

**A43 MOULTON BYPASS  
ENVIRONMENTAL IMPACT  
ASSESSMENT SCOPING REPORT**

*Northamptonshire County Council*

*Final*



# **A43 Moulton Bypass**

## **Environmental Impact Assessment Scoping Report**

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## **1 INTRODUCTION**

### **1.1 Introduction to the Proposed Scheme**

1.1.1 This Scoping Report has been prepared by Parsons Brinckerhoff, on behalf of Northamptonshire County Council (NCC), in respect of a proposed new bypass near Moulton, Northamptonshire.

1.1.2 The new dual carriageway will be 2.5km in length and forms part of the A43 Kettering to Northampton congestion improvement scheme. The road will also serve a new housing development to the east of the existing A43.

1.1.3 Barratt Homes have submitted an outline planning application (LPA Ref: DA/2013/0850) for the residential development (2000 houses), including the new road, but the decision on the planning application has been delayed until the West Northamptonshire Joint Core Strategy is adopted. An Environmental Impact Assessment has been submitted with the application.

1.1.4 This Scoping Report only relates to the new bypass.

### **1.2 The Designer**

1.2.1 Parsons Brinckerhoff will provide the principal design for the road in consultation with NCC.

### **1.3 Legislation, Guidance and Process**

1.3.1 Environmental Impact Assessment (EIA) is governed by the requirements of the EIA Directive (2011/92/EU). This legislation sets out the criteria which define when EIA is required and what should be assessed.

1.3.2 The results of the EIA will be reported in an Environmental Statement (ES), to be submitted in support of a planning application.

### **1.4 Screening**

1.4.1 A screening exercise in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment HD47/08<sup>1</sup> has been undertaken. This screening is to identify whether the project falls within Annex I or II of the EIA Directive and establishes (with reference to Annex III) whether the project should be the subject of a statutory EIA.

1.4.2 Projects for which EIA may be required are listed in the EIA Directive (Annex I or II projects); Annex I projects always require an EIA, whilst Annex II projects only require an EIA if it is determined that significant effects are likely to arise.

*Key Considerations in determining the need for an EIA*

1.4.3 A scheme falls within Annex I where it involves “Construction of motorways and express roads. Construction of a new road of four or more lanes, or realignment and /or widening of an existing road of two or more lanes, where such new road, or realigned and/ or widened section of road would be 10 km or more in a continuous length.”

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<sup>1</sup> Screening of Projects for EIA

1.4.4 A scheme falls within Annex II where “a project for constructing or improving a highway where the area of the completed works together with any area occupied during the period of construction or improvement by requisite apparatus, equipment, machinery, materials, plant, spoil heaps or other such facilities exceeds 1 hectare or where any such area is situated in whole or in part in a sensitive area.”

1.4.5 The proposed scheme falls within Annex II as the proposed road will exceed 1 hectare in size.

## **1.5 Screening for Appropriate Assessment**

1.5.1 A preliminary screening exercise has been undertaken to determine whether there is a likely requirement for an Appropriate Assessment to be undertaken in order to identify whether the proposed scheme is likely to have any significant effect on a Ramsar or Natura 2000 site. There are no internationally designated sites within 2km of the scheme and therefore it has been determined that Appropriate Assessment is not required.

## **1.6 Scoping**

1.6.1 Scoping is a precursor to EIA to facilitate the process that will lead to the preparation of a comprehensive EIA as reported in an ES. The ES will record all significant beneficial and adverse, direct, indirect and cumulative environmental effects of the preferred option for the proposed scheme including effective and sustainable mitigation measures and identification of residual effects.

1.6.2 Objectives of this Scoping Report are to:

- Review existing data, identify sensitive resources and receptors, and scope the work required for an EIA; and
- Determine the appropriate level of effort that should be applied to the various environmental topics, namely whether a Simple or Detailed assessment as defined in DMRB Vol. 11, Part 4, HA204/08 is required.

1.6.3 The Scoping Report allows the ‘scoping out’ of environmental topics where little or no change to the existing situation will occur, thus leading to the preparation of a concise ES.

## **1.7 Scoping Report Structure**

1.7.1 Section 2 of the Scoping Report describes the proposed scheme. Section 3 describes how the proposed scheme options will be considered. Section 4 describes the information consultation undertaken on the scope of the EIA prior to the submission of the Scoping Report. Sections 5 to 15 identify key issues (including Cumulative Effects) relating to each of the environmental assessment topics; summarise work undertaken to date; and present the proposed methodologies for the assessment of potential effects in the EIA.

## **2 PROJECT**

### **2.1 Background to the Project**

2.1.1 NCC recognises that the existing A43 between Kettering and Northampton is an exceptionally busy route between the County's two largest towns and requires improvement. As a result, the Council has been exploring options to reduce congestion and travel time.

2.1.2 About 20,000 vehicles use the A43 each day and significant traffic congestion occurs along the route during the morning peak hour period for traffic heading south towards Northampton.

2.1.3 A report presented to the Council explained that the improvements would be delivered in stages:

- Phase 1a – Improvements to Round Spinney roundabout (2014/2015).
- Phase 1b – Dual carriageway linking Round Spinney and Moulton roundabouts (late 2015).
- Phase 2 – Extending the dual carriageway for a further 2.6km from Moulton roundabout to the Holcot/Sywell roundabout (timeframe to be confirmed).
- Further Phases – Further extension of the dual carriageway from the Holcot/Sywell roundabout to the A14 (timeframe to be confirmed).

2.1.4 The new bypass will also serve as access for a new residential development proposed by Barratt Developments. This is currently the subject of a planning application. The development will consist of residential housing, public open space and a new primary school.

### **2.2 A43 Bypass**

2.2.1 The new dual carriageway will be 2.5km in length and forms part of the A43 Kettering to Northampton congestion improvement scheme. The accompanying alignment plan (Figure 1) shows the proposed route of the new bypass.

2.2.2 Pedestrian / Cycleways are also proposed which will run in a parallel alignment to the road, but be a safe distance from the carriageway.

2.2.3 As shown in figure 1, the new bypass will start at a new roundabout replacing the existing Overstones Roundabout, moving south-west behind the existing properties on the A43, and finish at the Spinney Roundabout linking up with the existing A43.

2.2.4 The proposed scheme sits within Daventry District Council (DDC) and Northampton Borough Council (NBC). Being a highways scheme NCC will be the determining authority.

### **2.3 Project Programme**

2.3.1 A formal Planning submission will be made towards the end of 2014 with the intention of starting on-site mid-2015.

### **3 ALTERNATIVES CONSIDERED**

#### **3.1 Options Considered**

3.1.1 MGWSP has been commissioned by NCC to undertake a study of the A43 Northampton to Kettering and to assess different options which have been derived through consultation with stakeholders, in order to come up with an option or a package of small options to implement to improve the study area.

3.1.2 An option appraisal criteria form was created using Department for Transport's (DfT) 'Delivering a Sustainable Transport System' Report and criteria that was derived from the stakeholder meetings.

3.1.3 The appraisal matrix was based on the following 11 criterion;

- Accessibility – Improve access from villages to key services;
- Congestion – Improve journey times;
- Connectivity – Improve links between Northampton, Kettering and Corby;
- Economy – Improve access to Moulton Park and Sywell Aerodrome;
- Environmental – impacts on local biodiversity, archaeology, noise, air quality and water resources;
- Growth – Support housing and employment growth;
- Maintenance – Reduce maintenance costs;
- Modal-Shift – Encouraging increase in sustainable transport;
- Rat-Running – Discourage heavy traffic from using villages;
- Safety – Reduce number and severity of accidents; and
- Severance – Easier movement to/from villages either side of A43.

3.1.4 The 27 options from consultation with stakeholders were assessed against these criteria giving a final score for each option, where the higher the score, the better the scheme.

3.1.5 The 27 options are listed below:

1. Dualling the A43;
2. Round Spinney grade separated junction;
3. Close road from Hannington to A43;
4. Implement an overtaking ban;
5. Clearer signing and lining to improve traffic flow;
6. Divert Overstone crossroads traffic to Moulton roundabout;
7. Stop access to villages to prevent rat-runs;
8. Moulton traffic control - stop people using the route to Moulton village (except for access to Moulton College);
9. Implement Moulton Bypass;
10. Intermittent crawler lanes or passing places along the route could solve the issue of overtaking HGVs;
11. Improve cycle routes (facilities, safety and definition);
12. Direct bus from Northampton to Kettering like the X4 (careful assessment needs to be carried out as to where buses pick up and set down passengers);

13. Put in pavements to encourage walking; and improve walking facilities, especially in the Isham and Little Harrowden area, encouraging children to walk to school;
14. Have a bus service for Moulton College;
15. Free school transport needed to reduce school run traffic ;
16. Implement a commuter bus service from 07:00 – 10:00 and then from 16:00 – 19:00;
17. Bus priority along the A43;
18. Put in average speed cameras along the route so traffic flows at the same speed (like Bedford Road);
19. Implement a lower speed limit on the A43 (to equalise traffic speeds and improve traffic flows);
20. Variable speed limits should be put in;
21. Use coloured tarmacing and hatching as a road surface at junctions and lay-bys to make it safer;
22. Traffic lights should be put in at side roads along the route;
23. Adding extra lanes to Round Spinney roundabout to increase capacity
24. Remove traffic lights from Round Spinney roundabout;
25. Dual Great Billing Way A5076 and Billing Lane to improve links from the A43 to the A45 before Round Spinney roundabout;
26. Implement a park and ride service into Northampton;
27. Implement Bus Rapid Transit (BRT).

### **3.2 Preferred Option**

3.2.1 Based on scoring alone the top three best schemes were:

- Option 11 – Improve Cycle Route on A43;
- Option 13 – Improve walking facilities in villages surrounding the A43; and
- Option 9 – Moulton Bypass.

3.2.2 Further information on the preferred option and the criteria used to make this conclusion will be included in the Environmental Statement along with the different options for the bypass alignment.

**4 CONSULTATION****4.1 Informal Consultation**

4.1.1 Consultation has been carried out with the Planning Department within NCC to identify what a planning application for the A43 Moulton Bypass should include.

**4.2 Proposed EIA Consultation**

4.2.1 The Scoping Report will be submitted to NCC to request a Scoping Opinion. Statutory consultees and other stakeholders will be consulted throughout the EIA process. These will include:

- Environment Agency
- English Heritage
- Natural England
- Daventry District Council
- Northampton Borough Council

4.2.2 A public exhibition will be held to inform the local public of the proposed scheme and give them chance to comment.

## **5 AIR QUALITY**

### **5.1 Introduction**

- 5.1.1 The assessment of air quality and climate will follow the guidance set out in
- Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1 (HA 207/07).
  - Local Air Quality Management Technical Guidance Note TG(09) and subsequent advice notes.

### **5.2 Study Area**

5.2.1 The study area for the air quality assessment will comprise a corridor measured 200m either side of the centre of the proposed scheme, or series of buffer zones, along all roads potentially affected by changes in traffic associated with the proposed scheme.

5.2.2 For local air quality impacts, DMRB (HA207/07) provides the following guideline criteria for defining roads affected by a scheme:

- A change in road alignment of  $\geq 5\text{m}$ ; or
- Change in daily traffic flows of  $\geq 1000$  Annual Average Daily Traffic (AADT); or
- Change in Heavy Duty Vehicle (HDV) flows of  $\geq 200$  AADT; or
- Change in daily average speed of  $\geq 10$  km/hr; or
- Change in peak hour speed of  $\geq 20$  km/hr.

5.2.3 Based on the available traffic information, the study area is proposed to be limited to the corridors along the proposed scheme itself and the existing route of the A43 that is subject to the bypass. Any subsequent revisions to the traffic data may necessitate a re-evaluation of the extent of the study area.

### **5.3 Existing Baseline Knowledge**

#### Local Air Quality Management (LAQM)

5.3.1 DDC has investigated air quality within its area as part of its responsibilities under the LAQM regime. To date no Air Quality Management Areas (AQMAs) have been declared. The neighbouring authority NBC has, however, declared AQMAs in seven areas due to exceedences of the annual mean nitrogen dioxide objective. The closest of these AQMAs is approximately 4.5km southwest of the proposed development, in Kingsthorpe.

#### Monitoring

5.3.2 DDC currently monitors nitrogen dioxide concentrations at 22 locations across the district using diffusion tubes, prepared and analysed by Gradko Ltd. The closest diffusion tubes are located within Moulton, approximately 1km northwest of the proposed development.

5.3.3 The results indicate that, within Moulton, air quality is currently very good, with measured concentrations well below the annual mean nitrogen dioxide objective. Concentrations have remained fairly constant over the six year period. Roadside concentrations within Northampton range from well below to exceeding the annual mean objective.

#### **5.4 Value of the Environmental Resources and Receptors**

5.4.1 The resources and receptors potentially affected by the air quality impacts arising from the proposed scheme include receptors at locations relevant to the assessment of impacts on human health.

5.4.2 UK Air Quality Regulations make clear that ANY exceedences of the air quality objectives set for the protection of health should be assessed at locations which are situated outside buildings where members of the public are regularly present. Furthermore, LAQM technical guidance TG(09)<sup>2</sup> states that the assessment of air quality should focus on locations where members of the public are likely to be exposed for a period of time appropriate to the averaging period of the objective. For example, air quality objectives with an annual mean averaging period apply at facades of residential properties, schools, hospitals, care homes. Hourly objectives apply where members of the public might reasonably be expected to spend one hour or more e.g. busy shopping streets.

5.4.3 Residential properties within 200m of the road alignment are considered to be highly sensitive receptors. Businesses (Round Spinney Industrial Estate) and designated sites i.e. The Crownfields Common Local Nature Reserve approximately 0.5km west of the proposed road alignment.

#### **5.5 Potential Effects**

5.5.1 The proposed scheme has the potential to affect local air quality during both its construction and operational phases as a result of:

5.5.2 Temporary dust and particulate matter emissions from construction activities, as well as emissions from construction vehicles and

5.5.3 Changes in emissions from vehicles on the local road network due to both congestion as a result of the construction of the scheme and changes in flows and speeds due to the operation of the scheme.

#### **5.6 Proposed Level and Scope of Assessment**

5.6.1 Following the guidance of the DMRB and taking into account the above screening predictions which show a low risk of exceedence of the air quality objectives for the protection of human health, it is considered that a Simple Level assessment is considered appropriate for the next assessment stage. The prediction of baseline and future air quality will, however, be undertaken using detailed dispersion modelling to allow the most recent vehicle emissions database to be utilised (Defra's Emissions Factor Toolkit, v6).

5.6.2 The scope of the assessment will cover:

- Baseline air quality assessment

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<sup>2</sup> Local air quality management technical guidance, LAQM TG(09), February 2009, Defra

- Local air quality impacts during operation
- On human health
- Construction impacts

5.6.3 The geographic scope of the assessment will be determined using the appropriate DMRB criteria and the most recent traffic data available, but is considered unlikely to extend beyond that described above.

5.6.4 Given the scale of the current estimates of traffic changes, regional air quality is scoped out of the assessment.

## **5.7 Proposed Methodology including Significance Criteria**

5.7.1 The methodology used to assess the impacts on Local Air Quality as a result of the proposed Scheme follows current 'best practice' DMRB guidance published by the Highways Agency as specified in Section 5.1.

5.7.2 Operational impacts will be assessed quantitatively using the ADMS- Roads air quality dispersion model and the revised advice on the conversion of nitrogen oxides to nitrogen dioxide<sup>3</sup>.

5.7.3 For local air quality, pollutant concentrations at specific worst and typical case receptors will be modelled, together with mean concentrations within the 50m bands from the roadside. The predicted pollutant concentrations will be assessed in relation to the objectives for ambient air quality set out in the UK's Air Quality Strategy and EU Air Quality Directives. Pollutant concentrations in the 50m bands will be used to assess the overall change in the population's exposure to pollution, as required by DMRB and webTAG.

5.7.4 The dispersion model outputs will require verification against pollutant concentrations monitored by the Local Authority.

5.7.5 Construction impacts, including traffic impacts, will be assessed qualitatively using the guidance produced by Institute for Air Quality Management (IAQM, 2014). The assessment will take into account the nature of construction activities, the proximity of receptors to these activities and their duration. Where appropriate, mitigation measures will be proposed. It is not considered necessary at this stage to undertake any quantitative assessment of traffic impacts during construction. This requirement will be kept under review throughout the next stage as more traffic data becomes available.

5.7.6 In line with DMRB guidance, significance criteria are not applied to DMRB air quality assessments. It is left to the judgement of the air quality specialists to determine and justify the significance of the predicted impacts. For this assessment, the significance of the impacts will be assessed in relation to potential exceedence of the air quality objectives and the changes in overall exposure to pollution and guidance provided by EPUK and the IAQM.

5.7.7 Any required mitigation measures during operation will be identified and their impacts quantified.

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<sup>3</sup> Available from Defra website, <http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html>

**Data, modelling and forecasting**

- 5.7.8 The assessment will examine the potential impacts of the operation of the scheme, focussing on the effects of changes in vehicle emissions on local roads, both during construction and on operation of the scheme. The dispersion modelling will be limited to the main pollutants of concern from vehicular emissions and brake wear and tear, namely nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub>).
- 5.7.9 The air quality baseline data and potential scheme impacts will be assessed in relation to the objectives for air quality outlined in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, and EU Air Quality Directives.
- 5.7.10 A cumulative assessment of air quality impacts will consider cumulative impacts from other committed schemes through the inclusion of these schemes in the future year traffic models.
- 5.7.11 The assessment of operational impacts will consider impacts during the opening year of the scheme and the design year. In both cases, the modelling will compare future air quality in a 'Do Minimum' scenario with the 'Do Scheme' scenario.

## **6 CULTURAL HERITAGE**

### **6.1 Introduction**

6.1.1 The aims of this section are to define the study corridor, extent of any surveys and the scope of the assessment of baseline cultural heritage conditions including intrusive investigations. The scope of survey work and the proposed assessment methodology are based upon guidance within DMRB Volume 11, Section 3, Part 2 (HA 208/07). Reference will also be made to the Institute for Archaeologists (IfA) Guidance for Historic Environment Desk-based Assessment (updated 2012). The assessment of the significance of setting on the value of the heritage assets will be undertaken to English Heritage guidelines (2011). Professional judgement will be used at all times.

### **6.2 Study Area**

6.2.1 For the purposes of assessing the implications of the scheme on known and potential cultural heritage assets information from two study areas will be assessed. These will comprise an inner and an outer study area.

6.2.2 The assessment of the significance of the settings of statutory designated heritage assets will utilise a 1 km outer study area. The assessment of significance and impact will focus on all heritage assets lying within an inner 250m corridor either side of the proposed scheme.

### **6.3 Existing Baseline Knowledge**

#### Statutory Designated Heritage Assets

6.3.1 There are no Scheduled Monuments within the scheme area and five within the 5 km study area; the nearest being a Romano-British settlement and pottery kilns 1.9 km east of the scheme. There is one registered historic park and garden within the 5km study area – Grade II listed Broughton Hall which lies 3.3 km west of the scheme. There are no listed buildings within the scheme area. There are 25 Grade I and II\* listed buildings within the 5 km study area. There are 38 Grade II listed buildings within 1 km of the scheme. Of seven Conservation Areas within the 5 km study area, the nearest is Moulton lying approximately 680m west of the scheme.

#### Prehistoric Period (500,000 – AD43)

6.3.2 There is a paucity of Palaeolithic evidence (500,000 to 10,000 BC) from the Nene Valley and so the scheme study area is considered to have no potential for any such remains. Similarly, there are no Mesolithic Period (10,000 to 3,500 BC) finds known within the scheme area. Various Neolithic Period (3,500 to 2,200 BC) finds have been recorded such as worked flint including leaf-shaped arrowheads and axes (MNN24447, 24446 and 21327), although it is considered there is a low potential for sub-surface features. Bronze Age (2,200 to 700 BC) finds are recorded from the site (lithic scatters) and features have been confirmed as being present within the inner study area by excavation including possible ring ditches (MNN874 and 873). The potential for further sub-surface features from this period is high. The Historic Environment Records (HER) show a probable Iron Age (700 to 43 AD) settlement north-west of the scheme (MNN32639), and finds have been recorded within the inner study area. There is moderate potential for features associated with the settlement to extend into the scheme area.

#### Roman Period (43 to 410 AD)

- 6.3.3 A Roman villa is recorded on the HER at Boothville (MNN140219) approximately 500m south-west of the scheme area. Roman period circular timber buildings were present in the southern part of the inner study area, and a further potential settlement might be present in the central area as suggested by the presence of roof tiles, stone rubble, coins and part of a quern (MNN24445). Other finds of the period include pottery and evidence of iron working (MNN140220). The evaluation also recorded a Romano-British settlement including field boundaries. There is high potential for further evidence of this period to be present within the inner study area.

Saxon to Medieval period (410 to 1066 AD)

- 6.3.4 There are no Saxon sites or finds recorded on the HER or within the study area. However, a recent evaluation (*Section 6.8*, below) recorded one closely dated Saxon grave, further undated graves, and a small assemblage of early to middle Saxon pottery. It is also possible that the remains of a sunken-featured building (SFB) were present. The remains of a deserted medieval village (DMV) lie to the west of Overstone Park House. There is moderate potential for further evidence of this period to be present within the inner study area.

Post-medieval (1540 to c1750), Industrial (1750 to 1901) and Modern Periods (1901 onwards)

- 6.3.5 The majority of the study area was in agricultural use during the post-medieval period. During the following centuries (Industrial Period) enclosed fields were created, however the majority of these were removed in the mid nineteenth-century. The inner study area has the potential to contain the remains of a windmill or windmill mound (MNN6063) and a field of ploughed out ridge and furrow. There is low potential for further evidence of these periods to be present.

## **6.4 Value of Environmental Receptors and Resources**

- 6.4.1 All of the Scheduled Monuments and Grade I and II\* Listed Buildings are of high or national value/importance, but none of these lie within the inner study area. The Grade II listed buildings, registered park and garden and conservation areas are of medium or regional value –again, these do not lie within the inner study area. The potential sub-surface archaeological remains are of low to medium value (local/regional) although this cannot be determined prior to intrusive investigation with a high level of certainty. The archaeological assets excavated during the evaluation trenching were of similar value. A number of historic earthwork landscape features are considered to be of low (local) importance.

## **6.5 Potential Effects**

- 6.5.1 The development could impact in an adverse manner upon the setting of a number of designated assets including: Pytchley Gates (Grade II listed); Overstone College and associated wall, gate and steps (Grade II); and Moulton Conservation Area. It is possible that the setting of other designated assets within the outer study area will be subject to a slight adverse impact.
- 6.5.2 The scheme will have a direct impact upon potential buried archaeological remains with the scheme area. The magnitude of this impact could be moderate depending upon the currently unknown value of the remains, but assuming any such remains are similar to those exposed and recorded recently.

**6.6 Proposed Methodology Including Significance Criteria**

Assessment of Significance

6.6.1 The potential for effects on archaeological remains and the built heritage are assessed on the criteria outlined in the tables below (with reference to DMRB (HA 208/07), and IFA and English Heritage (EH) guidance (Section 6.1.1, above).

6.6.1 Initially, the significance of the Heritage Assets is judged in a neighbourhood (Negligible), local (Low), regional (Medium), national and international context (High), which results in the cultural sensitivity of the asset being determined along with the appropriate form of mitigation (Table 6.1, below). Once the value is established then the archaeological, historic, architectural and aesthetic interests are discussed.

**Table 6.1 Criteria for Evaluating Importance of Archaeological Sites and Monuments (i.e. the Importance of the Receptor).**

<b>Importance of Receptor</b>	<b>Equivalent to:</b>
High	Sites of National Importance, Scheduled Monuments, Grade I and II* Listed Buildings, World Heritage Sites
Medium	Registered Parks and Gardens, Conservation Areas, Historic or Archaeological sites of Regional or County Importance, Grade II Listed Buildings and locally designated buildings of historical importance, sites of high archaeological importance.
Low	Locally Important Historic or Archaeological Sites, Sites with a local value for education or cultural appreciation, Sites which are so badly damaged that too little remains to justify inclusion into a higher grade, sites of medium archaeological importance.
Negligible	Sites or features with no significant value or interest, Sites which are so badly damaged that too little remains to justify inclusion into a higher grade, sites of low archaeological importance.

6.6.2 Table 6.1 is a general guide to the attributes of Heritage Assets and it should be noted that not all the qualities listed need be present in every case and professional judgement is used in balancing the different criteria.

6.6.3 Harm to significance is the basis of assessing impact. In order to assess the level of harm or potential impact of any future development on built heritage or buried archaeological remains, consideration must be afforded to:

- Assessing in detail any impact and the significance of the effects arising from any future development of the Application Area;
- Reviewing the evidence for past impacts that may have affected the archaeological sites of interest identified during the desk-based assessment;
- Outlining suitable mitigation measures, where possible at this stage, to avoid, reduce, or remedy adverse impacts.

6.6.4 Key impacts are those that would potentially harm the significance of the Heritage Asset. Each potential impact will be determined as the predicted deviation from the baseline conditions, in accordance with current knowledge of the site and the

proposed development. Although the impact is assessed in terms of the sensitivity of the asset to the magnitude of change or potential scale of harm during the proposed development, consideration is afforded to the heritage values of the assets. The magnitude, or scale of impact on the significance is often difficult to define, but will be termed as large harm, medium harm, small, or negligible, as shown in Table 6.2, below.

**Table 6.2: Magnitude of Impact**

Magnitude of Impact	Description of Change
Large	Complete destruction or change to the site or feature resulting in a fundamental change in our ability to understand and appreciate the resource and its historical context and setting
Medium	Change to the site or feature resulting in an appreciable change in our ability to understand and appreciate the resource and its historical context and setting
Small	Change to the site or feature resulting in a small change in our ability to understand and appreciate the resource and its historical context and setting
Negligible	Negligible or no material changes to the site or feature. No real change in our ability to understand and appreciate the resource and its historical context and setting

6.6.5 The interaction of the potential scale of impact (Table 6.2) and the sensitivity of the Heritage Asset (Table 6.1) produce the impact significance. This may be calculated by using the matrix shown in Table 6.3, which is included to allow an objective assessment to be presented.

**Table 6.3: Significance of Environmental Effect**

Magnitude of Impact	Importance of Receptor			
	High	Medium	Low	Negligible
Large	Very Significant	Significant	Moderate/Slight	Slight
Medium	Significant	Moderate	Slight	Slight/Neutral
Small	Moderate/Slight	Slight	Slight/Neutral	Slight/Neutral
Negligible	Slight	Slight/Neutral	Neutral	None

Assessment of the Significance of the Setting of Heritage Assets

6.6.6 EH guidance *The Setting of Heritage Assets* (2011) will be used to define the contribution of the setting of the assets to their value. A similar approach to the tables show above is used. Once the contribution of the setting has been determined and the potential attributes of the proposed development upon it have been identified, the contribution will be evaluated in order to determine the magnitude of the potential impact. This is undertaken using the definitions presented in Table 6.4 below, and through site visit.

**Table 6.4: Definitions of Sensitivity for the Settings of Heritage Assets**

Sensitivity	Contribution to significance of the asset	Examples for settings
Very high	Very substantial	A defined setting that is contemporary with and historically and functionally linked with the heritage asset, may contain other heritage assets of international or national importance, has a very high degree of intervisibility with the asset and makes a very substantial contribution to both the significance of the heritage asset and to the understanding and appreciation of the significance of the asset.
High	Substantial	Contemporary with and historically and functionally linked with the heritage asset, with minor alterations (in extent and/or character), has a high degree of intervisibility with the asset and which makes a substantial contribution to both the significance of the heritage asset and to the understanding and appreciation of the significance of the asset.
Medium	Moderate	Contemporary with and/or historically and/or functionally linked with the heritage asset but with alterations which may detract from the understanding of the heritage asset, and/or with a moderate degree of intervisibility with the asset and/or which makes a moderate contribution to the significance of the heritage asset and/or a moderate contribution to the understanding and appreciation of the significance of the asset.
Low	Minor	Largely altered so that there is very little evidence of contemporaneous and/or historic and/or functional links with the heritage asset, and/or with a low degree of intervisibility with the asset and/or which makes a minor contribution to both the significance of the heritage asset and to the understanding and appreciation of the significance of the asset.

## **6.7 Intrusive Investigation**

- 6.7.1 An extensive programme of non-intrusive and intrusive investigation was carried out between 2009 and 2011 (geophysical survey) and 2010 to 2011 (trial trench evaluation) the results of which are incorporated in the baseline condition. Both types of investigation revealed the presence of archaeological remains, and should be used as guidance and a basis for further intrusive investigation as is proportionate to the predicted impact of the scheme. The proposed scheme can be considered in two sections - north and south with The Avenue being the dividing line (Figure 1):
- 6.7.2 The majority of the northern section follows a close alignment with the current road (A43) and therefore the opportunity for intrusive archaeological investigation is very limited. The area to the immediate east of this section was subject to extensive evaluation trenching and geophysical survey.
- 6.7.3 The southern section misses the alignment of previous trenching and passes very close to positive geophysical survey results. The southernmost section of the scheme between the A43 and the Round Spinney Industrial Estate respects the A43, and lies adjacent to a linear band of woodland.
- 6.7.4 A proportionate programme of intrusive evaluation and geophysical survey should be anticipated for the southern section. However, land access and ownership issues dictate that the available area is very limited at this stage, and access is only

permissible within the field immediately south of The Avenue. As this has already been subject to geophysical survey, a limited programme of archaeological trial trenching should be undertaken, and which targets the positive geophysical where possible. Any such evaluation investigation will be undertaken in consultation with the Northamptonshire County Archaeologist.

6.7.5 The outstanding areas should be investigated as a programme of mitigation to be undertaken post-application but prior to construction.

**6.8 Mitigation**

6.8.1 Should the results of the intrusive investigation prove to be significant then a programme of targeted open-area investigation should be considered along with an appropriate programme of post-excavation assessment and analysis.

## **7 ECOLOGY AND NATURE CONSERVATION**

### **7.1 Introduction**

7.1.1 This Chapter describes the scope and methodology adopted for the assessment of impacts and effects on ecological features. It describes the existing ecological baseline of the proposed scheme and its relevant surrounding area. It additionally summarises the potential ecological impacts that could arise as a result of the construction and operation of the proposed site and/or summarises additional survey work required to enable potential impacts to be identified. The assessment methodology proposed to be undertaken is also described.

### **7.2 Existing Baseline Knowledge**

7.2.1 An ecological desk study and Extended Phase 1 Habitat survey was undertaken to inform this Section.

#### *Desk study*

7.2.2 Existing ecological baseline information has been obtained from a number of reports and studies contained within the Environmental Statement submitted for Overstone Leys in October 2013 (hereafter referred to as the 'Overstone ES, 2013').

7.2.3 In addition, an updated desk-based study will be undertaken to inform this assessment for the scheme. Existing records for all notable species within 1km and habitats (statutory and non-statutory designated sites) within 2km of the proposed scheme site will be collated.

#### *Extended Phase 1 Habitat Survey*

7.2.4 An Extended Phase I Habitat survey was carried out by PB ecologists on 28<sup>th</sup> and 29<sup>th</sup> May 2014. The surveys followed standard methodology and focussed on the proposed scheme site, including, where known, all proposed associated access roads and construction compounds. The relevant surrounding area (up to 250m where there were no physical barriers to species dispersal) was also subject to a more limited assessment, using aerial photographs where access limitations dictated the need.

7.2.5 The aim of the Extended Phase 1 Habitat survey was to identify the type, quality and extent of habitats present within the survey area described above and whether their potential to support notable and protected species had changed since the previous site surveys had been carried out.

#### Current Baseline

7.2.6 The scheme site is located on the northern fringe of Northampton in the Overstone district lying to the east of the A43 Northampton to Kettering road. It is divided into three blocks of land by two minor roads and largely comprises gently undulating arable farmland, together with some fields of semi-improved grassland. Mature trees are a feature of several of the hedgerows, which are present within the new road alignment.

7.2.7 Other habitats and features include watercourses flowing through woodland belts along the southern and eastern boundaries of the Application Site, an orchard, buildings and associated hardstanding, scrub and tall ruderal vegetation.

*Designated Sites*

7.2.8 The following statutory designated sites for nature conservation interest occur within the study area:

- Crowfields Common Local Nature Reserve (LNR), located approximately 0.25km to the west of the scheme Site; and
- Lings Wood LNR located approximately 1km to the southeast of the scheme Site.

7.2.9 In addition, non-statutorily designated Coleman Leys Potential Wildlife Site (PWS) and Cowpasture Spinney Local Wildlife Site (LWS) are located adjacent to the scheme site.

*Habitats*

7.2.10 Surveys undertaken in 2009, 2011, 2013 and 2014 have established that the majority of the scheme site is of limited ecological value comprising arable farmland, with smaller areas of species poor, semi-improved grassland, scrub and tall ruderal vegetation present (refer to Table 1).

**Table 1 Habitat Features within Scheme Site and Surrounding Area (described in Overstone ES (2013) and 2014 Extended Phase 1 Habitat Survey)**

Habitat/Feature	Description	Location
Arable	The majority of the scheme site comprises arable farmland. Intensively managed with few arable weed species present, all of which are common and widespread species.	On site
Semi-improved grassland	Comprising pasture, field margins, unmanaged and amenity grassland, none of the swards considered to be species-rich, with no rare or notable species were recorded.	On site
Hedgerow	A number of the Hedgerows present may qualify as Important under the Regulations 1997, with others being more species-poor and unlikely to qualify.	On site and in surrounding area (hedgerows on site considered to be of higher ecological value)
Woodland	Woodlands of varying quality is present on site and in the surrounding area and is considered to be of moderate to high ecological value at the local level in terms of fauna, offering opportunities for a range of animals such as birds, bats and Badgers, both as habitat and as movement corridors.	On site and in surrounding area (woodland within scheme footprint of lower ecological value)
Mature Trees	Mature trees offer a range of	On site and in

Habitat/Feature	Description	Location
	potential foraging and roosting opportunities for bats, and nesting and foraging habitat for birds.	surrounding area
Traditional Orchard	An area of orchard lies in the south-west of the Site. The Orchard forms part of the Coleman Leys PWS.	On site (partially within footprint of scheme)
Scrub / Ruderal	There is a limited area present, dominated by a limited number of common species such as Bramble.	On site
Watercourse	Two watercourses are found in the surrounding area and are not envisaged to be impacted upon by the scheme. The Watercourses are considered valuable for a number of species potentially associated with the site.	In the surrounding area

7.2.11 Some significant habitat/features were considered to be present, mainly around the margins of the scheme Site, such as the mature trees, woodlands and orchard.

7.2.12 No further surveys are considered necessary to establish the value of habitats present within the scheme site. Sufficient information is available to inform a robust impact assessment and the requirements for mitigation.

*Protected/Notable Species*

7.2.13 Several protected and/or notable species have been recorded within 1km of the proposed development site. Where relevant, these records are discussed below alongside evidence of, or potential for, protected or notable species recorded during the Extended Phase 1 Habitat survey.

*Plant Species*

7.2.14 Updated records for protected or notable plant species within 1km of the proposed scheme site are pending.

7.2.15 The Overstone ES (2013) concluded that none of the habitats present on site were of significant value for flora and the 2014 Extended Phase 1 Habitat survey confirmed that this conclusion was still relevant.

7.2.16 Targeted surveys for flora, such as National Vegetation Classification (NVC) surveys are therefore not considered necessary to inform the proposed scheme.

*Invertebrates*

7.2.17 Updated records for protected or notable invertebrate species within 1km of the proposed scheme site are pending.

7.2.18 The Overstone ES (2013) identified the habitats within the scheme site as being common in the locality and unexceptional in quality. The scheme site was considered likely to support a typical range of common invertebrates being of low value at the

local level. The 2014 Extended Phase 1 Habitat survey confirmed that this conclusion was still relevant.

- 7.2.19 Targeted surveys for invertebrates are therefore not considered necessary to inform the proposed scheme.

*Badgers*

- 7.2.20 Updated records for badgers (*Meles meles*) within 1km of the proposed site are pending.

- 7.2.21 The Overstone ES (2013) concluded that the scheme site and surrounding area was of local importance for badgers, following surveys in 2009, 2011 and 2013.

- 7.2.22 17 badger setts were recorded in the surrounding area. A sett was recorded within approximately 10-20 m of the scheme, in the south-west of the Site. This sett was previously considered to be a main sett (in 2011) but was not considered to be in use in 2013 when only a single latrine and a single active outlier were found in this area.

- 7.2.23 The 2014 Extended Phase 1 Habitat survey did not establish any recent badger activity in this location. However, due to the proximity of this sett to the scheme footprint, further targeted badger surveys are to be completed during 2014 to inform the scheme with regard to potential impacts on badgers.

*Bats*

- 7.2.24 Updated records for bats within 1km of the proposed site are pending.

- 7.2.25 The Overstone ES (2013) identified that a number of buildings and trees within the area surrounding the scheme site had potential to support roosting bats. No tree bat roosts were identified during activity surveys completed during 2009 and 2011.

- 7.2.26 Activity surveys during 2009 and 2011 recorded moderate levels of bat activity predominately comprising common and widespread species. Foraging and commuting activity was concentrated in proximity to the woodland, stream, orchard and boundary features. The scheme site was considered to be of local value for foraging and commuting bats.

- 7.2.27 As a result of the time elapsed between the previous surveys undertaken in 2011, and the more recent best-practice guidance published on bat survey, a suite of bat activity and roost surveys are to be completed during 2014 in order to inform any impact assessment and potential mitigation. These surveys commenced in May 2014 and will be undertaken by experienced, licensed bat ecologists following best practice guidance. Any limitations considered to arise from the commencement of surveys in May will be mitigated by the extension of the bat activity surveys in October 2014 and consideration of the extensive data available from previous surveys completed in 2009 and 2011.

*Reptiles*

- 7.2.28 Updated records for reptiles within 1 km of the proposed site are pending.

- 7.2.29 A single probable Grass Snake (*Natrix natrix*) was recorded in the surrounding area during riparian and woodland survey work in 2009. In 2012, reptile surveys were carried out throughout the grasslands in the south-west of the Site, and a single adult male grass snake recorded on the east side of the Traditional Orchard. No other evidence of the presence of reptile activity was recorded during the survey work undertaken. The Site is considered to be of site value to reptiles.

- 7.2.30 The habitats recorded in 2014 during the Extended Phase 1 Habitat survey had not altered with regard to potential to support reptiles. Targeted surveys for reptiles are therefore not considered necessary to inform the proposed scheme.

*Amphibians*

- 7.2.31 Updated records for protected amphibian species within 1 km of the proposed site are pending.

- 7.2.32 The Overstone ES (2013) considered that there were no waterbodies suitable for breeding Great Crested Newt (*Triturus cristatus*) within 500m of the scheme site and that predominately poor terrestrial habitat was available dominated by intensive arable farmland and grazed grassland.

- 7.2.33 The 2014 Extended Phase 1 Habitat survey identified two garden ponds in proximity to the scheme with potential for Great Crested Newt and as such, this species will be considered further in the assessment. Presence/likely absence surveys, according to accepted guidelines, are to be undertaken within these ponds in order to inform the impact assessment and describe any mitigation measures considered necessary.

*Birds*

- 7.2.34 Updated records for protected and/or notable bird species within 1 km of the proposed site are pending.

- 7.2.35 The Overstone ES (2013) referenced breeding bird surveys completed during 2009, which concluded that the majority of the scheme site comprises intensively farmed arable land and as such offered limited potential for breeding birds. The marginal habitats such as hedgerows, trees and shelterbelts and scrub offer somewhat more potential for a variety of bird species. A range of common and widespread bird species, characteristic of the habitats present within the scheme site, were recorded during the 2009 survey. The Site was considered to be of value to birds at the local level.

- 7.2.36 As a result of the time elapsed between the previous surveys undertaken in 2009, breeding bird surveys are to be completed during the breeding season 2014 in order to inform any impact assessment and potential mitigation. These surveys will be undertaken by experienced ecologists following published guidance.

Potential Impacts

- 7.2.37 The construction and operation of the proposed scheme may result in both construction and operation impacts that will require investigation in the ES. Table 2 below summarises the key potential impacts that may occur.

- 7.2.38 Further potential impacts and recommendations may be generated following the completion of the recommended Phase II ecological surveys described above as well as following the acquisition of further desk data and consultations.

- 7.2.39 In addition to the potential impacts envisaged below, the construction and operation of other development in the local and wider area may result in cumulative impacts which will require consideration in the assessment once further details are available.

**Table 2 Potential Impacts and Effects and Action Required**

<b>Impact</b>	<b>Location/Cause</b>	<b>Effect</b>	<b>Key Receptor</b>	<b>Surveys Potentially Required or Potential Mitigation Options</b>
Land take	Within scheme footprint and at all proposed contractor's compounds and access roads and within the proposed scheme footprint.	Potential direct and indirect impacts on ecological receptors through the permanent and temporary loss of semi-natural or man-made habitat. Site clearance may harm, kill or displace resident fauna and could have indirect effects on species in adjacent habitats by habitat fragmentation	Notable habitats.  Species groups including birds, mammals, reptiles, amphibians	Surveys to identify any habitats of interest for protected/notable species (mammals, birds, amphibians) to be avoided/mitigated.  Generic mitigation to include: Post-development landscaping to compensate for loss of habitat.  Removal of vegetation between October and February (outside of the breeding bird season).  Mitigation to avoid killing/injuring reptiles during construction, including protection of riparian area and avoidance of land-take during hibernation where hibernacula may be affected.
Increased noise/vibration /visual disturbance	Site-wide construction phase impacts and the operation of the road.	Disturbance.  Temporary indirect effects during construction and potentially permanent during	Species groups including birds, mammals, reptiles, amphibians	Surveys to include birds, badgers, bats, and amphibians (followed by impact assessment and specific mitigation measures).

<b>Impact</b>	<b>Location/Cause</b>	<b>Effect</b>	<b>Key Receptor</b>	<b>Surveys Potentially Required or Potential Mitigation Options</b>
		operation, including disruption to species' behaviour.		Generic mitigation to include the implementation of a CEMP and any specific recommendations arising from the noise assessment of impacts.
Storage of construction material.	Site-wide construction phase impacts.	Pollution /damage of habitats and disturbance to species, disruption to feeding or breeding activity of mobile species.	Species groups including birds, mammals, reptiles, amphibians	Surveys to identify any habitats of interest for protected/notable species to be avoided/mitigated.  Generic mitigation to include the implementation of CEMP and any specific recommendations following survey.
Increased dust deposition and decreased air quality	At each location due to construction activities/increased vehicular movements. Operation of road.	Smothering of vegetation resulting in reduced growth or direct loss of vegetation.	Notable habitats and species. Amphibian, birds, reptiles and mammal species in vicinity of site.	Surveys to identify any habitats of interest for protected/notable species (badgers, bats, birds and amphibians) to be avoided/mitigated.  Generic mitigation to include the implementation of CEMP and any specific recommendations arising from the air quality assessment of impacts.
Increased light emissions	Site-wide construction and operation activities.	Disturbance.	Species groups including birds, mammals, reptiles.	Surveys to include birds, badgers, bats.  Generic mitigation may include directional, low-

Impact	Location/Cause	Effect	Key Receptor	Surveys Potentially Required or Potential Mitigation Options
				sodium, sensor-activated lighting to reduce impacts.
Habitat fragmentation	Site-wide due to construction activities and the operational site layout (including lighting and noise).	Disruption to breeding, foraging, and dispersing species (e.g. impacting upon the viability of local populations of species and/or impeding with dispersal patterns).	Species groups including birds, mammals, reptiles, amphibians	Surveys to include birds, bats, mammals, amphibians. Mitigation may include post-development landscaping.

Potential for net ecological gain

7.2.40 In addition to identifying impacts by the construction and operation of the proposed scheme, opportunities for positive impacts through ecological enhancement will be sought. A number of notable species have been recorded in the wider area (and potentially on site) and any enhancement measures implemented should recognise their presence.

7.2.41 Landscaping will incorporate native trees and shrubs of local provenance and aim to maintain, enhance and/or restore habitat connectivity. Additionally, the establishment of species-specific habitats and the implementation of sensitive post-development management may provide many positive impacts for protected and/or notable species.

**7.3 Ecological Impact Assessment Methodology and Approach**

Identification of Valued Ecological Receptors

7.3.1 It is impractical and inappropriate for an assessment of the ecological effects of a development to consider every species and habitat that may be affected. Instead, it focuses on 'valued ecological receptors' (VER). VERs are species and habitats present within the zone of influence of the proposed development that are of sufficiently high value that an effect upon them as a result of the proposed development could be considered to be significant.

7.3.2 The value of sites, populations of species, species assemblages and habitats will be evaluated with reference to: their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations); and their legal status.

7.3.3 In line with CIEEM (2006) guidelines<sup>4</sup>, in the assessment, sites, species populations, species assemblages and habitats are considered to be VER if they meet the following minimum level of importance:

- Sites – local importance
- Species populations and assemblages – local importance
- Habitats – local importance

#### Identification and Characterisation of Potential Impacts

7.3.4 The likely effects of the proposed development during construction and operation, and the potential ecological impacts arising from them, are identified and characterised taking into consideration the following parameters:

- Positive or negative – whether the effect will result in net loss or degradation of a VER or whether it will enhance or improve it;
- Magnitude – the size or intensity of the effect measured in relevant terms, e.g. number of individuals lost or gained, area of habitat lost or created, or the degree of change to existing conditions (e.g. noise or lighting levels);
- Extent – the spatial scope of the effect, for example the physical area affected or the geographical pattern of the effect;
- Duration – the length of time over which the effect occurs;
- Reversibility – the extent to which effects are reversible either spontaneously or through active mitigation; and
- Timing and frequency – consideration of the timing of events in relation to ecological change, some effects may be of greater significance if they take place at certain times of year (e.g. breeding season). The extent to which an effect is repeated may also be of importance.

#### Magnitude of Potential Impacts

7.3.5 Ecological receptors are usually sites, habitats, species assemblages or communities, or populations or groups of a species. Impacts can be permanent or temporary, direct or indirect, and can be cumulative. These factors are brought together to assess the magnitude of the impact on particular VERs and, wherever possible, the magnitude of the impact is quantified. Professional judgment is then used to assign the effects on the receptors to one of four classes of magnitude, defined as high, medium, low or negligible.

7.3.6 Potential impacts are characterised initially in the absence of any mitigation, except where this is integral to the design of the development. Any additional mitigation or compensation proposed is identified and its likely effectiveness is assessed.

#### Assessment of impact significance

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<sup>4</sup> Chartered Institute of Ecology and Environmental Management (IEEM) (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom*, available at <http://www.ieem.org.uk/ecia/index.html>

- 7.3.7 The significance of the predicted impacts on VERs arising from the identified effects of the proposed development, including designed-in and additional mitigation measures, is assessed. Significance is assessed as Negative, Positive or Not Significant. An impact is considered not significant if the integrity of a site or conservation status of a habitat or species was not affected by the impact
- 7.3.8 Liaison with the County Ecologist will also take place in regard to potential mitigation measures proposed.

## **8 LANDSCAPE AND VISUAL EFFECTS**

### **8.1 Introduction**

8.1.1 The purpose of the landscape and visual impact assessment (LVIA) will be to identify potentially significant landscape and visual effects that are predicted to arise from the construction and operation of the proposed A43 Moulton Bypass, north of Northampton.

8.1.2 The assessment will be undertaken in accordance with current best practice guidelines as set out within:

- Guidelines for Landscape and Visual Impact Assessment GLVIA 3<sup>rd</sup> edition 2013 (Landscape Institute/Institute of Environmental Management & Assessment);
- DMRB – Interim Advice Note 135/10 (W) landscape and Visual Effects (2014).

### **8.2 Study Area**

8.2.1 The study area for direct landscape effects will be 500m either side of the centre line of the proposed road with assessment of the general wider landscape context within which the project may influence landscape character.

8.2.2 The Zone of Visual Influence (ZVI) will be established to show the area of land from which there could be a view of the proposed scheme, especially a view of any vertical changes in height, above ground infrastructure (e.g. bridges) and traffic using the route.

### **8.3 Existing Baseline Knowledge**

#### The Site and its Context

8.3.1 The route is predominantly agricultural land use, passing through arable fields bounded by woodland/ tree belts. The southern end of the scheme, where the route passes between a residential property and the edge of Round Spinney Industrial Estate, contains some woodland and a small area of former allotments/ rough ground. As the route runs north south across the fields it crosses an avenue of trees (The Avenue), the tree lined Overstone Lane, before merging again with the existing Kettering Road. In general the route passes across flat land that is visually contained by woodland and is not overlooked by higher ground.

8.3.2 At a national level, the landscape character of the area is classified under Natural England's National Character Area 89, Northamptonshire Vales. The key characteristics of this character area and the adjacent Leicestershire Vales character area are described as:

- Gentle clay ridge and valleys with little woodland and strong patterns of Tudor and parliamentary enclosure;
- Distinctive river valleys Soar, Welland and Nene with flat floodplains and gravel terraces;
- Large towns of Leicester and Northampton dominate much of the landscape;

- Frequent small towns and large villages, often characterised by red brick buildings;
- Prominent parks and county houses;
- Frequent imposing, spired churches;
- Attractive stone buildings in older village centres and eastern towns and villages;
- Great diversity of landscape and settlement pattern with many sub units e.g. Nene Valley and Welland Valley.

8.3.3 At a county level, NCC has produced a suite of documents titled 'Northamptonshire's Environmental Character and Green Infrastructure'. This includes a county-wide Environmental Character Assessment (ECA) and a detailed Landscape Character Assessment (LCA).

8.3.4 Within the ECA the site is located within the Central Northamptonshire Plateau and Valleys, the key characteristics of which are as follows:

- Varied and complex area of high plateau farmlands separated by undulating valleys
- Plateau tops are sparsely settled and retain a remote character with wide views over the surrounding landscape;
- Valleys that form a major part of the catchment of the River Ise and Brampton are well settled and retain a more intimate, small scale character;
- Number of county major towns fringe the area and exert a strong influence over the local landscape; and
- Landscape has retained a quiet, rural character despite the proximity of the major towns.

8.3.5 The site lies within the Rolling Ironstone Valley Slopes and more specifically the Moulton Slopes as identified in the Northamptonshire LCA. The Moulton Slopes provides the most detailed character description of the area within which the site is located and it is described as follows:

*"The Moulton Slopes Character Area is located to the north of Northampton. It comprises a broad valley, through which flows the Sedge Brook, a tributary of the Brampton Valley, and a smaller watercourse, which flows southwards into the Northampton to the west of Overstone. From the upper slopes of the valley, wide views across rolling farmland are possible. From the slopes above Moulton, views southwards to Northampton are largely screened by vegetation and landform. However, tall urban elements such as Express Lifts Tower are prominent features punctuating the skyline."*

## **8.4 Value of Environmental Receptors and Resources**

8.4.1 In terms of the value of the landscape resource, the site lies within the North-East Quadrant of the Northampton Sensitivity and Green Infrastructure Study 2009. The following aspects are felt to be most relevant:

- Topography is relatively gentle, with some areas having greater connectivity with the wider landscape;
- There is relatively little gap between the northern edge of Northampton and the villages of Boughton, Moulton and Overstone;
- There has already been some coalescence along roads, so the open fields around the villages perform an important function in providing a physical and/or visual separation between Northampton and its surrounding villages;
- From the majority of this quadrant, the large industrial buildings on the northern edge of the town are also clearly visible;
- The hard edges of some of the residential development on the northern edge of the town are also clearly visible;
- The area does not fall within a strategic or local Green or Open Space Strategy, or a habitat corridor;
- High sensitivity areas include the prominent landform of the Ecton Ridge and Overstone Park;
- There are pockets of lower visual sensitivity north east of Round Spinney and north of Overstone, areas through which the A43 route passes.

8.4.2 With regard to visual amenity resource, the main (and numerous) visual receptors will be the residential properties along the existing A43, in Thorpeville and Parkview. There are few other publically accessible locations from where the route will be visible to users of public rights of way.

8.4.3 The site is visually well contained by existing woodland planting around neighbouring industrial and residential developments. The more exposed north and west allows short-mid distant views from the public right of way and some residential properties located along the A43, east of Moulton. Whilst the northern section of the site is more open, the central and southern sections are contained by tree belts, in particular the belt of mature trees to the east. Views from more sensitive receptors in Overstone Park to the east are limited due to the nature of the vegetation both within and adjacent to the park. The conclusions of the Northampton Sensitivity and Green Infrastructure Study were that this area is generally of low or medium sensitivity.

## **8.5 Potential Effects**

8.5.1 There is the potential for some degree of adverse effect on landscape character and visual amenity as a result of scheme construction. However, it is felt that, with appropriate mitigation, these effects could be effectively minimised. In some places, for example where the existing A43 road is being moved away from residential properties, the scheme could lead to a positive impact on residential receptors in the long term.

8.5.2 Potential effects reported will include construction and operation periods and will identify effects at year of opening and after fifteen years when the vegetation is expected to have matured.

## **8.6 Proposed Methodology Including Significance Criteria**

8.6.1 The methodology to be used for the assessment will be based on guidance set out in the Interim Advice Note (IAN) 135/10 Landscape and Visual Effects Assessment, which is applicable to the reporting of environmental assessment of highways and replaces DMRB Volume 11 Section 3 Part 5. General guidance will be taken from

'Guidelines for Landscape and Visual Impact Assessment' (GLVIA), 3rd Edition, published by the Landscape Institute and Institute for Environmental Impact and Assessment (2013) and would be undertaken by experienced landscape architects.

- 8.6.2 The methodology ensures a proper description and evaluation of the baseline landscape character and visual amenity is available for the assessment process. It considers effects in relation to:
- Landscape character and resources, including effects on the aesthetic values of the landscape caused by changes in the elements, characteristics, character and qualities of the landscape
  - Designated landscapes, historic gardens and designed landscapes, and recreational interests
  - Visual amenity - including effects upon potential viewers and viewing groups caused by changes in the appearance of the landscape as a result of the development
- 8.6.3 Landscape characteristics are considered to be of importance in their own right and are valued for their intrinsic qualities irrespective of whether they are seen by people. Impacts on visual amenity are effects as perceived by people and are therefore clearly distinguished from, although closely linked to, impacts on landscape character and resources. Landscape and visual assessments are therefore separate, linked processes.
- 8.6.4 The sensitivity of the landscape to accommodate change will be considered and whether mitigation would address any of the potential negative effects arising from the development. Analysis of the visible physical landscape (e.g. landform, vegetation etc.) and visible spatial components (e.g. scale, key views) at the baseline stage of the LVIA will help identify broad site constraints and opportunities to be developed within the design.
- 8.6.5 Recommendations for landscape mitigation to prevent or reduce predicted significant adverse impacts and enhancements will help to refine the design. The assessment will identify any significant residual effects, i.e. those effects which cannot practicably be further reduced through mitigation.
- 8.6.6 Interim Advice Note (IAN) 135/10 provides a methodology for the consideration of significance of identified effects in accordance with the principles set out in DMRB Volume 11, Section 2. Potential impacts will be identified and the magnitude of these assessed. Evaluation of the significance of the landscape and visual effects of the project will be deduced from assessing the sensitivity of the landscape and visual receptors against the magnitude of impact, taking into account mitigation.
- 8.6.7 The magnitude of impact (which could be either adverse or beneficial) will be estimated on the basis of expert professional judgement. In assessing the magnitude of any landscape impact due regard is given to the scale, nature and duration of the impact. Indicative criteria for guidance are given in Table 8.1 below.

**Table 8.1 Magnitude of Landscape Impact**

<b>Magnitude of Impact</b>	<b>Definition</b>
Major	Total loss or major change to key element of the landscape resource to the extent that there is a fundamental change to landscape character. A permanent or long term impact. <i>i.e.</i> introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape.
Moderate	Partial loss or change to key elements, features or characteristics of the landscape resource to the extent that there is a partial change to landscape character. A long term impact that can be partially mitigated to reduce the impact. <i>i.e.</i> introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape
Minor	Minor loss or change to key elements, features or characteristics of the landscape resource to the extent that there may be some slight perception of change to landscape character. Short term effect that in part can be reversed through appropriate mitigation.
Negligible	Very minor loss or change to elements, features or characteristics of the landscape resource and there would be no fundamental change to landscape character. A short term reversible impact.
No Change	No noticeable loss, damage or alteration to character or features or elements.

8.6.8 Typical descriptors of landscape sensitivity are given in Table 8.2.

**Table 8.2 Typical Descriptors of Landscape Sensitivity**

<b>Sensitivity category</b>	<b>Typical Descriptors of Sensitivity</b>
<b>High</b>	<ul style="list-style-type: none"> <li>• Of high quality with distinctive elements and features making a positive contribution to character and sense of place.</li> <li>• Likely to be designated.</li> <li>• Areas of special recognised value through use, perception or historic and cultural associations.</li> <li>• Likely to contain features and elements that are rare and could not be replaced.</li> <li>• Low capacity to accommodate change.</li> </ul>

**Table 8.2 Typical Descriptors of Landscape Sensitivity**

<b>Sensitivity category</b>	<b>Typical Descriptors of Sensitivity</b>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>• Comprised of common place element and features creating generally unremarkable character but with some sense of place.</li> <li>• Locally designated or their value may be expressed through non statutory local publications.</li> <li>• Containing some features of value through use, perception or historic and cultural associations.</li> <li>• Likely to contain some features and elements that could not be replaced.</li> <li>• Medium capacity to accommodate change.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Comprised of some features and elements that are discordant or in decline, resulting in indistinct character with little or no sense of place.</li> <li>• Not designated.</li> <li>• Likely to contain few if any features and elements that could not be replaced.</li> <li>• High capacity to accommodate change.</li> </ul>

8.6.9 Typical descriptors of the significance of effect are given in Table 8.3.

**Table 8.3 Typical descriptors of the Significance of Effect Categories**

<b>Significance category</b>	<b>Typical Descriptors of Effect</b>
<b>Large adverse</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Be at considerable variance with the character (including quality and value) of the landscape.</li> <li>• Degrade or diminish the integrity of a range of characteristic features and elements.</li> <li>• Damage a sense of place.</li> </ul>
<b>Moderate adverse</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Conflict with the character (including quality and value) of the landscape.</li> <li>• Have an adverse impact on characteristic features and elements.</li> <li>• Diminish a sense of place.</li> </ul>
<b>Slight adverse</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Not quite fit the character (including quality and value) of the landscape.</li> <li>• Be at variance with characteristic features and elements.</li> <li>• Detract from a sense of place.</li> </ul>

**Table 8.3 Typical descriptors of the Significance of Effect Categories**

<b>Significance category</b>	<b>Typical Descriptors of Effect</b>
<b>Neutral effect</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Maintain the character (including quality and value) of the landscape.</li> <li>• Blend with characteristic features and elements.</li> <li>• Enable a sense of place to be retained.</li> </ul>
<b>Slight beneficial</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Compliment the character (including quality and value) of the landscape.</li> <li>• Maintain or enhance characteristic features and elements.</li> <li>• Enable some sense of place to be restored.</li> </ul>
<b>Moderate beneficial</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Improve the character (including quality and value) of the landscape.</li> <li>• Enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development.</li> <li>• Enable a sense of place to be restored.</li> </ul>
<b>Large beneficial</b>	<p>The project would:</p> <ul style="list-style-type: none"> <li>• Enhance the character (including quality and value) of the landscape</li> <li>• Enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development</li> <li>• Enable a sense of place to be restored.</li> </ul>

8.6.10 The sensitivity of visual receptors is categorised on a three point scale ranging between high, medium and low as set out in Table 8.4.

**Table 8.4 Sensitivity of Visual Receptors**

<b>Sensitivity</b>	<b>Receptors</b>
High	<p>Viewers with proprietary/high interest in their everyday visual environment and/or with prolonged and regular viewing opportunities. Such receptors would include:</p> <ul style="list-style-type: none"> <li>• Residential properties</li> <li>• Users of Public Rights of Ways or other recreational trails e.g. National Trails</li> <li>• Users of outdoor recreational facilities whose attention or interest is focused on the landscape i.e. Country Parks, National Trust or other access land</li> </ul>

**Table 8.4 Sensitivity of Visual Receptors**

Sensitivity	Receptors
Medium	Viewers with moderate interest in their environment, and discontinuous and/or irregular viewing periods. Such receptors would include: <ul style="list-style-type: none"> <li>• Users engaged in outdoor sport or recreation other than appreciation of the landscape (i.e., hunting, shooting, golf, water-based activities)</li> <li>• Outdoor workers</li> <li>• Schools and other institutional buildings, and their outdoor areas.</li> </ul>
Low	Viewers with a passing interest in their surroundings and momentary viewing periods. Such receptors include: <ul style="list-style-type: none"> <li>• Drivers/travellers and/or passengers of moving vehicles including trains.</li> <li>• People at their place of work, including agricultural workers, road users or those already impacted by intrusive features.</li> </ul>

8.6.11 The scale by which magnitude of the visual impacts is judged is set out in Table 8.5.

**Table 8.5 Magnitude of Visual Impact and Typical Descriptors**

Magnitude of impact	Typical criteria descriptors
Major	The project, or a part of it, would become the dominant feature or focal point of the view.
Moderate	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a small part of the project would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view.
No change	No part of the project, or work or activity associated with it, is discernible.

8.6.12 In summary the assessment will follow the following process;

*Landscape*

- Baseline; including an assessment of the value of the landscape, both of character areas and features and elements.

- Assess sensitivity of landscape with reference to its capacity to accommodate change arising from the project
- Assess magnitude of impacts on landscape; features, elements and character, with reference to; scheme design, including bridges, approach roads, cuttings and embankments, scale of change, nature of change.
  - Develop mitigation to reduce potential adverse effects.
  - Evaluate significance of landscape effects.
  - Report residual landscape effects.

#### *Visual*

- Baseline; identification of visual receptors and their sensitivity to change; this will involve the preparations of a ZVI, which in turn will then be used to identify:-
  - Key viewpoints in which to carry out more detailed assessments.
  - Residential properties affected by the proposal
  - PROW affected by the proposal
- Consultation with the statutory bodies and key stakeholders will be carried out at this time to help identify and agree viewpoints that are most characteristics of the area.
- Assess magnitude of visual impacts with reference to scheme design, including bridges, approach roads, cuttings and embankments, scale of change, nature of change.
- Develop mitigation to reduce potential adverse effects.
- Evaluate significance of visual effects.
- Report residual visual effects for each receptor.

8.6.13 Landscape effects will be assessed by comparing the predicted effects of the scheme with the situation if the project were not to proceed (i.e. the 'Do Minimum'), using the following scenarios:

- On a winters day during construction when mitigation will be restricted to offsite and advanced planting where possible to ascertain maximum effect;
- In the winter of the year of opening (to represent a maximum effect situation, before any planted mitigation can take effect), taking account of the completed project and the traffic using it; and
- In the summer of the fifteenth year after project opening (to represent a least effect scenario, where any planted mitigation measures can be expected to be reasonably effective), taking account of the completed project and the traffic using it.

8.6.14 Visual effects will be assessed using the following scenarios:

- During the construction period, assuming a maximum visibility or maximum perceived change situation (i.e. when construction activity is at its peak for any given view);
- A winter's day in the year that the project would open to traffic or be fully operational (i.e. with noise/visual screens and mounds in place but before any planted mitigation has begun to take effect). This is usually a reflection of the operationally non-fully mitigated/maximum visibility scenario; and
- A summer's day in the fifteenth year after opening (i.e. when the planted mitigation measures can be assumed to be substantially effective). This is usually a reflection of the near fully mitigated scenario under normal conditions.

**9 NOISE AND VIBRATION****9.1 Introduction**

9.1.1 This section sets out the methodology with which noise and vibration will be assessed, the baseline conditions as they are currently understood and the predicted effects. The assessment of noise and vibration will be undertaken in accordance with BS5228:2009+A1:2014, for the construction phase, and DMRB Volume 11, Section 3, Part 7 (HD 213/11) for the operation of the scheme.

**9.2 Study Area**

9.2.1 The study area, based on DMRB methodology, will be 600m from the centre line of the road at either side, including side roads that are likely to be affected by any changes in traffic flows.

**9.3 Existing Baseline Knowledge**

9.3.1 The existing A43 is the dominant noise source across majority of the site, except to the south east where industrial units forming part of the Round Spinney Industrial Estate are dominant.

**9.4 Value of Environmental Receptors and Resources**

9.4.1 There are a number of dwellings on the A43 (i.e. Park View, Thorpeville and Kettering Road) within close proximity to the proposed scheme. The likely impact experienced by these receptors will form part of the assessment.

**9.5 Potential Effects**

9.5.1 Potential noise and vibration sources are likely to be construction and operation (i.e. road traffic noise) from the scheme.

**9.6 Proposed Methodology Including Significance Criteria**

9.6.1 A noise and vibration assessment will be undertaken to estimate the effects of the operation of the route on the local noise environment. The assessment will be prepared in line with the principles described in the National Planning Policy Framework.

9.6.2 A baseline noise survey will be undertaken to establish the existing noise climate representative of the noise sensitive receptors. In addition, the results of the survey will assist the preparation of the noise model. The methodology will be discussed and agreed with NCC prior to commencement of the baseline survey. The noise survey will be undertaken following recommendations in BS7445 and Calculation of Road Traffic Noise (CRTN). Noise monitoring will be conducted in suitable weather conditions, by suitably qualified engineers using Class I Sound Level Meters (SLMs).

9.6.3 The likely noise & vibration impacts arising from the construction phase of the scheme will be assessed in accordance with BS5228 -1&2 (2009+A1 2014). This standard provides a methodology for the assessment and control of noise from construction operations. The standard contains detailed information on noise reduction measures and promotes the 'best practicable means' (BPM) approach to control noise and minimise associated impacts on local residents.

- 9.6.4 The significance of impacts during the construction phase will be assessed based on the 'ABC' method described in BS5228. This method presents the threshold of significant effects at dwellings due to construction noise. Mitigation measures including BPM will be recommended, as required.
- 9.6.5 A computer noise model using CadnaA will be prepared to determine the potential noise impact arising from the operational phase of the Scheme. The prediction and assessment of noise from the scheme will be done in accordance with DMRB and CRTN, published by the Department of Transport (DfT) in 1988. This prediction method requires a good understanding of the traffic flows, percentage heavy vehicles (HVs) and traffic speeds amongst other factors. Information from the Transport Assessment will be used to inform the road traffic noise level predictions.
- 9.6.6 The quantification and assessment of the potential noise and vibration impacts of the proposed scheme will be assessed by a combination of site surveys, desktop studies, consultations and predictions. The assessment for the operation phase of the scheme will be based upon the 'detailed' assessment methodology set out in Chapter 3 and Annex 1 of DMRB 2.3.7 (HA 213/11) dated February 2011. A detailed assessment is considered to be the most appropriate assessment methodology to use when undertaking assessments involving the final scheme option, and noise impacts are likely.
- 9.6.7 The overall magnitude of short term and long term operational impacts will be reported using the classifications in Table 9.1 and 9.2. Both tables report magnitudes of impact for both increased and decreased traffic volumes.

**Table 9.1 Classification of Magnitude of Operational Noise Impacts in the Short Term**

Noise Change, LA10,18h	Magnitude of Impact
0	No Change
0.1 - 0.9	Negligible
1 - 2.9	Minor
3 - 4.9	Moderate
5+	Major

**Table 9.1 Classification of Magnitude of Operational Noise Impacts in the Long Term**

Noise Change, LA10,18h	Magnitude of Impact
0	No Change
0.1 - 2.9	Negligible
3 - 4.9	Minor
5 - 9.9	Moderate
10+	Major

- 9.6.8 The increases and decreases in noise levels will then be judged according to the sensitivity of receptors along the route.

**10 COMMUNITY AND PRIVATE ASSETS****10.1 Introduction**

10.1.1 This section sets out the methodology for assessing the impact on the existing community and local private assets. It also describes the existing baseline information and potential likely effects. The assessment of community and private assets will be undertaken in accordance with parts of DMRB Volume 11, Section 3, Part 8 and Part 6.

**10.2 Study Area**

10.2.1 The impact of the proposals on the baseline land uses will be considered at two geographic levels:

- The proposed development site itself;
- Within a 1km buffer zone from the proposed scheme centre line.

10.2.2 The scope of the assessment will be as set out in Part 6 of Section 3 of DMRB Volume 11.

- Land Use will cover the following:
- Private Property;
- Land Used by the Community;
- Development Land; and
- Agricultural Land.

10.2.3 Effects on the community will consider the presence and location of key community facilities and any changes in the ability of local people to reach these facilities by non-motorised methods. General community effects including on community facilities of importance or significance will be considered within 1km of the route. The boundary of the study area may be extended for facilities of particular importance or significance that serve vulnerable members and/or a high proportion of the community.

**10.3 Existing Baseline Knowledge**

10.3.1 The study area consists of a mix of different land uses. The proposed road alignment will predominately pass through agricultural land, although 3 private properties will be effected which front the existing A43.

10.3.2 To the south lies the Round Spinney Industrial Estate. To the north agricultural land. To the west the built form of Moulton and to the east more agricultural land.

10.3.3 No Public Rights of Way will be affected by the proposed scheme.

10.3.4 There are no key community facilities within close proximity to the scheme. The nearest schools are Overstones Primary School located on Sywell Road approximately 1.5km east of the proposed scheme.

10.3.5 Overstone Park Hotel and its associated gardens are located directly east of Billing Lane. This is a leisure resort with golf course, swimming pools and spa. The hotel is approximately 1km east of the proposed scheme.

**10.4 Value of Environmental Receptors and Resources**

10.4.1 In total (to date) 8 landholdings will be directly affected by the proposed scheme. Effects could potentially be loss of land or change or loss of access.

**10.5 Potential Effects**

10.5.1 Construction of the scheme would involve temporary loss of land for construction compounds, working areas and haul routes.

10.5.2 There would be no impacts on local communities with regards to access to key facilities.

10.5.3 New provisions for pedestrians and cyclists will be designed into the scheme.

**10.6 Proposed Methodology Including Significance Criteria**

10.6.1 Discussions with landowners undertaken by the Welsh Government will inform the assessment of the impact of land take and any private and commercial interests.

10.6.2 Magnitude of impact will be measured on a five-point scale according to example criteria set out in Table 10.1.

**Table 10.1 Magnitude of Community Impacts**

Magnitude	Typical Criteria Descriptors
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
No change	No loss or alteration of characteristics, features or elements; no observable in either direction.

10.6.3 The measures will inform an assessment on the significance of effects of the scheme on community and private assets as set out in Table 10.2.

**Table 10.2 Significance Criteria of Community Effects**

Category	Description of Effect
Very Large	The proposed scheme would result in an adverse effect due to the damaging impact and loss of property/land that is of international or national or regional importance or rarity. A serious change in a site or feature of district importance

	may also be included.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision making factors. The cumulative effects of such issues may become a decision making issue if leading to an increase in the overall adverse effect due to the loss of land uses of local importance.
Slight	The beneficial or adverse effects may be raised as local issues. They are unlikely to be critical in the decision making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects predicted or those identified are beneath the levels of perception, within normal bounds of variation or within the margin of forecasting error.

10.6.4 Table 10.3 sets out for the significance of the identified effects is judged when taking into account the magnitude of the impact and the sensitivity of the receptor.

**Table 10.3 Significance of Effect Criteria Descriptors**

		Magnitude of Impact				
		No Change	Negligible	Minor	Moderate	Major
Environmental Value (Sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

10.6.5 In addition to considering the significance of effects the assessment will also define the effects as either direct or indirect according to the following criteria.

10.6.6 Direct impact – where the proposed scheme would directly impinge on the land or farm business in question (e.g. demolition of buildings, loss of some or all of the associated land).

10.6.7 Indirect impact – where the scheme option would pass in close proximity, or directly adjacent to the agricultural receptors being considered, or the possible scheme would

encroach on the land uses over a wider area (e.g. Countryside Stewardship Scheme land).

10.6.8 No impact – scheme option would not impact upon land.

## **11 EFFECTS ON ALL TRAVELLERS**

### **11.1 Introduction**

11.1.1 This section sets out the methodology for assessing the effects on travellers using the scheme, which will be undertaken in accordance with guidance set out in the DMRB Volume 11 Section 3 Part 8 Pedestrians, Cyclists, Equestrians and Community Effects and Part 9 Vehicle Travellers. The existing baseline information and potential environmental effects are also described.

### **11.2 Study Area**

11.2.1 The assessment of effects on pedestrians, equestrians and cyclists (known as Non-Motorised Users (NMUs)) will consider the impact of the scheme on local journeys made by people on the local public rights of way network.

11.2.2 The effects on vehicle travellers using the local road network will also be assessed. There are two elements to the assessment of vehicle travellers: view from the road; and driver stress.

11.2.3 The study area for the assessment of impact on pedestrians, cyclists and equestrians is within 1km of the route.

11.2.4 The following will be considered:

- Community severance including journey lengths, times and local travel plans;
- Amenity; and
- Physical fitness.

11.2.5 The study area that will be considered for views from the road will be equivalent to the ZVI of the proposed route identified in the Landscape Chapter (see Section 8). There is no specific study area for driver stress.

### **11.3 Existing Baseline Knowledge**

11.3.1 One public right of way crosses the development to the north of the site forming a link between Overstone and Holcot - Footpath DG1 runs along the northern boundary on a south-east - north-west axis to the A43. The route continues along the DG4 towards Holcot. Although there are no bridleways within the vicinity of Overstone Leys, some equestrian activity does occur in the area.

11.3.2 The following pedestrian facilities are within close proximity to the scheme:

- running north-south along the A43 is a footway in at least one verge;
- a toucan crossing of the A43 Park View, on the line of the old Overstone Lane;
- on an east-west axis leading to Moulton along Overstone Road are footways in both verges;

- on an south-east – north-west axis leading to Moulton along Ashley Lane are footways in both verges;
- a footway along the southern verge of The Avenue leading towards the A43 Park View;
- a footway along Overstone Lane.

11.3.3 These footways and crossings provide connections to the local facilities (retail, secondary education, and employment at Round Spinney and Moulton Park)

#### **11.4 Value of Environmental Receptors and Resources**

11.4.1 The receptors considered in the assessment of effects on all travellers are the various road users including NMUs e.g. cyclists, pedestrians and equestrians, and vehicle travellers.

#### **11.5 Potential Effects**

11.5.1 Effects on vehicle travellers predicted during construction may include delays and local diversions, but these would be of a short term nature. To reduce driver frustration and uncertainty relating to the route being followed appropriate signage would be installed informing vehicle travellers of the proposed scheme, diversions and that delays due to works would be probable.

11.5.2 Influencing the three main components of driver stress (frustration, fear of potential accidents, and uncertainty relating to the route being followed) are factors such as road layout and geometry, surface riding characteristics, junction frequency, and speed and flow per lane. Taken together, these factors can induce in drivers the feelings of discomfort, annoyance, frustration or fear culminating in physical and emotional tension that detracts from the value and safety of a journey. The scheme may increase driver fear to some extent because it will increase traffic speeds. However, this increased perception of danger is likely to be more than offset in most cases by the superior design standards to which a new scheme is built.

11.5.3 Frustration may be caused by a driver's inability to travel at a constant speed due to the volume of traffic and slow moving vehicles, which in turn leads to unreliable journey times which further increases stress. Proposed routes would reduce frustration through use of existing routes (without diversions) and good forward visibility.

11.5.4 Reduced fear of potential accidents would be due to improved road standards including increase sight distances, a widened carriageway and controlled access on to the carriageway.

11.5.5 Route uncertainty is caused primarily by signing that is inadequate for the individual's purposes. Good design and layout of signs eliminates this cause of stress from new road schemes. However, as the scheme is broadly similar to the existing orientation, views will be considered, and forward visibility and signage would be improved, it is considered that this component of driver stress would likely also decrease in the long term.

#### **11.6 Proposed Methodology Including Significance Criteria**

##### Non-Motorised Users

- 11.6.1 The proposed methodology will be based on the procedures set out in the DMRB Volume 11, Section 3, Part 8 and 9 and the application of DMRB Volume 5, Section 2, Part 5, HD42/05 and will consider:
- The scheme's impact on the journeys that pedestrians, cyclists and equestrians make in its locality;
  - The impact on existing usage of the community facilities and routes by pedestrians and others;
  - Counts of pedestrians and other vulnerable users;
  - Changes in safety and amenity value of routes which may be affected by the proposed route.
  - The effects of the proposed scheme on community severance.
- 11.6.2 A survey will be undertaken to measure the quantity and type of NMUs on all routes potentially affected by the scheme, including the existing route and the national cycleways and other recreational routes/ Public Rights of Way (PRoWs).
- 11.6.3 The assessment will involve a desk study and site visit to observe NMu activity, as well as how local community facilities are likely to be impacted by the construction and operation of the proposed scheme in both adverse and beneficial senses.
- 11.6.4 The level of new severance will be taken into account using criteria set out by DMRB Volume 11, Section 3, Part 8 which categorises the level of severance as either Slight, Moderate or Severe.
- Views from the Road
- 11.6.5 The DMRB Volume 11, Section 3, Part 9 describes 'Views from the Road' as follows;
- '...the extent to which travellers, including drivers are exposed to the different types of scenery through which a route passes.'*
- 11.6.6 Aspects to be considered are:
- The types of scenery or the landscape character as described and assessed for the baseline studies;
  - The extent to which travellers may be able to view the scene;
  - The quality of the landscape as assessed for the baseline studies; and
  - Features of particular interest or prominence in the view.
- 11.6.7 The view from the road assessment has been informed by the assessment of landscape impacts set out in Section 8 (Landscape), with particular regard to the landscape character and quality areas.

Driver Stress

11.6.8 Driver stress is defined in Volume 11 of the DMRB as the adverse mental and psychological effects experienced by a driver traversing a road network. Stress can induce in drivers feelings of discomfort, annoyance, frustration, or fear culminating in physical or emotional tension that detracts from the value and safety of the journey. Volume 11 of the DMRB indicates that with increased driver stress, a drop in driving standards occurs, which may be expressed as an increase in aggression towards other road users, or a diminished response to visual and other stimuli.

11.6.9 The level of stress experienced by a driver may be affected by a number of factors including; road layout and geometry, surface riding characteristics, junction frequency and speed and flow per lane. There are three main components of driver stress: frustration; fear of potential accidents; and uncertainty relating to the route being followed.

- **Driver frustration** – Caused by an inability to drive at a speed consistent with the standard of the road, and increases as speed falls in relation to expectations.
- **Driver fear** – The main factors are the presence of other vehicles, inadequate sight distances and the likelihood of pedestrians, particularly children, stepping into the road. Fear is highest when speeds, flows and the proportion of heavy vehicles are all high, becoming more important in adverse weather conditions.
- **Driver uncertainty** – caused primarily by signing that is inadequate for the individual's purposes.

11.6.10 A matrix to determine the level of driver stress on single and dual carriageways is provided within Volume 11 of the DMRB as detailed in Table 11.1 below.

**Table 11.1 Assessing driver stress on single carriageway roads**

Average peak hourly flow per lane in flow units/hour <sup>1</sup>	Average Journey Speed km/h		
	Under 50 (<31 mph)	50-70 (31-43 mph)	Over 70 (>43 mph)
Under 600	High <sup>2</sup>	Moderate	Low
600-800	High	Moderate	Moderate
Over 800	High	High	High

11.6.11 Taking average known and modelled journey speeds (Peak hour 2-way flows) for the baseline and future years (for Do-Minimum and Do-Something scenarios) driver stress will be quantified and compared as tabulated above. The analysis will include consideration of HGV frequency to give an indication of flow units per lane.

**12 ROAD DRAINAGE AND THE WATER ENVIRONMENT****12.1 Introduction**

12.1.1 This section sets out the assessment methodology to be used to assess the potential effects on road drainage and the surrounding water environment. It also describes the existing baseline information and potential likely effects of the scheme. The assessment of road drainage and the water environment will comprise a qualitative assessment undertaken in accordance with DMRB Volume 11, Section 3, Part 10 (HD 45/09).

**12.2 Study Area**

12.2.1 The spatial scope of this assessment will encompass surface water features surrounding the proposed scheme and features within 1 km of the proposed scheme. This section will also cover the potential impacts of flood risk to the Scheme and to people and property elsewhere as a result of the Scheme.

12.2.2 Note that areas that may be affected by increased flood risk or pollutants transported downstream could be greater than 1km from the proposed scheme. The areas that could be significantly affected by development of the Scheme in terms of flood risk and pollution are therefore based on judgement of appropriately qualified professionals.

12.2.3 This section will not cover hydrogeology. Potential impacts to groundwater resources and groundwater quality will be addressed in Section 13 Soils and Geology.

**12.3 Existing Baseline Knowledge**

12.3.1 Review of OS mapping data indicates that the scheme passes within close proximity to two minor drains to the east of the current alignment of the A43. Review of the proposed alignment of the Scheme indicates that the new road may cross these features. These drains appear to convey surface water south towards the Billing Aquadrome and River Nene.

12.3.2 Pondhead Spinney lake is located approximately 1km east of the scheme. The lake appears to be upstream of the proposed works and is therefore not in direct hydraulic connectivity.

12.3.3 The scheme is located within Flood Zone 1 and is therefore at low risk of fluvial flooding. In places, the scheme is identified to be at risk of surface water flooding, predominantly associated with the alignment of the minor drains that flow towards the east.

12.3.4 A detailed assessment of potential water environment receptors and flood risk will be undertaken as part of the EIA.

**12.4 Value of Environmental Receptors and Resources**

12.4.1 The value of the Billing Aquadrome and River Nene are likely to be considered as 'high' to 'very high' following a more detailed assessment of ecological value, economic value and amenity value.

12.4.2 The value of the minor drains to the east of the Scheme area are likely to be considered as 'negligible to low' but this will be confirmed during the course of the EIA.

12.4.3 Flood risk receptors will largely comprise local industry and residential development that would be considered to have 'medium' and 'high' vulnerability.

## **12.5 Potential Effects**

12.5.1 The scheme has the potential to effect the water environment during construction and operation.

12.5.2 Potential impacts to surface water features and flood risk during construction could arise from:

- Polluted surface water runoff consisting of high sediment load, chemicals, and hydrocarbons from construction vehicles, plant and high risk activities that may migrate or be discharged to surface water features;
- Increased rates and volumes of surface water runoff resulting from intense rainfall combined with compacted soils and reduced vegetation, which could lead to an increase in flood risk;
- Damage to the integrity of water features associated with construction works in close proximity or above watercourses and drainage ditches.

12.5.3 Potential impacts to surface water features and flood risk during operation could arise from:

- Polluted surface water runoff consisting of silts and hydrocarbons from the proposed scheme (including an assessment of the potential increase in traffic flow) that may migrate or be discharged to surface water;
- Increased rates and volumes of surface water runoff from an increase in impermeable area and/or changes to the existing drainage regime leading to a potential increase in flood risk;
- Flood risk to the proposed scheme and to people and property elsewhere as a result of construction within areas identified to be at flood risk;
- Impact to the natural flow of watercourses and flood waters within identified fluvial flood extents, caused by the construction of the Scheme and re-profiling of current land forms, leading to a potential increase in flood risk.

12.5.4 Impacts will be assessed over the expected lifetime of the proposed scheme, taking into consideration the potential effects of climate change.

12.5.5 Note that these impacts have been assessed prior to the consideration of appropriate mitigation.

## **12.6 Proposed Methodology Including Significance Criteria**

12.6.1 The approach that will be adopted for this assessment comprises:

- Review of international, national and local legislation, policies and guidelines in relation to water resources, water quality and flood risk. This shall include a review of the requirements of the Water Framework Directive.
- Establish baseline conditions on and around the site through discussions with the client and design team, literature review, consultation with relevant authorities, Envirocheck report, review of water quality monitoring data and site walkover.
- Identify sensitive receptors and likely key issues.
- Identify risks to water resources, water quality and flood risk from the proposed Scheme and hence the likely impacts, magnitude of change and significance of impact during both the construction and operational phases.
- Develop mitigation strategies through consultation with the client, design team and relevant authorities.
- Identify opportunities for enhancement of water quality and water management through design and mitigation.
- Identify residual effects and cumulative impacts.

12.6.2 The method of assessment and reporting of significant effects will be undertaken and based on HD 45/09 guidance. The assessment will include an update of the findings of the 2004 assessment as detailed in the baseline knowledge section previously.

12.6.3 The DMRB promotes the following approach:

- i) Estimation of the importance of the attribute.
- ii) Estimation of the magnitude of the impact.
- iii) Assessment of the significance of the impact based on the importance of the attribute and magnitude of the impact.

12.6.4 The importance of the attribute is considered in terms of indicators, such as quality, scale, rarity and substitutability. The following criteria have been developed following the general guidance of HD 45/09 as set out in Table 12.1.

**Table 12.1 Criteria for Assessing the Value of Environmental Receptors.**

Importance	Criteria	Example
<b>Very High</b>	Attribute with a high quality and rarity, regional or national scale and limited potential for substitution	Water body of very good chemical or biological quality, i.e. Water Framework Directive (WFD) Class 'High'. Site protected/designed under EC or UK habitat legislation (Special Areas of Conservation.(SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), Water Protection Zone (WPZ), Ramsar site, species protected by EC legislation. EC designated Salmonid fishery. A source used for public or local potable water

		<p>supply.</p> <p>Water body of high amenity value, including areas of bathing and where water emersion sports are regularly practised.</p> <p>Floodplain or defence protecting more than 100 residential properties from flooding.</p> <p>Areas which are highly vulnerable to flooding. With reference to NPPF, these can include essential infrastructure, emergency services and basement dwellings.</p>
<b>High</b>	<p>Attribute with a high quality and rarity, local scale and limited potential for substitution</p> <p>Attribute with a medium quality and rarity, regional or national scale and limited potential for substitution</p>	<p>Water body of good chemical and biological quality, i.e. WFD Class 'Good'</p> <p>Species protected under EC or UK habitat legislation</p> <p>EC designated Cyprinid fishery.</p> <p>A source used for domestic non-potable water supply.</p> <p>Water body of a moderate amenity value including public parks, boating, non-contact water sports, popular footpaths adjacent to watercourses, or watercourses running through housing developments/town centres.</p> <p>Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding.</p> <p>Areas which are more vulnerable to flooding. With reference to NPPF, these can include hospitals, residential units, educational facilities and waste management sites.</p>
<b>Medium</b>	<p>Attribute with a medium quality and rarity, local scale and limited potential for substitution</p> <p>Attribute with a low quality and rarity, regional or national scale and limited potential for substitution</p>	<p>Water body of fair chemical or biological quality, i.e. WFD Class 'Moderate'.</p> <p>A source used for agricultural or industrial use.</p> <p>Water body of particular local social/cultural/educational interest. Water body of low amenity value with only casual access, e.g. along a road or bridge in a rural area.</p> <p>Floodplain or defence protecting 10 or fewer industrial properties from flooding.</p> <p>Areas which are less vulnerable to flooding. With reference to NPPF, these can include retail, commercial and general industrial units, agricultural/forestry sites and water/sewage treatment plants.</p>

<b>Low</b>	Attribute with a low quality and rarity, local scale and limited potential for substitution	<p>Water of poor or bad chemical or biological quality, i.e. WFD Class 'Poor'</p> <p>Low sensitivity aquatic ecosystem.</p> <p>A source with no known potable or non-potable use.</p> <p>Water body of no amenity value, seldom used for amenity purposes, in a remote or inaccessible area.</p> <p>Floodplain with limited constraints and a low probability of flooding of residential and industrial properties.</p> <p>Areas which are considered to be water-compatible. With reference to NPPF, these can include flood control infrastructure, docks/marinas, pumping stations and recreational/landscape areas.</p>
<b>Negligible</b>	Attribute has very low quality and rarity on local scale.	<p>Drainage ditches or land drains with no known value as an aquatic ecosystem.</p> <p>Land not within a floodplain and provides no flood defence benefit.</p>

12.6.5 The criteria for assessing the magnitude of a potential effect are summarised in Table 12.2 below, as developed from HD 45/09. Not all effects are adverse and there is the potential for beneficial effects, for example a significant reduction in AADT reducing risks to water quality.

**Table 12.2 Criteria for Assessing the Potential Magnitude of an Effect.**

<b>Magnitude</b>	<b>Criteria</b>	<b>Example</b>
Major Adverse	Results in loss of attribute and/or quality and integrity of the attribute	<p>Loss or extensive change to a fishery/designated nature conservation site.</p> <p>Change to the environmental status/classification of a water feature, including water quality classification.</p> <p>Changes to site resulting in an increase in discharge/runoff of &gt; 75% with flood/sewage exceedance potential.</p> <p>Increase in peak flood level (1% annual probability event) &gt; 100mm.</p> <p>Loss of flood storage areas.</p>
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute	<p>Partial loss or change to a fishery/designated nature conservation site. Loss in the productivity of a fishery.</p> <p>Pollution of a receiving water body, but insufficient to change the environmental status/classification, including water quality classification.</p> <p>Changes to site resulting in an increase in discharge/runoff of &gt; 50% with flood/sewage</p>

		<p>exceedance potential.</p> <p>Increase in peak flood level (1% annual probability event) &gt; 50mm.</p>
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability	<p>Potential low risk of some pollution to a surface water body, but insufficient to cause loss in quality, fishery productivity or biodiversity.</p> <p>Changes to site resulting in an increase in discharge/runoff of &gt; 25% with flood/sewerage exceedance potential.</p> <p>Increase in peak flood level (1% annual probability event) &gt; 10mm.</p>
Negligible Adverse	Results in effect on attribute, but of insufficient magnitude to affect the use of integrity	<p>The proposed scheme is unlikely to affect the integrity of the water environment.</p> <p>Negligible change in peak flood level (1% annual probability event) &lt; 10mm</p>
No Change	No observable impacts or effects	<p>No adverse or beneficial change to the integrity of the water environment.</p> <p>No change in peak flood level</p>
Negligible Beneficial	Results in effect on attribute, but of insufficient magnitude to affect the use of integrity	<p>The proposed scheme is unlikely to positively affect the integrity of the water environment.</p> <p>Negligible decrease in peak flood level (1% annual probability event) &lt;10mm</p>
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	<p>Potential for slight reduction in pollution to a surface water body, but insufficient to cause noticeable benefit in quality, fishery productivity or biodiversity.</p> <p>Changes to site resulting in a decrease in discharge/runoff &gt; 25%.</p> <p>Reduction in peak flood level (1% annual probability event) &gt; 10mm.</p>
Moderate Beneficial	Results in moderate improvement of attribute quality	<p>Moderate improvement to a fishery/designated nature conservation site. Potential increase in the productivity of a fishery.</p> <p>Reduced pollution of a receiving water body, but insufficient to change the environmental status/classification, including water quality classification.</p> <p>Changes to site resulting in a decrease in discharge/runoff &gt; 50%.</p> <p>Reduction in peak flood level (1% annual probability</p>

		event) > 50mm.
Major Beneficial	Results in major improvement of attribute quality	<p>Significant improvement to a fishery/designated nature conservation site.</p> <p>Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring.</p> <p>Change to the environmental status/classification of a water feature, including water quality classification.</p> <p>Changes to site resulting in a decrease in discharge/runoff of &gt; 75%.</p> <p>Reduction in peak flood level (1% annual probability event) &gt; 100mm.</p>

12.6.6 The overall significance of potential impacts considers both the magnitude of the effect against the value of the receptor, as demonstrated in Table 12.3.

**Table 12.3 Criteria for Assessing Significance of Effect**

		MAGNITUDE OF IMPACT				
		No Change	Negligible	Minor	Moderate	Major
IMPORTANCE OF ATTRIBUTE	Very High	Neutral	Slight	Moderate	Large	Very Large
	High	Neutral	Slight	Slight	Moderate	Large to
	Medium	Neutral	Neutral	Slight	Slight	Moderate
	Low	Neutral	Neutral	Neutral	Slight	Slight
	Negligible	Neutral	Neutral	Neutral	Neutral	Slight

12.6.7 In addition to Table 12.3, the overall significance of an effect is also assessed with regards to the likelihood of the effect, the potential use of mitigation, and any legal obligations. A detailed review of relevant planning policy and legislation will be undertaken in the assessment to assess compliance with the proposed Scheme and recommended mitigation.

12.6.8 Following the impact assessment process, further mitigation measures will be outlined to minimise any significant adverse effects upon the water environment. Any residual effects following these measures will be detailed.

**13 GEOLOGY AND SOILS****13.1 Introduction**

13.1.1 This section of the Scoping Report outlines the methods to be used to assess the impacts on 'Geology and Soils' associated with the construction and operation of the scheme in accordance with the updated DMRB Volume 11, Section 3, Part 11. The existing baseline information and potential environmental effects are also described.

**13.2 Study Area**

13.2.1 The Geology and Soils section, will include the contaminated land assessment, and will consider the potential impacts on and off site, within 250m of the proposed alignment ('study corridor'). Guidance contained within R&D Publication 66 ('Guidance for the Safe Development of Housing on Land Affected by Contamination' EA/NHBC, 2008) states that off site features within an area up to 250m from the site boundary should typically be considered within the hazard identification stage of site assessment.

**13.3 Existing Baseline Knowledge**

13.3.1 The following assessment is based on information provided by third parties, which has been reviewed in light of our current knowledge. The primary sources of information comprise:

- Ground Conditions Desk Study (Ground Stability, Phase 1 Contaminated Land & Mineral Resources), Overstone Leys, Northampton, Peter Brett Associates, Rev2, October 2013;
- Soil Resource and Agricultural Use & Quality of Land at Overstone Leys, Northampton, Land Research Associated, Report 963/1, August 2013;
- British Geological Survey mapping Sheet 185 (solid and drift edition);
- BGS web-hosted Onshore Geoindex (<http://www.bgs.ac.uk/geoindex/>); and
- Environment Agency, What's in your Backyard? (<http://apps.environment-agency.gov.uk/wiyby/default.aspx>).

13.3.2 Superficial geology identified within the study corridor comprises:

- Glaciofluvial Deposits: These deposits are identified in the northern portion of the study corridor and comprise 'Sand and Gravels'. In the Northamptonshire district, these deposits typically comprise pale brown fine to coarse quartz sands and sub-angular to rounded gravels. The fine gravel fraction is often made up of flint, limestone and ironstone.
- Calcareous Tufa: Tufa is a build-up of calcium carbonate including shells and sand which whilst often forming a soft paste-like mud can form a 'cemented hard rock-like chalk'. A small area of Calcareous Tufa is located in the southernmost part of the study corridor.

13.3.3 The solid geology within the study corridor comprises, with progressive depth:

- Stamford Member (Lower Estuarine Series): A series of sandstones and siltstones which weather to sands and silts. The lower part of the formation (formerly termed the Lower Estuarine Series) typically consists of pale grey and

white sands, grey to lilac tinted silts and clays with occasional calcareous sandstones and carbonaceous clay. In the Northamptonshire district, it is between 2m and 5m thick.

- Northampton Sand Formation: This typically comprises dark orange-brown or brown-orange sandy clays and silty sands with varying amounts of angular sandstone and ironstone gravels. It is ooidal ironstone which can have massive yellow/brown sandstone beds overlying a hard base of ironstone with layers of calcareous sandstone. Layers of clay may be interbedded with the lowest horizons as it transgresses to mudstone. Historical records suggest that Northampton Sand is up to 19.5m thick in the Northamptonshire district.
- Whitby Mudstone Formation (Upper Lias Clay): Whitby Mudstone typically comprises dark blue-grey clay which weathers to grey-brown and light blue-grey near to the surface. The Whitby Mudstone is known to reach a thickness in excess of 50m in the Northamptonshire district.

- 13.3.4 The oldest bedrock strata of the Whitby Mudstone Formation outcrops along the floor of the valley feature associated with Billing Brook, a surface water feature located approximately 500m to the south east of the proposed alignment. The Northampton Sand Formation and Stamford Member are successively present in the valley sides (as the topography rises towards the north west, away from Billing Brook).
- 13.3.5 The Environment Agency classifies the Glaciofluvial Deposits, Calcareous Tufa, Northampton Sand Formation and Stamford Formation as Secondary A Aquifers. The Whitby Mudstone is classified as Unproductive Strata. Groundwater is thought to flow beneath the study corridor to the south or south east towards Billing Brook. A spring line has been identified in the southern portion of the study corridor, at the interface between the Northampton Sand and the Whitby Mudstone. There are no active groundwater abstractions recorded by the Environment Agency within the study corridor.
- 13.3.6 The land is currently primarily in arable agricultural use, suggesting the present of topsoil. A Soil Resource and Agricultural Use & Quality of Land survey undertaken in August 2013 confirmed variable soils across the study corridor. Well drained loamy soils are dominant in the north of the site and stony soils dominant in the south. Smaller areas of slowly permeable fine textured soils are identified in the adjoining areas. These soil types are generally Grade 1 and Grade 2 quality in the northern half of the alignment, and Grade 3 quality in the southern half of the alignment.
- 13.3.7 A small area of raised ground has been identified in the southernmost area of the proposed alignment, which is understood to act as a screen between an industrial estate (Round Spinney Industrial Estate) and nearby residential properties. The composition of the raised ground is currently unknown.
- 13.3.8 The northern half of the study corridor lies within a Mineral Safeguarding and Consultation Area (MSA and MCA) associated with the Glaciofluvial Deposits. There are no geological Sites of Special Scientific Interest (SSSI) or Regionally Important Geological Sites (RIGS) located within the study corridor.
- 13.3.9 Potential ground hazards have been identified in the wider area of the proposed alignment due to unstable slopes, natural cavities and adverse foundation conditions, although these are yet to be quantified within the study corridor. Existing slopes above 7 degrees have been identified in the southern area of the study corridor. The presence of gulls and fissures are known in the Northampton Sand Formation, although no known natural cavities are recorded within the study corridor. Adverse

foundation conditions are noted due to the potential presence of 'weak' deposits at the base of the Northampton Sand Formation and Calcareous Tufa.

- 13.3.10 Small areas of historical surface workings are present within the study corridor. There is archaeological evidence of two sand extraction pits in the northern area and one ironstone extraction pit in the central area.
- 13.3.11 The Northamptonshire district is in a Radon Affected Area. Public Health England define Radon Affected Areas as those with 1% probability or more of a home having radon above the action levels of 300 Bq m<sup>-3</sup>. It is also noted that shallow soils in this district potentially contain elevated levels of naturally occurring arsenic and vanadium.
- 13.3.12 Notable potential contaminative land uses located within 250m of the proposed alignment include:
- Round Spinney Industrial Estate comprising a number of commercial units including car parts manufacturer, an iron foundry, printing process plant and spray coatings for vehicles, currently located immediately to the east of the southernmost section of the proposed alignment;
  - Moulton Fuel Station which includes underground tanks storing petrol and diesel fuels (typically ~20,000L to 50,000L), associated pipework delivering fuel to dispenser islands and drainage interceptor, currently located 110m to the west of the proposed alignment;
  - Arable agricultural land currently surrounding the proposed alignment may have been subject to fertiliser and pesticide application; and
  - Sand pits historically located approximately 80m to the west of the proposed alignment.
- 13.3.13 No landfills, animal burial sites, tanneries, knackers yard or other notable source of contamination have been identified within 250m of the proposed alignment.

#### **13.4 Value of Environmental Receptors and Resources**

- 13.4.1 The significance of a project effect is a function of the environmental value (or sensitivity) of an environmental receptor and the magnitude of the potential change (impact). In order to determine the significance of an environmental effect, a value must be assigned to the appropriate receptors.
- 13.4.2 The following potential receptors are considered appropriate for preliminary consideration:
- Underlying bedrock geology and superficial deposits;
  - Groundwater resources (Secondary A Aquifers);
  - Surface water bodies, most significantly the Billing Brook and land drains that pass to this water;
  - Built environment;
  - Residents and users adjacent to the proposed alignment;
  - Construction and maintenance workers; and

- Agricultural land along the proposed alignment (Grade 1 to 3 quality).

13.4.3 Potential ecological receptors have not been included in this chapter.

### **13.5 Potential Effects**

13.5.1 The potential effects upon the Geology and Soil quality within the study corridor would manifest as a result of the construction and subsequent operation of the highways improvement scheme. The assessment of the current status of the site with respect to land contamination will be a key aim of the baseline assessment which will include the assessment of potential risk to residents and users of land adjacent to the study corridor, and aim to establish any remedial requirements.

13.5.2 Other potential effects include:

- The aggressivity of the ground conditions constraining the design of the scheme;
- Road cuttings and soil erosion risks – sediment load to surface water bodies (if contaminated this could be a potentially more significant negative effect);
- The potential for local subsidence due to unstable slopes, natural cavities or 'weak' deposits;
- Increased hardstanding cover, compacted soils and reduction in vegetation could lead to a reduction in infiltration and increase in surface water runoff;
- Loss of Grade 1 to 3 quality agricultural land and mineral resource within Mineral Safeguarding and Consultation Area;
- Creation of new migratory pathways between potentially contaminated soils and the underlying aquifers through ground disturbance;
- Introduction of potential contaminating materials, e.g. inappropriate storage and use of fuels, etc. which may impact soil or water resources;
- Generation of waste soils requiring suitable classification and disposal;
- Health of construction workers arising from contact with potential contaminants within the Made Ground and historical landfill or inappropriate procedures and working methods; and
- Potentially contaminated surface water runoff from the proposed scheme may discharge to surface water bodies or groundwater resources.

13.5.3 These impacts have been assessed prior to the consideration of appropriate mitigation. Where such mitigation is considered standard practice, it will be assumed to be embedded in the design which will be subject to the Geology and Soil impact assessment.

### **13.6 Proposed Methodology Including Significance Criteria**

13.6.1 This assessment will be undertaken in general accordance with the guidance presented in:

- Design Manual for Roads and Bridges (DMRB) Volume 11, Section 2, Part 5 Assessment and Management of Environmental Effects, August 2008; and
- Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 11 Geology and Soils, June 1993.

13.6.2 As well as identifying the attribute importance of geology and soils and the significance of the potential effects upon them, there is also a requirement to establish the potential for land contamination within the scheme corridor.

Potential Land Contamination

13.6.3 Baseline studies will be completed to establish the 'geo-environmental' setting and establish the ground conditions within the study corridor with particular emphasis on the value of the geology present, the presence of any historical extractive industries, any history of ground instability and the presence of any significant aquifer resources.

13.6.4 The baseline assessment will utilise the existing Phase I or "Desk Study" investigation, which collates and reviews the available published and publicly accessible background data to establish the ground conditions. The Desk Study also includes a review of the available historical maps and records relating to the use of the study corridor with a view to determining the likelihood of any historic contamination being present prior to development. The Desk Study also includes a Conceptual Site Model (CSM), which would drive intrusive investigation works to refine the CSM.

13.6.5 The assessment method for identifying significant effects from land contamination will be undertaken in line with CLR11. The CSM is reviewed to establish the presence of any 'contaminant linkages', put simply, in order for a potential risk to be identified, a source of risk, a receptor and a pathway between the two need to be identified. In order to assess the potential impact of each of the identified potential contaminant linkages, they will be 'ranked' according to both the probability and severity of any likely impact. This approach is based on guidance presented in CIRIA Document C552 'Contaminated Land Risk Assessment - A Guide to Good Practice 2001'.

13.6.6 For each of the contaminant linkages, an estimate will be made of:

- The potential severity of the risk; and
- The likelihood of the risk occurring.

13.6.7 Table 13.1 presents the classification of the severity of the risk.

**Table 13.1: Contaminant Linkage Severity of Risk Classification**

<b>Severe</b>	Acute risks to human health; and/or Major pollution of controlled waters (watercourses or groundwater)
<b>Medium</b>	Chronic (long-term) risk to human health; and/or Pollution of sensitive controlled waters (surface waters or aquifers)
<b>Minor</b>	Requirement for protective equipment during site works to mitigate health effects; and/or Damage to non-sensitive ecosystems or species

13.6.8 The probability of the risk occurring is classified according to criteria given in Table 13.2.

**Table 13.2: Probability of Risk**

<b>High Likelihood</b>	Contaminant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor
<b>Likely</b>	Contaminant linkage may be present, and it is probable that the risk will occur over the long term
<b>Low Likelihood</b>	Contaminant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so
<b>Unlikely</b>	Contaminant linkage may be present but the circumstance under which harm would occur are improbable

13.6.9 Once the severity and probability have been determined for a contaminant linkage, an overall evaluation of the level of risk is produced, as presented in Table 13.3:

**Table 13.3: Evaluation of Level of Risk**

		<b>Severe</b>	<b>Medium</b>	<b>Minor</b>
<b>Probability</b>	<b>High Likelihood</b>	Very high risk	High risk	Moderate / low risk
	<b>Likely</b>	High risk	Moderate risk	Low risk
	<b>Low Likelihood</b>	Moderate risk	Moderate/ low risk	Very low risk
	<b>Unlikely</b>	Moderate/low risk	Low risk	Very low risk

Value/Sensitivity of Receptors and Resource

13.6.10 Environmental values/sensitivity are assigned to receptors and resources in accordance with the principles established in Volume 11, Section 2, Part 5 of DMRB, 2008. Consideration must also be given to the potential for any post-construction environmental effects, caused by remobilisation of contamination within the ground following disturbance during the construction process.

13.6.11 The environmental value of the relevant receptors is qualitatively described within **Error! Reference source not found.**

**Table 13.4: Environmental Value of Receptors**

<b>Receptor</b>	<b>Value/ Sensitivity</b>	<b>Discussion</b>
Underlying bedrock geology and superficial deposits	Medium	Northern area of study corridor is a Mineral Safeguarding and Consultation Area.
Groundwater resources (Secondary A Aquifers)	Medium	A number of geological units are located beneath the study area, which are classified by the Environment Agency as

**Table 13.4: Environmental Value of Receptors**

<b>Receptor</b>	<b>Value/ Sensitivity</b>	<b>Discussion</b>
		Secondary A Aquifers.
Surface water bodies, most significantly the Billing Brook and land drains that pass to this water feature	Medium	Minor surface water in close proximity to the study corridor.
Built environment	Low	No buildings present within the study corridor.
Residents and users adjacent to the proposed alignment	High	Road will serve proposed residential development (2,000 plots).
Construction and maintenance workers	Medium	Moderate earth works, no building demolition.
Agricultural land along the proposed alignment (Grade 1 to 3 quality)	High	Proposed alignment includes excellent to moderate quality agricultural land.

**14 MATERIALS**

**14.1 Introduction**

14.1.1 Section 3, Part 6 of DMRB Volume 11 requires the assessment of materials. Interim Advice Note 153/11 provides further guidance on the environmental assessment of material resources.

14.1.2 The assessment of materials should consider the use of material resources and the generation and management of waste. It does not include the direct energy use associated with operation of the network. Material resources include the materials and construction products required for implementation of the project, both raw materials and manufactured items.

**14.2 Study Area**

14.2.1 Many material resources will originate off site e.g. construction products. Some will arise on site during construction such as excavated soil and rock or recycled elements of existing roads.

14.2.2 Some impacts will occur off site or possibly outside of the UK. This includes the depletion of non-renewable resources, production of waste at the point of extraction of minerals or during the manufacturing process and transport. As these stages of the process are likely to have been subject to an environmental assessment, they will fall outside of the scope of this assessment. The assessment will concentrate on the impacts and effects resulting from the use of those materials within the proposed scheme.

**14.3 Existing Baseline Knowledge**

14.3.1 The project will inevitably result in surplus material which will need to be disposed of as waste. This usually arises from two sources as follows:

- Existing site materials e.g. concrete from demolition of an existing structure and excavation of material from earthworks.
- Materials brought on to the site but not used for its intended purpose e.g. damaged goods.

**Table 14.1: Summary of materials and waste that have the potential to generate significant effects**

Scheme Process	Type	Potential Use	Potential Waste
Site Clearance	Concrete		✓
	Bricks		✓
	Concrete/Bricks Mix		✓
	Wood		✓
	Bitmac (road planings)		✓
	Iron and Steel		✓
	Mixed metals		✓
	Plastics		✓
	Soil and Stone		✓
	Type 5 A (topsoil/turf)		✓

Scheme Process	Type	Potential Use	Potential Waste
	Type 2 (general excavation/fill)		✓
	Type 4 (landscaping/topsoil)		✓
	Type 6F1 & 2 (aggregates)		✓
	Vegetation		✓
<b>Site Construction</b>	Concrete	✓	✓
	Bricks	✓	✓
	Wood	✓	✓
	Bitmac		
	<i>Base, binder and wearing courses</i>	✓	✓
	<i>SLX tack coat</i>	✓	
	Iron and Steel	✓	✓
	Mixed Metals	✓	✓
	Plastic	✓	✓
	Soil and Stone		
	<i>Type 1 (803 sub-base/capping)</i>	✓	✓
	<i>Type 503 (pipe bedding)</i>	✓	✓
	<i>Type 505 (pipe filter material)</i>	✓	✓
	<i>Reclaimed Hedging Stone</i>	✓	
	<i>Type 5 A (topsoil/turf)</i>	✓	✓
	<i>Type 2 (general excavation/fill)</i>	✓	✓
	<i>Type 4 (landscaping/topsoil)</i>	✓	✓
Vegetation	✓		
<b>Site Operation/ Maintenance</b>	Concrete	✓	✓
	Bricks	✓	✓
	Wood	✓	✓
	Bitmac		
	<i>Base, binder and wearing courses</i>	✓	✓
	<i>SLX tack coat</i>	✓	✓
	Iron and Steel	✓	✓
	Mixed Metals	✓	✓
	Plastic	✓	✓
	Soil and Stone		
	<i>Type 5 A (topsoil/turf)</i>	✓	✓
	<i>Type 2 (general excavation/fill)</i>	✓	✓
	<i>Type 4 (landscaping/topsoil)</i>	✓	✓
	<i>Type 6F1 &amp; 2 Aggregates</i>	✓	✓
	<i>Type 1 (803 sub-base / capping)</i>	✓	✓
	<i>Type 503 (pipe bedding)</i>	✓	✓
	<i>Type 505 (pipe filter material)</i>	✓	✓
Reclaimed Hedging Stone	✓	✓	
Vegetation		✓	

#### 14.4

#### Value of Environmental Receptors and Resources

An assessment will be undertaken to identify how the use of materials conforms to high level strategy targets outlined in the following policy documents:

- The EU Waste Framework Directive 2008

- The Waste (England and Wales) (Amendment) Regulations 2012
- National Planning Policy Framework 2012
- Waste Prevention Programme for England 2013
- Northamptonshire Waste Management Strategy 2012

## **14.5 Potential Effects**

14.5.1 For material resource use, the potential environmental effects will be mainly associated with the extraction and transport of primary raw materials, such as aggregates and the manufacture and transport of products for use in construction. Road schemes such as that proposed will consume large quantities of materials and will therefore have permanent direct effects on the environment e.g. the depletion of natural resources and the embodied energy associated with the manufacture and transport of materials.

14.5.2 The potential environmental effects arising from waste will be associated with production, transport, processing and disposal. The assessment will identify the quantities and types of waste to be produced.

14.5.3 The use of materials and management of waste may give rise to other impacts to be assessed elsewhere in the ES, such as detrimental impacts on air quality and increased noise.

## **14.6 Proposed Methodology Including Significance Criteria**

14.6.1 For the purpose of assessing the effects associated with materials use and waste, the assessment will aim to identify and quantify the following:

- The types and quantities of materials required for the project;
- Details of the source of materials;
- The cut and fill balance;
- The types and quantities of forecast waste arising from the project, including the identification of any forecast hazardous waste;
- Waste that requires storage on site prior to re-use, recycling or disposal;
- Waste to be pre-treated on site for re-use within the project;
- Waste requiring treatment and/or disposal off site;
- The impacts that will arise from the issues identified in relation to materials and waste;
- A conclusion about the magnitude and nature of the impacts; and
- The identification of measures to mitigate the identified impacts.

- 14.6.2 The assessment will identify whether the impacts are positive or negative, permanent or temporary and direct or indirect. Permanent impacts are likely to be significant in terms of their effects. The quantities of materials to be used and the waste forecasts will be used to identify the magnitude for change.

**15 CUMMULATIVE EFFECTS****15.1 Cumulative Effects**

15.1.1 In accordance with legislation the DMRB Volume 11, Section 2 Part 5: Assessment and Management of Environmental Effects (HA205/08) requires that Cumulative Effects are assessed as part of the assessment process.

Methodology

15.1.2 The DMRB identifies two types of cumulative impact in environmental assessment:

- Cumulative effects from a single scheme (acknowledging the outcomes of each of the environmental topics assessed for the proposed scheme); and
- Cumulative effects from different schemes (assessed in combination with the scheme in question).

15.1.3 The approach to identify the likely cumulative effects arising from the proposed scheme and its interaction with other schemes will be based upon guidance contained within DMRB. However, this guidance will be adapted in order to make it relevant to each environmental topic being considered as part of the assessment.

Study Area

15.1.4 DMRB guidance on the assessment of cumulative effects requires that the spatial boundary of the receptor/resource with potential to be affected directly or indirectly is considered. The study area will be set for each individual topic in line with DMRB Guidance. In setting the study area consideration will be given to schemes that:

- will be occurring at times prior to or during construction of the proposed scheme;
- are 'in proximity' to the proposed scheme; or
- are considered likely to result in environmental effects which could act in synergy with effects arising from the proposed scheme.

15.1.5 Although the construction programmes of individual projects may not necessarily overlap, cumulative effects could still occur due to residual effects continuing after a project is operational, for example as a result of maintenance works.

15.1.6 In order to carry out the assessment it will be necessary to define the location and timing of nearby potential developments. In effect, the 'study area' will encompass all schemes which are 'committed' including (but not necessarily limited to):

- Trunk Road projects which have been confirmed (i.e. gone through the statutory processes) in proximity to the scheme; and
- Development projects with valid planning permissions as granted by the Local Planning Authority, and for which statutory EIA is a requirement or a non-statutory EIA has been undertaken.

- 15.1.7 Although the assessment will primarily include developments that are likely to occur and have some form of planning/land use approval, speculative developments will also be mentioned, specifically when their approval is fairly certain and if they are likely to have significant impacts.

#### Identification of Cumulative Effects Receptors

- 15.1.8 Receptors are defined as a resource or user group that may experience a cumulative effect. The receptors considered within each cumulative effect assessment will be dependent on the environmental topic under consideration.

#### Data Collection

- 15.1.9 The main source of data for the cumulative effects assessment will be the outcomes and information obtained from the individual environmental topic assessments. The assessment of cumulative effects arising from the proposed scheme in combination with other schemes will primarily constitute a desk-top study of planning documents broadly covering the location of schemes (if any are identified) considered relevant to the assessment.

- 15.1.10 Liaison will be undertaken with the Local Planning Authority to determine whether other schemes in the vicinity of the proposed scheme should be taken into consideration.

- 15.1.11 The focus of the desk-top study will be the collection of information relating to the background of relevant projects, their expected timelines and likely environmental impacts.

## **15.2 Assessment of the Potential for Cumulative Effects**

### Construction

- 15.2.1 Receptors most at risk from cumulative effects, during scheme construction, are those in close proximity to construction activities. Cumulative effects arising from construction phase activities are likely to relate to visual intrusion, dust, noise and vibration.

- 15.2.2 The severity of cumulative effects would be dependent upon:

- The type of works being undertaken;
- The duration of the works;
- The distance between the works and their respective proximity to the receptor;
- The sensitivity of the receptor; and
- The visible presence of the works.

- 15.2.3 Temporary land-take required for ancillary works such as compounds, diversions or working space and material storage would also have environmental impacts.

- 15.2.4 Indirect cumulative effects as a result of construction can also occur. To avoid disruptions to traffic flow caused by construction works, drivers sometimes choose to travel on surrounding roads, known as 'rat-running'. This can affect traffic flows on roads not directly affected by the construction works. Rat-running can result in

reduced air quality, increased noise, reduced amenity etc. Rat-running is a common concern at a local level although by, for example, effective traffic management or night-time working then it may be possible to reduce the risk of rat-running.

#### Operational

- 15.2.5 The prediction and evaluation of cumulative effects is not straightforward as the interaction between schemes is potentially complex and subject to change if projects are delayed or postponed. Contributing to the complexity is the variations in the geographical proximity of other schemes.
- 15.2.6 Furthermore, the significance of individual scheme impacts on each receptor will play a role in the overall importance of the effect; highly likely to be at least as significant as the most important contributory environmental impact. Therefore cumulative effects are considered according to the frequency of impacts upon receptors in the identified locality, as well as the significance of the impacts on each receptor.
- 15.2.7 For example, the majority of developments are likely to affect transport movements to a certain degree. A multitude of developments occurring at the same time would adversely affect local travellers to a degree greater than the disruption caused by one scheme alone. By contrast, a string of developments one after another would result in a prolonged period of disruption to travellers, although the location of the developments would play an important role in the significance of the effect.
- 15.2.8 Ecologically, habitats close to the road are commonly subjected to cumulative effects; possibly experiencing a combination of edge effects, light and noise pollution and reduced air quality as a result of the same development. If another development is occurring at the same time then significance of the effects experienced by the habitat would be increased.
- 15.2.9 Overall, cumulative effects are anticipated to diminish in the longer term. As local residents or receptors become accustomed to post-construction conditions the impact may become measurably less significant (for example the recovery of ecological areas after the effects of multiple schemes), or may be perceived to be less significant, for example, acclimatisation to noise levels.

### **15.3 Potential Developments to be Considered**

- 15.3.1 The potential developments to be considered in the cumulative effects assessment will be agreed with NCC.