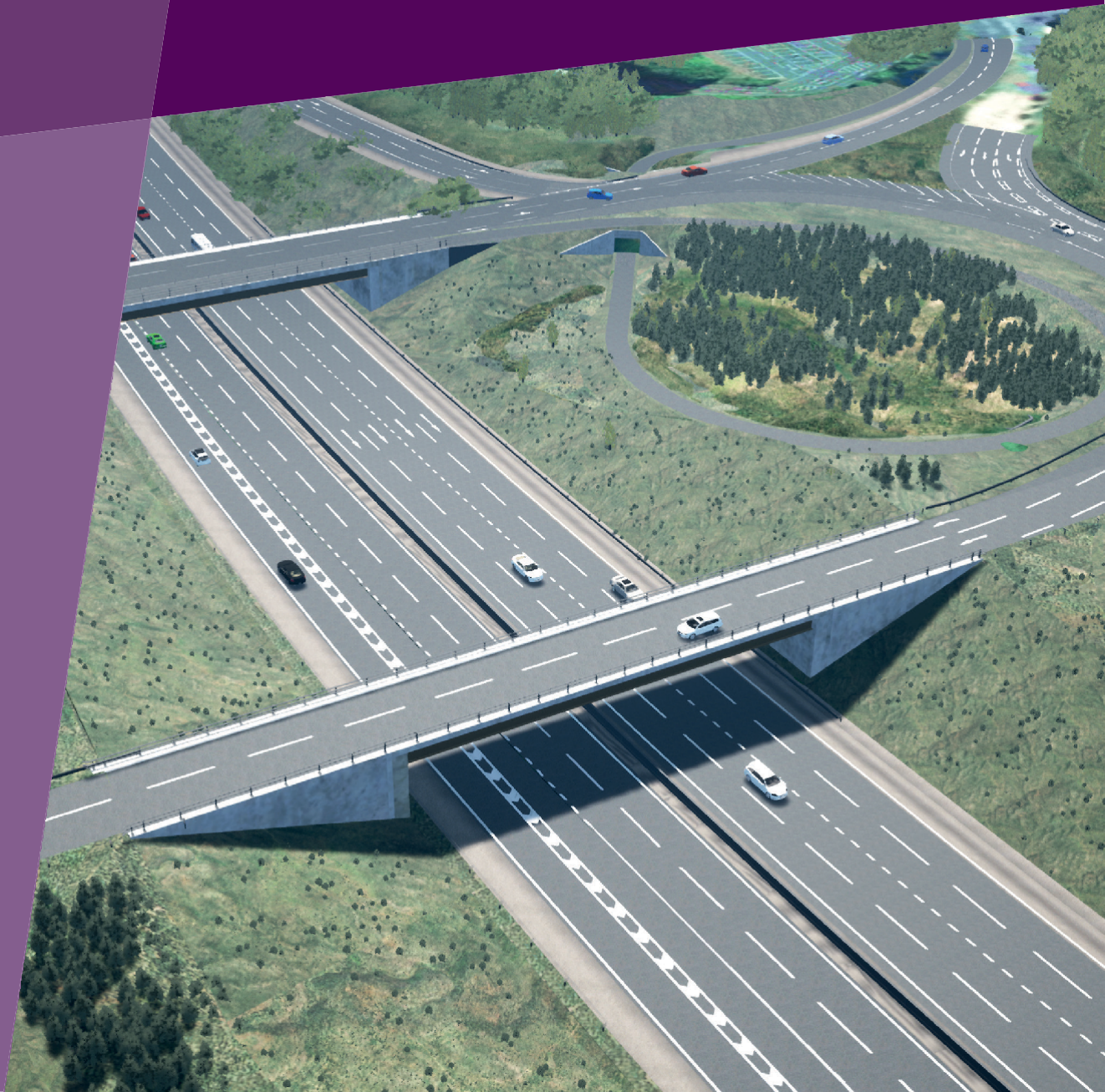


M3

junction 9 improvement scheme

Preliminary Environmental Information Report

May 2021



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Acronyms and abbreviations

Acronym / abbreviation	Definition
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
AEP	Annual Exceedance Probability
AMI	Advanced Matrix Indicator
AOD	Above Ordnance Datum
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ARN	Affected Road Network
ASSI	Area of Special Scientific Interest
AVR	Accurate Visual Representation
BGS	British Geological Survey
BMV	Best and Most Versatile
BNL	Basic Noise Level
BoQ	Bill of Quantities
BPM	Best Practicable Means
BSI	British Standards Institute
CA	Conservation Area
CCC	Committee on Climate Change
CCG	Clinical Commissioning Group
CCTV	Closed-Circuit Television
CDE	Construction, Demolition, Excavation
CDW	Construction and Demolition Waste
CFMP	Catchment Flood Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent

Acronym / abbreviation	Definition
CPRE	Campaign for the Protection of Rural England
CRoW	Countryside and Rights of Way Act
CRTN	Calculation of Road Traffic Noise
dB	Decibel
DBEIS	Department for Business, Energy & Industrial Services
Defra	Department for Environment Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DWGSZ	Drinking Water Groundwater Safeguard Zone
EA	Environment Agency
EBC	Eastleigh Borough Council
EclA	Ecological Impact Assessment
EEA	European Economic Area
EFT	Emissions Factor Toolkit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
EMP	Environmental Management Plan
END	European Noise Directive (Directive 2002/49/EC)
ES	Environmental Statement
EU	European Union
EV	Electric Vehicle
fiEMP	First Iteration Environmental Management Plan
FRA	Flood Risk Assessment
FWRA	Foundation Works Risk Assessment
GHG	Greenhouse Gas
GHGI	UK Greenhouse Gas Inventory
GIR	Ground Investigation Report
HADDMS	Highways Agency Drainage Data Management System
HBIC	Hampshire Biodiversity Information Centre

Acronym / abbreviation	Definition
HCC	Hampshire County Council
HCCILCA	Hampshire County Council Integrated Landscape Character Assessment
HDV	Heavy Duty Vehicle (gross weight greater than 3.5 tonnes)
HER	Historic Environment Record
HEWRAT	Highways England Water Risk Assessment Tool
HGV	Heavy Goods Vehicle
HIA	Hydrological Impact Appraisal
HLC	Historic Landscape Character
HPI	Habitats of Principal Importance
HPG	Historic Park and Garden
HRA	Habitats Regulations Assessment
HSE	Health and Safety Executive
IAB	Indicative Application Boundary
ICE	Institution of Civil Engineers
IEMA	Institute of Environmental Management and Assessment
JSNA	Joint Strategic Needs Assessment
ktCO ₂	Kilotonne of Carbon Dioxide
LAQM	Local Air Quality Management
LED	Light Emitting Diode
LLFA	Lead Local Flood Authority
LOAEL	Lowest Observed Adverse Effect Level
LSOA	Lower Super Output Area
MIDAS	Motorway Incident Detection and Automatic Signalling
MMP	Materials Management Plan
MS4	Message Sign Mark 4
MtCO ₂ e	Million tonnes carbon dioxide equivalent
NCA	National Character Area
NE	Natural England
NERC	Natural Environment and Rural Communities

Acronym / abbreviation	Definition
NHBC	National House Building Council
NHLE	National Heritage List for England
NIA	Noise Important Area
NMP	National Mapping Programme
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPSE	Noise Policy Statement for England
NPS NN	National Policy Statement for National Networks
NSIP	Nationally Significant Infrastructure Project
NUTS	Nomenclature of Territorial Units for Statistics
NVC	National Vegetation Classification
ONS	Office for National Statistics
PA 2008	Planning Act 2008
PAS	Publicly Available Standard
PAQAP	Project Air Quality Action Plan
PCF	Project Control Framework
PCM	Pollution Climate Mapping
PEIR	Preliminary Environmental Information Report
PfSH	Partnership for South Hampshire
RBMP	River Basin Management Plan
RHPG	Register of Parks and Gardens of Special Historic Interest
RPG	Registered Park and Garden
PM _{2.5}	Particulate matter smaller than 2.5µm in diameter
PM ₁₀	Particulate matter smaller than 10µm in diameter
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRA	Preliminary Risk Assessment
PRoW	Public Right of Way

Acronym / abbreviation	Definition
PSSR	Preliminary Sources Study Report
RCP	Representative Concentration Pathways
RDWE	Road Drainage and the Water Environment
RIS	Road Investment Strategy
RoFSW	Risk of Flooding from Surface Water
RVEI	Road Verge of Ecological Importance
SAC	Special Area of Conservation
SDILCA	South Downs Integrated Landscape Character Assessment
SDNP	South Downs National Park
SDNPA	South Downs National Park Authority
SFRA	Strategic Flood Risk Assessment
SHMA	Strategic Housing Market Assessment
siEMP	Second Iteration Environmental Management Plan
SINC	Site of Importance for Nature Conservation
SME	Small to Medium Sized Enterprise
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
SPI	Species of Principal Importance
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
TPO	Tree Preservation Order
TRA	Traffic Reliability Area
TRL	Transport Research Laboratory
UKCP18	UK Climate Projections 2018
UNFCCC	United Nations Framework Convention on Climate Change
VMS	Variable Message Sign
WBCSD	World Business Council for Sustainable Development
WCC	Winchester City Council
WCH	Walking, Cycling and Horse-riding

Acronym / abbreviation	Definition
WFD	Water Framework Directive
WHER	Winchester Historic Environment Record
WRI	World Resources Institute
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Background

- 1.1.1 M3 Junction 9 is a key transport interchange which connects South Hampshire (facilitating an intensive freight generating industry) and the wider sub-region, with London via the M3 and the Midlands/North via the A34 (which also links to the principal east–west A303 corridor).
- 1.1.2 Significant volumes of traffic use the grade separated, partially signalised gyratory (approximately 6,000 vehicles per hour during the peak periods) which acts as a bottleneck on the local highway network and causes significant delays throughout the day. Northbound and southbound movements between the M3 and the A34 are particularly intensive, with downstream queues on the northbound off-slip of the M3 often resulting in safety concerns during peak periods.
- 1.1.3 To address this, the Proposed Scheme (see **Chapter 2** for further detail) comprises the development and delivery of a scheme of works for increasing capacity, enhancing journey time reliability and supporting development in line with Local Plans. The Proposed Scheme includes widening of the M3 local to the junction to create four lanes each way, reconfigure the existing main junction 9 roundabout to make it more efficient, provision for walkers, cyclists and horse-riders and improvement of the motorway slip roads. A package of environmental mitigation and enhancement measures is being progressed as the design advances and will be reported in the Environmental Statement (ES), which will be submitted with the application for Development Consent. Consideration will be given to the enhancement of the South Downs National Park (SNDP) where reasonably practicable in the Proposed Scheme design.
- 1.1.4 The Proposed Scheme is classed as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 (as an alteration to a highway) and, as such, requires a Development Consent Order (DCO) to proceed. Highways England intends to submit an application for development consent for the Proposed Scheme to the Secretary of State through the Planning Inspectorate. However, before submission of the DCO application, Highways England is carrying out consultation, Environmental Impact Assessment (EIA) and refinement of the preliminary engineering design of the Proposed Scheme.

1.2 Planning history

- 1.2.1 In January 2019, Highways England submitted a request to the Planning Inspectorate for a Scoping Opinion for a previous iteration of the Proposed Scheme (document reference HE551511-JAC-EGN-0_00_00-RP-LE-0001IP03). The Secretary of State duly adopted a Scoping Opinion in March 2019.

- 1.2.2 Comments in the Scoping Opinion were considered and responded to through a statutory consultation exercise running from 2 July to 27 August 2019, which included a Preliminary Environmental Information Report (PEIR), available for public inspection and download via a dedicated project website (Highways England, 2020) (document reference HE551511-JAC-EGN-0_00_00-RP-LE-0004IP03). The 2019 PEIR is superseded by this 2021 PEIR.
- 1.2.3 Feedback from the consultation exercise showed that there was a high level of support for the scheme. However, some concerns were raised including the weaving length for vehicles joining the A34 from J9 and then heading onto the A33/Kings Worthy, the future capacity of the scheme and duration of construction impacts. Subsequently, Highways England undertook to amend the design, as consulted upon, to seek to resolve the identified issues.
- 1.2.4 Through design refinements, it was identified that there were potentially material changes to the Proposed Scheme when compared to the scheme as considered in the original EIA scoping process. The Design Manual for Roads and Bridges (DMRB) LA103 (Highways England, 2020) states:
- “Scoping shall be repeated where there are material changes:*
- 1. In physical characteristics and/or location of the project;*
 - 2. In the environmental assessment assumptions; and*
 - 3. In the level of understanding of the current state of the environment (baseline scenario).”*
- 1.2.5 The Proposed Scheme now comprises elements that were not scoped previously, see further information in **Chapter 2**, such changes comprise:
- An amended and increased Indicative Application Boundary (IAB)
 - New or improved bridge structures over the River Itchen system
 - New highways configuration and roundabout configuration
- 1.2.6 Highways England therefore determined that a new scoping exercise was required for the Proposed Scheme. Accordingly, a request for a second Scoping Opinion, superseding the previous scoping process, was submitted in October 2020.
- 1.2.7 A second Scoping Opinion was received on 27th November 2020 Section 3 of each technical chapter (**Chapters 5-15**) of this PEIR, (which supersedes the 2019 PEIR detailed above) demonstrates how due consideration is being given to the Scoping Opinion.

1.3 Environmental Impact Assessment (EIA)

1.3.1 EIA is a statutory process required for such a Proposed Scheme. It is a systematic process to identify, predict and evaluate the environmental effects of a proposed project. Its primary purpose is to inform the decision as to whether a project should go ahead. However, the EIA process will also have an important influence on the design of the Proposed Scheme since it enables environmental effects to be identified and, where possible, to be avoided or reduced through sensitive design or mitigation. EIAs for NSIPs are reported in two stages, as follows:

- A PEIR is prepared to inform statutory consultation with stakeholders and the public about the Proposed Scheme
- Following consultation, an ES is prepared to accompany the application for a DCO

1.4 The decision maker and planning policy

1.4.1 The Planning Inspectorate will examine the DCO application for the Proposed Scheme and will make a recommendation to the Secretary of State who will then decide whether to grant a DCO.

1.4.2 In accordance with section 104(2) of the Planning Act 2008, the Secretary of State is required to have regard to the relevant National Policy Statement (NPS), amongst other matters, when deciding whether or not to grant a DCO. The relevant NPS for the Proposed Scheme is the National Policy Statement for National Networks (NPS NN).

1.4.3 The Secretary of State will also consider other important and relevant national and local planning policy. The National Planning Policy Framework (NPPF) published in 2019 is the relevant national policy.

1.4.4 The local planning policy relevant to the Proposed Scheme can be found in **Section 2** of each technical chapter of this report.

1.4.5 The request for a second Scoping Opinion, submitted to The Planning Inspectorate, identified the national and local planning policies relevant to the assessment relating to each environmental topic. The purpose of considering relevant planning policy as part of the EIA is twofold:

- To identify policy that could influence the sensitivity of receptors (and therefore the significance of effects) and any requirements for mitigation
- To identify planning policy that could influence the methodology of the EIA. For example, a planning policy may require the assessment of a particular impact or the use of a particular methodology

1.5 Purpose of this PEIR

- 1.5.1 This document constitutes the second PEIR for the Proposed Scheme and supersedes the first PEIR report submitted in 2019. In accordance with Planning Inspectorate Advice Note 7 (*EIA Process, Preliminary Environmental Information and Environmental Statements, June 2020*) 'preliminary environmental information' is that which has been compiled by the applicant and is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development).
- 1.5.2 This PEIR provides a statement of the main environmental information available at this stage for each study area as relevant, along with the preliminary findings of the EIA and mitigation measures envisaged for the Proposed Scheme. The preliminary findings of the EIA rely in part on the informed professional judgement of specialist authors and preliminary results from on-going surveys at this stage. This document is intended to provide stakeholders, members of the community and the general public with an understanding of the principal issues and enable them to prepare an informed response to consultation.
- 1.5.3 An effect identified in this PEIR has been determined to be significant or otherwise if it is considered sufficient information is available to do so. If sufficient information is not available at this stage, the significance of an effect has not been stated.
- 1.5.4 It should be noted that at this stage the information is preliminary. An iterative process of scheme development and EIA is ongoing. The final EIA work will be reported in the ES that will accompany the DCO application.
- 1.5.5 A non-technical summary (NTS) of the PEIR has been prepared and is submitted alongside this report.

1.6 Structure and content of this PEIR

- 1.6.1 This report is divided into a number of sections which set out the environmental topics being considered in the EIA. Since the Proposed Scheme is a highway project, the design and assessments are guided by Highways England's DMRB. The DMRB on Environmental Assessment (LA 104, Highways England, 2020) and associated guidance set out the main environmental topic areas considered as part of a highway scheme EIA. This report covers those topic areas and is structured under the following headings:
- Air quality
 - Cultural heritage
 - Landscape and visual

- Biodiversity
- Geology and soils
- Material assets and waste
- Noise and vibration
- Population and health
- Road drainage and the water environment
- Climate
- Cumulative effects

1.6.2 Where appropriate, each environmental topic section of this report describes:

- the legislative and policy framework
- consultation undertaken to date and proposed consultation
- assessment methodology and significance criteria
- assessment assumptions and limitations
- the study area and baseline conditions
- the types of mitigation under consideration to reduce potential impacts of the Proposed Scheme
- the preliminary findings of the assessment of likely impacts that the Proposed Scheme would have on receptors relevant to an environmental topic
- anticipated further assessment

1.6.3 In this PEIR, the terms 'impact' and 'effect' have different meanings, with the effect referring to the environmental outcome caused by an impact.

1.7 Availability of this PEIR

1.7.1 Copies of this report are being made available as part of the summer 2021 consultation material for the Proposed Scheme. Details of these events are contained in Highways England's Statement of Community Consultation (SoCC) and hosted on a dedicated website:

- <http://www.highwaysengland.co.uk/m3junction9>

1.8 Consultation

Non-statutory engagement (2017 to June 2019)

- 1.8.1 From an early stage Highways England has carried out non-statutory engagement with a range of stakeholders about the Proposed Scheme. The primary aim of the non-statutory engagement was to introduce and notify stakeholders about the outline proposals and gain an understanding of local issues relating to the Proposed Scheme and technical advice.
- 1.8.2 As part of this non-statutory technical engagement, a series of workshops were held with prescribed consultees (including local authorities, the Environment Agency, South Downs National Park Authority (SDNPA), Historic England and Natural England) to gather feedback and discuss the approach to mitigating potentially significant environmental impacts as the design develops. This helped determine the information to be presented in the 2019 PEIR for the statutory consultation exercise.

Public consultation (Jan 2018 – Aug 2019)

- 1.8.3 Highways England has previously carried out two rounds of public consultation in relation to a previous iteration of the Proposed Scheme.
- 1.8.4 In January-February 2018, Highways England carried out a public consultation on four different route options (HE551511-WSP-GEN-M3J9PCF2-RP-TR-00048, PCF Stage 2 – Report on Public Consultation). Option 14 was presented as a preferred option and details of the three other options (Option 11, Option 16 and Option 18) were also presented with an explanation as to why these had been rejected.
- 1.8.5 Responses to the consultation in 2018 were taken into account in the identification of the preferred option. Highways England made a Preferred Route Announcement (PRA) in July 2019, in which Option 14 was identified as the preferred option for the Proposed Scheme.
- 1.8.6 Between 2 July 2019 and 27 August 2019, Highways England carried out a statutory public consultation in accordance with section 42, section 47 and section 48 of the Planning Act 2008 (PA 2008). The aim of the summer 2019 consultation was to seek the views of statutory consultees and stakeholders on all aspects of the Proposed Scheme and preliminary environmental information.
- 1.8.7 A PEIR accompanied the consultation to present the environmental information collected together with the preliminary findings of the assessment of likely significant environmental effects of the Proposed Scheme at that time. This PEIR updates and replaces the 2019 PEIR. The changes to the Proposed Scheme that have occurred since the summer 2019 consultation are set out in **Chapter 3** of the PEIR. A summary of summer 2019 consultation, including details of how Highways England has had regard to the matters raised by consultees, will be provided in the Consultation Report

which will be published and submitted with the DCO application. Note that a report summarising the 2019 consultation was also published on the website referenced below.

1.8.8 Details of the previous public consultations, including copies of the previous consultation materials, can be found by visiting the M3 Junction 9 Improvement scheme webpage:

- <http://www.highwaysengland.co.uk/m3junction9>

1.8.9 Following the July-August 2019 consultation, changes have been made to the design of the Proposed Scheme. Therefore, Highways England is seeking to consult on these changes through a further round of public consultation, for which this PEIR has been prepared.

On-going consultation

1.8.10 Following the summer 2019 consultation, Highways England has continued to engage with a range of stakeholders including prescribed bodies, local authorities and political representatives. Following adoption of the second Scoping Opinion in November 2020 Highways England is conducting a further round of statutory consultation in accordance with section 42, section 47 and section 48 of the Planning Act 2008 (PA 2008). **Section 3** of each technical chapter (**Chapters 5-15** of this PEIR) outline the consultation undertaken, and responses to such engagement, since the 2019 consultation exercise.

1.8.11 This PEIR has been prepared to assist consultees in developing an informed view of the potential likely significant effects of the Proposed Scheme. Highways England invites comments on the Proposed Scheme and the information set out in this PEIR.

1.8.12 Further details on the consultation exercise and copies of the consultation documents can be viewed and downloaded from the M3 junction 9 Improvement Scheme webpage:

- <http://www.highwaysengland.co.uk/m3junction9>

1.8.13 Following the consultation period, responses will be considered in finalising the scheme design and progressing the EIA. Comments will be taken into account when considering the need for further assessment or modification to the Proposed Scheme design or mitigation measures.

Responses to consultation

1.8.14 Responses received during the consultation will be considered in accordance with Section 49 of the PA 2008 and presented in the Consultation Report submitted with the DCO application. The Consultation Report will demonstrate how Highways England has complied with the relevant requirements of the PA 2008.

2 The Proposed Scheme

2.1 Need for the Proposed Scheme

- 2.1.1 Hampshire County Council (HCC) identified that infrastructure improvements are necessary to reduce congestion levels and assist with the strategic movement of traffic at a key arterial intersection, to make sure that traffic congestion and increased journey times do not compromise the scale of potential future economic growth in the sub-region (HCC, 2013a).
- 2.1.2 To address this, the improvement to M3 Junction 9 was included in the Department for Transport's Road Investment Strategy (RIS). The improvement contributes to national transport objectives by:
- Providing additional capacity
 - Enhancing journey time reliability
 - Supporting the development of housing and the creation of jobs, as set out in the existing and emerging Local Plans
- 2.1.3 The Proposed Scheme is included in the Solent to Midlands Route Strategy (Highways England, 2017), which identifies the M3 Junction 9 Improvement as a major improvement project as part of this route upgrade. Within this, Junction 9 of the M3 is specifically highlighted as being a location where there is a substantial barrier to connectivity in relation to the SDNP and walking, cycling and horse-riding (WCH). Additionally, the Proposed Scheme is identified and committed to under RIS 2 within the Road Investment Strategy 2: 2020-2025, Department for Transport (2020).
- 2.1.4 The latest available collision data has been combined with collision data outlined in the Project Control Framework (PCF) Stage 2 Scheme Assessment Report (Highways England, 2018), and identified that during that time a total of 82 accidents occurred, with approximately 50% on or on the approach to the junction roundabout. The remaining 50% occur on the M3 slip roads or on the main line of the M3 and the A34.

2.2 Proposed Scheme objectives

- 2.2.1 By providing an unconstrained link, vehicles will not be required to manoeuvre through a priority or signal-controlled junction. This seeks to reduce congestion and improve journey time reliability on the M3, A34 and local road network.
- 2.2.2 The Proposed Scheme has five strategic objectives, in line with Highways England Delivery Plan 2015-2020 (Highways England, 2015):
- A less congested network – reduce the amount of congestion and increase journey time reliability

- A safe and serviceable network – safety improved as a result of reducing delays and queue lengths
- An improved environment – endeavour to reduce where possible the number of households adversely affected by noise, improve the air quality at sensitive receptors and maximising biodiversity outputs from the Proposed Scheme
- A more accessible and integrated network – improvements at Junction 9 would also include improvements for WCH facilities
- Supporting economic growth – unlocked development capacity for job, business and housing creation

2.2.3 The design of the Proposed Scheme will take into account Highways England's 10 principles of good design, published in 'The Road to Good Design' (Highways England, 2018), to support its aspirations for a network that responds better to both people and places through improved design processes. These promote environmentally sustainable design that fits in context, whilst making roads safe, useful, and understandable.

2.3 Proposed Scheme location

Surrounding area

- 2.3.1 The M3 J9 Improvement site is located within the planning authority boundaries of Winchester City Council (WCC), HCC and the South Downs National Park Authority (SDNPA). The application site and surrounding area are shown in **Figure 2.1, Appendix 2.1**.
- 2.3.2 The surrounding area is primarily urban to the west of the M3 and primarily rural to the east. There are large concentrations of residential receptors close to the A34 in the north of the Indicative Application Boundary (IAB) (in Headbourne Worthy, Kings Worthy and Abbots Worthy) and close to the M3 to the south of the study area (on the eastern fringe of Winchester). A small number of isolated farm holdings or rural dwellings lie to the east and south-east of the IAB. There are a small number of schools and education facilities, including St Swithun's School north of the B3404 and east of the M3, Winnall primary school and Stepping Stones pre-school to the south west of the junction.
- 2.3.3 Immediately west of the IAB, there is an area of commercial development. This includes Sun Valley Business Park, Tesco, Winnall Industrial Estate and Scylla Industrial Estate. Wykeham Trade Park and Highways England's maintenance depot are located to the north-west of the junction.
- 2.3.4 The SDNP extends beyond the area of the IAB to the north, east, south and some areas to the west. The land to the east is generally greenfield. The River Itchen and associated floodplain are present within the north part of the IAB. It lies along the River Itchen valley with the base of the valley to the

west of the junction. The River Itchen Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) also extend to the northeast and southwest.

Designated sites

- 2.3.5 The River Itchen SAC is located in part beneath the existing alignment of the A34, the A33 and the M3. The River Itchen SAC is designated for its riverine habitats and species which it supports including southern damselfly, bullhead, white-clawed crayfish, brook lamprey, Atlantic salmon and otter.
- 2.3.6 The River Itchen is also a SSSI, primarily due to the complex mosaic of habitats found within the riparian zone and the species which occur within them, including otter, water vole and the white-clawed crayfish. The River Itchen SSSI is of nature conservation value at the national scale and is of high environmental value.
- 2.3.7 In addition, St Catherine's Hill SSSI is located approximately 500 metres to the south of the IAB and is designated for diverse chalk grassland habitats. The statutory designated sites are shown on **Figure 2.2, Appendix 2.1**.
- 2.3.8 The SDNP is an important designated area within and adjacent to the IAB to the north, east, south and in some areas, the west. The western extent of the wider SDNP boundary is shown on **Figure 2.2, Appendix 2.1**.
- 2.3.9 Two Groundwater Source Protection Zones (SPZ) lie to the north of the IAB, within the IAB. They are classified as Groundwater Source Protection Zone (SPZ) 1 (inner zone) and SPZ 2 (outer zone), see **Figure 13.1, Appendix 13.1**.
- 2.3.10 There are a number of Scheduled Monuments and Listed Buildings adjacent to the IAB. Designated cultural heritage assets are shown on **Figure 2.2, Appendix 2.1** and **Appendix 6.1**.
- 2.3.11 Further designations such as Noise Important Areas and Air Quality Management Areas are shown on the Environmental Constraints Plan (**Figure 2.2, Appendix 2.1**).
- 2.3.12 The sensitivity of this location, across a range of receptors, is noted and the potential significant effects, including impact interactions and cumulative effects, is reported in this PEIR.

2.4 Proposed Scheme description

- 2.4.1 This section of the PEIR should be read in conjunction with **Figures 2.3 to 2.5, Appendix 2.1** (indicative land use plan, indicative general arrangement plan and comparison of indicative traffic flow plan respectively).
- 2.4.2 Note, **Figure 2.5, Appendix 2.1** shows the predicted percentage change in annual average daily traffic flows on road links resulting from the Proposed

Scheme (at the time of writing). It shows an interpretation of not only direct changes in traffic flow anticipated from the Proposed Scheme but also how existing traffic flows on selected road links in the surrounding area could be re-distributed as a result of the Proposed Scheme. This figure is for illustrative purposes only and will be updated as design work progresses and, accordingly, reported in the ES.

Overview

- 2.4.3 The existing M3 Junction 9 is a grade separated, partially signalised gyratory roundabout connecting multiple nationally and locally significant routes. The M3 here is joined with the A34 towards Newbury and Salisbury, A272 towards Petersfield and southern Winchester, and Easton Lane towards Winnall and northern Winchester. Approximately 1 kilometre north of the roundabout, the A33 from Basingstoke connects with the A34, and approximately 1 kilometre south of the roundabout the A31 from Alton connects to the A272.
- 2.4.4 The improvements proposed as part of the Proposed Scheme maintain this existing connectivity, whilst providing enhanced capacity, simplified routing and improved facilities for WCH routes. The main changes from the existing junction are:
- Widening of the M3 from a dual two-lane motorway (two-lane motorway and a hard shoulder) to a four-lane motorway between the south-facing roundabout slip roads
 - A new smaller grade separated gyratory roundabout arrangement within the footprint of the existing roundabout, incorporating new connections over the M3 with improved WCH route facilities
 - Connector roads from to the new gyratory roundabout
 - Improved slip roads to/from the M3
- 2.4.5 The IAB is approximately 169.7 ha. This includes the proposed land required for gantries, signage, temporary construction compound areas, areas for environmental mitigation and areas for drainage requirements. It is possible that the IAB could be extended around the areas of search for excess spoil management (see **Figure 2.3, Appendix 2.1**). Such an extension is subject to ongoing design work and, if progressed, will be included in the Environmental Statement submitted with the application.
- 2.4.6 Additional modifications to the design of the earlier scheme have been made to improve the A33 northbound arrangement following feedback from the Public Consultation exercise undertaken in 2019. **Figure 2.3, Appendix 2.1** shows the indicative proposed land uses within the IAB, and **Figure 2.4, Appendix 2.1** shows the indicative general arrangement of the Proposed Scheme.

M3 to A34 northbound

- 2.4.7 To accommodate the proposed M3 junctions 9 to 14 Motorway Upgrade project which is separate to the Proposed Scheme (see **Section 4.13** below), the existing M3 northbound would be converted to an all-lane running motorway with four lanes northbound. South of Junction 9, in the northbound direction, the two nearside lanes would be signed, and line marked for the A34 northbound and the two offside lanes for the M3. Access to Junction 9 would be provided via a reconstructed northbound off-slip.
- 2.4.8 The two proposed northbound A34 lanes would pass under Junction 9 alongside the two M3 lanes, after which they would diverge from the M3 alignment to form the new A34 northbound link with the remaining two offside lanes continuing north as the M3.
- 2.4.9 After the split, the A34 would continue north, passing over the proposed realigned A33 with M3 northbound on-slip and then descending to tie into the existing A34 northbound carriageway before it crosses the River Itchen.
- 2.4.10 The existing northbound A34 diverge link towards the A33 would be abandoned (it is proposed to utilise part of the abandoned carriageway for a new walking route, see **Paragraphs 2.4.27 to 2.4.31** below), separating the existing linkage between the two A-roads.
- 2.4.11 North of the existing River Itchen crossing, the A33 diverge would be removed to leave the two lanes of the A34 to run continuously.

A34 southbound to M3

- 2.4.12 The A34 southbound link would leave the existing A34 alignment after it crosses the River Itchen, moving to the east where it would then pass under the M3 and proposed A33 alignment in an underpass with cuttings.
- 2.4.13 Beyond the proposed M3 and A33 underpass, an offslip would be provided (off the A34 southbound link road) connecting to the revised Junction 9 gyratory roundabout. The A34 southbound link road would continue to join the M3 mainline southbound carriageway and pass under the revised Junction 9 gyratory roundabout layout.

M3 Junction 9 roundabout

- 2.4.14 The Junction 9 circulatory roundabout would be replaced with a smaller gyratory roundabout. All link roads that access the roundabout would need to be realigned to this new layout. Some may include segregated left turn lanes. Two new longer span gyratory bridges would replace the existing bridges to provide the road corridor width required for the new configuration.

Slip roads

- 2.4.15 The existing M3 northbound on-slip would be realigned to become the A34 northbound on-slip, merging downstream with two A34 northbound lanes that diverge from the M3. The existing A34 link connecting to the existing roundabout would be converted to a two-way road connecting to the A33, linking the reconfigured gyratory roundabout to a new roundabout providing access to the Traffic Officer Service and Highways England's maintenance depot. Beyond the depot roundabout, the carriageway would continue with a dedicated M3 northbound on-slip road accessed off a new roundabout (north of the A34 underpass approach) and with a continuation of the A33 leading northbound towards Basingstoke.
- 2.4.16 The existing M3 southbound off-slip would be removed and replaced with a new off-slip located approximately 600 metres upstream. The new southbound M3 off-slip would then merge with the new A34 southbound diverge connector road, which then proceeds along a new link to the gyratory roundabout to maintain local access.
- 2.4.17 The two south-facing slip roads would be realigned to connect the new roundabout. Both would merge (southbound) and diverge (northbound) directly to the widened M3.

Bridge structures

- 2.4.18 The Proposed Scheme would require a number of highway structures as outlined below. These highway structures remain in development and will be considered as the design progresses.
- 2.4.19 The existing Junction 9 grade separated interchange, consists of a gyratory with two bridges crossing the M3. It is anticipated that these would be replaced by two new longer span bridges crossing the widened M3 alignment, located between the two existing bridges inside the existing gyratory diameter. If so, the existing bridges would need to be demolished. Steel and concrete material options will be considered as the design develops.
- 2.4.20 The proposed A33 link road (leading to the new M3 northbound on-slip) that heads north from the gyratory roundabout is to run beneath the proposed A34 northbound alignment by the provision of a new underpass structure.
- 2.4.21 It is anticipated that the new southbound A34 alignment would pass under the new M3 northbound on-slip / A33 link road and then the existing M3 carriageway. Construction sequencing will lead the structural form options, but at this stage of the design development the underpass would likely be a single-span reinforced concrete box structure. The existing M3 carriageway alignment would remain essentially unmodified at this location, minimising disruption during construction where possible.

River Itchen crossings

- 2.4.22 There are a number of existing crossings of the River Itchen system within the northern half of the IAB (south of Kings Worthy), including the Irrigation Stream Bridge, Barton Carrier East Bridge, Barton Carrier West Bridge, Itchen Bridge and Kingsworthy Bridge (see **Figure 2.3, Appendix 2.1**). Based on current design work (which remains on-going), it is anticipated that Kingsworthy Bridge would require modification to accommodate the new road configuration.
- 2.4.23 Whilst it is not currently anticipated that works would be required to other bridge structures, such works cannot be ruled out at this stage. This will be confirmed through further design work and reported and assessed within the ES. Environmental consideration within this PEIR is cognisant of the potential for other bridge structures to be affected. See **Paragraph 2.4.29** below regarding a new proposed footbridge crossing of the River Itchen.

Road surfacing

- 2.4.24 It is intended that road surfacing would be finished with a surface course which contributes to lower noise during operation where practicable and in relevant locations.

Retaining walls

- 2.4.25 At this stage of development there are a number of ground level differences to resolve across the scheme. Retaining walls will be required and the wide choice of retaining wall types will be considered when making a decision based upon the particular requirements at each location. Where possible, retaining walls would be screened with earth embankments.

Closed-circuit television (CCTV) masts

- 2.4.26 New CCTV masts would be required; these are in development but are anticipated to be in line with guidance and design standards. As further detail becomes available, it will be considered and reported within the ES.

Walking, cycling and horseriding facilities

- 2.4.27 The WCH facilities around and within the proposed junction are to be upgraded and would retain the provision of NCN route 23. On both sides of the motorway, the existing walking and cycling route links both parts of Easton Lane, which would descend to a subway route provided beneath the gyratory roundabout. Existing provision for horse-riders will be improved with a widened 3m route, which includes mounting blocks provided either side of the eastern subway to enable rider dismounting for leading horses through to continue the route to the existing bridleway extent (which currently ceases within the existing roundabout). Future provision for horse-riders is allowed for (beyond the existing cessation point within the roundabout) by providing a wider bridge over the M3 for a 3m width route, and space for future mounting

block provision either side of the western subway which will be sufficient to lead horses through.

- 2.4.28 A new footway for the western side of the scheme is also being developed to link the A33 / B3047 Junction to Winnall Industrial Estate situated on Easton Lane. The route runs parallel to the west of the A33 with the route to be constructed within the existing verge. A signalised Puffin crossing is proposed adjacent to the proposed Highways England depot roundabout, to provide a link to this walking route. The walking route then transitions to utilise the existing A34 Northbound and A33 carriageways which are to be abandoned as part of the scheme. The existing informal link to the existing Public Right of Way (PRoW) will also be upgraded from its connection to the A33. For the first River Itchen crossing (i.e. most northern), the route follows the existing A33 and is accommodated on the existing bridge deck abandoned carriageway.
- 2.4.29 For the second river crossing (i.e. most southern), the Proposed Scheme includes a new footbridge constructed across the River Itchen, with the route extending south along the east of the new A34 alignment, crossing under the A34 in a new subway which would then utilise the abandoned A34 northbound carriageway leading up to the existing depot junction and towards Easton Lane. The new footbridge would be approximately 3m wide.
- 2.4.30 Three proposed subways would be required to accommodate existing and improved provision of routes in the area. The two new subways at the roundabout would cater for existing users of NCN Route 23, with a subway under the A34 northbound catering for the pedestrian users of the new route.
- 2.4.31 An additional footpath is proposed on the eastern side of the Proposed Scheme to link Easton Lane with Long Walk. Such a route would provide a circular leisure path for those using the SDNP with a link to the other paths around Long Walk with their links to local villages.
- 2.4.32 **Figure 2.9, Appendix 2.1** provides an overview of the existing and new walking and cycling routes.

Signage/gantries

- 2.4.33 Signage is in development but will be in line with guidance and design standards.
- 2.4.34 Gantries will be provided at locations as per current guidance and design standards and would likely be portal or cantilever gantries.
- 2.4.35 All gantry mounted Variable Message Signage (VMS) and signals would be standard types commonly used across the Highways England network. These are MS4s (Message Sign Mark 4) and Advanced Matrix Indicators (AMI).

2.4.36 Infrastructure to support the VMS and signals would also be provided. This would include masts for CCTV cameras, Radar Motorway Incident Detection and Automatic Signalling (MIDAS) detectors, cabinets, chambers and a ducted network installed in a trench in the verge.

Lighting

2.4.37 Lighting design is currently in development. However, early indications would indicate that the current section of lighting located at Easton Lane will be unaffected. This may change through development in which case, the design will be adjusted in line with guidance and design standards. It is not currently planned to light any of the junction or slip roads, it is anticipated that a lighting plan will be prepared to inform the ES.

2.4.38 The subways and the underpasses will be provided with lighting due to the length of these facilities, however it is not currently envisaged to light the WCH routes (subject to ongoing design work).

Construction activities

2.4.39 For the purpose of the EIA, the site preparation and construction phase will include consideration of the demolition of existing infrastructure required to facilitate the Proposed Scheme.

Indicative construction phasing

2.4.40 The construction phase of the Proposed Scheme is estimated to commence in autumn 2023, with operation anticipated to commence in winter 2026. The construction phase will be programmed and sequenced to reduce disruption to the local surroundings and the environment, residents, business, and road users as far as practicable. It is anticipated construction methods would follow standard construction practices and specific mitigation measures would be implemented and tailored to the Proposed Scheme as required.

2.4.41 It is currently envisaged that the construction phase would be split into phases. Within each phase, the following broad activities would be undertaken with a number of temporary road realignments and diversions required to facilitate construction whilst maintaining traffic routes where practicable:

- Site establishment (within first phase)
- Service diversions
- Construction of new bridges at J9
- Construction of merge and diverge roads and roundabouts between A34, A33 and M3

- Construction of retaining walls associated with the new road alignments between the M3 and A34
- Construction of bridges and underpasses associated with revised road alignments
- Bridge improvement works on the A34
- Construction of WCH routes
- Installation of signs, barriers, and gantries for the revised road alignments

2.4.42 The construction process would re-use excavated materials as fill (where possible) to reduce the number of construction vehicles travelling on the network.

Temporary construction compounds

2.4.43 In order to facilitate construction of the Proposed Scheme, temporary construction compounds will be required. The final number, location and dimensions of the compounds is not yet known and is the subject of on-going design work. However, it is not anticipated that all options below will be required. The reasons for selecting the final compound locations, including a comparison of their potential environmental effects against compounds not progressed, will be reported in the ES. The description of compound locations below should be read in conjunction with **Figure 2.3, Appendix 2.1**:

- A central temporary construction compound, located to the immediate east of J9
- Two smaller areas within the footprint of the J9 gyratory roundabout
- A compound located between the A33/A34 and M3 (note, should a compound be sited in this location it would be designed cognisant to the environmental sensitivity of its location)
- A northern (satellite) compound located adjacent to the A34/A282 roundabout near Christmas Hill

2.4.44 Anticipated activities within the indicative compound locations (to be confirmed in the ES) are likely to consist of:

- Car parking
- Welfare and offices
- Material storage
- Wheel washing

- Drainage

2.4.45 It is anticipated that temporary heras (metal mesh fencing) (or similar) fencing (inside existing hedgerows where possible) will be erected to screen and secure compound locations.

Construction working hours

2.4.46 It is currently anticipated that working hours would consist of the following:

- 07.00 to 19.00 Monday to Friday
- 07.00 to 13.00 Saturday (with the site vacated by 14.00)
- Overnight, Sunday and bank holiday working may be required for discreet activities or exceptional circumstances such as abnormal load delivery and continuous concrete pour. Such instances will be agreed with the relevant local authority.
- Working hours outside of those identified above may be required for weather critical activities (for example, earthworks). Such instances will be agreed with the relevant local authority.

Areas of search for potential excess spoil management

2.4.47 It is likely that the construction of the Proposed Scheme will result in the requirement to manage excess spoil (i.e. after ground material arisings have been utilised to construct the Proposed Scheme). Accordingly, three areas of search for potential excess spoil management are indicated on **Figure 2.3, Appendix 2.1**.

2.4.48 Within these areas (at this stage it is not anticipated that all three areas will be required), it is proposed that topsoil would be stripped, separated and stored in bunds at an approximate height of 4m. The topsoil removal activity would be anticipated to last up to 6 weeks.

2.4.49 Some lengths of hedgerow would be removed to facilitate access through field boundaries to each area via temporary haul roads and may be replanted on completion of the works (depending on final land use). Standard earth moving equipment would be utilised in accordance with industry standard best practises. There may be a requirement to install land drainage features which will be defined and considered in the ES.

2.4.50 Each area required would be appropriately fenced and include site worker's 'welfare' facilities, weighbridges and wheel washing facilities. Water and sewage connections will be required.

2.4.51 The request for a second Scoping Opinion considered that these areas could be returned to chalk grassland or to agricultural use, however it is currently anticipated that these areas will be returned to agricultural use as shown on

Figure 2.6, Appendix 2.1 (Environmental Mitigation Design Plan). As design work progresses, further information on the volume of excess spoil as well as further detail on associated works required will be available and reported in the ES. Excess spoil will be managed in accordance with the waste hierarchy (reduce, reuse, recycle, recover, disposal).

Indicative construction vehicle types and movements

- 2.4.52 The construction plant required to facilitate the development will be confirmed subject to the design of the Proposed Scheme (which is ongoing). However, it is envisaged that the construction plant would mainly consist of articulated dumper trucks, bulldozers, excavators, rollers, and excavator mounted breakers. It is likely that there will be a requirement to use other plant such as piling rigs (vibration & impact) and drop/vibration hammers for specific activities.
- 2.4.53 There would be a requirement for construction-related vehicle movements; the number and frequency of which is subject to on-going assessment work and will be reported in the ES. However, it is currently envisaged that over the course of the construction period, there would be approximately 60,000 vehicle movements (based on 8m³ capacity vehicles) to manage the relocation of earth and spoil materials within the site; such movements may be required to utilise the transport network but are largely anticipated to remain within the IAB. Concrete batching is not anticipated to take place within the IAB, requiring the import of concrete through approximately 3,300 wagons capable of carrying 7.5m³ of material across the construction period. There would be a requirement to import materials to the M3J9 Improvement site, which is currently anticipated to require 9,400 wagons capable of carrying 8.5m³ of material. An average of 100 car parking spaces are anticipated to be required daily across the construction phase.
- 2.4.54 It is envisaged that the construction contractor would operate in accordance with relevant best practices, such as the Considerate Constructors Scheme. Where possible the construction contractor would control and limit noise, vibration and dust levels as far as practicable to minimise impact to sensitive receptors. Prior to and during construction activities, the construction contractor would engage regularly with key stakeholders to provide an opportunity to raise issues and discuss matters directly.
- 2.4.55 It is possible that the IAB could be extended around the areas of search for excess spoil management (see **Figure 2.3, Appendix 2.1**). Such an extension is subject to ongoing design work and, if progressed, will be included in the Environmental Statement submitted with the application.

Indicative construction delivery vehicle routing

- 2.4.56 Delivery vehicles would be routed to the M3 J9 Improvement site from the north and south. When accessing from the north, delivery vehicles would leave the M3 at Junction 8, continue in a westerly direction along the A303,

and then continue in a southerly direction along the A34 to the M3 Junction 9 Improvement site.

2.4.57 When accessing from the south, delivery vehicles would leave the M3 at Junction 9 and access the construction areas off the gyratory roundabout. Depending which area of the M3 J9 Improvement site is being accessed, if required, delivery traffic would also continue north through the gyratory, along the A34 and turn around at Three Maids Hill, then continuing south along the A34 to the M3 Junction 9 Improvement site.

Indicative Temporary Traffic Diversions

2.4.58 Various forms of traffic management will be required during construction to safely manage the interface between the motorists and construction workers and to facilitate construction of the scheme. This may possibly include temporary lane closures or limited road closures on the road network. The management of traffic will be carefully planned to minimise delay to motorists whilst providing safety. The relevant stakeholders shall be consulted during the preparation of traffic management arrangements.

2.4.59 At this stage, it is anticipated that the temporarily diverted traffic would be mainly confined to the motorway and A-roads, including the A303, A34, A33, A31 and A3404. Where it is not possible to route such temporary diversions along the motorway or A-roads, the use of B-roads will likely be required.

2.4.60 The below describes what is considered to be (at this stage) indicative temporary traffic diversion scenarios. Further consideration is to be given to these scenarios as knowledge of the Proposed Scheme progresses. This information will be further considered and reported in the ES as required. See **Figure 2.1, Appendix 2.1** for locations.

- Temporary closure of A34 between Bullington Interchange and Three Maids Interchange. Traffic in the Sutton Scotney area wishing to access Winchester would utilise Winchester Hill and Christmas Hill south to the Three Maids Interchange, then on to Winchester. Larger vehicles in the Sutton Scotney area, wishing to access the M3, or other routes to the north would likely be routed northbound along the closed A34 to the Bullington Interchange. Traffic wishing to access the M3 would then utilise the A303 east to Junction 7 of the M3. It is anticipated that 20 instances would occur over the construction period, with each instance lasting for 48 hours each.
- Temporary closure of the link between Junction 9 of the M3 and the Tesco Roundabout on Easton Lane. Traffic wishing to access the Tesco roundabout from the M3 would utilise the A34 northbound to the Three Maids Interchange, where it would merge onto the B3420, then south into Winchester and along Easton Lane to Tesco. It is anticipated that 10 instances would occur over the construction period, with instances lasting for 12 - 24 hours each.

- Temporary closure of the slip road from Junction 9 on to the M3 northbound. Traffic wishing to head north on the M3 would utilise the Junction 9 gyratory, head south on the M3 to Junction 11, where access to the M3 northbound would be gained. It is anticipated that 10 instances would occur over the construction period, with instances lasting for up to 48 hours each.
- Temporary closure of the slip road from Junction 9 on to the M3 southbound. Traffic wishing to head south on the M3 would utilise the A272 southbound, past the A31 roundabout and on to the M3 southbound at Junction 10. It is anticipated that 10 instances would occur over the construction period, with instances lasting for up to 48 hours each.
- Temporary closure of the slip road leading off the M3 northbound to Junction 9. Northbound motorway traffic wishing to leave the M3 at Junction 9, would continue north to Junction 7, then merge on to the A30 southbound, then the A303 west toward the Bullington Interchange (A34). It is anticipated that 10 instances would occur over the construction period, with instances lasting for up to 48 hours each.
- Temporary closure of the slip road leading off the M3 southbound to Junction 9. Southbound traffic wishing to leave the M3 at Junction 9 would continue south to Junction 11 to access the M3 northbound back to Junction 9. It is anticipated that 15 instances would occur over the construction period, with instances lasting for up to 48 hours each.
- Temporary closure of the A272/Spitfire Link south of M3 Junction 9. For motorway vehicles wishing to access the A31 south of Junction 9, it is anticipated they would continue south on the M3 to Junction 11, turn back along the M3 northbound to Junction 10 to merge onto the A31. Non-Motorway traffic would utilise Easton Lane into Winchester, accessing the A3404 to join the A31. It is anticipated that 10 instances would occur over the construction period, with instances lasting for up to 48 hours each.
- Temporary closure of the A33 southbound at Kings Worthy to the A34 (Kings Worthy Link). Traffic without height restriction wishing to access Junction 9 from the A33, would leave the A33 and utilise the B3047 west (London Road) into Winchester and on to Easton Lane. Traffic with height restrictions, wishing to access Junction 9 from the A33, would leave the A33 and utilise the B3047 east, to Arlesford Road, to the A31 and on to the A272. It is anticipated that 20 instances would occur over the construction period, with each instance lasting for 48 hours each.

Temporary diversions of walking, cycling and horse-riding routes

2.4.61 As a result of construction activities there is likely to be the requirement to temporarily divert existing walking, cycling and horse-riding routes. Such

details are subject to further design and will be considered in ongoing EIA work.

Drainage

2.4.62 The highway drainage strategy is in development, and currently seeks to both capture and treat the surface water runoff from the highway, its associated earthworks and structures, existing lengths of the carriageway that would not be altered by the Proposed Scheme and run-off from contributing adjoining land. The runoff will likely need to be attenuated and flows to outfalls restricted to existing or agreed discharge rates. The indicative locations of potential drainage ponds or other features are identified in **Figure 2.3, Appendix 2.1**.

Utility diversions

2.4.63 Enabling works, including utilities diversions, will be required to accommodate the Proposed Scheme. Such works would be undertaken by the utilities network operators or their Contractors. Elements of the existing utility assets within the IAB may need to be diverted, slewed, upgraded or protected as part of the construction process during the enabling works and final scheme layout.

Mitigation requirements

2.4.64 A comprehensive environmental mitigation design is in development. This is being developed as part of an iterative design process with input from technical environmental disciplines and project engineers, as well as in consultation with relevant stakeholders including the SDNPA, WCC, HCC, Environment Agency and Natural England.

2.4.65 The current proposals for the Proposed Scheme include the following environmental mitigation:

- The design seeks to integrate the Proposed Scheme into the surrounding topography, creating specific landscape forms, retaining vegetation wherever practicable and creating and planting new habitats
- Design and provision of an ecologically informed habitat compensation and enhancement package, to include habitats of ecological value which are sensitive to the local area, such as chalk grassland and woodland, seeking to maximise biodiversity outputs from the Proposed Scheme
- Ensure potential impacts to species known to use habitats within and adjacent to the M3 J9 Improvement site including otter, dormouse, and badgers are avoided or minimised through an ecologically informed design process
- Provision of a Biodiversity Mitigation Strategy (through an Environmental Masterplan) which will include measures required during construction to

avoid or minimise impacts to know receptors, including designated sites, habitats and species.

2.4.66 The current environmental mitigation and enhancement details are being developed as the design and the environmental assessment progresses, see **Figure 2.6, Appendix 2.1** for the indicative mitigation and enhancement strategy for the Proposed Scheme, and **Figure 2.7 and 2.8, Appendix 2.1** for associated sections. Where necessary, once the assessments have progressed further, other mitigation measures such as noise barriers would be incorporated into the design.

2.4.67 Mitigation measures for the construction of the Proposed Scheme will be recorded within a Register of Environmental Actions and Commitments, to form part of a first iteration Environmental Management Plan (fiEMP), which will accompany the ES.

3 Consideration of alternatives

3.1 EIA Regulations

- 3.1.1 The Infrastructure Planning (EIA) Regulations 2017 (as amended) (the EIA Regulations) require that an ES should include a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) that have been studied by the developer which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of environmental effects.
- 3.1.2 PINS Advice Note 7 (2020) identifies that PINS considers a good ES to be one that (inter alia):

“...explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment”

3.2 Historic consideration of alternatives

- 3.2.1 In 2013, Hampshire County Council (HCC) commissioned a feasibility study to examine the strategic case for initial options and estimate the expected performance of potential improvement schemes. The report proposed and assessed nine options and recommended that the option of direct free-flow links from M3 to A34 and remodelling Junction 9 would most likely ease congestion while reducing land take.
- 3.2.2 The Asset Support Contractor for the area developed three free-flow options as below:
- Option 1 – 70mph (120km/h) speed limit (A34 free-flow link below M3, but could also be considered over M3)
 - Option 2 – 50mph (80km/h) speed limit (A34 free-flow link below M3, but could also be considered over M3)
 - Option 3 – 40mph (65km/h) speed limit (A34 free-flow link below M3, but could also be considered over M3)
- 3.2.3 In December 2014, the Department for Transport published the RIS for 2015-2020. The RIS sets out the list of schemes that were to be delivered by Highways England over the period covered by the RIS (2015 to 2020).
- 3.2.4 The RIS identified improvements to M3 J9 Winnall Interchange as one of the key investments in the Strategic Road Network for the London and South East region.
- 3.2.5 Highways England developed the abovementioned three options further during PCF Stages 0 (HE551511-WSPGEN-ZZ-RP-ZM-0004) and 1

(HE551511-WSP-GEN-ZZ-RP-ZM-0003). During the strategy, shaping and prioritisation stages, Option 1 (70mph (120km/h) speed limit (A34 free-flow link below M3, but could also be considered over M3) was developed into a further alternative, Option 4. Option 4 made more use of existing infrastructure, such as retaining, rather than demolishing the Highways England depot, while delivering broadly similar journey time benefits.

3.2.6 Some options were combined for the next stage of option identification. As such, Highways England decided that the options should be renumbered to provide more clarity. As the original options were numbered 1 to 4, it was decided to renumber subsequent options Option 11 to Option 18.

3.2.7 The following options were considered during the strategy, shaping and prioritisation stages but ultimately rejected for further consideration due to land take, visual impact, cost inefficiencies and environmental issues:

- Option 12 – This option provided free-flow links between A34 and M3 with the A34 southbound link passing under the M3 with a 70mph (120km/h) design speed and a two-step relaxation on horizontal geometry. The A34 northbound link had a 70mph (120km/h) design speed.
- Option 13 – This option provided free-flow links between A34 and M3 with the A34 southbound link passing over the M3 with a 70mph (120km/h) design speed. The A34 northbound link had a 70mph (120km/h) design speed.
- Option 15 – This option provided free-flow links between A34 and M3 with the A34 southbound link passing over the M3 with an 53mph design speed and a two-step relaxation on horizontal geometry. The A34 northbound link had a 70mph (120km/h) design speed.
- Option 17 – This option provided free-flowing links with a 75 metre loop for the A34 southbound link under the M3. The A34 northbound link had a 70mph (120km/h) design speed.

3.2.8 The developing scheme was then progressed into the option identification stage. During the early part of the option identification stage, five options were short listed for further consideration:

- Option 11 – A development of Option 1 to include south-facing Junction 9 slip roads, retain Highways England depot and remove sweeping A33 southbound link to retain existing merge. This option provided free-flow links between A34 and M3 with the A34 southbound link passing under the M3 with a 70mph (120km/h) design speed. The A34 northbound link also had a 70mph (120km/h) design speed. Junction 9 was proposed to be rebuilt with a dumbbell roundabout layout.
- Option 14 – A variant of Option 4 provided free-flow links between A34 and M3 with the A34 southbound link passing under the M3, a 60mph (100km/h) design speed and a three-step relaxation on horizontal

geometry. The A34 northbound link had a 70mph (120km/h) design speed. Junction 9 was proposed to be rebuilt with a dumbbell roundabout layout.

- Option 16A – A variant of Option 4 provided incremental delivery of Option 14. This provided a free-flow for the A34 southbound with a 60mph (100km/h) design speed and a three-step relaxation on horizontal geometry. The northbound A34 was still proposed to use the existing A34 through the Junction 9 roundabout. This option was considered to facilitate potential scheme capital costs within the affordable budgets of RIS (2015- 2020). Option 16A was produced as a possible first stage of the incremental delivery of Option 14, which would then theoretically be followed by a second stage to complete the construction of a scheme comparable to Option 14.
- Option 16B – A variant of Option 4 providing incremental delivery of Option 14. This provided a free-flow for the A34 northbound, which had a 70mph(120km/h) design speed. The southbound A34 was still proposed to use the existing A34 through the Junction 9 roundabout. This option was considered to facilitate potential scheme capital costs within the affordable budgets of RIS (2015-2020). Option 16B was also produced as a possible first stage of the incremental delivery of Option 14 which would then theoretically be followed by a second stage to complete the construction of a scheme comparable to Option 14.
- Option 18 – A variant of Option 1 provided a ‘throughabout’ (a type of road junction where a major road passes through a roundabout) at M3 Junction 9 (do-minimum design) with a 40mph (70km/h) design speed. This option was developed to consider a reduced cost option of converting the current Junction 9 roundabout to a throughabout. This option was considered to facilitate potential scheme capital costs within the affordable budgets of RIS (2015-2020) and had no impact on the SDNP.

3.2.9 The developing scheme then progressed into the next stages of design, which included assessing options in more detail, referred to herein as the ‘option selection stage’ and ‘option selection assessment’. An Environmental Assessment Report (WSP, 2018d) was drafted at this stage. Options 11 and 18 were not progressed to an option selection stage. Option 11 was discounted due to its significant adverse environmental effects, high cost and a low benefit-to-cost ratio compared to other options. Option 18 was discounted as it was not compliant with the RIS’s objectives for providing free-flowing links from the A34 to the M3.

3.2.10 Highways England’s Investment Decision Committee decided that Option 14 should progress to the option selection assessment because it fully met the Proposed Scheme objectives and whilst it had similar adverse effects to the other options, it provided WCH benefits sooner. In addition, the incremental

delivery of Option 14 was progressed in the event of insufficient funds in future to deliver Option 14.

3.2.11 For the incremental delivery it was decided that Option 16B would be built first as it had a lower cost and higher benefit to cost ratio. This would be followed by a variation to Option 16A in order to complete the construction of a scheme comparable to Option 14. The variation to Option 16A was named Option 16C to distinguish from the original Option 16A as it required additional improvements such as the dumbbell roundabout and the widening of the Option 16B A34 northbound link under Junction 9 from one lane to two lanes and alteration of the diverge from a ghost island diverge for lane drop to a two lane drop.

3.2.12 In early 2018, the preferred Option 14 was taken to an options consultation. This was because there was clear evidence that Option 14 was more efficient and cost effective to build in one phase rather than the two phases of Option 16B followed by 16C. Views were sought on the preferred Option 14.

3.2.13 Feedback from the options consultation highlighted that the main concerns with the preferred option were about access from Junction 9 to the A33. These related to safety concerns with the weaving length from the A34 northbound merge, from the Junction 9 link, to the subsequent offside diverge to the A33.

3.2.14 The Preferred Route Announcement was made in July 2018 and took this option forward. It highlighted the need for further design development to be carried out to address the A34/A33 merging concerns.

3.2.15 As a result of the consultation process undertaken in 2019, further concerns were raised which resulted in the requirement to reconsider the design of the Proposed Development. Concerns related to:

- Local stakeholder perception
- Traffic capacity
- Operational safety

3.2.16 A report considering 'solutions' to the concerns raised was prepared in May 2020 (HE551511-JAC-GEN-0_00_00-RP-ZM-0014, Jacobs 2020). This report provided consideration as to how the option presented at consultation could be refined.

3.2.17 Four 'solutions' were assessed against criteria aligned with the Early Assessment and Sifting Tool (EAST):

- Solution 1 was developed with three alterations to the option consulted on in 2019. However, Solution 1 was discounted early in the assessment process because primary traffic results indicated that the solution would

not resolve the key issue identified in relation to traffic capacity (relating to insufficient capacity on the approach to the J9 roundabout and the capacity of the roundabout itself) which would be likely to impact the operational safety of the junction and result in an unsuccessful application for Development Consent.

- Solution 2 was developed with four alterations to the option consulted on in 2019, including a single two lane carriageway between M3J9 and the proposed A33 roundabout, an extension of the weaving distance between A34 southbound diverge and M3J9 southbound diverge, a proposed oval roundabout at M3J9 and a shortened M3J9 southbound diverge slip road.

The proposal for Solution 2 also included a new walking and cycling footbridge over the River Itchen, thereby taking into consideration of the NPS NN in that it addressed “*helping pedestrians and cyclists (paragraph 3.17)*”. The preferred location of the footbridge was to the east of the existing southbound A34 bridge due to the space available for construction.

It was identified that Solution 2 would support economic growth (by supporting economic growth through providing required capacity for forecast traffic flows and encouraging a safe and serviceable network). It would also encourage a freer, better flowing network whilst also reducing severance impacts and improving access for non-road users to Kings Worthy. It had the potential to encourage greater active travel whilst also encouraging access to the SDNP aligning with objective 5 of the South Downs Local Plan (“*to protect and provide opportunities for everyone to discover, enjoy, understand and value the National Park and its special qualities*”) and paragraph 5.184 of the NPS NN (PRoWs, National Trails and other rights of access to land (e.g. open access land) are important recreational facilities for walkers, cyclists and equestrians and that appropriate mitigation measures should be taken to address adverse effects and consider opportunities there may be to improve access).

- Solution 3 was developed with four alterations to the option consulted on in 2019, along with two WCH routes. Solution 3 was identified as providing the capacity required for forecast traffic flows and provide a direct free-flow connection between the A34 and M3, however, some queuing would remain. This separation of local and Strategic Road Network Traffic was considered to contribute towards improving the tranquillity of the Itchen Valley; an important aspect for the SDNP.

The solution was considered to reduce severance impacts and reduce delays compared with the option consulted on as it would provide a safer pedestrian and cycle route to and from Kings Worthy. However, the operation of the M3 northbound diverge slip road would still be substandard and there would be queuing, therefore establishing that Solution 3 would be non-compliant when compared with the overall reliability of the road network.

- Solution 4 is based on the principles of the option consulted on in 2019 with an additional change. The existing A34 northbound offside diverge to the A33 would be stopped up and a nearside diverge would be provided further north to accommodate traffic movements into Kings Worthy. A loop connector road approximately 890m in length would tie-in to Springvale Road at a priority junction. It was determined that Solution 4 did not align with scheme objectives in that it would not support economic growth (as it did not provide sufficient capacity at the J9 roundabout) nor would it provide a safe and serviceable network (while removing delays for strategic road network traffic, it would generate queues elsewhere and lead to safety concerns and increased risk of accidents affecting vulnerable groups disproportionately). Whilst providing a free-flowing connection between the A34 and M3, it would remove easy connections between the M3 and A33. Furthermore, it would not align with providing a more accessible and integrated network (as despite improving access to the SDNP and aligning with the policies identified against Solution 2, it would also reduce accessibility of surrounding villages and increased severance of local residents from local facilities). A proposed loop slip road was considered to adversely affect landscape character, could increase traffic in Kings Worthy and Headbourne Worthy (with associated potential adverse air quality and noise effects to local receptors) as well as crossing flood zones 2 and 3.

3.2.18 Accordingly, Solution 2 was considered the preferred option because it was the best performing solution overall.

3.3 Summary of on-going design work and consideration of alternatives

3.3.1 The preferred solution 2 has been subject to further refinement as more detailed information becomes available. The design development of the preferred solution will also be informed by continued consultation with affected parties, statutory bodies, community councils and other relevant interest groups.

3.3.2 An optioneering exercise was undertaken for proposed WCH routes to the east and west of the M3. Along the western extent of the M3, three walking and cycling route options were considered (note, the following walking and cycling route options 1, 2 and 3 are separate to the wider scheme options 1, 2 and 3 in **Section 2.3** above):

- Option 1 commenced at the A33/B3047 junction, running parallel to the east of the A33, requiring a new crossing of the River Itchen and then continuing along the western extent of the proposed realigned A33 and Easton Lane where it met the existing Tesco Roundabout and connected to the existing NCN 23.
- Option 2 commenced at the A33/B3047 junction, running parallel to the west of the A33, then utilising the existing A33 carriageway (proposed to be abandoned), requiring a new crossing of the River Itchen and then

merging with the A34 northbound carriageway (proposed to be abandoned) before it then met the existing Tesco Roundabout and connected to the existing NCN 23.

- Option 3 commenced at the A33/B3047 junction, running parallel to the west of the A33 routed within the existing verge, utilising the existing A33 carriageway (proposed to be abandoned), connecting to existing PRowS and using two existing subways beneath the A34 north and southbound carriageways. Option 3 then ran west of the A34 requiring two new crossings of the River Itchen, before and then merging with the A34 northbound carriageway (proposed to be abandoned) before it then met the existing Tesco Roundabout and connected to the existing NCN 23.

- 3.3.3 A scoring matrix was established against key topics (including environmental considerations) which identified Option 2 as the most favourable.
- 3.3.4 Further consideration was then provided to the crossing of the River Itchen for Option 2, resulting in a re-design of the new footbridge and adjoining path to reduce interaction with flood extents.
- 3.3.5 Subsequent to Option 2 being identified as the most favourable, a commercial review of the Proposed Scheme was undertaken which identified commercial challenges within the project. A consequence was that the scope of Option 2 was reduced to accommodate pedestrians only.
- 3.3.6 A similar exercise was undertaken in considering the upgrading of existing WCH routing from the Tesco roundabout, through the newly proposed M3J9 gyratory roundabout crossing the M3 and connecting with Easton Lane to the east of the M3.
- 3.3.7 Two WCH route alignments were considered within the newly proposed gyratory roundabout to the east of the M3 to connect with Easton Lane, while three options were considered in relation to the routing of the alignment within the gyratory roundabout to the west of the M3. The variant 'option 2A' was considered to be advantageous and will continue to be developed as the design progresses.
- 3.3.8 Design progression will remain ongoing throughout the scheme's detailed development. This will consider visibility assessments for road signs/signals which are ongoing and may introduce amendments to/additional earthworks cuttings or retaining structures. This will also consider refinement of highway design layouts relating to optimising gyratory entry/exit arrangements and maintenance access routes to off-highway elements such as drainage basins. As identified in **Section 4.6** below, ongoing EIA work will assess reasonable worst-case variations.
- 3.3.9 Furthermore, the IAB was increased in area for the 2020 scoping exercise to allow for potential areas of search for excess spoil management and areas of

consideration for temporary construction compounds. The final scheme and IAB remains subject to on-going design work and optioneering exercises.

3.3.10 The ES will provide further detail of the assessments described in this chapter as well as the comparison of the environmental effects from these alternative assessments, in accordance with the EIA Regulations.

4 Environmental impact assessment methodology

4.1 Introduction

- 4.1.1 The Proposed Scheme is classed as an NSIP under the PA 2008. Therefore, the EIA will be carried out in accordance with the Infrastructure Planning (EIA) Regulations 2017 (as amended) (the EIA Regulations), as well as guidance contained in the Design Manual for Roads and Bridges (DMRB).

4.2 Surveys and predictive techniques and methods

The Design Manual for Roads and Bridges

- 4.2.1 Guidance published by the Government for the preparation of environmental assessments of proposed road schemes is contained in the DMRB LA 104 (Highways England, 2020). This sets out both the general process and the methods for assessing individual environmental topics, to which this PEIR adheres.
- 4.2.2 DMRB LA104 (Highways England, 2020) advises on the environmental topics to be included in an EIA, and the general methods to be used in the assessment across each of those topics. The topics identified in **Section 5-15** of this PEIR are those required by DMRB LA 104 and the EIA Regulations.
- 4.2.3 Details of the methods to be used for each individual topic are provided in **Section 5-15** of this PEIR. Should any revisions to DMRB be issued between the publication of this PEIR and the publication of the ES, they will be adopted where appropriate, provided that it is reasonable to do so within the programme and governance for the Proposed Scheme.

The National Policy Statement for National Networks

- 4.2.4 Strategic roads have their own policy framework, with relevant policy objectives set out in the NPS NN (DfT, 2014). The NPS NN is framed in the context of the wider Government policies on environment, safety, technology, sustainable transport and accessibility. It provides planning guidance for promoters of NSIPs on the road network, and the basis for the examination by the Examining Authority and decisions by the Secretary of State. The Secretary of State will use the NPS NN as the primary basis for making decisions on development consent applications for national networks NSIPs in England. Given the importance of the NPS NN, the approach adopted for the EIA of the Proposed Scheme takes account of this policy document.

Scoping

- 4.2.5 The scoping process is used to determine which environmental topics should be assessed and the level of detail included in the EIA. A Scoping Report has been prepared for the Proposed Scheme, setting out the likely significant

environmental effects and the proposed approach to the assessment.
Identifying baseline conditions and sensitive receptors

- 4.2.6 An important stage in carrying out the EIA is to establish the baseline conditions. The baseline conditions are not necessarily the same as those that exist at the current time; they are the conditions that would exist in the absence of the Proposed Scheme either (a) at the time that construction is expected to start, for impacts arising from construction; or (b) at the time that the Proposed Scheme is expected to be open to traffic, for impacts arising from its operation. Therefore, the identification of the baseline conditions involves predicting changes likely to happen in the intervening period, for reasons unrelated to the Proposed Scheme. Work is currently ongoing to understand the baseline conditions. This report provides preliminary information about the baseline conditions.
- 4.2.7 The identification of sensitive receptors is closely linked to the baseline conditions. Receptors could be a physical resource, for example a water body or habitat type, or receptors could be a user group, for example, local residents or recreational users of an area. Some receptors would be more sensitive to particular environmental impacts than others or be considered more valuable.

4.3 Predicting environmental impacts

- 4.3.1 The next stage of the EIA process is to predict potential impacts that could arise as a result of the Proposed Scheme. Impacts are changes to the environment, compared with the baseline environment, attributable to the construction and operation of the Proposed Scheme, and could be adverse or beneficial, direct or indirect, temporary or permanent.
- 4.3.2 The methods of forecasting impacts vary by environmental topic, for example, the assessment of air quality and noise relies on traffic modelling. The general approach to the assessment is outlined in this document where appropriate.

4.4 Evaluating significance

- 4.4.1 The EIA process provides an evaluation of how significant these effects would be considering the sensitivity of the environmental receptor, the nature and magnitude of change (for example if it is permanent or temporary, large scale or small scale) and whether it can be mitigated through good design or construction management. It should be noted that this PEIR includes preliminary findings of assessments. An effect identified in this PEIR has been determined to be significant or otherwise if it is considered sufficient information is available to do so. If sufficient information is not available, the significance of an effect has not been stated.
- 4.4.2 Where assigned in this PEIR, and for use within the ES, the significance of effects will be determined as per DMRB LA 104 (Highways England 2020) (i.e. by taking into account the value/ sensitivity of a receptor and assessing

against the magnitude of change to determine the overall significance of effect which could be either adverse or beneficial). **Tables 4-1 to 4-4** demonstrate the overall significance of effects will be assessed using the matrix presented in DMRB LA 104.

Table 4-1: Environmental value (or sensitivity) and descriptions

Value (sensitivity) of receptor/resource	Typical description
Very high	Very high importance and rarity, international scale and very limited potential for substitution
High	High importance and rarity, national scale, and limited potential for substitution
Medium	High or medium importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale

Table 4-2: Magnitude of impact

Magnitude of impact (change)	Typical description	
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse)
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial)
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse)
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial)
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key

Magnitude of impact (change)		Typical description
		characteristics, features or elements (Adverse)
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial)

Table 4-3: Descriptors of the significance of effect categories

Significance category	Typical description
Very Large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.4.3 The significance of effect will be determined from a combination of the assessed value of the asset and the magnitude of change. Five levels of significance (very large, large, moderate, slight or neutral) are defined which apply to both adverse and beneficial impacts. A significance of effect of moderate or above is taken to be significant in EIA terms. The matrix used to report the significance of an effect is presented in **Table 4-4**. In this PEIR, the terms 'impact' and 'effect' have different meanings, with the effect referring to the environmental outcome caused by an impact.

Table 4-4: Significance matrix

Environmental value (sensitivity)	Magnitude of impact (degree of change)					
	Very High	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or large	Large or very large	Very large	
High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large	
Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large	
Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate	
Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight	

4.4.4 DMRB LA 104 recognises “*the approach to assigning significance of effect relies on reasoned argument, the professional judgement of competent experts and using effective consultation to ensure the advice and views of relevant stakeholders are taken into account*”.

4.4.5 **Table 4-4** illustrates how the DMRB describes the significance of effect categories. In arriving at the significance of effect, the assessor will also consider whether they are direct, indirect, secondary, cumulative, short, medium or long-term, permanent or temporary, positive or negative.

4.4.6 Not all of the environmental topics will use the above criteria or approach. For example, some topics do not use a matrix-based approach but instead use numerical values to identify potential impacts. Therefore, each environmental topic chapter will use the information provided above, any topic specific guidance as well as the assessor’s professional judgement to assess the significance of an effect. Where an effect could be one of two gradings (for example where a Negligible impact interacts with a Medium sensitivity receptor resulting in a Neutral or Slight significance of effect), professional judgement will be used to determine which effect is applicable and this will be explained in the associated commentary.

- 4.4.7 Effects determined to be slight or neutral are not deemed to be significant, whilst these will be reported in the ES, they will not be reported in detail and would not require specific mitigation. The exception to this is where the combination of multiple slight effects has the potential to lead to significant (i.e. moderate or above) cumulative effects.

4.5 Embedded and essential mitigation

- 4.5.1 There is a distinction between mitigation that is incorporated or ‘embedded’ into the design of the development (embedded mitigation) and mitigation that is subsequently identified in order to prevent, reduce or offset any remaining significant adverse effects (essential mitigation). Embedded mitigation may include, for example, incorporating habitat areas into the Proposed Scheme design, or incorporation of appropriate drainage attenuation.
- 4.5.2 Embedded mitigation evolves through the iterative design process and early consideration of the likely significant impacts. The ES will document the embedded mitigation measures which have been incorporated within the design in response to the identification of potentially significant effects. The ES, within each topic chapter as appropriate, will also document the essential mitigation that is required to complement the embedded mitigation.
- 4.5.3 At the time of publication of this PEIR, the scheme design is still in progress. Therefore, technical chapters of this PEIR identify the design mitigation and enhancement measures which are currently understood and accordingly provide an assessment of likely effects known at this stage.
- 4.5.4 Within the ES, assessments will assess likely significant effects based on embedded mitigation, subsequently considering identified essential mitigation to address significant effects and report the residual effect.
- 4.5.5 A summary of all mitigation measures and how they are secured, either inherently through the project design, or through the implementation of a suitable DCO requirement, will be set out in the ES.

4.6 The Rochdale Envelope

- 4.6.1 The Planning Inspectorate’s Advice Note 9: Using the ‘Rochdale Envelope’ (Advice Note 9) (Planning Inspectorate, 2018) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the PA 2008. The advice note acknowledges that there could be aspects of the Proposed Scheme design that are not yet fixed, and therefore, it could be necessary for the EIA to assess likely reasonable worst-case variations to ensure that all foreseeable significant environmental effects of the Proposed Scheme have been assessed.
- 4.6.2 Assessment findings presented in this PEIR are based on the emerging design for the Proposed Scheme. The Proposed Scheme is to be developed

further through a reference design stage which will form the basis for the DCO application.

- 4.6.3 Within the reference design there will need to be sufficient flexibility to provide scope for finalising the detailed design and construction methodology. Therefore, when presenting the Proposed Scheme design in the ES and the accompanying assessment, the requirements of Advice Note 9 will be complied with to ensure that the likely significant effects of the Proposed Scheme are assessed on a reasonable worst-case basis.

4.7 Monitoring of significant residual effects

- 4.7.1 The EIA Regulations require “*the monitoring of any significant adverse effects on the environment of proposed development*”. It is important to note that the EIA Regulations only require the monitoring of significant adverse effects. The ES will therefore ensure that it is clear to the reader which, if any, effects are both adverse and significant and may therefore require monitoring.

- 4.7.2 It is important to note that Regulation 21 (3) of the EIA Regulations states that the Planning Inspectorate should:

“(b) take steps to ensure that the type of parameters to be monitored and the duration of the monitoring are proportionate to the nature, location and size of the proposed development and the significance of its effects on the environment; and

(c) consider, in order to avoid duplication of monitoring, whether any existing monitoring arrangements carried out in accordance with an obligation under the law of any part of the United Kingdom, other than under the Directive, are more appropriate than imposing a monitoring measure.”

- 4.7.3 Schedule 4 to the EIA Regulations states that an ES should identify “*any proposed monitoring arrangements*”. The ES will therefore provide a schedule of proposed monitoring to clearly identify the monitoring that is proposed in relation to any significant adverse effects that have been identified. Any such monitoring will be proportionate, as noted above.

4.8 Reporting

- 4.8.1 The EIA for the Proposed Scheme is currently being carried out by environmental specialists. The findings of the EIA for the Proposed Scheme will be reported in the ES.
- 4.8.2 Additional assessments such as the Flood Risk Assessment, Habitats Regulations Assessment, Arboriculture Impact Assessment, the Highways Agency Water Risk Assessment Tool and Water Framework Directive Assessment will be reported alongside the Environmental Statement.

4.9 Scoped in effects

4.9.1 The effects that are proposed to be scoped into assessments in **Chapters 5-15** below will be reviewed as the scheme design progresses. In accordance with Planning Inspectorate Advice Note 7 Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (2020), in the interests of proportionality, it is intended that the ES will report potentially significant effects only.

4.10 Competent experts

4.10.1 In accordance with Regulation 14 (4)(a) of the EIA Regulations, the ES will be prepared by competent experts, with relevant details set out in the ES.

4.11 Constraints and limitations

4.11.1 Any constraints and limitations to the preliminary assessment are outlined in each topic section.

4.12 Risk of major accidents and/or disasters

4.12.1 The assessment of major accidents and disasters, hereafter referred to as “major events”, as required by the EIA Regulations should cover:

- Vulnerability of the Proposed Scheme to risks of major events
- Any consequential changes in the predicted effects of the Proposed Scheme on environmental topics.

4.12.2 In the absence of a current industry definition of major events in the context of EIA, the following definitions have been used to inform the identification of potential major events related to the Proposed Scheme.

4.12.3 The Control of Major Accidents and Hazards (COMAH) 2015 Regulations define major accidents as follows:

“Major accident means an occurrence such as a major emission, fire, or explosion ... leading to serious danger to human health or the environment;

Serious danger to human health means a risk of death, physical injury or harm

to health, e.g.: (a) a substantial number requiring medical attention; (b) some people seriously injured, requiring prolonged treatment”.

4.12.4 The United Nations Office for Disaster Risk Reduction (UNISDR, 2017) defines disaster as follows:

“A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure,

vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts”.

4.12.5 As such major accidents and disasters are very closely linked. They can be natural or man-made and could include:

- Severe weather, for example, floods, earthquakes, hurricanes, storms, drought,
- tsunamis, extremes of temperature – hot and cold
- Transport accidents, for example, rail accidents, motorway pileups, plane crash
- Industrial (for example, explosions, pollution and fire)
- Terrorism
- Disease outbreaks

4.12.6 With regards to the Proposed Scheme, the following potential major events have been identified:

- Severe weather: storms, floods
- Transport accidents: road

4.12.7 These were identified based on the site location, nature of the Proposed Scheme, likelihood of occurrence and surrounding land uses. They have also been informed by the PCF Stage 2 Ecological Assessment Report (EAR) (WSP, 2017i), the PCF Stage 2 Safety Plan and the PCF Stage 2 Health and Safety Risk Register.

4.12.8 An assessment of significance will be carried out for the major events identified for the Proposed Scheme, as shown in **Table 4-5**.

Table 4-5: Major events and associated environmental assessment topics

Major Event	Potential environmental impacts	Environmental assessment topic
Storms	Flooding High winds causing damage to environmental receptors and structures	Climate Change Road Drainage and the Water Environment
Floods	Flooding	Road Drainage and the Water Environment

Major Event	Potential environmental impacts	Environmental assessment topic
Transport accidents – road	Environmental pollution incidents, emissions to air, ground and water	Air Quality Biodiversity Geology and Soils Road Drainage and the Water Environment
Ground Instability	Unstable ground from geological units or made ground causing potential for collapsible/compressible ground or landslides.	Geology and Soils
Chalk Dissolution/Sinkholes	Subsidence	Geology and Soils

4.13 Cumulative effects

4.13.1 An explanation of the methodology and approach to the assessment of cumulative effects is provided in **Chapter 15**, including provision of the identified long and short lists for assessment.

4.13.2 It should be noted that there is a geographical relationship between the Proposed Scheme and the M3 junctions 9 to 14 Motorway Upgrade project. At this stage, it cannot be ruled out that there would not be a temporal overlap between the two developments. Accordingly, **Chapter 15** currently takes a precautionary approach, and assumes temporal overlap could exist. It is therefore considered (at this stage) that the M3 junctions 9 to 14 Motorway Upgrade project will be considered as a cumulative development (identified as ID68 in **Appendix 15.3**). As further information becomes available, the status of ID68 will be reconsidered as necessary.

5 Air Quality

5.1 Introduction

- 5.1.1 This chapter presents the preliminary findings of the assessment of likely significant effects relating to air quality arising from the construction and operation of the Proposed Scheme.
- 5.1.2 This chapter sets out the legislative policy framework, presents an overview of consultations thus far, presents the proposed assessment methodology, assumptions and limitations as well as further defining the current Air Quality study area. It also presents an overview of baseline air quality conditions, consideration of likely effects anticipated at this stage as well as identifying the scope of anticipated further assessment including how the requirement for mitigation measures will be identified.

5.2 Legislative and policy framework

- 5.2.1 Planning policies and guidance that are relevant to the Proposed Scheme include:
- National Policy Statement for National Networks (NPSNN) (DfT, 2014): Paragraph 3.8 (Emissions) and Air Quality paragraphs 5.3-5.15 (air quality), and 5.81-5.89 (dust)
 - National Planning Policy Framework (NPPF) (2019) Paragraph 8 (Achieving sustainable development), Paragraphs 102 and 103 (Promoting sustainable transport), 170 (Conserving and enhancing the natural environment), 180, 181 and 182 (Conserving and enhancing the natural environment - Ground conditions and pollution) and associated Planning Practice Guidance: Air Quality (2014)
 - Winchester District Local Plan Part 1 - Joint Core Strategy (2013): Policy CP13 (High Quality Design); Policy CP16 (Biodiversity); and Policy DS1 Development Strategy and Principles
 - Winchester District Local Plan Part 2 - Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town); Policy DM17 Site Development Principles; and Policy DM19 Development and Pollution
 - Winchester District Draft Local Plan 2018 -2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February – 12th April 2021
 - South Downs National Park Local Plan 2014 - 2033 (2019): Policy SD54: Pollution and Air Quality, Policy SD2: Ecosystem Services

5.2.2 The following regulations underpin the assessment:

- The Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002
- The Air Quality Standards Regulations 2010 (with subsequent amendments most notably in 2016 and for the devolved administrations)
- The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 which amended the AQ Standards Regulations 2010 to reflect the UK’s departure from the EU in January 2020 and came into force following the Transition Period
- The Conservation of Habitats and Species Regulations 2017 (Statutory Instrument, 2017)
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Statutory Instrument, 2019) to reflect the UK’s departure from the EU and come into force following the Transition Period
- Countryside and Rights of Way (CROW) Act 2000

5.3 Consultation

Consultation undertaken

Table 5-1: Consultation undertaken

Reference	Comment	Response
Secretary of State Scoping Opinion November 2020		
4.2.2	<i>“The Scoping Report states that DEFRA background mapping for Winchester City have been downloaded and reviewed and all concentrations of air pollution are below air quality thresholds, yet this data is not provided. Additionally, in paragraph 6.2.9 it states that for the most sensitive habitats at designated sites, the predicted background NO₂ rate is above the critical load for the River Itchen SSSI [Site of Special Scientific Interest] and SAC [Special Area of Conservation] and below for St Catherine’s Hill SSSI but these data are not presented.</i>	Now that the extents of the ‘Current Air Quality Study Area’ are more clearly defined, the Defra background maps are presented in Figures 5.5, 5.6 and 5.7, Appendix 5.1 (2020) and Figures 5.8, 5.9 and 5.10, Appendix 5.1 (2026) of this Preliminary Environmental Information Report (PEIR). Predicted background NO _x (oxides of Nitrogen) and Nitrogen deposition rates at designated sites were presented in Table 6-2 of the Scoping Report. This data has been updated for key

Reference	Comment	Response
	<i>The ES should present the data supporting baseline characterisation.”</i>	designated sites in Table 5-8 of this PEIR to reflect the ‘Current Air Quality Study Area’ and will be updated within the ES for all relevant designed sites.
4.2.3	<i>“The study area is proposed to be determined in line with The Design Manual for Roads and Bridges LA 105 Air Quality guidance; this includes defining the Affected Road Network (ARN) and identifying sensitive receptors within 200m of the ARN. The Applicant should make effort to agree the study area with the relevant consultation bodies and ensure that all roads potentially impacted by the Proposed Development, for example, as a result of road diversions or other traffic management measures, are used to determine the study area.”</i>	Under the opening year Operational scenario, the roads that exceed the Scoping Criteria defined within Design Manual for Roads and Bridges LA105 (Highways England, 2019) are presented in Figure 5.1, Appendix 5.1 of this PEIR. An initial 200m buffer from these roads has been used in relation to operational traffic, alongside a 200m buffer from the Indicative Application Boundary (IAB) to identify the overall ‘Current Air Quality Study Area’. Representative sensitive receptors within this area will be identified through consultation with relevant consultees. This extent of this Study Area is subject to change as further information relating to traffic flows during both construction (both construction traffic and diverted traffic due to either road closures or congestion) and operation becomes available.
4.2.4	<i>“Scoping Report paragraphs 6.2.8 to 6.2.9 present a baseline of NO_x and NO₂ concentrations for designated sites but not for PM_{2.5} or PM₁₀. No reasoning is provided for this omission. The ES should characterise all baseline pollutants and assess their effects on receptors where they have potential to cause significant effects or explain why this is not necessary/achievable.”</i>	Only NO _x and nitrogen deposition are reported at designated sites as these are the only relevant pollutants from road traffic that have been identified (by Natural England and others) as potentially having adverse effects. It is not relevant to assess Particulate Matter (PM ₁₀ or PM _{2.5}) concentrations at designated ecological sites as they have no known sensitivity to these pollutants.

Reference	Comment	Response
4.2.5	<i>“The data presented in Table 6.3 displays NO₂ concentrations at monitored locations during 2013, 2014, 2016 however, the NO₂ is presented as one figure rather than for each year. The ES should be clear in its presentation of baseline data as to what is being represented, for example, if it is an average of the three years or the worst-case figure etc.”</i>	<p>The data presented in the Scoping Report represented all available monitoring data collected by the Applicant and nearby Local Authorities to characterise the baseline air quality environment.</p> <p>The Environmental Statement (ES) will only apply data collected over a period of at least 12-months (to allow calculation of an annual average) to provide confidence that the data is reliable</p>
4.2.6	<i>“Scoping Report Table 6.6 and 6.7 present criteria used to determine the construction dust risk of the Proposed Development which is dependent on the scale of the proposed scheme and the distance of receptors to the construction activities. This risk level will then be used to inform the appropriate level of mitigation required. The ES should explain how these criteria will be applied to the Proposed Development and how the worst-case scenario will be assessed in terms of construction dust impacts. This may include consideration of the duration, timing, location and plant machinery used for construction.”</i>	<p>This will be undertaken through ongoing Environmental Impact Assessment (EIA) work as more detailed construction information becomes available and will be reported in the ES.</p> <p>In accordance with the methodology described in DMRB LA105, (Highways England, 2019), the ‘dust risk magnitude’ and proximity to sensitive receptors is used to determine the required mitigation, which will be reported in the first iteration Environmental Management Plan (fiEMP).</p>
4.2.7	<i>“Scoping Report paragraph 6.3.3 states that during operation, the Proposed Development will cause impacts from PM₁₀, NO₂ and NO_x emissions but there is no explanation as to why PM_{2.5} will not cause impacts. The ES should include an assessment of all potential emissions as a result of the Proposed Development or provide justification as to why no assessment is required.”</i>	<p>As stated in DMRB LA105 (Highways England, 2019) paragraph 2.21.2 to 2.21.4, modelling of PM₁₀ or PM_{2.5} in relation to human receptors is considered to offer little insight as to potential compliance with air quality thresholds where current baseline levels comply with legal requirements (as in the case in the Study Area) and the modelling of PM₁₀ can be used to demonstrate that the Proposed</p>

Reference	Comment	Response
		Scheme does not impact on the PM _{2.5} air quality thresholds.
4.2.8	<i>“Where criteria are used to determine significant effects, the Applicant should ensure that the definition is clear. In Table 6.9, whilst the figures are only guideline bands, the number of receptors cross from one definition to another, for example, if there were 10 receptors with worsening air quality objectives, it remains unclear whether they would be allocated a large or medium magnitude of change as 10 is in both categories. Whilst this is in line with DMRB guidance, the ES should justify the category allocated where there is overlap.”</i>	This is as stated in DMRB LA105 (Highways England, 2019), Table 2.92N. To clarify, the worst-case banding will be applied when judging air quality significance effects.
4.2.9	<i>“To ensure the most appropriate mitigation measures are proposed/employed to reduce any potential significant effects, the Applicant should consult with and agree upon such measures with the relevant consultation bodies.”</i>	Where potential significant effects are identified, required mitigation will be defined in consultation with the relevant consultation bodies.
4.2.10	<i>“Scoping Report paragraph 6.3.2 states that traffic management measures during the construction period could lead to impacts on local air quality, yet this is contradicted in paragraph 6.5.1 where it states impacts on local air quality are not anticipated. Based on these contradictory statements in relation to anticipated effects from changes in Air Quality. The Inspectorate considers that the ES should be consistent in presenting the effects.”</i>	It is not considered that these paragraphs of the Scoping Report are contradictory as paragraph 6.3.2 only acknowledges the potential for ‘impacts’ during construction resulting from traffic management measures (as highlighted as a concern by consultees), whereas paragraph 6.5.1 states that significant effects are not expected. The ES will report both predicted impacts and any resultant effects in a consistent manner as per the stated methodology.
<i>Other consultation undertaken</i>		

Reference	Comment	Response
19 th November 2020	<p>Hampshire County Council in response to the Scoping Opinion request stated:</p> <p><i>“It is recommended that the scope of the EIA is expanded to include an assessment of the proposal on traffic flows on the local highway network. It is expected that the congestion relief resulting from the proposal will influence route choice and therefore traffic flows on particular routes. The EIA will need to consider the impact this has on Air Quality and Noise issues, and any severance resulting from changes to traffic flows on particular routes.”</i></p>	<p>The ES will include the assessment of changes to traffic flows on the wider highway network (as defined by the Traffic Reliability Area) and resulting changes in air quality as per the stated DMRB LA105 (Highways England, 2019) methodology and will be defined as the ‘Affected Road Network’.</p>
9 th November 2020	<p>Natural England in response to the Scoping Opinion request highlighted that the impacts of emissions to designated ecological sites is required.</p>	<p>Ongoing EIA work will include the assessment of the impacts of emissions from traffic on designated habitats as per the stated DMRB LA105 (Highways England, 2019) methodology. This will be reported in the ES.</p>
18 th November 2020	<p>Public Health England in response to the Scoping Opinion request stated that the effects of air pollutants on health should be considered.</p>	<p>The ES will consider the effect on health resulting from air pollutants in the Population & Human Health Chapter.</p>
19 th November 2020	<p>South Downs National Park Authority in response to the Scoping Opinion request reiterated that the air quality assessment should consider the impact from removal of existing vegetation.</p>	<p>The Air Quality assessment will qualitatively consider how vegetation (removed, existing, retained and proposed) during both the construction and operational stages could mitigate particulate matter release.</p>
undated	<p>Winchester City Council (WCC) in response to the Scoping Opinion request highlighted concerns relating to the impact of traffic management during construction resulting in increased traffic flows through the city centre and Air Quality Management Areas</p>	<p>The extent to which traffic management during construction could result in increased traffic through Winchester City centre will be assessed through ongoing traffic modelling and reported in ES. Where appropriate (depending on duration and magnitude of the</p>

Reference	Comment	Response
	(AQMA) during the construction period. They also stated they would welcome the consideration of PM _{2.5} as a pollutant and their 'Air Quality SPD' (in preparation).	changes) the impact of these altered traffic flows on air quality would be assessed in accordance with DMRB LA105, (Highways England, 2019). PM ₁₀ will be used to demonstrate that the Proposed Scheme does not impact on the PM _{2.5} air quality thresholds and the requirements of the Supplementary Planning Documents (SPD) considered where appropriate.
17 th November 2020	Eastleigh Borough Council (EBC) in response to the Scoping Opinion request requested that they are keen to ensure that the study area encompasses all relevant receptors likely to be affected and includes impacts from traffic management measures during construction.	Further clarification of the likely Air Quality study area (for operational effects) is included within this PEIR to allow definition of appropriate receptor locations and EBC input to this is welcomed. The extent to which traffic management during construction would result in increased traffic through Eastleigh will be assessed through ongoing traffic modelling, to be reported in the ES. Where appropriate (depending on duration and magnitude of the changes) the impact of these altered traffic flows on air quality would be assessed in accordance with DMRB LA105, (Highways England, 2019).

Proposed consultation

5.3.1 Following clarification of the 'Air Quality study area' and affected roads, consultation with the Environmental Health department of the relevant local authorities (primarily WCC and EBC although others with affected roads will be consulted) will be undertaken to inform the identification of representative receptor locations and the location and sensitivity of locally designated ecological sites. The outcome of this consultation will continue to inform ongoing EIA work, which will be reported in the ES.

5.4 Assessment methodology and significance criteria

5.4.1 The assessment (to be reported in the ES) will be undertaken in accordance with the DMRB LA105 Air Quality (Highways England, 2019). Given the

nature of the Proposed Scheme, a ‘detailed assessment’ will be undertaken in accordance with the criteria presented in table 2.11a and 2.11b of LA105, as described in the following sections.

Relevant thresholds

5.4.2 The relevant air quality thresholds for human receptors, which will be used in the assessment, are shown in **Table 5-2**.

Table 5-2: Relevant Air Quality Objectives

Pollutant	Time Period	Objectives	Source
NO ₂ (Nitrogen Dioxide)	1-hour mean	200 microgram per cubic meter (µg/m ³) not to be exceeded more than 18 times a year	National Air Quality Objective (NAQO) and the relevant limit value
	Annual mean	40 µg/m ³	NAQO and the relevant limit value
PM ₁₀	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	NAQO and the relevant limit value
	Annual mean	40 µg/m ³	NAQO and the relevant limit value
PM _{2.5}	Annual mean	25 µg/m ³	NAQO and the relevant limit value

5.4.3 For designated sites, the impacts of NO_x will be compared to the critical level of 30 µg/m³ and site-specific critical loads for nitrogen deposition.

5.4.4 As per paragraph 2.21.4 of DMRB LA105 (Highways England, 2019), as the UK currently meets the legal requirements for the PM_{2.5} air quality thresholds, the PM₁₀ modelling will be used to demonstrate that the Proposed Scheme will not adversely affect compliance with the PM_{2.5} air quality threshold.

Baseline air quality

5.4.5 Baseline air quality will be assessed (and reported in the ES) with reference to a review of the following data sources:

- Local Air Quality Management (LAQM) published reports, primarily those by WCC and EBC
- Defra background mapping
- National modelling undertaken by Defra using the Pollution Climate Mapping (PCM) model

- Nitrogen deposition background modelling provided by the online Air Pollution Information System (APIS) for designated habitats.

5.4.6 Trends in future baseline air quality will reflect Defra predictions as to the change in vehicle fleet (i.e. electric vehicle uptake).

Construction dust

5.4.7 During construction, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive receptors within the current Air Quality study area; the main potential impacts are loss of amenity (as a result of dust soiling) dust annoyance and locally elevated concentrations of PM₁₀.

5.4.8 **Table 5-3** below will be followed to determine the ‘dust risk potential’ of the Proposed Scheme.

Table 5-3: Construction dust risk potential (as per DMRB LA105)

Risk	Examples of the Types of Project
Large	Large smart motorway projects, bypass and major motorway junction improvements.
Small	Junction congestion relief project i.e. small junction improvements, signalling changes. Short smart motorway projects.

5.4.9 **Table 5-4** below will be applied to determine the sensitivity of the receiving environment to construction dust.

Table 5-4: Receiving environment sensitivity to construction dust (as per DMRB LA105)

Construction Dust Risk Potential	Distance from construction activities		
	0-50 m	50 – 100 m	100 – 200 m
Large	High	High	Low
Small	High	Low	Low

5.4.10 This 'construction dust risk potential' will then be used, in ongoing EIA work, to inform the best practice mitigation measures in the first iteration Environmental Management Plan (fiEMP) (which will be submitted to accompany the application for development consent) depending on whether the Proposed Scheme has a high or low dust risk potential. These mitigation measures will seek to suppress the dust generation rate and also mitigate its dispersion and maximise the use of existing vegetation barriers where practicable.

Road vehicle emissions assessment

Identification of Affected Road Network

5.4.11 The screening criteria for defining the affected roads (during either construction or operational phases) are set out in DMRB LA105 Air Quality (Highways England, 2019), and identifies the following criteria when comparing the Do-Something scenario (with the Proposed Scheme) and the Do-Minimum scenario (without the Proposed Scheme) in the opening year (2026):

- Annual average daily traffic (Annual Average Daily Traffic (AADT)) ≥ 1000 (increase or decrease)
- Heavy duty vehicle (HDV) AADT ≥ 200 (increase or decrease)
- A change in speed band
- A change in carriageway alignment by $\geq 5\text{m}$

5.4.12 Roads that exceed one or more of the above the criteria will be classed as 'affected' and along with all other roads included in the traffic model within 200m, will constitute the Affected Road Network (ARN).

5.4.13 A proportionate number of sensitive receptors will be identified (and agreement as to their location will be sought with relevant consultees) within 200m of the ARN and include residential properties, schools and hospitals, which will be used for the assessment of annual mean air quality thresholds. Representative sensitive receptors will be chosen to reflect locations with the highest pollutant concentrations, or which are anticipated to experience the highest level of change in pollutant concentrations. Additional sensitive receptors (where deemed necessary) will be chosen to include all sensitive receptors which show an exceedance within the Do-Minimum or Do-Something scenarios.

5.4.14 All designated habitats (with features sensitive to air pollution) within 200m of the ARN will be included as receptors and impacts modelled at 10m spacing along a 200m long transect.

Prediction of impacts

5.4.15 The local air quality assessment of operational traffic emissions in the ES will consider the following scenarios:

- Baseline (2015)
- Projected base year (2015 traffic data with 2026 background concentrations and vehicle emissions to inform the 'gap analysis' of uncertainty in future decrease in NO_x emission from vehicle exhausts)
- Opening Year (2026) Do-Minimum
- Opening Year (2026) Do-Something

5.4.16 It is not considered necessary to also quantify air quality impacts at the design year of 2046 as the decrease in pollutant emissions (from traffic and other sources) in the interim period results in 2026 representing the worst case due to higher background concentrations and emissions.

5.4.17 The traffic model will be used to provide predictions of traffic flows, the proportion of HDV and speed bandings for differing time periods (AM peak, PM peak, inter-peak and overnight) for each of these scenarios.

5.4.18 This data will be used to calculate emissions of NO_x and PM₁₀ from each link of the ARN in accordance with LA105 (Highways England, 2019).

5.4.19 Concentrations of pollutants (NO_x, PM₁₀) due to the vehicle emissions from the ARN will then be predicted at identified sensitive receptor locations using the ADMS-Roads dispersion model with appropriate meteorological data.

5.4.20 The predicted road contribution of air pollutants will be compared to local air quality monitoring results to derive appropriate verification factors, which are then applied to the modelled concentrations to benchmark the model in accordance with Defra TG16 guidance.

5.4.21 The verified road contribution of modelled pollutants will then be combined with appropriate background pollutant concentrations to determine the overall pollutant concentration at each sensitive receptor.

5.4.22 For designated habitats located within 200m of the ARN, the annual average NO_x concentration and resultant nitrogen deposition rate will be determined in accordance with LA105 (Highways England, 2019) and combined with background concentrations and deposition rates. The Air Quality chapter of the ES will report the findings of the modelling, with the Biodiversity chapter of the ES reporting the assessment of significance to designated ecological habitats.

5.4.23 A compliance risk assessment (in relation to 'limit values') will be prepared and will involve the identification of any qualifying features, which include

areas of public access (i.e. footpaths) and sensitive receptors (e.g. residential properties, schools, hospitals) that are located within 15m of the running lane or kerb (but not within 25m of a junction) of PCM model roads that are encompassed by the ARN. Where such qualifying features are identified, the air quality model will be used to predict annual average NO₂ concentrations for the nearest qualifying feature and at a location 4m from the running lane (in the direction of the qualifying feature) for comparison against the national PCM modelled point. The outcome of this modelling will be used to identify if the Proposed Scheme will affect the reported ability of the zone to comply with the Air Quality Regulations.

Significance of effects

5.4.24 The assessment of the significance of the effects of road traffic emissions on local air quality, and compliance with the Air Quality Regulations will be undertaken in accordance with DMRB LA105 (Highways England, 2019).

5.4.25 A conclusion of no likely significant effect on air quality will be recorded where the:

- Outcomes of the air quality modelling for sensitive receptors indicate that all concentrations are less than the air quality thresholds and/or
- difference in concentrations is imperceptible, for example less than 1% of the air quality thresholds (0.4 µg/m³)

5.4.26 Where changes are greater than 1% of the air quality thresholds, then each sensitive receptor will be assigned to the categories as shown in **Table 5-5**.

Table 5-5: Information for judgement of significant air quality effects of a project (as per DMRB LA105)

Magnitude of change in annual mean NO ₂ or PM ₁₀ (µg/ m ³)	Total number of receptors with:	
	Worsening of an air quality at sensitive receptor above the air quality thresholds or the creation of a new exceedance	Improvement of an air quality at sensitive receptor above the air quality thresholds or the removal of an existing exceedance
Large (>4)	To be populated upon completion of assessment	To be populated upon completion of assessment
Medium (>2)	To be populated upon completion of assessment	To be populated upon completion of assessment
Small (>0.4)	To be populated upon completion of assessment	To be populated upon completion of assessment
Total Change	Sum of above	Sum of above

5.4.27 **Table 5-6** shows the framework for how the number of sensitive receptors in each 'magnitude of change' category are used to identify potential significant air quality effects.

Table 5-6: Guideline band for the number of properties informing a judgement of significant air quality effects (as per DMRB LA105)

Magnitude of change in annual mean NO ₂ or PM ₁₀ (µg/m ³)	Total number of receptors with:	
	Worsening of an air quality objective already above the objective or the creation of a new exceedance	Improvement of an air quality objective already above the objective or the removal of an existing exceedance
Large (>4)	1 to 10	1 to 10
Medium (>2)	10 to 30	10 to 30
Small (>0.4)	30 to 60	30 to 60

5.4.28 Where the total number of receptors in each category are less than the lower extent of the guideline band for all six magnitude of change categories, the project is unlikely to trigger a significant air quality effect for human health.

5.4.29 Where the total number of receptors in each category are greater than the upper extent of the guideline band in any category, the project is considered to trigger a significant air quality effect for human health.

5.4.30 Where the number of properties resides between the lower and upper guideline bands for any of the magnitude of change criteria, the following factors will be applied to determine if the impacts trigger a significant air quality effect for human health:

- the absolute concentration at each receptor
- how many receptors are there in each of the magnitude of change criteria i.e. does the project create more worsening than improvements
- the magnitude of change in concentration at each receptor

5.4.31 The ES chapter will consider the predicted concentrations at PCM links and where exceedances of the Limit value are predicted, and scheme contributions exceed $0.4\mu\text{g}/\text{m}^3$ to identify whether the scheme represents a risk of the report date of compliance with the Air Quality Regulations.

5.4.32 The assessment of significant effects on designated habitats will be undertaken by the competent expert, reported in **Chapter 8 Biodiversity** of the ES drawing on the modelled air quality results.

5.4.33 The assessment of significant effects on health will be undertaken by the competent expert in human health **Chapter 12 Population and Human Health** of the ES drawing on the modelled air quality results where there is the potential for an impact to health determinators (such as particulate matter and nitrogen dioxide).

Mitigation

5.4.34 Where the Proposed Scheme is deemed to trigger a significant adverse air quality effect (see **Table 5-6**) or a risk to the reported date of-compliance with the Air Quality Regulations, a Project Air Quality Action Plan (PAQAP) will be produced setting out the appropriate measures that mitigate any significant adverse air quality effects of the Proposed Scheme.

5.5 Assessment assumptions and limitations

5.5.1 The information presented in this chapter is based on the information available at the time of writing the report and based on emerging design. The findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process.

5.5.2 The key inputs to the air quality assessment will be sourced from the traffic model in terms of vehicle flow rates for differing time periods, percentage HDV and speed (and speed band) for each link within the traffic model

domain. This data will then be used to generate pollutant emission profile for each link within the ARN by applying Highways England's Speed Band Emission Factors which are derived from Defra's Emission Factor Toolkit.

- 5.5.3 An atmospheric dispersion model will then be applied to calculate the dispersion of these emissions and the impact at receptor locations using historical meteorological data.
- 5.5.4 As with any study that seeks to predict future conditions, there is inherent uncertainty in the predictions made. The estimates produced, while appropriately representing the complex factors involved, are subject to uncertainty and verification of model prediction against local monitored concentrations of air pollutants is applied to mitigate this.
- 5.5.5 In future years, one such uncertainty relates to the projection of vehicle emissions and in particular, the rate at which emissions of NO_x from vehicle exhaust will decrease over time. The guidance set out in LA 105 (Highways England, 2019) advises on how to take account of recent trends on roadside pollution concentrations and evidence on future vehicle emissions by consideration of a projected base year and derivation of a 'gap factor' to uplift modelled NO₂ concentrations to ensure a robust assessment of potential local air quality impacts.

5.6 Study area

Assessment of dust

- 5.6.1 The current Air Quality study area for the assessment of construction dust has been defined as up to 200m from the IAB as shown in **Figure 5.3, Appendix 5.1** and will be refined as more details as to the construction activities become available through ongoing design and EIA work.

Assessment of operational traffic emissions

- 5.6.2 The preliminary predicted traffic model flows have been analysed to identify roads exceeding the DMRB LA105 (Highways England, 2019) initial criteria and a 200m buffer from these 'affected roads' used to define the current air quality study area as presented in **Figure 5.1, Appendix 5.1**.
- 5.6.3 The 'affected roads' (see **Figure 5.1, Appendix 5.1**) extend along the A34 to Newbury in the North, several roads within Winchester, the M3 south to Junction 14 and the A272 east. As shown in **Figure 2.5, Appendix 2.1** (where roads with decreased traffic flows are coloured blue), it is important to note that a majority of roads considered by the traffic model within Winchester experience a decrease in traffic flows as a result of the Proposed Scheme.
- 5.6.4 All of the roads that exceed the initial DMRB criteria as well as adjoining roads within 200m will be defined as the ARN.

- 5.6.5 A proportionate number of representative sensitive receptors will be identified within 200 m of this ARN to include residential properties, schools and hospitals. Representative sensitive receptors will be chosen to ensure that the receptors with the highest pollutant concentrations or which are anticipated to experience the highest level of change in pollutant concentrations.
- 5.6.6 In relation to designated habitats, St Catherine's Hill Site of Special Scientific Interest (SSSI), River Itchen SSSI /Special Area of Conservation (SAC), River Test SSSI, Cheesefoot Head SSSI, River Kennet SSSI, Highclere Park SSSI, Burghclere Beacon SSSI and Kennet & Lambourn Floodplain SSSI/SAC have been identified as the key designated habitats (as a result of their level of protection) located within the current Air Quality study area.
- 5.6.7 There are also in excess of 50 areas of Ancient Woodland within the current Air Quality study area and the location of Local Wildlife Sites will be reviewed to identify those within the current Air Quality study area to inform the ES.

5.7 Baseline conditions

- 5.7.1 The baseline conditions, including the local monitoring data, AQMAs and 2021 PCM results are presented within **Figure 5.2 and Figure 5.4, Appendix 5.1.**

Local air quality monitoring

- 5.7.2 WCC and EBC monitoring locations within approximately 1km of the current Air Quality study area are shown in **Table 5-7, Figure 5.2, Appendix 5.1.** There are no monitoring locations within 1km of the current Air Quality study area in West Berkshire Council or Basingstoke and Deane District Council. The monitoring data from Test Valley District Council will be reviewed within the ES following clarification of their location.
- 5.7.3 In previous years exceedances of the air quality threshold for annual mean NO₂ were measured at several locations. However, reflecting trends in reducing concentrations, in 2019, one exceedance of the air quality threshold for annual mean NO₂ was measured within Winchester Town Centre AQMA at the 'Site 23' on Romsey Road; this is outside of the current Air Quality study area.

Table 5-7: Local authority monitoring (2015 -2019) within 1km of the current Air Quality study area of annual mean nitrogen dioxide concentrations ($\mu\text{g}/\text{m}^3$)

Exceedances of air quality thresholds for Nitrogen Dioxide ($40 \mu\text{g}/\text{m}^3$) are shown in bold.

Site ID	Local Authority	X (m)	Y (m)	Type	In AQMA?	2015	2016	2017	2018	2019
Continuous Monitoring										
St George's Street	Winchester	448062	129537	Roadside	YES (Winchester Town Centre)	-	-	38.5	41.0	37.0
Chesil Street	Winchester	448664	129257	Roadside	YES (Winchester Town Centre)	-	-	29.7	30.0	28.0
Romsey Road	Winchester	447544	129543	Roadside	YES (Winchester Town Centre)	-	-	-	-	32.0
Passive (Diffusion Tube) Monitoring										
ES2	Winchester	443959	119673	Urban Background	NO	-	29.3	27.0	28.5	26.1
LRPR	Winchester	444864	119174	Roadside	YES (Eastleigh No.1 A335)	30.2	32.4	31.9	32.9	31.6
OX	Winchester	444543	120187	Urban Background	NO	19.9	22.0	20.8	20.1	18.6
HG	Eastleigh	445347	120367	Urban Background	NO	18.8	20.6	19.2	19.0	17.1
WA	Eastleigh	444483	119443	Roadside	NO	34.1	35.9	34.0	35.0	31.5

Site ID	Local Authority	X (m)	Y (m)	Type	In AQMA?	2015	2016	2017	2018	2019
SC	Eastleigh	443959	119673	Urban Background	NO	26.6	-	-	-	-
SCA	Eastleigh	443959	119673	Urban Background	NO	-	25.8	23.3	24.1	22.6
SCB	Eastleigh	443959	119673	Urban Background	NO	-	25.2	23.4	25.7	23.0
SCC	Eastleigh	443959	119673	Urban Background	NO	-	26.0	22.9	25.4	22.5
BEL	Eastleigh	443778	119303	Urban Background	YES (Eastleigh No.2 M3)	24.7	26.5	23.5	26.0	24.4
LR13	Eastleigh	443842	119526	Roadside	YES (Eastleigh No.1 A335)	38.0	43.6	41.3	41.4	39.0
MC	Eastleigh	444239	120060	Urban Background	YES (Eastleigh No.2 M3)	24.7	27.6	25.5	26.4	24.4
PC	Eastleigh	444656	120775	Urban Background	YES (Eastleigh No.2 M3)	25.5	-	-	-	-
PCA	Eastleigh	444656	120775	Urban Background	YES (Eastleigh No.2 M3)	-	27.5	25.7	27.7	24.0
PCB	Eastleigh	444656	120775	Urban Background	YES (Eastleigh No.2 M3)	-	30.1	24.9	27.7	-
NH	Eastleigh	445121	122183	Urban Background	NO	23.7	28.4	22.3	26.0	26.0
CC	Eastleigh	443054	118962	Roadside	NO	26.5	29.9	29.4	28.2	28.0

Site ID	Local Authority	X (m)	Y (m)	Type	In AQMA?	2015	2016	2017	2018	2019
SSQ	Eastleigh	443483	118612	Urban Background	YES (Eastleigh No.2 M3)	26.6	30.4	29.2	28.2	24.3
DD	Eastleigh	443559	118751	Urban Background	YES (Eastleigh No.2 M3)	31.0	-	-	-	-
DDA	Eastleigh	443559	118751	Urban Background	YES (Eastleigh No.2 M3)	-	33.9	31.5	31.2	25.7
DDB	Eastleigh	443559	118751	Urban Background	YES (Eastleigh No.2 M3)	-	33.3	31.0	29.8	26.4
DDC	Eastleigh	443559	118751	Urban Background	YES (Eastleigh No.2 M3)	-	34.8	26.3	-	-
PA	Eastleigh	444340	118696	Roadside	NO	-	31.5	27.5	30.0	26.1
Site 1 (City Study)	Winchester	448563	129391	Roadside	YES (Winchester Town Centre AQMA)	37.6	36.8	30.9	28.9	27.9
Site 2 (City Study)	Winchester	448566	129560	Roadside	YES (Winchester Town Centre AQMA)	31.5	30.0	27.5	26.2	24.6
Site 3 (City Study)	Winchester	448426	129523	Roadside	YES (Winchester Town Centre AQMA)	25.9	26.9	23.9	23.8	22.2
Site 4 (City Study)	Winchester	448227	129504	Roadside	YES (Winchester Town Centre AQMA)	37.6	37.1	33.0	30.6	27.9
Site 5 (City Study)	Winchester	448666	129258	Roadside	YES (Winchester Town Centre AQMA)	38.2	37.2	32.1	29.8	28.4
Site 6 (City Study)	Winchester	448666	129258	Roadside	YES (Winchester Town Centre AQMA)	38.2	38.6	31.7	30.8	28.4
Site 7 (City Study)	Winchester	448666	129258	Roadside	YES (Winchester Town Centre AQMA)	38.2	37.7	31.9	30.6	29.0

Site ID	Local Authority	X (m)	Y (m)	Type	In AQMA?	2015	2016	2017	2018	2019
					Centre AQMA)					
Site 8 (City Study)	Winchester	448106	129541	Roadside	YES (Winchester Town Centre AQMA)	50.2	49.8	46.8	39.5	39.3
Site 9 (City Study)	Winchester	448163	129512	Roadside	YES (Winchester Town Centre AQMA)	52.6	48.9	46.5	41.4	38.5
Site 10 (City Study)	Winchester	448046	129692	Roadside	YES (Winchester Town Centre AQMA)	40.6	41.7	38.7	35.9	31.0
Site 11 (City Study)	Winchester	447918	129413	Roadside	YES (Winchester Town Centre AQMA)	37.7	37.0	31.6	28.8	28.3
Site 12 (City Study)	Winchester	447804	129741	Roadside	YES (Winchester Town Centre AQMA)	33.9	37.3	28.0	29.0	29.0
Site 13 (City Study)	Winchester	447963	129875	Roadside	YES (Winchester Town Centre AQMA)	36.7	33.8	31.6	28.8	28.2
Site 14 (City Study)	Winchester	448297	129789	Roadside	YES (Winchester Town Centre AQMA)	30.0	29.7	28.2	25.7	24.1
Site 15 (City Study)	Winchester	448842	129820	Roadside	YES (Winchester Town Centre AQMA)	30.5	31.5	29.8	26.1	23.4
Site 16 (City Study)	Winchester	449563	129439	Other	NO	37.0	38.4	33.0	34.6	30.0
Site 17 (City Study)	Winchester	448679	129068	Roadside	YES (Winchester Town Centre AQMA)	36.4	39.9	37.6	34.7	35.3
Site 18 (City Study)	Winchester	447534	130006	Roadside	YES (Winchester Town Centre AQMA)	21.2	24.8	23.7	20.0	18.7
Site 19 (City Study)	Winchester	448092	130411	Roadside	YES (Winchester Town Centre AQMA)	24.2	22.8	20.0	23.3	20.8

Site ID	Local Authority	X (m)	Y (m)	Type	In AQMA?	2015	2016	2017	2018	2019
Site 20 (City Study)	Winchester	448092	130411	Roadside	YES (Winchester Town Centre AQMA)	24.2	23.8	22.2	23.8	21.0
Site 21 (City Study)	Winchester	448092	130411	Roadside	YES (Winchester Town Centre AQMA)	24.2	22.9	20.4	23.7	21.6
Site 22 (City Study)	Winchester	447842	129050	Roadside	YES (Winchester Town Centre AQMA)	35.3	33.4	32.5	19.3	20.2
Site 23 (City Study)	Winchester	447495	129511	Roadside	YES (Winchester Town Centre AQMA)	48.8	56.6	50.8	47.6	46.5
Site 24 (City Study)	Winchester	447898	130065	Roadside	YES (Winchester Town Centre AQMA)	33.5	32.9	32.4	30.6	26.5
Site 25 (City Study)	Winchester	448427	129401	Roadside	YES (Winchester Town Centre AQMA)	33.7	30.4	28.0	22.7	21.7
Site 2 (District Study)	Winchester	446680	124644	Other	NO	28.5	29.4	27.1	25.2	22.2
Site 3 (District Study)	Winchester	449647	132669	Roadside	NO	-	-	56	40.5	34.6
Site 9 (District Study)	Winchester	445700	124877	Other	NO	-	-	-	12.3	-
Mill Lane	Winchester	449752	132674	Roadside	NO	-	-	-	20.0	15.4
Kingsworthy Cottage	Winchester	449650	132673	Roadside	NO	-	-	-	22.9	19.1
Old School House	Winchester			Roadside	NO	-	-	-	20.7	18.2

Defra pollution climate mapping

- 5.7.4 The Pollution Climatic Mapping (PCM) model is used by Defra (in combination with monitoring data) for the assessment of compliance with Air Quality Regulations limit values.
- 5.7.5 PCM data for 2021 are available from Defra's UK-Air website (Defra, 2020). The M3 within 2 km of the IAB is not currently identified by Defra as a PCM link and there are no roadside exceedances predicted by the Defra PCM within the current Air Quality study area from 2021 as shown on **Figure 5.4, Appendix 5.1**.
- 5.7.6 The data indicates maximum roadside annual mean NO₂ concentrations in the current Air Quality study area (on the M27 J14 [Census Id 568145]) **Figure 5.4, Appendix 5.1** is 35.07 µg/m³, which is below the limit value.

Defra background mapping

- 5.7.7 Background pollutant concentrations for the assessment from the mapped data provided by Defra on a 1km x 1km grid covering the UK in 2020 for NO₂, PM₁₀ and PM_{2.5} are presented in **Figures 5-5, 5-6 and 5-7, Appendix 5.1** and 2026 in **Figures 5-8, 5-9 and 5-10**. (Defra, 2020a).
- 5.7.8 Concentrations of NO₂, Particulate Matter (PM₁₀ and PM_{2.5}) within the current Air Quality study area are below the air quality thresholds.

Designated habitats

- 5.7.9 **Table 5-8** presents the APIS modelled annual NO_x background concentration (highest across the designated habitat) and background nitrogen deposition rate and relevant critical load for the most sensitive habitats across the identified key designated habitats within the current Air Quality study area (excluding ancient woodland and local wildlife sites that will be considered in the ES).
- 5.7.10 The predicted background annual average concentrations of NO_x at these key designated habitats are below the critical level (of 30µg/m³) at all receptors except St Catherine's Hill SSSI.
- 5.7.11 The predicted background nitrogen deposition rate at these key designated habitats is below the upper critical load for the sensitive habitat within St Catherine's Hill SSSI, River Itchen SSSI and SAC, River Test SSSI and Kennet and Lambourn Floodplain SSSI and SAC, but above within the Highclere Park SSSI and Burghclere Beacon SSSI.

Table 5-8: Background NO_x and nitrogen deposition rates for key designated habitats

Exceedances of relevant air quality thresholds are shown in bold.

Site	General Habitat type	Critical load range (kgN/ha/yr)	Background deposition (kgN/ha/yr)	Critical level (µg/m ³)	Background NO _x (µg/m ³)
St Catherine's Hill SSSI	Sub-Atlantic semi-dry calcareous grassland	15-25	18.6	30	30.8
River Itchen SSSI, SAC	Fen marsh and swamp	15-30	28.6	30	21.3
River Test SSSI	Fen marsh and swamp	15-30	29.4	30	15.74
Kennet and Lambourn Floodplain SSSI, SAC	Fen marsh and swamp	20-30	17.22	30	15.77
Highclere Park SSSI	Woodpasture and Parkland	10-20	24.5	30	14.9
Burghclere Beacon SSSI	Sub-atlantic semi-dry calcareous grassland	15-20	26.9	30	18.56
Cheesefoot Head SSSI	Sub-atlantic semi-dry calcareous grassland	15-25	19.04	30	16.48

5.8 Design, mitigation and enhancement measures

5.8.1 As described in DMRB LA105 (Highways England, 2019), best practice mitigation will be required to control dust emissions from construction works and plant during the construction phase, considering the sensitivity of relevant human and ecological receptors. These mitigation measures will seek to suppress the dust generation rate and also mitigate its dispersion and maximise the use of existing vegetation barriers where practicable. These measures will be set out in a the fiEMP which will be submitted to accompany the application for Development Consent.

5.8.2 No scheme specific mitigation or PAQAP are considered likely to be required for the operation of the Proposed Scheme, although should there be a requirement, a PAQAP will be produced in consultation with relevant consultees and in accordance with the guidance set out in DMRB LA 105 (Highways England, 2019).

5.9 Assessment of potential effects

5.9.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon Air Quality during the construction and operational phases. As noted in **Section 5.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through ongoing EIA work and the consultation process. The preliminary findings of the assessment are therefore presented below.

Construction phase dust

5.9.2 The dust risk potential of the Proposed Scheme is classified as 'high' and the current Air Quality study area for the assessment of construction dust has at this stage been defined as up to 200m from the IAB as shown in **Figure 5.3, Appendix 5.1**. Whilst the sensitivity of the receiving environment would likely be categorised as 'high' based on the presence of residential receptors within this current Air Quality study area, this will be reviewed as more construction details become available and the Study Area revisited to reflect the distance from construction activities rather than the IAB.

Construction phase traffic emissions

5.9.3 In relation to the potential impact of construction phase traffic, at this stage estimates of the actual vehicle movements and their routing resulting directly from the physical construction works are not available. Once available, the routing of these vehicles will be considered in accordance with DMRB LA105 (Highways England, 2019) to ascertain if there are additional 'affected roads' that require detailed assessment.

5.9.4 Indicative information on potential temporary road closures and temporary diversion routes during the construction period are summarised in **Chapter 2**. In categorising the potential impact on air quality due to these potential diversions, the duration of the diversion, likely magnitude of change in traffic flows and sensitivity of the diversion routes (i.e. baseline air quality and receptor proximity) are all important factors.

5.9.5 At this stage, it is anticipated that temporary closures would be focussed on the A34, M3 junction 9 slip-roads and roads adjacent to the junction. It is anticipated that the temporarily diverted traffic would be mainly confined to the motorway and A-roads, including the A303, A34, A33, A31 and A3404 and for limited durations (i.e. up to 48 hours on 20 occasions over the construction programme), see **Chapter 2** for further information. Given the traffic flows on these roads and the baseline air quality in vicinity to them, it is

considered unlikely that this temporarily diverted traffic would have a significant effect on air quality at receptors.

- 5.9.6 On some occasions it will not be possible to route such temporary diversions along the motorway or A-roads and the use of B-roads will likely be required. This information will be further considered and reported in the ES as required.
- 5.9.7 The final potential effect of construction on traffic emissions also relates to the potential for journeys to divert from the M3 Junction 9 during the construction period as a result of real or perceived congestion through the roadworks.
- 5.9.8 This potential issue has been raised by both WCC and EDC in relation to road users diverting from the M3 and alternative routes through Eastleigh and Winchester (and surrounding areas) and at this stage traffic modelling of the construction phase is yet to be finalised.
- 5.9.9 Therefore, it is not currently possible to ascertain the potential magnitude of any such impact, although the duration will be limited to the duration of the construction phase and will vary through the phased construction programme.
- 5.9.10 Therefore, at this stage, the potential for likely significant adverse effects on air quality due to traffic emissions during construction cannot be ruled out. Ongoing design and EIA work continue to consider likely impacts from the Proposed Scheme as the project progresses. Relevant effects and their significance will be reported in the ES in accordance with DMRB LA105 (Highways England, 2019).

Operational phase traffic emissions

- 5.9.11 The identification of roads that exceed the DMRB LA105 (Highways England, 2019) criteria indicates that the current Air Quality study area for the assessment of operational phase traffic emissions extends a substantial distance to the north and south (along the A34 and M3 respectively).
- 5.9.12 However, the actual magnitude of change to traffic flows along these roads in 2026 (as shown in **Figure 2.5, Appendix 2.1**) are considered to be relatively modest (as a proportion of baseline flows):
- M3 south of Junction 9 from 130,736 Annual Average Daily Traffic (AADT) to 135,344 AADT, an increase of 4,608 AADT.
 - A34 north of Winchester from 65,443 AADT to 68,224 AADT, an increase of 2,781 AADT (and past the A303 junction the increase is only 1,375 AADT).
- 5.9.13 Given that the A34 north of Winchester does not pass through any AQMAs it is considered likely that predicted concentrations of air pollutants individual

sensitive receptors in proximity to this road will increase due to the Proposed Scheme. However, impacts from the Proposed Scheme are unlikely to be classified as significant according to the DMRB methodology. This will be confirmed through ongoing modelling work which will be reported in the ES.

5.9.14 In relation to the M3 south, whilst this passes through the Eastleigh M3 AQMA (much of which is also a PCM link), there are currently no exceedances of the air quality thresholds in proximity to this road. Given the predicted decrease in background concentrations by 2026, it is considered likely that predicted concentrations of air pollutants at individual sensitive receptor locations will increase due to the Proposed Scheme. However, impacts from the Proposed Scheme are unlikely to be classified as significant according to the DMRB methodology. This will be confirmed through ongoing modelling work which will be reported in the ES.

5.9.15 For many roads within Winchester, there is a predicted decrease in traffic flows (as shown by 'blue' lines in **Figure 2.5, Appendix 2.1**) and for the following roads this decrease is more than 1,000 AADT:

- B3420, flows decrease from 11,279 AADT to 10,142 AADT, a decrease of 1,137 AADT.
- B3330 flows decrease from 10,164 AADT to 9,003 AADT, a decrease of 1,161 AADT.

5.9.16 As these decreased flows pass through the Winchester City AQMA it is anticipated that there will be a predicted decrease in pollutant concentrations at some individual sensitive receptor locations as a result of the Proposed Scheme.

5.9.17 The change in traffic flows is approximately minus 10% on these links, given that there are currently no exceedances of air quality thresholds along these roads, this is unlikely to be classified as significant according to the DMRB methodology. This will be confirmed through ongoing modelling which will be reported in the ES.

5.9.18 Conversely for some roads within Winchester there are predicted to be increased traffic flows in excess of 1000 AADT, for example:

- Easton Lane, flows increase from 6,239 to 8,289 AADT; an increase of 2,050 AADT
- Section of the B3404, flows increase from 5,279 to 6,343 AADT; an increase of 1,064 AADT
- A31 (east) flows increase from 18,991 to 20,759 AADT; an increase of 1,768 AADT

5.9.19 As some of these increased flows pass through the Winchester City AQMA it is anticipated that there will be an increase in pollutant concentrations at

some individual sensitive receptors locations as a result of the Proposed Scheme. At this stage it is not possible to clarify the magnitude of the likely increase in pollutant concentrations but monitored baseline concentrations in proximity to affected roads do not exceed the air quality thresholds and they will decrease further by 2026.

5.9.20 Further attention will therefore be paid to the identification of representative sensitive receptors locations in proximity to these roads (and in proximity to junctions) to ascertain the potential impacts of the predicted increased traffic flows within the ES. Whilst it is considered likely that there will be increased concentrations of pollutants at receptors in proximity to these roads, ongoing EIA work will determine the significance of the effect, which will be reported in the ES.

5.9.21 In relation to designated habitats, considering the current background levels and the predicted modest changes in traffic flows on nearby roads, the Proposed Scheme is not considered to be likely to have a significant impact at the Kennet and Lambourn Floodplain SSSI and SAC, River Test SSSI, Highclere Park SSSI, Burghclere Beacon SSSI and Cheesefoot Head SSSI although this will be confirmed through ongoing modelling work and reported in the ES.

5.9.22 For the River Itchen SSSI and SAC and St Catherine's Hill SSSI, further attention will be paid to the identification and sensitivity of the habitats present to ascertain the potential impacts due to the predicted change in traffic flows and current baseline levels within the ES. Whilst it is considered likely that there will be increased concentrations of pollutants at these designated sites, ongoing EIA work will determine the significance of the effect, which will be reported in the Biodiversity Chapter of the ES.

5.10 Anticipated further assessment

5.10.1 In relation to construction dust, as more construction details become available, the extent of Study Area will be revisited to reflect the distance from construction activities rather than the IAB. This revised Study Area will be used to identify the sensitivity of the receiving environment and inform the identification of appropriate mitigation measures (such as erecting screening around activities which could cause dust arisings, appropriate coverings and site dampening where relevant).

5.10.2 In relation to the assessment of the potential impacts of construction phase traffic on air quality, further work will be undertaken to clarify the duration and extent of change to traffic flows through the construction programme as the design is refined.

5.10.3 This will consider both traffic movements associated with the physical construction activities, temporary road closures and diversion, and the potential for diverted journeys due to the perceived or actual increased congestion.

5.10.4 Should predicted changes to road traffic flows during the construction period be predicted to exceed the LA105 (Highways England, 2019) screening criteria and be of sufficient magnitude and duration to potentially result in an impact on air quality, the same modelling methodology would be applied to define a construction specific ARN.

5.10.5 In relation to the assessment of the potential impacts of operational phase traffic on air quality, the following further assessment will be undertaken:

- Consultation with relevant Local Authorities to identify locations for representative sensitive receptors and the location and sensitivity of locally designated habitat sites
- Detailed dispersion modelling of the emissions from the ARN will be undertaken and results verified against local monitoring data
- The interpretation of the modelling results and the identification of their significance will be undertaken in accordance with the requirements of DMRB LA105
- Should significant impacts be identified, then appropriate mitigation measures will be identified in consultation with relevant consultees and reported in the ES as necessary

6 Cultural Heritage

6.1 Introduction

- 6.1.1 This chapter presents the preliminary findings of the assessment of likely significant effects arising from the construction and operation of the Proposed Scheme upon cultural heritage assets. It describes the methodology; the baseline conditions currently existing within the Indicative Application Boundary (IAB) and in the surrounding area; the likely significant environmental effects; the likely mitigation measures required to prevent, reduce or offset any significant adverse effects; and outlines further assessment still to be carried out.
- 6.1.2 This chapter is supported by the detailed cultural heritage baseline in **Appendix 6.1**, which provides a comprehensive description on the cultural heritage resource within the IAB and surrounding area. The document includes photographs taken in September 2020 during an initial walkover of the study area (beyond the IAB), photographs from a visit to the M3 Junction 9 Improvement site (land within the IAB) in December 2020, as well as figures which are referred to, where relevant, in this chapter. This baseline document is evolving and will be updated with additional baseline information following further consultation, desk-based research and any evaluative works carried out prior to the ES. This chapter is also supported by a geophysical survey summary report (**Appendix 6.2**) and an archaeological evaluation report (**Appendix 6.3**) which outline the results of the first phase of fieldwork (geophysics and trial trenching) carried out as part of an earlier design phase of the Proposed Scheme. A second phase of geophysical survey was carried out in 2019. The report summarising these results is included in **Appendix 6.4**.
- 6.1.3 For the purpose of this chapter, the cultural heritage resource has been divided into three sub-topics which are defined as archaeological remains, historic buildings and historic landscapes.
- **Archaeological remains:** the material remains of human activity from the earliest periods of human evolution to the present. These could be buried traces of human activities, archaeological deposits, archaeological sites which are visible above ground, or moveable artefacts. Archaeological remains can encompass the remains of buildings, structures, earthworks and landscapes, human, animal, or plant remains, or other organic material produced by or affected by human activities.
 - **Historic buildings:** architectural, designed or other structures with a significant historical value. These could include structures that have no aesthetic appeal or structures not usually thought of as 'buildings', such as milestones or bridges.

- **Historic landscapes:** the current landscape, whose character is the consequence of the action and interaction of natural and/ or human factors.

6.1.4 The cultural heritage resource can be designated (heritage assets which are afforded statutory protection, such as listed buildings, scheduled monuments, and registered parks and gardens) or undesignated (heritage assets which have a degree of heritage value but do not meet the criteria for designation).

6.2 Legislative and policy framework

6.2.1 This Preliminary Environmental Information Report (PEIR) chapter has been, and the on-going Environmental Impact Assessment (EIA) work will be undertaken within the context of the following legislation and planning policies and guidance documents:

- National Policy Statement for National Networks (NPS NN) (2014): Historic Environment, paragraphs 5.120 to 5.142
- National Parks and Countryside Act 1949 (as amended in the Environment Act 1995)
- Historic Buildings and Ancient Monuments Act 1953
- Ancient Monuments and Archaeological Areas Act 1979
- Hedgerow Regulations 1997 (amended 2003)
- National Planning Policy Framework (NPPF) (2019): Paragraphs 189 (Conserving and enhancing the historic environment) and 193, 194, 195, 196, 197, 199, 200 and 201 (Conserving and enhancing the historic environment – Considering potential impacts)
- Planning Practice Guidance (PPG) (2019): ‘Historic Environment’
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy CP20 (Heritage and Landscape Character)
- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (amended 2020)
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy DM25 (Historic Parks and Gardens), DM26 (Archaeology) and DM29 (Heritage Assets)
- South Downs National Park (SDNP) Local Plan 2014-2033 (2019) Policy SD12 (Historic Environment), SD13 (Listed Buildings) and SD16 (Archaeology)

6.3 Consultation

- 6.3.1 Consultation undertaken to date is summarised in **Table 6-1** along with the Scoping Opinion adopted by the Secretary of State received on 27 November 2020. The table also presents a response to these comments and outlines how they will be addressed in the Environmental Statement (ES) chapter.
- 6.3.2 A consultation workshop between the applicant and key cultural heritage stakeholders (Winchester City Council (WCC), Hampshire County Council (HCC), South Downs National Park Authority (SDNPA) and Historic England), was held on 25 November 2020 to discuss changes to the Proposed Scheme since the previously consulted design (see **Chapter 2** for further information), introduce the revised baseline study and discuss the next steps, including agreement of the parameters for further assessment and fulfilment of any outstanding elements of field evaluation and at what stage of the process this might be required. Key comments raised during this workshop and an outline of how these will be addressed is included in **Table 6-1**.

Consultation undertaken

Table 6-1: Summary of consultation undertaken to date

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
4.3.2	<i>“The ES should define the ZTV extent, the location of representative viewpoints, and specific heritage assets where detailed setting studies are required and make effort to agree the approach with the relevant consultation bodies.”</i>	Noted. The preliminary Zone of Theoretical Visibility (ZTV) is referenced in paragraph 6.4.3 and details of the methodology used to create this are given in Chapter 7 . The preliminary ZTV is shown in Figure 7.5, Appendix 7.1 . Heritage assets requiring a detailed settings assessment have been identified using the preliminary ZTV and the walkover surveys. This will be reviewed following ongoing design and completion of the final ZTV and incorporated into the ES. Consultation will be continued with relevant bodies and agreement on approaches will be sought.
4.3.3	<i>“The Inspectorate notes this and considers that other relevant guidelines should be referenced in the ES, where</i>	Relevant standards and guidance documents are listed in Section 6.4 and will be referenced in the

Reference	Comment	Response
	<p><i>appropriate, such as The Setting of Heritage Assets: Historic environment Good Practice Advice in Planning Note 3 (2nd edition) by Historic England (2017), Statements of Heritage Significance: Analysing significance in Heritage Assets by Historic England (2019), and Standards for Archaeological Desk-based Assessments (DBA) by Winchester City Council (n.d.).”</i></p>	<p>ES. This PEIR chapter has been written in accordance with the identified guidelines.</p>
4.3.4	<p><i>“due to the COVID-19 pandemic the Historic England Archives in Swindon is closed to the public and as of September 2020 is not available to consult historic aerial photographs”</i> <i>“The Planning Inspectorate understands these limitations, but also reminds the Applicant that the Winchester HER also holds a collection of historic aerial photographs that might be accessible.”</i></p>	<p>Noted. In their Scoping Response the Winchester City Archaeologist agreed with the list of proposed sources and limitations as outlined in the 2020 Scoping Report. It is anticipated that the majority of historic aerial photographs will have been reviewed and any features plotted as part of the National Mapping Programme (NMP). The Historic England Archive is still closed due to the COVID -19 pandemic. Aerial photographs that have been added since the NMP will be reviewed if the archive reopens prior to preparation of the Cultural Heritage ES chapter. The WCC HER will be contacted regarding aerial photographs that they hold in their collection.</p>
4.3.5	<p><i>“The ES should appropriately reference data used within the assessment and their sources.”</i></p>	<p>Noted. A full list of sources used is provided in Paragraph 6.4.5 and will be referenced in the ES.</p>
4.3.6	<p><i>“The Scoping Report notes that in addition to designated built heritage assets there are likely to be non-designated built heritage assets or locally listed buildings within the study areas. Any such assets considered to be potentially significantly affected by the Proposed Scheme will be included within assessment. The ES should describe how these assets will be identified and assessed in the ES.”</i></p>	<p>Noted. Some non-designated heritage assets have been identified though desk-based research and preliminary assessed in this report (see Section 6.8). The final list of non-designated built heritage assets and locally listed buildings for inclusion within the ES will be agreed with the WCC built heritage advisor.</p>

Reference	Comment	Response
4.3.7	<i>“The ES should be consistent in its assessment and explain how and where assumptions, professional judgement and sources underpin the assessment.”</i>	Noted. This will be made clear in the ES.
4.3.8	<i>“The ES should include an assessment of both direct and indirect impacts from vibration, compaction, changes in the water table (due to changes in runoff from the Proposed Development) and soil saturation on cultural heritage receptors as a result of the Proposed Development where significant effects are likely to occur.”</i>	Noted. The direct and indirect impacts from vibration, compaction and changes in water table will be considered in the ES.
4.3.9	<i>“The Applicant should make effort to undertaken ongoing consultation with the relevant consultation bodies and use information that derives from this to inform the assessment where appropriate.”</i>	This was raised at the consultation workshop (25 November 2020) where it was requested by attendees that an open dialogue be maintained during the evolving design of the Proposed Scheme and approaches to mitigation which should be discussed as and when details of new scheme elements become available (see paragraph 6.3.3). The applicant will continue to consult with the relevant consultation bodies as the scheme progresses.
4.3.10	<i>“The Inspectorate cautions against any premature conclusions given that it may be decided to preserve some archaeological remains in situ which could then be subject to potential effects from vibration, compaction, or dewatering. The ES should determine whether receptors may be preserved in situ and assess any effects as a result of this where they are likely to be significant.”</i>	Noted. Currently no archaeological remains have been identified that are of such high significance that they warrant preservation in situ. No such remains were highlighted by the WCC or HCC Archaeologist during the recent consultation workshop. Should such remains be identified during further evaluative works, the potential impacts upon these will be assessed in consultation with other relevant disciplines. This is outlined in paragraph 6.8.24.
4.3.11	<i>“The Inspectorate would like to see more detailed consideration of areas</i>	Noted. An evaluation strategy, consisting of geophysics and trial

Reference	Comment	Response
	<p><i>proposed for spoil management and storage within the ES, and these areas must be evaluated in order to establish the presence, nature, and date of any archaeological remains and potential susceptibility to damage from compression. Measures including the use of geotextile membrane and/or ground protection mats below stockpiled soil may also need to be considered within the ES.”</i></p>	<p>trenching has been agreed with the WCC Archaeologist. The geophysical survey is underway, and the trial trenching is due to take place over the summer of 2021. The results of the evaluation will be reported in the ES.</p> <p>The results of the above evaluation and consultation with Historic England, WCC and HCC will be considered when determining areas for spoil management. Potential impacts will be assessed in the ES.</p>
<p>Scoping responses from Statutory Consultees</p>		
SDNPA	<p><i>“At 7.2.12 it says that ‘the archaeological remains excavated during previous archaeological investigations within the IAB have been removed from the IAB and therefore have no value/ sensitivity’. Whilst, this is correct (they have been excavated), they remain indicative of wider archaeological potential and provide valuable context for known and currently unknown archaeological remains. The Scoping Opinion Report appears to go on to acknowledge this but we would welcome confirmation that this connection will be reflected in the new Desk Based Assessment mentioned at 7.1.2.’</i></p>	<p>Noted. This will be made clear within the new Desk Based Assessment (detailed Cultural Heritage baseline) once completed and reported in the ES.</p>
SDNPA	<p><i>“At 7.3.8 there is no mention of the short, medium and long term implications of the proposed scheme on in situ preservation of below ground archaeology in the event of potential changes in water table and soil saturation caused by management of water flow from the road and in relation to changes in the wider landscape, although this is mentioned specifically at 7.4.3 and at 7.5.1. We would suggest that this should be listed as a</i></p>	<p>Currently no archaeological remains have been identified that are of such high significance that they warrant preservation in situ. No such remains were highlighted by the WCC or HCC Archaeologist during the recent consultation workshop. Should such remains be identified during evaluative works, the potential impacts upon these will be assessed in consultation with</p>

Reference	Comment	Response
	<i>specific potential direct or indirect impact at 7.3.8 for consistency.”</i>	other relevant disciplines. This is outlined in paragraph 6.8.24.
SDNPA	Ongoing consultation should discuss enhancement measures not just mitigation measures	Opportunities for enhancement were discussed at the Cultural Heritage consultation workshop. See points below in second half of Table 6-1 .
WCC	It is important that all previous archaeological reports are included (SUMO 2019 Geophysical Survey – second phase)	The results of the SUMO 2019 report have been reviewed and are included within the detailed cultural heritage baseline (Appendix 6.1) and this chapter, to also be reproduced in the ES.
WCC	A watching brief on GI works may not be sufficient and the strategy for further evaluation should include purposive geoarchaeological boreholes and attendance by a qualified geoarchaeologist / environmental specialist where appropriate	Noted. An archaeological evaluation strategy consisting of geophysics and trial trenching has been agreed with the WCC Archaeologist. There is to be further consultation with the WCC Archaeologist to discuss palaeoenvironmental evaluation and the timing of this. The outcome of these discussions will inform ongoing EIA work, which will be reported in the ES.
WCC	Issue of changes in local water hydrology should be considered through joint working by the relevant project teams throughout the design, site investigation and analysis stages of the EIA and provision for consultation with Historic England science advisor	Noted. The impacts upon changes to hydrology will be discussed with the Stantec Drainage and Water Team. Potential impacts will be discussed with the Historic England regional science advisor and reported in the ES.
Historic England (late response)	Provided a list of known designated heritage assets within 1km of the Proposed Scheme they feel are most likely to be impacted upon by the Proposed Scheme.	List noted. These are all included in the detailed cultural heritage baseline and detailed setting assessments carried out for those considered likely to receive an impact from the proposed scheme, other than the late Iron Age settlement site north of Grace’s Farm. A detailed setting assessment of this will be reported within the ES.

Reference	Comment	Response
Historic England (late response)	<i>“We would expect the Environmental Statement to consider the potential impacts on non-designated features of historic, architectural, archaeological or artistic interest. Undesignated assets can also be of national importance and make an important contribution to the character and local distinctiveness of an area and its sense of place.”</i>	Noted. The preliminary findings of the assessment to Non-designated heritage assets are reported in this chapter. Ongoing EIA work will be reported in the ES.
Historic England (late response)	<i>“We would strongly recommend that you involve the Conservation Officer and archaeological staff at Winchester City Council in the development of this assessment.”</i>	The Winchester City Conservation Officer was unable to attend the consultation workshop but will be included in ongoing consultation. The WCC and HCC Archaeologist were both present at the consultation workshop and will also be part of ongoing consultation.
Historic England (late response)	<i>“There is the possibility of taller structures being constructed as part of the proposed development. These structures could have an impact on the significance of designated heritage assets as contributed to by their setting, and the surrounding landscape character. Therefore, the proposals could, as a result, affect the significance of heritage assets at some distance from this site itself. We would expect the assessment to clearly demonstrate that the extent of the proposed study area is of the appropriate size to ensure that all heritage assets likely to be affected by this development have been included and can be properly assessed.”</i>	Noted. The assessment has been informed by the preliminary ZTV (Figure 7.5, Appendix 7.1) and walkover survey. The final ZTV will be used to inform ongoing EIA work, which will be reported in the ES.
Historic England (late response)	<i>“It is important that the assessment is designed to ensure that all impacts are fully understood including the contribution the setting makes to the significance of these assets. In this respect an analysis of the views from within the site, out of, and across the site in relation to designated heritage assets will be important.”</i>	The ES will be accompanied by the detailed cultural heritage baseline which will include a setting assessment of designated and non-designated heritage assets considered likely to receive effects from the Proposed Scheme.

Reference	Comment	Response
Historic England (late response)	<i>“Consideration should also be given to undertaking a practical exercise with either a crane or balloons erected at the height of any proposed tall structures so that all parties are better able to understand the landscape impact of the proposals. We have been engaged in other major developments where this technique has been used and it greatly assisted the identification of the key issues and impacts from which the resulting EIA was able to focus its assessment.”</i>	Noted. Options for evaluation will be considered through ongoing consultation and use of the detailed ZTV once prepared.
Historic England (late response)	<i>“The assessment should also take account of the potential impact which associated activities (such as construction, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of the heritage assets in the area.”</i>	Noted.
Historic England (late response)	<i>“the assessment should also consider, where appropriate, the likelihood of alterations to drainage patterns that might lead to in situ decomposition or destruction of below ground archaeological remains and deposits and can also lead to subsidence of buildings and monuments.”</i>	Noted. This will be considered in ongoing EIA work and reported in the ES.
Historic England (late response)	<p><i>“The scope of the ZTV is yet to be determined and further work will inform on the extent of this. It would be our advice that assessments of this nature should be undertaken during the winter months where existing foliage is at a minimum to ensure all possible receptors are included.</i></p> <p><i>This assessment should also take into consideration any structures within the proposals which are of height.”</i></p>	<p>Noted. The Preliminary ZTV has been prepared and included in this PEIR in Figure 7.5, Appendix 7.1. A detailed ZTV will be prepared and used to inform ongoing EIA work which takes into account structures which are of height.</p> <p>This matter was raised at the consultation workshop. See points in table below.</p>
<i>Comments made at the cultural heritage workshop (25 November 2020)</i>		

Reference	Comment	Response
Winchester City Council	Previous geophysical survey and trial trenching carried out as part of the previous design phase did not identify any archaeological remains that would prevent or significantly constrain the Proposed Scheme but further archaeological evaluative works particularly in the areas of temporary works and areas of uncertain potential will be required. This is likely to involve geophysical survey and targeted trial trenching.	An evaluation strategy, consisting of a geophysics and trial trenching has been agreed with the WCC Archaeologist. The geophysics is under way and the trial trenching is planned for the summer of 2021. The results of the evaluation will be used to inform a suitable mitigation strategy and will be reported in the ES.
Winchester City Council	A geoarchaeological and palaeoenvironmental review should be integrated into the archaeological desk-based assessment [detailed cultural heritage baseline for the ES] and outline mitigation strategy as planned, with special attention to deep sequences associated with the River Itchen floodplain to be impacted by piling	The result of historic boreholes are included within the detailed cultural heritage baseline (Appendix 6.1). This will be updated with the results of any new boreholes taken as part of the current design phase and considered in its wider landscape context. The results will also be reported upon in the Cultural Heritage Chapter of the ES.
Winchester City Council	Mitigation should look to take a holistic landscape approach.	Agreement on suitable mitigation will be sought in outline with WCC and HCC Archaeologists and reported upon in the Cultural Heritage Chapter of the ES, to be amended and finalised in detailed design.
Winchester City Council	Suggested revisiting the archive for previous fieldwork carried out during the construction of the M3 to analyse material not previous analysed.	To be considered during the design of the outline mitigation strategy which will be agreed WCC and HCC Archaeologists.
Winchester City Council	Community outreach should be included in the mitigation package	Community outreach will be considered during the design of the outline mitigation strategy which will be agreed with WCC and HCC Archaeologists.
Hampshire County Council	Raised issued about intrusive groundworks to create chalk grassland. Mentioned nitrate reduction methodology, with a preference for no soil strip.	Stantec Landscape and Visual Impact Assessment (LVIA) and design teams to consider as the design progressed. Alternative methods for creating chalk

Reference Comment		Response
		grassland will be considered where possible and necessary.
Hampshire County Council	Agreed it was appropriate to use the WCC Historic Environment Record (HER) dataset, but the County Archaeologist will review the baseline during consultation on the outline mitigation strategy to advise on any small updates needed based on the HHER	Baseline sent to the County Archaeologist during consultation on evaluation strategy. Geophysics report from PCF Stage 3A supplied to the Hampshire Historic Environment Record (HHER) and Historic England for information
Hampshire County Council	Adequate time must be allowed in the future construction programme for pre-construct mitigation measures (tbc) to be fully implemented without rushing	Noted
Historic England	Wish to be further consulted on any permanent elevated structures including gantries, signage and any long-term spoil retention areas in close proximity to scheduled monuments	Noted
Historic England	There will be a need for a settings assessment to be carried out to understand the impact of the proposals (both temporary and permanent elements). Any assessment should include winter foliage conditions.	An initial settings assessment has been carried out (see Appendix 6.1). Further assessment of the temporary works to be carried out once design confirmed. The Applicant's LVIA assessment will consider both summer and winter conditions in accordance with DMRB LA107 (Highways England, 2020).
South Downs National Park	Scheme should include proposals for enhancement. Avoid intrusive public information boards but explore modern digital interpretation methods such as Quick Response (QR) codes which would enable the public to put the landscape into context.	Areas of public art and exhibition space are being considered. Proposed Scheme to look at innovative ways of integrating digital technologies to engage the public for other disciplines such as ecology and heritage.
South Downs National Park	Issue raised about the lack of storage space for archaeological archives and a number of large infrastructure projects in the same area will put increased pressure on storage space	Issue of archive storage is to be discussed with the key stakeholders.
South Downs National	Found the opportunity to come together useful. All wish to be kept informed as the evaluation package and outline	Noted

Reference	Comment	Response
	Park, Hampshire County Council, Historic England, Winchester City Council	mitigation packages evolve. A group meeting was proposed to finalise the outline mitigation package (agreement to be led by Winchester CC)

Proposed consultation

- 6.3.3 At the cultural heritage consultation workshop the key cultural heritage stakeholders requested that an open dialogue be maintained during the evolving design of the Proposed Scheme and approaches to mitigation which should be discussed as and when details of new scheme elements become available rather than providing a large quantity of documents at one time. The results of further consultation will be reported upon in the Cultural Heritage ES Chapter.
- 6.3.4 A programme of archaeological mitigation is likely to be required to record any archaeological remains that might be damaged or removed during the construction of the Proposed Scheme. The scale and scope of any archaeological mitigation will be discussed and agreed with HCC and WCC following the completion of any further evaluation works that might be required.
- 6.3.5 Consultation will be undertaken with the WCC HER to identify any aerial photographs that may need to be considered within ongoing EIA work.
- 6.3.6 Agreement has been sought from the WCC Built Heritage advisor on the list of non-designated built heritage assets for consideration in ongoing EIA work. This consultation remains ongoing.
- 6.3.7 Additional consultation may be required in order to discuss the need for further mitigation of indirect impacts upon cultural heritage assets, for example any changes to local hydrology that could result in effects upon archaeological remains through dewatering. The indirect impact upon cultural heritage assets through changes to setting was raised at the consultation workshop held on 25 November 2020 (see response in **Table 6-1**). The need for further consultation in regards to indirect impacts through dewatering will be ascertained through further consultation and following the completion of detailed design and the identification of any significant impacts that may require mitigation.
- 6.3.8 The results of the consultation workshop and all relevant subsequent consultation will be further reported upon in the Cultural Heritage chapter of the ES.

6.4 Assessment methodology and significance criteria

Standards and guidance

- 6.4.1 This assessment is being carried out in accordance with the following standards and guidance:
- Design Manual for Roads and Bridges (DMRB) Environmental Assessment and Monitoring (LA104) (Highways England, 2020)
 - Design Manual for Roads and Bridges (DMRB) Cultural Heritage Assessment (LA106) (Highways England, 2020)
 - Chartered Institute for Archaeologists (CIfA) 'Standards and Guidance for Historic Environment Desk-based Assessment (as revised 2017)
 - DEFRA The Hedgerow Regulations: A Guide to the Law and Good Practice (1997)
 - Historic England's 'Managing Significance in Decision-Taking in the Historic Environment (2015)
 - Historic England's 'The Setting of Heritage Assets (Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (2017)
 - Historic England's 'Statements of Heritage Significance: Analysing Significance in Heritage Assets (2019)
 - Winchester City Council's 'Standards for Archaeological Desk-Based Assessments (DBA)' (n.d.)

Study area

- 6.4.2 The spatial scope of this assessment is defined by a 1km study area around the IAB for designated cultural heritage assets and a 300m study area around the IAB for non-designated cultural heritage assets. These study areas have been used to identify cultural heritage assets that might be impacted upon, directly or indirectly, by the Proposed Scheme and have been used to put the land within the IAB into its full archaeological and historic context. These study areas were presented within the January 2019 Scoping Report (Highways England, 2019) and deemed appropriate within the March 2019 Scoping Opinion. Since this previous agreement, and in accordance with DMRB guidance, the study areas have been reconfirmed as acceptable for this assessment by the Overseeing Organisation (email received from Highways England principal cultural heritage advisor on 6 August 2020). These study areas were also presented in the October 2020 Scoping Opinion (Highways England, 2020) and at the cultural heritage consultation workshop (November 2020) and were deemed to still be appropriate for the current assessment.

6.4.3 In paragraph 3.6.1 of DMRB (LA106) (Highways England, 2020) it is stated that a “*study area should include the settings of any designated or other cultural heritage resource in the footprint of the scheme or within the zone of visual influence or potentially affected by noise*”. A preliminary ZTV has been produced as part of the Landscape and Visual assessment (**Figure 7.5, Appendix 7.1**) for a 5km radius around the IAB. This is based upon the emerging design, using spot heights taken from the centre of the proposed carriageway and does not include features such as lighting columns or gantries. The initial ZTV indicates that the Proposed Scheme has a relatively limited visual envelope focused along around the existing M3, A34 and A33 transport corridors, and it is unlikely that the setting of any cultural heritage asset beyond the 1km study area will be affected. This will be clarified following completion of the final ZTV and assessed in the ES. Additional ZTVs (**Figures 7.7 and 7.8, Appendix 7.1**) have been created to take into account the 3D model of the permanent road infrastructure of the Proposed Scheme and consider the visibility of the Heavy Goods Vehicles, which indicates a slightly reduced visual envelope from the initial ZTV. This cultural heritage PEIR chapter has been prepared using the initial ZTV.

Cultural heritage assessment

6.4.4 The baseline conditions of this chapter are described comprehensively in the detailed cultural heritage baseline prepared by Stantec in 2020 (**Appendix 6.1**). The following section outlines the methodology used in the production of the cultural heritage baseline, the results of which are summarised in **Section 6.6** of this chapter. The spatial scope for the detailed cultural heritage baseline was defined by a 1km study area around the IAB for designated heritage assets and a 300m study area around the IAB for non-designated heritage assets. The assessment involved both a desk-based review, an initial walkover of the study areas outside the IAB (carried out in September 2020) and a walkover over of land within the IAB (in December 2020), in order to put it into its full archaeological and historical context.

6.4.5 Information on the cultural heritage resource within the study area was gathered from the following sources:

- The Winchester Historic Environment Record (WHER) for archaeological sites and features, events, findspots, historic buildings, historic landscape character (HLC) and National Mapping Programme (NMP) data (data received August 2020)
- The National Heritage List for England (NHLE) as compiled by Historic England for designated cultural heritage assets (data downloaded August 2020)
- Winchester City Council website for information on Conservation Areas
- The Hampshire Record Office in Winchester for historic maps and manuscripts (visited August 2020)

- Historic Ordnance Survey maps included within the previous cultural heritage assessments and those freely available online
- Other freely available online websites including the Archaeological Data Service and Britain from Above and Heritage Gateway
- Cultural heritage desk-based assessments produced by WSP (2017) and Jacobs (2018)
- Two geophysical surveys (WSP, 2018 and SUMO, 2019) and a trial trench evaluation (Wessex Archaeology, 2019)
- Relevant primary and secondary sources including published and unpublished reports relating to previous archaeological investigations and ground investigation works considered relevant

6.4.6 Designated cultural heritage assets are referenced in the detailed cultural heritage baseline and this chapter by their NHLE entry number. They are listed in Table 1 of **Appendix 6.1** and depicted on Figure 2 of **Appendix 6.1**. For ease of reference the WHER data (investigations, monuments and findspots) has been rationalised and records assigned a Stantec Reference Number (SRN). This is referred in the text where relevant, listed in Table 2 of **Appendix 6.1** and shown on Figures 3 – 7 of **Appendix 6.1**.

Geophysical survey 2018

6.4.7 During an earlier design phase of the Proposed Scheme, a geophysical survey was undertaken directly to the north of the Junction 9 roundabout (WSP, 2018) (**Appendix 6.2**). This was carried out in February 2018 and identified an anomaly consistent with the partial remains of the ring ditch (SRN 71) excavated in 1974 (Site R7 in the Easton Down excavations carried out prior to the construction of the M3). Other anomalies were interpreted as former field boundaries, whilst discrete anomalies and trends which were unlikely to have archaeological provenance were also noted. The survey and findings remain relevant to the current Proposed Scheme.

Trial trench evaluation 2019

6.4.8 Following the geophysical survey, an intrusive programme of archaeological survey, comprising the excavation of 32 trial trenches and the monitoring of 11 geotechnical pits, was carried out across the area subjected to the geophysical survey in March and April 2019 (Wessex Archaeology 2019) (**Appendix 6.3**). The purpose of the survey was to test the results of the geophysical survey, to examine the remains of the Neolithic/ Bronze Age ring ditch within the IAB and to identify areas of chalk back fill resulting from the original construction of the motorway junction. The trial trench evaluation identified the eastern part ring ditch (approximately 32.5m or c. 35%) and confirmed that the remains are relatively undisturbed. In general, few other significant archaeological features were found during the evaluation although two probable prehistoric pits were identified suggesting limited potential for

further discrete prehistoric features within the IAB. Former field boundaries and a parish boundary were found but were of limited cultural heritage value. The evaluation identified some areas of disturbance from agricultural activity, previous archaeological investigations and construction work associated with the building of the M3, but it was concluded that this has not substantially diminished the potential for archaeological remains.

Geophysical survey 2019

6.4.9 A second phase of geophysical survey was carried out to the north of the earlier phases of evaluation by Sumo Surveys in 2019 (**Appendix 6.4**). The survey identified a number of linear and discrete anomalies of uncertain origin which could be of archaeological interest and several former field boundaries.

Further evaluative works 2021

6.4.10 An additional programme of archaeological evaluation, comprising a geophysical survey (non-intrusive) and targeted trial trenching (intrusive) has been agreed with the WCC Archaeologist and is required to ascertain the presence (or absence) of archaeological remains in the parts of the IAB not yet investigated which are to be subjected to intrusive groundworks during the construction of the Proposed Scheme. The geophysical survey is ongoing, and the trial trenching is planned for the summer of 2021. The results of the evaluative work will help to clarify the nature, value and survival of archaeological remains within the IAB and inform a suitable mitigation strategy. The results of the evaluative works are being carried out to sufficiently inform on going EIA work and will be included within the Cultural Heritage Chapter of the ES.

Value (sensitivity) of resource

6.4.11 The value (or sensitivity) of cultural heritage assets has been based mainly upon existing designations but allows for professional judgement where features are found which do not have any formal national or local designation. The value of cultural heritage assets is assessed on a five-point scale of, Very High, High, Medium, Low and Negligible. The criteria used to assess the value of cultural heritage assets is presented in **Table 6-2**. This is derived from Table 3.2N in DMRB (LA104) (Highways England, 2020) and incorporates more detailed descriptions used in the previous version of DMRB (HA208/07) (Highways Agency, 2007) specific to cultural heritage. Whilst the revised version of DMRB supersedes the previous version, the criteria tables used in the former version provide a greater level of detail specific to cultural heritage and have therefore been adopted in this assessment while continuing to adhere to the approach and guidance of the updated DMRB. This approach was presented in the October 2020 Scoping Report (Highways England, 2020) and at the cultural heritage consultation workshop (25 November 2020) and was deemed appropriate. This preliminary consideration of value will be updated with ongoing EIA work and will be reported in the ES.

Table 6-2: Criteria for grading the value (or sensitivity) of cultural heritage assets

Value (sensitivity) of receptor/resource	Typical description of		
	Historic landscapes	Archaeological assets	Historic buildings
Very High (International)	World heritage sites inscribed for their historic landscape qualities Historic landscapes of international value, whether designated or not Extremely well-preserved historic landscapes with exceptional coherence, time depth or other critical factor(s)	World heritage sites Archaeological sites of acknowledged internal importance Assets that can contribute significantly to acknowledged international research objectives	Structures inscribed as being of universal importance as world heritage sites Other buildings recognised as internationally important
High (National)	Designated historic landscapes of outstanding interest Undesignated landscapes of outstanding interesting Undesignated landscapes of high quality and importance and of demonstrable national value. Well preserved historic landscapes exhibiting considerable coherence, time-depth or other critical factors	Scheduled monuments (including proposed sites) Undesignated archaeological remains of schedulable quality and importance Assets that can contribute significantly to acknowledge national research objectives	Scheduled monuments with standing remains Grade I and II* listed buildings Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade Conservation areas containing very important buildings Undesignated structures of clear national importance
Medium (National/ regional)	Designated special historic landscapes.	Archaeological remains that contribute towards	Grade II listed buildings

Value (sensitivity) of receptor/resource	Typical description of		
	Historic landscapes	Archaeological assets	Historic buildings
	<p>Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value.</p> <p>Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factors.</p>	<p>regional research objectives</p>	<p>Historic unlisted buildings that can be shown to have exceptional qualities in their fabric or historical associations.</p> <p>Conservation areas containing buildings that contribute significantly to the historic character.</p> <p>Historic townscape or built-up areas with important historic integrity in their buildings or built settings (e.g. including street furniture and other structures).</p>
<p>Low (Regional/ local)</p>	<p>Robust undesignated historic landscapes.</p> <p>Historic landscapes with importance to local interest groups.</p> <p>Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.</p>	<p>Archaeological remains of local importance.</p> <p>Archaeological remains compromised by poor preservation and/or poor survival of contextual associations.</p> <p>Archaeological remains of limited value, but with potential to contribute to local research objectives</p>	<p>'Locally listed' buildings.</p> <p>Historic unlisted buildings of modest quality in their fabric or historical association.</p> <p>Historic townscape or built-up areas of limited historic integrity in their buildings or built settings (e.g. including street furniture and other structures).</p>
<p>Negligible (local)</p>	<p>Landscapes with little or no significant historical interest</p>	<p>Assets with very little or no surviving archaeological interest</p>	<p>Buildings with some hidden (i.e. inaccessible) potential for historic significance</p>

Magnitude

6.4.12 Magnitude of impact is the degree of change that would be experienced by a cultural heritage asset and its setting during the construction and operation of the Proposed Scheme, as compared with a 'do nothing' scenario. Magnitude of impact is assessed without reference to the value of the cultural heritage asset and could include physical impacts upon the cultural heritage asset or impacts on its setting. Effects may be temporary or permanent, direct or indirect and may be adverse, beneficial or may result in no change.

6.4.13 The magnitude of impact has been assessed using a five-point scale of, Major, Moderate, Minor, Negligible and No Change. The assessment is based on professional judgement and follows criteria provided in DMRB (LA 104) (Highways England, 2020). Factors in the assessment of the magnitude of impact for all cultural heritage assets are presented in **Table 6-3**. This preliminary consideration of impact will be updated with ongoing EIA work and will be reported in the ES.

Table 6-3: Magnitude of impact and typical descriptions

Magnitude of impact (change)		Typical description
Major	Adverse	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting. Change to key historic building elements, such that the resource is totally altered. Comprehensive changes to the setting.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Changes to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, noticeable differences in noise or sound quality, considerable changes to use or access; resulting in moderate changes to historic landscape character.

Magnitude of impact (change)		Typical description
		<p>Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the character of the asset.</p> <p>Change to many key historic building elements, such that the resource is significantly modified. Changes to the setting of an historic building, such that it is significantly modified.</p>
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	<p>Changes to few key historic landscape elements, parcels or components, slight visual changes to few key aspects of historic landscape, limited changes to noise levels or sound quality; slight changes to use or access: resulting in limited changes to historic landscape character.</p> <p>Changes to key archaeological materials, such that the asset is slightly altered. Slight changes to setting.</p> <p>Change to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.</p>
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	<p>Very minor changes to key historic landscape elements, parcels or components, virtually unchanged visual effects, very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.</p> <p>Very minor changes to archaeological materials or setting.</p> <p>Slight changes to historic buildings elements or setting that hardly affect it.</p>
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Magnitude of impact (change)	Typical description
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Determination of significance of effect

6.4.14 For all three sub-topics the significance of effect has been determined as a combination of the assessment of the value of the cultural heritage asset and the magnitude of impact. This is achieved using professional judgement informed by the matrix illustrated below in **Table 6-4**. Five levels of significance (Very Large, Large, Moderate, Slight or Neutral) are defined which apply equally to adverse and beneficial impacts. Where two significances of impacts are given in the table (for example neutral or slight) professional judgement is used in the text to suggest the most likely significance of impact in addition to the reasonable worst-case scenario. This preliminary consideration of the significance of effect will be updated with ongoing EIA work and will be reported in the ES.

6.4.15 A significance of effect of Moderate or above is taken to be significant in EIA terms.

Table 6-4: Significance of effect matrix

Environmental value (sensitivity)	Magnitude of impact (degree of change)					
	No change	Negligible	Minor	Moderate	Major	
Very High	Neutral	Slight	Moderate or large	Large or very large	Very large	
High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large	
Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large	
Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate	
Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight	

6.5 Assessment assumptions and limitations

- 6.5.1 The information presented in this chapter is based on the information available at the time of writing the report and is based on an emerging design. The findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process, to be reported in the ES.
- 6.5.2 Data used to compile this chapter consists of secondary information derived from a variety of sources. The assumption is made that this data, as well as that derived from other secondary sources, is reasonably accurate.
- 6.5.3 The records held by the WHER are not a record of all surviving heritage assets, but a record of the discovery of a wide range of archaeological and historical components of the historic environment, usually driven by development in a particular area. The information held within it is not complete and does not preclude the subsequent discovery of further heritage assets that are, at present, unknown, notably buried archaeological remains.
- 6.5.4 The COVID-19 public health crisis (2020) restricted all but essential travel and resulted in the closure of all non-essential shops and offices including the Historic England Archives in Swindon. As such it was not possible to visit the archive to view aerial photographs as part of this assessment. NMP data was supplied by the WHER and aerial photographs have, where possible, been viewed online and at the Hampshire Record Office. Aerial photographs held by the Historic England Archives will have been assessed as part of the NMP assessment and as such not visiting the archive as part of this assessment is not considered to have resulted in a gap in the baseline. However, if the Historic England Archives reopens during the preparation of the ES it will be contacted for a list of available aerial photographs. The archives will then be visited to view any aerial photographs identified within the 300m study area.
- 6.5.5 The full range of archaeological and historical sources usually consulted during the preparation of cultural heritage baselines, other than the Historic England Archives, have been used in the preparation of this chapter. There is the potential for previously unknown archaeological remains to be present within the IAB, however, the geophysical survey and trial trench evaluation carried out within the IAB to the north of the M3 Junction 9 roundabout has in part tested the archaeological potential of this part of the IAB. These investigations and further ongoing and proposed evaluative works will serve to inform the ES and allow a robust assessment of the historic environment within the Cultural Heritage chapter of the ES.

6.6 Baseline conditions

Land use, topography, and geology

- 6.6.1 Description on the IAB and the surrounding land use is provided in **Chapter 2** and **Appendix 6.1**. Description of topography and geology is provided in

Appendix 6.1 and **Chapter 9**. In summary, the IAB contains Junction 9 of the M3 along with sections of the M3 to the north and south of the junction and sections of the A33, A34, A272 and Easton Lane. The IAB also contains a narrow strip of land either side of these roads; several fields and Highways England's maintenance depot (located between the A34 and M3); areas of water meadow along the River Itchen and several fields to the east of the M3. A single field, approximately 4.5km northwest of Junction 9, at the junction to the east of the junction between the A34 and Christmas Hill is also included within the IAB. The surrounding landscape is primarily urban to the west of the M3 and rural to the east. Immediately to the west of junction 9 is Winnall, a suburb of Winchester which contains residential commercial and industrial areas. Other urban areas within close proximity to the IAB include the villages of Headbourne Worthy, Kings Worthy and Abbots Worthy to the north and Easton to the northeast.

6.6.2 The River Itchen flows through the northern part of the IAB. Within the base of the valley, the ground level is at approximately 40m above Ordnance Datum (aOD) rising to between 80m and 90m aOD on the valley sides. The carriageway at the M3 Junction 9 is approximately 59m aOD and 66m aOD at roundabout level.

6.6.3 The geology within the IAB, as recorded by the British Geological Survey (BGS) is shown on **Figure 1** in **Appendix 6.1**. The underlying bedrock geology is recorded as chalk across the whole of the IAB. In the central and northern parts of the IAB, Seaford Chalk is recorded whilst in the southern part, either side of Petersfield Road bands of Lewes Nodular Chalk, New Pit Chalk and Holywell Nodular Chalk are recorded (BGS 2020). Superficial deposits, where recorded, consist of alluvium within the river valley comprising clay, silt, sand and gravel. Elsewhere, head deposits are recorded on the subaerial slopes formed by soil creep, solifluction and hill wash. These deposits also comprise clay, silt, sand and gravel.

Archaeological remains

Scheduled monuments

6.6.4 Whilst there are no designated archaeological remains (Scheduled Monuments) within the IAB there are 11 within the 1km study area which are of national interest and therefore of high value (**Figure 2, Appendix 6.1**). The closest is the round barrow cemetery on Magdalen Hill Down (NHLE: 1016746), which is approximately 120m from the IAB, and has views across the southern 'area of search for potential excess spoil management' at the southern end of the IAB.

6.6.5 At the northern end of the IAB, the site of St Gertrude's Chapel (NHLE: 1005518) is approximately 185m west of the IAB. The trees along the edge of the carriageway which screen views of the carriageway and vehicle movements from the scheduled monument are included within the IAB.

- 6.6.6 The late Iron Age Settlement site to the north of Grace's Farm (NHLE: 1001825) lies in close proximity to the northern end of the IAB. The remainder of the scheduled monuments within the 1km study area share no inter-visibility with the IAB or have glimpsed long distance views of the IAB. Further details are provided in **Appendix 6.1**.

Known non-designated archaeological remains

- 6.6.7 The WHER records archaeological investigations at 54 locations within the 300m study area including 16 within the IAB (**Figure 3, Appendix 6.1**). The majority of these investigations are associated with survey work, preliminary excavations and rescue excavations and watching briefs carried out during the construction and development of the M3. The remains of Neolithic and Bronze Age funerary monuments, two small early Bronze Age cemeteries, middle and late Bronze Age settlements, 'Celtic' field systems, an early Iron Age settlement, a late Iron Age/ Romano-British settlement and evidence of early medieval occupation have all been found within the IAB (**Figure 4 and 5, Appendix 6.1**). Whilst the archaeological remains excavated during previous archaeological investigations within the IAB have been removed from the IAB and therefore have no value/ sensitivity they remain indicative of wider archaeological potential and provide valuable context for known and currently unknown archaeological remains.
- 6.6.8 Other known archaeological remains recorded within the IAB from sources listed in 6.4.5 that have not been removed by previous archaeological investigations or development include:
- The surviving remains of the Neolithic/ Bronze Age ring ditch (SRN 71), originally excavated during the construction of the M3, and recently investigated as part of the archaeological investigations carried out as PCF Stage 3a (Geophysical Survey Summary Report - HE551511-WSP-GEN-M3J9PCF3-RP-LH-00015-P01, see **Appendix 6.2**; and Archaeological Evaluation Report - HE551511-WEA-EGN-0_00_00-RP-LE-0001, see **Appendix 6.3**), along with several discrete prehistoric pits, post-medieval field boundaries and parish boundary
 - An undated ring ditch (SRN 75), likely dating to the prehistoric period, and an undated east to west aligned feature (SRN 215) identified as a cropmark at Manor Farm
 - Two Roman roads (SRN 129), one along the course of the A33 and another along the course of Petersfield Road, and an aqueduct (SRN 123, 124) which crosses the IAB at six locations
 - Geophysical anomalies which were identified to the west of Manor Farm and are thought to represent a possible Anglo-Saxon settlement (SRN 214)

- An early-medieval royal residence (SRN 144) recorded by the WHER within Kings Worthy. It should be noted that this is conjecture and as yet no archaeological evidence has been identified
- Water meadows (SRN 186,187, 188, 190, 192, 193, 194, 196) which survive as earthworks along the River Itchen
- Watermill and pond visible on historic maps (**Figures 11 and 15, Appendix 6.1**) to the of Kings Worthy
- Group of post-medieval cottages (SRN 179), now demolished, to the northeast of the junction between the A33 and the B3047
- Former road/ track visible on historic maps (**Figures 14 and 17, Appendix 6.1**) linking Winnall with Down Farm
- The former Didcot, Newbury and Southampton Railway line (SRN 160, 161, 163, 165), which survives as an embankment on which the A34 was built, and Kings Worthy train station (SRN 207, 208) which opened in 1908 and was demolished later in the twentieth century
- Area of flint and dark clay (SRN 213) which suggests the presence of archaeological deposits in the White Hall Cottage area
- Additional features identified as cropmarks and earthworks identified by the NMP
- Features of uncertain origin identified during the second phase of geophysical survey carried out as part of the PCF stage 3a works (Geophysical Survey Summary Report - HE551511-SUM-VES-0_00_00-RP-LE-0001, see **Appendix 6.4**)

6.6.9 Further details about the known archaeological resource within the IAB and the likely value of receptors is provided in **Appendix 6.1** and is summarised in **Table 6-5** below.

Previously unknown archaeological remains

6.6.10 Previous archaeological investigations within the 300m study area have demonstrated that the IAB lies within an archaeologically sensitive area. In addition to the known archaeological remains described above, the IAB is considered to have a high potential to contain buried archaeological remains, the presence and value of which is currently unknown. An assessment of the potential and likely value of previous unknown archaeological remains within the IAB is provided in the heritage assessment (**Appendix 6.1**).

6.6.11 In summary, there is a paucity of early prehistoric remains, although areas of Palaeolithic potential have been identified within the IAB by a recent assessment of the archaeological potential for Pleistocene deposits in Hampshire (**Figure 4, Appendix 6.1**). Palaeolithic finds could also be present in alluvial deposits along the River Itchen and whilst no Mesolithic

finds, features or deposits have been found within the 300m study area there is the potential for undiscovered sites under later alluvial deposits, as has proved to be the case in other similar river valleys in southern England, with lack of discovery potentially a function of depth of burial and development rather than absence.

6.6.12 Previous archaeological investigations within the IAB and 300m study area have found extensive late prehistoric settlement, agricultural and funerary remains, along with evidence of a continuation of occupation into the Roman period. During the early medieval period, the river valley appears to have been a focus of nucleated settlement and evidence of early medieval occupation and several cemeteries have been found. As such, there is considered to be a high potential for remains of these dates to be present within the IAB.

6.6.13 During the medieval and post-medieval periods, the majority of the IAB was located beyond the settlements and within the wider agricultural landscape. There is considered to be a low potential for previously unrecorded medieval and post-medieval settlement remains to be present within the IAB although it is possible that remains may be present in the area directly to the south of Kings Worthy. There is a higher potential that medieval and post-medieval agricultural remains, such as ridge and furrow and former field boundaries, will be present within the IAB.

Previous disturbances and survival

6.6.14 Examination of historic mapping shows that prior to the construction of the M3 the IAB was predominantly farmland with a number of woods, coppices and water meadows, although it was crossed by several roads heading east out of Winchester and the former railway line between London and Southampton. Intrusive groundworks associated with the construction of the M3, A33 and the A34 and any associated services, drainage ditches and attenuation features will have significantly impacted buried archaeological deposits, although a programme of archaeological investigation was carried out during these construction works to mitigate the impact. Intrusive groundworks associated with the construction of these roads and the associated services will have resulted in the damage or destruction of buried archaeological deposits. Where the roads are in deep cuttings, for example at the Junction 9 roundabout, there is likely to have been the complete removal of archaeological deposits within the footprint of the carriageway. There is also likely to have been significant impacts on archaeological remains where the roads are at grade. It is anticipated that where the roads are located on embankments, archaeological deposits are likely to have survived below the embankment. Examination of Ordnance Survey maps shows that there are two or three areas of chalk quarrying within the IAB and the Environment Agency records two areas of historic landfill within the IAB (see **Chapter 9**). The excavation of these landfill and quarry sites will have significantly impacted upon archaeological remains within their footprint, damaging or more likely removing any deposits that might have been present.

6.6.15 The majority of the IAB, beyond the carriageways, which cover the 'areas of search for potential excess spoil management' and temporary compounds to the east of the M3, appears to have remained relatively undeveloped and as such it is anticipated that, if archaeological remains are present, they are likely to have survived, albeit it with some minor truncation from historic episodes of cultivation as demonstrated by the recent trial trench evaluation. It is also anticipated that waterlogged archaeological remains and deposits are likely to survive within the River Itchen flood plain where deep layers of made ground alluvium and peat are recorded.

Historic buildings

Designated built heritage assets

6.6.16 The IAB covers small parts of the Abbots Worthy and Kings Worthy Conservation Areas. In addition, there are a further 136 designated built heritage assets within 1km of the IAB including 133 Listed Buildings and three further Conservation Areas (**Figure 2, Appendix 6.1**).

6.6.17 The following designated built heritage assets are of high value:

- Five Grade I Listed Buildings (Church of St Mary NHLE: 1095898, City Bridge NHLE: 1167781, Church of St John the Baptist NHLE: 1296158, Church of St Swithun NHLE: 1350461, Church of St Andrew NHLE: 1095907)
- 11 Grade II* Listed Buildings (Church of St Mary NHLE: 1156360, Dymoke House NHLE: 1095857, Church of St Swithun NHLE 1350471, 1 Water Lane NHLE: 1095347, 24 and 25 St John's Street NHLE: 1095386, St John's Croft NHLE: 1095387, Peter's Theatre NHLE: 1095502, 42 Chisel Street NHLE: 1271527, 1 Chisel Street NHLE: 1350648, 12 Chisel Street NHLE: 1350651, Worthy Park House NHLE: 1095892)
- The Winchester Conservation Area which contains a significant number of important historical buildings

6.6.18 The following designated built heritage assets are of medium value:

- 117 Grade II listed buildings, which are mainly located within Conservation Areas
- The Abbots Worthy, Easton, Kings Worthy, Martyr Worthy Conservation Areas which contain a number of designated and non-designated historic buildings that contribute significantly to their historic character

6.6.19 Further details of the value of designated built heritage assets and an assessment of the setting, including the contribution of the M3 Junction 9

Improvement site towards the setting, of those designated built heritage assets considered likely to receive effects from the Proposed Scheme is provided in **Appendix 6.1**.

Non-designated built heritage assets

6.6.20 In addition to the designed built heritage assets there is also non-designated built heritage assets within the study areas which have the potential to receive effects from the Proposed Scheme. For example, Abbotsworthy House (SRN 168) which was originally constructed in 1836 and extensively remodelled in the 1950s, is still considered to have some architectural and historic interest and is of low value. The IAB covers a small part of the Abbotsworthy House Historic Park and Garden (HPG) (SRN 200) which is considered to be part of the non-designated built heritage assets setting. An assessment of the value and the setting of Abbotsworthy House is provided in **Appendix 6.1**.

6.6.21 No additional non-designated built heritage assets were raised as a concern at the consultation workshop held on 25 November 2020. However, should any be identified during further desk-based research or consultation which are considered to have the potential to receive significant effects from the Proposed Scheme they will be included within Cultural Heritage chapter of the ES.

Historic Landscape

6.6.22 There is one designated historic landscape recorded by Historic England within the 1km study area (**Figure 2, Appendix 6.1**). This is the Magdalen Hill Cemetery (Grade II Registered Park and Garden (RPG), NHLE:1000310) and is considered to be of medium value. Whilst the cemetery occupies a commanding position with extensive views over the surrounding landscape, the surrounding topography and intervening vegetation screen the IAB in views from the RPG.

6.6.23 Within Kings Worthy and Abbots Worthy there are nine historic park and gardens (HPG) some of which are on the local register (**Figure 6, Appendix 6.1**). In accordance with **Table 6-2** these are most likely to be of low value/sensitivity. The IAB includes a small part of Abbots Worthy House HPG, which is on the local register, and is directly adjacent to Kings Worthy House HPG and Kings Worthy Grove HPG, neither of which are on the local register. These HPGs date to the post-medieval period and early twentieth century. Worthy Park HPG which is on the northern side of the Itchen Valley with extensive views across the river valley is likely to have developed originally as a deer park.

6.6.24 The historic landscape character within the IAB is recorded by the Hampshire HLC project as predominately parliamentary enclosure with areas of recent settlement, old settlement, downland and valley floor (**Figure 9, Appendix 6.1**). These broad types are further subdivided into historic landscape types which are described in **Appendix 6.1**. The majority of these HLC types are

common and are considered to be of low value/ sensitivity although the old settlement areas and the water meadows are likely to be of higher sensitivity. The old settlements are designated as conservation areas for their special character and appearance and are of medium value. The water meadows which are situated within the valley floor may be of higher value/ sensitivity depending upon their level of survival and current condition. This will be ascertained during further work and reported upon in the Cultural Heritage ES Chapter. The valley floor and large parts of the study areas to the east of the M3 are part of the SDNP.

Table 6-5: Summary of Receptors Sensitivity

Receptor	Sensitivity	Qualifying comment
Archaeological remains		
Roman road east of St Catherine's Hill (NHLE: 1001798)	High	Scheduled monuments are of national importance
Anglo-Saxon cemetery in Worthy Park (NHLE: 1001817)	High	Scheduled monuments are of national importance
The late Iron Age settlement site north of Grace's Farm (NHLE: 1001825)	High	Scheduled monuments are of national importance
Worthy Down ditch (NHLE: 1001907)	High	Scheduled monuments are of national importance
The site of St Gertrude's Chapel (NHLE: 1005518)	High	Scheduled monuments are of national importance
Wolvesey Palace (NHLE: 1005535)	High	Scheduled monuments are of national importance
The Iron Age field system, banjo enclosure and Romano-British villa, 500m east of Woodham Farm (NHLE: 1013269)	High	Scheduled monuments are of national importance
The bowl barrow at the east end of Magdalen Hill Down (NHLE: 1015984)	High	Scheduled monuments are of national importance
St Catherine's Hill hillfort (NHLE: 1016489)	High	Scheduled monuments are of national importance
The round barrow cemetery on Magdalen Hill Down (NHLE: 1016746)	High	Scheduled monuments are of national importance

Receptor	Sensitivity	Qualifying comment
City Bridge at the junction of High Street and Bridge Street (NHLE: 1021112)	High	Scheduled monuments are of national importance
Surviving remains of the Neolithic/ Bronze Age ring ditch (SRN 71) and several discrete prehistoric pits found during recent evaluation (SRN 55)	Medium	Receptor compromised by construction of the M3. Surviving part retains cultural heritage value and is likely to be of regional importance
Post-medieval field boundaries and parish boundary found during recent evaluation (SRN 55)	Low	Local interest
An undated (but possibly prehistoric) ring ditch (SRN 75)	Unknown likely to be medium	The value of the receptor is unknown. If the cropmark relates to a prehistoric barrow it could be of at least regional importance
An undated linear feature (SRN 215)	Unknown likely to be low	The value of the receptor is unknown
Two Roman roads (SRN 129), and an aqueduct (SRN 123, 124)	Medium	Archaeological remains likely to be of regional importance
Geophysical anomalies - possible Anglo-Saxon settlement (SRN 214)	Unknown likely to be medium (reasonable worst-case scenario high)	The value of the receptor is unknown. If remains do relate to an Anglo-Saxon settlement, they would be of at least regional importance
Early medieval royal residence (SRN 144)	Unknown (reasonable worst-case scenario high)	The presence of this receptor within the IAB is conjectural. The value of the remains if present is unknown
Water meadows (SRN 186, 187, 188, 190, 192, 193, 194, 196)	Medium	Surviving original features which are of regional importance
Watermill and pond to the south of Kings Worthy	Low	Condition of receptor likely to be compromised by the construction of the A33 but still of local interest
Group of post-medieval cottages (SRN 179)	Low	Buildings demolished but associated buried remains still likely to be of local interest

Receptor	Sensitivity	Qualifying comment
Former road/ track linking Winnall with Down Farm	Low	Local interest
The former Didcot, Newbury and Southampton Railway line (SRN 160, 161, 163, 165), and Kings Worthy train station (SRN 207, 208)	Negligible	Little or no surviving archaeological interest
Area of flint and dark clay (SRN 213)	Unknown	The value of the receptor is unknown
Additional features identified as cropmarks and earthworks by the NMP	Unknown (reasonable worst-case scenario high)	The value of the receptor is unknown
Features identified during the second phase of geophysical survey.	Unknown (reasonable worst case scenario high)	The value of the receptor is unknown.
Previously unknown archaeological remains	Unknown (reasonable worst-case scenario high)	The IAB has a high potential to contain previously unrecorded remains dating to the prehistoric, Romano-British and early medieval periods, the presence and value of which are currently unknown. Based upon previous investigations within the IAB remains could be of between medium and high value. There is also the potential for medieval and post-medieval remains to be present which would most likely be of local interest. The potential for remains of Palaeolithic and Mesolithic date are deemed to be low but not discounted, particularly at depth within the River Itchen floodplain
Built heritage assets		
Winchester Conservation Area	High	Conservation areas which contain very important buildings are of national importance
Church of St Mary NHLE: 1095898, City Bridge NHLE: 1167781, Church of St John the Baptist NHLE: 1296158, Church of St Swithin NHLE:	High	Grade I listed buildings are of national importance

Receptor	Sensitivity	Qualifying comment
1350461, Church of St Andrew NHLE: 1095907		
Church of St Mary NHLE: 1156360, Dymoke House NHLE: 1095857, Church of St Swithun NHLE: 1350471, 1 Water Lane NHLE: 1095347, 24 and 25 St John's Street NHLE: 1095386, St John's Croft NHLE: 1095387, Peter's Theatre NHLE: 1095502, 42 Chisel Street NHLE: 1271527, 1 Chisel Street NHLE: 1350648, 12 Chisel Street NHLE: 1350651, Worthy Park House NHLE: 1095892	High	Grade II* listed buildings are of national importance
Kings Worthy Conservation Area and associated Grade II listed buildings	Medium	Grade II listed buildings and conservation areas containing buildings that contribute significantly to the historic character are of regional interest
Abbots Worthy Conservation Area and associated Grade II listed buildings	Medium	Grade II listed buildings and conservation areas containing buildings that contribute significantly to the historic character are of regional interest
Easton Conservation Area and associated Grade II listed buildings	Medium	Grade II listed buildings and conservation areas containing buildings that contribute significantly to the historic character are of regional interest
Martyr Worthy Conservation Area and associated Grade II listed buildings	Medium	Grade II listed buildings and conservation areas containing buildings that contribute significantly to the historic character are of regional interest
Other Grade II listed buildings located beyond the conservation areas	Medium	Grade II listed building are of regional importance
Abbotsworthy House (SRN 168)	Low	Building with local historic environment interest

Receptor	Sensitivity	Qualifying comment
Historic landscapes		
Magdalen Hill Cemetery (Grade II RPG, NHLE: 1000310)	Medium	Designated special historic landscape of regional interest
Historic Park and Gardens – Abbotsworthy House, Hinton House and Upper Farm	Low	Locally listed HPG's of local interest
Historic Park and Gardens – Kings Worthy Court, Kings Worthy House, Kings Worthy Grove, Northleigh, Worthy Park, Morton House	Negligible to Low	HPG's with little historical interest or value limited by poor preservation
River Valley – water meadows	Medium	An undesignated historic landscape types which are of regional value
Old settlement – village/ hamlet 1810 extent	Medium	The areas of old settlement are designated conservation areas and are of regional value
Downland	Low	Robust landscape of local interest
Parliamentary fields – medium regular fields with straight boundaries, large regular fields with straight boundaries and prairie fields	Low	Robust landscape of local interest
Recent settlement – post 1810 settlement	Low	Robust landscape of local interest
Valley Floor – Miscellaneous valley bottom paddocks and pastures and marsh and rough grazing	Low	Robust landscape of local interest

Future baseline

6.6.25 In the absence of the Proposed Scheme, the land uses within the IAB will be retained and management of the historic environment will continue on a similar basis to the existing situation.

6.7 Design, mitigation and enhancement measures

6.7.1 Following the ongoing and proposed evaluative works, a programme of archaeological mitigation which could include a combination of watching briefs, strip-map-sample and detailed archaeological excavation is likely to be required to reduce or offset (mitigate) the impacts upon archaeological

remains. Fulfilment of archaeological excavation and strip-map-sample requirements will need to be carried out prior to construction. Watching briefs, where required, will monitor intrusive groundworks during the construction of the Proposed Scheme. The agreement on the scope and scale of all archaeological investigations will be sought with the WCC Archaeologist.

- 6.7.2 Mitigation of harm to loss of palaeoenvironmental remains and sequences through direct scheme impacts may also be required. Such remains provide data on past landscapes and human activity within them. Of particular note are remains associated with stasis horizons (soils and peats) which represent former land surfaces, preserved within the wider floodplain of the River Itchen and its former courses and tributaries. Mitigation may be in the form of dating, geoarchaeological and palaeoenvironmental assessment and analysis of deep sequences collected by borehole and review of existing borehole logs taken for non-archaeological purposes.
- 6.7.3 Potential loss of archaeological remains must be addressed. The findings of the resulting archaeological investigations (evaluative works and mitigation), will result in knowledge gain, providing a better understanding of the historic environment within the 1km study area, will enhance the existing WHER data for the area, so making the baseline more robust for future planning purposes and may increase public knowledge and awareness of the historic environment. However, it is noted that the ability to record archaeological remains is not a factor when deciding if the loss of remains should be permitted.
- 6.7.4 Incorporating mitigation through design such as screening and considerate construction practices, to be undertaken in accordance with measures included in the first iteration Environmental Management Plan (fiEMP), will reduce potential effects to the setting of cultural heritage assets.

6.8 Assessment of potential effects

- 6.8.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon cultural heritage assets during the construction and operational phases. As noted in **Section 6.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below.
- 6.8.2 Impacts may be direct (physical) or indirect (changes to setting). The effects during construction are anticipated to be short to medium term duration (temporary) while post-construction effects are anticipated as being of long-term duration (permanent) unless otherwise stated. The exceptions to this are (direct) construction effects upon archaeological sites and features, which will be permanent due to loss/ removal.
- 6.8.3 Direct physical impacts could arise from intrusive construction related works across the IAB. Intrusive works within the IAB are likely to involve:

- Geotechnical and ground investigation works
- The removal of hardstanding, buried underground obstacles and potentially contaminated ground within the footprint of the existing carriageways
- The removal of topsoil, subsoil and the grading of existing ground levels within the IAB. This is likely to occur in the areas of permanent works as well as the areas of temporary works such as the working easement, construction access and compounds. The removal of topsoil, subsoil and grading of the spoil storage/ deposition areas is also anticipated
- The excavation for new subways
- The excavation of trenches and pits for new gantries, new and diverted utility services, soakaways, culverts or other drainage features
- The excavation and drilling for piles for any new bridge crossings or the widening of existing bridges
- Landscaping and planting

6.8.4 Potential indirect impacts (beneficial or adverse) that could arise from the Proposed Scheme include:

- Changes to local hydrology that could result in effects upon archaeological remains through dewatering
- The introduction of construction related activities and new roads with associated infrastructure such as gantries in key views from, towards, through and across cultural heritage assets particularly if there is a substantial change to the skyline
- The alteration to the historic landscape (i.e. setting) of cultural heritage assets, for example, new lengths of road causing a physical division between previously related heritage assets causing a loss of the identifiable relationship or where there are substantial changes to key features of an assets setting
- The loss of land historically associated with cultural heritage assets
- An increase in dust, noise, light, pollution, movement and vibration within the setting of cultural heritage assets

Construction

Archaeological remains

6.8.5 The construction of the Proposed Scheme will not result in direct impacts to any Scheduled Monument; all of those identified within the 1km study area are located outside of the IAB.

6.8.6 During an initial walkover of the study area it was found that the majority of Scheduled Monuments have little, if any, visibility with the IAB. This has, in part, been demonstrated by the preliminary ZTV produced as part of the Landscape and Visual assessment (**Figure 7.5, Appendix 7.1**). Given the distance from the IAB and the general lack of inter-visibility, it is considered that land within the IAB does not currently contribute towards the setting or heritage significance of the majority of Scheduled Monuments within the 1km study area (see **Appendix 6.1**). It is unlikely that construction of the Proposed Scheme will be visible or prominent in views from Scheduled Monuments within 1km of the IAB or result in an increase in noise, dust or vibration within the setting of the scheduled monuments. The potential exceptions to this are the round barrow cemetery on Magdalen Hill Down (NHLE: 1016746) and the site of St Gertrude's Chapel (NHLE: 1005518), the settings of which include part of the IAB.

- The round barrow cemetery on Magdalen Hill Down (NHLE: 1016746) is located in close proximity to the southern area of search for potential excess spoil management (**Figure 2.3, Appendix 2.1**). Currently it is not known how many or which of these areas will be required. The southern area is within the setting of the scheduled round barrow cemetery and is currently assessed as making a neutral contribution to the value of the scheduled monument. If this area is taken forward into the final design, construction activities are likely to be very prominent in views and audible from the scheduled monument, which could have an impact of moderate magnitude to the setting and a moderate or large adverse effect upon the value of the Scheduled Monument. Subsequent reinstatement of the area following use would make these effects temporary, with no residual effects anticipated. This assessment will be reviewed during ongoing EIA work and reported in the ES following the decision on which areas of search for potential excess storage will be included and once further details about construction activities in this area are available.
- The site of St Gertrude's Chapel (NHLE: 1005518) is largely screened from land within the IAB, although trees along the western edge of the A34 which screen views of the carriageway, a small part of water meadow which are within the IAB, and higher ground beyond the A34 (which is within the IAB) are visible from the Scheduled Monument. The trees which line and screen the A34 and the small part of the meadow which are currently proposed for environmental mitigation, are considered to make a neutral contribution towards the setting of the scheduled monument. Preliminary environmental mitigation design plans (**Figure 2.6, Appendix 2.1**) suggest that this area of vegetation is to be retained and enhanced. Therefore, construction activities in this area are considered unlikely to be noticeably visible. There is however the possibility for an increase in noise which could have an adverse effect upon the setting of the Scheduled Monument. This will be assessed through ongoing EIA work, to be reported in the ES). Beyond this, the higher ground to the east of the A33 and A34 is visible above the tree line. This area is currently proposed for environmental mitigation and a

new roundabout. It is possible that construction activities associated with this may be visible. It is currently considered that this could have an indirect minor impact resulting in a temporary slight or moderate adverse effect although this will be reviewed for the ES once further details on construction activities in this area are available.

- 6.8.7 It was not possible to visit the late Iron Age settlement site to the north of Grace’s Farm (NHLE: 1001825) during the initial walkover survey. Whilst it is anticipated that land within the IAB does not currently make a significant contribution towards the setting of the Scheduled Monument (see **Appendix 6.1**), and therefore the Proposed Scheme would be unlikely to affect the Scheduled Monument, the preliminary ZTV (see **Figure 7.5, Appendix 7.1**) indicates that there will be some visibility of the new carriageway alignment. As such, further assessment and a visit to ascertain the contribution of these views to the setting of the Scheduled Monument is required and will be conducted to further inform the EIA, which will be reported within the ES.
- 6.8.8 It is currently anticipated that the magnitude of change on the remaining scheduled monuments within the 1km study area is likely to be no change resulting in a neutral effect.
- 6.8.9 Intrusive groundworks associated with the construction of the Proposed Scheme, as described in paragraph 6.8.3, are likely to have a direct adverse effect resulting in the damage, removal or destruction of known archaeological remains which are within the IAB and within the footprint of intrusive groundworks. Where archaeological remains are wholly within the footprint of intrusive ground works, these construction activities will likely result in the complete removal of archaeological remains which represents a major adverse effect. Where archaeological remains within the IAB and the footprint of construction activities extend outside the footprint of intrusive groundworks, the magnitude of impact is likely to be lower because the assets will not be completely destroyed and those parts that are beyond intrusive groundworks will not be impacted upon. The likely effect before mitigation upon known archaeological remains is outlined in **Table 6-6**. A programme of archaeological mitigation will be discussed with the WCC and HCC Archaeologists prior to construction and outlined within the ES. The implementation of any agreed mitigation will ensure that archaeological remains are recorded prior to their removal from land within the IAB and will reduce or remove any potential pre-mitigation effects identified in **Table 6-6** below.

Table 6-6: Potential effects before mitigation upon known archaeological remains

Receptor	Likely magnitude of impact	Likely significance of effect
Surviving remains of the Neolithic/ Bronze Age ring ditch (SRN 71) and several discrete prehistoric pits	Receptors are located wholly within the IAB and in the area of permanent / temporary land take. Intrusive groundworks will	Permanent moderate or large adverse effect.

Receptor	Likely magnitude of impact	Likely significance of effect
found during recent evaluation (SRN 55)	likely involve their complete removal (major impact).	
Post-medieval field boundaries and parish boundary found during recent evaluation (SRN 55)	Receptors are located wholly within the IAB and in the area of permanent / temporary land take. Intrusive groundworks will likely involve their complete removal (major impact).	Permanent slight or moderate adverse effect.
An undated (but possibly prehistoric) ring ditch (SRN 75)	Receptor is located wholly within the IAB. However, no intrusive groundworks are proposed within this area.	No groundworks proposed in the area of this feature and as such no impact upon this feature is anticipated. This will be monitored and reviewed during further EIA work and should this change potential impacts will be assessed and reported within the ES.
An undated linear feature (SRN 215)	Full extent of feature is currently unknown. Intrusive groundworks could have a major impact.	Permanent unknown adverse effect.
Two Roman roads (SRN 129), and an aqueduct (SRN 123, 124)	Only a small part of these receptors is recorded within the IAB by the WHER and their existence within the footprint of intrusive groundworks is currently unknown. At this stage it is also unclear what intrusive groundworks are proposed on the parts of these features thought to be within the IAB and therefore the effect is unknown. If present, given that only a small part of the features would be likely to be affected any groundworks would likely have a minor impact	Permanent unknown adverse effect. If remains of the features are present within the IAB and within the footprint of intrusive groundworks, only a small area of the overall feature would be impacted, and this is unlikely to result in a significant effect.
Geophysical anomalies - possible Anglo-Saxon settlement (SRN 214)	The receptor is located in an area proposed for environmental mitigation. The nature and extent of this receptor is currently	Permanent unknown adverse effect. Further archaeological investigation to be

Receptor	Likely magnitude of impact	Likely significance of effect
	unclear. Further archaeological evaluation will aid in ascertaining the presence and value of this receptor. In a reasonable worst-case scenario, intrusive groundworks could have a major impact.	carried out as part of ongoing EIA work will help to inform the significance of effect which will be reported upon in the ES.
Early medieval royal residence (SRN 144)	The presence of this feature within the IAB is currently unknown and its inclusion in the HER is conjectural and based on documentary evidence that records a royal residence at Kings Worthy. In a reasonable worst-case scenario, if remains are present within the IAB, intrusive groundworks could have a major impact.	In a reasonable worst case-scenario potentially a permanent large or very large adverse effect.
Water meadows (SRN 186,187, 188, 190, 192, 193, 194, 196)	Intrusive groundworks are only likely to affect a small part of the water meadows. This could have a minor effect upon the receptors.	Anticipated to be permanent slight adverse effect. To be reviewed in ongoing EIA work and reported in the ES following confirmation of construction activities within this area.
Watermill and pond to the south of Kings Worthy	Receptor located within the IAB, but it is not known whether any below ground remains survive. Intrusive groundworks in this area could have a major impact upon any elements of this receptor which survive within the IAB.	In a reasonable worst-case scenario permanent slight or moderate adverse effect.
Group of post-medieval cottages (SRN 179)	Receptor is located in the IAB. However, no groundworks are anticipated within this area.	No groundworks proposed in the area of this feature and as such no impact upon this feature is anticipated. This will be monitored and reviewed during further EIA work and should

Receptor	Likely magnitude of impact	Likely significance of effect
		this change potential impacts will be assessed and reported within the ES.
Former road/ track linking Winnall with Down Farm	Receptor crosses an area of search for potential excess spoil management. Intrusive groundworks within this area could have a major impact	Anticipated to be permanent slight or moderate effect. To be reviewed in going EIA work and reported in the ES following confirmation of construction activities within this area.
The former Didcot, Newbury and Southampton Railway line (SRN 160, 161, 163, 165), and Kings Worthy train station (SRN 207, 208)	Only a small part of the former railway line is located within the IAB. The train station was wholly within the IAB but has been demolished and it is not clear if below ground remains survive. Intrusive groundworks in this area could have a minor effect upon the route of the railway line and potentially a major impact upon any surviving remains of the railway station.	Permanent unknown adverse effect. To be reviewed in ongoing EIA work and reported in the ES following confirmation of construction activities within this area.
Area of flint and dark clay (SRN 213)	Value of receptor is currently unknown. Further archaeological evaluation will aid in ascertaining the presence and value of this receptor. It is located within the IAB and in a reasonable worst-case scenario, intrusive groundworks in this area could have a major impact.	Permanent unknown adverse effect. To be reviewed in ongoing EIA work and reported in the ES following confirmation of construction activities within this area.
Additional features identified as cropmarks and earthworks by the NMP	The NMP records features, currently of unknown value, across the IAB. Further archaeological evaluation will aid in ascertaining the presence and value of this receptor. In a reasonable worst-case scenario, intrusive groundworks could have a major impact.	Permanent unknown adverse effect. In a reasonable worst-case scenario Permanent large or very large adverse effect. Further archaeological investigation to be carried out as part of ongoing EIA work will

Receptor	Likely magnitude of impact	Likely significance of effect
		help to inform the significance of effect which will be reported upon in the ES.
Features identified during the second phase of geophysical survey.	The geophysical survey identified anomalies that could be of archaeological origin. Trial trenching proposed for the summer of 2021 will aid in ascertaining the presence and value of this receptor. These are currently of unknown value but in a reasonable worst-case scenario, intrusive groundworks could have a major impact	Permanent unknown adverse effect. In a reasonable worst-case scenario, permanent large or very large adverse effect.

6.8.10 In addition to known archaeological remains, there is the potential for previously unidentified archaeological remains of unknown sensitivity to be present in currently undisturbed parts of the IAB which have not been previously investigated. The presence and value of such remains is currently unknown. A programme of archaeological evaluative works, comprising ongoing geophysics and trial trenching proposed for summer 2021, will test the archaeological potential of these parts of land within the IAB and significantly reduce (but not completely remove) the risk of encountering previously unknown archaeological remains during construction. Any archaeological remains identified during evaluative works carried out prior to the submission of the application will be reported upon in the cultural heritage chapter of the ES. However, there will still be the potential for previously unknown remains to be encountered during construction. Construction activities will potentially have an impact of major magnitude which would result (before mitigation) in a permanent slight or slight to moderate adverse effect upon negligible or low value archaeological remains and a permanent moderate or large adverse effect upon archaeological remains of medium value. In a reasonable worst-case scenario, archaeological remains could be of high value and construction activities will result (before mitigation) in an impact of major magnitude and a permanent large or very large adverse effect. A suitable programme of mitigation, to be agreed with the WCC and HCC Archaeologists, will reduce or remove any risk and potential effects.

Built heritage

6.8.11 The construction of the Proposed Scheme will not result in direct physical impacts to any listed building or unlisted historic building within the 1km study area; all of those identified within the 1km study area are located outside of the IAB. The IAB includes small parts of the Kings Worthy and Abbots Worthy Conservation Areas, although no works are proposed in these areas.

- 6.8.12 Land within the IAB is screened in views to and from the majority of the listed buildings within the Abbots Worthy and Kings Worthy Conservation Areas and as such these are unlikely to receive effects from the construction of the Proposed Scheme.
- 6.8.13 Worthy Park House is located to the north of the IAB. Due to its elevated position, it has extensive views across the surrounding landscape including south across land within the IAB. These views of the River Itchen and the surrounding landscape, which are recorded in nineteenth century descriptions, have been significantly altered by the construction of the M3, the existing junction and the modern encroachment of Winchester from the west. Despite this, the landscape on the eastern side of the M3 has remained undeveloped retaining part of the views described in the nineteenth century and contributes towards the historic interest of the listed building. The construction of the Proposed Scheme, particularly areas of search for potential excess spoil management, potential construction compound areas and areas proposed for environmental mitigation on the eastern side of the M3 are likely to be prominent in views from the listed building introducing construction traffic and further eroding the character of the surrounding landscape which are part of the wider setting of the listed building. As part of the wider setting that has already been extensively altered the construction of the Proposed Scheme is likely to result in an impact of minor magnitude and a temporary slight or moderate adverse effect. This assessment will be reviewed in ongoing EIA work and reported in the ES following the decision on which areas of search for potential excess storage will be included and once further details about construction activities in this area are available.
- 6.8.14 The construction phase of the Proposed Scheme will largely be screened in views from the Winchester Conservation Area, Easton Conservation Area, Martyr Worthy Conservation Area, their associated listed buildings and the remaining listed buildings within the 1km study area (which are located outside of the conservation areas) and is unlikely to impact upon elements of their setting or how their value is experienced and appreciated. Therefore, the construction of the Proposed Scheme will likely have a magnitude of impact of no change and result in a neutral effect. This assessment will be reviewed in ongoing EIA work and reported in the ES.
- 6.8.15 The construction of the Proposed Scheme is likely to be largely screened in views from Abbotsworthy House (SRN 168). A section of the IAB adjacent to the A33 covers a small part of the Abbotsworthy HPG (SRN 200) which is part of the wider setting of Abbotsworthy House and makes a low positive contribution to the overall value of the building. Given that no works are proposed within this area the magnitude of impact is defined as no change resulting in a neutral effect. This assessment will be reviewed in ongoing EIA work and reported in the ES.
- 6.8.16 It should be noted that during the construction phase there will be temporary road diversions, which will be restricted to motorways and A roads where possible, including the A303, A34, A33, A31 and A3404 (**Chapter 2**). Where this is not possible, smaller B-roads may need to be used which could result

in increased traffic levels through the conservation areas or adjacent to listed buildings. These temporary road closures are likely to be between 12 and 48 hours and could result in a temporary adverse effect. The road closures are subject to further work as the design progresses. Currently the effect is not anticipated to be significant, but this will be reviewed in ongoing EIA work and reported in the ES following further design.

Historic landscapes

- 6.8.17 Construction activities associated with the Proposed Scheme will not directly or indirectly affect Magdalen Hill Cemetery (Grade II RPG, NHLE: 1000310). Therefore, the magnitude of impact will be no change resulting in a neutral effect.
- 6.8.18 A section of the IAB adjacent to the A33 covers a small part of the Abbotsworthy HPG (SRN 200). No construction activities are proposed in this area and as such the magnitude of impact is defined as no change resulting in a neutral effect. This assessment will be reviewed in ongoing EIA work and reported in the ES.
- 6.8.19 The construction of the Proposed Scheme will result in direct physical impacts upon the HLC types within the footprint of intrusive groundworks within the IAB. Construction activities, particularly those associated with the areas of search for potential excess spoil management, potential construction compound areas and areas proposed for environmental mitigation are likely to have a direct impact of moderate magnitude upon the low value historic landscape types resulting in a permanent slight or moderate adverse effect. Construction of the Proposed Scheme will extensively alter the character of the downland area between the M3 and the A33 this will result in a direct impact of major magnitude and a permanent slight or moderate adverse effect.
- 6.8.20 It is anticipated that the construction of the Proposed Scheme will only impact a small part of the water meadows and old settlement HLC types. A direct impact of minor magnitude upon the medium value HLC type will result in a permanent slight adverse effect.

Operation

Archaeological remains

- 6.8.21 It is anticipated that, if the “southern area of search for potential excess storage management” is taken to final design, following reinstatement, there will be no operational impacts of the Proposed Scheme upon the setting of the round barrow cemetery on Magdalen Hill Down (Scheduled Monument, NHLE: 1016746). It is also anticipated that following the enhancement of existing vegetation along the western side of the A34 that there will be no operational impacts upon the setting of St Gertrude’s Chapel (Scheduled Monument, NHLE: 1005518). Therefore, the operation of the Proposed Scheme will have a magnitude of impact of no change upon these scheduled

monuments, resulting in a permanent neutral effect. Further assessment of the impacts upon the setting of these scheduled monuments, particularly views across St Gertrude's Chapel, will be carried out following further detailed design and finalisation of the ZTV, and will be reported within the ES.

6.8.22 The operation of the Proposed Scheme is likely to be visible from the scheduled Iron Age settlement to the north of Grace's Farm. Whilst the preliminary ZTV (See **Figure 7.5, Appendix 7.1**) indicates that there will be some visibility of the new carriageway alignment the preliminary ZTV does not include gantries and other structures. Further assessment of the setting of the scheduled monument and the impact upon this setting following further detailed design will be conducted to further inform the EIA, which will be reported within the ES.

6.8.23 The M3 J9 site is not considered to contribute towards the setting of any other scheduled monument within the 1km study area and therefore the operation of the Proposed Scheme will have a magnitude of impact of no change resulting in a permanent neutral effect upon them.

6.8.24 Where the impact upon archaeological remains is suitably mitigated prior to or during the construction of the Proposed Scheme, there will be no direct impacts during the operation phase as remains will have been damaged or removed during the construction phase. Should any archaeological remains be identified during ongoing and proposed evaluative works that are of such high value that they warrant preservation in situ any potential impacts upon these as a result of vibration, compaction, or dewatering will be assessed in the ES.

6.8.25 There is the potential that the Proposed Scheme could result in changes to local hydrological regimes see, **Chapter 13 Road Drainage and the Water Environment**, which could result in residual effects upon archaeological remains and deposits through dewatering. The significance of this impact and the potential receptors that might be affected requires further consideration in light of the detailed design and construction methodology once available.

Built heritage

6.8.26 The operation of the Proposed Scheme will not directly affect any listed or unlisted historic building within the 1km study area, although there is the potential for indirect effects from changes to the setting of some listed buildings.

6.8.27 The operation of the Proposed Scheme is likely to be visible from Worthy Park House (Grade II* listed building, NHLE: 1095892) which occupies a prominent position to the north of the IAB. These will be long distance views of the Proposed Scheme and areas of chalk grasslands created as part of the environmental mitigation. The listed building currently has extensive views across the motorway and overall, it is considered that the operation of

the Proposed Scheme may have an impact of negligible magnitude resulting in a permanent slight adverse effect. This assessment will be reviewed in ongoing EIA work and reported in the ES following confirmation of the environmental mitigation.

6.8.28 There will be no direct changes to the Kings Worthy or Abbots Worthy Conservation Areas during the operation of the Proposed Scheme. The A33 is already a busy road that passes adjacent to Kings Worthy and Abbots Worthy and the operation of the Proposed Scheme will not alter this. Slight changes to the alignment of the A33 adjacent to the Kings Worthy Conservation Area, addition of the walking route and creation of new access from the A33 to businesses at the western end of the conservation area represent minor changes to the setting that may have a permanent slight adverse effect. This assessment will be reviewed in ongoing EIA work and reported in the ES following further design work to be carried out as part of the EIA.

6.8.29 The operation of the Proposed Scheme will largely be screened in views from all other conservation areas and listed buildings within the 1km study area and will not impact upon elements of their setting or how their value is experienced and appreciated. Therefore, at this stage, it is expected that the operation of the Proposed Scheme is likely to have a magnitude of impact of no change and result in a permanent neutral effect, although this will be reviewed in ongoing EIA work and reported in the ES chapter.

6.8.30 The operation of the Proposed Scheme is likely to be largely screened in views from Abbotsworthy House (SRN 168). Therefore, it is unlikely that there will be an effect upon the setting of the historic building. This assessment will be reviewed in ongoing EIA work and reported in the ES following confirmation of the environmental mitigation.

Historic landscape

6.8.31 The operation of the Proposed Scheme will not be visible from and will not alter the setting of Magdalen Hill Cemetery (Grade II Registered Park and Garden, NHLE: 1000310). Therefore, the magnitude of impact will be no change resulting in a permanent neutral affect.

6.8.32 There will be no direct impacts upon the historic landscape character types or HPGs during the operation of the Proposed Scheme. The alteration to the historic landscape character will have occurred during the construction phase. The operation of the Proposed Scheme is likely to be largely screened in views from HPGs within the 1km study area and is unlikely to affect the setting of the low value receptors. As such there is likely to be a magnitude of impact of no change and a permanent neutral effect. This assessment will be reviewed in ongoing EIA work and reported in the ES following further design work to be carried out as part of the EIA.

6.9 Anticipated further assessment

6.9.1 Further work anticipated to be undertaken includes:

- Archaeological evaluation, consisting of a geophysical survey and trial trenching has been agreed with the WCC Archaeologist. The geophysical survey is ongoing, and the trenching is planned for summer 2021. These surveys are targeting areas proposed for environmental mitigation, construction compounds and areas of search for potential excess spoil management. The results of this work, which will clarify the presence (or absence) and significance of the archaeological remains within the IAB, will be reported in the ES which will be submitted to accompany the application for Development Consent.
- Visits, where possible, to cultural heritage assets not visited during the initial walkover survey and those identified through further consultation and from further assessment of the final ZTV. The results of further setting assessments will be included within the ES, which will be submitted to accompany the application for Development Consent.
- LiDAR data is to be downloaded and visualisations (such as hillshade) will be created to assess whether any archaeological features survive as earthworks within the IAB. This assessment, visualisations and an interpretation will be included within the cultural heritage ES chapter.
- The ES will identify the significance of effects in accordance with the methodology and significance criteria outlined in the methodology section.

7 Landscape and Visual

7.1 Introduction

7.1.1 This chapter describes the preliminary findings of the assessment of likely significant landscape and visual effects that the Proposed Scheme could have on receptors relevant to landscape and visual matters. In addition, it identifies the types of proposed mitigation under consideration to reduce potential impacts of the Proposed Scheme as well as proposed enhancement measures.

7.1.2 As the Proposed Scheme is a highways infrastructure project, the design and assessment methodology are guided by the relevant Department for Transport's Design Manual for Roads and Bridges (DMRB), in this instance LA107 Landscape and Visual Effects (Highways England, 2020).

7.1.3 The importance and value of our landscape is recognised by the European Landscape Convention (ELC) which came into effect for the UK in March 2007. This treaty recognises the importance of landscape not just in terms of its scenery or backdrop, but because it links culture with nature, and past with present. The treaty provides the following definition:

- *“Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.”*

7.1.4 The ELC identifies the following reasons why landscape is of vital importance:

- *“Landscape is everywhere: Landscape provides a setting to people’s lives, both physically and through memories and associations.*
- *Landscape is the product of human history. It is the meeting ground between natural and cultural influences. It is constantly changing in response to a myriad of different decisions.*
- *Landscape defines identity and sense of place: it is central to defining, national, regional, local and personal identity. Differences in landscape character play on all our senses – sight, hearing, smell and taste – day and night and through the seasons.*
- *Landscape is imbued with personal values: it inspires and can take on spiritual values. These values change and evolve.*
- *Landscape provides a sense of continuity: despite change it provides continuity in people’s lives, linking the past with the present and the future.*
- *Landscape provides a wide range of benefits: it provides goods and services essential for human survival and well-being.”*

7.1.5 There exists an intrinsic link between the landscape, historic and ecological features, which form an integral part of the overall character of the landscape. In this context, heritage and ecological features which influence or relate to the landscape are identified as key component characteristics of the landscape. Reference is also made to the relevant PEIR chapters for each of the interrelated topics where relevant.

7.2 Legislative and policy framework

7.2.1 The legislative and policy frameworks relevant to landscape and visual matters associated with the Proposed Scheme are as follows:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Landscape and Visual Impacts paragraphs 5.81-5.89 (Artificial Light) 5.143 to 5.161 (Landscape and Visual Impacts including Tranquillity) and 5.188 (Tranquillity)
- National Planning Policy Framework (NPPF) (2019): Paragraph 8 (Achieving sustainable development), 124, 127 and 130 (Achieving well-designed places), 170 and 172 (Conserving and enhancing the natural environment) and 180 (Conserving and enhancing the natural environment: Ground conditions and pollution) and the associated Planning Practice Guidance: Natural Environment (2016), Noise (2014) and Light pollution (2014)
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles); Policy MTRA4 (Development in the Countryside); Policy CP13 (High Quality Design); Policy CP15 (Green Infrastructure); Policy CP19 (South Downs National Park (SDNP)); and, Policy CP20 (Heritage and Landscape Character)
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town); Policy WIN3 (Winchester Town– Views & Roofscape); Policy DM10 (Essential Facilities & Services in the Countryside); Policy DM15 (Local Distinctiveness); Policy DM16 (Site Design Criteria); Policy DM17 (Site Development Principles); Policy DM19 (Development and Pollution); Policy DM23 (Rural Character); Policy DM24 (Special Trees, Important Hedgerows and Ancient Woodlands); Policy DM25 (Historic Parks and Gardens); and, Policy DM29 Heritage Assets
- Winchester District Draft Local Plan 2018 -2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February – 12th April 2021
- South Downs Local Plan (adopted 2019) – Core Policy SD1 (Sustainable Development); Core Policy SD3 (Major Development); Strategic Policy SD4 (Landscape Character); Strategic Policy SD5 (Design); Strategic Policy SD6 (Safeguarding Views); Strategic Policy SD7 (Relative Tranquillity); Strategic Policy SD 8 (Dark Night Skies); Development

Management Policy SD11 (Trees, Woodland and Hedgerows); Development Management Policy SD21 (Public Realm, Highway Design and Public Art); Strategic Policy SD42 (Infrastructure); Strategic Policy SD45 (Green Infrastructure); and, Development Management Policy SD54 (Pollution and Air Quality)

- South Downs National Park Viewshed Study Report (South Downs National Park Authority, SDNPA, 2015)
- 2020-2025 South Downs Partnership Management Plan (2020) - Outcome 1: Landscape & Natural Beauty

7.3 Consultation

7.3.1 Relevant consultation with Statutory Consultees in regard to Landscape and Visual Effects is recorded as per **Table 7-1** below.

Table 7-1: Consultation Undertaken

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020) and Statutory Consultee Responses		
Page 22 Paragraph 4.4.2	<i>“The ES should define and justify the study area based on the Zone of Theoretical Visibility and extent to which significant effects are likely to occur. This may also introduce new viewpoint locations which the ES should identify and assess any likely significant effects where they are likely to occur.”</i>	A preliminary (see Figure 7.5, Appendix 7.1) and updated (see Figure 7.6 Appendix 7.1) ZTV has been produced at this PEIR stage, which illustrates a limited visual envelope focused around the existing M3, A34 and A33 transport corridors accounting for high sided vehicles. As part of ongoing EIA work, a more detailed ZTV will be produced that considers locations of gantries and other vertical elements such as CCTV columns (and reported in the ES). Should further landscape and visual receptors arise as a result of the detailed ZTV mapping these will be accounted for in the ongoing EIA work, to be reported in the ES.
Page 22 Paragraph 4.4.3	<i>“Considering the location of Abbots Worthy Park is only c. 15m to the south-east of one part of the red line boundary, the ES should include Abbots Worthy House and Garden as a receptor and assess</i>	Effects on the heritage assets have been considered as part of the cultural heritage chapter of this PEIR (Chapter 6) and subsequently within the ES in line

Reference	Comment	Response
	<i>any potential significant effects as a result of the Proposed Development where they are likely to occur.”</i>	with DMRB LA106, (Highways England 2020). Effects on the setting of Abbots Worthy House and Garden are considered in Table 7-10 of this PEIR, along with other heritage designations.
Page 23 Paragraph 4.4.4	<i>“The ES should assess the potential significant effects from night time/winter lighting of the Proposed Development during its construction and operation where they are likely to occur.”</i>	Lighting effects will be considered within the ES in line with DMRB LA107 (Highways England 2020). Agreement has been sought with Statutory Consultees in regard to view locations for undertaking lighting assessment.
Page 23 Paragraph 4.4.5	<i>“Therefore, the ES should include an assessment of effects on landscape character for the Itchen Valley as a receptor in its own right where significant effects are likely to occur.”</i>	The Itchen Valley as a landscape feature falls within landscape character areas F5: Itchen Floodplain (South Downs Landscape Character Assessment, 2020) and 3c: Itchen Valley (Hampshire County Council Integrated Landscape Character Assessment, 2012) and has been considered within the PEIR and will subsequently be within ongoing EIA work and reported in the ES.
Page 24 Paragraph 4.4.6	<i>“The ES should define and assess significant effects on all sensitive receptors where they are likely to occur and effort should be made to agree the approach with the relevant consultation bodies.”</i>	SDNPA, Hampshire County Council (HCC) and Winchester City Council (WCC) have been consulted in relation to LVIA methodology, study area and view locations as part of the Scoping Report (2020) and informally during pre-scoping discussions. Receptors have been defined in Section 7.7 of this PEIR and significant effects will be reported within the ES.
Page 24 Paragraph 4.4.7	<i>“Proposed view locations are set out in Scoping Report Table 8.2 but no photomontages, 3D models, wireframe images, and/or Accurate Visual Representations</i>	Accurate Visual Representations will be produced to inform the ongoing EIA work which will be reported in the ES. 3D modelling will help to refine the design prior

Reference	Comment	Response
	<p><i>of the Proposed Development are provided.</i></p> <p><i>The ES should include some or all of these visual examples. Such visual impact assessment within the ES should assess not just views from identified locations or receptors, but also views to them where significant effects are likely to occur.”</i></p>	<p>to assessment to lessen potential effects on surrounding receptors.</p>
<p>Page 24 Paragraph 4.4.8</p>	<p><i>“Key impacts are listed in Scoping Report paragraph 8.3.3 but do not consider potential effects on topography, agricultural land, recreation and enjoyment and cumulative effects with other development.</i></p> <p><i>The ES should list all key impacts and assess them where significant effects are likely to occur.”</i></p>	<p>Potential effects on topography, agricultural land and recreation have been considered within Section 7.9 of this PEIR and significant effects will be recorded within the ES.</p>
<p>Page 25 Paragraph 4.4.9</p>	<p><i>“Mitigation proposed in the ES should account for changes in vegetation and foliage between winter and summer months. The ES should also assess significant effects of the Proposed Development on the setting of trees and woodland where they are likely to occur”</i></p>	<p>The Preliminary Environmental Mitigation Plan (see Figure 2.6, Appendix 2.1) illustrates where reinforcement of roadside planting has been proposed, which takes into account seasonality by creating overlapping layers of vegetation.</p> <p>The assessment of significant effects will be reported in the ES.</p>
<p>Page 25 Paragraph 4.4.10</p>	<p><i>“Paras 8.4.7–8.4.13 outline some mitigation and enhancement measures for the operation of the Proposed Development; effort should be made to agree any mitigation measures with the relevant consultation bodies to ensure that the measures are appropriate. The ES should include a full description of the proposed measures and indicate how these measures will be implemented, secured and their influence on the assessment of significant effects.”</i></p>	<p>The Preliminary Environmental Mitigation Plan (see Figure 2.6, Appendix 2.1) and sections (see Figures 2.7 and 2.8, Appendix 2.1) will be consulted on with relevant Statutory Consultees. The full description of mitigation measures, once agreed with Statutory Consultees, will be set out within ES, along with how they will be legally secured, implemented, as well as their influence on the assessment (i.e. through defining residual effects).</p>

Reference	Comment	Response
Page 25 Paragraph 4.4.11	<i>“The Inspectorate encourages the Applicant to take account of more recent guidance such as Visual Representation of Development Proposals: Technical Guidance Note 06/19 (Landscape Institute 2019), and Infrastructure: Technical Guidance Note 04/20 (Landscape Institute 2020), where relevant.”</i>	Noted and relevant standards and guidance reflected in Section 7.4 of this PEIR.
Page 25/26 Paragraph 4.4.12	<i>“The ES should explain how sensitivity and impact magnitude are applied in relation to the guidance and explain how and where assumptions, professional judgement and sources underpin the assessment.”</i>	Full landscape and visual assessment tables will be included within the ES, which set out the sensitivity and magnitude for each receptor.
Forestry Commission Page 67-72	<i>“Woodland under 2 hectares may not appear on the Ancient Woodland Inventory but may still have ancient woodland characteristics, so we would suggest that a detailed investigation is undertaken to ascertain whether any additional ancient woodlands exist that may be impacted by the proposed scheme.”</i>	Detailed arboricultural surveys have been carried out to inform the evolving design process. Should ancient woodland or veteran trees be identified the baseline constraints mapping for the project will be updated.
	<i>“The ES should consider the importance of practicing good biosecurity, this includes when sourcing tree stock. Purchasing UK-grown plants can help avoid accidentally introducing pest or diseases on imported stock.”</i>	Landscape mitigation measures detailed in Section 7.8 of this PEIR refers to sourcing plants/trees from locally available stock where reasonably practicable and from UK sources in any event. Further information will be included within the ES as appropriate.
	<i>“We suggest that a UKFS-compliant Woodland Creation Design Plan is considered for any potential woodland creation habitat proposed in the development; including its long term management to address future management including ‘land locked’ areas to ensure suitable</i>	It is intended that a UKFS compliant woodland management plan will be integrated as part of a draft Outline Landscape and Ecological Management Plan (OLEMP) for the Proposed Scheme. The Preliminary

Reference	Comment	Response
	<p><i>planting schemes and the appropriate infrastructure is in place, and that woods can be effectively managed (including timber extraction) in the future. The Forestry Commission would welcome the opportunity to be engaged in the planting proposals.</i></p>	<p>Environmental Mitigation Plan (see Figure 2.6, Appendix 2.1).</p>
	<p><i>“A UKFS-compliant woodland management plan should be undertaken for any woodland management of existing woodland proposals put forward as part of the mitigation package. We note that Highways England intend to draw up a 15-year management plan for the current and to-be-created woodland, and we expect to see this confirmed, in detail, within the ES.”</i></p>	<p>It is intended that a UKFS compliant woodland management plan will be integrated as part of a draft Outline Landscape and Ecological Management Plan (OLEMP) for the Proposed Scheme. The Preliminary Environmental Mitigation Plan (see Figure 2.6, Appendix 2.1).</p>
Natural England Page 85-95	<p><i>“Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the Hampshire Biodiversity Information Centre and other appropriate bodies (which may include the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document).”</i></p>	<p>Relevant landscape character information from SDNPA, WCC and HCC has been consulted and recorded in the PEIR.</p> <p>The Hampshire Biodiversity Information Centre has been consulted, as reported in Chapter 8 of this PEIR.</p>
	<p><i>“As the development site is within/adjacent to South Downs National Park, consideration should be given to the direct and indirect effects upon this designated landscape and in particular the effect upon its purpose for designation within the environmental impact assessment, as well as the content of the relevant</i></p>	<p>SDNPA have been consulted in regard to LVIA methodology, study area and view locations. Consideration has been given to impacts known at this stage within Section 7.9 of this PEIR, ongoing EIA work will be reported within the ES.</p>

Reference	Comment	Response
	<p><i>management plan for South Downs National Park.”</i></p> <p><i>“Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography.”</i></p>	<p>Please refer to Figure 7.3, Appendix 7.1 for Landscape Character Area mapping. Relevant landscape receptors are identified and potential effects set out within Section 7.9 of this PEIR.</p>
	<p><i>“The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies.”</i></p>	<p>This PEIR is, and ongoing EIA work (to be reported in the ES) will be guided by the relevant standards and guidance for the assessment of landscape and visual effects. These are set out within Section 7.4 of this PEIR.</p>
	<p><i>“The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.”</i></p>	<p>Mitigation measures for construction and operation are set out in Section 7.8 of this PEIR and will be expanded upon within the ES. Design process has been guided by relevant guidance.</p>
	<p><i>“Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of</i></p>	<p>Footpaths and Walking, Cycling and Horse riding (WCH) routes have been integrated into the Proposed Scheme with the aim to provide greater connectivity between Winchester and the SDNP. Re-purposing sections of the abandoned A33 and A34 carriageways to accommodate walking also presents the opportunity to integrate wildflower/chalk grass planting along the routes. Figure 2.9,</p>

Reference	Comment	Response
	<i>local authority green infrastructure strategies should be incorporated where appropriate.”</i>	Appendix 2.1 shows existing and new walking and cycling routes.
	<i>“We recommend early engagement with South Downs National Park to discuss incorporating measures to improve access to the National Park and links to the wider footpath network.”</i>	Early consultation on LVIA methodology, study area and view locations has taken place with SDNPA. Consultation with Statutory Consultees on the Preliminary Environmental Mitigation Design Plan and sections (see Figures 2.6-2.8, Appendix 2.1) will take place as part of the ongoing EIA process.
	<i>“The EIA should consider potential impacts on access land, public open land, rights of way and coastal access routes in the vicinity of the development.”</i>	Land-use receptors have been set out in Section 7.7 of this PEIR and will be expanded upon within the ES.
	<i>“Further, given the scale of the scheme there may nevertheless remain significant wider residual impacts to landscape and biodiversity interests. In order to address and moderate any such wider residual impacts the scheme the ES should also include the preparation of a comprehensive landscape, biodiversity and access enhancement plan for the wider areas of landscape affected by the proposals that are outside the applicants control.”</i>	A biodiversity and landscaping mitigation package is being developed, which will include provision of habitats of ecological and landscape value which are sensitive to the local area. This is presented within the Preliminary Environmental Mitigation Design Plan and sections (see Figures 2.6-2.8, Appendix 2.1).
	<i>“Natural England would welcome the opportunity to comment on the landscape, biodiversity and access enhancement plan and agree the funding arrangements in due course.”</i>	A biodiversity and landscaping mitigation package is being developed, which will include provision of habitats of ecological and landscape value which are sensitive to the local area. This is presented within the Preliminary Environmental Mitigation Design Plan and sections (see Figures 2.6-2.8, Appendix 2.1). The applicant welcomes comments.
	<i>“The SDNPA notes that the study area for the LVIA is 3km</i>	The preliminary and updated ZTVs (see Figure 7.5 and 7.6,

Reference	Comment	Response
<p>South Downs National Park Authority Page 121-129</p>	<p><i>north/south and 2km east/west from the red line of the current IAB. Given the location of additional areas for management of excess spoil, we consider that the study area should be expanded to 3km from the red line of the IAB in all directions.”</i></p>	<p>Appendix 7.1) indicate a limited visual envelope and that any potential effects are likely to be within the 2km buffer from the edge of the IAB. On the ground, overlapping layers of vegetation, undulating topography and built form act to further reduce intervisibility between the Proposed Scheme and surrounding receptors. No permanent road infrastructure is associated with the areas of search for potential excess spoil management. Earthworks in these areas are intended to be designed to sympathetically tie in with existing levels to prevent unnatural landform shaping and detract from local landscape character.</p> <p>From a visual perspective construction activity will be largely imperceptible due to overlapping layers of vegetation and undulating topography. Temporary construction effects on landscape character identified in this chapter will be localised and anticipated to be contained within the study area.</p> <p>Further information will be considered in ongoing EIA work as the design progresses and the study area will be reviewed if required. The ES will report the landscape effects from the proposed excess spoil management works.</p>
	<p><i>“We would welcome the opportunity to work with Highways England to identify the best location for the management of excess spoil and currently we do have concerns that the selected</i></p>	<p>Consultation with Statutory Consultees in regard to design is on-going.</p>

Reference	Comment	Response
	<p><i>areas may result in the ‘in filling’ of topography.”</i></p> <p><i>“The SDNPA welcomes reference to all the key landscape character assessments which cover the study area and wish to see the Winchester City and its setting study (as noted above) is also included.”</i></p>	<p>An assessment of townscape and visual effects of the Proposed Scheme on the setting of Winchester City will be included as part of the ES.</p>
	<p><i>“We note in the scoping Opinion para 8.6.8 that the LVIA may defined local character areas. Extracts of the plans and descriptive text of the local landscape character areas already defined for the SDNPA have been shared with Highways England’s consultants (in email correspondence in Oct 2020) and we would encourage the use of these within the assessment.”</i></p>	<p>Receipt of the extracts alluded to are acknowledged. Clarity will be sought with SDNPA (to assist ongoing EIA work) as to the publication status of the character area information that can be formally referred to. However, the draft text has been used to help inform the Preliminary Environmental Mitigation Design Plan and sections (see Figures 2.6-2.8, Appendix 2.1)</p>
	<p><i>“We would wish to see collaboration between cultural heritage and landscape effects in relation to HLC in accordance with Guidance on Landscape and Visual Impact Assessment (3rd Edition) paragraphs 5.7-5.11.”</i></p>	<p>Noted. Project landscape and heritage consultants are currently working closely on the assessment and design processes. Overlaps between disciplines will be identified and reported in the ES accordingly.</p>
	<p><i>“We would suggest that effects from areas of open access are included in the assessment and that where viewpoints are identified within open access land the location is chosen based on a reasonable worst case scenario”</i></p>	<p>Areas of open access have been identified as part of the baseline in Section 7.7 of this PEIR and the Landscape Planning Constraints Plan (see Figure 7.1, Appendix 7.1). View locations from open access areas are identified on the Proposed View Location Plan (see Figure 7.4, Appendix 7.1)</p>
	<p><i>“We welcome this and would encourage the use of a series of ZTVs looking at different components of the scheme in order to establish the effects of individual elements of the proposals and also to inform and finalise the selection of</i></p>	<p>The preliminary and updated ZTVs (see Figure 7.5 and 7.6, Appendix 7.1) indicate a limited visual envelope focused along around the existing M3, A34 and A33 transport corridors. As part of the ES a more detailed ZTV will be produced that considers</p>

Reference	Comment	Response
	<p><i>representative viewpoint locations. We consider this level of detail is required for a scheme of this nature”</i></p>	<p>locations of gantries and other vertical elements. Should further landscape and visual receptors arise as a result of the detailed ZTV mapping these will be accounted for in the ES.</p>
	<p><i>“Based on the information provided to date including Table 8-2 and Figure 5-3-1 we would like to make the following suggestions regarding the proposed viewpoint locations and have also suggested a number of additional viewpoints which reflect the current junction improvement proposals, including areas of search for management of excess spoil” “Viewpoint 7, 8, 10, 12, 13” “Additional Viewpoints A, B, C, D, E, F, G, H, I, J, K, L”</i></p>	<p>Noted. The Proposed View Location Plan (see Figure 7.4, Appendix 7.1) has been updated accordingly to take into account suggested views. However, additional views C, D, F, G and K have not been included based on the results of the preliminary ZTV mapping and ground truthing undertaken in October 2020, concluding unlikely intervisibility between the addition visual receptors and the proposed scheme.</p>
	<p><i>Paragraph 8.3.1 notes significant effects include the removal of, or damage to, landscape elements and on landscape character. To this we would also add the introduction of new uncharacteristic elements.”</i></p>	<p>Introduction of new uncharacteristic elements is identified within the typical criteria descriptors for magnitude of impact as referenced in DMRB LA107 and set out in Section 7.4 of this PEIR in relation to landscape and visual effects.</p>
	<p><i>“Paragraph 8.3.3 lists the key impacts likely to arise as a result of the proposed scheme. To this list we would like to see added:</i></p> <ul style="list-style-type: none"> ▪ <i>Effects on topography;</i> ▪ <i>Effects on open agricultural land;</i> ▪ <i>Change to recreation and enjoyment, and</i> ▪ <i>Cumulative effects with other road infrastructure in the area.”</i> 	<p>Potential effects are set out within Section 7.9 of this PEIR in regard to landscape and visual effects.</p>
	<p><i>“We would also expect the LVIA to consider all aspects of the proposed development including ancillary development such as CCTV masts, signage and lighting which may be more visually</i></p>	<p>The assessment of landscape and visual effects arising from the Proposed Scheme will consider all elements of the design. Updated detailed ZTV mapping will also be conducted as part of the ES to</p>

Reference	Comment	Response
	<i>obvious given the height of elements.”</i>	take account of gantries and other vertical elements.
	<i>“Paragraph 8.4.1 states the principle objective of landscape mitigation is to ‘integrate and minimise adverse landscape and visual impacts’. Given a significant part of the proposals fall within the SDNP we would suggest that the principle objective to mitigation is to further the purposes of the National Park designation as referenced above.”</i>	Noted and reference made in Section 7.8 of this PEIR to the purposes of the National Park.
	<p><i>“the identification of areas for the management of spoil should seek to:</i></p> <ul style="list-style-type: none"> ▪ <i>highlight changes in topography and not ‘fill in’ shallow coombes or depressions;</i> ▪ <i>avoid the creation of landscape effects within areas of landscape that would otherwise remain relatively unaffected by the proposed scheme;</i> ▪ <i>consider these areas for the restoration of chalk grassland;</i> ▪ <i>take account of the role of some areas in the setting of Winchester or the Itchen Valley, and</i> ▪ <i>enhance recreational routes and connections between Winchester and the SDNP.”</i> 	Earthworks in these areas are intended to be designed to sympathetically tie in with existing levels to prevent unnatural landform shaping and detract from local landscape character. Further information will be considered in ongoing EIA work as the design progresses and the study area will be reviewed if required. The ES will report the landscape effects from the proposed excess spoil management works.
	<i>“We would wish to see the development of mitigation measures which are grounded in an understanding of the special qualities of the National Park and local areas and which seek not just to minimise the adverse effects, but also actively seek enhancement the landscape and special qualities including through</i>	The special qualities of the SDNP have been taken into account in the production of the Preliminary Environmental Mitigation Design Plan (see Figure 2.6, Appendix 2.1).

Reference	Comment	Response
	<p><i>the reduction in existing effects of road infrastructure on the SDNP.”</i></p>	
	<p><i>“In terms of recreation, we welcome the recognition that the vicinity of the Junction 9, M3 corridor road infrastructure is a substantial barrier to the South Downs National Park for horse riders, pedestrians and cyclists. Given the purposes of National Park designation we would wish to see measures proposed to improve the current situation.”</i></p>	<p>The Proposed Scheme has integrated options into design for Walking, Cycling and Horse Riding (WCH) routes (see Figure 2.9, Appendix 2.1).</p>
	<p><i>“We note that table 8-8 sets out a significance matrix to guide professional judgement. We also note in paragraph 8.6.20 that where the effect could be one of two gradings professional judgement will be used to determine which effect is applicable. We would suggest that rather than chose one or another the profession judgment provides a commentary on where the effects lie within the spectrum between the two categories. To do otherwise runs the risk of downplaying or overstating effects. We therefore recommend that the wording in the table is changed from ‘moderate or large’ to ‘moderate to large’.”</i></p>	<p>Table 7-6 Significance matrix is based on methodology indicated within DMRB LA104. Professional judgement will be fully explained where grading determinations are made. The precautionary principle will be used when making professional judgement such that the assessment will be conservative and robust.</p>
	<p><i>“Currently both very high and high sensitivity receptors, when combined with a negligible magnitude of change, would give rise to slight significance of effect only. Given the status of a ‘very high sensitivity receptor’ compared to a ‘sensitive receptor’ we would expect negligible effects on the former to reflect a slight to moderate effect rather than just slight. Currently the gradation of significant effects for ‘very high sensitivity receptors’ jumps from</i></p>	<p>Table 7-6 Significance matrix is based on methodology indicated within DMRB LA104. Professional judgement will be fully explained where grading determinations are made. The precautionary principle will be used when making professional judgement such that the assessment will be conservative and robust.</p>

Reference	Comment	Response
	<p><i>‘slight’ to ‘moderate or large’ whereas for high sensitivity receptors it is more gradual e.g. slight, slight to moderate, moderate to large and large or very large.”</i></p> <p><i>“The SDNPA recommends that when assessing effects on the National Park consideration is given to the purposes of National Park designation and the effects are considered in terms of how they:</i></p> <ul style="list-style-type: none"> ▪ <i>conserve the special qualities of the SDNP as a whole (with reference to the special qualities) including those expressed at a local level;</i> ▪ <i>enhance the character and qualities of the landscape within the study area and the distinctiveness of the SDNP landscape as a whole, and</i> ▪ <i>provide opportunities for the enjoyment and understanding of the landscape within the SDNP.”</i> <p><i>“For information, the SDNPA has recently updated its Landscape Character Assessment. The 2020 updated assessment is available to view online (and is interactive) at https://www.southdowns.gov.uk/landscape-design-conservation/south-downs-landscape-characterassessment/south-downs-landscape-character-assessment-2020/.”</i></p>	<p></p> <p>The ongoing EIA work will duly consider the purposes of the National Park in the assessment process, and report how this has taken place within the ES.</p> <p>Note and updated in Section 7.7 of this PEIR.</p>
<p>Winchester City Council Page 131-149</p>	<p><i>“it is important to note the proposed spoil management areas are within the South Downs National Park and it would be expected this is also considered within the landscape impact assessment.”</i></p>	<p>Earthworks in these areas are intended to be designed to sympathetically tie in with existing levels to prevent unnatural landform shaping and detract from local landscape character. Further information will be</p>

Reference	Comment	Response
		considered in ongoing EIA work as the design progresses and the study area will be reviewed if required. The ES will report the landscape effects from the proposed excess spoil management works.
Consultation on View Locations and Study Area with SDNPA, WCC and HCC in relation to Landscape and Visual Effects		
12/10/2020 (HCC – Landscape Architect)	<ul style="list-style-type: none"> ▪ Proposed View Location 4 should be moved slightly to capture newly created area of public open space at Lea View ▪ Concern over part of the Itchen Way Public Right of Way (PRoW) in between the A34 road embankment and the wetland of the Moors. HCC believe this path needs ‘some serious’ (WCC emphasis) upgrading as part of the works. HCC believe the inevitable loss of the roadside planting will open it up to extensive views of the road. HCC believe this area will need some careful design as the path appears to be well used. 	<p>The proposed View Location 4 has been updated to reflect the request for on-going field surveys to account for public open space at Lea View. Table 7-11 has been updated to reflect the change.</p> <p>Wider connectivity of the Itchen Way has been considered as part of the Walking and Cycling route of the Proposed Scheme. The design has considered the potential loss of vegetation and where reasonably practicable has avoided removing existing vegetation. Where losses are likely new planting has been proposed adjacent to new elements of road infrastructure to provide visual screening and green infrastructure connectivity (see Figure 2.6, Appendix 2.1)</p>
16/10/2020 (SDNPA – Major Projects Lead)	<ul style="list-style-type: none"> ▪ SDNPA provided relevant draft sections of Winchester M3 Mitigation Strategy (2019) covering baseline character assessment for the area surrounding interface between SDNP and Winchester. 	The draft Winchester M3 Mitigation Strategy (2019) will be used to assist in designing appropriate environmental mitigation into Proposed Scheme.
19/10/2020 (WCC – Principal Landscape Architect)	<ul style="list-style-type: none"> ▪ Proposed View Location 4 should be moved slightly to capture newly created area of public open space at Lea View ▪ Request for the following View Locations to be assessed: 	The proposed View Location 4 has been updated to reflect the request for on-going field surveys to account for public open space at Lea View. Table 7-11 has been updated to reflect change.

Reference	Comment	Response
	<ul style="list-style-type: none"> ▪ Layby on Morestead Road – SU499274 ▪ South Downs Way footbridge – SU496289 ▪ Chilcomb Sports Ground – SU502288. This is not HCC as mapping states but belongs to WCC now ▪ A31 – SU500292 	The additional View Locations have been considered and added to Table 7-11 accordingly.
02/02/21, 03/02/21 and 18/02/21 (WCC Principal Landscape Architect, HCC Landscape Architect and SDNPA – Major Projects Lead)	<ul style="list-style-type: none"> ▪ Request that View Location 16 should be scoped into the Night Time Lighting Assessment. Other view locations and night-time lighting assessment methodology put forward by the Applicant agreed by Statutory Consultees 	View Location 16 was added to the scope for Night-Time Lighting Assessment.

Proposed consultation

7.3.2 Further consultation will be undertaken with SDNPA, WCC and HCC to agree on appropriate preliminary environmental mitigation design, which reflects the changes to the Proposed Scheme since the 2019 consultation period.

7.4 Assessment methodology and significance criteria

7.4.1 The assessment has been undertaken using the following standards and guidance:

- DMRB LA107, Landscape and visual effects, Revision 2, (Highways England, 2020)
- DMRB LA104, Environmental assessment and monitoring, Revision 1, (Highways England, 2020)
- DMRB LD117, Landscape design, Revision 0, (Highways England, 2020)
- DMRB LD119, Roadside environmental mitigation and enhancement, Revision 0, (Highways England, 2020)
- Guidelines for Landscape and Visual Impact Assessment (3rd Edition) published jointly by The Landscape Institute and Institute of

Environmental Management and Assessment (Landscape Institute, 2013)

- Visual Representation of Development Proposals: Technical Guidance Note 06/19 (Landscape Institute 2019)
- Infrastructure: Technical Guidance Note 04/2020 (Landscape Institute, 2020)

7.4.2 Landscape and visual effects are related but distinct topics, so are considered and assessed separately. Effects on the landscape arise from a development causing direct changes to the physical elements of the landscape, affecting its features, character and quality, and more widely, from indirect effects of the development on the character and quality of the surrounding landscape and townscape. Visual effects arise where a development changes the character and quality of the views that people (visual receptors) may enjoy.

7.4.3 The landscape assessment follows the following process:

- Baseline; identification of landscape character areas, characteristics, features and elements. Establish the key landscape receptors to be assessed (normally landscape character areas and landscape designations). Reported in the PEIR
- Assessment of the sensitivity of landscape receptors with reference to the value that is attached to them by society and their susceptibility, that is their capacity to accommodate change arising from the Proposed Scheme. Reported in the PEIR
- Assessment of the magnitude of impacts on landscape receptors with reference to the Proposed Scheme design, including bridges, approach roads, cuttings and embankments, drainage, signage, lighting, scale of change, nature of change etc. To be reported in ES
- Development of mitigation to reduce potential adverse landscape effects and contribute to the green infrastructure in the local area as part of an over-arching environmental design for the Proposed Scheme. Reported in the PEIR
- Evaluation of the significance of landscape effects, as a function of landscape sensitivity and magnitude of landscape impact. To be reported in ES
- Reporting of residual landscape effects for each landscape receptor. To be reported in ES

7.4.4 The relevant landscape character areas include the following:

- South Downs Landscape Character Assessment 2020 (SDLCA) Landscape Character Area (LCA) A5: East Winchester Open Downs
- SDLCA LCA F5: Itchen Floodplain
- SDLCA LCA G5: Itchen Valley Sides

7.4.5 The landscape character areas identified in the HCC Integrated Landscape Character Assessment and Winchester District Landscape Character Assessment will also be examined, although these overlap in part with those of the SDLCA and care will be taken to avoid 'double counting'.

7.4.6 A draft local landscape characterisation study identifying smaller subtypes of landscape character has been undertaken by SDNPA and WCC focusing on the interface between SDNP and the townscape of Winchester. It is considered that this report will become publicly available in time to allow incorporation into the landscape baseline and assessment of landscape effects.

7.4.7 The visual assessment follows the following process:

- Baseline; identification of visual receptors (people) and their sensitivity to change based on the importance attached to the views they currently experience and the activity in which they are engaged in. Reported in PEIR
- Assessment of the magnitude of visual impacts, that is the degree of change to the views currently experienced, with reference to scheme design, including bridges, approach roads, cuttings and embankments, drainage, signage, lighting, scale of change, nature of change etc. To be reported in ES
- Development of mitigation to reduce potential adverse visual effects as part of an over-arching environmental design for the Proposed Scheme. Reported in the PEIR
- Evaluation of the significance of visual effects, as a function of the sensitivity of the visual receptor and magnitude of visual impact. To be reported in ES
- Reporting of residual visual effects for each visual receptor. To be reported in ES

7.4.8 The representative view locations to be assessed in the Environmental Impact Assessment (EIA) in relation to the Proposed Scheme include those outlined in **Table 7-11** (which reports the preliminary findings of the assessment). These have been discussed and agreed in principle with SDNPA, WCC and HCC. The approximate locations of the representative view locations are shown in **Figure 7.4, Appendix 7.1**. The view locations are also set out in **Figure 7.5, Appendix 7.1** along with the preliminary ZTV mapping for

ease of illustrating how the preliminary ZTV mapping initially helped inform view location selections in terms of theoretical visibility between potential visual receptors and the permanent road infrastructure of the Proposed Scheme.

- 7.4.9 The representative view locations offer potentially important views, which are experienced by various visual receptors. ZTV modelling has been carried out as part of the EIA which has been examined and validated by fieldwork to ensure that any key view locations from which the Proposed Scheme could be visible are included in the assessment.
- 7.4.10 The results of the ZTV mapping (**Figures 7.6, 7.7 and 7.8, Appendix 7.1**) for this PEIR stage were generated by using the 3D model of the permanent road infrastructure of the Proposed Scheme available at the time of production of this chapter. At this stage additional information concerning some vertical elements of the Proposed Scheme i.e. gantries, were not fixed and have been excluded from the modelling for the PEIR. The ZTV mapping has accounted for the use of the road network by high sided HGV vehicles based on a vehicle height of 4.5m to represent theoretical reasonable worst case visibility with vehicle movements. The Proposed Scheme height data was provided by the project design team. The ZTV computer software (ArcGIS) processes Digital Surface Model (DSM) data and other selected features influencing the extent of visibility (visual barriers), for example, woodland and settlements, in order to identify the theoretical extent of the area from which the proposed development is likely to be visible. It is important to note that the ZTV illustrates the reasonable worst-case scenario. On the ground, other features, such as hedgerows or street trees, are likely to provide additional filtering of views thus reducing the intervisibility between the Proposed Scheme and surrounding receptors.
- 7.4.11 Intervisibility between much of the town of Winchester and the Proposed Scheme would be limited due to screening by intervening built form, vegetation and topography. Overlooking views from the tower of Winchester Cathedral, which can be experienced by visitors to the cathedral as part of guided tours, has been included as a view location due to potential visibility of the Proposed Scheme. *The SDNP Viewshed Study Report (SDNPA, 2015)* has also been referred to.
- 7.4.12 The assessment has used the following scenarios based on paragraph 2.6, page 12 of the DMRB, LA107, Landscape and visual effects (Highways England, 2020):
- During the construction period, assuming a maximum visibility or maximum perceived change situation (i.e. with construction activity at its peak for any given view) and noting how long that period would be likely to last.
 - A winter's day in the year that the Proposed Scheme would open to traffic or be fully operational (i.e. with noise and visual screens and mounds in place but before any planted mitigation takes effect). This is usually a

reflection of the operationally non-fully mitigated and maximum visibility scenario. A night-time scenario for a winter's day in year that the Proposed Scheme would open will also be considered.

- A summer's day in the fifteenth year after opening (i.e. when any planting mitigation measures can be assumed to be substantially effective). This is usually a reflection of the near fully mitigated scenario under normal conditions. A night-time scenario for a summer's day in the fifteenth year after the Proposed Scheme has opened will also be considered.

7.4.13 The landscape assessment will be described in the ES using relevant landscape character assessments and associated studies, as a means of assessing landscape and take account of any relevant local policies. Broader issues of effects on the 'setting' of the SDNP and the townscape of Winchester will be assessed.

7.4.14 The assessment of landscape effects will include an examination of impacts on perceptual qualities of the landscape resulting from the Proposed Scheme such as impacts on tranquillity and sense of remoteness which are important aspects of the SDNP. As part of this process changes in noise and lighting levels resulting from the Proposed Scheme will be considered. Reference will be made to the SDNP Authority Tranquillity Study (SDNPA,2017) and web-based Campaign for the Protection of Rural England (CPRE) tranquillity mapping.

7.4.15 There will also be an assessment within the ES of the effects on the night-time environment and the SDNP's dark skies in relation to the SDNP's International Dark Skies Reserve status, resulting from the Proposed Scheme. This will include an appraisal of the existing night-time light sources, sky glow and direct glare within the study area. Exterior lighting environmental zones will be identified in accordance with those set out in the Guidance Notes for the Reduction of Obtrusive Light GN01:2011 (Institution of Lighting Professionals, 2011). A judgement will then be made on the effects on these zones which would result from the Proposed Scheme. Reference will also be made to the SDNP Dark Skies Technical Advice Note 2018 (SDNPA, 2018) and web-based CPRE light pollution mapping.

7.4.16 The landscape and visual assessment has also addressed ID 4.4.8., page 24 of the Planning Inspectorate, (2020), Scoping Opinion: Proposed M3 Junction 9 Improvement scheme through identifying potential impacts on land use in relation to tourism from the perspective of changes to views and landscape elements experienced by visitors as a result of the Proposed Scheme. **Chapter 12 Population and Health** will address specific socio-economic functions of land use and any impacts as a result of the Proposed Scheme.

7.4.17 A detailed programme of landscape fieldwork has been carried out as part of the assessment and a detailed photographic record taken recording landscape features and views. Night-time fieldwork has also been undertaken as part of the dark skies assessment. Photography was carried

out in accordance with Landscape Institute Technical Guidance Note 06/19 'Visual Representation of development proposals' (LI, 2019 replaces TGN 01/11). The photographic records of the detailed fieldwork are currently being processed to help inform on-going design processes and will be presented within the ES.

7.4.18 Receptor sensitivity, magnitude of impact and evaluation of the significance of landscape and visual effects arising from the Proposed Scheme will be categorised using typical criteria tables from DMRB LA107 Landscape and visual effects (Highways England, 2020) and DMRB LA104 Environmental assessment and monitoring (Highways England, 2020) as indicated in **Table 7-2** to **Table 7-7** below.

Table 7-2: Landscape sensitivity and typical descriptors

Sensitivity	Landscape – typical criteria descriptors
Very High	Landscapes of very high international/national importance and rarity or value with no or very limited ability to accommodate change without substantial loss/gain (i.e. national parks, internationally acclaimed landscapes - UNESCO World Heritage Sites).
High	Landscapes of high national importance containing distinctive features/elements with limited ability to accommodate change without incurring substantial loss/gain (i.e. designated areas, areas of strong sense of place - registered parks and gardens, country parks).
Medium	Landscapes of local or regional recognition of importance able to accommodate some change (i.e. features worthy of conservation, some sense of place or value through use/perception).
Low	Local landscape areas or receptors of low to medium importance with ability to accommodate change (i.e. non-designated or designated areas of local recognition or areas of little sense of place).
Negligible	Landscapes of very low importance and rarity able to accommodate change.

Source: DMRB LA107 Landscape and visual effects (Highways England, 2020)

Table 7-3: Visual sensitivity and typical descriptors

Sensitivity	Visual – typical criteria descriptors
Very High	1) Static views from and of major tourist attractions; 2) Views from and of very important national/international landscapes, cultural/historical sites (e.g. National Parks, UNESCO World Heritage sites); 3) Receptors engaged in specific activities for enjoyment of dark skies.
High	1) Views by users of nationally important PRoW / recreational trails (e.g. national trails, long distance footpaths); 2) Views by users of public open spaces for enjoyment of the countryside (e.g. country parks); 3) Static views from dense residential areas, longer transient views from designated public open space, recreational areas; 4) Views from and of rare designated landscapes of national importance.
Moderate	1) Static views from less populated residential areas, schools and other institutional buildings and their outdoor areas; 2) Views by outdoor workers; 3) Transient views from local/regional areas such as public open space, scenic roads, railways or waterways, users of local/regional designated tourist routes of moderate importance; 4) Views from and of landscapes of regional importance.
Low	1) Views by users of main roads or passengers in public transport on main arterial routes; 2) Views by indoor workers; 3) Views by users of recreational/formal sports facilities where the landscape is secondary to enjoyment of the sport; 4) Views by users of local public open spaces of limited importance with limited variety or distinctiveness.
Negligible	1) Quick transient views such as from fast moving vehicles; 2) Views from industrial area, land awaiting re-development; 3) Views from landscapes of no importance with no variety or distinctiveness.

Source: DMRB LA107 Landscape and visual effects (Highways England, 2020)

Table 7-4: Magnitude and nature of landscape impact and typical descriptors

Magnitude of impact	Typical criteria descriptors
Major Adverse	Total loss or large-scale damage to existing landscape character or distinctive features or elements; and/or addition of new uncharacteristic, conspicuous features or elements (i.e. road infrastructure).
Moderate Adverse	Partial loss or noticeable damage to existing landscape character or distinctive features or elements; and/or addition of new uncharacteristic, noticeable features or elements (i.e. road infrastructure).
Minor Adverse	Slight loss or damage to existing landscape character of one (maybe more) key features and elements; and/or addition of new uncharacteristic features and elements.
Negligible Adverse	Very minor loss, damage or alteration to existing landscape character of one or more features and elements.
No Change	No noticeable alteration or improvement, temporary or permanent, of landscape character of existing features and elements.
Negligible Beneficial	Very minor noticeable improvement of character by the restoration of one or more existing features and elements.
Minor Beneficial	Slight improvement of landscape character by the restoration of one (maybe more) key existing features and elements; and/or the addition of new characteristic features.
Moderate Beneficial	Partial or noticeable improvement of landscape character by restoration of existing features or elements; or addition of new characteristic features or elements or removal of noticeable features or elements.
Major beneficial	Large scale improvement of landscape character to features and elements; and/or addition of new distinctive features or elements, or removal of conspicuous road infrastructure elements.

Source: DMRB LA107 Landscape and visual effects (Highways England, 2020)

Table 7-5: Magnitude and nature of visual impact and typical descriptors

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

Source: DMRB LA107 Landscape and visual effects (Highways England, 2020)

Table 7-6: Significance matrix (can be beneficial or adverse)

Landscape/visual receptor sensitivity	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
Moderate/Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Source: Based on DMRB LA104 Environmental assessment and monitoring (Highways England, 2020)

Table 7-7: Significance categories and typical descriptions

Significance category	Typical criteria descriptors
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Source: DMRB LA104 Environmental assessment and monitoring (Highways England, August 2020)

7.4.19 Where an effect could be one of two gradings (for example where a Negligible impact interacts with a Moderate/Medium sensitivity receptor resulting in a Neutral or Slight effect), professional judgement (which includes the precautionary principle) will be used to determine which effect is applicable.

7.4.20 The significant adverse landscape and visual effects remaining after mitigation at the design year (15 years after opening), (known as residual effects) will be summarised at the end of the assessment within the ES.

7.4.21 The landscape and visual effects that fall within the categories of moderate or greater are deemed to be significant in EIA terms. This is in line with guidance set out as a note to paragraph 3.27, page 23 of the DMRB LA107 Landscape and visual effects (Highways England, 2020).

7.4.22 Visualisations will be used during on-going EIA work so that they become an integral part of the iterative design process and will inform the visual impact assessment. Preliminary 3D modelling showing the relationship between existing and proposed built form and vegetation from key viewpoints will help determine how planting or changes to the engineering design can avoid, reduce or offset significant visual effects. Accurate Visual Representations (AVRs) will show effects during construction, at year one winter and at year 15 summer for several of the most important view locations, where reasonably practicable, which will be determined during the assessment process and in consultation with Statutory Consultees. The reasonable worst case scenario will be considered in the ES where design detail may not be available to ensure a robust assessment (addressing comments identified

under ID 4.3.4, page 18 of the Planning Inspectorate (2019), Scoping Opinion for M3 Junction 9 Improvement Project. Whilst the 2019 Scoping Opinion is superseded by the 2020 Scoping Opinion, this measure has been carried over for ongoing EIA work.

7.5 Assessment assumptions and limitations

- 7.5.1 The information presented in this chapter is based on the information available at the time of writing the report and based on emerging design (see **Chapter 2**). The preliminary findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the ongoing EIA and consultation process.
- 7.5.2 Detailed design of the mitigation will be an outcome of the iterative design and assessment process. The detailed design of elements of the project, including heights of embankments and extent of cuttings, will be available during the EIA process, informing detailed mitigation.
- 7.5.3 At the time of writing, the full extent of vegetation removal remains to be confirmed. However, it is assumed that there would be a working area or corridor beyond the extent of earthworks (within the confines of the IAB) and that this area would be cleared of all existing vegetation. Detailed tree constraints surveys have been undertaken of vegetation in line with BS 5837:2012 to determine baseline tree conditions and assist in avoiding impacts on good quality trees where reasonably practicable. The detailed tree survey records are currently being processed to help inform on-going design processes and will be presented within the ES. Working areas are to be confirmed through ongoing EIA work, which will be assessed on a precautional basis (i.e. maximum area required) and reported in the ES.
- 7.5.4 At the time of writing there exists on-going limitations and restrictions to field survey work and timescales this work can be undertaken within as a result of the Covid-19 crisis and UK Government rules/guidance.

7.6 Study area

- 7.6.1 The Proposed Scheme is being considered in relation to the surrounding area, including the settlements of Abbots Worthy and Kings Worthy beyond the River Itchen Valley to the north, the SDNP to the east, St Catherine's Hill to the south and the city of Winchester and the River Itchen to the north-west. This gives a study area for consideration of landscape and townscape effects of 3km north and 3km south and 2km east and 2km west extending out from the boundary of the Indicative Application Boundary (IAB). This will allow general issues of effects on the 'setting' of the SDNP and the townscape of Winchester to be considered and provide a thorough baseline understanding of the relationship between the existing M3 motorway, the River Itchen valley and the surrounding topography.
- 7.6.2 The visual study area has been focused on a 2km radius from the IAB as this is where anticipated effects are likely to be greatest.

- 7.6.3 The study areas are based on information presented in paragraph 5.3.12, page 47 of the previous Preliminary Environmental Information Report (PEIR) (Jacobs, June 2019) (replicated below). Note that this PEIR replaces the 2019 PEIR. Further consultation on study areas will be undertaken with Statutory Consultees as required, and fully explained and justified within the Environmental Statement (ES).

“Two overarching study areas have been defined for the assessment as follows:

The landscape assessment will be based on a broad study area of mapping approximately 6 kilometres north to south and 4 kilometres east to west, to incorporate the settlements of Abbots Worthy and Kings Worthy beyond the River Itchen Valley to the north, the SDNP to the east, St Catherine’s Hill to the south and the town of Winchester and the River Itchen to the west. This broad study area has been defined as a precautionary approach to make sure that effects on the ‘setting’ of the SDNP and the townscape of Winchester is appropriately assessed.

The visual assessment will be based on a 2 kilometre study area, as illustrated on Figure 5-3-1. However, the assessment will focus on effects within 1 kilometre of the Proposed Scheme, since this is where the greatest effects are anticipated to occur.”

- 7.6.4 The study area has been refined using ZTV modelling; that is modelling which maps areas of land within which a development would be theoretically visible, based on Digital Surface Model (DSM) data (see **Figure 7.6, 7.7 and 7.8 Appendix 7.1**). The ES will define the detailed ZTV methodology used as part of the assessment process. The ZTV has enabled consideration of intervisibility between the Proposed Scheme and the surrounding landscape / townscape, for example in longer distance views from St. Catherine’s Hill and visual receptors likely to experience views from this location. The ZTV has also helped to inform potential environmental mitigation options.

- 7.6.5 The study area includes parts of the city of Winchester and therefore the landscape and visual assessment to be presented within the ES will also consider potential effects resulting from the Proposed Scheme on the city in terms of its townscape setting. For the purposes of assessment, the term landscape should however, be deemed to include townscape.

- 7.6.6 The above approach to identifying the study area is based on the guidance in paragraph 3.13.1 of the DMRB LA104 Environmental assessment and monitoring (Highways England, 2020), which states that:

“The study area for an assessment should reflect the project and the surrounding environment over which effects are reasonably be thought to occur, taking into account cumulative effects.”

7.7 Baseline conditions

- 7.7.1 The existing area covered by the Proposed Scheme's IAB comprises a complex landscape pattern which is strongly influenced by the M3 and A34 transport corridors, the existing grade separated M3 Junction 9 roundabout and slip roads, and other associated features including bridges, cuttings, slip roads and signage. The highways estate includes substantial areas of mixed native tree and shrub planting of mainly broadleaf species which has established to provide an element of screening and landscape integration of the M3 and A34, and associated infrastructure and traffic. The Stage 3A Arboricultural Survey for the Proposed Scheme found that trees adjacent to the A33 and A34 are mainly fragmented woodland areas and established vegetation on embankments planted at the time of construction of these roads.
- 7.7.2 The landscape of the areas of search for potential excess spoil management is defined by undulating arable farmland bounded by hedgerows and hedgerow trees. These areas of search for potential excess spoil management lie within the boundary of the SDNP.
- 7.7.3 The wider area is primarily urban to the west of the M3, near Junction 9 and includes the commercial developments of Sun Valley Business Park, Tesco, Winnall Industrial Estate and Scylla Industrial Estate. Wykeham Trade Park and Highways England's maintenance depot are located to immediately northwest of the M3 Junction 9. Beyond the industrial area are the residential areas and historic town centre of Winchester. Further to the north, there are concentrations of residential properties close to the A34 and to the west of the M3, including Headbourne Worthy, Kings Worthy and Abbots Worthy and Abbot's Barton. These areas of existing residential development are separated from the M3 transport corridor by the low-lying, vegetated River Itchen valley.
- 7.7.4 The area to the east and south of the M3 is a valued landscape of rolling chalk downland, comprising large arable and pastoral fields interspersed with small woodlands and copses, hedgerow field boundaries and a small number of isolated farm holdings or rural dwellings. St Catherine's Hill forms a prominent landscape feature to the south of Winchester and is identified as an Ordnance Survey (OS) viewpoint due to the open views available from the peak of the hill across the landscape. This landscape forms part of the SDNP, which is a statutory landscape designation of national importance (see **Figures 7.1 and 7.2, Appendix 7.1**), and which includes a stretch of the River Itchen and associated floodplain crossing the northern part of the Proposed Scheme, extending towards Winchester city centre. The existing highway infrastructure has resulted in severance between the town of Winchester to the west and the downland of the SDNP to the east.
- 7.7.5 Important recreational PRoWs near the Proposed Scheme include St Swithun's Way and the Itchen Way Long Distance Paths running along the Itchen Valley and National Cycle Network Route 23 which crosses the M3

Junction 9 and provides a recreational link from Winchester to the SDNP (see **Figure 7.1, Appendix 7.1**).

7.7.6 The main change to the landscape baseline between the time of writing this PEIR and the construction of the Proposed Scheme (the future baseline) would be continued maturation of vegetation in and around the highways network, which would provide a slightly increased visual screening of the adjacent transport corridors. The landscape east of the M3 within the SDNP would continue to exist as arable farmland with associated crop and land management changes.

Landscape receptors and value

7.7.7 The key landscape elements and receptors have been described below in **Table 7-8**. The value (sensitivity) of receptors is based on descriptions set out in Table 3.2N in the DMRB LA104 Environmental assessment and monitoring (Highways England, 2020).

Table 7-8: Baseline description of key landscape elements and receptors

Landscape receptor	Description	Landscape Value (Sensitivity)
Topography	<p>At a local level the existing Junction 9 roundabout and highways infrastructure to the south including slip roads and the A272/Spitfire Link are lower than the surrounding land (see Figure 7.2, Appendix 7.1). There is a 10m, almost vertical, cut under the B3404 at the southern end of the area of the Proposed Scheme, which is the most notable engineered landform. The existing highways infrastructure of the A34/Winchester Bypass is slightly elevated to cross the River Itchen floodplain in the north-western extents of the area of the Proposed Scheme. To the north of Junction 9 the M3 rises gradually at an even gradient to pass over Easton Down. This is achieved by embankments through a small combe or hollow near the Highways England depot and then cuttings on the higher ground.</p> <p>There are numerous ditches, water bodies, streams and rivers in the study area. The largest watercourse is the River Itchen and its tributaries, which</p>	<p>It is therefore considered to be of medium to high value (sensitivity) depending on location relative to the SDNP and its setting.</p>

Landscape receptor	Description	Landscape Value (Sensitivity)
	<p>run across a wide, flat floodplain and fall within the IAB between the A33 and M3 corridors. Topography is a key characteristic of the undulating hills in the nationally designated SDNP. It is also important to the wider distinctive landscape of the River Itchen valley.</p>	
<p>Land use of the site and surrounding area</p>	<p>The existing highway corridor of the M3, including embankments, cuttings, bridges, slip roads, and accompanying infrastructure such as signage, fencing, embankment planting, traffic lights and occasional lighting forms a noticeable feature within the IAB. The south-western length of the area of the IAB also contains built elements, including two-storey office and construction blocks, and areas of car parking around the Highways England depot. The central and northern sections of the area of the IAB contain areas of open farmland contrasting with a more intimate rural landscape of scattered tree and wetland where the Proposed Scheme area crosses the River Itchen floodplain.</p> <p>The landscape to the east, south-east and north-west of the area of the IAB is largely one of open farmland containing large rectangular fields intersected by access tracks and bounded by hedgerows. There are regular clumps of mature trees, copses, hedgerow trees and hedgerows alongside lanes, tracks and field boundaries.</p> <p>To the south-west and west of the area of the IAB is the built form of Winchester, with retail parks and industrial estates adjacent to the M3 corridor. This area retains a small-scale and intimate landscape through which the River Itchen passes. To the north-west, north and north-east of the Proposed Scheme are the villages of</p>	<p>Land use in the study area varies from relatively prosaic infrastructure and urban development of low to medium value (sensitivity) to more high value (sensitivity) land within the SDNP associated with recreational and tourist usage.</p>

Landscape receptor	Description	Landscape Value (Sensitivity)
	Kings Worthy, Abbots Worthy and Easton. The M3 forms a prominent feature within the landscape to the north-east of the Proposed Scheme.	
Vegetation	<p>Trees, hedgerows and wooded areas associated with highway planting are located on embankments and roundabouts of the existing M3 corridor, as well as in the adjoining landscape along with lengths of semi-improved grassland and scrub. The surrounding landscape contains numerous copses, blocks of trees, hedgerow trees and hedgerows alongside lanes, tracks and field boundaries. The area of the IAB contains fields of both arable and pastoral farmland, typically bounded by hedgerows, along with a more enclosed landscape to the north of lowland fen wetland and scattered trees around the River Itchen.</p> <p>The ES will report on an arboricultural survey to BS 5837: 2012 - Trees in relation to design, demolition and construction will describe and evaluate the existing arboricultural resource within the vicinity of the Proposed Scheme.</p> <p>Statutory designations relating to trees include two separate Tree Preservation Orders (TPOs) and the Kings Worthy Conservation Area, which is located at the northern end of the study area.</p>	Vegetation is a key characteristic of the nationally designated SDNP and is fundamental to the distinctive landscape of the River Itchen valley. It is an important part of the green infrastructure of the area and it is therefore considered to be of high value (sensitivity).
Heritage statutory designations	There are no parks and gardens listed on the Register of Parks and Gardens of Special Historic Interest (RHPG) which are located within 500m of the IAB (see Figure 7.1, Appendix 7.1) The nearest RHPG is the Grade II Magdalen Hill Cemetery approximately 1.4km to the south-east of the existing M3 Junction 9 on the south side of Alresford Road and approximately 550m south of the secondary area of search for potential	Heritage statutory designations are considered to be high value (sensitivity).

Landscape receptor	Description	Landscape Value (Sensitivity)
	<p>excess spoil management. There are nine Conservation Areas (CA) within the landscape study area: Kings Worthy CA, Abbots Worthy CA, Easton CA and Winchester CA. A small area of the IAB falls within the boundary of the locally listed Abbots Worthy House and historic park.</p> <p>Other heritage assets such as Listed Buildings and historic landscape characterisation are assessed in Chapter 6 – Cultural Heritage. The assessment of cultural heritage effects is guided by the DMRB LA106 Cultural heritage assessment (Highways England, 2020).</p>	
Landscape statutory designations	<p>The SDNP covers around 117ha of the area of the IAB, principally around its northern and eastern lengths (see Figure 7.1, Appendix 7.1). The SDNP incorporates the more intimate local landscape of the River Itchen to the north-west, the north-east of the area of the IAB and also covers the downland to the east. Consideration will be given to both the direct and indirect effects upon this designated landscape, including effects upon its special qualities and representative views. Special qualities of the SDNP are defined by the South Downs National Park Authority (SDNPA); those special qualities which have the potential to be affected by the Proposed Scheme are as follows:</p> <p><i>Diverse, inspirational landscapes and breath-taking views. This is in part a function of the downland topography.</i></p> <p><i>Tranquil and unspoilt places.</i></p>	<p>The SDNP is a nationally designated landscape resource of high value (sensitivity) based on DMRB LA104. However, refer to paragraph 7.7.9 below.</p>

Landscape receptor	Description	Landscape Value (Sensitivity)
Public rights of way (PRoW)	<p>The main long-distance footpath likely to be located within the ZTV is the St Swithun's Way long-distance path - a 34 mile long-distance walk from Winchester to Farnham following lengths of the original route of the Pilgrim's Way (see Figure 7.1, Appendix 7.1).</p> <p>The Itchen Way long distance footpath - a 32 mile long-distance footpath following the River Itchen in Hampshire from its source near Hinton Ampner House to its mouth at Woolston – is anticipated to be largely outside the ZTV, but a length passes directly through the area of the IAB and would therefore be directly affected.</p> <p>Part of Sustrans Regional Route 23 would fall within the ZTV. This is an 80-mile route with a mixture of off and on road cycling from Reading to Southampton via Basingstoke, Alresford, Winchester and Eastleigh. The route crosses the area of the Proposed Scheme at the M3 Junction 9 roundabout in a north-east to south-west direction along Easton Lane underpass.</p> <p>A number of footpaths, cycle paths and bridleways cross the area of the IAB or are located adjacent to it, with many others connecting these to the wider countryside. The footpaths, cycle paths and bridleways connect the urban and rural areas, with bridges and underpasses allowing access across the M3 and A31, although railways and highways typically sever many connections east west. Where paths are located on elevated ground or across open fields, their users could have clear views of lengths of the area of the IAB.</p>	<p>PRoW are important recreational resources and are of medium to very high value (sensitivity) depending on location i.e. within SDNP and whether the route is a long distance walk or national trail. The differing sensitivities of PRoWs will be reported within the ES.</p>
Perceptual aspects	Noise, lighting, vehicle movement and the presence of infrastructure, all associated with the urban fringe of	The international status of the SDNP Dark Skies

Landscape receptor	Description	Landscape Value (Sensitivity)
	<p>Winchester and the transport routes including the M3, A34/Winchester bypass and A272/Spitfire Link all erode tranquillity in the area.</p> <p>Paragraph 5.43 of Strategic Policy SD7: Relative Tranquillity of the South Downs Local Plan (adopted 2019) defines tranquillity as:</p> <p><i>“Tranquillity is considered to be a state of calm, quietude and is associated with a feeling of peace. It relates to quality of life, and there is good scientific evidence that it also helps to promote health and well-being. It is a perceptual quality of the landscape, and is influenced by things that people can both see and hear in the landscape around them.”</i></p> <p>Built development and transport corridors have also affected the pattern and texture of the landscape over time.</p> <p>The SDNP became an International Dark Skies Reserve in 2016, although the darkest areas are not in the immediate vicinity of Winchester and the M3 corridor where the night-time baseline condition is of a lit road and lighting from moving vehicles.</p>	<p>Reserve affords the receptor a very high value (sensitivity).</p> <p>Tranquillity and a sense of remoteness are important aspects of the nationally designated SDNP and the River Itchen valley and are of high value (sensitivity).</p>
Landscape character	<p>At a national level the area of the Proposed Scheme falls within both the Hampshire Downs and South Downs National Character Areas (NCAs) and these will be used to provide an overall landscape character context.</p> <p>As part of the area of the IAB is located within the SDNP, the South Downs Landscape Character Assessment (SDLCA, 2020) will also be examined and used to inform the landscape assessment as part of the ES (see Figure 7.3, Appendix 7.1).</p> <p>Within the SDLCA, the area of the Proposed Scheme falls into the</p>	<p>The landscape character areas of the nationally designated SDNP and locally important landscape of the River Itchen valley are of high value (sensitivity). However, refer to paragraph 7.7.9 below.</p>

Landscape receptor	Description	Landscape Value (Sensitivity)
	<p>following three landscape character areas:</p> <p>Landscape Type A: Open Downland sub-area A5: East Winchester Open Downs, whose key sensitivities with the potential to be affected by the Proposed Scheme are remoteness, tranquillity, and open, undeveloped skylines.</p> <p>Landscape Character Area F5: Itchen Floodplain, whose key relevant sensitivities are panoramic views from St Catherine’s Hill.</p> <p>SDLCA states in regard to development considerations specific to LCA F5: <i>‘ensure that any future traffic regulation and road upgrades associated with the M3, A34 and A31 are integrated into the rural valley landscape and ensure any signage is sensitively detailed’.</i></p> <p>SDLCA LCA G5: Itchen Valley Sides whose key relevant sensitivities are panoramic views from St Catherine’s Hill and designed landscape parks.</p> <p>HCC has produced an Integrated Landscape Character Assessment (HCCILCA, Hampshire County Council, 2012), within which the area of the IAB falls, in part, within Character Area 3c: Itchen Valley. The only key characteristics of Character Area 3c with the potential to be affected by the Proposed Scheme is that it provides a setting to Winchester. The Proposed Scheme lies adjacent to townscape character areas 8a Winnall Trading Estate and 6b Winnall indicated in the HCCILCA, which includes the Winchester Townscape Assessment (2010).</p>	

Landscape receptor	Description	Landscape Value (Sensitivity)
	The IAB also falls within the Winchester District Landscape Character Assessment (Winchester City Council, 2004) landscape character areas 9. Upper Itchen Valley and 12 East Winchester Downs and these will also be examined.	

7.7.8 Landscape character is an expression of the landscape elements such as topography, land use and vegetation and landscape character areas, which will be considered as the key landscape receptors as part of the assessment process.

7.7.9 The SDNP is a statutory landscape designation of national importance with a high intrinsic sensitivity as set out in **Table 4-1** of **Chapter 4**. However, for the purposes of the landscape assessment process the SDNP as a landscape receptor will be treated as very high sensitivity in line with **Table 7-2** of this chapter as the Proposed Scheme falls largely within the boundary of the SDNP.

Visual receptors and sensitivity

7.7.10 The key visual receptors have been described below in **Table 7-9**. The sensitivity of receptors is based on descriptions set out in Table 3.41 in the DMRB LA107 Landscape and visual effects (Highways England, 2020).

Table 7-9: Assessment view locations and visual sensitivity

View location name, number and distance from IAB at nearest point	Description	Visual Sensitivity
1. Easton Lane / Sustrans 23 20m to the east	Residents at White Hill Cottage and Winnall Cottage Farm. Also represents recreational users of the Sustrans route within the SDNP	Very High
2. Church Green 200m to the north-west	Residential Receptors in the Kings Worthy Conservation Area to the north	High

View location name, number and distance from IAB at nearest point	Description	Visual Sensitivity
3. Itchen Valley St Swithun's Way 400m to the west	Recreational receptors using the St Swithun's Way Long Distance Route (LDR) on the valley floor. Representative view location in SDNP viewshed analysis. Also represents views from Site of St Gertrude's Chapel Scheduled Monument	Very High
4. Abbots Barton, Public Open Space (POS) at Lea View 650m to the west	Residential receptors within new housing development and associated POS on the far side of the River Itchen Valley to the west	High
5. Turnpike Down 350m to the west	Residential receptors on the north-facing hillside to the south-west	Moderate
6. B3404/M3 road bridge Elevated position within IAB	Road users in an elevated area to the south	Low
7. PRow adjacent to railway near Well House Lane 1.2km to the west	Recreational receptors on elevated ground on the far side of the River Itchen Valley to the west – local use	High
8. PRow on crown of Magdalen Hill 305m to the north- east	Recreational receptors using PRow on Magdalen Hill, within the SDNP	Very High
9. St Catherine's Hill 1.2km to the south-west	Recreational receptors. Representative view location in the SDNP viewshed analysis	Very High
10. Whiteshute Lane/Bushfield Camp 3.4km to the south- east	Recreational receptors of open access land. Distant view location	Moderate
11. Itchen Way north of Easton Down 244km to the east	Recreational receptors using the Itchen Way LDR within SDNP	Very High

View location name, number and distance from IAB at nearest point	Description	Visual Sensitivity
12. Local Winchester townscape – Easton Lane 150m to the west	Town receptors in Winchester, local to the Proposed Scheme	Moderate
13. Long Walk 700m to the east	Road users in an elevated area to the east in SDNP	Moderate
14. Itchen Way 20m to the north	Recreational receptors using the Itchen Way LDR within SDNP	Very High
15. Down Farm Lane 1.4km to the north- west	Road users in an elevated area to the north-west	Low
16. St Swithun’s School 280m to the south	Receptors at the school and associated playing fields within SDNP	Moderate
17. Winchester Cathedral 1.5km to the south-west	Receptors (tourists) experiencing historic panoramic views from the cathedral tower while on walking tours of the cathedral	Very High
18. Ridgeway 3.8km to the south-west	Townscape receptors in elevated area of Winchester	Low to Moderate
19. Layby on Morestead Road (requested by WCC as per Table 7.1) 1.5km to the south	Road users in an elevated area to the south within SDNP	Moderate
20. South Downs Way Footbridge over M3 (requested by WCC as per Table 7.1) Elevated position within IAB	Recreational receptors using the South Downs Way LDR on boundary of SDNP	Very High
21. WCC Sports Ground (requested by WCC as per Table 7.1) 200m to the south	Receptors at the associated playing fields within SDNP	Moderate

View location name, number and distance from IAB at nearest point	Description	Visual Sensitivity
22. Layby on A31 (requested by WCC as per Table 7.1) 50m to the north	Road users on A-road within SDNP	Moderate
23. PRow between Long Walk and Easton 10m to the north	Recreational receptors using PRow within SDNP	Very High
24. PRow near B3047 (requested by SDNPA as per Table 7.1) 350m to the north-west	Recreational receptors using PRow within SDNP	Very High

7.8 Design, mitigation and enhancement measures

7.8.1 The principal objective of landscape mitigation is to integrate the Proposed Scheme into the local landscape to minimise adverse landscape and visual impacts with particular regard for the purposes of the SDNP. Development of the landscape mitigation is an iterative process, working closely with the engineering design team and Statutory Consultees, responding to the findings of ongoing assessment and scheme design requirements. It will ultimately form part of an over-arching environmental design for the Proposed Scheme in line with DMRB, LD117 Landscape design (Highways England, 2020) and DMRB, LD119 Roadside environmental mitigation and enhancement (Highways England, 2020) and in consultation with Statutory Consultees. **Figures 2.6, 2.7 and 2.8, Appendix 2.1** illustrate the preliminary environmental mitigation designs for the Proposed Scheme with indicative cross sections for key areas to provide greater richness to the design narrative.

7.8.2 Landscape mitigation would seek to address both construction effects and operational effects.

Construction mitigation

7.8.3 Mitigation of effects on the landscape and visual resource during construction is integral to the 'Considerate Constructors Scheme, which could be adopted as part of the Proposed Scheme. This includes measures such as: tidy site management to reduce visual clutter associated with the works and carefully controlling construction lighting in accordance with best practice to minimise light spill and nuisance caused by glare. Additionally, compound facilities should be of a recessive colour to lessen the visual intrusion of the structures

during the construction period, particularly where the compounds may form part of the visual composition in views to and from the SDNP.

- 7.8.4 An element of vegetation removal as part of the construction of the Proposed Scheme would be unavoidable. The existing vegetation is, however, a valued landscape and green infrastructure resource and provides important screening to the existing highway corridor in the study area and therefore would be retained where reasonably practicable. The vegetation between the M3 and the A34 for example, currently screens views of the highways from receptors to the west and the retention of that vegetation, where reasonably practicable, is a key design objective.
- 7.8.5 A tree survey has been conducted to determine the arboricultural constraints relevant to the Proposed Scheme. This survey was based upon the BS 5837:2012 methodology and will enable an assessment (Arboricultural Impact Assessment, as per SDNP policy SD11) to be made as part of the ES as to which trees are practically retainable within and adjacent to the IAB. Trees were surveyed as individuals, groups and woodlands where appropriate. Part of the survey scope was to identify notable trees due to quality, age, third party status and designation and to determine where retention is possible and where tree protection is likely to be required. Further arboricultural input will be required at later stages of the programme when a tree protection strategy will be produced, (in line with BS 5837:2012 and SDNP policy SD11) in the form of a generic arboricultural method statement and Tree Protection Plan. Any design developments will also need to be considered in terms of a change in impacts to trees.
- 7.8.6 Advanced planting and earthworks as mitigation to screen views of construction activities for particular receptors could be considered where there is the potential for impacts on sensitive visual receptors. Advanced mitigation would be sympathetically designed to integrate with its environs with due consideration of the character of the local area.

Mitigation for operation

- 7.8.7 During the preliminary and detailed design, landscape mitigation and enhancement measures will follow the guidance in the Highways England publication *The Road to Good Design* (Highways England, 2018) together with DMRB, LD117 *Landscape design* (Highways England, 2020).
- 7.8.8 Earthworks have been designed, where possible, to help integration into the gently undulating topography of the study area. Any proposed embankments and cuttings would be graded to respect existing local landforms and reduce disruption to major topographical features. The use of false cuttings and land-raising with a return to chalk grassland, sensitively graded to tie in with the existing adjacent downland, has been considered on the eastern side of the M3 corridor. This would provide screening to the Proposed Scheme at the sensitive interface with the SDNP including helping to screen the road network in views from the proposed footpath link between M3 Junction 9/Easton Lane and Long Walk.

- 7.8.9 New planting would be carried out to replace the vegetation resource and green infrastructure features which are removed as a consequence of the Proposed Scheme. New planting would also be carefully located to screen the new highway and its associated traffic and infrastructure in views experienced by visual receptors from key view locations.
- 7.8.10 The design of new planting would comprise native species of local provenance where practicable and reflect the character of the local landscape. Consideration could also be given to reinforcing the visually open character of the chalk downland by creating breaks in the roadside planting or leaving the chalk unplanted and exposed on the steepest embankments or cuttings.
- 7.8.11 Opportunities for landscape enhancement or improvement through the management of any retained areas of vegetation will also be explored.
- 7.8.12 The planting design (particularly that proposed within the SDNP) will be agreed with key stakeholders, including the SDNPA and local residents during the consultation process. The planting design is also being prepared collaboratively with the project ecologists who continue to advise on the ecological requirements, particularly in relation to sensitive habitats such as chalk grassland.
- 7.8.13 Design proposals will reflect local design characteristics and use materials commonplace in the local area. New planting will be sourced from UK nurseries and locally available stock where reasonably practicable to help lessen the risk of introducing pests and disease.

Monitoring

- 7.8.14 Long term monitoring of proposed landscape mitigation would entail the following measures:
- Monitoring of mature trees within the highway boundary would take place following construction and a woodland management plan integrated into the Outline Landscape and Ecological Management Plan (OLEMP). Thinning, coppicing and replanting of newly planted woodlands would be carried out particularly when densely planted smaller nursery stock is used. This would maintain a structurally diverse and species rich woodland.
 - Monitoring of new structural planting, particularly along the boundaries of the Proposed Scheme, to encourage successful establishment and ensure it provides the necessary degree of visual screening, where appropriate. Failed stock would be re-planted over this long-term monitoring period to ensure continued landscape function.
 - Monitoring of proposed chalk grassland would be undertaken to ensure successful establishment and long-term habitat functionality in line with appropriate ecology recommendations.

- A First Iteration Environmental Management Plan' (fiEMP) which will be submitted to accompany the application for development consent. This document would evolve during detailed design to form the basis of a second iteration Environmental Management Plan (siEMP).

7.9 Assessment of potential effects

7.9.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon landscape and visual receptors during the construction and operational phases. As noted in **Section 7.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below and at this early stage of assessment does not specifically discuss the permanence or significance of effects. Consideration of permanence and significance of effects will be set out in full within the ES.

Potential landscape effects

7.9.2 **Table 7-10** below sets out the potential landscape effects as a result of the Proposed Scheme considering construction and operation stages.

Table 7-10: Potential landscape effects (considering construction and operation stages)

<i>Landscape receptor</i>	<i>Stage of Proposed Scheme/ Type of Effect</i>
Topography	<p>Construction: Temporary adverse landscape effects are anticipated for the topography within the IAB as a result of construction activities and land reprofiling.</p> <p>Operation: Adverse effects on topography are anticipated to remain during operation as result of the earthworks required to enable the Proposed Scheme. However, earthworks have been designed to sympathetically tie into existing levels and surrounding landform within the SDNP.</p>
Land use of the site and surrounding area	<p>Construction: Temporary adverse landscape effects are anticipated for the land use e.g. tourism within the IAB due to the interconnected visual element to landscape as a result of construction activities and land reprofiling, which would lessen the scenic quality of views. Adverse effects on some agricultural land use within the IAB would also occur and would remain through operation as a result of changing land use for landscape mitigation.</p>

<i>Landscape receptor</i>	<i>Stage of Proposed Scheme/ Type of Effect</i>
	<p>Consideration is given to Agricultural Land Classification as a receptor within Chapter 9.</p> <p>Operation: Longer term beneficial effects are anticipated on land use within the IAB as a result of the landscape mitigation measures; specifically creation of areas of chalk grassland on cuttings within the Proposed Scheme and adjacent to the proposed footpath between Easton Lane and Long Walk, which would be appreciated by visitors to the SDNP and support the enhancement of local landscape character. Improvements to accessibility to the SDNP from Winchester as a result of the Walking, Cycling and Horse Riding (WCH) route and footpath connections would also help create longer term benefits for tourist usage.</p>
Vegetation	<p>Construction: Temporary adverse landscape effects are anticipated for the vegetation within the IAB as a result of vegetation clearance prior to construction works. Arboricultural surveys have been carried out to BS 5837:2012 prior to vegetation clearance to understand nature of losses and requirements for mitigation planting.</p> <p>Operation: Longer term beneficial effects on vegetation are expected as a result of the landscape mitigation measures, which would replace vegetation lost at construction and contribute to enhancing local green infrastructure linkages.</p>
Heritage statutory designations (see Chapter 6 for consideration of effects to heritage assets)	<p>Construction: The construction of the Proposed Scheme will not result in direct physical impacts to any listed building or unlisted historic building within the 1km cultural heritage study area; all of those identified within the 1km cultural heritage study area are located outside of the IAB. There is however the potential for direct adverse impacts upon the Kings Worthy and Abbots Worthy Conservation Areas at construction, small parts of which are within the IAB.</p> <p>Operation: The operation of the Proposed Scheme will not directly affect any listed or unlisted historic building within the 1km cultural heritage study area, although there is the potential for both indirect adverse and</p>

Landscape receptor	Stage of Proposed Scheme/ Type of Effect
	beneficial effects from changes to the setting of some heritage assets as a result of the landscape mitigation.
Landscape statutory designations	<p>Construction: Temporary adverse landscape effects are anticipated within the areas of the SDNP that fall within the IAB as a result of construction work, which will take place within the boundary of the National Park and in its setting and is anticipated to impact on the special qualities of the National Park.</p> <p>Operation: Adverse effects on the special qualities of the National Park as a result of the Proposed Scheme would lessen with time and maturation of landscape mitigation measures. Longer term beneficial effects on the special qualities of the National Park are expected as a result of the landscape mitigation measures as new planting matures, which would replace vegetation lost at construction, enhance the local landscape character, accord with the special qualities of the SDNP and contribute to enhancing local green infrastructure linkages.</p>
Public rights of way (PRoW)	<p>Construction: Temporary adverse landscape effects are anticipated for the PRoW, which fall within the IAB and connectivity to the wider network whilst improvement works to the PRoW are undertaken resulting in short term closures and diversions.</p> <p>Operation: Longer term beneficial effects are anticipated as a result of the installation of a new walking route along sections of the abandoned A33/A34 carriageways and footpath between Easton Lane and Long Walk thus enhancing connectivity to SDNP and Winchester. The existing Walking, Cycling and Horse-riding (WCH) route within the Junction 9 roundabout will also be upgraded as part of the Proposed Scheme.</p>
Perceptual aspects	<p>Construction: Temporary adverse landscape effects are anticipated on tranquillity as a result of vegetation clearance and construction works, which will temporarily increase noise and light intrusion within the construction area and where the existing road network is exposed.</p> <p>Temporary lighting effects on the SDNP Dark Skies Zone</p>

<i>Landscape receptor</i>	<i>Stage of Proposed Scheme/ Type of Effect</i>
	<p>are anticipated as a result of construction activity associated with the areas of search for potential excess spoil management.</p> <p>Operation: Adverse effects on tranquillity as a result of the Proposed Scheme would lessen with time and maturation of landscape mitigation measures. At this stage, new underpass lighting is the only additional lighting feature forming part of the permanent works of the Proposed Scheme. During operation no permanent lighting features are associated with the areas of search for potential excess spoil management.</p>
Landscape character	<p>Construction: Temporary adverse landscape effects are anticipated on local landscape character as a result of vegetation clearance and construction works, which would alter key characteristics of the LCAs A5: East Winchester Open Downs, F5: Itchen Floodplain G5: Itchen Valley Sides. Construction effects are anticipated on the National Character Areas (NCA), however given the extent of geographic area the NCAs cover these construction effects are unlikely to be significant.</p> <p>Operation: Adverse effects on local landscape character as a result of the Proposed Scheme would lessen with time and maturation of landscape mitigation measures. The presence of new operational road infrastructure within the local area would be analogous with the existing baseline. Longer term beneficial effects on character are expected as a result of the landscape mitigation measures, which would replace vegetation lost at construction, lessen the urbanising effect of the road network, enhance local character and contribute to enhancing local green infrastructure linkages.</p>

Potential visual effects

7.9.3 **Table 7-11** below sets out the potential visual effects as a result of the Proposed Scheme considering construction and operation stages.

Table 7-11: Potential visual effects (considering construction and operation stages)

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
1. Easton Lane / Sustrans 23 20m to the east	Residents at White Hill Cottage and Winnall Cottage Farm. Also represents recreational users of the Sustrans route within the SDNP	<p>Construction: Users of NCN 23 (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of the siting of the central construction compound and construction activity.</p> <p>Operation: Adverse effects would reduce over time as the central compound is decommissioned and reinstatement takes place along with installation of landscape mitigation.</p>
2. Church Green 200m to the north-west	Residential Receptors in the Kings Worthy Conservation Area to the north	<p>Construction: No construction effects are anticipated for residential receptors as a result of the Proposed Scheme due to intervening built form and vegetation.</p> <p>Operation: No operational effects are anticipated for residential receptors as a result of the Proposed Scheme due to intervening built form and vegetation.</p>
3. Itchen Valley St Swithun's Way 400m to the west	<p>Recreational receptors using the St Swithun's Way Long Distance Route (LDR) on the valley floor.</p> <p>Representative view location in SDNP viewshed analysis. Also represents views from Site of St Gertrude's Chapel</p>	<p>Construction: Users of St Swithun's Way (Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of construction activities where vegetation bounding the existing road network is removed to enable works.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation matures.</p>

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
	Scheduled Monument	
4. Abbots Barton, Public Open Space (POS) at Lea View 650m to the west	Residential receptors within new housing development and associated POS on the far side of the River Itchen Valley to the west	<p>Construction: Users of the POS and local residents (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of construction activities where vegetation bounding the existing road network is removed to enable works.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation matures.</p>
5. Turnpike Down 350m to the west	Residential receptors on the north-facing hillside to the south-west	<p>Construction: Local residents (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of earthwork reprofiling within the eastern area of the IAB, albeit seen in glimpsed views at distance and in the context of the townscape of Winchester. From this location local residents are unlikely to perceive the road improvement works despite proximity to IAB due to intervening built form, topography and vegetation.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation takes effect. Longer term beneficial effects are expected as a result of the landscape mitigation.</p>
6. B3404/M3 road bridge Elevated position within IAB	Road users in an elevated area to the south	Construction: Localised temporary adverse visual effects are anticipated as a result of construction activities and vegetation clearance around the M3 Junction 9, albeit seen by road users focused on driving in the context

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
		<p>of the existing road network at this location.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation matures and the Proposed Scheme integrates into its environs.</p>
<p>7. PRow adjacent to railway near Well House Lane 1.2km to the west</p>	<p>Recreational receptors on elevated ground on the far side of the River Itchen Valley to the west – local use</p>	<p>Construction: Users of PRow (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of construction activities where vegetation bounding the existing road network is removed to enable works.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation matures.</p>
<p>8. PRow on crown of Magdalen Hill 305m to the north-east</p>	<p>Recreational receptors using PRow on Magdalen Hill, within the SDNP</p>	<p>Construction: Users of PRow (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of the siting of the central construction compound, construction activity and earthwork reprofiling within the eastern area of the IAB.</p> <p>Operation: Adverse effects would reduce over time as the central compound is decommissioned and reinstatement takes place along with installation of landscape mitigation. Longer term beneficial effects are expected as a result of the landscape mitigation.</p>
<p>9. St Catherine’s Hill 1.2km to the south-west</p>	<p>Recreational receptors. Representative view location in</p>	<p>Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p>

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
	the SDNP viewshed analysis	Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.
10. Whiteshute Lane/Bushfield Camp 3.4km to the south- east	Recreational receptors of open access land. Distant view location	<p>Construction: Users of open access land (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of earthwork reprofiling within the eastern area of the IAB, albeit seen in glimpsed views at distance and in the context of the townscape of Winchester.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation takes effect. Longer term beneficial effects are expected as a result of the landscape mitigation.</p>
11. Itchen Way north of Easton Down 244m to the east	Recreational receptors using the Itchen Way LDR within SDNP	<p>Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p> <p>Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p>
12. Local Winchester townscape – Easton Lane 150m to the west	Town receptors in Winchester, local to the Proposed Scheme	Construction: Localised temporary adverse visual effects are anticipated as a result of construction activities and vegetation clearance around the M3 Junction 9, albeit seen in the context of the existing road network and industrial townscape of Winnall at this location.

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
		Operation: Adverse effects would reduce over time as the landscape mitigation matures and the Proposed Scheme integrates into its environs.
13. Long Walk 700m to the east	Road users in an elevated area to the east in SDNP	<p>Construction: Users of Long Walk (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of the siting of the central construction compound, construction activity and earthwork reprofiling within the eastern area of the IAB and area of search for potential excess spoil management.</p> <p>Operation: Adverse effects would reduce over time as the central compound is decommissioned and reinstatement takes place along with installation of landscape mitigation. Longer term beneficial effects are expected as a result of the landscape mitigation.</p>
14. Itchen Way 20m to the north	Recreational receptors using the Itchen Way LDR within SDNP	<p>Construction: Localised temporary adverse visual effects are anticipated as a result of construction activities and vegetation clearance on the elevated land between the existing A34 southbound and M3 northbound. However, the undulating landform effectively curtails views of the construction works focused around the M3 Junction 9 and as such would not be experienced by visual receptors at this location.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation matures and the Proposed Scheme integrates into its environs.</p>

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
		However, localised adverse visual effects are likely to remain as a result of the additional road infrastructure and potential changes to landform to accommodate the drainage strategy.
15. Down Farm Lane 1.4km to the north- west	Road users in an elevated area to the north-west	<p>Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p> <p>Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p>
16. St Swithun's School 280m to the south	Receptors at the school and associated playing fields within SDNP	<p>Construction: Users of the playing fields (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of the siting of the central construction compound, construction activity and earthwork reprofiling within the eastern area of the IAB and area of search for potential excess spoil management due to limited vegetation cover along the northern boundary of the school grounds.</p> <p>Operation: Adverse effects would reduce over time as the central compound is decommissioned and reinstatement takes place along with installation of landscape mitigation. Longer term beneficial effects are expected as a result of the landscape mitigation.</p>
17. Winchester Cathedral 1.5km to the south-west	Receptors (tourists) experiencing historic panoramic views from the	Construction: There is potential for temporary adverse effects as a result of construction activities and vegetation clearance on the elevated land between the existing A34

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
	cathedral tower while on walking tours of the cathedral	southbound and M3 northbound, albeit, viewed at long distance and in context of a much wider panoramic view. Operation: Adverse effects would reduce over time as the landscape mitigation matures and the Proposed Scheme integrates into its environs.
18. Ridgeway 3.8km to the south-west	Townscape receptors in elevated area of Winchester	Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography, vegetation and distance from the construction works. Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.
19. Layby on Morestead Road (requested by WCC as per Table 7.1) 1.5km to the south	Road users in an elevated area to the south within SDNP	Construction: Road users parked in the specific layby on Morestead Road (see Figure 7.4, Appendix 7.1) may be potential temporary adverse effects as a result of construction activities associated with an area of search for potential excess soil management, albeit, viewed at distance and in context of a much wider panoramic view. The elevated landform to the north of the A31 effectively curtails views of the construction works focused around the M3 Junction 9 and as such would not be experienced by visual receptors at this location. Operation: Adverse effects would reduce over time as the landscape mitigation takes effect. Longer term beneficial effects are expected as a result of the landscape mitigation. No

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
		permanent road infrastructure improvements would be visible in views from this location at operation.
20. South Downs Way Footbridge over M3 (requested by WCC as per Table 7.1) Elevated position within IAB	Recreational receptors using the South Downs Way LDR on boundary of SDNP	Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation. Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.
21. WCC Sports Ground (requested by WCC as per Table 7.1) 200m to the south	Receptors at the associated playing fields within SDNP	Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation. Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.
22. Layby on A31 (requested by WCC as per Table 7.1) 50m to the north	Road users on A-road within SDNP	Construction: Road users and pedestrians on the adjacent pavement (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of construction activities associated with an area of search for potential excess spoil management south of the A31. However, the elevated landform to the north of the A31 effectively curtails views of the construction works focused around the M3 Junction 9 and as such would not be experienced by visual receptors at this location. Operation: Adverse effects would reduce over time as the landscape mitigation takes effect. Longer term

View location name, number and distance from IAB at nearest point	Visual Receptors	Stage of Proposed Scheme/ Type of Effect
		beneficial effects are expected as a result of the landscape mitigation. No permanent road infrastructure improvements would be visible in views from this location at operation.
23. PRoW between Long Walk and Easton 10m to the north	Recreational receptors using PRoW within SDNP	<p>Construction: Users of the PRoW (see Figure 7.4, Appendix 7.1), are likely to experience temporary adverse visual effects as a result of construction activities associated with an area of search for potential excess spoil management east of the M3. However, the undulating landform to the south effectively curtails views of the construction works focused around the M3 Junction 9 and as such would not be experienced by visual receptors at this location.</p> <p>Operation: Adverse effects would reduce over time as the landscape mitigation takes effect. Longer term beneficial effects are expected as a result of the landscape mitigation. No permanent road infrastructure improvements would be visible in views from this location at operation.</p>
24. PRoW near B3047 (requested by SDNPA as per Table 7.1) 350m to the north-west	Recreational receptors using PRoW within SDNP	<p>Construction: No construction effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p> <p>Operation: No operational effects are anticipated as a result of the Proposed Scheme due to intervening built form, topography and vegetation.</p>

7.10 Anticipated further assessment

7.10.1 Anticipated further assessment relevant to landscape and visual matters,

which will be submitted with the ES to accompany the Development Consent Order (DCO) process is as follows:

- A full assessment of landscape and visual effects on receptors and reporting of significance will be undertaken as part of the ES.
- On-going detailed ZTV mapping as the Proposed Scheme evolves and further detailed information relating to vertical features (e.g. CCTV columns and gantries) becomes available
- On-going 3D modelling of the Proposed Scheme to inform AVR production process. Use of AVRs will in turn help assist in the evolution of the design of the Proposed Scheme.
- Cross over and collaborative work will be undertaken between the interrelated project disciplines, particularly between landscape, ecology/biodiversity, heritage, engineering, drainage and acoustics. Collaborative consultation with Statutory Consultees to agree environmental mitigation design will also be on-going.

8 Biodiversity

8.1 Introduction

8.1.1 This chapter presents the preliminary findings of the assessment of likely significant effects on biodiversity arising from the construction and operation of the Proposed Scheme.

8.1.2 The Proposed Scheme has the potential to result in the following effects on biodiversity:

- habitat loss, disturbance or fragmentation during site clearance, site preparation and/or construction
- noise and/or visual disturbance during site clearance, site preparation, construction and/or operation
- effects to habitats from dust during site clearance, site preparation and/or construction
- effects to habitats from surface water drainage during, site preparation, construction and/or operation
- effects to species from lighting during site preparation, construction and/or operation
- effects as a result of emissions / deposition during operation

8.2 Legislative and policy framework

8.2.1 This section summarises the relevant planning policies and legislation pertaining to designated areas, habitats and species mentioned within this chapter.

Conservation of Habitats and Species Regulations 2017 (as amended)

8.2.2 The Conservation of Habitats and Species Regulations 2017 (as amended), which has most recently been amended by the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019, provide for:

- designation and protection of Special Protection Areas (SPAs) and Special Areas of Conservation (SAC), including the need for Appropriate Assessment of plans and proposals
- protection of certain European protected species listed within the Regulations
- adaptation of planning and other controls for the protection of SPAs and SACs

- 8.2.3 No steps that will impact upon a European protected species or its habitat can be undertaken unless authorised by a European Protected Species licence issued by Natural England. Such a licence can only be issued after planning consent has been granted and once Natural England is satisfied that adequate measures are to be put in place to mitigate for the impact of the development.

Wildlife and Countryside Act 1981 (as amended)

- 8.2.4 The Wildlife and Countryside Act 1981 (as amended) has been amended by the Countryside and Rights of Way (CROW) Act 2000.
- 8.2.5 Schedules 1 (birds) and 5 (animals) of the Wildlife and Countryside Act 1981 (as amended) identify species of bird and other animal in relation to which the Act makes killing, injury, taking and disturbance an offence while Schedule 8 to the Act lists species of plant in relation to which the Act makes it an offence to intentionally pick, uproot or destroy.
- 8.2.6 Section 14(2) of the Wildlife and Countryside Act 1981 (as amended) makes it an offence to cause any species of animal or plant listed in Schedule 9 of the Act to grow in the wild.
- 8.2.7 The Wildlife and Countryside Act 1981 (as amended) further provides for notification and confirmation of Sites of Special Scientific Interest (SSSI) for their flora, fauna, geological or physiographical features. It also contains measures for the protection and management of SSSIs.

The Natural Environmental and Rural Communities Act 2006 ('NERC')

- 8.2.8 The NERC Act 2006 sets a duty on public bodies (including Local Authorities) to have due regard for Habitats and Species of Principal Importance (SPI) for biodiversity in England when carrying out their duties.
- 8.2.9 Section 41 (S.41) of the NERC Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list is used by decision-makers, such as Local Authorities, in implementing their protection duties under this Act when carrying out their functions.
- 8.2.10 The S.41 list includes 56 Habitats and almost 1,000 SPI in England. Since the United Nations (UN) Convention on Biological Diversity (CBD) in 2010, the UK identifies these habitats and species as conservation priorities under the UK Post-2010 Biodiversity Framework, (they were formerly identified as UK BAP habitats and species).
- 8.2.11 Paragraph 117 of the National Planning Policy Framework (NPPF) 2019 (see below) guides local planning authorities to create policies which promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species.

Protection of Badgers Act 1992

8.2.12 The Protection of Badgers Act 1992 protects badgers from persecution rather than being a response to unfavourable conservation status. This makes it an offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a badger; or attempt to do so
- intentionally or recklessly interfere with a sett

8.2.13 Badgers and their setts are frequently encountered in both urban and rural areas and as such development projects have the potential to affect badgers and/or their setts. If an offence is likely to result, an effective mitigation plan must be agreed with Natural England and authorised by licence before work proceeds.

Hedgerow Regulations 1997

8.2.14 The Hedgerow Regulations 1997 made it an offence to remove or destroy certain “important” hedgerows in England and Wales without permission from the local planning authority. The criteria determining whether the hedgerow is “important” are defined in the Hedgerow Regulations 1997 and relate to biodiversity and archaeological interest, associated features and setting in the landscape.

Wild Mammals (Protection Act, 1996 (as amended))

8.2.15 Under the Wild Mammals (Protection) Act 1996 it is an offence to cause unnecessary suffering to wild mammals, including crushing and asphyxiating. This Act is primarily concerned with animal welfare and aims to prevent cruelty. As a result, offences include those actions with the intent to inflict unnecessary suffering. A wild mammal includes any mammal which is not domestic or captive. Red foxes, wild deer and other mammals such as rabbits are therefore covered by the Act.

Planning Policy

8.2.16 Planning policies that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Paragraphs 4.22 to 4.25 (Habitats Regulations Assessment (HRA)); Paragraphs 5.20 to 5.38 (Biodiversity and Ecological Conservation); Paragraphs 5.81-5.89 (Dust, odour, artificial light, smoke and steam); and, 5.192 (Noise and vibration)
- NPPF (Ministry of Housing, Communities and Local Government, 2019): Paragraph 8 (Achieving sustainable development); 170 and 172 (Conserving and enhancing the natural environment); 175, 176 and 177 (Conserving and enhancing the natural environment – Habitats and

biodiversity); 180 (Conserving and enhancing the natural environment: Ground conditions and pollution); and, associated Planning Practice Guidance: Air Quality (2019), Natural Environment (2019), Noise (2019) Light pollution (2019)

- Winchester District Draft Local Plan 2018 -2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February – 12th April 2021 Winchester District Local Plan Part 1 – Joint Core Strategy (2013) Policy CP16 (Biodiversity)
- South Downs Local Plan 2014-2033 (2019): SD9 (Biodiversity and Geodiversity), SD11 (Trees, Woodland and Hedgerows)

8.3 Consultation

Consultation undertaken

Table 8-1: Response to consultation comments

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
Page 27 Paragraph 4.5.1	<i>“The ES must, as indicated in Paragraph 9.6.7, identify and all impact-effect pathways and assess the significance of effects. The ES should characterise impacts (i.e. describe their magnitude, extent, duration and timing, reversibility, and whether positive or negative) and justify the conclusions reached regarding the residual significant effects. The ES may draw on the conclusions of the HRA material to support such conclusions.”</i>	The Biodiversity chapter of the Environmental Statement (ES) will identify all impact-effect pathways and assess the significance of effects. The ES will characterise impacts and justify the conclusions reached regarding the residual significant effects.
Page 28 Paragraph 4.5.2	<i>“Reporting of intra-project effects on the River Itchen System in a standalone section” “It is for the Applicant to determine the most appropriate way of presenting this assessment. However, the Inspectorate agrees that a standalone section may aid clarity over the likely effects on this sensitive feature and considers that it may also aid co-ordination with other related</i>	It is proposed that the impact interactions and cumulative assessment will report potential intra-project effects on the River Itchen system. See Chapter 15 of this PEIR.

Reference	Comment	Response
	<i>assessments i.e. the Habitats Regulations Assessment and Water Framework Directive assessment referred to in Paragraph 5.1.27.”</i>	
Page 28 Paragraph 4.5.3	<i>“The Inspectorate welcomes the intended inclusion of plans in the ES. The Inspectorate considers that labelled plans showing the locations in relation to the Proposed Development of all designated sites described and assessed in the ES should be included, not solely those within 2km as indicated in the Scoping Report.”</i>	Figures 8.1 – 8.3 Appendix 8.1 show the locations in relation to the Proposed Development of all designated sites described within this chapter, including those beyond 2km.
Page 28 Paragraph 4.5.4	<i>“The ES must clearly explain all mitigation measures applied to the assessment of significant residual effects and specify how each measure will be secured.”</i>	The ES will clearly explain all mitigation measures used to inform the assessment of significant residual effects, and will specify how each measure will be legally secured e.g. by DCO requirement.
Page 28 Paragraph 4.5.5	<i>“If the assessments in the ES rely on specific aspects of project design to be agreed with stakeholders post-consent, the ES should indicate the stakeholders involved, the mechanism for the process, and how it will be legally secured e.g. by DCO requirement.”</i>	The ES will include details of all required mitigation, including any stakeholders involved, the mechanism for the process, and how it will be legally secured e.g. by DCO requirement.
Page 28/29 Paragraph 4.5.6	<i>“The Inspectorate understands from the Scoping Report that specific mitigation for these receptors will sit alongside more general project-wide mitigation measures in the Environmental Management Plan (EMP). The Inspectorate welcomes this approach and encourages the Applicant to engage with relevant stakeholders to agree these measures as far as possible in</i>	The Applicant will continue to consult with stakeholders to seek agreement on mitigation measures as far as possible in advance of the proposed DCO application.

Reference	Comment	Response
	<i>advance of the proposed DCO application. Clear cross-references should be provided in the ES to the EMP and any other relevant application documents.”</i>	
Page 29 Paragraph 4.5.7	<i>“The Scoping Report states that no more survey work is proposed to augment the desk study information, which relates to the River Itchen. It is not clear if any other water features are affected by the Proposed Development which could support notable fish species. If so, the Applicant should consider if further survey work is required and seek advice from relevant consultees in this regard. The Inspectorate would expect the ES to contain this information as part of a full explanation the assessment undertaken.”</i>	In addition to the desk study information collected in relation to fish, aquatic habitat surveys were undertaken in 2020 to assess habitat suitability for bullhead, Atlantic salmon and brook lamprey; qualifying feature species of the River Itchen SAC. In addition, surveys of the River have been undertaken for otter, water vole, and aquatic invertebrates. Results of desk study and surveys are presented in this PEIR and will be reported in the ES. Other than the River Itchen system, no water features will be affected by the Proposed Development.
Page 29 Paragraph 4.5.8	<i>“The Inspectorate advises the Applicant to differentiate clearly in the ES between works associated with BNG and works which are necessary to deliver essential ecological mitigation on which the assessment in the ES relies. Details and methodologies of both ecological mitigation and BNG should be described in the ES.”</i>	The ES will present the results of a biodiversity metric calculation which will assess the predicted habitat losses and gains, with the aim of maximising biodiversity outputs from the Proposed Scheme in accordance with Highways England performance targets. The ES will differentiate clearly between works associated with maximising biodiversity outputs, and those which are necessary to deliver essential ecological mitigation on which the assessment in the ES relies.
Other Consultation		
Page 64 – 66	<i>“Eastleigh Borough Council (EBC) considers that the Environmental Impact Assessment (EIA) should</i>	The survey and assessment of biodiversity receptors is being undertaken in line with industry

Reference	Comment	Response
Eastleigh Borough Council (EBC)	<i>include a thorough analysis of the impacts of the scheme, in its construction and operational phases, in terms of the physical works, emissions from road traffic, temporary and permanent alteration of surface and ground water, air quality and the noise environment, and consequent effects particularly on human health and on biodiversity, in affected areas within the Eastleigh Borough”.</i>	standard practice, and will assess potential construction and operation impacts of the scheme (from changes to surface and ground water, air quality and noise) to identified biodiversity receptors. The study areas that are being used to inform the consideration of impacts to biodiversity features vary due to differing zones of influence over which features may be subject to impacts and subsequent effects. Selection of the study areas has been informed by the Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018).
Page 64 – 66 EBC	<i>“EBC is keen to see that the air quality study area, when identified, properly encompasses all areas where human health and biodiversity are likely to be affected, including by impacts from traffic management measures during construction”</i>	In line with standard guidance (DMRB LA105, Highways England 2019), potential effects from traffic emissions to designed nature sites within 200m of the Affected Road Network will be assessed.
Page 64 – 66 EBC	<i>“The study area for Biodiversity needs to extend beyond the survey areas set out in the Scoping Report particularly in terms of the River Itchen SAC and SSSI within the Eastleigh Borough area”.</i>	The study areas that are being used to inform the assessment of impacts to biodiversity features vary due to differing zones of influence over which features may be subject to impacts and subsequent effects. Selection of the study areas has been informed by the Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018). Surveys of the River Itchen have focused on the areas within and adjacent to the Proposed Scheme

Reference	Comment	Response
		as, due to the proximity, these are the areas most likely to be subject to impacts. The ES will present an assessment of potential effects to the River Itchen SAC/SSSI, including all qualifying features of these designated sites.
Page 67 – 72 Forestry Commission (FC)	<i>“Woodland under 2 hectares may not appear on the Ancient Woodland Inventory but may still have ancient woodland characteristics, so we would suggest that a detailed investigation is undertaken to ascertain whether any additional ancient woodlands exist that may be impacted by the proposed scheme.”</i>	In addition to the desk based data gathering, surveys have been undertaken of all habitats including woodlands, likely to be impacted by the Proposed Development, to identify their characteristics and condition. No ancient woodland has been identified within the IAB.
Page 67 – 72 Forestry Commission (FC)	<i>“The EIA Scoping Report provided by Highways England states that there are no Ancient woodlands within 2km of the site. With reference to the comment above regarding woodland less than 2ha the existing baseline summary would need to be updated, if Ancient Woodland is found. The table should mention Ancient Woodland, Ancient Trees or Veteran Trees being “Irreplaceable Habitats” as per the National Planning Policy Framework. If there isn’t any ancient woodland, ancient trees or veteran trees impacted we would expect this to be referenced in the Environmental Statement.”</i>	No ancient woodland, veteran trees or ancient trees have been identified within the IAB. A number of parcels of ancient woodland have been identified on the ancient woodland inventory within 2km. The ES will present an assessment of potential impacts to ancient woodland, ancient trees or veteran trees, however currently no impacts are anticipated.
Page 67 – 72 Forestry Commission (FC)	<i>“Site investigations for the ES should identify ancient and veteran trees.”</i>	Surveys of all habitats within the IAB have been undertaken. No ancient or veteran trees have been identified.
Page 67 – 72	<i>“If there is loss of woodlands it should be included in the compensation package.”</i>	The biodiversity and landscaping mitigation package, which will include provision of habitats of

Reference	Comment	Response
Forestry Commission (FC)	<i>Opportunities to strengthen and buffer existing woodland and provide connectivity should be considered. The appropriate species should be considered to enhance the scheme. It is important that the right trees are planted in the right locations.”</i>	ecological value which are sensitive to the local area, is being developed. This includes areas of native broadleaved woodland, which adds to, and provides connectivity between, existing woodlands.
Page 89 – 95 Natural England	<i>“Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters.”</i>	The Biodiversity chapter of the ES will identify all potential impacts on identified biodiversity features in accordance with CIEEM Guidance (2018). Habitat creation and enhancement will be undertaken developed in accordance with LD 118 Biodiversity Design (Highways England, 2020), LD 117 Landscape design (Highways England, 2020).
Page 89 – 95 Natural England	<i>“The ES should thoroughly assess the potential for the proposal to affect designated sites.”</i>	The Biodiversity chapter of the ES will identify all potential impacts on designated sites, in accordance with CIEEM Guidance (2018).
Page 89 – 95 Natural England	<i>“Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.”</i>	A Habitats Regulations Assessment of the Proposed Development will be undertaken in accordance with LA 115 Habitats Regulations assessment and Advice note ten: Habitats Regulations Assessment relevant to nationally significant infrastructure (The Planning Inspectorate, 2017).
Page 89 – 95 Natural England	<i>“The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within River Itchen SSSI and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.”</i>	The Biodiversity chapter of the ES will include a full assessment of the direct and indirect effects of the Proposed Scheme on the features of special interest within the River Itchen SSSI, and will identify any mitigation measures required (as well as how they would be legally secured e.g. by DCO requirement) in order to

Reference	Comment	Response
		avoid, minimise or reduce any adverse significant effects.
Page 89 – 95 Natural England	<p><i>“The EIA will need to consider any impacts upon local wildlife and geological sites.”</i></p> <p><i>“The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures.”</i></p>	The ES will include a full assessment of the direct and indirect effects of the Proposed Development on local wildlife sites, and will identify any mitigation measures required (as well as how they would be legally secured e.g. by DCO requirement) in order to avoid, minimise or reduce any adverse significant effects. See Chapter 9 – Geology and Soils for consideration of impacts to geological sites.
Page 89 – 95 Natural England	<p><i>“Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the Hampshire Biodiversity Information Centre and other appropriate bodies (which may include the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document).”</i></p>	Data was initially requested from Hampshire Biodiversity Information Centre (HBIC) in 2016. This included biological records in relation to statutory and non-statutory nature conservation sites, notable habitats and species, and controlled species. To ensure desk study data used to inform the ongoing assessment work which will be reported in the ES is current, and to ensure data is obtained for any areas recently added to the Indicative Application Boundary (IAB), HBIC will be asked to undertake a new data search, which will be used to inform the assessment to be presented in the ES.
Page 89 – 95 Natural England	<p><i>“The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats).”</i></p> <p><i>“Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and</i></p>	The Biodiversity chapter of the ES will include a full assessment of the direct and indirect effects of the Proposed Development on protected species, including consideration to the wider context of the site in terms of habitat linkages and protected species populations in the wider area. The ES will identify any mitigation measures required in order to

Reference	Comment	Response
	<i>consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment.”</i>	avoid, minimise or reduce any adverse significant effects. Desk study data was initially requested from HBIC in 2016. To ensure desk study data used to inform the ongoing assessment work which will be reported in the ES is current, HBIC will be asked to undertake a new data search, which will be used to inform the assessment to be presented in the ES.
Page 89 – 95 Natural England	<i>“The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.”</i>	A suite of surveys has been undertaken by competent ecologists between 2017 and 2020, and will be ongoing during 2021. Surveys have been undertaken following standard survey guidance, or where methods have deviated from standard guidance, the rationale or limitations have been explained within the relevant report. The results of these surveys will be used to inform the assessment of impacts, and where required appropriate mitigation strategies, that will be presented in the ES.
Page 89 – 95 Natural England	<i>“The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as ‘Habitats and Species of Principal Importance’ within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006.”</i>	The Biodiversity chapter of the ES will include a full assessment of the direct and indirect effects of the Proposed Development on Habitats and Species of Principal Importance. The ES will identify any mitigation measures required (as well as how they would be legally secured) in order to avoid, minimise or reduce any adverse significant effects.
Page 89 – 95 Natural England	<i>“Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be</i>	The Biodiversity chapter of the ES will include a full assessment of the direct and indirect effects of the Proposed Development on Habitats and Species of Principal Importance, and Local BAP habitats and species. The ES will

Reference	Comment	Response
	<p><i>given to those species and habitats included in the relevant Local BAP.”</i></p>	<p>identify any mitigation measures (as well as how they would be legally secured) required in order to avoid, minimise or reduce any adverse significant effects.</p>
<p>Page 89 – 95 Natural England</p>	<p><i>“Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of:</i></p> <ul style="list-style-type: none"> <i>• Any historical data for the site affected by the proposal (e.g. from previous surveys);</i> <i>• Additional surveys carried out as part of this proposal;</i> <i>• The habitats and species present;</i> <i>• The status of these habitats and species (e.g. whether priority species or habitat);</i> <i>• The direct and indirect effects of the development upon those habitats and species;</i> <i>• Full details of any mitigation or compensation that might be required.”</i> 	<p>A suite of surveys has been undertaken between 2017 and 2020, including habitat surveys, detailed botanical surveys, bird surveys, and invertebrate surveys. The results of these surveys along with desk study data are being used to inform an assessment of the conservation importance of receptors, and an assessment of impacts which will be presented in the ES. The ES will also include details of mitigation and or compensation where required.</p>
<p>Page 89 – 95 Natural England</p>	<p><i>“Further, given the scale of the scheme there may nevertheless remain significant wider residual impacts to landscape and biodiversity interests. In order to address and moderate any such wider residual impacts the scheme the ES should also include the preparation of a comprehensive landscape, biodiversity and access enhancement plan for the wider areas of landscape affected by the</i></p>	<p>A biodiversity and landscaping mitigation package is being developed which will include provision of habitats of ecological and landscape value which are sensitive to the local area. This is presented on the Preliminary Environmental Mitigation Design Plan (Figure 2.6, Appendix 2.1).</p>

Reference	Comment	Response
	<i>proposals that are outside the applicants control.”</i>	
Page 89 – 95 Natural England	<i>“Natural England would welcome the opportunity to comment on the landscape, biodiversity and access enhancement plan and agree the funding arrangements in due course.”</i>	The Preliminary Environmental Mitigation Design Plan is included in Figure 2.6, Appendix 2.1 .
Page 121 – 129 South Downs National Park Authority	<i>“We note that the areas of additional land now included in the IAB are currently undergoing Preliminary Ecological Assessment (PEA) and it would be helpful to understand any recommendations that come out of this work and assurances that any recommendations are incorporated into the ES.”</i>	The PEA Report covering areas to the east of the M3 recently added to the IAB, is appended to this PEIR as Appendix 8.2 , and a summary is provided within this PEIR. Any recommendations will be incorporated into the ES.
Page 131 – 149 Winchester City Council	<i>“The River Itchen SAC/SSSI is one of the main ecological features with potential to be impacted, as well as a number of other habitats and species in the environment. Disturbance, fragmentation and pollution are the main potential impacts and avoidance, mitigation, compensation and enhancement measures will have to be looked at”</i>	The Biodiversity chapter of the ES will include a full assessment of the direct and indirect effects of the Proposed Development on the features of special interest, including the River Itchen SAC/SSSI. The ES will identify any mitigation measures required in order to avoid, minimise or reduce any adverse significant effects.
Page 131 – 149 Winchester City Council	<i>“The assessment on LSE (likely significant effects) on ecological receptors will be undertaken in accordance with HA standards and the associated interim advice notes.”</i>	The assessment set out in the biodiversity chapter of the ES will be undertaken in accordance with CIEEM Guidance (2018) which is endorsed in DMRB LA108 Biodiversity (Highways England, 2020).
Page 131 – 149 Winchester City Council	<i>“LSE is predicted for a number of notable species through habitat loss, disturbance and direct mortality and a hierarchical approach to mitigation will be adopted to avoid/reduce adverse impacts. Compensation/offsetting measures may be required. A biodiversity net gain needs to be assessed and achieved.”</i>	The Biodiversity chapter of the ES will include a full assessment of the direct and indirect effects of the Proposed Development on protected and notable species. The ES will identify any mitigation measures required in order to avoid, minimise or reduce any adverse significant effects.

Reference	Comment	Response
		The ES will present the results of a biodiversity metric calculation which will assess the predicted habitat losses and gains, with the aim of maximising biodiversity outputs from the Proposed Scheme in accordance with Highways England performance targets.
Page 131 – 149 Winchester City Council	<i>“The potential impacts from pollution, changes to groundwater resources, accidental spillages and flood risk on the River Itchen SSSI and SAC will be assessed through the HRA.”</i>	Potential effects to the River Itchen SAC from construction and operation of the Proposed Development will be presented in the HRA (to be appended to and summarised within the ES). Potential effects to the River Itchen SSSI from construction and operation of the Proposed Development will be present in the ES.
Late Response Environment Agency	<i>“We have previously made available to Highways England a copy of a report regarding a Brook Lamprey Condition Assessment for the River Itchen SAC. This should be utilised in regard to the ES.”</i>	We have requested a copy of this report from the EA, which will be used to inform the assessment presented in the ES and HRA.
Late Response Environment Agency	<i>“strongly recommend that there is scoped in further assessments of otter and other mammal movements in the project area, and the risk of them crossing the roads, with a view to minimising the risks of injuries and fatalities.”</i>	Update surveys for otter and badger have been undertaken during 2020, and along with historical data and an assessment of animal movements in the wide area, will be used to inform the assessment of impacts presented in the ES, and any required mitigation measures.
Late Response Environment Agency	<i>“Potential impacts during construction should also include changes in surface water flows (quantity and quality) which lead to or are connected to aquatic habitats.”</i>	Potential construction impacts from changes to surface water flows will be assessed within the ES.
Late Response Environment Agency	<i>“We welcome the aim of delivering biodiversity net gain, but feel this shouldn’t be an aim but a requirement of the scheme to</i>	The ES will present the results of a biodiversity metric calculation which will assess the predicted habitat losses and gains, with the

Reference	Comment	Response
	<i>deliver against the Applicant's own commitments in their biodiversity plan, alongside the aims of national planning policy."</i>	aim of maximising biodiversity outputs from the Proposed Scheme in accordance with Highways England performance targets.
Late Response Environment Agency	<i>"The ES should include changes to surface water flows as a potential for significant effect on the River Itchen SSSI/SAC and other priority habitats."</i>	Potential effects to the River Itchen SAC/SSSI from construction and operation of the Proposed Scheme will be present in the ES.
Late Response Environment Agency	<i>"If a Flood Risk Activity Permit (or other permits are required from us), then we will become a Competent Authority under the Habitat Regulations. We request, therefore, that the findings of the Habitats Regulation Assessment (HRA) are presented to us and we are able to review the HRA at the earliest possible opportunity."</i>	Potential effects to the River Itchen SAC from construction and operation of the Proposed Development will be presented in the HRA, with a summary in the ES. Along with Natural England, the EA will be consulted on the HRA.

8.3.1 A meeting with Natural England was held on 19 January 2021 to discuss the baseline survey work which has been undertaken to inform the Habitats Regulations Assessment (HRA), and the scope of further assessment work. It was agreed that the baseline survey work undertaken to date was largely sufficient to inform the HRA, although the scope of data collection for otter should be increased to include survey of some terrestrial habitats adjacent to the proposed walking route to Kings Worthy along with data on otter mortalities in the local area. It was agreed that robust measures to control construction silts will be required due to the risk of pollution of salmon spawning beds in the River Itchen.

8.3.2 A meeting with the Environment Agency was held on 24 February 2021 to discuss biodiversity and HRA matters, along with the drainage design and hydrology. To avoid impacts to migratory fish, the need for sensitive working practices and timing restrictions for construction work in the vicinity of the River Itchen was discussed. The Environment Agency subsequently provided written advice in relation to this¹. The Environment Agency mentioned the importance of control of sediments during construction due to the risk of pollution of the River Itchen.

¹ Environment Agency (March 2021). *Highways England – M3 Junction 9 Project: Timing restrictions and considerations advice note.*

Proposed consultation

8.3.3 Consultation with stakeholders continues to take place, including Natural England, the Environment Agency, SDNPA, Hampshire County Council (HCC), and Winchester City Council (WCC), amongst others, through the statutory consultation process. Further consultation will be focused on, but will not be limited to, baseline ecological survey work, assessment of ecological effects, and scheme design and mitigation requirements.

8.4 Assessment methodology and significance criteria

Baseline data collection

Desk study

- 8.4.1 Data in relation to the M3 Junction 9 Improvement was initially requested from HBIC in 2016 and is presented within M3 Junction 9 Improvement Scheme: Ecological Desk Study, June 2016 (WSP, 2016) (**Appendix 8.2**). This included biological records in relation to statutory and non-statutory nature conservation sites, notable habitats and species, and controlled species.
- 8.4.2 To ensure desk study data used to inform the ongoing assessment work which will be reported in the ES is current, and to ensure data is obtained for any areas recently added to the IAB, HBIC will be asked to undertake a new data search, which will be used to inform the assessment to be presented in the ES.
- 8.4.3 On-line resources including data available through the Multi Agency Geographic Information for the Countryside website (www.magic.gov.uk - MAGIC), JNCC and Natural England websites has been used to complement the existing information obtained from HBIC.

Field survey

- 8.4.4 Existing baseline information has been derived from the following ecological survey and assessment work, from previous stages of the development design (full reports can be found in **Appendix 8.2** (confidential reports have not been included)):
- M3 Junction 9 Improvement Scheme: Phase 1 Habitat Survey Report, November 2017 (WSP, 2017)
 - M3 Junction 9 Improvement Scheme: Botanical Survey Report, November 2017 (WSP, 2017)
 - M3 Junction 9 Improvement Scheme: Badger Survey Report, November 2017 (WSP, 2017) Confidential
 - M3 Junction 9 Improvement Scheme: Bat Activity Survey Report, November 2017 (WSP, 2017)

- M3 Junction 9 Improvement Scheme: Preliminary Bat Roost Assessment, January 2018 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Hazel Dormouse Survey Report, January 2018 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Otter Survey Report, October 2017 (WSP, 2017) Confidential
- M3 Junction 9 Improvement Scheme: Water Vole Survey Report, November 2017 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Breeding Bird Community Walkover Survey Report, September 2017 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Reptile Survey Report, November 2017 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Great Crested Newt Survey Report, November 2017 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Terrestrial Entomological Walkover Survey Report, August 2017 (WSP, 2017)
- M3 Junction 9 Improvement Scheme: Habitat Verification Survey and Orchid Survey (Jacobs, 2020)
- M3 Junction 9 Improvement Scheme: Aquatic Ecology Survey Report (Jacobs, 2020) Confidential
- M3 Junction 9 Improvement Scheme: Terrestrial Invertebrate Survey and Southern Damselfly Habitat Assessment (Jacobs, 2020)

8.4.5 In addition, the following sources have been used to inform the baseline and subsequent assessment:

- M3 Junction 9 Improvement Scheme: Ecological Desk Study, June 2016 (WSP, 2016)
- M3 Junction 9 Improvement Scheme: Wintering Bird Community Survey Report, June 2018 (unpublished)
- M3 Junction 9 Improvement Scheme: Great crested newt survey update (unpublished)
- M3 Junction 9 Improvement Scheme: Badger survey update (unpublished)

8.4.6 Due to the age of the some of the survey data contained in the above reports, a review of all baseline data has been undertaken with regard to CIEEM's Advice Note of the Lifespan of Ecological Reports & Surveys

(2019). Habitat survey data from 2020 (Jacobs, 2020) demonstrates there have been no substantive changes in habitats within the IAB since 2017, and therefore for some species and species groups the data is considered to be sufficient and robust to inform the assessment process (see **Table 8-2**). For other species or species groups, the following additional surveys have been completed in 2020 (full reports in **Appendix 8.2**):

- M3 Junction 9 Improvement Scheme: Preliminary Ecological Appraisal – deposition and compound areas (Stantec, 2020) Confidential
- M3 Junction 9 Improvement Scheme: Bat trapping surveys (Stantec, 2020)
- M3 Junction 9 Improvement Scheme: Bat roost surveys and update bat activity surveys (Stantec, 2020) Confidential
- M3 Junction 9 Improvement Scheme: Update water vole surveys (Stantec, 2020)

8.4.7 In addition, surveys are continuing during 2021 to update existing data, and to augment the existing baseline data, for instance where the emerging design results in increased land take. Results of these surveys will be presented in the ES. This includes the following surveys:

- update badger surveys winter and spring 2021
- great crested newt surveys during spring 2021
- further bat roost surveys will be undertaken during spring and summer 2021 to confirm the status of the probable roosts which have been identified in 2020
- further bat trapping surveys during spring 2021

Assessment

8.4.8 The assessment of impacts to biodiversity receptors that will be presented in the ES will follow the standard industry approach as set out in Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) which is endorsed in DMRB LA108 Biodiversity (Highways England, 2020).

8.4.9 This PEIR presents the preliminary findings of the ongoing assessment work based on the information available at the time of writing.

8.4.10 The baseline conditions within the M3 Junction 9 Improvement site are well defined following surveys undertaken between 2017 and 2020, and have allowed an importance level to be attributed to each ecological feature in accordance with CIEEM's geographic framework (CIEEM, 2018) within this Preliminary Environmental Information Report (PEIR). The geographical framework has used the following levels of nature conservation importance:

- International
- National (England)
- Regional (southern England)
- County (Hampshire)
- Local
- Less than local

8.4.11 In order to determine the likelihood of a significant ecological effect (which will be undertaken and reported in the ES), it will be necessary to identify whether an ecological feature is sufficiently important for a significant effect upon it to be material in decision-making. Ecological features of 'Local' level importance or above will be classified as being 'Important' ecological features. Identified 'Important' ecological features will be considered in full within the ES, ensuring the assessment focuses only on those impacts which are potentially environmentally significant.

8.4.12 Where protected or controlled species are present within or adjacent to the M3 Junction 9 Improvement site, which are not considered 'Important' ecological features, measures will be included in the mitigation package to ensure legal compliance.

8.4.13 A logical and transparent assessment of impacts and associated effects on each 'Important' ecological feature will be presented within the ES for construction and operation of the Proposed Scheme. In each case the level of impact and the significance of the effect will be expressed in accordance with the criteria provided in DMRB LA108 Biodiversity (Highways England, 2020), see **Table 8-2** and **Table 8-3** below.

8.4.14 The terms impact and effect are used within this chapter in accordance with the following definitions (as provided by the CIEEM guidelines):

- Impact: actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.
- Effect: outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow.

Table 8-2: Level of impact and typical descriptions (taken from DMRB LA108 (Highways England, 2020))

Level of impact (change)		Typical description
Major	Adverse	1) Permanent/irreversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Permanent addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Moderate	Adverse	1) Temporary/reversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Temporary addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor	Adverse	1) Permanent/irreversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	1) Permanent addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible	Adverse	1) Temporary/reversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	1) Temporary addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
No Change		No observable impact, either positive or negative.

Table 8-3: Significance matrix (taken from DMRB LA108 (Highways England, 2020))

	Level of impact					
		No change	Negligible	Minor	Moderate	Major
Resource importance	International or European importance	Neutral	Slight	Moderate or large	Large or very large	Very large
	UK or national importance	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Regional importance	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	County or equivalent authority importance	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Local importance	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

8.4.15 Where an effect could be one of two gradings, professional judgement will be used and explained to determine which effect is applicable.

8.4.16 The assessment to be presented within the ES will conclude with the residual effects on biodiversity resources in accordance with CIEEM’s Guidelines for Ecological Impact Assessment for the UK and Ireland CIEEM (CIEEM, 2018), stating whether effects are significant or not significant at the relevant geographical level of importance.

8.4.17 Potential significant effects on ‘Important’ ecological features will be identified along with the mitigation and/ or management measures required to prevent, reduce or off-set any significant adverse effects. Significant beneficial environmental effects will also be highlighted. The ES will set out the significance of any residual ecological effects and clarify whether these are adverse or beneficial.

8.4.18 The ES will also present the results of a biodiversity metric calculation which will assess the predicted habitat losses and gains, with the aim of maximising biodiversity outputs from the Proposed Scheme in accordance with Highways England performance targets. The latest version of Defra’s Biodiversity Metric will be used for this process, which will be provided to consultees for comment during the ongoing assessment process.

8.4.19 Assessment of impacts to designated sites for nature conservation from exhaust emissions from vehicles will be undertaken in line with DMRB LA105 Air Quality (Highways England, 2019). Traffic modelling data will be used to provide predictions of traffic flows, for the Affected Road Network (ARN). This data will be used to calculate emissions of pollutants such as Nitrous Oxide (NO_x) during operation of the Proposed Scheme using data from Defra's Emission Factor Toolkit (EFT) and in accordance with LA105 (Highways England, 2019). For designated sites, the annual average NO_x concentration and resultant nitrogen deposition rate will be determined in accordance with LA105 (Highways England, 2019) and combined with background concentrations and deposition rates. Where the air quality modelling identifies potential exceedances to designated sites, these will then be subject to further assessment of the potential ecological effects within the Biodiversity chapter of the ES. Further details of the air quality modelling which will be used to inform assessments can be found in **Chapter 6 Air Quality**.

8.4.20 With respect to River Itchen SAC further information is required in relation to the scheme design and groundwater conditions. Once this information is available this will be used to inform the HRA assessment and accompany the submission of the ES. Natural England and the Environment Agency will be consulted with respect to the findings of the HRA at the earliest opportunity.

8.4.21 The HRA will be undertaken in accordance with LA115 Habitats Regulations assessment (Highways England, 2020) and *Advice note ten: Habitats Regulations Assessment relevant to nationally significant infrastructure* (The Planning Inspectorate, 2017).

8.5 Assessment assumptions and limitations

8.5.1 The information presented in this chapter is based on the information available at the time of writing the report and based on emerging design. The findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the ongoing EIA and consultation process.

8.5.2 The desk study data which has been used to inform this preliminary assessment was requested from HBIC in 2016. Due to the age of the data, some recent biodiversity records may not be included, however the data still provides a useful baseline to inform the preliminary assessment. In addition this preliminary assessment is informed by a range of field survey work undertaken between 2017-2020, meaning the biodiversity baseline within the study area is well known. To ensure desk study data used to inform the ongoing assessment work which will be reported in the ES is current, and to ensure data is obtained for any areas recently added to the IAB, HBIC will be asked to undertake a new data search, which will be used to inform the assessment to be reported in the ES.

8.5.3 A number of limitations to the collection of baseline data were identified in the previous M3 J9 Improvement EIA Scoping Report (Highways England, 2019). These related to:

- Surveys being undertaken outside the optimum survey window, or at night using traffic management
- Lack of access to some areas
- Technical malfunctions and stolen equipment

8.5.4 Whilst it was considered that these did not present a significant limitation to the assessment process, as was identified in the recent EIA Scoping Report (Highways England, 2020) the affected surveys have been updated during 2020, and will continue to be during 2021, with the results used to inform the ongoing EIA work to be reported in the ES. This has addressed any previously identified limitations and ensures baseline data is sufficiently robust for the assessment stage.

8.6 Study area

8.6.1 The study areas that are being used to inform the consideration of impacts to biodiversity features in this PEIR (and will also be used to inform assessments to be reported in the ES) are set out below. Due to differing zones of influence (Zol) over which ecological features may be subject to impacts and subsequent effects, both during construction and operation, a range of study areas are being used. Selection of the study areas has been informed by the Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018).

8.6.2 For the desk study the following search radii from the maximum extent of the IAB will be used:

- 2km radius for protected species records (excluding bats)
- 5km radius for bats
- 2km radius for statutory and non-statutory designated sites
- 2km radius for notable habitats
- 10km radius for SACs and SPAs, extended to 30km for SACs designated for bats

8.6.3 The survey area used to collect habitat data comprised all land within the IAB. and up to 250m beyond the IAB where appropriate.

8.6.4 Some of the initial surveys of species and species groups, used a survey area which was based on an earlier iteration of the Proposed Scheme. As the design of the Proposed Scheme has evolved, surveys have been reviewed to

ensure they are sufficient to inform the assessment of the current design. Where necessary, the survey area has increased and the surveys have been updated to provide sufficient information (for instance surveys of additional ponds for great crested newts have been undertaken).

- 8.6.5 When discussing the Study Area throughout this chapter, for each receptor this taken to be a combination of the desk study search area and the survey area, as described above.
- 8.6.6 Due to potential operational effects from exhaust emissions from vehicles, the study area for designated sites has been extended to include all areas within 200m of the ARN as defined in LA105 (Highways England, 2019).

8.7 Baseline conditions

SACs and SPAs

- 8.7.1 The River Itchen SAC passes under the existing A34 and A33 and lies partially within the IAB (albeit below the carriageway).
- 8.7.2 The River Itchen SAC is designated for its riverine habitats and species which it supports including southern damselfly *Coenagrion mercurial*, bullhead *Cottus gobio*, white-clawed crayfish *Austropotamobius pallipes*, brook lamprey *Lampetra planeri*, Atlantic salmon *Salmo salar*, and otter *Lutra lutra*.
- 8.7.3 Mottisfont Bats SAC lies approximately 16km to the west of the IAB. This SAC is designated as the woodland supports an important population of the rare barbastelle bat *Barbastella barbastellus*.
- 8.7.4 The sites above can be viewed on **Figures 8.1-8.3, Appendix 8.1**.

Other statutory designated sites

- 8.7.5 The River Itchen Site of SSSI is partially within the IAB. This SSSI is designated due to the complex mosaic of riparian habitats it supports including the chalk stream and associated fen meadow, flood pasture and swamp habitats which support species such as otter, water vole *Arvicola amphibius*, and white-clawed crayfish. Unlike the SAC, the SSSI designation also includes some of the habitats adjacent to the river channel.
- 8.7.6 St Catherine's Hill SSSI is located approximately 500m south of the IAB. This SSSI is designated for chalk grassland and associated habitats.
- 8.7.7 Cheesefoot Head SSSI is located approximately 2km east of the IAB. This SSSI is designated for chalk grassland and a colony of the Duke of Burgundy *Hamearis lucina* butterfly.
- 8.7.8 There are no further statutory designated sites within a 2km study area surrounding the IAB.

8.7.9 Other statutory designated sites mentioned above can be viewed on **Figure 8.1, Appendix 8.1**.

Non-statutory Designated Sites

8.7.10 There are seven Sites of Importance for Nature Conservation (SINC) and one SINC that is also a Road Verge of Ecological Importance (RVEI) within a 2km radius of the IAB.

8.7.11 Easton Down SINC lies partially within the IAB. Grassland within the SINC was designated as it met the SINC selection Criteria “*Grasslands which have become impoverished through inappropriate management, but which retain sufficient elements of relic unimproved grassland to enable recovery*”. Grassland within this SINC has been subject to detailed assessment during the botanical surveys undertaken in 2017 as part of the M3 J9 Improvement surveys and was considered to be of limited ecological interest.

8.7.12 All other non-statutory designated sites fall outside the IAB. Four of these sites (The Old Rectory Meadow Easton SINC, Magdalen Down North SINC, Magdalen Down South SINC and Deacon Hill SINC) contain important grassland communities.

8.7.13 One of the seven sites, A31 Petersfield Road, Chilcomb SINC RVEI supports a rare and notable moth species and one of the sites, River Itchen Meadow Easton SINC, is designated for important water meadow habitat.

8.7.14 The desk study recorded the presence of Easton Lane RVEI within the extent of the IAB. However, subsequent correspondence from HBIC confirms that the RVEI was designated in error and has been formally de-notified.

8.7.15 A plan showing non-statutory designated sites will be prepared and included within the ES.

Habitats

8.7.16 A Phase 1 habitat survey of a previous iteration of the M3 J9 Improvement site was undertaken in 2017, followed up with detailed botanical surveys in 2017 of some areas using the National Vegetation Classification (NVC) methodology. The habitat surveys have been updated and augmented in 2020 to ensure coverage of the current IAB, along with specific survey to map previously identified populations of orchid species within and around the IAB. Full reports can be viewed within **Appendix 8.2**. Habitats of Principal Importance (HPI) within and adjacent to the IAB identified during the surveys can be viewed on **Figure 8.4, Appendix 8.1**.

8.7.17 No parcels of ancient woodland, ancient trees, or veteran trees have been identified within the M3 J9 Improvement site. A number of parcels of ancient woodland have been identified on the ancient woodland inventory with 2km, the closest being 475m north-west of the IAB.

- 8.7.18 To the east of the M3, the landscape is dominated by arable farmland, with associated hedgerows and small areas of woodland. The central area between the A34/A33 and the M3 contains a variety of habitats, including grazed semi-improved pastures and several small woodlands of various types. The River Itchen is a chalk river passing north-east to south-west through the north of the M3 J9 Improvement site and characterised by a number of interconnected channels associated with the historic water meadow management of the surrounding grasslands.
- 8.7.19 The south-western part of the study area is characterised by urban development, including industrial and commercial premises. Also of relevance to the habitats within the study area is the route of a historic railway line passing close to the A34 and is evidenced by cuttings and embankments, largely vegetated with semi natural broadleaved woodland.
- 8.7.20 Of the habitats recorded during surveys in 2020 the following were considered to comprise HPI for the conservation of biodiversity (as identified under the Natural Environment and Rural Communities (NERC) Act (2006)).

Hedgerows

- 8.7.21 The survey area included two hedgerows comprising parallel hedgerows along Easton Lane to the east of the M3, bounding arable fields. Both hedgerows were species rich, supporting a diversity of native woody and herbaceous plant species.

Lowland calcareous grassland

- 8.7.22 Calcareous grassland was present on the thin chalk soils on the east side of the M3 J9 roundabout, in parts of the roundabout on the west side, by the entrance to Tesco off Easton Lane, on the narrow verge of the A272 and to the north of the Easton Lane Highways England depot. These stands of calcareous grassland were dominated by a range of calcicolous forbs, including greater knapweed *Centaurea scabiosa*, wild basil *Clinopodium vulgare* and wild marjoram *Origanum vulgare*, with abundant pyramidal orchid *Anacamptis pyramidalis* present around the roundabout.

Lowland fen

- 8.7.23 Stands of fen habitat were found in unmanaged areas along the River Itchen and other low-lying parts of the SSSI. This habitat comprised wetland tall herb vegetation, dominated by large grasses and sedges, such as common reed *Phragmites australis* and reed canary-grass *Phalaris arundinacea*, with wetland forbs such as common comfrey *Symphytum officinale* and hemlock water-dropwort *Oenanthe crocata*.

Lowland meadows

- 8.7.24 Stands of species-rich neutral grassland were present within the River Itchen SSSI. These meadows supported a range of neutral grassland and wetland

species, including sedges such as carnation sedge *Carex panicea* and lesser pond-sedge *C. acutiformis*, rushes such as blunt-flowered rush *Juncus subnodulosus*, and forbs such as marsh thistle *Cirsium palustre*, meadowsweet *Filipendula ulmaria*, ragged robin *Silene flos-cuculi*, southern marsh-orchid *Dactylorhiza praetermissa* and water avens *Geum rivale*.

Lowland mixed deciduous woodland

8.7.25 Stands of this habitat were found along the River Itchen. These were unusual in being dominated by hazel (*Corylus avellana*) coppice stools, with occasional trees.

Reedbed

8.7.26 Where the River Itchen flows under the A34 to the north of Winnall Industrial Estate, was a large stand of common reed.

Rivers

8.7.27 The survey area included the floodplain of the River Itchen, including the main River Itchen channel and numerous tributary channels, which are crossed by the Proposed Scheme. The vegetation of the river and tributaries was typical of chalk streams, with very clear water and abundant aquatic vegetation, in the areas surveyed mostly comprised of fool's-watercress *Apium nodiflorum* and water starworts *Callitriche spp.*, and marginal vegetation with tall wetland species such as greater tussock-sedge *Carex paniculata*.

8.7.28 This type of habitat is referable to the Annex I habitat² '3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation' and is a qualifying feature of the River Itchen SAC.

Wet woodland

8.7.29 This habitat was present along the River Itchen, north and south of the A34 and A33. Dominated by a canopy of alder *Alnus glutinosa* and willows *Salix spp.*

Other habitats

8.7.30 Other habitats identified which do not constitute HPI include: other neutral grasslands, scrub, other woodlands (including plantation and coniferous woodlands), and cultivated land.

8.7.31 It should be noted that arable (cultivated land) and road verges are Local Biodiversity Action Plan habitats due to their inclusion on *Biodiversity Action Plan for Hampshire* (Hampshire Biodiversity Partnership).

² Habitats of European Community importance, listed on Annex I of Council Directive 92/43/EEC ('Habitats Directive')

Species

8.7.32 A summary of the baseline information for species and species groups is provided in **Table 8-4** below. Baseline survey reports can be viewed in **Appendix 8-2**.

Table 8-4: Summary of the baseline information for species and species groups, along with further work proposed to update baseline. Survey reports and associated figures can be viewed in [Appendix 8-2](#).

Receptor	Status of survey	Summary of baseline data
Badgers	Badger survey 2017, 2018 and 2019. Being updated during winter and spring 2021.	Surveys in 2017 and 2019 identified badger activity in the IAB. Further badger activity has been identified during a Preliminary Ecological Appraisal. Due to the mobility of badgers, update surveys are being undertaken during 2021 which will be reported in the ES.
Bats (foraging and commuting)	Bat activity surveys- May to October 2017 Update bat activity surveys – August, September & October 2020 Bat trapping surveys August, September and October 2020	The desk study has identified a number of bat records, however none of the records were within the M3 J9 Improvement site. The following seven bat species were recorded within the 5km search radius: Daubenton’s bat <i>Myotis daubentonii</i> , Natterer’s bat <i>Myotis nattereri</i> , noctule bat <i>Nyctalus noctula</i> , brown long-eared bat <i>Plecotus auritus</i> , common pipistrelle <i>Pipistrellus pipistrellus</i> , soprano pipistrelle <i>Pipistrellus pygmaeus</i> and serotine <i>Eptesicus serotinus</i> . The use of the IAB by foraging and commuting bats is likely to be limited by the presence of the highway infrastructure which will displace bats due to reduced foraging resource and other effects from lighting and disturbance. However marginal habitats such as woodland, hedgerows and grassland will provide suitable resources, and the activity surveys have established that habitats within the IAB are used by a range of species, including some rarer species. In particular, elevated activity from <i>Myotis</i> species bats was noted. This group, which includes some rare species, cannot easily be identified to species level based on call parameters. In addition, greater horseshoe bat <i>Rhinolophus ferrumequinum</i> calls were detected. Bat activity recorded during the 2017 surveys did not record pronounced concentrations of activity in any one location. Higher levels of activity were noted along the River Itchen corridor, which is unsurprising given the mixture of wetland and woodland habitats along the River Itchen provides optimal habitat for foraging and commuting bats. Elevated levels of bat activity were also recorded within the narrow fields between the M3 and the A34 (although this is likely to be associated with the bats using the adjacent River Itchen corridor, and given the isolation of

Receptor	Status of survey	Summary of baseline data
		<p>these habitats and high background light levels are considered unlikely to be of particular importance for bats), and along the field margin south-east of the Junction 9 roundabout.</p> <p>Further bat activity and bat trapping survey work has been undertaken during 2020 to update and augment the 2017 surveys. A summary of survey results is provided below:</p> <p><u>2020 Bat activity surveys</u></p> <p>Static automated detectors during August and September for five consecutive nights at the same locations used in 2017. The survey was extended into October due to technical malfunction of some equipment in September. There were no further technical malfunctions during surveys in October.</p> <p>The surveys detected a similar species composition to the surveys carried out in 2017, with the exception being that lesser horseshoe bat was recorded in 2017, but not recorded in 2020 and Nathusius' pipistrelle was not recorded in 2017, but was recorded in 2020. Rare and uncommon species recorded during both surveys include barbaselle, noctule, Leisler's, and serotine and in addition to these Nathusius' pipistrelle in 2020 and greater horseshoe in 2017. The most commonly recorded species during both surveys was soprano pipistrelle.</p> <p>As with the surveys in 2017, high levels of Myotis species activity were recorded, although during the 2020 monitoring the majority of this activity was recorded outside the IAB along the River Itchen to the west of the IAB, rather than between the A34 and the M3 which recorded the highest levels in 2017.</p> <p><u>2020 Bat trapping surveys</u></p> <p>Bat trapping surveys in August and September 2020 within fields between the M3 and A34 to identify the species of bats using this area foraging and commuting. No bats were captured on either survey, which is unusual for the trapping techniques employed and the high levels of bat captures elsewhere by surveyors at other sites at a similar time. A low level of bat activity was detected during the August survey using hand-held detectors and these were identified as pipistrelle species. No Myotis bats were detected during either survey. Surveyors noted</p>

Receptor	Status of survey	Summary of baseline data
		<p>artificial light levels were high in this area, which is likely to reduce is suitability for many species of light sensitive bats.</p> <p>Further bat trapping surveys are being undertaken in May and June 2021.</p>
Bats (roosting)	<p>Preliminary Bat Roost Assessment - 2017 and 2019</p> <p>Bat Tree Climbing Survey February 2019</p> <p>Bat roost emergence surveys August 2020</p>	<p>Trees and structures with potential to support roosting bats occur within the IAB as determined by the preliminary bat roost assessment completed in 2017 and 2019.</p> <p>Tree climbing and inspection surveys in 2019 of 19 trees with bat suitability within the IAB, did not identify any roosting bats or evidence of roosting. Following the climbing and inspection surveys twelve of the trees were assessed as having negligible or low suitability for roosting bats. The remaining seven trees were assessed as having moderate suitability for roosting bats. The seven moderate suitability trees were subject to two additional (three in total) climb and inspect surveys during June and July 2019.</p> <p>The four A34 road bridges over the River Itchen have all been assessed as having moderate or high suitability for roosting bats. All other structures were assessed as having negligible suitability for roosting bats.</p> <p>Results from bat roost surveys in August 2020 indicate that bat roosts are likely to be present within the IAB. Further surveys in 2021 are being undertaken to fully establish the status of these roosts.</p>
Hazel dormouse	Nest tube survey - May to November 2017	<p>The desk study and 2017 field survey identified multiple records of dormouse within the study area.</p> <p>Due to the absence of significant changes to habitats, and the largely sedentary nature of this species, the existing survey data is considered sufficient to inform the assessment which will be reported in the ES. Dormice are considered to be present within all suitable habitat within the IAB.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>

Receptor	Status of survey	Summary of baseline data
Otter	Otter surveys - June and August 2017, updated June 2020	<p>The desk study identified 18 otter records within a 2km search radius, including locations within the IAB.</p> <p>Otter presence has been confirmed on the River Itchen and associated habitats within and adjacent to the IAB during surveys in 2017 and 2020.</p> <p>The majority of the habitats associated with the River Itchen system were considered suitable for otter foraging, resting, commuting and breeding purposes. The study area offers suitable food resources (large fish were observed during the survey), hydrological connectivity and vegetative cover such as dense reed bed, scrub and small areas of deciduous woodland.</p> <p>No otter resting places were identified within the IAB, although they have been identified in adjacent habitats.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>
Water vole	Water vole surveys undertaken in June and August 2017. Updated September 2020	<p>The desk study identified 357 water vole records within a 2km radius of the IAB. One of these records fell within the IAB and a large number of the records were located along the River Itchen immediately west.</p> <p>Surveys in 2017 found no evidence of water voles within the extent of the IAB, however presence was confirmed in adjacent habitats.</p> <p>Surveys in 2020 also found no evidence of water vole within the IAB, and reported that the riparian woodland habitats along the River Itchen corridor within the IAB were of limited suitability for water vole due to shading and lack of bankside vegetation.</p> <p>Whilst it is acknowledged that this species is likely to be present in adjacent habitats which are of high suitability for water vole outside the IAB, no evidence of this species has been found within the IAB. This species is considered likely to be absent from the IAB other than occasional commuting along the River Itchen, and no further survey work is planned. This species is not considered further within this assessment.</p>

Receptor	Status of survey	Summary of baseline data
Other notable mammals	No specific survey undertaken	<p>The desk study identified records of hedgehog, brown hare, harvest mouse and polecat within a 2km search radius of the IAB.</p> <p>The Phase 1 habitat survey completed in 2017 and updated in 2020 confirmed the presence of suitable habitat for these species within the extent of the IAB. The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>
Breeding bird	Breeding bird survey - June and July 2017 and April and May 2019.	<p>The desk study highlighted a number of notable bird species records within a 2km radius of the IAB. Some of these species are associated with wetland habitat, and others associated with grassland and more urban habitats. Notable species include: kingfisher <i>Alcedo atthis</i>, bittern <i>Botaurus stellaris</i>, black redstart <i>Phoenicurus ochruros</i> and hen harrier <i>Circus cyaneus</i>.</p> <p>Four breeding bird survey visits have been completed, two during June and July 2017 and two during April and May 2019. These surveys established that the habitats within and surrounding the IAB support a breeding bird assemblage likely to include at least two declining farmland SPI as listed under the NERC Act (2006), skylark <i>Alauda arvensis</i> and yellowhammer <i>Emberiza citrinella</i>. Due to the intensively farmed nature of the arable habitats, and the limited number of registrations of these species, it is likely that only small populations are present within or adjacent to the IAB. Two Schedule 1 species of the Wildlife and Countryside Act 1981 (as amended), Cetti's warbler <i>Cettia cetti</i> and kingfisher, and a variety of other species of conservation concern have been recorded during the bird surveys along the River Itchen corridor.</p> <p>An incidental sighting of a dead barn owl <i>Tyto alba</i> was made during the reptile surveys on 26/06/2017, located on the southbound M3, indicating this species is present in the local area. This species typically forages over farmland and wetland habitats and may use habitats within the IAB for foraging.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>

Receptor	Status of survey	Summary of baseline data
Wintering birds	Wintering bird surveys undertaken between October 2017 and March 2018.	<p>The desk study retrieved records of bird species which could use habitats within the IAB during winter such as lapwing <i>Vanellus vanellus</i>, redwing <i>Turdus iliacus</i> and starling <i>Sturnus vulgaris</i>.</p> <p>The River Itchen corridor supports a more notable bird community than other habitats, especially where it passes through Winnal Moors Nature Reserve. During the 2017/2018 winter bird survey 63 species were recorded, among them, four species listed under Schedule 1: common kingfisher, Cetti's warbler, red kite, and redwing. Twelve additional species recorded during the surveys are featured in the RSPBs Birds of Conservation Concern Amber list and eleven in the Red list. A further seven species considered as SPI were also recorded.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>
Reptiles	Reptile survey within suitable habitat - June and September 2017.	<p>The desk study identified records of two species of reptiles within a 2km radius, slow worm <i>Anguis fragilis</i> and common lizard <i>Zootoca vivipara</i>, located 0.9km and 0.8km from the IAB respectively.</p> <p>Two species of reptile have been recorded within the IAB during the 2017 surveys; slow worm and common lizard. Reptile populations varied from 'exceptional' to 'low' within the IAB.</p> <p>Due to the absence of significant changes to habitats within the IAB, the existing survey data is considered sufficient to inform the assessment which will be reported in the ES.</p>

Receptor	Status of survey	Summary of baseline data
Amphibians including great crested newt	Habitat Suitability Index (HSI) assessment – 2017 and 2019 Environmental DNA (eDNA) – 2017 and 2019 Preliminary Ecological Appraisal during 2020 to identify waterbodies within 500m of the IAB.	<p>The desk study did not identify any amphibian records within 2km of the extent of the IAB.</p> <p>None of the waterbodies within 500m of the IAB which were sampled for great crested newt eDNA in 2017 and 2019 tested positive for the presence of eDNA and no inhibition or degradation was identified within any of the samples. No significant limitations to the surveys were noted. As such, great crested newt are considered to be absent from the IAB.</p> <p>Common toad <i>Bufo bufo</i> (a SPI) and common frog <i>Rana temporaria</i> have been incidentally recorded on several occasions, associated with the flood meadow habitats adjacent to the River Itchen outside the IAB.</p> <p>Due to recent increases in the IAB, Preliminary Ecological Appraisal of additional areas has been undertaken during 2020 which identified two additional ponds within 500m of the IAB. Further surveys for great crested newts are being undertaken in 2021 to augment and update previous survey data.</p> <p>Given great crested newt have not been recorded, and common toad had only been recorded outside the IAB, amphibians are not considered further at this stage. If great crested newts are identified during any additional survey work effects will be assessed within the ES.</p>

Receptor	Status of survey	Summary of baseline data
Freshwater fish	No survey undertaken to date.	<p>The River Itchen is known to support notable species including bullhead, Atlantic salmon and brook lamprey. Brook lamprey and bullhead are widely known to be present throughout the River Itchen catchment where optimal habitats are present. Salmon will utilise optimal habitats within the main stem of the River and adjacent tributaries where water quality and barriers to migration allow. Salmon have been reported in the River Itchen around the existing road crossings and are expected to move through this reach during migration periods to upstream spawning areas. It is likely that the River Itchen supports a diverse fish community as fish are classified at High quality under the Water Framework Directive, indicating a community demonstrating no, or very minor, deviation from reference condition.</p> <p>The existing desk study data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>
Terrestrial invertebrates	<p>Walkover survey - June 2017.</p> <p>Detailed invertebrate survey 2020.</p>	<p>The desk study identified 167 notable invertebrate species records within a 2km search radius. The majority of these records are from the Lepidoptera family, (butterflies and moths). Three of the records fell within 1km grid squares that overlap with the IAB, including the silver wash fritillary <i>Argynnis paphia</i>, small heath butterfly <i>Coenonympha pamphillus</i>, and the stag beetle <i>Lucanus cervus</i>. Small heath and stag beetle are SPI.</p> <p>The 2017 walkover survey identified areas of high potential for important invertebrate assemblages. Further surveys during 2020 have identified twelve notable species largely associated with the flower rich grasslands within the motorway roundabout, and to the east of the motorway roundabout.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>

Receptor	Status of survey	Summary of baseline data
Aquatic invertebrates	Habitat assessment for southern damselfly and white-clawed crayfish – 2020	<p>Although the desk study did not detail any notable aquatic invertebrates, it is likely that the River Itchen supports a diverse aquatic invertebrate community as aquatic invertebrates are classified at High quality under the Water Framework Directive, indicating a community demonstrating no, or very minor, deviation from reference condition.</p> <p>In relation to the two invertebrate species for which the River Itchen SAC is designated, southern damselfly and white-clawed crayfish, the absence of records for these species in the area (which can be considered well studied particularly in light of the nearby Wildlife Trust nature reserve) is taken as an indication that these species are absent from the extent of the IAB. The use of desk study data to inform the assessment was discussed with Natural England during consultation meeting in April 2019.</p> <p>Surveys for suitable southern damselfly habitat undertaken in 2020 following methods set out in Thompson et al. (2003) have confirmed that habitats within and adjacent to the IAB are sub-optimal for southern damselfly and unlikely to support a southern damselfly population.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>
Notable Plants	<p>Phase 1 habitat survey – March to August 2017</p> <p>National Vegetation Classification (NVC) survey -August 2017</p> <p>Habitat verification survey, orchid and notable species survey – June 2020</p>	<p>Eight species of orchid have been recorded: bee orchid, broad-leaved helleborine, chalk fragrant orchid, greater butterfly orchid, pyramidal orchid, southern marsh orchid, twayblade, and white helleborine. White helleborine is a SPI for the conservation of biodiversity. The other species have no legal status.</p> <p>Five species listed on the red list of vascular plants for England were recorded, including: dwarf spurge <i>Euphorbia exigua</i>, field scabious <i>Knautia arvensis</i>, sainfoin <i>Onobrychis viciifolia</i>, stinking chamomile <i>Anthemis cotula</i>, and wild strawberry <i>Fragaria vesca</i>.</p> <p>Six invasive non-native species have been recorded, including: giant bramble <i>Rubus armeniacus</i>, goat's-rue <i>Galega officinalis</i>, Himalayan cotoneaster <i>Cotoneaster simonsii</i>, Michaelmas daisy <i>Aster sp.</i>, red-osier dogwood <i>Cornus sericea</i>, and wall cotoneaster <i>Cotoneaster horizontalis</i>. Of these the Himalayan and wall cotoneaster are listed on Schedule 9</p>

Receptor	Status of survey	Summary of baseline data
		<p>of the Wildlife and Countryside Act 1981 (as amended) making it an offence to plant or otherwise cause to grow in the wild these species.</p> <p>The existing survey data is considered sufficient and robust to inform the assessment which will be reported in the ES.</p>

8.7.33 The baseline provided in the above sections describes the biodiversity features as they were in the years surveyed (2016-2020). The following paragraph describes the anticipated future biodiversity baseline in autumn 2023, which is the assumed start of construction.

8.7.34 The majority of the land within the IAB has been classified as agricultural land or highway verges and associated linear boundaries. As such, the biodiversity baseline is unlikely to change significantly by autumn 2023, unless any large-scale changes in management of highways estate or agriculture come forward.

Nature conservation importance

8.7.35 The nature conservation importance of biodiversity features, in line with CIEEM’s geographic framework (see **Section 8.4**), is set out in **Table 8-5** below.

Table 8-5: Nature conservation importance of ecological receptors identified within the Study Area.

Receptor	Nature Conservation Importance	Rationale
River Itchen SAC Mottisfont Bats SAC	International	Legal protection at an international level
River Itchen SSSI St Catherine’s Hill SSSI Cheesefoot Head SSSI	National	Legal protection at a national level
The seven Sites of Importance for Nature Conservation SINC with the search area	County	Non-statutory sites are designated through planning policy at the county or local authority level
Hedgerows	Local	Hedgerows are a HPI under the NERC Act, although they are a common habitat in the local area. Many of hedgerows in the local area will be species poor and heavily manged, and the two hedgerows along Easton Lane are species rich, elevating their importance to the local level.
Lowland calcareous grassland	Local	Lowland calcareous grassland is a HPI and a Hampshire BAP habitat, however the areas of this habitat on the highway verges within the scheme are small and

Receptor	Nature Conservation Importance	Rationale
		fragmented and are unlikely to meet criteria for selection of SINCs at a county level.
Habitats within River Itchen SSSI, (including: lowland fen, lowland meadows, lowland mixed deciduous woodland, Reedbed)	National	The area supports an assemblage of these habitats associated with the River Itchen which form a reason for designation of the River Itchen SSSI.
River	International	The River Itchen is a qualifying feature of the River Itchen SAC.
Wet woodland (outside River Itchen SSSI)	County	The wet woodland habitat located between the A34 and A33, is likely to be degraded due to its isolation between two roads and does not form part of the River Itchen SSSI. However, it is likely to provide a supporting function to the SSSI and species which use the River Itchen Corridor.
Other habitats (other neutral grasslands, scrub, other woodlands and cultivated land)	Less than local	Other habitats within the study area are considered to be common and widespread in the local area.
Badgers	Less than local	Badgers are widespread and common throughout the local area.
Bats (foraging and commuting)	County	Bat activity was highest along the River Itchen corridor, and this landscape feature provides optimum foraging and commuting habitat. Other habitats within the study area were of lower suitability albeit with some localised areas of interest. The majority of bats recorded were common species, although smaller numbers of rare or uncommon species were recorded.

Receptor	Nature Conservation Importance	Rationale
Bats (roosting)	TBC	Bat roosts are likely to be present. Further surveys in 2021 will be undertaken to fully establish the status of these roosts.
Hazel dormouse	Local	Dormouse are present within suitable woodland scrub and hedgerow habitat within the IAB and adjacent habitats. Whilst dormouse are distributed across southern England, they live at low densities and are becoming increasingly scarce due to habitat fragmentation. They are listed as common in Hampshire (PTES, 2013) and so would not meet the threshold for 'county' importance, but their general scarcity makes them of importance at the local level.
Otter	County	Whilst otter have become more widespread in recent decades, they are still relatively scarce, and the optimum habitats within the River Itchen corridor are likely to be of high importance to otter.
Water vole	-	Not considered present in IAB and not considered further within this assessment.
Other notable mammals (hedgehog, brown hare, harvest mouse and polecat)	Less than local	The arable habitats which surround the Site are likely to support a local population of brown hare, which would likely be widespread in the local area. Similarly, the suburban and scrub habitats within and adjacent to the Site are suitable for hedgehog which is also likely to be widespread locally. Harvest mouse and polecat have been identified during the desk study and are suspected to be under-recorded.
Breeding and wintering bird	Local	The surveys recorded some notable farmland species such as skylark and yellowhammer, within arable farmland habitats. Whilst notable, these species are widespread in suitable habitat in Hampshire.

Receptor	Nature Conservation Importance	Rationale
		The assemblages of wintering bird recorded within the study area were considered to be typical of the agricultural farmland habitat within the local area.
Reptiles	Local	Slow worm and common lizard have both been recorded within the study area. Populations varied from 'exceptional' to 'low' within the IAB. Whilst both species are relatively common species, the presence of exceptional populations would indicate an importance at a local level.
Amphibians including great crested newt	-	Given great crested newt have not been recorded, and common toad had only been recorded outside the IAB, amphibians are not considered further within this assessment.
Freshwater fish	County	The River Itchen is known to support notable species including bullhead, Atlantic salmon, and brook lamprey, which are also qualifying features of the River Itchen SAC, as well as a diverse assemblage of other species.
Terrestrial invertebrates	Local	Surveys during 2020 have identified twelve notable species largely associated with the flower rich grasslands within the motorway roundabout, and to the east of the motorway roundabout.
Aquatic invertebrates	County	It is likely that the River Itchen and associated riparian habitats supports a diverse aquatic invertebrate community, although qualifying species of the River Itchen SAC (Southern damselfly and white-clawed crayfish) are likely absent from the study area.
Notable Plants	Local	One SPI, white helleborine, and five species listed on the red list of vascular plants for England have been recorded.

8.8 Design, mitigation and enhancement measures

- 8.8.1 A hierarchical approach to mitigation is being adopted through the design process which seeks to avoid adverse impacts in the first instance through an iterative approach to design, e.g. informing alignment to avoid sensitive receptors where possible. In areas where avoidance is not possible, measures will be proposed to prevent or reduce potentially significant negative effects. Measures to compensate negative effects may also be required, e.g. habitat creation to offset impacts associated with habitat loss and fragmentation where these cannot be avoided.
- 8.8.2 Where known at the current stage of design, details have been provided below with respect to design, mitigation and enhancement measures. It is important to note that these should be treated as preliminary and are likely to evolve as the designs develops. A preliminary summary of mitigation measures is provided below.
- 8.8.3 Full details of all embedded or essential mitigation measures, along with the mechanism for delivery, will be provided within the ES.
- 8.8.4 Design measures are being developed in accordance with LD 118 Biodiversity Design (Standards for Highways, 2020) and LD 117 Landscape design (Standards for Highways, 2020). Measures will be set out within an Environmental Masterplan (or similar) submitted with the DCO application. Full details would be developed at detailed design stage, to be secured through Development Consent Order (DCO) requirement.
- 8.8.5 The current design has been subject to review and options appraisal to ensure potential effects to biodiversity receptors are avoided where possible. This has resulted in:
- The chosen route of the western walking route (see **Chapter 3**) is located wholly outside the River Itchen SAC and SSSI, other than the proposed new bridge which spans these designated areas.
 - The proposed new footbridge over the River Itchen SAC/SSSI is intended to be a clear span. In addition, the abutments will be set back from the riverbank, outside of the SAC and SSSI. The design will allow passage of wildlife, in particular otter, to be maintained along the riverbank.
 - Where hedgerows cannot be retained, either during construction or following landscaping activities these will either be replaced or translocated where practical, along with enhancement of existing hedgerows through gaps filling where necessary. This includes the hedgerows running alongside Easton Lane.
- 8.8.6 The design includes provision of an ecologically informed habitat creation package, to include habitats of ecological value which are sensitive to the local area, including chalk grassland and woodland, with the aim of maximising biodiversity outputs from the Proposed Scheme in accordance

with Highways England performance targets. Stakeholders including SDNPA are being consulted on the design of the habitat compensation and enhancement package to ensure it is sensitive to the surrounding landscape and habitats. The design of the habitat creation package is drawing on the successes of other mitigation schemes designed for highways in the local area³. The habitat creation package can be viewed **on Figure 2.6, Appendix 2.1**, (Preliminary Mitigation Design Plan). Habitats to be created and restored will include:

- Areas of chalk grassland to the east of the M3, and on the highway cuttings and embankments. Grassland to be created using suitable seed mixes of local provenance. Chalk grassland will be created over exposed chalk substrate, or chalk that has been liberated during construction work, with little or no topsoil to ensure a nutrient-poor substrate suitable for chalk grassland. The creation of new areas of chalk grassland will provide habitats for a range of species including priority species of invertebrates and birds, as well as providing connectivity between existing areas of this habitat in the wider landscape.
- A number of areas of native broadleaved woodland and native scrub, both on the highway estate and within adjacent farmland. Woodland and scrub will be located to maintain connectivity for wildlife (including bats and dormice) within the IAB and adjacent landscape.
- Species rich grassland in adjacent farmland to the west of the M3. Grassland to be created using a suitable seed mix of local provenance.
- A mosaic of chalk bunds, native scrub and natural regeneration will be created along a stretch of the redundant A34 between the M3J9 gyratory and the River Itchen crossing. The chalk bunds will be planted with larval food plants for priority species of butterfly.
- The section of the walking route heading north from the M3J9 gyratory will be lined with low chalk bunds on either side to demark the route. The chalk bunds will be planted with larval food plants for butterflies.

8.8.7 The strategy for managing surface water runoff from the road will be based on DMRB guidance and includes provision of appropriate measures for treatment to mitigate pollution likely to higher standards than at present. This would minimise any impacts upon the quality of surface water and groundwater and substantially improve water quality being discharged from the existing highway in the surrounding area. A Sustainable Drainage System (SuDS) is being designed in consultation with the project ecologist to include measures beneficial to wildlife.

³ Case Study: Dorset's Natural Influence at its best. Biodiversity net gains from the Weymouth Relief Road construction. (Dorset Local Nature Partnership)

8.8.8 The design will seek to ensure ground water flows to the River Itchen are not disrupted, or if this is not possible appropriate and robust mitigation measures will be employed.

8.8.9 Lighting has only been incorporated into the design of the Proposed Scheme where it is essential for safety reasons and is currently in development. It is not currently planned to light any of the junction or slip roads. The subways and the underpasses will be provided with lighting due to the length of these facilities. Where lighting is necessary it will be sensitively designed to avoid, or minimise illumination of all habitats adjacent to the road. The River Itchen and associated habitats are considered particularly sensitive to the effects of lighting. The lighting strategy will have regard to Guidance Note 08/18 Bats and Artificial Lighting in the UK, Bats and the Built Environment series BCT/ILP (2018) be developed in consultation with the project ecologist.

8.8.10 Avoid or minimise potential impacts, and provide enhancements, to species known to use habitats within and adjacent to the M3 J9 site including otter, dormouse, and badgers through an ecologically informed design process.

8.8.11 Construction phase mitigation measures to include:

- Update of baseline ecological surveys (where appropriate) to help avoid impacts on protected species during construction.
- Provision of a first iteration Environmental Management Plan (fiEMP) in accordance with LD 120 Environmental management plans (Standards for Highways, 2020) (with full EMP anticipated to be secured through Development Consent Order (DCO) requirement) to include a pollution prevention strategy to avoid accidental pollution events, with particular regard to the River Itchen.
- The fiEMP will also include mitigation strategies for known important ecological receptors, which will include measures required during construction to avoid or minimise impacts, including:
 - fencing to prevent access to retained important habitat, to protect the habitat, avoid accidental damage or species mortality.
 - the location of haulage routes, material storage areas, compounds, generators, lighting and other construction activities will be carefully sited.
 - habitat clearance where possible carefully programmed to avoid sensitive periods for fauna such as breeding birds, dormice, roosting bats and badgers.
 - to avoid impacts on fish in the River Itchen, any piling works will be carried out using low vibration methods and will avoid periods of fish migration. The Environment Agency has provided advice on working methods and timing restrictions in relation to avoiding impacts to fish

during construction of the Proposed Scheme in proximity to the River Itchen⁴.

- In addition, Natural England has identified the potential for ‘gravel cleaning’ which could be used as a proactive mitigation measure to offset the potential for pollution of salmon spawning beds from sediment discharge. The cleaning of gravel beds outside salmon spawning period, would offset residual risks of potential silt pollution during the construction phase. If no pollution occurs during construction the gravel cleaning would provide an enhancement to the River Itchen SAC.
- Where required, obtain Natural England Protected Species Mitigation Licences for species such as hazel dormouse and badger, including appropriate mitigation strategies and mitigation measures.
- An Ecological Clerk of Works (ECoW) will be present on site during key periods of the construction phase. The ECoW will be required to ensure that all committed mitigation measures, including monitoring surveys, are adhered to.

8.9 Assessment of potential effects

8.9.1 This section describes the preliminary findings of the assessment of potential impacts and subsequent effects of the Proposed Scheme upon biodiversity during the construction and operational phases. As noted in **Section 8.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented in the sections below.

8.9.2 The potential impacts anticipated as having the potential to arise without mitigation during construction are:

- Direct and indirect impacts to designated sites (including SACs, SSSIs and non-statutory designated sites) through loss or damage to habitats, changes to hydrology, disturbance of qualifying species, or impacts to habitats and species which provide a supporting function.
- Disruption of ground water flows which could affect aquatic habitats
- Permanent and temporary habitat loss within the M3 J9 Improvement site
- Damage or disturbance to habitats from construction activities
- Displacement, species loss and isolation through fragmentation
- Direct mortality during site clearance and construction

⁴ Environment Agency (March 2021). *Highways England – M3 Junction 9 Project: Timing restrictions and considerations advice note.*

- Disturbance of wildlife from construction activities including visual, noise, vibration and lighting
- Degradation through air borne and water borne pollution (water quality and sediment loading)
- Pollution caused by use of hazardous materials and incidental release of dust, chemicals, fuels or waste materials

8.9.3 The potential impacts anticipated as having the potential to arise without mitigation during operation are:

- Change in surface or groundwater flows which could affect aquatic habitats
- Direct mortality of wildlife such as birds or bats during operational use
- Habitat fragmentation disrupting species movement and dispersal
- Direct disturbance from operational use visual, noise, vibration and lighting
- Degradation of designated sites and habitats through air borne and water borne pollution (water quality and sediment loading)

River Itchen SAC/SSSI

8.9.4 The River Itchen SAC is designated for its riverine habitats and species which it supports including southern damselfly, bullhead, white-clawed crayfish, brook lamprey, Atlantic salmon, and otter.

8.9.5 This River Itchen SSSI is designated due to the complex mosaic of riparian habitats it supports including the chalk stream and associated fen meadow, flood pasture and swamp habitats which support species such as otter, water vole, and white-clawed crayfish. Unlike the SAC, the SSSI designation also includes some of the habitats adjacent to the river channel.

8.9.6 The Proposed Scheme includes a new footbridge over the River Itchen SAC/SSSI, adjacent to the existing Itchen Bridge on the A34.

8.9.7 Construction of the footbridge would be undertaken outside the River Itchen SAC/SSSI. There would be no direct loss of qualifying habitats of the River Itchen SAC/SSSI during construction. The bridge is intended to be a clear span. Abutments would be set back from the riverbank ensuring passage for wildlife such as otter, white-clawed crayfish, and fish is maintained at all times along the river and adjacent habitats.

8.9.8 There is potential for construction impacts to the SAC/SSSI from habitat degradation due to changes in surface water quality which could affect habitats and qualifying species. Construction activity is likely to include removal of vegetation, piling work for bridge foundations, concrete formation,

and other associated activities. However, it is considered that standard control measures incorporated within the fiEMP and the integrated design of the Proposed Scheme (as described in **Section 8.8**) would avoid significant adverse effects on the SAC/SSSI and its qualifying features from changes in water quality.

- 8.9.9 There is potential for construction impacts to the SAC/SSSI from disturbance which could affect qualifying species including otter, fish. However, it is considered that control measures incorporated within the fiEMP and the integrated design of the Proposed Scheme (as described in **Section 8.8**) would avoid significant adverse effects on these qualifying species of the SAC/SSSI from disturbance.
- 8.9.10 There is potential for construction impacts to groundwater which could affect the SAC/SSSI through habitat degradation. Construction activities including implementation of the surface water drainage strategy and earthworks have the potential to impact upon groundwater through potential creation of preferential pollution pathways or possible leaching of pollutants to the groundwater body. The construction phase will be completed in line with the fiEMP, which will outline the pollution controls and management measures that will be implemented to avoid pollutants entering groundwater and causing impacts to the groundwater body such that it is considered that there will be no effects to the SAC/SSSI due to impacts to groundwater (see also **Chapter 13**).
- 8.9.11 There is potential for operational impacts to the SAC/SSSI from habitat degradation due to shading. The new footbridge bridge deck will be approximately 3m wide, and will permanently shade the area directly underneath the bridge. The shaded area would be expected to result in a variation in aquatic and terrestrial plant growth. Some variations in the growth of grasses and other plants are expected according to location under the bridge, due to changes in the shading and micro-climate. Aquatic habitat surveys in this location identified that due to heavy shading from the adjacent woodland, in-river macrophyte vegetation was either absent or very limited in this area. Other riparian vegetation was present, however, due to the proposed small width of the bridge, continuity of vegetation within the SAC/SSSI would be maintained ensuring connectivity for wildlife. It is considered unlikely there will be significant adverse effects on the SAC/SSSI, although this will be assessed further with results presented within the ES.
- 8.9.12 There is potential for operational impacts from exhaust emissions from vehicles to affect the River Itchen SAC/SSSI through habitat degradation and changes to species composition. This will be assessed further with full results presented within the ES.
- 8.9.13 Further details of potential effects to the River Itchen SAC will be presented in a Habitats Regulation Assessment.
- 8.9.14 Whilst there will be no direct loss of terrestrial habitats which form part of the River Itchen SSSI (but which are outwith the SAC boundary) there is

potential for effects through degradation during construction or operation of the Proposed Scheme. However, it is considered that control measures incorporated within the fiEMP and the integrated design of the Proposed Scheme (as described in **Section 8.8**) should avoid significant adverse effects on the SSSI. This will be assessed further with full results presented within the ES.

Other SACs and SSSIs

8.9.15 Mottisfont Bats SAC is approximately 16km from the IAB. There is no land take from the SAC or supporting habitat (i.e. the 7.5 km buffer zone around the SAC considered to be most important to barbastelle bats for which the SAC is designated (Jonathan Cox Associates, 2010)). Due to the distance and lack of connecting impact pathways no effects to the SAC are anticipated.

8.9.16 St Catherine's Hill SSSI and Cheesefoot Head SSSI are approximately 500 and 2km from the IAB respectively. There will be no direct or indirect effects to these SSSI from construction of the Proposed Scheme. There is potential for operational impacts during operation due to potential effects resulting from exhaust emissions from vehicles. This will be assessed further with full results presented within the ES.

Easton Down SINC

8.9.17 Easton Down SINC lies partially within the IAB. Whilst there will be no direct loss of terrestrial habitats which form part of the SINC there is potential for adverse effects through habitat degradation during construction or operation of the Proposed Scheme. However, it is considered that control measures incorporated within the fiEMP and the integrated design of the Proposed Scheme (as described in **Section 8.8**) should avoid significant adverse effects on the SINC. This will be assessed further with results presented within the ES.

8.9.18 There is potential for operational impacts due to potential effects resulting from exhaust emissions from vehicles. This will be assessed further with full results presented within the ES.

Other non-statutory designated sites

8.9.19 All other non-statutory designated sites fall outside the M3 J9 Improvement site. Whilst there will be no direct loss of terrestrial habitats which form part of these sites there is potential for impacts from airborne or waterborne pollution to cause effects through habitat degradation during construction of the Proposed Scheme. However, it is considered that control measures incorporated within the fiEMP and the integrated design of the Scheme (as described in **Section 8.8**) should avoid significant adverse effects on these sites. This will be assessed further with results presented within the ES.

8.9.20 There is potential for operational impacts to these sites resulting from exhaust emissions from vehicles which could cause effects through habitat degradation. This will be assessed further with full results presented within the ES.

Habitats of Principal Importance (HPI)

8.9.21 Of the eight HPI identified within or adjacent to the IAB, three are likely to be subject to direct effects from habitat loss during the construction period, these are:

- sections of hedgerow along Easton Lane will require removal to facilitate construction of the WCH route
- lowland calcareous grassland present around the M3J9 gyratory will require removal to facilitate construction of the Proposed Scheme
- wet woodland may need to be removed to facilitate construction of the footbridge over the River Itchen and the associated walking route

8.9.22 The design has sought to minimise impacts to these habitats as far as practical. As described in **Section 8.8**, an ecologically informed habitat creation package is being developed, to include habitats of ecological value which are sensitive to the local area, including creation of large areas of chalk grassland and native woodland. Hedgerows would either be replaced or translocated where practical. As such, whilst there will be temporary effects to these habitats, significant residual adverse effects are considered unlikely. This will be assessed further with results presented within the ES.

8.9.23 Potential effects to the River Itchen are set out in the River Itchen SAC/SSSI section above.

8.9.24 Other HPI within, or adjacent to, the IAB but which will not be subject to direct effects include lowland fen, lowland meadows, lowland mixed deciduous woodland, and reedbeds. Whilst there will be no direct loss of these habitats there is potential for effects through habitat degradation from waterborne or airborne pollution during construction or operation of the Proposed Scheme. However, it is considered that control measures incorporated within the fiEMP and the integrated design of the Proposed Scheme (as described in **Section 8.8**) should avoid significant adverse effects on these habitats. This will be assessed further with full results presented within the ES.

Other habitats

8.9.25 Other habitats within the IAB which are likely to be directly affected during the construction phase include other neutral grasslands, scrub, other woodlands (including plantation and coniferous woodlands), and cultivated land.

- 8.9.26 Other neutral grasslands, scrub and other woodlands are present across much of the highway verges and highway estate. Clearance of these habitats will be necessary to facilitate construction of the Proposed Scheme. Retained habitats will be protected during construction works through appropriate fencing. As described in **Section 8.8**, an ecologically informed habitat creation package is being developed, which includes habitats of ecological value which are sensitive to the local area, including large areas of chalk grassland, species rich grassland, native broadleaved woodland and scrub. As such, whilst there will be temporary adverse effects to these other habitats, significant residual adverse effects are considered unlikely. This will be assessed further with results presented within the ES.
- 8.9.27 Areas of cultivated (arable) land to east of the M3 will be lost during construction through its use as: temporary construction compound, areas for excess spoil management, and environmental mitigation and enhancement area.
- 8.9.28 The primary purpose of the environmental mitigation and enhancement area is to create habitats of ecological and landscape value, such as chalk grassland, woodland and scrub, which will help to integrate the scheme into the wider landscape (as described in **Section 8.8**).
- 8.9.29 Given the above, and the control measures incorporated within the fiEMP and the integrated design of the Proposed Scheme (as described in **Section 8.8**) it is considered that significant residual adverse effects on other habitats are unlikely. This will be assessed further with full results presented within the ES.

Species

- 8.9.30 A summary of potential effects on species and species groups during construction and operation of the Proposed Scheme is provided in **Table 8-6** below.

Table 8-6: Summary of potential effects to species and species groups.

Receptor	Stage of Proposed Scheme	Type of effect
Badgers	Construction	<p>All works which could affect badger setts through damage or disturbance would be undertaken under a Natural England Protected Species Mitigation Licence for badger, which would include appropriate mitigation strategies.</p> <p>Other construction effects could come from direct mortality, entrapment of badgers within excavations or pipes, and disturbance to badgers. Measures to avoid these effects would be incorporated within the fiEMP.</p>
	Operation	<p>Direct mortality of badgers is likely to already occur given the presence of badger activity near to existing major highway corridors. The Proposed Scheme is unlikely to worsen the existing situation, and should provide improvements through provision of mammal fencing in strategic locations.</p>
Bats (foraging and commuting)	Construction	<p>Construction effects may arise through loss and fragmentation of habitats used by foraging and commuting bats during construction, including woodland, tree lines and scrub. This will include loss of habitats between the A34 and the M3 which have been identified during survey work as being key for certain species of foraging bats. The habitat mitigation and enhancement package will compensate for these losses, and will provide additional habitats of value for foraging and commuting bats including native woodland, scrub and chalk grassland. The new habitats have been designed to provide habitat linkages and foraging resource within the IAB and into the wider landscape to enhance the value of the area for foraging and commuting bats in the long term.</p> <p>Commuting and foraging bats can be subject to disturbance (from noise, vibration and lighting) Measures to avoid these effects would be incorporated within the fiEMP.</p>
	Operation	<p>Direct mortality through collision with traffic is likely to already occur given the presence of bats near to existing major highway corridors. The Proposed Scheme will not significantly</p>

Receptor	Stage of Proposed Scheme	Type of effect
		alter the existing road layout (in relation to its existing effects on foraging and commuting bats) and is not considered to worsen the existing situation in relation to mortality of bats. Habitat degradation for foraging bats could occur through lighting, however the current lighting design indicates no worsening of the existing situation, and potentially reduction in light spill through upgrading of current lighting in line with industry standard guidance in relation to bats.
Bats (roosting)	Construction	Any required works that affect bat roosts will be undertaken under a Natural England Protected Species Mitigation Licences for bat, where required, which would include appropriate mitigation strategies.
	Operation	It is the current understanding that roosting opportunities for bats would remain following any required works as part of the scheme. Positive effects to bats could come through provision of suitably located bat boxes within the IAB.
Hazel dormouse	Construction	Construction effects will result in the loss and fragmentation of habitats used by dormouse, including woodland, tree lines and scrub. Any required works to dormice habitats would be undertaken under a Natural England Protected Species Mitigation Licences for dormice, which would include appropriate mitigation strategies. The habitat mitigation and enhancement package will compensate for these losses and providing additional habitats of value for dormice. The new habitats have been designed to provide habitat linkages across the IAB and into the wider landscape to enhance the area for dormice in the long term.
	Operation	The Proposed Scheme may result in limited increase in noise disturbance (preliminary assessment showing increases of <1dB), compared to the current baseline. Further noise modelling work will be undertaken to inform the assessment presented in the ES. However, dormice in this area will be accustomed to existing noise disturbance, and it is considered unlikely that operational noise levels will be significantly worse than the existing situation.

Receptor	Stage of Proposed Scheme	Type of effect
Otter	Construction	Construction effects could arise from changes to water quality, direct mortality, entrapment of animals within excavations or pipes, and disturbance. Measures to avoid these effects would be incorporated within the fiEMP. Passage for otter along the River Itchen corridor will be maintained at all times during construction.
	Operation	<p>Direct mortality of otters may currently occur given the presence of this species near to existing major highway corridors. The Proposed Scheme is unlikely to worsen the existing situation, and should provide improvements through provision of mammal fencing in strategic locations.</p> <p>The Proposed Scheme may result in limited increase in noise disturbance (preliminary assessment showing increases of <1dB), compared to the current baseline. Further noise modelling work will be undertaken to inform the assessment presented in the ES. However, otter in this area will be accustomed to existing noise disturbance, and it is considered unlikely that operational noise levels will be significantly worse than the existing situation.</p>
Other notable mammals	Construction	Construction effects could come from direct mortality or entrapment within excavations or pipes. Measures to avoid these effects would be incorporated within the fiEMP.
	Operation	Direct mortality of some notable mammals (e.g. brown hare) is likely to already occur. The Proposed Scheme is unlikely to worsen the existing situation, and should provide improvements through provision of mammal fencing in strategic locations.
Breeding and wintering birds	Construction	<p>Effects on breeding and wintering birds could arise through habitat loss, direct mortality, disturbance and habitat degradation.</p> <p>Loss of habitats including arable farmland to the east of the M3 has the potential to affect SPI including yellowhammer and skylark. However, effects will be temporary, and the habitat mitigation and enhancement package will compensate for losses of habitats, providing chalk grassland suitable for breeding and wintering yellowhammer, skylark and</p>

Receptor	Stage of Proposed Scheme	Type of effect
		<p>other farmland birds, along with native woodland and scrub of importance for a range of species.</p> <p>Overall, much of the habitat lost as part of the vegetation clearance would be offset by the creation of a large areas of diverse semi-natural habitats within the Proposed Scheme boundary, providing benefits of additional foraging and nesting opportunities compared to the intensive agricultural cropping.</p> <p>The wooded habitats along the section of the River Itchen within the IAB are not considered to be suitable for nesting kingfisher or Cetti's warbler (Schedule 1 species). No construction activities are planned to occur on the River Itchen other than the localised works for the footbridge abutments, and proposed works to Kingsworthy bridge. As such, no impacts to nesting kingfishers or Cetti's warbler are considered likely.</p> <p>Measures to avoid effects on birds, such as sensitive timing of vegetation clearance, will be incorporated within the fiEMP.</p>
	Operation	<p>Direct mortality of birds may currently occur given their presence near to major highway corridors. The Proposed Scheme is unlikely to worsen the existing situation.</p> <p>The Proposed Scheme may result in limited increase in noise disturbance to birds, compared to the current baseline. Preliminary assessment showing increases of <1dB compared to the current baseline Further noise modelling work will be undertaken to inform the assessment presented in the ES, however it is considered unlikely that the situation will be significantly worse than the existing situation.</p>
Reptiles	Construction	<p>Construction effects will result in the loss of habitats used by reptiles, including grassland and scrub within the highway estate and adjacent farmland. Any required works to reptile habitats would be undertaken under a method statement for reptiles which will include appropriate mitigation strategies.</p> <p>Mitigation during construction will include:</p>

Receptor	Stage of Proposed Scheme	Type of effect
		<ul style="list-style-type: none"> - enhancement of habitats outside the construction footprint through habitat management and creation of reptile refugia and hibernacula; and - encouragement of reptiles out of the construction area into adjacent habitat through habitat management, and where necessary trapping and translocation. <p>This approach has been successfully used on other major highways schemes⁵.</p>
	Operation	<p>In the long term the habitat mitigation and enhancement package will compensate for losses of reptile habitats and providing additional habitats of value for reptiles including chalk grassland, chalk bunds, and scrub. The new habitats have been designed to provide habitat linkages across the IAB and into the wider landscape to enhance the area for dormice.</p>
Freshwater fish	Construction	<p>No direct impacts on fish within the River Itchen are anticipated as no construction works are anticipated within the river, and abutments of the proposed footbridge will be set back from the riverbank.</p> <p>Potential effects could arise from habitat degradation associated with construction activities such as pollution events, however measures to avoid these effects would be incorporated within the fiEMP.</p> <p>The new footbridge will require construction of supports for the bridge deck, likely requiring piling which could generate noise and vibration disturbance. Measures would be agreed with the Environment Agency and included within the fiEMP which will avoid disturbance effects to fish during key migration periods.</p> <p>No piers or other structures will be located within the river for the current design of the bridge, and passage for fish will be maintained at all times.</p>

⁵ Case study: A338 Major Maintenance scheme. A new approach for ensuring road scheme avoid harm to reptiles, including European Protected Species (EPS), while securing significant gains. (Natural England & Dorset County Council)

Receptor	Stage of Proposed Scheme	Type of effect
	Operation	<p>The addition of the footbridge over the River Itchen will increase shading to a short stretch of this watercourse. However, the area is currently heavily shaded by the Itchen Bridge and adjacent woodland, and the additional shading is unlikely to significantly affect the existing situation.</p> <p>No piers or other structures will be located within the river for the current design of the bridge, and passage for fish will be maintained at all times.</p>
Terrestrial invertebrates	Construction	<p>Effects to terrestrial invertebrates will arise through loss of habitats of value to this species group such as lowland chalk grassland. The design has sought to minimise impacts to these habitats as far as practical. As described in Section 8.8, an ecologically informed habitat creation package is being developed, to include habitats of ecological value which are sensitive to the local area, including large areas of chalk grassland scrub and native woodland. This habitat creation package will compensate for the losses of habitats of value for invertebrates, and provide enhancements for this species group in the long-term, including species of national and local importance.</p>
	Operation	<p>The habitat creation package, including large areas of chalk grassland will provide beneficial impacts to terrestrial invertebrates through provision of larval foodplants and suitable habitats. This is likely to provide beneficial effects for this species group in the long-term, including species of national and local importance.</p>
Aquatic invertebrates	Construction	<p>No direct impacts on aquatic invertebrate within the River Itchen are anticipated as no construction works are anticipated within the river, and abutments of the proposed footbridge will be set back from the riverbank.</p> <p>Potential effects could arise from habitat degradation associated with construction activities such as pollution events, however measures to avoid these effects would be incorporated within the fiEMP.</p>

Receptor	Stage of Proposed Scheme	Type of effect
	Operation	The addition of the footbridge over the River Itchen will increase shading to a short stretch of this watercourse. However, the area is currently heavily shaded from the Itchen Bridge and adjacent woodland, and the additional shading is unlikely to significantly affect the existing situation.
Notable Plants	Construction	Effects to notable plants will arise through loss of habitats of value to this species group such as lowland chalk grassland. The design has sought to minimise impacts to these habitats as far as practical. As described in Section 8.8 , an ecologically informed habitat creation package is being developed, to include habitats of ecological value which are sensitive to the local area, including large areas of chalk grassland scrub and native woodland. This habitat creation package will compensate for the losses of habitats of value for notable plants, and provide enhancements for this species group in the long-term. Other mitigation measures which will be considered include translocation of notable plants and translocation of topsoil from areas of diverse grassland, to maintain local populations. Measures to control invasive non-native species and to avoid spread during construction will be included within the fiEMP.
	Operation	The habitat creation package, including large areas of chalk grassland will provide beneficial impacts to notable plants through provision of suitable habitats which will be managed for biodiversity in the long term. This is likely to provide beneficial effects for notable plants in the long-term.

8.9.31 The preliminary findings in **Table 8-6** will be considered further with full results presented within the ES.

8.10 Anticipated further assessment

- 8.10.1 Ecological survey work will continue to be reviewed and updated where required during the development of the design and the ongoing assessment process.
- 8.10.2 Due to the mobility of badgers, further surveys for this species are being undertaken during winter and spring 2021 to update the existing baseline. The results of these surveys will be reported in the ES, which will be submitted to support the application for Development Consent.
- 8.10.3 Further bat roost surveys are being undertaken during spring and summer 2021 to confirm the status of the likely roosts which have been identified in 2020. The results of these surveys will be reported in the ES, which will be submitted to support the application for Development Consent.
- 8.10.4 Assessment of impacts to designated sites for nature conservation from exhaust emissions from vehicles will be undertaken in line with DMRB LA105 Air Quality (Highways England, 2019). Traffic modelling data will be used to provide predictions of traffic flows, for the ARN. This data will be used to calculate emissions of pollutants such as NO_x from the Proposed Scheme using data from Defra's Emission Factor Toolkit (EFT) and in accordance with LA105 (Highways England, 2019). For designated sites, the annual average NO_x concentration and resultant nitrogen deposition rate will be determined in accordance with LA105 (Highways England, 2019) and combined with background concentrations and deposition rates. Where the air quality modelling identifies potential exceedances to designated sites, these will then be subject to further assessment of their potential ecological effects within the Biodiversity chapter of the ES. Further details of the air quality modelling which will be used to inform assessments can be found in **Chapter 6 Air Quality**.
- 8.10.5 With respect to River Itchen SAC further information is required in relation to the scheme design and groundwater conditions. Once this information is available this will be used to inform the HRA assessment and accompany submission of the ES. Natural England and the Environment Agency will be consulted with respect to the findings of the HRA at the earliest opportunity.
- 8.10.6 The HRA will be undertaken in accordance with LA 115 Habitats Regulations Assessment and Advice note ten: Habitats Regulations Assessment relevant to nationally significant infrastructure (The Planning Inspectorate, 2017).

9 Geology and Soils

9.1 Introduction

- 9.1.1 This chapter presents the preliminary findings of the assessment of likely significant effects on geology and soils arising from the construction and operation of the Proposed Scheme.
- 9.1.2 This chapter has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the EIA Regulations).

9.2 Legislative and policy framework

Policies and plans

- 9.2.1 Planning policies and guidance that are relevant to the Proposed Scheme include the following, which are being used to guide and inform ongoing assessment work:
- National Policy Statement for National Networks (NPS NN) ((DfT, 2014): Paragraphs 5.116 to 5.119 (Land Stability) and 5.168 (Agricultural Land and Contamination).
 - The National Planning Policy Framework (NPPF) (2019): Paragraph 8 (Achieving sustainable development), paragraphs 170 (Conserving and enhancing the natural environment), 178 (Conserving and enhancing the natural environment) and 179 (Conserving and enhancing the natural environment – Ground conditions and pollution); and the associated Planning Practice Guidance for NPPF, Land Affected by Contamination, June 2014 (updated July 2019); Land Stability, March 2014 (updated July 2019); Natural Environment, January 2016 (updated July 2019).
 - Winchester District Local Plan Part 1 Policy CP16 (Biodiversity)
 - Winchester District Local Plan Part 2 (2017): Policy DM17 (Site Development Principles); Policy DM19 (Development and Pollution); and Policy DM21 (Contaminated Land).
 - Winchester District Draft Local Plan 2018 -2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February – 12th April 2021.
 - South Downs Local Plan 2014-2033 (2019): Core Policy SD2 (Ecosystems Services); Strategic Policy SD9 (Biodiversity and Geodiversity); Development Management Policy SD54 (Pollution and Air Quality); and Development Management Policy SD55 (Contaminated Land).

Legislation, regulations and directives

9.2.2 The assessment is being undertaken with due consideration of the following relevant legislation, regulations and directives:

- Part 2A of the Environmental Protection Act 1990, as amended by the Environment Act 1995
- The Contaminated Land (England) (Amendment) Regulations 2012
- Water Framework Directive (2000/60/EC)
- The Environmental Damage (Prevention and Remediation) Regulations 2015
- Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009
- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) Statutory Guidance and Regulations

9.2.3 Statutory guidance on the application of legislative requirements and restrictions have been obtained from:

- Contaminated Land Statutory Guidance (Defra, 2012)
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017/572)

Non-Statutory Guidance

9.2.4 Further non-statutory guidance which will be referred to as appropriate during preparation of the ES chapter includes:

- Land Contamination: Risk Management - <https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks>
- CIRIA 552: Contaminated Land Risk Assessment, A guide to good practice (CIRIA, 2001)
- BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of practice
- DMRB CD622: Managing geotechnical risk (2020)
- DMRB LA104: Environmental assessment and monitoring (2020)
- DMRB LA109: Geology and soils (Highways England, 2019)

9.3 Consultation

9.3.1 **Table 9.1** below summarises the key consultation responses received to date in relation to geology and soils and how they have been responded to during the EIA process.

Consultation undertaken

Table 9-1: Consultation undertaken

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
Page 30 Paragraph 4.6.3	<i>“The proposed assessment includes impacts to surface waters. The Road Drainage and the Water Environment Chapter of the scoping report proposes a study area of the red line boundary of the Proposed Development plus a 500m buffer. The study area for the Geology and Soils Chapter proposes the red line boundary of the Proposed Development plus a 250m buffer. The Inspectorate considers that these two study areas do not align and requests that the ES either explains the reasoning as to why they are different or apply the most appropriate study area to both.”</i>	Noted: the study areas will be reviewed and their justification will be provided in the final ES. Paragraph 9.6.2 of this PEIR allows the study area to be extended for specific features if required.
Page 31 Paragraph 4.6.4	<i>“The ES should supply a Figure depicting the location of receptors and geological elements within the study area (e.g. historic landfills, chalk pits, aquifers, source protection zones (SPZs), abstraction sites and rivers and flood plains etc) in relation to the Proposed Development to enable understanding of potential impacts and effects. This should also be used in the ES to support scoping out potential impacts such as historic landfill sites that are too far from the Proposed Development to</i>	Noted: A figure will be included within the ES.

Reference	Comment	Response
	<i>cause an impact (paragraph 10.2.10); no distance or visual aid is provided to support this statement.”</i>	
Page 31 Paragraph 4.6.5	<i>“A number of further surveys are proposed to be undertaken between paragraphs 10.2.2 and 10.2.37 to inform the baseline. Any surveys undertaken to inform the baseline and the assessment in the ES should be appended to the relevant ES Chapter.”</i>	Noted: All surveys used to inform the baseline and assessment of Geology & Soils will be appended to the ES.
Page 31 Paragraph 4.6.6	<i>“The definition and justification of receptor sensitivity remains unclear; for example, Scoping Report Table 10.2 defines residential receptors as ‘medium’ sensitivity, yet it is defined as ‘very high’ sensitivity in Table 10.3. The ES should define and justify receptor sensitivity in line with the relevant guidance and/or consultation and ensure that this is consistent throughout the ES assessment.”</i>	Table 10.2 identifies site specific receptors and their sensitivity with human health assessed as low and medium dependent on the nature of their relationship with the Proposed Development. Table 10.3 provides the generic receptor sensitivity that forms part of the significance criteria and is taken from LA109 (Highways England, 2019). Table 10.3 allows for a range of sensitivity levels for human health – based on the relationship/use of a given site/development, with a range between negligible and very high. Accordingly, Tables 10-2 and 10-3 in the Scoping Report are accurate and are repeated within this PEIR chapter as Tables 9-7 and 9-2 .
Page 31 Paragraph 4.6.7	<i>“Whilst construction activities are not currently confirmed, paragraph 10.4.3 anticipates that piling may be undertaken. Piling creates pathways for contamination. The ES should assess any potential contamination impacts as a result of piling and secure specific, appropriate mitigation measures agreed through consultation with the relevant</i>	A geoenvironmental risk assessment and Tier 2 Generic Quantitative Risk Assessment (GQRA) for controlled waters will be undertaken to enable potential impacts to controlled waters to be assessed and reported in the ES. Further to this, design specific Foundation Works Risk Assessment will be a requirement of any DCO consent. This will provide an assessment of the risk

Reference	Comment	Response
	<i>statutory bodies including mitigating potential bentonite breakouts where relevant.”</i>	and any appropriate mitigation measures required and will be agreed with the relevant statutory bodies.
Page 32 Paragraph 4.6.8	<i>“Scoping Report paragraph 10.3.3 proposes that impacts to soils are to be included in the Geology and Soils assessment of the ES and the quantities will be defined in the design stage (determined in Chapter 11, Materials and Waste). Impacts from excavated soils should be included in the ES assessment where significant effects are likely to occur, including impacts from the release of carbon and on the land receiving the excavations which should be identified in the ES.”</i>	As noted in Table 15.7 of the Scoping Report, land use change (which includes soil movements), will be assessed within the climate chapter of the ES.
Environment Agency Late Response (November 2020)		
Hydrogeological Risk Assessment	<i>“Given the sensitivity of the groundwater environment beneath the IAB, we would expect the Applicant to produce a Hydrogeological Risk Assessment for the development. This assessment would focus on groundwater and receptors that are dependent upon groundwater and potential risks of contamination (land contamination, drainage, piling and excavation).”</i>	A Controlled Waters Risk Assessment is being undertaken and will be reported in the Ground Investigation Report that will be submitted to accompany the ES. The findings will be used to inform the impact assessment.
Land Contamination	<i>“With the increased scope for excavation and penetrative works, there is a risk of the mobilisation of potentially contaminated material. There is a risk that unknown contamination could be mobilised into shallow groundwater. Groundwater may then act as a potential pathway to sensitive receptors, in this case</i>	The requirement for an Environmental Management Plan will be secured as part of any DCO Consent. This will include measures (including the requirement for a watching brief if necessary) for dealing with any unexpected contamination.

Reference	Comment	Response
	<p><i>ecological receptors or public water supply boreholes.</i></p> <p><i>In addition to the findings of the phase 2 site investigation, we would expect an extensive watching brief around any significant earthworks to ascertain contaminated material and initiate remediation and verification of the site prior to any intrusive works occurring.”</i></p>	
<p>Piling and Excavation</p>	<p><i>“It is assumed that with the changes in the proposal that there will be the need for piled foundations and excavations to support the new, proposed structures and reconfigurations. As explained in the comments on land contamination above, these works can liberate contaminated material into groundwater, putting sensitive receptors at risk. Additionally, they also increase the risk of turbidity. Piling operations and excavations can induce sediment loads into groundwater, this sediment then moves with groundwater flow and had the potential to carry harmful bacteria, and can result in the shutdown of a public water supply. As such we would expect the Applicant to produce a Foundation Risk Assessment, focusing on the potential hazards of piling/excavation activities on local groundwater, and the methods that might mitigate the risk of those hazards having a detrimental impact.”</i></p>	<p>A Controlled Waters Risk Assessment is being undertaken and will be reported in the Ground Investigation Report that will be submitted to accompany the ES.</p> <p>The requirement for a design specific Foundation Works Risk Assessment will be a requirement of any DCO consent. This will provide an assessment of the risk and any appropriate mitigation measures required and will be agreed with the relevant statutory bodies.</p>
<p>Dewatering</p>	<p><i>“The scoping report suggests that temporary de-watering may be required in order for construction activities to take place and mentions permits may be</i></p>	<p>Noted, see Paragraph 9.3.2 below.</p>

Reference	Comment	Response
	<p><i>required. For information, dewatering is generally no longer exempt from needing an abstraction licence. However there still remains a small scale dewatering exemption in place under Section 5, Part 2 of the Water Abstraction and Impounding (Exemptions) Regulations 2017. Details on this exemption can be found on the following web page: https://consult.environment-agency.gov.uk/environment-and-business/removing-previously-exempt-abstraction-activities/user_uploads/dewatering-application-advice-1.pdf If the exemption cannot be complied, with then an abstraction licence will need to applied for. The licensing process can be fairly lengthy, therefore we recommend early pre-application discussions with us. An environmental permit may also be required to cover the discharge from the scheme. Additionally an abstraction licence and/or environmental permit may be required if the cuttings or other works are assessed to intercept groundwater on a longer term basis, and if more permanent passive or active groundwater management mitigation measures will be required. It is understood that groundwater levels are currently being monitored which could be used to assess groundwater levels extremes at the site (if taken over a number of years). As above, we recommend early pre-application discussions with us.”</i></p>	

Proposed consultation

- 9.3.2 Following the completion of a Tier 2 risk assessment (see [Section 9.4](#)), an outline remediation strategy will be prepared, and both the Environment Agency (EA) and relevant authorities will be consulted for comment and agreement prior to completion of the Environmental Statement (ES).

9.4 Assessment methodology and significance criteria

Methodology

- 9.4.1 The assessment of the ground conditions at the M3 J9 Improvement site is being undertaken following a tiered approach as recommended within industry guidance (previously the Model Procedures for the Management of Contaminated Land (CLR11)), and in accordance with Design Manual for Roads and Bridges (DMRB) LA109 Geology and Soils (Highways England, 2019). CLR11 has now been superseded by Land Contamination: Risk Management (LC:RM) (Environment Agency, 2020) and therefore the more recent guidance is being used in assessments going forward (both advocate the tiered approach described below):

- Tier 1 – Preliminary Risk Assessment. A qualitative assessment of historical and published information, together with a site reconnaissance, undertaken in order to develop a preliminary conceptual site model and inform a preliminary risk assessment
- Tier 2 – Generic quantitative risk assessment. An assessment of ground condition data using published generic assessment criteria to screen the site and establish whether there are actual, or potential, unacceptable risks; and (if required)
- Tier 3 - Detailed quantitative risk assessment: A detailed quantitative assessment involving the generation of site-specific assessment criteria (SSAC) (if required)

- 9.4.2 The preliminary findings reported in this chapter have been informed through a Tier 1 qualitative assessment. A Tier 2 assessment is being undertaken based upon the findings of a Phase 2 Ground Investigation (undertaken by Soils Ltd between March 2019 and June 2019) to further inform the EIA and will be reported in the ES. The requirement (or not) for a Tier 3 assessment will be identified following the completion of the Tier 2 Assessment. The results of the Tier 1 assessment form the basis for the baseline conditions and assessment of effects within this Preliminary Environmental Information Report (PEIR). The results of the Tier 1 and Tier 2 assessments will form the basis for the baseline conditions and assessment of effects within the ES.

- 9.4.3 It is also recognised that certain soils can be a cause of land instability, either as a result of natural processes or as a result of historical activities such as dissolution, excavation, (resulting in) landslides or slips, soil creep, and

ground compression. Where there are reasons for suspecting instability, appropriate assessment including desk based Cavities Occurrence Assessments, Phase 2 Ground Investigations and geotechnical appraisal is undertaken to determine whether:

- The land is capable of supporting the loads to be imposed
- The Proposed Scheme could be threatened by unstable slopes on or adjacent to the M3 J9 Improvement site
- The Proposed Scheme could initiate slope instability which may threaten its neighbours
- The M3 J9 Improvement site could be affected by ground movements due to natural cavities
- The M3 J9 Improvement site could be affected by ground movements due to past, present or foreseeable future mining or excavation activities.

9.4.4 The assessment of impacts to agricultural land is being undertaken in accordance with DMRB LA109 Geology and Soils (Highways England, 2019). The assessment considers the grading and area of agricultural land classification (ALC) affected by the Proposed Scheme (informed by dedicated ALC surveys undertaken in spring 2021), as well as the relative abundance of the identified soil type in the wider geographic area.

Assessment

9.4.5 The assessment involves a study of available desk based information including previously prepared reports (listed below in **Section 9.7**), together with a Phase 1 Ground Condition Assessment (including a Tier 1 preliminary risk assessment) of additional areas not previously assessed in earlier studies due to changes in the indicative application boundary, (see **Chapter 2** for further information).

9.4.6 In addition, the assessment will include an appraisal of ground conditions encountered during a site specific Phase 2 Ground Investigation (Soils Ltd, 2019) carried out at the M3 J9 Improvement site.

9.4.7 Interpretive ground investigation reporting and assessment is being undertaken to provide information to enable a Tier 2 assessment of existing data, and this will be reported within the final ES.

9.4.8 In order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences, a source-pathway-receptor methodology is adopted, with the underlying principle that the identification of pollutant linkages consists of the following three elements:

- A source/hazard (a substance or situation that has the potential to cause harm or pollution)

- A pathway (a means by which the hazard moves along / generates exposure)
- A receptor/target (an entity that is vulnerable to the potential adverse effects of the hazard)

9.4.9 Whilst the contamination may be a hazard it would not constitute a risk unless all other elements are present and a pollutant linkage can be determined. Therefore, in assessing the potential for contamination to cause a significant effect: the extent and nature of the potential source or sources of contamination must be assessed; any pathways present must be identified; and, sensitive receptors or resources identified and appraised to determine their value and sensitivity to contamination related impacts.

9.4.10 The methodology adopted in this chapter is qualitative with a progression from factual information (stated with reasonable certainty) regarding the baseline conditions, to appraisal informed by professional judgement and expression of opinions on the relative significance.

9.4.11 The assessment of ALC is informed by the baseline classification within the IAB. It identifies the sensitivity of the ALC classification (with Grades 1, 2 and 3a being considered 'best and most versatile (BMV)') against the area of agricultural land to be affected by the Proposed Scheme.

Significance criteria

9.4.12 The sensitivity of receptors has been determined in accordance with guidance and criteria provided in DMRB LA109 Geology and Soils (Highways England, 2019) and LA113 Road Drainage and the Water Environment (Highways England, 2020). The excerpt below presents the relevant environmental value (sensitivity) and descriptors from LA109 and LA113.

Table 9-2: Receptor value (sensitivity) and descriptions

Receptor value (sensitivity)	Description
Very High	<p>Geology: very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, Sites of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such.</p> <p>Soils:</p>

Receptor value (sensitivity)	Description
	<p>ALC grade 1 and 2</p> <p>Contamination:</p> <p>1) human health: very high sensitivity land use such as residential or allotments;</p> <p>2) surface water: Watercourse having a Water Framework Directive (WFD) classification shown in a River Basin Management Plan (RBMP) and Q95 $\geq 1.0 \text{ m}^3/\text{s}$. Site protected/designated under EC or UK legislation (Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Ramsar site)</p> <p>3) groundwater: Principal aquifer providing a regionally important resource, Source Protection Zone 1</p>
High	<p>Geology: rare and of national importance with little potential for replacement (e.g. geological SSSI, Area of Special Scientific Interest (ASSI), National Nature Reserves (NNR)). Geology meeting national designation criteria which is not designated as such.</p> <p>Soils:</p> <p>ALC grade 3a</p> <p>Contamination:</p> <p>1) human health: high sensitivity land use such as public open space;</p> <p>2) surface water: Watercourse having a WFD classification shown in a RBMP and Q95 $< 1.0 \text{ m}^3/\text{s}$.</p> <p>3) groundwater: Principal aquifer providing locally important resource or supporting a river ecosystem, SPZ2.</p>
Medium	<p>Geology: of regional importance with limited potential for replacement (e.g. RIGS). Geology meeting regional designation criteria which is not designated as such.</p>

Receptor value (sensitivity)	Description
	<p>Soils: ALC grade 3b</p> <p>Contamination: 1) human health: medium sensitivity land use such as commercial or industrial; 2) surface water: Watercourses not having a WFD classification shown in a RBMP and Q95 >0.001m³/s. 3) groundwater: Aquifer providing water for agricultural or industrial use with limited connection to surface water, SPZ3</p>
Low	<p>Geology: of local importance / interest with potential for replacement (e.g. non designated geological exposures, former quarries / mining sites).</p> <p>Soils: ALC grade 4 and 5</p> <p>Contamination: 1) human health: low sensitivity land use such as highways and rail; 2) surface water: Watercourses not having a WFD classification shown in a RBMP and Q95 ≤0.001m³/s. 3) groundwater: Unproductive strata</p>
Negligible	<p>Geology: no geological exposures, little / no local interest.</p> <p>Soils: Previously developed land formerly in 'hard uses' with little potential to return to agriculture.</p> <p>Contamination: 1) human health: undeveloped surplus land / no sensitive land use proposed;</p>

Receptor value (sensitivity)	Description
	2) surface water: not present 3) groundwater: Unproductive strata

9.4.13 The magnitude of change will be determined in accordance with the criteria provided in LA109 and LA113. The excerpt below presents the relevant magnitude of impact and typical descriptions from LA109 and LA113.

Table 9-3: Magnitude of impact and typical descriptions

Magnitude of Impact (change)	Typical Description
Major	Geology: loss of geological feature / designation and/or quality and integrity, severe damage to key characteristics, features or elements. Contamination: 1) human health: significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (e.g. category 4 screening levels) SP1010 with potential for significant harm to human health. Contamination heavily restricts future use of land; 2) surface water: Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in water body WFD classification. 3) groundwater: Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Loss or significant damage to major structures through subsidence or similar effects.
Moderate	Geology: partial loss of geological feature / designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. Contamination: 1) human health: contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination can be present. Control / remediation

Magnitude of Impact (change)	Typical Description
	<p>measures are required to reduce risks to human health / make land suitable for intended use;</p> <p>2) surface water: Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies. Contribution to reduction in water body WFD classification</p> <p>3) groundwater: Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies.</p> <p>Damage to major structures through subsidence or similar effects or loss of minor structures.</p>
Minor	<p>Geology: minor measurable change in geological feature / designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.</p> <p>Contamination:</p> <p>1) human health: contaminant concentrations are below relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination is unlikely with a low risk to human health. Best practice measures can be required to minimise risks to human health;</p> <p>2) surface water: Minor effects on water supplies.</p> <p>3) groundwater: Minor effects on an aquifer, abstractions and structures</p>
Negligible	<p>Geology: very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature / designation. Overall integrity of resource not affected.</p> <p>Contamination:</p> <p>1) human health: contaminant concentrations substantially below levels outlined in relevant screening criteria (e.g. category 4 screening levels) SP1010. No requirement for control measures to reduce risks to human health / make land suitable for intended use;</p>

Magnitude of Impact (change)	Typical Description
	2) surface water; The proposed project is unlikely to affect the integrity of the water environment 3) groundwater: No measurable impact upon an aquifer and/or groundwater receptors

Agricultural land

9.4.14 The sensitivity of agricultural land receptors are outlined in **Table 9-2** above, with the magnitude of impact to be used within assessments outlined in **Table 9-4** below (replicating Table 3.12 of LA109 Geology and Soils (Highways England, 2019) as updated by Table E/2.1 of LA109 Geology and Soils (Highways England, 2019)).

Table 9-4: Magnitude of impact and typical descriptions – Agricultural land

Magnitude of impact (change)	Typical description
Major	Physical removal or permanent sealing of >20ha of agricultural land
Moderate	<ul style="list-style-type: none"> ■ physical removal or permanent sealing of 1ha - 20ha of agricultural land; or ■ permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource).
Minor	Temporary loss/reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource)
Negligible	No discernible loss/reduction of soil function(s) that restrict current or approved future use
No change	No loss/reduction of soil function(s) that restrict current or approved future use

9.4.15 The significance of effects will be determined in accordance with **Table 9-5** below. An effect of Moderate or above is taken to be significant in EIA terms.

9.4.16 Where an effect could be one of two gradings (for example where a Negligible impact interacts with a Medium sensitivity receptor resulting in a

Neutral or Slight effect), professional judgement will be used to determine which effect is applicable and this will be explained in the associated commentary.

Table 9-5: Significance of effect matrix

		Magnitude of impact (degree of change)				
		No change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Very High	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

9.5 Assessment assumptions and limitations

- 9.5.1 This assessment is in part based on published information which is generic to an area rather than specific to the M3 J9 Improvement site. Where this is the case professional judgement will be used to inform and justify the assessment in terms of likelihood and scale of effect associated with the identified land uses and environmental/geological setting. This is accepted practice and therefore does not affect the robustness of the assessment.
- 9.5.2 The assessment in this PEIR is, and the ES will be, based in part on the findings of ground investigation works. Ground investigation works are by their nature exploratory and there may be ground conditions at the M3 J9 Improvement site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any assessment. This is accepted practice and therefore does not affect the robustness of the assessment.
- 9.5.3 Historical maps and aerial photographs used as part of the studies provide a 'snap shot' in time about conditions or activities within the study area, and as such cannot be relied upon as indicators of any events or activities that may have taken place at other times.

- 9.5.4 It should also be noted that groundwater levels, groundwater chemistry, surface water levels, surface water chemistry, soil gas concentrations and soil gas flow rates can vary due to seasonal, climatic, tidal and man-made effects.
- 9.5.5 Only contamination from current and historical land-uses will be considered. It is assumed that the generation of new contamination during the construction phase will be minimised through measures required in a first iteration Environmental Management Plan (fiEMP) (which will be submitted to accompany the application for development consent).
- 9.5.6 The methodology promotes a tiered approach to the assessment of potentially contaminated land and the ES will be supported by both desk based and site specific information to enable determination of the baseline conditions and assessment of the potential significant impacts. The findings of this assessment will be incorporated into the fiEMP. The findings and interpretation of supplementary intrusive works and assessment required to support the discharge of Development Consent Order (DCO) requirements will be incorporated into the final Environmental Management Plan (EMP) to ensure that an appropriate level of mitigation is provided. Risk assessments to further characterise ground conditions and ground gas risks will be updated following additional investigation works and monitoring.
- 9.5.7 The information presented in this chapter is based on the information available at the time of writing this report and based on emerging design. The preliminary findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and will be refined through the ongoing EIA and consultation process and updated as part of the final ES.

9.6 Study area

- 9.6.1 The study area for the geology and soils assessment for the Proposed Scheme comprises the maximum physical extent of the Indicative Application Boundary (IAB) plus a buffer zone of 250m. This distance is referenced in Guidance for the Safe Development of Housing on Land Affected by Contamination (NHBC 2008) and is typical at the hazard identification stage of an assessment.
- 9.6.2 The potential for features outside of this buffer zone to be impacted or to constrain the Proposed Scheme will be based on professional judgement and included in the assessment, with justification provided within the ES. It is noted that LA109 (Geology and Soils) of the DMRB (Highways England, 2019) does not specify a minimum study area distance for the assessment of impacts to geology and soils but supports the derivation of a project specific study area.
- 9.6.3 It is noted that the current IAB (see **Figure 2.1, Appendix 2.1**) differs from that previously submitted and informed by earlier investigations and

assessments. Therefore, additional preliminary studies have been undertaken to further inform the baseline conditions to these areas, as set out in **Section 9.7** below.

9.6.4 In relation to ALC, consideration will be given to the relative abundance of similar soil types in the wider geographic area. However, the study area for the assessment of impacts to ALC extends to the limits of the IAB (as this incorporates land to be affected by the Proposed Scheme).

9.7 Baseline conditions

9.7.1 The baseline conditions within the study area have been assessed with reference to the following main sources of information (some of which are documents from previous stages of the development design):

- BGS online Geology of Britain viewer (BGS 2020)
- BGS web-hosted Onshore Geoindex (British Geological Society 2020)
- British Geological Society (BGS) 1:50,000 Series Geological Map Sheet No. 299 'Winchester' (Solid and Drift ed.), 2002 (BGS 2020)
- Development Consent Order (DCO) Application - Consultation Report (HE551511-JAC-GEN-0_00_00-RP-ZH-0014) (Highways England (HE) May 2020)
- Draft Ground Investigation Report (HE551511-JAC-HGT-0_00_00-RP-GE-0001) (Jacobs, March 2020)
- Environment Agency (EA) Catchment Data Explorer (EA, 2020)
- Environmental Constraints (HE551511-JAC-EGN-0_00_00-DR-GI-0001) (Jacobs, January 2019)
- Factual Ground Investigation Report (HE551511-HEX-EGT-ZZ-RP-CE-0001) (Soils Limited, August 2019, amended July 2020)
- M3 Junction 9 Scoping Opinion (TR010055-000078-M3J9) (The Planning Inspectorate (PINS), March 2019)
- MAGIC map - geographic information about the natural environment (Defra, 2020)
- Project Control Framework (PCF) Stage 2 - Environmental Assessment Report (Appendix A drawings) (Appendix B Technical Appendices) (HE551511-WSP-EGN-ZZ-RP-LE-0003) (WSP, June 2018)
- PCF Stage 2 – Preliminary Sources Study Report (HE551511-WSP-HGT-ZZ-RP-CE-0001) (WSP, September 2017)

- PCF Stage 3B – Phase 1 Ground Condition Assessment (Contamination and Stability) for Proposed Deposition and Compound Areas (HE551511-VFK-EGT-X_XXXX_XX-RP-GE-0001) (Stantec, January 2021).
- Preliminary Environmental Information Report (PEIR) (GFD19_0101_M3 Junction 9) (Jacobs, June 2019)
- PCF Stage 2 – Preliminary Sources Study Report (HE551511-WSP-HGT-ZZ-RP-CE-0001) (WSP, September 2017)

Geology & Ground Conditions

9.7.2 The anticipated ground conditions within the IAB have been determined through review of the published geological mapping, and also site specific intrusive information contained within both the Factual Ground Investigation Report and the draft Ground Investigation Report (GIR). This will be updated in the final ES following completion of the GIR.

Published Geology

- 9.7.3 The published BGS geological mapping indicates that the majority of the M3 J9 Improvement site is underlain by solid geology comprising the Seaford Chalk formation (the Chalk), with the overlying Newhaven Chalk only present in the area to the east of the M3, in the northern part of the study area. The Seaford Chalk formation is underlain by the Lewes Nodular Chalk formation, and in the southern extent of the IAB, the Lewes Nodular Chalk is indicated to outcrop at the ground surface.
- 9.7.4 Along the route of the River Itchen, which traverses the northern part of the M3 J9 Improvement site, the solid geology is overlain by superficial deposits comprising Alluvium. There are also smaller transects of superficial deposits, comprising Head, overlying the solid geology, located to the north and to the south of the existing junction, and in the northern parts of the IAB, including the location of the proposed A33/A34 construction compound.
- 9.7.5 In the area to the east of the M3 and to the south of the River Itchen, the geological mapping also indicates there may be an area of Clay with Flints and Head deposits overlying the Newhaven Chalk Formation (which overlies the Seaford Chalk Formation where present).
- 9.7.6 In addition to the published geology described above, it is anticipated that made ground is also present within the IAB, associated with the construction of the M3, A34, A33 and other infrastructure. It is anticipated that this made ground material will predominantly comprise reworked natural strata, and the overlying road carriageway construction (to be confirmed following completion of the GIR).
- 9.7.7 Extracts of the published geological mapping will be included within an appendix to the ES.

Published information

- 9.7.8 A review of the available information has identified records for three historical landfills within the study area. These are located beneath the existing M3 J9 roundabout (Spitfire Link), on the western side of the A34 at the northern tip of Wykeham Industrial Estate (land between Old Newbury Railway and A33) and between the A34/A33 and M3 carriageways, south of the River Itchen (land adjacent to Winchester Bypass). Further commentary is given below.
- 9.7.9 The ‘Spitfire Link, Easton Lane’ landfill was investigated in part by Soils Limited (SL, 2020) with six exploratory holes undertaken within or immediately adjacent to the mapped extents of the landfill. No evidence of waste or Made Ground was indicated on those exploratory hole records. As such the presence and extent of any deposited materials and its composition is unknown.
- 9.7.10 The ‘Land Adjacent to Winchester Bypass, Abbots Worth, Hampshire’ landfill is recorded as accepting inert waste from 1967 through to 1968. The licence holder is listed as D Hewestson-Brown. The recorded operational period broadly corresponds with the widening of the Winchester Bypass and construction of a gantry crossing the River Itchen. It is considered that the landfill may therefore have been used to accept earthworks arising from that scheme.
- 9.7.11 Therefore, further assessment of the historical landfills will be undertaken, in consultation with the EA and both Winchester City Council (WCC) and Hampshire County Council (HCC), and used to inform the ES.

Site specific ground condition information

- 9.7.12 A Phase 2 geotechnical and geo-environmental ground investigation was undertaken across parts of the M3 J9 Improvement site between March 2019 and June 2019. The interim information from the investigation (available at the time of writing) generally confirms the anticipated/published ground conditions.
- 9.7.13 Further supplementary ground condition reporting and assessment is being undertaken, and the combined results of the site specific ground investigation and additional assessment will be used to determine ground conditions and baseline conditions across the full extent of the M3 J9 Improvement site for the final ES.

Land stability/geological hazards

- 9.7.14 Chalk can be affected by both natural erosion features and man-made cavities, and a number of chalk pits and natural features (solution pipes) have been identified within the study area. Therefore, it is proposed to undertake a Cavity Occurrence Assessment based on readily available BGS mapping records, enhanced by the records contained within the Stantec UK

Ltd. Natural cavities and mining databases. This report will then further inform the ES. This approach was not objected to in the November 2020 Scoping opinion.

9.7.15 Based on the anticipated ground conditions, it is considered that there is a moderate risk of compressible ground being present in parts of the IAB, associated with the Alluvium and any non-engineered made ground. The Envirocheck Report previously obtained indicated a reasonable worst-case low risk of landslide and running sand potential, and a very low risk of shrinking/swelling clay or collapsible ground. A preliminary land stability risk assessment will be undertaken to inform further assessment and reported in the ES.

Hydrogeology

9.7.16 The Chalk is designated as a Principal Aquifer, and the overlying superficial deposits are designated as Secondary Aquifers, the Alluvium as a Secondary A Aquifer, and the Head as a Secondary (undifferentiated) Aquifer.

9.7.17 These designations reflect the importance of the aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

9.7.18 The Defra MAGIC map indicates that there are two sets of groundwater SPZs within the study area, associated with two groundwater abstraction sites. SPZs are identified in **Figure 13.1, Appendix 13.1**.

9.7.19 Parts of the M3 J9 Improvement site are also covered by a Drinking Water Groundwater Safeguard Zone (DWGSZ), associated with Zone 1 and 2 of the SPZ. The groundwater body associated with the DWGSZ is the River Itchen Chalk and this is indicated (EA Catchment Data Explorer) to be in poor environmental condition.

9.7.20 Groundwater monitoring wells were installed across the M3 J9 Improvement site during the ground investigation completed in 2019 and groundwater monitoring has been undertaken. This data will be used as part of the assessment of the baseline groundwater quality in the ES, including assessing impacts to the SPZs within the study area.

Hydrology

9.7.21 The River Itchen flows from the north-east to the south-west through the study area and below the M3, and A34/A33. The flood plain of the river spreads out between the A33 and M3 carriageways in the north part of the M3 J9 Improvement site, and there are several cross cutting and interlinked channels forming the river. In addition, Nun's Walk stream is present adjacent and flowing parallel to the River Itchen.

Historical land use

- 9.7.22 The historical land uses (relevant to the potential for contamination) have previously been determined at PCF Stage 2. These are based on historical Ordnance Survey maps obtained as part of an Envirocheck Report. The historical land use has been re-reviewed using old-maps.co.uk (2020), and historical Google Earth Aerial Imagery. A summary is presented below.
- 9.7.23 The area of the current M3 J9 roundabout and its immediate surroundings had remained undeveloped until the construction of the A33 in the late 1930s and later, in the early 1980s, when J9 of the M3 is shown to have been constructed.
- 9.7.24 From the late 1800s, there are several chalk pits indicated to be present within the study area, the closest located on the south side of the River Itchen flood plain between the A34 and M3 carriageways. One of these chalk pits remained evident on OS mapping until the late 1980s.
- 9.7.25 The Didcot, Newbury and Southampton railway line is indicated to have been constructed in the late 1890s 200m to the west of the IAB, along the eastern bank of the River Itchen, crossing the northern section of the site. The railway line remained until the 1960s when it was dismantled. Also, at this time, the Vulcan Iron Works was developed on the eastern side of the railway line to the north of the site and north of the River Itchen, adjacent to the north eastern boundary of the site. By the early 1960s this is no longer indicated to be 'Vulcan Iron Works', instead shown as 'Works'.
- 9.7.26 In the early 1900s, Winnall Gas Works was developed approximately 100m to the west of the IAB, within the current Wykeham Industrial Estate. The gas works had been extended by the 1930's and included tanks and a gasometer which remained until at least the late 1970s, although the main part of the gas works was redeveloped earlier.
- 9.7.27 By the early 1950s the Winchester by-pass (within the IAB) had been constructed adjacent to the gas works, and in the 1960s there appears to have been some modification to some of the channels in the River Itchen flood plain, to the east of the Winchester by-pass. The spoil from the construction may have been deposited to form what has been identified as the 'Land Adjacent to Winchester Bypass' landfill.
- 9.7.28 Between the early 1960s and early 1970s, the gas works and surrounding land, now the Wykeham Industrial Estate, are shown to have been developed for a variety of industrial uses including saw mills, rubber moulding works and engineering works. Other potentially contaminative activities within the industrial estate include and fire service depot, abattoir and garage.
- 9.7.29 A review of the available information indicates that the northern part of the study area comprised predominantly open fields from the early 1870s, and

also the development of Kings Worthy. The Didcot, Newbury and Southampton railway line had been constructed by the late 1890s within the west part of the study area. There was a general expansion of Kings Worthy between the late 1800s and present day and some general industrial use (works, saw mills and including the Vulcan Iron Works discussed above).

9.7.30 There is no previous development indicated in the area of the proposed northern satellite construction compound.

9.7.31 Contrary to the ‘published information’ outlined above, a review of the available historical OS mapping has not specifically identified the presence of infilled workings/landfills within the study area.

Current land use

9.7.32 The majority of the M3 J9 Improvement site comprises the carriageways of the M3, A33 and A34. In the area to the east of the M3, the land use both within the IAB and the study area is predominantly agricultural.

9.7.33 In the areas to the west of the A34, the land use within the IAB is predominantly highway land or undeveloped land adjacent to the highway. However, in the wider study area, the land use is varied including flood plain, residential and mixed use industrial.

9.7.34 In the northern part of the M3 J9 Improvement site, the predominant current land use outside of the IAB is mixed, comprising residential, agricultural and flood plain.

Potential contaminative land uses and contamination sources

9.7.35 **Table 9-6** summarises the potential contaminative land uses and contamination sources based on the current and historical land uses.

Table 9-6: Potential contaminative land uses and contamination sources

Land Use	Potential Contaminants of Concern
Motorway/'A' Road	Localised areas of made ground and/or spills and leaks comprising metals and metalloids, chloride, polycyclic aromatic hydrocarbons (PAHs), oil/fuel hydrocarbons, sulphates, asbestos.
Historical Landfill	Composition assumed to be naturally occurring arisings from road construction; but possible localised slightly elevated general industrial contaminants should be considered including metals, hydrocarbons, PAHs and asbestos.

Land Use	Potential Contaminants of Concern
Historical Railway Line	Metals and metalloids, PAHs, oil/fuel hydrocarbons, lubricating oils, creosotes, sulphates, asbestos.
Agricultural Land	Hydrocarbons and lubricating oils associated with machinery and nitrates from fertilisers. Potential pesticides and herbicides. Asbestos (e.g. on farm tracks due to possible use of demolition rubble for surfacing).
Gas Works	Metals and metalloids, inorganic compounds, asbestos, coal tars, PAHs, oil/fuel hydrocarbons, acids, alkalis,
Iron Works	Metals and metalloids, inorganic compounds, asbestos, Polychlorinated Biphenyls (PCBs)
Mixed Industrial Use	Metals and organo-metals, PAHs, oil/fuel hydrocarbons, sulphates, asbestos, PFAS.

Agricultural Land Classification

9.7.36 A baseline survey was undertaken in spring 2021 (Reading Agricultural Consultants, April 2021) further to a historic survey effort which was undertaken in 2017 (WSP, June 2018) which identified the ALC for a previous iteration of the IAB. Eighty one soil profiles were examined across the two assessment periods using hand augers and seven pits were excavated by spade to examine sub soil structures. Thirty soil samples were submitted for laboratory determination.

9.7.37 Of the survey area considered, 37% (31.3 ha) was identified as being ALC grade 2 and 43.9% (37.1) was identified as being ALC grade 3a (thus constituting BMV), while 19% (16.1ha) was considered ALC grade 3b and 0.1% (0.1ha) was considered ALC grade 4 (falling below the threshold of BMV). A total of 90.5 ha was identified as non-agricultural land.

Identification of sensitive receptors

9.7.38 **Table 9-7** below summarises sensitive receptors which could be affected by the M3 J9 Improvement during the construction and operation phases. The sensitivity of each has been determined according to the descriptors given in **Table 9-7**. It is possible that further sensitive receptors or potentially different categories of a receptor may be identified following review of additional data during preparation of the ES. This table will be updated as appropriate according to available information.

Table 9-7: Identified receptors and sensitivity

Receptor	Comment	Sensitivity
Geology and Geomorphology	The Proposed Scheme area does not lie within an area where nationally important geological or geomorphological features have been recorded (geological Site of Special Scientific Interests (SSSI)) and there are no regionally important geological sites within the area.	Negligible
Groundwater	Aquifers beneath the Proposed Scheme area are classified as Principal and Secondary A aquifers. Also, parts of the study area in the north are covered by both Zones 1 and 2 groundwater SPZs. Two abstraction points for potable drinking supply are also located in the north of the Scheme area.	Very High
Surface Water	The River Itchen flows across the north and along the west of the Proposed Scheme area with several associated water courses. The River Itchen is designated a SSSI and a Special Area of Conservation (SAC). Nun's Walk Stream flows in a channel approximately parallel to the River Itchen and is classified by the EA as a Main River.	Very High
Environmentally Sensitive Sites	The nearest environmentally sensitive area is the River Itchen SSSI and SAC, and flows through the study area.	Very High

Receptor	Comment	Sensitivity
	The Proposed Scheme area also lies partly within the South Downs National Park.	
Built Environment	Mixed use surrounding the M3 J9 Improvement site. including residential, school and commercial properties and agricultural land.	Medium
Human Health – Construction/maintenance Workers	<p>The Proposed Scheme is considered likely to include extensive earthworks which could expose construction workers to any potential contamination in the soil material.</p> <p>There is also potential for historical inert landfills within the study area and therefore there is a very limited potential for landfill gas. Naturally occurring land gases could be generated from the underlying geology which could also accumulate within confined spaces.</p>	Medium
Human Health - End Users	The Proposed Scheme is for improvements to highways and therefore lower sensitivity with no exposure to any potential contamination associated with the geology and soils.	Low
Human Health - Neighbours	Mixed use surrounding the site including residential, school and commercial.	Medium
Agricultural Land – Grade 2	Survey effort identified agricultural land classed as grade 2 (BMV	Very High

Receptor	Comment	Sensitivity
Agricultural Land – Grade 3a	Survey effort identified agricultural land classed as grade 3a (BMV	High
Agricultural Land – Grade 3b	Survey effort identified agricultural land classed as grade 3b	Medium
Agricultural Land – Grade 4	Survey effort identified agricultural land classed as grade 4	Low

9.8 Design, mitigation and enhancement measures

- 9.8.1 The Proposed Scheme would provide embedded mitigation measures and a fiEMP to be submitted as part of the application for Development Consent, will include requirements for working within best practice guidelines, preventing the release of contamination and therefore negating any effects from such releases / construction activities on the environment.
- 9.8.2 Furthermore, construction methods such as appropriate piling techniques (if required) to minimise the risk of mixing of aquifer bodies through the creation of new pathways would form part of the embedded mitigation. This may include the provision of a Foundation Works Risk Assessment (FWRA) which would be undertaken once the proposed foundation solutions are known, in accordance with EA guidance ‘Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination’ (EA, 2001).
- 9.8.3 In relation to the potential for exposure of construction workers to ground gas, the fiEMP will include protocols for working in confined spaces (if appropriate), in accordance with Health and Safety Executive (HSE) Approved Code of Practice ‘Safe work in confined spaces’.
- 9.8.4 The fiEMP would include details of the protocol to be followed in the event of previously undiscovered contamination being encountered during enabling works and/or construction.
- 9.8.5 In relation to ground instability, the potential impacts will be mitigated through appropriate ground investigation leading to design of appropriate cutting and embankment slopes, retaining structures and remedial works. Furthermore, if required, measures such as treatment of solution features, use of geogrids or other risk based solutions will be provided to enable carriageway construction and provide mitigation to risk of land instability (if required). The construction of all earthworks and rock cuttings along the alignment of the Proposed Scheme will be designed to an appropriate factor of safety to reduce the potential for slope instability. These profiles should maintain long-

term slope stability and remove the need for direct, active slope stabilisation measures during construction.

- 9.8.6 At the current time, it is not anticipated that temporary dewatering will be required facilitate construction (see **Chapter 13, Road Drainage and Water Environment**).
- 9.8.7 The excavation and re-use of materials would be undertaken in accordance with a Materials Management Plan (MMP). An outline MMP will be prepared as part of the application for Development Consent.
- 9.8.8 Where material is required to be placed as fill in 'areas area of search for potential excess spoil management' (see **Chapter 2**), the necessary assessment will be undertaken and consultation made with regulatory authorities to ensure that the appropriate regulatory controls, consents and permits are in place ahead of material placement. In areas where topsoil is to be managed and reused for restoration or landscaping the final EMP will set out and specify methods of handling and storage conditions, to reduce the level of damage and deterioration in soil quality during storage and transit.
- 9.8.9 The loss of areas of agricultural land cannot be fully mitigated against. The area of loss will be reduced during the design process where feasible.

9.9 Assessment of potential effects

- 9.9.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon Geology and Soils during the construction and operational phases. As noted above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the ongoing EIA and consultation process. The preliminary findings of the assessment are therefore presented below.

Construction

- 9.9.2 Potential contamination within the soils and groundwater from identified and unidentified sources has the potential to affect construction workers and cause health impacts as a result of direct or indirect contact with contaminated materials. It is anticipated that the risk of contamination is likely to be low, and therefore the magnitude of change is likely to be minor at worst, but is critically subject to confirmation through ground investigation and Tier 2 and 3 assessments, as appropriate. A geoenvironmental risk assessment will be undertaken and the findings used to assess potential impacts which will be reported in the ES. Implementation of the embedded mitigation described in **Section 9.8** will reduce potential effects below a significant level, and therefore further mitigation is not anticipated at this stage.
- 9.9.3 Pollution releases during the construction phase have the potential to affect construction workers. During the construction works there is the potential to

introduce new sources of contamination into the environment (for instance: uncontrolled leaks and spills from machinery), which could result in a minor to moderate magnitude of impact. To mitigate this potential no additional measures are required over and above the embedded mitigation referred to earlier in this chapter and that would be included in the anticipated fiEMP. With the implementation of embedded mitigation measures, there are not anticipated to be any significant effects.

- 9.9.4 A potential effect of the construction of specific elements of the Proposed Scheme is the mobilisation of any contamination present in made ground, and the creation of new pathways to controlled waters. It is anticipated that construction of piled foundations through made ground at the Proposed Scheme and into underlying competent strata will be required for many of the proposed structures, subject to further assessment and design. A Tier 2 geoenvironmental risk assessment and GQRA for controlled waters will be undertaken to determine the potential risks to controlled waters from any contamination identified by the ground investigation. The findings of the Tier 2 GQRA will be used to assess potential impacts and this will be reported in the ES.
- 9.9.5 With the implementation of the embedded mitigation measures, there are not anticipated to be any significant effects at this stage, subject to confirmation through ground investigation and Tier 2 and 3 assessments as appropriate. The natural strata present within the study area are such that there is the potential for naturally occurring geological hazards and other land stability constraints to be present, which could result in a moderate to major magnitude of impact. A geotechnical engineering assessment, including a Cavities Occurrence Assessment will be undertaken and the findings will be used to assess potential impacts and reported in the ES. With the implementation of the embedded mitigation, there are not anticipated to be any significant effects at this stage, subject to confirmation through ongoing assessment and mitigation.
- 9.9.6 With the implementation of the embedded mitigation measures, impacts to negligible and low sensitivity receptors such as geology and geomorphology and human health (end users) are anticipated to result in neutral effects. Similarly, impacts to medium sensitivity receptors such as the built environment are also anticipated to result in neutral effects.
- 9.9.7 Over 20ha of ALC grade 2, 3a and grade 3b agricultural land could be affected by the Proposed Scheme. A portion of this land would be removed from agricultural use on a permanent basis to facilitate the Proposed Scheme (namely the new footpath and bund in land immediately east of the M3). However, the majority of agricultural land would be affected on a temporary basis and reinstated to agricultural use upon completion of the construction phase. Through the implementation of mitigation measures identified within the anticipated fiEMP (to maintain quality of retained and excavated soil) it is not considered that there would be a permanent loss of soil function in these areas. Overall, significant adverse effects are considered likely to

agricultural soil resources. The detailed assessment of impact to specific gradings of soil will be undertaken through ongoing EIA work as the design progresses.

Operational

9.9.8 It is considered that if the potential impacts are addressed through the design of the project, the potential for environmental effects during operation would be limited.

9.9.9 Potential impacts of the M3 J9 during operation include the potential for chemical attack and decay on buried concrete structures from potential existing contamination, exposure of maintenance workers to hazardous ground gas in confined spaces and the introduction of new potential contaminants to the environment as a result of spills during ongoing use of the motorway, and major accidents.

9.9.10 With the implementation of the embedded mitigation including ground investigation and appropriate design, there are not anticipated to be any significant effects at this stage.

9.9.11 Potential impacts on groundwater associated with drainage and surface water discharge proposals (i.e. the operational phase) are considered within **Chapter 13 - Road Drainage and the Water Environment**.

9.9.12 Impacts to agricultural land would occur during the construction phase, therefore further consideration within the operational phase is not given within this PEIR.

Summary of assessment

Table 9-8: Summary of assessment of potential effects

Receptor	Stage of Proposed Scheme	Type of effect
Geology and Geomorphology (Negligible)	Construction	Neutral
	Operation	Neutral
Groundwater (Very High)	Construction	Slight adverse
	Operation	Neutral
Surface Water (Very High)	Construction	Slight adverse
	Operation	Neutral
Environmentally Sensitive Sites (Very High)	Construction	Slight adverse
	Operation	Neutral

Receptor	Stage of Proposed Scheme	Type of effect
Built Environment (Medium)	Construction	Neutral
	Operation	Neutral
Human Health – Construction/ maintenance workers (Medium)	Construction	Slight adverse
	Operation	Neutral
Human Health – End Users (low)	Construction	Neutral
	Operation	Neutral
Human Health – Neighbours (Medium)	Construction	Neutral
	Operation	Neutral
Agricultural Land	Construction	Very Large/Large/Moderate adverse
	Operation	N/A

9.9.13 Until such a time that the ground investigation report and Phase 2 Ground Condition Assessment has been completed, the residual effects (beyond those identified above which include embedded mitigation) cannot be identified. However, it is inherent to the process of managing contaminated land in accordance with the policies, legislation and guidance described in **Section 9.2** that the completed scheme is designed such that no adverse effects to any receptor (human health, controlled waters, ecology etc.) remain.

9.10 Anticipated further assessment

9.10.1 A number of sensitive receptors that could be affected by the Proposed Scheme during the construction and operational phases have been identified. Further information will be obtained for the ES to gain a more detailed understanding of baseline conditions and allow refinement of assessment of impacts and mitigation measures.

9.10.2 It is considered that the majority of impacts could be readily mitigated through design and the implementation of good practices to be set out in a fiEMP.

9.10.3 Following the Phase 2 Ground Investigation, a Tier 2 Risk Assessment will be undertaken. This assessment will then inform, where necessary, recommendations for remediation/mitigation measures. This may include further intrusive ground investigation to inform Tier 3 Risk Assessments if required. A ground gas risk assessment and controlled waters risk assessment will also be undertaken to inform the baseline for the final ES.

9.10.4 Along with the Tier 2 Risk Assessments, a Cavity Occurrence Assessment, based on the records contained within the Stantec natural cavities and mining database will be undertaken.

9.10.5 The Phase 2 ground Investigations will also inform the design of the works and appropriate mitigation will be incorporated in the design to further address risks of land instability.

10 Material Assets and Waste

10.1 Introduction

- 10.1.1 This chapter presents, where possible, the preliminary results of the assessment of likely significant effects of the Proposed Scheme in relation to material assets and waste and considers the use of material resources and the generation and management of waste associated with the Proposed Scheme.
- 10.1.2 Where possible the assessment has been undertaken throughout in accordance with Design Manual for Roads and Bridges (DMRB) LA110 – Material assets and waste (Highways England, 2019).
- 10.1.3 For the purposes of the assessment, material assets are defined as comprising the provision and use of material resources, including primary, secondary, recycled, and manufactured materials. This includes the consideration of mineral safeguarding.
- 10.1.4 For the purposes of the assessment waste is defined, as within the EU Waste Framework Directive (2008/98/ES) as “*any substance or object which the holder discards or intends or is required to discard*”.

10.2 Legislative and policy framework

- 10.2.1 The principal legislative and planning context for the assessment of the environmental effects of the Proposed Scheme on material assets and waste is presented below:
- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Waste Management - Paras 5.39 to 5.45
 - Waste Management Plan for England (Defra, 2021)
 - A Strategy for Hazardous Waste Management in England (2010)
 - National Planning Policy Framework (NPPF) (2019): Facilitating the sustainable use of minerals – Section 17
 - National Planning Policy for Waste (2014)
 - Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles)
 - Winchester District Local Plan 2018-2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February – 12th April 2021

- Hampshire Minerals and Waste Plan (2013): Policy 1 (Sustainable mineral and waste development), Policy 15 (Safeguarding – mineral resources), Policy 18 (Recycled and secondary aggregates development)
- South Downs Local Plan 2014-2033 (2019): Core Policy SD2 (Ecosystems Services)

10.3 Consultation

Consultation undertaken

Table 10-1: Consultation undertaken

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
Page 33 Paragraph 4.7.1	<i>“During operation, the quantity of materials used and waste produced as a result of the Proposed Development is anticipated to be small due to the nature of the development. The Inspectorate agrees that impacts associated with the consumption of material resources, site arisings and waste production during operation is unlikely to result in significant effects. However, the Inspectorate considers that this matter should be considered where likely significant effect may occur.”</i>	The Applicant notes the positive response to scoping out operational waste. Should the ongoing assessment work identify the likelihood for significant effects, they will be reported in the ES.
Page 33 Paragraph 4.7.2	<i>“The ES should provide a Figure locating any mineral safeguarding areas and/or peat deposits within the study area to enable understanding of potential impacts on these receptors.”</i>	Figure 10.2, Appendix 10.1 of this Preliminary Environmental Information Report (PEIR) demonstrates the extent of the Mineral Safeguarding Area (MSA) and its interaction with the IAB. Peat is not identified within the Hampshire Minerals and Waste Local Plan. Should peat deposits be identified through ongoing EIA work it will be considered within the ES as appropriate.
Para 33 Paragraph 4.7.3	<i>“The Applicant should endeavour to agree mitigation measures,</i>	Agreement will be sought with relevant consultees on the design,

Reference	Comment	Response
	<i>both embedded and additional, with the relevant consultation bodies and reference any such consultation in the ES.”</i>	mitigation and enhancement measures detailed within the ES.
Page 34 Paragraph 4.7.4	<i>“Where the materials required to construct the Proposed Development will be sourced and transported from and their method of transportation should be included in the assessment of significant effects.”</i>	The material assets and waste chapter will assess the likely impacts of the volume and composition of the construction materials and any waste generated during construction. Consideration of the transportation of construction materials will be provided within the noise and vibration, and air quality chapters of the ES.
Page 34 Paragraph 4.7.5	<i>“The ES should include an assessment of the importation and/or storage of these materials (e.g. leachate impacts) where significant effects are likely to occur. Details on mitigation measures to prevent/avoid such impacts should be included and secured in the Application.”</i>	An assessment of leachate impacts will be provided in the road drainage and water environment and geology and soils chapters of the ES.
Page 34 Paragraph 4.7.6	<i>“The construction phase of the Proposed Development has the potential to generate road planings/waste which may contain coal tars. The ES does not consider such arisings during demolition and construction. Such materials are classified as hazardous waste and should be dealt with accordingly. The ES should assess impacts associated with these materials where significant effects are likely to occur.”</i>	The assessment of effects from hazardous waste will be included within the assessment and reported in the ES, as confirmed in Paragraph 10.4.2 (bullet point 3) of this PEIR.
Hampshire County Council – Minerals and Waste Planning Authority		
	<i>“Within this report the County Council would expect to see an assessment for the provision of prior extraction of any available mineral deposits.”</i>	An assessment for the provision of the prior extraction of mineral deposits from the MSA will be included and appended to the ES.

Reference	Comment	Response
	<i>"In line with the above comment, the County Council would also expect to see a Mineral Resource Assessment / Report accompanying the main application upon submission."</i>	A MSA assessment will be included and appended to the ES.
	<i>"With regard to further safeguarding issues, the application site lies in close proximity to the following safeguarded waste site: Easton Lane Depot, a concrete batching plant operated by CEMEX UK. This site is safeguarded under Policy 26 (Safeguarding – waste infrastructure) of the HMWP." "While this issue is unlikely to require consideration within the EIA, the County Council will expect to see how the operation of the safeguarded site has been considered within any forthcoming application."</i>	The CEMEX UK facility is located within the Winnall Industrial Estate, which is included as a receptor within the Population and Health ES assessment.
Public Health England		
18 November 2020	<i>"The EIA should demonstrate compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery and disposal). For wastes arising from the installation the EIA should consider: • the implications and wider environmental and public health impacts of different waste disposal options • disposal route(s) and transport method(s) and how potential impacts on public health will be mitigated"</i>	The principles of the waste hierarchy will be illustrated throughout the ES to minimise disposal and maximise re-use and recycling of any waste arisings. The assessment of health impacts will be included within the population and health chapter of the ES.

Proposed consultation

10.3.1 Consultation will continue to be undertaken with the team responsible for the Minerals and Waste Plan (MWP) within Hampshire County Council (HCC), to progress discussions relating to both the minerals assessment work and the approach to the assessment of waste across the Proposed Scheme.

10.4 Assessment methodology and significance criteria

10.4.1 As confirmed through the 2020 Scoping opinion the operational phase of the Proposed Scheme has been scoped out of the assessment. Once operational, although there will be some material asset usage and generation of waste, this will be minimal, and any effects are not considered to be significant. Therefore, only the construction phase is scoped into this assessment.

10.4.2 At the time of drafting this PEIR, much of the information required in order to carry out the assessment is yet to be finalised due to ongoing design work. Therefore, the methodology outlined in this section will be followed for ongoing EIA work to be reported in the ES. The assessment reported in the ES will be a largely a desk-based exercise, and for the purposes of the material assets and waste topic, the following issues will be identified and assessed:

- the materials required for the Proposed Scheme and, where information is available, the quantities
- any potential impact or sterilisation of mineral resources within Mineral Safeguarding Areas (MSA)
- the anticipated waste arisings from the Proposed Scheme and, where information is available, the quantities and type (e.g. inert / hazardous)
- the impact of these waste arisings on the identified waste management infrastructure

Material assets assessment

10.4.3 Once the material requirements have been established for the Proposed Scheme, the assessment (to be reported in the ES) will comprise a qualitative and quantitative exercise using the provided forecast data and information (as provided by the appointed designer and other scheme delivery partners) which for material assets aims to identify the following:

- The types and quantities of materials required for the project
- Information on materials that contain secondary/ recycled content
- Information on any known sustainability credentials of materials to be consumed

- The type and volume of materials that will be recovered from off-site sources for use on the project
- The cut and fill balance
- Details of on-site storage and stockpiling arrangements, and any supporting logistical details

10.4.4 An assessment of the impacts of consuming material assets required during construction of the Proposed Scheme will be undertaken by considering the origins and sources of materials, including their general availability (production, stock, sales) and the proportion of re-used or recycled materials they contain.

10.4.5 The assessment will take into account the relative volume of material assets that need to be consumed for the Proposed Scheme. The assessment will then evaluate the impacts and effects of the Proposed Scheme understanding that typically, the larger a development footprint and associated groundworks, the greater the requirement to consume materials.

10.4.6 Arisings (from site preparation/ remediation/ excavation/ construction activities) are likely to be varied in their composition and will be evaluated as part of the assessment of material assets, to determine the volume of excavations that can be retained for re-use or as a last resort be sent to landfill as waste.

10.4.7 Any arisings that are suitable will, as a priority, be used within IAB to facilitate the Proposed Scheme. Should this not be possible, excess spoil will be managed within the areas of search for excess spoil management identified within the IAB (**Chapter 2, Figure 2.3, Appendix 2.1** 'Indicative Land Use Plan').

10.4.8 The assessment will take into account the nature of impacts (adverse/beneficial, permanent/temporary, direct/indirect) from material assets and site arisings.

10.4.9 The impacts on material assets will be assessed in accordance with **Table 10-3**. The significance of effects on material assets will be reported in the ES in accordance with the criteria set out in **Table 10-4**.

Minerals Safeguarding Area Assessment

10.4.10 The MSA assessment looks to establish the level (if any) of impact that the Proposed Scheme will have on the identified MSA.

10.4.11 The IAB overlaps an area of a MSA, illustrated in **Figure 10.1, Appendix 10.1**.

10.4.12 Consideration of the MSA alongside the Proposed Development, will help the consideration of the potential impact of the Proposed Scheme on the MSA.

10.4.13 The MSA assessment (to be reported in the ES) will look to establish whether it is reasonable to conclude that the MSA is likely to be sterilised as a direct result of the construction of the Proposed Scheme.

10.4.14 To inform the determination as to whether the MSA is sterilised or not, it is also important to consider the relative magnitude of impact to, and the sensitivity of, the MSA. This is viewed through the context of Policy 15 of the Hampshire MWP that presents four criteria, that, if any are satisfied, would enable development without the prior extraction of mineral resources in the MSA to occur. The four criteria are:

- a. *“it can be demonstrated that the sterilisation of mineral resources will not occur; or*
- b. *it would be inappropriate to extract mineral resources at that location, with regards to the other policies in the Plan; or*
- c. *the development would not pose a serious hindrance to mineral development in the vicinity; or*
- d. *the merits of the development outweigh the safeguarding of the mineral.”*

10.4.15 The impact on the MSA will therefore be assessed in conjunction with the criterion listed above in order to conclude a level of significance category which can be reasonably attributed on the basis of informed professional opinion (which will be justified when reported in the ES). Paragraph 10.4.23 then provides the guidance as to the significance criteria as attributed to material assets and waste.

Waste Assessment

10.4.16 The assessment (to be reported in the ES) will identify the following:

- The amount of waste (by weight) recovered and diverted from landfill either on site or off site (i.e. for use on other projects)
- Types and quantities of waste arising from the Proposed Scheme (site preparation, excavation arisings and remediation) that can't be reused within the Proposed Scheme or processed for recycling, and that would need disposal to landfill as a last resort.
- Details of on-site storage and segregation arrangement for waste and any supporting logistical arrangements
- Potential for generation of hazardous waste (type and quantity)

10.4.17 An assessment of the remaining landfill capacity in the south of England will then be used to determine the impacts of waste generated during the Proposed Scheme delivery.

10.4.18 The assessment will consider the volume of residual waste generated by the Proposed Scheme and its potential impact on remaining landfill void capacity. This will be carried out for both inert and non-inert (non-hazardous and hazardous) waste types.

10.4.19 The assessment will take the nature of impacts (adverse/ beneficial, permanent/ temporary, direct/ indirect) from waste generated and treated/disposed of into account and for further assessment the effects on the generation of waste will be assessed in accordance with **Table 10-3**. The significance of effects from the generation of waste from the Proposed Scheme is reported in accordance with the criteria set out in **Table 10-4**.

10.4.20 Where required professional judgement will be used to determine the significance of effects, and any conclusions will be justified and explained within the ES.

Receptors

10.4.21 The receptor types likely to be at risk are summarised and presented in **Table 10-2**.

Table 10-2: Material Assets, Mineral Safeguarding Areas and Waste Receptors

Receptor	Description
Material assets	<p>Primary materials and non-renewable resources should – in accordance with the principles of resource efficiency and the waste hierarchy – be protected wherever possible.</p> <p>The consumption of primary material depletes natural resources which in turn degrades the natural environment. Mechanisms to reduce the volume of primary materials consumed and increase sustainability benefits of materials used, should be deployed across a project lifecycle.</p>
Mineral Safeguarding Areas	Any mineral safeguarding areas and/or peat resources located in the first study area (Section 10.6) could be potentially at risk of being sterilised.
Waste Management Capacity	Waste needs to be managed appropriately to limit the impact on waste management capacity in a region. Also, landfill capacity is an increasingly scarce (sensitive) resource in England. Where potential exists to reduce the generation of waste and use best practice methods to divert it from landfill, associated opportunities should be taken.

Significance

Table 10-3: Significance category descriptions

Significance category	Description
Very Large	<p>Material Assets:</p> <ol style="list-style-type: none"> 1. No criteria: use criteria for large categories <p>Waste:</p> <ol style="list-style-type: none"> 1. >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or 2. construction of new (permanent) waste infrastructure is required to accommodate waste from a project.
Large	<p>Material Assets:</p> <ol style="list-style-type: none"> 1. project achieves <70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (CDW) to substitute use of primary materials; and 2. aggregates required to be imported to site comprise <1% re-used / recycled content; and 3. project sterilises greater than or equal to 1 mineral safeguarding site and/or peat resource. <p>Waste:</p> <ol style="list-style-type: none"> 1. >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and 2. >50% of project waste for disposal outside of the region
Moderate	<p>Material Assets:</p> <ol style="list-style-type: none"> 1. project achieves less than 70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2. aggregates required to be imported to site comprise re-used/recycled content below the relevant regional percentage target. <p>Waste:</p> <ol style="list-style-type: none"> 1. >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and 2. 1-50% of project waste for disposal outside of the region

Significance category	Description
Slight	<p>Material Assets:</p> <ol style="list-style-type: none"> 1. project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2. aggregates required to be imported to site comprise re-used / recycled content in line with the relevant regional percentage target. <p>Waste:</p> <ol style="list-style-type: none"> 1. less than or equal to 1% reduction or alteration in the regional capacity of landfill; and 2. waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
Neutral	<p>Material Assets:</p> <ol style="list-style-type: none"> 1. project achieved >99% overall material recovery / recycling (by weight) of non-hazardous Construction Demolition Waste (CDW) to substitute use of primary materials; and 2. aggregates required to be imported to site comprise >99% re-used / recycled content. <p>Waste:</p> <ol style="list-style-type: none"> 1. no reduction or alteration in the capacity of waste infrastructure within the region.

Significance of effects

10.4.22 Significance of effects on material assets and waste will be reported in accordance with the criteria set out in the DMRB LA110 – Material assets and waste (Highways England, 2019) guidance and **Table 10-4**.

Table 10-4: Significance criteria for material assets and waste

Significance	Description
Significant (one or more criteria met)	<p>Material assets:</p> <ul style="list-style-type: none"> • Category description met for moderate or large effect <p>Waste:</p> <ul style="list-style-type: none"> • Category description met for moderate, large or very large effect

Significance	Description
Not significant	Material assets: <ul style="list-style-type: none"> Category description met for neutral or slight effect Waste: <ul style="list-style-type: none"> Category description met for neutral or slight effect

10.4.23 Significance of effects on mineral safeguarding will follow the DMRB LA110 – Material assets and waste (Highways England, 2019) guidance which allocates a ‘large’ effect (and therefore significant in EIA terms) where development of the Proposed Scheme ‘sterilises one or more minerals sites’.

10.5 Assessment assumptions and limitations

10.5.1 The information presented in this chapter is based on the information available at the time of writing the report and based on emerging design. The preliminary findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process.

Material Assets

10.5.2 Design level detail regarding the volumes and composition of materials to be used during the construction of the Proposed Scheme are not available at the time of drafting this PEIR. Therefore, it has not been possible to carry out the assessment and reach a conclusion in regard to the impact of the Proposed Scheme on regional material assets at this time. Design information will become available as the scheme develops to enable full assessment within the ES.

Mineral Safeguarding Area

10.5.3 A desk top assessment of the potential impact of the Proposed Scheme on the MSA and mineral safeguarding policy within Hampshire’s Mineral & Waste Plan is being made using professional judgement. Consultation on the approach with the Minerals & Waste Team at Hampshire County Council is yet to be finalised at the time of drafting the PEIR.

Waste

10.5.4 The anticipated volumes of waste generated during construction of the Proposed Scheme have not yet been estimated. These will be needed in order to carry out the assessment on the impact of regional landfill void capacity and in turn present an anticipated effect. Accordingly, it is not yet possible to reliably identify individual waste disposal outlets for this PEIR, however consideration will be given in ongoing EIA work and reported in the ES.

- 10.5.5 Construction, Demolition and Excavation (CDE) waste figures at a national level are accessible through the publicly available Waste Data Interrogator Database (EA, 2018). Defra does not publish CDE figures at a regional level. This database is held and operated by the Environment Agency.
- 10.5.6 Until such time that CDE generation and recovery rates by region are available, transfer (non-civic), recovery and metal recycling data (available through the Waste Data Interrogator Database) is used as the closest possible proxy.
- 10.5.7 Waste management operators can claim commercial confidentiality for their data at the time they are requested to provide inputs for the Waste Data Interrogator Database. Data for sites with commercial confidentiality in place are therefore unavailable for the analyses presented in this chapter.

10.6 Study area

- 10.6.1 The study areas are defined with reference to DMRB LA110 – Material assets and waste (Highways England, 2019). The assessment defines two geographically different study areas, used to examine the use of primary/ secondary/ recycled/ manufactured materials and the generation and management of waste.
- 10.6.2 The first study area comprises all land contained within the Indicative Application Boundary (IAB), within which materials would be contained and waste generated and managed, including any areas identified for temporary uses. Such temporary land could include temporary storage areas for soils and other materials, construction compounds, haulage roads and land for temporary construction site drainage.
- 10.6.3 To allow determination of the significance of effects in line with DMRB LA110 – Material assets and waste (Highways England, 2019) guidance, the second study area (study area two) has been defined using professional judgement as being sufficient to identify:
- suitable recovery and waste management facilities that could accept arisings and/or waste generated by the Proposed Scheme
 - feasible sources and availability of construction materials
- 10.6.4 The second study area (**Figure 10.2**) provides the area for consideration of raw material availability and relevant waste management facility capacity. This is considered on a regional basis as the south of England (inclusive of both the south-east and the south-west). This is in line with DMRB LA110 – Material assets and waste (Highways England, 2019) guidance with consideration of the proximity principle and value for money. In the context of this chapter, the south of England is the region comprising Berkshire, Oxfordshire, Buckinghamshire, East Sussex, West Sussex, Hampshire,

Surrey, Kent, Bristol, Cornwall, Dorset, Devon, Gloucestershire, Somerset and Wiltshire.

10.7 Baseline conditions

Material Assets

Availability of construction materials in the South of England

10.7.1 **Table 10-5** (Defra 2016, South East Aggregates Working Party 2013, Mineral Products Association 2016, World Steel Organisation) provides a summary of the availability of the main construction materials in the south-east of England required to deliver typical highways schemes. **Table 10-5** provides the initial south-east context.

10.7.2 The assessment of impacts from the consumption of materials resulting from the Proposed Scheme is undertaken using this data in combination with the south-west data once sourced. This will inform the ES and allow referenced data to be consistent with the application of the secondary study area.

Table 10-5: Materials availability in the south-east of England 2015 - (million tonnes / million metres cubed)

Material Type		South East of England
Aggregate	Sand and gravel*	18.8 million tonnes
	Permitted crushed rock*	1.0 million tonnes
Recycled and secondary aggregate (as part of 'Aggregate', above) *		3.7 million tonnes (2013, consumption)
Ready-mix concrete +		5.9Mm ³
Asphalt *		3.6Mm ³
Concrete blocks #		5.8Mm ³
Steel +		(no data)
# stocks	+ production	* sales

10.7.3 The sensitivity of specific construction materials (as determined by their regional availability) cannot be accurately determined without long-term trend information, the latter being unavailable at the time this chapter was drafted. A Bill of Quantities (BoQ) will be established for the Proposed Scheme (and the associated data will then be used in conjunction with cumulative information) to more precisely establish the sensitivity of current stocks, production and sales of construction material types.

Mineral Safeguarding Area

10.7.4 The Proposed Scheme is located partially within an area safeguarded for the deposit of superficial sand/gravel (the MSA).

10.7.5 The MSA area stretches from the centre of Winchester, following the River Itchen northward, turning east to cross the A34 and M3 just north of Junction 9.

10.7.6 The MSA is covered in Policy 15 within the Hampshire Waste and Minerals Local Plan which covers the safeguarding of mineral resources, includes the presentation of four important criterion that, if one or more are satisfied, would enable development without the prior extraction of mineral resources in the MSA to occur. The criteria are:

- a. *‘it can be demonstrated that the sterilisation of mineral resources will not occur; or*
- b. *it would be inappropriate to extract mineral resources at that location, with regards to the other policies in the Plan; or*
- c. *the development would not pose a serious hindrance to mineral development in the vicinity; or*
- d. *the merits of the development outweigh the safeguarding of the mineral.’*

Waste Treatment

Transfer, treatment and metal recycling in England and the south of England

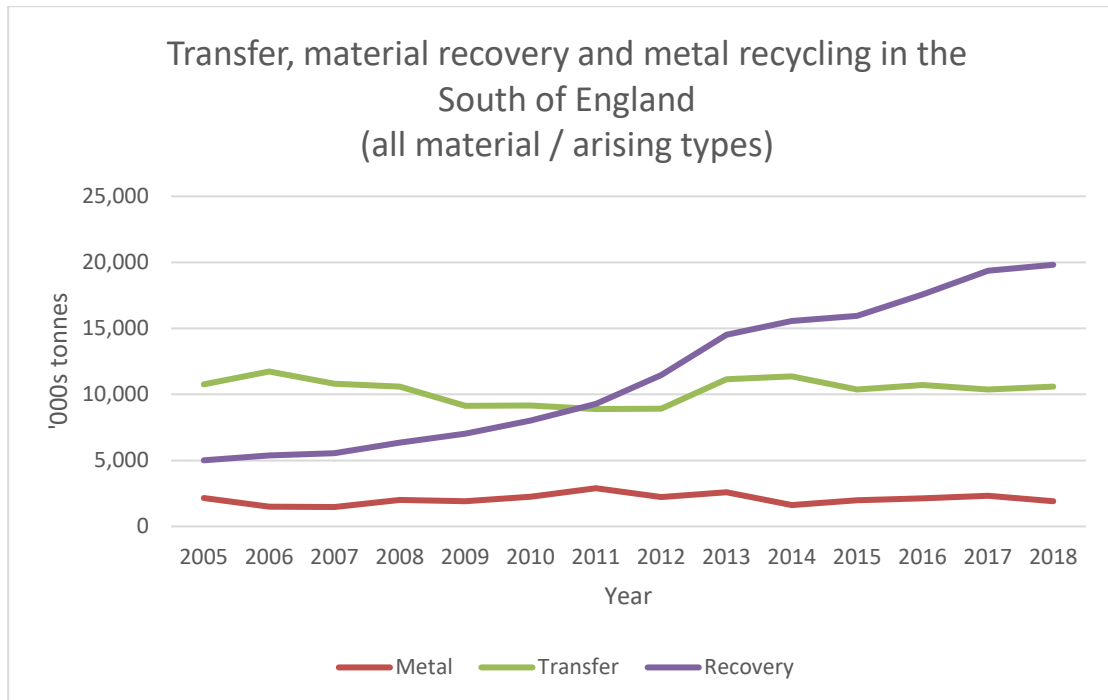
10.7.7 Defra’s Waste Management Plan for England (2021) data (**Table 10-6**) shows that within England, the recovery rate for non-hazardous construction and demolition arisings have remained above 92% since 2010. The EU target was for the UK to exceed 70% by 2020.

Table 10-6: Non-hazardous construction and demolition arisings recovery in England

Year	Generation (Mt)	Recovery (Mt)	Recovery rate (%)
2010	53.6	49.4	92.2%
2011	54.9	50.8	92.5%
2012	50.5	46.4	92.0%
2013	51.7	47.6	92.0%
2014	55.9	51.7	92.4%
2015	57.7	53.3	92.3%
2016	59.6	55.0	92.1%

10.7.8 No regional data for CDE production or recovery rates is currently available for the south of England.

10.7.9 **Inset Figure 10-1** shows that rates of material recovery¹ within the south of England have risen steadily over the past 13 years. Metal recycling and transfer shows a consistent, and relatively flat profile. Data provided include all waste types in the region and hence include, but are not specific to, CDE arisings.



Inset Figure 10-1: Transfer, material recovery and metal recycling in the south of England

Landfill - national, regional and local context

10.7.10 Environment Agency data demonstrate an increasing shortage of landfill capacity in England: 723M m³ of capacity was recorded in 1998/99, and 405M m³ in 2018, representing a 44% reduction over a period of 19 years.

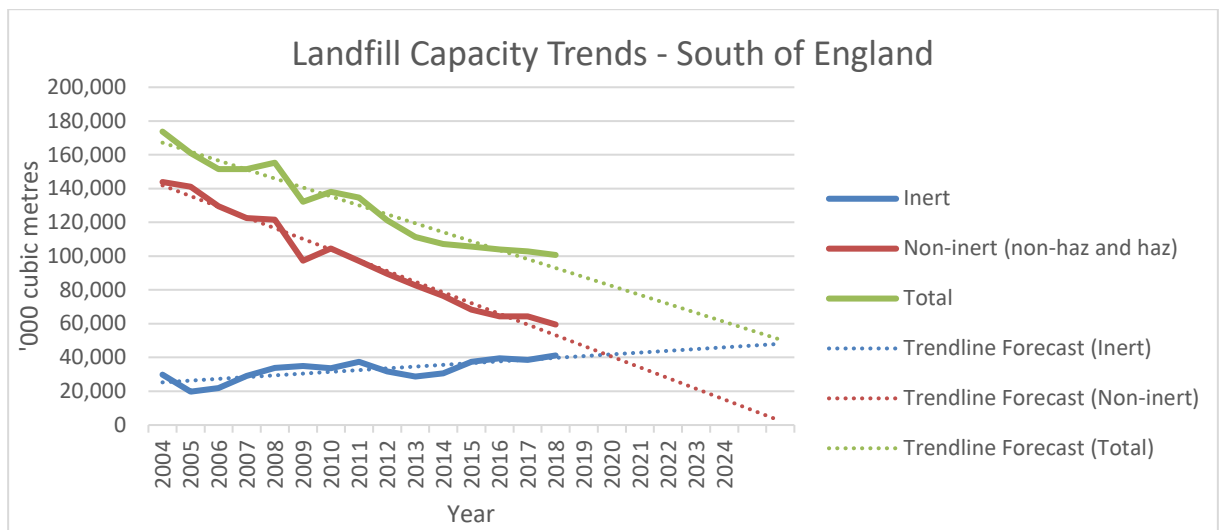
10.7.11 At the end of 2018, 97 licensed landfill sites in south England were recorded as having 100.6M m³ of remaining capacity (**Table 10-7**).

¹ Environment Agency, 2018. Waste Management in the England: Data Tables. Available at: <https://data.gov.uk/dataset/312ace0a-ff0a-4f6f-a7ea-f757164cc488/waste-data-interrogator-2018>

Table 10-7: Remaining landfill capacity, South England

Landfill type	Remaining capacity '000 m ³ (2018)
Hazardous (merchant and restricted)	1,921
Inert	41,184
Non-hazardous (including stable hazardous waste cells)	57,492
<i>Total</i>	100,597

10.7.12 **Inset Figure 10-2** shows the remaining landfill capacity in the south of England² and uses simple extrapolation in MS Excel to indicate how this trend may continue in the absence of future recovery provision up to 2026.



Inset Figure 10-2 Landfill capacity trends in south England

10.7.13 Baseline data indicates that the total and non-inert landfill capacity in the south of England is likely to become an increasingly sensitive receptor over time. Simple extrapolation indicates that, by comparison with 2018 data and in the absence of future provision, non-inert capacity could fall as much by 100%, and total capacity by 50% by 2026.

10.7.14 Inert landfill capacity in south England increased by over 2.7Mt between 2017 and 2018.

² Environment Agency, 2018. Waste Management in the England: Data Tables. Available at: <https://data.gov.uk/dataset/312ace0a-ff0a-4f6f-a7ea-f757164cc488/waste-data-interrogator-2018>

10.8 Design, mitigation and enhancement measures

10.8.1 At the time of drafting this PEIR, no specific design measures relating to material use or waste generation are available.

10.8.2 The Proposed Scheme will have in place a Site Waste Management Plan (SWMP) as a key document with which to measure and report on construction operations as they occur. It will include specific instruction on steps to be taken to manage and dispose of the varied waste that is anticipated to occur during the construction phase.

10.8.3 A Materials Management Plan (MMP) will also ensure that any adverse effects associated with material assets are responsibly managed.

10.8.4 These plans will be implemented on-site to ensure efficient use of material assets and reduction of waste arisings, and to reduce the potential impacts identified in **Section 10.9** and will look to ensure:

- Materials will be delivered on an as required basis to avoid damage or contamination and, therefore, limit the likelihood of waste.
- Where site-won material is not available or suitable for re-use, secondary or recycled materials will be procured where available and practicable.
- Where practicable excavated material will be re-used in the construction of the scheme and in landscaping features to reduce the requirement to import materials for construction and reduce the need to remove surplus materials from site.
- Temporary stockpiling of fill materials, prior to incorporation in the scheme, will be avoided where possible. This ensures double handling and damage is minimised and therefore, avoids the generation of waste. However, where required, materials will be stockpiled in accordance with best practice and managed appropriately to limit the likelihood of damage or contamination.
- Locally sourced materials and suppliers will be identified and used where practicable.
- The waste hierarchy will be implemented throughout the construction to minimise disposal and maximise re-use and recycling of waste arisings. Opportunities for re-use and recycling of waste include (but are not limited to):
 - Re-using excavated soils on-site in the landscaping features of the scheme.
 - Chipping green waste on-site for use in the landscaping for the scheme.

- Composting of green waste.
 - Recycling of inert material by crushing, blending and subsequent re-use, as an aggregate.
 - Re-using waste on other nearby schemes.
 - Re-using waste for uses with clear benefits to the environment, for example in the remodelling of agricultural land or in the restoration of nearby quarries or other excavation sites.
- Facilities will be provided on-site to separate out waste, for example for recycling.

10.8.5 Where waste must be taken to a recycling or disposal site, the contractor must ensure that the sites have the appropriate permits to ensure that environmental risks are reduced. In addition, the suitable facility would be located as close to the works as possible to minimise the impacts of transportation, in particular the release of carbon emissions. The appointed Contractor would identify the closest and relevant treatment and disposal sites.

10.8.6 Agreement on mitigation measures, both embedded and additional will be sought through consultation with relevant consultees and will be reported within the ES.

10.9 Assessment of potential effects

10.9.1 This section describes, where possible, the preliminary findings of the assessment of potential effects of the Proposed Scheme upon material assets, mineral safeguarding areas and waste during the construction. As noted in **Section 10.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below.

Material assets

10.9.2 Due to the limitation of design information as outlined in **Section 10.5**, it has not been possible, at this time, to complete the assessment of potential effects of the Proposed Scheme on material assets. This will be carried forward under the methodology detailed and completed within the ES chapter to be provided.

Minerals Safeguarding Areas

10.9.3 Consideration of the Proposed Scheme on the MSA has been undertaken. The Proposed Scheme is located partially within an area safeguarded for mineral (the deposit of superficial sand/gravel, the 'MSA').

10.9.4 **Figure 10.1, Appendix 10.1** presents the totality of the Proposed Scheme and its relationship with the relevant MSA. This shows that the key areas for consideration are focussed to the north of Junction 9, extending along both the M3 and A34.

10.9.5 The Proposed Scheme is a non-minerals development proposed to be located partly within an identified MSA. However, work undertaken on the assessment to date demonstrates that the potential for sterilisation is very low.

10.9.6 Much of the MSA affected lies adjacent to the existing strategic highway network; these areas are likely already devoid of mineral or would not be practicable to work.

10.9.7 Other areas of the MSA affected are small and lie within the vicinity of the strategic road network and on the periphery of a reasonable working area. These areas also lie within the South Downs National Park (SDNP); policy requires that mineral working occurs in this designation only in exceptional circumstances.

10.9.8 Consultation is being undertaken with Hampshire Minerals Team to confirm approach and findings.

Waste Management Capacity

10.9.9 Prior to any predicted waste composition and volumes being made available, it has not yet been possible to accurately establish the potential effects resulting from waste generation. As this becomes available the assessment will be carried out in line with the methodology outlined in this chapter to assess against the reduction in the regional landfill void capacity.

10.9.10 With the detail around material requirements and anticipated waste volumes not yet provided it is not possible at this stage to conclude as to the significance or not of the possible impacts that might result to these elements.

10.10 Anticipated further assessment

10.10.1 Once data becomes available, continued assessment work will be undertaken, in line with the approach set out above, to identify the potential effects on Material Assets and the effects relating to waste on the Proposed Scheme.

11 Noise and Vibration

11.1 Introduction

11.1.1 This chapter presents the preliminary findings of the assessment of likely effects of noise and vibration arising from the construction and operation of the Proposed Scheme. The chapter summarises the legislative and policy framework, consultation undertaken, assessment methodology, assessment assumptions and limitations, study area, baseline conditions, design mitigation and enhancement measures, assessment of potential impacts, and anticipated further assessment.

11.2 Legislative and policy framework

11.2.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (Department for Transport, 2014): Paragraphs 5.186 to 5.200.
- Noise Policy Statement for England (NPSE): The NPSE was published in March 2010 by the Department for Environment Food and Rural Affairs (Defra) and is the overarching statement of noise policy for England. The whole document is relevant for consideration.
- National Planning Policy Framework (NPPF) (2019): Paragraphs: 170 (Conserving and enhancing the natural environment) and 180 and 182. (Conserving and enhancing the natural environment – Ground conditions and pollution); and associated Planning Practice Guidance for 'Noise' (2014).
- Noise Action Plan (outside first round agglomerations), Environmental Noise (England) regulations 2006 as amended, 2010, Defra – Defra produced the Noise Action Plan in March 2010 to address the effects of noise from major roads in England under the terms of the Environmental Noise (England) Regulations 2006.
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles) and Policy MTRA4 Development in the Countryside.
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy DM17 (Site Development Principles); Policy DM19 (Development and Pollution); Policy DM20 (Development and Noise); and, Policy DM23 (Rural Character).
- South Downs Local Plan 2014-2033 (2019) – Strategic

Policy SD1 (Sustainable Development); Strategic Policy SD3 (Major Development); Strategic Policy SD5 (Design); Strategic Policy SD7 (Relative Tranquillity); and, SD54 (Pollution and Air Quality).

11.2.2 The following policy and guidance underpin the assessment:

- Road Investment Strategy 2 (RIS): for the 2020-2025 Road Period
- Planning Practice Guidance (PPG)

11.3 Consultation

Consultation undertaken

Table 11-1: Consultation undertaken

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
PINS Page 35 Paragraph 4.8.2	<i>“Diversion routes and potential traffic flows are not yet determined in the Scoping Report. The ES should locate and describe any traffic management measures and explain any subsequent changes in traffic flow; the ES should report any noise impacts and effects that might derive from this.”</i>	Preliminary information of temporary diversion routes are included within Chapter 2 . This is being considered in ongoing EIA work and will be reported within the ES. The ES will also describe the necessary traffic management measures and associated changes in traffic flows, defining a significance of effect from such changes in flows.
PINS Page 35 Paragraph 4.8.3	<i>“The duration and timings of the surveys should also be agreed with the LPA to ensure that they are representative.”</i>	Winchester City Council (WCC) are aware of the duration and timings of the surveys and have made no adverse comment.
PINS Page 35/36 Paragraph 4.8.4	<i>“The ES should explain whether the calculation and study areas are different and if so, how. These areas should be defined based on the ZOI and identified on a supporting Figure and sensitive receptors within the study area should be identified in line with the methodology set out.”</i>	We now only refer to the study area, and no longer refer to the calculation area. The study area and sensitive receptors will be identified within a figure which will be provided as part of the ES.

Reference	Comment	Response
PINS Page 36 Paragraph 4.8.5	<i>“The ES should define the study area based on the ZOI which should include potential impacts from all forms of traffic management. Effort should be made to agree the study area with the relevant consultation bodies.”</i>	WCC will be consulted on the construction noise study area.
PINS Page 36 Paragraph 4.8.6	<i>“The ES should demonstrate how the Proposed Development aligns with the objectives of the RIS and provisions of the Round 3 NIAs” “Where assessment diverges from the methodology the ES should explain and justify how it has changed and for what reason. Effort should be made to agree alternative approaches with the relevant consultation bodies.”</i>	The ES will demonstrate how the Proposed Scheme aligns with the RIS. Where assessment diverges from the methodology (set out in Section 11.4 of this chapter), the ES will explain and justify how it has changed and for what reason.
PINS Page 36 Paragraph 4.8.7	<i>“The ES should include and justify the assumptions they have made in relation to future operation and resulting anticipated noise impacts and effects taking into account changes in vehicle fleet and fuel source, where relevant.”</i>	The ES will consider the resulting noise impacts and effects taking into account change in vehicle fleet and fuel source, where relevant.
PINS Page 37 Paragraph 4.8.8	<i>“A number of assumptions are anticipated regarding the number, type, operation and location of plant machinery used for construction. Where these assumptions form the basis of the assessment, a reasonable worst-case scenario should be described, and the ES should explain why it is appropriate. Effort should be made to agree this approach with the relevant consultation bodies.”</i>	Where assumptions are being made for the construction noise and vibration assessment regarding the number, type, operation and location of plant machinery, agreement will be sought with WCC.
Eastleigh Borough Council (Noise)	<i>“Chapter 12, at 12.1.1, notes that the study area in relation to construction noise will only include diversion routes where a project requires full carriageway closures during the night. At 12.1.2 and 5 it is stated that the final study area is not yet known for construction</i>	A construction traffic study area will be defined to include a 50m width from the kerb line of public roads with the potential for an increase in baseline noise level of 1dBA or more as a result of the addition of construction traffic to existing traffic levels.

Reference	Comment	Response
	<p><i>noise and vibration. It is considered that such study area should include routes affected by traffic management measures comprising the diversion of all or selected traffic at any time of day, as well as the planned routing of construction traffic, where this would affect flows on highways in the Eastleigh Borough area. If not scoped into the EIA, an explanation of the omission should be given."</i></p>	
<p>Hampshire County Council (Noise)</p>	<p><i>"It is recommended that the scope of the EIA is expanded to include an assessment of the proposal on traffic flows on the local highway network. It is expected that the congestion relief resulting from the proposal will influence route choice and therefore traffic flows on particular routes. The EIA will need to consider the impact this has on Air Quality and Noise issues, and any severance resulting from changes to traffic flows on particular routes."</i></p>	<p>With respect to noise, the study area for operational road traffic noise will be defined in accordance with guidance in DMRB LA 111 (Highways England, 2020). This is up-to-date guidance and an appropriate approach.</p>
<p>Kings Worthy and Abbots Worthy Parish Council (Noise)</p>	<p><i>"In Section 12: Noise and Vibration Kings Worthy Primary School is omitted from Table 12.1 although St. Swithin's and Winnall Primary are included, although in our opinion they appear further from the construction area than Kings Worthy Primary. We would prefer that this education establishment is also included."</i></p>	<p>The Kings Worthy Primary School sits within 600 m of proposed road changes and therefore will be scoped into the operational noise assessment and reported within the ES.</p> <p>The Kings Worthy Primary School sits outside 300 m of construction activity and therefore will not be included in the construction noise assessment.</p> <p>If the Kings Worthy Primary School sits within 25 m of a construction diversion route, or within 50 m of a road which could increase in noise level by 1 dB as a result of construction traffic it will</p>

Reference	Comment	Response
		be considered in ongoing EIA work and reported in the ES as necessary.
	<i>"It should be noted that Kings Worthy Primary is included in Table 13.8. In a similar vein, a Preschool and Day Nursery exists at Woodhams Farm which lies very close to the end of the area covering the A34 section and we feel this establishment should be included in both Table 12.1 and Table 13.8. We would welcome your comments on the inclusion of these two educational establishments into the document."</i>	<p>The Woodhams Farm Preschool and Day Nursery sits outside 600 m of proposed road changes and therefore will be scoped out of the construction and operational noise assessment.</p> <p>If Woodhams Farm Preschool and Day Nursery sits within 25 m of a construction diversion route, or within 50 m of a road which could increase in noise level by 1 dB as a result of construction traffic it will be considered in ongoing EIA work and reported in the ES as necessary.</p>
	<i>"The document also mentions Princes Meads School at Abbots Worthy but it is not included in any of the monitoring regimes and therefore missing from both Table 12.1 and 13.8 but could be adversely affected if the North Spoil Management Area is adopted. In the event of this area being used the school should, in our opinion, be included in both Table 12.1 and 13.8"</i>	<p>If Princes Meads School is determined to fall within 300 m of proposed construction activity (to be further defined and reported within the ES) it will be included within the assessment, based on the study area definition within DMRB LA 111 (Highways England, 2020).</p> <p>If Princes Meads School sits within 25 m of a construction diversion route, or within 50 m of a road which could increase in noise level by 1 dB as a result of construction traffic it will be considered in ongoing EIA work and reported in the ES as necessary.</p>
Public Health England (Noise)	<i>"For noise exposure, PHE expects assessments of significance to be closely linked to the associated impacts on health and quality of life, and not on noise exposure per se (in line with the NPSE)."</i>	<p>The assessment of significance will be judged based on guidance provided with DMRB LA 111 (Highways England, 2020). This is up-to-date guidance and an appropriate approach.</p> <p>An assessment of health impacts to receptors will be included within</p>

Reference	Comment	Response
	<p>the Population and Health chapter of the ES.</p> <p><i>“The daytime SOAEL of 68 dB LA10,18hr (façade) appears to be derived from the relative noise level in the Noise Insulation Regulations (NIR) [9], which is linked to the provision of enhanced noise insulation for new highway infrastructure. The NIR does not explicitly refer to the underpinning evidence on which the relevant noise level is based, and there is a lack of good quality evidence linking noise exposure expressed in the LA10 metric to health effects. Therefore, it is helpful to convert these levels to Lden and LAeq,16hr metrics, which are more widely used in the noise and health literature.”</i></p> <p><i>“PHE recommends that for each scheme the Applicant gives careful consideration of the following:</i></p> <ul style="list-style-type: none"> <i>i. The existing noise exposure of affected communities – in particular, consideration of any designated Noise Important Areas identified in proximity to the scheme;</i> <i>ii. The size of the population affected – for example an effect may be deemed significant if a large number of people are exposed to a relatively small noise change;</i> <i>iii. The relative change in number and type of vehicle pass-bys;</i> <i>iv. Changes in the temporal distribution of noise during day/evening/night, or between weekdays and weekends;</i> <i>v. Soundscape and tranquillity, in particular the value that communities put on the lack of</i> 	<p>As per Table 11-5 in this chapter, the project’s noise SOAEL of 68dB and LOAEL will be based on guidance provided with DMRB LA 111 (Highways England, 2020). This is up-to-date guidance and an appropriate approach.</p> <p>An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.</p> <p>Given the nature of the Proposed Scheme, the noise assessment will be conducted based on the relevant guidance (DMRB LA 111 (Highways England, 2020)). This is up-to-date guidance and an appropriate approach. Noise Important Areas will be assessed based on the Road Investment Strategy 2020 to 2025.</p> <p>An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.</p>

Reference	Comment	Response
	<p><i>environmental noise in their area, or conversely, on the lack of public areas within walking distance that are relatively free from environmental noise;</i> <i>vi. Opportunities for respite (predictable periods of relief from noise), either spatially or temporally;</i> <i>vii. Cumulative exposure to other environmental risk factors, including other sources of noise and air pollution,</i> <i>viii. Local health needs, sensitivities and objectives.”</i></p>	
	<p><i>“Therefore, the impact assessment should acknowledge that adverse health effects will occur beyond the assessment threshold (LOAEL). PHE recommends that the Applicant explains what its chosen SOAELs for a specific scheme mean in population health terms in a similar fashion.”</i></p>	<p>The project’s noise SOAEL and LOAEL will be based on guidance provided with DMRB LA 111. This is up-to-date guidance and an appropriate approach.</p> <p>An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.</p>
	<p><i>“PHE encourages the applicant to present noise exposure data in terms of the Lden metric (in addition to Leq and L10), to facilitate interpretation by a broad range of stakeholders.”</i></p>	<p>It is intended that noise exposure will be presented the in L_{den} metric.</p>
	<p><i>“For transportation sources, PHE recommends the quantification of health outcomes using the methodology agreed by the Interdepartmental Group on Costs and Benefits - Noise subgroup [IGCB(N) [23] (currently under review)), and more recent systematic reviews [1, 5, 6].”</i></p>	<p>The assessment of significance will be judged based on guidance provided with DMRB LA 111. This is up-to-date guidance and an appropriate approach.</p> <p>An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.</p>
	<p><i>“Where schemes have the potential to impact a large number of people, PHE expects the Applicant to carry out literature scoping reviews to ensure that the</i></p>	<p>The assessment of significance will be judged based on the relevant guidance for the Proposed Scheme (DMRB LA</p>

Reference	Comment	Response
	<i>most robust and up-to-date scientific evidence is being used to quantify adverse effects attributable to the Scheme.”</i>	111, Highways England, 2020). This is up-to-date guidance and an appropriate approach.
	<i>“PHE expects to see a clear outline of the steps taken to arrive at the final judgement of significance based on these health outcomes, including a description of local circumstances and modifiers anticipated, and how reasonably foreseeable changes in these circumstances will be dealt with during the assessment process.”</i>	The assessment of significance will be judged based on guidance provided with DMRB LA 111. This is up-to-date guidance and an appropriate approach. The ES will document the steps taken to arrive at the final judgement of significance. An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.
	<i>“DMRB requires a list of noise mitigation measures that the project will deliver in Noise Important Areas. PHE supports this requirement - new development should offer an opportunity to reduce the health burden of existing transport infrastructure, particularly for those worst affected. PHE would encourage this approach to extend beyond NIAs, in line with the third aim of NPSE”</i>	A list of noise mitigation measures that the project will deliver (where relevant) in Noise Important Areas will be included within the ES. An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.
	<i>“PHE recommends that traditional averaged noise levels are supplemented by a qualitative characterisation of the sound environment, including any particularly valued characteristics (for example, tranquillity) and the types of sources contributing to it”</i>	The assessment of significance will be judged based on guidance provided with DMRB LA 111, (Highways England, 2020). This is up-to-date guidance and an appropriate approach. Where significant effects are considered likely, qualitative consideration of the sound environment will be presented in the ES.
	<i>“PHE recommends that baseline noise surveys are carried out to</i>	Updated environmental sound surveys took place over a 6 week

Reference	Comment	Response
	<i>provide a reliable depiction of local diurnal noise variations for both weekdays and weekends, in a variety of locations, including the difference between day (07:00-19:00), evening (19:00-23:00) and night-time (23:00-07:00) periods.”</i>	period, which is expected to provide a reliable depiction of diurnal noise variations for both weeks and weekends, in a variety of locations (note, data still being processed at the time of writing).
	<i>“PHE suggests that a variety of metrics can be used to describe the sound environment with and without the scheme – for example, levels averaged over finer time periods, background noise levels expressed as percentiles, and number of event metrics (e.g. N65 day, N60 night) – and that, where possible, this suite of metrics is used to inform judgements of significance.”</i>	The assessment of significance will be judged based on relevant guidance (DMRB LA 111, Highways England, 2020). This is up-to-date guidance and an appropriate approach. The assessment will be undertaken in accordance with the methodology outlined in this chapter (i.e. considering the Do-Minimum against the ‘Do-Something scenario).
	<i>“PHE expects decisions regarding noise mitigation measures to be underpinned by good quality evidence, in particular whether mitigation measures are proven to reduce adverse impacts on health and quality of life. For interventions where evidence is weak or lacking, PHE expects a proposed strategy for monitoring and evaluating their effectiveness during construction and operation, to ensure the effectiveness of said measures.”</i>	Noise mitigation will be proposed where significant impacts are anticipated, to reduce noise levels so that they are not significant. An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.
	<i>“PHE expects any proposed noise insulation schemes to take a holistic approach which achieves a healthy indoor environment, taking into consideration noise, ventilation, overheating risk, indoor air quality and occupants’ preference to open windows.”</i>	The detailed design of any noise insulation which may be required as a result of the scheme is beyond the remit of the ES, although if and where required, the approach described will be encouraged within the ES.
	<i>“PHE suggests that monitoring of health and quality of life can be considered pre and post operational phases, to ascertain</i>	DMRB LA 111 which is up-to-date guidance states that post construction noise monitoring cannot provide a reliable gauge

Reference	Comment	Response
	<p><i>whether mitigation measures are having the desired effect for local communities.”</i></p>	<p>for whether the predicted magnitude and extent of operation adverse impacts are greater or less than those predicted in the assessment. On this basis post construction noise monitoring is not proposed.</p>
	<p><i>“PHE expects consideration of potential adverse effects due to noise and vibration during construction and recommends that a full and detailed Construction Environmental Management Plan (CEMP) is developed and implemented by the Applicant and/or the contractor responsible for construction. PHE recommends that the CEMP includes a detailed programme of construction which highlights the times and durations of particularly noisy works, the measures taken to reduce noise at source, the strategy for actively communicating this information to local communities, and procedures for responding effectively to any specific issues arising.”</i></p>	<p>Consideration of potential adverse effects due to noise and vibration during construction will be given within the ES.</p> <p>Where necessary, mitigation mitigations will be outlined within a first iteration Environmental Management Plan (fiEMP), which will be submitted to accompany the application for development consent.</p>
	<p><i>“There is a paucity of scientific evidence on the health effects attributable to construction noise associated with large infrastructure projects [5, 6] where construction activities may last for a relatively long period of time. PHE recommends that the Applicant considers emerging evidence as it becomes available and reviews its assessment of impacts as appropriate.”</i></p>	<p>The assessment of construction noise will be undertaken in accordance with relevant and available standards and guidance.</p> <p>An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.</p>
	<p><i>“PHE expects proposals to take into consideration the evidence which suggests that quiet areas can have both a direct beneficial health effect and can also help</i></p>	<p>Operational noise change will be assessed within Quiet Areas in-line with guidance provided within DMRB LA 111. This is up-to-date</p>

Reference	Comment	Response
	<i>restore or compensate for the adverse health effects of noise in the residential environment”</i>	guidance and an appropriate approach. An assessment of health impacts to receptors will be included within the Population and Health chapter of the ES.
	<i>“PHE expects consideration to be given to the importance of existing green spaces as well as opportunities to create new tranquil spaces which are easily accessible to those communities exposed to increased noise from the scheme. These spaces should be of a high design quality and have a sustainable long-term management strategy in place.”</i>	The response is noted. Figures 2.6 to 2.8, Appendix 2.1 outline landscape and ecological mitigation, including new areas for public access.
	<i>“The Applicant should take into consideration the “change-Effect”, i.e. the potential for a real or anticipated step-change in noise exposure to result in attitudinal responses that are greater or lower than that which would be expected in a steady state scenario [28, 32]. Where a perception of change is considered likely, PHE recommends that the change-effect is taken into account in the assessment for the opening year of the proposed development. For longer term assessments, the effects of population mobility need to be taken into consideration.”</i>	The assessment of significance will be judged based on guidance provided with DMRB LA 111. This is up-to-date guidance and an appropriate approach.
	<i>“PHE recommends that public consultations carried out during the planning application process clearly identify the predicted changes to the sound environment during construction and operation of the Scheme, the predicted health effects on neighbouring communities, proposed noise mitigation strategies and any proposed</i>	The preliminary findings of the assessment of construction and operational noise effects are reported in Section 11.9 of this PEIR.

Reference	Comment	Response
	<i>measures for monitoring that such mitigation measures will achieve their desired outcomes.”</i>	
1 September 2020, 21 September 2020 and 17 November 2020	Request to Environmental Health Officer (EHO) at Winchester City Council (WCC) to confirm suitability of environmental sound survey methodology.	Acceptance of proposed environmental sound survey on 17 November 2020.

Proposed consultation

11.3.1 The study area, noise sensitive areas and sensitive receptors will be agreed through consultation with WCC.

11.3.2 If further noise and vibration studies indicate the potential for significant effects, then consultation will be undertaken with the relevant stakeholders where appropriate.

11.4 Assessment methodology and significance criteria

11.4.1 Design Manual for Roads and Bridges (DMRB) LA111 (LA111 - Revision 2) (Highways England, 2020) requires the determination of appropriate levels of assessment for operational road traffic and noise and vibration effects with reference to the following thresholds, where upon a ‘further’ assessment should be undertaken:

- “Construction noise – does construction noise generated by the project have the potential to adversely affect any noise sensitive receptors?”
- “Construction noise – are there any noise receptors where there would be a reasonable stakeholder expectation that a construction noise assessment would be undertaken?”
- “Construction vibration – does vibration from construction have the potential to adversely affect any vibration sensitive receptors?”
- “Construction vibration – does the scale of the development or type of construction mean that there will be a reasonable stakeholder expectation that a construction vibration assessment would be undertaken at any vibration sensitive receptors?”
- “Operational noise - is the project likely to cause a change in the Basic Noise Level (BNL) of 1 decibel (dB) LA10,18hr in the Do-Minimum opening year (DMOY) compared to the Do-Something opening year (DSOY)?”

- “Operational noise - is the project likely to cause a change in the BNL of 3dB LA10,18hr in the Do-Something future year (DSFY) compared to the DMOY?”
- “Operational noise - does the project involve the construction of new road links within 600m of noise sensitive receptors?”
- “Operational noise - would there be a reasonable stakeholder expectation that an assessment would be undertaken?”

11.4.2 The assessment of noise and vibration is being undertaken in accordance with the requirements of DMRB LA111 (LA111 - Revision 2) (Standards for Highways, 2020). Based on the outcomes of the Project Control Framework (PCF) Stage 2 assessment and the preliminary findings of the assessment reported in this PEIR, a 'further' assessment, as defined in DMRB LA111 (LA111 - Revision 2) (Standards for Highways, 2020) is being undertaken for the Environmental Impact Assessment (EIA) and will be reported in the ES.

11.4.3 At this stage of the assessment only the magnitude of change has been assessed at residential dwellings.

11.4.4 The sensitivity of other receptors is still to be determined and will be reported within the ES.

Construction noise

11.4.5 DMRB LA111 (LA111 - Revision 2) (Standards for Highways, 2020) states that when determining the need for assessment of potential noise effects during the construction phase, that the potential for exceeding the criteria provided in LA111 should be considered. This includes the effects of any temporary road closures resulting from construction works.

11.4.6 The Lowest Observed Adverse Effect Level (LOAEL) is set at a level where construction becomes the dominant noise source, whereas the Significant Observed Adverse Effect Level (SOAEL) is set at a level where construction noise exceeds thresholds determined in accordance with British Standard 5228 Code of practice for noise and vibration control on construction and open sites Part 1: Noise (BS 5228-1) (BSI, 2009a).

11.4.7 The guidance in DMRB LA111 (LA111 - Revision 2) (Standards for Highways, 2020) has been reproduced for construction noise, in **Table 11-2** below. The guidance reproduced below relates to noise sensitive receptors as defined in DMRB LA111 (LA111 - Revision 2) (Standards for Highways, 2020). Where appropriate, alternative criteria will be developed for ecological noise sensitive receptors for the assessment to be reported within ES. For reference, the $L_{Aeq,T}$ refers to the equivalent continuous sound level of a notional steady sound, at a given position and over a defined period of time that would have the same A-weighted acoustic energy as the measured naturally fluctuating noise.

Table 11-2: Effect levels for construction noise

Period	LOAEL	SOAEL
Daytime weekday (07:00-19:00) and Saturdays (07:00-13:00)	Exceeds existing $L_{Aeq,T}$ noise level	Threshold level determined as per BS 5228-1: 2009 + A1: 2014 (BSI, 2009a) (Section E3.2 and Table E.1)
Evenings weekday (19:00-23:00), Saturdays (13:00-23:00) and Sundays (07:00-23:00)	Exceeds existing $L_{Aeq,T}$ noise level	Threshold level determined as per BS 5228-1: 2009 + A1: 2014 (BSI, 2009a) (Section E3.2 and Table E.1)
Night-time weekday and weekend (23:00-07:00)	Exceeds existing $L_{Aeq,T}$ noise level	Threshold level determined as per BS 5228-1: 2009 + A1: 2014 (BSI, 2009a) (Section E3.2 and Table E.1)

Source – LA111 (LA111 - Revision 2) (Highways England, 2020) Table 3.12

11.4.8 An impact may be significant in EIA terms when the noise level at sensitive receptors during construction works exceeds the SOAEL values listed in **Table 11-2**. A significant effect will be determined and reported in the ES if this noise level is exceeded for a period of ten or more days of working in any fifteen consecutive days or for a total number of days exceeding forty in any 6 consecutive months. Similarly, adverse effects might be expected where noise levels exceed the LOAEL, but these will not be considered significant. Other factors will also be considered in determining if there is the potential for adverse and significant adverse effects, such as the number of receptors affected and the duration and character of the impact.

11.4.9 Detailed information regarding the construction programme and the likely plant and equipment that might be used for the reasonable worst-case consideration is not yet available. At this stage of the assessment, calculations have been undertaken to determine areas where construction noise levels are anticipated to be above the reasonable worst-case (lowest) SOAEL based on typical construction techniques (see **Chapter 2**).

11.4.10 The assessment to be reported within the ES will be based on reasonable assumptions as to the likely construction programme, construction methods and typical plant and equipment. The assessment will also consider the likely need for construction works outside of typical daytime working hours and highlight potential noise mitigation measures that are likely to be required.

11.4.11 The potential construction noise levels at ecological receptors will be presented within the Noise and Vibration chapter of the ES, and the impact will be assessed within the Biodiversity chapter of the ES.

Construction vibration

11.4.12 LA111 (LA111 - Revision 2) (Standards for Highways, 2020) states when determining the need for assessment of potential vibration effects during the construction phase that the potential for exceeding the criteria provided in LA111 (LA111 - Revision 2) (Highways England, 2020) should be considered.

11.4.13 The guidance reproduced in **Table 11-3** below relates to noise sensitive receptors as defined in DMRB LA111 (LA111 - Revision 2) (Standards for Highways, 2020). Where appropriate alternative criteria will be developed for ecological vibration sensitive receptors for the assessment to be reported within ES.

Table 11-3: Effect levels for construction vibration

Effect level	Peak particle velocity (PPV)
SOAEL	1.0mm/s
LOAEL	0.3mm/s

Source – LA 111 (LA111 - Revision 2) (Highways England, 2020) Table 3.31

11.4.14 The need for further assessment will be established and reported in the ES. Where the need for further assessment is established, the prediction methodology presented in British Standard 5228 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration (BS 5228-2) (BSI, 2009b) shall be used to calculate construction vibration levels.

11.4.15 If the predicted vibration level at a sensitive receptor is above the SOAEL, then there is the potential for a significant effect to occur and mitigation should be proposed. However, the duration of the works, the number of receptors affected, and the duration and character of the impact should also be considered in determining the significance of effect.

11.4.16 An impact may be significant in EIA terms when the vibration level at sensitive receptors during construction works exceeds the SOAEL values listed in **Table 11-3**. A significant effect would be determined if this vibration level is exceeded for a period of ten or more days of working in any fifteen consecutive days or for a total number of days exceeding forty in any 6 consecutive months. Similarly, adverse effects might be expected where vibration levels exceed the LOAEL although these will not be considered as significant. Other factors would also be considered in determining if there is the potential for adverse and significant adverse effects, such as the number of receptors affected and the duration and character of the impact.

11.4.17 At this stage of the assessment an assessment of construction vibration has not yet been undertaken and therefore is not reported within this PEIR.

11.4.18 If necessary, the potential impact from construction vibration on building structures will be considered within the ES. The potential construction vibration levels at ecological receptors will be presented within the Noise and Vibration chapter of the ES, and the impact will be assessed within the Biodiversity chapter of the ES.

11.4.19 Similar to construction noise, the assessment of construction vibration impacts will be based on reasonable assumptions as to the likely construction programme, construction methods and typical plant and equipment that would be used. The assessment will also consider the likely need for construction works outside of typical daytime working hours and highlight potential vibration mitigation measures that are likely to be required.

Operational road traffic noise

11.4.20 The ongoing EIA will include the assessments specified in DMRB LA111 (Revision 2) (Standards for Highways, 2020). The assessment of permanent road traffic noise impacts arising from the M3 Junction 9 Improvement will involve calculations for all sensitive receptors in the study area which is to be defined, as well as a BNL assessment for routes outside the study area (i.e. the wider road network).

11.4.21 This aspect of the assessment will consider the following scenarios:

- Opening year (2026) – Do-Minimum (i.e. without the Proposed Scheme)
- Opening year (2026) – Scheme Do-Something (i.e. with the Proposed Scheme)
- Future year (2041) – Do-Minimum
- Future year (2041) – Scheme Do-Something

11.4.22 The assessment will make the following comparisons, as specified in LA111 (LA111 - Revision 2) (Standards for Highways, 2020):

- Do-Minimum in the opening year versus Do-Minimum in the future year (long-term)
- Do-Minimum in the opening year versus scheme Do-Something in the opening year (short-term)
- Do-Minimum in the opening year versus scheme Do-Something in the future year (long-term)

11.4.23 At the current stage of the assessment, detailed 3D noise modelling has not been undertaken. However, preliminary calculations of noise change from the scheme have been undertaken for the following scenarios:

- Do-Minimum in the opening year versus scheme Do-Something in the opening year (short-term)
- Do-Minimum in the opening year versus scheme Do-Something in the future year (long-term)

11.4.24 All road traffic noise predictions have and will be undertaken in accordance with the calculation methodology presented in the former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN) and the advice contained in Appendix A2 of LA111 (LA111 – Revision 2) (Standards for Highways, 2020). Traffic speeds have and will be derived in accordance with Appendix A3 of LA111. (LA111 - Revision 2) (Standards for Highways, 2020).

11.4.25 The classification of magnitude of noise impacts associated with short and long term changes in noise levels is being determined in accordance with the criteria presented in **Table 11-4** below, which are taken from LA111 (LA111 - Revision 2) (Standards for Highways, 2020). Both adverse and beneficial changes are being considered in the assessment.

Table 11-4: Classification of magnitude of noise impacts

Magnitude of impact	Noise change, dB (LA10,18h or Lnight)	
	Short-term	Long-term
Major	≥5.0	≥10.0
Moderate	3.0 – 4.9	5.0 – 9.9
Minor	1.0 – 2.9	3.0 – 4.9
Negligible	<1	<3

Source – DMRB LA111 (LA111 - Revision 2) (Highways England, 2020) Tables 3.54a and 3.54b

11.4.26 Particular consideration is being given to both noise change and noise levels within Noise Important Areas (NIA)s along the Proposed Scheme (three NIAs have been identified, see **Figure 2.2, Appendix 2.1**).

11.4.27 An assessment of likely eligibility for sound insulation measures under the Noise Insulation Regulations 1975 will be carried out to identify residential dwellings that may potentially qualify under the Regulations.

11.4.28 In addition to the requirements of LA111 (LA111 - Revision 2) (Standards for Highways, 2020), consideration of the Proposed Scheme with respect to national policy will be undertaken.

Road traffic noise - significant environmental effects

11.4.29 For the operational noise assessment, appropriate noise level criteria have been defined for the purposes of identifying potential significant environmental effects arising from the operation phase of the Proposed Scheme. The criteria have been defined based on the guidance provided in the NPSE, PPG and LA111 (LA111 - Revision 2) (Standards for Highways, 2020).

11.4.30 For the operational noise assessment to be reported in the ES, the noise levels detailed in **Table 11-5** will be considered as the LOAEL and SOAEL in this assessment:

Table 11-5: SOAEL and LOAEL values for operational noise

Parameter	Value for daytime (06:00 – 24:00)	Value for night-time (23:00 – 07:00)
SOAEL	68dB LA _{10,18h} (façade)	55dB L _{night,outside} (free-field)
LOAEL	55dB LA _{10,18h} (façade)	40dB L _{night,outside} (free-field)

Source – DMRB LA111 (LA111 - Revision 2) (Highways England, 2020) Table 3.49.1

11.4.31 For the operation road traffic noise assessment, groups of receptors, or individual receptors where appropriate, will be assessed.

11.4.32 If the predicted magnitude of impact at a sensitive receptor is above Moderate or Major (see **Table 11-4**), then there is the potential for a significant effect to occur and mitigation should be proposed. However, where the magnitude of impact in the short term is Minor, Moderate or Major at noise sensitive buildings, Table 3.60 of LA111 (LA111 – Revision 2) (Standards for Highways, 2020) will be used to determine the final significance. These factors include, but are not limited to:

- Noise level change
- Differing magnitude of impact in the long term to magnitude of impact in the short term
- Absolute noise level with reference to LOAEL and SOAEL (by design this includes sensitivity of receptor)
- Location of noise sensitive parts of a receptor
- Acoustic context
- Likely perception of change by residents

Road traffic noise – Significant policy effects

11.4.33 The Environmental Statement (ES) will demonstrate how the project intends to comply with the three aims of the NPSE. To put the aims of the NPSE into context, the following will be reported:

- For daytime and night-time periods, count and report the number of properties in the following categories:
 - Above the SOAEL
 - Between the SOAEL and LOAEL
 - Below the LOAEL

11.5 Assessment assumptions and limitations

11.5.1 The information presented in this chapter is based on the information available at the time of writing the report and based on emerging design. The findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process.

11.5.2 The study area for the EIA is in the process of being determined based on detailed traffic data.

11.5.3 The assessment of operational noise impacts is based on the traffic data provided by the transportation team. At this stage, the preliminary findings are based on vehicle flows, speeds and the proportion of heavy vehicles in the form of Average Annual Weekday Traffic (AAWT) as determined by the transportation team. The preliminary findings presented in this PEIR do not consider topography or intervening terrain and are limited to calculations of noise from the A33, A34, M3 junction 9 link roads and Easton Lane. The preliminary findings are subject to change once detailed noise modelling has been undertaken.

11.5.4 The preliminary findings of the operational noise assessment are proportionate and limited to assessing noise change to identify significant effects, as it has not been possible to produce detailed calculations of the absolute noise levels at this stage, based on the data available.

11.5.5 The assessment of significance of operational noise is therefore limited to where noise changes are above 1 dB in the short-term or above 3 dB in the long-term.

11.5.6 The noise modelling incorporates many different data sources. Therefore, the outcome of the modelling is reliant on the quality of these data. Any limitations of these data sources will be reported in the noise and vibration assessment in the ES, along with any associated implications.

- 11.5.7 Night-time noise levels will be estimated using the guidance within the Transport Research Laboratory (TRL) document 'Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping'. The availability of appropriate traffic data will influence the prediction methodology adopted.
- 11.5.8 The ES will report the methodology for and consideration of the resulting noise impacts and effects taking into account change in vehicle fleet and fuel source, where relevant.
- 11.5.9 The BS 5228 calculation methods enable the level of noise during various construction activities to be determined. However, the precision of any such predictions is necessarily limited by the number of assumptions made regarding the number and type of plant proposed to be utilised, their location and detailed operating arrangements. Some of this information will be clarified as the Proposed Scheme design progresses and later when a contractor is appointed and resources are mobilised, but other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works had commenced. Where necessary reasonable worst-case assumptions will be made in relation to plant locations and activities.
- 11.5.10 Despite the limitations identified, the information to be provided for the ES will result in robust assessments.

11.6 Study area

Construction noise

- 11.6.1 The study area for the assessment of construction noise for the ongoing EIA will be defined in accordance with the guidance in DMRB, LA111(LA111 - Revision 2) (Standards for Highways, 2020), as follows:
- 1) A study area of 300m from the closest construction activity is normally sufficient to encompass noise sensitive receptors.
 - 2) A diversion route study area will be defined where a project requires full carriageway closures during the night (23:00 – 07:00) to enable construction works to take place.
 - 3) A diversion route study area will be defined to include a 25m width from the kerb line of the diversion route.
 - 4) A construction traffic study area will be defined to include a 50m width from the kerb line of public roads with the potential for an increase in baseline noise level of 1dBA or more as a result of the addition of construction traffic to existing traffic levels.
- 11.6.2 The final study area is not yet known, and a plan identifying the study area will be depicted as part of the ES.

Construction vibration

11.6.3 The study area for the assessment of construction vibration for the ongoing EIA will be defined in accordance with the guidance in DMRB, LA111 (LA111 - Revision 2) (Standards for Highways, 2020), as follows:

- 1) A study area of 100m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors.

11.6.4 The final study area is not yet known, and a plan identifying the study area will be depicted as part of the ES.

Operational noise

11.6.5 The study area for operational road traffic effects will be defined in accordance with the guidance in DMRB, LA111 (LA111 - Revision 2) (Highways England, 2020), as follows:

- 1) The area within 600m of new road links or road links physically changed or bypassed by the project.
- 2) The area within 50m of other road links with potential to experience a short-term BNL change of more than 1dBA as a result of the project.

11.6.6 The study area for operation road traffic will ultimately be defined through a combination of the Proposed Scheme footprint and the predicted change in traffic flows to determine affected links, whether those lie within the main study area or within the wider road network.

11.6.7 The final study area is not yet known, and a plan identifying the study area will be depicted as part of the ES.

11.7 Baseline conditions

Existing noise climate

11.7.1 The existing noise climate varies around the Proposed Scheme. The noise climate across much of the Proposed Scheme is dominated by road traffic noise, particularly the areas close to the M3, A34, and A33. However, there are relatively large areas close to the Proposed Scheme also where there are no major roads and, as such, these areas are exposed to lower noise levels.

11.7.2 In addition to road traffic noise, there will be localised noise from commercial areas clustered around the west side of Junction 9, as well as some limited noise associated with aircraft arriving at and departing from Southampton Airport. The train line running from Winchester, northwards to Basingstoke lies in excess of 1 km to the west of the motorway junction; consequently it is considered unlikely that rail noise will significantly affect the existing noise

climate in the areas studied at this stage of the assessment. These assumptions will be revisited once the model study area has been defined.

11.7.3 Baseline environmental sound monitoring was undertaken in 2019, with the positions agreed with the EHO at WCC. Results from the measurements have been summarised in **Table 11-6** and the locations are identified in **Figure 11.1 in Appendix 11.1**.

Table 11-6: Measured Environmental Sound Levels (2019)

Date	Period	Average L _{Aeq,T} (dB)		
		LT1 – 70 Longfield Road	LT2 – Fulling Mill Cottage	LT3 – 24 Willis Waye
Tuesday 02/07/2019	Daytime (07:00 – 23:00)	62	62	60
	Night-time (23:00 – 07:00)	57	52	58
Wednesday 03/07/2019	Daytime (07:00 – 23:00)	62	55	62
	Night-time (23:00 – 07:00)	57	-	58
Thursday 04/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	57	-	58
Friday 05/07/2019	Daytime (07:00 – 23:00)	60	-	62
	Night-time (23:00 – 07:00)	56	-	56
Saturday 06/07/2019	Daytime (07:00 – 23:00)	61	-	61
	Night-time (23:00 – 07:00)	55	-	54
Sunday 07/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	57	-	58
Monday 08/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	56	-	58
Tuesday 09/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	56	-	56
Wednesday 10/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	56	-	57
Thursday 11/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	56	-	58
Friday 12/07/2019	Daytime (07:00 – 23:00)	61	-	70
	Night-time (23:00 – 07:00)	56	-	57

Date	Period	Average L _{Aeq,T} (dB)		
		LT1 – 70 Longfield Road	LT2 – Fulling Mill Cottage	LT3 – 24 Willis Waye
Saturday 13/07/2019	Daytime (07:00 – 23:00)	61	-	61
	Night-time (23:00 – 07:00)	55	-	56
Sunday 14/07/2019	Daytime (07:00 – 23:00)	62	-	61
	Night-time (23:00 – 07:00)	54	-	54
Monday 15/07/2019	Daytime (07:00 – 23:00)	62	-	61
	Night-time (23:00 – 07:00)	58	-	58
Tuesday 16/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	57	-	58
Wednesday 17/07/2019	Daytime (07:00 – 23:00)	61	-	62
	Night-time (23:00 – 07:00)	57	-	58
18/07/2019	Daytime (07:00 – 23:00)	63	-	64
	Night-time (23:00 – 07:00)	56	-	59

11.7.4 Further environmental sound surveys have been undertaken in 2021. The measurement locations were confirmed with the WCC EHO in November 2020. The measurements were undertaken at the same properties as the 2019 survey.

11.7.5 Baseline noise monitoring has been undertaken (in 2021) at locations close to the M3 and A34. The M3 and A34 is the main corridor between the Midlands and north carrying freight traffic from Southampton and Portsmouth Docks. Substantial volumes of Heavy Goods Vehicle (HGV) traffic are likely, particularly at night. Evaluation of daytime and night-time noise levels from measured data, will be used to assist in the accuracy of predictions for the night-time period using the Transport Research Laboratory (TRL) methods within DMRB, LA111 (LA111 - Revision 2) (Highways England, 2020).

11.7.6 Short-term attended noise measurements were undertaken (in 2021) along a public right of way which runs adjacent to the River Itchen, where it passes beneath the A34. The purpose of this measurement location was to determine noise levels close to and underneath the bridge structure to assist in the assessment of noise impacts to Biodiversity.

11.7.7 With the change in traffic flows resulting from the Covid-19 pandemic, the 3D noise model of the 2019 baseline conditions will be validated using the results of the environmental sound survey, the results of the previous (2019)

environmental sound survey and traffic flows reported over the 2021 survey period obtained from the online portal WEBTRIS (Highways England, 2020).

11.7.8 This PEIR chapter has been prepared using the results of the 2019 survey work. The 2021 survey results were not processed at the time of writing (and therefore not available for inclusion within this PEIR chapter), however will be used to inform ongoing EIA work and will be reported in the ES.

11.7.9 Assessment of operational noise during the opening year (2026) and future year (2041) will be based on modelled traffic flows for these years, respectively.

Existing vibration climate

11.7.10 Short-term attended vibration measurements have been undertaken along a public right of way which runs adjacent to the River Itchen, where it passes beneath the A34. The purpose of this measurement location is to determine vibration levels close to and underneath the bridge structure to assist in the assessment of Biodiversity vibration impacts.

Noise and vibration sensitive receptors

11.7.11 In accordance with the DMRB, LA111 (LA111 - Revision 2) (Highways England, 2020), examples of sensitive receptors include dwellings, hospitals, healthcare facilities, education facilities, community facilities, European Noise Directive (European Commission, 2002) (END) quiet areas or potential END quiet areas, international and national or statutorily designates sites, public rights of way and cultural heritage assets.

11.7.12 In addition to the list of example receptors with DMRB, LA111 (LA111 - Revision 2) (Standards for Highways, 2020), ecological receptors and commercial premises will be considered as noise sensitive receptors. The sensitivity of commercial premises to noise and vibration will be considered as part of the assessment. The sensitivity of ecological receptors and noise and vibration impact will be considered within the Biodiversity chapter of the ES.

11.7.13 A summary of potentially sensitive receptors identified as likely to be lying within the study area is provided in **Table 11-7**. The areas below and sensitive receptors will be revisited as part of the ongoing EIA work and agreed through consultation with WCC.

Table 11-7: Potentially sensitive receptors

Potentially Sensitive Receptors	
Residential Areas	Headborne Worthy
	Kings Worthy
	Easton Village

Potentially Sensitive Receptors	
	Eastern fringes of Winchester, including (from north to south) Winnall, St Giles Hill and Highcliffe
	Properties along Easton Lane towards Winchester
Nursery Schools	Springvale Playgroup, St Marys Church, Kings Worthy, SO23 7QL
	Sparklers Sure Start Children's Centre, Winnall Community Centre, Winchester SO23 0NY
	Yellow Dot Nursery, Wales Street, Winchester, SO23 0ET
	Stepping Stones Preschool, Winnall Community Centre, Winchester SO23 0NY
Primary Schools	Winnall Primary School, Winchester SO23 0NY
	St Swithun's Junior School, Winchester SO23 1HA
	Kings Worthy Primary School, Winchester, SO23 7QS
Secondary Schools, Colleges and Further Education (FE)	St Swithun's Senior School, Winchester SO23 1HA
Healthcare Facilities	Leigh House Hospital
Places of Worship	Kingdom Hall, Winchester SO23 0NY
	St Swithun's Church, Headborne Worthy SO23 7JX
	St Mary's Church, Kings Worthy SO23 7QL
Scheduled Monuments	Round barrow cemetery on Magdalen Hill Down
	Site of St Gertrude's Chapel
	Late Iron Age settlement site N of Grace's Farm
Designated Areas	South Downs National Park (SDNP)
	River Itchen Special Area of Conservation (SAC)
	River Itchen Site of Special Scientific Interest (SSSI)
Public Rights of Way (PRoW)	Itchen Way
	St Swithun's Way

Potentially Sensitive Receptors	
	Three Castles Path
	Allen King Way
	South Downs Way
	NCN 23
Commercial Areas	Winnall Industrial Estate
	Premises off London Road, adjacent to A34

Vibration sensitive receptors

11.7.14 Vibration sensitive receptors are considered to be any noise sensitive receptor within the construction vibration study area, inclusive of ecological receptors.

Noise Important Areas (NIAs)

11.7.15 The Round 3 NIAs for both Highways England and local authority maintained roads are available under the Open Government Licence (Defra, 2020). The Round 3 NIAs within (whether partially or wholly) anticipated to be within the study area are set out below. Note that this list will be updated once the study area has been confirmed for the ES.

- NIA4006, M3, north of Junction 9 – owned by Highways England.
- NIA4007, A34, north of Junction 9 – owned by Highways England.
- NIA4008, M3, south of Junction 9 – owned by Highways England.

11.7.16 In accordance with the provisions of the Round 3 Noise Action Plan for Roads and the objectives of the Road Investment Strategy 2: 2020-2025 (RIS) (DfT, 2020), it is understood that the aim should be to bring about improvements to the noise environment in these areas. The NIAs can be seen in **Figure 2.2, Appendix 2.1**.

11.8 Design, mitigation and enhancement measures

11.8.1 A mitigation strategy will be developed during the ongoing EIA to minimise any residual noise and vibration impacts during construction and these will be set out in an fiEMP. This will include a requirement on the Contractor to apply Best Practicable Means (BPM).

11.8.2 Mitigation measures will be considered in the ongoing EIA to minimise any noise impact arising from the operation of the Proposed Scheme where practicable. The requirement for environmental noise barriers and low noise road surfaces will be considered to minimise adverse effects to receptors. However, it should be noted that mitigation measures such as these would

be developed in conjunction with other EIA topics/constraints such as ecology and landscape.

- 11.8.3 For the purposes of reporting the preliminary findings of the assessment, noise barriers have not been included and road surfaces are assumed to have the same acoustics correction as existing roads (i.e. the road surface will be no noisier than existing roads).

11.9 Assessment of potential effects

11.9.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon noise during the construction and operational phases. At this stage an assessment of construction vibration has not been undertaken. As noted in **Section 11.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below.

Potential impacts during construction

11.9.2 Temporary noise and vibration effects can be defined as those that would occur during advanced works. Typical effects may include a localised increase in noise and/or vibration and a loss of amenity due to the presence of construction traffic. Although temporary, construction-related effects could nevertheless require mitigation.

11.9.3 The following are generally applicable to temporary construction related effects:

- The area where construction causes disruption tends to be more localised than the effects of the Proposed Scheme once it has opened to traffic.
- Disturbance arising from construction diminishes rapidly with distance.
- The duration of the effect is important when considering the potential for disturbance.

11.9.4 Construction activities such as site preparation and piling, could cause high levels of noise and vibration. Whether such impacts might cause significant effects would depend on other factors such as the time of day, duration and proximity of receptors. The ES will set out anticipated construction details such as programme, night-time working, duration, plant and equipment. Consideration will be given to construction noise and vibration effects on ecological receptors.

11.9.5 At this stage of the detailed construction plant is not yet known (see **Chapter 2**). However, noise levels associated with site preparation and construction are likely to be in the region of 65 dBA at distances of approximately 200 m. 65 dBA relates to the lowest Threshold Level (lowest SOAEL) which could be applied. Therefore, noise sensitive human receptors beyond 200 m are

unlikely to subject to adverse effects, as this would be below the lowest threshold identified in BS 5228-1.

11.9.6 Human noise sensitive receptors within 200 m of construction works may be subject to adverse effects, although the likelihood of this depends on the points highlighted above. The results of the ongoing assessment, based on the information available, will be provided within the ES.

11.9.7 The construction compounds are proposed to be in the following locations:

- A central temporary construction compound, located to the immediate east of J9
- Two smaller areas within the footprint of the J9 gyratory roundabout
- A compound located between the A33/A34 and M3 (note, should a compound be sited in this located it would be designed cognisant to the environmental sensitivity of its location).
- A northern (satellite) compound located adjacent to the A34/A282 roundabout near Christmas Hill.

11.9.8 Based on typical compound operation, noise generated through use of each respective compound is unlikely to exceed 65 dBA at a distance of 100 m. Given that there are no residential properties located within 100 m of the site compound locations, adverse impacts are not anticipated at human noise sensitive receptors. A detailed assessment of construction noise impacts from construction, including the construction compounds and assessment of impact to biodiversity will be undertaken and presented in the ES.

Potential impacts during operation

11.9.9 The level of road traffic noise affecting any receptor is dependent on a number of variables, all of which are accounted for within the road traffic noise prediction methodology. In summary these are:

- Traffic related factors: volume, speed and composition of vehicles.
- Road related factors: surface (e.g. concrete or bituminous) and gradient.
- Propagation factors based on horizontal and vertical alignment: distance, the presence of screening and type of ground cover (for example new or removed vegetation) intervening between the road and any receptor.
- Receptor specific factors: view of the road and reflections.

11.9.10 Therefore, should any of these factors alter, such as changes along an existing road, or with the introduction of a new length of carriageway, then noise levels would also be likely to change. Individually, these variables could cause noise levels to increase or decrease for any receptor.

11.9.11 Based on the preliminary findings of the operational noise assessment, the following outcomes are anticipated in the Opening Year (2026), as depicted in **Figure 11.2, Appendix 11.1:**

- Noise levels generated by road traffic in the Do-Something Opening Year scenario along the A34, A33 and M3 towards the north of the Proposed Scheme are anticipated to increase by less than 1 dB against the Do-Minimum Opening Year scenario, and the change is likely to be negligible.
- Noise levels generated from the link roads in the Do-Something Opening Year scenario to the north of the Junction 9 roundabout are anticipated to increase by up to 1 dB against the Do-Minimum Opening Year scenario, and the change is likely to be negligible.
- Noise levels generated by road traffic in the Do-Something Opening Year scenario along Easton Lane are anticipated to increase by up to 1 dB against the Do-Minimum Opening Year scenario, and the change is likely to be imperceptible.
- Noise levels generated by road traffic in the Do-Something Opening Year scenario along the section of the M3 to the south of the Junction 9 roundabout are anticipated to increase by less than 1 dB against the Do-Minimum Opening Year scenario, and the change is likely to be imperceptible.

11.9.12 Based on the preliminary findings of the operational noise assessment, the following outcomes are anticipated in the Future Year (2041), as depicted in **Figure 11.3, Appendix 11.1:**

- Noise levels generated by road traffic in the Do-Something Future Year scenario along the A34, A33 and M3 towards the north of the Proposed Scheme are anticipated to increase by less than 1 dB against the Do-Minimum Opening Year scenario, and the change is likely to be imperceptible.
- Noise levels generated from the link roads in the Do-Something Future Year scenario to the north of the Junction 9 roundabout are anticipated to increase by approximately 1 dB against the Do-Minimum Opening Year scenario, and the change is likely to be imperceptible.
- Noise levels generated by road traffic in the Do-Something Future Year scenario along Easton Lane are anticipated to increase by up to 2 dB against the Do-Minimum Opening Year scenario, and the change is likely to be imperceptible.
- Noise levels generated by road traffic in the Do-Something Future Year scenario along the section of the M3 to the south of the Junction 9 roundabout are anticipated to increase by less than 1 dB against the Do-

Minimum Opening Year scenario, and the change is likely to be imperceptible.

11.9.13 The preliminary findings of the assessment indicate that significant effects are unlikely at human noise sensitive receptors.

11.10 Anticipated further assessment

11.10.1 The results of the preliminary findings of the assessment have been reported within this PEIR. In order to identify the significance of effects in accordance with the methodology and significance criteria outlined in the methodology section, ongoing assessment work will be presented within the ES.

Baseline conditions

11.10.2 The following will be undertaken to inform the assessment to be provided within the ES:

- A 3D noise model of the study area will be generated to determine baseline noise conditions within the study area.
- The 3D noise model of the 2019 baseline conditions (identified above) will be validated using the results of the environmental sound survey, the results of the environmental sound surveys and traffic flows reported over the survey periods obtained from the online portal WEBTRIS (Highways England, 2020).

Construction Impacts

11.10.3 The following will be undertaken to inform the assessment to be provided within the ES:

- Once construction programme and anticipated construction plant has been determined a study of construction noise and vibration impacts will be undertaken. The results of the assessment will be presented in the ES.

Operational Impacts

11.10.4 The following will be undertaken to inform the assessment to be provided within the ES:

- A 3D noise model of the study area will be generated to determine noise conditions during the Opening Year (2026) Do-Minimum and Do-Something scenarios, and the Future Year (2041) Do-Minimum and Do-Something scenarios.
- The results of the modelling exercise will determine if noise mitigation will be required to reduce noise impacts from operational noise. If required and where feasible, noise mitigation will be embedded into the Proposed Scheme. The results of ongoing assessment will be presented in the ES.

12 Population and Health

12.1 Introduction

12.1.1 This section of the Preliminary Environmental Information Report (PEIR) presents the preliminary findings of the assessment of likely significant effects from the construction and operation of the Proposed Scheme under the Environmental Impact Assessment (EIA) topics of 'Population' and 'Human Health'.

12.1.2 The Proposed Scheme has the potential to have positive and negative impacts on population and health receptors. The potential socio-economic impacts linked to population and health topics are assessed through the construction and operational phases of the Proposed Scheme.

12.1.3 In accordance with the EIA Scoping Report and EIA Scoping Opinion adopted by the Secretary of State (SoS) in November 2020, a full assessment of likely significant effects on Population and Health will be provided in the Environmental Statement accompanying a Development Consent Order (DCO) application for the Proposed Scheme.

12.2 Legislative and policy framework

12.2.1 As outlined in **Chapter 2**, the relevant National Policy Statements (NPSNN) (see below) provide the primary basis for decisions by the Secretary of State on nationally significant infrastructure projects. Other national and local planning policies are also important considerations and relevant to the scope of this chapter.

12.2.2 This section identifies requirements from relevant NPSs and other important considerations of specific relevance to this assessment.

National Planning Policy

- National Policy Statement for National Networks (NPS NN), applicable to all road and railway Nationally Significant Infrastructure Projects (NSIPS) (DfT, 2014):
 - The NPS NN (paragraph 2.2) identifies a “critical need to improve the national networks to address road congestion...to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth. Improvements may also be required to address the impact of the national networks on quality of life and environmental factors”. It also identifies “a need for development on the national networks to support national and local

economic growth and regeneration, particularly in the most disadvantaged areas. Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other. This can help rebalance the economy” (paragraph 2.6) These objectives, all of which directly relate to Population and Health considerations, are a consistent theme for all provisions in the NPS NN.

- Section 3 emphasises the importance of road and rail national networks to improving economic performance, environment, safety, technology, sustainable transport and accessibility outcomes, as well as journey reliability and the experience of road/rail users. These aspects all relate to Population and Health considerations.
 - Section 4 identifies a set of assessment principles, including the need to balance all potential environmental, safety, social and economic beneficial and adverse impacts from proposed NN NSIPs (paragraph 4.4). Population & Health EIA reporting and associated technical assessments will support the preparation of the required business case for the Proposed Scheme, which must set out “*proportionate*” information regarding social and economic impacts. This section also confirms the need to assess likely significant impacts and where necessary identify appropriate mitigation, including in relation to amenity protection (4.57 – 4.59), safety (4.60 – 4.66) and health (4.79 – 4.82) as well as other relevant environmental and socio-economic topics.
 - Section 5 outlines thematic considerations and impacts to be considered when developing and assessing NN NSIPs. Paragraphs 5.162 – 5.185 address impacts on Land Use and associated socio-economic implications, including effects on the best and most versatile (BMV) agricultural land, brownfield land, recreational routes and green infrastructure.
- The National Planning Policy Framework (NPPF) (2019): Sections of the NPPF of specific relevance to this assessment are identified in **Table 12-1** below.

Table 12-1: Relevance of NPPF to this Assessment

Chapter	Paragraphs	Relevance
Chapter 8 - Promoting healthy and safe communities	91	Promoting social interaction and enabling and supporting healthy lifestyles through street layouts that allow for easy

Chapter	Paragraphs	Relevance
		pedestrian and cycle connections
Chapter 9 - Promoting sustainable transport	102 - 104	Consideration of transport issues on active travel, dependent development, and the environment
Chapter 11 - Making effective use of land	118	Encourage multiple benefits from land and taking opportunities to achieve net environmental gains
Chapters 12 - Achieving well-designed places	127	<ul style="list-style-type: none"> Provide visually attractive development with sympathetic landscaping <p>Create places that are safe, inclusive, and accessible to promote health and well-being.</p>
Chapter 15 - Conserving and enhancing the natural environment	180	<ul style="list-style-type: none"> Protection of health and general amenity <p>Mitigate the impacts of noise and light pollution</p>

- Linked to the NPPF, sections of the Planning Practice Guidance (PPG) of specific relevance to this assessment are identified in **Table 12-2** below.

Table 12-2: Relevance of PPG to this Assessment

Chapter	Paragraphs	Relevance
Healthy and Safe Communities (2019)	003	Description of a healthy place
Travel Plans, Transport Assessments and Statements (2014)	004	Description of a transport assessment

Chapter	Paragraphs	Relevance
Natural environment (2019)	001	Description of how planning can take account of agricultural land quality
Open space, sports and recreation facilities PRow and local green space (2014)	004, 011	Recognising the importance of sustainable travel links Different purposes of protected designations such as National Parks

Local Planning Policy Context

Existing Policies

12.2.3 Reflecting the cross-boundary nature of the site, the Winchester District Local Plan and the South Downs Local Plan 2014-2033 are both directly relevant to this assessment.

12.2.4 The Winchester District Local Plan comprises Part 1 - Core Strategy and Part 2 - Development Management. Relevant policies and associated criteria therein are identified in **Table 12-3** below.

Table 12-3: Relevant Winchester Local Plan Policies

Local Plan Policy Key Issues, Policy Tests and Receptors Requiring Assessment	
Winchester District Local Plan Part 1- Joint Core Strategy <i>Requires development proposals to...</i>	
MTRA4 (Development in the Countryside)	<ul style="list-style-type: none"> • In areas designated under this policy, avoid adverse impacts on character, landscape and neighbouring uses.
Policy CP13 (High Quality Design)	<ul style="list-style-type: none"> • Meet the highest standards of design, taking account of the constraints and opportunities of the site and surrounding area. • Contribute positively to local environments and placemaking. • Provide “<i>accessible and attractive public realm with wider active travel links to and within the development</i>”.
Policy CP15 Green Infrastructure	<ul style="list-style-type: none"> • Maintain, protect and enhance the function and integrity of existing green infrastructure (including public realm and recreation), providing net gain where appropriate.
Policy CP19 (National Park)	<ul style="list-style-type: none"> • Be in keeping with the context and setting of the landscape and settlements of South Downs National Park (SDNP) • Support the economic and social wellbeing of SDNP and its communities. • Avoid significant detrimental impact to rural character and setting “<i>unless the impact can be mitigated or demonstrated that the proposal is of over-riding national importance</i>”.
Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017) <i>Requires development to...</i>	

Local Plan Policy Key Issues, Policy Tests and Receptors Requiring Assessment	
Policy WIN1 (Winchester Town)	<ul style="list-style-type: none"> • Support the implementation of Winchester City Council’s (WCC) vision Winchester Town • Protect and enhance the offering, vibrancy, prosperity and sustainability of Winchester Town
Policy DM16 (Site Design Criteria)	<ul style="list-style-type: none"> • Demonstrate high design standards. • Maintain permeability and access through the site and improve connections
Policy DM17 (Site Development Principles)	<ul style="list-style-type: none"> • Provide a safe and secure environment • Facilitate adjacent development where appropriate • Provide amenity and recreational space
Policy DM18 (Access and Parking)	<ul style="list-style-type: none"> • Provide access for a range of users • Ensure emergency service access • Meet safety requirements for highways • Support safe and attractive walking and cycling routes
Policy DM19 (Development and Pollution)	<ul style="list-style-type: none"> • Achieve an acceptable level of environmental quality and should not result in unacceptable impacts on health or quality of life
Policy DM20 (Development and Noise)	<ul style="list-style-type: none"> • Not have an unacceptable impact on human health or quality of life • Be supported by an assessment to demonstrate how it prevents, or minimises all adverse noise impacts to an acceptable level • Levels above the Significant Observed Adverse Effect Level (SOAEL) have not been suitably mitigated to as near to the Lowest Observed Effect Level (LOAEL) as is reasonably possible.

Local Plan Policy Key Issues, Policy Tests and Receptors Requiring Assessment	
	<ul style="list-style-type: none"> Any mitigation measures proposed do not render the design or amenity spaces unacceptable
Policy DM23 (Rural Character)	<ul style="list-style-type: none"> Avoid impacts on public realm or rights of way
Policy Win11 (Winnall)	<ul style="list-style-type: none"> Support the delivery of the Winnall Planning Framework, which provides a growth strategy for the largest employment area in Winchester Town. The Winnall Planning Framework sets out a flexible approach which seeks to capitalise on the area's strong economic performance by encouraging sub-division of plots and land use intensification, particularly for start-ups and small to medium enterprises (SMEs). Improve pedestrian/cycle links with surrounding areas Create or improve recreation and greenspace opportunities

12.2.5 Relevant policies in the South Downs Local Plan (2019) include:

Table 12-4: Relevant Policies in South Downs Local Plan (2019)

Local Plan Policy	Key Issues, Policy Tests and Receptors Requiring Assessment
Core Policy SD1 (Sustainable Development)	<ul style="list-style-type: none"> New developments need to conserve the landscape, natural beauty, wildlife and cultural heritage of the SDNP unless it can be demonstrated that the benefits outweigh these interests.
Core Policy SD2 (Ecosystem Services)	<ul style="list-style-type: none"> An overall positive impact on the natural environment should be demonstrated across range of ecosystems from water quality and natural habitats to peoples' health and wellbeing.
Core Policy SD3 (Major Development)	<ul style="list-style-type: none"> Major development in the SDNP will need to demonstrate that the proposal is in the public interest.
Strategic Policy SD5 (Design)	<ul style="list-style-type: none"> Design of new development must be sensitive to the landscape character and demonstrate effective routes and access
Strategic Policy SD6 (Safeguarding Views)	<ul style="list-style-type: none"> Demonstrate that the proposals conserve and enhance views to and from settlements which contribute to viewers' enjoyment of the SDNP and from PRow.
Strategic Policy SD7 (Relative Tranquillity)	<ul style="list-style-type: none"> Development proposals will need to conserve and enhance relative tranquillity and the experience of users of the PRow network.
Strategic Policy SD19 (Transport and Accessibility)	<ul style="list-style-type: none"> Development proposals must demonstrate the continued safe and efficient operation of the strategic and local road networks Proposals should also support public transport waiting facilities, particularly those with reliable and accessible information; Infrastructure supporting the transfer of freight from road to rail and water; Improvements to walking, cycling and bus connectivity at all transport interchanges; and Improvements to the quality and provision of cycle parking at railway stations and key bus stops.
Strategic Policy SD20 (Walking, Cycling and Equestrian Routes)	<ul style="list-style-type: none"> New development will contribute to a network of attractive and functional non-motorised travel routes, with appropriate signage, throughout the SDNP.

Local Plan Policy	Key Issues, Policy Tests and Receptors Requiring Assessment
	<ul style="list-style-type: none"> protect and enhance existing crossings provided for non-motorised travel routes across major roads. Proposals for sensitively designed new crossings, and proposals to upgrade the safety of existing crossings, will be supported.
Development Management Policy SD21 (Public Realm, Highway Design and Public Art)	<ul style="list-style-type: none"> Proposals must protect and enhance highway safety. The impacts of additional traffic must be considered and avoid reducing biodiversity and landscape amenity value. Particular care is required to protect amenity and safety of all road users.
Strategic Policy SD42 (Infrastructure)	<ul style="list-style-type: none"> Demonstrate that proposals are the least harmful option reasonably available and design minimises impact on natural beauty, wildlife, cultural heritage of the SDNP and the general amenity of local communities.
Strategic Policy SD45 (Green Infrastructure)	<ul style="list-style-type: none"> Proposals must demonstrate that they maintain or enhance green infrastructure assets and contribute to multifunctional landscapes taking into account opportunities for cycling and walking and where possible facilitating circular routes. Support health and wellbeing and improve opportunities for understanding the SDNP and its special qualities.
Development Management Policy SD54 (Pollution and Air Quality)	<ul style="list-style-type: none"> Air, noise, vibration, light, water, odour or other pollutants will not have a significant negative effect on people and the natural environment

Local Economic Strategy

12.2.6 Winchester City Council (WCC) Economic Strategy 2010-2020 provides a ten-year framework for actions by the City Council and others to support and enhance the economic prosperity of Winchester District. It identifies the key economic sectors in the Winchester area as knowledge, tourism, creative and media industries noting these are to be supported and strengthened during the Local Plan period.

12.2.7 Whilst at the end of its lifespan and prepared in the shadow of the economic downturn of 2008, there are aspirations within the strategy that remain relevant as well as its acknowledgement that *“the pressures on the county’s road network are likely to increase... every day in the meantime work time is lost to jams and accidents on the two main motorways.”*¹

12.2.8 WCC has advised that the current Economic Strategy will be replaced by a new Green Economic Development Strategy in 2021. If published prior to the submission of the DCO Application for the Proposed Scheme, this will be taken account of within the Population & Health chapter of the accompanying ES.

Winchester Movement Strategy (2019)

12.2.9 Developed by WCC in partnership with Hampshire County Council (HCC), this document sets out a vision and long-term priorities for travel and transport improvements in Winchester Town. Of specific relevance to this assessment, the strategy identifies a need to manage economic and associated traffic growth along Easton Lane and for this to be addressed through the Proposed Scheme:

“planned improvements to Junction 9 of the M3 should allow Easton Lane to perform much better as a route into Winchester from the motorway and creates options for improved vehicle movement and public realm enhancements”

Emerging Policies

12.2.10 WCC has commenced preparation of a new Local Plan for that part of the WCC area outside the SDNP. A draft Strategic Issues and Options paper was published for consultation in February 2021.

12.2.11 The Issues and Options paper does not set out any specific planning policies at this stage, nor does it reference the Proposed Scheme or consider associated potential spatial development implications. Instead, the paper focuses on nine key issues, some of which may be influenced by the Proposed Scheme. For example, the Proposed Scheme is likely to have impacts on sustainable transport, economic growth and carbon neutrality – all identified as key issues.

12.2.12 The Strategic Issues and Options paper states that all existing Local Plan policies will be reviewed to ensure they are NPPF compliant in terms of wording and emphasis. It indicates that the following policies which are relevant to the Proposed Scheme may be removed from the emerging Local Plan:

¹ Economic Strategy for the Winchester District 2010 – 2020 Part 4: The Winchester Economy (June 2010)

- MTRA4 (Development in the Countryside) (Likely to be covered in the NPPF)
- Policy CP13 (High Quality Design) (Likely to be covered in the NPPF)
- Policy CP15 Green Infrastructure (Likely to be covered in the NPPF)
- Policy CP19 (National Park) (Now accommodated by the SDNP Local Plan)
- Policy WIN1 (Winchester Town) (Likely to be covered in a future design code)
- Policy DM16 (Site Design Criteria) (To be replaced by design codes)
- Policy DM19 (Development and Pollution) (Likely to be replaced by design codes)
- Policy DM20 (Development and Noise) (Likely to be replaced by design codes)

12.3 Consultation

Consultation undertaken

Table 12-5: Consultation undertaken

Reference	Comment	Response ²
Secretary of State Scoping Opinion (November 2020)		
Page 38 Paragraph 4.9.2	<i>“The ES should include a Figure depicting the location of sensitive receptors within the study area to support the assessment of likely significant effects.”</i>	A figure showing the location of specific sensitive receptors is provided in Figure 12.1, Appendix 12.1 of this PEIR and will be included in the ES. It should be noted that some sensitive receptors such as the labour market are economic rather than spatially based. Aside from considering the extent of assessment Study Areas, these receptors have no physical identifying features on the ground and thus are not able to be depicted on a figure. However, relevant receptors are described

² The comments to date have been considered as part of the PEIR Chapter, but the Environmental Statement will also further consider and respond to the comments.

Reference	Comment	Response ²
		<p>within Section 12.7 – Baseline Conditions. Such receptors will be considered in ongoing EIA work and reported in the ES.</p>
<p>Page 38 Paragraph 4.9.3</p>	<p><i>“The ES should fully justify the study area based on the Zol.”</i></p>	<p>The 2km Study Area adopted is considered appropriate and proportionate to assess likely <i>significant</i> effects on population and health receptors at the local level. The 2km Study Area aligns with the Study Area previously consulted on through the 2019 EIA Scoping exercise and PEIR consultations for the Proposed Scheme.</p> <p>Adopting a wider local Study Area (e.g. 3km) may capture a greater proportion of all changes in accessibility and other effects generated on population and health receptors, but this would only represent a small incremental change to effects already captured within 2km and is not likely to generate any new or different likely significant effects.</p> <p>The 2km local Study Area has not been adopted in isolation, rather the assessment combines it with a larger District wide Study Area to represent the labour market and to align with geographical reporting of health baseline data.</p> <p>Key receptors for assessing commuter movements i.e. residential areas and key employment locations including Winnall Industrial Estate and Winchester City Centre, are located within 2km of the IAB.</p> <p>Reporting health data and likely effects at District level in combination with assessing local effects within a focused 2km Study Area therefore provides for</p>

Reference	Comment	Response ²
		<p>a robust and proportionate assessment of all likely significant effects, including in relation to commuting by walking or cycling.</p> <p>The study area used within this PEIR will also be utilised in ongoing EIA work and reported in the ES.</p>
Page 38/39 Paragraph 4.9.4	<i>“The ES should explain how the pandemic may have affected baseline figures deriving from 2020 data and how the baseline, where informed by 2020 data, is representative and appropriate to inform the assessment of significant effects.”</i>	The baseline conditions presented within this PEIR utilise data collected prior to the global disruption caused as a result of the ongoing COVID-19 pandemic. At the time of writing, COVID-19 has resulted in a range of changes to socio-economic conditions, however, there is no evidence to indicate the long-term implication of these changes. Currently available baseline data remains representative and appropriate to inform the proportionate assessment (to be reported in the ES) of the Proposed Scheme given construction start date of autumn 2023 and operation from winter 2026.
Page 39 Paragraph 4.9.5	<i>“The ES should clearly set out a methodology by which the significance of effects on Human Health are assessed and determined.”</i>	Comment noted. Human Health assessment is qualitative as per the methodology set out in this PEIR Chapter.
Page 39 Paragraph 4.9.6	<i>“The ES should use consistent terminology across all the Chapters to avoid any confusion as to the assessment and conclusions of significant effects.”</i>	Comment noted. Consistent terminology will be adopted unless discipline specific methodologies determine otherwise (see Chapter 4 of this PEIR).
Hampshire County Council – Minerals and Waste Planning Authority	<i>“Easton Lane Depot, a concrete batching plant operated by CEMEX UK is a safeguarded waste site (Policy 26 of the</i>	The CEMEX UK facility is located within the Winnall Industrial Estate, which is included as a receptor within the Population and

Reference	Comment	Response ²
	<p><i>HMWP) in close proximity to the application site.”</i></p> <p><i>“It is unlikely to require consideration within the EIA, but the HCC will expect to see how operation of the site has been considered within the application.”</i></p>	<p>Health assessment (see Figure 12.2, Appendix 12.1).</p>
Public Health England	<p><i>“The EIA should demonstrate compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery and disposal).</i></p> <p><i>For wastes arising from the installation the EIA should consider:</i></p> <ul style="list-style-type: none"> <i>• the implications and wider environmental and public health impacts of different waste disposal options</i> <i>• disposal route(s) and transport method(s) and how potential impacts on public health will be Mitigated”</i> 	<p>The principles of the waste hierarchy will be illustrated throughout the ES to minimise disposal and maximise re-use and recycling of any waste arisings. This is also referenced within Chapter 10 – Material Assets and Waste.</p> <p>A proportionate assessment of health impacts will be reported within the population and health chapter of the ES.</p>
Kings Worthy Parish Council	<p><i>“a Preschool and Day Nursery exists at Woodhams Farm which lies very close to the end of the area covering the A34 section and we feel this establishment should be included</i></p> <p><i>Princes Meads School at Abbots Worthy but it is not included in any of the monitoring regimes and therefore missing from both Table 12.1 and 13.8</i></p> <p><i>We believe that there are factual errors in section 13.2.12 which relate to our parishes and these require review in our opinion.”</i></p>	<p>Baseline narrative updated to include additional nursery and school provision and updated description of “The Worthys” which has been updated in this PEIR chapter. This baseline narrative will be considered in ongoing EIA work, to be reported in the ES.</p>
Other Consultation with Non-statutory bodies		

Reference	Comment	Response ²
WCC – Strategic Planning, Economic Development	<p>Reinforcement of Winnall being the key employment area in Winchester</p> <p><i>A low employment rate but we assume this correctly reproduces ONS data? The subsequent pay info looks consistent with our Employment Study.</i></p> <p><i>Winnall described as 3 areas but it would be better to use the 4 subdivisions set out in Local Plan Part 2 policy WIN11, so as to reflect statutory plan policy.</i></p> <p><i>The adopted Local Plan target (2011-2031) is 12,500 dwellings</i></p> <p><i>refer to ‘Winchester Town’, not ‘Winchester City Centre’.</i></p> <p><i>We are now planning to consult on a ‘Strategic Issues & Priorities’ document in Feb/March 2021.</i></p> <p><i>North Whiteley is within the WCC area</i></p> <p><i>A good idea to mention the Green Economic Development Strategy and to be conscious that the Council has declared a climate</i></p>	<p>Winnall Industrial Estate is included as a receptor within this PEIR and for the population and health assessment (to be reported in the ES) it will be recognised as a key receptor.</p> <p>We can confirm that ONS employment baseline data is the correct and uses current 2020 data.</p> <p>Winnall baseline description has been updated in this PEIR chapter to reflect the four subdivisions.</p> <p>Adopted Local Plan target of 12,500 dwellings is used throughout this PEIR chapter.</p> <p>References in the PEIR Chapter have been updated to incorporate updated terminology.</p> <p>The “Strategic Issues and Options” paper published for consultation in early 2021 has been considered within the PEIR.</p> <p>Reference to North Whiteley within WCC area used in this PEIR chapter.</p> <p>If published prior to the submission of the DCO Application for the Proposed Scheme, the Green Development Strategy will be taken account of</p>

Reference	Comment	Response ²
	<i>emergency which any plans for Winnall or the improvement of J9 will need to take into account.</i>	within the Population and Health chapter of the accompanying ES.

Proposed Consultation

12.3.1 In accordance with the Design Manual for Roads and Bridges (DMRB) LA112 (Highways England, 2020) and best practice, this assessment will be informed by stakeholder consultation to capture relevant baseline issues and consider the impacts of the Proposed Scheme on Population and Health receptors. The assessment team has engaged with WCC and Enterprise M3 and Solent Local Enterprise Partnerships (LEP) to arrange consultation workshops focused respectively around:

- the implications of the Proposed Scheme on economic development, property development, land use change and future planning strategies (e.g. the emerging new Local Plan) in Winchester
- Potential relationships between M3 Junction 9, the Port of Southampton and the logistics sector, including in terms of access (existing and proposed) provided by the Junction 9 - A34 link to distribution centres in the Midlands.

12.3.2 The findings of these consultations will enable an understanding of stakeholder perspectives on the direction of future growth in Winchester, whether this is currently constrained by junction capacity, and the likely social and economic impacts of the Proposed Scheme at local and regional levels.

12.4 Assessment methodology and significance criteria

12.4.1 The preliminary findings of the assessment as presented in this PEIR, and the results of ongoing assessment of likely significant effects to be presented within an ES follow the scope and methodology requirements outlined in the EIA Regulations and DMRB LA 112 (Highways England, 2020). DMRB LA 112 (Highways England, 2020) also provides fixed assessment criteria and definitions of sensitivity, magnitude of change and EIA significance which are used to underpin the assessment.

12.4.2 The assessment is also informed by other relevant UK Government guidelines and best practice guidance, including HM Treasury (2020) Green Book, and undertaken in accordance with relevant and applicable legislation, policies and technical standards set out in **Section 12.2**.

12.4.3 The following activities are being undertaken to complete a proportionate assessment of likely significant effects from the Proposed Scheme on identified population and health receptors:

- Reviewing relevant legislation and planning policies
- Establishing baseline conditions within the relevant study areas to identify potential receptors and receptor groupings for consideration in the assessment
- Defining receptor sensitivity to likely changes (e.g. in employment, business sector performance, land use or community severance) resulting from the Proposed Scheme
- Examining likely population and health changes from the Proposed Scheme on identified receptors and receptor groupings, with consideration given to the phasing, magnitude, duration (e.g. short/long term, temporary/permanent) and nature (i.e. adverse/beneficial) of the change
- Considering likely cumulative population and health changes from the Proposed Scheme in combination with other identified approved developments
- Determining the likely level of population and health effects from the Proposed Scheme, having regard to both receptor sensitivity and the characteristics of predicted changes
- Identifying the significance of likely population and health effects in the context of the assessment criteria
- Identifying mitigation and enhancement measures to address any likely significant adverse population and health effects, and to enhance the socio-economic performance of the Proposed Scheme where practicable.

12.4.4 Identifying likely residual population and health effects from the Proposed Scheme taking account of all mitigation and enhancement measures.

Information Sources, Modelling and Approach

12.4.5 A detailed population and health baseline of the relevant study areas will be collated to establish the sensitivity of identified receptors (labour market, housing market, key business sectors, etc) and reported in the ES. The following key data sources have been reviewed:

12.4.6 Office for National Statistics (ONS) datasets, including: Business Register and Employment Surveys; Annual Survey of Hours and Earnings; Mid-year Population Estimates; Annual Business Statistics; and UK business activity, size and location specific statistical bulletins.

12.4.7 A site familiarisation visit was undertaken in September 2020 to inform the preparation of the EIA Scoping Report and PEIR chapters. Ground truthing has verified the characteristics of identified receptors including key economic

areas (e.g. Winnall Industrial Estate), public access routes and community infrastructure assets within the assessed study areas.

12.4.8 There have been circumstances where information required for the assessment as stated has not been available or the quality of information is poor. In these circumstances, the latest publicly available information has been used and supplemented by proportionate consultation with appropriate organisations to try and fill any gaps in the data. For example, seeking to better understand strategic planning issues and options for growth in Winchester due to the pause in WCC publishing and consulting on the future direction of their Local Plan. The limitations will be clearly identified and noted in the ES once all consultation has been undertaken and requested information received.

12.4.9 Relevant WebTAG and traffic model outputs will be used to identify changes in accessibility resulting from the Proposed Scheme, which will inform the full assessment of likely significant population and health effects to be reported in the ES. Relevant data will also be input into a bespoke economic model to estimate gross and net social and economic effects, including expenditure and employment, from the construction and operation of the Proposed Scheme. This model will incorporate economic multipliers and additionality assumptions.

12.4.10 The level and significance of likely population and health effects from the Proposed Scheme will be judged with reference to the following factors:

- Sensitivity of affected receptor: Negligible to Very High
- Predicted magnitude of change: No change to Major

Receptor Sensitivity

12.4.11 DMRB LA 112 (Highways England, 2020) sets out definitions for receptors sensitivity for use within impact assessments. From this, **Tables 12-6 to 12-8** below identify the definitions of receptors and magnitude of change relating to the Proposed Scheme where it is considered there is a likelihood for significant effects and further assessment is required.

Table 12-6: Population Sensitivity

Receptor value (sensitivity)	Description
Very High	<p>Private property and housing:</p> <ul style="list-style-type: none"> ■ existing private property or land allocated for housing in a local authority area where the number of households are expected to increase by >25% by 2041 (ONS data) ■ existing housing and land allocated for housing (e.g. strategic housing sites) covering >5ha and / or >150 houses. <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> ■ complete severance between communities and their land/assets, with little/no accessibility provision ■ alternatives are only available outside the local planning authority area ■ the level of use is very frequent (daily) ■ the land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses³:</p> <ul style="list-style-type: none"> ■ existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >5ha. ■ there is an extensive shortfall of appropriate labour and skills. The Proposed Scheme would therefore lead to labour market pressure and distortions (i.e. skills and capacity shortages, import of labour, wage inflation). <p>Walkers, cyclists and horse-riders (WCH):</p> <ul style="list-style-type: none"> ■ national trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with

³ To provide a full assessment of likely significant effects on population and health receptors, this assessment heading captures both direct effects on the use of specific land and business interests as well as wider economic effects on the economy (i.e. labour market effects). Additional labour market sensitivity and magnitude of change criteria have therefore been added to Tables 12.6 and 12.8 beyond the initial criteria prescribed within DMRB LA 112 (Highways England, 2020).

Receptor value (sensitivity)	Description
	<p>employment land uses and other services with a direct and convenient WCH route. Little / no potential for substitution.</p> <ul style="list-style-type: none"> ▪ routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs. ▪ rights of way for WCH crossing roads at grade with >16,000 vehicles per day.
High	<p>Private property and housing:</p> <ul style="list-style-type: none"> ▪ private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16-25% by 2041 (ONS data) ▪ existing housing and land allocated for housing (e.g. strategic housing sites) covering >1-5ha and / or >30-150 houses. <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> ▪ there is substantial severance between community and assets, with limited accessibility provision ▪ alternative facilities are only available in the wider local planning authority area ▪ the level of use is frequent (weekly) ▪ the land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ul style="list-style-type: none"> ▪ existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >1 - 5ha. ▪ there is an extensive shortfall of appropriate labour and skills. The Scheme would therefore lead to labour market pressure and distortions (i.e. skills

Receptor value (sensitivity)	Description
	<p>and capacity shortages, import of labour, wage inflation).</p> <p>WCH:</p> <ul style="list-style-type: none"> ■ regional trails and routes (e.g. promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution ■ rights of way for WCH crossing roads at grade with >8,000 - 16,000 vehicles per day.
Medium	<p>Private property and housing:</p> <ul style="list-style-type: none"> ■ houses or land allocated for housing located in a local authority area where the number of households are expected to increase by >6-15% by 2041 (ONS data) ■ existing housing and land allocated for housing (e.g. strategic housing sites) covering <1ha and / or <30 houses. <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> ■ there is severance between communities and their land/assets but with existing accessibility provision ■ limited alternative facilities are available at a local level within adjacent communities ■ the level of use is reasonably frequent (monthly) ■ the land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ul style="list-style-type: none"> ■ existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <1ha. ■ there is a low/limited supply of appropriate labour and skills. The proposed development may therefore lead to labour market pressure or distortions.

Receptor value (sensitivity)	Description
	<p>WCH:</p> <ul style="list-style-type: none"> ▪ public rights of way and other routes close to communities which are used for recreational purposes (e.g. dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys ▪ rights of way for WCH crossing roads at grade with >4000 - 8000 vehicles per day.
Low	<p>Private property and housing:</p> <ul style="list-style-type: none"> ▪ proposed development on unallocated sites providing housing with planning permission/in the planning process. <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> ▪ limited existing severance between community and assets, with existing full Disability Discrimination Act (DDA) DDA 1995 [Ref 2.N] compliant accessibility provision ▪ alternative facilities are available at a local level within the wider community ▪ the level of use is infrequent (monthly or less frequent) ▪ the land and assets are used by the minority (>=50%) of the community. <p>Development land and businesses:</p> <ul style="list-style-type: none"> ▪ proposed development on unallocated sites providing employment with planning permission/in the planning process. ▪ there is a readily available supply of appropriate labour and skills. The proposed development is therefore unlikely to lead to labour market pressure or distortions. <p>WCH:</p> <ul style="list-style-type: none"> ▪ routes which have fallen into disuse through past severance or which are scarcely used because

Receptor value (sensitivity)	Description
	<p>they do not currently offer a meaningful route for either utility or recreational purposes,</p> <ul style="list-style-type: none"> ▪ rights of way for WCH crossing roads at grade with <4000 vehicles per day.
Negligible	<p>Private property and housing: N/A.</p> <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> ▪ no or limited severance or accessibility issues ▪ alternative facilities are available within the same community ▪ the level of use is very infrequent (a few occasions yearly) ▪ the land and assets are used by the minority (>=50%) of the community. <p>Development land and businesses: N/A.</p> <p>WCH: N/A.</p> <p>Receptors identified as having negligible sensitivity (to likely effects) have no potential to experience significant effects from the Proposed Scheme and thus do not require further consideration in the assessment. To remain proportionate and support the assessment process, the baseline analysis presented in Section 12.7 focuses on characterising potential receptors with higher than negligible sensitivity to likely changes due to the Proposed Scheme.</p>

Table 12-7: Health Sensitivity

Receptor	Description
Human Health	Once the health profile of communities has been established through analysis of baseline conditions in the PEIR and in preparing the ES (including those set out through other relevant EIA topics such as air quality and noise & vibration), human health sensitivity will be reported as Low, Medium, High in line with DMRB LA 112 (Highways England, 2020) guidance. Sensitivity will be assigned to the following broad receptor groupings which cover key health determinants: Physical Health Statistics; Wider Wellbeing and Mental Health Determinants and Wider Environmental Factors.

Magnitude of Change

12.4.12 The assessment of likely significant effects to be reported in the ES will draw on the findings of the related technical assessments, including the draft Economic Appraisal, Equalities Impact Assessment, and optioneering exercise undertaken for proposed WCH routes. These will inform identification of the predicted type, valency (direction) and magnitude of changes associated with specific likely population and health effects from the Proposed Scheme. At this stage, the Economic Appraisal and Equalities Impact Assessment are under development. Such reporting will be finalised in tandem with ongoing EIA work. A high-level summary of the optioneering exercise undertaken for proposed WCH routes is available in **Chapter 3** of this PEIR.

12.4.13 Relevant WebTAG and traffic model outputs will be used to identify changes in accessibility resulting from the Proposed Scheme, which will inform the full assessment of likely significant population and health effects to be reported in the ES. Proportionate economic modelling will also be undertaken to quantify the net additional employment generated by and wider economic effects of the Proposed Scheme.

Economic Appraisal

12.4.14 The final Economic Appraisal will identify both the transport economic benefits from the Proposed Scheme and wider factors likely to benefit in economic development terms from related accessibility, capacity, and journey time improvements. It will consider likely development land and business impacts of the Proposed Scheme on nearby sites, including the Winnall Industrial Estate and the wider regional and national economies.

12.4.15 Identified in its strategic economic growth plan, Highways England’s four strategic economic roles provide a framework for the identification and appraisal of likely economic development and sectoral impacts. These impacts relate to:

- i. Supporting business productivity and competitiveness and enable the performance of Strategic Road Network (SRN) reliant sectors.
- ii. Providing efficient routes to global markets through international gateways.
- iii. Stimulating and supporting the sustainable development of homes and employment spaces.
- iv. Providing employment, skills, and business opportunities related to the SRN.

Equality Impact Assessment

12.4.16 The Equality Impact Assessment (EqIA) for the M3 Junction 9 Improvement is a predictive assessment tool which contributes to enabling Highways England's compliance with legislation set out under the Equality Act 2010 and the associated Public Sector Equality Duty. It considers the potential effects of the M3 J9 Improvement on 'protected characteristic groups' and seeks to identify any likely differential impacts on such persons. It also identifies opportunities to improve equality of opportunity and eliminate discrimination.

Walking, Cycling and Horse-riding facilities

12.4.17 Through the ongoing design process, potential opportunities to improve the existing WCH network surrounding M3 Junction 9 have been identified and evaluated, with selected improvements incorporated within the Proposed Scheme. These proposed improvements are intended to address permanent operational phase effects on public access and recreational receptors. Findings from the optioneering exercise which was undertaken for proposed WCH routes have informed the design of the Proposed Scheme and the preliminary findings of the assessment of likely effects presented in this PEIR. **Figure 2.9, Appendix 2.1** shows the existing and new walking and cycling routes.

Magnitude of Change Criteria

12.4.18 Building upon relevant technical assessments, this chapter assigns a specific magnitude of change rating to each type of likely impact from the Proposed Scheme (as listed in **Section 12.9**) on each identified relevant receptor. As specified within DMRB LA112 (Highways England, 2020), the definitions of magnitude of change set out in **Table 12-8** below will be adopted in this assessment and refined through ongoing EIA work. The magnitude of impact on Population and Health is gauged by estimating the amount of change on the receptor arising from a project using the criteria below.

Table 12-8: Population Magnitude of Change Criteria

Magnitude of impact (change)	Typical description
Major	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ul style="list-style-type: none"> ■ Major change (beneficial /adverse) to a resource including quality and integrity of resource; key characteristics; features or elements (e.g. direct acquisition and demolition of buildings and direct development of land to accommodate highway assets) ■ Major change (beneficial /adverse) to accessibility ■ Major change (beneficial /adverse) the number of net jobs in the study area, 250 or greater (based upon the EU definition of small and medium enterprises (European Commission, 2003)). <p>WCH:</p> <ul style="list-style-type: none"> ■ Major change (beneficial /adverse) >500m in WCH journey length.
Moderate	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ul style="list-style-type: none"> ■ Moderate change (beneficial /adverse) to a resource including quality and integrity of resource; key characteristics; features or elements (e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings) ■ Moderate change (beneficial /adverse) to accessibility ■ Moderate change (beneficial /adverse) the number of net jobs in the study area would be 50 or greater, but fewer than 250. <p>WCH:</p> <ul style="list-style-type: none"> ■ Moderate change (beneficial /adverse) >250m - 500m in WCH journey length.

Magnitude of impact (change)	Typical description
Minor	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ul style="list-style-type: none"> ■ Minor change (beneficial /adverse) to a resource including quality and integrity of resource; key characteristics; features or elements (e.g, amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings) ■ Minor change (beneficial /adverse) to accessibility ■ Minor change (beneficial /adverse) to the number of net jobs in the study area would be greater than 10, but fewer than 50. <p>WCH:</p> <ul style="list-style-type: none"> ■ Minor change (beneficial /adverse) >50m - 250m) in WCH journey length.
Negligible	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ul style="list-style-type: none"> ■ Very minor change (beneficial /adverse) to a resource including quality and integrity of resource; key characteristics; features or elements (e.g. acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings) ■ Very minor change (beneficial /adverse) to accessibility ■ Very minor change (beneficial /adverse) in the number of net jobs in the study area would be less than 10. <p>WCH:</p> <ul style="list-style-type: none"> ■ Very minor change (beneficial /adverse) <50m in WCH journey length.

Magnitude of impact (change)	Typical description
No change	No change of resource, key characteristics, features, elements, accessibility or net jobs with no observable impact (beneficial /adverse).

Table 12-9: Human Health Outcomes

Human health outcomes	Typical description
Positive	A beneficial health impact is identified
Neutral	No discernible health impact is identified
Negative	An adverse health impact is identified
Uncertain	Where uncertainty exists as to the overall health impact

12.4.19 The Institute of Environmental Management and Assessment (IEMA) ‘Health in Environmental Impact Assessment – A Primer for a Proportionate Approach’ (2017) notes the complexities to defining significance for population and human health. There is an absence of significance criteria or a defined threshold for determining significance for population and health in UK EIA practice. As such, the typical matrix of determining impact significant in EIAs, will therefore not be applied in this impact assessment of human health. Rather, a qualitative assessment of likely effects on the key determinants of health will be undertaken with reference to identified receptor groupings of relevant health determinants. Any comments provided at the PEIR stage of the EIA will be used to further refine the human health methodology and reported in the ES. Where relevant, in preparing the ES chapter the assessment will draw upon the findings of other ES chapters in relation to likely primary environmental effects (e.g. change in air quality) with potential secondary implications for or relationships with identified key health determinants.

12.4.20 In line with the general approach outlined in **Chapter 4**, the level and significance of likely population and health effects from the Proposed Scheme will be judged with reference to the following factors:

- Sensitivity of affected receptor: Low to Very High (refer to **Table 12-6**)
- Predicted magnitude of change: No change to Major (refer to **Table 12-8**)

12.4.21 In line with standard EIA practice, a matrix-based approach will be used to objectively assess the level and significance of predicted population effects

with reference to receptor sensitivity and the predicted magnitude of population and health changes from the Proposed Scheme, as outlined in **Table 12-10** which is taken from DMRB LA104 Environmental assessment and monitoring (Highways England 2020). Effects predicted to occur at levels of moderate and major will be considered significant in the context of the Infrastructure Planning (Environmental Impact Assessment) Regulations (2017) (as amended) (the EIA Regulations).

Table 12-10: Significance matrix of Population

Sensitivity	Magnitude of Change				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate / Large	Large / Very Large	Very Large
High	Neutral	Slight	Slight / Moderate	Moderate / Large	Large / Very Large
Medium	Neutral	Neutral / Slight	Slight	Moderate	Moderate / Large
Low	Neutral	Neutral / Slight	Neutral / Slight	Slight	Slight / Moderate
Negligible⁴	Neutral	Neutral	Neutral / Slight	Neutral / Slight	Slight

12.4.22 Where an effect could be one of two gradings (for example where a Negligible impact interacts with a Medium sensitivity receptor resulting in a Neutral or Slight effect), professional judgement will be used to determine which effect is applicable and this will be explained in the associated commentary.

12.4.23 The level and significance of likely residual effects will be determined taking account of embedded mitigation and any essential mitigation or enhancement measures identified through the assessment to prevent, reduce or offset significant adverse effects (or to enhance the socio-economic performance of the Proposed Scheme) given the strategic objectives of the Proposed Scheme include supporting economic growth – through unlocked development capacity for job, business and housing creation. The Population and Health chapter will ensure that it is clear to the

⁴ Receptors identified as having negligible sensitivity (to likely effects) have no potential to experience significant effects from the Proposed Scheme and thus do not require further consideration in the assessment. To remain proportionate and support the assessment process, the baseline analysis presented in **Section 12.7** focuses on characterising potential receptors with higher than negligible sensitivity to likely changes due to the Proposed Scheme.

reader which, if any, effects are both adverse and significant and may therefore require monitoring.

12.5 Assessment assumptions and limitations

- 12.5.1 The information presented in this chapter is based on information available at the time of writing the report and based on emerging design. The findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process.
- 12.5.2 This PEIR draws upon relevant conclusions from the draft Economic Appraisal, the Equalities Impact Assessment (EqIA) and the optioneering exercise undertaken for proposed WCH routes as well as other technical assessment chapters of the PEIR. In particular, likely 'primary' environmental or physical effects arising from changes in traffic, noise and air quality which may lead to secondary Population and Health effects will be considered. To avoid duplication and maintain assessment proportionality, amenity related environmental effects on local residents have been scoped out of the Population and Health assessment as any likely significant visual, air quality or noise effects are assessed elsewhere in the PEIR where relevant.
- 12.5.3 The approach to determining effect levels and significance in **Table 12-10** will apply to likely Population and Health effects from the Proposed Scheme.
- 12.5.4 Following the identification of likely population and health effects, the need for any essential mitigation or further enhancement measures to address predicted adverse effects or to enhance the socio-economic performance of the Proposed Scheme will be considered in through the assessment. Given the proposed Scheme Objectives, this may include identifying appropriate options and opportunities to reduce community severance and provide a more accessible and integrated multimodal access network between Winchester city centre, including to key employment areas, housing locations and across the M3 into the SDNP.
- 12.5.5 At this stage the preliminary findings of the assessment are limited. Gaps in available information have been identified and further information requested in relation to the costs associated with the Proposed Scheme, estimated employment figures along with targets and aspirations for local supply chain use and social value proposals to work with the local community. We have also sought to consult with non-statutory bodies to build an up to date baseline position. This has involved engagement with WCC (Economic Development) to better understand the replacement of the current Economic Strategy (2010-2020) with a new "Green Economic Development Strategy" to be published in 2021. We have also engaged with WCC (Strategic Planning) to consider development option and priorities beyond the current Local Plan and how the Proposed Scheme may factor into strategic planning in future. Further design development and analysis is required before all likely significant effects and mitigation proposals can be reported in the ES.

12.6 Study area

12.6.1 DMRB LA 112 (Highways England, 2020) advises that, whilst the minimum study area for assessment is set at a 500m radius around the project boundary, this should be extended accordingly where likely effects (direct or indirect) are identified in the surrounding area. This necessitates consideration of the broad types of effects likely to occur from the Proposed Scheme and the spatial extent within which there is the potential for these to be identified and considered significant in the context of the EIA Regulations.

Land use and development study area

12.6.2 No direct encroachment or unlocking of development land would occur or is proposed. There is however the potential for indirect effects to occur. This includes potential indirect effects in terms of land value uplift, removing or reducing cumulative development constraints, accelerating development and improving development site marketability. Any such population and health effects would be driven by changes in accessibility resulting from the introduction of the Proposed Scheme to the transport network, potentially in combination with other plans and projects.

12.6.3 The starting point for defining the land use study area was therefore to review the Traffic Reliability Area (TRA) and the extent of land already included in the M3 Junction 9 Uncertainties Log (HE551511-JAC-GEN-0_00_00-RP-TR-0019). However, the Uncertainty Log (Transport Forecasting Report HE551511-JAC-GEN-0_00_00-RP-TR-0005 refers) covers the entirety of both the Winchester local authority area and the Partnership for South Hampshire (PfSH) subregion as M3 Junction 9 is indirectly connected to the road network across this area. To ensure this assessment remains proportionate, we have focused on land in the vicinity of the Indicative Application Boundary (IAB) where specific relationships with the Proposed Scheme can be identified, such as at Winnall Industrial Estate. Subject to potential refinement or change through the forthcoming Economic Appraisal, an area extending to 2km radius from the IAB (including land within the SDNP) is proposed as the land use study area.

Health and communities study area

12.6.4 The PEIR identifies the WCC area and a 2km buffer from the edge IAB, as Health study areas to assess likely effects on the key determinants of health, including on physical and social/socio-economic factors.

12.6.5 This approach is appropriate to identify and assess likely significant effects on both key health determinants (for individuals) and related effects on community infrastructure provision (including but not limited to recreational routes). The distance of 2km from the IAB encompasses:

- Surrounding industrial and residential neighbourhoods within Winchester

- Winchester City Centre and historic core
- Kings Worthy
- Headbourne Worthy
- Abbots Worthy
- Easton
- Western part of SDNP
- The journey distance that can be reasonably undertaken by most people on foot, thereby capturing potential impacts on access to local facilities and community infrastructure using active travel modes (i.e. walking or cycling) as well as using vehicular transport.

12.6.6 The 2km Study Area captures within it both key residential and employment areas such as Winnall and Winchester city centre any commute by foot or cycling will therefore be captured within the study area. It is therefore appropriate to retain 2km (from the IAB) as the principal study area to assess likely effects on both key health determinants and communities (e.g. effects on access to community infrastructure). with a higher-level assessment also undertaken at WCC level to align with existing public health reporting. The two study areas are shown on **Figure 12.1, Appendix 12.1** and identify the location of key receptors under the population and health topic.

12.7 Baseline conditions

Introduction

12.7.1 This section provides an overview of key baseline conditions which have informed the scope of the Population and Health assessment, including:

- **IAB and surrounding area:** an overview of nearby settlements and the demographics and health of the study area population.
- **Labour market and key business sectors:** the activity and skillset of the study area labour market and the relative performance of the construction sector.
- **Housing market and development allocations:** the market trends and geography of the local housing market, including major land allocations.
- **Community infrastructure:** provision of education, health, care, and community facilities within the study area.
- **Public access and recreation:** relevant key roads, active travel routes and rights of way.

IAB and surrounding area

Indicative Application Boundary

12.7.2 A description of the IAB and surrounding area is provided in **Chapter 2**.

Spatial Overview

12.7.3 In terms of administrative geographies, the IAB and the 2 km study area are located wholly within the WCC local authority area. The junction is within the St Bartholomew electoral ward of WCC, with the Alresford and Itchen Valley, Upper Meon Valley, St Michael, St Paul, St Barnabas, and The Worthys wards also located within 2 km. Wards can be further divided into smaller geographical units called Lower Super Output Areas (LSOA). The IAB is located within the LSOA of Winchester 006C.

12.7.4 South of Junction 9, the M3 forms the western boundary of the SNDP, however south of the IAB, the SDNP boundary extends further to the south-west. An area of the SNDP also wraps around land north of Junction 9. This means that parts of the 2 km study area fall within the National Park, as do parts of the IAB.

12.7.5 As the IAB is in the north of the WCC local authority area, it falls outside the PfSH subregional grouping of Councils grouped around the Solent Coast. However, WCC is itself a member of the PfSH.

12.7.6 A short overview of settlements within the study area is set out below in **Table 12-11**.

Table 12-11: Settlements within the Study Area

Name	Type of Settlement	Distance from Proposed Scheme to settlement centre	Population (2011 Census)	% of Popn under 16	% of Popn 65+
Winchester City Centre	City	Approximately 1.7 km south west	45,184	17.7%	17.5%
St John and All Saints Ward (includes Winnall)	Suburb of Winchester	Abuts western and southern scheme boundary	6,285	18.2%	13.8%
St Bartholemew Ward (includes Abbott's Barton)	Suburb of Winchester	Approximately 1.1 km west	6,407	14.9%	21.6%

Name	Type of Settlement	Distance from Proposed Scheme to settlement centre	Population (2011 Census)	% of Popn under 16	% of Popn 65+
Itchen Valley Ward (includes Easton and Chilcomb hamlets)	Suburb of Winchester	Abuts eastern scheme boundary	1,896	18.8%	22.3%
Headbourne Worthy	Village	Abuts northern scheme boundary	466	12.9%	41%
Kings Worthy	Village	Abuts northern scheme boundary	4,435	19%	16.5%

Winchester

12.7.7 Winchester is a historic city and acts as a sub-regional centre for the district services and assets include a hospital, primary, secondary, and tertiary education establishments, a core retail area, employment areas and tourist attractions. A large proportion of journeys to and from Winchester to access services are via the A34 and M3, by vehicle.

Winnall

12.7.8 Winnall is a mixed-use neighbourhood in the eastern part of Winchester, situated immediately west of the IAB. Industrial and commercial uses are concentrated within the Winnall Industrial Estate, Valley Business Park and the Wykeham Trade Park, all of which are accessed directly from the Easton Lane arm of the existing interchange. Easton Lane also provides access to retail and services including Winchester Fire station, a fuel station, coffee shop, a hotel and a Tesco Extra superstore, which includes a pharmacy.

12.7.9 To the south of the industrial and commercial area lies a residential area, within which is the Winnall Primary School, Winnall Community Centre and a convenience store. It is likely that local residents of Winnall and employees of the businesses utilise the pedestrian and cycle route access within this area to access the Tesco superstore, and local residents will be serviced by the smaller convenience store and the primary school. Other local facilities are likely to be accessed from Winchester city centre.

12.7.10 Leigh House Hospital and St Swithun's School are located east of the M3 from Alresford Road (B3404). They may be accessed on foot by residents of Winnall by a footway on either side of the carriageway, however most journeys are expected to be made by vehicle.

12.7.11 Most journeys from Winnall into Winchester will be via Easton Lane or Alresford Road. Access to the M3 or the A34 is from Easton Lane.

'The Worthys'

12.7.12 Kings Worthy lies between the fork of the A34, A33 and the South Western main line. Within this local settlement are a food convenience store, which is used by smaller villages to the north and east a primary school, nursery and pre-school, two post offices/convenience stores, a church, a sports and social club and a pharmacy. In addition to these community facilities, there are take-aways' shops, restaurants and two dining pubs.

12.7.13 It is likely that some of the local trips to the facilities listed above are made by non-motorised means by local residents and the surrounding villages. For access to other services, it is likely that these will currently be sought in the centre of Winchester, via vehicular means by the B3047 (London and Worthy Roads), or Harestock to the west by Wellhouse Lane.

12.7.14 Abbots Worthy lies to the south-east of Kings Worthy, in between the A33 Basingstoke Road and the M3. There are a small number of residential properties accessed from the B3047. There are no community facilities within Abbots Worthy. Princesmead School lies in the in the countryside to the east of the hamlet of Abbots Worthy.

12.7.15 There is some off-road pedestrian provision along the B3047 and a public footpath from Mill Lane to Kings Worthy, so it is likely that journeys from Abbots Worthy are made on foot to local facilities in Kings Worthy, or by vehicle into Kings Worthy and Winchester by the A33/A34 or the B3047.

12.7.16 Headbourne Worthy is located west of Kings Worthy, separated by the A34. There are no community facilities located within this small residential cluster, restricted to the Cobbs Farm Shop and Café, but forms part of a wider parish which does include planned growth at Barton Farm.

12.7.17 There is pedestrian provision on the B3047 to Kings Worthy and there is a pedestrian footway on Springvale Road into Kings Worthy. Some residents from Headbourne Worthy could, however, access facilities in Kings Worthy on foot, but it is more likely that the majority of journeys are made by vehicle into Kings Worthy (via London Road or Springvale Road), Harestock (via Wellhouse Lane) or Winchester (via the B3047).

Demographic Overview

12.7.18 The 2011 National Census and 2019-based mid-year population estimates have been used to inform the broad demographic profile of the Winchester District, in which the Proposed Scheme is wholly located, compared with the south-east region (the Nomenclature of Territorial Units for Statistics (NUTS) 1 region). **Table 12-12** sets out this profile.

Table 12-12: Demographic Profile of Winchester District

Category	Winchester District	South-east
Population	2011 Census: 116,595 2019 estimate: 124,900 (+7.1%)	2011 Census: 8,634,750 2019 estimate: 9,180,000 (+6.3%)
All Persons Aged 0-15	2011 Census: 18.4% 2019 estimate: 18.5% (+0.7%)	2011 Census: 18.9% 2019 estimate: 19.3% (+1.9%)
All Persons 65 and over	2011 Census: 18.7% 2019 estimate: 18.5% (-0.2%)	2011 Census: 19.8% 2019 estimate: 21.4% (+1.6%)
Ethnicity (Census only)	White British (91.8%), White Irish (0.6%), White Traveller (0.2%), Other White (3.0%), Mixed (1.4%), Asian British (2.3%), Black or Black British (0.4%), Other Ethnic Group (0.3%)	White British (79.8%), White Irish (1.0%), White Traveller (0.1%), Other White (4.6%), Mixed (2.2%), Asian British (7.7%), Black or Black British (3.4%), Other Ethnic Group (0.6%)
Long-Term Health Problem / Disability (Census only)	Day to day activities limited a lot (5.89%), Day to day activities limited a little (8.63%), Day to day activities not limited (85.5%)	Day to day activities limited a lot (8.3%), Day to day activities limited a little (9.3%), Day to day activities not limited (82.4%)
Religion (Census only)	Christian (63.2%), Buddhist (0.5%), Hindu (0.4%), Jewish (0.2%), Muslim (0.5%), Sikh (0.1%), Other (0.4%), No Religion (27.3%), Not Stated (7.5%)	Christian (59.3%), Buddhist (0.4%), Hindu (1.5%), Jewish (0.5%), Muslim (5%), Sikh (0.8%), Other (0.4%), No religion (24.7%), Not stated (7.1%)

12.7.19 The data indicates that the population of Winchester District is broadly in line with the average age profile for the south-east, has a lower rate of people with very limiting health conditions and is comparatively less diverse than the south-east as a whole in terms of ethnicity and religion.

Health

12.7.20 Joint Strategic Needs Assessments (JSNAs) identify the current and future health and social care needs of the local community and are a fundamental part of planning and commissioning (buying) services at a local level. The IAB is located within the jurisdiction of Winchester City Council and the West Hampshire Clinical Commissioning Group (CCG).

12.7.21 The JSNA undertaken by the West Hampshire CCG (2017) identifies a range of health issues for the area, including the following:

- The ratio of people of state pension age is increasing compared to the working age population
- Healthy life expectancy is not keeping up with overall life expectancy. Women in particular are living longer in poor health
- Health inequalities are increasing and more people are living with multiple long term conditions and there is increasing prevalence of lifestyle related illness related to unhealthy behaviours

12.7.22 The Local Authority Health Profile 2019 for Winchester indicates the area generally performs better than the England average with respect to most indicators (Public Health England, 2019). The exception to concerns the suicide diagnosis rate where Winchester performs significantly worse.

12.7.23 However, when looking at data at the local level of the IAB, the Index of Multiple Deprivation (ONS, 2019) identifies the corresponding LSOA as in the fourth decile, meaning it performs relatively poorly in terms of health inequalities.

12.7.24 Key health indicators, including wider social determinants of health such as income and employment, are set out below in **Table 12-13**. These have been taken for the population of Winchester District and compared to the average for England using the most up to date data available. The table only presents those health issues deemed relevant to transport.

Table 12-13: Key Health Indicators for the Winchester District

Indicator	Time Period	Winchester District	England
Life expectancy at birth (male) (years)	2016-2018	82.0	79.6
Life expectancy at birth (female) (years)	2016-2018	85.2	83.2
Killed and seriously injured on roads (crude rate per 100,000 population)*	2017-2019	50.4	43.2
Physically active adults (aged 19+) (%)	2018/2019	76.2	67.2
Excess weight in adults (aged 18+) (%)	2018/2019	57.3	61.3
Obese children (aged 10-11) (%)	2019/2020	11.2	21.0
Children in low income families (%)	2018/19	9.2	21.1
Source - Public Health England (2020) Office for National Statistics (2020)			

Indicator	Time Period	Winchester District	England
Department for Transport (2020)			
*Data reported for HCC area (excluding Portsmouth and Southampton) rather than at WCC level.			

12.7.25 In summary, the health of people in Winchester is generally better than the average for England and life expectancy for both men and women is higher than the average for England. However, it is noted in the context of the Proposed Scheme that those seriously injured or killed on Hampshire’s roads (50) is higher than the national average (43) over the period 2017-2019, as shown in **Table 12-13**. The employment rate for Winchester is lower than average for England (**Table 12-14**) and Winchester is one of the 20% least deprived districts/unitary authorities in England, however 9.2% of children live in low income families. In Year 6 (aged 10-11 years), 11.2% of children are classified as obese, which is below the average for England (which is 21%). Estimated levels of adult excess weight and physical activity are better than the average for England.

Labour Market and Key Business Sectors Overview

Labour market

12.7.26 WCC typically consider three or four distinct labour market sub-geographies: the City, South Winchester / South Hampshire (PfSH) and the ‘rural’ areas, sometimes further split by the rural SDNP and non-SDNP Area. The IAB is directly on the border between the City and National Park areas as defined in the Council’s recent employment land study (Stantec UK for Winchester City Council, 2020).

12.7.27 **Table 12-14** below presents key labour market statistics as recorded by the Annual Population Survey.

Table 12-14: Economic activity and employment

	Economic Activity Rate	Employment Rate
Winchester	78.3%	72.8%
South-east	82.3%	79.6%
England	79.4%	76.2%
Source: ONS (2020). Annual Population Survey.		

12.7.28 The economic activity rate (78.3%) and employment rate (72.8%) in Winchester are lower than regional and national averages. At the same time, residents of Winchester are relatively highly skilled with 60.5% of the

population aged 16-64 holding a degree-level qualification or equivalent (NVQ4+) (see **Table 12-15** below).

Table 12-15: Qualifications held by residents aged 16-64

	Winchester	South-east	England
NVQ4+	60.5%	43.4%	40.0%
NVQ3+	75.0%	62.1%	58.5%
NVQ2+	90.9%	79.1%	75.7%
NVQ1+	97.1%	88.8%	85.8%
Other	No data	5.4%	6.7%
None	2.9%	5.8%	7.5%

Source: ONS (2020). Annual Population Survey.

12.7.29 This high skills profile is reflected in the occupational structure of the Winchester Local Authority Area (the district), with 64.3% of those in employment in Standard Occupational Classification (SOC2010) levels 1 – 3, representing the highest skilled jobs. This is significantly higher than the south-east (53.2%) and England as a whole (48.5%).

Table 12-16: Employed workforce by Standard Occupational Classification 2010

SOC2010	Winchester		South-east		England	
	'000s	%	'000s	%	'000s	%
1: Managers, Directors and Senior Officials	8.8	15.1%	624.8	13.5%	3,284.7	11.9%
2: Professional	18.3	31.4%	1,080.6	23.3%	5,999.6	21.7%
3: Associate Prof. and Tech.	10.4	17.8%	765.2	16.5%	4,112.5	14.9%
4: Administrative and Secretarial	3.7	6.3%	457.0	9.8%	2,699.2	9.8%
5: Skilled Trades	5.0	8.6%	403.0	8.7%	2,710.2	9.8%
6: Caring, Leisure and Other Service	3.2	5.5%	403.7	8.7%	2,447.9	8.9%
7: Sales and Customer Service	2.3	3.9%	306.8	6.6%	1,895.7	6.9%
8: Process, Plant and Machine Operatives	2.7	4.6%	210.7	4.5%	1,654.2	6.0%

SOC2010	Winchester		South-east		England	
	'000s	%	'000s	%	'000s	%
9: Elementary	3.9	6.7%	389.6	8.4%	2,798.8	10.1%
Total	58.3	100.0	4,641.4	100.0	27,602.8	100.0

Source: ONS (2020). Annual Population Survey.

12.7.30 Higher skilled jobs typically command higher wages. **Table 12-17** below shows that the gross annual pay of Winchester residents in 2019 (£35,812) was 8.3% higher than the regional average (£33,072) and 16.5% higher than the average across England (£30,748). However, workplace earnings in Winchester were lower than across the south-east and England as a whole. This suggests that a proportion of higher skilled individuals, with higher remuneration on average, work outside of the district on a daily basis and commute from their place of residence.

Table 12-17: Gross Annual Pay, 2019

	Resident	Workplace
Winchester	£35,812	£30,332
South-east	£33,072	£31,902
England	£30,748	£30,753

Source: ONS (2020). Annual Survey of Hours and Earnings.

12.7.31 While Winchester experienced a net increase in its workday population of 18,361 at the 2011 Census (ref. WU03UK), a substantial number of residents commuted to other authority areas daily (23,412). Neighbouring authorities including Eastleigh (3,034), Southampton (2,923), and Portsmouth (2,098) receive the highest number of commuters. Most commuters travelled to other parts of the south-east (19,490) followed by London (2,581).

Economic Activity and Key Business Sectors

Overview

12.7.32 The Winchester District Joint Core Strategy (2013) identifies key growth sectors as the service sector (primarily business services), health, distribution and retail, construction, and transport. The Enterprise M3 LEP has a narrower focus on manufacturing and professional services activities including ICT, pharmaceuticals, and aerospace and defence (Enterprise M3, 2014). All these sectors are likely to be directly impacted by journey time improvements, changes in productivity, access to markets and/or effects on development land and are therefore of relevance to this impact assessment.

Neighbouring Economic Assets

- 12.7.33 The Winnall Industrial Estate is accessed from Easton Lane via the existing M3 Junction 9. It is a purpose-built facility that provides business units to a variety of retail (convenience and comparison) and industrial businesses. The immediate proximity of the estate to the strategic road network (i.e. M3 Junction 9) together with proximity to consumer markets provides a strategic locational advantage for businesses within the logistics and manufacturing sectors. Current industrial occupiers include a Royal Mail depot, Basepoint office space, Sydenhams Aggregates, APEM Components and B&M Steel.
- 12.7.34 The Winnall Planning Framework identifies a number of opportunities to enhance the quality of life for the local community, and improve business performance. Although the Framework has no formal planning status, it is recognised as being a material planning consideration.
- 12.7.35 The Framework recognises opportunities to improve pedestrian and cycle access to the countryside and SDNP, given the location of Winnall, and highlights the need to provide additional open space and improve local community infrastructure.
- 12.7.36 Winnall is the largest employment area in Winchester Town and generally the area is thriving with very few vacant premises. The policy therefore is aimed at retaining the core of the employment area in traditional employment uses (Use Classes B1, B2, and B8) while allowing for a degree of flexibility in those parts of the employment area where change might be expected. It also recognises the need to maximise opportunities for improvements to community infrastructure, open space and green infrastructure provision.
- 12.7.37 Winnall Industrial Estate (and surrounding industrial areas) comprises three distinct areas:
- Central: this area includes a Tesco Extra superstore and a noticeable grouping of retail warehouses and DIY stores orientated around large central car parks adjacent to Easton Lane, generating the feel of a retail park destination. The premises are largely uniform size, shape and finishing at double storey.
 - North: the northern half of Winnall Industrial Estate is dominated by large 'industrial' sheds and depots for industrial and related employment use, each with their own car park. Sectors represented here include automotive engineering and sales, building materials, electronics manufacturing and engineering consultancy. Two university halls of residence are also located along the western edge close to the River Itchen.
 - South and Outlying: the southern boundary of the industrial area is formed by Winnall Valley Road, a linear road with disparate small-scale trade shops, each with their own car parks. Both the layout and sectoral

representation of businesses here are different from the public facing retail park further north. There are also outlying individual comparison retail and service units, such as the Midmay Vets, Mole Valley unit and the Homebase sections, which all have dedicated access and car parks specific to each business.

12.7.38 Junction 9 is the designated M3 junction for accessing Winchester City Centre, the largest economic centre across the local authority area. Easton Lane leading to Wales Street provides a direct route to the city centre.

Construction Sector

12.7.39 The nature and scale of the Proposed Scheme means it is likely to impact the construction sector during the construction phase. Initial analysis of the construction sector in the WCC area indicates:

- **Lower than average labour market density:** some 4,000 people were employed in construction in 2019 across Winchester, accounting for 4.6% of all workforce jobs. This is a lower concentration than the south-east as a whole (5.3%).
- **Lower than average concentration of firms:** whilst construction is one of the largest sectors in the district (measured by the number of enterprises) at approximately 810 units and represents 10.1% of the total, this is lower than the southeast average of 13.6%.
- **Higher than average productivity:** the Winchester construction sector generates more gross value added per-worker (£89,250) than the south-east average (£81,190).

Tourism Sector

12.7.40 While not a major employer in Winchester, the South Downs Local Plan (2019) recognises that tourism plays a key role in the economy of the SDNP and facilitating visits. While recreational routes provide access into the SDNP from Winchester, there are no other specific tourism destinations in immediate proximity to the IAB.

Housing Market and Development Allocations

12.7.41 The adopted Local Plan for Winchester has a housing target of 12,500,000 over the plan period 2011 – 2031 (WCC, 2011). The Future Local Housing Need and Population Profile Assessment (WCC, 2020) suggests a local housing need of 664 dwellings per annum over the emerging local plan period (2021 – 2030).

12.7.42 The Winchester District Strategic Housing Market Assessment (2020) concludes there are three distinct housing sub-markets in the district which demonstrate different characteristics:

- **Winchester Town Market Area:** covering Winchester Town and partially containing the IAB, this area commands higher house prices than the rest of the district.
- **Northern Market Area:** this area includes the remainder of the M3 J9 Improvement IAB and the area surrounding Winchester Town.
- **Southern Market Area:** house prices are the lowest in this area, which has greater commuting connections to Portsmouth and Havant.

12.7.43 Major settlements within the two market areas which contain IAB include Winchester itself, the Worthys, and Winnall.

12.7.44 Following consideration by the SDNPA and WCC both planning authorities adopted the Winchester District Local Plan Part 1. The Winchester District Local Plan Part 1 – Joint Core Strategy was adopted by both authorities in March 2013 and sets out the overall vision, objectives, spatial strategy and strategic policies for the district. The emerging new Local Plan 2018-38 has progressed updates of its evidence base, but a draft plan is not yet available. A Strategic Issues and Priorities Document is due to be consulted on during Feb/March 2021, which is an early phase of preparing the new Local Plan and will explore important issues that will influence the future Local Plan's development.

12.7.45 The current development strategy for the District identifies three spatial areas with accompanying vision and objectives, along with development requirements for – Winchester Town, Market Towns and Rural Area and South Hampshire Urban Area. The Local Plan Part 1 states that the principal focus for new development across the District will be within the urban areas of Winchester Town and the South Hampshire Urban Area. The development strategy (Policy DS1) plans for some around 12,500 new dwellings and 20 hectares of employment land to be delivered over the plan period, through the following:

Winchester Town

- Around 4,000 new homes: The Barton Farm development area will provide 2,000 including affordable housing, community facilities, a new primary school and a new park and ride facility to serve the north of Winchester. The site is on the edge of the 2km study area to the north-west of the Proposed Scheme.
- Retention of existing employment land and premises along with new development or redevelopment to provide for new business growth to broaden Winchester's economic base is identified. This targets sector growth including knowledge, tourism, creative and media industries and more specifically start-up premises to encourage entrepreneurship including exploring opportunities at the employment site of Bushfield

Camp, located to the southern edge of Winchester close to M3 junction 11.

City Centre

- Additional retail floorspace through existing developments at Silver Hill are planned to support Winchester's role as a sub-regional shopping centre for existing and new communities.
- Promotion of the town centre as the preferred location for new development that attracts high visitor numbers such as retail, commercial and offices, leisure, culture and tourism with the need to demonstrate that this type of development outside the town centre would not have a harmful impact on the town centre.

The Worthys

- The larger village of King's Worthy, which forms part of the Market Towns and Rural Area in the Winchester Local Plan, is expected to contribute approximately 250 new homes over the plan period with any economic and commercial growth at a scale appropriate to the settle and its catchment area.

Market Towns and Rural Area including Winchester Part of South Downs National Park

12.7.46 This spatial area includes approximately 50 smaller settlements within the District, which range from market towns of a few thousand population to small hamlets of a few dwellings originally serving the agricultural sector. It includes that part of the SDNP that is within Winchester District.

12.7.47 Whilst this spatial area is largely rural in nature there are opportunities to address local needs and maximise attractive rural settings through Tourism, local food production and niche markets which will be more resilient to wider changes in the economy.

12.7.48 Some settlements within this spatial area have an ageing population and those in an attractive setting with a school are often popular with in-migrants. The key objective is to ensure that the right amount and type of development occurs, so that existing communities can remain viable, with access to the services they need:

- 2,500 new homes in the Market Towns and Rural Area across Bishops Waltham, New Alresford, Colden Common, Denmead, Kings Worthy, Swanmore, Waltham Chase, and Wickham.
- New employment uses through development and redevelopment opportunities within existing settlement boundaries in the first instance, along with retention of major commercial establishments in the countryside.

South Hampshire Urban Area

12.7.49 The PfSH is a consortium of 11 local authorities focused on economic development, of which WCC is a member. However, the IAB lies in the northern part of the WCC area and is therefore itself outside of the PfSH subregion.

12.7.50 Through a non-statutory Spatial Position Statement (2016), PfSH has identified specific Strategic Development Locations, Strategic Employment Locations, and a Hierarchy of Centres for the subregion and works to key principles utilising a “*cities first*” approach to development. The Spatial Position Statement (2016) identifies specific locations for strategic housing and employment growth, including West of Waterlooville within the Winchester District area:

- Around 6,000 new homes, of which 2,500 of the new homes, which already have planning permissions, will be to the West of Waterlooville and 3,500 new homes in North Whiteley.
- The allocations West of Waterlooville which form part of the PfSH spatial approach are a key location for provision of new employment floorspace which are of significant scale to have sub-regional importance that offer further development potential.

12.7.51 The Winchester District Local Plan Part 2 was adopted in April 2017 follows on from the Local Plan Part 1 and makes further land allocations at the non-strategic level to help deliver the overall development requirements for the district over the plan period, particularly for the Market Towns and Rural Areas outside the SDNP that are expected to provide around 2,500 new homes between 2011 and 2031.

12.7.52 The South Downs Local Plan was adopted in July 2019 to cover the whole of the SDNP. It is a landscape-led plan that reflects the national parks’ statutory purposes and considers the park as a single entity which covers the counties of Hampshire, West Sussex and East Sussex and the districts of East Hampshire, Winchester, Lewes, Arun, Horsham and Wealdon.

12.7.53 There are no market towns in this area of the SDNP. Villages in the Western Downs are clustered along the northern boundary of the SDNP and relate most closely to gateway towns along the A31 corridor.

12.7.54 The area known as the Western Downs abuts the M3 corridor at Winchester and is recognised as both a gateway to the SDNP and a location of external growth pressure. In economic and land use terms the area is characterised by farming and rural enterprises taking the form of diversified land holdings (e.g. Rotherfield Estate) which include arable, managed woodland, shoots and fisheries. Nationally important watercress production also occurs in the Itchen Valley.

12.7.55 Challenges and opportunities within The Western Downs relate to ease of accessibility from more densely populated areas around the SDNP, such as Winchester and Alton, and there are opportunities to create better multi-user routes and circular itineraries based on railway stations. A specific challenge in this area lies with the need to safeguard the important habitats and species of the River Itchen and to reconcile these with the commercial requirements of watercress production by finding more sustainable methods of cultivation and processing.

Community Infrastructure

12.7.56 There are a range of community facilities and assets within the 2km health and communities study area. An overview of community infrastructure is set out in **Tables 12-18** to **12-21** below.

Table 12-18: Schools in Health and Communities Study Area

Facility	Type of facility	Location from Proposed Scheme
All Saints Church of England Primary School	One form entry primary school.	1,600m south-west
Kings Worthy Primary School	Mixed government school for children ages 4 - 11	368m east
Osbourne School	Maintained special school for pupils with learning disabilities aged 11-19.	1,600m west
Prince's Mead School	Independent preparatory school for ages 3 – 11	450m west
St. Bede Church of England Primary School	Church of England school for pupils aged 4-11.	1,190m west
St Swithun's School	Independent school for girls aged 3 – 18.	270m east
Winnall Primary School	Mixed public community school	430m west

Table 12-19: Nurseries and Playgroups in Health and Communities Study Area

Facility	Type of facility	Location from Proposed Scheme
Nurseries and Playgroups		
Hartley House Montessori Ltd	Montessori style nursery for children aged 6 months to 5 years	1,310m west
Riverside Nursery School	Private nursery with some government funding for children aged 2 – 5	1,010m west
Kingsmead Day Nursery	Private nursery for children aged 0 – 5	1,550m south-west
Spingvale Playgroup	Playgroup	240m east
All Saints Preschool	Early years provision for children aged 2 years 6 months and up	1,600m south-west
Stepping Stones Pre-School	Private nursery with some government funding for children aged 2 to 4/5	450m west
Woodhams Farm Day Nursery	Education for children from 3 months to 5 years	300m north
Yellow Dot Nursery	Private nursery for children of 'baby to kindergarten age'	900m west

Table 12-20: Care Homes and Nursing Homes in Health and Communities Study Area

Facility	Type of facility	Location from Proposed Scheme
Care Homes and Nursing Homes		
Leonard Cheshire	Provides support for disabled people	310m west
Homerise House	Assisted living facility with resident management staff	1,700m west

Facility	Type of facility	Location from Proposed Scheme
Moorside Nursing Home	Specialist dementia care	1,400m south-west
Abbotts Barton Care Home	Private residential and nursing care	1,250m north-west
Brendoncare Park Road Nursing Home	Charity-run nursing home	1,400m west
Anchor - Watersmeet	Private residential and nursing care.	1,560m south
Cambria House	Specialist residential care	1,600m west

Table 12-21: Emergency Services in Health and Communities Study Area

Facility	Type of facility	Location from Proposed Scheme
Hospitals		
Leigh Hospital	Specialist mental health unit for young people	620m east
Winchester Fire Station	Fire station	430m south-west

Public Access and Recreation

12.7.57 The key roads and public rights of way (PRoW) that interact with or are in close proximity to the Proposed Scheme are shown on **Figures 2.1 and 2.2, Appendix 2.1.**

12.7.58 The highways associated with the M3 Junction 9 include:

- **M3 motorway itself:** the M3 runs 95km from Sunbury-on-Thames in Surrey to Eastleigh in Hampshire. From Junction 8 to Junction 9, it runs dual two lanes and then dual three lanes onwards to Southampton.
- **A34 Winchester Bypass:** Junction 9 connects the M3 to the A34, a major road which runs to the Midlands and the north-west. The A34 is a key route within Winchester, connecting northern residential areas at the Worthies, Wherwell, and Wonston to the city centre.
- **Easton Lane:** this road provides direct access to Winchester city centre from the M3 via Junction 9. It also provides access into the adjacent industrial areas.

- 12.7.59 The B3404 (Alresford Road) crosses the M3 east-west via a bridge approximately 570m south of Junction 9 and accommodates bus routes between Winchester and settlements to the east. Vehicle travellers on the M3 north of junction 9 would have intermittent views of the surrounding countryside since the motorway is on embankment. However, to the south of the junction, the motorway drops into cutting restricting views for vehicular travellers. There is a footway along the eastern edge of the A34 dual carriageway. There are footways on both sides of Easton Lane within industrial estate.
- 12.7.60 There are four non-vehicular PRow within the vicinity of the Proposed Scheme including the South Downs Way National Trail which crosses the M3 in a west–east alignment using an overbridge south of Junction 9.
- 12.7.61 The National Cycle Network Route 23, linking Reading to Southampton, crosses Junction 9 via at-grade crossings. The cycleway is routed onto Easton Lane in the industrial estate from the south, crossing the motorway junction via two at-grade crossings, before continuing along Easton Lane to the east. Easton Lane at this point is bridleway 502 as it crosses the junction and for approximately 200m until it becomes a small, single carriageway metalled track from which some isolated residential properties/farms may be accessed. There is no through-route for motorised traffic across the junction via Easton Lane.
- 12.7.62 There are four distance paths (regional trails) following the Itchen valley. The Allan King Way and St Swithun’s Way follow the same route on the west side of the valley, crossing the A34 immediately north of the Proposed Scheme location via an underpass into Kings Worthy. The Itchen Way and Three Castles Path follow another route on the east side of the valley, crossing under the A34 where the River Itchen crosses, within the footprint of the Proposed Scheme. The two distance paths diverge approximately 600m east of the A34, with the Three Castles Path crossing the M3 via a subway approximately 740m north of the Proposed Scheme, whilst the Itchen Way joins St Swithun’s Way and crosses the M3 approximately 380m further along. These are the main PRow within close proximity to the Proposed Scheme, although there are several shorter public footpaths and bridleways in the wider area.
- 12.7.63 The location of the Proposed Scheme on the edge of settlement with the SDNP to the east means that the majority of pedestrian and cycling journeys across the Proposed Scheme area would be likely to be for recreational purposes. However, community infrastructure such as St Swithun’s School and Leigh House Hospital east of the M3 can be accessed via the cycleway or Alresford Road and likewise, it is possible that some residents from the villages and properties east of the M3 would access services within Winchester via the same routes.

12.7.64 The routes identified above are likely to be heavily used as the M3 acts as a barrier between Winchester and the SDNP and these represent the only crossing points available in the vicinity of the site.

12.7.65 Potential improvements to the local PRow network as part of the Proposed Scheme. The inclusion of specific PRow network improvements will be investigated further and confirmed through the detailed design of the Proposed Scheme.

Future Baseline Scenario

12.7.66 The projection figures indicated that the WCC area population is expected to increase by 3% or 3,548 people between 2018 and 2023 which is in line with the national average (3%). At the date of opening the new junction the population is estimated to have increased by 4% on the base year of 2018.⁵

12.7.67 A review has been undertaken to identify relevant developments either under construction or where conditions have been discharged to allow construction to commence. The methodology for assessing the cumulative effects along with a list of developments is set out in **Chapter 15**.

12.8 Design, mitigation and enhancement measures

12.8.1 The Proposed Scheme will incorporate a number of embedded mitigation measures to seek to achieve the five scheme objectives:

- Supporting economic growth – unlocked development capacity for job, business and housing creation
- A safe and serviceable network – safety improved as a result of reducing delays and queue lengths
- A less congested network – reduce the amount of congestion and increase journey time reliability
- An improved environment – endeavour to reduce where possible the number of households adversely affected by noise, improve the air quality at sensitive receptors and maximising biodiversity outputs from the Proposed Scheme.
- A more accessible and integrated network – improvements at Junction 9 would also include improvements for WCH routes.

12.8.2 The Proposed Scheme will also seek to avoid, prevent or minimise likely significant adverse environmental effects where practicable. The inclusion of embedded mitigation measures is an iterative process and any measures

⁵ ONS 2018-based subnational population projections for Winchester

which are introduced after the publication of this PEIR will be reported within the ES.

12.8.3 The following relevant design principles are proposed to be incorporated into the final design of the Proposed Scheme:

- Opportunities to improve provision for pedestrians, cyclists and equestrians when crossing the M3 Junction 9 area - an improved standard of shared use (pedestrian/cycle) route across the junction area is proposed, offering a more direct means of accessing the countryside east of the Proposed Scheme, see **Chapter 2** and **Figure 2.6, Appendix 2.1**.
- Potential improvements to the local PRow network - the inclusion of specific PRow network improvements will be investigated further and outlined in **Chapter 3**.
- Responding to feedback from previous engagement with consultees and local communities, the detailed design and implementation of the Proposed Scheme will consider additional opportunities to maximise local accessibility and socio-economic benefits. This may include:
 - Proposals to better integrate adjacent residential, industrial and commercial areas (e.g. Winnall Industrial Estate) accessed from Easton Lane immediately west of the M3 with the new Junction 9 and A34 interchange where possible.
 - Proposals to maximise social value and local supply chain opportunities through the construction phase of the Proposed Scheme where possible.

12.8.4 For the construction phase a first iteration Environmental Management Plan (fiEMP), will be developed to reduce the risk of any likely significant adverse effects on environmental receptors as a result of construction activities, and to minimise disturbance to local residents which can be secured through a suitable planning condition (effects on local residents are reported within other environmental chapters of the PEIR). Of relevance to this assessment, the fiEMP will include measures and procedures to manage public access and amenity effects during construction.

12.8.5 All proposed embedded and other essential mitigation measures seek to achieve the five scheme objectives listed above and avoid, prevent, or minimise likely significant adverse effects on Population and Human Health receptors where practicable, will be reported in the ES.

12.9 Assessment of potential effects

Overview

12.9.1 All new developments have the potential to generate population and health effects at the local, regional and/or national level, principally in relation to

changes in economic development, employment, area regeneration, community infrastructure provision and usage, retail expenditure and public access to recreational assets. However, the range of likely significant effects generated by a development proposal depends upon the characteristics of the individual development combined with the baseline socio-economic conditions (e.g. labour and housing markets) which the proposal would interact with.

12.9.2 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon Population and Health during the construction and operational phases. As noted in **Section 12.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through iterative design, EIA and consultation processes.

12.9.3 This chapter of the PEIR is supported by the preliminary findings of the Economic Appraisal, the EqIA and the optioneering exercise undertaken for proposed WCH routes, which all directly inform the assessment of likely significant effects on Population and Health. Once finalised, these technical assessments will form the evidence base for the assessments in the Population and Health Chapter of the ES, which will assign a specific magnitude of change to each type of likely impact from the Proposed Scheme.

Construction

12.9.4 In accordance with the EIA Scoping Opinion (November 2020), the following construction phase effects require to be assessed:

- Development Land and Businesses:
- Construction employment effects, with associated economic and expenditure effects
 - Effects on the performance of the construction sector
 - Access and amenity effects on economic and employment areas
- Community Land and Assets: amenity and accessibility related effects on community assets and infrastructure
- WCH / Public Access: effects on users of recreational routes through changes in public access between Winchester and the SDNP;
- Private Property and Housing: amenity effects on existing residential areas; and,
- Health and amenity: effects on relevant key determinants of health (physical and social).

Development Land and Businesses

Employment Impacts

- 12.9.5 Labour market impacts from construction have not been quantified at this stage as cost, programme, and procurement data was not available at the time of writing this PEIR. However, it is recognised that the construction phase will give rise to temporary employment.
- 12.9.6 The extent to which these impacts will be additional will be assessed as part of the ES. This will take account of likely leakage, displacement, and multiplier effects relating to the temporary construction workforce. This assessment will be informed by the baseline conditions described in **Section 12.7**, and the procurement and sourcing policies of Highways England's primary contractor.
- 12.9.7 The applicant has made framework level commitments to prioritise the local labour and materials supply chain. Targets will be set for small to medium sized enterprise (SME) engagement and carbon reduction through local procurement.
- 12.9.8 The applicant will produce heat maps for local aggregate quarries, waste tips, and batching plants for Ready Mix Concrete. Early engagement with the local supply chain is planned to understand its capabilities. 'Distance travelled to site' will be embedded and scored positively within the subcontract scoring matrix.
- 12.9.9 These processes have been used by the applicant on other road schemes and have been shown to work effectively. For example, work has started on the A27 project and 100% of tenders included local companies where appropriate. From the 25 appointed contractors 9 are local companies (within 20 miles) and 19 are within the SME classification.

Construction Sector Impacts

- 12.9.10 The ES will include an assessment of the likely effects of supply chain development, temporary employment, and increased value-added on the Winchester construction sector. As this is an assessment of the direct labour market effects described above, which have not been quantified at this stage, it cannot yet be undertaken.

Winnall Industrial Estate

- 12.9.11 Traffic management arrangements could potentially affect access into the Winnall Industrial Estate for workers, deliveries, shoppers and residents (student accommodation). Disruption to journeys could be caused by the physical footprint of construction activities affecting existing routes or temporary diversions and traffic management creating difficult conditions on the adjacent road network. Details of traffic management on Easton Lane during the construction phase have not yet been finalised and so the effects

on Winnall are yet to be quantified. This will be reported and assessed in the context of population and human health in the ES chapter.

Community Land and Assets

Traffic Impacts

12.9.12 There is potential for temporary disruption to pedestrian and cycle journeys near to and within the IAB, particularly around the A34 and Easton Lane arms of the Junction 9 roundabout and for people seeking to access the Easton Lane Depot.

12.9.13 However, as identified in the baseline, no routes have been identified that currently support high numbers of active travel journeys, and therefore the potential magnitude of this impact would be unlikely to be high.

Walking, Cycling Horseriding / Public Access

Public Access and Recreation

12.9.14 There would likely be temporary disruption to, or loss of, physical access to the section of National Cycle Network Route 23 (including bridleway 502) and the existing shared use footway/cycleway adjacent to the southbound carriageway of the A34 within the footprint of the Proposed Scheme (See **Figure 2.2, Appendix 2.1**). This would result in temporary severance between Winchester and the SDNP in the vicinity of the Site for WCH users.

12.9.15 The amenity of PRoW and other routes and recreational resources within study area would also be likely to be affected by noise, vibration, dust and visual intrusion. Refer to the air quality, noise, and landscape and visual assessments reported elsewhere in this PEIR for further details of the likely extent of such environmental effects.

12.9.16 There is potential that the temporary loss of amenity, and disruption to usual routes, would be enough to deter people from accessing the SDNP for outdoor recreation. There is strong evidence that direct contact with the natural world can have beneficial effects on mental health and wellbeing and the immune system. Therefore, any disruption to access to the SDNP is potentially significant in terms of local health. However, there are alternative routes, such as via Alresford Road and the South Downs Way, that would likely remain unaffected by the Proposed Scheme. Continuity of access to services in Winchester for WCH users from the SDNP and associated rural areas east of the M3 is therefore anticipated to be maintained, albeit through alternative routes.

Private Property and Housing

Noise

12.9.17 Preliminary findings of the assessment in relation to noise impacts are reported within **Chapter 11** of this PEIR. At this stage, it is considered that noise sensitive human receptors beyond 200m of construction activities are unlikely to be subject to adverse effects. Further assessment of the potential impacts of construction impacts (in particular from construction traffic) is required under **Chapter 11** of this PEIR. The conclusions of other environmental chapters of this PEIR will continue to inform assessment work to be reported in the ES in the context of Private Property and Housing within the population and health chapter.

Air Quality

12.9.18 Further assessment of the potential impacts of construction phase traffic on air quality is required under **Chapter 5** of this PEIR to clarify the duration and extent of change during the construction programme. The conclusions of other environmental chapters of this PEIR will continue to inform assessment work to be reported in the ES in the context of Private Property and Housing within the population and health chapter.

Landscape

12.9.19 Preliminary findings of the assessment in relation to potential visual effects on private property and housing interests suggest that there may be some temporary adverse effects during the construction phase on residential properties and new development within the study area. The full extent of these potential effects will be informed by design development and mitigation measures and will be assessed and reported within the ES.

Health

Effects on Key Health Determinants

12.9.20 Aside from temporary restrictions to WCH routes discussed above, which could limit local opportunities for active travel and physical exercise, the construction phase could also affect identified key determinants of health through temporary changes in air pollutant levels and noise levels within the vicinity of construction works. The preliminary findings set out in **Chapter 5 Air Quality** of this PEIR note that it is not currently possible to ascertain the potential magnitude of any such impact on air quality for the construction phase. Ongoing design and EIA work continue to consider likely impacts from the Proposed Scheme as the project progresses. The preliminary findings in **Chapter 11 Noise and Vibration** conclude that adverse impacts are not anticipated at human noise sensitive receptors. Updated air quality and noise assessments for the Proposed Scheme will be completed to inform ongoing EIA work which will be reported in the ES, and this will be used to

carry out further assessment of the potential impact of these aspects of population health. A detailed assessment of impacts on individual relevant health determinants will be considered through ongoing EIA work and reported in the ES.

12.9.21 In addition, there could be potential for driver stress caused by frustration, route uncertainty and/or fear of accidents as a result of temporary changes in traffic flows and any route diversions needed to construct the Proposed Scheme. This would potentially affect drivers on the M3 at Junction 9 and wider affected highway network. Traffic data will be used to support further assessment of this issue which will be reported in the ES.

Operation

12.9.22 In accordance with the EIA Scoping Opinion (November 2020), the following operation phase effects require to be assessed:

- Development Land and Businesses:
- Effects on the performance of relevant key business sectors
- Access and amenity effects on economic and employment areas
- Secondary effects on development land and key employment areas resulting from improvements in access
- Community Land and Assets: amenity effects on community assets / infrastructure
- Walking, Cycling Horseriding / Public Access: effects on users of recreational routes through changes in public access between Winchester and the SDNP.
- Private Property and Housing: Secondary effects on residential development land and the housing market (Winchester District Strategic Housing Market Area (SHMA)) resulting from improvements in access.
- Health: effects on relevant key determinants of health (physical and social)

Development Land and Businesses

12.9.23 Likely impacts on development land and businesses are being considered through the draft Economic Appraisal. These will be assessed against the four strategic economic roles for Highways England identified in its strategic economic growth plan, The Road to Growth (Highways England, 2017).

12.9.24 **Table 12-22** below summarises relevant findings from the draft Economic Appraisal in relation to likely operational phase impacts on development land

and business. The Economic Appraisal will be finalised in tandem with ongoing EIA work.

Table 12-22: Draft Economic Appraisal findings: development land and business

	Strategic economic role	Sub-category	Existing role of M3 J9	Likely impacts of M3 J9 Improvement
1	Support business productivity and competitiveness and enable the performance of SRN-reliant sectors.	Goods market access	<ul style="list-style-type: none"> ■ Key node in national distribution networks based in the Midlands, and local networks providing access to Winchester. 	<ul style="list-style-type: none"> ■ Reduce operating cost of freight traffic.
		Labour market access	<ul style="list-style-type: none"> ■ Provides commuting access into Winchester from the M3 corridor. 	<ul style="list-style-type: none"> ■ Allow Winchester-based businesses access to a broader labour catchment. ■ Help address likely skills shortages and grow Winchester's high value employment base.
		Connectivity and tourism	<ul style="list-style-type: none"> ■ Key node along journeys to the eastern Solent from London, Berkshire, and Kent, among others. 	<ul style="list-style-type: none"> ■ Encourage greater numbers of day trips to the Solent. ■ Support the growth of the Solent's visitor economy. ■ Secure the competitiveness of the Port of Southampton's cruise industry.
2	Provide efficient routes to global markets through international gateways.	Port access	<ul style="list-style-type: none"> ■ Facilitates access between northern manufacturing markets and Solent ports via the A34. 	<ul style="list-style-type: none"> ■ Reduce operating cost of freight traffic. ■ Improve the competitiveness of the Solent ports, optimising the benefits of their strategic location adjacent to deep

Strategic economic role		Sub-category	Existing role of M3 J9	Likely impacts of M3 J9 Improvement
		Airport access	<ul style="list-style-type: none"> Facilitates access between Heathrow Airport and Winchester, Southampton, and surrounding areas. 	<p>water shipping routes.</p> <ul style="list-style-type: none"> Improve business connectivity and improve the attractiveness of these areas as a place for businesses to locate. Support the growth of Enterprise M3's digital and professional services sectors. Secure the competitiveness of the Port of Southampton's cruise industry.
3	Stimulate and support the sustainable development of homes and employment spaces.	New development	<ul style="list-style-type: none"> Provides Winchester businesses and residents access to the SRN. Facilitates access to adjacent retail services and the SDNP. 	<ul style="list-style-type: none"> Potential to accelerate local development sites by improving marketability and mitigating potential capacity constraints.
		Existing employment sites		<ul style="list-style-type: none"> Increase in adjacent commercial and industrial land values. Potential to accelerate ongoing trends towards densification and new development in Winnall.
4	Provide employment, skills, and business opportunities related to the SRN.	Construction phase impacts	Not applicable	<ul style="list-style-type: none"> Support temporary construction employment. Stimulate supply chain development through focus on local procurement.

12.9.25 This analysis confirms that the Proposed Scheme responds positively to all of Highways England's strategic economic roles and in doing so also addresses the specific strategic objective of the Proposed Scheme to "*support economic growth through unlocking development capacity for job, business, and housing creation*".

Community Land and Assets

12.9.26 Assessment of effects on community land uses and assets will be informed by transport modelling and the Economic Appraisal. The Economic Appraisal, including both transport and development economics topics are underway and being prepared to support ongoing assessments of likely effects which will be reported in the ES. This work will:

- Identify operational changes to accessibility to community land and assets including any severance as a result of the Proposed Scheme;
- Identify how frequently the assets are used and by who;
- Where appropriate, identify and consider the location of alternative assets; and
- Consider the impacts of such changes on those community assets across the wider WCC area.

Walking, Cycling Horseriding / Public Access

Public Access and Recreation

12.9.27 The Proposed Scheme incorporates opportunities to improve provision for pedestrians, cyclists, and horse-riders.

12.9.28 The WCH facilities around and within the Proposed Scheme boundary are to be upgraded and will retain the provision of NCN Route 23, segregating users from vehicles on the gyratory.

12.9.29 There are also proposed improvements to the local Public Rights of Way network as part of the Proposed Scheme, including a new footpath parallel to the eastern edge of the M3 corridor linking Easton Lane and Long Walk and a new footpath along the north side of Easton Lane, adjacent to the Homebase site and northward along the western edge of the A34. This route along the A34 also provides an improved walking link to the Highways England Depot site north of the gyratory and will also provide potential improvement to this employment site between the M3 and A34.

Private Property and Housing

12.9.30 In the absence of the publications of a Strategic Issues and Priorities paper to inform the preparation of the forthcoming local plan, non-statutory consultation has been undertaken to inform the PEIR and how the Proposed

Scheme may unlock future development land for residential and employment use. At this stage WCC has been unable to advise on a specific direction for future growth other than the Winnall area remains a key employment area and has advised that a paper will be published in Feb/March 2021. Effects of the Proposed Scheme are therefore yet to be quantified in terms of impact on private property and housing, but are likely to see beneficial effects from improved traffic flows and reduced congestion as a result of the proposed Scheme. This will be reported and assessed in the ES chapter building on information available at that time and further consultation.

Noise

12.9.31 Preliminary findings with regard to noise impacts are reported within **Chapter 11** of this PEIR and do not identify any significant noise effects during the operational phase of the Proposed Scheme. Private property interests within study area, particularly along Easton Lane closest to the IAB are therefore unlikely to experience significant adverse effects from operation of the Proposed Scheme. Further noise and vibration assessment is required through ongoing EIA work, which will be reported in the ES.

Air Quality

12.9.32 Preliminary findings with regard to air quality are set out within **Chapter 5** of this PEIR. These initial findings suggest the private property and housing interests could anticipate a decrease in pollutant concentrations in certain areas as a result of the Proposed Scheme, whilst other areas may experience an increase. These are preliminary findings and further assessment work is required to ascertain the potential impacts on receptors from predicted traffic flows, which will be assessed and reported in the ES.

Landscape

12.9.33 Preliminary findings within **Chapter 7** of this PEIR suggest that any adverse visual effects on private property and housing would likely reduce over time and therefore may not adversely impact on private property and housing receptors during the operational phase. However, these effects require to be assessed, taking design development, reinstatement and landscape mitigation into consideration inform assessment work to be reported in the ES.

Health

Effects of Key Health Determinants

12.9.34 Daily physical activity is important for maintaining health, and for most people the easiest forms of physical activity are those that can be built into everyday life such as trips to places of study and work.

12.9.35 There is also growing evidence that access to green spaces are important for both physical and mental health. However, across the UK people who live in more deprived areas are less likely to have good access to green space.

Improving equality of access to green space is thought to be important for addressing health inequalities.

12.9.36 The Proposed Scheme would improve opportunities for active travel journeys within the study area, and also improve access to the surrounding countryside, particularly for residents of the urban areas with higher levels of deprivation on the eastern fringe of Winchester.

12.9.37 Two further pathways by which the Proposed Scheme could affect population health – through changes in air pollutant levels and noise levels for local residents. The preliminary results of air quality and noise work suggests that noise effects are likely to be neutral and air quality is unlikely to exceed air quality thresholds. Updated air quality and noise modelling for the Proposed Scheme will be completed to inform ongoing EIA work which will be reported in the ES, and this will be used to carry out further assessment of the potential impact of these aspects of population health.

12.9.38 A detailed assessment of impacts on individual relevant health determinants will be considered through ongoing EIA work and reported in the ES.

Summary

12.9.39 **Table 12-23** below presents a summary of preliminary effects identified in this PEIR. The ES will assess these in greater detail to determine their level of likely significance.

Table 12-23: Summary of Preliminary Effects

Receptor	Stage of Proposed Scheme	Type of effect
Development Land and Businesses - Labour Market	Construction	Temporary Beneficial
Development Land and Businesses - Construction Sector	Construction	Temporary Beneficial
Development Land and Businesses - Winnall Industrial Estate	Construction	Temporary Adverse
Development Land and Businesses - Winnall Industrial Estate	Operation	Beneficial
WCH - National Cycle Network Route 23	Construction	Temporary adverse
WCH - National Cycle Network Route 23	Operation	Beneficial
WCH - Public Rights of Way: Bridleway [502] within the scheme extents.	Construction	Temporary adverse

Receptor	Stage of Proposed Scheme	Type of effect
Footpath [515] forming part of the NCN Route 23. Restricted Byway [19] linking Long Walk to Easton. Multiple Footpaths [20, 21, 22, 52] West of the Long Walk underpass.		
WCH - Public Rights of Way: Bridleway [502] within the scheme extents. Footpath [515] forming part of the NCN Route 23. Restricted Byway [19] linking Long Walk to Easton. Multiple Footpaths [20, 21, 22, 52] West of the Long Walk underpass.	Operation	Beneficial
Human health: physical activity and driver stress	Construction Operation	Temporary adverse Beneficial
Human health: physical activity and driver stress	Operation	Beneficial

12.10 Anticipated further assessment

12.10.1 Preparation of the Population and Health chapter of the ES will be supported by proportionate economic modelling (through the Economic Appraisal) which will be undertaken to quantify the net additional employment, supply chain and wider economic impacts generated directly or indirectly by the Proposed Scheme (construction and operational phases). This modelling cannot yet be completed as it is dependent upon the design, indicative cost, programme and construction arrangements for the Proposed Scheme being confirmed.

12.10.2 The assessment of likely significant effects to be reported in the ES will draw on the findings of the related technical assessments (when completed), including the Economic Appraisal, Equalities Impact Assessment and optioneering exercise undertaken for proposed WCH routes. These will inform identification of the predicted type, valency (direction) and magnitude of changes associated with specific likely population and health effects from the Proposed Scheme.

13 Road Drainage and the Water Environment

13.1 Introduction

13.1.1 This chapter presents the preliminary findings of the assessment of likely significant effects on Road Drainage and the Water Environment (RDWE) arising from the construction and operation of the Proposed Scheme. This encompasses the potential for flood risk, geomorphology (including the Water Framework Directive (WFD)), water quality and groundwater impacts associated with the Proposed Scheme. The preliminary findings presented in this Preliminary Environmental Information Report (PEIR) are based on existing studies and open source, freely available data.

13.1.2 During the ongoing Environmental Impact Assessment (EIA) process, these preliminary findings will be subject to further detailed assessment, the results of which will be reported in the RDWE chapter of the Environmental Statement (ES). Separate parallel assessments will be completed in the Water Framework Directive (WFD) Compliance Assessment, Flood Risk Assessment (FRA) and Piling Risk Assessment, which will be appended to the ES with the main findings summarised in the RDWE chapter. The WFD Assessment will determine compliance with the legislation identified in **Section 13.2** of this chapter, and the FRA will seek to demonstrate compliance with the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2019) and associated Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2014). The Piling Risk Assessment will seek to determine any significant impacts that the Proposed Scheme will have on groundwater quality.

13.2 Legislative and policy framework

13.2.1 A summary of the policies relevant to RDWE is provided below and includes national, regional, and local level policies.

- National Policy Statement for National Networks (NPS NN) (2014)
 - Paragraphs 4.36 to 4.47 (Climate change adaptation)
 - Paragraphs 4.48 to 4.56 (Pollution control and other environmental protection regimes)
 - Paragraphs 5.90 to 5.115 (Flood risk)
 - Paragraphs 5.219 to 5.231 (Water quality and resources)

- NPPF (2019)
 - Chapter 2 (Achieving sustainable development), paragraph 8
 - Chapter 14 (Meeting the challenge of climate change, flooding and coastal change), paragraphs 148, 150, 155, 158-161, 163 and 165
- PPG (2014-2019)
 - Flood Risk and Coastal Change (2014)
 - Climate Change (2019)
 - Land Affected by Contamination (2019)
 - Natural Environment (2019)
 - Water Supply, Waste Water and Water Quality (2019)
- The Flood Risk Regulations (2009)
- Flood and Water Act (2010)
- Environmental Permitting (England and Wales) Regulations (2016)
- The Water Resources Act (1991)
- Land Drainage Act (1991)
- The Building Regulations (2010): Drainage and waste disposal, 2015 edition
- Water Environment (Water Framework Directive (England and Wales) Regulations (2017)
- Highways England: Licence (2015)
- Sewers for Adoption 8th Edition
- Non-statutory Technical Standards for Sustainable Drainage Systems
- Rainfall Runoff Management for Developments (Report SC030219/R, October 2013)
- The SuDS Manual (C753)
- Environment Agency (EA), Flood Risk Assessments: Climate Change Allowances (2020)
- Environment Agency, The Environment Agency's Approach to Groundwater Protection (2018)

- Design Manual for Roads and Bridges (DMRB) CD 365 Design of Highways Structures for Hydraulic Action (2020)
- Winchester District Draft Local Plan 2018-2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February - 12th April 2021. Part 1: Policies DS1 (Development Strategy and Principles) and CP17 (Flooding, Flood Risk and the Water Environment)
- Winchester District Local Plan Part 2: Policies DM17 (Site Development Principles) and DM19 (Development and Pollution)
- South Downs National Park Local Plan 2014-2033 (2019): Policies SD17 (Protection of the Water Environment), SD49 (Flood Risk Management), SD50 (Sustainable Drainage Systems) and SD2 (Ecosystems Services)

13.3 Consultation

13.3.1 Consultation was undertaken with the EA in August 2020 (Reference: SSD/178635) to obtain the Product 5, 6 and 7 of the 2019 River Itchen Modelling Study. As a result, the model files and results for the EA’s latest approved model have been received.

13.3.2 Scheme specific consultation has been undertaken with the EA and Hampshire County Council (HCC) as Lead Local Flood Authority (LLFA). This is summarised in **Table 13-1**.

Consultation Undertaken

Table 13-1: Consultation undertaken

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
Page 40 Paragraph 4.10.1	<i>“The ES should determine where nutrients have potential to enter the water environment as a result of the Proposed Development and assess significant effects where they are likely to occur as a result. In the absence of a more detailed justification, the Inspectorate therefore does not agree to scope out the Itchen Navigation from the ES assessment. The ES should assess impacts to receptors where significant effects are likely to occur.”</i>	The applicant notes that the topic of nutrient neutrality has not been agreed to be scoped out of assessments. In line with Winchester City Council’s (WCC) Position Statement on Nitrate Neutral Development dated February 2020, the applicant considers that due to the lack of overnight stays associated with the Proposed Scheme, effects will not be significant.

Reference	Comment	Response
		<p>Consultation has been completed with Natural England to confirm the requirement of a Nutrient Neutrality Assessment (meeting of 19 January 2021). It was confirmed that a formal Nutrient Neutrality Assessment will not be required, however consideration will be given to nutrients with the assessments which are to be completed, including a WFD Compliance Assessment and Highways England Water Risk Assessment Tool (HEWRAT) assessment.</p> <p>The findings of these assessments will be reported within the ES.</p>
<p>Page 40/41 Paragraph 4.10.2</p>	<p><i>“The Itchen Navigation located 5km downstream from the site is proposed to be excluded from assessment due to being located too far away from the Proposed Development. It is unclear from the Scoping Report whether this is being scoped out as a receptor or impact pathway.</i></p> <p><i>The Itchen Navigation is <5km from the red line boundary and downstream of the River Itchen so this statement appears to be incorrect. Other waterbodies such as the Southampton and Solent Water Special Protection Area are included in the assessment which are located 16km downstream of the Proposed Development. In the absence of a more detailed justification, the Inspectorate therefore, does agree to scope out the Itchen Navigation from the ES assessment.</i></p>	<p>Itchen Navigation will be included within ES.</p>

Reference	Comment	Response
	<i>The ES should assess impacts to receptors where significant effects are likely to occur.”</i>	
Page 41 Paragraph 4.10.3	<i>“It is stated that the ES will fully justify and explain the rationale behind adapting the study area during the progression of the design. The ES should explain how the Zol and hydrological connectivity of the site has informed the study area extent. The ES should include a supporting Figure locating the study area and receptors.”</i>	Noted, a supporting figure will be produced for the ES.
Page 41 Paragraph 4.10.4	<i>“The ES should include the methods proposed to cross the river including the construction activities, timings and extent. Effort should be made to agree the river crossing solutions with the relevant consultation body and significant effects should be assessed where they are likely to occur.”</i>	Details of the bridge crossings are subject to ongoing survey and design work, which will be reported within the ES. The ES will include the methods proposed to cross the River Itchen. Once methods are established, agreement will be sought with the relevant consultation body.
Page 41/42 Paragraph 4.10.5	<i>“Groundwater monitoring has been undertaken across the M3 J9 site since 2019. This data will inform the baseline in terms of groundwater levels, fluctuations and quality. It is stated that it will form part of the baseline assessment, but it is unclear what other data will be used to inform the baseline. The ES should explain how the data provides representative information on which to base assessments and make effort to agree the baseline scenario with the EA and any other relevant consultation bodies.”</i>	Noted, the ES will provide explanation of how the data provides representative information, and agreement will be sought with the EA and relevant consultation bodies.

Reference	Comment	Response
Page 42 Paragraph 4.10.6	<i>“The FRA should define the catchment area of the River Itchen and apply the appropriate climate change allowances in line with government guidance ‘Flood Risk Assessment: Climate Change Allowances’ to the assessment. Effort should be made to agree the approach to the FRA with the relevant consultation bodies.”</i>	Noted, the ES will define the catchment area and apply appropriate climate change allowances. Agreement will be sought with the EA and relevant consultation bodies.
Page 42 Paragraph 4.10.7	<i>“The ES should define the extent and risk of both groundwater and reservoir flooding to and from the Proposed Development where there is potential for likely significant effects. This should be supported by a Figure.”</i>	Noted, this will be defined in the FRA as relevant and where necessary supported by a figure.
Page 43 Paragraph 4.10.8	<i>“The FRA submitted to inform the ES should address each of the relevant sources of flooding identified.”</i>	Noted
Page 43 Paragraph 4.10.9	<i>“The ES should detail the piling methods and locations and potential impacts from these construction activities on the water environment, including groundwater sources. Mitigation should include a plan for the event of a bentonite breakout which should be secured via the DCO; effort should be made to agree the details of the plan with the relevant consultation bodies.”</i>	The ES will identify the types and location of piling activities where possible, assessing impacts determining their significance. Appropriate mitigation will be reported in their ES, along with how they will be legally secured. Agreement will be sought with the EA and relevant consultation bodies.
Page 43 Paragraph 4.10.10	<i>“Details of both temporary and permanent drainage features should be included in the ES and construction, operational and decommissioning impacts of these features should be assessed in the ES where significant effects are likely. Effort should be made to agree the embedded and additional mitigation measures with the relevant statutory</i>	Noted, agreement will be sought with the EA and relevant consultation bodies.

Reference	Comment	Response
	<i>consultation bodies to ensure that they are appropriate.”</i>	
Page 43/44 Paragraph 4.10.11	<i>“The ES should identify water abstractions within the study area and assess significant effects where they are likely to occur.”</i>	Noted
Consultees Response to Scoping Opinion		
South Down National Park Authority (SDNPA)	<i>“The SDNPA does not agree that the issue of Nitrate Neutrality should be scoped out of the assessment (as referred to in Table 14-4). This scheme could have a significant environment impact in relation to this issue.”</i>	<p>The applicant notes that the topic of nutrient neutrality has not been agreed to be scoped out of assessments.</p> <p>Consultation has been completed with Natural England to confirm the requirement of a Nutrient Neutrality Assessment (meeting of 19 January 2021). It was confirmed that a formal Nutrient Neutrality Assessment will not be required, however consideration will be given to nutrients with the assessments which are to be completed, including a WFD Compliance Assessment and HEWRAT assessment.</p> <p>The findings of these assessments will be reported within the ES.</p>
WCC – Environmental Service	<i>“Whilst ‘assessment of nutrient neutrality’ is proposed to be scoped out in Table 17-2 (road drainage and the water environment), an assessment of the nutrient impact would be expected within other supporting documents outside of the Environmental Statement given the identified ongoing concerns for the Solent water system in the region.”</i>	A WFD Compliance Assessment and HEWRAT assessment will be completed and reported in the ES.
WCC - Drainage	<i>“Bridge works over the Itchen would be of interest to the Environment Agency, they would</i>	Noted

Reference	Comment	Response
	<i>also need to issue a permit separately to planning. They may wish to comment on EIA matters relating to the proposed scheme.”</i>	
WCC – Ecology	<p><i>“Best practice recommendations for the prevention of contamination and pollution, an erosion prevention and sediment control plan, should be outlined in detail in the CEMP.</i></p> <p><i>The potential impacts from pollution, changes to groundwater resources, accidental spillages and flood risk on the River Itchen SSSI and SAC will be assessed through the HRA.”</i></p>	<p>Noted – Second Iteration Environmental Management Plan (siEMP) will be produced prior to commencement of construction, using the First Iteration Environmental Management Plan (fiEMP) which will accompany the application for Development Consent.</p> <p>Pollution prevention will be designed into the drainage strategy.</p>
Southern Water Services	<i>“Provided a spreadsheet of assets/easements in proximity to proposed works. Data is sensitive and not to be placed on public record.”</i>	Noted
EA	<i>“Our primary concerns regarding the scheme relate to the protection of groundwater, and protection/enhancement of the ecological balance and species within the River Itchen and surrounding areas (including biodiversity net gain). The River Itchen is a designated Main River, and the river and the associated floodplain is a Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI).”</i>	Noted
	<i>“In regard to flood risk, the majority of works are to take place in Flood Zone 1 areas. It seems that only minor works are taking place within the section of road that is located in Flood Zone 3 (i.e. the section of road crossing the River Itchen). Therefore, flood risk is of lesser concern to us at this stage. This may change if</i>	Noted

Reference	Comment	Response
	<p><i>later design stages determine that more extensive work will be required within Flood Zone 3.”</i></p> <p><i>“In the report, there is mention of possible works on or near the River Itchen (Sections 9.4.2 and 14.2.20). Any proposed works or structures in, under, over or within 8 metres of the river bank is likely to require a Flood Risk Activity Permit from us under the Environmental Permitting (England and Wales) Regulations 2016.</i></p> <p><i>As construction details are developed, we would recommend early consultation with us regarding any applications for any Flood Risk Activity Permits.”</i></p>	<p>Noted, once relevant detail becomes available consultation will be undertaken and agreement sought.</p>
<p>Environment Agency - Meetings</p>		
<p>16 June 2019</p>	<p>Meeting to discuss drainage, water environment, groundwater, flood risk, and WFD.</p> <p>Scheme overview provided.</p> <p>Confirmation of no drainage works in Source Protection Zone (SPZ).</p> <p>One catchment confirmed to drain to the River Itchen with increased permeable and impermeable contributing catchment areas.</p> <p>Discharge to be limited to existing runoff rate, attenuated via a pond.</p> <p>All other catchments to drain to soakaways or infiltration trenches.</p> <p>Water quality assessment completed which confirmed that the catchment is considered to be (lower end) medium risk.</p> <p>Spillage risk assessment completed and confirmed that M3 Junction 9 is at very low risk (<1:1000).</p>	<p>Updated HEWRAT assessment to be completed to inform ES which will include water quality assessment.</p>

Reference	Comment	Response
	<p>Confirmed that no hydraulic modelling was being completed due to the scheme being located in Flood Zone 1 (at the time).</p> <p>Confirmed that standalone WFD assessment to be provided covering ground and surface water bodies.</p> <p>Agreed that no specific hydromorphological assessment required.</p>	<p>Proposed Scheme has progressed, and now hydraulic modelling is being completed due to the new proposed crossing of the River Itchen.</p>
<p>27 June 2019</p>	<p>Proposed Scheme overview provided.</p> <p>Confirmed FRA will be produced to support ES.</p> <p>Confirmed Proposed Scheme location within Flood Zone 1 with no new crossings.</p> <p>Confirmed that river model files had been provided.</p> <p>Discharge of groundwater would be dependent on quality, with on-site treatment being sufficient (lined pond).</p> <p>Proposed Scheme is downstream of SPZ so there should not be interaction with public water supply extraction.</p> <p>Attenuation storage provided by ponds or underground storage tanks prior to discharge to watercourses or surface water drainage network.</p> <p>Attenuation storage sized to:</p> <p>a) store flows up to the 1 in 100yr storm +20% Climate Change uplift factor (and assessed against a +40% Climate Change uplift).</p>	<p>Proposed Scheme has progressed and is now located within Flood Zone 1, 2 and 3, with new crossing of the River Itchen proposed.</p> <p>Updated model now available and obtained to inform Proposed Scheme.</p>

Reference	Comment	Response
	<p>b) allowable discharge rates are to be limited to 1 in 1 year greenfield runoff for offline sections.</p> <p>c) allowable discharge rates are to be limited to the existing highway peak runoff rates for existing online sections.</p> <p>d) a minimum practicable discharge of 5l/s.</p> <p>Pollution control will be critical for discharge to ground and watercourse due to SPZ and abstraction licences.</p> <p>Existing outfalls to River Itchen will be utilised where possible.</p>	
<p>24 February 2021</p>	<p>Confirmed that flood risk is of lower concern and requested that the FRA be clear on any impacts of the scheme.</p> <p>Climate change allowances applied within the available hydraulic model are inputted differently to the standard approach due to the detailed hydrological study completed which took account of non-stationarity. Confirmation requested by the Applicant that it was appropriate to continue to apply climate change allowances in a consistent manner.</p> <p>High level intentions for the drainage design were presented. Outlined the target of 2l/s per hectare of long-term storage rate and total discharge of 20l/s to be discharged across three outfalls for area contributing new runoff to River Itchen. Current and proposed pollution treatment measures were outlined.</p>	<p>Noted.</p> <p>Environment Agency to respond.</p>

Reference	Comment	Response
	Queried whether discharge rate discussions are being held with LLFA.	Discussions are being held with LLFA.
Environment Agency – Data Requests		
24 August 2020 – present	Model files and data requested (Products 5, 6 and 7).	Model files and data provided, however review showed not all files are present. Consultation is ongoing to receive all required files.
Hampshire County Council - Meeting		
27 June 2019	<p>Meeting with HCC as LLFA</p> <p>Recent flood history reviewed, confirmed that it is only to residential gardens, with last significant flood in 2014/15 which was mainly attributed to groundwater.</p> <p>HCC confirmed that there were no minor watercourses or land drainage that would be impacted by Proposed Scheme.</p> <p>Two areas highlighted as at risk of surface water flooding:</p> <p>1) At marker post 101/6 +33m – upstream of a 300mm diameter culvert (according to HADDMS). Current standards state a minimum 450mm diameter for culverts. Culvert sizes will be looked at during preliminary design.</p> <p>2) A272 (approx. 400m south of junction 9) – there is a natural depression into which the local road drainage outfalls towards.</p> <p>Design criteria agreed:</p> <p>a) Attenuation of 1 in 100yr storm +20% Climate Change uplift factor (and assessed against a +40% Climate Change).</p>	<p>Proposed Scheme updated and now has more interaction with minor watercourses and land drains.</p> <p>To be taken into consideration in the surface water drainage strategy.</p>

Reference	Comment	Response
	<p>b) Allowable discharge rates are to be limited to 1 in 1 year greenfield runoff for offline sections.</p> <p>c) Allowable discharge rates are to be limited to the existing highway peak runoff rates for existing online sections.</p> <p>d) Restricted discharge rate of 5l/s.</p> <p>HCC confirmed no official betterment requirements, but stated designing to current standards and limiting discharge to 5l/s minimum would be an improvement.</p>	
Natural England – Meeting		
19 January 2021	<p>Meeting with Natural England to provide an update of the Proposed Scheme and key deliverables, and discuss outcomes of the EIA Scoping Opinion.</p> <p>It was highlighted that the Natural England Scoping Opinion response did not reference the requirement of a Nutrient Neutrality Assessment, however other consultee responses (WCC and SDNPA) identified the need for consideration.</p> <p>Natural England agreed that there did not appear to be nutrient input pathways, however the Applicant would be required to demonstrate this within the assessments being completed to inform the ES.</p>	<p>A WFD Compliance Assessment and HEWRAT assessment will be completed which will consider nutrients and nutrient pathways and will be reported in the ES.</p>

Proposed Consultation

13.3.3 The following stakeholders will be consulted to acquire local/site-specific information on hydrology, flood risk, and water resources, to obtain information on groundwater abstractions, to assist with characterising the

baseline water environment and to agree the methodology for the technical assessments/analysis required to inform the EIA process:

- Environment Agency
- WCC
- SDNPA
- HCC as LLFA

13.4 Assessment methodology and significance criteria

13.4.1 The following approach has been adopted to identify the preliminary findings as presented in this PEIR:

- Review of international, national and local legislation, policies and guidelines in relation to water resources, water quality, flood risk and WFD.
- Establish baseline conditions within the study area through review of desk based sources of information. A site walkover was completed (6 October 2020) to inform the preliminary findings of the assessment, and to inform the ongoing EIA work to be reported in the ES.
- Identify the importance of sensitive receptors and likely key issues.
- Identify potential risks to surface water quality, groundwater quality and all forms of flood risk from the Proposed Scheme and hence the likely significant impacts during both the construction and operation phases. At this stage, unless stated otherwise, the preliminary findings relate to impacts from Proposed Development in general (i.e., not a specific scheme element).
- Recommend appropriate mitigation.

13.4.2 The method of assessment and reporting of significant effects is based on guidance contained in DMRB LA 113 (Highways England, 2020). The DMRB promotes the following approach:

- Estimation of the importance of the attribute.
- Estimation of the magnitude of the impact.
- Assessment of the significance of the impact based on the importance of the attribute (**Table 13-2**) and magnitude of the impact (**Table 13-3**).

Table 13-2: Estimating the Importance of the Water Environment Attributes (extract)

Importance	Typical Criteria	Typical Examples	
Very high	Nationally significant attribute of high importance	Surface water	Watercourse having a WFD classification shown in a River Basin Management Plan (RBMP) and $Q_{95} \geq 1.0\text{m}^3/\text{s}$ Site protected/designated, such as Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), Ramsar site, salmonid water)/Species protected by EC legislation LA 108 [Ref 1.N]
		Groundwater	Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK legislation LA 108 [Ref 1.N] Groundwater locally supports Ground Water Dependent Terrestrial Ecosystem (GWDTE) Source Protection Zone (SPZ)1
		Flood risk	Essential infrastructure or highly vulnerable development
High	Locally significant attribute of high importance	Surface water	Watercourse having a WFD classification shown in a RBMP and $Q_{95} < 1.0\text{m}^3/\text{s}$ Species protected under EC or UK legislation LA 108 [Ref 1.N]
		Groundwater	Principal aquifer providing a locally important resource or supporting a river ecosystem Groundwater locally supports GWDTE SPZ2
		Flood risk	More vulnerable development
Medium	Of moderate quality and rarity	Surface water	Watercourses not having a WFD classification shown in a RBMP and $Q_{95} > 0.001\text{m}^3/\text{s}$
		Groundwater	Aquifer providing water for agricultural or industrial use with limited connection to surface water

Importance	Typical Criteria	Typical Examples	
			SPZ3
		Flood risk	Less vulnerable development
Low	Lower quality	Surface water	Watercourses not having a WFD classification shown in a RBMP and $Q_{95} \leq 0.001m^3/s$
		Groundwater	Unproductive strata
		Flood risk	Water compatible development

Table 13-3: Estimating the Magnitude of an Impact(extract)

Magnitude	Criteria	Typical example	
Major adverse	Results in loss of attribute and/or quality and integrity of the attribute	Surface water	<p>Failure of both acute-soluble and chronic sediment related pollutants in HEWRAT and compliance failure with Environmental Quality Standard (EQS) values.</p> <p>Calculated risk of pollution from a spillage $\geq 2\%$ annually (spillage assessment).</p> <p>Loss or extensive change to a fishery.</p> <p>Loss of regionally important public water supply.</p> <p>Loss or extensive change to a designated nature conservation site.</p> <p>Reduction in water body WFD classification.</p>
		Groundwater	<p>Loss of, or extensive change to, an aquifer.</p> <p>Loss of regionally important water supply.</p> <p>Potential high risk of pollution to groundwater from routine runoff - risk score >250 (Groundwater quality and runoff assessment).</p> <p>Calculated risk of pollution from spillages $\geq 2\%$ annually (Spillage assessment).</p>

Magnitude	Criteria	Typical example	
			<p>Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies.</p> <p>Reduction in water body WFD classification.</p> <p>Loss or significant damage to major structures through subsidence or similar effects.</p>
		Flood risk	Increase in peak flood level (100mm)
Moderate adverse	Results in effects on integrity of attribute, or loss of part of attribute	Surface water	<p>Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values.</p> <p>Calculated risk of pollution from spillages $\geq 1\%$ annually and $< 2\%$ annually.</p> <p>Partial loss in productivity of a fishery.</p> <p>Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies.</p> <p>Contribution to reduction in water body WFD classification.</p>
		Groundwater	<p>Partial loss or change to an aquifer.</p> <p>Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies.</p> <p>Potential medium risk of pollution to groundwater from routine runoff - risk score 150-250.</p> <p>Calculated risk of pollution from spillages $\geq 1\%$ annually and $< 2\%$ annually.</p> <p>Partial loss of the integrity of GWDTE.</p> <p>Contribution to reduction in water body WFD classification.</p> <p>Damage to major structures through subsidence or similar effects or loss of minor structures.</p>

Magnitude	Criteria	Typical example	
		Flood risk	Increase in peak flood level (> 50mm).
Minor adverse	Results in some measureable change in attributes, quality or vulnerability	Surface water	<p>Failure of either acute soluble or chronic sediment related pollutants in HEWRAT.</p> <p>Calculated risk of pollution from spillages $\geq 0.5\%$ annually and $< 1\%$ annually.</p> <p>Minor effects on water supplies.</p>
		Groundwater	<p>Potential low risk of pollution to groundwater from routine runoff - risk score < 150</p> <p>Calculated risk of pollution from spillages $\geq 0.5\%$ annually and $< 1\%$ annually</p> <p>Minor effects on an aquifer, GWDEs, abstractions and structures</p>
		Flood risk	Increase in peak flood level (>10mm)
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	The proposed project is unlikely to affect the integrity of the water environment	
		Surface water	<p>No risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants).</p> <p>Risk of pollution from spillages $< 0.5\%$.</p>
		Groundwater	No measurable impact upon an aquifer and/or groundwater receptors and risk of pollution from spillages $< 0.5\%$.
		Flood risk	Negligible change to peak flood level ($\leq \pm 10\text{mm}$).
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	Surface water	<p>HEWRAT assessment of either acute soluble or chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition.</p> <p>Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is $< 1\%$ annually).</p>

Magnitude	Criteria	Typical example	
		Groundwater	<p>Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk <1% annually).</p> <p>Reduction of groundwater hazards to existing structures.</p> <p>Reductions in waterlogging and groundwater flooding.</p>
		Flood risk	<p>Creation of flood storage and decrease in peak flood level (> 10mm).</p>
Moderate beneficial	Results in moderate improvement of attribute quality	Surface water	<p>HEWRAT assessment of both acute-soluble and chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition.</p> <p>Calculated reduction in existing spillage by 50% or more (when existing spillage risk >1% annually).</p> <p>Contribution to improvement in water body WFD classification.</p>
		Groundwater	<p>Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is >1% annually).</p> <p>Contribution to improvement in water body WFD classification.</p> <p>Improvement in water body Catchment Abstraction Management Strategy (CAMS) (or equivalent) classification.</p> <p>Support to significant improvements in damaged GWDTE.</p>
		Flood risk	<p>Creation of flood storage and decrease in peak flood level (>50mm).</p>
Major beneficial	Results in major improvement	Surface water	<p>Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring to a watercourse.</p>

Magnitude	Criteria	Typical example	
	of attribute quality		Improvement in water body WFD classification.
		Groundwater	Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body WFD classification.
		Flood risk	Creation of flood storage and decrease in peak flood level (> 100mm).
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.	

Table 13-4 Interpretation of Significance Matrix from DMRB LA108 (Highways England 2020)

Importance	Magnitude of impact				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
High	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
Medium	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
Low	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

13.4.3 Where an effect could be one of two gradings, professional judgement will be used to determine which effect is applicable.

13.4.4 The PEIR outlines the preliminary findings of the assessment and includes consideration of the Proposed Scheme in the context of flood risk, water quality, the water environment and WFD.

13.4.5 The assessment of potential effects to the water environment (surface water features, groundwater features and flood risk) during construction and operation is being undertaken in accordance with DMRB LA 113 (Highways

England, 2020). The preliminary findings of the assessment are informed through a desk-based review of existing information and assessment of the potential Proposed Scheme effects, in relation to flood risk and water quality.

13.4.6 The assessment of potential effects reported in this PEIR, which could arise during construction consists of a qualitative assessment, which considers risks to the chemical quality of surface and groundwater features associated with pollutants typically experienced during construction.

13.4.7 When assessing risks to surface water features during construction, particular attention is given to features located within close proximity of the works or proposed compound areas (c. 100m) that are most likely to experience direct impacts from flood risk, accidental spillages and pollution.

13.4.8 As the Proposed Scheme is not yet finalised, not all information required to fully assess the potential effects is available to inform the PEIR. **Section 13.10** outlines the ongoing assessment work that will be reported in the ES, which is briefly summarised below.

13.4.9 Paragraphs 5.221-5.223 of the NPS NN set out how water quality and resources should be assessed for nationally significant road schemes. In accordance with this policy, the ES will describe:

- The existing quality of waters affected by the Proposed Scheme
- Existing water resources affected by the Proposed Scheme and the impacts of the Proposed Scheme on water resources
- Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the Proposed Scheme, and any impact of physical modifications to these characteristics
- Any impacts of the Proposed Scheme on water bodies or protected areas under the WFD and SPZs around potable groundwater abstractions
- Any cumulative effects

13.4.10 In addition to the core aspects of assessment as defined within DMRB LA113 (Highways England 2020), the assessment of potential impacts to the water environment will also consider the potential impacts to the hydromorphological quality of surface water features. This would be likely to be associated with potential changes to catchment hydrology, associated with cuttings, which may affect baseflow to rivers. An assessment will be undertaken to determine the degree of hydromorphological change and its acceptability.

13.4.11 Potential significant effects with regards to nutrient neutrality will be considered within the WFD Compliance Assessment and HEWRAT assessment in line with the outcomes of the consultation completed with Natural England.

- 13.4.12 A review of the available 2019 River Itchen modelling studies hydrological analysis and hydraulic modelling will be completed using Flood Modeller Pro and TUFLOW. This is consistent with the software used by the EA for the latest approved hydraulic model.
- 13.4.13 A review of the existing drainage system will be conducted using the Highways Agency Drainage Data Management System (HADDMS). The status of priority drainage assets (outfalls, soakaways and culverts) identified on HADDMS and any associated risk to receiving water bodies (or flood risk) will be used to inform the ES.
- 13.4.14 As the Proposed Scheme is not yet finalised the FRA and WFD Compliance Assessment (which will consider GWDTes) have not been completed. The preliminary findings of these assessments inform the PEIR, with ongoing assessment work completed in line with the approach outlined in **Section 13.10** to be reported in the ES.

13.5 Assessment assumptions and limitations

- 13.5.1 The information presented in this chapter is based on the information available at the time of writing the report and based on emerging design. The findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process.
- 13.5.2 Many of the identified risks during construction and operation will be dependent on the existing and proposed surface water drainage systems. Limited information is currently known about the existing drainage system, however, it will be identified and prepared during ongoing assessment work and reported in the ES.
- 13.5.3 Information regarding baseline flood risks has been obtained from desk-based sources (EA, 2020a; EA, 2020b; EA, 2020c). Further analysis using site specific data which is currently being undertaken, such as topographic survey and drainage surveys, is proposed to be utilised within the ES to fully understand the potential risks posed by the Proposed Scheme including potential impacts to the environment, people and existing property and infrastructure.
- 13.5.4 At present fluvial flood risk is based on the EA's Flood Map for Planning (EA, 2020a). Whilst this provides flood risk associated with Main Rivers, the risk of flooding from ordinary watercourses has not been accounted for. Such risks are unlikely to be determined without specific modelling by the local authority, however the Risk of Flooding from Surface Water Map (EA, 2020b) is considered to give a reasonable representation of the risk and is assumed to be sufficient given the limited impact of the Proposed Scheme on the minor watercourses.

13.5.5 The preliminary findings of the assessment are robust despite the limitations identified above.

13.6 Study area

13.6.1 The overall study area includes a 500m buffer surrounding the Indicative Application Boundary (IAB), which is provided in **Figure 2.1, Appendix 2.1**. This buffer is considered a suitable extent to assess direct potential impacts as well as encompassing indirect pathways, such as the migration of surface-borne pollutants, and the effects of any prolonged interception of groundwater flows. The study area encompasses surface water and groundwater features and associated uses, located up to approximately 500m. This is considered to be in hydraulic connectivity with the Proposed Scheme to assess potential indirect impacts.

13.7 Baseline conditions

13.7.1 The following key data sources have been used to inform a description of the existing water environment baseline conditions:

- British Geological Survey mapping (BGS, 2020)
- Magic Map (DEFRA, 2020)
- EA Flood Map for Planning (EA, 2020a)
- EA Long Term Flood Risk (EA, 2020b)
- EA Historic Flood Map (EA, 2020c)
- EA South East River Basin Management Plan (EA, 2015)
- EA Test and Itchen Catchment Flood Management Plan (EA, 2009)
- SDNP Authority Water Cycle Study and Strategic Flood Risk Assessment (SFRA) Level 1 (AMEC, 2015)
- WCC Strategic Flood Risk Assessment (Halcrow, 2007)
- HCC Hampshire Groundwater Management Plan (Hampshire County Council, 2013)

13.7.2 The baseline data source also includes consultation undertaken with the Environment Agency (EA) in August 2020 (Reference: SSD/178635) to obtain the Product 5, 6 and 7 of the 2019 River Itchen Modelling Study.

Surface Water Features

13.7.3 The Proposed Scheme alignment crosses the River Itchen at three locations, along the A34, A33 and M3. The Proposed Scheme also crosses one of the River Itchen's tributaries, the Nun's Walk Stream, which is crossed by the

A34. The Proposed Scheme and its interaction with the present watercourses and existing bridges are demonstrated in **Figure 2.3, Appendix 2.1**.

- 13.7.4 The River Itchen and the Nun's Walk Stream are classified as 'Main Rivers' and therefore regulated by the EA. The River Itchen also has a separate arm called the Itchen Navigation, located approximately 5km downstream of the site. The Itchen Navigation has been heavily modified and forms part of the floodplain of the River Itchen, and has been excluded from consideration.
- 13.7.5 The River Itchen flows in a channel in a south-westerly direction and comprises several tributaries and land drains. There are also a number of ditches, ponds, wetlands, and ordinary watercourses associated with this floodplain.
- 13.7.6 All watercourses within the study area form part of the Test and Itchen Catchment Flood Management Plan (CFMP) (EA, 2009) and the South East River Basin District RBMP (EA, 2015).

Environment Designations and Water Framework Directive Classifications

- 13.7.7 The River Itchen catchment area is designated as a SAC and SSSI, both of which are situated within the study area (see **Figure 2.2, Appendix 2.1**).
- 13.7.8 The River Itchen also flows into the Southampton and Solent Water SPA and Ramsar site, located approximately 16km downstream of the Proposed Scheme, where the River Itchen discharges into the Solent.
- 13.7.9 The River Itchen also flows through the South Downs National Park (SDNP). The River Itchen floodplains forms part of the River Itchen SSSI, and much of the floodplain is designated as Lowland Fen wetland priority habitat. The floodplain is anticipated to protect in excess of 100 properties in Winchester and Kings Worthy from flooding.
- 13.7.10 The quality of the River Itchen and the Nun's Walk Stream is monitored by the EA against the objectives of the Water Framework Directive (WFD). There are two WFD designated water bodies in the vicinity of the Proposed Scheme: Itchen (GB107042022580) and Nun's Walk Stream (GB107042022730). Both water bodies are currently (Cycle 2, 2019) classified as at overall Moderate status, with Good ecological status, but Fail chemical status. The Proposed Scheme is underlain by the River Itchen Chalk WFD groundwater body (GB40701G505000), which is currently (Cycle 2, 2019) at Poor overall status, with Poor status for both quantitative and chemical elements.

Existing Drainage

- 13.7.11 The HADDMS has Priority Asset Registers that identify existing outfalls, culverts and soakaways that potentially pose a risk of pollution or flooding.

There are 17 Priority Outfalls from the Highways England network to the River Itchen catchment within the study area and numerous soakaway chambers and soakaway trenches. The database also identifies four surface water Priority Culverts.

13.7.12 Using the HADDMS database, the following has been reviewed as part of preparing the PEIR, with further information being collected to inform the ongoing EIA work which will be reported in the ES:

- The receiving water bodies of the Priority Outfalls and soakaways
- The existing drainage system of the M3, the junction 9 roundabout, and the A34 approach

Groundwater Features: Geology

13.7.13 Review of BGS (BGS, 2020) mapping indicates that the Proposed Scheme is underlain by bedrock geology of the Seaford Chalk Formation, which is described as “*firm white chalk with conspicuous semi-continuous nodular and tabular flint seams*” on the BGS online viewer. This chalk is itself underlain by the Lewes Nodular Chalk Formation, which is described as “*composed of hard to very hard nodular chalks and hardgrounds, with interbedded soft to medium hard chalks*” on the BGS online viewer.

13.7.14 Superficial deposits are limited across the study area. Superficial Alluvium, River Terrace and Head Deposits (comprising clay, silt, sand, and gravel) are present in close proximity to the River Itchen, within the extent of the river floodplain and adjacent riverbanks.

Groundwater Features: Hydrogeology

13.7.15 Review of EA mapping (DEFRA, 2020) indicates that both the Seaford Chalk and the Lewes Chalk strata are classified as Principal Aquifers. A Principal Aquifer is defined by the EA as ‘layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. These layers of rock or drift deposits may support water supply and/or river base flow on a strategic scale’.

13.7.16 The Alluvium and River Terrace Deposits are classified as a Secondary A Aquifer by the EA (DEFRA, 2020). A Secondary A Aquifer is defined as permeable layers of rock capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. The Head Deposits are classified as Secondary Aquifer (undifferentiated) (DEFRA, 2020).

13.7.17 Groundwater monitoring has been completed across the M3 J9 Improvement site during the ground investigation completed in 2019, with groundwater levels recorded between June 2019 and July 2020. This data is being used as part of the ongoing assessment of the baseline groundwater quality (to be reported in the ES), including understanding of baseline groundwater levels,

fluctuations and quality across the Proposed Scheme in accordance with guidance in Construction Industry Research and Information Association (CIRIA) 753 (CIRIA, 2015), BRE 365 (BRE, 2016) and the Institute of Civil Engineers (ICE) Earthworks Guidance, 2nd Edition, 2015 (ICE, 2015).

13.7.18 The River Itchen is a baseflow-dominated chalk stream, fed by three major tributaries in its upper reaches: the Candover Stream, River Alre and Cheriton Stream. The River Itchen catchment has undergone significant modification over centuries (including the construction of the downstream Itchen Navigation which was completed in 1710), which has had a lasting impact on the fluvial geomorphology of the river. Modifications include re-alignment and/or deepening for land drainage and the construction of a variety of sluices and artificial channels for navigation, milling and to feed water meadows.

13.7.19 Notwithstanding, the river mainly retains the chalk stream geomorphological characteristics (low energy, high width to depth ratio, gravel bed with abundant macrophyte growth) and water quality characteristics required to support the features for which it is designated.

13.7.20 The Proposed Scheme lies within a Groundwater Vulnerability Zone of 'High'. These areas are able to easily transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits.

Groundwater Features: WFD Classifications

13.7.21 Groundwater in the study area has been assessed against the objectives of the WFD. The RBMP (EA, 2015) identifies the groundwater body underlying the Proposed Scheme to be the River Itchen Chalk (GB40701G505000). The quality of the River Itchen Chalk is monitored by the EA against the objectives of the WFD. The groundwater body is currently (Cycle 2, 2019) classified as at overall Poor status, with Poor quantitative quality and chemical status. The reasons for the River Itchen Chalk achieving a Poor status are noted to be local agriculture and rural land management practices.

Groundwater Features: Groundwater Abstractions

13.7.22 Review of the EA SPZ map (**Figure 13.1, Appendix 13.1**, DEFRA, 2020) shows that the northern parts of the M3 and the A34 traverse areas that are classified as SPZ 1: inner zones (50 day travel time of pollutant to source with a 50m default minimum radius) and SPZ 2: outer zone (400 day travel time of pollution to sources, with a 250m or 500m minimum radius around the source depending on the amount of water taken).

13.7.23 The SPZs are used by the EA as screening tools to identify those areas where it would object in principle to certain potentially polluting activities, or other activities that could damage groundwater and/or where additional controls or restrictions on activities may be needed to protect water intended

for human consumption. Zone 1 is the most sensitive of these protective areas and indicates the zone in which contamination released to the ground could reach the point of abstraction within 50 days. Zone 2 similarly defines a travel time of 400 days. Typically discharges of road drainage should be outside SPZ 1 and should be avoided within SPZ 2.

13.7.24 Information regarding licensed and non-licensed groundwater abstractions will be obtained through consultation with the EA, HCC and WCC throughout the EIA process.

13.7.25 Groundwater users may be particularly vulnerable to any disruptions of groundwater flow, provision and quality, and could therefore require consideration in the assessment of impacts due to the Proposed Scheme.

Flood Risk: Fluvial

13.7.26 The EA Flood Map for Planning (**Figure 13.2, Appendix 13.1**) indicates that the northern and western parts of the study area, particularly at the A34 Winchester Bypass and M3 north of Long Walk, extend into an area designated as Flood Zone 3: area with a 1% (1 in 100) Annual Exceedance Probability (AEP) risk or greater of fluvial flooding. The designated Flood Zone 3 area is associated with the River Itchen and its tributaries.

13.7.27 The northern and western part of the study area also extends into a Flood Zone 2 area: risk between a 0.1% (1 in 1000) and 1% (1 in 100) AEP of fluvial flooding. The remainder of the study area is situated within Flood Zone 1: less than 0.1% (1 in 1000) AEP risk of flooding. It is anticipated that climate change would cause these flood zone extents to increase in the future. The EA 2019 River Itchen modelling study considered climate change based on the EA guidance (EA, 2020d) for the South East River Basin District using the anticipated potential change factors of +35%, +45% and +105%.

Flood Risk: Tidal

13.7.28 The Proposed Scheme is not located within an area at risk of tidal flooding.

Flood Risk: Surface Water (Pluvial)

13.7.29 The Risk of Flooding from Surface Water (RoFSW) map (**Figure 13.3, Appendix 13.1**) details that the study area is predominantly within an area at very low risk: less than 0.1% (1 in 1000) AEP of surface water flooding.

13.7.30 The RoFSW map identifies that parts of the M3 and slip roads at Junction 9 have a high: greater than 3.3% (1 in 30) AEP surface water flood risk.

13.7.31 The RoFSW mapping also identifies that there are several overland flow routes and isolated areas of ponding within the study area with a high: greater than 3.3% (1 in 30) AEP, to low: between 0.1% (1 in 1000) and 1% (1 in 100) AEP, risk of surface water flooding. These areas of flood risk are

generally associated with topographic depressions within the fields to the east or where existing infrastructure (highways and residential development) causes an obstruction to natural overland flow paths.

13.7.32 There are several low-lying areas adjacent to watercourses to the west of the Proposed Scheme that are also shown to be at risk of surface water flooding. The flood risk associated with these areas are captured in the Fluvial section above.

Flood Risk: Groundwater

13.7.33 The SDNPA Water Cycle Study and SFRA Level 1 (AMEC, 2015) Groundwater Flood Risk Map indicates a variable susceptibility to groundwater flooding within the study area. The level of risk ranges from high (>75% based on a 1km square grid area) to low (25 – 50% based on a 1km square grid area) susceptibility; from south (M3/A34 crossing) to north of the Proposed Scheme. There are areas identified to be of high groundwater flood risk within the study area to the south-west and north-east of the Proposed Scheme. The areas of greatest risk are generally at close proximity to the River Itchen and its tributaries.

13.7.34 WCC SFRA (Halcrow, 2007) states that there is a high proportion of chalk within the Winchester District. These geological conditions and the high-water table increase susceptibility to groundwater flooding. The SFRA details that flooding from a combination of sources including groundwater has occurred in Winchester, however there are no records of flooding occurring from groundwater only.

13.7.35 The Hampshire Groundwater Management Plan (HCC, 2013a) identified areas throughout the county at risk of groundwater flooding. Kings Worthy village, located north of the A34, showed a significant history of groundwater flooding (21 properties flooded in 2000/2001) and continued susceptibility to this flood risk.

13.7.36 The risk of flooding from groundwater will need to be further investigated as part of the ongoing EIA work and will be reported in the ES.

Flood Risk: Reservoir

13.7.37 The EA provides mapping that gives an indication of the areas at risk of flooding due to reservoir failure. The northern extent of the study area is identified to be at risk of flooding, likely to be in the event of a failure of Old Alresford Pond. The mapped reservoir flood extents are indicated to be similar to the fluvial flood extents associated with the River Itchen.

Flood Risk: Historic Flood Events

13.7.38 The Environment Agency's Historic Flood Map (**Figure 13.4, Appendix 13.1**) identifies maximum extent of recorded flood outlines from the rivers, sea and groundwater springs. A review of the map identifies no recorded historic flood

events within the Proposed Scheme, although there are areas of historic flooding recorded with the study area with most common source being groundwater.

13.7.39 WCC SFRA (Halcrow, 2007) identifies that there are historic flood records dating from 1997 to 2006 within the area of Winchester; the source is identified to be a combination of groundwater, fluvial flooding and foul/combined systems. The nearest recorded flood report to the Proposed Scheme is approximately 750m south-west on Wales Street; flooding is reported to have occurred from sewer flooding.

Flood Risk: Other Flood Sources

13.7.40 The EA Flood Map for Planning (EA, 2020a) highlights that there are no areas benefiting from flood defences within the vicinity of the Proposed Scheme and therefore no flood risk due to defence failure has been identified.

13.8 Design, mitigation and enhancement measures

13.8.1 The below describes the anticipated design, mitigation and enhancement measures to be included for consideration within the ES. As the Proposed Scheme is at preliminary stages the full design, mitigation and enhancement measures remain in development.

Construction Phase

Pollution

13.8.2 During the construction phase, several actions can be taken to mitigate against potential pollution and accidental spillages. Such measures could include, but not limited to, the following:

- Designing the Proposed Scheme to seek to avoid the requirement for mixing of wet cement/concrete to be conducted in proximity to watercourses and/or drainage lines, thus aiming to prevent wet cement/concrete coming into contact with surface water features
- Provision of site worker awareness of environmental best practice
- Installation of systems such as silt traps, swales and basins, designed to trap silty/polluted water
- Controlled and covered waste storage areas
- On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak

- Preparation of incident response plans, prior to construction, which should be present on-site throughout construction to inform contractors of required actions in the event of a pollution incident
- During construction, is it anticipated that CIRIA 648 guidance (or the relevant guidance that may supersede this) will be considered and adhered to as relevant

13.8.3 The position and extent of working area during the construction stage would reflect the sensitivity of surrounding areas and works being carried out. The contractor would appraise the suitability of such working areas in this respect as part of working method statements.

13.8.4 Proposed site compounds are currently located in Flood Zone 1 'Low Probability' and in areas classified as at Very Low risk of surface water flooding and therefore are unlikely to introduce pollutants to the watercourse.

13.8.5 Best practice recommendations for the prevention of contamination will be outlined in detail in a fiEMP submitted to accompany the application for Development Consent, (to be agreed with relevant statutory consultees) which will form a siEMP prior to commencement of construction works. This would include measures to comply with relevant legislation, guidance and best practice measures, in line with the Considerate Contractors Scheme and 'Site Handbook for the Construction of SuDS' (CIRIA C698).

13.8.6 The fiEMP and siEMP could include an erosion prevention and sediment control plan to reduce the quantity of sediment entrained in runoff and to prevent hydromorphological changes to surface water features. It would also describe the procedures in the event of an environmental emergency such as a fuel or chemical spillage and outline measures to minimise the risk of flooding during construction.

13.8.7 A temporary drainage strategy will be prepared for the construction phase. Runoff should be collected and directed through the temporary drainage system, to ensure protection of water quality in receiving waterbodies from increased sediment and contaminant load. This strategy will be prepared to inform the ongoing assessment work reported in the ES and secured through the fiEMP and siEMP.

13.8.8 Movement of materials around the site would be managed under an appropriate Materials Management Plan (MMP), to minimise any hydromorphological disturbances and minimise flood risk. The impacts of material placement and how the protection would be secured will be assessed in the context of the principles of Definition of Waste Code of Practice (DoWCoP).

Flood Risk

13.8.9 During the construction phase, several actions can be taken to mitigate against increased flood risk. Such measures may include, but are not limited to, the following:

- Site work areas should be located outside of the floodplain where possible, where this is not possible temporary floodplain compensation could be required to offset storage losses
- Site runoff would be controlled through the implementation of an appropriate temporary drainage strategy and attenuated onsite prior to discharge, to mitigate flood risk
- Best practise construction measures would be adopted in line with the Considerate Contractors Scheme and CIRIA SuDS Manual (C753) (CIRIA, 2015) to minimise the risk of flooding during construction

13.8.10 Proposed site compounds are currently located in Flood Zone 1 'Low Probability' and in areas classified as at Very Low risk of surface water flooding so are highly unlikely to be at risk of flooding from these sources through the construction phase.

13.8.11 The works could themselves be classed as a flood risk activity and require a flood risk permit under the Environmental Permitting (England and Wales) Regulations. Land drainage consents could also be required for works near ordinary watercourses and could require an environmental permit. Applications for the relevant permits involve a separate process to the EIA and would be sought prior to construction where required.

Groundwater

13.8.12 It is not currently anticipated that temporary de-watering will be required to facilitate construction due to the lower point of the Proposed Scheme (A34 underpass) remaining above the groundwater table. If further assessment indicates that de-watering is required in order for construction activities to take place, a de-watering risk assessment would be performed as per the guidance titled Hydrogeological Impact Appraisal (HIA) for dewatering abstractions (EA, 2007). Dewatering during construction could require an environmental permit, which would be sought prior to construction if required.

13.8.13 The local area, including the study area, is considered to be a sensitive water-rich environment, which could be subjected to the impacts from de-watering activities, albeit temporary in nature. If the HIA suggests significant impacts could be experienced away from the site area being de-watered, then temporary mitigation, could be required.

13.8.14 During construction, several actions can be taken to mitigate the potential impacts to groundwater water users. These measures could include, but are not limited to, the following:

- Water user pump lowering; whereby local groundwater abstraction pumps would need to be lowered below the revised groundwater table
- Re-drilling of water well(s); where water user abstraction wells were not deep enough to accommodate pump lowering, needing to be re-drilled
- Water recycling practices; whereby dewatered groundwater was recycled into the aquifer, maintaining groundwater contributions to groundwater users

13.8.15 Potential de-watering impacts of the floodplain must be assessed in terms of potential impacts on the specific watercourses that interact with the floodplain, notably the potential for low-flow impacts. It is not currently anticipated that temporary de-watering will be required to facilitate construction due to the lower point of the Proposed Scheme (A34 underpass) remaining above the groundwater table.

13.8.16 If SuDS that discharge to ground are proposed during the construction stage, groundwater level information will be used to inform drainage design as high groundwater levels could undermine the performance of drainage features or discharges could lead to increased risk from groundwater flooding.

Operation Phase

Pollution

13.8.17 During the operation phase, mitigation for the effects of routine runoff would be managed by the implementation of a robust surface water drainage strategy, appropriately designed against the potential for pollution and considering the proximity of the Proposed Scheme to sensitive receptors and following impact assessment in accordance with the HEWRAT tool within DMRB LA113 (Highways England, 2020). The efficacy of the surface water drainage strategy will be identified and assessed within the FRA, to be appended to the RDWE chapter of the ES.

13.8.18 It is currently envisaged that discharge to ground is likely to be the main drainage mechanism. Any discharge to surface water bodies that may occur would directly or ultimately be received by the River Itchen. An assessment will be undertaken as part of the ES relating to the impacts to the River Itchen from contaminants entering the watercourse and detail what mitigation would be implemented in agreement with relevant consultation bodies.

13.8.19 All surface water discharge would drain through effective SuDS, thereby mitigating the risk of pollution. SuDS design would be subject to a range of factors including the thickness of the unsaturated zone (notably in the winter period when groundwater levels are highest), groundwater permeability, the presence of sensitive receptors and the predicted degree of contaminant loading.

- 13.8.20 Oil interceptors and oil containment structures would be considered to minimise the potential linkage between free-phase fuels, which may arise from a catastrophic spill, and local sensitive receptors, principally the River Itchen and Principal Chalk Aquifers.
- 13.8.21 In addition to the likely need for containment control features for spilled oils and fuels that could arise from a major accident/spillage, it is recommended that the emergency services and Highways England should hold copies of incident response plans and be aware of the procedure to minimise pollution entering the watercourse.

Flood Risk

- 13.8.22 Structures are to be designed outside of the floodplain where possible. The proposed footbridge is intended to be clear span and thus to be an open span structure to minimise potential effects upon the floodplain and watercourse. Floodplain compensation could be required to offset floodplain losses which would be assessed within the FRA and other relevant EIA topics as required. The vulnerability of structures to climate will be considered within **Chapter 14** of the ES.
- 13.8.23 Mitigation for the effects of any increased surface water flood risk would be managed by the implementation of a robust surface water drainage strategy and appropriate drainage design. The strategy would be designed to ensure discharge from the proposed Scheme does not increase flood risk elsewhere up to and including the 1% Annual Exceedance Probability rainfall event, with allowances for climate change as detailed in the EA Flood Risk Assessments: climate change allowances (EA, 2020b). Surface water from the new high catchment area would then be discharged in accordance with the drainage hierarchy to achieve greenfield runoff rated and ensure that surface water is managed as close to its source as possible.
- 13.8.24 The Proposed Scheme could provide an opportunity to provide betterment to the existing system and to reduce existing flood risk. Multi-stage proposals that maximise passive treatment through the use of SuDS would be considered.
- 13.8.25 As discussed previously, groundwater contours and groundwater investigation will inform the assessment of groundwater flood risk during both construction and operation phases of the Proposed Scheme, and this will be a focus within the FRA. To improve, or at least maintain, the current flood risk, the Surface Water Drainage Strategy will attempt to maintain the current groundwater levels by replicating the current location and discharge rates into existing soakaways.

Groundwater

- 13.8.26 The potential effects to groundwater will be considered when designing the surface water drainage strategy. Surface water discharge points could act as

point sources for the discharge of contaminated road runoff, eventually migrating into the Itchen system. An appropriate groundwater risk assessment (in accordance with guidance in DMRB LA113, (Highways England, 2020)) would inform mitigation to be incorporated into the drainage design. Water quality attenuation facilities would be required (as described for surface water receptors previously), where this risk was judged to be significant.

13.8.27 Given the SPZ, the use of piling will be assessed. Winter monitoring data will be used to determine the unsaturated zone thickness between the base of the soakaway and highest groundwater levels (the minimum unsaturated zone thickness typically acceptable to the EA under similar constraints is 5m). Groundwater monitoring has been completed, the results of which will be presented as part of the Ground Investigation Works report within the Geology and Soils ES Chapter.

13.8.28 If groundwater controls are required there is the possibility that the local groundwater receptors could be impacted upon. If impacts were determined to be significant, then mitigation measures could include but are not limited to the following:

- Water user pump lowering; whereby local groundwater abstraction pumps were lowered below the revised groundwater table
- Re-drilling of water well(s); where water user abstraction wells were not deep enough to accommodate pump lowering, needing to be re-drilled
- Water recycling practices; whereby any dewatered groundwater was recycled into the aquifer, maintaining groundwater contributions to groundwater users
- The provision of water during completion of the construction phase

13.9 Assessment of potential effects

13.9.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme upon RDWE during the construction and operational phases. As noted in **Section 13.5** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below.

Construction

13.9.2 The site includes the WFD designated surface water body the Itchen (GB107042022580). The Nun's Walk Stream (GB107042022730) WFD designated surface water body is also located within approximately 100m of the IAB. The Itchen Navigation (GB70710008) WFD designated surface water body is located approximately 5km downstream of the site, however is included for consideration.

- 13.9.3 As the Itchen water body is WFD designated and designated as a SAC, it is considered to be of Very High importance in accordance with **Table 13-2**. As the Nun's Walk Stream water body is WFD designated it is considered to be of High importance in accordance with **Table 13-2**. As the Itchen Navigation water body is WFD designated and designated as a SAC, it is considered to be of Very High importance in accordance with **Table 13-2**.
- 13.9.4 Construction activities including modifying the Kingsworthy Bridge, implementation of a new foot bridge across the River Itchen (downstream of the existing Itchen Bridge), associated vegetation clearance, earthworks and implementation of the surface water drainage have the potential to impact upon these designated water bodies.
- 13.9.5 The construction phase will be completed in line with the siEMP, which will outline the pollution controls and management measures that will be implemented and will detail the methods of construction for the modifications to the Kingsworthy Bridge and construction of a new foot way across the River Itchen. The measures outlined will mitigate against pollutants entering and conveying to the WFD designated water bodies and causing adverse impacts to the water bodies such that there is considered to be No Change to the WFD status of the water bodies. The preliminary effect to the WFD status of the water bodies will be therefore be considered Neutral.
- 13.9.6 The modifications to the Kingsworthy Bridge and construction of a new foot way across the River Itchen downstream of the Itchen Bridge includes work at/near a main river and will therefore require a Flood Risk Activity Permit which will be sought prior to construction. The Permit application will be supported by a Risk and Method Statement outlining in detail how the works will be completed, taking the WFD designated nature of the water bodies into account.
- 13.9.7 Site compounds and material storage areas are located within Flood Zone 1 'Low Probability' and in areas classified as at Very Low risk of surface water flooding and are therefore unlikely to potentially impact upon the WFD designated surface water bodies.
- 13.9.8 The construction phase has the potential to alter the surface water flow mechanisms that currently exist across the M3 J9 Improvement site, which could impact upon the road users. Road users are considered to be of High sensitivity. A temporary surface water drainage strategy will be implemented for the construction phase such that the surface water flood risk will not increase in comparison to existing conditions and could provide a temporary, localised betterment considered to have a magnitude of impact of Minor Beneficial or Negligible. The preliminary effect to surface water flood risk to road users will be therefore be considered Neutral and Slight Beneficial.
- 13.9.9 The construction phase could have the potential to alter the fluvial flood risk in the localised area, which could impact upon local residents and businesses downstream of the A34, considered to be of High sensitivity. The

construction method is not currently confirmed; however, it is anticipated that the siEMP, design and mitigation measures implemented will prevent against any impact upon the flow regime, such that the overall magnitude of impact will have No Change. This is subject to further consideration through ongoing EIA work, which will be reported in the ES. At this stage, the preliminary effect to fluvial flood risk is therefore considered to be Neutral.

- 13.9.10 The M3 J9 Improvement site is underlain by the WFD designated groundwater body the River Itchen Chalk (GB40701G505000). As the groundwater body is WFD designated and classified as a principal aquifer and supporting the River Itchen SAC it is considered to be of Very High importance. Construction activities including implementation of the surface water drainage strategy and earthworks have the potential to impact upon this designated water body through potential creation of preferential pollution pathways or possible leaching of pollutants to the groundwater body.
- 13.9.11 The construction phase will be completed in line with the siEMP, which will outline the pollution controls and management measures that will be implemented. The measures outlined will mitigate against pollutants entering the WFD designated groundwater body and causing impacts to the groundwater body such that it is considered that there will be No Change to the aquifer as a result of the Proposed Scheme construction phase. The preliminary effect to the status of the WFD water bodies will therefore considered to be Neutral.
- 13.9.12 Groundwater abstraction points are present in the vicinity of the M3 J9 Improvement site. Should appropriate mitigation measures not be implemented this could impact upon the consumers of water from the abstraction points, which are considered to be of High sensitivity. The construction phase will be completed in line with the siEMP, which will outline the pollution controls and management measures that will be implemented, such that the magnitude of impact will be No Change. The preliminary effect to consumers of water from abstraction points will therefore be considered to be Neutral.

Operation

- 13.9.13 The site includes the WFD designated surface water body the Itchen (GB107042022580). The Nun's Walk Stream (GB107042022730) WFD designated surface water body is also located within approximately 100m of the IAB. The Itchen Navigation (GB70710008) WFD designated surface water body is located approximately 5km downstream of the site, however, is included for consideration.
- 13.9.14 As the Itchen water body is WFD designated and designated as a SAC, it is considered to be of Very High importance in accordance with **Table 13-2**. As the Nun's Walk Stream water body is WFD designated it is considered to be of High importance in accordance with **Table 13-2**. As the Itchen Navigation

water body is WFD designated and designated as a SAC, it is considered to be of Very High importance in accordance with **Table 13-2**.

- 13.9.15 The Proposed Scheme elements which have the potential to influence the water environment includes modifying the Kingsworthy Bridge, a new foot bridge across the River Itchen (downstream of the existing Itchen Bridge), and a new surface water drainage strategy. The new foot bridge will be designed such that it will not be a constraining feature to flow and as such is not anticipated to influence the hydrological regime of the River Itchen within the IAB or downstream. The new bridge will have associated abutments which will result in the permanent loss of a minor area of vegetation. The Proposed Scheme aims to maximise biodiversity outputs from the Proposed Scheme. It is considered that with the above measures in place there will be No Change to the WFD status of the designated water bodies. The preliminary effect to the WFD status of the water bodies will therefore be considered Neutral.
- 13.9.16 The surface water drainage strategy will include a number of pollution prevention and control elements, introducing a treatment train for surface water runoff prior to any discharge to the watercourse. The magnitude of change is therefore considered to be Minor Beneficial. The preliminary effects to the WFD designated water bodies will therefore be Neutral or Slight Beneficial.
- 13.9.17 The operation phase of the Proposed Scheme will amend the surface water drainage mechanisms that currently exist across the M3 J9 Improvement site, which could impact upon the road users. Road users are considered to be of High sensitivity. A surface water drainage strategy will be implemented such that the capacity of the surface water drainage system will not result in an increase in flood risk in comparison to existing conditions and would provide a localised betterment considered to have a magnitude of impact of Minor Beneficial. The preliminary effects to surface water flood risk to road users will therefore be Slight Beneficial.
- 13.9.18 The operational phase of the Proposed Scheme has the potential to alter the fluvial flood risk in the localised area (through the implementation of a new footbridge), which could impact upon local residents and businesses downstream of the A34, considered to be of High sensitivity.
- 13.9.19 The new foot bridge across the River Itchen is located downstream of the existing Itchen Bridge and Kingsworthy Bridge. These existing bridges therefore form the upstream constraints. The new foot bridge will be designed such that it will not be a constraining feature to flow. The soffit of the bridge will be informed by the hydraulic modelling, however as the design is not finalised, the bridge parameters are not confirmed. At this stage it is intended that the bridge will have a soffit level that is equal to or higher than the existing Itchen Bridge (see **Figure 2.3, Appendix 2.1**), and a span that is equal to or wider than the existing Itchen Bridge such that it will not constrict flow through the area in the context of the upstream Itchen Bridge. Based

upon the available information to inform the preliminary assessment the differences in flood extents and levels are anticipated to have a magnitude of impact of Negligible. This will be refined through ongoing EIA work and reported in the ES. The preliminary effect to flood risk will therefore be Neutral.

13.9.20 The site is underlain by the WFD designated groundwater body the River Itchen Chalk (GB40701G505000). As the groundwater body is WFD designated and classified as a principal aquifer and supporting the River Itchen SAC it is considered to be of Very High importance. The Proposed Scheme includes a new surface water drainage strategy which has the potential to impact upon this designated water body through possible leaching of pollutants to the groundwater body.

13.9.21 The surface water drainage strategy will include a number of pollution prevention and control elements, introducing a treatment train for surface water runoff prior to any discharge to the watercourse or the ground. The measures outlined will mitigate against pollutants entering the WFD designated groundwater body and causing impacts to the groundwater body such that it is considered that there will be No Change to the aquifer as a result of the Proposed Scheme. This will be refined through ongoing EIA work and reported in the ES as required. The preliminary effect to WFD water bodies will therefore be Neutral.

13.9.22 Groundwater abstraction points are present in the vicinity of the M3 J9 Improvement site. Should appropriate mitigation measures not be implemented this could impact upon the consumers of water from the abstraction points, which are considered to be of High sensitivity. The operation phase will include a surface water drainage strategy which will include a number of pollution prevention and control elements, including a treatment train, such that the magnitude of impact at this stage is that there will be No Change. This will be refined within ongoing EIA work and reported in the ES as required. The preliminary effect to groundwater abstraction will therefore be Neutral.

Table 13-5: Summary of Assessment of Potential Effects Including Mitigation

Receptor	Stage of Proposed Scheme	Type of effect
Itchen WFD water body (GB107042022580)	Construction	Neutral
Nun's Walk Stream WFD water body (GB107042022730)	Construction	Neutral
Surface water flood risk to road users	Construction	Temporary Neutral or Slight Beneficial

Receptor	Stage of Proposed Scheme	Type of effect
Fluvial flood risk to local residents	Construction	Neutral
River Itchen Chalk WFD groundwater body (GB40701G505000)	Construction	Neutral
Groundwater abstraction consumers	Construction	Neutral
Itchen WFD water body (GB107042022580)	Operation	Neutral or Slight Beneficial
Nun's Walk Stream WFD water body (GB107042022730)	Operation	Neutral or Slight Beneficial
Surface water flood risk to road users	Operation	Slight Beneficial
Fluvial flood risk to local residents	Operation	Neutral
River Itchen Chalk WFD groundwater body (GB40701G505000)	Operation	Neutral
Groundwater abstraction consumers	Operation	Neutral

13.10 Anticipated further assessment

13.10.1 The design of the Proposed Scheme remains ongoing. Continued assessment will therefore inform the design and assess the potential effects.

13.10.2 When conducting continued assessment of risks to groundwater resources during construction, particular attention will be given to assessing winter groundwater conditions, and any deep excavations or retaining features that could negatively interact with groundwater resources.

13.10.3 The significance of any identified groundwater abstractions will be further assessed against proposed soakaway or surface water drainage features, as these have the potential to act as preferential mechanisms for the transmission of road contaminants. Additionally, surface water discharge features can also facilitate the movement of chemicals arising from

catastrophic spills. The potential impacts from catastrophic spills, where SPZs exist and groundwater wells are currently operating, are given heightened significance and require due consideration. The assessment of potential effects that may arise during operation will also be undertaken in accordance with the methods outlined in the DMRB LA 113 (Highways England, 2020). This includes HEWRAT for operational effects, the DMRB states the following impacts should be considered:

- Potential effects of routine runoff on surface water
- Potential effects of routine runoff on groundwater
- Pollution impacts from spillages
- Impacts from flooding

13.10.4 Potential significant effects with regards to nutrient neutrality will be considered within the WFD Compliance Assessment and HEWRAT assessment in line with the consultation completed with Natural England.

13.10.5 Hydraulic modelling to represent the Proposed Scheme in the existing River Itchen model will be undertaken as part of ongoing assessment work within a design model. The outcome of the design modelling exercise will indicate if the Proposed Scheme changes the flood risk profile within the study area and if there are any detectable effects offsite. As the Proposed Scheme design is not yet finalised, the design modelling has not yet been completed. It will be completed to inform the ES.

13.10.6 A FRA and standalone WFD Compliance Statement will be prepared to accompany the application for Development Consent. The flood risk design criteria and approach for the FRA will be developed through consultation with the EA, LLFA and other relevant stakeholders. The FRA will be carried out in accordance with the NPS NN and in accordance with the technical guidance provided by the National Planning Policy Framework (NPPF). As part of the FRA, and to comply with the NPPF, the FRA will seek to demonstrate compliance with the requirements of the NPPF, specifically that the Proposed Scheme would:

- remain operational and safe for users in times of flood
- result in no net loss of floodplain storage
- not impede water flows
- not increase flood risk elsewhere

13.10.7 Specific requirements for the FRA and WFD will be confirmed through consultation with the EA and other relevant stakeholders and are anticipated to include:

- Assessment of flood risk to the Proposed Scheme due to fluvial, surface water and groundwater flood risk, as well as the potential for flooding from water retaining, water supply or drainage infrastructure
- Assessment of change in flood risk from all sources due to the Proposed Scheme
- Possible hydraulic modelling of main rivers where significant impacts are envisaged
- Design of mitigation measures to prevent adverse impact to flood risk
- The completion of the Sequential and Exception Tests (if required)

14 Climate

14.1 Introduction

14.1.1 This chapter presents the preliminary findings of the assessment of likely significant effects on climate arising from the construction and operation of the Proposed Scheme. The climate assessment covers the following two elements as required by the Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (as amended) (the EIA Regulations) and the latest Design Manual for Roads and Bridges (DMRB) guidance 'LA 114 Climate' (Highways England, 2019):

- Impact of the project on climate change (from greenhouse gas (GHG) emissions – 'carbon')
- Vulnerability of the project to climate change

14.1.2 The two assessments have different methodologies, baseline conditions, receptors, potential impacts, significance and mitigation measures. This chapter therefore sets out the GHG emissions assessment and climate vulnerability assessment separately. This chapter is structured as follows:

- Introduction, legislative and policy context and consultation – introduces the chapter, presents the policy, legislation and guidance relevant to the assessments, and documents the consultation undertaken or proposed to be undertaken
- **Part 1:** Effects of the Proposed Scheme on Climate (GHG emissions assessment) – considers the activities associated with the Proposed Scheme with the potential to emit GHG emissions and the mitigation measures implemented to reduce these emissions
- **Part 2:** Vulnerability of the Proposed Scheme to Climate Change – reviews the outcomes of a high-level climate risk and resilience assessment undertaken for the Proposed Scheme and the mitigation measures implemented to increase climate resilience.

14.1.3 This chapter should be read alongside other technical chapters within this Preliminary Environmental Information Report (PEIR) including **Chapter 8: Biodiversity**, **Chapter 10: Material Assets and Waste** and **Chapter 13: Water Environment**.

14.2 Legislative and policy framework

14.2.1 Legislation and planning policies that are relevant to the Proposed Scheme and climate change include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Paragraphs 5.16 to 5.19 (Carbon emissions)
- Climate Change Act (2008) (2050 Target Amendment) Order 2019
- Carbon Budget Orders 2009, 2011 and 2016
- National Planning Policy Framework (NPPF) (2019): Paragraph 8 (Achieving sustainable development), Paragraphs 148 to 169 (Meeting the challenge of climate change, flooding and coastal change), and the associated Planning Practice Guidance: Climate change (2019)
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles) and Policy CP13 (High Quality Design)
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town)
- Winchester District Draft Local Plan 2018 -2038 (Emerging). Consultation on the Issues and Priorities document took place from 15th February – 12th April 2021: Climate Change and adaption and Carbon neutrality have been identified as new policy areas
- South Downs Local Plan 2014-2033 (2019) – Policy SD2 (Ecosystem Services); Policy SD45 (Green Infrastructure); and Policy SD48 (Climate Change and Sustainable Use of Resources)

14.3 Consultation

14.3.1 **Table 14-1** provides an overview of the consultation that has been undertaken to inform the Proposed Scheme and EIA, including the consideration of likely significant effects and the methodology for assessment.

Consultation undertaken

Table 14-1: Summary of Consultation

Reference	Comment	Response
Secretary of State Scoping Opinion (November 2020)		
Page 11 / 12 3.3.16	<i>“The ES should include a description and assessment (where relevant) of the likely significant effects the Proposed Development has on climate (for example having regard to the nature and magnitude of</i>	The impact of the Proposed Scheme on climate change from GHG emissions and the vulnerability of the Proposed Scheme to climate change will be assessed within the Environmental Statement (ES).

Reference	Comment	Response
	<i>greenhouse gas emissions) and the vulnerability of the project to climate change. Where relevant, the ES should describe and assess the adaptive capacity that has been incorporated into the design of the Proposed Development.”</i>	The adaptive capacity (in the form of climate resilience) of the Proposed Scheme will be reported in the ES.
Page 32 Paragraph 4.6.8	<i>“Impacts from excavated soils should be included in the ES assessment where significant effects are likely to occur, including impacts from the release of carbon and on the land receiving the excavations which should be identified in the ES.”</i>	As noted in Table 15.7 of the Scoping Report, land use change (which includes soil movements), will be assessed within the climate chapter of the ES. These emissions will be assessed qualitatively to determine the significance level of effects.
Page 45 Paragraph 4.11.1	<i>“Due to the short term and temporary nature of construction it is anticipated that climate change will not significantly affect the workforce. The Inspectorate agrees that this matter can be scoped out of the assessment. Where extreme events occur, established procedures should be adhered to, to protect the workforce.”</i>	The Applicant notes the response
Page 45 Paragraph 4.11.2	<i>“The Proposed Development is not anticipating being decommissioned and should decommissioning occur, this would be beyond the period of projected UK Government carbon budgets. The Inspectorate agrees that impacts from decommissioning can be scoped out of the assessment on this basis.”</i>	The Applicant notes the response
Page 45/46 Paragraph 4.11.3	<i>“Modelling should be completed for both construction and operational phases of the proposed development. Any</i>	Modelling of construction and operation GHG emissions will be undertaken in the ES, as noted in paragraphs 15.6.9 and 15.6.10 of the Scoping Report and

Reference	Comment	Response
	<i>modelling should be appended to the ES."</i>	paragraph 14.4.3 and 14.4.7 of this PEIR.
Page 46 Paragraph 4.11.4	<i>"The ES should define the amount of soil to be moved and the subsequent carbon emissions from this and assess any significant effects where they are likely to occur."</i>	As noted in Table 15.7 of the Scoping Report, land use change (which includes soil disturbance), will be assessed within the ES. These emissions will be assessed qualitatively to determine the significance level of effects. GHGs from the transportation of soils will be included within the assessment of construction traffic as noted in Table 15.7 of the Scoping Report.
Page 46 Paragraph 4.11.5	<i>"The government's 'Road to Zero' strategy has committed to stopping the sale of diesel and petrol cars and vans by 2040; this should be taken into account in the assessment. The ES should include a transport assessment and use this to inform the assessment of the potential adverse and/or beneficial significant effects from the release/reduction in carbon emissions."</i>	The 'Road to Zero' and other Government strategies to reduce GHG emissions associated with transport will be considered within the ES, see paragraphs 14.7.11 and 14.7.12. The ES will utilise transport data for the Proposed Scheme to model the potential GHG emissions resulting from end-users.
Page 46 Paragraph 4.11.6	<i>"Where mitigation is proposed to reduce the vulnerability of the Proposed Development to climate change, effort should be made to agree these measures with the relevant consultation bodies to ensure that they are appropriate."</i>	Mitigation measures to reduce the vulnerability of the Proposed Development to climate change will be agreed with consultees as relevant.
Page 47 Paragraph 4.11.7	<i>"The ES should provide a full explanation of how professional judgement has determined the magnitude of impact and subsequently the significance of effects and how this has materially impacted the government's ability to meet carbon commitments to give the Inspectorate confidence in the assessment and its</i>	Significance of effects resulting from GHG emissions will be determined and justified (with explanation) by professional judgement in the context of sectoral, local and national carbon budgets within the ES. The approach to cumulative effects was set out in Chapter 16 of the Scoping Report, and further

Reference	Comment	Response
	<i>conclusions. The assessment should clearly set out the approach to the assessment of other cumulative projects including other roads schemes.”</i>	outlined in Part 1 of this PEIR chapter. The GHG emissions from other road schemes will be provided for within the transport data upon which ongoing assessment work will be based and reported in the ES. Therefore, the assessment of GHG emissions is inherently cumulative and will not be reported within the cumulative effects chapter of the ES.
Page 47 Paragraph 4.11.8	<i>“Scoping Report Table 15.8 lists the likelihood of an extreme event happening based on DMRB guidance. Both the ‘low’ and ‘very low’ categories describe the same threshold where an event happens once within 60 years. These categories feed into how the significance of an effect is determined in Table 15.10 of the Scoping Report. The Applicant should explain why a particular likelihood category has been applied referencing professional judgement as appropriate.”</i>	Table 15.8 in the Scoping Report that defines the likelihood categories has been sourced from the DMRB LA 114 Climate guidance (Highways England, 2019). The ES will explain and justify the likelihood category applied within the climate vulnerability assessment.
Natural England Scoping Repose		
	<i>“The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development’s effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained.”</i>	The interrelationships between topics, including climate change and biodiversity will be considered within the ES. Consideration will be given to climate change within technical assessments in the ES.
Winchester City Council (WCC)		

Reference	Comment	Response
	<i>“Whilst Climate correctly has its own topic section in the Environmental Statement, this is a topic which is interrelated with and has involvement in other parts of the ES. It is therefore important that the applicant provides an assessment of how Climate and the Climate Emergency declaration have been considered and responded to across all topics of the ES.”</i>	As noted in Table 16.1 of the Scoping Report, the interrelationships between topics will be considered within the ES. Consideration will be given to climate change within technical assessments in the ES.

Proposed Consultation

14.3.2 Mitigation measures to reduce the vulnerability of the Proposed Development to climate change will be agreed with relevant consultation bodies.

Part 1: Effects of the Proposed Scheme on climate

14.4 Assessment methodology and significance criteria

14.4.1 There is no nationally adopted method for assessing climate change within EIA and therefore the assessment approach draws upon the following guidance:

- DMRB, Sustainability and Environment Appraisal, LA 114 Climate (Highways England, 2019)
- Institute of Environmental Management and Assessment (IEMA)'s Environmental Impact Assessment guide to assessing greenhouse gas emissions and evaluating their significance (IEMA, 2017)
- Publicly Available Standard (PAS) 2080:2016 Carbon management in Infrastructure (British Standards Institute (BSI), 2016)
- World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) Greenhouse Gas Protocol guidance (WBCSD and WRI, 2004)

Scope of emissions

14.4.2 The scope of emissions within the assessment will align with the WBCSD and WRI Greenhouse Gas Protocol (WBCSD and WRI, 2004) and BSI PAS 2080 (BSI, 2016). The ES will categorise direct and indirect emissions into three broad scopes:

- Scope 1: all direct GHG emissions.

- Scope 2: indirect GHG emissions from consumption of purchased electricity, heat, or steam.
- Scope 3: other indirect emissions, such as the extraction and production of purchased materials and fuels, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc.

14.4.3 The assessment and reporting of GHG emissions associated with the Proposed Scheme considers the following project stages:

- Construction (of the Proposed Scheme) – including land use change, material supply (embodied carbon) and recycling, transport, manufacturing and construction processes. A quantification of construction phase emissions has not been possible in this PEIR as the design of the Proposed Scheme is not yet finalised. The ES will report the full calculation of GHG emissions related with construction as far as practicably possible.
- Operation – assessing the carbon associated with additional road users and emissions associated with the maintenance/refurbishment requirements and lighting. Given the current stage of development design, this PEIR chapter reports the carbon associated with additional road users for the opening year of the Proposed Scheme only (2026).

14.4.4 GHG emissions associated with the decommissioning of the Proposed Scheme was scoped out of further assessment within the EIA Scoping Report. This is because the long design life of the Proposed Scheme (more than 60 years) means there is not enough certainty about the likelihood, type or scale of activities that could emit GHG emissions.

14.4.5 Activities associated with the Proposed Schemes’ operation and construction life cycle stages that have the potential to emit GHG emissions are outlined in **Table 14-2** below.

Table 14-2: Sources and lifecycle stages of the Proposed Schemes’ GHG Emissions, based on the DMRB LA 114 Climate (Highways England, 2019)

Main Lifestyle Stage	Sub-Stage	Potential Sources of Emissions
Construction (to be reported in the ES)	Product stage (manufacture and transport of raw materials to suppliers)	Embodied emissions associated with the required raw materials. For example: Pavement: asphalt, aggregate New roundabout construction at junction 9; steel concrete New bridge connecting the roundabout above M3; steel, concrete

Main Lifestyle Stage	Sub-Stage	Potential Sources of Emissions
		New bridges under M3 carrying A34 Southbound Link; steel, concrete
	Construction process stage (transport of materials and arisings to/from site; construction process, earth movements)	Activities for organisations conducting construction work (i.e. fuel/electricity construction) Delivery of materials for new bridge and grade-separated junctions Disposal of site excavations Delivery of materials for new roundabout and bridges Installation of major structures
	Land use, land use change and forestry	Change in emissions associated with movement of soils, potential loss of agricultural grassland and trees.
Operation (Only opening year end user emissions are reported in this PEIR. Remaining items to be reported within the ES)	End-user emissions (regional traffic flows)	Additional vehicles using highways infrastructure
	Operation and maintenance	Fuel and energy consumption for infrastructure operation, including lighting, and activities of organisations conducting routine maintenance
	Land use, land use change and forestry	Carbon sequestration from proposed planting

Calculation methodology

14.4.6 The emissions from activities outlined within **Table 14-2** have been assessed for operational end user emissions for the opening year of development. Other items in **Table 14-2** will be assessed using project information and nationally recognised carbon conversion factors, as noted below, within the ES. Different GHG emissions have different global warming potentials and, to account for this, emissions are reported throughout the assessment in their carbon dioxide equivalent (CO_{2e}) value. It should be noted that the assessment undertaken in the PEIR and the full assessment in the ES will refer to both GHG and carbon emissions interchangeably. Carbon is used as a short-hand for GHGs as defined by the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol.

- 14.4.7 GHG emissions associated with construction include raw material supply, transport and manufacture. This will be modelled using the Highways England Carbon Tool carbon factors (Highways England, 2015).
- 14.4.8 Preliminary information regarding vehicle movements during the operational phase of the Proposed Scheme has been obtained based on the current design. The end user GHG emissions have been calculated using the Emissions Factors Toolkit (EFT) published by Defra (Defra, 2020). The GHG assessment, following the DMRB LA 114 Climate (Highways England, 2019), includes a comparison of the GHG emissions for the Do-Minimum (DM) (road network with no changes) and Do-Something (DS) (indicative traffic flows after implementation of the Proposed Scheme) scenarios for the opening year (2026). Information regarding the design (future) year (2041) is not currently available. This PEIR does not include an assessment of the end-user GHG emissions for 2041, however this will be reported in the ES.
- 14.4.9 A quantification of operational energy use emissions has not been possible in this PEIR. This will be presented within the ES.
- 14.4.10 GHG emissions associated with land use change, soil movement and vegetation loss during construction and carbon sequestration resulting from proposed planting during operation, along with repair, maintenance and replacement is anticipated to be insignificant compared to the rest of the Proposed Scheme and therefore a qualitative approach has been agreed through the EIA scoping process and within the Scoping Opinion. Information on repair, maintenance and replacement during the operation of the Proposed Scheme are not yet available and have therefore not been assessed in the PEIR. An assessment will be presented within the ES.

Identification and sensitivity of receptors

- 14.4.11 GHG emissions have a global effect rather than directly affecting specific local receptors to which levels of sensitivity can be assigned. The global climate has therefore been treated as a single receptor. Given the global scale and severe consequences of climate change and limited recoverability, the receptor sensitivity is considered to be high.

Defining significance

- 14.4.12 Significance will be assessed in the ES rather than within this PEIR due to information not being available to fully complete the GHG emissions assessment at this stage.
- 14.4.13 There is an absence of significance criteria or defined threshold for determining the significance of effects resulting from GHG emissions in EIA. IEMA guidance identifies three underlying principles to inform the assessment of significance and conclude that:
- all projects create GHG emissions that contribute to climate change.

- climate change has the potential to lead to significant environmental effects.
- there is a GHG emission budget that defines a level of dangerous climate change whereby any GHG emission within that budget can be considered significant.

14.4.14 Therefore, in the absence of any significance criteria or a defined threshold, IEMA recommends that all GHG emissions might be considered as significant and that the EIA should ensure the project addresses their occurrence through mitigation. The DMRB LA 114 Climate (Highways England, 2019) states that assessments should only report significant effects where increases in GHG emissions will have a material impact on the ability of Government to meet its carbon reduction targets. IEMA guidance (IEMA, 2017) and the DMRB LA 114 Climate (Highways England, 2019) recommend that GHG emissions are considered in the context of national, sectoral and local carbon budgets.

14.4.15 This assessment therefore compares the Proposed Scheme emissions (DS scenario) with the DM scenario. Due to the subjectivity of defining the degree of significance (i.e. major, moderate, minor) for GHG emission assessments, significance will be determined and justified by professional judgement in the context of sectoral, local and national carbon budgets within the ES (and thus the assessment of GHG emissions is inherently cumulative). Benchmarking the Proposed Scheme's emissions against similar highways projects will also be explored within ongoing and reported in the ES if required.

14.5 Assessment assumptions and limitations

14.5.1 The preliminary findings presented in this PEIR chapter are based on the information available at the time of writing and based on emerging design. The preliminary findings that are reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the ongoing EIA and consultation process.

14.5.2 The assessment in the ES will be based on information on the Proposed Scheme. Some project information, such as quantities of material required for construction of the Proposed Scheme, may be based on reasonable assumptions. These will be outlined and justified where appropriate within the ES.

14.5.3 Preliminary information regarding vehicle movements during the operational phase of the Proposed Scheme may be subject to change through ongoing design work.

14.5.4 The Defra EFT, used to model the estimated GHG emissions from vehicle movements, accounts for likely changes to vehicle fleet composition such as increasing use of electric vehicles (EVs). However, it should be noted that the EFT only allows for the assessment year up to 2030. Therefore the 2041

DM scenario does not account for the uptake of EVs beyond 2030. The 2041 GHG emissions are therefore considered to be a conservative estimate.

14.6 Study area

14.6.1 GHG emissions are released into the Earth's atmosphere and are not limited to geographic boundaries. The study area for the GHG emissions assessment relates to the location of potential sources of emissions that are considered within the assessment, however, as noted in **Section 14.4**, the receptor is the global atmosphere.

14.6.2 For construction, the study area shall be based on the Indicative Application Boundary (IAB) (including compounds and temporary land take) and extends to include activities that occur beyond the IAB, such as the generation of electricity off site and transport of construction materials. It is not possible to define the exact location for some sources of GHG emissions that will occur outside the IAB, such as material production.

14.6.3 For operational end user GHG emissions, the study area shall be consistent with the affected road network defined in the traffic model, which extends to Bracknell and Woking in the north east, Horsham and Worthing to the east and south east, Portsmouth to the south, Bournemouth to the south west and Newbury to the north.

14.7 Baseline conditions

14.7.1 This section establishes the existing GHG emissions at a national (UK), sector (transport) and local (WCC) level, as well as outlining the baseline GHG emissions of the M3 J9 Improvement site.

National GHG emissions

14.7.2 From a national perspective, in 2018, UK net GHG emissions were estimated to be 451.5 million tonnes carbon dioxide equivalents (MtCO₂e), a decrease of 2.1% compared to 2017 (Ricardo Energy & Environment for DBEIS, 2020a). The Climate Change Act 2008 (as amended) legally binds the UK to reduce its GHG emissions through carbon budgets. The total emissions for the UK over the last two carbon budgets are shown in **Table 14-3** below. Both the 2008-2012 and 2013-2017 budgets were successfully met. National GHG emissions in 2018 have decreased by 43.1% from 1990 levels (Ricardo Energy & Environment for DBEIS, 2020a).

Table 14-3: 2008-2017 UK Carbon Budgets

UK Budget	Carbon Budget (MtCO _{2e}) ¹	Reduction below 1990 levels	UK Emissions
1st carbon budget (2008 to 2012)	3,018 MtCO _{2e}	25% (achieved)	2,982 MtCO _{2e}
2nd carbon budget (2013 to 2017)	2,782 MtCO _{2e}	31% (achieved)	2,398 MtCO _{2e}

¹ million tonnes carbon dioxide equivalents

Sector GHG emissions

14.7.3 Statistics for the transport sector are composed of road transport, rail, shipping, and aviation. Despite a 1.4% decrease in transport emissions in 2018, the sector continues to be the largest emitting sector in the UK. An estimated 124.4 MtCO_{2e}, or 28% of net UK GHG emissions, are attributed to the transport sector (Ricardo Energy & Environment for DBEIS, 2020a).

Regional and local GHG emissions

14.7.4 The Department for Business, Energy & Industrial Services (DBEIS) provides emission data for each local planning authority (Ricardo Energy & Environment for DBEIS, 2020b), including for WCC and south east England. These are presented in **Table 14-4** below. Transport was the greatest source of WCC and south east England emissions in 2018 comprising 59% and 46% of the area's emissions in kilotonnes of carbon dioxide equivalents (ktCO_{2e}) respectively.

Table 14-4: WCC and South East England Baseline CO₂ estimates for 2018

Area	CO _{2e} estimates (ktCO _{2e})				Total
	Industry and Commercial	Domestic	Transport (including Motorways)	Land Use, Land Use Change and Forestry	
WCC	191.2	192.5	484.1	-49.1	818.8
South East England	11,731.3	13,252.3	19,676.6	-1,913.7	42,746.5

14.7.5 A climate emergency was declared by WCC in June 2019 and WCC is now committed to being carbon neutral by 2024, with a wider goal of carbon neutrality in the district by 2030. The target takes into account both production and consumption emissions, with a focus on the biggest sources of carbon emissions – transport, property and energy. WCC will work with partners across the district to deliver this goal. The WCC Climate Action Plan

excludes motorway emissions “as these are national infrastructure and will require a national response” (WCC, 2019).

Existing and future M3 J9 Improvement site baseline GHG emissions

14.7.6 As there is no construction currently taking place on the M3 J9 Improvement site the baseline position for construction phase GHG emissions is considered to be zero.

14.7.7 The operational GHG emissions from the existing road are associated with existing traffic and road users. GHG emissions from traffic flows in DM scenario for the opening year 2026 have been modelled in accordance with DMRB LA 114 Climate (Highways England, 2019). The modelling includes the total GHG emissions for all existing traffic using the strategic and Affected Road Network (covered by the traffic model) in the vicinity of the M3 J9 Improvement site and its surrounding region.

14.7.8 The road user carbon emissions for the DM scenario is as follows:

- 2026: 3,264,100 tCO_{2e}

Future baseline

14.7.9 The carbon budgets set for the next 12 years are set out below in **Table 14-5**. The Committee for Climate Change (CCC) provided their recommendation for 6th carbon budget, for the period 2033-37, in December 2020 (CCC, 2020) however the Government has not yet imposed this budget into law. This recommended carbon budget is the first budget to consider the consider the UKs net zero target by 2050 with a trajectory that is consistent with the Paris Agreement.

Table 14-5: 2018-2032 UK Carbon Budgets

UK Budget	Carbon Budget (MtCO _{2e})	Reduction below 1990 levels	UK Emissions
3rd carbon budget (2018 to 2022)	2,544 MtCO _{2e}	37% by 2020	N/A
4th carbon budget (2023 to 2027)	1,950 MtCO _{2e}	51% by 2025	N/A
5th carbon budget (2028 to 2032)	1,725 MtCO _{2e}	57% by 2030	N/A
6 th carbon budget recommendation (2033—37)	965 MtCO _{2e}	78% by 2035	N/A

14.7.10 The transport sector is a key driver in the trend of projected UK emissions. It is anticipated that emissions from the transport sector will decline from 2018

to 2035, with a projected fall of 19% from 2016 levels (BEIS, 2019). In 2017, 97% of final energy consumption in transport was from fossil fuels, however by 2035 this is projected to fall to 93% due to the update of EVs and increased use of biofuels.

14.7.11 A combination of policy initiatives and technical advancements are predicted to influence the decline of GHG emissions from the transport sector. In 2018, the UK Government launched the Road to Zero strategy, which sets out its ambition to reduce emissions from vehicles on UK roads and promote the uptake of zero emissions vehicles (DtT, 2018). Proposed support mechanisms to facilitate this transition include increasing the supply and sustainability of low carbon fuels in the UK through a legally-binding 15-year strategy, offering grants for plug-in vehicles and introduce a voluntary industry-supported commitment to reduce HGV GHG emissions by 15% by 2025, from 2015 levels.

14.7.12 In March 2020, the Electric Vehicles and Infrastructure paper (House of Commons, 2020) was published, which outlined how the infrastructure for EVs have been planned for and what incentives are available to encourage growth. In November 2020, the Government announced that the target to end the sale of petrol and diesel cars and vans will be brought forward to 2030 to increase the uptake of EVs and reduce transport GHG emissions.

14.8 Design, mitigation and enhancement measures

14.8.1 Strategically, emissions are mitigated by applying the carbon reduction hierarchy (Highways England, 2019) as follows:

1) avoid / prevent:

a) maximise potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required, and/or explore alternative lower carbon options to deliver the project objectives (i.e. shorter route options with smaller construction footprints);

b) identify through projects and delivery programmes opportunities to influence user GHG emissions;

2) reduce:

a) apply low carbon and/or reduced resource consumption solutions (including technologies, materials and products) to minimise resource consumption during the construction, operation, and at end of life;

3) remediate:

a) identify, assess and integrate measures to further reduce carbon through on or off-site offsetting or sequestration.

a) Build nothing: evaluate the basic need for an asset and/or programme of works and explore alternative approaches to achieve outcomes set by the asset owner/manager.

b) Build less: evaluate the potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required.

c) Build clever: consider the use of low carbon solutions (including technologies materials and products) to minimise resource consumption during the construction, operation and user's use stages of the asset or programme of work.

d) Build efficiently: use techniques (e.g. construction, operational) that reduce resource consumption during the construction and operation phases of an asset or programme of work.

14.8.2 The basic need for the Proposed Scheme has been evaluated and a number of alternative approaches were proposed before the preferred route, as described in **Chapter 3**, was brought forward to design. A suite of reports provided evidence to support this decision and to establish the extent of improvement work required to meet the desired aims of the scheme. Principles a) and b) of the carbon hierarchy have therefore been duly considered in the historical development of the Proposed Scheme.

14.8.3 Potential measures that relate to principles c) and d) of the carbon hierarchy that will be considered as the design of the Proposed Scheme evolves are outlined below. These will be confirmed within the ES:

- Designing, specifying and constructing the Proposed Scheme with a view to maximising the operational lifespan of surfaces and structures and minimising the need for maintenance and refurbishment.
- Designing, specifying and constructing the Proposed Scheme with a view to maximising the potential for reuse and recycling of materials/elements at the end-of- life stage.
- Reduction of materials consumption would be carried out in accordance with mitigation measures outlined in **Chapter 10: Material Assets and Waste**.
- Use of more efficient construction plant and delivery and/or those powered by electricity from alternative/lower carbon fuels.
- Construction plant emissions would be managed via the first iteration Environmental Management Plan (fiEMP), specifying plant operator efficiency requirements.
- Specifying high efficiency mechanical and electrical equipment such as Light Emitting Diode (LED) lighting (see **Chapter 2** for further information on lighting) and signal gantries.

- Making adequate provision to support up and coming new clean vehicle technologies where appropriate.
- Incorporation of planting into the design of the Proposed Scheme.

14.9 Assessment of potential effects

14.9.1 This section describes the preliminary findings of the assessment of potential effects of the Proposed Scheme on climate during the construction and operational phases. As noted in **Section 14.5** above, preliminary findings presented in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below.

Construction

14.9.2 GHG emissions from construction have not been quantified at this stage due to design data not being available at the time of preparing this PEIR. However, it is recognised that the construction phase will give rise to emissions as a result of embodied carbon from purchased materials and onsite construction activities such as use of diesel or petrol fuelled equipment. This will result in temporary adverse effects.

14.9.3 Construction emissions will be calculated and presented as part of the ES.

Operation

14.9.4 The calculated 2026 opening year end-user emissions for the DS scenarios, compared with the DM scenarios are shown in **Table 14-6**. The following comparisons do not include GHG emissions from operational 2041 design year. This will be provided in the ES.

Table 14-6: Opening Year 2026 Operation end user emissions

Operation Year	End-user Emissions (tCO _{2e})		
	DM Scenario	DS Scenario	Difference
2026	3,264,100	3,267,200	+3,100

14.9.5 The DS scenario of the Proposed Scheme will generate an estimated additional 3,100 tCO_{2e} in the Opening Year compared with the DM scenario.

Comparison to carbon budgets

14.9.6 The GHG emissions calculated for the operation of the Proposed Scheme have been contextualised in relation to the UK Carbon Budgets, the transport sector and WCC baseline emissions in **Table 14-7** below.

Table 14-7: Comparison of Proposed Scheme Emissions Against Relevant Carbon Budgets

Project Stage	Net GHG emissions (tCO2e/y) (DS - DM)	% of Relevant Carbon Budget					
		UK 4th carbon budget (2023 to 2027)	UK 5th carbon budget (2028 to 2032)	6th Recommended Carbon Budget (2033—37)	Sector Baseline Emissions	Regional Baseline Emissions	Local (WCC) Baseline Emissions
Construction 2023	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES
Operation 2026	3,100	0.0003%	0.0009%	0.002%	0.003%	0.007%	0.4%*
Operation 2041	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES	To be presented in the ES

*end user emissions will not all occur within the WCC administrative boundary, but across the affected road network as defined in section 14.6.

14.9.7 The calculated 2026 opening year end user emissions are anticipated to contribute less than 0.001% of both the 4th and 5th UK Carbon Budgets and less than 0.5% of sector and local baseline GHG emissions. As the end-user emissions are anticipated to increase with the Proposed Scheme, it can be concluded that there will be an adverse, direct, long term effect on the global climate. As the GHG assessment remains ongoing with preliminary results reported in this PEIR the significance of the effects of the Proposed Scheme will be reported in the ES and will factor in the total emissions from construction and operation.

14.10 Anticipated further assessment

14.10.1 The calculation and assessment of construction GHG emissions and operation end user GHG emissions for the year 2041 will be presented within the ES. As noted in section 14.4, construction GHG emissions will be calculated using the Highways England Carbon Tool carbon factors (Highways England, 2015). Operation end user GHG emissions will be calculated using traffic data and the EFT (Defra, 2020)

14.10.2 A qualitative assessment of land use change, carbon sequestration, operational maintenance, repair and replacement will be undertaken within the ES.

Part 2: Vulnerability of the Proposed Scheme to Climate Change

14.11 Assessment methodology and significance criteria

14.11.1 There is no nationally adopted method for assessing climate change within EIA and therefore the assessment approach draws upon the following guidance:

- DMRB, Sustainability and Environment Appraisal, LA 114 Climate (Standards for Highways, 2019).
- IEMA's Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (IEMA, 2020).
- UKCP18 Guidance: How to use the UKCP18 Land Projections (Fung et al., 2018a).

14.11.2 The construction stage has been scoped out of the climate vulnerability assessment, as agreed within the 2020 Scoping Opinion.

Establishing the baseline

14.11.3 IEMA guidance (IEMA, 2020) recommends that the climatic baseline should consider extremes in short-term weather events, such as heatwaves; long-term climatic variability, such as seasonal changes in precipitation; and average climate norms, such as ambient temperature.

- 14.11.4 The current climatic baseline has been defined by historic climate conditions and the prevailing conditions at the time of the assessment using data provided by the Met Office (N.Db). The future climate conditions, identified as part of the future baseline, have been defined by Met Office UK Climate Projections 18 (UKCP18) (Met Office, N.Da) and a literature review of relevant publications. UKCP18 builds upon previous projections to provide information on how the climate of the UK may change over the rest of this century. UKCP18 uses Representative Concentration Pathways (RCPs) to develop projections and consider factors such as economic activity, population growth and land use change, which will result in a different range of global mean temperature increases until 2100.
- 14.11.5 The UKCP18 high emissions scenario (RCP 8.5) projections have been considered in this assessment, in line with the DMRB LA 114 Climate (Highways England, 2019). This is a conservative approach due to the uncertainties that exist around climate projections.
- 14.11.6 In line with DMRB LA 114 Climate (Highways England, 2019) requirements, the life span of the Proposed Scheme is assessed as being 60 years. Lifecycle stages have then been assessed in the short, medium and long term (i.e. 2030s, 2050s and 2080s).

Defining significance

- 14.11.7 The DMRB LA 114 Climate (Highways England, 2019) identifies the following three steps that will be undertaken to assess the vulnerability of the Proposed Scheme to climate change:
- 1) identify climate hazards and benefits.
 - 2) assess likelihood and consequences of hazards.
 - 3) evaluation of significance.
- 14.11.8 Sensitive receptors and the likely climate hazards and benefits (step 1 above) have been identified within this PEIR. The assessment of likelihood (step 2 above), consequence and significance (step 3) will be presented within the ES once further design information is available.
- 14.11.9 The Proposed Scheme receptors vulnerable to climate change have been identified based on assets and their operation, maintenance and refurbishment, and end users, including the public and commercial operators. Impacts have been described in terms of hazards and opportunities using the UKCP18 data, together with the vulnerability of the Proposed Scheme to both normal and extreme weather-related scenarios.
- 14.11.10 The likelihood and consequence of the impact occurring at receptors and the evaluation of the significance of effects will be based on the DMRB LA 114 Climate (Highways England, 2019) significance matrix which is provided below in **Tables 14-8 – 14-10**.

Table 14-8: Likelihood Categories (Highways England, 2019)

Likelihood Category	Description (probability and frequency)
Very High	The event occurs multiple times during the lifetime of the project (60 years) e.g. approximately annually, typically 60 events.
High	The event occurs several times during the lifetime of the project (60 years) e.g. approximately once every five years, typically 12 events.
Medium	The event occurs limited times during the lifetime of the project (60 years) e.g. approximately once every 15 years, typically 4 events.
Low	The event occurs during the lifetime of the project (60 years) e.g. once in 60 years.
Very Low	The event can occur once during the lifetime of the project (60 years).

Table 14-9: Measure of Consequence (Highways England, 2019)

Consequence of Impact	Description
Very Large Adverse	Operation - national level (or greater) disruption to strategic route(s) lasting more than 1 week.
Large Adverse	Operation - national level disruption to strategic route(s) lasting more than 1 day but less than 1 week or regional level disruption to strategic route(s) lasting more than 1 week.
Moderate Adverse	Operation - regional level disruption to strategic route(s) lasting more than 1 day but less than 1 week.
Minor Adverse	Operation - regional level disruption to strategic route(s) lasting less than 1 day
Negligible	Operation - disruption to an isolated section of a strategic route lasting less than 1 day.

Table 14-10: Significance Matrix (Highways England, 2019)

	Measure of likelihood					
		Very Low	Low	Medium	High	Very High
Measure of Consequence	Very Large	NS	S	S	S	S
	Large	NS	NS	S	S	S
	Moderate	NS	NS	S	S	S
	Minor	NS	NS	NS	NS	NS
	Negligible	NS	NS	NS	NS	NS

NS = Not significant; S = Significant

14.11.11 In considering the elements of climate, professional judgements (using a proportionate approach), will be used to provide a qualitative description of the nature of the impacts.

14.12 Assessment assumptions and limitations

14.12.1 As noted above, the information presented in this chapter is based on the information available at the time of writing the report and based on the emerging Proposed Scheme design. The preliminary findings reported in this PEIR may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process.

14.12.2 Scientific evidence shows that our climate is changing. However, there are significant uncertainties in the magnitude, frequency and spatial occurrence within the climate projections utilised in this assessment. The projections are dependent on future global GHG emissions and, while several different scenarios are provided, it cannot be reliably predicted which (if any) emission scenario will occur over the next 60 years (Fung et al. 2018b). As a result, RCP8.5, the highest emission scenario is considered most appropriate for this assessment to provide a conservative projection.

14.12.3 Projections after the 2040s increasingly diverge between scenarios and provide greater confidence for long-term climate averages than extreme events. Levels of confidence and certainty are considered when assessing the likelihood and consequence of climate hazards.

14.13 Study area

14.13.1 The assessment utilises the UKCP18 data for the 25 km grid cell within which the IAB is located (Grid Squares 437500, 137500 and 462500, 137500), although the area of influence for potential climate vulnerability impacts is expected to be limited to IAB and the immediate area around this. The 25 km probabilistic projections have been used to show a broad range of outcomes for the study area.

14.14 Baseline conditions

14.14.1 This section outlines the current and future climatic baseline conditions for the M3 J9 Improvement site and the surrounding area.

UK observations

14.14.2 For the UK as a whole, observed changes in climate over the last decade compared with the last seven decades include:

- The most recent decade (2009-2018) has been on average 0.3 °C warmer than the 1981-2010 average and 0.9 °C warmer than 1961-1990. All of the top ten warmest years have occurred since 2002 (Lowe *et al.*, 2019).
- In the past few decades there has been an increase in annual average rainfall over the UK. However, natural variations are also seen in the longer observational record (Lowe *et al.*, 2019).
- The period since 2000 accounts for two-thirds of hot-day records, and close to half of wet-day records, in monthly, seasonal and annual observations since 1910 (Kendon, 2014).
- Winters in the UK, for the most recent decade (2009-2018), have been on average 5% wetter than 1981-2010 and 12% wetter than 1961-1990. Summers in the UK have also been wetter, by 11% and 13% respectively (Met Office, 2019a).
- The frequency of severe autumn and winter wind storms increased between 1950 and 2003 (Alexander *et al.*, 2005), although there are no compelling trends in storminess as determined by maximum gust speeds from the UK wind network over the last four decades (Kendon *et al.*, 2019).
- Widespread and substantial snow events have occurred in 2018, 2013, 2010 and 2009, but their number and severity have generally declined since the 1960s (Met Office, N.Dc).

Regional observations

14.14.3 Historic climate averages during the period 1981-2010 for the closest climate station to the M3 J9 Improvement site (Martyr Worthy), obtained from the Met Office website (Met Office, N.Db), indicates the following:

- Average annual maximum temperature was 14.6°C
- Warmest month on average was July (mean maximum temperatures of 22.7°C).
- Coldest month on average was January (mean minimum temperature of 1.3°C).
- Average total annual rainfall was 746.5 mm.
- Wettest month on average was November (average monthly rainfall of 88.6 mm).
- Driest month on average was April (average monthly rainfall of 50.1 mm).

Future baseline

14.14.4 **Appendix 14.1** shows the projections for the two 25 km UK grid squares that surround the M3 J9 Improvement site for average summer, winter and annual precipitation, maximum average summer temperature, minimum average winter temperature and annual mean temperature. A summary of the projections is provided below in **Table 14-11**. The projections show the potential change in temperature or precipitation above or below the observed temperature/precipitation for 1981-2000.

Table 14-11: Summary of 50th Percentile Climate Projections for 25km grid square using baseline 1981-2000 scenario RCP 8.5 (Grid Squares 437500.0 East, 137500.0 North and 462500.0 East 137500.0 North)

Climate Variable at 50th Percentile						
Year	Mean Annual air temperature anomaly at 1.5m (°C)	Annual Precipitation rate anomaly (%)	Maximum Summer air temperature anomaly at 1.5m (°C)	Average Summer Precipitation rate anomaly (%)	Minimum Winter air temperature anomaly at 1.5m (°C)	Average Winter Precipitation rate anomaly (%)
2020	0.78	1.39	0.93	-5.76	0.67	12.35
2026	0.91	0.76	1.65	-9.27	0.70	3.70
2041	1.48	1.25	2.05	-18.21	1.35	13.34
2066	2.73	-0.83	3.96	-32.50	2.38	16.02
2086	4.09	1.73	6.21	-38.29	3.41	26.13

- 14.14.5 The projections show a continuous increase in annual average temperature over the next 60 years. Annual precipitation is shown to vary year on year, with some years being dryer or wetter than previous years.
- 14.14.6 The projections suggest that summers will become warmer and drier, with an expected increase in maximum summer temperatures and overall decline in summer precipitation. Natural variations may mean that some cooler and/or wet summers will occur.
- 14.14.7 Winters may become milder and wetter, with an overall increase in both minimum winter temperature and winter precipitation. Natural variations may mean that some cold and/or dry winters may still occur.
- 14.14.8 In the UK, the heaviest snowfalls tend to occur when the air temperature is between zero and 2°C (Met Office, N.Dc). There is less certainty in the magnitude of change to snow occurrence and amount, although climate models do show a downward trend in both falling and lying snow over time.

Extreme Weather Events

Heatwaves

- 14.14.9 A heatwave is an extended period of hot weather relative to the expected conditions of the area at that time of year, which may be accompanied by high humidity. For the UK, the Met Office defines a heatwave as “*when a location records a period of at least three consecutive days with daily maximum temperatures meeting or exceeding the heatwave temperature threshold*” (Met Office, N.Dd). The threshold varies by county and have been calculated using the 1981-2010 climatology of daily maximum temperature at the mid-point of the meteorological summer (15 July), which for the Site is 27 °C.
- 14.14.10 Research has found that the likelihood of heatwave events in the UK is about 10 times higher with climate change than without climate change (Vautard R. et al., 2019). As discussed above, the maximum summer air temperature and annual average air temperature is expected to increase over the next 60 years, which could result in more intense and more frequent heatwaves.

Low rainfall and drought

- 14.14.11 Droughts are natural events which occur when a period of low rainfall creates a shortage of water. There is no single definition of drought although the EA identifies three main types that may occur together or separately:
- Environmental Drought: shortage of rainfall causing a detrimental impact on the environment e.g. reduced river flows and/or low groundwater levels.
 - Agricultural Drought: crop production or farming practises such as spray irrigation is constrained by a shortage of rainfall.

- Water Supply Drought: shortage of rainfall is affecting human water supply.

14.14.12 The UKCP18 projections show a trend toward drier summers on average, although the uncertainties of these are wide ranging. Research on the influence of climate change on drought in the UK is limited and given the several different factors that influence droughts (meteorological, hydrological, and societal), it is challenging to identify whether drought events will become more common and prolonged in the future.

Heavier Rainfall

14.14.13 Heavy rainfall that may lead to flooding is hard to predict in the long term. A study has shown that an extended period of extreme winter rainfall in the UK is now about seven times more likely due to human-induced climate change (Christidisa and Stott, 2015), although the largest changes in heavy rainfall since 1961 have occurred in Scotland and northern England.

14.14.14 The climate projections for M3 J9 Improvement site show there will be an increase in average winter precipitation. There is also a pattern of larger increases in winter precipitation over southern and central England toward 2100.

14.14.15 While projections indicate a trend that summers will become dryer toward the end of the century, there is also evidence that summer rainfall events may become more intense when they do occur.

Storms and High Winds

14.14.16 Projections of future wind and storm occurrence and intensity are uncertain and confidence in projections is low. Research has shown that there are no compelling trends in maximum gust speeds over the last four decades (Kendon et al., 2019) and therefore there is no evidence that link climate change and storms.

14.14.17 UKCP18 identifies an increase in near surface wind speed over the UK in 2050-2100 for the winter season, which is accompanied by an increase in frequency of winter storms over the UK (Met Office, 2019). However, the increase in wind speeds is modest compared to natural variability from month to month and season to season.

14.15 Design, mitigation and enhancement measures

14.15.1 Potential mitigation measures for reducing effects from climate change are provided below. These measures are subject to final designs and will be confirmed within the ES:

- Making sure that the Proposed Scheme design (in particular the drainage system) complies with Environment Agency guidance regarding peak

rainfall. **Chapter 13: Road Drainage and the Water Environment** provides further information in regard to mitigating flood risk

- Designing and specifying pavement construction, expansion joints, planting and other elements that would be resilient to anticipated increases in peak summer temperatures and increased UV exposure
- Designing and specifying pavement construction, drainage systems, embankments and other elements with a view to anticipated increases in peak rainfall as well as increased variability of ground conditions (wetting and drying)

14.16 Assessment of potential effects

14.16.1 This section describes the preliminary findings of the assessment of potential impacts of climate change on the Proposed Scheme during the operational phase. As noted in **Section 14.13** above, preliminary findings may be subject to change as the design of the Proposed Scheme is developed and refined through the EIA and consultation process. The preliminary findings of the assessment are therefore presented below.

14.16.2 Climate hazards that have the potential to affect the Proposed Scheme are outlined in **Table 14-12** below.

Table 14-12: Climate variables and related hazards

Climate variable	Climate-related hazard
Average (air) temperature change (annual, seasonal, monthly)	Long term changes to climate norms
Extreme (air temperature (frequency and magnitude)	Heatwaves
Average precipitation (annual, seasonal, monthly)	Long term changes to climate norms
Extreme rainfall (frequency and magnitude)	Floods and droughts
Gales and extreme winds (frequency and magnitude)	Storms (tracks and intensity), including storm surge
Humidity	Snow, ice and hail
Solar radiation	Storms and lightning

14.16.3 Receptors for the Proposed Scheme that are vulnerable to damage from climate hazards include:

- Infrastructure, including road surface and pavements; structures, embankments and bridges; and drainage infrastructure
- Landscaping and water bodies
- End-user receptors.

14.16.4 As noted in **paragraph 14.11.7 & 14.11.8**, assessments will be undertaken within the ES, once ongoing design work has been completed. However, the preliminary findings of the assessment indicate that there could be potential adverse effects to receptors from extreme weather events and long term/seasonal variabilities.

14.16.5 It is anticipated that such adverse effects could be mitigated through (but not limited to) such measures as identified in **section 14.15** above.

14.17 Anticipated further assessment

14.17.1 The assessment of climate hazard likelihood, consequence and significance will be presented within the ES once further design information is available.

15 In Combination and Cumulative Effects

15.1 Introduction

15.1.1 Paragraph 4.16 of the National Policy Statement for National Networks (NPS NN) (DfT, 2014) states:

“When considering significant cumulative effects, any ES should provide information on how the effects of the proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence).”

15.1.2 Cumulative effects occur either as a result of changes caused by other reasonably foreseeable developments acting cumulatively with the effects of the Proposed Scheme (cumulative effects); or from the combined effect of several different impacts acting together on a single receptor, such that the combined effect would be more significant than the sum of the individual effects (in combination effects).

15.1.3 Cumulative effects could therefore arise from multiple projects (cumulative effects) or from within the same project (in combination effects). For two impacts to have a cumulative effect, the impacts would 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 would arise from two or more impacts acting together, an impact that does not cause a significant effect on its own could combine with another to result in a significant cumulative effect.

15.1.5 This chapter has been prepared with reference to the Planning Inspectorate’s Advice Note 17: Cumulative Effects Assessment (Planning Inspectorate, 2019), guidance on cumulative effects contained in Design Manual for Roads and Bridges (DMRB) LA104 (Highways England, 2019), the NPS NN (DfT, 2014), the 2019 Scoping Opinion and the 2020 Scoping Opinion.

15.2 Part 1 – Assessment of in combination effects between topics

15.2.1 The assessment of in combination effects between topics addresses the ways in which a single receptor, group of receptors or receptor type could be affected in more than one different way by a project.

15.2.2 Each technical Environmental Statement (ES) chapter will report the assessment of effects to receptors relevant to that topic’s methodology. In some instances, the same receptor or resource could be assessed in more than one technical chapter or more than once within the same technical chapter. In these cases, there is the possibility that several individual effects on the same receptor (which are not significant in their own right) could add up to create a significant cumulative effect.

- 15.2.3 Once the ongoing Environmental Impact Assessment (EIA) work has been completed and the ES drafted, an assessment of in combination effects between topics will be undertaken and reported in the cumulative chapter of the ES.
- 15.2.4 Only residual (i.e. after the consideration of mitigation) effects that are slight (not significant in its own right), moderate, large or very large will be considered for assessment. This is because multiple slight effects have the potential to lead to a significant (i.e. moderate or above) cumulative effect. The key will be to focus on the receptor and consider its capacity to accommodate changes likely to occur (based on professional judgement) because of the Proposed Scheme. Effects identified as being neutral will not be considered, as they would not combine with other effects to increase overall significance. Justification for conclusions drawn will be reported in the ES.
- 15.2.5 Potential impacts on a receptor due to the Proposed Scheme could be both beneficial and adverse.
- 15.2.6 There is no guidance for assessing the significance of in combination effects, hence assessing the significance of combined effects is necessarily a qualitative process, based on professional judgement.
- 15.2.7 It should be noted that, in some cases, multiple effects on a single receptor will already be considered within the topic sections. These links will be recorded in the in combination effects assessment matrix in the ES but to avoid duplication will not be reassessed. For example, the biodiversity section could evaluate impacts on ecological components due to various aspects like changes in air quality, noise, vibration, groundwater flow, land use, habitat fragmentation and vegetation clearance.
- 15.2.8 This chapter of the PEIR reports the preliminary findings of the assessment of in combination effects, identifying where it is currently considered that receptors could be affected by more than one impact.
- 15.2.9 **Table 15-1** and **Table 15-2** report the preliminary findings of the assessment for the construction phase and the operational phase respectively. The tables have identified receptors where it is considered that there is a likelihood of in combination effects to individual receptors. The tables are not intended as a summary of all receptors as identified within the PEIR topic chapters (**Chapters 5-14**). Therefore, if a receptor is not likely to be affected by an impact from more than one environmental topic, it has not been included. As further assessment is undertaken as part of the EIA, these tables will be reviewed and updated to reflect newly identified in combination effects.
- 15.2.10 At this stage of assessment, and due to ongoing EIA work, it is not possible to identify all receptors in specific detail, therefore receptors have been grouped in to overarching headings e.g. local residents. It is recognised that collectively addressing a receptor group does not account for the variations of impacts to receptors within that group (e.g. residents in Winchester, residents in Abbots Worthy and residents in Kings Worthy may experience varying degrees of

impacts). The receptors will be identified in specific detail through further EIA work and will be reported in the ES.

Table 15-1: Matrix to show receptors vs impact linkages for in combination assessment: construction phase

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
Environmental Discipline and Environmental Receptor	Biodiversity	Aquatic invertebrates	X			X	X		X		X	X
	Cultural Heritage	Archaeological remains/soil deposits		X			X		X		X	X
	Biodiversity	Badgers				X	X		X		X	X
	Biodiversity	Bats	X			X			X			X
	Biodiversity	Breeding and wintering birds				X	X		X		X	X
	Population and Health	Commercial areas (development land and business)							X	X		

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
	Cultural Heritage	Conservation Areas		X	X					X		
	Biodiversity	Cultivated land		X		X	X	X			X	X
	Biodiversity	Freshwater Fish	X			X	X		X		X	X
	Geology and Soils	Geology and Geomorphology					X				X	X
	Climate	Global climate	X									X
	Biodiversity	Hazel Dormice	X			X	X		X		X	X
	Population and Health	Healthcare facilities							X	X		
	Biodiversity	Hedgerows	X		X	X	X				X	X
	Cultural Heritage	Heritage statutory designations		X	X		X		X		X	

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
	Cultural Heritage	Historic landscapes - historic landscape types within the IAB		X	X					X		
	LVIA	Land use of the site and surrounding area (landscape receptor)			X							X
	LVIA	Landscape character			X							X
	LVIA	Landscape statutory designations		X	X					X		X
	Cultural Heritage	Listed Buildings		X	X					X		
	Misc.	Local residents	X		X	X	X			X	X	X

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
	Biodiversity	Lowland calcareous grassland	X			X	X				X	X
	Material assets and waste	Material Assets						X				X
	Material assets and waste	Mineral Safeguarding Area					X	X				
	Biodiversity	Neutral Grasslands	X			X	X				X	X
	Biodiversity	Notable plants	X			X	X				X	X
	Road Drainage and the Water Environment	Nun's Walk Stream				X	X				X	X

		Technical Discipline									
		Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
Population and Health	Nursery, Primary, Secondary schools, colleges and further education	X						X	X		
Biodiversity	Other woodland	X			X	X				X	X
Biodiversity	Otter	X			X	X		X		X	X
LVIA	Perceptual aspects			X							
Population and Health	Places of worship	X						X	X		
LVIA	Public Rights of Way			X				X	X		
Biodiversity	Reptiles	X			X	X				X	X

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
Biodiversity	Designated sites (Biodiversity)	X			X	X			X		X	X
LVIA	Designated sites (Landscape)			X					X			X
LVIA	Road users			X					X	X		
Cultural Heritage	Scheduled Monuments		X	X					X			
Biodiversity	Scrub	X			X	X					X	X
Biodiversity	Terrestrial Invertebrates	X		X	X	X					X	X
Population and Health	WCH - National Cycle Network Route 23			X					X	X		
Biodiversity	Wet Woodland	X			X	X					X	X

Table 15-2: Matrix to show receptors vs impact linkages for in combination assessment: operational phase

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
Environmental Discipline and Environmental Receptor	Biodiversity	Aquatic invertebrates	X			X					X	X
	Cultural Heritage	Archaeological remains/soil deposits									X	X
	Biodiversity	Badgers				X					X	X
	Biodiversity	Bats				X						X
	Biodiversity	Breeding and wintering birds	X			X			X		X	X
	Population and Health	Commercial areas (development land and business)							X	X		

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
	Cultural Heritage	Conservation Areas		X	X				X			
	Biodiversity	Cultivated land		X		X		X			X	X
	Biodiversity	Designated sites (Biodiversity)	X			X			X		X	X
	LVIA	Designated sites (Landscape)			X				X			X
	Biodiversity	Freshwater Fish				X					X	X
	Geology and Soils	Geology and Geomorphology										X
	Climate	Global climate	X									X
	Biodiversity	Hazel Dormice				X					X	X

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
	Population and Health	Healthcare facilities							X	X		
	Biodiversity	Hedgerows				X					X	X
	Cultural Heritage	Heritage statutory designations		X	X				X			
	Cultural Heritage	Historic landscapes - historic landscape types within the IAB		X	X				X			
	LVIA	Land use of the site and surrounding area (landscape receptor)			X							X

			Technical Discipline									
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
	LVIA	Landscape character			X							X
	LVIA	Landscape statutory designations		X	X				X			X
	Cultural Heritage	Listed Buildings		X	X				X			
	Misc.	Local residents	X		X		X		X	X	X	X
	Biodiversity	Lowland calcareous grassland				X					X	X
	Material assets and waste	Material Assets						X				X
	Biodiversity	Neutral Grasslands				X					X	X

		Technical Discipline									
		Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
Biodiversity	Notable plants				X					X	X
Road Drainage and the Water Environment	Nun's Walk Stream				X	X				X	X
Population and Health	Nursery, Primary, Secondary schools, colleges and further education	X						X	X		
Biodiversity	Other woodland				X					X	X
Biodiversity	Otter				X					X	X
LVIA	Perceptual aspects			X				X			

			Technical Discipline										
			Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate	
	Population and Health	Places of worship	X							X	X		
	LVIA	Public Rights of Way			X					X	X		
	Biodiversity	Reptiles				X						X	X
	LVIA	Road users			X						X		
	Cultural Heritage	Scheduled Monuments		X	X					X			
	Biodiversity	Scrub				X						X	X
	Biodiversity	Terrestrial Invertebrates			X	X						X	X
	Population and Health	WCH - National Cycle Network Route 23			X					X	X		

		Technical Discipline									
		Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
Biodiversity	Wet Woodland				X					X	X

15.2.11 Separate consideration has been given to the potential in combination effects to the River Itchen as outlined in **Table 15-3** below. Results are preliminary at this stage, as ongoing EIA work progresses, results will be considered in full and reported in the ES.

Table 15-3: Matrix to show River Itchen receptors vs impact linkages for in combination assessment: construction and operation phase

Receptor		Technical Discipline									
		Air Quality	Cultural Heritage	Landscape	Biodiversity	Geology and Soils	Material Assets and Waste	Noise and Vibration	Population and Health	Road Drainage and the Water Environment	Climate
River Itchen (waterbody, SSSI/SAC)	X				X	X		X		X	X
River Itchen Chalk WFD groundwater						X				X	

15.3 Part 2 – Cumulative assessment approach

15.3.1 This PEIR chapter reports the methodology for the assessment of cumulative effects that will be reported in the ES, considering ‘other development’ proposed to be developed at the same time as the Proposed Scheme.

15.3.2 Schedule 4 (part 5) to the Infrastructure Planning (EIA) Regulations 2017 (as amended) requires an ES to include “...a description of the likely significant effects of the development on the environment resulting from...the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of potential environmental importance likely to be affected or the use of natural resources”.

15.3.3 Planning Inspectorate’s Advice Note 17: Cumulative Effects Assessment (Planning Inspectorate, 2019) provides advice on a ‘staged’ process that applicants may wish to adopt in cumulative effects assessments, the four assessment stages comprise:

- Establish the NSIP’s zone of influence (Zol) and identify a ‘long list’ of other developments which could potentially have effect interactions with the Nationally Significant Infrastructure Project (NSIP)
- Develop a ‘short list’ of other developments which could potentially have effect interactions with the NSIP. Essentially, analysing the ‘long list’ in more detail in order to include only those developments that have potential to give rise to significant cumulative effects by virtue of overlaps in temporal scope; due to the scale and nature of the ‘other development’/receiving environment; or any other relevant factors
- Gather available information on the shortlisted developments
- Assess likely significant effects arising as a result of the NSIP cumulatively with the short listed developments
- The environmental topics of Materials and Waste, and Climate were scoped out for consideration of cumulative effects, confirmed through the 2020 Scoping Opinion

15.4 Stage 1 – Establishing the Proposed Scheme’s Zone of Influence

15.4.1 **Table 15-4** below identifies the Zol for environmental disciplines that have been used to identify the long list of ‘other developments’ and then the short list.

Table 15-4: Zones of influence

Environmental aspect	Zone of Influence	Justification
Air Quality	Construction – 200m from Indicative Application Boundary (IAB)	Beyond 200m of the IAB, construction effects are not anticipated to occur.
	Operation – Scope out	The assessment inherently provides for the assessment of cumulative effects through use of the traffic model. The Proposed Scheme in operation would not introduce a specific emission point source (i.e. an energy generation facility stack).
Cultural Heritage	Construction – 1km from IAB	1km relates to industry standard study areas, to be confirmed through the Zone of Theoretical Visibility (ZTV).
	Operation – 1km from IAB	1km relates to industry standard study areas, to be confirmed through the Zone of Theoretical Visibility (ZTV).
Landscape and Visual	Construction - 3km north to south and 2km east to west from the IAB	In lieu of the ZTV being available, construction related visual impacts from the Proposed Scheme are considered to be limited to within the Zol.
	Operation - 3km north to south and 2km east to west from the IAB	In lieu of the ZTV being available, operational related visual impacts from the Proposed Scheme are considered to be limited to within the Zol.
Geology and Soils	Construction - 2km from IAB	Beyond this distance, effects are not anticipated to occur. This distance is based upon the ground water Source Protection Zone (SPZ) inner zone travel time of 50 days multiplied by the mean transmissivity of the chalk.
	Operation - 2km from IAB	Beyond this distance, effects are not anticipated to occur. This distance is based upon the ground water Source Protection Zone (SPZ) inner zone travel time of 50 days multiplied by the mean transmissivity of the chalk.
Noise and Vibration	Construction – 300m from IAB	Beyond this distance (as set out in the DMRB LA111 Noise and vibration guidance), effects are not anticipated to occur.

Environmental aspect	Zone of Influence	Justification
	Operation – 2km from IAB	Beyond this distance, effects are not anticipated to occur. However, major development in close proximity, but beyond the 2km buffer will be considered.
Population and Health	Construction – 2km from IAB	Beyond this distance, effects are not anticipated to occur.
	Operation – 2km from IAB	Beyond this distance, effects are not anticipated to occur.
Road Drainage and the Water Environment	Construction - 2km for major development and 200m for minor planning applications, from the IAB.	Beyond this distance, effects are not anticipated to occur.
	Operation - 2km for major development and 200m for minor planning applications, from the IAB.	Beyond this distance, effects are not anticipated to occur.

15.5 Stage 2 – Identification of a long list of ‘other developments’

15.5.1 A search for ‘other development’ has been undertaken using information gathered from the Planning Inspectorate website, Local Authority Planning websites and other relevant sources.

15.5.2 Guidance on the identification of ‘other development’ to be taken into account in the consideration of cumulative effects, including the certainty to be attributed to each ‘other development’ is available in PINS Advice Note 17 (Planning Inspectorate, 2019) (Table 2), which is reproduced below:

Tier 1:

- projects under construction.
- permitted application(s), whether under the PA 2008 or other regimes, but not yet implemented
- submitted application(s) whether under the PA 2008 or other regimes but not yet determined.

Tier 2:

- projects on the Planning Inspectorate’s Programme of Projects where a scoping report has been submitted.

Tier 3:

- projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted
- identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals would be limited
- identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

15.5.3 Where other past projects are already complete or are expected to be completed before construction of the Proposed Scheme, and the effects of those projects are fully determined, effects arising from them will be considered as part of the baseline in the ES. These could be considered as part of both the construction and operation assessment. The ES will clearly distinguish between projects forming part of the baseline and those included in the cumulative impact assessment.

15.5.4 Applications registered (currently approved or not decided) five years before the start of the construction of the Proposed Scheme have been considered for inclusion in the long and short lists. Although planning applications typically have three years to start of construction once permission is granted, some of them may not yet be fully implemented and so could have a construction timescale that coincides with that of the Proposed Scheme. Taking 2023–2026 to be the construction period of the Proposed Scheme, applications registered from April 2017 onwards will be considered. However, if any other ongoing construction works corresponding to an application from before April 2017 are known, then such applications will also be included.

15.5.5 The cumulative effects assessment will, therefore, focus primarily on interaction between the Proposed Scheme and other developments whose construction will not have commenced, or will not be complete, before construction of the Proposed Scheme. Relevant other developments will be identified through a staged process.

15.5.6 The 'long list' has taken account of requests identified through the previously adopted (and now superseded) March 2019 Scoping Opinion and the November 2020 Scoping Opinion:

- Inclusion of the strategic growth site in the Eastleigh Local Plan - the new link road to J10 of the M3 (ID54)
- The cumulative impact of M3 J9-14 Motorway Upgrades (ID68).

15.5.7 It has also been cognisant of the July to August (2019) consultation exercise, which included the following request:

- Policy WT3, WIN4, WIN 5-7 as set out within the Winchester City Council 2017/2018 AMR (ID73, ID69, ID70 and ID71, respectively).

15.5.8 Additionally, the Statement of Community Consultation response from Winchester City Council which requested the following two schemes for inclusion:

- Land East of A272 Solar Farm (ID77)
- Three Maids Hill Waste Centre (ID38).

15.5.9 The following have also been taken into account:

- Refused applications subject to appeal procedures not yet determined
- Any other relevant developments identified through consultation with developers and stakeholders
- Road Investment Strategy Schemes
- Highways England Designated Funds Projects (none identified).

15.5.10 Development Management Procedure) (England) Order 2015 (TCPO), 'major applications' include:

- the winning and working of minerals or the use of land for mineral-working deposits
- waste development
- the provision of dwellings where:
 - the number of dwellings to be provided is 10 or more or
 - the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i)
 - the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more
 - development carried out on a site having an area of 1 hectare or more

15.5.11 An initial 'long list' of potentially relevant other developments has been developed in accordance with PINS Advice Note 17 (Planning Inspectorate, 2019), using the Zols identified in **Table 15-4** and the tier structure outlined above. 81 schemes were identified in the long list. The long list is shown in **Appendix 15.1**.

15.5.12 The long list will continue to be updated throughout the ongoing EIA process as appropriate when new developments are proposed to make sure that all potentially relevant developments are included in the cumulative assessment.

However, to allow assessment work to progress, a ‘cut-off date’ for the consideration of any new ‘other development’ is proposed to be 1st July 2021.

15.5.13 Where significant cumulative effects are identified, beyond those identified as residual effects from the Proposed Scheme in isolation, additional mitigation measures would be recommended.

15.6 Stage 3 – Identification of a short list of ‘other development’

15.6.1 A short list of ‘other development’ has been prepared through a review of the long list to identify those to be taken forward into the cumulative assessment, primarily by applying threshold (inclusion/exclusion) criteria to the identified long list, as shown in **Table 15-5**:

Table 15-5: Threshold criteria

EIA Discipline	Threshold Criteria
Air Quality	Construction phase Air Quality effects that are significant
Cultural Heritage	Any development that has a potential impact upon archaeological remains, built heritage assets or the historic landscape (including minor)
Landscape and Visual	Any development that has a potential impact upon archaeological remains, built heritage assets or the historic landscape (including minor)
Biodiversity	Any (including minor) potential impacts had been identified to European designated sites (for 10km) and significant impacts to all other species.
Geology and Soils	Any impacts that would be potentially contaminative and might create pathways (e.g. excavations/piled foundations) within 2km
Noise and Vibration	A 300 m boundary from M3J9 construction related activities, and developments where construction activity is likely to be longer than 40 days during M3J9 construction.
Population and Health	Housing schemes and transport infrastructure works that could affect accessibility to services in the local area, and other non-domestic development
Road Drainage and the Water Environment	Exclude schemes smaller than 1 hectare (ha) or schemes falling within Flood Zone 1 and any scheme that could contribute to contamination within surface water and water channels

15.6.2 If it was identified that ‘other development’ breached the inclusion/exclusion thresholds (therefore requiring to be assessed), consideration was given to whether there would be temporal overlap with the Proposed Scheme. ‘Other development’ which breaches thresholds, yet for which there was no

temporal overlap identified with the 'Proposed Scheme', will be considered as part of the baseline for each individual assessment topic as relevant in the ES (in that they are anticipated to be built out and in operation by the time the construction of the Proposed Scheme commences). 'Other development' for which a temporal overlap has been identified, is to be taken forward for the consideration of cumulative effects.

- 15.6.3 There is limited environmental information available about allocations and policies. As a precautionary approach it is assumed that there could be temporal overlap, accordingly they have been included in the short list for further consideration within technical assessments to be reported in the ES.
- 15.6.4 Accordingly, after the application of the above thresholds and consideration of likely temporal overlap, a short list of 'other development' for consideration within the ES is shown in **Appendix 15.2**. A total of 49 developments have been identified to be taken forward in the short list. Twenty three of these developments are draft policies or allocations, and one falls within the Road Investment Strategy (ID75 in **Appendix 15.2**).
- 15.6.5 The above long list and short list was prepared through the use of a single cumulative assessment matrix (see **Appendix 15.3**), detailing the individual 'other development' considered, the determination as to whether each scheme falls within a specific ZoI, whether the relevant assessment thresholds have been exceeded and whether or not a temporal overlap exists.
- 15.6.6 There is a geographical relationship between the Proposed Scheme and the M3 Junction 9 to Junction 14 Motorway Upgrade project. At this stage, it cannot be ruled out that there would not be a temporal overlap between the two developments. Accordingly, a precautionary approach is adopted and assumes temporal overlap could exist. It is therefore considered (at this stage) that the Motorway Upgrade project will be considered as a cumulative development (identified as ID68 in **Appendix 15.3**). As further information becomes available, the status of ID68 will be reconsidered as necessary.

15.7 Stage 4 – Gathering Information on the developments in the short list

- 15.7.1 The following information will be sought for each of the developments included on the short list for assessment, to inform the cumulative effects assessment in the ES:
- the location and extent of the development
 - information on the design of the development
 - the proposed programme for obtaining consent (if relevant), construction, operation and decommissioning
 - environmental assessment information that will allow the identification of:
 - the environmental baseline

- the environmental effects of the development
- the environmental Zol of the development as a whole and on a topic by topic basis
- the timescale over which effects would occur, overall and on a topic by topic basis

15.7.2 The extent to which this information is available, and the level of detail of the information, has varied between developments, even where the minimum requirement for inclusion in the short list has been met.

16 Summary of Effects

16.1 Introduction

- 16.1.1 The Proposed Scheme has the potential to result in both beneficial and adverse effects to the environment. Some of these impacts may occur during construction, such as benefits to the labour market, or adverse impacts to vegetation and habitat. Other impacts may occur during operation, such as the development/maturation of beneficial new habitats resulting from the landscape and ecological mitigation proposals, or adverse visual effects on nearby properties.
- 16.1.2 **Chapters 5-15** of this Preliminary Environmental Information Report (PEIR) present the preliminary findings of ongoing assessment work. In accordance with Planning Inspectorate Advice Note 7 (*EIA Process, Preliminary Environmental Information and Environmental Statements, May 2020*) ‘preliminary environmental information’ is that which has been compiled by the applicant and is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development).
- 16.1.3 **Table 16-1** presents a summary of these findings, however, it should be noted that these are subject to change as a result of ongoing design work and Environmental Impact Assessment (EIA) assessment. The final environmental topic findings will be reported in the Environmental Statement (ES).

Table 16-1: Summary of Preliminary Findings

Environmental Discipline	Construction Phase	Operational Phase
Air Quality	<p>Dust impacts from construction of the Proposed Scheme will require appropriate mitigation measures through best practice measures to reduce effects to sensitive human and ecological receptors.</p> <p>At this stage, the potential for likely significant adverse effects on air quality due to traffic emissions during construction cannot be ruled out. Ongoing design and EIA work will continue to consider likely impacts due to construction of the Proposed Scheme as the project progresses.</p>	<p>The detailed conclusions of the air quality assessment will be presented within the ES.</p> <p>At this stage, it is considered that as the A34 north of Winchester doesn't pass through an Air Quality Management Area (AQMA), predicted effects to human receptors in proximity to the road are unlikely to be classified as significant according to the Design Manual for Roads and Bridges (DMRB) methodology.</p> <p>In proximity to the M3 south of Winchester, there are no exceedances of thresholds and background concentrations are predicted to decrease. Effects are unlikely to be classified as significant according to the DMRB methodology.</p> <p>Within Winchester, some traffic links would experience an increase in traffic movements, while some would experience a decrease. Ongoing EIA work is required to determine the significance of effects to air quality from varying traffic movements.</p>

Environmental Discipline	Construction Phase	Operational Phase
		<p>Significant adverse effects are not considered likely to the Kennet and Lambourn Floodplain Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC), River Test SSSI, Highclere Park SSSI, Burghclere Beacon SSSI and Cheesefoot Head SSSI due to current baseline pollution levels and predicted changes in traffic flows. It is likely there would be an increase in concentrations of pollutants at the River Itchen SSSI and SAC, and St Catherine’s Hill SSSI – however further EIA work is required to determine the significance of effects, which will be reported in the biodiversity chapter of the ES.</p>
<p>Cultural Heritage</p>	<p>The Proposed Scheme is likely to have moderate adverse effects to the setting of, and a moderate to large impact on round barrow cemetery at Magdalen Hill Down are anticipated (due to an increase in noise, dust and vibration) if the southern area of search for potential excess spoil management is taken forward. Subject to reinstatement of the area following use making the effect temporary, no residual effects are anticipated. This assessment will be reviewed during ongoing EIA work and reported in the ES following the decision on which areas of search for potential excess storage will be included and once further details about construction activities in this area are available.</p>	<p>Following reinstatement of the ‘southern area of search for potential excess spoil management’, it is considered that there would be a likely neutral effect to Magdalen Hill Down and St Gertrude’s Chapel Scheduled Monuments.</p> <p>There is the potential that the Proposed Scheme could affect archaeological remains through dewatering; further assessment is required to consider effects.</p> <p>There is the potential for slight adverse effects upon the setting of the Kings Worthy and Abbots Worthy Conservation Areas associated with the A33, the</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>Likely slight or moderate adverse effect on the setting of the site of St Gertrude’s Chapel due to an increase in noise, dust and vibration. This could have an indirect minor impact resulting in a temporary slight or moderate adverse effect although this will be reviewed for the ES once further details on construction activities in this area are available.</p> <p>Likely major adverse effect on archaeological remains within the Indicative Application Boundary (IAB) associated with intrusive groundworks. Where archaeological remains within the IAB and the footprint of construction activities extend outside the footprint of intrusive groundworks, the magnitude of impact is likely to be lower because the assets will not be completely destroyed.</p> <p>Before mitigation, there is the potential for adverse effects upon archaeological remains. A programme of archaeological mitigation will be discussed with the WCC and HCC Archaeologists prior to construction and outlined within the ES.</p>	<p>addition of a walking route and new access to businesses.</p> <p>Likely slight adverse effect upon the setting of Worthy Park House (Grade II* listed building) due to views of the operational Proposed Scheme.</p> <p>The operation of the Proposed Scheme is likely to be largely screened in views from Abbotsworthy House. Therefore, it is unlikely that there will be an effect upon the setting of the historic building.</p> <p>Likely neutral effect to historic landscapes from the Proposed Scheme.</p> <p>Assessments will be reviewed in ongoing EIA work and reported in the ES.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>There is the potential that the Proposed Scheme could affect archaeological remains through dewatering; further assessment is required to consider effects.</p> <p>Likely slight or moderate adverse effect upon the setting of Worthy Park House (Grade II* listed building) due to views of areas of search for excess spoil management, potential construction compound areas and areas for proposed environmental mitigation.</p> <p>Likely neutral effect upon the historic landscape setting of Abbotsworthy House Historic Park and Garden associated with construction activities.</p> <p>Likely slight or moderate adverse effect upon the character of the downland area between the M3 and A33 associated with construction activities at areas of search for excess spoil management, potential construction compound areas and areas for proposed environmental mitigation.</p> <p>Likely slight adverse effect upon the water meadows and old settlement historic landscape character types associated with construction activities.</p>	

Environmental Discipline	Construction Phase	Operational Phase
	<p>Assessments will be reviewed in ongoing EIA work.</p>	
<p>Landscape and Visual</p>	<p>The Proposed Scheme is likely to have temporary adverse landscape effects upon the topography within the IAB associated with construction activities and land reprofiling.</p> <p>Likely temporary adverse landscape effects upon the land use of the M3 Junction 9 Improvement site and surrounding area e.g. tourism and some agricultural land.</p> <p>Likely temporary adverse landscape upon the vegetation within the IAB as a result of vegetation clearance prior to construction works.</p> <p>Likely temporary adverse effects upon Kings Worthy and Abbots Worthy Conservation Areas.</p> <p>Likely temporary adverse landscape effects within areas of the South Downs National Park (SDNP) within the IAB associated with construction activities.</p>	<p>The Proposed Scheme is likely to have adverse effects upon the topography as a result of the earthworks required to enable the Proposed Scheme.</p> <p>Likely long-term beneficial effects are anticipated upon the land use within the IAB as a result of the landscape mitigation measures.</p> <p>Likely long-term beneficial effects on vegetation as a result of the landscape mitigation measures.</p> <p>Likely beneficial effects on the special qualities of the SDNP as a result of the landscape mitigation measures.</p> <p>Likely beneficial visual effects anticipated as a result of the installation of a new walking route along sections of the abandoned A33/A34 and footpath between Easton lane and Long Walk, with enhanced connectivity to the SDNP and Winchester.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>Likely temporary adverse landscape effects to Public Right of Way (PRoW) which fall within the IAB associated with short term closures and diversions during construction works.</p> <p>Likely temporary adverse landscape effects on tranquillity as a result of vegetation clearance and construction works.</p> <p>Likely temporary lighting effects on the SDNP Dark Skies Zones as a result of construction activity associated with the areas of search for potential excess spoil management.</p> <p>Likely temporary adverse landscape effects are anticipated on local landscape character as a result of vegetation clearance and construction works.</p> <p>Likely temporary adverse visual effects to residents and recreational users due to construction activities.</p>	<p>Likely adverse effects on tranquillity associated with more open views of the Proposed Scheme. However, the effects would lessen with time and maturation of landscape mitigation measures.</p> <p>Likely adverse effects on local landscape character, due to more open views of the Proposed Scheme being analogous with the existing baseline. However, the effects would lessen with time and maturation of landscape mitigation measures.</p> <p>Likely adverse visual effects for residents and recreational users due to more open views of the Proposed Scheme would lessen over time.</p>
Biodiversity	There is potential for adverse effects to the River Itchen SAC/SSSI from habitat degradation and disturbance due to changes in surface water quality	There is potential for adverse effects to the River Itchen SAC/SSSI from shading due to the new proposed footbridge, however this is not anticipated to

Environmental Discipline	Construction Phase	Operational Phase
	<p>which could affect habitats and qualifying species. Impacts to the River Itchen SAC designated features will be determined through the Habitat Regulations Assessment (HRA).</p> <p>Construction activity could also include removal of vegetation, piling, concrete formation and other activities. However, significant effects are not anticipated due to the implementation of standard control measures (to be further detailed in the ES).</p> <p>Construction activities including implementation of the surface water drainage strategy and earthworks have the potential to impact upon groundwater through potential creation of preferential pollution pathways or possible leaching of pollutants to the groundwater body. However, significant effects are not anticipated due to the implementation of standard control measures (to be further detailed in the ES).</p> <p>No effects are anticipated to Catherine’s Hill SSSI or Cheesefoot Head SSSI due to intervening distance from the Proposed Scheme.</p>	<p>be significant. Changes from exhaust emissions could result in habitat degradation and changes to species composition, however ongoing assessment is required to determine the significance of effects. Impacts to the River Itchen SAC designated features will be determined through the HRA.</p> <p>There are potential operational impacts to Catherine’s Hill SSSI and Cheesefoot Head SSSI from traffic emissions, which will be assessed further in ongoing EIA work. No operational effects are anticipated to Mottisfont Bats SAC.</p> <p>Effects to Easton Down Site of Importance for Nature Conservation (SINC) and other non-statutory designated sites from habitat degradation are not anticipated to be significant. Further assessment of traffic emissions will be undertaken.</p> <p>Badgers – the Proposed Scheme is unlikely to worsen the existing situation and improvements are anticipated through provision of mammal fencing in strategic locations.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>Effects to Easton Down Site of Importance for Nature Conservation (SINC), and other non-statutory designated sites from habitat degradation are not anticipated to be significant.</p> <p>Some Habitats of Principal Importance (HPI), as well as ‘other habitats’ will be directly affected, however the Proposed Scheme has been designed to minimise impacts as far as practicable and significant effects are unlikely.</p> <p>Badgers – all works which could affect badger setts would be undertaken under a Natural England Protected Species Mitigation Licence, which would incorporate appropriate mitigation strategies.</p> <p>Bats - construction effects may arise through loss and fragmentation of habitats used by foraging and commuting bats during construction, including woodland, tree lines and scrub. New habitats have been designed to provide habitat links and foraging resource.</p> <p>Bats – Any required works that affect bat roosts will be undertaken under a Natural England Protected Species</p>	<p>Bats – the Proposed Scheme is not considered to worsen the existing situation in relation to bat mortality. Any lighting proposed (the junction is not proposed to be lit) would be sensitive to bats. Roosting opportunities would remain during the operation of the Proposed Scheme, and positive effects could occur through provision of bat boxes. Roosting opportunities would remain following any works required as part of the scheme.</p> <p>Hazel dormouse – it is considered unlikely that operation noise levels will be significantly worse than the existing situation, and it is considered that dormice in this area will be accustomed to existing noise disturbance.</p> <p>Otter - the Proposed Scheme is unlikely to worsen the existing situation and improvements are anticipated through provision of mammal fencing in strategic locations. It is considered unlikely that operation noise levels will be significantly worse than the existing situation and it is considered that otter in this area will be accustomed to existing noise disturbance.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>Mitigation Licences for bat, where required, which would include appropriate mitigation strategies.</p> <p>Hazel dormouse – the Proposed Scheme could result in the loss of, and fragmentation of habitats. Any works to habitat to be undertaken under licence and would include mitigation strategies. New habitat linkages are designed across the IAB.</p> <p>Otter – measures to avoid effects from construction (water quality, mortality, entrapment) are under consideration. Passage along the River Itchen would be maintained during construction.</p> <p>Breeding and wintering birds – the Proposed Scheme could result in the loss of habitat, direct mortality, disturbance and habitat degradation, which would be offset by creation of the ecological mitigation package creating large areas of diverse semi-natural habitat. Measures to avoid effects on birds are under consideration.</p> <p>Reptiles – the Proposed Scheme could result in the loss of habitat, however works would be undertaken</p>	<p>Breeding and wintering birds - the Proposed Scheme is unlikely to worsen the existing situation in relation to mortality. In relation to noise, it is considered unlikely that the operational scheme would be significantly worse than the existing situation.</p> <p>Reptiles – In the long term, the habitat mitigation and enhancement package will compensate for losses of reptile habitat, and provide additional habitat designed to provide linkages across the IAB and into the wider landscape.</p> <p>Freshwater fish – the limited addition of shading from the footbridge is unlikely to significantly affect the existing situation. No piers or other structures will be located within the river for the current design of the bridge, and passage for fish will be maintained at all times.</p> <p>Terrestrial invertebrates - the mitigation and enhancement package will compensate for losses and provide longer term enhancement.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>under a method statement with appropriate mitigation strategies.</p> <p>Freshwater fish – It is anticipated that no construction works are required within the River Itchen. However potential effects could arise from habitat degradation and disturbance but measures to avoid such effects are under consideration. No piers or other structures will be located within the river for the current design of the bridge, and passage for fish will be maintained at all times.</p> <p>Terrestrial invertebrates – the Proposed Scheme will result in the loss of habitat; however the design has sought to minimise this. The mitigation and enhancement package will compensate for losses and provided longer term enhancement.</p> <p>Aquatic invertebrates - It is anticipated that no construction works are required within the River Itchen. Habitat degradation associated with construction could occur, however measures to avoid such effects are under consideration.</p>	<p>Aquatic invertebrates - the limited addition of shading from the footbridge is unlikely to significantly worsen the existing situation.</p> <p>Notable plants - the mitigation and enhancement package will compensate for losses and provide longer term enhancement.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>Notable plants – the Proposed Scheme could result in the loss of habitat during construction, however design has sought to minimise impacts. The mitigation and enhancement package will compensate for losses and provide longer term enhancement. Measures to control invasive non-native species and to avoid spread during construction are under consideration.</p>	
<p>Geology and Soils</p>	<p>The Proposed Scheme is likely to have a neutral effect to geology and geomorphology, the built environment and human health due to potential for mobilisation of contaminants.</p> <p>The Proposed Scheme is likely to have a slight adverse effect to groundwater, surface water and environmentally sensitive sites due to potential for mobilisation of contaminants.</p> <p>There is potential for the construction of piled foundations to create new pathways to controlled waters. A Tier 2 geoenvironmental risk assessment will be undertaken to determine the risk to controlled waters from any contamination identified by the ground investigation.</p>	<p>With the implementation of mitigation (including working within best practice guidelines, preventing the release of contamination, ground investigation and appropriate design), no significant effects are anticipated to groundwater, surface water, environmentally sensitive sites, built environment and human health due to the potential for chemical attack and decay on buried concrete structures from potential existing contamination, exposure of maintenance workers to hazardous ground gas in confined spaces and the introduction of new potential contaminants to the environment. A Geoenvironmental risk assessment will be undertaken and the findings will be used to assess potential impacts which will be reported in the ES.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>The Proposed Scheme is likely to impact agricultural land classification 2, 3a and 3b respectively (classed as best and most versatile). A portion of this land would be removed from agricultural use on a permanent basis to facilitate the Proposed Scheme (namely the new footpath and bund in land immediately east of the M3). However, the majority of agricultural land would be affected on a temporary basis and reinstated to agricultural use upon completion of the construction phase. Overall, significant adverse effects are considered likely to agricultural soil resources. The detailed assessment of impact to specific gradings of soil will be undertaken through ongoing EIA work as the design progresses.</p> <p>There is the potential for naturally occurring geological hazards and other land stability constraints to be present which could result in a moderate to major magnitude of impact. A geotechnical engineering assessment, including a Cavities Occurrence Assessment will be undertaken and the findings will be used to assess potential impacts and reported in the ES. With the implementation of embedded mitigation, there are not anticipated to be any significant effects at this stage.</p>	

Environmental Discipline	Construction Phase	Operational Phase
<p>Material Assets and Waste</p>	<p>As the design of the Proposed Scheme has yet to be finalised, information about material usage and composition is not yet available, assessment of use of material assets will be reported in the ES.</p> <p>Effects due to the potential sterilisation of mineral reserves is ongoing and will be reported in the ES.</p> <p>Due to the early stage of design, it has not been possible to undertake assessment work relating to impacts to waste management capacity. This will be undertaken and reported in the ES. The waste hierarchy will be implemented throughout the construction to minimise disposal and maximise re-use and recycling of waste arisings.</p>	<p>Scoped out of assessment</p>
<p>Noise and Vibration</p>	<p>Noise sensitive human receptors beyond 200m from construction activities are unlikely to be subject to adverse effects, while noise sensitive human receptors within 200m of construction may be subject to adverse effects.</p>	<p>Operational traffic noise levels (at the opening year) have been considered along the A34, A33, M3, north and south of Junction 9 roundabout and Easton Lane and are anticipated to be either negligible or imperceptible. When a future year scenario is considered at the same locations, levels are considered to be imperceptible.</p>

Environmental Discipline	Construction Phase	Operational Phase
	<p>Adverse impacts to noise sensitive human receptors from site compounds are not anticipated beyond 100m, and there are no residential properties within 100m.</p> <p>An assessment of potential vibration effects to human and ecological receptors will be reported in the ES.</p>	
Population and Health	<p>The Proposed Scheme is likely to have temporary beneficial effects to the labour market and construction sector during construction, while temporary adverse effects are anticipated to the Winnall Industrial Estate (traffic management arrangements affecting access), the local PRow (potential for temporary loss of physical access) and driver stress.</p>	<p>The Proposed Scheme is likely to have beneficial effects are anticipated to the Winnall Industrial Estate, local PRow and driver stress.</p>
Road Drainage and the Water Environment	<p>The Proposed Scheme is considered to have a likely neutral effect to the River Itchen Water Framework Directive (WFD) water body, River Itchen Chalk WFD groundwater body Nun's Walk Stream WFD water body, fluvial flood risk and groundwater abstraction consumers. This is due to construction works being undertaken in accordance with pollution controls and management measures which will mitigate against pollutants entering water bodies. It is considered that there would be a neutral or slight beneficial effect to surface water flood risk to road users.</p>	<p>The Proposed Scheme is considered to have a likely neutral or slight beneficial effects to the River Itchen WFD water body and Nun's Walk Stream WFD water body, a slight beneficial effect to surface water flood risk to road users, a neutral effect to fluvial flood risk to local residents, the River Itchen Chalk WFD groundwater body and to groundwater abstraction consumers. This is due to the surface water drainage strategy having a number of pollution prevention and control elements.</p>

Environmental Discipline	Construction Phase	Operational Phase
Climate	<p>Due to the early stage of design, Greenhouse Gas (GHG) emissions from construction have not been quantified, however, a temporary adverse effect is anticipated as a result of embodied carbon from construction materials and construction works.</p> <p>An assessment of the vulnerability of the Proposed Scheme to Climate Change remains ongoing and will be reported in the ES.</p>	<p>The calculated 2026 opening year end user emissions are anticipated to contribute less than 0.001% of both the 4th and 5th UK Carbon Budgets and less than 0.5% of sector and local baseline GHG emissions (across the affected road network). However, as end user emissions are anticipated to increase with the Proposed Scheme, it is considered that there would be an adverse effect on global climate. GHG assessments remain ongoing and will be reported in the ES.</p> <p>It is currently envisaged that that receptors for the Proposed Scheme that are vulnerable to damage from climate hazards include road infrastructure, landscaping features and end-user receptors. An assessment of the vulnerability of the Proposed Scheme to Climate Change remains ongoing and will be reported in the ES.</p>

16.2 Next steps

Consultation

- 16.2.1 We would like to obtain the views of the public on the draft proposals for the Proposed Scheme design, taking into account the potential environmental effects of the Proposed Scheme. Those views would then be considered in finalising the design and refining the EIA and reporting in the ES.
- 16.2.2 Highways England continues to engage with a range of stakeholders including prescribed bodies, local authorities and political representatives. Following adoption of the second Scoping Opinion in November 2020 Highways England is conducting a further round of statutory consultation. **Section 3** of each technical chapter (**Chapters 5-15** of this PEIR) outline the consultation undertaken, and responses to such engagement, since the 2019 consultation exercise.
- 16.2.3 This PEIR has been prepared to assist consultees in developing an informed view of the potential likely significant effects of the Proposed Scheme. Highways England invites comments on the Proposed Scheme and the information set out in this PEIR.
- 16.2.4 Information related to the Proposed Scheme, including the preliminary environmental information set out in this report, is available to access on the consultation web page.
- 16.2.5 Members of the public and the wider community are able to respond to the consultation using the online questionnaire, by email, or via a dedicated freepost address, enclosing a completed consultation questionnaire or letter. Respondents have the opportunity to comment on all aspects of the Proposed Scheme, including the environmental information.

Responding to the consultation

- 16.2.6 Responses received during the consultation will be considered in accordance with Section 49 of the Planning Act 2008 and presented in the Consultation Report submitted with the application for development consent.
- 16.2.7 We must submit an application for development consent to the Secretary of State for authorisation to construct the Proposed Scheme. The ES will be submitted with the application for development consent. Once the application has been submitted and accepted by the Planning Inspectorate on behalf of the Secretary of State, the public and wider community will have further opportunity to comment on the application.
- 16.2.8 Details of how the Development Consent Order (DCO) process works can be found on the Planning Inspectorate's National Infrastructure Planning website:

<https://infrastructure.planninginspectorate.gov.uk/application-process/>

16.2.9 You can view all the consultation materials on our webpage at:

<http://www.highwaysengland.co.uk/m3junction9>

17 Glossary of Terms

Term	Definition
Adaptive Capacity	Ability or capacity of a system to modify or change to cope with changes in actual or expected climate stress. Also referred to as climate resilience.
Affected Road Network	All roads that trigger the traffic screening criteria and adjoining roads within 200m.
Agricultural Land Classification	A system used to grade agricultural land according to versatility, quality and suitability for growing crops as set out in the ALC for England and Wales issued by the Department for Environment, Food and Rural Affairs (Defra). The top three grades, Grades 1, 2 and Subgrade 3a, are referred to as “Best and Most Versatile” (BMV) land.
Air Quality Dispersion modelling	The mathematical simulation of how air pollutants disperse in the ambient atmosphere. A dispersion model is used to estimate or predict the downwind concentration of air pollutants emitted from sources such as industrial facilities or road traffic.
Air Quality Management Area	Areas within a local authority's boundary that are identified as areas where Air Quality Objectives are not likely to be achieved.
Air Quality Objective	Defined levels of air quality and maximum pollution limits as specified in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007.
Air Quality Threshold	Generic term to represent the relevant pollutant averaging period and concentration value described by the air quality strategy objectives or EU limit values.
Annual Average Daily Traffic	Total volume of vehicle traffic on a road flowing past a certain point over a year divided by 365 days.
Annual Average Weekday Traffic	The average 24-hour traffic volume occurring on weekdays throughout a full year.
Anticipated Air Quality Study Area	The likely extent of the Study Area prior to confirmation of Affected Road Network in the opinion of the competent expert for air quality.
Base year traffic data	The outputs of the traffic model coinciding with the year the traffic data was collected.

Term	Definition
Basic Noise Level	The basic noise level (BNL) is a measure of source noise as defined in Appendix A1 of DMRB LA 111.
Best Practicable Means	A term used by the Environment Agency's requiring operators to take all reasonably practicable measures in the design and management of their facilities to minimise charges and disposals of radio-active waste so as to achieve a high standard of environmental protection of the environment and the public.
Bifurcate	To divide into two or split.
Carbon Budget	GHG targets over defined periods of time
Conceptual site model	A tool which sets out the information gained gathered through a site investigation is and is used to characterise the physical, biological, and chemical systems existing at a site.
Conservation Area	An area designated under Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being an area of "special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance".
Contaminated Land: Applications in Real Environments	An independent not-for-profit organisation established in 1999 to stimulate the regeneration of contaminated land in the UK. It aims to raise awareness of, and confidence in, practical and sustainable remediation technologies.
Critical level	An air quality standard or guideline for ambient concentrations of a pollutant which applies at ecological receptors.
Critical load	A quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge. This is used to assess modelled nitrogen.
Cumulative Effects Assessment	An assessment to identify the potential significant effects caused by the interactions of the effects on the environment from different aspects of the same project and from other projects.
Design Manual for Roads and Bridges	A manual, prepared by Highways England that sets out all current standards, advice notes and other published documents relating to the design, assessment and operation road schemes.

Term	Definition
Designated habitats	Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.
Development Consent Order	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
Diffusion Tube	A passive sampler used for collecting Nitrogen Dioxide (NO ₂) in the air
Dispersion modelling	The mathematical simulation of how air pollutants disperse in the ambient atmosphere. A dispersion model is used to estimate or predict the downwind concentration of air pollutants emitted from sources such as industrial facilities or road traffic.
Do-Minimum	The scenario that represents the situation that would occur without the project in operation, which includes permitted developments.
Ecological Status	From the Water Framework Directive; ecological status is classified in all Water Bodies and expressed in terms of five classes (high, good, moderate, poor or bad). These classes are established on the basis of specific criteria and boundaries defined against biological, physico-chemical and hydromorphological elements.
Embedded mitigation	Design measures which are integrated into a project for the purpose of minimising environmental effects
Embodied Carbon	GHG targets over defined periods of time
Energy Average Sound Level (or equivalent continuous sound level)	The sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. LAeq is considered the best general purpose index for environmental noise.
Essential mitigation	Measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment
Evening peak period (PM)	Period of time representing traffic characteristics in the evening, normally between 4pm and 7pm

Term	Definition
Ground Investigation	An intrusive investigation undertaken to collect information relating to the ground conditions, normally for geotechnical or land contamination purposes.
Habitats and Species of Principal Importance	Habitats and Species of Principal Importance as listed under the NERC (Natural Environment Research Council) Act 2006 are those habitats that require conservation action.
Hampshire Biodiversity Information Centre	Hampshire Biodiversity Information Centre (HBIC) provides an independent and impartial data service. Data maintained by HBIC and covers designated sites, habitats and species.
Heavy duty vehicle	Heavy duty vehicles include a vehicle with a gross weight of more than 3.5 tonnes and buses.
Heavy goods vehicle	A goods vehicle with a gross weight of more than 3.5 tonnes.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).
Historic Environment Record	The record of heritage assets which provides information to members of the public, statutory bodies and developers about the archaeological resource in an area.
Inter peak period (IP)	Period of time representing traffic characteristics during the day, normally between 10am, and 4pm.
Key characteristics (landscape)	The combination of elements that are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
LA10	The level exceeded for 10% of the measurement time. This has been shown to correlate well with human responses to road traffic noise.
LAeq T	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "T" represents the time period to which the noise level relates. For example, LAeq 1 hr is the LAeq level determined over a period of one hour.

Term	Definition
Landscape and Visual Impact Assessment	An assessment to identify and assess the significance of change on the landscape including specific views and general visual amenity resulting from a proposed development.
Landscape Character Area	A discrete geographical area of a particular landscape type.
Landscape character assessment	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive.
Landscape Element	Landscape features found within the highway estate, which can encompass both hard landscape features and elements the soft estate.
Lead Local Flood Authorities	Unitary authorities or county councils who are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets.
Listed Building	A building or structure designated under the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of 'special architectural or historic interest'.
Local Air Quality	Assessment of the impact of pollutant concentrations on sensitive receptors within 200m of a road.
Local Air Quality Management	A process that requires local authorities across the UK to review, assess and manage the air quality within their geographical areas.
Local Biodiversity Action Plan Habitats or Species	Habitats or Species which are included in the Hampshire Biodiversity Action Plan.
Local Nature Reserves	Sites that are designated by the local authority under Section 21 of the National Parks and Access to the Countryside Act 1949 for nature conservation which have wildlife or geological features that are of special interest locally.
Lowest Observable Adverse Effect Level (noise)	This is the level above which adverse effects on health and quality of life can be detected

Term	Definition
Morning period (AM)	Period of time representing traffic characteristics in the morning, normally between 7am and 10am.
National Cycle Network	A series of traffic-free paths and quiet, on-road cycling and walking routes that connect towns and cities. These routes are promoted for both recreational and active travel purposes.
National Nature Reserve	Sites that are dedicated by the statutory country conservation agencies, under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981, for nature conservation and which have wildlife or geological features that are of special interest nationally.
National Trails	Long distance footpaths and bridleways in England and Wales. In Scotland the equivalent trails are called long distance routes.
National Vegetation Classification	A system of classifying natural habitat types in Great Britain according to the vegetation they contain.
No Observed Effect Level	This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise
Open space	Land where the public have access either by legal right or by informal agreement.
Overnight period (OP)	Period of time representing traffic characteristics over night, normally between 7pm and 7am.
Particulate matter	Airborne particulate matter is made up of a collection of solid and/or liquid materials of various sizes that range from a few nanometres in diameter (about the size of a virus) to around 100 micrometres (about the thickness of a human hair).
Pollutant concentrations	Concentrations of pollutants normally reported as micrograms per cubic metre of air ($\mu\text{g}/\text{m}^3$).
Pollution climatic mapping model	Government's national air quality modelling used to assess and report on compliance with the Air Quality Regulations limit values.
Principal Aquifer	Layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. These layers of rock or drift deposits may support water supply and/or river base flow on a strategic scale.

Term	Definition
Project air quality action plan	The section of the air quality assessment where the proposed viable mitigation measures are set out and assessed.
Projected base year	Represents the opening year of the project assessed with the vehicle emission rates for the base year to inform the assessment of future year projections of NOx and NO2.
Public Right of Way	Highways such as footpaths, cycle ways and national trails that allow the public a legal right of passage.
Ramsar Site	Wetlands of international importance designated under the Ramsar Convention 1971.
Regionally Important Geological Sites	Locally designated sites of importance for geodiversity.
Residual effect	Residual effects are those effects that remain after all mitigation (embedded and essential) have been factored into the assessment of effects.
River Basin District	The area of land and sea, made up of one or more adjacent river basins together with their associated groundwaters and coastal waters.
Road Verge of Ecological Importance	A road verge that supports either a notable species and/or a species rich habitat. Selection of RVEI sites is undertaken by the Hampshire Biodiversity Information Centre. The County Council is responsible for the management of the verges on all roads in the county, except motorways, major trunk roads, and urban areas.
Scheduled Monument	A heritage asset designated and protected under the Ancient Monuments and Archaeological Areas Act 1979.
Setting	The surroundings in which a place is experienced, whilst embracing an understanding of perceptible evidence of the past in the present landscape.
Significant Observed Adverse Effect Level (noise)	This is the level above which significant adverse effects on health and quality of life occur.

Term	Definition
Site of Importance for Nature Conservation	Important wildlife sites which are designated through local planning policy. They are generally administered by local authorities in partnership with conservation organisations. HBIC manages the Hampshire SINC system on behalf of the local planning authorities and follows national guidance on identification, selection and management of local sites.
Site of Special Scientific Interest	Site designated as being of special interest for its flora, fauna or geological or physiographical features and protected under the Wildlife and Countryside Act 1981.
Special Area of Conservation	An area which has been identified as being important for a range of vulnerable habitats, plant and animal species within the EU and is designated under the Habitats Directive.
Special Protection Area	A site designated under the Birds Directive due to its international importance for the breeding, feeding, wintering, or the migration of, rare and vulnerable species of birds.
Speed band	A range of categories for which outputs from the traffic model are grouped into to describe their emissions.
Source Protection Zone (groundwater)	Zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk
Study area	The spatial area within which environmental effects are assessed (i.e. extending a distance from the development footprint in which significant environmental effects are anticipated to occur). This area varies between different environmental topic areas.
Sustainable Drainage Systems	A collective approach to manage surface water as close to source as possible and mimic natural drainage by taking into account water quantity (flooding), water quality (pollution), biodiversity (wildlife and plants) and amenity.
Sustrans	Registered British charity whose aim is to promote sustainable transport, i.e. walking, cycling and public transport.
Temporary Traffic Management	Measures, including directive barriers and signs, taken to ensure that road users can travel safely through or around the work site.

Term	Definition
Traffic reliability area	The traffic scoping criteria is only be applied to the area covered by the traffic model, that the competent expert for traffic has identified as reliable for inclusion in an environmental assessment, and is referred to as the traffic reliability area.
Water Framework Directive	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy.
Zone of Influence	The area(s) over which environmental features may be affected by the biophysical changes caused by the Proposed Scheme.
Zone of Theoretical Visibility	A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

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