

**Northumberland County Council**

## **Managing Morpeth's Transport**

### **Assessment of Telford Bridge Junction Options – Final Report**

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## Introduction

### 2 The Study

3 This report provides a summary of the work carried out by Phil Jones Associates (PJA) in relation to the movement of traffic (including pedestrians, cyclists and public transport) through Morpeth Town Centre, and specifically the operation of the junction on the northern side of Telford Bridge. That junction was previously a mini-roundabout, and was changed to traffic signal control in the Spring of 2012.

4 Phil Jones Associates has carried out numerous visits to the town since commencing the study late in 2012. These have included meetings with particular interest groups and officers and members of the County and Town Councils, and holding a workshop in March 2013 which considered issues in the round. We have also carried out observations on the operation of the Bridge Street traffic signals and how this interacts with other movements through and to the town centre.

5 Our work has led us to conclude that there is a case for the reinstatement of a mini-roundabout layout at the key junction at the northern end of Telford Bridge, which is currently controlled by traffic signals. We therefore recommend that a trial of such a layout should now be carried out, following which the Highway Authority will be better able to decide on the long-term layout.

### 6 Background to the study

7 Significant concerns were raised by the public and other stakeholders following the replacement of the mini-roundabout markings with traffic signals at the junction of Telford Bridge, Damside and Bridge Street in the centre of Morpeth in April 2012.

8 These works were funded by a developer, Dransfield Properties, who was required to satisfy a planning condition attached to the granting of planning permission for a new supermarket at Lower Stanners. The analysis and design of the signals was carried out by AECOM, as consultants to Dransfield, and was reviewed technically by officers at Northumberland County Council.

9 The principal concerns raised by the public in connection with the traffic signals were:

- Increased delays to motor traffic, leading to increased flows on more minor routes around the town centre;
- The tightness of the junction layout for large vehicles, causing them to overrun footways and come into conflict with street furniture;
- The perceived increased risk of collisions;
- Increased delays to pedestrians at the associated signal crossings;

- The negative effect of the traffic signals on the street scene at this important gateway to the town centre;
- The adverse effect of the traffic signals on retailers and other businesses in the centre.

10 PJA's brief was to conduct an independent review of the operation of the junction and the local transport networks serving the town. The terms of reference of the study are as follows:

- *To engage with and involve people and groups in the town who are vocal in their views and feel that their voices are not being properly heard;*
- *To examine and agree what the traffic and movement network in Morpeth should and shouldn't provide to its users, be they motorists, pedestrians, cyclists or delivery vehicles, and express these commonly held views through a hierarchy of users and a series of agreed objectives for the town's transport network;*
- *To examine the current transport system in Morpeth and see where these objectives are failing; and critically*
- *To assess a full range of options for altering the transport network in Morpeth in the immediate term, in the medium term (the period between the superstore opening and the bypass being completed) and the long term (once the bypass is opened).*

11 The reference to the bypass is to the Morpeth Northern Bypass, which is currently due for commencement in Autumn 2015.

## 12 **Aims of the report**

13 The aims of this report are to review the present situation, and to recommend a series of actions. Therefore, this report covers the following areas;

- Summary and review of the data that has been collected – traffic volumes, journey time and origin-destination surveys;
- The operation of the existing traffic signals
- Options for alternative layouts
- Recommendations for the layout of the Telford Bridge junction for both the short and long-term.

14 In drawing our conclusions and recommendations, we have had regard to the outcomes of the March 2013 Workshop, which sought to answer the following questions:

- *What should be the overall aims and specific objectives for transport in Morpeth?*



- *What are the present problems and what is working well?*
- *What will be the effect of planned changes on Morpeth's transport networks?*
- *What options should be considered for improving Morpeth's transport networks?*

15 The report of the workshop is included in Appendix A. The discussions went well beyond simply the Telford Bridge junction; potential actions considered included some large projects such as new road links and changes to the town centre traffic management regime. The assessment of this type of intervention would require a more comprehensive transport assessment which is beyond the scope of our instructions at this time.

16 However, we have sought to reflect the views expressed at the workshop in making this assessment of the options for the junction. In particular, in answer to the first question (ie 'what does success look like?'), the following points were made:

- *Some traffic congestion at peak times is inevitable but it should be predictable.*
- *It is better for traffic to flow evenly and slowly than in a stop-start manner*
- *The appearance of the town centre is very important to the local economy*

## Summary of surveys

### 18 Traffic Counts

19 Automatic Traffic Count data for a number of key links around the town centre (pre-and post the junction scheme) has been provided by NCC and are summarised on the diagram included as Appendix B. The analysis shows the following trends:

- Traffic volumes on Telford Bridge have reduced following the introduction of the traffic signals. 12 hour flows were reduced by 16% northbound and 10% southbound compared to the most recent pre signals data from 2011. Northbound flows have fallen by some 18% in the morning peak and 25% in the afternoon peak, and around 15% over 24 hours (all weekdays). The reduction in southbound flow is lower, but still amounts to 10% over 24 hours.
- There was some increase in traffic flows in the post-signals situation at St Mary's Field, which is the most likely diversion route from the A197 to the town centre, via Curly Kews and Oldgate. The 12 hour flows increased by 34% northbound and 26% southbound.

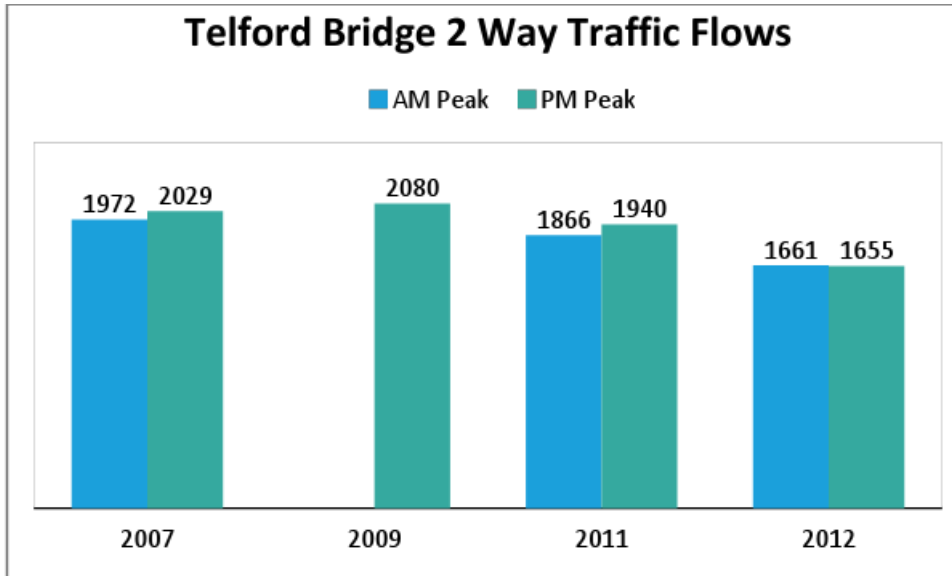
20 Traffic data for the PM peak is also provided in the AECOM Transport Assessment of April 2010. This indicates that PM peak traffic flows in 2009 were higher than in the post-signals situation. The overall reduction in PM peak hour flow from 2009 to 2012 is 22% Northbound and 8% Southbound.

21 Data on town centre flows are also given in the AECOM Report of Surveys, prepared for Northumberland CC as part of the modelling work for the Northern Bypass. This data, which is from October 2007, shows similar traffic flows across Telford Bridge to those measured in 2009 and 2011.

22 Figure 2-1 below summarises the change in traffic flows at Telford Bridge over time.



Figure 2-1: Telford Bridge Traffic Flows



- 23 This data shows that traffic flows were reasonably consistent between 2007 and 2011, albeit with a slight decline, but that has been a more significant reduction in traffic flow on Telford Bridge since the traffic signals were installed in 2012. Given that the junction is operating at capacity in the peak hours, this indicates that the signals are coping less well with traffic demands than the previous mini-roundabout layout.
- 24 Although there may be some impact on the non-strategic route via Curly Kews, the additional flow is relatively small in absolute terms, and is less than the reduction in traffic on Telford Bridge. Overall there has therefore been a reduction in traffic flows across the River Wansbeck.

## 25 Journey Time Data

26 Northumberland County Council commissioned a series of journey time surveys in May and August 2013, in order to establish the current level of congestion across the town. As part of the preparatory work for the Northern Bypass Scheme in 2007, 2008 and 2009, AECOM (as consultants to the County Council) also undertook extensive surveys for a number of routes.

27 These sets of data provide the basis for a comparison of the level of congestion with the previous mini-roundabout and present traffic signals layouts at the Telford Bridge junction. As noted above, traffic flows at Telford Bridge during the period before the installation of the signals were reasonably consistent.

28 The data for the 2013 Journey Time surveys are included as Appendix C. It should be noted that the two sets of surveys differ in detail in terms of the routes taken and the manner of recording, and therefore a direct comparison of the journey time data is not possible and some interpolation has been necessary.

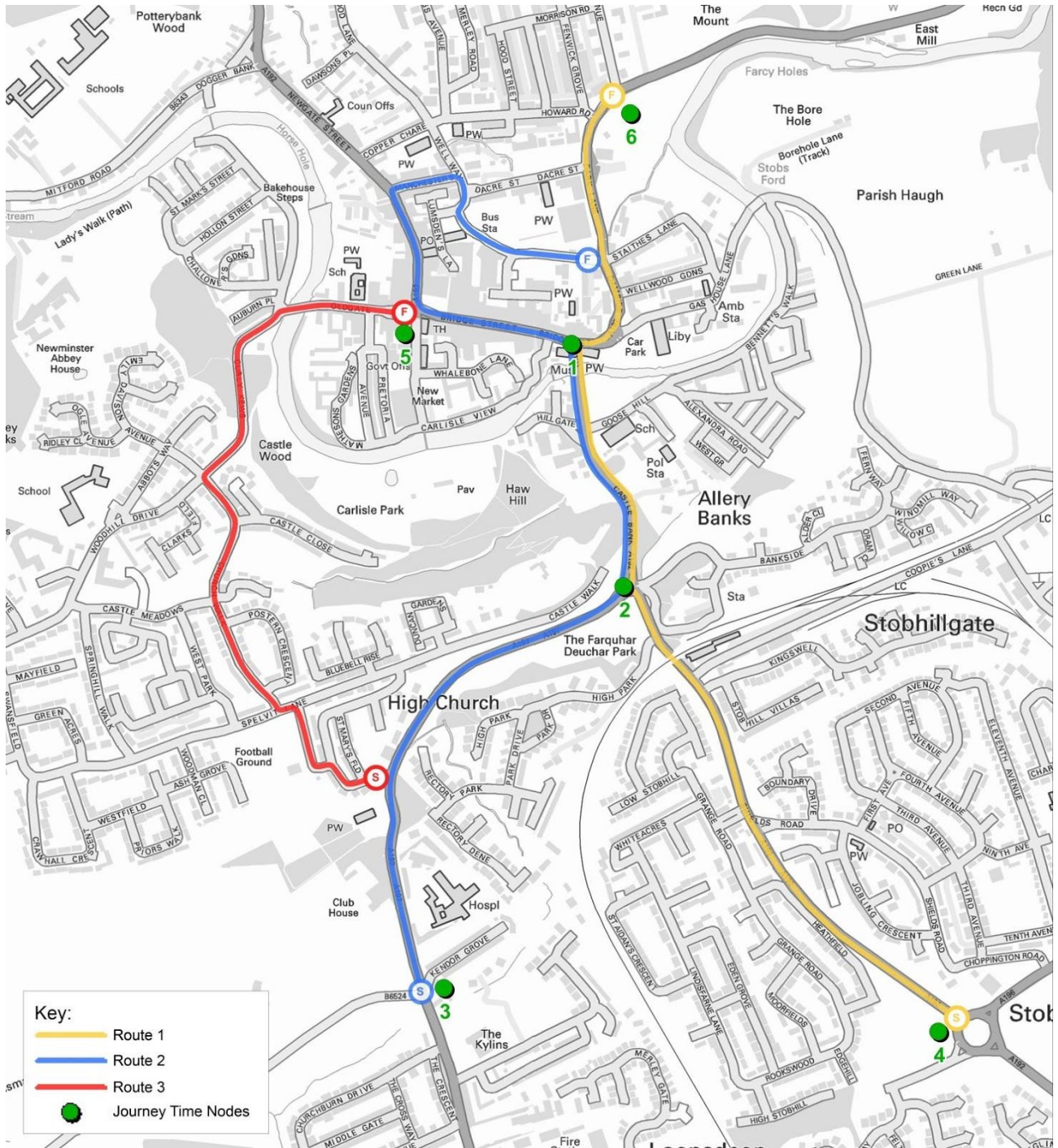
29 The May 2013 surveys consisted of three routes, both carried out in the northbound and southbound directions, as shown on Figure 2.2;

- Route 1 – A192/A196 roundabout, via Castle Bank to A197 Dark Lane (through Morpeth Town Centre);
- Route 2- B6524/A197 junction via Castle Bank to A192 Bridge Street (through Morpeth Town Centre);
- Route 3- St Marys Field/A197 junction, Church Walk, Curley Kews

30 Additional surveys were carried out for Routes 1 and 3 in August 2013 to provide additional information on the journey times.

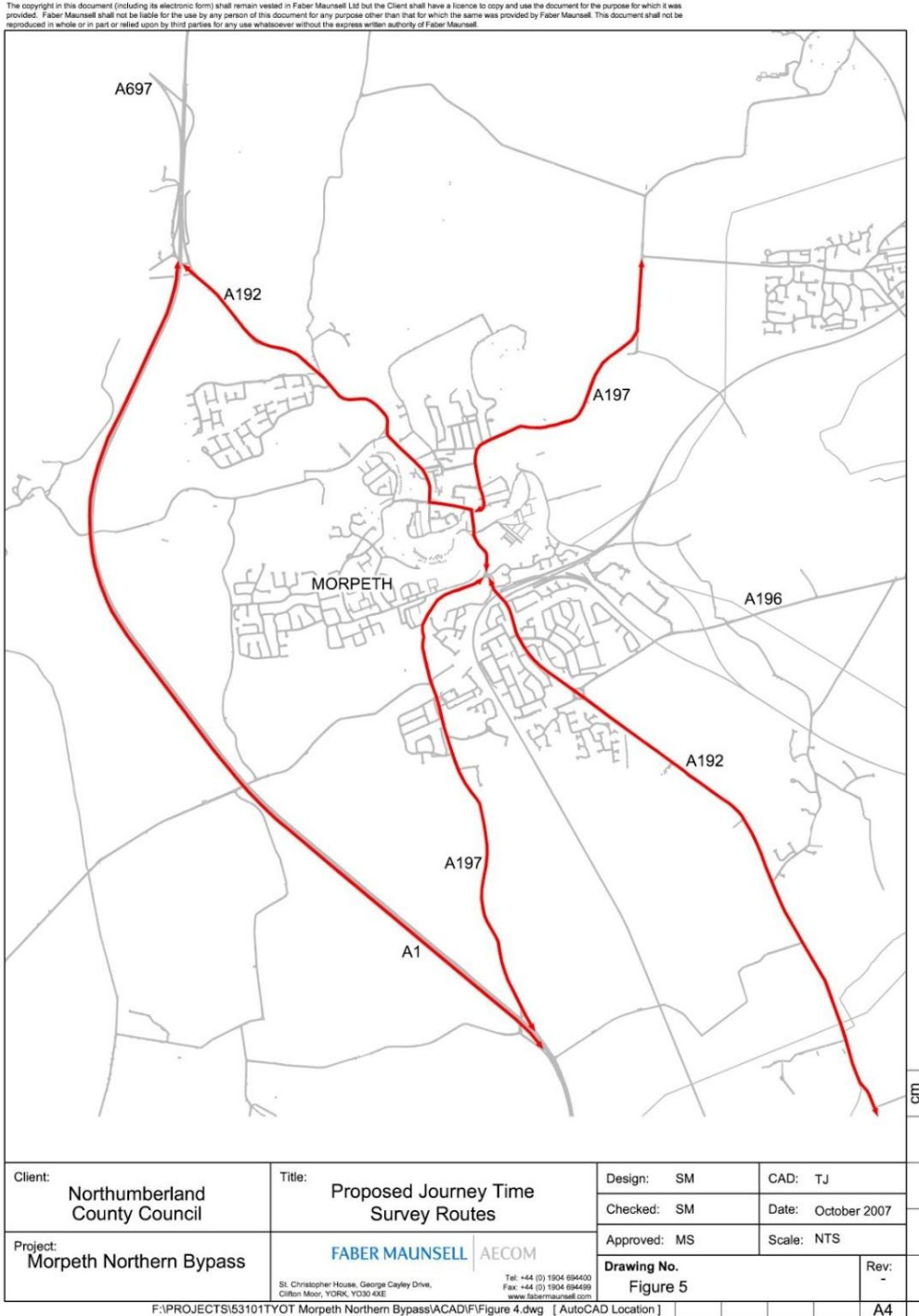


Figure 2-2: Journey Time Routes, 2013



31 The AECOM survey routes are shown below.

**Figure 2-3: AECOM 2007-9 Journey Time Survey Routes**



32 To enable a direct comparison of sections of the route with the previous AECOM surveys, the times taken to travel between the following Journey Time Nodes, as shown on Figure 2.2, were considered;

- From 3 to 2 –B6254/A197 northbound to Mafeking Roundabout;
- From 2 to 5 – Mafeking northbound to Bridge Street/Oldgate/Newgate Roundabout;
- From 4 to 2 – A192/A196 Roundabout northbound to Mafeking Roundabout;
- From 6 to 1 – Dark Lane/Howard Road southbound to Bridge Street/Damside Junction.

33 The 2013 survey results are for the AM peak period 07:00 to 09:00, and the PM peak period 16:00 to 18:00. The exact times of the 2007-9 surveys are unknown, as they are only referred to as AM and PM peaks, but it is expected that they would have been similar.

**Table 2-1: Comparison of Journey Times for the AM Peak, 2007 and 2013 surveys**

Surveys	Time (seconds) 3 to 2			Time (seconds) 2 to 5			Time (seconds) 4 to 2			Time (seconds) 6 to 1		
	Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max
2007 Surveys	85	57	153	105	69	155	154	78	371	49	35	75
2013 May Surveys	153	105	400	136	85	200	170	120	275	109	60	270
2013 Aug Surveys	n/a	n/a	n/a	n/a	n/a	n/a	96	94	398	n/a	n/a	n/a
Change 2007 to May 2013	<b>68</b>	<b>48</b>	<b>247</b>	<b>30</b>	<b>16</b>	<b>45</b>	<b>16</b>	<b>42</b>	<b>-96</b>	<b>60</b>	<b>25</b>	<b>195</b>

**Table 2-2: Comparison of Journey Times for the PM Peak, 2007 and 2013 surveys**

Surveys	Time (seconds) 3 to 2			Time (seconds) 2 to 5			Time (seconds) 4 to 2			Time (seconds) 6 to 1		
	Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max
2007 Surveys	122	70	370	152	51	419	79	61	117	57	44	63
2013 May Surveys	196	120	390	232	210	260	168	155	185	124	70	295
2013 Aug Surveys	n/a	n/a	n/a	n/a	n/a	n/a	158	94	398	n/a	n/a	n/a
Change 2007 to May 2013	<b>74</b>	<b>50</b>	<b>20</b>	<b>80</b>	<b>159</b>	<b>-159</b>	<b>89</b>	<b>94</b>	<b>68</b>	<b>68</b>	<b>26</b>	<b>232</b>

- 34 The results show that the average journey time has increased from 2007-9 to May 2013 on all of the routes (although there two routes where there was a decline in the maximum delay that was recorded by one particular survey run).
- 35 The data for August 2013 only covers one of the routes considered. It shows that delays reduced in the morning peak but increased in the evening peak, compared to 2007-9, but given that this is during a school holiday period, the results are unlikely to be representative of normal conditions.
- 36 This data analysis indicates that the signals have not improved the average traffic delays at junction, as was expected, but have generally made the situation worse, even though there has been a reduction in traffic flow through the junction. This is a significant finding which has implications for the decision whether or not to retain the existing traffic signal layout.



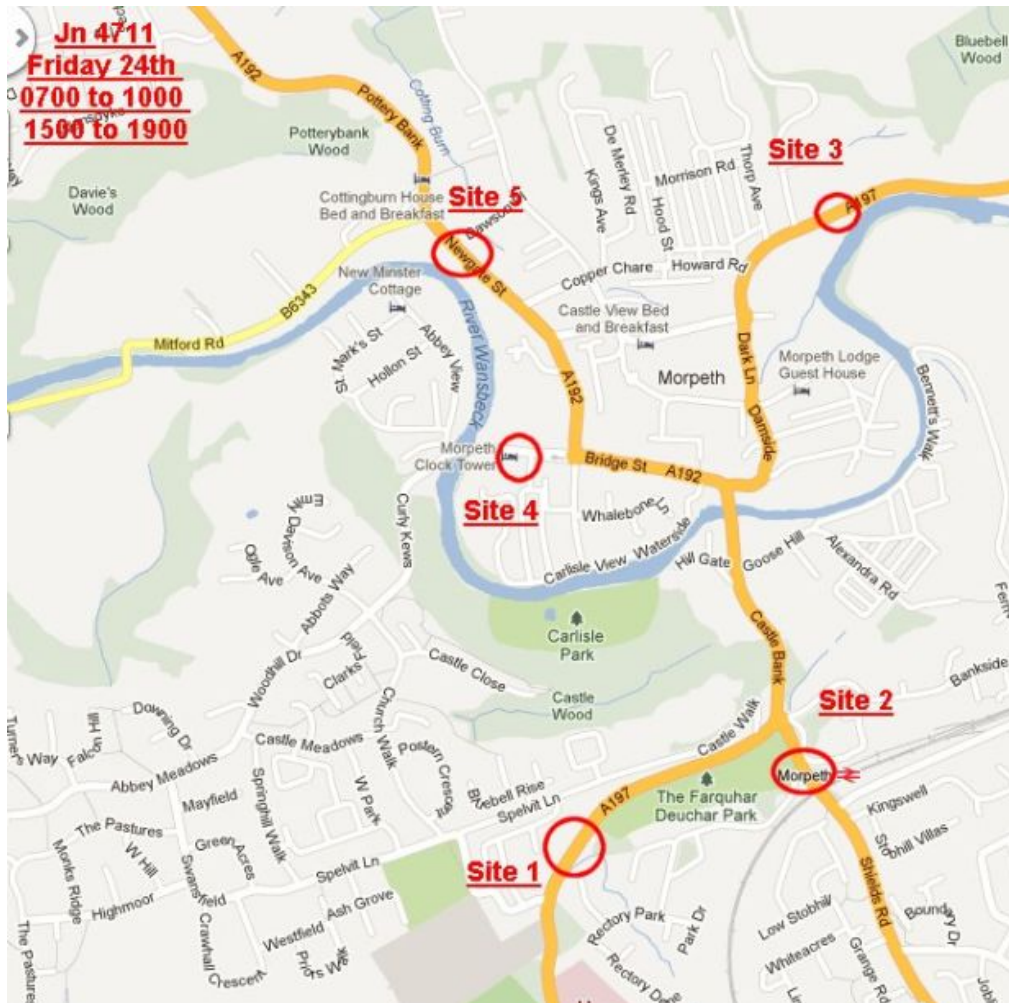


### 37 Origin Destination Surveys

38 Northumberland County Council also conducted an origin-destination survey in 2013, with the AM peak survey carried out on the 7<sup>th</sup> June, and the PM peak survey on the 24<sup>th</sup> May.

39 The locations of the five survey sites are shown on Figure 2.3 below, with the summary results for the AM and PM peak periods in Tables 2.3 and 2.4 below. The full results are included as Appendix D.

Figure 2-3: Location of sites for the Origin-Destination surveys in Morpeth



**Table 2-3: Origin Destination Data for Morpeth, May 2013, AM Peak (07:00 – 09:00)**

			Destination	1	2	3	4	5	Total
<b>Total</b>	<b>Origin</b>	<b>Site 1</b>	A197 (Sun Inn)	0	510	111	18	63	<b>702</b>
		<b>Site 2</b>	A192 (Shields Road)	653	0	87	24	328	<b>1092</b>
		<b>Site 3</b>	Whorral Bank	398	192	0	95	301	<b>986</b>
		<b>Site 4</b>	Oldgate	79	97	126	0	147	<b>449</b>
		<b>Site 5</b>	Newgate Street	160	291	185	46	0	<b>682</b>
			<b>Total</b>		<b>1290</b>	<b>1090</b>	<b>509</b>	<b>183</b>	<b>839</b>

**Table 2-4: Origin Destination Data for Morpeth, May 2013, PM Peak (15:00 – 17:00)**

			Destination	1	2	3	4	5	Total
<b>Total</b>	<b>Origin</b>	<b>Site 1</b>	A197 (Sun Inn)	0	103	219	34	108	<b>464</b>
		<b>Site 2</b>	A192 (Shields Road)	640	0	112	38	263	<b>1053</b>
		<b>Site 3</b>	Whorral Bank	216	65	0	111	230	<b>622</b>
		<b>Site 4</b>	Oldgate	46	53	141	0	123	<b>363</b>
		<b>Site 5</b>	Newgate Street	96	72	217	59	0	<b>444</b>
			<b>Total</b>		<b>998</b>	<b>293</b>	<b>689</b>	<b>242</b>	<b>724</b>

40 It is important to note that the surveys only show the matched registrations for through movements passing across two of the five sites. Therefore, the volume of traffic parking or remaining within the town centre for the peak periods is not identified, and therefore, this is only a partial registration matching survey.

41 The results demonstrate the following patterns for through-traffic for the morning peak period;

- A predominant movement is from Site 1 to Site 2 (A197 South to Shields Road), accounting for 73% of all matched vehicles approaching from the A197 South;
- A predominant movement from Site 2 to Site 1 (Shields Road to the A197 South), accounting for 60% of all traffic approaching from Shields Road;
- A high volume of through-traffic approaching from Site 3 (Whorral Bank), with 40% travelling south through to Site 1 and 31% northbound through Newgate Street;
- A lower total of through movements from Sites 4 and 5, with a spread of through movements in all directions.

- 42 For the evening peak period, there are total of just under 3000 matched movements, compared to nearly 4000 for the morning 2-hour period. The following patterns for the PM peak are shown;
- There are only 100 vehicles matched from Site 1 to Site 2, and therefore the high volume of traffic in the morning peak from 2 to 1 is not transposed (reversed) for the evening peak home trip;
  - 36% of the matched movements are arriving from Site 2 (Shields Road), with the majority turning left to Site 1 (A197 south) and not through the town;
- 43 It could be argued that a significant level of the through traffic recorded in the surveys may be removed in the future as a result of the Morpeth Northern Bypass. The County Council's consultants AECOM previously modelled the predicted effect of the planned Northern Bypass, which will link the A1 and the A197 (due for completion in 2015), together with the additional development.
- 44 The modelling predicts that although the bypass will itself relieve traffic in the town centre by around 20%, traffic generated by planned developments has the potential to leave the town no better off in traffic terms than at present, assuming that the travel choices of the new and existing residents are the same as now. Investment in walking, cycling and public transport would have the potential to mitigate any impact, however.

**45**

## Road Safety

### 46 Introduction

47 In the earlier sections of this report we assessed the impact of the traffic signals on congestion. We now assess the signals with regard to the concerns expressed over road safety and have also looked at the safety record of the previous mini-roundabout layout.

### 48 Assessment

49 It is understood that there have been a number of vehicle strikes on traffic signs and other street furniture at the signalled junction, including signal heads, and we have witnessed occasions when large vehicles making the right turn from Telford Bridge to Damside have failed to make the turn and had to reverse.

50 We have not been made aware of any casualties arising from these collisions, however, and we understand that the Police are not greatly concerned over road safety at the junction.

51 The tracking of the signal layout has been reviewed by PJA, and the results are included as Appendix E.

52 This shows that while it is possible for long articulated and other large vehicles to negotiate the signals successfully, the space is tight and there is little room for error. If a vehicle turns earlier than it should it is possible that the rear end of the vehicle would overrun the kerb. This would potentially place a pedestrian at some risk, although the likelihood of this occurring is small. Nevertheless, the consequences of such an event could be serious.

53 We also note that the introduction of the signals has increased the waiting time for pedestrians at the signal-controlled crossings on Dam Street and Bridge Street, as they now operate with the longer traffic signal cycle rather than as stand-alone Pelicans. This has reduced pedestrian amenity and could lead to more people crossing the carriageway on the red man.

54 We have reviewed the accident record of the former mini roundabout and have found it to be good, considering the high volume of traffic that uses the junction, with only two recorded personal injury accidents in the 5 year period up to 2011, neither of which involved a pedestrian or cyclist.

55 In conclusion, there appears to be a persistent problem with large vehicles at the traffic signals striking street furniture, and while it is unlikely that this will cause personal injury, this cannot be ruled out. It is clearly an undesirable situation which has only arisen since the change to the junction layout.

- 56 There is also some potential for the bodies of large vehicles to overhang the edge of the footway if drivers misjudge the turn, and while the risk of a pedestrian being struck is low, the consequences could be severe. Pedestrians may also be more at risk at the crossings due to the longer cycle times.
- 57 The previous mini-roundabout had a good accident record and we therefore conclude that while the new signals are not likely to give rise to large numbers of personal injury accidents, on balance there will have been a slight reduction in road safety with the new junction.

**58**

## Telford Bridge Junction – Potential Options

### 59 Introduction

60 There are a number of options for the layout and operation of the Telford Bridge junction, based on the traffic management arrangements in the town centre remaining unchanged;

- 1 Retain the traffic signals, but with better coordination with the separate signal-controlled crossing at Goose Hill
- 2 Reinstating a mini-roundabout
- 3 A more comprehensive “shared space” scheme

61 Other options have been identified, including the reduction in conflicts at the junction by making Bridge Street one-way, but their assessment would require more extensive traffic modelling which is beyond the scope of our present instructions.

### 62 Option Review

63 Linking the existing signals to the Goose Hill crossing is expected to have some benefits in terms of congestion. It is not possible to quantify this without further modelling work, but given the significant increase in average delays that has taken place following the introduction of the signals, we do not consider that this would have a major effect. It would also increase the delay to pedestrians at the Goose Hill crossing, which would particularly affect children walking to and from school, and would not reduce delay to pedestrians at the junction itself. The problems with long vehicles would also remain.

64 Reinstating a mini-roundabout is expected to bring traffic benefits. The evidence of the AECOM journey time runs is that there would be a reduction in traffic delay at peak times. Pedestrians would also benefit from a shorter cycle time at the two stand-alone crossings, which could be returned to “pelican” operation. Delays to all users outside the peaks would be very low.

65 There has been some carriageway widening carried out as part of the signalisation scheme which means that a reinstated mini-roundabout would have a higher traffic capacity than the former layout.

66 A drawing showing a reinstated mini-roundabout is included in Appendix F. We understand that the highway authority has prepared more detailed proposals based on this layout, and that this scheme could be built fairly quickly, and at a relatively low cost. The traffic signals are demountable, and it should be possible to remove or haunch over the splitter islands in the junction without undue difficulty.

67 Although the mini-roundabout would improve the street scene at the junction, there would still be some intrusion from the traffic signs and markings that would be required.

68 Changing the junction to a more informal priority, through the use of 'shared space' techniques, would be a possibility in the longer term, if additional funding were to become available, and subject to further detailed modelling and investigation. A study of shared space options is beyond the scope of this current report, however.

## **69 Changes to the traffic flows in Morpeth**

70 It is possible that the recent opening of the new Morrisons store on Dark Lane (relocated from Corporation Yard) may have affected the traffic flows in the town. The Transport Assessment prepared in support of the store predicted some increase in traffic, on the assumption that the existing Morrisons was reopened. That is not expected to take place until later in the year, however.

71 In the longer term, the completion of the northern bypass will significantly reduce traffic flows through the town, including traffic travelling over the Telford Bridge and through the junction.

72 There may be some concerns that any change to the operation of the junction should be postponed until both the new and old supermarkets are operational, so that their combined traffic effects are known.

73 However, given that the traffic signals are subject to more congestion than the previous mini-roundabout layout, any increase in traffic due to both stores being operational will only make the situation worse. We therefore do not see this as a reason to hold off from making changes now.

**74**

## Conclusions and Recommendations

### 75 Short term

76 The results of the data collection exercise show that peak hour traffic congestion in the town, centred on the Telford Bridge junction and measured outside school holidays, has increased following the introduction of the traffic signals; while at the same time the volume of traffic passing over the bridge has reduced. This indicates that the signals have a lower traffic capacity than the mini-roundabout junction that they replaced.

77 We have also noted that there are difficulties in accommodating large vehicles at the traffic signals, which is resulting in regular damage to street furniture, including the signal heads themselves. While we do not consider the risk of personal injury to be high, given the low traffic speeds, this is clearly an undesirable situation.

78 It is therefore recommended that the traffic signals should be removed and replaced with a mini-roundabout junction, initially as a trial, based on the design included in Appendix E. This trial should include traffic flow and delay monitoring to assess how traffic queues and delays are affected by the change in junction layout and control.

79 We believe that this change will better reflect the desired outcomes expressed at the March 2013 workshop, which were:

- *Some traffic congestion at peak times is inevitable but it should be predictable.*
- *It is better for traffic to flow evenly and slowly than in a stop-start manner*
- *The appearance of the town centre is very important to the local economy*

80 The evidence indicates that the removal of the signals will be positive for all three of these aims.

81 There is no need to wait for the former Morrisons store to open before carrying out these works; any further increase in traffic with both stores open would in turn have increased delays at the traffic signal junction.

82 On the assumption that the trials show no major immediate adverse impact of reinstating the mini-roundabout, we would suggest that the temporary layout remains in place for at least 6 months, which will hopefully mean that it also covers the reopening of the existing Morrisons store, and any traffic impact that results from this. Traffic and delay surveys, repeating the methodology used previously, should be carried out during the trial to provide a sound comparison of the effect of the change.



83 We would also recommend that all of the sub-surface signals infrastructure should remain in place during the trial, so that the signals could be easily reinstated if the temporary removal is not judged to be a success.

#### 84 **Long term**

85 Traffic flows are expected to be reduced in the town centre once the bypass is opened, although they may increase again as development takes place, if there is not a shift away from private car use.

86 Depending on the outcome of the mini-roundabout trial, we recommend that consideration is given to a shared space-type solution at Telford Bridge in the longer and as funds permit, which will significantly improve the visual quality of this key arrival space, as well as having the potential to further reduce traffic delays and improve pedestrian amenity.

87 Other options could also be considered, however, in terms of the traffic management arrangements across the town as a whole, which would also have implications for the form of the junction and its approaches. These assessments would require further modelling, or could also be the subject of further trials.

88



Appendix A

# Workshop Report

Appendix B

## Summary of Traffic Data

Appendix C

## Journey Time Data

Appendix D



## Origin Destination Surveys

Appendix E





## Vehicle Tracking for the Signals

## Appendix F



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## Proposed mini-roundabout