



# **SEMMMS A6 to Manchester Airport Relief Road**

## Environmental Scoping Report

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3<sup>rd</sup> February 2010

# Document Control Sheet

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# Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Format of the Report .....	1
1.3	Consultation .....	2
<b>2</b>	<b>Background to SEMMMS and Development of the Relief Road .....</b>	<b>3</b>
2.1	The SEMMMS Strategy .....	3
2.2	Background to the SEMMMS New Relief Road .....	3
2.3	The Scheme and its Objectives .....	4
<b>3</b>	<b>Description of the Proposed Development .....</b>	<b>5</b>
3.1	Proposed Scheme Corridor .....	5
3.2	The Proposed Development .....	5
<b>4</b>	<b>Potential Environmental Impacts and Proposed Assessments.....</b>	<b>8</b>
4.2	Air Quality.....	9
4.3	Cultural Heritage .....	11
4.4	Landscape.....	13
4.5	Nature Conservation .....	15
4.6	Geology and Soils .....	18
4.7	Materials.....	20
4.8	Noise and Vibration.....	21
4.9	Effects on All Travellers .....	23
4.10	Community and Private Assets.....	24
4.11	Road Drainage and the Water Environment.....	26
4.12	Cumulative Impacts .....	27
4.13	Health Impacts .....	27
<b>5</b>	<b>Proposed Environmental Statement Structure.....</b>	<b>29</b>
<b>Appendix 1: Initial Consultation Responses</b>		
<b>Figure 1: Scheme Extent</b>		
<b>Figure 2A - 2E: Principal Constraints</b>		

## Acronyms

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AWI	Ancient Woodland Inventory
BAP	Biodiversity Action Plan
CEC	Cheshire East Council
CRTN	Calculation of Road Traffic Noise
dB(A)	A-Weighted Decibel (noise as perceived by the human ear)
DEFRA	Department of the Environment, Food and Rural Affairs
DfT	Department for Transport
DM	The Do Minimum Scenario (the option of not developing the scheme)
DMRB	The Design Manual for Roads and Bridges
DS	Do Something Scenario (the action of developing the scheme)
EA	Environment Agency
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
ES	Environmental Statement
GCN	Great Crested Newts
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GMEU	Greater Manchester Ecological Unit
GMITA	Greater Manchester Integrated Transport Authority
HADDMS	Highways Agency Drainage Data Management System
HAWRAT	Highways Agency Risk Assessment Tool
HDV	Heavy Duty Vehicles
HIA	Health Impact Assessment
HSI	Habitat Suitability Index
IEEM	Institute of Ecology and Environmental Management
IGCB	UK Interdepartmental Group on Cost Benefit
LNR	Local Nature Reserve
MAELR	A555 Manchester Airport Eastern Link Road
MCC	Manchester City Council
MSBC	Major Scheme Business Case
NATA	New Approach to (Transport) Appraisal
NMU	Non-Motorised Users
NO <sub>2</sub>	Nitrogen Dioxide
NVC	National Vegetation Classification
PM <sub>10</sub>	Particulate Matter with a spectral diameter of 10 micrograms
RIGS	Regionally Important Geological and Geomorphological Sites
SBI	Site of Biological Importance
SEMMMS	South East Manchester Multi Modal Strategy
SMBC	Stockport Metropolitan Borough Council
WFD	Water Framework Directive

# 1 Introduction

## 1.1 Background

- 1.1.1 The South East Manchester Multi Modal Strategy (SEMMMS) identifies a series of transport improvements within Greater Manchester and the wider region. One such improvement comprises the development of a new relief road to remove traffic from the local road networks within Wythenshaw, Cheadle Hulme, Bramhall and Hazel Grove with a view to improving public transport service reliability, increasing accessibility, reducing congestion and improving the local environment.
- 1.1.2 The proposed relief road would involve the introduction of a 14 km dual carriageway linking the A6 at Hazel Grove to Manchester Airport. Ten kilometres of the relief road would comprise sections of new road, with the central 4 km using the recently constructed A555 Manchester Airport Eastern Link Road (MAELR) south of Bramhall. The proposed alignment and relationship between new and existing sections of dual carriageway is shown in Figure 1.
- 1.1.3 The relief road is being jointly promoted by Stockport Metropolitan Borough Council (SMBC), Manchester City Council (MCC) and Cheshire East Council (CEC). The consortium of authorities is currently developing proposals for the scheme with a view to submitting a planning application during the autumn/winter of 2010. The consortium has also agreed that the competent authority responsible for determining the application should be SMBC.
- 1.1.4 The authorities have concluded that the proposed scheme constitutes EIA development and that an Environmental Statement (ES) should be prepared and submitted as part of the application documentation in accordance with the requirements of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 as amended (the EIA Regulations).
- 1.1.5 This scoping report has been prepared in support of a request to SMBC, as the competent authority, for a Scoping Opinion in accordance with the provisions of Regulation 10 of the EIA Regulations; the objective being to establish the nature and form of the assessments that will be undertaken and reported in the ES.

## 1.2 Format of the Report

- 1.2.1 The report provides the following information:
- Chapter 2 – a brief explanation of the history of the proposed scheme leading to its current form in the context of the SEMMMS strategy and a description of the proposed scheme objectives;
  - Chapter 3 – an introduction to the existing environment associated with the corridor within which the proposed relief road would be located and a description of the key components and activities associated with the scheme;
  - Chapter 4 – an indication of the assessments which the project promoters consider should form the focus of the EIA and be reported in the ES; and
  - Chapter 5 – an indicative format for the project ES.
- 1.2.2 Identification of the proposed assessments has been informed by reference to documentation prepared during the scoping and assessment for a previous proposal for the relief road and to Volume 11 of the Design Manual for Roads and Bridges (DMRB) (Highways Agency et al). The latter document provides a nationally adopted framework for scoping and assessing major road proposals and was used to inform the scope of the assessment for the previously proposed scheme. Parts of the guidance have been updated since the preparation of the previous scoping and assessments. Account has been taken of these updates during the identification of assessments considered appropriate for the currently proposed scheme.

1.2.3 Previous documents referred to comprise:

- SEMMMS Major Road Schemes – Stage 2 Environmental Assessment (Mouchel Parkman, 2003),
- SEMMMS Major Road Schemes – Stage 3 Environmental Assessment Strategy (Mouchel Parkman, 2003),
- SEMMMS Major Road Schemes – Stage 3 Environmental Assessment, Scoping Report (Mouchel Parkman, 2004), and
- SEMMMS Stage 3 Environmental Assessment: Draft Environmental Statement and Supporting Documents (Mouchel Parkman, 2007);

## 1.3 Consultation

1.3.1 The scoping has also been informed by preliminary consultation with statutory consultees and other stakeholders. A schedule of consultees contacted is provided in Appendix 1.

1.3.2 Key issues raised in responses are outlined below:

- The scheme is strategically important to increase growth of Manchester Airport (North West Regional Development Agency);
- There may be issues with regard to landscape and ecology, with specific reference to bird hazards and proximity of the road to one of the airport's runways (Manchester Airport);
- The scheme will be a significant physical barrier to local journeys by bicycle or on foot on a north-south axis (Sustrans);
- There is a need to consider in depth designs and how cycleways link into the highway as there is concern that the highway design will just consider cycle paths as leisure routes and not adequately consider cyclists as road users (Cycle Stockport);
- Consultees have highlighted the need for the provision of under and over bridges to reduce severance of communities (Cheshire and Warrington Local Access Forum/ Ramblers Association); and
- Concerns regarding the ecological assessment for the scheme due to presence of protected species such as great crested newts and mammals (Natural England, rECOrd, GMEU, Mammal Review, Manchester City Council).

## 2 Background to SEMMMS and Development of the Relief Road

### 2.1 The SEMMMS Strategy

- 2.1.1 In July 1998 the Government published a strategic review of their roads programme; 'A New Deal for Trunk Roads in England'. This review was undertaken as part of the development of a new integrated transport policy delivered under the White Paper: 'A New Deal for Transport: Better for Everyone'.
- 2.1.2 In 1999, the Government proposed that a study looking at all transport modes across the south east Manchester area should be undertaken; this being one of the country's major areas of concern in terms of accessibility and congestion. This culminated in the production of the SEMMMS study in 2001, which contained a broad range of measures to address existing traffic and transportation issues across the region.
- 2.1.3 The SEMMMS was accepted and endorsed by the Government in March 2002. Since then, the local authorities within the SEMMMS area (Cheshire, Derbyshire, Manchester, Stockport and Tameside) and the Greater Manchester Integrated Transport Authority (GMITA) have been working to deliver the various elements of the strategy.

### 2.2 Background to the SEMMMS New Relief Road

- 2.2.1 Following the recommendations of the SEMMMS study, approval was given by the Secretary of State for Transport for the councils to progress the development of a relief road, this being recognised as a key solution to many of the transport issues highlighted in the study.
- 2.2.2 Initially, the proposed relief road was a larger scheme than that currently being promoted. It included the development of a dual carriageway bypass along the routes of several former proposed trunk road schemes: the A6(M) Stockport North South Bypass; Manchester Airport Eastern Link Road (West); and a single carriageway along the routes of the proposed Poynton Bypass and Stepping Hill Link Road. The corridors associated with these former Highways Agency schemes remain safeguarded from development.
- 2.2.3 The chosen solution at that stage broadly followed a semi-circular route around the north-east to south-west perimeter of Stockport, linking with the existing A555 link road and continuing to a termination at Manchester Airport to the west. A proposed second link, in the form of a bypass southwards around Poynton, was also included under the scheme proposals resulting in a development totalling approximately 25 km.
- 2.2.4 These proposals also included a number of 'complementary measures', which were promoted to introduce traffic calming and flow control measures within the surrounding towns and villages.
- 2.2.5 This proposal sought central government funding in 2004 through the submission of an entry-level major scheme business case (MSBC). The business case was a critical document as it demonstrated local outline support for the scheme following consultation with a number of stakeholders.
- 2.2.6 In parallel with the preparation of the business case, the scheme proposals were subject to a process of environmental assessment to compare various proposed alternative options and alignments.
- 2.2.7 Following the options appraisal, the scheme was developed into a single preferred outline route alignment based on refinements to the traffic model, information gathered at two public consultations and various environmental considerations. This outline route alignment also defined the scheme junction proposals.

- 2.2.8 With the preferred outline route finalised, a scoping report was produced to establish the proposed content of an Environmental Statement, which it was recognised would need to be submitted in support of a planning application for the scheme. Assessment work to inform the ES began in 2004 and stopped in 2007 when the scheme was put on hold prior to the submission of the planning application. This was due to concerns raised by the Department for Transport (DfT), who would be part-funding the scheme that the road was too large and expensive to finance as a single development proposal; the recommendation being to split the scheme into phases.
- 2.2.9 In the summer of 2007 work progressed by the local authority consortium to develop a phased approach in order for the scheme to remain viable.
- 2.2.10 During this period the DfT, in consultation with the local authority consortium, prioritised the development and funding of the link between the A6 and Manchester Airport.
- 2.2.11 The need for the scheme has been demonstrated on the environmental and safety benefits, which seek to address a series of deep-seated transport issues and local community needs within south east Manchester. The need is further acknowledged by the promoting local authorities including specific transport and development related planning policies within their respective development control documents. To this end, the land through which the proposed route passes has been safeguarded in local planning policy, with any potentially prejudicial planning applications being rejected.

### **2.3 The Scheme and its Objectives**

- 2.3.1 In the context of the broader objectives of the Major Road component of the SEMMMS, the relief road would be a fundamental driver in removing traffic from the local road network, in order to improve the environment for residents of local communities and improve public transport reliability through increased accessibility.



## 3 Description of the Proposed Development

### 3.1 Proposed Scheme Corridor

- 3.1.1 The proposed relief road follows an alignment that traces the southern fringe of the Greater Manchester conurbation. The corridor comprises a sequence of open space and broader countryside, much of which is designated greenbelt. Agricultural land, recreational and sports areas, institutional grounds, and residential, industrial and commercial land use, constitute areas of varying landscape quality, framed to the north by dense settlement that forms part of the core conurbation and to the south by discrete settlements set within open countryside.
- 3.1.2 Key settlements comprise Hazel Grove, Bramhall, Cheadle Hulme and Benchill to the north and Poynton-with-Worth (Poynton) and Handforth to the south.
- 3.1.3 Agriculture is the primary land use. There are, however, a significant number of other substantial interests. These include Manchester Airport, golf courses at Styal, Moorend, Bramhall and Hazel Grove, the Primrose Cottage nursery and garden centre off Ringway Road, the Brookside Garden centre off the A523, and Ponyton Lake, and Woodhouse Park.
- 3.1.4 There are a number of significant radial roads and rail routes that cross the corridor as they run south to north towards Manchester. These include the A34, A523 and A6, and the Hazel Grove to Buxton railway, the West Coast Main Line and Styal line into Manchester Airport.
- 3.1.5 The topography of the corridor is relatively flat and occasionally gently undulating. Areas of substantial planting are limited, the most prominent being associated with the four golf courses, at Wigwam Wood and at the Styal Estate to the east of the airport. The result is that much of the area appears open with views that are generally uninterrupted other than by occasional mature field boundaries, hedgerow trees, areas of scrub and small copses of trees.
- 3.1.6 There are important, locally contained, watercourses in the form of the Norbury Brook, Lady Brook, and Poynton Brook at the eastern end of the corridor. Other watercourses include the River Dean in the central part of the corridor, and the Spath, Gately and Baguley Brooks at the western end of the corridor.
- 3.1.7 A complex network of rights of way and public accesses, some of which form parts of long distance routes, provide for access to the countryside and open areas from the neighbouring communities. The principal rights of way include: the Ladybrook Valley Interest Trail, a long-distance footpath running along Norbury Brook in the vicinity of Hazel Grove; the Sustrans Regional Cycle Route 85 in the vicinity of the airport; the Sustrans National Cycle Route 55, which crosses the A6 road near Hazel Grove; and the Greater Manchester Cycle Routes and Manchester Airport Orbital Cycleway near the airport.
- 3.1.8 Phase 3b of the Manchester Metrolink tramway extension is programmed for delivery by 2011, and will introduce a new section of operational track parallel to the scheme corridor between Manchester Airport and Woodhouse Park. New stations will also be created within the local area.

### 3.2 The Proposed Development

#### *Route Overview*

- 3.2.1 The proposed relief road would comprise a new section of dual carriageway running from a new junction on a re-aligned section of the A6(T) at Hazel Grove and following a generally westerly alignment between Bramhall and Poynton. It would continue south of Cheadle Hulme and North of Handforth along the line of the completed A555 dual carriageway. West of Handforth a further new section of dual carriageway would run north of Styal and south of Moss Nook, before tying into the existing network at Manchester Airport (Figure 1).

### *Key Components of the Proposed Development*

3.2.2 Travelling east to west, the key components of the proposed scheme would comprise:

- the creation of a new signalised junction at the A6, Buxton Road, requiring the realignment of 1 km of the A6 around the junction;
- the requirement for a new dual-carriageway section running west up to the A523, Macclesfield Road, seeing the creation of underpasses under the retained section of the A6 and the Hazel Grove to Buxton railway line;
- the construction of a new junction at the scheme's intersection with the A523, Macclesfield Road, between Brookside garden centre and Norbury Hall;
- the retention of the road in cutting south of Macclesfield Road;
- the requirement to run close and parallel to Norbury Brook, realign and cross it at Norbury Hollow;
- the need to raise a section of cutting under the A6102 Woodford Road and retain the relief road on embankment as it passes over the West Coast Main Line;
- the creation of a new roundabout junction near the Woodford Oil Storage Depot and a grade-separated junction at A5102, Woodford Road, Bramhall;
- the relief road's tie-in to the existing A555;
- the need to upgrade the A555 to accommodate the footpath/cycleway on the north side of the carriageway;
- the requirement for junction improvements where the A555 crosses over the A34;
- the creation of a new grade-separated junction to extend the relief road beyond the A555's current termination with the B5358, Wilmslow Road;
- the creation of a new section of dual-carriageway between the B5358, Wilmslow Road and Styal Road, with the creation of an at-grade junction to link in to Styal Road;
- the creation of a final dual-carriageway section to link in to the Terminal One roundabout at Manchester Airport, requiring the creation of two additional junctions with Shadowmoss Road and Ringway Road;
- the reconfiguration of the existing Terminal One roundabout as a grade-separated junction;
- the inclusion of three footway/farm bridges along the route; and
- the creation of a local road distribution network to service a major new development on the north side of the Terminal 1 junction.

3.2.3 A new combined footpath/cycleway would be provided along the entire length of the scheme, including the existing A555 MAELR section. Street lighting would be provided in the vicinity of junction interfaces and along key sections of the route. Contemporary drainage, including necessary pollution-prevention control measures, will be implemented in the scheme. Bus lay-bys will be created around the proposed junctions.

### *Key Construction Activities*

3.2.4 Key construction activities would include:

- selective vegetation clearance;
- site-stripping, levelling and major and minor earthworks using scrapers, bulldozers and dump trucks to establish levels;
- the import and export of material (fill, spoil and road stone) to establish the carriageway;

- the use of generators, temporary machinery and lighting;
- construction vehicle movements;
- the requirement for a number of temporary diversions and imposition of temporary access restrictions;
- possible temporary watercourse stop-ups and/or diversions; and
- possible dewatering activities.

3.2.5 Geotechnical studies for the previous proposal indicate there would generally be no need for explosive drilling or blasting around the planned areas of cutting. Localised piling may, however, be required at certain points close to the embankment areas and grade-separated junctions.

3.2.6 It is anticipated construction will extend over a 36 month period.

## 4 Potential Environmental Impacts and Proposed Assessments

- 4.1.1 The following review of potential impacts and relevant assessments takes the form of an initial evaluation of potential interactions between the key components and activities described in Chapter 3 and the existing human, natural and built environment associated with the proposed relief road corridor. The findings of the initial review are summarised in a matrix of scheme components and activities and environmental aspects (Table 4.1) in which a one-star rating is indicative of potentially low interaction and a three-star rating is indicative of potentially high interaction.
- 4.1.2 The matrix is followed by a description of the nature of the consequent potential impacts and an analysis of the need for assessments specific to each aspect. Where the analysis concludes that assessment is required, there is a description of the assessments considered appropriate and methods of assessment which it is intended would be adopted. Environmental aspects adopted are those identified and detailed in Volume 11 of the Design Manual for Road and Bridges (DMRB) – Environmental Assessment.
- 4.1.3 DMRB Volume 11 was republished in August 2008 which reduced the number of environmental assessment topic areas from twelve to ten, resulting in some environmental aspects being renamed and/or merged into other topic areas. The proposed scope of the assessment reflects this update, with the consideration of construction related impacts and the relationship to planning policy now forming an integral component of each of the ten topic areas.

**Table 4-1 Scheme Components, Activities and Environmental Aspects**

	Environmental Aspects									
	Air Quality	Cultural Heritage	Landscape	Nature Conservation	Geology and Soils	Materials	Noise and Vibration	Effects on All Travellers	Community and Private Assets	Road Drainage and the Water Environment
Construction										
Geotechnical investigations	*	**		*	**		*			*
Site Clearance			**	***	*	*			*	*
Earthworks	**	**	*	**	***	***	**	**	**	**
Import/Export fill, spoil, road stone	*					***		*	*	*
Use of Generators and Temporary Machinery	**		*		**		**	*	*	*
Site Compounds	**	*	**	*			**			**
Temporary Diversions and Access Restrictions								**	**	
Potential Temporary Watercourse stop-ups/diversions and dewatering				**	*				*	**
Landscaping			*	**					*	
Temporary Lighting			*	**					*	
Operational										
Traffic	***	*	***	**	**		***	***	***	**
Drainage			*	**	*					***
Road Profile and Structures		**	***	**	**			**	**	**

## 4.2 Air Quality

- 4.2.1 The DMRB indicates that for road schemes of the type proposed, potential impacts related to local air quality, regional emissions and construction-related dust should be considered. The guidance also highlights the potential for impact on sites of nature conservation interest; particularly where sensitive habitat types can potentially be subject to significant impact as a result of nitrogen deposition associated with traffic related emissions.
- 4.2.2 In relation to local air quality, the focus of concern is on potential impacts on human health associated with increases or reductions in traffic-related emissions. Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>) are highlighted as the two principal indicators of such impacts and form the focus of the assessment methodology recommended in the guidance.
- 4.2.3 In relation to regional emissions the focus is on changes in annual emissions of oxides of nitrogen, particulate matter, carbon monoxide, hydrocarbons and carbon, which it is predicted would result from changes in traffic volumes, distance travelled and travelling speed within the parts of the road network affected by the introduction of the proposed scheme.

### *Existing Environment*

- 4.2.4 Information derived from the previous assessments and a preliminary review of the data in light of the currently proposed scheme has established that:
- concentrations of NO<sub>2</sub> and PM<sub>10</sub> associated with urban background locations that may be affected by the proposals are generally below the statutory air quality standards set to protect human health. In the context of these pollutants these are set at 40 µg/m<sup>3</sup> for the annual mean for both pollutants and a short-term 1-hour limit of 200 µg/m<sup>3</sup> for NO<sub>2</sub>, not to be exceeded more than 16 times per year and a 24-hour mean limit value of 50 µg/m<sup>3</sup> for PM<sub>10</sub> not to be exceeded more than 35 times per year;
  - there are however existing localised instances of exceedences of the standards within the affected area which would be subject to changes in traffic flows and characteristics;
  - parts of the affected area are located within defined Air Quality Management Areas (AQMAs). These are shown in Figure 2A and relate to parts of the corridor in the vicinity of Manchester Airport, focused along the A34 between Cheadle Hulme and Handforth and at Hazel Grove; and
  - there are no designated nature conservation sites associated with the potentially affected area that qualify for consideration under the DMRB criteria.

### *Potential Impacts*

- 4.2.5 The introduction of the proposed scheme into the existing settlement and land use pattern will result in marked changes in traffic flows on parts of the existing road network. This will result in changes in concentrations of NO<sub>2</sub> and PM<sub>10</sub> currently experienced by residents living in the vicinity of the affected roads and residents who would be located in similar proximity to the proposed new sections of road. There will also be the potential for similar impacts on locations in the vicinity of the affected and new sections of road where people are regularly present in numbers outside of the home environment, such as recreational areas, schools, hospitals, and homes for the elderly.
- 4.2.6 Changes in flows, travelling speeds and distance travelled within the affected parts of the network will also result in changes in total annual emissions of the nominated pollutants related to regional emissions over and above those that would occur without the introduction of the proposed scheme.
- 4.2.7 Construction of the proposed scheme will involve substantial earthworks activity whereby soils and overburden will be exposed as they are stripped and moved to establish the necessary design profiles for the proposed relief road. There will also be activity associated with the import of aggregates and potential import or removal of soils and overburden. In many instances these activities will occur in relatively close proximity to residential development and other land use

where dust arising from the activities will potentially result in temporary nuisance. Dependant on requirements related to import and export of materials there would be the potential for temporary impacts on local air quality in the vicinity of roads used for either purpose.

### *Proposed Assessments and Methods of Assessment*

#### *Local Air Quality*

- 4.2.8 In light of the scale of the proposed scheme, the relationship of residents and other sensitive receptors to parts of the road network that would be affected, and the sensitivity of parts of the affected area in relation to existing concentrations of traffic related pollutants, it is intended that potential impacts on local air quality should form part of the assessments required to inform the ES.
- 4.2.9 It is proposed that the assessment should be undertaken in accordance with the methodology recommended in DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07). This will involve an initial screening of predicted changes in traffic flows and characteristics within the road network to establish the affected roads to be included in the assessment and enable relevant receptors to be identified (the local air quality study area). The screening will involve the use of the five criteria detailed in the DMRB to determine affected roads, namely sections of road where it is predicted there would be:
- a change in alignment of 5 m or more; or
  - a change in daily traffic flows of 1,000 Annual Average Daily Traffic (AADT) or more; or
  - a change in heavy duty vehicle (HDV) flows of 200 AADT or more; or
  - a change in daily average speed by 10 km/hr or more; or
  - a change in peak hour speed of 20 km/hr or more.
- 4.2.10 Relevant parts of the study area will then be subject to either a simple level or detailed level assessment.
- 4.2.11 It is intended that detailed assessment will be undertaken where exceedences of the Air Quality Objectives already occur, as is the case within the identified AQMAs, and at complex locations within the study area. These include the areas around proposed major junctions and at certain locations within the main settlements where there is a high density of sensitive receptors. All other areas will be subject to simple assessment.
- 4.2.12 The detailed assessment will involve advanced dispersion modelling using ADMS Roads. The simple assessment will involve application of the DMRB Local Air Quality Spreadsheet. Both assessments will involve comparison of the predicted emissions between the Do-Minimum scenario (the situation prior to construction of the road) and the Do-Something scenario (the situation assuming the proposed scheme is in place and in use). It is intended the comparison will be based on Opening Year (2015) traffic data for the two scenarios.
- 4.2.13 The assessment of significance will be based on an evaluation of predicted concentrations for the two pollutants against the air quality standards described in 4.2.4.

#### *Regional Emissions*

- 4.2.14 In light of the predicted changes in traffic flows, speeds of travel and distance travelled by traffic within the affected network it is intended that impacts related to regional emissions should form part of the assessments required to inform the ES.
- 4.2.15 It is proposed that the assessment should be undertaken in accordance with the methodology recommended in DMRB Volume 11 Section 3, Part 1 Air Quality (HA207/07). This will involve an initial screening to establish the affected roads to be included in the assessment using the three criteria detailed in the DMRB, namely sections of road where it is predicted there would be:

- a change of more than 10% in AADT; or
- a change of more than 10% to the number of HDV; or
- a change in daily average speed of more than 20 km/hr.

4.2.16 The affected roads (the regional emissions study area) will then be subject to evaluation of predicted changes in annual emissions using the DMRB Regional Impact Spreadsheet. The assessment will involve comparison of the predicted emissions between the Do-Minimum scenario and the Do-Something scenario both in the Opening Year (assumed to be 2015) and in the design year (assumed to be 2030).

### *Construction Related Impacts*

4.2.17 In light of the scale of the proposed scheme, the substantial construction activities that would be involved and the proximity of a large number of residents to the potential working areas, it is intended that impacts related to construction-related dust should be assessed. It is proposed the assessment should be undertaken in accordance with the DMRB with a view to ensuring that a robust mitigation strategy is identified for the construction period.

4.2.18 An assessment of the vehicle emissions associated with proposed traffic management procedures and the use of machinery and generators during the 36-month construction period will be undertaken. Subject to traffic data being available for the construction period a quantitative approach will be adopted; otherwise a qualitative assessment will be undertaken with the assumptions being clearly stated.

## **4.3 Cultural Heritage**

4.3.1 The DMRB identifies three specific areas of interest under the overarching aspect of cultural heritage; archaeological remains, the built heritage and historic landscapes.

4.3.2 Archaeological remains consider those materials created or modified by past human activities, which includes a wide range of visible and buried artefacts, field monuments, structures and landscape features. Built heritage considers architectural, designed or other structures with a significant historical value, such as listed buildings; whilst the historic landscape concerns perceptions that emphasise evidence of the past and its significance in shaping the present landscape.

4.3.3 Within the context of the DMRB a cultural heritage asset is considered an individual archaeological site or building, a monument or group of monuments, an historic building or group of buildings and/or a historic landscape.

### *Existing Environment*

4.3.4 Known sites and features of cultural heritage interest associated with the proposed scheme corridor are shown in Figure 2B. The figure demonstrates that there are four areas of marked interest located along the proposed corridor. These are areas north of Styal Golf Course, around Mill Hill Hollow, west of Poynton and in the vicinity of the golf course at Hazel Grove.

4.3.5 Notable sites and features within these areas comprise:

- Norbury Corn Mill (Site 1) which is considered of regional significance on grounds of its survival, condition and diversity;
- a potential area of Anglo-Saxon activity in the environs of Norbury Hall Farmhouse (Site 2);
- Poynton Mill leat (Site 3);
- The Lumb Lane routeway (Sites 4 and 5); and

- Ridge and furrow earthworks (Sites 6) and earthworks along township boundaries (Sites 7 and 8).

4.3.6 Other sites and features located in the vicinity of the proposed scheme corridor include:

- a number of isolated sites immediately north and south of the existing A555;
- several roads which are believed to be of Roman origin; and
- historic landscape features associated with small areas of remnant woodland and the area's history of agriculture use.

4.3.7 There are two conservation areas within 200 m of the proposed route corridor, one at Syddal Park south of Bramhall and the other at Styal Village. There is also an extensive area of National Trust land comprising Quarry Bank Mill and the Styal Estate within the Bollin Valley.

### *Potential Impacts*

4.3.8 The introduction of the proposed scheme will require land to be taken from areas of known cultural heritage interest. There is also the possibility that unknown buried sites or features of interest could be encountered during construction of the proposed scheme. Potential impacts could involve:

- direct destruction or partial destruction of known or unknown assets;
- impacts on the setting of known assets;
- severance or fragmentation of the relationship between features that contribute to the understanding of an area of historic landscape.

### *Proposed Assessments and Methods of Assessment*

4.3.9 Taking into account the information relating to cultural heritage resources gathered as part of the assessment for the previously proposed relief road and of the modified proposals for the relief road, it is intended that an assessment of impacts on cultural heritage interests should form part of the assessments required to inform the ES and that all three aspects considered within the DMRB should be addressed.

4.3.10 The assessment will be conducted in accordance with the guidance published in DMRB, Volume 11, Section 3, Part 2 Cultural Heritage (HA208/07). The methods specific to archaeological remains, built heritage and historic landscapes will be based on the guidance detailed in Annexes 5, 6 and 7 of HA208/07.

4.3.11 The existing data relative to archaeological remains and the built heritage collected during the assessment for the previously proposed relief road scheme will be reviewed and verified. The review will involve an investigation to determine if other known features should be included in the assessment by virtue of the modifications to the previously proposed scheme.

4.3.12 The value of the sites, features, buildings and structures identified in the updated baseline will then be determined in accordance with HA208/07 and the evaluations undertaken for the previous assessment will be used to test the conclusions. Identification of the potential for unknown assets being present within the proposed construction corridor will involve a review of the previous documentary analysis for the corridor and the geophysical evidence derived from previous surveys.

4.3.13 Baseline data relating to characterisation of historic landscapes in the context of the proposed scheme corridor will involve reference to the Cheshire Historic Landscape Characterisation Report (Revised December 2008). Baseline data for the sections of the corridor located within Manchester and Stockport will involve application of the guidance detailed in HA208/07, Annex 7 Cultural Heritage Sub-Topic Guidance: Historic Landscape. Application of the guidance will involve liaison between the landscape and cultural heritage specialists within the environmental



assessment team and cross reference to the Cheshire classification to ensure the baseline description and evaluation of sensitivity is consistent.

- 4.3.14 The evaluation of the significance of impacts for all three aspects will involve quantification and description of the magnitude of impact relative to direct impacts, impacts on the setting of resources and impacts on the relationships between resources and the value/sensitivity of the resources as recommended in Annexes 5, 6 and 7 of HA208/07. Magnitude will be reported as being adverse and major, moderate or minor or negligible and value as being very high, high, medium, low or negligible.
- 4.3.15 The resultant significance of impacts will be guided by reference to the ratings, recommended in the Annexes, using the matrices provided for combining value and magnitude, and applying professional judgement.
- 4.3.16 The establishment of a mitigation strategy to address predicted/potential impacts will involve review of the strategies relevant to resources previously identified and agreed with the County Archaeologists, validation or modification of the strategies with the County Archaeologists and inclusion of further measures subject to the emergence of newly identified sites or areas of potential during the assessment.

## 4.4 Landscape

- 4.4.1 The DMRB recognises that the introduction of major roads schemes, such as that proposed, will generally have an impact on the landscape character of the area within which they are located and on views experienced by residents and visitors to the area. The guidance accordingly includes recommendations relating to the assessment of impacts and their resultant effects on the landscape character and visual context of areas within which major road schemes are located.

### *Existing Environment*

- 4.4.2 The landscape associated with the preferred scheme corridor comprises a composition of land use and urban and rural features and components, which has established a sequence of areas of varying character and quality.
- 4.4.3 In common with many such urban fringe areas there are areas where urban development in a number of forms is dominant. Housing of varying age and style abuts and influences perception of the neighbouring countryside throughout much of the area. Industrial, commercial and institutional development evokes a sense of urbanisation of the countryside, particularly along the A34 and in the vicinity of Manchester Airport. Stylised landscapes, such as those associated with the many golf courses located within this fringe to the conurbation contrast with areas of continuing agricultural activity in which there is clear evidence of long established field patterns and evidence of changing practice as boundary fences have increasingly replaced traditional hedgerows.
- 4.4.4 Parts of the corridor retain a strong sense of their relationship to the agricultural landscape of the Cheshire Plain. Other areas, such as that associated with and surrounding Styal, constitute significant examples and early evidence of the emergence of designed and industrial landscapes within the countryside.
- 4.4.5 Substantial sections of the corridor are designated greenbelt (Figure 2D), which not only serves its primary function of preventing coalescence of settlement but provides an important visual link with the countryside that surrounds the conurbation.
- 4.4.6 Landscape quality and visual context varies from the higher quality areas at the eastern end of the corridor associated with the Norbury Brook and Ladybrook Valleys to ordinary relatively open undulating, landscapes south of Woodford and further west towards Manchester Airport. There are poor quality areas such as at Heald Green and localised higher quality features such as the locally prominent Wigwam Wood.

- 4.4.7 Whilst the visual quality of the open space and countryside within the corridor is variable, it constitutes a local resource which adds value to the environmental quality for the communities and individual residents located within and in the vicinity of the corridor.

#### *Potential Impacts*

- 4.4.8 The introduction of the proposed new sections of dual carriageway at the eastern and western ends of the corridor, crossing the established radial pattern of existing infrastructure will serve to sever existing compositions of landform, planting structure, settlement and land use which contribute to existing landscape character. Construction of the proposed scheme will involve the loss of established landscape components such as hedgerows and other planting and will require modifications to existing landform. The presence of the road and its associated traffic within parts of the corridor which are currently not heavily influenced by roads and traffic, will have a potential impact on perceptions of the areas. The new sections of road and its associated traffic will also constitute a new, and potentially discordant, component in views experienced by numbers of residents and users of the rights of way network within the area.

#### *Proposed Assessments and Methods of Assessment*

- 4.4.9 The review of previous studies, of information relating to existing landscape character and the visual context of the proposed scheme corridor, and of the scale and form of the currently proposed scheme, indicate that an assessment of impacts on landscape character and views experienced by receptors associated with the area should form part of the assessments required to inform the ES.
- 4.4.10 The assessment will be undertaken in accordance with the guidance contained in DMRB Volume 11 Section 3 Part 5, Landscape Effects, and the Guidelines for Landscape and Visual Impact Assessment' (GLVIA) published by the Landscape Institute and Institute of Environmental Management and Assessment (2002). Reference will be also made to guidance for landscape character assessment in the Countryside Agency published 'Landscape Character Assessment' (2002).
- 4.4.11 The assessment will address landscape and townscape character as an integrated approach; the dominant element in this instance being landscape character.
- 4.4.12 Establishment of the baseline for landscape character will involve a review of the previous assessment relating to regional, sub-regional and local character areas. Further desk-based and field validation surveys will be undertaken to identify any changes in landscape components and their composition. Descriptions relating to quality, value and sensitivity of the areas to the form of proposed development will be updated to reflect the findings of the review.
- 4.4.13 The previously plotted visual envelope for the relief road will be re-plotted to reflect the currently proposed horizontal and vertical profiles for the scheme and the schedule of originally identified visual receptors will be reviewed and updated following a preliminary site survey.
- 4.4.14 Winter and summer visual impact surveys will then be undertaken and the need for landscape proposals to address specific visual impacts will be identified.
- 4.4.15 The assessment of significance for the landscape and visual impact assessments will involve an evaluation of the sensitivity of landscape character areas and visual receptors and the magnitude of change predicted to result from the introduction of the proposed scheme. Significance will be defined on a seven point scale ranging between substantial, moderate, or slight, adverse or beneficial or no change where there is no discernable deterioration or improvement.
- 4.4.16 The assessment of significance and description of residual effects will take into account the landscape measures which will be developed to aid integration of the proposed scheme into the local environment and to address impacts relative to specific receptors.

## 4.5 Nature Conservation

- 4.5.1 The DMRB indicates a requirement to consider the following potential ecological impacts: the direct loss of habitats through land-take; how road scheme's potentially create a barrier and divide habitats or wildlife corridors; the potential for road kill through species trying to cross a road where foraging routes and habitats have been lost or severed; the effects on wetlands, aquatic environments and drainage patterns through disruption to the local hydrology; the effects on birds and mammals through constructing major road structures; the effects of road lighting, pollution runoff, spray and lighting; and disturbance caused during construction.
- 4.5.2 The assessment focus is on potential impacts on designated and non-designated sites, key habitats and habitat-types, and protected and notable species.

### *Existing Environment*

- 4.5.3 The location of the principal sites of nature conservation interest associated with the proposed scheme corridor is shown in Figure 2C.
- 4.5.4 Much of the land associated with the proposed route corridor is predominantly under agricultural use, comprising improved pasture. Some fields are bisected by narrow streams. Damper marginal vegetation is found beside some of the streams and in small depressions. There are some disturbed areas of ruderal vegetation locally. Whilst some fields are enclosed by hedges, many are defined by wire fences along which scattered shrubs and occasional standard trees remain. Scattered shrubs are also found along some of the stream valleys with scrub and developing woodland in places.
- 4.5.5 Information derived from the previous assessments and a preliminary review of the data in light of the currently proposed scheme has established the following.
- There are no statutory designated sites within 1 km of the proposed scheme corridor;
  - There are six Sites of Biological Importance (SBI) associated with the proposed scheme corridor. These include Dobbinbrook Clough (Grade A); Wigwam Wood (Grade C); Mill Hill Farm Wood (Grade C); Poynton Park Lake (Grade B); Norbury Brook (Grade B); and Park Pitt Grasslands, Poynton (Grade C). Mill Hill Farm Wood is also classified as Ancient Woodland in the Ancient Woodland Inventory (AWI). Further sites of interest comprise the statutorily protected Happy Valley Local Nature Reserve (LNR) and a Site of Nature Conservation Importance (SNCI) immediately north of the Airport;
  - There are populations of Great Crested Newt (GCN) active within the proposed scheme corridor and the surrounding area. The most notable populations identified during surveys in 2004 were identified at ponds associated with Styal Golf Course, and in the area north of Styal Woods at the western end of the corridor;
  - There is evidence of badger activity throughout much of the corridor;
  - There is a strong indication that bats utilise a variety of boundary and linear features located throughout the proposed scheme corridor for commuting and foraging. Surveys undertaken in 2004 were, however, hampered by poor weather and were limited to the extent that they established clear distributions and patterns of use;
  - No evidence of otter was found during the 2004 surveys;
  - Breeding bird surveys undertaken in 2003 and 2004 indicated that interest is limited to a number of common birds likely to utilise boundary habitats and woodlands for nesting activity. At the time of the survey the only BAP species recorded was lapwing;
  - Wintering bird surveys undertaken in 2004 only recorded fieldfare and redwing as true wintering species with other records being limited to resident passerines or small numbers of migratory common birds. There are no large suitable waterbodies or otherwise designated features of bird interest within 2 km of the site;

- No evidence of water vole was found during the previous surveys, though habitat suitable for the species was identified in the vicinity of Poynton;
- No evidence of White-Clawed Crayfish was found during previous ecological surveys. Signal crayfish were, however, reported. It is considered unlikely that re-colonisation of watercourses will have occurred in the interim period; particularly given the presence of the non-native signal crayfish; and
- The Phase 1 Habitat survey undertaken in 2004 recorded an absence of potential reptile habitat. It is considered unlikely that circumstances will have changed in the interim period.

4.5.6 The Biodiversity Action Plans (BAP) covering Greater Manchester, Cheshire and Stockport highlight the potential for the following BAP habitats and protected and notable species to be present within 1 km of the proposed route corridor.

Habitats	Protected and Notable Species
<ul style="list-style-type: none"> <li>• Broad-leaved, mixed and yew woodland;</li> <li>• Arable and horticulture;</li> <li>• Boundary and linear features;</li> <li>• Neutral grassland;</li> <li>• Swamps and reedbeds;</li> <li>• Managed greenspace;</li> <li>• Ponds and lodges;</li> <li>• Rivers and streams;</li> <li>• Species rich urban grassland;</li> <li>• Road verges;</li> <li>• Marsh/marshy grassland;</li> <li>• Transport corridors;</li> <li>• Urban;</li> <li>• Ponds; and</li> <li>• Roadside verges.</li> </ul>	<ul style="list-style-type: none"> <li>• Great crested newt and common toad;</li> <li>• Birds (including: skylark, bittern, twite, nightjar, reed bunting, corn bunting, tree sparrow, grey partridge, bullfinch, lapwing, linnet, barn owl and song thrush);</li> <li>• Mammals (including: badger, pipistrelle bat, water vole, brown hare and otter) and European hedgehog;</li> <li>• Vascular plants (specifically: floating water plantain and grass-wrack pondweed);</li> <li>• Fungi (specifically: hedgehog fungus, pink meadow cap and <i>Haploporus odorus</i>);</li> <li>• White-clawed crayfish; and</li> <li>• Shining ram's horn snail.</li> </ul>

### *Potential Impacts*

4.5.7 The introduction of the proposed scheme into the existing environment, with its established range of habitats and associated fauna, will result in the loss of areas of various habitat types and disrupt established ecological corridors used by fauna. Likely or potential impacts include:

- direct loss of wildlife habitats through the process of land take;
- killing, injuring and disturbance of protected species during construction;
- fragmentation of retained habitats and/or severance of wildlife corridors;
- wildlife fatalities caused as a direct result of severance of foraging routes, breeding sites or territories;
- disruption to local hydrology, with consequence impacts on associated habitats and fauna;

- contamination of watercourses and/or waterbodies associated with road related run-off with consequent impacts on habitats and fauna;
- disturbance to nocturnal animals such as bats where road lighting introduces a new light source; and/or
- loss or degradation of existing habitat types as a result of airborne pollutant deposition associated with traffic related emissions.

#### *Proposed Assessments and Methods of Assessment*

- 4.5.8 Taking into account: the presence and extent of habitats and fauna with a nature conservation interest within the proposed scheme corridor and surrounding area; the scale and form of the proposed scheme; and substantial nature of construction activities required to build the scheme, it is recognised that assessments related to impacts on habitats and fauna should form part of the assessments required to inform the ES.
- 4.5.9 It is proposed that the assessments should be undertaken in accordance with the methods outlined in the DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation, and the Guidelines for Ecological Impact Assessment in the United Kingdom published by the Institute of Ecology and Environmental Management (IEEM) (2006).
- 4.5.10 Establishment of the baseline environment for nature conservation will involve a review of the previous assessment relating to designated and non-designated sites, habitats and fauna and further consultation with Greater Manchester Ecology Unit (GMEU) and rECOrd – the Biodiversity Information Service for Cheshire, Halton, Warrington and Wirral.
- 4.5.11 A number of surveys will also be undertaken to verify and update baseline information related to habitats and fauna. The proposed surveys comprise:
- A review and updating of the previous Phase 1 habitat survey. In keeping with the previous survey, the review will be conducted in accordance with the Joint Nature Conservation Committee (JNCC) standard methodology for habitat survey. Should the updated survey identify areas of higher botanical value, consideration will be given to the need for more detailed investigation in localised areas. These surveys would be conducted in accordance with the principles of the National Vegetation Classification;
  - A review and updating of the previous hedgerows survey adopting the criteria detailed in the Hedgerow Regulations 1997;
  - A review of existing data and re-survey to establish current levels and distribution of badger activity. The survey will include habitats up to 250 m either side of the proposed route. Features up to 1 km will be investigated as necessary in order to determine the locations of setts;
  - Otter surveys along Norbury Brook and Lady Brook. Adjacent habitats will be surveyed up to 2 km up and downstream of the proposed crossing or interference point. Any bridges up to 5 km from the crossing points will be checked for signs of otter. The survey will be undertaken 4 times in one year to provide a robust assessment of otter activity. Any potential field signs of water vole will be observed during the otter surveys, with follow on surveys undertaken as necessary;
  - A review and validation of the previous bat roost potential survey. Validation will involve a daytime habitat assessment up to 250m from the proposed route and bat emergence, transect and activity surveys. The surveys will be undertaken in accordance with Bat Conservation Trust best practice guidelines (2007);
  - Habitat Suitability Index (HSI) surveys of all ponds within 250 m of the route. Surveys will be conducted in line with published guidelines (English Nature, 2001);

- Great crested newt surveys. It is intended to resurvey the 30 ponds within 250 m of the proposed scheme that were surveyed previously plus any additional ponds with HSI scores over 0.5. Surveys will be conducted in line with published guidelines (English Nature, 2001);
- HSI surveys for areas between 250 m and 500 m from the proposed route. The need for detailed surveys in this buffer will be subject the findings of the HSI surveys and consultation with Natural England. Three breeding bird surveys to validate previous survey information. Surveys will be undertaken between March and August in accordance with best practice;
- Two wintering bird surveys to validate previous survey information. Surveys will be completed by March in accordance with best practice; and
- An invertebrate habitat assessment, which will include an assessment of habitat suitability for Lesser Silver Water Beetle.

4.5.12 Subject to the findings of the above surveys, and following consultation with Natural England, consideration will be given to the need for surveys and assessments for the following species to be included as part of the assessments required to inform the ES.

- Great crested newt surveys of any ponds with HSI scores below 0.5 and/or beyond 250 m of the proposed route;
- Common toad survey;
- White-clawed crayfish survey;
- Water vole survey;
- Deer;
- Surveys for brown hare and European hedgehog; and
- Reptile survey.

4.5.13 Assessment of the significance of impacts on sites, habitats and species will be based on the guidance provided in the Guidelines for Ecological Impact Assessment. These define the ecological value of identified assets based on their geographic influence, which ranges in definition from sites of international importance down to those within the local and immediate zone of influence of the scheme. Those assets with a geographic value at the local level or above will be subject to detailed assessment, other than where receptors of lesser value are subject to some form of legal protection or can act in combination to lead to a cumulative impact. Criteria relating to confidence, magnitude, extent, duration, reversibility and timing will be considered in combination with value to define impact significance.

4.5.14 Based on the findings of the assessments mitigation measures relating to avoidance, reduction or compensation of impact will be identified prior to a re-evaluation of the residual impacts and their consequent effects. Typical mitigation measures will be likely to include, mammal underpasses and fencing, compensatory planting and habitat creation and adoption of working practices and programming to avoid or reduce disturbance.

## 4.6 Geology and Soils

4.6.1 The DMRB indicates that assessments for major roads schemes relative to geology and soils should consider impacts on notable geological features, geological changes to land form, impacts on soil and ground quality, and disturbance of contaminated land.

4.6.2 In relation to geological features, the focus is on direct impacts on designated and non-designated geological sites, such as Regionally Important Geological Sites (RIGS).

4.6.3 Potential geological and geomorphological impacts focus on impacts resulting from surcharging the ground or changing the hydrogeology of an area, i.e. altering groundwater flows and

preventing aquifer recharge. In terms of soil quality, the focus is on the deterioration and destruction of agricultural soils and the loss of viable agricultural land.

- 4.6.4 Where there is evidence of contaminated land, the focus is on the potential to encounter, disturb or remobilise contaminants and the subsequent impact on human health, flora and fauna, land quality and the aquatic environment.

### *Existing Environment*

- 4.6.5 Geological features and areas of potential contamination interest are shown on Figure 2D.

- 4.6.6 Information derived from the previous assessments and a preliminary review of the data in light of the currently proposed scheme has established that:

- there are no RIGS located within 1 km of the proposed scheme corridor;
- there are two 'Sites of Geological Interest' associated with Norbury Brook, where it passes close to Carwood Farm and Towers Farms, located to the west and east of the A523 London Road, respectively;
- much of the proposed scheme corridor is underlain by a major aquifer;
- soils consist of slowly permeable, seasonally wet, loams and clays;
- drift deposits consist of glacial till, with some minor lacustrine deposits and fluvio-glacial gravels at Lostock Hall Farm in the vicinity of Poynton Brook (varying between ~2.6 and 6 m depth), the associated leaching potential of which remains high-to-moderate allowing the free migration of any contaminants in to the underlying aquifer;
- the base geology comprises glacial and post-glacial Devensian Drift overlying Triassic sandstones;
- the groundwaters associated with the aquifer are of 'poor quality' as classified under the Water Framework Directive (WFD) and not used for any specific for any key sensitive uses requiring their protection;
- there are historic landfill sites at
  - *Woodhouse Park, near the airport;*
  - *land off Dairy House Lane, near the A555;*
  - *sites at Mill Bank Farm, Hill Green Farm, Ashmere Farm and Upper Swineseye Farm to the east of Bramhall; and*
  - *sites at Rabbit Burro Farm, Park Pitt, Norbury Hollow Road, Pool House Farm, Middlewood and Threaphurst Farm, near the A6.*
- there is an active landfill sites near the A555 and Norbury House Farm, which is licensed to receive 'non-biodegradable wastes excluding construction derived waste'; and
- the Thor Specialties site at Commercial Avenue, Cheadle Hulme is registered by the EA as a 'chemically polluting industry'.

- 4.6.7 Other areas of potentially contaminated land include the railway lines and roads in the area, the Oil Storage Depot near Woodford, several petrol stations located close to the main preferred corridor and potential historic contaminated land uses associated with Manchester Airport.

### *Potential Impacts*

- 4.6.8 The construction of the proposed scheme could establish potential pathways whereby contaminants / pollutants associated with contaminated land could have an impact on sensitive receptors such as human beings, watercourses, aquifers, terrestrial habitats. The geology of the area demonstrates that there is a clear mechanism (termed a source-pathway-receptor linkage)

allowing the local groundwater environment and soils to be impacted by the proposed development.

- 4.6.9 There would be potential impacts on two Sites of Geological Interest by virtue of the proximity of the proposed scheme to Norbury Brook.
- 4.6.10 The introduction of cuttings and embankments and large structures as part of the permanent works could potentially result in localised impacts on groundwater profiles.

#### *Proposed Assessments and Methods of Assessment*

- 4.6.11 Given the potential disturbance of existing contaminated land, the relationship of the proposed scheme to Sites of Geological Interest, and the requirement for construction that could potentially establish pathways between pollutants associated with construction and groundwaters it is intended that impacts on geology and soils should form part of the assessments required to inform the ES.
- 4.6.12 The assessment will follow the guidance presented in DMRB Volume 11 Section 3 Part 11 Geology and Soils, as supplemented by: the assessment procedures contained within BS10175, the Investigation of Potentially Contaminated Sites; guidance on the assessment of soil and geology issued by the Department of the Environment (DoE, 1993); and the requirements to consider the implications of the proposed development in terms of pollution and contamination risk as per Annex II of Planning Policy Statement 23: Planning and Pollution Control.
- 4.6.13 A geo-environmental risk assessment will be initially undertaken which will focus on those resources/receptors identified above plus any additional sites and constraints identified through further desk study and consultation. Data will be obtained from public sources detailing potentially contaminated land sources, the appropriate geological memoirs, soil survey and geological maps, and groundwater vulnerability mapping.
- 4.6.14 This will allow the development of an updated site conceptual model to clarify potential source-pathway-receptor linkages and assist with the assessment of potential impacts on groundwaters discussed in Section 4.11.
- 4.6.15 The planned geotechnical works required to support the development of the scheme's detailed design would be additionally used to collect any required site-specific intrusive information on local ground conditions should it be determined from the initial risk assessment that this is required.
- 4.6.16 Specific consultation with the EA, EHOs and the local RIGS group will be undertaken to identify additional contamination sources and any potential implications at Norbury Brook.
- 4.6.17 In terms of geological and geomorphological resources the assessment of significance will involve an evaluation of the sensitivity of asset and the magnitude of change predicted to result from the introduction of the proposed scheme. Significance will be defined on a seven point scale ranging between substantial, moderate, or slight adverse or beneficial or no change where there is no discernable deterioration or improvement.
- 4.6.18 In terms of contaminated land the derived information will be used to inform a qualitative risk assessment using the source-pathway-receptor protocol introduced under Part IIA of the Environmental Protection Act (1990).

## **4.7 Materials**

- 4.7.1 The DMRB provides guidance relating to potential impacts on mineral assets and the requirement to source material for the works, such as structural fill, and disposal of waste arisings.
- 4.7.2 There are no previous mineral working, areas of peat, or evidence of existing or historic mining within the confines of, or immediately adjacent to, the proposed route corridor. However, there is



a surface mining coal resource and a brick-clay mineral resource located within the study area at the A6 junction near Hazel Grove. Effects on the loss, operational viability or access restriction to these resources will be considered as part of the community and private asset assessment.

- 4.7.3 The cut, fill and materials requirements for the scheme have not been established; however there is a likely requirement both to source materials required for the works (such as structural fill), as well as disposing of certain cut materials (spoil) and other wastes. An assessment will be undertaken to: determine material arisings and requirements; sourcing and disposal locations.

## 4.8 Noise and Vibration

- 4.8.1 The DMRB provides guidance in relation to noise and vibration for major road schemes during construction and future operation of such schemes.
- 4.8.2 In relation to operation, the guidance considers impacts associated with increases in traffic-related noise and vibration associated with the use of a new road and adverse and beneficial impacts that can occur as a result of existing and future traffic potentially adopting new patterns of movement with the proposed road in place.
- 4.8.3 In relation to construction, the guidance considers how construction-related plant and traffic can have a temporary impact on noise levels for receptors close to working areas and along haulage routes and roads within the network used to import or remove materials/waste from the site. It also considers how particular operations, such as piling could result in temporary impacts related to vibration.

### *Existing Environment*

- 4.8.4 Data relating to projected 2010 background noise levels (measured as LA<sub>10 18 hours</sub>) taken from the previous assessment for the previous proposals for the relief road show road traffic to be the dominant continuous noise source in the local environment, with additional intermittent (yet frequent) influences from Manchester Airport and the Styal, Hazel Grove to Buxton, and West Coast Main Line railway lines. With the exception of the airport, background ambient noise levels away from the major road network within the local environment are less than 55 dB(A) within urban areas falling to 35-40 dB(A) in the areas of open countryside through which the proposed scheme would be routed.
- 4.8.5 Around the airport, peak levels reach in excess of 70 dB(A), this has resulted in the implementation of specific local planning control policies to prevent the introduction of other significant noise sources within the local environment as well as limiting the noise generated by the airport itself.
- 4.8.6 Along and immediately adjacent to, the main arterial network of A-Roads, noise levels range between 65-75 dB(A). Around the principal junctions and motorways these levels increase to 80 dB(A) and higher.
- 4.8.7 Primary sources of vibration in the area relate to road and rail traffic as well as potential effects close to, and immediately under, the Manchester Airport flight path.
- 4.8.8 As a result, there are currently a number of receptors that are already adversely impacted by the various existing noise and vibration sources within the local environment, most notably, residential properties in Heald Green and Benchill close to the Airport and properties close to the A34, A5149, A5102, A523, the B5166 and A6.

### *Potential Impacts*

- 4.8.9 The introduction of the proposed scheme will result in a change in the volumes and distribution of traffic on the existing local road network. It will introduce a new source of traffic-related noise and potential vibration for a number of receptors where new sections of the proposed dual carriageway are located in the vicinity of properties or public areas not currently located close to roads carrying relatively large numbers of vehicles.

- 4.8.10 Locations that would be potentially adversely affected are at Handforth, south Bramhall, Moss Nook, Stanley Green, Styal and south Hazel Grove. It is also likely to affect ambient noise levels at the Styal, Bramhall and Hazel Grove golf clubs, as well as having an impact on the recreational enjoyment of several of the rights of way and amenity areas locally, including the Ladybrook Valley Interest Trail.
- 4.8.11 There is also potential for construction phase impacts associated with the use of various plant and heavy machinery as well as the associated HGV movements required to import and export materials to site along established haul routes. The potential need for piling close to the embankment areas and grade-separated junctions will introduce a temporary noise and vibration source.

#### *Proposed Assessments and Methods of Assessment*

- 4.8.12 The review of information relating to the existing noise environment taken from previous studies and potential extent of redistribution of traffic as a noise and potential vibration source within the study area indicate that an assessment of impacts associated with traffic related noise and vibration should be undertaken to inform the ES for the proposed scheme.
- 4.8.13 It also evident that there will be the likelihood of temporary noise and possible vibration disturbance associated with construction activity. It is therefore intended that an assessment of construction related noise and vibration should be undertaken with a view to identifying appropriate mitigation measures to ensure such disturbance is appropriately and practicably minimised.
- 4.8.14 Both operational and construction related assessments will be undertaken in accordance with the guidance provided in DMRB Volume 11, Section 3, Part 7 Noise and Vibration (HA213/08). Reference will also be made to guidance within BS5228 Code of practice for noise and vibration control on construction and open sites (2009), the Control of Pollution Act (1974) and the Environmental Noise Directive (2002). Noise calculations will be undertaken following the procedures detailed in the Calculation for Road Traffic Noise (CRTN) (1988).
- 4.8.15 The assessment of operational impacts will involve an initial screening, as recommended in the DMRB. Sensitive receptors within 2 km of the proposed scheme boundary will initially be identified. The study area will then be defined by reviewing the traffic data to establish sections of existing and new road (affected roads) within the 2 km buffer where it is predicted flows would increase by 25% or decrease by 20% as a result of the introduction of the proposed scheme.
- 4.8.16 Once defined, the study area will be subject to detailed assessment in terms of potential operational noise impacts, focussing on sensitive receptors within 600 m of affected roads. This will use noise modelling software and follow the procedures detailed in CRTN.
- 4.8.17 A review of DEFRA's Noise Mapping, compiled to inform the production of noise action plans and to meet the requirements of the Environmental Noise (England) Regulations 2006, will also be undertaken to review any potential implications on local authority designated 'Quiet Areas'.
- 4.8.18 With regards to operational vibration, a simple level of assessment will be initially undertaken to establish the number of sensitive receptors within 40 m of the new sections of road.
- 4.8.19 Both assessments will involve comparison of the predicted emissions between the Do-Minimum scenario (the situation prior to construction of the road) and the Do-Something scenario (the situation assuming the proposed scheme is in place and in use). It is intended the comparison will be based on Opening Year (2015) and Design Year (assumed to be 2030) traffic data.
- 4.8.20 The effects of noise and vibration from construction activities will be assessed through identifying the locations of key noise and vibration construction activities, such as around the major earthworks areas, junctions and embankments. Data provided in the Parts 1 and 2 of BS:5228 representing typical noise and vibration values for construction plant (i.e. generators, piling equipment and heavy machinery) will be used. The assessment will identify any sensitive receptors that would require further consideration by the future contractor ahead of construction

so that agreement can be reached with the local Environmental Health Officer (EHO) on permissible construction noise and vibration operating limits.

- 4.8.21 An assessment of the noise levels associated with implemented traffic management procedures and planned HGV movements along haul routes during the 36-month construction phase will be undertaken. Where traffic data are available for the construction period a quantitative approach will be applied, otherwise a qualitative assessment will be undertaken with the assumptions being clearly stated.
- 4.8.22 Significance will be determined using the criteria detailed within the DMRB, relating to instances where noise levels change by more than 5 dB(A) at any dwelling or sensitive receptors, or noise levels exceed 68 dB(A) at the façade of any building under the do something scenario in the design year. Based on the findings of the assessment, appropriate mitigation measures will be identified and calculations will be repeated to determine the effectiveness of the proposed measures, the resultant noise levels and the residual impacts and their effects.

## 4.9 Effects on All Travellers

- 4.9.1 The DMRB recognises that, by virtue of their linear nature, there is a marked likelihood that rights of way and established means of access between communities and facilities can be subject to impact in the form of severance and loss of amenity, thus affecting the people that use and rely on them; local residents, ramblers, equestrians and cyclists.
- 4.9.2 Guidance is accordingly provided for evaluating and assessing impacts on, journey length and times, amenity value, and increases or reductions in community severance for users of rights of way and local roads.
- 4.9.3 The guidance also takes in to account the potential benefits that the introduction of new roads, designed to modern standards can have in relation to the relief of driver stress. This is particularly the case where the new road offers an alternative to older existing roads with design characteristics and access arrangements that have evolved over time as they have adapted to changing forms and volumes of travel demand. A further consideration relates to an evaluation of the view from the road as part of the driver experience.

### *Existing Environment*

- 4.9.4 The location of principal community facilities and rights of way is shown in Figure 2A. The figure demonstrates that there is an extensive network of footpaths, public rights of way, cycleways, bridleways and other public accesses that serve the communities and visitors to the area. These include:
- three footpaths in Wilmslow and four in Poynton-with-Worth (Cheshire East District);
  - three recreational routes to the west around the airport; one road-associated footpath along the Ringway Road West, which runs alongside and transects the proposed route in the vicinity of the airport; the Sustrans Regional Cycle Route 85, in the vicinity of the airport; Greater Manchester Cycle Routes and Manchester Airport Orbital Cycleway; local cycle routes near the airport on the A34 to the north of the junction with the A555 (Manchester District); and
  - four footpaths (including the Ladybrook Valley Interest Trail, a long distance footpath and recreational route which runs along Norbury Brook); National Cycle Route 55, which crosses the A6 near Hazel Grove; three road-associated paths; two recreational routes which transect the proposed alignment; and a local cycle route near Hazel Grove (Stockport district).
- 4.9.5 In addition, there is a well-established network of local roads that provide for access between communities located to the north and south of the corridor and to a range of associated facilities and institutions such as: the golf courses; the various community recreational areas, sports fields, schools, churches and retail centres within the corridor; and the stations at Heald Green, Poynton and Hazel Grove.

### *Potential Impacts*

- 4.9.6 Construction of the proposed scheme will involve temporary disruption for users of local roads and other rights of way where these cross the proposed relief road alignment, disruption that could be potentially significant in some instances. The proposed scheme will also involve a number of crossings of railway lines where detailed provision for introduction of the crossing structures will need to be appropriately planned and co-ordinated with the relevant network management organisations.
- 4.9.7 Once completed and opened, the proposed scheme will include measures for future continued access which in some instances could involve rationalisation of current provision and movements.

### *Proposed Assessments and Methods of Assessment*

- 4.9.8 The review of previous studies, of information relating to local roads and other rights of way associated with the proposed scheme corridor, and of the scale and form of the currently proposed scheme, indicates that an assessment of impacts on established use of these established facilities should form part of the assessments undertaken to inform the ES for the proposed scheme.
- 4.9.9 The assessment will be undertaken in accordance with the guidance contained in DMRB Volume 11, with particular reference to the guidance in Section 3 Part 8 which addresses Pedestrians, Cyclists and Equestrians, and Part 9, Vehicle Travellers.
- 4.9.10 Previous assessments specific to each of the rights of way affected by the relief road relating to levels of use will be reviewed and selective validation surveys will be undertaken to determine their status and current use. The aspects considered will be potential changes in journey length and travel pattern, changes in amenity (including the views experienced by road users), and the severance/diversion of existing NMU routes.
- 4.9.11 The findings of the assessment will be used to inform the detailed proposals for the provision of crossings and or diversions of established routes prior to finalisation of the assessment of the residual impacts and their effects.
- 4.9.12 An assessment will also be undertaken in relation to driver stress and view from the road. This will be undertaken in accordance with DMRB Volume 11 Section 3, Part 9 Vehicle Travellers.
- 4.9.13 For existing road users the significance of driver stress will be based on average peak traffic hourly flows compared to the average journey speed for the specific road type being assessed (i.e. dual carriageway/single carriageway).
- 4.9.14 In terms of journey length increased or decreased journey times will be calculated where traffic flows increase or decrease by 30%. Severance will be defined as being slight, moderate or severe based the number of provided crossings, the AADT for the associated road in the opening year, and any increase in journey length.

## **4.10 Community and Private Assets**

- 4.10.1 The DMRB recognises that the form and scale of major road schemes will generally have potentially significant impact on the pattern of land use and individual land use entities within the area through which they are routed. In relation to land use, the guidance recommends that consideration should be given to four specific areas of interest:
- demolition of private property and associated land-take;
  - loss of land used by the community;
  - effects on development land; and
  - effects on agricultural land.

### *Existing Environment*

- 4.10.2 The location and extent of existing land use within the proposed scheme corridor is shown in Figure 2D.
- 4.10.3 Land use within the proposed scheme corridor comprises a mix of arable and pastoral agricultural land (much of which is classified as being best and most versatile), sports and recreational land, public open space, residential land and institutional, industrial and commercial land. Manchester Airport is located at the western end of the corridor.
- 4.10.4 Important community and private assets include: the Primrose Cottage nursery and garden centre off Ringway Road, the Brookside Garden centre off the A523, four golf courses (Styal Golf Club, Hazel Grove, Bramhall Golf Club and Moorend Golf Club), Ponyton Lake, Woodhouse Park and the Ladybrook Valley Interest Trail.
- 4.10.5 Key landowners within the footprint of the preferred corridor and wider area include Manchester Airport, the Highways Agency, Network Rail, the Local Authorities and a number of private agricultural holdings.

### *Potential Impacts*

- 4.10.6 Although the proposed scheme is being designed to minimise property loss, certain dwellings and buildings may be affected by the proposals, the most significant being those to the south of Hazel Grove (along Darley Road, Mill Lane, Old Mill Lane, and Macclesfield Road), properties along Carsdale Road, Wythenshawe, the properties near Hill Mill Hollow to the north of Poynton and the commercial and residential properties immediately west and east of the A555's termination with the B5358 and Woodford Road.
- 4.10.7 Construction of the proposed scheme will involve the taking of agricultural land and land associated with recreational and residential use. It may also involve the loss of some areas of industrial and commercial land.
- 4.10.8 The road will sever and fragment a number of agricultural holdings with potential implications for future operation. In addition to these permanent impacts there will be likely to be temporary impacts on existing uses related to disruption to access.
- 4.10.9 In some instances, such as recreational areas and public open space, the location of the proposed scheme may result in impacts on the amenity value of the areas.
- 4.10.10 The protection of the route corridor within Local Planning Spatial Policy has ensured however that there are no current or future land-use planning conflicts; the exception being the current 9-hole golf course at Moorend, which was granted a conditional approval until such time that the relief road was developed and the golf course at Hazel Grove which has been adapted to accommodate the road proposals.

### *Proposed Assessments and Methods of Assessment*

- 4.10.11 The review of the previous studies, of information relating to existing land use and of the relationship between the currently proposed scheme to land use and established community facilities indicate that an assessment of impacts on community and land use assets should form part of the assessments undertaken to inform the ES for the proposed scheme.
- 4.10.12 The assessment will be undertaken in accordance with the guidance contained in DMRB Volume 11, Section 3, Part 6, Land Use, and Part 8 in relation to Community Facilities.
- 4.10.13 The existing data relative to land use and the location of community facilities within the area collected during the assessment of the previous relief road proposals will be reviewed and verified. Where appropriate, the area of search will also be extended to include sections of the corridor where the current proposal deviates from the originally proposed alignment. Current development framework documentation and saved development plan documents will also be

reviewed and the planning registers for the three authorities within which the proposed scheme is located will be reviewed.

## **4.11 Road Drainage and the Water Environment**

- 4.11.1 The DMRB identifies four specific areas of interest under the overarching aspect of road drainage and the water environment; effects of routine runoff on surface waters, effects of routine runoff on groundwater, pollution impacts from spillages and flood impacts.

### *Existing Environment*

- 4.11.2 The principal watercourses and water bodies and location of areas of flood risk are shown in Figure 2E. The principal watercourses comprise Norbury Brook, Poynton Brook and Lady Brook at the eastern end of the corridor, the River Dean in the central part of the corridor and Spath Brook, Gately Brook and Baguley Brook at the western end of the corridor. The biological quality of the watercourses ranges from good to poor.
- 4.11.3 In addition to the principal watercourses there is a network of unclassified watercourses field drains, ditches and dykes located throughout the corridor.
- 4.11.4 There are two large water bodies; Poynton Lake in Poynton Park and a reservoir near Woodford and a series of smaller ponds set in clusters to the north of Styal village, associated with the golf course at Styal, to the immediate south east of the A555/A34 junction near the River Dean and near Poynton Brook.
- 4.11.5 There are two areas of notable flood plain and flood risk. The first is associated with the confluence of Norbury Brook, Poynton Brook and Lady Brook and the second, the area surrounding the River Dean in the vicinity of the A34.
- 4.11.6 In relation to groundwater, most of the corridor is underlain by a major aquifer of low vulnerability.
- 4.11.7 There are no source abstractions that are protected within the local environment; however there is the potential for other abstractions to occur from the surface and groundwaters.

### *Potential Impacts*

- 4.11.8 Construction of the proposed scheme will involve disturbance of soils and overburden, operation of construction plant and use of potentially polluting materials in close proximity to watercourses within the proposed scheme corridor.
- 4.11.9 The completed scheme will involve the introduction of structures to cater for crossings of a number of watercourses and require the diversion of approximately 100 m of the Norbury Brook. Construction of these components will involve temporary diversions and the building of structures close to or along watercourses.
- 4.11.10 The introduction of a drainage scheme to cater for road related runoff will potentially introduce volumes of water, rates of flow and traffic related pollutants to existing watercourses with potential consequent impacts on the dynamics and water quality within the watercourses.
- 4.11.11 The alignment of the proposed scheme will involve encroachment into the area of flood risk at the confluence of the Norbury Brook, Poynton Brook and Lady Brook.
- 4.11.12 The introduction of traffic along a new route and with new discharge points to existing watercourses will introduce a new risk associated with accidental spillage of hazardous material being carried by vehicles using the road.

### *Proposed Assessments and Methods of Assessment*

- 4.11.13 The review of previous studies, of information relating to surface waters, groundwater and flood risk associated with the proposed scheme corridor, and of the scale and form of the currently

proposed scheme, indicate that an assessment of impacts on all four aspects should be undertaken to inform the ES for the proposed scheme.

- 4.11.14 The assessments will be undertaken in accordance with the guidance contained in DMRB Volume 11, Section 3 Part 10 Road Drainage and the Water Environment (HD45/09).
- 4.11.15 In relation to assessment of pollution impacts from routine runoff to surface waters, a simple level of assessment using the Method A as detailed in Annex I of HD45/09 will initially be undertaken to determine the likely nature and magnitude of impact and establish if there are locations where detailed assessment may be required. The assessment findings will be reported on Highways Agency Drainage Data Management System (HADDMS).
- 4.11.16 The assessment of the road drainage outfalls (i.e. routine runoff) will be carried out using the Highways Agency Risk Assessment Tool (HAWRAT). The findings of the assessment will be used to define with the design engineers the necessary drainage specifications and mitigation requirements, as well as additionally considering the need for attenuated storage (balancing features).
- 4.11.17 The assessment of pollution impacts from routine runoff on groundwaters will be undertaken in accordance with Method C as detailed in Annex I of HD45/09.
- 4.11.18 The assessment of impacts relating to flood risk will be undertaken in accordance with Method E as detailed in Annex I of HD45/09. It is anticipated this will be limited to the area of recorded flood risk located at the confluence of the Norbury Brook, Poynton Brook and Lady Brook.
- 4.11.19 The assessment of pollution impacts from spillages will be undertaken in accordance with Method D as detailed in Annex I of HD45/09.
- 4.11.20 In terms of water and road drainage resources the assessment of significance will involve an evaluation of the importance of the water attribute and the magnitude of change predicted to result from the introduction of the proposed scheme. Significance will be defined and reported in accordance with the guidance provided in Annex IV of HD45/09.

## **4.12 Cumulative Impacts**

- 4.12.1 In addition to the key environmental aspects addressed in Volume 11 of the DMRB consideration will be given to the potential for cumulative impacts. This will consider:
  - such impacts relative to specific receptors associated with the proposed scheme; and
  - those where the effects of impacts associated with the proposed scheme combined with those predicted for other committed development could be potentially significant.
- 4.12.2 It will consider those development commitments included within the traffic model used to inform the noise, air, water and effects on all travellers assessments.

## **4.13 Health Impacts**

- 4.13.1 As part of the wider assessment of the scheme's development implications a specific health impact assessment (HIA) will be undertaken to support the planning application. The HIA will be heavily informed by the scope, assessment and findings of the EIA.
- 4.13.2 The purpose of the HIA will be to consider impacts on public health in the local and wider community. The assessment will be based on information published by the Regional Health Observatory, other published public health information for the area (e.g. reports of the Director of Public Health, Primary Health Care Trusts etc.) and information from the Office of National Statistics.

### *Public Health*

- 4.13.3 The health component will focus on changes in local air quality and the noise environment.
- 4.13.4 Information from the air quality assessment on negative and beneficial changes in exposure risk to the key traffic related pollutants (NO<sub>2</sub> and PM<sub>10</sub>) will be used to determine impacts on life expectancy and rates of hospital admissions. This will be calculated using concentration-response relationships developed by the UK Interdepartmental Group on Cost Benefit (IGCB). Other assessed impacts will include symptom-days in people with asthma and GP consultations for respiratory conditions. These will be assessed using concentration-response information used in European Commission sponsored studies.
- 4.13.5 The public health impacts relating to noise exposure will be assessed where the assessments supporting the ES have proven exposure-response relationships, such as an exceedence of the human health based noise criteria, the occurrence of potential nuisance, or the qualification of certain properties for noise insulation. The health impact assessment will focus on threshold noise levels that give rise to adverse impacts (e.g. impacts on children's welfare, sleep deprivation) and for these, an assessment will be made of the likely numbers of people affected.

### *Community*

- 4.13.6 The assessment of impacts relating to opportunities to exercise, community structure, access to services/jobs, economic growth and other effects of the proposed scheme will develop issues identified during consultations undertaken on the previous iteration of the scheme proposals. Effects will be identified in relation to the potential magnitude of impact on individual's lives and the proportion of individuals in the population affected. It will also take account of relevant published studies of the impacts of new road schemes on community health.



## 5 Proposed Environmental Statement Structure

5.1.1 The intended format for the Environmental Statement is as follows:

1. **Introduction**
  - 1.1. Background
  - 1.2. The Statutory Context
2. **Need for the Scheme**
3. **Project Alternatives**
4. **The Existing Environment**
5. **Description of the Proposed Scheme**
  - 5.1. Key Components
  - 5.2. Site Access and Traffic Movements
  - 5.3. Design Components
  - 5.4. The Construction Phase
6. **Scoping and Introduction to Environmental Assessments**
  - 6.1. Scope of the Environmental Impact Assessment
  - 6.2. Format to the Assessment Chapters
7. **Air Quality**
8. **Cultural Heritage**
9. **Landscape Effects and Visual Context**
10. **Ecology and Nature Conservation**
11. **Geology and Soils**
12. **Materials**
13. **Noise and Vibration**
14. **Effects on All Travellers**
15. **Community and Private Assets**
16. **Road Drainage and the Water Environment**
17. **Environmental Impact Tables, Cumulative Impacts and Schedule of Environmental Commitments**

Addendum A

1. Health Impact Assessment
2. Outline Construction Environmental Management Plan
3. Outline Site Waste Management Plan

## Appendix 1: Initial Consultation Responses

## Figures