Pell Frischmann

C.C. Projects

Land to the East of Leeds Road and Land at Heybeck Lane, Chidswell, Dewsbury

Transport Assessment (TA)

Final Report

A13398/VAA

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www.pellfrischmann.com
5 Manchester Square, London, W1U 3PD

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Contact Information

Pell Frischmann

5 Manchester Square
London
United Kingdom
W1U 3PD

pflondon@pellfrischmann.com
+44 (0)20 7486 3661
www.pellfrischmann.com

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Limitations

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1 Introduction

Overview

1.1 Pell Frischmann is commissioned by C.C. Projects (referred to as the 'Applicant') to provide transport planning and highways consultancy services in connection with the Proposed Development of Land to the East of Leeds Road and Land at Heybeck Lane, Chidswell, Dewsbury (the 'Site').

1.2 The Site is split into two development parcels, referred to as 'Land at Heybeck Lane' (Site A) and 'Land to the East of Leeds Road' (Site B). It is proposed that each of Site A and Site B are the subject of separate outline planning applications, that will be submitted to the Local Planning Authority (LPA) in parallel.

1.3 Site A is proposed to comprise up to 181 residential dwellings with associated access and landscaping.

1.4 Site B is proposed to comprise, up to 35 hectares (ha) (equal to up to 122,500 square metres [m^2]) of employment space (mixed B1(a) / B1(c) / B2 / B8 Use Classes); up to 1,354 residential dwellings (C3 use class); a new two-form entry (2FE) primary school; a new local centre (including community facilities); and associated accesses and landscaping.

1.5 This Transport Assessment (TA) – and the accompanying Framework Travel Plan (FTP) – have been prepared to assess the combined impacts of the Proposed Development of both Site A and B as a whole and each will be submitted twice, once with each planning application. This TA also assesses the impacts of the Proposed Development of Site A only and provides a summary of the separate traffic impacts of Site A and Site B separately.

1.6 The Local Planning Authority (LPA) and Local Highways Authority (LHA) is Kirklees Council (KC) and the Highways Authority for the Strategic Road Network (SRN), including the nearby M1 and M62 Motorways, is Highways England (HE). Leeds City Council (LCC) and Wakefield Council (WC) are neighbouring local authorities.

Planning History, Background and Scope

1.7 The Applicant's Site is allocated within the KC Kirklees Local Plan which was adopted in February 2019 and provides the basis, vision and strategic objectives for development in Kirklees from 2013 to 2031. The area designated as MXS7 "Land East of 932-1110 Leeds Road, Shawcross/Woodkirk, Dewsbury", which is comprised of the Land to the East of Leeds Road and Land at Heybeck Lane and to which the development proposals for this submission relate, were designated for mixed use (residential and employment).

1.8 In addition to the Applicant's Site, the land to the immediate south-west of the Applicant's Site (bounded by Chidswell Lane, Owl Lane and Windsor Road) is being promoted by Barratt David Wilson Homes (BDWH). This separate site is also allocated for development in the KC Local Plan ('Land to the East of Leeds Road, Chidswell'; KC LP Site Ref: HS47) for up to 280 residential dwellings. One of the site-specific considerations as set out in the KC 'Local Plan Allocations and Designations' Supplementary Planning Document (SPD) (adopted 27th February 2019) is to provide access to MXS7 (the Applicant's Site) with no right-turn onto Chidswell Lane (from HS47) and the provision of a new roundabout at the junction with the B6128 (Owl Lane).

1.9 As noted above, the KC Kirklees Local Plan was the subject of an Examination in Public (EIP) by a Government-appointed Inspector in February 2018 who considered the evidence presented by KC to support the Local Plan. To support the designation of the Site in this process, an Interim Transport Assessment (ITA) was produced in August 2016, together with other supplementary information, to inform KC Highways officers and the Government-appointed Inspector of the potential transport and highways impacts of a strategic masterplan development at the Site. Data produced at that time also fed into the wider highway modelling activities undertaken by KC to support the Local Plan.

1.10 Processes and methodologies herein were initially informed by that 2016 Interim Transport Assessment (ITA), but have since developed through a scoping process which has been undertaken through 2018 and 2019 with KC, LCC, WC, and HE to establish the technical basis for the TA (and Framework Travel Plan) to support this planning application. This TA has therefore been produced in accordance with the formal Scoping (and Environmental Impact Assessment [EIA] screening) Responses issued by KC and the relevant scoping opinions of those other stakeholders listed above. This scoping process also included regular meetings with KC and further meetings with HE and others.

1.11 As a part of the TA scoping process, an extension to the number of local junctions to be studied was agreed at the request of LCC. Furthermore, road works were underway on the M62 Junction 28 (J28) (Tingley Interchange) at the time of traffic survey in March 2019, related to the now completed Congestion Relief scheme. Whilst the works were broadly complete, it was considered that there could be impacts on the collected data. New surveys were therefore agreed and undertaken in November 2019, however the outputs were not available at the time of submission. A TA Addendum will therefore follow the planning submission which will relate to M62 J28.

Site Location and Description

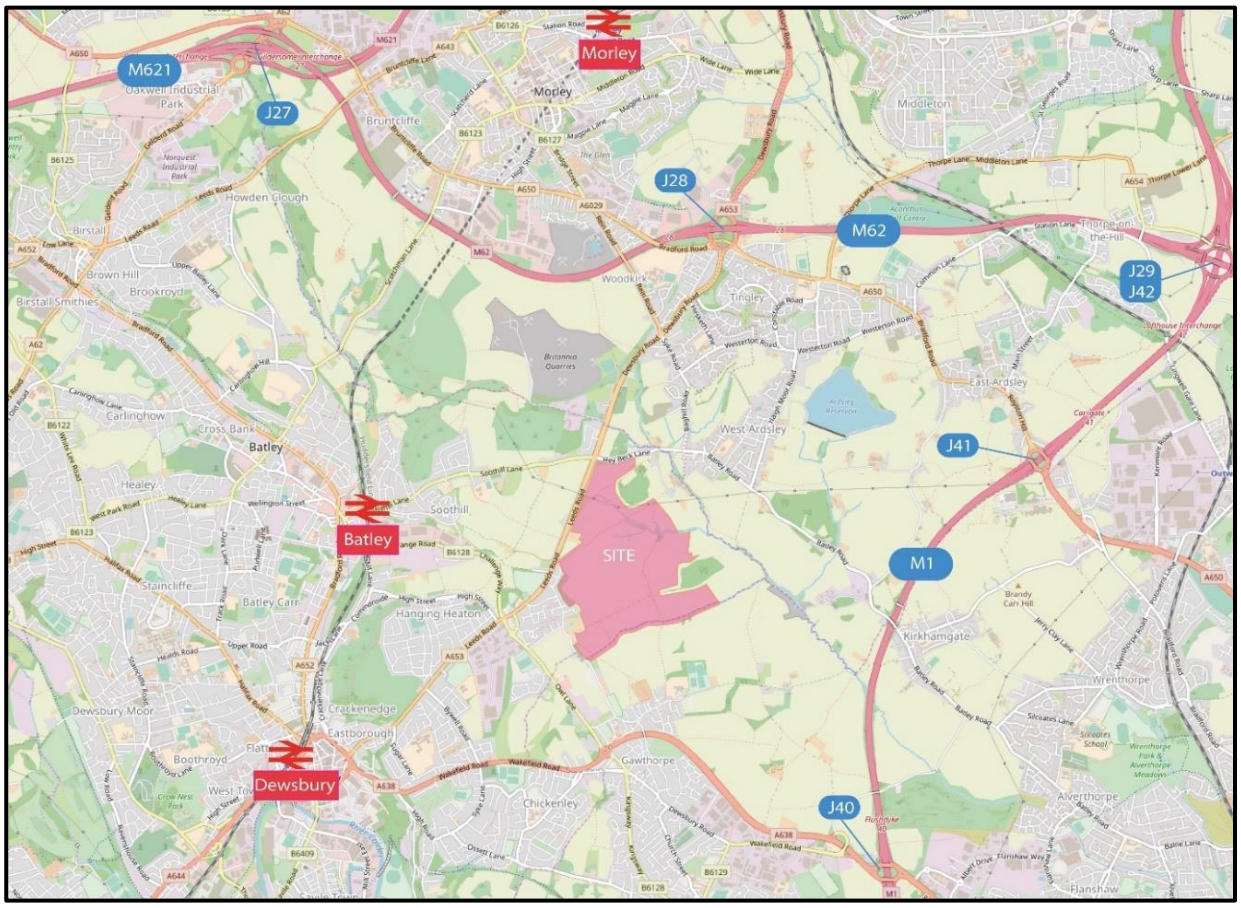
1.12 The Site is situated to the east of the A653 Leeds Road which is a strategic corridor between Dewsbury to the south and Leeds to the north. In the immediate vicinity of the Site, the A653 Leeds Road runs in a north-south direction connecting the A638 Wakefield Road to the south and Junction 28 (the Tingley Interchange) of the M62 Motorway to the north. In addition, the A638 Wakefield Road links with Junction 40 (the Flushdyke Interchange) of the M1 Motorway to the east of the Site.

1.13 The Site extends to Heybeck Lane to the north and Chidswell Lane to the south. Chidswell Lane provides access onto Leeds Road to the south-west of the Site and to the B6128 Owl Lane, via Windsor Road, to the south. Owl Lane in turn connects to the A638 Wakefield Road to the east, which connects to the M1 Junction 40, and heads towards Ossett to the west.

1.14 The land to the east of the Site, some of which is also within the ownership of C.C. Projects, is predominantly in agricultural use.

1.15 A strategic Site location plan, showing the location of the Site in relation to the wider area, surrounding local and strategic highway networks and key public transport interchanges, is provided in **Figure 1.1.**

Figure 1.1: Site Location Plan



Source: OpenStreetMap with Pell Frischmann annotations

Report Structure

1.16 The structure of this report has been developed following pre-application scoping discussions with KC, Leeds City Council (LCC) and HE, a summary of these discussions is included at **Appendix A**. Following this introductory chapter, the remainder of this TA is structured as follows:

- **Chapter 2: Existing Transport Conditions** – provides an outline review of the existing transport conditions prevailing at the Site and in the immediate surrounding area;
- **Chapter 3: Policy Considerations** – provides a review and national and local development and transport policy relevant to the location, scale and type of the proposal;
- **Chapter 4: Development Proposals** – provides a summary of the Proposed Development, including existing and proposed land uses, access arrangements and parking provision;
- **Chapter 5: Trip Generation** – presents a multi-modal trip generation assessment for the Proposed Development;
- **Chapter 6: Highway Impact Assessment** – presents the outcomes of the traffic modelling capacity assessment;
- **Chapter 7: Mitigation Measures** – presents suggested mitigation measures for effects on the junction network.
- **Chapter 8: Sustainable Transport Strategy** – summarises the proposals and effects of the Proposed Development with regard to sustainable transport options.
- **Chapter 9: Summary and Conclusions** – provides a summary of the report and concludes by highlighting the key points raised within the report.

1.18 Technical appendices, which are included at the end of this TA for reference, are as follows:

- **Appendix A:** Summary of Pre-Application Highways Scoping Discussions.
- **Appendix B**: Full TRICS Reports
- **Appendix C:** Trip Generation spreadsheets
- **Appendix D:** Illustrative Masterplan and Schedule of Accommodation
- **Appendix E:** Full details of the Census data and route assignments
- **Appendix F:** Traffic survey turning counts
- **Appendix G:** Proposed Site Access Arrangements
- **Appendices H-W:** Junction output reports
- **Appendix X:** Annual Average Daily Traffic (AADT) Flow Data
- **Appendix Y:** Framework Travel Plan (FTP)

2 Existing Transport Conditions

Introduction

2.1 This chapter of the TA Report introduces the existing, or 'baseline', transport conditions relevant to the proposals. A review of the surrounding local transport networks is undertaken including highway conditions, the public transport bus and rail networks, walking (including public rights of way) and cycling networks. A high-level analysis of recent accident data in the surrounding area is undertaken, as is a review of the accessibility of the Site to local facilities such as schools and hospitals.

Local Highway Network

2.2 The A653 Leeds Road is a two-lane dual carriageway providing access between Leeds and the M62 Junction 28 (Tingley Interchange) to the north and the town of Dewsbury to the south. It is a local 'A' road owned and managed, within the vicinity of the Site, by KC as the Local Highway Authority. The Site is fronted by residential properties and also has a number of small farm accesses, including access to Lees House Farm which is adjacent to the Site. Further to the north, the A653 retains it character but changes name to Dewsbury Road once it is within the LCC highway authority area.

2.3 The B6124 Heybeck Lane along the north of the Site is a single carriageway road approximately 9m in width and with one lane in each direction. The road is lined with residential properties on both sides. Parking along the street is generally uncontrolled (with the exception of waiting restrictions at the western end of Heybeck near the junction with Leeds Road) and intermittent as most of the properties have off-road driveways.

2.4 To the south of the Site, Leeds Road becomes a single carriageway road with a single lane of traffic in each direction. It continues to be fronted by residential properties, although various local shops and facilities are provided between the Site and Dewsbury town centre. As Leeds Road enters Dewsbury town centre, it meets the Dewsbury Ring Road which is a dual carriageway with limited active frontage.

2.5 Chidswell Lane is located to the immediate south of the Site and is residential in nature. It is approximately 7.3m in width and features speed-reducing features throughout the length. Parking is uncontrolled with most properties having off-road or dedicated parking provision. Further to the south east, Chidswell Lane leaves the built-up Shaw Cross area (beyond a junction with Windsor Road) and becomes more rural in nature with widths reducing to below 4m in places. The road runs broadly parallel with B6128 Owl Lane and connects into Gawthorpe.

2.6 The B6128 Owl Lane is a single carriageway road with a single lane of traffic in each direction. It connects the A653 Leeds Road with the A638 Wakefield Road. The junction of Leeds Road and Owl Lane is a signalised crossroads.

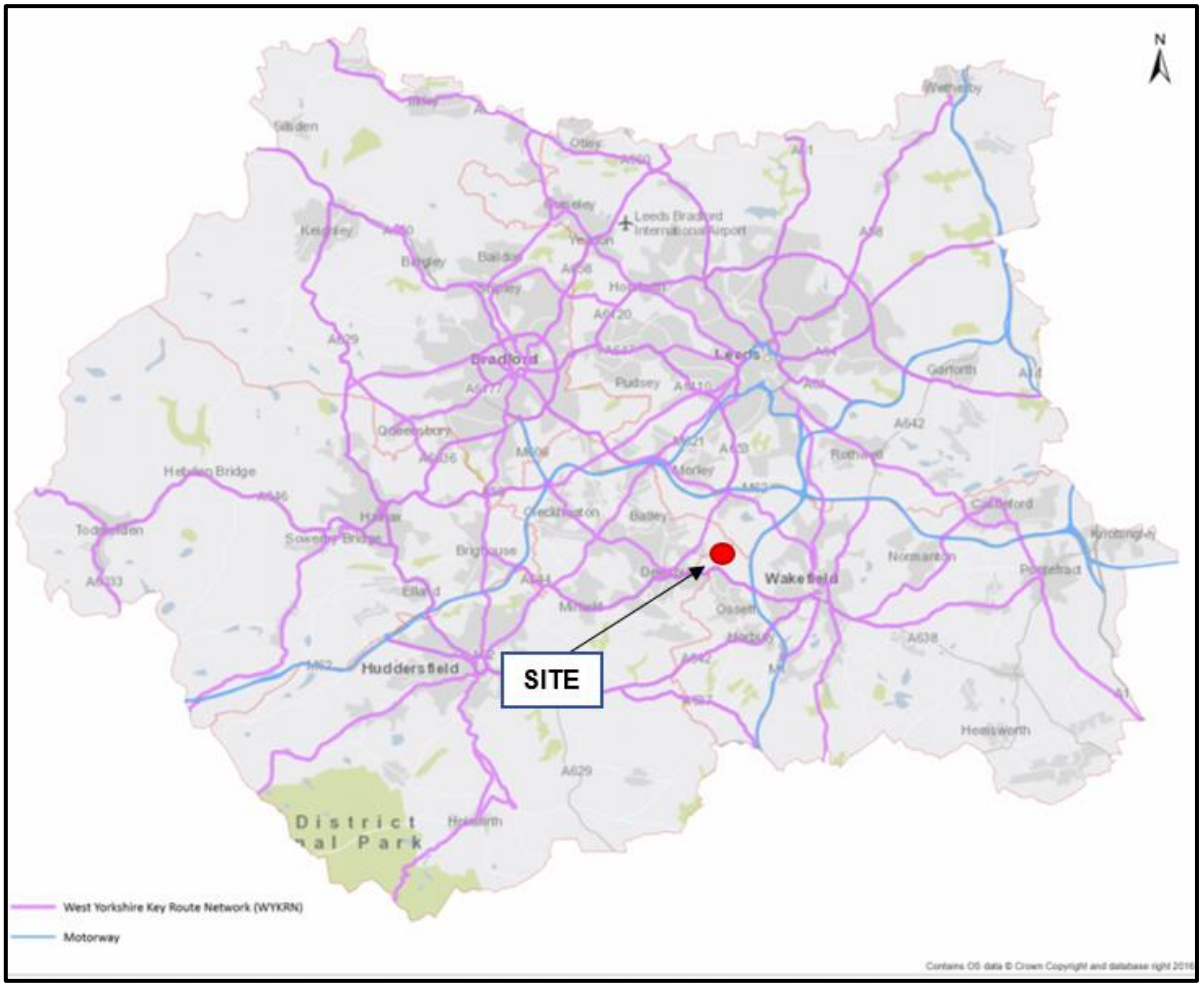
2.7 The West Yorkshire Combined Authority (WYCA) *West Yorkshire Transport Strategy 2040 (2017)* as well as the KC *Local Plan (LP; 2019)* identify strategic transport corridors. These corridors, which include road and rail routes, connect Leeds to the north with Bradford, Wakefield, Halifax and the main towns within Kirklees District, including Dewsbury and Huddersfield, with the HE Strategic Road Network (SRN).

2.8 The Site is situated within the Leeds – North Kirklees – Huddersfield – Manchester transport corridor, which is identified as the main strategic corridor in Kirklees District as it links the major towns with the adjoining regional centres. This corridor comprises several transport routes within Kirklees including strategic roads and the TransPennine Railway. The proposals for development in the KC LP have as far as possible been linked with this main corridor, both to take advantage of the highest quality transport links in the District and to ensure new developments are well connected and sustainable. The Site is also situated within the West Yorkshire Combined Authority (WYCA) 'Cross-Pennine' transport corridor which will be the subject of various road improvements.

2.9 The Site is well-located within the Strategic Road Network, with various A-roads nearby and the M1 routed approximately 2.5km east of the Site as the crow flies providing ease of access to the Site by

construction vehicles and, when the Site is functioning, delivery vehicles. A Kirklees Key Route plan showing the proximity of the Site to key routes is provided at **Figure 2.1**.

Figure 2.1: Kirklees Local Plan – Key Routes



Source: Kirklees Council Local Plan, OS Maps with Pell Frischmann annotations

2.10 The Site is therefore considered to be very well connected to the local, regional and strategic road networks.

Existing Traffic Information

2.11 To inform the baseline and modelling aspects of this TA, a specialist traffic survey company was commissioned to carry out:

- Manual Classified Turning Counts (MCTCs) on 11 key junctions in the area around the Site;
- Queue length, saturation flow and signal timings, as appropriate, on same; and
- Automated Traffic Counters (ATCs) at 12 locations including future locations of Site accesses, Dewsbury Town Centre Air Quality Management Area (AQMA), and key points across the study area.

2.12 The scope of these surveys was agreed with KC Highways officers (in advance) through the scoping process. This information feeds into the highway modelling presented in **Chapter 6**.

Existing Site Accesses

2.13 As existing undeveloped agricultural land, formal Site accesses are not currently provided. However there are a number of informal vehicular and non-vehicular points of access including those that facilitate farm access and/or existing Public Rights of Way (PROWs).

Site Accessibility

Department for Transport (DfT) Core Accessibility Indicators

2.14 The Department for Transport (DfT) publishes 'Core Accessibility Indicators' as ways of measuring accessibility from a site by walking, cycling, public transport and car/van to various types of services, including schools, GP surgeries and hospitals, shops and town centres. Recommended, and maximum acceptable, travel times are given for each type of service.

2.15 In order to identify the accessibility of the Site to the various types of services and facilities, Pell Frischmann has carried out a Geographic Information Systems (GIS) modelling exercise to measure travelling times and distances from the Site to certain destinations based on the DfT list. In addition, Pell Frischmann has assessed distance to green spaces, as these are considered factors for increased resident quality of life. Instead of public transport journey times, which vary depending on the day (e.g. see **Table 2-1**), we have assessed distance from the Site to nearby bus stops and train stations.

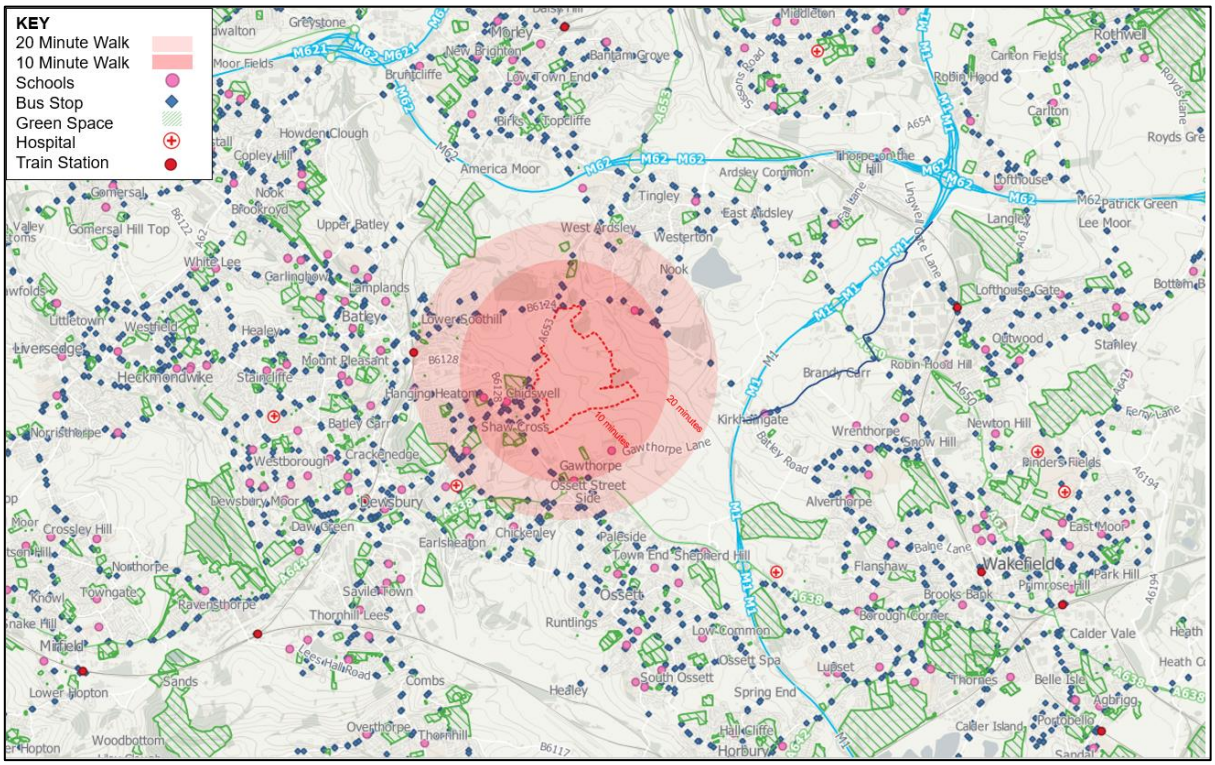
2.16 It should be noted that the Proposed Development will also create large scale development of its own, including 122,500 square metres (m^2) Gross External Area (GEA) of employment use, a new local centre with a two-form entry (2FE) primary school, and green spaces. As such, the Site itself will become a hub for services accessible to the wider local area.

Methodology

Walking Journey Times

2.17 The 10 and 20 minute walking radii (**Figure 2.2**) were taken from each of the Site accesses to points around the Site using a standard assumed walking speed of approximately 3mph. This method weights the radii according to distance from the accesses of the Site, rather than from the centre.

Figure 2.2: Accessible walking radii from Site



Cycling Journey Times

2.18 The 10 and 20 minute cycling radii were taken from each of the Site accesses to points around the Site using a standard assumed cycling speed of approximately 12mph. This method weights the radii according to distance from the accesses of the Site and the road network.

Results

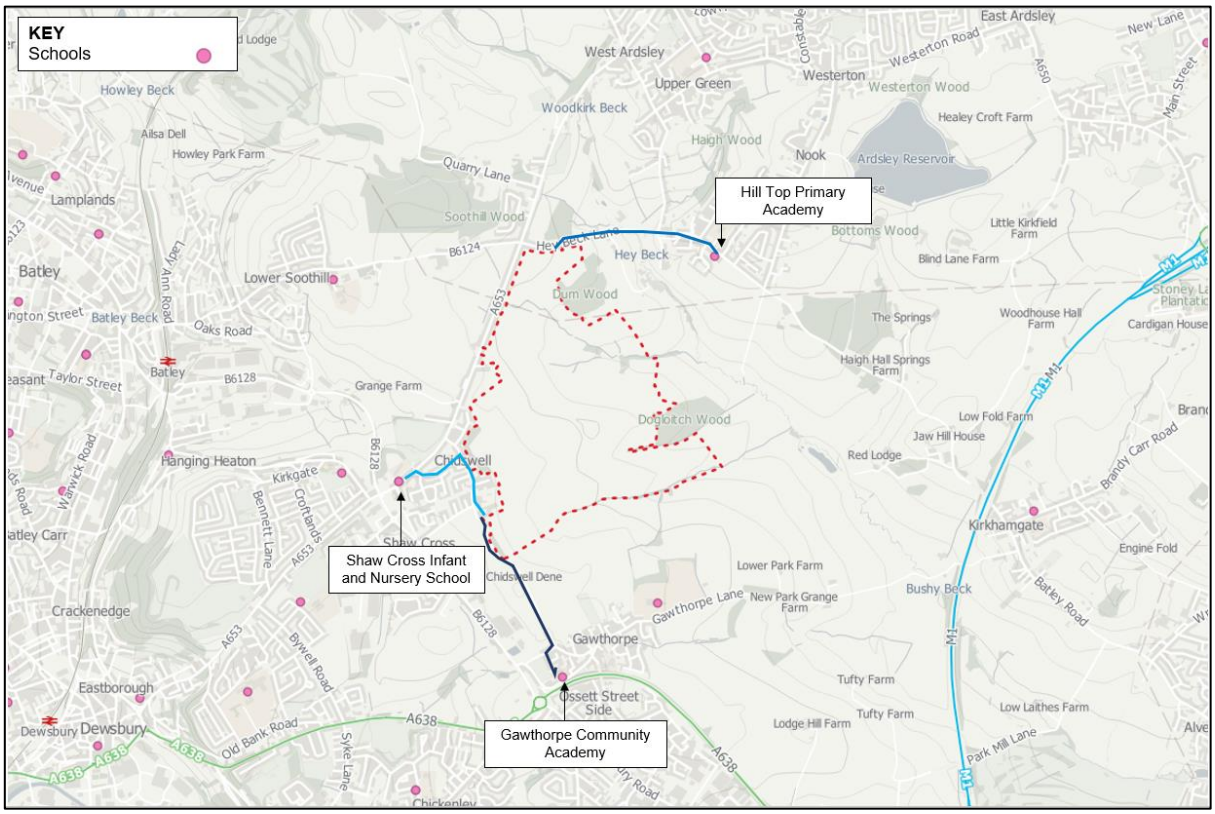
Schools

2.19 According to the most reasonable routes from the Site accesses, three schools out of the five within the 10-minute walking radius were selected as being the most accessible from the Site.

2.20 The three routes are shown on the map presented at **Figure 2.3**, to Hill Top Primary Academy (Primary) from proposed Site Access 1 (Heybeck Lane), to Shawcross Infant and Nursery School (Infant) from proposed Site Access 5 (Owl Lane), and to Gawthorpe Community Academy (Secondary) from proposed Site Access 5 (Owl Lane). A description of the proposed Site accesses is provided further on within this TA.

2.21 The Proposed Development will also create a new two-form entry (2FE) primary school on the Site, which will be the new closest school for many of the future residents of the Site.

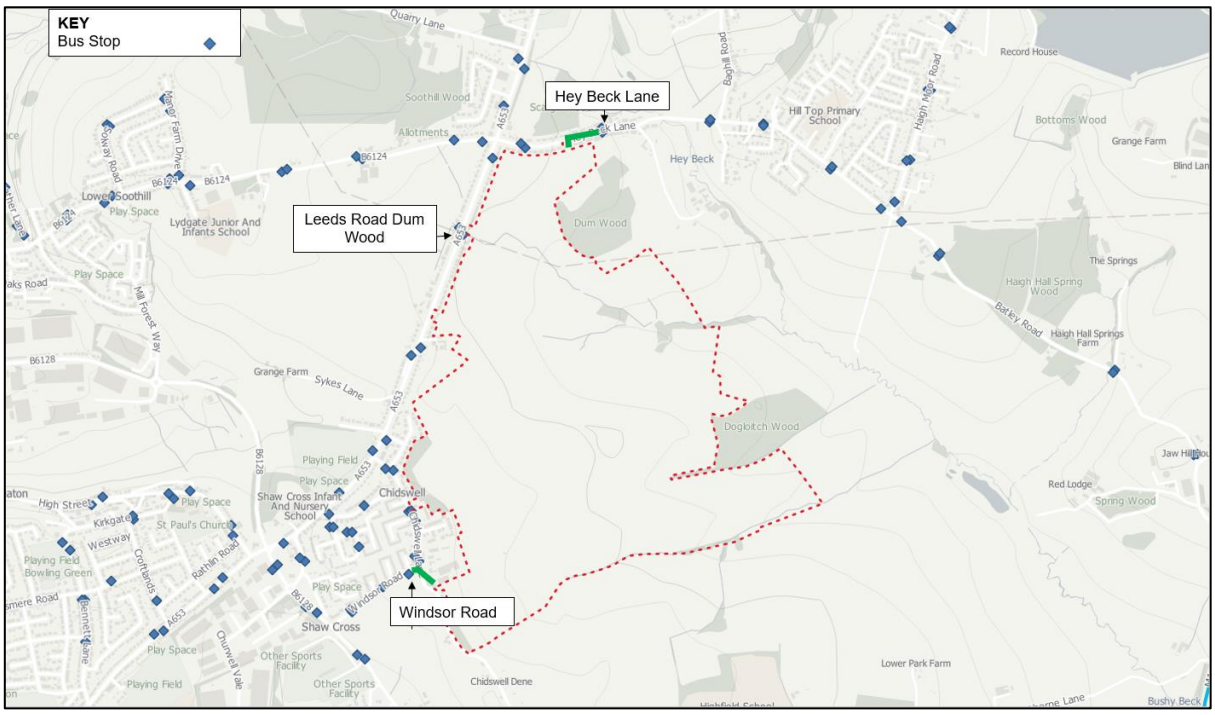
Figure 2.3: Routes to local schools



Bus stops

2.22 Although all nearby bus stops are marked on the map in **Figure 2.4** (in green and blue), the most accessible from accesses 1, 2 and 5 are shown in green below.

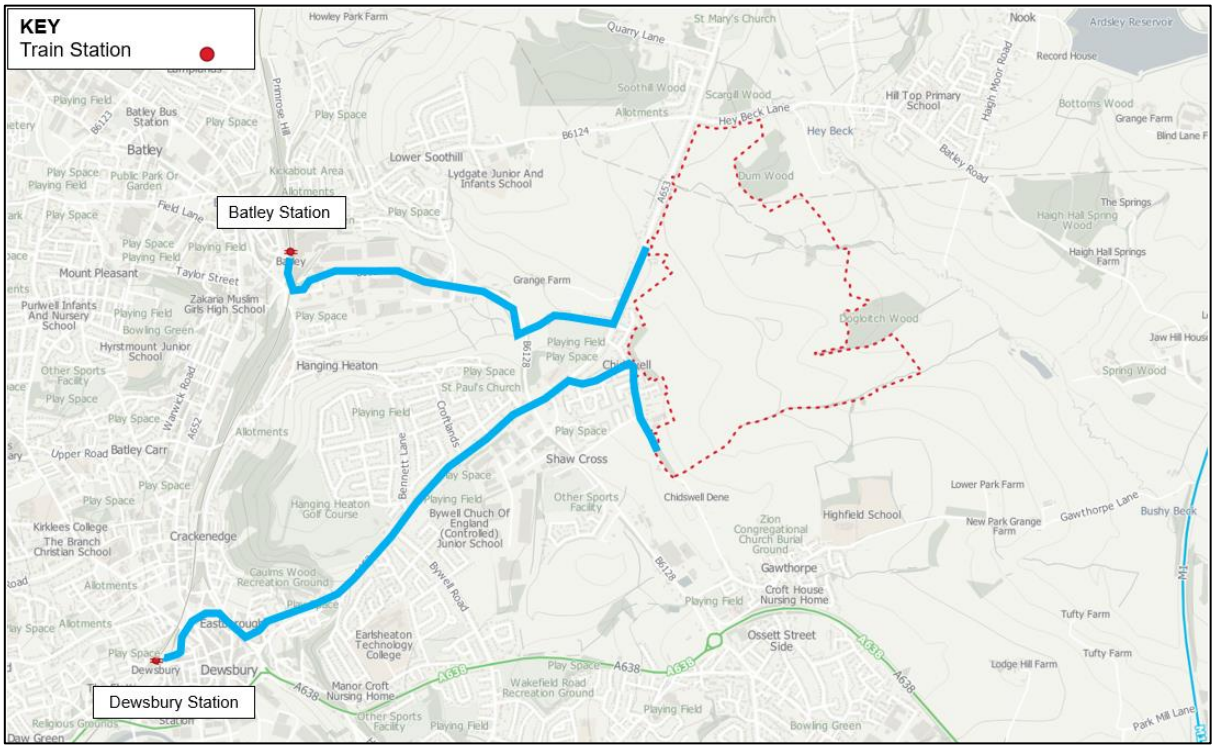
Figure 2.4: Routes to nearest existing bus stops



Railway stations

2.23 The two nearest railway stations accessible from the Site are shown in **Figure 2.5** below. They coincide with the nearest town centres of Batley and Dewsbury, both of which are within a 20 minute cycle from proposed Site Accesses 3 (Leeds Road [South]) and 5 (Owl Lane) respectively.

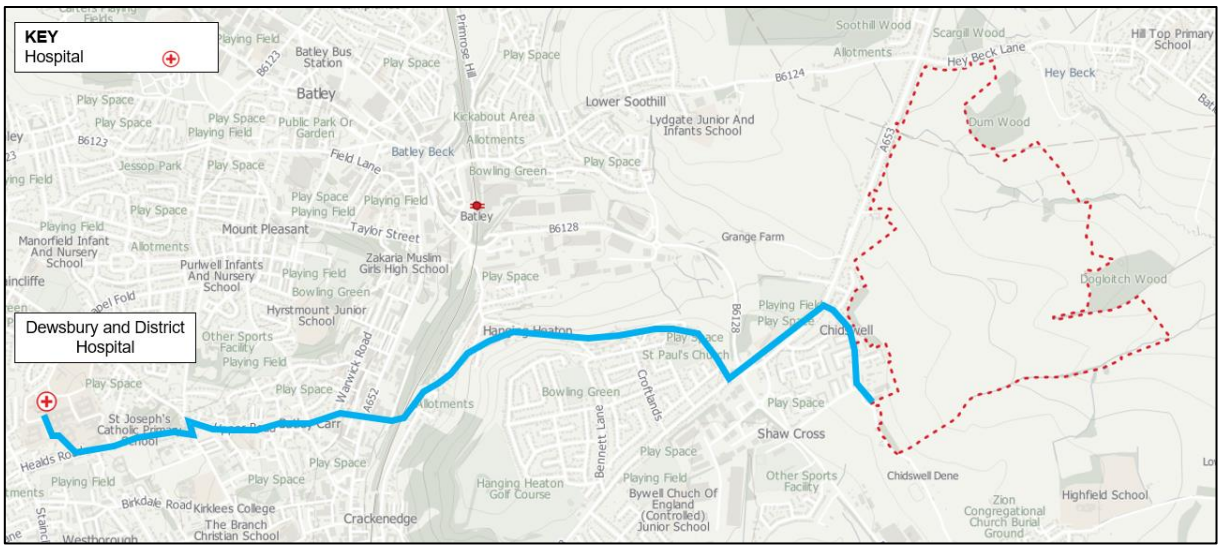
Figure 2.5: Routes to local rail stations



Hospitals

2.24 Dewsbury and District Hospital is located 4.1km to the west of the Site, an approximate 20 minute cycle from the southern Site accesses. The map presented in **Figure 2.6** shows the reasonable cycling route from proposed Site Access 5 (Owl Lane).

Figure 2.6: Route to local hospital



Public Transport Services and Facilities

Local Bus Services

2.25 The Site is well connected by the local bus network, being served by a large number of existing bus routes providing convenient key links to major employment areas and town centres elsewhere in the Kirklees District and beyond. There are numerous existing bus stops located in close proximity to the Site, including at the northern, western and southern edges of the Site, with bus stops situated along the A653 Leeds Road, Heybeck Lane and Chidswell Lane respectively.

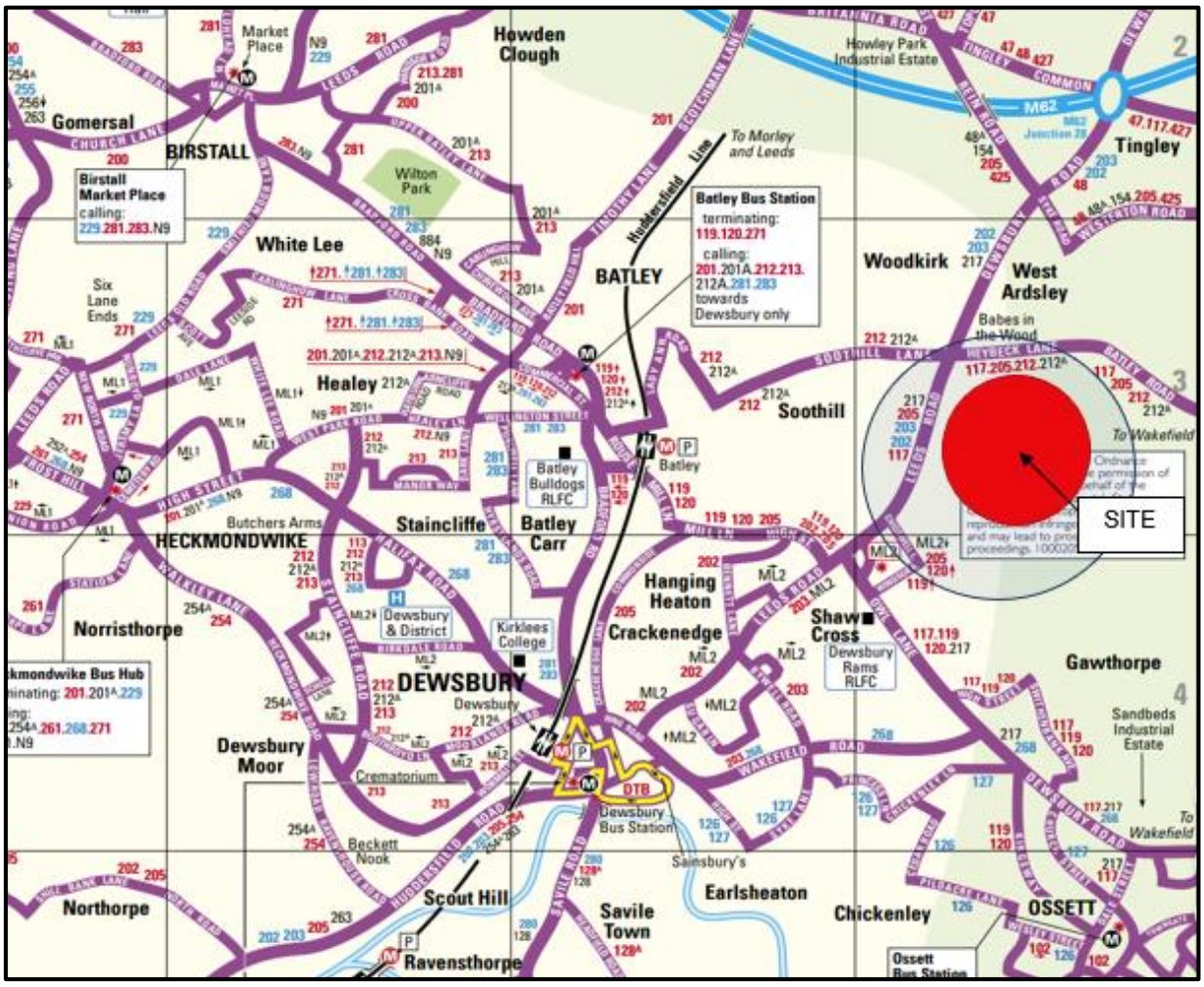
2.26 The northern part of the Site is served by local bus routes 117, 205, 212 and 212A in both directions along Heybeck Lane. Route 117 connects Wakefield with Leeds via Chidswell; route 205 connects Dewsbury with Pudsey; and routes 212 and 212A connect Wakefield with Batley, to the west, providing a direct bus service between the Site and Batley Rail Station. These routes generally all operate 1 bus per hour on weekday daytimes, and a lower frequency of service in the evenings and at weekends.

2.27 The Site's western edge, along Leeds Road, has three bus stops. These are served by routes 117, 202, 203, 205 and X17. Routes 202 and 203 run from Huddersfield to Leeds via Dewsbury, all major nearby employment centres. All routes are generally of low frequency at 1 bus per hour on weekday daytimes, with the exceptions of the 202 and 203 services which each operate two buses per hour, or route X17 which operates on the weekday AM peak only.

2.28 The Site's southern edge is also served by routes 117, 119, 120, and ML2. Route ML2 connects Chidswell with Dewsbury town centre by five buses a day (Monday to Saturday), once an hour between 10:00 and 14:00 hours, offering a 'hail-and-ride' service for most of the route. Routes 119 and 120 link Wakefield to Batley via Chidswell.

2.29 The location of the Site in the context of local bus routes is presented on **Figure 2.2** and services within 400m of the Site are presented within **Table 2-1**. The abbreviations ‘AY’ for Arriva Yorkshire, ‘LM’ for Longstaff of Mirfield, and ‘TLC’ for TLC Travel Ltd, are used.

Figure 2.7: Bus Routes in the Vicinity of the Site



Source: Metro (https://www.wymetro.com/buses/bus-maps-and-guides/ *North Kirklees area map with index* with Pell Frischmann annotations

Table 2-1: Bus Services and Approximate Frequency

Service (operator)	Route	Frequency (minutes)			
		Monday-Friday daytime	Monday-Friday evening	Saturday	Sunday
117 (AY)	Wakefield / Leeds	60 (schooldays only)	60 (schooldays only)	60	60
119 (AY)	Wakefield / Batley	120	-	120	-
120 (AY)	Wakefield / Batley	120 (mornings only)	-	120	-
202 (AY)	Huddersfield / Leeds	30	60	30	60
203 (AY)	Huddersfield / Leeds	30	60	30	60
205 (AY)	Dewsbury / Pudsey	60	-	60	-
212 (AY)	Dewsbury / Wakefield	60 (except 9am-3pm)	60	60 (except 9am-3pm)	60
212A (AY)	Dewsbury / Wakefield	60 (9am-3pm only)	-	60 (9am-3pm only)	-
ML2 (TLC)	Shaw Cross / Dewsbury Moor	60 (9am-3pm only)	-	60 (9am-3pm only)	-
X17 (AY)	Overton / Leeds	60 (AM peak only)	-	-	-

Mainline Rail Services

2.30 There are two mainline railway stations located within relatively close proximity to the Site. Batley Railway Station is located approximately 2.5km to the west and Dewsbury Railway Station is located approximately 3.5km to the south-west. Services are provided by Northern Rail and TransPennine Express and operate a total of four trains per hour each way in the weekday off-peak.

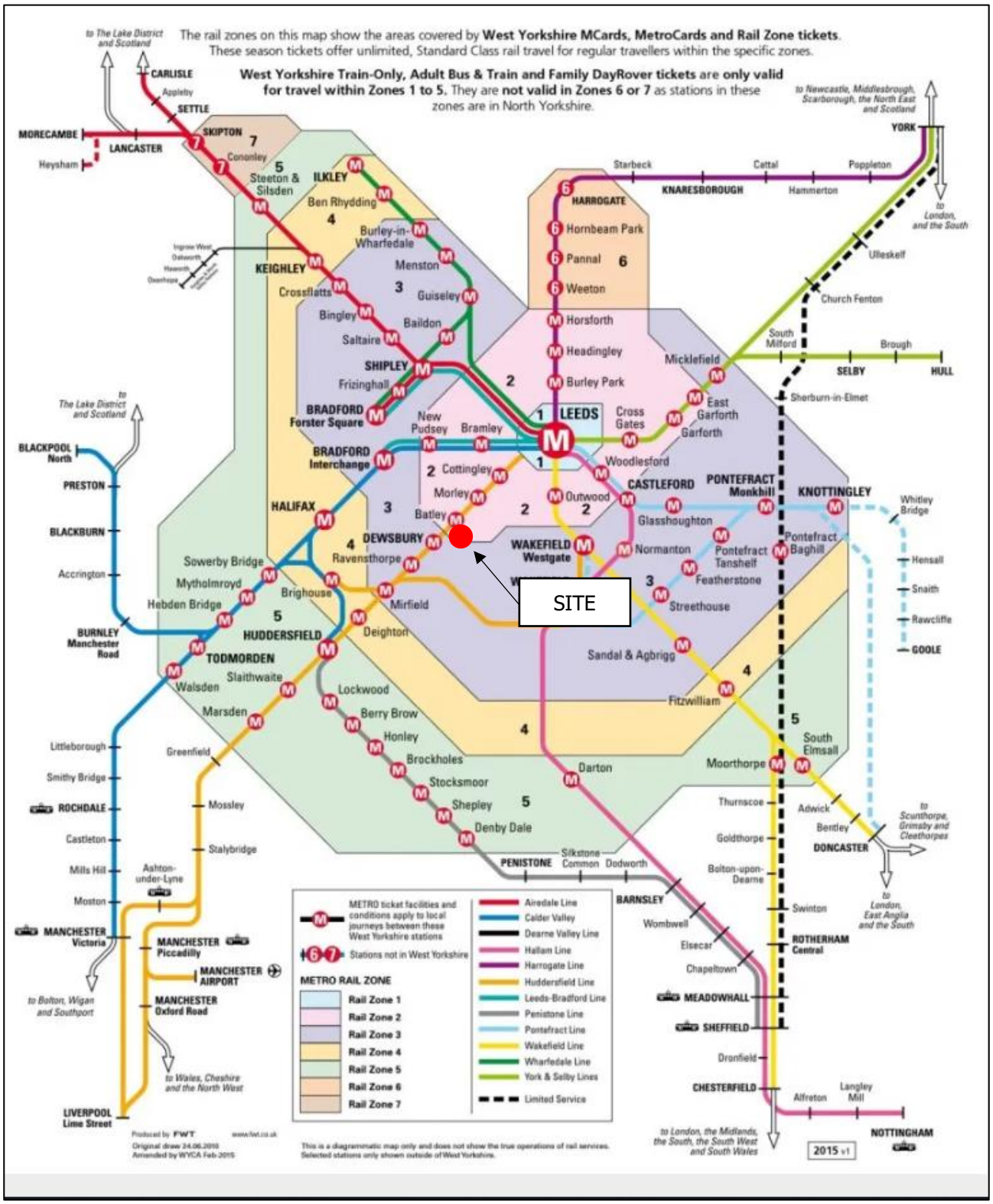
2.31 From Dewsbury railway station, peak time train services run to Leeds at a frequency of 4 per hour (13-21 min journey time), to Huddersfield at a frequency of 3 per hour (8-18 min journey time), and from Leeds one can change trains and continue on to Wakefield (Kirkfield and Westgate) at a frequency of 11 trains per hour (12-19 min journey time). Off-peak Monday to Friday and on weekends, the train frequencies from Dewsbury to Leeds remain at 4 per hour and to Huddersfield also remain at 3 per hour, with similar journey times. Services are provided by Northern Trains and TransPennine Express.

2.32 From Batley railway station, Monday-Saturday peak and daytime train services run to Dewsbury at a frequency of 2 per hour (2-3 min journey time), where trains continue on to Leeds and Huddersfield as above. Additionally, at the same times, trains run direct to Huddersfield at a frequency of once per hour (20 min journey time), and direct to Leeds at a frequency of 2 per hour (15-18 min journey time). On Sundays, direct trains run at a frequency of once per hour to each of Leeds and Huddersfield, and journey times remain similar. Services are provided by Northern Rail and TransPennine Express.

2.33 Both stations can be accessed via existing bus routes and bus stops are provided close to both stations. Dewsbury Station also has a dedicated public transport interchange facility located directly outside the station.

2.34 The Site is within the Leeds Metro Rail Zonal fare system with the border of Zones 2 and 3 being between Batley and Dewsbury Stations. The Site location in is shown in the context of the Metro Rail Zone in **Figure 2.3**.

Figure 2.8: Rail network in the Vicinity of the Site



Source: TransitMap https://www.transitmap.net/west-yorkshire-2015/ with Pell Frischmann annotations

Walking and Cycling Networks and Facilities

Walking

2.35 According to the Department for Transport (DfT), walking is considered to be the most important mode of travel at the local level with the greatest potential to replace short car trips, particularly under 2 kilometres. Additionally, the Chartered Institution of Highways & Transportation (CIHT) Guidance 'Planning for Walking' also states that, *"Across Britain about 80 per cent of journeys shorter than 1 mile are made wholly on foot"*. This would indicate that a large percentage of the trips within the Site itself and within a 1 mile radius of the Site would be made on foot.

2.36 The majority of roads surrounding the Site, including Leeds Road, Heybeck Lane, Chidswell Lane and Windsor Road, have footways provided on both sides of the carriageway to facilitate pedestrian movement.

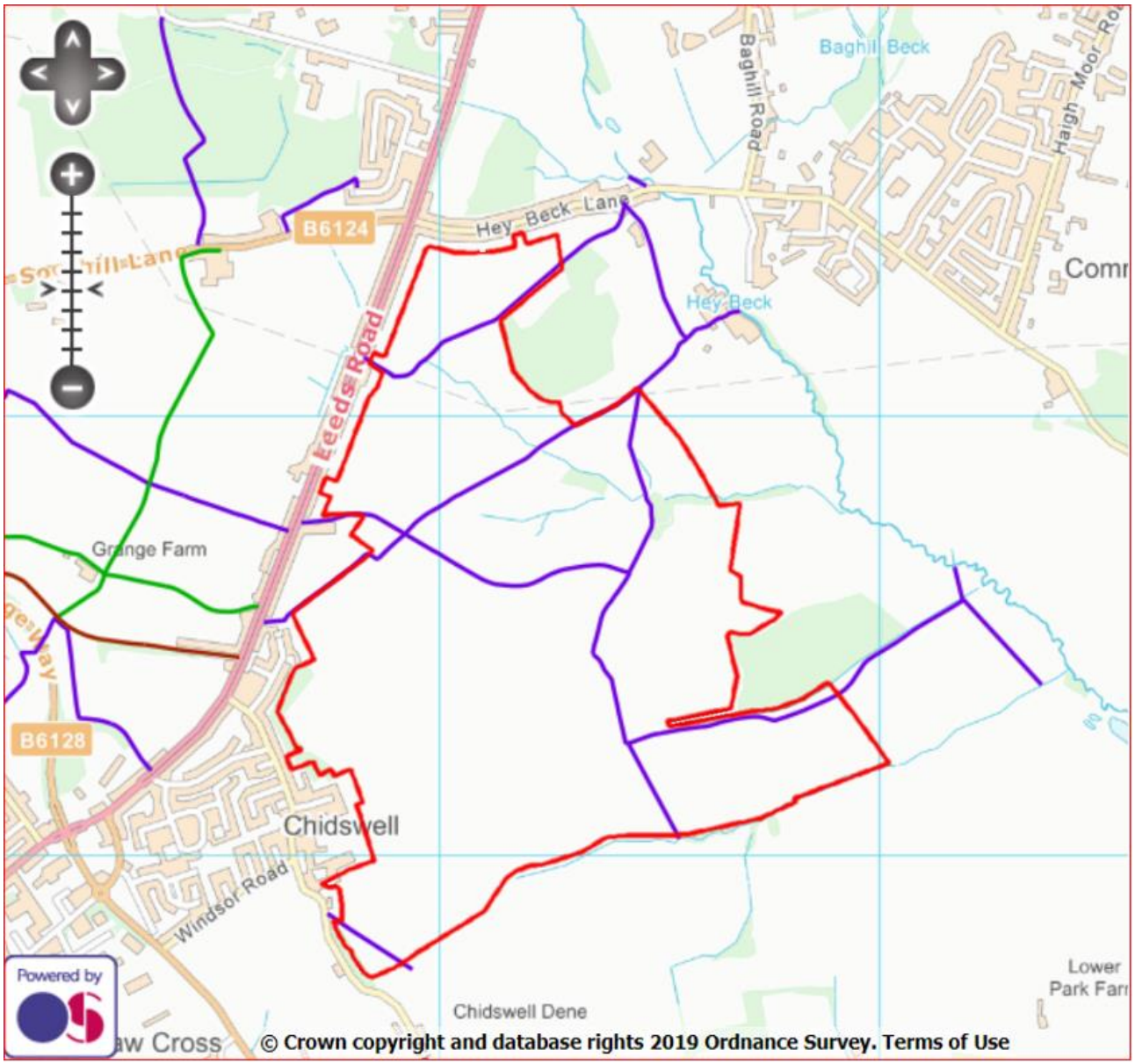
2.37 Along the A653 Leeds Road, good-quality footways are provided on both sides of the carriageway. Pedestrian crossing facilities are also provided at various junctions, providing pedestrian connectivity. Leeds Road is well lit and is considered safe for pedestrians.

2.38 Heybeck Lane also provides good quality wide footways on both sides of the carriageway. It is also well lit making this a safe walking environment for pedestrians.

2.39 Chidswell Lane provides footways on both sides of the carriageway, which are also well lit.

2.40 Internal to the Site, an existing network of Public Rights of Way (PROWs) exists. The indicative layout of these is illustrated in **Figure 2.9.**

Figure 2.9: Public rights of way within and around the Site (in Kirklees Borough)



Source: Kirklees Public Rights of Way mapping: https://www.kirklees.gov.uk/beta/countryside-parks-and-open-spaces/PublicRightsofWay/

Cycling

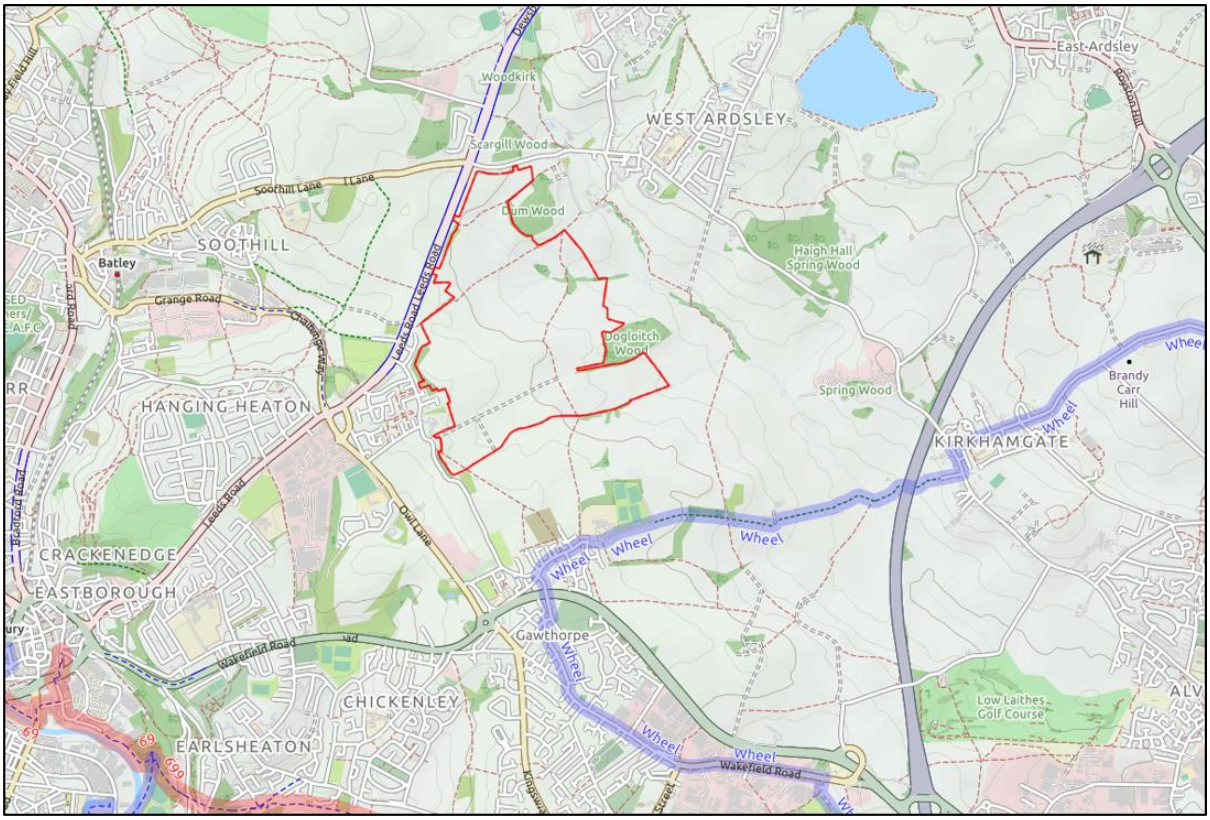
2.41 According to the DfT, cycling has the potential to replace short car trips, particularly those under 5km. The 5km cycling catchment from the Site includes Dewsbury, Batley, Morley, East Ardsley, Ossett and parts of Wakefield.

2.42 Cycling provision is available in the local area with cycle lanes being provided on Leeds Road adjacent to the Site. In addition, towns such as Wakefield, Horbury, Morley and Middleton can all be reached by bicycle within 30 minutes via existing cycle routes and Public Rights of Way (PROWs).

2.43 The Site is connected to various destinations via several National Cycle Network (NCN) routes. NCN route 69 connects Dewsbury with Ravensthorpe and, in turn via NCN route 66, with Huddersfield and Bradford. NCN route 69 also connects Dewsbury with Ossett and, in turn via NBCN route 699, to the 'Wakefield Wheel' (**Figure 2.10**).

2.44 To the north of the Site, there are several local traffic-free cycle routes that link Tingley to Beeston and Middleton to Leeds city centre.

Figure 2.10: Regional and national cycle network



Source: © OpenStreetMap contributors (CC BY-SA)

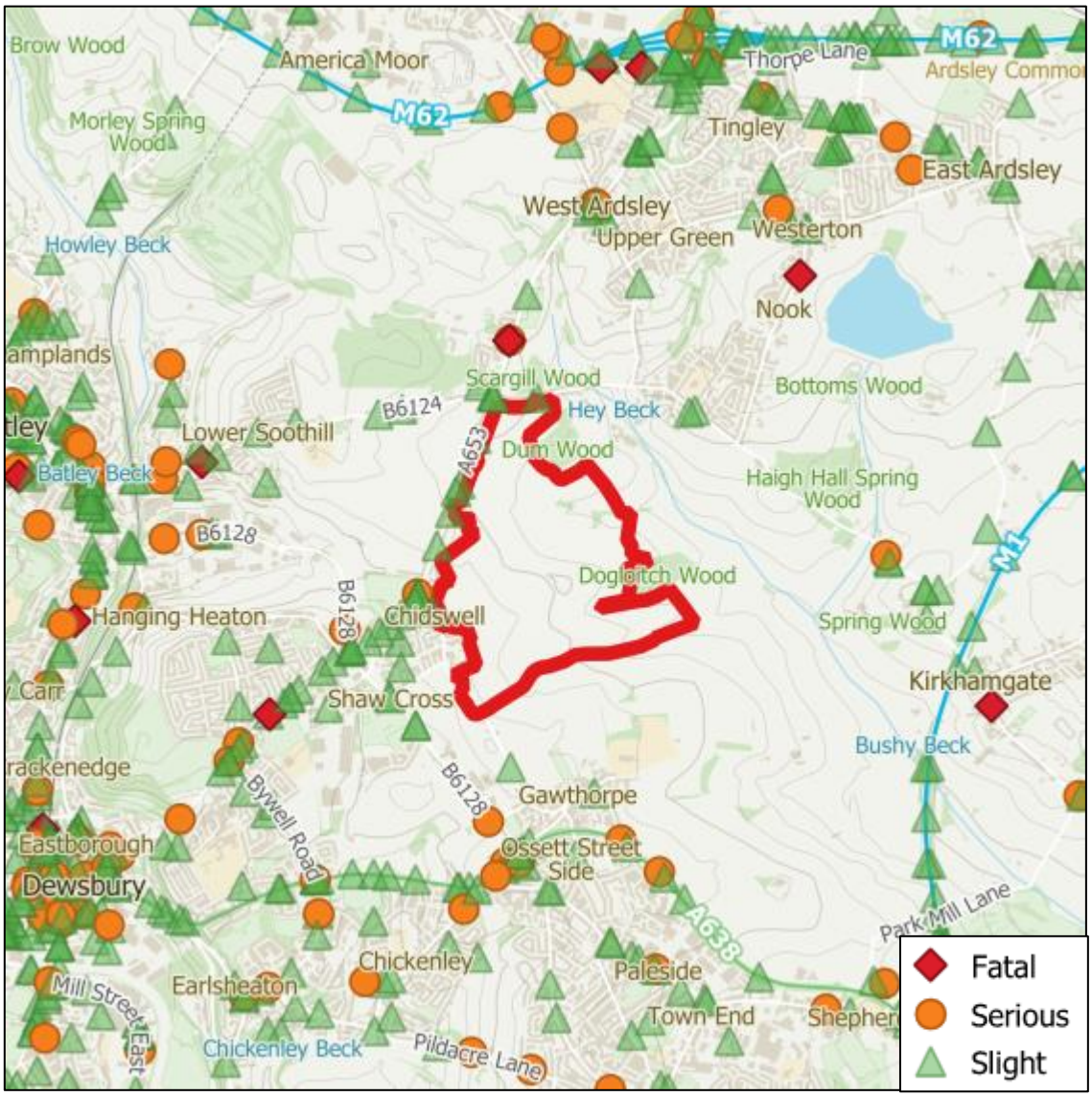
Road Traffic Accident Data

2.45 Data for road traffic accidents resulting in personal injury ('accident data') has been collated for the most recently available 5 full years for which data is available, 2014-2018 inclusive. No fatalities were recorded in the immediate surrounding of the Site, however 3no fatalities were recorded across the wider study area. 14 'serious' severity accidents and approximately 87 'slight' severity accidents. This is broadly in line with general expectations[1] where serious severity accidents are generally expected at approximately 10–15% (varying depending on link type) of the overall number and in this case comprise 14%.

2.46 The study area is diverse in road type and traffic levels, so focus here is on the most severe (i.e. fatal) accidents within the study area. It should be noted that highway safety is a matter of ongoing duty, focus and review by all local highway authorities. It is not anticipated that the Proposed Development would have any specific impacts with regard to highway safety.

[1] As defined by the accident severity proportions summarised in the COBA Manual, Design Manual for Roads and Bridges, 13(s1, pt2), published and maintained by the Department for Transport, June 2006.

Figure 2.11: The Site within the accident data map



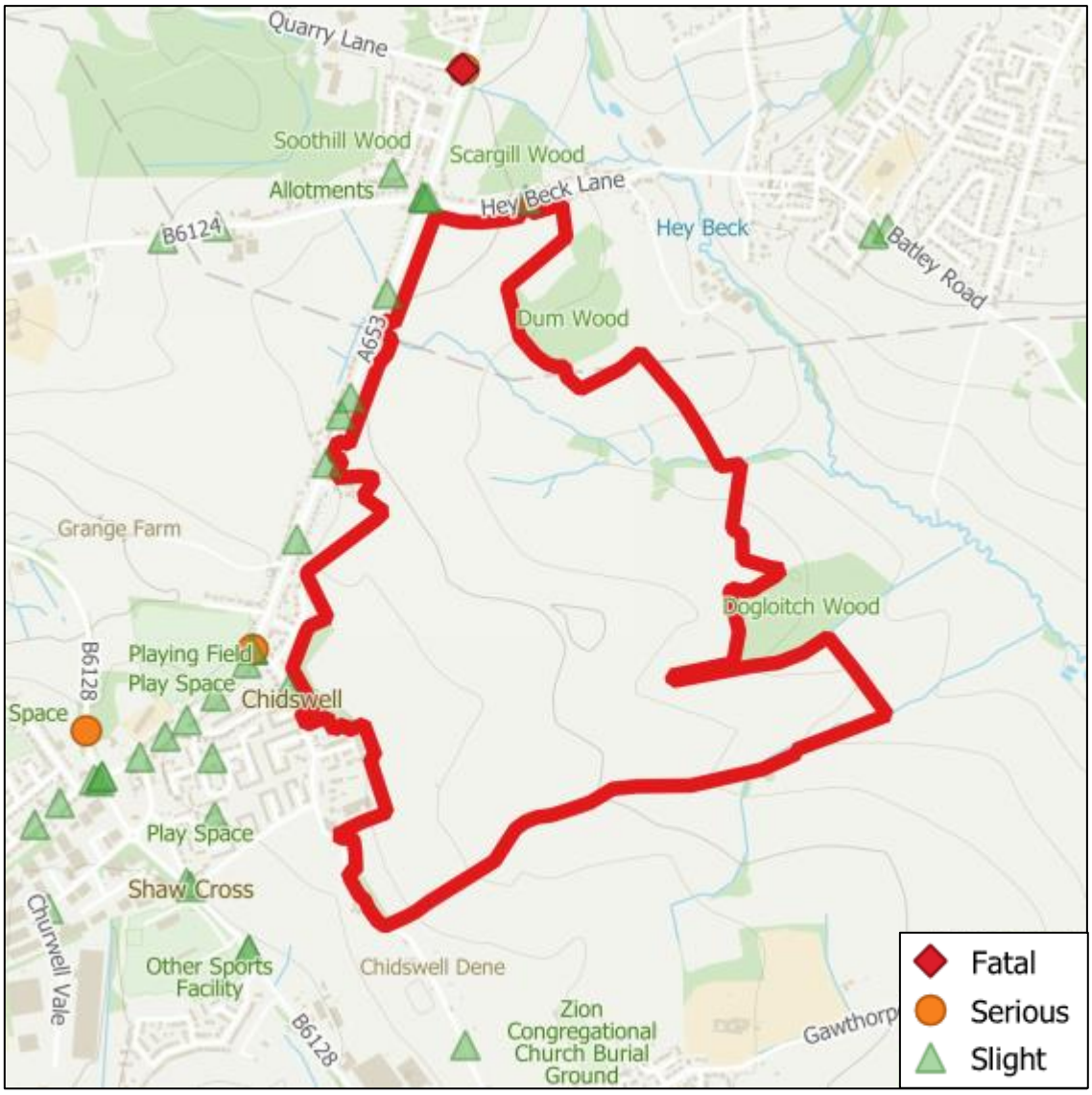
2.47 A single fatal accident was recorded over the 2014-2018 period within the study area at the junction of A639 Leeds/Dewsbury Road and Quarry Lane, a major-minor priority access (approximately 330m to the north of the junction with Heybeck Lane) which provides access to a small number of residential properties, some industrial units, and Howley Park Quarry. In 2016, a rigid HGV turning right at the junction struck and killed a pedestrian who was crossing the carriageway. No formal crossing facilities exist at this location, but residential property frontage along the length of Leeds Road is likely to result in north-south pedestrian desire lines across the minor road.

2.48 Two fatal accidents were recorded in 2015 on A650 Tingley Common to the west of Tingley Interchange (M62 J28). The first involved a cyclist being stuck and killed by a car. There are (and were) advisory on-carriageway cycle lanes on this (2x 2 lane) dual carriageway road, however the road is wide and subject to a 40mph speed limit and so this is likely to provide a poor cycling experience and would be hazardous if, for example, a cyclist was forced to deviate from the marked cycle lane by debris or poor road surface.

2.49 The second accident on this section of road was a motorcyclist being struck and killed by a heavy goods vehicle performing a 'U-turn' manoeuvre. Whilst there is a planting gap in the central reservation strip which was likely used, it cannot be characterised as formal provision, nor would this location appear to be reasonable for such a manoeuvre. There does not appear to be an obvious reason for

the retention of this gap, so it could be recommended that this gap is formally closed by way of upgrade to the current semi-permanent 'swing-back' bollards.

Figure 2.12: The Site closer within the accident data map



2.50 Recorded accidents are broadly distributed along the length of A639 Leeds Road adjacent to the Site. Some limited clustering is visible at junctions as would be expected. A high-level link accident rate analysis has been performed to establish if the outturn rate of accidents in this area is unexpectedly high, as new accesses are proposed along this stretch of road. However, any new accesses would be delivered to modern highway standards and thus would be expected to have negligible or improvement effect.

2.51 The link analysis runs from the junction of Leeds Road x Chidswell Lane to that with Heybeck Lane inclusive (total length 1.2km). A time series of Annual Average Daily Traffic (AADT) flow data is not available but baseline survey (ATC data) indicates an average of 19,744 vehicles per day (veh/day) in 2019 so this will be assumed for previous years.

Table 2-2: Accident data analysis table

Year	Accident Count	AADT	Million Veh km	Expected Rate	Recorded PIA/Mvkm
2014	3	19744	8.648	0.841	0.347
2015	3	19744	8.648	0.864	0.347
2016	3	19744	8.672	0.827	0.346
2017	1	19744	8.648	0.821	0.347
2018	2	19744	8.648	0.814	0.347

2.52 A comparison of recorded accident numbers for this link with expected 'link & junction' accident rates for the appropriate type of road (Department for Transport, WebTAG COBALT v0.1, 2014) indicates that A639 Leeds Road (adjacent to the Site) has an accident rate approximately half that which might be expected. The low number of accidents makes it difficult to establish any robust trend, but it can be noted that fewer accidents were recorded in the last two years for which data is available (2017 and 2018).

Conclusion

2.53 The Site is well connected to existing walking, cycling, public transport and highway networks. The Site is located near to the strategic network with multiple points of access (to both the M1 and M62 motorways) and adjacent to the regional network with a direct connection to the centres of both Leeds and Dewsbury, and a nearby connection to the centre of Wakefield.

2.54 The existing public transport network provides a range of buses to various local and regional destinations, and nearby Metro rail services connect to Leeds, Manchester and beyond. This provides a range of opportunities to capitalise on existing services and reinforce the commercial basis for new and expanded service provision.

2.55 The Site is also comprehensively covered by existing Public Rights of Way (PROWs) which connect to nearby public highways, bridleways and other rights of way, providing a robust basis for new Site connectivity for pedestrians and cyclists.

2.56 In summary, it is concluded that the Site is well situated to capitalise on existing connectivity on the highway, public transport and public rights of way networks to local, regional and national destinations. Furthermore, the Site proposals (discussed in **Chapter 4**) provide for new employment and local services in an already highly accessible location. The Site is therefore well placed to enable additional new development.

3 Policy Considerations

Introduction

3.1 This chapter of the TA Report draws together and summarises the planning and transport policies relevant to the Site and the Proposed Developments thereupon. First, national policy considerations are presented. These form the highest level (and least detailed level) of policy. All local policies must be in conformance with these and they set the overall strategic direction and shape of the planning system at the national scale.

3.2 Regional planning policy in the UK has generally been either centralised to national government or devolved to local or sub-regional authorities over recent years. However, relevant policy here is that set by the West Yorkshire Combined Authority which (among other concerns) leads cross-local authority on regionally strategic transport planning matters and is also responsible for operating the 'Metro' integrated public transport system.

3.3 Local policy is that at the KC level and includes the KC Local Plan (of which the Site forms an allocation) and other material concerns of the planning authority as they relate to transport.

National Policy

National Planning Policy Framework (NPPF) (June 2019)

3.4 The Government's *National Planning Policy Framework* (NPPF) sets out the government's planning policies for England and how these should be applied. The NPPF was adopted in July 2018 and last updated in June 2019.

3.5 It is meant as high level guidance for local councils to use when defining their own personal local and neighbourhood plans. This approach allows the planning system to be customised to reflect the needs and priorities of individual communities.

3.6 At the heart of the NPPF is a presumption in favour of sustainable development, and the NPPF notes that "*the purpose of the planning system is to contribute to the achievement of sustainable development"*. At a very high level, the objective of sustainable development can be summarised as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'.

3.7 The NPPF defines the delivery of sustainable development through three roles:

- an economic objective;
- a social objective; and
- an environmental objective.

3.8 Chapter 9 of the NPPF relates to the promotion of sustainable transport. Paragraph 102 states that:

- "*Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*
- *the potential impacts of development on transport networks can be addressed;*
- *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- *opportunities to promote walking, cycling and public transport use are identified and pursued;*

- *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
- *patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."*

3.9 Paragraph 108 states that:

- *"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:*
- *appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
- *safe and suitable access to the site can be achieved for all users; and*
- *any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."*

3.10 Paragraph 109 notes that "development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe".

3.11 Within this context, paragraph 110 notes that *"applications for development should:*

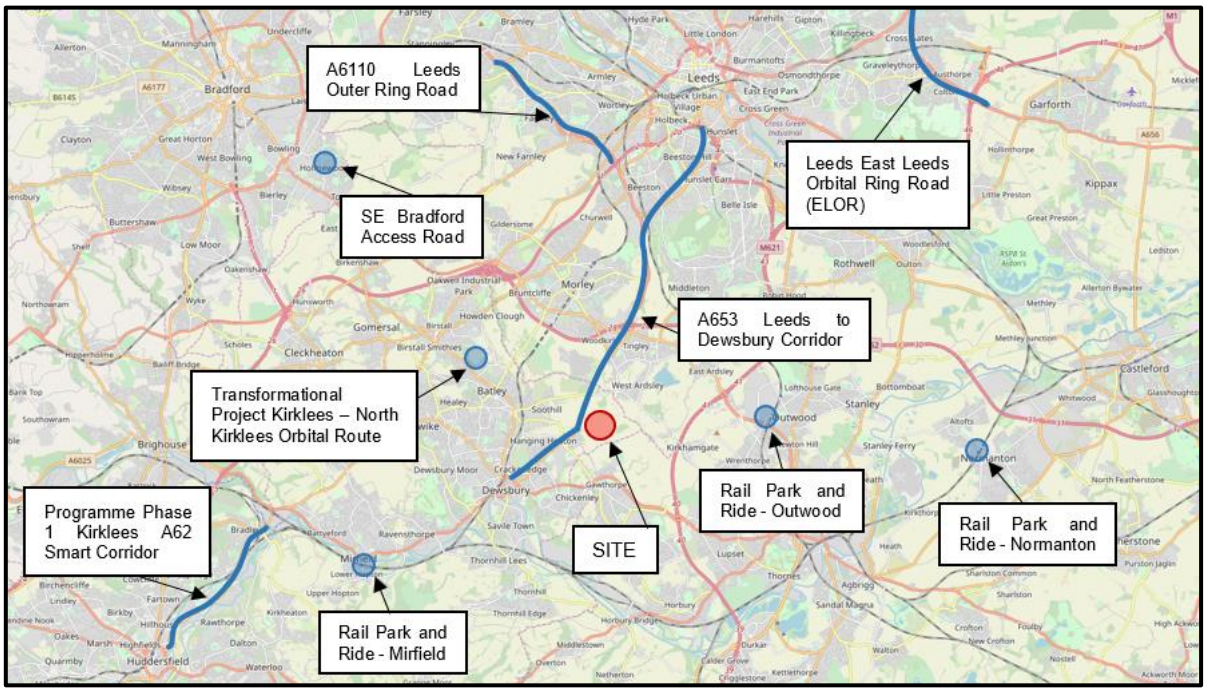
- *give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;*
- *address the needs of people with disabilities and reduced mobility in relation to all modes of transport;*
- *create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;*
- *allow for the efficient delivery of goods, and access by service and emergency vehicles; and*
- *be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations*."

Regional Policy

West Yorkshire Combined Authority: West Yorkshire-plus Transport Fund

3.12 The £1 billion West Yorkshire-plus Transport Fund from West Yorkshire Combined Authority describes the transport renovation projects approaching in the next 20 years. The projects closest to the Site are mapped out below:

Figure 3.1: Projects in the Vicinity of the Site Funded by West Yorkshire Transport Fund



Source: OpenStreetMap with Pell Frischmann annotations

3.13 As shown in **Figure 3.1**, renovation of the A653 Leeds Road immediately adjacent to the Site is expected to take place as a result of the West Yorkshire-plus Transport Fund before 2026. The Fund's website states "This scheme for the A653 corridor from Dewsbury into Leeds will see capacity enhancement measures to reduce congestion at 'hot spot' junctions along with public transport improvement such as the introduction of a limited stop bus service between Dewsbury and Leeds."

3.14 Kirklees Local Plan's Infrastructure Delivery Plan Addendum (November 2016) expands on the renovation plans, please see the Local Plan section below.

West Yorkshire Combined Authority Transport Strategy 2040

3.15 The West Yorkshire Combined Authority Transport Strategy was adopted in August 2017 and covers the areas of Bradford, Calderdale, Kirklees, Leeds and Wakefield Councils.

3.16 The Transport Strategy 2040 ambitions and policies are framed within six core themes:

- *"Inclusive Growth, Environment, Health and Wellbeing*
  - *Our ambition is to connect people to better living standards and higher earning jobs, and to significantly improve the health, overall well-being and environment of the people living and working here.*
  - *We aim to reduce traffic emissions to near zero, tackle the damaging impacts of climate change on our homes and businesses and reduce road accidents, aspiring to 'zero tolerance' of transport-related deaths. We want to become known as a great, safe place for cycling and walking.*
- *Road network*
  - *Our ambition is for an efficient, safe and reliable road network for all users, that creates new opportunities for jobs and housing.*
  - *We aim to deliver a step-change in the reliability of journey times for people and goods, and to provide high quality infrastructure for all users.*
- *Places to live and work*
  - *Our ambition is for West Yorkshire to be known for the quality and liveability of its places.*

- *We will use our transport investment to help transform our cities, towns and neighbourhoods - to create clean, safe, healthy places for communities and businesses, which attracts greater inward investment.*

- *One System Public Transport*
  - *Our ambition is for a world class public transport system that connects different modes of transport seamlessly into one comprehensive, easy-to-use network.*
  - *We aim to transform the performance, image and experience of public transport to make it an attractive choice for all.*
- *Smart futures*
  - *Our ambition is to make best use of advancements in technology across all of our transport networks*
  - *We aim to better plan and manage all of our transport networks to transform the affordability, ease and experience of the people using it.*
- *Asset management and resilience*
  - *Our ambition is to ensure that we make best use of our existing and future transport assets.*
  - *We aim to ensure our transport networks are fit for the future and properly managed in a safe, sustainable, environmentally-friendly and cost-effective way*."

Local Policy

Kirklees Economic Strategy (March 2019)

3.17 The Kirklees Economic Strategy was adopted by KC in March 2019 and spans from 2019-2025.

3.18 According to Chapter 1: Our Vision, "the strategy focuses on creating sustained economic growth and providing good employment for and with communities and businesses. It aligns to the Kirklees Local Plan and is supported by other strategies that have a fundamental impact on our economy... This strategy also responds to the UK Industrial Strategy and focuses on Kirklees' contribution to raising the nation's productivity."

3.19 Transport falls under Priority 4: Advanced Connectivity and Infrastructure. The long-term outcome is as follows:

"*To deliver an inclusive and productive economy we need to ensure all of Kirklees has the highest standards of connectivity and infrastructure. This includes not just road investment but public transport, active travel and modal shift to support the quality of our places, health, inclusion and air quality, safe, joined up cycling/walking routes and facilities and digital connectivity*"

Kirklees Local Plan (February 2019)

3.20 The KC Local Plan is the statutory development plan for the land under KC jurisdiction. The Local Plan was the subject of an Examination in Public (EIP) by a Government-appointed Inspector in February 2018 and was adopted in February 2019. The timespan of the Plan is 2013-2031.

3.21 Its purpose is to set out the policies necessary for sustainable development in the district. The Site for the Proposed Development is allocated within the KC Local Plan, in the Batley and Spen sub-area, reference MXS7 (Land east of, 932-1110 Leeds Road, Shaw Cross/Woodkirk, Dewsbury).

3.22 The Local Plan's Vision (4.2) states that

"Kirklees will be ideally placed to encourage inward investment and stimulate economic growth. This will be achieved through the provision of new prime employment land, Sites of strategic importance for employment with a focus on manufacturing and engineering including Whitehall Road, Cleckheaton and Chidswell and safeguarded employment land which, as a whole, provide the opportunities to grow

businesses, improve economic resilience and increase the district's ability to compete with other areas, economic benefits of housing delivery and the potential to reduce out-commuting."

3.23 Regarding transport, Section 6.1 states that in order to improve the vision, objectives and strategy, the Local Plan will "*improve transport links and sustainable travel"* through:

- *Support a pattern of development which helps facilitate the use of sustainable modes of transport by focusing most new development in the main urban areas where there is easier access to the core road and bus network*
- *Proper consideration of infrastructure opportunities and constraints relating to land allocations particularly where crucial infrastructure is needed to deliver growth.*
- *Focus on mixed use sites in the plan where land use mix can be more flexible, viable and allow for more sustainable development and place shaping, particularly in or on the edge of town centre locations."*

3.24 Additionally, Section 6.1 states that the Local Plan will "tackle inequality and give all residents the opportunity of a healthy lifestyle" by

- *"Avoiding allocating land for development in the worst areas of air quality in Huddersfield, Dewsbury, Batley and Spen*
- *Allocating/protecting key employment opportunities in areas of high unemployment and deprivation in Huddersfield, Dewsbury, Mirfield, Batley, Birstall, Cleckheaton*
- *Setting out transport proposals which address air quality issues*
- *Providing land for new homes in all parts of the district."*

3.25 In Chapter 10: Transport, Policy LP20: Sustainable travel states:

"The council will support development proposals that can be served by alternative modes of transport such as public transport, cycling and walking and in the case of new residential development is located close to local facilities or incorporates opportunities for day to day activities on site and will accept that variations in opportunity for this will vary between larger and smaller settlements in the area.

The council will support demand management measures which discourage single occupancy car travel within new development and encourage the use of low emission vehicles to improve areas with low levels of air quality. Proposals should include measures to encourage the use of sustainable travel options, including public transport, the promotion of personal journey planning, walking, cycling, car sharing, electronic communication and home working."

3.26 Further to this, Policy LP21: Highways and access states:

"*Proposals shall demonstrate that they can accommodate sustainable modes of transport and be accessed effectively and safely by all users… Proposals shall demonstrate adequate information and mitigation measures to avoid a detrimental impact on highway safety and the local highway network. Proposals shall also consider any impacts on the Strategic Road Network*."

3.27 Policy LP22: Parking states that:

"*Car parking provision in new developments will be determined by the availability of public transport, the accessibility of the site, location of the development, local car ownership levels and the type, mix and use of the development. New developments will incorporate flexibly designed minimum parking spaces for private cars, considering a range of solutions, to provide the most efficient arrangement of safe, secure, convenient and visually unobtrusive car parking within the site including a mix of on and off street parking in accordance with current guidance.*

"Car ownership levels are increasing despite car usage declining. There is need for new development to accommodate sufficient parking facilities. NPPF states when considering parking provision, a flexible approach is required that considers the accessibility of the development, the type, mix and use

of development, the availability of public transport, car ownership levels and a need to reduce the use of high-emission vehicles."

3.28 Policy LP23: Core walking and cycling network, Section 10.101 states that:

"*All proposals will be expected to have regard to the core walking and cycling network and demonstrate how their development will provide connecting links to the network where appropriate. On larger Sites, developers will be expected to contribute to the enhancement of existing sections of the core network or contribute to the establishment of new sections of the route where the Site would benefit from improved links to existing settlements and transport hubs. These can be delivered through scheme design, planning conditions and the use of planning obligations*."

3.29 As mentioned above, Kirklees Local Plan's Infrastructure Delivery Plan Addendum (November 2016) expands on the A653 Leeds Road renovation plans. It states that Policy TS5, the A653 Leeds Road Corridor, is in the Mirfield to Dewsbury to Leeds and North Kirklees Growth Zone, and that the junction renovations are essential.

3.30 It goes on to state that the impact for Kirklees will be to "reduce bi-directional journey times for all modes on the A653 and A644 corridors and Improve access to the M1 and M62, allowing businesses in North Kirklees to become better connected to labour markets across West Yorkshire." The improvements will thus:

"*'Kick-start' the transformative change of the urban centre of Dewsbury by encouraging investment and inward migration into the local area. Enhancing [sic] connectivity for walking and cycling between Dewsbury and its neighbourhoods and the associated uptake in active travel will improve the general health of the residents in the area. An improvement to public transport provision along the key route network will reduce the impact on air quality associated with overuse of the private car. The scheme will provide for future housing and employment growth in the local area and also maximise the benefit of the Bradford Road corridor as a well-developed and popular employment location and entertainment destination*."

3.31 Most relevant to the Proposed Development are the comments

"There will be improvements along the A653 corridor between Dewsbury and Leeds, in particular at the junction of the A653 and B6128 (Shaw Cross) to facilitate improvements to bus and car journey times between Dewsbury and Leeds, proving more efficient journeys to Leeds city centre, White Rose, Aire Valley and the M62 corridor and to accommodate a major mixed-use allocation in Chidswell."

3.32 The junction mentioned in this quote is at the south-west corner of the proposed Site. The effect of these works should have a positive benefit to transport leading from the Proposed Development.

Kirklees Highways Design Guide (October 2018)

3.33 The most relevant sections of the Kirklees Highway Design Guide include:

- Paragraph 5.2, Parking, which states that "*Kirklees Council has not set local parking standards for residential and non-residential development, however in practice the majority of new 2 to 3 bedroom dwellings within Kirklees have provided 2 off-street car parking spaces; with 4+ bedroom dwellings providing 3 off-street car parking spaces. New 1-2 bedroom apartments have provided 1 space (3+ bed 2 spaces). In most circumstances this has been supplemented by visitor spaces at the rate of 1 per 4 dwellings. One cycle space per unit is recommended. The Council can advise on provision for other uses*." It also makes specific design requirements which are appropriate for a detailed planning application.
- Paragraph 6.2, Servicing (Vehicle Path), which states that "*Computer-aided vehicle path tracking should be undertaken to ensure that refuse vehicles (and other service vehicles) can manoeuvre along the highway, and past any likely locations for on-street parking*."
- Paragraph 6.5, Servicing (Waste Collection), which states that "*a) Adequate bin storage should be provided for all dwellings, with easy, level access from the storage location to the*

collection point. Bin storage areas should be well integrated in enclosed or otherwise discreet/well screened areas, and must meet fire safety standards.
b) Careful consideration should be given to the location of bin storage facilities to ensure that the amenity of residents is not impacted (i.e. due to odour or anti-social behaviour/crime). Bin storage areas and bin presentation points should be carefully considered and approved by the Council's waste service team before planning submission.
c) Development proposals which may impact on the waste collection needs of a property are required to provide a Waste Management Plan to the Council's Waste Services Team prior to planning submission."

- Paragraph *6*.6, Servicing (Waste Collection), which states that "*The design of private land around each property should provide sufficient space to accommodate the secure storage of at least two 240 litre wheeled bins (one grey bin for residual waste and one green bin for recycling)*."
- Paragraph 6.9, Servicing (Waste Collection), which states that "*Where practicable, highways should be designed to accommodate a refuse vehicle with the following dimensions:*
    - *Length = 11.85 metres*
    - *Width = 2.5 metres*
    - *Width when Loading = 4.1 metres*
    - *Height = 6 metres*
    - *Turning circle (wall to wall) = 22.07 metres*
    - *Turning circle (between kerbs) = 17.88 metres*
    - *Gross Vehicle Weight = 26 tonnes*
    - *N.B. Refuse vehicle tracking shall be undertaken at a design speed of 15mph on Street Types A and B or 10mph on Street Type C*."

Highways Development Delivery Advice Note

3.34 The KC Highways Development Delivery Advice note states the car parking standards for large developments in Kirklees. These are listed below:

Kirklees car parking standards

Kirklees car parking standards		
Number of bedrooms	**Long-stay**	**Short-stay**
3 bedroom dwelling	2 spaces	1 visitor space per residential unit.
4+ bedroom dwelling	3 spaces	1 visitor space per residential unit.
1-2 bedroom apartment	1 space	1 visitor space per residential unit.
3+ bedroom apartment	2 spaces	1 visitor space per residential unit.

3.35 In addition, the advice note states the cycle parking *desirable* (emphasis added) standard is 1 space per residential unit.

3.36 With regard to electric vehicle charging points, the advice note requires 1 per dwelling and presumes each will be located inside a garage.

3.37 The garage dimension standards specified in the advice note are repeated below:

Kirklees garage dimension standards

Kirklees garage dimension standards (internal)	
Single	Single: 6.0m long x 3.0m wide
Double	6.0m long x 5.0m wide

Conclusion

3.38 The direction of travel of planning policy in the UK is towards enabling sustainable development. Kirklees and the wider West Yorkshire region are identified for substantial growth and being located near to Leeds and a number of the other regional centres, the Site is well placed to capture and accommodate this demand for growth.

3.39 National policy seeks to embed transport planning into the planning consideration process at the earliest opportunities. The location of the Site adjacent to a number of national-scale strategic transport corridors supports policy by providing best access to the existing transport network and reinforcing the viability of existing sustainable transport provision. Through the local planning process and supported at the regional level, the Site was allocated for mixed-use development through the Local Plan. That process required demonstration that the Site was appropriate for growth and that local, regional and strategic objectives could be supported by it, and the case remains through the current proposals.

4 Development Proposals

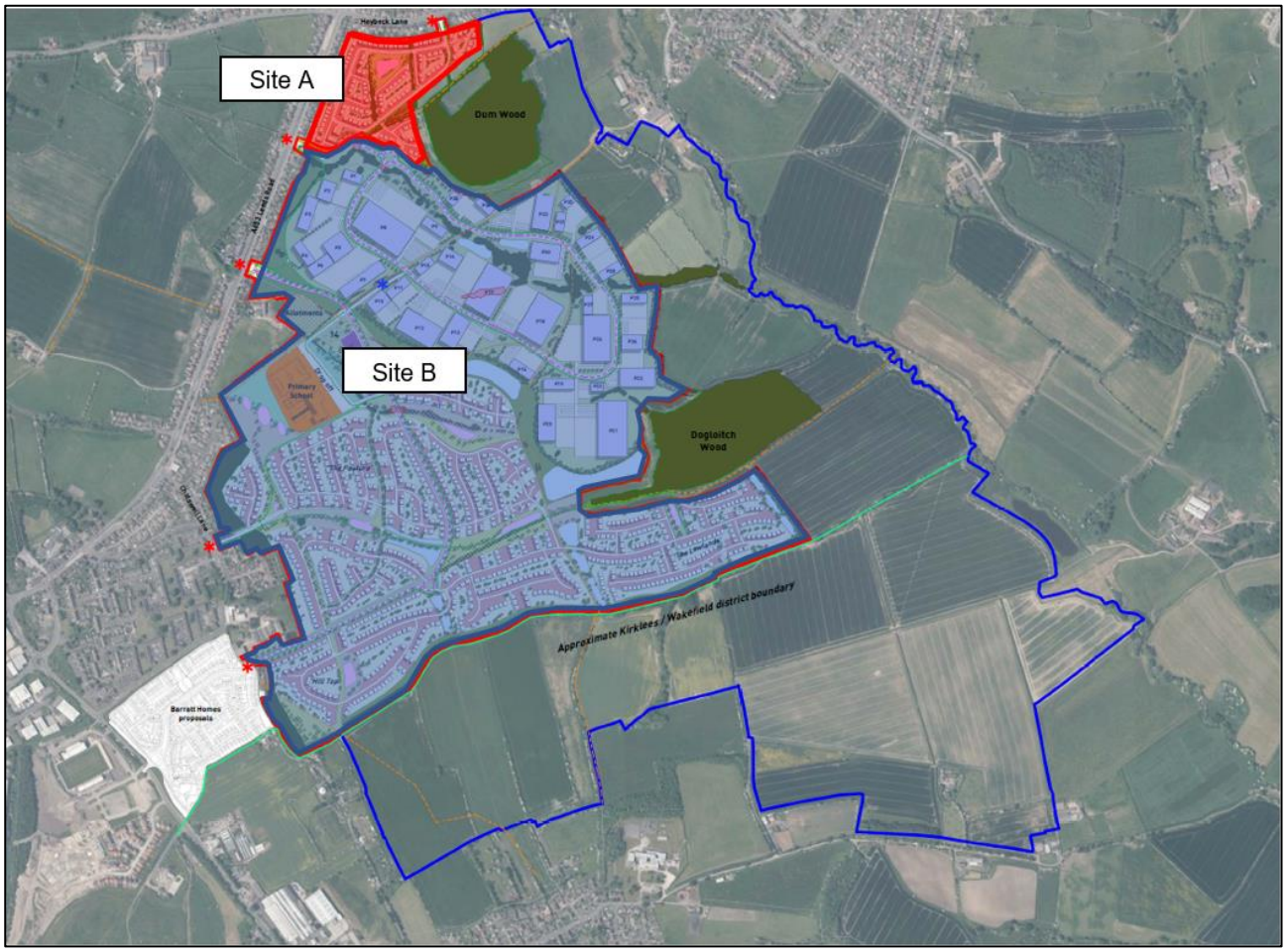
Introduction

4.1 This chapter considers the proposals for development of the Site, how Site access will be achieved, and those key items of internal provision which are established at this outline stage.

Site Plan Overview

4.2 The Site is split into two development parcels, referred to as 'Land at Heybeck Lane' (Site A) and 'Land to the east of Leeds Road' (Site B). It is proposed that each of Site A and Site B are the subject of separate outline planning applications, that will be submitted to KC in parallel. This TA and the accompanying FTP have been prepared to assess the combined impacts of the Proposed Development of both Site A and B as a whole (and also of Site A only) and each will be submitted twice, once with each planning application. An area plan to show the location of Site A and Site B is presented at **Figure 4.1**.

Figure 4.1: Sites A and B Location Plan



Source: Enjoy Design Masterplan Revision P with Pell Frischmann annotations

4.3 Land at Heybeck Lane (Site A) will comprise up to 181 residential dwellings.

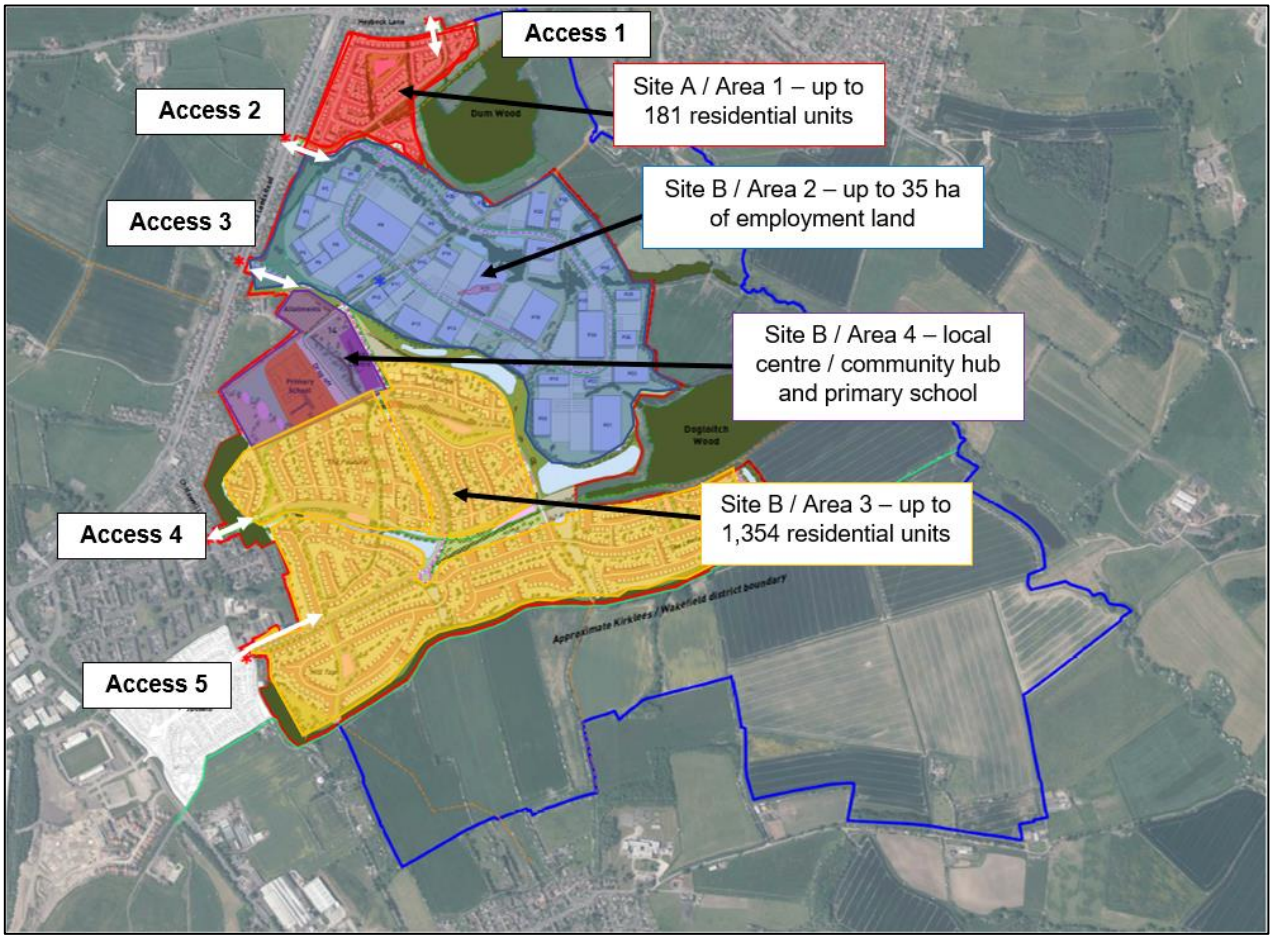
4.4 Land to the east of Leeds Road (Site B) will comprise up to 1,354 residential dwellings[2] (C3 use class), a local centre / community hub which includes a 2FE primary school, and 35 hectares (ha) of employment land equating to up to 122,500 square metres (m^2) Gross External Area (GEA). For the purpose of this analysis, the illustrative masterplan has assumed floor areas for each land use category as follows:

- B1(a) Office Use: 18375m^2 (GEA);
- B1(c) Light Industrial Use: 12250m^2 (GEA);
- B2 General Industrial Use: 30625m^2 (GEA); and
- B8 Warehousing: 61250m^2 (GEA).

4.5 Ultimately the split between employment land uses to be delivered is flexible with the above numbers being illustrative in status, with the exception of B1(a) Office use (at 15% of the total floorspace), which, to ensure a robust 'worst case' assessment in transport terms, is specified as a maximum.

4.6 The emerging Masterplan and Illustrative Development Parcels are shown on **Figure 4.2** below.

Figure 4.2: Illustrative Masterplan and approximate Land Parcels Plan



Source: Enjoy Design Masterplan Revision P with Pell Frischmann annotations

[2] Some units may be delivered as C2 Use Class 'residential institutions', however as these generate fewer trips, the assessment as exclusively C3 Use Class 'dwelling house' ensures a robust and 'worst-case' assessment in transport terms.

Proposed Access Arrangements

Vehicular Site Access

4.7 It is proposed to provide five points of vehicular access onto the local highway network.

4.8 All proposed Site access junctions have been the subject of extensive discussions with and have been agreed in principle with KC Highways officers. The nature and location of proposed Site access arrangements has been the subject of extensive discussions with KC Highways officers both prior to Local Plan EIP, throughout the development of the emerging masterplan proposals and as part of TA scoping discussions. As confirmed in the KC Transport Scoping Response (see **Appendix A**) the principle of signal-controlled Site access junctions on Leeds Roads has been discussed and agreed with KC Highways officers, as has the nature and location of the other three proposed Site access junctions.

4.9 With reference to Pell Frischmann 'Leeds Road Site Accesses – Sensitivity Test' Technical Note (dated 4th October 2018), the nature and form of Leeds Road proposed Site access arrangements as signal-controlled junctions are discussed. Alternative junction options (such as roundabouts) were considered but concluded as not being feasible due to:

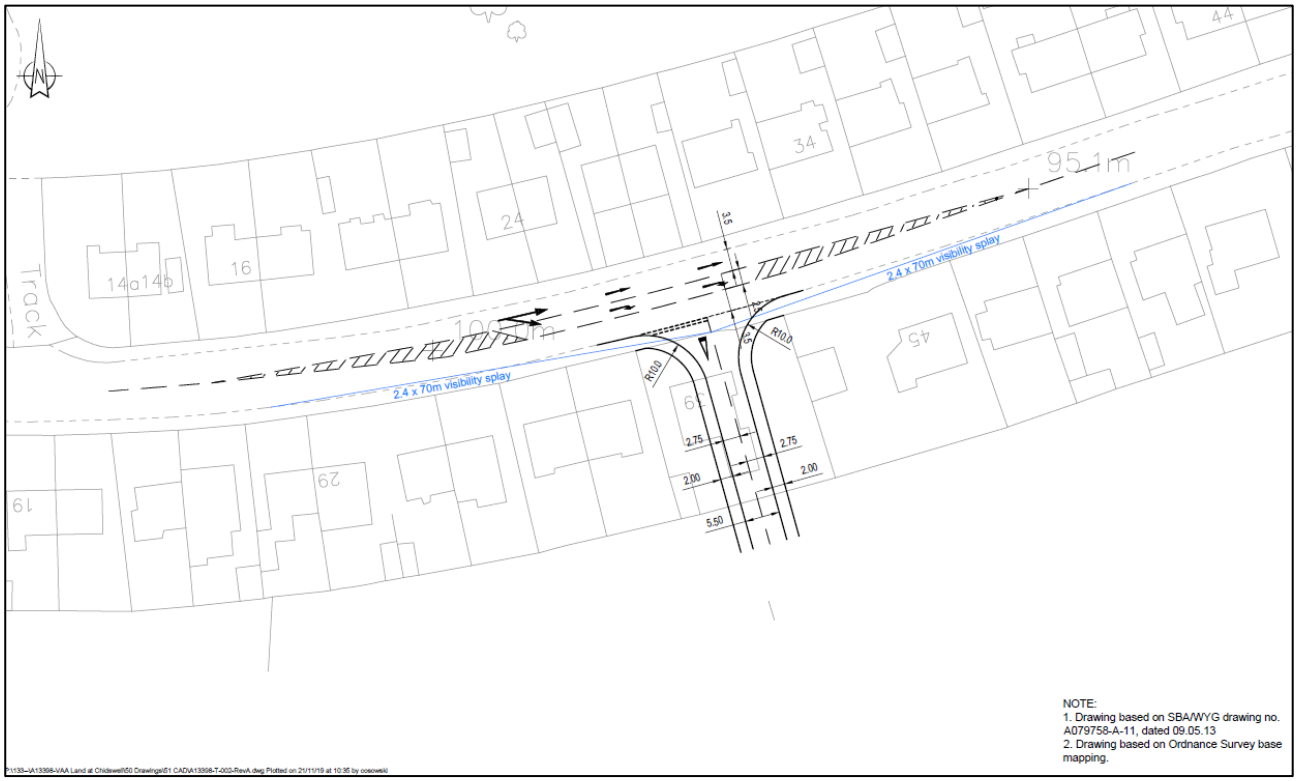
- Level differences along Leeds Road – the two carriageways vary in vertical alignment, meaning any new junction would be limited by significant issues of crossfall. Additionally, levels fall substantially towards the east upon entering the Site;
- Provision of roundabouts requires significant expansion in the amount of land required;
- New priority junctions are not feasible on Leeds Road due to existing north-south traffic flows which would make it difficult for vehicles to enter and exit the Site safely and efficiently.

4.10 Internal access between Sites A and B will be possible but restricted to non-motorised and emergency vehicle users only.

Site Access 1 – Heybeck Lane

4.11 To the north of the Site Access 1 takes the form of a ghost island right turn lane junction which is shown on **Figure 4.3** below.

Figure 4.3: Site Access 1 – Heybeck Lane

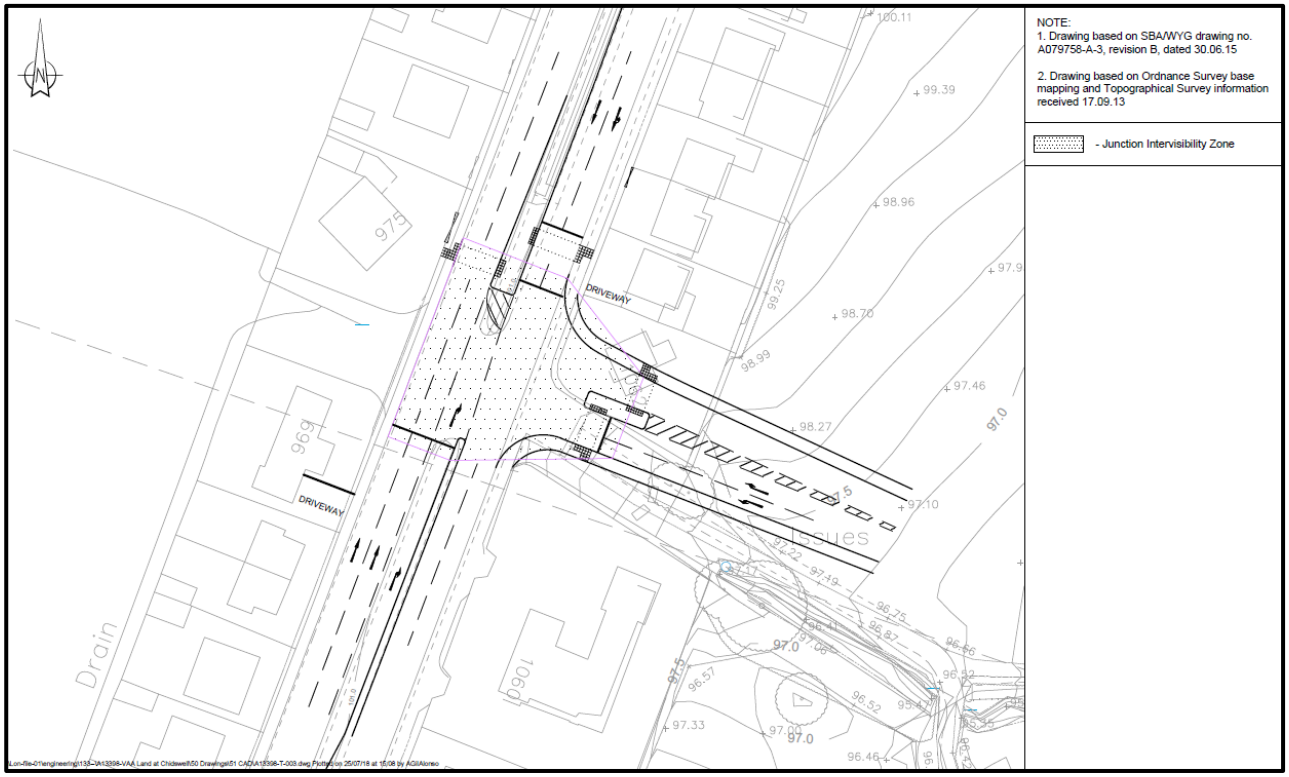


Source: Pell Frischmann drawing ref: A13398-T-002 Revision A (see Appendix G)

Site Access 2 – Leeds Road (North)

4.12 A signalised junction is proposed at Access 2 on Leeds Road (North) as shown within Figure 4.4.

Figure 4.4: Site Access 2 – Leeds Road (North)

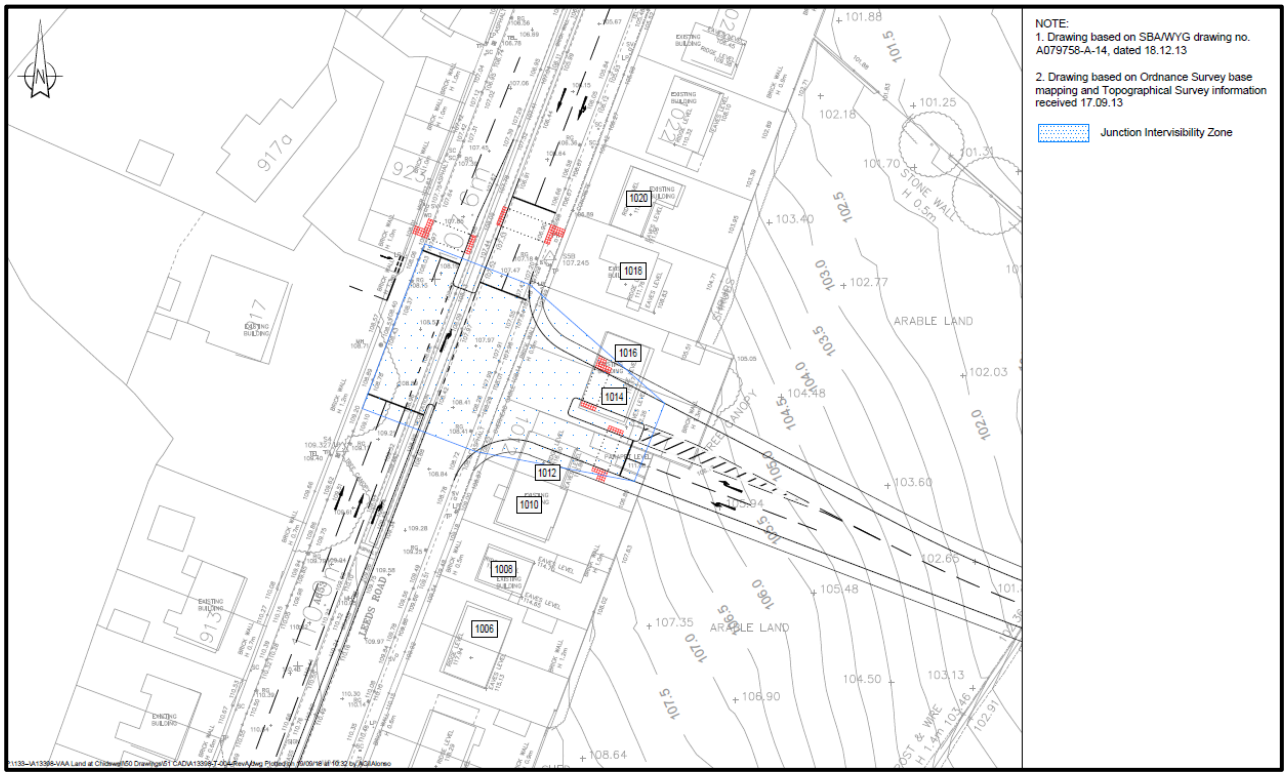


Source: Pell Frischmann drawing ref: A13398-T-003 (see Appendix G)

Site Access 3 – Leeds Road (South)

4.13 Site Access 3 (Leeds Road South) is also to be provided as a signalised junction. The design is shown in **Figure 4.5** below.

Figure 4.5: Site Access 3 – Leeds Road (South)

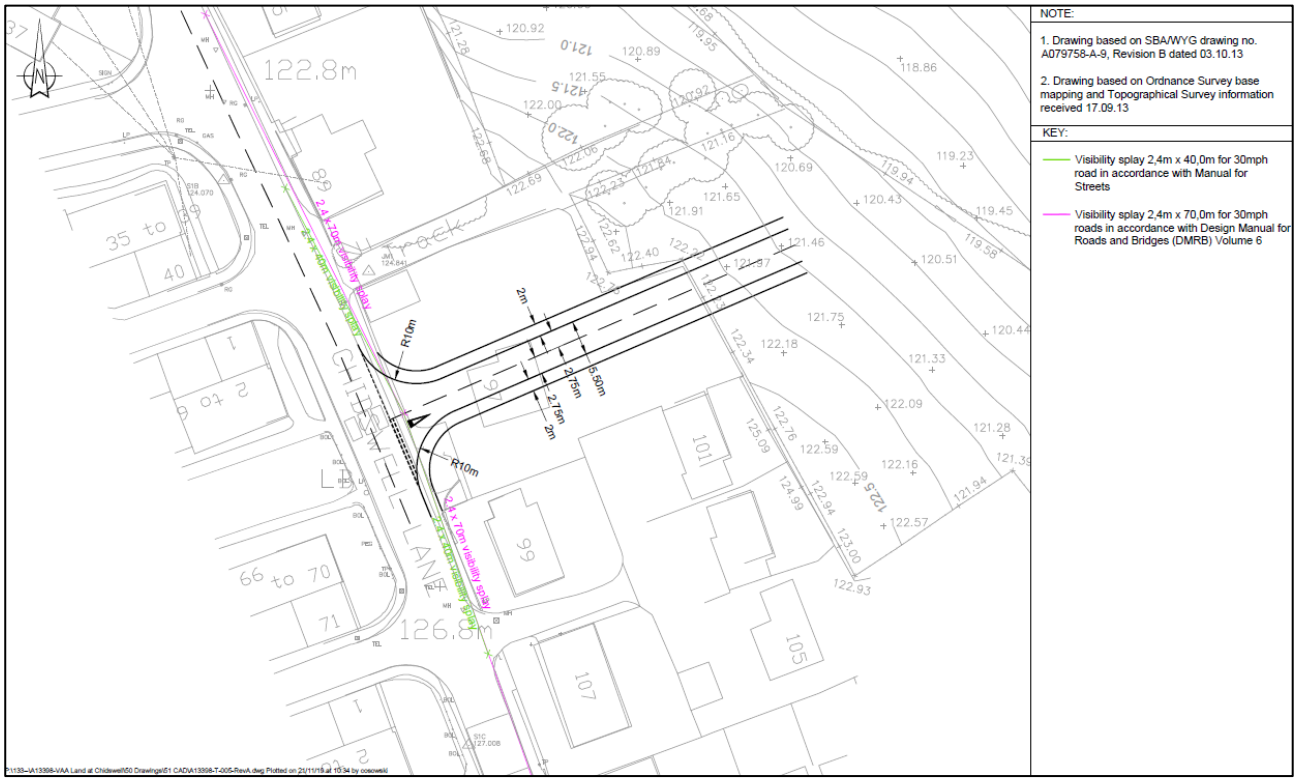


Source: Pell Frischmann drawing ref: A13398-T-004 Revision A (see Appendix G)

Site Access 4 – Chidswell Lane

4.14 Site Access 4 is also proposed in the form of a priority T-junction onto Chidswell Lane as shown on **Figure 4.6** below.

Figure 4.6: Site Access 4 – Chidswell Lane



Source: Pell Frischmann drawing ref: A13398-T-005 Revision A (see Appendix G)

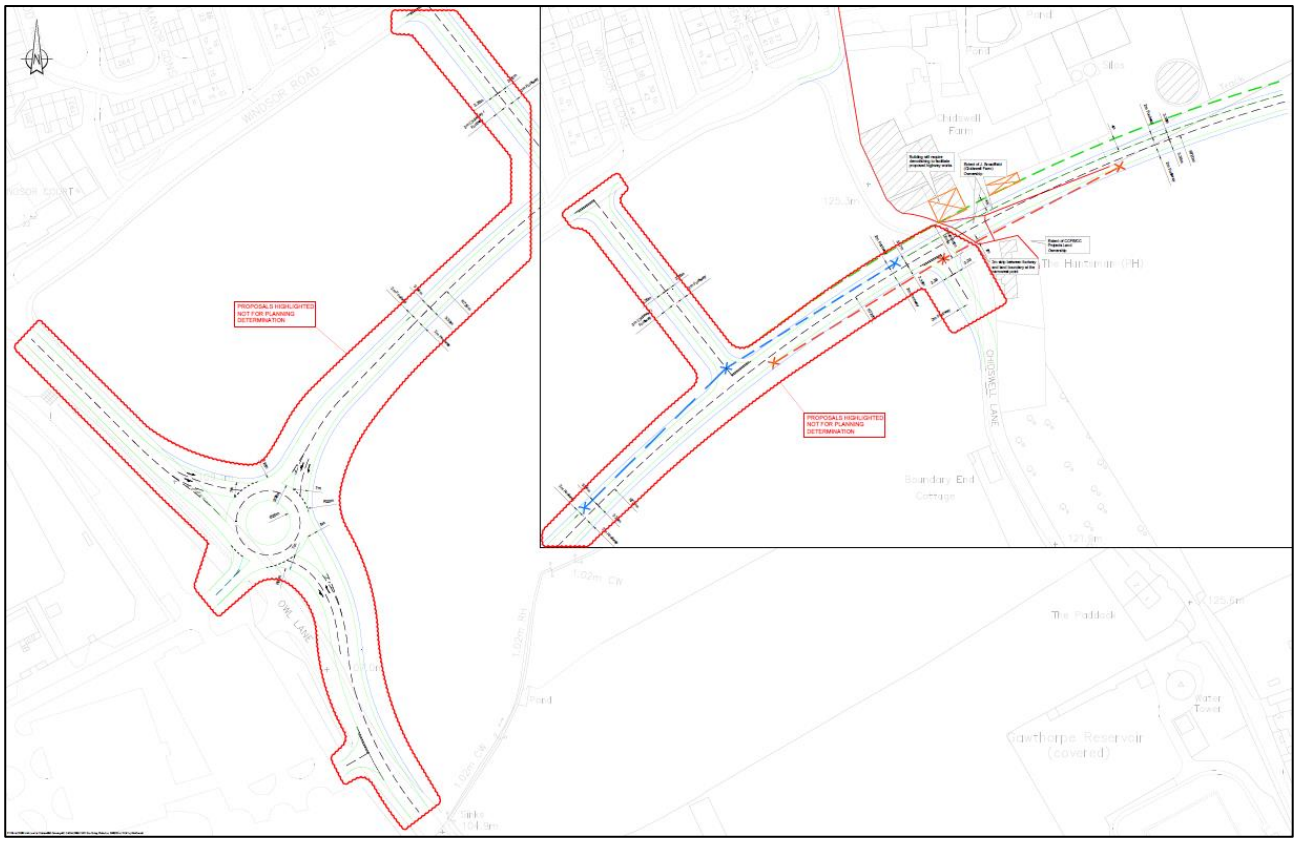
Site Access 5 – Owl Lane

4.15 Site Access 5 is proposed in the form of a four-arm roundabout on Owl Lane with a new access road running parallel to Windsor Road between Owl Lane and the southern edge of the Site. As noted above, this would include running through an adjacent landholding under the control of Barratt David Wilson Homes (BDWH) (KC Local Plan Site allocation reference HS47 'Land to the East of Leeds Road, Chidswell') to the south-west of the Site.

4.16 Discussions have taken place between the Applicant and Barratt David Wilson Homes, including their respective planning and transport consultants, to discuss and seek to agree the proposed nature and form of this access. A proposed site access arrangement layout, prepared on behalf of and preferred by the Applicant, is shown in **Figure 4.7** below. The areas of the drawing highlighted and outlined in red bubbles are indicative and are not for planning determination.

4.17 At time of writing (between December 2019 and April 2020), a planning application (KC Planning Ref: 2019/92787) has been submitted to KC supported by its own transport assessment prepared by Via Solutions. This includes a spine road and access junction layout different to that preferred by the Applicant. This is shown in **Figure 6.16** and has been tested for the purpose of the highway impact assessment presented in **Chapter 6**, but is a matter of ongoing discussion between the two Applicants and through the planning process.

Figure 4.7: Site Access 5 – Owl Lane



Source: Pell Frischmann drawing ref: A13398-T-001 Revision B (see Appendix G)

Car Parking

4.18 Although Kirklees Local Plan Policy LP22 (summarised in Paragraph 3.27) does not set specific minimum or maximum parking standards, and the previous standards in the Kirklees Unitary

Development Plan Policy T19 and Appendix 2 have been superseded, there are some parking standards recommended by KC.

4.19 Kirklees Highway Design Guide makes recommendations for number of parking spaces per residential unit, according to number of bedrooms. This is further supported by the Highways Development Delivery Advice Note, quoted in Paragraphs 3.34 to 3.37.

4.20 Regarding the Proposed Development, the number and location of its car parking spaces for Use Class C3 (Residential) units, and Use Class B1, B2 and B8 Business units, parking may be specified by KC standards in terms of spaces per house or the number of square metres of land used. Although the number of residential units and square metres built on is known at this time, the exact size and layout of the units is yet to be determined as the application is still at outline stage. In addition, the precise layout of the business land uses is also not yet determined. For this reason, subsequent reserved matters applications for each phase will include the exact number and location of parking spaces to be contained in the Proposed Development, in full accordance with KC standards.

4.21 In accordance with current KC policy, all residential dwelling parking will feature at least one electric point capable of being used for the charging of electric vehicles (in a garage where appropriate).

Pedestrian Access

4.22 Every Site Access road designed as part of the Proposed Development incorporates footways on either side and in accordance with KC Highways Design Guide (2018), as follows:

- **Site Access 1** contains 2-metre-wide footways on either side. This is in keeping with existing footway widths on Heybeck Lane, which are approximately 2 metres immediately west of the access and vary between approximately 3.2 and approximately 2.5 metres immediately east of the access.
- **Site Access 2** contains 2-metre-wide footways on either side. This is in keeping with existing footway widths on the A653 Leeds Road, which are approximately 2.3 metres immediately north of the access and approximately 2.4 metres immediately south of the access. The pedestrian crossings feature drop kerbs and tactile paving.
- **Site Access 3** contains 2-metre-wide footways on either side. This is in keeping with existing footway widths on the A653 Leeds Road, which are approximately 2 metres immediately north of the access and approximately 2.4 metres immediately south of the access. The pedestrian crossings feature drop kerbs and tactile paving.
- **Site Access 4** contains 2-metre-wide footways on either side. This is in keeping with existing footway widths on Chidswell Lane, which are approximately 2.4 metres immediately north-west of the access and approximately 2 metres immediately south-east of the access.

Bus Access

4.23 The Site is currently well served by public transport. However, given the large number of new residents and employees on the Site, and the associated growing demand for sustainable travel options, would encourage commercial operators to seek to run additional services. Furthermore, the internal Spine Road has been designed to accommodate the potential provision of bus services in the future. This would bring all but the most distant extents of the Site to within 400m range of bus services. The Applicant proposes to engage with local public transport operators to establish the commercial feasibility of bringing services into the Site in the future.

Cycle Access

4.24 Cycle access is via the five vehicular access roads outlined above and in addition through the network of internal cycle routes which includes a connection between Sites A and B.

Cycle Parking

4.25 In accordance with Kirklees Local Plan Policy LP21 Highways and access, the Proposed Development will provide on-site safe, secure and convenient cycle parking/storage facilities, as part of a package of measures to encourage sustainable travel modes.

Heavy Goods Vehicle (HGV) Access

4.26 Heavy Goods Vehicle (HGV) traffic relating to the employment uses will be restricted to entry/exit through Site Access 2 so as to avoid heavy traffic using unsuitable routes through the residential areas of the Site and the adjacent BDWH Site to the south.

4.27 An internal road connection is provided between the employment area and the remainder of Site B. This will feature a width restriction (either physical or by enforced traffic order) so as to prevent passage by large vehicles.

Proposed Servicing and Refuse Collection Arrangements

4.28 The Illustrative Masterplan has been developed in accordance with KC Highways Design Guide (2018). This demonstrates that, at reserved matters stage, the Proposed Development's internal roads can be designed to accommodate appropriate levels and dimensions of service and refuse traffic.

Conclusion

4.29 Given that the application is at the outline level of detail, the proposals for the internals of the Site are necessarily illustrative and focus here is generally on the external-facing aspects, such as the Site accesses. These are proposed to a feasibility level but are shown to be deliverable within the geometric constraints and the wider scope of the proposed masterplan and Site layout.

4.30 Car parking (including electric vehicle charging) and cycle parking, whilst ultimately matters of the relevant reserved matters applications for those phases of the Site, will be delivered in line with prevailing KC policies. Internal highways will be provided in line with the KC Highways Design Guide (2018) hierarchy. Such provision passively provides for potential future bus route(s) through the Site and enables access by refuse and other service vehicles, where appropriate.

4.31 Heavy Goods Vehicle (HGV) traffic relating to the employment areas will be constrained to that part of the Site (and access through Site Access 2) by a width restriction on the internal connection between the employment and residential parts of the Site.

4.32 The impact of Proposed Development traffic on the wider highway network is considered further in Chapter 6.

5 Trip Generation

Introduction

5.1 A multi-modal trip generation assessment has been undertaken to assess the impact of the Proposed Development on the local highway network. The purpose of this is to quantify the potential impact of the Proposed Development in terms of the number of trips, by mode, and including vehicle-based trips that could be expected to be generated by the Proposed Development.

5.2 Trip rates used in the following analysis were derived from the industry-standard TRICS trip rate database. The trip generation approach and methodology, including trip rates, were reviewed by KC Highways Officers (and officers at HE, LCC and WC) through a scoping process, and have been confirmed as being appropriate for the Proposed Development.

Background

5.3 To support the Kirklees Local Plan development process to allocate the Site in 2016, as part of the previous Interim Transport Assessment (ITA) appropriate trip rates were calculated from the then current version of TRICS (v7.3.1). An exercise was undertaken through the scoping process for this submission in 2019 to establish whether those trip rates remained applicable and acceptable to the relevant local and highway authorities. Using the same methodology but the current version (v7.6.1, 2019) of TRICS at that time of scoping, the result would have been a reduction in equivalent trip rates of approximately 15-20%. Consideration was also taken of the view of HE through the 2019 scoping process.

5.4 Consequently, to ensure a robust test case for future trip rate calculations – and one acceptable to the relevant highway authorities – the (higher) and previously agreed 2016 (v7.3.1) trip rates are retained for use in this assessment for residential uses and for B1(a) Office uses. More recent (and higher) B1(c), B2 and B8 trip rates have been determined from the current (December 2019, v7.6.3) TRICS database. This ensures a robust trip rate for each and all use classes. Full TRICS reports are supplied at **Appendix B**.

Trip Generation Approach and Methodology

5.5 Person trip rates from the TRICS database were derived from selected survey sites identified as sharing characteristics similar to the emerging masterplan proposals, based on a number of criteria. The site selection process was carried out in accordance with the TRICS *Good Practice Guide* and the requirements of KC (and HE).

5.6 For the purpose of the trip generation assessment, the Site was identified as being within a 'Neighbourhood Centre'. In accordance with the TRICS *Good Practice Guide*, only survey sites that are categorised as being located within a 'Neighbourhood Centre', 'Edge of Town' or 'Suburban Area' were therefore included in the site selection process. Sites in town centres and edge of town centres were excluded. Sites in Greater London and Ireland were also excluded. Site selection therefore focussed on the North, North West, Yorkshire, Midlands and East Anglia regions within TRICS. Sites in the South West, Wales, Scotland and the South East were only considered where a lack of comparable sites from the other regions was evident.

5.7 With regards to the data range, in accordance with the TRICS *Good Practice Guide* and with the purpose of using only up-to-date surveys, a cut-off-date of 1st January 2005 was initially applied to exclude any surveys that were considered too old. However, following an initial review and following receipt of feedback from KC Highways Officers, additional surveys were subsequently considered for between 2000 and 2005. This was to ensure that an adequate range of sites was considered.

Residential – C3 Residential Dwellings

5.8 It is expected that the proposed residential units at the Site will comprise a mix of privately owned (market) and affordable dwellings. For the purpose of the TA, it is assumed (for robustness) that 90% will be privately owned and 10% will be in affordable ownership, however the eventual split is a matter for discussion between the Applicant and KC officers.

5.9 Trip rates for both 'Privately Owned Houses' and 'Affordable / Local Authority Houses' will therefore be considered to ensure the distinct trip generation characteristics of the two types of dwelling are reflected in the assessment. On this basis, a total of 19 sites (comprising 12 'private' and 7 'affordable') were identified within the TRICS database. Residential trip rates generated from the above methodology are summarised in **Table 6.1**.

Employment – B1(a) Business (Office), B1(c) Business (Light Industry), B2 General Industry and B8 Storage or Distribution

5.10 It is expected that the proposed employment uses at the Site will comprise a mix of 'B1(a) Business (Office)', 'B1(c) Business (Light Industry)', 'B2 General Industry' and 'B8 Storage or Distribution' Use Classes. The site selection for each Use Class is derived from the following land use categories contained within the TRICS database:

- **B1(a) Business (Office)** – '02 Employment – (B) Business Park';
- **B1(c) Business (Light Industry)** – '02 Employment – (D) Industrial Estate';
- **B2 General Industry** – '02 Employment – (D) Industrial Estate'; and
- **B8 Storage or Distribution** – '02 Employment – (F) Warehousing (Commercial)'.

5.11 As noted above, full TRICS reports are supplied at **Appendix B**. For purpose of summary, agreed total person trip rates used for this TA, are set out in **Table 5.1**.

Table 5.1: TRICS Total Person Trip Rates (Trips per Dwelling or 100m² GFA)

Land Use	Time Period	Arrivals	Departures	Total Two-Way
Residential Dwellings (Private) (C3 Use Class) (trips per dwelling)	08:00 – 09:00	0.233	0.818	1.051
	17:00 – 18:00	0.605	0.390	0.995
	Daily (07:00-19:00)	**4.185**	**4.445**	**8.630**
Residential Dwellings (Affordable) (C3 Use Class) (trips per dwelling)	08:00 – 09:00	0.211	0.669	0.880
	17:00 – 18:00	0.477	0.373	0.850
	Daily (07:00-19:00)	**3.472**	**3.607**	**7.079**
Business (Office) (B1(a) Use Class) (trips per 100m² GFA)	08:00 – 09:00	1.970	0.268	2.238
	17:00 – 18:00	0.218	1.627	1.845
	Daily (07:00-19:00)	**7.148**	**7.022**	**14.170**
Business (Light Industry) (B1(c) Use Class) and General Industry (B2 Use Class) (trips per 100m² GFA)	08:00 – 09:00	0.747	0.263	1.010
	17:00 – 18:00	0.321	0.869	1.190
	Daily (07:00-19:00)	**4.855**	**4.735**	**9.590**
Storage or Distribution (B8 Use Class) (trips per 100m² GFA)	08:00 – 09:00	0.483	0.085	0.568
	17:00 – 18:00	0.022	0.389	0.411
	Daily (07:00-19:00)	**2.463**	**2.632**	**5.095**

Total Person Trips

5.12 The total person trip rates identified in **Table 5.1** will be used to derive the total number of person trips expected to be generated by the emerging masterplan proposals at the site. The resultant two-way person trips for the residential element of the masterplan are presented in **Tables 5.2 and 5.3**.

5.13 An Illustrative split of use classes has been assumed for this TA. As noted above, residential trips (for a total of 1535 units across Site A (181 units) and Site B (1354 units)) will be split between 90% at the 'private' ownership rate, and 10% at the 'affordable' ownership rate for the purpose of this assessment. Employment trips will be split in line with the Illustrative Masterplan proportions of:

- B1(a) Office Use: 18375m² (GEA; 15%);
- B1(c) Light Industrial Use: 12250m² (GEA; 10%);
- B2 General Industrial Use: 30625m² (GEA; 25%); and
- B8 Warehousing: 61250m² (GEA; 50%).

5.14 It is again noted that these employment land use area splits are based upon the Illustrative Masterplan and represent flexible uses with the exception of the B1(a) Office use which represents a maximum, to ensure a robust 'worst case' assessment in transport terms.

Table 5.2: Total Residential Two-Way Person Trips

Residential Trips	Time Period	Arrivals	Departures	Total Two-Way
Residential (Private) (C3 Use Class) 1382 dwellings	08:00 – 09:00	322	1130	1452
	17:00 – 18:00	836	539	1375
	Daily (07:00-19:00)	**5,784**	**6,143**	**11,927**
Residential (Affordable) (C3 Use Class) 153 dwellings	08:00 – 09:00	32	102	135
	17:00 – 18:00	73	57	130
	Daily (07:00-19:00)	**531**	**552**	**1083**
Residential (Total)	*08:00 – 09:00*	*354*	*1233*	*1587*
	17:00 – 18:00	*909*	*596*	*1505*
	Daily (07:00-19:00)	***6,315***	***6,695***	***13,010***

Table 5.3: Total Employment Two-Way Person Trips

Residential Trips	Time Period	Arrivals	Departures	Total Two-Way
B1(a) Office 18375 sqm GEA	08:00 – 09:00	362	49	411
	17:00 – 18:00	40	299	339
	Daily (07:00-19:00)	**1,313**	**1,290**	**2,604**
B1(c) Light Industry 12250 sqm GEA	08:00 – 09:00	92	32	124
	17:00 – 18:00	39	106	146
	Daily (07:00-19:00)	**595**	**580**	**1,175**
B2 General Industry 30625 sqm GEA	08:00 – 09:00	229	81	309
	17:00 – 18:00	98	266	364
	Daily (07:00-19:00)	**1,487**	**1,450**	**2,937**
B8 Warehousing 61250 sqm GEA	08:00 – 09:00	296	52	348
	17:00 – 18:00	13	238	252
	Daily (07:00-19:00)	**1,509**	**1,612**	**3,121**
Employment (Total)	*08:00 – 09:00*	*978*	*214*	*1192*
	17:00 – 18:00	*191*	*910*	*1101*
	Daily (07:00-19:00)	***4,904***	***4,933***	***9,836***

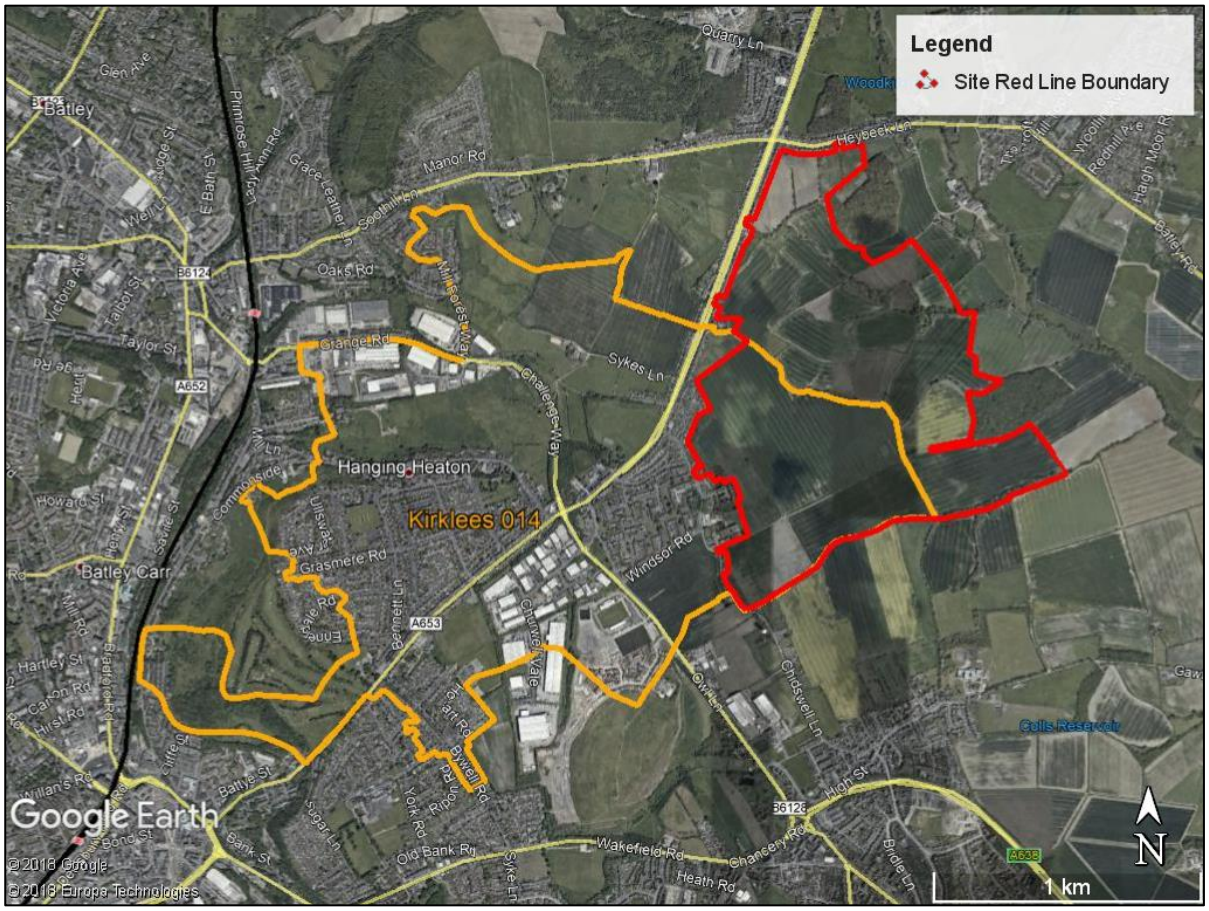
5.15 Complete breakdowns of trip rates per hour, trip numbers by time and mode, and for each component of the Site and scenarios are detailed at **Appendix C**.

Mode Split

5.16 Following the outcomes of the total person trip generation for each proposed land use, the trips are subdivided onto modes. In accordance with the approach and methodology agreed through the 2019 scoping process with KC, HE and others, this is based on the use of ONS 2011 Journey to Work Census data for the local area.

5.17 For the purpose of the following, and to enable the consistent use of 2011 Census data, the local area is defined as the Kirklees 014 Medium Super Output Area (MSOA; ONS Code E02002284). The coverage of Kirklees 014 relative to the Site is shown in **Figure 5.1**. Kirklees 014 is considered appropriate as the southern part of the Site is located within Kirklees 014 (including the majority of the residential use), the entire MSOA is located away from local public transport hubs and the Kirklees 014 MSOA includes both residential and significant employment areas with a land use mix comparable with that proposed on the Site. This applicability ensures that existing behaviours within/from/to Kirklees 014 are likely to be reflective of the new Site occupiers' behaviours.

Figure 5.1: Extent of Kirklees 014 MSOA and Layout Relative to the Site



Source: Google Earth with Pell Frischmann annotations

Residential – C3 Residential Dwellings

5.18 As detailed above, following agreement through scoping with KC, HE and others, the mode split for the residential land use is derived from ONS 2011 Census data for the Kirklees 014 MSOA (reference no. E02002284), which is considered to be the MSOA most representative of the Site's residential travel characteristics upon first occupation. Mode spilt is captured for journey-to-work trips (Census data set: WU03EW Location of usual residence and place of work by method of travel to work (MSOA level) for those persons living in Kirklees 014 and working elsewhere in the Yorkshire & Humber region. Proposed residential mode split for the Site are set out in **Table 5.4**.

Table 5.4: ONS 2011 Census Kirklees 014 Residential Mode Split (%)

Mode	Kirklees 014 MSOA (%)
Underground, metro, light rail, tram	0
Train	2
Bus, minibus or coach	7
Taxi	1
Motorcycle, scooter or moped	1
Driving a car or van	70
Passenger in a car or van	8
Bicycle	1
On foot	9
Other	1
Total	100

Employment – B1(a) Business (Office), B1(c) Business (Light Industry), B2 General Industry and B8 Storage or Distribution

5.19 In accordance with the approach agreed through scoping with KC, HE and others, the mode split for the employment land uses is derived from ONS 2011 Census data for the Kirklees 014 MSOA (reference no. E02002284), which is considered to be the MSOA most representative of the Site's employees' travel characteristics upon first occupation. Mode spilt is captured for journey-to-work trips (Census data set: WU03EW Location of usual residence and place of work by method of travel to work (MSOA level)) for those persons working in Kirklees 014 and living elsewhere in the Yorkshire & Humber region. The proposed employment mode split for the Site is set out in **Table 5.5**.

Table 5.5: ONS 2011 Census Kirklees 014 Employment Mode Split (%)

Mode	Kirklees 014 MSOA (%)
Underground, metro, light rail, tram	0
Train	1
Bus, minibus or coach	4
Taxi	1
Motorcycle, scooter or moped	2
Driving a car or van	71
Passenger in a car or van	10
Bicycle	2
On foot	9
Other	0
Total	100

Other Land Uses

Local Centre / Community Hub

5.20 As noted previously within this Scoping Note, the proposals for Site B also include a new local centre / community hub and a new two form entry (2FE) primary school. It is expected that the local centre / community hub will comprise local retail facilities (e.g. a local shop, convenience store, café and/or similar) targeted towards residents and employees within the Site. As noted above, the DfT considers walking to be the most important mode of travel for journeys of a short distance and it is therefore expected that the majority of journeys associated with the new local centre / community hub will be on-foot.

5.21 It is therefore expected that all trips associated with these facilities will be internalised and therefore result in no net impact on the surrounding public transport and highway networks.

Primary School

5.22 The proposals for Site B also include a new 2FE primary school that it is understood will serve both the Proposed Development and surrounding existing residential areas. Based on information provided by KC, it is noted that the primary school site is located partly within the Dewsbury East and Batley East primary school place planning areas and, as such, will likely draw some existing pupils from each of these two areas. Pupil and staff trips will be expected to be primarily less than 1km and will therefore be on-foot. The school component of the FTP will seek to reinforce this behaviour.

Trip Distribution

5.23 Following the determination of total vehicle trips through applying the ONS 2011 Census 'Driving a Car or Van' mode share to the total person trips, a trip distribution and traffic assignment exercise has been be carried out to determine where vehicular traffic associated with the Site is likely to route when arriving at and departing from the Site.

5.24 Trips are distributed, and traffic assigned to the surrounding highway network, by establishing:

- The likely end destinations of residents leaving the Site and start origins of employees arriving at the Site, identified by reviewing Census travel-to-work data for the local area.
- The likely off-site routing of new trips to elsewhere in the region (Yorkshire and the Humber) for trips originating at the Site, and equivalent from elsewhere to the Site for those trips ending at the Site.

5.25 Full details of the Census data and route assignments are included at **Appendix E**.

Conclusion

5.26 A trip generation analysis was undertaken to establish the volume of new trips expected to be generated by the proposed Site delivery. This involved considering each land use type and by making estimations based on comparable sites, forecasts of (person) trip numbers are derived. Applying known travel behaviour from Census data appropriate to the Site allows an estimation of new trips for each mode to and from the Site. Finally, those trips which will use the highway network are able to be assigned to probable routings based on that Census data. The outputs from this exercise inform the highway impact modelling which follows in Chapter 6.

6 Highway Impact Assessment

Introduction

6.1 In order to understand the current and future capacity levels at the junctions affected by the Proposed Developments, a series of junction capacity assessments have been undertaken at junctions within the vicinity of the Site. This chapter of the TA presents the outcomes of the junction modelling undertaken. The scope of this junction assessment study area was the subject of discussion and agreement with KC Highways officers and HE.

Assessment Methodology

6.2 This section of the chapter of the TA will define some terms used in interpretation of the results of the junction modelling.

Junction Capacity

6.3 Junction capacity assessment results are presented, for non-signalised junctions, in terms of 'Ratio of Demand Flow to Capacity' ('RFC'), expressed as a factor of 1.00; and for signal-controlled junctions, in terms of 'Degrees of Saturation' ('DoS'), expressed as a percentage (%).

6.4 For non-signalised junctions, an RFC of less than 0.85 indicates that the junction is operating within its theoretical capacity; an RFC of equal to or greater than 0.85 but less than 1.00 indicates that the junction is approaching its capacity (but remains within capacity); and an RFC of equal to or greater than 1.00 indicates that it has either reached or exceeded its capacity. Once beyond 1.00, delays/queues are shown in the model to increase disproportionately with further increases in demand flow.

6.5 For signal-controlled junctions, a DoS of less than 90% indicates that the junction is operating within its theoretical capacity; a DoS of equal to or greater than 90% but less than 100% indicates that the junction is approaching its capacity (but remains within capacity); and a DoS of equal to or greater than 100% Indicates that it has either reached or exceeded its theoretical capacity. Similar to the 1.00 threshold for non-signalised junctions, beyond 100% DoS, queues and delays increase disproportionately with increasing demand flow. In particular regard to signals, queues would begin to not be able to discharge fully within each cycle and delays increase as a result.

Queue Lengths

6.6 In addition to junction capacity expressed in terms of RFC or DoS, consideration should also be given to queue lengths that are expected to form on junction arms as traffic approaches the junction. Queue lengths are typically expressed in terms of Passenger Car Units (PCUs), with different types of vehicles having different PCU values based on their relative size, described as follows:

- Pedal cycle = 0.2;
- Motorcycle = 0.4;
- Passenger car = 1.0;
- Light Goods Vehicle (LGV) = 1.0;
- Medium Goods Vehicle (MGV) = 1.5;
- Buses & Coaches = 2.0; and
- Heavy Goods Vehicle (HGV) = 2.3.

6.7 For reference, it is noted that the DfT *Design Manual for Roads and Bridges* (DMRB) states that the, *"precise validation of queue lengths can be difficult because of the volatility of the observed data"*, and therefore does not provide an acceptable threshold for modelled versus observed queue lengths.

6.8 The threshold at which a queue is considered to become unacceptably long is therefore usually subject to interpretation, but key concerns are the interactions between a given junction and adjacent ones ('blocking-back') and the ability of the road space around a junction to store a queue of a given space.

Practical Reserve Capacity

6.9 For signalised junctions, the 'Practical Reserve Capacity' (PRC) of the junction is also used to assess the impact of traffic. The PRC is calculated from the maximum degree of saturation on a lane controlled by the stage stream; and is a measure of how much additional traffic could pass through a junction controlled by the stage stream whilst maintaining a maximum Degree of Saturation (DoS) of 90% on all lanes.

6.10 A positive value indicates that a junction has spare capacity, whilst a negative value demonstrates that a junction is either approaching or is already experiencing capacity issues and could be subject to congestion.

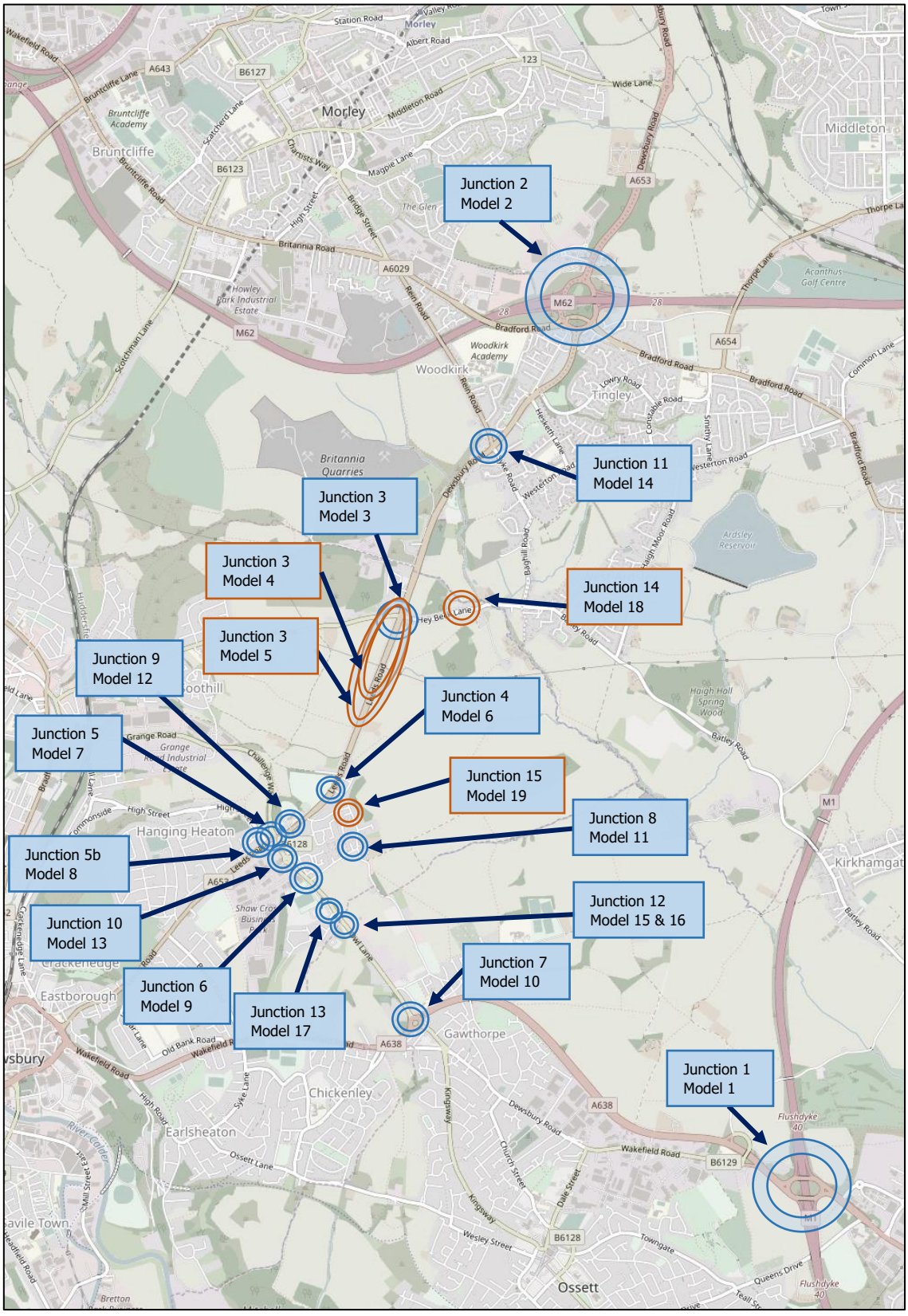
Scope of Modelling

6.11 In order to understand the current and future capacity levels at the junctions affected by the Proposed Development, a series of junction capacity assessments have been undertaken at junctions within the vicinity of the Site.

6.12 The scope of junctions to be included has been agreed with KC officers through the TA scoping process in 2018 and 2019. Further junction modelling has been requested by LCC on Dewsbury Road (A653) and this will be provided as part of a TA Addendum (which will follow the planning submission).

6.13 A total of 16 junctions have been identified and modelled. The approximate locations of these junctions are illustrated in **Figure 6.1** below.

Figure 6.1: Locations of Assessed Junctions



Source: OpenStreetMap with Pell Frischmann annotations

Strategic Road Network Scope

6.14 The M1 Junction 40 (herein Junction 1) Flushdyke Interchange, and M62 Junction 28 (herein Junction 2) Tingley Interchange, have both been included in the junction assessments in this TA.

6.15 The Tingley Interchange (M62 Junction 28) was yet to complete congestion reduction capacity enhancement roadworks at time of baseline survey. As those works have been subsequently completed, it was agreed with HE that this junction would be re-surveyed (in isolation) so as to ensure existing conditions are as representative as possible. This was completed in November 2019 . It was agreed that revised modelling outputs would be presented as a part of a TA Addendum which will be submitted following this application's submission. For completeness, this TA Report includes modelling (and flows) based upon the original (March 2019) survey baseline. HE have subsequently confirmed that they are in the process of developing an updated TRANSYT model for the motorway junction (based on their own surveys) and that this should be used as the basis for any further assessment of the junction.

6.16 In the scoping process, HE requested consideration of the need (if any) to model impacts on Junction 41 of the M1 (Carr Gate Interchange). The predicted flow patterns support it being unlikely that any appreciable traffic would use (or cross) M1 J41 related to the Site.

6.17 The only traffic flow which departs (or arrives to) the Site in a direction which might have the reasonable potential to interact with M1 Junction 41 is that which leaves towards (or arrives from) the east on Heybeck Lane. This is expected to be a very small number (around 10-40 Passenger Car Units [PCUs / pcu] either way in either peak). The most likely routing for this traffic would be either local trips or trips to/from Wakefield. On the northbound M1 off-slip alone, the range of daily variation over each weekday peak hour is in the order of 100 to 300pcu (Source: HE MIDAS count data site M1/4979J w/c 13th May 2019). Consequently, if all this traffic were to route via M1 J41 (unlikely), a total peak increase of approximately 60pcu would be well within the range of daily variation on the junction as a whole (or part thereof).

6.18 Therefore, it is considered that there is not a need to assess the M1 Junction 41 (Carr Gate Interchange) due to the minimal number of trips expected at the junction.

Future Assessment Years

6.19 The DfT Circular 02/2013 'The Strategic Road Network and the Delivery of Sustainable Development' (September 2013), Paragraph 25, states that:

"The overall forecast demand should be compared to the ability of the existing network to accommodate traffic over a period up to ten years after the date of registration of a planning application or the end of the relevant Local Plan whichever is the greater. This is known as the review period."

6.20 In order to support the supporting highway proposals in the current Kirklees Local Plan (within which the Site is allocated), SATURN highway modelling was commissioned by KC at that time with scenarios in 2015 (the base year for the model), 2020 and 2030. Outputs of this model have been made available to the project team and it has been agreed through scoping with KC (and others) that these will be used to produce robust future traffic scenarios which reflect the detail of the changing strategic traffic assignment that would not be available if high-level projections (such as TEMPro growth factors) were used and applied to the full extent of the studied area.

6.21 In order to accurately assess the impact of the Proposed Development and in accordance with the scoping process undertaken in 2019, it is proposed to assess the traffic impacts of the Proposed Development on the above listed junctions in two future assessment years; 2024 and 2030. The former (2024) being an interim scenario in which some phases of the Proposed Development have been delivered, and the latter (2030) being the future year in which all phases of the Proposed Development are complete and operational.

6.22 To ensure a realistic (but robust) interim assessment, the impact of that part of the Proposed Development of Site A (up to 100 residential units) and the phased Proposed Development within Site

B (which has been assumed to be 1no unit totalling 9780sqm of B1(a) Office use) likely to be commercially and practically deliverable by that time, are assessed in 2024.

6.23 The full impact of the complete-and-operational Proposed Development of both Site A (up to 181 residential units) and all of Site B (up to 1,354 residential units and up to 35 ha of employment) will be assessed in 2030.

6.24 Options for delivery are also modelled where Site B does not come forward with Site A for each future year.

Scenarios

6.25 Classified turning count surveys have been undertaken (March 2019) for each of the above listed junctions on a mid-week weekday during term time, to reflect existing, or baseline, traffic conditions. These surveys have been agreed as representative and will therefore be the defined baseline ("2019") traffic scenario for the assessment to follow.

6.26 Given the above requirements, and as agreed through the scoping process with KC and others, the following 7 scenarios have been modelled for all junctions for the AM (07:30-08:30) and PM (16:30-17:30).

- **2019 Base:** turning counts extracted from March 2019 surveys, i.e. observed traffic.
- **2024 Do Nothing (DN):** Forecast background growth of Base traffic to 2024 at the rates indicated by KC's SATURN models (see below for methodology) which is inclusive of Kirklees Local Plan but exclusive of any of the Proposed Development at hand.
- **2030 Do Nothing (DN):** Forecast background growth of Base traffic to 2030 at the rates indicated by KC's SATURN models (see below for methodology) which is inclusive of Kirklees Local Plan but exclusive of any of the Proposed Development at hand.
- **2024 Do Something Site A (DS A):** 2024 Do Nothing flows with flows added by that part of Site A deliverable by 2024.
- **2024 Do Something Sites A+B (DS A+B):** 2024 Do Nothing flows with flows added by those parts of Site A and of Site B deliverable by 2024.
- **2030 Do Something Site A (DS A):** 2030 Do Nothing flows with the complete and operational Site A generated flows added.
- **2030 Do Something Sites A+B (DS A+B):** 2030 Do Nothing flows with both the complete and operational Site A and Site B generated flows added.

Scenario Interpolation

6.27 To support the development of the current Kirklees Local Plan, SATURN modelling was undertaken in 2015. Future year SATURN models for 2020 and 2030 were also produced at that time. The SATURN models allowed the impact and distribution of future trips on the network to be accounted for as traffic assignments on the modelled network incorporate the effects of congestion, available capacity etc.

6.28 These models are however calibrated and validated against 2015 traffic data, therefore through the scoping process it has been agreed that SATURN scenarios will not be used directly, but will be used to derive growth factors for each turning movement on the network. This provides a more detailed and nuanced consideration of growth than the simple blanket application of a single TEMPRO factor to the whole network as might be applied for a less impactful site. Our methodology will reflect the strategic changes identified over the period of the SATURN model, but allow the future scenarios to be based more closely on the known state of the network that has emerged over the period 2015 to 2019.

6.29 The proposed baseline scenario is therefore one based in 2019 and underpinned by March 2019 survey data.

6.30 A notional set of SATURN scenarios for 2019 and 2024 were generated using the 2015, 2020 and 2030 SATURN scenarios. These were produced by linearly interpolating the flows between the two adjacent model scenarios. For example, a 2019 scenario is generated by taking 4÷5 (4 years of the 5) of the flow difference between the 2015 and 2020 models, and adding this to the 2015 flows.

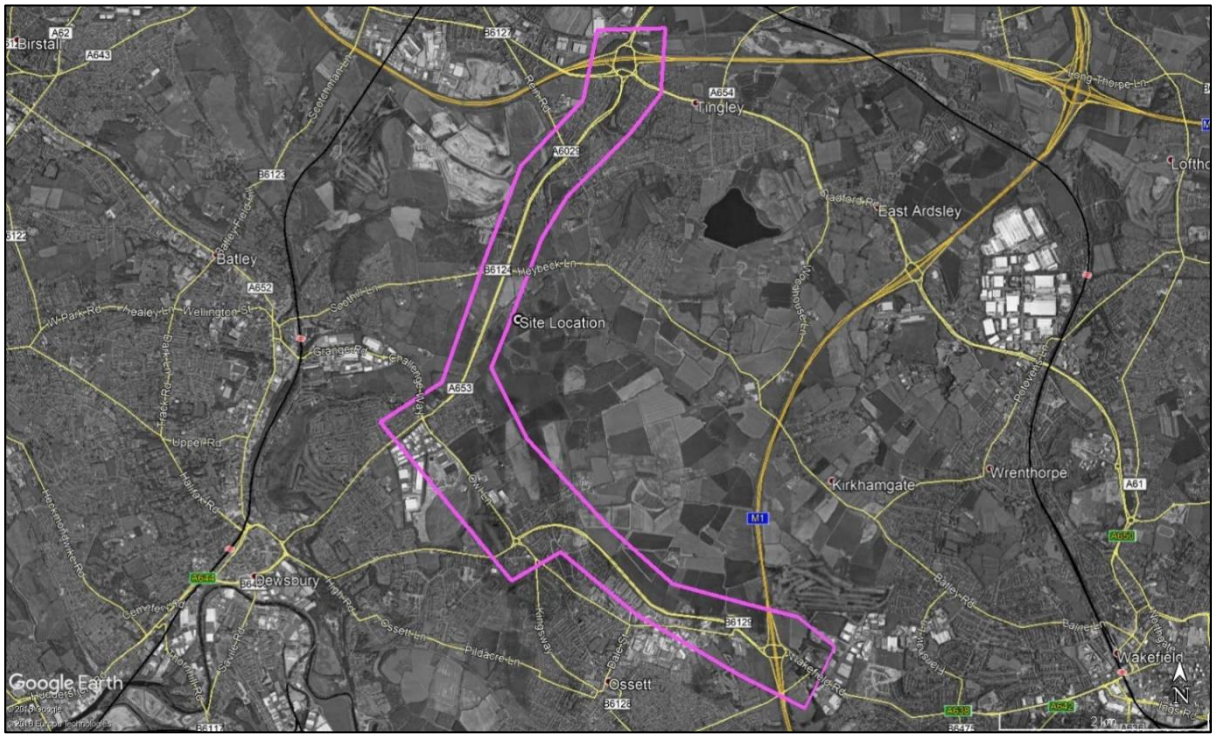
6.31 Using this method, growth rates from 2019 to 2024, and from 2019 to 2030 can be derived in detail. For example, growth factors from 2015 to 2019 can be found by dividing the 2019 flows by the 2015 flows; e.g. a 2015 flow of 100pcu and a 2019 flow of 110pcu would have a growth factor of 110÷100 = 1.100. Where flows are absent in the 2015 baseline model (e.g. the SATURN model does not include that link), growth rate is set to 1.000 so as to retain any observed flows in our dataset in the future scenarios.

6.32 As the purpose of the SATURN model was to test transport interventions and it cannot be certain that these will be forthcoming, future scenarios are derived based on the above process and the use of the 'Do Minimum' KC's SATURN scenarios. A comparison of scenarios is summarised in **Table 6.1** based on weighted averages across an area cordoned to cover the junctions of interest (illustrated in Figure 6.2). For reference, an equivalent TEMPRO rate for the cordoned area is also included. Whilst 'whole-of-scenario' weighted average growth rates are shown, it should be reiterated that actual growth rates are applied on a turn-by-turn junction-by-junction basis.

Table 6.1: SATURN-Derived Trip Rate Growth Summary

Base Year	Future Year	Weekday Peak	Scenario	Weighted Cordon Area Average Growth Rate		Equivalent TEMPro Rate (NTM-Adjusted Local Growth Figure)	
2019	2024	AM	DM	1.0627	6.3%	1.0421	4.2%
2019	2024	PM	DM	1.0466	4.7%	1.0419	4.1%
2019	2030	AM	DM	1.1071	10.7%	1.0913	9.1%
2019	2030	PM	DM	1.0733	7.3%	1.0920	9.2%

Figure 6.2: SATURN Cordon Area



Source: Google Earth with Pell Frischmann annotations

Committed Developments

6.33 The scenarios developed using the above methodology include KC Local Plan growth and other background knowledge that was available at the time of model creation, calibration and validation. However, additional known committed development sites, which are not appropriately reflected in the SATURN models, were identified by have been requested by KC to be added to the baseline. Adding growth due to these sites ensures a more robust consideration of the future traffic situation around the Site.

6.34 KC requested the addition of one site, as follows:

- Barratt David Wilson Homes (BDWH) site on Owl Lane (KC LP Site Ref: HS47): This site, whilst included in the KC Local Plan allocations, is in an area of the SATURN model of low detail. Consideration of the southern Site Access junction (Junction 12 below) has flows taken from that planning submission's TA (Kirklees Planning Ref: 2019/92787) added to the SATURN and survey-derived flows. Whilst this theoretically 'double-counts' flows to some extent, it ensures a robust assessment of this junction. Such an addition is not made for other junctions as flows from this site are already appropriately incorporated in the SATURN data.

6.35 LCC requested consideration of a number of sites (all references are LCC Planning):

- 06/04892/FU: Capitol Park West (Land north of Capitol Boulevard, Morley): Residual part of Site; 2,260sqm B1 offices.
- 12/01332/OT: Land at Bruntcliffe Road, Morley: 173 residential units.
- 12/02470/OT: Unbuilt development that was permitted under the following outline approval: Land at Gelderd Road / Asquith Avenue and Nepshaw Lane, Gildersome.
- 13/01640/OT and 15/00363/OT: Extensions to White Rose Shopping Centre.
- 13/05423/OT: Land off Bradford Road, East Ardsley: 299 residential units and 2-form entry primary school.
- 13/05761/EXT: Land at Capitol Park East (Land off Topcliffe Lane, Morley): 11,535sqm B1 offices.
- 14/01886/RM: Land to the rear of Owler's Farm, Wide Lane, Tingley: 114 residential units.
- 15/04256/FU: Garden Centre on A654 Thorpe Lane.
- 15/05356/FU: 4,884sqm Parcel distribution depot with ancillary areas and office accommodation.
- 16/00865/FU: Albert Road, Morley: 62 residential units.
- 16/02988/OT: Lane Side Farm, Victoria Road, Churwell: 550 residential units.
- 16/03861/FU: Land to the west of Towcester Avenue, Middleton: 93 residential units.
- 16/04733/RM: Land at Low Moor Farm, Albert Drive, Morley: 200 residential units.
- 16/06109/FU: Land at Bruntcliffe Road, Morley: 210 residential units.
- 17/08262/OT: Land off Haigh Moor Road and Westerton Road.

6.36 For the purpose of this assessment, none of the LCC sites have been included additional to the analysis presented in this document. However, as part of the TA Addendum to be submitted post-planning submission, and which will incorporate updated modelling on the M62 J28 (Junction 2 herein) and an additional junction on Dewsbury Road (junction of Dewsbury Rd x Lowry Rd x Hesketh Ln x Turnberry Gdns), it is anticipated that additional committed developments applicable to those junctions may be included at that time.

6.37 WC did not request any additional sites for inclusion.

Modelling Results

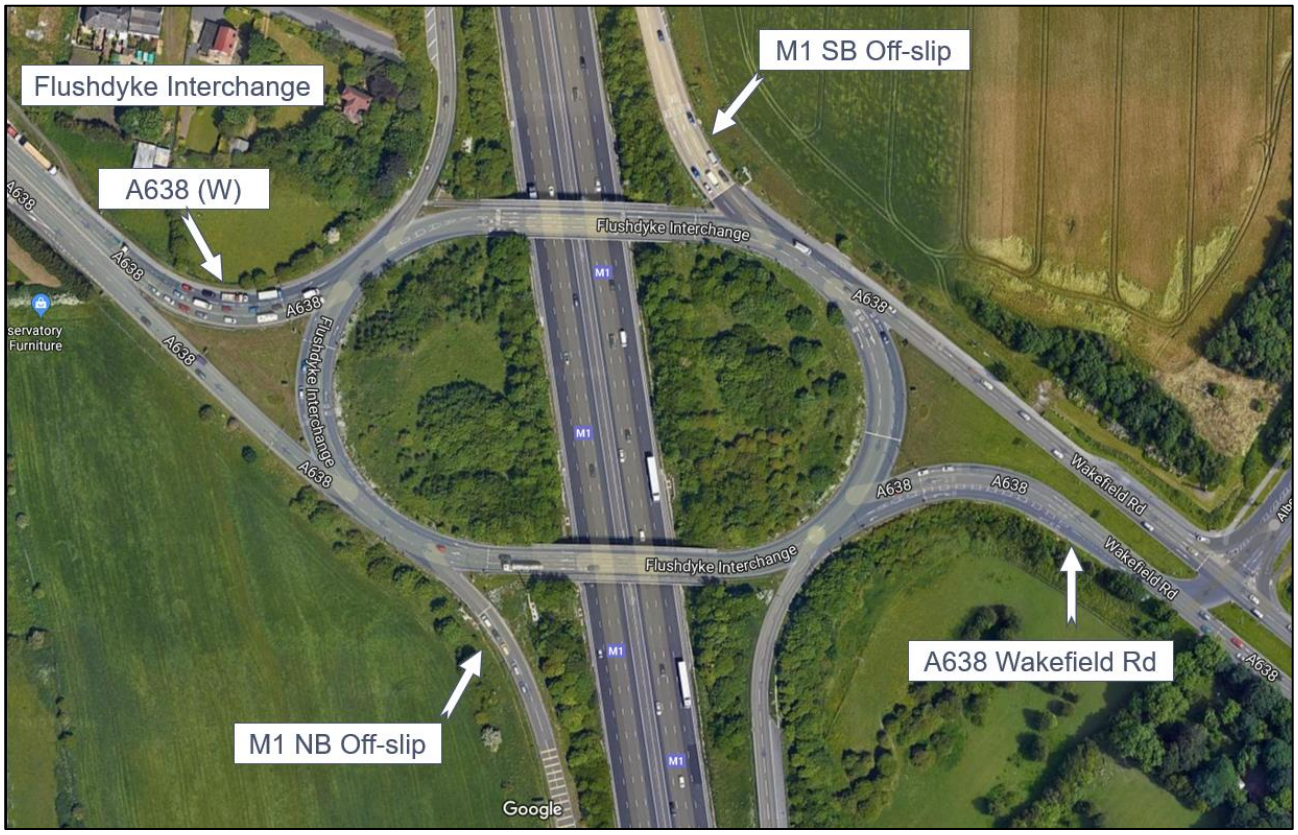
6.38 The full junction output reports are supplied at **Appendices H-W**.

Junction Analysis

Junction 1 – M1 Junction 40

6.39 Junction 1 forms Junction 40 of the M1 also known as 'Flushdyke Interchange' the junction sits to the south east of the Site and is managed by HE with whom scoping discussions were undertaken and the need to assess the impact of the Proposed Development on the junction was agreed. The junction is a large 135m-ICD signalised roundabout that connects the M1 motorway a signifcant strategic route that runs north / south between Newcastle and London and A638 which forms the main link between Deswsbury to the west and Wakefield to the east. The layout of the junction is shown on the aerial shot at **Figure 6.3**.

Figure 6.3: Junction 1 – Aerial Shot of Flushdyke Interchange



Source: Google Maps with Pell Frischmann annotations

6.40 The junction was modelled using the LinSig modelling tool which is discussed above and the results are presented within **Table 6-1** below. The modelling results demonstrate that capacity is constrained particularly on the A638 east and westbound arms in the AM peak hour with queues of 40 PCU's experienced from the west and 24 PCU's from the east. Within the PM peak hour, the junction performs better, just within capacity (89.1%, 90.0% is considered the limit of capacity) though similarly the A638 arms are the greatest constraint on capacity.

Table 6-1: Junction 1 summary 2019 Baseline junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		AM Base 2019		PM Base 2019	
M1 SB Off-slip	Lanes 1+2	13.7	87.9	10.9	80.8
	Lane 3	11.7	72.8	17.4	84.3
A638 Wakefield Rd	Lanes 1+2	14.7	81.1	17.0	89.1
	Lane 3	24.4	91.4	14.8	78.8
M1 NB Off-slip	Lane 1	14.1	84.6	10.5	76.3
	Lane 2	9.2	69.0	4.6	44.2
A638 (W)	Lanes 1+2	40.3	100.6	9.5	68.0
	Lane 3	36.7	99.6	12.3	65.6

Table 6-2: Junction 1 summary 2024 and 2030 Do Nothing junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DN AM		2024 DN PM		2030 DN AM		2024 DN PM	
M1 SB Off-slip	Lanes 1+2	18.2	92.8	37.4	101.4	21.3	95.2	15.4	91.4
	Lane 3	14.0	80.8	29.1	100.3	16.1	86.4	16.0	88.1
A638 Wakefield Rd	Lanes 1+2	55.9	105.8	22.0	95.6	17.8	91.3	19.8	93.6
	Lane 3	44.5	106.1	20.5	93.6	20.0	93.1	17.3	89.1
M1 NB Off-slip	Lane 1	17.2	93.6	12.0	85.7	22.5	98.8	13.9	90.4
	Lane 2	13.7	89.2	8.1	72.8	18.8	96.8	10.5	83.6
A638 (W)	Lanes 1+2	90.5	111.0	21.0	94.0	112.3	115.3	31.1	98.5
	Lane 3	74.5	110.5	39.5	102.7	94.2	115.0	57.3	107.7

6.41 Proposed Development traffic for both Site A and Site A & B together has been applied to the 2024 base models and the results are presented within **Table 6-3**. The results of the survey show that with the Proposed Development in place the operation of the junction would improve.

Table 6-3: Junction 1 summary 2024 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A) AM		2024 DS(A) PM		2024 DS(A+B) AM		2024 DS(A+B) PM	
M1 SB Off-slip	Lanes 1+2	8.0	64.8	10.0	77.3	11.4	80.5	10.1	77.7
	Lane 3	10.4	57.6	12.3	68.4	11.0	63.0	13.1	71.4
A638 Wakefield Rd	Lanes 1+2	9.0	60.8	12.5	77.4	8.3	57.9	12.2	76.5
	Lane 3	15.7	69.8	14.2	73.7	13.9	64.5	13.6	71.4
M1 NB Off-slip	Lane 1	13.7	77.9	11.3	75.6	15.0	79.8	11.3	75.8
	Lane 2	8.2	58.7	5.4	47.2	6.9	50.0	5.4	47.2
A638 (W)	Lanes 1+2	19.5	84.4	10.6	71.5	17.3	81.8	10.6	71.6
	Lane 3	11.3	58.4	13.4	68.6	10.7	56.8	13.6	69.5

6.42 Furthermore looking ahead to 2030 the 'Do Something' traffic flows show that the Proposed Development would be within capacity with Site A built out (and inclusive of expected background and committed development traffic growth), however when Site A + B are complete and operational, the A638 westbound arm starts to approach capacity. No mitigation is considered necessary based on the impact of the Proposed Development.

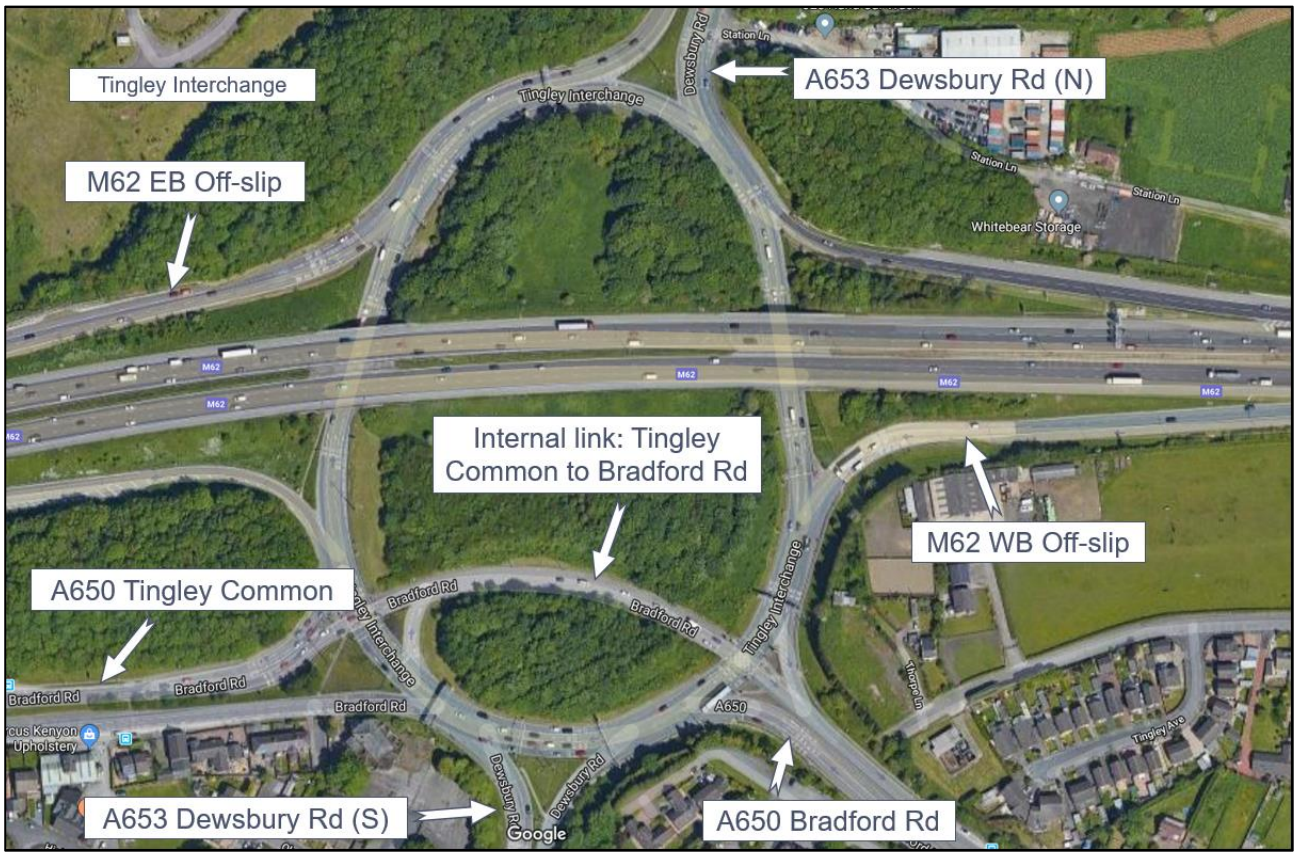
Table 6-4: Junction 1 summary 2030 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A) AM		2030 DS(A) PM		2030 DS(A+B) AM		2030 DS(A+B) PM	
M1 SB Off-slip	Lanes 1+2	11.6	80.9	9.1	73.4	8.7	68.3	10.2	78.4
	Lane 3	8.9	52.7	12.7	72.0	16.3	78.4	14.1	77.8
A638 Wakefield Rd	Lanes 1+2	9.0	60.6	11.4	73.7	11.0	70.0	12.6	77.6
	Lane 3	15.3	72.6	12.9	69.0	17.6	82.7	14.4	74.2
M1 NB Off-slip	Lane 1	15.0	78.5	12.1	77.6	15.3	80.3	13.9	82.6
	Lane 2	7.3	51.0	6.3	52.4	8.4	57.6	7.4	58.8
A638 (W)	Lanes 1+2	16.6	81.8	11.0	73.3	27.9	91.2	12.2	77.5
	Lane 3	9.7	55.0	14.2	70.6	17.1	73.1	17.4	78.0

Junction 2 – M62 Junction 28

6.43 The second junction assessed is also managed by HE and forms Junction 28 of the M62. There are 6 points of access to the junction, the M62 runs west to east with Dewsbury Road running north to south and Bradford Road forming a signalled loop across the southern access of Dewsbury Road. This is shown on **Figure 6.4** below.

Figure 6.4: Junction 2 – Aerial Shot of Tingley Interchange



Source: Google Maps with Pell Frischmann annotations

6.44 **Table 6-5** below demonstrates the junction within capacity within the AM peak period and marginally over capacity within the PM peak period with the M62 westbound offslip constricting this flow.

Table 6-5: Junction 2 summary 2019 Baseline junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		AM Base 2019		PM Base 2019	
A653 Dewsbury Rd (N)	Lanes 1+2	4.9	53.6	11.2	81.9
	Lane 3	3.3	35.8	9.5	67.9
	Lane 4	2.5	26.0	3.9	35.3
M62 WB Off-slip	Lanes 1+2	6.2	64.4	4.8	65.7
	Lanes 3+4	11.3	81.5	11.0	93.1
A650 Bradford Rd	Lane 1	13.2	88.8	10.2	78.1
	Lanes 2+3	11.9	84.4	5.0	47.0
A653 Dewsbury Rd (S)	Lanes 1+2	13.8	90.2	6.2	70.4
	Lane 3	14.2	86.7	7.0	70.5
A650 Tingley Common	Lanes 1+2	8.8	73.7	6.5	56.3
	Lane 3+4	3.5	41.0	2.5	30.5
M62 EB Off-slip	Lanes 1+2	4.6	60.0	6.2	70.5
	Lane 3	3.6	48.6	8.9	84.4
Internal link: Tingley Common to Bradford Rd	Lane 1	4.8	50.3	2.7	44.4
	Lane 2	3.6	38.9	2.5	48.0

6.45 **Table 6-6** presents the future year 'Do Nothing Scenarios' which account for the predicted background growth in traffic volumes as set out above. This shows some increases which push the junction marginally over capacity within 2024 and are over capacity within the PM peak also, similarly the M62 westbound arm demonstrates significant queueing and as such delay to journeys.

Table 6-6: Junction 2 summary 2024 and 2030 Do Nothing junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DN AM		2024 DN PM		2030 DN AM		2024 DN PM	
A653 Dewsbury Rd (N)	Lanes 1+2	3.3	39.7	6.8	67.1	2.7	33.5	4.1	50.0
	Lane 3	2.8	30.6	4.2	38.4	2.5	27.2	3.6	34.5
	Lane 4	3.6	36.2	9.7	66.2	4.0	38.3	7.9	58.5
M62 WB Off-slip	Lanes 1+2	6.5	37.0	5.6	72.4	5.9	63.2	4.5	54.6
	Lanes 3+4	10.4	78.4	14.4	97.8	8.6	69.8	7.3	74.0
A650 Bradford Rd	Lane 1	15.0	91.6	10.0	77.3	12.6	84.9	8.0	62.4
	Lanes 2+3	13.9	89.4	3.2	32.2	12.4	83.2	2.6	24.9
A653 Dewsbury Rd (S)	Lanes 1+2	8.4	78.0	5.6	65.6	7.8	75.4	4.3	51.3
	Lane 3	7.1	58.6	4.4	50.6	6.8	54.3	2.8	29.2
A650 Tingley Common	Lanes 1+2	5.1	50.5	6.4	62.6	5.4	50.2	6.1	60.6
	Lane 3+4	4.0	46.0	3.5	42.3	4.6	50.4	3.6	43.8
M62 EB Off-slip	Lanes 1+2	3.6	48.5	4.4	47.3	2.4	37.3	4.2	45.6
	Lane 3	4.5	57.8	6.6	60.7	5.8	72.3	6.6	61.0
Internal link: Tingley Common to Bradford Rd	Lane 1	5.3	55.5	4.4	46.6	6.1	57.0	4.4	36.7
	Lane 2	5.5	56.8	4.5	47.6	6.2	57.7	4.3	36.5

6.46 **Table 6-7** demonstrates the impact of the Proposed Development on the overall operation of the junction in both the Site A and Site A & B scenarios.

Table 6-7: Junction 2 summary 2024 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A) AM		2024 DS(A) PM		2024 AM DS(A+B)		2024 PM DS(A+B)	
A653 Dewsbury Rd (N)	Lanes 1+2	3.3	33.0	10.7	72.3	3.3	32.5	10.0	71.1
	Lane 3	2.2	16.2	8.1	47.2	2.8	20.1	7.6	45.2
	Lane 4	4.4	27.9	11.0	56.4	3.7	24.2	11.1	56.4
M62 WB Off-slip	Lanes 1+2	4.6	46.4	6.5	62.2	6.3	56.0	6.5	62.3
	Lanes 3+4	10.1	56.9	10.8	77.8	9.8	55.6	10.8	77.8
A650 Bradford Rd	Lane 1	15.7	77.4	12.9	78.0	12.0	65.2	11.3	73.2
	Lanes 2+3	9.8	55.2	7.2	50.2	9.2	52.5	7.0	50.2
A653 Dewsbury Rd (S)	Lanes 1+2	12.0	79.1	5.9	54.1	10.5	75.9	5.8	53.6
	Lane 3	11.5	62.0	6.5	42.3	11.9	62.2	6.9	43.9
A650 Tingley Common	Lanes 1+2	8.3	63.8	8.8	64.0	9.6	75.8	9.1	67.0
	Lane 3+4	6.4	58.6	5.0	46.4	7.4	69.1	5.2	48.7
M62 EB Off-slip	Lanes 1+2	5.5	58.3	5.5	40.9	5.4	56.3	5.8	42.9
	Lane 3	7.1	69.9	8.1	47.4	7.5	69.9	8.6	50.2
Internal link: Tingley Common to Bradford Rd	Lane 1	6.2	41.3	5.6	51.0	6.8	41.6	5.7	53.7
	Lane 2	5.8	42.9	5.4	51.7	6.2	42.6	5.7	54.4

6.47 **Table 6-8** below shows how the operation of the junction will operate adequately with the Proposed Development trips added to to the 2024 AM and PM Do Nothing flows, as such no mitigation is required at this junction.

Table 6-8: Junction 2 summary 2030 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A) AM		2030 DS(A) PM		2030 DS(A+B) AM		2030 DS(A+B) PM	
A653 Dewsbury Rd (N)	Lanes 1+2	2.7	27.8	7.2	60.3	2.9	29.1	7.2	60.3
	Lane 3	2.0	15.0	8.0	46.8	1.8	13.5	7.7	45.8
	Lane 4	4.6	29.6	12.0	60.0	6.7	39.1	18.4	76.6
M62 WB Off-slip	Lanes 1+2	5.0	50.7	6.4	62.2	7.3	64.3	7.6	73.0
	Lanes 3+4	8.3	50.9	11.1	79.3	10.4	58.7	12.5	86.4
A650 Bradford Rd	Lane 1	15.1	74.3	12.6	74.6	13.7	72.1	10.8	74.3
	Lanes 2+3	10.6	57.6	6.5	44.3	13.7	71.0	10.0	69.1
A653 Dewsbury Rd (S)	Lanes 1+2	13.8	80.3	7.1	67.2	17.1	81.1	11.1	77.3
	Lane 3	11.1	58.0	5.7	46.3	18.3	75.4	9.7	59.6
A650 Tingley Common	Lanes 1+2	9.8	72.9	7.3	52.4	10.9	80.9	9.9	73.6
	Lane 3+4	8.5	73.4	4.5	41.6	9.5	80.1	6.0	58.2
M62 EB Off-slip	Lanes 1+2	3.5	38.4	6.0	46.3	3.4	36.0	5.5	41.8
	Lane 3	8.0	70.9	9.4	57.2	9.5	74.9	13.6	70.5
Internal link: Tingley Common to Bradford Rd	Lane 1	7.6	45.1	5.5	48.2	8.6	49.8	6.5	62.3
	Lane 2	7.4	46.0	5.5	48.0	8.6	51.3	6.7	62.8

Junction 3 – A653 Leeds Road / Heybeck Lane / B6124 Soothill Lane

6.48 Junction 3 is located to the north west of the Site and takes the form of a signalised crossroads junction. Leeds Road (A653) runs north / south with two full lanes plus short right turn lanes and Heybeck Lane runs to the east fronting the north of the Site. Soothill Lane is the westbound arm. The layout of the junction is shown on **Figure 6.5.**

Figure 6.5: Junction 3 – Aerial Shot of A653 Leeds Road / Heybeck Lane / B6124 Soothill Lane

Source: Google Maps with Pell Frischmann annotations

6.49 **Table 6-9** below shows the existing operation of the junction when modelled using the LinSig junction modelling tool. Whilst all arms of the junction operate within capacity in the PM peak, within the AM peak Soothill Lane is classified as over capacity owing to a degree of saturation value of 94.1%.

Table 6-9: Junction 3 summary 2019 Baseline junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		AM Base 2019		PM Base 2019	
A653 Leeds Road (N)	Lane 1	16.8	77.0	11.7	65.2
	Lanes 2+3	4.9	64.2	10.2	62.0
A653 Leeds Road (S)	Lane 1	15.1	68.1	9.2	56.8
	Lanes 2+3	15.1	72.1	9.9	68.1
Soothill Lane	Lane 1	20.0	94.1	11.3	82.6
Heybeck Lane	Lane 1	6.6	43.1	5.0	41.1

6.50 **Table 6-10** shows how the junction will operate two future year scenarios, 2024 and 2030. This shows an improvement from the Observed AM and PM peak hour scenrios with all arms operating within capacity.

Table 6-10: Junction 3 summary 2024 and 2030 Do Nothing junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DN AM		2024 DN PM		2030 DN AM		2024 DN PM	
A653 Leeds Road (N)	Lane 1	11.4	58.6	13.4	68.8	14.2	67.9	14.1	69.9
	Lanes 2+3	9.2	73.9	10.9	66.4	13.2	77.8	14.0	74.2
A653 Leeds Road (S)	Lane 1	15.9	68.9	8.6	48.8	17.8	72.4	9.2	50.7
	Lanes 2+3	15.7	73.7	9.4	56.0	17.6	77.6	9.9	57.9
Soothill Lane	Lane 1	13.6	73.4	9.1	67.9	13.4	76.4	9.1	71.2
Heybeck Lane	Lane 1	7.9	44.9	5.3	39.8	10.5	59.3	5.7	45.3

6.51 Through scoping discussions it was agreed that in the 'Do Something' ie. 'with development' scenarios the junction would be modelled within a connected model with Site Access 2 to the south on Leeds Road. This will connect to Site Access 1 and as such a sensitivity test of the junction in isolation is first presented in **Table 6-11**. This demonstrates that the junction would operate within capacity in all periods with Site A implemented.

Table 6-11: Junction 3 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A) AM		2024 DS(A) PM		2030 DS(A) AM		2030 DS(A) PM	
A653 Leeds Road (N)	Lane 1	11.5	59.4	12.1	64.2	14.8	69.6	14.2	70.3
	Lanes 2+3	9.2	73.9	12.7	70.4	13.1	77.8	14.9	77.1
A653 Leeds Road (S)	Lane 1	15.9	68.9	8.6	48.7	17.8	72.5	9.0	49.4
	Lanes 2+3	15.7	73.9	9.4	60.6	17.7	77.8	9.7	67.5
Soothill Lane	Lane 1	13.7	73.9	9.5	69.8	13.7	77.4	9.8	74.7
Heybeck Lane	Lane 1	9.4	52.6	5.9	44.0	14.2	75.9	7.0	53.8

6.52 **Table 6-12** sets out the results of testing the junction in conjunction with the proposed Access 2 in place, and Sites A & B constructed. This shows that the Proposed Development traffic will marginally increase delay at the junction, for example queues of 16 PCUs in the AM Peak increasing to approximately 20 PCU's when the full Proposed Development traffic is applied.

Table 6-12: Junction 3 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A+B) AM		2024 DS(A+B) PM	
A653 Leeds Road (N)	Lane 1	13.6	71.0	16.3	75.9
	Lanes 2+3	11.0	81.2	14.2	75.1
A653 Leeds Road (S)	Lane 1	19.7	81.2	8.0	60.0
	Lanes 2+3	19.6	83.4	8.0	69.9
Soothill Lane	Lane 1	15.8	82.5	11.0	73.5
Heybeck Lane	Lane 1	9.9	56.9	6.8	46.1

6.53 Further, **Table 6-13** presents the junction with the full Proposed Development implemented. Within both the AM and PM peak hour the addition of the Proposed Development traffic causes the junctions to go over capacity with a peak DOS of 108.7% on Leeds Road north bound in the AM peak and a peak of 112.6% on the same arm in the PM peak.

Table 6-13: Junction 3 summary 2030 Do Something (Sites A+B) junction modelling outputs

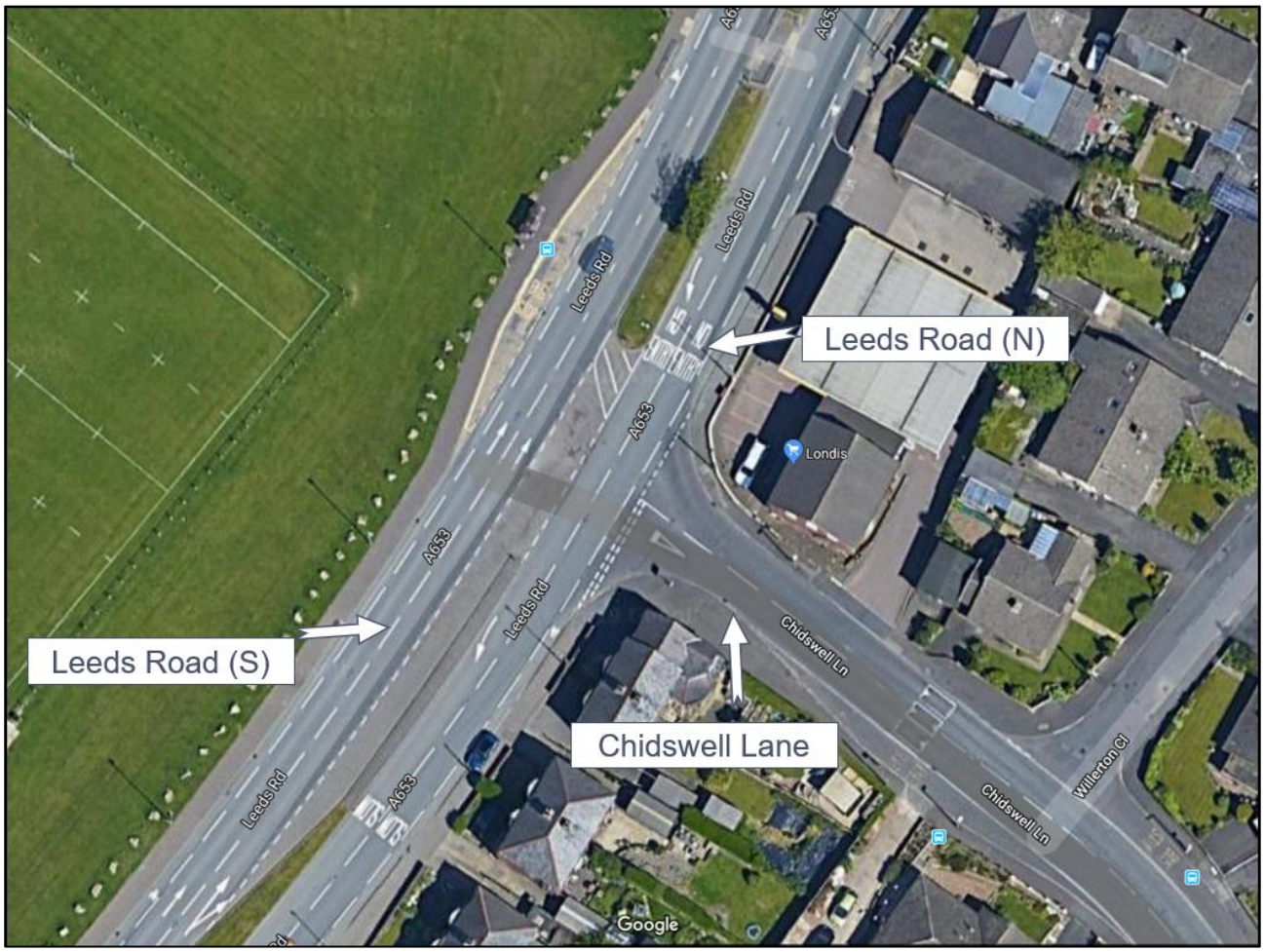
Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A+B) AM		2030 DS(A+B) PM	
A653 Leeds Road (N)	Lane 1	23.9	85.5	180	132.7
	Lanes 2+3	29.9	95.8	217	133.5
A653 Leeds Road (S)	Lane 1	137	118.2	56.2	103.5
	Lanes 2+3	147	117.2	84.8	119.4
Soothill Lane	Lane 1	46.9	109.9	107	132.8
Heybeck Lane	Lane 1	18.2	83.1	10	50.8

6.54 It is understood that KC had identified this junction as a capacity constraint to future growth through the SATURN modelling undertaken to inform the Local Plan.

Junction 4 – A653 Leeds Road / Chidswell Lane

6.55 Junction 4 is located to the west of the Site and takes the form of a ghost island right turn junction. As shown on **Figure 6.6** Leeds Road runs north east / south west with Chidswell Lane forming the minor arm to the southeast.

Figure 6.6: Junction 4 – Aerial Shot of A653 Leeds Road / Chidswell Lane



Source: Google Maps with Pell Frischmann annotations

6.56 **Table 6-14** presents the results of the observed 2019 AM and PM peak hour surveys modelled within the PICADY modelling tool. The junction is observed to operate well within capacity within the AM and PM peak periods.

Table 6-14: Junction 4 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
Chidswell Lane (LT to Leeds Rd (S))	0.1	9	0.07	0.0	7.5	0.05
Chidswell Lane (RT to Leeds Rd (N)	0.7	17.3	0.41	0.1	11.3	0.13
Leeds Rd (S) (RT into Chidswell Lane)	0.0	6.7	0.04	0.1	6.9	0.06

6.57 In the future year it is expected that the junction will operate better with the AM peak hour with a reduced RFC of 0.2 and close to the same in the PM period as show within **Table 6-15.**

Table 6-15: Junction 4 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
Chidswell Lane (LT to Leeds Rd (S))	0.1	9.5	0.11	0.1	7.7	0.06
Chidswell Lane (RT to Leeds Rd (N)	0.6	18.4	0.39	0.2	12.0	0.13
Leeds Rd (S) (RT into Chidswell Lane)	0.0	7.1	0.03	0.1	7.2	0.05

6.58 Within **Table 6-16** with background traffic and other committed developments added there is an increase from 0.2 to 0.37 of the AM peak period peak RFC and this marginally increases within when Site A Proposed Development traffic is added as shown within **Table 6-17.**

Table 6-16: Junction 4 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
Chidswell Lane (LT to Leeds Rd (S))	0.2	10.6	0.14	0.1	7.9	0.07
Chidswell Lane (RT to Leeds Rd (N)	0.6	19.8	0.37	0.2	12.4	0.13
Leeds Rd (S) (RT into Chidswell Lane)	0.0	7.5	0.02	0.0	7.6	0.02

Table 6-17: Junction 4 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Chidswell Lane (LT to Leeds Rd (S))	0.1	9.6	0.11	0.1	7.7	0.06
Chidswell Lane (RT to Leeds Rd (N)	0.7	18.7	0.39	0.2	12.1	0.13
Leeds Rd (S) (RT into Chidswell Lane)	0.0	7.1	0.04	0.1	7.2	0.05

Table 6-18: Junction 4 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Chidswell Lane (LT to Leeds Rd (S))	0.1	9.71	0.11	0.1	7.9	0.06
Chidswell Lane (RT to Leeds Rd (N)	0.7	19.6	0.40	0.2	12.5	0.14
Leeds Rd (S) (RT into Chidswell Lane)	0.0	7.2	0.04	0.1	7.4	0.05

Table 6-19: Junction 4 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Chidswell Lane (LT to Leeds Rd (S))	0.2	10.2	0.15	0.1	8	0.07
Chidswell Lane (RT to Leeds Rd (N)	0.6	20.6	0.38	0.2	12.6	0.13
Leeds Rd (S) (RT into Chidswell Lane)	0.0	7.6	0.03	0.0	7.6	0.02

6.59 With only Site A Proposed Development traffic added (**Table 6-18** and **Table 6-19** above), a minimal increase in flows either of the 2024 or 2030 scenarios emerges over the DN scenario of no practical impact.

6.60 However when the whole of the Proposed Development is built out, along with other committed developments and the rerouting of vehicles included within the SATURN Model, together these factors significantly increase the traffic volumes on Leeds Road which causes substantial delays to vehicles looking to leave Chidswell Lane, as they have to wait for gaps in traffic. This causes the junction to exceed its theoretical capacity as shown in **Table 6-20**. Owing to this, it is considered likely that in reality traffic will find alternative routes, however it is reiterated that as a result of the cumulative effect on Leeds Road of the background growth of traffic and the Proposed Development, this junction is not expected to operate satisfactorialy over the longer term.

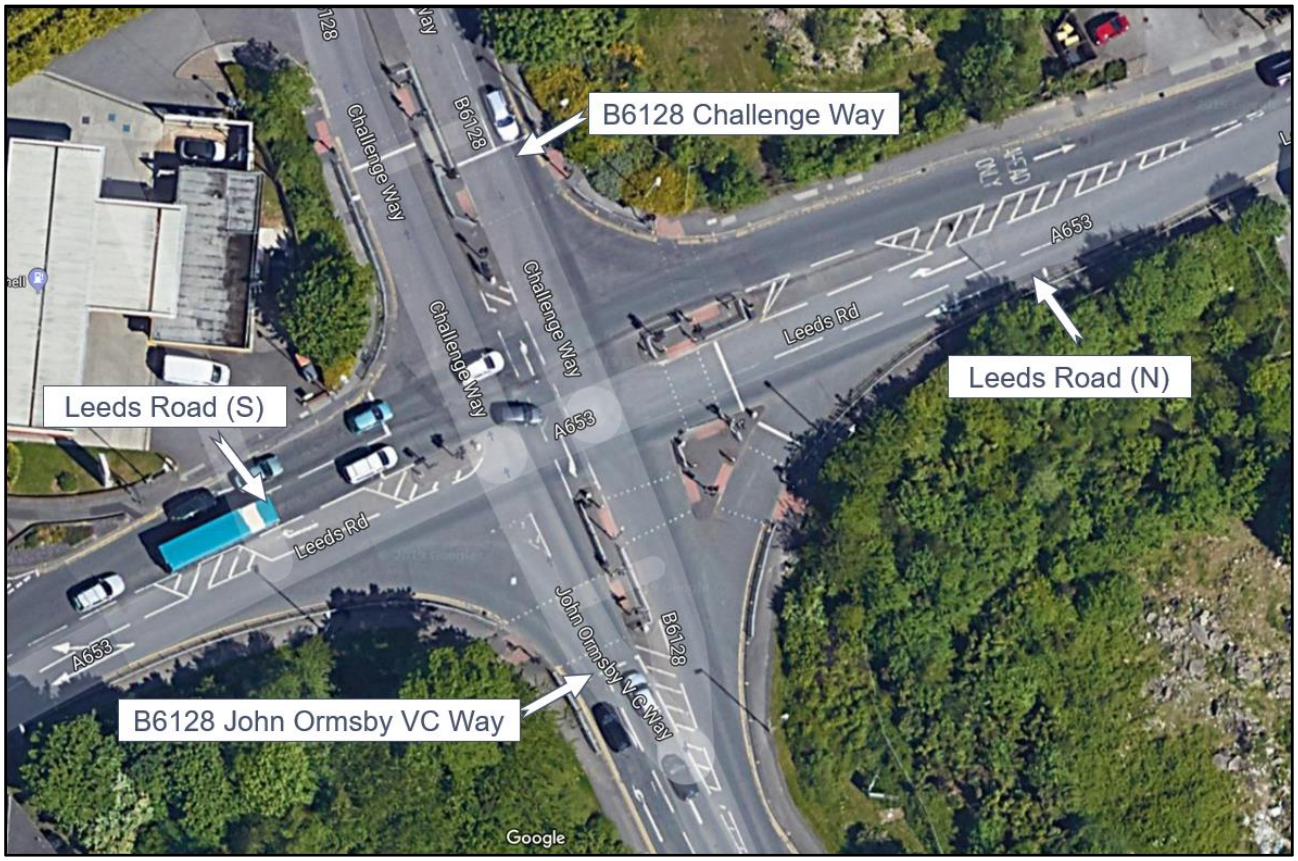
Table 6-20: Junction 4 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Chidswell Lane (LT to Leeds Rd (S))	23.8	242	1.13	0.7	15.4	0.42
Chidswell Lane (RT to Leeds Rd (N)	9.1	317	1.08	0.5	40.5	0.33
Leeds Rd (S) (RT into Chidswell Lane)	0.3	10.2	0.20	1.1	19.4	0.54

Junction 5 – Leeds Road / B6128 Challenge Way / B6128 John Ormsby VC Way

6.61 Junction 5 is a signalised crossroads junction formed between Challenge Way which runs to the north towards Soothill, John Ormsby VC to the south and Leeds Road running east and westwards. The layout of the junction is shown on the aerial at **Figure 6.7.**

Figure 6.7: Junction 5 – Aerial Shot of Leeds Road / B6128 Challenge Way / B6128 John Ormsby VC Way



Source: Google Maps with Pell Frischmann annotations

6.62 **Table 6-21** sets out the results of the junction when surveyed in 2019 and modelled using the LinSig modelling tool. The results of the model show that the junction is considered to operate marginally in capacity within the the Challenge Way arm displaying a DOS of 89.9% (anything 90% or above is considered to be over capacity). Within the PM peak, there is additional capacity with a peak RFC, again on Challenge Way of 82.4%.

Table 6-21: Junction 5 summary 2019 Baseline junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		AM Base 2019		PM Base 2019	
A653 Leeds Road (S)	Lanes 1+2	20.9	86.5	13.9	73.1
A653 Leeds Road (N)	Lanes 1+2 (L / Ah)	10.6	62.8	13.7	76.4
	Lane 3 (R)	1.6	26.6	0.7	9.9
B6128 Challenge Way	Left	15.5	89.9	13.6	82.4
B6128 John Ormsby VC Way	Lane 1 (L)	5.6	44.2	9.4	62.4
	Lane 2 (Ah / R)	10.5	75.2	7.6	56.6

6.63 When future year growth is applied to the flows and reassignment is accounted for, the junction is shown to marginally improve in 2024 but with further growth, particularly on Leeds Road 3 arms on the junction are shown to be over capacity (ie a DOS > 90.0%). A reduction within capacity in the PM peak is also experienced and by 2030 this has reached 87.2% on Challenge Way from an RFC of 82.4% in the observed PM peak.

Table 6-22: Junction 5 summary 2024 and 2030 Do Nothing junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DN AM		2024 DN PM		2030 DN AM		2024 DN PM	
A653 Leeds Road (S)	Lanes 1+2	20.1	84.5	13.8	76.1	23.8	91.3	11.8	80.4
A653 Leeds Road (N)	Lanes 1+2 (L / Ah)	15.4	84.0	15.0	78.1	20.4	92.5	17.1	86.0
	Lane 3 (R)	2.2	35.8	0.8	11.9	3.1	46.7	0.9	11.9
B6128 Challenge Way	Left	14.4	85.8	14.6	80.0	17.0	91.7	18.5	87.2
B6128 John Ormsby VC Way	Lane 1 (L)	7.3	56.0	8.5	49.6	9.0	67.4	7.4	44.0
	Lane 2 (Ah / R)	10.3	71.4	7.1	46.0	10.9	75.4	6.7	43.5

6.64 When the Proposed Development traffic is added to the Do Nothing Scenarios the existing issues of capacity on the network are exacerbated to a degree. However, further to discussions with KC Highways officers, it is understood there are emerging plans for improvements to this junction. It has been agreed that PF will test this junction as a part of the TA Addendum, if proposals are available within the appropriate timescale.

Table 6-23: Junction 5 summary 2024 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A) AM		2024 DS(A) PM		2024 DS(A+B) AM		2024 DS(A+B) PM	
A653 Leeds Road (S)	Lanes 1+2	32.4	97.8	12.5	69.4	28.0	94.2	14.2	76.1
A653 Leeds Road (N)	Lanes 1+2 (L / Ah)	14.8	80.0	14.3	74.4	14.5	78.0	16.3	82.0
	Lane 3 (R)	2.2	42.7	0.8	10.2	2.1	39.3	0.8	12.2
B6128 Challenge Way	Left	13.8	82.7	23.6	97.4	17.0	92.5	15.7	84.3
B6128 John Ormsby VC Way	Lane 1 (L)	6.6	47.7	10.2	66.2	7.0	53.6	9.2	55.8
	Lane 2 (Ah / R)	10.1	68.8	8.3	59.6	11.1	77.4	7.4	50.3

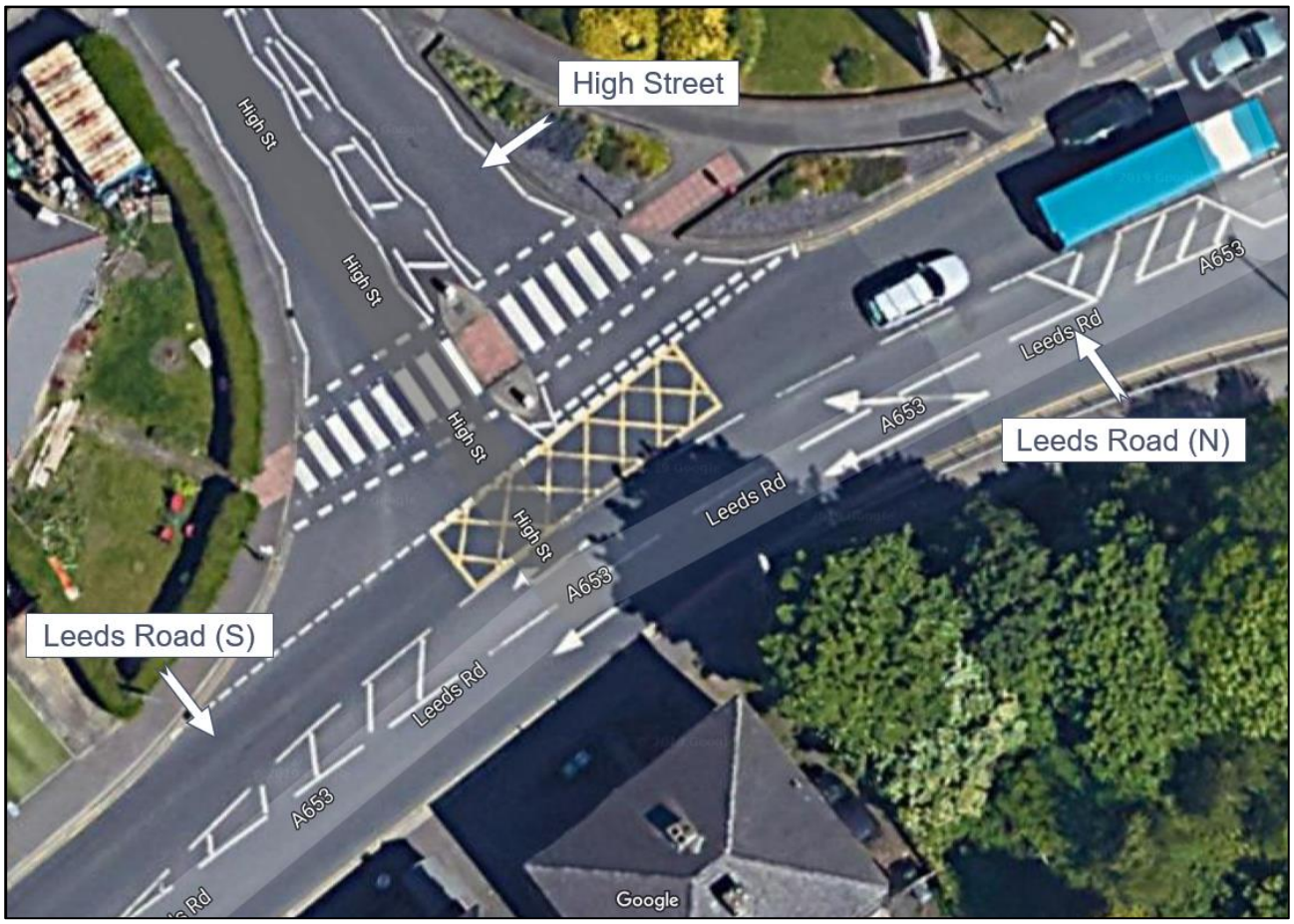
Table 6-24: Junction 5 summary 2030 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A) AM		2030 DS(A) PM		2030 AM DS(A+B)		2030 PM DS(A+B)	
A653 Leeds Road (S)	Lanes 1+2	30.8	96.1	12.7	80.4	107.1	114.3	94.4	114.8
A653 Leeds Road (N)	Lanes 1+2 (L / Ah)	23.3	95.4	19.2	90.6	82.4	113.3	79.0	114.3
	Lane 3 (R)	3.5	50.9	1.0	12.7	7.5	80.8	2.2	44.3
B6128 Challenge Way	Left	19.2	95.2	19.4	89.3	47.2	109.4	95.0	116.3
B6128 John Ormsby VC Way	Lane 1 (L)	8.4	61.8	7.9	47.7	13.1	83.0	10.4	61.2
	Lane 2 (Ah / R)	11.3	78.3	7.1	46.0	18.2	95.0	8.8	57.1

Junction 5b – A653 Leeds Road / High Street

6.65 Junction 5b sits immediately to the west of Junction 5 set out and modelled above. The junction takes the form of a ghost island right turn junction with the High Street running north operating as the minor arm and Leeds Road running southwest to northeast with a yellow box in place to aid movement. The junction layout is shown in **Figure 6.8**.

Figure 6.8: Junction 5b – Aerial Shot of A653 Leeds Road / High Street



Source: Google Maps with Pell Frischmann annotations

6.66 **Table 6-25** shows the results of the observed 2019 base flows modelled within the PICADY modelling tool. The results of the model show the junction working well within capacity with a peak RFC of 0.43 in the AM peak period and 0.56 in the PM peak period.

Table 6-25: Junction 5b summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
High Street (LT into Leeds Road (N))	0.8	10.5	0.43	0.5	8.6	0.33
High Street (RT into Leeds Road (S))	0	17.8	0.02	0.1	20.2	0.07
Leeds Road (N) (RT into High Street)	0.7	11.2	0.4	1.3	13.9	0.56

6.67 **Table 6-26** and **Table 6-27** show the results of testing undertaken with 2024 and 2030 base traffic applied to the Proposed Development and with increased traffic flows on Leeds Road, RFC's on the High Street turning left and Leeds Road turning into the high street creep to 0.54 and 0.56 respectively in the 2024 AM Peak and 0.67 and 0.7 respectively in the 2030 AM Peak. Similar reduction in reserve capacity are seen by High Street left turners (0.33 in 2019, 0.4 in 2024 and 0.51 in 2030).

Table 6-26: Junction 5b summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
High Street (LT into Leeds Road (N))	1.1	12.8	0.54	0.7	9.57	0.4
High Street (RT into Leeds Road (S))	0	22.6	0.02	0.1	21.4	0.16
Leeds Road (N) (RT into High Street)	1.3	14.5	0.56	1.4	13.9	0.56

Table 6-27: Junction 5b summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
High Street (LT into Leeds Road (N))	2	17.8	0.67	1	11.5	0.51
High Street (RT into Leeds Road (S))	0	32.7	0.03	0.2	22.6	0.16
Leeds Road (N) (RT into High Street)	2.7	18.8	0.7	1.3	13.1	0.56

Table 6-28: Junction 5b summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
High Street (LT into Leeds Road (N))	1.1	12.8	0.54	0.7	9.6	0.4
High Street (RT into Leeds Road (S))	0	22.9	0.02	0.1	21.7	0.11
Leeds Road (N) (RT into High Street)	1.3	14.5	0.56	1.5	14	0.58

Table 6-29: Junction 5b summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
High Street (LT into Leeds Road (N))	1.2	13.2	0.54	0.7	9.7	0.4
High Street (RT into Leeds Road (S))	0	23.8	0.02	0.1	22.2	0.11
Leeds Road (N) (RT into High Street)	1.3	14.9	0.56	1.5	14	0.58

Table 6-30: Junction 5b summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
High Street (LT into Leeds Road (N))	2	17.9	0.67	1	11.6	0.51
High Street (RT into Leeds Road (S))	0	33.6	0.03	0.2	23.2	0.16
Leeds Road (N) (RT into High Street)	2.8	18.8	0.71	1.4	13.2	0.57

Table 6-31: Junction 5b summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
High Street (LT into Leeds Road (N))	2.4	21.6	0.71	1.8	20.4	0.65
High Street (RT into Leeds Road (S))	0.1	62.4	0.05	0.5	68.2	0.36
Leeds Road (N) (RT into High Street)	3.8	19.4	0.75	2.3	17	0.66

6.68 **Table 6-29** to **Table 6-31** show the results of the model with the Proposed Development traffic applied. Whilst there is an increased in delay experieced by right turning vehicles in 2030 with all Proposed Development added this would only result in a queue of 1 vehicle due to the small number of vehicles looking to make this manouvre. All of the arms across all of the Proposed Development scenarios are within capacity and as such no ammendments are proposed to this junction

Junction 6 – Windsor Road / Owl Lane

6.69 Windsor Road and Owl Lane form a simple priority junction to the south west of the Site which forms the sixth junction model tested. In its current form the junction acts as a residential distributor road to Windsor View, Windsor Close and Windsor Garden and connects to Chidswell Lane to the east. layout of the junction is presented within **Figure 6.9** below.

Figure 6.9: Junction 6 – Aerial Shot of Windsor Road / Owl Lane

Source: Google Maps with Pell Frischmann annotations

6.70 **Table 6-32** below presents the results of the PICADY model of the surveyed junction. When observed the junction produced an RFC of 0.84 which is just 0.01 from what is considered to be 'at capacity' when an arm of the junction reaches 0.85. The arm in question is vehicles right turning from Owl Lane having to cross the southbound traffic flor on Owl Lane.

Table 6-32: Junction 6 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
Windsor Road	0.1	4.2	0.11	0.5	4.9	0.31
Owl Lane (E) (RT into Windsor Road)	12	18.8	0.84	1	4.2	0.25

6.71 Within the PM peak hour there is a substantial amount of reserve capacity in the with a maximum RFC of 0.31, continued in the future year 2024 and 2030 Do Minimum scenarios. However an increase in background flows southbound on Owl Lane causes the Owl Lane right turn into Windsor Road movement to increase beyond capacity in the 2024 DN AM scenario (RFC of 0.99, with a queue of 37pcu) and further over capacity by 2030 (RFC of 1.03, with a queue of 57pcu).

Table 6-33: Junction 6 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
Windsor Road	0.1	4.6	0.12	0.5	4.9	0.31
Owl Lane (E) (RT into Windsor Road)	36.6	76	0.99	1.1	4.23	0.26

Table 6-34: Junction 6 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
Windsor Road	0.2	5.53	0.15	0.5	4.96	0.31
Owl Lane (E) (RT into Windsor Road)	56.9	120.7	1.03	1.1	4.23	0.26

6.72 **Table 6-33** and **Table 6-34** above set out how the junction would be over capacity in both 2024 and 2030 due to background changes, committed development and reassignment across the network. By 2024 the RFC on Owl Lane is 0.99 with queues of 37pcu and an RFC of 1.03 with queues of 57pcu by 2030.

6.73 As set out within **Table 6-35** to **Table 6-37** below, when only part of the Proposed Development is constructed the impact is negligible however with the full Proposed Development including Sites A and B completely constructed in 2030, the junction would also be over capacity within the PM peak.

Table 6-35: Junction 6 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Windsor Road	0.1	4.38	0.11	0.4	4.86	0.31
Owl Lane (E) (RT into Windsor Road)	24.1	41.1	0.95	1.1	4.13	0.25

Table 6-36: Junction 6 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Windsor Road	0.1	4.45	0.12	0.4	4.90	0.31
Owl Lane (E) (RT into Windsor Road)	30.8	57.45	0.98	1.0	4.14	0.25

Table 6-37: Junction 6 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Windsor Road	0.2	5.15	0.14	0.4	4.89	0.31
Owl Lane (E) (RT into Windsor Road)	45.2	93.5	1.01	1.0	4.13	0.25

Table 6-38: Junction 6 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Windsor Road	0.5	8.89	0.32	1.5	15.3	0.61
Owl Lane (E) (RT into Windsor Road)	264	628	1.30	70.2	152	1.06

6.74 In summary the junction is marginally within capacity in the existing situation however by 2024 and further in 2030 does not have sufficient capacity for the expected traffic flows with or without the Proposed Development as a whole or if Site A only came forward. As such it is expected that improvements will be required to upgrade the junction to deliver greater capacity.

Junction 7 – A638 Chancery Road / Owl Lane / B6128 Leeds Road / A638 Wakefield Road

6.75 Junction 7 is a four arm roundabout connecting Chancery Road which runs east / west, Owl Lane to the north and Leeds Road to the south. The roundabout is located directly south of the Site and Chancery Road the A638 is an arterial route linking Dewsbury in the west and Wakefield to the east. **Figure 6.10** below shows the existing layout of the junction.

Figure 6.10: Junction 7 – Aerial Shot of A638 Chancery Road / Owl Lane / B6128 Leeds Road / A638 Wakefield Road

Source: Google Maps with Pell Frischmann annotations

6.76 The results of the observed AM and PM base results are presented within **Table 6.41** below. This demonstrates that the junction is currently over capacity on three of four arms in both the AM and PM peak periods (0.85 or above is considered to be at capacity for a junction of this type). Through **Table 6-39** and **Table 6-40** it is clear that the junction will remain over capacity in the future years 2024 and 2030 with particularly in the AM peak period with RFCs of 1.03 on Wakefield Road in 2024 and 1.01 in 2030.

Table 6-39: Junction 7 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
Chancery Road (A638)	5.6	14	0.85	14.4	37	0.95
Leeds Road	9.7	42.7	0.92	3.1	16.1	0.76
Wakefield Road (A638)	31.0	90.9	1.03	6.5	20.8	0.88
Owl Lane	4.1	16.2	0.81	20.4	65	1.0.

Table 6-40: Junction 7 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
Chancery Road (A638)	7.4	17.4	0.88	12.1	29.6	0.94
Leeds Road	6.4	31.3	0.87	3.2	17.1	0.76
Wakefield Road (A638)	33.2	95	1.03	4.4	15.6	0.82
Owl Lane	3.7	14.9	0.79	7.8	27.8	0.90

Table 6-41: Junction 7 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
Chancery Road (A638)	8.6	19.5	0.90	7.6	17.9	0.89
Leeds Road	5.3	27.6	0.85	2.6	14.8	0.72
Wakefield Road (A638)	25.5	76.8	1.01	2.5	10.5	0.72
Owl Lane	3.6	14.1	0.78	6.3	21.6	0.87

Table 6-42: Junction 7 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Chancery Road (A638)	7	16.6	0.88	12.1	29.3	0.94
Leeds Road	6	29.4	0.87	3	16.4	0.76
Wakefield Road (A638)	33.2	94.6	1.03	4.4	15.4	0.82
Owl Lane	3.7	14.5	0.79	7.6	27.18	0.90

Table 6-43: Junction 7 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Chancery Road (A638)	7.8	18.1	0.89	12.6	30.5	0.94
Leeds Road	7.0	33.8	0.89	3.1	16.5	0.76
Wakefield Road (A638)	38.1	106.7	1.04	4.4	15.5	0.82
Owl Lane	3.7	14.4	0.79	9.2	32.1	0.92

Table 6-44: Junction 7 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Chancery Road (A638)	8.4	18.9	0.90	7.6	17.8	0.89
Leeds Road	5	26.1	0.85	2.5	14.4	0.72
Wakefield Road (A638)	25.7	77.2	1.01	2.5	10.4	0.72
Owl Lane	3.6	14.1	0.79	6.2	21.2	0.87

Table 6-45: Junction 7 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Chancery Road (A638)	16.6	35.7	0.96	57.2	100.6	1.05
Leeds Road	8.5	43.1	0.92	6.9	37.1	0.89
Wakefield Road (A638)	44.6	123.8	1.06	4.8	20.2	0.84
Owl Lane	26	74.4	1.01	65.1	151.3	1.09

6.77 Within the future year plus Proposed Development scenarios the junction remains over capacity as per the Do Nothing scenarios. As such, it is expected that future improvements will be required to upgrade the junction to deliver greater capacity.

Junction 8 – Chidswell Lane / Windsor Road

6.78 Junction 9 is located to the southwest of the Site where Windsor Road meets Chidswell Lane in the form of a simple priority junction. Windsor Road acts as a local distributor road and adjoins Owl Lane to the west. The junction layout is shown within **Figure 6.11** below.

Figure 6.11: Junction 8 – Aerial Shot of Chidswell Lane / Windsor Road

Source: Google Maps with Pell Frischmann annotations

6.79 **Table 6-46** to **Table 6-52** show how the Proposed Development would function in each modelled scenario from the existing to future years 2024, 2030 with nothing done and with both Site A and Site A+B traffic added to those traffic volumes. Within the AM and PM base the RFC does not exceed 0.06 for any arm of the junction and as such is considered to be lightly trafficked and well within capacity.

Table 6-46: Junction 8 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
Chidswell Lane (S) (LT into Windsor Road)	0	5.8	0.01	0	6.5	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	7.1	0.03	0	7.9	0.02
Windsor Road (RT into Chidswell Lane (S))	0	5.56	0.00	0.1	6.7	0.06

Table 6-47: Junction 8 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
Chidswell Lane (S) (LT into Windsor Road)	0	6.1	0.01	0	6.6	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	7.5	0.03	0	8.1	0.02
Windsor Road (RT into Chidswell Lane (S))	0	5.7	0.00	0.1	6.9	0.06

Table 6-48: Junction 8 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
Chidswell Lane (S) (LT into Windsor Road)	0	6.6	0.01	0	6.6	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	8.4	0.03	0	8.1	0.02
Windsor Road (RT into Chidswell Lane (S))	0	6.2	0.00	0.1	6.9	0.06

Table 6-49: Junction 8 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Chidswell Lane (S) (LT into Windsor Road)	0	6.1	0.01	0	6.6	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	7.5	0.03	0	8.1	0.02
Windsor Road (RT into Chidswell Lane (S))	0	5.7	0.00	0.1	6.9	0.06

Table 6-50: Junction 8 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Chidswell Lane (S) (LT into Windsor Road)	0	6.1	0.01	0	6.6	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	7.5	0.03	0	8.1	0.02
Windsor Road (RT into Chidswell Lane (S))	0	5.7	0.00	0.1	6.9	0.06

Table 6-51: Junction 8 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Chidswell Lane (S) (LT into Windsor Road)	0	6.6	0.01	0	6.6	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	8.4	0.03	0	8.1	0.02
Windsor Road (RT into Chidswell Lane (S))	0	6.2	0.00	0.1	6.9	0.06

Table 6-52: Junction 8 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Chidswell Lane (S) (LT into Windsor Road)	0	6.9	0.01	0	6.7	0.00
Chidswell Lane (S) (Ah into Chidswell Lane (N)	0	8.8	0.03	0	8.4	0.02
Windsor Road (RT into Chidswell Lane (S))	0	6.2	0.00	0.1	6.5	0.06

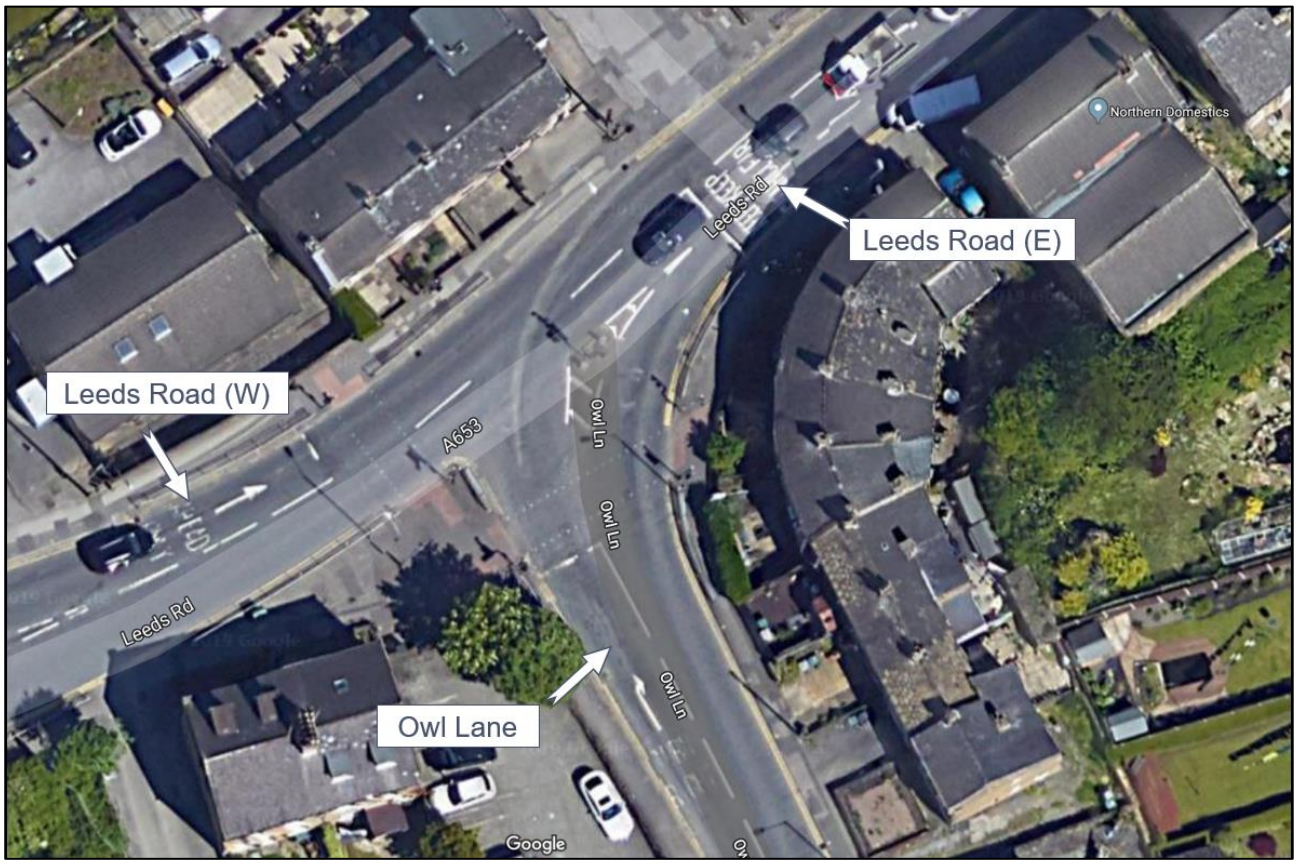
6.80 Through all Proposed Development scenarios up to 2030 with only Site A constructed the RFC of any arm does not exceed 0.06 as per the observed base period. With all of the background and Proposed Development traffic added in the 2030 Site A + B scenario the RFC of Chidswell Lane stays at 0.02 to 0.06. It is anticipated that due to stopping up further east as a result of the adjacent committed BDWH development, the southern part of Chidswell Lane will become access only.

Junction 9 – A653 Leeds Road / Owl Lane

6.81 Junction 9 is an existing signal-controlled junction between the northern end of Owl Lane and A653 Leeds Road. Owing to the nearby Junctions 5 and 10, it has some limited movements. The layout is shown on **Figure 6.12**. The south-western arm of the junction (Leeds Road) is restricted from turning right into Owl Lane and Owl Lane traffic is restricted from turning left onto Leeds Road. In both cases, traffic would use John Ormsby VC Way to the south instead. Each of these arms has a single lane entry to the junction.

6.82 Southbound Leeds Road has two lanes entering the junction with traffic turning left into Owl Lane signalled separately to allow it to run concurrently with traffic exiting Owl Lane and to enable alternation with pedestrian crossing phases on the Owl Lane and south-western Leeds Road arms. No specific cycle facilities are included on the junction.

Figure 6.12: Junction 9 – Aerial Shot of A6532 Leeds Road / Owl Lane



Source: Google Maps with Pell Frischmann annotations

6.83 As an existing signal-controlled junction, Junction 9 has been modelled in all scenarios using LinSig modelling software with summary outputs detailed in **Table 6-53** through **Table 6-56**, inclusive.

Table 6-53: Junction 9 summary 2019 Baseline junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		AM Base 2019		PM Base 2019	
Leeds Road (E)	Lane 1 (L)	2.4	19.1	1.5	13.5
	Lane 2 (Ah)	9.2	53.9	9.0	54.0
Owl Lane	Lane 1 (R)	9.6	75.1	8.3	70.0
Leeds Road (W)	Lane 1 (Ah)	12.2	61.3	9.6	52.5

Table 6-54: Junction 9 summary 2024 and 2030 Do Nothing junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DN AM		2024 DN PM		2030 DN AM		2030 DN PM	
Leeds Road (E)	Lane 1 (L)	2.8	21.7	1.7	14.4	3.9	23.4	1.9	15.5
	Lane 2 (Ah)	15.6	63.3	13.7	58.6	18.4	68.9	14.5	60.4
Owl Lane	Lane 1 (R)	12.2	68.3	10.3	59.3	13.9	78.9	10.8	62.6
Leeds Road (W)	Lane 1 (Ah)	18.1	65.0	13.1	53.0	18.0	64.8	10.8	46.8

Table 6-55: Junction 9 summary 2024 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A) AM		2024 DS(A) PM		2024 DS(A+B) AM		2024 DS(A+B) PM	
Leeds Road (E)	Lane 1 (L)	2.9	22.6	1.7	14.9	3.1	23.5	2.1	16.9
	Lane 2 (Ah)	16.3	65.3	14.2	60.0	16.9	66.7	14.5	60.5
Owl Lane	Lane 1 (R)	12.1	66.8	10.3	58.6	13.3	70.6	10.8	62.6
Leeds Road (W)	Lane 1 (Ah)	18.7	66.2	13.7	54.4	20.4	69.4	13.1	53.3

Table 6-56: Junction 9 summary 2030 Do Something junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A) AM		2030 DS(A) PM		2030 DS(A+B) AM		2030 DS(A+B) PM	
Leeds Road (E)	Lane 1 (L)	4.1	24.4	2.0	16.1	7.5	38.5	7.6	41.6
	Lane 2 (Ah)	19.4	70.8	15.1	62.3	74.4	105.0	31.0	89.9
Owl Lane	Lane 1 (R)	14.0	79.5	11.0	62.5	35.5	102.6	40.9	103.7
Leeds Road (W)	Lane 1 (Ah)	18.1	65.2	11.5	48.7	24.9	76.9	25.6	78.5

6.84 Modelling indicates that this junction operates substantively below the 90% degree-of-saturation threshold of operational performance in 2019 and in all future Do Nothing scenarios with a maximum DoS on the junction for Owl Lane of 78.9% in the AM peak.

6.85 In those scenarios with Proposed Development traffic added, generally the junction continues to operate adequately however in the 2030 Do Something (Sites A+B) scenario – i.e. complete and operational Proposed Development – degrees-of-saturation on the junction for traffic travelling south-west on Leeds Road and exiting Owl Lane are 105% and 103% respectively. Mean maximum queues

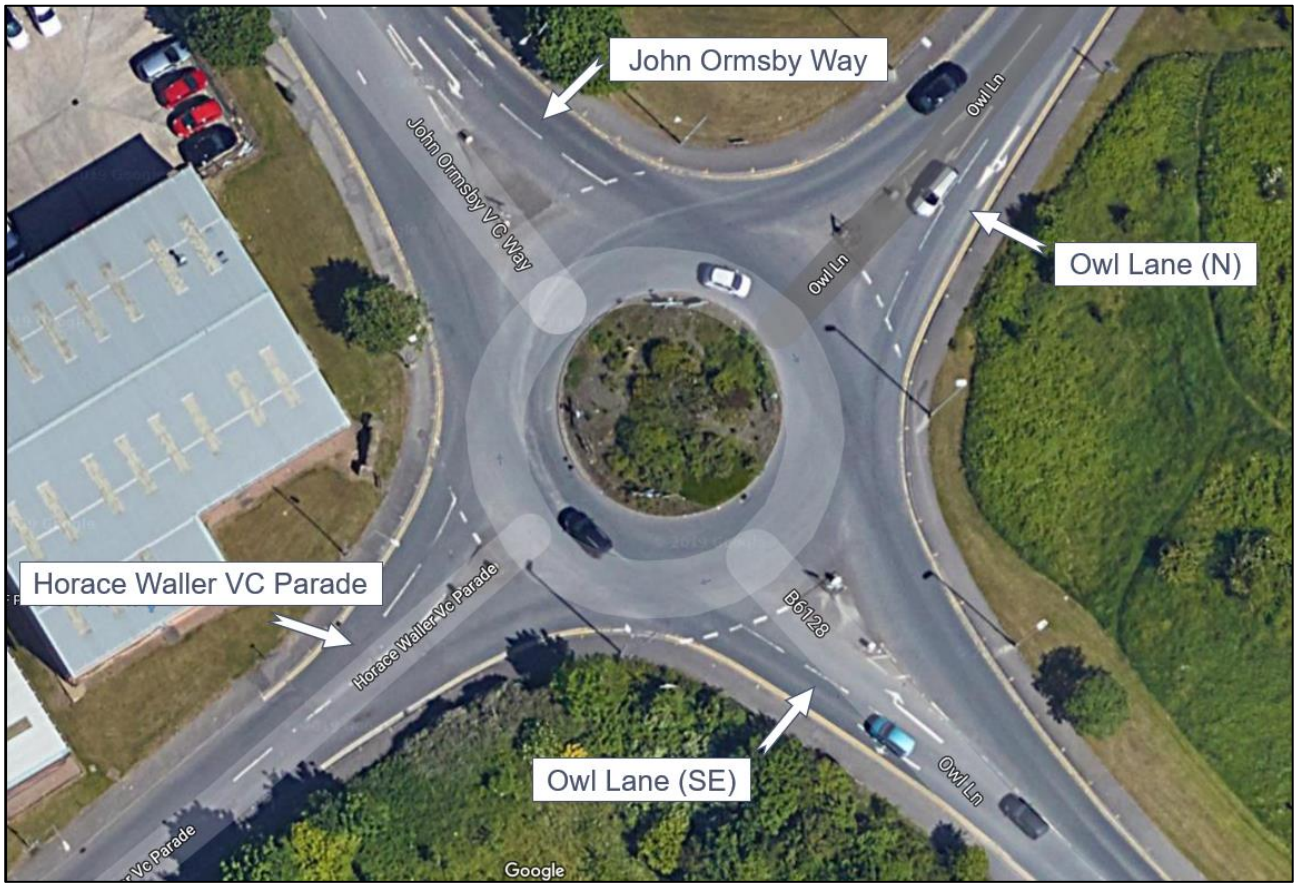
are notable as a result and drivers would not be able to discharge fully each cycle. Delays would then naturally build over the peak with queues extending to (and through) adjacent junctions.

6.86 There is substantial geometric constraint on this junction given adjacent landholders/buildings are close to the back-of-footway which precludes any obvious mitigation suggestions. It is understood that KC have plans to make improvements to Junction 5, 100m to the south-west. Given Owl Lane functions as a 'bypass' for this junction for traffic between the north-east and south-east, this would have implications in terms of traffic distributions in this area which would need to be accounted for in any future proposals.

Junction 10 – John Ormsby VC Way / Owl Lane

6.87 Junction 10 is an existing 36m diameter roundabout on Owl Lane with the access to Shawcross Business Park (on Horace Waller VC Parade) and John Ormsby VC Way. All inbound links are single lane with flares on entry to a two-lane width give-way line. All traffic to/from the Shawcross Business Park must use this junction. The B6128 crosses the junction being Owl Lane to the south-east and John Ormsby VC Way to the north-west. Owl Lane continues to the north-east to meet Leeds Road at Junction 9; John Ormsby VC Way (B6128) continues to the signal installation at Junction 5. The layout is shown on **Figure 6.13**.

Figure 6.13: Junction 10 – Aerial Shot of John Ormsby VC Way / Owl Lane



Source: Google Maps with Pell Frischmann annotations

6.88 Modelling has been undertaken for all scenarios with the current geometric layout using ARCADY modelling software. Summary outcomes are presented in **Table 6-57** through **Table 6-63**, inclusive.

Table 6-57: Junction 10 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
John Ormsby Way	1.1	5.4	0.50	0.8	4.6	0.42
Owl Lane (N)	0.3	4.2	0.22	0.2	3.7	0.17
Owl Lane (SE)	3.9	11.8	0.79	1.4	5.4	0.57
Horace Waller VC Parade	0.2	6.9	0.10	0.7	6.8	0.39

Table 6-58: Junction 10 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
John Ormsby Way	1.1	5.7	0.52	0.7	4.5	0.41
Owl Lane (N)	0.3	4.4	0.25	0.2	3.7	0.17
Owl Lane (SE)	5.8	16.5	0.85	1.5	5.6	0.59
Horace Waller VC Parade	0.2	7.5	0.11	0.7	7.0	0.40

Table 6-59: Junction 10 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
John Ormsby Way	1.2	5.9	0.53	0.7	4.4	0.39
Owl Lane (N)	0.4	4.6	0.28	0.2	3.6	0.18
Owl Lane (SE)	8.4	23.2	0.90	1.5	5.6	0.59
Horace Waller VC Parade	0.2	8.0	0.12	0.7	7.0	0.40

Table 6-60: Junction 10 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
John Ormsby Way	1.1	5.4	0.52	0.7	4.4	0.41
Owl Lane (N)	0.3	4.2	0.25	0.2	3.6	0.17
Owl Lane (SE)	5.6	16.1	0.86	1.4	5.4	0.59
Horace Waller VC Parade	0.1	5.3	0.11	0.7	6.8	0.41

Table 6-61: Junction 10 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
John Ormsby Way	1.1	5.6	0.53	0.7	4.4	0.41
Owl Lane (N)	0.3	4.2	0.26	0.2	3.7	0.20
Owl Lane (SE)	6.5	18.3	0.88	1.5	5.5	0.59
Horace Waller VC Parade	0.1	5.5	0.13	0.7	6.8	0.41

Table 6-62: Junction 10 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
John Ormsby Way	1.1	5.6	0.54	0.7	4.4	0.40
Owl Lane (N)	0.4	4.5	0.29	0.2	3.6	0.19
Owl Lane (SE)	8.3	23.0	0.90	1.4	5.4	0.59
Horace Waller VC Parade	0.1	5.7	0.13	0.7	6.8	0.41

Table 6-63: Junction 10 summary 2030 Do Something (Site A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
John Ormsby Way	1.5	7.0	0.61	1.6	8.0	0.61
Owl Lane (N)	0.8	6.1	0.46	0.9	6.3	0.48
Owl Lane (SE)	139	303	1.17	5.0	14.0	0.84
Horace Waller VC Parade	0.2	6.8	0.18	1.9	15.8	0.66

6.89 The junction operates within capacity in all PM peak scenarios, however in the AM peak, traffic on Owl Lane (south-eastern arm) has a ratio-of-flow-to-capacity of 0.85 – i.e. the limit of operational capacity – in the 2024 Do Nothing scenario with further increase by 2030 Do Nothing to 0.90. Additional Proposed Development traffic then exacerbates this capacity issue with the RFC being increased in all Proposed Development scenarios and finally in 2030 Do Something (Sites A+B) – i.e. complete and operational Proposed Development – this arm is anticipated to have an RFC of 1.09. Modelled queues and flows are then extensive.

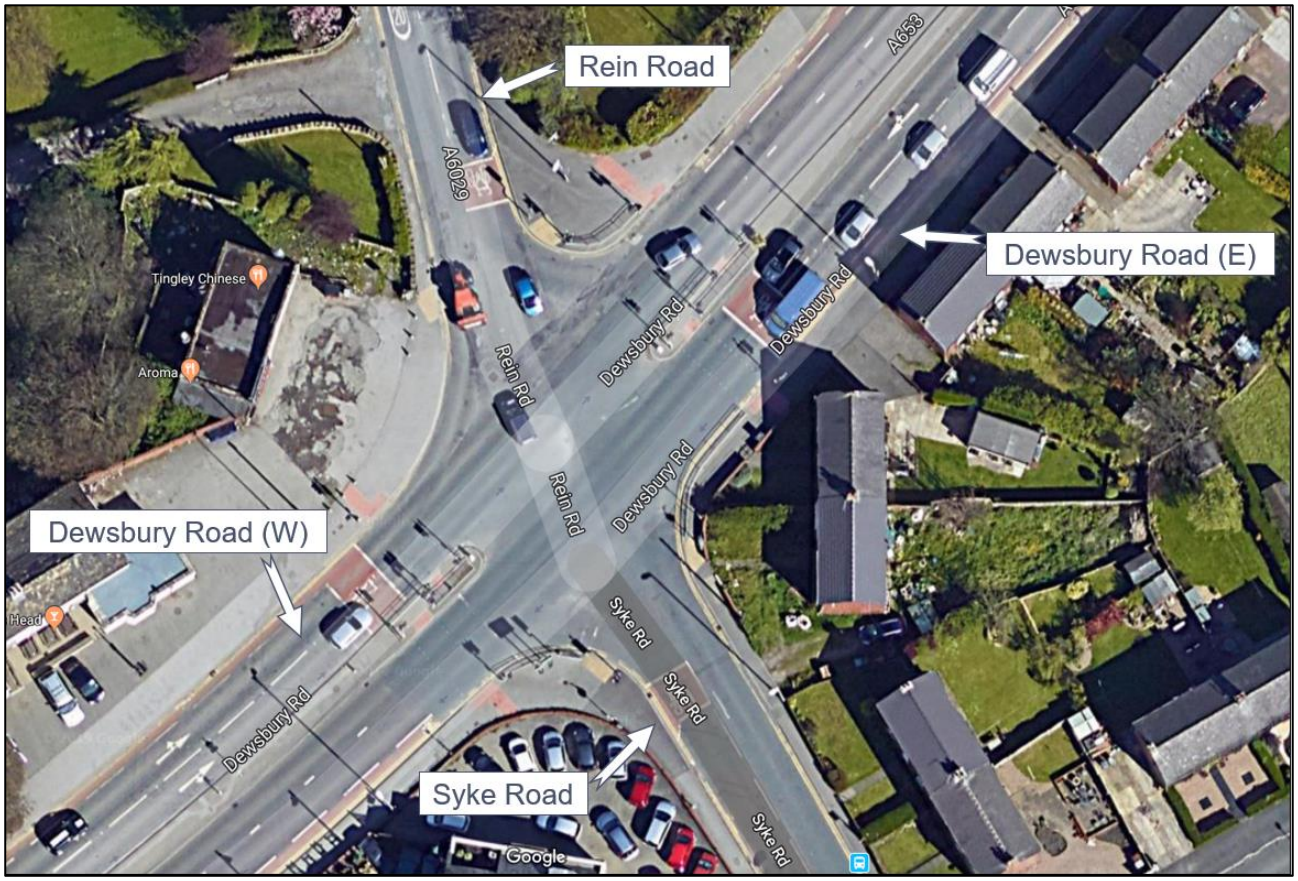
6.90 Given the junction is expected to operate at or beyond the capacity of the current geometry in the AM peak in all future scenarios, with or without Proposed Development, some intervention will be required. It is understood that KC have plans to make improvements to the adjacent Junction 5 (approximately 120m north-west) and it is reasonable that this junction be included in a related review given that changes to the queuing area of that junction are likely to interact with this junction.

6.91 In summary, this junction will require intervention in the future, likely in combination with other interventions nearby.

Junction 11 – A653 Dewsbury Road / Rein Road / Syke Road

6.92 Junction 11 is located approximately 1.5km to the north of the Site on the A653, at which point it is called Dewsbury Road, and within LCC Highway Authority area. It is a signal-controlled junction between the A653 dual carriageway and the A6209 Rein Road which provides a direct route to Morley and Syke Road which is an unclassified (predominantly residential) road to West Ardsley and Heybeck Lane approximately 500m to the east of the Site. The layout is shown on **Figure 6.14**

Figure 6.14: Junction 11 – Aerial Shot of A653 Dewsbury Road / Rein Road / Syke Road



Source: Google Maps with Pell Frischmann annotations

6.93 Dewsbury Road is two lanes in either direction at this junction with no flare provision. Rein and Syke Roads are each a single lane in either direction again with no flare provision, though some in-junction waiting space is available within the junction area. Staggered signal-controlled pedestrian crossing facilities are provided on both the north and south Dewsbury Road arms; uncontrolled pedestrian crossing areas are provided on the Rein and Syke Road arms.

6.94 As the junction is signalised (and is intended to remain so), LinSig modelling has been performed with summary results presented in **Table 6-64** through **Table 6-67**, inclusive.

Table 6-64: Junction 11 summary 2019 Baseline junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		AM Base 2019		PM Base 2019	
Rein Rd	Lane 1	12.6	81.7	12.8	77.0
Dewsbury Road (E)	Lane 1	15.2	63.6	19.4	75.7
	Lane 2	3.9	85.2	8.1	51.3
Syke Road	Lane 1	9.6	62.8	5.7	40.5
Dewsbury Road (W)	Lane 1	22.4	82.3	13.2	62.4
	Lane 2	13.9	62.7	7.9	44.2

Table 6-65: Junction 11 summary 2024 and 2030 'Do Nothing' junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DN AM		2024 DN PM		2030 DN AM		2030 DN PM	
Rein Rd	Lane 1	12.8	84.6	15.2	74.9	44.4	112.9	20.6	89.0
Dewsbury Road (E)	Lane 1	20.4	83.6	20.6	76.4	24.9	89.2	24.7	88.6
	Lane 2	3.9	84.3	14.9	74.8	5.6	94.6	17.2	90.2
Syke Road	Lane 1	8.5	59.8	9.5	48.5	9.0	64.9	14.3	63.1
Dewsbury Road (W)	Lane 1	21.0	86.8	17.0	70.2	85.7	110.7	20.8	83.8
	Lane 2	20.3	86.8	14.6	66.6	63.1	116.8	18.6	82.6

Table 6-66: Junction 11 summary 2024 'Do Something' junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A) AM		2024 DS(A) PM		2024 DS(A+B) AM		2024 DS(A+B) PM	
Rein Rd	Lane 1	12.9	84.9	15.5	76.8	46.1	115.9	15.5	77.0
Dewsbury Road (E)	Lane 1	20.6	84.1	20.6	75.7	138.7	117.9	20.8	76.1
	Lane 2	3.9	84.3	15.1	74.2	3.8	84.3	15.2	74.8
Syke Road	Lane 1	8.5	59.8	9.6	49.4	9.9	72.7	9.6	49.4
Dewsbury Road (W)	Lane 1	21.6	88.1	16.9	69.4	50.3	102.3	17.7	71.7
	Lane 2	20.8	87.9	14.6	65.8	49.6	102.1	15.5	68.3

Table 6-67: Junction 11 summary 2030 'Do Something' junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A) AM		2030 DS(A) PM		2030 DS(A+B) AM		2030 DS(A+B) PM	
Rein Rd	Lane 1	56.3	119.6	21.0	89.7	80.1	133.2	24.4	100.0
Dewsbury Road (E)	Lane 1	24.6	88.3	26.4	90.8	45.7	100.6	33.5	92.5
	Lane 2	5.6	94.6	18.6	92.7	5.6	94.6	38.0	100.3
Syke Road	Lane 1	9.2	67.1	14.3	63.1	9.4	69.2	10.8	55.8
Dewsbury Road (W)	Lane 1	96.4	112.4	21.5	85.3	254.3	141.2	28.4	88.9
	Lane 2	52.9	112.3	19.1	83.2	20.7	139.3	26.2	87.4

6.95 2019 baseline outputs show the junction operating acceptably in both the AM and PM peaks. The highest degrees of saturation are in the AM peak on Dewsbury Road at 82-85% which is acceptably below the usual 90% DoS acceptability threshold for signal operation. Queues are substantive but not excessive with a modelled mean maximum queue on the northbound carriageway in the AM of 22pcu and southbound in the PM peak of 19pcu. However, given the available capacity, these would be expected to clear on each cycle.

6.96 In the future however, this does not remain the case. The 2024 Do Nothing scenario remains acceptable with all degrees-of-saturation (save for Syke Road which is lower) in the 80-90% band in the AM peak and lower in the PM. Mean maximum queues on Dewsbury Road are longer in aggregate but in the range of 20-21pcu on most lanes. Again, these would be expected to discharge each cycle. By 2030 however, background growth (as illustrated in the 2030 Do Nothing scenario) leads to a significant demand beyond the ability of the junction to provide for it. In the AM peak, demand on Rein Rd and northbound on Dewsbury Rd are in the range of 110-120% of capacity, with long queues as a result and traffic likely to make multiple cycles to get through. PM peak issues are less severe but degrees-of-saturation are approaching (or passing) 90% on all but Syke Road.

6.97 When Proposed Development flows are added, the future capacity issues are exacerbated. The junction continues to operate acceptably in the 2024 Do Something (Site A) scenario with flows and queues comparable to the 2024 Do Nothing scenario, but in the 2024 Do Something (Site A+B) scenario, flows at the junction exceed capacity. In the 2030 Do Nothing AM scenario, capacity is already substantially exceeded, with the addition of development flows exacerbating the situation further. This problem is similar but less severe in the 2030 PM scenarios.

6.98 It is clear that even in the absence of the Proposed Development, intervention would be required at this junction in order to accommodate background growth both widely and more specifically due to the Kirklees (and other adjacent authorities') Local Plan. The presence of the Proposed Development both accelerates and exacerbates the future issues, but is not the underlying cause. Given the situation of the junction, intervention could potentially be in the form of widening/flare provision of Dewsbury Road through the junction (in both directions) and potentially also some limited flare provision on Rein Road. The junction is located within the LCC Highway Authority area, proposals and programme for junction improvements would, it is assumed, be led by LCC.

Junction 12 – Owl Lane / Southern Site Access 5 / Dewsbury Rams

6.99 Junction 12 exists currently as the access to the Dewsbury Rams Rugby Club to the south of Owl Lane. It is a major-minor priority access with a ghost island provided on Owl Lane (which is the major route) for those that turn right into the Rugby Club. The layout is show on **Figure 6.15**.

Figure 6.15: Junction 12 – Aerial Shot of Owl Lane / Southern Site Access 5 / Dewsbury Rams

Source: Google Maps with Pell Frischmann annotations

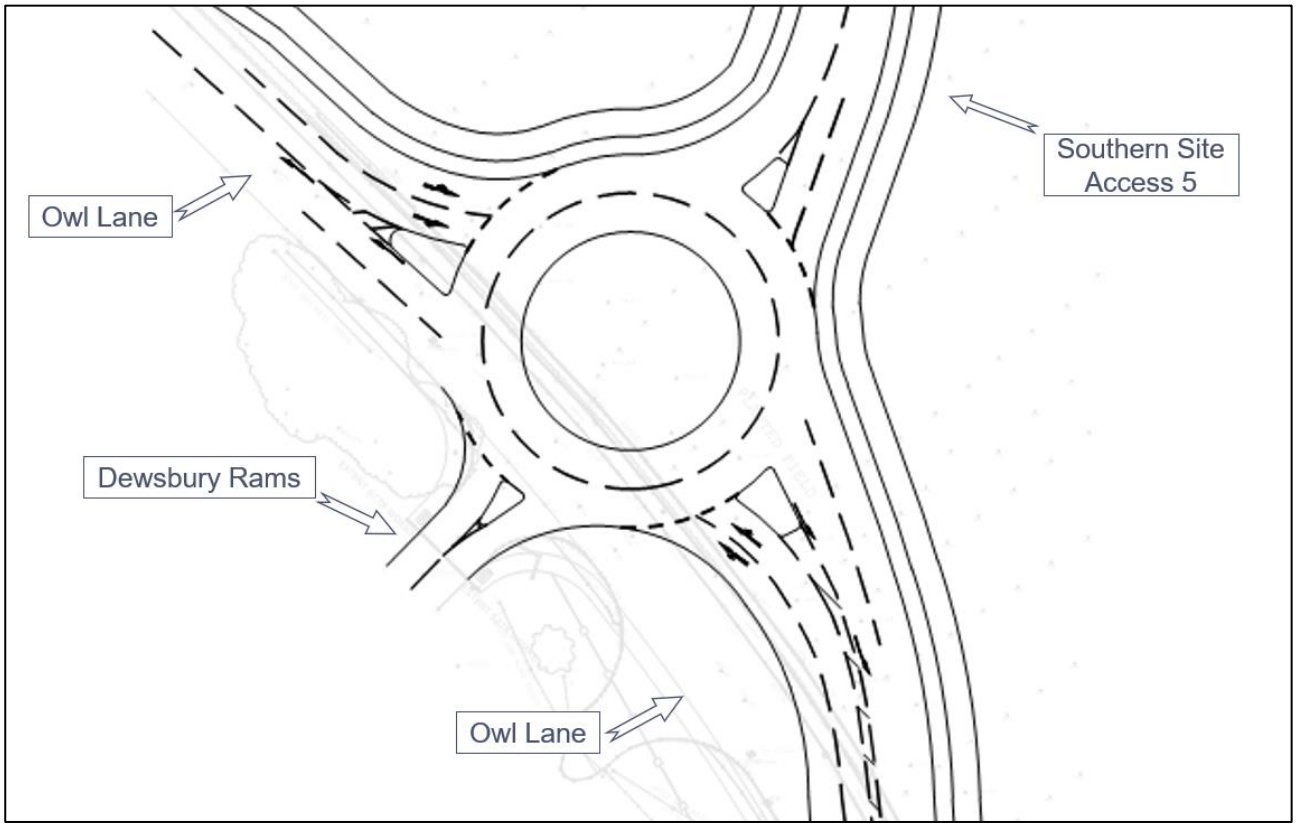
6.100 As baseline, the access has been modelled using PICADY for 2019 flows and the current geometry. The results are summarised in **Table 6-68** and indicate that the junction operates acceptably. This is expected as flows are negligible in the weekday peak periods and the Rugby Club would be more likely to generate its peak flows outside of the weekday network peak (e.g. on weekends or in the evenings)

Table 6-68: Junction 12 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
Dewsbury Rams	0.0	0.0	0.00	0.0	10.1	0.02
Owl Lane (RT into Dewsbury Rams)	0.0	12.0	0.02	0.0	9.5	0.04

6.101 In the future, and delivered as a part of the Barratt David Wilson Homes development to the south of the Site (Kirklees Planning Ref: 2019/92787), this access will be incorporated into a new roundabout junction. The Barratt development is considered a committed development for the purpose of this Applicant's application and therefore the roundabout is expected to be delivered in all future scenarios, with or without this development. Access to (and through) the Barratt site provides the southern end of the 'Spine Road' through Site B. For the purpose of consistent naming, this junction arm is referred to as 'Southern Site Access 5' (with the actual entry to the Site being referred to as 'Site Access 5').

Figure 6.16: Junction 12 – Layout Drawing of redesigned Owl Lane / Southern Site Access 5 / Dewsbury Rams



Source: Barratt David Wilson Homes drawing number 1820-SI-05 with Pell Frischmann annotations

6.102 ARCADY modelling has been undertaken for each future scenario against the geometric layout of junction as updated for that submitted to planning by Barratt David Wilson Homes at the end of February 2020. Summary outputs are provided in **Table 6-69** to **Table 6-74**, inclusive. Flows also include the specific addition of the predicted traffic generation of the BDWH Site (per Via Solutions' supporting 18159Technical Note 2: Highways, 16 December 2019).

6.103 Whilst the network flows generated for the remainder of this document's assessment do include the BDWH Site as a component of background growth, given it is a Local Plan development incorporated in KC's SATURN model from which our background growth is derived, they need to be considered through a manual accounting on this junction as this junction does not feature in the SATURN model. Whilst this may be 'double-counting' trips around this junction, it ensures a robust assessment.

Table 6-69: Junction 12 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
Southern Site Access 5	0.1	3.1	0.12	0.1	3.2	0.07
Owl Lane (East)	1.8	4.6	0.64	0.9	3.0	0.47
Dewsbury Rams	0.0	0.0	0.00	0.0	6.0	0.01
Owl Lane (West)	0.9	3.2	0.46	1.3	4.0	0.56

Table 6-70: Junction 12 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
Southern Site Access 5	0.1	3.3	0.13	0.1	3.3	0.07
Owl Lane (East)	2.1	5.0	0.68	0.9	3.0	0.47
Dewsbury Rams	0.0	0.0	0.00	0.0	6.0	0.01
Owl Lane (West)	1.0	3.4	0.50	1.4	4.2	0.58

Table 6-71: Junction 12 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Southern Site Access 5	0.1	3.1	0.12	0.1	3.2	0.07
Owl Lane (East)	1.8	4.6	0.65	0.9	3.0	0.47
Dewsbury Rams	0.0	0.0	0.0	0.0	6.0	0.01
Owl Lane (West)	0.9	3.2	0.45	1.3	4.0	0.57

Table 6-72: Junction 12 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Southern Site Access 5	0.1	3.1	0.12	0.1	3.2	0.07
Owl Lane (East)	1.9	4.7	0.66	0.9	3.0	0.47
Dewsbury Rams	0.0	0.0	0.0	0.0	6.0	0.01
Owl Lane (West)	0.9	3.2	0.47	1.4	4.1	0.58

Table 6-73: Junction 12 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Southern Site Access 5	0.1	3.3	0.13	0.1	3.3	0.07
Owl Lane (East)	2.1	5.0	0.68	0.9	3.0	0.47
Dewsbury Rams	0.0	0.0	0.0	0.0	6.0	0.01
Owl Lane (West)	1.0	3.5	0.50	1.4	4.2	0.58

Table 6-74: Junction 12 summary 2030 Do Something (Site A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Southern Site Access 5	1.2	6.8	0.54	0.6	5.5	0.38
Owl Lane (East)	4.4	10.0	0.82	2.1	5.3	0.68
Dewsbury Rams	0.0	0.0	0.00	0.0	11.9	0.02
Owl Lane (West)	1.7	4.9	0.64	5.6	12.4	0.85

6.104 The future scenario modelling indicates that the junction (as currently proposed) is expected to operate generally satisfactorily with the overall flows being somewhat 'tidal', i.e. heavier in the westbound direction in the AM peak (into Shaw Cross / Hanging Heaton) and heavier in the eastbound in the PM peak. Queues and delays are acceptably low at generally approximately 3pcu in the peak direction with delays on all arms less than 10s. RFCs are between 0.64 and 0.82 in the AM peak on the heaviest loaded arm and up to 0.85 in the PM peak on the opposing arm.

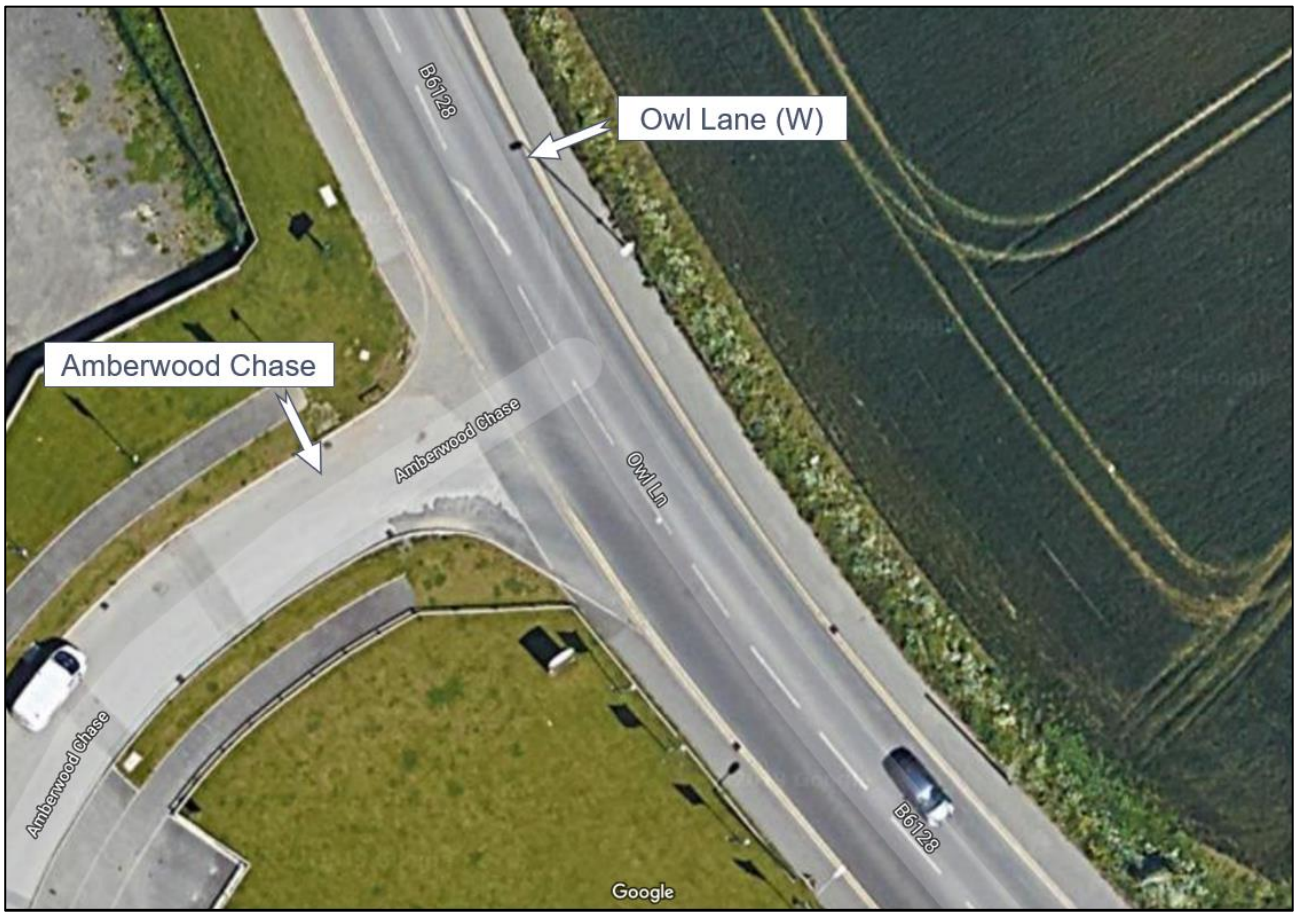
6.105 In the future 2030 Do Something (Sites A+B) scenario – i.e. complete and operational Proposed Development for both Site A and B – the junction experiences an RFC on Owl Lane (W) in the PM peak of 0.85. Queues and delays are not yet extensive at that level (queues less than 6pcu and delays 10-15s) but there would not be additional capacity available. However, as noted above, the expected trip generation for the BDWH Site was added to the expected future traffic forecasts which, being SATURN-derived, are expected to incorporate the BDWH flows as a function of background growth. The result is that this modelling is therefore a 'worst-case' given there is some element of 'double-counting' involved in this analysis.

6.106 The exact geometric (and thus capacity) provision of this junction is a matter of ongoing discussion with KC Highways officers and Barratt David Wilson Homes. Through the KC Local Plan allocation policy, the junction is required to provide suitable vehicular access to the Applicant's Site in later phases. It is suggested that further changes to the proposals at this junction may emerge soon with any update being presented in the TA Addendum to be submitted following the planning submission. It is also expected that the BDWH planning application (KC Planning Ref: 2019/92787) will be updated to reflect the collectively agreed layout. The final agreed layout will be expected to appropriately accommodate predicted traffic flows and meet the Site access requirements for the Applicant's Site.

Junction 13 – Owl Lane / Amberwood Chase

6.107 The junction of Amberwood Chase and Owl Lane is an existing major-minor priority junction where Amberwood Chase forms the minor arm. Amberwood Chase leads exclusively into a residential development of 206 family homes (Kirklees Planning Ref: 2014/90780) and provides the only means of vehicular access to these properties. It is currently provided as a simple priority junction with no major arm right-turn provision and in accordance with its original planning permission. The layout is shown on **Figure 6.17**.

Figure 6.17: Junction 13 – Aerial Shot of Owl Lane / Amberwood Chase



Source: Google Maps with Pell Frischmann annotations

6.108 As a baseline, the junction has been modelled using PICADY for 2019 flows and current geometry. The results are summarised in **Table 6-75**. They indicate that the junction currently operates with substantial capacity available (maximum ratio-of-flow-to-capacity of 0.44 on Amberwood Chase) and provides a good agreement with the future forecasts (2019) in the TA for that development (see Appendix H of Sanderson Associates Report Ref: 7452/001/02, Jan 2014). No analysis beyond 2019 forecasts were included in that planning application.

Table 6-75: Junction 13 summary 2019 Baseline junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2019 Base AM			2019 Base PM		
Amberwood Chase	0.8	30.2	0.44	0.2	14.4	0.16
Owl Lane (West) (RT into Amberwood Chase)	0.2	4.2	0.10	0.9	3.9	0.23

6.109 For the purpose of this document's assessment, Junction 13 has been modelled for future scenarios accounting for the committed development of the Barratt Land which includes the provision of a new roundabout to the west of this junction (at Dewsbury Rams – Junction 12) but more specifically, widening and a ghost right-turn island for inbound access to Amberwood Chase. Summary outcomes of the PICADY modelling for this junction, based on the committed future geometry, are summarised in **Table 6-76** to **Table 6-81**, inclusive.

Table 6-76: Junction 13 summary 2024 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DN AM			2024 DN PM		
Amberwood Chase	2.1	175	0.75	0.2	14.8	0.17
Owl Lane (west) (RT into Amberwood Chase)	0.1	11.3	0.12	0.1	8.9	0.09

Table 6-77: Junction 13 summary 2030 Do Nothing junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DN AM			2030 DN PM		
Amberwood Chase	2.1	87.3	0.71	0.2	15.2	0.17
Owl Lane (west) (RT into Amberwood Chase)	0.1	11.4	0.06	0.1	8.9	0.09

Table 6-78: Junction 13 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Amberwood Chase	1.1	45.3	0.54	0.2	14.9	0.17
Owl Lane (west) (RT into Amberwood Chase)	0.1	10.8	0.06	0.1	8.9	0.09

Table 6-79: Junction 13 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Amberwood Chase	1.3	52.6	0.58	0.2	15.2	0.17
Owl Lane (west) (RT into Amberwood Chase)	0.1	11.1	0.06	0.1	8.9	0.09

Table 6-80: Junction 13 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Amberwood Chase	2.2	93.4	0.72	0.2	15.3	0.17
Owl Lane (west) (RT into Amberwood Chase)	0.1	11.4	0.06	0.1	8.9	0.09

Table 6-81: Junction 13 summary 2030 Do Something (Site A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Amberwood Chase	47.5	1608	Inf	2.1	175	0.75
Owl Lane (west) (RT into Amberwood Chase)	0.1	12.5	0.06	0.1	11.3	0.12

6.110 The modelling indicates that the junction continues to operate within theoretical capacity constraint for most future scenarios, but that delay increases substantially over that in the baseline scenarios, especially in the AM peak. By 2030, in the absence of Proposed Development (i.e. the Do Nothing scenario), whilst the ratio-of-flow-to-capacity of Amberwood Chase is 0.71 in the AM peak – which is substantially less than the usual upper operational threshold 0.85 – and whilst queues are short (approx. 2pcu), delay for vehicles exiting the Amberwood Chase development is expected to average approximately 1½ minutes per vehicle. Some drivers may consider this to be unacceptable and may as a result take greater risks to accept (or force) smaller gaps in the traffic.

6.111 The addition of Proposed Development traffic exacerbates this issue with the increase in traffic in the 2030 Do Something (Sites A+B) scenario being sufficient to cause the modelled ability to exit Amberwood Chase through the underlying PICADY formulae to fail. In reality however, vehicles will be (to some extent) allowed out into traffic by drivers on Owl Lane and/or will force their way out (which may have further safety implications as noted above). As such, it would not be expected that the junction would fail entirely as the modelling indicates, but should the modelled scenario manifest, the situation is likely to be unacceptable to residents of Amberwood Chase.

6.112 As noted, delay is already likely to become unacceptable to residents of Amberwood Chase in the absence of the Proposed Development, even before the junction theoretically hits a capacity threshold. The issue, primarily, is the high traffic level in both directions on Owl Lane. This is also a situation likely to be exacerbated by any planned junction improvements at either end of Owl Lane and which are not reflected in the future SATURN models upon which the Do Nothing (i.e. without development) flows are based. Then, additional Proposed Development traffic increases these traffic levels further.

6.113 However, the junction will, in all future scenarios, be less than 100m from the new roundabout at the entry to the BDWH Site and Dewsbury Rams, located to the north-west. This provides an opportunity for right-turning traffic from Amberwood Chase to exit by a left turn, travel to the roundabout and perform a 'U'-turn to return to Owl Lane in an eastbound direction. This would be significantly easier to achieve than turning to the right from Amberwood Chase where a driver would (theoretically) need to find an acceptable gap in both the westbound traffic and eastbound traffic streams simultaneously. It is likely that many drivers would choose to do this with minimal delay rather than wait for (in the order of) minutes to exit directly to the east/right.

Table 6-82: Junction 13 summary 2030 Do Something (Site A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Amberwood Chase	0.4	17.1	0.31	0.2	11.8	0.14
Owl Lane (west) (RT into Amberwood Chase)	0.1	12.5	0.06	0.1	11.3	0.12

6.114 **Table 6-82** shows the summary result of modelling the Amberwood Chase access with all right-turning exit traffic being assigned to exit to the west (i.e. left, and then returning along Owl Lane west-to-east). With this assignment, the maximum ratio-of-flow-to-capacity of Amberwood Chase is significantly lower at 0.31, delay is in the order of low 10s of seconds, and queuing is negligible.

6.115 Clearly the situation should be monitored given the high level of uncertainty in future flow forecasts 10 years in the future. The potential of the benefit of a left-turn exit and 'U'-turn via the new roundabout at Junction 12 (especially in the AM peak hours) could be reinforced through advisory signage, a turning restriction (which itself could be time-restricted if the issue were limited to a certain peak for example) and/or through a limited amount of physical central island provision (Design Manual for Roads and Bridges standard CD123 para2.14 contraindicates ghost island use where major road flows preclude single manoeuvre minor road egress).

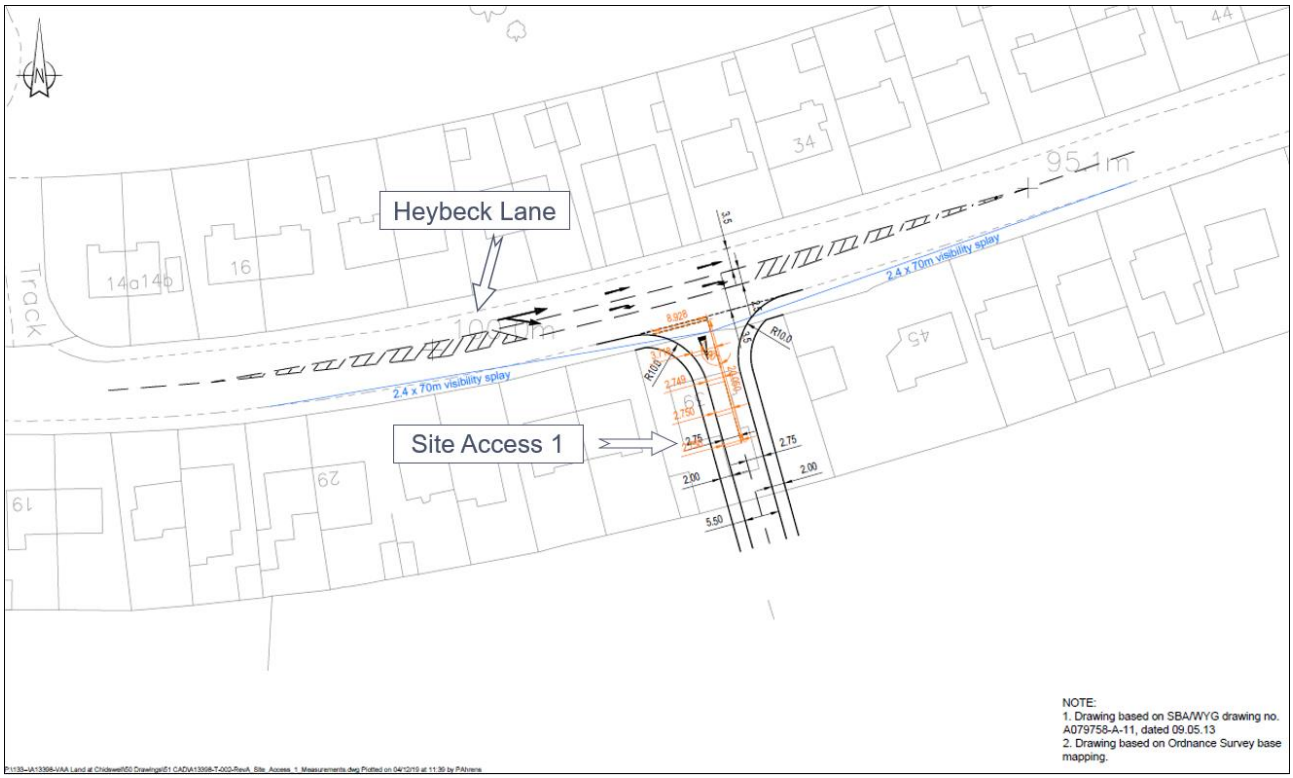
6.116 In any case, and with drivers tending (over time) to equilibrate across routes to minimise their own (and overall) delay, it is likely that such an arrangement would come about naturally over the course of time, obviating the need for any specific intervention.

Junction 14 – Site Access 1

6.117 Site Access 1 (Junction 14) does not currently exist but will be provided to enable access to Site A. It will be the sole vehicular access to Site A (with the exception of a proposed pedestrian/cycle and emergency vehicular access between Sites A and B) and is to be located approximately 230m to the east of the junction of Leeds Road x Heybeck Lane x Soothill Lane (Junction 3).

6.118 An optioneering exercise was undertaken prior to the examination-in-public and adoption of the Kirklees Local Plan to establish the scale and type of appropriate future accesses to the Site (given it is an allocated Local Plan Site; Site Ref: MXS7) and to verify that a junction of appropriate type and scale could be accommodated in this area to enable access to the Site A part of the overall allocated Site. On the basis of the limited number of properties allocated to Site A (less than 200 – specifically proposed at 181 in this application) and the exclusively residential nature of the land use of Site A, a simple major-minor priority junction is considered appropriate. The property at 39 Heybeck Lane was included as a part of the Site to enable this and with that property excepted, the remainder of the junction is deliverable within existing highway land (or the Site itself). The proposed layout is illustrated at **Figure 6.18** and has already been the subject of extensive discussion and subsequent agreement-in-principle with KC Highways officers.

Figure 6.18: Layout Drawing of Site Access 1



Source: SBA/WYG drawing with Pell Frischmann annotations

6.119 The proposed layout is for Site Access 1 to form the minor arm of a major-minor priority junction where Heybeck Lane forms the major arms. The access would provide exclusive access to the 181 residential units to be delivered on Site A and is therefore proposed at 5.5m in width, i.e. 'Type B Local Residential Street' in accordance with Kirklees Highway Design Guide SPD (2018). No changes to Heybeck Lane itself would be necessary.

6.120 Given that the Site Access does not currently exist, no baseline modelling has been undertaken. All future 'Do Something' scenarios involve at least the partial delivery of Site A, and therefore PICADY modelling has been undertaken for these scenarios.

6.121 Summary outputs from the PICADY modelling are detailed in **Table 6-83** through **Table 6-86** inclusive:

Table 6-83: Junction 14 summary 2024 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A) AM			2024 DS(A) PM		
Site Access 1 (LT into Heybeck Lane (W))	0.1	7.7	0.10	0.1	6.9	0.05
Site Access 1 (RT into Heybeck Lane (E))	0.0	10.5	0.01	0.0	9.7	0.01
Heybeck Lane (W) (RT into Site Access 1)	0.0	6.5	0.03	0.1	6.5	0.07

Table 6-84: Junction 14 summary 2024 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2024 DS(A+B) AM			2024 DS(A+B) PM		
Site Access 1 (LT into Heybeck Lane (W))	0.1	7.7	0.10	0.1	6.9	0.05
Site Access 1 (RT into Heybeck Lane (E))	0.0	10.5	0.01	0.0	9.8	0.01
Heybeck Lane (W) (RT into Site Access 1)	0.0	6.5	0.03	0.1	6.5	0.07

Table 6-85: Junction 14 summary 2030 Do Something (Site A) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A) AM			2030 DS(A) PM		
Site Access 1 (LT into Heybeck Lane (W))	0.3	8.9	0.19	0.1	7.3	0.09
Site Access 1 (RT into Heybeck Lane (E))	0.0	11.8	0.03	0.0	10.4	0.01
Heybeck Lane (W) (RT into Site Access 1)	0.1	6.9	0.05	0.1	6.9	0.12

Table 6-86: Junction 14 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Site Access 1 (LT into Heybeck Lane (W))	0.3	8.9	0.19	0.1	7.4	0.09
Site Access 1 (RT into Heybeck Lane (E))	0.0	12.1	0.03	0.0	10.8	0.01
Heybeck Lane (W) (RT into Site Access 1)	0.1	6.9	0.05	0.2	7.1	0.12

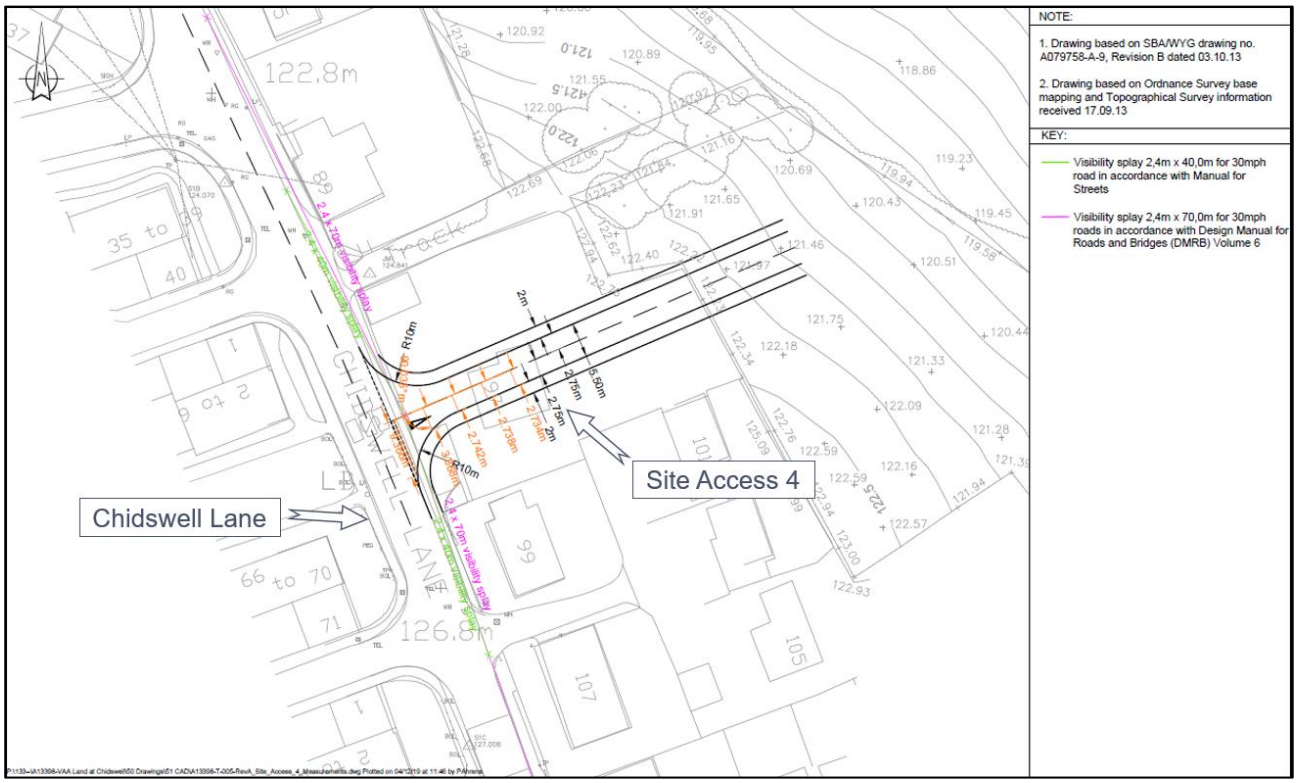
6.122 In all scenarios the proposed junction operates with substantial available capacity with a maximum ratio-of-flow-to-capacity in the 2030 scenarios of 0.19 in the AM peak for traffic exiting Site A by turning left and with negligible queuing or delay for all movements. Geometric requirements (both policy and for example, for emergency or refuse access) preclude a reduction in junction size. The junction is therefore considered to be of an appropriate size and functionality to support the Proposed Development without any direct impact on the existing (or future network).

Junction 15 – Site Access 4

6.123 Site Access 4 (Junction 15) does not currently exist but will be provided to enable secondary access to the southern part of Site B from Chidswell Lane.

6.124 An optioneering exercise was undertaken prior to the examination-in-public and adoption of the Kirklees Local Plan to establish the scale and type of appropriate future accesses to the Site (given it is an allocated Local Plan Site; Site Ref: MXS7). The applicant's preferred option, given the scale and type of Proposed Development was a major-minor priority junction onto Chidswell Lane. To support this, the property at 97 Chidswell Lane was included in the Site to enable construction of the junction. With the exception of this property required to enable access, the remainder of the junction is deliverable within existing highway land. The proposed layout is illustrated at **Figure 6.19** and has already been the subject of extensive discussion and subsequent agreement-in-principle with KC Highways officers.

Figure 6.19: Layout Drawing of Site Access 4



Source: SBA/WYG with Pell Frischmann annotations

6.125 The proposed layout is at the south-western end of the secondary access route to the south-western (predominantly residential) part of Site B. The new Site Access road is proposed at 5.5m width as appropriate for a higher specification 'Type B Local Residential Street' (see Table 1 of Kirklees Highway Design Guide SPD 2018). This road will meet Chidswell Lane as the minor arm of a priority junction with a give-way arrangement. This is in keeping with the existing residential nature of the surrounding roads but still provides sufficient visibility for both safety and operations in line with Manual for Streets (and KC Highway Design Guide SPD 2018) requirements. No changes to Chidswell Lane itself would be necessary, save for the relocation of existing speed cushions out of the junction itself, or potentially their incorporation into a junction table (this could be explored as the design for the junction progresses).

6.126 Given the Site Access does not currently exist, no baseline modelling has been undertaken. In the future, the junction is assumed to be delivered only in those future scenarios where full Proposed Development of Site B occurs (i.e. 2030 Do Something (Site A+B)). PICADY modelling has been undertaken to test the capacity and operation of the proposed junction with geometry being unchanged between scenarios.

6.127 Summary outputs from the PICADY modelling are detailed in **Table 6-87:**

Table 6-87: Junction 15 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2030 DS(A+B) AM			2030 DS(A+B) PM		
Site Access 4 (LT to Chidswell Lane (E))	0.4	18.2	0.27	0.1	7.7	0.08
Site Access 4 (RT into Chidswell Lane (W))	2.9	39.8	0.74	0.6	16.3	0.38
Chidswell Lane (E) (RT into Site Access 4)	0.1	7.7	0.04	0.1	7.9	0.12

6.128 Modelling for the proposed design indicates that the junction operates within acceptable capacity constraints in both tested AM and PM peak scenarios. Maximum ratio-of-flow-to-capacity occurs in the AM peak with traffic leaving the Site to turn right onto Chidswell lane having an RFC of 0.74, a mean queue of less than 3pcu and an average delay of 40s per vehicle. Any perceived delay on exiting the Site Access is likely to encourage users to divert to use either of Site Accesses 2, 3 or 5 which are more appropriate and will support the aspiration to reduce the impact on Chidswell Lane to as little as is reasonably practicable. Consequently, for the forecast flows, this is considered an appropriate level of design to accommodate the new Site.

6.129 As the major arm(s) of the new junction, Chidswell Lane itself is broadly unaffected by any delays incurred on the Site Access arm.

Site Access 2 (in Models 4 and 5)

6.130 Site Access 2 does not currently exist but will be provided to enable access to the northern part of Site B (the commercial/industrial areas) from Leeds Road. It is intended to be a primary access to the Site and is located approximately 300m to the south-west of Junction 3 (Leeds Rd x Heybeck La x Soothill La).

6.131 An optioneering exercise was undertaken prior to the examination-in-public and adoption of the Kirklees Local Plan to establish the scale and type of appropriate future accesses to the Site (given it is an allocated Local Plan Site; Site Ref: MXS7). The preferred option, given the scale and type of Proposed Development was a signalised junction with associated pedestrian and cycle facilities. An existing gated farmland access is located here however to support the new access, the properties at 1062 Leeds Road is included in the Site to enable delivery of the junction. With the exception of this property required to enable access, the remainder of the junction is deliverable within existing highway land (or the Site itself). The proposed layout is illustrated at **Figure 4.4** and has already been the subject of extensive discussion and subsequent agreement-in-principle with KC Highways officers.

6.132 The proposed layout is the western end of the internal Site access road to the industrial and commercial spaces in the northern part of Site B. This internal road will be 7.3m in width in line as appropriate for a 'Type CA Major Industrial Commercial Road' category of Kirklees Highway Design Guide SPD (2018). It will widen in approach to the junction so as to provide two lanes (one for each turning direction). The northern arm (Leeds Road) will retain its existing two lanes in each direction with the existing central reservation being used to provide the island for the staggered pedestrian facility across Leeds Road. Given the width of the combined carriageways, it is appropriate to provide staggered (as opposed straight-across) facilities as crossing lengths would be extensive. This is also compatible with the placement of existing property access driveways.

6.133 This junction is located in a section of Leeds Road (A653) which is dual carriageway with two lanes in either direction. There are also additional advisory cycle lanes in either direction, although given the current 40mph speed limit, these cannot be assumed to be welcoming to cyclists. Properties are located along both sides of the length of this part of Leeds Road with driveway accesses crossing the footway directly to the main carriageways. The carriageways are generally separated by a continuous length of blockwork planter with no access between the two carriageways save for a turning gap in the

central reservation to enable agricultural access to the adjacent farmland. A bus stop is provided in each direction located here and these would be relocated to enable the delivery of the junction.

6.134 Given that the agricultural access is very lightly used, the current arrangement is essentially a pair of free-flow links, and therefore no baseline modelling has been undertaken. In the future, the junction is assumed to be delivered in those future scenarios where any delivery of Site B occurs (i.e. 2024 Do Something (Site A+B) and 2030 Do Something (Site A+B)). As this junction is proposed to be signal controlled and will be located approximately 300m to the south-west of the existing signal controlled junction of Leeds Rd x Heybeck La x Soothill La, this Site Access is modelled in combination (using LinSig software) with Junction 3 (Leeds Rd x Heybeck La x Soothill La) and additionally with Site Access 3, in those scenarios where this is delivered as this is also signal controlled and is located approximately 300m to the south-west.

6.135 Summary outputs from the LinSig modelling are detailed in **Table 6-88**:

Table 6-88: Site Access 2 summary 2024 and 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2024 DS(A+B) AM		2024 DS(A+B) PM		2030 DS(A+B) AM		2030 DS(A+B) PM	
A653 Leeds Road (N)	Lane 1	1.5	33.5	2.9	35.4	23.3	53.2	13.5	68.0
	Lane 2	1.6	39.4	4.6	39.5	23.1	54.3	17.8	68.6
A653 Leeds Road (S)	Lane 1	11.0	53.4	7.0	38.8	15.7	83.2	10.5	66.0
	Lanes 2+3 (Ah + R)	14.5	62.9	9.4	46.0	28.8	89.8	26.0	81.7
Site Access 2	Lane 1 (L)	0.2	4.3	1.5	27.1	1.6	27.9	7.6	75.6
	Lane 2 (R)	0.3	5.1	1.9	29.9	2.0	31.6	10.4	84.2

6.136 Modelling for the proposed design indicates that the junction operates within acceptable capacity constraints in both the AM and PM peaks in all tested scenarios. Scenarios in 2030 operate with a higher degree of saturation given the more substantive Site delivery and higher levels of background flow in these scenarios. Maximum degree of saturation occurs in the 2030 Do Something (Site A+B) scenario for lanes 2 and 3 (ahead and right-turn flare, respectively) at 89.8% of capacity for those flows tested. A mean maximum queue length of 28.8pcu is expected, however it would be distributed across the two lanes and would be expected to discharge on each cycle. Maximum DoS in the PM peak is expected to be 84.2% for those turning right whilst leaving the Site with a shorter queue of 10.4pcu.

6.137 Whilst the capacity-determining component of the Junction 3 – Site Access 2 – Site Access 3 junction complex is that part at Soothill/Heybeck Lanes (Junction 3), the modelling presented here illustrates that the Site Access as proposed operates substantially within capacity constraints, but without providing excessive capacity which would indicate an overengineered junction. For the forecast flows, this is an appropriate level of design.

Site Access 3 (in Model 5)

6.138 Site Access 3 does not currently exist but will be provided to enable access to the southern part of Site B from Leeds Road. It is intended to be a primary access to the Site and is located at the northern end of the Spine Road through Site B.

6.139 An optioneering exercise was undertaken prior to the examination-in-public and adoption of the Kirklees Local Plan to establish the scale and type of appropriate future accesses to the Site (given it is an allocated Local Plan Site; Site Ref: MXS7). The preferred option, given the scale and type of Proposed Development was a signalised junction with associated pedestrian and cycle facilities. To support this, the properties at 1012-1016 Leeds Road were included in the Site allocation to enable

delivery of the junction. With the exception of these properties required to enable access, the remainder of the junction is deliverable within existing highway land (or the Site itself). The proposed layout is illustrated at **Figure 4.5** and has already been the subject of extensive discussion and subsequent agreement-in-principle with KC Highways officers.

6.140 The proposed layout is at the northern end of the 6.75m wide 'Spine Road' ('Type A Residential Connector Street' per Kirklees Highway Design Guide SPD 2018) which widens to provide two outbound lanes and pedestrian crossing facilities on the Site Access arm, retaining existing north-south connectivity. Southbound Leeds Road (i.e. the northern arm) is retained as two lanes in each direction with the existing central reservation being used to provide the island for the staggered pedestrian facility across Leeds Road. Given the width of the combined carriageways, it is appropriate to provide staggered (as opposed straight-across) facilities as crossing lengths would be extensive. This is also compatible with the placement of existing property access driveways. Northbound Leeds Road (i.e. the southern arm) will be provided with a third lane for right-turning traffic to queue to access the Site. The land required will be taken from within the existing central reservation and through a reduction in other lane widths. Existing nearside kerblines would be unchanged as a result of the proposals.

6.141 This junction is located on a section of Leeds Road (A653) which is dual carriageway with two lanes in either direction. There are also additional advisory cycle lanes in either direction, although given the current 40mph speed limit, these cannot be assumed to be welcoming to cyclists. Properties are located along both sides of the length of this part of Leeds Road with driveway accesses crossing the footway directly to the main carriageways. The carriageways are separated by a continuous length of blockwork planter with no access between the two carriageways for any user. There is however a central reservation cross-over gap some 100m to the south-west.

6.142 Given that the current arrangement is essentially a pair of free-flow links, no baseline modelling has been undertaken. In the future, the junction is assumed to be delivered only in those future scenarios where full Proposed Development of Site B occurs (i.e. 2030 Do Something (Site A+B)). As this junction is proposed to be signal controlled and will be located approximately 300m to the south-west of Site Access 2 – itself signal controlled and approximately 300m to the south-west of the signal controlled junction of Leeds Rd x Heybeck La x Soothill La – this Site Access is modelled in combination (using LinSig software) with both Junction 3 (Leeds Rd x Heybeck La x Soothill La) and Site Access 2, as a single linked-signal installation.

6.143 Summary outputs from the LinSig modelling are detailed in **Table 6-89**:

Table 6-89: Site Access 3 summary 2030 Do Something (Sites A+B) junction modelling outputs

Arm	Movement	Queue (PCU)	DOS %	Queue (PCU)	DOS %
		2030 DS(A+B) AM		2030 DS(A+B) PM	
A653 Leeds Road (N)	Lane 1	19.1	79.3	18.3	82.1
	Lane 2	0.5	68.4	21.4	74.4
A653 Leeds Road (S)	Lane 1	27.4	72.2	12.1	52.3
	Lanes 2+3 (Ah + R)	24.2	87.9	19.6	71.5
Site Access 3	Lane 1 (L)	4.3	33.2	3.5	31.4
	Lane 2 (R)	18.0	89.2	9.3	67.4

6.144 Modelling for the proposed design indicates that the junction operates within acceptable capacity constraints in both the AM and PM peak scenarios. Maximum degree of saturation occurs in the AM peak at 89.2% of capacity used across both lanes 2 and 3 of the northbound flow on Leeds Road. This flow route includes right-turns into the Site and the estimated mean maximum queue of 24.7pcu would be distributed across both lanes and, given the DoS, would be expected to discharge on each cycle.

PM peak usage is from southbound Leeds Road (left lane) which runs at 82.1% of capacity for the modelled scenario.

6.145 Whilst the capacity-determining component of the Junction 3 – Site Access 2 – Site Access 3 junction complex is that part at Soothill/Heybeck Lanes (Junction 3), the modelling presented here illustrates that the Site Access as proposed operates substantially within capacity constraints, and provides new pedestrian crossing facilities but without providing excessive capacity which would indicate an overengineered junction. For the forecast flows, this is an appropriate level of design.

Traffic Impact Summary

6.146 The following **Table 6-90** and **Table 6-91** summarise the contribution to future traffic growth in 2024 and 2030 from each of background traffic growth, Site A and Site B, for the junctions detailed in this chapter.

Table 6-90: Junction uplift contribution summary 2019 to 2024

Jct.	Detail	Uplift over 2019 Base due to Background growth		Uplift over 2019 Base due to 2024 Site A		Uplift over 2019 Base due to 2024 Site B	
		AM	PM	AM	PM	AM	PM
1	M1 Junction 40	2.3%	2.4%	0.1%	0.1%	0.3%	0.3%
2	M62 Junction 28	-	-	0.3%	0.3%	0.7%	0.6%
3	A653 Leeds Road / Heybeck Lane / B6124 Soothill Lane	13.3%	8.3%	2.3%	2.3%	3.1%	2.6%
4	A653 Leeds Road / Chidswell Lane	10.2%	7.0%	1.1%	1.1%	3.3%	2.8%
5	Leeds Road / B6128 Challenge Way / B6128 John Ormsby VC Way	9.1%	3.4%	0.6%	0.5%	1.2%	1.0%
5b	A653 Leeds Road / High Street	13.5%	2.8%	0.9%	0.8%	2.0%	1.5%
6	Windsor Road / Owl Lane	6.0%	1.2%	0.3%	0.3%	1.5%	1.3%
7	A638 Chancery Road / Owl Lane / B6128 Leeds Road / A638 Wakefield Road	0.6%	-2.9%	0.1%	0.1%	0.7%	0.6%
8	Chidswell Lane / Windsor Road	51.5%	11.2%	0.0%	0.0%	0.0%	0.0%
9	A653 Leeds Road / Owl Lane	9.4%	1.6%	1.2%	1.3%	3.6%	3.3%
10	John Ormsby VC Way / Owl Lane	5.8%	0.1%	0.4%	0.4%	1.8%	1.6%
11	A653 Dewsbury Road / Rein Road / Syke Road	8.6%	6.1%	0.9%	0.9%	1.9%	1.6%
12	Owl Lane / Southern Site Access 5 / Dewsbury Rams	6.6%	1.0%	0.3%	0.3%	1.5%	1.3%
13	Owl Lane / Amberwood Chase	6.2%	1.0%	0.3%	0.3%	1.4%	1.3%
14	Site Access 1	25.2%	13.0%	12.4%	13.4%	0.8%	0.7%
15	Site Access 4	42.6%	13.1%	0.0%	0.0%	0.0%	0.0%
3	Site Access 2	16.4%	9.3%	1.1%	1.1%	7.4%	6.3%
3	Site Access 3	9.9%	7.2%	1.1%	1.1%	3.4%	2.8%

Table 6-91: Junction uplift contribution summary 2019 to 2030

Jct.	Detail	Uplift over 2019 Base due to Background growth		Uplift over 2019 Base due to 2030 Site A		Uplift over 2019 Base due to 2030 Site B	
		AM	PM	AM	PM	AM	PM
1	M1 Junction 40	2.2%	1.3%	0.1%	0.1%	4.7%	6.7%
2	M62 Junction 28	-	-	0.6%	0.6%	7.8%	12.2%
3	A653 Leeds Road / Heybeck Lane / B6124 Soothill Lane	28.6%	17.3%	4.2%	4.2%	29.3%	47.9%
4	A653 Leeds Road / Chidswell Lane	20.6%	12.4%	2.0%	2.0%	36.2%	55.0%
5	Leeds Road / B6128 Challenge Way / B6128 John Ormsby VC Way	17.8%	4.5%	1.0%	1.0%	25.4%	32.8%
5b	A653 Leeds Road / High Street	26.8%	3.6%	1.7%	1.5%	27.8%	35.9%
6	Windsor Road / Owl Lane	12.1%	2.3%	0.5%	0.5%	29.7%	43.4%
7	A638 Chancery Road / Owl Lane / B6128 Leeds Road / A638 Wakefield Road	1.1%	-6.5%	0.2%	0.2%	8.8%	13.6%
8	Chidswell Lane / Windsor Road	134.3%	13.6%	0.0%	0.0%	40.4%	19.4%
9	A653 Leeds Road / Owl Lane	19.0%	0.6%	2.2%	2.3%	39.6%	65.7%
10	John Ormsby VC Way / Owl Lane	11.1%	-0.3%	0.8%	0.8%	27.3%	44.6%
11	A653 Dewsbury Road / Rein Road / Syke Road	18.0%	15.9%	1.7%	1.7%	21.3%	32.2%
12	Owl Lane / Southern Site Access 5 / Dewsbury Rams	13.1%	2.6%	0.5%	0.5%	37.6%	55.2%
13	Owl Lane / Amberwood Chase	12.4%	2.5%	0.5%	0.5%	17.5%	29.3%
14	Site Access 1	48.6%	22.3%	22.4%	24.2%	7.2%	13.0%
15	Site Access 4	117.2%	16.1%	0.0%	0.0%	155.4%	92.5%
3	Site Access 2	35.1%	18.4%	2.0%	2.0%	43.7%	82.9%
3	Site Access 3	20.2%	13.2%	2.1%	2.0%	50.1%	73.8%

Conclusion

6.147 This chapter considered the various junctions within the agreed study area relevant to the Site. For each junction, a modelling exercise was undertaken using surveyed (i.e. baseline) traffic data to produce models to replicate the current situation in 2019 (where relevant). Then, in the future interim year of 2024 and the future year 2030 when the Proposed Development is expected to be complete and operational, those models are used to test scenarios both with and without the Proposed Development and to establish the net impact of the Proposed Development on the junctions, both in terms of operation and of ultimate capacity.

6.148 A number of the junctions are identified as having operational and/or capacity issues in future years as a result of the background growth of traffic (inclusive of committed developments). Background growth in the area being predominantly due to Local Plan growth in Kirklees, but further reinforced by similar high growth plans for adjacent local authorities (such as Leeds and Wakefield) and wider regional and national growth expectations.

6.149 In light of this, when Proposed Development traffic is added to junctions already at or over capacity, existing issues are exacerbated, and as an overall result traffic levels at a number of the considered

junctions are taken beyond the point of capacity. If highway capacity is to be expanded to cater for forecast flows, some mitigation may be necessary. Details of possible measures follow in Chapter 7.

7 Mitigation Measures

Introduction

7.1 This chapter considers the junctions identified in the previous chapter (Chapter 6) as having capacity and/or operational issues in the future as a potential result of increased traffic inclusive of that due to the Proposed Development. The identified issues are summarised and the scope and any proposals for mitigation are discussed. For clarity, those junctions not requiring mitigation or not experiencing any future capacity issues have not been included in the following.

Individual Junctions

Junction 1: M1 Junction 40

7.2 The modelling demonstrates that in the 2030 scenarios, the junction would be within capacity with Site A of the Proposed Development built out (and inclusive of expected background and committed development traffic growth), however when Site A + B are complete and operational, the A638 westbound arm starts to approach capacity. No mitigation is considered necessary based on the impact of the Proposed Development (either Site A or B), however it is assumed that the performance of the junction will continued to be monitored, with any issues arising being adressed as they emerge.

Junction 2: M62 Junction 28

7.3 The modelling results demonstrate that the existing junction is over capacity within the AM peak hour and is close to capacity within the PM peak period. However due to mitigation works part implemented around the time of the survey (the Congestion Relief Fund [CRF] improvement scheme) it is considered necessary that further testing of this junction should be undertaken. Discussions are currently ongoing with key stakeholders including KC, Leeds City Council (LCC) and Highways England (HE) and this will be addressed in a TA Addendum to follow on from this report.

Junction 3: A653 Leeds Road / Heybeck Lane / B6128 Soothill Lane

7.4 In the 2019 Baseline modelled scenarios, the existing junction was already observed to be over capacity on Soothill Lane. Background growth and associated strategic traffic redistribution is expected to resolve this in future years. Consequently, the delivery of Site A in isolation can be accommodated within expected capacity constraints.

7.5 However, with the committed/allocated Local Plan sites constructed, and including the Proposed Development of both Sites A and B in 2030, then the junction capacity issues will not resolve and will remain over capacity, exacerbated further by the Proposed Development. It is understood that KC has identified the junction for improvement works.

Junction 4: A653 Leeds Road / Chidswell Lane

7.6 When the whole of the Proposed Development is built out (i.e. both Site A and B), along with other committed developments and the rerouting of vehicles included within the SATURN Model, together these factors significantly increase the traffic volumes on Leeds Road which causes substantial delays to vehicles looking to leave Chidswell Lane. This causes the junction to exceed its theoretical capacity. Owing to this, it is considered likely that in reality traffic will find alternative routes, however it is reiterated that as a result of the cumulative effect of the background growth of traffic and to a lesser extent the Proposed Development, this junction is not expected to operate satisfactorily over the longer term.

7.7 Delivery of Site A in isolation is not expected to have any material impact on this junction.

Junction 5: Leeds Road / B6128 Challenge Way / B6128 John Ormsby VC Way

7.8 When the Proposed Development traffic from delivery of (either or both of) Sites A and B is added to the junction, the existing capacity issues on the network are exacerbated to a degree. However, further to discussions with KC Highways officers, it is understood there are emerging plans for improvements to this junction. It has been agreed that PF will test this junction as a part of the TA Addendum, if proposals are available within the appropriate timescale. The junction is expected to become unacceptably congested in future years regardless of the Site proposals.

Junctions 6 and 7

7.9 The junctions are shown to be over capacity by 2024 with or without the Proposed Development. As such it is expected that improvements will be required to upgrade the junction to deliver greater capacity.

Junction 9: A653 Leeds Road / Owl Lane

7.10 This junction functions adequately in the future in the absence of the Proposed Development and accounting for background traffic growth. There is sufficient capacity available to accommodate the delivery of Site A in isolation.

7.11 With the complete-and-operational Proposed Development in place (2030 Do Something (Sites A+B) scenario), this junction is expected to be significantly over capacity for south-west-bound traffic on Leeds Road and for traffic on Owl Lane in the AM peak, and for south-west-bound traffic in the PM peak.

7.12 There is substantial geometric constraint around Junction 9 which precludes obvious mitigation solutions. Additionally, it is understood that KC have plans for improvements to the nearby (100m to the south-west) Junction 5 which will potentially have impacts on traffic volumes and distribution on Junction 9 as Owl Lane forms a 'bypass' route for traffic east of Junction 5.

7.13 The Applicant and Pell Frischmann would welcome the opportunity to discuss and engage with KC with regard to plans here and at Junctions 5 and 10.

Junction 10: John Ormsby VC Way / Owl Lane

7.14 The junction functions adequately in 2019 but is expected to operate at or over capacity on the south-eastern Owl Lane entry in the AM peak in all future scenarios, in the absence of the Proposed Development, but accounting for background growth. All other entries are expected to operate successfully in the AM peak, and the whole junction operates acceptably in the PM peak.

7.15 The addition of any Proposed Development traffic disproportionately exacerbates this existing inability to accommodate background growth. Implementation of Site A in isolation (and an increase in traffic on Owl Lane from the southeast) would add to capacity pressures in 2024 and more so in 2030. Though the practical effect would be generally marginal, the junction would be very sensitive to small changes in traffic volumes and so existing capacity issues are amplified.

7.16 With complete-and-operational Proposed Development in place (2030 Do Something (Sites A+B) scenario), the ratio-of-flow-to-capacity on the south-eastern Owl Lane arm in the AM peak is expected to reach 1.17.

7.17 Delivery of either or both of Site A and B is not the cause of capacity issues at this junction, but it brings forward the time at which the impacts would begin to be observed.

7.18 The nature of any necessary mitigation at this junction is heavily interlinked with improvements that are understood to be forthcoming at Junction 5 and being delivered by KC. This would input into a formal feasibility, optioneering and modelling exercise to consider potential mitigation(s).

7.19 Potential mitigation could take the form of localised widening of the Owl Lane south-eastern entry and marking/circulation improvements to enable a third lane entry to the circulating carriageway with two lanes marked through onto John Ormsby VC Way.

7.20 As with Junction 9, the applicant and Pell Frischmann would welcome the opportunity to discuss and engage with KC with regard appropriate plans here.

Junction 11: A653 Dewsbury Road / Rein Road / Syke Road

7.21 In the absence of the Proposed Development, intervention would be required at this junction in order to accommodate background growth both widely and more specifically due to the Kirklees (and other adjacent authorities') Local Plan through to 2030. The presence of the Proposed Development both accelerates and exacerbates the future issues, but is not the underlying cause.

7.22 Site A can be accommodated in 2024 within existing capacity constraint, however by 2030, as the junction is expected to be substantively over capacity due to background growth including Local Plan development, there is no available capacity. Delivery of both Site A and B are not able to be accommodated in 2024 or 2030, the effect having been to bring forward the time at which the junction cannot accommodate demand, not to cause the fundamental issue.

7.23 Given the situation of the junction, intervention could potentially be in the form of widening/flare provision of Dewsbury Road through the junction (in both directions) and potentially also some limited flare provision on Rein Road. The junction is located within the LCC Highway Authority area, proposals and programme for junction improvements would, it is assumed, be led by LCC.

Conclusion

7.24 This chapter summarised those junctions identified as having capacity/operational issues in future years and related proposals for mitigation. Full discussion (and modelling) for all is included in Chapter 6 however, as matter of summary, only those junctions with issues have been included.

7.25 Background growth in the area is predominantly due to Local Plan growth in Kirklees, but further reinforced by similar high growth plans for adjacent local authorities (such as Leeds and Wakefield) and wider regional and national growth expectations. In light of this, when Proposed Development traffic is added to junctions already at or over capacity, existing issues are exacerbated, and traffic levels at a number of the considered junctions are taken beyond the point of capacity/operability that is usually considered acceptable.

7.26 In a number of cases, capacity issues emerge earlier as a result of the Proposed Development, however are not ultimately caused by it. If highway capacity is to be expanded to accommodate future forecast flows, some mitigation may be necessary. This applies to delivery to the both of Site A and B together, though to a greater number of junctions where Site B is included, owing to its larger scale and consequent impact. No junctions are ultimately taken beyond the point of available capacity owing solely to the delivery of Site A which, it is concluded, is expected to have a minimal impact on junctions.

8 Sustainable Transport Strategy

Introduction

8.1 This chapter of the TA reviews and summarises the sustainable transport options that can be used to access the Site.

8.2 For a full consideration of future sustainable transport options, including the mechanisms to enable (and enforce) these, the reader is directed to the Framework Travel Plan (enclosed at **Appendix Y**) which is submitted to planning in parallel with this document.

Policy Overview

Pedestrians

8.3 The Department for Transport (DfT) considers walking to be the most important mode of travel at the local level with the greatest potential to replace short car trips, particularly under 2 kilometres.

8.4 In this regard, the Department of Transport (DfT) highlights the following in advice to local authorities:

The Government wants walking to be easier, more pleasant and safer than it is now. There are four good reasons for this:

- *Walking benefits personal health;*
- *Walking is good for communities. Streets are safer with people in them;*
- *Walking is an essential part of most public transport journeys, and of some journeys mainly by car; and*
- *Walking accounts for more than 25 percent of all journeys, and for some 80 percent of journeys less than a mile. Anything that makes those journeys easier, more pleasant, and safer is benefiting a lot of people.*

8.5 These reasons are further substantiated in the Chartered Institution of Highways and Transportation (CIHT) document, *Guidelines for Providing Journeys on Foot*. This states that, "*walking accounts for a quarter of all journeys and four fifths of journeys less than one mile*". Furthermore, the DfT document *Transport Statistics Great Britain* indicates that the average distance for pedestrian shopping journeys is around 1km; this fits with the assumptions noted of how far people would be generally willing to walk for work or for leisure. As a result of this it can be concluded that journeys up to 1.6km (1 mile) are able to be undertaken on foot by most people.

Cycling

8.6 Cycling has the potential to replace the private car for a great variety of short journeys. Many journeys that are currently undertaken by car are viable by bicycle. It is a relatively inexpensive transport mode and the cost of infrastructure provision for cycling is low in comparison to other modes. Furthermore, measures to support cycling can be readily integrated with both new development and existing private and public transport. Therefore, cycling is a viable alternative to private vehicle use.

8.7 The DfT document *Transport Statistics Great Britain* indicates an average cycling distance of 2.4km for customer shopping journeys. In terms of employees, journey times of around 15 minutes are generally seen as appropriate for commuting journeys; this would include the majority of employees travelling to the Site.

8.8 For journeys to sports facilities there is more propensity to travel further by cycle as those using sports facilities are generally more inclined to travel by active modes, doing so more regularly and therefore more open to longer distance journeys.

Active Transport

8.9 As undeveloped land, the Site generates low levels of demand for travel and that which does occur is agricultural/operational in nature, appropriately undertaken by specialist vehicles. The proposed scheme is anticipated to create substantial increased local pedestrian demand in the surrounding area (both from new residents on the Site and existing nearby residents with new jobs at the Site) and a further level of cycling demand; however, this is likely to be less substantial in the absence of supporting measures.

8.10 To promote and encourage an uplift in trips by active modes, a number of measures are proposed that would significantly enhance the pedestrian and walking environment for journeys to and from the Site. These proposals include:

- Provision of a comprehensive walking and cycling network within the Site, incorporating the existing public rights of way network.
- Rights of way internal to the Site will incorporate footways and appropriate cycle facilities which will connect with the existing pedestrian and cycle networks off the Site.
- A Framework Travel Plan (submitted in support of this application) will be in place across the Site, secured as a condition of planning, and will encourage increased uptake of active (and sustainable) travel modes.
- Cycle parking will be provided with associated lockers and changing rooms in employment areas; and
- Residential cycle parking will be provided for all properties.

8.11 This package of measures will also complement wider walking and cycling aspirations. Provision of new and purpose-built facilities within the Site, considering its scale, will represent a significant improvement for the Shaw Cross and wider Dewsbury area. These high-quality facilities will significantly enhance the walking and cycling environment, creating a real incentive for residents and visitors to the Site to travel to the Site by sustainable modes.

8.12 Further details regarding these facilities and other measures to encourage walking and cycling to the Site are contained within the Framework Travel Plan (FTP) included at **Appendix Y**.

Public Transport

8.13 The majority of the western and northern parts of the Site are located within 400m (equal to approximately six minutes' walking distance) of existing bus stops on Leeds Road (Routes 117, 202, 203, 205 and 217), Heybeck Lane (Routes 117, 205, 212 and 212A) and on Chidswell Lane (Routes ML2, 119, 120, and 205). This range of routes provide access to a wide range of destinations including (but not limited to): Wakefield, Leeds, Batley, Huddersfield and Dewsbury.

8.14 The eastern part of the Site, given its size, is located further from the existing road and bus network. The internal Spine Road, which connects Leeds Road and Owl Lane through the Site (and the adjacent Barratt David Wilson Homes land), will be designed to a level sufficient to accommodate bus routing. The large number of new residents and employees on the Site, and the associated growing demand for sustainable travel options, is likely to encourage commercial operators to seek to run services along this route. This would bring all but the most distant extents of the Site to within approximately 400m range of bus services. The Applicant proposes to engage with local public transport operators to establish the commercial feasibility of bringing services into the Site in the future.

8.15 These public transport options provide a good opportunity to encourage travel to/from the Site by means other than the car. To complement this high-quality provision the proposed pedestrian and cycling linkages detailed previously are planned to connect with key transport interchanges and bus stops.

8.16 Staff (at the employment uses) in particular will be encouraged to travel to the Site by sustainable modes, further information on the measures used to encourage staff to travel on foot, bike of public transport can be found in the FTP.

Conclusion

8.17 The Site is very well placed to take advantage of and support existing sustainable transport options in the local area. A Framework Travel Plan (**Appendix Y**) will be in place, and secured by planning condition, to ensure that these sustainable travel options are adopted and reinforced by the Proposed Development and the ultimate occupiers.

8.18 Existing and future bus, rail and local active travel options (such as walking and cycling) will ensure that the impacts of the Proposed Development are minimised, and that residents, visitors and employees have the maximum choice of travel options. This will ensure that travel can, where possible, be achieved by the most sustainable means.

9 Summary and Conclusions

Summary

9.1 Pell Frischmann is commissioned by C.C. Projects (referred to as the 'Applicant') to provide transport planning and highways consultancy services in connection with the Proposed Development of Land to the East of Leeds Road and Land at Heybeck Lane, Chidswell, Dewsbury (the 'site'). The Applicant's Site is allocated within the KC Kirklees Local Plan, that was the subject of an Examination in Public (EIP) by a Government-appointed Inspector in February 2018 and was adopted in February 2019. The Applicant's Site is referred as 'Land East of 932-1110 Leeds Road, Shawcross/Woodkirk, Dewsbury' (KC Local Plan Site allocation reference MXS7).

9.2 This Transport Assessment (TA) – and the accompanying Framework Travel Plan (FTP) – have been prepared to assess the cumulative impacts of the Proposed Development at Site A, and of both Site A and B as a whole. Each document will be submitted twice, once with each planning application. Site A is proposed to comprise up to 181 residential dwellings with associated access and landscaping. Site B is proposed to comprise up to 35 ha (122,500m^2) of employment space (mixed B1(a) / B1(c) / B2 / B8 Use Classes); up to 1,354 residential dwellings; a new two-form entry (2FE) primary school; a new local centre; and associated accesses and landscaping.

9.3 The methodology and content of this TA developed through a scoping process which was undertaken through 2018 and 2019 with KC, LCC, WC, and HE to establish the technical basis for the TA (and Framework Travel Plan). This TA has therefore been produced in accordance with the formal transport scoping (and Environmental Impact Assessment (EIA) screening) responses issued by KC and the relevant scoping opinions of those other stakeholders. This scoping process also included regular meetings with KC and further meetings with HE and others.

9.4 This TA report considered the existing transport conditions relating to the Site (**Chapter 2**); the policy considerations relevant at the national, regional and local levels (**Chapter 3**); the Proposed Development (**Chapter 4**); the new trips that will be generated as a result of the Proposed Development and how they will be undertaken (**Chapter 5**); the impact that new vehicle trips will have on the operation of the current highway network (**Chapter 6**); suggested mitigations for issues identified on the current or future highway network (**Chapter 7**); and a summary of the sustainable transport strategy relating to the Proposed Development (**Chapter 8**).

9.5 The Site is shown to be well situated to capitalise on existing connectivity on the highway, public transport and public rights of way networks to local, regional and national destinations. The Site is therefore well placed to enable additional new development.

9.6 In policy terms, the UK is moving towards enabling sustainable development. With Kirklees and the wider West Yorkshire region identified for substantial growth, and being located near to Leeds and a number of the other regional centres, the Site is well placed to capture and accommodate this demand. The location of the Site adjacent to a number of national-scale strategic transport corridors supports policy by providing good access to the existing transport network (rather than requiring new network) and reinforcing the viability of existing sustainable transport provision. Through the local planning process and supported at the regional level, the Site was allocated for mixed-use development through the Local Plan. That process required demonstration that the Site was appropriate for growth and that local, regional and strategic objectives could be supported by it, and the case remains through the current proposals.

9.7 Given that the application is at the outline level of detail, the proposals for the internals of the Site are necessarily illustrative and focus here is generally on the external-facing aspects, such as the Site accesses. These are proposed to a feasibility level but are shown to be deliverable within the geometric constraints and the wider scope of the proposed masterplan and Site layout. Other policy considerations such as car, electric vehicle and cycle parking provisions will be delivered in reserved matters (as the Site is built-out) in line with prevailing policy. Internal highways will be provided in line

with the KC Highways Design Guide (2018) hierarchy and consequently will passively provide for the future provision of bus routes internal to the Site.

9.8 A multi-modal trip generation assessment has been undertaken to assess the impact of the Proposed Development on the local highway network. This has involved considering each land use type and by making estimations based on comparable Sites, forecasts of (person) trip numbers were derived. Applying known travel behaviour from Census data appropriate to the Site allowed an estimation of new trips for each mode to and from the Site.

9.9 Using that trip generation data relating to vehicles, and an accounting of other background and local traffic growth, a series of junction capacity assessments were undertaken at junctions within the vicinity of the Site. A modelling exercise was undertaken for each junction using surveyed (i.e. baseline) traffic data to produce models to replicate: the current situation in 2019 (where relevant); then, in the future interim year of 2024 and the future year 2030 when the Proposed Development is expected to be complete and operational. Those models were used to test scenarios both with and without the Proposed Development and to establish the net impact of the Proposed Development on the junctions, both in terms of operation and of ultimate capacity.

9.10 A number of the junctions were identified as having operational and/or capacity issues in future years as a result of the background growth (inclusive of committed developments) of traffic. Background growth in the area is predominantly due to Local Plan growth in Kirklees, but further reinforced by similar high growth plans for adjacent local authorities (such as Leeds and Wakefield) and wider regional and national growth expectations, exacerbating any existing (or future) issues. In light of this, when Proposed Development traffic is added to junctions already at or over capacity, existing issues are exacerbated, and traffic levels at a number of the considered junctions are taken beyond the point of capacity/operability that is usually considered acceptable. Some mitigations may be necessary if it is sought to provide highway capacity for forecast motor vehicle flows, with some suggestions included in this document where appropriate.

9.11 Future trips from the Proposed Development will be encouraged to take place through sustainable and active travel modes by design and location of the Site, but further reinforced by the Framework Travel Plan which will be in place (secured by planning condition). Existing and future bus, rail and local active travel options (such as walking and cycling) will ensure that the impacts of the Proposed Development are minimised, and that residents, visitors and employees have the maximum choice of travel options.

Conclusion

9.12 Paragraph 109 of the Government's National Planning Policy Framework (NPPF) (June 2019) states that, *"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe"*. The traffic modelling presented in this TA report (and the wider qualitative implications of the Site proposals) demonstrate that the predicted traffic impacts resulting from the Proposed Development are not severe.

9.13 It is concluded that the traffic impacts of Site A can be generally accommodated within the overall existing highway network capacity, without the cause for any mitigation. There are some specific issues of network capacity which exist in the absence of any Proposed Development but the traffic impact of Site A alone is considered to be negligible.

9.14 It is concluded that the delivery of Sites A and B together results in some impact on local junctions. As a result of background traffic growth and additional future traffic as a result of committed developments, it is expected that various local junctions will experience capacity issues in the forecast future years, irrespective of the Proposed Development. It is concluded that the traffic impact of Site B is minimal compared with the traffic impact resulting from background growth and committed developments. Furthermore, should local highway improvements come forward then it is considered that the impact of the Site B would be reduced further.

9.15 It is therefore considered that the Land to the East of Leeds Road and Land at Heybeck Lane Proposed Developments are both, on their own and together, compliant with the requirements of the NPPF as well as local and regional policy.

9.16 In summary, the traffic modelling presented within this TA report demonstrates that, even when taking into account the traffic predicted to be generated by the Proposed Development, and in addition to KC SATURN-derived background traffic growth and committed development traffic, both the Land at Heybeck Lane (Site A) and Land to the East of Leeds Road (Site B) Proposed Developments will not result in a detrimental impact on the operation of the surrounding highway network. It is identified that there are existing highway capacity issues in the area, mainly as a result of Local Plan, background and other committed growth, which are exacerbated by this and other developments.

9.17 Therefore, it is concluded that there are no transport or highways reasons why the outline planning applications for Land to the East of Leeds Road and Land at Heybeck Lane should not be granted planning consent.