



Kirklees Draft Local Plan

Technical Paper: Transport Model

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Investment and Regeneration Service
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1. Introduction

- 1.1 Kirklees Council has produced a transport model to help support the development of the Local Plan. The Local Plan is the council's strategy for growth from 2016 to 2031. The government requires all local councils to develop a long-term plan which sets out how and where land can be developed over the next 15 years, in order to meet the growing needs of local people and businesses. The plan will be used to guide development and inform planning decisions once adopted.
- 1.2 Due to its use as a basis for informing planning decisions, the Local Plan needs to be robust. This includes its strategies and policies being based on appropriate and credible evidence. From the perspective of transport, it is considered prudent to understand the cumulative transport impact of the Local Plan proposals on the transport network and to show how this translates into a transport strategy and potential transport improvements.
- 1.3 To achieve the above, Kirklees Council undertook to strategically model the transport network (highway and public transport) in order to assess the cumulative transport impact of the land use allocations in the draft Local Plan. The work identifies locations on the highway network which are forecast to suffer increased delays as a result of the proposals and therefore where the Council needs to concentrate its transport mitigation strategy. It also shows whether the mitigation strategy is able to accommodate the growth over the plan period.
- 1.4 This report summarises the methodology and results of the modelling study. The results of this study have been and will be used in further work to help identify potential transport improvements in the borough of Kirklees. The improvements study informs the Council's Infrastructure Delivery Plan, which forms part of the evidence base for the Local Plan.
- 1.5 The report includes the following information:
 - Model build information;
 - The methodology of the transport study;
 - The assumptions used for forecasting future travel demand;
 - Tests undertaken;
 - A summary of the key results; and,
 - Conclusions and recommendations.
- 1.6 In addition this report is designed to provide background to information that is contained in the draft Kirklees Local Plan - Allocations and Designations Document and the Kirklees Infrastructure Delivery Plan.

2. Model Build Information

- 2.1 The transport modelling study has been undertaken using the recently commissioned Kirklees Transport Model of 2015. The methodology used was based on information available in the Department for Transport's Transport Analysis Guidance (TAG).
- 2.2 The Transport Model operates as a five stage transport demand model and has three component parts. The five stages are:
1. **Trip generation** determines the frequency of origins or destinations of trips in pre-determined zones within the model by trip purpose, as a function of land uses and household demographics, and other socio-economic factors.
 2. **Trip distribution** matches origins with destinations, using existing travel patterns as a starting point.
 3. **Time of day choice** determines which trips occur in the peak hours and which in the inter-peak or off-peak.
 4. **Mode choice** computes the proportion of trips between each origin and destination that use a particular transportation mode.
 5. **Route assignment** allocates trips between an origin and destination by a particular mode to a route or service. The allocation of trips to routes in the highway model takes into account the congestion caused by other travellers.
- 2.3 The three components of the model are:
- 1 Demand Model which performs the first four stages above.
 - 2 and 3 Highway Assignment Model and Public Transport Assignment Model which undertake the fifth stage in relation to highway and public transport trips.
- 2.4 The Kirklees Transport Model is a strategic transport model, the coverage of which is shown in Appendix A. The detailed model area is contained within the pink boundary. It can be seen that this detailed modelled area extends beyond the boundary of Kirklees, serving to ensure that traffic to and from areas outside Kirklees enters and leaves the highway network at the correct points. The model covers a full 24 hour period although the highway and public transport assignment models only cover the morning and evening weekday period periods of 0900-0800 and 1700-1800, in addition to an inter-peak average hour 1000-1600.
- 2.5 The model divides Kirklees and large parts of the neighbouring districts into a number of small zones. The purpose of the model is to understand how people currently move between these zones either on the highway or public transport network. When new development is proposed in the zones, these characteristics can be updated, taking into account the changing demand for travel, and the impact on the two networks can be forecast. A zone and network plan can be found in Appendix B.
- 2.6 The highway assignment model contains a detailed representation of the local and strategic highway network with associated highway characteristics, which are represented by relationships between flow and speed as well as junction capacities. These characteristics are used within the model to reflect how much traffic a road can accommodate and what delays will result from the traffic.

- 2.7 The public transport assignment model contains a representation of the bus and rail routes that make up the local public transport network.
- 2.8 For the highway element, the model uses existing travel patterns in the time periods described above between zones. These are referred to as trips. These trips are taken from national census data, known as Journey to work data and, more locally, from mobile phone data. This has been supplemented by 9 roadside interviews in order to provide actual "on the ground" journey purpose information and undertake some validation of the mobile phone data.
- 2.9 The trips are then assigned to the highway network based on the principle of user equilibrium¹. To ensure the numbers of vehicles on the network adequately reflects what is happening on the street, the assignment is verified against traffic counts that have taken place around the district. Clearly it is not financially feasible or practical to count traffic on every single road in the district or indeed in the modelled area. However as many major routes as possible are counted, along with known links between these routes and routes around local settlements. A plan and list of all the count locations is shown in Appendix C.
- 2.10 To ensure that journey times across the network are realistic the journey times on 25 routes were surveyed and these data used to calibrate the model.
- 2.11 For the public transport element, the model is built using Census journey to work data with other journey purposes being synthesised. Counts were undertaken at around 50 locations to check that the volume and routing of trips across the network are realistic.
- 2.12 Further information on the structure of the Kirklees Transport Model 2015 update is provided in the following reports:
- Kirklees Transport Model Specification 2015
 - Local Model Validation Report, Kirklees Transport Model 2015

¹ *The journey times in all routes actually used are equal and less than those which would be experienced by a single vehicle on any unused route.* Each user non-cooperatively seeks to minimize his cost of transportation. The traffic flows that satisfy this principle are usually referred to as "user equilibrium" (UE) flows, since each user chooses the route that is the best. Specifically, a user-optimized equilibrium is reached when no user may lower his transportation cost through unilateral action. *At equilibrium the average journey time is minimum.* This implies that each user behaves cooperatively in choosing his own route to ensure the most efficient use of the whole system

3. Transport Study Methodology

- 3.1 In addition to the base modelled 2015 flows, the study considered future year growth scenarios of 2020 and 2030 in line with the plan period. These future year scenarios contained various assumptions relating to potential changes to the highway network and traffic demand.
- 3.2 Traffic growth was applied to the base model to account for forecast changes in traffic demand in the two forecast years. The growth was calculated based on best practice guidance and future housing and employment targets.
- 3.3 Traffic growth is the change over time of the number of cars and goods vehicles on the highway network. When forecasting the performance of the highway network in the future, it is necessary to allow for changes in traffic demand.
- 3.4 Traffic growth can be split into two broad areas:
 1. New trips: Changes in population and employment directly affect how many trips are made.
 2. Frequency of trips: Changes in GDP, income, car ownership and travel costs affect how frequently people travel by each mode.
- 3.5 The first of these are taken from the Kirklees Local Plan. Outside of the Kirklees area the forecasts contained within the DfT National Trip End Model are used.
- 3.6 The changes in the second group of factors are taken from national forecasts provided either within TEMPRO or in the DfT's WebTAG guidance for transport modelling.

4. Tests Undertaken

- 4.1 As noted earlier the purpose of the model is to understand the cumulative impact of the development allocations in the Kirklees Local Plan. As part of this analysis, current transport schemes that are being worked on by the Council to mitigate the impact of the development have also been tested. The results have been used to inform the effectiveness of the current mitigation strategy and identify any gaps in infrastructure provision.
- 4.2 Initially a base model was constructed for 2015. The base model gives as realistic a representation as is possible of the current flows on the transport network, using the Census, mobile phone and road side interview data, supplemented with the traffic count and journey time surveys. Once the base model was constructed, 2 forecast years were created, 2020 and 2030, i.e. 5 and 15 years from the base.
- 4.3 Within each forecast year, two scenarios were run using the model and these are presented below. The 2014 Planning Practice guidance states that: “The Local Plan should make clear, for at least the first five years, what infrastructure is required, who is going to fund and provide it, and how it relates to the anticipated rate and phasing of development. This may help in reviewing the plan and in development management decisions. For the later stages of the plan period, less detail may be provided as the position regarding the provision of infrastructure is likely to be less certain.”
- 4.4 Housing, mixed use and windfall development site phasing has been estimated across the local plan period, according to the information available to the planning team, with windfall sites being assigned to model zones according to the level of existing development in each zone. Employment site phasing has been spread evenly across the local plan period. Mineral and waste sites were assigned phasing information according to the information available to the planning team. This data was used in the growth model to generate cumulative development levels, which ensured that development impacts were introduced in appropriate model years.
- 4.5 The following table summarises the forecasts and what transport schemes were tested.

Table 1: Modelled Scenarios

Forecast	Forecast Name	Contains (development supply)	Contains (Transport Supply)
1	Base	Nothing	Nothing- This is the current situation in 2015 and is a representation of the highway network as it operates now.
2	Do Minimum 2020	5 year allocation Commitments Windfall	Nothing- This test shows how the network would cope with no transport interventions in 5 years from now
3	Do Something 2020	5 year allocation Commitments Windfall	<ol style="list-style-type: none"> 1. A616/B6108 Lockwood Bar junction improvements 2. Cavalry Arms Junction + widening on approach to Ainley Top + Red Route 3. Dewsbury Ring Road Schemes- A638 / A652 and B6409 / Church Street 4. Holmfirth Roundabout 5. UTC Package
4	Do Minimum 2030	15 year allocation Commitments Windfall	Nothing- This test shows how the network would cope with no transport interventions in 15 years from now, i.e. the end of the plan period
5	Do Something 2030	15 year allocation Commitments Windfall	<p>As Do Something 2020, plus</p> <ol style="list-style-type: none"> 1. Bradley Link Road, Bradley+ Cooper Bridge + Three Nuns junctions 2. M62 J24a 3. A62 Leeds Road schemes 4. A653 / B6128Shaw Cross 5. Ravensthorpe Relief Road + potential road improvements around South Dewsbury 6. A62 Longroyd Bridge 7. Selected primary route traffic management treatment. (Link Red Routes)

5. Results of Do Minimum- Base Situation 2015

- 5.1 The forecast scenarios were created by amending the model to include additional development traffic, applying traffic growth and where relevant, including new traffic schemes, to the validated base model.
- 5.2 The forecast scenarios also included a traffic signal optimising procedure. The signal timings contained within the model are fixed at the start of the model run, and changes in traffic flow due to developments may result in the original timings becoming inappropriate. The majority of signalised junctions within Kirklees operate on a system which coordinates signal timings, so junction capacity at these locations may be underestimated without optimisation.
- 5.3 The results of the forecast scenarios were then analysed in the am peak (0800-0900) and a number of outputs created. The model outputs include traffic flows, queues, delays, and the Ratio of Flow to Capacity (RFC) for junction movements in the model. The RFC of a movement at a junction is a measure of the congestion of that movement. A movement with a capacity of 1,000 vehicles per hour and a traffic demand of 900 vehicles per hour has an RFC of 0.9.
- 5.4 The maximum ideal junction performance is when no movements have an RFC of in excess of 0.85–0.9. A junction is defined as operating over capacity if it has a movement with an RFC greater than one. However the model represents an average day and traffic flow is subject to day to day as well as seasonal variation. This means that a junction which is modelled with a RFC of 0.85 on an average day may exceed 1.0 on some days. As the RFC increases above 0.85 then the delays experienced tend to increase exponentially and this in turn leads to unreliable journey times and an increase in queuing. The number of days when the turn is operating with an RFC of 1.0 will also increase.
- 5.5 A lot of thought has been given as to how best represent the results from the model. It is considered important for readers to understand how congested particular junctions are now.
- 5.6 Rejected options have included:
- a) Flagging a junction as congested if any one turn in the junction exceeded an RFC of 85% and then categorising the results into 3 bands:
 1. 85%-90% RFC
 2. 90%-95% RFC
 3. >95% RFC
 - b) Using a demand weighted average RFC across the whole junction. This option fails as there may be junctions with fairly busy movements but are operating under capacity, but it is not possible to reallocate the spare capacity elsewhere within the junction. Ainley Top is an example of this as there is spare capacity on some of the internal movements which cannot be allocated to the external arms. This brings the demand weighted average down to an unrealistic level for reporting purposes.
 - c) Refining option a) to include only junctions where there is a movement with an RFC greater than 85% and a flow rate greater than 600 PCUs² in one peak hour.

² Traffic is composed of various types of vehicles, the range and relative composition of which can vary from location to location. Traffic modelling software frequently utilises a common unit, known as the Passenger Car

Junctions are then prioritised based on the total delay, which is represented as flow (PCU) * delay (sec) summed across all movements within the junction.

- 5.7 In order to include junctions where congestion issues are known, sensitivity tests were carried out on option c) using flow rates between 600 and 300 PCUs. A flow rate of 350 PCUs was eventually settled on along with the RFC being greater than 85%. This is referred to as option d).
- 5.8 350 PCUs per hour equates to almost 6 vehicle movements per minute, which could be considered conservative, but was chosen as spatial analysis of the results showed that it picked up the majority of junctions where council officers recognised that residents would point out that some degree of congestion already occurs.

Unit (PCU), to represent general traffic. Common vehicle types are assigned a conversion factor so that an equivalent PCU value can be generated from classified vehicle data collected. Nominally 1 PCU is 5.75m

6. Results of Do Minimum- 2020 and 2030

- 6.1 The National Planning Policy Framework places great importance on Local Plans being evidence based. Paragraph 162 states that Local Planning Authorities should assess the quality and capacity of infrastructure for transport and its ability to meet forecast demands.
- 6.2 For this reason the impact of potential new development across the plan period on the transport network has been assessed. This is calculated as the junctions in the model that experience the greatest levels of congestion as a result of development. The Plan’s mitigation strategy is based around accommodating the impact of new development.
- 6.3 The table below summarises this and shows how these have been calculated from the traffic model forecast scenarios:

Table 2: Summary of the Do Minimum Scenarios

Grouping	Explanation	Model
1	Junctions ranked in order of congestion based on option d) congestion indicator	Base Congested Situation (Forecast 1)
2	Junctions ranked in order of congestion after 5 years of development based on option d) congestion indicator	Forecast 2 (Do minimum 2020)
3	Junctions ranked in order of congestion after 15 years of development based on option d) congestion indicator	Forecast 4 (Do minimum 2030)

- 6.4 The top 30 for each group have been mapped and these are shown in Figure 1 and Figure 2 below:

Figure 1: Congested Junctions – Northern Kirklees

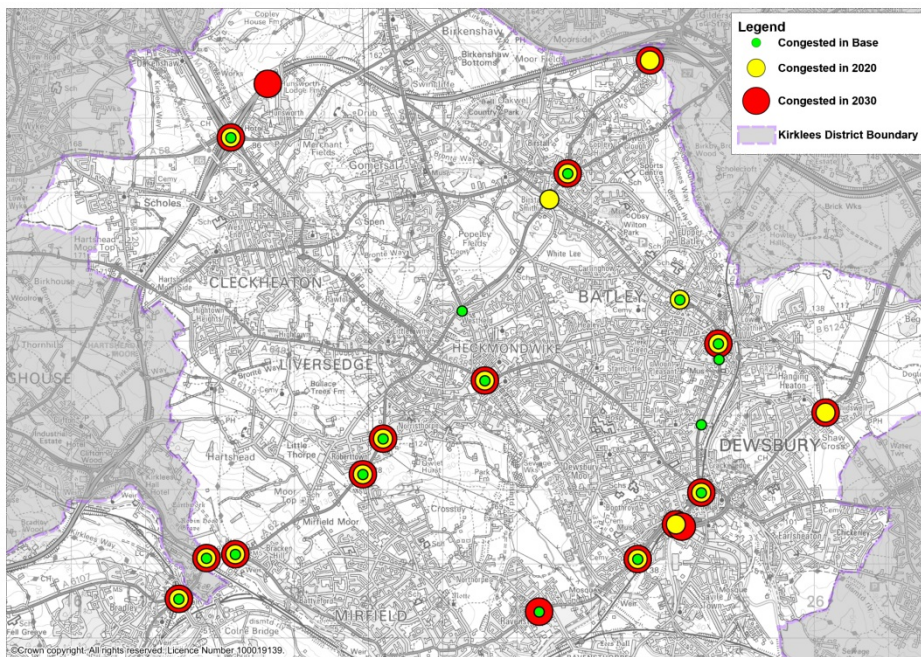
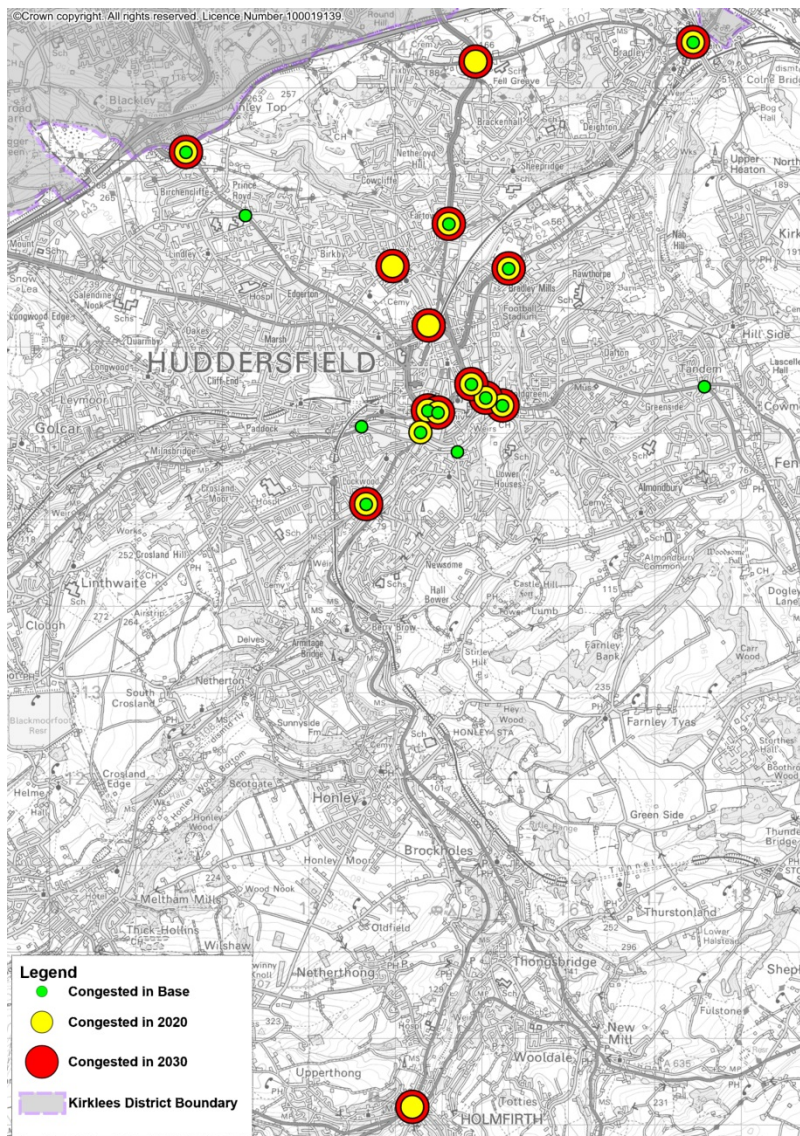


Figure 2: Congested Junctions - Southern Kirklees



- 6.5 Whilst the choice of dealing with 30 is an arbitrary decision, it is reasonable to consider these as a priority and that a realistic mitigation strategy can be developed as a result.
- 6.6 Full lists of all the junctions ranked in the 3 do-minimum scenarios can be found in Appendix D. Care should be taken when interpreting these rankings. The total delay figure (in hours) in the final column in the tables is a planning figure and has been calculated to assist the Planning Authority in understanding total delay over the full AM and PM hours for all vehicles using the whole junction in question and therefore where improvements are most needed from a strategic plan perspective. For example there are occasions where high ranking junctions (in any forecast scenario) show low delays per vehicle, but because they are being used by large numbers of vehicles, the total delay is extremely high.
- 6.7 Impacts on individual drivers, i.e. Individual vehicle delays are to be found in the column adjacent and give a better feel for average delay incurred.

7. Do Something Position

- 7.1 To arrive at a do something position (i.e. an understanding of what the transport mitigation strategy should look like), a spatial analysis of the results of the three do-minimum scenarios was undertaken. This analysis of the top 30 junctions in the 3 do minimum scenarios shows that they fall into 9 broad areas or corridors and a mitigation strategy has been designed to reflect these impacts. The references reflect the schemes as they have been identified in the draft Kirklees Local Plan-Allocations and Designations Document and the Kirklees Infrastructure Delivery Plan. Appendix E shows the mitigation strategy and its broad congruence with the congested junctions.
- 7.2 The following table provides detail on the mitigation strategy and shows how, through identified programmes and funding sources, Kirklees intends to address these highway issues.
- 7.3 All the locations flagged through the modelling work as being congested or impacted by development traffic in future years have been identified through a strategic forecasting process and they should be read as what might happen given a number of assumptions, not what will happen. Therefore the Authority will continue to work to refine both the forecasts and the mitigation strategy between now and submission of the plan to the Secretary of State in late 2016.

Table 3: Congestion Locations and Programme Opportunities

Corridor /Area	Location	Programme and funding Opportunity ³
TS 1	A62 Leeds Road /Bradley Mills Road	West Yorkshire Transport Fund Projects: <ul style="list-style-type: none"> • A62/A644 Cooper Bridge Junction • A62 and A644 corridors including work around South Dewsbury and Ravensthorpe. Leeds Road Cycle Super Highway
	A62/A6107 (Bradley Road)	
	A62/A644 (Cooper Bridge)	
	A62/A644 (Three Nuns)	
	A62/Sunny Bank Road	
	A62/Norristhorpe Lane	
	A638/High Street/B6117 Market Street	
	A62/A652 (Six Lane Ends)	
	A62/A652 (Birstall Smithies)	
	A62/A643 (Coach and Six)	

Cont.

³ All WY+TF project information can be found at <http://www.westyorks-ca.gov.uk/wytf/> and <https://democracy.kirklees.gov.uk/Data/Cabinet/201304251600/Agenda/CABINET25041348113D.pdf>

Corridor /Area	Location	Programme and funding Opportunity
TS 2	<p>A641 Bradford Road/ A6107 Bradley Road</p> <p>Full diamond junction at the overbridge of the A641 (Bradford Road) and the M62</p> <p>A641 Bradford Road/ Spaines Road (Fartown Bar)</p> <p>A62 Castlegate/ St Johns Road/ A641 Bradford Road</p>	<p>West Yorkshire Transport Fund Project :</p> <ul style="list-style-type: none"> • M62 Junction 24a scheme including works to the A641 Bradford Road
TS 3	<p>A62/B6432 (Longroyd Bridge)</p> <p>A616/B6108 (Lockwood Bar)</p> <p>A62/B6432 (Folly Hall)</p> <p>Newsome Road/Kings Mill Lane</p> <p>A62 Queensgate / A616 Chapel Hill / A62 Manchester Road</p> <p>A62 Queensgate/Alfred Street</p> <p>A62/A629 (Shorehead)</p> <p>A629/B6432 St Andrews Road</p> <p>A629/Somerset Road</p> <p>A629/A642 (Waterloo)</p> <p>A635/A6024 (Holmfirth)</p>	<p>Lockwood Bar and Chapel Hill- Part funded Through the West Yorkshire Transport Fund (Highways Efficiency and Bus Priority Programme)</p> <p>Intention to expand this programme to cover the remaining two junctions.</p>
TS 4	<p>A629/HalifaxRoad/BlackerRoad (to reduce congestion at Blacker Road/St .John's Road due to rerouting to avoid the A629)</p> <p>A629/ East Street (Cavalry Arms)</p> <p>Ainley Top</p>	<p>West Yorkshire Transport Fund:</p> <ul style="list-style-type: none"> • A629 Corridor

Cont.

Corridor /Area	Location	Programme and funding Opportunity
TS 5	<p>A644/Huddersfield Road/Calder Road/North Road (Ravensthorpe Gyratory)</p> <p>A644 Huddersfield Road/B6117 Thornhill Road</p> <p>A644 Webster Hill / A638 Dewsbury Ring Road</p> <p>A638 Dewsbury Ring Road/A638 Halifax Road</p> <p>A638/Mill Street West</p> <p>A652 Bradford Road/Town Street</p> <p>A652/B6123 (Rouse Mill Lane)</p> <p>A652/B6124 (Soothill Lane)</p> <p>A652/B6128 (Stocks Lane)</p> <p>A653 Leeds Road – B6128 Challenge Way</p>	<p>West Yorkshire Transport Fund Project:</p> <ul style="list-style-type: none"> • A653 Dewsbury to Leeds Corridor
TS8	<p>This scheme tackles congestion hot spots across West Yorkshire with improvements to traffic control; systems and integration of traffic management and traffic signal control centres.</p>	<p>No funding opportunity identified to date , although partial funding will be sought from the WY+TF Highway Network Efficiency Programme (HNEP)</p>
TS9	<p>Highway Efficiency and Bus Priority Programme including:</p> <p>A62- Huddersfield to Leeds (not including A62/A6107 Bradley Junction, the A62/A644 Cooper Bridge and Three Nuns junctions as these are in a separate scheme)</p> <p>Huddersfield Southern Gateways including key junctions identified through the transport modelling on the A616 and A62 and in Holmfirth town centre</p> <p>A629- Broad Lane to Waterloo</p>	<p>West Yorkshire Transport Fund Project:</p> <ul style="list-style-type: none"> • Highway Efficiency and Bus Priority Programme HEBP
TS10	<p>A programme of core cycling and walking schemes in around Kirklees</p>	<p>No funding opportunity identified to date, but linkages to TS1 will be made and complimentary schemes developed.</p>
TS11	<p>M62/M606/A58/A638 (Chain Bar)</p> <p>M62 Junctions 20-25 Smart Motorway</p> <p>M62 Junction 24 (Northern dumb- bell and link to Ainley Top)</p>	<p>Highways England Roads Investment Strategy (See section 4.3.1 above)</p>

	M62 Junction 27 (Southern dumb-bell)	
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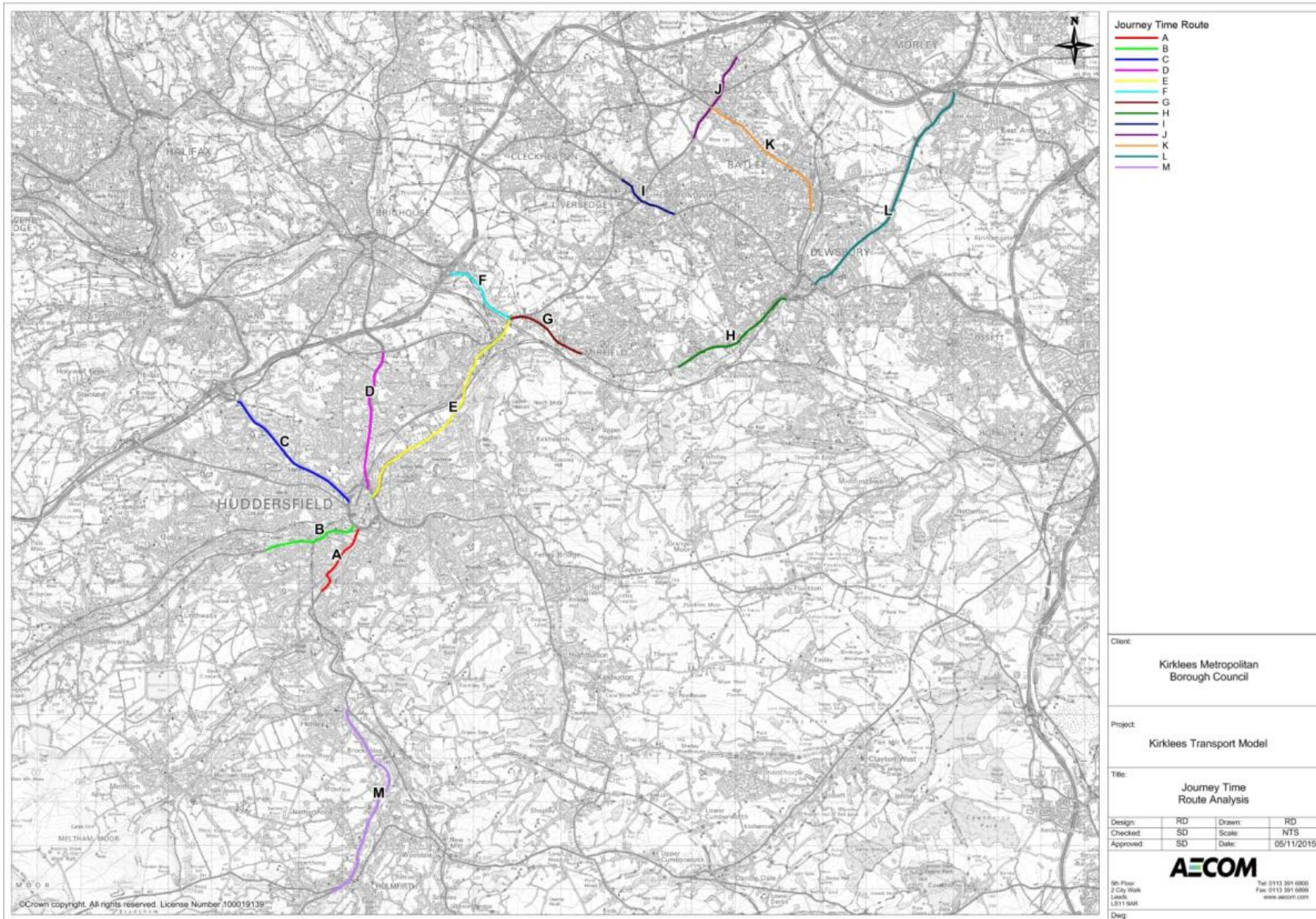
8. Impact of Mitigation

- 8.1 To understand the impact of the mitigation strategy a number of key transport corridors have been chosen, broadly congruent with the forecast existing and potential areas of congestion identified in forecasts 1, 2 and 4 in table 1 above.
- 8.2 The key transport corridors and extents are shown in figure 3 below.
- 8.3 The transport models have been run to include the known mitigation schemes set out in Table 1 above (Forecasts 3 and 5). The impact of these schemes in terms of journey time along the congested corridors is set out in Table 4 below.
- 8.4 This shows that there is an improvement in the average speed along the congested corridor as a result of implementing the schemes in the existing programmes.

Table 4: Change in Journey Time as a result of Implementing Schemes in Existing Programmes

Congestion/ Mitigation Area	Route Key (Map)	Route	BASE AM	DM 2020 AM	DM 2030 AM	DS 2020 AM	DS 2030 AM
			Time (min:sec)	Time (min:sec)	Time (min:sec)	Time (min:sec)	Time (min:sec)
TS1	E	A62 Hudds RR - Cooper Bridge	15:20	17:10	18:10	17:10	13:30
TS1	F	A644 M62 J25 - Cooper Bridge	06:00	08:50	11:30	08:50	02:00
TS1	G	A644 Stocks Bank Rd - Cooper Bridge	09:00	12:10	14:00	12:10	03:30
TS2	D	A641/A6107 Roundabout - Hudds RR	06:20	06:30	06:10	06:30	10:00
TS3	A	A616 Taylor Hill - Chapel Hill	05:50	07:00	07:50	06:50	07:00
TS4	C	A629 Hudds RR - Ainley Top	10:10	12:30	13:50	11:10	12:00
TS5	H	A644 Low Mill Ln - Webster Hill	08:30	10:10	10:40	10:00	09:20
TS5	L	A653 Dewsbury - M62 J28	10:20	10:50	13:10	10:50	11:40
TS6/TS8	J	A62 White Lee Road - Dark Lane	05:10	05:40	06:00	05:40	06:40
TS6/TS8	K	A652 Alexandra Rd – Birstall Smithies	07:30	08:00	09:10	07:30	08:40
TS7	I	A638 Knowler Hill – Station Ln	07:50	11:10	11:30	11:10	11:10
TS9	M	A6024 Modd Lane – A6024 Eastgate	09:20	11:30	12:00	10:30	10:20

Figure 3: Journey Time Routes

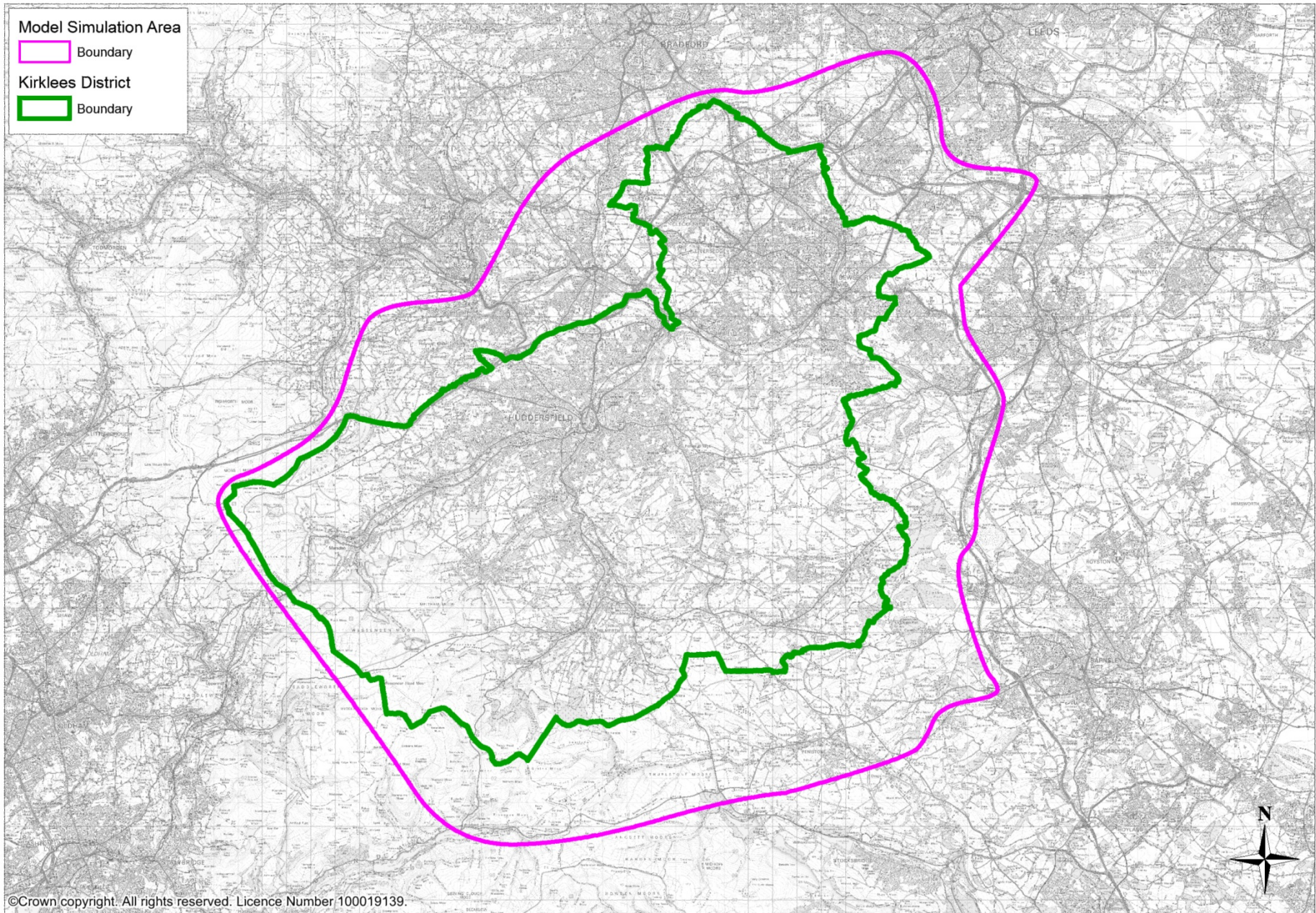


9. Concluding Remarks

- 9.1 The results of the journey speed analyses show that do something (i.e. with all the development and the proposed transport schemes in place) forecast year results have generally improved or remained fairly constant when compared to the do minimum results. This evidence backs up the conclusion that at a district-wide level the proposed transport mitigation strategy can accommodate the development proposed in the Kirklees Local Plan period 2016-2031.
- 9.2 The model is a strategic representation of a large proportion of the Kirklees transport network and care must be taken when interpreting the results at the relatively spatially coarse short corridor level. Nonetheless the results at a corridor level do give an indication of where further investigation and analysis must be carried out to understand the impact of the proposed land uses allocations and the subsequent impact of the mitigation proposed
- 9.3 Throughout the more detailed analysis and investigation of the traffic model the Local Authority will ensure that appropriate mitigation is developed.

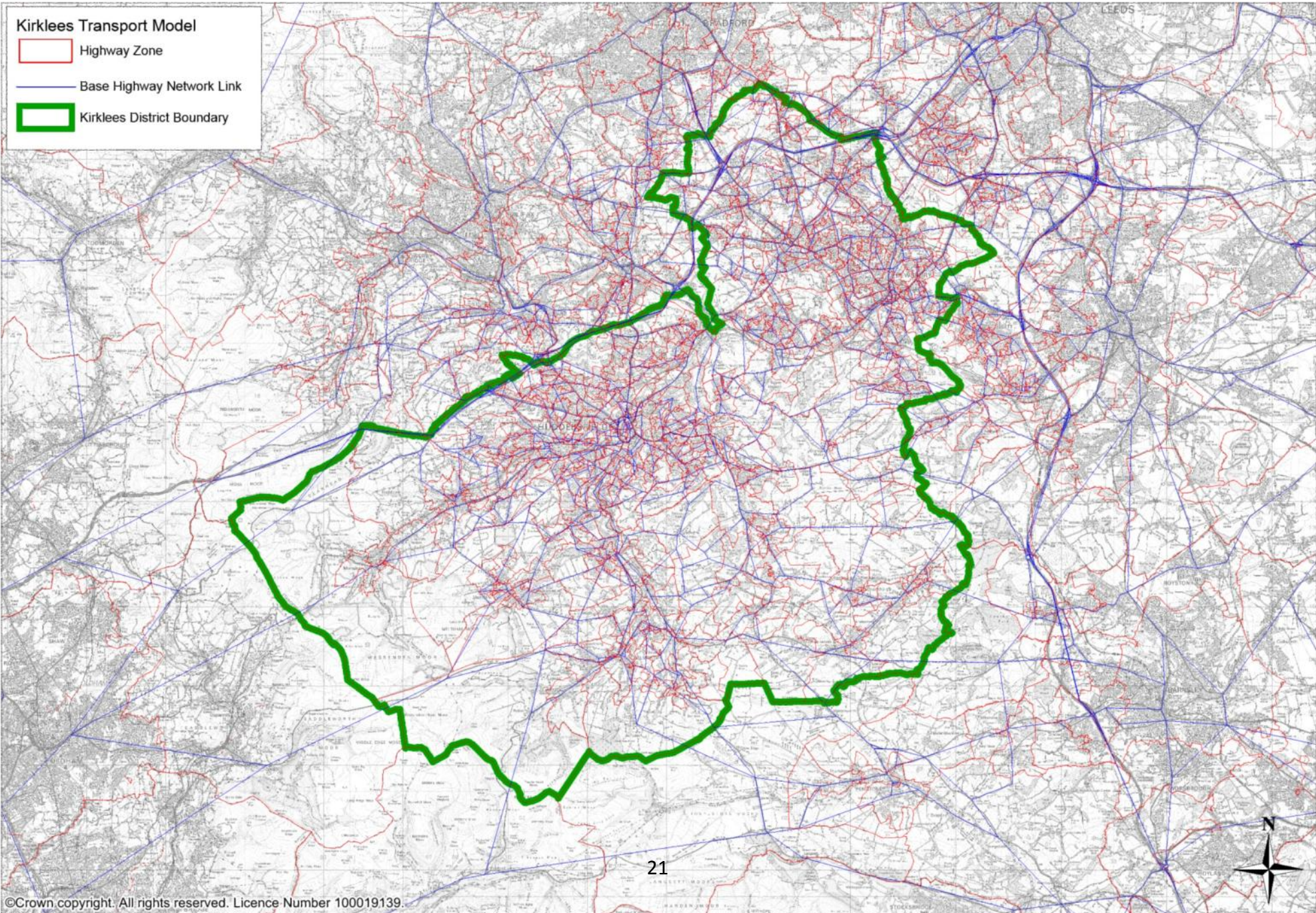
Appendix A

Model Area Coverage



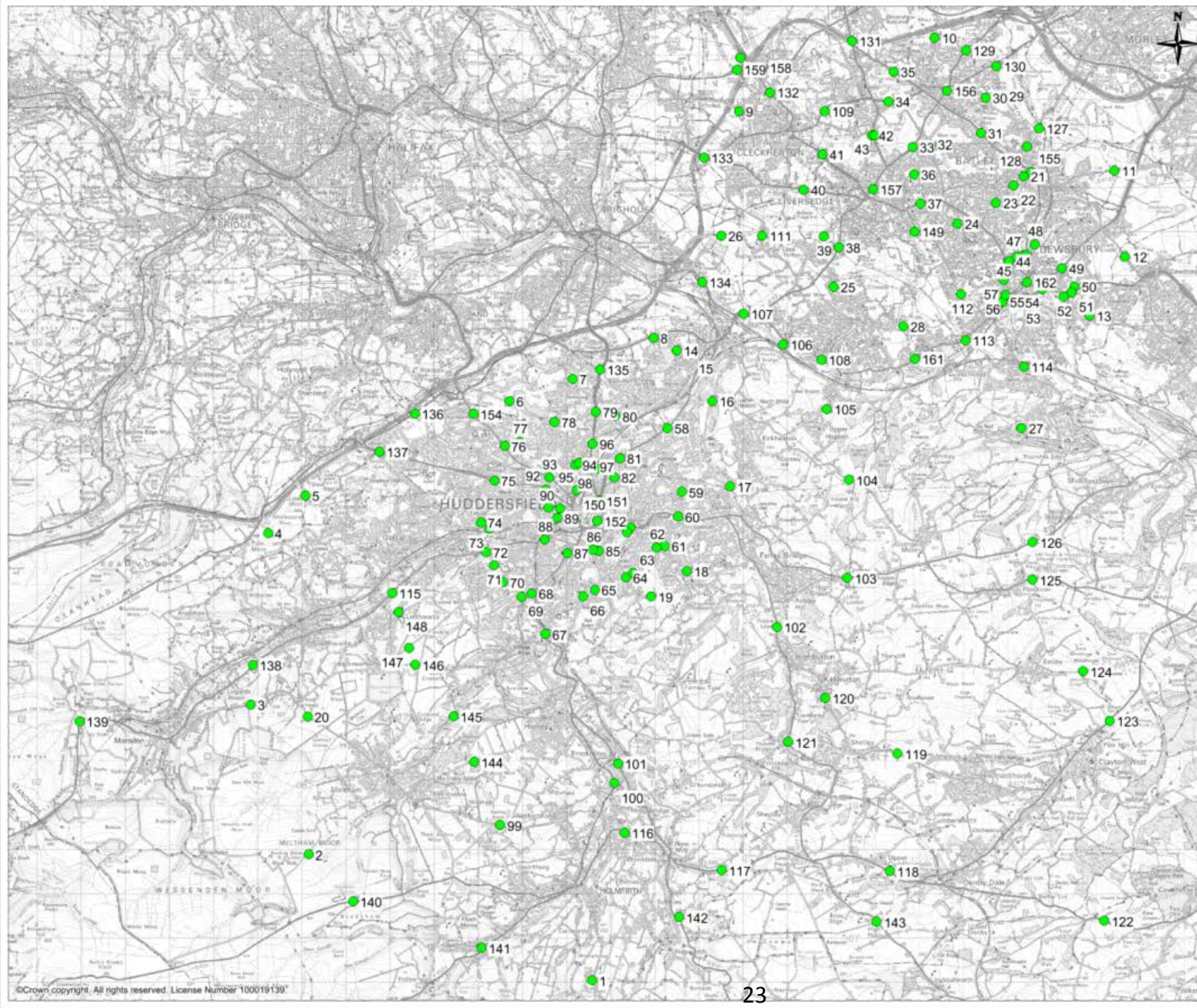
Appendix B

Zone and Network Plan



Appendix C

Location of Traffic Counts



Key
 Proposed ATC and MCC Location



Project:
 Kirklees Transport Model

Title:
 Proposed ATC and MCC Locations

Design:	RD	Drawn:	RD
Checked:	JP	Scale:	NTS
Approved:	SD	Date:	03/03/2015

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#	ATC/MCC Location
1	B6106 Dunford Road - between Longley Edge Lane and Longley Edge Road
2	Wessenden Head Road - between Pennine Way and Leygards Lane
3	B6107 Chain Road - between Lingards Road and B6107 Meltham Road
4	Quebec Road - between A640 New Hey Road and Rochdale Road
5	Round Ings Road - between A640 New Hey Road and Hall Lane
6	Grimescar Road - between Burn Road and Halifax Old Road
7	Lightridge Road - between Broomfield Road and The Fairway
8	A6107 Bradley Road - between Redwood Drive and Lamb Cote Road
9	B6120 Turnsteads Avenue - between Whitechapel Rd and Turnsteads Crescent
10	B6125 Field Head Lane - between Owler Lane and Fieldhead Crescent
11	B6124 Soothill Lane - between Manor Farm Drive and A653 Leeds Road
12	B6128 Owl Lane - between Windsor Road and Pickering Lane
13	Ossett Lane - between Town Street and Jilling Ing Park
14	Alandale Road - between Gisbourne Road and Staynton Crescent
15	Keldregate - between Brooklands and Copthorne Gardens
16	Dalton Bank Road - between B6118 Colne Bridge Road and Jagger Lane
17	School Lane - between Crossley Lane and Newland Road
18	Northgate - between Southfield Road and Thorpe Lane
19	Kaye Lane - between Longley Lane and Wheatroyd Lane
20	B6107 Slaithwaite Road - between B6109 Varley Road and Deer Hill End Road
21	Commercial Street - between Market Place and Wards Hill
22	Wellington Street - between East Street and Cambridge Street
23	Dark Lane - between Woodsome Estate and Manor Way
24	Dewsbury Gate Road - between Occupation Lane and Moor End Lane
25	Sunny Bank Road - between Sunny Bank Drive and Crossley Lane
26	Blake Law Lane - between M62 and Church Lane/ Hartshead Lane
27	Edge Top Road - between Overthorpe Avenue and Cross Avenue
28	Shillbank Lane - between Eastfield Road and North Road
29	Upper Batley Low Lane - between Brow Wood Road and Upper Batley Lane
30	Upper Batley Lane - between Woodlands Road and Wind mill Lane
31	A652 Bradford Road - between Anne Street and Denham Street
32	B6122 White Lee Road - between Carlinghow Lane and Rinding Street
33	A62 Leeds Road - between Stubley Farm Road and B6122 Muffit Lane
34	A643 Church Lane - between Craven Drive and B6122 Muffit Lane
35	A652 Dewsbury Road - between Nutter Lane and Mock Ings Avenue
36	Dale Lane - between Lincoln Avenue and Brighton Street
37	A638 High Street - between North Street and Cawley Lane
38	A62 Huddersfield Road - between Balmfield Crescent and Norristhorpe Lane
39	Robertown Lane - between Child Lane and Richmond Park Avenue
40	A649 Halifax Road - between Springfield Lane and Primrose Lane
41	A638 Bradford Road - between Rawfolds Way and Primrose Lane
42	Quarry Road - between Lower Lane and California Lane
43	A651 Oxford Road - between Lower Lane and California Lane

#	ATC/MCC Location
44	A638 Halifax Road - between Stonefield Street and Northfield Road
45	Pyrah Street - between Carlton Road and Hartley Street
46	Meadow Lane - between Carlton Road and Hartley Street
47	A652 Bradford Road - between Mill Road and Carlton Road
48	Crackenedge Lane - between Caulms Wood Road and Peter Hill
49	A653 Leeds Road - between Sugar Lane and Bywell Road
50	Old Bank Road - between Sugar Lane and York Road
51	A638 Wakefield Road - between High Road and Cross Park Street
52	High Road - between A638 Wakefield Road and Middle Road
53	B6409 Savile Road - between Link Road and Mill Street
54	Mill Street W - between A644 Webster Hill and Cannon Way
55	A644 Webster Hill - between Cemetery Road and Pinfold Hill
56	High Street - between Middle Road and Boothroyd Lane
57	Moorlands Road - between Moorlands Avenue and Boothroyd Lane
58	A62 Leeds Road - between Old Fieldhouse Lane and Syngenta access
59	Long Lane - between Ridgeway and Tolson Crescent
60	A629 Wakefield Road - between Mayfield Avenue and Ravensknowle Road
61	Almondbury Bank - between Forest Road and Bank End Lane
62	Somerset Road - between Longley Road and Foxglove Road
63	Hall Cross Road - between Hall Cross Grove and Lowerhouses Lane
64	Wood Lane - between Ashenhurst Avenue and Lowerhouse Lane
65	Newsome Road - between Hart Street and Dawson Road
66	Church Lane - between Towngate and Newsome Road
67	A616 Woodhead Road - south of Taylor Hill Road
68	B6108 Meltham Road - south of Hanson Lane
69	Beaumont Park Road - between Dryclough Road and Moor End Road
70	Walpole Road - between Dryclough Road and Gilbert Grove
71	Blackmoorfoot Road - between Gramfield Road and Frederick Street
72	A62 Manchester Road - between Factory Lane and Park Road W
73	Lower Gate - between Cross Firs Street and Clough Lane
74	Quarmby Road - between Longwood Road and Douglas Avenue
75	A640 New Hey Road - between Reinwood Road and Wellfield Road
76	A629 Halifax Road - between Daisy Lea Lane and Talbot Avenue
77	Birkby Road - between Stanwell Avenue and Bryan Road
78	Halifax Old Road - between S Cross Road and Grimscar Avenue
79	A641 Bradford Road - between Dewhurst Road and Fartown Green Road
80	Woodhouse Hill - between Central Avenue and Dewhurst Road
81	A62 Leeds Road - between Thistle Street and Grove Road
82	B6432 St. Andrew's Road - between Thistle Street and Gasworks Street
83	A629 Wakefield Road - between Silver Street and Smithy Lane
84	Somerset Road - between Maple Street and Dog Kennel Bank
85	Newsome Road - between King's Mill Lane and Elm Street
86	Damside Road - between Queens Mill Road and King's Bridge Road

#	ATC/MCC Location
87	A616 Chapel Hill - between Caine Road and St. Thomas' Road
88	A62 Manchester Road - between Longroyd Lane and Outcote Bank
89	Springwood Avenue - between Oastler Avenue and Park Avenue
90	Greenhead Road - between Park Grove and Park Avenue
91	Park Drive S - between Gledholt Road and Park Avenue
92	A640 Trinity Street - between Park Drive and Fitzwilliam Street
93	A629 New N Road - between Mountjoy Road and Vernon Avenue
94	St. John's Road - between St John's Crescent and Beck Road
95	Beck Road - between St. Johns Road and Willow Lane
96	A641 Bradford Road - south of Willow Lane E
97	Alder Street - between Hillhouse Lane and Hebble Street
98	Great Northern Street - between Hillhouse Lane and Lower Viaduct Street
99	B6107 Wilshaw Road - between Bradshaw Road and Knoll Lane
100	A6024 Woodhead Road - between Hagg Wood Road and Calf Hill Road
101	A616 New Mill Road - between Brockholes Lane and Island Drive
102	A629 Penistone Road - Woodsome Road and Far Dene
103	A642 Wakefield Road - Pinfold Lane and Paul Lane
104	B6118 Liley Lane - between Tanhouse Lane and Healey Green Lane
105	Hopton Lane - between Hopton Hall Lane and Waste Lane
106	Wood Lane - between A444 Huddersfield Road and Helm Lane
107	A644 Leeds Road - between Cooper Bridge Road and A62 Leeds Road
108	A644 Huddersfield Road - between Stocks Bank Road and Doctor Lane
109	A643 Spen Lane - between Fusden Lane and Gomersal Lane
111	B6119 Peep Green Road -between Windy Bank Lane and School Lane
112	B6117 Heckmondwike Road - between Staincliffe Road and Beckett Lane
113	A644 Huddersfield Road - between Park Road and Railway Street
114	B6117 Slaithwaite Road - between Brewery Lane and Churchbank Way
115	A62 Manchester Road - between Church Avenue and Hoyle Ing
116	A635 New Mill Road - between Heys Road and Springwood Road
117	A635 Penistone Road - between Hollins House Lane and Horn Lane
118	A635 Barnsley Road - between Cumberworth Lane and A636 Wakefield Road
119	B6116 Huddersfield Road - between Bark House Lane and Shelley Woodhouse
120	B6116 Huddersfield Road - between Lane Head Lane and Queens Way S
121	A629 Penistone Road - between Thunder Bridge Lane and Dam Hill
122	A635 Lane Head Road - between Coach Gate Lane and North Lane
123	A636 Wakefield Road - between Kiln Lane and Litherop Lane
124	Ash Lane - between Hag Hill Lane and A636
125	A637 Barnsley Road - between Pinfold Lane and Hardcastle Lane
126	A642 Wakefield Road - between Grange Lane and Nat Coal Mining Museum
129	A62 Gelderd Road - between Oakwell Way and Dark Lane
130	A643 Leeds Road - between Nab Lane and Windsor Road
131	A651 Bradford Road - between Manor Park Gardens and A652 Dewsbury Road
132	A638 Bradford Road - between Exchange Street and B6121 Hunsworth Lane
133	A649 Halifax Road - between Moorside and M62 bridge

#	ATC/MCC Location
134	A644 Wakefield Road - between Premier Inn access road and M62
135	A641 Bradford Road - between Hazel Grove and Woodside Lane
136	A643 Lindley Moor Road - between Crosland Road and Haigh House Hill
137	A640 New Hay Road - between Moorlands Road and Oxleys Square
138	A62 Manchester Road - between West Slaithwaite Road and Yew Tree Lane
140	A635 Greenfield Road - between Wessenden Head Road and Harden Moss Road
141	A6024 Woodhead Road - between Digley Road and Bank Lane
142	A616 Sheffield Road - between Bank Street and East Street
143	A629 Penistone Road - between Mill Bank and Quaker Bottom
127	B6123 Timothy Lane - between Batley Field Hill and Howley Mill Lane
128	B6123 Batley Field Hill - between Willow Court and York Road
139	A62 Manchester Road - between Hey Green and Mount Road
144	Knowle Lane - between Wood Nook Lane and Acre Lane
145	B6108 Huddersfield Road - between Crosland Factory Lane and Bent Ley Road
146	Black Lane - between Arboray Lane and Reservoir Side Road
147	Blackmoorfoot Road - between Nopper Road and Heath Road
148	Cowlersley Lane - between Church Lane and Tommy Lane
149	B6117 Walkley Lane - between Walkley Avenue and Artillery Street
150	Castlegate A62 - between A629 clockwise on-slip and St Johns Rd anti-clockwise on-slip
151	A62 Southgate – south of St Peter’s Street
152	A62 Queensgate – between Queen St and Zetland St
153	A62 Castlegate - south of Market St/Merton St
154	A629 Halifax Rd – between Birchington Ave and Rock Rd
155	A652 Bradford Rd – between Park Rd and Bridge St
156	A62 Huddersfield Rd – between A643 Leeds Rd and Brookroyd Rd
157	A62 Leeds Rd – between A638 and Thornleigh Dr
158	A58 between Chain Bar roundabout and Centurion Way
159	A58 – west of Chain Bar roundabout
160	Bradford Road – north-west of Chain Bar roundabout
161	A644 Huddersfield Road – between Fir Parade and Armitage Street
162	A638 Dewsbury Ring Road – between Bond St and Croft St
163	A638 Rishworth Road – between Wakefield Rd and Railway St

Appendix D

Base and Do Minimum Scenarios

Junction Ranking

Base Scenario- Junction ranking

TS Scheme	No.	Junction	BASE Delay/veh (secs)	BASE Flow	BASE DELAY (Hrs)
There are no TS scheme associated with this ranking because if the junction is already congested then that is not attributable to the cumulative effect of the local plan designations	1	M62 J26 - M606 Chain Bar	17	67962	329.74
	2	Ainley Top	27	26014	197.35
	3	Cooper Bridge	48	7845	105.18
	4	A62 Leeds Road - A644 Huddersfield Road Three Nuns signals	173	1929	92.50
	5	A62 Leeds Road - A6107 Bradley Road signals	65	3177	56.96
	6	A638 High Street - B6117 Market Street signals	100	2035	56.38
	7	A641 Bradford Road - Spaines Road signals	60	2820	46.81
	8	A62 Queensgate - A616 Chapel Hill - A62 Manchester Road signals	56	2856	44.71
	9	A62 Shorehead Roundabout	22	6862	42.19
	10	A644 Huddersfield Road - Thornhill Road signals	52	2768	39.96
	11	A616 Lockwood Road - B6108 Meltham Road signals	57	2490	39.64
	12	A638 Dewsbury Ring Road - A638 Halifax Road signals	59	2344	38.32
	13	A62 Castlegate - St Johns Road - A641 Bradford Road signals	48	2468	33.22
	14	A644 Webster Hill - A638 Dewsbury Ring Road signals	41	2516	28.49
	15	A641 Bradford Road - Willow Lane East signals	40	2586	28.41
	16	A652 Bradford Road - A62 Huddersfield Road Birstall Smithies signals	53	1918	28.35
	17	A653 Leeds Road - B6128 Challenge Way signals	59	1628	26.83
	18	A616 Chapel Hill - B6432 Colne Road signals	41	2283	26.04
	19	A629 Wakefield Road - B6432 St Andrew's Road signals	25	3669	25.81
	20	A629 Wakefield Road - Somerset Road signals	28	3263	25.26
	21	A642 Wakefield Road - Waterloo Road signals	21	4304	25.13
	22	A62 Manchester Road - Morley Lane - Cowlersley Lane signals	77	1175	25.01
	23	A643 Leeds Road - A62 Gelderd Road - A62 Huddersfield Road signals	41	2061	23.24
	24	A62 Leeds Road - Sunny Bank Road signals	58	1422	23.05
	25	A62 Leeds Road - Thistle Street signals	43	1891	22.82
	26	A62 Huddersfield Road - Norristhorpe Lane signals	46	1779	22.77
	27	A652 Bradford Road - B6128 Rouse Mill Lane signals	51	1575	22.13
	28	Wheathouse Rd - Blacker Rd signals	50	1558	21.43
	29	Ravensthorpe Gyratory	11	6747	21.14
	30	A629 Halifax Road - Birkby Road signals	50	1532	21.07
	31	A62 Leeds Road - A651 Gomersal Road Six Lanes End signals	40	1871	21.01
	32	A652 Bradford Road - Town Street signals	45	1597	20.06
	33	A638 Dewsbury Ring Road - A638 Wakefield Road signals	24	2958	19.82

TS Scheme	No.	Junction	BASE Delay/veh (secs)	BASE Flow	BASE DELAY (Hrs)
	34	A62 Leeds Road - Bradley Mills Road signals	37	1923	19.77
	35	A652 Bradford Road - B6123 Stocks Lane signals	31	2267	19.61
	36	A62 Castlegate - A640 Trinity Street signals	31	2209	19.28
	37	A638 Dewsbury Ring Road - A653 Leeds Road signals	32	2149	19.12
	38	A652 Bradford Road - B6128 Station Road signals	28	2415	18.64
	39	A62 Southgate - A641 Northgate signals	36	1888	18.62
	40	A62 Leeds Road - Stocks Bank Road signals	47	1410	18.51
	41	A62 Manchester Road - Longroyd Lane signals	58	1153	18.48
	42	Dewsbury Ring Road - southern (DS)	10	6086	17.74
	43	A651 Oxford Road - A643 Spen Lane signals	38	1642	17.44
	44	A6024 Huddersfield Road - A635 Victoria Street signals	76	829	17.42
	45	A638 Aldams Road - B6409 Wilton Street signals	47	1327	17.34
	46	A616 Folly Hall - B6432 Saint Thomas Road signals	27	2246	16.96
	47	A638 Webster Hill - Mill Street West signals	29	2099	16.66
	48	A6107 Bradley Road - A641 Bradford Road roundabout	23	2587	16.46
	49	A62 Leeds Road end of bus lane pedestrian crossing	50	1126	15.60
	50	A62 Southgate - A62 Leeds Road signals	34	1644	15.47

DM 2020 Scenario Junction Ranking.

TS Scheme	Base Rank	New Rank	Junction	DM 2020 Delay/veh (secs)	DM 2020 Flow	DM 2020 DELAY (Hrs)
TS11	1	1	M62 J26 - M606 Chain Bar	22	80914	491.13
TS4/11	2	2	Ainley Top	49	27588	375.44
TS1	3	3	Cooper Bridge	94	7975	208.63
TS1	4	4	A62 Leeds Road - A644 Huddersfield Road Three Nuns signals	268	2119	157.74
TS1	5	5	A62 Leeds Road - A6107 Bradley Road signals	135	3457	130.03
TS3	9	6	A62 Shorehead Roundabout	45	7803	97.66
TS3	8	7	A62 Queensgate - A616 Chapel Hill - A62 Manchester Road signals	99	3409	93.37
TS1	34	8	A62 Leeds Road - Bradley Mills Road signals	134	2444	91.16
TS1	6	9	A638 High Street - B6117 Market Street signals	140	2089	81.42
TS2	7	10	A641 Bradford Road - Spaines Road signals	89	3182	78.80
TS3	11	11	A616 Lockwood Road - B6108 Meltham Road signals	98	2772	75.77
TS1	24	12	A62 Leeds Road - Sunny Bank Road signals	142	1839	72.80
TS2	13	13	A62 Castlegate - St Johns Road - A641 Bradford Road signals	85	2993	70.50
TS3	19	14	A629 Wakefield Road - B6432 St Andrew's Road signals	58	4218	68.30
TS5	10	15	A644 Huddersfield Road - Thornhill Road signals	75	3070	63.83
TS5	53	16	B6409 Savile Road - Mill Street West signals	95	2385	62.64
TS11	177	17	M62 EB east of Chain Bar	31	7105	61.62
TS2	48	18	A6107 Bradley Road - A641 Bradford Road roundabout	72	2904	58.40
TS4	28	19	Wheathouse Rd - Blacker Rd signals	112	1778	55.53
TS5	12	20	A638 Dewsbury Ring Road - A638 Halifax Road signals	69	2892	55.44
TS1	55	21	A62 Huddersfield Road - A649 Halifax Road signals	106	1826	53.87
TS3	18	22	A616 Chapel Hill - B6432 Colne Road signals	71	2584	50.86
TS5	14	23	A644 Webster Hill - A638 Dewsbury Ring Road signals	62	2878	49.57
TS4	30	24	A629 Halifax Road - Birkby Road signals	96	1769	47.36
TS1	23	25	A643 Leeds Road - A62 Gelderd Road - A62 Huddersfield Road signals	65	2596	46.98
TS2	15	26	A641 Bradford Road - Willow Lane East signals	55	2997	45.81
TS1	16	27	A652 Bradford Road - A62 Huddersfield Road Birstall Smithies signals	70	2346	45.49
TS3	44	28	A6024 Huddersfield Road - A635 Victoria Street signals	135	1206	45.23
TS5	17	29	A653 Leeds Road - B6128 Challenge Way signals	74	2207	45.13
TS5	38	30	A652 Bradford Road - B6128 Station Road signals	52	2960	43.05
TS5	35	31	A652 Bradford Road - B6123 Stocks Lane signals	54	2843	42.60
TS1	40	32	A62 Leeds Road - Stocks Bank Road signals	101	1512	42.50
TS1	25	33	A62 Leeds Road - Thistle Street signals	67	2283	42.40
TS3	21	34	A642 Wakefield Road - Waterloo Road signals	27	5445	41.24
	22	35	A62 Manchester Road - Morley Lane - Cowlersley Lane signals	107	1265	37.48
TS3	41	36	A62 Manchester Road - Longroyd Lane signals	88	1521	37.32
TS5	45	37	A638 Aldams Road - B6409 Wilton Street signals	86	1539	36.59
TS5	37	38	A638 Dewsbury Ring Road - A653 Leeds Road signals	47	2751	36.26
TS5	66	39	A638 Market St - Northgate signals	76	1703	36.14

TS Scheme	Base Rank	New Rank	Junction	DM 2020 Delay/veh (secs)	DM 2020 Flow	DM 2020 DELAY (Hrs)
TS5	29	40	Ravensthorpe Gyratory	16	7971	36.07
TS5	27	41	A652 Bradford Road - B6128 Rouse Mill Lane signals	66	1884	34.46
TS5	33	42	A638 Dewsbury Ring Road - A638 Wakefield Road signals	34	3614	34.10
TS1	31	43	A62 Leeds Road - A651 Gomersal Road Six Lanes End signals	56	2120	33.04
TS5	32	44	A652 Bradford Road - Town Street signals	62	1876	32.43
TS1	26	45	A62 Huddersfield Road - Norristhorpe Lane signals	57	2022	32.24
	54	46	B6117 Walkley Ln - Station Ln	47	2458	32.01
	57	47	A6024 Woodhead Road - Station Road signals	64	1763	31.55
TS3	20	48	A629 Wakefield Road - Somerset Road signals	28	3797	29.66
TS1	78	49	A62 Gelderd Road - Highwood Road	56	1861	29.07
	43	50	A651 Oxford Road - A643 Spen Lane signals	54	1925	28.93

DM 2030 Scenario Junction Ranking.

TS Scheme	Base Rank	New Rank	Junction	DM 2030 Delay/veh (secs)	DM 2030 Flow	DM 2030 DELAY (Hrs)
TS11	1	1	M62 J26 - M606 Chain Bar	28	87292	690.55
TS4/11	2	2	Ainley Top	62	27505	470.84
TS1	3	3	Cooper Bridge	118	7857	256.75
TS1	4	4	A62 Leeds Road - A644 Huddersfield Road Three Nuns signals	316	2406	211.21
TS1	5	5	A62 Leeds Road - A6107 Bradley Road signals	171	3441	163.16
TS1	24	6	A62 Leeds Road - Sunny Bank Road signals	253	1901	133.53
TS1	34	7	A62 Leeds Road - Bradley Mills Road signals	171	2625	124.41
TS3	9	8	A62 Shorehead Roundabout	52	8205	119.45
TS3	8	9	A62 Queensgate - A616 Chapel Hill - A62 Manchester Road signals	112	3547	110.43
TS2	7	10	A641 Bradford Road - Spaines Road signals	126	3124	109.01
TS11	177	11	M62 EB east of Chain Bar	50	7781	108.71
TS2	48	12	A6107 Bradley Road - A641 Bradford Road roundabout	127	3032	107.10
TS3	11	13	A616 Lockwood Road - B6108 Meltham Road signals	125	2850	98.95
TS3	19	14	A629 Wakefield Road - B6432 St Andrew's Road signals	78	4474	96.93
TS1	6	15	A638 High Street - B6117 Market Street signals	163	2036	92.31
TS5	17	16	A653 Leeds Road - B6128 Challenge Way signals	133	2477	91.26
TS2	13	17	A62 Castlegate - St Johns Road - A641 Bradford Road signals	103	3107	88.81
TS5	10	18	A644 Huddersfield Road - Thornhill Road signals	91	3123	78.73
TS1	40	19	A62 Leeds Road - Stocks Bank Road signals	185	1419	73.09
TS1	23	20	A643 Leeds Road - A62 Gelderd Road - A62 Huddersfield Road signals	94	2695	70.15
TS5	35	21	A652 Bradford Road - B6123 Stocks Lane signals	84	2965	69.20
TS4	28	22	Wheathouse Rd - Blacker Rd signals	130	1842	66.31
TS5	12	23	A638 Dewsbury Ring Road - A638 Halifax Road signals	73	3132	63.91
TS3	18	24	A616 Chapel Hill - B6432 Colne Road signals	86	2672	63.52
TS5	62	25	A638 Wakefield Road - Syke Lane signals	88	2504	61.22
TS5	14	26	A644 Webster Hill - A638 Dewsbury Ring Road signals	75	2908	60.65
TS3	44	27	A6024 Huddersfield Road - A635 Victoria Street signals	167	1280	59.48
TS5	38	28	A652 Bradford Road - B6128 Station Road signals	67	3106	57.51
TS1	16	29	A652 Bradford Road - A62 Huddersfield Road Birstall Smithies signals	81	2554	57.42
TS3	21	30	A642 Wakefield Road - Waterloo Road signals	30	6296	52.93
TS5	47	31	A638 Webster Hill - Mill Street West signals	73	2576	52.16
TS4	30	32	A629 Halifax Road - Birkby Road signals	96	1819	48.41
TS5	33	33	A638 Dewsbury Ring Road - A638 Wakefield Road signals	46	3759	47.83
TS5	32	34	A652 Bradford Road - Town Street signals	88	1929	47.23
	57	35	A6024 Woodhead Road - Station Road signals	90	1864	46.51
TS3	41	36	A62 Manchester Road - Longroyd Lane signals	105	1583	46.35
TS5	27	37	A652 Bradford Road - B6128 Rouse Mill Lane signals	84	1968	46.09
	22	38	A62 Manchester Road - Morley Lane - Cowlersley Lane signals	129	1281	45.90
TS5	66	39	A638 Market St - Northgate signals	90	1775	44.34
TS1	25	40	A62 Leeds Road - Thistle Street signals	67	2331	43.54
TS2	15	41	A641 Bradford Road - Willow Lane East signals	50	2953	41.24
TS5	37	42	A638 Dewsbury Ring Road - A653 Leeds Road signals	51	2890	41.14
TS5	29	43	Ravensthorpe Gyratory	18	8097	40.77
TS5	45	44	A638 Aldams Road - B6409 Wilton Street signals	85	1711	40.51
TS5	131	45	B6117 Slaithwaite Road - Headfield Road	64	2221	39.36
	125	46	Church St - Thornhill Rd	78	1803	39.23

TS Scheme	Base Rank	New Rank	Junction	DM 2030 Delay/veh (secs)	DM 2030 Flow	DM 2030 DELAY (Hrs)
TS3	71	47	A62 Queensgate - Alfred Street signals	70	1995	39.03
TS3	20	48	A629 Wakefield Road - Somerset Road signals	33	4054	36.73
TS1	26	49	A62 Huddersfield Road - Norristhorpe Lane signals	63	2062	35.92
	59	50	B6123 Batley Road - B6122 White Lee Road signals	108	1143	34.29

Appendix E

Do Something Scenario and Transport Mitigation Strategy

