Preliminary Environmental Information

A556 Knutsford to Bowdon Environmental Improvement

January 2012
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1 Introduction

1.1 The A556 Knutsford to Bowdon Environmental Improvement

1.1.1 The Highways Agency (HA) intends to improve the A556 trunk road between Junction 19 of the M6 motorway, near Knutsford, and Junction 7 of the M56 motorway, near Bowdon (see Figures 1 and 2.1).

1.1.2 The A556 is a major strategic route, heavily used by traffic from south Manchester and northern Cheshire going to the West Midlands via the M6. It is the only non-motorway section on the link between Manchester and Birmingham.

1.1.3 Details of the way in which the road would be improved and why the improvement is needed are given in Chapter 2 of this document. The key objectives of the scheme are:

- To improve the local environment in Bucklow Hill and Mere;
- To improve road safety and journey time reliability;
- To reduce conflicts between local and long distance traffic; and
- To minimise the environmental impacts of the proposed scheme both during construction and once the scheme is open.

1.1.4 This Preliminary Environmental Information (PEI) is written in as non-technical a style as possible, to make it accessible and clear to a wide, non-specialist audience. Where necessary, technical information is given in footnotes (e.g. cross-references to legislation and regulations). Where it has been impossible to avoid the use of technical terminology, an explanation is given in the text or in a glossary at the end of the text.

1.2 The purpose of this report

1.2.1 An Environmental Impact Assessment (EIA) is being carried out for the project. The EIA is an important influence on the design of the highway itself. The final report on the EIA will be prepared in the form of an Environmental Statement (ES)\(^1\).

1.2.2 However, before the design of the highway improvements is finalised, the Highways Agency wishes to obtain the views of the community on the current draft proposals, taking into account the environmental effects of the scheme. Those views can then be taken into account in finalising the design and refining the EIA and ES.

1.2.3 This document therefore provides a preliminary statement of the outcome of the EIA. It is intended to give members of the community an understanding of the potential environmental effects of the scheme and of the measures proposed to reduce those effects. This will enable them to prepare well-informed responses to consultation. After the consultation, the PEI will inform the development of the ES.

1.2.4 Consultation at this stage follows previous consultations of the community in 2007 and 2009 (see Chapter 4 for more information). The previous consultations were about choosing the best route for the improvements. The current consultation is about more detailed proposals that have now been developed for the route that was selected.

1.2.5 There will be a 12-week period for members of the community to respond to the consultation. Responses can relate to the environmental issues addressed in this report, or to any other aspect of the scheme. They can be made by completing a questionnaire, by letter, by e-mail, or online, using any of the following addresses:

- By post: A556 Knutsford to Bowdon Project Team, Highways Agency, Piccadilly Gate, Store Street, Manchester M1 2WD
- Website: [www.highways.gov.uk/a556knutsfordbowdon](http://www.highways.gov.uk/a556knutsfordbowdon)
- E-mail: a556knutsfordbowdon@highways.gsi.gov.uk

1.3 After the consultation

1.3.1 After the consultation period, all responses will be considered in finalising the scheme design and the ES. A report will be prepared on the responses received and how they have been taken into account, whether or not they led to changes in the scheme.

1.3.2 The Highways Agency intends to obtain authorisation for the scheme through an application to the Infrastructure Planning Commission\(^2\) (IPC) for a Development Consent Order (DCO). The ES will be submitted to the IPC with the application.

1.4 Scope and content of the Preliminary Environmental Information

1.4.1 This PEI is organised in a similar way to the future ES, which is governed by volume 11 of the Department for Transport’s ‘Design Manual for Roads and Bridges’ (DMRB). The PEI comprises three main elements:

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\(^1\) The EIA & ES are required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009

\(^2\) Or its successor after new legislation that is intended to replace the IPC
• The Non-Technical Summary;
• The main text of the PEI; and
• The drawings and other illustrative material.

1.4.2 The main text of the final ES will provide more detail than the PEI on some technical aspects of the EIA, such as assessment methods and legislative background. There will be several appendices, mostly made up of detailed factual reports on environmental surveys carried out for the EIA, tables of data and the details of calculations. The outcome of all of these surveys, calculations etc. are described within this PEI.

1.4.3 The main text of the PEI divides naturally into three parts:
• Chapters 1 to 5 describe the scheme and the approach taken to the EIA;
• Chapters 6 to 15 describe and assess the potential effects of the scheme in relation to ten specialist topics covering particular aspects of the environment; and
• Chapter 16 considers the inter-relationships between the topics covered in Chapters 6 to 15, and between this project and other developments in the surrounding area.

1.4.4 The specialist topics covered in Chapters 6 to 15 of the PEI are:
• Chapter 6 - Air quality;
• Chapter 7 - Noise;
• Chapter 8 - Cultural heritage;
• Chapter 9 - Landscape;
• Chapter 10 - Ecology and nature conservation;
• Chapter 11 - Road drainage and the water environment;
• Chapter 12 - Materials;
• Chapter 13 - Geology and soils;
• Chapter 14 - Community and private assets; and
• Chapter 15 - Effects on all travellers.

1.4.5 Each specialist chapter of the PEI describes the following (further information on the nature and scope of each topic is given in Chapter 5 of this PEI, and in Chapters 6-15):
• Existing environmental conditions;
• The potential adverse or beneficial changes in environmental conditions that could arise from the scheme; and
• Proposed measures to avoid, reduce or mitigate any adverse effects.

1.4.6 The nature and scope of work required for the EIA as a whole, and in relation to each individual topic, was defined by the Highways Agency in a Scoping Report. The Scoping Report was issued to the IPC on 19 August 2011, and after consultation with a range of statutory Consultation Bodies the IPC issued a Scoping Opinion on 26 September 2011, and this opinion will be considered in completing the EIA and preparing the Environmental Statement.

1.5 Availability of the Preliminary Environmental Information

1.5.1 Copies of the PEI will be available at any exhibitions or other consultation events, details of which were published in the Highways Agency’s ‘Statement of Community Consultation’ (SoCC) on the 4th and 11th of January in the ‘Knutsford Guardian’ and on the 5th and 12th of January in the ‘Sale and Altrincham Messenger’. The SoCC can also be seen on the Highways Agency website via the following website:

• Website: www.highways.gov.uk/a556knutsfordbowdon

1.5.2 To give the community the opportunity to consider the environmental information before attending any such events or responding to the consultation, copies of this Preliminary Environmental Information are available to view, free of charge, at the following locations, together with other information about the scheme proposals:

• Knutsford Library, Toft Road, Knutsford, Cheshire, WA16 0PG, tel. 01625 374873 (Monday and Friday 9 am to 5 pm; Tuesday and Thursday 9 am to 7 pm; Wednesday 9 am to 1 pm; Saturday 9.30 am to 1 pm)
• Cheshire East Council’s Macclesfield Customer Service Centre, Town Hall, Market Place, Macclesfield, SK10 1EA, tel. 0300 123 5500 (Monday to Friday 8.45 am to 5 pm)
• Sandbach Library, The Commons, Sandbach, Cheshire, CW11 1FJ, tel. 01270 375355 (Monday and Wednesday 9 am to 7 pm, Tuesday and Friday, 9 am to 5 pm, Thursday 9 am to 1 pm, Saturday 9.30 am to 1 pm)

3 The Consultation Bodies are prescribed in the Infrastructure Planning (Prescribed Forms and Procedures) Regulations 2009

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1.5.3 You will be able to take away paper copies of the Non-Technical Summary, together with copies of a consultation leaflet and the SoCC.

1.5.4 The Non-Technical Summary, the complete PEI and other consultation information is also available for download free of charge from the following Highways Agency website:

- Website: [www.highways.gov.uk/a556knutsfordbowdon](http://www.highways.gov.uk/a556knutsfordbowdon)

1.5.5 Copies of the Non-Technical Summary can be obtained in paper form, free of charge, from the following postal address:

- A556 Knutsford to Bowdon Project Team, Highways Agency, Piccadilly Gate, Store Street, Manchester, M1 2WD

1.5.6 Copies of the complete PEI in electronic format on a CD can be obtained from the same address, free of charge. Paper copies are available at a cost of £186.23, inclusive of VAT. To obtain either the Non-Technical Summary or the complete PEI, please write to the Highways Agency at the address given above, enclosing payment if required.
2 The project

2.1 The roles of the Highways Agency and the Designer

2.1.1 HA is responsible for the maintenance and improvement of the trunk road and motorway network in England. HA’s five strategic aims are:

- We provide a service that our customers can trust;
- We set the standard for delivery;
- We deliver sustainable solutions;
- Our roads are the safest in the world;
- Our network is a dynamic and resilient asset.

2.1.2 HA has appointed Jacobs as the Designer for the improvements to the A556. The role of Designer includes preparation of the preliminary design of the scheme, carrying out the EIA and preparation of the application to the IPC for a DCO (see paragraph 1.3.2). After award of a DCO, the detailed design and construction of the scheme would be carried out by Costain, as the HA’s ECI Contractor, with their design partner.

2.2 Background to the project

2.2.1 The relevant section of the existing A556 is approximately 4 miles (6.5 km) long, between Junction 19 of the M6 motorway near Knutsford, and Junction 7 of the M56 motorway near Bowdon. For most of its length it is a single carriageway with two lanes of traffic in each direction. There is a short section of dual carriageway at its north end.

2.2.2 Junction 19 of the M6 is a conventional ‘grade-separated’ motorway junction (i.e. a junction at which the two roads are at different levels). In this case, the A556 joins a roundabout raised above the motorway. The motorway is linked to the roundabout by slip roads, and through-traffic on the motorway does not use the roundabout.

2.2.3 At Junction 7 of the M56, the A556 joins an ‘at-grade’ roundabout junction (i.e. a junction at which all the roads are at the same level, and all traffic normally uses the roundabout). In this case, there is also a free-flow lane to allow traffic from the M56 to join the A556 southbound directly, avoiding the roundabout. The junction is between the A556 Chester Road to the south, a ‘spur’ from the M56 motorway to the east, the A56 Lymm Road to the west and the A56 Dunham Road to the north. Traffic on the main line of the M56 motorway does not pass through the junction.

2.2.4 Other junctions along this section of the existing A556 include signal-controlled junctions with the A50 at Mere and the A5034 at Bucklow Hill and nine junctions with minor side roads. There is also access onto the trunk road from many private properties and fields.

2.2.5 The A556 between Knutsford and Bowdon carries up to 51,500 vehicles on an average weekday\(^5\). Approximately 11% are heavy goods vehicles, which is similar to the national average\(^6\) (10% for rural trunk roads and 12% for motorways). Most of the traffic is strategic through-traffic, which is in conflict with local traffic joining or leaving the A556, or crossing it, at any of the minor side roads and private access points.

2.2.6 The A556 has been identified as one of the most congested roads in England. The traffic levels are already above the sustainable maximum for this type of road and the time taken to travel the length of the road varies considerably.

2.2.7 The A556 is also the main tourist route to a popular National Trust property at Tatton Park. Traffic flows are sometimes significantly larger when national events such as the annual Royal Horticultural Society Tatton Park Flower Show are held there.

2.2.8 Traffic is often severely congested in the villages of Over Tabley, Mere and Bucklow Hill, particularly at peak times, during roadworks and during emergency situations (such as after a road traffic accident). This congestion causes driver stress and fatigue, affects the local air quality and increases noise pollution. The whole length of the A556 through and beyond this section is designated as an Air Quality Management Area (AQMA) because of pollution from vehicle exhaust emissions on the road.

2.2.9 The existing road has a poor accident record. There were 118 personal injury accidents within the scheme area (including relevant parts of the A50 and A5034) between

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\(^4\) ECI means ‘Early Contractor Involvement’ – see glossary

\(^5\) Mon-Fri Average Daily Traffic from Traffic Flow Data System (TRADS) between A5034 and M56, Sept 2009

\(^6\) Data received from Cheshire East Council Feb 2010 & HA’s Managing Agent Contractor, March 2010
January 2005 and December 2009. Of these, 14 were categorised as ‘serious’ and one was fatal. One of the aims of the improvements is to improve on this accident record.

2.2.10 The congestion gives rise to ‘rat-running’ on the minor rural side roads, as drivers look for alternative routes. These roads are not suitable for such traffic, which affects quality of life in surrounding rural areas. However, it is anticipated that reduced congestion after opening of the scheme would remove the main incentive for this behaviour.

Existing highway drainage

2.2.11 The drainage system on the existing A556 is divided into six catchments, three of which drain eastwards, into small streams which feed three lakes (The Mere, Little Mere and Rostherne Mere), and ultimately feed into the River Bollin via the Birkin Brook. Of the remaining catchments, one drains into the drainage system of the M6 motorway, one into a sewer and one directly into the River Bollin. In addition, part of Junction 7 of the M56 discharges into Birkin Brook, a tributary of the River Bollin.

2.2.12 Rainwater drainage from roads can, in some circumstances, increase flood risk in the surrounding area. It can also cause regular low-level pollution of streams and lakes, with a small risk of serious contamination, occurring very rarely, after spillages caused by road accidents. There are currently no known measures within the existing drainage system to protect the streams, rivers and lakes in the study area from these risks.

2.2.13 Rostherne Mere, The Mere, Little Mere and Tabley Mere are all internationally-important nature conservation sites, designated under the ‘Ramsar Convention’. All four are also designated at a UK level as Sites of Special Scientific Interest (SSSI). Rostherne Mere SSSI also covers some surrounding land, and is also a National Nature Reserve (NNR).

2.3 Scheme history

2.3.1 The congestion, safety and environmental problems along the A556 are of long standing. Different approaches to solving these problems have been considered from the 1980s onwards. A proposal for a new motorway (the A556 (M)) was developed in the late 1980s and taken to public inquiry in 1993. ‘MIDMAN’, a study of transport needs across the region published in 2002, recommended improvements to M6 Junction 20 (combined with widening of both the M6 and M56) over the A556 (M) scheme (both schemes are illustrated on Figure 3.1). However, MIDMAN also recognised the weaknesses of this recommended option, and the HA carried out a more detailed assessment of the options before a final view could be taken. The resulting A556 Area Study (2002 – 2003) concluded that the A556 (M) scheme was preferred over any M6 Junction 20 option, because it would cater more successfully for motorway traffic; it would cost around 15% less; it was preferable in relation to five out of nine environmental objectives; it required no demolition of property; it offered a six-times greater accident saving; and it scored better on standard measures of ‘value for money’.

2.3.2 Notwithstanding the above, both the A556 (M) and M6 Junction 20 schemes were ultimately rejected by the Secretary of State. Following the rejection of other options, the solution chosen has therefore been the improvement of the A556 itself, and a series of studies have been carried out to select the best route. Highlights of the historic development of the scheme and its predecessor schemes are shown as a ‘timeline’ in Table 2.1. More details of the consideration of alternatives are set out in Chapter 3.

Table 2.1: Timeline of scheme development

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<th>Year</th>
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<td>1993</td>
<td>Proposals for A556(M) motorway scheme considered at Public Inquiry</td>
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<td>1995</td>
<td>Line, Side Road and Compulsory Purchase Orders for the A556(M) motorway scheme confirmed by Secretary of State and made in June 1996</td>
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<td>1997</td>
<td>Roads Review – A556(M) motorway scheme remitted to West Midlands to North West Conurbation Multi-Modal Study (MIDMAN)</td>
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<td>2002</td>
<td>MIDMAN study (published 2002) recommends further consideration of an alternative - improve M6 Junction 20, with widening of M6 Juctions 19-20 and M56 Juncstions 7-9</td>
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<tr>
<td>2003</td>
<td>A556 Area study considered A556 (M) motorway and M6 Junction 20 schemes. A556 (M) proposals rejected by Secretary of State on environmental grounds. M6 J20 improvements also rejected. Route Management Strategy to consider best use of existing route</td>
</tr>
<tr>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>Options Study for amendments to southern end of A556 Environmental Improvements – 3 options considered. September to December – Public Consultation on options</td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>Preferred Route Announcement</td>
</tr>
<tr>
<td>2008</td>
<td>Options Study for amendments to southern end of A556 Environmental Improvements – 3 options considered. September to December – Public Consultation on options</td>
</tr>
<tr>
<td>2009</td>
<td>March – Amended Preferred Route Announcement Development of design of Preferred Route</td>
</tr>
<tr>
<td>2010</td>
<td>Further development of design of Preferred Route and Public Consultation on the developed design</td>
</tr>
<tr>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

Issued January 2012
2.3.3 As shown on the timeline, a Preferred Route for the improvements was announced in 2008, and amended in March 2010. The choice of option was based on comparative studies addressing the options in relation to engineering feasibility, traffic, economic effects and environmental effects. The decision was also influenced by the results of Public Consultations carried out in 2007 and between September and December 2009.

2.4 Description of the proposed improvements

Environmental objectives of the scheme

2.4.1 The four overall objectives of the scheme are described in Chapter 1. Two of the four relate to the environment, and a number of more specific environmental objectives have been defined that contribute towards achievement of the overall objectives, as follows:

- To improve air quality in the Chester Road Air Quality Management Area (AQMA), including the communities of Mere and Bucklow Hill;
- To eliminate existing potentially adverse effects of highway drainage on Rostherne Mere and The Mere Ramsar/SSSI sites;
- To reduce traffic-related noise and vibration for local residents; and
- To relieve community severance caused by heavy traffic on the existing A556.

Outline description of the scheme

2.4.2 The timeline of scheme development shown on the previous page (Table 2.1) shows that the Amended Preferred Route was announced in 2010, and the scheme design was further developed during 2010-11. This chapter of the PEI describes the scheme design as developed over that period, and this is the scheme design that has been used for computer modelling of traffic flows and for assessing environmental impacts in this PEI.

2.4.3 Local community engagement in the summer of 2011 gave rise to feedback on aspects of the design, and in particular the junctions proposed to connect the trunk road into the local road system. In response to this feedback, we have developed some alternative design options for the junctions. More information about these options is given in Section 3.3 of this PEI, and in a separate report.

2.4.4 The whole of the improvement scheme would be built to the standard of an all-purpose dual carriageway with two lanes of traffic in each direction. From Junction 19 of the M6 motorway to north of Bucklow Hill, the improvements would be constructed ‘off-line’ to the west of the existing A556, bypassing the villages of Over Tabley, Mere and Bucklow Hill. The route would rejoin the existing line of the A556 north of Millington Lane, and from there northwards the improvements would be on-line (see Figure 2.1).

2.4.5 Structures would include five bridges carrying side roads or elements of junctions over the new A556, one underpass for pedestrians, cyclists and horse riders and three retaining walls. It is currently proposed to provide a continuous concrete safety barrier along the whole length of the central reservation. Consideration is also being given to a ‘green bridge’ to reconnect habitats either side of the new road.

2.4.6 Where the improvement is off-line, the existing A556 would cease to be a trunk road and would become part of the local highways authority’s network (see Figures 2.8-2.12). This ‘de-trunked’ section would become a rural side road, and is referred to throughout this report as ‘Chester Road’, to avoid confusion with the new trunk road (the A556).

2.4.7 There would be four junctions along the line of the improvements, as outlined below:

- Junction 19 of the M6 would be modified (see Figures 2.2 and 2.8) by closing the access to and from Chester Road as part of the de-trunking works, and creating a new tie-in between the off-line improvements and the junction;
- A new ‘south-facing’ junction (Tabley Junction; Figure 2.2) would be built north-west of Over Tabley. This would include a slip road and overbridge allowing northbound traffic on the new A556 to exit towards the de-trunked Chester Road, giving access to local communities and, indirectly, to the A50. A second slip road would allow traffic to join the new A556 southbound only. Both slip roads would be linked to the de-trunked road 700m north of the existing M6 Junction 19. There would be no access to the A556 northbound, and no exit to the junction for southbound traffic;
- A new ‘north-facing’ junction (Millington Junction; Figure 2.4) would be constructed to the north of Bucklow Hill. An overbridge would be linked to the new road by slip roads allowing northbound access to the new A556 and allowing southbound traffic to leave the new A556. The overbridge would be linked eastwards to Chester Road and westwards to Millington Hall Lane and Chapel Lane, via a new side road. There would be no access to the new A556 southbound, and no access to the junction for northbound traffic already on the A556. The overbridge will carry a path for pedestrians, horse-riders and cyclists that is segregated from vehicular traffic;
- Junction 7 of the M56 motorway would be substantially remodelled (see Figure 2.6). The main line of the A556 would curve to the north-east to form a free-flow link to the M56 in both directions. The existing roundabout and a new roundabout would lie either side of this free-flow link, linked by an overbridge, forming a ‘dumb-bell’ arrangement. Slip roads would link the roundabouts to the A556 and the M56 spur. The junction of the A56 with the existing roundabout would be unchanged; and

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7 Junction Options Comparative Assessment Report (Jacobs, January 2012)
There would be no direct junction between the new trunk road and either the A50 or the A5034 Mereside Road (see Figures 2.3 and 2.4).

Minor side roads

2.4.8 Minor side roads to be stopped-up either side of the new A556 where they are cut by the off-line improvements include:

2.4.9 Old Hall Lane. Residents to the west of the new road would have access to the de-trunked Chester Road via Pickmere Lane, Junction 19 of the M6, and Tabley Junction. If travelling on foot, bicycle or horseback, they would have a more direct route, crossing the new A556 via an underpass adjacent to the line of Old Hall Lane itself;

2.4.10 Bucklow Hill Lane, between Bucklow Hill and Hoo Green. Residents to the west of the new road would have access to the east via the A50 or the new over-bridge at the proposed Millington Junction;

2.4.11 Chapel Lane, west of Bucklow Hill. Residents to the west of the new road would have access to the east via the new side road and the over-bridge at Millington Junction; and

2.4.12 Millington Hall Lane and Millington Lane, north of Bucklow Hill. Residents to the west of the new road would have access to the east via the new side road and the over-bridge at the proposed Millington Junction.

2.4.13 Burleyhurst Lane (south of Mere) and the A50 would be carried over the off-line improvements on bridges. One private road (Yarwoodheath Farm access track) would be diverted, but would still cross the M56 and M56 spur by the existing bridges.

2.4.14 Rostherne Lane would retain its junction with the de-trunked Chester Road, but would have no direct access to the new A556. Cherry Tree Lane would be extended southwards, within the existing highway boundary, linking it to Chester Road and the proposed Millington Junction; it would have no direct access to the new A556.

De-Trunking of the existing A556 Chester Road

2.4.15 Where the improvement is off-line, the existing Chester Road would cease to be a trunk road. A programme of ‘de-trunking’ works would be required before it could be handed over to the local highways authority (Cheshire East Council) as part of their network. The scope of these works is to be agreed with the local highways authority, but they are likely to include the following (see also Figures 2.8 to 2.12):

- A reduction from four lanes to two along Chester Road;
- Changes at junctions with side roads;
- Changes to traffic signs and signals and road markings;
- Possible changes to or removal of lighting, where it is present;
- Changes to provision for pedestrians, cyclists and horse riders;
- It may also be necessary to make changes to the existing highway drainage; and
- Possible removal of speed control measures, safety barriers and CCTV/security cameras, all required for a busy trunk road and not relevant to a rural side road.

Byways, bridleways and footpaths

2.4.16 There would be no direct access from any public right of way (PRoW) to the new A556. Access from two footpaths in the northern section of the scheme onto the A556 would be stopped-up (Millington FP7, which joins the west side of the existing A556 adjacent to Mereside Farm; and Rostherne FP13, which runs along a private road and joins the east side of the A556 near Yarwoodheath Farm). Alternative routes would be provided.

2.4.17 Other changes to the network of walking, cycling and equestrian routes would be as follows (see also Figures 2.8 to 2.12):

- The de-trunked Chester Road would become a rural side road carrying low traffic flows (particularly in its more rural southern half). Whereas the existing A556 is a barrier to non-motorised traffic, the de-trunked Chester Road would become a potentially attractive route and a useful link between other routes to either side;
- Although Old Hall Lane would be severed for vehicular traffic, an underpass would be provided for pedestrians, dismounted horse-riders and cyclists. For these users, it is currently very difficult to cross the existing A556 to get from the Swain’s Walk bridleway on one side to Old Hall Lane on the other. This change will therefore open up a connection between the PRoWs to the east and west of the A556;
- A pedestrian and cyclist link would be provided from the west end of the underpass southwards to Junction 19 of the M6, allowing continued access to the existing footway around the west side of the motorway junction;
- Burleyhurst Lane would be carried over the new A556 on a bridge;
- Users of Bucklow Hill Lane, Chapel Lane and Millington Hall Lane would have to follow diversions to cross the new A556 at the A50 or at the new Millington Junction;
- Users of Regional Cycle Route 70 (via Cicely Mill Lane, Bucklow Hill Junction and Chapel Lane) would follow a diversion via Chester Road and Millington Junction;
• It would not be possible to cross the new A556 directly between Rostherne Lane and Millington Lane. However, although at present it is theoretically possible to make this crossing, heavy traffic makes it very hazardous. Pedestrians, cyclists and horse-riders wishing to cross here would follow diversions via the new Millington junction;

• The new overbridge at the proposed new Millington Junction would incorporate a separate facility for pedestrians, cyclists and horse-riders, segregated from vehicular traffic, to avoid conflict with vehicles at the top of the slip roads;

• Cherry Tree Lane would be extended southwards to the de-trunked Chester Road, opening up potential circular journeys using both Cherry Tree and Rostherne Lanes;

• Footpath Rostherne FP13 (which crosses the M56 via Tom Lane and Yarwood Heath Lane before joining the east side of the existing A556) would be upgraded to bridleway (with new equestrian parapets on the existing bridge), and linked to the new roundabouts at Junction 7 of the M56, which would carry less traffic than the existing junction and would have a footway around one side. This would open opportunities for pedestrians, horse-riders and cyclists to make north-south journeys between the villages along Chester Road and the urban areas to the north;

• Footpath Rostherne FP9, which crosses the M56 spur via an agricultural bridge to reach the Bollin valley, would be severed. However, the existing bridge would be retained and a diversion provided that would allow continued access;

• The steps linking footpath Millington FP10 to the existing A556 footway adjacent to the Cheshire Lounge pub would be closed, and the footpath would be diverted northwards to the existing Bowdon Roundabout; and,

• All new facilities for pedestrians, cyclists and horse riders would be designed to be accessible for disabled users, and all existing facilities that are modified or diverted would be made accessible for disabled users within the extent of the modified or diverted section.

Lighting, road signs, signals and markings

2.4.18 The design of lighting for the scheme will draw on a ‘lighting appraisal’ based in part on environmental advice, in accordance with relevant guidance. The nature, location and extent of lighting will be taken into account where relevant in the EIA process.  

2.4.19 At this stage, the extent of lighting along the new road has not been finalised, but it is currently intended to light the scheme only on the approaches to Junction 19 of the M6 and Junction 7 of the M56. It is not yet determined whether or not there would be lighting at the new Tabley and Millington Junctions. The decision will be based on economic, environmental and road safety factors.

2.4.20 The emphasis in lighting design has been on balancing the safety of road users with the minimisation of environmental impacts. A range of environmental topics were relevant, but the key environmental factors were:

• The effect on the historic setting of Listed Buildings and historic landscapes, particularly at Over Tabley Hall and Mere Hall;

• The visual impact of lighting columns in the daytime and lights during the night;

• The effect of the lighting columns on the quality and character of the landscape;

• The potential effect of the lighting on birds, bats and other wildlife.

2.4.21 The majority of signs will be conventional post-mounted boards. ‘Variable message’ signs may be used in some locations near the north end of the scheme. Environmental advice is being sought on the design of road signs and markings, although the principal influence on their design will be the demands of road safety. Signs and road markings have been taken into account in the assessment of visual and other impacts.

2.4.22 There are two existing signalised junctions within the section of Chester Road that is to be de-trunked – at the A50 in Mere and the A5034 in Bucklow Hill. Both junctions would be modified, but would continue to be signal controlled. At present, only the Bucklow Hill traffic lights include a pedestrian crossing. However, it is intended to introduce signalised pedestrian and equestrian crossings over the A50 at Mere junction and over the de-trunked Chester Road east of the new Millington Junction.

Drainage

2.4.23 The design of drainage for both the new road and the de-trunked Chester Road has been undertaken from the outset with advice from the Water Environment specialist on the EIA team. The key environmental issue is to improve protection of local watercourses and water bodies, in particular the Ramsar/SSSI sites located to the east.

2.4.24 Consultation about the environmental effects of drainage has taken place with both the Environment Agency (EA) and Natural England (NE), and will continue as required.

2.4.25 The drainage of the proposed new trunk road is divided into 4 catchment areas (A-D; see Figure 2.7). Each catchment represents the area of the road that would drain to a specific ‘outfall’ (the location at which water is discharged into a watercourse).
Catchments A and B would discharge into Tabley Brook (west of the road, flowing south), while Catchment C would discharge into an un-named stream to the west, flowing north to the River Bollin. Catchment D would discharge into the River Bollin to the north. No drainage from any of these catchments would flow eastwards towards The Mere, Little Mere or Rostherne Mere, or into the streams that feed them.

2.4.26 A new pond at each outfall would be used to attenuate flows\(^9\) and treat the water to allow settlement of silt and pollutants. This system would ensure that water running off the new road would be treated in terms of water quality, that any spillages (for instance as a result of road accidents) are captured and controlled, and that there is no increase in flood risk. The effectiveness of water treatment for Catchments A, B and C would be enhanced by establishing reedbeds in the ponds; this is not needed for Catchment D.

2.4.27 The drainage system on the existing A556 is described in paragraph 2.2.11. Most of this system would be unchanged by the de-trunking works on Chester Road. However, there is likely to be a reduction in the area of hard road surface on Chester Road, which would reduce the quantity of water drained via this system and discharged at the existing outfalls. In addition, the reduced usage of Chester Road would reduce both the amount of pollutants in the routine run-off and the risk of accidental spillages caused by traffic accidents.

2.4.28 Catchment 6 would experience very little change. Catchment 7 currently drains a significant length of the existing A556, plus the existing Bowdon Roundabout. The scheme would significantly reduce the area of this catchment, limiting it to the parts of the remodelled Junction 7 of the M56, principally the existing Bowdon Roundabout.

2.5 Changes in traffic flows

2.5.1 In order to predict the impact of the proposed improvements in the future, a series of computer models have been developed which forecast traffic flows in the area, based on simulations of existing traffic conditions. The models were developed using recent survey data on traffic movements and planning information on jobs and population.

2.5.2 This model is the starting point for predicting traffic flows and behaviour in the future, allowing for growth in housing, employment and the number of cars on the network. Traffic forecasts have been developed for the proposed Opening Year of the scheme in 2015 and a Design Year in 2030 to help predict the long term impacts of the scheme.

2.5.3 The forecasts examine two development alternatives; one with the scheme in place and one without. The traffic flows around the area can therefore be compared to determine whether the scheme will alleviate the problems associated with the current layout in the future, and what conditions would be like if the scheme did not go ahead.

2.5.4 For the purposes of this assessment, an ‘area of confidence’ has been identified within the model where traffic flows can be extracted for environmental analysis (see plan).

### Table 2.2: Summary of average weekday traffic flows on A-Roads around the scheme

<table>
<thead>
<tr>
<th>Link</th>
<th>2009 Existing</th>
<th>2015 No Scheme</th>
<th>2015 With Scheme</th>
<th>2030 No Scheme</th>
<th>2030 With Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>A556 Current</td>
<td>50,500</td>
<td>55,300</td>
<td>7,200</td>
<td>64,200</td>
<td>8,200</td>
</tr>
<tr>
<td>A556 Proposed</td>
<td>-</td>
<td>-</td>
<td>69,900</td>
<td>-</td>
<td>82,300</td>
</tr>
<tr>
<td>A50</td>
<td>9,200</td>
<td>9,400</td>
<td>11,900</td>
<td>12,100</td>
<td>14,100</td>
</tr>
<tr>
<td>A5034</td>
<td>7,500</td>
<td>6,700</td>
<td>4,900</td>
<td>9,600</td>
<td>6,800</td>
</tr>
</tbody>
</table>

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\(^9\) ‘Attenuate’ in this context means any method used to slow down the rate of discharge of water drained off the road into local watercourses, to avoid the risk of causing floods. In this case, the water will be captured in ponds and then slowly released. ‘Treatment’ means any method used to improve the quality of water before discharge.
2.5.5 Data can then be extracted from within the models, such as average weekday flows, 24 hour flows and percentage of HGVs, as required for the assessment of each individual environmental topic. A summary of the information is provided in Table 2.2.

2.5.6 The table shows a drop of around 87% in traffic using the de-trunked Chester Road, compared to traffic expected on the A556 in either 2015 or 2030 without the scheme. This fall represents 48,000 fewer vehicles per day in 2015 and 56,000 fewer vehicles in 2030. Traffic on the A5034 would also fall by around 27% in 2015 and 29% in 2030.

2.5.7 There would be increases on the A50 of around 26% in 2015 and 16% in 2030. However, these increases (around 2,500 vehicles per day in 2015 and 2,000 vehicles in 2030) represent far fewer vehicles than the decreases on the de-trunked Chester Road.

2.6 Programme

2.6.1 For the purposes of environmental impact assessment in this PEI, the programme for the project is structured around the following key dates:

- Monday 23 January 2012 – Monday 16 April 2012 – public consultation events;
- 2012 – submission of an application for a DCO to the IPC;
- By 2014 – start of construction;
- Duration of construction – around 2 years.
3 Consideration of alternatives

3.1 Project history

3.1.1 The history of and background to the project are set out in Chapter 2, with a summary of alternative projects that were considered prior to the initiation of the currently proposed scheme (see also Figure 3.1). In summary, these comprised:

- MIDMAN, a multi-modal study of regional transport needs, which considered both road-based and public transport options;
- The A556 (M), a new motorway linking the M56 and M6 motorways; and
- Improvements to Junction 20 of the M6 motorway, which would also have entailed widening both motorways.

3.2 A556 Knutsford to Bowdon - alternative scheme options considered

3.2.1 Following rejection of all of the other options, a decision was made to pursue the improvement of the existing A556 to dual carriageway standard. Options for the achievement of this objective have been considered and refined through several stages of work, as summarised below (see also Figures 3.2 to 3.4):

- A route options assessment to determine the overall alignment of the scheme, carried out in 2005-7, with public consultation in 2007 and a Preferred Route Announcement in December 2008;
- A study of options for adjustments to the alignment at its south end to reflect changed circumstances, carried out in 2009, with public consultation in September to December 2009 and an amended Preferred Route Announcement in March 2010;
- Smaller adjustments to the alignment made by the design team during 2010 to minimise impacts on the environment and the community; and
- A comparative study of alternative junction strategies and layouts, to maximise value for money and minimise environmental impact, in June to October 2010.

3.2.2 The scheme described in this report is the cumulative outcome of all of these options studies and design refinement. Each of these stages is described in outline below.

Route options assessment, 2005-7

3.2.3 Between 2005 and 2007, a study was carried out to identify and compare options for the improvement of the existing A556 to dual-carriageway standard, partly on-line and partly off-line. The scheme included improvements to Junction 7 of the M56 motorway. Two main options were developed (see also Figure 3.2):

- Option A – online from Junction 7 of the M56 through Bucklow Hill, bypassing Mere to the west, and tying-in to the existing A556 again north of Over Tabley. All traffic would still go through Bucklow Hill and Over Tabley, but Mere would be bypassed;
- Option B – online from Junction 7 of the M56 to a point north of Bucklow Hill, then bypassing both Bucklow Hill and Mere to the west, tying-in as above. Trunk-road traffic would bypass Bucklow Hill or Mere, but would still go through Over Tabley.

3.2.4 Both options included improvements to Junction 7 of the M56, to allow traffic between the M56 and A556 to flow freely without going around a roundabout, with an enlarged and remodelled junction linked to the A556 and motorway by slip roads.

3.2.5 Option A also included a new junction at Rostherne Lane/Millington Lane and required remodelling of the existing junction between the A556 and Chapel Lane/Bucklow Hill Lane in Bucklow Hill.

3.2.6 Option B included a junction between the off-line section of the new A556 and Millington Hall Lane, with a local link road to Chapel Lane to allow access into Bucklow Hill and a southbound-only access to the de-trunked Chester Road, north of Bucklow Hill.

3.2.7 Each option would have had one additional junction, chosen from two alternatives:

- A new grade-separated junction with the A50;
- A new grade-separated junction at Turnpike Wood, at the point where the off-line improvements tie back in to the existing line, north of Over Tabley.
A report was prepared to compare the environmental impacts of these options\(^{10}\). After public consultation in 2007, Option B with the A50 junction was announced as the ‘Preferred Route’ in December 2008.

**A556 south end options assessment**

The Preferred Route announced in 2008 was designed to tie-in with a separate project to improve the M6 motorway, which included improvements to Junction 19 of the M6 at Over Tabley. However, changes to the scope and programme for the M6 widening project meant that this tie-in would no longer be provided, leaving an un-improved gap of around 600m between Junction 19 of the M6 and the end of the A556 improvements. Additional options were developed to close this gap, as follows (see also Figure 3.3):

- The Brown Option – the Preferred Route as announced, tying-in to the existing A556 north of Over Tabley, leaving the last 600m of the A556 unimproved;
- The Blue Option – extend the improvements from the tie-in point along the existing A556 through Over Tabley to Junction 19 of the M6; and
- The Red Option – bypass Over Tabley to the west to tie-in directly to Junction 19.

The options were compared in relation to engineering feasibility, safety, traffic and economic performance and environmental effects\(^{11}\), and a supplementary Public Consultation on the options was carried out between September and December 2009. Key conclusions of the options study, taking account of the consultation results, were:

- The Brown Option was considered to create an abrupt transition from a high-speed road to one of a significantly lower standard through Over Tabley. Further development would be required to address these concerns, which would erode the distinction between the Brown and Blue options;
- The Blue Option attracted more opposition from the public than the Red Option, principally due to its effects on some residents and on non-motorised users; and
- The Red Option was deemed to perform best in terms of safety and traffic. It would introduce some new environmental impacts, but would also eliminate some impacts associated with the Brown and Blue Options. On balance, it would be environmentally preferable. Although some consultees preferred the Blue Option to the Red the overall balance of consultation responses favoured the Red Option.

The results of the options study and the supplementary public consultation were taken into account in selecting the Red Option as the amended Preferred Route. An amended Preferred Route Announcement was made on 19 March 2010.

**Ongoing refinement of the design**

Following the amended Preferred Route announcement in March 2010, further work commenced to develop the outline design in more detail. Environmental studies are being carried out in parallel with the design to maximise the influence of environmental considerations on the design. The draft preliminary design and traffic forecasting reports, together with this Preliminary Environmental Information, form the basis for the current phase of Public Consultation. The results of the current consultation will be taken into account in finalising the preliminary design and environmental studies.

Changes to the design made since the amended Preferred Route Announcement in March 2010 include:

- The alignment has been adjusted in the area between Bucklow Hill Lane and Burleyhurst Lane. This adjustment was made to achieve the following:
  - To increase the separation between the road and properties around Mere Hall, taking account of comments from a representative of Mere Hall residents;
  - To minimise the loss of woodland, particularly in Belt Wood and Kennel Wood;
  - To maximise the proportion of a hedgerow that could be retained on the east side of the road, to utilise its contribution to visual screening and preserve its value for bats (the hedge runs from near Kennel Wood Cottage to Belt Wood); and
  - The size of the movement to the west was limited, as any greater movement would have significantly increased ecological impacts and impacts on the residential properties at Hulme Barns Farm and possibly Bentleyhurst Farm.
- The alignment has been adjusted a few metres further to the west at its south end, to avoid the need to relocate Over Tabley Parish Hall;
- The alignment was adjusted north of Bucklow Hill, extending the off-line section and shortening the on-line section, so that the road would now pass west of Rangemore Nursing Home, rather than immediately in front of it. This change was made in consultation with the management of Rangemore Nursing Home and Natural England, and is intended to achieve the following:
  - To reduce or avoid impacts on the nursing home and on Rostherne Mere SSSI, including elimination of drainage towards Rostherne Mere; and


\(^{11}\) A556 Environmental Improvement South End Options: Comparative Environmental Assessment (Jacobs, 2009)
To make the road easier to build, reducing the amount of temporary diversions and other temporary construction features required. This would reduce the cost of construction, may reduce the duration of construction, and would reduce the environmental impact of the construction process.

Consideration was given to the realignment of Old Hall Lane and the provision of a bridge to maintain its continuity, but this option has not been pursued as it would be incompatible with the final junction strategy (see below).

### Changes to junction strategy and layout

3.2.14 A ‘Value Management Workshop’ was held over two days in June 2010. The aim of the workshop was to find better value ways to achieve the scheme objectives. Key opportunities identified at the workshop were:

- The number of new bridges required could be reduced by providing a single bridge north of Millington Lane instead of both a bridge at Chapel Lane and a bridge or underpass for non-motorised users at Rostherne Lane;
- Options were identified for alterations to the number and location of junctions; and
- The form and layout of M56 Junction 7 was reconsidered and new options identified.

3.2.15 The key drivers for reconsidering the junction strategy included the potential to improve access to local communities, property and business, particularly in Over Tabley and along Cherry Tree Lane, the opportunity to improve the distribution of traffic between the A50 and the A5034 (thereby reducing adverse effects on residents in part of Mere) and the potential to reduce the cost of the scheme while still meeting its objectives.

3.2.16 Following the workshop, a comparative study was carried out to select the best value options both for overall junction strategy and for the layout of each individual junction. There was significant environmental input to both the workshop itself and the subsequent comparative study.

3.2.17 Junction strategy options that were considered were as follows (see also Figure 3.4):

- **Strategy 0 – the pre-workshop design**
  - Junctions at the M6, M56 and A50;
  - A50 junction comprises a bridge and two roundabouts, linked to the new A556 by four slip roads (two to the north and two to the south); and
  - Southbound-only access from the new A556 to Chester Road north of Bucklow Hill.

- **Alternative Strategy 1**
  - Junctions at the M6 and M56;
  - South-facing aspect of the A50 junction replaced by the new Tabley Junction; and
  - North-facing aspect of the A50 junction replaced by the new Millington Junction, with north-facing slip roads only. This would also replace the southbound-only access from the new A556 to the old line of the A556.

- **Alternative Strategy 2**
  - Junctions at the M6 and M56;
  - South-facing aspect of the A50 junction replaced by the new Tabley Junction;
  - Junction at the A50 with north-facing slip roads only; and
  - The southbound-only access from the new A556 to the old line of the A556 north of Bucklow Hill would not be provided.

- **Junction layout options**

3.2.19 Both alternative strategies had two variants involving alternative layouts for the new Tabley Junction. The alternative layouts were:

- A ‘compact’ junction layout that would have allowed access to and from the trunk road in both directions, but which would have had a limited capacity;
- A fully grade-separated junction layout linked to the A556 by slip roads, with access to and from the south only.

- **Outcome of the junction strategy options assessment**

3.2.20 Alternative strategy 1 was ultimately selected and is reflected in the current scheme layout (see Figures 2.1 and 2.2-2.6). The adoption of a strategy with junctions near the south and north ends of the scheme (the new Tabley and Millington Junctions) maximises ease of access to businesses and communities in Over Tabley, Cherry Tree Lane and in Bucklow Hill. It also makes best use of existing highway infrastructure by distributing traffic between the A5034 and A50, minimising the effects of traffic flows on residents along the A50 in Mere. Based on the assessment of junction strategy options,
this strategy was considered to provide the optimal balance between traffic/economic performance and environmental impact.

3.2.21 The junction layout selected for Tabley Junction was the fully grade-separated option. This preserves the existing level of access to the key roadside businesses in Over Tabley (which are currently accessible only for northbound traffic on the A556). The alternative, compact layout would also have allowed southbound traffic to access the businesses, but the fully grade-separated option was preferred because it would provide a higher standard of road safety on the approach to Junction 19 of the M6 motorway.

3.3 Junction options – further comparative assessment 2011-2012

3.3.1 Engagement with local community representatives has identified some concerns about aspects of the current junction strategy, although there was also explicit support for it.

3.3.2 To address the concerns that have been raised, several further alternative junction strategies have been developed, incorporating different junction locations, different junction layouts and different connectivity within the local road network. A comparative assessment has been undertaken to determine the advantages and disadvantages of the various junction options.

3.3.3 These alternative options are described within the Junction Options Comparative Assessment Report\(^{13}\), which presents the results of the assessment. This compares each of the alternatives with the design described in this PEI (referred to as the ‘Baseline Design’), and considers whether each alternative would be better or worse in relation to engineering, cost and environmental impacts. As a result, some of the alternative options have been rejected, while others are still ‘live’ and are open for comment as part of the public consultation.

3.3.4 The Highways Agency has undertaken this assessment to ensure that the public and other interested stakeholders have the opportunity to comment on the Baseline Design and the alternative junction strategies. This feedback will be taken into account when deciding the layout of the scheme and before preparing the application for a Development Consent Order.

\(^{13}\) Junction Options Comparative Assessment Report (Jacobs, January 2012)
4 Consultation of third parties and of the public

4.1 Consultation of third parties

4.1.1 For the purposes of this assessment, ‘third parties’ is taken to mean organisations or individuals who hold responsibilities or interests relevant to the EIA, including both statutory Consultation Bodies and other organisations with relevant responsibilities.

4.1.2 All statutory Consultation Bodies were consulted by the IPC before preparation of their Environmental Scoping Opinion. In addition, HA and Jacobs consulted selected third parties, including some of the statutory Consultation Bodies, during the course of the EIA work. The breadth of the list of statutory Consultation Bodies means that there is a significant overlap between those covered here and those covered below under the separate heading of ‘consultation of the public’.

4.1.3 Extensive consultation with third parties had been carried out at earlier stages of scheme development and will continue throughout the EIA. This consultation process is intended to address any or all of the following purposes (see also Section 5.7 of this report for more information about some of the issues listed below):

- To obtain factual information about the environment (‘baseline data’, e.g. records of protected species that may be present, or records of known archaeological sites);
- To obtain advice about the scope of work required for the EIA;
- To obtain comment and advice about the environmental merits of the proposed scheme or strategic environmental issues that may affect it;
- To obtain comment and advice on the factors influencing our assessment of how significant each environmental impact may be;
- To obtain advice about potential design changes or other measures we could take to remove or reduce impacts or make them less significant; and
- To obtain advice or comment about the methods proposed in this report.

4.1.4 Consultation of third parties prior to preparation of this report has been focussed on key environmental bodies (principally the IPC, Environment Agency, Natural England, English Heritage and Cheshire East Council). Consultation methods have involved; exchanges of letters, telephone calls and e-mails; presentations by the Highways Agency, Jacobs or both, with question-and-answer sessions; and face-to-face meetings, either with a single consultee organisation or jointly with two or more organisations at the same time. The consultation process has involved two or more contacts with each organisation and it is anticipated that this ongoing consultation will continue.

4.1.5 Given the proximity of internationally designated sites, there has been a particular focus on consultation with Natural England, which was consulted by letter in November 2009, and subsequently through several meetings and further exchanges of correspondence (letters and e-mails). Some of these consultations were held jointly with the nature conservation officer of Cheshire East Council and/or representatives of the Environment Agency. Consultation addressed the scope of ecological surveys for the scheme as a whole and Rostherne Mere in particular; potential impacts of the scheme from land-take, highway drainage and air pollution; the geological interests at Rostherne Mere; and relevant aspects of scheme design. Natural England expressed views on all of these matters and some of the design changes described in paragraphs 3.2.13 - 3.2.21 arose in part from their comments.

4.1.6 Consultation of Cheshire East Council has been addressed to a wide range of specialist officers, including planning and highways officers and specialist officers dealing with air quality, noise, ecology, landscape, heritage, countryside access and rights of way. Some of this consultation has been on an individual, one-to-one basis, and some has been joint with multiple officers and/or joint with other consultees.

4.1.7 English Heritage is the HA’s official adviser on all heritage matters, but all consultation with English Heritage has been carried out jointly with the archaeological officer and conservation officer of Cheshire East Council.

4.1.8 The Environment Agency has been consulted both individually and jointly with other organisations in relation to the drainage design, flood risk, water quality and potential effects on aquatic habitats.

4.2 Consultation of the public

4.2.1 The local community and wider public were consulted in 2007 (prior to the original selection of a Preferred Route) and in 2009 (prior to selection of a preferred option for changes to the alignment at the south end). Responses from the public, and from community groups such as parish councils, were taken into account in selection of a Preferred Route. In addition, issues raised in these responses have been taken into account in developing the outline design of the amended Preferred Route itself.

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14 i.e. organisations prescribed by The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
4.2.2 Highways Agency and Jacobs representatives have attended meetings of the relevant Parish Councils or similar community representative organisations at intervals during 2009-11, to present the outcome of key stages in the development of the scheme and to answer questions.

4.2.3 In addition to the above, presentations have been given to the Cheshire Local Access Forum (LAF) in March 2010, at a meeting also open to members of the public, and in June 2011. The LAF is a statutory organisation with a volunteer membership that advises Cheshire East Council on public access to open country, common land and PRoWs, and on wider public access issues.

4.2.4 The presentations to the LAF focussed on the potential effects of the scheme on community severance, access to the countryside, public rights of way and other routes used by pedestrians, cyclists and/or horse riders. Follow-up consultation is planned. The minutes of the meeting are published on the LAF website. Consultation of the LAF has been backed-up by exchanges of correspondence with individual organisations representing the interests of pedestrians, cyclists, horse-riders etc.

4.2.5 Individual farm proprietors whose land or access arrangements would be affected have been interviewed in order to provide a better understanding of how they manage and farm their land, and therefore how they would be affected by the scheme.

4.2.6 Further consultation of the community is now in progress and this Preliminary Environmental Information has been prepared to inform the current consultation. The form of and arrangements for this consultation were set out in the Statement of Community Consultation (SoCC) published in January 2012. The current consultation process includes the following elements:

- Public exhibition: our exhibition will provide an opportunity to see the scheme plans, meet the project team and ask questions. It will be held in the ‘Veranda Suite’ at Cottons Hotel and Spa, Manchester Road, Knutsford, Cheshire, WA16 0SU, on:
  - Saturday 28 January 2012, from 10 am until 5 pm
  - Tuesday 31 January 2012 from 10 am until 9 pm
  - Thursday 9 February 2012 from 1 pm until 9 pm
- The publication of our consultation leaflet, questionnaire and other information on our scheme web page (www.highways.gov.uk/a556knutsfordbowdon)

- Leaflet: The distribution of our consultation leaflet to addresses in the parishes through which the scheme would pass

- Meetings: we will hold meetings with local residents, businesses and groups about the scheme in general or about particular issues. If you are interested in this, please let us know

- The publication of additional consultation information on our web page (www.highways.gov.uk/a556knutsfordbowdon), including:
  - The leaflet, as detailed above, with a questionnaire that you can use to provide feedback electronically
  - A non-technical summary of the Preliminary Environmental Information
  - The Scheme Assessment Report, which summarises the engineering design and the business case for the scheme
  - The Junction Options Comparative Assessment Report
  - The Statement of Community Consultation
  - A notice required under Section 48 of the Planning Act 2008 to publicise the consultation in the local and national press.

- All of this information will be available to download free of charge. In addition, the information will be placed on deposit at the locations listed in Chapter 1, Section 1.5, and will be available for inspection by members of the public, free of charge. Paper copies of the information can also be requested from the Highways Agency, although there would be a charge for copies of the full PEI, the Scheme Assessment Report and the Junction Options Comparative Assessment Report (see the Section 48 notice for details of charges).

4.2.7 Separately from the SoCC process, a statutory notice of the intended application has been published. A deadline of Monday 16 April 2012 has been set for people to submit questions or comments. Following the consultation, a Consultation Report will be prepared to summarise the views and comments received and outlining how comments are being taken into consideration in finalising the design and preparing the Environmental Statement prior to submission of an application to the IPC. The Consultation Report will be sent to the IPC as part of the application for a Development Consent Order, and the IPC will decide whether the application meets the required standards, and whether the pre-application consultation has been adequate.
4.2.8 All elements of the consultation process will include information about environmental conditions and effects, and will seek feedback from the public about environmental matters. The formal consultation event(s) will include information gathered and analysed for the EIA, and will present information about environmental impacts and mitigation proposals.
5 Approach to assessment

5.1 The Design Manual for Roads and Bridges

5.1.1 The development and design of major highway projects is governed by guidance set out in the 15 volumes of the Design Manual for Roads and Bridges (DMRB). Guidance on EIA is given in Volume 11, and on environmental mitigation in Volume 10.

5.1.2 DMRB Volume 11 defines three ‘levels’ of EIA assessment and reporting (‘Scoping’, ‘Simple’ and ‘Detailed’). The level to be applied at any stage of environmental reporting is determined on a topic-by-topic basis according to the following factors:

- The results of any previous assessment work;
- The likely scale or significance of impact (not the scale of development);
- The nature of the decision-making process to which the report relates; and
- The degree of uncertainty about the potential impact of the scheme.

5.1.3 DMRB requires that the EIA should consider the following environmental topics:

- Air quality;
- Noise and vibration;
- Nature conservation;
- Landscape;
- Cultural heritage;
- Geology and soils;
- Materials;
- Effect on all travellers;
- Community and private assets; and
- Road drainage and the water environment.

5.1.4 The guidance within DMRB has been progressively updated since its first publication in 1993. For the purposes of this report, the most up-to-date published guidance for each topic has been used. Methods will be kept under review with reference to any new guidance published before preparation of the final ES. Three new topics have been recently introduced and guidance for these topics has not yet been published; the approach adopted here is based on professional judgement, drawing on guidance from superseded topics where possible:

- Community and private assets - combining elements of two old topics - Land Use and Pedestrians, Cyclists, Equestrians and Community Effects (PCEC);
- Effects on all travellers - combining the former Vehicle Travellers and relevant parts of PCEC, to ensure that the interests of all road users are given equal weight; and
- Materials - the approach adopted for this topic is based on advice from the Highways Agency’s internal experts, who are engaged in developing guidance for the topic.

5.2 Objectives of the EIA process

5.2.1 The objectives of the EIA are to provide information, advice and reports to:

- Facilitate the consideration of environmental effects and opportunities in the development of the design of the highway improvements;
- Enable the minimisation of environmental effects through design, and the identification of environmental mitigation measures where required;
- Seek the opportunity to provide environmental improvements where possible;
- To provide information about environmental effects for the public consultation; and
- Ensure that decision making about the project is based on sound environmental information and takes environmental effects into account.

5.3 Study area

5.3.1 Study areas have been defined individually for each environmental topic, taking account of guidance published in DMRB, the geographic scope of the potential impacts relevant to that topic or of the information required to assess those impacts. The study areas are described within each relevant chapter of this report.
5.3.2 However, except where extended to meet the needs of individual disciplines, all desk-based studies have covered an area stretching at least 1 km in all directions from the nearest point on the scheme.

5.4 Existing, baseline and future conditions and the ‘do minimum’ scenario

5.4.1 In order to identify the effects of the proposed scheme on the environment, it is important to understand the environment that would be affected by the proposed works (the ‘baseline conditions’). Understanding the baseline allows the measurement of changes that would be caused by improvements.

5.4.2 The ‘baseline’ for the measurement of environmental effects is not the situation as it exists now, but the situation as it would exist immediately before the implementation of the scheme. This means that the identification of baseline conditions will take into account potential changes likely to occur before implementation of the scheme, that are entirely independent of the proposed scheme. Identification of the baseline therefore requires first the identification of the existing situation and then the prediction of how it is likely to change between now and implementation of the scheme.

5.4.3 For the purposes of this assessment, it is assumed that construction would start in 2014 and the scheme would open in 2015. The baseline year for impacts that would be caused by the construction of the proposed scheme is therefore 2014. The baseline year for the impacts caused by the operation of the new road after it is open is 2015.

5.4.4 For some topics, impacts are predicted both for the baseline year and for a ‘future’ or ‘design’ year (for example 15 years after opening, or the worst year in the first 15 years of operation). Impact prediction for the future year compares the predicted situation in that year with the situation that would occur in that year if the scheme had not been built, but taking into account any other, independent changes that can be predicted, such as predicted growth in traffic, or known future changes in law, regulations or policy. This hypothetical situation is known as the ‘do-minimum’ scenario. Where relevant, the future year is defined separately for each topic.

5.5 Data gathering and consultation

5.5.1 For each topic, data was gathered from a number of sources during previous phases of scheme development. Additional or updated information from the same sources and from new sources was gathered during the current phase of work, building on information gathered at earlier stages of the project. The data gathering work carried out is defined in each specialist chapter. However, in most cases the work can be broken down into four elements:

- Consultation of third-party organisations to obtain factual information;
- Consultation of third-party organisations (including statutory Consultation Bodies) for comment on the scope of work required, on the prediction and assessment of impacts and in relation to mitigation requirements;
- Desk-based surveys; and
- Field surveys to be carried out for the EIA or for other aspects of the project.

5.5.2 For some topics (Air quality, Noise, Road drainage and the water environment, Effects on all travellers), one of the key items of information is predicted flows of traffic. The methods used for predicting traffic flows are strictly governed by guidance published by the Department for Transport. The traffic flow predictions used in this report comply with guidance current during the relevant assessment work. However, it is anticipated that new guidance will come into force during 2011. It is therefore anticipated that the traffic flow predictions will be revised and any affected assessments of environmental impact will be reviewed before production of the final ES for this scheme.

5.5.3 Notwithstanding the expected revisions to the traffic flow predictions, the scale of change in the predictions is expected to be small. The environmental assessments within this report that are derived in part from traffic flow predictions are therefore believed to be a fair reflection of the likely effects of the scheme.

5.6 Identifying potential impacts – direct, indirect and cumulative

5.6.1 The EIA considers potential environmental effects identified through:

- Specialist studies carried out by the EIA team;
- Consultation with third parties; or
- By interaction with members of the public.

5.6.2 It is recognised that this approach could potentially give rise to the consideration of effects that seem to a specialist unlikely to occur but that are perceived by the public as being likely. Any such impacts are addressed in such a way as to test and demonstrate their probability of occurrence. Such impacts would be addressed principally in the ES (i.e. after the consultation of the community) rather than in the PEI.

5.6.3 The EIA considers both direct and indirect effects. Indirect effects in this context can be “those that alter the character, behaviour or functioning of the affected environment...
because of the knock-on impacts over a wider area or timescale", or "the effects related to pressure as a result of project-induced change."  

5.6.4 Cumulative effects are considered within the EIA through the following questions:

- Will any environmental feature experience multiple impacts of the same type from this and other transport-related projects?
- Will any environmental feature experience several different types of effects from this project?
- Will different types of impact occur that would interact in such a way as to alter their significance?
- Will the effects of this project on any environmental feature compound similar effects from another recent project, or will they be compounded by the effects of a future project already planned?
- Will the project interact with any planned non-transport development, or stimulate proposals for non-highways developments, in ways that compound its effects?
- Will any cumulative effects that are identified be temporary or permanent?

5.6.5 Relevant recent and future projects have been identified through consultation with the Highways Agency, the Local Highways Authority and the Local Planning Authority.

5.7 Significance of impacts

5.7.1 The significance of an environmental effect is often defined by reference to two key factors:

- The ‘value’ or ‘sensitivity’ of the receptor; and
- The ‘magnitude’ or ‘scale’ of the impact.

5.7.2 DMRB specifies both typical generic terminology and criteria and topic-specific terminology and criteria for some topics, covering the description of both the sensitivity and magnitude. However, DMRB does not necessarily use the same scales, terminology or criteria for all topics, while for some topics there is no relevant guidance.

5.7.3 All assessments of impact are based on the professional judgement of the relevant environmental specialist. Impacts can be defined through the following four pairs of opposites:

- Adverse (i.e. they are undesirable effects) or beneficial (i.e. they represent an improvement over the existing situation);
- Short-term (i.e. they are felt for less than 15 years) or long-term (still felt 15 years after construction and beyond);
- Construction or operational (i.e. caused by the construction of the scheme, or by the operation of the scheme after opening); and
- Significant or insignificant.

5.7.4 However, for topics that benefit from detailed guidance in DMRB, professional judgement can be applied to further refine the significance of impact into a graduated scale of different levels of significance. This is done by grading both the value/sensitivity of the receptor and the magnitude of impact on separate graduated scales and then applying a matrix, with the sensitivity of the affected receptor on one axis and the magnitude of the impact on the other axis. A typical matrix for this purpose is given in DMRB, and is presented below as Table 5.1, showing typical terminology for sensitivity of receptor, magnitude of impact and significance of impact.

<table>
<thead>
<tr>
<th>Value/Sensitivity</th>
<th>Magnitude of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No change</td>
</tr>
<tr>
<td>Very High</td>
<td>Neutral</td>
</tr>
<tr>
<td>High</td>
<td>Neutral</td>
</tr>
<tr>
<td>Medium</td>
<td>Neutral or Slight</td>
</tr>
<tr>
<td>Low</td>
<td>Neutral or Slight</td>
</tr>
<tr>
<td>Negligible</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

5.7.5 Notwithstanding the above, certain topics do not use a matrix-based approach, including noise, air quality and aspects of water quality and flood risk, because they are more amenable to the calculation of impacts in terms of numerical values, (i.e. absolute noise levels, and the amount of change in noise levels caused by the scheme).
5.8 Mitigation measures, enhancements and ‘residual impacts’

5.8.1 Where there would be adverse environmental effects, mitigation measures are proposed. The purpose of any mitigation measure is to eliminate the impact or, where this is not possible, to reduce its significance.

5.8.2 The first option in mitigating any impact is to seek design measures that would enable the impact to be avoided, or at least reduced. For instance, through changes to the horizontal or vertical alignment of the scheme or in the methods and/or materials to be used in construction. Where such measures are not possible, or only partly effective, further measures are required and such measures fall into three broad categories:

- Measures that do not remove an impact, but make it less significant. A typical example is planting trees to screen views of a road where it is visually intrusive;
- The like-for-like replacement of a feature that would be lost, for instance creating a new pond designed to provide habitat similar to that in a pond that is on the scheme alignment and cannot be avoided; or
- The provision of a beneficial effect that is related to the impact, but is not a like-for-like replacement of the feature to be lost. A typical example would be an archaeological excavation, which provides detailed archaeological records of the archaeological remains to offset the loss of the remains themselves.

5.8.3 All of the above are designed principally to address impacts that can be predicted in advance. However, there are also potential risks to the environment from accidental occurrences during the construction of the scheme. For instance, accidental spillages of fuels, oils or other chemicals, or the generation of nuisance dust through poor construction site management. These cannot be predicted but their likelihood of occurrence and the severity of any such incidents can be mitigated through good management practices. To address these risks the contractor would build the scheme under the terms of a detailed Construction Environmental Management Plan (CEMP). The CEMP would:

- Identify all aspects of the construction process that could give rise to accidental damage to the environment;
- Set out control measures to reduce the likelihood of such occurrences; and
- Set out action plans to respond to any such occurrences, to minimise the damage caused.

5.8.4 Similar accidental damage could occur during the operation of the scheme, while poor monitoring and maintenance could undermine the effectiveness of other environmental mitigation measures, particularly in the first few years after construction. To address these risks, the scheme would be maintained in accordance with a Handover Environmental Management Plan (HEMP), which would operate in a similar way to the CEMP. The HEMP would also identify requirements for monitoring and maintenance of environmental features and of mitigation measures to ensure that they achieve, and continue to achieve, their environmental objectives.

5.8.5 In some cases, it may be necessary to apply a combination of two or more of these approaches. Where appropriate, statutory Consultation Bodies have been consulted before determining the measures or combinations of measures to be used in mitigation.

5.8.6 Impacts that would still occur after the mitigation measures are taken into account are referred to as ‘residual’ impacts. This PEI describes all the relevant impacts before mitigation, but assesses their significance after the application of mitigation measures. The significance described therefore represents the residual impact.

5.8.7 Wherever there is doubt about the deliverability of a particular mitigation measure that is desirable, this uncertainty is identified in the PEI and that mitigation measure has not been taken into account in calculating the residual impact.

5.8.8 Some measures that are designed to mitigate an adverse impact may leave the environment improved over its existing state. In these cases, the residual impact has been recorded as beneficial.
6 Air quality

Executive summary

Improving air quality is one of the key ‘environmental improvements’ intended by the road scheme. People living in houses along the current A556 are exposed to air pollution concentrations above air quality standards set by government. This pollution is caused principally by high volumes of traffic on the existing A556.

Shifting the traffic from the existing A556 onto the new road alignment would move the main source of air pollution further away from most residential properties. This would improve air quality around these properties, so that concentrations of pollutants fall below the upper limits set by the EU.

The new road would attract more traffic than the old road, and would change traffic flows on other roads in a wider surrounding area. However, computer modelling shows that none of the properties near the new road or in the wider surrounding area would be exposed to pollution above the EU limits as a result of this scheme. Air pollution from the new road would not significantly affect any sensitive habitats, including those around Rostherne Mere Ramsar Site and SSSI. However, emissions of greenhouse gases would increase, because of changes in the quantity and speed of traffic using the new A556.

6.1 Introduction

6.1.1 ‘Air Quality’ is measured in relation to the concentrations of certain pollutants in the air, taking account of the effects of pollution on human health and ecosystems. Emissions from vehicle exhausts are a major contributor to the concentrations of these pollutants in Britain. In rural areas, such as the vicinity of the A556, vehicle emissions are often the main source of air pollutants. Changes to the road infrastructure can therefore affect the air quality, as they can change the quantity, location and speed of traffic in a local area. Air quality is therefore a key topic in the assessment of the impact of road improvements on the environment.

6.1.2 Air Quality Standards (AQS) are set by UK regulations\(^\text{22}\) that implement European law\(^\text{23}\). These set limit values\(^\text{24}\) for concentrations of pollutants in the air, at a level judged both to be achievable practically and to give protection from harm for the population as a whole.

6.1.3 The UK Air Quality Strategy, last revised in 2007, sets out how local air quality is managed, through the application of Air Quality Objectives\(^\text{25}\) (AQO). The AQOs are set at the same levels as the AQSs, but are measured and managed at a more local level. Where air quality does not meet the relevant AQO, the local authority must declare an Air Quality Management Area (AQMA) and draw up a plan for remedial measures.

6.1.4 Air pollution can have both chronic (long term) and acute (short term) adverse effects on health. The main pollutants in vehicle emissions that are of concern in relation to human health are nitrogen dioxide (\(\text{NO}_2\)) and particulate matter smaller than 10 microns in diameter (\(\text{PM}_{10}\), i.e. very small smoke or dust particles, which can penetrate deep into the lungs). \(\text{NO}_2\) can cause respiratory problems; \(\text{PM}_{10}\) is the more harmful of the two and can cause a wider range of health problems, particularly by making existing respiratory and cardiovascular conditions worse.

6.1.5 Separate AQSs are set for long-term and short-term air quality. The long-term AQS for both \(\text{NO}_2\) and \(\text{PM}_{10}\) is an annual mean of 40 µg/m\(^3\) (i.e. 40 millionths of a gram in a volume of 1 cubic metre of air). The short-term AQS for \(\text{NO}_2\) is 200 µg/m\(^3\), not to be exceeded for more than 18 hours each year. For \(\text{PM}_{10}\), the short-term AQS is 50 µg/m\(^3\), not to be exceeded on more than 35 days each year. To comply with the standards, concentrations should be below these values at every individual dwelling.

6.1.6 The section of the A556 through the scheme area carries a large volume of non-local traffic. The whole length of the A556 within the scheme area has been declared as an AQMA, because of actual or predicted concentrations of \(\text{NO}_2\) that are above the relevant AQO. These concentrations arise principally (but not entirely) from road traffic, and in consequence, improving local air quality is one of the key ‘environmental improvements’ intended by the road scheme. Additional AQMAs lie within the wider surrounding area.

6.1.7 Cheshire East Council (CEC) has drawn up a Draft ‘Air Quality Action Plan’ (Jan 2011) to improve air quality along the A556. This plan describes the proposed A556 improvement as having a “very high benefit” for air quality.

Limitations of the information in this chapter

6.1.8 There is a high degree of uncertainty in the prediction of future air pollution, because it requires making assumptions about changes over time in many contributing factors.

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\(^{22}\) Under the Air Quality Standards Regulations 2010

\(^{23}\) Under the Directive on Ambient Air Quality and Clean Air for Europe – 2008/50/EC

\(^{24}\) A technical term for the concentration of a particular pollutant that is not to be exceeded

\(^{25}\) Air Quality (England) Regulations 2000 and 2002 Amendments
These include the number of vehicles, the type of vehicles, the efficiency of vehicle engines, and other sources of pollution. Despite these uncertainties, it is clear that the new road would make the local air quality situation better in Over Tabley, Mere and Bucklow Hill, because the main source of air pollution (the A556) would be moved further away from these communities.

6.1.9 The computer modelling of traffic flows, on which this air quality assessment is based, is still being refined. The assessment will therefore be revised in the ES to take into account the outcome of this refined traffic modelling. In addition, monitoring of air quality in the study area is on-going and the ES will take into account the most recent data.

6.2 Approach and methods

6.2.1 The impact of the scheme has been assessed using the DMRB Guidance HA207/07\(^{26}\), and guidance published by Defra\(^{27}\). DMRB allows for either a ‘detailed’ or ‘simple’ assessment. For this scheme, a detailed assessment has been carried out for the immediate area of the existing A556 and the proposed new A556 because this is the area in which the greatest changes in traffic flows would occur, and a simple assessment outside of this area. The detailed assessment covers all residential properties and other sensitive properties within 200m of the centre-line of either the existing A556 or the proposed improvement (see paragraph 6.2.3 for information on the simple assessment).

6.2.2 The detailed assessment is used to determine whether the scheme would make the air quality situation better or worse overall, by decreasing or increasing the numbers of properties where the EU limit values are exceeded. It is Highways Agency policy that it will not promote a scheme which worsens the situation overall, with respect to the EU limit values.

6.2.3 The scheme would have an effect on traffic over a wide area, as it will draw in traffic which currently avoids the A556 because of congestion (see Section 2.5 for more information on traffic). The simple assessment deals with changes on roads in a wider surrounding area (see plan in Section 2.5), in which the traffic model shows that the number of vehicles, the proportion of heavy duty vehicles or the speed of the traffic would be significantly altered, taking account of standard qualifying criteria published in DMRB\(^{26}\).

6.2.4 This assessment considers the air quality in 3 cases:
- 2009 Baseline scenario (i.e. existing conditions at the start of the assessment);
- 2015 Opening Year – Do Minimum (i.e. without the scheme in place); and,  
- 2015 Opening Year – Do Something (i.e. with the scheme in place).

6.2.5 The assessment covers three different geographic scales, as follows:
- Local air quality, focusing only on the headline pollutants NO\(_2\) and PM\(_{10}\);
- Regional air quality, again focusing on NO\(_2\) and PM\(_{10}\); and,
- Global, focusing on carbon emissions because of their effect on climate (using calculations made within the regional assessment).

6.2.6 Unlike some other topics, a ‘future year’ (usually 15 years after opening) is not assessed for local air quality, because of the degree of uncertainty in predicting air quality that far ahead.

6.2.7 For the ‘detailed’ assessment of the current and new A556, the local air quality situation is predicted using a standard computer model known as ‘ADMS Roads’, which uses the traffic flows for each case to calculate the emissions from the vehicles, and predict how these pollutants disperse through the areas surrounding the road. The model predictions are adjusted to match measurements made near the road.

6.2.8 For the ‘simple’ assessment of the roads affected further away, the local air quality situation is predicted using a simpler computer model published as part of DMRB.

6.2.9 Both the simple and the detailed assessments identify changes in air quality at individual properties. In addition, a generalised assessment\(^{28}\) is carried out that covers the whole of both the detailed and simple assessment study areas (see the plan in Section 2.5 of this PEI). The generalised assessment creates an overall ‘score’ for the scheme, which is calculated on the basis of the number of residential properties within 200m of affected roads and the overall sum of the changes in pollutant concentrations at these properties. There are approximately 14,500 relevant properties within the area covered by the generalised assessment for this scheme (shown in the plan in Section 2.5).

6.2.10 The potential for the construction of the scheme to create nuisance dust is considered.

\(^{26}\) DMRB, Volume 11, Section 3, Part 1, ‘Air Quality’ (HA207/07)
\(^{27}\) Local Air Quality Management Technical Guidance 2009 (Defra). This is up-dated by items published on the Local Air Quality Management Review and Assessment Helpdesk website.

\(^{28}\) Transport Analysis Guidance (WebTAG), unit 3.3.3
6.2.11 The assessment identifies the changes in air quality at individual properties in quantitative terms; i.e. by identifying the size of the increase or reduction in the concentrations of air pollutants, and whether or not the EU limit values would be exceeded. The significance of the impact is assessed in relation to the scheme as a whole, taking account of whether there would be an overall improvement or an overall worsening of air quality as it affects residential and other sensitive properties.

6.2.12 In addition to human health, atmospheric pollution can affect sensitive ecosystems, depending on soil conditions and the composition of local vegetation. This potential impact is assessed by identifying any changes that could occur in nitrogen deposition and the concentration of nitrogen oxides (NO\textsubscript{x}, which includes both NO and NO\textsubscript{2}) within ecologically sensitive places near the road (in this case, principally Gale Bog, which is part of Rostherne Mere Ramsar site).

6.3 Existing air quality ('baseline conditions')

6.3.1 There have been general improvements in air quality across England over the past few decades, despite the very large increase in road traffic. This is mainly due to the reduction in emissions from industry and domestic sources. There have also been reductions in emissions from individual vehicles through improved technologies, such as catalytic converters and oxidative catalysts, and also from less polluting fuels.

6.3.2 However, it is recognised across the European Union that NO\textsubscript{2} levels alongside busy roads are not currently falling, and the UK and other countries are applying to the European Commission to extend the year by which they must meet the limit values for NO\textsubscript{2}. At present, the proportion of NO\textsubscript{2} to other pollutants in the emissions from engines is generally increasing.

6.3.3 In 2008, CEC declared an AQMA at Mere. The AQMA extends 20m to either side of the existing A556 from south of Junction 19 of the M6 to north of Junction 8 of the M56 (see Environmental Constraints map), with some extensions to either side to include additional properties in Over Tabley, Mere, Bucklow Hill and Millington. Overall, around 80 properties are within the AQMA. Measurements of the concentration of NO\textsubscript{2} made by CEC in 2008, 2009 and 2010 show that NO\textsubscript{2} concentrations were not falling over that period (see Table 6.1).

6.3.4 In addition to NO\textsubscript{2}, PM\textsubscript{10} is also measured at a continuous monitor in Mere. Measurements taken in 2007, 2008 and 2009 all showed concentrations well below the relevant EU limit values. It is therefore unlikely that any exceedences of the standard are occurring or will occur in the near future.

6.3.5 For local air quality in the detailed assessment area, the assessment covers all the residential and other sensitive properties within 200m of the affected roads (approximately 262 properties; shown as green dots on Figure 6.1A and B). For the simple assessment area, only specific properties closest to affected roads are assessed, selected using professional judgement. All properties or places where people may reside are treated as being equally sensitive.

6.3.6 The modelled background concentration\textsuperscript{29} of nitrogen dioxide (away from the roads) in the detailed assessment area is taken to be 15\,µg/m\textsuperscript{3}, which is well within the limit value. Local measurements are consistent with this. Similarly, background PM\textsubscript{10} (13.4\,µg/m\textsuperscript{3}) is well within the limit value.

6.3.7 Calculations of the concentration of NO\textsubscript{2} using the detailed assessment model (see paragraph 6.2.7), taking account of the measurements of actual concentrations (Table 6.1), suggests that there are approximately 24 properties exceeding the EU limit value at the present time within the detailed assessment area.

\textsuperscript{29}‘Background’ air quality is a concept used to simplify the assessment of air pollution situations. It may be defined as the average air quality away from the immediate source of pollution being assessed, and is distinguished from ‘roadside’ air quality in this case.

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**Table 6.1: Measurements of Annual Mean Nitrogen Dioxide in the study area (µg/m\textsuperscript{3})**

<table>
<thead>
<tr>
<th>Location</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTA1 – Continuous Monitor - Mere</td>
<td>44.0</td>
<td>40.0</td>
<td>46.0</td>
</tr>
<tr>
<td>RTA1 (tube co-location)</td>
<td>50.9</td>
<td>40.3</td>
<td>39.8</td>
</tr>
<tr>
<td>Westholme, A556 Chester Road, Mere</td>
<td>28.1</td>
<td>23.3</td>
<td>30.8</td>
</tr>
<tr>
<td>Old Hall Lane</td>
<td>56.9</td>
<td>53.1</td>
<td>55.3</td>
</tr>
<tr>
<td>Almond Tree Cottage</td>
<td>52.5</td>
<td>45.6</td>
<td>51.6</td>
</tr>
<tr>
<td>Tollbar Cottage, Chester Road</td>
<td>-</td>
<td>-</td>
<td>41.5</td>
</tr>
<tr>
<td>Mere Corner Cottage, Chester Road</td>
<td>46.7</td>
<td>42.0</td>
<td>45.7</td>
</tr>
<tr>
<td>4, Mere Home Farm, Chester Road</td>
<td>23.4</td>
<td>21.3</td>
<td>26.6</td>
</tr>
<tr>
<td>Old Smity Cottage, Chester Road</td>
<td>36.5</td>
<td>33.2</td>
<td>32.8</td>
</tr>
<tr>
<td>Mereside Farm, Chester Road, Rostherne</td>
<td>36.7</td>
<td>33.4</td>
<td>30.5</td>
</tr>
<tr>
<td>2 Denfield Cottages, Millington Hall Lane, Mere</td>
<td>-</td>
<td>-</td>
<td>19.3</td>
</tr>
<tr>
<td>Kennel Wood Cottage, Mere Farm Estate</td>
<td>-</td>
<td>-</td>
<td>18.1</td>
</tr>
<tr>
<td>Yarwood Heath Farm, Chester Road, Rostherne</td>
<td>-</td>
<td>-</td>
<td>26.2</td>
</tr>
</tbody>
</table>

---

Issued January 2012
6.4 Predicted environmental effects

Construction Effects

6.4.1 During construction of the scheme, there is potential for dust nuisance to be caused. This nuisance, which is separate from adverse effects on health, can arise through annoyance caused by the soiling of windows, cars, washing and other property. Nuisance is regulated under Part III of the Environmental Protection Act 1990.

6.4.2 The maximum distance at which dust nuisance may be caused is held to be 200m. As regards the potential for the construction of the scheme to create dust nuisance, this is relatively low since there are few properties within 200m of the scheme. There are approximately 41 properties within 200m of the new road, and over 200 within 200m of the existing A556.

Operational Effects

6.4.3 Computer modelling has identified the likely changes in air quality between the 2009 baseline conditions and 2015, both without the scheme and with the scheme. These results are compared in Table 6.2 and on Figure 6.1A and B (which show which specific properties would have exceedences of the AQS in each scenario).

6.4.4 Table 6.2 indicates that concentrations of NO\(_2\) exceeded the relevant limit value at 24 properties along the existing A556 in 2009. Projecting the pollution situation forwards to 2015 (without the scheme), the number of exceedences is expected to reduce to 6; this is based on government predictions of year-on-year reductions in emissions in the vehicle fleet, allowing for expected increases in the volume of traffic. The area where the limit value for NO\(_2\) would still be exceeded in 2015 without the scheme is mainly restricted to the areas around Junction 19 of the M6 and Junction 7 of the M56 motorways, and around the southern end of the A556.

6.4.5 With the road scheme in place, there would be no exceedences of the limit value at any property. This would allow the AQMA to be revoked. Although there would still be an area where concentrations of NO\(_2\) would be above the EU limit value, this limit applies only where there are residential or other sensitive properties, and there would be no such properties within the affected area.

6.4.6 As indicated in paragraph 6.4.4, predictions of future air pollution depend in part on an assumed rate at which vehicle technology will improve, reducing the emissions from each individual vehicle. It is accepted that there is significant uncertainty in this assumption. However, even with this assumption removed there would be a significant improvement in local air quality with the scheme compared to without the scheme, because of the increased distance between the source of pollution and most residential properties.

6.4.7 For PM\(_{10}\), there are no predicted exceedences, with or without the scheme in place.

6.4.8 The results of the ‘simple’ assessment of the wider study area show that no new exceedences would be created with the scheme in place.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Base 2009</th>
<th>Do Minimum 2015</th>
<th>Do Something 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy House Farm, Chester Rd</td>
<td>70.1</td>
<td>56.8</td>
<td>35.2</td>
</tr>
<tr>
<td>Dairy Farm Cottage, Chester Rd</td>
<td>64.5</td>
<td>50.1</td>
<td>33.9</td>
</tr>
<tr>
<td>Rose Cottage, Chester Rd</td>
<td>62.9</td>
<td>48.7</td>
<td>32.8</td>
</tr>
<tr>
<td>Church Farm, Chester Rd</td>
<td>54.3</td>
<td>41.4</td>
<td>20.6</td>
</tr>
<tr>
<td>Cobblestones, Chester Rd</td>
<td>53.6</td>
<td>40.8</td>
<td>21.4</td>
</tr>
<tr>
<td>2 Church Cottage, Chester Rd</td>
<td>53.1</td>
<td>40.5</td>
<td>21.7</td>
</tr>
<tr>
<td>1 Church Cottage, Chester Rd</td>
<td>52.5</td>
<td>39.9</td>
<td>21.8</td>
</tr>
<tr>
<td>Swan Hotel, Chester Rd</td>
<td>51.2</td>
<td>37.8</td>
<td>18.8</td>
</tr>
<tr>
<td>Toll Bar Cottage, Chester Rd</td>
<td>49.0</td>
<td>37.3</td>
<td>19.3</td>
</tr>
<tr>
<td>Whitehouse Farm, Chester Rd</td>
<td>47.3</td>
<td>35.6</td>
<td>19.2</td>
</tr>
<tr>
<td>Holly Tree Cottage, Chester Rd</td>
<td>45.5</td>
<td>34.3</td>
<td>20.1</td>
</tr>
<tr>
<td>Hillmount, Chester Rd</td>
<td>44.6</td>
<td>33.7</td>
<td>19.4</td>
</tr>
<tr>
<td>Smithy Cottage, Chester Rd</td>
<td>44.6</td>
<td>33.7</td>
<td>19.7</td>
</tr>
<tr>
<td>Mere Hall Lodge, Chester Road</td>
<td>43.7</td>
<td>33.5</td>
<td>18.7</td>
</tr>
<tr>
<td>Rangemore Nursing Home, Chester Rd</td>
<td>42.5</td>
<td>32.2</td>
<td>21.6</td>
</tr>
<tr>
<td>Travelodge Hotel, Chester Rd</td>
<td>42.3</td>
<td>32.6</td>
<td>36.2</td>
</tr>
<tr>
<td>9 Over Tabley Hall Farm, Old Hall Lane</td>
<td>42.3</td>
<td>32.9</td>
<td>32.5</td>
</tr>
<tr>
<td>Montebello Castle (4 Individual Properties), Millington Hall Lane</td>
<td>42.0</td>
<td>31.9</td>
<td>19.9</td>
</tr>
<tr>
<td>Grove Farm, Chester Rd</td>
<td>41.8</td>
<td>31.9</td>
<td>33.3</td>
</tr>
<tr>
<td>10 Over Tabley Hall Farm, Old Hall Lane</td>
<td>41.0</td>
<td>32.0</td>
<td>31.9</td>
</tr>
<tr>
<td>Almond Tree Cottage, Chester Rd</td>
<td>40.2</td>
<td>30.8</td>
<td>32.2</td>
</tr>
</tbody>
</table>
6.4.9 Changes in traffic flows following opening of the new road would cause an increase in NO2 concentrations at 12 properties, but the concentrations at all of these properties would remain below the EU limit values. The majority of these properties lie in Millington Hall Lane. A further 89 properties would experience significant reductions in NO2 concentrations. Only those with increases are listed in Table 6.3.

Table 6.3: Properties Experiencing Increased Concentrations of Annual Mean Nitrogen Dioxide (µg/m3)

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Base 2009</th>
<th>Do Minimum 2015</th>
<th>Do Something 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rushford Cottage, Millington Hall Lane</td>
<td>18.0</td>
<td>16.6</td>
<td>20.8</td>
</tr>
<tr>
<td>2 Denfield Cottages, Millington Hall Lane</td>
<td>18.6</td>
<td>17.0</td>
<td>29.1</td>
</tr>
<tr>
<td>1 Denfield Cottages, Millington Hall Lane</td>
<td>18.7</td>
<td>17.0</td>
<td>31.0</td>
</tr>
<tr>
<td>Denfield, Millington Hall Lane</td>
<td>18.2</td>
<td>16.7</td>
<td>24.0</td>
</tr>
<tr>
<td>Three Oaks, Millington Hall Lane</td>
<td>18.5</td>
<td>18.3</td>
<td>25.1</td>
</tr>
<tr>
<td>Holly Cottage (2 properties), Millington Hall Lane</td>
<td>18.9</td>
<td>18.9</td>
<td>26.7</td>
</tr>
<tr>
<td>1, (2 properties), Millington Hall Lane</td>
<td>26.8</td>
<td>21.9</td>
<td>27.7</td>
</tr>
<tr>
<td>Mereside Farm, Chester Road</td>
<td>34.8</td>
<td>26.6</td>
<td>32.0</td>
</tr>
<tr>
<td>Yarwood Heath Farm</td>
<td>18.9</td>
<td>17.3</td>
<td>23.9</td>
</tr>
<tr>
<td>Travelodge Hotel, Chester Road</td>
<td>42.3</td>
<td>32.6</td>
<td>36.2</td>
</tr>
</tbody>
</table>

6.4.10 The generalised assessment described in paragraph 6.2.9 covers some 14,500 properties within a wide surrounding area (see plan within Section 2.5 of this report). The generalised assessment generates a ‘score’, by identifying the concentration of the relevant pollutant at each property for both the do-minimum and do-something scenarios (based on the distance from the property to the nearest affected road); adding up the concentrations for all properties for each scenario; and subtracting the total for the do-minimum scenario from the total for the do-something scenario, to identify the difference between the two. If the difference is a positive number, it indicates an increase in exposure to the pollutant, while a negative number indicates a reduction in exposure.

6.4.11 In this case, the score for PM10 is 86.6 over 190,308 (i.e. the total of all the concentrations in the do-something scenario is 190,308, and the difference between that figure and the equivalent for the do-minimum scenario is 86.6). The score is positive, which indicates an increase in exposure, but it is also very small (i.e. the difference is around 0.004%), meaning that the difference is marginal and would have no measurable effect. The score for NO2 is 54.6 over 184,518; this is also a marginal difference between the do-something and do-minimum scenarios, equivalent to around 0.03%.

6.4.12 The regional assessment, covering roads in a wider surrounding area where traffic flows would be significantly changed (see paragraph 6.2.3), predicts an overall increase in concentrations of a ‘basket’ of greenhouse gases (carbon monoxide, oxides of nitrogen, PM10 and THC, total hydrocarbons) of around 20%. The regional assessment also indicates an increase in carbon (carbon dioxide expressed as carbon) emissions from 23,000 tonnes to 32,000 tonnes (an increase of 9,000 tonnes) in the opening year.

6.4.13 Gale Bog, within Rostherne Mere Ramsar Site and SSSI, has been identified as the only protected habitat which includes areas of sensitive vegetation and is near enough to the road to be affected by any changes. Gale Bog is a small area of wet woodland which has plant species sensitive to nitrogen deposition. Nitrogen deposition at the nearest point of Gale Bog to the scheme (170 metres away) would be approximately 17.7 kg N ha\(^{-1}\) year\(^{-1}\) without the scheme and 17.8 kg N with the scheme, an increase of 0.1 kg N ha\(^{-1}\) year\(^{-1}\), or less than 1%.

6.4.14 Different types of habitat have different ‘critical loads’ with forest habitats typically having a critical load of 10-20 kg N ha\(^{-1}\) year\(^{-1}\) (for impacts on soil processes, ground vegetation, lichens and algae and mycorrhiza). This indicates a potential exceedence of the critical load for the habitat type with or without the scheme, however, the degree of difference between the situations is considered negligible.

6.5 Mitigation

6.5.1 Moving the road further away from most properties will make the air quality better at those properties. One of the intentions of the scheme is to mitigate the effect of the emissions of trunk road traffic on the existing road by increasing the distance separating the source of those emissions from properties on the current alignment. Allowing sufficient distance allows emissions to dilute and disperse so that the air quality limit values are not threatened.

6.5.2 For air quality, there is no effective area-wide mitigation to reduce the impact of vehicle emissions on air quality once they have been emitted to atmosphere.

6.5.3 Mitigation for dust arising during construction can be very effective. Comprehensive mitigation measures such as wheel washing and damping during dry weather will be included in the Construction Environmental Management Plan.

6.6 The significance of environmental impacts

6.6.1 The detailed assessment identified 12 properties that would experience increased concentrations of NO2, and 89 properties that would experience reduced concentrations. All existing exceedences of the EU limit values within the Mere AQMA would be eliminated, and no new exceedences would be created in the immediate vicinity of the scheme.
6.6.2 Overall, the great disparity between the number of properties experiencing a reduction in exposure to pollutants and those experiencing an increase, combined with the elimination of exceedences of the EU limit values, indicates that the effect of the scheme is significantly beneficial.

6.6.3 The results of the generalised assessment show a very small increase in exposure over the larger area. The magnitude and therefore the significance of this increase are considered to be negligible.

6.6.4 The scheme will improve traffic speeds and reduce journey times. As a result, the proposed scheme is predicted to increase carbon emissions from 23,000 to 32,000 tonnes in the opening year (an increase of 9,000 tonnes) over the case without the scheme in place. This partly a result of higher traffic speeds, and partly due to the increase in the total volume of traffic using the road. There are no means of assessing the significance of greenhouse gas emissions from highways schemes.

6.6.5 With mitigation, the impact of dust from the construction of the scheme is likely to be negligible.

6.6.6 The only area with vegetation or ecosystems which could potentially be affected by emissions of air pollutants, Rostherne Mere, would experience a negligible impact from the scheme.
Executive summary

Potential noise and vibration impacts arising from the construction and operation of the new A556 have been assessed for sensitive receptors within a defined study area.

Reductions in noise and vibration are predicted for large numbers of properties close to the existing A556 and A5034, while smaller numbers of properties would have increases in noise and vibration in close vicinity to the scheme. The number of properties experiencing benefits classified as ‘moderate’ or ‘major’ greatly outweighs the number experiencing major or moderate adverse impacts. Therefore, the overall noise and vibration impact of the Scheme would be beneficial for the surrounding environment.

7.1 Introduction

7.1.1 This chapter assesses the changes in noise and vibration that would take place as a result of the scheme. Noise in its widest sense can be defined as unwanted sound. Such sound can be associated with industrial, domestic and transportation sources. In this assessment, any potential noise impacts would relate to construction activities in the short term and to changes in road traffic in the longer term.

7.1.2 As traffic noise fluctuates continually, it is necessary to define it in a way that can be related to the subjective response of those experiencing it. Attitude surveys have shown a relationship between the annoyance caused by road traffic noise and the sound level exceeded for just 10% of the time during the 18-hour period between 6am and midnight (i.e. the noisiest 10% of the day). This noise level is known as the \( L_{A10,18h} \), and is used as the main unit of measurement for changes in noise levels throughout this chapter.

7.1.3 European Directive (85/337/EEC) requires member states to assess the effects of noise from major projects. The Design Manual for Roads and Bridges (DMRB) Volume 11 sets out the overall framework for the assessment process and how noise and vibration issues relate to UK Highways Legislation. This assessment has been undertaken using the guidance provided in DMRB with regards to the relevant legislation including The Control of Pollution Act.

Limitations and Assumptions

7.1.4 Information about expected changes in traffic flows is key to the prediction of noise levels. This chapter draws on predicted changes in traffic flows, traffic speeds and the proportion of HGVs that have all been taken from the traffic model (see Section 2.5 for more information about traffic modelling). This traffic modelling will be repeated in line with new guidance before preparation of the ES, and this could alter some of the noise effects predicted in this chapter.

7.1.5 It is assumed that the carriageway would be dressed with a low noise surface and an appropriate adjustment has been made to the noise predictions to take account of this.

7.1.6 The identification of the baseline conditions has drawn on both computer modelling and noise surveys carried out in the area surrounding the existing and proposed roads during June 2010. Data from these measurements is considered representative of baseline conditions for most of the study area. However, for a limited area around Peacock Lane, the information available at this stage is not considered representative. Further noise surveys are in progress, to ensure that more representative information is available for preparation of the ES.

7.1.7 Only limited information is available at this stage about construction programme, plant and methods. The assessment of construction noise in this report has therefore been done on a qualitative basis (i.e. using professional judgement rather than calculations). A more detailed assessment will be provided in the ES.

7.1.8 The noise levels given in this report were calculated taking account of earth bunds\(^{30}\) that had already been incorporated into the scheme design. Additional bunds or increases in the height of some bunds are proposed in this report as mitigation measures, and have now been added to the scheme design; however, the noise levels reported here do not take these additional mitigation measures into account. Noise levels reflecting these additional measures will be reported in the ES.

7.1.9 Assessment of traffic induced vibration requires the consideration of two types of vibration impact, the impact on structures and the disturbance to occupiers.

7.1.10 Traffic induced vibration can be transmitted either through the air or through the ground. Ground-borne vibration can often be associated with the interaction between tyres and the road surface, whereas airborne vibration is produced by low frequency pressure waves emitted by vehicle engines.

7.1.11 Despite the common belief that road traffic induced ground-borne vibration can cause damage to buildings, extensive research has shown no evidence of such effects.

\(^{30}\) A bund is a long earthen mound or bank, in this context running parallel to the road to act as a barrier to noise.
7.1.12 Airborne vibration can cause building elements like doors or windows to vibrate and can lead to annoyance to residents. A good correlation exists between traffic noise levels and vibration disturbance, for properties within 40m of a road and without screening. For the purposes of this assessment, the percentage of people affected by traffic noise and within 40m of the road is assumed to indicate the extent of potential vibration nuisance.

7.2 Approach and methods

Construction Phase

7.2.1 For the purposes of this assessment, it is assumed that construction of the proposed Scheme would start in 2014, with the scheme expected to open to traffic during 2015. Some residents and other sensitive receptors alongside the proposed route could experience noise and vibration impacts during the construction period.

7.2.2 At this stage, a qualitative assessment of construction noise and vibration has been made. The final assessment will draw on the methods and other information provided in the relevant British Standards. These standards also suggest practical ways to mitigate excessive noise and to control vibration.

Operational Phase

7.2.3 Noise impacts are assessed by comparing predicted noise levels with the scheme in place (the ‘do-something scenario’) against those predicted without the scheme (the ‘do-minimum scenario’). It is impractical to make measurements of existing noise levels for every individual property in the study area; therefore, noise levels are predicted (both with and without the scheme) using computer modelling.

7.2.4 Noise predictions for this PEI have been made in accordance with guidance contained within CRTN and DMRB. DMRB offers options for ‘simple’ or ‘detailed’ assessments; for this scheme, elements of the detailed level assessment have been undertaken.

7.2.5 Noise levels were derived at all residential properties and other sensitive receptors within the ‘calculation area’ (1,779 receptors). The calculation area is defined as:

- The whole area within 600m of ‘affected roads’ on the existing network that are within 1km of the boundary of either the new A556 or the de-trunked Chester Road; ‘Affected roads’ are those that would experience a traffic increase of at least 25% or a reduction of 20% in the opening year of the scheme as a result of the scheme.

7.2.6 It should be noted that a 25% increase or a 20% decrease in traffic volume approximately corresponds with a change in noise level of 1 decibel (dB).

7.2.7 In calculating noise levels at specific receptors (mainly residential properties), the following scenarios have been compared:

- Do-Minimum conditions in the baseline year (2015) compared with the Do-Minimum conditions 15 years later (referred to as the ‘future assessment year’, 2030).
- Do-Minimum conditions in the baseline year (2015) compared with conditions after opening of the new A556 in 2015; and,
- Do-Minimum conditions in the baseline year (2015) compared with conditions 15 years after opening of the new A556 (2030).

7.2.8 Noise level predictions were calculated using a standard computer modelling package (Cadna A). Predictions were for the most affected façade of each relevant building at a height of 4m above ground level (1st floor), or 1.5m for single-storey buildings.

7.2.9 For areas where road traffic is not the dominant existing sound source, noise measurements were undertaken on site to establish the ambient sound level, and this has been compared to the noise level predicted using the computer model. Wherever the measured ambient noise level is greater than the day or night time noise level predicted by the computer model, the measured value is used for the noise assessment at that specific location.

7.2.10 Night-time noise levels were derived using a standard statistical method for converting predicted daytime noise levels into equivalent night-time noise levels.

Magnitude of Impact

7.2.11 People’s perception of changes in noise varies over time. A small increase can cause annoyance in the short term, but would no longer be noticed in the longer term. A larger

33 Calculation of Road Traffic Noise, 1988, Department of Transport, HMSO (CRTN)
34 DMRB, Volume 11, Section 3, Part 7, ‘Noise and Vibration’ (HD 213/11)
36 In accordance with DMRB: Method 3 of the TRL report ‘Converting the UK traffic noise index $L_{A10,18}$ to EU noise indices for noise mapping’.

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increase in noise is required to cause annoyance that persists over the long term. DMRB provides criteria for attaching an overall level of ‘magnitude of impact’ to noise changes in the environment for short-term and long term impacts respectively, as shown in Tables 7.1 and 7.2.

Table 7.1: Classification of the short-term magnitude of impact for changes in road traffic noise

<table>
<thead>
<tr>
<th>Noise Change $L_{A_{10,18h}}$ (dB)</th>
<th>Magnitude of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Change</td>
</tr>
<tr>
<td>0.1 - 0.9</td>
<td>Negligible</td>
</tr>
<tr>
<td>1 - 2.9</td>
<td>Minor</td>
</tr>
<tr>
<td>3 - 4.9</td>
<td>Moderate</td>
</tr>
<tr>
<td>5 +</td>
<td>Major</td>
</tr>
</tbody>
</table>

Table 7.2: Classification of the long term magnitude of impact for changes in road traffic noise

<table>
<thead>
<tr>
<th>Noise Change $L_{A_{10,18h}}$ (dB)</th>
<th>Magnitude of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Change</td>
</tr>
<tr>
<td>0.1 - 2.9</td>
<td>Negligible</td>
</tr>
<tr>
<td>3 - 4.9</td>
<td>Minor</td>
</tr>
<tr>
<td>5 - 9.9</td>
<td>Moderate</td>
</tr>
<tr>
<td>10 +</td>
<td>Major</td>
</tr>
</tbody>
</table>

7.3 The existing environment (‘baseline conditions’)

7.3.1 A total of 117 properties and other sensitive receptors stand within 100 m of the existing A556 in Over Tabley, Mere, Bucklow Hill and Millington (see Figure 7.1). These properties currently experience high levels of noise, with road traffic dominating. Noise levels vary between around 53 dB and 82 dB according to the distance from the road to the façade of the property, and whether there are other properties between them and the road. If no changes are made to the existing road infrastructure, these noise levels would gradually increase with time, due to expected growth in the volume of traffic.

7.3.2 A further 125 properties lie close to the A5034 or A50 in Mere and Bucklow Hill (see Figure 7.1). Road traffic is the main contributor to noise in these areas, but noise levels are generally lower than along the A556, varying between around 51 dB and 74 dB. Again, noise levels are likely to increase gradually with time. For some properties around the northern and southern ends of the study area, including Over Tabley Hall and adjacent properties, the noise environment is dominated by traffic noise from the nearby M56 or M6 motorways.

7.3.3 A total of 54 properties in the study area lie in the countryside to the west of the existing A556, at distances of more than 300m from the A556 and the A50 and at distances of 500m or more from the two motorways. This area generally experiences low existing noise levels, with predicted ambient noise levels varying from around 37 dB to around 57 dB (although there is some uncertainty about ambient noise levels here, pending further noise surveys). The ambient noise level is composed of general environmental noise, for instance from agricultural machinery, wind in the trees and other sources. Road traffic is not a significant component of the overall noise level in this area.

7.3.4 Approximately 78 properties lie within 40m of the existing A556. Any of these properties may experience annoyance caused by airborne vibration as a result of traffic on the existing A556. Without changes to the road infrastructure, this annoyance may get gradually worse over time due to expected growth in the volume of traffic.

7.4 Predicted noise and vibration impacts

7.4.1 Factors expected to influence the effect of construction work on noise and vibration levels at nearby properties include:

- Existing noise levels;
- Type and number of activities;
- Type of plant;
- Distance from noise sources;
- Topography; and
- Wind direction.

7.4.2 Noise impacts would vary from location to location and from time to time throughout the construction period, and are dependent on the contractor’s chosen method of working and on the timing and phasing of operations. Whilst there is the potential for relatively high noise levels at particular locations for short periods, the narrow linear nature of the site should ensure that the location of the main working areas changes on a regular basis. This would limit the duration of exposure of any one receptor to high levels of construction noise.

7.4.3 Vibration from construction projects is generally caused by general equipment operations and tends to be highest during soil compaction, earth-moving and piling. Similar to potential noise impacts, although there is the potential for elevated vibration...
levels for receptors in close proximity to such activities, the short-term nature of the works would limit the exposure time.

7.4.4 Construction activities that could potentially generate the highest levels of noise and vibration are rock breaking, breaking out redundant highways and piling. All piling works for structures on this scheme are proposed as ‘CFA’ piles (i.e. they are drilled rather than driven; this is the less noisy piling option). There may be some requirement for sheet-piling as part of the temporary works, but this is not confirmed. Piling is likely to be required at the following locations:

- Yarwoodheath Farm Access Bridge Wingwall, near the new Junction 7 of the M56. There are approximately four residential properties within 600m of this structure.

- Bowdon Roundabout Link Overbridge, part of the new Junction 7 of the M56. There are approximately six residential properties within 600m of the junction;

- A50 Overbridge, carrying the A50 over the off-line improvements. There are approximately 45 residential properties within 600m of the bridge, mainly in Hoo Green, around Mere Hall and along the A556 in Mere, Bucklow Hill and along Millington Hall Lane. Nearly all of these properties are at the outer limit of the 600m buffer; only three properties in Hoo Green, three in Mere and Hulme Barns Farm lie within 500m. The nearest property is Hulme Barns Farm, at just over 300m;

- Tabley Junction Overbridge. There are approximately four residential properties within 600m, all directly adjacent to the existing A556 in Over Tabley, and towards the outer boundary of the 600m buffer. In addition, St Paul’s Church in Over Tabley is located approximately 600m from the proposed bridge location.

7.4.5 The construction methodology and programme have yet to be determined in detail, so a detailed construction assessment could not be undertaken at this stage. A construction noise and vibration assessment will be undertaken when construction methodologies and plant are clearly defined, and discussions held with the local authority on the intended working practices, this will be presented in the ES.

Operational Phase: Improvements in the noise environment

7.4.6 The transfer of traffic to the new A556 would substantially reduce traffic volumes on the de-trunked Chester Road. Major improvements in the noise environment would follow for receptors on or close to Chester Road, depending on the distance to the new A556.

7.4.7 The noise predictions show a major short-term improvement in the noise environment for 115 properties and five other sensitive receptors within the study area (derived using the ‘magnitude of impact’ criteria given in Table 7.1). A moderate short-term improvement has been predicted for 31 properties. In the longer term the noise predictions show a major improvement for 67 residential properties and four other sensitive receptors (based on the criteria in Table 7.2). Moderate long term improvements are predicted for 47 properties and one other sensitive receptor. A further 282 receptors would experience minor short-term benefits, with 22 properties experiencing minor long-term benefits.

7.4.8 Table 7.3 below identifies expected beneficial changes in noise of ‘major’ magnitude in the short term, with the actual change in both short and long terms. ‘Moderate’, ‘minor’ or ‘negligible’ changes are not listed due to the large number of properties involved.

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Change in noise level - ( L_{A10,18} ) (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short-term</td>
</tr>
<tr>
<td>North Lodge, Chester Road</td>
<td>-25.3</td>
</tr>
<tr>
<td>Tolbar Cottage, Chester Road</td>
<td>-24.8</td>
</tr>
<tr>
<td>White Gate (East façade), Chester Road</td>
<td>-23.7</td>
</tr>
<tr>
<td>Church Cottages (East façade), Chester Road</td>
<td>-23.1</td>
</tr>
<tr>
<td>Oakmere, Chester Road</td>
<td>-21.1</td>
</tr>
<tr>
<td>Links Way, Chester Road</td>
<td>-21.0</td>
</tr>
<tr>
<td>Mericourt, Chester Road</td>
<td>-20.7</td>
</tr>
<tr>
<td>Abbots Moss, Chester Road</td>
<td>-20.6</td>
</tr>
<tr>
<td>Heddlynw, Chester Road</td>
<td>-20.5</td>
</tr>
<tr>
<td>Fertherney, Chester Road</td>
<td>-20.4</td>
</tr>
<tr>
<td>Heatherslade, Chester Road</td>
<td>-20.4</td>
</tr>
<tr>
<td>Willow Cottage, Chester Road</td>
<td>-20.4</td>
</tr>
<tr>
<td>Almareae, Chester Road</td>
<td>-20.4</td>
</tr>
<tr>
<td>Manor House, Chester Road</td>
<td>-20.3</td>
</tr>
<tr>
<td>Oak Green, Chester Road</td>
<td>-20.0</td>
</tr>
<tr>
<td>Rosmerie Cottage, Chester Road</td>
<td>-20.0</td>
</tr>
<tr>
<td>Dene Croft, Chester Road</td>
<td>-20.0</td>
</tr>
<tr>
<td>Sevenoaks, Chester Road</td>
<td>-19.9</td>
</tr>
<tr>
<td>Deva, Chester Road</td>
<td>-19.9</td>
</tr>
<tr>
<td>Mere Croft, Chester Road</td>
<td>-19.9</td>
</tr>
<tr>
<td>White Oaks, Chester Road</td>
<td>-19.9</td>
</tr>
<tr>
<td>Strathmere, Chester Road</td>
<td>-19.8</td>
</tr>
<tr>
<td>Windgather, Chester Road</td>
<td>-19.8</td>
</tr>
<tr>
<td>Mere Field, Chester Road</td>
<td>-19.8</td>
</tr>
<tr>
<td>Malber, Chester Road</td>
<td>-19.6</td>
</tr>
<tr>
<td>The Causeway, Chester Road</td>
<td>-19.6</td>
</tr>
<tr>
<td>Thornbank, Chester Road</td>
<td>-19.5</td>
</tr>
<tr>
<td>Rangemore Nursing Home (East façade), Chester Road</td>
<td>-19.4</td>
</tr>
<tr>
<td>Linden, Chester Road</td>
<td>-19.4</td>
</tr>
<tr>
<td>Dolphins, Chester Road</td>
<td>-19.3</td>
</tr>
<tr>
<td>The Hollies, Chester Road</td>
<td>-19.2</td>
</tr>
<tr>
<td>Church Farm, Chester Road</td>
<td>-19.2</td>
</tr>
<tr>
<td>Mere Close, Chester Road</td>
<td>-18.8</td>
</tr>
<tr>
<td>Westholme, Chester Road</td>
<td>-18.8</td>
</tr>
</tbody>
</table>
### Change in noise level - $L_{A10,18h}\ (dB)$

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Short-term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>White House, Chester Road</td>
<td>-18.5</td>
<td>-17.7</td>
</tr>
<tr>
<td>Windy Ridge, Chester Road</td>
<td>-18.4</td>
<td>-18.4</td>
</tr>
<tr>
<td>Wood Bank, Chester Road</td>
<td>-18.3</td>
<td>-17.9</td>
</tr>
<tr>
<td>Mereside, Chester Road</td>
<td>-18.2</td>
<td>-17.8</td>
</tr>
<tr>
<td>Villa Desta, Chester Road</td>
<td>-18.2</td>
<td>-17.7</td>
</tr>
<tr>
<td>Fairbourne, Chester Road</td>
<td>-18.2</td>
<td>-17.6</td>
</tr>
<tr>
<td>Mere Hall Farm, Chester Road</td>
<td>-18.2</td>
<td>-17.6</td>
</tr>
<tr>
<td>The Far Pavilion, Chester Road</td>
<td>-18.1</td>
<td>-17.6</td>
</tr>
<tr>
<td>Silverwood, Chester Road</td>
<td>-18.0</td>
<td>-17.2</td>
</tr>
<tr>
<td>Conninger House, Chester Road</td>
<td>-17.7</td>
<td>-17.3</td>
</tr>
<tr>
<td>Willow Green, Chester Road</td>
<td>-17.6</td>
<td>-17.3</td>
</tr>
<tr>
<td>Broadway, Chester Road</td>
<td>-17.5</td>
<td>-17.1</td>
</tr>
<tr>
<td>Pin High, Chester Road</td>
<td>-17.2</td>
<td>-16.3</td>
</tr>
<tr>
<td>Hollow Glade, Chester Road</td>
<td>-16.6</td>
<td>-16.2</td>
</tr>
<tr>
<td>Police Cottage, Chester Road</td>
<td>-16.6</td>
<td>-15.7</td>
</tr>
<tr>
<td>Delwoodoo, Chester Road</td>
<td>-16.3</td>
<td>-16.0</td>
</tr>
<tr>
<td>The Ranch House, Chester Road</td>
<td>-16.1</td>
<td>-15.8</td>
</tr>
<tr>
<td>Aldrin, Chester Road</td>
<td>-15.8</td>
<td>-15.4</td>
</tr>
<tr>
<td>Rose Cottage (East facade), Chester Road</td>
<td>-15.8</td>
<td>-15.3</td>
</tr>
<tr>
<td>Smithy House, Chester Road</td>
<td>-15.6</td>
<td>-14.7</td>
</tr>
<tr>
<td>Bracken Wood, Chester Road</td>
<td>-15.4</td>
<td>-15.1</td>
</tr>
<tr>
<td>Moss Lodge, Moss Lane</td>
<td>-15.4</td>
<td>-14.4</td>
</tr>
<tr>
<td>Glen Coyne, Chester Road</td>
<td>-15.4</td>
<td>-15.0</td>
</tr>
<tr>
<td>Greenway, Chester Road</td>
<td>-12.8</td>
<td>-12.8</td>
</tr>
<tr>
<td>Red Ridge, Chester Road</td>
<td>-13.5</td>
<td>-12.5</td>
</tr>
<tr>
<td>Prospect House, Tabley Hill Lane</td>
<td>-13.2</td>
<td>-12.6</td>
</tr>
<tr>
<td>Dairv House Farm, Chester Road</td>
<td>-11.7</td>
<td>-11.3</td>
</tr>
<tr>
<td>Virginia Lodge, Chester Road</td>
<td>-11.3</td>
<td>-10.3</td>
</tr>
<tr>
<td>Birch House, Moss Lane</td>
<td>-11.0</td>
<td>-9.9</td>
</tr>
<tr>
<td>4 Mere Home Farm</td>
<td>-10.9</td>
<td>-10.3</td>
</tr>
<tr>
<td>Virginia Lodge, Moss Lane</td>
<td>-10.9</td>
<td>-9.9</td>
</tr>
<tr>
<td>3 Mere Home Farm</td>
<td>-10.3</td>
<td>-9.4</td>
</tr>
<tr>
<td>Holly Tree Cottage, Chester Road</td>
<td>-9.9</td>
<td>-9.7</td>
</tr>
<tr>
<td>5 Mere Home Farm</td>
<td>-9.9</td>
<td>-9.3</td>
</tr>
<tr>
<td>Bracken House, Moss Lane</td>
<td>-9.9</td>
<td>-8.8</td>
</tr>
<tr>
<td>2 Mere Home Farm</td>
<td>-9.8</td>
<td>-8.8</td>
</tr>
<tr>
<td>Birchwood, Moss Lane</td>
<td>-9.8</td>
<td>-8.8</td>
</tr>
<tr>
<td>Hill Mount, Chester Road</td>
<td>-9.7</td>
<td>-9.0</td>
</tr>
<tr>
<td>Old Smithy Cottage, Chester Road</td>
<td>-9.7</td>
<td>-9.0</td>
</tr>
<tr>
<td>Whitehouse Farm, Chester Road</td>
<td>-9.7</td>
<td>-8.9</td>
</tr>
<tr>
<td>The Farmhouse, Chester Road</td>
<td>-9.7</td>
<td>-8.7</td>
</tr>
<tr>
<td>1-3 Moss Lane Cottages, Moss Lane</td>
<td>-9.7</td>
<td>-8.7</td>
</tr>
<tr>
<td>Denfield Smithy (East facade), Chester Road</td>
<td>-9.7</td>
<td>-9.0</td>
</tr>
<tr>
<td>Montebello Castle (East facade), Chester Road</td>
<td>-9.6</td>
<td>-8.9</td>
</tr>
<tr>
<td>1-4 Mere Court, Chester Road</td>
<td>-9.4</td>
<td>-8.4</td>
</tr>
<tr>
<td>13-14 The Crescent</td>
<td>-9.3</td>
<td>-8.8</td>
</tr>
<tr>
<td>Hayrake, Moss Lane</td>
<td>-9.1</td>
<td>-8.0</td>
</tr>
<tr>
<td>Moss Side Cottage, Moss Lane</td>
<td>-9.0</td>
<td>-8.1</td>
</tr>
<tr>
<td>11-12, The Crescent</td>
<td>-9.0</td>
<td>-8.5</td>
</tr>
</tbody>
</table>

### Operational Phase: Deterioration in the noise environment

7.4.9 Major adverse impacts are predicted for some receptors lying close to the proposed scheme, particularly in the countryside west of the existing A556. This is expected as the new A556 would effectively be a new noise source in a mostly rural area away from major roads. Mitigation measures will reduce the noise increase, however for the majority of such receptors it will not remove the adverse impact.

7.4.10 Noise predictions show a major adverse short-term deterioration in the noise environment for 38 properties and two other sensitive receptors. A moderate short-term worsening has been predicted for nine properties. Longer term, the noise predictions show a major adverse impact for 16 residential properties. Moderate long term deteriorations are predicted for 24 properties and two other sensitive receptors.

7.4.11 A more detailed description of the worst deteriorated noise environments is provided in the following sections. For the purpose of describing the adverse impacts the scheme has been divided into three sections i.e. south, middle and north. The southern section runs from the M6 Junction 19 to the A50 Warrington Road; the middle section from the A50 to Millington Lane; and the northern section from Millington Lane to M56 Junction 7.

#### Southern section

7.4.12 Along this section of the scheme there are a number of receptors that would experience major adverse impacts. The receptors most adversely impacted are listed in Table 7.4 below. These receptors are located relatively close to the new A556.
7.4.13 Note that some specific properties that could have been expected to have an adverse impact, including Over Tabley Hall, in fact receive only a small change in noise. This is because the noise environment there is dominated by the nearby M6 motorway.

### Table 7.4: Major adverse effects: noise levels for the Do-Something scenarios in the opening and future years against the Do-Minimum scenario in the baseline year - southern section

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Change in noise level, $L_{A10,18h}$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kennelwood Cottage, Mere Hall Estate</td>
<td>12.0</td>
</tr>
<tr>
<td>Faraway, Mere Hall Estate</td>
<td>8.7</td>
</tr>
<tr>
<td>Sawpit Cottage, Mere Hall Estate</td>
<td>8.3</td>
</tr>
<tr>
<td>Donkey Shed, Mere Hall Estate</td>
<td>7.7</td>
</tr>
<tr>
<td>Gardeners Cottage, Mere Hall Estate</td>
<td>6.1</td>
</tr>
<tr>
<td>Travelodge Knutsford Motel (West facade)</td>
<td>5.4</td>
</tr>
</tbody>
</table>

**Middle section**

7.4.14 As in the other sections, the noise environment at receptors located close to the new A556 would deteriorate due to the introduction of a new noise source in the area. For these properties the distance to the new A556 is shorter than the distance to the existing A556, hence the increase in noise level. Receptors in the middle section where a major adverse impact is predicted can be found in Table 7.5 and Table 7.6.

7.4.15 Receptors listed in Table 7.6 represent the worst affected near the Chapel Lane area east of the Scheme. To the west of the middle section, the worst affected property is 1 Denfield Cottages, Millington Hall Lane (Table 7.5). The close proximity of this receptor to the scheme means the noise contribution from the new A556 is significant.

**Northern section**

7.4.16 In the northern section, three receptors would experience major short-term and moderate long term adverse noise impacts, as shown in Table 7.7. Other receptors, including Mereside Farm, Cherry Tree Farm, Cherry Tree Cottage and Yarwoodheath Farm would receive only small changes in the noise environment, as they would remain in close proximity to the new A556.

7.4.17 At the Millington Lane properties the new A556 is closer compared to the current A556, leading to a worsening of the noise environment. The noise deterioration at the western façade of Rangemore Nursing Home is due to the relocation of the A556 from the eastern side to the western side of the nursing home. Currently, the western façade is mostly shielded from noise from the A556. With the new A556 the inverse applies i.e. an exposed western façade and a shielded eastern façade. However, the new A556 will be at a greater distance from the nursing home than the existing road, so the reduction in noise on the eastern façade (-19.2 dB in the long term; see Table 7.3) is much greater than the increase on the western façade (+6.1 dB; see Table 7.7).

### Table 7.5: Major adverse effects: noise levels for the Do-Something scenarios – opening and future years against the Do-Minimum scenario in the baseline year for receptors in the middle section - western side of the scheme

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Change in noise level, $L_{A10,18h}$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Denfield Cottages, Millington Hall Lane</td>
<td>14.3</td>
</tr>
<tr>
<td>Denfield Cottage, Millington Hall Lane</td>
<td>11.0</td>
</tr>
<tr>
<td>2 Denfield Cottages, Millington Hall Lane</td>
<td>9.9</td>
</tr>
<tr>
<td>Rushford Cottage, Millington Hall Lane</td>
<td>6.4</td>
</tr>
<tr>
<td>2 Burnthouses, Bucklow Hill Lane</td>
<td>5.1</td>
</tr>
</tbody>
</table>

### Table 7.6: Major adverse effects: noise levels for the Do-Something scenarios - opening and future years against the Do-Minimum scenario in the baseline year for receptors in the middle section - eastern side of the scheme

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Change in noise level, $L_{A10,18h}$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thornedge, Chapel Lane</td>
<td>11.6</td>
</tr>
<tr>
<td>Aysgarth, Chapel Lane</td>
<td>9.4</td>
</tr>
<tr>
<td>38, Chapel Lane</td>
<td>8.1</td>
</tr>
<tr>
<td>1-2 The Crescent, Bucklow Hill</td>
<td>6.4</td>
</tr>
<tr>
<td>3-4 The Crescent Bucklow Hill</td>
<td>5.3</td>
</tr>
<tr>
<td>31 White House Road</td>
<td>5.4</td>
</tr>
<tr>
<td>27 White House Road</td>
<td>5.2</td>
</tr>
</tbody>
</table>

### Table 7.7: Major adverse effects: noise levels for the Do-Something scenarios - opening and future years against the Do-Minimum scenario in the baseline year for receptors - northern section

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Change in noise level, $L_{A10,18h}$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangemore Nursing Home (West facade), Chester Road</td>
<td>5.8</td>
</tr>
<tr>
<td>1 Millington Lane</td>
<td>5.2</td>
</tr>
<tr>
<td>2 Millington Lane</td>
<td>5.1</td>
</tr>
</tbody>
</table>

**Other areas**

7.4.18 Besides changes in noise level directly related to the scheme, indirect impacts on the wider road network may occur due to changes in traffic flow. In particular, it is
recognised that increased traffic may lead to noise impacts for some properties located on Peacock Lane, Chapel Lane, Hulse Heath Lane and Millington Hall Lane. Further noise surveys are in progress to enable a full assessment of these impacts.

Overview

7.4.19 Tables 7.9 to 7.11 present noise level changes for all receptors in the calculation area organised into categories of ‘change in noise level’ in accordance with DMRB for short and long term impacts respectively.

Short-term impact

7.4.20 From Table 7.8 below, it can be seen that for the majority of properties (1222) within the study area the change in noise level between the Do-Something and the Do-Minimum in the opening year would be either zero or negligible. Table 7.8 also shows that there would be an overall improvement in noise in the short term. Although a larger number of increases than decreases in noise is shown, most of the increases would be negligible (i.e. below the level at which they are likely to be noticed by people; 877 negligible increases against 118 perceptible increases), whereas most of the decreases are larger (427 perceptible reductions against 281 negligible ones). On balance, therefore, the short-term effects of the scheme would be beneficial.

7.4.23 The benefits of the scheme in terms of noise in the long term, is further demonstrated through a comparison between Table 7.9 and Table 7.10. These results show that the negligible increases in Table 7.9 can be disregarded, as an even larger number of negligible increases would have occurred without the scheme.

<table>
<thead>
<tr>
<th>Table 7.8: Total no. of properties categorised in ‘change in noise level’ - Do-Something scenario compared to Do-Minimum scenario in the baseline/opening year (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-term change in noise level, L_{A10, 18h} (dB)</strong></td>
</tr>
<tr>
<td>Increase in noise level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>No change</td>
</tr>
<tr>
<td>Decrease in noise level</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Long term impact

7.4.22 Table 7.9 shows that, on balance, the long-term effects of the scheme on noise would be beneficial. The majority of properties (89%) within the study area would undergo a negligible long term change. Although there would be more noise increases than decreases, most of the increases would be negligible (i.e. below the level of perception). When the negligible increases are discounted, more receptors would experience a perceptible improvement in their noise environment than would experience a perceptible deterioration.

<table>
<thead>
<tr>
<th>Table 7.9: Total no. of properties categorised in ‘change in noise level’ - Do-Something scenario in the future year (2030) compared to the Do-Minimum scenario in the baseline year (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long term change in noise level, L_{A10, 18h} (dB)</strong></td>
</tr>
<tr>
<td>Number of properties</td>
</tr>
<tr>
<td>Increase in noise level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>No change</td>
</tr>
<tr>
<td>Decrease in noise level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

* Night-time property counts based on properties with outside night-time noise levels over 55 dB, and with changes due to the scheme of 3 dB or more.
### Table 7.10: Total number of properties categorised in ‘change in noise level’ - comparison of the Do-Minimum scenario (baseline year, 2015) against the Do-Minimum scenario (future year, 2030).

<table>
<thead>
<tr>
<th>Long term change in noise level, L_{A10, 18h} (dB)</th>
<th>Daytime</th>
<th>Night-time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of properties</td>
<td>Number of other sensitive receptors</td>
</tr>
<tr>
<td><strong>Increase in noise level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major (10+)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate (5 - 9.9)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minor (3 - 4.9)</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Negligible (0.1 - 2.9)</td>
<td>1746</td>
<td>12</td>
</tr>
<tr>
<td><strong>No change</strong></td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Decrease in noise level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major (10+)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate (5 - 9.9)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minor (3 - 4.9)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Negligible (0.1 - 2.9)</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

* Night-time property counts based on properties with outside night-time noise levels over 55 dB, and with changes due to the scheme of 3 dB or more.

### Night-time

7.4.24 The number of properties exposed to night-time noise levels greater than 55.0 dB (night time outside) and where there would be long-term increases or reductions in noise of 3.0 dB or more are listed in Table 7.9 (right-hand column) for the Do-Something scenario and Table 7.10 (right-hand column) for the Do-Minimum scenario.

7.4.25 Table 7.10 shows that out of all receptors assessed in the study area, night-time levels at two receptors would deteriorate over a 15-year period without the scheme. With the scheme, Table 7.9 shows deterioration over 15 years for nine receptors against an improvement for 87 receptors. Of the deteriorations, one is moderate and three are major, whereas 21 moderate and 65 major improvements in noise are predicted. It can therefore be concluded that the beneficial effects of the scheme would outweigh the adverse effects, and on balance the overall effects of the scheme on night-time noise levels would be beneficial.

### Vibration

7.4.26 The new A556 generally runs to the west of the current alignment away from any immediately close residential properties. Vibration nuisance is minimal due to the majority of properties being at least 40m from the road. However, as the new A556 will be located in relatively close proximity to the receptors listed in Table 7.11 adverse impacts may be expected. A more detailed description of these adverse impacts will be presented in the ES.

### Table 7.11: Receptors experiencing adverse vibration impacts

<table>
<thead>
<tr>
<th>Receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travelodge Knutsford Motel (Western facade)</td>
</tr>
<tr>
<td>1 Denfield Cottages, Millington Hall Lane</td>
</tr>
<tr>
<td>1 Millington Lane</td>
</tr>
<tr>
<td>Mereside Farm, Chester Road</td>
</tr>
</tbody>
</table>

7.4.27 As with the noise predictions, receptors located on or in close vicinity to the current A556 in the study area would experience improvements in vibration nuisance as traffic volume on the current A556 would be greatly reduced due to introduction of the new A556. Currently 78 properties are located within 40m of the A556 and these properties would see an improvement in airborne vibration impacts.

### 7.5 Mitigation

7.5.1 The scheme has been designed to minimise the noise generated by traffic during the operation of the road. As such, it is intended that the scheme will incorporate low noise surfacing. Much of the road is in cutting, which provides some screening from noise; this has been enhanced by provision of earth bunds (i.e. earth embankments) adjacent and parallel to the road, between the road and nearby receptors. Where bunds are impractical due to lack of space, or would increase the loss of ecological features such as woodland, vertical noise barriers have been used instead.

7.5.2 These features were included in the design of the scheme for the purposes of computer modelling of noise impacts (as described in paragraphs 7.2.3 to 7.2.10). Following the modelling, recommendations have been made for increases in the height of some bunds to increase their effectiveness at screening noise. In consequence, some of the noise increases are likely to be lower than those listed in Tables 7.4 to 7.9. These changes have been targeted at those areas where the worst adverse impacts have been predicted.

### 7.6 The significance of environmental impacts

7.6.1 DMRB does not provide a method for assessing the significance of noise impacts; instead, it provides a classification of the magnitude of both short-term and long term impacts, as outlined in Tables 7.1 and 7.2.

7.6.2 These magnitudes of impact have been used throughout this chapter to describe and classify noise impacts upon receptors. As outlined in Section 7.5 above, the recommended changes to noise bunding will reduce the magnitude of some noise impacts. These effects will be quantified in the ES.

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8 Cultural heritage

Executive summary

Cultural heritage has been addressed in line with the guidance provided in DMRB. It draws on information gained from desk-based sources, site inspections and specialist field surveys commissioned for the proposed scheme. A diverse range of heritage features have been identified, varying from prehistoric archaeological remains to early 20th century buildings.

Potential adverse impacts on cultural heritage include removal of archaeological remains during construction and effects on the setting of historic buildings and the historic landscape. A small number of beneficial impacts have also been identified where the proposed scheme will lead to a reduction in traffic passing close to historic buildings.

Measures proposed to mitigate impacts on cultural heritage include the detailed recording of archaeological remains, photographic survey of the existing setting of historic buildings and historic landscapes, and tree and shrub planting designed to integrate the proposed scheme into the historic landscape.

8.1 Introduction

8.1.1 In line with the guidance provided in DMRB, Cultural Heritage is considered under three separate sub-topics:

- Archaeological Remains – materials created or modified by past human activities that contribute to the study and understanding of past societies and behaviour. This can include the remains of buildings, structures, earthworks and landscape features; human, animal or plant remains, or other organic material produced by or affected by human activities, and their settings;

- Historic Buildings – architectural or designed structures with significant historical value. This encompasses a wide variety of structures such as historic churches and country houses, modest cottages and farm buildings, industrial buildings, World War 2 military structures, milestones and bridges, and can include buildings of no aesthetic merit; and,

- Historic Landscapes – as all of England’s landscape has been modified by past human activities, it is historic. However, the value of historic landscapes depends on how rare they are or how they contribute to local distinctiveness.

8.1.2 Collectively, the individual sites, buildings, landscapes or other remains that make up the three subtopics are known as heritage assets.

8.1.3 The wider surroundings of any heritage feature (its setting) can significantly contribute to its heritage value. The nature and extent of the feature’s setting is not fixed and can change over time as the asset and its setting evolve.

8.1.4 The following legislation and policy was taken into account during the preparation of this report:

- Ancient Monuments and Archaeological Areas Act 1979 – protects Scheduled Monuments;

- Planning (Listed Buildings and Conservation Areas) Act 1990 – protects Listed Buildings (Grades I, II and II*) and Conservation Areas;

- Planning Policy Statement 5 ‘Planning for the Historic Environment’ – central government guidance applicable to all cultural heritage features, whether protected by law or not; and,

8.1.5 Relevant policies in the Macclesfield Borough Local Plan (still applicable in Cheshire East Council).

Limitations on the information in this chapter

8.1.6 Detailed information on the cultural heritage baseline will be provided in the appendices to the Environmental Statement. This will comprise a detailed desk-based assessment (including full list of sources) and reports on geophysical survey of the route corridor. Information from these documents has informed the preparation of this report.

8.1.7 The extent and nature of land required for temporary uses during construction have been developed in outline during preparation of this assessment, and this process is not yet complete. In consequence, it has only been possible to make generic statements about the impacts of such temporary land uses. More detail will be provided in the environmental statement.

37 Geophysical surveys use variations in physical properties of soils, such as its electrical conductivity or magnetic properties to detect potential archaeological features without excavation. In this case, a magnetic survey was carried out.
8.2 Approach and methods

8.2.1 For this stage of work, DMRB specifies that impacts should be assessed for a study area extending for at least 200m in all directions from the proposed scheme. In this case, information was initially gathered for a study area extending 500m in all directions from the footprint of the scheme as it was then proposed, to allow for potential changes in the design. Impacts were then assessed for heritage sites within 200m of the footprint of the scheme after design development (but see also paragraph 8.2.4 below).

8.2.2 Information was gathered from the following sources:

- Records on existing cultural heritage assets held by the National Monuments Record, the Cheshire Historic Environment Record and the Greater Manchester Historic Environment Record;
- Historic maps;
- Published literature about local archaeology;
- Aerial photographs;
- Previous cultural heritage reports prepared for this scheme or previous schemes;
- Site inspection; and
- Archaeological surveys carried out along the route corridor using geophysical survey techniques.

8.2.3 Information on the wider range and scope of consultations can be found in Chapter 4.

8.2.4 In order to ensure that all possible impacts on the setting of sensitive heritage sites were assessed, information on protected heritage features was gathered for a wider study area extending 1km from the scheme. This comprised a search for any of the following:

- Scheduled Monuments;
- Listed Buildings;
- Conservation Areas;
- Sites included on the Register of Historic Parks and Gardens of special historic interest in England; and
- Sites included on the Register of Historic Battlefields.

Where potential impacts were identified, these sites were included in the assessment.

8.2.5 In accordance with the guidance provided in DMRB, the value of each asset was assessed on a six-point scale of Very High, High, Medium, Low, Negligible and Unknown.

8.2.6 For each site, the magnitude of impact of the scheme was then assessed. Magnitude of impact is understood to be the level of change that a site would experience as a result of the construction and operation of the scheme. This can be negative or beneficial, and is assessed on a five-point scale from Major to No Change, based on the guidance provided in DMRB.

8.2.7 Finally, the Significance of Impact was assessed. This combines the assessment of the value of cultural heritage sites with the magnitude of impact, including any mitigation measures. This process used professional judgement and experience guided by a matrix (see Chapter 5, Table 5.1).

8.3 Cultural heritage background

8.3.1 All cultural heritage assets identified within the study area are shown on Figures 8.1A and 8.1B.

8.3.2 Known prehistoric activity (to AD 43) within the study area is represented principally by a group of eight ring ditches in the vicinity of Bucklow Hill. These are likely to be the ploughed down remains of barrows (burial mounds) which may have formed part of a barrow cemetery of Bronze Age (2500 – 700 BC) date.

8.3.3 The modern A556 follows the line of the northern extension of a Roman road (Watling Street) for much of its course. In addition, the present A50 is believed to follow the approximate line of the North Cheshire Ridge Roman road, meeting Watling Street slightly to the north of the present A556/A50 junction.

8.3.4 Medieval (AD1066 to AD1540) activity is attested by sites including Watch Hill motte and bailey castle and Hough Hall moated site both of which are protected by law as Scheduled Monuments, and stand within the wider study area.

8.3.5 Field name evidence from historic maps (such as ‘Old Moat’) indicates the possible presence of another moated site towards the south end of the study area, although the

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38 The principal road from Chester to Manchester in the Roman period (AD 43 – 410)
39 Motte-and-bailey castles are an early (Norman) type of castle, comprising an artificial mound of earth (the ‘motte’) on which a wooden castle would have been built, and a courtyard (‘bailey’) at the foot of the motte, defended by an earthen rampart and wooden palisade or fence
40 A moated site is a semi-fortified property usually occupied by a high-status dwelling or associated structure, bounded or partly bounded by a wide ditch, often intended to be filled with water

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name may refer to an older site which preceded Over Tabley Hall, a Grade II listed building. The medieval manors of Strettle and Millington may also have been located within the study area, but their exact locations are unknown.

8.3.6 River and furrow earthworks (linear raised cultivation beds formed by repeated ploughing) have been identified within the study area and represent the remains of a system of arable agriculture used in the medieval period and remaining in use in many areas well into the 18th or 19th centuries.

8.3.7 The archaeology of the study area is dominated by sites dating to the Post Medieval (AD 1540 – 1901) and the Modern periods (AD 1901 – present). Field name evidence from historic maps indicates extensive clay extraction, possibly for brick-making, and it is likely that the ponds shown on the modern Ordnance Survey mapping in these fields are the remains of marl pits.

8.3.8 The built heritage of the study area is also characterised by buildings dating to the Post Medieval period. These include farm buildings and cottages, a few of which are Listed Buildings, and halls such as Over Tabley Hall and Mere Old Hall, both of which are Grade II Listed Buildings. Over Tabley Hall was built in the 1760s in a Gothic style, and is possibly an adaptation of an earlier building. Mere Old Hall also dates to the late 18th century and is associated with a complex of buildings including a walled garden which is a Listed Building in its own right.

8.3.9 While the historic landscape character of most of the study area has been shaped by Post Medieval or Modern agricultural improvements, settlement, communications or industry, some areas derive their character from earlier periods and are less common. The landscape in the immediate vicinity of Hough Hall Moated Site and Over Tabley Hall has been characterised as ‘Ancient Field Systems’, while immediately to the west and southwest of Rostherne Mere and to the west of Meremoss Wood are areas of ‘Ancient Woodland’.

8.3.10 Mere Old Hall Park was created in the 17th century and was improved during the 18th and 19th centuries to provide a suitable setting for the building of Mere Old Hall. Large parts of the park are now in use as agricultural land, however surviving shelter belts and tree plantations maintain a naturalistic feel within the park.

8.3.11 Dunham Massey, a Grade II* Registered Park and Garden, extends into the northern part of the study area. This was originally created as a deer park during the 17th century, with formal landscaping taking place from 1694 until the mid 18th century. The grounds are now a country park and a National Trust property.

8.4 Archaeological remains

The existing environment (‘baseline conditions’)

8.4.1 A total of 89 archaeological remains have been identified within or near the study area. Of these, two are statutorily protected Scheduled Monuments both located more than 500m from the scheme and the value of both has been assessed as High. These comprise:

- Hough Hall Moated Site (Site 69); and,
- Watch Hill Motte and Bailey Castle (Site 114).

8.4.2 The remaining 87 archaeological sites do not have any legal protection (i.e. they are undesignated); however, this does not always mean that they are of lesser heritage value. Some of these sites represent locations where archaeological remains are suspected, but their actual presence has not yet been tested by excavation. The value of undesignated archaeological sites in the study area have been assessed as follows:

- 7 sites of Medium value;
- 26 sites of Low value;
- 36 sites of Negligible value; and,
- 18 sites of Unknown value.

8.4.3 The prehistory of the study area is represented by four sites, three of which are traces recorded from aerial photographs or the results of geophysical surveys. Two of these may have been barrows (burial mounds) which have now been levelled by centuries of ploughing, although none have yet been confirmed by excavation. Geophysical surveys have identified a rectangular enclosure (Site 188) close to the M56 junction which, although as yet un-excavated, is believed to be of Late Iron Age (100 BC – AD 43) or Romano-British (AD 43 – AD 410) date, based on its similarity to sites elsewhere in Cheshire. The fourth (Site 132), is the findspot of a single flint tool, believed to date from somewhere between the early Neolithic and late Bronze Age (4000 BC – 700 BC).

8.4.4 The study area is crossed by two Roman roads. Watling Street (Site 58) was the main north to south road connecting Chester and Manchester, and is believed to have followed the line now taken by the existing A556. The remains of a bridge which might have carried Watling Street over the River Bollin were exposed by flooding during the 1980s (Site 158). The North Cheshire Ridge Roman road (Site 50) linked the Roman

41 An area of land belonging to or farmed on behalf of a lord
42 A pit from which marl, a mixture of clay and carbonate of lime, is excavated. Marl was extensively used as a fertilizer until the 19th century.
settlement at Wilderspool, to the west, with Watling Street, and is believed to follow the approximate route of the A50, although its precise alignment within the study area is yet to be established.

8.4.5 The largely rural landscape of the study area was shaped during the medieval period (AD 1066 – AD1540) and there are a number of sites within and near the study area that date from this time. Watch Hill motte and bailey castle (Site 114) lies on the north bank of the River Bollin. It is typical of the network of administrative sites established following the Norman Conquest in AD 1066 and would have been used to control the local population. Hough Hall moated site (Site 69) represents a high-status rural dwelling from which surrounding agricultural land would have been managed. The name ‘Brick Meadow and Old Moat Field’ (Site 9) recorded near the Tabley junction on a historic map could indicate the presence of a moat which has subsequently been ploughed flat. Traces of ridge and furrow ploughing have been identified through aerial photography in a number of places within the study area. Evidence for the overall organisation of the medieval landscape survives in the form of parish boundaries many of which follow substantial field boundaries and ditches, roads and streams (Sites 193-202).

8.4.6 The archaeology of the study area is dominated by sites dating from the Post Medieval period (AD 1540 – AD 1901). A large proportion of these assets are in the form of place or field names recorded on historic maps, many of which describe local topographic or other features. For instance, ‘Big Kiln’, ‘Brick Kiln’ and ‘Oven Croft’ may all describe the presence of lime or brick kilns, ‘Street Hey’ (Site 108) probably relates to nearby Watling Street Roman road, and ‘Salt Acre’ (Site 154) could be a reference to salt production, an activity common in Cheshire since Roman times and known to have taken place at nearby Dunham Massey. There are many place names containing the element ‘marl’, which is unsurprising given the number of marl pits within the study area. In fact marl pits, or the ponds formed when they become flooded following disuse, are a characteristic feature of the study area.

8.4.7 Based on the types and numbers of archaeological sites that have been identified to date, there is moderate potential for the presence of as yet unknown sites to be present within the footprint of the proposed scheme. Such remains could belong to any of the periods already identified. In the area west of Bucklow Hill, the presence of a possible Barrow cemetery may indicate potential for further prehistoric archaeological sites in this area.

**Predicted environmental effects**

8.4.8 Construction and operation of the proposed scheme could impact on archaeological remains as a result of physical impacts or changes to their setting.

8.4.9 Physical impacts can result in the partial or complete removal of an asset during construction of a road and any associated activities. All such impacts would occur during construction, and would be long-term in nature. Such impacts can include:

- Removal of archaeological deposits during construction or operational maintenance;
- Compaction of archaeological deposits by construction traffic and structures; and,
- Changes in groundwater levels leading to the drying out of waterlogged archaeological deposits.

8.4.10 Physical impacts resulting from construction of the proposed scheme and leading to the removal of archaeological remains have been identified at 39 archaeological sites.

8.4.11 Key amongst the physical impacts are those on the North Cheshire Ridge and Watling Street Roman roads (Sites 50 and 58), and geophysical anomalies that may represent part of the remains of a prehistoric barrow cemetery south-west of Bucklow Hill (Site 134). In all three cases, it has not yet been possible to carry out trial excavation to test the affected locations to confirm the presence or absence of archaeological remains, although measures to address this are proposed in the Mitigation section below.

8.4.12 Impacts on the setting of archaeological remains can result from the construction or operation of a new road. In most cases, they would be long-term in nature. They would commence during construction and continue during operation, although the degree of impact may vary between phases. Such impacts can include:

- Interruption or improvement of important views to or from an asset;
- Introduction or removal of large, prominent or intrusive structures within the setting of an asset;
- Introduction or removal of visual intrusion, such as moving vehicles, the presence of road signs or lighting;
- Significant changes in noise, dust, odour or air quality; and,
- Severance or restoration of relationships between associated assets.

8.4.13 Effects resulting from construction of the proposed scheme and leading to impacts on setting have been identified at 14 archaeological sites.

8.4.14 Of particular note are the potential effects on the setting of Hough Hall Moated Site (Site 69), a Scheduled Monument. Although this asset is located 300m north-west of the proposed scheme, there is only relatively sparse existing tree or hedge cover in this area which may result in a temporary impact from the visual intrusion of construction traffic, and a similar permanent impact from traffic using the proposed scheme. This
8.4.15 Additional impacts may occur during construction on land required for temporary construction uses (compounds, haul roads, temporary storage areas, temporary drainage, etc.). Such impacts have not been identified and assessed at this stage, although advice has been given to the ECI Contractor on sensitive locations and the avoidance of impact, either through the choice of locations or through construction, management and reinstatement methods for temporary facilities.

Mitigation

8.4.16 The preferred mitigation option for archaeological sites is to preserve them in situ. However, where this is not possible, the alternative is to make a detailed record of the archaeological remains that would be lost in accordance with DMRB. This is referred to as ‘preservation by record’.

8.4.17 Through recording works and the dissemination of their results, a permanent record of the affected archaeological remains is made, reducing the amount of information that would be lost. However, for some sites, creation of such a record would not fully mitigate the impact, due to the loss of potential information which it may be possible to retrieve in the future through improved recording and analysis techniques.

8.4.18 Possible options for archaeological mitigation can include any of the following, or a combination of any two or more:

- Retrieval and analysis of core samples;
- Photographic survey to make a permanent record of visible archaeological remains or their setting;
- Detailed archaeological excavation: where particularly significant, complex or densely-concentrated archaeological remains are expected to be present, then a detailed archaeological excavation in advance of construction would be undertaken;
- Strip map and sample: where archaeological remains of relatively low significance and/or complexity are expected to be present, and particularly where they are expected to be spread over a large area at low density, then strip, map and sample works may be appropriate. Topsoil would be stripped over relatively large, defined areas using methods designed to maximize archaeological visibility, followed by inspection to define the scope of any archaeological recording works that might be required;
- Archaeological recording during construction (‘watching brief’): Where there is some potential for as yet unidentified archaeological remains to be present, but the risk is considered to be low, then archaeological monitoring of the main topsoil/overburden stripping operations, and other excavation works as appropriate, would be applied, followed by appropriate archaeological investigation and recording of any remains that are identified; and,

- Works to reduce potential impacts on the settings of monuments such as planting trees or shrubs, creation of bunds to reduce road noise and block views, and/or grading the back of bunds for return to agriculture and integration with the local topography. These measures may also have an impact on archaeological remains.

8.4.19 All but the last of these options fall into the broader category of ‘preservation by record’.

8.4.20 At present, there are a number of assets whose precise nature, date and significance have been impossible to establish. To address this gap in our current knowledge, a programme of archaeological trial trenching has been designed and agreed with English Heritage and Cheshire East Council’s Historic Environment Planning Officer. The results of this work will be used as an aid to the design of detailed mitigation measures. Modifications to the trial trenching design will be required following scheme design changes and additional geophysical survey. English Heritage and Cheshire East Council would be consulted about any such modifications before implementation.

8.4.21 Impacts of the proposed scheme on the setting of archaeological remains can be mitigated by the use of appropriate landscaping. When mature, landscape planting can reduce the visual impact by integrating the new road with its surroundings. Landscape mitigation proposed for the proposed scheme includes appropriate planting along the new road, earth bunds and areas of planting to screen views. Earth bunds and tall fences are also proposed to reduce noise impacts during operation of the new road.

8.4.22 Based on current knowledge, preservation by record is recommended as a potential mitigation measure for 39 archaeological sites. The specific method of preservation by record is detailed in Table 8.1 below, and would be subject to amendment following trial trenching and further consultation with English Heritage and Cheshire East Council. Planting to reduce visual impacts during operation of the proposed scheme is recommended for 14 archaeological sites.

The significance of environmental impacts

8.4.23 After mitigation, the impacts at 14 archaeological sites would be of Slight significance. These impacts would result from activities including the excavation of cuttings,

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43 Archaeological trial trenching involves the excavation of a small sample area of potential archaeological interest, to confirm whether archaeological remains are actually present and obtain information about them. This information is used to inform the impact assessment and the design of mitigation.

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construction of embankments and bridges, as well as the movement of construction vehicles, noise and dust. The significance of these residual impacts after application of the proposed mitigation measures is summarised in Table 8.1 below, covering only those sites where the significance of impact after mitigation is greater than ‘neutral’ (see also paragraphs 8.4.24 and 8.4.25).

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Name</th>
<th>Value</th>
<th>Proposed Mitigation Measures</th>
<th>Significance of impact during construction</th>
<th>Significance of impact during operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Site of Cottage North of Mere</td>
<td>Negligible</td>
<td>Detailed Excavation</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>50</td>
<td>Conjectural Routes of North Cheshire Ridge</td>
<td>Medium</td>
<td>Detailed Excavation</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>58</td>
<td>Watling Street, Chester to Manchester Roman</td>
<td>Medium</td>
<td>Detailed Excavation</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>60</td>
<td>Barn Croft and Hough Pavement Place Names</td>
<td>Medium</td>
<td>Watching Brief</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>69</td>
<td>Hough Hall Moated Site</td>
<td>High</td>
<td>Landscape Planting</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>116</td>
<td>Marl Pit 2</td>
<td>Low</td>
<td>None proposed</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>119</td>
<td>Geophysical Anomalies - South</td>
<td>Negligible</td>
<td>Strip Map and Sample</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>121</td>
<td>Ridge and Furrow Cropmarks</td>
<td>Low</td>
<td>Watching Brief</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>130</td>
<td>Marl Pit 4</td>
<td>Low</td>
<td>None proposed</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>134</td>
<td>Mound - Potential Barrow Site</td>
<td>Medium</td>
<td>Landscape Planting</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>136</td>
<td>Geophysical Anomalies - North</td>
<td>Negligible</td>
<td>Strip Map and Sample</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>139</td>
<td>Marl Pits in Coachman's Pit Field</td>
<td>Low</td>
<td>None proposed</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>178</td>
<td>Possible Ridge and Furrow Cropmarks</td>
<td>Low</td>
<td>Watching Brief</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>192</td>
<td>Pond south of Denfield Cottage</td>
<td>Low</td>
<td>Landscape Planting</td>
<td>Slight</td>
<td>Slight</td>
</tr>
</tbody>
</table>

8.4.24 In addition to those sites tabulated above, the residual impact of the scheme has been assessed as being of Unknown significance for 18 archaeological sites. The ‘unknown’ status of all but one of these reflects a current lack of knowledge of the nature, date and value of the sites. In the case of the possible site of Strettle Medieval Settlement (Site 26), this is because it is known only from documentary references; its location is unclear, so while it may be located within the study area this is uncertain. The status of these sites will be addressed by the proposed programme of trial excavation described above, the results of which will be used to accurately assess the impact of the proposed scheme and to design appropriate mitigation measures.

8.4.25 In addition to those sites tabulated above, residual impacts of Neutral significance, meaning that a site would neither improve nor deteriorate as a result of the proposed scheme, have been identified for 59 archaeological sites.

8.4.26 Many of the impacts on setting that have been identified are temporary and would stop when construction is complete. However, some impacts on setting resulting from the presence of the road would continue during operation. Many of these impacts would be mitigated by tree and shrub planting when it has matured.

8.5 Historic buildings

The existing environment (‘baseline conditions’)

8.5.1 A total of 41 historic buildings have been identified within or near the study area, eight of which are statutorily protected as Listed Buildings, and one of which is protected as a Locally Listed building (Table 8.2; Figure 8.1A and B).

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Name</th>
<th>Designation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Over Tabley Old Hall</td>
<td>Grade II Listed Building</td>
<td>High</td>
</tr>
<tr>
<td>8</td>
<td>Farm building around 200 yards west of Over Tabley Hall</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
</tr>
<tr>
<td>14</td>
<td>Church of St Paul and the Langford Brooke Monument</td>
<td>Grade II Listed Building</td>
<td>High</td>
</tr>
<tr>
<td>34</td>
<td>Kitchen Garden at Mere Old Hall</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
</tr>
<tr>
<td>38</td>
<td>Mere Old Hall, Mere</td>
<td>Grade II Listed Building</td>
<td>High</td>
</tr>
<tr>
<td>43</td>
<td>AA Box 372 at Mere Corner</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
</tr>
<tr>
<td>81</td>
<td>Denfield Cottage, Back Lane, Millington</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
</tr>
<tr>
<td>187</td>
<td>Holly Cottage, Millington Lane</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
</tr>
<tr>
<td>78</td>
<td>Montebello Castle</td>
<td>Locally Listed Building</td>
<td>Low</td>
</tr>
</tbody>
</table>

8.5.2 The remaining 32 historic buildings have no legal protection for their heritage value; however, this does not always mean that the buildings are of lower heritage value. The undesignated historic buildings in the study area have been assessed as follows:

- 2 buildings of Medium value;
- 24 buildings of Low value; and
- 6 buildings of Negligible value.

8.5.3 With one exception, the historic buildings in the study area all date from the 18th to early 20th century. These buildings are characteristic of the building types in rural areas...
across Cheshire, comprising farms, cottages, county and gentry houses, churches and buildings related to transport and communications.

8.5.4 The most numerous historic building type in the study area is the worker’s cottage (13 buildings). These are generally two-storey brick buildings constructed from the early 19th century onwards and often sited in small plots adjacent to local roads or in small hamlets as at Hulseheath (Site 77). These buildings are generally simple in their architectural treatment, however, a small number of cottages are more ornate, as may be seen in the gothic style of Old Smithy Cottage (Site 174).

8.5.5 There are 10 historic farm buildings in the study area, mainly of 18th and early 19th century date. The farms are characterised by long, two-storey ranges of farm buildings set on opposing sides of a small yard, close to the farmhouse. The remaining farms were constructed from the mid-19th century onwards as planned farms, typically on a square or U-plan in accordance with contemporary theories on farming practice.

8.5.6 Within the study area, there are two country houses. Over Tabley Hall (Site 7) was built in the mid-18th century and designed in the fashionable Gothic style. The Hall is set back from the surrounding roads and is orientated to enjoy long views to the east, across the surrounding rural landscape towards the village of Over Tabley and beyond.

8.5.7 Mere Old Hall (Site 38) is a Neo-classical style building which dates from the late 18th century. The hall formed the centrepiece of a small landscape park and retains a number of estate buildings today, including a walled kitchen garden (Site 34), stables, and home farm.

8.5.8 Other buildings within this area include the Church of St Paul (Site 14) erected in the 1850s, and a range of structures related to transport, including inns, a mile post, and an inter-war petrol station / garage (Sites 10, 107, 164 and 165).

Predicted environmental effects

8.5.9 Construction and operation of new highways can affect historic buildings through physical impacts on the historic structures or changes to setting. However, the A556 scheme has been designed to avoid any direct physical impacts on any historic (or other) buildings. All of the impacts of the scheme on historic buildings are therefore impacts on setting.

8.5.10 Impacts on the setting of historic buildings can result from the construction and/or operation of a new road and can be beneficial or adverse. Impacts on setting can include:

- The interruption or improvement of important views to or from a historic building;
- The introduction or removal of large, prominent or intrusive structures within the setting of a historic building;
- The introduction or removal of visual intrusion, such as moving vehicles, the presence of road signs or lighting;
- Significant changes in noise, dust, odour or air quality; and
- The severance or restoration of relationships between associated historic buildings, such as a church and manor house.

8.5.11 Impacts on setting can affect the continued use of a historic building by making it more or less attractive to users. Historic buildings which remain in active use are generally better maintained and more likely to survive in the long term.

8.5.12 During the construction phase, temporary impacts on setting can result from construction activities such as excavation of foundations, landscaping works or the movement of construction vehicles. These impacts will end when construction is complete. Such construction-period impacts are predicted on the setting of 33 historic buildings. It is likely that some of these impacts would be added to by temporary land uses during construction; however, as these works are not yet fully identified, they have not been taken into account at this stage. More information will be given in the ES.

8.5.13 Effects on the setting of three high value sites would commence during construction, and would continue at a lower level during operation, as follows:

- The new road will run in front of the main elevation of Over Tabley Hall (Site 7) and will intrude on important views to and from the building. Although the lighting design is not yet determined (see Chapter 2), there is a risk that lighting along the new road would add to the impact on the setting of the building after the scheme opens to traffic. There is also a risk that the proximity of the building to the new road may also have long term impacts on residential usage;
- The scheme will be constructed through the open fields to the rear (west) of the Church of St Paul (Site 14) introducing a new element into its setting;
- The road will run through the former landscape park surrounding Mere Old Hall (Site 38). This will make it harder to appreciate the relationship between the Hall, estate buildings, and the surrounding landscape, which was a key element of its original

44 The term ‘Gothick’ is applied to the decorative use of the gothic style in the 18th century. This style contrasted with the concern for the ‘correct use’ of the style which characterised Victorian gothic architecture.
design. It is unlikely that this section will be lit, so there would be no additional impact from lighting.

8.5.14 There would also be adverse effects during construction on the setting of a further 30 historic buildings which range from Medium to Negligible value, including the grade II Listed Buildings of the farm building at Over Tabley Hall, the Kitchen Garden at Mere Old Hall, and Denfield Cottage (Site 8, 34 and 81). Of these 30 historic buildings, eleven will experience impacts of moderate or major magnitude on their setting. These comprise:

- Rose Cottage (Site 6);
- The Grade II Listed Over Tabley farm building (Site 8);
- Kennel Wood Cottage (Site 33);
- Sawpit and Faraway Cottages (Site 37);
- The Grade II Listed Building of Denfield Cottage (Site 81);
- Numbers 1 & 2 Millington Lane (Site 91);
- Mereside Farm (Site 97);
- Cheshire Lounge (formerly Nag’s Head Inn, Site 107);
- Yarwood Heath Farm (Site 110);
- Structures south of Over Tabley Hall (Site 118); and
- Numbers 1 & 2 Denfield Cottages (Site 145).

8.5.15 During operation of the scheme, either adverse or beneficial impacts are predicted on the setting of 30 historic buildings. Adverse impacts resulting from the presence of the new road and the movement of vehicles will result in noise and visual intrusion on the setting of 23 historic buildings, including the following grade II Listed Buildings:

- Over Tabley Hall (Site 7; see 8.5.13 above);
- Over Tabley farm building (Site 8);
- The Kitchen Garden at Mere Old Hall (Site 34);
- Mere Old Hall (Site 38; see 8.5.13 above); and
- Denfield Cottage (Site 81).

8.5.16 In any areas where the new road would be lit, there would be an additional impact on the setting of historic buildings in the vicinity.

8.5.17 Operation of the scheme will also reduce traffic levels on the de-trunked Chester Road. This will improve the amenity of historic buildings along the existing road due to reduced noise and visual intrusion. Within the study area, this will have a beneficial impact on seven historic buildings, including the Grade II Listed Church of St Paul and the Locally Listed Building of Montebello Castle (Sites 14 and 78).

Mitigation

8.5.18 Where it is not possible to preserve a historic building in its setting, a scheme of building recording, or preservation by record, can be undertaken. This involves the creation of a photographic, drawn and written record of the building to provide a permanent record of the structure in its current setting. The resulting information is submitted to the local archives or Historic Environment Record where it can be consulted by members of the public.

8.5.19 Building recording can not remove or reduce the magnitude of impact on a historic building; however, it can offset the impact to some extent and reduce the overall significance of impact.

8.5.20 Photographic survey is recommended to document the setting of Over Tabley Old Hall (Site 7) and Mere Old Hall (Site 38), and their associated estate buildings.

8.5.21 Landscape mitigation, including tree and shrub planting, earth bunds and tall fences are proposed to mitigate impacts on the setting of the following historic buildings:

- Over Tabley Hall and associated buildings (Sites 7, 8 and 118);
- Mere Old Hall and estate buildings (Sites 33, 34, 37 and 38);
- Denfield Cottage (Site 81); and
- Nine undesignated historic buildings (Sites 15, 27, 53, 77, 85, 91, 92, 110 and 145).

8.5.22 Please refer to chapters 7 and 9 for further information relating to noise and landscape mitigation.

Significance of environmental impacts

8.5.23 Of the 33 sites impacted by construction of the scheme, impacts have been identified on the setting of 17 historic buildings after mitigation. These impacts would result from visual intrusion and noise arising from activities such as the excavation of cuttings, construction of embankments and bridges, as well as the movement of construction
vehicles, noise and dust. Neutral impacts have been identified on the remaining 16 sites.

8.5.24 Of the 30 sites impacted by operation of the scheme, long-term adverse impacts have been identified to impact on eleven sites after mitigation.

8.5.25 As described above, landscape planting will help to reduce the visual impact of the scheme on Over Tabley Old Hall (Site 7) and Mere Old Hall (Site 38), whilst photographic survey will provide a permanent record of the buildings in their current setting. A Large adverse impact is predicted on Over Tabley Old Hall (Site 7) and Moderate and Slight adverse impacts are predicted on associated estate buildings (Sites 8 and 118) due to continued impacts on setting and amenity. A Moderate adverse impact is predicted on Mere Old Hall (Site 38) and Moderate and Slight adverse impacts are predicted on its estate buildings (Sites 33, 34 and 37), due to the importance of setting to any appreciation of their relationship with one another and the surrounding landscape.

8.5.26 During operation of the new road, the reduction in traffic on the de-trunked Chester Road will improve the setting of adjacent historic buildings. Within the study area beneficial impacts have been identified on seven historic buildings.

8.5.27 Impacts of Neutral significance have been identified for the remaining 12 sites affected during operation of the scheme.

8.5.28 The significance of impacts on Historic Buildings are summarised in Table 8.3 below.

### Table 8.3: Historic Buildings – significance of impact

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Name</th>
<th>Designation</th>
<th>Value</th>
<th>Mitigation</th>
<th>Significance of impact during construction</th>
<th>Significance of impact during operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Church Farm</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Neutral</td>
<td>Slight</td>
</tr>
<tr>
<td>27</td>
<td>Bentleyhurst Farm</td>
<td>None</td>
<td>Low</td>
<td>Landscape mitigation</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>33</td>
<td>Kennel Wood Cottage</td>
<td>None</td>
<td>Medium</td>
<td>Landscape mitigation and historic building recording</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>34</td>
<td>Kitchen garden at Mere Old Hall</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
<td>Landscape mitigation and historic building recording</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>37</td>
<td>Sawpit &amp; Faraway Cottages</td>
<td>None</td>
<td>Medium</td>
<td>Landscape mitigation and historic building recording</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>38</td>
<td>Mere Old Hall, Mere</td>
<td>Grade II Listed Building</td>
<td>High</td>
<td>Landscape mitigation and historic building recording</td>
<td>Large</td>
<td>Moderate</td>
</tr>
<tr>
<td>53</td>
<td>Humble Barns Farm</td>
<td>None</td>
<td>Low</td>
<td>Landscape mitigation</td>
<td>Slight</td>
<td>Neutral</td>
</tr>
<tr>
<td>56</td>
<td>Burnthouse</td>
<td>None</td>
<td>Negligible</td>
<td>Landscape mitigation</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>76</td>
<td>Hulse Heath Farm</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>77</td>
<td>Hulse Heath</td>
<td>None</td>
<td>Low</td>
<td>Landscape mitigation</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>78</td>
<td>Montebello Castle</td>
<td>Locally Listed Building</td>
<td>Low</td>
<td>None proposed</td>
<td>Neutral</td>
<td>Slight</td>
</tr>
<tr>
<td>81</td>
<td>Denfield Cottage, Back Lane, Millington</td>
<td>Grade II Listed Building</td>
<td>Medium</td>
<td>Landscape mitigation</td>
<td>Moderate</td>
<td>Slight</td>
</tr>
<tr>
<td>85</td>
<td>Rose Cottage, Millington Hall Lane</td>
<td>None</td>
<td>Negligible</td>
<td>Landscape mitigation</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>88</td>
<td>Rangemore House</td>
<td>None</td>
<td>Negligible</td>
<td>None proposed</td>
<td>Neutral</td>
<td>Slight</td>
</tr>
<tr>
<td>91</td>
<td>Nos. 1 &amp; 2 Millington Lane</td>
<td>None</td>
<td>Negligible</td>
<td>Landscape mitigation</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>92</td>
<td>Newhall Farm</td>
<td>None</td>
<td>Low</td>
<td>Landscape mitigation</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>95</td>
<td>Newhall Cottages</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>97</td>
<td>Mere side Farm</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Slight</td>
<td>Neutral</td>
</tr>
<tr>
<td>100</td>
<td>Mere side Cottage</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Slight</td>
<td>Neutral</td>
</tr>
<tr>
<td>101</td>
<td>Cherrytree Farm</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>107</td>
<td>Cheshire Lounge</td>
<td>None</td>
<td>Low</td>
<td>None proposed</td>
<td>Slight</td>
<td>Neutral</td>
</tr>
<tr>
<td>110</td>
<td>Wortwood Heath Farm</td>
<td>None</td>
<td>Low</td>
<td>Landscape mitigation</td>
<td>Moderate</td>
<td>Slight</td>
</tr>
<tr>
<td>118</td>
<td>Structures South of Over Tabley Hall</td>
<td>None</td>
<td>Negligible</td>
<td>Landscape mitigation and historic building recording</td>
<td>Slight</td>
<td>Slight</td>
</tr>
<tr>
<td>145</td>
<td>1 &amp; 2 Denfield Cottages</td>
<td>None</td>
<td>Low</td>
<td>Landscape mitigation</td>
<td>Moderate</td>
<td>Slight</td>
</tr>
</tbody>
</table>

Issued January 2012
8.6 Historic Landscape

The existing environment ('baseline conditions')

8.6.1 Fifteen historic landscape character types (HLCT) have been identified within the study area. The location and extent of these assets is shown on Figure 8.2A and B. Historic landscape character is distinct from, but related to, the character of the modern landscape (see Chapter 9). An assessment of the value of historic landscape character types is given in Table 8.4 below.

8.6.2 Most of the historic landscape character types identified are defined by features established after AD 1540 and reflect changes in the landscape resulting from post medieval and modern agricultural improvements. Due to their widespread nature (i.e. extending beyond the study area and common throughout Cheshire), the heritage value of these types has been assessed to be no more than Low.

8.6.3 Small pockets of Ancient Field Systems (HLCT 2) survive around Over Tabley Old Hall (Asset 7), as does Ancient Woodland (HLCT 3) at the edge of the study area near Rostherne Mere. Both of these assets are unusual in that they have escaped later ‘improvement’ and remain visible in the current landscape. The value of both of these types has been assessed as Medium.

8.6.4 Post-Medieval Ornamental Parkland is represented by two separate assets:

- Dunham Massey Park (HLCT 7) located at the limit of the study area north of the M56 Junction; and
- Mere Old Hall Park (HLCT 8), west of the modern settlement of the same name.

8.6.5 Dunham Massey Park is a Grade II* Registered Park and Garden, located c.500m north-west of the scheme. Only a small portion of the park extends into the study area. The value of this asset has been assessed as High.

### Table 8.4: Historic landscape – assessment of value

<table>
<thead>
<tr>
<th>HLCT Number</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Natural Water Bodies</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>Ancient Field Systems</td>
<td>Medium</td>
</tr>
<tr>
<td>3</td>
<td>Ancient Woodland</td>
<td>Medium</td>
</tr>
<tr>
<td>4</td>
<td>Post-Medieval Settlement</td>
<td>Low</td>
</tr>
<tr>
<td>5</td>
<td>Post-Medieval Agriculture</td>
<td>Low</td>
</tr>
<tr>
<td>6</td>
<td>Post-Medieval Plantation</td>
<td>Low</td>
</tr>
<tr>
<td>7</td>
<td>Post-Medieval Ornamental Parkland (Dunham Massey Park)</td>
<td>High</td>
</tr>
<tr>
<td>8</td>
<td>Post-Medieval Ornamental Parkland (Mere Old Hall Park)</td>
<td>Medium</td>
</tr>
<tr>
<td>9</td>
<td>Late Post-Medieval Agriculture</td>
<td>Low</td>
</tr>
<tr>
<td>10</td>
<td>C19th Parliamentary Enclosure</td>
<td>Low</td>
</tr>
<tr>
<td>11</td>
<td>C20th Settlement</td>
<td>Negligible</td>
</tr>
<tr>
<td>12</td>
<td>C20th Communications</td>
<td>Negligible</td>
</tr>
<tr>
<td>13</td>
<td>C20th Agriculture</td>
<td>Negligible</td>
</tr>
<tr>
<td>14</td>
<td>C20th Industry</td>
<td>Negligible</td>
</tr>
<tr>
<td>15</td>
<td>C20th Plantation</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

8.6.6 Mere Old Hall Park has its origins in a formal design established in the 17th century, although much of what can be seen today derives from later improvements and agricultural reuse. It surrounds Mere Old Hall (Asset 38), and its outer limit is defined by extensive shelter belt plantations, which would have formed the backdrop to the park and screened it from its surroundings. The interior contains isolated plantations and individual trees, which lend the park a naturalistic feel. Although the outline of the original park can still be traced on modern maps, post medieval agriculture has reduced the park’s visibility in the modern landscape. Despite this, Mere Old Hall Park is a distinctive feature in the landscape and its value has been assessed as Medium.

Predicted environmental effects

8.6.7 Construction and operation of the proposed scheme could impact on historic landscape assets as a result of physical impacts or changes to their setting.

8.6.8 Impacts can affect assets in a variety of ways during both construction and operation of a new road. Such impacts can include:

- Partial or complete removal of historic landscape features;
• Severance of landscape elements caused by the location of the road alignment;
• Changes to historic land use patterns; and
• Visual intrusion or increased noise levels during construction and operation.

8.6.9 Physical impacts have been identified at seven historic landscape types. For clarity, these impacts are summarised in Table 8.5 below.

<table>
<thead>
<tr>
<th>HLCT Number</th>
<th>Description</th>
<th>Value</th>
<th>Source of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Post-Medieval Agriculture</td>
<td>Low</td>
<td>Construction and operation of road alignment leading to loss of individual landscape features; Severance of individual land parcels;</td>
</tr>
<tr>
<td>6</td>
<td>Post-Medieval Plantation</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Post-Medieval Ornamental Parkland (Mere Old Hall Park)</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Late Post-Medieval Agriculture</td>
<td>Low</td>
<td>Visual intrusion from traffic during construction and operation, and</td>
</tr>
<tr>
<td>10</td>
<td>19th Parliamentary Enclosure</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>C20th Communications</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>C20th Agriculture</td>
<td>Negligible</td>
<td></td>
</tr>
</tbody>
</table>

8.6.10 Key among these impacts is the effect on Mere Old Hall Parkland (HLCT 8). The proposed scheme would remove sections of the northern shelter belt plantation and of other plantations within the park. It would bisect the park from north to south, and this physical severance would affect the way the park functions and a viewer’s perception of its extent and layout. Although the scheme would be in a cutting and uses natural topography to minimise impacts on views of the park from Mere Old Hall, it would still introduce visual intrusion and noise during construction and operation. However, the effect of the proposed route is reduced by it being located west of the better preserved parts of the park, within an area that has been largely turned over to agriculture.

8.6.11 Effects on the other six landscape types would result from the removal of sections of field boundaries which define their character, and in the case of Post Medieval Plantations, the removal of trees. They too would be subject to severance of individual elements and visual and aural intrusion during construction and operation.

8.6.12 The scale of some impacts on historic landscapes during construction may be increased by temporary land uses (compounds, haul roads, storage areas, temporary drainage etc), although such impacts would be temporary. Such impacts have not been fully identified and assessed at this stage, as the proposals were not sufficiently advanced.

**Mitigation**

8.6.13 Measures that can be used to mitigate effects on the historic landscape include:

- Landscape recording to document the historic landscape before construction;
- Landscape planting to integrate the new road into its surroundings and reduce visual and aural intrusion; and
- Sensitive design of new structures to minimise their visual impact.

8.6.14 However, when a road is constructed on a totally new alignment, it is impossible to completely mitigate its impacts. In the case of the proposed scheme, it would be possible to offset the impact on Mere Old Hall Park by producing a record of its current state, but this would not fully mitigate the physical effects of severance, and or visual intrusion and noise. However, these have been minimised so far as possible by adjusting the alignment to avoid the best-preserved parts of the park and to minimise visual intrusion by taking advantage of natural topography. The same would apply to the other affected historic landscape assets.

**The significance of environmental impacts**

8.6.15 After mitigation is taken into account, six of the adverse impacts on the historic landscape would be of Slight significance, whilst the impact on Mere Old Hall Parkland would still be Moderate. These impacts would result from severance caused by the presence of the proposed scheme, the loss of individual landscape elements such as trees, hedgerows or fences, and the introduction of visual intrusion and noise during construction and operation.

8.6.16 Although the mitigation measures described above may go some way towards reducing the impact of the proposed scheme on the historic landscape, it is unlikely that they would noticeably reduce the impact on Mere Old Hall Park (HLCT 8). The other historic landscape character types form part of a wider ‘patchwork’ landscape of agricultural land and settlement in this part of Cheshire, but the park is an isolated type in its own right. The severance created by the proposed scheme would not be reduced, and our appreciation of it as a designed landscape against a predominantly rural background would be permanently affected.

8.6.17 Residual impacts of Neutral significance, meaning that there would be neither improvement nor deterioration as a result of the presence of the proposed scheme, have been identified for the remaining eight historic landscape character types.

8.6.18 A summary of the significance of impact after mitigation is presented at Table 8.6 overleaf.
### Table 8.6: Historic landscape – significance of environmental impacts

<table>
<thead>
<tr>
<th>HLCT Number</th>
<th>Description</th>
<th>Value</th>
<th>Significance of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Post-Medieval Agriculture</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>6</td>
<td>Post-Medieval Plantation</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>8</td>
<td>Post-Medieval Ornamental Parkland (Mere Old Hall Park)</td>
<td>Medium</td>
<td>Moderate</td>
</tr>
<tr>
<td>9</td>
<td>Late Post-Medieval Agriculture</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>10</td>
<td>C19th Parliamentary Enclosure</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>12</td>
<td>C20th Communications</td>
<td>Negligible</td>
<td>Slight</td>
</tr>
<tr>
<td>13</td>
<td>C20th Agriculture</td>
<td>Negligible</td>
<td>Slight</td>
</tr>
<tr>
<td>5</td>
<td>Post-Medieval Agriculture</td>
<td>Low</td>
<td>Slight</td>
</tr>
</tbody>
</table>
Executive summary

The landscape assessment has characterised the existing landscape, including its typical topography, land use and land cover. Available views have been assessed to determine their direction, nature and quality. The area is typical Cheshire countryside, with only slight undulations and with a mosaic of arable land, grassland and woodland. The landscape is influenced by three major transport corridors (the M6, M56 and A556) and is punctuated by lakes (The Mere, Little Mere and Rostherne Mere) and many small ponds.

New highways can cause short-term or long-term changes in landscape character and views available to local people and road users, in ways that are adverse for some people and beneficial for others.

Landscape character would be affected by removal of features such as trees, hedgerows and ponds, and the introduction of a new road, subdivide the rural landscape and separating related features such as blocks of woodland.

Views from 157 properties, including residential properties and businesses, could be affected, having either adverse or beneficial effects. During construction, some views would be temporarily altered by visible construction operations, storage areas and compounds. The removal of vegetation would have longer-lasting effects, declining as new tree and shrub planting matures.

There would be longer-term effects on properties with views of the new road, and of prominent features like new bridges. However, approximately 58 properties along the existing A556 would enjoy long-term beneficial effects after transfer of traffic to the new road and other changes to the old road.

Mitigation would include appropriate planting of trees and shrubs in blocks or linear features to replace lost features and provide visual screening, placing the road in cutting or flanking it with earth bunds to make it less visible and sensitive design of structures and lighting.

9.1 Introduction

9.1.1 This chapter considers the potential effects of the A556 scheme on the landscape and visual amenity\(^46\) within a study area determined by the geographical context of the surrounding landscape.

9.1.2 Landscape and visual effects are two separate but related concepts, and they do not always coincide. Effects on the landscape alter the fabric, character and quality of the landscape itself. Visual effects alter the views of the landscape that are available to the people in the area around the development.

9.1.3 The landscape takes its character from a combination of elements, including topography, watercourses, land use and pattern, vegetation, public open space and elements of cultural heritage. Landscapes vary considerably in character and quality, and they are a key component of the distinctiveness of any local area or region.

9.1.4 Human beings primarily experience the landscape through their views, and the quality of views available in any given area can make a significant contribution to the quality of life. Visual Impact Assessment therefore addresses potential changes in the quality of existing views. It takes into account the extent to which the scheme would be visible from surrounding houses, farms, footpaths and bridleways, open spaces and places of work.

9.1.5 Road schemes, by their nature, can have large impacts to both landscape character and visual receptors. It is therefore important to consider these in developing the scheme, so that impacts can be designed-out where possible and appropriate mitigation for remaining impacts can be identified.

9.1.6 The following legislation and policy was taken into account during the preparation of this report:

- Planning Policy Statement 1: Delivering Sustainable Development 2005 – promotes sustainable and inclusive design of rural and urban development;

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\(^{46}\) ‘Amenity’ can be defined as ‘the pleasantness or attractiveness of a place’ (Oxford Dictionary of English), and visual amenity is therefore the contribution of views towards the pleasantness or attractiveness of a place. The degree of visual amenity therefore varies between locations according to the quality of views available.
9.2 Approach and methods

9.2.1 The information used to support this assessment was obtained through a desk based survey of the proposed route, identifying the potential Zone of Visual Influence (ZVI) of the scheme, local planning policies, existing character assessments and designations relating to landscape and visual issues. The existing baseline is shown on Figure 9.1A and B, ‘Landscape Appraisal’, highlighting the main designations and landscape elements present within the study area. Figure 9.2 shows the landscape character areas and Figures 9.3A and B show the ZVI for the proposed scheme highlighting key receptors and locations for photomontages. This desk based survey was then followed up with site visits in order to undertake the full landscape character and visual assessment.

9.2.2 Main sources of information have included documents published by the local planning authorities, landscape character assessments at regional and county level, aerial photographs and Ordnance Survey mapping. The information was used both to identify the existing conditions (2010-2011) and predict any changes that may occur before the start of construction, independently of the scheme.

9.2.3 The assessment was carried out in line with published guidance in the Design Manual for Roads and Bridges as updated by Highways Agency Interim Advice Note 135/10 and supported by Guidelines for Landscape and Visual Impact Assessment (GLVIA).

9.2.4 An assessment was made of the sensitivity of each character area and receptor to impacts, on a scale of ‘High’, ‘Moderate’ or ‘Low’ sensitivity. The scale or magnitude of each impact was assessed on a scale of ‘Major’, ‘Moderate’, ‘Minor’, ‘Negligible’ or ‘No change’. The sensitivity of each receptor and the magnitude of each impact were then used together to determine the significance of each impact on a scale of ‘Very Large’, ‘Large’, ‘Moderate’, ‘Slight’ or ‘Neutral’, in accordance with the guidance provided in GLVIA, using a method consistent with the generic guidance and terminology given in IAN 135/10 and in Chapter 5 of this PEI.

9.2.5 The timescale over which effects of the scheme would be felt varies according to the nature of the impact itself and the time taken for mitigation to become fully effective. The timescales applied within this assessment are as follows:

9.2.6 Limitations of the information given in this PEI

9.1.7 This chapter presents a preliminary assessment of the landscape character and visual amenity effects of the scheme. The assessment was undertaken in April 2010 and January 2011 based on route proposals which were available at those times. Photomontage locations were agreed with the local authority and photos taken in April 2010. Access to areas around one key receptor was restricted at this time and no photomontage was undertaken. This will be reviewed prior to submission of the Environmental Statement (ES).

9.1.8 At the time of conducting the assessment, the preliminary design was not fully complete, with some uncertainty still remaining over aspects of some structures, earthworks, lighting, signage, gantries and drainage. In particular, provision of a ‘green bridge’ is currently being considered, although its form and location are not confirmed; this has not been considered within the landscape and visual impact assessment at this stage. The landscape and visual assessment will be reviewed and updated prior to preparing the ES, to pick up on any changes in the design and take into account any relevant issues raised during consultation of the community and ongoing consultation of third parties.

9.1.9 The technical methodology and terminology used to assess the sensitivity of receptors and the magnitude and significance of impacts are described here only in outline (see paragraph 9.2.4). A more detailed definition of methodology terminology will be provided in the ES. In addition, the full technical details of the results of the assessment on a receptor-by-receptor basis are only summarised within this report, but will be presented in full in the appendices to the ES, in the form of a set of tables and figures.

47 The ‘zone of visual influence’ approximately covers all land from which the scheme is visible, and could influence the views available. It is limited by topographic features such as hills and valleys, and by visual barriers such as woodland and buildings. See Figure 9.3A & B for Zone of Visual Influence.

48 Interim Advice Note 135/10 Landscape and Visual Effects Assessment, Highways Agency, October 2010

49 Guidelines for Landscape and Visual Impact Assessment (GLVIA); 2nd Edition - Landscape Institute and Institute of Environmental Management and Assessment– Spons Press
9.2.6 The ZVI (see Figures 9.3A and B) has been produced through desk top survey of contours, and confirmed through field surveys and further enhanced using computer modelling. Significant visual barriers (e.g. residential properties, tree groups, etc.) were taken into account to confirm areas where views would be screened.

9.2.7 ‘Visual receptors’ are any locations whose occupants or users could experience visual intrusion from the scheme. The majority of visual receptors around the proposed scheme are residential properties, with some additional business and recreational users. A total of 157 properties have been identified within the ZVI. These include, but are not limited to, properties along the existing A556 at Over Tabley, Millington, Mere and Bucklow Hill, including Over Tabley Hall and Mere Old Hall, properties at Hoo Green and individual properties dotted within the study area.

Photomontages

9.2.8 Photomontages have been used to illustrate the impacts of the scheme by selecting key viewpoints from around the study area, to provide a representative illustration of the visual effects of the scheme. The selection of these key viewpoints was done in consultation with landscape specialists from Cheshire East Council. The photomontages are shown on Figures 9.4 to 9.11. The viewpoints chosen were:

- Figure 9.4 - View from the rear of Rose Cottage towards the new A556;
- Figure 9.5 - Over Tabley Hall (To be undertaken at a later date by agreement);
- Figure 9.6 - View from Church Farm towards the Tabley Junction;
- Figure 9.7 - View from Sawpitt Cottage and Faraway Cottage towards the new A556;
- Figure 9.8 - View from Mere Hall towards the new A556;
- Figure 9.9 - View from Hulme Barns Farm towards the re-aligned A50;
- Figure 9.10 - View from No. 1 Denfield Cottage towards the Millington Lane Junction and new A556; and
- Figure 9.11 - View from Yanwood Heath Farm towards the M56 Junction 7/8 south roundabout and new A556.

9.2.9 During the course of this assessment, consultation has taken place with relevant third parties, through both exchanges of correspondence and face-to-face meetings. The principal third parties consulted in relation to the landscape have been Natural England, Cheshire East Council and English Heritage.

9.3 The existing environment (‘baseline conditions’)  

9.3.1 The study area for this assessment has been determined by the geographical context of the surrounding landscape, principally through reference to the ZVI (see paragraph 9.2.1 and Figures 9.3A and 9.3B). It encompasses an irregularly-shaped area, limited by the rising topography, woodland and vegetation.

9.3.2 The extent of the ZVI is limited by:

- To the north by the southern edge of Dunham Massey and Bowdon Ridge;
- To the east by topography, mature woodland blocks and the linear residential development along the eastern side of the A556 at Mere;
- To the south by the M6 motorway embankments, the grade-separated Junction 19 of the M6 motorway, and mature woodland belts; and
- To the west by the gently rising topography and by mature woodland blocks.

The Green Belt

9.3.3 All of the land in the study area is designated as Green Belt. The principal purpose of the Green Belt is to protect rural land so as to prevent urban sprawl by keeping land permanently open, and to safeguard the ‘openness’ of the countryside by preserving special character. The ‘openness’ of the Green Belt is afforded by the rural and accessible character of the area. Visual amenity within the Green Belt is an aspect of the ‘special character’ that is to be preserved.

Topography and hydrology

9.3.4 The local topography is generally flat with some gentle changes in elevation, between 20m and 70m above sea level, forming a number of low ridges which help define the landscape character and restrict local views. Locally, the gently undulating landscape allows views across a varied field pattern with fields up to a size of 8 hectares, mainly bounded by traditional maintained hedgerows and fence lines. Some larger fields have been formed by removing pre-existing boundary features. There are no significant man-made topographical features such as embankments and cuttings, except along the line of the M6 and M56 motorways. The undulating landscape is characteristic of the general...
agricultural landscape which forms part of the Green Belt for southern Manchester. (See Figures 9.1A & B Landscape Appraisal and Figure 15.5A and B, which illustrates views of the countryside along the line of the scheme).

9.3.5 Within the immediate area there is very little evidence of rivers, streams or ditches significantly influencing the landscape, except at the northern extreme of the study area where Bowdon Junction stands in the valley of the River Bollin, near its confluence with Birkin Brook. Small ponds (historically marl pits) are dispersed throughout the study area, the majority of which are within existing woodland and copses. There are a few small ditches, particularly in the southern part of the study area; these generally lie at field boundaries, and have little influence on the landscape (see Chapter 10 for their ecological characteristics). There are three large and ecologically important lakes (Little Mere, The Mere and Rostherne Mere - Ramsar and SSSI sites; see Chapter 10 for more information) all to the east of the A556, however the gently undulating topography of most of the study area and residential development along the east side of the A556 limit the visibility of the meres, and therefore the extent of their influence on the landscape.

**Land-use and settlement pattern**

9.3.6 Land-use issues are addressed more fully in Chapter 14, Community and private assets, and are summarised here only so far as they are relevant to the landscape impact assessment.

9.3.7 Land use is predominantly agricultural, interspersed with mature woodland. Parkland landscapes around Mere and Tatton Halls alter the overall agricultural pattern. The study area is influenced by several major highways (the M6, M56, A556 and A50) along with a number of local roads.

9.3.8 Open rural land within the Green Belt extends beyond the study area in all directions, and is very extensive to the south and west, interrupted only by the Knutsford urban area. A medium to large-scale field pattern over gently undulating topography creates a simple landscape pattern, criss-crossed by a number of rights of way, especially in the northern section. A network of local minor roads linking small settlements and scattered groups of properties give the landscape a typically rural quality. This is overlaid and subdivided by major highways (the M56, M6, A50 and the A556 itself), which contrast with that rural quality.

9.3.9 Long rows of large detached houses and gardens along the eastern side of the A556 at Mere are very distinctive of this locality, and would be more typical of an urban edge landscape than of a rural locality. These properties are generally within well established grounds which add to the mature landscape character and to some extent would help reduce visual intrusion of the road. Hotels, motels and petrol stations along the A556 create a ‘transport corridor’ character within rural and village settings.

9.3.10 Historic buildings, including the country houses and associated buildings (Over Tabley Hall and Mere Hall) add another element to this landscape, contributing points of interest and an element of grandeur to the landscape. Historic buildings of a more typical rural character include Denfield Cottage, off Millington Hall Lane (unusual in the area, being a timber-framed building with a thatched roof); St Paul’s Church in Over Tabley (incorporating a memorial to the Langford-Brooke family of Mere Hall); and an AA phone box near Mere Crossroads.

9.3.11 Features that detract from the quality of the landscape within the study area include the major highways (M6, M56 and A556), and in particular the heavy traffic on the A556. There are also at least two series of overhead power lines/pylons, which are key visual detractors.

**Landscape / townscape character**

9.3.12 The land cover is characterised by medium to large fields, frequent hedges and mature woodlands. Traditional field boundaries comprise maintained mixed native hedgerows, predominantly hawthorn with many mature hedgerow trees. However, many boundaries are marked simply by fences. Dense and fairly frequent woodlands to the south of the A50 and to a lesser extent to the north form very important visual and wildlife features and generally help contain views.

9.3.13 The area surrounding Mere Hall is less typical, as the field pattern is less regular, and the boundaries tend to curve rather than follow straight lines. It is likely that this arrangement is the relic of an ancient deer park, later formalised as an ornamental park surrounding the country house (see Chapter 8). The park is bounded to the north and west by extensive mature shelter belt plantations (‘Belt Wood’) and a distinctive avenue of mature oaks along the A50, while the enclosed park area contains a number of smaller plantations and numerous scattered individual parkland trees. The trees are mostly deciduous, giving rise to much seasonal variation as the foliage changes colour in autumn and drops in winter.

9.3.14 Landscape Character Areas are broad areas of similar or related landscape character defined at national and regional level (by Natural England) and at a local level (by local planning authorities). The purpose of these definitions is to aid in the formulation and implementation of planning policies relating to the landscape.

9.3.15 At national level, the site lies within Natural England’s National Character Area (NCA) 61, ‘Shropshire, Cheshire and Staffordshire Plain’ whilst to the north the site extends into NCA 55 ‘Manchester Conurbation’ (See Figure 9.2).

9.3.16 At regional level, the study area is covered by Natural England’s North West Landscape Character Framework, which places the study area in the ‘Estate Farmlands’ Character Issued January 2012
This comprises a flat to gently rolling landscape of mixed farmland and ancient woodland with minor rivers, meres and ponds (marl pits). It is influenced by halls, estates and their surrounding parklands and gardens.

9.3.17 At a local level, the study area lies within the Cheshire Landscape Character Assessment\(^50\), Landscape Type 10: Lower Farms and Woods. The route is also adjacent to Landscape Type 9: Estate, Woodland and Mere (See Figure 9.2).

9.3.18 For the purpose of this assessment, more localised landscape character areas (LCA) and townscape character areas (TCA) have been identified, building on the information gathered at national, regional and local levels (see Figure 9.2 for the extent of these areas). The eight areas identified are:

- **LCA1 - Arley Character Area**
  Open agricultural land influenced by the road network and historic halls and parklands. Gently undulating landscape with an irregular field pattern, extensive maintained hedgerows and frequent blocks of woodland. A large number of small water bodies. Settlement is dispersed in some areas and concentrated into hamlets and villages in others. This LCA has moderate sensitivity. This relatively rural character area contains and is influenced by a number of transport corridors.

- **LCA2 - Tatton Character Area**
  Dominated by Tatton Park, with extensive open parklands, woodlands, meres and grasslands. Gently undulating with a medium to large irregular field pattern and maintained hedgerows. Some dispersed farms and hamlets with influences from the Tatton Estate in the form of groups of workers cottages. This LCA has a high sensitivity due to the high quality landscapes around Tatton Park and the presence of nature conservation sites protected by law at international and national level (see Chapter 10).

- **LCA3 - Ashley Character Area**
  Mainly agricultural with small to medium scale semi-irregular field pattern and maintained hedgerows with hedgerow trees. Linear residential areas along main roads with dispersed farms. The M56 is an intrusive element within this area. This LCA has a high sensitivity due to the high quality landscapes around Tatton Park and the presence of nature conservation sites protected by law at international and national level (see Chapter 10).

- **LCA4 - Wooded River Valley**
  Very narrow area following the Bollin River valley. Mature tree belts and marginal aquatic vegetation adjacent to agricultural land with steep valley sides. This LCA has moderate sensitivity and is not remarkable as this character is common along other river valleys of this type.

- **LCA5 - Wooded Claylands**
  Wooded landscape marked by scattered hedgerow oaks. Gently rolling valley subdivided by narrow steep sided valleys. Provides areas of rural landscape surrounding the Hale residential area. This LCA has moderate sensitivity. The area contains one nationally important monument (Castle Hill Motte and Bailey Castle; see Chapter 8) and has strong influences from surrounding residential areas.

- **LCA6 - River Meadowlands**
  Flat alluvial floodplain associated with the Bollin River watercourse. Agricultural fields bounded by hawthorn hedgerows and fences. Occasional buildings and minor roads with good footpath access and links to the adjacent Dunham Massey estate. This LCA has high sensitivity. The topography and lack of built structures mean that this character area would be sensitive to development.

- **LCA7 - Wooded Estate Lands**
  Rolling topography rising towards the east, dominated by extensive parklands at Dunham Massey with pockets of woodlands and hedgerow boundaries. Network of minor roads and extensive footpath, bridleway and cycleway network provide good access to the surrounding area. This LCA has high sensitivity, due to influences from the Dunham Massey Estate, and reflected in the designation of large parts of the LCA as a Grade II* Registered Park and Site of Biological Interest.

- **TCA1 – Mere & Bucklow Hill**
  Mere and Bucklow Hill form linear settlements along the A556, giving a slightly urbanised character with residential properties, hotels, petrol stations and small businesses. These settlements are characterised by older style brick buildings, well maintained cottages and large detached two storey properties with established boundary planting. The A556 dominates this character area. This TCA has moderate sensitivity.

**Visual receptors**

9.3.19 Typically, views within the study area are limited by local woodlands and low ridges. A total of 157 properties have been identified within the study area (see Figure 9.3A and B for Zone of Visual Influence). Of these, 148 are residential properties which are considered to be of high sensitivity. The other nine properties are business premises, varying in sensitivity between low and moderate depending on the type of business. Businesses that have some recreational or residential purpose, e.g. public houses or nursing homes, have a higher sensitivity than offices.
At the southern end of the study area, there is a cluster of small cottages, larger homes and farms around Over Tabley, together with some business premises. Although the countryside around Over Tabley is quite open, some of these properties have very restricted views to the west, because of existing mature boundary vegetation and/or other buildings. To the west, Over Tabley Hall and its associated farm buildings have been converted to multiple residential properties. The hall has open views eastwards from a slightly elevated position, while views from the farm buildings are very restricted by existing woodland and other buildings.

The majority of properties are located along the existing A556 in the central part of the study area, between the junction with the A50 at Mere and Bucklow Hill. Residential properties line the east side of the A556, many with views to the west, although these views are filtered or screened by mature trees within the grounds of the property and vegetation lining the existing A556. There is a cluster of houses on both sides of the road and extending along side roads around the junction with the A50. There are only very restricted views to the west from these properties, because of rising ground and many mature trees. Mere Hall, to the west of the A50 junction, is subdivided into flats, and there are several cottages within its former estate grounds. Further to the north, properties extend to the west from Bucklow Hill along Bucklow Hill Lane and Chapel Lane.

North and west of Bucklow Hill, residential properties, farms and businesses are much more dispersed, scattered individually to either side of the A556 or its side roads - principally Millington Hall Lane, Millington Lane and Chapel Lane.

A number of Public Rights of Way (PRoW) have been identified within the study area. Since these are recreational facilities, their sensitivity is considered to be high. The impacts to these routes are considered in Chapter 15, Effects on all travellers.

### 9.4 Predicted environmental effects

- **9.4.1** Generally, impacts would be more pronounced during the construction phase and therefore the largest adverse impacts would be temporary in nature. These impacts include the presence of construction compounds, construction vehicles, materials storage areas and the removal of vegetation and stripping of soil where required prior to construction works.

- **9.4.2** Longer term impacts would be from the presence of the road and associated infrastructure including gantries, signage, lighting, structures such as bridges and underpasses, embankments and traffic using the route.

**Effects on the Green Belt**

- **9.4.3** Although the road proposal introduces a new built element into the existing landscape, the development and mitigation should be considered against the overall existing landscape character including future changes in woodland cover and agriculture.

- **9.4.4** There would be a short-term adverse effect on the openness and visual amenity of the Green Belt during construction. As proposed planting develops, the scheme would integrate into the existing landscape reducing the adverse effects over a period of time. Effects on the overall visual amenity of the Green Belt would be minimal. The balance of openness and enclosure would be unchanged.

- **9.4.5** It is not considered likely that the proposed scheme would undermine the purposes of the Green Belt (i.e. it would not promote urban sprawl or the coalescence of large settlements) therefore it is considered there would be no change in future years.

**Effects on topography and hydrology**

- **9.4.6** The introduction of new structures such as bridges and earthworks in the form of raised embankments, cuttings and earth bunding along the alignment would add new, uncharacteristic features to the landscape, locally altering the natural topographical character of the area and limiting views.

- **9.4.7** The earthworks likely to have the greatest impact on local topography would be raised features such as embankments, and the most prominent raised features would be those associated with Tabley Junction, the A50 overbridge, Millington Junction and the new A556/M56 Junction. Earth bunding flanking the route (required to attenuate noise impacts; see Chapter 7, Noise) would also alter local topography to a lesser degree. Most of the route is in cutting, particularly between the M6 and Bucklow Hill Lane, with some cuttings up to nearly 7m deep. Where embankments do occur, most are fairly low, the main exceptions being around the new Bowdon Junction at the north end, where a localised area of low ground is crossed by an embankment up to 5.2m high.

- **9.4.8** There would be no topographic effects on the landscape around the Meres or on the River Bollin valley, as these areas are separated from the scheme by the existing A556 or lie adjacent to existing highway features that are re-used in the scheme (the on-line section of the A556 improvement, and the existing M56 spur). The scheme drainage has been designed to ensure no hydrological effect on the Meres or the River Bollin (see Chapter 2 for a description of the drainage design, and Chapter 11 for effects on the water environment). The only alterations to watercourses would affect a number of small ditches, some of them carrying little flow of water, mainly in the southern part of the scheme. These would either be carried under the new road in culverts, or diverted parallel to the new road until they meet another watercourse. A number of ponds would be lost (see Chapter 10, Ecology).
9.4.9 All of these topographical alterations would take place during the construction period, but would be long-term in nature.

**Effects on land-use and settlement pattern**

9.4.10 The principal effects of the new A556 on land-use would be the long-term loss of farmland along its length, and the severance of individual plots of land and of farm units. These agricultural effects are quantified and assessed in Chapter 14 (Community and private assets). Additional land would be lost in the short term for use as site compounds and temporary storage areas, but would revert to their existing use at the end of the construction period.

9.4.11 In relation to the landscape, these changes would alter the use of the agricultural land through the disruption of the existing field pattern, severance and partial loss of hedgerows and (to a lesser extent) woodlands (see Chapter 14, Community and private assets, for a full assessment of agricultural effects). A total of 28 hedgerows would be affected, a total of approximately 3,300 linear metres, of which two are classified as ‘species rich’ and five are species-poor with hedgerow trees (see Figures 9.1A and B Landscape Appraisal for locations); this represents a small proportion of the hedgerows in the study area. Relatively small areas of woodland would be lost, the largest being at Tableypipe Wood and Belt Wood, both of which would be partially severed; there would be smaller-scale losses from Square Wood and Kennel Wood.

9.4.12 The alignment would pass through the parkland landscape surrounding Mere Hall. However, the alignment avoids the surviving area of traditional parkland landscape, identified by rough grassland with mature parkland trees. Instead, it follows a route through an area of former parkland that has reverted to arable agricultural use. This area lacks the typical scattered parkland trees, but retains the larger-scale structure of the park, being surrounded by shelter-belt plantations (Belt Wood) and containing a number of small ornamental copses or plantations. Most of this structure would be retained, although subdivided by the route of the road, in cutting.

9.4.13 The proposed route avoids local properties and there would be no change in the use of the residential properties within the villages and isolated farmhouses. However, the A50 would have to be raised on embankment near Hulme Barns Farm, and this would require alterations to its driveway to maintain access. Mereside Farm would have its existing direct access onto the A556 replaced by a new farm access track linking it to Millington Lane.

9.4.14 The principal effect on settlement pattern would be on the dispersed rural settlement of Millington, linked by winding country lanes, north of Chapel Lane and around Millington Hall Lane and Millington Lane. This area would be subdivided by the new A556, and the network of lanes linking the settlements would be severed, with diversions via a new side road and the new Millington Junction. A small number of properties in this area, including Denfield Cottage Listed Building, would find themselves in close proximity to the new road. This would alter the relationship between groups of properties either side of the new road, and the relationship between properties west of the new road and the larger settlement of Bucklow Hill. However, all properties would retain access to each other and to the de-trunked Chester Road. The effects of these changes on the communities in the area are addressed in Chapter 14 (Community and private assets).

9.4.15 Properties and settlements along Chester Road in Over Tabley, Mere and Bucklow Hill, including the Church of St Paul, the AA phone box (both Listed Buildings) and many residential properties would experience a substantial beneficial change in the character of the local area resulting from reduction in traffic levels and the de-trunking of Chester Road. These settlements would lose some of their urban-edge character, becoming more typically rural.

9.4.16 Effects on the setting of historic buildings such as the Grade II Listed Over Tabley and Mere Halls are considered here in relation to their contribution to the character and quality of the landscape; effects on their heritage value are considered in Chapter 8. Both Halls sit within a very rural context, separate from the main settlement areas in the study area. Over Tabley Hall in particular is a prominent feature in the landscape as seen from the east and north-east, adding a point of interest and ornamentation in a very open, relatively featureless area of landscape. The positioning of the new A556 in the foreground, between the de-trunked Chester Road and the Hall, would alter the relationship between the Hall and the surrounding landscape, undermining the contribution that the building makes to the wider landscape.

9.4.17 Mere Hall is much more enclosed by the woodland forming part of its surrounding parkland. It forms the focal point within that parkland, but is barely visible from most locations outside. Although the parkland itself would be bisected by the new A556, the placement of the road in cutting and in relation to topographic features means that there would be only small-scale change in the relationship between the Hall and the surrounding landscape.

**Effects on landscape character**

9.4.18 The off-line section of the new A556 would sit almost entirely within the LCA1 Arley Character Area (see Figure 9.2 Landscape Character Areas). During construction there would be short-term, localised changes in the quiet, rural character of the area, following the introduction of busy construction activity and plant movements and the visually intrusive effect of vegetation clearance, topsoil stripping and the construction of highway embankments, cuttings and structures, added to by the presence of temporary soil storage areas, site compounds and associated construction traffic and equipment. These effects would cease at the end of the construction period.
In the longer term, the character of the landscape would be altered through the introduction of the new A556, which as a whole would form a major new landscape feature not in keeping with the character of this area. The Tabley and Millington Junctions would be the most intrusive elements, due to their prominent raised earthworks and modern structures. The Old Hall Lane underpass would be less intrusive, in part because it would be intrinsically less prominent and in part because of its proximity to a number of other built features of varying styles and ages in the village of Over Tabley. Although also raised, the new A50 bridge forms part of an existing road corridor and is also screened from most directions by existing trees; it would not therefore substantially alter the character of the local area. Other, lesser structures, such as attenuation ponds and outfalls, would be much less prominent and would have minimal effects on the character of the area.

The proposals form part of the north-west boundary of the character area but would not materially change any of the main features that make up the character of this area. However, the western boundary of the character area would experience long-term benefits as a result of the de-trunking works on Chester Road and the transfer of traffic to the new A556.

Within LCA3 Ashley, there would be large-scale construction activity around the existing Bowdon Junction (see Figure 2.6). In the longer term, the new junction would occupy a significantly larger area than the existing one. However, these effects would be very localised within an area already enclosed and heavily influenced by major highways (the M56, A556 and the M56 spur linking to Bowdon Roundabout), and this limits the overall effect on the wider character area.

The southern boundary of LCA4 Wooded River Valley is formed by the existing M56 spur, placing it in close proximity to the scheme. The area would be influenced to a small extent by construction activity in the short term. In the longer term, however, it would retain a largely unaltered character.

TCA 1 Mere and Bucklow Hill would remain largely unaffected during the majority of the construction period, except by the influence of any construction traffic passing through the settlements on the A556 and A50. The final phase of construction would be the de-trunking works on Chester Road, which would, in the short term, introduce construction plant, activity and noise in close proximity to the residential areas. However, the adverse effect of this would be partially offset by the transfer of through-traffic to the new road, which would take place before the de-trunking works. In the longer term, the permanent transfer of most traffic to the new A556, the reduction in the width of Chester Road and the potential reduced lighting and road signage would all significantly improve the townscape character in Mere and Bucklow Hill.

The other surrounding landscape character areas (LC5, 6 & 7) are not directly affected by the scheme. There may be some small-scale indirect effects, such as changes in the pattern and quantity of traffic or small changes to long distance views such as those from Dunham Massey.

Effects on visual receptors

The assessment identified 157 properties that would have changes of view, adverse or beneficial, due to the proposed scheme. Potential receptors have been identified on Figure 9.3A and B, Zone of Visual Influence. Receptors within the ZVI shown on the figure would have potential impacts from the proposals depending on views and screening from individual properties.

New highways are often more visually intrusive during construction than they are after opening, due to the exposure of bare soils and rocks and the presence of temporary compounds, storage areas etc. and because visual mitigation measures have not yet been provided or are not yet mature. Properties with direct views of the site would therefore experience a relatively high level of visual intrusion during construction. These properties mainly comprise some, but not all of those in the countryside to the west of Chester Road, together with some properties in Over Tabley and parts of Bucklow Hill. The intrusion would decline towards the end of the construction period as much of the later phases of activity would be at least partially hidden within cuttings, while the exposures of bare soils and rocks would be eliminated by landscape works or by the application of road surface materials.

Most properties along Chester Road would see little change in views during construction of the main route, but would have temporary effects during the de-trunking works. All of these properties would experience large-scale beneficial effects in the long term, following the transfer of traffic to the new A556 and alterations to Chester Road.

The extent of lighting is subject to a lighting appraisal that is in progress. However, at this stage it is assumed that lighting would be restricted to the immediate approaches to Junction 19 of the M6 and Junction 7 of the M56. Pending the results of the lighting appraisal, it is not clear whether lighting would be required at Tabley and Millington junctions. There would be no lighting on the new A556 between these junctions, so any visual effects of lighting would be limited to the southern end of the scheme, around Over Tabley, and the northern end of the scheme, from Millington Hall Lane northwards.

Within these areas, lighting columns would be visible during the day and lighting would be visible at night, with some properties experiencing noticeable changes in night time views towards rural areas which are currently very dark, with little or no visible lights. Headlights from traffic using the new road could also have an impact to properties at night, although this effect would be limited by the high proportion of the scheme that is in cutting and/or flanked by earth bunds. The effect would be most pronounced in the
vicinity of junctions, where vehicles would be in an elevated position. The position and arrangement of Tabley Junction means that few properties would be exposed to this effect. At Millington Junction, a small number of properties close to the alignment on Millington Lane could experience this effect, although attenuated by their distance from the junction. Properties to the south on Millington Hall Lane are protected by a dazzle barrier between the vehicular junction and the new facility for non-motorised users.

9.5 Mitigation

9.5.1 The most effective form of environmental mitigation is to alter the scheme design to avoid causing an impact, or to reduce its scale and significance. To this end, the scheme alignment has been adjusted during preparation of the preliminary design so as to limit its impact on the landscape and its visual impact. In particular, the alignment was adjusted slightly to the west in the Mere Hall parkland to minimise the loss of hedgerows and of woodland in Belt Wood, Kennel Wood and Square Wood and to maximise the use of natural topography to screen views of the road. Combined with the placement of the road in cutting, this means that the new road would be barely visible from Mere Hall itself, although some of the properties within the estate (particularly Faraway and Sawpitt Cottages) would have views towards the road.

9.5.2 Beyond this area, opportunities to reduce landscape and visual impacts to this degree by design changes were less easily available. However, constructing the majority of the new road in cutting helps to minimise the visual impact on some other properties. Near Over Tabley Hall, however, the road must inevitably rise onto low embankment to enable a tie-in with Junction 19 of the M6 motorway. The openness of the landscape, combined with the elevated position of Over Tabley Hall, limit the mitigation opportunities available. Earth bunding to either side of the road, combined with planting of native trees and shrubs in blocks or linear arrangements, will provide some visual screening. Consideration is being given to additional landscape design options to further reduce the impact. However, to be effective, any such measures would significantly alter the existing landscape context of the Hall.

9.5.3 Following consultation with English Heritage and Cheshire East Council, consideration was given to cladding parts of some or all of the structures with a finish in keeping with local building traditions to reduce the impact of the scheme on landscape character and visual amenity from the surrounding properties. However, it was considered that due to the screening effects of earth bunding, cuttings and proposed mitigation planting the beneficial effects on views and on landscape character would be minimal.

9.5.4 For the scheme as a whole, a landscape design has been developed, incorporating a range of measures to integrate the scheme into its surrounding landscape, thereby limiting effects on landscape character and quality, and to screen or filter views from affected properties. These measures are integrated with and incorporate mitigation measures for other environmental topics, principally Noise, Cultural Heritage, Ecology, and the Water Environment (see Chapters 7, 8, 10 and 11). The design is shown on the Environmental Masterplan (EMP) attached to this PEI. Requirements for management and maintenance of these mitigation features during the operation of the road will be set out in a Handover Environmental Management Plan (HEMP) to be prepared before the completion of construction.

9.5.5 The mitigation measures shown on the EMP have been designed to address the following objectives:

- Develop a landscape structure which physically and visually integrates the proposed road, its embankments and associated features into the local surroundings and retains the visual amenity of residents, footpath users, road users;
- Identify and retain open characteristics of the landscape and the visual amenity of the Green Belt;
- Maximise the potential of the road corridor for enhancement of the wider landscape and provision of increased habitat diversity and structure and reduce the effects on ecological resources such as biologically important woodland, ponds and wildlife;
- Minimise visual intrusion and reduce the negative effect of any visual obstructions such as gantries, structures and lighting columns;
- Preserve, reinstate, replace or enhance elements of the existing landscape directly or indirectly affected by the proposal and protect the setting of Listed Buildings and other historic buildings; and
- Assist in the creation of pleasant safe driving conditions.

9.5.6 The landscape design incorporates the use of earth bunding, creation of new ponds, planting of grassland, native trees and shrubs, blocks of woodland, and the design of some engineering features such as drainage ponds to naturalise them into the landscape through modifying their shape and incorporating appropriate vegetation around their edges.

9.5.7 Where possible, subject to agreement with the adjoining landowner, hedgerows rather than larger blocks of tree and shrubs would be planted along the scheme boundaries in

 Issued January 2012
areas where this is the most appropriate boundary treatment. The use of new hedgerows similar to those that are characteristic of the local area would maintain the integrity of the existing landscape whilst keeping existing views open and maximise the opportunity for open views into the countryside. Any agreements with landowners would specify appropriate hedgerow maintenance regimes.

9.5.8 Locally sourced native shrub and woodland edge planting would be used where there is a need for low-level, dense visual screening that would establish and become effective quickly. Such areas include the vicinity of new junctions and busy intersections and other areas where there is significant visual intrusion.

9.5.9 Woodland planting is proposed to provide longer term visual screening, to integrate the road with existing woodlands and as replacement for sections of woodland lost.

9.5.10 Additionally, special measures would be incorporated to mitigate the effects of the new road on bats and incorporate specimen tree planting to create bat ‘hop-over’ points (for more information see Chapter 10, Ecology).

9.5.11 Low maintenance or naturalising grass and wildflower areas would be established over verge areas within the highway boundary. Consideration would be given to the mitigation requirements for barn owls (see Chapter 10) to avoid attracting them onto the road, where they are vulnerable to traffic accidents, and to ensure that foraging grassland is created in appropriate locations that would attract owls away from the road.

9.5.12 Attenuation ponds would be shaped to create a more natural appearance. They would be planted with native wetland plants and sown with suitable native wildflower species in keeping with the landscape character of the area. New wildlife ponds created to replace those lost as a result of the scheme (see Chapter 10) would also be planted with species suitable for their locations. Landscape areas would be managed to support the establishment of trees, shrubs and grassland / wildflower areas and promote biodiversity alongside highway maintenance operations.

9.5.13 Some of the highway earthworks and/or earth bunds may be ‘graded out’ to provide very gentle slopes on the sides away from the new road. This technique tends to reduce the visual intrusion of the earthworks, and can also allow the return of some land to agricultural use (see Chapter 14, Community and private assets). However, this approach can only be implemented in appropriate locations following consultation with local people and affected parties and by agreement with owners.

9.6 The significance of environmental impacts

9.6.1 The significance of effects on the Green Belt

9.6.2 In the long term, there would be no change in the openness and visual amenity of the Green Belt and the principal purposes of the Green Belt would not be undermined. The long-term effects on the Green Belt are therefore neutral.

9.6.3 The changes to the topographical characteristics of the landscape resulting from the construction of embankments, cutting and earth bunding are likely to disrupt the gently undulating character on a local scale. With the establishment of mitigation planting and easing of earth bunding (where this can be returned as agricultural land to integrate with the local landform) there is likely to be a moderate adverse effect on the character of the topography in the long term.

9.6.4 There would be no landscape effects to the Meres or River Bollin.

9.6.5 Within the construction site boundary on the off-line section of the scheme, there would be losses of ponds and disturbance to ditches throughout the construction period. In relation to the effect on the landscape, this would comprise a slight adverse impact (see Chapter 10 for the ecological significance of impact).

9.6.6 However, more new ponds would be created as part of the mitigation measures than would be lost during construction. In addition, although their purpose is not principally related to landscape or ecological mitigation, the large attenuation ponds would integrate with the landscape and be in keeping with the dispersed ponds and larger Meres. Although some of the ditches would be culverted beneath the road, losing ecological and landscape value for the length of the culvert, others would be diverted parallel to the road, potentially increasing their actual length. Overall, there would be an increase in water bodies throughout the study area, although this would not alter its hydrological character or functioning. There would therefore be a long-term slight beneficial effect on hydrological aspects of the landscape.

9.6.7 The loss of woodland cover, hedgerows and other vegetation during construction has been reduced through adjustments to the scheme design, and would comprise a short-term moderate adverse effect. In the longer term, replacement works would create larger quantities of woodland and other vegetation types than were lost, leading to a long-term slight beneficial effect (note – this assessment relates to the contribution of
these features to the landscape. See Chapter 10 for ecological effects, which may differ in significance).

9.6.8 Impacts on the setting of historic buildings are considered here in relation to the contribution that cultural features make to the landscape and townscape, rather than their cultural heritage value, and the assessment given here may therefore differ from that given in Chapter 8. It is considered that the scheme would have an initial large adverse effect on the setting of Over Tabley Hall during the construction period. The limited opportunities for effective mitigation mean that the longer-term effect, after mitigation, is likely to remain large.

9.6.9 At Mere Hall, the visual intrusion of construction activity would create a large adverse impact in the short term. However, with the establishment of mitigation planting and the proposed road in cutting the impacts would reduce so that the remaining effects would be moderate adverse.

9.6.10 The intrusive nature and large scale of construction operations in the close vicinity of Denfield Cottage would also create a large adverse impact in the short term. In the longer term, the impact would decline as mitigation works mature, but is likely to remain moderate adverse. Other historic buildings, including St Paul’s Church and the AA Box 372 at Mere Corner would experience much lesser construction impacts during the de-trunking works, with slight to moderate beneficial effects once de-trunking is complete and from the reduction in traffic levels on the A556.

9.6.11 Impacts on the Green Belt, topography, hydrology and land use are summarised in Table 9.1 below.

### Table 9.1: Summary of significance of impacts on the Green Belt, topography, hydrology and land use

<table>
<thead>
<tr>
<th>Receptor description</th>
<th>Sensitivity</th>
<th>Significance of impact during construction</th>
<th>Significance of impact during operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Belt</td>
<td>High</td>
<td>Slight adverse</td>
<td>Neutral</td>
</tr>
<tr>
<td>Rostherne Mere, The Mere/Little Mere, River Bollin</td>
<td>High</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>Hydrology – ponds and ditches</td>
<td>High</td>
<td>Slight adverse</td>
<td>Slight beneficial</td>
</tr>
<tr>
<td>Vegetation cover - woodland, hedgerows, grassland</td>
<td>Moderate</td>
<td>Moderate adverse</td>
<td>Slight beneficial</td>
</tr>
<tr>
<td>Landscape setting of Over Tabley Hall</td>
<td>High</td>
<td>Large adverse</td>
<td>Large adverse</td>
</tr>
<tr>
<td>Landscape setting of Mere Hall</td>
<td>High</td>
<td>Large adverse</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Landscape setting of Denfield Cottage</td>
<td>High</td>
<td>Large adverse</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Landscape/townscape setting of other</td>
<td>High</td>
<td>Slight adverse</td>
<td>Slight to moderate</td>
</tr>
</tbody>
</table>

9.6.12 LCA1 Arley Character Area would see the most significant adverse effects as the majority of the scheme is located within this area. During construction, planting and other mitigation works would not yet be effective and the new road would form a detracting element within the character area. These impacts would reduce after the end of construction, and continue to reduce as mitigation planting begins to establish and soften the scheme. However, the long-term disruption of the field pattern means that there would be a continuing slight adverse effect upon landscape character in the long term.

9.6.13 LCA2 Tatton Character Area would see no change during the construction phase. However, during operation there would be a slight beneficial effect as the majority of traffic would be moved away from this area and into LCA1 and the de-trunking works would improve the boundary to this area.

9.6.14 There would be no significant change to LCA3 Ashley where the scheme comprises works to the existing junction with the M56 motorway. This area already contains the M56 junction, and although during construction they would be short-term adverse effects, the finished scheme would not alter the overall perception of this character area which stretches west along the M56 corridor. LCA4 Wooded River Valley would experience a slight short-term adverse effect due to the proximity of the construction operations at the M56 junction, but would have no impacts in the long term.

9.6.15 The scheme would have a short-term adverse effect on townscape character TCA1 (Mere and Bucklow Hill) due to the proximity of construction works and the presence of construction traffic, particularly during the de-trunking works. After construction is over, the transfer of traffic to the new A556 and de-trunking of Chester Road would have a long-term moderate beneficial effect on townscape character within these communities.

9.6.16 LCA5 Wooded Claylands and LCA7 Wooded Estate Lands would experience a short-term slight adverse effect as the construction site would be visible in long distance views which are part of the character of these areas. In the longer term, there would be no significant change in the character of these views.

9.6.17 LCA6 River Meadowlands would have no change as is not directly affected by the scheme and does not have the longer views of the other character areas. It would therefore have no effects from the proposed works during construction or operation.
### Table 9.2: Summary of significance of impacts to Landscape Character Area

<table>
<thead>
<tr>
<th>Landscape Character Area</th>
<th>Sensitivity</th>
<th>Significance of impact during construction</th>
<th>Significance of impact during operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCA 1 - Arley Character Area</td>
<td>Moderate</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>LCA 2 - Tatton Character Area</td>
<td>High</td>
<td>No Change</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>LCA 3 - Ashley Character Area</td>
<td>Moderate</td>
<td>Slight Adverse</td>
<td>No Change</td>
</tr>
<tr>
<td>LCA 4 - Wooded River Valley</td>
<td>Moderate</td>
<td>Slight Adverse</td>
<td>No Change</td>
</tr>
<tr>
<td>LCA 5 - Wooded Claylands</td>
<td>Moderate</td>
<td>Slight Adverse</td>
<td>No Change</td>
</tr>
<tr>
<td>LCA 6 - River Meadowlands</td>
<td>High</td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>LCA 7 - Wooded Estate Lands</td>
<td>High</td>
<td>Slight Adverse</td>
<td>No Change</td>
</tr>
<tr>
<td>TCA 1 - Mere and Bucklow Hill</td>
<td>Moderate</td>
<td>Slight Adverse</td>
<td>Moderate Beneficial</td>
</tr>
</tbody>
</table>

### The significance of impacts on visual receptors

9.6.18 Very large and large adverse effects would be more prevalent during the construction stage and opening year when mitigation would not yet be fully effective. During this time construction activities would be visible to the occupants of numerous properties. However, these effects would end at the completion of the construction period (approximately 2 years) when properties on the existing A556 would benefit from substantially reduced traffic levels in views following completion of the scheme.

9.6.19 During the initial year of the scheme after opening and until mitigation becomes effective, the proposed route would continue to have large adverse effects for a number of properties. These impacts would be due to significant changes in views through direct views of the proposed route or loss of open views across a rural landscape.

9.6.20 Properties that would have the largest adverse impacts during the construction phase and in the short term would be:

- Over Tabley Hall (Grade II Listed);
- Mere Old Hall (Grade II Listed) and associated buildings;
- Montebello Castle (locally listed building);
- Hulme Barns Farm;
- No. 1 Denfield Cottage, Millington Hall Lane;
- No. 1 Cottage, Millington Lane;
- Three Oaks, Millington Lane; and
- Yarwood Heath Farm.

9.6.21 In the medium to long term, the proposed scheme would lead to both beneficial and adverse effects. The main beneficial effect would be the improvement in views as a result of reduction in traffic on the existing A556 (reducing the impact of high sided vehicles in particular) and de-trunking of the highway between Bucklow Hill and Over Tabley. This would lead to 63 properties experiencing beneficial effects, 58 of those with large beneficial effects, to views including the Church of St Paul and properties along the A556. Adverse effects would continue for properties with direct views of road, traffic, signage or lighting.

9.6.22 In the future year, 63 properties would continue to see beneficial effects. Properties that would continue to have large adverse impacts in future years would be:

- Over Tabley Hall (Grade II Listed);
- No. 1 Denfield Cottage, Millington Hall Lane;
- No. 1 Cottage, Millington Lane; and
- Three Oaks, Millington Lane.

9.6.23 Of the 94 remaining properties, 83 would have slight to moderate adverse effects mainly caused by the intrusion into their views of high-sided vehicles moving along the new A556 or glimpsed views of traffic, lighting, structures and signage even after mitigation has established. Seven properties would have no change in views. The quantification of visual impacts for the construction period, the opening year and a future year (15 years after opening) are summarised in Table 9.3 below, and impacts on individual properties are outlined in Table 9.4.

### Table 9.3: Quantified summary of significance of impacts to visual receptors

<table>
<thead>
<tr>
<th></th>
<th>Very Large Adverse</th>
<th>Large Adverse</th>
<th>Moderate Adverse</th>
<th>Slight Adverse</th>
<th>Neutral</th>
<th>Slight Beneficial</th>
<th>Moderate Beneficial</th>
<th>Large Beneficial</th>
<th>Very Large Beneficial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>8</td>
<td>32</td>
<td>84</td>
<td>22</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Opening Year</td>
<td>6</td>
<td>23</td>
<td>39</td>
<td>25</td>
<td>2</td>
<td>3</td>
<td>59</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Future Year</td>
<td>0</td>
<td>4</td>
<td>22</td>
<td>61</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>58</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table 9.4: Significance of impacts to visual receptors

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Receptor Name</th>
<th>Sensitivity</th>
<th>Significance of impact during construction</th>
<th>Significance of impact during opening year</th>
<th>Significance of impact in the future year</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Almond Tree Cottage, A556</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R2</td>
<td>Dairy House Farm, A556</td>
<td>High</td>
<td>Large Adverse</td>
<td>Large Adverse</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>R3</td>
<td>Dairy Farm Cottage, A556</td>
<td>High</td>
<td>Large Adverse</td>
<td>Slight Beneficial</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>R4</td>
<td>Rose Cottage, A556</td>
<td>High</td>
<td>Large Adverse</td>
<td>Slight Beneficial</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>R5</td>
<td>Over Tabley Hall, Old Hall Lane</td>
<td>High</td>
<td>Very Large Adverse</td>
<td>Very Large Adverse</td>
<td>Large Adverse</td>
</tr>
<tr>
<td>R6</td>
<td>Soldanella, Old Hall Lane</td>
<td>High</td>
<td>Large Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R7</td>
<td>Pownall Green, Old Hall Lane Farm</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Neutral</td>
</tr>
<tr>
<td>R8</td>
<td>Kincroft, Old Hall Lane</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Neutral</td>
</tr>
<tr>
<td>R9</td>
<td>1 &amp; 2 Church Cottages, A556</td>
<td>High</td>
<td>Large Adverse</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>R10</td>
<td>Abbots House Conference Centre, Moss Lane (residential part)</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R11</td>
<td>Moss Lane Farm, Moss Lane</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R12</td>
<td>Beechcroft, Moss Lane</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R13</td>
<td>Tolbar Cottage</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R14</td>
<td>Knowespit Farm</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R15A</td>
<td>Old Hay Farm, Mere Estate</td>
<td>High</td>
<td>Large Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R16</td>
<td>Sawpit Cottage, Mere Estate</td>
<td>High</td>
<td>Large Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R17</td>
<td>Cottage on the Mere Estate</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R18</td>
<td>Wren Hall and associated residential buildings</td>
<td>High</td>
<td>Very Large Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R19</td>
<td>Hulme Barns Farm</td>
<td>High</td>
<td>Very Large Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R20</td>
<td>Property (un-named) at junction of Hulmeheath Lane and Bucklow Hill Lane</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R21</td>
<td>1 &amp; 2 Burnt Cottages</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R22</td>
<td>Maltkiln House, Bucklow Hill Lane</td>
<td>High</td>
<td>Large Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
</tbody>
</table>

Issued January 2012
<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Receptor Name</th>
<th>Sensitivity</th>
<th>Significance of impact during construction</th>
<th>Significance of impact during opening year</th>
<th>Significance of impact in the future year</th>
</tr>
</thead>
<tbody>
<tr>
<td>R49</td>
<td>No.1 Cottage, Millington Lane</td>
<td>High</td>
<td>Very Large Adverse</td>
<td>Very Large Adverse</td>
<td>Large Adverse</td>
</tr>
<tr>
<td>R50</td>
<td>Three Oaks, Millington Lane</td>
<td>High</td>
<td>Very Large Adverse</td>
<td>Very Large Adverse</td>
<td>Large Adverse</td>
</tr>
<tr>
<td>R51</td>
<td>Mereisle Farm, A556</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R52</td>
<td>Hope Cottage</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R53</td>
<td>Newhall Cottages</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R54</td>
<td>Spodegreen Farm, Spodegreen Lane Mandalay, Spodegreen Lane</td>
<td>High</td>
<td>Moderate Adverse (2 receptors)</td>
<td>Slight Adverse (2 receptors)</td>
<td>Slight Adverse (2 receptors)</td>
</tr>
<tr>
<td>R55</td>
<td>Yanwood Heath Farm</td>
<td>High</td>
<td>Very Large Adverse</td>
<td>Very Large Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>R56</td>
<td>Bowdon View Farm Bowdon View Cottage</td>
<td>High</td>
<td>Slight Adverse (2 receptors)</td>
<td>Slight Adverse (2 receptors)</td>
<td>Neutral</td>
</tr>
<tr>
<td>R57</td>
<td>Cherry Tree House</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Neutral</td>
</tr>
<tr>
<td>R58</td>
<td>Hunter's Moon, Rostherne Lane</td>
<td>High</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R59</td>
<td>Denfield Hall Farm</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>R60</td>
<td>Hill Mount</td>
<td>High</td>
<td>Neutral</td>
<td>Moderate Beneficial</td>
<td>Large Beneficial</td>
</tr>
<tr>
<td>R61</td>
<td>Holly Tree Cottage</td>
<td>High</td>
<td>Neutral</td>
<td>Moderate Beneficial</td>
<td>Large Beneficial</td>
</tr>
<tr>
<td>R62</td>
<td>White House Farm</td>
<td>High</td>
<td>Neutral</td>
<td>Moderate Beneficial</td>
<td>Large Beneficial</td>
</tr>
<tr>
<td>R63</td>
<td>Aldrin, Chester Road Mereside, Chester Road Woodbank, Chester Road Windy Ridge, Chester Road Fairborne, Chester Road Fair Pavilion, Chester Road</td>
<td>High</td>
<td>Slight Adverse (6 receptors)</td>
<td>Moderate Beneficial (6 receptors)</td>
<td>Large Beneficial (6 receptors)</td>
</tr>
<tr>
<td>R64</td>
<td>Broadway Villa d'Esta Malber Linden Devon Fenethray Willow Green Dolphins Glen Coyne The Ranch House</td>
<td>High</td>
<td>Slight Adverse (16 receptors)</td>
<td>Moderate Beneficial (16 receptors)</td>
<td>Large Beneficial (16 receptors)</td>
</tr>
<tr>
<td>R65</td>
<td>Delwood The Hollies Den Croft Abbots Moss Willow Glade Oak Green Heatherslade Willow Cottage</td>
<td>High</td>
<td>Slight Adverse (9 receptors)</td>
<td>Moderate Beneficial (9 receptors)</td>
<td>Large Beneficial (9 receptors)</td>
</tr>
<tr>
<td>R66</td>
<td>Heddwyn Mere Croft Windgather White Oaks Strathmire Rosemere Cottage Manor House Mericourt</td>
<td>High</td>
<td>Slight Adverse (16 receptors)</td>
<td>Moderate Beneficial (16 receptors)</td>
<td>Large Beneficial (16 receptors)</td>
</tr>
<tr>
<td>R67</td>
<td>Oakmere Links Way North Lodge Mere Field White House Silverwood Pin High</td>
<td>High</td>
<td>Slight Adverse (8 receptors)</td>
<td>Moderate Beneficial (8 receptors)</td>
<td>Large Beneficial (8 receptors)</td>
</tr>
<tr>
<td>BR1</td>
<td>Over Tabley Hall Farm (Business)</td>
<td>Moderate</td>
<td>Large Adverse</td>
<td>Large Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>BR2</td>
<td>Travel Lodge, Petrol Station and Little Chef</td>
<td>Low</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>BR3</td>
<td>St. Paul's Church</td>
<td>Moderate</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>BR4</td>
<td>Denfield Smithy, Rainbow Business, Chester Road, A556</td>
<td>Low</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>BR5</td>
<td>Cheshire Lounge</td>
<td>Moderate</td>
<td>Large Adverse</td>
<td>Large Adverse</td>
<td>Large Adverse</td>
</tr>
<tr>
<td>BR6</td>
<td>Rangemore Nursing Home</td>
<td>High</td>
<td>Large Adverse</td>
<td>Large Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>BR7</td>
<td>Swan Hotel</td>
<td>Moderate</td>
<td>Moderate Adverse</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>BR8</td>
<td>Mere Hall Farm Business Centre</td>
<td>Moderate</td>
<td>Moderate Adverse</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>BR9</td>
<td>Bucklow Hill Garage</td>
<td>Low</td>
<td>Slight Adverse</td>
<td>Slight Beneficial</td>
<td>Slight Beneficial</td>
</tr>
</tbody>
</table>

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10 Ecology

Executive summary

Ecology and nature conservation has been assessed in accordance with DMRB supported by guidance from the Institute of Ecology and Environmental Management. Information was obtained from previous studies, biological records, consultation with relevant organisations, and field surveys. Ecological field surveys were undertaken from late 2009 to early 2011 to obtain information about habitats and species. Additional surveys are in progress during 2011.

Key ecological features in the study area include protected nature conservation sites and other sensitive habitats, including broadleaved woodland, parkland, watercourses, over 100 ponds and hedgerows. Legally protected species present in the survey area include bats, great crested newt, badger, otter and wintering and breeding birds including barn owl.

There would be some loss of sensitive habitats, including woodlands and ponds. Wildlife would be at risk of disturbance, direct mortality and pollution, as well as fragmentation and severance of their habitat. However, beneficial effects are predicted for two internationally-important nature conservation sites (The Mere/Little Mere and Rostherne Mere) due to a greater separation from the scheme and improved protection from water pollution.

The adverse effects of the scheme would be mitigated through replacing the lost woodland, ponds and other habitats; re-locating relevant protected species before the start of works; provision of safe wildlife crossings and barriers to stop wildlife straying onto the site; landscape planting designed to discourage barn owls from hunting within the road corridor; and pollution control measures. Provision of a ‘green bridge’ to help reconnect habitats is also being considered.

10.1 Introduction

10.1.1 This chapter describes existing habitats and species present in the survey area, how they would be affected, and the measures proposed to avoid or reduce the impacts. Opportunities to provide improvements on the existing situation have also been considered. The work supporting this chapter has all been done in accordance with the most recently published Highways Agency guidance51.

10.1.2 Potentially the most significant impacts of the scheme are the permanent loss and fragmentation of existing habitats. This is likely to affect wildlife through severance of existing territories, affecting their movement and dispersal opportunities.

10.1.3 Many habitats and species are protected to varying degrees through national and European legislation. Advice relating to wildlife is also given in various policy documents. The main legislation and policy guidance relevant to this chapter are:

- Wildlife and Countryside Act 1981 (as amended)
- Countryside and Rights of Way Act 2000
- Conservation of Habitats and Species Regulations 2010
- Protection of Badgers Act 1992
- Natural Environment and Rural Communities Act 2006
- Planning Policy Statement 9 (PPS9) 2005
- Highways Agency Biodiversity Action Plan
- Cheshire Biodiversity Action Plan (i.e. Local BAP)
- UK Biodiversity Action Plan (UK BAP)
- Weeds Act 1959
- The Highways (Assessment of Environmental Effects) Regulations 1999
- The Hedgerow Regulations 1997
- Wild Mammals (Protection) Act 1996
- Environment Act 1995
- The Town and Country Planning (Trees) Regulations 1999
- Macclesfield Borough Local Plan 2004
- Borough of Macclesfield Biodiversity Audit 2006
- Cheshire Local Biodiversity Action Plan (LBAP)

Limitations of the information given in this PEI

10.1.4 This is a preliminary description of the ecology of the study area and the likely ecological effects of the scheme, as assessed at the time of drafting. It draws on surveys carried out and information gathered between November 2009 and January 2011. The results of surveys completed up to January 2011 are outlined here. Additional surveys are in progress during 2011. The results of all of the surveys will be described in the ES, supported by the full survey reports. The ES will also give more detailed information on survey methods and on the methods and criteria used to define and assess the significance of impacts.

10.1.5 Some aspects of the design of both the permanent design and the temporary construction works that may have ecological impacts are not yet finalised. For example, confirmation is required on the form and location of a green bridge and whether or not central concrete barriers are included within the detailed design. Decisions on these aspects will be made, and the ecological implications taken into account, before preparation of the ES.

10.1.6 Ecological mitigation measures are described in outline in this report and shown on the Environmental Masterplan (EMP). Details regarding the location and form of certain forms of mitigation such as mammal underpasses are still being developed as new information is collected, and to take account of surveys in progress during 2011. The impact assessment and mitigation measures are therefore subject to change.

10.2 Approach and methods

10.2.1 Information on ecology and nature conservation was obtained through a desk-based study and field surveys.

10.2.2 The desk-based study involved reviewing reports from previous studies at earlier stages of scheme development, historic records of species/habitats and of sites designated for their nature conservation value at international, national and local level. Information was obtained from a range of sources including online resources such as the National Biodiversity Network (NBN) gateway website and Natural England’s Nature on the Map website, and through consultation with relevant statutory and non-statutory bodies.

10.2.3 Field surveys have been carried out for ecological receptors (habitats and species) likely to be present in the survey area. These are identified in paragraph 10.2.5. Some of these surveys are being supplemented by additional surveys in 2011, to identify any change in the baseline status and to gather specific data to inform the ES.

Study area

10.2.4 The study area takes account of the proposed scheme design as detailed in Chapter 2 of this PEI. The general study area for the desk-based study was a 2km radius from the centre line of the scheme. Nationally and internationally designated sites were identified over a wider surrounding area. Field survey areas were defined in accordance with guidance published in DMRB or other recommended specialist survey techniques/best practice documentation, and varied according to the nature of the habitats or species concerned. The surveys were undertaken in accordance with recognised published survey methodologies, including Natural England guidelines where applicable.

Field survey

10.2.5 The likelihood of a habitat and/or species being present in the study area was identified by desk study, consultation and walkover survey. Field surveys were undertaken for the habitats and species likely to be present and affected by the scheme, as follows:

- Habitats (including a Phase 1 Habitat Survey, detailed botanical survey of woodlands and arable field margins; and hedgerow surveys)
- Aquatic macrophytes (plants found in water bodies)
- Aquatic invertebrates (including lesser silver water beetle and pond mud snail)
- Amphibians (including great crested newt)
- Otter
- Water vole
- Reptile
- Badger
- Bats
- Barn owl
- Breeding Birds
- Wintering Birds
10.2.6 The method used for ecological impact assessment is in line with the most recently published Highways Agency guidance and with reference to existing best practice guidelines. These methods conform to the principles of the generic assessment methods described in Chapter 5 of this PEI, but vary from them in detail.

10.2.7 The ecological impact assessment comprises six key stages:

- Description of baseline conditions (i.e. the ecology of the study area);
- Valuation of each separately identified ecological / nature conservation receptor;
- Identification of scheme-related activities that may affect ecological receptors;
- Characterisation of ecological impacts and their effects, taking account of the likelihood, reversibility, duration, timing and frequency;
- Identification of appropriate mitigation measures and enhancements measures, where appropriate; and
- Determination of the significance of the effects on each receptor after mitigation is taken into account during the construction period, immediately after the scheme opens and in a ‘future year’, after the mitigation works have matured.

10.2.8 For the purposes of this preliminary assessment, the following scheme dates have been assumed (refer to Chapter 2 and 5, Section 5.4):

- Construction is assumed to start in 2014;
- The scheme is assumed to open in 2015;
- The future year is assumed to be 2030 (15 years after the scheme opens).

10.2.9 Valuation of the ecological and nature conservation receptors uses a value framework (ranging from Very high value to Lower value), linked to a geographical scale at which the specific receptor has been valued (i.e. international, national, regional, county or local to the site).

10.2.10 This PEI describes the impacts of the scheme in the first instance without application of any mitigation measures. This is followed by the identification of appropriate mitigation measures and an assessment of the significance of the impacts taking those mitigation measures into account. The impacts on individual ecological receptors are assessed as ‘significant’ or ‘not significant’ at the level at which the receptor is valued, and an overall assessment of the impact of the scheme on ecology and nature conservation as a whole is given on a five-point scale (neutral, slight, moderate, large or very large), and can be either beneficial or adverse.

10.2.11 However, it is important to note that the scheme as designed already incorporates mitigation in the form of design changes that have been made to reduce ecological (and other environmental) impacts. More information on the approach to mitigation, and types of mitigation measure, is given in Chapter 5.

10.3 The existing environment (‘baseline conditions’)

10.3.1 The most important habitats in the survey area in terms of nature conservation are those designated for their international nature conservation importance. Two sites designated under the 1971 Ramsar Convention on Wetlands of International Importance are located in the study area. A summary of their importance is given in Table 10.1 below and the site locations are shown in Figure 10.1.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rostherne Mere Ramsar Site</td>
<td>National Nature Reserve Site</td>
<td>The waterbody of Rostherne Mere and some terrestrial</td>
</tr>
<tr>
<td></td>
<td>Site of Special Scientific</td>
<td>habitat immediately surrounding the waterbody,</td>
</tr>
<tr>
<td></td>
<td>Interest (SSSI)</td>
<td>including Harpers Bank Wood (an ancient semi-natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>woodland) and Gale Bog are of international</td>
</tr>
<tr>
<td></td>
<td></td>
<td>importance for their wetland habitat.</td>
</tr>
<tr>
<td>The Mere, Mere and Little</td>
<td>Ramsar Site</td>
<td>The nationally-important NNR and SSSI cover a more</td>
</tr>
<tr>
<td>Mere</td>
<td>SSSI</td>
<td>extensive area, and to the west they abut the existing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A556.</td>
</tr>
</tbody>
</table>


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A556 Knutsford to Bowdon Environmental Improvement

Preliminary Environmental Information

10.3.2 For the purposes of this PEI, the European designated sites have been valued as International value (very high importance). Those parts of Rostherne Mere SSSI/NNR that lie beyond the Ramsar site boundary are of national value (high importance).

10.3.3 A separate screening assessment has been conducted to determine whether the scheme would have significant effects on Rostherne Mere Ramsar site and The Mere and Little Mere Ramsar site, in line with the Habitats Regulations 2010. The provisional conclusion is that there would be no significant adverse effects.

Non-statutory designated sites for nature conservation

10.3.4 Five Sites of Biological Importance (SBIs) are present in the survey area (Table 10.2). These are non-statutory wildlife sites, designated by the Local Planning Authority and protected through local planning policies as they support important habitats and/or species of nature conservation value.

Table 10.2: Locally important designated sites for nature conservation

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableypipe Wood SBI</td>
<td>Botanically rich woodland with mosaic of semi-natural woodland and mixed plantation. Main area contains woodland ponds, marshy habitat and ancient woodland indicators; whilst the eastern block is younger with Scots pine (Pinus sylvestris) and Rhododendron ponticum.</td>
</tr>
<tr>
<td>Belt Wood SBI</td>
<td>Mixed canopy of oak (Quercus sp.), Scots pine (Pinus sylvestris) and larch (Larix decidua) over bracken (Pteridium aquilinum) and locally dominant rhododendron. Several ponds and marl pits present.</td>
</tr>
<tr>
<td>Meremoss Wood (includes Tableymoss wood) SBI</td>
<td>Ancient woodland with a mixed canopy of oak, sycamore (Acer pseudoplatanus) and silver birch (Betula pendula). Central area is marshy with several ponds. Drier areas with abundant rhododendron and bracken. Part of the woodland has been replanted.</td>
</tr>
<tr>
<td>M56/A556 Cloverleaf SBI</td>
<td>Rough grassland with scrub and tall herb; large population of southern marsh orchid (Dactylorhiza praetermissa) and common spotted orchid (O. fuchsii). Centre is a young plantation.</td>
</tr>
<tr>
<td>Yanwood Heath Covert SBI</td>
<td>Small woodland partially planted with conifers but with semi-natural groundflora. Several ponds and ditches present with associated wet woodland.</td>
</tr>
</tbody>
</table>

10.3.5 SBIs in Cheshire are graded from A (most important) to Grade C. As the SBIs in the Study Area are all Grade C, for the purposes of this PEI, the sites have been valued as being of no more than County value (medium importance).

Terrestrial habitat

10.3.6 Figures 10.2A to C show the habitats that are present along the scheme corridor.

10.3.7 The survey area is in a lowland area of predominantly agricultural land use on the Cheshire plain. Fields of improved grassland separated by native species-poor hedgerows dominate the survey area. The proposed route has been divided into five sections, identified by road names and junctions and dominant habitat types within each section and habitats of particular note are briefly described from south to north.

North of M6 Junction 19 to the A50, west of the existing A556

10.3.8 Improved grassland is the most abundant habitat in this section, and there are also significant areas of arable farmland. However, this is the most wooded part of the survey area, and most of the broad-leaved woodlands occur here, including two SBIs: Tabley Pipe Wood and Belt Wood. East of Belt Wood there is an area of sheep-grazed mature parkland surrounding Mere Hall. Fields are divided by either fences or hedgerows, mainly species-poor, but with two species-rich intact hedgerows.

10.3.9 Aquatic habitats in this section include 69 ponds, together with a number of minor ditches that cross fields or form field boundaries.

North of M6 Junction 19 to the A50, east of the existing A556

10.3.10 Improved grassland is the most abundant habitat in this section with a few arable fields. The western part of Meremoss Wood SBI is ancient plantation woodland. A large tree nursery is also present in the northern end of this section (classified as arable land as per Phase 1 Habitat survey methodology JNCC, 2010).

Between the A50 and Chapel Lane, both sides of the existing A556

10.3.11 The majority of land in this section to the west of the existing A556 comprises arable fields with approximately twenty-two ponds. Fields are divided by species-poor hedgerows. Land immediately east of the existing A556 is dominated by residential properties with large gardens.

Between Chapel Lane and the M56, west of the A556

10.3.12 This section comprises a mixture of improved grassland and arable fields. Twenty ponds are found in this section. Fields are divided by fences, species-poor hedgerows and one species-rich hedgerow.

53 Note – only the southern half of Belt Wood is designated as a SBI.
Between Chapel Lane and the M56, east of the A556

10.3.13 The European designated site Rostherne Mere, (Ramsar site) dominates this section and is the largest water body in Cheshire. The nationally-designated Rostherne Mere SSSI and NNR covers a larger area surrounding the Ramsar site, flanked to the west by the existing A556. The SSSI/NNR site comprises a mix of woodland, grassland and arable habitats.

10.3.14 The M56/A556 Cloverleaf SBI, designated for its grassland interest, is located at the northern end of this section, within the ‘loop’ formed by Junction 8 of the M56.

10.3.15 Ancient broad-leaved semi-natural woodland is present at Rostherne Banks towards the southern end of this section.

10.3.16 The land immediately adjacent to the existing A556, including that within Rostherne Mere SSSI, is dominated by improved grassland and arable land, divided by fences and hedgerows typical of the area.

Habitat descriptions

10.3.17 Seventeen broad habitat types have been identified in the survey area, with arable land and improved grassland being the most dominant in terms of area.

10.3.18 The following paragraphs provide a description of the ecological receptors in the survey area that are found outside the designated nature conservation sites.

Woodland

10.3.19 A number of woodlands are present, and this is the largest semi-natural habitat type present in the survey area. Figure 10.2A to C identifies the woodlands that were subject to a detailed botanical survey. Named woodlands include: Square Wood, Kennel Wood, Brickhill Pits, Gleavehole Wood and Turnpike Wood, in addition to the woodland SBIs (Tableypipe Wood, Belt Wood, Meremoss Wood and Yarwoodheath Covert). These woodlands have been in continuous wooded cover for at least 120 years and are classified as semi-natural broad-leaved woodlands. Many of them are long-standing secondary woodlands. Rostherne Banks Wood and Watch Hill Wood are recorded as ancient semi-natural woodlands (continuously wooded since at least 1600, irrespective of how they have been managed).

10.3.20 The woodlands are variable in species composition, although pedunculate oak (Quercus robur), ash (Fraxinus excelsior), sycamore (Acer pseudoplatanus) and beech (Fagus sylvatica) are the most frequently occurring species. Few of the woodlands have a well structured understorey or native groundflora interest, with the exception of Rostherne Banks Wood and Watch Hill. The northernmost section of Belt Wood contains a number of veteran beech trees. Broad-leaved plantation woodland, coniferous woodland and mixed plantation woodland are present but less common in the survey area. These are woodlands that are more recent and originate from planting. The majority of this habitat is located in the northern end of the survey area and is associated with Junction 7 of the M56 motorway.

10.3.21 North of Mere Hall and to the west of Turnpike Wood there are areas of mature parkland, comprising improved grassland used for pasture with scattered mature and over-mature broad-leaved trees. Although this vegetation structure is in decline across the UK and certain types of parkland qualify as UKBAP Priority Habitat, the habitat present is not considered to meet the relevant UK BAP criteria as it lacks large open grown or high forest trees.

10.3.22 In addition to its intrinsic habitat interest, parkland may be of importance for bats, birds and invertebrates. The parkland was formerly more extensive, and the relevant historic landscape unit referred to in Chapter 8 (Cultural heritage) therefore covers a larger area than the parkland habitat shown on Figure 10.2 A and B. The surviving parkland habitat will not be affected by the scheme and it is not considered further within this chapter, although it is discussed in Chapters 8 and 9 in relation to its heritage and landscape values.

Scrub

10.3.23 Dense and scattered scrub is not frequent in the survey area as it is not typical of intensively managed agricultural areas in the Cheshire Plain. Where it did occur, it was generally recorded as small single species stands or mixed stands around ponds, or as scattered scrub often associated with watercourses. Typical species include bramble (Rubus fruticosus agg.), hawthorn (Crataegus monogyna) and goat willow (Salix caprea). Scattered and dense scrub habitats provide a resource for birds; however, they are limited in extent within the survey area and are easily recreated habitat types.

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54 The ‘understorey’ is a lower layer of shrubs and small trees growing below the woodland canopy.

55 ‘Ground flora’ refers to small, non-woody plants growing at ground level within the wood, such as primroses, bluebells, celandine, etcetera.

56 A ‘veteran’ tree is a tree that is of individual biological interest due to its age, size or condition.
Hedgerows

10.3.24 Figures 10.3A and B show the location of the hedgerows surveyed in 2010. Hedgerow habitat is a significant wildlife resource, due to its intrinsic habitat value and its important functional role in linking fragmented habitat mosaics, resulting in connected sites which are more resilient to change over time. Most of the hedgerows in the survey area are species poor, dominated by hawthorn and intensively managed with frequent mature pedunculate oak standards. None of the hedgerows meet the criteria for being "important" in line with the Hedgerow Regulations 1997. One hedgerow that qualifies as UKBAP priority habitat has been identified (see Figure 10.3B, Hedgerow 8B).

Grassland

10.3.25 The majority of grassland in the survey area is improved grassland that has received significant agricultural improvement and/or ploughing. The improved grassland comprises species typical of agricultural intensification including perennial rye grass (Lolium perenne), white clover (Trifolium repens) and creeping buttercup (Ranunculus repens). The grassland is species poor with low herb (i.e. native wildflowers) content and as such is easily recreated.

10.3.26 Some small isolated areas of marshy grassland were recorded in the survey area. These are rush (Juncus sp.) dominated stands found in wet depressions in agricultural fields or associated with watercourses.

10.3.27 Some fields of semi-improved neutral grassland are present in the survey area. These are grasslands that show less sign of agricultural improvement and have a higher diversity of grass species. None of the fields in the survey area have high herb content. Other areas of semi-improved grasslands are found along the existing road network. This habitat is widespread and not species rich, but the importance of semi-improved grassland is increased due to the paucity of unimproved grassland in Cheshire.

10.3.28 One area of acid grassland was previously recorded at the archaeological site near Hoo Green (Capita Symonds, 2009). The area of acid grassland will not be affected by the scheme and it is not considered further in the PEI.

Swamp and marginal habitat

10.3.29 Swamp and marginal habitat outside of Rostherne Mere is not extensive and it is typically associated with the numerous ponds in the survey area. Species recorded include common species such as reedmace (Typha latifolia) and yellow flag (Iris pseudacorus). The nationally scarce species cowbane (Cicuta virosa) was recorded.

10.3.30 Some ponds in the survey area were surveyed for their aquatic macrophyte species, including marginal emergent species.

10.3.31 At this stage of the assessment, it is understood that the swamp habitat in the survey area will not be directly or indirectly affected by the scheme and it is not considered further in the PEI.

Arable

10.3.32 Arable land use is extensive throughout the survey area and it is the largest habitat type recorded. It is intensively farmed, with narrow arable margins. No scarce arable flora was recorded and few arable margins that are managed for wildlife were recorded. This habitat is easily recreated and of limited nature conservation interest.

Tall ruderal and ephemeral/short perennial

10.3.33 This habitat type is found along road verges, field boundaries and other areas of disturbed ground in the survey area. It is not abundant and is typically species poor, comprising common species. The tall ruderal habitat and ephemeral/short perennial habitats in the survey area will not be affected by the scheme and these habitats are not considered further in the ecological impact assessment.

Open water

10.3.34 The open water habitat in the survey area (excluding Rostherne Mere) is represented by approximately 151 ponds and numerous ditches along field boundaries and in the woodlands. A variety of pond types are represented, including ponds in a late succession stage, shaded woodland ponds, deep ponds stocked with fish, former marl pits and shallow/ephemeral ponds that dry out periodically.

57 ‘Marginal’ habitats are areas of shallow water or wet ground around the edges (‘margins’) of waterbodies, and have their own characteristic flora and fauna.

58 ‘Emergent’ species are plants that grow upright from the water surface, and are rooted on the base of the water body.

59 Tall ruderal habitat comprises stands of tall perennial or biennial herbs such as common nettle or rosebay willowherb. Ephemeral/short perennial habitat comprises patchy aggregations of annual or perennial small herbs, usually on recently disturbed ground or poor soils.

60 Ponds in later succession stages will be well vegetated and drying out (evidence of scrub invasion and little open water remaining).
Ponds are a UK BAP priority habitat that is in decline across the UK. They provide valuable wildlife habitat and are a resource for birds, amphibians, fish and invertebrates.

Sampling surveys were undertaken on those ponds likely to have important ecological resources or those likely to be a material consideration in the impact assessment. The surveys included aquatic macrophytes; pond mud snail; great crested newt; lesser silver water-beetle; and aquatic macro-invertebrates, which have been reported separately, below.

**Running water**

The River Bollin and Birkin Brook are located to the north of the M56 Junction 7. Both are natural watercourses and are fisheries. The River Bollin is a large tributary of the River Mersey; it flows through a rather flat and wide floodplain at this point. Evidence was recorded for the presence of otters on the Bollin. Non-native plant species were also recorded, including Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracelum mantegazzianum*).

**Legally Protected species**

Surveys were conducted to determine the likely presence or likely absence of a range of legally protected species, and to obtain information about their abundance, distribution and behaviour. The outcome of these surveys is summarised below.

**Aquatic ecology**

Aquatic habitats within the survey area demonstrate a highly variable ecological quality and type. No legally protected species were recorded, although two sites (ponds 19 and 99) supported macro-invertebrate species of conservation interest. Two macrophyte species of conservation interest were also recorded, including the nationally scarce cowbane (*Cicuta virosa*).

Although no lesser silver water beetle eggs or adults were recorded in 2010, several sites provide suitable habitat and there is potential for these ponds to be colonised by this species in the future. No ponds met the UKBAP Index of Biological Integrity standard. Figure 10.4 shows the aquatic survey locations and a summary of their aquatic interest.

**Great crested newt**

Adult great crested newts (GCN) are dependent on dry-land habitats, typically woodland, scrub or semi-improved grassland, for feeding, refuges and hibernation sites extending generally up to 500m from a breeding pond, however, it can be considerably further depending upon the characteristics of the habitat and the size of the population. However, they are also dependent on aquatic habitats, principally ponds, for breeding and the early stages of their life-cycle.

An extensive network of 151 ponds is present within the survey area. Of these, nine were found to have GCN present during the field surveys in 2010. Of these nine ponds, two were dry by the fifth survey visit, six supported a low population of GCN and one had a good population of great crested newts. Figure 10.5A and B shows the ponds that were surveyed and those that have a breeding population of GCN. Further GCN surveys have been carried out in 2011.

**Water vole and otter**

No definitive evidence of water vole was recorded during the 2010 field survey. Water voles have, however, been recorded in the area as recently as 2009 and several water bodies provide suitable habitat for water voles, offering the potential for future re-colonisation by this species.

Evidence of otters was spread widely throughout the survey area. Specifically, evidence was recorded on the River Bollin, Birkin Brook, at Rostherne Mere and using the pond network in the survey area. Although otter numbers are increasing throughout the UK, the expansion in range of the species is slower in East Cheshire than elsewhere in the County (Environment Agency, 2010).

**Reptiles**

The survey area is dominated by arable and pastoral land, with very little scrub or rough grassland. This provides sub-optimal reptile habitat for reptiles, and the networks of large roads present barriers to movement of reptiles that may be present off site. No historical records for reptiles exist within the study area and no reptiles were recorded during the field surveys in 2010. These surveys were targeted in the most optimal habitats that would be lost by the scheme. As such this species group is considered to be absent from the survey area and it is not considered further in this PEI.
Bats

10.3.48 The findings of the field surveys for bats are shown in Figure 10.7A to E. At least six bat species were recorded within the survey area (out of 10 species known in Cheshire), although numbers were typically low. Species present included common pipistrelle, soprano pipistrelle, brown long-eared, noctule, Daubenton’s and Myotis species (most likely Natterer’s) bats. Nearly all hedgerows and woodland areas surveyed were found to be used by commuting or foraging bats and bat activity was concentrated around habitat features such as Kennel Wood, Belt Wood, Rostherne Mere and the River Bollin. Eight bat roosts were identified in buildings and four bat tree roosts were recorded. Many other structures and trees were assessed as offering high and moderate bat roost potential. Further bat surveys are in progress in 2011.

Badger

10.3.49 Signs of badger activity were recorded throughout the survey area, with at least 16 social groups located within 500m of the proposed scheme, which is in line with the relatively high frequency of badger in East Cheshire. Due to the sensitivity of badger sett locations, this information is not given within this PEI. A Confidential report containing this information will be available only to parties with a bona fide interest in the information, including relevant recognised environmental bodies and the owners of the land. Sett distribution is particularly concentrated south of the A50 and this reflects the good quality habitat provided by the woodland areas present here. Badger presence is frequent along the scheme corridor and would require mitigation measures to address potential impacts. Additional badger surveys have been carried out in 2011.

Barn owl

10.3.50 There are a number of records of barn owl (Tyto alba) in the study area, and there were sightings of barn owls by ecologists engaged in surveys for other species, indicating that the species is present. Typical hunting habitats include rough grassland.

10.3.51 Field surveys completed for the scheme have confirmed a barn owl roost in a property near the south end of the scheme. In addition, the local barn owl group has a high number of nest boxes in the general surrounding area, including 8 known breeding sites and 9 known roosting sites. The barn owl survey results are not illustrated to reduce the risk of persecution of this species.

Breeding birds

10.3.52 A total of 67 different bird species were recorded in the survey area during the Breeding Bird Survey in 2010 (see Figure 10.9A and B). This number includes 11 Red List species (species of the highest conservation priority requiring urgent action) and 20 Amber List species (species in unfavourable status). Fourteen of the species recorded are listed under the NERC Act 2006 Section 41: Species of Principal Importance in England, along with 14 UK BAP Priority Species and 12 LBAP Species (see paragraph 10.1.3 and the glossary for definitions of UK BAP and LBAP).

10.3.53 Significant numbers and/or territories of breeding birds of conservation importance were recorded in certain specific areas of farmland, including Hulme Barns Farm, Mere Hall Farm, Millington Hall Farm and the south of New Hall Farm. Certain areas of mature woodland were also important, including Tableypipe Wood, Square Wood, Kennel Wood and Belt Wood. Breeding bird populations within the survey area enrich biodiversity within the local context, and the nesting sites of all breeding birds are protected while they are in use.

Wintering birds

10.3.54 A total of 63 different bird species were recorded during the Wintering Bird Survey in 2009-2010 (see Figure 10.10A and B). The total includes three species listed on the Wildlife and Countryside Act 1981, Schedule 1 and 12 Red List species. Thirteen species recorded are listed under the NERC Act 2006 Section 41: Species of Principal Importance in England; along with 11 UKBAP Priority Species and 11 LBAP species.

10.3.55 Several groups of birds containing large numbers of mixed and single species were recorded within the survey corridor. The lapwing and fieldfare assemblages were of particular importance. These aggregations were principally associated with areas of improved grassland fields and unploughed arable fields. Areas of woodland, reedbeds and built up areas also contained flocks of wintering birds. Areas in which large numbers of wintering birds were recorded are located at Tableymoss Wood, Knowlespit Farm, Kennel Wood, Hulme Barns Farm, Mere Hall Farm, Millington Hall Farm, New Hall Farm, Moss House Farm, Denfield Hall Farm, Rostherne Mere, Spodegreen Farm and Yarwoodheath Farm.

Table 10.3: Summary – valuation of ecological receptors

<table>
<thead>
<tr>
<th>Ecological receptor</th>
<th>Valuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rostherne Mere</td>
<td>International (very high importance)</td>
</tr>
<tr>
<td>SBIs</td>
<td>County (medium importance)</td>
</tr>
<tr>
<td>Ancient woodland: Rostherne Mere and Watch Hill</td>
<td>National (high importance)</td>
</tr>
<tr>
<td>Other woodland: excluding SBIs and ancient woodland</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Parkland</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Scrub</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Hedgerows</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Improved grassland</td>
<td>Negligible (important within the scheme footprint only)</td>
</tr>
<tr>
<td>Marshy grassland</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Semi-improved grassland</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Acid grassland</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Swamp and marginal habitat</td>
<td>Negligible (important within the scheme footprint only)</td>
</tr>
<tr>
<td>Tall ruderal and ephemeral/short perennial</td>
<td>Negligible (important within the scheme footprint only)</td>
</tr>
<tr>
<td>Open water (excluding designated sites)</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Running water</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Aquatic ecology (general)</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Great crested newt</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Water vole</td>
<td>Negligible (important within the scheme footprint only)</td>
</tr>
<tr>
<td>Otter</td>
<td>County/regional (medium importance)</td>
</tr>
<tr>
<td>Reptiles</td>
<td>Negligible (important within the scheme footprint only)</td>
</tr>
<tr>
<td>Bats</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Badger</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Barn owl</td>
<td>County/regional (medium importance)</td>
</tr>
<tr>
<td>Breeding birds</td>
<td>Local (lower importance)</td>
</tr>
<tr>
<td>Wintering birds</td>
<td>County/regional (medium importance)</td>
</tr>
</tbody>
</table>

Future ecological baseline conditions without the scheme

10.3.56 The information given on previous pages describes the ecological conditions as they were at the time of the surveys carried out between November 2009 and January 2011. However, these conditions are likely to change over time whether or not the scheme is built. The following paragraphs therefore consider how ecological conditions might change, even if the scheme is not built, by 2014 (the assumed start date for construction), 2015 (the assumed year in which the scheme will open to traffic) and 2030 (the ‘future year’, when environmental mitigation will reach maturity).

10.3.57 In this mainly agricultural area, ecological conditions are unlikely to have changed significantly by 2014 or 2015. However, changes in farming practices could occur in response to changes in agricultural economics, farming policy and agri-environment schemes. For example, an increase in set-aside would increase invertebrate abundance and diversity thereby benefiting bat and bird populations. Conversely an increase in livestock production would be detrimental to arable flora but would benefit some bird species and badger, for example, because they depend heavily on earthworms as a foraging resource and these are abundant in grazing land.

10.3.58 It is not possible to predict farming practices in the survey area in 2030. However, distribution and abundance of fauna are likely to change in the long-term.

10.4 Predicted environmental impacts

10.4.1 Road schemes have the potential to affect ecology and nature conservation in a number of recognised ways:

- Direct habitat loss through land take;
- Severance or fragmentation of existing areas of habitat;
- Direct mortality of animals;
- Through the indirect effects of environmental pollution via road drainage, run-off and spray from road traffic;
- Disturbance caused by lighting, noise or vibration;
- Cumulative effects of the scheme taken together with other developments occurring in the area at the same time or before/after the construction of this scheme;
- The combined effects on a particular species of several different aspects of the scheme (e.g. a single species may be affected by habitat loss, severance and disturbance).

10.4.2 These impacts can be caused by the construction of the scheme (‘construction effects’) or by the operation of the scheme after it opens (‘operational effects’). Construction effects can be short term or long term in nature. Most operational effects would be long-term, but may decline in their significance as the environmental mitigation works become mature. In this context, short term means that the effect would cease at the end of construction, or at the latest by 15 years after the end of construction; long-term means that the effect would still be felt 15 years or more after the end of construction.

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62 Set-aside is the policy of taking land out of agricultural production to reduce surpluses in agricultural product.
10.4.3 Predicted effects associated with the scheme are detailed for each habitat type and/or species likely to be significantly affected by the scheme in the paragraphs below.

10.4.4 Activities associated with the proposed scheme that may affect ecological resources have been identified for the construction and operation phases. Ecological impacts have only been assessed for significant ecological receptors.

10.4.5 In accordance with best practice, the impacts identified throughout this Section 10.4 are described without taking any mitigation measures into account; they therefore represent a ‘worst case scenario’, and provide the basis on which the necessary mitigation can be identified. The resulting mitigation measures are described in Section 10.5, and the impact after mitigation is described and its significance is assessed in Section 10.6.

Construction effects

Statutory designated sites

10.4.6 Neither the internationally-important Ramsar sites nor the nationally-important SSSI and NNR sites at Rostherne Mere and The Mere/Little Mere would be subject to significant negative impacts as a result of the scheme. There would be no direct impacts such as habitat loss from these sites. A separate draft report presents the assessment of whether significant effects on the integrity or favourable status of the European designated sites are likely to occur, and the conclusions of this report are to be confirmed through consultation with Natural England.

Non-statutory designated sites

10.4.7 Three Sites of Biological Importance designated by Cheshire East Council are likely to be directly affected through permanent or temporary land-take required during construction, as a result of the scheme (see Table 10.4). It is considered that the habitat loss impacts would be significant at the County level.

10.4.8 The two woodland sites (Tableypipe Wood and Belt Wood) would be affected permanently, as the scheme is aligned through these. However, the potential effect on the grassland site at the M56 Cloverleaf would be principally the result of temporary land-take during the construction phase only. This impact is uncertain, as the feasibility of alternatives is being investigated.

10.4.9 In addition to land-take, Tableypipe Wood SBI would be severed from the remaining part of this woodland.

<table>
<thead>
<tr>
<th>SBI</th>
<th>SBI total area (m²)</th>
<th>Permanent land-take (m²)</th>
<th>% of SBI affected</th>
<th>Temporary land-take (m²)</th>
<th>% of SBI affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableypipe Wood</td>
<td>46,195</td>
<td>4,755</td>
<td>10.29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Belt Wood</td>
<td>105,736</td>
<td>1,245</td>
<td>1.18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M56/M6 Cloverleaf</td>
<td>18,027</td>
<td>252</td>
<td>1.4</td>
<td>6,429</td>
<td>36</td>
</tr>
</tbody>
</table>

10.4.10 Beyond these designated areas, construction of the scheme would result in long-term direct loss of habitat within the scheme footprint, and short-term loss of habitat for temporary construction uses such as work compounds, storage areas and site access roads. Long term and short term losses during construction have been calculated for each habitat type (see Table 10.5), measured in units of length (metres, or m) for watercourses and units of area (square metres, or m²) for other habitats (see Figures 2.2-2.6 for the footprint of the engineering works, and the Environmental Masterplan for the full footprint of the scheme including environmental mitigation works).

<table>
<thead>
<tr>
<th>SBI</th>
<th>Total Area/length (m or m²)</th>
<th>Permanent land-take (m or m²)</th>
<th>% of habitat affected</th>
<th>Temporary land-take (m or m²)</th>
<th>% of habitat affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadleaved semi-natural woodland</td>
<td>1,234,491</td>
<td>30,030</td>
<td>2.4</td>
<td>105</td>
<td>0.01</td>
</tr>
<tr>
<td>Mixed plantation</td>
<td>49,241</td>
<td>8,372</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Broadleaved plantation</td>
<td>28,827</td>
<td>0</td>
<td>0</td>
<td>623</td>
<td>2.2</td>
</tr>
<tr>
<td>Coniferous plantation</td>
<td>18,391</td>
<td>118</td>
<td>0.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Scrub (dense/continuous)</td>
<td>14,938</td>
<td>1,030</td>
<td>6.9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Arable land</td>
<td>38,53,046</td>
<td>406,291</td>
<td>10.5</td>
<td>95,550</td>
<td>2.5</td>
</tr>
<tr>
<td>Marshy grassland</td>
<td>14,252</td>
<td>957</td>
<td>6.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Amenity grassland</td>
<td>40,727</td>
<td>40,727</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Improved grassland</td>
<td>5,264,793</td>
<td>370,595</td>
<td>7</td>
<td>108,881</td>
<td>2</td>
</tr>
<tr>
<td>Species poor semi improved neutral grassland</td>
<td>443,223</td>
<td>30,560</td>
<td>6.9</td>
<td>5,806</td>
<td>1.3</td>
</tr>
<tr>
<td>Ponds</td>
<td>63,449</td>
<td>4,091 (15 ponds)</td>
<td>6.5</td>
<td>131 (1 pond)</td>
<td>0.2</td>
</tr>
<tr>
<td>Watercourses</td>
<td>34,943</td>
<td>1491</td>
<td>4.3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

10.4.11 In addition to habitat loss, the scheme would result in long-term terrestrial habitat fragmentation and severance, starting in the construction phase and continuing during operation. The new road would present a major physical barrier bisecting open areas of agricultural land and semi-natural habitat in the off-line section. This would have
implications for all faunal groups (i.e. animals) in the survey area primarily through reduction in resource availability and limiting population migration and colonisation.

10.4.12 The most significant severance or fragmentation would affect a mosaic of small woodland blocks connected by hedgerows and drainage ditches, in the area between Junction 19 of the M6 and the A50.

10.4.13 Habitats are also at risk of accidental pollution through spills of chemicals and other liquids such as oils and petrochemicals during construction.

10.4.14 If night time working is required for certain sections of the scheme, this could have adverse effects on fauna in the survey area, particularly bats and birds.

**Aquatic ecology**

10.4.15 Construction of the scheme would lead to the permanent loss of aquatic pond habitats, resulting in the loss of resource for aquatic invertebrates, macrophytes and fish. A total of 15 ponds would be affected by the permanent works and one additional pond by temporary land take. However, this habitat loss would be unlikely to have a significant affect on the conservation value of these aquatic resources locally, due to the large number of ponds present and their variable but largely poor quality.

10.4.16 Loss or pollution of ponds, severance of the routes between ponds and severance or culverting of ditches could fragment habitat for species that spend only part of their life-cycle in water and part in the air or on land. The movement of adults between ponds may play a significant role in maintaining diversity between sites, and the loss of ponds would limit the exchange of species between localised sites.

10.4.17 Permanent hydrological changes in the ditch network would be expected through construction of culverts, with the need to dewater or divert water to allow in-channel construction activities. The removal or redirection of water is likely to change the aquatic communities at these crossing points. Additional surveys in 2011 will provide additional information about the likely changes.

10.4.18 Accidental pollution during construction, for example from accidental spillage, could cause long term damage to sensitive aquatic habitats and species. See Chapters 11 and 12 for more information on the likelihood of occurrence of such pollution.

**Great crested newt**

10.4.19 GCN are vulnerable to long-term impacts if construction takes place within approximately 500m of a breeding pond. They may be inadvertently killed in or en-route to and from breeding ponds, or while feeding on dry land, or in their hibernation sites. This can cause local extinction, particularly in areas that support low populations. However, these effects can be avoided (see Section 10.6).

10.4.20 At least one pond known to be used by GCN during the 2010 breeding season (Pond 66) would be lost. The potential reduction of breeding habitat could cause a localised decrease in breeding success. In addition, the loss of pond habitats can have severe impacts on the population structure of GCN over the wider surrounding area by reducing the density of ponds and isolating potentially non-viable populations.

10.4.21 The direct loss of optimal terrestrial habitat such as semi-improved grassland, scrub and woodland areas within approximately 250m of the nine breeding ponds shown in Figure 10.5A and B could affect GCN populations. Loss of this habitat could reduce available refuge sites, hibernation sites and foraging opportunities and increase the risk of exposure, predation and failure to sustain a viable population. These impacts could result in a long-term reduction or continuing decline in population size.

10.4.22 Construction of the scheme would sever habitats, with works areas presenting a barrier to GCN movements between terrestrial and aquatic habitats.

10.4.23 Accidental diffuse run-off from the construction activities could pollute water bodies, adversely affecting GCN populations. Potential sediment run-off (e.g. from embankment construction, culvert installation and vehicle washing) could block drainage and alter the depth and size of ponds, adversely affecting GCN populations in the short-term.

**Water vole and otter**

10.4.24 There is no conclusive evidence for water vole presence within the survey area. As such it is considered unlikely that this species is currently present, and no measurable impacts are predicted to occur upon water vole populations.

10.4.25 Otters are inquisitive animals and would be attracted onto work sites during the construction phase to investigate new machinery or spoil heaps. Otters therefore risk becoming trapped in any pits, piping, chemical containers or wire mesh. As otters are largely nocturnal, any night works may also lead to otter being run-over by works vehicles.

10.4.26 Otters are secretive and as such, lying-up sites are very important. Each individual is familiar with its home range, knowing each site where shelter is available. Potential loss of lying-up sites would therefore place more stress on the animal, requiring it to travel further in order to find suitable cover. This would put them at risk to other hazards such as road traffic accidents. The likelihood of such an impact occurring is hard to quantify; such lying-up sites are likely to be present in the vicinity of the scheme, but it is not known whether any are present in the works area.

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10.4.27 Given the spread of otter field signs throughout the survey area the temporary works areas may prevent otters from moving freely within and between existing areas of habitat. This would particularly affect otters using the pond network.

10.4.28 Physical disturbance from construction could affect otter activity in the area. Noise from machinery and vehicles, light for night working, the potential for obstruction of possible resting/breeding places (none have been confirmed to date) and otter pathways and the presence of humans could all have adverse effects.

10.4.29 The construction of culverts can, if not sensitively designed, cause restrictions in water body channels, which would cause scouring and flooding, cumulating in sediment deposition downstream and a reduction in aquatic invertebrate numbers. This would have an adverse impact on fish populations, which in turn would affect otter prey availability.

10.4.30 Accidental pollution during construction could reduce the availability of prey in the short term. A particularly severe spillage could lead to a bio-accumulation of toxic contaminants in the prey species eaten by otters.

**Bats**

10.4.31 Bats are particularly susceptible to impacts that compromise their numbers or ability to reproduce since they typically only produce up to one offspring each year. Bats are selective about roost sites and some species return to the same sites year after year (e.g. brown long-eared bats in particular), so the loss of individual roost sites can affect the local population. Impacts could arise from the felling of one tree with a confirmed pipistrelle bat roost (T73, near Belt Wood, see Figure 10.7A) and another tree with a historic record of a bat roost (of unknown species) (T62, in Kennel Wood). No roosts in buildings would be lost, as no buildings are to be demolished.

10.4.32 Bats are particularly sensitive to the loss or severance of even small patches of habitat of several types, including foraging areas, roost sites and the linear features (e.g. rivers, hedgerows and tree lines) that they use for commuting between roosts and foraging grounds. Severance of commuting corridors and sheltered flyways may affect access to resources and may affect long term survival of populations. These habitat fragmentation/isolation effects are common to the construction and operation phases.

10.4.33 The effects of disturbance are likely to be most significant during construction; in particular during felling of trees (no demolition works are planned). Increased human presence and the use of heavy machinery are likely to cause extra dust, noise and vibration. This may cause disturbance to roosting bats and may even cause bats to abandon a roost. Such impacts are likely to affect bat roosts in four trees (T54, T62, T73, and T77) and five buildings (Brook Cottage, Montebello Castle, Denfield Stables and Cottages, New Hall Farm and 2 Millington Lane) (see Figures 10.7 A-B).

10.4.34 Night-time working involving floodlighting may be required in the online section. This may cause disruption to bats foraging and commuting in this area for (see Figure 10.7E).

**Badger**

10.4.35 Badgers are naturally inquisitive animals and may investigate construction sites during the night. In such instances badgers may get trapped in any pits, piping, fuel containers, wire mesh or similar hazards, or may risk being run-over by works vehicles. Inappropriate siting of earthworks or construction compounds can destroy badger setts and kill any badgers inside.

10.4.36 Construction would cause the loss of agricultural and semi-natural habitats suitable for badger setts, foraging and commuting. Approximately four setts, including at least one main sett, are likely to be lost or significantly disturbed. Habitat loss could cause increased territorial conflict between badger social groups. The unlicensed destruction or damage of any badger sett would constitute an offence under current legislation. Disturbance effects from construction works could extend beyond the area affected by the direct habitat loss.

10.4.37 Severance of badger habitat during the construction phase would be minimal, as they would generally be able to freely move across the carriageway before it is operational. Temporary localised fragmentation of badger group territories could occur through disturbance, or the construction of temporary barriers such as the fencing of construction corridors.

10.4.38 Machinery and works activities during construction could cause temporary increases in disturbance to badgers. Night-time working in the online section could deter badgers from using land around a works site in the short-term, although badgers generally become accustomed to this. Activities during the daytime near breeding setts could cause serious disturbance to badgers and mortality of cubs.

10.4.39 Accidental pollution during construction could lead to poisoning of the water or accumulation of contaminants in the food resources used by badger, potentially poisoning the badgers and leading to increased mortality.

**Barn owl**

10.4.40 Construction activities are likely to reduce the available foraging habitat as vegetation is removed, and there is likely to be an increase in general disturbance which could
adversely affect any breeding barn owls or their dependant young during the
collection phase. The local population may be unable to recover from these
collection effects due to the potential ongoing effects of the scheme during operation
(see paragraph 10.4.71).

Breeding birds

10.4.41 Clearance of vegetation prior to construction is unlikely to cause direct mortality of adult
birds or fledged young, since they can escape by moving away. Eggs and nestlings,
however, cannot relocate, and would die if nests are lost during site clearance works in
the breeding season, typically March – August. It is an offence to recklessly disturb a
bird’s nest while it is in use (i.e. from when the bird starts to build the nest until all the
chicks have fledged).

10.4.42 Direct mortality of adult birds, their dependent young and eggs can result from
construction activities, particularly during earthworks. This is likely to have a short-term
effect and the local population is expected to recover.

10.4.43 Removal of vegetation would alter the available foraging habitat and shelter for
breeding birds, increasing vulnerability to a range of external factors such as adverse
weather conditions and predators.

10.4.44 Loss and fragmentation of habitats during construction is unlikely to fragment or isolate
bird populations in the surrounding area. Although disturbance during construction may
deter many bird species from foraging close to the route alignment, the scheme would
not affect their primary flight behaviour and therefore their access to other habitats to
either side of the construction site, as the construction would take place in certain
stretches for particular durations and then move along to the next section. The overall
construction effects would depend upon the construction method and duration.

10.4.45 Different bird species would be affected to varying degrees.

10.4.46 Accidental pollution during construction would be of particular concern if it happened in
close proximity to ecologically sensitive communities or water bodies.

Wintering birds

10.4.47 Many of the impacts and resultant effects on wintering birds are similar to those for
breeding birds (excluding effects on nesting sites, eggs and young).

10.4.48 The loss of arable land and improved grassland during construction of the scheme
would be particularly important for species such as fieldfare, lapwing, black-headed gull
and starling that rely on such areas for over wintering feeding.

Operational impacts

Habitats - Statutory designated sites and non-designated habitats

10.4.49 Rostherne Mere Ramsar site, SSSI and NNR is likely to benefit from improved water
quality, as the streams feeding the lake would no longer receive water drained from the
trunk road. The volume of water entering Rostherne Mere would decrease marginally
as the impermeable area of Chester Road would be reduced after the de-trunking
works. The ecological effects of this marginal change to the hydrological regime of
Rostherne Mere are difficult to predict with any certainty due to the wide number of
variables involved, however it may be beneficial to certain plant communities.

10.4.50 Pollution from run-off, road drainage, spray from road vehicles, road gritting and
accidental pollution events such as road traffic accidents during the operation of the
scheme could negatively impact terrestrial habitats adjacent to the road.

10.4.51 The permanent severance of habitats and the lack of connectivity between the
fragmented parts of Tabley Pipe Wood SBI and Belt Wood are likely to be significant.
Severance of other non-designated habitats would compound the loss of habitat by
denying wildlife access to alternative suitable habitats on the opposite side of the road.

Aquatic ecology

10.4.52 The potential effects of the highway drainage on local watercourses are described in
Chapter 11 (Road drainage and the water environment), covering the risk of pollution of
local watercourses associated with routine drainage of rainwater from the road and with
spillages caused by road accidents.

10.4.53 Watercourses and water bodies to the east of the de-trunked Chester Road that
currently receive discharges from the existing A556 would have an improvement in the
quality and reduction in the quantity of the water discharged from the de-trunked road
and a reduced risk of accidental spillages. These watercourses include those that flow
into the statutory designated sites discussed above.

10.4.54 In the absence of suitable protective measures, certain specific watercourses (the River
Bollin, the lower reaches of Birkin Brook, Tabley Brook, and an un-named watercourse
west of the new A556 that flows north into the Bollin) would receive contaminated
discharges from the new trunk road. Such pollution could cause mortality of sensitive
aquatic features, including fish, invertebrates and macrophytes.
10.4.55 It is considered unlikely that there would be any operational impact on aquatic ecology in ponds not lost during construction, except as described in relation to specific species below.

Great crested newt

10.4.56 Roads can be a significant barrier to amphibian dispersal, interrupting migration between terrestrial and aquatic habitats and raising the risk of individuals being killed while crossing the road. Reduced dispersal between populations can lead to breeding ponds becoming isolated from the terrestrial habitat used by GCN when they are not breeding. The barrier effect of new roads can also isolate populations, increasing the risk of inbreeding and/or local extinction. Without appropriate mitigation, there would be the potential for substantial reductions in the local populations of GCN or even their complete loss, after five to ten years exposure.

10.4.57 In the absence of appropriate protective measures (see Chapter 11), inorganic diffuse run-off from the scheme could pollute water bodies, adversely affecting GCN populations. If salt used to de-ice roads in winter were to enter ponds or terrestrial habitat used by GCN, this would have adverse impacts on GCN in areas close to the road. There is also the potential for sediment run-off to block rain seepage lines and alter the depth and size of ponds, adversely affecting resident GCN populations.

Water vole and otter

10.4.58 Water voles are currently absent from the survey area. Therefore, no potential impacts on water voles have been identified resulting from the operational scheme.

10.4.59 The risk of an otter being struck by vehicles if attempting to cross the operational scheme would be high. They are highly susceptible to being killed on existing roads with 60% of all recorded deaths in the UK being attributed to road accidents.

10.4.60 The operational scheme would result in habitat fragmentation and form a physical barrier to otter, preventing them from moving freely within and between available areas of habitat. Severance of an otter’s home range may also place it in direct competition with other otters, thus increasing stress within the population. The scheme may also restrict immigration and emigration thus decreasing genetic dispersal and increasing competition among the population. These effects would be damaging to the population, removing animals that might have successfully colonised new areas in the catchment and affecting breeding.

10.4.61 During the operational phase otters would initially suffer disturbance from traffic noise and road lighting, but would become accustomed to these impacts over time.

Otters, as a predator of aquatic species, are particularly vulnerable to the effects of pollution in watercourses. Without protective measures, therefore, food supplies for otters could be reduced and otters could be affected by contaminants in their prey.

Bats

10.4.63 During operation, bats may follow existing commuting/foraging routes that have been severed by the scheme, increasing the risk of collision with oncoming vehicles. The risk to adult bats is generally low, as bats are unlikely to be attracted to major roads, but young bats emerging from maternity colonies are more at risk, as they are particularly weak fliers.

10.4.64 The road and its traffic may form a long-term barrier to bat movements between habitats in the landscape, leading to fragmentation and isolation of roosting, foraging or commuting habitats for bats. This reduces resource accessibility including roost or foraging habitats, potentially forcing bats to use sub-optimal resources.

10.4.65 Options for lighting the northern and southern ends of the scheme and certain junctions are being appraised as part of the scheme design at the time of writing this PEI and this appraisal is taking into account risks to bats. Fast-flying bat species, such as noctule and pipistrelle bats, may be attracted to the insects that feed around road lighting. This increases the availability of prey in these lit areas, but reduces it in nearby dark areas. It would also increase the risk of collision with traffic. Slower flying species including brown long-eared and Daubenton’s bats are likely to avoid lit areas. All four of these species were recorded in the study area during 2010.

10.4.66 Noise and maintenance works associated with the operational scheme can potentially cause disturbance to bats in nearby roosts.

10.4.67 In the absence of protective measures (see Chapter 11), potential pollution of water bodies due to run-off from the operational scheme could reduce invertebrate assemblages in aquatic habitats, with knock-on effects on the quantity and quality of insect prey for bats.

Badger

10.4.68 Collision with traffic is the main cause of badger deaths in the UK, and it is probable that some would be killed while crossing the new A556, particularly where the scheme bisects existing badger paths or foraging areas, as badgers tend to follow their paths habitually. The presence of a continuous concrete barrier in the central reservation (if provided (this is not certain), see paragraph 2.4.3) could exacerbate this effect.
10.4.69 The barrier effect of the scheme would result in a reduction of available foraging habitat for badger social groups, particularly in the southern part of the survey area. Disruption of a badger territory, even the loss of a small area, may cause disproportional disruption to the group directly affected. Badgers would become isolated from areas such as key foraging locations. The barrier effects of the scheme may also restrict immigration and emigration of individuals.

10.4.70 Regular disturbance from noise and light seems to have little effect on badgers as they quickly become habituated, and it is therefore unlikely that these features would have a long-term effect on badgers.

**Barn owl**

10.4.71 Barn owls are particularly vulnerable to road traffic accidents, and during the operation of the scheme there is a high potential for barn owl deaths due to collisions between owls and moving vehicles. This has the potential to substantially affect resident barn owl populations in the area surrounding the new road, and may limit the potential for the replacement of lost barn owls by migration from outside the study area.

**Breeding birds**

10.4.72 Many bird species cross active roads to reach different habitat areas, and this puts them at risk of collision with vehicles. Bird deaths through such collisions typically occur where woodland or scrub habitats are located immediately adjacent to busy roads, and the most affected species are those that typically fly low (e.g. members of the thrush family, owls and game birds).

10.4.73 Habitat fragmentation and isolation is likely to have a long-term adverse impact on local bird populations by reducing dispersal and subsequent isolation of species, potentially causing a reduction in population size. The degree of impact would vary between species, but in general the busier and wider a road the more likely it is to present a barrier to dispersal. Habitat fragmentation may also affect birds through the creation of increased areas of edge habitat where predation risk may be increased.

10.4.74 Road lighting can have affect both breeding and foraging behaviour in a number of bird species, as artificial lighting can modify the timing of natural behavioural patterns in birds normally active in the daytime, and can modify the natural behaviour of nocturnal birds.

**Wintering birds**

10.4.75 Many of the operational impacts and resultant effects on wintering birds are similar to those for breeding birds.

10.4.76 De-icing salt used in the winter to keep roads ice-free can potentially result in the death of seed-eating birds such as finches, which consume seeds contaminated by salt. The application of high amounts of de-icing salt to the road during winter and the indirect pollution of food resources in the adjacent habitats via vehicle spray would therefore potentially result in the death of seed-eating bird species.

10.4.77 The operational scheme is further from Rostherne Mere Ramsar site than the existing A556 road, and the scheme creates a partial separation between Rostherne Mere SSSI and the new A556 trunk road. It is therefore unlikely that significant adverse impacts to wintering birds using Rostherne Mere Ramsar site would arise.

**10.5 Mitigation**

10.5.1 A range of environmental and other factors were taken into account to inform the development of the scheme. Where there is potential for adverse ecological impacts, mitigation measures have been considered and incorporated in the scheme design. These include measures to avoid or reduce impacts, and measures to reduce the significance of impacts that cannot be fully avoided (see Chapter 5).

10.5.2 The Environmental Master Plan (EMP) provided with this report shows environmental mitigation measures, including ecological measures that have been incorporated into the design of the scheme so far. The location and extent of the ecological mitigation measures have not been finalised at this stage and their portrayal on the EMP is indicative only. The ecological mitigation strategy has been developed in accordance with guidance from DMRB, supported by additional guidance from the Institute of Ecology and Environmental Management (IEEM) and published ecological literature.

10.5.3 Ecological conditions may change before the start of construction, and up-to-date information will be required to facilitate implementation of the mitigation works. It is considered likely that the following pre-construction surveys would be required, although the scope will not be fixed until the detailed design stage:

- **Badgers** – a pre-construction survey, to be conducted no more than six months in advance of the proposed works, to check for any new badger setts in the survey area and assess the status of known badger setts;
- **Bats** – A pre-construction assessment on those trees identified as having moderate to high bat roost potential (see Figure 10.7A and B) which require felling;
- **Otter** – a pre-construction survey, to be conducted prior to works commencing. This survey would be conducted at intervals to be agreed with Natural England and the Environment Agency, to confirm status of otter holts or lying up sites in the survey area;
• Water vole – a pre-construction survey of those watercourses that would be culverted or would receive a new surface water discharge from the scheme;

• Lesser silver water beetle – a pre-construction survey prior to works commencing on those ponds offering suitable habitat (see Section 10.3);

• Great crested newt – a pre-construction survey on those ponds that currently support GCN and those within 250m of these and/or the scheme; and

• Non-native plant species – a pre-construction survey of the scheme footprint and any areas required for construction purposes, to ensure that a waste management strategy is in place and the status of these species is determined.

10.5.4 The following mitigation measures may need to be refined in light of the outcome of further consultation with stakeholders and the pre-construction surveys.

Mitigation of construction impacts

Terrestrial habitats

10.5.5 The scheme has been designed to avoid terrestrial habitats of known or designated nature conservation interest. The scheme alignment has been significantly altered to avoid land-take from Rostherne Mere SSSI. It was also adjusted to minimise the effects on Belt Wood SBI, Kennel Wood and Square Wood, reducing both land-take and severance from these sites. Where the scheme passes through or adjacent to woodlands, earth bunds proposed as noise and visual mitigation have been replaced with vertical barriers to reduce land-take from woodland.

10.5.6 Siting of temporary land requirements for construction, such as haul roads, site compounds and topsoil storage areas, are currently being developed and would be located so as to avoid adverse impacts or damage to sensitive ecological receptors so far as is reasonably practicable. This assessment takes account of preliminary proposals for temporary land requirements, in the recognition that these proposals are likely to be altered to some extent after consultation of the public and third parties.

10.5.7 Compensatory planting and terrestrial habitat creation included in the scheme design would mitigate for losses from several habitat types. The design of all replacement habitat has been carried out in collaboration between specialists in different topics (principally ecology, heritage and landscape; see also Chapters 8 and 9), to ensure that the interests of one topic are not undermined by mitigation for another, and where possible that a single mitigation measure can contribute to more than one environmental objective. These habitat creation works are summarised below:

• The loss of part of Tableypipe Wood SBI would be mitigated by replacement planting on no less than a two for one basis;

• The loss of woodland on the edge of Square Wood would be mitigated for on a like for like basis, as a minimum;

• The loss of woodland on the edge of Kennel Wood would be mitigated for on a two for one basis, and bat roosting opportunities provided due to the loss of bat roost habitat; and

• An area of replacement broad-leaved woodland is proposed to compensate for the loss of veteran beech trees in Belt Wood. This would offer partial compensation for the loss of the veteran trees.

10.5.8 A key ecological objective of the overall mitigation proposals is to ensure connectivity between the existing woodland blocks, and to enhance connectivity between woodland blocks on each side of the road as mitigation of the loss of connectivity across the road. To achieve this, some woodland planting areas would be larger than the minimum replacement ratios described above, and would be supplemented by the creation of linear features to enhance connectivity.

10.5.9 To address the long term habitat fragmentation impacts and the permanent barrier effects that will be experienced from construction onwards, a green bridge is being considered. The green bridge would be designed to re-connect habitats either side of the scheme. This would not only address effects upon habitat but also contribute to the mitigation of severance of animal territories and foraging/commuting routes. However, the beneficial effects of the green bridge would be relatively localised around the position chosen. The provision of a green bridge and its location are not yet confirmed.

10.5.10 Options for a haul road at the M56 Cloverleaf SBI site are being assessed, and the final decision will be considered in the ES. If the loss of semi-improved grassland from within this site cannot be avoided, mitigation measures would be designed to ensure reinstatement of the grassland and management suitable to ensure it recovers its ecological value.

10.5.11 Where the scheme leads to the loss of hedgerows, appropriate new planting would be provided as mitigation. The planting would comprise appropriate native shrub species of local provenance, such as hawthorn, blackthorn, field maple, pedunculate oak, goat willow, hazel and holly. The planting is also designed to compensate for severance and fragmentation affecting bat foraging and commuting lines, and to contribute to the mitigation of visual impacts and impacts on landscape character (see Chapter 9).

10.5.12 Many ecological receptors are vulnerable to accidental impacts during construction, caused by construction activities. The likelihood of such impacts occurring, and the
likely severity of any impacts that do occur, would be minimised through the implementation of the ECI Contractor's Construction Environmental Management Plan (CEMP). This will be available in outline at the time of the application to the IPC, and will be prepared in full detail during the detailed design phase, before the start of construction. Indicatively, it would include the following measures relevant to the protection of ecological receptors:

- Constraints on the movement of plant and construction personnel, including defined working areas around sensitive locations such as bat roost, badger setts, ponds and watercourses;
- Constraints on working hours and temporary lighting in certain areas of the site;
- Other measures to minimise disturbance to sensitive habitats and to wildlife species;
- Measures to protect the environment as a whole, and sensitive ecological receptors in particular, from spillages of fuels, oils, chemicals or other pollutants, in line with Environment Agency Pollution Prevention Guidelines;
- Implementation of good working practices such as no excavations or trenches being left open over night unless a means of escape (wooden plank) is provided, no open barrels left open overnight, all fuel storage and change areas should be bunded;
- All site equipment should be returned to site compound at the end of every day;
- Mechanisms will be in place to record new mammal holes/tracks or other signs of fauna;
- Protection measures in place to prevent accidental spillages or unmitigated construction surface water run-off into existing watercourses;
- Clearly demarked areas of proposed ecological mitigation areas so that the ground is not compacted or adversely affected in any way; and
- Mechanisms in place to check for breeding birds and non-native plant species in advance of vegetation clearance.

Aquatic ecology

10.5.13 Mitigation measures for aquatic ecology would include:

- Replacement of lost ponds, on a 1:1, 1:2 or 1:3 basis, depending on the degree of fragmentation and the number and quality of ponds lost; and
- Measures to protect and to seek to enhance existing pond habitats, to prevent the degrading of their ecological value.

Great crested newt

10.5.14 Mitigation measures for GCN would depend on the type, extent and significance of the construction impact. Most mitigation work would be implemented under the terms of a European Protected Species (EPS) licence, which would be obtained from Natural England after all other consents (including the DCO) are in place. These measures are likely to include the following:

- The loss of ponds supporting GCN would be offset by the creation of new ponds typically on a 3:1 basis, although this may vary in individual cases;
- Replacement ponds would be designed to provide optimal breeding habitat, and surrounding terrestrial habitat would be enhanced through planting, management and the construction of hibernaculae;
- GCN would be cleared from relevant terrestrial and aquatic habitat in advance of construction, through a programme of trapping and relocation;
- Where ponds would be destroyed best practice measures would be undertaken to ensure that no individual GCN remain. It is likely that temporary amphibian fencing would be installed and maintained along the boundaries of the construction site within between 250m and 500m (extent to depend upon scale of impact at specific locations) of known breeding ponds to prevent GCN from entering construction areas; and
- Sensitive siting of construction compounds and storage areas away from water bodies and high value terrestrial habitat to avoid adverse impacts so far as is reasonably practicable.

Water vole

10.5.15 Measures to maintain aquatic habitats in a favourable state would form part of the mitigation for other ecological receptors such as aquatic ecology and GCN. These measures would also maintain aquatic habitats in a suitable condition for water voles,

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64 The place/structure/shelter chosen by an animal for hibernation

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enabling them to re-colonise the survey area should environmental conditions become suitable in the future.

**Otter**

10.5.16 Mitigation measures for otter would include:

- Protective measures to be set out in the CEMP (10.5.12);
- Possible fencing to prevent otter accessing the road; and
- Safe crossing points would be provided; the type of crossing is to be confirmed, but at present consideration is being given to a combination of different types, including a green bridge, underpasses and modified culverts.

**Reptiles**

10.5.17 Reptiles are not considered to be present within the survey area and therefore no specific measures directed at mitigating for effects upon reptiles are required.

**Bats**

10.5.18 The pre-construction assessment described in paragraph 10.5.3 would identify any requirement for appropriate mitigation during construction, such as supervised felling of trees which offer bat potential but where no roost has been confirmed. Where loss of a roost site would be unavoidable, it would be necessary to obtain an EPS licence from Natural England. This would require production of a detailed method statement and a mitigation strategy, which may include constraints on the timing of the work. Other mitigation works for bats would include:

- Constraints on the siting of site compounds, storage areas and construction activities to avoid impacts on bats;
- Provision of ‘hop-overs’ to minimise habitat fragmentation by helping bats to cross the scheme at or close to their existing linear routes. These could comprise a combination of temporary and permanent features including planting to provide new linear features, planting of more mature trees and installation of temporary bat bridges during construction period at crossing points to encourage bats to fly at height over the new road, bunds, a green bridge, or other suitable measures;
- New foraging opportunities to replace lost foraging habitat would be provided through habitat replacement works designed for other purposes;
- Fragmentation of linear habitat would be mitigated through appropriate planting; and
- Disturbance of foraging bats during night-time working would be minimised by restricting such works to certain areas of the scheme (where practicable)

**Badger**

10.5.19 Measures to avoid badgers becoming trapped, injured or killed during construction would include:

- The careful siting of compounds and storage areas;
- restrictions on night-time working and ensuring that excavations are not left uncovered overnight without a means of escape for any badgers that may enter them;
- Contractors would be made aware of the need to avoid activities which could disturb badgers such as lighting fires or storing chemicals near setts;
- Disturbance to foraging badgers would be prevented or reduced by ensuring all construction activities are maintained within prescribed working areas. Exclusion zones would be set up around setts to prevent unnecessary disturbance of badgers;
- Where active badger setts would be closed or disturbed this would be undertaken under licence from Natural England. The licence would require production of a badger mitigation strategy detailing the location of artificial replacement sett(s) and safe crossing points as necessary. Licences to interfere with setts are generally only issued between July and November inclusive; and
- Safe crossing points would be provided to reduce the incidence of badgers being killed as they attempt to cross the scheme. The type of crossing is to be confirmed, but at present consideration is being given to a combination of different types, including a green bridge, underpasses and modified culverts, in combination with badger resistant fencing.

**Barn owl**

10.5.20 Construction impacts would be mitigated by making the construction area inhospitable to foraging barn owl by ensuring that rough grassland does not occur within the construction site.

**Breeding birds**

10.5.21 Mitigation measures that would be considered for breeding birds include:
• All habitat clearance, where possible, would take place outside the main bird breeding season, March to August;

• Cleared vegetation would be chipped or moved offsite to prevent its use by breeding birds;

• Cleared areas would also be maintained in a condition to prevent re-colonisation by breeding birds where nesting attempts would be vulnerable to further disturbance or destruction;

• If works during the breeding season are unavoidable, the potential presence of bird nests would be taken into consideration when planning habitat clearance and any vegetation clearance work should be undertaken under the supervision of a suitably qualified ecologist; and,

• All construction activities would be restricted within a prescribed working corridor to minimise disturbance.

10.5.22 The widespread planting of native shrubs and trees within the landscape design of the scheme (refer to Environmental Master Plan) would mitigate against the adverse effects associated with habitat loss from construction of the scheme. By the design year this planting would be sufficiently mature to provide foraging and nesting habitat for breeding birds.

Wintering birds

10.5.23 Mitigation measures outlined for breeding birds would also alleviate adverse effects upon wintering birds. Maintaining all construction plant and personnel within a prescribed working corridor would minimise disturbance associated with construction of the scheme. Habitat replacement works (refer to Environmental Master Plan) would provide habitat for wintering birds within the local area and thereby mitigate for habitat loss due to the scheme.

Mitigation of operational effects

10.5.24 Mitigation measures for the operational effects of the scheme such as those arising from noise, increased lighting and increased disturbance are fundamentally addressed as part of an iterative process through the detailed design of the road. It is important that the measures built into the design are monitored to assess whether they are addressing any long term operational impacts.

10.5.25 It is proposed that a post-construction monitoring programme would be carried out during the first five years following construction of the scheme. This monitoring would assess the success of the mitigation measures and inform future management proposals. The specific requirements of the monitoring would be determined at the detailed design stage of the scheme and would be detailed in a Handover Environmental Management Plan (HEMP). The anticipated preliminary monitoring and management programme is detailed below for each ecological resource. A refined version of this would be detailed in the Environmental Action Plan (EAP) of the ES which would be used to develop both the CEMP and the HEMP. Indicatively the HEMP would include the following measures relevant to the protection/conservation and monitoring of ecological receptors and mitigation measures:

• Establishment of a post construction monitoring programme and setting frequency of monitoring and assigning responsibility for the delivery of this. This will depend upon the habitat type/species mitigation being monitored;

• Implementation of monitoring of all ecological mitigation measures including bat hop-overs, mammal underpasses, green bridge, new ponds, new vegetation etc;

• Implement a condition assessment programme for those features that require this, for example new woodland planting, new grasslands, linear bands of trees and shrubs etc;

• Establishment of a recording mechanism for the monitoring of ecological mitigation and a feedback process for possible amendments to the design if possible;

• Monitoring any ecological fencing to ensure that it is fit for purpose;

• Record all mitigation that may be subject to ongoing European Protected Species Licensing (EPSL) mitigation monitoring; and,

• Identify and implement any required maintenance/repair work required to ensure the continued effectiveness of the mitigation works.

Terrestrial habitats

10.5.26 Monitoring and management requirements would be detailed in the HEMP (above).

10.5.27 Pollution from run-off, road drainage, spray from road vehicles, road gritting and accidental pollution events such as road traffic accidents has been mitigated through detailed drainage design (see Chapter 11) which would minimise likely impacts to terrestrial habitats.

10.5.28 The majority of other long-term impacts would be mitigated through the continued operation of other mitigation measures detailed above under mitigation for construction impacts (paragraphs 10.5.5 to 10.5.12).
Aquatic ecology

10.5.29 The drainage design of the scheme is described in Chapter 2 (paragraphs 2.4.21-26) and in Chapter 11 (Road drainage and the water environment). Using appropriate drainage systems, maximising run-off retention times prior to discharge and ensuring a high dilution factor on discharge which would reduce the risk of adverse effects of road run-off on receiving watercourses. The scheme drainage and water treatment system, including the proposed attenuation ponds, will be entirely isolated from all existing ponds used by wildlife and all new ponds proposed as part of the ecological mitigation measures. This would prevent any pollution of wildlife ponds and any damage to their habitat value. In addition, where practicable, the outlets of the attenuation ponds would be open ditches planted with marginal plant species. As such, this habitat would develop over time to support aquatic invertebrate and macrophyte communities. The locations where this is feasible will be identified during the detailed design.

Great Crested Newt

10.5.30 The ongoing effects of habitat loss and severance would be mitigated through the continuing operation of the habitat replacement works described in paragraph 10.5.14. GCN surveys would be undertaken as stated in the conditions attached to any EPS licence for the works, and as to be defined in the HEMP.

10.5.31 See paragraph 10.5.29 for mitigation through the drainage design, which would prevent adverse effects on GCN as a result of potentially contaminated run-off from the road entering ponds used by GCN. The design of the road (mainly in cutting, or flanked by earth bunds and landscape planting) means that no significant quantity of water in the form of vehicle spray is likely to enter ponds or other habitats.

Water vole

10.5.32 The road drainage and treatment system (see paragraph 10.5.29) would aid in the prevention of pollution of water bodies. This would maintain aquatic habitats in a favourable state, enabling water voles to re-colonise the survey area should environmental conditions become suitable in the future.

Otter

10.5.33 Monitoring surveys would be required to monitor levels of otter activity in the vicinity of the scheme and assess the efficacy of mitigation incorporated as part of the construction stage, highlighting any required changes, as the species continues to colonise this area. Details of the monitoring requirements will be set out in the HEMP.

Bats

10.5.34 The ongoing effects of habitat loss, disturbance and severance would be mitigated through the continued operation of the habitat replacement works described in paragraph 10.5.18.

10.5.35 Bat surveys would be carried out to monitor the local bat populations and efficacy of mitigation; details would be set out in the HEMP. The surveys would focus on new crossing points and severed hedgerows and other linear features. The frequency of the surveys would be determined in accordance with DMRB and best practice guidance and specified in the ES and/or HEMP. These surveys would provide data on any changes in how bats use the local landscape after implementation of the scheme and as mitigation planting matures.

10.5.36 Once the extent of lighting is determined, ecological advice to minimise impacts to bats and other species will be taken into account in the detailed design.

Badger

10.5.37 The ongoing effects of habitat loss, disturbance and severance would be mitigated through the ongoing operation of the habitat/sett replacement works and safe crossing points outlined in paragraph 10.5.19.

10.5.38 The ongoing risk of road-traffic accidents involving badgers would be addressed through the provision of adequate safe crossings and associated fencing.

10.5.39 Requirements for surveys to monitor badger activity in the survey area would be set out in the HEMP, subject to consultation and the evolution of the detailed design. The focus for these surveys would be placed on the use of badger setts and mammal crossing points, as well as the integrity of the badger resistant fencing. The survey results would be used to refine mitigation measures, if necessary, and identify any remedial measures that may be required; for example, planting additional vegetation to guide badgers to safe crossing points, repairing/replacing fencing or ensuring mammal tunnels remain unblocked.

Barn owl

10.5.40 Construction of false cuttings topped with woodland edge habitats or other appropriate planting would increase the flight height and therefore minimise the risk of barn owl mortality by collision with high sided vehicles.

10.5.41 Barn owl activity would be monitored and information on breeding status gathered from existing nest boxes in the local area. It is expected that records of any death by road traffic accident would be recorded as part of the HEMP. The monitoring data would be
used to assess if any additional planting is required to maintain the area close to the road in an inhospitable manner for foraging barn owl.

**Breeding birds**

10.5.42 Habitat management of areas of woodland, scrub or grassland close to the road would take place outside the main breeding season for birds, which is between March and August. This would avoid losses of nestlings and eggs.

10.5.43 Proposed landscape planting along the carriageway (as detailed in Chapter 9) may minimise disturbance to birds from traffic.

10.5.44 The extent of road-lighting is still being designed. Once the extent of lighting is determined, ecological advice to minimise impacts to breeding birds will be taken into account.

10.5.45 The proposed design of attenuation ponds would consider the creation of new wetland habitats and ponds that could complement other biodiversity mitigation measures and provide habitat for birds.

10.5.46 Monitoring of breeding bird assemblages would be carried out in the year of opening and at agreed intervals thereafter. These intervals would be specified in the ES, and these actions would be transferred to the HEMP. The results of these surveys would inform subsequent habitat management plans and identify any required supplementary planting to improve the available habitat.

**Wintering birds**

10.5.47 Mitigation outlined for breeding birds would also serve to alleviate adverse effects upon wintering birds. The scheme drainage design would minimise pollution of habitats adjacent to the operational road.

10.5.48 Monitoring of wintering bird assemblages would be carried out in the year of opening and at intervals to be specified in the ES, and transferred to the HEMP. The results of these surveys would inform subsequent habitat management plans and identify any required supplementary planting to improve the available habitat.

10.6 The significance of environmental impacts

10.6.1 Table 10.6 on the following pages summarises the assessment of the significance of impact on each individual ecological receptor, taking into account the effects of the scheme and of the mitigation measures detailed above.

10.6.2 There are no significant adverse effects on statutory designated sites. The drainage strategy for the new road and the de-trunked Chester Road provides benefits for the internationally-important Ramsar sites at The Mere/Little Mere and Rosterne Mere, through improved water quality in the streams feeding the meres. However, given the low proportion of the inflow to the meres that derives from highway run-off, the benefit is not deemed significant.

10.6.3 The proposed retaining wall near Rosterne Mere SSSI would stand outside the SSSI boundary and the removal of the existing highway boundary hedgerow is not considered to result in a significant impact as it is typical of the area and does not support any protected species. The benefits of reduced disturbance due to the realignment of the road are also not deemed significant.

10.6.4 The habitat loss and fragmentation effects on the SBIs at Tableypipe Wood, Belt Wood and the M56 Cloverleaf would be significant at the county level during and immediately after construction. However, as the mitigation works mature, the impact would decline, and it would be insignificant by the design year (15 years after opening).

10.6.5 During and immediately after construction, there would be adverse effects that are significant at a local level on a range of non-designated habitats, including woodland, scrub, hedgerows, marshy grassland, semi-improved grassland, open water and running water. All of these effects would become insignificant by the design year, as the mitigation works reach their full effectiveness. Effects on other habitats would all be below the level of significance.

10.6.6 During and immediately after construction, there would be significant effects at a county level on wildlife species including otters, barn owl and wintering birds and significant effects at a local level on aquatic ecology, GCN, bats, badgers and breeding bird. The provision of replacement habitat, safe crossing points and other mitigation measures is designed to address these impacts, and their significance would reduce over time. In many cases, mitigation provided specifically for one species may have secondary benefits for another (e.g. new ponds created for GCN and for surface water attenuation would provide new invertebrate habitat, providing new feeding opportunities for bats). All of these impacts would cease to be significant by the design year.

10.6.7 Where severance and barrier effects are present for badgers, otters and other mammals, the provision of safe crossing points (where practicable) and the potential green bridge, combined with fencing to direct badgers towards crossing points, would mitigate the impact.

10.6.8 Overall, with the proposed mitigation measures in place the scheme would result in Slight Adverse impacts in the Opening Year, reducing to Neutral by the Design year, with potential for specific benefits in relation to enhanced habitats.
Table 10.6: Ecological impact assessment summary

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<thead>
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<tbody>
<tr>
<td><strong>Designated Sites</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statutory designated sites: Rostherne Mere Ramsar, SSSI and NNR5</td>
<td>International (very high importance)</td>
<td>No direct impacts; Disturbance from construction activities in proximity to site</td>
<td>Existing operational impacts at a greater separation distance. Likely beneficial with respect to surface water run-off</td>
<td>N/A</td>
<td>Not Significant</td>
<td>Not significant</td>
</tr>
<tr>
<td>Non- statutory designated sites (SBIs)</td>
<td>County (medium importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Permanent barrier, fragmentation. Disturbance effects from road: increased noise, air pollution</td>
<td>Woodland and other planting. Green Bridge</td>
<td>Significant at County level</td>
<td>Not Significant</td>
</tr>
<tr>
<td><strong>Non-Designated Habitats</strong></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Ancient Woodland: Rostherne Mere Banks and Watch Hill</td>
<td>National (high importance)</td>
<td>Disturbance</td>
<td>Disturbance effects from road, likely to be reduced due to greater separation distance</td>
<td>N/A</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Other Woodland (excl SBIs, and ancient woodland)</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Permanent barrier, fragmentation. Disturbance effects from road: increased noise, air pollution</td>
<td>Woodland and other planting</td>
<td>Significant at local level</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Parkland</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Disturbance effects from road</td>
<td>N/A</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Scrub</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Disturbance effects from road</td>
<td>Scrub planting in the footprint of the scheme to compensate for loss.</td>
<td>Significant at local level</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Hedgerow</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Disturbance effects from road</td>
<td>Additional linear planting along the scheme to re-connect severed habitats</td>
<td>Significant at local level</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Improved grassland</td>
<td>Negligible (important in the scheme footprint only)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Disturbance effects from road</td>
<td>Additional species rich grassland seeding</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Marshy grassland</td>
<td>Local (Lower importance)</td>
<td>Disturbance Habitat Loss</td>
<td>Disturbance effects from road</td>
<td>Additional species rich grassland seeding, outlets from attenuation ponds would be planted with native species of local provenance</td>
<td>Significant local level</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Semi-improved grassland</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Disturbance effects from road</td>
<td>Additional species rich grassland seeding</td>
<td>Significant local level</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Acid grassland</td>
<td>Local (Lower importance)</td>
<td>Disturbance</td>
<td>Disturbance effects from road</td>
<td>Additional and enhanced species composition of grasslands</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Swamp and marginal habitat</td>
<td>Negligible (important in the scheme footprint only)</td>
<td>Disturbance</td>
<td>Disturbance effects from road</td>
<td>Additional and enhanced species composition of grasslands</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Tall ruderal and ephemeral/short perennial</td>
<td>Negligible (important in the scheme footprint only)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Disturbance effects from road</td>
<td>Additional and enhanced species composition of grasslands</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Open Water (excluding designated sites)</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Habitat loss, change in surface water run-off patterns, general disturbance</td>
<td>Creation of new ponds. Aquatic habitat planting at outlets of attenuation ponds</td>
<td>Significant at local level</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Running Water</td>
<td>Local (Lower importance)</td>
<td>Habitat loss Habitat fragmentation Disturbance</td>
<td>Habitat loss, change in surface water run-off patterns, general disturbance</td>
<td>Sensitive design of culverts. Aquatic habitat planting at outlets of attenuation ponds</td>
<td>Significant at local level</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>
## Preliminary Environmental Information

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Aquatic ecology (general)</td>
<td>Local (Lower importance)</td>
<td>Habitat loss</td>
<td>Habitat fragmentation</td>
<td>Disturbance effects from road, change in surface water run-off patterns</td>
<td>Creation of new ponds, inoculation with invert species from existing good quality ponds</td>
<td>Significant at local level</td>
</tr>
<tr>
<td>Great crested newt</td>
<td>Local (Lower importance)</td>
<td>Direct mortality</td>
<td>Habitat fragmentation</td>
<td>Disturbance effects from road, change in surface water run-off patterns. Permanent barrier between existing ponds. Fencing during construction</td>
<td>Creation of new ponds and new foraging/hibernation habitat either side of scheme.</td>
<td>Significant at local level</td>
</tr>
<tr>
<td>Water vole</td>
<td>Negligible (important in the scheme footprint only)</td>
<td>NO FURTHER ASSESSMENT AND CURRENTLY NOT PRESENT IN SCHEME FOOTPRINT</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Otter</td>
<td>County (medium importance)</td>
<td>Direct Mortality</td>
<td>Habitat loss</td>
<td>N/A</td>
<td>Fencing at construction and operation, safe underpasses</td>
<td>Significant at county level</td>
</tr>
<tr>
<td>Reptile</td>
<td>Negligible (important in the scheme footprint only)</td>
<td>NO FURTHER ASSESSMENT AND CURRENTLY NOT PRESENT IN SCHEME FOOTPRINT</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Bats</td>
<td>Local (Lower importance)</td>
<td>Direct Mortality</td>
<td>Habitat loss</td>
<td>Disturbance (lighting effects)</td>
<td>Planting of new foraging lines (appropriate planting along road), mature trees either side of existing foraging routes across the road. Temporary wires/hop-overs at construction. Sensitive lighting design, Green Bridge</td>
<td>Significant at local level</td>
</tr>
<tr>
<td>Badger</td>
<td>Local (Lower importance)</td>
<td>Direct Mortality</td>
<td>Habitat loss (sett loss)</td>
<td>Disturbance (lighting effects)</td>
<td>Fencing during construction and operation, replacement setts. Sensitive lighting design, Green Bridge</td>
<td>Significant at local level</td>
</tr>
<tr>
<td>Barn owl</td>
<td>County (medium importance)</td>
<td>Direct Mortality</td>
<td>Habitat loss</td>
<td>Disturbance (lighting effects)</td>
<td>Sensitive planting next to road to discourage barn owl foraging</td>
<td>Significant at county level</td>
</tr>
<tr>
<td>Breeding birds</td>
<td>Local (Lower importance)</td>
<td>Direct Mortality</td>
<td>Habitat loss</td>
<td>Disturbance effects</td>
<td>New planting will provide improved nesting/feeding habitats</td>
<td>Significant at local level</td>
</tr>
<tr>
<td>Wintering birds</td>
<td>County (medium importance)</td>
<td>Direct Mortality</td>
<td>Habitat loss</td>
<td>Disturbance effects</td>
<td>New planting will provide improved habitats</td>
<td>Significant at county level</td>
</tr>
</tbody>
</table>
11 Road drainage and the water environment

Executive summary

An assessment of the effects of the proposed scheme on the water environment has been carried out in line with the guidance contained in the Design Manual for Roads and Bridges.

To the south and west of the study area, minor watercourses flow south to Tabley Brook, a tributary of Smoker Brook. To the east of the study area, minor watercourses drain through a series of meres (lakes), before joining Birkin Brook and the River Bollin adjacent to the M56 slip roads. These include ‘The Mere’, ‘Little Mere’ and ‘Rostherne Mere’, all of which are designated as Sites of Special Scientific Interest (SSSI) and Ramsar sites. Rostherne Mere is also a National Nature Reserve. The area is not in a flood zone. There is an aquifer underlying the study area, although groundwater is not abstracted for public supply.

Most of the existing A556 in the study area drains to tributaries of Rostherne Brook, and through The Mere, Little Mere and Rostherne Mere; no treatment of the water or protection of watercourses is currently provided. Drainage of the new road would avoid these sensitive water bodies. The southern section would drain to the Tabley Brook catchment, and the northern section would drain to a tributary of the River Bollin. Drainage from the re-designed junction with the M56 would drain to Birkin Brook and the River Bollin. Treatment and protection would be provided, in the form of wetlands and ponds.

The assessment has considered the various attributes of each feature of the water environment. Many of the impacts have been assessed as ‘neutral’. There would be beneficial impacts on water quality in Rostherne Brook, The Mere and Little Mere as a result of diverting traffic from the existing A556 onto the new road. There would be adverse impacts on tributaries of Tabley Brook as a result of introducing new discharges to those watercourses.

11.1 Introduction

11.1.1 Water is essential for life for plants and animals. Watercourses and waterbodies provide habitat for a wide range of aquatic flora and fauna and a source of drinking water for many terrestrial animals. For human beings, water is used for industrial and agricultural practices as well as for drinking, cooking and other domestic uses.

11.1.2 Water pollution from road drainage derives from contaminants left on the road surface during its use. The main sources of these contaminants include spillages of oil, fuel and other pollutants following road accidents, and deposition of contaminants from incomplete fuel combustion, general vehicle, tyre and road degradation, small oil or fuel leaks and the deposition of pollutants out of the atmosphere.

11.1.3 In the UK, the legislation for the protection of the water environment has developed over several decades, leading to a complex collection of Acts and Regulations. Key items within the overall suite of legislation are listed below:

- Water Resources (Licences) Regulations 1965
- European Freshwater Fish Directive 78/659/EEC
- Surface Water Classification Regulations 1989
- Control of Pollution (Consents for Discharge) (Secretary of State Functions) Regulations 1989
- Control of Pollution (Oil Storage) Regulations 2001
- Environmental Protection Act 1990
- Water Resources Act 1991
- Water Industry Act 1991 and 1999
- Land Drainage Act 1991 and 1994
- Surface Water (River Ecosystem) (Classification) Regulations 1994
- Environment Act 1995
- Groundwater Regulations 1998
- European Water Framework Directive 2000/60/EC
- Water Act 2003
11.1.4 Planning policy relevant to the water environment, in the context of the proposed scheme, is as follows:

- National Planning Policy
  - Planning Policy Statement (PPS) 1: Delivering Sustainable Development (2005);
  - Planning and Climate Change Supplementary to PPS1 (2007);
  - PPS 23: Planning and Pollution Control (2004);
  - PPS 25: Development and Flood Risk (2010);
- North West of England Plan, Regional Spatial Strategy to 2021 (2008);
  - DP1: Spatial Principles;
  - DP7: Promote Environmental Quality;
  - DP9: Reduce Emissions and Adapt to Climate Change;
- Macclesfield Borough Local Plan – saved policies (2004);
  - NE9: Protection of River Corridors;
  - NE10: Conservation of the River Bollin;
  - DC1: New Build;
  - DC3: Amenity;
- Cheshire’s Local Transport Plan 2011 – 2026 (LPT3)
  - Objective 6: Protect and enhance the built, natural and historic environment.
- Macclesfield Borough Strategic Flood Risk Assessment (June 2008);
- Trafford Revised Unitary Development Plan (June 2006);
  - ENV1: Flood Risk;
  - ENV8: River Valleys and Major Watercourses;
- Greater Manchester Strategic Flood Risk Assessment Level 1 2008.

11.1.5 The assessments of impact for this topic depend on calculations based on three main factors – information about the watercourses into which the scheme drainage will discharge, information about the extent of impermeable surfaces (i.e. surfaces which water cannot penetrate) draining to each discharge point, and information about traffic flows. It is intended to re-calculate all the traffic flows using new traffic modelling guidance before preparation of the ES, and it will therefore be necessary to recalculate all of the water quality impacts.

11.1.6 The assessments of impact in this PEI are based on conservative assumptions about the extent to which the proposed mitigation measures can successfully remove sediment and pollutants from the water drained off the road. Further work will be carried out to refine these assumptions for the ES.

11.2 Approach and methods

11.2.1 Information has been obtained for a study area extending a minimum of 1km from the scheme, and extending as necessary to incorporate river quality sampling points and a flow gauging station beyond this 1km distance.

11.2.2 The following sources of information on the existing environment have been consulted:

- Ordnance Survey Mapping;
- Environment Agency website (www.environment-agency.gov.uk);
- Data on water quality, abstractions and discharges, provided upon request by the Environment Agency;
- Defra’s ‘Magic’ interactive map (http://magic.defra.gov.uk);
- Freshwater Fish Directive designations, published on the Defra website (www.defra.gov.uk);
- National River Flow Archive data on the Centre for Ecology and Hydrology’s website (www.ceh.ac.uk);
- National Rivers Authority Groundwater Vulnerability Map Sheet 16: West Cheshire;
- Atkins (2006a) Assessment of Outfalls, A556(T) Outfalls to The Mere and Rostherne Mere SSSIs, Highways Agency – Area 10 Managing Agent;
• Atkins (2006b) Assessment of Outfalls, A556(T) & M6 Outfalls to Tabley Mere SSSI, Highways Agency – Area 10 Managing Agent;
• Highways Agency (2009) A556 Environmental Improvements: Southern End Options Comparative Environmental Assessment; and
• Envirocheck Report covering the southern end of the scheme, December 2009.

11.2.3 The assessment has been carried out in line with the methods contained in DMRB.

11.2.4 The significance of an impact is a function of the ‘importance’ of an attribute of the water environment and the magnitude of a predicted impact. DMRB defines importance in four categories (Very High, High, Medium or Low; there is no ‘negligible’ category), and provides typical examples in relation to surface water, groundwater and flood risk. The magnitude of impact is defined in DMRB as Major, Moderate, Minor or Negligible, with criteria and examples. Impacts may be either adverse or beneficial.

11.2.5 The process for identifying the magnitude of an impact draws on the Highways Agency Water Risk Assessment Tool (HAWRAT). HAWRAT is a spreadsheet tool that calculates whether the proposed scheme would ‘pass’ or ‘fail’ in terms of water quality in the receiving watercourses, based on information about the site, the scheme design and traffic flows (see Section 2.5 for information about traffic). HAWRAT has been used both for assessment and to inform the iterative design process, and has influenced the amount and type of mitigation included in the scheme drainage design.

11.2.6 The significance of impact is predicted with reference to table A4.5 in DMRB. This is different from that in Chapter 5 of this PEI, and so is reproduced in Table 11.1 below.

Table 11.1: Estimating the Significance of Potential Effects

<table>
<thead>
<tr>
<th>Importance of Attribute</th>
<th>Magnitude of Impact</th>
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<tbody>
<tr>
<td></td>
<td>Negligible</td>
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<tr>
<td>Very High</td>
<td>Neutral</td>
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<tr>
<td>High</td>
<td>Neutral</td>
</tr>
<tr>
<td>Medium</td>
<td>Neutral</td>
</tr>
<tr>
<td>Low</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

11.3 The existing environment (‘baseline conditions’)

Hydrology

11.3.1 Features of the water environment in the study area are shown on Figure 11.1A and B. The existing A556 between the M56 and the M6 is separated into a number of drainage catchments.

11.3.2 Approximately 500 metres of the existing A556 adjoining Junction 19 of the M6 drains into the neighbouring M6 drainage system. This is shown as Catchment 1 on Figure 11.1A. Once combined with water draining from a section of the M6, the runoff from Catchment 1 is discharged into a minor watercourse known as Serpentine Water, south of the M6. Serpentine Water flows into Tabley Mere SSSI.

11.3.3 A small drainage catchment (Catchment 3) covering the junction of the A556 with the A50 in the village of Mere is drained to a combined sewer.

11.3.4 The remainder of the A556 between the M6 and the M56 is divided into separate catchments (2 and 4 to 7), which drain into the River Bollin and its tributaries as follows:
• Catchment 2 discharges upstream of The Mere;
• Catchments 4 and 5 discharge upstream of Rostherne Mere;
• Catchment 6 discharges to Birkin Brook; and,
• Catchment 7 discharges directly into the River Bollin. All existing road drainage catchments and discharge points are shown on Figure 11.1A and B.

11.3.5 The existing drainage does not include any features to prevent increased flood risk (such features are known as ‘flow attenuation’) or to protect the watercourses either from chronic contamination from routine run-off or from acute contamination from accidental spillages. HAWRAT tests run on the ‘do minimum’ situation (i.e. without the scheme) showed that catchments 2, 4 and 5 (i.e. the catchments discharging eastwards towards The Mere and Rostherne Mere) would all ‘fail’ in 2030 (i.e. 15 years after the assumed opening of the scheme). This means that, without the scheme, the drainage of the existing road would damage water quality and habitats in the watercourses feeding the designated wetland sites.

65 DMRB, Volume 11, Section 3, Part 10, ‘Road Drainage and the Water Environment’ (HD 45/09)
11.3.6 Minor watercourses to the west of the existing A556 drain the surrounding land. Tabley Brook, to the west and south of Mere, flows in a southerly direction, crossing under the M6 to the west of Junction 19. It then flows into Waterless Brook, which also receives the outflow from Tabley Mere. Waterless Brook then flows into Smoker Brook. Tabley Brook is therefore part of the Smoker Brook catchment, and does not feed Tabley Mere.

11.3.7 An un-named watercourse, which crosses under the M56 just to the west of Junction 8, flows into the River Bollin downstream of any of the discharge points associated with the existing A556.

11.3.8 The annual 95 percentile river flow of a watercourse (Q95) is the flow exceeded for 95% of the time (i.e. it is a measure of the flow of water in the river when it is very low). This is important because it is an indication of the capacity of the watercourse to dilute and disperse any contaminants discharged into it without significant harm to water quality or ecosystems. Data from a gauging station on the River Bollin at Dunham Massey is held on the National River Flow Archive, and shows a Q95 flow of 1.178 m³/second. None of the other watercourses in the study area have gauging stations on them.

11.3.9 For Birkin Brook, Capita Symonds (2008) reports a Q95 flow of 0.075 m³/second.

11.3.10 For the smaller watercourses in the Rostherne Brook catchment and the Tabley Brook catchment, estimates of Q95 were made by Atkins (2006a and 2006b), by carrying out a proportional calculation of the flow measured on Arley Brook at Gore Farm (within the Smoker Brook catchment), which was considered to be a similar catchment in the vicinity. The Q95 for the tributaries of Rostherne Mere is therefore estimated to be 0.0019 m³/second, and for Tabley Brook it is estimated to be 0.0010 m³/second.

11.3.11 For the purposes of this assessment, it has been assumed that the flow in the un-named watercourse draining into the River Bollin to the west of the scheme is similar to the flow in the tributaries to Rostherne Brook, as it has similar characteristics.

Groundwater

11.3.12 The bedrock beneath part of the study area is a ‘Secondary B’ aquifer, meaning that it may store and yield small quantities of groundwater.

11.3.13 The superficial deposits beneath a larger part of the study area are part of a ‘Secondary A’ aquifer, and therefore may be capable of supporting water supplies at a local level only, and may have a role in supplying base flow to local watercourses.

11.3.14 Soils overlying the aquifer are of intermediate leaching potential. This means that some types of pollutant can pass through the soil into the underlying deposits, potentially reaching the groundwater in the aquifer, while other types of pollutant would be retained within the soil.

11.3.15 The study area is not within a groundwater source protection zone.

Surface Water Quality

11.3.16 No water treatment is provided for existing road runoff into the neighbouring watercourses.

11.3.17 The Mere, Little Mere and Rostherne Mere are designated as Sites of Special Scientific Interest (SSSI) and Ramsar sites. Rostherne Mere is also a National Nature Reserve. Tabley Mere, to the south, is a SSSI. More information on the ecological sensitivity of these designated sites is provided in Chapter 10 (Ecology).

11.3.18 Under the Water Framework Directive, the Environment Agency classifies water bodies (rivers, streams and lakes) according to their ecological quality (this is separate from the ecological assessment in Chapter 10). There are five classes of ecological status (high, good, moderate, poor or bad). Under the directive, the UK is obliged to ensure that all watercourses achieve good ecological status by 2015.

11.3.19 The watercourse flowing through The Mere and Little Mere, and then on into Rostherne Mere is known as Rostherne Brook. The current ecological status of Rostherne Brook is moderate. Birkin Brook is included within the classification for Rostherne Brook, and therefore also has moderate ecological status.

11.3.20 The River Bollin is a separate watercourse under the Water Framework Directive, but also has moderate ecological status.

11.3.21 Smoker Brook, to the south and west of the M6, is also classified as having moderate ecological status. The smaller watercourses draining into Smoker Brook (including Tabley Brook) are not classified, but it is reasonable to assume that their water quality is similar to that of Smoker Brook.

11.3.22 Rostherne Mere is classified as having poor ecological status, whereas The Mere and Little Mere have moderate ecological status.

11.3.23 Water hardness is high (more than 200 mg of calcium carbonate per litre) in the Tabley Mere system (measured in Smoker Brook) and also in Birkin Brook and the River Bollin. Water hardness is moderate (between 50 and 200 mg of calcium carbonate per litre) in Rostherne Brook.

Water Abstractions

11.3.24 There are two licensed water abstractions within the study area. The Mere Golf Resort and Spa abstracts water from The Mere for spray irrigation, and Mereside Farm (note – this is not the property with the same name adjacent to the west side of the existing Mere) abstracts water from both The Mere and Little Mere for irrigation of the resort's golf course.
A556 north of Millington Lane), just to the northwest of The Mere, abstracts from groundwater, also for spray irrigation. There are no abstractions for drinking water.

Consented Discharges

11.3.25 Tabley Brook receives treated effluent from United Utilities’ Hoo Green sewage treatment works at Bucklow Hill.

11.3.26 There are a small number of individual domestic properties discharging treated effluent to Tabley Brook and to a tributary of Rostherne Brook. It is likely that these properties use septic tanks.

11.3.27 Treated effluent from the Travel Lodge and Little Chef businesses, just north of the M6 Junction 19, is discharged into a tributary of Tabley Brook.

11.3.28 Bowdon sewage treatment works discharges final effluent to the River Bollin, approximately 500 metres upstream of the confluence with Birkin Brook.

Flood Risk

11.3.29 Neither the existing nor the proposed route of the A556 is within a flood zone.

11.3.30 There is a localised flood plain to the north, associated with the River Bollin and its confluence with Birkin Brook. To the east of the existing A556, localised areas of land alongside Rostherne Brook are at risk of flooding. To the west of the A556, Tabley Brook has a small flood zone associated with it, extending approximately 500 metres to the north of the M6. In all of these areas, the risk of flooding is considered to be significant (greater than 1.3% in any one year, which is equivalent to 1 event in 75 years on average).

Fisheries

11.3.31 Birkin Brook in the study area is designated as a cyprinid water (coarse fishery). Blackburn Brook, including the whole of Rostherne Brook, is also designated as a cyprinid water.

11.3.32 The River Bollin in the study area is designated as a cyprinid water. Higher up the catchment, the River Bollin upstream of Macclesfield is designated as a salmonid water (supporting salmon and trout). Salmonid fish migrating to the upper catchment will pass through the study area.

11.3.33 Tabley Brook is not a designated fishery, although Smoker Brook, which receives flow from Tabley Brook, is designated as a cyprinid water.

Importance of Attributes

11.3.34 The importance of each of the various attributes of the local water environment is shown in Table 11.2.

Table 11.2: Water Features: Attributes, Quality and Importance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Attribute</th>
<th>Indicator of Quality</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabley Brook and its tributaries</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Effluent discharges from Hoo Green sewage works, from a small number of domestic properties, and from a Travelodge / Little Chef.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
</tr>
<tr>
<td>Rostherne Brook and its tributaries</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Effluent discharges from a small number of domestic properties</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>WFD class ‘Moderate’. Designated cyprinid fishery</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
</tr>
<tr>
<td>Birkin Brook</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>WFD class ‘Moderate’. Designated cyprinid fishery</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Conveyance of flow</td>
<td>Receives water from Blackburn’s Brook (Rostherne Brook), Mobberley Brook and Sugar Brook including their catchments upstream. Birkin Brook flows from Knutsford, where it receives flows from tributary streams.</td>
<td>High</td>
</tr>
<tr>
<td>River Bollin</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Bowdon sewage works discharges to the River Bollin approximately 500m upstream of the confluence with Birkin Brook.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>WFD class ‘Moderate’. Designated cyprinid fishery.</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Conveyance of flow</td>
<td>River Bollin drains a large catchment which includes Macclesfield and areas to the east.</td>
<td>High</td>
</tr>
<tr>
<td>Un-named tributary to River Bollin</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Water Supply</td>
<td>Local abstraction for spray irrigation</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Vulnerability</td>
<td>Secondary aquifer overlain by soils of intermediate leaching potential. No groundwater source protection zones.</td>
<td>Low</td>
</tr>
</tbody>
</table>
11.4 Predicted Environmental Effects

Potential environmental impacts that could arise from the scheme, if mitigation measures were not to be put in place, are as follows:

Construction impacts

- Pollution from mobilised sediments and from spillage of fuels, lubricants, hydraulic fluids and cement during construction activity.

Operational impacts

- Changes to surface water quality as a result of routine runoff from the highway;
- Pollution impacts from accidental spillages;
- Changes in the conveyance of flood flows as a result of new structures; and
- Changes to flood patterns due to a change in the impermeable area and associated runoff rates.

Construction Impacts

11.4.2 The same discharge points would be used to drain the construction site as would be used to drain the road after opening.

11.4.3 During the majority of the construction period, most of the construction site will comprise surfaces of bare earth or other construction materials such as crushed rock. Rainwater draining from the construction site will therefore carry a heavy load of sediment. Without mitigation, the discharge of such quantities of sediment would affect the quality of water in local watercourses and could lead to silting-up their beds; this would increase flood-risk and damage aquatic habitats. The deposition of silt from the construction site would cease at the end of construction, but the effects of the silt deposited during that period could potentially be long-term in nature.

11.4.4 Without mitigation, construction works give rise to the risk of accidental spillages of fuels, lubricants, hydraulic fluids, cement or other pollutants. These are risks rather than impacts as such, because their actual occurrence is uncertain, and the specific location, nature and severity of any incident cannot be predicted. The risk would cease at the end of the construction period, but the effects of any incident could be either long-term or short-term, depending on the nature of the spillage, its location and its scale.

Operational impacts

11.4.5 The drainage strategy for both the new A556 and the de-trunked Chester Road is illustrated on Figure 2.7 and described in Chapter 2.

Routine Runoff from the de-trunked Chester Road

11.4.6 Runoff from Chester Road would drain via the same discharge points used for the drainage of the existing A556 (see paragraphs 11.3.2-6 above, and Figures 11.1A and B), and no alterations would be made to the outfall structures. Changes to the existing catchments and outfalls would be as follows (see also Figure 2.7):

- The road area of the existing Catchments 1, 2, 4 and 5 would be significantly reduced, due to the removal of impermeable surfaces over half of the width of the de-trunked road as part of the de-trunking works (see Chapter 2). Discharges would be unchanged (i.e. Catchment 1 would continue to discharge into the M6 drainage system, and Catchments 2, 4 and 5 would continue to discharge into watercourses east of the scheme);
- The road area of the existing Catchment 3 would be reduced by less than half, as it drains part of the A50 as well as the A556, and only the A556 would be reduced in width. The discharge would be unchanged (i.e. into a combined sewer);
- Catchment 7 would be divided in two. The southern part of the catchment (south of the M56) would be reduced by at least half, and incorporated into the drainage system for the new trunk road (Catchment C; see below). The northern part would be reduced in area by more than half, comprising only the existing Bowdon Roundabout and some adjacent elements of the remodelled Junction 7 of the M56. It would continue to discharge as at present, into the River Bollin.

11.4.7 The reduction in traffic using Chester Road and in the surface area of the road draining to the existing discharge points would be expected to lead to long-term beneficial impacts on the receiving watercourses during operation. Notably, the Rostherne Brook catchment, including its tributaries, The Mere, Little Mere and Rostherne Mere, would...
benefit from an improvement in the quality of road runoff. The Rostherne Brook catchment would receive no runoff from the new A556.

**Routine run-off from the new A556 trunk road**

11.4.8 No runoff from the scheme would discharge to groundwater. Runoff from the new A556, between M6 Junction 19 and a point just to the south of the M56, would be drained to four new discharge points (A to D). Two of these discharges (A and B) would be to Tabley Brook, one would be to an un-named tributary of the River Bollin (C), and one would be to the River Bollin itself (D).

11.4.9 Without appropriate mitigation, the watercourses receiving discharges from catchments A to D could be adversely affected by reductions in water quality (in particular by high sediment loads) and increases in discharge rates, which could affect flood risk. A key parameter in calculating the effect of the scheme on Tabley Brook and the un-named tributary of the River Bollin is the small size of these watercourses, which means that when the watercourses themselves are low the amount of water entering them from the highway discharges would be greater than the amount of water already in the stream.

11.4.10 Bowdon Roundabout at the northern end of the scheme would be drained into the River Bollin, using the existing Catchment 7 discharge point. The area of highway draining via this outfall would be reduced, and less traffic would use the roundabout, so it is expected that the volumes of water and the levels of sediment and pollutants in the water discharged at this location would be reduced.

11.4.11 Drainage from the M56 slip roads at the north-eastern limit of the scheme would be drained via a new outfall structure to Birkin Brook. This would discharge to the same reach of the river that currently receives road runoff in this area (Catchment 6), but the area of highway draining to this point would be reduced. It is therefore expected that the levels of pollutants discharged at this location would be reduced.

**Accidental Spillages**

11.4.12 The risk of an accidental spillage or vehicle fire, which could lead to a pollution incident, is considered to be proportional to the risk of a collision of heavy goods vehicles. As the new route of the A556 would be designed to reduce collision rates, for example through improved junction design and the elimination of conflict with local traffic joining/leaving at side roads and private property entrances, the risk of spillages would be expected to reduce. However, the design of the scheme does incorporate features that would provide additional protection to watercourses in the event of such a spillage (see paragraph 11.5.11). Not all spillages lead to pollution incidents, as action can be taken to control spillages and prevent them from affecting the water environment.

**Flood Risk**

11.4.13 The scheme would create new, larger areas of impermeable surface. Without mitigation to control discharge rates, this can increase flood risk along the receiving watercourses, due to a larger volume and rate of discharge.

11.4.14 Construction of new structures in any floodplain can reduce the capacity available for storage of floodwaters, thereby increasing the extent of flooding in the surrounding area. The floodplain of the River Bollin is adjacent to the northern extent of the scheme. However, the scheme would not be constructed in the floodplain, and hence this risk would not arise.

11.4.15 Discharges to groundwater can cause the water table to rise and hence lead to an increased risk of groundwater flooding. However, the proposed scheme would not discharge to groundwater, so this risk would not arise.

**11.5 Mitigation**

**Mitigation during Construction**

11.5.1 The permanent drainage system for the A556 improvements would be developed early in the construction process to reduce the temporary risks of pollution to the water environment during construction.

11.5.2 Measures to control the risk of pollution during construction would be implemented through a construction environmental management plan (CEMP). Contractors would be required to operate in accordance with the Environment Agency’s Pollution Prevention Guidelines (PPGs). PPGs of particular relevance to this scheme include:

- PPG2: Above ground oil storage tanks;
- PPG5: Works and maintenance in or near water;
- PPG6: Working at construction and demolition sites; and
- PPG21: Pollution incident response planning.

11.5.3 All fuel, oil and chemicals would be stored in accordance with the requirements of the Control of Pollution (Oil Storage) Regulations 2001. Construction plant would be refuelled in designated areas on an impermeable surface, away from drains and watercourses. An emergency spill plan would be generated and spill kits would be available at appropriate locations.
11.5.4 Flood defence consent would be obtained from the Environment Agency for any works in ordinary watercourses which may involve culverting or possible obstructions to the flow, and for any works within eight metres of a main river.

Mitigation for the Operational Phase

11.5.5 The drainage design for Catchments A, B and C has been modified to include a surface flow wetland (reed bed) as well as an attenuation pond with an impermeable liner. This combination of treatment elements would be required due to the sensitivity of the receiving watercourses in these locations, particularly as their relatively low flow rates mean that their capacity to dilute pollutants and to disperse sediments is limited. Without such mitigation in place, the outfalls from these three catchments would not pass the HAWRAT assessment for routine runoff. Indicative treatment efficiencies presented in HD33/06 of DMRB show that surface flow wetlands and attenuation ponds are likely to provide significant reductions in concentrations of pollutants prior to discharge to the watercourses. The proposals for these mitigation measures have been developed in consultation with the Environment Agency.

11.5.6 Contaminated sediment would be removed periodically from the attenuation ponds, and the reeds would be removed and replaced as required. Regular inspections would identify when this action would need to be taken, and it is likely to be at approximately five to ten year intervals. Reed removal and re-planting would be done in sections, to ensure that treatment capability would be retained at all times.

11.5.7 In addition to providing water treatment, the attenuation ponds would also be used to regulate discharge rates to ensure that flood risk would not be increased. The runoff from the new carriageway would be limited to existing greenfield runoff rates.

11.5.8 Catchment D would be drained via an attenuation pond, which would control flow rates to ensure that flood risk would not be increased. There would be no requirement for additional treatment for catchment D, as the assessment showed that the water discharged here would be of acceptable quality without further treatment.

11.5.9 Discharge points 1 to 5 currently drain the existing A556. After the transfer of traffic to the new trunk road, traffic volumes on the de-trunked Chester Road would be greatly reduced, leading to a reduction in the pollutant loading in the runoff. In addition, the flow rates off the road into these discharge points would be reduced, due to a reduction in impermeable surface area of approximately 50%. For these reasons, the receiving watercourses are expected to experience an improvement in water quality and a reduction in flood risk, and therefore mitigation is not considered to be required for these discharge points.

11.5.10 Changes to the drainage catchments at the northern limit of the scheme mean that the road area within Catchment 6 would be reduced by approximately 50%, and the area within Catchment 7 would be reduced by approximately 80%. Therefore, the discharge rates would be reduced without any attenuation of flow being included in the design. Similarly, there would be no requirement for treatment for catchments 6 or 7, as the assessment showed that the quality of water to be discharged here would be acceptable without treatment.

11.5.11 The risk of a pollution incident arising from a spillage incident is well within the acceptable limits set out in HD45/09, for all discharge points, and is likely to be lower than in the existing situation. Therefore, no mitigation measures specifically for this purpose are required. However, the attenuation ponds for Catchments A-D, although provided for other purposes, would also provide protection from accidental spillages, in that any water polluted as a result of an accident within those catchments could be retained within the ponds for any clean-up that is required prior to discharge.

11.5.12 Side roads in the local area have no formal drainage in place. Instead, surface runoff drains ‘over the edge’ onto the adjacent land. The new side road that would be constructed to link from Chapel Lane to the new alignment of the A556 would also be drained ‘over the edge’ with no mitigation measures in place.

11.6 The significance of environmental impacts

11.6.1 All of the impacts of the scheme on the water environment are summarised in Tables 11.3 (construction effects) and 11.4 (operational effects) on the following pages. The tables also assess the significance of impact on each attribute of each of the existing features of the water environment, taking into account the mitigation measures described in Section 11.5.

11.6.2 The majority of impacts arising from the construction of the scheme would be ‘neutral’ (i.e. neither significantly adverse or significantly beneficial), with the exception of water quality impacts on Tabley Brook, Birkin Brook and a tributary of the River Bollin, which would be of slight adverse significance. However, these construction impacts would be short-term in nature and would not continue beyond the construction phase.

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67 During rainfall, water can run off rapidly from the impermeable surface of the road, increasing water level in the streams to which it discharges. An ‘attenuation pond’ (or ‘balancing pond’) holds back the water before discharge, allowing it to be released slowly and reducing flood risk. While the water is held in the pond, sediment and pollutants can settle out, which improves the quality of water before it is discharged.

68 i.e. the rate of discharge that would be expected from an area of un-developed land with entirely soil-covered, permeable surfaces. Such areas release water into watercourses much more slowly than areas with hard, impermeable surfaces.
11.6.3 The operational impacts of the scheme would all be long-term in nature. The majority of impacts would be neutral, after the application of mitigation measures described in Section 11.5. There would be beneficial impacts on the streams and designated wetlands to the east of the existing A556 (The Mere and Little Mere Ramsar and SSSI sites), as a result of draining the new road away from these areas.

11.6.4 There would be moderate adverse impacts on some attributes of the minor watercourses to the west of the proposed new road (Tabley Brook and a tributary of the River Bollin), as they would receive runoff from the new road whereas currently they receive no runoff from the existing road, and the mitigation options available cannot fully remove the sediment and pollutants from the water. However, this assessment has used conservative estimates of the degree of water treatment that would be achieved by the proposed drainage system, based on the limited information available in DMRB. With further development of the design, the significance of the impact may ultimately be downgraded in the ES.
### Table 11.3: Summary of Potential Effects arising from the Construction of the Scheme

<table>
<thead>
<tr>
<th>Feature</th>
<th>Potential Impact</th>
<th>Attribute</th>
<th>Quality</th>
<th>Importance</th>
<th>Mitigation</th>
<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabley Brook and its tributaries</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Moderate' (assumed)</td>
<td>Medium</td>
<td>Contractor to implement a construction environmental management plan</td>
<td>Minor Adverse (short term)</td>
<td>Slight Adverse (short term)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Effluent discharges from Hoo Green sewage works, from a small number of domestic properties, and from a Travelodge / Little Chef.</td>
<td>High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD classification 'Moderate' (assumed)</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water run off</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Rostherne Brook and its tributaries</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Moderate'</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Effluent discharges from a small number of domestic properties</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD class 'Moderate'. Designated cyprinid fishery</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water run off</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Birkin Brook</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Moderate'</td>
<td>Medium</td>
<td>Minor Adverse (short term)</td>
<td>Slight Adverse (short term)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD class 'Moderate'. Designated cyprinid fishery</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water run off</td>
<td>Conveyance of flow</td>
<td>Receives water from Blackburn's Brook (Rostherne Brook), Mobberley Brook and Sugar Brook including their catchments upstream. Birkin Brook flows from Knutsford, where it receives flows from tributary streams.</td>
<td>High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>River Bollin</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Moderate'</td>
<td>Medium</td>
<td>Follow the Environment Agency’s pollution prevention guidance, Permanent drainage system to be developed early in construction</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Bowdon sewage works discharges to the River Bollin approximately 500m upstream of the confluence with Birkin Brook.</td>
<td>High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD class 'Moderate'. Designated cyprinid fishery</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water run off</td>
<td>Conveyance of flow</td>
<td>River Bollin drains a large catchment which includes Macclesfield and areas to the east.</td>
<td>High</td>
<td>Obtain flood defence consent for works in or within eight metres of a watercourse.</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Un-named tributary to River Bollin</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Moderate' (assumed)</td>
<td>Medium</td>
<td>Minor Adverse (short term)</td>
<td>Slight Adverse (short term)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD classification 'Moderate' (assumed)</td>
<td>Medium</td>
<td>Minor Adverse (short term)</td>
<td>Slight Adverse (short term)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water run off</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Groundwater</td>
<td>Change in water quality</td>
<td>Water Supply</td>
<td>Local abstraction for spray irrigation</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vulnerability</td>
<td>Secondary aquifer overlain by soils of intermediate teaching potential. No groundwater source protection zones.</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>The Mere and Little Mere</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Moderate'</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water Supply</td>
<td>Local abstraction for spray irrigation</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>SSSI and Ramsar site</td>
<td>Very High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Rostherne Mere</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification 'Poor'</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>National Nature Reserve, SSSI and Ramsar site</td>
<td>Very High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Tabley Mere</td>
<td>Change in water quality</td>
<td>Biodiversity</td>
<td>SSSI</td>
<td>Very High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Floodplain</td>
<td>Flooding from increased surface water run off</td>
<td>Conveyance of Flow</td>
<td>Localised floodplains associated with watercourses, outside of developed areas.</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
</tbody>
</table>

*Issued January 2012*
## Table 11.4: Summary of Potential Effects arising from the Operation of the Scheme

<table>
<thead>
<tr>
<th>Feature</th>
<th>Potential Impact</th>
<th>Attribute</th>
<th>Quality</th>
<th>Importance</th>
<th>Mitigation</th>
<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabley Brook and its tributaries</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
<td>Runoff from catchments A and B to pass through surface flow wetland and attenuation pond</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Effluent discharges from Hoo Green sewage works, from a small number of domestic properties, and from a Travelodge / Little Chef.</td>
<td>High</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water runoff</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Discharge rate limited to existing greenfield runoff rate</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Rostherne Brook and its tributaries</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Effluent discharges from a small number of domestic properties</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD class ‘Moderate’. Designated cyprinid fishery</td>
<td>Medium</td>
<td>Minor Beneficial</td>
<td>Slight Beneficial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water runoff</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
<td></td>
</tr>
<tr>
<td>Birkin Brook</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD class ‘Moderate’. Designated cyprinid fishery</td>
<td>Medium</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water runoff</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
<td></td>
</tr>
<tr>
<td>River Bollin</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
<td>Runoff from catchment D to pass through attenuation pond</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dilution and removal of waste products</td>
<td>Bowdon sewage works discharges to the River Bollin approximately 500m upstream of the confluence with Birkin Brook.</td>
<td>High</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD class ‘Moderate’. Designated cyprinid fishery</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water runoff</td>
<td>Conveyance of flow</td>
<td>River Bollin drains a large catchment which includes Macclesfield and areas to the east.</td>
<td>High</td>
<td>Discharge rate from catchment D limited to existing greenfield runoff rate</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Un-named tributary to River Bollin</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
<td>Runoff from catchment C to pass through surface flow wetland and attenuation pond</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>WFD classification ‘Moderate’ (assumed)</td>
<td>Medium</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flooding from increased surface water runoff</td>
<td>Conveyance of flow</td>
<td>Minor watercourse draining surrounding land</td>
<td>Medium</td>
<td>Discharge rate limited to existing greenfield runoff rate</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Change in water quality</td>
<td>Water Supply</td>
<td>Local abstraction for spray irrigation</td>
<td>Low</td>
<td>n/a</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vulnerability</td>
<td>Secondary aquifer overlain by soils of intermediate leaching potential. No groundwater source protection zones.</td>
<td>Low</td>
<td>n/a</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>The Mere and Little Mere</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Moderate’</td>
<td>Medium</td>
<td>Minor Beneficial</td>
<td>Slight Beneficial</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water Supply</td>
<td>Local abstraction for spray irrigation</td>
<td>Low</td>
<td>n/a</td>
<td>Minor Beneficial</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>SSSI and Ramsar site</td>
<td>Very High</td>
<td>n/a</td>
<td>Minor Beneficial</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>Rostherne Mere</td>
<td>Change in water quality</td>
<td>Water quality</td>
<td>WFD classification ‘Poor’</td>
<td>Low</td>
<td>Negligible</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiversity</td>
<td>National Nature Reserve, SSSI and Ramsar site</td>
<td>Very High</td>
<td>n/a</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Tabley Mere</td>
<td>Change in water quality</td>
<td>Biodiversity</td>
<td>SSSI</td>
<td>Very High</td>
<td>Runoff from catchments A and B to pass through surface flow wetland and attenuation pond</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Floodplain</td>
<td>Flooding from increased surface water runoff</td>
<td>Conveyance of Flow</td>
<td>Localised floodplains associated with watercourses, outside of developed areas.</td>
<td>Low</td>
<td>Discharge rate from new carriageway to be limited to existing greenfield runoff rate</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
</tbody>
</table>
12 Materials

Executive summary

This chapter addresses the potential environmental effects associated with the use of material resources and the management of waste during the construction of the scheme.

A high proportion of the potential impacts associated with materials cannot be absolutely predicted, as they would only occur if something goes wrong (i.e. they would be the result of unplanned, accidental occurrences, such as spillages, or as a result of failure of management systems). The risk of such events occurring will be managed and reduced through the development and application of several plans addressing different aspects of construction site management, as follows:

- Construction Environmental Management Plan;
- Environmental Action Plan;
- Site Waste Management Plan;
- Materials Management Plan; and
- Soil Resources Plan.

After the application of these plans, construction of the new A556 is expected to give rise to small-scale impacts only, mainly relating to the temporary storage and movement of materials and wastes during construction. However, the de-trunking works on Chester Road (the old A556) may give rise to more significant impacts. This is because this activity can only occur at the end of the construction programme, which limits opportunities for planning materials re-use within the wider scheme, potentially leading to requirements for the disposal of waste off site.

12.1 Introduction

12.1.1 ‘Materials’ is a new topic in DMRB, and guidance on the scope of the topic and the approaches / methodologies to be applied has not yet been published. For the purposes of this assessment Materials is defined as comprising:

- The use of Materials Resources; and
- The generation and management of Waste.

12.1.2 Material resources include both primary raw materials such as aggregates and minerals, and secondary manufactured products. Many material resources will originate off-site and some will arise on-site, such as excavated soils or recycled road planings.

12.1.3 Road schemes require significant quantities of both primary raw materials and secondary manufactured products. The production, sourcing, transport, handling, storage and use of these materials, as well as the disposal of any surplus materials, have the potential to adversely affect the environment.

12.1.4 Many impacts associated with the extraction and transport of primary raw materials and manufactured products would occur off site, in some cases potentially outside the UK. The production of these materials is likely to have been the subject of separate consent procedures (such as applications for planning permission), which may have included Environmental Impact Assessment. It is therefore outside the scope of this document to assess the environmental impacts associated with the extraction of raw materials and the manufacture of products.

12.1.5 This assessment focuses on the assessment of impacts arising from the transport, storage and use of material resources within the construction site, and the production, movement, transport, processing, and disposal of wastes, to the extent that they are not covered within Chapters 6 (Air quality), 11 (Road drainage and the water environment) or 13 (Geology and soils). The consumption of energy has been considered in relation to the above processes, but not in relation to operation of the scheme.

12.1.6 In considering materials resource use and waste management it is important to define when, under current legislation and understanding, a material is considered to be a waste. Waste is defined in European Directive 2008/98/EC as “any substance or object the holder discards, intends to discard or is required to discard”.

12.1.7 Some types of wastes are harmful to human health, or to the environment, either immediately or over an extended period of time. These are called hazardous wastes.

12.1.8 Once a material has become waste, it remains waste until it has been fully recovered and no longer poses a potential threat to the environment or to human health. Once recovered, it ceases to be waste and is no longer subject to the controls and other measures required by the Directive. These principles are applied by the Environment

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69 i.e. old road surface materials removed from redundant carriageways or areas to be re-surfaced.
Agency to waste used as aggregate/construction material in civil engineering applications, which ceases to be waste once it is incorporated in the construction.

12.1.9 Construction wastes account for approximately three times as much waste as all UK households combined. The Strategy for Sustainable Construction 2008 set a target for halving the amount of Construction, Demolition and Excavation (CD&E) waste that is sent to landfill by 2012. The Government envisage that this will be achieved as a result of improvements in waste reduction, re-use and recycling initiatives in construction. In terms of materials the strategy sets out that those used in construction should have the least environmental and social impact as feasible both socially and economically.

12.1.10 The following legislation, regulations or guidelines are applicable to the assessment for this scheme:

- The Site Waste Management Plans Regulations 2008;
- Environment Act 1995;
- Environmental Protection Act 1990;
- Environmental Protection (Duty of Care) Regulations 1991;
- Hazardous Waste (England and Wales) Regulations 2005 as amended;
- Environmental Permitting (England and Wales) Regulations 2010;
- Wildlife and Countryside Act 1981;
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009);
- The Definition of Waste: Development Industry Code of Practice Version 2 (CL:AIRE, 2011);
- Environment Agency (Guidance Note SR2010No8_100Kte) Use of waste in Construction;
- Strategy for Sustainable Construction Defra 2008;
- Strategy for Sustainable Construction, Progress Report 2009; and

12.1.11 The Waste Strategy for England sets out a framework for waste management structured around a ‘waste hierarchy’, which defines the order of preference of the various options for the management of waste. The waste hierarchy can be illustrated in diagrammatic form as shown in Table 12.1.

Table 12.1: The Waste Hierarchy

Limitations of this chapter

12.1.12 This assessment has been carried out at a stage when the preliminary design is still being developed. For some aspects of the scheme information about design is not available or is incomplete, and there is a high likelihood that certain aspects of the design that are key to this topic may change before the ES is prepared. Examples of aspects of the scheme that may be affected include:

- Earthworks quantities;
- Permanent scheme drainage and temporary site drainage;
- Lighting;
- Land required temporarily during construction;
- Aspects of construction site management; and
- Maintenance regime during operation of the scheme.

12.1.13 As a result, some aspects of the baseline information, impacts and mitigation are described only in outline at this stage. More detailed information will be given in the Environmental Statement, but some of the relevant aspects may not be finalised until later stages (during pre-construction preparation or during the construction period).
12.1.14 The likely sources of aggregates will be considered in the ES. The potential effects of the scheme on the identified local landfills will also be considered in the ES.

12.1.15 Operational impacts have not been described in this PEI but will be addressed in the Environmental Statement.

12.1.16 A Draft Interim Advice Note (IAN) Guidance on the Environmental Assessment of Material Resources has recently been drafted by the Highways Agency, after work for this PEI was nearly complete. However, as this IAN is still a draft this PEI does not necessarily reflect the final contents.

12.2 Approach and methods

12.2.1 As there is no published guidance for the assessment of Materials aspects of highways schemes, the methodology used here is based on advice received from the Highways Agency, before the latest draft IAN (see above) became available.

12.2.2 The study area for this topic is limited to the boundaries of the construction site, within which materials will be used and wastes will be generated and managed. For the purposes of the assessment the study area has been sub-divided into the following sections based upon similarity of Materials and Waste issues associated with each activity (see Section 2.4 for detailed descriptions of proposed works):

- The footprint of the new A556, of any temporary land required during construction, and of any works required to stop-up side roads either side of the new A556; and
- De-trunking works on Chester Road.

12.2.3 The construction site is deemed to include the full footprint of the new A556 and of the de-trunking works, together with any land that would be used temporarily during construction. Such temporary land will include site compounds, temporary storage areas for soils and other materials, haul-roads, and potentially land for temporary construction site drainage. The full extent of the construction site cannot be fully defined at this stage as the required working areas have not been fully identified by the contractor. As a result the assessment considers, where necessary, the potential generic impacts of materials aspects of the scheme on the environment.

12.2.4 The assessment considers materials and waste aspects of the scheme, falling under the following general categories:

- **Material Resource** – The primary and secondary materials required for construction;
- **Material Resource Efficiency** – Optimisation of material resource use through minimisation of the use of resources, promotion of materials’ re-use and minimisation of waste production;
- **Material Resource Flow** – Consideration of the demand for and proposed use of materials and the management / use of surplus materials in the context of the Waste Hierarchy (as defined above).

12.2.5 The assessment of potential impacts has been generally undertaken considering the following categories:

**Materials**

- Assessment against regulatory and policy drivers;
- Assessment against the carrying capacity of the environment; and
- Materials re-use / recycling / recovery.

**Waste**

- Assessment against regulatory and policy drivers;
- Waste prevention, materials re-use, recycling and recovery;
- Waste classification, volumes and disposal routes.

12.2.6 In the absence of specific guidance, the assessment of potential impacts has been undertaken on the basis of professional judgement.

12.2.7 The following sources of information have been consulted to inform the assessment of baseline conditions and potential environmental impacts:

- Environmental Impact Scoping Report (Jacobs 2011);
- Advice from the Highways Agency’s lead materials specialist;
- Outline design information (locations, volumes, balance etc), preliminary assessment of secondary materials requirements (e.g. concrete, steel, asphalt) and the Structures Options Report (Jacobs, 2011); and
12.3 The existing environment ('baseline conditions')

12.3.1 Receptor types likely to be at risk of impacts under this topic heading include:
- Quarries and other sources of minerals and other finite raw material resources. Specific sources of raw materials to be used for this scheme have not yet been identified;
- Landfill sites or other waste disposal facilities. Waste disposal facilities to be used for the scheme have not yet been identified;
- Soils and agricultural land in the surrounding area. The majority of the surrounding land is in Agricultural Land Classification Grades 2 and 3a, and therefore falls into the 'best and most versatile' land category. More information on soil resources and land is given in Chapters 13 (Geology and soils) and 14 (Private and community assets);
- Surface water resources, including the water bodies in the study area, comprising many ponds, larger water bodies (Rostherne Mere, The Mere and Little Mere), small streams and the River Bollin (see Chapters 10 and 11 for more information on ecology and water quality);
- Groundwater resources. This is a minor concern on this project, due to the nature of existing groundwater resources (see Chapters 11 and 13);
- Human beings, particularly local residents. The distribution of residential properties is shown on the Environmental Constraints Plan attached to this report;
- Wildlife and its habitats. Information on habitats and protected species is given in Chapter 10 and on the Environmental Constraints Plan;
- The global climate, through the use of energy and resultant greenhouse gas emissions.

12.3.2 The baseline conditions for the scheme have been considered, where possible, according to conditions likely to be present at the commencement of construction (assumed for the purposes of this assessment to be in 2014). Many of the likely conditions, such as specific targets for materials re-use and or waste disposal, cannot be confirmed until the detailed design is completed.

12.3.3 The types of materials likely to be required for construction are common to all road schemes. The approximate quantities of materials will be assessed and included in the ES. The principal materials required for this scheme include:
- Bulk earthworks materials (soils and/or rock);
- Topsoil and subsoil for landscaping;
- Bitumen products and aggregates for carriageway construction;
- Concrete, steel and plastics for the construction of highways structures, drainage and services (including temporary works);
- Concrete, wood, steel and plastics for temporary works construction; and
- Wood, metals and plastics for fencing, lighting and signage.

12.3.4 Structures, drainage and signage require steel, concrete and plastics and these products are to be procured mindful of the environmental effects associated with their manufacture, as well as other considerations such as structural design, performance, visual impacts, durability and cost. Both reinforced concrete and steel structures include a measurable recycled content in their manufacture. However, reinforced concrete is likely to be the material of choice for bridge construction as this is the most economic form of construction for the specific types of structures required.

12.3.5 Many existing materials, both man made and natural, can be potentially re-used including the following which will be generated during this scheme;
- Excavated natural soils and/or rocks (and made ground) produced during topsoil stripping and the construction of cuttings and embankments (collectively referred to as ‘earthworks’);
- Re-use of road planings from de-trunking of Chester Road by incorporation into new pavements on or off site

12.3.6 It is a key aim to design the scheme so as to achieve a ‘cut and fill balance’ such that the amount of material produced by excavation for the new highway (services and proposed cuttings etc) is matched by the amount of material required to build embankments and landscaping. This maximises the re-use of excavated bulk earthworks materials in the scheme or enables their re-use elsewhere.

12.3.7 At the time of writing the amount of material to be excavated from the proposed road cuttings would exceed that required to construct the road embankments. Adjustments to the vertical alignment have been made to raise the road and therefore reduce the amount of excavation and thereby to improve the overall balance of the earthworks (i.e. bring the amount of excavation close to the amount of placement). The remaining surplus material is expected to be required for construction of essential landscape and other environmental mitigation works (principally earth bunds to reduce noise impacts and to provide visual screening), although the extent and height of these is not yet finalised. Overall, it is considered unlikely that any surplus fill material would be exported from site. Similarly, it is anticipated that no fill material would need to be
imported to site unless it is to be used for specialist purposes (i.e. structural backfill or drainage material).

12.3.8 Despite the intention to re-use excavated materials it is often a requirement to import some additional earthworks construction materials to site for specialist purposes. For example:

- The incorporation of geo-textiles (i.e. textiles that are permeable to water and that can be used to reinforce structures built of earth) in earthworks can considerably reduce the quantity of fill material required by improving the strength of the material. Similarly this can also reduce the quantity of steel or concrete required to build structures.

- Imported aggregates are likely to be required such as for earthworks for structures, drainage and road pavement construction. These can be primary (e.g. natural gravels and rocks) or secondary (e.g. recycled concrete, recycled road planings, Incinerator Bottom Ash Aggregate (IBAA), reclaimed railway ballast etc.).

12.3.9 The choice of whether to use primary or secondary aggregates (or a combination of both) will be made after considering a combination of factors such as source, specification, production and transport of available materials. Consequently secondary (recycled) aggregates may not always have the lowest environmental impact and materials will be selected based on consideration of all relevant impacts.

12.3.10 Existing soils and infrastructure are considered to be a potential materials resource. They are not therefore considered to be a waste, unless there is no possibility of recovering the material through recycling (on or off site), or other processing that would enable re-use of the materials in the new construction or elsewhere. Where no re-use of any material is possible on or off site, the material will need to be discarded and would thus become classified as waste.

12.3.11 The new A556 would be aligned predominantly across agricultural land, and in consequence there is no requirement for demolition of existing buildings and structures, and little potential for the generation and recycling of demolition wastes. The scheme description is discussed in detail in Chapter 2, The Project. The de-trunking works for Chester Road and other crossings and/or stopping up works for minor routes will not require the demolition of existing buildings and structures although small quantities of demolition wastes (e.g. redundant barriers, lighting columns) could be generated.

12.3.12 No materials or land uses have been identified to date with significant potential to generate contaminated soils or ground water. However, there is the potential for such materials to be identified during pre-construction investigations or during construction. Contaminated soils or ground water are those that due to their hazardous physical and/or chemical properties do not meet the required specification and or exceed the relevant environmental standards and are thus not suitable for re-use and need to be remediated or discarded as waste. The possible sources of contaminated soils are discussed further in Chapter 13, Geology and soils.

12.3.13 The site is located close to highways infrastructure capable of accommodating vehicle movements for materials and waste transportation.

12.4 Predicted environmental effects

12.4.1 Environmental effects associated with material resources and waste occur at each stage of the project’s material flow cycle. A simplified diagrammatic representation of materials resource flows is set out below (Table 12.2), identifying material resource use and the management of waste.

<table>
<thead>
<tr>
<th>Table 12.2: Material flow cycle</th>
</tr>
</thead>
</table>

Materials

12.4.2 For materials, the potential environmental effects are associated with the extraction and transport of primary raw materials, the manufacture of secondary materials, and the transportation of both primary and secondary materials to and use on construction sites. It is not possible at this stage to quantify the majority of these effects until the completion of detailed design.
12.4.3 Energy is considered an aspect of both material use and waste management. For example, energy is consumed during raw material extraction, the manufacture of products, transport and in their use on site. Energy is also consumed in the management of waste from transport for reprocessing and disposal and the energy involved in the recycling and reprocessing into secondary products. Direct energy usage associated with the operation of the scheme, such as the energy use from lighting, is not considered within the Materials assessment.

12.4.4 Material resources will be used, and wastes generated, during operation of the new road, as a result of ongoing maintenance works. However, the quantities of both materials used and wastes generated would be much smaller than during construction. Insufficient information about the likely maintenance regime is available at this stage to allow assessment of the operational impacts, which will be addressed in the ES. In consequence, all potential environmental effects considered in this PEI, and presented below, are considered likely to occur during the construction phase.

12.4.5 Potential effects associated with the use of materials in the construction phase are detailed below:

- The depletion of finite natural resources could occur through extraction of primary aggregates (e.g. sands and gravels) from local or other quarries;
- The sterilisation of waste-management or waste-disposal facilities could occur, either through permanent or temporary severance of access to existing landfill sites, or by filling a local landfill site up to capacity with surplus excavated materials or other wastes. This would force locally-produced wastes to be transported greater distances for disposal elsewhere. The preliminary design used in the PEI achieves an earthworks balance and therefore the likelihood that that materials will require disposal off-site is greatly reduced;
- Creation of nuisance in the local communities and damage to farmland, wildlife, habitats and surface waters as a result of wind-blown dust arising from the excavation, movement, temporary storage and permanent placement of large quantities of topsoil and subsoil;
- Pollution of controlled waters by the creation of water-borne sediments, which can damage farmland, wildlife, habitats and particularly surface waters. Such effects could occur by, for example, locating unmanaged stockpiles of materials close to water courses or drainage. Siltation of water courses and drainage can occur if water containing silts, for example, from dewatering of excavations is not managed appropriately;
- Disturbance or storage of contaminated soils during construction can lead to the release of chemical pollutants into the air, ground or water (remobilisation of contaminants);
- Flooding or disruption of the existing drainage network could be caused by poor stockpile management, creation of additional impermeable areas etc;
- Poor planning of materials re-use could lead to excessive use of plant and vehicles to move and handle bulk materials, resulting in inefficient use of energy (contributing to climate change) and increased risk of spillages of fuel, lubricants etc, potentially causing localised contamination of soils or watercourses.

12.4.6 For surplus materials and wastes, the potential environmental effects will be primarily associated with the production, movement, transport, processing (including recycling/recovery) of the materials on and off site and, if required, the disposal of wastes at off-site facilities.

12.4.7 The de-trunking of Chester Road will occur after the new A556 has been constructed and opened to traffic, restricting the potential opportunities for re-use of the existing road construction materials (road planings) within the scheme and thus increasing the potential generation of wastes.

12.4.8 Some wastes will always occur during construction even following implementation of mitigation measures. Wastes anticipated during construction of the new A556 and during the de-trunking of Chester Road include the following:

- Surplus organic materials including vegetation, deposits removed from within redundant drainage channels etc.;
- Contaminated soils that can not be treated to make them suitable for use;
- Other soils not meeting specification criteria for any re-use;
- Concrete, steel, plastic and wood wastes resulting from off cuts and defective products that could not be returned to the manufacturer or otherwise re-used;
- Wastes resulting from de-trunking of Chester Road such as:
  - Redundant drainage materials, if these need to be removed;
  - Redundant steel safety barrier;
  - Lighting and other electrical wastes;
o Road planings that cannot be recycled (e.g. those containing coal tars); and
o Plastics that can not be recycled, some of which may be hazardous waste.

12.5 Mitigation

12.5.1 Measures would be implemented to mitigate the identified impacts from both the use of materials and the generation of waste in relation to the scheme. There is significant synergy between materials re-use and the avoidance of the generation of waste, and therefore there is a substantial overlap between the mitigation measures for materials and waste.

12.5.2 The importance of careful management of materials to promote re-use and reduce waste has been widely recognised by the construction industry. Both legislation and voluntary best practice mechanisms have been developed and implemented. These provide measurable and accountable processes and provide the basis for mitigating environmental effects associated with materials and waste.

12.5.3 The principal mitigation measure relating to this topic would be the development and implementation of a Construction Environmental Management Plan (CEMP). The CEMP would be developed during the detailed design phase (i.e. after development consent has been granted, but before the start of construction) and implemented during detailed design and construction. The CEMP would include the following:

- Details of the approach to environmental management throughout the construction phase, with the primary aim of mitigating any adverse impacts from construction activity on the identified sensitive receptors;
- Methods for the prevention and control of any potential short-term construction-phase impacts (e.g. construction dust and the risk of accidental spillages of contaminating materials) and also permanent impacts (e.g. disturbance to vegetation, archaeology and heritage);
- Good materials management methods, such as co-location of temporary haul routes on permanent capping and recovery and re-use of temporary works materials from haul routes, plant and piling mattresses etc;
- Risk/impact specific method statements and strategic details of how relevant environmental impacts will be addressed throughout the scheme, embodying the requirements of the relevant Environment Agency Pollution Prevention Guidelines.

12.5.4 The Site Waste Management Regulations 2008 are mandatory for all construction projects with a value in excess of £300,000 and as such would apply to the scheme. The Regulations require that a Site Waste Management Plan (SWMP) is developed and is regularly updated during the scheme. The SWMP would identify, prior to the start of construction, the types and likely quantities of wastes that may be generated. It would set out, in an auditable document, how these wastes would be reduced, re-used, managed and disposed.

12.5.5 The SWMP would be developed by the Principal Contractor before commencement of the construction phase and will be regulated by the Environment Agency.

12.5.6 The SWMP would contain a materials management plan (MMP) which would set out how all construction phase materials would be managed. The MMP would further include specific soils management plans developed under the following voluntary and industry regulated Codes of Practice:

- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009) (which provides best practice guidance for the excavation, handling, storage and final placement of soils);
- The Definition of Waste: Development Industry Code of Practice Version 2 (CL:AIRE, 2011) (which provides a process whereby contaminated soils can be re-used on the site of origin (i.e. they do not become a waste) if they are proven through appropriate risk assessment to be suitable for use. It also provides for soils with naturally elevated contamination to be used directly on another site provided that they are suitable for use at that site);
- The Implementation of the SWMP and the accompanying MMPs would ensure that materials re-use is maximised by minimising wastes at source (new construction materials) and during construction.

12.5.7 As outlined above, there are only very limited opportunities for re-use in this scheme of existing road materials removed during the de-trunking of Chester Road. This increases the risk that these materials may become wastes. It is proposed to develop a strategy that retains in situ the majority of the existing road construction. It may be possible to recycle all or most of the road surface (planings) for incorporation in other schemes or sold to other local construction projects, but it will not be possible to confirm this until closer to the time of implementing the de-trunking works. In this way the generation of wastes such as redundant service pipes and road base are minimised. Topsoil derived from elsewhere on the scheme would then be used for the creation of a landscape bund.

12.5.8 If contaminated soils are encountered during the construction works, further investigation, testing and risk assessment would be undertaken to determine whether the soils can stay onsite, require treatment to make them suitable to remain on site or need to be disposed of off site. Details for dealing with unexpected contaminated soils would be included in the CEMP.
12.5.10 Operational impacts have not been described in this PEI, and will be addressed in the ES. However, as outlined in paragraph 12.4.5, there will be a requirement for the use of material resources and the potential generation of waste during maintenance of the new A556. Potential environmental impacts associated with these materials and wastes would be managed through the operation of relevant sections of a ‘Handover Environmental Management Plan’ (HEMP), which would be prepared by the contractor before the end of construction and passed over to the Highways Agency’s managing agent after the end of construction.

12.6 The significance of environmental impacts

12.6.1 No published guidance is currently available on the definition or assessment of significance of impact in relation to materials. In this context, for impacts falling into this category, professional judgements about the magnitude of impact were influenced by the likelihood that an impact would actually occur. This was itself assessed on the basis of professional judgement, taking into account the nature, frequency and duration of the activity and the material concerned, the location in relation to relevant receptors, and any control measures proposed by the contractor.

12.6.2 This approach does not allow the graduation of impacts into multiple levels of significance, so impacts have been assessed simply as being either ‘significant’ or ‘not significant’.

12.6.3 A high proportion of the potential impacts associated with materials cannot be absolutely predicted, as they would only occur if something goes wrong. For example, if they were the result of unplanned, accidental occurrences (such as spillages), or as a result of failure by a contractor or sub-contractor to follow procedures established in the various management plans described in this chapter.

12.6.4 These risks may be reduced or eliminated through well-planned and well-controlled construction site management, planned and expressed through the CEMP, MMP, SWMP and (for the operational period) the HEMP. The proper application of these management procedures should reduce the significance of all of the impacts described in this chapter to below the level of significance.

12.6.5 A summary of the significance of impacts after mitigation is presented at Table 12.3.

<table>
<thead>
<tr>
<th>Impact Description</th>
<th>Significance of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depletion of finite resources</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Sterilisation of existing waste management facilities</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Creation of windborne dust</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Pollution of controlled waters (sediments)</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Release of pollutants to air or controlled waters (contamination)</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Excess waste requiring disposal to landfill</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Flooding and disruption to drainage network</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Use of energy</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>
13 Geology and soils

Executive summary

An assessment of the impact of the construction and operation of the proposed road development on the geology and soils of the area was undertaken using a generic sensitivity – magnitude – significance methodology. This has allowed the sensitivity of the site to be determined by identifying potential receptors and the impacts of the scheme on these receptors, and has guided appropriate mitigation measures.

A number of sensitive receptors have been identified, the most significant one comprising a Site of Special Scientific Interest located adjacent to the north end of the A556. However, it is not expected that this would be affected by construction or operation of the proposed route.

Minor impacts have been identified relating to the re-use or disposal of excavated soil, soil deterioration, creation of dust and changes to surface water and groundwater flow regimes. With the implementation of relevant mitigation measures, the residual impact on the geology and soils of the site is considered to be neutral.

Potential impacts relating to past land uses within the study area include those arising from potentially contaminated land, which are considered to be generally of slight or negligible impact.

13.1 Introduction

Scope of topic

13.1.1 Geology and soils are important factors in determining the environmental character and quality of any given geographic area. Underlying rocks are a key determinant of landform, while the physical and chemical properties of the rocks and the overlying soils influence the type and variety of vegetation that will grow, agricultural quality, flood risk and water storage capacity. In some cases, historic land uses have resulted in changes to the geology and soils, for instance by introducing contaminants or by replacing rocks with waste (landfill).

13.1.2 Highway construction can have a significant effect on soil and geological resources, while the nature and condition of the soils and underlying rocks can be a key constraint on scheme design.

13.1.3 This chapter assesses the impact of the scheme on the geology and soils of the study area following guidance provided in DMRB Volume 11. Where no specific guidance is provided for assessment of particular impacts, professional judgement has been used to assess the significance of each impact. This chapter addresses the following aspects of geology and soils:

- Designated sites, i.e. sites protected by law or policy because of their geological importance;
- Geology and geomorphology (the structure, origin, and development of topographical features of the land, e.g. hills and valleys);
- Soil deterioration and consolidation;
- Creation of dust during construction;
- Changes to surface water flows and groundwater regimes;
- Potentially contaminated land (in brief); and
- Earthworks balance (in brief).

13.1.4 A summary of the extent of available data is given and gaps in the baseline information are highlighted. A brief summary of the potential receptors and related impacts are given. Details of the scope and method of assessment are provided and possible mitigation measures suggested.

13.1.5 Detailed calculation of earthworks volumes and a detailed contaminated land risk assessment will be provided as part of the Environmental Statement.

Limitations of the information in this chapter

13.1.6 This chapter draws on information from desk-based studies, reports prepared for alternative schemes and a preliminary ground investigation (see paragraph 13.2.1 overleaf). A more detailed ground investigation will be carried out by the ECI Contractor and this new information will be taken into account in the ES, if the information is available at that stage.

71 DMRB, Volume 11, Section 3 Part 11 (Geology and Soils)
Legislative and Policy Background

13.1.7 The Mines and Quarries Act (1954) (as amended) sets out requirements relating to abandoned and disused mines and quarries.

13.1.8 PPG14 explains briefly the effects of land instability on development and land use. The responsibilities of the various parties to any development are considered and the need for instability to be taken into account in the planning process is emphasised.

13.1.9 The Cheshire Replacement Minerals Local Plan, adopted in 1999, provides planning advice on where development mineral extraction can take place within both Cheshire West & Chester and Cheshire East Boroughs. The Minerals Local Plan in relation to mineral extraction within the site area is saved within the council website at: http://www.cheshireeast.gov.uk/environment_and_planning/planning/spatial_planning/saved_and_other_policies/cheshire_minerals_local_plan.aspx

13.1.10 Legislation on contaminated land is included within the Environmental Protection Act 1990 together with the Environment Act 1995. These define contaminated land and the procedures to identify and initiate remediation of such land. Contaminated Land is defined as land where due to the presence of substances it appears to the Local Authority that “Significant Harm is being caused or there is a Significant Possibility of such harm being caused or Pollution of Controlled Waters is being or is likely to be caused.”

13.1.11 Land contamination issues have been a material consideration within the planning legislation since 1974. The Town and Country Planning Act 1990 sets out the legislative framework for the role of the Planning Authority, and its scope to control the development of the land affected by contamination through the use of planning conditions.

13.2 Approach and methods

Data Sources

13.2.1 Information has been gathered from the following sources for the identification and assessment of effects on geology and soils:

- Desk study information including an Envirocheck Report by Landmark Information Group (2009) and a Preliminary Sources Study Report by Capita Symonds (2007);
- The Geological Survey of Britain, The Pennines and adjacent areas (2002);
- Geological map from British Geological Survey, Sheet 98, Stockport, 1:50 000 (1962); and,
- Site walkover surveys by Jacobs staff.

13.2.2 Previous geotechnical studies and investigations (including engineering geology and hydrogeology) include:

- A556(M) Improvement (M6 – M56), Ground Investigation Geotechnical Interpretative Report, Allott & Lomax (1992);
- Exploration Associates, A556 (M56–M6) Improvement Supplementary Investigation, Factual Report on Ground Investigation, November 1992;
- Allied Exploration and Geotechnics Limited, A556 Bucklow Hill Knutsford, Ground Investigation Factual Report, April 2006; and,
- Fugro Engineering Services Limited, A556 Environmental Improvement, Knutsford to Bowden, Factual Report on Ground Investigation, November 2010.

Impact Assessment

13.2.3 None of the potential impacts on geology and soils can be predicted with certainty; rather, they are risks that may or may not come to pass. Therefore the significance of any impact can only be assessed by defining its likelihood of occurrence in addition to evaluating their magnitude of effect. The general methodology described in Chapter 5 (Approach to Assessment) has been adopted to distinguish between significant and insignificant impacts.

13.2.4 Assessment of risk in relation to geotechnics and earthworks has also been considered as the corresponding mitigation measures may have an impact on the soils and geological aspects of the environment. This will be covered by the geotechnical reporting, investigation, assessment and certification procedures carried out in accordance with HD22/02. Further details on the assessment methodology will be incorporated within the Environmental Statement.

13.2.5 The risk assessment will generally determine relevant aspects of the engineering design. In most cases, the engineering design solutions represent the relevant
mitigation measures (e.g. requirements for treatment of contaminated land or treatment of voids caused by mineral extraction).

13.2.6 Additionally, there is much overlap with other sections of this report, particularly in terms of:

• Creation of dust (see also Chapter 6);
• Changes to surface water flows and groundwater regimes (see also Chapter 11);
• Potentially contaminated land (see also Chapter 12); and,
• Materials and earthworks balance (see also Chapter 12).

13.3 The existing environment (‘baseline conditions’)

Geology and Pedology

13.3.1 The superficial geology of the study area is presented on Figure 13.1 and shows the site to be underlain by glacial drift deposits comprising Glacial Till underlying the majority of the route, with occasional lenses of laminated clay. Glacial Sand and Gravel outcrop in localised areas, predominantly between Bucklow Hill and Over Tabley. To the north of the route, Fluvio-Glacial Gravel is present with isolated deposits of alluvium encountered, associated with minor watercourses.

13.3.2 The bedrock geology underlying the drift deposits is shown on Figure 13.2 and comprises the Bollin Mudstone, Northwich Halite Member and Tarporley Siltstone strata (formerly Keuper strata) from the Permo-Triassic period. A small region of Helsby Sandstone is also noted northwest of the route around Booth Bank.

13.3.3 Deposits of salt have been recorded as being present beneath areas adjacent to the site as part of the Northwich Halite formation. It is generally considered that the meres in the area occupy historical salt subsidence hollows formed by the natural solution of salt and collapse of the overlying strata. Natural solution processes have occurred in this area for thousands of years, resulting in washing out all salt-bearing strata near the surface – it is therefore considered that there is no ongoing risk of subsidence from natural solution effects. Potential for subsidence from salt mining or brine pumping at depth is considered in paragraphs 13.3.15 and 13.3.16.

74 Geology is the study of the solid earth, the materials of which it is composed (principally rocks) and the processes by which they evolve. Pedology is more specific – it is the study of soils in the natural environment.

75 A ‘lens’ in this context is a geological deposit that is thick in the middle and thinner near its edges, usually limited in extent and either occurring within a more extensive deposit or sandwiched between two more extensive deposits.

13.3.4 The topography along the route consists of a gently undulating agricultural landscape. The land rises from approximately 20m AOD on the flood plain of the River Bollin to the north, rising to about 70m AOD in the centre around Bucklow Hill and then slopes gently down to approximately 50m AOD at junction 19 of the M6.

13.3.5 To the east of the A556 the land slopes steeply down to around 20m AOD towards The Mere and Rostherne Mere, which both lie in steep-sided depressions considered by the British Geological Survey (BGS) to have been formed by natural solution of salt in the underlying Northwich Halite Formation.

13.3.6 Tabley Brook flows southwards in a steep sided valley to the east of the beginning of the proposed scheme.

Designated Sites

13.3.7 There is one site (Rostherne Mere) in the study area that is designated at national level as a Site of Special Scientific Interest (SSSI) for its geological interest, as well as at both international and national level for its nature conservation interest (see Chapter 10, Ecology and nature conservation for details of all SSSIs in the study area). The location of Rostherne Mere with respect to the scheme alignment is shown in Figure 10.1, Nature Conservation – Designated Sites.

13.3.8 The principal feature of geological interest is the large hollow within which the lake is formed. The hollow is a product of subsidence resulting from the natural solution of large quantities of salt within the underlying geological strata.

13.3.9 Other features of geological interest within the SSSI include landslip scars to the north and north-west of the lake and the glacial sands underlying parts of the site. All of these features are present close to the western boundary of the SSSI, near where it shares a boundary with the existing A556.

Hydrology and Hydrogeology

13.3.10 Surface water bodies and watercourses are described in Chapter 11 and shown on Figure 11.1A and B.

76 ‘Above Ordnance Datum’ – Ordnance Datum is the standard measure of sea level in the UK, from which all heights are measured for mapping purposes.
Aquifer designations are shown on Figure 13.3 – Groundwater Vulnerability Plan. The bedrock beneath part of the study area is a Secondary B aquifer, meaning that it may store and yield small quantities of groundwater.

The superficial deposits beneath a larger part of the study area are part of a Secondary A aquifer, and therefore may be capable of supporting water supplies at a local level only, and may have a role in supplying base flow to local watercourses.

There are no existing consents in place for discharges to groundwater.

Correspondence with British Coal confirmed that the A556 study area lies outside any known coalfield. Available information from previous reports indicates that the Coal Measures strata may be present below the Triassic strata at a depth greater than 4km, which is unlikely to have been economic to extract in the past. Old workings are therefore unlikely to be present.

A desk study undertaken for a previous scheme notes that natural brine was pumped from Agden, 2km west of the existing A556, and Healeys, 6km north of the M56 for salt extraction at the surface. Correspondence with the Cheshire Brine Compensation Board (included in the desk study) indicates that subsidence due to brine pumping to the surface is localised due to the presence of major geological faulting, which limit the extent of the salt deposits. Because of the distances involved, the risk of subsidence from brine pumping affecting the study area is negligible.

Rock salt mining has not taken place within the study area. The nearest historic rock salt mines were at Northwich, over 10km southwest of the study area. The nearest active rock salt mine is at Winsford, 13km southwest of the study area. The risk of subsidence affecting the study area due to rock salt mining is therefore negligible.

Information was gathered from the 1990 Allott and Lomax desk study and the Cheshire East Council website on mineral extraction within the site area. In accordance with the Cheshire Replacement Minerals Local Plan, three ‘Areas of Search’ for sand and gravel have been identified within the study area. Of these, a small part of one lies beneath the proposed alignment and is located to the north of the A50.

No permissions for mineral extraction have been identified within the study area up to 1990 (from desk study information). The Mineral Workings in Cheshire map dated June 1999 does not show any recent workings within the site area and BGS records have not identified any active or historical mineral extraction sites within 1km of the proposed alignment. The Sand and Gravel Areas for Search identified within the proposed alignment have also not been designated as ‘Preferred Areas’ for mineral extraction.

Potential Sources of Contamination

The site investigations to date have not identified any specific areas of land contamination. The main potential sources of contamination in the study area are:

Landfill Sites and unforeseen contamination

Licensed landfill sites have been identified at the north end of the scheme at Pool Bank Farm and Bow Lane and a small historical landfill on the bank of the River Bollin, to the north of the existing link road to the M56. The last known licenses for these sites were issued in 1990 (Pool Bank Farm) and 1991 (Bow Lane), which are both recorded as ‘Cancelled’; the sites are therefore no longer active. The sites were generally licensed to receive demolition and inert waste, although historic information records that wastes accepted between 1967 and 1972 at Bow Lane also included commercial and household waste and liquid sludge.

It is common in all construction schemes to encounter areas of contaminated soils that could not be reasonably foreseen to be present. Historically, pits were excavated in the area for marl and were potentially backfilled with wastes of unknown composition and most likely under uncontrolled conditions. Waste may also have been dumped in some of the smaller meres and ponds in the study area.

Agricultural Land

Much of the route crosses agricultural land which, although predominantly undeveloped, may have areas of contaminated soils associated with agricultural land use. These could include sewage sludge, abattoir wastes, inorganic fertilizers, pesticide, herbicide, dredged material from drainage ditches, oil spills and hydrocarbons from maintenance of farm vehicles or accidents, carcass burial pits or buried asbestos containing materials (ACMs) which were commonly used on farms. ACMs could be legally buried on farmers’ property until this practice was banned in 2005.

References

77 Allott & Lomax (now Jacobs), A556 (M56 – M6) Improvement, Geotechnical Desk Study, March 1990
78 http://www.cheshireeast.gov.uk/environment_and_planning/planning/spatial_planning/saved_and_other_policies/cheshire_minerals_local_plan.aspx
79 Landmark Information Group Ltd, Envirocheck Report for B076602/A556 (Report Ref 29503566_1_1), Dec 2009

Issued January 2012
13.3.23 However, although there is the potential for any of the above types of contaminated land to be present, none have been identified to date. There are no known carcass burial pits recorded in the vicinity of the route according to available records held by the Department for Environment, Food and Rural Affairs (Defra). Therefore the potential for localised contamination from carcass burial is considered to be very low.

13.3.24 Potential for localised contamination associated with agriculture will be covered in the appropriate risk assessments and method statements for the development.

The Existing Road Network

13.3.25 Where the route crosses existing carriageways and drainage, removal of these features may reveal areas of localised contaminated soils.

13.3.26 During de-trunking works to the existing A556, removal of near surface soils and services may reveal areas of localised contaminated soils.

Petrol Filling Stations

13.3.27 Two petrol filling stations are recorded within 250m of the route at the following locations:

- Tabley Garage and Petrol Station, 150m south of M6 Junction 19
- BP Petrol Station, Over Tabley, on west side of the existing A556 alignment

13.3.28 Any leakage or spills from the filling stations or underground fuel tanks could lead to hydrocarbon contamination of the underlying soils, which may leach into the surrounding area.

Utilities and Services

13.3.29 Existing services crossing the site may be a source of contamination, particularly the fuel pipeline near Chapel Lane which may cause contamination through leakage historically or at some point in the future.

13.3.30 Wherever possible, road construction will avoid or bridge existing services such that soils around them which may be contaminated would not be disturbed.

Earthworks

13.3.31 It is intended to re-use the material excavated from the proposed road cuttings to form the embankments and landscaped areas elsewhere on the scheme.

13.3.32 It is considered that an approximate balance of earthworks material should be achievable for the scheme, with the amount of material placed roughly equal to that excavated from the site. This is subject to further ground investigation to confirm the acceptability of the excavated material for use as part of the road embankments.

13.3.33 Topsoil will be stripped and stored temporarily whilst the road cuttings, embankments and landscaped areas are formed. It will then be placed where required. At this stage there is a surplus of topsoil across the site, which would be re-used where possible to minimise any resultant export of material.

Environmental Receptors

13.3.34 The following sensitive receptors were identified, in decreasing level of sensitivity:

- The designated site of Rostherne Mere (a Site of Special Scientific Interest designated in part for its geological importance);
- Agricultural land to the east and west of the A556;
- Geological resources in and around the site;
- The geomorphology of the site and its surroundings; and
- The Secondary B aquifer.

13.4 Predicted environmental effects

13.4.1 Impacts on geology and soils are likely to be most significant during construction. Where a specific construction or operational impact is identified, details are given in the text.

Designated Sites

13.4.2 The preferred alignment for the scheme runs along the boundary of the Site of Special Scientific Interest at Rostherne Mere.

13.4.3 The works are not planned to include any land within the SSSI, although there would be construction within very close proximity. However, it is considered that the scheme would have no impacts on the geology or soils of the SSSI because:

- There would be no high embankments in this area that could cause compression;
- There would be no deep excavations in this area that could affect groundwater flows;
- There would be no piled foundations in this area.
Therefore, it is considered that the scheme will have no impact on the SSSI in relation to the geology and soils.

Geology and Geomorphology

Apart from the designated site noted above, the only other geological features of importance along the scheme relate to mineral resources within the study area.

The Sand and Gravel Area of Search (including a buffer zone of 250m) of significance is located at the proposed junction with the A50, to the north of the current A50 road (Figure 13.1). Where the main route crosses the area of search, it comprises shallow cuttings where material will be removed as part of the works and re-used for forming embankments within the scheme.

An attenuation pond (Pond B) is located approximately 200m north-west of the nearest component of the Sand and Gravel Area of Search, and the geological map indicates that it will be underlain by Glacial Till. Construction of the pond is therefore unlikely to affect the Sand and Gravel.

The proposed realignment of the A50 is on embankment at that location but will run south of the current A50 alignment and will therefore not sterilise this Area of Search, i.e. the sand and gravel deposit will not be buried under an embankment and will be available for future use. The impact of the scheme on the mineral resources within the study area is therefore considered to be negligible.

The limited size of the proposed cuttings and embankments in comparison with the general undulation of the landscape means that the predicted impact on the geomorphology of the area would be of minor significance. The landscape and visual impacts of cuttings and embankments are considered further in Chapter 9 (Landscape).

Creation of Dust

Dust created by on-site construction activity, particularly excavation and transportation of soil materials, can occur throughout the construction period particularly during periods of dry weather.

Ground conditions likely to result in the creation of dust include the presence of silts and fine sands and low groundwater table. Based on the geology of the site, materials likely to be disturbed during construction include mostly clays. Although there is a high water table at the site, there is a risk that during periods of dry weather site operations could give rise to airborne dust.

There is the potential for lime and cement to be used within the scheme for the treatment of unacceptable material for re-use on site and these fine particles may result in the generation of dust, where used.

Whilst there appears to be no long term residual impact, the creation of dust during construction tends to be a nuisance. This issue is addressed in greater detail in Chapter 6 (Air quality) and will be addressed in the Contractor’s Construction Environmental Management Plan (CEMP).

Changes to Surface Water and Groundwater

Construction and operation of highways can create the potential for contaminants and sediment to reach surface water and groundwater receptors. Additionally, construction methods can influence the flow of groundwater. Construction operations and operational activities have the potential to:

- Disturb groundwater flow paths e.g. through excavations or the use of drainage measures or closely spaced piles;
- Cause siltation of surface water courses e.g. through run off from exposed soils; and
- Cause potential contamination of water resources due to spillages during construction or road run off during operation.

Further consideration of these impacts is given in Chapter 11 (Road drainage and the water environment).

Potentially Contaminated Land

No specific impacts have been identified at this time.
A number of generic potential impacts have been identified (prior to mitigation) which have the potential to occur on any construction project. These are mainly associated with the construction phases and in particular initial disturbance of the ground. The potential impacts are:

- Disturbance of potentially contaminated land such as landfill and areas of made ground;
- Mobilising of contaminants in soil which would otherwise be relatively immobile;
- Remobilisation of residual pollutants (i.e. pollutants that are already present, but stable and inactive in their present condition);
- Creation of new pollutant pathways, i.e. routes by which pollutants can reach environmental receptors that are vulnerable to their effects (engineering works such as excavations and piling for foundations may have the potential to create new pathways for contamination to reach groundwater or for gases to migrate and build up in other areas);
- Creation of potentially contaminated dust and airborne particles especially in the area of the mobile screening and crushing plant; and
- Potentially contaminated run-off from land (which may also impact upon groundwater and surface water).

The significance of these impacts will be related to the likelihood that they may occur, as well as the potential severity. An assessment of risk in relation to contaminated land will be addressed by quantitative risk assessments undertaken in accordance with best practice and with consultation with the relevant environmental regulator.

Should contaminated materials be encountered, options for their re-use shall be investigated fully and undertaken wherever possible. The re-use of any contaminated soils encountered shall be subject to an assessment of the potential risks to human health and the environment resulting from the re-use of the affected materials. If no risks are identified, then no further specific measures shall be required. Further information on the impacts of the waste management and re-use of materials (including contaminated soils) is provided in Chapter 12 (Materials).

The proposed alignment is reasonably remote from the landfill boundaries (Figure 13.1) and is mainly on embankment at the nearest point to the landfill sites. Therefore the landfill sites are unlikely to be disturbed by the works and are not considered further.

**Earthworks**

It is considered that an approximate balance of earthworks material should be achievable for the scheme (i.e. the amount of material to be used in building-up ground levels in some areas would be roughly equal to that excavated from the site in other areas). This will reduce the need for significant quantities of heavy transport movements into or out of the site to import fill or export surplus material.

Some material will be used to construct bunds alongside the route for noise mitigation (see Chapter 7 – Noise, and the Environmental Masterplan). The maximum acceptable slope angle for the bunds and embankments will depend upon specific characteristics of the materials excavated, and hence the earthworks quantities may change.

Within the site, there will be significant heavy transport movements to move material from the location of cuttings to the location of embankments and for landscaping works.

The assessment of impacts arising from the transport, storage and use of material resources within the construction site are addressed in further detail in Chapter 12 (Materials) and impacts of construction traffic on existing live roads in Chapter 15 (Effects on all travellers). The environmental effects of the excavation and removal of topsoil and any potential effects upon agricultural land are addressed in Chapter 14 (Community and private assets).

**13.5 Mitigation**

**Designated Sites**

As discussed previously, the scheme has been designed to avoid any potential impact on the geological interest of the SSSI and therefore no specific mitigation measures are proposed in relation to the Rostherne Mere, from the aspect of geology and soils.

**Geology and Geomorphology**

Negligible impact has been identified in relation to the geology of the site, therefore no mitigation measures are proposed.

Alteration of the geomorphology through construction of cuttings and embankments is required to construct the scheme. However, this will be mitigated as far as possible by minimising the volume of material to be excavated or placed as part of the scheme.

**Soil Deterioration and Consolidation**

This consideration principally relates to topsoil. Any topsoil stockpiled during construction will be handled in a manner designed to retain its potential to support plant
growth. Soil management operation generally would be in accordance with Defra’s Good Practice Guide for Handling Soils to ensure the sustainable re-use of these soils including:

- Stripping of topsoil and subsoil when weather and soil conditions are suitable;
- Separate storage and management of topsoil and subsoil storage heaps;
- Return of these soils to the original plots, also in separate layers (where these plots are not occupied by permanent new infrastructure);
- Use of appropriate machinery to minimise soil compaction;
- Relief of any compaction of restored soils;
- Surface ripping and if necessary under-drainage of restored sites (subject to other environmental constraints, such as the presence of buried archaeological remains); and
- Aftercare of restored soils, including appropriate cropping, for example a temporary grass ley if required, and associated soil nutrient requirements.

13.5.5 For all areas the following mitigation measures would be adopted to mitigate effects on topsoil:

- Define access routes to all working areas and restrict access only to these areas;
- Stripping, careful handling and storage of soils, where necessary;
- Careful soil replacement; and
- Breaking up of compacted soil.

13.5.6 Appropriate design of the scheme will seek to minimise the amount of soil consolidation during construction and operation. This may include drainage measures at the toe of embankments to prevent ponding of water.

### Potentially Contaminated Land

13.5.7 In summary, no specific impacts from land contamination have been identified to date. The only potentially significant area of land contamination is that of the identified licensed landfill sites which are not expected to underlie the area of the scheme.

13.5.8 Therefore, there are no requirements for mitigation measures at this stage. However, further ground investigations and disturbance of soils during construction may reveal unforeseen areas of land contamination, for example associated with existing or disused drainage, agricultural land use or infilled ponds. These potential impacts and the associated mitigation measures are summarised in Table 13.1.

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release and spread of known contamination – for example disturbance of landfill sites during construction</td>
<td>Detailed liaison with EA and landfill operator to avoid direct disturbance of landfill area. Design proposals are outside landfill boundary. Further investigations will be carried out as necessary. Other than the landfill sites, no other known sources of contamination have been identified on the scheme.</td>
</tr>
<tr>
<td>Release and spread of contamination - possible disturbance of additional unknown localised contamination during construction such as infilled pits, spillages and associated with existing and disused drainage</td>
<td>Where contamination is encountered during further ground investigation or the construction phase, additional investigations and risk assessments will be undertaken to identify any remediation required.</td>
</tr>
<tr>
<td>Release and spread of potentially contaminated dust during construction</td>
<td>Use dust suppression systems especially in the area of any mobile screening and crushing plant. LAPPC consent would also be achieved.</td>
</tr>
<tr>
<td>Accidental spillages on the highway during the operational phase</td>
<td>Appropriate pollution prevention measures would be implemented during any clean up activity. Site would be covered by hardstanding which would limit migration of contamination.</td>
</tr>
<tr>
<td>Potentially contaminated run-off from the highway during construction and operational phases</td>
<td>Appropriate mitigation measures during construction to collect any contaminated water as set out in CEMP. Appropriate drainage to collect, treat or contain run-off during operation will be provided (see Chapters 2 and 11).</td>
</tr>
</tbody>
</table>

### Creation of Dust

13.5.9 During periods of dry weather, measures would be required to prevent the generation of nuisance dust. These measures will be detailed in the Contractor’s CEMP.

### Changes to Surface Water and Groundwater

13.5.10 Further details on the mitigation measures in relation to surface water and groundwater are given in Chapter 11 (Road drainage and the water environment).

### Earthworks Balance

13.5.11 Mitigation measures associated with the removal of materials from site and the import of materials to site are provided in detail in Chapter 12 (Materials). A summary of measures relevant to issues discussed in this chapter is as follows:

- Design of the vertical alignment and side slopes of cuttings and embankments in order to minimise the volumes of construction materials imported or exported from...
the site (subject to compatibility with the objectives of the scheme and other geotechnical and environmental objectives);

- Treatment of ‘unacceptable’ material (i.e. material not suitable for use in engineering works) on site to render it acceptable for use in the works (for example, by treatment with lime or cement);
- Consider use of by-products from existing processes, e.g. pulverised fuel ash, and/or recycled materials (e.g. excess materials from other construction sites). Availability of such resources close to the site will be assessed during detailed design; and,
- Sourcing of imported material in close proximity to the site.

13.6 The significance of environmental impacts

Designated Sites

13.6.1 The scheme has been designed so that it does not impact on the designated site (Rostherne Mere). Consequently, the magnitude is considered to equate to ‘no change’ and the resulting impact is therefore of neutral significance.

Geology and Geomorphology

13.6.2 The feature of special importance to geology or geomorphology, namely the Sand and Gravel Area of Search, is unlikely to be impacted on at the proposed alignment of the main route and realignment of the A50.

13.6.3 Thus, the magnitude of any impact on the geology is considered to be negligible and the resulting impact is of slight or neutral significance.

13.6.4 The limited size of the proposed cuttings and embankments in comparison with the general undulation of the landscape means that the predicted impact on the geomorphology of the area would be of minor significance.

Soil Deterioration and Consolidation

13.6.5 Following the implementation of precautionary measures as detailed in paragraphs 13.5.4-13.5.6, any effects on the quality and nature of the soils are likely to be local in extent. The magnitude of impact is therefore considered to be negligible and the resulting impact is of neutral significance.

Creation of Dust

13.6.6 Following the implementation of precautionary measures as detailed in Chapter 6 (Air quality), the magnitude of any residual impact from the creation of dust during the construction phase of the works is likely to be negligible and hence the residual impact is of neutral significance.

Changes to Surface Water and Groundwater

13.6.7 Impacts on surface water and groundwater are considered in Chapter 11 (Road drainage and the water environment). The significance of these impacts is summarised in Tables 11.3 and 11.4.

Potentially Contaminated Land

13.6.8 There is a low residual risk that potentially contaminated material may be encountered on site in the future, during further phases of ground investigation or construction. However, the implementation of appropriate assessment would allow identification of any sensitive areas and any remedial measures deemed necessary, as set out in Table 13.1 above, would lead to the mitigation of any associated risks.

13.6.9 The significance of the overall impact in relation to Contaminated Land has therefore been assessed as being Slight Adverse for the construction phase of the works.

13.6.10 Measures for addressing contaminated soils encountered during construction are to be included in the Environmental Action Plan and will be outlined in the CEMP.

Earthworks Balance

13.6.11 It is anticipated that only minimal quantities of imported material will be required for special purposes, such as structural backfill. Wherever possible, it is anticipated that excavated materials will be reused elsewhere on site and hence the effects of excavation on the existing geology and soils on the site is likely to equate to ‘no change’ conditions. The significance of the resulting impact is considered to be neutral.
### 14 Community and private assets

#### Executive summary

This topic addresses the effects of the scheme on people’s access to community facilities such as schools, doctors’ surgeries, shops, etc.; effects on land used by the community, such as village greens; and effects on private property, including farms and agricultural land. The assessment draws on information gained from desk-based studies, site inspections, consultation and interviews with farm proprietors.

The assessment covered communities directly affected along the line of the scheme, other communities in the surrounding area that contain facilities that are assumed to be used by local residents, businesses in the affected communities and farms along the line of the scheme.

Communities along the existing A556 currently suffer from severance caused by heavy traffic on the trunk road. This also affects communities in the surrounding areas to either side of the existing A556, due to the difficulty of joining or crossing this road. The new alignment would mean longer journeys for some, particularly in Millington, but would largely eliminate the severance effect of the traffic.

There would be no loss of land used by the community or demolition of private property. Some land would be taken from private and commercial property, and there may be some loss of passing trade for businesses.

Approximately 80% of the permanent land take is from agricultural land, most of which is of good or very good quality, with smaller areas of moderate or poor quality land. Other agricultural impacts include severance of fields, creation of smaller irregular shaped fields, and changes to access points. Fourteen farms are affected, although the degree of impact varies greatly from farm to farm.

#### Community assets

14.1.2 The assessment of community assets is primarily concerned with the degree of severance a community is subjected to. Community severance is defined as the separation of residents from facilities and services they use within their community. The assessment considers the change to residents’ ability to travel in the locality of the scheme coupled with the loss of any facilities.

14.1.3 The impact of community severance does not affect all members of the community evenly. Certain residents are more vulnerable to changes to the routes used to access facilities and services, particularly children, aged people and the disabled.

14.1.4 In addition to community severance, the assessment covers loss of land used by the community. Land which may be used by the community is defined in DMRB as:

- Common Land (registered under the Commons Registration Act 1965);
- Town or Village Green (registered under the Commons Registration Act 1965);
- Fuel and Field Garden Allotments; and
- Public Open Space.

#### Private assets

14.1.5 The assessment of private assets is concerned with the use of privately-owned land, including residential and commercial or industrial property, development land and agricultural land. It takes into account changes in access, parking arrangements or the loss of homes, facilities, amenities, attractive buildings or townscape, services or employment associated with land-take.

14.1.6 In relation to development land, it covers allocations for development in the local planning authority’s structure and local plans or Local Development Framework, and planning applications lodged with the planning authorities.

14.1.7 The assessment of agricultural land follows guidance in the old Land Use topic in DMRB Volume 11. This chapter includes the following aspects of agricultural land use:

- Land quality, using the Agricultural Land Classification (ALC) of England and Wales;
• Land take, whether permanent or temporary;
• Farm businesses affected;
• Land severance and access; and
• Agri-environment scheme areas potentially affected.

Legislative and policy background

14.1.8 National and local policies taken into account in this assessment are summarised below.

National Policy
• PPS 1: Delivering Sustainable Development (2005);
• PPS 1 (supplementary): Planning and Climate Change (2007);
• PPS4: Planning for Sustainable Economic Growth (2009);
• PPS7: Planning Policy Statement No. 7: Sustainable Development in Rural Areas (ODPM, 2004);
• PPG 17: Planning for Open Space, Sport and Recreation (2002);
• Natural Environment White Paper – The natural choice: Securing the value of Nature (Defra, 2011);
• Safeguarding our Soils – a Strategy for England (Defra, 2009);
• Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra/BIS/WRAP, 2009);

Local – Cheshire East Council
• Macclesfield Borough Local Plan - saved polices (2004), including:
  o NE18: Accessibility to Nature Conservation;
  o RT8: Access to the Countryside;
  o DC6: Circulation and Access;
• Cheshire Replacement Minerals Local Plan, Chapter 2, Policy 29 – Agricultural Land;
• The Cheshire Replacement Waste Local Plan, Policy 19 – Agricultural Land Quality

Local – Trafford Council
• Trafford Revised Unitary Development Plan (June 2006) OSR5: Protection of Open Space.

14.1.9 In relation to agriculture, the Natural Environment White Paper and PPS7 emphasise the desirability of protecting agricultural land in Grades 1, 2 and 3a of the ALC, which is viewed as our ‘Best and Most Versatile’ (BMV) agricultural land.

Limitations

14.1.10 Where there are no facilities of a particular type, it has been assumed that local residents will use facilities in the wider surrounding area. No interviews with local residents have been undertaken to identify their movements and habits (such as shopping and leisure activities).

14.1.11 A detailed ALC survey of the study area has not been carried out. The assessment of effects on BMV agricultural land is therefore based on published data, previous reports and professional observations made during site visits.

14.1.12 It was only possible to visit 13 of the 14 farm businesses potentially affected; however, it is anticipated that the farm business survey will be completed for the Environmental Statement. Therefore assumptions and estimates have been made in a few cases for this chapter, based on the available data.

14.1.13 Some areas of farm and woodland in the study area are used for recreational and commercial sporting activities such as game bird shooting but these have not been taken into account for this chapter.

14.2 Approach and methods

14.2.1 No guidance for this new DMRB topic has been published. The assessment of the potential impacts of the proposed scheme on community and private assets was undertaken using relevant parts of the guidance for two topics no longer included in DMRB\(^\text{81}\) (‘Land Use’ and ‘Pedestrians, Cyclists, Equestrians and Community Effects’).

14.2.2 The available guidance does not include a method of measuring the value or sensitivity of the receptors, or the magnitude of impacts, and there is no agreed scale against which these factors can be measured. Each resource or receptor has therefore been

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81 DMRB Volume 11, Section 3, Part 6 and Part 8
assessed on an individual basis, based on professional judgement and the factors influencing its sensitivity have been taken into account in assessing the significance of impacts. Professional judgement has been used to distinguish between significant and insignificant impacts, but different levels of significance have not been assessed.

14.2.3 In exercising professional judgement, consideration has been given to the following:

- Whether the effect is short or long-term, and the duration of any short-term effects;
- Whether land or features affected by the scheme are essential to the operation of the relevant community or private asset.

**Data sources**

14.2.4 This chapter has been structured around two key themes, as follows:

- Community assets, including community severance and loss of land used by the community; and
- Private assets, including effects on private property and associated land-take, effects on development land and effects on agricultural land.

14.2.5 Data on community and private assets was obtained through:

- Desk-based research including information from various web-based sources;
- Site visits and, for agricultural aspects, interviews with farmers;
- Consultation responses received from parish councils; and
- An investigation of the potential agricultural effects of the proposed scheme improvements by a specialist consultant.

14.2.6 Information has been gathered from the following sources for the identification and assessment of effects on agricultural land:

- Geological information as described in Chapter 13, Geology and soils;
- Soil Survey of England and Wales map, Midlands and Western England (1983);
- Defra Provisional Agricultural Land Classification map, West Midlands Region;
- Local site Agricultural Land Classification records held by Natural England;
- Agri-environmental scheme areas identified on Government websites;
- Land ownership and occupation survey; and
- Farm visits and visual inspections.

14.2.7 Previous agricultural studies and investigations, including:

- ADAS Agricultural Assessment: A556(M) Improvement (M6-M56; 1992); and

**Study area**

14.2.8 The study area was defined as the villages and communities adjacent to the existing A556 and the new alignment. The assessment covered the communities of Over Tabley and Holehouses (at the southern extent of the scheme); Mere, Hoo Green and Bucklow Hill (in the centre of the scheme); and Rostherne and Millington (at the northern end of the scheme). These communities have limited facilities and services, such as schools and doctors’ surgeries. Consequently the residents of the communities travel further afield to access these facilities and services.

14.2.9 The wider communities which were taken into consideration because they contain facilities used by the communities in the study area are Knutsford, High Legh, Little Bollington, Lymm, Agden, Dunham, Bowdon, Altrincham, Hale, Ashley, Tatton and Mobberley. The location of all the communities is shown on Figure 14.1.

14.2.10 Agricultural land was considered in terms of whole farm units within the study area which would lose some land, or which would have adverse effects on access between the farmsteads and any of the relevant land. Site visits to the farms and interviews with the majority of farmers were carried out in 2010 to gather information about the potentially affected farm businesses. These visits and visual surveys informed the assessment, including the estimation of the ALC grades of the farmland affected by the scheme.

**Community assets**

14.2.11 The assessment of effects on communities and community facilities has taken into account:

- Increases or reductions in community severance, both within communities and between communities;
- Changes in the accessibility of community facilities; and
• Potential changes in the ongoing viability of local businesses and employment opportunities within the local communities.

14.2.12 For the purpose of this assessment, the boundary of each of the communities was determined based on both electoral and administrative boundaries, knowledge of the area and on the location of key community facilities.

14.2.13 In line with DMRB, community facilities include doctors’ surgeries and hospitals, aged persons homes, schools, shops, post offices, churches, parish halls, recreational areas and leisure facilities, libraries and railway stations and bus services.

14.2.14 In relation to the assessment of community assets, judgements have been made in the light of the following considerations:

• The extent to which a given community is ‘self-contained’. Self-contained communities are those in which all essential local facilities are located within the area of the community, whereas communities that are not self-contained are dependent on access to facilities located elsewhere;

• The extent to which a given community asset is essential to the well-being or self-contained nature of the local community;

• The extent to which a given community asset is duplicated by alternative facilities to which members of the community have equally easy access; and,

• The extent of the catchment area served by a given community asset, and the principal mode of transport used to access the facility.

Private assets

14.2.15 DMRB specifies that the assessment of the effects on private assets should take into account:

• Demolition of private property and/or associated land take;

• Effects on development land – future changes in land use due to new development which planning permission has been granted for or changes which would be likely to occur in the absence of the scheme;

• Effects on agriculture; and,

• Any of the above may have adverse effects on the owners or occupiers of the relevant property or land, but may also have adverse effects on employment opportunities in the local communities.

14.2.16 In assessing the agricultural impacts, professional judgement has been used in relation to the agricultural quality of the land and the vulnerability of the farm units concerned to loss of economic viability. Factors influencing this include (but are not necessarily limited to) the following:

• The size of the farm unit;

• The quality of the land;

• The nature of the farming operations;

• The extent to which the fields farmed are concentrated together or dispersed over a larger area;

• The location of the farmstead(s) in relation to the land farmed;

• The routes used to access the land and the availability of alternative routes;

14.2.17 Consideration has also been given to the following general principles:

• Viability of a farm in a typical year under the current farming system;

• Extent of any likely major reorganisation of the holding; and,

• Extent of increased demands on management.

14.3 The existing environment (‘baseline conditions’)

Communities and community facilities

14.3.1 The communities located closest to the scheme are assessed in detail for this chapter. These communities are predominantly small villages surrounded by open countryside within the Green Belt. Larger built-up residential areas are mainly located at the outer fringes of the study area or beyond, in the communities of Altrincham, Hale, Bowdon, High Legh, Lymm and Knutsford. These areas are referred to in this Chapter as the ‘wider communities’, and are addressed in less detail in this chapter.

14.3.2 The total population of the communities within the study area is 1,321 (see Table 14.1 for information on these communities from the 2001 census). A further 60,653 people live in the communities in the wider surrounding area.
Table 14.1: Population profile of main communities directly affected by the scheme

<table>
<thead>
<tr>
<th>Community</th>
<th>Total populations</th>
<th>% under 16</th>
<th>% between 16 and 65</th>
<th>% over 65</th>
<th>Number of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabley Superior (includes Over Tabley and Holehouses)</td>
<td>316</td>
<td>22</td>
<td>66</td>
<td>12</td>
<td>122</td>
</tr>
<tr>
<td>Mere (includes Mere, Hoo Green and Bucklow Hill)</td>
<td>601</td>
<td>17</td>
<td>68</td>
<td>15</td>
<td>254</td>
</tr>
<tr>
<td>Rostherne</td>
<td>160</td>
<td>11</td>
<td>76</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Millington</td>
<td>244</td>
<td>16</td>
<td>58</td>
<td>26</td>
<td>87</td>
</tr>
</tbody>
</table>

**Over Tabley and Holehouses**

14.3.3 Over Tabley and Holehouses are located in the south of the catchment area, divided from each other by the M6 motorway. Over Tabley in particular suffers from severance caused by traffic using the existing A556. The facilities in this community include:

- A highway service area (cafe, motel and petrol station);
- St Paul’s Church;
- A privately owned conference facility (at the end of Moss Lane); and
- Over Tabley Parish Hall (located on Old Hall Lane).

14.3.4 The majority of business for the service area comes from passing trade deriving from northbound traffic on the A556 (there is no access for southbound traffic). St Paul’s Church is located along the existing A556 and suffers from access issues due to the location of the car park on the opposite side of the road.

14.3.5 The community is not self-contained and requires access to additional facilities including doctors’ surgeries and schools situated in Knutsford.

14.3.6 The majority of Holehouses community is located south of the M6 motorway; facilities comprise:

- A small farm shop;
- A privately owned public house and hotel; and
- A petrol station.

14.3.7 Within Over Tabley there are a number of attractions for tourists including the county showground and Tabley House. Knutsford motorway service area is also located a short distance south of Junction 19 of the M6.

**Bucklow Hill, Mere and Hoo Green**

14.3.8 The communities of Bucklow Hill and Mere are in the centre of the study area. Together with Over Tabley, these communities have been identified as being the most affected by the existing traffic problems due to their close proximity to the existing A556.

14.3.9 Most residential properties in Mere are located along the east side of the existing A556, the north side of the A50 and the west side of the A5034, with smaller numbers to the west of the A556 at Mere crossroads and in the Mere Hall area. Properties in Bucklow Hill cluster around the junction between the existing A556, the A5034, Bucklow Hill Lane and Chapel Lane, and are located both east and west of the existing A556. Both communities are affected by traffic using the existing A556. There is only one signalised pedestrian crossing, at Bucklow Hill.

14.3.10 In Bucklow Hill, facilities include:

- A petrol station with small shop;
- Premier Inn Hotel and privately owned public house; and
- A car show room.

14.3.11 In Mere, the only facilities available are:

- Mere Parish Club;
- Mere Golf Resort and Spa;
- Rainbow Day Nursery; and
- A petrol station located along the A5034.

14.3.12 The communities are not self-contained and residents are assumed to use facilities available in the larger communities in the wider surrounding area. Children in these communities attend schools in High Legh and Knutsford.

14.3.13 Hoo Green is a small village located on the A50 west of the existing A556. This community focuses around a village store, post office, two hotels, a public house and small petrol station. The community is partly self-contained except for health care and school facilities, which are found in High Legh or Lymm.
Millington and Rostherne

14.3.14 The communities of Millington and Rostherne are located in the north of the study area. Millington is located west of the existing road and Rostherne to the east. Both communities are sparsely populated, with limited community facilities.

14.3.15 Settlement in Millington is dispersed, mainly comprising properties along Millington Lane and Millington Hall Lane, many of which are farms. There are no facilities in the community other than a nursing home. The community is not self-contained and the residents are assumed to use facilities in other nearby communities, including Bucklow Hill and Hoo Green. Children attend schools in High Legh and Knutsford and residents are assumed to use shops and doctors' surgeries in Lymm and Altrincham. Access from Millington to Rostherne, Bucklow Hill, Mere and Knutsford or northwards into Bowdon and Altrincham is made difficult by heavy traffic on the existing A556, particularly on trips for which right-turns onto or off the A556 are required.

14.3.16 Rostherne comprises a village centre around St Mary's church, with scattered farm and residential properties in the surrounding countryside. It is dominated by Rostherne Mere, the largest lake in Cheshire and an internationally-designated site for nature conservation. It is not self contained and residents of the community travel to wider communities such as Altrincham, Lymm or Mobberley. This community is less affected by traffic on the A556 than others in the study area.

Wider communities

14.3.17 The larger communities of Lymm to the northwest, Altrincham, Hale and Bowdon to the northeast and Knutsford to the southeast lie on the fringes of the study area and beyond. These larger communities provide a wide selection of facilities used by the population within the study area, including educational facilities, health services, churches, shops, leisure and recreational facilities, post offices, libraries, public houses and restaurants. The local hospital is in Knutsford. These larger communities supplement the facilities and services available in the smaller communities along the A556. Most journeys to these areas from within the study area are made by vehicle. Public transport facilities are very limited.

14.3.18 There are a number of other small communities in the wider surrounding area, namely Dunham, Tatton, Mobberley, Tabley, Aston by Budworth, High Legh, and Agden.

Land used by the community

14.3.19 There is no community land (as defined in 14.1.4) located within the study area. The nearest areas are found in Knutsford and Bowdon.

14.3.20 There are three community buildings within the study area: Tabley Parish Hall, off Old Hall Lane in Over Tabley, Mere Parish Club, located in the centre of Mere just off the A50 and Egerton Hall, off Rostherne Lane. Tabley Parish Hall holds the bi-monthly meetings of Tabley Parish Council and is available for venue hire. It is understood that Mere Parish Club is used predominantly as a leisure venue for bowling, cricket and snooker, but is also used for meetings on matters affecting the community. Egerton Hall is used by Millington and Rostherne parish councils for meetings and by the Cheshire Girl Guides.

14.3.21 There have been a number of meetings and other direct consultations with the relevant parish councils, residents associations, other community groups, local businesses and individuals, between September 2009 and the date of this report. Views expressed by these groups or individuals have been taken into consideration in developing the design of the scheme.

Private property

14.3.22 There are no residential properties located directly on the route of the new alignment. However, a number of residential properties lie within close proximity to the scheme (see Table 14.2).
Table 14.2: Summary of residential properties in close proximity to the scheme

<table>
<thead>
<tr>
<th>Community</th>
<th>Residential properties</th>
<th>Current means of access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Tabley</td>
<td>Approximately three properties located along the south side of Moss Lane</td>
<td>From Moss Lane, either via the existing A556 or the A50.</td>
</tr>
<tr>
<td>Church Farm and other properties facing onto the existing A556</td>
<td>Directly from the existing A556</td>
<td></td>
</tr>
<tr>
<td>Over Tabley Hall and converted farm buildings, off Old Hall Lane, and two cottages facing the existing A556</td>
<td>From Old Hall Lane via the existing A556 or Budworth Road and Pickmere Lane</td>
<td></td>
</tr>
<tr>
<td>Mere</td>
<td>Huime Bams Farmhouse and Farm</td>
<td>From the A50 via a small track south of the property</td>
</tr>
<tr>
<td></td>
<td>Bentleyhurst Farm</td>
<td>Along Bentleyhurst Lane</td>
</tr>
<tr>
<td></td>
<td>Knowlespit Farm</td>
<td>From Bentleyhurst Lane</td>
</tr>
<tr>
<td></td>
<td>Kennel Wood Cottage, Faraway and Sawpit Cottage</td>
<td>From the existing A556 via Mere Hall Lane</td>
</tr>
<tr>
<td></td>
<td>Mere Hall</td>
<td>From the existing A556</td>
</tr>
<tr>
<td>Bucklow Hill</td>
<td>Two cottages on Bucklow Hill Lane, west of the proposed alignment</td>
<td>Via Bucklow Hill Lane, either from Bucklow Hill or Hoo Green</td>
</tr>
<tr>
<td></td>
<td>Various properties along Chapel Lane and The Crescent, Thornedge and Alytham lie to the east of the new alignment</td>
<td>Chapel Lane via the existing A556 or Peacock Lane or Häseheath Lane.</td>
</tr>
<tr>
<td>Millington</td>
<td>Montebello Castle, 1 and 2 Denfield Cottages, Denfield Cottage and Stables, Rustford Cottage, Rose Cottage and Sandhole Farm</td>
<td>Millington Hall Lane via the existing A556 or Millington Lane.</td>
</tr>
<tr>
<td></td>
<td>1 and 2 Millington Lane, Three Oaks and Newhall Farm</td>
<td>Millington Lane via Millington Lane or the existing A556.</td>
</tr>
<tr>
<td></td>
<td>Mere Side Farm</td>
<td>The existing A556</td>
</tr>
<tr>
<td>Rostherne</td>
<td>Yarwoodheath Farm</td>
<td>Yarwoodheath Lane</td>
</tr>
<tr>
<td></td>
<td>Mere Side Cottage</td>
<td>Cherry Tree Lane via the existing A556 or various minor roads to the east.</td>
</tr>
</tbody>
</table>

Commercial property

14.3.23 There are no commercial properties located directly on the route of the new alignment. However, a number of commercial properties are located in close proximity to the scheme. These are summarised in Table 14.3 below.

Table 14.3: Summary of commercial properties in close proximity to the scheme

<table>
<thead>
<tr>
<th>Community</th>
<th>Commercial properties</th>
<th>Current means of access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Tabley</td>
<td>Service area including Little Chef restaurant, Travelodge hotel and petrol station with small shop</td>
<td>From the existing A556 from northbound carriageway only.</td>
</tr>
<tr>
<td></td>
<td>Dairy House Farm includes a number of businesses which require movement of vehicles including Bailey’s Turkeys, NU Drives (supplier of bearings and other motor transmission products), PJP Group (shop</td>
<td>From the existing A556 via M6 motorway roundabout to the south or A556 to the north.</td>
</tr>
</tbody>
</table>

Development land

14.3.24 There are no existing or proposed land-use planning designations such as employment land, mixed use areas, housing proposals, retail allocations or redevelopment sites within the main communities surrounding the A556. The Borough of Macclesfield Local Plan, January 2004, under saved policy T7 states that “Land along the A556 (M) M6 to M56 link will be safeguarded from other development” and the land within the main communities has also been designated as Green Belt.
Agricultural land

14.3.25 Most of the study area comprises land in agricultural use, associated with working farms. The farms are a mix of owner-occupied and tenanted units. The Mere, Millington and Tatton Estates are the main owners of the rented farms.

14.3.26 The geology of the study area is described in Chapter 13 (Geology and soils) and shown on Figure 13.1. Soil type is a key factor in the quality of agricultural land, and varies a great deal from place to place. In England and Wales, soil is classified into 10 major groups, with nearly 700 soil types grouped into around 300 associations that typically reflect the varied geology of the parent rock. The majority of the soils in the study area are classified as ‘Salop’ soils, which are relatively heavy soils overlying boulder clay. There are smaller areas of lighter ‘Wick 1’ soils overlying glacial sands and gravels, and ‘Blackwood’ soils at the north end of the study area (see Figure 14.3 for the distribution of soil types).

14.3.27 The quality and versatility of agricultural land is classified from ALC Grade 1 to Grade 5, based in part on soil type. Grade 3 is further subdivided into Grades 3a and 3b. Land in Grades 1, 2 or 3a is defined in PPS7 as the ‘best and most versatile’ (BMV) agricultural land and benefits from a higher degree of protection under national and local planning policy. The ‘old’ county of Cheshire comprises: 0.4% Grade 1, 14.8% Grade 2, 71.8% Grade 3, 9.7% Grade 4 and 3.3% Grade 5.

14.3.28 Most of the agricultural land in the study area is mapped in published information as Grade 3 (i.e. good to moderate quality; the mapping does not distinguish Grades 3a and 3b), with some very good Grade 2 land (see Figure 14.4). Grade 2 land is typically identified in areas covered by the Blackwood soil type in the north and Wick 1 soil type in the centre of the study area. Grade 3 land is shown mainly on the Salop soil type in the other parts, and following the site visits the majority of it is considered likely to be Grade 3a. There is a small area of poor quality Grade 4 land in the valley of the River Bollin, on Blackwood type soils.

14.3.29 The ADAS 1992 report (see paragraph 14.2.7) identified additional areas of Grade 2 land north and south of the A50 and several areas of Grade 3a land along the A556 (M) route corridor investigated at that time. Grade 3b land was also identified, particularly between Bucklow Hill Lane and Millington Hall Lane. The study area therefore comprises mainly BMV agricultural land, above the average proportion for Cheshire.

14.3.30 The agricultural land use in the study area is predominantly managed grassland for grazing and hay/silage making, associated with dairy and beef cattle rearing farms. There is some arable cropping, mainly cereals, on the better land. Other livestock enterprises include sheep rearing. Some farms have diversified enterprises such as commercial letting of surplus buildings and horse livery. Most farms use the local road network, including the A556 and A50 for access to and from farmsteads and fields.

14.3.31 Much of the agricultural land in the study area is in Natural England’s Entry Level Stewardship Scheme which encourages environmentally sensitive management of land. One farm also has land in Higher Level Stewardship and there is a management agreement in place with Natural England for farmland around Rostherne Mere SSSI.

14.3.32 Fourteen farm businesses have been identified which would be affected by land take for the scheme (summarised in Table 14.4). The known extent of agricultural land of each farm unit and the location of the farmsteads are shown on Figure 14.2A and B.

<table>
<thead>
<tr>
<th>Farm business</th>
<th>Approx total area of land farmed</th>
<th>Farm type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pow nell Green Farm, Over Tabley</td>
<td>70 ha (175 acres)</td>
<td>Cattle rearing – mainly grassland, some cereals</td>
</tr>
<tr>
<td>Over Tabley Development Land*</td>
<td>11 ha (27 acres)</td>
<td>Not farmed in 2010</td>
</tr>
<tr>
<td>Over Tabley Hall Land</td>
<td>8 ha (20 acres)</td>
<td>Grassland for grazing and hay/silage</td>
</tr>
<tr>
<td>Tabley Hill Farm, Tabley</td>
<td>30 ha (75 acres)</td>
<td>Cattle rearing – grassland (grazing &amp; hay/silage)</td>
</tr>
<tr>
<td>Church Farm, Tabley</td>
<td>50 ha (125 acres)</td>
<td>Grassland farm – heifer rearing</td>
</tr>
<tr>
<td>Knowlespit Farm, Mere</td>
<td>150 ha (370 acres)</td>
<td>Dairy farm – mainly grassland, some cereals</td>
</tr>
<tr>
<td>Winterbottom Farm, Mere</td>
<td>90 ha (225 acres)</td>
<td>Sheep farm – grassland for grazing &amp; hay/silage</td>
</tr>
<tr>
<td>Hulme Barns Farm, Mere</td>
<td>Est. 60 ha (150 acres)</td>
<td>Grassland for grazing &amp; hay/silage, some cereals</td>
</tr>
<tr>
<td>Mere Hall Farm, Mere</td>
<td>57 ha (140 acres)</td>
<td>Cereals and grassland farm</td>
</tr>
<tr>
<td>Millington Hall Farm, Millington</td>
<td>80 ha (200 acres)</td>
<td>Mixed farming – arable, grassland and livestock</td>
</tr>
<tr>
<td>New Hall Farm, Millington</td>
<td>105 ha (260 acres)</td>
<td>Dairy farm – mainly grassland with some cereals</td>
</tr>
<tr>
<td>Denfield Hall Farm, Rostherne</td>
<td>200 ha (500 acres)</td>
<td>Dairy farm – mainly grassland with some cereals</td>
</tr>
<tr>
<td>Spode Green Farm, Bollington</td>
<td>53 ha (130 acres)</td>
<td>Grassland farm – heifer rearing</td>
</tr>
<tr>
<td>Yarwood Heath Farm, Rostherne (operated from Wayside Farm, approx. 4 miles to the east)</td>
<td>73 ha (180 acres)</td>
<td>Livestock farm (beef and sheep) – grassland for grazing and hay/silage</td>
</tr>
</tbody>
</table>

*Note – despite the name, ‘Over Tabley Development Land’ is identified here as an agricultural unit, not as an area of development land

14.4 Predicted environmental effects

Community severance

14.4.1 The scheme would affect the degree of community severance experienced by all the communities within the study area during the opening year. The impacts on community severance for each community in the study area are described in Table 14.5 below.
Please see also Chapters 6 and 7 for changes in air quality and noise affecting communities, and Chapter 15 for more detailed information on effects on journeys.

### Table 14.5: Summary of community severance effects

<table>
<thead>
<tr>
<th>Community</th>
<th>Construction effects</th>
<th>Operational effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Tabley</td>
<td>Short-term increase in community severance (Old Hall Lane severed before the underpass is open for use and before traffic is transferred from Chester Road to the new A556)</td>
<td>Long-term increase in severance for east-west vehicular journeys within the community and vehicular journeys across the M6 due to longer routes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term improvement in access to St Paul’s Church.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term improvement in access between Over Tabley and Knutsford, including access to Egerton Primary School and Knutsford High School via Moss Lane or Tabley Superior Bridleway 7 ‘Swains Walk’.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No long-term diversions or increases in distance for pedestrians, cyclists and horse-riders, after provision of the Old Hall Lane underpass.</td>
</tr>
<tr>
<td>Holehouses</td>
<td>Potential short-term increase in severity due to disruption during construction</td>
<td>Long-term increase in vehicular journey length to facilities in Over Tabley, balanced by reduced journey length on return journey.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimal change in journey length for non-vehicular journeys between Holehouses and Over Tabley.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some traffic, including traffic to/from the Cheshire Show site, diverted via Pickmere Lane.</td>
</tr>
<tr>
<td>Mere</td>
<td>Potential short-term increase in severity due to disruption to traffic flows, particularly during the de-trunking works on Chester Road</td>
<td>Long-term reduction in community severance and improved amenity, following transfer of traffic from Chester Road to the new A556 and completion of the de-trunking works.</td>
</tr>
<tr>
<td>Hoo Green</td>
<td>None identified</td>
<td>Long-term improvement in access to hospital, high school and other facilities in Knutsford, due to reduced conflict with trunk-road traffic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term increase in journey length to/from Bucklow Hill, following severance of Bucklow Hill Lane.</td>
</tr>
<tr>
<td>Bucklow Hill</td>
<td>Potential short-term increase in severity due to disruption to traffic flows, particularly during the de-trunking works on Chester Road</td>
<td>Long-term increase in severance for following stopping-up of Bucklow Hill Lane and Chapel Lane – increased journey length via A50 or new Millington Junction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term reduction in severance within the community following transfer of traffic from Chester Road to the new A556.</td>
</tr>
<tr>
<td>Millington</td>
<td>Potential short-term increase in severity due to disruption during construction</td>
<td>Long-term increase in severance following stopping-up of Millington Lane and Millington Hall Lane – increased journey length via new Millington Junction.</td>
</tr>
</tbody>
</table>

### Loss of land used by the community

14.4.2 The scheme would not require the loss of any community land as defined in DMRB. However the scheme would reduce the size of Tabley Parish Hall car park as a result of land-take for the new alignment. Vehicles would still be able to access the car park.

14.4.3 There would not be any loss of land used by the community during construction.

### Demolition of private property and/or associated land-take

#### Demolition of private property

14.4.4 The scheme would not require the demolition of any private properties.

#### Land-take from private property

14.4.5 The scheme would require some land from the rear garden of Rangemore Nursing Home, which would affect a T-Mobile mast erected in the garden. Access to the nursing home would be significantly improved, using the de-trunked Chester Road and eliminating conflict with trunk road traffic. The car park would remain unaffected.

14.4.6 Figure 14.2A and B shows the land take areas for each receptor affected and Table 14.6 shows the total area of non-agricultural land lost. Impacts on agricultural land are dealt with in the Effects on Agriculture section below. The total area of non agricultural land take is 18.96ha, excluding woodland which is accounted for in Landscape and Ecology, Chapters 9 and 10 respectively.
There would be a temporary increase in land take during construction. This land would be returned to its original use following the completion of the scheme.

Effects on commercial properties

The scheme as currently designed would not require the demolition of any commercial properties. However, a number of commercial properties which are located in close proximity to the scheme may be affected by:

- Changes in the access routes, with some longer routes from the motorway and trunk road network;
- Increased journey time reliability and improved safety for customers and staff travelling to and from the businesses, and in some cases improved connectivity;
- Less direct access to passing trade originating from trunk road traffic; and
- Improved access to passing and other trade originating in the local area.

Construction of the scheme would temporarily increase disruption to businesses when vehicle travellers are directed away from Chester Road.

Effects on development land

There will be no effect on development land within the study area as no sites have been designated for future development in the local and structure plans, no current planning applications for commercial development are known and there are no existing planning permissions for commercial development. All of the study area is in the Green Belt, so future development is unlikely.

Effects on agricultural land

Most of the permanent land take (almost 80%) required for the scheme is currently in agricultural use. This land is required for the route of the new road, including junctions, side road diversions, embankments and cuttings, drainage ponds and essential environmental mitigation such as noise bunds, woodland and replacement ponds. Additional land would be taken temporarily for construction purposes, and returned to agricultural use after construction is complete.

The results of the desk-based assessment and visual survey suggest that most of the agricultural land which would be required for the scheme is likely to be Grades 2 (31.6 ha, 41%) and 3a (31.3 ha, 40%). This falls within the BMV agricultural land category, and for the purposes of the assessment is considered to be of medium sensitivity. The remaining area (14.5 ha, or 19%) is likely to be Grade 3b, and therefore outside the BMV category.

In line with national policy PPS7, the desirability of avoiding BMV land was taken into account in deciding the route of the scheme. However, the widespread distribution of BMV land in the study area meant that it could not be avoided. A small reduction could be achieved by adopting a different route in the Millington area; however, this would have entailed land-take from Rostherne Mere SSSI, stopping-up Cherry Tree Lane and Rostherne Lane, adverse effects on Rangemore Nursing Home and would have compromised safety-related aspects of road design. Additionally, the area of agricultural land take is not significant in national or regional terms. Therefore, these other factors were considered to outweigh the loss of BMV land.

Further areas of agricultural land are likely to be required for temporary uses during the construction period for contractor’s compounds and materials storage, soil storage and haul routes. These areas would be out of agricultural production for some or all of the construction period but would be progressively returned to agriculture on completion of their use.

Effects on farm businesses

Fourteen farm businesses would be affected by permanent land take for the proposed scheme (see Figure 14.2A and B and Table 14.7), taking between 1% and 25% of the total land area identified of each farm or landholding.

The retention of the local road network west of the present A556, with three overbridges (Burleyhurst Lane, A50 and Millington Junction) and the new side road linking to Millington Lane and Chapel Lane, would allow continued access to land on both sides of the road for most farms. In the north, the Cherry Tree Lane link on the east side of the scheme would avoid potential problems of farming land in the

Table 14.6: Non-agricultural land take (excluding woodland)

<table>
<thead>
<tr>
<th>Land Owner</th>
<th>Total area of non-agricultural land take (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowden Water Treatment Works</td>
<td>0.07</td>
</tr>
<tr>
<td>Cheshire Lounge</td>
<td>0.06</td>
</tr>
<tr>
<td>Rangemore Nursing Home</td>
<td>0.33</td>
</tr>
<tr>
<td>Sandhole Farm (amenity grassland)</td>
<td>0.08</td>
</tr>
<tr>
<td>Secretary of State for Transport</td>
<td>18.4</td>
</tr>
<tr>
<td>Tabley Parish Hall</td>
<td>0.02</td>
</tr>
<tr>
<td>1 Denfield Cottage</td>
<td>Less than 0.01</td>
</tr>
</tbody>
</table>

Issued January 2012
Rostherne area. However, without mitigation, three farms at the southern end of the route, between M6 Junction 19 and Tabley Junction, would lose access routes off Old Hall Lane that are currently available. The design standards of the new road mean that no direct accesses from the new road would be provided to the adjoining fields.

14.4.17 The impacts of land take and severance on each farming business affected by the proposed scheme are summarised in Table 14.7 overleaf. The impacts described are in the absence of mitigation; proposed mitigation of these effects is described in Section 14.5.

14.5 Mitigation

Community severance

14.5.1 Although the scheme cuts across a number of existing roads and involves the stopping up of several of them, alternative access points are provided between the de-trunked Chester Road and the new A556 and across the new road. This facilitates the movement of all travellers between the communities directly impacted by the new alignment, as well as movement to the wider surrounding area (see Chapter 2 for the description of the scheme, Figure 2.1 for the scheme alignment, and see Chapter 15 for Effects on all travellers). In particular, the underpass at Old Hall Lane, the Burleyhurst Lane overbridge, the new side road and NMU facilities at Millington Junction, and the Cherry Tree Lane link are all designed to mitigate impacts on community severance and/or to reduce existing severance, while the adjustment of the alignment to the west at Millington avoids the need to stop-up Cherry Tree Lane and Rostherne Lane.

14.5.2 Over Tabley, Mere and Bucklow Hill would experience a reduction in community severance as a result of less traffic on the de-trunked Chester Road, reduced congestion and more reliable journey times. For these communities, the scheme itself is designed to mitigate existing problems, and no additional mitigation would be required. Further consultation is required to determine potential mitigation measures for the effects of the diversion of traffic onto Pickmere Lane on the community of Holehouses.

14.5.3 Where routes of access are prevented during construction alternative diversions would be implemented to ensure residents can reach their destinations with minimal disruption.

Loss of land used by the community

14.5.4 There is no loss of any land used by the community as defined by the DMRB therefore no mitigation is required.

14.5.5 Mitigation for the loss of land from the Tabley Parish Hall car park would be determined following further discussion with the Parish Council.

Demolition of private property and/or associated land-take

14.5.6 Rangemore Nursing Home would lose land from the grounds to the rear of the property. However, the home would also gain improved access. No further mitigation is proposed.

Effects on commercial property

14.5.7 The scheme incorporates new access routes for a number of the properties including Hulme Barns Farm, Mereside Farm, Cheshire Lounge and Yarwoodheath Farm therefore no mitigation is required for these properties.

14.5.8 Consideration will be given to providing signage along the new alignment for the service area in Over Tabley, and for local services elsewhere along the de-trunked Chester Road in Millington.

14.5.9 Where routes of access are obstructed during construction, diversions would be implemented to ensure customers and/or employees can reach their destinations with minimal disruption.

Effects on development land

14.5.10 No mitigation will be required because there is no development land in the study area.
## Table 14.7: Summary of effects on farm businesses

<table>
<thead>
<tr>
<th>Name/description of farm</th>
<th>Area of farm (hectares)</th>
<th>Land-take required (hectares) and % of farm area</th>
<th>Description of land taken</th>
<th>Other effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pownell Green Farm</td>
<td>70</td>
<td>0.85 1.2%</td>
<td>Part of arable field north of M6</td>
<td>None</td>
</tr>
<tr>
<td>‘Over Tabley Development Land’</td>
<td>11</td>
<td>2.78 26%</td>
<td>Part of grassland north of Old Hall Lane</td>
<td>Remaining land split by new road</td>
</tr>
<tr>
<td>Over Tabley Hall Land</td>
<td>8</td>
<td>1.94 24%</td>
<td>Part of grassland fields east of Over Tabley Hall</td>
<td>Remaining land split by new road; Loss of access to part of land; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Tabley Hall Farm</td>
<td>30</td>
<td>7.38 24.6%</td>
<td>Part of grassland fields south of Tableypipe Wood</td>
<td>Remaining land split by new road; Loss of access to part of land; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Church Farm</td>
<td>50</td>
<td>1.1 2.2%</td>
<td>Part of grassland fields west of A556; part in Higher Level Stewardship scheme</td>
<td>Safer access off de-trunked Chester Road (no conflict with trunk road); Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Knowlespit Farm, including Bentleyhurst Farm</td>
<td>150</td>
<td>17.7 11.8%</td>
<td>Parts of mainly grassland fields between Tableypipe Wood and Belt Wood</td>
<td>Creation of small, irregularly-shaped severed fields; Longer access routes; Farm reorganisation required; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Winterbottom Farm</td>
<td>90</td>
<td>4.0 4.4%</td>
<td>Whole of a single detached field between Belt Wood and the A50</td>
<td>None</td>
</tr>
<tr>
<td>Hullme Barns Farm</td>
<td>60 (estimate)</td>
<td>5.0 8.5%</td>
<td>Parts of fields between A50 and Bucklow Hill Lane</td>
<td>Farm land bisected; Creation of small, irregularly-shaped fields; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Mere Hall Farm</td>
<td>57</td>
<td>4.8 8.5%</td>
<td>Parts of fields between Bucklow Hill Lane and Chapel Lane</td>
<td>Farm land bisected; Increased journey length for access to western land</td>
</tr>
<tr>
<td>Millington Hall Farm</td>
<td>80</td>
<td>11.1 13.7%</td>
<td>Parts of fields north and south of Millington Hall Lane</td>
<td>Farm land bisected both from north to south and east to west; Creation of small, awkwardly-shaped fields; Changes to access; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>New Hall Farm</td>
<td>105</td>
<td>6.0 5.8%</td>
<td>East side of fields adjacent to west side of existing A556</td>
<td>Favourable changes to access; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Denfield Hall Farm</td>
<td>200</td>
<td>7.8 3.9%</td>
<td>Large parts of two fields north of the M56</td>
<td>Improved access via new Cherry Tree Lane extension; Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Spode Green Farm</td>
<td>53</td>
<td>1.3 2.5%</td>
<td>Narrow strip at east edge of fields, adjacent to existing A556</td>
<td>Possible additional temporary land-take during construction</td>
</tr>
<tr>
<td>Yarwoodheath Farm (farmed from Wayside Farm, north east of the study area)</td>
<td>73</td>
<td>5.64 7.8%</td>
<td>Parts of fields adjacent to existing M56 spur and Yarwoodheath Lane</td>
<td>Changes to access; Possible additional temporary land-take during construction</td>
</tr>
</tbody>
</table>
Effects on Agricultural Land

14.5.11 The permanent loss of BMV agricultural land cannot be mitigated in this scheme. However, surplus topsoil would be sustainably managed and re-used in line with the requirements of a soil management plan to be outlined in the Construction Environmental Management Plan (CEMP) and/or the Site Waste Management Plan (SWMP) (see Chapter 9, Landscape, and Chapter 12, Materials).

14.5.12 Agricultural land quality and farm systems in the study area depend upon effective land drainage in winter. The detailed design of the scheme would take this into account in order to minimise the impact on agriculture.

14.5.13 The agricultural land areas affected by temporary uses would be out of production during all or part of the construction period, but would be returned to agriculture on completion. A Soil Resources survey would be used to devise a Soil Management Plan as part of the CEMP and/or SWMP to include measures to ensure careful stewarding of the soil resources during the works period, proper restoration of the land and subsequent agricultural aftercare including any necessary land drainage.

14.5.14 Soil management operations generally would be in accordance with Defra’s Good Practice Guide for Handling Soils including:

- Stripping of topsoil and subsoil when weather and soil conditions are suitable;
- Separate storage and management of topsoil and subsoil storage heaps;
- Return of these soils to the original plots, also in separate layers (where possible, and where these plots are not occupied by permanent new infrastructure);
- Use of appropriate machinery to minimise soil compaction;
- Relief of any compaction of restored soils;
- Surface ripping and if necessary under-drainage of restored sites (subject to other environmental constraints, such as the presence of buried archaeological remains); and,
- Aftercare of restored soils, including appropriate cropping, for example a temporary grass ley if required, and associated soil nutrient requirements.

14.5.15 Additionally, consideration will be given to the feasibility of returning some land to agricultural use through the grading-out of some earthworks to more gradual slopes, where this would not conflict with other environmental mitigation, and subject to the agreement of the adjacent landowner. In addition to reducing the permanent land-take for the scheme, this would have benefits for the landscape.

Effects on farm businesses

14.5.16 Access to farmed land during the works would be maintained where possible to enable continued farming on all the holdings affected by construction. Disruption to farms would be minimised through measures to be adopted in the CEMP (see Chapter 12, Materials and Chapter 13, Geology and soils), such as measures to reduce dust and construction site runoff and temporary access arrangements.

14.5.17 Suitable replacement access points to severed fields and areas where existing access is lost would be required to ensure continued operation of farm units. Without this mitigation some farm units would experience a greater land loss than discussed above and subsequently a greater adverse impact than detailed in the section below.

14.5.18 A new shared Private Means of Access (PMA) track would be provided from the de-trunked A556 Chester Road at Tabley to give access to the severed lands of Over Tabley Hall and Tabley Hill Farm, passing through the ‘Over Tabley Development Land’.

14.5.19 Other agricultural impact mitigation and accommodation measures would include provision for suitable outlets for existing field drainage systems and continuity of water and other utility supplies.

14.6 The significance of environmental impacts

Community severance

14.6.1 The majority of communities would experience some short-term adverse impacts through disruption/increased severance during construction, to varying degrees. In all cases, this would cease after the new road has opened to traffic and the de-trunking works are complete.

14.6.2 The majority of communities would experience longer-term operational impacts through a reduction in community severance as a result of less traffic on the de-trunked Chester Road, reduced congestion and more reliable journey time (see Chapter 15, Effects on all travellers). These and other long-term operational effects are summarised and assessed in Table 14.8 overleaf.
### Table 14.8: Summary of significance of long-term effects on community severance

<table>
<thead>
<tr>
<th>Community</th>
<th>Impacts of scheme</th>
<th>Mitigation Measures</th>
<th>Significance of residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Tabley</td>
<td>Reduced severance along/ across A556</td>
<td>None</td>
<td>Beneficial – not significant</td>
</tr>
<tr>
<td></td>
<td>Improved access between St Paul’s church and it’s car park</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved vehicular and NMU access to schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New underpass/reduced traffic would reduce NMU severance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New vehicular severance along Old Hall Lane and Pickmere Lane, increased journey length for residents travelling to/from Holehouses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holehouses</td>
<td>Longer journey length to Over Tabley facilities, balanced by shorter return journey</td>
<td>None</td>
<td>Beneficial – not significant</td>
</tr>
<tr>
<td></td>
<td>Improved safety along Chester Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mere</td>
<td>Reduced severance – reduced traffic on Chester Road</td>
<td>None</td>
<td>Beneficial - significant</td>
</tr>
<tr>
<td></td>
<td>New - scheme itself mitigates a range of adverse impacts of the existing road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoo Green</td>
<td>Reduced severance – improved access to the hospital and high school located in Knutsford</td>
<td>None</td>
<td>Beneficial – not significant</td>
</tr>
<tr>
<td></td>
<td>Increased journey length between Hoo Green and Bucklow Hill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bucklow Hill</td>
<td>Reduced severance – reduced traffic on Chester Road</td>
<td>None</td>
<td>Beneficial – significant</td>
</tr>
<tr>
<td></td>
<td>Increased severance – increase in journey lengths due to the stopping up of Bucklow Hill Lane and Chapel Lane</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New - scheme itself mitigates a range of adverse impacts of the existing road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millington</td>
<td>Reduced severance – improved vehicular and NMU access and safety across the Chester Road and new alignment</td>
<td>New side road linking Chapel Lane/Peacock Lane to the de-trunked Chester Road introduced to reduce severance</td>
<td>Adverse – significant</td>
</tr>
<tr>
<td></td>
<td>Increased severance – increased journey lengths and incline of the overbridge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased journey times to wider communities north of the scheme</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rostherne</td>
<td>Increased severance between the community of Rostherne and wider communities to the north – longer journey times; balanced by reduced severance due to easier/safer access to the trunk road via new Millington Junction</td>
<td>New side road linking Chapel Lane/Peacock Lane to the de-trunked Chester Road introduced to reduce severance</td>
<td>Beneficial – not significant</td>
</tr>
<tr>
<td></td>
<td>Reduce severance between the community of Rostherne and other communities to the south – reduced traffic on Chester Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduced severance for non-vehicular journeys; easier access to and from the north</td>
<td>None</td>
<td>Beneficial – not significant</td>
</tr>
</tbody>
</table>

#### Loss of land used by the community

14.6.3 There is no loss of land used by the community as defined by DMRB. Pending further consultation with the parish council with reference to the lost car parking at Tabley Parish Hall, the impact of the scheme is considered to be neutral.

### Demolition of private property and associated land-take

#### Private Property

14.6.4 There is no demolition of private property therefore the impact of the scheme is neutral.

### Land Take

14.6.5 The adverse effect of loss of land on Rangemore Nursing Home is offset by the benefits to the business of improved access. The overall impact is therefore considered to be neutral. There would also be beneficial impacts in other areas (air quality and noise; see Chapters 6 and 7) and adverse visual impacts (Chapter 9).

### Effects on commercial property

14.6.6 The significance of effects on each commercial property within the study area is summarised in Table 14.9.

#### Table 14.9: Summary of significance of effects on commercial properties

<table>
<thead>
<tr>
<th>Community</th>
<th>Commercial properties</th>
<th>Mitigation Measures</th>
<th>Significance of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Tabley</td>
<td>Service area</td>
<td>Signage along the new alignment</td>
<td>Adverse - not significant</td>
</tr>
<tr>
<td></td>
<td>Dairy House Farm</td>
<td>None</td>
<td>Beneficial - not significant</td>
</tr>
<tr>
<td></td>
<td>Abbott House Conference facility</td>
<td>None</td>
<td>Beneficial - significant</td>
</tr>
<tr>
<td>Mere</td>
<td>Mere Golf Resort and Spa</td>
<td>None</td>
<td>Beneficial - significant</td>
</tr>
<tr>
<td></td>
<td>Rainbow Day Nursery</td>
<td>None</td>
<td>Beneficial - significant</td>
</tr>
<tr>
<td>Bucklow Hill</td>
<td>The Swan public house, Premier Inn and petrol station with small shop</td>
<td>Signage along the new alignment</td>
<td>Adverse - not significant</td>
</tr>
<tr>
<td></td>
<td>Bucklow Garage Ltd</td>
<td>None</td>
<td>Adverse - not significant</td>
</tr>
<tr>
<td>Millington</td>
<td>Rangemore Nursing Home</td>
<td>None</td>
<td>Beneficial - significant</td>
</tr>
<tr>
<td></td>
<td>AVEC cookers at Mereside Farm</td>
<td>None</td>
<td>Beneficial – not significant</td>
</tr>
<tr>
<td></td>
<td>Cheshire Lounge</td>
<td>Signage along the new alignment</td>
<td>Adverse - not significant</td>
</tr>
<tr>
<td></td>
<td>Millington Power Cleaning</td>
<td>None</td>
<td>Beneficial - not significant</td>
</tr>
<tr>
<td></td>
<td>Aqua Air and Cleaning at Denfield Smithy</td>
<td>None</td>
<td>Beneficial - not significant</td>
</tr>
<tr>
<td></td>
<td>The Children’s Adventure Farm</td>
<td>None</td>
<td>Beneficial - not significant</td>
</tr>
</tbody>
</table>

Issued January 2012
Effects on development land

14.6.7 There is no impact on development land.

Effects on agricultural land

14.6.8 Sixteen individual agricultural land receptors have been considered within this chapter and impacts have been identified for all these receptors: agricultural land quality, soil resources and 14 farm businesses (see Table 14.10). These impacts may be long term, such as permanent loss of land, or short term such as temporary uses of land during the construction period.

14.6.9 Mitigation measures are provided for the agricultural receptors where appropriate and feasible. These include design measures to reduce impact, construction management measures designed to minimise disruption to farm businesses and soil resources, and the provision of new private means of access to replace those that would be lost. However, these mitigation measures do not reduce the land take area.

14.6.10 The restoration of temporarily disturbed land used during the construction phase, such as land used for contractor’s compound sites, would result in a reduction in the overall impact.

14.6.11 The identification and assessment of impacts, taking account of mitigation where appropriate, is summarised in Table 14.10.

<table>
<thead>
<tr>
<th>Receptor Type</th>
<th>Receptor</th>
<th>Mitigation Measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 2 &amp; 3a</td>
<td>Farm business</td>
<td>Compensation in the form of restoration of temporarily used areas to agricultural production</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Soil resources</td>
<td>Farm business</td>
<td>Offsetting through re-use of topsoil, for example in de-trunked landscape works</td>
<td>Adverse - significant</td>
</tr>
<tr>
<td>Pownell Green Farm, Over Tabley</td>
<td>Farm business</td>
<td>New PMA entrance off de-trunked A556 Chester road</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Over Tabley, Development Land</td>
<td>Farm business</td>
<td>New PMA from de-trunked A556 Chester road via Over Tabley Development Land</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Over Tabley Hall Land Farm</td>
<td>Farm business</td>
<td>New PMA from de-trunked A556 Chester road via Over Tabley Hall and Development lands</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Church Farm, Over Tabley</td>
<td>Farm business</td>
<td>None</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Knowlespit Farm, Mere</td>
<td>Farm business</td>
<td>None – Burleyhurst Lane overbridge and access track to pond B ensure access to Bentleyhurst Farm land</td>
<td>Adverse – significant</td>
</tr>
<tr>
<td>Winterbottom Farm, Mere</td>
<td>Farm business</td>
<td>None</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Hulme Barns Farm, Mere</td>
<td>Farm business</td>
<td>None – A50 overbridge ensures continued access to severed land east of new road</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Mere Hall Farm, Mere</td>
<td>Farm business</td>
<td>None – Millington Junction and new local road link to Chapel Lane allow access to severed land west of the new road</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Millington Hall Farm, Millington</td>
<td>Farm business</td>
<td>None – Millington Junction and new local road link to Millington Hall Lane allow access to severed lands east of the new road</td>
<td>Adverse – significant</td>
</tr>
<tr>
<td>New Hall Farm, Millington</td>
<td>Farm business</td>
<td>None – access track to Mereside farm and pond C replace accesses off the present A556</td>
<td>Adverse - significant</td>
</tr>
<tr>
<td>Denfield Hall Farm, Rostherne</td>
<td>Farm business</td>
<td>None – Cherry Tree Lane link ensures continued access to land around Yarwoodheath Farm</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Spode Green Farm, Bollington</td>
<td>Farm business</td>
<td>None</td>
<td>Adverse – not significant</td>
</tr>
<tr>
<td>Yarwood Heath farm, Rostherne</td>
<td>Farm business</td>
<td>New track to link to existing accommodation bridge over M56 spur via new roundabout allows access to land to the north</td>
<td>Adverse – not significant</td>
</tr>
</tbody>
</table>
15 Effects on all travellers

Executive summary

This topic addresses effects of the scheme on all types of travellers in the study area – vehicle drivers and passengers, and pedestrians, equestrians and cyclists.

The existing A556 suffers from congestion and has a poor accident record, due to the high volume of traffic on the road and conflict between trunk road traffic and users of the numerous properties, field accesses, minor side roads and public rights of way (PRoW) that have direct access onto the trunk road. Driver stress increases due to frustration and fear of potential accidents. However, the views available to vehicle travellers on the existing road network are mostly of good quality.

The existing PRoWs in the study area do not provide a linked network between the surrounding villages, while the existing A556 forms a barrier to pedestrian, cyclist and equestrian movements, mainly caused by the volume of traffic on the road.

The transfer of traffic to the new A556 and the provision of safe crossing points over the new road would eliminate this barrier effect, allowing the de-trunked Chester Road to become an attractive route for pedestrians, equestrians and cyclists and a connecting route between PRoWs to either side. However, although crossing the trunk road would be safer and easier than at present, changes to side roads and footpaths mean that some users would have to follow longer routes to reach the crossings.

The higher standard of the new road and the elimination of conflict with local traffic mean that stress would reduce for drivers on the trunk road. While trunk road users would initially experience poorer-quality views, the views would improve as the landscaping works along the route mature. Travellers on the local road network would in general experience improved views after the scheme opens.

A de-trunking and non-motorised user strategy has been developed in parallel with scheme design, to ensure that, on balance, the effects on pedestrians, equestrians and cyclists are beneficial. All new, modified or diverted facilities would be made accessible to disabled users within the extent of the works.

15.1 Introduction

15.1.1 This chapter addresses two key aims:

- To assess the difference between the journeys that people would make on foot, bicycle, horse back or by horse-drawn vehicle, using the PRoW network or minor roads, with and without the proposed scheme in place. The assessment considers changes in journey length and times, connectivity between routes and changes in amenity value of journeys (pleasantness of the journey); and

- To assess the impact of the proposed scheme on vehicle travellers, particularly considering driver stress and changes in views from the road for drivers and passengers. This includes users of public transport within the area.

15.1.2 Within this chapter reference will be made to ‘Non-Motorised Users’ (NMUs), a term that includes all of the following – pedestrians, equestrians (horse riders and horse-drawn vehicles) and cyclists. This will also include people with mobility problems, whose needs may differ from other pedestrians.

15.1.3 Non-motorised travel can improve health, reduce social exclusion and reduce travel costs. The assessment considers journeys made by NMUs for both recreational purposes and to access educational facilities, shops and places of work (referred to as ‘utility’ journeys). Recreational trips are likely to use both the PRoW and minor road networks, as they provide access to the local countryside, open spaces and provide opportunities for outdoor exercise and leisure activities. Most NMU utility journeys use roads, with PRoWs used to a much lesser extent.

15.1.4 In respect of vehicle travellers, driver stress is currently a problem in the area due to the large quantity of congestion, resulting in significant delays and unreliable journey times. Reducing congestion is one of the main objectives of the scheme. The design of the road itself can have a significant effect on minimising or increasing the level of stress experienced. The views travellers experience from the road also impact on the quality of the journey.

15.1.5 The national policy guidance that has been taken into account in this chapter includes Planning Policy Guidance 13: Transport (2011). On a more local level, relevant policies published by Cheshire East Council specifically relating to transportation policy, public transport and provision for NMUs have been taken into account, and more detail will be provided in the Environmental Statement.

Limitations of the information presented

15.1.6 This PEI provides only outline information on the sources of information used, on the legislative and policy background to the topic and on the methods used to assess the

\[ A \text{ standard measure of drivers' stress can be calculated, based on the volume of traffic and average speeds} \]
relevant environmental impacts. More information on these aspects of the assessment will be provided in the ES.

15.1.7 This chapter also draws heavily on a separate ‘Non-Motorised Users Context Report’ prepared for the scheme, which presents the baseline information in more detail. Surveys of pedestrian, equestrian and cyclist traffic in the study area were carried out in July and August 2010, and the results are presented in detail within the Non-Motorised Users Context Report. For reasons of space, this report is not presented within this PEI, but it will be made available to the public as an appendix to the ES.

15.2 Approach and methods

15.2.1 Due to restrictions with public consultation, a limitation of this study has been a delay in consultation, particularly with Cheshire East Public Rights of Way Officer. Further follow up consultation is proposed with Cheshire Local Access Forum and other NMU organisations. As explained in Section 1.4, the main text of the final ES will provide more detail than the PEI, particularly on the assessment methods and legislative background.

15.2.2 The information used in this chapter was obtained through a desk-based study and surveys of non-motorised traffic. Key sources of information for the desk-based study included the online version of the Definitive Map of PRoWs, planning policy documents, relevant ordnance survey maps and site visits in November 2009 and January 2010.

15.2.3 This assessment and the design of the de-trunking and NMU strategy have drawn on consultation with relevant officers of Cheshire East Council, correspondence with organisations representing non-motorised users and two meetings with the Cheshire Local Access Forum.

15.2.4 The assessment took account of all vehicular and non-motorised traffic that uses, meets or crosses the existing A556 in the baseline situation, and how that traffic would be affected during and after construction of the scheme. The assessment considers the route between Junction 19 of the M6 motorway and Junction 7 of the M56 and takes account of all footpaths, bridleways, restricted byways and side roads to either side of both the existing and the proposed A556.

15.2.5 DMRB does not provide guidance for this topic, as it has only recently been introduced to the EIA process. Therefore the assessment of impacts of the proposed scheme on all travellers has been carried out using professional judgement, drawing on older guidance for superseeded topics in DMRB. Pending publication of new DMRB guidance, there is no agreed method of measuring the value or sensitivity of effects on all travellers, and there is no agreed scale against which they can be measured. As detailed in Chapter 5, the assessment is therefore based on professional judgement.

15.2.6 The assessment has been carried out with reference to the de-trunking and NMU strategy drawings (Figures 2.8 to 2.12). It refers to three different timescales – during the construction period (assumed for the purposes of the assessment to be 2014-15), in the year of opening (assumed to be 2015) and a future year (2030, 15 years after opening). This is to take into account both the continuing change in traffic flows over time, and the time taken for mitigation planting to establish and mature.

15.3 The existing environment (‘baseline conditions’)

Public Rights of Way, cycle routes and roads

15.3.1 The PRoW, cycle routes and roads that meet or cross the existing A556 are illustrated on Figure 15.1A and B and the main routes are described below in Table 15.1.

15.3.2 In summary, around the southern end of the existing and new A556, the network principally comprises a limited number of bridleways, a byway, one footpath close to the scheme and a number of minor side roads. The central section of the existing and new A556 has few PRoWs, although there are several side roads that are used by NMUs such as the A50, Chapel Lane, Bucklow Hill Lane and Cicely Mill Lane. Around the northern part of the existing A556, there is an extensive network of public footpaths, linked by minor side roads, but there are no bridleways.

<table>
<thead>
<tr>
<th>ID</th>
<th>Description/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabley Superior FP6 (Photo 4 Figure 15.1A)</td>
<td>A short link running eastwards from the existing A556 to Moss Lane. Seems little used - demand may be suppressed by the existing A556.</td>
</tr>
<tr>
<td>Rostherne FP1</td>
<td>Footpath running eastwards from the existing A556 (opposite Millington Hall Lane) to Rostherne Lane.</td>
</tr>
<tr>
<td>Millington FP1 (Photo 10 Fig. 15.1B)</td>
<td>Footpath linking Chapel Lane with Millington Hall Lane. Possibly used by equestrians.</td>
</tr>
<tr>
<td>Millington FP2</td>
<td>Footpath linking Millington Hall Lane and Peacock Lane.</td>
</tr>
</tbody>
</table>


84 DMRB, Volume 11, Section 3, Part 8 Pedestrians, Cyclists, Equestrians and Community Effects and Volume 11, Section 3, Part 9 Vehicle Travellers.

85 Note – only routes adjoining the existing A556, or likely to be affected by the proposed scheme, are listed.
### Preliminary Environmental Information

#### Roads

<table>
<thead>
<tr>
<th>ID</th>
<th>Description/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A556 (Photo 5 Fig. 15.1A)</td>
<td>There is a continuous footway along the full length of the existing A556 (west side). Footway on east side of existing A556 through Bucklow Hill and Mere. Footway on east side of existing A556 – intermittent between M6 J 19 and Mere. Survey recorded some use of the existing A556 by pedestrians and cyclists.</td>
</tr>
<tr>
<td>Old Hall Lane (Photo 2 Fig. 15.1A)</td>
<td>Lane from Over Tabley to Pickmere, via bridge over the M6. Survey recorded NMU use mainly by cyclists, with some pedestrians at the weekend.</td>
</tr>
<tr>
<td>Moss Lane</td>
<td>Lane running east from the existing A556 in Over Tabley, to Green Lane.</td>
</tr>
<tr>
<td>Burleyhurst Lane (Photo 6 Fig. 15.1A)</td>
<td>Lane running west from the existing A556 via Knowles Pit Farm to Bentleyhurst Farm, where it links with Mere BR1.</td>
</tr>
<tr>
<td>A50 (Photo 8 Fig. 15.1A)</td>
<td>Road from Knutsford to Warrington via Mere. Well used by cyclists, some pedestrians were recorded at the weekend. Used by cycling clubs for time trials</td>
</tr>
<tr>
<td>Bucklow Hill Lane</td>
<td>Lane linking Bucklow Hill to Hoo Green. Survey recorded pedestrian and cyclist use.</td>
</tr>
<tr>
<td>A5034 Mereside Road</td>
<td>Road to south-east from Bucklow Hill to the A50 and Knutsford. Access route for Tatton Park.</td>
</tr>
<tr>
<td>Cicely Mill Lane</td>
<td>Lane to east from Bucklow Hill to Rostherne, forming part of Regional Cycle Route 70. Popular with cyclists at weekends.</td>
</tr>
<tr>
<td>Chapel Lane (Photo 9)</td>
<td>Lane to west from Bucklow Hill towards High Legh.</td>
</tr>
</tbody>
</table>

#### Driver stress

15.3.3 The existing A556 is a major strategic trunk road linking north Cheshire and southern Greater Manchester with the West Midlands.

15.3.4 Traffic surveys carried out in 2009 estimated flows on the existing A556 between Knutsford and Bowdon to be sometimes in excess of 51,500 vehicles, with around 44,000 on an average weekday (including flows in both directions). The major vehicle movements contributing to the traffic flows are as follows:

- Traffic continuing along the existing A556 itself in both directions, across Junction 19 of the M6 motorway;
- Traffic to and from the M6 motorway at Junction 19
- Traffic to and from the M56 motorway at Junction 7;
- Traffic to and from the A56, through the roundabout at Junction 7 of the M56 motorway;
- Through traffic on the A50 as well as traffic joining and leaving the existing A556 at the A50 junction in Mere and at the A5034 junction in Bucklow Hill.

15.3.5 In addition, the existing A556 is the main tourist route to Tatton Park (National Trust) and can experience large increases in flow volume when events are held there. For example, the 2008 RHS Tatton Park Flower Show saw flows in excess of 57,000 vehicles.

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86 2003 Classified Turning Count Survey at M6 Junction 19

87 2006 Classified Turning Count Surveys at the junctions of the A50 and A5034 with the A556

Issued January 2012
15.3.6 Figures 15.2 and 15.3 compare the annual average daily traffic figures in 2030 for the ‘do minimum’ without scheme and ‘do something’ with scheme.

15.3.7 It is these major traffic movements that contribute to the congestion along the existing A556, resulting in significant delays and unreliable journey time. The existing A556 is currently a very busy road carrying large volumes of traffic. In general, drivers making the major traffic movements experience moderate to high levels of stress on many of the links. At present, high levels of stress are concentrated at Bowdon roundabout in the north, the M6 roundabout in the south and the existing A556 trunk road particularly between Cherry Tree Lane and the edge of Over Tabley.

15.3.8 Views from the road can make a significant difference to the quality of a journey, both for drivers and passengers in vehicles. This section considers the quality of views for journeys that travellers presently undertake using the existing road system. This information will be used to help predict the differences in the quality of views that would be experienced by travellers using the new A556 or staying on the de-trunked Chester Road and the altered local road network.

15.3.9 The views available to vehicle travellers on the existing road network are generally of a good quality (see Figure 15.4A and B). Views along the new A556 would also generally be of good quality (see Figure 15.5A and B).

15.3.10 In general, the existing A556 follows natural ground levels throughout the route between the M6 and M56, with very little embankment or cutting along the route. Existing views for travellers are of a mature agricultural landscape with low ridges and gently undulating topography, partially defined by hedgerows, woodland groups and dispersed rural residences and large farms (see Chapter 9 for more information on landscape character). Road-side vegetation and relatively high numbers of roadside properties at the settlements of Over Tabley, Mere and Bucklow Hill are recognisable elements of the existing A556 and restrict views along some sections. Properties facing the road, together with established businesses, public houses and service stations strongly characterise the existing A556 as a well established and partially urbanised route.

15.3.11 South of Mere, travellers experience restricted or intermittent views of the rural landscape to the east and west partially constrained by a number of mature woodlands and roadside properties. Views to the west between Mere and Bucklow Hill become intermittent or open across the agricultural landscape, while views east are constrained by large residential properties and mature grounds. Between Bucklow Hill and south of Bowdon roundabout there are fewer woodlands and roadside properties, allowing more open and distant views across the agricultural landscape to the east and west. In the vicinity of Bowdon roundabout, travellers’ views are influenced by the motorway interchange with highway plantations constraining intermittent views. Travellers to the north have views across the Bollin River valley to Bowdon ridge. Travellers views at M6 Junction 19 are relatively open, but dominated by the major traffic interchange.

15.3.12 Features of particular interest include the Grade II Listed Buildings of Over Tabley Hall and St. Paul’s Church, ornamental parkland associated with Mere Hall, several other Listed Buildings and the nature conservation site at Rostherne Mere (see Chapter 8, Cultural heritage and Chapter 10, Ecology for more information on these features).

15.3.13 Several sets of electricity pylons follow a north/south alignment parallel to the existing A556 and cross the existing A556 near Over Tabley. These detract from the quality of views available on the southern section of the existing road, particularly those towards the west. Highway lighting along the existing A556 also detracts from the quality of views.

15.3.14 There are a number of public transport routes in the vicinity of the existing A556, although services are very infrequent:

- 289 – Northwich to Altrincham;
- 47 – Warrington to Lower Peover (only Tuesdays and Fridays);
- 27 – Macclesfield to Tatton Park (only Sundays and Bank Holidays between April and August);
- 37 and 37A – Warrington to Altrincham; and
- Village Rider Service – a flexible and bookable service for several local villages, including Over Tabley, with links to Knutsford, Northwich, Wilmslow and Handforth Dean on different days of the week.

88 Traffic Flow Data Service (TRADS Data between A5034 and M56 (not 2009 due to Bowdon View Bridge closure), 2008
15.4 Predicted environmental effects

Public Rights of Way, cycle routes and roads

15.4.1 The predicted effects of the scheme on the existing NMU network are described here, working from south to north. The description of effects takes account of the following factors:

- Effects of the new A556 trunk road, new junctions and new side road at Millington;
- Changes to the existing highway infrastructure (de-trunking works on Chester Road, stopping-up or other changes to existing side roads, and changes to existing junctions);
- New facilities provided for pedestrians, equestrians and/or cyclists; and
- Changes to existing facilities for pedestrians, equestrians and/or cyclists.

15.4.2 Construction and operation of new highways can have short-term impacts (those that cease at the latest by the beginning of the design year), for example a temporary PRoW closure or diversion, and long-term impacts (those that will continue in or after the design year), such as a permanent closure. All of the beneficial and adverse impacts have been summarised within Table 15.2 for each road, cycle route or PRoW to be affected. The impacts described are as they affect NMUs only – other effects are addressed elsewhere within this PEI.

### Table 15.2: Predicted effects on PRoW, cycle routes and roads

<table>
<thead>
<tr>
<th>Affected roads, cycle routes or PRoW</th>
<th>Impacts</th>
<th>Type of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 Junction 19</td>
<td>Removal of cycleway around part of junction; Dedicated pedestrian and cyclist link to new A556 underpass at Old Hall Lane, accessible for disabled users</td>
<td>Long-term operational impact</td>
</tr>
<tr>
<td>Chester Road (de-trunked A556)</td>
<td>Scheme would remove most traffic between Over Tabley and Cherry Tree Lane allowing NMUs easier, safer and more pleasant use; Chester Road no longer a barrier to NMU traffic, improvement in connectivity north-south and east-west; NMUs on the de-trunked Chester Road will have new signalised pedestrian and equestrian crossings over the A50.</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Old Hall Lane</td>
<td>New trunk road would permanently sever Old Hall Lane for vehicular traffic immediately west of Over Tabley (Figure 15.1A); Provision of an underpass to maintain connectivity for pedestrians, cyclists and dismounted horse riders, and accessible to disabled users; Improvement in east-west connectivity between Old Hall Lane and Swains Walk as no conflict with vehicular traffic.</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Moss Lane</td>
<td>Indirect impact due to reduction in traffic along Chester Road, beneficial</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Burleyhurst Lane</td>
<td>Short-term disruption during construction whilst the overbridge over the new A556 is tied into the existing lane; During operation, the route will become much more NMU-friendly, particularly as a result of less traffic on Chester Road allowing easier access to Mere BR1; Possible increase in usage of Burleyhurst Lane and Mere BR1 as a result of easier and safer access from Chester Road.</td>
<td>Short-term, construction impact; Long-term, operational impact</td>
</tr>
<tr>
<td>A50</td>
<td>A50 overbridge over the new A556 to be built off-line, short-term disruption during construction whilst the overbridge is tied into the existing A50; NMUs on the A50 (mainly cyclists and pedestrians) will no longer have conflict with trunk road traffic as there will be no junction with the trunk road.</td>
<td>Short-term, construction impact; Long-term, operational impact</td>
</tr>
<tr>
<td>Bucklow Hill Lane</td>
<td>Stopped up on either side of the new A556 off-line route (see Figure 15.1B) resulting in longer journeys for NMUs.</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Chapel Lane</td>
<td>Stopped up on either side of the new A556 off-line route (see Figure 15.1B) resulting in longer journeys for NMUs including users of the Regional Cycle Route 70, diverted via Millington Junction or the A50 to cross the new A556; Diverted traffic via Millington Junction or the A50 would have less conflict with traffic on the trunk road making the journey across the new A556 easier and safer.</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Millington Hall Lane</td>
<td>Stopped up on either side of the new A556 off-line route (see Figure 15.1B); Residents in properties at the end of Millington Hall Lane, including Montebello Castle would have safer and easier access onto the de-trunked Chester Road; Longer journey for NMUs wanting to cross the new A556, diversions via the new dedicated NMU shared use facility at Millington Junction; Improved east-west connectivity via Millington Junction which provides segregation from and reduces conflict with vehicular traffic.</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Millington Lane</td>
<td>Stopped up on either side of the new A556 off-line route (see Figure 15.1B);比我来说, Rangemore Nursing home would have safer and easier access onto the de-trunked Chester Road; Longer journey for NMUs wanting to cross the new A556, diversions via the new dedicated NMU shared use facility at Millington Junction; Improved east-west connectivity via Millington Junction which provides segregation from and reduces conflict with vehicular traffic.</td>
<td>Long-term, operational impact</td>
</tr>
<tr>
<td>Rostherne Lane</td>
<td>Short-term disruption during de-trunking works; No through access to the new A556 trunk road; Improved connectivity to north and south, without conflict with trunk road traffic; With the Millington Junction improved east-west connectivity for all NMUs, a particular benefit for horse riders accessing Ashley Tollride.</td>
<td>Short-term, construction impact; Long-term, operational impact</td>
</tr>
<tr>
<td>Cherry Tree Lane</td>
<td>Short-term disruption during construction of the new A556 and of Cherry</td>
<td>Short-term, operational impact</td>
</tr>
</tbody>
</table>
### Affected roads, cycle routes or PRoW Impacts | Type of impact
---|---
Tree Lane link to the south; | construction impact
No through access to the new A556 trunk road; | Long-term, operational impact
Improved connectivity to north and south, without conflict with trunk-road traffic. | 
Improved connectivity to area west of the new A556, via new Millington Junction, avoiding conflict with trunk road traffic. | 

### Footways on existing A556 north of Millington Lane
Existing footways along the existing A556 would be removed on the northern, on-line section of the improvements. | Long-term, operational impact

### Bowdon roundabout
Substantial reduction in traffic following grade-separation of the junction; reduced conflict for cyclists and pedestrians; Removal of cycleway around parts of existing roundabout – cyclists to use carriageway; Footway within new junction to allow safe passage for pedestrians and link to diverted Rostherne FP9. | 

### Public Rights of Way
Tabley Superior Bridleway 7 (Swain’s Walk)
Indirect impact due to reduction in traffic along Chester Road, beneficial effect on TS BR7 which would become more attractive and would have improved connectivity to Chester Road north-south and Old Hall Lane east-west via the proposed underpass (Figure 15.1A). | Long-term, operational impact

Tabley Superior Footpath 6
Indirect impact due to reduction in traffic along Chester Road, beneficial effect on TS FP6 which would become more attractive and would have improved connectivity (Figure 15.1A). | Long-term, operational impact

Mere BR1
See Burleyhurst Lane | See Burleyhurst Lane

Rostherne Footpath 1
Indirect impact due to reduction in traffic along Chester Road, beneficial effect on Rostherne FP1 which would become more attractive and would have improved connectivity (Figure 15.1B). | Long-term, operational impact

Millington Footpath 7
The footpath would be stopped up at its junction with the existing A556, where the roadside footway running northwards would be removed. Connectivity would be retained with other footpaths including Millington FP8 and Millington FP6 and a safer diversion provided via Millington Junction. | Long-term, operational impact

Millington Footpath 10
Access to footway on existing A556 lost after removal of footway and connecting stairs on embankment; Alternative route provide via new Cheshire Lounge access track linking Millington Footpath 10 with the A56 Lymm Road; Improved accessibility for disabled users due to elimination of stairs. | Long-term, operational impact

Rostherne Footpath 13/ Yarwoodheath Lane
Footpath to be stopped-up south-east of new Bowdon Junction; Remainder of footpath diverted to new roundabout (providing link from Tom Lane to new Bowdon Junction) and upgraded from footpath to bridleway; Greater connectivity north-south from Bucklow Hill to north of the M56 motorway via the new grade-separated junction and the Cherry Tree Lane extension. | Long-term, operational impact

Rostherne Footpath 9
Existing footpath to be stopped-up (see Figure 15.1B), Diversion provided to provide connectivity between FP13, south of the remodelled Junction 7 of the M56, and the River Bollin valley to the east. | Long-term, operational impact

### Cycle route
Regional Cycle Route 70 'The Cheshire Cycleway'
See Chapel Lane for impacts on Regional Cycle Route 70 Indirect impact on Cicely Mill Lane and Bucklow Hill signalised crossing due to reduction in traffic along Chester Road, beneficial effect on Cicely Mill Lane and Bucklow Hill junction which would become more attractive and would have improved connectivity. | Long-term, operational impact

**Driver stress**

15.4.3 During the construction phase, the need to travel through road-works is likely to result in temporary short-term delays which may lead to driver frustration and uncertainty regarding the revised route. However, this will be limited mainly to the area of the on-line improvements north of Millington Lane; the majority of the road will be built off-line, reducing the disruption and consequent driver stress caused during construction.

15.4.4 For the operational period (i.e. after the scheme opens), calculations of drivers stress levels were made for 21 possible traffic movements, which between them represent the great majority of the traffic through the area of the scheme.

15.4.5 There would be a long-term beneficial effect on driver stress along the de-trunked Chester Road and surrounding side-roads, as the scheme is designed to remove the bulk of the traffic from these routes, with consequent benefits for residents of Bucklow Hill, Mere and Over Tabley and other users of the local road network.

15.4.6 Driver stress would reduce for the majority of traffic shifting from the existing road to the new A556, while for a minority it would remain about the same, due to the predicted increase in the volume of traffic over time.

15.4.7 Increased driver stress levels would occur in the long term, at the following locations:
- around the roundabout at Junction 19 of the M6 and on the existing A556 south of the M6;
- on the A56 northbound from Bowdon roundabout;
- on the new A556 trunk road between Millington Junction and Bowdon roundabout; and
15.4.8 Overall the scheme would have a beneficial effect on driver stress for the majority of traffic movements surrounding the existing A556.

15.4.9 This section considers the predicted changes in the quality of views that travellers would experience during construction, and after the opening of the new road, taking account of travellers who transfer to the new road and those that continue to use the local road network. Examples of existing views in the area of the new road alignment are shown on Figures 15.5A and 15.5B. Travellers that will experience changes to the quality of views have been considered in three main groups, as follows:

- Through-traffic that currently uses the full length of the existing A556 between the M6 and M56 and would transfer to the new A556 when it opens;
- Through-traffic whose journeys currently use parts of both the existing A556 and side roads (principally the A50 and A5034) and would transfer to the new A556 for parts of their journeys, via the new Tabley and/or Millington Junctions, after the scheme opens; and,
- Local traffic, which currently uses parts of the existing A556 and other local roads, but which will largely cease to use the A556 trunk road after the scheme has opened.

15.4.10 The changes in views that would occur if the scheme were built without mitigation are characterised below. Mitigation proposals are outlined in Section 15.5 and discussed in greater detail in Chapter 9, Landscape, and the significance of the impact of the changes after mitigation is assessed in Section 15.6.

Existing A556 during construction

15.4.11 During the construction period, strategic through-traffic will continue to use the existing road while the new road is being built. Construction activities are likely to give rise to impacts to the quality of travellers’ views along parts of the existing road during the construction phase for the following reasons:

- Removal of hedgerows, trees and shrubs in advance of construction (further details are provided in Chapter 9, Landscape and Chapter 10, Ecology);
- Passing through roadworks, particularly on the northern on-line section and at tie-in points;
- Construction of embankments, structures and cuttings;
- The movement of construction plant draws the eye;
- The presence of site compounds and soil storage bunds.

15.4.12 The effects from most of the construction activities would be short-term, and would cease at the end of the construction period. However, removal of vegetation would be long-term and mitigation proposals would provide replacement where feasible to integrate with the remaining vegetation. These effects can be characterised in more detail as set out below:

- Removal of parts of some roadside hedgerows and a section of Tabley Pipe Wood would open views to the farmland and accentuate construction activities. These effects would be most noticeable for travellers between Over Tabley and Mere, and north of Bucklow Hill, where construction of structures and approach embankments at Over Tabley, Burleyhurst Lane and Millington Hall Lane would be evident.
- Travellers on the A50 would experience views of construction activities at the new overbridge and embankments, removal of a section of Belt Wood and construction of the main line in cutting.
- On the northern on-line section, travellers would pass through roadworks and have close-range views during construction of two gantries. Loss of roadside hedgerows and vegetation on the embankment adjacent to Cheshire Lounge would open views to the farmland. The immediate foreground would at times be dominated by traffic cones and temporary road signs.
- Views for travellers using the existing M56 Junctions 7 and 8 would include large-scale clearance, excavation and construction activities in the formerly agricultural landscape south–east of the existing junction. Travellers joining or leaving the M6 at Junction 19 would have views of disturbance to the agricultural landscape north of the junction.

Effects after the scheme opens for through traffic on the new A556

15.4.13 The quality of travellers’ views for through-traffic using the new A556 in the opening year without mitigation are characterised in more detail below:

- Views for travellers accessing or exiting the M6 at Junction 19 would be similar to those already experienced albeit with a different alignment.
- For much of the route, views for travellers shifting from the de-trunked Chester Road to the new A556 would either be in cutting or contained by earth bunds built as noise mitigation (see Chapter 7), which would restrict views into the surrounding countryside to occasional glimpses, particularly between M6 Junction 19 and north of the A50. Embankments would obscure views of Over Tabley Hall, although travellers...
would retain views of the Church of St. Paul’s spire. Travellers would have occasional open views where existing woodland groups or cuttings recede. The new overbridges and associated embankments at Over Tabley and the A50, together with closer proximity to the electricity pylons, would detract from the quality of views.

- Views for travellers on the new A556 between north of the A50 and Millington junction would include an overbridge and associated embankments. Much of this section is in deep cutting or contained between noise bunds, so travellers would have no views outside the road corridor in most locations.

- On passing Millington junction, views would initially be contained within a cutting and between embanked slip roads, but would become more open after joining the on-line section. Two new gantries would detract from the quality of views, while at the same time reducing stress through eliminating route uncertainty. Loss of roadside hedgerows and vegetation on the west-facing slope of the embankment north of the M56 would open views to the farmland. Travellers would retain restricted views to Rostherne Mere, similar to existing views.

- Views for travellers on the M56 Junction 7 and 8 would view a more complex M56 interchange including slip roads, new Bowdon roundabout and over bridge. Users of the A556-M56 free flow link would have views contained within the cutting, but users of the slip roads and roundabouts would experience open views to the farmland following loss of roadside hedgerows and vegetation.

Effects on views from the road for local traffic after the scheme opens

15.4.14 The quality of travellers’ views for local traffic in the opening year without mitigation are characterised in more detail below:

- Views of travellers along the de-trunked Chester Road would alter in the first instance as a result of the dramatic reduction in traffic levels. De-trunking operations would reduce the dual carriageway to a two lane road, while the redundant lanes would be removed and landscaped with earth bunds, narrowing the transport corridor. The existing lighting may be removed, or simply switched off, while the replacement of trunk road signage with new signs appropriate to a local road and the new road layout would also alter views.

- There would be little change to views for traffic using other local roads to the east of Chester Road, unless their journeys involve joining or crossing Chester Road or the new A556. Users of Cherry Tree Lane (a very small number), who currently join or leave the trunk road at the west end of the lane, would instead travel for a short distance parallel and adjacent to the on-line section of the new A556, and the trunk road and traffic on it would be prominent in their views to the west.

- Users of local roads west of Chester Road would generally retain open views of the surrounding countryside, except where they are restricted or filtered by existing roadside vegetation, topographic features and properties. There would be localised changes in views where the structures at the new Tabley and Millington junctions are visible. Travellers crossing the new A556 via the overbridges at the new junctions, Burleyhurst Lane or the A50 would have brief glimpsed views of the new trunk road and more extensive views of the surrounding countryside from an elevated position.

- Users of some local roads (Old Hall Lane, Bucklow Hill Lane, Millington Hall Lane, Millington Lane and Chapel Lane) would have to follow alternative routes if their journey requires crossing the line of the new A556. This would change their views in detail, but not in overall character or quality.

Effects on views from the road for through-traffic joining or leaving the new A556 within the scheme area

15.4.15 Changes in the quality of travellers views for this group of travellers are characterised in more detail below:

- Views for travellers along the A50 Warrington Road would remain largely unchanged, except at the overbridge crossing the new A556, where there would be glimpsed views of the new road and southwards into the Mere Hall parkland, and at the junction with the de-trunked Chester road, where there would be a dramatic reduction in trunk road traffic and differences in the junction layout. Travellers joining or leaving the new A556 from/to the A50 would travel via part of Chester Road to reach the Tabley or Millington junctions, and would therefore experience the changes in views described above for those roads.

- Views for travellers on the A5034 would remain largely unchanged up to the junction with Chester Road in Bucklow Hill, after which they would experience the changes described above for the de-trunked road before joining the new A556 at Millington Junction, where they would briefly have extensive views from an elevated position before joining the new trunk road.

Public transport

15.4.16 During construction there may be temporary short-term disruption to the No. 47 bus route along the A50 as the overbridge and new alignment are constructed. At this stage it is anticipated that traffic management measures will enable the A50 to remain open to buses throughout the construction period. However, there may need to be a temporary closure.

15.4.17 After opening, the 289 bus service would be permanently diverted from its present route via Chapel Lane to run via Millington Junction. This would increase journey length and
would require relocation of the bus stops on Chapel Lane. This would result in an increase in journey length and would be subject to formal consultation with Cheshire East and the bus company.

15.5 Mitigation

Public Rights of Way, cycle routes and roads

15.5.1 Throughout the scheme design consideration has been given to the NMU strategy and de-trunking works and mitigation has already been incorporated as part of the design. All new or altered facilities have been designed in accordance with relevant Highways Agency guidance and are Disability Discrimination Act compliant.

15.5.2 The following measures have already been incorporated (for a more detailed description, see Chapter 2, paragraphs 2.4.6 to 2.4.15 which provide a description of the proposed improvements to PRoWs, minor side roads and de-trunking of Chester Road):

- NMU underpass to link Old Hall Lane and the existing A556 (pedestrians, cyclists and equestrians) and Old Hall Lane and the M6 roundabout (pedestrians and cyclists);
- Millington junction - shared use facilities for NMUs on the bridge over the new A556, segregated from vehicular traffic, and signal-controlled crossing to allow NMUs to cross the de-trunked Chester Road;
- Millington FP7 and FP6 would be stopped-up where they join the proposed Mereside Farm access track which will provide a link to Millington Lane. Pedestrians requiring access to Chester Road would be diverted via Millington Junction over the shared use facility.
- Permanent diversion of Rostherne FP9 via Yarwoodheath Farm access track, Bowdon Roundabout Link and associated dumbbell roundabout to meet Yarwoodheath Lane access track;
- Proposed upgrading of Rostherne FP13 from footpath to bridleway;
- The de-trunked Chester Road between Over Tabley and Millington Junction would become a viable and potentially attractive route for pedestrians, cyclists and equestrians, linking the various side-roads and PRoW to either side;
- The Cherry Tree Lane link would provide an onward link northwards from Bucklow Hill and the new Millington Junction, via Cherry Tree Lane, Tom Lane and Yarwoodheath Lane to the remodelled M56 Junction 7 at Bowdon. The proposed upgrading of Yarwoodheath Lane from footpath to bridleway status means that this route would be open to pedestrians, cyclists and horse riders, while its segregation from the trunk road means that it would be more attractive to most NMUs than the route currently available (along the existing A556 itself, on the carriageway for cyclists and equestrians); and
- For equestrians the Cherry Tree Lane Link coupled with Millington Junction provides improved east – west connectivity and allows safer access to the Ashley Tollride.

15.5.3 With the mitigation already included in the design, and subject to further consultation, no further mitigation measures have been identified.

Driver stress

15.5.4 During the construction phase, a traffic management plan would be implemented to reduce any increase in stress caused by the roadworks. This would include temporary short-term diversion and temporary signage which would be put in place to reduce frustration and uncertainty.

15.5.5 On the majority of movements the effects of the scheme on drivers’ stress are beneficial during the operational phase, due to the increase in average speed and the removal of potential conflict with vehicular or other traffic joining from side roads, private properties, agricultural land and PRoWs. As part of the scheme, road signs and traffic signals would be used to explain to drivers where they should be going with the aim to reduce uncertainty and driver stress.

15.5.6 The new A556 will be designed to a higher highway standard than the existing road, which will help to reduce uncertainty and driver stress. The scheme design includes stopping-up of side roads and PRoWs that join the trunk road. Consequently, there will be less opportunity for accidents and drivers’ fear of potential accidents would reduce. At this stage it is proposed that no further mitigation would be required, however this is subject to further consultation.

Travellers’ views from the road

15.5.7 The key change for most travellers is the switch from the existing road, which is at natural ground level and provides varied, often open views with features of interest on both sides, to the much less varied and mostly enclosed views along the new trunk road. These enclosed views are largely the result of the road being in cutting for much of its length, and flanked by noise mitigation bunds for much of the remainder, cutting off views of the surrounding countryside and points of interest.

89 DMRB Volume 6, Section 3, Part 5, ‘The geometric design of pedestrian, cycle and equestrian routes’ (TA90/05)
15.5.8 To an extent, the enclosure of the views can only be accentuated by tree and shrub planting designed to mitigate the wider landscape and visual impacts of the scheme. However, the desirability of retaining open views out of the road corridor wherever they could be available has been considered in designing the landscape and visual impact mitigation. In addition, the design of the planting offers the opportunity to provide some variety in the views available from the new A556, and to emphasise the more rural nature of the new route as compared to the existing route. This will include native woodland and shrub planting to embankments to integrate with existing woodland, appropriate planting along some boundaries and species rich grassland.

15.5.9 The new structures crossing the new A556 at Tabley and Millington Junctions and at the A50 would further enclose and detract from the quality of views along the route. Several options for the design of these structures were compared in a ‘Structures Options Report’, leading to the recommendation of a preferred structural option. Factors considered included the type of construction material (e.g. concrete or steel structural members, which influences the overall thickness of the bridge decks and the need for central piers) and the finish to be applied. The Structures Options Report took into account environmental factors affecting the choice of a preferred structural option and finish, including advice on the visual prominence and appearance of the structures.

15.5.10 In consultation with English Heritage the use of cladding was discussed, with the aim of reducing the visual prominence of the facades of structures and integrating them with the local building tradition. The use of sandstone has been discussed, but brick is a more common building material in the local tradition. Both the use of cladding and the material to be used are still under discussion, and further consultation is planned.

15.5.11 The changes in views arising from the de-trunking works on Chester Road are considered to improve the quality of views overall.

15.5.12 The changes in views for users of the A50 and local roads west of the existing A556 are relatively small in scale, and can largely be mitigated through the general landscape and visual impact mitigation works.

**Public transport**

15.5.13 The new junction at Millington would provide an alternative route for the 289 service, to replace the existing route via the stopped-up Chapel Lane. The opportunity would be available to Cheshire East Council and the bus company to provide additional stops along the new side road to Millington Junction and/or to relocate the Chapel Lane stops on the de-trunked Chester Road. These proposals would be subject to consultation with Cheshire East Council and the bus company.

15.6 The significance of environmental impacts

**Public Rights of Way, cycle routes and roads**

15.6.1 The removal of the great majority of traffic from the de-trunked Chester Road, combined with the de-trunking works, would provide a long-term significant beneficial impact for pedestrians, cyclists and equestrians during operation. Chester Road would be transformed from a barrier to NMU traffic into a potentially attractive route in its own right, and a connector route between other routes to either side.

15.6.2 The permanent diversion of Rostherne FP9 and Rostherne FP13 would have an adverse impact. However, this impact would be outweighed by the improvements in safety, connectivity and accessibility that would be provided by the proposed design. The upgrade of Rostherne FP13 (Yarwoodheath Lane) from footpath to bridleway would provide a beneficial impact allowing improved access to this part of the PRoW network for cyclists and horse riders and there would be safer access to Bowdon Roundabout and the A56. On balance, the long-term impact would be beneficial but probably not to a significant degree.

15.6.3 The permanent diversion of Rostherne FP6 and Rostherne FP7 would have a long-term adverse impact. However, survey data suggests these routes are little used. The proposed design would provide a safer and more attractive alternative route with greater connectivity and accessibility, which balances the significant length of diversion required. The impact of diverting Rostherne FP6 and FP7 is therefore considered neutral overall.

15.6.4 The stopping-up of side roads would have a significant adverse effect for some NMUs. However, the proposed design does go some way to mitigate the impact and provide alternative routes. Although these are often longer, they are also safer and could be more attractive to users, due to their segregation from the trunk road, the incorporation of grade-separated crossings and greater accessibility for the disabled. Overall, balancing the loss of connectivity against the improved quality of the alternative routes, this is considered a long-term but insignificant adverse impact.

15.6.5 Where side roads are not stopped-up, their segregation from trunk road traffic and improved connectivity where they meet the de-trunked Chester Road are long-term, significant beneficial impacts. The proposed design also provides permanent improvements in terms of safety for NMUs and local vehicle travellers as they would be segregated from trunk road traffic throughout the scheme area.

15.6.6 Overall, NMUs would experience significant long-term beneficial effects through most of the study area, as a result of improved connectivity, accessibility, safety and amenity on the network of PRoWs and side roads. These effects outweigh the long-term significant
adverse effect of stopping-up some side roads and stopping-up or diverting some PRoWs.

**Driver stress**

15.6.7 During the construction phase, there would be a short-term rise in driver stress due to the temporary short-term disruption in access to certain roads as the new road is built and the disruption to traffic, which would still be obliged to use the existing A556 during construction. However, this effect would be limited to the northern end of the scheme and, to a lesser extent, the area around Over Tabley, because the new road would be predominantly off-line. Appropriately designed traffic management would reduce the adverse impacts on driver stress in all cases.

15.6.8 Although there are a number of locations where driver stress would increase after opening (e.g. at M6 Junction 19, A56, the new A556 trunk road between Rostherne Lane and Bowdon roundabout and sections between the new A556 and the M56 eastbound on-slip) for most drivers on the A556 and de-trunked Chester Road, there would be a reduction in stress after the scheme has opened. The overall effect of the scheme is therefore significantly beneficial.

**Travellers’ views from the road**

15.6.9 The effects on travellers’ views along the existing A556 would be most noticeable during the construction year (2014) which would introduce close range views of the construction works in some areas. Removal of hedgerows and sections of woodlands, construction of structures, cuttings, additional lighting, gantries and general construction activities along the route will result in a significant adverse effect in the quality of views, particularly in the areas close to Over Tabley and north of Bucklow Hill.

15.6.10 After the scheme opens, travellers switching to the new A556 would experience a significant change in the character of the views, making them more rural, more enclosed in many places and less varied than the views they currently experience. However, the reduction in the quality of views, as opposed to character, would be marginal, and would not constitute a significant impact. Some additional variety would be introduced as the roadside planting develops and matures, so that the longer-term impact on the quality of views would be neutral. The vast majority of travellers on the existing A556 would make this switch, and would therefore experience a short-term insignificant adverse effect, with a neutral effect in the long term.

15.6.11 In the year of opening and in the future years, travellers on the de-trunked Chester Road looking in either direction would experience improved views. The narrowing of the Chester Road corridor and retention of pavements, hedgerows and retention of existing open or intermittent views will result in a significant beneficial effect. Some residual views will remain of the new A556, although established landscape mitigation will help integrate the road elements and will not detract from the quality of views.

15.6.12 In the year of opening and in the future years, travellers using the remodelled junction between the A50 and the de-trunked Chester Road and on the A50 to the east of the junction would experience improved views due to reduced traffic levels, narrowing of the route corridor and re-alignment of the junction. Retention of pavements, hedgerows and retention of intermittent or restricted views will result in a significant beneficial effect on the quality of travellers’ views.

15.6.13 Views for travellers using the A50 between Hoo Green and Mere would experience extended views to the north and glimpsed views southwards into the Mere Hall parkland for the short section over the bridge. Mitigation planting would to some extent screen views of the new A556 from the A50. Overall, the quality of views would be improved, although not to any significant degree.

15.6.14 Views for travellers using Bowdon roundabout would be integrated by the future year as the planting becomes established, softening and screening the earthworks, although landscape mitigation would reduce the vistas previously experienced on the Bowdon roundabout resulting in an insignificant adverse effect on the quality of travellers views.

**Public transport**

15.6.15 Immediately after opening, there would be a short-term rise in uncertainty for users of public transport due to the re-routing of services, until they became more familiar with the new facilities. The initial adverse impact of re-routing the bus route and relocating bus stops has been considered to have an insignificant impact as access to the services would remain throughout. The opportunity to establish new bus stops along the side road leading to Millington Junction could provide a beneficial impact allowing improved access to the public transport facilities for residents of Millington who currently do not have direct access. The overall impact on public transport is considered neutral.

15.6.16 A summary of the significance of impact after mitigation is presented in Table 15.3 overleaf.
<table>
<thead>
<tr>
<th>Description of Impact</th>
<th>Significance of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of traffic from de-trunked Chester Road</td>
<td>Significant Beneficial (long term, operational)</td>
</tr>
<tr>
<td>Diversion of Rostherne FP9 and Rostherne FP13; upgrading Rostherne FP13 to bridleway</td>
<td>Insignificant Beneficial (long-term, operational)</td>
</tr>
<tr>
<td>Diversion/stopping up Rostherne FP6 and Rostherne FP?</td>
<td>Neutral</td>
</tr>
<tr>
<td>Diversion of Millington FP 10</td>
<td>Neutral</td>
</tr>
<tr>
<td>Stopping-up side roads for NMUs (Bucklow Hill Lane, Chapel Lane, Millington Hall Lane, Millington Lane)</td>
<td>Insignificant Adverse (long-term, operational)</td>
</tr>
<tr>
<td>Improved safety, connectivity and amenity for NMUs on side-roads and connecting PRoWs (Swains Walk, Old Hall Lane, Moss Lane, Burleyhurst Lane, A50, Cicely Mill Lane, Rostherne Lane, Cherry Tree Lane)</td>
<td>Significant Beneficial (long term, operational)</td>
</tr>
<tr>
<td>Changes to Driver Stress</td>
<td>Significant Beneficial (long term, operational)</td>
</tr>
<tr>
<td>Impact on travellers views along the existing A556 during construction</td>
<td>Significant Adverse (Short term, construction period only)</td>
</tr>
<tr>
<td>Impact on travellers views along the de-trunked Chester Road</td>
<td>Significant Beneficial (long-term, operational)</td>
</tr>
<tr>
<td>Impact on travellers views along the new A556</td>
<td>Short-term Insignificant Adverse Long-term neutral (Operational)</td>
</tr>
<tr>
<td>Impact on travellers views at the A50/Chester Road junction and on the A50 to the east</td>
<td>Significant Beneficial (long-term, operational)</td>
</tr>
<tr>
<td>Impact on travellers views on A50 between Hoo Green and Mere</td>
<td>Insignificant Beneficial (long-term, operational)</td>
</tr>
<tr>
<td>Impact on travellers views at Bowdon Roundabout</td>
<td>Insignificant Adverse (long-term, operational)</td>
</tr>
<tr>
<td>Impact on users of public transport</td>
<td>Neutral</td>
</tr>
</tbody>
</table>
## 16 Cumulative effects

### Executive summary

Cumulative impacts arise where an environmental receptor is affected by the scheme in two or more different ways, or where the effects of the scheme would be added to or compounded by similar effects of other schemes. In either case, the combined effect on an individual receptor is greater than the individual effects considered in isolation.

No other non-highway developments were identified that could act cumulatively with this scheme, other than solely through their impact on traffic. All traffic-related cumulative effects are already built-in to the assessments in other chapters of this PEI, as those chapters draw on traffic forecasts that take into account other developments and other highway projects.

Cumulative effects have been identified that arise from two or more effects of this scheme on an individual environmental receptor. The receptors affected by such impacts that have been identified to date include communities, residential properties, other sensitive receptors such as nursing homes, farms, the landscape and some wildlife habitats. These effects can be summarised as follows:

- Overall benefits affecting quality of life for residents in the communities of Over Tabley, Mere and Bucklow Hill, and for Rangemore Nursing Home;
- Overall adverse effects on quality of life for the community of Millington, for residents at Over Tabley Hall and certain other groups of properties;
- Overall adverse effects for some farms, due to the loss of land combined with longer access routes and the creation of small, awkwardly-shaped fields; and
- Potential adverse effects on habitats and landscape character through pressure for farmers to rationalise small, awkwardly-shaped fields by removing hedgerows.

### 16.1 Introduction

16.1.1 Chapters 6 to 15 each address the potential effects of the proposed scheme on an individual aspect of the environment. Where an individual environmental receptor or group of receptors may be affected in more than one way, but those effects fall under a single specialist topic heading, these effects are addressed within the relevant specialist chapter. For instance, if a given property is affected by increased noise levels on one side of the property but by reduced noise on the other side, the combined effect of the increase and the reduction would be addressed within Chapter 7 (Noise); or if a given habitat is affected by land-take, severance and disturbance, the combined effect would be addressed in Chapter 10 (Ecology).

16.1.2 However, there are instances where individual receptors and receptor groups may be affected in more than one way, and these effects fall under different specialist topic headings. The combined effects of multiple impacts on the receptor may be more significant than the individual impacts. For instance, properties within a given community might be affected by changes in noise levels, air quality, visual impact and community severance, aspects that would be covered individually under four different specialist topic headings. This chapter highlights these cumulative impacts.

16.1.3 There is also potential for the effects of this project on the environment to act cumulatively with other projects within the region. This chapter addresses this potential.

### Limitations on the information in this chapter

16.1.4 This chapter draws much of its information from the specialist topics covered in Chapters 6 to 15. The impacts identified and assessed in all of these chapters are subject to change before preparation of the Environmental Statement (ES), to take account of information still being gathered, the outcome of consultation of the public and of third parties, and any changes to the design of the scheme. This may result in changes to the cumulative effects described and assessed in this chapter.

16.1.5 This chapter also makes reference to the traffic flow forecasts obtained from the traffic model for the scheme, and to a separate ‘Future Development Assumptions Report’ (FDAR; Jacobs, August 2010) and its draft Addendum (Jacobs, June 2011). Both of these may change before preparation of the ES; the traffic flow forecasts will be updated to reflect new traffic modelling guidance, while the FDAR Addendum has not yet been finalised. Finalisation of the FDAR Addendum and changes to the traffic forecasts could alter the assessment of traffic-related impacts.

16.1.6 This chapter draws on a preliminary consideration of the impacts of the scheme through the process described in paragraphs 16.2.1 and 16.2.2 below. There remains the potential for additional cumulative impacts to be identified through the ongoing application of that process, or as a result of responses to public consultation. If any such additional impacts are identified, they will be described in the ES.

### 16.2 Approach and methods

16.2.1 The cumulative impacts of different aspects of the proposed A556 scheme have been identified by considering the individual receptors or categories of receptors affected by impacts identified within each specialist topic chapter, and then determining whether any of those receptors are also affected by other impacts identified under other topic
headings. Wherever this is the case, there is the potential for the combined significance of the different impacts to be greater than the significance of each impact on its own. There is also the potential for an individual receptor to be affected by adverse impacts under one topic heading and beneficial impacts under another. In such cases, it is necessary to determine the balance between the two.

16.2.2 The cumulative effects of this scheme together with other developments have been identified through first identifying other developments that should be considered, and secondly identifying the types of effect of those other developments that could act cumulatively with the A556 scheme. For instance, land-take and other effects of a major commercial development located adjacent to the A556 could potentially act cumulatively with the A556 scheme in a large number of different ways. The same type of development, located several miles away, would only be likely to act cumulatively with the A556 only in relation to its influence on the quantity of traffic and the environmental impacts determined by the flow of traffic, such as effects on air quality and noise.

16.2.3 DMRB provides guidance on the identification of other projects that should be taken into account in the consideration of cumulative effects. They can relate to past, present or reasonably foreseeable projects. For the purposes of assessment, ‘reasonably foreseeable’ means projects that are ‘committed’, including (but not limited to):

- Trunk road and motorway projects which have been confirmed (i.e. have gone through the relevant statutory process); and
- Development projects with valid planning permissions, for which formal EIA is a requirement or for which non-statutory environmental impact assessment has been carried out.

16.2.4 This chapter reports only impacts that have been identified through the process described in paragraphs 16.2.1 and 16.2.2. There is no specific reporting of any findings that a particular receptor is not affected by cumulative effects, as this would entail a long list of negative results that would not contribute to the value of this chapter. For instance, no cumulative impact is identified in this chapter as a result of the planning for the M54 motorway.

16.2.5 Where a group of similar receptors would all be affected by a cumulative impact, the impact is described in relation to the group (e.g. ‘residents in the community of Over Tabley’), rather than for each individual receptor. If there would be differences in the degree of impact between receptors in the group, a note is made of that difference.

16.2.6 Any cumulative impacts that are identified are further defined as ‘construction’ or ‘operational’ effects, ‘short-term’ or ‘long-term’ (based on whether they would still be felt 15 or more years after construction) and ‘beneficial’ or ‘adverse’. HA guidance sets out a specific methodology for the assessment of the significance of cumulative effects. In particular, the significance of cumulative effects is categorised as shown in Table 16.1.

### Table 16.1: Determining the significance of cumulative effects

<table>
<thead>
<tr>
<th>Significance</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised</td>
</tr>
<tr>
<td>Major</td>
<td>Effects that may become a key decision-making issue</td>
</tr>
<tr>
<td>Moderate</td>
<td>Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be necessary to improve on current performance</td>
</tr>
<tr>
<td>Minor</td>
<td>Effects that are locally significant</td>
</tr>
<tr>
<td>Not significant</td>
<td>Effects that are beyond the current forecasting ability or are within the ability of the resource to adapt to such change</td>
</tr>
</tbody>
</table>

16.2.7 The potential cumulative impacts of the scheme are described in Section 16.4, and their significance is assessed in Section 16.6. The impact description and assessment are summarised together in Table 16.2 at the end of this chapter.

16.3 The existing environment (‘baseline conditions’)

16.3.1 The environmental baseline conditions in the immediate environs of this scheme are described in Chapters 6 to 15 of this PEI, and will not be repeated here. Wherever cumulative impacts have been identified that would affect receptors identified in other chapters, cross-reference is made to the relevant chapters for information about existing conditions. This section therefore focuses principally on information about other development and highways projects and on their relevance to the assessment of cumulative effects.

Other non-highway developments

16.3.2 No non-highway proposals meeting the criteria defined in DMRB (see paragraph 16.2.3, second bullet point) are known within the area immediately surrounding the A556.
improvements. In addition, there are no known planning applications for such developments awaiting determination within 1km of the existing or proposed A556. A search of planning applications on Cheshire East Council’s website, carried out in October 2011, did not identify any current planning applications of any kind in the area immediately surrounding the scheme. A search of Trafford Council’s website for the area within 1km of the existing Bowdon Roundabout, at the north end of the scheme, identified no extant consents or outstanding applications meeting the DMRB criteria. The area is very rural, principally characterised by small villages, individual rural residential properties and farms, and good-quality agricultural land. The whole area lies in the Green Belt, and it is unlikely that any development meeting these criteria will be either proposed or approved within this area.

16.3.3 Any developments in the wider surrounding region that meet the criteria set out in paragraph 16.2.3 are likely to act cumulatively with the A556 improvement through the generation of additional traffic, or through changes in the pattern of traffic flows on the highway network. Any such developments that are likely to affect traffic in this way are identified and taken into account in the FDAR and its draft Addendum.

16.3.4 The FDAR and its Addendum define future development assumptions to be taken into account in the development of the traffic model. Taken together, the FDAR and its Addendum cover a large area in the region surrounding the A556, extending from Oldham in the north-east to Cheshire West and Chester in the west and Birmingham in the south. They take account of strategic planning by local authorities and by regional and national bodies over the period 2006 – 2030, including likely growth in housing and employment, and of specific individual large-scale development projects within the region such as the Port Salford development.

16.3.5 The traffic model is built in part on assumptions taken from the FDAR and its Addendum, because these development assumptions affect the likely growth in the volume of traffic and its distribution within the road network. All impacts identified within this PEI whose assessment depends on calculations based on the flows of traffic therefore already take account of any cumulative effect of the scheme together with future developments in the wider surrounding region. No further consideration is therefore given to such cumulative effects in this chapter.

16.3.6 The FDAR and its Addendum also identify other highway projects within the surrounding region that could act cumulatively with the scheme to influence traffic flows. Eleven relevant highway schemes were included, as follows:

- Hard shoulder running on the M6, Junctions 4-5;
- Hard shoulder running on the M6, Junctions 5-8;
- Hard shoulder running on the M6, Junctions 8-10a;
- Hard shoulder running on the M6, Junctions 10-13;
- Additional lane on the M60, Junctions 12-15;
- Hard shoulder running on the M62, Junctions 18-20;
- Hard shoulder running on the M60, Junctions 8-12;
- M56 Junction 7 westbound diverge improvements;
- A555 East Airport Link Road;
- A34 Alderley Edge Bypass; and
- Port Salford highway improvements.

16.3.7 It should be noted that some of these schemes are now wholly or partly complete, although this was not necessarily the case in the base forecasting year (2009). All other highway schemes in the surrounding region that were not confirmed in the government’s recent Comprehensive Spending Review were excluded from the FDAR Addendum, with the exception of the hard-shoulder running schemes on the M6 Junction 13-19 and M56 Junctions 6-8. These were included in the Addendum, but not in the traffic model, as they were assigned a ‘hypothetical’ likelihood of being implemented before 2030.

16.3.8 Both the A556 scheme and each of the highway projects listed in paragraph 16.3.2, taken individually, would have their own influence on the capacity of the highway system and on the location, timing and severity of congestion. The traffic model used for the A556 scheme simultaneously takes account of all of these projects. This means two things; firstly that their cumulative effects on traffic are all ‘built-in’ to the traffic predictions made by the model, and secondly that the effects of the individual projects in isolation cannot be separated from the cumulative effects of all the projects taken together. These traffic predictions are the basis of the assessments of impact for air quality and noise (Chapters 6 and 7 of this PEI), and are a significant part of the assessments for water (Chapter 11) and effects on all travellers (Chapter 15).
reason, the cumulative effects of these highway projects are effectively built-in to the assessments of impact for all of these topics, and cannot be separated from the impacts of the A556 in isolation. Because these impacts are fully covered under the relevant specialist topics, no further consideration is given to these effects in this chapter.

16.4 Potential environmental effects

16.4.1 As outlined above, the effects of other developments and highway projects in the wider region on traffic are already built-in to the assessments of impacts in the relevant specialist chapters. There are no known development proposals meeting the criteria defined in paragraph 16.2.3 in the immediate areas of the scheme that could interact with it in other ways.

16.4.2 This section therefore focuses on the cumulative effects of the A556 on receptors or receptor groups, as described in paragraph 16.1.2. The receptors referred to here have been identified through the process described in paragraphs 16.2.1 and 16.2.2.

16.4.3 Please see also Table 16.2 for a summary of the impacts described below.

Communities/residents in Mere and Bucklow Hill

16.4.4 The scheme bypasses these communities to the west, affecting them in a number of beneficial ways, summarised below. All of these represent long-term operational impacts, which individual properties and residents would be affected to differing degrees depending on their specific location:

- Improved air quality (see Chapter 6);
- Reduced traffic noise for the great majority of residents (see Chapter 7);
- Conflict between trunk-road traffic and local traffic eliminated (see Chapters 2, 14 and 15);
- Conflict between vehicular and non-motorised traffic greatly reduced (see Chapters 14 and 15);
- Improved ease of access within and between communities, both along and across the de-trunked Chester Road (see Chapter 15);
- Improved crossing facilities at Mere and Bucklow Hill junctions (see Chapter 15); and
- Improved quality of views following the transfer of traffic to the new A556 and the de-trunking works on Chester Road (see Chapter 9).

16.4.5 Adverse effects on these communities are much more limited, and can be summarised as follows:

- Increased traffic noise for a small number of residents on parts of Chapel Lane, on the western edge of Bucklow Hill (see Chapter 7);
- New severance between Bucklow Hill and communities/destinations to the west, following the stopping-up of Bucklow Hill Lane and Chapel Lane (long-term operational effect; see Chapter 14);
- Reduced traffic on Chester Road could affect passing-trade for businesses, although local users will have easier access to the businesses and there would still be access to and from the trunk road in both directions, via the new Tabley and Millington junctions (long-term operational effect; see Chapter 14); and
- Potential disruption during construction, including noise, dust, visual effects and roadworks, particularly during the de-trunking phase (short-term construction effect; see Chapters 2, 6, 7 and 9).

16.4.6 Overall, the combined effect of these beneficial and adverse effects would, on balance, lead to an improved quality of life for residents in the majority of properties in Mere and Bucklow Hill. A small minority of residents, principally those living on parts of Chapel Lane, would on balance experience adverse effects.

Properties west of Mere Hall and at Burnt Cottages, Bucklow Hill Lane

16.4.7 Properties lying in the countryside between Mere Hall and the new A556 and at Burnt Cottages would experience higher noise levels (see Chapter 7) and some of these properties would also experience visual intrusion and a change in the character of the local landscape (Chapter 9). Additionally, residents at Burnt Cottages would experience an increase in severance (Chapter 14) due to the stopping-up of Bucklow Hill Lane, meaning that they would have to take longer routes to reach the de-trunked Chester Road and Bucklow Hill.

Community/residents in Over Tabley (except Over Tabley Hall and adjacent properties)

16.4.8 The position is more mixed for this community, although overall the community should benefit from the scheme. Effects can be summarised as follows:

- Improved air quality (see Chapter 6);
- Reduced traffic noise for most, but not all receptors, with the main source of noise moved from the front to the rear of those properties standing along the west side of the existing A556 (see Chapter 7);
• Conflict between trunk-road traffic and local traffic eliminated (see Chapters 2, 14 and 15);
• Conflict between vehicular and non-motorised traffic greatly reduced (see Chapters 14 and 15);
• Improved ease of access within and between communities, both along and across the de-trunked Chester Road (see Chapter 15);
• Improved quality of views to the east for properties on the west side of Chester Road, following the transfer of traffic to the new A556 and the de-trunking works on Chester Road (see Chapter 9);
• Adverse visual impact in views to the west, towards and across the new road, particularly for properties towards the south end of the community and on the west side of Chester Road;
• Severance of Old Hall Lane to vehicles; and
• Partial loss of the car-park at Tabley Parish Hall.

16.4.9 Effects on businesses and disruption during construction would be similar to those described for Mere and Bucklow Hill.

16.4.10 Cumulative effects on Over Tabley Hall and adjacent properties are dealt with separately on the following page.

Over Tabley Hall and adjacent properties

16.4.11 Residents at Over Tabley Hall and its adjacent converted farm buildings would be affected in two ways that could act cumulatively to affect their quality of life:

• The severance of Old Hall Lane to vehicles. This means that, to access the remainder of the community of Over Tabley, the de-trunked Chester Road, the new trunk road or the motorway network, they would have to take a longer route via Pickmere Lane and Junction 19 of the M6 motorway. However, direct access via Old Hall Lane would still be available for journeys on foot, cycle or horseback (see Chapters 2, 14 and 15);
• The road and Balancing Pond A would be prominent in views to the east and north-east, changing the character of these views. This visual effect would mainly affect residents in the Hall itself rather than the adjacent properties, and has been assessed as being of ‘Large Adverse’ significance in the long term (see Chapter 9, Table 9.4). This visual impact would also detract from the historic setting of the Hall, thereby affecting its cultural heritage value as a Listed Building (see Chapter 8); and
• When making journeys on foot, cycle or horse-back, residents would benefit from the elimination of conflict with trunk-road traffic at the junction of Old Hall Lane with the de-trunked Chester Road.

Community/residents in Millington

16.4.12 Residents in the dispersed community of Millington would experience a range of both beneficial and adverse effects, summarised as follows (all long-term operational effects unless otherwise stated):

• Worse air quality for some residents, mainly those located close to the off-line improvements where they cross Millington Lane and Millington Hall Lane (although all remaining well below the relevant EU limit values, and therefore unlikely to affect human health; see Chapter 6);
• Increased traffic noise for residents on Millington Lane and Millington Hall Lane with properties close to the new alignment (see Chapter 7);
• Adverse visual impact for some residents, again mainly those close to the off-line improvements in Millington Lane and Millington Hall Lane (see Chapter 9);
• Severance of Millington Lane and Millington Hall Lane, with longer routes to follow via the new Millington Junction to reach the de-trunked Chester Road and Bucklow Hill (see Chapters 2 and 14);
• Conflict between trunk-road traffic and local traffic eliminated, following the provision of a grade-separated crossing of the new trunk road at Millington Junction (see Chapters 2 and 14); and
• Conflict between vehicular and non-motorised traffic greatly reduced, following provision of a segregated crossing of the new trunk road for pedestrians, horse-riders and cyclists at Millington Junction and signalised crossings of the link from the new junction to the de-trunked Chester Road (see Chapters 14 and 15).

Rangemore Nursing Home

16.4.13 Rangemore Nursing Home is affected by changes in noise (an increase in noise on its western side of 6.1 decibels, and a reduction in noise on its eastern side of 19.2 decibels, in the long term). It would also lose part of its grounds, but would be provided with much improved access (via the de-trunked Chester Road, rather than the existing trunk road, eliminating conflict with trunk road traffic). The net effect of these changes, on balance, is considered to be beneficial for the residents and operators of the nursing home.
Cumulative effects of agricultural changes

16.4.14 The land-take for the scheme will sever some fields, leaving small, awkwardly-shaped plots. This particularly affects some fields within Knowlespit Farm, Hulme Barns Farm and Millington Hall Farm. This could increase the impact on those farms above that identified in Chapter 14, by leaving plots that are no longer economic to farm; or could lead the landowner or tenant farmer to remove existing hedgerows and amalgamating fields to maintain their economic viability.

16.4.15 If this amalgamation of fields were to occur, it would increase the loss of hedgerow habitats above that identified in Chapter 10. It would also increase the impact on landscape character and visual impacts above that identified in Chapter 9.

16.5 Mitigation

16.5.1 All appropriate mitigation measures that can be identified at this stage have been fully identified and described within Chapters 6 to 15 and briefly summarised within Table 16.2 at the end of this chapter. The impacts considered within this chapter take account of mitigation already proposed in those chapters. Pending the outcome of consultation of the community and of third parties, no additional mitigation is proposed here.

16.6 The significance of environmental impacts

16.6.1 The significance of impact on each group of receptors is discussed below, and summarised in Table 16.2 at the end of this chapter.

Communities/residents in Mere and Bucklow Hill

16.6.2 Overall, the communities of Mere and Bucklow Hill and most individual residents within these communities would experience much better conditions than they would without the scheme. These communities, which include the majority of residents in the study area, would therefore benefit significantly from the scheme in the long term. These effects address the key objectives of the project (see paragraph 1.1.3), and are therefore a key decision-making issue. In consequence and in line with the categorisation set out in Table 16.1, the significance of these cumulative impacts are considered to be major beneficial.

16.6.3 Notwithstanding the above, the communities would experience some short-term disruption during construction and potential long-term reduction in passing trade for businesses. The effects of these impacts on the community are considered to be minor adverse.

Properties west of Mere Hall and at Burnt Cottages, Bucklow Hill Lane

16.6.4 These properties currently lie in relatively remote and tranquil locations, distant from the existing A556. The adverse impacts on these properties would act cumulatively to significantly affect the quality of life for residents in the long term. The significance of these cumulative impacts is therefore deemed to be moderate adverse.

Community/residents in Over Tabley

16.6.5 Overall, the beneficial effects for the community of Over Tabley and most individual residents in the community would outweigh the adverse effects, although to a lesser degree than Mere and Bucklow Hill. On balance therefore, this community would benefit significantly in the long term and the significance of the cumulative impact is considered to be minor beneficial.

Over Tabley Hall and adjacent properties

16.6.6 Residents at Over Tabley Hall and adjacent properties are not located directly adjacent to the existing A556, and therefore would receive less benefit from its improvement. Overall, the adverse impacts for these residents outweigh the beneficial effects and the long-term significance of the cumulative impacts would be moderate adverse.

Community/residents in Millington

16.6.7 Residents of Millington are not located directly adjacent to the existing A556, and therefore benefit less from its improvement than Over Tabley and the much larger communities of Mere and Bucklow Hill. Overall, the adverse effects on Millington tend to outweigh the benefits and the long-term significance of the cumulative impacts of the scheme would be moderate adverse.

Rangemore Nursing Home

16.6.8 Overall, the adverse effects on Rangemore Nursing home are relatively minor and are outweighed by the beneficial effects. The long-term cumulative effects for both residents and the business would therefore be moderate beneficial.

Cumulative effect of agricultural changes

16.6.9 It is not possible to predict on a field-by-field basis the extent to which field amalgamation is likely to occur. However, even if it were to affect all of the small, awkwardly-shaped plots created by the scheme, the effect on biodiversity, landscape character and visual impact would be relatively localised. The maximum potential significance of this cumulative effect would therefore be moderate adverse, as defined in Table 16.1.
Table 16.2: Summary of Cumulative Impacts

<table>
<thead>
<tr>
<th>Transport effect</th>
<th>Cumulative effect</th>
<th>Spatial extent</th>
<th>Magnitude</th>
<th>Timing/ duration</th>
<th>Mitigation/ enhancement</th>
<th>Uncertainty</th>
<th>Significance of effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communities/ residents along A556 in Mere and Bucklow Hill (except properties west of Mere Hall and some properties on Chapel Lane and Bucklow Hill Lane)</td>
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<tr>
<td>Improved air quality (amount varies from property to property)</td>
<td>Improved quality of life for large number of residents in the long term, due to:</td>
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<td>• increased tranquility</td>
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<td>• reduced impact of traffic on health and safety of residents</td>
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<td>• reduced community severance</td>
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<td>• improved visual environment</td>
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<tr>
<td>Reduced noise for great majority of residents (amount varies from property to property)</td>
<td>Major beneficial</td>
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<td>Conflict between local vehicular traffic and trunk road traffic eliminated</td>
<td>Major beneficial</td>
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<tr>
<td>Conflict between vehicular traffic and non-motorised traffic greatly reduced</td>
<td>Major beneficial</td>
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<tr>
<td>Improved ease of access within and between communities, along and across Chester Road</td>
<td>Major beneficial</td>
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<tr>
<td>Improved pedestrian/ cyclist/equestrian crossing facilities in Mere and Bucklow Hill</td>
<td>Moderate beneficial</td>
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<tr>
<td>Improved quality of views following transfer of traffic to the new A556 and de-trunking works on Chester Road</td>
<td>Moderate beneficial</td>
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<tr>
<td>Potential reduction in passing trade for some businesses</td>
<td>Moderate adverse</td>
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<td>Selection of 2-junction strategy</td>
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<tr>
<td></td>
<td>Minor adverse</td>
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<tr>
<td>Potential disruption due to construction</td>
<td>Minor adverse</td>
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<td>Short term (approx 2 years)</td>
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<tr>
<td></td>
<td>Operation of CEMP &amp; traffic management</td>
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</tbody>
</table>

<p>| Residents on parts of Chapel Lane |
| Increased traffic noise for some residents on parts of Chapel Lane | Increased noise and severance combine to affect quality of life in the long term for a minority of residents in Bucklow Hill |
| Severance following stopping-up of Chapel Lane | Local |
| | Major adverse |
| | Long-term |
| | Noise bunds and barriers |
| | Low |
| | Moderate adverse |
| Properties west of Mere Hall |
| Increased traffic noise | Increased noise and visual impact combine to affect quality of life in this very tranquil location |
| Visual intrusion and changed landscape character | Local |
| | Major |
| | Long-term |
| | Noise bunds/barriers |
| | Low |
| | Moderate adverse |
| Properties at Burnt Cottages, Bucklow Hill Lane |
| Increased traffic noise | Increased noise, visual impact and severance combine to affect quality of life in this tranquil location |
| Visual intrusion and changed landscape character | Local |
| | Major |
| | Long-term |
| | Noise bunds/barriers |
| | Low |
| | Moderate adverse |
| Severance – Bucklow Hill Lane stopped up | Moderate |
| | Long-term |
| | Alternative route |
| | Low |</p>
<table>
<thead>
<tr>
<th>Transport effect</th>
<th>Cumulative effect</th>
<th>Spatial extent</th>
<th>Magnitude</th>
<th>Timing/duration</th>
<th>Mitigation/ enhancement</th>
<th>Uncertainty</th>
<th>Significance of effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved air quality</td>
<td>Major beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
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<tr>
<td>Reduced traffic noise for most residents</td>
<td>Major beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
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<tr>
<td>Increased traffic noise for a minority of residents</td>
<td>Moderate adverse</td>
<td>Long-term</td>
<td>Noise bunds and barriers</td>
<td>Low</td>
<td></td>
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<tr>
<td>Traffic noise moved from east façade to west façade of properties on west side of Chester Road</td>
<td>Minor adverse</td>
<td>Long-term</td>
<td>Noise bunds and barriers</td>
<td>Low</td>
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</tr>
<tr>
<td>Conflict between local vehicular traffic and trunk road traffic eliminated</td>
<td>Major beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Conflict between vehicular traffic and non-motorised traffic greatly reduced</td>
<td>Major beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved ease of access within and between communities</td>
<td>Minor beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Improved quality of views to the east for properties on west side of Chester Road</td>
<td>Minor beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
<td></td>
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</tr>
<tr>
<td>Reduced quality of views to the west for properties in southern part of community and west of Chester Road</td>
<td>Moderate adverse</td>
<td>Long-term</td>
<td>Landscape works, including planting</td>
<td>Low</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Severance of Old Hall Lane to vehicles</td>
<td>Moderate adverse</td>
<td>Long-term</td>
<td>Alternative routes are available</td>
<td>Low</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Reduced car-parking available at Tabley Parish Hall</td>
<td>Minor adverse</td>
<td>Long-term</td>
<td>To be determined</td>
<td>Low</td>
<td></td>
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<tr>
<td>Potential reduction in passing trade for some businesses</td>
<td>Moderate adverse</td>
<td>Long-term</td>
<td>Selection of 2-junction strategy</td>
<td>High</td>
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<tr>
<td>Potential disruption due to construction</td>
<td>Minor adverse</td>
<td>Short-term (approx 2 years)</td>
<td>Operation of CEMP and traffic management</td>
<td>Low</td>
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</table>

**Over Tabley Hall and adjacent properties**

<table>
<thead>
<tr>
<th>Transport effect</th>
<th>Cumulative effect</th>
<th>Spatial extent</th>
<th>Magnitude</th>
<th>Timing/duration</th>
<th>Mitigation/ enhancement</th>
<th>Uncertainty</th>
<th>Significance of effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severance of Old Hall Lane to vehicles – longer route to reach Over Tabley and Chester Road</td>
<td>Moderate adverse</td>
<td>Long-term</td>
<td>Alternative route is available</td>
<td>Low</td>
<td></td>
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<tr>
<td>Adverse visual impact of the new road and Balancing Pond A for residents of the Hall</td>
<td>Major adverse</td>
<td>Long-term</td>
<td>Landscape works, including planting Potential additional off-site works by agreement</td>
<td>Low</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Conflict between vehicular traffic and non-motorised traffic eliminated at junction of Old Hall Lane and Chester Road</td>
<td>Minor beneficial</td>
<td>Long-term</td>
<td>N/A</td>
<td>Low</td>
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<tr>
<td>Transport effect</td>
<td>Cumulative effect</td>
<td>Spatial extent</td>
<td>Magnitude</td>
<td>Timing/duration</td>
<td>Mitigation/ enhancement</td>
<td>Uncertainty</td>
<td>Significance of effect</td>
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<tr>
<td>Community/residents in Millington</td>
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<tr>
<td>Worse air quality for some residents (all pollutants remain within the relevant EU limit values)</td>
<td>The balance of adverse and beneficial effects in Millington is deemed to lead to an overall reduction in the quality of life for some, but not all, residents.</td>
<td>Local</td>
<td>Minor adverse</td>
<td>Long-term</td>
<td>None available</td>
<td>Low</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Increased traffic noise for some residents</td>
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<tr>
<td>Adverse visual impact for some residents</td>
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<tr>
<td>Severance of Millington Lane and Millington Hall Lane – longer routes to reach the de-trunked Chester Road for both vehicular and non-motorised traffic</td>
<td>Unlikely to affect community cohesion within Millington as all properties are to the west of the new A556 (except Rangemore Nursing Home), but would tend to exacerbate the division between Millington and Mere/Bucklow Hill.</td>
<td>Local</td>
<td>Moderate adverse</td>
<td>Long-term</td>
<td>Grade-separated crossing at new Millington Junction, with dedicated facilities for non-motorised traffic</td>
<td>Low</td>
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<tr>
<td>Conflict between local vehicular traffic and trunk road traffic eliminated</td>
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<tr>
<td>Conflict between vehicular and non-motorised traffic greatly reduced</td>
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<tr>
<td>Rangemore Nursing Home</td>
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<tr>
<td>Increase in noise on west-facing façade (+6.1 decibels) outweighed by reduced noise on east-facing façade (-19.2 decibels), in the long term</td>
<td>The combined effect of the adverse and beneficial effects is deemed to be beneficial overall for both residents and operators of the nursing home</td>
<td>Local</td>
<td>Major beneficial</td>
<td>Long-term</td>
<td>Noise bunds and barriers</td>
<td>Low</td>
<td>Moderate beneficial</td>
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<td>Loss of part of grounds</td>
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<tr>
<td>Improved access via Millington Lane and de-trunked Chester Road</td>
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<tr>
<td>Agricultural changes</td>
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<tr>
<td>Land-take for engineering works and environmental mitigation</td>
<td>Could lead farmers to amalgamate small residual plots into adjacent larger fields, requiring removal of sections of hedgerow. Would increase loss of habitat and impact on landscape character.</td>
<td>Local</td>
<td>Major adverse</td>
<td>Long-term</td>
<td>None available</td>
<td>Low</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Severance of fields, leaving small, awkwardly-shaped plots</td>
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Issued January 2012
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>µg</strong></td>
<td>micrograms – i.e. a millionth of a gram. The symbol used at the beginning is the Greek letter ‘μ’</td>
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<tr>
<td><strong>AADT</strong></td>
<td>Annual Average Daily Traffic – one of several ways of measuring the flow of traffic; represents the daily average number of vehicles using a particular link in the network, averaged across the whole year</td>
</tr>
<tr>
<td><strong>AD</strong></td>
<td>Anno Domini (Year of Our Lord)</td>
</tr>
<tr>
<td><strong>ADMS</strong></td>
<td>ADMS Roads is a software programme used to model air pollution problems associated with networks of roads</td>
</tr>
<tr>
<td><strong>ALC</strong></td>
<td>Agricultural Land Classification – a system of classifying the quality of agricultural land, from Grade 1 (best) to Grade 5 (worst). Grade 3 is subdivided into 3a and 3b. For the purposes of government policy, Grades 1-3a are further classified as ‘best and most versatile’ (BMV) agricultural land</td>
</tr>
<tr>
<td><strong>AOD</strong></td>
<td>Above Ordnance Datum - Ordnance Datum is the standard measure of sea level in the UK, from which all heights are measured for mapping purposes</td>
</tr>
<tr>
<td><strong>AQMA</strong></td>
<td>Air Quality Management Area – local planning authorities are obliged to declare an AQMA in any area where there are, or are expected to be, exceedences of the relevant Air Quality Objectives. The authority declaring an AQMA is obliged to prepare a management plan to prevent or remove any such exceedences</td>
</tr>
<tr>
<td><strong>AQO</strong></td>
<td>Air Quality Objective – targets set in the UK Air Quality Strategy, which represent specific concentrations of certain pollutants in the air. The concentrations vary from pollutant to pollutant, and there may be more than one AQO for each pollutant, depending on the method and timescale of measurement. The AQOs are intended to represent the concentration of any pollutant below which no effects on human health would be expected to occur, even in the most vulnerable individuals. If the concentration of any one pollutant goes above the level set in the AQO, an ‘exceedence’ is said to occur</td>
</tr>
<tr>
<td><strong>AQS</strong></td>
<td>Air Quality Standard – set by the Air Quality Standards Regulations 2010, which implement the ‘limit values’ set by European law (under the Directive on Ambient Air Quality and Clean Air for Europe – 2008/50/EC). The AQS are generally the same as the relevant AQOs</td>
</tr>
<tr>
<td><strong>Archaeological trial trenching</strong></td>
<td>Archaeological trial trenching involves the excavation of a small sample of an area of potential archaeological interest, to confirm whether archaeological remains are actually present and obtain more information about them. This information is used to inform the impact assessment and the design of mitigation</td>
</tr>
<tr>
<td><strong>ASCV</strong></td>
<td>Area of Special County Value – the former Cheshire County Council designated ASCVs in areas where the landscape was of particularly high quality and required protection through the planning system. The relevant policies under which ASCVs were designated are still recognised by Cheshire East Council</td>
</tr>
<tr>
<td><strong>Attenuate</strong></td>
<td>‘Attenuate’ in this context means any method used to slow down the rate of discharge of water drained off the road into local watercourses, to avoid the risk of causing floods. In this case, the water will be captured in ponds and then slowly released</td>
</tr>
<tr>
<td><strong>BAP</strong></td>
<td>Biodiversity Action Plan – includes the UK BAP (United Kingdom Biodiversity Action Plan), LBAP (Local Biodiversity Action Plans prepared by or on behalf of local authorities) and the HA BAP (Highways Agency Biodiversity Action Plan)</td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td>In EIA, ‘baseline conditions’ are the environmental conditions in existence just before the occurrence of an impact - i.e. they are the conditions that would be affected. Baseline conditions are not the same as existing conditions, which are those in existence at the time of carrying out the EIA, because, this may be some time in advance of the occurrence of an impact, and environmental conditions may change in the intervening period</td>
</tr>
<tr>
<td><strong>BGS</strong></td>
<td>British Geological Survey (BGS)</td>
</tr>
<tr>
<td><strong>BMV land</strong></td>
<td>‘Best and Most Versatile land’ is land in Grades 1, 2 and 3a of the Agricultural Land Classification system, deemed by government policy to be a national strategic resource</td>
</tr>
<tr>
<td><strong>CBAP</strong></td>
<td>Cheshire Biodiversity Action Plan</td>
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<tr>
<td><strong>CEC</strong></td>
<td>Cheshire East Council</td>
</tr>
<tr>
<td><strong>CEMP</strong></td>
<td>Construction Environmental Management Plan – a plan prepared by a contractor before the start of construction work, detailing ‘environmental aspects’ that may be affected by the construction work and management</td>
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</tbody>
</table>
methods to prevent any such effects. The CEMP would include methods and site management practices to be applied to prevent generation of nuisance dust, accidental pollution events and a range of other potential sources of accidental damage to the environment, and response and reporting procedures to minimise the damage in the event of a pollution incident.

CPRE – Campaign to Protect Rural England – a pressure group concerned with landscape issues.

CRTN – Calculation of Road Traffic Noise – a computer model used to calculate the noise levels at any given location, identifying the contribution to that noise made by traffic.

dB – Decibel – a measure of noise. Not on a linear scale – 2 dB is 10 times as loud as 1 dB, and 3 dB is 10 times as loud as 2 dB, and so on.

DCO – Development Consent Order – under which the relevant Secretary of State can grant consent for construction of a Nationally Significant Infrastructure Project, on the advice of the Infrastructure Planning Commission, under the Planning Act 2008.

Defra – Department for the Environment, Food and Rural Affairs.

DMRB – Design Manual for Roads and Bridges – the 15 volumes of DMRB provide guidance for all aspects of the design of roads and bridges in the UK. Volume 10 covers environmental mitigation, and Volume 11 governs environmental impact assessment.

Do-minimum – A hypothetical scenario used to provide a realistic comparison of the effects of the scheme. The do-minimum scenario includes any changes to the highway infrastructure that would occur even if the scheme does not go ahead, and any other developments in the surrounding area that would influence the movement of traffic and would occur independently of the scheme.

EA – Environment Agency – a non-departmental government body covering England and Wales, responsible for protection of the environment, including the regulation of polluting activities and the control and prevention of flooding.

ECI – Early Contractor Involvement – a form of contract for major construction projects, in which the contractor is involved earlier than under a traditional contract, to ensure their contribution to relevant decision-making during the pre-construction phases.

EIA – Environmental Impact Assessment – an assessment by the proposer of certain types of major project of the significant effects that the project could have on the environment. The proposer is required to carry out the assessment by law, in this case under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.


EPS Licence – A licence obtained from Natural England, under which works that would affect an EPS are permitted. Usually carries conditions to ensure that there is no long-term damage to the affected population of the species concerned. Such works would be an offence if carried out without a licence or without complying with the conditions on the licence.

ES – Environmental Statement – the report on the results of an EIA.

EU – European Union.

FSC – Forest Stewardship Council.

Geophysical – Geophysical surveys use variations in physical properties of the soil, such as its electrical conductivity or magnetic properties, to detect potential archaeological features without excavation. In this case, a magnetic survey was carried out.


Green bridge – A green bridge is a structure intended to provide direct connectivity between habitats on opposite sides of the road that would otherwise be severed. Its decking would normally be covered with soils and planted with appropriate vegetation, integrated with planting on the land to either side.

HA – Highways Agency.

HAWRAT – Highways Agency Water Risk Assessment Tool – a method published by the HA to assist in assessing impacts on water quality in accordance with DMRB.

HEMP – Handover Environmental Management Plan – a plan prepared by the ECI Contractor at the end of the project, before handing the scheme over to the Highways Agency for long-term maintenance. The HEMP sets out the...
long-term maintenance and management works required to ensure the continued long-term effectiveness of the environmental mitigation measures and to prevent unexpected environmental impacts during the operation of the scheme

**HER** Historic Environment Records – a database maintained by individual counties or local authorities, containing records of archaeological sites, historic buildings and other aspects of the historic environment

**HDV** Heavy Duty Vehicle

**HGV** Heavy Goods Vehicle

**Hibernaculae** The place/structure/shelter chosen by an animal for hibernation

**Historic landscape character types** Historic landscape character types are distinctive and repeated combinations of components defining generic historic landscapes such as ‘ancient woodland’ or ‘parliamentary enclosure’. The types used in this study were defined based on evidence from historic maps and other sources

**IAN** Interim Advice Note – published by HA to modify/update guidance given within DMRB, in advance of the permanent replacement of the relevant sections of DMRB

**IEEM** Institute of Ecology and Environmental Management – a professional body for ecologists and environmental managers

**IEMA** Institute of Environmental Management and Assessment – a professional body for environmental managers and EIA professionals

**Impermeable** Impermeable surfaces are those where water cannot pass through the surface and soak into the underlying ground. This means that all of the water will flow rapidly off the road surface into the highway drainage system

**IPC** Infrastructure Planning Commission – a public body established by the Planning Act 2008, to consider applications for consent for Nationally Significant Infrastructure Projects

**LAF** Local Access Forum – statutory bodies, prescribed under the Countryside and Rights of Way Act 2000 and appointed by a local highway authority or national park authority. Their function is to the relevant authority as to the improvement of public access to land for the purposes of open-air recreation and the enjoyment of the area. LAFs comprise appointed members who must be representative of both users of local rights of way or access land and owners and occupiers of access land or land encompassing local rights of way

**LAPPC** Local Authority Pollution Prevention Control, under which local authorities are responsible for granting permits for, and regulation of, industrial activities in category A(2) or B as defined in the Environmental Permittin (England and Wales) Regulations 2010.

**LBAP** Local Biodiversity Action Plan – see also BAP; the relevant LBAP for this scheme is the Cheshire Biodiversity Action Plan

**LCA** Landscape Character Area – defined at a local level by the Local Planning Authority. Additional information has been included for the purposes of this assessment

**Limit value** The concentration of certain specific pollutants in the air that are not to be exceeded, under the Air Quality Standards that implement the European Directive on Ambient Air Quality and Clean Air for Europe – 2008/50/EC

**MIDMAN** West Midlands to North West Conurbation Multi-Modal Study – a study of transport needs across the region, considering both road-based and public-transport based options, published in 2002

**Mycorrhiza** A group of fungi that grow in symbiotic relationships with the roots of trees. Many tree species are dependent on mycorrhiza to extend their root systems

**NCA** National Character Area – landscape character areas defined at a national level by Natural England

**NE** Natural England – a public body responsible for the protection of the natural environment in England and the management of NNRs and SSSIs

**NMU** Non-Motorised Users

**NNR** National Nature Reserve

**NO₂** Nitrogen dioxide – a chemical pollutant emitted from vehicle exhausts

**NOₓ** Oxides of nitrogen – includes NO (Nitrogen oxide) and NO₂

**Ordnance Datum** see ‘AOD’

**PCEC** Pedestrians, Cyclists, Equestrians and Community Effects – an environmental topic now deleted from Volume 11 of DMRB, superseded by
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>PEI</td>
<td>Preliminary Environmental Information – information that the applicant must publicise before carrying out consultation of the community in advance of applying for a DCO, if the project concerned is subject to a requirement for EIA</td>
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<tr>
<td>PM$_{10}$</td>
<td>Particulate Matter with a diameter of 10 micrometres or less – a pollutant emitted from vehicle exhausts</td>
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<td>PMA</td>
<td>Private Means of Access</td>
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<tr>
<td>PPG</td>
<td>Planning Policy Guidance – guidance to local authorities, published by central government, on how to consider specific issues in the development of planning policy and in the consideration of planning applications (e.g. PPG 16, Planning and Archaeology); gradually being superseded by PPS</td>
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<tr>
<td>PPS</td>
<td>Planning Policy Statements – statements of policy by central government, covering similar issues to PPG</td>
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<tr>
<td>PRoW</td>
<td>Public Right of Way – includes public footpaths, bridleways and restricted byways</td>
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<tr>
<td>Ramsar site</td>
<td>Wetlands of international conservation importance, designated under the Ramsar Convention, often but not always for the protection of populations of water birds</td>
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<tr>
<td>SAC</td>
<td>Special Area of Conservation – strictly protected sites designated under the EG Habitats Directive, representing internationally important, high-quality conservation sites that significantly contribute to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended)</td>
</tr>
<tr>
<td>SBI</td>
<td>Site of Biological Importance – non-statutory designated sites, recognised by Cheshire East Council and Cheshire Wildlife Trust as being of importance for nature conservation in a county (Grade A), district (Grade B) or more than local (Grade C) context for the habitats, plant or animal communities or species they support</td>
</tr>
<tr>
<td>SoCC</td>
<td>Statement of Community Consultation – a statement published by the proposer of a Nationally Significant Infrastructure Project, detailing how they intend to consult the community about their project before applying for a DCO. Required under the Planning Act 2008</td>
</tr>
<tr>
<td>SSSI</td>
<td>Site of Special Scientific Interest – a statutory designation under the Wildlife and Countryside Act 1981 (as amended), protecting nationally important wildlife sites, habitats and geological sites</td>
</tr>
<tr>
<td>SWMP</td>
<td>Site Waste Management Plan – a plan required by law in England for all construction projects worth more than £300,000, governing the minimisation, management, storage, re-use and disposal of wastes generated through construction work</td>
</tr>
<tr>
<td>TAG</td>
<td>Transport Appraisal Guidance – Department for Transport guidance on the appraisal of transport strategies and projects, providing a framework for decision-making on the funding of projects</td>
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<tr>
<td>TCA</td>
<td>Townscape Character Area – defined at a local level for the purposes of this assessment; the equivalent of LCA in areas where buildings are a dominant feature of this landscape</td>
</tr>
<tr>
<td>Trial trenching</td>
<td>see ‘Archaeological trial trenching’</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UKBAP</td>
<td>UK Biodiversity Action Plan – see BAP</td>
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<tr>
<td>VOSA</td>
<td>Vehicle and Operator Services Agency – a Department for Transport body that oversees MoT testing, supports the traffic commissioners and enforces standards of maintenance for road vehicles</td>
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<tr>
<td>WFD</td>
<td>Water Framework Directive</td>
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<tr>
<td>WRAP</td>
<td>Waste and Resources Action Programme – an organisation that works in partnership with government and business to improve resource efficiency and reduce the generation of waste</td>
</tr>
<tr>
<td>ZVI</td>
<td>Zone of Visual Influence – the area within which a project may be visible and may influence the quality of views</td>
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