



Loughborough Town Centre Transport Scheme

Leicestershire County Council
(Loughborough Inner Relief Road Classified
Road (1) and Epinal Way Classified Road (2))
(Side Roads) Order 2008

And

The Leicestershire County Council
(Loughborough Inner Relief Road Classified
Road and Epinal Way Classified Road)
Compulsory Purchase Order 2008

EVIDENCE OF LEICESTERSHIRE COUNTY COUNCIL

ENGINEERING

J. CUTHBERT – WRITTEN STATEMENT

October 2009

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Written Statement

Loughborough Town Centre
Transport Scheme -
Inner Relief Road

ENGINEERING EVIDENCE OF LEICESTERSHIRE COUNTY COUNCIL

James Cuthbert will say:

My name is James Cuthbert. I appear at this public inquiry as lead witness for Leicestershire County Council on the Engineering issues relevant to the Compulsory Purchase and Side Roads Order required for the implementation of the Loughborough Town Centre Transport Scheme – Inner Relief Road.

I was awarded a Masters Degree in Civil Engineering by the University of Leeds in 1997. I have been a Chartered Engineer and a Member of the Institution of civil Engineers since 2003.

I have over 11 years experience in highway design and maintenance gained with Scott Wilson Ltd, including the design of numerous highway improvement schemes, ranging from minor junction improvements to major bypasses.

I have both design and supervision experience and I am currently a Team Leader in Scott Wilson's Matlock office.

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1 Introduction

1.1 In justifying the need for the published Orders (Ref LE03) to be made for the proposed Loughborough Town Centre Transport Scheme – otherwise referred to as the Scheme – this Proof of Evidence is presented under five headings as follows:

- Engineering
- Traffic
- Policy
- Environment - Landscape

1.2 The Engineering statement provides a detailed description of the Scheme, and explains the various design, construction and operational factors that have been taken into consideration.

1.3 The Traffic statement provides an assessment of the effect of the Scheme on traffic flows; explains how the traffic information has influenced the scheme design; and summarises the findings of the economic assessment of the scheme.

1.4 The Policy statement sets out the overall aim and objectives of the Scheme; how the scheme relates to existing Central Government, Regional, County Council and Local Plan policies; and provides an outline of the alternatives considered leading to the defined Orders needed to build the Preferred Scheme.

1.5 The Environment - Landscape statement describes how the landscaping proposals have been designed to blend the Scheme with its surroundings.

1.6 Where necessary Appendices have been included containing plans, diagrams and tables for clarification, which are referred to in the Evidence.

1.7 The key elements of the overall Scheme are as follows:

- Completion of the Inner Relief Road (IRR);
- Pedestrianisation of the A6 Swan Street and Market Place thereby linking the shopping and commerce areas on either side of the A6;

- Other environmental and accessibility improvements to the town centre including Baxter Gate and High Street;
- Provision of high quality bus information and waiting facilities with two new bus hubs at Baxter Gate and Ashby Square; and,
- Other highway network improvements on the A6004 to provide additional traffic relief to the town centre.

- 1.8 The route corridor for the IRR is reserved in the current Borough of Charnwood Local Plan (Policy TR/2 adopted 2004 Ref LP03) and has been identified in Charnwood Borough/Loughborough Local Plans since 1971.
- 1.9 Planning approval for the IRR was given on 17th May 2007 (Ref LE04). The County Council seeks confirmation of Compulsory Purchase and Side Roads Orders in order to construct the scheme within the planning and the project timescales. If approved, this will secure land required to construct the Scheme, and to make alterations to side roads and rights of way necessary to maintain existing routes, and to fulfil current planning obligations.

2 Scope Of Evidence

- 2.1 The IRR will provide a peripheral route around the central core, replacing the A6 between its junctions at Bridge Street and at Southfields Road. The IRR is not intended to increase capacity, but it will enable the part of the A6 through the town centre to be closed off to traffic (except buses during the trial period) and eliminate the severance and conflict which exists between the high volume of traffic and large numbers of pedestrian crossing movements.
- 2.2 The corridor for an IRR has been established in subsequent Local Plans and over time approximately two thirds of the relief road has been developed from the A6 Derby Road on the north side of the town centre along Bridge Street, Fennel Street and Lemyngton Street up to Baxter Gate.
- 2.3 My evidence provides a detailed description of the preferred route for the IRR. The preferred route can be broken into two distinct sections as follows:
- Section 1
 - A6 Leicester Road to Baxter Gate
 - Section 2
 - Baxter Gate to A6 Derby Road
- 2.4 Section 1 of the proposed route involves upgrading the existing road, Barrow Street, between Leicester Road and Aumberry Gap, with a new section of carriageway will be constructed between Aumberry Gap and Baxter Gate.
- 2.5 Section 2 of the proposed route of the IRR uses the existing highway network with minor alignment improvement and significant junction improvements.
- 2.6 In addition, my evidence also covers related network improvement works to two offline junctions; the A6004 Epinal Way / B5350 Forest Road junction and the A6004 Belton Road / Belton Road West Extension.

3 Drawings

- 3.1 General layout drawings of the proposed scheme is provided in Appendix A.

4 Existing Conditions

- 4.1 Strategically, Loughborough is a growing and important town in the East Midlands region, but suffers from significant traffic related problems in the town centre. Loughborough sits in the centre of the Three Cities Sub-Area; which has National Growth Point status, and has to compete economically with the three major cities of Leicester, Nottingham and Derby all within 14 miles.
- 4.2 At present the A6 passes directly through the heart of the town centre severing the main shopping and business areas on The Rushes, Swan Street, Market Place and High Street, with the daily traffic flow of around 12,000 vehicles being in direct conflict with approximately 20,000 pedestrian crossing movements. Over this stretch of the A6, there were also 87 road casualties between 2000 and 2005. On the length to be pedestrianised, three quarters of the casualties were either pedestrians or cyclists. These issues are described in further detail in the Traffic Evidence.
- 4.3 The town centre also suffers from poor air quality due to the high volume of slow moving through traffic on the A6. As a result, this stretch of road has been designated an Air Quality Management Area.
- 4.4 Finally, Loughborough is well served by buses but the existing bus infrastructure is poor. As a result of the high volume of traffic through the town centre the scope to create new space to improve the bus facilities is therefore severely limited

5 Scheme Options

5.1 In developing the preferred solution to best meet the overall aims and objectives, four over-arching scenarios were considered in the Major Scheme Business Case (LE05). The four options are outlined as follows with sketch layouts included in Appendix B.

Option A - A6 road closure at Market Place/Swan Street with no network improvements.

5.2 Although this scenario would combine the shopping and commerce areas to improve the town centre environment and economic prosperity, the displacement of heavy traffic flow would be on to an already unsuitable existing road network.

5.3 Other than vehicles travelling along narrow town centre streets, the alternative routes are a longer diversion on the already congested A6004/A60/A6 Ring Road either to the south-west or the north-east of the A6 running through the town centre.

5.4 As a result, this option would result in unacceptable delays for drivers. Furthermore, the increase in traffic flow through Derby Square, High Street and Baxter Gate would reduce the road space area needed to successfully implement and operate new bus hubs in these central locations. This option therefore cannot fulfil the overall aim and objectives for the town centre improvement.

Option B - A6 road closure at Market Place/Swan Street and targeted junction improvements to the A6004 Ring Road.

5.5 This scenario was considered to evaluate measures that could remove some of the traffic from the town centre. An alternative is needed and the A6004 Ring Road to the south-west of the A6 is the obvious choice. With the benefit of junction capacity improvements at the worst two locations (i.e. Epinal Way/Forest Road and Belton Road) there is albeit limited, the potential to reduce the traffic impact and congestion in the town centre that would result from the closure of the A6 at Market Place/Swan Street.

5.6 However, parts of the Ring Road are in heavily built up areas severely limiting the scope for further improvements. Furthermore, analysis of the traffic model shows that although flows would reduce through the town centre, the cross town and central trips would still continue. In addition, without completion of the relief road the volume of traffic using High Street and Baxter Gate would still be unacceptably high thus preventing the implementation of the new bus hubs. This option therefore cannot fulfil the overall aim and objectives for the town centre improvement.

Option C - A6 road closure at Market Place/Swan Street and completion of the Inner Relief Road – Credible Lower Cost Alternative.

5.7 This scenario resolves the bus hub issues evident in Option B since completion of the relief road would remove all vehicles (except for buses, service and access) from Derby Square/Swan Street/Market Place/High Street and Baxter Gate.

5.8 However, in balancing the design of the new road to minimise its impact on the surrounding urban area, the reduced road width also restricts its capacity to match only low traffic growth at the opening date. Not surprisingly, the traffic model indicates that there will be a nominal increase in vehicle journey times for the diverted A6 traffic thus reducing the overall scheme benefits to achieve a benefit cost ratio of less than 1.

5.9 Nevertheless, this option can fulfil most of the scheme objectives for improving the town centre and it is therefore put forward as the only credible lower cost alternative.

Option D - A6 road closure with completion of the Inner Relief Road and related network junction improvements – Proposed Scheme.

5.10 To offset the delays and additional costs to drivers evident in Option C, it is clear that some further network capacity improvements are needed. Option D optimises this balance by combining the benefits of both options B and C.

5.11 The traffic model indicates that by improving selected junctions on the A6004 Ring Road, traffic flows in the town centre can be reduced. Improvements to the junctions on Epinal Way and Belton Road can best provide traffic relief to the town centre and when evaluated in economic terms Option D delivers high value for money with a resultant benefit to cost ratio of 3.33 at 33% optimism bias.

5.12 Without the ring road junction improvements, any limited congestion relief could only be achieved by constructing a much wider relief road involving prohibitive extra costs and demolition of more property.

5.13 In conclusion, the Preferred Scheme as Option D will therefore best achieve the overall scheme aims and objectives with the Local Plan route being addressed. Option C was identified as the only credible lower cost alternative but does not provide any congestion relief thus having less overall scheme benefits in comparison with the Preferred Scheme.

6 Alternative Routes For Completion Of The Inner Relief Road

- 6.1 A number of route options for the completion of the IRR were considered. These route options were identified in Appendix C of the Major Scheme Business Case. The Options have been outlined as follows with sketches of the routes included in Appendix C;

Proposed Route

- 6.2 Completion of the IRR requires construction of a new link road between the A6 Leicester Road and Baxter Gate. The proposed route lies within the corridor protected in the local plan and crosses over private land between Baxter Gate and Pinfold Gate. The proposed route then passes to the rear of properties on Pinfold Gate before joining Barrow Street at the existing junction with Moor Lane. The remaining section of the proposed route utilises a widened Barrow Street before joining the A6 Leicester Road.
- 6.3 A total of 8 properties originally required demolition, including the Pinfold Day Nursery at the corner of Pinfold Gate and School Street. This has reduced to 5 properties, as a number of properties have already been demolished.

Alternative Route 1

- 6.4 The first route follows a path outside and to the west of the approved Local Plan corridor that avoids demolition of the Pinfold Gate Day Nursery. This route would however still severely affect properties on Pinfold Gate near to Aumberry Gap and would have involved the demolition of 13 properties including 1 listed building, the Pinfold Gate

Medical Centre and the Beauchief Hotel. This would be the most expensive route. This has reduced to 10 properties, as a number of properties have already been demolished.

Alternative Route 2

6.5 The second route could be formed from a combination of the new section of the IRR between Baxter Gate/Pinfold Gate and the existing streets between Pinfold Gate and the A6 Leicester Road. This could provide a route to complete the IRR without the apparent need for property demolition. However, the constraints of this route would be so severe that design standards would be compromised and acceptable traffic flows at the time of the scheme opening could not be attained. Highway improvements and carriageway widening could be undertaken to resolve this difficulty but this would require the acquisition of land outside the Local Plan corridor and would have required the demolition of 10 properties including 1 listed building. This has reduced to 7 properties, as a number of properties have already been demolished.

Alternative Route 3

6.6 The third route was based on a gyratory system utilising Pinfold Gate, Aumberry Gap and Barrow Street as one way streets. Although this avoids the need to widen Aumberry Gap, the existing narrow section of Pinfold Gate would present problems for the additional right turning traffic from the A6 Leicester Road. To establish two lanes for traffic, extra land outside the Local Plan corridor and the demolition of further properties on Pinfold Lane would have been needed, giving a total of 16 properties requiring demolition.

6.7 In conclusion, the proposed route to complete the IRR involves the least demolition of property and land acquisition outside the Local Plan corridor and complies with the adopted town centre Masterplan.

7 Design Standards

7.1 The Design Manuals for Roads and Bridges (DMRB) published by The Stationary Office have been used as the basis for the design together with relevant Traffic Advisory Leaflets and other publications.

7.2 The relief road will be an urban link with a speed limit of 30mph; therefore in accordance with Table 2 of TD9/93 (LE06) a design speed of 60kph has to be used for design purposes.

7.3 A number of Departures from Standard have been approved by the Highway Authority, where it is considered the standards can be relaxed without adversely affecting the safe operation of the proposed road. This has been necessary in order to minimise the impact of the proposed scheme, in particular its land take.

7.4 The Departures from the Standards that have been accepted are summarised in Appendix D.

8 Proposed Highway Cross Section

Carriageway section for Section 1 of the inner relief road

- 8.1 The proposed carriageway cross-sectional width has been selected based on the proposed traffic flows and the needs of the proposed junctions. Additional lanes are required at the proposed junction entries and exits to ensure they accommodate the design traffic flows.
- 8.2 The Traffic Forecasting Report (LT08) indicates the heavy traffic flows are in the southbound directions. The predicted traffic flows between Baxter Gate and Aumberry Gap are up to 1400 vehicles per hour in the southbound direction, increasing to 1908 vehicles per hour between Aumberry Gap and the A6 Leicester Road. To cater for these proposed flows two lanes have been provided in the southbound direction.
- 8.3 In the northbound direction flows are lower and only one lane has been provided, which is widened to two lanes on the approaches and exits of the junctions.
- 8.4 The traffic forecasting work found that an additional 500 vehicles per hour will join the southbound lanes between Baxter Gate and Pinfold Gate. This explains why southbound traffic required two lanes on Section 1 (southern) of this project compared to Section 2 (northern).
- 8.5 The proposed carriageway configurations have been checked against the guidance given in TA 79/99 "Determination of Urban Road

Capacity” (LE07) to confirm the proposed layout has adequate capacity.

- 8.6 The nominal proposed lane width is 3.65m in line with the guidance provide in TD 27/05 “Cross Sections and Headroom” (LE08). Where additional lanes have been added for the signalised junction, this has to be done in accordance with TD 50/04 “The Geometric Layout of Signal-controlled Junctions and Signalised Roundabout” (LE09).
- 8.7 A 1m wide section of hatching has been provided between the northbound and southbound lanes between Aumberry Gap and Pinfold Gate. This hatching is to help mitigate the risk of vehicles entering into the opposite lanes while going around the radius. The hatching then widens between Pinfold Gate and Baxter Gate up to the proposed island to the pedestrian crossing and the signalised junction.
- 8.8 The proposed widening on the radius is also in line with the recommendation in TD 9/93 “Highway Link Design” (LE06). This recommends the standard widths of lanes are widened by 0.3m per lane for a radius between 90m and 150m. It has been decided to provide the widening in the form of central hatching due to concerns that providing widened lanes will encourage higher vehicle speeds.
- 8.9 A minimum width of 3m has been provided either side of the proposed carriageway. This is to accommodate a combined un-segregated footway/cycleway.

Carriageway section for Section 2 of the inner relief road

- 8.10 The proposed section of the IRR from the A6 Derby Road to Baxter Gate is to be retained as existing with local widening at the junctions. The existing carriageway width varies; Bridge Street 8m, Fennel Street 10m and Lemington Street widened to 12m for the junction. However, it is proposed to only provide a two lane single carriageway. Some additional carriageway width will be hatched out where in excess of the standard lane widths.
- 8.11 The Traffic Forecasting Report (LT08) indicates there is a disparity in predicted traffic flows between Section 1 (southern) and Section 2 (northern) of the IRR. This is due to a preference for east and west bound traffic on Baxter Gate. Section 2 is considered to provide sufficient capacity with the current and proposed two lane configuration.

9 Alignment

9.1 The proposed alignment of Section 1 (southern) of the IRR initially follows the existing road Barrow Street, up to it's junction with Moor Lane. There is then a 116m left hand radius to rejoin Pinfold Gate at the location of the Pinfold Gate Day Nursery. The alignment then continues in a general northerly direction in front of the Magistrates Court to it's junction with Baxter Gate.

9.2 The proposed radius of 116m has been selected to minimise the impact on the surrounding property. This radius is not normally permitted for the proposed design speed in TD 9/93 "Highway Link Design" and is a Departure from Standard. The Highway Authority has approved this Departure from Standard.

9.3 Four properties affected by the route will require demolition i.e. plot no. 45 on Baxter Gate, Pinfold Gate Day Nursery, the corner plot no. 4 on Moor Lane and the unit 1 at the corner of Barrow Street and Aumberry Gap. The buildings formerly situated at the corner of Leicester Road and Barrow Street have been demolished by the land owner and are therefore no longer affected by the scheme.

9.4 The proposed vertical alignment is controlled by the need to tie into existing roads and the desire to follow existing ground level to minimise the impact of the scheme.

9.5 The proposed vertical alignment is to match the existing carriageway levels between Leicester Road and Moor Lane; in this section it is

generally falling towards Moor Lane. From Moor Lane the alignment continues to fall gently to a low point at Pinfold Gate. The road in this section will mainly be in slight cutting; in the order of 375mm.

- 9.6 The vertical alignment then gently climbs from Pinfold Gate to Baxter Gate. The road in this section is a mixture of slight cutting or fill; with a maximum cutting of approximately 650mm and fill of approximately 450mm.
- 9.7 The proposed alignment for Section 2 (northern) of the IRR follows the existing roads, Lemyngton Street, Fennel Street and Bridge Street prior to rejoining the A6 Derby Road.
- 9.8 The existing alignment on Lemyngton Street will be realigned between Church Gate and Baxter Gate to remove two very tight horizontal curves and a section of poor forward visibility. This realignment however, contains a number of Departures from Standard, but is a significant improvement (further details are given in appendix D). The remainder of the route will remain as existing.
- 9.9 The vertical alignment between Church Gate and Baxter Gate will generally match the existing carriageway alignment.

10 Junctions – Online

Junction Strategy

10.1 The terminal junctions at each end of the IRR and the key junction along the alignment (Baxter Gate) will be signalised. Although other forms of junction were considered during the design process, signals were eventually adopted because:

- i. They can effectively control and adapt to differing volumes of traffic by direction;
- ii. The land take associated with signals is moderate in comparison with alternatives;
- iii. Pedestrian facilities can easily be incorporated into signals; and
- iv. They can be linked to adjacent signalised junctions to create a traffic platooning effect, allowing for improved vehicle progression.

10.2 All signalised junctions along the route have been tested for opening and design year operational performance using the junction analysis programme LINSIG. The software has been used to design and refine the requirements in respect of layout and geometry, lane configuration, pedestrian facilities, signal timings and traffic flow requirements. The resultant capacity of the proposed junctions is detailed further in the Traffic Evidence.

10.3 The proposed signalised junctions along the Loughborough Inner Relief Road will integrate into the existing Urban Traffic Control System “SCOOT” currently in operation within Loughborough. This will help the proposed junctions to operate at an optimum level of performance.

- 10.4 The junction strategy for the minor accesses and egresses has been to limit movements to left in/left out provisions. This reduces the impact of turning on the main alignment and improves traffic progression along the route.
- 10.5 The following existing traffic signal junctions along the IRR will be improved and signal equipment renewed or modified:
- i. A6 Leicester Road/Southfield Road/Barrow Street;
 - ii. A6 Leicester Road/A6 High Street/Wood Gate/Pinfold Gate;
 - iii. Fennel Street/Bridge Street; and
 - iv. A6 Derby Road/Broad Street/The Rushes/Bridge Street
- 10.6 Barrow Street/Moira Street will be maintained as a major/minor junction as existing.
- 10.7 Barrow Street/Aumberry Gap junction will be modified into an exit only.
- 10.8 Barrow Street/Moria Lane junction will be modified into a major/minor junction, but restricted to left in and left out only.
- 10.9 The traffic signal junction at Sparrow Hill/Baxter Gate will be modified to permit right turn from The Coneries into Sparrow Hill.
- 10.10 A new traffic signal junction will be provided at the junction of the new section of the relief road with Baxter Gate and Lemyngton Street.
- 10.11 The Lemyngton Street/Church Gate (West) junction will remain as a major/minor priority junction, but movements will be restricted to left in and left out. This will improve the capacity of the junction, where the

right turn movement would have a significant impact on the mainline traffic (Lemyngton Street).

10.12 The Lemyngton Street/Church Gate (East) junction will remain as a major/minor priority junction, but movements will be restricted to left out only. This will improve the capacity of the junction, where the turning movement would have a significant affect on the mainline traffic (Lemyngton Street). The restriction will also help mitigate the very limited visibility to the right of the minor junction

10.13 The Fennel Street/Biggin Street junction will remain as a major/minor priority junction, but movements will be restricted to left in and left out. This will improve the capacity of the junction, where the right turn movement would have a significant impact on the mainline traffic (Fennel Street).

10.14 The following major/minor priority junctions will remain as existing, with only minor adjustments to the kerb lines to accommodate the widening at the Bridge Street junction;

- i. Bridge Street/Canal Bank
- ii. Bridge Street/Limehurst Avenue

A6 Leicester Road/Southfield Road/Barrow Street Junction

10.15 The existing signal controlled junction has two-way traffic on the A6 east/west arms with one-way southbound traffic flow on the Barrow Street/Southfield Road arms. Controlled pedestrian crossings are present on all four arms.

10.16 It is proposed to widen the Barrow Street arm to allow northbound traffic to access the IRR. The A6 east arm will also be widened to accommodate the forecasted extra traffic turning right into the IRR and to facilitate the traffic turning left into Southfield Road. A shared footway/cycleway 3m wide will be provided on both sides of the Barrow Street arm and on the south side of the A6 east arm. Land will be acquired from the Aumberry Gap development site and the open space to the east of Barrow Street to enable the junction improvements to be implemented.

10.17 The former vacant properties on the A6/Barrow Street frontage of the Aumberry Gap development site were demolished by the land owner in 2008. This has removed the need for the County Council to carry out this work as indicated in the 2007 planning permission for the IRR.

10.18 The proposed land to be acquired under the Compulsory Purchase Order is based on the layout shown in Appendix A. This layout is different to the layout in the Major Schemes Business Case. The design has been refined to avoid the removal of the trees on Leicester Road, while still providing adequate capacity.

Lemyngton Street/IRR/Baxter Gate Junction

- 10.19 This is currently a 3-arm priority junction with traffic on Baxter Gate from the town centre side giving way to the other traffic. There are buildings on all arms of the junction but some demolition has been completed in the past in anticipation of the scheme to complete the IRR. Also the property (no 45 Baxter Gate) and land on the south east side of the junction has previously been acquired by the County Council and the land necessary for the demolition of this building has been included in the Order
- 10.20 Additional land will be acquired to construct the new arm on the south west side of the junction with sufficient traffic lanes to accommodate the forecast traffic flows at the junction.
- 10.21 With the addition of the fourth arm for the new section of the IRR, it is proposed to provide traffic signal control at this junction. Baxter Gate will remain one-way from the town centre towards the junction, but it is intended that it will be for use only by service vehicles and buses.
- 10.22 A shared use footway/cycleway, 3m wide will be provided on the new arm and on the west side of the Lemyngton Street arm. On the Baxter Gate east and west arms the crossing facilities will be constrained by the proximity of the existing buildings fronting the highway.
- 10.23 The design standards for intervisibility between traffic at all arms will not be met because of the proximity of the existing buildings. To avoid

further demolition of buildings, Departures from Standards have been accepted for the reduced intervisibility.

Bridge Street/Fennel Street

10.24 To accommodate the forecasted flows, in particular the increased right turn movements (Bridge Street to Fennel Street) it is proposed to widen the Bridge Street east bound approach to provide an additional lane for right turning traffic. Controlled crossing facilities will be provided for pedestrians and cyclists to cater for all movements. For cyclists, advanced stop lines with feeder lanes or gate lead-ins will be provided.

10.25 A right turn island will be provided immediately after the junction to cater for traffic turning into Limehurst Avenue. This will reduce the likelihood of right turning vehicles blocking northbound traffic.

A6 Derby Road/Bridge Street /The Rushes Junction

10.26 The existing junction directs most of the traffic flow from Derby Road to The Rushes. When the IRR is completed, the main traffic flow will be directed along Bridge Street and The Rushes will become a side road.

10.27 To accommodate the forecast flows, an additional lane will provided to carry traffic turning between Bridge Street and Derby Road.

10.28 Controlled crossing facilities will be provided for pedestrians and cyclists to cater for all movements. The crossings will come on during the traffic stages. For cyclists advanced stop lines with feeder lanes or gate lead-ins will be provided where possible.

10.29 A 3.0m wide combined footway/cycleway will be provided adjacent to the recent Wharf Development to link with the canal bank cycle route.

10.30 A S106 agreement is in place with the developer to ensure that sufficient land is provided to enable the junction improvement to be constructed. Without the land take, the capacity of the junction would be deficient resulting in additional queuing and delay.

11 Related Network Improvements

11.1 Improvement works to two junctions on the A6004 have been found to offer significant benefit to the scheme. The improvement works are as detailed:

A6004 Epinal Way/B5350 Forest Road Junction

11.2 It is proposed to convert the existing roundabout junction into a signalised roundabout. This will increase the junction capacity and so reduce delays. Appendix A contains a drawing showing the proposed layout.

11.3 To enable the existing roundabout to be converted into a signalised roundabout, all the entry and exit arms need to be widened to provide adequate capacity. Most of this widening can be accommodated within the existing highway. However, the widening on Forest Road (west) does require small areas of additional land.

11.4 Pedestrian and cycle facilities will be provided across all arms of the roundabout as signal controlled crossings. In addition the existing "Pelican" crossing across Forest Road (west) will be upgraded to a "Toucan" crossing. Advanced stop lines will also be provided at the signals for cyclist. Combined footway/cycleway will be provided around the junction/

11.5 The current proposal has been developed from the original proposal included in the Major Scheme Business Case, which was to convert the roundabout into a signalised crossroads. The signalised

roundabout solution will allow vehicles to complete “U turns”, thus removing a number of local access issues. It is also considered that a signalised roundabout is more in keeping with other junctions on this section of the A6004.

Belton Road/Belton Road West Junction

11.6 It is proposed to widen the carriageway for vehicles turning left from Belton Road on to Belton Road West. This will make the left turn manoeuvre easier and so increase capacity. Pedestrian and cycle facilities will also be improved. Appendix A contains a drawing showing the proposed layout

11.7 The proposed improvements to this junction can all be accommodated within the existing highway boundary.

12 Facilities For Pedestrians And Cyclists

- 12.1 All the proposed and upgraded signal junctions have pedestrian crossing facilities included within their design and where appropriate their facilities are proposed to be upgraded to Toucan crossings to allow pedestrian and cycle movements. All the proposed and upgraded signals also include 'advance cycle stoplines' to assist cyclist in using the junction.
- 12.2 The junctions have been designed with all road users in mind, including pedestrians, cyclists and disabled persons. Tactile paving will be provided at all crossings, and rotating cones on right-hand poles at signalised pedestrian crossing points.
- 12.3 Along the new section of the relief road a shared use 3.0m wide combined footway/cycleway will be provided on both sides of the carriageway.
- 12.4 Pinfold Jetty which runs from Moor Lane to Pinfold Gate will be partly severed by the relief road. The remaining length of the Jetty will be connected to the new footway/cycleway.
- 12.5 There are two Toucan crossings proposed across the new link road. The first Toucan crossing is situated adjacent to Pinfold Gate, while the other crossing will provide a link to the Pinfold Jetty.
- 12.6 The existing Pelican crossing across Fennel Street will be relocated to better suit the pedestrian desire line between Church Gate east and Church Gate west.

12.7 Footways will be provided between Baxter Gate and Derby Road, mostly as existing. The footways have only been upgraded in parts as there is generally insufficient width within the existing highway boundary to enable them all to be widened for use by both pedestrians and cyclists. Widening the footways sufficiently for their use as footway/cycleway would have required significant additional land take and property demolish, which was not considered to be justifiable.

- 13 Effect On Adjacent Streets And Existing Traffic Movements
- 13.1 Moira Street will be restricted for local access only. Only left in/left out into turning movements will be permitted.
- 13.2 Moor Lane will also be restricted to the left in/left out turning movements.
- 13.3 School Street will be stopped up at the Pinfold Gate end and will become a cul-de-sac. A turning facility will be provided at the end of School Street to allow vehicles to turn around.
- 13.4 There will be no exit from Aumberry Gap on to the relief road and entry will be restricted to left in only a turning facility will be provided. Traffic wishing to turn right into Aumberry Gap will have to do so via Barrow Street, Leicester Road and Pinfold Gate. Traffic wishing to exit Aumberry Gap onto the IRR will have to do so via Pinfold Gate, Leicester Road and Barrow Street.
- 13.5 Pinfold Gate (West) will be closed with no access onto the IRR, so becoming a cul-de-sac. A turning facility will be provided at the end of Pinfold Gate (West) to allow vehicles to turn around. Traffic wishing to exit Pinfold Gate (West) on the IRR will have to do so via Leicester Road and Barrow Street.
- 13.6 Pinfold Gate (East) will be restricted to a left turn exit only. Traffic wishing to enter Pinfold Gate (East) will have to do so via Baxter Gate and Sparrow Hill. Traffic wishing to turn right onto the IRR will also have to do so via Sparrow Hill and Baxter Gate.

- 13.7 There will be no entry into Church Gate (East) from the relief road and the exit will be left turn only. Traffic wishing to enter Church Gate (East) will have to do so via Baxter Gate and Sparrow Hill.
- 13.8 Traffic will only be permitted to turn left in and left out of Church Gate (West) and Biggin Street.
- 13.9 On Bridge Street there is an access with left out only facilities from the multi storey car park provided as a part of The Rushes development. The access will be maintained as existing.

14 Drainage

- 14.1 Section 1 of the IRR will have a new surface water drainage system constructed to effectively drain the new areas of carriageway. The drainage system will consist of gullies and pipes discharging into the local sewer system operated by Severn Trent Water. Gullies will be supplemented with kerb drainage units, where required. The additional surface water run off will be attenuated within the site to the satisfaction of Severn Trent Water.
- 14.2 Surface water drainage for Section 2 of the IRR will be via the existing highway drainage system. Minor amendments to the existing system will be made to accommodate the areas of localised widening. The existing drainage system consists of gullies and pipes discharging into the local sewer system maintained by Severn Trent Water Plc. The proposed drainage system will also consist of gullies and pipes but may be supplemented with kerb drainage units as required to effectively drain the carriageway surface. All changes to the surface water drainage system will be agreed with Severn Trent Water
- 14.3 Areas of existing highway within Section 2 will be drained via the existing drainage system with minor changes to suit the new layout.

15 Earthworks

15.1 The earthworks for the new section of highway in Section 1 of the IRR are limited, as the proposed alignment generally follows the existing ground. The majority of the earthworks will be to allow for the construction of the new pavement works. Any arisings will either be recycled or disposed of off site at a fully licensed disposal facility. Any differences in level between proposed and existing at the highway boundary will be dealt with using local engineering solutions within the site.

15.2 The earthworks within Section 2 of the IRR will be limited to excavation works to allow for the construction of the new pavement works. Any arising will either be recycled or disposed of off site at a fully licensed disposal facility.

16 Road Pavement And Other Paved Areas

16.1 The road pavement will be a flexible construction and the thickness will be determined to withstand the predicted traffic flows. Construction will comprise a capping layer at the bottom if required, followed by sub-base, binder course with bituminous material and the final surface course.

16.2 The footway/cycleway will also be constructed with bituminous materials in line with normal practice. In some areas footway surface materials will be upgraded as part of the landscape mitigation works, please refer to Landscaping Evidence (LL01) for further details. Tactile paving will be provided at pedestrian crossings.

17 Street Lighting Proposals

17.1 Street lighting will be provided along the new link and upgraded, where required on the existing section of the relief road. The lighting will be designed to comply with current British Standards. Modern cut-off lanterns will be used to minimise light pollution.

18 Accommodation Works

18.1 The highway boundary treatment will be as agreed with the adjoining landowner or as agreed with the Planning Authority as part of the landscape mitigation works, this is covered in more detail in the Landscape Evidence.

18.2 The access to the recently completed Magistrates Court will be adjusted to tie into the relief road.

19 Statutory Undertakers Apparatus

- 19.1 Protection and diversion of the Statutory Undertakers apparatus will be dealt with in accordance with the New Roads and Street works Act 1991 (in parts amended by the Traffic Management Act 2004).

20 Bus Lay-Bys

- 20.1 The existing bus lay-by on Barrow Street will be removed to form part of the carriageway. A bus stop will be provided at a similar location with the carriageway. This will be identified by road markings in accordance with the standards.

21 Conclusions

- 21.1 The proposed Loughborough Town Centre Transport Scheme provides clear benefit to the public interest by allowing the removal of traffic from the A6 through the town centre. This will provide road safety, amenity and air quality benefits.
- 21.2 The proposed Scheme has been designed to carry out the forecast traffic flows safely.
- 21.3 It has been designed to current national standards with appropriate Departures from Standard to minimise the impact of the scheme.
- 21.4 The Scheme includes improved facilities for pedestrians, cyclists and public transport users.
- 21.5 The land acquisition included in the Compulsory Purchase Order is the minimum required for the construction of the Scheme and provides the necessary Landscape Mitigation Works.
- 21.6 The proposed Side Order is necessary for the construction and safe operation of the Scheme.
- 21.7 I therefore conclude that from an engineering perspective, the proposed Compulsory Purchase order and Side Roads Orders for the Scheme are justified.

22 Documents Referred To In Engineering Evidence

Document Title	Document Ref:
<p>The Leicestershire County Council (Loughborough Inner Relief Road and Epinal Way Classified Road) Compulsory Purchase Order and Side Roads Order 2008</p> <p>http://www.leics.gov.uk/cpo_order_-_v2.4.pdf</p> <p>www.leics.gov.uk/sro_order_and_schedules.pdf</p> <p>http://www.leics.gov.uk/cpo_order_-_v2.4.pdf</p>	LE03
<p>Borough of Charnwood Local Plan (Policy TR/2 adopted 2004)</p> <p>http://www.charnwood.gov.uk/pages/adoptedlocalplan</p>	LP03
<p>Planning Permission for the Inner Relief Road – Development Control Regulatory Board Meeting of 17th 2007 (No. 2007/0363/02)</p> <p>http://www.leics.gov.uk/ieListDocuments.aspx?CId=144&MId=1595&Ver=4</p>	LE04
<p>Major Scheme Business Case August 2007</p> <p>http://website/master_final_5.2_p_amended.pdf</p> <p>http://website/loughborough_business_case_appendices.pdf</p>	LE05
<p>DMRB Volume 6, TA 9/93 – Highway Link Design</p> <p>http://www.standardsforhighways.co.uk/dmrb/vol6/section1/td993.pdf</p>	LE06
<p>Traffic Forecasting Report</p>	LT08
<p>DMRB Volume 5, TA 79/99 – Determination of Urban Road Capacity</p>	LE07

http://www.standardsforhighways.co.uk/dmr/vol5/section1/ta7999.pdf	
DMRB Volume 6, TA 27/05 – Cross Sections and Headroom http://www.standardsforhighways.co.uk/dmr/vol6/section1/td2705.pdf	LE08
DMRB Volume 6, TA 50/04 – The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts http://www.standardsforhighways.co.uk/dmr/vol6/section2/td5004.pdf	LE09

Appendix A

Loughborough Town Centre Transport Scheme Layout Drawings

- | | |
|---|---------------------|
| 1 Inner Relief Road Proposals | 0498.M.142.4 |
| 2 Belton Road/Belton Road West Junction
Improvements | 0498.M.148A |
| 3 Epinal Way/Forest Road Managed Roundabout Option | 0498.M.143 |

Appendix B

Loughborough Town Centre Transport Scheme Options

APPENDIX C

Inner Relief Road Route Alternatives

APPENDIX D

Departures from Standard – Loughborough Inner Relief Road