

DD21

A453 Widening M1 Junction 24 to A52 Nottingham

PROOF OF EVIDENCE HIGHWAY DESIGN

BY

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Inquiry commencing 10/11/09

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APPENDICES – Bound separately

- Appendix A Plans of the proposed Scheme
- Appendix B Typical cross sections
- Appendix C Non Motorised User (NMU) proposals
- Appendix D Departures from Standard

1. INTRODUCTION

1.1 My name is Charles William Howarth. I am a Chartered Engineer and a member of the Institution of Civil Engineers and the Institution of Highways and Transportation. I have a Bachelor of Science Honours degree in Civil Engineering. I am an Associate with WYG. I have over 30 years of experience in the design and development of highway schemes. I have worked on all stages of highway schemes from scheme identification to the supervision of works on site.

1.2 I am WYG's Design Manager for the A453 Widening scheme ("the Scheme"). I have been involved with the Scheme since the award of the ECI Contract in March 2006 I attended the 2004, 2007 and 2009 public exhibitions and have been involved with numerous stakeholder consultations. I am therefore familiar with the site and the surrounding area and the engineering issues relating to the scheme.

Scope of Evidence

1.3 At this inquiry I am to present evidence on the development of the highway design from the commencement of the A453 Widening Contract in order to explain the resulting scheme layout as presented in the draft Orders.

1.4 The object of this evidence is to demonstrate that engineering issues have been fully considered and taken into account in publishing the draft Orders for the Scheme.

1.5 My evidence firstly describes the existing highway within and around the site; it then gives a summary of the engineering proposals.

2. THE EXISTING SITUATION

Introduction

2.1 The A453 Trunk Road east of the M1 Motorway is a major route between Nottingham, the M1 and East Midlands Airport, and forms part of the national strategic road network. This section of road currently carries between 23,000 and 30,000 vehicles per day, and is severely congested at peak hours with unreliable journey times, a poor safety record and is difficult to maintain safely. Traffic matters

are covered in more detail in the Traffic and Economics Aspects evidence given by Mr. Shields [DD19].

- 2.2 The A453 is a single carriageway road between M1 Junction 24 and the A52 Nottingham Ring Road apart from a short section of dual carriageway between Farnborough Road and the A52. The Scheme lies between M1 Junction 24 and the start of the dual carriageway, a distance of 11.5km (7.2 miles).
- 2.3 For a distance of 9km (5.6 miles) between M1 Junction 24 and the western end of Clifton, the road passes through an essentially rural area. The remaining 2.5km (1.56 miles) through Clifton is essentially urban. The existing road is generally 7.3m wide, except on the dual carriageway section where it widens out to approximately 20.0m.
- 2.4 The road lies in the Counties of Leicestershire and Nottinghamshire and the City of Nottingham.

Highway layout

- 2.5 Plans 21959/E/ES/1.1.1.1 - 1.1.1.8 showing the existing layout are included in Appendix A.

Rural Section

- 2.6 The surrounding area is open, mainly arable farmland with intermittent small areas of tree cover in the form of plantations. Verge widths vary throughout this section between 1.5m and 3.0m. There are also 30 field and farm accesses to the Trunk Road.
- 2.7 The Ratcliffe on Soar Power Station is a dominant feature in the landscape.
- 2.8 The existing road was apparently designed as one half of a dual carriageway and, as such, the horizontal alignment in the rural section is unsuitable for a single carriageway with long medium-large radius curves limiting forward visibility and creating unsafe overtaking conditions. This, together with poor 'at grade' junction layouts, contributes to a poor safety record. The vertical alignment over Mill Hill, in

particular, restricts safe overtaking opportunities and, although the national speed limit of 60mph (100kph) applies, traffic is often delayed by slower-moving vehicles.

- 2.9 The rural section from M1 Junction 24 to Clifton has no road lighting.

Urban Section

- 2.10 From the western end of Clifton to Crusader Roundabout, the road passes through a relatively wide highway corridor with properties to the south of the A453 set back 10 to 20 m from the edge of the carriageway, whilst those to the north of the A453 are shielded from the road by earth mounds and planting.
- 2.11 East of Crusader Roundabout the A453 passes through a grassed and tree lined Conservation Area which contains a registered Village Green, known as Clifton Green, and eight listed buildings. North-east of Clifton Green the existing road borders the Nottingham Trent University Clifton Campus which lies behind an established hedge line on the highway boundary. On the opposite side of the road, residential properties are set back approximately 30m from the Trunk Road behind a 10 to 20 m wide belt of trees.
- 2.12 The horizontal alignment is of an essentially urban standard with some small radius curves which, together with the rolling vertical alignment, reduces forward visibility and offers only limited overtaking opportunities.
- 2.13 A 40 mph speed limit applies throughout the urban section from the outskirts of Clifton.
- 2.14 The urban section has road lighting throughout.

Junctions

- 2.15 Between the M1 and the A52 there are six major junctions providing access to the A453. These are at Kegworth Road, West Leake Road and Barton Lodge (which provides the main route from Barton in Fabis to Gotham and Nottingham via the existing A453) in the rural section, and at Crusader Roundabout, Green Lane and

Farnborough Road in the urban section. In addition, there are three accesses to the University and six minor junctions onto the existing road. These are at Barton Road (east of Thrumpton) and Manor Road in the rural section, and at Garrett Grove, Village Road, Glapton Lane and Sunninghill Drive in the urban section. There are also four demand activated pedestrian crossings.

2.16 An Esso filling station (including a Tesco Express) and the Man of Trent Public House/restaurant also have direct accesses onto the A453 between Crusader Roundabout and Clifton Green.

2.17 A number of properties have direct legal access to the A453, and a number in Clifton make unauthorised vehicular use of footways and verges to access their properties.

Facilities for Pedestrians, Cyclists and Equestrians (Non-Motorised Users (NMUs))

2.18 There is a shared footway/cycleway adjacent to the eastbound carriageway of the A453 from Clifton Green to the A52 and there are numerous footpaths and bridleways crossing and adjacent to the A453 including some long distance routes, notably the Trent Valley Way and the Midshires Way.

Topography

2.19 The topography of the route comprises predominantly low-lying rural terrain with low hills notably at Red Hill, Gotham Hill, Brands Hill and Mill Hill. The western end is dominated by the flood plains of the river Soar and river Trent. The suburb of Clifton is sited on a low escarpment lying to the south of the river Trent at the eastern end.

2.20 Between M1 Junction 24 and the Midland Main Line Railway, the road crosses the floodplain of the river Soar and river Trent on embankment with openings provided by structures and dedicated floodspans.

2.21 Between the Midland Main Line Railway and Thrumpton, the ground is undulating and the road is in a series of cuttings and embankments.

- 2.22 Between Thrumpton and Barton in Fabis the land is relatively flat at around 30m above Ordnance Datum (AOD).
- 2.23 As the A453 approaches Clifton from the west the road rises to a high point of approximately 77m AOD at Mill Hill where the road is in a 3m deep cutting. To the northwest, the land continues to rise to a ridgeline with a high point of around 86m AOD at Brands Hill. To the southeast the ground gently falls towards the flatter plains of Clifton Pasture and Barton Moor and beyond to generally 30m AOD.
- 2.24 Through the urban area, the land is gently undulating with a prominent ridge in the vicinity of Nottingham Trent University before gradually sloping down in a northerly direction towards the flood plain of Fairham Brook. The 70 kph design speed of the road allows it to follow the land surface more closely, with a shallow cutting through the ridge at NTU.

Drainage

- 2.25 The existing carriageway in the rural section is kerbed along its entire length. Road drainage generally comprises gullies discharging to highway drainage ditches at the embankment toe. Run-off is conveyed by land drainage ditches to outfalls at the river Soar and river Trent.
- 2.26 The existing carriageway in the urban section of the Scheme is kerbed along its entire length. Road drainage generally comprises gullies connecting to highway drainage pipes or public sewers. Run-off is conveyed directly through these pipe systems to outfalls at the Nethergate Stream watercourse or the Fairham Brook.

Existing Structures

- 2.27 There are eleven existing major structures along the A453 which would be affected by the widening proposals. These are:
- i) Cattle Creep Underbridge
 - ii) Long Lane Overbridge
 - iii) Floodspans Near Long Lane
 - iv) Canal Bridge
 - v) Soar Flood Spans
 - vi) River Soar Bridge

- vii) Bridge over Railway
- viii) Ash Lane Bridge
- ix) Ratcliffe Precast Culvert
- x) Ratcliffe Underbridge
- xi) Thrumpton Accommodation Overbridge

2.28 The locations of existing structures are shown on the plans in Appendix A.

Public Utilities

2.29 The following utilities companies (Statutory Undertakers) have confirmed that they own apparatus within the existing A453 corridor that would be affected by the highway improvement proposals:

- i) Central Networks
- ii) British Telecom
- iii) Energis
- iv) National Grid Gas
- v) National Grid Electricity
- vi) Severn Trent Water
- vii) Virgin Media
- viii) Verizon
- ix) Hutchison 3G UK Ltd

2.30 The Ratcliffe on Soar Power Station is located adjacent to the A453 approximately 2 km east of M1 Junction 24. There is a significant number of overhead and underground high voltage electricity cables and associated apparatus relating to the power station which would be potentially affected by the scheme.

Land Use

2.31 Land in the vicinity of the rural section of the existing A453 is generally open farmland in agricultural use, with intermittent plantations of broadleaf and coniferous woodland. Agricultural use is dominated by arable practices although sizable areas of pastureland also occur, particularly to the northwest of the road. A number of farmers work land on either side of the existing road and access across the road is a relevant concern as part of the farming operations.

2.32 The western end of the A453, between the M1 and the Midland Main Line railway lies within the river Soar/Trent floodplain.

- 2.33 Within the rural section of the A453 route, there are some large areas of land that are not in agricultural use, notably:-
- i) Ratcliffe on Soar Power Station
 - ii) East Midlands Parkway Station development on the Midland Main Line railway
 - iii) The Lark Hill Retirement Village (recently constructed on the southern borders of Clifton)
 - iv) NET Phase 2 park and ride site (proposed) (adjacent to the Lark Hill Retirement Village)
- 2.34 Beneath the A453, the River Soar / Leicester Arm of the Grand Union Canal splits into two parts. The first is the Ratcliffe Cut (canal) which is a section of the Leicester Arm of the Grand Union Canal and is navigable. This route is generally used by recreational boating traffic. The second part is the river Soar further to the east which is generally too shallow for navigation and is interrupted by a weir. Both watercourses are used for recreational fishing. The resulting island between the two watercourses is known as Cedar Isle.
- 2.35 Most of Cedar Isle is put to agricultural use; however, on the southern tip there is a single residential dwelling. This property shares a direct access onto the A453 with other users of Cedar Isle. It is understood that anglers access the Isle by this route and there is some evidence of its use for recreational boating.
- 2.36 To the north of the A453 between the river Soar and the railway, lies an area of land known as Red Hill. There are various land uses associated with the land at Red Hill, ranging from agricultural uses to a large marina with associated river and canal side moorings, as well as remote residential properties. Red Hill can be accessed via Ratcliffe on Soar village using Soar Lane and the new Parkway station via their Private Means of Access.
- 2.37 E.ON owns and operates the power station at Ratcliffe on Soar. The Power Station is visible from much of the A453 route and the M1 due to its sheer scale and open position. E.ON holds land on both sides of the A453. The land to the north of the A453 houses the main power station, offices and staff welfare facilities, including a golf course that runs along the frontage of the A453. The power station site also houses the headquarters of Powertech and E.ON Engineering Academy (EEA). The land to the south of the A453 is used for ash storage, settling lagoons, etc.

- 2.38 Land in the vicinity of the urban section of the A453 is predominantly residential in nature. A number of housing estates occur along the route as discrete residential areas separated by local distributor roads. However, there are a number of areas of land with non-residential uses.
- 2.39 The Crusader public house is located on the northern side of the A453 at Crusader Roundabout, with direct access via Hartness Road. The pub building is separated from the A453 by a grass strip approximately 10 metres wide. To the west of the pub (behind the main frontage) is a large customer car park owned by the pub.
- 2.40 The Man of Trent public house is located within the Clifton urban area on the south side of the A453 midway between Green Lane Junction and the Crusader Roundabout. The pub site is leased from Nottingham City Council, and extends up to the southern edge of the public footway adjacent to the A453. The pub building sits approximately 50m back from the edge of the carriageway, being separated from the road by a large car park with two entrances onto the A453, one at each end of the car park.
- 2.41 Nottingham Trent University (NTU) is located towards the eastern end of the A453. Access into the campus is via three entrances (Southern, Central and Northern), with a general one-way system in operation for the bus services onto and within the site. At present, all three entrances provide vehicular routes in and out of the campus. The frontage west of its 'North Entrance' comprises the existing road verge, a shared footway/cycleway, and a narrow but mature hedge.
- 2.42 To the northwest of the A453 at Clifton there is a registered Village Green which also forms part of a wider Clifton Conservation Area. Between Green Lane and the Esso service station there is an open grass area that falls outside both the registered Village Green and designated Conservation Area and is also excluded from the designated Open Space Network set out in the Nottingham Local Plan of November 2005.

Traffic Congestion

- 2.43 Traffic on the rural section averages approximately 23,000 vehicles per day as a two-way flow, of which approximately 19% are heavy goods vehicles.

- 2.44 The rural section is congested at peak hours, and traffic flow is regularly impeded at uphill sections (gradient approximately 4%) in the eastbound direction which cause significant reductions in the speed of heavy vehicles. The 'at grade' junctions exacerbate the problem as right turning vehicles can bring A453 traffic to a halt.
- 2.45 Traffic flows through the urban section are substantially higher than for the rural section, principally as a result of local vehicles joining the A453 from the Clifton Estate. The total Trunk Road flow through the urban section is approximately 30,000 vehicles per day (two-way flows), of which approximately 12% are heavy goods vehicles.
- 2.46 The urban section suffers from substantial levels of peak period traffic congestion and journey times are unreliable. The traffic signalled controlled junction at Farnborough Road causes delays to local and Trunk Road traffic particularly in the morning and evening peaks. Westbound, the gradient up the ridge near NTU causes significant reductions in speed for heavy vehicles, further impeding flow. Trunk Road traffic is also delayed at the four demand activated pedestrian crossings along the A453.

Safety

- 2.47 The safety record of the road is poor and frequent accidents add to delays, resulting in traffic diverting onto unsuitable minor roads. Although there are currently three demand activated pedestrian crossings and two more pedestrian crossings at the signal controlled Farnborough Road junction, which cater for pedestrian movements across the A453, accidents involving pedestrians attempting to cross the road at uncontrolled locations are high. Also, the high number of accidents resulting from right turn manoeuvres is a reflection of the large number of minor roads and accesses that connect to the A453 through Clifton and the lack of safe right turn facilities.
- 2.48 Road maintenance along both the rural and urban sections is difficult and the risk of severe accidents at roadworks has led to a policy of closing the road during maintenance operations. This can delay drivers and causes problems elsewhere on the network.

3. SCHEME OBJECTIVES

3.1 The main scheme objectives are to reduce congestion and improve safety for motorists and non-motorised users (pedestrians, cyclists and horse riders) in the area.

3.2 The scheme brief cites the following scheme objective with regard to the environment:

“ensure no significant change to the AST sub-criteria assessment results and improve on them, where possible, within the constraints of the brief, taking into account any special requirements”.

3.3 Improvements to the A453 would also help to deliver the five Central Government objectives for transport, namely environment, safety, economy, accessibility and integration as follows:

- i) Impact on the natural and built environment would be minimised;
- ii) Safety would be improved for road users on the A453 and local roads, including pedestrians, cyclists and equestrians;
- iii) Economic efficiency would be improved by reducing congestion and improving the reliability of journey times;
- iv) Accessibility around the A453 for those using non-motorised modes of travel, especially pedestrians, cyclists and equestrians, would be improved by reducing severance and provision of new facilities;
- v) Improvements would be made in the context of the Government’s integrated transport policy by reflecting national, regional and local plans and policies and wider land-use considerations. Objectives of the Multi-Modal Study [DD13], published in 2002, to increase integration and encourage a move to other modes of travel would be delivered, including the provision of access to the Parkway Station and NET developments.

4. SCHEME PROPOSALS

Highway Layout

- 4.1 The Scheme (as shown on the drawings in Appendix A) starts at M1 Junction 24 and extends through Clifton to the existing section of dual carriageway approximately 350m east of the existing A453 / Farnborough Road junction. The Scheme would provide a dual two lane carriageway along the rural section from M1 Junction 24 to the proposed Mill Hill Roundabout, approximately 9 km (5.5 miles), and a 4-lane single carriageway along the urban section between Mill Hill Roundabout and Farnborough Road Junction, approximately 2.5 km (1.75 miles).
- 4.2 Widening along the rural section would generally follow the horizontal alignment of the existing A453 between M1 Junction 24 and Manor Road (Barton in Fabis), with a second carriageway being built mainly on the south side of the existing road. Between Manor Road and Mill Hill Roundabout the new A453 dual carriageway would be built off line to the south of the existing road. This alignment has been chosen to overcome a number of problems with an online route, chiefly excessive earthworks, buildability issues, future access to the proposed NET (tram) and accessibility for Barton in Fabis and Thrumpton. The resulting redundant sections of the A453 would be de-trunked (see paragraph 4.17) and become a local road connecting the new West Leake Junction with Mill Hill Roundabout and serving Barton and Thrumpton.
- 4.3 Widening along the urban section between Mill Hill Roundabout and Farnborough Road Junction would generally follow the horizontal and vertical alignment of the existing A453 with widening mainly to the north.
- 4.4 The carriageway width along the rural section (inclusive of the central reserve) would be generally 21.10m, and the carriageway width along the urban section would be generally 15.05m. However, there would be local widening of the central reserve and verges to maintain adequate forward visibility. Typical cross section drawings are included in Appendix B.

Road Restraint Systems

- 4.5 Vertical Concrete Barrier (VCB) safety barrier would be used in the central reserve, except for the section between Long Lane and the Railway Bridge and the approaches to the roundabouts at M1 Junction 24 and Mill Hill where steel would be used due to the short lengths involved. Gaps would left be for future maintenance crossovers and moveable barrier provided instead in these locations.
- 4.6 In the verge conventional steel fencing would be used where appropriate.

Speed Limits

- 4.7 The rural section would be subject to a 70 mph speed limit and the urban section to a 40 mph speed limit.

Junctions

- 4.8 A new grade separated junction would be provided at Parkway in the vicinity of the existing A453 / Kegworth Road junction. This would enhance access to the recently constructed Parkway Station and provide a grade separated access to the Power Station south of the A453.
- 4.9 A new grade separated junction would be provided at West Leake Lane providing an improvement over the existing compact junction.
- 4.10 Cedar Isle would be accessed by means of the only 'left in / left out' junction in the rural section with the westbound carriageway of the A453 as no alternative is available. Lack of demand and the proximity of the Parkway junction would make a grade separated junction inappropriate.
- 4.11 The E.ON Central access would be closed because the proximity of Parkway and West Leake junctions on either side would mean that the geometric standards for weaving lengths could not be achieved. This would make it unsafe for normal use. However, it would be retained for use by Abnormal Loads on rare occasions.

- 4.12 Traffic signal controlled junctions at Crusader Roundabout, Green Lane Junction, Farnborough Road Junction and Nottingham Trent University (NTU) would be provided with crossing facilities for cyclists and pedestrians. A cycle/pedestrian crossing would also be provided opposite the Man of Trent public house to replace the existing one. The pedestrian signals would be linked to the traffic signals to ensure traffic flows are maintained while allowing pedestrians and cyclists to cross safely during the 'inter-green' periods.
- 4.13 The Central access to NTU would be closed to traffic and the southern entrance (South Gate) would be restricted to left in/left out manoeuvres only. The right turn manoeuvre out of the existing northern entrance (North Gate) would not be permitted with the new NTU junction.
- 4.14 All other existing junctions with the A453 along the urban section would remain open as part of the widening scheme. However, right turn manoeuvres in and out of these junctions would not be permitted. This would include Clifton (Esso) Filling Station and the Man of Trent Public House.
- 4.15 A detailed description of the rural and urban sections and their associated junctions are provided in the Stage 3 Scheme Assessment Report [DD08].

Side Roads

- 4.16 New Side Roads would be adopted by the appropriate Local Highway Authority. These include the roundabouts and link roads at Parkway Junction and the roundabouts and the re-aligned Barton Lane at West Leake Junction.

De-trunked A453

- 4.17 The de-trunked section of the A453 would be modified to give the appearance and style of a local rural road. This could be achieved by replacement signage and white lining to narrow the carriageway, giving a narrow cycle lane on both sides of the carriageway although details are still to be agreed with the Local Highway Authority.

Highway Standards

- 4.18 The A453 Widening Scheme has been designed in accordance with the Design Manual for Roads and Bridges (DMRB) [DD176] current at the time of writing. However, the physical constraints imposed by the widening of an existing road have meant that in some situations, full standards cannot be achieved. Relaxations and Departures have been assessed in terms of their effect on their economic value to the scheme, the environment and the safety of the road user.
- 4.19 The 4-lane single carriageway in the urban section would not be in accordance with Figure 4-3a of TD 27/05 of the DMRB [DD176] and requires a Departure from Standard (see paragraph 4.24). Provision of a carriageway in accordance with TD 27/05 of the DMRB [DD176] would have meant constructing a dual carriageway within the urban section resulting in considerable additional environmental impact and construction cost.
- 4.20 Typical cross sections of the proposed carriageway provisions for the rural and urban sections are presented in Appendix B.
- 4.21 The horizontal and vertical alignment has been designed in accordance with TD 9/93 'Highway Link Design' of the DMRB [DD176]. The Design Speed for the national speed limit rural section is 120kph. The urban section, which would be subject to a speed limit of 40 mph has a design speed of 70 kph.
- 4.22 Where possible, the proposed alignment would closely follow the existing Trunk Road alignment. In order to maintain adequate forward visibility this has required localised widening of the central reserve and verges.
- 4.23 Grade separated junctions are proposed at Parkway Junction and West Leake Junction. The standard appropriate to grade separated junctions and slip roads is TD 22/06 'Layout of Grade Separated Junctions' of the DMRB [DD176]. A lesser standard, TD 40/94 'Layout of Compact Grade Separated Junctions' of the DMRB [DD176], can be applied where traffic figures are low enough. This is not the case on the A453.

Departures from Standard

- 4.24 A total of 24 departures have been approved by the Highways Agency. A full list of Departures from Standard is presented in Appendix D. A detailed explanation of why the departures have been proposed is given in the 'Highway Alignment Departures from Standards Report' [DD40].

Facilities for Pedestrians, Cyclists and Equestrians (NMUs)

- 4.25 Full details of proposals for NMUs can be found in the Non-Motorised Audit Report [DD39]. In summary, a continuous route for pedestrians and cyclists would be provided between Clifton and Long Lane linking the nearby residential areas of Clifton, Barton in Fabis, Thrumpton, Gotham, Ratcliffe on Soar and Kegworth to key destinations such as the Parkway Station, East Midlands Airport, the Power Station and the proposed NET Park and Ride. Provision for equestrians would also be enhanced.
- 4.26 In the rural area, the Scheme would provide a parallel but separate route for pedestrians and cyclists alongside the A453 except for short sections where the route would use a shared footway/cycleway, separated from traffic by a barrier. New bridleways would link existing routes incorporating safe and convenient grade separated crossing points along the rural section where Public Rights of Way (PROW) cross the A453.
- 4.27 In the urban area, the existing footway cycleway would be re-created and linked to additional controlled crossing points and additional pedestrian and cycle facilities.
- 4.28 The NMU proposals are shown on the drawings in Appendix C.

Drainage

- 4.29 The existing and proposed scheme drainage strategies are shown in Figures 2.10.3 and 2.10.4 of the Environmental Statement Volume 2 [DD05], respectively.

- 4.30 Drainage in the rural section would be via a combination of open surface water channels and combined kerb drainage systems for the main A453 carriageway, with a combination of filter drains, kerbs and gullies for the side roads. It would be self contained, collecting run-off into carrier drains before discharging into selected outfalls.
- 4.31 Five balancing ponds and extensive lengths of highway drainage ditches would attenuate and clean storm water runoff prior to discharge at the rural outfalls. The balancing ponds would also have secondary functions to enhance ecological habitat and provide visual amenity for travellers.
- 4.32 Drainage in the urban area would be via combined kerb drainage systems for the main A453 carriageway, with kerbs and gullies for the side roads. Where necessary, oversized pipes would attenuate storm water and petrol interceptors will clean runoff prior to discharge into Nethergate Stream or Fairham Brook.

Flood Compensation

- 4.33 The widening of the embankment across the flood plain results in the loss of flood storage volume. The Environment Agency requires this to be replaced on a like for like basis close to where the volume is lost by the creation of Flood Compensation Areas (FCAs) on the edge of the active flood plain. Whilst this does not remove land from agriculture, it does place it at greater risk from flooding.
- 4.34 The siting and design of FCAs is covered in detail in the Flood Compensation Options Report [DD41].

Road Pavement

- 4.35 The pavement has been designed for a 40 year design life and is limited by the 80 msa (million standard axles) cut off for pavement thickness.
- 4.36 Proprietary Thin Surfacing would be used throughout, providing low noise and low spray characteristics. High Friction Surfacing would be provided at high stress points such as approaches to junctions.

- 4.37 As much of the existing carriageway as possible would be incorporated into the scheme. However, the condition of the existing road combined with physical constraints such as levels at structures, mean that full reconstruction could not be avoided in some areas. Where this is the case, existing materials would be recycled, either in situ, or elsewhere on site.
- 4.38 Where possible we would use stabilisation techniques including using pulverised fuel ash (PFA) sourced locally from Ratcliffe power station to improve the pavement foundations rather than importing granular material from offsite.

Road Lighting

- 4.39 The rural section would be unlit except for the junctions. Lighting at the junctions would comprise 10m or 12m high columns designed to minimise light spillage.
- 4.40 The urban section would be lit throughout. Lighting would comprise 10m or 12m high columns designed to minimise light spillage.

Structures

- 4.41 It is proposed that the westbound carriageway of the A453 would be carried on new structures which, with some exceptions, would be separate from but generally replicate the form, if appropriate, of the existing structures:
- i) Cattle Creep Underbridge – to be extended to the south in similar form to the existing bridge
 - ii) Long Lane Bridge – to be extended as allowed for by the original design, i.e. by the addition of an extra span to the south
 - iii) Floodspans Near Long Lane – replicate existing
 - iv) Canal Bridge – the new structure will be a single span structure of similar overall span to the existing three span structure
 - v) Soar Flood Spans – replicate existing

- vi) River Soar Bridge – the new structure will be, like the existing, a three span structure but of different dimensions to accommodate the alignment of the river
- vii) Bridge over Railway – the new structure will be a single span structure of similar overall span to the existing three span structure
- viii) Ash Lane Bridge – existing Ash Bridge is to be demolished to make way for a completely new structure (Parkway Bridge) which would form part of the Parkway Junction carrying both carriageways of the A453 and the slip roads over the junction link road and the Ash Road
- ix) Ratcliffe Precast Culvert – designed to accommodate widening of the A453 without modification
- x) Ratcliffe Underbridge – designed to accommodate widening of the A453 without modification
- xi) Thrumpton Accommodation Overbridge – to be extended as allowed for by the original design, i.e. by the addition of an extra span to the south
- xii) Near Barton Lodge, where the A453 is to be widened off line relative to the existing road, an entirely new structure, Barton Lane Underpass, is to be provided to allow NMUs and farm traffic to cross beneath the A453.

Accommodation Works

- 4.42 Negotiations have taken place and are on-going with all affected parties to agree accommodation works to ensure that existing facilities are maintained or suitable replacements provided.

5. CONCLUSIONS

The main benefits of the proposed Scheme may be summarised as follows:

- i) The A453 currently suffers from significant congestion and delays to travellers, especially at peak times. The Scheme would relieve congestion, improve journey times and improve safety;
- ii) The Scheme would improve facilities and safety for NMUs in the area;
- iii) The safety of the route would be further improved by removing uncontrolled direct accesses onto the trunk road;
- iv) The provision of new facilities for pedestrians, cyclists and equestrians would promote walking, cycling and equestrian activity;

In my opinion, the proposed scheme meets the objectives and is an effective solution to the problems associated with the current A453.