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Northumberland

Strategic Road Network Infrastructure Study

February 2016

Northumberland – Strategic Road Network Infrastructure Study

Final Report

May 2016

Acronyms and Abbreviations

ANPR	Automatic Number Plate Recognition
AONB	Area of Outstanding Natural Beauty
DMRB	Design Manual for Roads and Bridges
IDP	Infrastructure Delivery Plan
MOVA	Microprocessor Optimised Vehicle Actuation
NCC	Northumberland County Council
the Plan	Northumberland Core Strategy Pre-submission draft, October 2015
SRN	Strategic Road Network
the Study	Northumberland Strategic Road Network Infrastructure Study
TEMPro	Trip End Model Presentation Program

Executive Summary

The key headline from this study is that Highways England **supports the Local Plan aspirations of Northumberland County Council** on the basis that the outcomes of this study, in the form of indicative supporting infrastructure measures at the strategic road network, are provided. This equates to the potential release of approximately **381 hectares of employment land** and **24,320 additional residential dwellings** in Northumberland over the period of the Local Plan.

The strategic road network in Northumberland and the adjacent wider Tyne and Wear region is currently affected by congestion in peak periods, which is often severe in places. Development, as envisaged in Northumberland's Local Plan, has the potential to increase demands on the strategic road network, exacerbating the congestion and reliability problems and ultimately negatively impacting on the economic development of the region.

Highways England is keen to ensure that the strategic road network serves its purpose in operating safely and efficiently such that it supports the economic growth aspirations of Northumberland, as identified in the Local Plan.

This strategic road network infrastructure study uses a mesoscopic simulation model to investigate these current and future issues. The location and cause of delays and congestion on the network have been identified, and indicative solutions (specific schemes to be identified through further Highways England study) have been tested to ascertain the extent to which they have the potential to improve the operation of the network with the Local Plan development aspirations in place.

Based on these assessments, it is suggested that the following indicative improvements at the strategic road network are required in the future as a result of additional development traffic:

- Moor Farm/Dudley Lane: a significant improvement including grade separation of the A19;
- Fisher Lane: significant remodelling of the existing roundabout junction, taking into consideration the aspiration for the A19 to become an Expressway; and
- A1: provision of a ghost island merge southbound at Seaton Burn. .

The delivery of three lanes on the A1 between North Brunton and Scotswood, which is planned to be delivered through the RIS process will need to be delivered prior to other schemes, and therefore this scheme is identified as a requirement associated with the Northumberland Plan.

This study has identified that these measures are needed by the 'End of Plan' (2031) and the specific timescales by which these measures are required to be delivered to support the incremental delivery of Local Plan development aspirations will be determined in due course in close liaison with Northumberland County Council.

Contents

1 Introduction

1.1 Introduction

1.1.1 The strategic road network (SRN) is the road network for which Highways England has responsibility. In Northumberland and the wider Tyne and Wear region, the SRN is affected by traffic congestion, particularly in peak periods, giving rise to identifiable network issues.

1.1.2 Development aspirations in Northumberland as presented in the Local Plan Core Strategy Pre-Submission Draft of October 2015 (the Plan), and indeed the wider Tyne and Wear region, will place additional demands on the SRN and this will likely exacerbate the existing problems. Highways England considers that it is critical to ensure that the implications of developments on infrastructure, and in particular the SRN, is fully understood, to enable any potential improvements to be appropriately planned for.

1.1.3 It is therefore essential that forward planning of network operations take these additional pressures into account. On this basis it is considered that this SRN infrastructure study (study) report provides a key piece of evidence to support the Plan and it is considered the recommendations of the study should be fully reflected in the provisions of the Plan and its associated Infrastructure Delivery Plan (IDP).

1.1.4 To facilitate this, a mesoscopic simulation model has been used to consider these development aspirations and on the basis of determining the additional traffic impact, a number of potential indicative solutions (specific schemes to be identified through further study) have been identified which aim to mitigate the forecast network issues. The indicative solutions identified are not fixed and have been developed to provide an indication of the likely scale of solution that will be required. The precise form of the solutions will be identified through further Highways England study. These indicative solutions have also been subsequently modelled to provide an indication of their effectiveness and it is this range of outcomes that this study report ultimately seeks to present.

1.2 Purpose of this report

1.2.1 The primary purpose of this report is to detail the potential impact of the Plan development aspirations on the SRN through the use of Highways England's mesoscopic model and to consider the extent to which solutions are required to support these development aspirations.

1.2.2 The outcomes of this study will be shared with and discussed with Northumberland County Council (NCC) with a view to accommodating the findings and recommendations appropriately in the provisions of the Plan.

1.3 Structure of this report

1.3.1 The following chapters follow on from this introduction:

- Chapter 2 provides some context to the study;
- Chapter 3 outlines the study methodology;
- Chapter 4 reviews the 2015 'base' network operation;

- Chapter 5 reviews the 2031 ‘committed’ network operation;
- Chapter 6 reviews the 2031 ‘potential’ network operation; and
- Chapter 7 offers a summary and conclusion to the report, including recommendations.

2 Study context

2.1 Northumberland context

2.1.1 Northumberland is the northernmost county in England, bordering Scotland (to the north), Cumbria (to the west) and County Durham and Tyne and Wear (to the south). The county encompasses approximately 5,000 square kilometres and has an estimated population of 316,000 (2011 Census).

2.1.2 The most densely populated area of the county lies immediately to the North of Tyne and Wear, and it is the section of the SRN passing through this area of Northumberland that is of most concern to Highways England in terms of current and potential future operation. Significant settlements include the towns of Blyth, Cramlington, Ashington and Morpeth. These towns provide a wide range of functions including retail, services and other businesses as well as residential areas. There are strong linkages between Northumberland residents and employment locations in Tyne and Wear, though a reciprocal trend has emerged in recent years.

2.1.3 The majority of the north and west of the county is open countryside, a substantial proportion of which comprises the Northumberland National Park. There are also two designated Areas of Outstanding Natural Beauty (AONB); the North Pennines AONB and Northumberland Coast AONB. These, coupled with numerous culturally and historically significant sites, form the basis of a strong leisure economy,

2.1.4 In terms of public transport, provision is mixed. Main corridors are relatively well served by public transport. There are numerous bus services operating within the main population area in the southeast, becoming more limited in the outlying towns and villages.

2.1.5 The East Coast Main Line railway passes through the county, connecting Newcastle upon Tyne with Edinburgh. There is an hourly stopping service between Morpeth and Newcastle, with services to stations between Berwick and Morpeth being more limited. The Tyne Valley Line connects Newcastle to Carlisle, with an hourly stopping service between Newcastle and Hexham, overlaid with a semi-fast service through to Carlisle.

2.2 Overview of the SRN

2.2.1 The SRN in Northumberland comprises:

- The **A1** between the junction at Seaton Burn to the Scottish border, passing Morpeth, Alnwick and Berwick-upon-Tweed;
- A short stretch of the **A19** from east of Moor Farm roundabout to the junction with the A1 at Seaton Burn; and
- The **A69** which acts as the main east-west transport corridor, and passes the towns of Hexham and Haltwhistle.

2.3 Study area

2.3.1 The previous (2013) Highways England Northumberland Infrastructure Study saw the section of the A19 between Seaton Burn and east of Moor Farm, and the A1 in the Seaton Burn area modelled in a mesoscopic model. This study considers

operationally this same area of the SRN, extending to cover the north facing slips at the North Brunton Interchange, to allow assessment of the impacts of traffic generated by the Plan proposals.

2.3.2 The potential impact on other stretches of the SRN (A1, A19 and A69) in Northumberland and surrounding counties is also considered, though not explicitly modelled. These sections of the network are subject to a high-level assessment of the potential impact of the additional traffic flows. This approach is adopted on the basis that these elements of the network are currently the subject of wider ranging strategic studies.

2.5 Existing network conditions

2.5.1 The following section describes the SRN junctions within the study area, and comments on their current operation. These comments are drawn from a combination of operational observations and traffic count information.

A19 / A189 Moor Farm junction

2.5.2 The existing A19/A189 Moor Farm junction is a six armed at-grade roundabout. Both the A19 and A189 are two lane dual carriageways, with the A189 being the main arterial connection between south east Northumberland and Tyne & Wear. Entries from both the A189 and A19 are signalised.

2.5.3 The operation of the junction is complicated by the connection to the north west quadrant of the A1171, and to the south west quadrant of the B1321, both of which are unsignalised. There is a three arm mini roundabout on the A1171 within 20 metres of the exit, which affects smooth exit from the roundabout on this arm and can cause blocking back onto the Moor Farm circulatory carriageway.

2.5.4 Traffic flows through the junction are substantial, with dominant flows in the morning peak being from the A189 north, to both the A189 south and the A19 south. These flow patterns are reversed in the evening peak. Through-junction flows on the A19 are notably lower than these dominant movements.

2.5.5 An improvement scheme at Moor Farm roundabout was implemented in 2008 that involved widening of the approaches and circulatory carriageway and installation of full time MOVA traffic signals. The improvement was considered to have delivered substantial benefits in the short term by reducing existing traffic congestion. A further enhancement was made as part of mitigations for traffic generated by the development of the Northumbria Specialist Hospital. This involved widening of the A19 approach from the west from three to four lanes.

2.5.6 The junction currently operates over capacity, with substantial queues occurring on the A189 southbound and A19 westbound in the morning peak. The evening peak also sees queues on the A19 westbound approach, and the A189 northbound.

A19 / A1171 Dudley Lane interchange

2.5.7 To the west of Moor Farm roundabout is the Dudley Lane Interchange. This is a limited access dumbbell junction, with the omission of a slip to the A19 westbound. As such, traffic from Dudley Lane for the A19 eastbound instead travels along a parallel link road, via the mini roundabout cited above, to join at Moor Farm.

2.5.8 There are no significant operational issues at the Dudley Lane interchange currently.

A19 / A1068 Fisher Lane junction

2.5.9 This is a five arm, at-grade MOVA signalised roundabout junction between the A1068 Fisher Lane and A19. There are also connections from the Great North Road to the south (B1318) and the north (C368). It is located immediately to the east of the A1/A19 Seaton Burn interchange, and operationally can be considered as part of Seaton Burn junction as issues at one impact the other. Indeed the public facing name of the entire complex is Seaton Burn, as evidenced in the junction name displayed on Advance Direction Signs on the approach from the east.

2.5.10 A pinch point scheme has been implemented at the junction, opening in early 2015. This involved widening of approaches and the circulatory carriageway. This has, under normal conditions, largely resolved the previous issues of peak time delay.

A1/A19 Seaton Burn junction

2.5.11 This junction of the A19 and the A1 north of Newcastle is a grade separated trumpet junction. The lip roads connect through to the Fisher Lane roundabout described above.

2.5.12 The major movements at the junction are between A1 South and A19. As part of the recent pinch point scheme, the northbound A1 diverge was improved from a taper diverge to a two lane parallel diverge, so as to cope more effectively with the large flows in the PM peak.

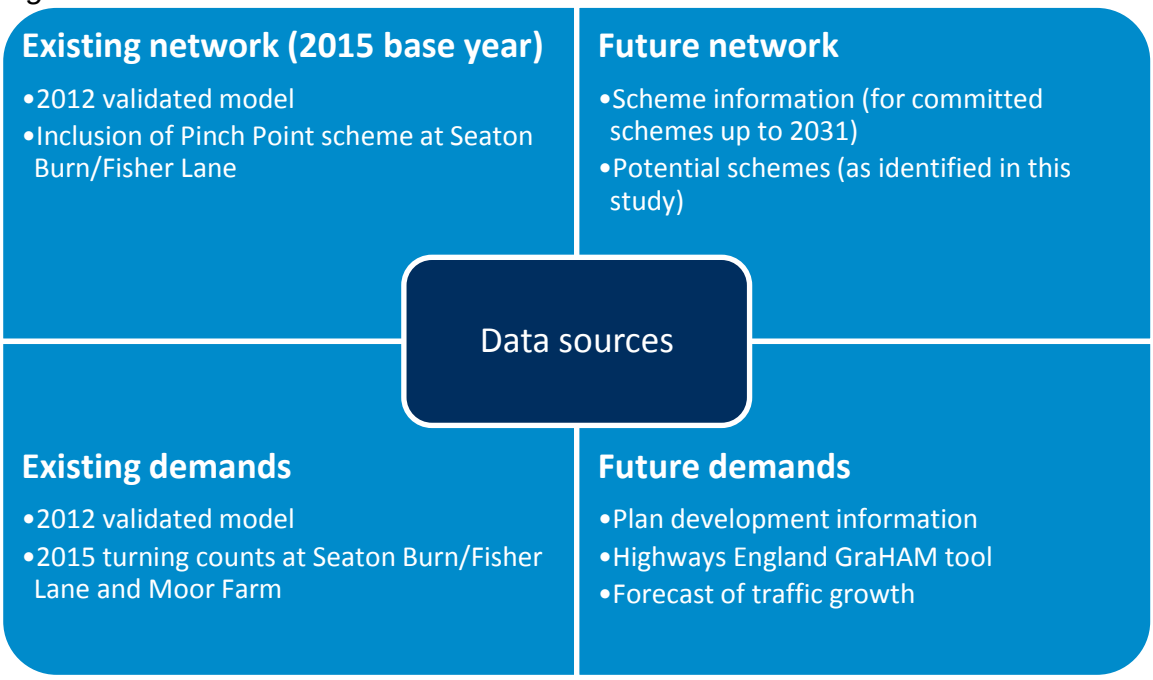
2.5.13 .

2.5.14 Given the relatively small through movement on the A1 southbound, more traffic is able to merge in the morning peak than might be expected, however the merge operation is approaching a tipping point whereby its performance on occasion has implications for the operation of Fisher Lane roundabout with queuing back into the roundabout.

2.6 Data and information sources

2.6.1 A range of data sources have been referenced and used as part of this study. Key sources include those identified in Figure 2.2.

Figure 2.2 Data and information sources

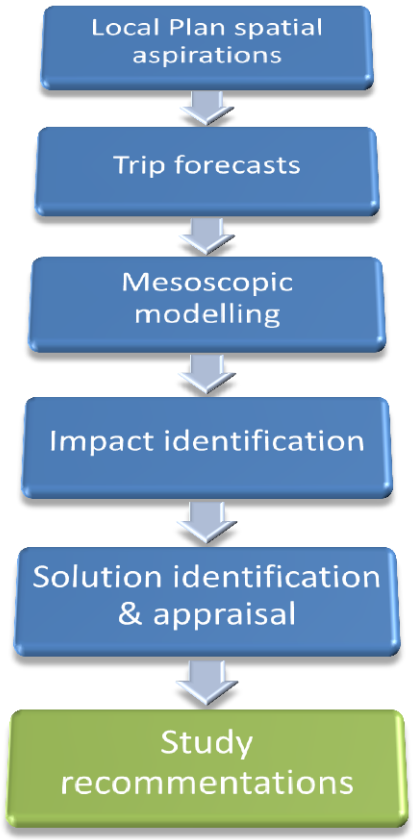


3 Study methodology

3.1 Method overview

3.1.1 The following chapter of the report summarises the methodology adopted as part of the study. This is illustrated in Figure 3.1.

Figure 3.1 – Methodology Process Overview



3.2 Local Plan spatial aspirations

3.2.1 The spatial aspirations have been derived from the Plan itself but also from further discussions with NCC in relation to seeking clarity on the nature and scale of the aspirations. The Plan period is identified as being between 2011 and 2031.

Housing aspirations

3.2.2 Within the Plan period, the Plan includes for the provision of at least **24,320 new houses**. Of these, the locational distribution across the delivery areas of the Plan is identified as:

- 53%: South East Northumberland;
- 24%: Central Northumberland;
- 17%: North Northumberland; and
- 6%: West Northumberland.

3.2.3 The main focus in terms of the location of the new houses within each of the delivery areas is within the main towns. Therefore, a significant proportion of houses are proposed in or around the towns of Blyth and Cramlington within the South East Northumberland area, in or around Morpeth within the Central Northumberland area, in or around Alnwick and Berwick-upon-Tweed within the North Northumberland area and in or around Haltwhistle within the West Northumberland area. However, dwellings are also proposed for the 'service centre' and 'remaining' areas within each of the Northumberland sub areas.

Employment aspirations

3.2.4 Within the Plan period, the Plan includes for the release of **381 hectares of land for economic development**. Of this:

- 189 hectares is allocated as strategic employment land around Blyth Estuary;

- 13 hectares at West Hartford Business Park for a B1 or B2 single user, prestige inward investment development;
- 128 hectares is protected for B1/B2/B8 development across Northumberland; and
- 51 hectares for mixed use development.

Reflection of spatial aspirations in the study

3.2.5 In order to identify how the spatial aspirations of the Plan have been translated into the study on the basis of the information afforded in the Plan itself and from discussions with NCC, a full set of data is provided in ***Appendix A*** for the housing aspirations and ***Appendix B*** for the employment aspirations.

3.3 Trip forecasts

3.3.1 Having derived the spatial aspirations of the Plan, the next stage of the process has involved forecasting the trip making potential of these aspirations. This has involved a number of steps as described below.

Trip generation

3.3.2 As with the spatial aspirations, detailed discussions have taken place with NCC in relation to the trip generating characteristics that should be employed as part of this study. These discussions have resulted in the following trip generating philosophy being adopted:

- For employment sites where the Plan does not distinguish between specific land uses, an equal mix of B1/B2/B8 has been assumed;
- For the West Hartford Strategic employment site, based on the proposed form of that site it has been assumed to be an equal mix of B1/B2;
- For the Blyth Estuary strategic employment area, based on further information received in relation to the site, the following assumptions have been made:
  - For the quayside locations, 40% of B8 rates have been applied;
  - For other locations, 75% of B8 rates have been applied; and
  - For the power station site to the north of Brock Lane, this has been excluded from the analysis.

3.3.3 With a view to the above, Table 3.1 sets out the trip rates (based on generic trip rates utilised by Highways England in strategic considerations such as those of Local Plans) utilised in the study.

Table 3.1 – Trip rates

Land Use	Trip rate unit	AM in	AM out	PM in	PM out
Residential	Per dwelling	0.15	0.41	0.38	0.23
B1	Per hectare	26.61	4.10	3.28	22.85
B2	Per hectare	13.61	4.62	2.59	11.53
B8	Per hectare	5.58	2.83	2.34	5.17

3.3.4 A full set of data trip generation data is provided in ***Appendix A*** and ***Appendix B*** which sets out the trip generating forecast of the housing and employment aspirations respectively.

Trip distribution and assignment

3.3.5 The trips that have been forecast to be directly associated with the Plan development aspirations have been derived through the use of the Highways England GraHAM tool. GraHAM is a GIS-based program for estimating the origins and destinations of trips associated with proposed land-use developments. Using Census 2011 Origin-Destination data, GraHAM distributes residential and employment trips using a GIS routing algorithm, which finds the quickest path through a detailed road network. The road network is based OS Meridien2 (Open Data) and a free hand drawn Strategic Road Network (using OS StreetView (10,000 raster images) to define the network).

3.3.6 Flow diagrams identifying the assigned Plan trips on the network across Northumberland are provided in ***Appendix C.***

3.3.7 For the purpose of the mesoscopic modelling, these flows have been cordoned to produce a matrix for addition to the model.

3.4 Mesoscopic modelling

Mesoscopic model background

3.4.1 Mesoscopic models allow modelling of factors contributing to congestion, such as weaving and merging, and differential lane use. They require less data input than micro models, have faster run times and can cover larger areas, allowing identification of upstream and downstream impacts.

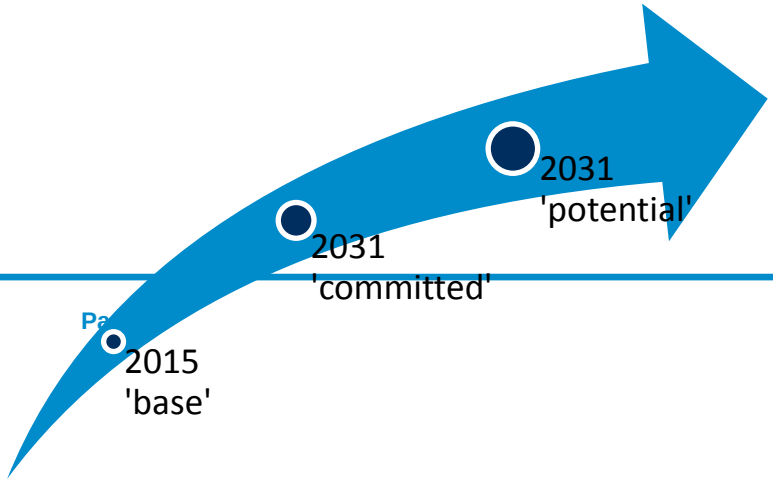
3.4.2 The study utilises the south east Northumberland mesoscopic model that was used as the basis of the previous Northumberland SRN Infrastructure Study. Based on the Dynameq platform, this model encompasses the A19 from Seaton Burn through to east of Moor Farm, and the A1 from North Brunton through to north of Seaton Burn. This coverage of the A1 represents an extension from the last model to include the north facing slips at North Brunton.

3.4.3 This mesoscopic model has been updated to incorporate the pinch point scheme which was recently implemented at Seaton Burn, for which a localised junction model was developed. Information from this pinch point scheme sub-model (based on the previous Infrastructure Study model) has then been passed back to refresh the inherited base infrastructure study model.

3.4.4 The refreshed sub-area meso model was calibrated with the purpose being to ensure, via an iterative process, that the network performance of the model closely reflected that observed in reality.

Assessment scenarios

3.4.5 As part of the study, the end of Plan future year of 2031 has been assessed including the Local Plan development trips and any committed highways infrastructure schemes to



be implemented by the respective year (known as the 'committed' network). The outputs from the committed networks have then been compared with the base network for 2015 and any operational issues on the SRN have been identified. Indicative schemes were then developed (if required) to mitigate any impacts (known as the 'potential' network). It should be noted that the indicative schemes identified are not fixed and have been developed to provide an indication of the likely scale of solution that will be required. The precise form of the solutions will be identified through further Highways England study.

3.4.6 Table 3.2 outlines the assessment scenarios and their components in terms of the network and traffic demands.

Table 3.2 – Assessment Scenarios

Assessment scenario	Network			Demands	
	Current	+ committed	+ potential	Current	+ future growth (including Plan)
2015 'base' network	✓			✓	
2031 'committed' network	✓	✓		✓	✓
2031 'potential' network	✓	✓	✓	✓	✓

3.4.7 Assignments have been run for both the morning (0730-0930) and evening (1630-1830) periods, network performance analysed and reported, and issues identified.

Base traffic demands

3.4.8 A major data collection exercise was undertaken by Highways England on the A19 corridor in 2015, involving turning counts at junctions on the SRN, and key local junctions, extending on the A1 through to North Brunton. This data has been utilised in the development of the matrices for this model.

3.4.9 As such, the morning and evening peak matrices from the 2012 south east Northumberland model were updated using the 2015 turning counts for Seaton Burn/Fisher Lane and Moor Farm. The traffic split necessary to produced demand for the extension through to the slips at North Brunton was also derived from these counts.

3.4.10 The demand in the matrices is split into 15 minute time slices, allowing a good replication of the variations in flow over the peak period.

Future traffic demands

3.4.11 The mesoscopic model has two vehicle user classes, 'light' and 'heavy'. The approach that has been adopted in applying growth to each of these is detailed below.

Light vehicles

3.4.12 In the case of light vehicles, the usual approach as part of SRN infrastructure studies is to control the overall increase in traffic demands to TEMPro. With a view to the application of this methodology in Northumberland, there exist issues due to the anticipated growth (and assumed development) inherent within TEMPro in

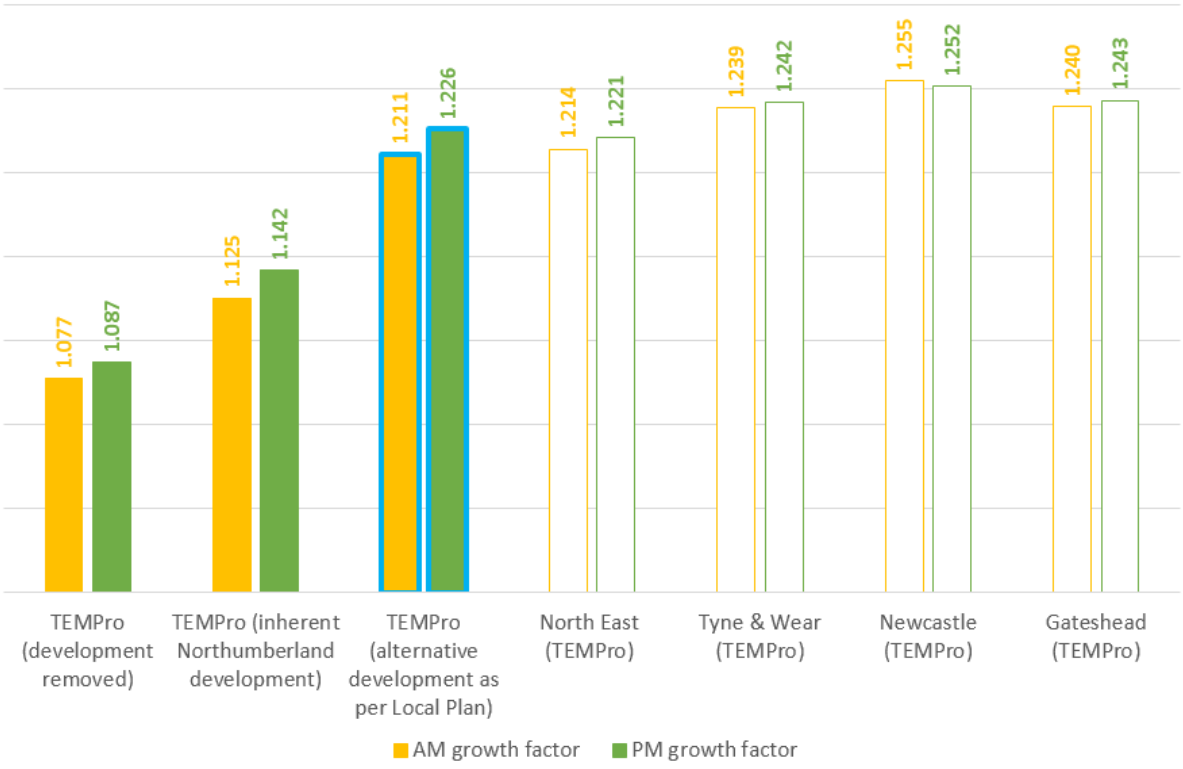
Northumberland when compared to that now being aspired to in the Plan. This difference is highlighted in Table 3.3.

Table 3.3 – TEMPro development assumption v Plan aspirations (2011-2031)

	Dwellings	Jobs
The Plan	24,230	10,000
TEMPro	18,124	-3,353

3.4.13 Such an outcome (TEMPro assumed development) is clearly contrary to the aims and objectives of the Plan. Should all the employment sites envisaged in the plan come forward, which is the premise adopted in this study, the number of jobs in the county will increase. As a result, an alternative approach has been adopted to better reflect the influences of the Plan. The Plan aspirations (dwellings and jobs), as identified in Table 3.3 above, have been input to the 'alternative planning assumptions' facility in TEMPro. The resultant growth rates achieved through this process have then been used as the control of future growth. Figure 3.2 sets out the growth that is proposed to be utilised as the control.

Figure 3.2 – Growth 'control' assessment



3.4.14 It can be seen that the proposed control (21.1% in the morning peak and 22.6% in the evening peak) can be justified given that it is in the same order as the growth rates forecast in the rest of the region. This provides a reasonable forecast of traffic growth and in ensuring that the overall growth is controlled to a recognised benchmark figure (when cordoned from the GraHAM tool, the Plan development suggests traffic significantly in excess of this TEMPRO based control), avoids the potential of double counting the growth.

Heavy vehicles

3.4.15 The 'heavy' matrix has been growthed from the model base year to 2031, using RTF forecasts. The forecast for heavy vehicles accounts for articulated and rigid goods vehicles, with a 50:50 ratio applied.

3.5 Impact identification

3.5.1 The background flows and development trips have been assigned to the 'committed' network for the end of Plan year of 2031. This network contains only schemes which are committed and funded, or are subject to Section 278 agreements for committed developments. Details of the committed schemes that have been included in the committed networks are given in Chapter 5.

3.5.2 The operation of the 'committed' network was then assessed to identify the operational issues in 2031.

3.6 Solution identification and appraisal

3.6.1 Based on the assessment of the 2031 'committed' network presented in Chapter 5, indicative potential schemes have been identified. The indicative schemes identified are not fixed and have been developed to provide an indication of the likely scale of solution that will be required. The precise form of the solutions will be identified through further Highways England study. The indicative schemes that have been considered were added to the 'committed' network to create a 2031 'potential' network. The impact of these indicative schemes was then assessed by comparing the 'potential' and 'committed' network operation. The assessment of the 'potential' network in 2031 is presented in Chapter 6.

3.7 Study recommendations

3.7.1 Recommendations are made based on the outcomes of the assessments and these are presented in Chapter 7.

3.8 Format of results provision

3.8.1 The results are presented in the form of a progressive narrative, supported with images from the model. This variously includes consideration of the full network, or focuses at the particular junctions, depending on the indicative intervention being tested.

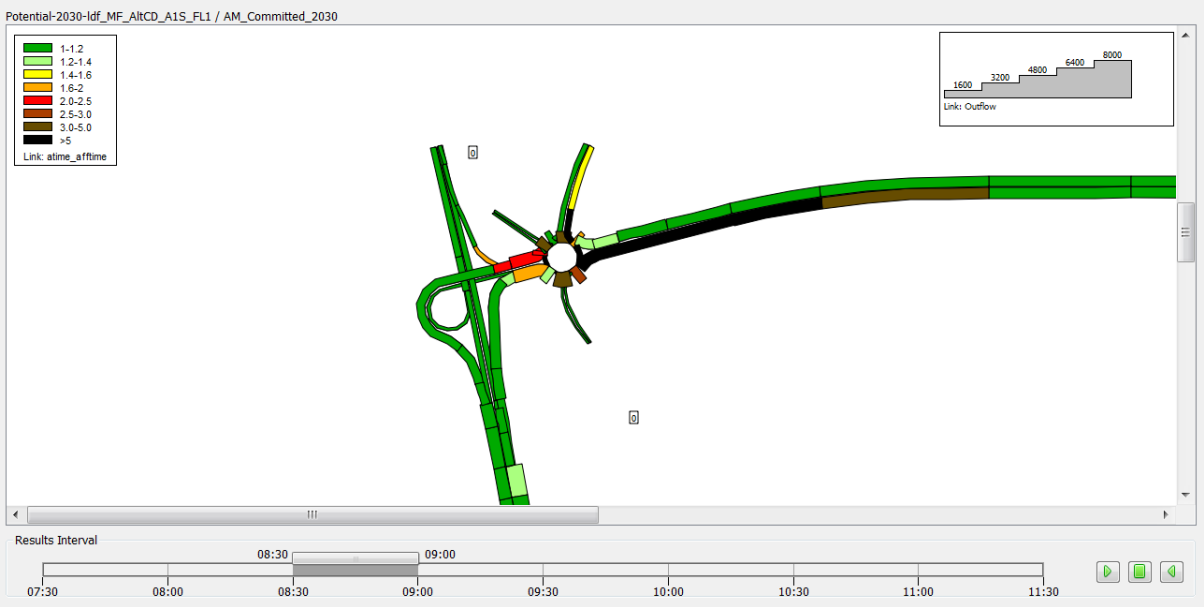
3.8.2 For the morning peak, the time slice of 0830 – 0900 is presented. For the evening peak, it is 1730 – 1800. This is selected based on future year performance, where the issues on the network become increasingly apparent over the peak period. The time interval that is presented is consistent between assessment scenarios in order to enable a comparative view to be made.

3.8.3 Figure 3.3 provides an example of the visual outputs. Specifically:

- The bar widths are indicative of outflow from a particular link in the 30 minute time interval, represented in hourly terms. A bandwidth legend is provided.
- The bar colour represents the ratio of modelled journey time to the free flow journey time for a particular link. For example if it takes 10 seconds to travel on a link in free flow conditions, but the output shows 'dark red' (link time ratio of 3.0-5.0) this indicates that the journey time on the link is between 30-50 seconds in congested conditions. A colour legend is provided.

- The boxed numbers at the link entry points indicate the number of vehicles that are queuing off the modelled network at that location. This value is reflected by the size of the red centroid.

Figure 3.3 – Visual assessment example



3.8.4 Throughout, it is noted that the model represents average conditions, expressed over a 30 minute period. Therefore, in considering the representation of the base situation in particular, it is likely that users will have had particularly salient experiences where the performance of the network was significantly below that illustrated, however these would be outlier events.

4 2015 ‘base’ network assessment

4.1 Overview

4.1.1 This section of the report presents the modelled assessment of the mesoscopic model network within the 2015 ‘base’ year. The outputs of the 2015 ‘base’ provide a reference scenario to which the 2031 ‘committed’ scenario and 2031 ‘potential’ scenarios can be compared.

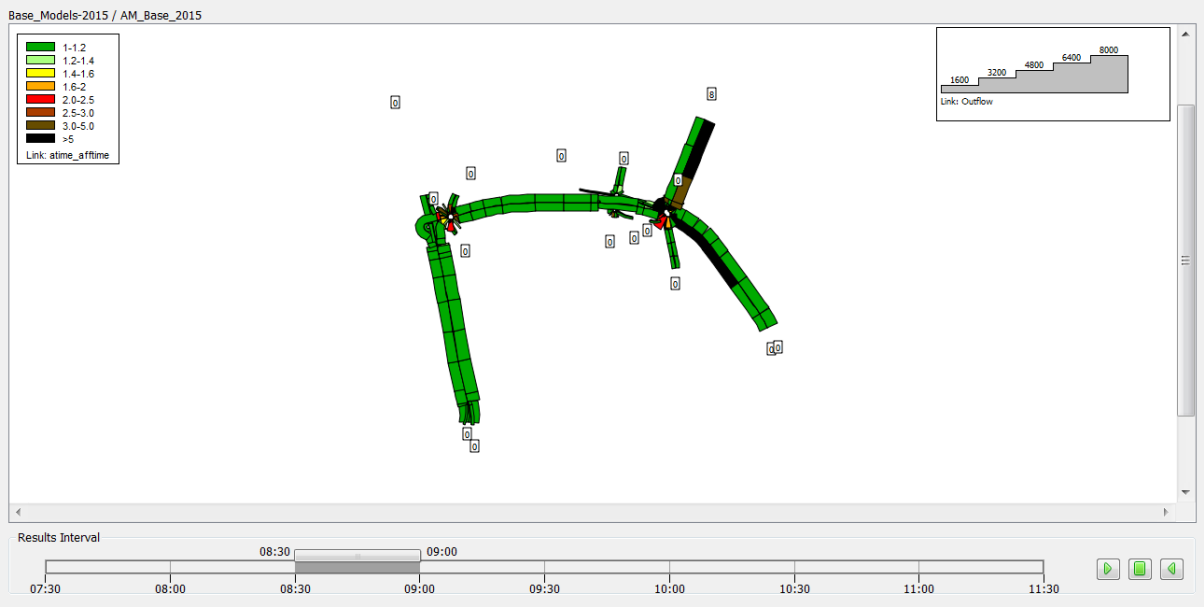
4.2 2015 ‘base’ network

4.2.1 The base network is representative of the network in its current form, following completion of the pinch point works at Seaton Burn/Fisher Lane.

4.3 2015 ‘base’ network – performance review

4.3.1 The detailed review of network performance in the 2015 ‘base’ scenario is provided below in Figures 4.1 and 4.2 for the morning and evening peaks respectively.

Figure 4.1 – 2015 ‘base’ AM peak performance – full network

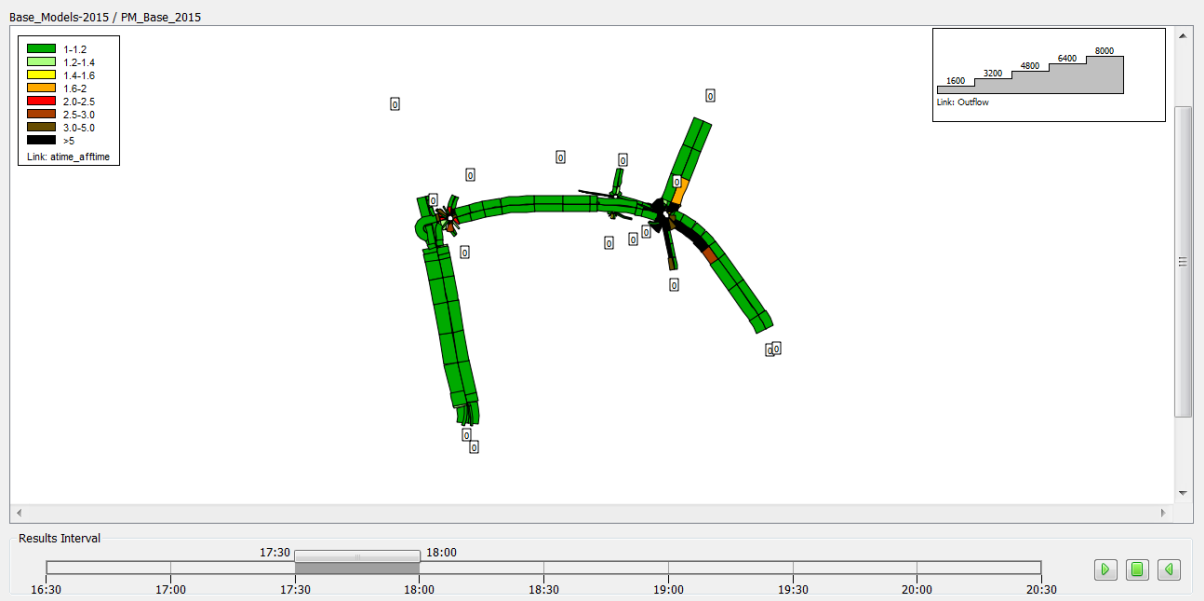


4.3.2 The network sees delay and queuing occurring on the A19 westbound and A189 southbound approaches to the Moor Farm junction.

4.3.3 At Fisher Lane, there is limited queuing, with the recently implemented Pinch Point scheme being fairly successful at alleviating the previously existing congestion. It is noted that the scheme was designed around ‘current day’ flows, as per the requirements for such a scheme.

4.3.4 It is noted that the merge to the A1 southbound, which was not covered by the Pinch Point scheme, operates “choppily”, though not to an extent to be picked up in the period reported. This does intermittently impact downstream up the slip back towards the Fisher Lane roundabout.

Figure 4.2 – 2015 'base' PM peak performance – full network



4.3.5 As in the morning peak period, the Fisher Lane Roundabout and Seaton Burn interchange are seen to operate well. There is notable queuing at Moor Farm on the A19 westbound, A189 northbound and, to a lesser extent, the A189 southbound.

5 2031 'committed' network assessment

5.1 Overview

5.1.1 This section of the report presents the modelled assessment of the mesoscopic model network within the 2031 'committed' year. The 2031 scenarios see the demand associated with the Northumberland Local Plan assigned to the network in the manner identified in Chapter 3.

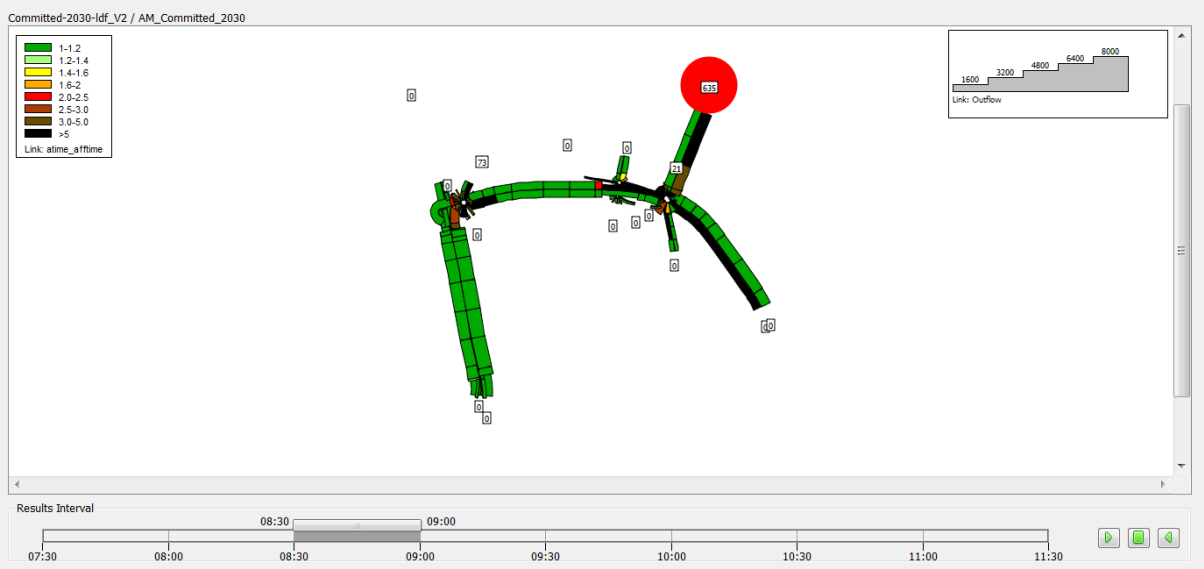
5.2 2031 'committed' network

5.2.1 There are no committed infrastructure schemes in the modelled area, so the network remains as per the base model.

5.3 2031 'committed' network - performance review

5.3.1 The detailed review of network performance in the 2031 'committed' scenario is provided below in Figures 5.1 and 5.2 for the morning and evening peaks respectively.

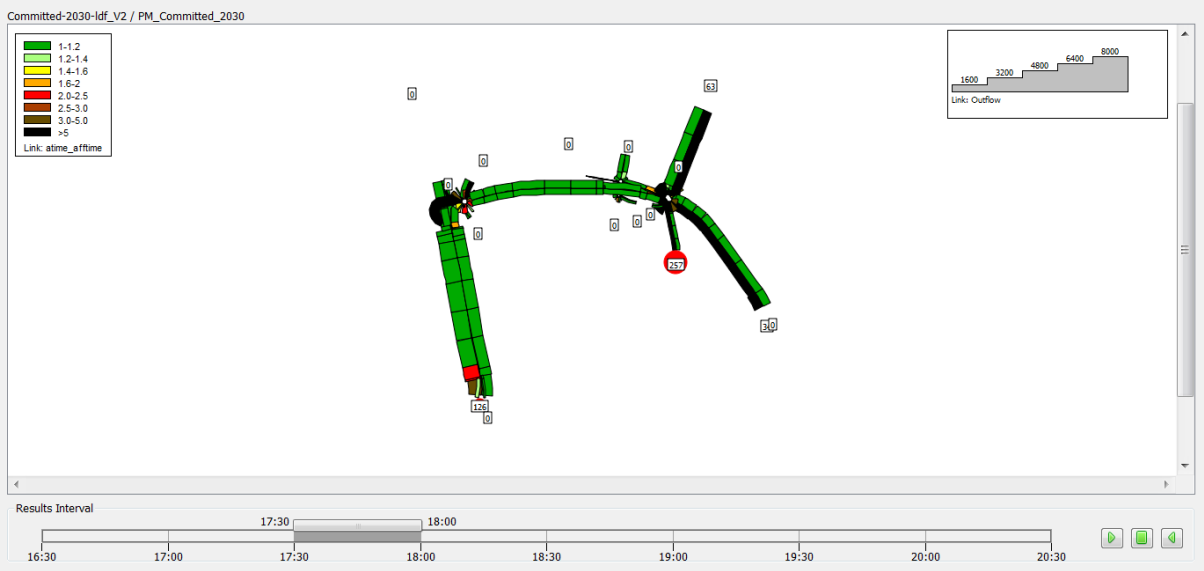
Figure 5.1 – 2031 'committed' AM peak performance – full network



5.3.2 It is evident that there is significant queuing at Moor Farm, with over 600 vehicles queuing back off the modelled network by 9am. There are also significant queues on the other approaches, particular on the A19 westbound.

5.3.3 There is also a queue back off the network on the A1068 approach to Fisher Lane Roundabout. Issues generally are less manifest here due to the metering effect of the Moor Farm roundabout.

Figure 5.2 – 2031 'committed' PM peak performance – full network



5.3.4 It is evident that queues extend back from Fisher Lane roundabout towards the A1 northbound diverge. Traffic reaching this point from the East is metered by Moor Farm.

5.3.5 At Moor Farm, significant queues extend back off the modelled network most extensively on the A189 northbound. There are also queues back off the network on the A19 westbound, and on the A189 southbound. Traffic reaching this point from the west is metered by the Fisher Lane roundabout.

6 2031 'potential' network assessments

6.1 Overview

6.1.1 This section of the report presents the modelled assessment of the mesoscopic model network within the 2031 'potential' year. This is in the form of a progressive narrative of incremental mitigations. It should be noted that the mitigations tested here are not fixed and they have been developed to provide an indication of the likely scale of solution that will be required. The precise form of the solutions will be identified through further Highways England study.

6.2 2031 'potential' network

6.2.1 The 2031 'potential' network is as per the 2031 'committed' network, but also includes the indicative schemes that have been identified as providing potential solutions to the operational issues identified in the 2031 'committed' scenario as described in Chapter 5.

6.2.2 This process has allowed for a review of the benefits offered by the potential indicative schemes and this review has formed the basis upon which the study recommendations and conclusions are founded.

6.2.3 The potential indicative schemes have been considered from a high-level implementation and feasibility perspective, but not from a detailed costing and benefit appraisal point of view. This is considered to be a suitable level of detail for the Local Plan stage, but would require further work to determine more accurate layouts, risks and scheme costs. This will be the subject of further Highways England study.

6.2.4 It is noted that the aim of this study is to provide a high level analysis illustrating that there are potential options which would mitigate the impact of traffic generated by the development set out in the Plan. It does not seek to promote nor endorse particular solutions or options. Additional specific analysis will be required to take these schemes forward.

6.2.5 These potential indicative schemes are detailed below, along with analysis of their impacts.

6.3 2031 'potential' network - performance review

Potential Moor Farm / Dudley Lane indicative scheme

6.3.1 This potential indicative scheme involves the use of a signalised diamond arrangement for the Moor Farm interchange.

6.3.2 The westbound off slip at Dudley Lane is retained, and in addition an eastbound slip is added in with a collector/distributor arrangement with the west facing slips at Moor Farm. In addition, the access to Broad Law has been made one way, with the new slip arrangement facilitating return movements. The layout is illustrated in Figure 6.1. Again it should be noted that this indicative scheme is not fixed. It provides an indication of the likely scale of intervention that may be required in the future year. The precise form of the intervention will be identified through further Highways England study.

6.3.3 The detailed review of network performance of this indicative scheme is provided below in Figures 6.2 and 6.3 for the morning and evening peaks respectively.

Figure 6.1 - Potential Moor Farm/Dudley Lane indicative scheme

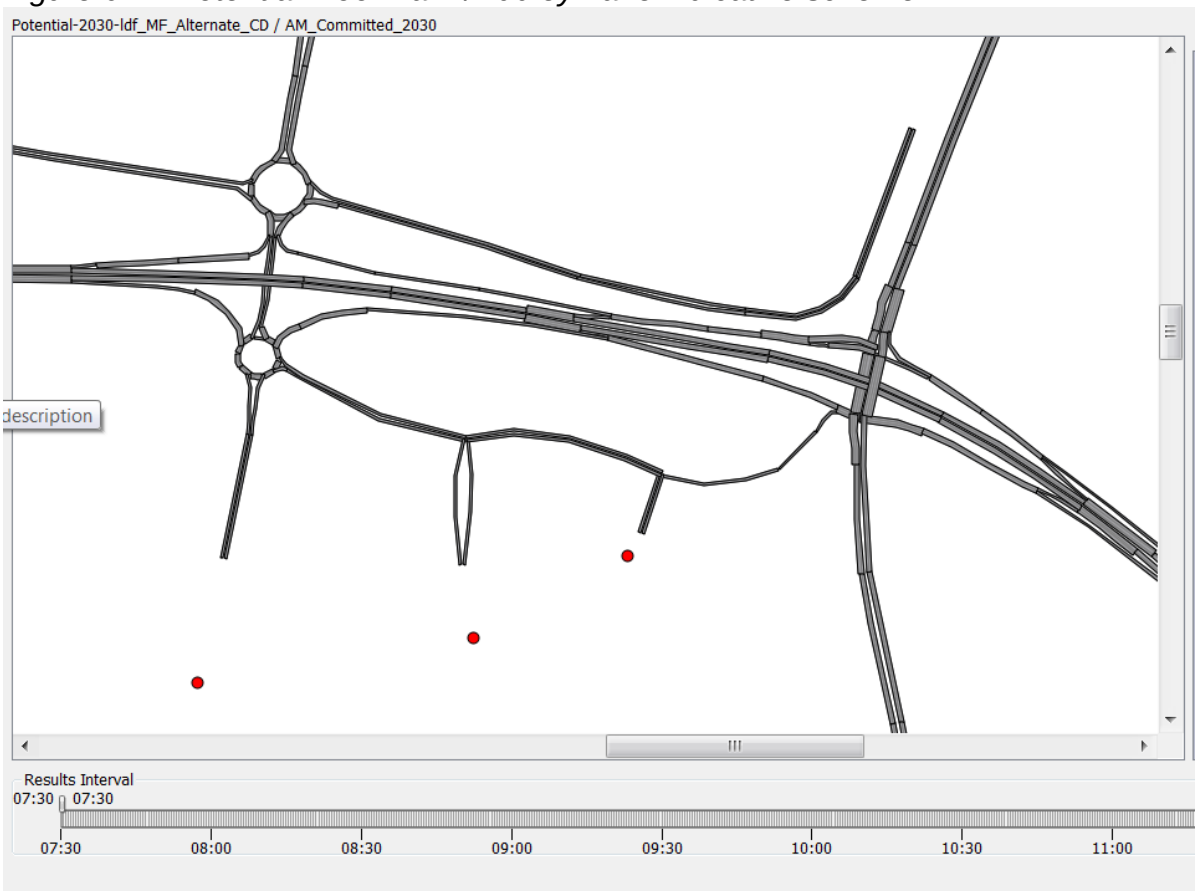
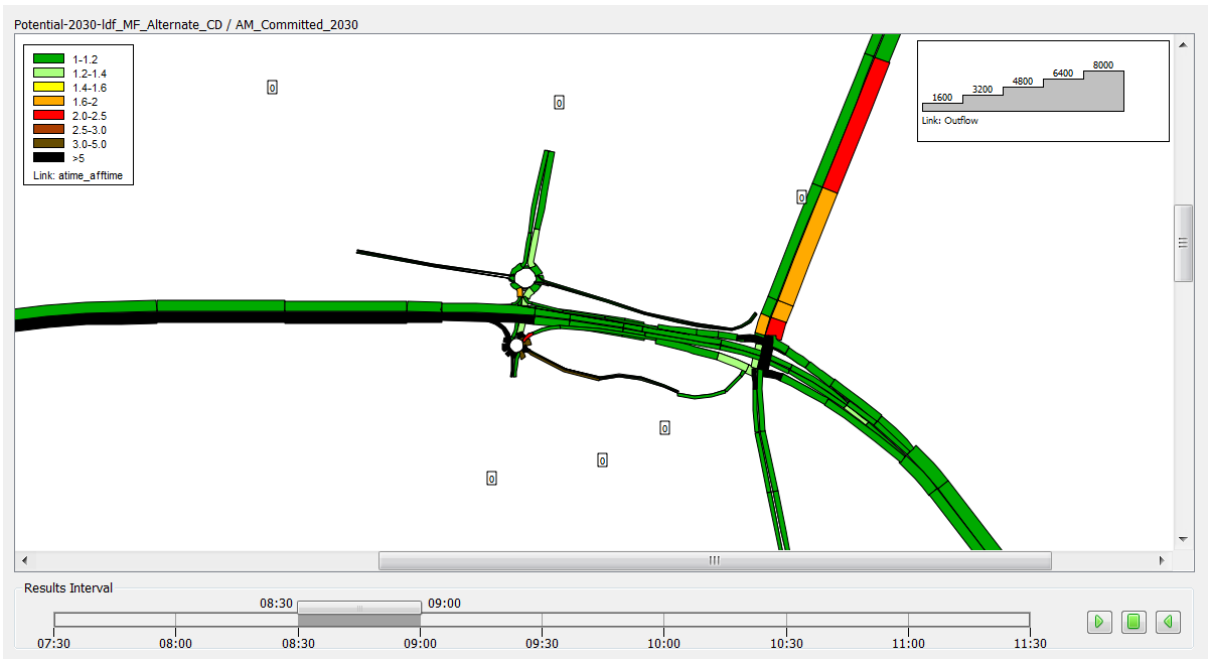
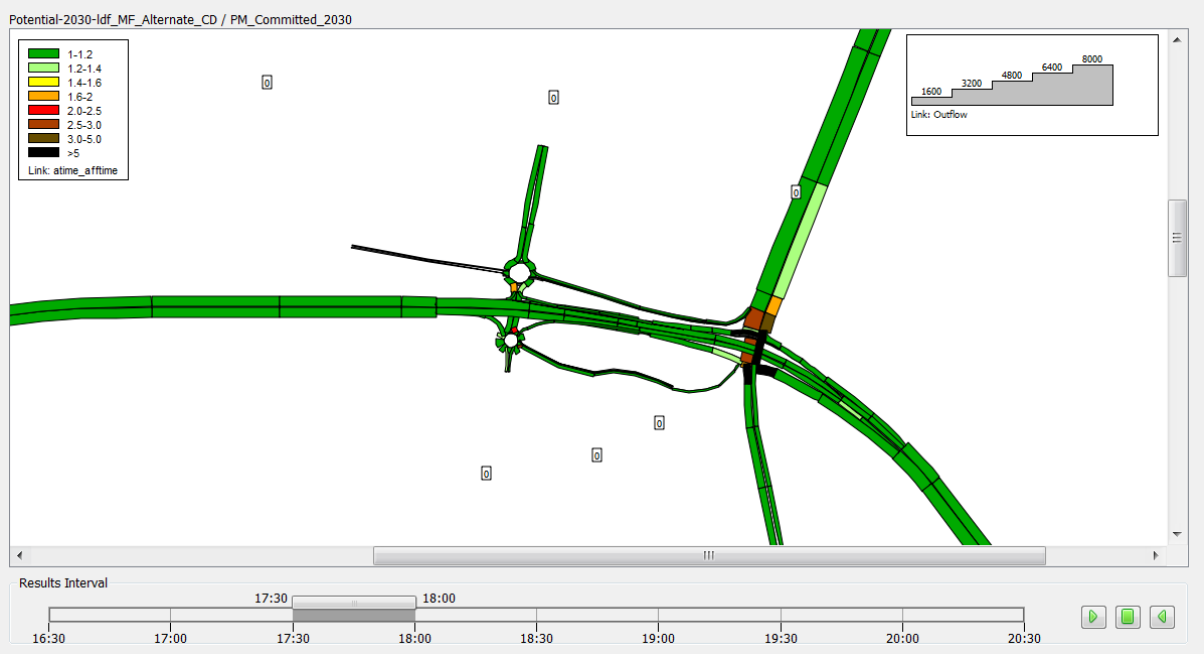


Figure 6.2 - 2031 'Potential Moor Farm/Dudley Lane indicative scheme' AM Peak Performance – Moor Farm



6.3.4 In the morning peak, slow moving traffic is seen on the A189 southbound approach to Moor Farm, however this no longer extends back off the network as all previous scenarios. Traffic on all other approaches is without significant delay. The additional throughput at Moor Farm now sees queuing extended back to Dudley Lane, and back onto Broad Law.

Figure 6.3 - 2031 'Potential Moor Farm/Dudley Lane indicative scheme' PM Peak Performance – Moor Farm



6.3.5 In the evening peak, there are no significant delays or queues predicted in 2031. It is, however noted that traffic is to some extent metered to the west by issues at Fisher Lane.

Potential A1 / Seaton Burn / Fisher Lane indicative scheme

6.3.6 With the issues at Moor Farm largely resolved by the indicative scheme described above, attention turns here to the A1 / Seaton Burn / Fisher Lane. The testing of options at this location is done so with the potential Moor Farm / Dudley Lane indicative scheme in place to ensure that there is no restriction in traffic reaching this western part of the network.

6.3.7 The indicative scheme at this location involves:

- replacing the Fisher Lane roundabout with a signalised junction given that the seed point in the evening peak was seen to be related to capacity eastbound through the junction. To facilitate this, the C368 Great North Road is realigned to use the former alignment of Arcot Hall Road, to the south of the Holiday Inn. This then meets the A1068 Fisher Lane at a signalised junction. Where the C368 resumes its previous alignment, a mini roundabout is provided, giving access to the services. There is potential to also provide a slip from the A19 eastbound prior to the signalised junction, giving direct access to both the services and C368 Great North Road; and

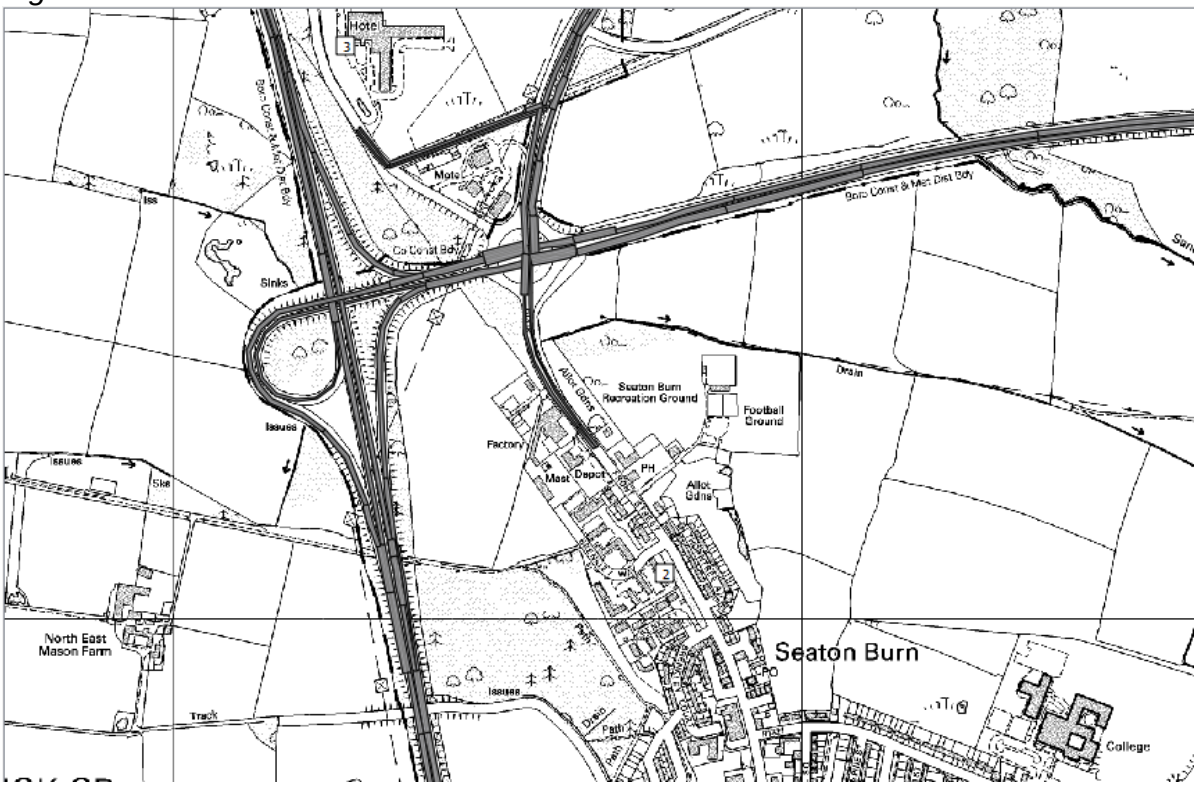
- provision of a ghost island merge southbound at Seaton Burn. The operation of the merge was seen to be the initial congestion seed point at this location in the morning peak.
-

6.3.8 Again it should be noted that this indicative scheme is not fixed. It provides an indication of the likely scale of intervention that may be required in the future year. The precise form of the intervention will be identified through further Highways England study.

6.3.9 This indicative scheme recognises that there is an aspiration in the future for the A19 to become an Expressway and, as such, does not jeopardise these plans, Furthermore, there is the possibility that the indicative scheme shown here could be accommodated within the footprint of the existing junction.

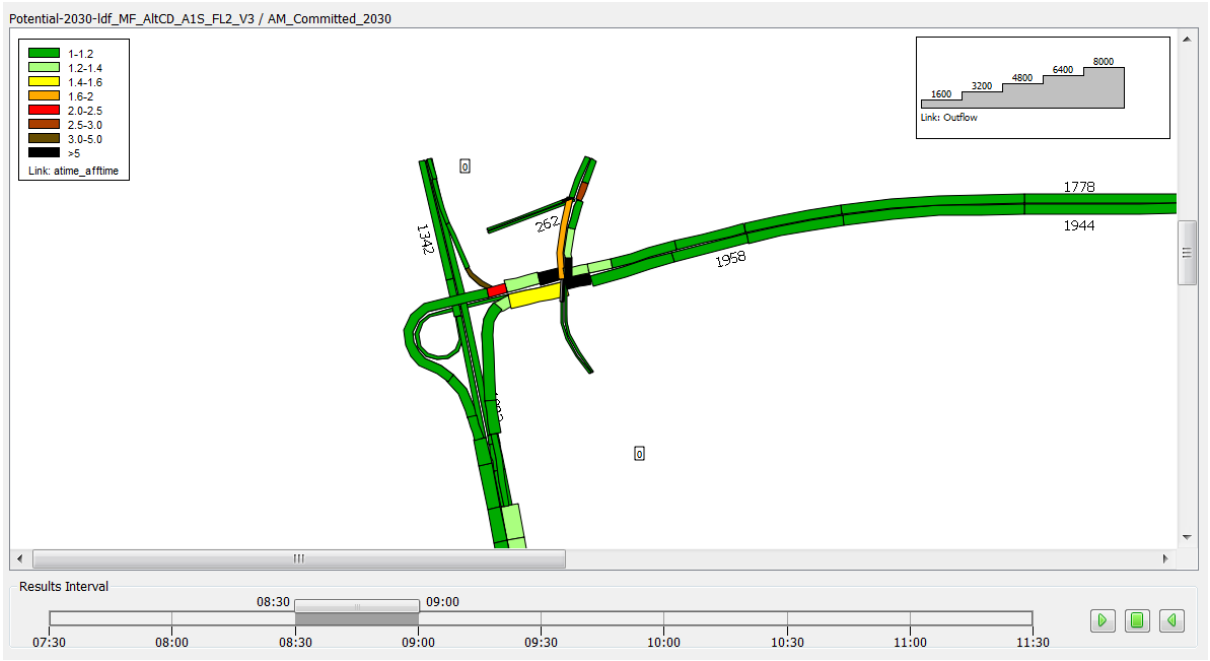
6.3.10 The indicative scheme at Seaton Burn / Fisher Lane is illustrated in Figure 6.4

Figure 6.4 - Potential Seaton Burn/Fisher Lane indicative scheme



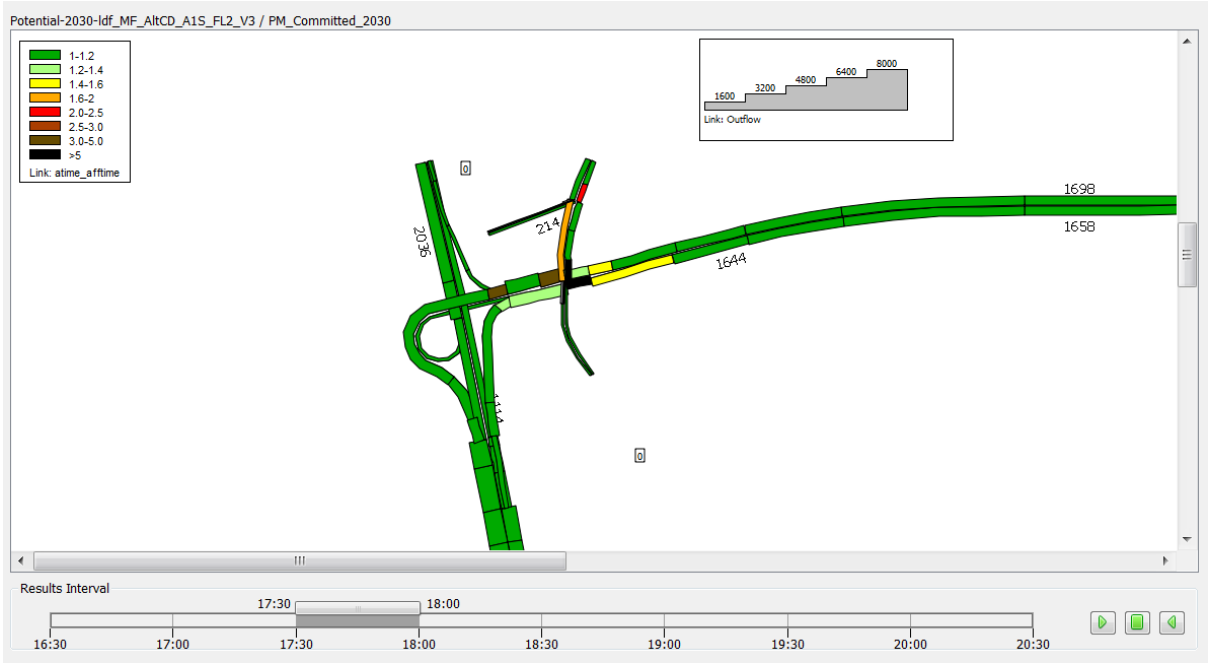
6.3.11 The detailed review of network performance of this indicative scheme is provided below in Figures 6.5 and 6.6 for the morning and evening peaks respectively.

Figure 6.5 - 2031 'Potential A1 / Seaton Burn / Fisher Lane indicative scheme AM Peak Performance – Seaton Burn



6.3.12 In the morning peak, the indicative scheme has removed the significant delay on all approaches, with minimal queuing remaining.

Figure 6.6 - 2031 'Potential A1 / Seaton Burn / Fisher Lane indicative scheme PM Peak Performance – Seaton Burn



Whole Network – Full indicative schemes

6.3.13 The images below show the morning and evening peak operational performance of the indicative schemes (Figure 6.8 for the morning peak and 6.9 for the evening peak) given:

- Moor Farm/Dudley Lane: indicative scheme including A19 grade separation; slips signalised diamond with A189; Collector-Distributor linkage with east facing slips at Dudley Lane; Broad Law made one way from the Moor Farm junction.
- Fisher Lane: indicative scheme including roundabout replaced by signalised junction; C368 realigned on existing disused corridor.
- A1: indicative scheme including provision of a ghost island merge southbound at Seaton Burn

Figure 6.8 - 2031 'Final Potential with indicative schemes' AM Peak Performance – Full Network

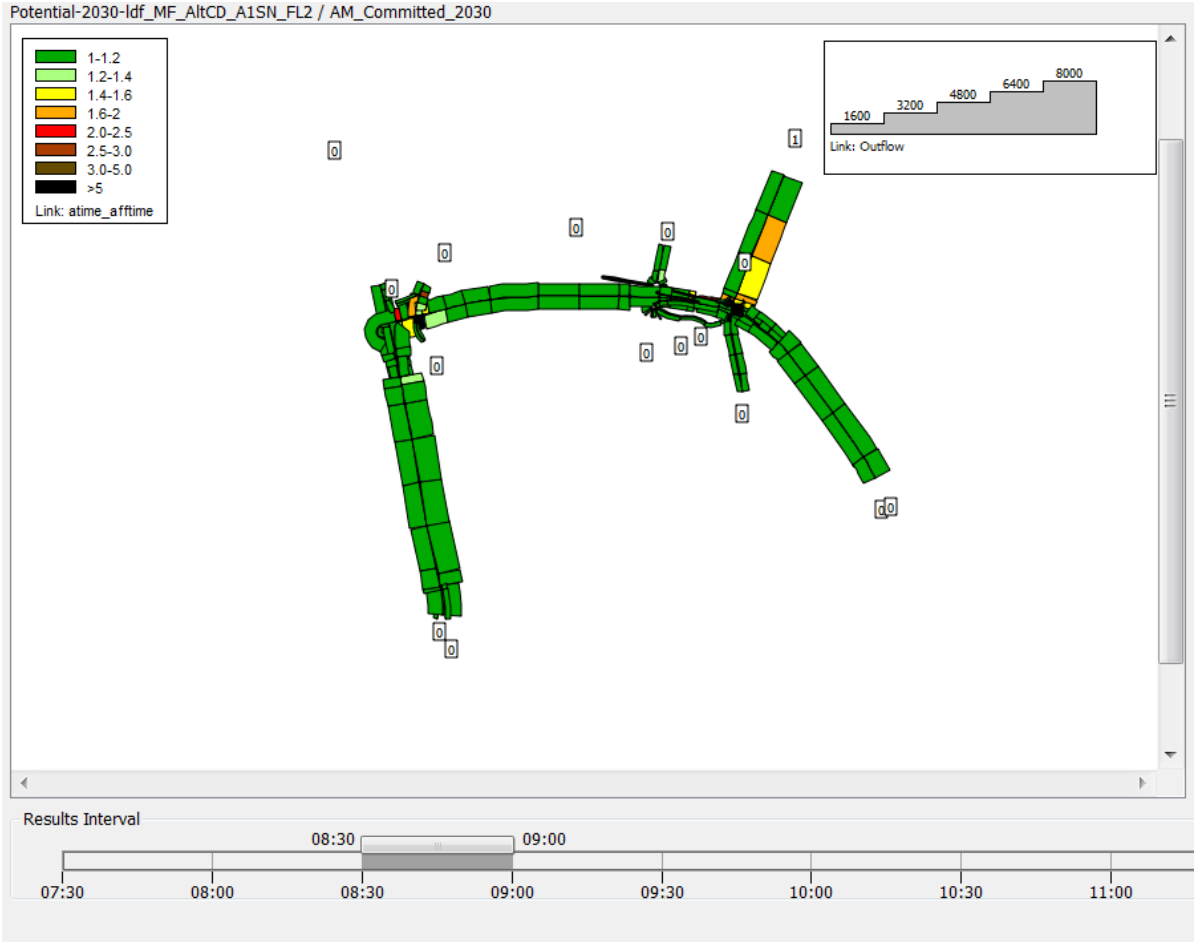
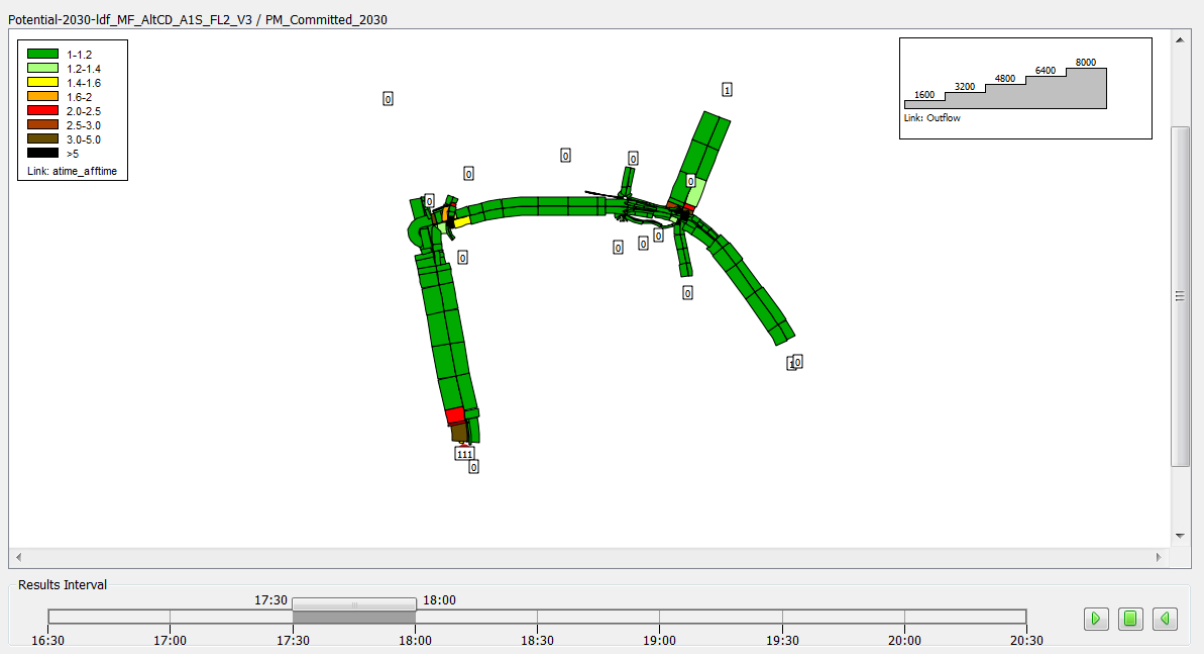


Figure 6.9 - 2031 'Final Potential with indicative schemes' PM Peak Performance – Full Network



6.3.14 As can be seen, the network with these indicative interventions operates well in both the morning and evening peaks in 2031, taking into account the traffic generated by development outlined in the Plan.

7 Study Conclusions

7.1 Summary

7.1.1 The study has investigated the potential impacts of the traffic generated by the developments outlined in the Plan upon the operation of the SRN, for the plan horizon year of 2031. Potential mitigations to the issues arising in order to maintain, or better, the operation of the network have been investigated with a view to the SRN operating in a way that can support the Plan aspirations. The indicative schemes identified here are not fixed. They do however provide an indication of the scale of intervention that may be required in the future,

7.1.2 It is noted that the study has not given consideration to the possible phasing of interventions, nor any restrictions on development that might be appropriate prior to implementation of particular enabling schemes. Nor does it form any commitment on the part of Highways England relating to scheme delivery.

Modelling approach

7.1.3 It should be noted that the forecasting approach used for this study is a robust approach with the resultant forecast traffic growth greater than TEMPro growth for Northumberland. The approach undertaken is consistent with that employed in similar studies for neighbouring authorities, while being cognisant of particular unique facets of the Plan. These relate to the aspirations of the County as compared to the decline in employment suggested in the TEMPro planning data, and the special status of the expansive potential employment sites around Blyth.

Committed network summary – Moor Farm / Dudley Lane Junctions

7.1.4 In the 2015 ‘base’ scenario the main issues at the junction are delay on the A189 north approach and A19 east approach in the morning peak, and on the A189 east and A189 north approaches in the evening peak.

7.1.5 In the 2031 ‘committed’ network scenario, there is extensive queuing, with a significant amount of traffic unable to access the modelled network.

Committed network summary - A1 / A19 Seaton Burn / Fisher Lane Junctions

7.1.6 In the 2015 ‘base’ scenario, with the inclusion of the Seaton Burn Pinch Point scheme, the junction is seen to operate well. There are intermittent issues with their locus at the A1 southbound merge, which threaten, but do not quite cause, blocking back to the Fisher Lane roundabout.

7.1.7 In the 2031 ‘committed’ network scenario, the operation of the network is severely degraded, with extensive queuing back off the network and towards the A1 northbound diverge.

Potential network summary

7.1.8 A number of options have been tested in the study to ameliorate these issues, with a progressive approach, looking first at Moor Farm, and then the Seaton Burn complex.

7.1.9 The modelling suggests that there are indicative potential interventions which would be effective in facilitating the growth aspirations of the Plan, in terms of additional capacity on, across, to and from the SRN.

7.1.10 The indicative schemes tested are not fixed. They do however provide an indication of the type and scale of intervention that may be required in the future year,

7.2 Recommendations

7.2.1 Based on the analysis presented above, it is recommended that, in order to facilitate the Plan aspirations, improvements are implemented as follows:

- Moor Farm/Seaton Burn: a significant improvement including grade separation of the A19;
- Fisher Lane: significant remodelling of the existing roundabout junction , taking into consideration the aspiration for the A19 to become an Expressway; and
- A1: provision of a ghost island merge southbound at Seaton Burn.

7.2.2 The exact design, nature, and required timescales, of the schemes at these locations will be subject to further Highways England study. The indicative interventions have been designed for consideration for the future year given that the end of the plan period is 2031. The precise form of the solutions will be identified through further Highways England study.

7.2.3 The delivery of three lanes on the A1 between North Brunton and Scotswood , which was a policy requirement identified by Highways England in relation to the Newcastle / Gateshead Core Strategy and is now a scheme that is planned to be delivered through the RIS process, will need to be delivered prior to the other schemes, and therefore this scheme is identified as a requirement associated with the Northumberland Plan.

7.2.4 The studies of the ‘A1 in Northumberland’ (Highways England) and the ‘Northern Trans-Pennine Routes’ (Highways England / Department for Transport) will give consideration to the operational performance of those elements of the SRN and the level of development growth that influences their operation. On the basis of the scale of development traffic influences at those locations of the SRN (relatively small in comparison to the network subject to detailed modelling in this study report) as identified in ***Appendix C***, any measures required along those corridors will be identified through those studies.

7.2.5 Given the model prediction that the indicative measures will address many of the problems predicted on the SRN, Highways England is minded to take the view that the development proposals contained in the Local Plan are sound, on the basis that:

- This Infrastructure Study forms a suitable evidence base upon which indicative measures to support the Plan can be identified, with further Highways England study providing further definition; and
- The outcomes of this study are appropriately translated into the policy provisions of the Plan.

7.2.6 Notwithstanding the above, developments outlined in the plan which come after plan adoption, with the potential to generate traffic on/at the SRN will still require consideration by Highways England as a consultee, as at present. This includes any plans coming forward in the Blyth Strategic Employment area, particular if they that

deviate markedly from the assumptions applied to the expansive tracts of available land in this study.

7.3 Concluding remarks

7.3.1 The study has shown that there are potential indicative interventions which could be made to the SRN that would support and facilitate the delivery of development as outlined in the Plan. In so doing, it enables Highways England to state that, given such interventions, the content of the Northumberland Local Plan is considered sound.

7.3.2 The study's aim is to investigate where such interventions might be required, and their possible scale, rather than comprehensively investigate options for these scheme. This will need to be considered in subsequent studies, and there will be numerous other factors to be taken into account in these considerations.

Appendix A - Spatial Aspirations: Housing

Plan

Delivery Area	Location	Dwellings
South East Northumberland	Amble	600
	Ashington	1800
	Bedlington	1280
	Blyth	3100
	Cramlington	3820
	Guidepost / Stakeford / Choppington	380
	Newbiggin-by-the-Sea	300
	Seaton Delaval / New Hartley / Seghill / Holywell	780
	Rest of South East Northumberland	780
Central Northumberland	Hexham	720
	Morpeth	2100
	Ponteland	900
	Prudhoe	900
	Corbridge	300
	Rest of Central Northumberland	1020
North Northumberland	Alnwick	1100
	Berwick-upon-Tweed	900
	Belford	230
	Seahouses	230
	Rothbury	200
	Wooler	280
	Rest of North Northumberland	1250
Haltwhistle	Haltwhistle	400
	Allendale	100
	Bellingham	280
	Haydon Bridge	200
	Rest of West Northumberland	370
	Total	24320

GRAHAM Analysis

Site Name	Easting	Northing	Dwellings	Rates AM In	Rates AM Out	Rates PM In	Rates PM Out	Trips AM In	Trips AM Out	Trips PM In	Trips PM Put
Amble	426492	604090	600	0.15	0.41	0.38	0.23	90	246	228	138
Ashington	427735	587715	1800	0.15	0.41	0.38	0.23	270	738	684	414
Bedlington	425636	581992	1280	0.15	0.41	0.38	0.23	192	525	486	294
Blyth	431400	581600	3100	0.15	0.41	0.38	0.23	465	1271	1178	713
Cramlington South	425600	575100	850	0.15	0.41	0.38	0.23	128	349	323	196
Cramlington South West	424800	576700	2500	0.15	0.41	0.38	0.23	375	1025	950	575
Cramlinton Central	426300	577900	470	0.15	0.41	0.38	0.23	71	193	179	108
Guide Post	425360	584960	127	0.15	0.41	0.38	0.23	19	52	48	29
Stakeford	427050	585333	127	0.15	0.41	0.38	0.23	19	52	48	29
Choppington	425610	583560	127	0.15	0.41	0.38	0.23	19	52	48	29
Newbiggin-by-the-Sea	431046	588014	300	0.15	0.41	0.38	0.23	45	123	114	69
Seaton Delaval	430450	575525	195	0.15	0.41	0.38	0.23	29	80	74	45
New Hartley	430843	576769	195	0.15	0.41	0.38	0.23	29	80	74	45
Seghill	428574	574070	195	0.15	0.41	0.38	0.23	29	80	74	45
Holywell	431560	574510	195	0.15	0.41	0.38	0.23	29	80	74	45
Rest of South East Northumberland Delivery Area OA1	425300	585200	156	0.15	0.41	0.38	0.23	23	64	59	36
Rest of South East Northumberland Delivery Area OA2	428400	581600	156	0.15	0.41	0.38	0.23	23	64	59	36
Rest of South East Northumberland Delivery Area OA3	430000	579300	156	0.15	0.41	0.38	0.23	23	64	59	36
Rest of South East Northumberland Delivery Area OA4	427200	578900	156	0.15	0.41	0.38	0.23	23	64	59	36
Rest of South East Northumberland Delivery Area OA5	430400	587100	156	0.15	0.41	0.38	0.23	23	64	59	36
Hexham	392919	564231	720	0.15	0.41	0.38	0.23	108	295	274	166
Morpeth	420005	586090	2100	0.15	0.41	0.38	0.23	315	861	798	483
Ponteland	416719	572848	900	0.15	0.41	0.38	0.23	135	369	342	207
Prudhoe	409880	563071	900	0.15	0.41	0.38	0.23	135	369	342	207
Corbridge	398977	564379	300	0.15	0.41	0.38	0.23	45	123	114	69
Rest of Central Northumberland Delivery Area OA1	428000	592200	204	0.15	0.41	0.38	0.23	31	84	78	47
Rest of Central Northumberland Delivery Area OA2	423700	594300	204	0.15	0.41	0.38	0.23	31	84	78	47
Rest of Central Northumberland Delivery Area OA3	412900	581600	204	0.15	0.41	0.38	0.23	31	84	78	47
Rest of Central Northumberland Delivery Area OA4	414600	594600	204	0.15	0.41	0.38	0.23	31	84	78	47
Rest of Central Northumberland Delivery Area OA5	425200	600000	204	0.15	0.41	0.38	0.23	31	84	78	47
Alnwick	418692	613238	1100	0.15	0.41	0.38	0.23	165	451	418	253
Berwick-upon-Tweed	399699	653104	900	0.15	0.41	0.38	0.23	135	369	342	207
Belford	410884	633977	230	0.15	0.41	0.38	0.23	35	94	87	53
Seahouses	422089	631996	230	0.15	0.41	0.38	0.23	35	94	87	53
Rothbury	405839	601820	200	0.15	0.41	0.38	0.23	30	82	76	46
Wooler	399326	628122	280	0.15	0.41	0.38	0.23	42	115	106	64
Rest of North Northumberland Delivery Area OA1	401500	639700	250	0.15	0.41	0.38	0.23	38	103	95	58
Rest of North Northumberland Delivery Area OA2	422700	622900	250	0.15	0.41	0.38	0.23	38	103	95	58
Rest of North Northumberland Delivery Area OA3	407100	614500	250	0.15	0.41	0.38	0.23	38	103	95	58
Rest of North Northumberland Delivery Area OA4	416500	603700	250	0.15	0.41	0.38	0.23	38	103	95	58
Rest of North Northumberland Delivery Area OA5	423000	602100	250	0.15	0.41	0.38	0.23	38	103	95	58
Haltwhistle	370987	564514	400	0.15	0.41	0.38	0.23	60	164	152	92
Allendale	383960	555630	100	0.15	0.41	0.38	0.23	15	41	38	23
Bellingham	383899	583519	280	0.15	0.41	0.38	0.23	42	115	106	64
Haydon Bridge	384494	564747	200	0.15	0.41	0.38	0.23	30	82	76	46
Rest of West Northumberland Delivery Area OA1	391900	571200	74	0.15	0.41	0.38	0.23	11	30	28	17
Rest of West Northumberland Delivery Area OA2	398800	585800	74	0.15	0.41	0.38	0.23	11	30	28	17
Rest of West Northumberland Delivery Area OA3	401800	561500	74	0.15	0.41	0.38	0.23	11	30	28	17
Rest of West Northumberland Delivery Area OA4	383000	556300	74	0.15	0.41	0.38	0.23	11	30	28	17
Rest of West Northumberland Delivery Area OA5	406000	560300	74	0.15	0.41	0.38	0.23	11	30	28	17
			24320					3648	9971	9242	5594

Appendix B - Spatial Aspirations: Employment

Plan

Delivery Area	Location	Hectares
South East Northumberland	Amble	10.84
	Ashington	28.38
	Bedlington	0.00
	Blyth	206.29
	Cramlington	67.55
	Guidepost / Stakeford / Choppington	0.00
	Newbiggin-by-the-Sea	0.00
	Seaton Delaval/New Hartley/Seghill/Holywell	0.29
	Rest of South East Northumberland	2.09
	Hexham	12.68

GRAHAM Analysis

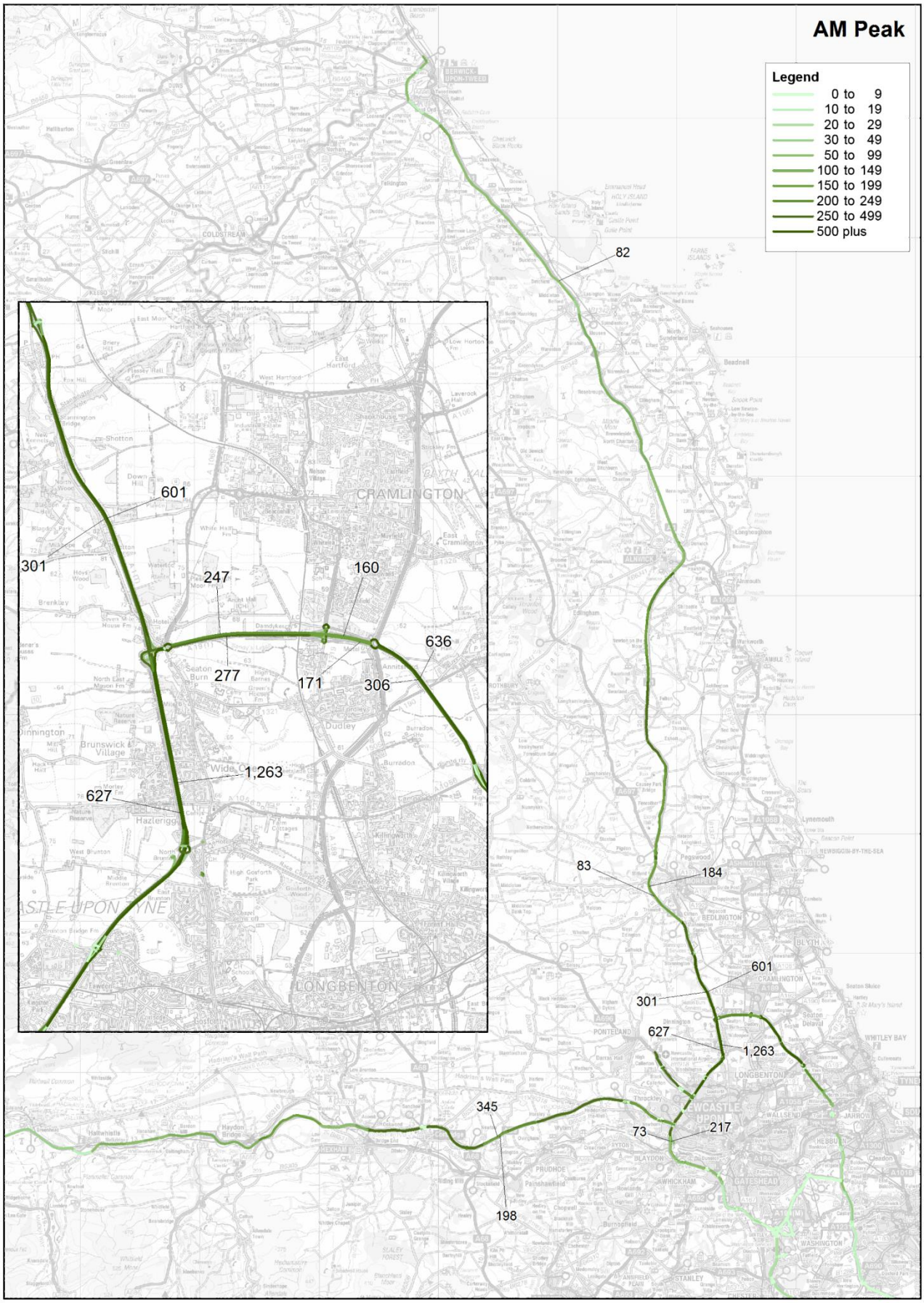
Site Name	Easting	Northing	Development Type	Hectares	Rates AM In	Rates AM Out	Rates PM In	Rates PM Out	Trips AM In	Trips AM Out	Trips PM In	Trips PM Put
Coquet Enterprise Park	426727	603710	B1 / B2 / B8 Average	10.84	15.27	3.85	2.74	13.18	165	42	30	143
Ashwood Business Park	429472	586163	B1 / B2 / B8 Average	16.13	15.27	3.85	2.74	13.18	246	62	44	213
North Seaton (Colliery)	428892	586041	B1 / B2 / B8 Average	6.24	15.27	3.85	2.74	13.18	95	24	17	82
Wansbeck Business Park	426709	588096	B1 / B2 / B8 Average	5.40	15.27	3.85	2.74	13.18	82	21	15	71
Jubilee Industrial Estate	427529	586326	B1 / B2 / B8 Average	0.39	15.27	3.85	2.74	13.18	6	2	1	5
Lintonville Enterprise Park	427591	588139	B1 / B2 / B8 Average	0.22	15.27	3.85	2.74	13.18	3	1	1	3
Green Lane Workshops	427609	586935	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Barrington	426368	583554	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Brickworks	427257	583277	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Bedlington Station	427552	583548	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Earth Balance	427189	584202	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Blyth Quayside	431958	581501	40% B8	0.58	2.23	1.13	0.94	2.07	1	1	1	1
Cowley Business Park	429884	582222	75% B8	5.23	4.19	2.12	1.76	3.88	22	11	9	20
Coniston Business Park	428975	582070	75% B8	3.92	4.19	2.12	1.76	3.88	16	8	7	15
Distribution Park	429700	583970	B1 / B2 / B8 Average	7.56	15.27	3.85	2.74	13.18	115	29	21	100
Blyth Harbour North	430120	583300	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
South Harbour	430610	582430	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
East Sleekburn	427799	584653	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Blyth Estuary Strategic Employment Area	429690	584150	75% B8	44.00	4.19	2.12	1.76	3.88	184	93	77	171
			40% B8	21.00	2.23	1.13	0.94	2.07	47	24	20	43
			Not included	124.00	0.00	0.00	0.00	0.00	0	0	0	0
Former Alcan site	429778	589899	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
West Hartford Strategic	425589	579168	B1 / B2 Average	13.19	20.11	4.36	2.94	17.19	265	58	39	227
Windmill	424109	578508	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
North Nelson	425066	578726	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Nelson Park West	424765	578224	B1 / B2 / B8 Average	6.83	15.27	3.85	2.74	13.18	104	26	19	90
Nelson Park	425293	578265	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Crosland Park	425734	578514	B1 / B2 / B8 Average	2.99	15.27	3.85	2.74	13.18	46	12	8	39
Nelson Park East	425741	578200	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
South Nelson	425348	577884	B1 / B2 / B8 Average	1.35	15.27	3.85	2.74	13.18	21	5	4	18
Bassington	424923	577479	B1 / B2 / B8 Average	7.73	15.27	3.85	2.74	13.18	118	30	21	102
Northumberland Business Park	426356	574560	B1 / B2 / B8 Average	16.17	15.27	3.85	2.74	13.18	247	62	44	213
West Hartford	425461	579176	B1 / B2 / B8 Average	19.29	15.27	3.85	2.74	13.18	294	74	53	254
Double Row	429909	576093	B1 / B2 / B8 Average	0.29	15.27	3.85	2.74	13.18	4	1	1	4
West Sleekburn Industrial Estate	428320	584350	B1 / B2 / B8 Average	1.72	15.27	3.85	2.74	13.18	26	7	5	23
Hadston	424997	600408	B1 / B2 / B8 Average	0.37	15.27	3.85	2.74	13.18	6	1	1	5
Avenue Row	430344	574892	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Seghill	428866	574882	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Ellington Colliery	428322	591612	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
East Cramlington	428667	575922	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Land East of Egger	394856	564733	B1 / B2 / B8 Average	9.82	15.27	3.85	2.74	13.18	150	38	27	129
Egger	394856	564733	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Bridge End	394387	564889	B1 / B2 / B8 Average	0.51	15.27	3.85	2.74	13.18	8	2	1	7
Burn Lane	393363	564571	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Haugh Lane	393536	564501	B1 / B2 / B8 Average	0.17	15.27	3.85	2.74	13.18	3	1	0	2
Bunker site	393821	564405	B1 / B2 / B8 Average	2.18	15.27	3.85	2.74	13.18	33	8	6	29
Tyne Mills	394116	564411	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
Goods yard	394111	564199	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0

Central Northumberland	Morpeth	10.46	Fairmoor Northgate	418488	587499	B1 / B2 / B8 Average	1.59	15.27	3.85	2.74	13.18	24	6	4	21
			Fairmoor - adjacent to A1	418278	587180	B1 / B2 / B8 Average	8.71	15.27	3.85	2.74	13.18	133	34	24	115
			Coopies Lane	421124	585390	B1 / B2 / B8 Average	0.16	15.27	3.85	2.74	13.18	2	1	0	2
			Railway Yards	420678	585465	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Whalton Road	418233	584199	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Loansdean	419959	584495	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Ponteland	1.08	Ponteland Office Park	416579	572381	B1 / B2 / B8 Average	1.08	15.27	3.85	2.74	13.18	16	4	3	14
			Meadowfield	416120	573013	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Prudhoe	9.43	Low Prudhoe	409843	563807	B1 / B2 / B8 Average	5.71	15.27	3.85	2.74	13.18	87	22	16	75
			Land to the west of Low Prudhoe	408280	562750	B1 / B2 / B8 Average	1.08	15.27	3.85	2.74	13.18	16	4	3	14
			Eltringham	408245	562922	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Land adjoining former Akzo Nobel	410600	563810	B1 / B2 / B8 Average	2.64	15.27	3.85	2.74	13.18	40	10	7	35

	Corbridge	0.00	Corbridge Station	398903	563490	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Rest of Central Northumberland	0.10	Acomb	392584	566227	B1 / B2 / B8 Average	0.10	15.27	3.85	2.74	13.18	2	0	0	1
			Howford Quarry	391940	566353	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Milkhope Centre	421663	576142	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			New Kennels	421633	577921	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			West End	369690	563635	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Bywell Home Farm	404889	563206	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Ochrelands	394425	562460	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Pegswood	422927	587680	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Whitehouse Farm	419095	581789	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Stocksfield Hall	405419	561797	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
North Northumberland	Alnwick	17.24	Willowburn Avenue	419279	611701	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Greensfield Park	419241	611996	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Greensfield Moor	419531	611546	B1 / B2 / B8 Average	2.22	15.27	3.85	2.74	13.18	34	9	6	29
			Lionheart Enterprise Park	419764	611627	B1 / B2 / B8 Average	0.21	15.27	3.85	2.74	13.18	3	1	1	3
			Lionheart Phase two	419921	611769	B1 / B2 / B8 Average	1.71	15.27	3.85	2.74	13.18	26	7	5	23
			West Cawledge	419807	611917	B1 / B2 / B8 Average	2.88	15.27	3.85	2.74	13.18	44	11	8	38
			Willowtree	419661	612019	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Willowburn	419781	612247	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Sawmill	419478	612380	B1 / B2 / B8 Average	0.22	15.27	3.85	2.74	13.18	3	1	1	3
			South Road	419418	612630	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Station Road	419187	612896	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			St Thomas Close	417921	613167	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Land to the east of Lionheart Estate	419772	611625	B1 / B2 / B8 Average	10.00	15.27	3.85	2.74	13.18	153	39	27	132
	Berwick-upon-Tweed	8.67	Tweedmouth	399595	651764	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Tweedside	398809	652096	B1 / B2 / B8 Average	1.80	15.27	3.85	2.74	13.18	27	7	5	24
			North Road	399096	655036	B1 / B2 / B8 Average	0.24	15.27	3.85	2.74	13.18	4	1	1	3
			Ramparts Business Park	398932	655296	B1 / B2 / B8 Average	6.63	15.27	3.85	2.74	13.18	101	26	18	87
	Belford	0.70	Belford Industrial Estate	412094	633724	B1 / B2 / B8 Average	0.70	15.27	3.85	2.74	13.18	11	3	2	9
	Seahouses	0.00													
	Rothbury	0.00	Rothbury	405820	601820	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Wooler	2.08	NW of Berwick Road	399322	628708	B1 / B2 / B8 Average	2.08	15.27	3.85	2.74	13.18	32	8	6	27
			Wooler Industrial Estate	399421	628588	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Rest of North Northumberland	0.71	North Sunderland Estate	421124	631727	B1 / B2 / B8 Average	0.71	15.27	3.85	2.74	13.18	11	3	2	9
			Millfield	394230	633061	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Lee Moor Farm	422032	618240	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Swarland Grains	417302	603745	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Wooperton Sawmill	404970	619936	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0

West Northumberland	Haltwhistle	1.37	Hadrian	371077	563819	B1 / B2 / B8 Average	1.37	15.27	3.85	2.74	13.18	21	5	4	18
	Allendale	1.13	Station Site	370392	563849	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Catton	383130	557104	B1 / B2 / B8 Average	0.55	15.27	3.85	2.74	13.18	8	2	2	7
	Bellingham	0.06	Ridleys Yard	383161	556580	B1 / B2 / B8 Average	0.58	15.27	3.85	2.74	13.18	9	2	2	8
			Foundry Road	384081	583461	B1 / B2 / B8 Average	0.06	15.27	3.85	2.74	13.18	1	0	0	1
	Haydon Bridge	0.00	Haydon Bridge	384276	564492	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			North of Station Road	384472	564682	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Rest of West Northumberland	0.00	Limeworks	388674	567751	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Papermill	390182	566536	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Plenmeller	370631	562795	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
			Sawmill	386251	576615	B1 / B2 / B8 Average	0.00	15.27	3.85	2.74	13.18	0	0	0	0
	Total	381.15					381.15					3119	846	615	2708

Appendix C – Local Plan trip assignments (pre-TEMPro control)


AM Peak
Legend
0 to 9
10 to 19
20 to 29
30 to 49
50 to 99
100 to 149
150 to 199
200 to 249
250 to 499
500 plus
82
601
301
247
160
636
277
171
306
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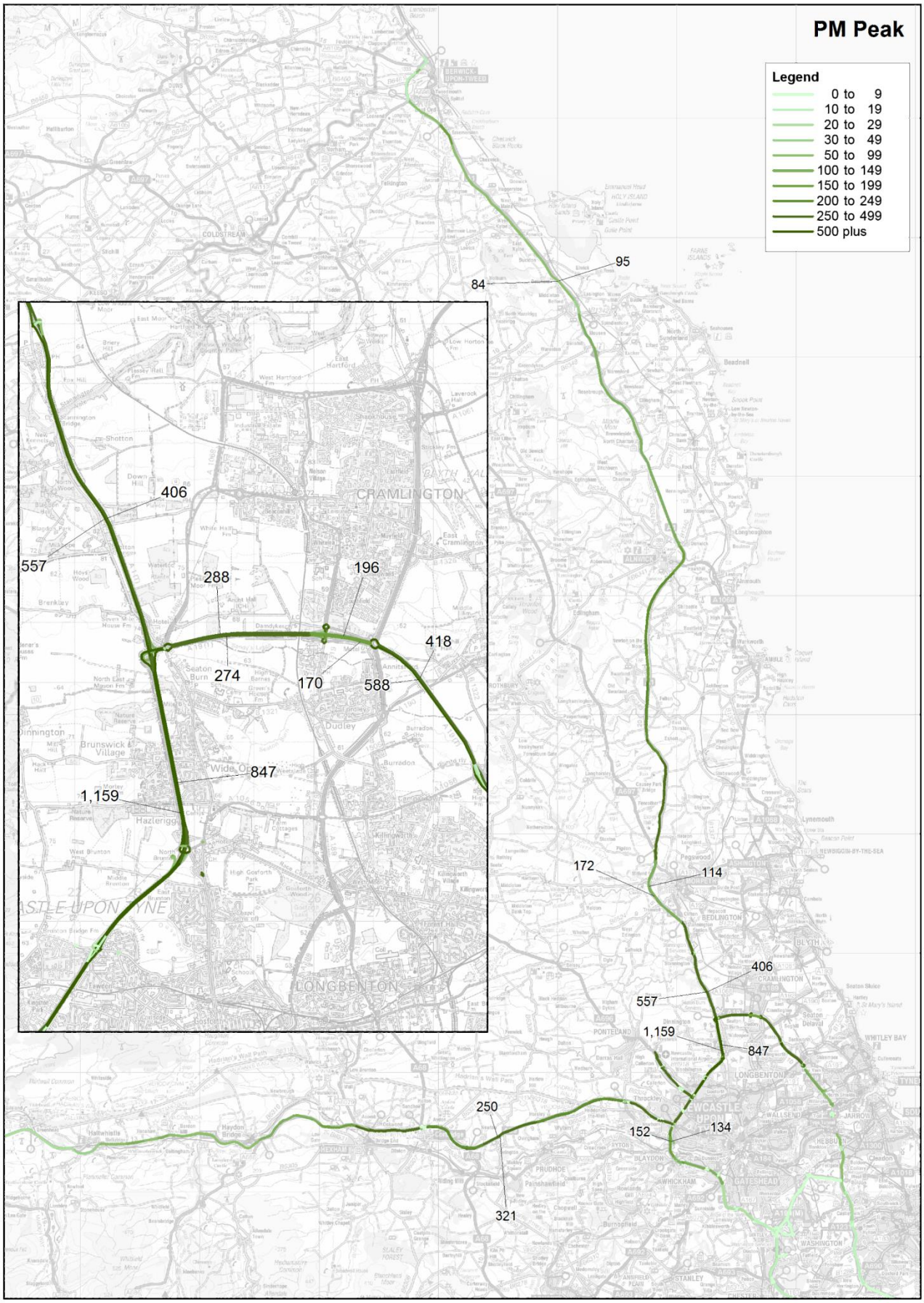
627
83
184
601
301
627
1,263
345
73
217
198
CRAMLINGTON
LONGBENTON


PM Peak
Legend
0 to 9
10 to 19
20 to 29
30 to 49
50 to 99
100 to 149
150 to 199
200 to 249
250 to 499
500 plus
95
84
406
557
288
196
418
274
170
588
847
1,159
172
114
406
557
1,159
847
250
152
134
321
CRAMLINGTON
LONGBENTON