 CAR	4	2	11	4	21	6	3	2	1	12	-43%	1.8	1.3	7.1	3.8	2.2
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 CAR	57	43	34	39	173	38	39	52	44	173	0%	5.5	1.2	5.5	1.6	0.0
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 CAR	0	7	5	13	25	10	6	1	9	26	4%	0.0	0.8	4.6	2.4	0.2
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 CAR	56	54	21	42	173	53	41	51	62	207	20%	0.8	3.8	10.0	5.5	2.5
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 CAR	4	9	9	12	34	7	9	6	7	29	-15%	2.6	0.0	2.2	3.2	0.9
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 CAR	4	7	4	9	24	3	1	5	5	14	-42%	1.1	6.0	0.9	3.0	2.3
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 CAR	10	17	24	21	72	15	15	11	13	54	-25%	2.8	1.0	6.2	3.9	2.3
								Total	5,213	4,918	4,921	4,515	19,566	4,465	4,502	4,802	4,884	18,653	-5%	3.3	3.2	3.4	3.2	2.6

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 2 - LGV Volume - Turn Calibration

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	93%	90%	92%	94%	97%
% GEH <5	96%	97%	96%	98%	99%
% GEH <10	100%	100%	100%	100%	100%

LGV

Counts: 147

Site	Count	Arm	From Ref	From	Arm	To Ref	To	Count Ref	Survey Pk Q1 16:30	Survey Pk Q2 16:45	Survey Pk Q3 17:00	Survey Pk Q4 17:15	Survey Pk Hr	Model Pk Q1 16:30	Model Pk Q2 16:45	Model Pk Q3 17:00	Model Pk Q4 17:15	Model Pk Hr	% Diff Pk Hr	GEH (Based Hourly Flows) Pk Q1 16:30	GEH Pk Q2 16:45	GEH Pk Q3 17:00	GEH Pk Q4 17:15	GEH Pk Hr 17:30
									13	14	15	16	22	4	5	6	7	10						
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 LGV	0	4	2	0	6	2	1	1	1	5	-17%	0.0	3.8	1.6	0.0	0.4
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 LGV	5	4	5	1	15	6	4	3	3	16	7%	0.9	0.0	2.0	2.8	0.3
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 LGV	2	4	3	2	11	7	5	4	5	21	91%	4.7	0.9	1.1	3.2	2.5
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 LGV	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 LGV	0	3	3	0	6	1	0	0	1	2	-67%	0.0	4.9	4.9	0.0	2.0
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 LGV	0	1	2	2	5	2	2	1	2	7	40%	0.0	1.6	1.6	0.0	0.8
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 LGV	7	7	8	5	27	12	9	7	6	34	26%	3.2	1.4	0.7	0.9	1.3
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 LGV	0	0	1	0	1	1	1	0	0	2	100%	0.0	0.0	2.8	0.0	0.8
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 LGV	1	3	2	2	8	2	5	3	3	13	63%	1.6	2.0	1.3	1.3	1.5
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 LGV	2	1	2	1	6	2	3	2	1	8	33%	0.0	2.8	0.0	0.0	0.8
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 LGV	4	1	1	1	7	1	3	2	3	9	29%	3.8	2.8	1.6	2.8	0.7
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 LGV	2	8	5	4	19	9	13	6	6	34	79%	6.0	3.1	0.9	1.8	2.9
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 LGV	14	9	7	10	40	8	10	7	7	32	-20%	3.6	0.6	0.0	2.1	1.3
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 LGV	3	4	6	2	15	7	5	2	1	15	0%	3.6	0.9	4.0	1.6	0.0
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 LGV	0	0	0	2	2	0	0	0	0	0	-100%	0.0	0.0	0.0	4.0	2.0
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 LGV	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 LGV	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 LGV	0	1	0	0	1	0	1	0	0	1	100%	0.0	1.2	0.0	0.0	0.6
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 LGV	16	16	10	10	51	21	17	24	13	75	47%	2.6	0.7	6.8	1.8	3.0
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 LGV	11	11	7	11	39	15	12	5	4	36	-6%	2.2	0.9	1.3	4.8	0.4
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 LGV	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.0	1.0
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 LGV	0	1	0	0	1	1	0	0	0	1	100%	0.0	2.0	0.0	0.0	0.6
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 LGV	37	25	23	21	105	46	48	34	39	167	60%	3.0	7.8	4.1	6.8	5.4
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 LGV	10	13	12	7	41	12	17	9	11	49	20%	1.2	2.3	1.6	2.7	1.2
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 LGV	8	7	7	7	28	8	5	5	5	23	-16%	0.4	1.3	1.3	1.6	0.9
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 LGV	0	0	0	0	0	2	1	0	1	4	0%	0.0	0.0	0.0	0.0	0.0
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 LGV	6	3	6	2	15	8	8	5	4	25	67%	1.9	4.8	0.4	3.0	2.2
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 LGV	5	11	7	5	28	10	17	9	7	43	54%	3.7	3.2	1.4	1.6	2.5
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 LGV	0	0	2	0	2	1	1	1	1	4	100%	0.0	0.0	1.6	0.0	1.2
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 LGV	5	8	8	3	24	15	9	7	7	38	58%	6.3	0.7	0.7	3.6	2.5
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 LGV	3	0	0	0	3	1	1	1	1	4	33%	2.8	0.0	0.0	0.0	0.5
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 LGV	1	0	0	1	2	2	1	1	2	6	200%	1.6	0.0	0.0	1.6	2.0
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 LGV	0	0	1	0	1	0	1	0	1	2	100%	0.0	0.0	2.8	0.0	0.8
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 LGV	2	0	0	0	2	0	0	1	1	2	0%	4.0	0.0	0.0	0.0	0.0
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 LGV	6	3	5	4	18	9	10	7	4	30	67%	2.2	5.5	1.6	0.0	2.4
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 LGV	20	10	7	7	44	17	14	20	13	64	45%	1.4	2.3	7.1	3.8	2.7
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 LGV	0	0	0	0	0	1	1	0	0	2	0%	0.0	0.0	0.0	0.0	0.0
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 LGV	0	0	1	0	1	0	1	0	1	2	100%	0.0	0.0	2.8	0.0	0.8
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 LGV	1	1	0	0	2	0	0	1	1	2	0%	2.8	2.8	0.0	0.0	0.0
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 LGV	1	0	1	1	3	0	1	1	0	2	-33%	2.8	0.0	0.0	2.8	0.6
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 LGV	18	14	8	6	46	15	23	18	14	70	52%	1.5	4.2	5.5	5.1	3.2
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 LGV	0	1	0	0	1	0	0	0	1	1	0%	0.0	2.8	0.0	0.0	0.0
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 LGV	1	0	1	0	2	3	1	1	0	5	150%	2.8	0.0	0.0	0.0	1.6
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 LGV	37	42	32	36	147	45	36	31	41	153	4%	2.5	1.9	0.4	1.6	0.5
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 LGV	3	1	1	2	7	2	1	2	2	7	0%	1.3	0.0	1.6	0.0	0.0
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 LGV	3	3	1	0	7	3	4	3	4	14	100%	0.0	1.1	2.8	0.0	2.2
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 LGV	2	0	0	0	2	0	1	2	0	3	50%	4.0	0.0	0.0	0.0	0.6
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 LGV	1	0	0	0	1	0	0	1	0	1	0%	2.8	0.0	0.0	0.0	0.0
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 LGV	0	1	0	1	2	0	0	0	1	1	-50%	0.0	2.8	0.0	0.0	0.8
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 LGV	32	15	22	16	85	32	25	27	15	99	16%	0.0	4.5	2.0	0.5	1.5
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 LGV	6	6	7	6	25	7	6	11	9	33	32%	0.8	0.0	2.7	2.2	1.5
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 LGV	0	0	1	1	2	0	0	0	0	0	-100%	0.0	0.0	2.8	2.8	2.0
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 LGV	1	0	0	1	2	2	1	0	0	3	50%	1.6	0.0	0.0	2.8	0.6
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 LGV	0	1	0	0	1	1	0	0	1	2	100%	0.0	2.8	0.0	0.0	0.8
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 LGV	43	41	31	23	138	54	51	39	39	183	33%	3.2	2.9	2.7	5.7	3.6
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 LGV	0	1	0	0	1	0	0	0	1	1	0%	0.0	2.8	0.0	0.0	0.0
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 LGV	2	3	6	1	12	1	1	1	2	5	-58%	1.6	2.8	5.3	1.6	2.4
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 LGV	4	3	3	3	13	2	3	1	1	7	-46%	2.3	0.0	2.8	2.8	1.9
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 LGV	0	0	1	0	1	1	1	1	0	3	200%	0.0	0.0	0.0	0.0	1.4
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 LGV	0	3	0	1	4	2	5	1	1	9	125%	0.0	2.0	0.0	0.0	2.0
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 LGV	4	3	7	3	17	4	4	3	3	14	-18%	0.0	1.1	3.6	0.0	0.8
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 LGV	3	2	3	2	10	3	2	3	2	10	0%	0.0	0.0	0.0	0.0	0.0
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 LGV	7	7	8	3	25	7	7	11	4	29	16%	0.0	0.0	1.9	1.1	0.8
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 LGV	0	0	0	1	1	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 LGV	4	6	4	4	18	4	5	5	3	17	-6%	0.0	0.9	0.9	1.1	0.2
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 LGV	2	1	3	2	8	4	2	2	2	10	25%	2.3	1.6	1.3	0.0	0.7
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 LGV	7	1	5	6	19	6	4	2	4	16	-16%	0.8	3.8	3.2	1.8	0.7
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 LGV	2	1	0	1	4	2	2	1	1	6	50%	0.0	1.6	0.0	0.0	0.9
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 LGV	5	3	3	3	14	5	2	1	2	10	-29%	0.0	1.3	2.8	1.3	1.2
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 LGV	2	1	2	2	7	2	1	1	1	5	-29%	0.0	0.0	1.6	1.6	0.8
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 LGV	4	6	3	3	16	4	6	2	3	15	-6%	0.0	0.0	1.3	0.0	0.3
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 LGV	1	0	0	0	1	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 LGV	3	2	12	2	19	4	3	16	4	27	42%	1.1	1.3	2.1	2.3	1.7
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 LGV	3	6	6	4	19	3	5	1	2	11	-42%	0.0	0.9	5.3	2.3	2.1
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 LGV	4	4	1	1	10	4	4	2	1	11	10%	0.0	0.0	1.6	0.0	0.3
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 LGV	2	2	2	2	8	2	1	2	2	7	-13%	0.0	1.6	0.0	0.0	0.4
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 LGV	1	1	2	1	5	1	1	2	1	5	0%	0.0	0.0	0.0	0.0	0.0
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 LGV	2	1	0	0	3	2	1	0	0	3	0%	0.0	0.0	0.0	0.0	0.0
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 LGV	0	2	2	0	4	0	2	2	0	4	0%	0.0	0.0	0.0	0.0	0.0
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 LGV	6	9	4	4	23	8	11	6	5	30	30%	1.5	1.3	1.8	0.9	1.4
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 LGV	0	1	2	0	3	3	4	4	1	12	300%	0.0	3.8	2.3	0.0	3.3
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 LGV	7	8	6	4	25	9	6	6	7	28	12%	1.4	1.5	0.0	2.6	0.6
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 LGV	5	2	3	1	11	9	2	7	3	21	91%	3.0	0.0	3.6	2.8	2.5
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 LGV	2	0	1	0	3	3	1	2	1	7	133%	1.3	0.0	1.6	0.0	1.8
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 LGV	1	2	0	2	5	0	2	3	4	9	80%	2.8	0.0	0.0	2.3	1.5
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 LGV	7	10	7	9	33	8	9	8	4	29	-12%	0.7	0.6	0.7	3.9	0.7
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 LGV	0	1	1	1	3	2	2	0	2	6	100%	0.0	1.6	2.8	1.6	1.4
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 LGV	9	12	8	10	39	12	10	8	8	38	-3%	1.9	1.2	0.0	1.3	0.2
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 LGV	5	1	1	4	11	5	6	6	4	21	91%	0.0	5.3	5.3	0.0	2.5
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 LGV	2	3	0	0	5	3	3	2	2	10	100%	1.3	0.0	0.0	0.0	1.8
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 LGV	5	5	3	2	15	7	6	3	7	23	53%	1.6	0.9	0.0	4.7	1.8
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 LGV	3	10	8	5	26	16	11	8	9	44	69%	8.4	0.6	0.0	3.0	3.0
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 LGV	1	4	1	1	7	1	2	1	2	6	-14%	0.0	2.3	0.0	1.6	0.4
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 LGV	11	9	7	7	34	11	13	10	7	41	21%	0.0	2.4	2.1	0.0	1.1
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 LGV	2	1	1	0	4	1	0	1	1	3	-25%	1.6	2.8	0.0	0.0	0.5
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 LGV	2	2	0	4	8	2	1	2	2	7	-13%	0.0	1.6	0.0	2.3	0.4
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 LGV	0	1	1	0	2	2	0	0	1	3	50%	0.0	2.8	2.8	0.0	0.6
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 LGV	1	2	1	2	6	2	2	2	1	7	17%	1.6	0.0	1.6	1.6	0.4
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 LGV	6	12	10	6	34	15	12	9	10	46	35%	5.6	0.0	0.6	2.8	1.9
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 LGV	0	0	0	0	0	0	1	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 LGV	0	1	1	0	2	4	3	3	3	13	550%	0.0	2.8	2.8	0.0	4.0
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 LGV	0	1	0	0	1	1	1	0	1	3	200%	0.0	0.0	0.0	0.0	1.4
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 LGV	10	11	8	10	39	11	13	11	8	43	10%	0.6	1.2	1.9	1.3	0.6
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 LGV	1	1	0	0	2	0	0	0	0	0	-100%	2.8	2.8	0.0	0.0	2.0
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 LGV	1	0	0	0	1	2	1	1	1	5	400%	1.6	0.0	0.0	0.0	2.3
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 LGV	0	1	1	0	2	2	0	0	1	3	50%	0.0	2.8	2.8	0.0	0.6
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 LGV	0	0	1	0	1	1	0	0	0	1	0%	0.0	0.0	2.8	0.0	0.0
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 LGV	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 LGV	3	3	3	2	11	1	0	0	1	2	-82%	2.8	4.9	4.9	1.6	3.5
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 LGV	0	0	2	1	3	0	0	0	0	0	-100%	0.0	0.0	4.0	2.8	2.4
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 LGV	1	3	0	0	4	3	3	3	3	12	200%	2.8	0.0	0.0	0.0	2.8
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 LGV	3	3	1	2	9	1	1	0	0	2	-78%	2.8	2.8	2.8	4.0	3.0
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 LGV	1	0	0	0	1	9	7	2	1	19	1800%	7.2	0.0	0.0	0.0	5.7
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 LGV	0	0	0	1	1	1	0	0	0	1	0%	0.0	0.0	0.0	2.8	0.0
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 LGV	1	2	1	1	5	3	2	2	3	10	100%	2.8	0.0	1.6	2.8	1.8
130	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 LGV	4	4	2	3	13	3	3	3	3	12	-8%	1.1	1.1	1.3	0.0	0.3
131	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 LGV	3	5	2	4	14	4	11	5	4	24	71%	1.1	4.2	3.2	0.0	2.3
132	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 LGV	3	6	3	3	15	11	9	3	2	25	67%	6.0	2.2	0.0	1.3	2.2
133	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 LGV	3	3	5	1	12	1	0	2	3	6	-50%	2.8	4.9	3.2	2.8	2.0
134	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 LGV	5	6	2	6	19	3	2	2	2	9	-53%	2.0	4.0	0.0	4.0	2.7
135	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 LGV	3	0	3	2	8	0	0	0	0	0	-100%	4.9	0.0	4.9	4.0	4.0
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 LGV	1	0	0	1	2	2	1	1	0	4	100%	1.6	0.0	0.0	2.8	1.2
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 LGV	1	1	2	3	7	3	5	4	3	15	114%	2.8	4.6	2.3	0.0	2.4
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 LGV	0	1	1	0	2	1	2	2	1	6	200%	0.0	1.6	1.6	0.0	2.0
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 LGV	0	0	1	0	1	0	1	0	1	2	100%	0.0	0.0	2.8	0.0	0.8
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 LGV	0	0	0	0	0	1	1	0	0	2	0%	0.0	0.0	0.0	0.0	0.0
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 LGV	6	5	4	1	16	6	5	4	4	19	19%	0.0	0.0	0.0	3.8	0.7
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 LGV	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 LGV	6	1	5	3	15	7	5	6	4	22	47%	0.8	4.6	0.9	1.1	1.6
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 LGV	0	1	1	0	2	2	0	0	3	5	150%	0.0	2.8	2.8	0.0	1.6
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 LGV	0	0	0	1	1	1	0	0	0	1	0%	0.0	0.0	0.0	2.8	0.0
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 LGV	1	4	1	1	7	1	0	1	2	4	-43%	0.0	5.7	0.0	1.6	1.3
								Total	**511**	**497**	**435**	**355**	**1,798**	**664**	**618**	**508**	**458**	**2,248**	**25%**	**1.2**	**1.3**	**1.3**	**1.1**	**1.2**

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 3 - OGV1 Volume - Turn Calibration

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	93%	97%	95%	95%	95%
% GEH <5	99%	97%	97%	99%	98%
% GEH <10	100%	100%	100%	100%	100%

OGV1

Counts	147							Count Ref	Survey					Model					% Diff	GEH (Based Hourly Flows)				
									13	14	15	16	22	4	5	6	7	10						
									Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
Site	Count	Arm	From Ref	From	Arm	To Ref	To		16:30	16:45	17:00	17:15	Pk Hr	16:30	16:45	17:00	17:15	Pk Hr	Pk Hr	16:30	16:45	17:00	17:15	17:30
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 OGV1	1	1	0	0	2	0	0	0	0	0	-100%	2.8	2.8	0.0	0.0	2.0
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 OGV1	0	0	1	1	2	0	1	1	1	3	50%	0.0	0.0	0.0	0.0	0.6
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 OGV1	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 OGV1	0	0	0	0	0	2	1	2	3	8	0%	0.0	0.0	0.0	0.0	0.0
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 OGV1	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 OGV1	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 OGV1	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 OGV1	0	2	0	1	3	3	3	4	5	15	400%	0.0	1.3	0.0	4.6	4.0
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 OGV1	0	0	0	0	0	1	0	0	1	2	0%	0.0	0.0	0.0	0.0	0.0
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 OGV1	0	0	0	0	0	1	1	0	0	2	0%	0.0	0.0	0.0	0.0	0.0
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 OGV1	0	0	0	0	0	1	1	1	0	3	0%	0.0	0.0	0.0	0.0	0.0
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 OGV1	6	4	6	2	17	0	0	0	0	0	-100%	6.6	5.3	6.9	4.0	5.8
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.0	0.0	0.0	0.0	1.0
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 OGV1	4	3	4	4	15	2	4	5	6	17	17%	1.8	1.1	0.9	1.8	0.6
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 OGV1	1	1	1	1	2	2	4	5	5	16	700%	2.7	4.7	5.4	5.4	4.7
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 OGV1	1	1	1	1	2	1	1	2	1	5	150%	1.2	1.2	2.7	1.2	1.6
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 OGV1	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 OGV1	0	1	1	0	1	1	1	1	1	4	300%	0.0	1.2	1.2	0.0	1.9
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 OGV1	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 OGV1	1	1	1	1	4	0	1	1	1	3	-25%	2.8	0.0	0.0	0.0	0.5
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 OGV1	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 OGV1	0	1	1	0	2	0	0	0	0	0	-100%	0.0	2.8	2.8	0.0	2.0
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 OGV1	2	4	5	3	14	0	0	1	1	2	-86%	4.0	5.7	4.6	2.8	4.2
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 OGV1	2	1	1	1	5	0	1	1	3	5	0%	4.0	0.0	0.0	2.8	0.0
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 OGV1	3	4	2	2	11	3	8	11	10	32	191%	0.0	3.3	7.1	6.5	4.5
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 OGV1	2	1	0	0	3	0	0	0	0	0	-100%	4.0	2.8	0.0	0.0	2.4
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 OGV1	3	6	3	3	15	0	0	0	0	0	-100%	4.9	6.9	4.9	4.9	5.5
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 OGV1	4	6	7	3	20	0	0	0	0	0	-100%	5.7	6.9	7.5	4.9	6.3
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 OGV1	0	0	0	0	0	3	4	6	7	20	0%	0.0	0.0	0.0	0.0	0.0
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 OGV1	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 OGV1	0	0	0	0	0	1	0	1	1	3	0%	0.0	0.0	0.0	0.0	0.0
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 OGV1	0	0	1	0	1	0	2	3	3	8	700%	0.0	0.0	2.8	0.0	3.3
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 OGV1	1	0	1	1	3	0	0	0	0	0	-100%	2.8	0.0	2.8	2.8	2.4
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 OGV1	0	0	1	0	1	0	0	0	0	0	-100%	0.0	0.0	2.8	0.0	1.4
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 OGV1	2	2	3	1	8	1	1	2	1	5	-38%	1.6	1.6	1.3	0.0	1.2
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 OGV1	0	0	0	0	0	1	1	1	1	4	0%	0.0	0.0	0.0	0.0	0.0
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 OGV1	0	1	0	0	1	0	0	0	0	0	-100%	0.0	2.8	0.0	0.0	1.4
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 OGV1	0	1	0	0	1	1	0	1	1	3	200%	0.0	2.8	0.0	0.0	1.4
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 OGV1	0	1	1	0	2	0	0	1	1	2	0%	0.0	2.8	0.0	0.0	0.0
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 OGV1	1	1	2	2	6	0	0	0	0	0	-100%	2.8	2.8	4.0	4.0	3.5
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 OGV1	2	0	1	0	3	0	0	0	0	0	-100%	4.0	0.0	2.8	0.0	2.4
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 OGV1	0	1	1	0	2	0	1	3	2	6	200%	0.0	0.0	2.8	0.0	2.0
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 OGV1	1	0	1	0	2	0	0	0	0	0	-100%	2.8	0.0	2.8	0.0	2.0
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 OGV1	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 OGV1	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 OGV1	0	0	1	1	2	0	0	0	0	0	-100%	0.0	0.0	2.8	2.8	2.0
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 OGV1	2	0	1	1	4	0	1	1	1	3	-25%	4.0	0.0	0.0	0.0	0.5
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 OGV1	0	0	0	0	0	1	2	5	5	13	0%	0.0	0.0	0.0	0.0	0.0
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 OGV1	0	0	0	0	0	0	0	1	1	2	0%	0.0	0.0	0.0	0.0	0.0
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 OGV1	0	1	2	1	4	3	2	3	3	11	175%	0.0	1.6	1.3	2.8	2.6
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 OGV1	0	0	0	0	0	2	1	1	2	6	0%	0.0	0.0	0.0	0.0	0.0
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 OGV1	0	0	0	0	0	2	1	3	4	10	0%	0.0	0.0	0.0	0.0	0.0
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 OGV1	0	2	1	1	4	5	4	5	5	19	375%	0.0	2.3	4.6	4.6	4.4
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 OGV1	0	0	0	0	0	0	0	1	1	2	0%	0.0	0.0	0.0	0.0	0.0
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 OGV1	0	0	0	0	0	1	1	3	4	9	0%	0.0	0.0	0.0	0.0	0.0
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 OGV1	0	0	0	0	0	0	0	1	1	2	0%	0.0	0.0	0.0	0.0	0.0
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 OGV1	0	0	0	0	0	0	0	0	1	1	0%	0.0	0.0	0.0	0.0	0.0
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 OGV1	0	2	1	1	4	4	3	4	4	15	275%	0.0	1.3	3.8	3.8	3.6
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 OGV1	0	0	0	0	0	2	1	1	1	5	0%	0.0	0.0	0.0	0.0	0.0
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 OGV1	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 OGV1	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 OGV1	1	1	0	0	2	0	0	0	0	0	-100%	2.8	2.8	0.0	0.0	2.0
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 OGV1	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 OGV1	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 OGV1	0	0	0	0	0	1	0	0	1	2	0%	0.0	0.0	0.0	0.0	0.0
130	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
131	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 OGV1	2	1	0	0	3	0	0	0	0	0	-100%	4.0	2.8	0.0	0.0	2.4
132	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 OGV1	1	0	0	0	1	1	0	1	1	3	200%	0.0	0.0	0.0	0.0	1.4
133	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 OGV1	3	1	0	0	4	0	0	0	0	0	-100%	4.9	2.8	0.0	0.0	2.8
134	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 OGV1	0	0	0	0	0	1	0	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
135	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 OGV1	0	0	0	1	1	0	0	0	0	0	-100%	0.0	0.0	0.0	2.8	1.4
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 OGV1	0	0	0	0	0	2	1	2	2	7	0%	0.0	0.0	0.0	0.0	0.0
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 OGV1	1	1	1	0	3	0	0	0	0	0	-100%	2.8	2.8	2.8	0.0	2.4
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 OGV1	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
								Total	**49**	**51**	**55**	**33**	**187**	**52**	**53**	**91**	**94**	**290**	**55%**	**0.6**	**0.5**	**0.6**	**0.4**	**0.7**

Wrehxam VISSIM BY 2018 2563

Turn Count Calibration Results

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Class 3 - OGV1 Volume - Turn Calibration

OGV2

	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
% GEH <4	95%	98%	96%	96%	95%
% GEH <5	97%	99%	97%	98%	96%
% GEH <10	100%	99%	100%	100%	100%

									13	14	15	16	22	4	5	6	7	10						
Counts				147				Count Ref	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr	Pk Hr	Pk Q1	Pk Q2	Pk Q3	Pk Q4	Pk Hr
									Survey					Model					% Diff	GEH (Based Hourly Flows)				
Site	Count	Arm	From Ref	From	Arm	To Ref	To		16:30	16:45	17:00	17:15	Pk Hr	16:30	16:45	17:00	17:15	Pk Hr	Pk Hr	16:30	16:45	17:00	17:15	17:30
1	1	1	1-1>	Cefn Rd	2	1-2<	Holt Rd South	1-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	2	1	1-1>	Cefn Rd	3	1-3<	Dean Rd	1-1>3 OGV2	1	1	0	0	2	0	0	1	0	1	-50%	2.8	2.8	0.0	0.0	0.8
1	3	1	1-1>	Cefn Rd	4	1-4<	Holt Rd North	1-1>4 OGV2	0	0	1	0	1	2	2	1	1	6	500%	0.0	0.0	0.0	0.0	2.7
1	4	1	1-1>	Cefn Rd	5	1-5<	Bryn Estyn Rd	1-1>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	5	2	1-2>	Holt Rd South	1	1-1<	Cefn Rd	1-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	6	2	1-2>	Holt Rd South	3	1-3<	Dean Rd	1-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	7	2	1-2>	Holt Rd South	4	1-4<	Holt Rd North	1-2>4 OGV2	1	1	0	0	2	0	0	0	0	0	-100%	2.8	2.8	0.0	0.0	2.0
1	8	2	1-2>	Holt Rd South	5	1-5<	Bryn Estyn Rd	1-2>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	9	3	1-3>	Dean Rd	1	1-1<	Cefn Rd	1-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	10	3	1-3>	Dean Rd	2	1-2<	Holt Rd South	1-3>2 OGV2	0	0	0	0	0	0	1	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
1	11	3	1-3>	Dean Rd	4	1-4<	Holt Rd North	1-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	12	3	1-3>	Dean Rd	5	1-5<	Bryn Estyn Rd	1-3>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	13	4	1-4>	Holt Rd North	1	1-1<	Cefn Rd	1-4>1 OGV2	0	0	0	0	0	0	1	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
1	14	4	1-4>	Holt Rd North	2	1-2<	Holt Rd South	1-4>2 OGV2	1	0	0	0	1	5	5	6	5	21	2000%	4.6	0.0	0.0	0.0	6.0
1	15	4	1-4>	Holt Rd North	3	1-3<	Dean Rd	1-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	16	4	1-4>	Holt Rd North	5	1-5<	Bryn Estyn Rd	1-4>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	17	5	1-5>	Bryn Estyn Rd	1	1-1<	Cefn Rd	1-5>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	18	5	1-5>	Bryn Estyn Rd	2	1-2<	Holt Rd South	1-5>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	19	5	1-5>	Bryn Estyn Rd	3	1-3<	Dean Rd	1-5>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
1	20	5	1-5>	Bryn Estyn Rd	4	1-4<	Holt Rd North	1-5>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	21	1	2-1>	A5156	2	2-2<	Wrexham Golf Club	2-1>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	22	1	2-1>	A5156	3	2-3<	A534 Bypass	2-1>3 OGV2	8	8	7	5	27	0	3	0	0	3	-89%	7.7	4.3	7.2	6.3	6.2
2	23	1	2-1>	A5156	4	2-4<	Holt Rd	2-1>4 OGV2	1	0	0	0	1	0	2	0	0	2	100%	2.8	0.0	0.0	0.0	0.8
2	24	2	2-2>	Wrexham Golf Club	1	2-1<	A5156	2-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	25	2	2-2>	Wrexham Golf Club	3	2-3<	A534 Bypass	2-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	26	2	2-2>	Wrexham Golf Club	4	2-4<	Holt Rd	2-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	27	3	2-3>	A534 Bypass	1	2-1<	A5156	2-3>1 OGV2	7	8	4	7	26	6	6	5	5	22	-14%	0.8	1.5	0.9	1.3	0.7
2	28	3	2-3>	A534 Bypass	2	2-2<	Wrexham Golf Club	2-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	29	3	2-3>	A534 Bypass	4	2-4<	Holt Rd	2-3>4 OGV2	0	0	0	0	0	6	6	6	6	24	0%	0.0	0.0	0.0	0.0	0.0
2	30	4	2-4>	Holt Rd	1	2-1<	A5156	2-4>1 OGV2	1	2	2	0	4	1	1	0	0	2	-50%	0.0	0.9	3.5	0.0	1.2
2	31	4	2-4>	Holt Rd	2	2-2<	Wrexham Golf Club	2-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
2	32	4	2-4>	Holt Rd	3	2-3<	A534 Bypass	2-4>3 OGV2	1	0	0	0	1	1	0	1	1	3	500%	1.2	0.0	0.0	0.0	1.9
3	33	1	3-1>	Cefn Rd North	2	3-2<	Cefn Rd South	3-1>2 OGV2	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
3	34	1	3-1>	Cefn Rd North	3	3-3<	Hullah Ln	3-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	35	2	3-2>	Cefn Rd South	1	3-1<	Cefn Rd North	3-2>1 OGV2	2	0	1	0	3	2	2	2	1	7	133%	0.0	0.0	1.6	0.0	1.8
3	36	2	3-2>	Cefn Rd South	3	3-3<	Hullah Ln	3-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	37	3	3-3>	Hullah Ln	1	3-1<	Cefn Rd North	3-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
3	38	3	3-3>	Hullah Ln	2	3-2<	Cefn Rd South	3-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	39	1	4-1>	A534 Bypass	2	4-2<	Borras Hall Ln	4-1>2 OGV2	0	0	0	0	0	0	1	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
4	40	1	4-1>	A534 Bypass	3	4-3<	A534 Holt Rd	4-1>3 OGV2	1	0	2	0	3	0	1	0	0	1	-67%	2.8	0.0	4.0	0.0	1.4
4	41	1	4-1>	A534 Bypass	4	4-4<	Wrexham Industrial Estate	4-1>4 OGV2	7	7	5	6	25	0	1	0	0	1	-96%	7.5	6.0	6.3	6.9	6.7
4	42	1	4-1>	A534 Bypass	5	4-5<	Sandy Ln	4-1>5 OGV2	1	0	0	0	1	0	1	0	0	1	0%	2.8	0.0	0.0	0.0	0.0
4	43	2	4-2>	Borras Hall Ln	1	4-1<	A534 Bypass	4-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	44	2	4-2>	Borras Hall Ln	3	4-3<	A534 Holt Rd	4-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	45	2	4-2>	Borras Hall Ln	4	4-4<	Wrexham Industrial Estate	4-2>4 OGV2	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
4	46	2	4-2>	Borras Hall Ln	5	4-5<	Sandy Ln	4-2>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	47	3	4-3>	A534 Wrexham Rd	1	4-1<	A534 Bypass	4-3>1 OGV2	2	5	0	1	8	3	2	3	3	11	38%	1.3	3.2	0.0	2.8	1.0
4	48	3	4-3>	A534 Wrexham Rd	2	4-2<	Borras Hall Ln	4-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	49	3	4-3>	A534 Wrexham Rd	4	4-4<	Wrexham Industrial Estate	4-3>4 OGV2	1	0	2	1	4	0	0	0	0	0	-100%	2.8	0.0	4.0	2.8	2.8
4	50	3	4-3>	A534 Wrexham Rd	5	4-5<	Sandy Ln	4-3>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	51	4	4-4>	Wrexham Industrial Estate	1	4-1<	A534 Bypass	4-4>1 OGV2	6	9	8	3	26	9	10	10	8	37	42%	2.2	0.6	1.3	4.3	2.0
4	52	4	4-4>	Wrexham Industrial Estate	2	4-2<	Borras Hall Ln	4-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	53	4	4-4>	Wrexham Industrial Estate	3	4-3<	A534 Holt Rd	4-4>3 OGV2	2	1	0	1	4	0	0	0	0	0	-100%	4.0	2.8	0.0	2.8	2.8
4	54	4	4-4>	Wrexham Industrial Estate	5	4-5<	Sandy Ln	4-4>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	55	5	4-5>	Sandy Ln	1	4-1<	A534 Bypass	4-5>1 OGV2	0	0	0	2	2	0	0	0	1	1	-50%	0.0	0.0	0.0	1.6	0.8
4	56	5	4-5>	Sandy Ln	2	4-2<	Borras Hall Ln	4-5>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	57	5	4-5>	Sandy Ln	3	4-3<	A534 Holt Rd	4-5>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
4	58	5	4-5>	Sandy Ln	4	4-4<	Wrexham Industrial Estate	4-5>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	59	1	5-1>	A5156 West	2	5-2<	Borras Rd	5-1>2 OGV2	0	0	0	0	0	0	3	1	0	4	0%	0.0	0.0	0.0	0.0	0.0
5	60	1	5-1>	A5156 West	3	5-3<	A5156 East	5-1>3 OGV2	7	5	5	6	23	0	5	0	0	5	-78%	7.5	0.0	6.3	6.9	4.8
5	61	1	5-1>	A5156 West	4	5-4<	Borras Park Rd	5-1>4 OGV2	0	0	0	0	0	0	3	1	0	4	0%	0.0	0.0	0.0	0.0	0.0
5	62	2	5-2>	Borras Rd	1	5-1<	A5156 West	5-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	63	2	5-2>	Borras Rd	3	5-3<	A5156 East	5-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	64	2	5-2>	Borras Rd	4	5-4<	Borras Park Rd	5-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	65	3	5-3>	A5156 East	1	5-1<	A5156 West	5-3>1 OGV2	6	14	11	2	33	1	0	0	0	1	-97%	5.3	10.6	9.4	4.0	7.8
5	66	3	5-3>	A5156 East	2	5-2<	Borras Rd	5-3>2 OGV2	0	0	0	0	0	5	6	4	5	20	0%	0.0	0.0	0.0	0.0	0.0
5	67	3	5-3>	A5156 East	4	5-4<	Borras Park Rd	5-3>4 OGV2	0	0	0	0	0	1	1	0	0	2	0%	0.0	0.0	0.0	0.0	0.0
5	68	4	5-4>	Borras Park Rd	1	5-1<	A5156 West	5-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
5	69	4	5-4>	Borras Park Rd	2	5-2<	Borras Rd	5-4>2 OGV2	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
5	70	4	5-4>	Borras Park Rd	3	5-3<	A5156 East	5-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	71	1	7-1>	Bodhyfryd	2	7-2<	Holt Rd	7-1>2 OGV2	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
7	72	1	7-1>	Bodhyfryd	3	7-3<	Tesco	7-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	73	1	7-1>	Bodhyfryd	4	7-4<	Farndon St	7-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	74	1	7-1>	Bodhyfryd	5	7-5<	Holt St	7-1>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	75	2	7-2>	Holt Rd	1	7-1<	Bodhyfryd	7-2>1 OGV2	1	0	0	0	1	1	1	1	1	4	300%	0.0	0.0	0.0	0.0	1.9
7	76	2	7-2>	Holt Rd	3	7-3<	Tesco	7-2>3 OGV2	0	0	0	0	0	1	2	1	1	5	0%	0.0	0.0	0.0	0.0	0.0
7	77	2	7-2>	Holt Rd	4	7-4<	Farndon St	7-2>4 OGV2	1	1	1	0	3	0	0	0	0	0	-100%	2.8	2.8	2.8	0.0	2.4
7	78	2	7-2>	Holt Rd	5	7-5<	Holt St	7-2>5 OGV2	0	0	0	0	0	1	1	2	0	4	0%	0.0	0.0	0.0	0.0	0.0
7	79	3	7-3>	Tesco	1	7-1<	Bodhyfryd	7-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	80	3	7-3>	Tesco	2	7-2<	Holt Rd	7-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	81	3	7-3>	Tesco	4	7-4<	Farndon St	7-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	82	3	7-3>	Tesco	5	7-5<	Holt St	7-3>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	83	4	7-4>	Farndon St	1	7-1<	Bodhyfryd	7-4>1 OGV2	1	1	0	0	2	0	0	0	0	0	-100%	2.8	2.8	0.0	0.0	2.0
7	84	4	7-4>	Farndon St	2	7-2<	Holt Rd	7-4>2 OGV2	0	0	0	2	2	0	0	0	0	0	-100%	0.0	0.0	0.0	4.0	2.0
7	85	4	7-4>	Farndon St	3	7-3<	Tesco	7-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	86	4	7-4>	Farndon St	5	7-5<	Holt St	7-4>5 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	87	5	7-5>	Holt St	1	7-1<	Bodhyfryd	7-5>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	88	5	7-5>	Holt St	2	7-2<	Holt Rd	7-5>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	89	5	7-5>	Holt St	3	7-3<	Tesco	7-5>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
7	90	5	7-5>	Holt St	4	7-4<	Farndon St	7-5>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	91	1	8-1>	Cefn Rd North	2	8-2<	Cefn Rd South	8-1>2 OGV2	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
8	92	1	8-1>	Cefn Rd North	3	8-3<	Queensway	8-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	93	2	8-2>	Cefn Rd South	1	8-1<	Cefn Rd North	8-2>1 OGV2	0	0	0	0	0	1	3	2	1	7	0%	0.0	0.0	0.0	0.0	0.0
8	94	2	8-2>	Cefn Rd South	3	8-3<	Queensway	8-2>3 OGV2	0	0	0	0	0	1	1	0	0	2	0%	0.0	0.0	0.0	0.0	0.0
8	95	3	8-3>	Queensway	1	8-1<	Cefn Rd North	8-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
8	96	3	8-3>	Queensway	2	8-2<	Cefn Rd South	8-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	97	1	9-1>	Holt Rd South	2	9-2<	Holt Rd North	9-1>2 OGV2	1	0	0	0	1	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
9	98	1	9-1>	Holt Rd South	3	9-3<	Montgomery Rd	9-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	99	2	9-2>	Holt Rd North	1	9-1<	Holt Rd South	9-2>1 OGV2	1	0	0	0	1	3	4	5	2	14	1300%	2.8	0.0	0.0	0.0	4.7
9	100	2	9-2>	Holt Rd North	3	9-3<	Montgomery Rd	9-2>3 OGV2	0	0	0	0	0	2	1	3	2	8	0%	0.0	0.0	0.0	0.0	0.0
9	101	3	9-3>	Montgomery Rd	1	9-1<	Holt Rd South	9-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
9	102	3	9-3>	Montgomery Rd	2	9-2<	Holt Rd North	9-3>2 OGV2	0	1	0	0	1	0	0	0	0	0	-100%	0.0	2.8	0.0	0.0	1.4
10	103	1	10-1>	Holt Rd South	2	10-2<	Holt Rd North	10-1>2 OGV2	1	1	0	0	2	1	0	0	0	1	-50%	0.0	2.8	0.0	0.0	0.8
10	104	1	10-1>	Holt Rd South	3	10-3<	Hullah Ln	10-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	105	2	10-2>	Holt Rd North	1	10-1<	Holt Rd South	10-2>1 OGV2	1	0	0	0	1	6	6	7	5	24	2300%	5.3	0.0	0.0	0.0	6.5
10	106	2	10-2>	Holt Rd North	3	10-3<	Hullah Ln	10-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	107	3	10-3>	Hullah Ln	1	10-1<	Holt Rd South	10-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
10	108	3	10-3>	Hullah Ln	2	10-2<	Holt Rd North	10-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	109	1	12-1>	Holt Rd South	2	12-2<	Borras Rd	12-1>2 OGV2	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
12	110	1	12-1>	Holt Rd South	3	12-3<	Holt Rd North	12-1>3 OGV2	1	1	0	0	2	1	0	0	0	1	-50%	0.0	2.8	0.0	0.0	0.8
12	111	1	12-1>	Holt Rd South	4	12-4<	Archer's Way	12-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	112	2	12-2>	Borras Rd	1	12-1<	Holt Rd South	12-2>1 OGV2	0	0	0	0	0	0	1	2	0	3	0%	0.0	0.0	0.0	0.0	0.0
12	113	2	12-2>	Borras Rd	3	12-3<	Holt Rd North	12-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	114	2	12-2>	Borras Rd	4	12-4<	Archer's Way	12-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	115	3	12-3>	Holt Rd North	1	12-1<	Holt Rd South	12-3>1 OGV2	1	0	0	0	1	5	5	6	4	20	1900%	4.6	0.0	0.0	0.0	5.9
12	116	3	12-3>	Holt Rd North	2	12-2<	Borras Rd	12-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	117	3	12-3>	Holt Rd North	4	12-4<	Archer's Way	12-3>4 OGV2	0	0	0	0	0	1	2	1	1	5	0%	0.0	0.0	0.0	0.0	0.0
12	118	4	12-4>	Archer's Way	1	12-1<	Holt Rd South	12-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	119	4	12-4>	Archer's Way	2	12-2<	Borras Rd	12-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
12	120	4	12-4>	Archer's Way	3	12-3<	Holt Rd North	12-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	121	1	13-1>	Rhosnesni Ln West	2	13-2<	Borras Rd North	13-1>2 OGV2	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
13	122	1	13-1>	Rhosnesni Ln West	4	13-4<	Borras Rd South	13-1>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	123	2	13-2>	Borras Rd North	1	13-1<	Rhosnesni Ln West	13-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	124	2	13-2>	Borras Rd North	4	13-4<	Borras Rd South	13-2>4 OGV2	0	0	0	0	0	0	1	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
13	125	3	13-3>	Rhosnesni Ln East	1	13-1<	Rhosnesni Ln West	13-3>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	126	3	13-3>	Rhosnesni Ln East	2	13-2<	Borras Rd North	13-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	127	3	13-3>	Rhosnesni Ln East	4	13-4<	Borras Rd South	13-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	128	4	13-4>	Borras Rd South	1	13-1<	Rhosnesni Ln West	13-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
13	129	4	13-4>	Borras Rd South	2	13-2<	Borras Rd North	13-4>2 OGV2	0	0	0	0	0	1	0	0	0	1	0%	0.0	0.0	0.0	0.0	0.0
14	130	1	14-1>	Jeffery's Rd	2	14-2<	Borras Rd	14-1>2 OGV2	0	0	0	0	0	0	1	1	0	2	0%	0.0	0.0	0.0	0.0	0.0
14	131	1	14-1>	Jeffery's Rd	3	14-3<	Dean Rd	14-1>3 OGV2	1	0	0	0	1	0	1	1	0	2	100%	2.8	0.0	0.0	0.0	0.8
14	132	2	14-2>	Borras Rd	1	14-1<	Jeffery's Rd	14-2>1 OGV2	0	0	0	1	1	1	1	0	0	2	100%	0.0	0.0	0.0	2.8	0.8
14	133	2	14-2>	Borras Rd	3	14-3<	Dean Rd	14-2>3 OGV2	1	0	0	0	1	0	0	0	0	0	-100%	2.8	0.0	0.0	0.0	1.4
14	134	3	14-3>	Dean Rd	1	14-1<	Jeffery's Rd	14-3>1 OGV2	0	0	1	1	2	0	0	1	0	1	-50%	0.0	0.0	0.0	2.8	0.8
14	135	3	14-3>	Dean Rd	2	14-2<	Borras Rd	14-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	136	1	16-1>	Montgomery Rd	2	16-2<	Queensway Sports Centre	16-1>2 OGV2	0	0	0	0	0	2	1	2	1	6	0%	0.0	0.0	0.0	0.0	0.0
16	137	1	16-1>	Montgomery Rd	3	16-3<	Queensway	16-1>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	138	1	16-1>	Montgomery Rd	4	16-4<	Smithfield Rd	16-1>4 OGV2	0	0	0	0	0	0	0	1	0	1	0%	0.0	0.0	0.0	0.0	0.0
16	139	2	16-2>	Queensway Sports Centre	1	16-1<	Montgomery Rd	16-2>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	140	2	16-2>	Queensway Sports Centre	3	16-3<	Queensway	16-2>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	141	2	16-2>	Queensway Sports Centre	4	16-4<	Smithfield Rd	16-2>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	142	3	16-3>	Queensway	1	16-1<	Montgomery Rd	16-3>1 OGV2	0	1	0	0	1	0	0	0	0	0	-100%	0.0	2.8	0.0	0.0	1.4
16	143	3	16-3>	Queensway	2	16-2<	Queensway Sports Centre	16-3>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	144	3	16-3>	Queensway	4	16-4<	Smithfield Rd	16-3>4 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	145	4	16-4>	Smithfield Rd	1	16-1<	Montgomery Rd	16-4>1 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	146	4	16-4>	Smithfield Rd	2	16-2<	Queensway Sports Centre	16-4>2 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
16	147	4	16-4>	Smithfield Rd	3	16-3<	Queensway	16-4>3 OGV2	0	0	0	0	0	0	0	0	0	0	0%	0.0	0.0	0.0	0.0	0.0
								Total	**68**	**67**	**49**	**38**	**221**	**74**	**95**	**82**	**54**	**305**	**38%**	**0.6**	**0.4**	**0.3**	**0.3**	**0.6**

Appendix C

Link Flow Validation Results – AM and PM peak hours

Wrexham BY2018 VISSIM Model - AM Link Count Validation Results

Wrexham VISSIM BY 2018 2563

2018 BY-AM Peak Hr (0800 - 0900) - Total Traffic (Lights & Heavies) - Link Validation

	PASS	FAIL	Criteria	%	Flow Test	
	6	3	% GEH <5	67%	% PASS	7
Counts 9	8	1	% GEH <10	89%		78%
	9	0	% GEH <15	100%		

Count Source	ID	Arms	Ref	Location	Dir	Survey	Model	Diff (S-M)	% Diff	GEH	Flow Test Criteria	Flow Test PASS/FAIL
1	1	<>	1<>	Cefn Rd South	TW	597	614	-17	-3%	0.7	100	PASS
2	2	<>	2<>	Cefn Rd North	TW	893	809	84	10%	2.9	134	PASS
3	3	<>	3<>	Hullah Ln	TW	230	295	-66	-22%	4.0	100	PASS
4	4	<>	4<>	Borras Park Road	TW	402	718	-317	-44%	13.4	100	FAIL
5	5	<>	5<>	Queensway	TW	219	247	-29	-12%	1.9	100	PASS
6	6	<>	6<>	Jeffrey's Rd	TW	0	0	0	0%	0.0	100	PASS
7	7	<>	7<>	Stryt Holt Rd	TW	1,114	1,035	79	8%	2.4	167	PASS
8	8	<>	8<>	Ffordd Montgomery	TW	290	404	-115	-28%	6.1	100	FAIL
9	9	<>	9<>	Borras Road	TW	182	273	-91	-33%	6.0	100	PASS
					Total	3,925	4,395	-471	-11%	4.2		

2018 BY-AM Peak Hr (0800 - 0900) - Total Traffic (Lights & Heavies) - Link Validation

	PASS	FAIL	Criteria	%	Flow Test	
	12	4	% GEH <5	75%	% PASS	15
Counts 16	15	1	% GEH <10	94%		94%
	15	1	% GEH <15	94%		

Count Source	ID	Arm	Ref	Location	Dir	Survey	Model	Diff (S-M)	% Diff	GEH	Flow Test Criteria	Flow Test PASS/FAIL
1	1	>	1>	Cefn Rd South	NB	320	322	-3	-1%	0.1	100	PASS
1	2	<	1<	Cefn Rd South	SB	278	292	-15	-5%	0.9	100	PASS
2	3	>	2>	Cefn Rd North	SB	418	357	61	17%	3.1	100	PASS
2	4	<	2<	Cefn Rd North	NB	476	452	24	5%	1.1	100	PASS
3	5	>	3>	Hullah Ln	EB	87	127	-40	-31%	3.9	100	PASS
3	6	<	3<	Hullah Ln	WB	143	168	-26	-15%	2.0	100	PASS
4	7	>	4>	Borras Park Road	NB	127	434	-307	-71%	18.3	100	FAIL
4	8	<	4<	Borras Park Road	SB	275	284	-10	-3%	0.6	100	PASS
5	9	>	5>	Queensway	EB	69	168	-99	-59%	9.1	100	PASS
5	10	<	5<	Queensway	WB	150	79	71	89%	6.6	100	PASS
7	11	>	7>	Stryt Holt Rd	EB	460	425	35	8%	1.6	100	PASS
7	12	<	7<	Stryt Holt Rd	WB	654	610	44	7%	1.8	100	PASS
8	13	>	8>	Ffordd Montgomery	NB	148	199	-51	-26%	3.9	100	PASS
8	14	<	8<	Ffordd Montgomery	SB	142	205	-64	-31%	4.8	100	PASS
9	15	>	9>	Borras Road	NB	89	106	-17	-16%	1.7	100	PASS
9	16	<	9<	Borras Road	SB	93	167	-74	-44%	6.5	100	PASS
					Total	3,925	4,395	-471	-11%	4.1	Ave	

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Light Traffic - Link Calibration

% GEH <5	67%
% GEH <10	89%
% GEH <15	100%

Counts				9		Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	<>	1<>	Cefn Rd South	TW	571	591	4%	0.8
2	2	<>	2<>	Cefn Rd North	TW	843	788	-7%	1.9
3	3	<>	3<>	Hullah Ln	TW	219	292	34%	4.6
4	4	<>	4<>	Borras Park Road	TW	384	707	84%	13.8
5	5	<>	5<>	Queensway	TW	199	237	19%	2.6
6	6	<>	6<>	Jeffrey's Rd	TW	0	-	0%	0.0
7	7	<>	7<>	Stryt Holt Rd	TW	1,048	1,002	-4%	1.4
8	8	<>	8<>	Ffordd Montgomery	TW	268	390	46%	6.8
9	9	<>	9<>	Borras Road	TW	170	271	60%	6.8
					Total	3,700	4,278	16%	4.3

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Light Traffic - Link Calibration

% GEH <5	75%
% GEH <10	94%
% GEH <15	94%

Counts				16		Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	>	1>	Cefn Rd South	NB	305	309	1%	0.2
1	2	<	1<	Cefn Rd South	SB	266	282	6%	1.0
2	3	>	2>	Cefn Rd North	SB	391	347	-11%	2.3
2	4	<	2<	Cefn Rd North	NB	453	441	-3%	0.5
3	5	>	3>	Hullah Ln	EB	80	126	58%	4.6
3	6	<	3<	Hullah Ln	WB	139	166	19%	2.2
4	7	>	4>	Borras Park Road	NB	121	425	253%	18.4
4	8	<	4<	Borras Park Road	SB	264	282	7%	1.1
5	9	>	5>	Queensway	EB	62	158	155%	9.2
5	10	<	5<	Queensway	WB	137	79	-42%	5.5
7	11	>	7>	Stryt Holt Rd	EB	431	398	-8%	1.6
7	12	<	7<	Stryt Holt Rd	WB	617	604	-2%	0.5
8	13	>	8>	Ffordd Montgomery	NB	138	198	44%	4.7
8	14	<	8<	Ffordd Montgomery	SB	130	192	48%	4.9
9	15	>	9>	Borras Road	NB	84	105	25%	2.2
9	16	<	9<	Borras Road	SB	86	166	94%	7.2
					Total	3,700	4,278	16%	4.1

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Heavy Traffic - Link Calibration

% GEH <5	88%
% GEH <10	100%
% GEH <15	100%

Counts				9		Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	<>	1<>	Cefn Rd South	TW	26	23	-12%	0.6
2	2	<>	2<>	Cefn Rd North	TW	50	21	-58%	4.9
3	3	<>	3<>	Hullah Ln	TW	11	3	-73%	3.0
4	4	<>	4<>	Borras Park Road	TW	18	11	-37%	1.7
5	5	<>	5<>	Queensway	TW	20	10	-50%	2.6
6	6	<>	6<>	Jeffrey's Rd	TW	0	-	0%	0.0
7	7	<>	7<>	Stryt Holt Rd	TW	66	33	-50%	4.6
8	8	<>	8<>	Ffordd Montgomery	TW	22	14	-36%	1.9
9	9	<>	9<>	Borras Road	TW	13	2	-84%	3.9
					Total	225	117	-48%	2.6

2018 BY- Quarterly AM Peak Hr (0800 - 0900) - Heavy Traffic - Link Calibration

% GEH <5	88%
% GEH <10	100%
% GEH <15	100%

Counts				16		Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	>	1>	Cefn Rd South	NB	15	13	-10%	0.4
1	2	<	1<	Cefn Rd South	SB	12	10	-13%	0.5
2	3	>	2>	Cefn Rd North	SB	27	10	-63%	4.0
2	4	<	2<	Cefn Rd North	NB	23	11	-52%	2.9
3	5	>	3>	Hullah Ln	EB	8	1	-87%	3.2
3	6	<	3<	Hullah Ln	WB	4	2	-43%	0.9
4	7	>	4>	Borras Park Road	NB	7	9	38%	0.9
4	8	<	4<	Borras Park Road	SB	11	2	-82%	3.5
5	9	>	5>	Queensway	EB	7	10	43%	1.0
5	10	<	5<	Queensway	WB	13	-	-100%	5.1
7	11	>	7>	Stryt Holt Rd	EB	29	27	-5%	0.3
7	12	<	7<	Stryt Holt Rd	WB	37	6	-84%	6.7
8	13	>	8>	Ffordd Montgomery	NB	11	1	-90%	4.0
8	14	<	8<	Ffordd Montgomery	SB	12	13	13%	0.4
9	15	>	9>	Borras Road	NB	5	1	-80%	2.3
9	16	<	9<	Borras Road	SB	8	1	-87%	3.2
					Total	225	117	-48%	2.4

Wrexham BY2018 VISSIM Model - PM Link Count Validation Results

Wrexham VISSIM BY 2018 2563

2018 BY-PM Peak Hr (1630 - 1730) - Total Traffic (Lights & Heavies) - Link Validation

		PASS	FAIL	Criteria	%	Flow Test	
		6	2	%GEH <5	75%	%PASS	5
Counts	8	8	0	%GEH <10	100%		63%
		8	0	%GEH <15	100%		

Count Source	ID	Arms	Ref	Location	Dir	Survey	Model	Diff (S-M)	%Diff	GEH	Flow Test Criteria	Flow Test PASS/FAIL
1	1	<>	1<>	Cefn Rd South	TW	648	667	-20	-3%	0.8	100	PASS
2	2	<>	2<>	Cefn Rd North	TW	763	884	-121	-14%	4.2	114	FAIL
3	3	<>	3<>	Hullah Ln	TW	249	216	33	15%	2.2	100	PASS
4	4	<>	4<>	Borras Park Road	TW	426	508	-83	-16%	3.8	100	PASS
5	5	<>	5<>	Queensway	TW	256	386	-131	-34%	7.3	100	FAIL
7	6	<>	7<>	Stryt Holt Rd	TW	1,336	1,255	81	6%	2.2	200	PASS
8	7	<>	8<>	Ffordd Montgomery	TW	369	524	-155	-30%	7.3	100	FAIL
9	8	<>	9<>	Borras Road	TW	180	209	-29	-14%	2.1	100	PASS
Total						**4,225**	**4,649**	**-424**	**-9%**	**3.7**		

2018 BY-PM Peak Hr (1630 - 1730) - Total Traffic (Lights & Heavies) - Link Validation

		PASS	FAIL	Criteria	%	Flow Test	
		11	5	%GEH <5	69%		13
Counts	16	13	3	%GEH <10	81%	%PASS	81%
		16	0	%GEH <15	100%		

Count Source	ID	Arm	Ref	Location	Dir	Survey	Model	Diff (S-M)	%Diff	GEH	Flow Test Criteria	Flow Test PASS/FAIL
1	1	>	1>	Cefn Rd South	NB	362	374	-12	-3%	0.6	100	PASS
1	2	<	1<	Cefn Rd South	SB	286	293	-8	-3%	0.4	100	PASS
2	3	>	2>	Cefn Rd North	SB	379	417	-38	-9%	1.9	100	PASS
2	4	<	2<	Cefn Rd North	NB	384	467	-83	-18%	4.0	100	PASS
3	5	>	3>	Hullah Ln	EB	129	99	30	30%	2.8	100	PASS
3	6	<	3<	Hullah Ln	WB	121	117	4	3%	0.3	100	PASS
4	7	>	4>	Borras Park Road	NB	240	106	134	126%	10.2	100	FAIL
4	8	<	4<	Borras Park Road	SB	186	402	-216	-54%	12.6	100	FAIL
5	9	>	5>	Queensway	EB	94	271	-178	-65%	13.1	100	FAIL
5	10	<	5<	Queensway	WB	162	115	47	41%	4.0	100	PASS
7	11	>	7>	Stryt Holt Rd	EB	692	668	24	4%	0.9	100	PASS
7	12	<	7<	Stryt Holt Rd	WB	644	587	57	10%	2.3	100	PASS
8	13	>	8>	Ffordd Montgomery	NB	210	306	-97	-32%	6.0	100	PASS
8	14	<	8<	Ffordd Montgomery	SB	160	218	-58	-27%	4.3	100	PASS
9	15	>	9>	Borras Road	NB	118	86	32	37%	3.2	100	PASS
9	16	<	9<	Borras Road	SB	62	123	-61	-50%	6.3	100	PASS
					Total	**4,225**	**4,649**	**-424**	**-9%**	**4.6**	**Ave**	

0 > 7

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Light Traffic - Link Calibration

% GEH <5	63%
% GEH <10	100%
% GEH <15	100%

Counts			8			Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	<>	1<>	Cefn Rd South	TW	622	654	5%	1.3
2	2	<>	2<>	Cefn Rd North	TW	728	871	20%	5.1
3	3	<>	3<>	Hullah Ln	TW	239	215	-10%	1.6
4	4	<>	4<>	Borras Park Road	TW	419	496	19%	3.6
5	5	<>	5<>	Queensway	TW	242	383	58%	8.0
7	6	<>	7<>	Stryt Holt Rd	TW	1,301	1,214	-7%	2.4
8	7	<>	8<>	Ffordd Montgomery	TW	354	506	43%	7.3
9	8	<>	9<>	Borras Road	TW	178	203	14%	1.8
Total						4,081	4,542	11%	3.9

< 11

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Light Traffic - Link Calibration

% GEH <5	69%
% GEH <10	81%
% GEH <15	100%

Counts			16			Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	>	1>	Cefn Rd South	NB	347	364	5%	0.9
1	2	<	1<	Cefn Rd South	SB	275	290	5%	0.9
2	3	>	2>	Cefn Rd North	SB	364	414	14%	2.5
2	4	<	2<	Cefn Rd North	NB	364	457	26%	4.6
3	5	>	3>	Hullah Ln	EB	125	98	-22%	2.6
3	6	<	3<	Hullah Ln	WB	114	117	3%	0.3
4	7	>	4>	Borras Park Road	NB	236	101	-57%	10.4
4	8	<	4<	Borras Park Road	SB	183	395	116%	12.5
5	9	>	5>	Queensway	EB	90	268	199%	13.4
5	10	<	5<	Queensway	WB	153	115	-25%	3.2
7	11	>	7>	Stryt Holt Rd	EB	679	652	-4%	1.0
7	12	<	7<	Stryt Holt Rd	WB	622	562	-10%	2.4
8	13	>	8>	Ffordd Montgomery	NB	202	305	51%	6.5
8	14	<	8<	Ffordd Montgomery	SB	152	201	32%	3.7
9	15	>	9>	Borras Road	NB	117	83	-29%	3.4
9	16	<	9<	Borras Road	SB	61	120	97%	6.2
Total						4,081	4,542	11%	4.7

0 > 8

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Heavy Traffic - Link Calibration

% GEH <5	100%
% GEH <10	100%
% GEH <15	100%

Counts			8			Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	<>	1<>	Cefn Rd South	TW	26	13	-50%	2.9
2	2	<>	2<>	Cefn Rd North	TW	35	13	-63%	4.5
3	3	<>	3<>	Hullah Ln	TW	11	1	-90%	4.0
4	4	<>	4<>	Borras Park Road	TW	7	12	71%	1.6
5	5	<>	5<>	Queensway	TW	14	3	-78%	3.7
7	6	<>	7<>	Stryt Holt Rd	TW	35	41	17%	1.0
8	7	<>	8<>	Ffordd Montgomery	TW	15	18	20%	0.7
9	8	<>	9<>	Borras Road	TW	2	6	200%	2.0
Total						144	107	-26%	2.5

< 12

2018 BY- Quarterly PM Peak Hr (1630 - 1730) - Heavy Traffic - Link Calibration

% GEH <5	100%
% GEH <10	100%
% GEH <15	100%

Counts			16			Pk Hr	Pk Hr	Pk Hr	Pk Hr
						Survey	Model	% Diff	GEH
Count Source	ID	Arm	Ref	Location	Dir	Pk Hr	Pk Hr	Pk Hr	Pk Hr
1	1	>	1>	Cefn Rd South	NB	16	10	-35%	1.5
1	2	<	1<	Cefn Rd South	SB	11	3	-71%	2.9
2	3	>	2>	Cefn Rd North	SB	15	3	-80%	4.0
2	4	<	2<	Cefn Rd North	NB	20	10	-50%	2.6
3	5	>	3>	Hullah Ln	EB	4	1	-71%	1.7
3	6	<	3<	Hullah Ln	WB	7	-	-100%	3.7
4	7	>	4>	Borras Park Road	NB	4	5	25%	0.5
4	8	<	4<	Borras Park Road	SB	3	7	133%	1.8
5	9	>	5>	Queensway	EB	4	3	-25%	0.5
5	10	<	5<	Queensway	WB	10	-	-100%	4.4
7	11	>	7>	Stryt Holt Rd	EB	13	16	23%	0.8
7	12	<	7<	Stryt Holt Rd	WB	22	25	14%	0.6
8	13	>	8>	Ffordd Montgomery	NB	8	1	-87%	3.2
8	14	<	8<	Ffordd Montgomery	SB	8	17	127%	2.7
9	15	>	9>	Borras Road	NB	1	3	200%	1.4
9	16	<	9<	Borras Road	SB	1	3	200%	1.4
Total						144	107	-26%	2.1

Appendix D

Journey Time Validation Results – AM and PM peak hours

Wrexham BY2018 VISSIM Model - AM Journey Time Validation Results

Wrehxam VISSIM BY 2018

2018 BY-AM Peak Hr (0800 - 0900) - Journey Time Validation

% PASS / FAIL	100%

Route	Counter	Route Description	Distance (m)	Observed	Modelled	% Difference		Difference (secs)			PASS / FAIL
Corridor 1 SB	1	From after Tesco roundabout to before A5156/A534 roundabout	2,422	250	295	18%	FAIL	-45	PASS		PASS
Corridor 1 NB	2		2,413	236	272	15%	PASS	-36	PASS		PASS
Corridor 2 SB	3	From Queensway junction to Borras Rd/Jeffrey's Rd junction	2,383	228	253	11%	PASS	-25	PASS		PASS
Corridor 2 NB	4		2,364	244	261	7%	PASS	-17	PASS		PASS
Corridor 3 EB	5	From A534 East of roundabout to industrial estate roundabout befroe junction	2,067	103	110	7%	PASS	-7	PASS		PASS
Corridor 3 WB	6		2,141	116	113	-3%	PASS	3	PASS		PASS
Corridor 4 SB	7	Borras Park Road from Jeffrey's road junction to A5156 roundabout	723	110	129	18%	FAIL	-19	PASS		PASS
Corridor 4 NB	8		717	104	154	48%	FAIL	-50	PASS		PASS
		Total	**15,231**	**1,391**	**1,587**	14%	PASS	-25	PASS	Ave	PASS
		Average Speed (kph)		**39.4**	**34.6**	-12%	PASS	5	PASS		PASS

Wrexham BY2018 VISSIM Model - PM Journey Time Validation Results

Wrehxam VISSIM BY 2018

2018 BY-PM Peak Hr (1630 - 1730) - Journey Time Validation

% PASS / FAIL	88%

Route	Counter	Route Description	Distance (m)	Observed (secs)	Modelled (secs)	% Difference		Difference (secs)			PASS / FAIL
Corridor 1 SB	1	From after Tesco roundabout to before A5156/A534 roundabout	2,422	262	318	21%	FAIL	-56	PASS		PASS
Corridor 1 NB	2		2,413	272	307	13%	PASS	-35	PASS		PASS
Corridor 2 SB	3	From Queensway junction to Borras Rd/Jeffrey's Rd junction	2,383	229	258	13%	PASS	-29	PASS		PASS
Corridor 2 NB	4		2,364	261	261	0%	PASS	0	PASS		PASS
Corridor 3 EB	5	From A534 East of roundabout to industrial estate roundabout befroe junction	2,067	99	101	3%	PASS	-2	PASS		PASS
Corridor 3 WB	6		2,141	120	167	39%	FAIL	-47	PASS		PASS
Corridor 4 SB	7	Borras Park Road from Jeffrey's road junction to A5156 roundabout	723	121	159	31%	FAIL	-38	PASS		PASS
Corridor 4 NB	8		717	118	201	70%	FAIL	-83	FAIL		FAIL
		Total	**15,231**	**1,483**	**1,772**	20%	FAIL	-36	PASS	Ave	PASS
		Average Speed (kph)		**37.0**	**30.9**	-16%	FAIL	6	PASS		PASS

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Appendix B

SLR Forecasting Note

Vectos Microsim

Holt Road VISSIM Modelling

Forecasting, Mitigation Proposals & Summary Results

September 2019

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Contents

1 INTRODUCTION 1

Background 1
Methodology 2
Model Scope 2

2 ADJUSTMENTS TO BASE MODEL 3

Rationale 3

3 FORECAST DEMAND METHODOLOGY 8

Do-Nothing Forecast Demand 9
Do-Minimum Forecast Demand 10

4 KSS2 & KSS3 DEVELOPMENT SITES 17

Location 17
Traffic Demand 18

5 SCENARIO LIST 21

6 MODELLING RESULTS 22

2023 Do-Nothing (2023 DN) 22
2023 Do-Minimum (2023 DM) 22
2023 Do-Something (2023 DS) 23
2028 Do-Nothing (2028 DN) 26
2028 Do-Minimum (2028 DM) 27
2028 Do-Something 1 (2028 DS1) 28
2028 Do-Something 2 (2028 DS2) 33
Scenario Comparison 35
Journey Time Corridor Comparison 35
Junction Flow Comparison 38

7 SUMMARY 43

8 CONCLUSION 45

1 INTRODUCTION

Background

1.1 Vectos Microsim (VM) has been commissioned to undertake VISSIM testing in support of Wrexham's Local Development Plan. Two development sites have been specifically identified for inclusion in this testing; known as KSS2 (Policy SP5: Land east of Cefn Road, Wrexham) and KSS3 (Policy SP11: Land to the north of Bryn Lane, Wrexham Industrial Estate). The work is to be undertaken on behalf of a tri-party of stakeholders; Wrexham County Borough Council (WCBC), Barratt Homes/Bloor Homes (promoting the northern of the two sites that make up the KSS2 development site of primary interest), and Countryside Properties (promoting the southern KSS2 element).

1.2 VM has received a VISSIM Base model from WCBC, which was developed on their behalf by Integrated Transport Planning Ltd (ITP). This model was calibrated and validated to 2018 observed conditions and considered fit for purpose by WCBC. The model build process is documented in the accompanying LMVR[1].

1.3 In addition to the inclusion of KSS2 and KSS3 development sites, TEMPro forecasts have also been used to ensure the effects of growth in background traffic volumes are also accounted for within the assessment and identification of infrastructure.

1.4 VM developed a Method Statement for a series of tests carried out to determine the infrastructure requirements both for the end of the Local Plan year (2028), and a 5 year build-out horizon year of 2023[2]. The purpose of the +5 year test is to establish any immediate infrastructure requirements necessary for the early phases of the development build out, whilst the end of plan assessment is intended to identify the full suite of interventions necessary to enable the delivery of the Local Plan proposals and will likely be adopted within the Infrastructure Delivery Plan (IPD) which will accompany the Local Plan. The methodology which has been adopted is summarised below.

[1] 2563 Wrexham VISSIM R001_LMVR_V1-1.pdf
[2] VM180223.TN001 Method Statement_Rev2.pdf

Methodology

1.5 VM proposed to develop a 5 year test in the first instance to determine any interim off-site mitigation necessary prior to the link road being operational.

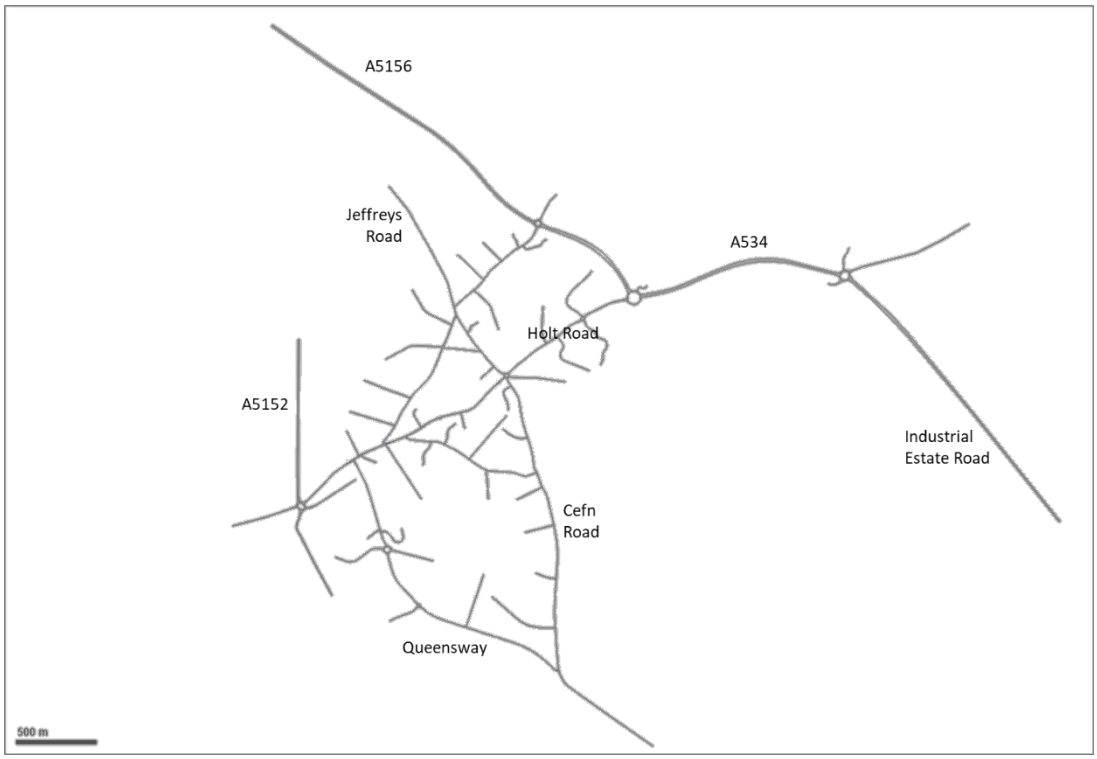
1.6 Following the inclusion of a suitable mitigation strategy for 2023, the testing will move to 2028, by which time the link road will be delivered alongside the full development build out, and any additional off-site mitigation requirements can be developed.

1.7 The demand matrices for the 2023 and 2028 were based on the most recent trajectory for each site within KSS2, along with the KSS3 site, and finally an element of background growth informed by TEMPro. The detailed forecasting methodology will be documented in Chapter 3.

Model Scope

1.8 The base model extent is shown in Figure 1 below:

Figure 1: VISSIM Base Model Extent



2 ADJUSTMENTS TO BASE MODEL

Rationale

2.1 Following receipt of the appropriate VISSIM model files, it was noted that significant queues were observed on the A5156 southbound approach to Borras Park Road roundabout. As queue lengths were not used as a calibration or validation measure in the development of the Base, these queue lengths were not reported in the LMVR.

2.2 The reason for the queuing was a very low circulatory speed at the roundabout which restricted throughput from the north to a level far below that which might be expected, and overly-prescriptive hesitancy parameters on Borras Park Road southbound where traffic calming measures are in place on street. This created queue lengths of approximately 500-600m during the AM peak hour in 2018; this is widely regarded as unrealistic.

2.3 Early iterations of future year testing showed that this queue becomes significantly worse following the addition of growth traffic, which not only exacerbates unrealistic queues observed in the Base but also undermines the robustness of any impact assessment, as traffic intended to travel through the network is constrained by and held on this approach.

2.4 Whilst it was undesirable to make changes to the Base model, the efficacy of the testing relied on the ability of the Borras Park Road approach to accommodate the southbound traffic levels in a realistic manner, and this was not the case in the original model received by VM. Through dialogue with all stakeholders it was agreed that changes should be made to the behaviour at this location.

2.5 The specific changes made were:

- Borras Park Road Roundabout: circulatory speed distribution changed from 6-15mph to 20-25mph (new distribution added, estimated based on the size, number of lanes and trajectory of the roundabout)
- Borras Park Road eastbound and westbound approaches: approach speed distribution changed from 9-15mph to 15-20mph (new distribution added, estimated based on the approach visibility and local knowledge of approaching vehicle behaviour)

- A534/A5156 Roundabout and A534/Industrial Estate Road Roundabout: new distribution added, estimated based on the size, number of lanes and trajectory of the roundabout). In the existing base model, no speed controls were included on either roundabout, meaning vehicles were allowed to traverse the roundabouts at speeds in excess of what would be considered realistic.

2.6 These three roundabouts (along with Greyhound Roundabout) are arguably the key junctions to the east of Wrexham and certainly the areas of primary interest in regards to the inclusion of KSS2 and KSS3 and the impact on the local network. As a result it was considered necessary to ensure behaviour at these locations was as accurate as possible before the testing progressed. This means, in this case, encouraging throughput at Borras Park Road roundabout in-line with known conditions at the roundabout, but also reducing speeds at the other two roundabouts in response to the observed conditions in the model.

2.7 To ensure these limited changes did not materially impact the accuracy of the model, quantitative analysis conducted by ITP during development of the Base model was replicated by re-running the Base after these alterations had been made.

2.8 Excerpts from the Base model LMVR[3] are provided below, detailing the turn count calibration statistics for the AM and PM Base models:

Table 1: Original ITP Base model AM and PM Turn and Link Count Calibration

Table 5-1: Total Traffic Flow Calibration (Peak Hours)

Modelled Period	Link Counts (99)		Turn Counts (147)	
	% GEH Criteria (<5)	% Flow Criteria	% GEH Criteria (<5)	% Flow Criteria
AM Peak Hour (08:00 – 09:00)	95%	95%	92%	99%
PM Peak Hour (16:30 – 17:30)	84%	86%	88%	96%

[3] 2563 Wrexham VISSIM R002_Forecasting Report_V1-1, page 23

2.9 Following the minor alterations described, the revised Base model turn count calibration statistics were as follows:

Table 2: Revised VM Base model AM and PM Turn and Link Count Calibration

Modelled Period	Link Counts (99)		Turn Counts (147)	
	% GEH Criteria (<5)	% Flow Criteria	% GEH Criteria (<5)	% Flow Criteria
AM Peak Hour (08:00-09:00	94%	93%	92%	99%
PM Peak Hour (16:30-17:30)	82%	86%	87%	97%

2.10 In the AM period, only 1 fewer link counts fall within the GEH <5 criteria and 2 fewer fall within the % Flow criteria, and both remain well within permitted tolerances. All turn count results remain the same as the originally reported model. In the PM period, only 2 fewer link counts fall within the GEH <5 criteria whilst the % Flow criteria achieves the same standard as the original. 2 fewer turn counts fall within the GEH <5 criteria, but 1 additional turn count falls within the % Flow criteria.

2.11 The following excerpts from the Base model relate to journey time comparisons in the AM and PM peak base models:

Table 3: Original ITP Base model AM Journey Time Validation

Table 6-2: AM peak journey time analysis

Route	Direction	Observed (secs)	Modelled (secs)	Difference (%)	Difference (secs)	Result
Corridor 1	Southbound	250	295	18%	-45	PASS
	Northbound	236	272	15%	-36	PASS
Corridor 2	Southbound	228	253	11%	-25	PASS
	Northbound	244	261	7%	-17	PASS
Corridor 3	Eastbound	103	110	7%	-7	PASS
	Westbound	116	113	-3%	3	PASS
Corridor 4	Southbound	110	129	18%	-19	PASS
	Northbound	104	154	48%	-50	PASS

Table 4: Original ITP Base model PM Journey Time Validation

Table 6-3: PM peak journey time analysis

Route	Direction	Observed (secs)	Modelled (secs)	Difference (%)	Difference (secs)	Result
Corridor 1	Southbound	262	318	21%	-56	**PASS**
	Northbound	272	307	13%	-35	**PASS**
Corridor 2	Southbound	229	258	13%	-29	**PASS**
	Northbound	261	261	0%	0	**PASS**
Corridor 3	Eastbound	99	101	3%	-2	**PASS**
	Westbound	120	167	39%	-47	**PASS**
Corridor 4	Southbound	121	159	31%	-38	**PASS**
	Northbound	118	201	70%	-83	**FAIL**

2.12 The tables below show the results following the minor alterations:

Table 5: Revised VM Base model AM Journey Time Validation

Route	Direction	Observed (s)	Modelled (s)	Difference (%)	Difference (s)	Result
Corridor 1	Southbound	250	276	10%	-26	PASS
	Northbound	236	266	13%	-30	PASS
Corridor 2	Southbound	228	252	10%	-24	PASS
	Northbound	244	270	11%	-26	PASS
Corridor 3	Eastbound	103	115	12%	-12	PASS
	Westbound	116	115	-1%	1	PASS
Corridor 4	Southbound	110	112	2%	-3	PASS
	Northbound	104	122	17%	-17	PASS

Table 6: Revised VM Base model PM Journey Time Validation

Route	Direction	Observed (s)	Modelled (s)	Difference (%)	Difference (s)	Result
Corridor 1	Southbound	262	289	10%	-27	PASS
	Northbound	272	305	12%	-33	PASS
Corridor 2	Southbound	229	257	12%	-27	PASS
	Northbound	261	265	2%	-4	PASS
Corridor 3	Eastbound	99	105	6%	-6	PASS
	Westbound	120	140	17%	-20	PASS
Corridor 4	Southbound	121	110	-10%	12	PASS
	Northbound	118	133	13%	-15	PASS

2.13 Journey time results show the model maintains a 100% pass rate for journey time validation during the AM peak. In the PM peak, where the original model showed northbound corridor 4 (Borras Park Road from Jeffreys Road to A5156 Roundabout) failed to meet DMRB criteria, the revised model achieves a 100% pass rate. This demonstrates that the measures taken to improve accuracy at the Borras Park Road roundabout have been effective.

2.14 It should also be noted that corridor 3 (between Borras Park Road roundabout and Industrial Estate Road roundabout) also shows a closer correlation between modelled and observed journey times (westbound differences between observed and modelled fall from 39% to just 17%). This further indicates that the model has benefitted from the alterations.

2.15 In summary, the results show no significant difference between the original and revised models and, whilst the existing LMVR is still applicable to the revised model, the changes described above should be recorded as the latest calibration and validation statistics.

3 FORECAST DEMAND METHODOLOGY

3.1 Forecast traffic growth for the various modelled scenarios has been informed by TEMPro growth rates for the years between the Base (2018) and the two forecast years (2023 and 2028).

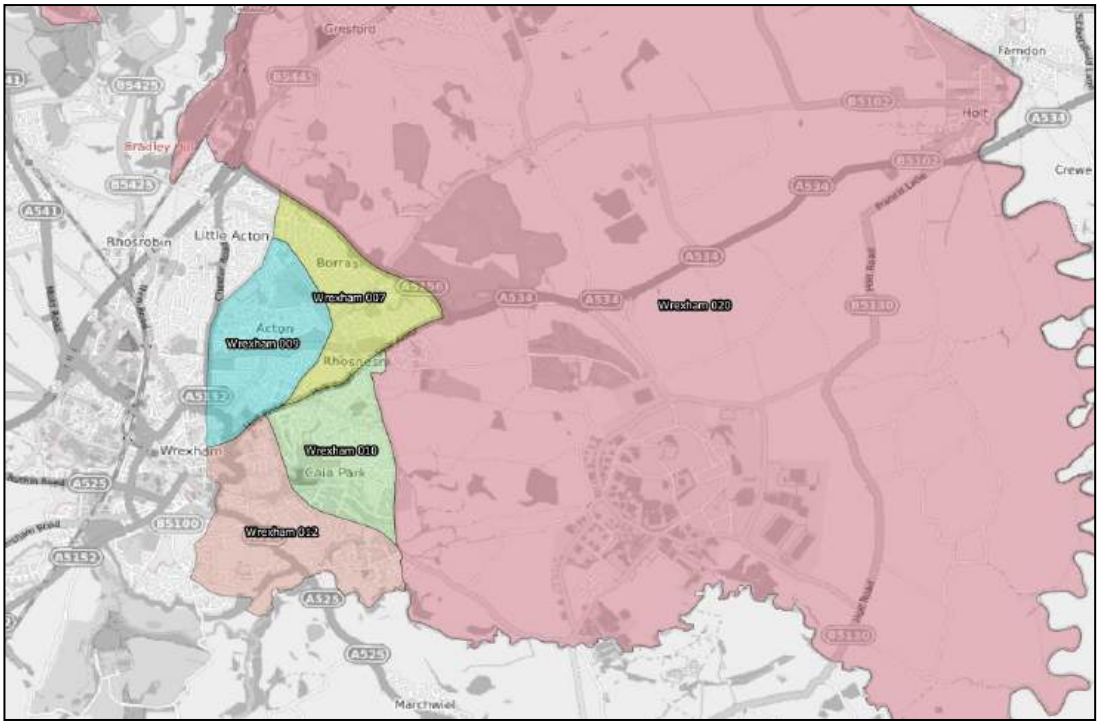
3.2 For each year, the following scenarios have been developed (these will be explained in further detail in Chapter 5):

- Do-Nothing – assumes no KSS2 and KSS3, growth solely informed by TEMPro growth assumptions
- Do-Minimum – assumes appropriate level of KSS2 and KSS3 demand for each year, with TEMPro growth also added but adjusted for the inclusion of these two sites to ensure no double-counting
- Do-Something – assumes the same level of demand as the Do-Minimum, but with the additional highway mitigation measures

Do-Nothing Forecast Demand

3.3 The following Figure presents the Middle-Super-Output-Areas (MSOAs) that cover the model extent:

Figure 2: MSOA Map



3.4 The TEMPro rates used for 2023 and 2028 are provided below:

Table 7: TEMPro Growth Rates

MSOA Number	MSOA Name	AM Peak		PM Peak	
		2018-2023 Growth	2018-2028 Growth	2018-2023 Growth	2018-2028 Growth
W02000084	**Wrexham 007**	1.0461	1.0894	1.0453	1.0900
W02000086	**Wrexham 009**	1.0527	1.0981	1.0509	1.0963
W02000087	**Wrexham 010**	1.0676	1.1240	1.0710	1.1321
W02000089	**Wrexham 012**	1.0555	1.1015	1.0517	1.0965
W02000420	**Wrexham 020**	1.0331	1.0654	1.0329	1.0650
Authority	**Wrexham**	1.0472	1.0885	1.0469	1.0893

3.5 Each internal zone in the model is assigned an MSOA based on its relative positon. The corresponding TEMPro growth rate is then assigned to all trips in the model to provide 2018-2023/2028 forecast demand.

3.6 As per the original agreed forecasting methodology, certain zones on the edges of the model extent were selected as 'external' zones. Trips between these zones are assumed to be through trips, growth in these trips is both less certain and less likely to be affected by the internal growth assumptions within the model. As a result growth in external trips was informed by the wider Wrexham growth rate. These zones are 7 (A5152 Fardon Street), 9 (A5152 Bodhyfyrd), 17 (A5156) and 21 (A534 Wrexham Road)[4].

3.7 The application of the various TEMPRO growth rates across the model demands resulted in the following net growth levels within 2023 and 2028 AM and PM modelled peak hours:

Table 8: 2023 and 2028 Total Network Growth Rates (Do-Nothing Scenarios)

AM Peak		PM Peak	
2018-2023 Growth	**2018-2028 Growth**	**2018-2023 Growth**	**2018-2028 Growth**
4.8%	9.2%	4.6%	8.8%

Do-Minimum Forecast Demand

3.8 In the Do-Minimum demand set, TEMPro forecasts are adjusted to account for the household and jobs that are to be delivered as part of KSS2 and KSS3 as these trips are now explicitly included within the model. These adjustments are necessary to avoid double-counting as the Local Plan now provides more certainty around where the housing and jobs will be delivered.

3.9 For 2023, TEMPro assumes housing growth, from 2018, of 785 dwellings. The KSS2 housing site assumes a build out trajectory of 250 dwellings on the northern site and 460 dwellings on the southern site by 2023/24; a total of 710 dwellings. These are therefore removed from the housing growth assumptions and only the residual housing number is re-entered into TEMPro to create a revised growth rate.

[4] 2563 Wrexham VISSIM R002_Forecasting Report_V1-1, page 6 para. 3.2

3.10 By 2028, TEMPro assumes a housing growth of 1599 dwellings. The KSS2 site will deliver a total of 1680 dwellings. Therefore, all housing growth was removed from the TEMPro assumptions to derive a revised growth rate.

3.11 Similarly for the employment adjustment, KSS3 is expected to deliver job growth in excess of that predicted by TEMPro. In 2023, TEMPro predicts job growth of 194 by 2023 and 415 by 2028; KSS3 is assumed to deliver at least 500 and 1000 jobs by each respective year. Therefore any additional growth in jobs has been removed from the TEMPro assumptions, but only for the MSOA that covers the KSS3 site (i.e. Wrexham 020). Job growth predictions in the areas outside of the specific KSS3 MSOA remain; this reflects the uncertainty of future employment sites across the full extent of the model which ensures the forecasting methodology remains robust.

3.12 The following table presents the housing and job growth assumptions that underpin the TEMPro growth rates used for the Do-Nothing demands alongside a summary of the adjustments and resulting growth rates applied within the Do-Minimum scenarios to reflect ‘background growth’.

Table 9: Do-Nothing and Do-Minimum 2023 TEMPro Growth Rates – Internal Trips

Do-Nothing 2023								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0461	1.0453	2377	965	2487	979	110	14
Wrexham 009	1.0527	1.0509	2377	1794	2487	1810	110	16
Wrexham 010	1.0676	1.0710	3118	965	3263	973	145	7
Wrexham 012	1.0555	1.0517	4013	4353	4200	4406	187	53
Wrexham 020	1.0331	1.0329	5868	16081	6100	16275	232	194
Do-Minimum 2023 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0234	1.0186	2377	965	2392	979	15	14
Wrexham 009	1.0357	1.0330	2377	1794	2392	1810	15	16
Wrexham 010	1.0451	1.0443	3118	965	3137	973	20	7
Wrexham 012	1.0383	1.0340	4013	4353	4039	4406	25	53
Wrexham 020	1.0098	1.0092	5868	16081	5868	16081	0	0

Table 10: Do-Nothing and Do-Minimum 2028 TEMPro Growth Rates – Internal Trips

Do-Nothing 2028								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0894	1.0900	2377	965	2602	993	225	28
Wrexham 009	1.0981	1.0963	2377	1794	2602	1835	225	42
Wrexham 010	1.1240	1.1321	3118	965	3413	986	296	21
Wrexham 012	1.1015	1.0965	4013	4353	4394	4468	381	115
Wrexham 020	1.0654	1.0650	5868	16081	6340	16497	472	415
Do-Minimum 2028 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0355	1.0267	2377	965	2377	993	0	28
Wrexham 009	1.0572	1.0534	2377	1794	2377	1835	0	42
Wrexham 010	1.0698	1.0678	3118	965	3118	986	0	21
Wrexham 012	1.0602	1.0539	4013	4353	4013	4468	0	115
Wrexham 020	1.0168	1.0158	5868	16081	5868	16081	0	0

3.13 A similar process was undertaken to inform the growth in external trips within the model. TEMPro contains assumptions in relation to job and housing growth across the whole Wrexham Authority; these can be revised in accordance with the known delivery of KSS2 and KSS3, along with the total Local Plan housing assumptions for each year.

3.14 As with the internal trips, KSS2 housing delivery is assumed to be 710 dwellings by 2023 and 1680 dwellings by 2028. The assumed level of job growth from delivery of KSS3 is 500 jobs by 2023 and 1000 by 2028.

3.15 Prior to any deductions from the housing numbers assumed by TEMPro, the housing projection for both 2023 and 2028 can be updated in accordance with the Local Plan Housing number to ensure that the TEPRO numbers align with those that are expected to come forward as a result of adopting the Local Plan.

3.16 WCBC Local Development Plan states that "*the housing requirement […] has been established as 7750 units*"[5]. This therefore overwrites the current assumption in TEMPro as the projected housing growth up to 2028.

3.17 Table 18 of the same document provides an overview of the anticipated completions per year, which reads as follows:

Table 11: Local Plan Housing Delivery Projections

Year	Anticipated Completions	Cumulative
2017-2018	414	-
2018-2019	484	898
2019-2020	571	1469
2020-2021	781	2250
2021-2022	803	3053
2022-2023	841	3894
2023-2024	820	**4714**
2024-2025	748	5462
2025-2026	717	6179
2026-2027	761	6940
2027-2028	751	7691
Total	**7691**	

3.18 The result of these adjustments is detailed in the following Tables:

[5] Wrexham Local Development Plan (2013-2028) BP08, page 8

Table 12: Do-Nothing and Do-Minimum 2023 TEMPro Growth Rates – External Trips

Do-Nothing 2023								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0472	1.0469	60437	65166	63180	66101	2743	934
Local Plan Housing Adjustment								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0623	1.0633	60437	65166	65151	66101	4714	934
Do-Minimum 2023 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0526	1.0535	60437	65166	64441	65601	4004	434

Table 13: Do-Nothing and Do-Minimum 2028 TEMPro Growth Rates – External Trips

Do-Nothing 2028								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0885	1.0893	60437	65166	66023	67015	5586	1849
Local Plan Housing Adjustment								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.1052	1.1074	60437	65166	68187	67015	7750	1849
Do-Minimum 2028 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0836	1.0854	60437	65166	66507	66015	6070	849

3.19 When these rates are applied across all zones in the model the cumulative growth within the Do-Minimum scenario is as follows:

Table 14: 2023 and 2028 Total Network Growth Rates (Do-Minimum/Do-Something Scenarios)

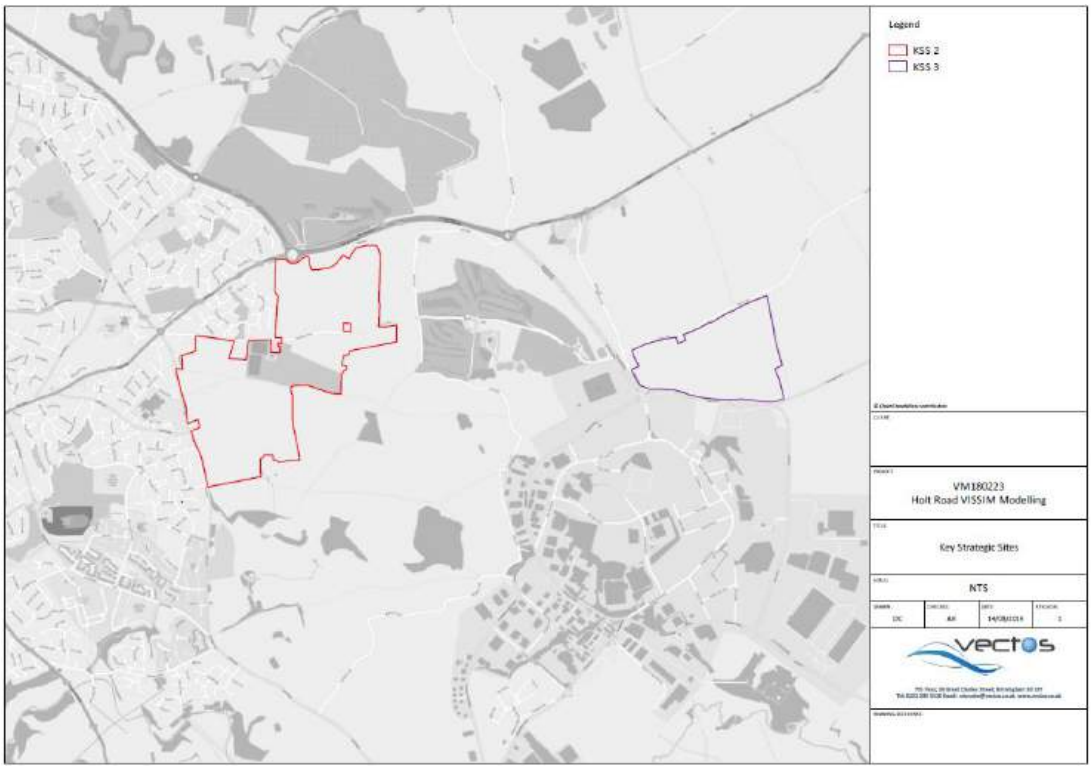
	AM Peak		PM Peak	
	2023	**2028**	**2023**	**2028**
KSS2 Growth	4.6%	10.8%	5.1%	12.0%
KSS3 Growth	3.7%	7.5%	3.1%	6.3%
TEMPro Growth (Background)	3.1%	4.8%	2.8%	4.5%
Total	**11.4%**	**23.1%**	**11.0%**	**22.7%**

4 KSS2 & KSS3 DEVELOPMENT SITES

Location

4.1 Both KSS2 and KSS3 sites fall within, or just outside of the model extent. The location of the sites is illustrated in the Figure below.

Figure 3: KSS2 and KSS3 Site Locations



4.2 KSS2 is split between northern and southern sites, which are promoted by Barratt Homes/Bloor Homes and Countryside Properties respectively.

4.3 KSS2 traffic is assigned into the model via the inclusion of new zones and associated accesses onto the existing road network; a southern access via a new priority junction with Cefn Road and a northern access via new arm to the south of the existing A5156/A534 roundabout.

4.4 For KSS3, traffic is assigned via existing Zone 22 which represents the existing Industrial Estate Road.

Traffic Demand

4.5 Trip rates to inform traffic demands for northern and southern KSS2 sites were agreed between ITP and WCBC in the Modelling Methodology Technical Note[6] in August 2018. Trip distributions were set out in Vectos' December 2018 Note[7]

4.6 The trip rates for private and affordable dwellings are provided below:

Table 15: TRICS Trip Rates – KSS2 Private and Affordable Dwellings

	Affordable			Private		
	Arr.	Dep.	Two-Way	Arr.	Dep.	Two-Way
07:00-08:00	0.041	0.099	0.140	0.069	0.292	0.361
08:00-09:00	0.170	0.251	0.421	0.134	0.403	0.537
09:00-10:00	0.205	0.222	0.427	0.148	0.166	0.314
16:00-17:00	0.211	0.181	0.392	0.323	0.179	0.502
17:00-18:00	0.275	0.175	0.450	0.370	0.180	0.550

4.7 The above trip rates are used to calculate arriving and departing vehicle numbers for each 15-minute time interval during the AM and PM peak and shoulder periods, based on an assumed split of 20% affordable and 80% private.

4.8 The table below summarises the total peak hour trip generation for each site in each test year:

Table 16: KSS2 Trip Generation

		2023			2028		
		Northern Site	Southern Site	Total	Northern Site	Southern Site	Total
No. of Units		250	460	710	600	1080	1680
AM	**Peak Hour Arrivals**	35	65	100	85	152	237
	Peak Hour Departures	93	171	265	224	402	626
PM	**Peak Hour Arrivals**	81	150	231	195	352	547
	Peak Hour Departures	45	82	127	108	194	301

[6] Wrexham KSS2 – TN001 Rev A Modelling Methodology, 17th August 2018

[7] KSS2 Wrexham Southern Site VISSIM Matrix Estimation Methodology, December 2018

4.9 All KSS2 vehicles are assumed to be Lights.

4.10 The trip rates for KSS3 are provided in the table below. These are based on rates derived from the TRICS database using large sites in the Industrial Estate (TRICS output can be found in Appendix A):

Table 17: TRICS Trip Rates (per hectare) – KSS3

	All Vehicles			Heavies		
	Arr.	**Dep.**	**Two-Way**	**Arr.**	**Dep.**	**Two-Way**
07:30-08:00	7.974	1.789	9.763	0.281	0.257	0.538
08:00-08:30	7.471	2.537	10.008	0.281	0.292	0.573
08:30-09:00	4.969	2.280	7.249	0.269	0.210	0.479
09:00-09:30	4.513	2.712	7.225	0.398	0.327	0.725
16:00-16:30	2.385	5.027	7.412	0.269	0.281	0.555
16:30-17:00	3.648	4.548	8.196	0.210	0.257	0.467
17:00-17:30	1.333	8.477	9.810	0.105	0.117	0.222
17:30-18:00	1.076	4.712	5.788	0.117	0.094	0.211

4.11 The above trip rates are used to calculate arriving and departing vehicle numbers for each 15-minute interval during the AM and PM peak and shoulder periods, based on the Local Plan development area of 28.5 hectares.

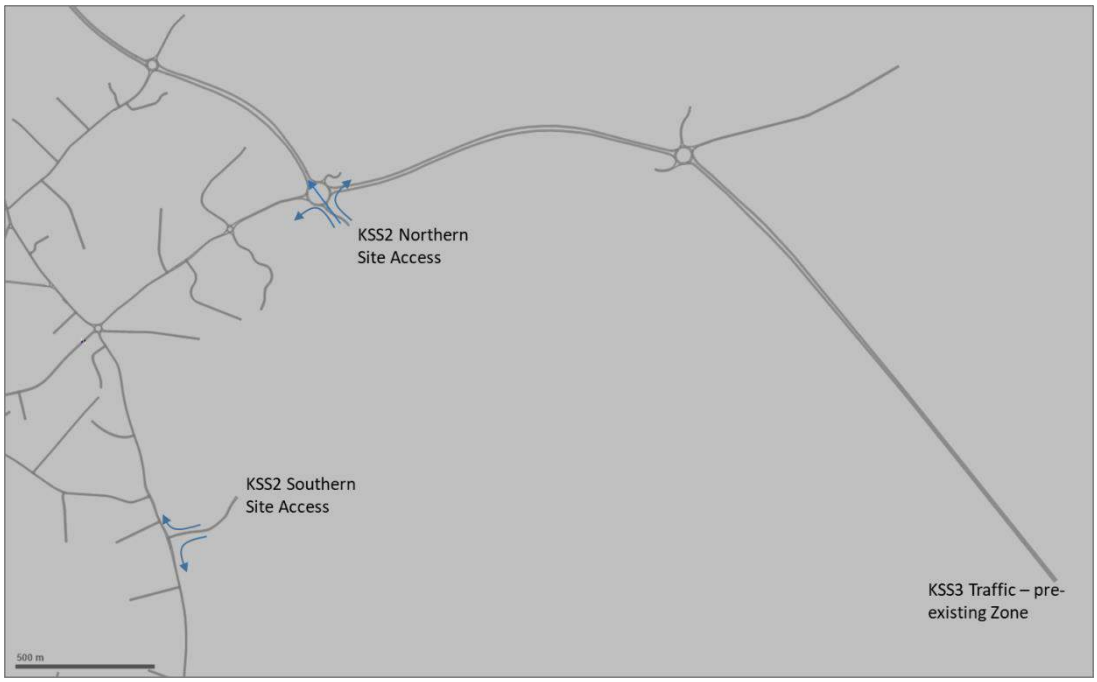
4.12 The table below presents the KSS3 trip generation, split between Light and Heavy vehicles:

Table 18: KSS3 Trip Generation

		2023			2028		
		Lights	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
AM	**Peak Hour Arrivals**	169	8	177	339	16	355
	Peak Hour Departures	61	7	69	123	14	137
PM	**Peak Hour Arrivals**	66	4	71	133	9	142
	Peak Hour Departures	180	5	186	361	11	371

4.13 In the scenarios, prior to the introduction of the Link Road (i.e. up to and including the 2028 Do-Minimum scenario), KSS2 and KSS3 traffic was assigned into the VISSIM network as is illustrated within the following Figure:

Figure 4: KSS2 and KSS3 Traffic Demand Loading Points (pre Link Road)



5 SCENARIO LIST

5.1 The following provides a summary of the scenarios included in this assessment:

Table 19: Scenario List & Inclusions

	Traffic Demands	Network
Base	Base demands, as per ITP Base model	Base network, as per ITP Base model with minor alterations as described in Chapter 2
2023 Do-Nothing	Base demands, plus TEMPro informed growth to 2023	As per Base
2023 Do-Minimum	Base demands, plus KSS2 and KSS3 2023 trip generation plus adjusted TEMPro informed growth to 2023	Base, plus site access arrangements at Cefn Road for Southern Site and A5156/A534 roundabout for Northern Site
2023 Do-Something	As per 2023 Do-Minimum	As per 2023 Do-Minimum, plus off-site mitigation proposals (to be discussed)
2028 Do-Nothing	Base demands, plus TEMPro informed growth to 2028	As per Base
2028 Do-Minimum	Base demands, plus KSS2 and KSS3 2028 trip generation plus adjusted TEMPro informed growth to 2028	As per 2023 Do-Something. Mitigation proposals for 2023 are carried forward to 2028
2028 Do-Something 1	As per 2028 Do-Minimum	As per 2028 Do-Minimum, plus Link Road through KSS2 Southern and Northern Sites
2028 Do-Something 2	As per 2028 Do-Minimum	As per 2028 Do-Something 1, plus further off-site mitigation proposals (to be discussed)

6 MODELLING RESULTS

6.1 Each scenario will be discussed in detail in the following section. Comprehensive network statistics, journey times and queue length data are provided in Appendix B.

2023 Do-Nothing (2023 DN)

6.2 Model results show that following inclusion of TEMPro growth to 2023 (4.8% in the AM and 4.6% in the PM), average delay increases by approximately 3 seconds and 8 seconds respectively.

6.3 No significant issues are reported in the AM peak period, suggesting the current network has residual capacity which can accommodate the level of growth predicted to occur by 2023.

6.4 In the PM, queue length increases (~100m, or approximately 17 vehicles) and journey time increases (~30s) are observed on Industrial Estate Road exit from Wrexham Industrial Estate. *N.B. This is without the specific inclusion of KSS3 but with a level of growth applied to the Industrial Estate informed by TEMPro forecasts.*

6.5 This issue is specific to that approach only and has little effect on the operation of the network as a whole.

2023 Do-Minimum (2023 DM)

6.6 Following inclusion of KSS2 and KSS3 development demands for 2023, alongside the adjusted TEMPro background growth, the results reveal that the increased traffic levels has a detrimental effect on the network.

6.7 During the AM peak, average delay per vehicle increases by approximately 17 seconds compared with the DN. Whilst there are some queue and journey time increases, including around Greyhound roundabout, A5156 southbound approach to A534 roundabout and A534 Wrexham Road approach to Industrial Estate Road roundabout, model observations show that queues do not persist for prolonged periods and dissipate quickly enough to ensure the network continues to operate efficiently. As such it is considered that conditions at Greyhound in the Do-Minimum do not require local mitigation at 2023.

6.8 During the PM peak however a higher level of impact is observed, with average delay per vehicle increasing by over 40 seconds compared with the DN (a rise of almost 50%). This delay is almost exclusively attributable to extended delays on Industrial Estate Road exit from the Wrexham Industrial Estate. Queues increase from an average of ~200m to ~750m (an increase of approximately 96 vehicles), and journey times increase from almost 3 minutes to almost 5 minutes.

6.9 Whilst the impacts are not considered to be excessive in the AM peak, the impacts in the PM indicate that mitigation should be considered to ensure traffic leaving Wrexham Industrial Estate (including KSS3 traffic), is able to access the wider network without the delays observed in the DM.

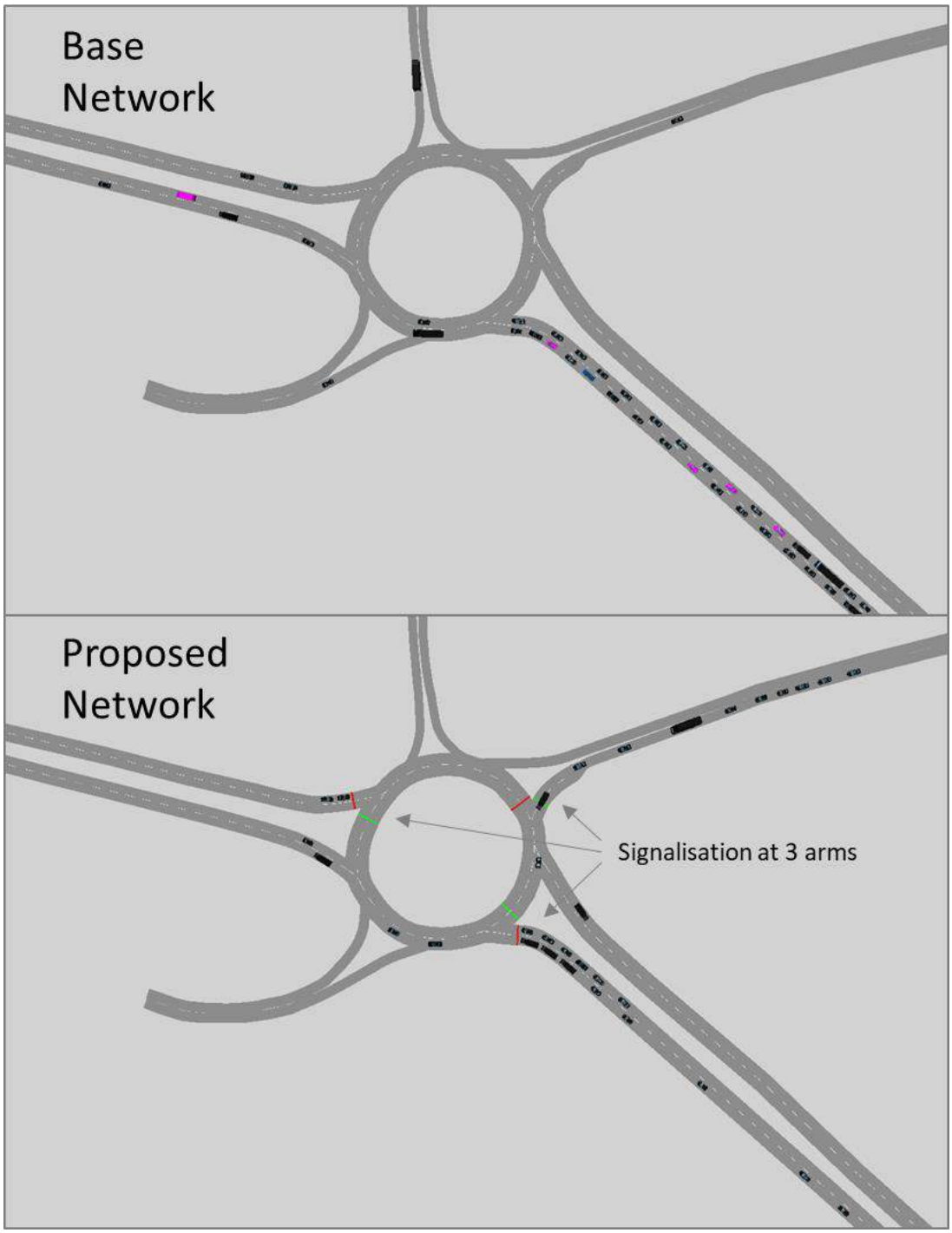
2023 Do-Something (2023 DS)

6.10 Two individual scheme improvements were proposed in response to the issues observed within the 2023 Do Minimum scenario.

6.11 Firstly, in order to better regulate traffic from Industrial Estate Road, signals were proposed at the roundabout. The signals were coded into VISSIM using the VISVAP function that allows demand-responsive signalling based on queuing conditions at the roundabout. The intention is to better control queue lengths across all approaches and prevent the excessive queuing on one arm demonstrated in the PM DM scenario.

6.12 The following Figure provides a screenshot of the Base layout and the proposed layout at A534/Industrial Estate Road roundabout:

Figure 5: A534/Industrial Estate Road Roundabout – 2023 Proposed Scheme

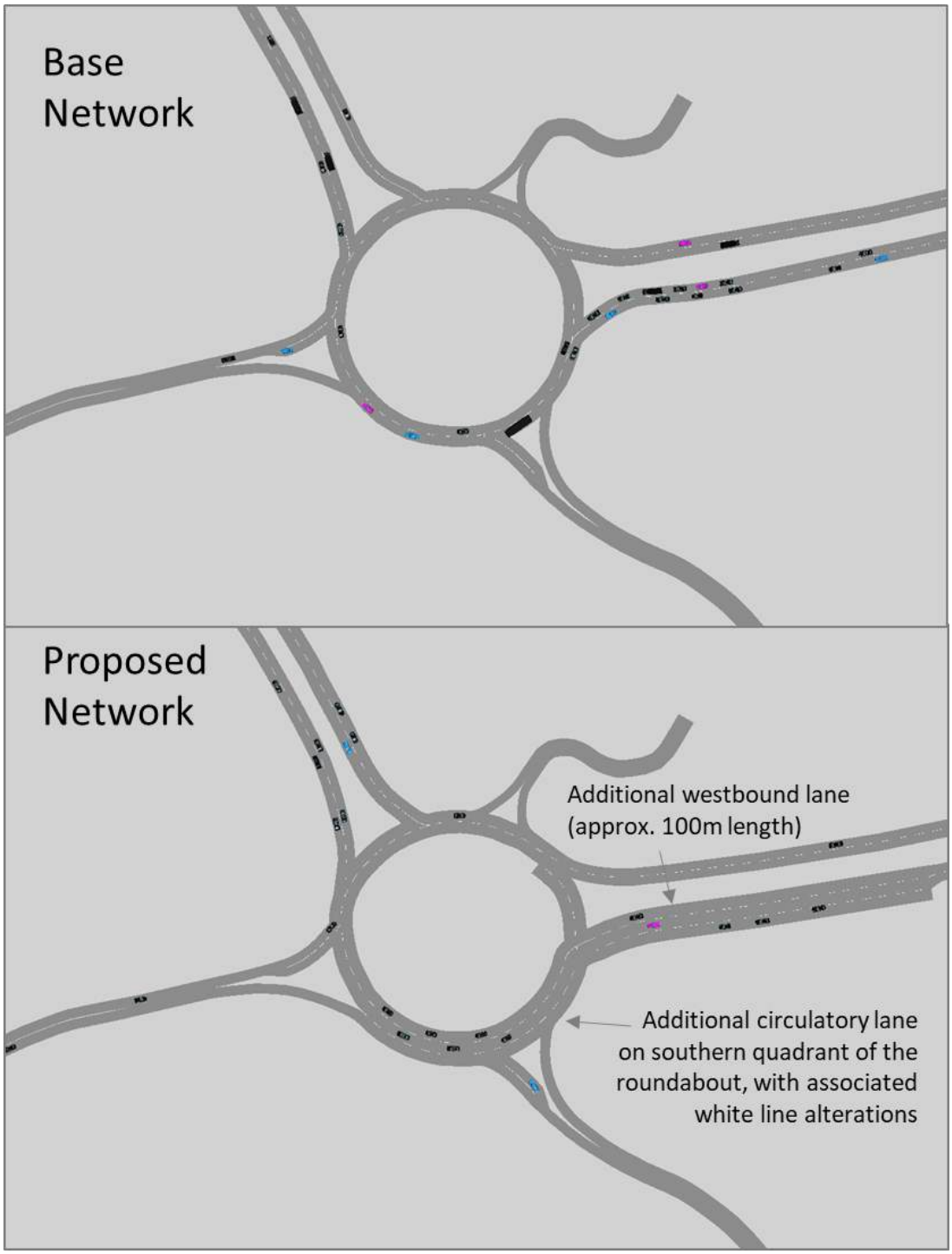


6.13 In addition, following a scheme which would allow more traffic out of Wrexham Industrial Estate, it was also necessary to enhance the A5156/A534 roundabout westbound arm.

6.14 Iterative VISSIM testing demonstrated that without enhancements at this location, queues previously observed on Industrial Estate Road simply were relocated onto the westbound approach to A5156/A534 roundabout.

6.15 The Figure below provides a screenshot of the Base layout and the proposed layout at A5156/A534 roundabout:

Figure 6: A5156/A534 Roundabout – 2023 Proposed Scheme



6.16 Results show that average delay per vehicle in the PM DS scenario decreases by approximately 35 seconds, compared with the DM. Journey times on Industrial Estate Road northbound decrease from almost 5 minutes to less than 2 minutes; lower than journey times in both the 2023 Do-Nothing and the 2018 Base. This provides evidence that the signal scheme is successful at regulating traffic out of Wrexham Industrial Estate following partial delivery of KSS3.

6.17 Improvements on the westbound approach to the A5156/A534 roundabout are sufficient to accommodate the additional traffic being released from the east, with journey times showing a reduction compared with the DM of approximately 15 seconds despite an additional c. 200 vehicles approaching the roundabout during the PM peak hour.

6.18 Whilst there are minor increases in journey times beyond this roundabout towards Greyhound Roundabout along Holt Road westbound, the increases are considered acceptable and do not result in any concerns over network performance. Average queue lengths for example increase from ~10m to ~50m; an increase of approximately 7 vehicles. Maximum queue lengths increase from 110m to 250m (approximately 24 vehicles); however maximum queue values represent the largest recorded queue length across the whole hour and average queues alongside model observations show this queue dissipates quickly.

2028 Do-Nothing (2028 DN)

6.19 The 2028 Do-Nothing tests rely solely on TEMPro for forecasting, with growth percentages of 9.2% and 8.8% applied across the network in the AM and PM peak respectively. This scenario assumes no KSS2 or KSS3 traffic, and no network improvements.

6.20 The AM model shows an increase in delay of approximately 10 seconds per vehicle compared with the Base. There are some localised journey time increases on Borras Park Road eastbound (resulting from the increased traffic levels travelling westbound on the A5156), and on Dean Road southbound towards Greyhound Roundabout.

6.21 Across the network however, there appears to be enough residual capacity in the network to accommodate 2028 TEMPro forecast demands during the AM peak.

6.22 The PM model shows an increase in delay of approximately 30 seconds per vehicle compared with the Base. As demonstrated in the 2023 DN and DM scenarios, the vast majority of delay is attributed to the Industrial Estate Road exit from Wrexham Industrial Estate. Average

queues increase from approximately 100m in the Base to approximately 500m in the DN (approximately 70 vehicles), and journey times increase from almost 2 minutes to almost 4 minutes.

6.23 There are also some minor queue increases around the A5152/Holt Road roundabout and Greyhound roundabout.

2028 Do-Minimum (2028 DM)

6.24 The 2028 DM scenario assumes that the mitigation schemes devised during the 2023 testing are in situ by 2028, under the assumption that KSS2 and KSS3 are delivered in full in this 2028 DM scenario and therefore the interim mitigation will have already have been delivered.

6.25 The AM model shows a significant increase in average delay per vehicle compared with the 2028 DN, from just over 1 minute to over 7 minutes.

6.26 The vast majority of the delay increase is caused by congestion on the southbound approach to A5156/A534 roundabout, which creates queues that propagate back through the Borras Park Road roundabout to the edge of the model extent.

6.27 This queuing, along with the impact of additional KSS2 traffic exiting the northern site during the AM peak, creates queues on the eastbound Holt Road as circulatory speeds at the roundabout reduce due to the levels of traffic traversing the roundabout. In turn, this eastbound Holt Road queuing impacts upon the exit capacity away from Greyhound Roundabout, causing significant queues at all approaches and exacerbating the Cefn Road queues that result from KSS2 traffic from the southern site travelling northbound.

6.28 Model results for the AM DM scenario are highly unstable due to the congestion and the propensity for the model to 'lock' around Greyhound Roundabout where approaching and exiting traffic cause the junction operation to fail. Even with the interim mitigation, the AM 2028 DM model indicates that additional mitigation is necessary simply to enable the network to operate.

6.29 The PM model also experiences an increase in average delay per vehicle compared with the 2028 DN, from almost 2 minutes to over 3 ½ minutes. These results also suggest the network is still over capacity in the PM peak under the 2028 DM scenario.

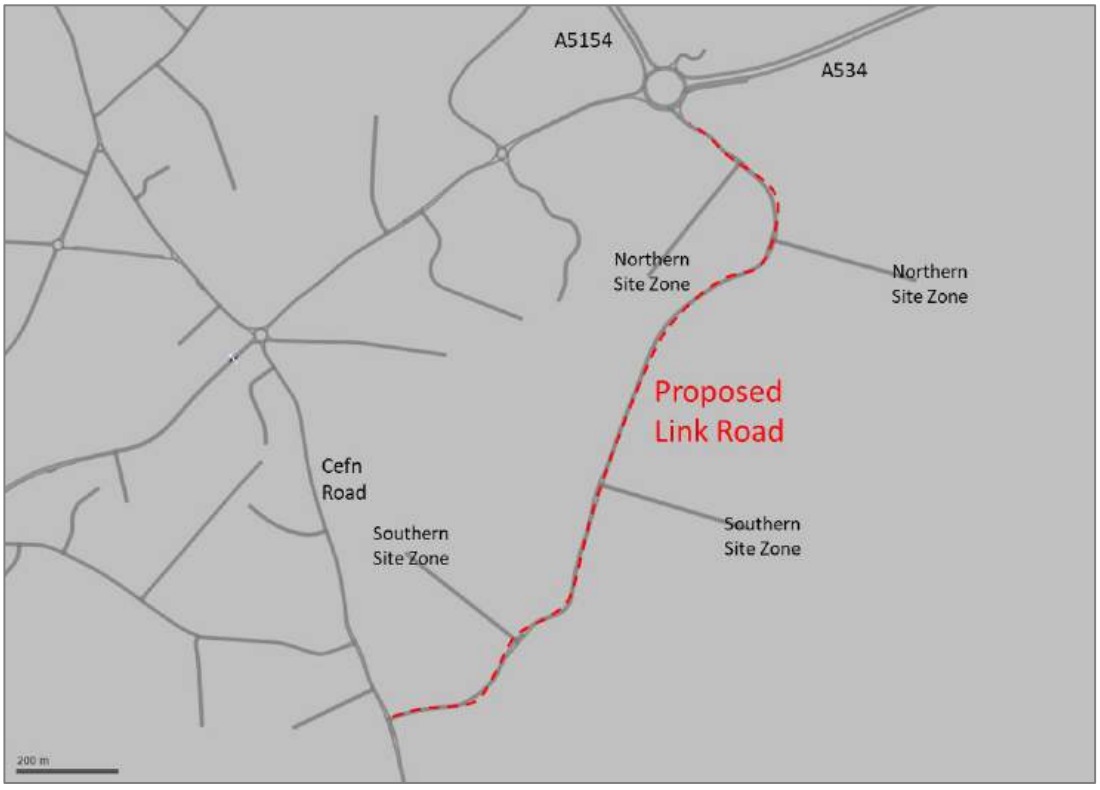
6.30 The proposals carried forward from 2023 are sufficient to accommodate the traffic from Wrexham Industrial Estate. There are however queue and journey time increases towards the west of the model area, including the A5152 southbound approach to the Holt Road roundabout, and the eastbound Holt Road exit. Pedestrian crossings and right turning vehicles from Holt Road eastbound create slow moving traffic away from the A5152/Holt Road roundabout towards the end of the PM peak period.

6.31 There are also queues and journey time increases on many approaches to Greyhound Roundabout as this junction forms a key route for both KSS2 and KSS3 traffic to and from central Wrexham.

2028 Do-Something 1 (2028 DS1)

6.32 The 2028 Do-Something 1 scenario introduces the link road through the KSS2 northern and southern sites, connecting the A5152/A534 Roundabout to Cefn Road. The following Figure illustrates the revised VISSIM network including the proposed link road:

Figure 7: Link Road Alignment and KSS2 Internal Zone Layout



6.33 Both northern and southern sites are split across 2 VISSIM zones each, with demands assigned equally between the two. The exact alignment of the link road, and exact location of the internal accesses are yet to be determined and so this represents an indicative layout.

6.34 The AM peak shows a moderate improvement following inclusion of the link road, with average delay per vehicle reducing from just over 7 minutes in the 2028 DM to approximately 5 ½ minutes in the 2028 DS1.

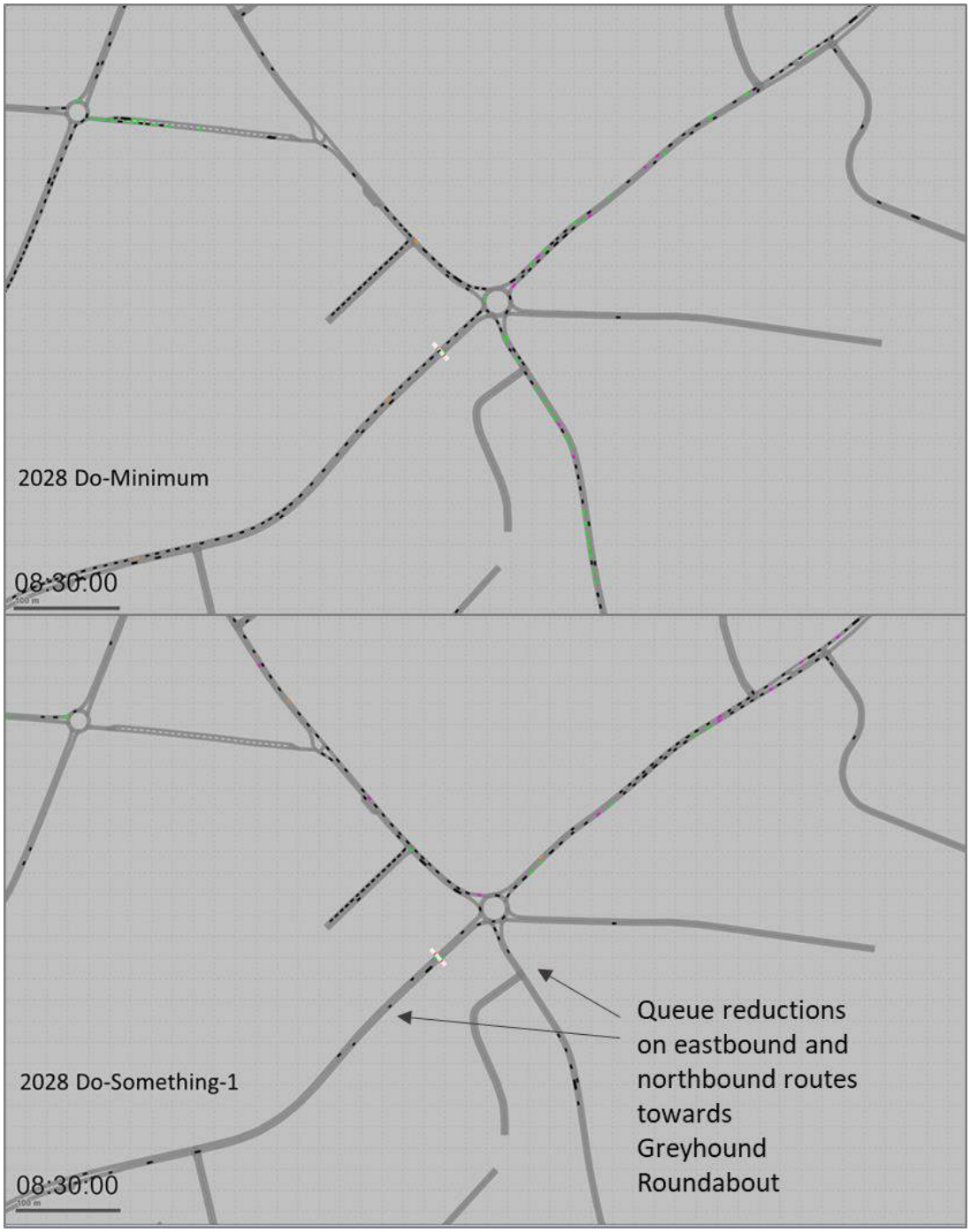
6.35 Inclusion of the link road provides an alternative route from the south to the A5156/A534 roundabout. This means that traffic from the southern KSS2 site travelling to the A5156/A534 no longer has to travel northbound on Cefn Road towards Greyhound Roundabout but can use the link road instead. This also applies to base level trips, background growth and KSS3 trips as well, all of which are afforded an alternative route which avoids passing through Greyhound Roundabout.

6.36 Likewise, traffic travelling towards Cefn Road south from the north or east of the model can use the link road southbound rather than travelling westwards towards Greyhound then southbound along Cefn Road.

6.37 Use of this alternative route has impacts on the rest of the network, with minor queue and journey time reductions around the west of the model as lower traffic levels are confined to the routes available prior to inclusion of the link road.

6.38 The following screenshots illustrate the benefit of the link road in the AM peak.

Figure 8: AM Greyhound Roundabout Screenshots – 2028 DM vs 2028 DS1



6.39 Whilst the link road has demonstrable benefits in the AM, the network is still congested along two key routes:

- A5156 southbound to A5156/A534 roundabout – queues extending back through Borras Park Road roundabout and beyond
- Holt Road eastbound to A5156/A534 roundabout – a result of the A5156 queues and additional traffic from the northern site access, both of which create slow moving traffic on the circulatory. These queues are visible in Figure 8 above, having knock-on impacts on Dean Road and Jeffreys Road in particular.

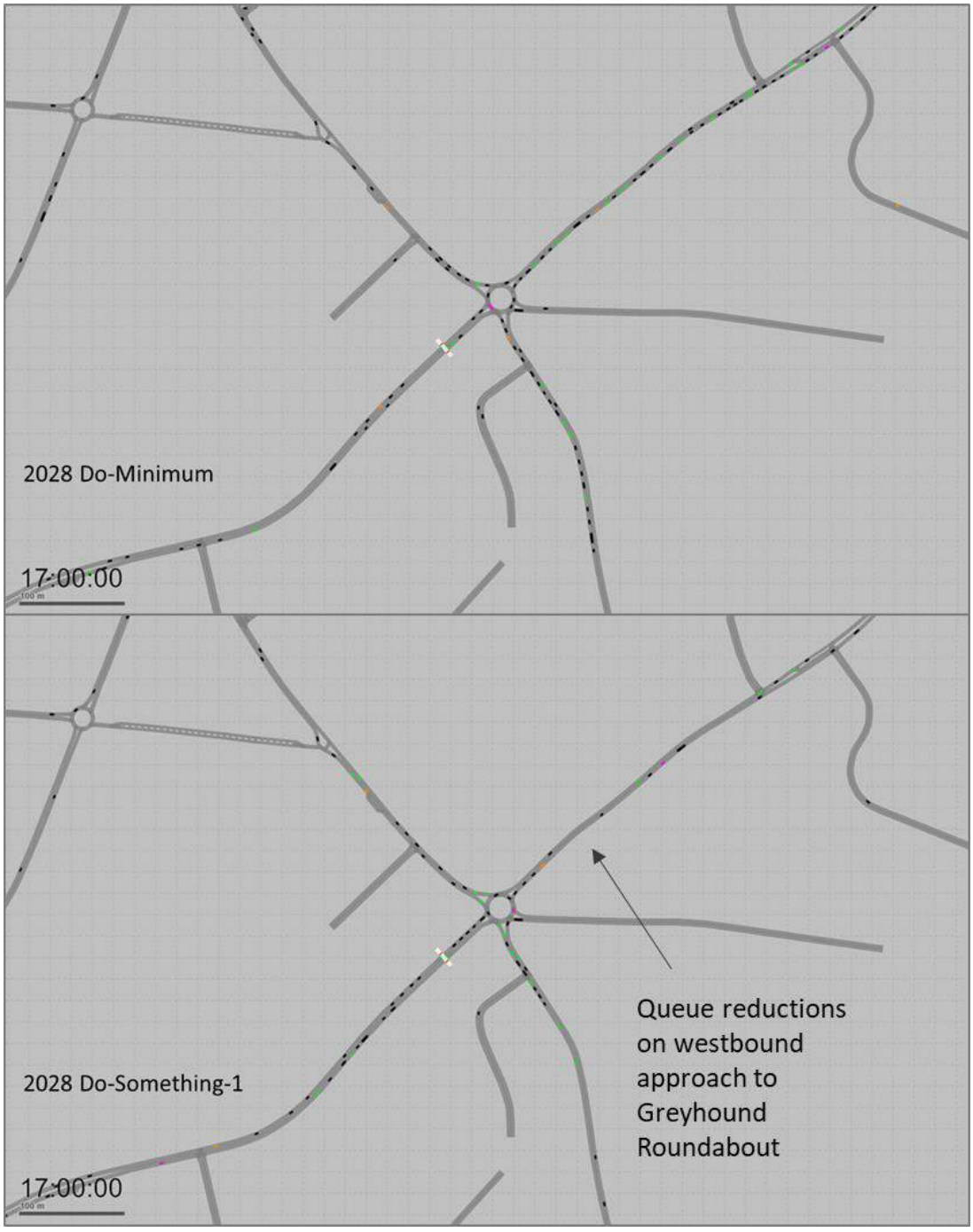
6.40 The PM peak shows a greater level of improvement following inclusion of the link road, with average delay per vehicle reducing from just approximately 3 ½ minutes in the 2028 DM to approximately 2 ½ minutes in the 2028 DS1.

6.41 Traffic from the north and east travelling to the south in the PM (including the southern KSS2 housing site) also utilises the new link road rather than travelling westbound along Holt Road to Greyhound Roundabout then travelling southbound on Cefn Road.

6.42 Improvements also occur to the west of the model, the easing of congestion at and around Greyhound Roundabout improves the eastbound Holt Road away from the A5152 roundabout. Furthermore, some vehicles from the west now choose the Queensway-Cefn Road-Link Road route to the east rather than the more direct Holt Road route, which further eases the congestion observed at the end of the PM peak in the DM scenario.

6.43 The following screenshots illustrate the benefit of the link road in the PM peak.

Figure 9: PM Greyhound Roundabout Screenshots – 2028 DM vs 2028 DS1



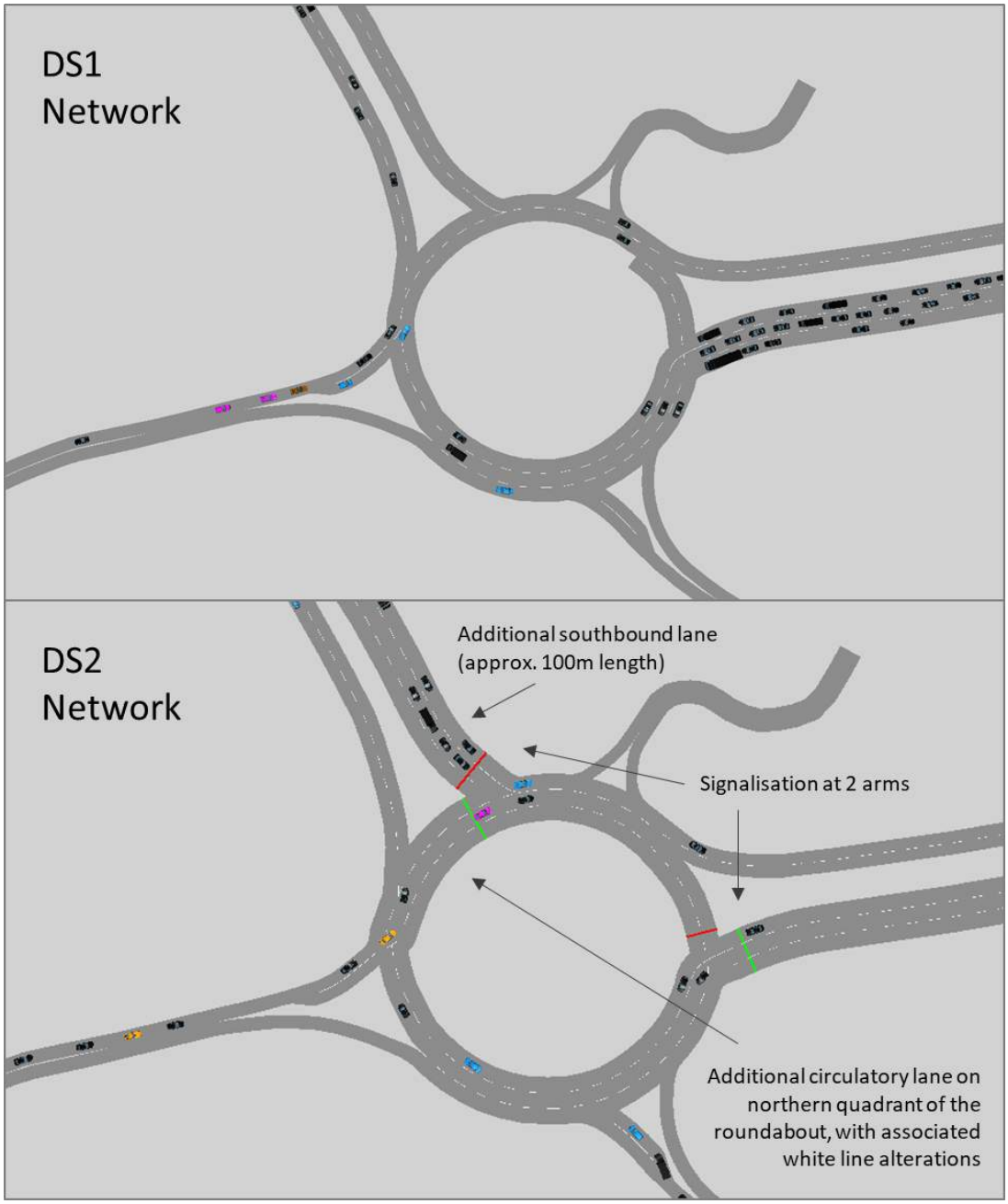
6.44 The inclusion of the link road has significant benefits, however particularly in the AM, further mitigation is required to reduce network delay, principally on the A5156 southbound link.

2028 Do-Something 2 (2028 DS2)

6.45 In response to the observed queuing in the AM DS1 scenario, improvements are required at the A5156/A534 roundabout to further improve throughput beyond the level of improvements identified through the interim scheme proposals.

6.46 The following Figure provides a screenshot of the proposed improvements for 2028:

Figure 10: A5156/A534 Roundabout – 2028 Proposed Scheme



6.47 Inclusion of signals and widening on the approach to, and at the A5156/A534 Roundabout has significant benefits in the AM peak. Average delay per vehicle reduces from 5 ½ minutes in the DM to just over 1 minute in the DS2.

6.48 The majority of this delay saving is on the A5156 southbound link, between Gresford Roundabout and A5156/A534 Roundabout. The additional lane and inclusion of signals formalises the junction and allows better queue balancing and increased circulatory speeds as signals reduce the level of hesitancy on the approach. In turn, eastbound Holt Road queues reduce and the issues reported on Jeffreys Road and Dean Road are removed.

6.49 Compared with the 2028 DN, average delay per vehicle in the DS2 scenario increases by only 13 seconds. This is despite over 1000 more completed trips during the AM peak period.

6.50 The PM benefits of the A5156/A534 roundabout are less pronounced, but average delay per vehicle reduces from 2 ½ minutes in the DM to just over 2 minutes in the DS2.

6.51 Following the signalisation of the A5156/A534 roundabout, the link road becomes a more attractive route as the signals allow for more gaps in the traffic flows that conflicts with the northern site access road. This encourages more traffic from the south and west, taking more traffic away from Greyhound roundabout.

6.52 As in the DS1 scenario, this encourages vehicles from central Wrexham to choose the Queensway-Cefn Road-Link Road route to the east rather than the more direct Holt Road route, which alleviates congestion at the A5152 roundabout and eastbound Holt Road to an even greater degree than reported in DS1.

6.53 Compared with the 2028 DN, average delay per vehicle in the DS2 scenario increases by only 14 seconds, despite over ~950 more completed trips during the PM peak period.

Scenario Comparison

6.54 This section provides an overview of comparisons between each scenario in relation to journey times and flow differences at key junctions.

Journey Time Corridor Comparison

6.55 Four journey time corridors have been selected to determine overall journey time differences across all scenarios for key routes through the network. These corridors are in line with previous analysis undertaken by ITP.

6.56 The routes are shown in Figure 11 below:

Figure 11: Journey Time Corridors



6.57 The tables below show journey time results for each corridor and each direction, followed by a comparison of results for 2023 and 2028, both in terms of actual journey time difference and percentage journey time difference between the Do-Nothing and the corresponding Do-Something scenario.

Table 20: AM Journey Time Corridor Comparison (seconds)

Route	Dir.	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
A	EB	250	257	273	270	261	703	450	291
	WB	260	263	289	295	276	350	376	305
B	NB	252	247	293	278	256	583	292	252
	SB	238	253	271	269	268	472	385	262
C	EB	107	108	124	155	113	288	278	129
	WB	99	99	102	98	100	105	99	100
D	EB	119	137	141	148	153	145	163	201
	WB	111	106	108	108	125	119	362	111

Table 21: AM Journey Time Corridor Comparison, Do-Nothing vs Do-Something (seconds)

Route	Dir.	2023		2028	
		DN vs DS (n)	DN vs DS (%)	DN vs DS (n)	DN vs DS (%)
A	EB	13	5%	30	12%
	WB	31	12%	29	11%
B	NB	30	12%	-4	-1%
	SB	17	7%	-6	-2%
C	EB	47	43%	16	15%
	WB	-2	-2%	0	0%
D	EB	11	8%	48	31%
	WB	2	2%	-13	-11%

6.58 Results show that during the AM, following inclusion of development and mitigation at 2023 journey times remain stable compared with the Do-Nothing scenario. Moderate journey time increases of 47 seconds are exhibited on A5156 to Industrial Estate Road corridor owing to the additional traffic levels approaching the Industrial Estate following inclusion of KSS3, whilst all other corridors exhibit increases no higher than 12%.

6.59 In 2028 comparisons show less of an impact, with no increases over 15% observed other than the Borras Park eastbound corridor, which is the result of additional traffic levels on northbound A5156 conflicting the eastbound movement.

6.60 The tables below show the results for the PM peak.

Table 22: PM Journey Time Corridor Comparison (seconds)

Route	Dir.	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
A	EB	287	297	326	365	320	548	481	376
	WB	272	268	273	319	283	400	280	282
B	NB	252	252	262	275	261	335	283	253
	SB	242	247	252	254	251	270	261	250
C	EB	98	98	98	99	98	99	100	103
	WB	128	110	128	115	113	158	131	126
D	EB	127	126	157	147	130	152	152	154
	WB	108	126	148	160	140	149	130	124

Table 23: PM Journey Time Corridor Comparison, Do-Nothing vs Do-Something (seconds)

Route	Dir.	2023		2028	
		DN vs DS (n)	DN vs DS (%)	DN vs DS (n)	DN vs DS (%)
A	EB	68	23%	56	17%
	WB	51	19%	-1	0%
B	NB	23	9%	-8	-3%
	SB	7	3%	-2	-1%
C	EB	1	1%	5	5%
	WB	5	5%	13	11%
D	EB	21	16%	25	19%
	WB	34	27%	-16	-12%

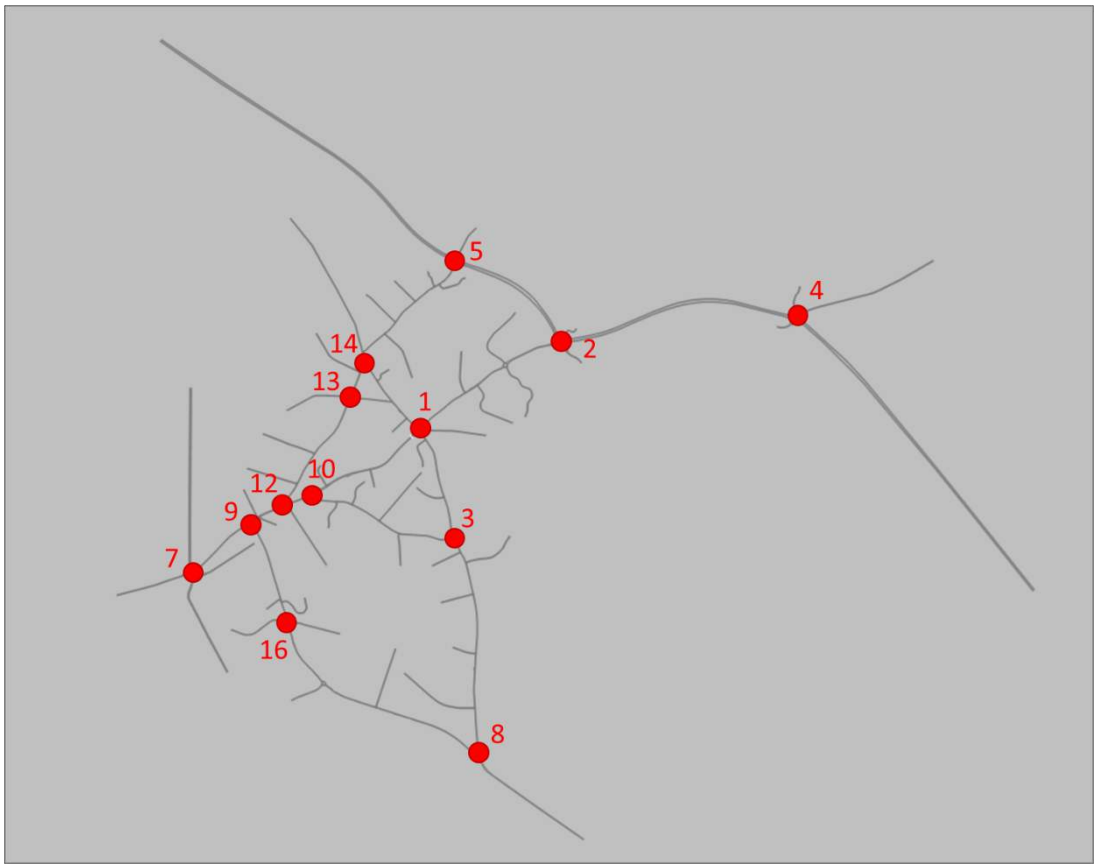
6.61 Results show that during the PM, following inclusion of development and mitigation at 2023 journey times remain relatively stable compared with the Do-Nothing scenario. Moderate journey time increases are exhibited on Holt Road eastbound corridor, and on Borras Park Road westbound, however both corridors show increases of only ~25%.

6.62 In 2028 comparisons show less of an impact, with no increases over 20% observed.

Junction Flow Comparison

6.63 Figure 12 below presents the junctions identified for assessing modelled junction turn counts.

Figure 12: Turn Counts - Junction Locations



6.64 The tables overleaf provide a summary of AM junction turn counts across the network at these locations, followed by comparisons of the Do-Nothing and Do-Something scenarios for 2023 and 2028 both in vehicle numbers and percentages.

Table 24: AM Turn Count Comparison (vehicles)

Junction No.	Junction Name	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
1	Greyhound Roundabout	1953	2037	2228	2232	2132	2069	2208	2215
2	A5156/A534	3053	3241	3658	3648	3381	3905	4305	4149
3	Cefn Road/Hullah Lane	734	718	917	900	760	868	740	714
4	A534/ Industrial Estate Road	2591	2721	3024	3039	2840	3186	3282	3411
5	A5156/Borras Park Road	2884	3011	3239	3208	3143	3345	3508	3536
7	Tesco Roundabout	1703	1792	1854	1852	1866	1813	1948	1998
8	Cefn Road/ Queensway	720	747	800	786	785	922	945	902
9	Holt Road/ Montgomery Road	1280	1343	1407	1411	1397	1370	1491	1529
10	Holt Road/ Hullah Lane	1104	1228	1282	1260	1268	1184	1260	1340
12	Holt Road/ Borras Road/ Archer's Way	1292	1312	1381	1388	1364	1408	1439	1496
13	Rhosnesni Lane/ Borras Road	854	695	720	735	739	919	806	831
14	Jeffrey's Road/ Borras Road	1103	1060	1076	1116	1120	936	1199	1284
16	Queensway/ Montgomery Road/ Smithfield Road	558	622	606	611	648	723	671	608

Table 25: AM Turn Count Comparison, Do-Nothing vs Do-Something (vehicles / %)

Junction No.	Junction Name	2023		2028	
		DN vs DS (vehs)	DN vs DS (%)	DN vs DS (vehs)	DN vs DS (%)
1	Greyhound Roundabout	195	10%	83	4%
2	A5156/A534	407	13%	768	23%
3	Cefn Road/Hullah Lane	182	25%	-46	-6%
4	A534/Industrial Estate Road	318	12%	571	20%
5	A5156/Borras Park Road	197	7%	393	13%
7	Tesco Roundabout	60	3%	132	7%
8	Cefn Road/Queensway	39	5%	117	15%
9	Holt Road/Montgomery Road	68	5%	132	9%
10	Holt Road/Hullah Lane	32	3%	72	6%
12	Holt Road/Borras Road/ Archer's Way	76	6%	132	10%
13	Rhosnesni Lane/Borras Road	40	6%	92	12%
14	Jeffrey's Road/Borras Road	56	5%	164	15%
16	Queensway/Montgomery Road/ Smithfield Road	-11	-2%	-40	-6%

6.65 AM turn count comparisons show that an additional ~1600 vehicle movements are recorded in the Do-Something scenario compared with the Do-Nothing in 2023, and an additional ~2500 vehicle movements in 2028, highlighting both the additional traffic levels generated by KSS2 and KSS3 compared with assumptions contained within TEMPro and the extra capacity created by the scheme proposals.

6.66 The largest AM increases in 2023 are shown at Cefn Road/Hullah Lane, Greyhound Roundabout, A5156/A534 Roundabout and A534 Industrial Estate Road Roundabout. These increases are a result of the focussed growth from KSS2 and KSS3 as opposed to the more generic growth applied via TEMPro. In 2028, increases are exhibited at most locations as more vehicles traverse the network. In contrast to 2023, reductions are shown at Cefn Road/Hullah Lane resulting from inclusion of the Link Road providing an alternative route to Cefn Road.

Table 26: PM Turn Count Comparison (vehicles)

Junction No.	Junction Name	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
1	Greyhound Roundabout	2088	2132	2184	2291	2072	2438	2267	2030
2	A5156/A534	2889	2908	3102	3276	2812	3687	3756	3770
3	Cefn Road/Hullah Lane	839	807	990	964	808	1203	929	691
4	A534/ Industrial Estate Road	2750	2797	2915	3136	2728	3410	3422	3410
5	A5156/Borras Park Road	2693	2753	2941	3020	2699	3270	3308	3257
7	Tesco Roundabout	2532	2655	2709	2713	2518	2589	2683	2823
8	Cefn Road/ Queensway	928	964	1030	1020	983	1096	1174	1216
9	Holt Road/ Montgomery Road	1558	1622	1723	1687	1523	1701	1672	1771
10	Holt Road/ Hullah Lane	1296	1267	1259	1341	1191	1385	1354	1361
12	Holt Road/ Borras Road/ Archer's Way	1486	1528	1641	1593	1439	1608	1598	1617
13	Rhosnesni Lane/ Borras Road	605	630	806	639	628	673	770	702
14	Jeffrey's Road/ Borras Road	1090	1186	1241	1220	1170	1172	1282	1193
16	Queensway/ Montgomery Road/ Smithfield Road	825	879	894	883	859	909	837	936

Table 27: PM Turn Count Comparison, Do-Nothing vs Do-Something (vehicles / %)

Junction No.	Junction Name	2023		2028	
		DN vs DS (vehs)	DN vs DS (%)	DN vs DS (vehs)	DN vs DS (%)
1	Greyhound Roundabout	159	7%	-42	-2%
2	A5156/A534	368	13%	958	34%
3	Cefn Road/Hullah Lane	157	19%	-117	-14%
4	A534/Industrial Estate Road	339	12%	682	25%
5	A5156/Borras Park Road	267	10%	558	21%
7	Tesco Roundabout	58	2%	305	12%
8	Cefn Road/Queensway	56	6%	233	24%
9	Holt Road/Montgomery Road	65	4%	248	16%
10	Holt Road/Hullah Lane	74	6%	170	14%
12	Holt Road/Borras Road/ Archer's Way	65	4%	178	12%
13	Rhosnesni Lane/Borras Road	9	1%	74	12%
14	Jeffrey's Road/Borras Road	34	3%	23	2%
16	Queensway/Montgomery Road/ Smithfield Road	4	0%	77	9%

6.68 PM turn count comparisons show that an additional ~1600 vehicle movements are recorded in the Do-Something scenario compared with the Do-Nothing in 2023, and an additional ~3300 vehicle movements in 2028.

6.69 A similar pattern of increases is observed in the PM, with the largest in 2023 located at the Cefn Road and Greyhound Roundabout junctions, and at the A5156 and A534 junctions to the east of the model. Again this is the result of focussing the location of growth in the Do-Something models compared with the TEMPro-informed Do-Nothing.

6.70 2028 shows large increases across the network as additional traffic levels are released from Wrexham Industrial Estate and onto the wider network. Greyhound Roundabout and Cefn Road show moderate reductions in traffic levels compared with the Do-Nothing following inclusion of the Link Road which takes traffic away from these junctions.

7 SUMMARY

7.1 Vectos Microsim (VM) has been commissioned by Wrexham County Borough Council (WCBC), Barratt Homes, Bloor Homes and Countryside Properties to carry out VISSIM testing in Wrexham.

7.2 VM has been instructed to include specific trip generation for two sites; KSS2 and KSS3, along with some background growth informed by TEMPro.

7.3 As part of the KSS2 development, a link road will be delivered through the north and south plots that make up the whole site that will connect the existing A5156/A534 roundabout to Cefn Road. It is anticipated this link road will be delivered during the course of the KSS2 build out.

7.4 VM has included the following scenarios in the assessment:

- Base
- 2023 Do-Nothing
- 2023 Do-Minimum
- 2023 Do-Something
- 2028 Do-Nothing
- 2028 Do-Minimum
- 2028 Do-Something 1
- 2028 Do-Something 2

7.5 The purpose of the assessment is to determine what, if any, off-site mitigation is required at 2023 before a link road through the site is delivered, and what, if any, off-site mitigation is required at 2028 when the full sites and link road are delivered.

7.6 Results of the testing show that without intervention, extensive queuing can be expected in 2023 on Industrial Estate Road during the PM peak. Signalising the A534/Industrial Estate Road roundabout helps alleviate this problem, but would result in excessive queues on the westbound approach to A5156/A534 roundabout without further intervention. Westbound approach and southern-quadrant circulatory widening is sufficient to mitigate against these issues in 2023.

7.7 In 2028, the link road has demonstrable benefits in both AM and PM peaks, but particularly the PM as vehicles are afforded an additional route both away from the KSS3 employment site and towards the KSS2 (southern) housing site. The link road takes traffic away from Greyhound roundabout which becomes highly congested in the Do-Minimum scenario with full development but without the link road.

7.8 Whilst it is not expected that full development build outs would occur *without* the link road, a comparison of the 2028 Do-Minimum with the 2028 Do-Something 1 allows the benefits of the link road to be fully understood.

7.9 The 2028 scenario however still exhibited significant queuing during the AM peak, on A5156 southbound and Holt Road eastbound approaches to the A5156/A534 roundabout, with other associated queuing issues. A further scheme is proposed whereby additional widening is applied to the A5156/A534 roundabout on the northern quadrant and a third lane is added to the southbound approach. Both eastbound and southbound approaches are also signalised to better regulate queue conditions around the roundabout in both peaks.

7.10 Results suggest that this package of measures is sufficient to mitigate against the impact of full delivery of KSS2 and KSS3 sites, along with additional background growth up to 2028.

7.11 Approximately 1000 additional trips are accommodated during both AM and PM peak periods, with only a minor increase in average delay per vehicle. The economic benefits therefore are considered to outweigh the minor increases in travel times through the network.

8 CONCLUSION

8.1 The modelling indicates that by 2023 the following highway mitigation measures will be required to maintain an acceptable level of network operation:

- Part signalisation of A534/Industrial Estate Road roundabout; and
- Additional third lane on westbound approach to A5156/A534 roundabout (approximately 100m in length), and widening of the southern part of the circulatory to allow 3 circulating lanes.

8.2 Modelling of the link road through the site, in 2028, reveals that there are significant benefits to a number of road users, not just the KSS2 traffic. Testing also reveals that, in 2028, as well as the link road the following mitigation measures will be necessary to ensure that the network can accommodate the additional growth in traffic associated with the Local Plan proposals:

- Part signalisation of A5156/A534 roundabout, additional third lane on southbound approach to A5156/A534 roundabout (approximately 100m in length), and widening of the northern part of the circulatory to allow 3 circulating lanes.

8.3 Analysis reveals that the implementation of these schemes will mitigate the major impacts which may arise as a result of the growth in traffic, both Local Plan and general background traffic increases.

8.4 Through discussions with all stakeholders[8] including WCBC, Barratt Homes, Bloor Homes and Countryside Properties, these measures and timescales for delivery are considered to be an appropriate response to the issues reported in the pre-mitigation scenarios, and model results along with conclusions drawn from watching the models during simulation suggest that the package of measures is commensurate with the developments' highway impacts.

[8] Meetings at WCBC, 11.07.2019 and 08.08.2019

Appendix A

Calculation Reference: AUDIT-751701-190612-0632

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE
VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	CW	CORNWALL	1 days
	DC	DORSET	1 days
06	WEST MIDLANDS		
	WO	WORCESTERSHIRE	1 days
11	SCOTLAND		
	AG	ANGUS	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Site area
Actual Range: 12.46 to 30.07 (units: hect)
Range Selected by User: 10 to 50 (units: hect)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/11 to 27/06/18

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1
Free Standing (PPS6 Out of Town)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Village	1
Out of Town	2
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

Not Known	1 days
B1	1 days
B2	2 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,000 or Less	1 days
5,001 to 10,000	2 days
10,001 to 15,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	3 days
50,001 to 75,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	3 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	4 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AG-02-D-02 INDUSTRIAL ESTATE ANGUS
A933 WESTWAY
ARBROATH
HOSPITALFIELD
Edge of Town
No Sub Category
Total Site area: 30.07 hect
Survey date: TUESDAY *25/04/17* *Survey Type: MANUAL*

2 CW-02-D-03 IND. ESTATE CORNWALL
LONG ROCK ROAD
NEAR PENZANCE
LONG ROCK
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Site area: 12.46 hect
Survey date: MONDAY *03/10/11* *Survey Type: MANUAL*

3 DC-02-D-20 INDUSTRIAL ESTATE DORSET
OLD BARN FARM ROAD
NEAR BOURNEMOUTH
THREE LEGGED CROSS
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 16.00 hect
Survey date: MONDAY *24/03/14* *Survey Type: MANUAL*

4 WO-02-D-03 INDUSTRIAL ESTATE WORCESTERSHIRE
MILLENNIUM WAY
EVESHAM

Edge of Town
Out of Town
Total Site area: 27.00 hect
Survey date: TUESDAY *26/06/18* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
WK-02-D-01	Logistics
WK-02-D-02	Logistics

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
VEHICLES
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	3.075	4	21.38	1.602	4	21.38	4.677
07:30 - 08:00	4	21.38	7.974	4	21.38	1.789	4	21.38	9.763
08:00 - 08:30	4	21.38	7.471	4	21.38	2.537	4	21.38	10.008
08:30 - 09:00	4	21.38	4.969	4	21.38	2.280	4	21.38	7.249
09:00 - 09:30	4	21.38	4.513	4	21.38	2.712	4	21.38	7.225
09:30 - 10:00	4	21.38	3.344	4	21.38	2.245	4	21.38	5.589
10:00 - 10:30	4	21.38	3.297	4	21.38	2.409	4	21.38	5.706
10:30 - 11:00	4	21.38	3.215	4	21.38	2.350	4	21.38	5.565
11:00 - 11:30	4	21.38	3.274	4	21.38	2.444	4	21.38	5.718
11:30 - 12:00	4	21.38	3.449	4	21.38	3.133	4	21.38	6.582
12:00 - 12:30	4	21.38	3.110	4	21.38	3.823	4	21.38	6.933
12:30 - 13:00	4	21.38	3.297	4	21.38	3.554	4	21.38	6.851
13:00 - 13:30	4	21.38	3.917	4	21.38	3.741	4	21.38	7.658
13:30 - 14:00	4	21.38	3.964	4	21.38	3.168	4	21.38	7.132
14:00 - 14:30	4	21.38	3.192	4	21.38	3.940	4	21.38	7.132
14:30 - 15:00	4	21.38	2.257	4	21.38	3.250	4	21.38	5.507
15:00 - 15:30	4	21.38	2.549	4	21.38	4.373	4	21.38	6.922
15:30 - 16:00	4	21.38	2.479	4	21.38	3.917	4	21.38	6.396
16:00 - 16:30	4	21.38	2.385	4	21.38	5.027	4	21.38	7.412
16:30 - 17:00	4	21.38	3.648	4	21.38	4.548	4	21.38	8.196
17:00 - 17:30	4	21.38	1.333	4	21.38	8.477	4	21.38	9.810
17:30 - 18:00	4	21.38	1.076	4	21.38	4.712	4	21.38	5.788
18:00 - 18:30	4	21.38	0.690	4	21.38	2.373	4	21.38	3.063
18:30 - 19:00	4	21.38	1.274	4	21.38	1.836	4	21.38	3.110
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			79.752			80.240			159.992

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	12.46 to 30.07 (units: hect)
Survey date date range:	01/01/11 - 27/06/18
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	2

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
TAXIS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.012	4	21.38	0.000	4	21.38	0.012
07:30 - 08:00	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
08:00 - 08:30	4	21.38	0.047	4	21.38	0.023	4	21.38	0.070
08:30 - 09:00	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
09:00 - 09:30	4	21.38	0.047	4	21.38	0.070	4	21.38	0.117
09:30 - 10:00	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
10:00 - 10:30	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
10:30 - 11:00	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
11:00 - 11:30	4	21.38	0.012	4	21.38	0.000	4	21.38	0.012
11:30 - 12:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
12:00 - 12:30	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
12:30 - 13:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
13:00 - 13:30	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
13:30 - 14:00	4	21.38	0.000	4	21.38	0.012	4	21.38	0.012
14:00 - 14:30	4	21.38	0.023	4	21.38	0.000	4	21.38	0.023
14:30 - 15:00	4	21.38	0.000	4	21.38	0.023	4	21.38	0.023
15:00 - 15:30	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
15:30 - 16:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
16:00 - 16:30	4	21.38	0.012	4	21.38	0.000	4	21.38	0.012
16:30 - 17:00	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
17:00 - 17:30	4	21.38	0.035	4	21.38	0.035	4	21.38	0.070
17:30 - 18:00	4	21.38	0.023	4	21.38	0.012	4	21.38	0.035
18:00 - 18:30	4	21.38	0.035	4	21.38	0.023	4	21.38	0.058
18:30 - 19:00	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.376			0.350			0.726

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
OGVS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.199	4	21.38	0.140	4	21.38	0.339
07:30 - 08:00	4	21.38	0.281	4	21.38	0.257	4	21.38	0.538
08:00 - 08:30	4	21.38	0.281	4	21.38	0.292	4	21.38	0.573
08:30 - 09:00	4	21.38	0.269	4	21.38	0.210	4	21.38	0.479
09:00 - 09:30	4	21.38	0.398	4	21.38	0.327	4	21.38	0.725
09:30 - 10:00	4	21.38	0.327	4	21.38	0.187	4	21.38	0.514
10:00 - 10:30	4	21.38	0.362	4	21.38	0.339	4	21.38	0.701
10:30 - 11:00	4	21.38	0.292	4	21.38	0.304	4	21.38	0.596
11:00 - 11:30	4	21.38	0.257	4	21.38	0.199	4	21.38	0.456
11:30 - 12:00	4	21.38	0.292	4	21.38	0.433	4	21.38	0.725
12:00 - 12:30	4	21.38	0.538	4	21.38	0.398	4	21.38	0.936
12:30 - 13:00	4	21.38	0.316	4	21.38	0.234	4	21.38	0.550
13:00 - 13:30	4	21.38	0.316	4	21.38	0.374	4	21.38	0.690
13:30 - 14:00	4	21.38	0.339	4	21.38	0.374	4	21.38	0.713
14:00 - 14:30	4	21.38	0.292	4	21.38	0.409	4	21.38	0.701
14:30 - 15:00	4	21.38	0.234	4	21.38	0.234	4	21.38	0.468
15:00 - 15:30	4	21.38	0.257	4	21.38	0.327	4	21.38	0.584
15:30 - 16:00	4	21.38	0.374	4	21.38	0.339	4	21.38	0.713
16:00 - 16:30	4	21.38	0.269	4	21.38	0.281	4	21.38	0.550
16:30 - 17:00	4	21.38	0.210	4	21.38	0.257	4	21.38	0.467
17:00 - 17:30	4	21.38	0.105	4	21.38	0.117	4	21.38	0.222
17:30 - 18:00	4	21.38	0.117	4	21.38	0.094	4	21.38	0.211
18:00 - 18:30	4	21.38	0.012	4	21.38	0.129	4	21.38	0.141
18:30 - 19:00	4	21.38	0.105	4	21.38	0.105	4	21.38	0.210
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			6.442			6.360			12.802

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
PSVS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.012	4	21.38	0.105	4	21.38	0.117
07:30 - 08:00	4	21.38	0.000	4	21.38	0.117	4	21.38	0.117
08:00 - 08:30	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
08:30 - 09:00	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
09:00 - 09:30	4	21.38	0.129	4	21.38	0.000	4	21.38	0.129
09:30 - 10:00	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
10:00 - 10:30	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
10:30 - 11:00	4	21.38	0.000	4	21.38	0.047	4	21.38	0.047
11:00 - 11:30	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
11:30 - 12:00	4	21.38	0.047	4	21.38	0.023	4	21.38	0.070
12:00 - 12:30	4	21.38	0.000	4	21.38	0.023	4	21.38	0.023
12:30 - 13:00	4	21.38	0.082	4	21.38	0.012	4	21.38	0.094
13:00 - 13:30	4	21.38	0.047	4	21.38	0.023	4	21.38	0.070
13:30 - 14:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
14:00 - 14:30	4	21.38	0.000	4	21.38	0.047	4	21.38	0.047
14:30 - 15:00	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
15:00 - 15:30	4	21.38	0.012	4	21.38	0.058	4	21.38	0.070
15:30 - 16:00	4	21.38	0.035	4	21.38	0.012	4	21.38	0.047
16:00 - 16:30	4	21.38	0.035	4	21.38	0.000	4	21.38	0.035
16:30 - 17:00	4	21.38	0.070	4	21.38	0.035	4	21.38	0.105
17:00 - 17:30	4	21.38	0.035	4	21.38	0.035	4	21.38	0.070
17:30 - 18:00	4	21.38	0.070	4	21.38	0.012	4	21.38	0.082
18:00 - 18:30	4	21.38	0.117	4	21.38	0.012	4	21.38	0.129
18:30 - 19:00	4	21.38	0.117	4	21.38	0.023	4	21.38	0.140
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.902			0.758			1.660

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
CYCLISTS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.117	4	21.38	0.035	4	21.38	0.152
07:30 - 08:00	4	21.38	0.164	4	21.38	0.000	4	21.38	0.164
08:00 - 08:30	4	21.38	0.140	4	21.38	0.012	4	21.38	0.152
08:30 - 09:00	4	21.38	0.047	4	21.38	0.000	4	21.38	0.047
09:00 - 09:30	4	21.38	0.035	4	21.38	0.023	4	21.38	0.058
09:30 - 10:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
10:00 - 10:30	4	21.38	0.023	4	21.38	0.035	4	21.38	0.058
10:30 - 11:00	4	21.38	0.082	4	21.38	0.082	4	21.38	0.164
11:00 - 11:30	4	21.38	0.000	4	21.38	0.012	4	21.38	0.012
11:30 - 12:00	4	21.38	0.035	4	21.38	0.023	4	21.38	0.058
12:00 - 12:30	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
12:30 - 13:00	4	21.38	0.035	4	21.38	0.012	4	21.38	0.047
13:00 - 13:30	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
13:30 - 14:00	4	21.38	0.058	4	21.38	0.023	4	21.38	0.081
14:00 - 14:30	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
14:30 - 15:00	4	21.38	0.023	4	21.38	0.070	4	21.38	0.093
15:00 - 15:30	4	21.38	0.023	4	21.38	0.246	4	21.38	0.269
15:30 - 16:00	4	21.38	0.035	4	21.38	0.047	4	21.38	0.082
16:00 - 16:30	4	21.38	0.023	4	21.38	0.070	4	21.38	0.093
16:30 - 17:00	4	21.38	0.035	4	21.38	0.058	4	21.38	0.093
17:00 - 17:30	4	21.38	0.023	4	21.38	0.187	4	21.38	0.210
17:30 - 18:00	4	21.38	0.047	4	21.38	0.117	4	21.38	0.164
18:00 - 18:30	4	21.38	0.164	4	21.38	0.070	4	21.38	0.234
18:30 - 19:00	4	21.38	0.047	4	21.38	0.000	4	21.38	0.047
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			1.203			1.203			2.406

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Appendix B

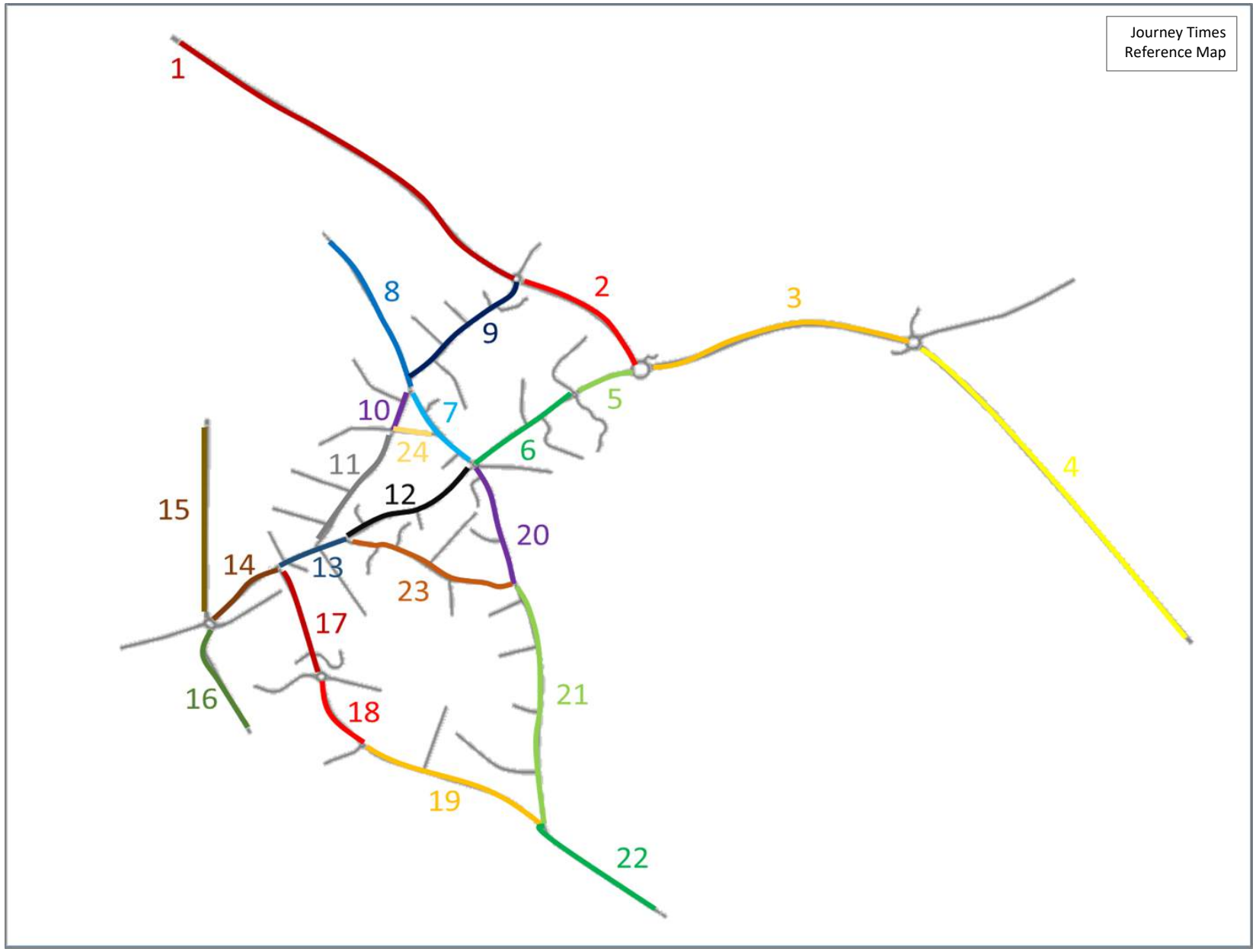
	AM							
	AM Base	**AM 2023 DN**	**AM 2023 DM**	**AM 2023 DS**	**AM 2028 DN**	**AM 2028 DM**	**AM 2028 DS1**	**AM 2028 DS2**
Average Delay per Vehicle in the Network (s)	49.7	52.5	68.1	74.0	59.6	339.7	270.8	71.7
Overall Delay per Vehicle (including time off network) (s)	53.2	56.3	73.4	79.7	64.0	428.7	328.2	77.2
Total Travel Time (hrs)	521.1	547.8	625.5	636.3	588.4	1392.3	1245.3	706.4
Average Travel Time (s)	246.2	247.0	263.2	267.5	254.1	519.0	461.5	267.9
Average Speed per Vehicle (mph)	30.0	29.8	28.3	27.8	28.9	13.5	15.8	28.3
Vehicles Active in the Network	503	522	606	605	568.0	1897.0	1280.0	662.0
Vehicle Trips Completed	7116	7463	7950	7957	7768.0	7760.0	8434.0	8831.0
Latent Demand at end of Simulation	0	0	0	0	0	74	16	0
Total Input Vehicle Numbers	7619	7985	8556	8562	8336	9731	9730	9493
Total Delay (hrs)	105.1	116.5	161.9	176.0	137.9	909.2	730.8	189.1
Latent Delay (hrs)	0.1	0.1	0.1	0.1	0.1	14.8	38.2	0.2

	PM							
	PM Base	**PM 2023 DN**	**PM 2023 DM**	**PM 2023 DS**	**PM 2028 DN**	**PM 2028 DM**	**PM 2028 DS1**	**PM 2028 DS2**
Average Delay per Vehicle in the Network (s)	75.6	82.3	119.7	89.8	102.3	181.6	134.2	113.9
Overall Delay per Vehicle (including time off network) (s)	82.4	90.1	133.7	98.3	113.1	214.6	151.6	127.1
Total Travel Time (hrs)	615.0	653.7	791.1	715.0	726.4	1017.7	911.8	853.6
Average Travel Time (s)	272.5	277.5	315.2	285.2	295.9	371.0	329.3	308.2
Average Speed per Vehicle (mph)	27.0	26.2	22.9	25.9	24.3	19.6	22.5	24.1
Vehicles Active in the Network	668	728	944	780	837.1	1255.0	1111.0	1029.0
Vehicle Trips Completed	7456	7752	8092	8246	8000.1	8621.0	8858.0	8941.0
Latent Demand at end of Simulation	0	2	0	0	0	138	21	0
Total Input Vehicle Numbers	8124	8482	9036	9026	8838	10014	9990	9970
Total Delay (hrs)	170.5	193.8	300.3	225.1	251.1	498.3	371.7	315.4
Latent Delay (hrs)	0.1	0.2	0.2	0.2	0.2	15.7	1.2	0.2

PEAK HOUR JOURNEY TIMES (SECONDS)

		Direction	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	85	86	88	89	88	505	591	92
		NB	75	76	76	76	75	76	76	76
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	41	42	54	90	45	223	213	59
		NB	36	36	37	37	37	37	37	39
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	66	66	70	66	68	66	65	70
		WB	63	63	65	61	64	68	62	62
4	Industrial Estate Road	SB	76	76	77	78	76	78	78	79
		NB	79	79	79	78	80	79	79	79
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	24	23	24	25	23	54	27	23
		EB	27	28	31	29	29	54	77	47
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	62	64	80	90	69	123	103	70
		EB	57	58	62	63	58	143	166	63
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	54	53	53	53	54	75	71	56
		SB	67	80	91	89	92	283	209	89
8	Jeffreys Road	NB	76	78	77	76	78	77	81	78
		SB	83	85	84	84	86	94	317	88
9	Borras Park Road	EB	119	137	141	148	153	145	163	201
		WB	111	106	108	108	125	119	362	111
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	22	22	22	22	23	25	44	25
		SB	20	20	20	20	20	43	21	20
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	138	129	129	134	131	418	138	141
		NB	105	102	102	101	103	113	131	102
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	73	75	77	77	76	376	104	76
		WB	69	71	75	72	76	66	127	93
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	56	56	62	59	60	58	70	69
		EB	53	55	60	59	57	85	60	63
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	48	48	49	49	49	49	49	51
		EB	41	41	42	42	41	46	42	43
15	A5152 North	SB	75	75	76	76	76	76	76	76
		NB	75	75	75	75	75	75	75	75
16	A5152 South	SB	43	43	43	43	43	43	43	43
		NB	49	49	49	49	49	49	49	50
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	62	62	62	62	62	65	62	62
		NB	68	70	69	71	70	83	78	75
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	58	58	62	59	60	69	61	57
		NB	54	59	57	57	58	65	65	58
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	127	132	131	131	134	145	140	133
		WB	143	148	148	147	153	184	222	152
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	55	55	59	59	56	60	55	55
		NB	77	75	118	104	81	276	101	75
21	Cefn Road: Between Hullah Lane and Queensway	SB	116	117	120	121	119	128	121	119
		NB	120	119	122	121	121	232	121	121
22	Cefn Road South of Queensway	NB	43	43	43	43	43	43	43	43
		SB	62	62	63	63	62	62	62	63
23	Hullah Lane	WB	214	214	223	224	218	268	306	234
		EB	212	203	193	202	210	258	221	197
24	Rhosnesni Lane	WB	24	22	22	22	22	115	23	23

		Direction	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	82	85	86	86	85	90	87	91
		NB	75	75	76	76	75	77	77	77
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	37	37	37	37	37	38	38	40
		NB	38	42	46	49	43	66	49	57
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	61	61	61	61	61	62	62	63
		WB	90	68	82	67	69	91	82	69
4	Industrial Estate Road	SB	70	70	71	71	70	72	72	72
		NB	135	170	279	105	227	144	149	157
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	27	26	26	31	27	51	24	26
		EB	31	35	52	34	35	86	54	30
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	73	71	72	99	74	159	65	66
		EB	55	55	56	55	54	69	57	53
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	52	54	55	54	55	53	57	55
		SB	67	72	77	76	75	88	81	70
8	Jeffreys Road	NB	80	80	80	80	80	80	81	81
		SB	82	84	84	83	85	84	84	83
9	Borras Park Road	EB	127	126	157	147	130	152	152	154
		WB	108	126	148	160	140	149	130	124
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	21	21	22	22	21	21	22	22
		SB	19	19	19	19	19	19	19	19
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	136	148	170	141	155	142	148	145
		NB	99	101	106	102	100	96	96	99
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	77	81	80	79	80	80	85	80
		WB	70	69	69	74	72	74	73	74
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	54	54	57	65	61	68	68	66
		EB	80	79	86	102	90	115	111	101
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	49	49	49	50	50	48	50	50
		EB	45	47	52	94	61	199	174	113
15	A5152 North	SB	78	78	78	82	79	484	248	111
		NB	76	76	76	76	76	77	76	77
16	A5152 South	SB	43	43	43	43	43	43	43	43
		NB	53	53	54	53	53	58	58	66
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	63	64	66	64	65	63	62	69
		NB	80	72	77	97	81	191	127	113
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	67	78	83	69	78	69	68	93
		NB	59	60	58	62	61	64	59	61
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	134	139	140	136	137	135	138	149
		WB	188	187	186	194	204	204	228	251
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	56	55	55	57	56	59	55	53
		NB	78	75	80	97	82	154	97	70
21	Cefn Road: Between Hullah Lane and Queensway	SB	119	120	120	121	120	123	126	126
		NB	122	123	128	124	125	128	129	128
22	Cefn Road South of Queensway	NB	44	44	44	44	45	45	46	46
		SB	63	63	63	63	63	63	63	63
23	Hullah Lane	WB	213	220	232	198	209	183	225	208
		EB	226	191	236	223	196	243	232	226
24	Rhosnesni Lane	WB	22	22	23	22	22	22	23	22


Journey Times
Reference Map
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AVERAGE QUEUE LENGTHS (METRES)

Junction	Site	Arm	Description	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
4	Site 4	Arm A	Sandy Lane	0	0	0	0	0	0	0	0
4	Site 4	Arm B	A534 Bypass	1	1	2	19	1	20	19	29
4	Site 4	Arm C	Borras Hall Lane	1	2	5	1	2	1	1	1
4	Site 4	Arm D	A534 Wrexham Rd	8	16	55	21	20	22	27	26
4	Site 4	Arm E	Industrial Estate Rd	0	0	1	3	1	3	3	3
5	Site 5	Arm A	Borras Rd	0	0	0	0	0	8	6	1
5	Site 5	Arm B	A5156 East	1	1	2	1	1	1	3	5
5	Site 5	Arm C	Borras Park Rd	7	5	4	5	8	6	18	3
5	Site 5	Arm D	A5156 West	7	9	12	15	13	1507	1791	20
1	Site 1	Arm A	Holt Rd North	6	9	36	59	14	336	109	20
1	Site 1	Arm B	Bryn Estyn Rd	0	0	0	1	0	5	0	0
1	Site 1	Arm C	Cefn Rd	24	21	112	79	32	720	54	25
1	Site 1	Arm D	Holt Rd South	3	4	7	7	6	690	39	5
1	Site 1	Arm E	Dean Rd	3	21	39	39	45	260	592	44
7	Site 7	Arm A	Holt Rd	1	1	2	2	2	2	2	2
7	Site 7	Arm B	Tesco	0	0	0	0	0	2	0	0
7	Site 7	Arm C	Fardon Rd	1	1	1	1	1	7	1	1
7	Site 7	Arm D	Holt St	0	0	0	0	0	2	0	0
7	Site 7	Arm E	A5152 Main	0	0	0	0	0	13	0	0
7	Site 7	Arm F	A5152 Left Slip	0	0	0	0	0	13	0	1
8	Site 8	Arm A	Cefn Rd Right Turn	0	0	0	0	0	1	2	1
8	Site 8	Arm C	Queensway Right Turn	0	0	0	0	0	1	0	0
2	Site 2	Arm A	A5156	4	6	42	158	11	700	689	57
2	Site 2	Arm C	A534 Bypass	5	5	8	1	6	52	2	4
2	Site 2	Arm C	Holt Road	1	2	3	4	2	210	471	55
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	0	0	N/A	6	22	12

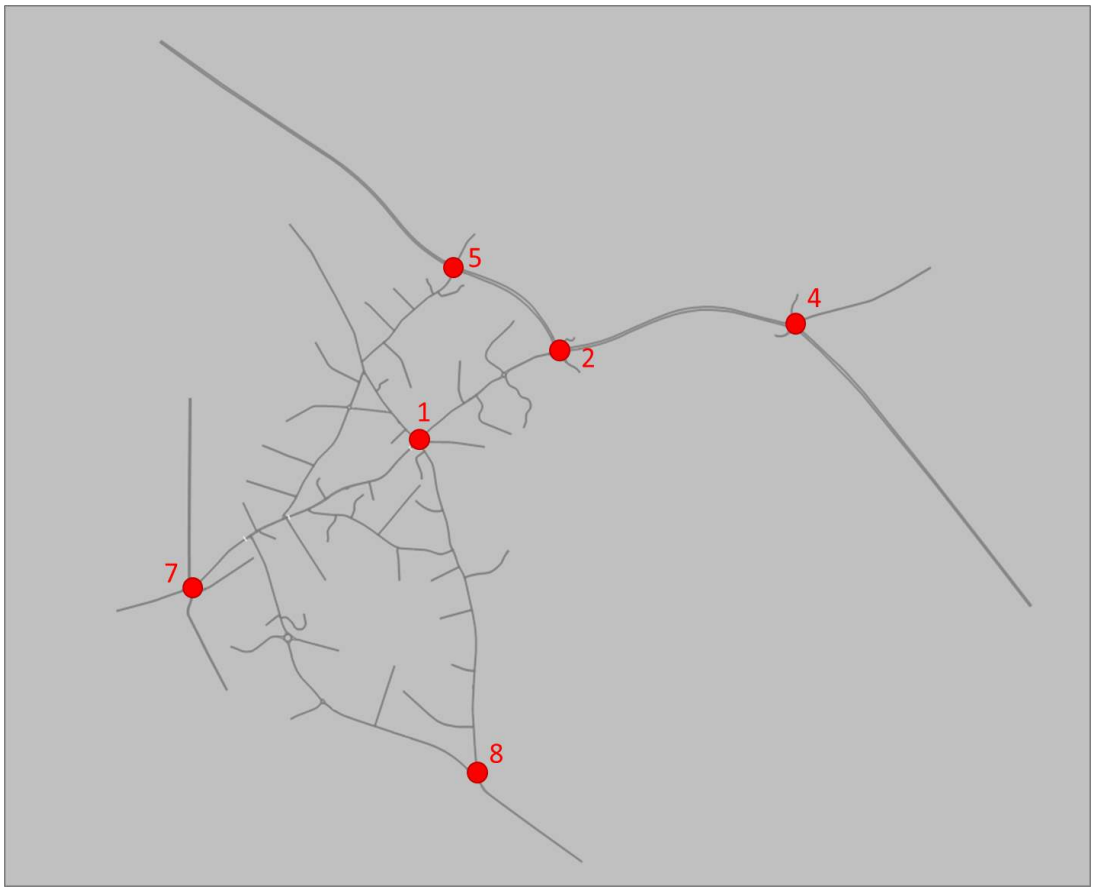
Junction	Site	Arm	Description	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
4	Site 4	Arm A	Sandy Lane	1	1	1	0	2	0	0	0
4	Site 4	Arm B	A534 Bypass	1	1	1	7	1	7	8	8
4	Site 4	Arm C	Borras Hall Lane	0	0	0	0	0	0	0	0
4	Site 4	Arm D	A534 Wrexham Rd	0	0	0	35	14	66	68	83
4	Site 4	Arm E	Industrial Estate Rd	92	214	746	76	488	272	292	332
5	Site 5	Arm A	Borras Rd	0	0	0	0	2	2	0	4
5	Site 5	Arm B	A5156 East	6	15	25	29	18	107	33	64
5	Site 5	Arm C	Borras Park Rd	3	1	4	5	2	2	7	5
5	Site 5	Arm D	A5156 West	3	5	7	7	28	41	10	47
1	Site 1	Arm A	Holt Rd North	9	10	10	52	74	311	6	7
1	Site 1	Arm B	Bryn Estyn Rd	0	0	0	0	5	0	0	0
1	Site 1	Arm C	Cefn Rd	23	20	31	57	76	182	65	17
1	Site 1	Arm D	Holt Rd South	6	12	12	10	11	11	19	10
1	Site 1	Arm E	Dean Rd	4	9	14	14	72	37	21	7
7	Site 7	Arm A	Holt Rd	3	3	3	3	3	2	3	4
7	Site 7	Arm B	Tesco	0	1	1	1	24	1	1	1
7	Site 7	Arm C	Fardon Rd	2	2	3	2	44	6	11	16
7	Site 7	Arm D	Holt St	1	1	1	1	32	17	13	4
7	Site 7	Arm E	A5152 Main	1	1	1	2	68	596	379	98
7	Site 7	Arm F	A5152 Left Slip	1	1	2	13	71	653	416	112
8	Site 8	Arm A	Cefn Rd Right Turn	0	6	1	1	1	1	4	4
8	Site 8	Arm C	Queensway Right Turn	0	1	0	1	1	1	1	1
2	Site 2	Arm A	A5156	0	0	0	0	5	0	0	4
2	Site 2	Arm C	A534 Bypass	90	14	58	11	73	103	58	24
2	Site 2	Arm C	Holt Road	7	10	31	9	11	127	39	6
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	4	0	N/A	2	21	18

MAXIMUM QUEUE LENGTHS (METRES)

Junction	Site	Arm	Description	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
4	Site 4	Arm A	Sandy Lane	4	5	4	4	5	4	4	4
4	Site 4	Arm B	A534 Bypass	38	45	65	125	50	118	120	173
4	Site 4	Arm C	Borras Hall Lane	17	20	29	16	21	18	18	19
4	Site 4	Arm D	A534 Wrexham Rd	54	80	147	87	91	89	103	104
4	Site 4	Arm E	Industrial Estate Rd	21	19	22	32	20	35	38	36
5	Site 5	Arm A	Borras Rd	12	12	12	12	11	27	25	13
5	Site 5	Arm B	A5156 East	23	26	33	32	32	26	39	50
5	Site 5	Arm C	Borras Park Rd	69	55	52	52	69	50	85	39
5	Site 5	Arm D	A5156 West	90	92	114	111	118	1807	2010	161
1	Site 1	Arm A	Holt Rd North	90	92	166	210	120	554	338	132
1	Site 1	Arm B	Bryn Estyn Rd	10	10	10	13	11	20	13	13
1	Site 1	Arm C	Cefn Rd	118	115	253	213	131	953	151	103
1	Site 1	Arm D	Holt Rd South	49	59	78	77	75	916	126	71
1	Site 1	Arm E	Dean Rd	54	104	157	169	167	410	807	191
7	Site 7	Arm A	Holt Rd	38	37	44	43	44	36	43	42
7	Site 7	Arm B	Tesco	14	14	16	14	16	23	15	15
7	Site 7	Arm C	Fardon Rd	25	22	20	20	22	43	24	28
7	Site 7	Arm D	Holt St	6	7	8	7	8	12	8	8
7	Site 7	Arm E	A5152 Main	16	16	16	17	17	47	14	16
7	Site 7	Arm F	A5152 Left Slip	19	21	24	21	22	53	23	24
8	Site 8	Arm A	Cefn Rd Right Turn	13	18	22	21	17	31	47	32
8	Site 8	Arm C	Queensway Right Turn	10	12	13	13	13	22	19	14
2	Site 2	Arm A	A5156	76	83	178	315	110	789	790	186
2	Site 2	Arm C	A534 Bypass	46	51	60	28	53	132	35	42
2	Site 2	Arm C	Holt Road	38	50	86	88	65	566	776	240
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	8	4	N/A	27	106	93

Junction	Site	Arm	Description	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
4	Site 4	Arm A	Sandy Lane	11	12	11	9	13	10	10	10
4	Site 4	Arm B	A534 Bypass	26	27	30	58	26	57	57	57
4	Site 4	Arm C	Borras Hall Lane	7	7	7	8	8	7	7	7
4	Site 4	Arm D	A534 Wrexham Rd	17	21	17	131	37	181	188	202
4	Site 4	Arm E	Industrial Estate Rd	355	488	1079	287	785	598	625	657
5	Site 5	Arm A	Borras Rd	7	9	8	8	11	12	8	13
5	Site 5	Arm B	A5156 East	68	106	136	159	115	272	156	219
5	Site 5	Arm C	Borras Park Rd	34	24	40	46	27	29	49	42
5	Site 5	Arm D	A5156 West	46	64	72	72	103	137	85	136
1	Site 1	Arm A	Holt Rd North	121	114	110	251	206	647	77	95
1	Site 1	Arm B	Bryn Estyn Rd	9	9	10	10	16	11	8	9
1	Site 1	Arm C	Cefn Rd	129	125	138	179	190	347	218	92
1	Site 1	Arm D	Holt Rd South	73	93	89	87	84	92	104	90
1	Site 1	Arm E	Dean Rd	57	74	98	98	167	150	129	73
7	Site 7	Arm A	Holt Rd	55	51	58	47	55	39	52	70
7	Site 7	Arm B	Tesco	17	20	18	20	45	19	24	20
7	Site 7	Arm C	Fardon Rd	42	38	49	34	88	77	86	127
7	Site 7	Arm D	Holt St	21	23	23	28	59	79	72	45
7	Site 7	Arm E	A5152 Main	19	20	21	34	99	743	545	202
7	Site 7	Arm F	A5152 Left Slip	35	34	37	74	123	791	571	233
8	Site 8	Arm A	Cefn Rd Right Turn	26	43	27	36	32	33	67	63
8	Site 8	Arm C	Queensway Right Turn	15	22	23	24	20	22	29	29
2	Site 2	Arm A	A5156	13	9	13	11	18	18	19	37
2	Site 2	Arm C	A534 Bypass	217	109	198	96	185	283	209	114
2	Site 2	Arm C	Holt Road	61	82	134	74	79	320	159	55
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	17	6	N/A	17	48	72

QUEUE SITE REFERENCE MAP



Appendix C

MCC Survey Comparison 2018-2023

				AM 08:00-09:00 Observed Survey Comparison									PM 16:30-17:30 Observed Survey Comparison								
				2018			2023			Difference			2018			2023			Difference		
				Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
		Borras Hall Lane North	A534 Wrexham Road East	14	0	14	3	0	3	-11	0	-11	3	0	3	8	1	9	5	1	6
		Borras Hall Lane North	Industrial Estate Road	51	1	52	36	2	38	-15	1	-14	17	1	18	8	0	8	-9	-1	-10
		Borras Hall Lane North	Sandy Lane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Borras Hall Lane North	A534 West	4	0	4	7	0	7	3	0	3	6	0	6	4	0	4	-2	0	-2
		Borras Hall Lane North	Borras Hall Lane North	-	-	-	0	0	0	-	-	-	-	-	-	1	0	1	-	-	-
		A534 Wrexham Road East	Industrial Estate Road	79	13	92	99	9	108	20	-4	16	30	4	34	37	8	45	7	4	11
		A534 Wrexham Road East	Sandy Lane	3	3	6	2	3	5	-1	0	-1	3	0	3	0	1	1	-3	1	-2
		A534 Wrexham Road East	A534 West	274	20	294	295	13	308	21	-7	14	425	13	438	320	5	325	-105	-8	-113
		A534 Wrexham Road East	Borras Hall Lane North	4	0	4	2	0	2	-2	0	-2	4	0	4	4	0	4	0	0	0
		A534 Wrexham Road East	A534 Wrexham Road East	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Industrial Estate Road	Sandy Lane	2	1	3	1	1	2	-1	0	-1	2	0	2	1	0	1	-1	0	-1
1	A534 / Wrexham Rd / Sandy Ln / Industrial Estate Rd / Borras Hall Ln	Industrial Estate Road	A534 West	257	88	345	254	98	352	-3	10	7	1353	37	1390	1239	31	1270	-114	-6	-120
		Industrial Estate Road	Borras Hall Lane North	8	1	9	11	1	12	3	0	3	80	0	80	86	1	87	6	1	7
		Industrial Estate Road	A534 Wrexham Road East	33	12	45	41	14	55	8	2	10	123	7	130	153	7	160	30	0	30
		Industrial Estate Road	Industrial Estate Road	-	-	-	0	0	0	-	-	-	-	-	-	2	1	3	-	-	-
		Sandy Lane	A534 West	1	2	3	12	7	19	11	5	16	14	2	16	15	0	15	1	-2	-1
		Sandy Lane	Borras Hall Lane North	0	0	0	1	0	1	1	0	1	3	0	3	2	0	2	-1	0	-1
		Sandy Lane	A534 Wrexham Road East	1	0	1	0	4	4	-1	4	3	2	0	2	5	0	5	3	0	3
		Sandy Lane	Industrial Estate Road	0	0	0	2	2	4	2	2	4	0	0	0	0	0	0	0	0	0
		Sandy Lane	Sandy Lane	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		A534 West	Borras Hall Lane North	3	1	4	6	0	6	3	-1	2	8	0	8	15	0	15	7	0	7
		A534 West	A534 Wrexham Road East	426	15	441	322	22	344	-104	7	-97	329	5	334	278	4	282	-51	-1	-52
		A534 West	Industrial Estate Road	1379	95	1474	1190	74	1264	-189	-21	-210	319	39	358	362	57	419	43	18	61
		A534 West	Sandy Lane	2	3	5	13	8	21	11	5	16	0	1	1	1	1	2	1	0	1
		A534 West	A534 West	-	-	-	1	0	1	-	-	-	-	-	-	2	0	2	-	-	-
		A5156 North	Holt Road Services	14	0	14	67	2	69	54	2	56	5	0	5	54	6	60	49	6	55
		A5156 North	A534 East	1391	76	1466	1209	94	1303	-182	19	-163	487	44	531	416	50	466	-71	6	-65
		A5156 North	A534 Stryt Holt	272	12	284	248	11	259	-24	-1	-25	382	2	384	282	1	283	-100	-1	-101
		A5156 North	A5156 North	-	-	-	0	0	0	-	-	-	-	-	-	0	1	1	-	-	-
		Holt Road Services	A534 East	1	0	1	74	5	79	73	5	78	3	0	3	45	11	56	43	11	54
		Holt Road Services	A534 Stryt Holt	1	0	1	14	4	18	13	4	17	6	0	6	33	0	33	28	0	28
		Holt Road Services	A5156 North	1	0	1	37	8	45	36	8	44	9	0	9	55	3	58	46	3	49
2	A5156 / A534	Holt Road Services	Holt Road Services	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		A534 East	A534 Stryt Holt	189	8	197	180	6	186	-9	-2	-11	428	2	430	376	1	377	-52	-1	-53
		A534 East	A5156 North	323	98	421	361	103	464	39	5	44	1224	40	1264	1130	31	1161	-94	-9	-103
		A534 East	Holt Road Services	1	0	1	18	9	27	18	9	27	0	0	0	45	6	51	45	6	51
		A534 East	A534 East	-	-	-	0	1	1	-	-	-	-	-	-	2	0	2	-	-	-
		A534 Stryt Holt	A5156 North	329	10	339	246	4	250	-83	-6	-89	247	6	253	201	2	203	-46	-4	-50
		A534 Stryt Holt	Holt Road Services	11	0	11	28	1	29	18	1	19	6	0	6	21	1	22	16	1	17
		A534 Stryt Holt	A534 East	334	7	341	247	4	251	-87	-3	-90	233	2	234	199	0	199	-34	-2	-35
		A534 Stryt Holt	A534 Stryt Holt	-	-	-	0	0	0	-	-	-	-	-	-	3	0	3	-	-	-
		A5156 West	Borras Road	29	1	30	20	3	23	-9	2	-7	14	1	15	16	0	16	2	-1	1
		A5156 West	A5156 East	1654	115	1769	1407	105	1512	-247	-10	-257	773	38	811	720	59	779	-53	21	-32
		A5156 West	Borras Park Road	121	2	123	188	2	190	67	0	67	267	0	267	262	0	262	-5	0	-5
		A5156 West	A5156 West	-	-	-	31	0	31	-	-	-	-	-	-	15	0	15	-	-	-
		Borras Road	A5156 East	9	1	10	8	2	10	-1	1	0	7	0	7	4	0	4	-3	0	-3
		Borras Road	Borras Park Road	16	0	16	15	0	15	-1	0	-1	10	0	10	12	0	12	2	0	2
		Borras Road	A5156 West	20	0	20	10	3	13	-10	3	-7	14	0	14	6	0	6	-8	0	-8
3	A5156 / Borras Rd	Borras Road	Borras Road	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		A5156 East	Borras Park Road	30	0	30	35	2	37	5	2	7	101	0	101	107	0	107	6	0	6
		A5156 East	A5156 West	649	121	770	603	112	715	-46	-9	-55	1298	53	1351	1285	37	1322	-13	-16	-29
		A5156 East	Borras Road	4	0	4	6	1	7	2	1	3	9	0	9	4	0	4	-5	0	-5
		A5156 East	A5156 East	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Borras Park Road	A5156 West	229	1	230	232	2	234	3	1	4	101	0	101	120	1	121	19	1	20
		Borras Park Road	Borras Road	30	0	30	22	0	22	-8	0	-8	20	0	20	12	0	12	-8	0	-8
		Borras Park Road	A5156 East	83	0	83	99	1	100	16	1	17	52	1	53	26	0	26	-26	-1	-27
		Borras Park Road	Borras Park Road	-	-	-	0	0	0	-	-	-	-	-	-	1	0	1	-	-	-
		Jeffreys Road North	Borras Road East	-	-	-	39	0	39	-	-	-	-	-	-	31	0	31	-	-	-
		Jeffreys Road North	Jeffreys Road South	-	-	-	245	0	245	-	-	-	-	-	-	126	0	126	-	-	-
4	Jeffreys Rd / Borras Park Rd	Borras Road East	Jeffreys Road South	-	-	-	299	2	301	-	-	-	-	-	-	274	0	274	-	-	-
		Borras Road East	Jeffreys Road North	-	-	-	22	0	22	-	-	-	-	-	-	48	0	48	-	-	-
		Jeffreys Road South	Jeffreys Road North	-	-	-	136	2	138	-	-	-	-	-	-	171	0	171	-	-	-
		Jeffreys Road South	Borras Road East	-	-	-	264	2	266	-	-	-	-	-	-	213	1	214	-	-	-
		Cherry Hill Drive	Borras Park Road East	-	-	-	50	0	50	-	-	-	-	-	-	24	0	24	-	-	-
		Cherry Hill Drive	Ysgol Parc Borras Park School	-	-	-	4	0	4	-	-	-	-	-	-	1	0	1	-	-	-
		Cherry Hill Drive	Borras Park Road West	-	-	-	6	0	6	-	-	-	-	-	-	5	0	5	-	-	-
		Borras Park Road East	Ysgol Parc Borras Park School	-	-	-	63	0	63	-	-	-	-	-	-	17	0	17	-	-	-
		Borras Park Road East	Borras Park Road West	-	-	-	224	2	226	-	-	-	-	-	-	308	0	308	-	-	-
5	Cherry Hill Dr / Borras Park Rd	Borras Park Road East	Cherry Hill Drive	-	-	-	26	0	26	-	-	-	-	-	-	35	0	35	-	-	-
		Ysgol Parc Borras Park School	Borras Park Road West	-	-	-	79	0	79	-	-	-	-	-	-	24	0	24	-	-	-
		Ysgol Parc Borras Park School	Cherry Hill Drive	-	-	-	2	0	2	-	-	-	-	-	-	5	0	5	-	-	-
		Ysgol Parc Borras Park School	Borras Park Road East	-	-	-	52	0	52	-	-	-	-	-	-	14	0	14	-	-	-
		Borras Park Road West	Cherry Hill Drive	-	-	-	23	0	23	-	-	-	-	-	-	8	0	8	-	-	-
		Borras Park Road West	Borras Park Road East	-	-	-	204	3	207	-	-	-	-	-	-	164	1	165	-	-	-
		Borras Park Road West	Ysgol Parc Borras Park School	-	-	-	106	0	106	-	-	-	-	-	-	18	0	18	-	-	-
		Borras Road North	Borras Road South	49	0	49	77	1	78	28	1	29	44	0	44	43	0	43	-1	0	-1
		Borras Road North	Rhosnesni Lane West	161	1	162	165	0	165	4	-1	3	80	0	80	102	0	102	22	0	22
		Borras Road North	Borras Road North	-	-	-	10	0	10	-	-	-	-	-	-	3	0	3	-	-	-
		Rhosnesni Lane East	Borras Road South	21	0	21	44	0	44	23	0	23	15	1	16	20	0	20	5	-1	4
		Rhosnesni Lane East	Rhosnesni Lane West	148	0	148	137	1	138	-11	1	-10	151	1	152	154	2	156	3	1	4
6	Rhosnesni Ln / Borras Rd	Rhosnesni Lane East	Borras Road North	62	1	63	43	1	44	-19	0	-19	30	0	30	50	0	50	20	0	20
		Borras Road South	Rhosnesni Lane West	14	0	14	37	1	38	23	1	24	5	0	5	10	0	10	5	0	5
		Borras Road South	Borras Road North	67	0	67	86	1	87	19	1	20	110	0	110	84	0	84	-26	0	-26
		Borras Road South	Borras Road South	-	-	-	3	0	3	-	-	-	-	-	-	0	0	0	-	-	-
		Rhosnesni Lane West	Borras Road North	197	1	198	226	0	226	29	-1	28	187	3	190	186	1	187	-1	-2	-3
		Rhosnesni Lane West	Borras Road South	15	0	15	36	0	36	21	0	21	6	0	6	6	0	6	0	0	0
		Rhosnesni Lane West	Rhosnesni Lane West	-	-	-	1	0	1	-	-	-	-	-	-	0	0	0	-	-	-
		Dean Lane North	Dean Lane South	-	-	-	447	1	448	-	-	-	-	-	-	295	2	297	-	-	-
7	Dean Ln / Rhosnesni Ln	Dean Lane North	Rhosnensi Lane West	-	-	-	86	0	86	-	-	-	-	-	-	65	0	65	-	-	-
		Dean Lane South	Rhosnensi Lane West	-	-	-	200	1	201	-	-	-	-	-	-	183	2	185	-	-	-
		Dean Lane South	Dean Lane North	-	-	-	182	2	184	-	-	-	-	-	-	226	1	227	-	-	-
		Dean Road	Stryt Holt East	125	0	125	115	0	115	-10	0	-10	83	0	83	83	0	83	0	0	0
		Dean Road	Bryn Estate Road	19	1	20	7	0	7	-12	-1	-13	22	0	22	10	0	10	-12	0	-12
		Dean Road	Cefn Road	200	2	202	234	1	235	34	-1	33	122	0	122	148	2	150	26	2	28
		Dean Road	Stryt Holt West	103	0	103	90	0	90	-13	0	-13	71	1	72	62	0	62	-9	-1	-10
		Dean Road	Dean Road	-	-	-	6	0	6	-	-	-	-	-	-	2	0	2	-	-	-
		Stryt Holt East	Bryn Estate Road	16	1	17	10	0	10	-6	-1	-7	29	0	29	10	0	10	-19	0	-19
		Stryt Holt East	Cefn Road	197	9	206	201	9	210	4	0	4	238	1	239	198	0	198	-40	-1	-41
		Stryt Holt East	Stryt Holt West	327	10	337	266	11	277	-61	1	-60	404	4	408	329	1	330	-75	-3	-78
		Stryt Holt East	Dean Road	76	0	76	93	1	94	17	1	18	146	0	146	151	1	152	5	1	6
		Stryt Holt East	Stryt Holt East	-	-	-	1	0	1	-	-	-	-	-	-	2	0	2	-	-	-
		Bryn Estate Road	Cefn Road	2	0	2	2	0	2	0	0	0	5	0	5	4	0	4	-1	0	-1
		Bryn Estate Road	Stryt Holt West	13	1	14	5	0	5	-8	-1	-9	17	0	17	4	0	4	-13	0	-13
8	Dean Rd / Cefn Rd / Stryt Holt / Bryn Estyn Rd	Bryn Estate Road	Dean Road	4	0	4	4	0	4	0	0	0	16	0	16	9	0	9	-7	0	-7
		Bryn Estate Road	Stryt Holt East	11	2	13	3	1	4	-8	-1	-9	14	0	14	12	0	12	-2	0	-2
		Bryn Estate Road	Bryn Estate Road	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Cefn Road	Stryt Holt West	78	1	79	79	0	79	1	-1	0	89	0	89	73	0	73	-16	0	-16
		Cefn Road	Dean Road	213	1	214	209	1	210	-4	0	-4	183	4	187	208	2	210	25	-2	23
		Cefn Road	Stryt Holt East	199	9	208	165	2	167	-34	-7	-41	160	3	163	162	2	164	2	-1	1
		Cefn Road	Bryn Estate Road	6	0	6	2	0	2	-4	0	-4	8	0	8	3	0	3	-5	0	-5
		Cefn Road	Cefn Road	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Stryt Holt West	Dean Road	78	1	79	65	1	66	-13	0	-13	88	0	88	60	0	60	-28	0	-28
		Stryt Holt West	Stryt Holt East	243	9	252	188	6	194	-55	-3	-58	339	2	341	289	0	289	-50	-2	-52
		Stryt Holt West	Bryn Estate Road	18	0	18	4	0	4	-14	0	-14	15	0	15	12	0	12	-3	0	-3
		Stryt Holt West	Cefn Road	69	1	70	55	0	55	-14	-1	-15	73	0	73	59	0	59	-14	0	-14
		Stryt Holt West	Stryt Holt West	-	-	-	1	0	1	-	-	-	-	-	-	1	0	1	-	-	-
		Borras Road North	Borras Road South	-	-	-	96	1	97	-	-	-	-	-	-	49	0	49	-	-	-
		Borras Road North	Camberley Drive	-	-	-	50	0	50	-	-	-	-	-	-	9	0	9	-	-	-
9	Camberley Dr. / Borras Rd	Borras Road South	Camberley Drive	-	-	-	4	0	4	-	-	-	-	-	-	11	0	11	-	-	-
		Borras Road South	Borras Road North	-	-	-	84	2	86	-	-	-	-	-	-	88	0	88	-	-	-
		Camberley Drive	Borras Road North	-	-	-	17	0	17	-	-	-	-	-	-	6	0	6	-	-	-
		Camberley Drive	Borras Road South	-	-	-	5	0	5	-	-	-	-	-	-	6	0	6	-	-	-
		Holt Rd East	Hullah Lane South	6	0	6	11	1	12	5	1	6	28	0	28	12	0	12	-16	0	-16
		Holt Rd East	Holt Road West	487	10	497	399	10	409	-88	0	-88	510	5	515	433	0	433	-77	-5	-82
10	Holt Rd / Hullah Ln	Hullah Lane South	Holt Road West	180	0	180	173	1	174	-7	1	-6	133	0	133	108	0	108	-25	0	-25

		Hullah Lane South	Holt Road East	19	0	19	16	0	16	-3	0	-3	9	0	9	7	0	7	-2	0	-2
		Holt Rd West	Holt Road East	345	10	355	273	6	279	-72	-4	-76	477	2	479	389	0	389	-88	-2	-90
		Holt Rd West	Hullah Lane South	106	0	106	92	1	93	-14	1	-13	119	0	119	135	0	135	16	0	16
		Cefn Road North	Cefn Road South	306	12	318	312	12	324	6	0	6	344	1	345	260	2	262	-84	1	-83
		Cefn Road North	Hullah Lane West	15	0	15	21	0	21	6	0	6	26	0	26	31	0	31	5	0	5
11	Hullah Ln / Cefn Rd	Cefn Road South	Hullah Lane West	22	2	24	20	0	20	-2	-2	-4	31	0	31	29	0	29	-2	0	-2
		Cefn Road South	Cefn Road North	354	11	365	344	4	348	-10	-7	-17	342	7	349	334	3	337	-8	-4	-12
		Hullah Lane West	Cefn Road North	20	0	20	13	0	13	-7	0	-7	18	0	18	24	0	24	6	0	6
		Hullah Lane West	Cefn Road South	13	0	13	25	1	26	12	1	13	20	0	20	23	0	23	3	0	3
		Birkdale Road North	Stryt Holt East	-	-	-	30	0	30	-	-	-	-	-	-	20	0	20	-	-	-
		Birkdale Road North	St Mellion Crescent	-	-	-	6	0	6	-	-	-	-	-	-	10	0	10	-	-	-
		Birkdale Road North	Stryt Holt West	-	-	-	52	1	53	-	-	-	-	-	-	49	0	49	-	-	-
		Birkdale Road North	Birkdale Road North	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Stryt Holt East	St Mellion Crescent	-	-	-	11	0	11	-	-	-	-	-	-	32	0	32	-	-	-
		Stryt Holt East	Stryt Holt West	-	-	-	422	22	444	-	-	-	-	-	-	628	2	630	-	-	-
		Stryt Holt East	Birkdale Road North	-	-	-	11	0	11	-	-	-	-	-	-	35	0	35	-	-	-
12	Birkdale Rd / Stryt Holt / St Mellion Cress	Stryt Holt East	Stryt Holt East	-	-	-	0	0	0	-	-	-	-	-	-	1	0	1	-	-	-
		St Mellion Crescent	Stryt Holt West	-	-	-	40	0	40	-	-	-	-	-	-	16	0	16	-	-	-
		St Mellion Crescent	Birkdale Road North	-	-	-	11	0	11	-	-	-	-	-	-	6	0	6	-	-	-
		St Mellion Crescent	Stryt Holt East	-	-	-	62	0	62	-	-	-	-	-	-	16	0	16	-	-	-
		St Mellion Crescent	St Mellion Crescent	-	-	-	1	0	1	-	-	-	-	-	-	0	0	0	-	-	-
		Stryt Holt West	Birkdale Road North	-	-	-	32	0	32	-	-	-	-	-	-	66	0	66	-	-	-
		Stryt Holt West	Stryt Holt East	-	-	-	433	9	442	-	-	-	-	-	-	389	3	392	-	-	-
		Stryt Holt West	St Mellion Crescent	-	-	-	16	0	16	-	-	-	-	-	-	21	0	21	-	-	-
		Stryt Holt West	Stryt Holt West	-	-	-	0	0	0	-	-	-	-	-	-	2	0	2	-	-	-
		Queensway	Cefn Road North	13	1	14	17	0	17	4	-1	3	21	0	21	17	1	18	-4	1	-3
		Queensway	Cefn Road South	39	2	41	52	0	52	13	-2	11	59	0	59	58	1	59	-1	1	0
13	Queensway / Cefn Rd	Cefn Road North	Cefn Road South	222	9	231	226	8	234	4	-1	3	267	2	269	189	0	189	-78	-2	-80
		Cefn Road North	Queensway	26	1	27	28	1	29	2	0	2	21	0	21	12	0	12	-9	0	-9
		Cefn Road South	Queensway	112	2	114	106	0	106	-6	-2	-8	136	0	136	151	1	152	15	1	16
		Cefn Road South	Cefn Road North	299	10	309	289	3	292	-10	-7	-17	315	4	319	310	1	311	-5	-3	-8
		Ffordd Montgomery North	Wrexham Athletics Club	3	0	3	3	0	3	0	0	0	66	0	66	20	0	20	-46	0	-46
		Ffordd Montgomery North	Queensway South	140	2	142	86	0	86	-54	-2	-56	108	0	108	89	0	89	-19	0	-19
		Ffordd Montgomery North	Smithfield Road	29	1	30	34	0	34	5	-1	4	28	0	28	32	0	32	4	0	4
		Ffordd Montgomery North	Ffordd Montgomery North	-	-	-	0	0	0	-	-	-	-	-	-	1	0	1	-	-	-
		Wrexham Athletics Club	Queensway South	0	0	0	1	0	1	1	0	1	14	0	14	5	0	5	-9	0	-9
		Wrexham Athletics Club	Smithfield Road	0	0	0	1	0	1	1	0	1	21	0	21	17	0	17	-4	0	-4
		Wrexham Athletics Club	Ffordd Montgomery North	0	0	0	0	0	0	0	0	0	31	0	31	17	0	17	-14	0	-14
14	Smithfield Rd / Queensway / Ffordd Montgomery	Wrexham Athletics Club	Wrexham Athletics Club	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Queensway South	Smithfield Road	204	5	209	216	2	218	12	-3	9	188	3	191	201	0	201	13	-3	10
		Queensway South	Ffordd Montgomery North	145	0	145	115	1	116	-30	1	-29	189	1	190	162	0	162	-27	-1	-28
		Queensway South	Wrexham Athletics Club	2	1	3	0	0	0	-2	-1	-3	25	0	25	20	0	20	-5	0	-5
		Queensway South	Queensway South	-	-	-	1	0	1	-	-	-	-	-	-	3	0	3	-	-	-
		Smithfield Road	Ffordd Montgomery North	21	0	21	16	0	16	-5	0	-5	36	0	36	38	0	38	2	0	2
		Smithfield Road	Wrexham Athletics Club	3	0	3	5	0	5	2	0	2	25	0	25	19	0	19	-6	0	-6
		Smithfield Road	Queensway South	53	0	53	66	0	66	13	0	13	79	0	79	84	0	84	5	0	5
		Smithfield Road	Smithfield Road	-	-	-	1	0	1	-	-	-	-	-	-	1	0	1	-	-	-
		Stryt Holt East	Ffordd Montgomery	105	2	107	59	0	59	-46	-2	-48	131	0	131	72	0	72	-59	0	-59
		Stryt Holt East	Stryt Holt West	606	9	615	566	9	575	-40	0	-40	534	5	539	506	1	507	-28	-4	-32
15	Ffordd Montgomery / Stryt Holt	Ffordd Montgomery	Stryt Holt West	91	0	91	54	0	54	-37	0	-37	108	0	108	86	0	86	-22	0	-22
		Ffordd Montgomery	Stryt Holt East	90	0	90	82	0	82	-8	0	-8	136	1	137	96	0	96	-40	-1	-41
		Stryt Holt West	Stryt Holt East	403	10	413	367	5	372	-36	-5	-41	678	1	679	632	1	633	-46	0	-46
		Stryt Holt West	Ffordd Montgomery	48	1	49	42	0	42	-6	-1	-7	66	0	66	63	0	63	-3	0	-3
		A5152 North	Stryt Holt East	152	6	158	189	2	191	37	-4	33	235	1	236	266	1	267	31	0	31
		A5152 North	Tesco Car Park	111	7	118	98	0	98	-13	-7	-20	179	3	182	187	0	187	8	-3	5
		A5152 North	A5152 South	270	8	278	325	6	331	55	-2	53	241	1	242	339	3	342	98	2	100
		A5152 North	Holt Street	27	1	28	35	1	36	8	0	8	31	0	31	23	0	23	-8	0	-8
		A5152 North	A5152 North	-	-	-	0	0	0	-	-	-	-	-	-	1	0	1	-	-	-
		Stryt Holt East	Tesco Car Park	56	1	57	68	0	68	12	-1	11	100	0	100	147	0	147	47	0	47
		Stryt Holt East	A5152 South	221	8	229	239	2	241	18	-6	12	139	4	143	169	0	169	30	-4	26
		Stryt Holt East	Holt Street	75	1	76	99	0	99	24	-1	23	64	1	65	68	0	68	4	-1	3
		Stryt Holt East	A5152 North	196	7	203	209	6	215	13	-1	12	120	9	129	228	0	228	108	-9	99
		Stryt Holt East	Stryt Holt East	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Tesco Car Park	A5152 South	109	0	109	67	0	67	-42	0	-42	205	6	211	218	0	218	13	-6	7
		Tesco Car Park	Holt Street	26	0	26	19	0	19	-7	0	-7	35	0	35	32	0	32	-3	0	-3
16	A5152 / Stryt Holt / Tesco Car Park	Tesco Car Park	A5152 North	65	3	68	49	0	49	-16	-3	-19	135	0	135	224	0	224	89	0	89
		Tesco Car Park	Stryt Holt East	48	1	49	38	0	38	-10	-1	-11	60	2	62	99	0	99	39	-2	37
		Tesco Car Park	Tesco Car Park	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		A5152 South	Holt Street	7	0	7	5	0	5	-2	0	-2	9	0	9	10	0	10	1	0	1
		A5152 South	A5152 North	141	4	145	179	5	184	38	1	39	274	5	279	231	0	231	-43	-5	-48
		A5152 South	Stryt Holt East	97	3	100	152	2	154	55	-1	54	142	4	146	220	0	220	78	-4	74
		A5152 South	Tesco Car Park	66	1	67	72	0	72	6	-1	5	97	2	99	196	0	196	99	-2	97
		A5152 South	A5152 South	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Holt Street	A5152 North	21	2	23	32	1	33	11	-1	10	126	0	126	135	0	135	9	0	9
		Holt Street	Stryt Holt East	26	0	26	41	0	41	15	0	15	104	0	104	96	0	96	-8	0	-8
		Holt Street	Tesco Car Park	16	0	16	9	0	9	-7	0	-7	34	0	34	39	0	39	5	0	5
		Holt Street	A5152 South	11	0	11	13	0	13	2	0	2	54	0	54	58	0	58	4	0	4
		Holt Street	Holt Street	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
		Prince Charles Road	Queensway East	-	-	-	38	0	38	-	-	-	-	-	-	19	1	20	-	-	-
		Prince Charles Road	Queensway West	-	-	-	123	0	123	-	-	-	-	-	-	121	0	121	-	-	-
17	Queensway / Prince Charles Rd	Queensway East	Queensway West	-	-	-	112	1	113	-	-	-	-	-	-	161	0	161	-	-	-
		Queensway East	Prince Charles Road	-	-	-	19	0	19	-	-	-	-	-	-	25	0	25	-	-	-
		Queensway West	Prince Charles Road	-	-	-	85	0	85	-	-	-	-	-	-	85	0	85	-	-	-
		Queensway West	Queensway East	-	-	-	77	0	77	-	-	-	-	-	-	57	0	57	-	-	-
		Cefn Road North	Cefn Road South	-	-	-	235	9	244	-	-	-	-	-	-	181	0	181	-	-	-
		Cefn Road North	Anthony Eden Drive	-	-	-	10	0	10	-	-	-	-	-	-	29	0	29	-	-	-
18	Cefn Rd / Anthony Eden Dr.	Cefn Road South	Anthony Eden Drive	-	-	-	30	0	30	-	-	-	-	-	-	30	0	30	-	-	-
		Cefn Road South	Cefn Road North	-	-	-	280	3	283	-	-	-	-	-	-	294	2	296	-	-	-
		Anthony Eden Drive	Cefn Road North	-	-	-	18	1	19	-	-	-	-	-	-	15	0	15	-	-	-
		Anthony Eden Drive	Cefn Road South	-	-	-	18	0	18	-	-	-	-	-	-	19	0	19	-	-	-
		Cefn Road North	Cefn Road South	-	-	-	246	11	257	-	-	-	-	-	-	231	0	231	-	-	-
		Cefn Road North	Churchill Drive	-	-	-	91	2	93	-	-	-	-	-	-	53	2	55	-	-	-
19	Cefn Rd / Churchill Dr.	Cefn Road South	Churchill Drive	-	-	-	12	0	12	-	-	-	-	-	-	14	0	14	-	-	-
		Cefn Road South	Cefn Road North	-	-	-	295	4	299	-	-	-	-	-	-	298	2	300	-	-	-
		Churchill Drive	Cefn Road North	-	-	-	68	0	68	-	-	-	-	-	-	64	1	65	-	-	-
		Churchill Drive	Cefn Road South	-	-	-	11	0	11	-	-	-	-	-	-	14	0	14	-	-	-

Appendix C Illustrative Masterplan

TTE_UD_v2



Aerial image: © Google Earth 2022

TETRA TECH

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KEY

- Site boundary
- KSS2 boundary
- Proposed residential parcel
- Proposed sports pitches
- Proposed public open space
- Retained tree / hedgerow
- Proposed planting
- Indicative proposed SuDS
- Wildlife corridor
- Proposed primary access
- Proposed secondary access
- Proposed spine road with green verge*
- Proposed road network
- Road feature / traffic calming
- Placemaking / gateway feature
- Existing / potential play space
- Pedestrian / cycle link
- Retained Public Right of Way (PRoW)
- Retained / proposed pedestrian / cycle route
- Existing cycle route

*Position of link to remaining KSS2 to be determined

Document control

Rev	Description	Date	Dwn	Chk	App
P06	Updated masterplan to reflect drainage strat and T.constraints	25.11.24	EI	AC	AC
P05	Updated masterplan to reflect new drainage strat	12.11.24	EI	AC	AC
P04	Red boundary update	12.03.24	LR	BR	AC
P03	Updated parcels	27.02.24	BR	BR	AC
P02	Updated masterplan based on technical updates	02.02.24	BR	AC	AC

Erlas Park Wrexham
Harworth Group

STRATEGIC MASTERPLAN

TTE Proj No	Drwn | Date	Checked | Date	Appr'd | Date	Scale @ A3	Suitability
B024030	EI | Nov '24	AC | Nov '24	AC | Nov '24	1:5,000	S0

Client Proj No	Originator	Vol/System	Level/Location	Type/Code	Role	Number	Revision
-	TTE	00	XX	DR	UD	40	P06

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Appendix D TRICS Total Person Trip Rate Report

Vectos (North) Limited 4th Floor, Oxford Place, 61 Oxford St Manchester Licence No: 715001

Calculation Reference: AUDIT-715001-231127-1155

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	ES	EAST SUSSEX	1 days
	HC	HAMPSHIRE	1 days
	KC	KENT	1 days
	SC	SURREY	1 days
	WS	WEST SUSSEX	1 days
04	EAST ANGLIA		
	NF	NORFOLK	7 days
05	EAST MIDLANDS		
	DY	DERBY	1 days
06	WEST MIDLANDS		
	ST	STAFFORDSHIRE	1 days

Primary Filtering selection:

Parameter:	No of Dwellings
Actual Range:	212 to 1146 (units:)
Range Selected by User:	200 to 1817 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/15 to 20/03/23

Selected survey days:

Monday	2 days
Tuesday	6 days
Wednesday	4 days
Thursday	2 days

Selected survey types:

Manual count	14 days
Directional ATC Count	0 days

Selected Locations:

Edge of Town	14

Selected Location Sub Categories:

Residential Zone	14

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	8 days - Selected
Servicing vehicles Excluded	8 days - Selected

Secondary Filtering selection:

Use Class:

C3	14 days

Population within 500m Range:
All Surveys Included

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	4 days
10,001 to 15,000	4 days
15,001 to 20,000	4 days

Population within 5 miles:

5,001 to 25,000	3 days
50,001 to 75,000	1 days
75,001 to 100,000	4 days
125,001 to 250,000	5 days
250,001 to 500,000	1 days

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	9 days
1.6 to 2.0	1 days

Travel Plan:

Yes	10 days
No	4 days

PTAL Rating:

No PTAL Present	14 days

LIST OF SITES relevant to selection parameters

1 DY-03-A-01 MIXED HOUSES DERBY
RADBOURNE LANE
DERBY

Edge of Town
Residential Zone
Total No of Dwellings: 371
Survey date: TUESDAY *10/07/18* *Survey Type: MANUAL*

2 ES-03-A-03 MIXED HOUSES & FLATS EAST SUSSEX
SHEPHAM LANE
POLEGATE

Edge of Town
Residential Zone
Total No of Dwellings: 212
Survey date: MONDAY *11/07/16* *Survey Type: MANUAL*

3 HC-03-A-24 MIXED HOUSES & FLATS HAMPSHIRE
STONEHAM LANE
EASTLEIGH

Edge of Town
Residential Zone
Total No of Dwellings: 243
Survey date: WEDNESDAY *10/11/21* *Survey Type: MANUAL*

4 KC-03-A-07 MIXED HOUSES KENT
RECULVER ROAD
HERNE BAY

Edge of Town
Residential Zone
Total No of Dwellings: 288
Survey date: WEDNESDAY *27/09/17* *Survey Type: MANUAL*

5 NF-03-A-06 MIXED HOUSES NORFOLK
BEAUFORT WAY
GREAT YARMOUTH
BRADWELL
Edge of Town
Residential Zone
Total No of Dwellings: 275
Survey date: MONDAY *23/09/19* *Survey Type: MANUAL*

6 NF-03-A-09 MIXED HOUSES & FLATS NORFOLK
ROUND HOUSE WAY
NORWICH
CRINGLEFORD
Edge of Town
Residential Zone
Total No of Dwellings: 984
Survey date: TUESDAY *24/09/19* *Survey Type: MANUAL*

7 NF-03-A-28 MIXED HOUSES & FLATS NORFOLK
ATLANTIC AVENUE
NORWICH
SPROWSTON
Edge of Town
Residential Zone
Total No of Dwellings: 1146
Survey date: THURSDAY *22/09/22* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8	NF-03-A-30 BRANDON ROAD SWAFFHAM	MIXED HOUSES	NORFOLK
	Edge of Town Residential Zone Total No of Dwellings:	266	
	Survey date: THURSDAY	*23/09/21*	*Survey Type: MANUAL*
9	NF-03-A-38 BEAUFORT WAY GREAT YARMOUTH BRADWELL	MIXED HOUSES	NORFOLK
	Edge of Town Residential Zone Total No of Dwellings:	537	
	Survey date: TUESDAY	*20/09/22*	*Survey Type: MANUAL*
10	NF-03-A-39 HEATH DRIVE HOLT	MIXED HOUSES	NORFOLK
	Edge of Town Residential Zone Total No of Dwellings:	212	
	Survey date: TUESDAY	*27/09/22*	*Survey Type: MANUAL*
11	NF-03-A-46 BURGH ROAD AYLSHAM	MIXED HOUSES & FLATS	NORFOLK
	Edge of Town Residential Zone Total No of Dwellings:	300	
	Survey date: TUESDAY	*14/09/21*	*Survey Type: MANUAL*
12	SC-03-A-08 REIGATE ROAD HORLEY	MIXED HOUSES	SURREY
	Edge of Town Residential Zone Total No of Dwellings:	790	
	Survey date: WEDNESDAY	*04/05/22*	*Survey Type: MANUAL*
13	ST-03-A-07 BEACONSIDE STAFFORD MARSTON GATE	DETACHED & SEMI-DETACHED	STAFFORDSHIRE
	Edge of Town Residential Zone Total No of Dwellings:	248	
	Survey date: WEDNESDAY	*22/11/17*	*Survey Type: MANUAL*
14	WS-03-A-11 ELLIS ROAD WEST HORSHAM S BROADBRIDGE HEATH	MIXED HOUSES	WEST SUSSEX
	Edge of Town Residential Zone Total No of Dwellings:	918	
	Survey date: TUESDAY	*02/04/19*	*Survey Type: MANUAL*

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period
Total People to Total Vehicles ratio (all time periods and directions): 1.67

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	14	485	0.109	14	485	0.479	14	485	0.588
08:00 - 09:00	14	485	0.227	14	485	0.763	14	485	0.990
09:00 - 10:00	14	485	0.192	14	485	0.245	14	485	0.437
10:00 - 11:00	14	485	0.159	14	485	0.191	14	485	0.350
11:00 - 12:00	14	485	0.184	14	485	0.193	14	485	0.377
12:00 - 13:00	14	485	0.213	14	485	0.201	14	485	0.414
13:00 - 14:00	14	485	0.208	14	485	0.185	14	485	0.393
14:00 - 15:00	14	485	0.234	14	485	0.242	14	485	0.476
15:00 - 16:00	14	485	0.501	14	485	0.251	14	485	0.752
16:00 - 17:00	14	485	0.473	14	485	0.253	14	485	0.726
17:00 - 18:00	14	485	0.559	14	485	0.263	14	485	0.822
18:00 - 19:00	14	485	0.478	14	485	0.265	14	485	0.743
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.537			3.531			7.068

Appendix E National Travel Survey Data

NTS0502a: Trip start time by trip purpose (Monday to Friday only): England, 2002 onwards

This worksheet contains one table. Some cells refer to notes which can be found on the notes worksheet.
The table in this worksheet contains percentages and the unweighted sample sizes show the number. These represent the proportion of each trip purpose by trip start time (Monday to Friday only).
Some shorthand is used in these tables, [low] denotes rounds to 0.
Filters are active in row 6 and may hide some data. To turn off all filters select the 'Data' ribbon then 'Filters' button or use [Ctrl, Shift, L].

Year [note 1]	Start time	Commuting (%)	Business (%)	Education (%)	Escort education (%)	Shopping (%)	Other work, other escort and personal business (%)	Visiting friends, entertainment and sport (%)	Holiday, day trip and other (%)	All purposes (%)	Unweighted sample size: trips (thousands) (number)
2022	**0000 to 0059**	37	1	0	0	3	22	26	12	100	[low]
2022	**0100 to 0159**	59	3	6	13	0	0	8	11	100	[low]
2022	**0200 to 0259**	53	0	0	10	0	7	27	3	100	[low]
2022	**0300 to 0359**	73	5	0	0	0	4	7	12	100	[low]
2022	**0400 to 0459**	83	5	0	0	2	2	5	4	100	[low]
2022	**0500 to 0559**	77	5	0	0	[low]	6	5	7	100	1
2022	**0600 to 0659**	64	6	[low]	[low]	3	6	6	14	100	2
2022	**0700 to 0759**	42	4	16	6	3	14	4	12	100	6
2022	**0800 to 0859**	17	2	28	26	4	13	3	6	100	13
2022	**0900 to 0959**	9	4	3	5	22	24	15	20	100	5
2022	**1000 to 1059**	5	2	1	[low]	32	23	17	20	100	6
2022	**1100 to 1159**	5	2	2	1	33	22	18	18	100	6
2022	**1200 to 1259**	6	3	2	1	28	22	23	15	100	6
2022	**1300 to 1359**	9	3	1	1	27	23	18	17	100	5
2022	**1400 to 1459**	10	2	5	12	22	17	15	17	100	7
2022	**1500 to 1559**	8	1	25	22	11	13	10	10	100	12
2022	**1600 to 1659**	22	3	8	5	14	19	16	14	100	8
2022	**1700 to 1759**	30	2	3	2	12	19	20	11	100	7
2022	**1800 to 1859**	17	2	1	1	17	16	31	16	100	6
2022	**1900 to 1959**	8	2	1	1	15	13	39	22	100	4
2022	**2000 to 2059**	12	2	[low]	[low]	12	16	37	20	100	2
2022	**2100 to 2159**	12	1	[low]	[low]	7	13	47	18	100	1
2022	**2200 to 2259**	23	2	[low]	[low]	2	6	55	11	100	1
2022	**2300 to 2359**	30	2	[low]	[low]	4	8	47	9	100	[low]
2022	**All day**	17	2	10	8	15	17	17	14	100	97

Appendix F TRICS Vehicle Trip Rate Report

Calculation Reference: AUDIT-743001-180710-0721

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	KC	KENT	2 days
03	**SOUTH WEST**		
	DV	DEVON	1 days
	SM	SOMERSET	1 days
	WL	WILTSHIRE	1 days
04	**EAST ANGLIA**		
	NF	NORFOLK	1 days
	SF	SUFFOLK	2 days
05	**EAST MIDLANDS**		
	LN	LINCOLNSHIRE	1 days
06	**WEST MIDLANDS**		
	SH	SHROPSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NY	NORTH YORKSHIRE	2 days
	WY	WEST YORKSHIRE	1 days
08	**NORTH WEST**		
	CH	CHESHIRE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
Actual Range: 7 to 363 (units:)
Range Selected by User: 100 to 4334 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 27/11/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	4 days
Wednesday	6 days
Thursday	4 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	14 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	8
Edge of Town	5
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	13
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	14 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

10,001 to 15,000	5 days
15,001 to 20,000	3 days
20,001 to 25,000	3 days
25,001 to 50,000	3 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
50,001 to 75,000	4 days
75,001 to 100,000	5 days
100,001 to 125,000	1 days
125,001 to 250,000	3 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	5 days
1.1 to 1.5	9 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	14 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	14 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **CH-03-A-08** **DETACHED** **CHESHIRE**
WHITCHURCH ROAD
BOUGHTON HEATH
CHESTER
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 11
Survey date: TUESDAY *22/05/12* *Survey Type: MANUAL*

2 **DV-03-A-01** **TERRACED HOUSES** **DEVON**
BRONSHILL ROAD

TORQUAY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 37
Survey date: WEDNESDAY *30/09/15* *Survey Type: MANUAL*

3 **KC-03-A-03** **MIXED HOUSES & FLATS** **KENT**
HYTHE ROAD
WILLESBOROUGH
ASHFORD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 51
Survey date: THURSDAY *14/07/16* *Survey Type: MANUAL*

4 **KC-03-A-06** **MIXED HOUSES & FLATS** **KENT**
MARGATE ROAD

HERNE BAY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 363
Survey date: WEDNESDAY *27/09/17* *Survey Type: MANUAL*

5 **LN-03-A-03** **SEMI DETACHED** **LINCOLNSHIRE**
ROOKERY LANE
BOULTHAM
LINCOLN
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 22
Survey date: TUESDAY *18/09/12* *Survey Type: MANUAL*

6 **NF-03-A-03** **DETACHED HOUSES** **NORFOLK**
HALING WAY

THETFORD
Edge of Town
Residential Zone
Total Number of dwellings: 10
Survey date: WEDNESDAY *16/09/15* *Survey Type: MANUAL*

7 **NY-03-A-10** **HOUSES AND FLATS** **NORTH YORKSHIRE**
BOROUGHBRIDGE ROAD

RIPON
Edge of Town
No Sub Category
Total Number of dwellings: 71
Survey date: TUESDAY *17/09/13* *Survey Type: MANUAL*

8 **NY-03-A-13** **TERRACED HOUSES** **NORTH YORKSHIRE**
CATTERICK ROAD
OLD HOSPITAL COMPOUND
CATTERICK GARRISON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 10
Survey date: WEDNESDAY *10/05/17* *Survey Type: MANUAL*

9 **SF-03-A-04** **DETACHED & BUNGALOWS** **SUFFOLK**
NORMANSTON DRIVE

LOWESTOFT
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 7
Survey date: TUESDAY *23/10/12* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

10 **SF-03-A-05** **DETACHED HOUSES** **SUFFOLK**
VALE LANE

BURY ST EDMUNDS
Edge of Town
Residential Zone
Total Number of dwellings: 18
Survey date: WEDNESDAY *09/09/15* *Survey Type: MANUAL*

11 **SH-03-A-06** **BUNGALOWS** **SHROPSHIRE**
ELLESMERE ROAD

SHREWSBURY
Edge of Town
Residential Zone
Total Number of dwellings: 16
Survey date: THURSDAY *22/05/14* *Survey Type: MANUAL*

12 **SM-03-A-01** **DETACHED & SEMI** **SOMERSET**
WEMBDON ROAD
NORTHFIELD
BRIDGWATER
Edge of Town
Residential Zone
Total Number of dwellings: 33
Survey date: THURSDAY *24/09/15* *Survey Type: MANUAL*

13 **WL-03-A-02** **SEMI DETACHED** **WILTSHIRE**
HEADLANDS GROVE

SWINDON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 27
Survey date: THURSDAY *22/09/16* *Survey Type: MANUAL*

14 **WY-03-A-01** **MIXED HOUSING** **WEST YORKSHIRE**
SPRING VALLEY CRESCENT
BRAMLEY
LEEDS
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of dwellings: 46
Survey date: WEDNESDAY *21/09/16* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	14	52	0.069	14	52	0.292	14	52	0.361
08:00 - 09:00	14	52	0.134	**14**	**52**	**0.403**	14	52	0.537
09:00 - 10:00	14	52	0.148	14	52	0.166	14	52	0.314
10:00 - 11:00	14	52	0.140	14	52	0.159	14	52	0.299
11:00 - 12:00	14	52	0.144	14	52	0.151	14	52	0.295
12:00 - 13:00	14	52	0.168	14	52	0.162	14	52	0.330
13:00 - 14:00	14	52	0.173	14	52	0.184	14	52	0.357
14:00 - 15:00	14	52	0.148	14	52	0.181	14	52	0.329
15:00 - 16:00	14	52	0.258	14	52	0.191	14	52	0.449
16:00 - 17:00	14	52	0.323	14	52	0.179	14	52	0.502
17:00 - 18:00	**14**	**52**	**0.370**	14	52	0.180	**14**	**52**	**0.550**
18:00 - 19:00	14	52	0.278	14	52	0.199	14	52	0.477
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.353			2.447			4.800

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	7 - 363 (units:)
Survey date date range:	01/01/12 - 27/11/17
Number of weekdays (Monday-Friday):	14
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-743001-180710-0724

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : B - AFFORDABLE/LOCAL AUTHORITY HOUSES

VEHICLES

Selected regions and areas:

04	**EAST ANGLIA**		
	NF	NORFOLK	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	2 days
08	**NORTH WEST**		
	GM	GREATER MANCHESTER	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
Actual Range: 29 to 54 (units:)
Range Selected by User: 100 to 473 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 13/09/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	1 days
Wednesday	2 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	1
Suburban Area (PPS6 Out of Centre)	2
Edge of Town	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	2
Built-Up Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	4 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

10,001 to 15,000	1 days
25,001 to 50,000	3 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

75,001 to 100,000	3 days
250,001 to 500,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	4 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **GM-03-B-01** **TERRACED HOUSES** **GREATER MANCHESTER**
NEWBOLD

ROCHDALE
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 43
Survey date: WEDNESDAY *21/10/15* *Survey Type: MANUAL*

2 **NF-03-B-01** **TERRACED HOUSES** **NORFOLK**
NELSON ROAD NORTH

GREAT YARMOUTH
Edge of Town Centre
Residential Zone
Total Number of dwellings: 45
Survey date: WEDNESDAY *13/09/17* *Survey Type: MANUAL*

3 **WY-03-B-02** **MIXED HOUSES** **WEST YORKSHIRE**
WHITEACRE STREET
DEIGHTON
HUDDERSFIELD
Edge of Town
Residential Zone
Total Number of dwellings: 54
Survey date: TUESDAY *17/09/13* *Survey Type: MANUAL*

4 **WY-03-B-03** **TERRACED HOUSES** **WEST YORKSHIRE**
LINCOLN GREEN ROAD

LEEDS
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Number of dwellings: 29
Survey date: THURSDAY *19/09/13* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	4	43	0.041	4	43	0.099	4	43	0.140
08:00 - 09:00	4	43	0.170	**4**	**43**	**0.251**	4	43	0.421
09:00 - 10:00	4	43	0.205	4	43	0.222	4	43	0.427
10:00 - 11:00	4	43	0.193	4	43	0.152	4	43	0.345
11:00 - 12:00	4	43	0.123	4	43	0.111	4	43	0.234
12:00 - 13:00	4	43	0.123	4	43	0.140	4	43	0.263
13:00 - 14:00	4	43	0.088	4	43	0.105	4	43	0.193
14:00 - 15:00	4	43	0.140	4	43	0.158	4	43	0.298
15:00 - 16:00	4	43	0.263	4	43	0.240	**4**	**43**	**0.503**
16:00 - 17:00	4	43	0.211	4	43	0.181	4	43	0.392
17:00 - 18:00	**4**	**43**	**0.275**	4	43	0.175	4	43	0.450
18:00 - 19:00	4	43	0.170	4	43	0.105	4	43	0.275
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.002			1.939			3.941

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	29 - 54 (units:)
Survey date date range:	01/01/12 - 13/09/17
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Appendix G VISSIM Forecasting Report 2019

Vectos Microsim

Holt Road VISSIM Modelling

Forecasting, Mitigation Proposals & Summary Results

September 2019

7th Floor, 36 Great Charles Street, Birmingham B3 3JY www.vectos.co.uk
Registered address: Vectos Microsim Limited, Network Building, 97 Tottenham Court Road, London W1T 4TP Company no. 9322829

Contents

1 INTRODUCTION 1

Background 1
Methodology 2
Model Scope 2

2 ADJUSTMENTS TO BASE MODEL 3

Rationale 3

3 FORECAST DEMAND METHODOLOGY 8

Do-Nothing Forecast Demand 9
Do-Minimum Forecast Demand 10

4 KSS2 & KSS3 DEVELOPMENT SITES 17

Location 17
Traffic Demand 18

5 SCENARIO LIST 21

6 MODELLING RESULTS 22

2023 Do-Nothing (2023 DN) 22
2023 Do-Minimum (2023 DM) 22
2023 Do-Something (2023 DS) 23
2028 Do-Nothing (2028 DN) 26
2028 Do-Minimum (2028 DM) 27
2028 Do-Something 1 (2028 DS1) 28
2028 Do-Something 2 (2028 DS2) 33
Scenario Comparison 35
Journey Time Corridor Comparison 35
Junction Flow Comparison 38

7 SUMMARY 43

8 CONCLUSION 45

1 INTRODUCTION

Background

1.1 Vectos Microsim (VM) has been commissioned to undertake VISSIM testing in support of Wrexham's Local Development Plan. Two development sites have been specifically identified for inclusion in this testing; known as KSS2 (Policy SP5: Land east of Cefn Road, Wrexham) and KSS3 (Policy SP11: Land to the north of Bryn Lane, Wrexham Industrial Estate). The work is to be undertaken on behalf of a tri-party of stakeholders; Wrexham County Borough Council (WCBC), Barratt Homes/Bloor Homes (promoting the northern of the two sites that make up the KSS2 development site of primary interest), and Countryside Properties (promoting the southern KSS2 element).

1.2 VM has received a VISSIM Base model from WCBC, which was developed on their behalf by Integrated Transport Planning Ltd (ITP). This model was calibrated and validated to 2018 observed conditions and considered fit for purpose by WCBC. The model build process is documented in the accompanying LMVR[1].

1.3 In addition to the inclusion of KSS2 and KSS3 development sites, TEMPro forecasts have also been used to ensure the effects of growth in background traffic volumes are also accounted for within the assessment and identification of infrastructure.

1.4 VM developed a Method Statement for a series of tests carried out to determine the infrastructure requirements both for the end of the Local Plan year (2028), and a 5 year build-out horizon year of 2023[2]. The purpose of the +5 year test is to establish any immediate infrastructure requirements necessary for the early phases of the development build out, whilst the end of plan assessment is intended to identify the full suite of interventions necessary to enable the delivery of the Local Plan proposals and will likely be adopted within the Infrastructure Delivery Plan (IPD) which will accompany the Local Plan. The methodology which has been adopted is summarised below.

[1] 2563 Wrexham VISSIM R001_LMVR_V1-1.pdf
[2] VM180223.TN001 Method Statement_Rev2.pdf

Methodology

1.5 VM proposed to develop a 5 year test in the first instance to determine any interim off-site mitigation necessary prior to the link road being operational.

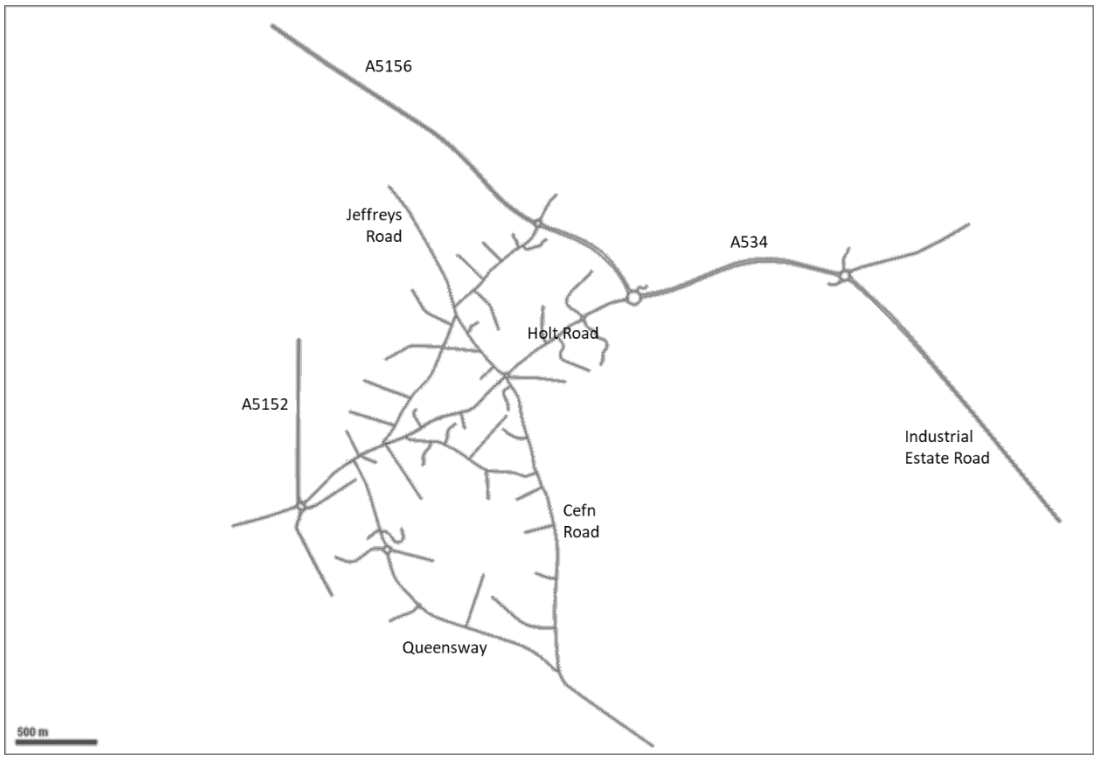
1.6 Following the inclusion of a suitable mitigation strategy for 2023, the testing will move to 2028, by which time the link road will be delivered alongside the full development build out, and any additional off-site mitigation requirements can be developed.

1.7 The demand matrices for the 2023 and 2028 were based on the most recent trajectory for each site within KSS2, along with the KSS3 site, and finally an element of background growth informed by TEMPro. The detailed forecasting methodology will be documented in Chapter 3.

Model Scope

1.8 The base model extent is shown in Figure 1 below:

Figure 1: VISSIM Base Model Extent



2 ADJUSTMENTS TO BASE MODEL

Rationale

2.1 Following receipt of the appropriate VISSIM model files, it was noted that significant queues were observed on the A5156 southbound approach to Borras Park Road roundabout. As queue lengths were not used as a calibration or validation measure in the development of the Base, these queue lengths were not reported in the LMVR.

2.2 The reason for the queuing was a very low circulatory speed at the roundabout which restricted throughput from the north to a level far below that which might be expected, and overly-prescriptive hesitancy parameters on Borras Park Road southbound where traffic calming measures are in place on street. This created queue lengths of approximately 500-600m during the AM peak hour in 2018; this is widely regarded as unrealistic.

2.3 Early iterations of future year testing showed that this queue becomes significantly worse following the addition of growth traffic, which not only exacerbates unrealistic queues observed in the Base but also undermines the robustness of any impact assessment, as traffic intended to travel through the network is constrained by and held on this approach.

2.4 Whilst it was undesirable to make changes to the Base model, the efficacy of the testing relied on the ability of the Borras Park Road approach to accommodate the southbound traffic levels in a realistic manner, and this was not the case in the original model received by VM. Through dialogue with all stakeholders it was agreed that changes should be made to the behaviour at this location.

2.5 The specific changes made were:

- Borras Park Road Roundabout: circulatory speed distribution changed from 6-15mph to 20-25mph (new distribution added, estimated based on the size, number of lanes and trajectory of the roundabout)
- Borras Park Road eastbound and westbound approaches: approach speed distribution changed from 9-15mph to 15-20mph (new distribution added, estimated based on the approach visibility and local knowledge of approaching vehicle behaviour)

- A534/A5156 Roundabout and A534/Industrial Estate Road Roundabout: new distribution added, estimated based on the size, number of lanes and trajectory of the roundabout). In the existing base model, no speed controls were included on either roundabout, meaning vehicles were allowed to traverse the roundabouts at speeds in excess of what would be considered realistic.

2.6 These three roundabouts (along with Greyhound Roundabout) are arguably the key junctions to the east of Wrexham and certainly the areas of primary interest in regards to the inclusion of KSS2 and KSS3 and the impact on the local network. As a result it was considered necessary to ensure behaviour at these locations was as accurate as possible before the testing progressed. This means, in this case, encouraging throughput at Borras Park Road roundabout in-line with known conditions at the roundabout, but also reducing speeds at the other two roundabouts in response to the observed conditions in the model.

2.7 To ensure these limited changes did not materially impact the accuracy of the model, quantitative analysis conducted by ITP during development of the Base model was replicated by re-running the Base after these alterations had been made.

2.8 Excerpts from the Base model LMVR[3] are provided below, detailing the turn count calibration statistics for the AM and PM Base models:

Table 1: Original ITP Base model AM and PM Turn and Link Count Calibration

Table 5-1: Total Traffic Flow Calibration (Peak Hours)

Modelled Period	Link Counts (99)		Turn Counts (147)	
	% GEH Criteria (<5)	% Flow Criteria	% GEH Criteria (<5)	% Flow Criteria
AM Peak Hour (08:00 – 09:00)	95%	95%	92%	99%
PM Peak Hour (16:30 – 17:30)	84%	86%	88%	96%

[3] 2563 Wrexham VISSIM R002_Forecasting Report_V1-1, page 23

2.9 Following the minor alterations described, the revised Base model turn count calibration statistics were as follows:

Table 2: Revised VM Base model AM and PM Turn and Link Count Calibration

Modelled Period	Link Counts (99)		Turn Counts (147)	
	% GEH Criteria (<5)	% Flow Criteria	% GEH Criteria (<5)	% Flow Criteria
AM Peak Hour (08:00-09:00	94%	93%	92%	99%
PM Peak Hour (16:30-17:30)	82%	86%	87%	97%

2.10 In the AM period, only 1 fewer link counts fall within the GEH <5 criteria and 2 fewer fall within the % Flow criteria, and both remain well within permitted tolerances. All turn count results remain the same as the originally reported model. In the PM period, only 2 fewer link counts fall within the GEH <5 criteria whilst the % Flow criteria achieves the same standard as the original. 2 fewer turn counts fall within the GEH <5 criteria, but 1 additional turn count falls within the % Flow criteria.

2.11 The following excerpts from the Base model relate to journey time comparisons in the AM and PM peak base models:

Table 3: Original ITP Base model AM Journey Time Validation

Table 6-2: AM peak journey time analysis

Route	Direction	Observed (secs)	Modelled (secs)	Difference (%)	Difference (secs)	Result
Corridor 1	Southbound	250	295	18%	-45	PASS
	Northbound	236	272	15%	-36	PASS
Corridor 2	Southbound	228	253	11%	-25	PASS
	Northbound	244	261	7%	-17	PASS
Corridor 3	Eastbound	103	110	7%	-7	PASS
	Westbound	116	113	-3%	3	PASS
Corridor 4	Southbound	110	129	18%	-19	PASS
	Northbound	104	154	48%	-50	PASS

Table 4: Original ITP Base model PM Journey Time Validation

Table 6-3: PM peak journey time analysis

Route	Direction	Observed (secs)	Modelled (secs)	Difference (%)	Difference (secs)	Result
Corridor 1	Southbound	262	318	21%	-56	**PASS**
	Northbound	272	307	13%	-35	**PASS**
Corridor 2	Southbound	229	258	13%	-29	**PASS**
	Northbound	261	261	0%	0	**PASS**
Corridor 3	Eastbound	99	101	3%	-2	**PASS**
	Westbound	120	167	39%	-47	**PASS**
Corridor 4	Southbound	121	159	31%	-38	**PASS**
	Northbound	118	201	70%	-83	**FAIL**

2.12 The tables below show the results following the minor alterations:

Table 5: Revised VM Base model AM Journey Time Validation

Route	Direction	Observed (s)	Modelled (s)	Difference (%)	Difference (s)	Result
Corridor 1	Southbound	250	276	10%	-26	PASS
	Northbound	236	266	13%	-30	PASS
Corridor 2	Southbound	228	252	10%	-24	PASS
	Northbound	244	270	11%	-26	PASS
Corridor 3	Eastbound	103	115	12%	-12	PASS
	Westbound	116	115	-1%	1	PASS
Corridor 4	Southbound	110	112	2%	-3	PASS
	Northbound	104	122	17%	-17	PASS

Table 6: Revised VM Base model PM Journey Time Validation

Route	Direction	Observed (s)	Modelled (s)	Difference (%)	Difference (s)	Result
Corridor 1	Southbound	262	289	10%	-27	PASS
	Northbound	272	305	12%	-33	PASS
Corridor 2	Southbound	229	257	12%	-27	PASS
	Northbound	261	265	2%	-4	PASS
Corridor 3	Eastbound	99	105	6%	-6	PASS
	Westbound	120	140	17%	-20	PASS
Corridor 4	Southbound	121	110	-10%	12	PASS
	Northbound	118	133	13%	-15	PASS

2.13 Journey time results show the model maintains a 100% pass rate for journey time validation during the AM peak. In the PM peak, where the original model showed northbound corridor 4 (Borras Park Road from Jeffreys Road to A5156 Roundabout) failed to meet DMRB criteria, the revised model achieves a 100% pass rate. This demonstrates that the measures taken to improve accuracy at the Borras Park Road roundabout have been effective.

2.14 It should also be noted that corridor 3 (between Borras Park Road roundabout and Industrial Estate Road roundabout) also shows a closer correlation between modelled and observed journey times (westbound differences between observed and modelled fall from 39% to just 17%). This further indicates that the model has benefitted from the alterations.

2.15 In summary, the results show no significant difference between the original and revised models and, whilst the existing LMVR is still applicable to the revised model, the changes described above should be recorded as the latest calibration and validation statistics.

3 FORECAST DEMAND METHODOLOGY

3.1 Forecast traffic growth for the various modelled scenarios has been informed by TEMPro growth rates for the years between the Base (2018) and the two forecast years (2023 and 2028).

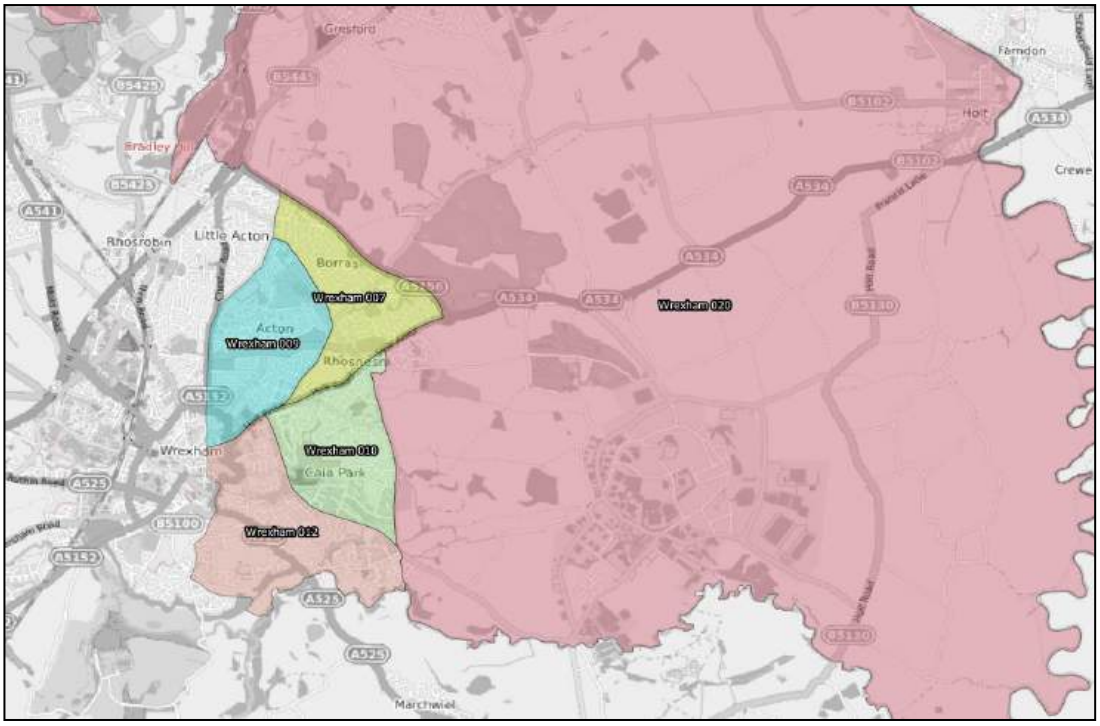
3.2 For each year, the following scenarios have been developed (these will be explained in further detail in Chapter 5):

- Do-Nothing – assumes no KSS2 and KSS3, growth solely informed by TEMPro growth assumptions
- Do-Minimum – assumes appropriate level of KSS2 and KSS3 demand for each year, with TEMPro growth also added but adjusted for the inclusion of these two sites to ensure no double-counting
- Do-Something – assumes the same level of demand as the Do-Minimum, but with the additional highway mitigation measures

Do-Nothing Forecast Demand

3.3 The following Figure presents the Middle-Super-Output-Areas (MSOAs) that cover the model extent:

Figure 2: MSOA Map



3.4 The TEMPro rates used for 2023 and 2028 are provided below:

Table 7: TEMPro Growth Rates

MSOA Number	MSOA Name	AM Peak		PM Peak	
		2018-2023 Growth	2018-2028 Growth	2018-2023 Growth	2018-2028 Growth
W02000084	**Wrexham 007**	1.0461	1.0894	1.0453	1.0900
W02000086	**Wrexham 009**	1.0527	1.0981	1.0509	1.0963
W02000087	**Wrexham 010**	1.0676	1.1240	1.0710	1.1321
W02000089	**Wrexham 012**	1.0555	1.1015	1.0517	1.0965
W02000420	**Wrexham 020**	1.0331	1.0654	1.0329	1.0650
Authority	**Wrexham**	1.0472	1.0885	1.0469	1.0893

3.5 Each internal zone in the model is assigned an MSOA based on its relative positon. The corresponding TEMPro growth rate is then assigned to all trips in the model to provide 2018-2023/2028 forecast demand.

3.6 As per the original agreed forecasting methodology, certain zones on the edges of the model extent were selected as 'external' zones. Trips between these zones are assumed to be through trips, growth in these trips is both less certain and less likely to be affected by the internal growth assumptions within the model. As a result growth in external trips was informed by the wider Wrexham growth rate. These zones are 7 (A5152 Fardon Street), 9 (A5152 Bodhyfyrd), 17 (A5156) and 21 (A534 Wrexham Road)[4].

3.7 The application of the various TEMPRO growth rates across the model demands resulted in the following net growth levels within 2023 and 2028 AM and PM modelled peak hours:

Table 8: 2023 and 2028 Total Network Growth Rates (Do-Nothing Scenarios)

AM Peak		PM Peak	
2018-2023 Growth	**2018-2028 Growth**	**2018-2023 Growth**	**2018-2028 Growth**
4.8%	9.2%	4.6%	8.8%

Do-Minimum Forecast Demand

3.8 In the Do-Minimum demand set, TEMPro forecasts are adjusted to account for the household and jobs that are to be delivered as part of KSS2 and KSS3 as these trips are now explicitly included within the model. These adjustments are necessary to avoid double-counting as the Local Plan now provides more certainty around where the housing and jobs will be delivered.

3.9 For 2023, TEMPro assumes housing growth, from 2018, of 785 dwellings. The KSS2 housing site assumes a build out trajectory of 250 dwellings on the northern site and 460 dwellings on the southern site by 2023/24; a total of 710 dwellings. These are therefore removed from the housing growth assumptions and only the residual housing number is re-entered into TEMPro to create a revised growth rate.

[4] 2563 Wrexham VISSIM R002_Forecasting Report_V1-1, page 6 para. 3.2

3.10 By 2028, TEMPro assumes a housing growth of 1599 dwellings. The KSS2 site will deliver a total of 1680 dwellings. Therefore, all housing growth was removed from the TEMPro assumptions to derive a revised growth rate.

3.11 Similarly for the employment adjustment, KSS3 is expected to deliver job growth in excess of that predicted by TEMPro. In 2023, TEMPro predicts job growth of 194 by 2023 and 415 by 2028; KSS3 is assumed to deliver at least 500 and 1000 jobs by each respective year. Therefore any additional growth in jobs has been removed from the TEMPro assumptions, but only for the MSOA that covers the KSS3 site (i.e. Wrexham 020). Job growth predictions in the areas outside of the specific KSS3 MSOA remain; this reflects the uncertainty of future employment sites across the full extent of the model which ensures the forecasting methodology remains robust.

3.12 The following table presents the housing and job growth assumptions that underpin the TEMPro growth rates used for the Do-Nothing demands alongside a summary of the adjustments and resulting growth rates applied within the Do-Minimum scenarios to reflect ‘background growth’.

Table 9: Do-Nothing and Do-Minimum 2023 TEMPro Growth Rates – Internal Trips

Do-Nothing 2023								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0461	1.0453	2377	965	2487	979	110	14
Wrexham 009	1.0527	1.0509	2377	1794	2487	1810	110	16
Wrexham 010	1.0676	1.0710	3118	965	3263	973	145	7
Wrexham 012	1.0555	1.0517	4013	4353	4200	4406	187	53
Wrexham 020	1.0331	1.0329	5868	16081	6100	16275	232	194
Do-Minimum 2023 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0234	1.0186	2377	965	2392	979	15	14
Wrexham 009	1.0357	1.0330	2377	1794	2392	1810	15	16
Wrexham 010	1.0451	1.0443	3118	965	3137	973	20	7
Wrexham 012	1.0383	1.0340	4013	4353	4039	4406	25	53
Wrexham 020	1.0098	1.0092	5868	16081	5868	16081	0	0

Table 10: Do-Nothing and Do-Minimum 2028 TEMPro Growth Rates – Internal Trips

Do-Nothing 2028								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0894	1.0900	2377	965	2602	993	225	28
Wrexham 009	1.0981	1.0963	2377	1794	2602	1835	225	42
Wrexham 010	1.1240	1.1321	3118	965	3413	986	296	21
Wrexham 012	1.1015	1.0965	4013	4353	4394	4468	381	115
Wrexham 020	1.0654	1.0650	5868	16081	6340	16497	472	415
Do-Minimum 2028 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	**PM Peak**	**Base HH**	**Base Jobs**	**FY HH**	**FY Jobs**	**Growth HH**	**Growth Jobs**
Wrexham 007	1.0355	1.0267	2377	965	2377	993	0	28
Wrexham 009	1.0572	1.0534	2377	1794	2377	1835	0	42
Wrexham 010	1.0698	1.0678	3118	965	3118	986	0	21
Wrexham 012	1.0602	1.0539	4013	4353	4013	4468	0	115
Wrexham 020	1.0168	1.0158	5868	16081	5868	16081	0	0

3.13 A similar process was undertaken to inform the growth in external trips within the model. TEMPro contains assumptions in relation to job and housing growth across the whole Wrexham Authority; these can be revised in accordance with the known delivery of KSS2 and KSS3, along with the total Local Plan housing assumptions for each year.

3.14 As with the internal trips, KSS2 housing delivery is assumed to be 710 dwellings by 2023 and 1680 dwellings by 2028. The assumed level of job growth from delivery of KSS3 is 500 jobs by 2023 and 1000 by 2028.

3.15 Prior to any deductions from the housing numbers assumed by TEMPro, the housing projection for both 2023 and 2028 can be updated in accordance with the Local Plan Housing number to ensure that the TEPRO numbers align with those that are expected to come forward as a result of adopting the Local Plan.

3.16 WCBC Local Development Plan states that "*the housing requirement […] has been established as 7750 units*"[5]. This therefore overwrites the current assumption in TEMPro as the projected housing growth up to 2028.

3.17 Table 18 of the same document provides an overview of the anticipated completions per year, which reads as follows:

Table 11: Local Plan Housing Delivery Projections

Year	Anticipated Completions	Cumulative
2017-2018	414	-
2018-2019	484	898
2019-2020	571	1469
2020-2021	781	2250
2021-2022	803	3053
2022-2023	841	3894
2023-2024	820	**4714**
2024-2025	748	5462
2025-2026	717	6179
2026-2027	761	6940
2027-2028	751	7691
Total	**7691**	

3.18 The result of these adjustments is detailed in the following Tables:

[5] Wrexham Local Development Plan (2013-2028) BP08, page 8

Table 12: Do-Nothing and Do-Minimum 2023 TEMPro Growth Rates – External Trips

Do-Nothing 2023								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0472	1.0469	60437	65166	63180	66101	2743	934
Local Plan Housing Adjustment								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0623	1.0633	60437	65166	65151	66101	4714	934
Do-Minimum 2023 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0526	1.0535	60437	65166	64441	65601	4004	434

Table 13: Do-Nothing and Do-Minimum 2028 TEMPro Growth Rates – External Trips

Do-Nothing 2028								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0885	1.0893	60437	65166	66023	67015	5586	1849
Local Plan Housing Adjustment								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.1052	1.1074	60437	65166	68187	67015	7750	1849
Do-Minimum 2028 (inc. Job and Housing Adjustments for KSS2 and KSS3)								
	AM Peak	PM Peak	Base HH	Base Jobs	FY HH	FY Jobs	Growth HH	Growth Jobs
Wrexham 007	1.0836	1.0854	60437	65166	66507	66015	6070	849

3.19 When these rates are applied across all zones in the model the cumulative growth within the Do-Minimum scenario is as follows:

Table 14: 2023 and 2028 Total Network Growth Rates (Do-Minimum/Do-Something Scenarios)

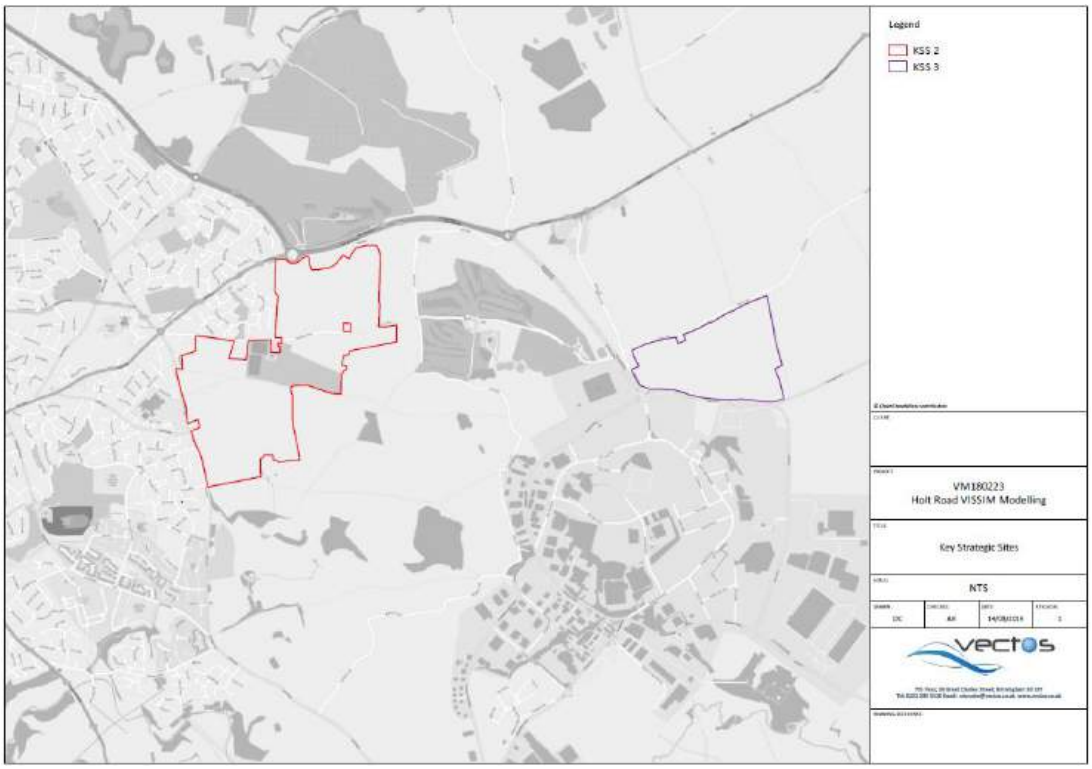
	AM Peak		PM Peak	
	2023	**2028**	**2023**	**2028**
KSS2 Growth	4.6%	10.8%	5.1%	12.0%
KSS3 Growth	3.7%	7.5%	3.1%	6.3%
TEMPro Growth (Background)	3.1%	4.8%	2.8%	4.5%
Total	**11.4%**	**23.1%**	**11.0%**	**22.7%**

4 KSS2 & KSS3 DEVELOPMENT SITES

Location

4.1 Both KSS2 and KSS3 sites fall within, or just outside of the model extent. The location of the sites is illustrated in the Figure below.

Figure 3: KSS2 and KSS3 Site Locations



4.2 KSS2 is split between northern and southern sites, which are promoted by Barratt Homes/Bloor Homes and Countryside Properties respectively.

4.3 KSS2 traffic is assigned into the model via the inclusion of new zones and associated accesses onto the existing road network; a southern access via a new priority junction with Cefn Road and a northern access via new arm to the south of the existing A5156/A534 roundabout.

4.4 For KSS3, traffic is assigned via existing Zone 22 which represents the existing Industrial Estate Road.

Traffic Demand

4.5 Trip rates to inform traffic demands for northern and southern KSS2 sites were agreed between ITP and WCBC in the Modelling Methodology Technical Note[6] in August 2018. Trip distributions were set out in Vectos' December 2018 Note[7]

4.6 The trip rates for private and affordable dwellings are provided below:

Table 15: TRICS Trip Rates – KSS2 Private and Affordable Dwellings

	Affordable			Private		
	Arr.	Dep.	Two-Way	Arr.	Dep.	Two-Way
07:00-08:00	0.041	0.099	0.140	0.069	0.292	0.361
08:00-09:00	0.170	0.251	0.421	0.134	0.403	0.537
09:00-10:00	0.205	0.222	0.427	0.148	0.166	0.314
16:00-17:00	0.211	0.181	0.392	0.323	0.179	0.502
17:00-18:00	0.275	0.175	0.450	0.370	0.180	0.550

4.7 The above trip rates are used to calculate arriving and departing vehicle numbers for each 15-minute time interval during the AM and PM peak and shoulder periods, based on an assumed split of 20% affordable and 80% private.

4.8 The table below summarises the total peak hour trip generation for each site in each test year:

Table 16: KSS2 Trip Generation

		2023			2028		
		Northern Site	Southern Site	Total	Northern Site	Southern Site	Total
No. of Units		250	460	710	600	1080	1680
AM	**Peak Hour Arrivals**	35	65	100	85	152	237
	Peak Hour Departures	93	171	265	224	402	626
PM	**Peak Hour Arrivals**	81	150	231	195	352	547
	Peak Hour Departures	45	82	127	108	194	301

[6] Wrexham KSS2 – TN001 Rev A Modelling Methodology, 17th August 2018

[7] KSS2 Wrexham Southern Site VISSIM Matrix Estimation Methodology, December 2018

4.9 All KSS2 vehicles are assumed to be Lights.

4.10 The trip rates for KSS3 are provided in the table below. These are based on rates derived from the TRICS database using large sites in the Industrial Estate (TRICS output can be found in Appendix A):

Table 17: TRICS Trip Rates (per hectare) – KSS3

	All Vehicles			Heavies		
	Arr.	**Dep.**	**Two-Way**	**Arr.**	**Dep.**	**Two-Way**
07:30-08:00	7.974	1.789	9.763	0.281	0.257	0.538
08:00-08:30	7.471	2.537	10.008	0.281	0.292	0.573
08:30-09:00	4.969	2.280	7.249	0.269	0.210	0.479
09:00-09:30	4.513	2.712	7.225	0.398	0.327	0.725
16:00-16:30	2.385	5.027	7.412	0.269	0.281	0.555
16:30-17:00	3.648	4.548	8.196	0.210	0.257	0.467
17:00-17:30	1.333	8.477	9.810	0.105	0.117	0.222
17:30-18:00	1.076	4.712	5.788	0.117	0.094	0.211

4.11 The above trip rates are used to calculate arriving and departing vehicle numbers for each 15-minute interval during the AM and PM peak and shoulder periods, based on the Local Plan development area of 28.5 hectares.

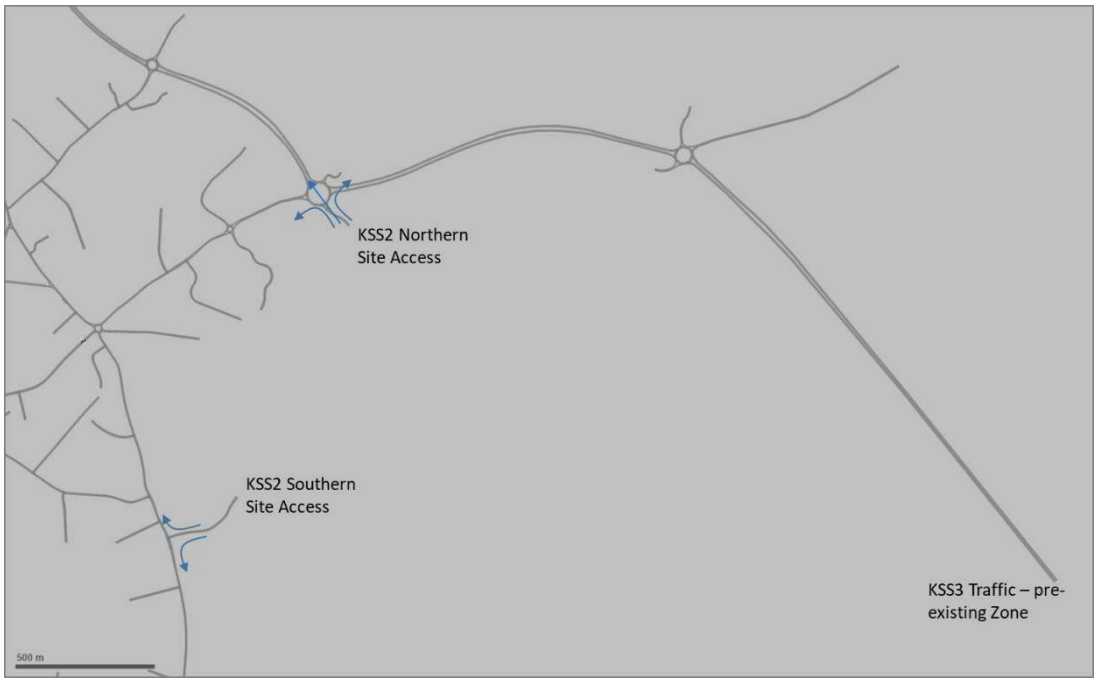
4.12 The table below presents the KSS3 trip generation, split between Light and Heavy vehicles:

Table 18: KSS3 Trip Generation

		2023			2028		
		Lights	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
AM	**Peak Hour Arrivals**	169	8	177	339	16	355
	Peak Hour Departures	61	7	69	123	14	137
PM	**Peak Hour Arrivals**	66	4	71	133	9	142
	Peak Hour Departures	180	5	186	361	11	371

4.13 In the scenarios, prior to the introduction of the Link Road (i.e. up to and including the 2028 Do-Minimum scenario), KSS2 and KSS3 traffic was assigned into the VISSIM network as is illustrated within the following Figure:

Figure 4: KSS2 and KSS3 Traffic Demand Loading Points (pre Link Road)



5 SCENARIO LIST

5.1 The following provides a summary of the scenarios included in this assessment:

Table 19: Scenario List & Inclusions

	Traffic Demands	Network
Base	Base demands, as per ITP Base model	Base network, as per ITP Base model with minor alterations as described in Chapter 2
2023 Do-Nothing	Base demands, plus TEMPro informed growth to 2023	As per Base
2023 Do-Minimum	Base demands, plus KSS2 and KSS3 2023 trip generation plus adjusted TEMPro informed growth to 2023	Base, plus site access arrangements at Cefn Road for Southern Site and A5156/A534 roundabout for Northern Site
2023 Do-Something	As per 2023 Do-Minimum	As per 2023 Do-Minimum, plus off-site mitigation proposals (to be discussed)
2028 Do-Nothing	Base demands, plus TEMPro informed growth to 2028	As per Base
2028 Do-Minimum	Base demands, plus KSS2 and KSS3 2028 trip generation plus adjusted TEMPro informed growth to 2028	As per 2023 Do-Something. Mitigation proposals for 2023 are carried forward to 2028
2028 Do-Something 1	As per 2028 Do-Minimum	As per 2028 Do-Minimum, plus Link Road through KSS2 Southern and Northern Sites
2028 Do-Something 2	As per 2028 Do-Minimum	As per 2028 Do-Something 1, plus further off-site mitigation proposals (to be discussed)

6 MODELLING RESULTS

6.1 Each scenario will be discussed in detail in the following section. Comprehensive network statistics, journey times and queue length data are provided in Appendix B.

2023 Do-Nothing (2023 DN)

6.2 Model results show that following inclusion of TEMPro growth to 2023 (4.8% in the AM and 4.6% in the PM), average delay increases by approximately 3 seconds and 8 seconds respectively.

6.3 No significant issues are reported in the AM peak period, suggesting the current network has residual capacity which can accommodate the level of growth predicted to occur by 2023.

6.4 In the PM, queue length increases (~100m, or approximately 17 vehicles) and journey time increases (~30s) are observed on Industrial Estate Road exit from Wrexham Industrial Estate. *N.B. This is without the specific inclusion of KSS3 but with a level of growth applied to the Industrial Estate informed by TEMPro forecasts.*

6.5 This issue is specific to that approach only and has little effect on the operation of the network as a whole.

2023 Do-Minimum (2023 DM)

6.6 Following inclusion of KSS2 and KSS3 development demands for 2023, alongside the adjusted TEMPro background growth, the results reveal that the increased traffic levels has a detrimental effect on the network.

6.7 During the AM peak, average delay per vehicle increases by approximately 17 seconds compared with the DN. Whilst there are some queue and journey time increases, including around Greyhound roundabout, A5156 southbound approach to A534 roundabout and A534 Wrexham Road approach to Industrial Estate Road roundabout, model observations show that queues do not persist for prolonged periods and dissipate quickly enough to ensure the network continues to operate efficiently. As such it is considered that conditions at Greyhound in the Do-Minimum do not require local mitigation at 2023.

6.8 During the PM peak however a higher level of impact is observed, with average delay per vehicle increasing by over 40 seconds compared with the DN (a rise of almost 50%). This delay is almost exclusively attributable to extended delays on Industrial Estate Road exit from the Wrexham Industrial Estate. Queues increase from an average of ~200m to ~750m (an increase of approximately 96 vehicles), and journey times increase from almost 3 minutes to almost 5 minutes.

6.9 Whilst the impacts are not considered to be excessive in the AM peak, the impacts in the PM indicate that mitigation should be considered to ensure traffic leaving Wrexham Industrial Estate (including KSS3 traffic), is able to access the wider network without the delays observed in the DM.

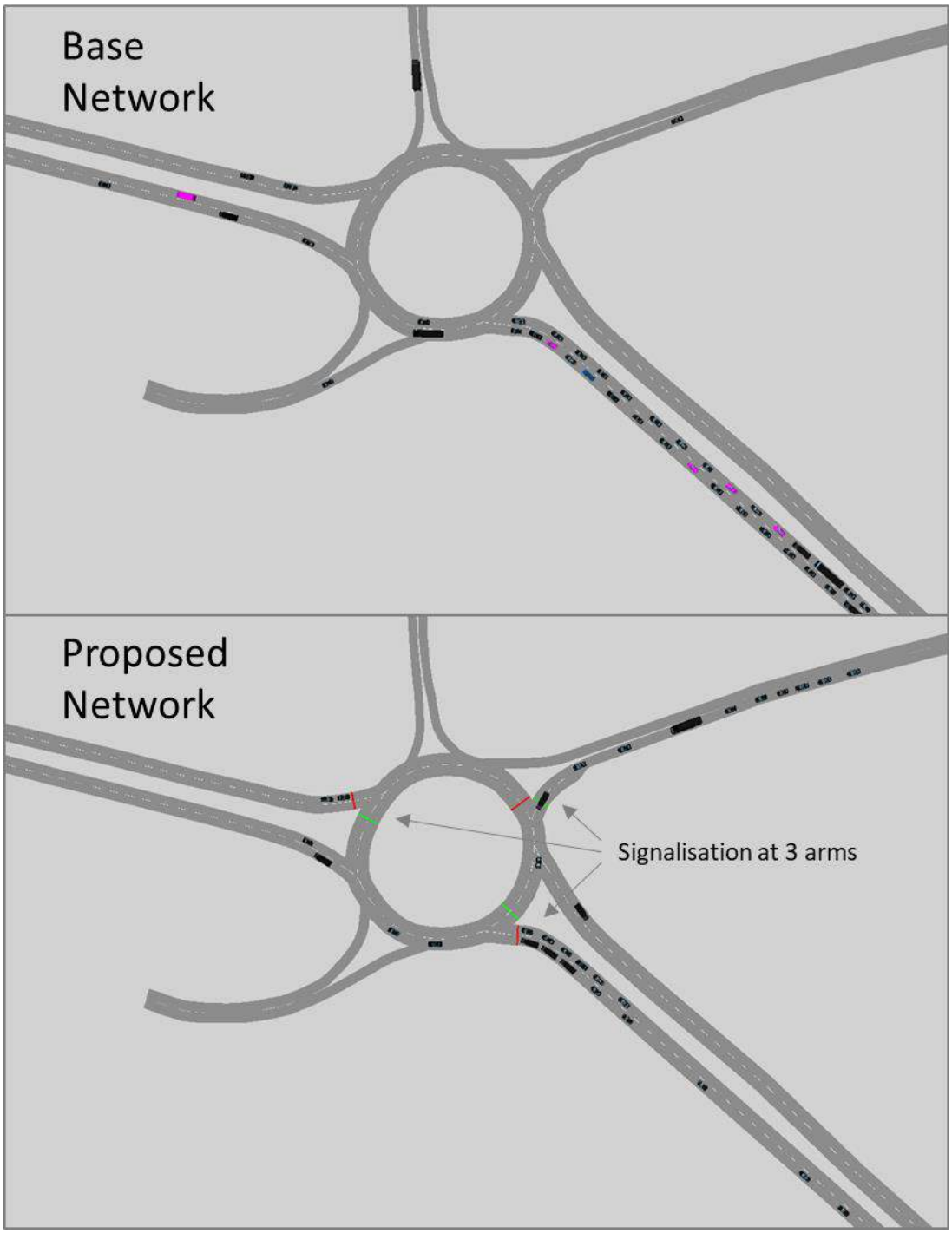
2023 Do-Something (2023 DS)

6.10 Two individual scheme improvements were proposed in response to the issues observed within the 2023 Do Minimum scenario.

6.11 Firstly, in order to better regulate traffic from Industrial Estate Road, signals were proposed at the roundabout. The signals were coded into VISSIM using the VISVAP function that allows demand-responsive signalling based on queuing conditions at the roundabout. The intention is to better control queue lengths across all approaches and prevent the excessive queuing on one arm demonstrated in the PM DM scenario.

6.12 The following Figure provides a screenshot of the Base layout and the proposed layout at A534/Industrial Estate Road roundabout:

Figure 5: A534/Industrial Estate Road Roundabout – 2023 Proposed Scheme

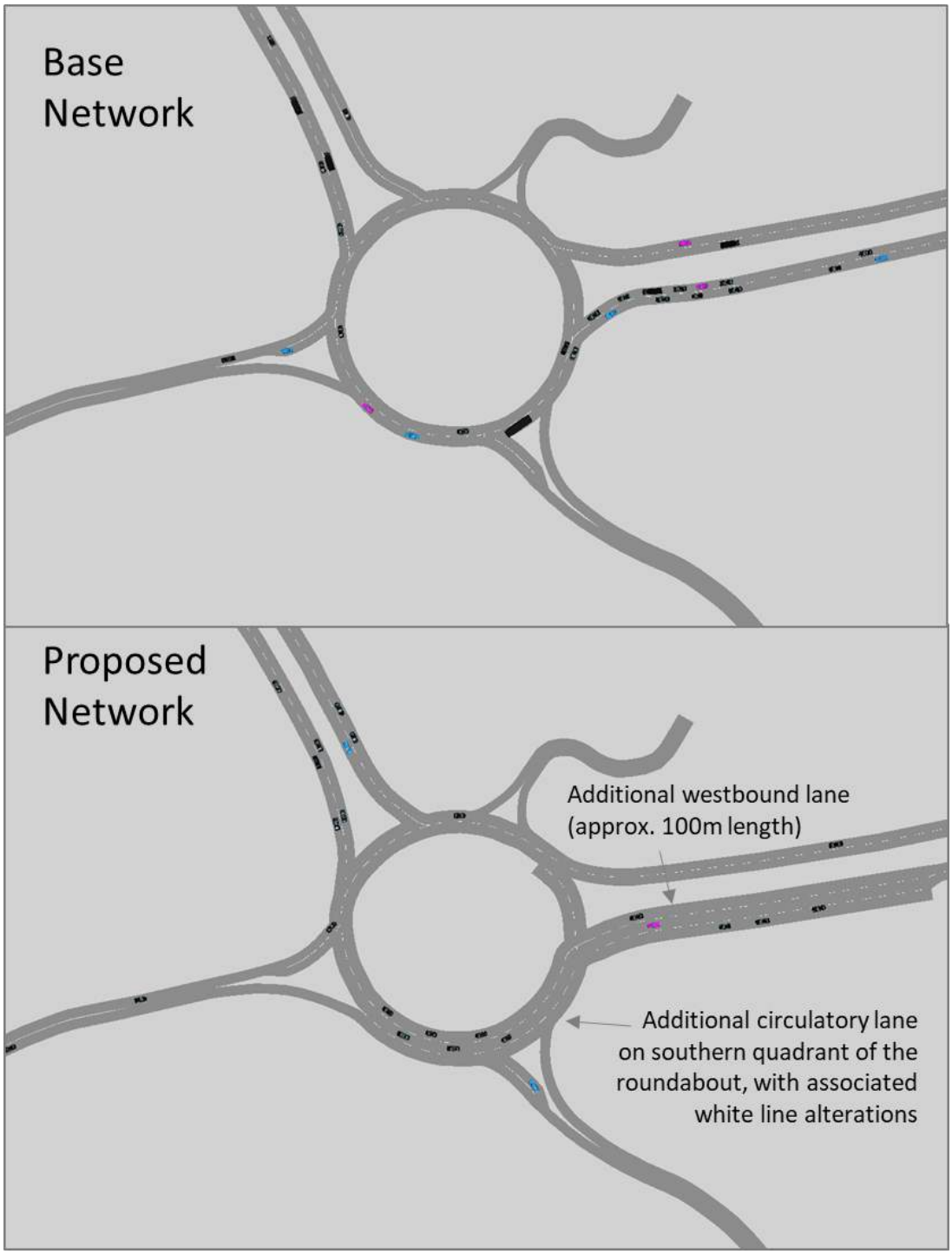


6.13 In addition, following a scheme which would allow more traffic out of Wrexham Industrial Estate, it was also necessary to enhance the A5156/A534 roundabout westbound arm.

6.14 Iterative VISSIM testing demonstrated that without enhancements at this location, queues previously observed on Industrial Estate Road simply were relocated onto the westbound approach to A5156/A534 roundabout.

6.15 The Figure below provides a screenshot of the Base layout and the proposed layout at A5156/A534 roundabout:

Figure 6: A5156/A534 Roundabout – 2023 Proposed Scheme



6.16 Results show that average delay per vehicle in the PM DS scenario decreases by approximately 35 seconds, compared with the DM. Journey times on Industrial Estate Road northbound decrease from almost 5 minutes to less than 2 minutes; lower than journey times in both the 2023 Do-Nothing and the 2018 Base. This provides evidence that the signal scheme is successful at regulating traffic out of Wrexham Industrial Estate following partial delivery of KSS3.

6.17 Improvements on the westbound approach to the A5156/A534 roundabout are sufficient to accommodate the additional traffic being released from the east, with journey times showing a reduction compared with the DM of approximately 15 seconds despite an additional c. 200 vehicles approaching the roundabout during the PM peak hour.

6.18 Whilst there are minor increases in journey times beyond this roundabout towards Greyhound Roundabout along Holt Road westbound, the increases are considered acceptable and do not result in any concerns over network performance. Average queue lengths for example increase from ~10m to ~50m; an increase of approximately 7 vehicles. Maximum queue lengths increase from 110m to 250m (approximately 24 vehicles); however maximum queue values represent the largest recorded queue length across the whole hour and average queues alongside model observations show this queue dissipates quickly.

2028 Do-Nothing (2028 DN)

6.19 The 2028 Do-Nothing tests rely solely on TEMPro for forecasting, with growth percentages of 9.2% and 8.8% applied across the network in the AM and PM peak respectively. This scenario assumes no KSS2 or KSS3 traffic, and no network improvements.

6.20 The AM model shows an increase in delay of approximately 10 seconds per vehicle compared with the Base. There are some localised journey time increases on Borras Park Road eastbound (resulting from the increased traffic levels travelling westbound on the A5156), and on Dean Road southbound towards Greyhound Roundabout.

6.21 Across the network however, there appears to be enough residual capacity in the network to accommodate 2028 TEMPro forecast demands during the AM peak.

6.22 The PM model shows an increase in delay of approximately 30 seconds per vehicle compared with the Base. As demonstrated in the 2023 DN and DM scenarios, the vast majority of delay is attributed to the Industrial Estate Road exit from Wrexham Industrial Estate. Average

queues increase from approximately 100m in the Base to approximately 500m in the DN (approximately 70 vehicles), and journey times increase from almost 2 minutes to almost 4 minutes.

6.23 There are also some minor queue increases around the A5152/Holt Road roundabout and Greyhound roundabout.

2028 Do-Minimum (2028 DM)

6.24 The 2028 DM scenario assumes that the mitigation schemes devised during the 2023 testing are in situ by 2028, under the assumption that KSS2 and KSS3 are delivered in full in this 2028 DM scenario and therefore the interim mitigation will have already have been delivered.

6.25 The AM model shows a significant increase in average delay per vehicle compared with the 2028 DN, from just over 1 minute to over 7 minutes.

6.26 The vast majority of the delay increase is caused by congestion on the southbound approach to A5156/A534 roundabout, which creates queues that propagate back through the Borras Park Road roundabout to the edge of the model extent.

6.27 This queuing, along with the impact of additional KSS2 traffic exiting the northern site during the AM peak, creates queues on the eastbound Holt Road as circulatory speeds at the roundabout reduce due to the levels of traffic traversing the roundabout. In turn, this eastbound Holt Road queuing impacts upon the exit capacity away from Greyhound Roundabout, causing significant queues at all approaches and exacerbating the Cefn Road queues that result from KSS2 traffic from the southern site travelling northbound.

6.28 Model results for the AM DM scenario are highly unstable due to the congestion and the propensity for the model to 'lock' around Greyhound Roundabout where approaching and exiting traffic cause the junction operation to fail. Even with the interim mitigation, the AM 2028 DM model indicates that additional mitigation is necessary simply to enable the network to operate.

6.29 The PM model also experiences an increase in average delay per vehicle compared with the 2028 DN, from almost 2 minutes to over 3 ½ minutes. These results also suggest the network is still over capacity in the PM peak under the 2028 DM scenario.

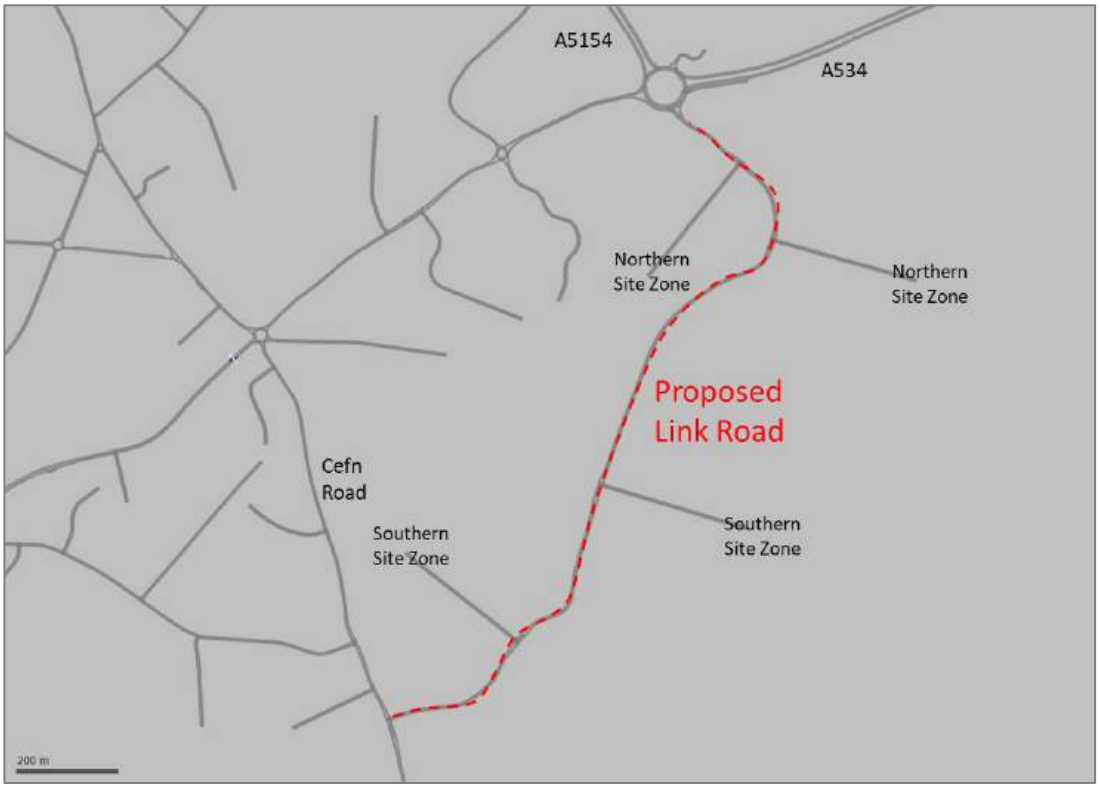
6.30 The proposals carried forward from 2023 are sufficient to accommodate the traffic from Wrexham Industrial Estate. There are however queue and journey time increases towards the west of the model area, including the A5152 southbound approach to the Holt Road roundabout, and the eastbound Holt Road exit. Pedestrian crossings and right turning vehicles from Holt Road eastbound create slow moving traffic away from the A5152/Holt Road roundabout towards the end of the PM peak period.

6.31 There are also queues and journey time increases on many approaches to Greyhound Roundabout as this junction forms a key route for both KSS2 and KSS3 traffic to and from central Wrexham.

2028 Do-Something 1 (2028 DS1)

6.32 The 2028 Do-Something 1 scenario introduces the link road through the KSS2 northern and southern sites, connecting the A5152/A534 Roundabout to Cefn Road. The following Figure illustrates the revised VISSIM network including the proposed link road:

Figure 7: Link Road Alignment and KSS2 Internal Zone Layout



6.33 Both northern and southern sites are split across 2 VISSIM zones each, with demands assigned equally between the two. The exact alignment of the link road, and exact location of the internal accesses are yet to be determined and so this represents an indicative layout.

6.34 The AM peak shows a moderate improvement following inclusion of the link road, with average delay per vehicle reducing from just over 7 minutes in the 2028 DM to approximately 5 ½ minutes in the 2028 DS1.

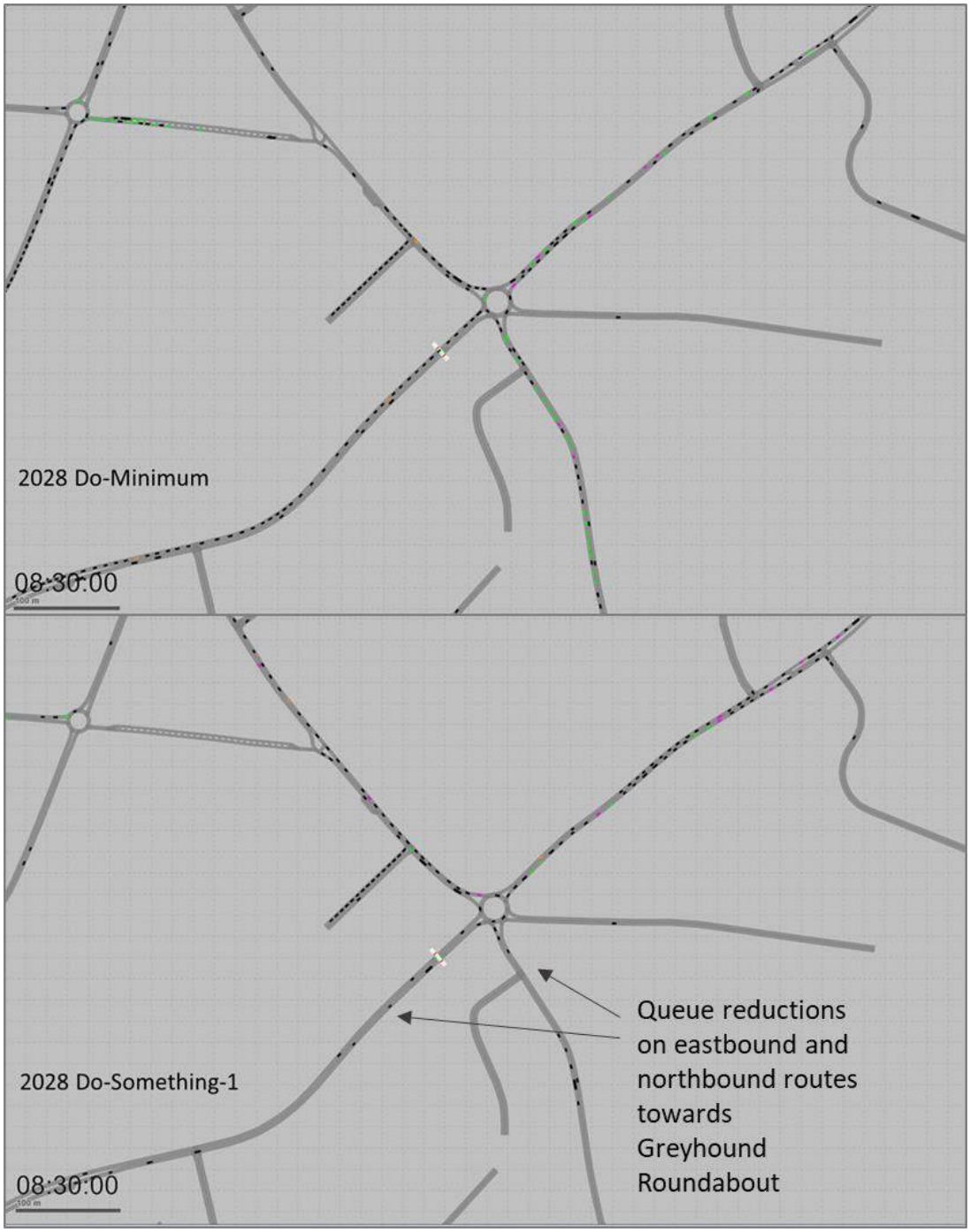
6.35 Inclusion of the link road provides an alternative route from the south to the A5156/A534 roundabout. This means that traffic from the southern KSS2 site travelling to the A5156/A534 no longer has to travel northbound on Cefn Road towards Greyhound Roundabout but can use the link road instead. This also applies to base level trips, background growth and KSS3 trips as well, all of which are afforded an alternative route which avoids passing through Greyhound Roundabout.

6.36 Likewise, traffic travelling towards Cefn Road south from the north or east of the model can use the link road southbound rather than travelling westwards towards Greyhound then southbound along Cefn Road.

6.37 Use of this alternative route has impacts on the rest of the network, with minor queue and journey time reductions around the west of the model as lower traffic levels are confined to the routes available prior to inclusion of the link road.

6.38 The following screenshots illustrate the benefit of the link road in the AM peak.

Figure 8: AM Greyhound Roundabout Screenshots – 2028 DM vs 2028 DS1



6.39 Whilst the link road has demonstrable benefits in the AM, the network is still congested along two key routes:

- A5156 southbound to A5156/A534 roundabout – queues extending back through Borras Park Road roundabout and beyond
- Holt Road eastbound to A5156/A534 roundabout – a result of the A5156 queues and additional traffic from the northern site access, both of which create slow moving traffic on the circulatory. These queues are visible in Figure 8 above, having knock-on impacts on Dean Road and Jeffreys Road in particular.

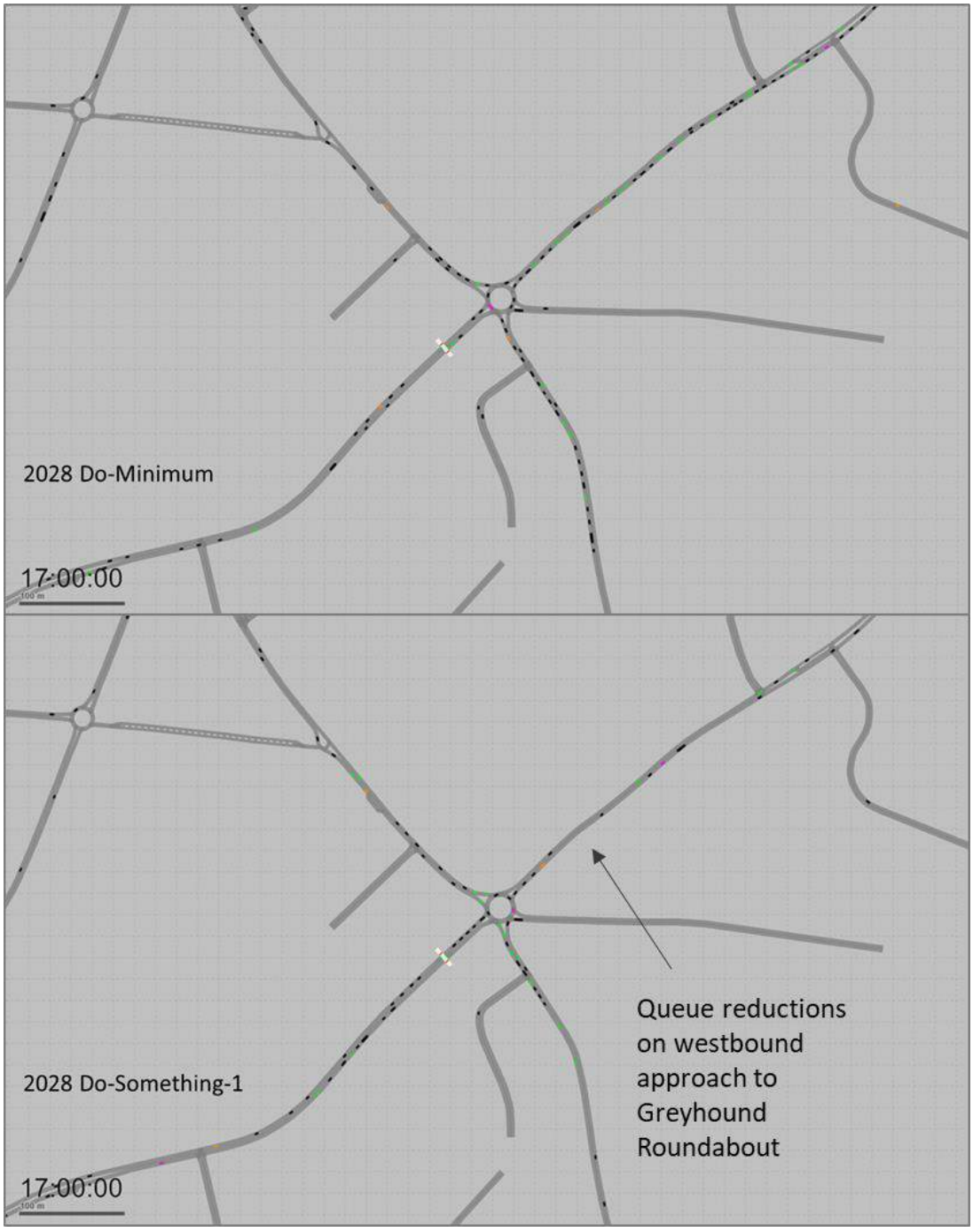
6.40 The PM peak shows a greater level of improvement following inclusion of the link road, with average delay per vehicle reducing from just approximately 3 ½ minutes in the 2028 DM to approximately 2 ½ minutes in the 2028 DS1.

6.41 Traffic from the north and east travelling to the south in the PM (including the southern KSS2 housing site) also utilises the new link road rather than travelling westbound along Holt Road to Greyhound Roundabout then travelling southbound on Cefn Road.

6.42 Improvements also occur to the west of the model, the easing of congestion at and around Greyhound Roundabout improves the eastbound Holt Road away from the A5152 roundabout. Furthermore, some vehicles from the west now choose the Queensway-Cefn Road-Link Road route to the east rather than the more direct Holt Road route, which further eases the congestion observed at the end of the PM peak in the DM scenario.

6.43 The following screenshots illustrate the benefit of the link road in the PM peak.

Figure 9: PM Greyhound Roundabout Screenshots – 2028 DM vs 2028 DS1



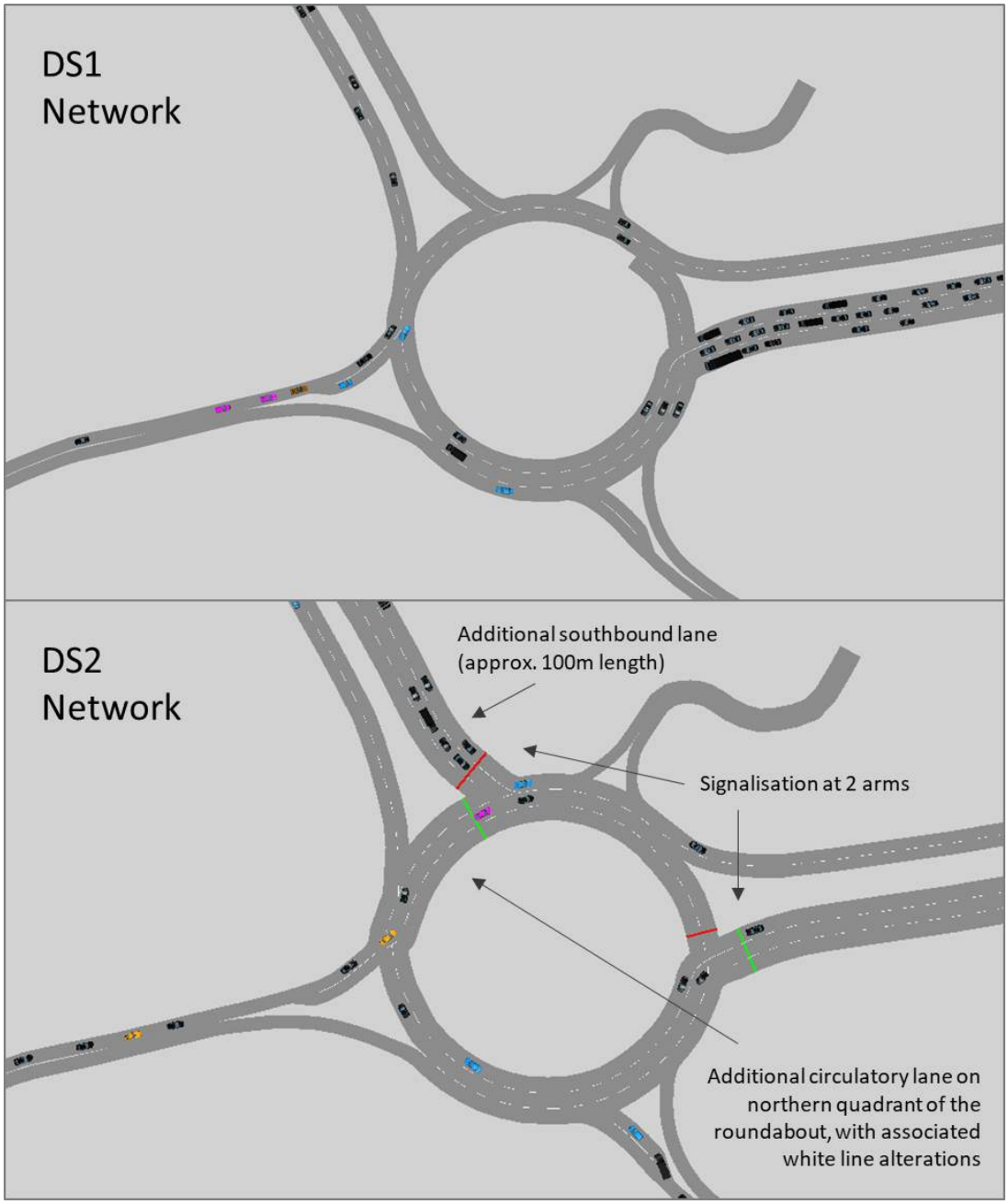
6.44 The inclusion of the link road has significant benefits, however particularly in the AM, further mitigation is required to reduce network delay, principally on the A5156 southbound link.

2028 Do-Something 2 (2028 DS2)

6.45 In response to the observed queuing in the AM DS1 scenario, improvements are required at the A5156/A534 roundabout to further improve throughput beyond the level of improvements identified through the interim scheme proposals.

6.46 The following Figure provides a screenshot of the proposed improvements for 2028:

Figure 10: A5156/A534 Roundabout – 2028 Proposed Scheme



6.47 Inclusion of signals and widening on the approach to, and at the A5156/A534 Roundabout has significant benefits in the AM peak. Average delay per vehicle reduces from 5 ½ minutes in the DM to just over 1 minute in the DS2.

6.48 The majority of this delay saving is on the A5156 southbound link, between Gresford Roundabout and A5156/A534 Roundabout. The additional lane and inclusion of signals formalises the junction and allows better queue balancing and increased circulatory speeds as signals reduce the level of hesitancy on the approach. In turn, eastbound Holt Road queues reduce and the issues reported on Jeffreys Road and Dean Road are removed.

6.49 Compared with the 2028 DN, average delay per vehicle in the DS2 scenario increases by only 13 seconds. This is despite over 1000 more completed trips during the AM peak period.

6.50 The PM benefits of the A5156/A534 roundabout are less pronounced, but average delay per vehicle reduces from 2 ½ minutes in the DM to just over 2 minutes in the DS2.

6.51 Following the signalisation of the A5156/A534 roundabout, the link road becomes a more attractive route as the signals allow for more gaps in the traffic flows that conflicts with the northern site access road. This encourages more traffic from the south and west, taking more traffic away from Greyhound roundabout.

6.52 As in the DS1 scenario, this encourages vehicles from central Wrexham to choose the Queensway-Cefn Road-Link Road route to the east rather than the more direct Holt Road route, which alleviates congestion at the A5152 roundabout and eastbound Holt Road to an even greater degree than reported in DS1.

6.53 Compared with the 2028 DN, average delay per vehicle in the DS2 scenario increases by only 14 seconds, despite over ~950 more completed trips during the PM peak period.

Scenario Comparison

6.54 This section provides an overview of comparisons between each scenario in relation to journey times and flow differences at key junctions.

Journey Time Corridor Comparison

6.55 Four journey time corridors have been selected to determine overall journey time differences across all scenarios for key routes through the network. These corridors are in line with previous analysis undertaken by ITP.

6.56 The routes are shown in Figure 11 below:

Figure 11: Journey Time Corridors



6.57 The tables below show journey time results for each corridor and each direction, followed by a comparison of results for 2023 and 2028, both in terms of actual journey time difference and percentage journey time difference between the Do-Nothing and the corresponding Do-Something scenario.

Table 20: AM Journey Time Corridor Comparison (seconds)

Route	Dir.	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
A	EB	250	257	273	270	261	703	450	291
	WB	260	263	289	295	276	350	376	305
B	NB	252	247	293	278	256	583	292	252
	SB	238	253	271	269	268	472	385	262
C	EB	107	108	124	155	113	288	278	129
	WB	99	99	102	98	100	105	99	100
D	EB	119	137	141	148	153	145	163	201
	WB	111	106	108	108	125	119	362	111

Table 21: AM Journey Time Corridor Comparison, Do-Nothing vs Do-Something (seconds)

Route	Dir.	2023		2028	
		DN vs DS (n)	DN vs DS (%)	DN vs DS (n)	DN vs DS (%)
A	EB	13	5%	30	12%
	WB	31	12%	29	11%
B	NB	30	12%	-4	-1%
	SB	17	7%	-6	-2%
C	EB	47	43%	16	15%
	WB	-2	-2%	0	0%
D	EB	11	8%	48	31%
	WB	2	2%	-13	-11%

6.58 Results show that during the AM, following inclusion of development and mitigation at 2023 journey times remain stable compared with the Do-Nothing scenario. Moderate journey time increases of 47 seconds are exhibited on A5156 to Industrial Estate Road corridor owing to the additional traffic levels approaching the Industrial Estate following inclusion of KSS3, whilst all other corridors exhibit increases no higher than 12%.

6.59 In 2028 comparisons show less of an impact, with no increases over 15% observed other than the Borras Park eastbound corridor, which is the result of additional traffic levels on northbound A5156 conflicting the eastbound movement.

6.60 The tables below show the results for the PM peak.

Table 22: PM Journey Time Corridor Comparison (seconds)

Route	Dir.	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
A	EB	287	297	326	365	320	548	481	376
	WB	272	268	273	319	283	400	280	282
B	NB	252	252	262	275	261	335	283	253
	SB	242	247	252	254	251	270	261	250
C	EB	98	98	98	99	98	99	100	103
	WB	128	110	128	115	113	158	131	126
D	EB	127	126	157	147	130	152	152	154
	WB	108	126	148	160	140	149	130	124

Table 23: PM Journey Time Corridor Comparison, Do-Nothing vs Do-Something (seconds)

Route	Dir.	2023		2028	
		DN vs DS (n)	DN vs DS (%)	DN vs DS (n)	DN vs DS (%)
A	EB	68	23%	56	17%
	WB	51	19%	-1	0%
B	NB	23	9%	-8	-3%
	SB	7	3%	-2	-1%
C	EB	1	1%	5	5%
	WB	5	5%	13	11%
D	EB	21	16%	25	19%
	WB	34	27%	-16	-12%

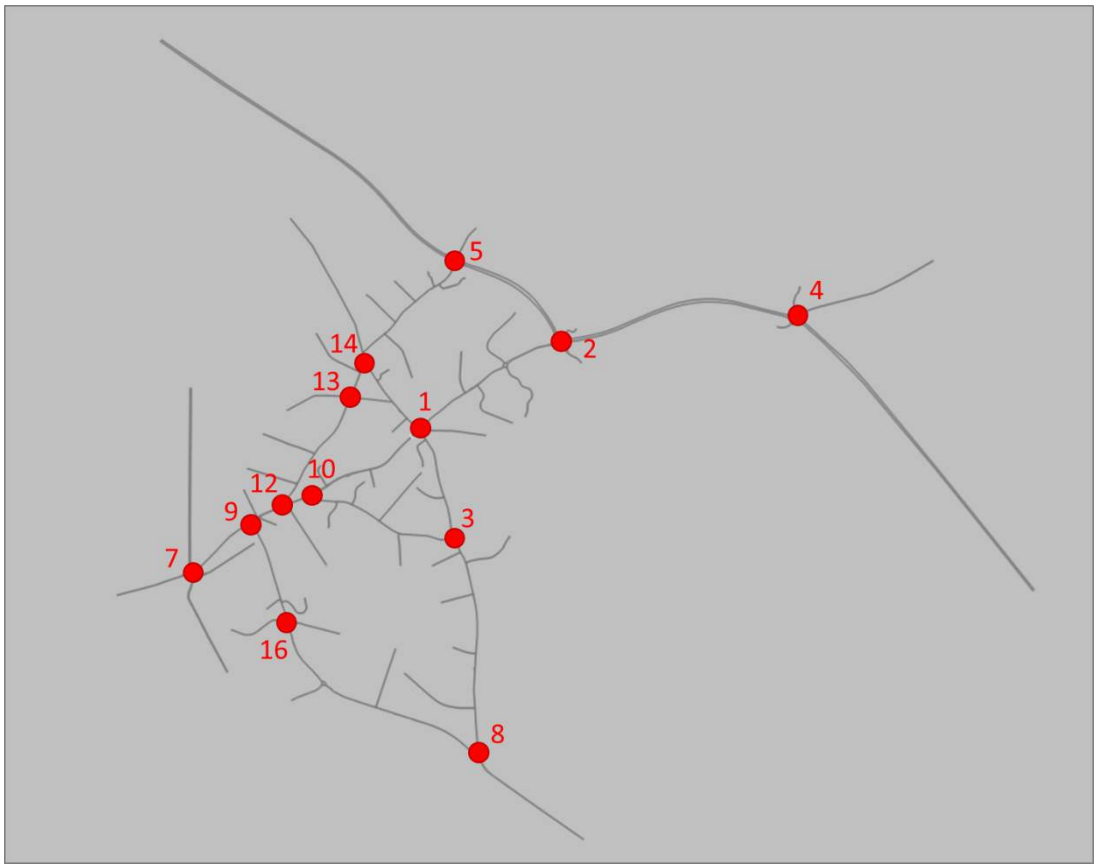
6.61 Results show that during the PM, following inclusion of development and mitigation at 2023 journey times remain relatively stable compared with the Do-Nothing scenario. Moderate journey time increases are exhibited on Holt Road eastbound corridor, and on Borras Park Road westbound, however both corridors show increases of only ~25%.

6.62 In 2028 comparisons show less of an impact, with no increases over 20% observed.

Junction Flow Comparison

6.63 Figure 12 below presents the junctions identified for assessing modelled junction turn counts.

Figure 12: Turn Counts - Junction Locations



6.64 The tables overleaf provide a summary of AM junction turn counts across the network at these locations, followed by comparisons of the Do-Nothing and Do-Something scenarios for 2023 and 2028 both in vehicle numbers and percentages.

Table 24: AM Turn Count Comparison (vehicles)

Junction No.	Junction Name	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
1	Greyhound Roundabout	1953	2037	2228	2232	2132	2069	2208	2215
2	A5156/A534	3053	3241	3658	3648	3381	3905	4305	4149
3	Cefn Road/Hullah Lane	734	718	917	900	760	868	740	714
4	A534/ Industrial Estate Road	2591	2721	3024	3039	2840	3186	3282	3411
5	A5156/Borras Park Road	2884	3011	3239	3208	3143	3345	3508	3536
7	Tesco Roundabout	1703	1792	1854	1852	1866	1813	1948	1998
8	Cefn Road/ Queensway	720	747	800	786	785	922	945	902
9	Holt Road/ Montgomery Road	1280	1343	1407	1411	1397	1370	1491	1529
10	Holt Road/ Hullah Lane	1104	1228	1282	1260	1268	1184	1260	1340
12	Holt Road/ Borras Road/ Archer's Way	1292	1312	1381	1388	1364	1408	1439	1496
13	Rhosnesni Lane/ Borras Road	854	695	720	735	739	919	806	831
14	Jeffrey's Road/ Borras Road	1103	1060	1076	1116	1120	936	1199	1284
16	Queensway/ Montgomery Road/ Smithfield Road	558	622	606	611	648	723	671	608

Table 25: AM Turn Count Comparison, Do-Nothing vs Do-Something (vehicles / %)

Junction No.	Junction Name	2023		2028	
		DN vs DS (vehs)	DN vs DS (%)	DN vs DS (vehs)	DN vs DS (%)
1	Greyhound Roundabout	195	10%	83	4%
2	A5156/A534	407	13%	768	23%
3	Cefn Road/Hullah Lane	182	25%	-46	-6%
4	A534/Industrial Estate Road	318	12%	571	20%
5	A5156/Borras Park Road	197	7%	393	13%
7	Tesco Roundabout	60	3%	132	7%
8	Cefn Road/Queensway	39	5%	117	15%
9	Holt Road/Montgomery Road	68	5%	132	9%
10	Holt Road/Hullah Lane	32	3%	72	6%
12	Holt Road/Borras Road/ Archer's Way	76	6%	132	10%
13	Rhosnesni Lane/Borras Road	40	6%	92	12%
14	Jeffrey's Road/Borras Road	56	5%	164	15%
16	Queensway/Montgomery Road/ Smithfield Road	-11	-2%	-40	-6%

6.65 AM turn count comparisons show that an additional ~1600 vehicle movements are recorded in the Do-Something scenario compared with the Do-Nothing in 2023, and an additional ~2500 vehicle movements in 2028, highlighting both the additional traffic levels generated by KSS2 and KSS3 compared with assumptions contained within TEMPro and the extra capacity created by the scheme proposals.

6.66 The largest AM increases in 2023 are shown at Cefn Road/Hullah Lane, Greyhound Roundabout, A5156/A534 Roundabout and A534 Industrial Estate Road Roundabout. These increases are a result of the focussed growth from KSS2 and KSS3 as opposed to the more generic growth applied via TEMPro. In 2028, increases are exhibited at most locations as more vehicles traverse the network. In contrast to 2023, reductions are shown at Cefn Road/Hullah Lane resulting from inclusion of the Link Road providing an alternative route to Cefn Road.

Table 26: PM Turn Count Comparison (vehicles)

Junction No.	Junction Name	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
1	Greyhound Roundabout	2088	2132	2184	2291	2072	2438	2267	2030
2	A5156/A534	2889	2908	3102	3276	2812	3687	3756	3770
3	Cefn Road/Hullah Lane	839	807	990	964	808	1203	929	691
4	A534/ Industrial Estate Road	2750	2797	2915	3136	2728	3410	3422	3410
5	A5156/Borras Park Road	2693	2753	2941	3020	2699	3270	3308	3257
7	Tesco Roundabout	2532	2655	2709	2713	2518	2589	2683	2823
8	Cefn Road/ Queensway	928	964	1030	1020	983	1096	1174	1216
9	Holt Road/ Montgomery Road	1558	1622	1723	1687	1523	1701	1672	1771
10	Holt Road/ Hullah Lane	1296	1267	1259	1341	1191	1385	1354	1361
12	Holt Road/ Borras Road/ Archer's Way	1486	1528	1641	1593	1439	1608	1598	1617
13	Rhosnesni Lane/ Borras Road	605	630	806	639	628	673	770	702
14	Jeffrey's Road/ Borras Road	1090	1186	1241	1220	1170	1172	1282	1193
16	Queensway/ Montgomery Road/ Smithfield Road	825	879	894	883	859	909	837	936

Table 27: PM Turn Count Comparison, Do-Nothing vs Do-Something (vehicles / %)

Junction No.	Junction Name	2023		2028	
		DN vs DS (vehs)	DN vs DS (%)	DN vs DS (vehs)	DN vs DS (%)
1	Greyhound Roundabout	159	7%	-42	-2%
2	A5156/A534	368	13%	958	34%
3	Cefn Road/Hullah Lane	157	19%	-117	-14%
4	A534/Industrial Estate Road	339	12%	682	25%
5	A5156/Borras Park Road	267	10%	558	21%
7	Tesco Roundabout	58	2%	305	12%
8	Cefn Road/Queensway	56	6%	233	24%
9	Holt Road/Montgomery Road	65	4%	248	16%
10	Holt Road/Hullah Lane	74	6%	170	14%
12	Holt Road/Borras Road/ Archer's Way	65	4%	178	12%
13	Rhosnesni Lane/Borras Road	9	1%	74	12%
14	Jeffrey's Road/Borras Road	34	3%	23	2%
16	Queensway/Montgomery Road/ Smithfield Road	4	0%	77	9%

6.68 PM turn count comparisons show that an additional ~1600 vehicle movements are recorded in the Do-Something scenario compared with the Do-Nothing in 2023, and an additional ~3300 vehicle movements in 2028.

6.69 A similar pattern of increases is observed in the PM, with the largest in 2023 located at the Cefn Road and Greyhound Roundabout junctions, and at the A5156 and A534 junctions to the east of the model. Again this is the result of focussing the location of growth in the Do-Something models compared with the TEMPro-informed Do-Nothing.

6.70 2028 shows large increases across the network as additional traffic levels are released from Wrexham Industrial Estate and onto the wider network. Greyhound Roundabout and Cefn Road show moderate reductions in traffic levels compared with the Do-Nothing following inclusion of the Link Road which takes traffic away from these junctions.

7 SUMMARY

7.1 Vectos Microsim (VM) has been commissioned by Wrexham County Borough Council (WCBC), Barratt Homes, Bloor Homes and Countryside Properties to carry out VISSIM testing in Wrexham.

7.2 VM has been instructed to include specific trip generation for two sites; KSS2 and KSS3, along with some background growth informed by TEMPro.

7.3 As part of the KSS2 development, a link road will be delivered through the north and south plots that make up the whole site that will connect the existing A5156/A534 roundabout to Cefn Road. It is anticipated this link road will be delivered during the course of the KSS2 build out.

7.4 VM has included the following scenarios in the assessment:

- Base
- 2023 Do-Nothing
- 2023 Do-Minimum
- 2023 Do-Something
- 2028 Do-Nothing
- 2028 Do-Minimum
- 2028 Do-Something 1
- 2028 Do-Something 2

7.5 The purpose of the assessment is to determine what, if any, off-site mitigation is required at 2023 before a link road through the site is delivered, and what, if any, off-site mitigation is required at 2028 when the full sites and link road are delivered.

7.6 Results of the testing show that without intervention, extensive queuing can be expected in 2023 on Industrial Estate Road during the PM peak. Signalising the A534/Industrial Estate Road roundabout helps alleviate this problem, but would result in excessive queues on the westbound approach to A5156/A534 roundabout without further intervention. Westbound approach and southern-quadrant circulatory widening is sufficient to mitigate against these issues in 2023.

7.7 In 2028, the link road has demonstrable benefits in both AM and PM peaks, but particularly the PM as vehicles are afforded an additional route both away from the KSS3 employment site and towards the KSS2 (southern) housing site. The link road takes traffic away from Greyhound roundabout which becomes highly congested in the Do-Minimum scenario with full development but without the link road.

7.8 Whilst it is not expected that full development build outs would occur *without* the link road, a comparison of the 2028 Do-Minimum with the 2028 Do-Something 1 allows the benefits of the link road to be fully understood.

7.9 The 2028 scenario however still exhibited significant queuing during the AM peak, on A5156 southbound and Holt Road eastbound approaches to the A5156/A534 roundabout, with other associated queuing issues. A further scheme is proposed whereby additional widening is applied to the A5156/A534 roundabout on the northern quadrant and a third lane is added to the southbound approach. Both eastbound and southbound approaches are also signalised to better regulate queue conditions around the roundabout in both peaks.

7.10 Results suggest that this package of measures is sufficient to mitigate against the impact of full delivery of KSS2 and KSS3 sites, along with additional background growth up to 2028.

7.11 Approximately 1000 additional trips are accommodated during both AM and PM peak periods, with only a minor increase in average delay per vehicle. The economic benefits therefore are considered to outweigh the minor increases in travel times through the network.

8 CONCLUSION

8.1 The modelling indicates that by 2023 the following highway mitigation measures will be required to maintain an acceptable level of network operation:

- Part signalisation of A534/Industrial Estate Road roundabout; and
- Additional third lane on westbound approach to A5156/A534 roundabout (approximately 100m in length), and widening of the southern part of the circulatory to allow 3 circulating lanes.

8.2 Modelling of the link road through the site, in 2028, reveals that there are significant benefits to a number of road users, not just the KSS2 traffic. Testing also reveals that, in 2028, as well as the link road the following mitigation measures will be necessary to ensure that the network can accommodate the additional growth in traffic associated with the Local Plan proposals:

- Part signalisation of A5156/A534 roundabout, additional third lane on southbound approach to A5156/A534 roundabout (approximately 100m in length), and widening of the northern part of the circulatory to allow 3 circulating lanes.

8.3 Analysis reveals that the implementation of these schemes will mitigate the major impacts which may arise as a result of the growth in traffic, both Local Plan and general background traffic increases.

8.4 Through discussions with all stakeholders[8] including WCBC, Barratt Homes, Bloor Homes and Countryside Properties, these measures and timescales for delivery are considered to be an appropriate response to the issues reported in the pre-mitigation scenarios, and model results along with conclusions drawn from watching the models during simulation suggest that the package of measures is commensurate with the developments' highway impacts.

[8] Meetings at WCBC, 11.07.2019 and 08.08.2019

Appendix A

Calculation Reference: AUDIT-751701-190612-0632

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE
VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	CW	CORNWALL	1 days
	DC	DORSET	1 days
06	WEST MIDLANDS		
	WO	WORCESTERSHIRE	1 days
11	SCOTLAND		
	AG	ANGUS	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Site area
Actual Range: 12.46 to 30.07 (units: hect)
Range Selected by User: 10 to 50 (units: hect)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/11 to 27/06/18

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1
Free Standing (PPS6 Out of Town)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Village	1
Out of Town	2
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

Not Known	1 days
B1	1 days
B2	2 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,000 or Less	1 days
5,001 to 10,000	2 days
10,001 to 15,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	3 days
50,001 to 75,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	3 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	4 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AG-02-D-02 INDUSTRIAL ESTATE ANGUS
A933 WESTWAY
ARBROATH
HOSPITALFIELD
Edge of Town
No Sub Category
Total Site area: 30.07 hect
Survey date: TUESDAY *25/04/17* *Survey Type: MANUAL*

2 CW-02-D-03 IND. ESTATE CORNWALL
LONG ROCK ROAD
NEAR PENZANCE
LONG ROCK
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Site area: 12.46 hect
Survey date: MONDAY *03/10/11* *Survey Type: MANUAL*

3 DC-02-D-20 INDUSTRIAL ESTATE DORSET
OLD BARN FARM ROAD
NEAR BOURNEMOUTH
THREE LEGGED CROSS
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 16.00 hect
Survey date: MONDAY *24/03/14* *Survey Type: MANUAL*

4 WO-02-D-03 INDUSTRIAL ESTATE WORCESTERSHIRE
MILLENNIUM WAY
EVESHAM

Edge of Town
Out of Town
Total Site area: 27.00 hect
Survey date: TUESDAY *26/06/18* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
WK-02-D-01	Logistics
WK-02-D-02	Logistics

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
VEHICLES
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	3.075	4	21.38	1.602	4	21.38	4.677
07:30 - 08:00	4	21.38	7.974	4	21.38	1.789	4	21.38	9.763
08:00 - 08:30	4	21.38	7.471	4	21.38	2.537	4	21.38	10.008
08:30 - 09:00	4	21.38	4.969	4	21.38	2.280	4	21.38	7.249
09:00 - 09:30	4	21.38	4.513	4	21.38	2.712	4	21.38	7.225
09:30 - 10:00	4	21.38	3.344	4	21.38	2.245	4	21.38	5.589
10:00 - 10:30	4	21.38	3.297	4	21.38	2.409	4	21.38	5.706
10:30 - 11:00	4	21.38	3.215	4	21.38	2.350	4	21.38	5.565
11:00 - 11:30	4	21.38	3.274	4	21.38	2.444	4	21.38	5.718
11:30 - 12:00	4	21.38	3.449	4	21.38	3.133	4	21.38	6.582
12:00 - 12:30	4	21.38	3.110	4	21.38	3.823	4	21.38	6.933
12:30 - 13:00	4	21.38	3.297	4	21.38	3.554	4	21.38	6.851
13:00 - 13:30	4	21.38	3.917	4	21.38	3.741	4	21.38	7.658
13:30 - 14:00	4	21.38	3.964	4	21.38	3.168	4	21.38	7.132
14:00 - 14:30	4	21.38	3.192	4	21.38	3.940	4	21.38	7.132
14:30 - 15:00	4	21.38	2.257	4	21.38	3.250	4	21.38	5.507
15:00 - 15:30	4	21.38	2.549	4	21.38	4.373	4	21.38	6.922
15:30 - 16:00	4	21.38	2.479	4	21.38	3.917	4	21.38	6.396
16:00 - 16:30	4	21.38	2.385	4	21.38	5.027	4	21.38	7.412
16:30 - 17:00	4	21.38	3.648	4	21.38	4.548	4	21.38	8.196
17:00 - 17:30	4	21.38	1.333	4	21.38	8.477	4	21.38	9.810
17:30 - 18:00	4	21.38	1.076	4	21.38	4.712	4	21.38	5.788
18:00 - 18:30	4	21.38	0.690	4	21.38	2.373	4	21.38	3.063
18:30 - 19:00	4	21.38	1.274	4	21.38	1.836	4	21.38	3.110
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			79.752			80.240			159.992

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	12.46 to 30.07 (units: hect)
Survey date date range:	01/01/11 - 27/06/18
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	2

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
TAXIS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.012	4	21.38	0.000	4	21.38	0.012
07:30 - 08:00	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
08:00 - 08:30	4	21.38	0.047	4	21.38	0.023	4	21.38	0.070
08:30 - 09:00	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
09:00 - 09:30	4	21.38	0.047	4	21.38	0.070	4	21.38	0.117
09:30 - 10:00	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
10:00 - 10:30	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
10:30 - 11:00	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
11:00 - 11:30	4	21.38	0.012	4	21.38	0.000	4	21.38	0.012
11:30 - 12:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
12:00 - 12:30	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
12:30 - 13:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
13:00 - 13:30	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
13:30 - 14:00	4	21.38	0.000	4	21.38	0.012	4	21.38	0.012
14:00 - 14:30	4	21.38	0.023	4	21.38	0.000	4	21.38	0.023
14:30 - 15:00	4	21.38	0.000	4	21.38	0.023	4	21.38	0.023
15:00 - 15:30	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
15:30 - 16:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
16:00 - 16:30	4	21.38	0.012	4	21.38	0.000	4	21.38	0.012
16:30 - 17:00	4	21.38	0.012	4	21.38	0.012	4	21.38	0.024
17:00 - 17:30	4	21.38	0.035	4	21.38	0.035	4	21.38	0.070
17:30 - 18:00	4	21.38	0.023	4	21.38	0.012	4	21.38	0.035
18:00 - 18:30	4	21.38	0.035	4	21.38	0.023	4	21.38	0.058
18:30 - 19:00	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.376			0.350			0.726

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
OGVS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.199	4	21.38	0.140	4	21.38	0.339
07:30 - 08:00	4	21.38	0.281	4	21.38	0.257	4	21.38	0.538
08:00 - 08:30	4	21.38	0.281	4	21.38	0.292	4	21.38	0.573
08:30 - 09:00	4	21.38	0.269	4	21.38	0.210	4	21.38	0.479
09:00 - 09:30	4	21.38	0.398	4	21.38	0.327	4	21.38	0.725
09:30 - 10:00	4	21.38	0.327	4	21.38	0.187	4	21.38	0.514
10:00 - 10:30	4	21.38	0.362	4	21.38	0.339	4	21.38	0.701
10:30 - 11:00	4	21.38	0.292	4	21.38	0.304	4	21.38	0.596
11:00 - 11:30	4	21.38	0.257	4	21.38	0.199	4	21.38	0.456
11:30 - 12:00	4	21.38	0.292	4	21.38	0.433	4	21.38	0.725
12:00 - 12:30	4	21.38	0.538	4	21.38	0.398	4	21.38	0.936
12:30 - 13:00	4	21.38	0.316	4	21.38	0.234	4	21.38	0.550
13:00 - 13:30	4	21.38	0.316	4	21.38	0.374	4	21.38	0.690
13:30 - 14:00	4	21.38	0.339	4	21.38	0.374	4	21.38	0.713
14:00 - 14:30	4	21.38	0.292	4	21.38	0.409	4	21.38	0.701
14:30 - 15:00	4	21.38	0.234	4	21.38	0.234	4	21.38	0.468
15:00 - 15:30	4	21.38	0.257	4	21.38	0.327	4	21.38	0.584
15:30 - 16:00	4	21.38	0.374	4	21.38	0.339	4	21.38	0.713
16:00 - 16:30	4	21.38	0.269	4	21.38	0.281	4	21.38	0.550
16:30 - 17:00	4	21.38	0.210	4	21.38	0.257	4	21.38	0.467
17:00 - 17:30	4	21.38	0.105	4	21.38	0.117	4	21.38	0.222
17:30 - 18:00	4	21.38	0.117	4	21.38	0.094	4	21.38	0.211
18:00 - 18:30	4	21.38	0.012	4	21.38	0.129	4	21.38	0.141
18:30 - 19:00	4	21.38	0.105	4	21.38	0.105	4	21.38	0.210
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			6.442			6.360			12.802

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
PSVS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.012	4	21.38	0.105	4	21.38	0.117
07:30 - 08:00	4	21.38	0.000	4	21.38	0.117	4	21.38	0.117
08:00 - 08:30	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
08:30 - 09:00	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
09:00 - 09:30	4	21.38	0.129	4	21.38	0.000	4	21.38	0.129
09:30 - 10:00	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
10:00 - 10:30	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
10:30 - 11:00	4	21.38	0.000	4	21.38	0.047	4	21.38	0.047
11:00 - 11:30	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
11:30 - 12:00	4	21.38	0.047	4	21.38	0.023	4	21.38	0.070
12:00 - 12:30	4	21.38	0.000	4	21.38	0.023	4	21.38	0.023
12:30 - 13:00	4	21.38	0.082	4	21.38	0.012	4	21.38	0.094
13:00 - 13:30	4	21.38	0.047	4	21.38	0.023	4	21.38	0.070
13:30 - 14:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
14:00 - 14:30	4	21.38	0.000	4	21.38	0.047	4	21.38	0.047
14:30 - 15:00	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
15:00 - 15:30	4	21.38	0.012	4	21.38	0.058	4	21.38	0.070
15:30 - 16:00	4	21.38	0.035	4	21.38	0.012	4	21.38	0.047
16:00 - 16:30	4	21.38	0.035	4	21.38	0.000	4	21.38	0.035
16:30 - 17:00	4	21.38	0.070	4	21.38	0.035	4	21.38	0.105
17:00 - 17:30	4	21.38	0.035	4	21.38	0.035	4	21.38	0.070
17:30 - 18:00	4	21.38	0.070	4	21.38	0.012	4	21.38	0.082
18:00 - 18:30	4	21.38	0.117	4	21.38	0.012	4	21.38	0.129
18:30 - 19:00	4	21.38	0.117	4	21.38	0.023	4	21.38	0.140
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.902			0.758			1.660

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
CYCLISTS
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	4	21.38	0.117	4	21.38	0.035	4	21.38	0.152
07:30 - 08:00	4	21.38	0.164	4	21.38	0.000	4	21.38	0.164
08:00 - 08:30	4	21.38	0.140	4	21.38	0.012	4	21.38	0.152
08:30 - 09:00	4	21.38	0.047	4	21.38	0.000	4	21.38	0.047
09:00 - 09:30	4	21.38	0.035	4	21.38	0.023	4	21.38	0.058
09:30 - 10:00	4	21.38	0.000	4	21.38	0.000	4	21.38	0.000
10:00 - 10:30	4	21.38	0.023	4	21.38	0.035	4	21.38	0.058
10:30 - 11:00	4	21.38	0.082	4	21.38	0.082	4	21.38	0.164
11:00 - 11:30	4	21.38	0.000	4	21.38	0.012	4	21.38	0.012
11:30 - 12:00	4	21.38	0.035	4	21.38	0.023	4	21.38	0.058
12:00 - 12:30	4	21.38	0.012	4	21.38	0.035	4	21.38	0.047
12:30 - 13:00	4	21.38	0.035	4	21.38	0.012	4	21.38	0.047
13:00 - 13:30	4	21.38	0.023	4	21.38	0.023	4	21.38	0.046
13:30 - 14:00	4	21.38	0.058	4	21.38	0.023	4	21.38	0.081
14:00 - 14:30	4	21.38	0.012	4	21.38	0.023	4	21.38	0.035
14:30 - 15:00	4	21.38	0.023	4	21.38	0.070	4	21.38	0.093
15:00 - 15:30	4	21.38	0.023	4	21.38	0.246	4	21.38	0.269
15:30 - 16:00	4	21.38	0.035	4	21.38	0.047	4	21.38	0.082
16:00 - 16:30	4	21.38	0.023	4	21.38	0.070	4	21.38	0.093
16:30 - 17:00	4	21.38	0.035	4	21.38	0.058	4	21.38	0.093
17:00 - 17:30	4	21.38	0.023	4	21.38	0.187	4	21.38	0.210
17:30 - 18:00	4	21.38	0.047	4	21.38	0.117	4	21.38	0.164
18:00 - 18:30	4	21.38	0.164	4	21.38	0.070	4	21.38	0.234
18:30 - 19:00	4	21.38	0.047	4	21.38	0.000	4	21.38	0.047
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			1.203			1.203			2.406

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Appendix B

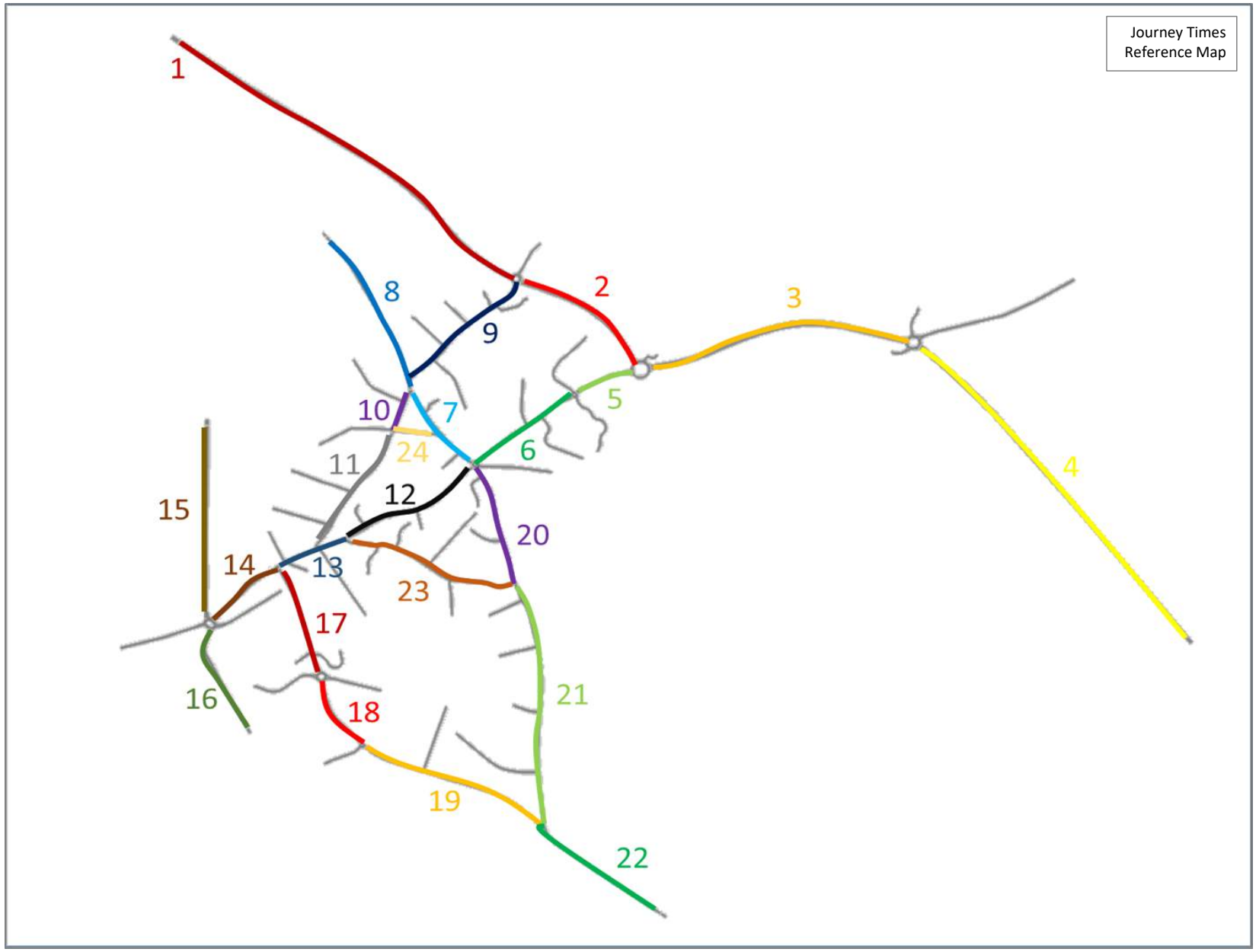
	AM							
	AM Base	**AM 2023 DN**	**AM 2023 DM**	**AM 2023 DS**	**AM 2028 DN**	**AM 2028 DM**	**AM 2028 DS1**	**AM 2028 DS2**
Average Delay per Vehicle in the Network (s)	49.7	52.5	68.1	74.0	59.6	339.7	270.8	71.7
Overall Delay per Vehicle (including time off network) (s)	53.2	56.3	73.4	79.7	64.0	428.7	328.2	77.2
Total Travel Time (hrs)	521.1	547.8	625.5	636.3	588.4	1392.3	1245.3	706.4
Average Travel Time (s)	246.2	247.0	263.2	267.5	254.1	519.0	461.5	267.9
Average Speed per Vehicle (mph)	30.0	29.8	28.3	27.8	28.9	13.5	15.8	28.3
Vehicles Active in the Network	503	522	606	605	568.0	1897.0	1280.0	662.0
Vehicle Trips Completed	7116	7463	7950	7957	7768.0	7760.0	8434.0	8831.0
Latent Demand at end of Simulation	0	0	0	0	0	74	16	0
Total Input Vehicle Numbers	7619	7985	8556	8562	8336	9731	9730	9493
Total Delay (hrs)	105.1	116.5	161.9	176.0	137.9	909.2	730.8	189.1
Latent Delay (hrs)	0.1	0.1	0.1	0.1	0.1	14.8	38.2	0.2

	PM							
	PM Base	**PM 2023 DN**	**PM 2023 DM**	**PM 2023 DS**	**PM 2028 DN**	**PM 2028 DM**	**PM 2028 DS1**	**PM 2028 DS2**
Average Delay per Vehicle in the Network (s)	75.6	82.3	119.7	89.8	102.3	181.6	134.2	113.9
Overall Delay per Vehicle (including time off network) (s)	82.4	90.1	133.7	98.3	113.1	214.6	151.6	127.1
Total Travel Time (hrs)	615.0	653.7	791.1	715.0	726.4	1017.7	911.8	853.6
Average Travel Time (s)	272.5	277.5	315.2	285.2	295.9	371.0	329.3	308.2
Average Speed per Vehicle (mph)	27.0	26.2	22.9	25.9	24.3	19.6	22.5	24.1
Vehicles Active in the Network	668	728	944	780	837.1	1255.0	1111.0	1029.0
Vehicle Trips Completed	7456	7752	8092	8246	8000.1	8621.0	8858.0	8941.0
Latent Demand at end of Simulation	0	2	0	0	0	138	21	0
Total Input Vehicle Numbers	8124	8482	9036	9026	8838	10014	9990	9970
Total Delay (hrs)	170.5	193.8	300.3	225.1	251.1	498.3	371.7	315.4
Latent Delay (hrs)	0.1	0.2	0.2	0.2	0.2	15.7	1.2	0.2

PEAK HOUR JOURNEY TIMES (SECONDS)

		Direction	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	85	86	88	89	88	505	591	92
		NB	75	76	76	76	75	76	76	76
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	41	42	54	90	45	223	213	59
		NB	36	36	37	37	37	37	37	39
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	66	66	70	66	68	66	65	70
		WB	63	63	65	61	64	68	62	62
4	Industrial Estate Road	SB	76	76	77	78	76	78	78	79
		NB	79	79	79	78	80	79	79	79
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	24	23	24	25	23	54	27	23
		EB	27	28	31	29	29	54	77	47
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	62	64	80	90	69	123	103	70
		EB	57	58	62	63	58	143	166	63
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	54	53	53	53	54	75	71	56
		SB	67	80	91	89	92	283	209	89
8	Jeffreys Road	NB	76	78	77	76	78	77	81	78
		SB	83	85	84	84	86	94	317	88
9	Borras Park Road	EB	119	137	141	148	153	145	163	201
		WB	111	106	108	108	125	119	362	111
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	22	22	22	22	23	25	44	25
		SB	20	20	20	20	20	43	21	20
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	138	129	129	134	131	418	138	141
		NB	105	102	102	101	103	113	131	102
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	73	75	77	77	76	376	104	76
		WB	69	71	75	72	76	66	127	93
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	56	56	62	59	60	58	70	69
		EB	53	55	60	59	57	85	60	63
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	48	48	49	49	49	49	49	51
		EB	41	41	42	42	41	46	42	43
15	A5152 North	SB	75	75	76	76	76	76	76	76
		NB	75	75	75	75	75	75	75	75
16	A5152 South	SB	43	43	43	43	43	43	43	43
		NB	49	49	49	49	49	49	49	50
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	62	62	62	62	62	65	62	62
		NB	68	70	69	71	70	83	78	75
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	58	58	62	59	60	69	61	57
		NB	54	59	57	57	58	65	65	58
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	127	132	131	131	134	145	140	133
		WB	143	148	148	147	153	184	222	152
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	55	55	59	59	56	60	55	55
		NB	77	75	118	104	81	276	101	75
21	Cefn Road: Between Hullah Lane and Queensway	SB	116	117	120	121	119	128	121	119
		NB	120	119	122	121	121	232	121	121
22	Cefn Road South of Queensway	NB	43	43	43	43	43	43	43	43
		SB	62	62	63	63	62	62	62	63
23	Hullah Lane	WB	214	214	223	224	218	268	306	234
		EB	212	203	193	202	210	258	221	197
24	Rhosnesni Lane	WB	24	22	22	22	22	115	23	23

		Direction	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	82	85	86	86	85	90	87	91
		NB	75	75	76	76	75	77	77	77
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	37	37	37	37	37	38	38	40
		NB	38	42	46	49	43	66	49	57
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	61	61	61	61	61	62	62	63
		WB	90	68	82	67	69	91	82	69
4	Industrial Estate Road	SB	70	70	71	71	70	72	72	72
		NB	135	170	279	105	227	144	149	157
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	27	26	26	31	27	51	24	26
		EB	31	35	52	34	35	86	54	30
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	73	71	72	99	74	159	65	66
		EB	55	55	56	55	54	69	57	53
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	52	54	55	54	55	53	57	55
		SB	67	72	77	76	75	88	81	70
8	Jeffreys Road	NB	80	80	80	80	80	80	81	81
		SB	82	84	84	83	85	84	84	83
9	Borras Park Road	EB	127	126	157	147	130	152	152	154
		WB	108	126	148	160	140	149	130	124
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	21	21	22	22	21	21	22	22
		SB	19	19	19	19	19	19	19	19
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	136	148	170	141	155	142	148	145
		NB	99	101	106	102	100	96	96	99
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	77	81	80	79	80	80	85	80
		WB	70	69	69	74	72	74	73	74
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	54	54	57	65	61	68	68	66
		EB	80	79	86	102	90	115	111	101
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	49	49	49	50	50	48	50	50
		EB	45	47	52	94	61	199	174	113
15	A5152 North	SB	78	78	78	82	79	484	248	111
		NB	76	76	76	76	76	77	76	77
16	A5152 South	SB	43	43	43	43	43	43	43	43
		NB	53	53	54	53	53	58	58	66
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	63	64	66	64	65	63	62	69
		NB	80	72	77	97	81	191	127	113
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	67	78	83	69	78	69	68	93
		NB	59	60	58	62	61	64	59	61
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	134	139	140	136	137	135	138	149
		WB	188	187	186	194	204	204	228	251
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	56	55	55	57	56	59	55	53
		NB	78	75	80	97	82	154	97	70
21	Cefn Road: Between Hullah Lane and Queensway	SB	119	120	120	121	120	123	126	126
		NB	122	123	128	124	125	128	129	128
22	Cefn Road South of Queensway	NB	44	44	44	44	45	45	46	46
		SB	63	63	63	63	63	63	63	63
23	Hullah Lane	WB	213	220	232	198	209	183	225	208
		EB	226	191	236	223	196	243	232	226
24	Rhosnesni Lane	WB	22	22	23	22	22	22	23	22


Journey Times
Reference Map
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AVERAGE QUEUE LENGTHS (METRES)

Junction	Site	Arm	Description	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
4	Site 4	Arm A	Sandy Lane	0	0	0	0	0	0	0	0
4	Site 4	Arm B	A534 Bypass	1	1	2	19	1	20	19	29
4	Site 4	Arm C	Borras Hall Lane	1	2	5	1	2	1	1	1
4	Site 4	Arm D	A534 Wrexham Rd	8	16	55	21	20	22	27	26
4	Site 4	Arm E	Industrial Estate Rd	0	0	1	3	1	3	3	3
5	Site 5	Arm A	Borras Rd	0	0	0	0	0	8	6	1
5	Site 5	Arm B	A5156 East	1	1	2	1	1	1	3	5
5	Site 5	Arm C	Borras Park Rd	7	5	4	5	8	6	18	3
5	Site 5	Arm D	A5156 West	7	9	12	15	13	1507	1791	20
1	Site 1	Arm A	Holt Rd North	6	9	36	59	14	336	109	20
1	Site 1	Arm B	Bryn Estyn Rd	0	0	0	1	0	5	0	0
1	Site 1	Arm C	Cefn Rd	24	21	112	79	32	720	54	25
1	Site 1	Arm D	Holt Rd South	3	4	7	7	6	690	39	5
1	Site 1	Arm E	Dean Rd	3	21	39	39	45	260	592	44
7	Site 7	Arm A	Holt Rd	1	1	2	2	2	2	2	2
7	Site 7	Arm B	Tesco	0	0	0	0	0	2	0	0
7	Site 7	Arm C	Fardon Rd	1	1	1	1	1	7	1	1
7	Site 7	Arm D	Holt St	0	0	0	0	0	2	0	0
7	Site 7	Arm E	A5152 Main	0	0	0	0	0	13	0	0
7	Site 7	Arm F	A5152 Left Slip	0	0	0	0	0	13	0	1
8	Site 8	Arm A	Cefn Rd Right Turn	0	0	0	0	0	1	2	1
8	Site 8	Arm C	Queensway Right Turn	0	0	0	0	0	1	0	0
2	Site 2	Arm A	A5156	4	6	42	158	11	700	689	57
2	Site 2	Arm C	A534 Bypass	5	5	8	1	6	52	2	4
2	Site 2	Arm C	Holt Road	1	2	3	4	2	210	471	55
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	0	0	N/A	6	22	12

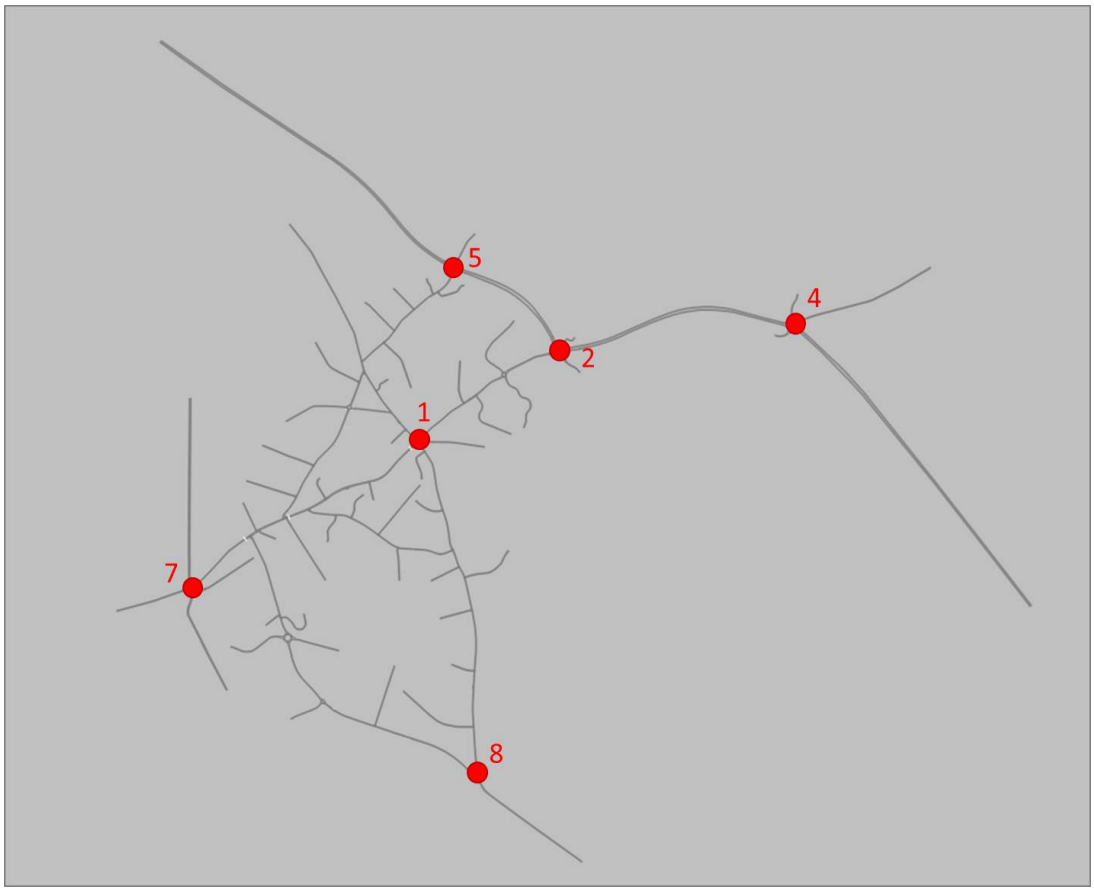
Junction	Site	Arm	Description	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
4	Site 4	Arm A	Sandy Lane	1	1	1	0	2	0	0	0
4	Site 4	Arm B	A534 Bypass	1	1	1	7	1	7	8	8
4	Site 4	Arm C	Borras Hall Lane	0	0	0	0	0	0	0	0
4	Site 4	Arm D	A534 Wrexham Rd	0	0	0	35	14	66	68	83
4	Site 4	Arm E	Industrial Estate Rd	92	214	746	76	488	272	292	332
5	Site 5	Arm A	Borras Rd	0	0	0	0	2	2	0	4
5	Site 5	Arm B	A5156 East	6	15	25	29	18	107	33	64
5	Site 5	Arm C	Borras Park Rd	3	1	4	5	2	2	7	5
5	Site 5	Arm D	A5156 West	3	5	7	7	28	41	10	47
1	Site 1	Arm A	Holt Rd North	9	10	10	52	74	311	6	7
1	Site 1	Arm B	Bryn Estyn Rd	0	0	0	0	5	0	0	0
1	Site 1	Arm C	Cefn Rd	23	20	31	57	76	182	65	17
1	Site 1	Arm D	Holt Rd South	6	12	12	10	11	11	19	10
1	Site 1	Arm E	Dean Rd	4	9	14	14	72	37	21	7
7	Site 7	Arm A	Holt Rd	3	3	3	3	3	2	3	4
7	Site 7	Arm B	Tesco	0	1	1	1	24	1	1	1
7	Site 7	Arm C	Fardon Rd	2	2	3	2	44	6	11	16
7	Site 7	Arm D	Holt St	1	1	1	1	32	17	13	4
7	Site 7	Arm E	A5152 Main	1	1	1	2	68	596	379	98
7	Site 7	Arm F	A5152 Left Slip	1	1	2	13	71	653	416	112
8	Site 8	Arm A	Cefn Rd Right Turn	0	6	1	1	1	1	4	4
8	Site 8	Arm C	Queensway Right Turn	0	1	0	1	1	1	1	1
2	Site 2	Arm A	A5156	0	0	0	0	5	0	0	4
2	Site 2	Arm C	A534 Bypass	90	14	58	11	73	103	58	24
2	Site 2	Arm C	Holt Road	7	10	31	9	11	127	39	6
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	4	0	N/A	2	21	18

MAXIMUM QUEUE LENGTHS (METRES)

Junction	Site	Arm	Description	AM Base	AM 2023 DN	AM 2023 DM	AM 2023 DS	AM 2028 DN	AM 2028 DM	AM 2028 DS1	AM 2028 DS2
4	Site 4	Arm A	Sandy Lane	4	5	4	4	5	4	4	4
4	Site 4	Arm B	A534 Bypass	38	45	65	125	50	118	120	173
4	Site 4	Arm C	Borras Hall Lane	17	20	29	16	21	18	18	19
4	Site 4	Arm D	A534 Wrexham Rd	54	80	147	87	91	89	103	104
4	Site 4	Arm E	Industrial Estate Rd	21	19	22	32	20	35	38	36
5	Site 5	Arm A	Borras Rd	12	12	12	12	11	27	25	13
5	Site 5	Arm B	A5156 East	23	26	33	32	32	26	39	50
5	Site 5	Arm C	Borras Park Rd	69	55	52	52	69	50	85	39
5	Site 5	Arm D	A5156 West	90	92	114	111	118	1807	2010	161
1	Site 1	Arm A	Holt Rd North	90	92	166	210	120	554	338	132
1	Site 1	Arm B	Bryn Estyn Rd	10	10	10	13	11	20	13	13
1	Site 1	Arm C	Cefn Rd	118	115	253	213	131	953	151	103
1	Site 1	Arm D	Holt Rd South	49	59	78	77	75	916	126	71
1	Site 1	Arm E	Dean Rd	54	104	157	169	167	410	807	191
7	Site 7	Arm A	Holt Rd	38	37	44	43	44	36	43	42
7	Site 7	Arm B	Tesco	14	14	16	14	16	23	15	15
7	Site 7	Arm C	Fardon Rd	25	22	20	20	22	43	24	28
7	Site 7	Arm D	Holt St	6	7	8	7	8	12	8	8
7	Site 7	Arm E	A5152 Main	16	16	16	17	17	47	14	16
7	Site 7	Arm F	A5152 Left Slip	19	21	24	21	22	53	23	24
8	Site 8	Arm A	Cefn Rd Right Turn	13	18	22	21	17	31	47	32
8	Site 8	Arm C	Queensway Right Turn	10	12	13	13	13	22	19	14
2	Site 2	Arm A	A5156	76	83	178	315	110	789	790	186
2	Site 2	Arm C	A534 Bypass	46	51	60	28	53	132	35	42
2	Site 2	Arm C	Holt Road	38	50	86	88	65	566	776	240
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	8	4	N/A	27	106	93

Junction	Site	Arm	Description	PM Base	PM 2023 DN	PM 2023 DM	PM 2023 DS	PM 2028 DN	PM 2028 DM	PM 2028 DS1	PM 2028 DS2
4	Site 4	Arm A	Sandy Lane	11	12	11	9	13	10	10	10
4	Site 4	Arm B	A534 Bypass	26	27	30	58	26	57	57	57
4	Site 4	Arm C	Borras Hall Lane	7	7	7	8	8	7	7	7
4	Site 4	Arm D	A534 Wrexham Rd	17	21	17	131	37	181	188	202
4	Site 4	Arm E	Industrial Estate Rd	355	488	1079	287	785	598	625	657
5	Site 5	Arm A	Borras Rd	7	9	8	8	11	12	8	13
5	Site 5	Arm B	A5156 East	68	106	136	159	115	272	156	219
5	Site 5	Arm C	Borras Park Rd	34	24	40	46	27	29	49	42
5	Site 5	Arm D	A5156 West	46	64	72	72	103	137	85	136
1	Site 1	Arm A	Holt Rd North	121	114	110	251	206	647	77	95
1	Site 1	Arm B	Bryn Estyn Rd	9	9	10	10	16	11	8	9
1	Site 1	Arm C	Cefn Rd	129	125	138	179	190	347	218	92
1	Site 1	Arm D	Holt Rd South	73	93	89	87	84	92	104	90
1	Site 1	Arm E	Dean Rd	57	74	98	98	167	150	129	73
7	Site 7	Arm A	Holt Rd	55	51	58	47	55	39	52	70
7	Site 7	Arm B	Tesco	17	20	18	20	45	19	24	20
7	Site 7	Arm C	Fardon Rd	42	38	49	34	88	77	86	127
7	Site 7	Arm D	Holt St	21	23	23	28	59	79	72	45
7	Site 7	Arm E	A5152 Main	19	20	21	34	99	743	545	202
7	Site 7	Arm F	A5152 Left Slip	35	34	37	74	123	791	571	233
8	Site 8	Arm A	Cefn Rd Right Turn	26	43	27	36	32	33	67	63
8	Site 8	Arm C	Queensway Right Turn	15	22	23	24	20	22	29	29
2	Site 2	Arm A	A5156	13	9	13	11	18	18	19	37
2	Site 2	Arm C	A534 Bypass	217	109	198	96	185	283	209	114
2	Site 2	Arm C	Holt Road	61	82	134	74	79	320	159	55
2	Site 2	Arm C	Northern Site Access Exit	N/A	N/A	17	6	N/A	17	48	72

QUEUE SITE REFERENCE MAP



Appendix H Link Road Testing Results Note

Link Road Testing Results Note

KSS2 Testing Wrexham VISSIM

Prepared by:

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SLR Project No.: 431.000223.00001

27 February 2024

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	27 February 2024	AH	JE	JE
	Click to enter a date.			
	Click to enter a date.			
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Basis of Report

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Table of Contents

1.0 Introduction & Background 1
2.0 KSS2 South Threshold Testing 3
3.0 Greyhound Roundabout || Proposed Scheme 11
4.0 Summary 15

Tables in Text

Table A: KSS2 South Trip Generation, Peak Hour Car Trips 6

Figures in Text

Figure A: Initial VISSIM Assessments 1
Figure B: KSS2 Build Out Rates and Trip Generation 2
Figure C: Model Extent & KSS2 Accesses 3
Figure D: A534/Industrial Estate Roundabout Signalisation 4
Figure E: A5156/A534 Roundabout Widening 5
Figure F: AM Average Delay Per Vehicle (seconds) 7
Figure G: Corridor Journey Time Route Map 8
Figure H: PM Average Delay Per Vehicle (seconds) 9
Figure I: Greyhound Roundabout Proposed Highway Scheme 11
Figure J: AM With Scheme Average Delay Per Vehicle (seconds) 12
Figure K: PM With Scheme Average Delay Per Vehicle (seconds) 13

1.0 Introduction & Background

1.1 SLR Consulting Ltd (SLR) has been advising Harworth as part of a renewed application for delivery of an allocated Site in Wrexham known as Key Strategic Site 2 (KSS2), Policy SP5, Land East of Cefn Road.

1.2 Integrated Transport Planning (ITP) on behalf of Wrexham County Borough Council (WCBC) developed a Base VISSIM model in 2018 to support the decision-making process for the Local Plan. Both AM and PM peak hour Base models were developed using hours 08:00-09:00 and 16:30-17:30.

1.3 SLR (formerly Vectos Microsim) carried out a series of assessments in 2019 using that agreed Base model which adopted a collaborative approach between promotors for Sites KSS2 and KSS3, along with WCBC who used the modelling to help inform their Local Plan strategy. The Local Plan was formally adopted by the Council in December 2023.

1.4 The assessments carried out are detailed in the Figure below:

Figure A: Initial VISSIM Assessments

	Traffic Demands	Network
Base	Base demands, as per ITP Base model	Base network, as per ITP Base model with minor alterations as described in Chapter 2
2023 Do-Nothing	Base demands, plus TEMPro informed growth to 2023	As per Base
2023 Do-Minimum	Base demands, plus KSS2 and KSS3 2023 trip generation plus adjusted TEMPro informed growth to 2023	Base, plus site access arrangements at Cefn Road for Southern Site and A5156/A534 roundabout for Northern Site
2023 Do-Something	As per 2023 Do-Minimum	As per 2023 Do-Minimum, plus off-site mitigation proposals (to be discussed)
2028 Do-Nothing	Base demands, plus TEMPro informed growth to 2028	As per Base
2028 Do-Minimum	Base demands, plus KSS2 and KSS3 2028 trip generation plus adjusted TEMPro informed growth to 2028	As per 2023 Do-Something. Mitigation proposals for 2023 are carried forward to 2028
2028 Do-Something 1	As per 2028 Do-Minimum	As per 2028 Do-Minimum, plus Link Road through KSS2 Southern and Northern Sites
2028 Do-Something 2	As per 2028 Do-Minimum	As per 2028 Do-Something 1, plus further off-site mitigation proposals (to be discussed)

1.5 As described two assessment years were selected; 2023 and 2028. Based on an assessment of targeted build out rates and scheduled delivery, the following details the trip generation assumed at each year:

Figure B: KSS2 Build Out Rates and Trip Generation

		2023			2028		
		Northern Site	Southern Site	Total	Northern Site	Southern Site	Total
	No. of Units	250	460	710	600	1080	1680
AM	Peak Hour Arrivals	35	65	100	85	152	237
	Peak Hour Departures	93	171	265	224	402	626
PM	Peak Hour Arrivals	81	150	231	195	352	547
	Peak Hour Departures	45	82	127	108	194	301

1.6 The 2023 assessment concluded that 460 KSS2 South and 250 KSS2 North dwellings could be delivered prior to the need for the Link Road between Cefn Road and A534, but recommended local mitigation at the A534/Industrial Estate Road Roundabout and A5156/A534 Roundabouts be introduced to accommodate the additional demand.

1.7 The 2028 assessment concluded that delivery of 1080 KSS2 South and 600 KSS2 North dwellings could not be delivered without delivery of the Link Road, due to significant delays around Greyhound Roundabout and elsewhere. The 2028 assessment recommended that for full delivery of KSS2 (and KSS3), further mitigation at A5156/A534 Roundabout along with the Link Road should be considered to accommodate all additional traffic.

1.8 No assessment was carried out previously to determine the point between 2023 and 2028 at which delivery of the Link Road is required, whether 460 dwellings was a suitable threshold in network capacity terms, or whether any alternative local mitigation could be proposed that could increase the permissible dwelling numbers without detriment to the overall level of network performance.

1.9 A previous Note was issued[1] which documented the proposed methodology for this additional testing. This Note will confirm the full methodology adopted, and the results of the VISSIM assessment.

[1] 431.000223.TN004 Link Road Testing Methodology Note

2.0 KSS2 South Threshold Testing

Methodology

2.1 The Figure below provides the VISSIM model extent, along with the locations of the KSS2 Northern and Southern Site Accesses:

Figure C: Model Extent & KSS2 Accesses



2.2 The 2023 Do-Something assessment used to inform the Local Plan was used as the starting point, which includes two proposed mitigation schemes:

- Signalisation of A534/Industrial Estate Roundabout; and
- Additional highway capacity at A5156/A534 Roundabout

2.3 Figures of these schemes are provided below:

Figure D: A534/Industrial Estate Roundabout Signalisation

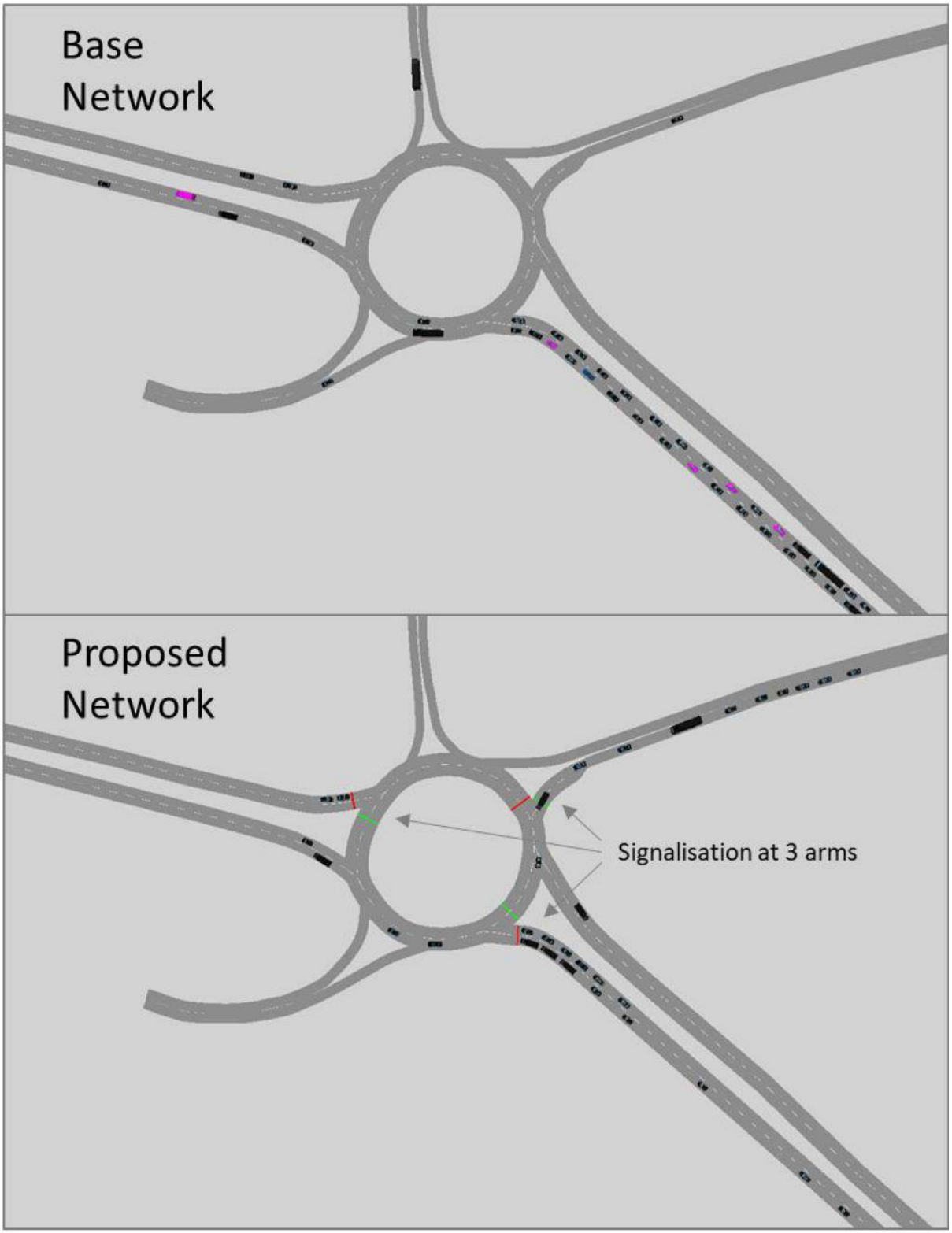
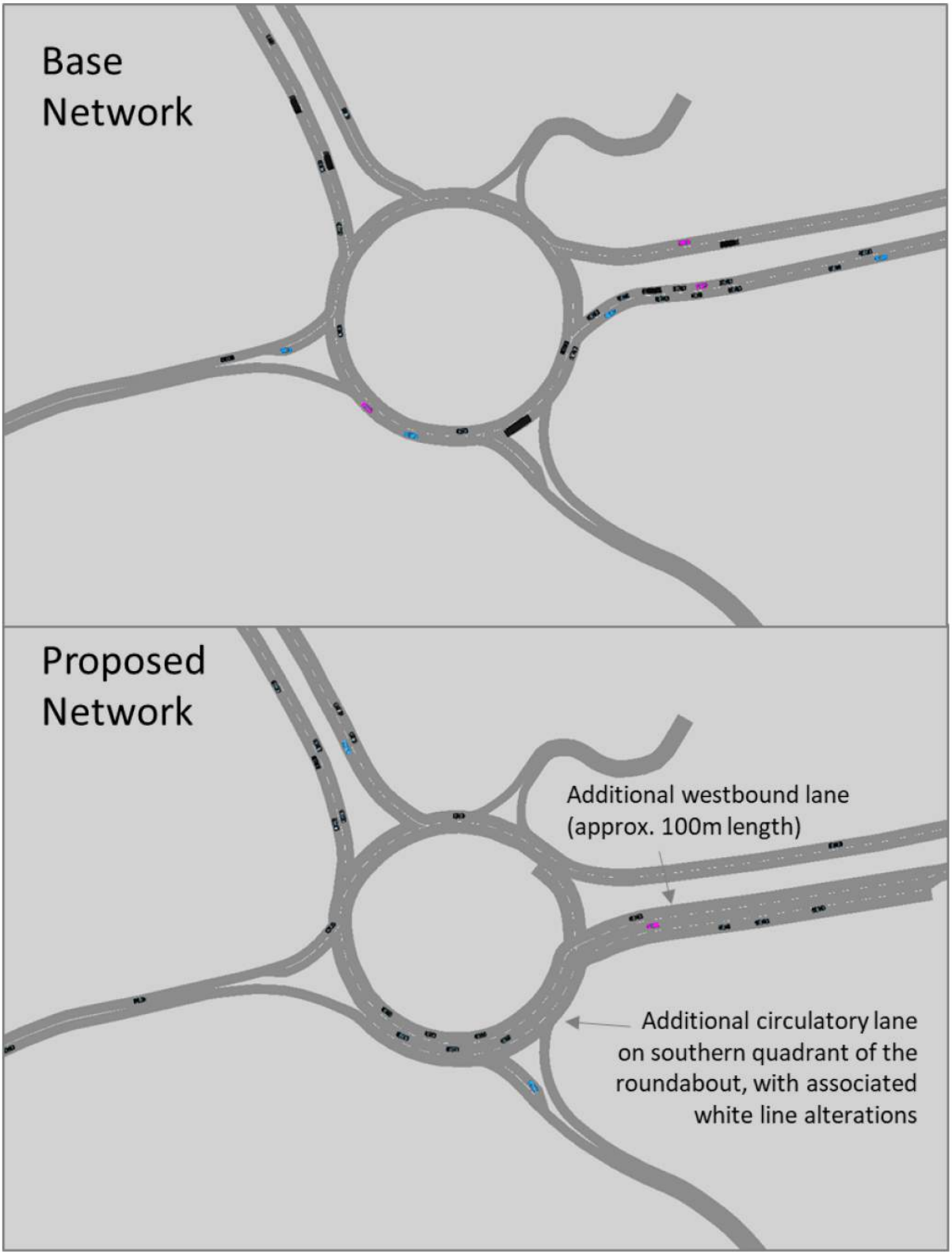


Figure E: A5156/A534 Roundabout Widening



2.4 These schemes are carried through to this threshold testing and remain unchanged from the modelling undertaken previously.

2.5 To develop the matrices, the existing KSS2 Northern and Southern plot demands were isolated from one another. The original 460 dwelling assessment was then increased to 500, 600, 700, 800 and 900 dwellings using proportional factors to growth the development demands in line with the additional number of dwellings proposed for that test. Distribution remained consistent with the original Local Plan assessment.

2.6 The resulting trip generation is documented in the Table below (all KSS2 South development trips are assumed to be Light Vehicles):

Table A: KSS2 South Trip Generation, Peak Hour Car Trips

KSS2 Southern Site		Number of Dwellings					
		460	500	600	700	800	900
AM	Arrivals	65	71	85	99	113	127
	Departures	171	186	224	261	298	335
PM	Arrivals	150	163	195	228	261	293
	Departures	82	90	108	125	143	161

2.7 New AM and PM peak period scenarios were set up in VISSIM using Scenario Management, as per the original assessment. No amendments to the increased dwelling number model scenarios were made and remain consistent with the original 2023 DS assessment, aside for the increase in vehicle demands.

Modelling Results

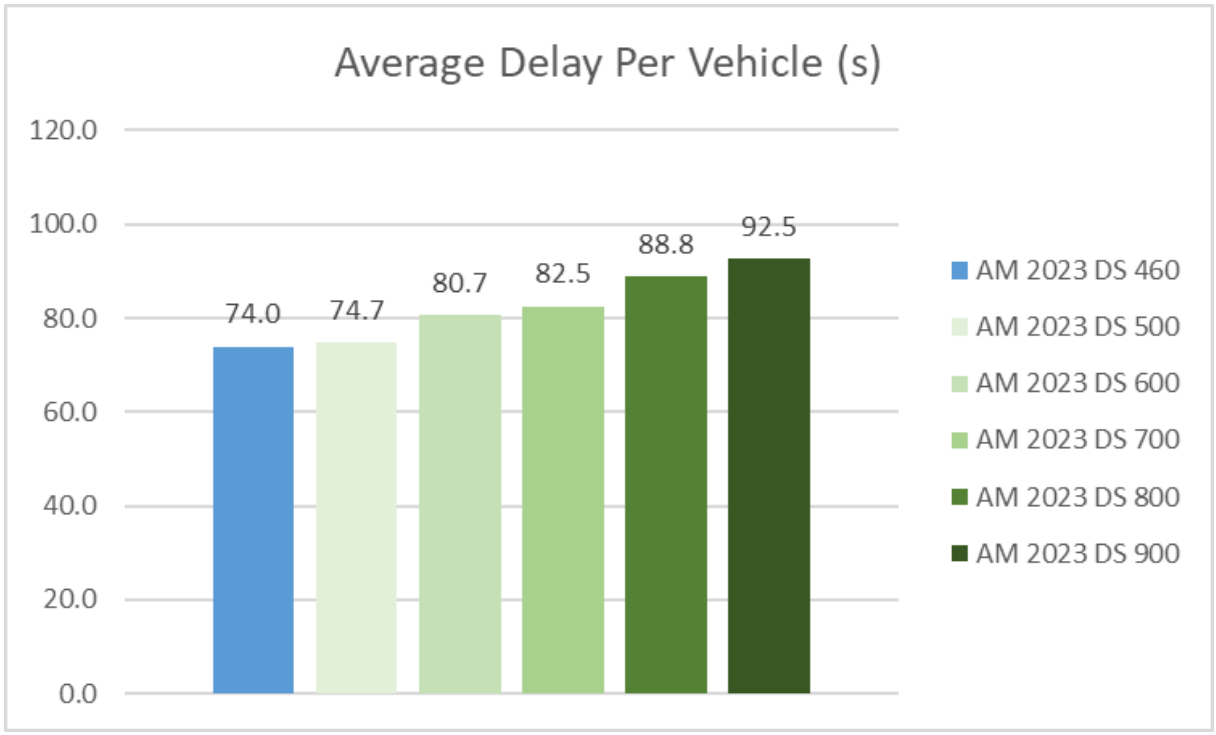
2.8 Full numerical outputs are provided within **Appendix A**.

AM Peak Period – 08:00-09:00

2.9 Through testing of the various assumed dwelling numbers, it is considered that 600 dwellings represents a reasonable threshold whereby the model indicates that network performance does not show a material impact against the agreed 2023 With Development position used to support the Local Plan. The rationale for this conclusion will be discussed in the forthcoming results commentary.

2.10 Average delay per vehicle across the network shows minor increases compared with the agreed 460 dwelling scenario. The Figure below provides an illustration of expected delay:

Figure F: AM Average Delay Per Vehicle (seconds)



2.11 The 600 dwelling scenario shows an increase in average delay per vehicle of ~7 seconds, compared with the 460 dwelling scenario (<10%). Whilst the 700 dwelling scenario shows minimal further detriment, 800 dwellings and above begin to show increases over 20%.

2.12 In regards to journey times, delays are shown to increase mainly on Cefn Road northbound, as more development trips travel away from the Site northbound towards Greyhound Roundabout.

2.13 Under the 600 dwelling scenario, journey times along this section increase by only 12 seconds (104 seconds in the agreed 2023 460 dwelling scenario, to 116 seconds in the 600 dwelling scenario). 700 dwellings shows an increase of just over 30 seconds, representing a 30% increase on the 460 dwelling scenario.

2.14 During analysis of the original assessment that informed the Local Plan, four main corridors were selected for analysis of journey times through the study area. These are provided in the Figure below:

Figure G: Corridor Journey Time Route Map



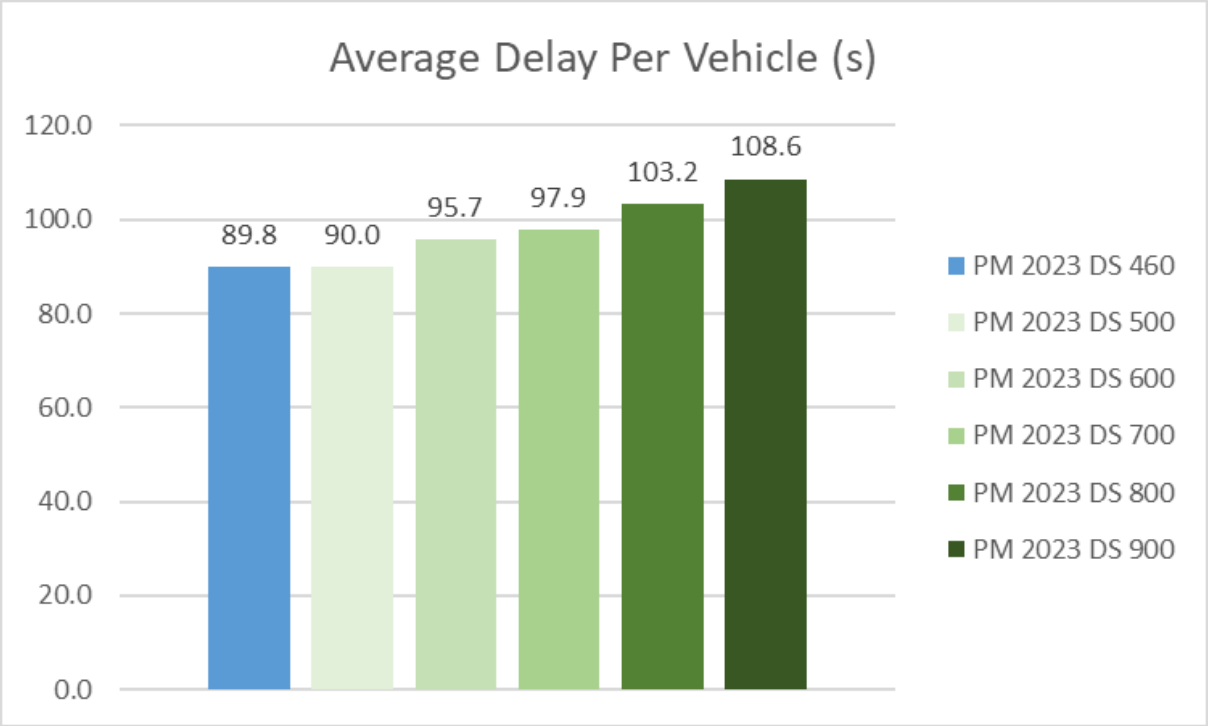
2.15 Results demonstrate that under the 600 dwelling scenario, no single route increases by more than 12 seconds across the AM peak period (<5%).

2.16 In regards to queue lengths, the highest increase is exhibited on Cefn Road, thereby corroborating the journey time outputs. The increase however corresponds to an average queue length increase of only 6 vehicles. At 700 dwellings the increase against the 460 dwelling scenario is 14 vehicles, which primarily forms the justification for the 600 dwelling test being considered the threshold beyond which impacts start to become material.

PM Peak Period – 16:30-17:30

2.17 Average delay per vehicle across the network shows minor increases compared with the agreed 460 dwelling scenario. The Figure below provides an illustration of expected delay:

Figure H: PM Average Delay Per Vehicle (seconds)



2.18 The 600 dwelling scenario shows an increase in average delay per vehicle of ~6 seconds, compared with the 460 dwelling scenario (7%). The PM 700 dwelling scenario shows only an 8 second increase (9%).

2.19 Journey time results show the greatest impact along eastbound Holt Road where journey times increase by 30 seconds. This is the result of additional development trips travelling eastbound towards the site, and the capacity constraints on Holt Road including the pedestrian crossings, a number of side roads causing delays to Holt Road when vehicles either enter out onto the Holt Road link or turn right into one of these side roads, and the steep gradient travelling eastbound towards Hullah Lane.

2.20 In regards to corridor journey times, Route A eastbound increases by 37 seconds (10%), with no other corridor exhibiting an increase above 10 seconds.

2.21 Maximum queue increases are shown primarily in 2 locations; Holt Road westbound approach to Greyhound Roundabout, and on A5152 southbound approach to the Holt Road/A5152 Roundabout to the west of the model extent. The latter is due to the constraints on eastbound Holt Road which affect the discharge rate away from the roundabout and thus impact on approach queues. Average queue lengths at this location show an increase of ~9 vehicles.

2.22 On Holt Road westbound, average queue lengths in the 600 dwelling scenario increase by ~7 vehicles. Journey times along this section however increase by only 8 seconds, suggesting the queuing on that approach is transient.

2.23 Overall, results for the 700 dwelling scenario do not differ significantly from the 600 dwelling scenario.

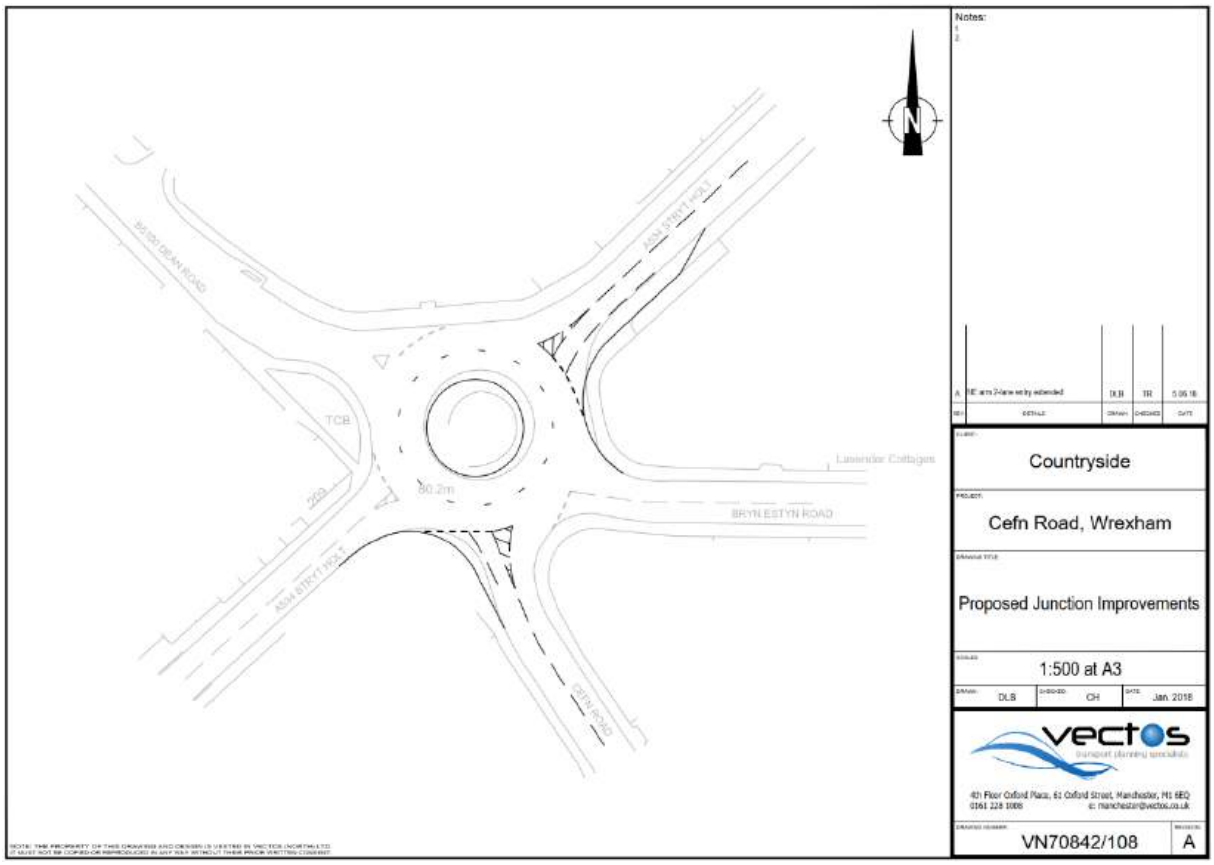
3.0 Greyhound Roundabout || Proposed Scheme

3.1 Greyhound Roundabout is a key junction for the operation of the network as a whole, and is shown to exhibit queue length increases on northbound and westbound approaches in the AM and PM peak periods respectively when KSS2 South development trips are increased in-line with incrementally higher delivery of dwelling numbers.

3.2 To mitigate this forecast impact a highway scheme is proposed which adds capacity to the existing arrangement on these two approaches, as well as the circulatory. Flare lanes are added to Holt Road westbound and to Cefn Road northbound, and the circulatory is revised to 2-lanes from the existing one.

3.3 The Figure below provides the proposed scheme design:

Figure I: Greyhound Roundabout Proposed Highway Scheme



3.4 In-line with the assessment carried out without mitigation, scenarios have been converged and run that test incrementally higher dwelling numbers, starting with 500 dwellings and testing up to 900 dwellings. The results of the tests are discussed below.

With Greyhound Roundabout Scheme || Modelling Results

3.5 Full numerical outputs are provided within **Appendix B**.

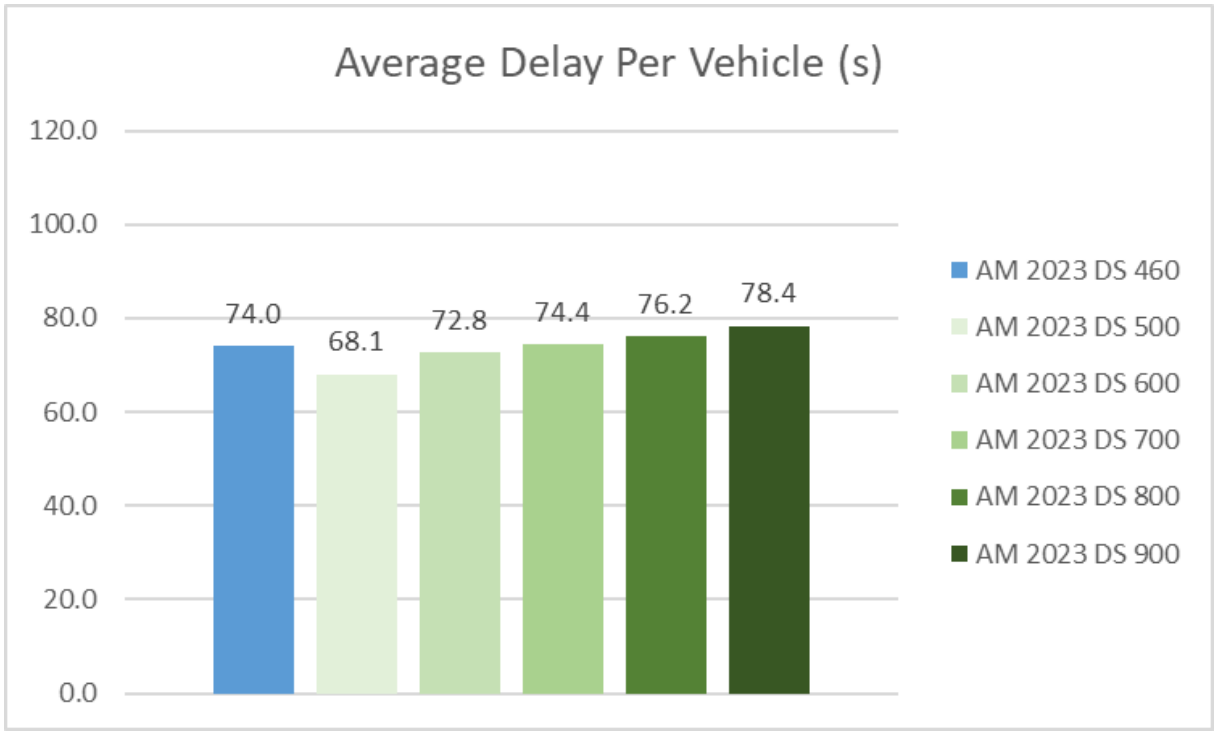
AM Peak Period With Greyhound Mitigation – 08:00-09:00

3.6 Through testing of the various assumed dwelling numbers, it is considered that 800 dwellings represents a reasonable threshold whereby the model indicates that network performance does not show a material impact against the agreed 2023 With Development position used to support the Local Plan, when considering the benefit achieved through delivery of mitigation at Greyhound Roundabout.

3.7 The rationale for this conclusion will be discussed in the forthcoming results commentary.

3.8 Average delay per vehicle across the network shows minor increases compared with the agreed 460 dwelling scenario. The Figure below provides an illustration of expected delay:

Figure J: AM With Scheme Average Delay Per Vehicle (seconds)



3.9 The graph above illustrates the improvement in network performance following inclusion of the mitigation at Greyhound Roundabout. The increase in dwelling numbers from 460 to 800 shows only an additional increase in average delay per vehicle of 2 seconds.

3.10 Network statistics also show an additional 190 vehicles are able to complete their origin-to-destination trip during the AM peak when compared with the 460 dwelling scenario, thereby providing associated economic benefits of a more free-flowing network.

3.11 In regards to journey times, Holt Road westbound, Dean Road southbound and Cefn Road northbound all show improvements at 800 dwellings compared with the agreed 460 dwelling scenario (ranging from ~15s-30s).

3.12 Additional delays are observed on Borras Park Road in both directions as the release of traffic from Greyhound Roundabout increases throughput and accessibility to other areas of the network, and the traffic calming measures on Borras Park Road result in journey time increases on this link of ~30-50s in each direction.

3.13 Elsewhere, no other journey time section increases by more than 15 seconds.

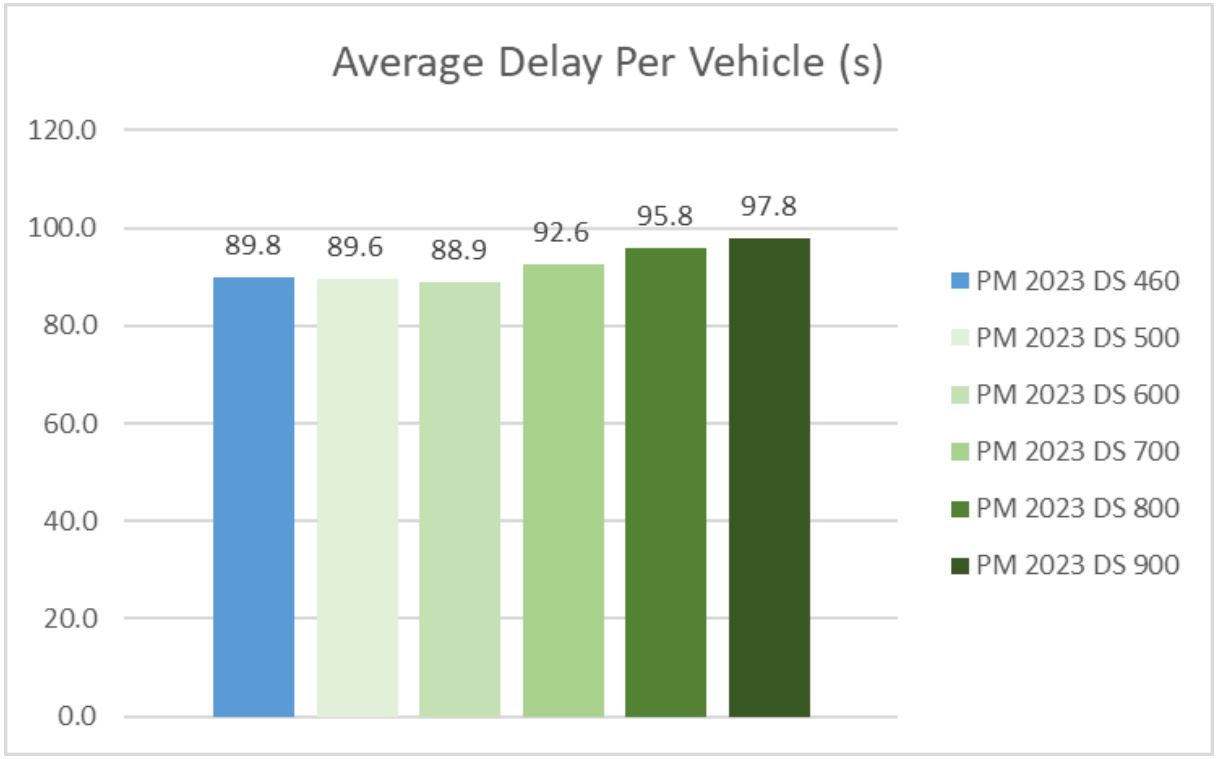
3.14 AM average queue lengths at Greyhound show reductions on Dean Road (~5 vehicles), Holt Road westbound (~4 vehicles) and Cefn Road (~7 vehicles) in the 800 dwelling scenario compared with the agreed 460 dwellings, demonstrating that despite the increase in development trip numbers the proposed mitigation is forecast to more than accommodate the impact. Elsewhere the A5156 approach to the Wrexham Golf Club Roundabout shows an average queue length reduction of ~6 vehicles, while Borras Park Road approach to the A5156 shows increases of ~2 vehicles.

PM Peak Period With Greyhound Mitigation – 16:30-17:30

3.15 The results for the PM with mitigation testing show that average delay per vehicle in the 800 dwelling scenario increases by only 6 seconds (7%).

3.16 The Figure below provides an illustration of expected delay:

Figure K: PM With Scheme Average Delay Per Vehicle (seconds)



3.17 Network statistics also show an additional 133 vehicles are able to complete their origin-to-destination trip during the PM peak when compared with the 460 dwelling scenario.

3.18 Holt Road westbound and Cefn Road northbound exhibit journey time improvements of between 20-30 seconds, compared with the agreed 460 dwelling scenario. Queue lengths also show reductions on Hold Road and Cefn Road (~7 vehicles), illustrating the additional capacity provided by the Greyhound Roundabout proposals.

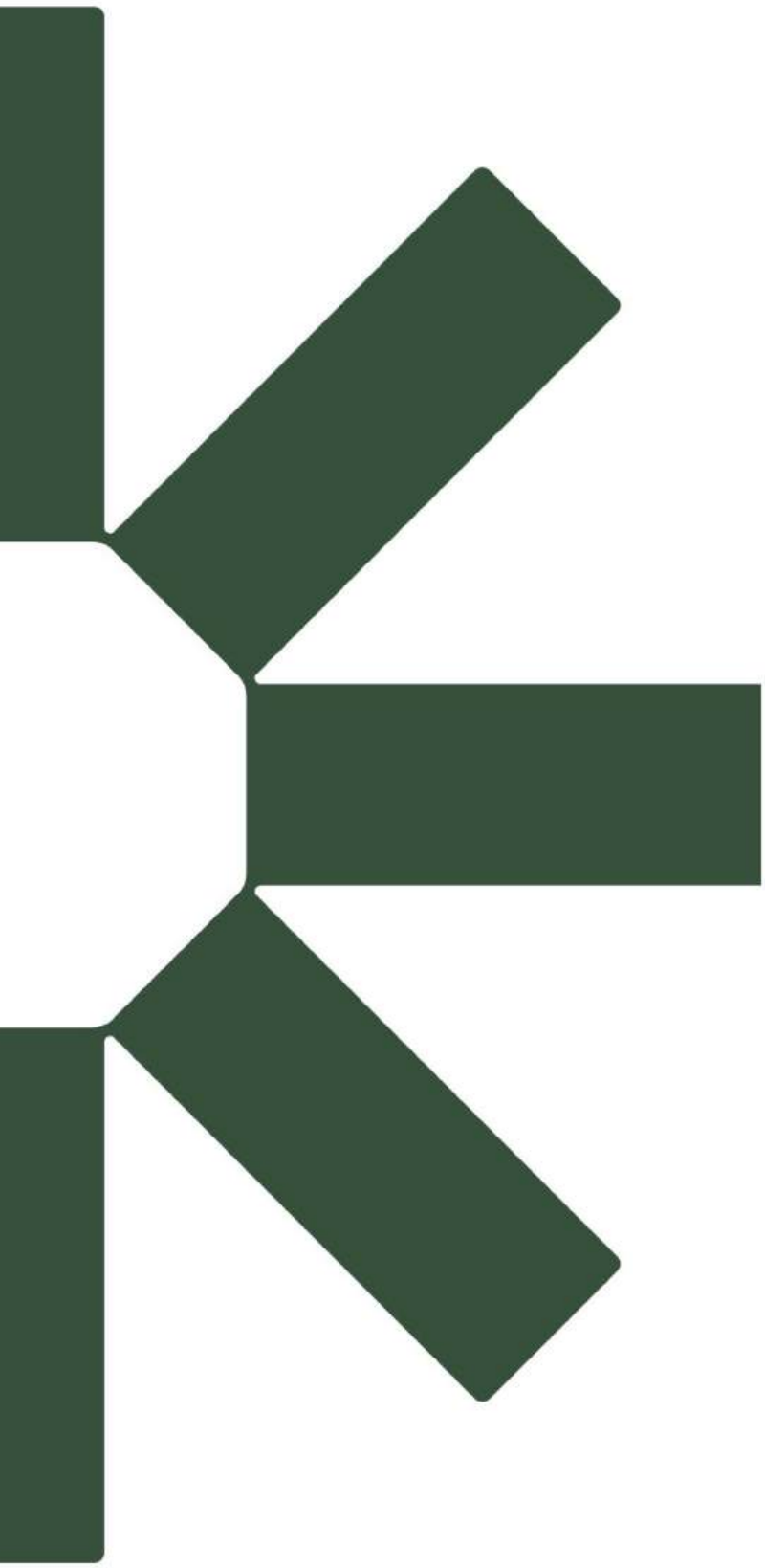
4.0 Summary

4.1 SLR Consulting Ltd (SLR) has been advising Harworth as part of a renewed application for delivery of an allocated Site in Wrexham known as Key Strategic Site 2 (KSS2), Policy SP5, Land East of Cefn Road.

4.2 This Note sets out the background of the 2023 and 2028 assessment years undertaken in 2019, and identifies the absence of a focussed assessment on when the Link Road is required and whether there is scope to increase the number of dwellings proposed to be delivered at KSS2, with and without the delivery of further off-site mitigation works.

4.3 The Note provides evidence that increasing the number of dwellings at KSS2 from 460, as agreed as part of the modelling undertaken in 2019 to support the Local Plan, to 600 dwellings, results in only a marginal impact on network performance. Minor increases in journey times are observed on Holt Road and Cefn Road approaches to Greyhound Roundabout, however average travel times and delays through the network are not materially affected.

4.4 Following inclusion of a proposed highway improvement scheme at Greyhound Roundabout, which increases capacity on Holt Road and Cefn Road approaches along with the circulatory itself, it is considered that the performance of the network at a KSS2 South delivery of 800 dwellings is not materially different from the agreed 460 position. The performance of Greyhound Roundabout shows a fairly significant improvement at 800 dwellings compared with 460, with some other areas exhibiting minor increases in delays following the release of traffic previously held up in queues around Greyhound Roundabout.



Making Sustainability Happen

Appendix A

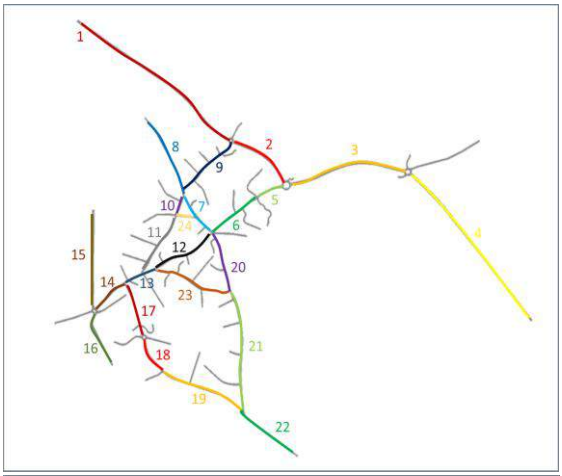
Without Scheme Threshold Testing VISSIM Results

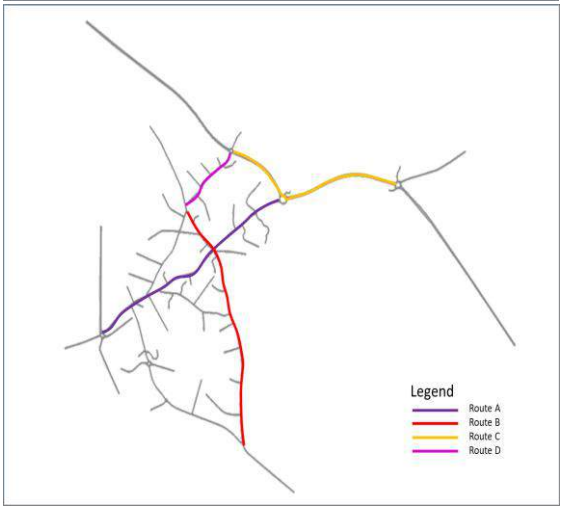
	AM					
	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
Average Delay per Vehicle in the Network (s)	74.0	74.7	80.7	82.5	88.8	92.5
Overall Delay per Vehicle (including time off network) (s)	79.7	80.5	87.4	89.2	96.9	100.9
Total Travel Time (hrs)	636	640	657	667	683	697
Average Travel Time (s)	268	268	274	276	281	285
Average Speed per Vehicle (mph)	27.8	27.7	27.1	26.9	26.3	25.9
Vehicles Active in the Network	605	607	656	647	719	720
Vehicle Trips Completed	7957	7982	7987	8059	8038	8094
Latent Demand at end of Simulation	0	0	0	0	1	0
Total Input Vehicle Numbers	8562	8589	8643	8706	8758	8814
Total Delay (hrs)	176	178	194	200	216	227
Latent Delay (hrs)	0	0	0	0	0	0

	PM					
	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
Average Delay per Vehicle in the Network (s)	89.8	90.0	95.7	97.9	103.2	108.6
Overall Delay per Vehicle (including time off network) (s)	98.3	98.5	105.3	107.7	114.1	120.5
Total Travel Time (hrs)	715	718	736	746	763	781
Average Travel Time (s)	285	285	291	293	298	302
Average Speed per Vehicle (mph)	25.9	25.9	25.4	25.2	24.7	24.2
Vehicles Active in the Network	780	779	824	830	876	914
Vehicle Trips Completed	8246	8272	8288	8333	8349	8377
Latent Demand at end of Simulation	0	0	0	0	0	0
Total Input Vehicle Numbers	9026	9051	9112	9163	9225	9291
Total Delay (hrs)	225	226	242	249	264	280
Latent Delay (hrs)	0	0	0	0	0	0

		Direction	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	89	88	90	88	89	90
		NB	76	76	76	76	76	76
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	90	96	99	103	107	109
		NB	37	37	37	37	37	37
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	66	66	66	65	66	66
		WB	61	61	61	61	61	61
4	Industrial Estate Road	SB	78	78	78	78	78	78
		NB	78	78	78	78	78	79
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	25	24	24	27	29	28
		EB	29	29	29	30	29	30
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	90	84	94	101	110	107
		EB	63	63	63	64	64	64
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	53	53	53	53	53	53
		SB	89	86	92	96	95	98
8	Jeffreys Road	NB	76	76	76	77	77	76
		SB	84	84	84	84	84	84
9	Borras Park Road	EB	148	148	157	154	154	151
		WB	108	107	112	108	106	109
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	22	22	23	23	23	22
		SB	20	20	20	20	20	20
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	134	134	134	135	134	136
		NB	101	101	103	103	101	102
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	77	77	78	78	77	78
		WB	72	75	75	74	76	74
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	59	60	60	60	61	60
		EB	59	58	59	61	58	59
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	49	49	49	49	49	50
		EB	42	42	42	42	42	42
15	A5152 North	SB	76	76	76	76	76	76
		NB	75	75	75	75	75	75
16	A5152 South	SB	43	43	43	43	43	43
		NB	49	49	49	49	49	49
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	62	63	62	62	62	62
		NB	71	70	72	72	72	73
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	59	58	59	60	58	60
		NB	57	58	58	58	57	57
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	131	130	131	131	131	133
		WB	147	148	148	149	148	149
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	59	59	59	59	61	61
		NB	104	109	116	135	151	188
21	Cefn Road: Between Hullah Lane and Queensway	SB	121	121	120	119	121	121
		NB	121	122	121	121	126	148
22	Cefn Road South of Queensway	NB	43	43	43	43	43	43
		SB	63	63	63	62	63	63
23	Hullah Lane	WB	224	229	228	223	234	225
		EB	202	206	212	206	211	224
24	Rhosnesni Lane	WB	22	22	22	22	22	22

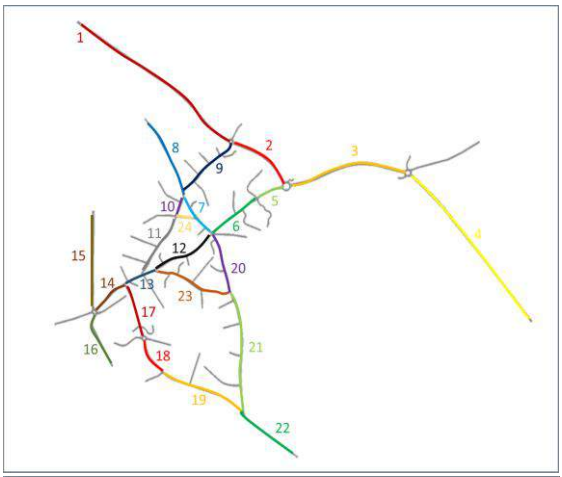
		Direction	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
A	Between A5152/Holt Road Roundabout and A5156/A534 Roundabout	EB	270	268	272	275	270	274
		WB	295	292	303	311	325	319
B	Between Cefn Road/Queensway and Dean Road/Borras Road	NB	278	284	289	309	330	388
		SB	269	266	272	275	277	280
C	Between A5156/Borras Park Road Roundabout and A534/Industrial Estate Road Roundabout	EB	155	162	164	168	173	175
		WB	98	98	98	98	98	98
D	Borras Park Road	EB	148	148	157	154	154	151
		WB	108	107	112	108	106	109

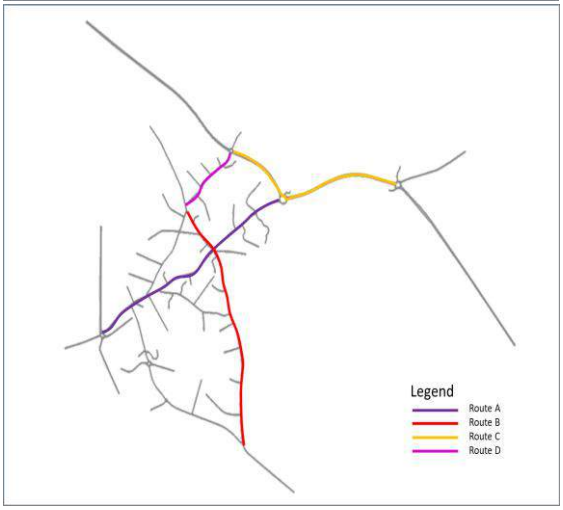




		Direction	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	86	86	86	86	86	86
		NB	76	76	76	76	76	76
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	37	37	37	37	37	37
		NB	49	48	47	47	47	48
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	61	61	61	61	61	61
		WB	67	67	67	68	70	72
4	Industrial Estate Road	SB	71	71	71	71	71	71
		NB	105	104	106	106	107	108
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	31	32	33	34	35	40
		EB	34	35	35	38	36	36
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	99	101	106	113	121	131
		EB	55	56	55	56	56	56
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	54	54	54	54	54	54
		SB	76	76	77	78	80	81
8	Jeffreys Road	NB	80	81	81	81	81	82
		SB	83	83	83	83	84	84
9	Borras Park Road	EB	147	148	148	144	151	154
		WB	160	157	153	157	154	156
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	22	22	22	22	22	22
		SB	19	19	19	19	19	19
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	141	138	136	137	136	136
		NB	102	102	104	104	104	104
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	79	80	80	79	79	79
		WB	74	75	74	74	76	76
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	65	65	64	66	67	66
		EB	102	102	107	105	109	108
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	50	49	49	49	49	49
		EB	94	95	124	125	134	139
15	A5152 North	SB	82	86	102	102	116	130
		NB	76	76	76	76	76	76
16	A5152 South	SB	43	43	43	43	43	43
		NB	53	53	53	53	54	54
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	64	64	64	64	63	64
		NB	97	95	95	96	105	102
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	69	72	72	74	71	71
		NB	62	61	61	61	61	61
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	136	138	135	138	137	136
		WB	194	191	190	193	192	193
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	57	57	57	57	58	58
		NB	97	98	104	105	120	131
21	Cefn Road: Between Hullah Lane and Queensway	SB	121	120	121	121	121	122
		NB	124	124	125	126	127	127
22	Cefn Road South of Queensway	NB	44	44	44	45	45	45
		SB	63	62	63	63	63	63
23	Hullah Lane	WB	198	207	213	217	205	202
		EB	223	222	225	229	239	238
24	Rhosnesni Lane	WB	22	22	22	22	22	22

		Direction	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
A	Between A5152/Holt Road Roundabout and A5156/A534 Roundabout	EB	365	367	401	404	413	417
		WB	319	322	326	335	349	362
B	Between Cefn Road/Queensway and Dean Road/Borras Road	NB	275	276	283	285	300	313
		SB	254	253	255	256	259	261
C	Between A5156/Borras Park Road Roundabout and A534/Industrial Estate Road Roundabout	EB	99	98	99	98	99	98
		WB	115	115	115	115	117	120
D	Borras Park Road	EB	147	148	148	144	151	154
		WB	160	157	153	157	154	156





Average Hourly Queue Length provided in Metres

Queue Counter	Junction	Site	Arm	Description	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
1	4	Site 4	Arm A	Sandy Lane	0	0	0	0	0	0
2	4	Site 4	Arm B	A534 Bypass	19	21	20	19	21	20
3	4	Site 4	Arm C	Borras Hall Lane	1	1	1	1	1	1
4	4	Site 4	Arm D	A534 Wrexham Rd	21	20	20	20	20	20
5	4	Site 4	Arm E	Industrial Estate Rd	3	2	3	3	3	3
6	5	Site 5	Arm A	Borras Rd	0	0	1	0	0	1
7	5	Site 5	Arm B	A5156 East	1	2	1	1	2	2
8	5	Site 5	Arm C	Borras Park Rd	5	5	5	4	5	5
9	5	Site 5	Arm D	A5156 West	15	12	17	13	16	17
10	1	Site 1	Arm A	Holt Rd North	59	42	79	93	128	110
11	1	Site 1	Arm B	Bryn Estyn Rd	1	0	1	0	2	1
12	1	Site 1	Arm C	Cefn Rd	79	90	111	158	219	328
13	1	Site 1	Arm D	Holt Rd South	7	7	14	8	13	8
14	1	Site 1	Arm E	Dean Rd	39	33	52	52	54	52
15	7	Site 7	Arm A	Holt Rd	2	2	2	2	2	2
16	7	Site 7	Arm B	Tesco	0	0	0	0	0	0
17	7	Site 7	Arm C	Fardon Rd	1	1	1	1	1	1
18	7	Site 7	Arm D	Holt St	0	0	0	0	0	0
19	7	Site 7	Arm E	A5152 Main	0	0	0	0	0	0
20	7	Site 7	Arm F	A5152 Left Slip	0	0	0	0	0	0
21	8	Site 8	Arm A	Cefn Rd Right Turn	0	0	0	0	0	0
22	8	Site 8	Arm C	Queensway Right Turn	0	0	0	0	0	0
23	2	Site 2	Arm A	A5156	158	181	190	203	219	227
24	2	Site 2	Arm C	A534 Bypass	1	1	1	1	1	1
25	2	Site 3	Arm C	Holt Road	4	2	2	4	2	3
26	2	Site 4	Arm C	Northern Site Access Exit	0	0	0	0	0	0
27	2009	Site 2009	Arm B	Southern Site Access Exit	0	0	1	1	2	14
28	2009	Site 2009	Arm C	Southern Site Access Entrance (Right Turn In)	0	0	0	0	0	0



Queue Counter	Junction	Site	Arm	Description	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
1	4	Site 4	Arm A	Sandy Lane	0	0	0	0	0	0
2	4	Site 4	Arm B	A534 Bypass	7	6	6	6	6	6
3	4	Site 4	Arm C	Borras Hall Lane	0	0	0	0	0	0
4	4	Site 4	Arm D	A534 Wrexham Rd	35	35	35	36	37	36
5	4	Site 4	Arm E	Industrial Estate Rd	76	73	78	80	81	87
6	5	Site 5	Arm A	Borras Rd	0	0	0	0	0	0
7	5	Site 5	Arm B	A5156 East	29	28	26	26	26	28
8	5	Site 5	Arm C	Borras Park Rd	5	6	6	6	6	7
9	5	Site 5	Arm D	A5156 West	7	7	7	7	7	9
10	1	Site 1	Arm A	Holt Rd North	52	60	92	100	125	198
11	1	Site 1	Arm B	Bryn Estyn Rd	0	0	0	0	0	0
12	1	Site 1	Arm C	Cefn Rd	57	60	72	75	104	123
13	1	Site 1	Arm D	Holt Rd South	10	10	10	9	9	10
14	1	Site 1	Arm E	Dean Rd	14	14	15	17	20	22
15	7	Site 7	Arm A	Holt Rd	3	3	3	3	3	3
16	7	Site 7	Arm B	Tesco	1	1	1	1	1	1
17	7	Site 7	Arm C	Fardon Rd	2	2	2	2	2	3
18	7	Site 7	Arm D	Holt St	1	2	2	2	3	4
19	7	Site 7	Arm E	A5152 Main	2	14	45	48	84	121
20	7	Site 7	Arm F	A5152 Left Slip	13	23	62	68	100	134
21	8	Site 8	Arm A	Cefn Rd Right Turn	1	1	1	1	1	1
22	8	Site 8	Arm C	Queensway Right Turn	1	0	1	1	0	0
23	2	Site 2	Arm A	A5156	0	0	0	0	0	0
24	2	Site 2	Arm C	A534 Bypass	11	11	13	15	20	29
25	2	Site 3	Arm C	Holt Road	9	10	10	14	11	11
26	2	Site 4	Arm C	Northern Site Access Exit	0	0	0	0	0	0
27	2009	Site 2009	Arm B	Southern Site Access Exit	0	0	0	0	0	0
28	2009	Site 2009	Arm C	Southern Site Access Entrance (Right Turn In)	0	0	0	0	0	0

Appendix B

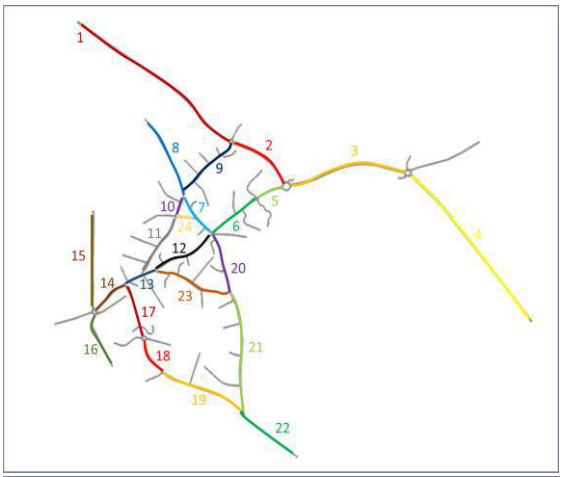
With Scheme Threshold Testing VISSIM Results

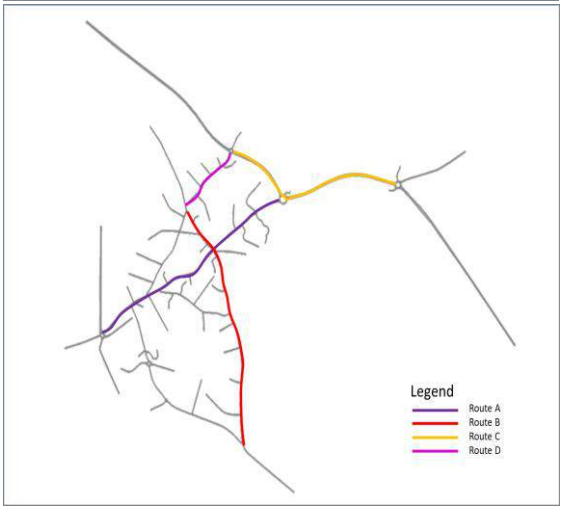
	AM					
	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
Average Delay per Vehicle in the Network (s)	74.0	68.1	72.8	74.4	76.2	78.4
Overall Delay per Vehicle (including time off network) (s)	79.7	73.1	78.6	80.2	82.1	84.6
Total Travel Time (hrs)	636	636	650	659	668	677
Average Travel Time (s)	268	266	270	272	274	276
Average Speed per Vehicle (mph)	27.8	28.2	27.7	27.5	27.3	27.1
Vehicles Active in the Network	605	584	627	617	621	646
Vehicle Trips Completed	7957	8022	8028	8090	8147	8178
Latent Demand at end of Simulation	0	0	0	0	0	0
Total Input Vehicle Numbers	8562	8606	8655	8707	8768	8824
Total Delay (hrs)	176	163	175	180	186	192
Latent Delay (hrs)	0	0	0	0	0	0

	PM					
	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
Average Delay per Vehicle in the Network (s)	89.8	89.6	88.9	92.6	95.8	97.8
Overall Delay per Vehicle (including time off network) (s)	98.3	98.0	97.2	101.5	105.5	107.6
Total Travel Time (hrs)	715	724	730	742	756	766
Average Travel Time (s)	285	288	288	292	295	297
Average Speed per Vehicle (mph)	25.9	26.0	26.0	25.6	25.3	25.1
Vehicles Active in the Network	780	768	773	805	842	842
Vehicle Trips Completed	8246	8286	8352	8358	8379	8445
Latent Demand at end of Simulation	0	0	0	0	0	0
Total Input Vehicle Numbers	9026	9054	9125	9163	9221	9287
Total Delay (hrs)	225	225	225	236	245	252
Latent Delay (hrs)	0	0	0	0	0	0

		Direction	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	89	88	90	88	89	88
		NB	76	76	76	76	76	76
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	90	69	69	75	79	80
		NB	37	37	37	37	37	37
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	66	66	66	65	66	65
		WB	61	61	61	61	61	61
4	Industrial Estate Road	SB	78	78	78	78	78	78
		NB	78	79	78	78	78	78
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	25	25	25	25	27	25
		EB	29	31	29	29	29	30
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	90	65	69	69	76	74
		EB	63	65	64	64	64	64
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	53	57	57	60	58	61
		SB	89	69	70	70	73	72
8	Jeffreys Road	NB	76	79	77	79	79	81
		SB	84	85	84	87	86	87
9	Borras Park Road	EB	148	183	202	190	180	190
		WB	108	128	147	169	155	160
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	22	24	23	29	25	31
		SB	20	20	20	20	20	20
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	134	145	140	144	144	146
		NB	101	108	108	108	106	107
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	77	78	77	78	78	78
		WB	72	81	98	88	86	91
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	59	64	67	66	67	67
		EB	59	59	61	59	58	62
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	49	49	50	50	50	50
		EB	42	42	42	42	42	42
15	A5152 North	SB	76	76	76	76	76	76
		NB	75	75	76	75	75	75
16	A5152 South	SB	43	43	43	43	43	43
		NB	49	49	50	49	50	50
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	62	64	62	63	62	63
		NB	71	73	70	73	74	74
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	59	63	61	61	60	61
		NB	57	57	56	57	56	57
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	131	138	135	137	135	138
		WB	147	155	150	157	161	160
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	59	57	59	59	60	60
		NB	104	65	72	72	77	80
21	Cefn Road: Between Hullah Lane and Queensway	SB	121	120	120	120	122	121
		NB	121	123	123	121	123	125
22	Cefn Road South of Queensway	NB	43	43	43	43	43	43
		SB	63	63	62	62	63	63
23	Hullah Lane	WB	224	227	241	227	232	228
		EB	202	233	238	221	226	229
24	Rhosnesni Lane	WB	22	24	23	24	24	24

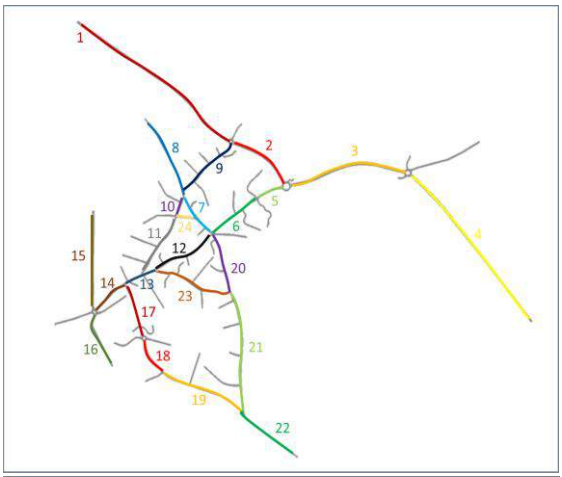
		Direction	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
A	Between A5152/Holt Road Roundabout and A5156/A534 Roundabout	EB	270	275	273	272	272	276
		WB	295	283	309	298	305	306
B	Between Cefn Road/Queensway and Dean Road/Borras Road	NB	278	245	252	253	258	266
		SB	269	246	249	250	256	254
C	Between A5156/Borras Park Road Roundabout and A534/Industrial Estate Road Roundabout	EB	155	134	134	141	144	145
		WB	98	98	98	98	98	98
D	Borras Park Road	EB	148	183	202	190	180	190
		WB	108	128	147	169	155	160

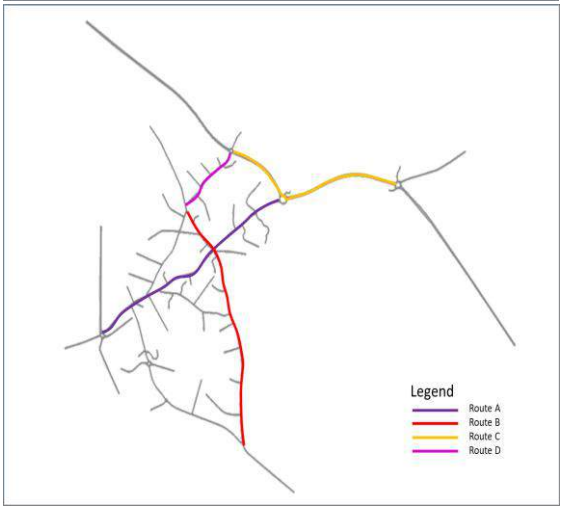




		Direction	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
1	A5156: Between Gresford Interchange and Borras Road Roundabout	SB	86	83	84	84	84	85
		NB	76	76	76	76	76	76
2	A5156: Between Borras Road Roundabout and A534 Roundabout	SB	37	38	38	38	38	38
		NB	49	42	43	42	42	43
3	A534: Between A5156 Roundabout and Industrial Estate Road Roundabout	EB	61	61	61	61	61	61
		WB	67	73	74	76	77	78
4	Industrial Estate Road	SB	71	71	71	71	71	71
		NB	105	102	102	105	105	106
5	Stryt Holt: Between A534 Roundabout and Birkdale Road Roundabout	WB	31	34	31	33	35	36
		EB	34	42	36	39	40	40
6	Stryt Holt: Between Birkdale Road Roundabout and Greyhound Roundabout	WB	99	77	73	77	78	78
		EB	55	56	55	56	56	56
7	Dean Road: Between Greyhound Roundabout and Jeffreys Road Roundabout	NB	54	54	56	55	55	55
		SB	76	67	68	68	68	68
8	Jeffreys Road	NB	80	81	82	80	81	82
		SB	83	82	83	83	83	83
9	Borras Park Road	EB	147	168	196	161	175	171
		WB	160	135	164	136	140	141
10	Borras Road: Between Dean Road Roundabout and Rhosnesni Lane	NB	22	22	24	22	22	23
		SB	19	18	19	19	19	19
11	Borras Road: Between Rhosnesni Lane and Stryt Holt	SB	141	133	153	140	141	139
		NB	102	104	107	106	108	109
12	Stryt Holt: Between Greyhound Roundabout and Hullah Lane	EB	79	79	79	79	78	78
		WB	74	86	76	79	90	87
13	Stryt Holt: Between Hullah Lane and Ffordd Montgomery	WB	65	73	69	74	77	76
		EB	102	104	101	103	105	105
14	Stryt Holt: Between Ffordd Montgomery and A5152 Roundabout	WB	50	49	50	49	49	49
		EB	94	94	88	101	101	109
15	A5152 North	SB	82	87	81	89	95	91
		NB	76	76	76	76	76	76
16	A5152 South	SB	43	43	43	43	43	43
		NB	53	55	55	54	55	55
17	Ffordd Montgomery: Between A534 and Smithfield Road Roundabout	SB	64	63	64	64	64	63
		NB	97	104	92	98	99	100
18	Queensway: Between Smithfield Road Roundabout and Whitegate Road Roundabout	SB	69	74	79	81	79	81
		NB	62	57	58	58	58	59
19	Queensway: Between Whitegate Road Roundabout and Cefn Road	EB	136	140	140	142	144	142
		WB	194	227	209	242	251	263
20	Cefn Road: Between Greyhound Roundabout and Hullah Lane	SB	57	57	58	58	58	59
		NB	97	67	67	67	65	69
21	Cefn Road: Between Hullah Lane and Queensway	SB	121	122	122	125	125	126
		NB	124	126	128	128	128	129
22	Cefn Road South of Queensway	NB	44	44	44	45	45	45
		SB	63	62	63	62	63	62
23	Hullah Lane	WB	198	217	223	230	230	223
		EB	223	223	232	233	240	233
24	Rhosnesni Lane	WB	22	23	23	22	23	22

		Direction	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
A	Between A5152/Holt Road Roundabout and A5156/A534 Roundabout	EB	365	374	359	378	380	389
		WB	319	319	299	312	328	326
B	Between Cefn Road/Queensway and Dean Road/Borras Road	NB	275	247	250	250	248	253
		SB	254	246	248	251	250	253
C	Between A5156/Borras Park Road Roundabout and A534/Industrial Estate Road Roundabout	EB	99	99	99	99	99	99
		WB	115	115	118	118	120	121
D	Borras Park Road	EB	147	168	196	161	175	171
		WB	160	135	164	136	140	141





Average Hourly Queue Length provided in Metres

Queue Counter	Junction	Site	Arm	Description	AM 2023 DS 460	AM 2023 DS 500	AM 2023 DS 600	AM 2023 DS 700	AM 2023 DS 800	AM 2023 DS 900
1	4	Site 4	Arm A	Sandy Lane	0	0	0	0	0	0
2	4	Site 4	Arm B	A534 Bypass	19	19	20	19	19	19
3	4	Site 4	Arm C	Borras Hall Lane	1	1	1	1	1	1
4	4	Site 4	Arm D	A534 Wrexham Rd	21	19	17	19	18	19
5	4	Site 4	Arm E	Industrial Estate Rd	3	3	2	2	2	2
6	5	Site 5	Arm A	Borras Rd	0	1	1	0	0	0
7	5	Site 5	Arm B	A5156 East	1	2	3	2	2	2
8	5	Site 5	Arm C	Borras Park Rd	5	8	16	18	16	17
9	5	Site 5	Arm D	A5156 West	15	11	15	9	12	12
10	1	Site 1	Arm A	Holt Rd North	59	11	15	17	38	29
11	1	Site 1	Arm B	Bryn Estyn Rd	1	0	0	0	0	0
12	1	Site 1	Arm C	Cefn Rd	79	14	24	26	37	45
13	1	Site 1	Arm D	Holt Rd South	7	8	6	7	9	8
14	1	Site 1	Arm E	Dean Rd	39	5	7	6	10	8
15	7	Site 7	Arm A	Holt Rd	2	2	2	2	2	2
16	7	Site 7	Arm B	Tesco	0	0	0	0	0	0
17	7	Site 7	Arm C	Fardon Rd	1	1	1	1	1	1
18	7	Site 7	Arm D	Holt St	0	0	0	0	0	0
19	7	Site 7	Arm E	A5152 Main	0	0	0	0	0	0
20	7	Site 7	Arm F	A5152 Left Slip	0	0	0	0	0	0
21	8	Site 8	Arm A	Cefn Rd Right Turn	0	0	0	0	0	0
22	8	Site 8	Arm C	Queensway Right Turn	0	0	0	1	0	0
23	2	Site 2	Arm A	A5156	158	87	86	109	122	126
24	2	Site 2	Arm C	A534 Bypass	1	1	1	1	1	1
25	2	Site 3	Arm C	Holt Road	4	6	2	2	2	3
26	2	Site 4	Arm C	Northern Site Access Exit	0	0	0	0	0	0
27	2009	Site 2009	Arm B	Southern Site Access Exit	0	0	1	1	1	2
28	2009	Site 2009	Arm C	Southern Site Access Entrance (Right Turn In)	0	0	0	0	0	0



Queue Counter	Junction	Site	Arm	Description	PM 2023 DS 460	PM 2023 DS 500	PM 2023 DS 600	PM 2023 DS 700	PM 2023 DS 800	PM 2023 DS 900
1	4	Site 4	Arm A	Sandy Lane	0	0	0	0	0	0
2	4	Site 4	Arm B	A534 Bypass	7	6	6	6	7	7
3	4	Site 4	Arm C	Borras Hall Lane	0	0	0	0	0	0
4	4	Site 4	Arm D	A534 Wrexham Rd	35	31	34	32	32	33
5	4	Site 4	Arm E	Industrial Estate Rd	76	65	64	78	75	76
6	5	Site 5	Arm A	Borras Rd	0	0	0	0	0	0
7	5	Site 5	Arm B	A5156 East	29	13	17	14	15	16
8	5	Site 5	Arm C	Borras Park Rd	5	10	17	10	10	10
9	5	Site 5	Arm D	A5156 West	7	5	6	5	6	7
10	1	Site 1	Arm A	Holt Rd North	52	15	8	12	10	12
11	1	Site 1	Arm B	Bryn Estyn Rd	0	0	0	0	0	0
12	1	Site 1	Arm C	Cefn Rd	57	17	17	16	15	18
13	1	Site 1	Arm D	Holt Rd South	10	8	10	9	8	8
14	1	Site 1	Arm E	Dean Rd	14	2	3	3	3	4
15	7	Site 7	Arm A	Holt Rd	3	3	3	3	3	3
16	7	Site 7	Arm B	Tesco	1	1	1	1	1	1
17	7	Site 7	Arm C	Fardon Rd	2	3	3	3	3	3
18	7	Site 7	Arm D	Holt St	1	2	1	2	2	2
19	7	Site 7	Arm E	A5152 Main	2	24	4	22	38	29
20	7	Site 7	Arm F	A5152 Left Slip	13	29	13	38	49	41
21	8	Site 8	Arm A	Cefn Rd Right Turn	1	1	1	2	2	3
22	8	Site 8	Arm C	Queensway Right Turn	1	1	1	1	1	1
23	2	Site 2	Arm A	A5156	0	0	0	0	0	0
24	2	Site 2	Arm C	A534 Bypass	11	31	35	38	46	49
25	2	Site 3	Arm C	Holt Road	9	18	11	14	16	16
26	2	Site 4	Arm C	Northern Site Access Exit	0	0	0	1	1	0
27	2009	Site 2009	Arm B	Southern Site Access Exit	0	0	0	0	0	1
28	2009	Site 2009	Arm C	Southern Site Access Entrance (Right Turn In)	0	0	0	0	1	1

Appendix I Northern Access JUNCTIONS Results Output

Junctions 10

PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693
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Filename: Northern Access v1a.j10
Path: N:\Vectos Job Data\2023\VN232881 KSS2 Cefn Park, Wrexham\Junctions
Report generation date: 15/02/2024 16:34:04

»Pre Link Road, AM
»Pre Link Road, PM
»Link Road, AM
»Link Road, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	Pre Link Road									
Stream B-AC	D1	0.4	17.63	0.28	C	D2	0.2	14.91	0.14	B
Stream C-AB		0.0	4.37	0.02	A		0.1	4.74	0.05	A
	Link Road									
Stream B-AC	D3	0.3	15.31	0.26	C	D4	0.1	11.59	0.11	B
Stream C-AB		0.0	4.69	0.02	A		0.1	4.82	0.04	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	22/12/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	SLR\john.lancaster
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	Pre Link Road	AM	ONE HOUR	07:45	09:15	15
D2	Pre Link Road	PM	ONE HOUR	16:45	18:15	15
D3	Link Road	AM	ONE HOUR	07:45	09:15	15
D4	Link Road	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Pre Link Road, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Northern Access	T-Junction	Two-way	Two-way	Two-way		1.14	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	1.14	A

Arms

Arms

Arm	Name	Description	Arm type
A	Cefn Road (N)		Major
B	Northern Site Access		Minor
C	Cefn Road (S)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			100.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.75	25	30

Minor Arm Geometry Notes

Arm	Notes
B	Visibility to left & right is conservative - assumes retention of hedges & trees

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	488	0.089	0.225	0.141	0.321
B-C	627	0.096	0.243	-	-
C-B	632	0.245	0.245	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	Pre Link Road	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	526	100.000
B		✓	75	100.000
C		✓	618	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	23	503
	B	60	0	15
	C	612	6	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	1	0	8
	C	3	3	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.28	17.63	0.4	C
C-AB	0.02	4.37	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	362	0.156	56	0.2	11.966	B
C-AB	10	859	0.011	10	0.0	4.368	A
C-A	456			456			
A-B	17			17			
A-C	379			379			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	332	0.203	67	0.3	13.834	B
C-AB	14	909	0.015	14	0.0	4.146	A
C-A	542			542			
A-B	21			21			
A-C	452			452			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	291	0.284	82	0.4	17.534	C
C-AB	21	980	0.022	21	0.0	3.870	A
C-A	659			659			
A-B	25			25			
A-C	554			554			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	291	0.284	83	0.4	17.627	C
C-AB	21	981	0.022	21	0.0	3.872	A
C-A	659			659			
A-B	25			25			
A-C	554			554			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	332	0.203	68	0.3	13.923	B
C-AB	14	909	0.015	14	0.0	4.150	A
C-A	542			542			
A-B	21			21			
A-C	452			452			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	362	0.156	57	0.2	12.046	B
C-AB	10	859	0.011	10	0.0	4.372	A
C-A	455			455			
A-B	17			17			
A-C	379			379			

Pre Link Road, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Northern Access	T-Junction	Two-way	Two-way	Two-way		0.58	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.58	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	Pre Link Road	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	616	100.000
B		✓	36	100.000
C		✓	540	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	52	564
	B	29	0	7
	C	527	13	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	0	1
	C	2	4	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.14	14.91	0.2	B
C-AB	0.05	4.74	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	355	0.076	27	0.1	10.978	B
C-AB	19	801	0.024	19	0.0	4.737	A
C-A	387			387			
A-B	39			39			
A-C	425			425			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	324	0.100	32	0.1	12.350	B
C-AB	27	839	0.032	27	0.0	4.552	A
C-A	459			459			
A-B	47			47			
A-C	507			507			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	282	0.141	39	0.2	14.888	B
C-AB	41	896	0.046	41	0.1	4.319	A
C-A	554			554			
A-B	57			57			
A-C	621			621			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	282	0.141	40	0.2	14.913	B
C-AB	41	896	0.046	41	0.1	4.316	A
C-A	554			554			
A-B	57			57			
A-C	621			621			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	324	0.100	33	0.1	12.372	B
C-AB	27	840	0.032	27	0.0	4.548	A
C-A	458			458			
A-B	47			47			
A-C	507			507			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	355	0.076	27	0.1	11.012	B
C-AB	19	801	0.024	20	0.0	4.736	A
C-A	387			387			
A-B	39			39			
A-C	425			425			

Link Road, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Northern Access	T-Junction	Two-way	Two-way	Two-way		1.16	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	1.16	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	Link Road	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	477	100.000
B		✓	75	100.000
C		✓	492	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	23	454
	B	60	0	15
	C	486	6	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	1	0	8
	C	3	3	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.26	15.31	0.3	C
C-AB	0.02	4.69	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	383	0.148	56	0.2	11.203	B
C-AB	8	799	0.010	8	0.0	4.686	A
C-A	362			362			
A-B	17			17			
A-C	342			342			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	357	0.189	67	0.2	12.634	B
C-AB	11	836	0.014	11	0.0	4.496	A
C-A	431			431			
A-B	21			21			
A-C	408			408			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	322	0.256	82	0.3	15.256	C
C-AB	17	889	0.019	17	0.0	4.254	A
C-A	525			525			
A-B	25			25			
A-C	500			500			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	322	0.256	83	0.3	15.311	C
C-AB	17	889	0.019	17	0.0	4.256	A
C-A	525			525			
A-B	25			25			
A-C	500			500			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	357	0.189	68	0.2	12.694	B
C-AB	11	836	0.014	11	0.0	4.501	A
C-A	431			431			
A-B	21			21			
A-C	408			408			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	383	0.148	57	0.2	11.269	B
C-AB	8	799	0.010	8	0.0	4.688	A
C-A	362			362			
A-B	17			17			
A-C	342			342			

Link Road, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Northern Access	T-Junction	Two-way	Two-way	Two-way		0.61	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.61	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	Link Road	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	397	100.000
B		✓	36	100.000
C		✓	452	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	52	345
	B	29	0	7
	C	439	13	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	0	1
	C	2	4	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.11	11.59	0.1	B
C-AB	0.04	4.82	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	402	0.067	27	0.1	9.614	A
C-AB	17	787	0.021	17	0.0	4.816	A
C-A	323			323			
A-B	39			39			
A-C	260			260			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	381	0.085	32	0.1	10.357	B
C-AB	23	820	0.028	23	0.0	4.647	A
C-A	384			384			
A-B	47			47			
A-C	310			310			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	351	0.113	40	0.1	11.581	B
C-AB	32	867	0.037	32	0.1	4.431	A
C-A	465			465			
A-B	57			57			
A-C	380			380			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	351	0.113	40	0.1	11.590	B
C-AB	32	867	0.037	32	0.1	4.429	A
C-A	465			465			
A-B	57			57			
A-C	380			380			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	381	0.085	32	0.1	10.372	B
C-AB	23	820	0.028	23	0.0	4.643	A
C-A	384			384			
A-B	47			47			
A-C	310			310			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	402	0.067	27	0.1	9.632	A
C-AB	17	787	0.022	17	0.0	4.815	A
C-A	323			323			
A-B	39			39			
A-C	260			260			

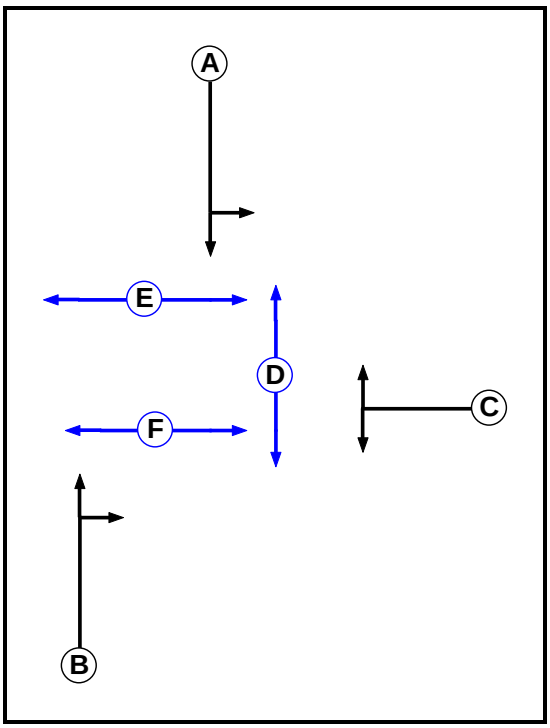
Appendix J Southern Primary Access LinSig Results Output

Basic Results Summary

User and Project Details

Project:	**KSS2 Wrexham**
Title:	
Location:	
Model Purpose:	Assessment of junction capacity
Additional detail:	
File name:	Primary site Access v1a.lsg3x
Author:	JL
Company:	SLR Consulting
Address:	Dale Street, Manchester

Phase Diagram



Basic Results Summary

Phase Intergreens Matrix

Terminating Phase	Starting Phase						
		A	B	C	D	E	F
	A		-	6	7	5	7
	B	-		6	7	7	5
	C	6	6		5	7	7
	D	8	8	8		-	-
	E	8	8	8	-		-
	F	8	8	8	-	-	

Lane Input Data

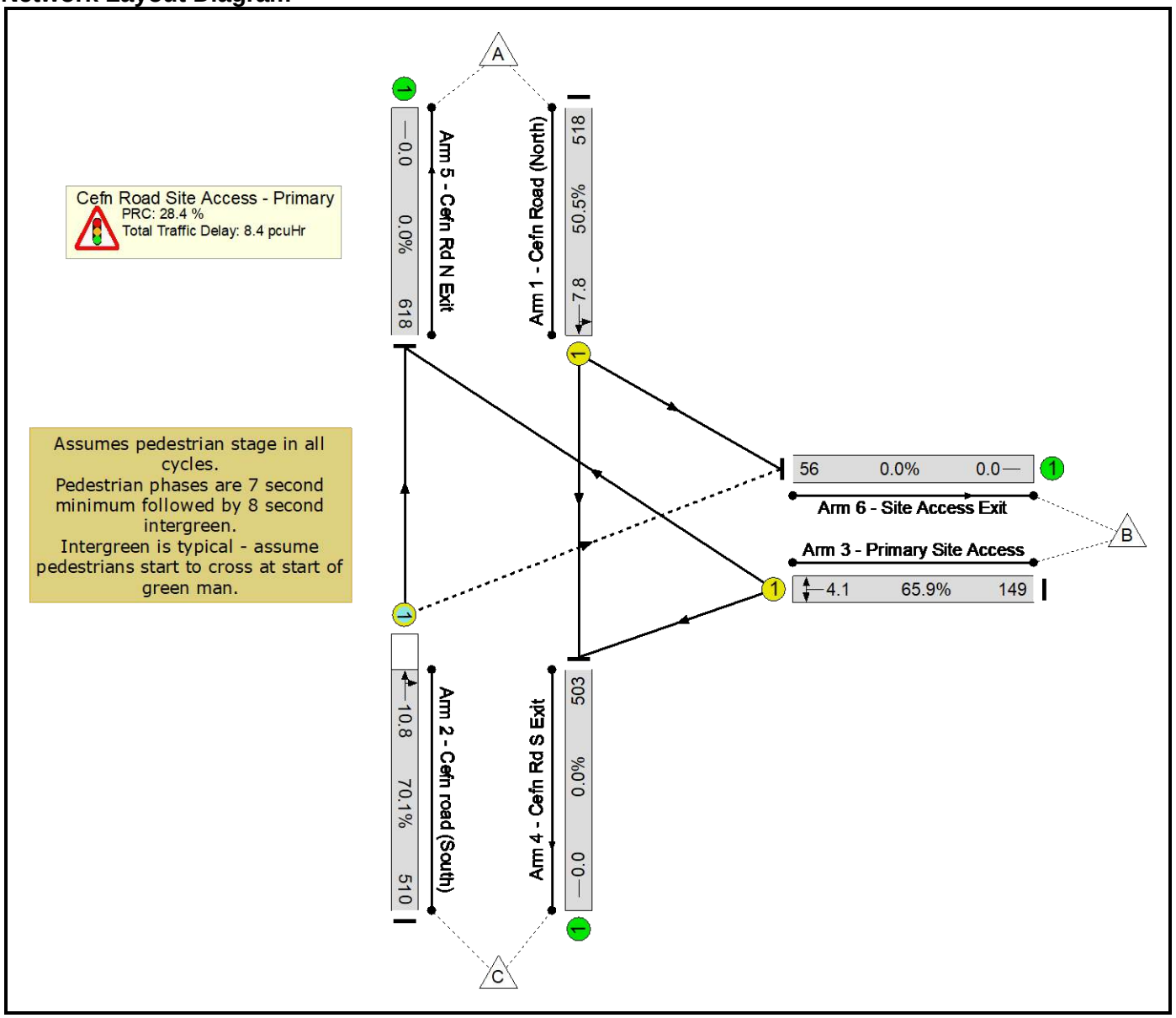
Junction: Cefn Road Site Access - Primary

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Cefn Road (North))	U	A	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 4 Ahead	Inf
											Arm 6 Left	20.00
2/1 (Cefn road (South))	O	B	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	20.00
3/1 (Primary Site Access)	U	C	2	3	60.0	Geom	-	3.30	0.00	Y	Arm 4 Left	20.00
											Arm 5 Right	20.00
4/1 (Cefn Rd S Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Cefn Rd N Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Site Access Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

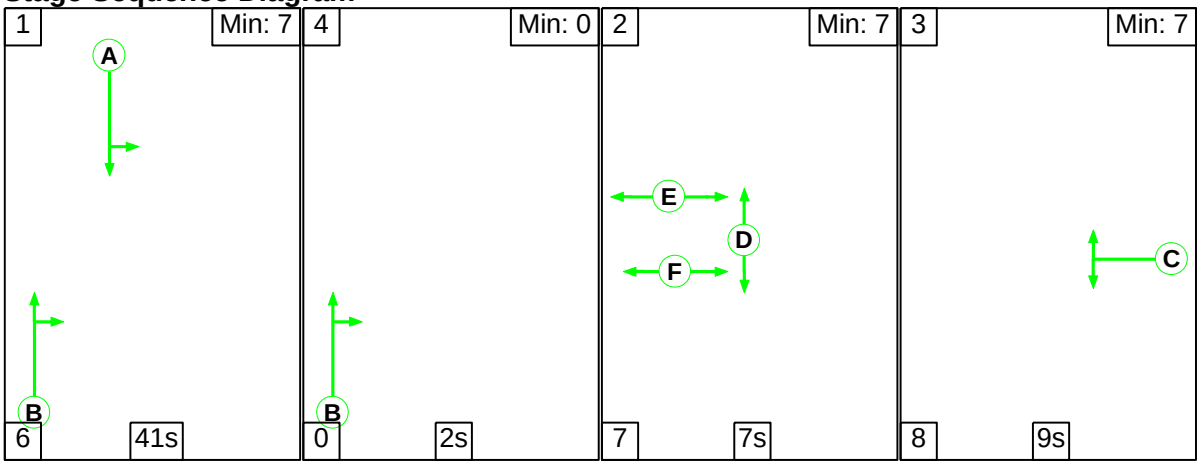
Basic Results Summary

Scenario 1: 'Pre Link Road AM' (FG1: 'Pre Link Road AM', Plan 2: 'Network Control Plan 2 - 4 Stage')

Network Layout Diagram



Stage Sequence Diagram



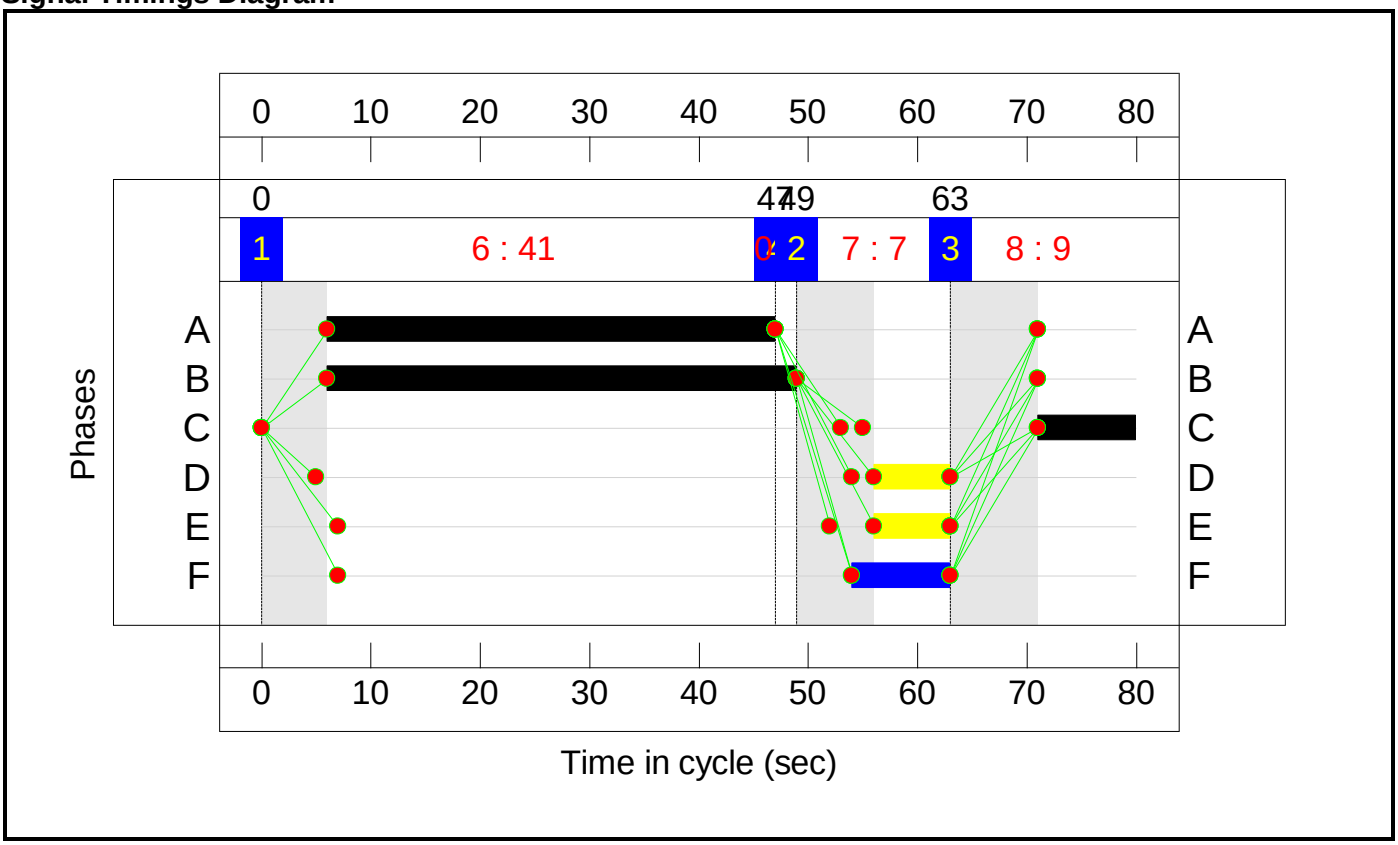
Basic Results Summary

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	45	473	518
	B	119	0	30	149
	C	499	11	0	510
	Tot.	618	56	503	1177

Signal Timings Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**70.1%**	**11**	**0**	**0**	**8.4**	**-**	**-**
Cefn Road Site Access - Primary	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**70.1%**	**11**	**0**	**0**	**8.4**	**-**	**-**
1/1	Cefn Road (North) Ahead Left	U	A		1	41	-	518	1952	1025	50.5%	-	-	-	2.3	15.8	7.8
2/1	Cefn road (South) Ahead Right	O	B		1	43	-	510	1962	728	70.1%	11	0	0	3.8	27.1	10.8
3/1	Primary Site Access Left Right	U	C		1	9	-	149	1809	226	65.9%	-	-	-	2.3	56.2	4.1

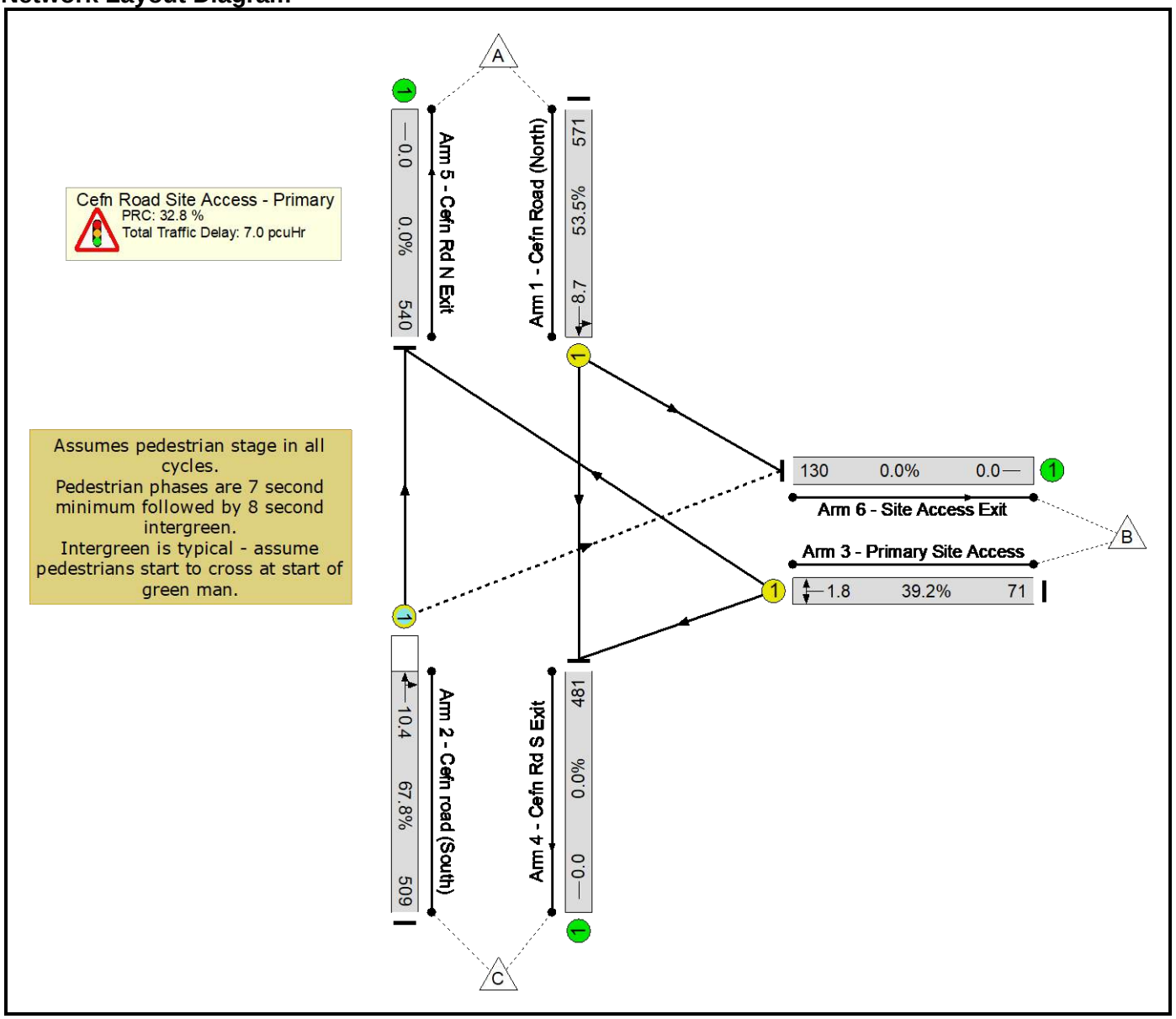
C1 PRC for Signalled Lanes (%): 28.4 Total Delay for Signalled Lanes (pcuHr): 8.44 Cycle Time (s): 80

PRC Over All Lanes (%): 28.4 Total Delay Over All Lanes(pcuHr): 8.44

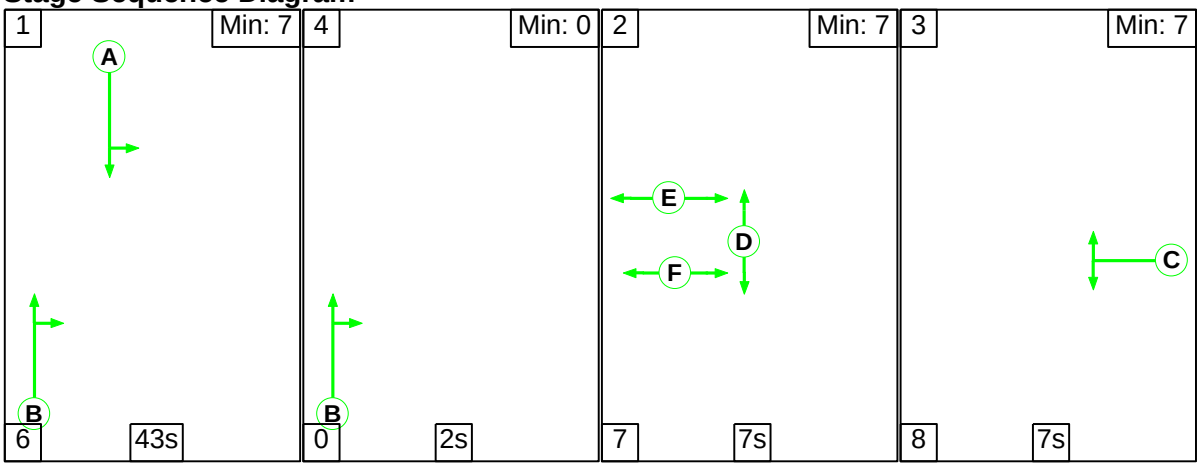
Basic Results Summary

Scenario 2: 'Pre Link Road PM' (FG2: 'Pre Link Road PM', Plan 2: 'Network Control Plan 2 - 4 Stage')

Network Layout Diagram



Stage Sequence Diagram



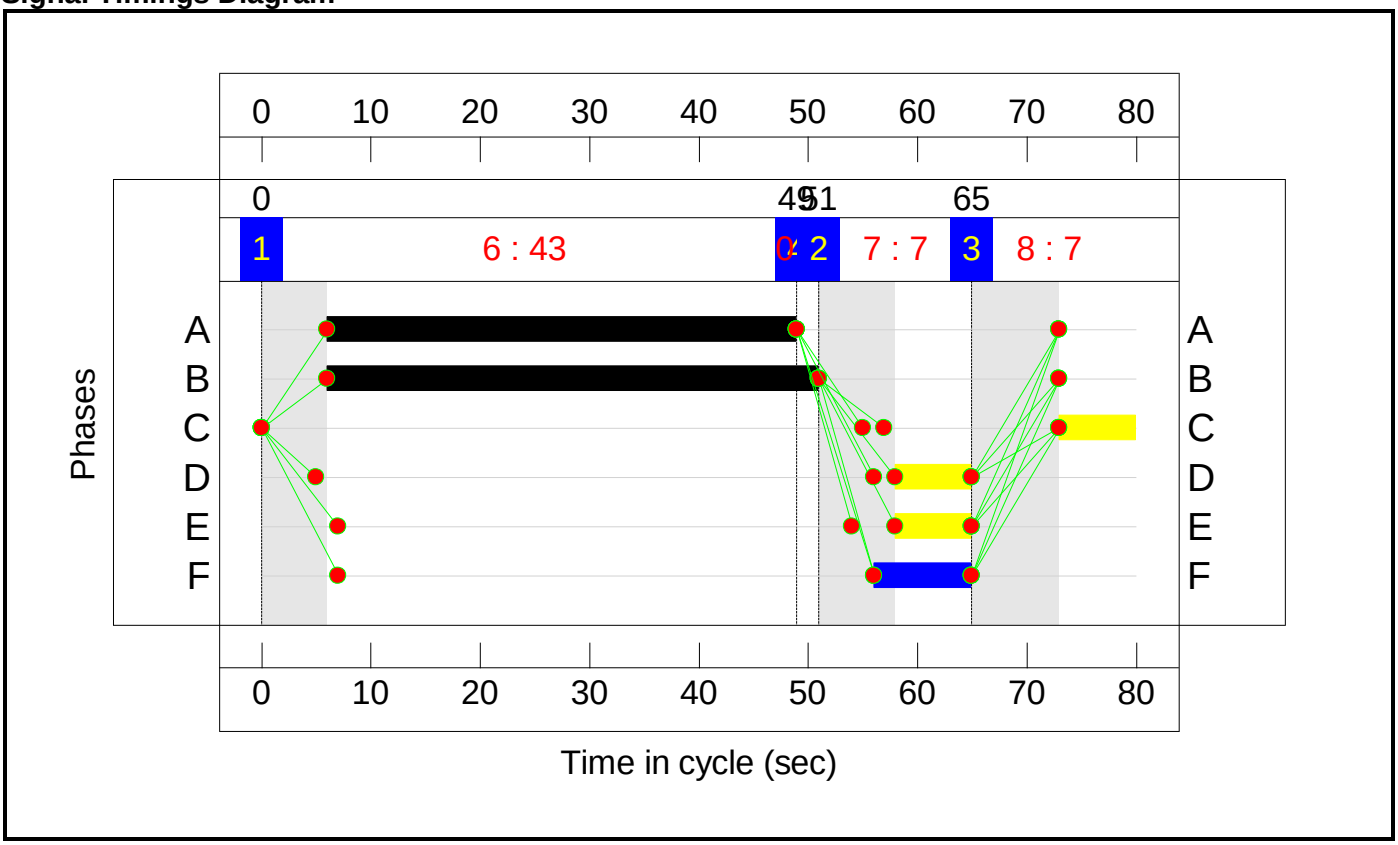
Basic Results Summary

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	104	467	571
	B	57	0	14	71
	C	483	26	0	509
	Tot.	540	130	481	1151

Signal Timings Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**67.8%**	**25**	**0**	**1**	**7.0**	**-**	**-**
Cefn Road Site Access - Primary	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**67.8%**	**25**	**0**	**1**	**7.0**	**-**	**-**
1/1	Cefn Road (North) Ahead Left	U	A		1	43	-	571	1939	1066	53.5%	-	-	-	2.4	15.1	8.7
2/1	Cefn road (South) Ahead Right	O	B		1	45	-	509	1958	751	67.8%	25	0	1	3.6	25.4	10.4
3/1	Primary Site Access Left Right	U	C		1	7	-	71	1809	181	39.2%	-	-	-	1.0	50.0	1.8

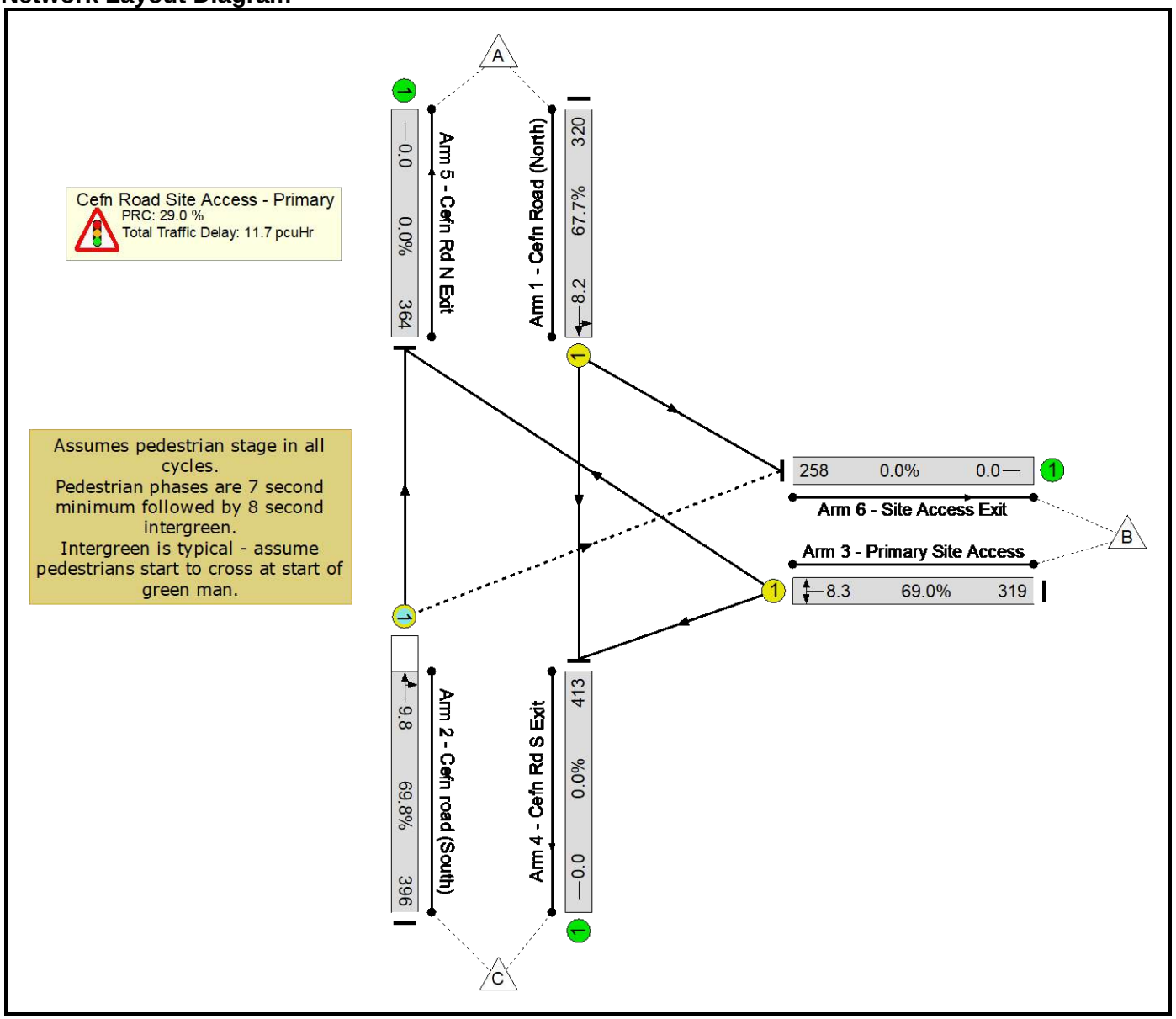
C1 PRC for Signalled Lanes (%): 32.8 Total Delay for Signalled Lanes (pcuHr): 6.97 Cycle Time (s): 80

PRC Over All Lanes (%): 32.8 Total Delay Over All Lanes(pcuHr): 6.97

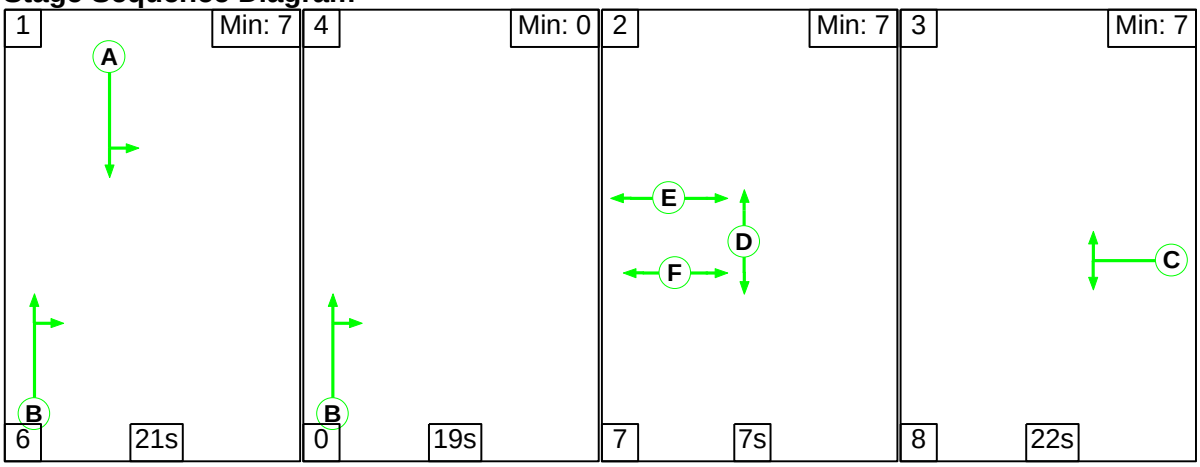
Basic Results Summary

Scenario 3: 'Link Road AM' (FG3: 'Link Road AM', Plan 2: 'Network Control Plan 2 - 4 Stage')

Network Layout Diagram



Stage Sequence Diagram



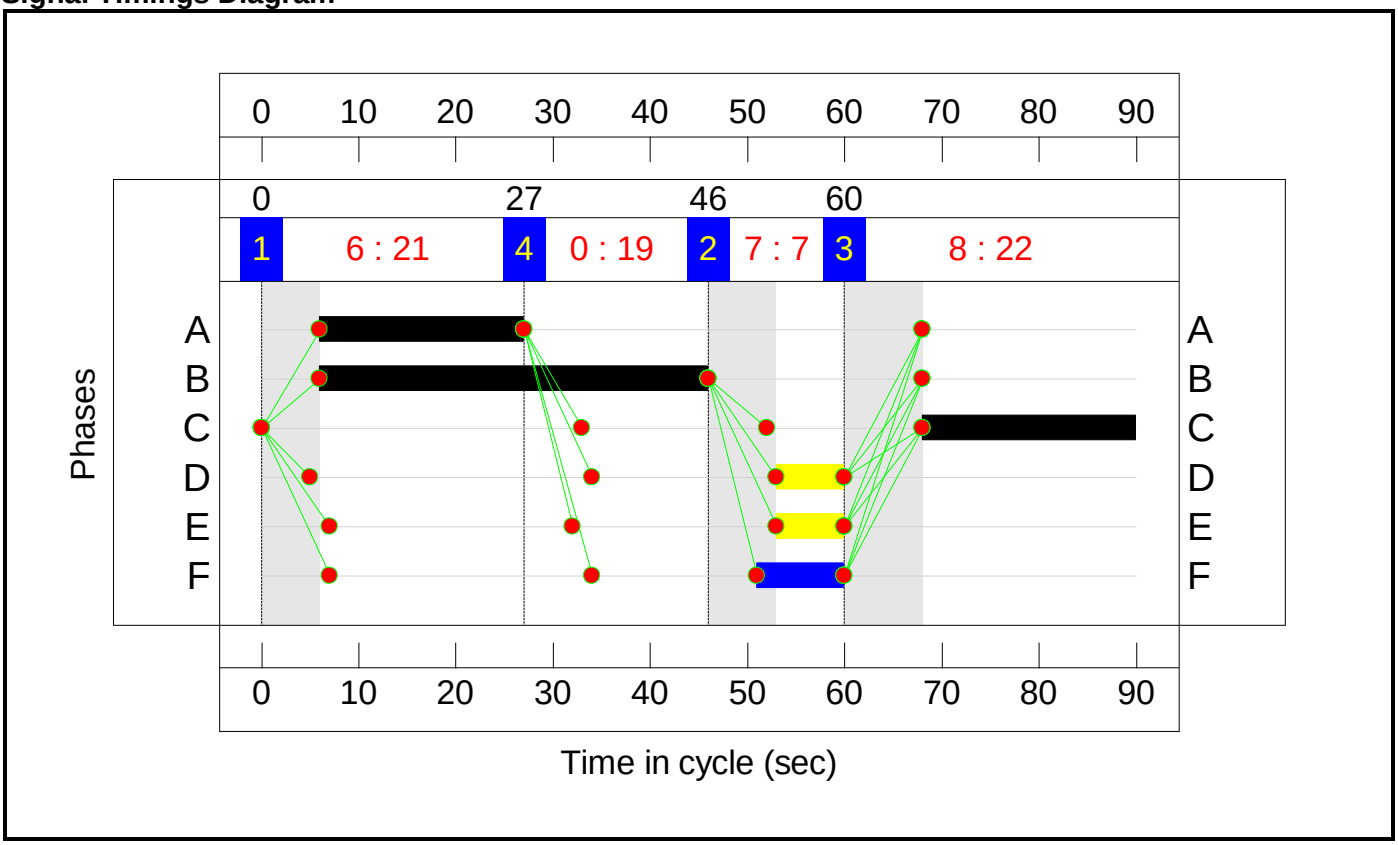
Basic Results Summary

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	67	253	320
	B	159	0	160	319
	C	205	191	0	396
	Tot.	364	258	413	1035

Signal Timings Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**69.8%**	**62**	**124**	**4**	**11.7**	**-**	**-**
Cefn Road Site Access - Primary	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**69.8%**	**62**	**124**	**4**	**11.7**	**-**	**-**
1/1	Cefn Road (North) Ahead Left	U	A		1	21	-	320	1935	473	67.7%	-	-	-	3.8	42.4	8.2
2/1	Cefn road (South) Ahead Right	O	B		1	40	-	396	1896	568	69.8%	62	124	4	4.1	37.3	9.8
3/1	Primary Site Access Left Right	U	C		1	22	-	319	1809	462	69.0%	-	-	-	3.8	42.7	8.3

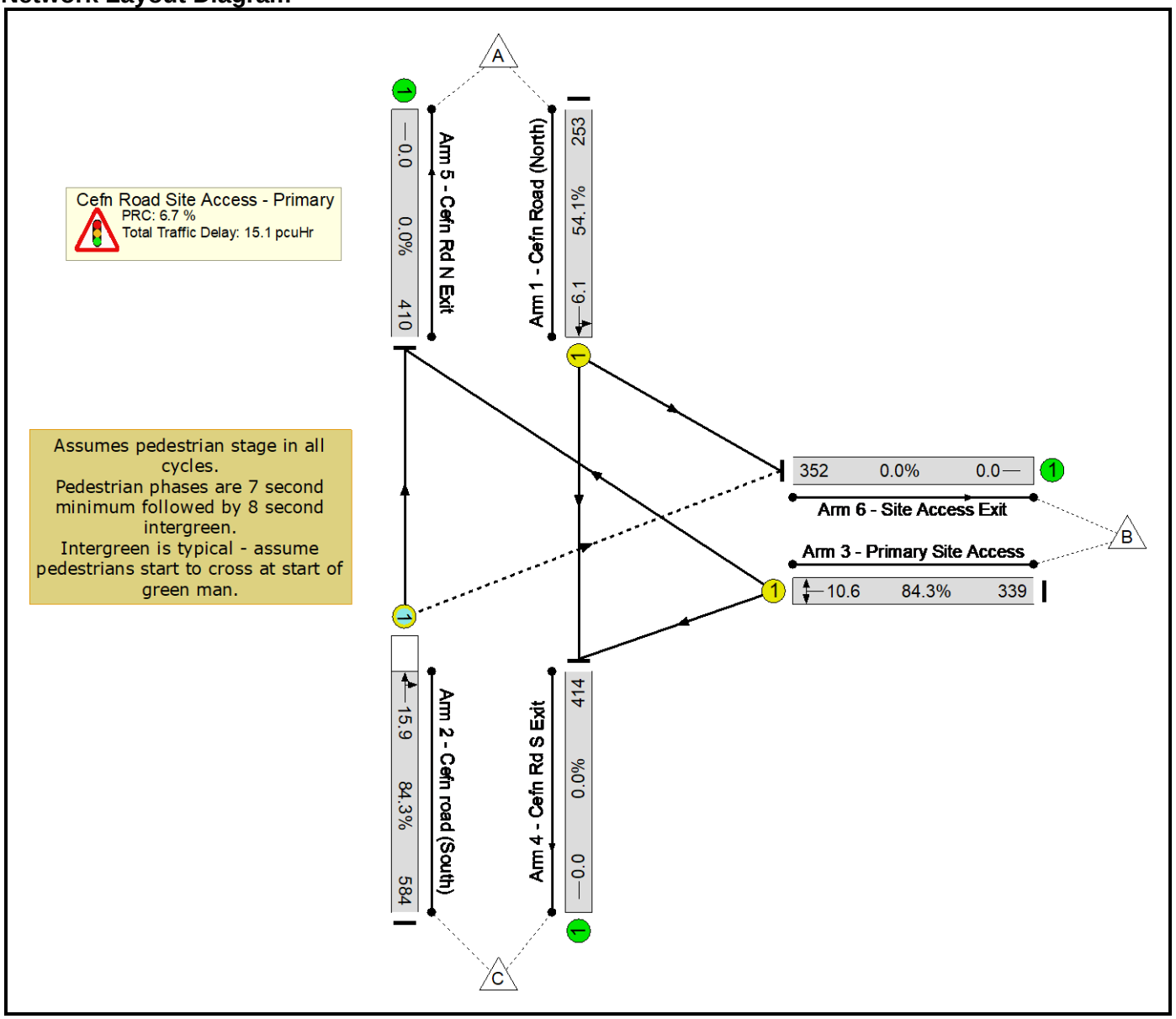
C1 PRC for Signalled Lanes (%): 29.0 Total Delay for Signalled Lanes (pcuHr): 11.65 Cycle Time (s): 90

PRC Over All Lanes (%): 29.0 Total Delay Over All Lanes(pcuHr): 11.65

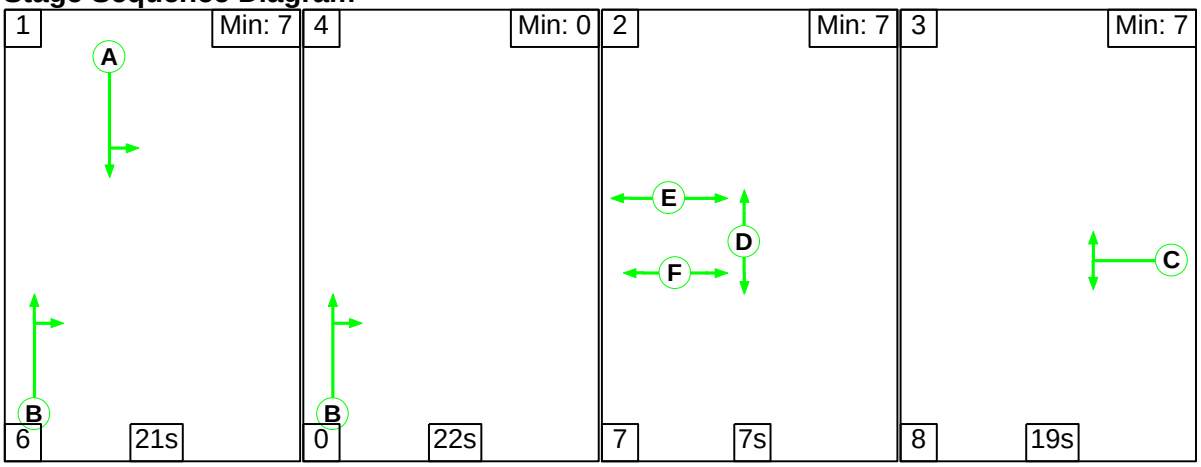
Basic Results Summary

Scenario 4: 'Link Road PM' (FG4: 'Link Road PM', Plan 2: 'Network Control Plan 2 - 4 Stage')

Network Layout Diagram



Stage Sequence Diagram



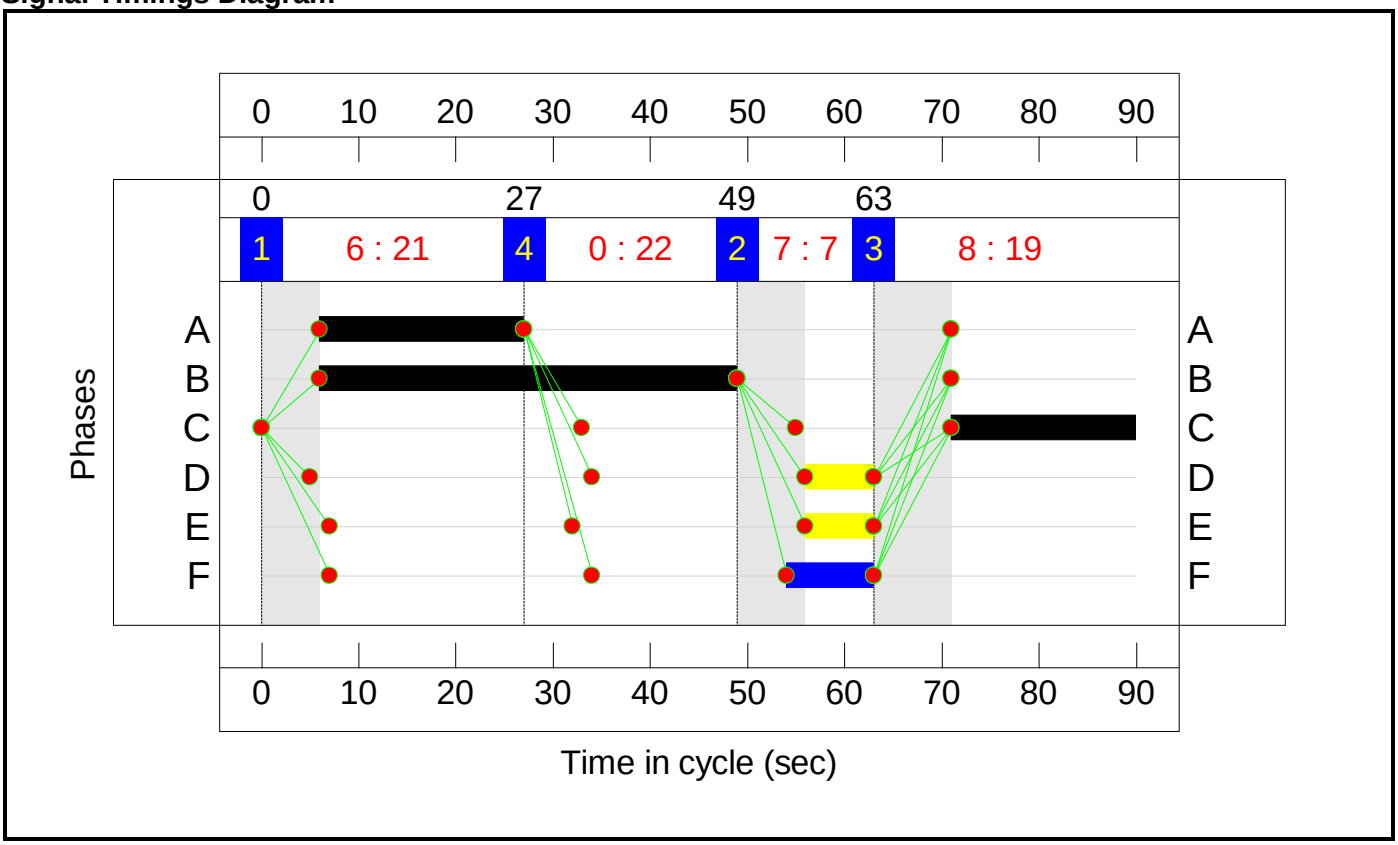
Basic Results Summary

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	91	162	253
	B	87	0	252	339
	C	323	261	0	584
	Tot.	410	352	414	1176

Signal Timings Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.3%**	**85**	**170**	**6**	**15.1**	**-**	**-**
Cefn Road Site Access - Primary	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.3%**	**85**	**170**	**6**	**15.1**	**-**	**-**
1/1	Cefn Road (North) Ahead Left	U	A		1	21	-	253	1913	468	54.1%	-	-	-	2.7	38.0	6.1
2/1	Cefn road (South) Ahead Right	O	B		1	43	-	584	1901	693	84.3%	85	170	6	6.7	41.6	15.9
3/1	Primary Site Access Left Right	U	C		1	19	-	339	1809	402	84.3%	-	-	-	5.6	60.0	10.6

C1 PRC for Signalled Lanes (%): 6.7 Total Delay for Signalled Lanes (pcuHr): 15.06 Cycle Time (s): 90

PRC Over All Lanes (%): 6.7 Total Delay Over All Lanes(pcuHr): 15.06

Appendix K Southern Secondary Access JUNCTIONS Results Output

Junctions 10

PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693
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Filename: Southern Secondary Access v1a.j10
Path: N:\Vectos Job Data\2023\VN232881 KSS2 Cefn Park, Wrexham\Junctions
Report generation date: 16/02/2024 16:21:59

»Pre Link Road, AM
»Pre Link Road, PM
»Link Road, AM
»Link Road, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	Pre Link Road									
Stream B-AC	D1	0.3	14.78	0.25	B	D2	0.1	12.42	0.12	B
Stream C-AB		0.0	4.73	0.02	A		0.1	4.80	0.04	A
	Link Road									
Stream B-AC	D3	0.3	12.74	0.22	B	D4	0.1	12.15	0.12	B
Stream C-AB		0.0	5.03	0.02	A		0.1	4.52	0.05	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	22/12/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	SLR\john.lancaster
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	Pre Link Road	AM	ONE HOUR	07:45	09:15	15
D2	Pre Link Road	PM	ONE HOUR	16:45	18:15	15
D3	Link Road	AM	ONE HOUR	07:45	09:15	15
D4	Link Road	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Pre Link Road, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Southern Secondary Access	T-Junction	Two-way	Two-way	Two-way		1.05	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	1.05	A

Arms

Arms

Arm	Name	Description	Arm type
A	Cefn Road (N)		Major
B	Site Access		Minor
C	Cefn Road (S)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.00			60.0	✓	0.00

Major Arm Geometry Notes

Arm	Notes
C	Visibility alon A for C-B traffic is taken to the signalled site access.

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.75	60	60

Minor Arm Geometry Notes

Arm	Notes
B	Visibility to the right is to primary site access.

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	514	0.089	0.226	0.142	0.323
B-C	645	0.095	0.239	-	-
C-B	609	0.226	0.226	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	Pre Link Road	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	526	100.000
B		✓	75	100.000
C		✓	516	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	23	503
	B	60	0	15
	C	510	6	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	1	0	8
	C	3	3	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.25	14.78	0.3	B
C-AB	0.02	4.73	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	397	0.142	56	0.2	10.749	B
C-AB	9	793	0.011	9	0.0	4.730	A
C-A	380			380			
A-B	17			17			
A-C	379			379			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	369	0.183	67	0.2	12.136	B
C-AB	12	833	0.014	12	0.0	4.519	A
C-A	452			452			
A-B	21			21			
A-C	452			452			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	331	0.250	82	0.3	14.730	B
C-AB	18	890	0.020	18	0.0	4.253	A
C-A	550			550			
A-B	25			25			
A-C	554			554			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	331	0.250	83	0.3	14.779	B
C-AB	18	890	0.020	18	0.0	4.255	A
C-A	550			550			
A-B	25			25			
A-C	554			554			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	369	0.183	68	0.2	12.197	B
C-AB	12	833	0.014	12	0.0	4.524	A
C-A	452			452			
A-B	21			21			
A-C	452			452			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	397	0.142	57	0.2	10.805	B
C-AB	9	793	0.011	9	0.0	4.734	A
C-A	380			380			
A-B	17			17			
A-C	379			379			

Pre Link Road, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Southern Secondary Access	T-Junction	Two-way	Two-way	Two-way		0.54	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.54	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	Pre Link Road	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	534	100.000
B		✓	36	100.000
C		✓	522	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	52	482
	B	29	0	7
	C	509	13	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	0	1
	C	2	4	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.12	12.42	0.1	B
C-AB	0.04	4.80	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	396	0.068	27	0.1	9.775	A
C-AB	19	791	0.024	19	0.0	4.796	A
C-A	374			374			
A-B	39			39			
A-C	363			363			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	368	0.088	32	0.1	10.729	B
C-AB	26	831	0.031	26	0.0	4.597	A
C-A	443			443			
A-B	47			47			
A-C	433			433			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	330	0.120	39	0.1	12.404	B
C-AB	39	888	0.044	39	0.1	4.349	A
C-A	536			536			
A-B	57			57			
A-C	531			531			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	330	0.120	40	0.1	12.417	B
C-AB	39	888	0.044	39	0.1	4.349	A
C-A	536			536			
A-B	57			57			
A-C	531			531			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	368	0.088	33	0.1	10.746	B
C-AB	26	831	0.031	26	0.0	4.594	A
C-A	443			443			
A-B	47			47			
A-C	433			433			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	396	0.068	27	0.1	9.787	A
C-AB	19	791	0.024	19	0.0	4.795	A
C-A	374			374			
A-B	39			39			
A-C	363			363			

Link Road, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Southern Secondary Access	T-Junction	Two-way	Two-way	Two-way		1.11	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	1.11	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	Link Road	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	436	100.000
B		✓	75	100.000
C		✓	402	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	23	413
	B	60	0	15
	C	396	6	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	1	0	8
	C	3	3	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.22	12.74	0.3	B
C-AB	0.02	5.03	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	423	0.133	56	0.2	9.967	A
C-AB	8	744	0.010	7	0.0	5.029	A
C-A	295			295			
A-B	17			17			
A-C	311			311			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	401	0.168	67	0.2	10.975	B
C-AB	10	773	0.013	10	0.0	4.855	A
C-A	351			351			
A-B	21			21			
A-C	371			371			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	371	0.223	82	0.3	12.706	B
C-AB	14	815	0.017	14	0.0	4.629	A
C-A	428			428			
A-B	25			25			
A-C	455			455			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	83	371	0.223	83	0.3	12.736	B
C-AB	14	815	0.017	14	0.0	4.630	A
C-A	428			428			
A-B	25			25			
A-C	455			455			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	67	401	0.168	68	0.2	11.013	B
C-AB	10	773	0.013	10	0.0	4.859	A
C-A	351			351			
A-B	21			21			
A-C	371			371			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	56	423	0.133	57	0.2	10.014	B
C-AB	8	744	0.010	8	0.0	5.033	A
C-A	295			295			
A-B	17			17			
A-C	311			311			

Link Road, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Southern Secondary Access	T-Junction	Two-way	Two-way	Two-way		0.54	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.54	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	Link Road	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	466	100.000
B		✓	36	100.000
C		✓	597	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	52	414
	B	29	0	7
	C	584	13	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	0	1
	C	2	4	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.12	12.15	0.1	B
C-AB	0.05	4.52	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	400	0.068	27	0.1	9.651	A
C-AB	21	840	0.024	20	0.0	4.515	A
C-A	429			429			
A-B	39			39			
A-C	312			312			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	374	0.087	32	0.1	10.564	B
C-AB	29	889	0.032	29	0.0	4.295	A
C-A	508			508			
A-B	47			47			
A-C	372			372			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	337	0.118	39	0.1	12.138	B
C-AB	44	960	0.045	43	0.1	4.028	A
C-A	614			614			
A-B	57			57			
A-C	456			456			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	40	337	0.118	40	0.1	12.151	B
C-AB	44	960	0.045	44	0.1	4.028	A
C-A	614			614			
A-B	57			57			
A-C	456			456			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	374	0.087	33	0.1	10.580	B
C-AB	29	889	0.032	29	0.0	4.292	A
C-A	508			508			
A-B	47			47			
A-C	372			372			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	27	400	0.068	27	0.1	9.670	A
C-AB	21	840	0.025	21	0.0	4.514	A
C-A	429			429			
A-B	39			39			
A-C	312			312			

Appendix L Highway Comments (June 2024)

Cyngor Bwrdeistref Sirol Wrecsam/ Wrexham County Borough Council
Neuadd y Dref, Wrecsam. LL11 1AY
Guildhall, Wrexham. LL11 1AY
www.wrecsam.gov.uk www.wrexham.gov.uk
Cyfnewid Testun/Text Relay: 18001

J10 Planning Ltd
2 Wrexham Road
Chester
CH4 7QR

Eich Cyf/Your Ref	
Ein Cyf/Our ref	ET/MZ/PRE/2024/004
Dyddiad/Date	06/06/2024
Gofynner am/Ask for	Ms M Zenner
Rhif Cyswllt/Contact No	01978 729687
E-bost/E-mail	michelle.zenner@wrexham.gov.uk

FAO: Justin Paul

Dear Sir

Land Off Cefn Road, Erlas Park, Wrexham, LL13 9TT
Proposed residential development for the construction of upto 900 residential dwellings with associated infrastructure (primary school, playing fields, open space, and SUDS attenuation) with all matters reserved except for detailed means of primary highway access

Further to your email dated 05/04/2024 the LHA can provide the following comments:

It is the LHA's understanding that the proposals are for the provision of 900 residential dwellings with associated infrastructure. The proposed application will initially be for outline permission for detailed means of primary highway access with all other matters reserved.

The submitted information is extensive but the LHA will keep the comments focussed on the most important issues that we feel require further clarification or substantiation as part of a further planning submission.

Scoping

It is noted that a discussion is provided in regards to the scoping with WCBC, the LHA has spoken to those involved in the scoping meetings and have reviewed the minutes and agendas provided but cannot see evidence that the extents of the transport assessment and methodology have been decided within an agreed scoping note. This should be undertaken prior to a formal submission. It is the LHA's view that further assessment should be undertaken at the Gresford interchange to provide a Linsig comparison of existing / base to proposed. The Vissim assessment only provides a % comparison of flows and journey time which doesn't assess the operation of the junction itself. Similarly an Arcady assessment is required for the Greyhound Roundabout.

Modelling

Traffic Surveys

It is noted that updated travel surveys have been undertaken in November 2023, it is not felt that these are extensively different to the surveys that were undertaken as part of the LDP2 modelling previously.

Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.
We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

The TA states that the updated travel surveys indicate a reduction of upto 11% in trips at the Greyhound Roundabout, however, it is noted that this reduction isn't experienced on all arms, and the Dean Road and Cefn Road arms actually show marginally increased trips.

Trip Generation & Distribution

Firstly, the outline permission details that the 900 homes will be made up of 20% affordable homes, from a highways perspective there is no way to control that affordable homes will not change to private ownership and therefore the LHA requires all highway assessments to be undertaken using appropriate data for private homes. The figures quoted have been gleaned from the LDP modelling, which unfortunately has been undertaken with lower trip rates than it should have been. The TRICS rates quoted appear to be lower than what we would expect to see for this type of development and therefore the LHA requires these to be undertaken solely for private dwellings.

The supplied trip rates for private dwellinghouses are acceptable and the modelling processes should be re-run using these and removing the affordable housing trip rates for vehicle trip generation.

The assessments have been undertaken for Phase 1 (pre-link road) and Phase 2 (post link road) as outlined in the phasing plan provided.

The Census (2011) Journey to work data has been used to derive a trip distribution for the KSS2 South site. Output areas Wrexham 007 and Wrexham 010 have been used which are the closest super output areas in relation to the site which have provided guidance on the distribution of trips, these indicate 26% of traffic will travel to the west, 12% east towards the industrial estate and 27% north towards the A483 Junction 6.

Methodology

Extensive modelling has been undertaken which appears to be based on the foundations of the LDP2 modelling which was undertaken several years ago. The modelling is exceptionally complex and would benefit from being updated with new future years. The existing modelling focusses on 2023 (which has now passed) and 2028 and a base year of 2018.

The vehicle trip generation has been gleaned from TRICS data for vehicle trips.

Person trips and a multi-modal approach have been used to assess non-car mode trips, these have used both Census data from 2011 and National Travel Survey data to find likely levels of trips for different purposes and different modes of transport.

The junction assessments undertaken compare Do-Nothing, Do-Minimum, Do-Something approaches.

Do-Nothing – No development on KSS2 or KSS3 sites with background growth assumptions in place using TEMPRO

Do-Minimum – Assumes development on KSS2 and KSS3 with background TEMPRO growth assumptions but adjusted to take account of levels of development on strategic sites to reduce the level of double counting.

Do-Something – Uses the same traffic demand as DM but includes highway mitigation measures.

Committed developments are listed but the LHA would recommend the applicant check with planning on any additional approvals that may have been granted recently prior to formal submission.

Link Road & Off-Site Mitigation Measures

Any mitigation measures that affect the Councils adopted highway will require the submission of swept paths, Stage 1-3 Safety Audits and will need to be required through a Section 278 Agreement.

KSS2 North Site Access Junction

The proposals that have been agreed as necessary alongside the provision of the link road previously are the widening of the A5156/A534 – KSS2 North site access roundabout to create three lanes and a widening of the southern section of the circulatory carriageway in the first instance. Works are also required to partly signalise the Industrial Estate Roundabout which then frees up more traffic onto the A534 westbound approach to the extent that a further improvement is required on the A534/A5156 roundabout to widen from two lanes to three on the northern section of the roundabout. It is unclear who is proposing to install this scheme, KSS2 North or KSS2 South, therefore clarification is required.

Industrial Estate Roundabout

Within the Vectos modelling report for LDP2 a scheme for the A534 / Industrial Estate Roundabout was outlined which would provide signalisation to three arms of the junction, all excepting the Borras Hall Lane entrance/exit. It is unclear who is proposing to install this scheme, KSS2 North or KSS2 South, therefore clarification is required.

Link Road

A Link road is proposed to connect from the A534/A5156 KSS2 North site access roundabout connecting through the KSS2 North and KSS2 South sites to Cefn Road.

The Statement of Common Ground stated that 'the traffic modelling has shown that at least 250 dwellings on the Northern Parcel and 460 dwellings on the southern parcel can be accommodated on the highway network prior to the completion of the spine road' and it is the LHA's understanding that for the KSS2 North part of the site, the position now reached with WCBC is that the KSS2 North developers would provide the link road from the A534 / A5156 site access roundabout to the southern boundary of their site before the occupation of the 250th dwelling on their site. This standpoint would mean the delivery of 460 dwellings on the southern parcel can be accommodated prior to the completion of the link road.

The proposals indicate shared cycle / footpaths along the link road that are 3m wide which is acceptable in principle.

The Link road should be designed around the critical width to comply with Active Travel Act guidance.

Concern remains that it is not proposed to deliver the Link Road until the final phase of the development within KSS2 South which will undermine the provision of bus services through the site until a late stage. This will also mean the main active travel route through the site will not be in place until a late stage and will result in all the construction traffic being required to travel on the existing strategic road network.

Greyhound Roundabout

The TA states that the roundabout generally operates ok under free flow conditions although with some occasional queues forming on the Cefn Road and Holt Road North arms. The applicant has stated that it is observed that the queues would clear within a short space of time and would not persist for prolonged periods.

However, the LHA has concerns that there will be an interim impact on the Greyhound Roundabout prior to the installation of the Link Road and will require mitigation as recommended by the Highway Engineer who provided comments on the KSS2 North Application. The Statement of Common Ground stated that 'the traffic modelling has shown that at least 250 dwellings on the Northern Parcel and 460 dwellings on the southern parcel can be accommodated on the highway network prior to the completion of the spine road' and it is the LHA's understanding that for the KSS2 North part of the site, the position now reached with WCBC is that the KSS2 North developers would provide their part of the link road from the A534 / A5156 site access roundabout to the southern boundary of their site before the occupation of the 250th dwelling on their site.

As part of the submitted proposals the applicant proposes some highway improvements for the Greyhound Roundabout which incorporate some carriageway widening to create a two lane approach to the Holt Street North arm of the junction and to the Cefn Road arms of the roundabout. The applicant states that the junction re-design doesn't compromise the delivery of the Councils proposed active travel improvements at the junction, however, the proposed design does not fit with the scheme that Active Travel are progressing. No swept paths have been provided with the proposals.

The applicant states that the 800 dwellings can be delivered on the southern KSS2 parcel with the Greyhound Roundabout improvement scheme in place, and this would deliver a similar level of network performance to that under the scenario for 600 dwellings without the Greyhound Roundabout Improvement scheme in place.

Further tests have been undertaken to demonstrate this based on the VISSIM modelling undertaken. The LHA would request that any new modelling is undertaken using private dwelling TRICS only and the definitive impacts are shown fully. i.e. how many existing vehicles queuing on each arm vs the number proposed, rather than just describing the number of extra vehicles on each arm. Whilst the methodology is based on there being a reduction in traffic flows since the original surveys, the updated surveys did not show reductions on all arms, the Cefn Road and Dean Road arms, for example, did not have a decrease in flows so that argument is a little misleading. The LHA would request an Arcady JUNCTIONS assessment to demonstrate the impact on the junction. Methodology also needs to be provided within the text of the TA to detail the impacts of the delivery of 800 houses on KSS2 South and the full scheme delivery and the impacts of the proposed mitigation on these.

Access arrangements

All of the proposed access routes are taken off Cefn Road which is currently within a 20mph zone.

It is noted that the submitted drawings indicate visibility splays for accesses onto Cefn Road for 20mph roads of 2.4m x 25m, in light of the recent change in stance of the Welsh Government the LHA would request the provision of visibility splays for a 30mph road, of 2.4m x 43m for all the proposed access points.

All accesses off Cefn Road require radius kerbs of 8m

It is proposed to retain the existing surface crossing point on Cefn Road near to the school.

North Access & Pedestrian Crossing

Wrexham County Borough Council require the provision of a second vehicular access point when any areas proposed to serve more than 150 homes. It is noted that the proposed north access is the sole access point for 200 houses which will require an amendment to the design or number of houses accessed or an additional access point being provided.

The proposals shown in the TA for this junction show a simple priority junction of 5.5m width with two number 2m wide footways and 6m radius kerbs which are provided alongside a new footway on the east side of Cefn Road, it would be beneficial if this footway construction could tie into the existing footpath opposite No 44 Cefn Road, the plan indicates a new footway tying into the existing kerbline to the north, but at present this is just grass verge.

Just south of the proposed access, the plans indicated a signal controlled crossing which is proposed to be located infront of Plas Rhosnesni Nursing Home. There are no objections in principle to these works subject to the works being delivered via a Section 278 Agreement. The LHA would recommend the installation of rotating cone devices rather than audibles to ensure noise from the operation of the traffic signals is kept to a minimum for local residents.

Sports Pitch Access

A new vehicular access is proposed next to the playing pitches, whilst it is not shown on the illustrative masterplan it is detailed within the TA and the TA appendix drawings.

No detail has been provided on the trip generation to or from this access but swept paths indicating a minibus passing a car have been demonstrated.

The applicant states that this access serves a limited number of car parking spaces intended for users of the sports pitches only. It is stated that the demand is likely during off-peak periods but there is some concern that parents might use this location for pick up and drop off at school opening and closing time. The TA states that the trips to the sports pitches are not new, but by delivering a new car park this will invariably focus trips to Cefn Road and the car park access.

The proposed access arrangement indicates a 5.5m wide access point with 2m wide footways on either side with 6m radius kerbs. The footways end in close proximity of the access and no clarification has been provided in regards to how this will tie in to the existing frontage which has an extensive length of grass verge at present, the LHA would like to see a continuous footway / cycleway along this frontage and feels this would be to the benefit of users of the playing fields and also will benefit those attending the school in addition to future residents of the site.

South Access Primary

The proposals indicate a signal controlled junction with single lane approaches to the southern end of the site, which is intended to be the southern end of the main link road through the site to provide a potential future link to the KSS2 North site. The signal controlled toucan aspects will provide an adequate crossing facility to both pedestrians and cyclists. The proposed footway on the east side of Cefn Road will tie into the existing footway, however, further work is needed on the west side of the road, The submitted drawing shows a footway / cycleway connection into the existing provision on Cefn Road, but the hard surfacing proposed doesn't actually tie into the existing footway to the west of the verge, dropped kerbs and tactile paving is required to ensure the route is accessible for all.

The junction design is shown to have a 6.75m width, and two 3m wide shared cycle / footpaths and 8m radius kerbs, the proposed junction will tie into the existing footways on the east side of Cefn Road. Swept paths for a single decker bus have been demonstrated negotiating the junction acceptably.

South Secondary Access

The proposed plans also show a secondary south access approximately 74m south of the proposed primary south access. The proposed access arrangement is a simple priority junction with 2 x 2m footways and a 5.5m carriageway and 6m radius kerbs.

In the TA it states that this access will potentially be an emergency access only but they also state it might serve a limited portion of the site. In its current form there is concern that drivers intending north on Cefn Road may use this junction as a way to avoid passing through the signal controlled junction. Careful consideration should be made in regards to the plans for this access and how it is managed.

Bryn Estyn Road

Bryn Estyn Road is to the sites northern boundary and is a rural lane providing limited vehicle access to a number of properties but also serves as an east-west route for pedestrians and cyclists linking to Wrexham Industrial Estate. The submitted TA does state that this could have an emergency access point. The LHA would ask that proposals are firmed up and confirmed so that a thorough assessment of the implications of the proposals can be undertaken at application stage.

At the moment Bryn Estyn Road is an advisory cycle route and there has been a recent audit of this route by the Councils Active Travel Team outlining the issues with the route, the applicant is encouraged to engage with the Councils Active Travel Officer in regards to this review.

Phasing

The proposals set out a phased delivery plan which indicates that the school, the link road and the associated active travel routes will not be delivered until the latter stages of the development. The LHA is concerned that this could leave areas to the east of the site without acceptable access to public transport and that this could potentially undermine active travel across the site as travel patterns will form in advance of the active travel route being provided and it will undermine the potential delivery of a bus route through the site.

This will also have implications for the construction period, as all construction traffic will have to route through the strategic network and onto Cefn Road during the substantial construction period.

Furthermore, the trip generation undertaken shows all trips to school exiting the site to access neighbouring schools (approx. 70% within a mile to access the three existing primary schools and two secondary schools, and 30% outside of that area) as the proposed school won't be constructed until the final phase of the development. But this also means that there is no assessment of the trips of the incoming trips to the new school from outside the site when it opens and the potential impact of these on the proposed access arrangements.

Active Travel

The LHA recommends the applicant engage with Gwen Thomas, the Councils active travel officer to discuss the requirements of the site in further depth. Ms Thomas has recommended that there needs to be a 250m mesh density of walking and cycling routes through the site, although these don't all have to be on segregated paths.

Bus services

In 2.27 of the submitted TA it states that the Chartered Institution of Highways & Transportation (CIHT) guidance indicates that for commuting purposes bus stops should be within a 400 metre walk of residential development. The LHA would ask the applicant to review the distance from

the proposed dwellings on the immediate east of the site as it is considered the services that run in close proximity to Cefn Road appear to be over a 400 metre walk. Although the submitted illustrative masterplan does not appear to scale correctly.

It is the LHA's view that the provision of a bus route on the link road would be preferable and that as such discussions should be held with the relevant parties to ensure this is designed into the scheme.

Walking / Cycling

The submission refers to a pedestrian / cycle link via Thornleigh, which does not appear to be shown on the illustrative masterplan, further clarification is required in this regard.

The proposals indicate shared cycle / footpaths along the link road that are 3m wide which is acceptable in principle, however, it is not proposed to deliver this until the final phase of the development.

Walking and cycling audits are required to be undertaken using the Welsh Government's Active Travel Act guidance and related tools.

The submission states that cyclists will be accommodated in the carriageway on the west side of Cefn Road from north of Churchill Drive to the south shared footway / cycleway which will be linked to the proposed crossing facilities at the signal controlled access junction, which is proposed to be installed with toucan aspects to provide a safe crossing point for both pedestrians and cyclists.

On the east side of Cefn Road it is proposed to have cyclists on the carriageway.

Public Rights of Way

The submission details that one of the Public Rights of Way (PROW) will require diversion. The information provided states that two PROW's lie within the site. Abenbury 1 and 2, more details is required and a clear plan of the proposed and existing PROW extents will be required. The applicant should liase with Sean Hanratty at WCBC over a diversion under Section 257 of the TCPA.

<u>Design Matters</u>

Parking

It is noted that the applicant intends to comply with the Councils car and cycle parking standards set out in Local Planning Guidance Note No.16. It must be noted that garages will not be counted as contributing towards on-site parking provision and driveways should be wide enough to allow pedestrian access alongside parked cars (including wheelchair access).

A brief review of the illustrative layout has resulted in some concerns from an arrangement perspective.

There are concerns that the lengthy shared surface roads shown across the site provide little scope for on-street visitor parking and the applicant might want to consider this further to ensure visitor parking does not obstruct access.

Long lengths of dropped kerbs to provide multiple parking spaces in a row restrict pedestrian visibility from parking spaces that abut other parking spaces. This could compromise pedestrian safety for children walking on footways or shared surfaces to the rear of the spaces. Pedestrian visibility of 2m x 2m with nothing higher than 0.6m should be provided at all driveways. The

provision of extensive lengths of dropped kerb also restricts visitor parking on-street, the LHA would recommend that this is considered carefully.

Whilst the standards do state that parking provision does not always need to be located within the curtilage of individual dwellings, communal parking and courtyards are only seen as appropriate for smaller properties. There are concerns that residents for the sizeable houses proposed to front onto Thornleigh will choose to park on street on Thornleigh rather than accessing and parking in a rear courtyard where they cannot easily overlook their vehicles. Page 108 of Manual for Streets states that spaces must be well overlooked for security and accessible, details of access should be provided if access is from the rear or garden of the property. It also goes on to state parking within a block is recommended only after parking at the front and on-street has been fully considered, rear courtyards should support on-street parking not replace it.

The provision of electric vehicle charging points is welcome.

Highway Layout

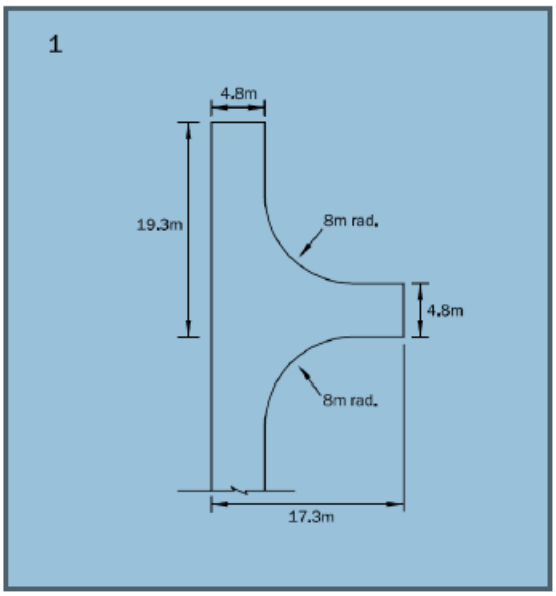
Where there are no footways proposed on-street there will be a requirement for a service strip to be installed and the provision of required infrastructure such as street lighting.

The provision of 3m wide shared footpath / cycle paths are required along the link road.

The LHA would request that within a reserved matters application plot numbers would be helpful to be included on the plan to ensure any issues can be dealt with on a plot by plot basis.

Turning Heads

The extents considered acceptable to meet the Councils adoptable standards are shown below.



A brief review of the illustrative layout has resulted in some concerns from an arrangement perspective. Whilst shared surface schemes do serve a purpose, this is a considerable distance for drivers to reverse down an access road for the parking area proposed at the end of the drive, adequate turning provision needs to be provided for all vehicles with special consideration to refuse and delivery vehicles, a 6m aisle width is required behind all driveways to ensure there is space for large cars to manoeuvre and turn to ensure they access and egress in forward gear.



Visibility Splays

It is noted that the submitted drawings indicate visibility splays for accesses onto Cefn Road for 20mph roads, in light in the recent change in stance of the Welsh Government the LHA would request the provision of visibility splays for a 30mph, of 2.4m x 43m for all the proposed access points.

Please provide full extents of the required visibility splays of 2.4 x 25m in both directions measured to the nearside edge for all internal junctions.

Refuse Collection / Recycling and servicing

The Councils waste management team are currently working on a new waste strategy and new collections policy which will be finalised shortly, therefore the LHA would strongly recommend that you consult with our Senior Waste Strategy Officer Gabrielle on 01978 729640 to discuss the requirements and the adequacy of any area allocated to waste collection.

The current standards that WCBC work to (other than on unadopted roads):

- Refuse vehicles are 11.2m long and swept paths should be demonstrated within proposed highway layouts
- A refuse vehicle will not reverse further than 12m
- A maximum distance of 15m for refuse operatives or residents to walk to move a bin

Consideration should also be given to turning facilities for medium sized delivery vehicles (i.e vehicles approx 7m long)

Summary

In light of the comments above, the LHA advises that:

- The approach for vehicle trips and active travel trips are not consistent, however we accept the vehicle trips for private dwelling houses. The use of trips for affordable houses should be removed from the modelling and any additional testing supplied.

- The LHA requests the provision of a LINSIG assessment on the Gresford Interchange and an ARCADY assessment on the Greyhound Roundabout to evaluate the impacts of the development on the junctions.
- All accesses off Cefn Road require radius kerbs of 8m
- A secondary access point is required at the north end of the site. For areas proposed to serve more than 150 homes, two vehicle access points are required.
- Concern remains that the secondary south access will encourage travel from vehicles intending north on Cefn Road to avoid the traffic signals at the main south access point.
- The LHA would request the provision of a continuous footway on the site frontage to Cefn Road.
- Clarification is required over the delivery of the Industrial Estate Roundabout and A5156/A534 Roundabout improvements.
- Concern remains that the late delivery of the link road would undermine the provision of bus services through the site until a late stage, this will also mean the active travel route through the site will not be in place until a late stage and will result in all the construction traffic being required to travel on the existing strategic road network.

Yours faithfully,



Chief Officer, Environment & Technical

Darren Williams

Prif Swyddog Amgylchedd a Thechnegol
Chief Officer Environment & Technical

Appendix M SLR Highway Response to DMO & Active Travel Comments

SLR Consulting Limited

Harworth

KSS2, Land off Cefn Road, Wrexham

SLR Project No.: 410.P65940.00001

1 July 2024

Revision: 01

SLR RESPONSE TO WREXHAM HIGHWAYS DMO COMMENTS DATED 06 JUNE 2024

Overview

1.1 SLR Consulting prepared a Transport Assessment (TA) and Travel Plan (TP), dated March 2024, in support of the proposals for residential development on land to the east of Cefn Road in Wrexham, also known as Erlas Park and KSS2 South. Wrexham County Borough Council (WCBC) Highways have provided comments in response to the documents and highlight issues that they feel require further clarification or substantiation as part of a further planning submission. The Highways comments are provided at **Appendix A** to this note for ease of reference. SLR has reviewed the Highways comments and provide a commentary and response within this Technical Note, with the clarification / substantiation as requested. The note follows the themes as they are presented in the Highways Comments.

Scoping

1.2 SLR undertook scoping with Wrexham Highways prior to submission of the TA. A meeting was held at the Council's Lambpit Street offices in Wrexham on Thursday 14th December 2023 to discuss the scope of the transport assessment work.

1.3 Whilst a summary of the meeting is provided in the TA, the full minutes of that meeting are provided at **Appendix B** to this note. The meeting lasted for 90 minutes and was attended by the appropriate representatives from WCBC Highways and Planning departments including a representative from WCBC's transport consultant Mott MacDonald.

1.4 A second meeting was held on 6th February 2024 at the Council's Abbey Road offices, with several members of the WCBC Highways team present. At that meeting, the results of the additional VISSIM modelling work were discussed along with the potential capacity improvements at the Greyhound Roundabout, the A483 Junction 6 and the site access proposals.

1.5 There was no request made by WCBC Highways for a scoping note to be submitted during, or subsequent to, either meeting. The outcome of the meetings was clear in terms of the proposed methodology that SLR would be / was using to assess the development proposals.

1.6 During the initial meeting it was agreed that the Local Plan VISSIM modelling work would be considered fit for purpose by the Local Authority to support the planning application at KSS2 South, subject to presentation of the traffic survey data that shows that current traffic flows on the network are lower than those used as the baseline flows for the Local Plan modelling work (such data was presented as part of the TA). It is noted that this appears to be consistent with the position taken by WCBC Highways in relation to the application at KSS2 North, for which a planning application has already been submitted and reviewed by WCBC Highways.

1.7 It therefore follows that the scope of the assessment for the Local Plan modelling work would be appropriate to support the KSS2 South application, which ultimately proposes a lower quantum of development than that assessed for the KSS2 South site in the Local Plan modelling work (900 dwellings vs 1,080 dwelllings).

1.8 It is worth reiterating that the Local Plan modelling work undertaken in support of KSS2 involved extensive data gathering and assessment work, which was endorsed by WCBC who jointly commissioned the work. Notably, the use of the industry standard VISSIM traffic modelling programme to assess the traffic effects of the KSS2 development as part of the Local Plan evidence base was selected because it provides a network wide assessment of the potential traffic generation of the site, that allows a more realistic assessment of the interaction of traffic passing between junctions on the network than the use of standalone junction models such as ARCADY and LinSig.

1.9 WCBC was satisfied with this being the case in support of the Local Plan process as is evident in their commissioning of the Local Plan VISSIM work, and the confidence invested by WCBC in the findings of that work to the extent that it was considered a sound basis upon which to allocate the KSS2 site within the Local Plan, which has now been adopted.

1.10 It is further noted that WCBC Highways have accepted the use of the Local Plan VISSIM work in support of the planning application for development at KSS2 North, both in terms of the extent of the assessment and the parameters used within the VISSIM model, such as trip rates. No additional standalone junction models were requested for that application nor was there any request from WCBC Highways to consider detailed assessment of any junction outside of the VISSIM model network.

1.11 WCBC's request to provide a LinSig assessment of the Gresford Interchange (A483 Junction 6) is surprising as the junction is around 4km from the site and was scoped out of the Local Plan modelling assessment, which was commissioned by WCBC in support of the site allocation in the Local Plan. Furthermore, there was no request from WCBC Highways to include the junction in the assessment during the scoping discussions, even when the junction was specifically discussed in the meeting on 6th February 2024.

1.12 Notwithstanding, the TA does include a consideration of the number of development trips at the junction in the context of the baseline traffic flows. This assessment was provided in response to the Welsh Government's scoping response to the Environmental Assessment work that supports the planning application. The A483 forms part of the Trunk Road network in Wales and is under the control of the Welsh Government, including the on and off slips at Junction 6. Notably, the Welsh Government has raised no further comment on the proposals

following submission of the TA information, which demonstrates their satisfaction with the information submitted in relation to the junction.

1.13 It is SLR's position that an appropriate scoping exercise was undertaken with WCBC Highways which resulted in a clear agreement as to the methodology and scope of assessment that would be utilised in the transport assessment work. This methodology has been followed and is the basis for the submitted TA.

Modelling

1.14 The results of the updated traffic surveys undertaken in November 2023 were described to WCBC Highways during the scoping meeting in December 2023. The scale of the reduction in the flows across the network was described and it was agreed that this was a significant reduction in flows and was consistent with Officers' own experience that traffic flows were generally lower currently than before the Covid pandemic.

1.15 The WCBC Highways comments state that not all arms of the Greyhound Roundabout showed a reduction in traffic flows since 2017/18, with marginal increases in traffic on the Dean Road and Cefn Road arms. These marginal increases are negligible, for example in the morning peak hour, Cefn Road doesn't show an increase in traffic but a reduction of 49 vehicles. Dean Road shows an increase of 3 vehicles, which is not significant in the context of the total junction flow of 1,838 for that hour, which is 10% lower than the flow at the junction recorded in 2018 and would not change the conclusions of any modelling work.

1.16 In the evening peak hour, Dean Road shows an increase of 8 vehicles when compared to the 2017/18 flows whilst Cefn Road shows an increase of 3 vehicles. Such flows are insignificant in the context of the total hourly junction flow of 1,899 for that hour, which is 11% lower than the flow at the junction recorded in 2018, and would not change the conclusions of any modelling work.

1.17 It should be noted that the applicant for the KSS2 North site has also separately undertaken updated traffic surveys in October 2023, covering four key junctions in the area:

- The Greyhound Roundabout (A534 Holt Road / Cefn Road junction)
- The A534 / A5156 Roundabout (where the site access will be taken from)
- The A534 / Industrial Estate Roundabout
- The A5156 / Borras Park Road Junction.

1.18 Those surveys showed that the morning and evening peak hour total traffic flows through the junctions were lower in 2023 than in 2017/18. The highways information submitted in support of the KSS2 North application concludes that the VISSIM modelling which is based on the 2017/18 base flows is therefore still fit for purpose as a tool for assessing the KSS2 development proposals.

1.19 SLR has also taken a robust position in relation to the use of the 2017/18 traffic data to inform the assessment of this application given that the baseline traffic flows have reduced significantly since that time, and the assessment therefore accounts for more baseline traffic than is actually present on the network.

Trip Generation and Distribution

1.20 The trip rates used to inform the VISSIM assessment were agreed by WCBC Highways in advance of the Local Plan evidence base assessment work, which has been used to inform the allocation of the KSS2 site in the Local Plan. Those trip rates were selected as appropriate for the KSS2 site taking into account the locational characteristics of the site, within a highly sustainable location, and the expected mix of full market value and affordable dwellings.

1.21 It is standard practice to apply a separate trip rate for affordable housing where this element of a scheme is known.

1.22 WCBC Highways suggest that, from a highways perspective, there is no way to control that affordable homes will not change to private ownership however that assumption is incorrect. The fact is that the adopted LDP Policy SP5 states very clearly that KSS2 shall be expected to provide 20% affordable housing on site. The applicant is proposing to deliver on this and provide 20%.

1.23 This shall be secured by a S.106 legal agreement that will ensure this tenure and quantum will be secured “in perpetuity” – therefore there is a mechanism to safeguard this, and the applicant therefore considers that the modelling and rationale for it to be sound, a position agreed previously by WCBC’s transport officers.

1.24 It is noted that WCBC Highways did not query the trip rate parameters used in the Local Plan modelling for KSS2 in their review of the KSS2 North planning application and accepted the resulting trip generation forecasts presented for that planning application, which were also based upon the mix of affordable and private dwellings.

1.25 To provide further comfort to WCBC Highways in relation to this matter, SLR have considered the difference that the use of the affordable trip rates for 20% of the dwellings makes in terms of the number of development trips used in the assessment. The two sets of trip rates are shown in Table 1 below.

Table 1: ‘Private’ and ‘Affordable’ Dwelling Trip Rates used in Assessment

	AM		PM	
	Arr	Dep	Arr	Dep
Private	0.134	0.403	0.347	0.180
Affordable	0.170	0.251	0.243	0.178

1.26 It can be seen from Table 1 that the affordable trip rates are actually higher than the private trip rates for the AM arrivals and the PM departures are virtually the same. It is only the AM departures and PM arrivals where the affordable trip rates vary more notably when compared

to the private. However, when this is applied to the proposed development of 900 dwellings, the difference between using the private trip rates for all dwellings versus using the private trip rates for 80% of the dwellings and the affordable trip rates for 20% of the dwellings is only a matter of 21 two-way vehicle trips in the AM peak hour and 19 in the PM peak hour. These are minor differences in flow representing around a 4% difference in development flows in each peak which would not have a material impact upon the modelling results.

1.27 Based on the proposed first phase of 600 dwellings, the application of the affordable trip rates to 20% of the dwellings results in 14 fewer trips in the AM peak hour and 12 in the PM peak hour, when compared to the application of the private trip rates to all of the dwellings. This is again a minor difference in flows and would not affect the results of the modelling.

1.28 This further highlights that there should be no concern over the use of the affordable dwelling trip rates to inform the assessments undertaken in support of the planning application. This is of course notwithstanding the planning position that the S.106 Obligations will secure 20% affordable housing and also that this approach has been agreed and endorsed previously by the Council's transport officers.

Methodology

1.29 WCBC Highways state that the modelling undertaken would benefit from being updated with new future years. As detailed within the TA, the future years that are included in the modelling (2023 and 2028) are more tests of different development levels and less tests of traffic levels at specific years and this is appropriate as there is no sustained year on year traffic growth occurring on the network (as evidenced in Section 2 of the TA), and therefore the background traffic growth that is included in the Local Plan modelling is a robust methodology.

1.30 The Local Plan modelling future year assessments include the key strategic development sites of KSS2 and KSS3 in addition to background traffic growth on the whole network, which is considered to be appropriate and robust for the purposes of the assessment for KSS2 South. Again, the approach of the approved Local Plan modelling to assess the proposed development at KSS2 South was discussed in the scoping meeting with WCBC Highways in December 2023 and the use of the Local Plan modelling to assess the application was agreed as appropriate.

Link Road and Off-Site Mitigation Measures

KSS2 North Site Access Junction

1.31 WCBC Highways ask for clarification regarding who will be responsible for delivering the highway mitigation scheme at the A534/A5156 roundabout. It is expected that this will be clarified following further discussions with the Council.

Industrial Estate Roundabout

1.32 WCBC Highways ask for clarification regarding who will be responsible for delivering the highway mitigation scheme at the Industrial Estate roundabout. It is expected that this will be clarified following further discussions with the Council.

Link Road

1.33 The applicant has committed to delivering the section of the link road that passes within the application site. They can do no more than this as the full delivery of the link road will be dependent upon other landowners.

1.34 WCBC Highways express concern it is not proposed to deliver the link road through the KSS2 site until the final phase of the development as this would undermine the provision of bus services through the site. However, the TA makes clear that bus services can serve the KSS2 South site prior to completion of the link road as the internal highway arrangement will provide for a bus loop so that buses can enter and exit the site via Cefn Road and serve areas within the site.

1.35 WCBC Highways also express concern that the main active travel route through the site will not be in place until a late stage. It should be noted however that there will be other active travel options for travel between KSS2 North and South such as via Bryn Estyn Road that are not dependent upon the link road.

1.36 With regards to construction traffic, the management of construction traffic will be secured through a Construction Traffic Management Plan that would be agreed with the Council prior to any construction starting on site.

Greyhound Roundabout

1.37 WCBC Highways consider that there will be an interim impact on the Greyhound roundabout prior to the installation of the link road and will require mitigation as recommended by the Highway Engineer who provided comments on the KSS2 North application.

1.38 SLR would reiterate the proposed phasing of development on KSS2 South as detailed in the TA, with the first phase comprising up to 600 dwellings. The modelling presented in the TA, which is all undertaken using the approved Local Plan model, shows that the delivery of 600 dwellings on the KSS2 South site can be accommodated on the highway network without material change to the accepted position that was adopted by WCBC in the Statement of Common Ground that informed the Local Plan Examination in Public. That accepted position did not include any mitigation at the Greyhound Roundabout.

1.39 The second phase of development on the KSS2 South site would deliver the remaining 300 dwellings once the main internal road is in place up to the northern boundary.

1.40 To be clear, whilst the TA presents the results of a modelling test that considers the effect of a capacity improvement at the Greyhound Roundabout, this is presented for information only and is not considered necessary to support the proposed phasing strategy. The results of that test however, show that the capacity improvement at the Greyhound Roundabout would allow up to 800 dwellings on the KSS2 South site without material change to the highway network operation under the 600 dwelling scenario.

1.41 SLR have seen the Highway Engineer comments on the KSS2 North application dated 12th October 2021. Those comments state that the mitigation as proposed in the Local Plan Modelling is satisfactory but further mitigation is suggested at two locations for the 2023 scenario as follows:

- *A5156/A534/Stryt Holt/Site Access - widening of A5156 southbound approaches to 3 lanes (100m) & 3 lanes of associated sections of circulatory carriageway*

- *Greyhound Roundabout: Introduce additional flare length Cefn Road and Holt Street North arms – could be implemented at the same time as the proposed improvements to the crossing facilities at this junction*.

1.42 SLR assume that the WCBC comments are referring to the above Highway Engineer comments on the KSS2 North application. In relation to this, SLR would note that there is no detail presented by WCBC Highways to justify the suggestion for additional capacity at the Greyhound Roundabout, for example no information regarding any modelling results that would justify the proposed intervention at this junction. In contrast, SLR has presented detailed modelling information using the approved Local Plan modelling to demonstrate the effect of the KSS2 traffic at the Greyhound Roundabout which supports the position as presented in the TA.

Access Arrangements

1.43 SLR note the request for visibility splays of 2.4m x 43m to be shown for the proposed site access junctions on Cefn Road and the request for all accesses off Cefn Road to have radius kerbs of 8m.

North Access and Pedestrian Crossing

1.44 Advice provided by WCBC Highways in the scoping stage was that an emergency access route would be sought for developments over 150 dwellings. The northern parcel would have such an emergency access from Bryn Estyn Road.

1.45 The proposed extent of new footway along the site frontage has been carefully considered taking into account various constraints including arboricultural constraints. There are significant trees and hedgerows to the north of the proposed site access and there is a strong desire to retain these from an arboricultural perspective. As such, a route for pedestrians has been shown on the masterplan within the site running to the north of the site access to link to the existing footway on Cefn Road further north. This route would be designed as an attractive pedestrian path and would be segregated from traffic, increasing its appeal for pedestrians.

Sports Pitch Access

1.46 The proposed extent of new footway along the site frontage has been carefully considered taking into account various constraints including arboricultural constraints. There are significant trees and hedgerows to the north and south of the proposed sports pitch access and there is a strong desire to retain these from an arboricultural perspective. As such, a route for pedestrians has been shown on the masterplan within the site running to the north and

south of the sports pitch access to link to the existing footway on Cefn Road further north and south.

South Access Primary

1.47 SLR note the comment regarding the provision of tactiles and dropped kerbs to tie into the existing footway on the western side of Cefn Road.

South Secondary Access

1.48 SLR note the comment regarding the need to design out the potential for rat-running via this access.

Bryn Estyn Road

1.49 SLR note the request to firm up details of the proposed emergency access on Bryn Estyn Road.

Phasing

1.50 WCBC Highways is concerned that the proposed phasing strategy would leave areas to the east of the site without acceptable access to public transport prior to delivery of the link road. SLR would note that the masterplan allows for buses to route within the site prior to the link road being delivered, meaning that buses would be able to enter the site from the Cefn Road southern access and serve areas within Phase 1 south, looping back to exit again onto Cefn Road. This strategy has been discussed with the WCBC public transport officer.

1.51 As set out in the TA, the proposed primary school within the site would serve a local catchment and is anticipated to primarily serve the surrounding KSS2 site. The school has been located centrally within the site to ensure that it is accessible to the whole KSS2 site allocation, including KSS2 North. It is therefore expected that the majority of trips generated by the school will be from within a reasonable walk and / or cycle distance and the majority of trips to and from the school would be by these active travel modes. The presence of the school within the site will also help to reduce the demand for travel to existing primary schools in the wider area, which would help to reduce the vehicle trip rates identified within the TA. The proposed school is therefore considered to be neutral in terms of vehicle trip generation.

Active Travel

1.52 SLR engaged with Gwen Thomas, the Council's Active Travel Officer during the scoping process and note the recommendation to engage further regarding the active travel proposals for the site.

Bus Services

1.53 As set out in the TA, the section of link road that would pass within the site has been designed to accommodate bus movements and a loop arrangement has been designed into the scheme

to allow buses to serve the site directly in the pre-link road scenario. This strategy has been discussed with the Council's Public Transport Officer.

Walking / Cycling

1.54 The proposed pedestrian / cycle link connecting to Thornleigh is shown by the white dotted line on the masterplan.

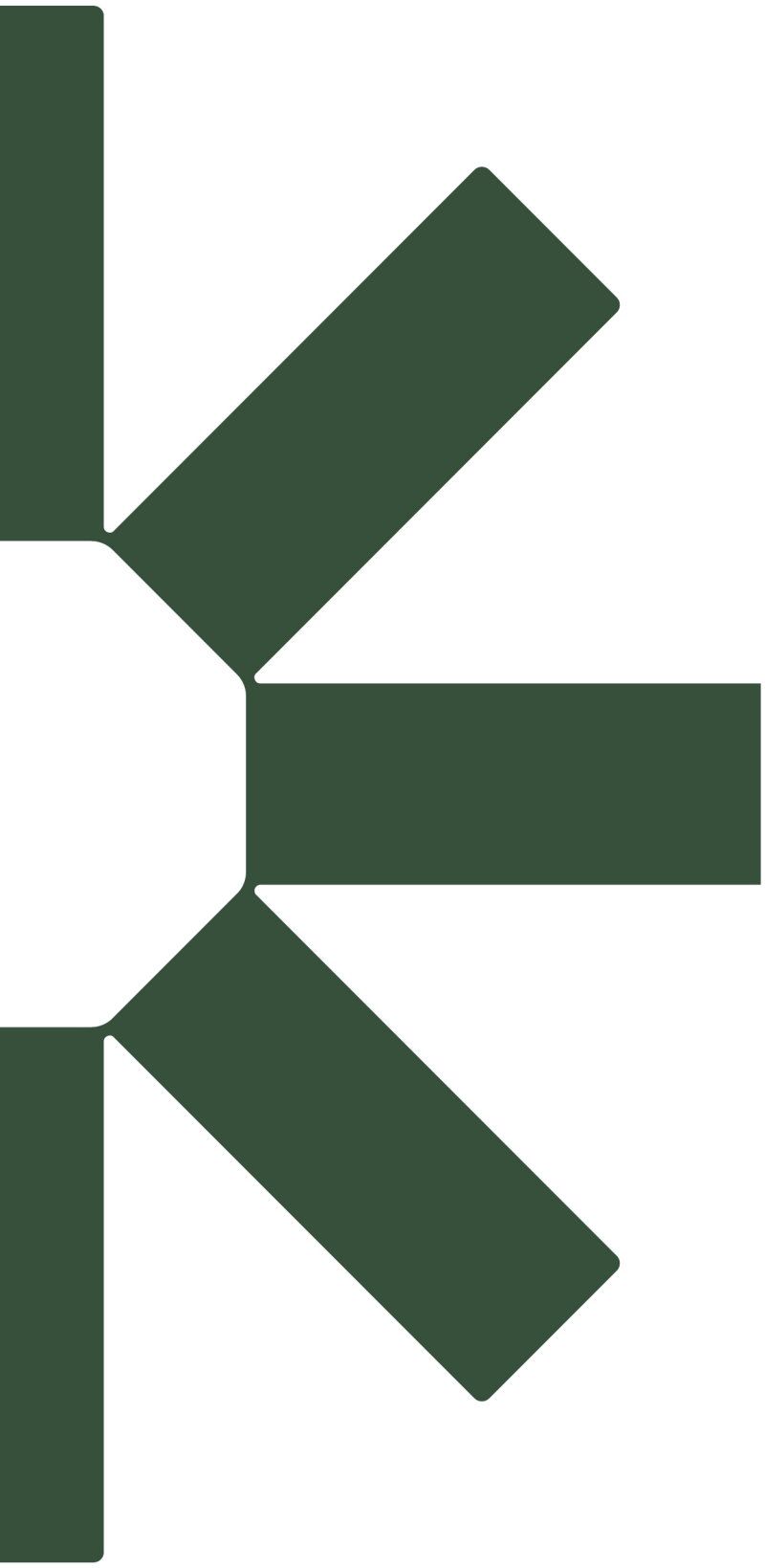
Public Rights of Way

1.55 SLR note the request for more detail in relation to the existing and proposed PRoW routes. The existing routes are shown in the TA (TA Figure 2.5). In terms of the proposed routes, one of the routes is proposed to be diverted – this being the circa 120m section between Thornleigh and Footpath Abenbury 1. The diversion would follow the white dotted line as shown on the masterplan. The principle of the diversion has already been discussed with the Council's PRoW officer.

1.56 The other PRoW routes within the site would remain on their current alignment. The detail of these routes would be determined at Reserved Matters stage.

Design Matters

1.57 Comments relating to design matters such as parking and highway layout will be considered by the masterplanning team.



Making Sustainability Happen

SLR Consulting Limited

Harworth

KSS2, Land off Cefn Road, Wrexham

SLR Project No.: 410.P65940.00001

5 August 2024

Revision: 01

SLR RESPONSE TO WREXHAM ACTIVE TRAVEL OFFICER DMO COMMENTS ON TRANSPORT ASSESSMENT, FRAMEWORK TRAVEL PLAN AND ILLUSTRATIVE MASTERPLAN

Overview

1.1 SLR Consulting prepared a Transport Assessment (TA) and Framework Travel Plan (TP), dated March 2024, in support of the proposals for residential development on land to the east of Cefn Road in Wrexham, also known as Erlas Park and KSS2 South. The Wrexham County Borough Council (WCBC) Active Travel Officer has provided comments in response to the documents and highlight issues that they feel should be considered as part of a further planning submission. The comments are summarised in Table 1, along with the SLR response.

1.2 Comments have also been provided by the WCBC Active Travel Officer on the Illustrative Masterplan however these relate to matters of internal site layout, which is not for determination at this outline planning stage. Notwithstanding, the comments are gratefully received and have been shared with the wider design team, and can be used to inform next steps in the development of the internal site layout once outline planning permission is obtained.

Active Travel Comments and Response

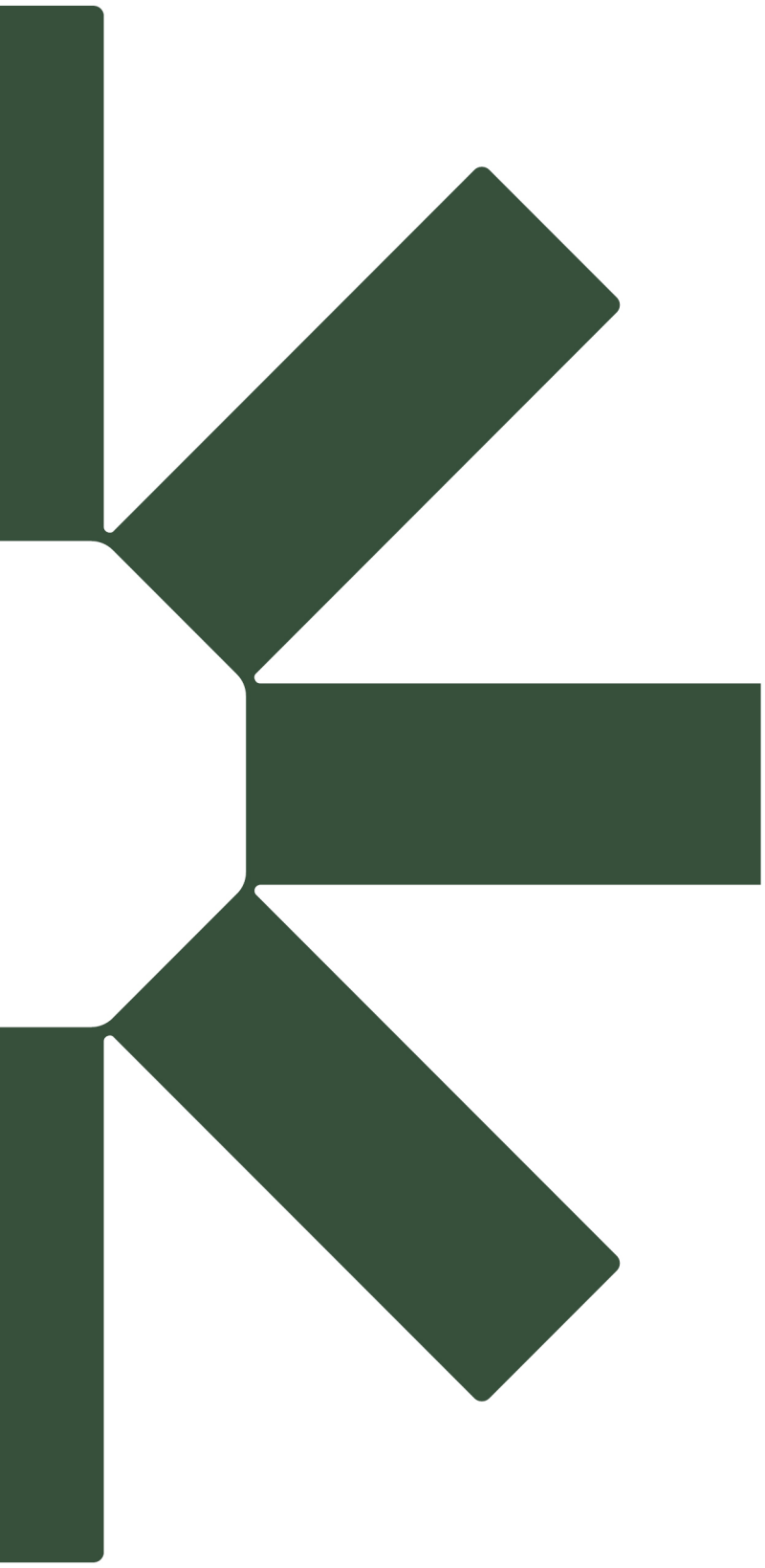
Table 1. Active Travel Comments and Response

Topic	WCBC Active Travel Comment	SLR Response
Transport Assessment		
Existing Cycle Routes.	Figure 2.6. *These routes generally would not achieve Active Travel Act Statutory Guidance standards now*.	Comment noted.
Cefn Road width north of Hullah Lane junction.	Para 2.38. *Space could provide wider footways, may be wide enough to allow for segregated cycle track (doubtful) or last resort, a shared use walking and cycling path (min.3m wide and to take into consideration constraints such as vertical features and does not include the kerb - see Design element 401 in the Active Travel Guidance).*	This corridor is not wide enough to accommodate a shared footway / cycleway facility for its entire length in accordance with the Active Travel Act Guidance. North/south connections for cyclists will be provided for within the site with new high-quality routes. Notwithstanding, Cefn Road is subject to a 20mph speed limit that assists in creating a comfortable environment for cyclists such that they can share the carriageway space with other vehicles safely. The accident review within the TA showed that there were no cyclist or pedestrian injury accidents along this route within the study period, which attests to the safe environment for these travel modes.
Greyhound Roundabout existing provision.	Para 2.40. *Traffic volumes are high for uncontrolled crossings and the dedicated facility for cycle users is not up to standard (shared use section too narrow).*	Comment noted.
Holt Road / A5156 Roundabout existing provision.	Para 2.42. *No pedestrian or cycle facilities - high speeds and flows of motor traffic.*	Comment noted.
Accessibility of local amenities.	Para 2.64. *They may be in terms of distances but there are significant wait times to cross roads (and thus the risk that people will cross when it is less safe to do so or use motor vehicles instead) and few dedicated facilities up to AT Act Statutory guidance standards.*	Comment noted.
LDP Policy requirement for KSS2 North and South site connectivity.	Para 3.37. *Does this note that it has to be open to all vehicles or could it just be for active travel and bus? The easier it is to travel by private motors the more people will do so. If it is easier to walk to the local shop/cycle to Wrexham industrial estate/bus to city centre, we have a chance of reducing car use. This could be beneficial for Bryn Estyn*	Policy SP4 of the LDP seeks to ensure connectivity between the land north and south of Bryn Estyn Road. It does not specify what travel modes this connectivity should facilitate. Connectivity between the two sites will be facilitated through the proposed site layout for KSS2 South and this will be the case whether the spine road is in

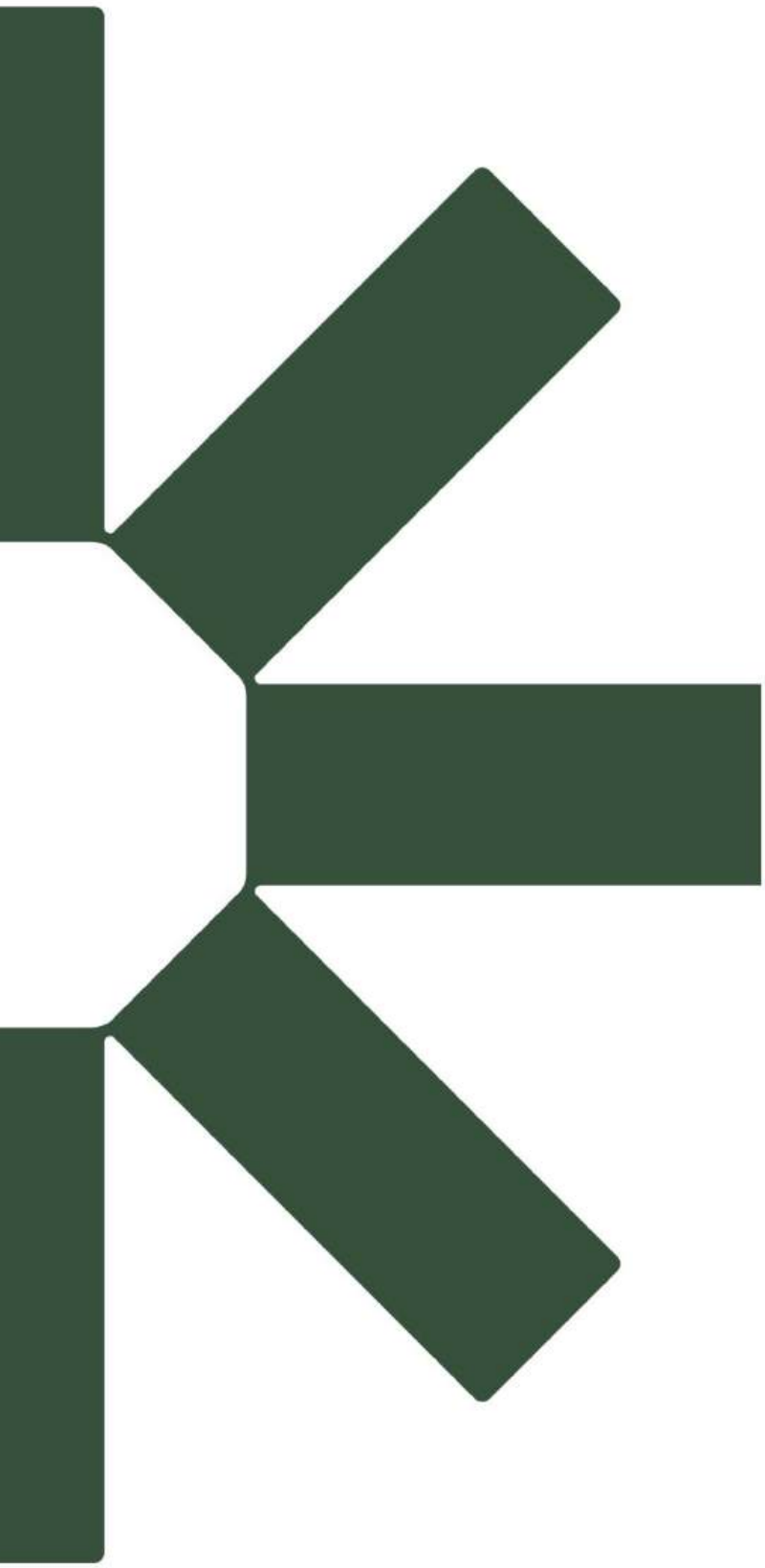
Topic	WCBC Active Travel Comment	SLR Response
	lane (low traffic through AT use and bus gate) as well as traffic flows in the area.	place or not, ensuring that active travel mode connectivity is prioritised.
Education related trip generation.	Para 4.10. *Where do the pupils go to school prior to the school being built? they will set up travel patterns, eg. possibly driving to Borras and this will be harder to change later on.*	There are several schools within 1 mile of the site including 3 primary schools and 2 secondary schools. All of these are within a suitable walk distance therefore it is expected that a high proportion of these trips can be undertaken by active travel modes, even before the delivery of a primary school on site. The multi-modal trip forecast in section 5 of the TA details how these education trips have been assigned to various travel modes for the purposes of trip forecasting.
Northern Access.	Para 4.16. *Will need to be min.6m for bus use - even if bus went in, did a loop and came back out. If this route is to be used for cycling at all (ie if there is no alternative route for cycle users) then a width in the critical range of 6.4-7.8m. from AT Act Statutory guidance Carriageways with lane widths between 3.2 and 3.9m should therefore be avoided for active travel routes, unless traffic flows are low and sightlines are good enough to permit safe overtaking.*	The northern access will not accommodate buses. It will serve a limited parcel of the site, perhaps around 180 dwellings therefore will be subject to low traffic flows, and cycles will be safely accommodated on-carriageway.
Southern primary access footway/cycleway	Para 4.20. *I take this to mean segregated from motor traffic/carriageway but for walking and cycling to be mixed - segregation between active modes is best practice and as noted previously should be the default in new developments where space is not constrained. This reduces conflict between the modes - where there is a speed differential, and allows for maximising of the active travel route usage as the local network improves*.	The proposed footway / cycleway infrastructure at the southern primary access is consistent with that proposed for KSS2 North, ensuring consistency of provision across the allocated KSS2 site.
Existing footway / cycleway on western side of Cefn Road	Para 4.21. *Does not exist to current active travel standards, although it is an aspiration for this route.*	Comment noted.
Existing on-carriageway cycle lane on eastern side of Cefn Road to the south of the site boundary	Para 4.22. *This is not to present active travel standards and thus cycling would probably be best routed to the western side of the carriageway to access quieter residential streets of Caia Park .*	Safe crossing to the western side of Cefn Road for cyclists would be facilitated via the proposed toucan crossings at the site access junction. If the Council's preference is not to promote the existing facility on the eastern side of the road then this can be factored into the design.
Southern secondary access	Para 4.24. *I take there will be no buses on this access?*	Correct, no bus access is proposed via the southern secondary access.

Topic	WCBC Active Travel Comment	SLR Response
Sports pitch access from new development	Para 4.25. *Will there be walking/cycling access to the sports pitches from the new development to allow for easy access?*	This comment will be shared with the design team for consideration.
Spine Road footway/cycleway	Para 4.26. *Should not be shared but as well as segregated from the road, walking and cycling should also be separate provision.*	The proposed footway / cycleway infrastructure within the site is consistent with that proposed for KSS2 North, ensuring consistency of provision across the allocated KSS2 site.
Spine Road pedestrian provision	Para 4.26. *AT Act guidance notes that seating opportunities should be included every 100m*	This can be considered at detailed design stage.
Bryn Estyn Lane potential active travel improvements	Para 4.29. *I would recommend re-surface of the length of Bryn Estyn Road from the restricted access section to the Greyhound roundabout. Ecological survey to understand whether lighting could be added along the same section.*	Comments noted.
Footpath Abenbury 1 surfacing improvements	Para 4.30. *check with PRoW officer if this is what he envisaged as my understanding was that the footpath should be kept as is as much as possible and not made up to Active travel standards.*	This can be considered at detailed design stage.
Cycle provision on western side of Cefn Road	Para 4.33. *Flows too high on Cefn Road for on-road cycling and we should not be promoting (though there are obviously old maps etc out there that people can access). the principle route to promote at this time for cycle users is getting them across Cefn Road and into the quieter roads of Caia Park.*	The proposed development will provide for cycle connectivity north-south via internal routes as well as providing for safe crossing of Cefn Road to access the Caia Park estate.
Cycle parking standards	Table 4.1. *Active travel standards (2021) states 1 cycle parking space per bedroom. Parking for accessible cycles should make up at least 10% of the parking andI would recommend more to allow for cargo cycles/trailers etc.*	Comments noted.
Greyhound Roundabout potential capacity improvement scheme	Para 7.69. *I would want to see drawings to show that this would be possible to Active Travel standards 2021.*	Comment noted.
Greyhound Roundabout Potential Improvement Scheme Showing Deliverability of Potential Active	Figure 7.2. *Leads to less direct route for walking and cycling - ideally the toucan crossings should be positioned close to the roundabout to reduce deviation from the desire line.* *This crossing does not cater for cycles - Even as a toucan their proposals*	The figure shows the principles of how active travel enhancements could be provided at the roundabout, through new crossings on two of the arms. It is provided for information and is not proposed in conjunction with the proposed development. If such improvements were to be implemented

Topic	WCBC Active Travel Comment	SLR Response
Travel Enhancements	*would require cycles rejoining the carriageway, to then navigate a higher capacity roundabout (due to limited widths on approach to the deviated ped crossings) – (subject to data collection) likely the flows would be in the critical ranges.*	then it would be expected that design details would be confirmed with the Council at the appropriate time.
Framework Travel Plan		
Travel Plan Measure: Creation of temporary mobility hubs in the vicinity of the sales area	*Where would this be based? within the sales office? lack of detail.*	The location would be determined at a later stage once details of the proposed site layout are for determination.
Travel Plan Measure: Investigate potential for community website	*Might be better if the developer supported WCBC to create a web page that could be useful for the wider public and could then consequently be maintained by wcbc*	Comment noted.
Travel Plan Measure: Provide sustainable travel vouchers to residents to encourage travel by non-car modes.	*What would these include?*	These could include bus vouchers that are valid for a limited period of time to encourage residents to use buses from the outset thus embedding sustainable travel habits. There are other potential options that can be explored at the appropriate time as part of the full Travel Plan.
Travel Plan Measure: Advertise Bikeability courses and Bike Right, along with national travel days to encourage participation.	*Would be best if they fund bikeability courses and ride leaders etc to support bike buses etc.*	Comment noted.



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