Sheffield Local Plan

Transport Assessment: Report on Local Road Network Impacts and Potential Mitigation

May 2025

TRANSPORT ASSESSMENT: REPORT ON LOCAL ROAD NETWORK IMPACTS AND POTENTIAL MITIGATION

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1.1.1 Sheffield City Council (SCC) have developed proposed a series of site allocations in the Draft Local Plan options corresponding to differing levels of development intensity (the 'Sheffield Plan'). This report summarises the findings of the study into the predicted impact of the Local Plan on the operation of the LRN, and suggests and summarises some potential mitigation measures.

1.1.2 Impacts of the Local Plan have been assessed for two forecast years (2029 and 2039) focussing on a comparison with a Reference Case scenario. The Reference Case scenario includes committed land-use developments and transport schemes, which are independent of the scheme being tested, with overall demand for travel controlled to national forecasts (provided by the Department for Transport, through the National Trip End Model (NTEM) dataset).

1.1.3 The report updates the previous Transport Assessment (published in January 2024) to take account of a series of additional proposed allocations on land currently designated as Green Belt.

1.2 Local Plan Assumptions

1.2.1 The Local Plan includes developments at over 400 sites, ranging from very small sites containing only a few dwellings to large sites with more than 1,000 dwellings or more than 100,000 square metres of employment space. The sites are primarily located on the fringes of the city centre, in the Lower Don Valley, along the A61/A6102 corridor and in the suburban areas in the south-east and north of the city. Figure 1 shows the location of the Local Plan allocation sites.

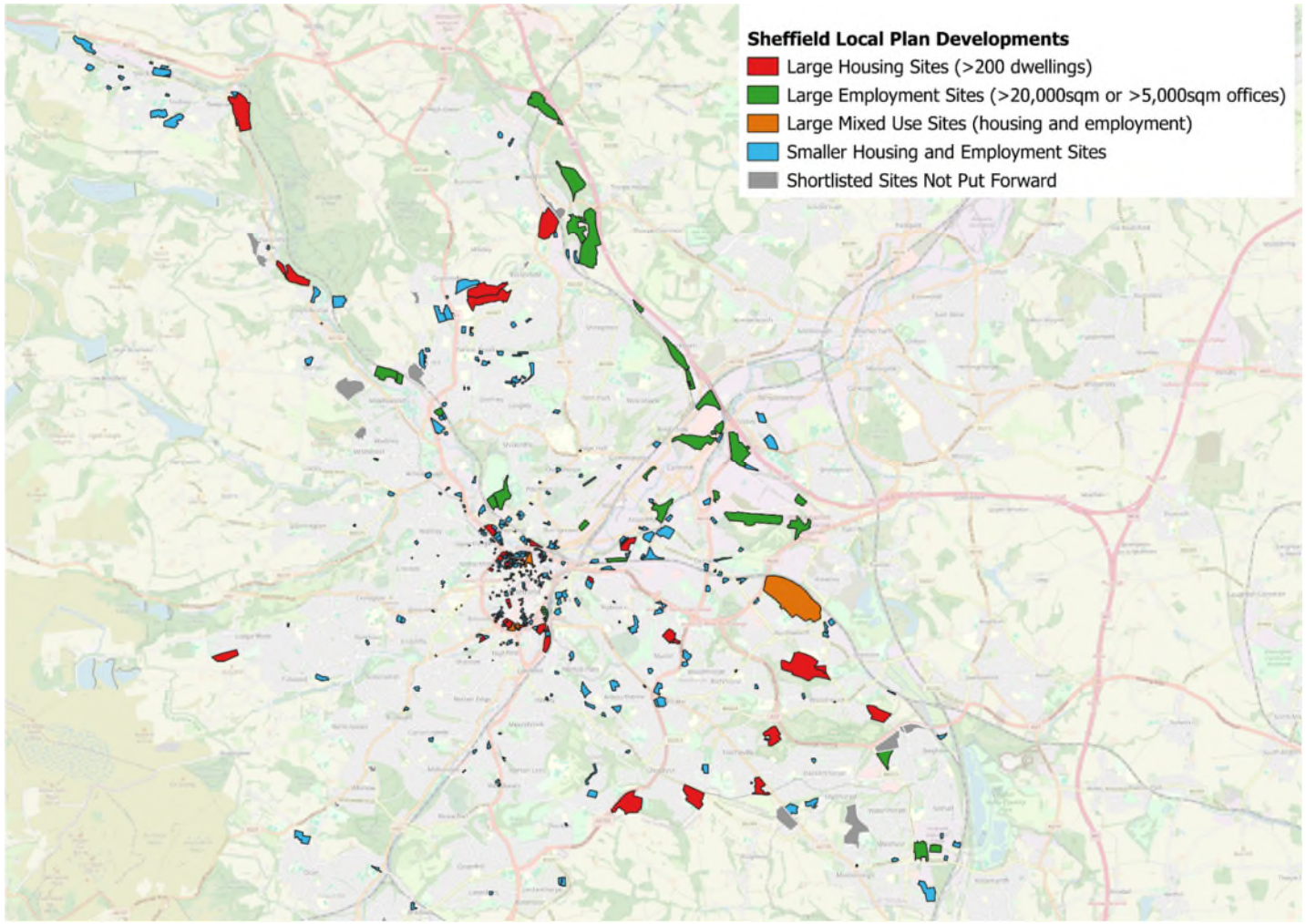


Figure 1. Local Plan Sites[1]

[1] 'Shortlisted Sites Not Put Forward' includes three sites in north Sheffield that were included in the Assessment but which were not shortlisted (and therefore also not taken forward). Some site boundaries do not exactly match the boundaries of the proposed allocations due to adjustments made after the Assessment was undertaken.

1.3 Key Findings Relating to the Local Road Network (LRN)

1.3.1 Analysis of the defined LRN study area indicates nine junctions requiring mitigation schemes to be considered:

- A615 City Road / Wulfric Road
- Station Road / New Street
- Mosborough Parkway / Coisley Hill
- Fulwood Road / Taptonville Road / Glossop Road
- Langsett Road North / Church Street
- Orchard Street / Station Lane
- Retford Rd / Beaver Hill Rd
- A630 Sheffield Parkway / B6200 Handsworth Road
- Warren Lane / Thorncliffe Road

1.3.2 A map showing the location of these junctions has been included as Figure 3 on page 36.

1.3.3 Some link capacity impacts are forecast on the A630 Sheffield Parkway; however, none of these are considered to constitute severe impacts.

1.3.4 The analysis set out in this report does not cover the entire LRN within Sheffield. The city centre and Lower Don Valley areas are being assessed via AIMSUN microsimulation modelling. Impacts in these areas will be reported separately.

2. INTRODUCTION

2.1 Background

2.1.1 SYSTRA are supporting Sheffield City Council (SCC) with the development of their Local Plan up to 2039. This is a complex undertaking which comprises a number of work stages. In late 2022 / early 2023, SYSTRA provided strategic transport modelling support to model the anticipated transport implications of the Local Plan developments. Between mid 2023 and early 2024, SYSTRA completed a more detailed analytical phase along with the consideration of potential mitigation measures.

2.1.2 During the Examination hearings in 2024, the Planning Inspectors agreed that some adjustments should be made to the housing land supply figures, and employment land supply. Having considered the latest evidence on housing and employment land supply, the Inspectors' conclusion, in February 2025, was that there would be a shortfall in supply, and that in order to address this the Council needed to undertake further work on housing delivery, and employment land supply. This included exploring opportunities to allocate further sites. As a consequence, SYSTRA has undertaken an updated assessment considering an additional 30 development sites across the local authority area. This is based on the short list of sites discussed with Members in February and March 2025, which includes the proposed additional site allocations, as well as other sites that were considered at that stage.

2.1.3 SCC have developed a series of Local Plan site allocations in the Draft Local Plan (the 'Sheffield Plan'). The Council's agreed spatial option maximises sites in the urban area, whilst allowing consideration of sustainably-located sites in the Green Belt that adjoin the existing urban area, striking a balance between provision of new homes and protection of the environment. This work focusses on the preferred spatial option site allocations comprising of 32,026 homes and 1.34 million square metres of employment floorspace2. These figures represent the full shortlist of sites

[2] Excluding Windfall Sites.

discussed with Members in February and March 2025, which includes those sites which were not taken forwards as allocated sites (these sites comprise approximately 1,300 homes and 60,000 square metres of employment floorspace. This represents a worst case scenario as it provides for more capacity than will be required.

2.1.4 The work has utilised the Sheffield City Region Transport Model 1 (SCRTM1), which is a strategic transport model designed to estimate the effect of changes in transport infrastructure and travel cost upon patterns of demand.

2.1.5 The most recent phase of the work has focused upon identifying transport impacts and developing potential mitigation concepts under the following workstreams:

- public transport and active travel networks, outside Sheffield City centre and in the vicinity of significant development sites;
- Local road network (LRN), outside Sheffield City centre and in the vicinity of significant development sites; and
- Strategic Road Network (SRN) within the agreed area of influence.

2.2 Other Reports

2.2.1 This report should be read in conjunction with the reports documenting other workstreams, specifically:

- ***Summary Report on Strategic Modelling Results (May 2025)*** – documenting the strategic modelling work undertaken and the expected city-wide demand changes as a result of the Local Plan.
- ***Report on Public Transport and Active Travel Impacts and Potential Mitigation (May 2025)*** – documenting the public transport and active travel demand analysis undertaken using SCRTM1 and potential recommendations for mitigation measures.
- ***Report on Strategic Road Network Impacts and Potential Mitigation (May 2025)*** – documenting the SRN road capacity analysis undertaken using a range

of modelling tools and techniques along with potential recommendations for mitigation measures.

2.3 Consultation

2.3.1 In addition to the technical components of the work, SYSTRA has also consulted with National Highways (NH, and their Spatial Planning consultants), South Yorkshire Mayoral Combined Authority (SYMCA), Rotherham Metropolitan Borough Council (RMBC) Barnsley Metropolitan Borough Council (BMBC) and other neighbouring authorities. The methodology and key assumptions have been discussed with these stakeholders as the work has progressed.

2.4 LRN Area of Impact

2.4.1 Further detailed analysis of the LRN in the city centre and Lower Don Valley is being undertaken using the Aimsun microsimulation models held by SCC. This work is progressing separately to this report, and results will form the base of a separate report.

2.4.2 The additional 30 development sites considered as part of the revised assessment are spread across the local authority area, and no sites are located in or close to the city centre. The inclusion of these sites in the assessment has a negligible impact on the city centre, with a total change in morning peak arrivals and evening peak departures of less than 1%.

2.4.3 When assessing the changes in flows through the LRN junctions, 32 junctions were considered in the city centre. The average changes in flows through these junctions as a result of the extra sites is 0.7% in the morning peak, and 0.2% in the evening peak.

2.4.4 Table 1 describes the analytical tools used for specific LRN areas.

Table 1. Analytical Tools Utilised for Specific Locations

ANALYTICAL TOOLS	ROAD JUNCTION / SECTION / AREA
Aimsun Models	Lower Don Valley City Centre
Local Junction Models	Local Road Network outside city centre and Lower Don Valley (covering most of Sheffield and also small areas of Rotherham)

2.5 Scenarios

2.5.1 Transport demand, capacity impacts and mitigation requirements have been assessed for the following scenarios:

- Reference Case scenario 2029 and 2039 – (with no local plan development)
- With Sheffield Local Plan 2029 and 2039

2.6 Purpose of this Report

2.6.1 The purpose of this report is to summarise the findings of the study into the predicted impact of the Local Plan on the operation of the LRN. This report also suggests and summarises indicative mitigation schemes as necessary.

2.6.2 The report updates the previous Transport Assessment (published in January 2024) to take account of a series of additional proposed allocations on land currently designated as Green Belt.

2.6.3 The report is structured as follows:

- Chapter 3 - sets out the technical approach;
- Chapter 4 - provides a summary of junction capacity impacts;
- Chapter 5 - provides a summary of link capacity impacts;
- Chapter 6 - sets out identified potential mitigation measures; and
- Chapter 7 - summarises the findings of the report.

3. TECHNICAL APPROACH

3.1 Forecasting Approach

3.1.1 In order to support the development of the Sheffield Local Plan, a multi-modal transport model, called Sheffield City Region Transport Model 1 (SCRTM1), has been used. This model was developed by the South Yorkshire Mayoral Combined Authority (SYMCA). The SCRTM1 variable demand model (VDM) is a strategic transport model designed to estimate the effect of changes in transport infrastructure and travel cost upon patterns of traffic demand. All of the traffic flows used in this analysis are derived from the SCRTM1 model.

3.1.2 SCRTM1 comprises a transport variable demand model (VDM) and highway and public transport supply models, with a base year representation of travel of 2016. An explanation of the VDM process is provided in a separate report: Summary Report on Strategic Model Results (May 2025).

3.1.3 This assessment is considered to represent a worst case scenario in terms of traffic demand. The future year Reference Scenario forecasts do not include the representation of any transport interventions over and above already committed and funded interventions, nor the introduction of the policy proposals and mode shift proposals set out in the Sheffield Transport Strategy (https://www.sheffield.gov.uk/travel-transport/transport-strategy-plans). Hence the model tests described in this report are referred to as “Policy Off” tests. As a consequence of this, the strategic modelling does not capture the likely impacts of the land use policies and transport interventions intended to result in reduced trip lengths, as trips increasingly redistribute to local neighbourhood destinations. Nor do they take account of the expected increase in the use of public transport or active modes resulting from improved provision of facilities. This approach represents the most robust level of assessment possible.

3.2 Selection of Junctions for Detailed Analysis

3.2.1 The process of selecting junctions for further detailed analysis via local junction modelling was undertaken using the SCRTM1 strategic model. Two primary variables were considered:

- Increases in traffic demand flows resulting from the Local Plan; and
- The increase in Volume/Capacity (V/C) of junctions across the model network.

3.2.2 These variables were compared between the future year Reference Case scenarios for the 2029 and 2039 model years, and the With the Local Plan scenarios for the 2029 and 2039 model years.

3.2.3 Through GIS mapping of the strategic SCRTM1 network and incorporating the comparisons set out above, junctions affected by the introduction of trips associated with the Local Plan allocations were identified for detailed assessment. Each junction should be taken on its own specific merits. Therefore, it was important to use professional judgment when deciding if detailed assessment was required. However, to guide the decision making process, the criteria presented in Table 2 was considered as a starting point for each junction. Most junctions will experience some change in traffic flow over the local plan period, and this assessment aimed to identify those which were likely to be severely impacted by Local Plan traffic. A V/C change of 10% or more was judged to be a large enough level of change for a junction to require further consideration.

Table 2. Starting Assumptions when Considering Junctions for Assessment

	V/C DECREASE	V/C REMAINS UNCHANGED	V/C INCREASES BY MORE THAN 10%
TRAFFIC DEMAND DECREASES	Do Not Include	Do Not Include	Possibly Include
TRAFFIC DEMAND REMAINS THE SAME	Do Not Include	Do Not Include	Include
TRAFFIC DEMAND INCREASES BY MORE THAN 10%	Possibly Include	Include	Include

3.2.4 As stated, Table 2 represents a starting point for consideration. Factors such as how close the junction is to its theoretical capacity in the reference case and which arms of the junction were experiencing the highest traffic demand increases were also considered.

3.2.5 In addition to the above, junctions considered to be of strategic importance with regard to local traffic corridors and their proximity to Local Plan allocation sites were included by default. This was regardless of whether they were within capacity, nearing capacity or over capacity. This was done to attempt to include junctions which would likely be the subject of scrutiny thought the EIP process.

3.2.6 From this exercise, 41 LRN junctions were identified as having junction congestion that increased from within or nearing capacity to over-capacity, or were likely to experience significant increases in congestion.

3.3 Local Junction Modelling

3.3.1 Once identified, local junction capacity assessments were undertaken utilising the Junctions 10 and LinSig v3 software packages in order to conduct a more detailed review of the potential impacts associated with the Local Plan. All junction modelling has been undertaken in accordance with the relevant TAG guidance (*TAG UNIT M3.1 Highway Assignment Modelling*).

3.3.2 Junctions 10 is an industry standard software package used to assess priority junctions and unsignalised roundabouts. With each of these analysis tools, the measurement of impacts across these junctions has been based on the units used within each respective program – in the case of unsignalised junctions this is Ratio of Flow to Capacity (RFC). RFC provides a measure of the utilised capacity of a junction approach arm. Arms exceeding a ratio of 0.85 (i.e. 85% capacity utilised) are considered to be approaching capacity.

3.3.3 For Junctions 10 models, it should be noted that once a Ratio-to Flow-Capacity (RFC) value reaches 1.00 (100%), further impacts are generally over-estimated and should be treated with increased caution.

3.3.4 For signalised junctions, the industry standard software LinSig v3 is used and for these junctions, Practical Reserve Capacity (PRC) is reported. The threshold indicator is recognised as the Degree of Saturation (DoS%). Once the DoS value reaches 1.0 (100%), a junction is considered to be operating at its theoretical capacity.

3.3.5 For the purpose of the Local Plan evidence base, a ratio of flow to capacity (uncontrolled junctions) / Degree of Saturation (signal controlled junctions) figure of between 85% and 99% was taken to illustrate that the junction is approaching its operational capacity, and a figure of 100% or over illustrates that operational capacity of the junction is exceeded and increased vehicle queuing and delay are likely to occur.

3.4 Approach to Mitigation

3.4.1 The 'with Local Plan' Scenario was compared to the Reference Scenario for the same assessment year, with analysis of the results being classified as per the criteria set out in Table 3 below. Where necessary, professional judgement was applied to confirm the need for mitigation. As a general rule, these principles were applied when determining the severity of the predicted impact.

Table 3. Classification of Junction Capacity Results

REFERENCE SCENARIO RESULT	'WITH LOCAL PLAN' SCENARIO RESULT	CLASSIFICATION	MITIGATION
Result 85% or less	'With Local Plan' Scenario result 85% or less	No significant impact	No mitigation required
	'With Local Plan' Scenario result 100% or greater	Significant impact	Mitigation required
Result between 85% and 99%	'With Local Plan' Scenario between 85% and 99%	No significant impact	No mitigation required
	'With Local Plan' result is 10%+ greater than Reference result	Significant impact	Mitigation required
100% or greater	'With Local Plan' result is <10% greater than Reference result	No significant impact	No Mitigation required
	'With Local Plan' result is 10% + greater than Reference result	Significant impact	Mitigation required

3.4.2 Further to any mitigation schemes developed as a result of impacts compared to the criteria set out in Table 3, pre-existing committed infrastructure upgrades as outlined within Sheffield City Council's Infrastructure Delivery Plan (IDP) have also been

reviewed. This was done to attempt to ensure that no mitigation strategies already exist for junctions identified through this study as needing intervention. Schemes identified as having significant PT/Active and Highway capacity benefits have been listed in Table 4.

Table 4. SCC Infrastructure Development Plan Schemes - Road

SCHEME NAME	SCHEME TYPE	INFRASTRUCTURE TYPE	SCHEME DETAILS
TR07 (Shalesmoor)	Integrated transport improvements	Transport - Local Road Network	Provision of additional transport capacity to support housing and employment growth around Kelham and Neepsend in the Shalesmoor Gateway (A61 Penistone Road between Rutland Road and Shalesmoor). Encouragement of more travel by active modes (walking and cycling) and public transport (tram and bus). Improve journey times and reliability for all modes on the Inner Ring Road. Support emergency access to the Northern General Hospital.
TR08 (Broadfield Road)	Integrated transport improvements	Transport - Local Road Network	Provision of increased highway capacity on a localised section of the A61 Chesterfield Road corridor – complemented by the Sheaf Valley cycle route which takes active travel users away from the busy intersection at Broadfield Road
TR38 (Nether Edge to City Centre)	Integrated transport improvements	Transport - Sustainable / Public Transport	Enhanced transport connectivity between Sharrow, Nether Edge and Broomhall linking into the city centre while at the same time improving journeys in the local area.
TR44 (A61 Chesterfield Road South)	Integrated transport improvements	Transport - Sustainable / Public Transport	Proposed A61 South Chesterfield Road corridor improvements including the delivery of a range of public transport, pedestrian access, highways and signal interventions.
TR45 (A61 North - Penistone Road)	Integrated transport improvements	Transport - Sustainable / Public Transport	Proposed A61 North Penistone Road corridor improvements including the delivery of a range of public transport, pedestrian access, highways and signal interventions.

SCHEME NAME	SCHEME TYPE	INFRASTRUCTURE TYPE	SCHEME DETAILS
TR46 (Sheffield to high Green)	Integrated transport improvements	Transport - Sustainable / Public Transport	Proposed Sheffield to High Green corridor improvements including the delivery of a range of public transport, pedestrian access, highways and signal interventions.

4. LOCAL ROAD NETWORK – JUNCTION CAPACITY IMPACTS

4.1 Introduction

4.1.1 As described in Section 3.3, 56 LRN junctions were identified as requiring detailed investigation via local junction modelling. These junctions were categorised by their geographic region within the Sheffield City Council area, and a unique identifier was assigned as outlined in Table 5. Following this, Figure 2 illustrates the approximate location of these junctions and indicates the junction type.

4.1.2 Sixteen of these junctions were only modelled in 2039, as they are located in proximity to development sites which are unlikely to come forward before 2029, and do not show any capacity constraints in the 2029 strategic model.

Table 5. Junctions Requiring Detailed Analysis

GEOGRAPHIC REGION	UNIQUE JUNCTION ID	JUNCTION	MODELLED YEARS	
			2029	2039
SOUTHWEST	L-SW-7	Glossop Road / Clarkehouse Road	Yes	Yes
	L-SW-14	Manchester Road / Sandygate Road	No	Yes
	L-SW-15	Manchester Road / Fulwood Road	No	Yes
	L-SW-16	Fulwood Road / Taptonville Road / Glossop Road	No	Yes
	L-SW-17	Fulwood Road / Crookes Road / Nile Street	No	Yes
	L-SW-18	Pedestrian crossing just north of Nile Street	No	Yes
SOUTHEAST	L-SE-6	London Road / Boston Street	Yes	Yes
	L-SE-13	Chesterfield Road South / Greenhill Main Road	Yes	Yes
	L-SE-19	B6388 Gleadless Road / Daresbury Road (tbc)	Yes	Yes
	L-SE-20	A6135 Granville Road / City Road	Yes	Yes

GEOGRAPHIC REGION	UNIQUE JUNCTION ID	JUNCTION	MODELLED YEARS	
			2029	2039
	L-SE-21	A6135 City Road / Manor Lane	Yes	Yes
	L-SE-22	A6135 City Road / Wulfric Road	Yes	Yes
	L-SE-26	A6102 Ridgeway Road / Newlands Road	Yes	Yes
	L-SE-27	A6102 Ridgeway Road / B6388 Gleadless Road	Yes	Yes
	L-SE-28	A6102 Bochum Parkway / Norton Avenue	Yes	Yes
	L-SE-32	B6053 Eckington Way / Westfield Northway / Holbrook Avenue	Yes	Yes
	L-SE-33	B6053 Eckington Way / Station Road	Yes	Yes
	L-SE-34	Station Road / New Street	Yes	Yes
	L-SE-35	Station Road / Rother Valley Way	Yes	Yes
	L-SE-39	B6053 Eckington Way / Owlthorpe Greenway	Yes	Yes
	L-SE-41	A57 Mosborough Parkway / B6053 Eckington Way	Yes	Yes
	L-SE-42	A57 Mosborough Parkway / Woodhouse Lane	Yes	Yes
	L-SE-43	Birley Moor Road / Occupation Lane	Yes	Yes
	L-SE-44	Sheffield Road/Donetsk Way	No	Yes
	L-SE-46	A57 Mosborough Parkway / Coisley Hill	No	Yes
	L-SE-48	Moss Way / Owlethorpe Greenway	No	Yes
	L-SE-49	Moss Way / Waterthorpe Greenway	No	Yes

GEOGRAPHIC REGION	UNIQUE JUNCTION ID	JUNCTION	MODELLED YEARS	
			2029	2039
NORTHWEST	L-NW-6	A61 Penistone Road / Bradfield Road / Owlerton Green	Yes	Yes
	L-NW-7	A61 Penistone Road / Owlerton Green	Yes	Yes
	L-NW-12	A6102 Forge Hill / Langsett Road South	Yes	Yes
	L-NW-13	A61 Halifax Road / A6102 Herries Road	Yes	Yes
	L-NW-14	A61 Halifax Road / Herries Road South	Yes	Yes
	L-NW-15	Langsett Road North / Cockshutts Lane	Yes	Yes
	L-NW-16	Langsett Road North / Orchard Street	Yes	Yes
	L-NW-17	Langsett Road North / Church Street	Yes	Yes
	L-NW-18	Orchard Street / Station Lane	Yes	Yes
	L-NW-19	Penistone Road North / Claywheels Lane	Yes	Yes
NORTHEAST	L-NE-1	A630 Sheffield Parkway / B6200 Handsworth Road (tbc)	No	Yes
	L-NE-2	A630 Sheffield Parkway / B6066 Poplar Way	Yes	Yes
	L-NE-3	Europa Link / Europa Avenue	Yes	Yes
	L-NE-18	Burncross Road / Lound Side	Yes	Yes
	L-NE-19	A6135 Ecclesfield Road / A629 Cowley Lane	Yes	Yes
	L-NE-20	Cowley Lane / Nether Lane	Yes	Yes

GEOGRAPHIC REGION	UNIQUE JUNCTION ID	JUNCTION	MODELLED YEARS	
			2029	2039
	L-NE-25	Rutland Road / Neepsend Bridge	Yes	Yes
	L-NE-26	Pitsmoor Road / Rock Street	Yes	Yes
	L-NE-29	Rutland Road / Pitsmoor Road	Yes	Yes
	L-NE-30	Pitsmoor Road / Barnsley Road	Yes	Yes
	L-NE-31	A6135 / Norwood Road	Yes	Yes
	L-NE-32	A6135 / A6102	Yes	Yes
	L-NE-34	Wordsworth Avenue / Southey Green Road	Yes	Yes
	L_NE_40	Handsworth Rd / Richmond Park Rd	No	Yes
	L-NE-41	Handsworth Rd / Laverack St	No	Yes
	L-NE-42	Handsworth Rd / Richmond Rd	No	Yes
	L-NE-43	Retford Rd / Beaver Hill Rd	No	Yes
	L-NE-45	Nether Lane / The Common	No	Yes
	L-NE-49	Warren Lane / Thorncliffe Road	No	Yes

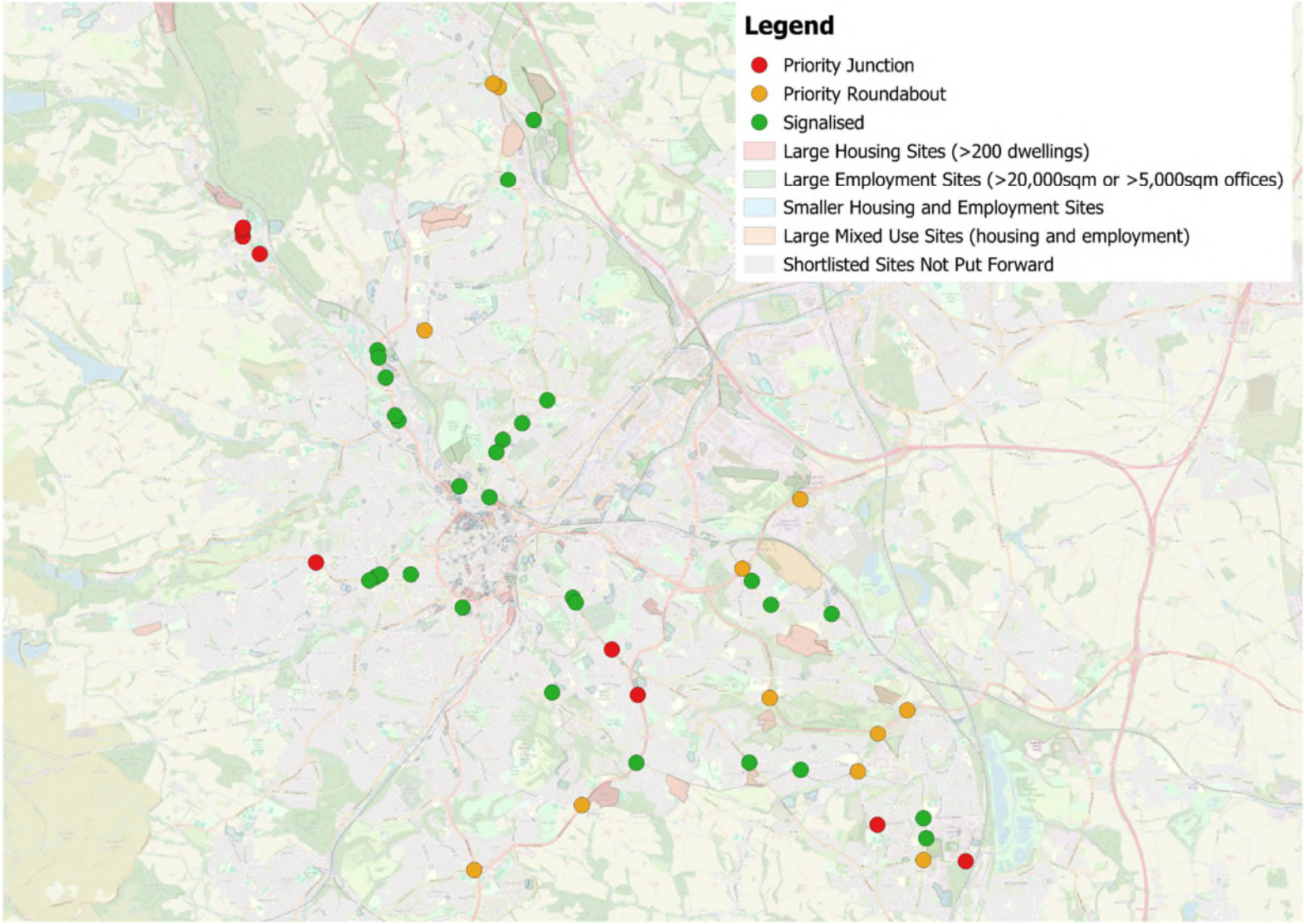


Figure 2. Local Road Network – Junctions Assessed

4.2 Assessment Results

4.2.1 The results of the junction capacity assessments have been summarised in Tables 6 to 8. The junctions have been grouped by geographic region:

- South
- North West
- North East

4.2.2 Junctions which require testing have been assessed using the relevant modelling software (either Junctions 10 or LINSIG v3), and consider the AM and PM peak hours for each scenario tested.

4.2.3 The summary of the analysis for those junctions outlined in Table 5 is based on the highest RFC/DoS recorded at any arm of the junction, and is measured in RFC/DoS (the measurements of which are outlined in section 3.4) depending on the type of junction and the software used to assess the traffic impacts.

4.2.4 For the purpose of the Local Plan evidence base, a ratio of flow to capacity (uncontrolled junctions) / Degree of Saturation (signal controlled junctions) figure of between 85% and 99% was taken to illustrate that the junction is nearing its operational capacity, and a figure of 100% or over illustrates that flows exceed the operational capacity at the junction and increased vehicle queuing and delay are likely to occur.

4.2.5 Table 6 to Table 8 provide a colour coded summary of the results :

- Within Capacity: <84% (Green)
- Nearing Capacity: 85 – 99% (Amber)
- Over Capacity: >100% (Red)

4.3 Junction Capacity Assessment Results – South

4.3.1 Capacity analysis results for the South region are shown in Table 6.

Table 6. Junction Capacity Assessment Results – South

JUNCTION UNIQUE ID	JUNCTION NAME	CAPACITY RESULTS							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-SW-7	Glossop Road / Clarkehouse Road	74%	52%	75%	57%	80%	56%	75%	70%
L-SW-14	Manchester Road / Sandygate Road	---	---	---	---	44%	39%	75%	44%
L-SW-15	Manchester Road / Fulwood Road	---	---	---	---	61%	65%	64%	74%
L-SW-16	Fulwood Road / Taptonville Road / Glossop Road	---	---	---	---	103%	73%	125%	82%
L-SW-17	Fulwood Road / Crookes Road / Nile Street	---	---	---	---	84%	104%	89%	110%
L-SW-18	Pedestrian crossing just north of Nile Street	---	---	---	---	31%	36%	32%	42%
L-SE-6	London Road / Boston Street	88%	73%	96%	77%	98%	76%	105%	84%
L-SE-13	Chesterfield Road South / Greenhill Main Road	100%	100%	100%	99%	101%	97%	101%	97%

JUNCTION UNIQUE ID	JUNCTION NAME	CAPACITY RESULTS							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-SE-19	B6388 Gleadless Road / Daresbury Road	59%	78%	59%	79%	60%	81%	62%	84%
L-SE-20	A6135 Granville Road / City Road	103%	74%	106%	76%	103%	75%	108%	79%
L-SE-21	A6135 City Road / Manor Lane	88%	133%	96%	133%	83%	131%	115%	136%
L-SE-22	A6135 City Road / Wulfric Road	195%	181%	205%	196%	199%	194%	213%	219%
L-SE-26	A6102 Ridgeway Road / Newlands Road	96%	102%	111%	104%	116%	105%	122%	110%
L-SE-27	A6102 Ridgeway Road / B6388 Gleadless Road	91%	111%	95%	118%	90%	141%	93%	161%
L-SE-28	A6102 Bochum Parkway / Norton Avenue	97%	109%	96%	114%	97%	116%	99%	122%
L-SE-32	B6053 Eckington Way / Westfield Northway / Holbrook Avenue	88%	109%	88%	113%	90%	110%	95%	119%
L-SE-33	B6053 Eckington Way / Station Road	83%	97%	85%	99%	130%	142%	124%	142%

JUNCTION UNIQUE ID	JUNCTION NAME	CAPACITY RESULTS							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-SE-34	Station Road / New Street	19%	30%	26%	56%	15%	35%	33%	86%
L-SE-35	Station Road / Rother Valley Way	67%	77%	70%	39%	77%	88%	77%	41%
L-SE-39	B6053 Eckington Way / Owlthorpe Greenway	60%	67%	62%	70%	62%	71%	71%	74%
L-SE-41	Mosborough Parkway / Eckington Way	101%	109%	102%	115%	136%	152%	147%	159%
L-SE-42	Mosborough Parkway / Woodhouse Lane	67%	71%	68%	67%	65%	73%	69%	78%
L-SE-44	Sheffield Road/Donetsk Way	---	---	---	---	45%	53%	63%	53%
L-SE-43	Birley Moor Road / Occupation Lane	57%	80%	65%	89%	65%	87%	70%	95%
L-SE-46	Mosborough Parkway / Coisley Hill	128%	110%	150%	121%	140%	141%	145%	171%
L-SE-48	Moss Way / Owlethorpe Greenway	---	---	---	---	33%	74%	31%	67%
L-SE-49	Moss Way / Waterthorpe Greenway	---	---	---	---	23%	36%	25%	43%

4.3.2 The junction modelling assessments indicate that, whilst there are several junctions currently operating over capacity in the Reference Case scenarios, the only junctions within the areas shown to be severely impacted by the introduction of generated trips associated with the Local Plan are as follows:

- A6135 City Road / Wulfric Road
- Station Road / New Street
- Mosborough Parkway / Coisley Hill
- Fulwood Road / Taptonville Road / Glossop Road

4.4 Junction Capacity Assessment Results – Northwest

4.4.1 Capacity analysis results for the Northwest region are shown in Table 7.

Table 7. Junction Capacity Assessment Results – Northwest

JUNCTION UNIQUE ID	JUNCTION NAME	CHANGE IN DEGREE OF SATURATION							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-NW-6	A61 Penistone Road / Bradfield Road / Owlerton Green	73%	72%	72%	73%	74%	73%	81%	74%
L-NW-7	A61 Penistone Road / Owlerton Green								
L-NW-12	A6102 Forge Hill / Langsett Road South	66%	72%	69%	81%	69%	75%	72%	85%
L-NW-13	A61 Halifax Road / A6102 Herries Road	99%	87%	92%	90%	100%	90%	93%	93%
L-NW-14	A61 Halifax Road / Herries Road South	49%	48%	50%	52%	51%	52%	52%	53%
L-NW-15	Langsett Road North / Cockshutts Lane	49%	45%	45%	41%	47%	44%	70%	56%
L-NW-16	Langsett Road North / Orchard Street	0%	0%	0%	0%	0%	0%	0%	0%
L-NW-17	Langsett Road North / Church Street	98%	139%	132%	172%	118%	159%	165%	197%
L-NW-18	Orchard Street / Station Lane	105%	114%	137%	123%	114%	122%	157%	132%
L-NW-19	Penistone Road North / Claywheels Lane	53%	55%	47%	50%	54%	55%	48%	51%

4.4.2 The junction modelling assessments indicate that, whilst there are several junctions currently operating over capacity in the Reference Case scenarios, the only junctions in this area forecast to be severely impacted by the introduction of Local Plan generated trips are listed as follows:

- Langsett Road North / Church Street
- Orchard Street / Station Lane

4.5 Junction Capacity Assessment Results – Northeast

4.5.1 Capacity analysis results for the Northeast region are shown in Table 8.

Table 8. Junction Capacity Assessment Results – Northeast

JUNCTION UNIQUE ID	JUNCTION NAME	CHANGE IN DEGREE OF SATURATION							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-NE-1	A630 Sheffield Parkway / B6200 Handsworth Road	---	---	---	---	77%	51%	90%	70%
L-NE-2	A630 Sheffield Parkway / B6066 Poplar Way	87%	83%	72%	85%	75%	82%	93%	87%
L-NE-3	Europa Link / Europa Avenue	64%	36%	77%	54%	64%	37%	78%	53%
L-NE-18	Burncross Road / Lound Side	78%	103%	80%	106%	83%	105%	83%	107%
L-NE-19	A6135 Ecclesfield Road / A629 Cowley Lane	100%	101%	101%	101%	101%	101%	102%	104%
L-NE-20	Cowley Lane / Nether Lane	57%	66%	66%	66%	50%	60%	93%	70%
L-NE-25	Rutland Road / Neepsend Bridge	57%	53%	65%	68%	54%	55%	65%	70%

JUNCTION UNIQUE ID	JUNCTION NAME	CHANGE IN DEGREE OF SATURATION							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-NE-26	Pitsmoor Road / Rock Street	50%	76%	51%	84%	50%	80%	48%	86%
L-NE-29	Rutland Road / Pitsmoor Road	100%	88%	102%	96%	104%	92%	104%	99%
L-NE-30	Pitsmoor Road / Barnsley Road	74%	68%	76%	70%	77%	69%	77%	71%
L-NE-31	A6135 / Norwood Road	74%	67%	74%	68%	75%	68%	74%	70%
L-NE-32	A6135 / A6102	84%	72%	84%	75%	85%	73%	84%	78%
L-NE-34	Wordsworth Avenue / Southey Green Road	60%	88%	65%	94%	61%	90%	64%	96%
L_NE_40	Handsworth Rd / Richmond Park Rd	---	---	---	---	50%	73%	56%	93%
L-NE-41	Handsworth Rd / Laverack St	---	---	---	---	43%	41%	43%	48%

JUNCTION UNIQUE ID	JUNCTION NAME	CHANGE IN DEGREE OF SATURATION							
		2029 Reference Case		2029 'with Local Plan'		2039 Reference Case		2039 'with Local Plan'	
		MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK	MORNING PEAK	EVENING PEAK
L-NE-43	Retford Rd / Beaver Hill Rd	---	---	---	---	68%	95%	97%	>150%
L-NE-45	Nether Lane / The Common	---	---	---	---	88%	102%	96%	108%
L-NE-49	Warren Lane / Thorncliffe Road	---	---	---	---	62%	51%	88%	120%

4.5.2 The junction modelling assessments indicate that, whilst there are several junctions currently operating over capacity in the Reference Case scenarios, , the only junctions in this area forecast to be severely impacted by the introduction of Local Plan generated trips are listed as follows:

- Retford Rd / Beaver Hill Rd
- A630 Sheffield Parkway / B6200 Handsworth Road
- Warren Lane / Thorncliffe Road

4.6 Assessment Summary

4.6.1 The detailed assessment has identified nine junctions across the study area which require mitigation options to be considered, namely:

- A615 City Road / Wulfric Road
- Station Road / New Street
- Mosborough Parkway / Coisley Hill
- Fulwood Road / Taptonville Road / Glossop Road
- Langsett Road North / Church Street
- Orchard Street / Station Lane
- Retford Rd / Beaver Hill Rd
- A630 Sheffield Parkway / B6200 Handsworth Road
- Warren Lane / Thorncliffe Road

4.6.2 Mitigation schemes for these junctions will be discussed in Chapter 6. A map showing the location of these junctions is shown in Figure 3.

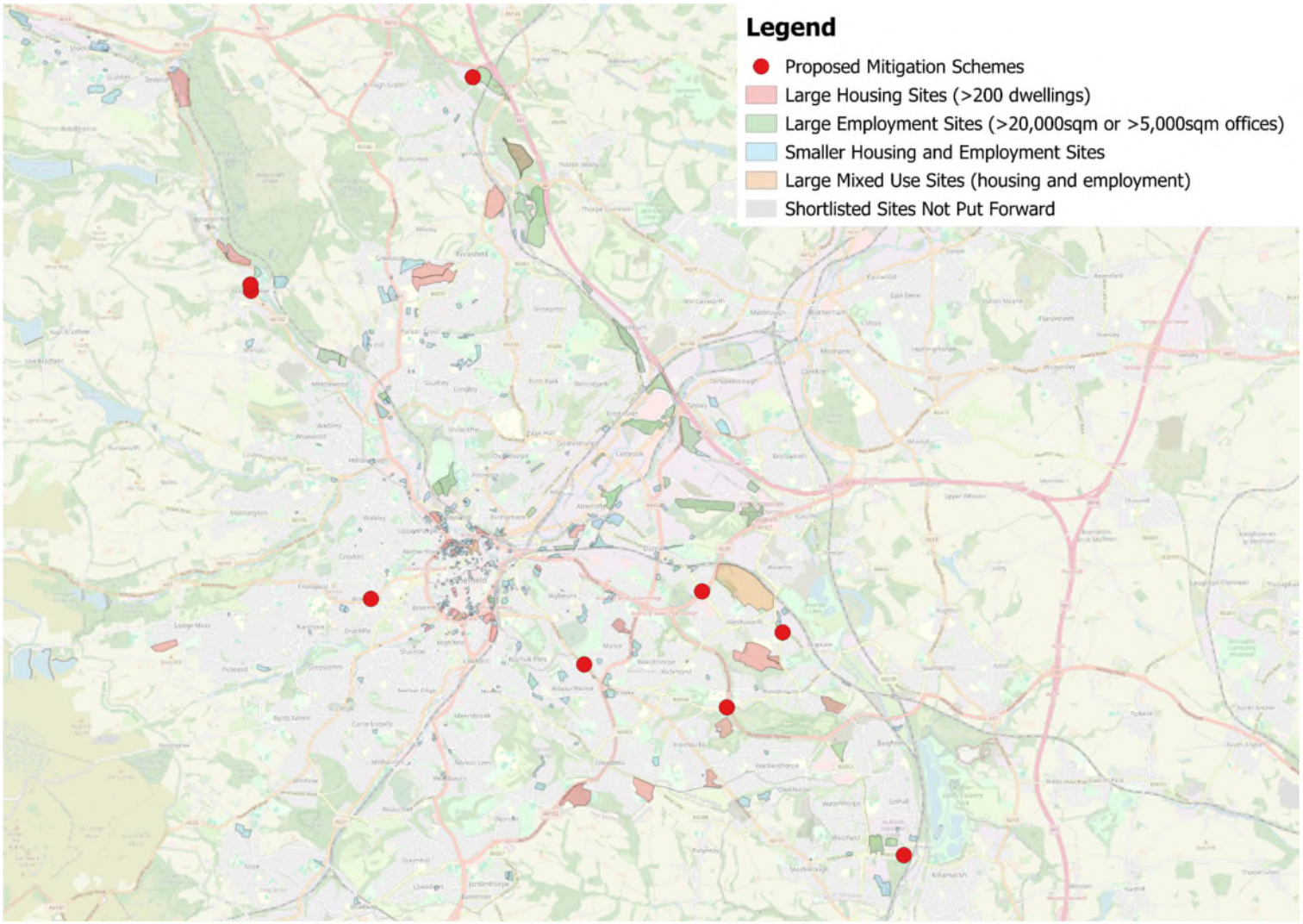


Figure 3. Junctions Considered for Mitigation

5. LOCAL ROAD NETWORK – LINK CAPACITY IMPACTS

5.1.1 Analysis of traffic flows and capacities was undertaken for all dual carriageway / grade-separated roads beyond the Strategic Road Network (SRN). Appendix A presents the following analysis for these roads:

- Assumed Link Capacity.
- Observed Base Year Flows.
- Base Year, 2029 and 2039 Reference Case Flows, and 2029 and 2039 Local Plan Scenario Flows in vehicles / hour.
- Flow Differences between the Reference Case and the Local Plan Models.
- Calculated Volume Over Capacity Ratios – this is a ratio which gives a good overall guide to a road's capacity *(V/C ratio is calculated for each turning movement at each junction. It is calculated by dividing the flow arriving at the junction by the capacity, separately for each turning movement. When the V/C is 100% the junction is at capacity*).

5.1.2 Of these dual carriageway / grade separated links, only the A630 Sheffield Parkway is significantly affected by the local plan traffic in 2029 as shown in Table 9. In the morning peak hour, the V/C ratios increase for most sections of the Parkway, in both directions, but there are no sections where the V/C ratio increases significantly. The westbound section of Sheffield Parkway between M1 Junction 34 and Europa Link is pushed to capacity in the morning peak, as the V/C increases from 97% to 100%, but the increase in V/C due to the Local Plan is relatively small (3%).

5.1.3 In the evening peak hour, the V/C ratios increase significantly at the following locations, but still remain under 100%:

- Eastbound between city centre and A6102 junction (V/C increases from 85% to 91%)
- Eastbound between A57 Interchange and Handsworth Interchange (V/C increases from 83% to 89%)

- Eastbound between Europa Link and M1 Junction 33 (V/C increases from 84% to 96%)

5.1.4 In 2039, the V/C ratios increase on every section of the Parkway, in both directions and in both time periods. The most affected section is eastbound between Europa Link and M1 Junction 33, where in the evening peak hour, the V/C increases from 87% to 101%, pushing it over capacity.

Table 9. 2029 Link Capacity Analysis for the LRN (A630 Parkway)

			REF CASE V/C		LOCAL PLAN V/C	
ROUTE	DIRECTION	DESCRIPTION	AM	PM	AM	PM
A630 Parkway	Eastbound	to A6102 junction	57%	85%	67%	91%
A630 Parkway	Westbound	from A6102 junction	94%	80%	92%	86%
A630 Parkway	Eastbound	A57 Int to Handsworth Int	77%	83%	84%	89%
A630 Parkway	Westbound	Handsworth Int to A57 Int	89%	90%	90%	93%
A630 Parkway	Eastbound	Europa Link to M1 j33	86%	84%	90%	96%
A630 Parkway	Westbound	M1 j34 to Europa Link	97%	92%	100%	94%

6. LOCAL ROAD NETWORK - POTENTIAL JUNCTION MITIGATION MEASURES

6.1 Junctions Requiring Mitigation

6.1.1 As identified in Chapter 4, due to the levels of congestion introduced at specific junctions across the Study area, nine junctions were considered for mitigation. Mitigation schemes were developed for six of these nine junctions (five schemes covering six junctions, and these are outlined in Table 10 below.

6.1.2 Three of the junctions were considered for mitigation, but schemes were not developed at these locations. These junctions are discussed in the following section.

Fulwood Road / Taptonville Road / Glossop Road

6.1.3 One site (258 homes on Land between Lodge Moor Road and Redmires Conduit) was added during the period sites were being considered by Members and has therefore been modelled outside of the variable demand model. The number of trips which would be generated by this site was estimated using trip rates agreed with National Highways, and these trips were distributed onto the local junction models using forecast trip patterns from the SATURN highway model.

6.1.4 Congestion issues were demonstrated at the junction of Fulwood Road / Taptonville Road in the morning peak period. A mitigation scheme was considered for this location, which successfully mitigated the impacts of the local plan, but it is instead recommended that the use of buses as a sustainable transport alternative, as well as walking and cycling, should be encouraged among local residents and employees in order to reduce the dependency on car travel for those accessing the city centre from this area of Sheffield. It is also recommended that Sheffield City Council review the operation of this junction five years into the Local Plan.

A630 Sheffield Parkway / B6200 Handsworth Road

6.1.5 This junction was initially tested with the temporary lane markings currently in place on the Sheffield Parkway Eastbound off slip which are in place while maintenance works are carried out on the structure of the junction. This assessment resulted in the need for a mitigation scheme to be developed. However, once it was established that the lane designations are temporary, the junction was retested with the lane designations reverting to their previous arrangement. Under this arrangement, the junction was shown to remain within capacity in the scenarios tested, and development of mitigation was not necessary.

Warren Lane / Thorncliffe Road

6.1.6 This junction was initially flagged for assessment because a large employment allocation was coded to take access off Warren Lane in the strategic model. Warren Lane is a narrow one-way road and would not be suitable to support a large employment allocation in its current form. Upon review, it was determined that the allocation would likely access from Thorncliffe Road and so the predicted impact on the Warren Lane junction was reduced below the threshold for assessment, and development of mitigation was not necessary.

Table 10. Mitigation schemes

AREA	JUNCTION	MITIGATION PROPOSED
South East	A6135 City Road / Wulfric Road	Signalisation of all arms – signal phasing and staging for regular traffic includes Sheffield Supetram due to shared approach arm.
South East	Station Road / New Street Junction	Signalisation of all arms, with a dedicated right-turn bay and a dedicated left-turn short-lane for trips into Holbrook Estate
South	A57 Mosborough Parkway / Coisley Hill	Localised widening of A57 South and Coisley Hill East arms to provide additional lanes at give way. Also elongation of roundabout central island to accommodate widening
North West	Langsett Road North / Church Street	Signalisation of all arms at both junctions, and additional second lane southbound at Orchard Street. Two junctions will effectively operate as one. Therefore, only one set of results has been reported..
North West	Orchard Street / Station Lane	
North East	Retford Rd / Beaver Hill Rd	Signalisation of all arms, with a dedicated right-turn bay and retain the dedicated left-turn lane for trips turning to Retford Road west bound

6.1.7 Following the identification of mitigation schemes illustrated in Table 10, junction capacity assessments have been conducted and are summarised in Table 11 and Table 12, again breaking results down by geographic area. These tables also provide the initial results extracted from Table 6 for comparison.

6.1.8 As with the initial junction assessment, The analysis for those junctions outlined in Table 11, Table 12 and Table 13 is based on the arm with the highest result, and is measured in RFC/DoS (the measurements of which are outlined above) depending on the type of junction and the software used to assess the traffic impacts.

6.1.9 Further details as to the development of the mitigation schemes and a description of what the improvement works entail are summarised in the following sections.

6.2 South

6.2.1 With mitigation capacity analysis results for the South region are shown in Table 11.

Table 11. Mitigation Results South Area

JUNCTION ID	JUNCTION NAME	JUNCTION TYPE	2029 REF		2029 LOCAL PLAN		2039 REF		2039 LOCAL PLAN	
			AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK
L-SE-22	A6135 City Road / Wulfric Road	Existing	195%	181%	205%	196%	199%	194%	213%	219%
		Mitigation	N/A	N/A	80%	89%	N/A	N/A	85%	96%
L-SE-34	Station Road / New Street	Existing	19%	30%	26%	56%	15%	35%	33%	86%
		Mitigation	N/A	N/A	83%	89%	N/A	N/A	84%	93%
L-SE-46	A57 Mosborough Parkway / Coisley Hill	Existing	128%	110%	150%	121%	140%	141%	145%	171%
		Mitigation	N/A	N/A	80%	96%	N/A	N/A	92%	126%

A6135 City Road / Wulfric Road

6.2.2 Congestion issues demonstrated at this location were found to be caused by the inability of traffic to successfully exit from Wulfric Road onto the A6135 City Road due to the volume of conflicting traffic passing along the A6135 City Road – this was compounded further by the presence of the Sheffield Supertram infrastructure.

6.2.3 Mitigation was developed at this location that included the introduction of signalisation of all arms – as the Supertram operates along the same carriageway as regular traffic, tram movements could be governed through the same signal staging as road traffic without the need for separate stages or phases which would add additional delay. The proposed layout is shown in Appendix B Figure B1.

6.2.4 With the introduction of signals at this location, significant improvements have been noted as traffic from Wulfric Road is now able to exit within a suitable timeframe without resulting in severe queue lengths, while not affecting the current performance of the A6135 City Road or the Sheffield Supertram. The maximum DoS is now reported as 95% in the 2039 PM Peak.

6.2.5 SCC currently use a network management strategy in this area, using signals to hold traffic on side roads to prioritise the tram. The area has very good PT services and SCC would like to encourage a change in mode of travel, rather than increasing highway capacity. Although this mitigation scheme is viable at this junction, it is recommended that Sheffield City Council continue to use their network management strategy, and that this is reviewed five years into the Local Plan.

B6053 Eckington Way / Westfield Northway / Holbrook Avenue

6.2.6 Congestion issues demonstrated at this location were found to be caused by the general volume of traffic travelling through this junction precluding the ability for traffic to successfully exit from the B6053 Eckington Way northern approach within the available green time.

6.2.7 Whilst mitigation schemes have been considered at this location, none have been able to successfully address the concerns of significant queuing on the northern approach, with the presence of the adjacent Supertram line and other constraints restricting the ability to deliver major infrastructural changes.

6.2.8 It is therefore recommended that, with the presence of the Supertram, the use of this sustainable transport alternative, as well as walking and cycling, should be encouraged among local residents and employees in order to reduce the dependency on car travel for those accessing the surrounding area.

Station Road/New Street

6.2.9 Congestion issues demonstrated at this location were found to be caused by the inability of traffic to successfully exit from New Street onto Station Road due to the volume of conflicting traffic passing along the Station Road.

6.2.10 Mitigation was developed at this location that included the introduction of traffic signals on all arms. This would include the widening of all approaches to include a dedicated left-turn and right-turn lanes for traffic entering New Street from Station Road, and a two-lane approach on New Street. The proposed layout is shown in Appendix B Figure B2.

6.2.11 With the introduction of signals at this location, improvements in the ability of traffic to exit New Street were observed, resulting in a reduction in queue lengths on this approach. The maximum delay on the New Street arm has reduced from 185 seconds to 94 seconds.

6.2.12 However, delivery of this scheme, including the provision of dedicated turning lanes for all approaches, will require the purchase of 3rd party land north of Station Road, on the western approach.

6.2.13 It should be noted that there are two large employment allocations in the vicinity of New Street, one to the east and one to the west. It has been assumed that the allocation to the west of New Street will take access off Holbrook Avenue to the north

and so not add a significant amount of traffic to the New Street / Station Road junction. The allocation to the east will likely take access off New Street and so will add a level of traffic to the junction.

6.2.14 No mitigation has been proposed at this location, however, through the assessment of this junction, it was noted that the side arm (New Street) was extremely sensitive to additional traffic. As there are two large employment allocation sites in close proximity to New Street the impact of these on this junction should be carefully considered as these allocations progress through the planning process.

6.2.15 Mitigation is considered possible at this location however the purchase of 3rd party land is likely to be required to provide sufficient capacity.

A57 Mosborough Parkway/Coisley Hill

6.2.16 It is understood that there is a traffic signal scheme which has recently been introduced to the Coisley Hill West arm of this junction. This scheme has now been included and tested in all scenarios.

6.2.17 Congestion issues at this location were found to be caused by a lack of turning storage on the A57 Mosborough Parkway southern arm and Coisley Hill western arm in all scenarios.

6.2.18 Initially, proposals were considered to introduce a free-flow slip that would connect the A57 Mosborough Parkway southern arm with the Coisley Hill western arm so as to remove this movement from the circulatory, the intention being to increase circulatory space on the roundabout itself and thus alleviate congestion on the Coisley Hill western arm by allowing more green time for this arm. However, due to the presence of a heavily wooded area bounding the roundabout to the west, together with general space constraints, a free-flow slip could not be implemented at this location without requiring a departure from standard and potentially significant ecological impact.

6.2.19 Therefore, proposals were instead generated to provide localised widening of the A57 South and Coisley Hill East arms to provide additional lanes at give ways. The elongation of the roundabout central island would also be required in order to accommodate this widening.

6.2.20 With the introduction of the localised widening for this junction, the mitigation recommended has shown success in alleviating the impact but not eliminating it entirely. However, as the objective of the mitigation is to accommodate trips associated with the Local Plan allocations, and is not focussed on solving pre-existing congestion issues, the inclusion of the mitigation scheme to this junction does successfully accommodate trips associated with the Local Plan. This scheme is indicatively shown in Appendix B Figure B3.

6.2.21 Maximum queue lengths now exhibited at this junction are 41 PCUs on the A57 Mosborough Parkway south approach during the 2039 'with Local Plan' AM Peak scenario, and the maximum DoS reported is 101% during the 2039 'with Local Plan' AM Peak scenario on the A57 Mosborough Parkway southern approach.

6.3 North West

6.3.1 With mitigation capacity analysis results for the Northwest region are shown in Table 12.

Table 12. Mitigation Results North West Area

JUNCTION ID	JUNCTION NAME	JUNCTION TYPE	2029 REF		2029 LOCAL PLAN		2039 REF		2039 LOCAL PLAN	
			AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK
L-NW-17	Langsett Road North / Church Street	Existing	98%	139%	132%	172%	118%	159%	165%	197%
		Mitigation	N/A	N/A	78%	99.9%	N/A	N/A	90%	109%
L-NW-18	Orchard Street / Station Lane	Existing	105%	114%	137%	123%	114%	122%	157%	132%
		Mitigation	N/A	N/A	97%	80%	N/A	N/A	103%	88%

Langsett Road North / Church Street and Orchard Street / Station Lane

6.3.2 Congestion issues demonstrated at these junctions were found to be caused by the inability of traffic to successfully exit either of the minor arms, Church Street for the Langsett Road North / Church Street junction and Station Lane for the Orchard Street / Station Street junction. This was due to the volume of conflicting traffic passing along Langsett Road North and Orchard Street, respectively.

6.3.3 Mitigation was developed at this location that included the introduction of signalisation on all arms of both junctions, effectively combining them into a single signalised junction. Also, mitigation required the addition of a second lane southbound on Orchard Street. It should be noted that this second lane will require the removal of on street parking at this location.

6.3.4 With the introduction of signals for these junctions, the recommended mitigation strategy has shown some success in alleviating the impact. However, the results in Table 12 should be treated with caution as there is likely to be some blocking back from the Bridge Hill arm to the Church Street / Langsett Road junction which would increase queuing and delay on the Church Street and Langsett Road South arms. Due to the functionality within LinSig, accurately reflecting this behaviour is challenging. Therefore, it recommended that as allocation sites come forward in this area, further study of this junction is undertaken to confirm the need for and the most appropriate form of mitigation. This scheme is indicatively shown in Appendix B Figure B4.

6.3.5 Maximum queue lengths with the mitigation in place are 37 PCUs on the Bridge Hill arm during the 2039 'with Local Plan' AM Peak scenario, and the maximum DoS is 104%, on the Station Lane arm during the same scenario.

6.3.6 Proposals were also investigated as to closing Bridge Hill, which connects the two junctions, to through traffic, and thus creating an expanded gyratory around the centre of Oughtibridge via Langsett Road North in the northbound direction, and Orchard Street in the southbound direction – access would still be maintained via

Bridge Hill to the car park of The Cock Inn pub located adjacent to Langsett Road North. This arrangement would also be non-signalised at the junctions.

6.3.7 As a result of this proposal, however, severe congestion concerns (particularly in the 2039 model years), still existed at both junctions, and thus the mitigation scheme was not explored further.

6.4 North East

6.4.1 Mitigation capacity analysis results for the Northeast region are shown in Table 13.

Table 13. Mitigation Results North East Area

JUNCTION ID	JUNCTION NAME	JUNCTION TYPE	2029 REF		2029 LOCAL PLAN		2039 REF		2039 LOCAL PLAN	
			AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK
L-NE-43	Retford Road / Beaver Hill Road	Existing	N/A	N/A	N/A	N/A	68%	95%	97%	>150%
		Mitigation	N/A	N/A	N/A	N/A	N/A	N/A	53%	97%

Retford Road / Beaver Hill Road

6.4.2 This junction was shown to experience significant congestion in the PM peak period. This is caused by a considerable increase in the number of vehicles wanting to turn right form Retford Road to Beaver Hill Road.

6.4.3 Mitigation was developed at this location that included the introduction of signalisation on all arms of the junction. This allows the right turning traffic an opportunity to make the turn while the opposing traffic is stopped.

6.4.4 Pedestrian crossing facilities have been retained as they are currently. Signalising the junction allows for additional pedestrian facilities to be added to the junction and there is space for this to be delivered. It should be noted that this junction is on an important bus corridor so any future scheme would need to consider pedestrian crossing facilities and potentially bus priority to reduce any future impact on bus delays.

6.4.5 Maximum queue lengths with the mitigation in place are 52 PCUs on the Retford Road West arm during the 2039 'with Local Plan' PM Peak scenario, and the corresponding maximum DoS is 97.9%.

6.4.6 Initially, a roundabout was considered at this location. However, following investigation, there is insufficient space to construct a roundabout and thus the mitigation scheme was not explored further.

7. SUMMARY

7.1 Summary

7.1.1 SYSTRA are working on behalf of Sheffield City Council (SCC) who have developed a series of Local Plan site allocations in the Draft Local Plan (the 'Sheffield Plan'). The Council's agreed spatial option maximises sites in the urban area, whilst allowing consideration of sustainably-located sites in the Green Belt that adjoin the existing urban area, striking a balance between provision of new homes and protection of the environment. This report summarises the findings of the strategic transport model analysis of the transport impacts of the preferred spatial option site allocations comprising of 32,026 homes and 1.34 million square metres of employment floorspace. . These figures represent the full shortlist of sites discussed with Members in February and March 2025, which includes those sites which were not taken forwards as allocated sites (these sites comprise approximately 1,300 homes and 60,000 square metres of employment floorspace. This represents a worst case scenario as it provides for more capacity than will be required

7.1.2 Impacts of the Local Plan have been assessed for two forecast years (2029 and 2039) focussing on a comparison with a Reference Case scenario.

7.1.3 Of the 56 junctions tested, only six required highway mitigation schemes to be developed, those are:

- A6135 City Road / Wulfric Road;
- Station Road / New Street;
- Mosborough Parkway / Coisley Hill;
- Langsett Road North / Church Street;
- Orchard Street / Station Lane; and
- Retford Road / Beaver Hill Road.

7.1.4 Potential mitigation schemes that aim to remedy the impact of the Local Plan have been proposed at these five locations. It should however be noted that the mitigation schemes are not the recommended approach for all junctions in the first instance.

- At the City Road / Wulfric Road junction, although the proposed mitigation scheme is viable, it is recommended that Sheffield City Council continue to use their network management strategy, and that this is reviewed five years into the Local Plan;
- At the Station Road / New Street junction, there are two large employment allocation sites in close proximity to New Street, and it is recommended that the impact of these on the surrounding junctions should be carefully considered as these allocations progress through the planning process; and
- At the Langsett Road North / Church Street, and Orchard Street / Station Lane junctions, it recommended that as allocation sites come forward in this area, further study of these junctions is undertaken to confirm the need for and the most appropriate form of mitigation.
- At the Retford Road / Beaver Hill Road Junction, it is recommended that the signalisation of the junction be explored. This could have benefits for public transport and active travel users.

7.1.5 Some link capacity impacts are forecast on the A630 Sheffield Parkway; however, none of these constitute a severe impact.

7.1.6 Based on the work to date, SYSTRA foresees no highway capacity issues on the local road network caused by the trips generated by the Local Plan which cannot be successfully mitigated.

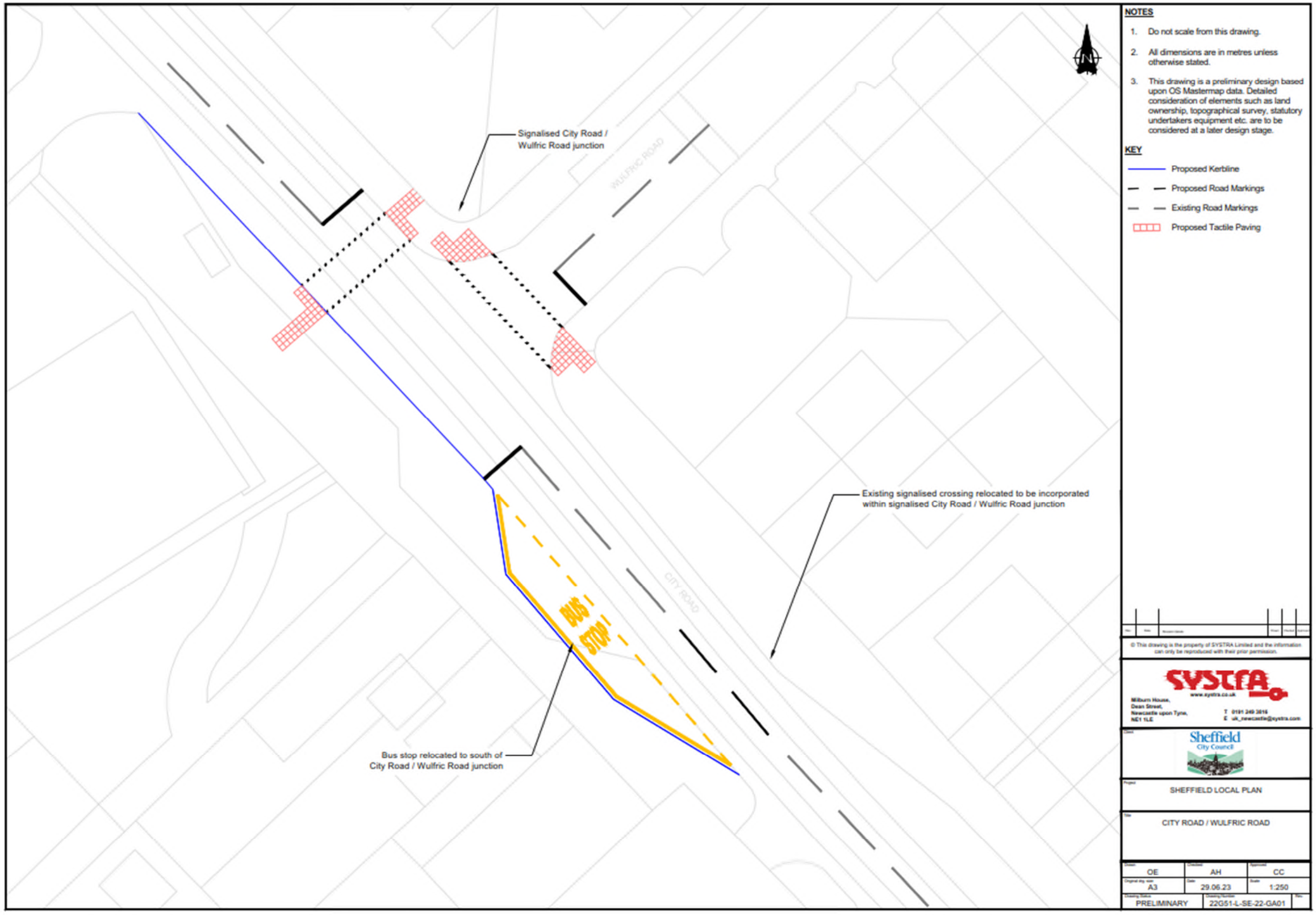
APPENDIX A: LRN Link Capacity Analysis

			Number of Lanes	Assumed Lane Capacity	2029 Ref		2029 Local Plan		Flow Difference 2029 Ref-> 2029 Local Plan		2029 Ref		2029 Local Plan	
Units				Vehs	Vehs		Vehs		Vehs					
Source					Demand Flows		Demand Flows		Demand Flows		VoC		VoC	
Motorway Route	Direction	Link name			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
A630 Parkway	Eastbound	to A6102 jn	2	3,400	1,936	2,887	2,279	3,107	343	220	57%	85%	67%	91%
A630 Parkway	Westbound	from A6102 jn	2	3,400	3,204	2,725	3,143	2,908	- 62	183	94%	80%	92%	86%
A630 Parkway	Eastbound	A57 Int to Handsworth Int	2	3,400	2,602	2,827	2,868	3,023	267	195	77%	83%	84%	89%
A630 Parkway	Westbound	Handsworth Int to A57 Int	2	3,400	3,027	3,052	3,048	3,155	21	103	89%	90%	90%	93%
A630 Parkway	Eastbound	Europa Link to M1 j33	2	3,400	2,939	2,842	3,062	3,279	123	436	86%	84%	90%	96%
A630 Parkway	Westbound	M1 j33 to Europa Link	2	3,400	3,297	3,126	3,389	3,206	92	80	97%	92%	100%	94%
A61	Northbound	Penistone Rd near Albert Terrace Rd	2	3,400	1,009	1,404	1,005	1,421	- 4	17	30%	41%	30%	42%
A61	Southbound	Penistone Rd near Albert Terrace Rd	2	3,400	1,346	876	1,366	913	21	38	40%	26%	40%	27%
A61	Northbound	Penistone Rd, Hillsborough	2	3,400	1,572	2,013	1,619	2,018	46	4	46%	59%	48%	59%
A61	Southbound	Penistone Rd, Hillsborough	2	3,400	2,134	1,647	2,150	1,762	16	115	63%	48%	63%	52%
A61	Northbound	Halifax Rd nr Wilcox Rd	2	3,400	990	1,245	839	1,238	- 151	- 7	29%	37%	25%	36%
A61	Southbound	Halifax Rd nr Wilcox Rd	2	3,400	1,207	1,077	1,138	1,116	- 70	39	36%	32%	33%	33%
A631 Shepcote Lane	Northbound	Europa Link to M1 j34	2	3,400	662	862	780	814	119	- 48	19%	25%	23%	24%
A631 Shepcote Lane	Southbound	M1 j34 to Europa Link	2	3,400	844	528	992	618	148	91	25%	16%	29%	18%
A631 Shepcote Lane	Northbound	Europa Link to A6102	2	3,400	642	709	791	727	150	18	19%	21%	23%	21%
A631 Shepcote Lane	Southbound	A6102 to Europa Link	2	3,400	645	766	709	888	64	122	19%	23%	21%	26%

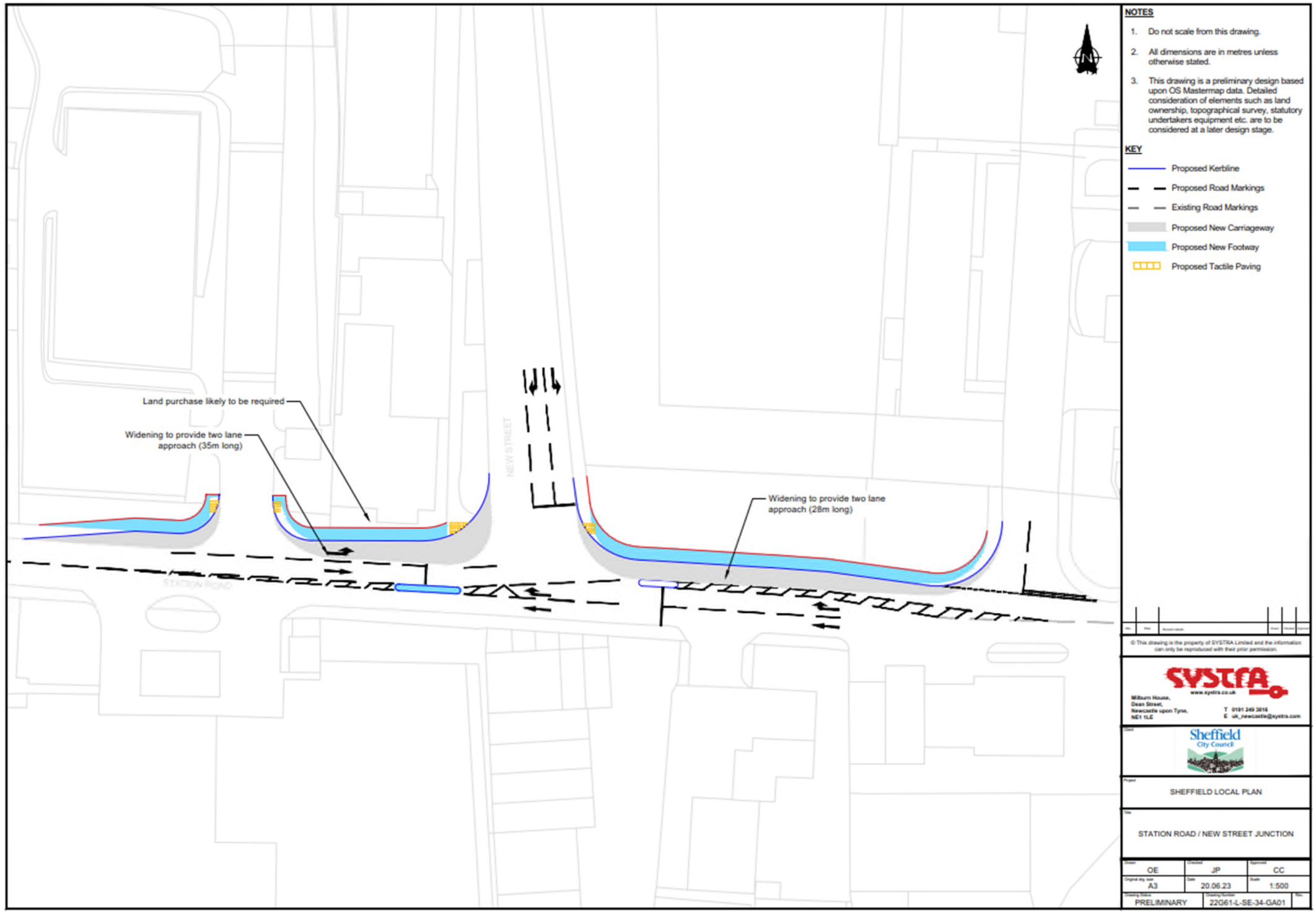
			Number of Lanes	Assumed Lane Capacity	2039 Ref		2039 Local Plan		Flow Difference 2039 Ref-> 2039 Local Plan		2039 Ref		2039 Local Plan	
Units				Vehs	Vehs		Vehs		Vehs					
Source					Demand Flows		Demand Flows		Demand Flows		VoC		VoC	
Motorway Route	Direction	Link name	2016 Base	2016 Base	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
A630 Parkway	Eastbound	to A6102 jn	2	3400	1,974	3,035	2,529	3,307	554	273	58%	89%	74%	97%
A630 Parkway	Westbound	from A6102 jn	2	3400	3,264	2,819	3,259	2,983	- 5	164	96%	83%	96%	88%
A630 Parkway	Eastbound	A57 Int to Handsworth Int	2	3400	2,681	2,938	3,169	3,304	487	366	79%	86%	93%	97%
A630 Parkway	Westbound	Handsworth Int to A57 Int	2	3400	3,069	3,120	3,145	3,234	75	114	90%	92%	92%	95%
A630 Parkway	Eastbound	Europa Link to M1 j33	2	3400	3,119	2,967	3,321	3,570	201	603	92%	87%	98%	105%
A630 Parkway	Westbound	M1 j33 to Europa Link	2	3400	3,353	3,213	3,550	3,427	196	214	99%	95%	104%	101%
A61	Northbound	Penistone Rd near Albert Terrace Rd	2	3400	1,002	1,429	1,029	1,448	27	19	29%	42%	30%	43%
A61	Southbound	Penistone Rd near Albert Terrace Rd	2	3400	1,407	940	1,476	1,044	68	104	41%	28%	43%	31%
A61	Northbound	Penistone Rd, Hillsborough	2	3400	1,586	2,046	1,722	2,070	136	24	47%	60%	51%	61%
A61	Southbound	Penistone Rd, Hillsborough	2	3400	2,171	1,723	2,203	1,883	32	160	64%	51%	65%	55%
A61	Northbound	Halifax Rd nr Wilcox Rd	2	3400	1,000	1,239	862	1,242	- 137	3	29%	36%	25%	37%
A61	Southbound	Halifax Rd nr Wilcox Rd	2	3400	1,210	1,120	1,164	1,155	- 46	35	36%	33%	34%	34%
A631 Shepcote Lane	Northbound	Europa Link to M1 j34	2	3400	700	895	825	885	125	- 10	21%	26%	24%	26%
A631 Shepcote Lane	Southbound	M1 j34 to Europa Link	2	3400	885	579	1,091	662	206	82	26%	17%	32%	19%
A631 Shepcote Lane	Northbound	Europa Link to A6102	2	3400	677	757	857	816	180	60	20%	22%	25%	24%
A631 Shepcote Lane	Southbound	A6102 to Europa Link	2	3400	669	832	833	947	164	115	20%	24%	24%	28%

APPENDIX B: Potential Mitigation Scheme Drawings

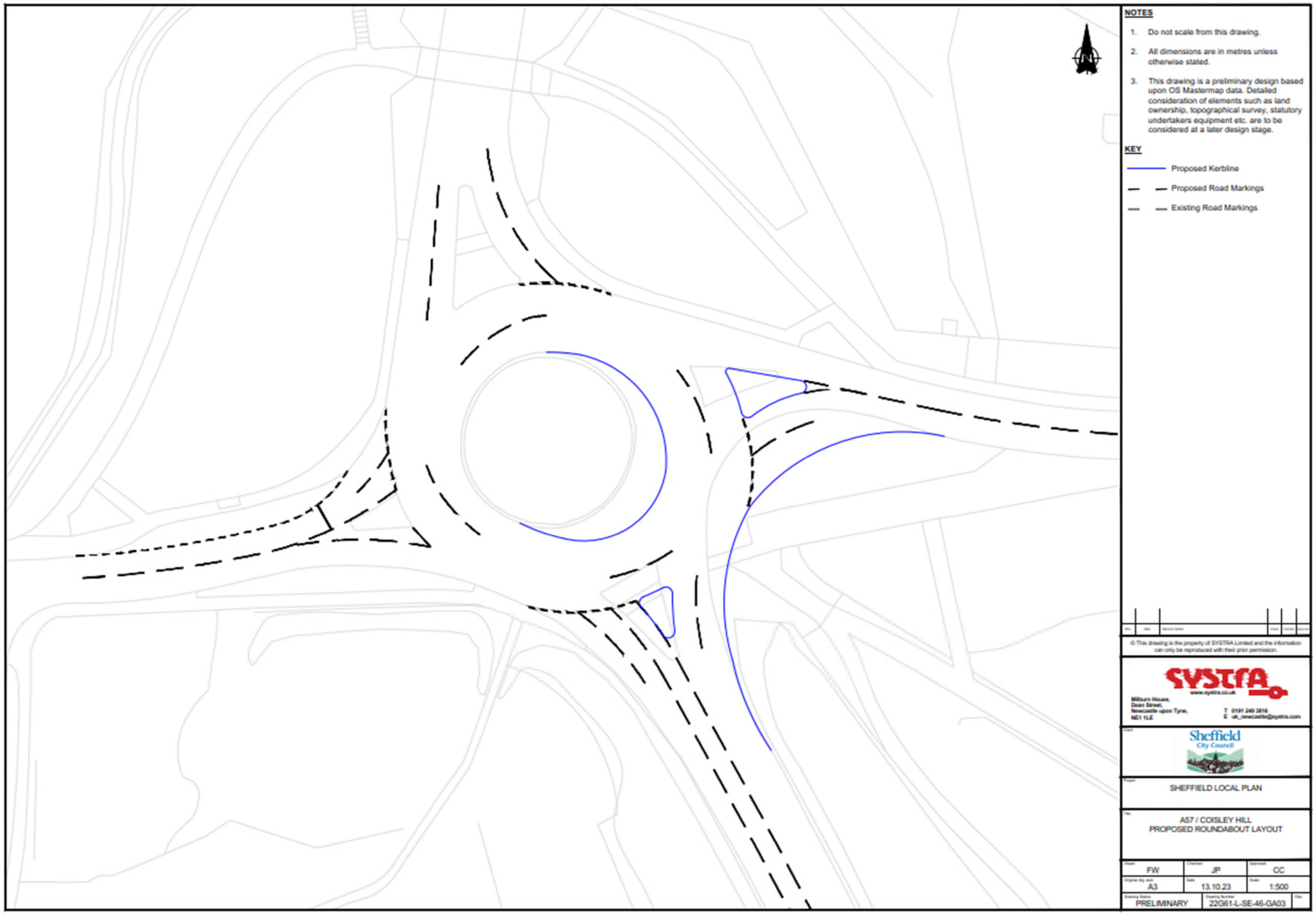
Appendix B Figure B1: A6135 City Road / Wulfric Road



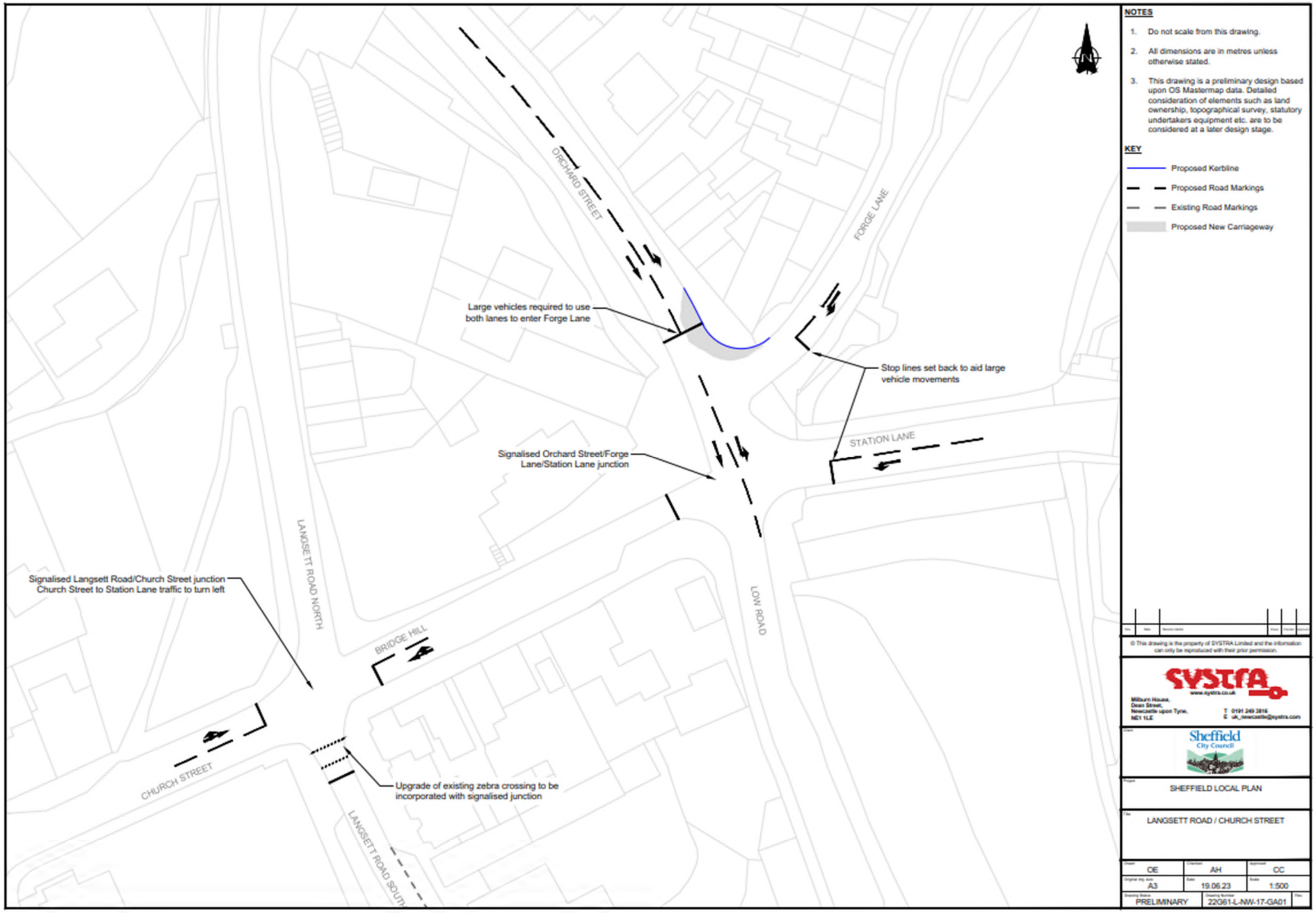
Appendix B Figure B2: Station Road/New Street



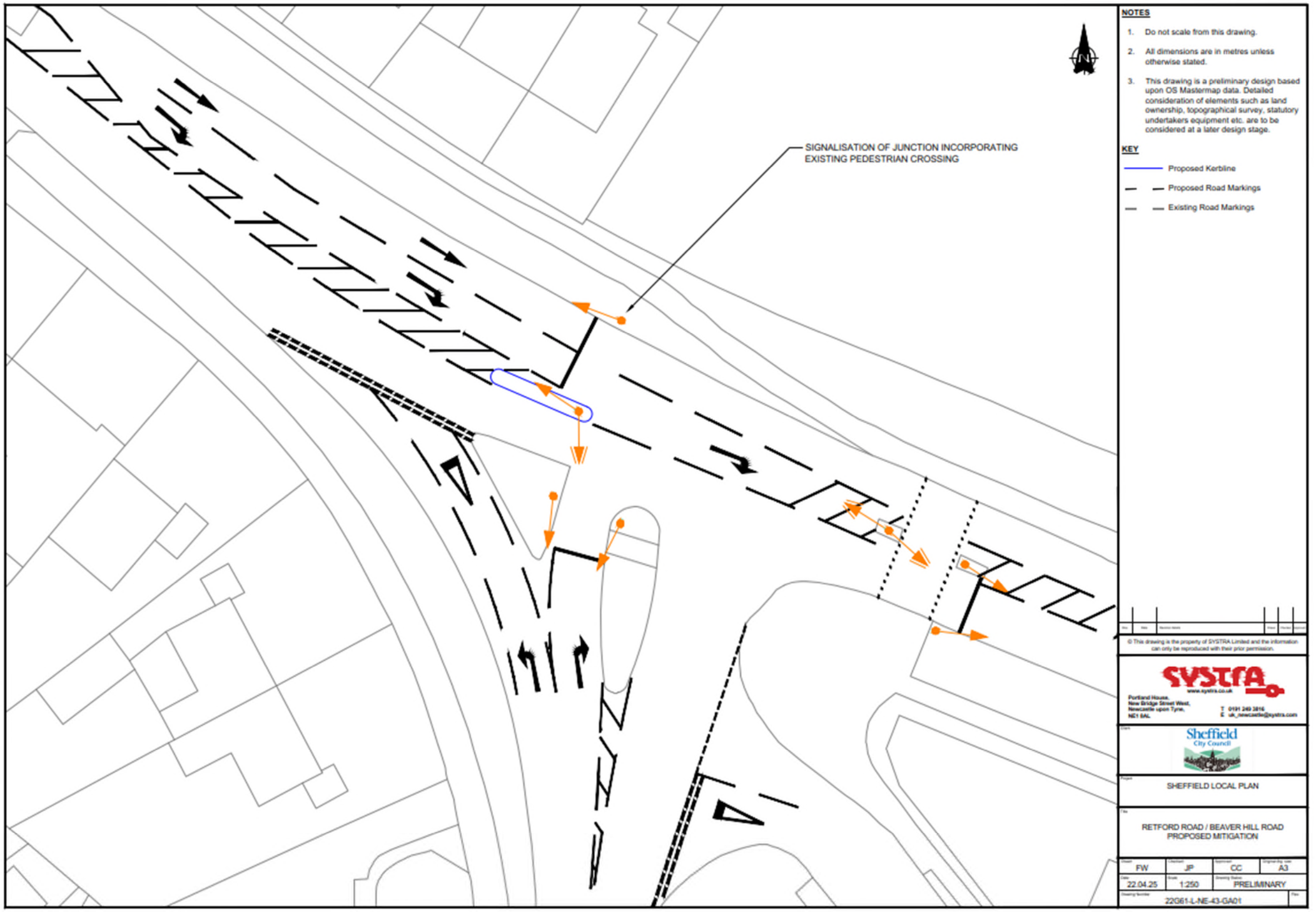
Appendix B Figure B3: A57 Mosborough Parkway/Coisley Hill Signalised Junction



Appendix B Figure B4: Langsett Road North/Church Street and Orchard Street/Station Lane



Appendix B Figure B5: Retford Road / Beaver Hill Road



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