

# **A19 Downhill Lane Junction Improvement Preliminary Environmental Information**

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## PREFACE

Highways England is responsible for the maintenance and improvement of the trunk road and motorway network in England. Highways England's key objectives are to achieve safe roads and reliable journeys for informed travellers.

Highways England has appointed Costain as the Designer for the A19 Downhill Lane Junction Improvement. Costain has appointed Jacobs as their Design Partner.

The roles of the Designer and Design Partner include preparation of the preliminary design of the proposed scheme, carrying out the environmental impact assessment (EIA) and preparation of the application to the Secretary of State through the Planning Inspectorate (as responsible agency) for a Development Consent Order (DCO). The Secretary of State for Transport will make the final decision on whether or not a DCO is granted for the scheme.

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# 1 INTRODUCTION

## 1.1 Background

- 1.1.1 Highways England intends to improve the A19 Downhill Lane junction; hereafter referred to as the 'Proposed Scheme'. The A19 is a major route running from Doncaster to the north of Newcastle. It is the main route linking Tyne and Wear with Teeside to the south and to the north of England via the A1.
- 1.1.2 Downhill Lane junction is located just over 5 km south of the Tyne Tunnel and approximately 1.2 km south of the A19/A184 Testos junction. Downhill Lane junction forms the junction between the A19 and the A1290, which is one of the main access routes for the Nissan car plant and Washington Road, which runs into north Sunderland. The location of the Proposed Scheme is shown on Figure 1-1.
- 1.1.3 Details of the way in which the road would be improved and why the improvement is needed are in Chapter 2 of this document. The key objectives of the Proposed Scheme are to:
- Improve road safety at the junction;
  - Relieve congestion; and
  - Minimise the environmental impacts of the proposals.
- 1.1.4 This Preliminary Environmental Information (PEI) report is written in as non-technical a style as possible, to make it accessible and clear to a wide, non-specialist audience. Where necessary, technical information is given in footnotes (e.g. cross references to legislation and

regulations). Where the use of technical terminology is used, an explanation is given in the text.

- 1.1.5 This report makes reference to an improvement scheme for the A19/A184 Testos junction as well as the Downhill Lane junction proposals. The two Schemes are physically linked and until 2015 were considered as a combined scheme. While reference may be made to the Testos junction proposals, the information presented in this PEI report is specific to the Downhill Lane junction improvement scheme.

## 1.2 Environmental impact assessment

- 1.2.1 The Proposed Scheme has a total footprint of approximately 27.5 hectares and is a highway 'alteration' project, which means it will require a Development Consent Order (DCO) as a Nationally Significant Infrastructure Project (NSIP) under Section 22 of the Planning Act 2008 due to exceeding the 12.5 hectare threshold. Its size also means the Proposed Scheme is classified as an Annex II highway development and due to the potential for there to be significant environmental effects an Environmental Impact Assessment (EIA) will be required in line with the European EIA Directive<sup>1</sup> and Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended); the latter is hereafter referred to as 'the EIA Regulations'. Though newer EIA Regulations came into force in 2017, the 2009 EIA Regulations apply to the Proposed Scheme as a result

<sup>1</sup> Council Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 *on the assessment of the effects of certain public and private projects on the environment* (as amended by Directive 2014/52/EU).

of the Scoping Report being submitted to the Planning Inspectorate prior to the 15<sup>th</sup> May 2017<sup>2</sup>.

- 1.2.2 EIA is a statutory, systematic process to identify, predict and evaluate the environmental effects of a proposed project. Its primary purpose is to provide environmental information to those who will make the decision as to whether a project should go ahead. However, during the process of preparing this information the EIA will also have an important influence on the design of the Proposed Scheme, since it enables early identification of potential environmental impacts and, where possible, their avoidance through sensitive design. In addition, the EIA identifies enhancement opportunities that could be incorporated into the design, where appropriate.
- 1.2.3 EIAs for NSIPs are reported in two stages, as follows:
- A PEI report is prepared, to inform consultation with the public about the Proposed Scheme; and
  - Following consultation with the public, an Environmental Statement (ES) is prepared to accompany the application for a DCO.
- 1.2.4 The ES will provide the detailed environmental information to be considered by decision makers.
- 1.2.5 This report is the first stage of reporting - the PEI.

### 1.3 EIA methodology and scope

- 1.3.1 The development and design of major highway projects is governed by guidance set out in the 15 volumes of the Design Manual for Roads and Bridges (DMRB). Volume 11<sup>3</sup> of DMRB provides guidance on EIA that is specifically applicable to highway projects. Volume 10 of DMRB<sup>4</sup> covers environmental mitigation.
- 1.3.2 The nature and scope of the work required for this EIA, as a whole and in relation to each individual topic, was defined by Highways England in an EIA Scoping Report. The EIA Scoping Report sets out the proposed scope of coverage, approaches and methodologies to be applied to the EIA and ES production as a whole, and to each individual environmental topic.
- 1.3.3 The EIA Scoping Report was issued with a request for a statutory Scoping Opinion to the Planning Inspectorate on 15<sup>th</sup> May 2017. The Scoping Opinion was received on 23<sup>rd</sup> June 2017 following the statutory consultation period. The ES will include an analysis of the Scoping Opinion and an explanation of how each point has been considered or taken into account in implementing the EIA.
- 1.3.4 The EIA will consider both direct and indirect effects, with the indirect effects being “*those that alter the character, behaviour or functioning of the affected environment because of the knock-on impacts over a wider area or*

<sup>2</sup> The Infrastructure Planning (Environmental Impact Assessment) Regulations, 2017 entered force on 16<sup>th</sup> May 2017.

<sup>3</sup> Highways Agency (1993, updated 2008). *The Design Manual for Roads and Bridges: Volume 11, Environmental Assessment*. Available from: <http://www.dft.gov.uk/ha/standards/ghost/dmrb/vol11/index.htm>

<sup>4</sup> Highways Agency (2001). *Design Manual for Roads and Bridges: Volume 10, Environmental Design and Management*. Available from: <http://www.dft.gov.uk/ha/standards/DMRB/vol10/index.htm>

- timescale*”, or “*the effects related to pressure as a result of project-induced change*”<sup>5</sup>.
- 1.3.5 The ‘baseline’ for the measurement of environmental effects is not the situation as it exists now, but the situation as it would exist immediately before the implementation of the scheme. This means that the identification of baseline conditions will take into account potential changes likely to occur before implementation of the scheme, that are entirely independent of the proposed scheme.
- 1.3.6 All assessments are based on the professional judgement of the relevant environmental specialist, supported by the application of published topic-specific guidance found in DMRB where this is available. An outline of the method of assessment, study area and issues to be assessed for each discipline topic is provided in each of the topic-specific Chapters 6-14 of this PEI report.
- 1.3.7 Certain environmental issues are not DMRB topics in their own right:
- Climate change mitigation (emissions) is addressed in the ‘Air Quality’ assessment;
  - Climate change adaptation in terms of flood risk is addressed under ‘Road Drainage and the Water Environment’;
  - Sustainability issues are addressed under ‘Materials’; and
  - Aspects of human health are addressed in: Air Quality, Noise and Vibration, and People and Communities.
- 1.3.8 Where there would be adverse environmental effects, mitigation measures are required. The purpose of any mitigation measure is to eliminate the effect or, where this is not possible, to reduce its significance. Where appropriate, statutory Consultee Bodies will be consulted before determining the measures or combinations of measures to be used in mitigation.
- 1.3.9 Effects that would still occur after the mitigation measures are taken into account are referred to as ‘residual’ effects.
- 1.4 Purpose of this preliminary environmental information report**
- 1.4.1 This report sets out the preliminary results of Highways England’s investigations into the potential environmental effects of a proposed improvement to Downhill Lane junction, near West Boldon in South Tyneside.
- 1.4.2 The aim of the PEI Report is to provide members of the community and other interested parties with a basic understanding about the design and environmental issues relating to the Proposed Scheme, including potential environmental effects and potential measures to reduce these effects. This will enable them to prepare well informed responses to consultation. After the consultation, the PEI will inform the development of the design and Environmental Statement.
- 1.4.3 Consultation at this stage follows previous consultations with the community in 2015, when the Proposed Scheme was presented as a combined scheme with Testos junction and in 2016 focusing specifically on Downhill Lane junction. The previous consultations were about

<sup>5</sup> DMRB, Volume 11 Section 2 Part 5 (HA 205/08), paragraph 1.50 i. and ii.

choosing the best option for the improvements. The current consultation is about more detailed proposals that have been developed for the option selected to be developed. Further details about consultations to date are outlined in Chapter 4 of this report.

- 1.4.4 It should be noted that at this stage, the information provided is **preliminary**. It is based on a design in which Highways England have confidence, but which is not completely finalised. Some minor changes may yet occur before an application for consent is made. The EIA is still in progress, in parallel with ongoing finalisation of the design. This ongoing work will confirm the scale and significance of predicted environmental effects arising from the Proposed Scheme design, and the mitigation proposed to address those effects, where appropriate and achievable. The final ES will accompany an application for a DCO that is expected to be submitted in Spring 2018.

## 1.5 Scope and content of the PEI

- 1.5.1 This PEI is organised in a similar way to the future ES, with the main text divided into four parts:
- Chapters 2 to 5 describe the Proposed Scheme, consultations and an overview of the environment.
  - Chapters 6 to 14 present a preliminary assessment of the potential effects of the Proposed Scheme in relation to nine specialist topics covering particular aspects of the environment.
  - Chapter 15 considers the inter-relationships between the topics covered in Chapters 6 to 14, and between the Proposed Scheme and other developments in the

surrounding area; these are known as cumulative effects.

- Chapter 16 outlines the next steps.

- 1.5.2 Since the Proposed Scheme is a highway project, the design and assessment is guided by the Department for Transport's DMRB<sup>6</sup>, supplemented by Interim Advice Notes (IANs). Guidance on EIA in volume 11 of the DMRB and relevant IANs sets out the main environmental topics to be considered in an EIA. The nine specialist topics identified as applicable to the Proposed Scheme and explored in Chapters 6 -14 are:

- Chapter 6 - Air quality;
- Chapter 7 - Cultural heritage;
- Chapter 8 - Landscape and visual effects;
- Chapter 9 - Ecology and nature conservation;
- Chapter 10 - Geology and soils;
- Chapter 11 - Materials;
- Chapter 12 - Noise and vibration;
- Chapter 13 - People and communities; and
- Chapter 14 - Road drainage and the water environment.

- 1.5.3 Each environmental topic chapter in this report (Chapters 6 - 14) covers the following:
- An introduction to the topic, method of assessment and its study area;

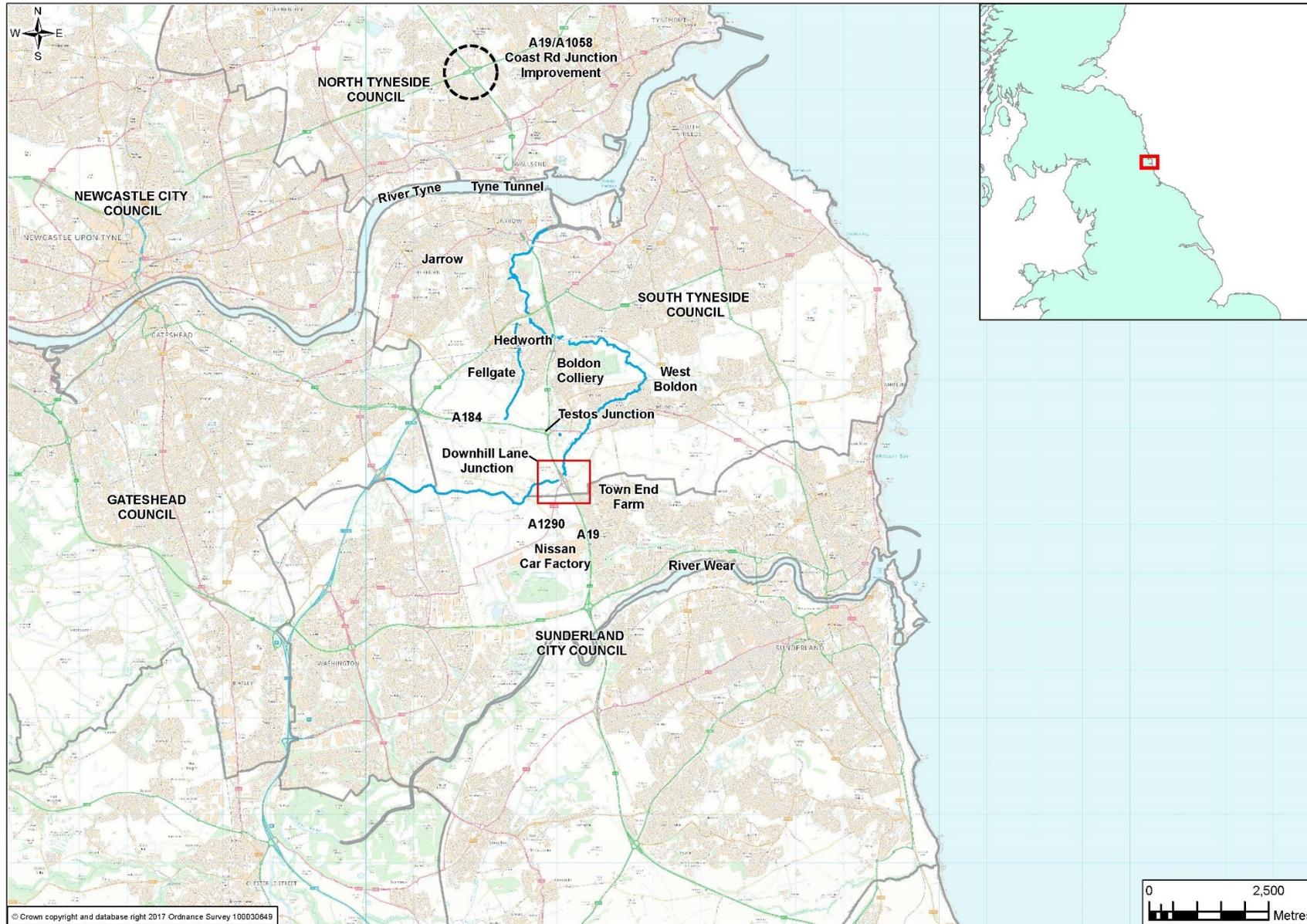
<sup>6</sup> The Highways England et al. (1993). Design Manual for Roads and Bridges.

- An overview of the baseline environmental conditions;
- The likely effects that the Proposed Scheme would have on that environmental aspect during construction and operation; and
- Potential types of mitigation that are under consideration to seek to minimise any effects of the Proposed Scheme during construction and operation.

1.5.4 In addition to supporting the consultation of the local community and general public, this PEI report will be used to consult a range of stakeholders, including:

- Local land owners and land interests;
- Local businesses;
- External statutory bodies, such as Natural England; Historic England and the Environment Agency;
- Local planning authorities (South Tyneside Council and Sunderland City Council);
- Neighbouring local authorities (this includes North Tyneside Council, Newcastle-upon-Tyne City Council, Gateshead Council and County Durham Council); and
- Non-statutory key stakeholders.

**Figure 1-1 Location of Downhill Lane junction**



## 2 SCHEME DESCRIPTION

### 2.1 Location of the scheme

2.1.1 The location of Downhill Lane junction is illustrated in Figure 1-1. It is located in South Tyneside, approximately 5 km south of the Tyne Tunnel entrance at Jarrow. It lies in a narrow belt of countryside that separates the urban areas of South Tyneside and Sunderland. The next junction is approximately 1.2 km to the north at Testos. The junction of the A19 and the A1231 is also approximately 2.6 km south of Downhill Lane.

2.1.2 Residential areas lie close to the Proposed Scheme, at Town End Farm, which is a dense residential area approximately 350 m to the south-east. The Chalet and Usworth cottages are located approximately 800 m to the south-west of the Proposed Scheme. There are commercial properties, such as the North East Aviation Museum, located to the north of Washington Road and the Three Horse Shoes pub is located south of the A1290. The Gateshead College Skills Academy lies approximately 150 m to the east of the A1290. The Nissan Manufacturing Plant lies approximately 1 km south of the Proposed Scheme.

### 2.2 Background to the project

2.2.1 The A19 is a strategic route running from Doncaster to north of Newcastle via York. More locally, it links the Tyne and Wear conurbation with Teesside. From the south, it connects the A1 at Dishforth and areas in between (including Middlesbrough and Sunderland) to South Tyneside, and then on to the Tyne Tunnel to the north. North from Testos junction, located 1 km north of Downhill Lane junction, the A19 also forms part of a Tyneside

eastern orbital route, crossing the River Tyne via the Tyne Tunnel and meeting the A1 again at Seaton Burn Interchange.

2.2.2 The A19 dual carriageway runs approximately north-south via Downhill Lane junction. Downhill Lane itself crosses above the A19 via an overbridge. The A1290 also joins this junction from the south-west.

2.2.3 Future developments on land to the north of the Nissan Manufacturing plant, south-west of Downhill Lane junction, are likely to significantly increase the amount of traffic using Downhill Lane junction. The current capacity of the junction would not be sufficient for the anticipated additional traffic and would therefore affect the A19 and local roads.

2.2.4 The current capacity of Downhill Lane junction is limited by its single bridge and lack of a full circulatory system. The Proposed Scheme aims to increase capacity by providing a second bridge and create a full circulatory system above the A19 at Downhill Lane junction.

### 2.3 Scheme history

2.3.1 The improvement of Downhill Lane junction became part of the Department for Transport's Road Investment Strategy in 2014. Initially, Highways England considered combining the Downhill Lane junction improvements with an ongoing scheme to improve the neighbouring Testos junction. However, the Testos Junction Improvement scheme was at a more advanced stage and was therefore progressed as a separate project to avoid delaying the DCO application for that scheme whilst the proposals for Downhill Lane junction were being developed.

2.3.2 The Preferred Route for the Downhill Lane junction improvement was announced by the Secretary of State on the 30<sup>th</sup> June 2017.

## 2.4 Road investment strategy

2.4.1 The Road Investment Strategy Part 1 (RIS 1) for the 2015/16 to 2019/20 Road Period, published by the Department for Transport, announced that Downhill Lane junction would be improved to support local plans for an International Advanced Manufacturing Park (IAMP) to the north of the existing Nissan plant.

2.4.2 The A19 Downhill Lane Junction Improvement Scheme is being designed with the following key objectives in mind:

- **Supporting economic growth** - This will be achieved by improving the attractiveness of the area for the IAMP and other prospective developers and businesses by improving road access. The Proposed Scheme would help connect key employment sites, schools, colleges and residential areas, thereby delivering major benefits.
- **A safe and serviceable network** - The Proposed Scheme aims to reduce accidents, provide safer crossings for non-motorists and improve journey time reliability, leading to a reduction in driver stress.
- **A more free-flowing network** - The traffic model used to develop the Proposed Scheme predicts that road users travelling through the junction would benefit significantly from reduced journey times as a result of the proposal.
- **Improved environment** - The environmental effects resulting from the Proposed Scheme have been

considered during the options identification stage. Measures to mitigate effects on the local environment and opportunities to provide enhancements will be further developed as the design progresses.

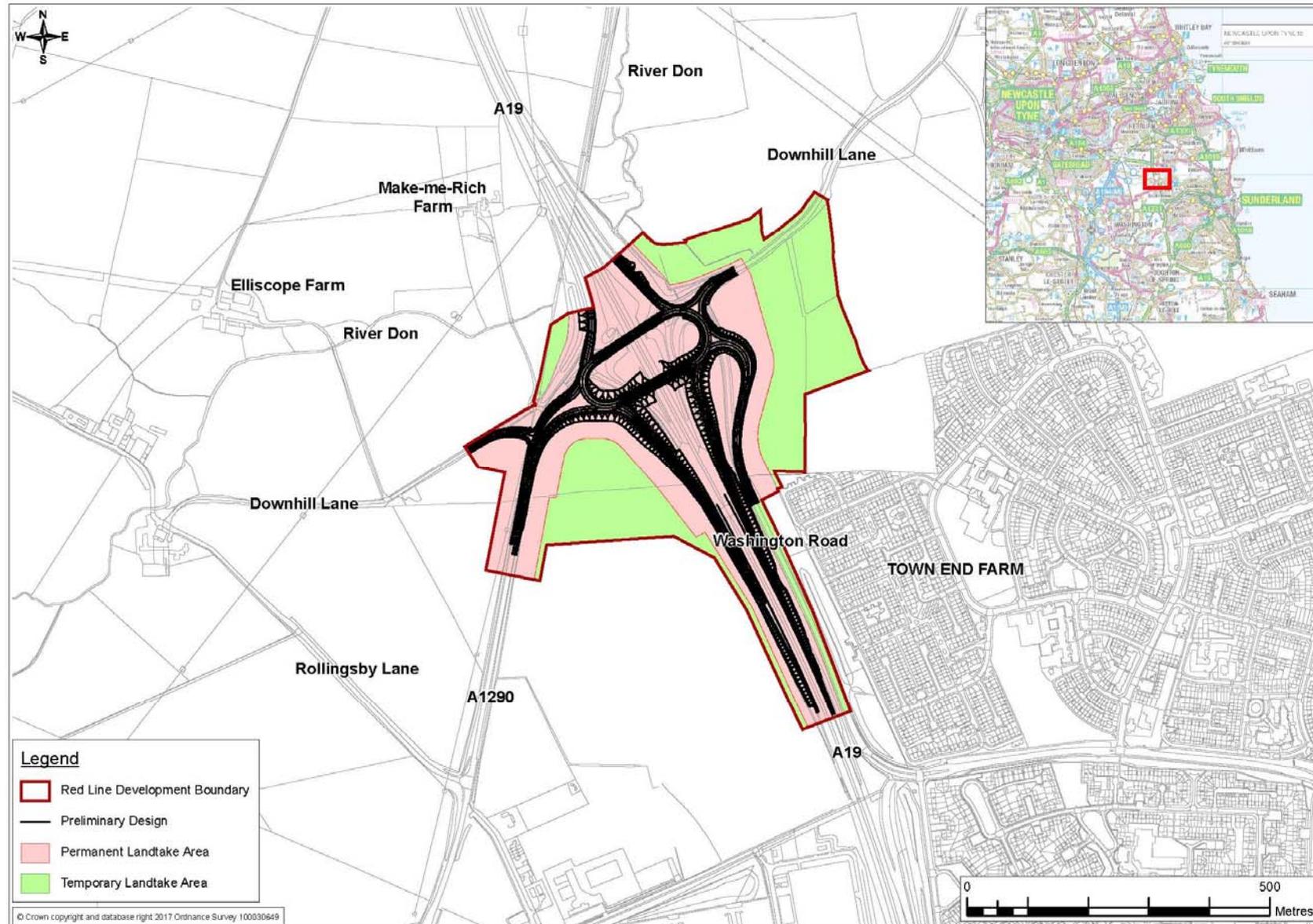
- **An accessible and integrated network** - The Proposed Scheme would provide improved connectivity with the local road network. We are investigating ways to maintain existing facilities for pedestrians, cyclists and horse-riders and, where possible, provide enhancements. We will continue to work with the local access forum and user groups to develop our proposals.

## 2.5 Proposed A19 junction design

2.5.1 Downhill Lane junction would be improved from a signalised priority, grade-separated junction with a single bridge crossing, to a two-bridge, grade-separated roundabout junction (see Figure 2-1).

2.5.2 A new overbridge would be constructed to the south of the existing A19 overbridge creating a circulatory carriageway over the A19. The improvement would require re-alignment of Washington Road and Downhill Lane to the east of the junction. The existing northbound diverge and southbound merge at Downhill Lane junction would be modified to provide connectivity between the A19 mainline and the proposed grade separated roundabout. A new northbound and southbound link road would connect Downhill Lane junction to the Testos junction, approximately 1.2 km north of Downhill Lane junction.

Figure 2-1: Proposed Scheme Layout



2.5.3 Due to the close proximity of the Testos and Downhill Lane junctions, there is insufficient length to provide a northbound merge slip road and a southbound diverge slip road to and from the A19 between the two junctions. Therefore, southbound traffic on the A19 would have to use the southbound link road for access to Downhill Lane junction; likewise, traffic from Downhill Lane junction would have to use the northbound link road for access to the A19 northbound.

### Structures

2.5.4 Two overbridges would be required as part of the Downhill Lane junction improvement. A new overbridge would be provided immediately south of the existing overbridge at Downhill lane junction. It has been assumed that the existing overbridge would be reused as part of the junction improvement. However, a structural assessment is to be carried out to ascertain whether it can be used in its current state, requires strengthening or needs replacing.

### Earthworks

2.5.5 The improvement at Downhill Lane junction would require embankments of approximately 6.5 m AOD. A maximum earthworks slope profile of 1V:2.5H would be applied throughout the Proposed Scheme.

### Drainage

2.5.6 The proposed drainage for the Downhill Lane junction improvements would generally follow existing drainage patterns. The mainline and all four slip roads would drain to the north to outfall into the River Don via a proposed attenuation pond. It is currently proposed that the Testos Junction Improvement Pond 1 would be used for attenuation, but a new pond would be required should the

ongoing design of this Testos scheme pond preclude this. Flows would be attenuated to greenfield rates.

2.5.7 The A1290 to the west of the junction would drain away to existing highway drainage. Existing geocellular storage at the junction would need to be replaced and re-sized appropriately.

2.5.8 The realigned Downhill Lane East and Washington Road Link would drain to an existing tributary of the River Don. There is an existing outfall at this location which would be re-used if possible, pending further survey work. Options for the layout of the junction in the vicinity of Downhill Lane East and Washington Road Link are currently being finalised. An assessment of the increase to paved areas will then be made and attenuation provided accordingly.

2.5.9 The drainage infrastructure proposed at this stage is standard; i.e. a mixture of concrete surface water channels, kerb and gully and combined kerb drainage units for edge of carriageway surface water collection. Carrier drains, a few filter drains and possibly an open ditch at the toe of embankments would be used to convey the water to the outfall. Attenuation and flow control are proposed at all outfalls, with the possible exception of Downhill Lane East where there may be no net increase in paved area. Sub-surface drainage would be provided in the form of narrow filter or fin drains.

2.5.10 The north of the Proposed Scheme lies adjacent to the River Don floodplain, but there are no known flooding issues associated with the existing road drainage. It has been a scheme design objective to avoid any impact on the Don Culvert under the existing A19 and slip roads.

### Lighting and other infrastructure

- 2.5.11 Existing highway lighting is present at Downhill Lane junction.
- 2.5.12 It is assumed at this stage that the improved junction would only need to be partially lit. Downhill Lane junction itself would continue to be lit as well as a short distance on the exits and immediate approaches to the junction. The length of road that would be lit on the approaches to the junction would be based on the predicted queue lengths.
- 2.5.13 There would also be changes to road signs and other roadside infrastructure, such as installing new or re-locating existing road signs, fencing and barriers.

### Non-Motorised User Facilities

- 2.5.14 Proposals to provide facilities for pedestrians, cyclists and horse-riders (referred to as 'non-motorised users', or NMUs) were discussed with the Local Access Forum (LAF) on 19<sup>th</sup> June 2017, where a number of NMu options were presented as outlined in Table 2.1.
- 2.5.15 NMu connectivity will be maintained and, where feasible, enhancements would be provided. NMu objectives have been set out with the aim of improving conditions for NMUs as part of the proposed works. These objectives are as outlined below:
- Ensure the new junction at least replicates all existing connectivity for pedestrians, cyclists and equestrians across the A19 and between Bridleway B46, Downhill

Lane, Washington Road, the A1290 and Follingsby Lane either side of the A19.

- Ensure that facilities are provided to a standard that enable cyclists and equestrians to cross the A19 safely without dismounting or the need for advisory 'cyclists dismount' signs.
- Introduce measures to improve cyclist convenience and safety at Downhill Lane junction.
- Improve the safety of the southern tie-in of bridleway B46 into Downhill Lane junction, eliminating the current 'shortcutting' along the slip roads and across the A19.
- Address the markings and layout of signals at Downhill Lane junction and ensure the new design is more compatible/ convenient to all NMu user needs.
- Ensure the IAMP development is considered carefully within the Proposed Scheme and that it does not deteriorate NMu facilities.
- Ensure accessibility and safety of all new and replaced provision for vulnerable users.

**Table 2.1: Screening of NMU Options**

NMU Options	Key Concerns from Consultation Feedback
<p><b>Option 1:</b> An at-grade solution retaining the existing desire-line, crossing directly over the existing bridge between Downhill Lane to the east and the A1290/Downhill Lane to the west. The NMU facility would be widened on the north side of the existing bridge with at-grade crossings of the northbound on-slip to the A19 and the southbound off-slip, as well as Downhill Lane and Washington Road to the east.</p> <p>The at-grade crossings would be signalised where possible, but it was noted that there is a strong desire from other stakeholders for free-flow lanes on the northbound on-slip and this would not be compatible with a signalised crossing.</p>	<ul style="list-style-type: none"> <li>• The location of the signalised crossing for Option 1 was not ideal, coming just after the exit from the roundabout and there was concern that Option 1 would continue to be difficult for NMUs to navigate as the signalised crossing is complex and in inconvenient locations.</li> <li>• In general, all options utilising underpasses were not preferred. Concerns about difficulties for horse riders in accessing the underpasses were raised and also anti-social behaviour concerns within the underpasses.</li> <li>• Noise was a concern for Options 2 and 4 as NMUs would be confined within the roundabout at different levels while using the facility, with specific concerns about the effect of noise on horses.</li> </ul>
<p><b>Option 2:</b> A mainly grade-separated solution, using an underpass beneath Downhill Lane to the east and three underpasses beneath segments of the roundabout to link the NMU facilities either side of the junction to the interior of the roundabout. Looped ramps would raise the facility to the level of the new, southern bridge to cross the A19. The relative levels do not permit the use of an underpass to cross from the interior of the roundabout to Downhill Lane to the west, so this link is achieved with an at-grade signalised crossing, in two stages via a traffic island.</p>	
<p><b>Option 3:</b> A mainly grade-separated solution using a dedicated NMU bridge to cross the A19. The bridge would be located approximately 200m south of the new south bridge at the junction. An at-grade crossing would be provided over Downhill Lane to the east and an underpass beneath Washington Road. It was assumed that the facility to the west would tie-in to provision being made by the IAMP on the A1290 and no specific crossing provision has been identified for the A1290, but it is recognised that a crossing facility would be required.</p>	
<p><b>Option 4:</b> A variant of Option 2, with one less underpass (using an at-grade crossing of Downhill Lane instead of an underpass).</p>	

2.5.16 As a result of the feedback outlined in Table 2.1, the NMU options were amended and the two options being taken forward to the statutory consultation in September 2017 are:

- **Option 1B** - provides NMU routes through Downhill Lane Junction via a combination of at-grade crossings; located at signalised points around the roundabout, and an independent NMU bridge over the A19; located within the junction roundabout. Where possible the NMU route will be taken away from the carriageway to provide separation of NMU and motorised traffic.
- **Option 2A/B** - provides NMU routes around Downhill Lane Junction via a separate NMU bridge over the A19 and Washington road; located to the south of the junction, and either an at-grade signalised crossing of, or underpass beneath, Downhill Lane. Where possible the NMU route would be taken away from the carriageway to provide separation of NMU and motorised traffic. Estimates of change in journey times take into consideration an at-grade signalised crossing of Downhill Lane junction.

## 2.6 Construction proposals

2.6.1 Subject to development consent being granted, construction work would start in Autumn 2019 and be complete by Spring 2021. There would be the potential to work at the weekends as well as nights throughout the whole works programme, which could help bring forward the estimated completion date. Prior to any construction work commencing, there would be a mobilisation period, including traffic management installation and site enabling

works. Traffic management would typically comprise lane closures, lane narrowing and speed restrictions for the duration of the works, with supporting temporary CCTV cameras. However, the contractor is required to keep two lanes of traffic open in each direction throughout construction, except during occasional night closures (e.g. for installing bridge beams).

2.6.2 Construction of the Downhill Lane junction improvements would take place largely in parallel with construction works for the A19/A184 Testos Junction Improvement scheme which is planned to start on site in December 2018 / January 2019 and be complete around the same time as the Downhill Lane scheme. It is expected that the two schemes would open simultaneously.

2.6.3 The Contractor would produce and manage a Construction Environmental Management Plan (CEMP) in advance of the start of construction. An outline CEMP would be produced to accompany the application for a DCO. The CEMP would identify relevant environmental aspects and management / working procedures to avoid environmental incidents on site or degradation of environmental features as a result of the works, together with response plans if incidents were to occur. It is anticipated that the CEMP would incorporate a Site Waste Management Plan, a Materials Management Plan and a Soils Management Plan, or that these would be prepared as separate documents. The plans would be subject to review and approval by Highways England. Implementation and adherence to these plans would all be subject to regular audit.

### **Materials Import**

- 2.6.4 It is expected that fill material would need to be imported to the site. The estimated bulk earthworks cut (extracted) volume would be 9,619 m<sup>3</sup> compared to a fill volume of 103,146 m<sup>3</sup>. These values have been derived from the options stage design and are subject to change as the design progresses.
- 2.6.5 A Traffic Management Plan would be developed for the Proposed Scheme that would put in place mechanisms to manage construction traffic resulting from the Proposed Scheme.

### **2.7 Changes in traffic**

- 2.7.1 Downhill Lane junction provides access from the trunk road network to both the existing Nissan Manufacturing Plant and the proposed IAMP. To accommodate the anticipated traffic growth at this location, the Proposed Scheme was identified in the Road Investment Strategy as having the potential to provide significantly enhanced capacity at the junction. Currently Downhill Lane junction becomes congested before and after the Nissan plant shift changes. The highest existing traffic flows on Downhill Lane Junction occur between 06:15 and 06:45 as traffic bound for Nissan queues on the Downhill Lane junction slip roads. These queues regularly block the inside lane of the A19 dual carriageway mainline causing a significant safety hazard. Significant queueing occurs on the A1290 on the approach to Downhill Lane junction during the evening peak as Nissan workers leave site after the shift change. It is recognised that the highway infrastructure at this location will need to be significantly improved both to solve current congestion issues and to support the

planned expansion of Nissan and proposed IAMP development.

- 2.7.2 Due to their close proximity, the interaction between the A19 Testos Roundabout and Downhill Lane junctions has a critical influence on the design of any improvement at Downhill Lane. Also, any major changes to the layout or usage of Downhill Lane junction would likely have a significant impact on the functionality of A19 Testos Roundabout.

### **2.8 Maintenance proposals**

- 2.8.1 Operational maintenance of the A19 would experience relatively few changes as compared to the current situation. Existing maintenance activities include inspection and repair of barriers and signage, drain inspection and clearance, road repairs and road verge / vegetation maintenance (amongst other activities). For Highways England and parties acting on their behalf, future maintenance activities would include these same tasks, plus the addition of inspection and maintenance of the new bridge and the balancing pond, including any oil interceptors.
- 2.8.2 Due to the high number of NMUs using the cycle paths, the design would seek to keep these clear of vegetation as part of the future maintenance programme.

### 3 SCHEME ALTERNATIVES

3.1.1 Six design options (A to F) were shortlisted for consideration in 2016. Option A, in Figure 3-1, was taken to a public consultation in December 2016 as the preferred option because:

- It is the most cost effective option, providing similar or greater benefits to other options, but at a lower cost.
- It provides the best fit with the Testos preferred route design so it would have no impact on the programme to deliver the improvements at Testos junction.
- It requires the least land take of all the options, minimising the impact on the proposed development site and the surrounding environment.
- It is one of the simplest options to construct as it would not require work within the River Don corridor or work to divert the Northern Powergrid overhead power lines.

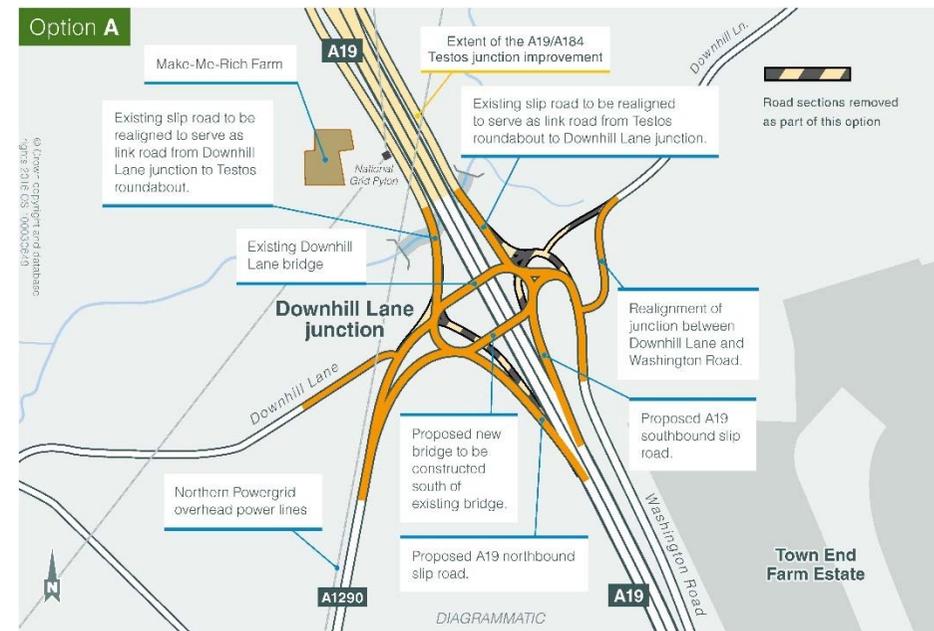
3.1.2 Environmental considerations had been taken into account, including land take and effects on the River Don and its associated habitat. Option A would require the least land take of all the options and would not require work within the River Don corridor.

3.1.3 The scheme description presented in Chapter 2 of this PEI report reflects some design refinements in response to previous consultation feedback and design development for buildability, such as changing the eastern connection between Downhill Lane junction and Washington Road. The final alignment with the Testos junction DCO submission red line boundary were also reviewed prior to fixing the Proposed Scheme layout for the September

2017 consultation (see Figure 2-1). Note that this layout remains subject to further change as the design is developed following this consultation.

3.1.4 The reasons for discounting options B to F are presented in Table 3.1, whilst illustrations of the discounted options are presented in Appendix B.

**Figure 3-1: Option A at December 2016 consultation**



**Table 3.1: Discounted Alternative Options and Reasons for Rejecting**

Discounted Option	Brief Description of Option	Reasons for Rejecting
B	<p>A new bridge would be constructed to the south of the existing Downhill Lane bridge creating a roundabout above the A19. To the north, there would be a northbound merge slip road to the A19 mainline. A diverge from the northbound merge slip road would merge with a northbound link road from Downhill Lane junction and provide connectivity to Testos roundabout. A19 southbound traffic for Downhill Lane junction would leave the A19 at Testos roundabout and use the southbound link road.</p> <p>To the south, there would be a southbound merge slip road and a north bound diverge slip road to and from the A19 mainline. Additional 'segregated left turn' lanes would be added for north bound traffic leaving the A19 and northbound traffic from the A1290, to join the A19 via Testos junction.</p>	<p>Strengthening works would be required to the River Don culvert which would increase costs.</p> <p>Safety concerns over traffic interaction on the northbound link road.</p> <p>Significant additional land would be required east of Make-Me-Rich farm.</p> <p>Northern Powergrid overhead lines supplying the Nissan plant would need diversion works.</p> <p>Maintenance access issues for the National Grid pylon.</p> <p>Not directly compatible with the preferred route announced for the Testos scheme.</p>
C	<p>A new bridge would be constructed to the south of the existing Downhill Lane bridge creating a roundabout above the A19. To the north, the slip roads would be re-aligned to provide link roads connecting to Testos roundabout. A19 northbound traffic would leave for Testos junction via a new 'diverge' north of Downhill Lane. A1290 northbound traffic wishing to join the A19 at Downhill Lane junction would do so via Testos junction.</p> <p>To the south, there would be a southbound merge slip road and a northbound diverge slip road to and from the A19 mainline. Additional 'segregated left turn' lanes would be added for northbound traffic leaving the A19 and northbound traffic from the A1290, joining the A19 via Testos junction.</p>	<p>Strengthening and extension of the River Don culvert would be required, which would increase costs and impact on the natural habitat of the local wildlife site.</p> <p>Significant additional land would be required east of Make-Me-Rich farm.</p> <p>Maintenance access issues for the National Grid pylon.</p> <p>Northern Powergrid overhead lines supplying the Nissan plant would need diversion works.</p> <p>Not directly compatible with the preferred route announced for the Testos scheme.</p>

Discounted Option	Brief Description of Option	Reasons for Rejecting
D	<p>A new bridge would be constructed to the north of the existing Downhill Lane bridge creating a roundabout above the A19. To the north, the slip roads would be re-aligned to provide link roads connecting to Testos roundabout. A19 north bound traffic would leave for Testos junction via a new 'diverge' north of Downhill Lane. A1290 northbound traffic wishing to join the A19 at Downhill Lane junction would do so via Testos junction.</p> <p>To the south, there would be a southbound merge slip road and a northbound diverge slip road to and from the A19 mainline. Additional 'segregated left turn' lanes would be added for north bound traffic leaving the A19 and northbound traffic from the A1290, joining the A19 via Testos junction.</p>	<p>Strengthening and extension of the River Don culvert would be required, which would increase costs and impact on the natural habitat of the local wildlife site.</p> <p>Poor ground conditions for construction of the new bridge to the north of the existing junction.</p> <p>Significant additional land would be required east of Make-Me-Rich farm.</p> <p>Northern Powergrid overhead lines supplying the Nissan plant would need diversion works.</p> <p>Maintenance access issues for the National Grid pylon.</p> <p>Not directly compatible with the preferred route announced for the Testos scheme.</p>
E	<p>A new bridge would be constructed to the south of the existing Downhill Lane bridge to carry south bound traffic leaving the A19 on to the A1290. This option provides the same solution as the other options for southbound traffic at Downhill Lane junction. For northbound traffic a new junction would be constructed to the west of the A19 north of the Nissan plant. This roundabout provides improved access for northbound A19 traffic via new slip roads. A19 north bound traffic would leave for Testos junction via a new 'diverge' north of Downhill Lane. A1290 northbound traffic would join the A19 without having to negotiate Testos junction, unlike the other options. To the east, Downhill Lane and Washington Road are realigned allowing a larger gyratory.</p>	<p>Requires considerably more land take than all other options</p> <p>Requires a significant area of land which is earmarked for development</p> <p>Not directly compatible with the preferred route announced for the Testos scheme</p>

Discounted Option	Brief Description of Option	Reasons for Rejecting
F	<p>New north bound exit and entry slip roads would be constructed to the south-west of Downhill Lane junction. The slip roads would be positioned in the area of land to the north of the Nissan factory and connect to the A1290. The new slip roads would provide direct access to and from the A19 northbound carriageway.</p>	<p>Does not meet the scheme objectives for improving Downhill Lane junction.</p> <p>Requires a significant area of land which is earmarked for development.</p> <p>Not directly compatible with the preferred route announced for the Testos scheme.</p>

## 4 CONSULTATION

### 4.1 Introduction

4.1.1 This chapter outlines the consultation that has been undertaken in relation to the Proposed Scheme. Consultation was undertaken between 2006 and 2015 on the Testos Junction Improvement Scheme, which covered Downhill Lane even though the Downhill Lane Junction Improvement Scheme was not announced until 2014. Relevant information from these consultations, applicable to the Proposed Scheme have been taken into account while developing the current design.

4.1.2 Independent public and stakeholder consultation, specific to the Proposed Scheme was undertaken in 2016 and future consultation discussed in this Chapter relates solely to the Proposed Scheme.

#### DCO consultation requirements

4.1.3 Downhill Lane is being delivered under the Planning Act 2008. The Act requires Highways England to submit an application for a DCO to the Planning Inspectorate, who will examine the application and provide a recommendation report to the Secretary of State, who will determine the application.

4.1.4 The DCO application has a number of statutory requirements regarding consultation. These requirements stipulate that certain stakeholder groups and the community must be consulted and engaged with as part of the pre-application process, as set out in Sections 42 and 47 of the Planning Act 2008. Further requirements relate to specific documents that must be produced,

including a Statement of Community Consultation (SoCC) and a Consultation Report.

4.1.5 The DCO application has a number of statutory requirements regarding consultation. The key items are:

- Local authorities, land interests and other specified third parties must be consulted under Section 42 of the Planning Act;
- The local community must be consulted under Section 47 of the Planning Act 2008;
- The community consultation arrangements must be publicised in a SoCC; and
- A Consultation Report must be prepared and included as part of the application for a DCO.

4.1.6 This PEI report is required to inform the consultation of the community about the likely effects of the proposed Scheme under Section 47 of the Planning Act 2008. It may also be used to inform consultation with third parties under Section 42.

### 4.2 Consultation to-date

4.2.1 Much of the consultation undertaken as part of the A19 Downhill Lane Junction Improvement Scheme has been in relation to specific environmental topics.

#### Consultation with consultee bodies

4.2.2 Consultee bodies under the Planning Act 2008 are defined by the Planning Inspectorate's Advice Note 3 'EIA Consultation and Notification' (version 6, June 2015).

4.2.3 The consultee bodies were consulted on the Scoping Report issued to the Planning Inspectorate on 15<sup>th</sup> May 2017. The Scoping Opinion was received on 23<sup>rd</sup> June 2017 and will be considered when completing the EIA and preparing the ES.

4.2.4 The consultee bodies that provided feedback to the Planning Inspectorate were:

- Durham County Council;
- Historic England;
- Natural England;
- North Tyneside Council;
- Northumbrian Water;
- Public Health England;
- Royal Mail;
- South Tyneside Council;
- Sunderland City Council;
- The Coal Authority;
- The Environment Agency; and
- The Health and Safety Executive.

#### Non-statutory key stakeholders

4.2.5 A NMU consultation meeting was also held on 14<sup>th</sup> December 2016. It was attended by representatives of: the Tyne and Wear Local Access Forum; user groups, including the British Horse Society, Cycling UK, Sustrans; South Tyneside Council; Sunderland Council; Gateshead

Council; and the urban traffic manager for Tyne and Wear. The meeting addressed potential effects on the right-of-way network, and identified the facilities that these groups would like to see incorporated into the design. The IAMP project coordinator was in attendance and an update was provided on relevant aspects of the IAMP project and its potential interactions with the Downhill Lane junction improvement.

4.2.6 A further NMU meeting was held with the Local Access Forum on the 19<sup>th</sup> June 2017 (as outlined in 2.5.14). This meeting presented four NMU options, two of which were subsequently modified and are being taken forward to the statutory consultation in September 2017.

#### Public consultation

4.2.7 Public consultation on selection of the preferred route ran for seven weeks, between 21<sup>st</sup> November 2016 and 6<sup>th</sup> January 2017. Two public consultation events were held during the consultation period, which included information about the Proposed Scheme. The public consultation brochure produced was delivered to approximately 35,000 residences in the local area. A total of 143 responses were received to the public consultation, with 137 of these being received from the general public. The remaining six responses were from local authorities and other key stakeholders. Responses to this consultation highlighted that in general there was support for the selection of Option A as the preferred route.

### **4.3 On-going consultation**

4.3.1 Under Section 42 of the Planning Act 2008, Highways England will conduct its own Section 42 consultation with

statutory environmental bodies (Natural England, the Environment Agency and English Heritage), the relevant planning authorities (South Tyneside Council, Sunderland City Council, Gateshead Council, North Tyneside Council and Newcastle-Upon-Tyne City Council), landowners and other key consultees. Information and views from these consultees will inform the environmental assessment study.

4.3.2 Section 42 consultation will be undertaken through a combination of correspondence, telephone calls and meetings. Some of this consultation is likely to be iterative (i.e. we may speak to an individual consultee several times as the scheme develops).

4.3.3 The local community and wider public will be consulted on the proposed scheme via a consultation programme, which will include making available the Preliminary Environmental Information, in accordance with Section 47 of the Planning Act 2008.

4.3.4 The Section 47 consultation programme will be publicised in the SoCC in local newspapers and will also be available at: <http://www.highways.gov.uk/roads/road-projects>. The Section 47 consultation has not yet been planned in detail, but methods of consultation are likely to include (without necessarily being limited to):

- Exchanges of correspondence, meetings and workshops with local community groups and businesses;
- Exchanges of correspondence, meetings and workshops with local groups representing walkers, cyclists and horse riders;

- Publication of leaflets, reports and other information made available in the local area and online; and
- Public exhibitions at which members of the community can interact directly with members of the project team.

4.3.5 Feedback obtained from consultation with third parties and the local community will be recorded and included in a Consultation Report that will be submitted as part of the DCO application.

#### **4.4 Further statutory consultation in 2017**

4.4.1 This document is written to inform a new consultation process planned for September 2017, which will provide more information on the Proposed Scheme following the preferred route announcement.

4.4.2 The consultation will be carried out primarily through the publication and distribution of information, correspondence and through face-to-face meetings where required.

4.4.3 In addition to these statutory consultation processes, informal non-statutory consultation/engagement with statutory bodies, other environmental bodies, local stakeholders and others with information or interests relevant to the EIA will continue throughout the period of working on the EIA.

4.4.4 The feedback from the consultation process and Highways England's responses will be recorded in a standalone Consultation Report, whilst each ES chapter will also cover any topic specific consultation matters.

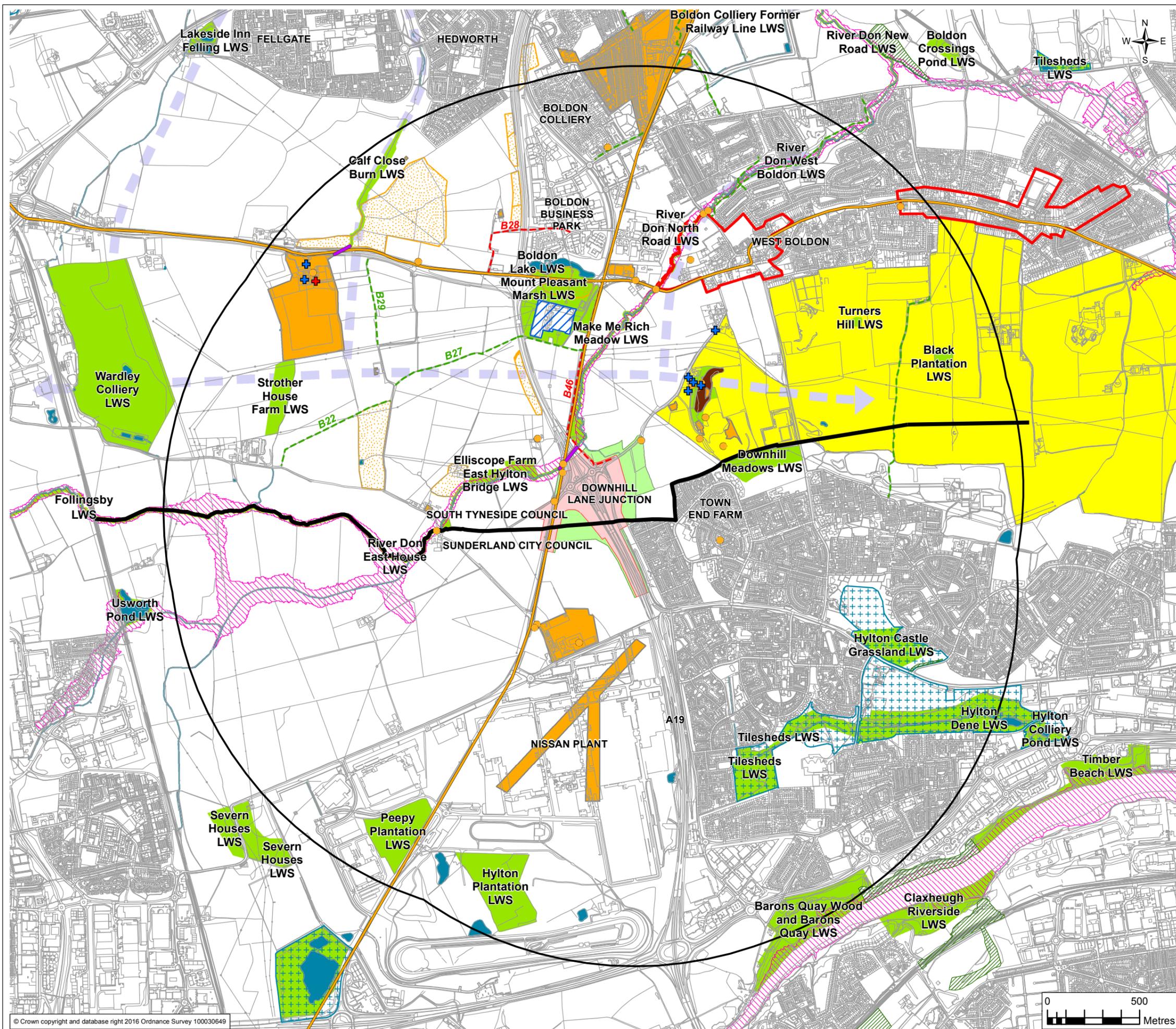
## 5 OVERVIEW OF THE ENVIRONMENT

- 5.1.1 Figure 5-1 provides an overview of the environmental baseline features and context for the Proposed Scheme.
- 5.1.2 The Proposed Scheme is located in the Green Belt of South Tyneside, at the boundary with Sunderland and close to the interface between the countryside and built up areas of Sunderland. Most of the land required to build the scheme is farmland, mainly in arable use. However, there are adjacent residential areas, particularly at Town End Farm to the south-east. Two farms (West House Farm and Make-Me-Rich Farm) lie close to the A19 to the west. The Nissan car manufacturing plant lies to the south, west of the A19.
- 5.1.3 The River Don passes beneath the A19 in a long culvert just north of Downhill Lane junction, flowing from west to east. Most of the corridor of the River Don is designated as a Local Wildlife Site (LWS). Make-Me-Rich Meadow LWS lies adjacent to the River Don and to Downhill Lane junction to the east, while East Hylton Bridge LWS lies adjacent to the River Don west of Downhill Lane junction. The River Wear is approximately 3 km to the south of Downhill Lane junction.
- 5.1.4 There are small blocks of woodland in the surrounding area. Most of the surrounding landscape comprises a pattern of rectilinear fields divided by hedgerows. To the east/south-east, the ground rises to the Boldon Hills.
- 5.1.5 Scots House, an historic Grade II\* Listed Building, lies approximately 1.8 km to the north-west of Downhill Lane junction, adjacent to the A184. Scots House sits in landscaped grounds, surrounded by mature trees. Several

subsidiary buildings in the Scots House complex are Grade II Listed Buildings. Another group of Grade II Listed Buildings around Downhill House lies 750 - 840 m north-east of Downhill Lane junction, adjacent to Downhill Lane.

- 5.1.6 Downhill Lane either side of the A19, continued further west by Follingsby Lane, forms part of a popular recreational cycling and horse-riding route (the Great North Forest Trail), also used locally for dog-walking. Although the funding and local authority partnership promoting the route followed by Great North Forest have lapsed. In this area, along Downhill Lane and Follingsby Lane, the policies remain in place and the Great North Forest Trail remains a well-used, popular route (in this area, as shown by survey evidence). In addition, a bridleway (Bridleway B46) runs southwards from the West Boldon area to meet Downhill Lane at Downhill Lane junction. Surveys show this to be very well used. In general, the junction remains busy with non-motorised traffic throughout the year, particularly with cycle commuters crossing the junction to reach the Nissan plant.
- 5.1.7 Chapters 6 to 14 of this report describe the main environmental information available and the study area for their respective environmental topic, and the likely environmental effects and mitigation measures envisaged for the Proposed Scheme.

**FIGURE 5.1**



- Legend**
- Permanent Landtake Area
  - Temporary Landtake Area
  - 2000m Ecology Study Area
  - + Grade II\* Listed Building
  - + Grade II Listed Building
  - Culvert
  - Local Authority Boundary
  - Public Right of Way
  - Bridleway
  - Electricity Sub-Station
  - Conservation Area
  - Surface Water Feature
  - Extent of Potential River Flooding (Zones 2 & 3)
  - Local Geological Site
  - Local Wildlife Site (LWS) or Candidate Local Wildlife Site (cLWS)
  - Site of Special Scientific Interest
  - Local Nature Reserve
  - Wildlife Corridor (indicative)
  - Area of High Landscape Value
  - Agricultural / Earthwork Features
  - Undesignated Assets

0	AUG 17	Initial Issue	IM	EA	MR	GW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd



Client:

Project: DOWNHILL LANE JUNCTION

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## 6 AIR QUALITY

### 6.1 Introduction

6.1.1 Air quality is a significant environmental issue because poor air quality can affect human health, quality of life and the natural environment; it can also have economic impacts. The dominant long-term source of air pollution in the UK is exhaust emissions from road traffic.

6.1.2 This topic comprises both localised impacts on air quality arising from construction activities, in particular the generation of nuisance dust, in addition to three sub-topics which address the principal types of operational impact from road traffic at different geographic scales:

- Local air quality, which principally relates to emissions of pollutants that are of concern in relation to human health and ecosystems at a local level. This covers Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>)<sup>7</sup>.
- Regional air quality, which is concerned with emissions of pollutants that can disperse over longer distances, affecting both human health and ecosystems. This covers oxides of Nitrogen (NO<sub>x</sub>), PM<sub>10</sub> and Carbon Dioxide (CO<sub>2</sub>).
- Climate change, which is concerned with the emissions of greenhouse gases that can contribute to changes in the climate at a global level. This is included in the regional air quality assessment and expressed in terms of CO<sub>2</sub> emissions.

6.1.3 The operational study area for local quality will be defined from a traffic model in order to enable identification of relevant 'affected roads'. The existing traffic model reviewed for this PEI report is a combined forecast for the Testos and Downhill Lane junction improvement schemes used to inform the 2017 Testos Junction Improvement Scheme EIA. However, a traffic model bespoke to Downhill Lane is being created to inform the air quality assessment for the Downhill Lane junction Proposed Scheme EIA.

6.1.4 Figure 6-1 shows the traffic model study area and covers the A19 from just north of the River Wear to just north of Lindisfarne junction, plus sections of the A1290, A1231, A184 A194, A195, Downhill Lane, Washington Road and parts of minor side roads close to the A19.

6.1.5 The new traffic model will assume the A19/A184 Testos Junction Improvement Scheme and the IAMP development will be proceeding, thus forming part of the baseline situation (i.e. the Do Nothing scenario). Therefore, the air quality impact assessment would identify the additional operational traffic effects arising specifically from the Proposed Scheme.

6.1.6 In addition to using Downhill Lane junction, traffic from the Nissan Site also accesses the highway network via the A1231 / Nissan Way roundabout. The assignment of Nissan traffic between these access points is controlled by the relative levels of congestion of these two junctions, and also the level of congestion at the A19 / A1231 grade separated interchange.

<sup>7</sup> PM<sub>10</sub> refers to Particulate Matter released from vehicle exhausts that is 10 micrograms in size or less.

**Figure 6-1: Traffic Modelled Road Network**



- 6.1.7 The air quality assessment will be undertaken in accordance with the guidance outlined in the DMRB Volume 11, Section 3, Part 1, HA207/07 'Air Quality', supporting Interim Advice Notes and Defra's Local Air Quality Management Technical Guidance.
- 6.1.8 Pollutant concentrations from traffic emissions disperse rapidly away from a road, returning to background concentrations within 200 m. Relevant receptor locations are chosen based on where people may be present within 200 m of an 'affected road'. These properties would be the worst affected properties, so an assessment based on them would represent a 'worst case scenario'.
- 6.1.9 Therefore, the study area for local air quality assessment will comprise all land within 200 m of 'affected roads', which, for this purpose, are roads that meet any of the following criteria:
- The alignment would move by more than 5 m;
  - Daily traffic flows would change by 1,000 annual average daily traffic (AADT)<sup>8</sup> or more;
  - Heavy duty vehicle flows would change by 200 AADT or more;
  - Daily average speed would change by 10 km/hour or more; and
  - Peak hour speed would change by 20 km/hour or more.
- 6.1.10 For construction, the study area will include any potentially sensitive receptors within 200 m of the

<sup>8</sup> AADT: a measure of the volume of traffic of a given highway or road, as a daily average.

construction site, such as residential properties, schools, hospitals or designated ecological receptors.

6.1.11 Carbon emissions and their potential impact on climate change are included in the regional air quality assessment.

## 6.2 Existing and baseline knowledge

6.2.1 The existing environment surrounding Downhill Lane junction is predominantly rural. The air quality assessment discussed in this PEI report is based on the assessment for the Testos Junction Improvement Scheme ES 2017, which considered air quality impacts around both Testos and Downhill Lane junctions.

6.2.2 The UK Government's Air Quality Strategy sets out the Air Quality Objectives<sup>9</sup> (AQO) for various pollutants; these are health-based objectives and represent the concentrations of each pollutant below which health effects are unlikely to be experienced by even the most sensitive members of the population.

6.2.3 The main pollutant in relation to the air quality effects of traffic is nitrogen dioxide (NO<sub>2</sub>). The AQO for NO<sub>2</sub> is 40µg/m<sup>3</sup> (milligrams per cubic metre of air), which is the same as for PM<sub>10</sub>. Data obtained from Defra shows that background annual mean concentrations of NO<sub>2</sub> in the 11 kilometre-squares surrounding Downhill Lane junction vary from 16 µg/m<sup>3</sup> to 20.8 µg/m<sup>3</sup> in 2014, and have been declining since at least 2012.

6.2.4 The assessment utilised data from roadside NO<sub>2</sub> diffusion tube monitoring, undertaken by Highways England.

6.2.5 Table 6.1 below presents annualised mean data from 2013-based background maps for air quality produced by Defra<sup>10</sup>, for 1 km grid squares close to the junction improvements. The data shown is an estimated projection for the base year, opening and design assessment years. Table 6.1 also shows the health-based AQO for NO<sub>2</sub>.

**Table 6.1: Annual Mean Nitrogen Dioxide Concentrations (µg/m<sup>3</sup>)**

1 km Grid Square Reference	Base year 2012*	Opening year 2021	Future year 2036**	Air Quality Objective
433500, 559500	15.6	11.0	9.6	40 µg/m <sup>3</sup>
434500, 559500	20.1	13.9	12.0	
433500, 560500	17.5	11.8	10.1	
434500, 560500	16.4	11.4	9.8	

Note: \*Background concentration has been factored using data calculated from 2013 – 2017

\*\*Background concentrations are only available up to and including 2030. For years beyond this data, 2030 values have been used.

6.2.6 Table 6.1 shows that concentrations of NO<sub>2</sub> were and are expected to be below the relevant AQO.

6.2.7 A search has been conducted for ecologically designated sites at European or national level within 2 km of the Proposed Scheme. No such internationally or nationally designated ecologically sensitive sites were identified. Although Hylton Castle Cutting Site of Special Scientific Interest (SSSI) is located just within

<sup>9</sup>[https://uk-air.defra.gov.uk/assets/documents/National\\_air\\_quality\\_objectives.pdf](https://uk-air.defra.gov.uk/assets/documents/National_air_quality_objectives.pdf)

<sup>10</sup> Defra (2017). *2013 Based Background Maps for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>*. Available from: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013>

2 km of the Proposed Scheme, this site is designated for its geological interest (exposed fossil beds in limestone) rather than its ecological interest.

6.2.8 An Air Quality Management Area (AQMA), set by South Tyneside Council is located approximately 3.7 km to the north of the Proposed Scheme, at Lindisfarne Roundabout; this is of sufficient distance not to be affected by, or impact, the Proposed Scheme.

### **6.3 Potential impacts during construction**

6.3.1 During construction, the use of site equipment, vehicles and machinery would result in emission of exhaust gases to the atmosphere. However, such emissions are unlikely to be significant, particularly when compared to levels of similar emissions from vehicles using the local road network. Emissions from construction vehicles and plant can be minimised by using equipment which meets current emission control standards, operating well-maintained vehicles and effective planning to reduce the number of trips required.

6.3.2 From an air quality perspective, the construction-related activities most likely to have the greatest impact include:

- Fugitive dust emissions from a variety of construction activities, including re-profiling of cuttings and embankments;
- Off-site disposal of excavated material during construction; and

- Heavy goods vehicle haulage of material to and from the construction site.

6.3.3 Without mitigation, properties in the vicinity of the Proposed Scheme could experience 'nuisance' as a result of construction dust emissions. However, following the implementation of best practice dust control measures, no statutory dust nuisance<sup>11</sup> would be expected.

### **6.4 Potential mitigation for construction impacts**

6.4.1 There are several standard and best practice mitigation measures that could be implemented during construction to help mitigate potential adverse effects upon air quality during construction. Typical examples include:

- Dampening down site access roads as necessary using a water bowser to reduce airborne dust, to be monitored on a daily basis during hot, dry weather;
- Locating internal haulage routes away from sensitive receptors where possible and dampening down the routes where necessary;
- Re-vegetating or temporarily sealing completed earthworks as soon as is practicable; and
- Sheeting vehicles carrying spoil, fill or earthworks material leaving the site to prevent loss of materials off-site.

<sup>11</sup> Under Part III of the Environmental Protection Act 1990 certain matters are declared to be 'statutory nuisances'. Dust is a statutory nuisance if it is harmful to health or a nuisance.

6.4.2 In addition to these practices, the establishment of a public relations service would be encouraged to manage public dust complaints. The environmental health department of South Tyneside Council and Sunderland City Council would be notified for verification purposes.

## **6.5 Potential impacts during operation**

6.5.1 Any operational effects from the Proposed Scheme would derive from changes in pollutant concentrations as a result of changes in the traffic using the roads in the local area.

6.5.2 Changes to the pollutant concentrations would be dependent on a number of variables, including:

- Changes in road alignment;
- Changes in vehicle numbers;
- Changes in vehicle speed;
- Increased or reduced traffic congestion; and
- Changes in the composition of the traffic, for instance the proportion of heavy duty vehicles.

### **Local air quality assessment**

6.5.3 It is anticipated that there would only be marginal differences between the Proposed Scheme and a 'do minimum' (i.e. 'without scheme') scenario in the opening year for both NO<sub>2</sub> and PM<sub>10</sub> pollutant concentrations. The largest increase in pollutant concentrations due to the Proposed Scheme would be at Make-Me-Rich Farm and Mill Lane. The significance of these changes would likely be 'negligible', as concentrations of both pollutants are expected to remain below relevant AQO.

6.5.4 There are unlikely to be exceedances of the relevant AQOs, including within the AQMA at Lindisfarne Roundabout.

### **Regional air quality assessment/climate change**

6.5.5 On a regional as opposed to local scale, there would be minor increases in overall emissions of NO<sub>x</sub>, PM<sub>10</sub> and CO<sub>2</sub>, compared to the do minimum scenario.

## **6.6 Potential mitigation for operational impacts**

6.6.1 The impacts during the operational phase are considered to be negligible, so no mitigation measures are expected to be proposed for the operational phase.

## **6.7 Summary**

6.7.1 Overall it is anticipated that there would be no significant changes in air quality as a result of the Proposed Scheme, with the localised risk of dust nuisance during construction controlled by mitigation measures. No exceedance of AQOs for any of the pollutants is anticipated during operation.

## 7 CULTURAL HERITAGE

### 7.1 Introduction

7.1.1 The Cultural Heritage assessment will be undertaken in accordance with the guidance provided in Volume 11, Section 3, Part 2 of the Design Manual for Roads and Bridges (HA208/07 'Cultural Heritage'), which considers cultural heritage under three sub-topics:

- **Archaeological remains** – the material remains of human activity from the earliest periods of human evolution to the present, which may be buried traces of human activities, sites visible above ground, or moveable artefacts;
- **Historic buildings** – architectural or designed or other structures with a significant 'historical value', which may include structures that have no aesthetic appeal or structures not usually thought of as buildings', such as milestones or bridges; and
- **Historic landscape** – the current landscape, whose character is the result of the action and interaction of natural and/or human factors, and includes evidence of past human activities, which is a significant part of the historic landscape, and may derive both from archaeological remains and historic buildings within it.

7.1.2 The cultural heritage inputs will also be prepared in line with the Chartered Institute for Archaeology's Code of Conduct (2014) and Standard and Guidance for Historic Environment Desk-Based Assessment (2014).

7.1.3 In accordance with the guidance provided in paragraph 5.4 of HA208/07, a study area of 300 m from the

footprint of the Proposed Scheme will be used for this assessment.

7.1.4 The information in this chapter is based on studies carried out in 2015 – 2016 for both the Testos and Downhill Lane junctions' improvement schemes, building on earlier phases of investigation carried out between 2006 and 2009.

7.1.5 The project team holds cultural heritage data extending to 1 km from the footprint of the Proposed Scheme, to provide context and enable effective consideration of the setting of cultural heritage assets.

### 7.2 Existing and baseline knowledge

7.2.1 Existing and baseline knowledge has been obtained from the following sources:

- The National Heritage List for information on statutorily designated heritage assets (Scheduled Monuments, Listed Buildings, Registered Battlefields and sites included on the Register of Historic Parks and Gardens);
- Tyne and Wear Historic Environment Record (HER) for information on undesignated heritage assets and Historic Landscape Characterisation;
- Previous unpublished heritage reports prepared for this scheme and the A19 Testos Junction Improvement scheme; and
- Walkover survey, conducted in December 2014.

#### Cultural heritage background

7.2.2 There are no known prehistoric (before AD 43), Roman (AD 43 to 410) or early medieval (AD 410 to 1066) cultural heritage assets within the study area.

7.2.3 The medieval (AD 1066 to 1540) period is represented by two areas of levelled ridge and furrow ploughing<sup>12</sup>.

7.2.4 The cultural heritage of the study area is heavily dominated by post medieval features (i.e. features that originate after AD 1540 and before AD 1900). Assets associated with this period comprise a range of settlement, domestic, industrial, agricultural and transport-related features. This reflects the rapid expansion of settlement and economic diversification in the area during and after the Industrial Revolution. The site of the Civil War ‘battle of Boldon’ (AD 1644) is located outside and approximately 500m north-east of the study area on Boldon Hill.

### **Cultural heritage assets**

7.2.5 Based on the data gathered from the sources identified above, a total of 19 cultural heritage assets have been identified within the study area, consisting of 11 archaeological sites, one historic building, and seven historic landscape types. Their locations are shown on Figures 7-1 and 7-2, and further information is provided in Table 7.1 and Table 7.2. Nine assets are located within or partially within the footprint of the Proposed Scheme comprising:

- Six archaeological sites (Assets 46, 47, 49, 58, 70 and 72); and
- Three historic landscape types (HLT1, HLT5 and HLT9).

7.2.6 There are no World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields, or Conservation Areas within the study area.

7.2.7 West Boldon Conservation Area lies approximately 1km to the north of the proposed scheme, outside the study area. However, the Conservation Area is within the visual envelope of the Proposed Scheme and any visual impacts on it or its historic setting are addressed in Chapter 8.

**Table 7.1: Cultural Heritage Assets Identified within the Study Area**

Asset No.	Asset name	Sub-topic	Value
43	Make-Me-rich Farm	Historic Buildings	Low
44	Stone (Site of)	Archaeological remains	Negligible
46	Engine House	Archaeological remains	Negligible
47	West Boldon Dam	Archaeological remains	Negligible
49	Downhill Level Crossing	Archaeological remains	Negligible
58	Stanhope and Tyne Railway	Archaeological remains	Negligible
63	Ridge and Furrow 4	Archaeological remains	Negligible
70	Ridge and Furrow 8	Archaeological remains	Negligible

<sup>12</sup> A series of long, raised ridges separated by ditches used to prepare the ground for arable cultivation; a technique characteristic of medieval & post medieval periods.

Asset No.	Asset name	Sub-topic	Value
72	Narrow Ridge and Furrow	Archaeological remains	Negligible
73	Ridge and Furrow 9	Archaeological remains	Negligible
74	Usworth, Sunderland Aerodrome (RAF Usworth)	Archaeological remains	Negligible
75	Usworth RAF, Searchlight Battery TT237	Archaeological remains	Negligible
HLT1	20th century enclosure	Historic Landscape	Negligible
HLT3	Settlement	Historic Landscape	Low
HLT5	Modern Communications	Historic Landscape	Negligible
HLT9	20th century plantation	Historic Landscape	Negligible
HLT10	Public services	Historic Landscape	Negligible
HLT11	Recreation	Historic Landscape	Negligible
HLT12	Industrial	Historic Landscape	Negligible

**Table 7.2: Summary of the Value of Cultural Heritage Assets Identified within the Study Area**

Asset value	Number of Assets
High	0
Medium	0
Low	2
Negligible	17

Asset value	Number of Assets
Unknown	0

### Archaeological remains

- 7.2.8 Archaeological remains within the study area predominantly date from the post-medieval period (AD1540 - AD1900) and comprise agricultural and transport-related features.
- 7.2.9 Four areas of ridge and furrow (Assets 63, 70, 72 and 73) have been identified within the study area, resulting from agricultural practice begun in the medieval period and continued into the post medieval period. These assets are generally in poor condition or have been destroyed by modern development.
- 7.2.10 Development of the railway in the 19th century is represented by four assets, including the route of the Stanhope and Tyne Railway (Asset 58) which was established in the 1830s to enable the movement of coal and lime to the coast.
- 7.2.11 Two cultural heritage assets dating to after AD 1900 are present within the study area. Sunderland Aerodrome (Asset 74) originated during the First World War, and became RAF Usworth during the Second World War. This site has been redeveloped as an industrial site. Related to the presence of the airfield is the former site of an RAF searchlight battery (Asset 75), the location of which has since been redeveloped with housing.
- ### Potential for unknown archaeological remains
- 7.2.12 As the land around Downhill Lane junction remains undeveloped, it is possible that previously unknown

archaeological remains representing any period could be present.

### Historic buildings

7.2.13 Within the study area, one historic building is present. Make-Me-Rich Farm (Asset 43) comprises a farmhouse of post-medieval date constructed on a T-plan.

### Historic Landscape

7.2.14 Within the study area, seven historic landscape types have been identified. These areas are summarised in Table 7.3 below and illustrated in Figure 7-2.

**Table 7.3: Historic Landscape Character Areas**

Unit No.	Unit Name	Description
HLT1	20th century enclosure	Large fields of 20 <sup>th</sup> century date, generally resulting from widespread alteration or reorganisation of post-medieval enclosure. Evidence of earlier ridge and furrow field systems survive in areas as earthworks, cropmarks and geophysical survey anomalies.
HLT3	Settlement	Mostly comprising blocks of early 20th century terraced housing or later semi-detached housing associated with the town of Downhill. It also includes the farmstead at Make-Me-Rich Farm.
HLT5	Modern Communications	Large modern roads (dual carriageways, greater than 20 m wide), and including embankments and service areas. In the study area this type comprises the A19.
HLT9	20th century plantation	Areas of modern plantation associated with the A19 which were probably created as part of visual screening when the road was constructed.

Unit No.	Unit Name	Description
HLT10	Public services	Characterised by the presence of types of building and land use that are closely connected to settlement, such as schools, hospitals and libraries.
HLT11	Recreation	Landscapes associated with recreational activities including: allotments, amusement parks, caravan parks and campsites, nature reserves, and playing fields.
HLT12	Industrial	A broad classification of landscape types covering the wide range of industrial activities that have occurred in Tyneside, including: collieries, shipyards, forges and foundries, and extending to modern industrial estates.

## 7.3 Potential impacts during construction

7.3.1 Construction of the Proposed Scheme has, in principle, the potential to affect heritage assets in the following ways:

- Partial or total removal of heritage assets;
- Compaction of archaeological deposits by construction traffic and structures;
- Changes in groundwater levels leading to the extreme drying of previously waterlogged archaeological deposits;
- Effects on the setting of heritage assets including visual and noise intrusion; and
- Severance and adverse impacts on amenity as a result of construction works.

7.3.2 The first aim of the assessment will be to determine the extent to which any of these effects would occur.

7.3.3 The Proposed Scheme crosses the route of the Stanhope and Tyne Railway (Asset 58), and the sites of an Engine House (Asset 46) and Downhill Lane Level Crossing (Asset 49). As a result, there would be potential for archaeological remains associated with these assets to be removed during construction.

7.3.4 Construction may also remove archaeological remains associated with levelled ridge and furrow identified by geophysical survey and aerial photography (Assets 63, 70, 72 and 73).

7.3.5 Based on available information, it is considered that there is low potential for the presence of unknown archaeological remains within the study area. However, construction of the Proposed Scheme could result in the removal of any such remains that may be present.

7.3.6 No physical impacts are predicted for any of the Historic Buildings. Make-Me-Rich Farm is located approximately 200 m from the Proposed Scheme, and would experience effects on its setting from construction and operation of raised elements such as junctions and signage.

7.3.7 Construction traffic and activity may temporarily interrupt distant views of West Boldon and the continuing agricultural landscape beyond the A19.

## 7.4 Potential mitigation for construction impacts

7.4.1 Potential mitigation measures for effects on heritage assets include:

- Detailed design of development proposals to avoid or reduce impacts on heritage assets;

- Installation of physical protection measures, or temporary removal of assets and for reinstatement following the completion of construction works;
- Archaeological investigation, including detailed excavation, strip map and sample, and recording during construction;
- Historic building recording and historic landscape recording in advance of construction to provide a permanent documentary record of assets in their current form and condition; and
- Dissemination of the results of all surveys in an appropriate format and supporting archive.

7.4.2 Further investigations would be conducted to inform the subsequent ES, to enable a better understanding of the archaeological potential of the Proposed Scheme footprint, and the magnitude and significance of impacts on the resource.

## 7.5 Potential impacts during operation

7.5.1 Operation of the Proposed Scheme has the potential to result in impacts on the setting of heritage assets. In the majority of cases, these would be long-term in nature. These impacts would commence during construction of the Proposed Scheme and continue during operation; however, the degree of impact may vary between phases. Such impacts can include:

- Changes to the surroundings of heritage assets or the general character of their setting;
- Changes to access or the viability of heritage assets; and

- Cumulative impacts on historic landscape elements as a result of operational maintenance through alteration of historic landscape elements.

7.5.2 The historic landscape types identified within the study area are large, fairly common and quite robust with a high ability to accept change without loss of historic legibility. The widening of the existing highway corridor required for the scheme would take land from a small portion of the 20<sup>th</sup> Century Enclosure (HLT1) and 20<sup>th</sup> century plantation (HLT9) types.

## 7.6 Potential mitigation for operational impacts

7.6.1 Adverse impacts on the setting of heritage assets resulting from operation of the Proposed Scheme can be mitigated through careful design of the Proposed Scheme. This may include measures such as:

- Consideration of the horizontal or vertical alignment of the proposed scheme to reduce its visual prominence;
- Careful siting of lighting or signage; and
- The use of noise fencing or maintenance of access routes to a historic building to maintain its viability.

7.6.2 Further mitigation can be provided through the use of landscape mitigation measures, such as bunds, planting or cladding of highways structures. These measures can help to reduce the visual prominence of the scheme and aid its integration with the surrounding landscape.

7.6.3 Impacts on the historic landscape are expected to be of neutral significance, and no further mitigation is proposed at this stage.

## 7.7 Summary

7.7.1 Based on current available information, no known cultural heritage assets would be directly affected. However, there may be effects on the settings of some cultural heritage assets and the local historic landscape. An archaeological geophysical survey in Autumn 2017 will verify any risk to currently unknown archaeological remains. It is anticipated that the suitable mitigation measures would be developed to avoid or minimise any adverse effects on cultural heritage.

Figure 7-1: Cultural Heritage Assets

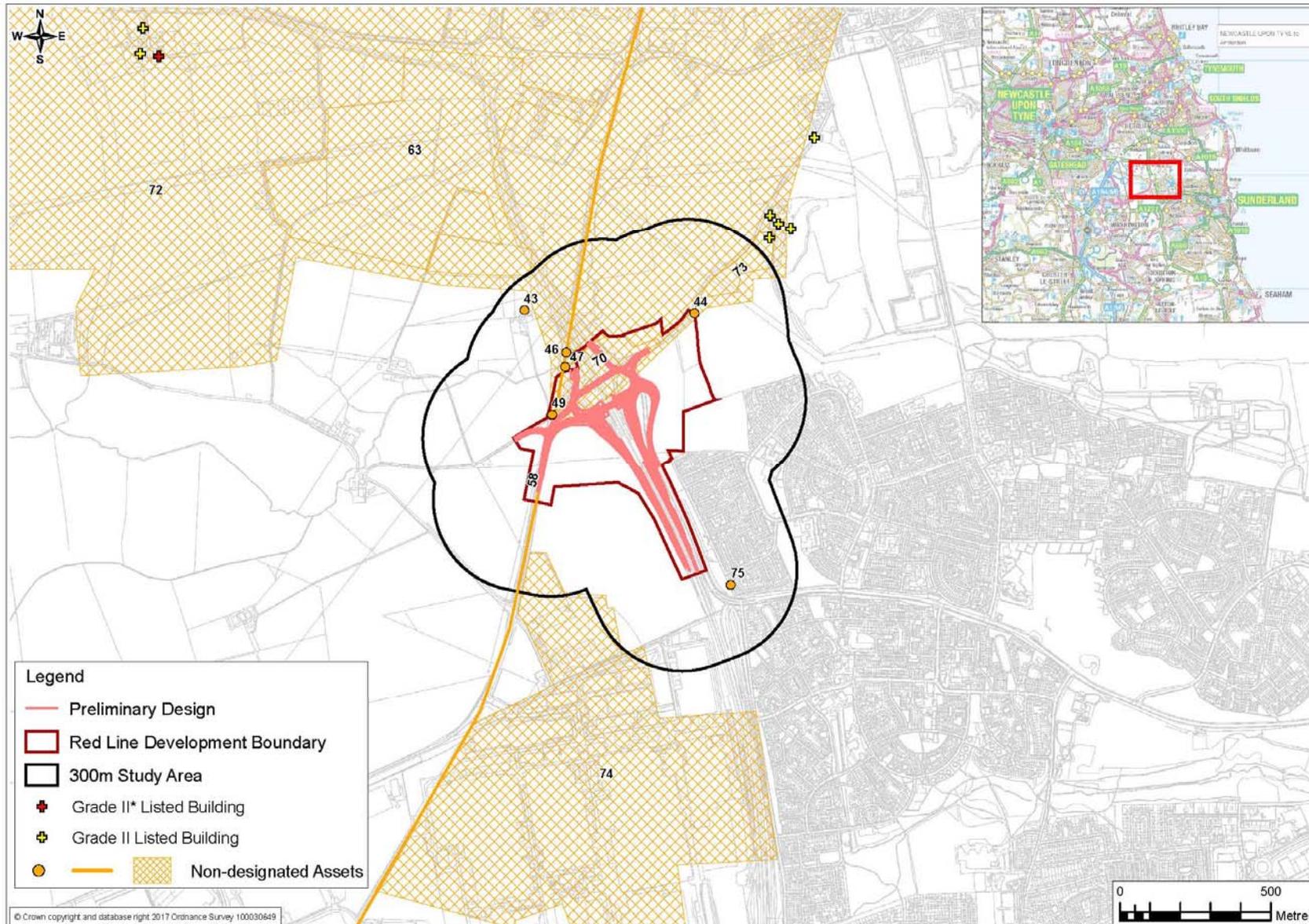
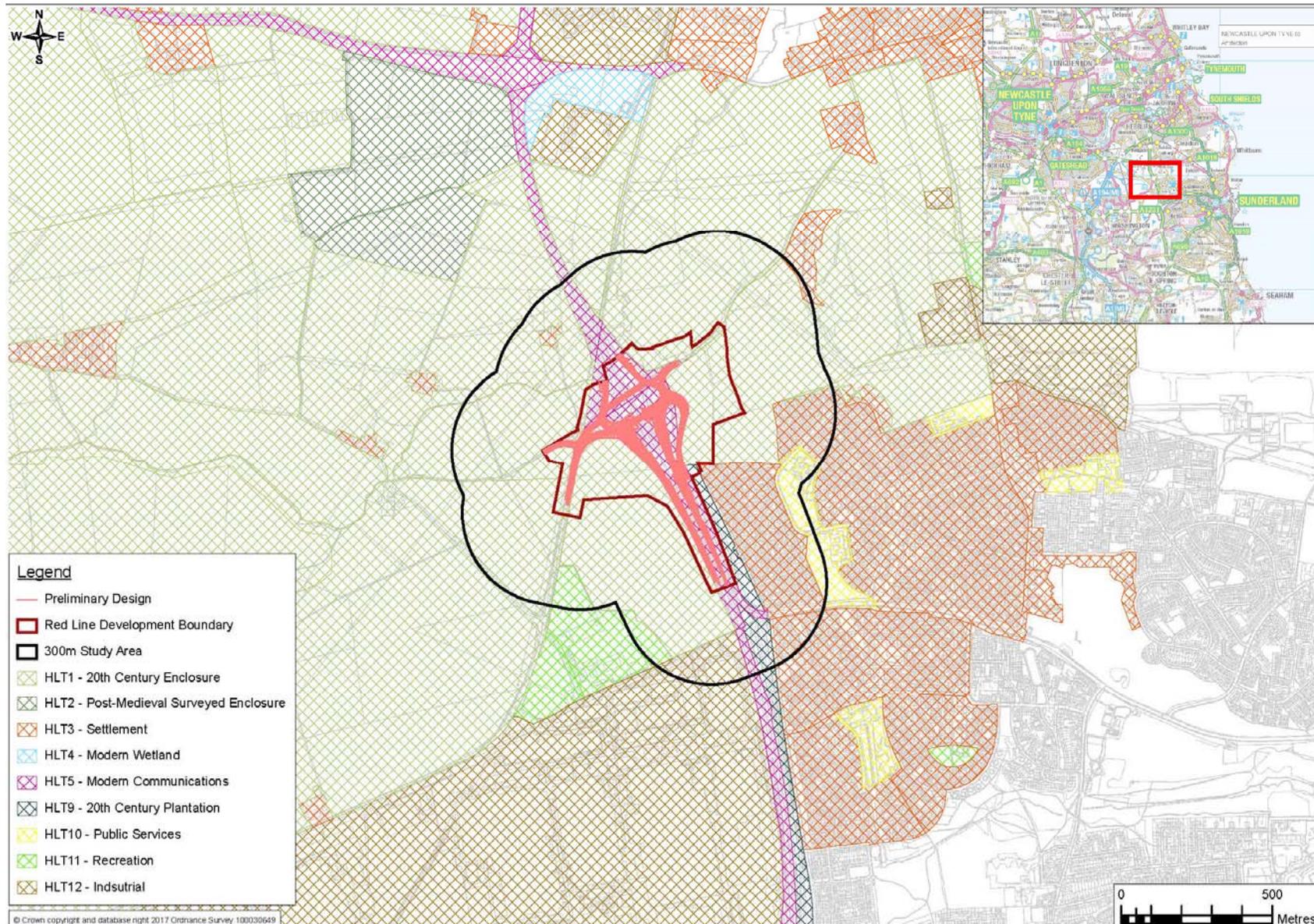


Figure 7-2: Historic Landscape Types



## 8 LANDSCAPE AND VISUAL EFFECTS

### 8.1 Introduction

- 8.1.1 Landscape and visual impact assessment are two separate but related concepts.
- 8.1.2 The landscape takes its character from a combination of elements, including topography, watercourses, land use and pattern, vegetation, public open space and cultural heritage influences. Landscapes vary considerably in character and quality, and are a key component of the distinctiveness of any local area or region. The concept of ‘townscape’ applies the same principles to an urban context, with greater emphasis on the built environment. The assessment of impacts on landscape and townscape therefore addresses changes in any of these components.
- 8.1.3 To a large extent, human beings experience the landscape and townscape visually. The quality of views available in any given area can contribute to the quality of life. Visual Impact Assessment (VIA) assesses potential changes in the key components and character of existing views. It takes into account the extent to which a development would be visible from surrounding houses, farms, footpaths and bridleways, open spaces and offices.
- 8.1.4 Studies to identify the affected landscape were carried out in 2015 – 2016 for both the Testos and Downhill Lane junction improvement schemes. Certain information has been reviewed through the Natural England website and the South Tyneside Local Development Framework. Assessment of the landscape and visual effects of the Proposed Scheme

will be undertaken in accordance with DMRB Volume 11, Section 3, Part 5 ‘Landscape impacts’, as updated by Interim Advice Note 135/10 ‘Landscape and Visual Effects Assessment’, and the Landscape Institute and Institute of Environmental Management and Assessment ‘Guidelines for Landscape and Visual Impact Assessment, 3<sup>rd</sup> Edition (2013).

- 8.1.5 The study area is based on an irregularly-shaped, broadscale visual envelope (see Figure 8-1), limited by the built-up areas of Fellgate, Hedworth and Boldon Colliery around 500 m to the north, by the Boldon Hills in the east (1.5 km), the Nissan Manufacturing plant and the residential area of Town End Farm to the south (1 km) and the A194 area to the west (2 km).

### 8.2 Existing and baseline knowledge

- 8.2.1 Existing landscape and visual elements within the study area are summarised below. Key landscape features in proximity to the A19 are illustrated in Figure 8-1, landscape character units are shown in Figure 8-2 and key visual receptors and a visual envelope are illustrated on Figure 8-3.

#### Landscape features

- 8.2.2 In terms of topography, the distant southern horizon is defined by Penshaw Hill, with a height of 136 m above ordnance datum (AOD), and Carr Hill which is approximately 100 m AOD; both of these are approximately 5 km to the south. The western horizon is defined by higher ground in Gateshead which is 150 m AOD, and between 6 and 8 km to the west. West Boldon (60 m AOD) and the Boldon Hills (90 m AOD) form areas of higher ground to the eastern horizon.

- 8.2.3 The topography of the study area to the west of the A19 is mainly flat, with rolling fields and localised valleys created by sunken streams, such as the River Don. Substantially modified landforms in the study area include the embankments, bridges and cuttings of the A19. Other locally common landform features include restored former open-cast mines to the west and east.
- 8.2.4 The main watercourses through the study area are the River Don and its smaller tributaries. The watercourses follow sinuous but generally north-south courses within noticeable local valleys in generally flat, low-lying land. There are also several disused local land drains amongst the fields.
- 8.2.5 Open water within the study area can be found at Boldon Lake and in parts of Mount Pleasant Marsh, which are both designated as Local Wildlife Sites<sup>13</sup>. The open water areas are located to the south of Boldon Business Park and also comprise marshland and deciduous woodland.
- 8.2.6 The local landscape pattern comprises a corridor of predominantly arable agricultural land aligned east-west, linked to a similar corridor aligned north-south. These corridors are protected by designation as green belt, in order to maintain the separation between the surrounding urban areas of Tyneside to the north, Wearside to the south-east and Washington to the south-west (3 km). The urban areas are linked by trunk roads, such as the A19, and minor roads, which subdivide the rural corridors. Isolated farms and other properties are scattered within the rural corridors (West House Farm, Scots House, Make-Me-Rich Farm and Elliscrope Farm).
- 8.2.7 Combined with some pasture, arable fields are separated by moderately maintained hedgerows (some with gaps and some semi-mature trees). There are several small-to-medium-sized deciduous woodland areas, particularly near farmsteads, town edges and along the river/stream banks. Tree Preservation Orders (TPOs) are present to the north at Mount Pleasant Marsh, Scots House and West Boldon and to the south-east of Downhill Lane junction near Hylton Castle.
- 8.2.8 Boldon Downhill Area of High Landscape Value or Landscape Significance is located on the west facing slopes of the Boldon Hills. The east-west green belt corridor is also designated as a Wildlife Corridor, and is linked to other designated Wildlife Corridors running north-south, for example along the River Don.
- 8.2.9 Commercial land in the study area largely comprises of Boldon Business Park to the north-east of Testos junction and the large Nissan plant to the south-west of Downhill Lane junction. There is a network of Public Right of Ways within the rural landscape, fragmented by existing highways, but with some intact links into the urban fringe areas to the east.
- 8.2.10 Cultural heritage elements and characteristics that influence the landscape within the study area include Listed Buildings (e.g. Scots House and within the East

<sup>13</sup> South Tyneside Council. 2012. *South Tyneside Local Development Framework: Site-Specific Allocations*. [Online]. [Accessed: 24 January 2017]. Available from: <https://www.southtyneside.gov.uk/article/36015/Local-Development-Framework>

and West Bolden Conservation Areas), the disused Stanhope and Tyne railway, Grade 1 listed Penshaw Monument, and the 18<sup>th</sup> / 19<sup>th</sup> century ‘enclosure’ period field system, which is superimposed on an earlier agricultural system with medieval origins.

### Landscape character

8.2.11 The attributes of the landscape can be used to subdivide it into different landscape character areas, and this can be done at a variety of geographic scales (e.g. national and local).

8.2.12 On a national / regional scale, the study area is covered by the eastern part of National Character Area 14 (Tyne and Wear Lowlands)<sup>14</sup>, and the northernmost tip of Area 15 (Magnesian Limestone Escarpment)<sup>15</sup>. At a local authority level, the study area is covered by the following character areas within the South Tyneside Landscape Character Study<sup>16</sup>:

- Character Area 24 (Urban): The Boldons;
- Character Area 31 (Urban Fringe): Boldon Fell; and
- Character Area 32 (Urban Fringe): Boldon Downhill.

8.2.13 The study area is also covered by the following character areas within the City of Sunderland Landscape Character Assessment<sup>17</sup>:

- Character Area 2a (Coalfield Lowland Terraces): Usworth Lowland; and
- Character 9f (Urban Limestone Plateau): Hylton Castle, Downhill and Castleton.

8.2.14 For the purposes of this study, smaller-scale local landscape character units (LCUs) have been identified using the published landscape character assessments as a guide, along with information gained through desk study work and site surveys. The LCUs are listed below along with a brief description and shown on Figure 8-2:

- LCU1 Western Lowland Agricultural Land: Mainly flat arable farmland with gappy hedgerows and occasional wooded clumps;
- LCU2 Vegetated Corridor: Busy commuter road between Newcastle and Sunderland with extensive tree belts and hedgerow planting;
- LCU3 Boldon Business Park Complex: Busy retail and office park of large warehouses and smaller office units with boundary planting to the edges;
- LCU4 Boldon Ecological Wetlands: Flat and low-lying areas of marshland, woodland and open water;

<sup>14</sup> Natural England. 2013. National Character Area Profile 14: Tyne and Wear Lowlands. [Online]. [Accessed: 16 January 2017]. Available from: <http://publications.naturalengland.org.uk/publication/4683608954503168>

<sup>15</sup> Natural England. 2013. National Character Area Profile 15: Durham Magnesian Limestone Plateau. [Online]. [Accessed: 16 January 2017]. Available from: <http://publications.naturalengland.org.uk/publication/8308038>

<sup>16</sup> LUC on behalf of South Tyneside Council. 2012. South Tyneside Landscape Character Study Part I: Landscape Character Assessment. [Online]. [Accessed:

16 January 2017]. Available from:

<https://www.southtyneside.gov.uk/article/36020/Supporting-Documentation-and-Evidence-Base-Studies>

<sup>17</sup> LUC on behalf of Sunderland City Council. 2015. City of Sunderland Landscape Character Assessment. [Online]. [Accessed: 16 January 2017]. Available from: <http://www.sunderland.gov.uk/index.aspx?articleid=3301>

- LCU5 River Don Scrubby Farmland: Gently sloping arable farmland with intermittent vegetation clumps crossed by the River Don;
- LCU6 West Boldon Elevated Urban Centre: Elevated residential area with recreational and community facilities based around a medieval layout and centre around St. Nicholas Church;
- LCU7 Downhill Elevated Farmland: Undulating, open arable farmland with gappy hedgerows and occasional properties and farmsteads;
- LCU8 Town End Farm Residential Edge: Mixed modern semi-detached and terraced housing of red brick, render and tile roofing along cul-de-sacs and main spine roads;
- LCU9 Usworth Lowland: Gently rolling to flat arable fields with undulating landform along river valleys, influenced by nearby residential and industrial development; and
- LCU10 Nissan Plant: Large scale industrial buildings amongst open car park areas with mature boundary planting.

### Existing views and visual receptors

8.2.15 Within the study area, views from the north are largely contained by woodland along the A19, at Boldon Business Park and at Mount Pleasant Marsh. Large commercial buildings in Boldon Business Park also screen views from some residential areas. Views from the east are more elevated and open, although beyond 1 km views become restricted by topography at the Boldon Hills.

8.2.16 Views from the south are contained by vegetation along the A19 and by buildings in Town End Farm and at the Nissan Plant. Views from the west are more open but the flat topography in this area results in views being filtered by intervening hedgerow and scrub vegetation.

8.2.17 Potentially visual receptors sensitive to the Proposed Scheme include the following types (see also Figure 8-3 and Table 8.1):

- Residents in houses along the residential edges of Town End Farm;
- Residents in houses and farmsteads scattered within the surrounding agricultural fields Make-Me-Rich Farm and Hylton Bridge Farm;
- Users of Public Rights of Way in close proximity to the scheme: Bridleway B46 to the north-east, the Great North Forest Heritage Trail on Downhill Lane, Washington Road; and
- Users of Public Rights of Way on elevated sections of routes like Great North Forest Heritage Trail on Downhill Lane near Lawn Drive and the footbridge to the Nissan Plant.

8.2.18 Other visual receptors identified within the visual envelope may be less sensitive to the Proposed Scheme due to the nature of the views being either further away or having a large amount of intervening features leading to filtered or partially screened views.

These include Important Panoramic Views<sup>18</sup> designated in the Sunderland City Council Urban Development Plan. The only one of these sensitive to the Proposed Scheme is Penshaw Monument approximately 1km away (see the full list visual receptors in Table 8.1 below).

- 8.2.19 Elements within the landscape that detract from visual amenity include the electricity substation within Mount Pleasant Marsh and the pylon network that extends out from it in all directions. The A19 itself and the large Nissan Plant are also visual detractors.
- 8.2.20 Night-time views from much of the surrounding area are dominated by light pollution independent of the highway. However, vehicle headlights between Downhill Lane junction and Testos junction are prominent in existing west-facing night-time views from the high ground at Downhill Lane / Lawn Drive and Town End Farm, where they are backed by dark areas of countryside.

Ref.no	Visual Receptor
07	Mansion House - East facing flats (part of Scots House complex)
08	Footpath B29 from A184 to West Pastures lane
09	West Pastures Travelling Community Site
10	Footpath B27 west of A19
11	Bridleway B46 / old railway route
12	Travelling Man Public House / edge of Open Space
13	West Boldon Open Space
14	Downhill Lane/ Lawn Drive/ Great North Forest Heritage Trail
15	Down Hill Farm, bus stop / Great North Forest Heritage Trail
16	Downhill Lane south-west of Downhill Lane junction / Great North Forest Heritage Trail
17	Hedworth southern edge
18	Town End Farm
19	Make-Me-Rich Farm
20	Elliscope Farm
21	Hylton Grove Farm
22	Hylton Bridge Farm
23	Footpath B22 from West Pastures Lane to Follingsby Lane
24	My Pet Store -Kennels and Cattery, Follingsby Lane
25	Penshaw Monument
26	Open space near Town End Farm
27	Footbridge near Nissan
28	West Moor Farm

**Table 8.1: Visual Receptors table**

Ref.no	Visual Receptor
01	West House Farm buildings and yard area.
02	West House Farm House
03	Bridleway B28 – Boldon Business Park to A184 (Enterprise Garage)
04	West Boldon Environmental Education Centre (WBEEC): outdoor teaching area
05	WBEEC: Jetty and lake side path
06	Scot's House –East Wing

<sup>18</sup> Sunderland City Council.1998. *Sunderland City Council Unitary Development Plan Includes Adopted Alteration No. 2*. [Online]. [Accessed: 24 January 2017]. Available from: [http://www.cartogold.co.uk/Sunderland/text/11\\_countryside.htm](http://www.cartogold.co.uk/Sunderland/text/11_countryside.htm)

Ref.no	Visual Receptor
29	North Moor Farm
30	On road local cycle route – Downhill Lane / Hylton Bridge Farm to North East Aircraft Museum Footway
31	Shared cycleway / footpath along A1290 from Downhill Lane Junction to Washington Road
32	On road local footway/ cycleway along A1290 from West Moor Farm to Washington Road
33	Nissan/ Gateshead College/ Three Horseshoes Pub
34	North East Aircraft Museum
35	Usworth Cottages and The Chalet
36	Shared cycleway / footpath from Downhill Lane Junction along Washington Road to Town End Farm

## 8.3 Potential impacts during construction

### Landscape impacts

8.3.1 Construction of the Proposed Scheme is likely to have an impact on the landscape in the following ways:

- Temporary loss of agricultural land in the near vicinity of the A19 to accommodate a site construction compound, haulage routes and topsoil/subsoil storage areas;
- Permanent loss of agricultural land to the south-west of the existing Downhill Lane junction for the new slip roads and bridge;
- Permanent loss of agricultural land for the realigned Downhill Lane east of the proposed scheme;

- Permanent loss of vegetation around Downhill Lane junction, particularly to the south-west and north-east;
- Introduction of new raised embankments on the approaches to the new Downhill Lane interchange arrangement;
- Introduction of new bridge structures at the junction interchange;
- Permanent reduction in field size and change in field shape due to alterations to Downhill Lane junction slip roads and the new alignment of Downhill Lane east of the Proposed Scheme; and
- Adverse change in landscape character, in particular of LCU1 Western Lowland Agricultural, LCU2 A19 Vegetated Corridor and LCU5 River Don Scrubby Farmland due to permanent loss of landscape features and a short term reduction of tranquillity and visual amenity as a result of intrusive construction works around the junction area.

### Visual impacts

8.3.2 There may be adverse visual impacts on all views focused towards the Downhill Lane junction area and adjacent fields between here and the A1290 and Downhill Lane; potential site compounds, temporary haulage routes and temporary storage bunds may increase the visibility of the construction works.

8.3.3 There would likely be adverse changes in views due to permanent loss of landscape features and short term construction works from several visual receptors. Those receptors likely to have a greater adverse effect on

views would be those closer to the Proposed Scheme works and with open or filtered views. These include Town End Farm residential edge, Make-Me-Rich Farm and views from users of Downhill Lane, the A19 and A1290, or more elevated areas (eastern end of Downhill Lane / Lawn Drive and footbridge near the Nissan plant).

- 8.3.4 There may also be greater adverse impacts upon visual receptors near to Downhill Lane junction (as well as corresponding adverse effects upon local LCUs) due to the proximity of construction activity and temporary structures, such as site compound, storage bunds and haulage routes.

## 8.4 Potential mitigation for construction impacts

- 8.4.1 Potential landscape and visual amenity effects during construction could be mitigated to some extent. Potential mitigation work considered to date includes:
- Retaining and protecting vegetation during construction in accordance with best practice;
  - Reinstating areas used for temporary works, such as construction compounds, to a condition suitable for its original use; and
  - Planting replacement hedgerows and trees where removal could not be avoided and to provide screening of views and integration with local landscape character.
- 8.4.2 Some residual landscape and visual amenity effects during construction may be likely to remain significant, despite mitigation. For example, this would be the case

for visual amenity effects from highly sensitive receptors where views would be close at hand and impossible to screen effectively.

## 8.5 Potential impacts during operation

### Landscape impacts

- 8.5.1 There would be no on-going impacts as a result of the operation of the Proposed Scheme other than a lessening of impact on the loss of vegetation as a result of establishment of mitigation planting. This would show results by the 15<sup>th</sup> year after the opening of the scheme with noticeable effects from 5 years onwards.

### Visual impacts

- 8.5.2 Likely longer term impacts on views identified above would include adverse changes as a result of a new highway and junction alignment, bridge structures and more open views of traffic due to vegetation loss.
- 8.5.3 These impacts would lessen over a 15 year period as mitigation planting establishes and helps to integrate the Proposed Scheme and provide screening. It is deemed that the impact of mitigation should be perceptible after 5 years of growth.
- 8.5.4 The operational impact on night-time views (or in poor weather) would be limited to the additional or realigned link or slip roads at the junction and affect properties in close proximity to the scheme or with views to dark areas of countryside to the west. Views from properties on the edge of Town End Farm and to the east of Downhill Lane (Lawn Drive / Down Hill farm) would have night-time views of traffic on the new link to Downhill Lane and from traffic on the junction itself.

8.5.5 Mitigation vegetation (landscape planting) may largely eliminate potential impacts on longer distance views. However, there may be glimpses of larger vehicles using the junction through gaps in existing vegetation and other visual barriers.

## **8.6 Potential mitigation for operational impacts**

8.6.1 Potential mitigation measures to reduce the impact of the proposed scheme include:

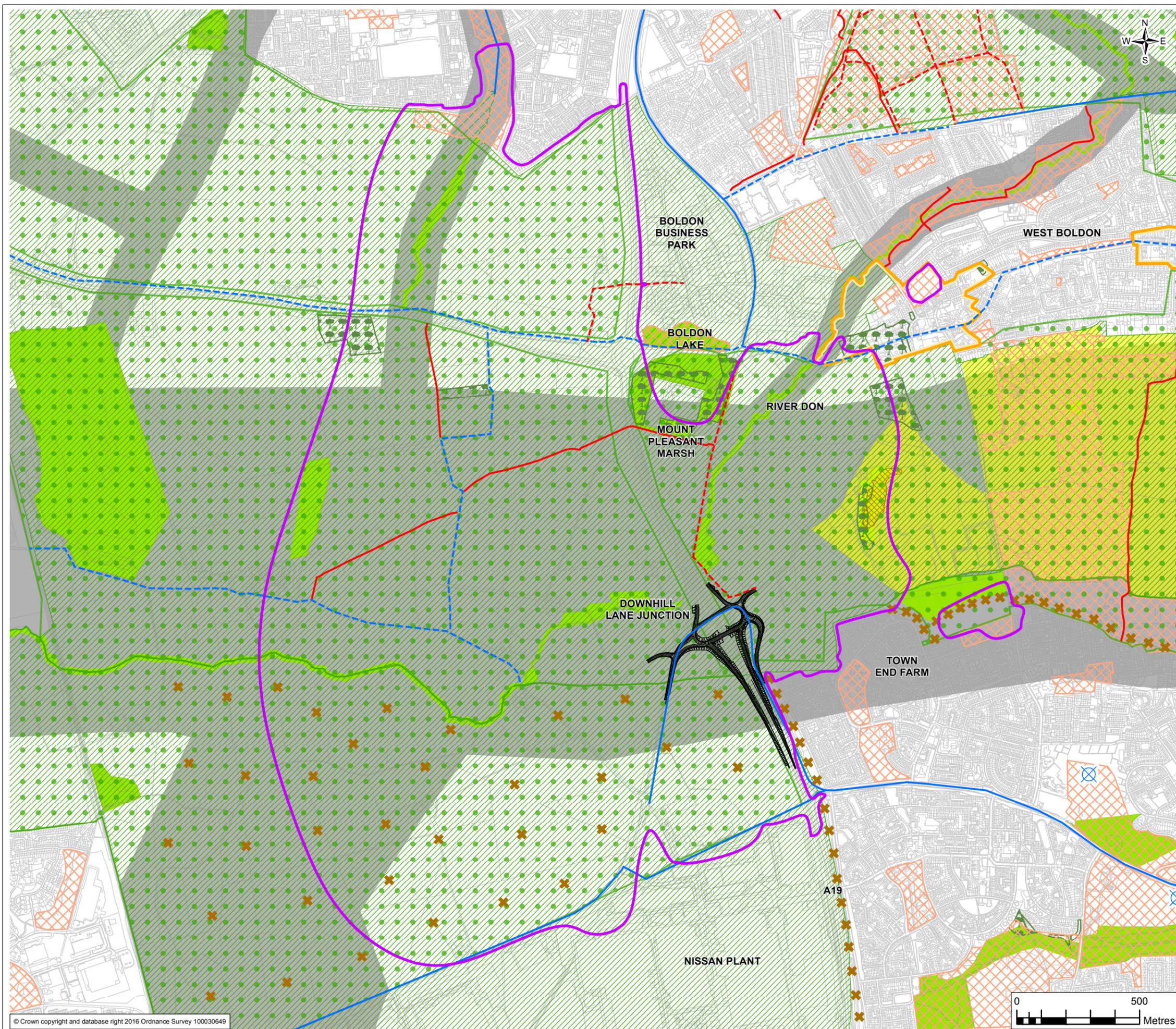
- Minimising loss of existing vegetation and retention wherever possible;
- Reinstatement or replacement of existing woodland blocks, hedgerows and individual trees lost during the construction phase, particularly around both junctions and along the west and east of the A19;
- Planting native tree and shrub species in keeping with local landscape character (both deciduous and evergreen where appropriate);
- Planting a variety of grassland, including species rich grassland, within the highway estate, to increase local biodiversity;
- Design to include landscape areas that provide habitat links between existing and proposed vegetation;
- Retaining views to local landmarks to help create a sense of place for drivers; and
- Design of structures, walls and fences to reflect local landscape character and pattern.

## **8.7 Summary**

8.7.1 Based on current information there is the risk of visual impacts arising from the Proposed Scheme, especially in the short term for residential receptors in close proximity to the development. Mitigation proposals would be developed to avoid or minimise these effects.

8.7.2 There would be some adverse effects on the local landscape with the new bridge, new junction layout and loss of agricultural land and vegetation, with short term impacts during construction on tranquillity and visual amenity.

**FIGURE 8.1**



- Legend**
- Study Area Based on Broadscale Visual Envelope
  - Important Panoramic Views (CN13/14)
  - ✖ Trees / Woodland (CN16, B1)
  - Individual
  - Footpath
  - Bridleway
  - Existing Cycleway
  - Proposed Cycleway
  - Preliminary Design
  - Conservation Area (EA1, DM6, SPDs 10-20)
  - Green Belt (CN2/3/4/5, EA1, DM5/7/8, SA4/7/10/11)
  - Recreational Open Space - Culture, Leisure, Education (L1/2/3/4/5/6/7/8/9, B3, SC6, SA2/4/6/7/8/9/11)
  - Local Geodiversity Site (LGS) (EA1/3, DM7/8)
- Tree Preservation Order**
- Group
  - Area of High Landscape Value or Landscape Significance (EA1, DM7/8)
  - Local Wildlife Site (LWS) or Candidate Local Wildlife Site (cLWS) (CN21, EA1/3, DM7/8)
  - Wildlife Corridor (CN23, EA3, DM7)

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Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd



Client **highways england**

Project **DOWNHILL LANE JUNCTION**

Drawing Title **LANDSCAPE FEATURES AND ELEMENTS**

Drawing Status

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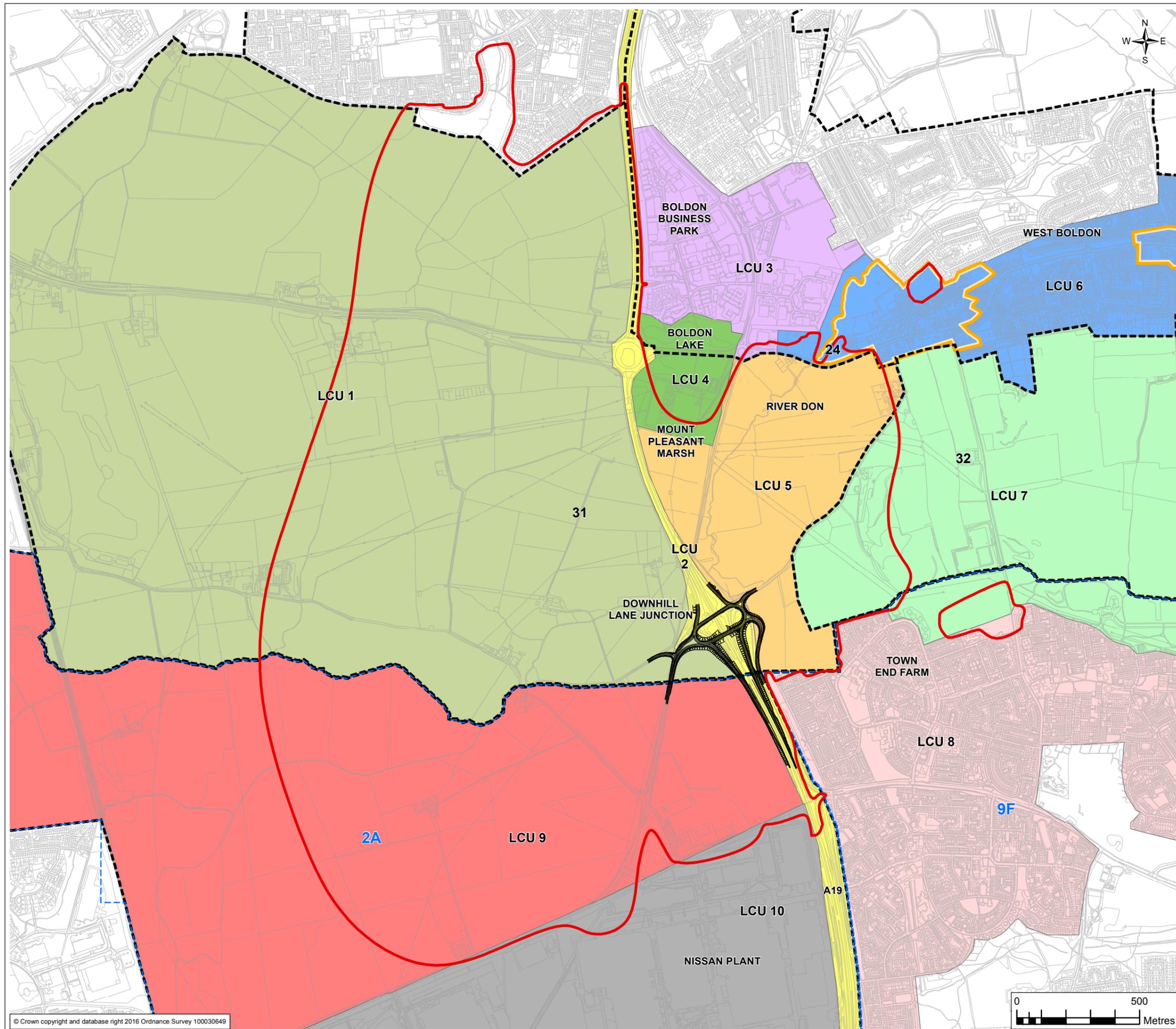
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**FIGURE 8.2**



**Legend**

- Preliminary Design
  - Study Area Based on Broadscale Visual Envelope
  - Conservation Area
- City of Sunderland Landscape Character Assessment 2015**
- 2A Coalfield Lowland Terraces - Usworth Lowland
  - 9F Urban Limestone Plateau - Hylton Castle, Downhill + Castleton
- South Tyneside Landscape Character Study - Part I Landscape Character Assessment March 2012**
- 24 (Urban) The Boldons
  - 31 (Urban Fringe) Boldon Fell
  - 32 (Urban Fringe) Boldon Downhill
- Local Character Units (Landscape)**
- LCU 1 - Western Lowland Agricultural Land
  - LCU 2 - A19 Vegetated Corridor
  - LCU 4 - Boldon Ecological Wetlands
  - LCU 5 - River Don Scrubby Farmland
  - LCU 7 - Downhill Elevated Farmland
  - LCU 9 - Usworth Lowland
- Local Character Units (Urban)**
- LCU 3 - Boldon Business Park Complex
  - LCU 6 - West Boldon Elevated Urban Centre
  - LCU 8 - Town End Farm Residential Edge
  - LCU 10 - Nissan Plant

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Client **highways england**

Project **DOWNHILL LANE JUNCTION**

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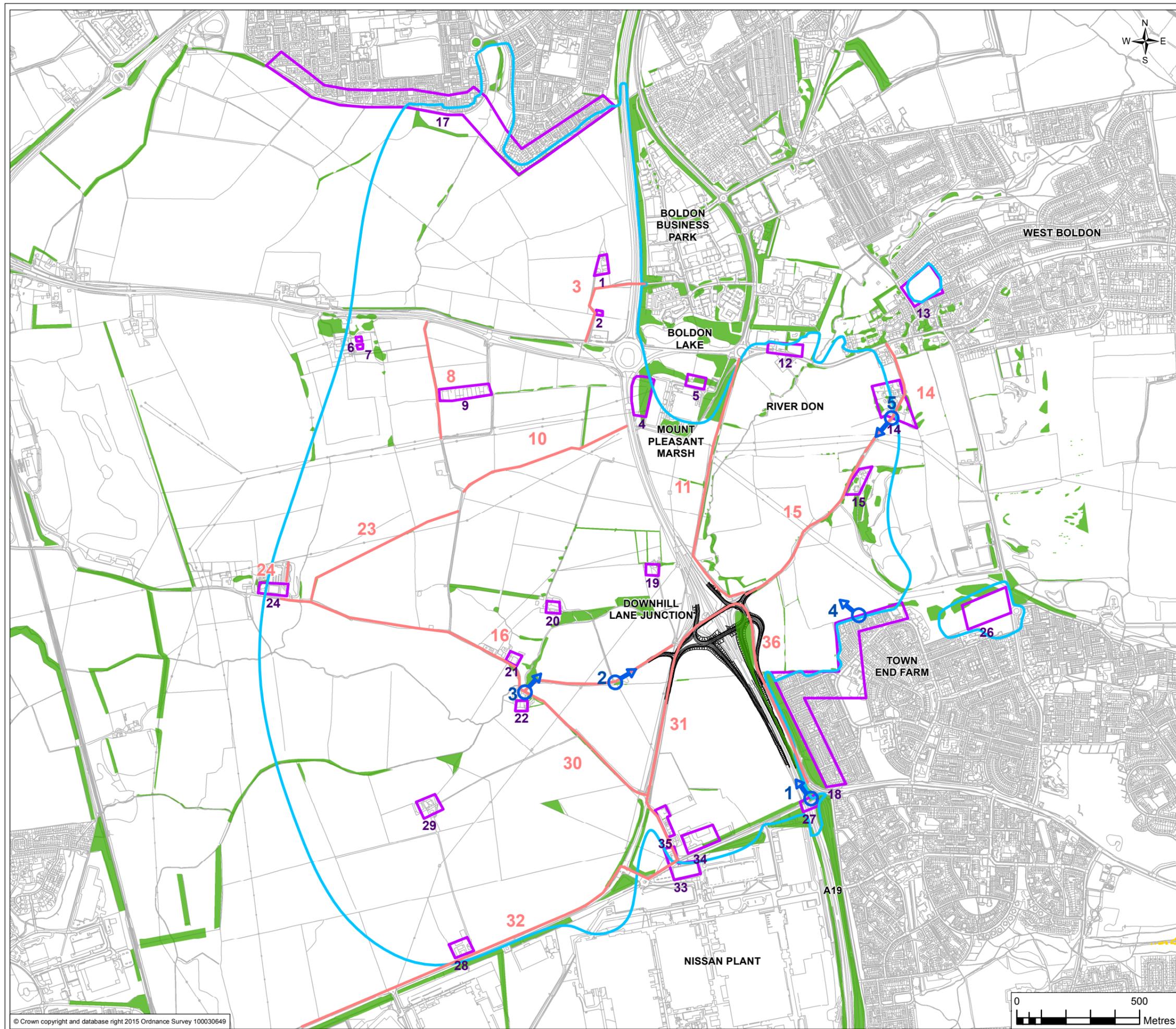
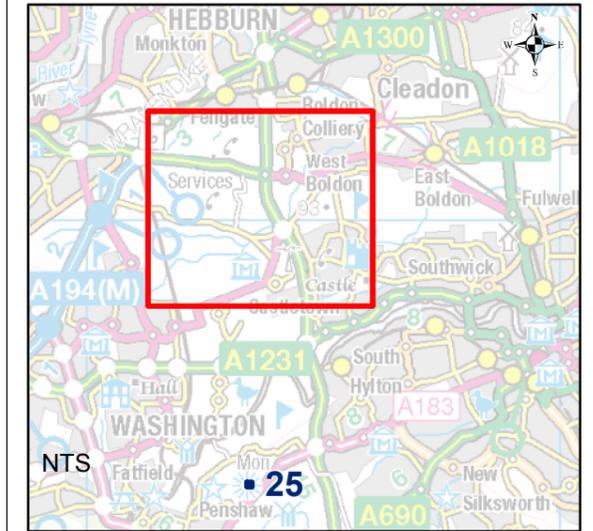
**FIGURE 8.3**

**Legend**

- 10m Contour
- Public Right of Way Visual Receptor
- Visual Envelope
- Visual Receptor
- Significant Vegetation
- Preliminary Design
- 1 ↗ Photo Location and Direction

Site Photographs are presented on subsequent figures, as described in the following notes:

- 1 Footbridge to Nissan (Fig. 8.4)
- 2 Downhill Lane SW of Downhill Lane Junction (Fig. 8.5)
- 3 Hylton Bridge Farm (Fig. 8.6)
- 4 Town End Farm (Figure 8.7)
- 5 Downhill Lane/Lawn Drive/Great North Forest Heritage Trail (Fig. 8.8)



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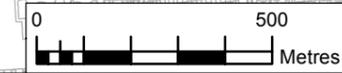
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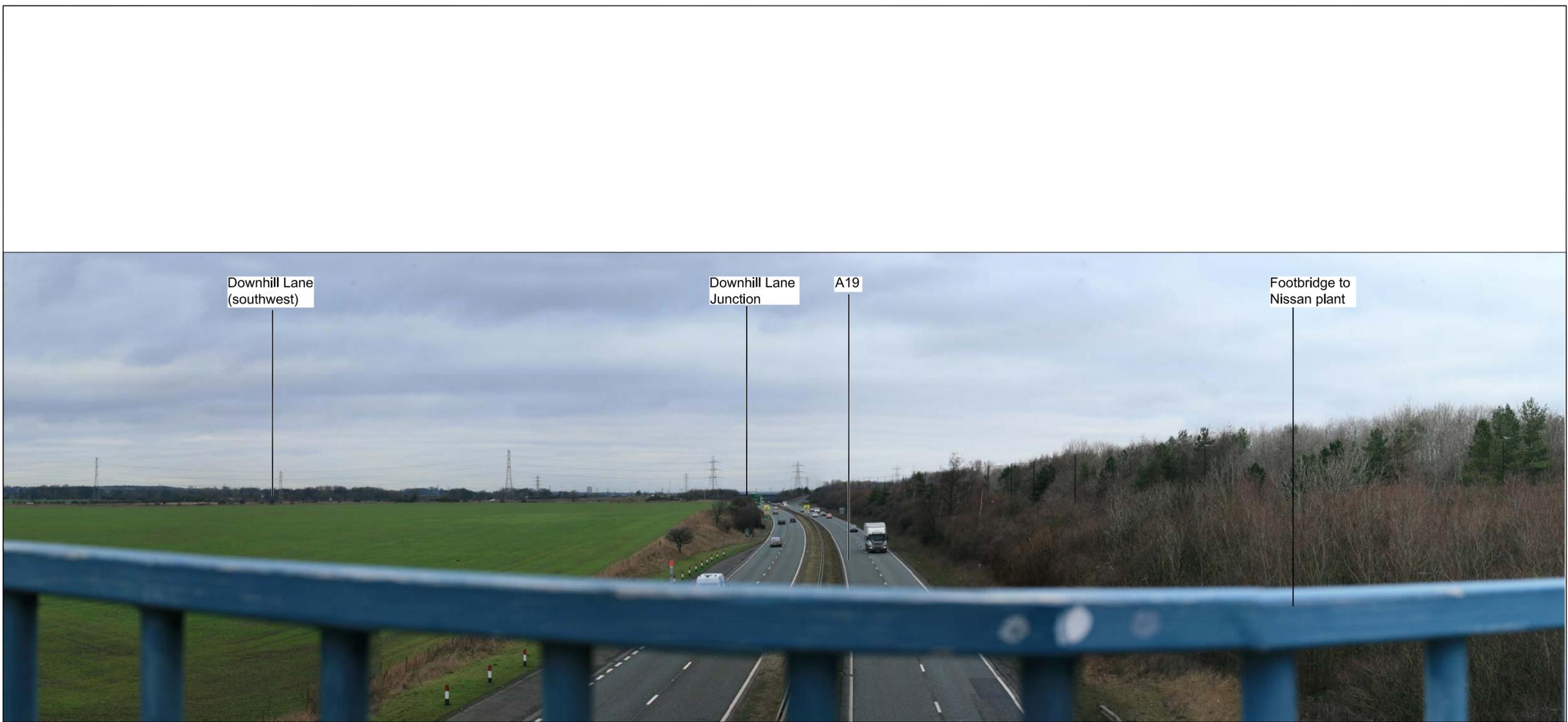
Project **DOWNHILL LANE JUNCTION IMPROVEMENT**

Drawing Title **VISUAL ENVELOPE AND VISUAL RECEPTORS**

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**FIGURE 8.4**

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DOWNHILL LANE JUNCTION

Drawing title

Viewpoint 01  
 Footbridge to Nissan plant

Drawing status

Initial Issue

Scale

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Jacobs No.

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Drawing number

B0140301\_DLJ\_PIER\_0804

Rev

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**FIGURE 8.5**

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Project

DOWNHILL LANE JUNCTION

Drawing title

Viewpoint 02  
Downhill Lane (south west)  
of Downhill Lane Junction

Drawing status

Initial Issue

Scale

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Drawing number

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**FIGURE 8.6**

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Drawing title  
 Viewpoint 03  
 Hylton Bridge Farm

Drawing status  
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Scale  
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 B0140301\_DLJ\_PIER\_0806

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**FIGURE 8.7**

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Client



Project

DOWNHILL LANE JUNCTION

Drawing title

Viewpoint 04  
Town End Farm (north western edge)

Drawing status

Initial Issue

Scale

NTS DO NOT SCALE

Jacobs No.

B0140301

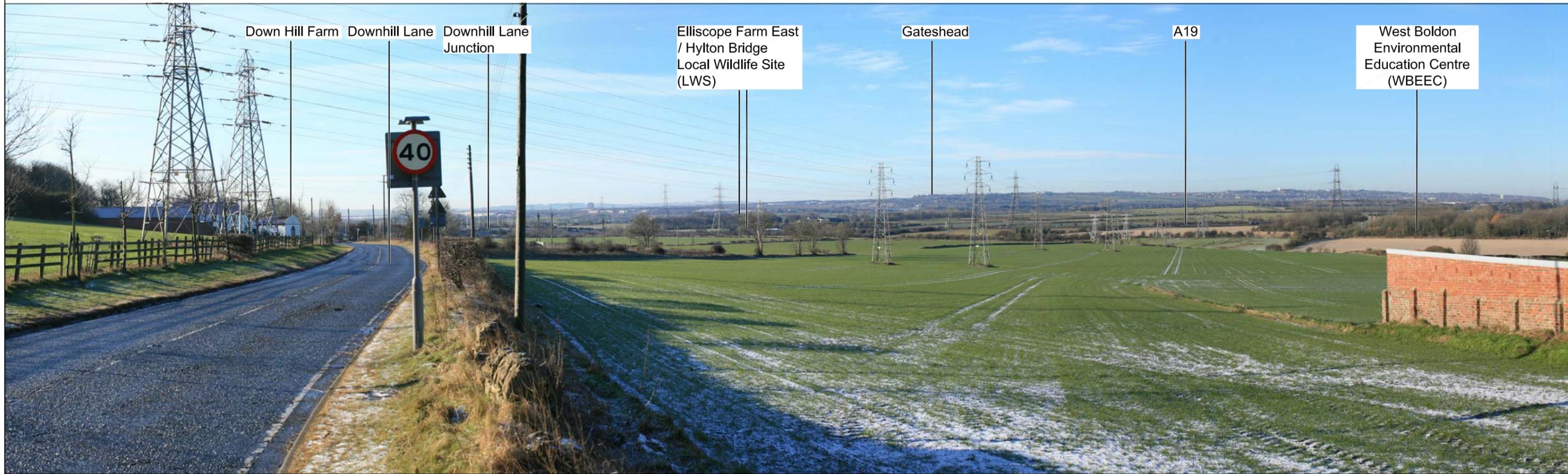
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**FIGURE 8.8**

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DOWNHILL LANE JUNCTION

Drawing title

Viewpoint 05  
 Downhill Lane / Lawn Drive /  
 Great North Forest Heritage Trail

Drawing status

Initial Issue

Scale

NTS DO NOT SCALE

Jacobs No.

B0140301

Drawing number

B0140301\_DLJ\_PIER\_0808

Rev

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## 9 ECOLOGY AND NATURE CONSERVATION

### 9.1 Introduction

9.1.1 Ecology is the scientific study of living organisms and their relationships with each other and their environment. Nature conservation is concerned with maintaining a viable population of the country's characteristic fauna, flora and wildlife communities. Impacts on nature conservation are broadly split into two categories: habitats and species.

9.1.2 The construction and operation of highways can affect both site-specific receptors (locations or areas that provide habitats for wildlife or rare flora) and mobile receptors (populations of wildlife, especially species that are rare, declining or endangered). The assessment of ecological effects will be undertaken in accordance with DMRB, Volume 11, Section 4 'Ecology and Nature Conservation' and supports Interim Advice Notes, such as IAN 130/10 'Ecology and Nature Conservation: Criteria for Impact Assessment'. The assessment will also draw on the Chartered Institute for Ecology and Environmental Management 'Guidelines for Ecological Impact Assessment in Britain and Ireland, 2016'.

9.1.3 The study area will vary for different aspects of the assessment, as follows:

- Statutory and non-statutory designated sites and records of protected species: 2 km from the centre-

line of the scheme, with reference to the above DMRB guidance on assessing the effects on sites protected at a European level<sup>19</sup> and Planning Inspectorate Guidance on Habitat Regulation Assessment (2013)<sup>20</sup>.

- Extended Phase 1 habitat survey: 500 m to either side of the proposed improvements, in accordance with guidance contained in the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 Habitat Survey<sup>21</sup>.
- Protected species and specific habitats: survey areas will be defined in accordance with standard survey methods for each species.

9.1.4 The information on the ecological environment expressed in this report has been derived from ecological surveys and a desk-based study collated in 2016. This was supplemented by ecology baseline information available from surveys undertaken between 2014 and 2016 in relation to the proposed IAMP development.

9.1.5 In addition, the following organisations / local wildlife groups were contacted in 2016 to obtain desk-based records that informed the scope of the ecology surveys:

- Environmental Records Information Centre North East;
- Durham Bat Group;

<sup>19</sup> Highways England. Design Manual for Roads and Bridges: Assessing the effects on sites protected at a European level (DMRB Volume 11, Section 4) and IAN 141/11.

<sup>20</sup> Planning Inspectorate, 2013. Guidance on Habitat Regulation Assessment (Advice note ten, Version 5).

<sup>21</sup> Joint Nature Conservation Committee (JNCC) (2010). *Handbook for Phase 1 Habitat Survey*. Available from: <http://jncc.defra.gov.uk/page-2468>

- Durham County Badger Group;
- Durham Bird Club; and
- North East Reptile and Amphibian Group.

## 9.2 Existing and baseline knowledge

9.2.1 Figure 5-1 illustrates the indicative environmental constraints for the wider study area, including the locations of designated statutory and non-statutory sites for nature conservation.

9.2.2 There are two statutory designated sites within 2 km of the scheme. These are:

- Hyton Castle Cutting Site of Special Scientific Interest (SSSI). This site is designated for its geological interest rather than its ecological value, so is not considered further in this chapter.
- Hyton Dene Local Nature Reserve (LNR).

9.2.3 There are a total of 19 Local Wildlife Sites (LWSs) located in the study area that span two local authorities (South Tyneside and Sunderland). Table 9.1 provides the details of these sites, which are also illustrated on Figure 5-1.

**Table 9.1: Locally Designated Sites**

Site Name	Description
Make-me-rich Meadow	The site is made up of an area of species-rich, damp, unimproved grassland together with a section of the River Don between the A19 and the A184. The meadow was formerly grazed, but has not been intensively managed for some years. In the absence of grazing, large areas have become dominated by tall stands of meadowsweet, great willowherb and tufted hairgrass.

Site Name	Description
Mount Pleasant Marsh	Located southeast of Testos Junction, comprising open water, reedbeds, marshy grassland scrub and woodland habitat (also hosts West Boldon Environmental Education Centre).
Elliscope Farm East/Hylton Bridge	The site consists of two small woodlands and the linking section of the River Don, leading east from Hylton Bridge Farm. Elliscope Farm East is a linear, mature broadleaf plantation dominated by sycamore, with ash and elder. Hylton Bridge is a small mature broadleaf plantation with a varied canopy of sycamore, ash and beech.
River Don west Boldon	A linear site covering the banks of the River Don as it flows through West Boldon between North Road and New Road. The Don here has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.
Downhill Old Quarry	Downhill is a Magnesian limestone 'outlier' which forms a prominent domed hill overlooking the low lying, open land north of the Nissan car plant. The former quarry base and paddock has a range of species-rich grassland types grading from Magnesian limestone grassland communities through to more neutral grasslands.
River Don East House	The site consists of a section of the River Don between East House Farm and Hylton Bridge Farm. In this stretch the Don has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.
Downhill Meadows	The site incorporates large areas of calcareous grassland with areas of tree planting, rank neutral grassland and small amounts of scattered scrub.
River Don North Road	The site consists of a section of the River Don between North Road and Newcastle Road. In this stretch the Don has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.

Site Name	Description
Boldon Lake	The site comprises a man-made lake (the largest body of open water in the borough) adjacent to the Quadrus building in West Boldon, together with species-rich damp grassland alongside. The lake was created in 1986 and has developed substantial areas of marginal vegetation including large stands of reedmace and common reed, and an area dominated by hard rush.
Tillesheds	A varied site with a wooded area, wetlands and an area of open Magnesian Limestone grassland. Covers part of the same area as Hylton Dene LNR.
Hylton Dene	Designated for the mature woodland, calcareous grassland, flushed herb-rich marsh and streambank habitats. Part of the woodland is designated as Ancient Semi-Natural woodland.
Hylton Castle Grassland	Hillside displays Magnesian Limestone grassland and scrub adjacent geological exposures of Ford Formation (reef facias) at Hylton Castle Cutting SSSI.
Turner's Hill	Turner's Hill is an area of grassland on a small circular hillock within Boldon Golf Course, south-east of Boldon Cemetery.
Hylton Plantation	A mixed plantation dominated by coniferous trees with scattered broad-leaved trees. Trees and scrub provide shelter for a thriving woodland bird community.
Strother House Farm	The site is situated to the north of Strother House Farm. It comprises an area of marshy ground approximately 0.3ha in extent, bounded by a ditch to the south and east.
Peepy Plantation	A mature plantation with interesting woodland flora and fauna is also notable for invertebrate assemblage and woodland birds.
Calf Close Burn	Calf Close Burn is a linear site following the course of a small burn as it flows north across agricultural land towards the Fellgate Estate. The stream sides have abundant great hairy willowherb and there is a stand of common reed extending into the burn's channel.

Site Name	Description
Black Plantation	Black Plantation is a small, rectangular, area of mature even-aged, broadleaved plantation woodland lying to the south of West Boldon. The canopy is dominated by sycamore, whilst other trees present include wych elm, beech, ash and hybrid poplar. The ground flora has no ancient woodland indicators, being dominated by plants such as bramble, stinging nettle, false oat-grass and umbellifers. A diverse bird life includes jays and breeding great spotted woodpecker, whilst barn owls have been recorded using the wider area.
Barons Quay Wood	Mixed deciduous woodland and hawthorn scrub are of particular botanical interest, with extensive areas of rough grassland of high nature conservation value. An important and integral part of the salt marsh complex along the River Wear.

9.2.4 Previous consultation with South Tyneside and Sunderland Councils led to all of the LWSs assessed as being of Medium value (Regional importance) for nature conservation. This will be reviewed as part of the ongoing environmental assessment work for the Proposed Scheme.

9.2.5 The habitat types listed in Table 9.2 below are those identified in the survey area during the Extended Phase 1 Habitat Survey undertaken in 2016. The table identifies any particularly sensitive habitats or species that are protected under specific legislation, or are listed as species or habitats of principal importance under the Section 41 List of the Natural Environment Research

Council (NERC), or the Durham Biodiversity Action Plan (BAP)<sup>22</sup>, which covers South Tyneside.

**Table 9.2: Habitats Identified in the Study Area in 2016**

Habitat type	Section 41 Habitats of Principal Importance	LBAP priority habitat
Species-Poor Semi-improved Grassland		
Running Water (River Don)	✓	✓
Broad-leaved Semi-natural Woodland (Elliscope Farm Copse LWS)	✓	✓
Broadleaved Plantation Woodland		✓
Broadleaved Scattered Tree		
Mixed Plantation Woodland		
Marshy Grassland		
Species Poor Hedgerows		✓
Native Species-rich Hedgerow	✓	✓
Scattered Scrub		
Dense Continuous Scrub		✓
Improved Grassland/Arable		
Amenity Grassland		
Tall Ruderal		
Inland Cliff		✓

9.2.6 The results of surveys carried out in 2016 showed that the majority of the hedgerows surveyed in the study area were dominated by hawthorn/ blackthorn and were species-poor.

9.2.7 There were three sections of hedgerow in the south-west of the survey area that were native species-rich hedges; these hedges would not be affected by the Proposed Scheme.

9.2.8 Table 9.3 provides a summary of the protected species surveys undertaken in the survey area in 2016 to inform ongoing environmental assessment work.

**Table 9.3: Protected Species Baseline Summary**

Receptor	Baseline Summary
Otter	<p>Otter surveys in 2016 found no evidence of otter within any of the areas surveyed, which included:</p> <ul style="list-style-type: none"> <li>• River Don upstream and downstream of the A19;</li> <li>• Mount Pleasant Marsh LWS; and</li> <li>• Boldon Lake LWS.</li> </ul> <p>Otter surveys in previous years have identified Otter activity concentrated on the River Don, both upstream and downstream of the A19, which is likely to be a commuting corridor for otters between suitable habitat on the River Tyne in the north and the River Wear to the south.</p> <p>No evidence of Otters was detected in the River Don during the surveys undertaken, but Otter spraint and footprints were observed during surveys undertaken for the IAMP in 2016, which is mentioned in the IAMP Scoping report and the IAMP Preliminary Environmental Report<sup>23</sup>.</p>

<sup>22</sup> Durham Biodiversity Partnership (2006). *Durham Biodiversity Action Plan*. Available from: <https://www.gateshead.gov.uk/DocumentLibrary/Building/PlanningPolicy/Core-Strategy-Documents/170.-SD-Durham-Biodiversity-Action-Plan.pdf>

<sup>23</sup> IAMP (2016) 'International Advanced Manufacturing Park – Environmental Impact Assessment Scoping Report' [on-line] Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/BC030001/BC030001-000021-Scoping%20Report>

Receptor	Baseline Summary
Barn Owl	Surveys undertaken in 2016 within 500 m of the proposals identified evidence of barn owl within two building groups. Both sites were considered to contain regular roosts and are classified potential breeding sites.
Great Crested Newt (GCN)	GCN environmental DNA (eDNA) sampling was undertaken in April 2016 on ponds within 500 m of the proposals. The results of the sampling identified no GCN.
Water Vole	Water vole presence was recorded on the River Don downstream of the A19 and upstream of the A19 at Make-Me-Rich Farm.
Bats	The result of surveys in 2016 showed that in general the habitat quality and bat activity within the survey area were low. The 500 m surrounding the proposals was of local value to edge habitat species and of less than local value to open and cluttered habitat species. No roosts were found within the survey area and few bats were observed crossing the road.
Badger	Badger setts were recorded over 1 km away from the proposals (identified from a desk-based study). No evidence of badger activity within 500 m of the proposals was identified during surveys undertaken in 2016. It was concluded that badgers would not be affected by the Proposed Scheme.
Breeding Birds	Breeding bird surveys undertaken by Jacobs in 2014 identified the following species of conservation interest in the survey area: <ul style="list-style-type: none"> <li>• 2 species listed under Schedule 1 (Part 1) of the WCA (as amended) – barn owl and kingfisher;</li> <li>• 13 'Species of Principal Importance', Section 41, NERC Act 2006;</li> <li>• 8 species on the Red List of Birds of Conservation Concern 4 2015324; and</li> </ul>

Receptor	Baseline Summary
	<ul style="list-style-type: none"> <li>• 11 species on the Amber List of the Birds of Conservation Concern 4, 2015.</li> </ul>
Wintering Birds	<p>Wintering bird surveys in the survey area identified a total of 45 bird species comprising:</p> <ul style="list-style-type: none"> <li>• 2 species listed on Schedule 1 (Part 1) of the Wildlife and Countryside Act 1981 (WCA) (as amended);</li> <li>• 11 species listed under Section 41 of the Natural Environment and Rural Communities Act 2006;</li> <li>• 8 species on the Red List of Birds of Conservation Concern 4 2015;</li> <li>• 2 species on the Amber List of the Birds of Conservation Concern 4 2015;</li> <li>• 8 Durham Biodiversity Action Plan Species; and</li> <li>• 22 common undesigned species.</li> </ul>
White-Clawed Crayfish	White-clawed crayfish were not identified in the study area, although the habitat looked suitable in the River Don.
Brown Hare	Brown hares were recorded in arable fields east and west of the A19, and likely to be using all suitable habitats in the study area.
Invasive Species	No invasive species were recorded within the survey area for Downhill Lane junction.

9.2.9 Surveys for red squirrels were not undertaken as both the nature and the structure of the habitat in the study area is unsuitable for this species. Reptile surveys were not carried out because most species are dependent on a structured mixture of rough grassland and scrub,

<sup>24</sup> Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the

population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708-746

whereas the habitat around Downhill Lane junction comprises mainly arable, pasture and plantation woodland.

- 9.2.10 A number of other species, including hedgehogs, polecat, deer and aquatic invertebrates (etc.) were not surveyed as their presence was not identified through either desk-based research or consultation, and even if these species were present, they would be unaffected by the Proposed Scheme.

### 9.3 Potential impacts during construction

- 9.3.1 There are a number of ways in which the Proposed Scheme may affect ecology and nature conservation during construction:

- **Habitat loss** - directly attributable to the loss of existing habitats due to the creation of the new bridge and road layout. The offline sections of the Proposed Scheme to the west of the existing A19, including contractor's compounds, are where these effects are likely to be most significant as the land take is at its greatest. Areas would be temporarily lost during construction, but may be restored once construction has been completed. Habitat loss for the Proposed Scheme is mostly arable and improved grassland.
- **Habitat damage** - habitats that extend from the construction footprint include aquatic habitats (River Don LWS) that are sensitive to pollution from fuel and chemicals spills, and from sediment run-off. While standard best practice construction techniques for pollution prevention and control would be used, there is always a risk that pollution

could result while construction takes place. Indirect impacts may also arise where vegetation in close proximity to any construction works are sensitive to any elevated levels of airborne dust arising from the works.

- **Disturbance** - disturbance from construction can result in significant effects on sensitive species, such as breeding birds. This could lead, amongst other things, to abandonment of young, predation risk and use of critical energy reserves. However, for the Proposed Scheme it is assumed that there is already a baseline of existing noise disturbance due to the presence of the existing A19.
- **Severance / fragmentation** - leads to isolation both within and between populations, and from specific resources vital for survival. Though the existing A19 already creates a severance effect, the Proposed Scheme could create new effects during the construction period through site clearance.
- **Species mortality during construction** - less mobile species, or animals that are young or hibernating, are likely to be those most vulnerable to direct mortality during construction; from removal of vegetation or collisions with moving vehicles and construction plant. The effects of individual mortality erode the population, which can lead to local extinctions once the population falls beneath a critical threshold.
- **Changes in air quality** - vehicle emissions and nuisance dust may increase during construction due to the presence of construction traffic. This can be

particularly damaging for sites of floristic importance which support the local ecosystem. It is assumed that there is already a baseline of effect of air quality on habitats due to the presence of traffic using the existing A19.

## 9.4 Potential mitigation for construction impacts

### 9.4.1 Potential mitigation measures include:

- Maintaining key habitat and wildlife dispersal corridors across the scheme corridor as far as is practicable using structural planting (in conjunction with appropriate fencing and sensitive lighting to maximise effectiveness) within the design;
- Creation of new and replacement habitat;
- For works near invasive species, for example Japanese Knotweed (*Fallopia Japonica*), follow Environment Agency best practice guidelines (it should be noted that no invasive plant species have been identified within the study area to date);
- Accounting for ecological receptors as surveys and survey analysis develops; adjust landscape, visual, noise and drainage mitigation where practicable to broaden habitat opportunities and biodiversity without compromising other mitigation provision; and
- Identifying areas beyond the Proposed Scheme boundary where lasting benefits might be achieved through additional land take and/or working with partners.

9.4.2 The Proposed Scheme would be designed to avoid direct or indirect impacts on sites designated for nature conservation importance, protected species or valued habitats where possible; mitigation or compensation for such impacts is considered a last resort only if avoidance is not possible.

9.4.3 Disturbance during construction is a temporary impact that would be mitigated through the instigation of working method statements that would address potential impacts on species, or where appropriate, Natural England licences that permit certain activities affecting protected species. This would, for instance, include removal of vegetation outside of bird nesting periods.

## 9.5 Potential impacts during operation

9.5.1 There are number of ways in which highway improvements can, in generic terms, affect ecology and nature conservation during operation. These include:

- **Habitat loss** – as the Proposed Scheme requires land take for the new bridge and road layout, there would be some permanent loss of habitat.
- **Severance / fragmentation** - the effects of this could include reduced foraging success, increased competition, genetic isolation and inbreeding, which can lead to local extinctions. In the absence of mitigation, the road acts as a barrier across the landscape to a range of species. It is assumed that there is already a baseline of severance effect due to the existing highway network around Downhill Lane junction and any risk of increased severance effects would be very limited.

- **Changes in vehicle emissions** - in the longer term overall vehicle emissions in some areas would increase and in other areas decrease as a result of the Proposed Scheme. Sites designated for their floristic importance, and any species that depend on them, are particularly sensitive to changes in air quality. Elevated concentrations of oxides of nitrogen (NO<sub>x</sub>) are generally considered to be the main threat to vegetation from vehicle emissions, but normally only within close proximity to the road. An assessment of such effects is only normally required where sites of European or International importance are likely to be affected, and there are no such sites in close proximity to the road or in the air quality study area.
- **Species mortality (vehicle collisions)** - many animals are killed on UK roads each year and there is the potential for an increase in deaths due to the Proposed Scheme, before mitigation is taken into account. Most of these deaths are the result of collisions with vehicles. Animals that are at particular risk include otters, as a result of the severance of their wildlife corridors. There are some mitigation measures that can be employed to reduce the risk of collisions and these would be considered during the ongoing design of the Proposed Scheme. It is assumed that there is already a baseline of effect of species mortality due to vehicle collisions given the existing highway network around Downhill Lane junction and, as this is an on-line scheme, the potential for significant increase is limited.

- **Disturbance from road lighting** - impacts from new lighting are most likely to affect bat species along the alignment of the Proposed Scheme. The effects of road lighting are complex, but include roost disturbance and abandonment, severance and loss of foraging habitats through avoidance, and a decline in airborne invertebrate prey. Habitats where the impact of lighting can be particularly severe include habitats along river corridors, woodland edges and hedgerows. There would only be very limited additional lighting as part of this Proposed Scheme, so the likelihood of a significant impact would be small.

## 9.6 Potential mitigation for operational impacts

9.6.1 A detailed mitigation strategy is being developed to avoid or reduce the impacts described above based on updated desk-based searches and field-based surveys undertaken in 2014 and 2016. The strategy would seek to employ best practice methods for dealing in particular with disturbance, habitat loss and habitat severance.

9.6.2 Mitigation measures are likely to include:

- Maintaining key habitat and wildlife dispersal corridors north-south across the scheme corridor as far as is practicable, using structural planting (in conjunction with appropriate fencing and sensitive lighting to maximise effectiveness) within the design.
- Maintaining river corridor habitat and wildlife dispersal along the River Don west-east near Downhill Lane junction as far as is practicable, using

both culverts and structural planting, in conjunction with appropriate fencing and sensitive lighting.

- Seeking opportunities to: maximise habitat connectivity along both sides of the proposed scheme with new landscaping using native, locally appropriate species; aim for no net loss of valued semi-natural habitats; minimise culverting of watercourses; and, where unavoidable, design culverts according to current best practice design.
- Seeking to increase habitats for key species that are limited by low availability of suitable habitat / connectivity; e.g. bats, otter and water vole.
- Adjustments to account for evolving design, including drainage, compounds and storage areas.
- Accounting for new ecological receptors as further surveys and survey analysis develops; adjustments to landscape, visual, noise and drainage mitigation where practicable to broaden habitat opportunities and biodiversity without compromising other mitigation provision.
- Bat and bird boxes would be included in the final proposals for the preferred option, as an enhancement measure. The exact number and location of bat and bird boxes would be determined at a later stage in the schemes design. Suitable locations occur at Elliscope farm / Hylton Bridge LWS.

## 9.7 Summary

9.7.1 The Proposed Scheme could create a number of temporary and permanent effects on the local ecology,

which includes the River Don LWS. Many effects (e.g. disturbance, severance effects and air pollution risks) already exist due to the presence of the existing A19 and road network around Downhill Lane junction. However, new effects may arise from the loss of land and vegetation with new permanent bridge and road layout, plus temporary site clearance during construction.

9.7.2 However, any potential effects would be avoided or minimised through good construction practices and specific mitigation, plus the involvement of our ecology specialists in the development of the landscape restoration and planting proposals to maximise biodiversity enhancement opportunities.

## 10 GEOLOGY AND SOILS

### 10.1 Introduction

- 10.1.1 Geology and soils are key factors in determining the environmental character and quality of any given location or area. The rocks beneath the ground's surface have a major influence on the landform (i.e. the topography and other geographical features of an area). The physical and chemical properties of the rocks and the overlying soils influence the type and variety of vegetation that will grow, agricultural quality, flood risk and water storage capacity.
- 10.1.2 This topic considers the geological and hydrogeological (i.e. links between geology and ground and surface water) characteristics of the Proposed Scheme and the immediately adjacent area. It addresses geology, hydrogeology, soils and soil quality, including agricultural land, mineral resources, contaminated land / potential contamination and designated geological sites. These issues will be considered in light of impacts to the resources themselves (as relevant), and also potential risks to the health of construction workers and future site users.
- 10.1.3 Information on geology and soils expressed in this report has been derived from the Preliminary Sources Study Report (2016) and the A19 Testos Junction Improvement Scheme ES (2017). Enquiries to external bodies, such as local councils, may need to be updated as part of the current environmental work.
- 10.1.4 For the purposes of the assessment, which will be undertaken in accordance with DMRB, Volume 11, Section 3, Part 11 'Geology and Soils', the area of

potential impact can be defined as the footprint of all the permanent and temporary works; and the study area covers this area plus all immediately adjacent land (defined as a surrounding 'buffer' extending to 200 m in all directions).

### 10.2 Existing and baseline knowledge

- 10.2.1 The site is underlain by a sequence of glacial deposits comprising Pelaw Clay, Tyne and Wear Complex (mainly laminated clay) and Durham Lower Boulder Clay. Alluvial deposits are present locally, associated with the River Don watercourse. These are likely to comprise clay, silt sand and gravel materials. These superficial deposits overlie a sequence of siltstones, mudstones, sandstones and coals of the Pennine Middle and Upper Coal Measures.
- 10.2.2 There are no nationally designated geological or geomorphological sites in the study area.
- 10.2.3 A Site of Special Scientific Interest designated for its geological value (exposed fossil beds in limestone) is located approximately 2 km to the south-east, at Hylton Castle Cutting. However, there is no 'pathway' by which this site could be affected by the development of the Proposed Scheme.
- 10.2.4 The bedrock underlying the site and the superficial alluvial deposits are designated by the Environment Agency as Secondary 'A' Aquifers. This means these deposits are capable of supporting water supplies at a local scale or forming a source of base flow to rivers. The superficial glacial deposits, due to their low permeability, are noted as unproductive strata and have negligible significance for water supply.

10.2.5 The surface soils underlying the south-east quadrant of Downhill Lane junction are reported to be of high leaching potential (i.e. having little ability to retain pollutants within the soil structure due to either being shallow or coarse grained). Soils under the remainder of the Proposed Scheme are classified as low leaching potential and pollutants are unlikely to penetrate the soil layer, either because water movement is largely horizontal or because the soils have the ability to attenuate diffuse pollutants (i.e. the pollutants will be retained within the soil structure and not pass into the underlying aquifer).

10.2.6 Available records suggest the agricultural soils comprise Grade 3b at best, and as such are not categorised as some of the 'best and most versatile' land.

10.2.7 The site is believed to be underlain by mine workings in four seams between 360 m and 540 m depth. The last recorded date of working of these seams is 1979, and consequent ground movement should have ceased. There are no recorded mine entries within 50 m of the study area.

10.2.8 The following potential sources of contamination have been identified in the vicinity of the site:

- Existing site uses: A19 and Nissan Manufacturing Plant;
- Anecdotal evidence of burnt shale potentially incorporated into the existing highway earthworks, which is likely to contain high sulphates and sulphides;
- Boldon Colliery and mine workings to the north;

- Licenced waste facilities at Nissan Manufacturing Plant/ historic land fill site east of the route at Downhill Quarry;
- Former brickworks and quarries to the east, north-east and south-east; and
- A former mineral railway line crossed by the A19 north of Downhill Lane junction.

10.2.9 The 2007 ground investigation included a number of holes on the north facing sliproads at Downhill Lane junction. These generally encountered Made Ground associated with the road construction overlying natural deposits. No evidence of burnt shale was encountered. Exploratory holes did not reveal visual or other evidence of contamination.

10.2.10 Enquiries made to the state veterinary services indicated that there are no animal burial sites within the vicinity of the scheme.

10.2.11 No high or very high sensitivity receptors were identified on the site. However, medium-sensitivity receptors in the study area include:

- Designated sites (e.g. Boldon Lake, Mount Pleasant Marsh, Elliscrope Farm / Easy Hylton Bridge and Make-Me-Rich Meadows Local Wildlife Sites);
- Agricultural land whose quality is classified as 'Grade 3b' on both sides of the A19 at Downhill Lane; and
- Surface watercourses.

10.2.12 Any risks to ecologically designated sites and surface watercourses are discussed separately in Chapters 9 and 14, respectively.

### **10.3 Potential impacts during construction**

10.3.1 Highway construction can affect geological and soil resources, while the nature and condition of soil and underlying rocks can be a key constraint on scheme design.

10.3.2 The Proposed Scheme will require the handling of Grade 3b agricultural soils within the footprint of both temporary construction work areas and the permanent new bridge and road layout; effects on agricultural businesses are discussed in Chapter 13.

10.3.3 Under some circumstances, construction work can also compound the environmental effects caused by previous activity, for instance by mobilising pollution left in the ground by former industrial activities.

10.3.4 Based on the baseline environment described above, potential impacts during construction may include:

- Disturbance of potentially contaminated land, but previous investigations have not identified any burnt shale in the vicinity;
- Remobilisation of residual pollutants (i.e. pollutants that are already present, but stable and inactive in their present condition), although it should be noted that previous studies have not found any evidence to date of contaminants;
- Creation of new pollution pathways (i.e. routes by which pollutants can reach environmental receptors

that are vulnerable to their effects) as a result of the larger footprint of the Proposed Scheme and construction on undeveloped land;

- Contact with unrecorded mineshafts and/ or mine workings;
- Alteration of the physical and chemical characteristics of the soil and in turn the potential to increase erosion and transfer of pollutants to surface water, restrict root growth and drainage, reduce recharge of aquifers and cause surface ponding of water; and
- Disturbance of groundwater flow paths.

### **10.4 Potential mitigation for construction impacts**

10.4.1 Based on the current information available for the Proposed Scheme, the potential for contaminated land to be encountered is low. This will be reviewed during completion of the EIA process.

10.4.2 In addition to minimising the permanent and temporary land take, especially the loss of Grade 3b agricultural land, a number of mitigation measures would be proposed to minimise effects on geology and soils during construction:

- Putting protective measures in place to deal with contaminated materials, should such material be encountered;
- Good construction practice and proper disposal of contaminated arisings to minimise creation of pollution pathways;

- Protective measures to prevent linkages between contaminants and ground and surface water;
- Handling topsoil in a manner to retain its potential for plant growth, including careful stripping, handling and placement; and
- Defining access routes to prevent overrun of topsoil where possible.

## 10.5 Potential impacts during operation

10.5.1 The Proposed Scheme would require the permanent change of unmade ground to hard standing, including Grade 3b agricultural land, under the footprint of the new bridge and road layout footprint, where it is additional to that currently part of the existing Downhill Lane junction road network. Other operational impacts can arise due to the permanent presence of the road improvement as well as due to maintenance and use of the road. Potential impacts can include:

- Alteration of the physical and chemical characteristics of the soil, which can be on-going after construction, and in turn the potential to increase erosion and transfer of pollutants to surface water, restrict root growth and drainage, reduce recharge of aquifers and cause surface ponding of water;
- Benefit of any remediation of areas of existing contamination carried out during construction (i.e. a beneficial effect in future years); and
- Disturbance of groundwater flow paths.

## 10.6 Potential mitigation for operational impacts

10.6.1 Potential mitigation measures for effects on geology and soils during operation include:

- Designing measures to use appropriate materials and construction methods to avoid impacts on hydrogeology;
- Protective measures to prevent linkages between contaminants and ground and surface water; and
- Seeding topsoil with grass to minimise risk of erosion.

## 10.7 Summary

10.7.1 The Proposed Scheme would affect geology and soils, including Grade 3b agricultural soils, within the footprint of both temporary construction work areas and the permanent new bridge and road layout. A permanent change of unmade ground to hard standing, including Grade 3b agricultural land, would occur where the new structures are additional to that currently part of the existing Downhill Lane junction road network.

10.7.2 There would be other adverse effects on soils and geology, but good construction practices would be recommended to avoid or minimise any adverse effects.

10.7.3 No geologically designated areas would be affected, while the potential for contaminated land to be encountered is low.

## 11 MATERIALS

### 11.1 Introduction

#### Material resources

- 11.1.1 Material resources include both primary raw materials, such as aggregates and minerals, and secondary manufactured products.
- 11.1.2 Road schemes require significant quantities of both primary raw materials and secondary manufactured products. Many material resources originate off-site and some arise on-site, such as excavated soils or recycled road planings (old road surface materials removed from redundant carriageways or areas to be re-surfaced).
- 11.1.3 The production, sourcing, transport, handling, storage and use of these materials, as well as the disposal of any surplus, have the potential to affect the environment adversely. At the same time, the beneficial re-use of materials arising on site in construction prevents these materials from becoming waste that would require transport off-site for disposal elsewhere, and also prevents the need for the use of finite resources obtained from elsewhere.

#### Generation and management of waste

- 11.1.4 In considering material resources use and waste generation and management, it is important to define when, under current legislation and understanding, a material is considered to be a waste. The Waste Framework Directive (European Directive 2006/12/EC, as amended by Directive 2008/98/EC) defines waste as “any substance or object that the holder discards, or is required to discard”.

- 11.1.5 Once a material has become waste, it remains waste until it has been fully recovered and no longer poses a potential threat to the environment or to human health, at which point it is no longer subject to the controls and other measures required by the Directive.
- 11.1.6 Information used in this PEI report has been gained from published information such as: the Model of Waste Arisings and Waste Management Capacity for the North East of England Planning Authorities report (Urban Mines 2012), which was updated 2016 (New Waste Management Capacity permitted in the North East since the Urban Mines Baseline); and the Sub-regional Tyne and Wear Waste Management Partnership Joint Municipal Waste Management Strategy (2007) and review (2012). The results of further research and survey, which were not available prior to the preparation of this report, will be reported in the forthcoming ES for the Proposed Scheme.
- 11.1.7 The management / use of surplus materials and waste would be undertaken in accordance with the waste hierarchy, outlined in the Waste (England and Wales) Regulations 2011.
- 11.1.8 The assessment of materials follows the interim guidance on the scope of the ‘Materials’ topic and the approaches/ methodologies to be applied as set out in Interim Advice Note 153/11, supplemented by the draft (unpublished) DMRB Volume 11, Section 3, Part 6, Materials guidance (HD 212/14).
- 11.1.9 There is no fixed study area for this topic. The ‘site’ is considered to include the full footprint of the Proposed Scheme, together with any land required temporarily during construction. Such temporary land includes site

compounds, temporary storage areas for soils and other materials, haul-roads, and land for temporary construction site drainage and service diversions. Potential sources of materials and waste management facilities outside of the boundaries of the construction site are considered on a regional basis.

## 11.2 Existing and baseline knowledge

- 11.2.1 The Downhill Lane junction scheme would have a fill material import requirement of about 94,000 m<sup>3</sup>.
- 11.2.2 Material import sources for the Proposed Scheme are not confirmed at this stage, but the three known closest options are further than 10 km away.
- 11.2.3 Identification of the baseline conditions for waste material disposal have been considered, where possible, according to conditions likely to be present at the commencement of construction (programmed for 2019) and up until the Proposed Scheme is operational (programmed for 2021).

### Local landfill capacity - South Tyneside Waste Planning Authority

#### Non-Hazardous

- 11.2.4 In 2011/12 Total Non-hazardous Municipal Waste produced in South Tyneside was estimated at 78,000 tonnes. As there is currently no local landfill or treatment capacity in South Tyneside, this represents an apparent shortfall of landfill capacity within the local area.
- 11.2.5 Figures for the Tyne and Wear Sub-region show that there is sufficient landfill and treatment capacity in adjoining waste planning authority areas to deal with the forecasted commercial and industrial waste arisings.

#### Hazardous

- 11.2.6 According to figures from the Environment Agency's Hazardous Waste Interrogator for 2014, South Tyneside Waste Planning Authority's Total Arisings are some 5,300 tonnes per annum. This is not expected to change significantly over a forecast period running to 2030.
- 11.2.7 Although there is no local hazardous landfill capacity in South Tyneside, there is considerable capacity in nationally significant sites in the Tees Valley Sub-region.

### Sub-regional landfill capacity - Tyne and Wear Waste Management Partnership

#### Non-Hazardous

- 11.2.8 The most recent available Defra Waste Management Information (2015) indicates landfill capacity to be in region of 5.9 million tonnes for non-hazardous wastes and 2.0 million tonnes for inert wastes. The same statistics show annual waste deposits to be in the order of 1,070,000 tonnes per annum of non-inert (non-hazardous) wastes and 530,000 tonnes per annum of inert wastes. These figures indicate there is likely to be landfill capacity for non-hazardous wastes for the duration of the project delivery. However, projection of these figures indicates inert landfill capacity within the Tyne and Wear area may be depleted within the period of the project unless new landfill capacity becomes available.

## Regional landfill capacity – North-east of England

### **Non-Hazardous**

- 11.2.9 A detailed 2012 study by Urban Mines estimated landfill capacity in north-east England to be equivalent to 1.8 million tonnes per annum in 2011, decreasing to 0.24 million tonnes per annum by 2030. The study concluded a potential shortfall of landfill capacity equivalent to 49,000 tonnes per annum by 2018, increasing to 312,000 tonnes per annum by 2021.
- 11.2.10 However, a more recent study undertaken to update the 2012 Urban Mines Study (2016 New Waste Management Capacity permitted in the North East) indicates additional landfill capacity has been permitted within the north-east area of approximately 3.7 million m<sup>3</sup> since the 2012 Urban Mines Study, indicating that the anticipated shortfall is unlikely to occur.
- 11.2.11 The most recent available Defra Waste Management Information (2015) for the North-East of England indicates landfill capacity to be in region of 17 million tonnes for non-hazardous wastes and 11 million tonnes for inert wastes.

### **Hazardous**

- 11.2.12 North-east England has considerable capacity for the treatment and disposal of hazardous wastes, and imports such wastes from various parts of the UK.
- 11.2.13 The 2012 Urban Mines Study concluded a regional hazardous landfill capacity of some 770,000 tonnes annually (in 2010). The 2016 update to the Urban Mines Study indicates that a minimum of 59,500 tonnes of

additional hazardous waste capacity has been approved within the north-east region since the 2012 study. This indicates sufficient capacity to cope with any hazardous waste that may arise through the Proposed Scheme.

### Treatment capacity

- 11.2.14 The 2012 Urban Mines Study concluded there is significant material recycling facility capacity in north-east England, and the 2016 update to the study indicates since the study was completed approximately 800,000 tonnes of inert and Construction Demolition and Excavation Waste treatment capacity has been added.
- 11.2.15 The presence of significant treatment capacity is supported by the most recent available Defra Waste Management Information (2015) for the North-East indicates in the order of 2 million tonnes of physical and material treatment capacity within the north-east region which may be suitable for the treatment of inert wastes.
- 11.2.16 The above indicates significant potential opportunity for the treatment of waste arising prior to disposal of residual wastes.

## **11.3 Potential impacts during construction**

- 11.3.1 Construction of the Proposed Scheme is likely to require the production, procurement, transport and use of construction materials, including: bulk materials for earthworks, concrete, steel and other structural material, pre-cast or prefabricated concrete, steel or other components, road surface material, timber used in temporary works (e.g. hoarding, shuttering) or in the

- permanent works (e.g. fencing), and other materials as required.
- 11.3.2 Construction work would also result in the production of construction wastes, including: surplus topsoil or subsoil materials arising from the earthworks, surplus materials not used as intended, any hazardous or contaminated material found on site, vegetation and other above-ground materials produced by site clearance, and demolition wastes.
- 11.3.3 Energy is considered an aspect of both material use and waste management and as such the Proposed Scheme would carry an impact in relation to carbon. For example, energy is consumed during raw material extraction, the processing and manufacture of products, transport and in their use on site. Energy is also consumed in the management of waste associated with transport for reprocessing and disposal as well as the energy consumed during recycling and reprocessing into secondary products.
- 11.3.4 Material is likely to be imported to the Proposed Scheme, which would have environmental and carbon impacts associated with increased vehicle use and material storage. Potential import sources for the Proposed Scheme are not yet confirmed, but the three known closest options are all further than 10 km away.
- 11.3.5 A previously considered alternative bulk fill material was 'Pulverised Fuel Ash', representing sustainable re-use of a waste material but also requiring careful handling to prevent unintended environmental effects. At this stage the continued availability of this material is not yet confirmed.

- 11.3.6 Whatever the source, import of material would create additional heavy duty transport movements, including increased vehicle use that could affect the local highway network. Similarly, if waste material cannot be reused and must be sent to a landfill further afield, this too would increase vehicle use, carbon impacts and associated environmental consequences, including the depletion of landfill capacity that is a finite resource in itself.

## **11.4 Potential impacts during operation**

- 11.4.1 Key operational and maintenance activities are likely to include inspection and repair of barriers and signage, drain inspection and clearance, road repairs and road verge / vegetation maintenance. Principal wastes arising from these activities are likely to include cleared vegetation waste, waste from gully emptying, oil separator waste and litter. It is anticipated that impacts associated with the operation and maintenance of the Proposed Scheme would be minimal and mitigated by: continued application of the waste hierarchy principle; and upkeep of the Proposed Scheme in terms of regular road sweeping and collection of any motorway debris by the appointed maintenance contractor.
- 11.4.2 The materials and waste arising associated with the operational phase are not expected to be significant in the context of construction of the Proposed Scheme and would be similar to the on-going operational and maintenance of the existing road network should the Proposed Scheme not be progressed.

## 11.5 Potential mitigation for construction impacts

11.5.1 The best opportunities to improve materials resource efficiency in construction projects occur during the design stage. Measures to design out waste include:

- Re-use and recovery of materials on site;
- Designing the layout to use the existing topography;
- Balancing cut / fill quantities;
- Screening arisings for use as recycled aggregates;
- Importing materials with high recycled content;
- Designing for off-site construction of elements if practical (e.g. manholes, bridge components etc.); and
- Designing for deconstruction and flexibility to make sure structures can be maintained, refurbished or extended if required.

11.5.2 Additional measures that can be taken to reduce waste during construction include:

- Segregating all arisings on site;
- Identifying site materials for re-use on site;
- Storage or resale; and
- Removing recyclable and recoverable materials from site to be processed by a licensed facility.

11.5.3 Where impacts cannot be designed out measures would be implemented to mitigate the potential impacts of both the use of materials and the generation of waste in

relation to the Proposed Scheme. This would also seek to consider the transport of materials and waste to and from site. There is significant synergy between materials re-use and the avoidance of the generation of waste. Therefore, there is a substantial overlap between the mitigation measures for materials and waste.

11.5.4 The importance of careful management of materials to promote re-use and reduce waste has been widely recognised by the construction industry. Both legislation and voluntary best practice mechanisms have been developed and implemented. These provide measurable and accountable processes that form the basis for mitigating environmental impacts associated with materials and waste.

11.5.5 Key mitigation measures would be included within the Construction Environmental Management Plan (CEMP) to be developed for the Proposed Scheme. The CEMP would be further developed during the detailed design phase (i.e. before the start of construction) and implemented during the construction phase. The CEMP sets out the approach to managing environmental issues on site. In relation to materials and waste, the CEMP would include the following information:

- Appropriate project targets for materials and waste;
- Site Waste Management Plan (SWMP);
- Materials Management Plan in accordance with CL:AIRE 2011;
- Soil Resource / Management Plan detailing protocols for soil management in line with current industry best practice as set out by Defra's

Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and requirements within the Specification for Highways Works series 600 and 3000);

- Procedures for the management of material procurement, delivery, storage, handling use and disposal; and
- Use of materials responsibly sourced in accordance with BES 6001:2009 and the UK Government Timber Procurement Policy.

11.5.6 SWMPs are prepared prior to a construction project commencing in order that waste is considered throughout the project. SWMPs identify the type of waste expected to be produced during the project, estimate the quantity of waste that would be produced and identify the planned waste management action proposed for each type of waste.

11.5.7 Although SWMPs are no longer a statutory requirement in England, the size and value of the Proposed Scheme means that the potential exists for significant impacts in relation to material use and waste generation. The implementation of a SWMP encourages the effective management of materials and ensures that waste is considered at all stages of a project, from detailed design through to completion.

11.5.8 The main aims of a SWMP are to:

- Improve resource efficiency and reduce the amount of waste produced on construction sites;
- Promote reuse, recycling and recovery of waste rather than disposal; and

- Reduce fly-tipping by keeping a full audit trail of waste removed from the site.

## 11.6 Summary

11.6.1 The Proposed Scheme would require use of materials and would generate waste arisings, but any adverse effects on natural resources, carbon emissions and off-site waste disposal facility capacity would be proactively managed to minimise any adverse effects.

## 12 NOISE AND VIBRATION

### 12.1 Introduction

12.1.1 Noise in its widest sense can be defined as unwanted sound. Such sound can be associated with industrial, domestic and transportation sources. Vibration comprises oscillatory waves that propagate from a source through either the ground or the air to adjacent areas.

12.1.2 Sound consists of vibrations transmitted to the ear as rapid variations in air pressure. The more rapid the fluctuation the higher the frequency of the sound.

12.1.3 Sound is measured in decibels (dB), but the sensitivity of the human ear varies with frequency. Therefore, most everyday noise is measured in decibels (dB(A)), with the (A) indicating that the measured level has been modified to allow for this phenomenon.

12.1.4 To measure noise, the logarithmic decibel scale is used. Using the scale, a change in noise level of 10 dB(A) represents a halving or doubling in perceived loudness. Table 12.1 gives examples of typical sound levels.

**Table 12.1: Typical sound levels found in the environment**

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory

Sound Level	Location
100 to 110 dB(A)	Burglar alarm at 1 m away
110 to 130 dB(A)	Jet aircraft on take-off
140 dB(A)	Threshold of pain

12.1.5 Under normal circumstances, the biggest contributor to noise from road traffic comes from the interaction between the vehicle tyres and the road.

12.1.6 The study area for the noise assessment is defined as:

- 1 km buffer around the proposed junction improvements;
- 600 m buffer around any 'affected roads' that lie within 1 km of Downhill Lane junction; and
- 50 m buffer around any 'affected roads' that lie beyond 1 km of Downhill Lane junction.

12.1.7 An 'affected road' is defined as one where there is a possibility of a change of 1 dB  $L_{A10,18hr}$  in the short-term or 3 dB  $L_{A10,18hr}$  in the long-term. In general, this is defined by reference to traffic flow forecasts, where there is a prediction that there may be an increase in traffic flows of 25% or more or a reduction of 20% or more. This may be modified where there is a change in the composition of the traffic, such as the proportion of HGVs, or a change in the average speed of traffic.

12.1.8 The noise assessment discussed in this PEI report is based on the assessment for the Testos Junction Improvement Scheme ES 2017, which considered noise impacts around both Testos and Downhill Lane junctions. However, a traffic model bespoke to Downhill Lane is being created to inform the EIA noise

assessment for the Downhill Lane junction Proposed Scheme (see Section 6.1).

- 12.1.9 Although there is no evidence that traffic-induced airborne vibration could cause even minor damage to buildings, it could be a source of annoyance to local people, causing vibrations of doors, windows and, on occasions, floors of properties close to a road.
- 12.1.10 The Downhill Lane junction noise and vibration assessment will be undertaken in accordance with the guidance provided in Volume 11, Section 3, Part 7 'Noise and Vibration' of the Design Manual for Roads and Bridges (HD 213/11 – Revision 1).

## 12.2 Existing and baseline knowledge

- 12.2.1 Road traffic noise emanating from the A19 dominates the existing noise environment for many sensitive premises within the study area. Other main roads in the area, such as the A1290 and Washington Road, would also be the primary noise source for receptors in their local vicinity. Road traffic noise is particularly dominant for those receptors in closest proximity to the existing busy roads, whereas many of the properties in the study area will be shielded from traffic noise by barriers formed by multiple other properties.
- 12.2.2 Indicatively, those receptors located on the western edge of the Town End Farm housing estate are currently exposed to noise levels in the region of 70 dB  $L_{A10,18hr}$ . Such properties are exposed to road traffic noise from the A19 and Washington Road. Other receptor groups in the area of the scheme include those adjacent to the A1290, such as The Chalet, which would currently be exposed to noise levels of approximately 60 dB  $L_{A10,18hr}$ ,

and Make-Me-Rich Farm with existing noise levels in the region of 65 dB  $L_{A10,18hr}$ , which results largely from the A19.

- 12.2.3 If no changes are made to the existing road infrastructure, these noise levels would gradually increase with time, due to expected growth in the volume of traffic.

### Measurement of existing noise levels

- 12.2.4 Noise monitoring was undertaken at Make-Me-Rich Farm during the period of November 20<sup>th</sup> - 4<sup>th</sup> December 2014. The monitored data is summarised in Table 12.2 which presents a summary of the daytime (06:00 to 00:00) and the night-time (23:00 to 07:00) monitoring respectively. The monitoring results below are the average values of the measurements taken across the day and night-time periods.

**Table 12.2: Summary of Baseline Noise Monitoring at Make-Me-Rich Farm**

Time Period	Average Measured Noise Level (dB)		
	$L_{Aeq,T}$	$L_{A90,T}$	$L_{A10,T}$
Day-time (06:00 – 00:00)	63	60	64
Night-time (23:00 – 07:00)	56	48	58

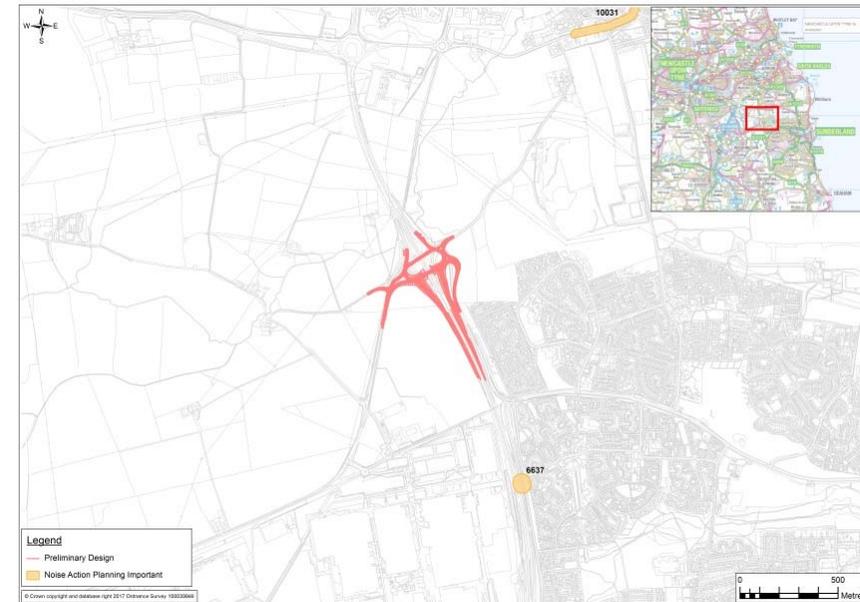
- 12.2.5 Further noise monitoring is proposed through the assessment process. This would likely include areas to the north east of the Town End Farm Estate, e.g. Boston Crescent.

## Noise Important Areas

12.2.6 The nearest Defra Noise Important Areas<sup>25</sup> to the Proposed Scheme are as follows (shown on Figure 12-1):

- Important Area ID 6637. Responsibility: Highways England. This is located approximately 1.2 km to the south of the Proposed Scheme and is associated with road traffic noise emanating from Ferryboat Lane. It is unlikely that this Important Area will fall within the Study Area defined under HD 213/11 guidance. In addition, it is considered unlikely that road traffic changes will be such on Ferryboat Lane that would result in a change in noise level for receptors within this Important Area.
- Important Area ID 10031. Responsibility: South Tyneside Council. This is located approximately 1.3km to the north east of the Proposed Scheme and is associated with road traffic noise emanating from the A184. It is unlikely that this Important Area will fall within the Study Area defined under HD 213/11 guidance. In addition, it is considered unlikely that road traffic changes will be such on the A184 that would result in a change in noise level for receptors within this Important Area.

Figure 12-1: Noise Important Areas



## 12.3 Potential impacts during construction

12.3.1 Construction works associated with the Proposed Scheme will involve a number of activities, such as:

- Site clearance;
- Earthworks (removal and importation);
- Drainage;
- Carriageway construction; and
- Piling for structures.

<sup>25</sup> A Noise Important Areas are where the 1% of the population that are affected by the highest noise levels from major roads are located according to the results of

Defra's strategic noise maps.

12.3.2 Such activities would involve the use of heavy plant items with the potential to emit high levels of noise and vibration (e.g. excavators, dumper trucks, dozers, cranes or compaction equipment).

12.3.3 There are a number of receptors that would be located in the vicinity of the construction works associated with the Proposed Scheme. As such the construction works may result in impacts on these receptors. It is expected that the majority of construction works would normally take place between 08:00 - 18:00 Monday to Friday and 08:00 - 13:00 on Saturday. There may be exceptions to these hours, such as for oversize deliveries and junction tie-ins. In addition, there are likely to be extended working hours in the summer months for the earthworks to take advantage of the weather / daylight. A CEMP would help minimise disruption and a Traffic Management Plan would provide a mechanism to manage construction traffic.

12.3.4 Noise and vibration impacts would vary from time to time and location to location throughout the construction period. These are also dependent on the contractor's chosen method of working and on the timing and phasing of certain operations. Factors expected to influence the effect of construction work on noise and vibration levels at nearby properties include:

- Existing noise levels;
- Type and number of activities;
- Type of plant/equipment;
- Distance from noise sources;
- Nature of the local ground and strata;

- Topography; and
- Wind direction.

#### Noise

12.3.5 Through consideration of the likely construction footprint and possible construction activities associated with the works, the following areas have the potential to be exposed to levels of noise considered significant against the guidance contained within BS 5228: 2009+A1, Part 1: Noise: West House Farm, Newcastle Road:

- Eastern side of Town End Farm Estate (e.g. Boston Crescent); and
- The Chalet and nearby properties, near to the A1290.

12.3.6 Much of the construction activities would be transient in nature (e.g. earthworks, carriageway preparation and construction). Therefore, the worst case noise levels from such activities are likely to occur for a limited period, when construction activities are located at a position closest to the receptors.

#### Vibration

12.3.7 Construction activities proposed that have the potential to give rise to largest levels of vibration at receptors would be associated with vibratory earthwork compacting works and piling activities. Such works would be associated with the construction of structures and earthworks.

From considering the indicative separation distances of the above works, it is considered that no receptors would be exposed to significant levels of vibration.

## 12.4 Potential mitigation for construction impacts

12.4.1 Potential mitigation measures that could be employed on site so that noise and vibration levels are attenuated as far as possible include:

- The use of 'best practicable means' during all construction activities;
- Switching off plant and equipment when it is not in use for longer periods of time;
- Establishing agreement with the local authority on appropriate controls for undertaking significantly noisy works or vibration-causing operations close to receptors;
- Programming works so that the requirement for working outside normal working hours is minimised (taking into account the highway authority's statutory duties under the Traffic Management Act 2004);
- Use of low noise emission plant where possible;
- The use of temporary noise screens around particularly noisy activities; and
- Regular plant maintenance.

## 12.5 Potential impacts during operation

12.5.1 Traffic modelling specifically tailored for the Proposed Scheme assessment is currently not available, at the time this PEI report was produced, to enable a quantitative assessment to be undertaken of the potential noise and vibration effects from the Proposed

Scheme. However, based on the assessment for the A19 / A184 Testos Junction Improvement Scheme ES, which covered Downhill Lane junction, there is sufficient knowledge for a qualitative assessment to give an indication of the potential impacts.

12.5.2 Potential adverse operational noise and vibration impacts within the immediate vicinity of the Proposed Scheme could be caused by increased traffic flows and speeds on roads, including the A19 and slip roads. These could result from reduction in congestion due to the Proposed Scheme. In addition, the proposed new slip and connector roads have the potential to move traffic, and therefore noise and vibration, closer to some receptors resulting in elevated noise levels.

12.5.3 On the wider road network traffic changes are likely with the introduction of the Proposed Scheme. Those roads with the greatest potential for change are Downhill Lane (east and west of Downhill Lane junction), A1290 and Washington Road. All these roads feed into Downhill Lane junction. Sensitive receptors located adjacent to such roads would have the potential to experience changes in noise and vibration as a result of such traffic alterations.

12.5.4 Should the A19 be resurfaced with a Low Noise Road Surface as part of the works, perceptible noise benefits would be likely result for nearby receptors. However, this benefit is unlikely to extend to residential properties existing within the Town End Farm Estate given that road traffic noise on Washington Road is likely to form the predominant noise source.

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## 12.6 Potential mitigation for operational impacts

12.6.1 Potential mitigation measures to prevent adverse noise and vibration impacts during operation can include:

- Environmental bunds and barriers;
- Quieter road surfacing; and
- Noise insulation.

12.6.2 It is not possible to provide further consideration on this until a quantitative assessment is undertaken. If necessary, measures such as those above could be considered at that stage.

## 12.7 Summary

12.7.1 The Proposed Scheme may lead to an increase in noise and vibration experienced by nearby receptors, but potential negative effects during construction and operation can be limited by the use of appropriate mitigation techniques.

## 13 PEOPLE AND COMMUNITIES

### 13.1 Introduction

13.1.1 This chapter covers the effects of the Proposed Scheme on people and the communities that live in the vicinity of Downhill Lane junction. This includes owners and users of private property, users of community land and facilities, stakeholder groups within the local area, vehicular travel, travel by public transport, non-motorised transport (pedestrians, cyclists and horse-riders) and the local economy.

13.1.2 The assessment is structured around the following eight key themes:

- **Land use** - considers the effects on: agricultural farm units community land and facilitates; and development land.
- **Physical assets** - considers the effects on private built assets in proximity to the scheme, including residential, commercial, industrial property and farm businesses.
- **Non-motorised users** - considers the effects on pedestrians, cyclists, equestrians, and their journey amenity.
- **Community severance** - considers the increase or reduction of journey lengths, which may deter or encourage people from using community facilities,

based on the change in AADT figures generated by traffic modelling.

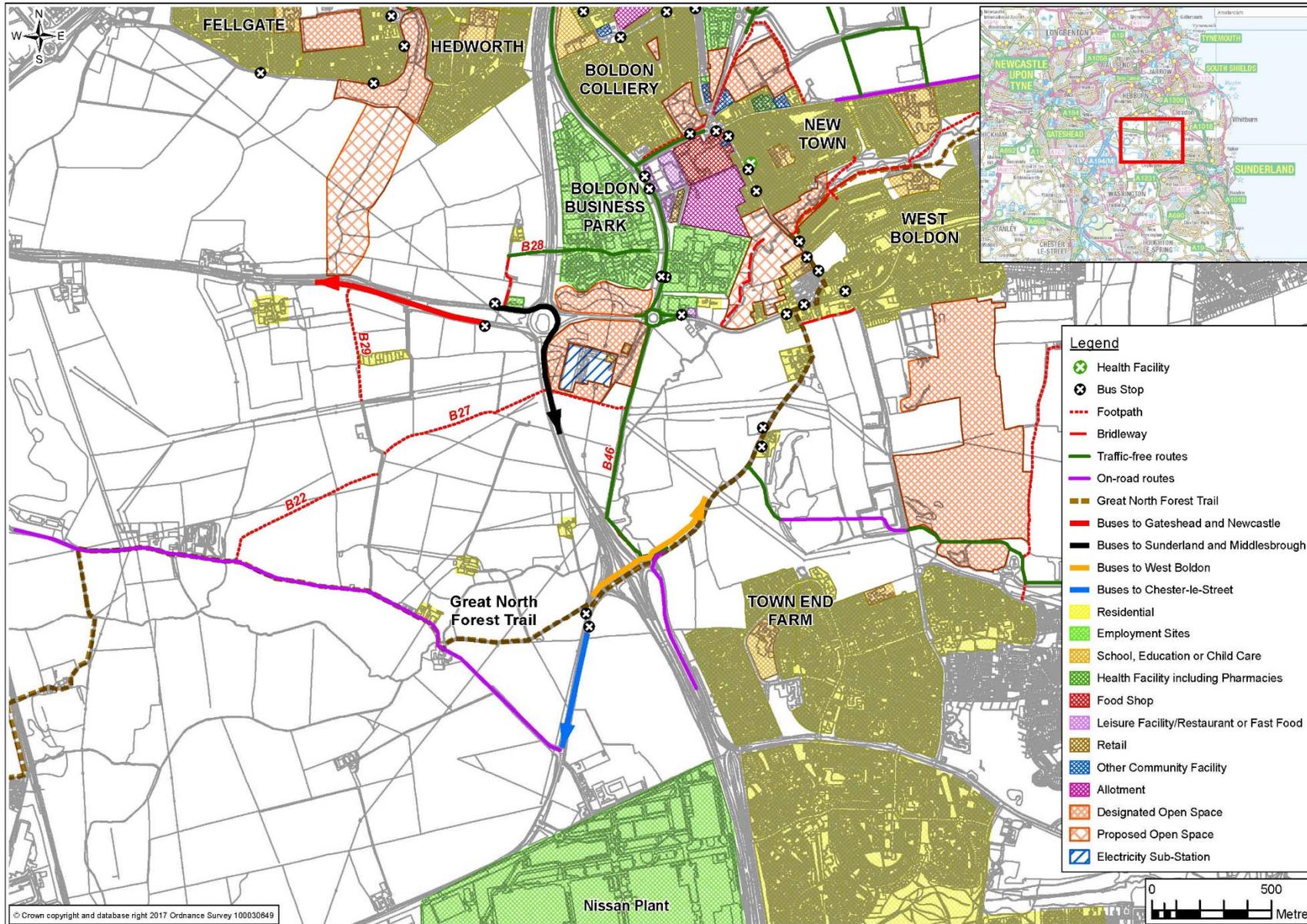
- **Community amenity** - considers the ability of people to enjoy their surroundings and the indirect effects on the wellbeing of local stakeholder groups.
- **Public transport users** - considers the effects on bus routes and the potential for changes to bus journey times.
- **Vehicle travellers** - considers the effects on the view from the road and changes to the level of stress experienced by drivers.
- **Economy and employment** - considers the effects on employment levels and general economic stimulation.

13.1.3 The People and Communities assessments will be completed with reference to the following parts of DMRB Vol 11:

- Section 3: Part 6 Land Use;
- Part 8 Pedestrians, Cyclists, Equestrians & Community Effects; and
- Part 9 Vehicle Travellers.

13.1.4 The Homes and Communities Agency's Additionality Guide will be used in the assessment of employment impacts<sup>26</sup>.

Figure 13-1: Non-motorised Users and Community



## 13.2 Existing and baseline knowledge

### Data sources

- 13.2.1 Information on people and communities has been derived from the 2016 studies undertaken to inform the combined A19 Testos and Downhill Lane junctions improvement scheme review, plus the subsequent A19 Testos Junction Improvement Scheme ES (2017); see Figure 13-1.
- 13.2.2 For example, the NMU Context Report (Jacobs, 2017) covered both schemes so provides important baseline information. The NMU Context Report was prepared using desk-based research, site visits, surveys, consultation feedback.
- 13.2.3 All previously collected data will be verified and, if required, updated with current datasets, desk-based research and consultations.

### Land use

#### **Agricultural land and businesses**

- 13.2.4 Farm structure<sup>27</sup> in the study area is a mix of owner occupied, tenanted and licensed landholdings sometimes farmed together with land elsewhere.
- 13.2.5 At least one owner-occupied unit licenses land for arable cropping.

- 13.2.6 All the farms use the local road network, here comprising the A1290 and Downhill Lane and Washington Road for access to and from the fields.
- 13.2.7 No farms in the study area have agreements under Natural England's Countryside Stewardship Scheme.
- 13.2.8 The permanent pasture fields immediately west of the A1290, south of Downhill Lane, are understood to be utilised for horse grazing.
- 13.2.9 The rest of the agricultural land in the study area, east and west of the A19, is mainly managed for arable crop production. The crops grown comprise combinable crops of winter sown cereals (mainly wheat) and oilseed rape in rotation.
- 13.2.10 For information on farm businesses, refer to the section below on private property.

#### **Community land and facilities**

- 13.2.11 Community land and facilities in the study area include:
- Land adjacent to the River Don, approximately 1 km to the north-east of the scheme, is designated as public open space; and
  - Land used as playing fields to the east of the A1290 and to the north of Washington Road, covering approximately 1.8 hectares.

<sup>27</sup> Farm structure refers to the general arrangement of farms though such factors as location, size, buildings and fixed equipment, tenure, cropping and/or stocking etc.

### **Development land**

13.2.12 The South Tyneside Local Plan and South Tyneside Site-Specific Allocations identify a number of development sites in the study area, which include the IAMP to be developed immediately south and west of Downhill Lane junction and housing developments to the east. The proposed Wearpoint 55 industrial / commercial development lies adjacent to the south-west of Downhill Lane, but has been refused planning permission at the time of preparing this report.

### **Physical assets**

#### **Residential property**

- 13.2.13 One residential property is located close to the west side of the existing A19: Make-Me-Rich Farm House. The farmhouse is located on a small holding approximately 75 m west of the A19 mainline highway boundary and 300 m north of the existing highway boundary surrounding Downhill Lane junction.
- 13.2.14 There are a number of residential properties to the south of the Proposed Scheme. The nearest are at Town End Farm, which is a dense residential area approximately 350 m to the south-east of the junction, and over 80 m east of the existing A19 highway boundary. The Chalet and Usworth cottages are located over 800 m to the south-west of Downhill Lane junction.
- 13.2.15 The Chalet is a private property located approximately 50 m west of the A1290 and north of Washington Road, just north of the Nissan car factory. Usworth cottages are located adjacent to the Chalet and consist of five individual properties.

### **Commercial property**

- 13.2.16 There are four active commercial properties in close proximity to the Proposed Scheme.
- 13.2.17 The north-east Aircraft Museum is a volunteer-run aviation museum located between the A1290 and the A19, to the north of Washington Road. It occupies an area of approximately 1.4 hectares and is adjacent to the Gateshead College Skills Academy, approximately 150 m from the Proposed Scheme.
- 13.2.18 The Three Horse Shoes pub is a host for community events and is located to the south of the A1290, to the north of Washington road in the same vicinity as the Aircraft Museum and the Skills Academy.
- 13.2.19 The Gateshead College Skills Academy is a department of Gateshead College focusing on sustainable manufacturing and innovation. It is located to the east of the A1290 and to the south of Washington Road, and lies approximately 150 m from the Proposed Scheme. It covers an area of approximately 0.8 hectares.
- 13.2.20 The Air Training Corp centre used to form part of the site of the historic RAF Usworth (subsequently Sunderland Airport), which was operational from 1916 to 1984. It is located adjacent to the North-East Aircraft Museum, approximately 160 m east of the A1290 and to the north of Washington Road.

#### **Private property: Industrial**

- 13.2.21 The Nissan plant, although it lies just outside the study area in Washington North, is the largest employer in the region and a major stakeholder in the Proposed Scheme. In addition to cars, it manufactures batteries

and other components. Around 80 % of its production is made for export, whilst a new production line has recently opened for manufacture of a new model; it is understood there are further plans for expansion. Past NMU surveys showed that large numbers of Nissan employees commute to and from the plant from West Boldon / Boldon Colliery, Fellgate and Hedworth, using the rights of way, cycle paths and roads in or near the study area (in particular, Bridleway B46, the 'Don Valley Footpath'), passing through Downhill Lane junction.

13.2.22 On the land adjacent to and north of the Nissan plant, South Tyneside and Sunderland Councils are jointly preparing an application for a DCO application for the IAMP development. If this were to proceed, it would comprise a large industrial park for high-tech manufacturing. The proposed park would be in the region of 160 hectares, providing over 5,200 jobs on completion. The park would provide modern manufacturing premises close to existing employers and would build on the region's advanced manufacturing heritage. The IAMP site is directly adjacent to Downhill Lane junction to the south, west and north-west. IAMP infrastructure proposals include upgrading the A1290 to dual carriageway, and this would tie-in directly to the Downhill Lane Junction Improvement Scheme.

13.2.23 In addition to the IAMP there is Wearpoint 55, which is proposed as a mix of manufacturing, storage and distribution facilities with a mix of commercial units. At the time of writing this report the development has been refused planning permission.

### Non-motorised users

13.2.24 Downhill Lane junction is a significant crossing over the A19 for equestrians, recreational walkers and in particular for both commuting and recreational cyclists. There are various footpaths, bridleways and cycle routes in the study area. Of specific note, bridleway (B46, the 'Don Valley Footpath') runs north-south from the A184 to Downhill Lane immediately to the west of the A19 and southbound off-slip road. Surveys of NMU traffic have been carried out on at five locations surrounding the junction during both the winter and summer periods in 2016, and a consultation meeting has been held with the Tyne and Wear Local Access Forum and user groups in December 2016 and in June 2017 to identify their aspirations and concerns relating to the junction and consult on the NMU Options outlined in paragraph 2.5.14.

### Community severance

13.2.25 The key community in the study area is Town End Farm in Sunderland. The built-up area of this community is mainly located to the south-east of Downhill Lane junction, while the areas closest to the Proposed Scheme are predominantly open countryside within the green belt. However, there is also significant non-motorised commuter traffic from the Boldons (East and West Boldon and Boldon Colliery) to the Nissan Plant, and this area is located to the north, east of the A19.

### Community amenity

13.2.26 Within the local study area, a number of general stakeholder groups are present:

- Residents in the local communities;

- Residents of farmhouses in close proximity to the Proposed Scheme;
- Farmers and others working on the agricultural land of the area;
- Commuters, including those using the public right of way and road network to access employment;
- Recreational users of the public rights of way in close proximity to the Proposed Scheme;
- Local road users who use the roads for access more generally; and
- Community groups, such as social and education groups within the local area.

#### **Public Transport Users**

- 13.2.27 A number of buses operate within the area of Downhill Lane junction providing routes to West Boldon to the north and Chester-le-Street and Durham to the south.
- 13.2.28 Bus route numbers 50 and 56 stop on Downhill Lane, both on the west side of the junction, while on the east side only the bus route number 50 has a stop. The number 50 has a 30-minute frequency from Monday to Saturday and 60-minute frequency on Sunday. The number 56 runs every 15 minutes from Monday to Saturday and 20-30 minutes on Sunday.
- 13.2.29 In Town End Farm three bus services are in operation (numbers 12, 13 and 35). The number 35 links Town End Farm with Houghton-le-Spring and Low Moorsley via Sunderland centre, with 30-minute frequency. The numbers 12 and 13 link Town End Farm with the area of Doxford Park to the south of Sunderland, via the

centre of Sunderland, with 20-minute frequency. These three services do not pass through Downhill Lane junction as part of their route.

#### **Vehicle travellers**

- 13.2.30 The A19 is a strategic north-south route running from Doncaster to north of Newcastle via York and linking the Tyne and Wear conurbation with Teesside. However, locally it is also used for commuting traffic; Downhill Lane junction is busiest at Nissan shift-change times, when there are often long queues at the junction, sometimes tailing back onto the A19 carriageway (especially northbound).

#### **Economy and employment**

- 13.2.31 This sub-topic focuses on the wider region surrounding the proposed scheme, represented by the local authority areas of South Tyneside, Sunderland and Gateshead.
- 13.2.32 The 2011 census shows there were 623,487 people across these three authority areas, with the most in Sunderland. In South Tyneside and Sunderland the unemployment rate was greater than that the average for the north-east region (5.4%), but it was lower in Gateshead. However, all three areas were above the average for England as a whole (4.4%).
- 13.2.33 All three areas are relatively deprived, ranking within the top 80 out of 326 local authorities in the Index of Multiple Deprivation 2015.

#### **South Tyneside**

- 13.2.34 Labour market statistics for 2015 show that South Tyneside had 45,000 employee jobs, of which 30,000

were full-time and 15,000 part-time. The main source of employment is the health and social care sector, in addition to education, manufacturing and wholesale and retail.

#### **Sunderland**

- 13.2.35 Labour market statistics for 2015 show that Sunderland had 119,000 employee jobs, of which 84,000 were full-time and 35,000 part-time. Over 50% of the employment is within the manufacturing, education, wholesale and retail and health sector. Manufacturing is the largest source of employment.

#### **Gateshead**

- 13.2.36 2015 labour market statistics show that Gateshead had a total of 98,000 employee jobs, of which 68,000 were full-time and 29,000 part-time. The majority of these jobs fall into the wholesale/ retail; manufacturing; administrative and support services and health sectors.

### **13.3 Potential impacts during construction**

#### **Land use**

##### **Agricultural land and businesses**

- 13.3.1 The Proposed Scheme would not require the demolition of any farm buildings.
- 13.3.2 It would be expected that some surrounding agricultural land would potentially be required for both permanent land take and also for temporary uses during the construction period. The temporary uses would typically include the contractor's compound and materials storage, soil storage, haul routes and land which would be required for utility diversions. There may also be

impacts on land drainage. The temporary change in land use is not expected to affect access to other areas of agricultural land unaffected by the works.

- 13.3.3 The temporarily used areas would be out of agricultural production for some or all of the construction period. Given the expected scale of land required to temporary use and limited effect on access, the impact is considered to be an insignificant adverse effect.

##### **Community land and facilities**

- 13.3.4 It is not expected that construction works would affect either the public open space adjacent to the River Don, located 1 km to the north-east of Downhill Lane Junction, or land used as playing fields to the east of the A1290 and to the north of Washington Road, given their distance from Downhill Lane junction.
- 13.3.5 There would be no impact on the River Don or land used as playing fields to the east of the A1290 and to the north of Washington Road.

##### **Development land**

- 13.3.6 Despite the proximity of the Proposed Scheme to the IAMP, it would not be expected that construction activities would have an adverse effect on this land allocation, as this land would not have been developed within the construction timeframe.
- 13.3.7 It is also expected that there would be little in the way of adverse effect on other nearby land allocations identified within the South Tyneside Local Plan and South Tyneside Site-Specific Allocations.

### Physical assets

- 13.3.8 The Proposed Scheme would not require the demolition of any properties, but it would be expected that there may be some disruption to residents of properties in close proximity to the construction works, namely the Make-Me-Rich Farm House and Town End Farm residential estate. Such disruption may include a temporary change in noise levels or the generation of dust as a result of construction works; these effects are discussed within Chapters 6 and 12 of this report.
- 13.3.9 The Chalet and Usworth cottages are located over 800 m to the south-west of Downhill Lane junction and are not anticipated to be affected directly by the construction activities.
- 13.3.10 Temporary roadworks and diversions required as part of construction activities (be it due to the junction's construction itself or utility diversions) may lead to delays, which could affect local residents. The extent of these effects will be assessed once the construction programme and associated works are known. It would be expected that, as these impacts would be temporary, there would be an insignificant adverse effect on private residences.
- 13.3.11 Disruption due to construction (traffic effects) may also be an issue for commercial and industrial properties in the area, as roadworks could cause delays and disruption to freight deliveries at the Nissan plant and other commercial businesses in the area. It is anticipated that this could be a significant adverse effect for some businesses.

### Non-motorised users

- 13.3.12 During construction, there are likely to be temporary impacts along the majority of the pedestrian, equestrian and cycle routes in the vicinity of the Proposed Scheme, resulting in disruption and possible closures.
- 13.3.13 A series of NMU surveys, undertaken in 2016, identified a series of key NMU desire lines through Downhill Lane junction. These included Bridleway B46 to the north, Downhill Lane to the east and west and Washington Road to the south. Bridleway B46 was the most used out of these routes, and many of these users went on to cross the A19 via Downhill Lane Junction.
- 13.3.14 It would be expected that due to the proximity of the Bridleway B46. Users of this route would experience disruption during construction due to temporary route closures or diversions.
- 13.3.15 East-west travel along the A1290 through Downhill Lane junction is expected to remain open throughout the construction period. There may be temporary roadside footpath closures with appropriate diversion provisions being provided.
- 13.3.16 Although the effects on NMUs are expected to be temporary, they are considered to have a significant and adverse impact on NMUs.

### Community severance

- 13.3.17 During construction, there is the potential for communities located near to the site to be affected by disruption caused by construction activities, such as roadworks and diversions, which could cause delays.

- 13.3.18 The Town End Farm residential community, located to the south-east of the site are the most likely community to experience a severance effect during construction. The scale of effect would be largely determined by construction impacts upon Washington Road, which provides a direct link between the Town End Farm residential community and Downhill Lane junction.
- 13.3.19 In addition, the disruption of Bridleway B46, during construction would potentially affect the connectivity of non-motorised commuter traffic from the Boldons (East and West Boldon and Boldon Colliery) to the Nissan Plant. As noted above, the effect would be expected to be temporary and the current NMU proposals would aim to maintain access as much as possible.
- 13.3.20 It is considered that the impacts relating to community severance would be insignificant and adverse in nature.

#### Community amenity

- 13.3.21 During construction, the amenity of community members who live near or use land in proximity to the site would be affected by disruption caused by construction activities due to increased congestion and reduced visual amenity caused by temporary traffic management measures. It is anticipated that the severity of these impacts would be insignificant.
- 13.3.22 There could also be an impact on noise and air quality as a result of the generation of dust and construction works, the effects of which are discussed within Chapters 6 and 12 of this PEI report.

#### Public transport users

- 13.3.23 During construction, the Proposed Scheme would have temporary adverse impacts on road users, including public transport users, due to disruptive construction activities. However, these effects are expected to be temporary and therefore insignificant in severity.
- 13.3.24 The presence of construction works would cause some short-term disruption to local bus routes which use Downhill Lane junction, particularly the 50 and 56 which have stops in close proximity to the junction, which may require temporary relocation. Although these impacts adversely affect public transport users, they are considered to be insignificant and temporary in nature.
- 13.3.25 A full consideration of the effects on public transport users will be completed once the construction programme and traffic management measures are available for review. It would be expected that these bus routes would remain open, but there may be the requirement for bus stops to be relocated. This would result in minor, temporary disruption to public transport users. In addition to this minor disruption, the amenity of the users of these services would be reduced.

#### Vehicle travellers

- 13.3.26 During the construction of the Proposed Scheme, it would be expected that delays would be experienced by all vehicle travellers, either as a direct result of reduced speed limits through the road works or increased congestion on alternative routes as a result of drivers re-routing.
- 13.3.27 During the construction phase, it would be expected that driver stress would increase during the construction of

the scheme as a result of lower speeds, whilst views from the road will be significantly constrained. Furthermore, construction activities would be visible from the road.

- 13.3.28 Due to the expected volume of traffic and the increased levels of stress experienced it is considered that these adverse impacts may be significant.

#### **Economy and employment**

- 13.3.29 Construction impacts at the level of the three local authority areas surrounding the scheme relate to economic stimulus and employment impacts from spend on the scheme. The scheme would act to stimulate the local job market and increase employment both through direct jobs and indirect and induced employment. In addition, expenditure on the scheme in the local economy would act to stimulate the local market including multiplier effects so that overall stimulus is greater than the nominal spend in the region.
- 13.3.30 Any economic and employment effects within the wider South Tyneside, Gateshead and Sunderland local authorities caused by disruption to commuter times during the construction of the scheme are likely to be minimal in respect to this regional scale.
- 13.3.31 Given the scale of the scheme in relation to the wider regional economy, it is considered that the construction of the scheme would have no impact on factors affecting the economy and employment in the South Tyneside, Gateshead and Sunderland region.

## **13.4 Potential mitigation for construction impacts**

- 13.4.1 The likelihood of occurrence of impacts can be reduced through good construction site management practices. The contractor would apply good practices through the application of a detailed CEMP. A CEMP is prepared and implemented for a specific scheme, and it evolves through the life of the scheme, developing information and a level of detail appropriate to the particular stage of scheme development. The CEMP would:
- Identify relevant environmental commitments made in the ES and measures put in place to enable their achievement;
  - Identify ‘environmental aspects’ – features of the local environment that may be particularly vulnerable to impacts as a result of construction activity, and construction activities that could give rise to accidental damage to the environment or accidental nuisance to local residence;
  - Set out good practice site management measures to minimise the routine effects of construction on the environment;
  - Set out control measures to reduce the likelihood of accidental occurrences that could lead to environmental damage; and
  - Set out action plans to respond to any such occurrences that do arise, to minimise the damage caused.

### Land use

- 13.4.2 Temporarily used areas of agricultural land would be progressively returned to agricultural use on completion of their use during the construction period and replacement of soils.
- 13.4.3 Access to farmed land and commercial and industrial premises during the works would be maintained, wherever possible, to enable continued operation on all the holdings affected by construction.
- 13.4.4 Disruption to would be minimised through measures which would be adopted in the contractor's CEMP, such as measures to reduce dust and construction site runoff. Access arrangements for temporarily severed farmland would be included in the contractors' Traffic Management Plan (TMP).

### Physical assets

- 13.4.5 The effects of disruption during construction on private property would be minimised or avoided through measures in the CEMP. These could include restrictions on the routes to be taken by construction traffic and careful design / timing of temporary road closures or diversions.

### Non-Motorised Users

- 13.4.6 If Bridleway B46 is temporarily closed and temporary roadside footpath closures are enforced, mitigation would include measures in the TMP such as advance warning signs, alternative route advice and diversion signing provisions.

### Community severance and amenity

- 13.4.7 The implementation of a TMP and CEMP would help reduce potential traffic impacts and maintain access throughout the construction phase.

### Public transport users

- 13.4.8 Any disruptive effect on public transport users as a result of construction activities would be addressed within the TMP. Mitigation would include advance warning signs, alternative route advice and diversion signing provisions.

### Vehicle travellers

- 13.4.9 During the construction phase, the TMP would be implemented to minimise delays and reduce any increase in stress caused by the roadworks. This would include temporary signage which would be put in place to reduce uncertainty and frustration.
- 13.4.10 Specific mitigation measures targeting specific aspects of the construction of the Proposed Scheme would be identified where appropriate.

### Economy and employment

- 13.4.11 Any economic and employment effects within the wider South Tyneside, Gateshead and Sunderland local authorities caused by disruption to commuter times during the construction of the Proposed Scheme are likely to be minimal in respect to this regional scale. No specific mitigation measures are likely to be required. Consideration and consultation between the Proposed Scheme and the Nissan and IAMP area would be required to minimise, as far as possible, the risk of potential disruption.

## 13.5 Potential impacts during operation

### Land use

#### **Agricultural land**

- 13.5.1 A small parcel of land that is part of the Make Me Rich Farm would be returned to agricultural use following construction. As the local road network would remain in place, access to local farms would be unaffected.
- 13.5.2 However, two small holdings of agricultural land off Downhill Lane would lose all or part of their area by permanent land-take for the Proposed Scheme.
- 13.5.3 The impacts would likely include the effects of severing land and the creation of small, awkwardly shaped fields. Some drainage systems may also be affected.
- 13.5.4 Overall, due to the overlapping effects of land take, severance and draining impacts, the adverse impact on agricultural land could be significant, but localised.

#### **Community land and facilities**

- 13.5.5 It is not expected that either the land adjacent to the River Don or land used as playing fields to the east of the A1290 and to the north of Washington Road would be affected during the operation of the scheme, given their distance from Downhill Lane junction.

#### **Development land**

- 13.5.6 Operational effects on development allocations and planning applications identified within the South Tyneside Local Plan and South Tyneside Site-Specific Allocations are largely expected to be beneficial due to the improved access provided by the scheme and increased capacity of the local road network. The

operational phase of the Proposed Scheme would both support and be of benefit to the accessibility of the IAMP once the site is developed.

- 13.5.7 It is anticipated that there would be a beneficial impact on development land.

### Physical assets

#### **Private property: Residential**

- 13.5.8 Make-Me-Rich Farm House and Town End Farm residential estate are the closest residential properties near the Proposed Scheme and likely to experience effects in terms of air quality and noise vibration resulting from changes in traffic. The extent of these effects are discussed in Chapters 6 and 12 of this PEI report.
- 13.5.9 The Chalet and Usworth cottages, given their distance from the Proposed Scheme, are not expected to be affected by the operation of the scheme and therefore the effect is considered to be no impact.

#### **Private property: Commercial**

- 13.5.10 Given the distance from the Proposed Scheme, the commercial properties to the south of Downhill Lane junction (the North-East Aircraft Museum, the Three Horse Shoes pub and the Gateshead College Skills Academy) are not expected to be affected by the operation of the Proposed Scheme.

#### **Private property: Industrial**

- 13.5.11 The Proposed Scheme is expected offer beneficial effects for workers and business activities at the existing Nissan motor manufacturing plant at Washington due to

the improved accessibility offered by the Proposed Scheme. It is expected there would be significant beneficial impacts on industrial property as a result of the Proposed Scheme.

#### Non-motorised users

- 13.5.12 The expected reduction in congestion around the junction should improve safety for NMUs using the adjacent footways and cycleways. Any changes to air quality and noise levels around the junction (see Chapters 6 and 12) would equally affect amenity levels for NMUs on these routes.
- 13.5.13 No impacts are expected during the operational phase on Bridleway B46, as access to the footpath would still be available.
- 13.5.14 Due to the reduction in congestion and the improved safety the beneficial impact is considered to be significant.

#### Community severance

- 13.5.15 The effect during the Proposed Scheme's operation on community severance is expected to be beneficial as local residents would benefit from reduced travel time and improved access. In addition, with the Proposed Scheme in place surrounding communities, such as Town End Farm, would benefit from improved access to the countryside. It is expected there would be an insignificant beneficial impact on community severance as a result of the Proposed Scheme.

#### Community amenity

- 13.5.16 Impacts during the operation of the Proposed Scheme in terms of community amenity would be expected to be

minimal, as the route of the A19 and Downhill Lane follows the general footprint of the existing road. Improved traffic flow and general economic and demographic growth would be expected to increase volume of traffic over time, but the scheme would also be expected to reduce congestion.

- 13.5.17 It is anticipated that there would be a beneficial impact on community amenity; however, it will be insignificant in nature.

#### Public transport users

- 13.5.18 With the Proposed Scheme in operation, there is expected to be a reduction in traffic congestion on the network around Downhill Lane junction which would have a positive effect on local bus services and their users. In particular, bus route number 50 and 56 services stop in close proximity to the junction.
- 13.5.19 It is considered that the operation of the Proposed Scheme would have an insignificant benefit to public transport users.

#### Vehicle travellers

- 13.5.20 Traffic volumes are expected to increase, but improved average speeds are expected due to reduced congestion. For local communities, such as Town End Farm to the south-east of the junction, it is expected that there would be improved access to retail and employment centres in Newcastle and to the Nissan manufacturing area.
- 13.5.21 Between Downhill Lane junction and Testos junction, the flow of traffic on the A19 is expected to improve, thus reducing congestion. This would also have a beneficial

effect on driver stress, which would be quantified using outputs from the traffic model. Improved average speeds on the A19 may induce traffic from local roads onto the A19 reducing congestion on local roads.

- 13.5.22 It is expected there would be significant beneficial impacts on vehicle travellers as a result of the Proposed Scheme.

### **Economy and employment**

- 13.5.23 It is expected that during the operation of the Proposed Scheme the accessibility between jobs and the labour market would be improved. Time and cost savings in the transport and access to goods and services across the three local authorities (South Tyneside, Gateshead and Sunderland) would occur.

- 13.5.24 The operation of the Proposed Scheme would facilitate the construction of the IAMP, which would become a major employment and manufacturing site in the region.

- 13.5.25 The impact of the operation of the Proposed Scheme is therefore considered to be a significant benefit to the local economy and employment.

### **13.6 Potential mitigation for operational impacts**

- 13.6.1 Any permanent loss of agricultural land that could not be acquired by agreement would be subject to compulsory acquisition procedures under the DCO. As this land would be required as part of this Proposed Scheme, no mitigation is proposed.

- 13.6.2 Agricultural land quality and farm systems in the study area depend upon effective land drainage in winter for sustainable farming operations. The detailed design of the Proposed Scheme would take this into account in

order to minimise the impact on agriculture through provision of outfalls for land drainage systems. Further work would be undertaken to design and install new land drains on retained or reinstated farmland by agreement as accommodation works.

- 13.6.3 Suitable replacement access points to severed fields and areas where existing access is lost would be required to maintain continued operation of farm units.

- 13.6.4 Mitigation for the operational effects on the Make-Me-Rich Farm House and Town End Farm residential estate as a result of air quality and noise effects are discussed in Chapters 6 and 12 of this PEI report.

- 13.6.5 As part of the Proposed Scheme, road signs and traffic signals would be used to explain route changes and direct drivers with the aim of reducing uncertainty, delays and driver stress for those drivers using the new road layout.

### **13.7 Summary**

- 13.7.1 The Proposed Scheme would result in the temporary and permanent loss of agricultural land, plus affect NMUs as cyclists and users of the Great North Forest Trail cross the A19 via Downhill Lane junction. These effects would be minimised through mitigation measures, including incorporating within the design measures to accommodate NMUs.

- 13.7.2 However, the Proposed Scheme would also bring beneficial effects due to the improvements in traffic flows, reduced drivers stress and the improvement in connectivity between employment areas and residential communities.

## 14 ROAD DRAINAGE AND THE WATER ENVIRONMENT

### 14.1 Introduction

- 14.1.1 This topic covers the hydrology (including water quantity and flood risk) and water quality of surface waters and groundwater, taking account of the construction and operational impacts of the Proposed Scheme.
- 14.1.2 The understanding of the water environment expressed in this report has been derived from 2016 studies into the combined A19 Testos and Downhill junction improvement scheme, and previous work on the Testos only scheme (Water Framework Directive assessment) due to the southern reach of the Proposed Scheme incorporating a section of the River Don.
- 14.1.3 The study area for this topic is based on the features and attributes of the water environment in the surrounding area that have the potential to be affected by the Proposed Scheme. It has not been defined as a measured zone around the Proposed Scheme location. The assessment will be undertaken in accordance with DMRB, Volume 11, Section 3, Part 10 'Road Drainage and the Water Environment'. This will include the use of the Highways Agency Water Risk Assessment Tool (HAWRAT) as one of the indicators of the likely impacts associated with routine runoff.
- 14.1.4 A Water Framework Directive assessment will be carried out, in order to assess whether the scheme would have any impact on the ecological status of any water bodies classified under the WFD. A flood risk assessment will be carried out in line with national planning policy guidance and the Environment Agency's

Flood Risk Assessment Guidance Note 1 and 3; the will look at changes in peak runoff from the site before and after the proposed development, and include consideration of climate change.

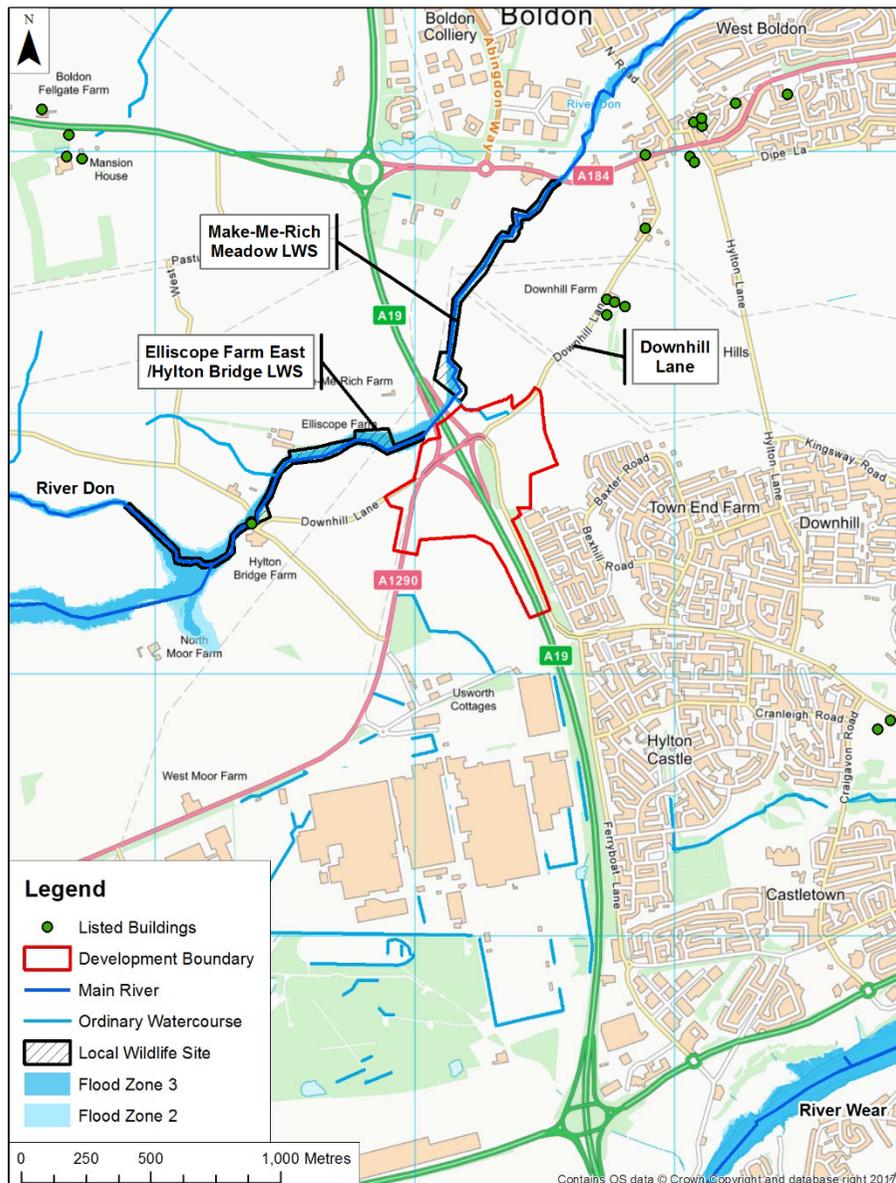
### 14.2 Existing and baseline knowledge

- 14.2.1 Figure 14-1 illustrates the indicative environmental constraints for the wider study area, including the key water environment features.

#### River Don

- 14.2.2 The River Don is a Main River that rises north-east of Wrekenton and flows in a generally easterly direction, mainly through farmland, until it meets the A19 at Downhill Lane junction. At Downhill Lane junction, the River Don passes beneath the A19 in a culvert approximately 160 m long. The river then follows a sinuous, but generally northerly course, between fields for around 1 km and then through a predominantly urban area, including Boldon and Hedworth, eventually discharging into the River Tyne at Jarrow, which is tidally influenced.
- 14.2.3 The Environment Agency classifies the River Don as a heavily modified water body (i.e. its shape or form has been significantly altered by people over time). The River Don is classified as being of 'poor' ecological potential from its source to its confluence with the River Tyne. The Water Framework Directive (WFD) 'chemical' status has been classified as 'good.'

**Figure 14-1: Environmental Constraints and Key Water Features**



14.2.4 The River Don, to the north of Downhill Lane junction, was designated as a cyprinid water (a river that supports fish such as minnows and carp) under the repealed Freshwater Fish Directive (FFD). This stretch of the River Don is now a protected area under the WFD. The River Don is not classified as a salmonid water under the repealed FFD through the Proposed Scheme or surrounding area.

14.2.5 The Environment Agency records available in January 2017 show four historic pollution incidents involving the River Don between its source and Jarrow. All the incidents, which occurred in 2016, 2007 (two spillage events) and 2002, involved the spillage of sewerage into the River Don.

### River Wear

14.2.6 The River Wear is a Main River that flows in an easterly direction towards the coast at Sunderland, approximately 2.5 km south of Downhill Lane junction. In the area near the Proposed Scheme, the River Wear is estuarine. The River Wear has 'moderate' ecological and 'good' chemical status, as classified by the Environment Agency under the WFD.

14.2.7 There are no water abstractions from the River Wear downstream of the A19 crossing. Information regarding the dilution and removal of waste products was not available at the time of the assessment, but the river is approximately 60 miles long and drains a catchment including the city of Durham and the town of Chester-le-Street, and so is likely to receive multiple discharges.

14.2.8 Washington and Harraton Angling Club fish in the stretch of the River Wear upstream of Hylton Bridge<sup>28</sup>. The Weardale Way long-distance footpath follows the whole length of the river<sup>29</sup>.

### Local Wildlife Sites

14.2.9 Two LWSs are located adjacent to Downhill Lane junction. Elliscope Farm / East Hylton Bridge LWS is located to the west of Downhill Lane junction. The site consists of two small woodlands and the linking section of the River Don, leading east from Hylton Bridge Farm. It has been designated as a LWS, in part, because it forms part of a section of the River Don which has particular habitat features that are beneficial to wildlife. It also provides occupied breeding habitat for water vole and used by otters.

14.2.10 Make-Me-Rich Meadow is located to the east of Downhill Lane junction. The LWS includes species-rich, damp, unimproved grassland and a section of the River Don itself. The LWS has also been designated, in part, because it forms part of a section of the River Don which has particular habitat features that are beneficial to wildlife. It also provides occupied breeding habitat for water vole and is used by otters.

14.2.11 The Environment Agency online Groundwater maps show there is a Secondary 'A' aquifer in the bedrock beneath the project area. There is no aquifer in the superficial deposits. A total catchment (Zone 3) groundwater source protection zone is located

approximately 625 m north-east of the most eastern extent of the Proposed Scheme. The groundwater vulnerability beneath the site is classified as low to the west of Downhill Lane junction and high to the east of the junction.

### Flood Risk

14.2.12 The Environment Agency's on-line fluvial flood maps indicate that there is a narrow floodplain either side of the River Don both upstream and downstream of the point where it is crossed by the A19. After assessing the current design fluvial flood risk is considered Low as the works are not to take place in the floodplain. However, the design is in its preliminary stages and is subject to change meaning fluvial flood risk may change in the future.

14.2.13 In terms of highway drainage, run-off from the A19 in the vicinity of Downhill Lane junction and from the slip roads of the junction itself drains to the River Don via an outfall to the north-east of Downhill Lane junction. Run-off from Downhill Lane to the east of the junction and Washington Road discharge to an unnamed tributary of the River Don, located approximately 225 m to the east of the A19. Records show that highway run-off for the A1290, west of Downhill Lane junction, discharges to the south of the Proposed Scheme. It is assumed that highway run-off from this road discharges into the River Wear.

<sup>28</sup> Washington & Harraton Angling Club (unknown) *Club's Waters* [online]. Accessed on 20<sup>th</sup> January 2017. Available at: <https://sites.google.com/site/washingtonharratonganglingclub/club-s-waters>

<sup>29</sup> The Long Distance Walkers Association *Weardale Way* [online]. Accessed on 20<sup>th</sup> January 2017. Available at: [https://www.ldwa.org.uk/ldp/members/show\\_path.php?path\\_name=Weardale+Way](https://www.ldwa.org.uk/ldp/members/show_path.php?path_name=Weardale+Way)

14.2.14 The Environment Agency's online flood maps indicate reservoir flood risk is considered Negligible.

### 14.3 Potential impacts during construction

14.3.1 Without considering any form of mitigation, the construction of highway schemes has the potential to have impacts on the water environment as follows:

- Mobilisation of sediments, particularly during earthworks and high rainfall events;
- Inadvertent discharge to surface waters or groundwater;
- Disruption of groundwater or surface water flows, in particular in areas where excavations are proposed (e.g. road cuttings);
- The risk that construction works could create new pathways for contaminants to migrate into water receptors; and
- Loss of floodplain storage, either temporarily or permanently.

14.3.2 There is also the potential for pollution in surface water runoff or from on-site spills by sediment and polluting substances (e.g. oils, fuels etc.).

14.3.3 There are standard construction techniques and best practices to avoid or reduce these potential environmental impacts as summarised below.

### 14.4 Potential mitigation for construction impacts

14.4.1 During the construction process, best practice would be followed to address the potential impacts detailed above. Best practice guidance can be found on the GOV.uk website<sup>30</sup>. These would all be clearly documented in method statements and a bespoke CEMP.

14.4.2 Site drainage would be programmed early in the construction sequence, so that any run-off from the site can be intercepted and controlled. This would include early construction of the proposed mitigation measures which will be determined in the next phases of work.

14.4.3 Other mitigation could include:

- Oil, fuel and chemical storage tanks for use during construction kept as far away from the key water environment receptors as possible;
- Bunding and/or storage facilities with impervious walls and floors installed around oil, fuel and chemical tanks at least 110% of the volume of the protected tank;
- Appropriate and legislatively compliant disposal of waste oils;
- Minimising areas of exposed surface in the vicinity of watercourses;

<sup>30</sup> The Environment Agency's Pollution Prevention Guidance (PPGs) have been withdrawn and are currently being revised. Current best practice advice can be

obtained (in relation to construction) at: <https://www.gov.uk/guidance/pollution-prevention-for-businesses#construction-inspection-and-maintenance>

- Use of wheel wash facilities to minimise the spread of silt;
- Minimising the gradient of exposed surfaces where possible to help reduce run-off; and
- Mixing of concrete in a designated area away from any potential receiving waters.

## 14.5 Potential impacts during operation

14.5.1 Without mitigation measures incorporated into the drainage design, there is a risk of contaminated road runoff being discharged to the receiving water environment. Potential contaminants can include:

- Fuel and other oil deposits that have leaked onto the road surface;
- Hydrocarbons from exhaust deposits;
- Lead, copper, zinc and cadmium deposits from exhaust emissions and tyre wear;
- Synthetic rubber deposits from tyre wear;
- Chemicals used in windscreen washes, such as detergents or de-icer;
- De-icing agents, such as salt, but also potentially including trace amounts of impurities such as cyanide, metals and clays;
- Herbicides from road-side verge maintenance; and
- Chemicals or oils that result from spillage and leakage after traffic collisions.

14.5.2 Without mitigation in place, highway runoff could cause adverse effects on various attributes of the receiving

waters, such as water quality, water supply, dilution of waste products, recreation, value to the economy, conveyance of flow, and biodiversity. The effects depend on a number of contributory factors, such as the size of the area of paved surfaces in the highway, volume and composition of the traffic using the road and the amount of water in the receiving water body.

14.5.3 The Proposed Scheme would result in a greater area of impermeable surfaces than presently exists, leading to increased volumes of surface water run-off.

14.5.4 Without appropriate mitigation in place it is possible for flood risk to and from the site to increase, which may place receptors locally and downstream at greater risk of flooding.

## 14.6 Potential mitigation for operational impacts

14.6.1 The Proposed Scheme is likely to discharge much of the run-off generated via the southern Testos attenuation pond (a pond used for the collection of runoff water). However, should the ongoing design preclude this, a new pond would be required. Flows would be attenuated to not exceed rates equivalent to run-off from greenfield areas.

14.6.2 The A1290 to the west of the junction would drain away to existing highway drainage. Existing geocellular storage at the junction would need to be replaced and re-sized appropriately.

14.6.3 A mixture of concrete surface water channels, gullies and combined kerb drainage units would be utilised for edge of carriageway surface water collection.

- 14.6.4 Carrier drains, filter drains and possibly an open ditch at the toe of embankments would be used to convey the water to the outfalls. Attenuation and flow control are proposed at all outfalls, with the possible exception of Downhill Lane East where there may be no net increase in paved area.
- 14.6.5 Sediment and pollutants associated with highway runoff are to be assessed via water quality and spillage assessments. Following these assessments appropriate mitigation measures would be implemented to meet WFD requirements. At this stage it is too early to state what mitigation measures are to be implemented. The mitigation would be reviewed as part of the EIA. The drainage design would be developed in line with current DMRB guidance. At this stage, it is expected that attenuation ponds are likely to form an important part of the design.
- 14.6.6 The majority of impacts during construction would likely be neutral with appropriate mitigation measure in place. It is anticipated that the majority of operational impacts would be neutral or providing betterment.

## **14.7 Summary**

- 14.7.1 Based on current information, it is anticipated that the Proposed Scheme would be designed to avoid any increase in flood risk, avoid a change in the quality of water being discharged and minimise the risk of pollution incident.

## 15 CUMULATIVE EFFECTS

### 15.1 Introduction

15.1.1 Despite the presence of various guidance documents covering EIAs, there is no widely accepted definition of 'cumulative impact assessment' at present. However, the cumulative assessment will take into account the Planning Inspectorate's 2015 'Advice Note 17: Cumulative Effects Assessment', and guidance on cumulative effects contained in DMRB Volume 11, Section 2, Part 5, 'Assessment and management of environmental effects'.

15.1.2 At its simplest, cumulative effects occur:

- as a result of changes caused by other reasonably foreseeable developments acting cumulatively with the similar effects of the proposed development ('inter-project cumulative effects'); or
- from the combined effect of several different impacts of the proposed development, acting together on a single receptor, so that the combined effect is more significant than the sum of the individual effects ('intra-project cumulative effects').

15.1.3 Cumulative effects can come from multiple projects (inter-project) or from within the same project (intra-project). In order for two impacts to have a cumulative effect, the impacts will need to have a temporal relationship (i.e. arise at broadly the same time) and a spatial relationship (i.e. occur in broadly the same geographic area).

15.1.4 As cumulative effects arise from two or more impacts acting together, an impact that may not have a

significant effect on its own may combine with another to have a significant cumulative effect.

### 15.2 Cumulative Effects

#### Highways Development

15.2.1 Downhill Lane Junction Improvement would be planned and co-ordinated in line with other road infrastructure projects within the vicinity so that cumulative effects are managed. In particular, the scheme has a close inter-relationship with the adjacent A19 Testos Junction Improvement Scheme. There is significant potential for cumulative environmental effects to occur as a result of the proximity of the two projects, and also for certain types of effect to be minimised through the efficient, coordinated joint delivery of the projects.

15.2.2 Other highway developments that could influence the traffic flows in the area surrounding the A19 / A184 Testos Junction Improvement Scheme have been identified in Table 15.1 below.

**Table 15.1: Relevant Highway Developments in the Vicinity of the Proposals**

Highway Authority	Scheme Name/ Type
Highways England	A19 / A184 Testos Junction Improvement
	Moor Farm
	A19 / A1058 Coast Road Junction Improvement
	Howdon Interchange (A19)
	Killingworth Interchange
Sunderland	A19 / A690

Highway Authority	Scheme Name/ Type
	A19 / A1231
	Cherry Blossom Way / A1290 Signals
	St Marys Way Realignment
North Tyneside	Whitehouse Farm – Buffer Area
	High Flatworth Roundabout
	Four Lane Ends - Buffer Area
	Scaffold Hill, West Shiremoor Amendments
	A192 West Park Highway Mitigations
	A1058 / Norham Road
Billy Mill Roundabout, Local Enterprise Partnership (LEP) Bid	

### Non-Highway Development

15.2.3 The following major non-highways developments have been considered as particularly relevant within the filtering process.

#### **International Advanced Manufacturing Plant (IAMP)**

15.2.4 An IAMP is proposed immediately south and west of Downhill Lane junction. The IAMP is a joint venture between Sunderland and South Tyneside Council. The aim of the IAMP would be to develop an employment site for advanced manufacturing that would attract both national and international business investment and job creation. The site is predicted to generate £295 million

of private sector investment and 5,200 new jobs by 2026/27.

15.2.5 The IAMP site would be developed on an area that is currently in the Green Belt. Sunderland and South Tyneside Councils have been consulting the local community on changes to their local plans required to remove the relevant area from the Green Belt.

15.2.6 The IAMP project is being pursued as a commercial Nationally Significant Infrastructure Project, and the Secretary of State gave a direction authorising it to be considered for consent under the Planning Act 2008 on 15<sup>th</sup> September 2015. An application for development consent is expected during 2017.

15.2.7 Environmental information for the IAMP site is available from an EIA Scoping Report published on the Planning Inspectorate website, and from ecological survey reports that have been shared with Highways England.

15.2.8 Based on current information for both schemes, it is anticipated that the cumulative effects of the Proposed Scheme and the IAMP scheme would be significant and opportunities to reduce the effects of these two schemes will be explored further during the development of the EIA and in consultation with the IAMP developers.

#### Wearpoint 55

15.2.9 Wearpoint 55 is a proposed industrial/commercial development adjacent to the A19, south-west Downhill Lane junction (between the Nissan plant and Downhill Lane junction). The planning application for this development has been rejected.

15.2.10 Wearpoint 55 and IAMP cannot both proceed without modification as the entirety of Wearpoint 55 would occupy some of the same land proposed for IAMP.

#### Nissan Manufacturing Site

15.2.11 Nissan Manufacturing Plant is located 1.25 km south of Downhill Lane junction. Nissan have confirmed an intention to expand their operations. No detailed information, including environmental information, has been identified at this stage.

#### Enterprise Zones

15.2.12 North East Local Enterprise Partnership has designated ten Enterprise Zone sites for businesses within the offshore, renewables and automotive sectors. The Enterprise Zones provide a space for businesses to grow and develop. Three Enterprise zones have been designated in the vicinity of the Proposed Scheme:

- Site 1 (approximately 23.5 ha in size) is situated immediately north of the A1232 between Hylton Grange interchange and Barmston junction and is partly developed.
- Site 2 (approximately 6.5 ha in size) is adjacent to the A19 north of Hylton Grange Interchange. It is currently the subject of a planning application.
- Site 3 (approximately 13 ha in size) is located immediately east of Glover Industrial estate and has yet to be brought forward for consent.

15.2.13 All of the sites are located south of the Nissan manufacturing plant. These sites would be primarily for automotive, low carbon vehicles, advanced manufacturing and advanced engineering sectors. No

environmental information was available for the proposed enterprise zones.

### **15.3 In-Combination Effects**

15.3.1 There are several areas where the impact of the junction improvements on one environmental topic may have knock-on effects on a second topic. In addition, the provision of mitigation measures for one topic may have either adverse or beneficial effects on another topic. These interactions are addressed within the individual specialist chapters along with any associated mitigation.

## 16 NEXT STEPS

### 16.1 Consultation

- 16.1.1 Highways England wishes to obtain the views of the public on the draft proposals for the scheme design as it has been developed up to July 2017, taking into account the potential environmental effects of the Proposed Scheme. Those views can then be taken into account in finalising the design and refining the EIA and ES.
- 16.1.2 Consultation at this stage follows earlier consultation in 2016 on the preferred route options and also previous statutory consultation in conjunction with the Testos Improvement Scheme between 2009 and 2014.
- 16.1.3 There will be a six-week period from 11<sup>th</sup> September 2017 for members of the public to respond to the consultation. Responses can relate to the preliminary environmental information set out in this report or to any other aspect of the proposed scheme. The responses can be made by completing a questionnaire by letter by e-mail or online, using any of the following addresses:

A19 Downhill Lane Project Team,  
Highways England,  
Lateral,  
8 City Walk,  
Leeds,  
LS11 9AT.

Website: <http://roads.highways.gov.uk/projects/a19-testos-and-downhill-lane-junction-improvements/>

Email: [A19DownHillLane@highwaysengland.co.uk](mailto:A19DownHillLane@highwaysengland.co.uk)

### 16.2 After the consultation

- 16.2.1 After the consultation period, which closes on 22<sup>nd</sup> October 2017, all responses will be considered in finalising the Proposed Scheme design and the ES. A Consultation Report will be prepared on the responses received and how they have been taken into account, including whether or not they led to changes to the Proposed Scheme.
- 16.2.2 Highways England is required to seek authorisation to construct the Proposed Scheme through an application to the Secretary of State through the Planning Inspectorate (as the responsible agency) to approve a DCO. The ES will be submitted with the DCO application in spring 2018.
- 16.2.3 Once accepted by the Planning Inspectorate on behalf of the Secretary of State, the public will have further opportunity to comment on the application. Information about how the process works can be found on the National Infrastructure Planning website<sup>31</sup> and information is also provided in the A19 Downhill Lane Junction Consultation Brochure.

<sup>31</sup> The Planning Inspectorate (2012). National Infrastructure Planning. Available at: <http://infrastructure.planningportal.gov.uk/>

## APPENDIX A: GLOSSARY

AADT	Annual Average Daily Traffic	LBAP	Local Biodiversity Action Plan
AOD	Above Ordnance Datum	LCU	Landscape Character Unit
AQMA	Air Quality Management Area	LNR	Local Nature Reserve
AQO	Air Quality Objective	LWS	Local Wildlife Site
BAP	Biodiversity Action Plan	NMU	Non-Motorised User
CCTV	Closed-Circuit Television	NO <sub>2</sub>	Nitrogen Dioxide
CEMP	Construction Environmental Management Plan	NSIP	Nationally Significant Infrastructure Project
dB	Decibel	OS	Ordnance Survey
DCO	Development Consent Order	PEI	Preliminary Environmental Information
DMRB	Design Manual for Roads and Bridges	PM <sub>10</sub>	Particulate Matter with a diameter of 10 micrometres or less
EIA	Environmental Impact Assessment	SoCC	Statement of Community Consultation
ES	Environmental Statement	SSSI	Site of Special Scientific Interest
Ha	Hectare	SWMP	Site Waste Management Plan
IAMP	International Advanced Manufacturing Park	TMP	Traffic Management Plan
IAN	Interim Advice Note	WFD	Water Framework Directive
JNCC	Joint Nature Conservation Committee		

## APPENDIX B: DISCOUNTED OPTIONS

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# A19 Downhill Lane junction improvement scheme

## Discounted options

The following plans show the shortlisted options that we considered. These have been discounted for the reasons described with each option.

All options apart from Option **F** are more expensive than our preferred option.



### Reasons for rejecting Option B

- Strengthening works would be required to the River Don culvert which would increase costs
- Safety concerns over traffic interaction on the northbound link road
- Significant additional land would be required east of Make-Me-Rich Farm
- Northern Powergrid overhead lines supplying the Nissan plant would need diversion works
- Maintenance access issues for the National Grid pylon
- Not directly compatible with the preferred route announced for the Testos scheme



### Reasons for rejecting Option C

- Strengthening and extension of the River Don culvert would be required, which would increase costs and impact on the natural habitat of the local wildlife site
- Significant additional land would be required east of Make-Me-Rich Farm
- Maintenance access issues for the National Grid pylon
- Northern Powergrid overhead lines supplying the Nissan plant would need diversion works
- Not directly compatible with the preferred route announced for the Testos scheme

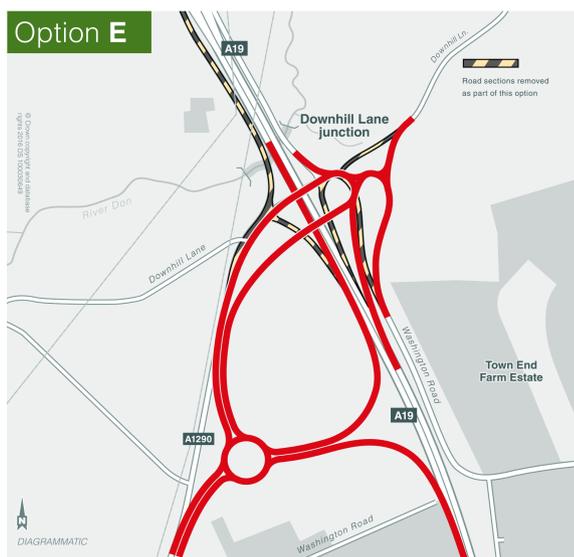


### Reasons for rejecting Option D

- Strengthening and extension of the River Don culvert would be required, which would increase costs and impact on the natural habitat of the local wildlife site
- Significant additional land would be required east of Make-Me-Rich Farm
- Maintenance access issues for the National Grid pylon
- Northern Powergrid overhead lines supplying the Nissan plant would need diversion works
- Not directly compatible with the preferred route announced for the Testos scheme

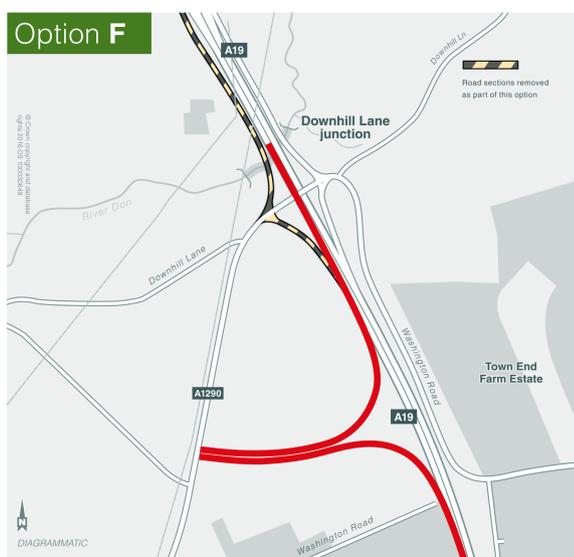
# A19 Downhill Lane junction improvement scheme

## Discounted options *(continued)*



### Reasons for rejecting Option E

- Requires considerably more land take than all other options
- Requires a significant area of land which is earmarked for development
- Not directly compatible with the preferred route announced for the Testos scheme



### Reasons for rejecting Option F

- Does not meet proposed scheme objectives for improving Downhill Lane junction
- Requires a significant area of land which is earmarked for development
- Not directly compatible with the preferred route announced for the Testos scheme