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08 December 2017

Dear Mr Ranger

**M25 junction 10/A3 Wisley interchange improvement scheme (“the Development”)
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Regulation 8(1)(b) Notification and Regulation 10(1) Application for a Scoping Opinion**

I write with reference to Highways England’s proposals to improve the M25 junction 10/A3 interchange in Surrey (the Development), for which we intend to apply for development consent under Section 37 of the Planning Act 2008. The scheme, which was included as one of a number of key investments in the Government’s Road Investment Strategy published in 2014, is needed to reduce congestion, improve safety and support planned growth. It will involve the enlargement and upgrading of the existing signalised M25 junction 10 roundabout, improvements to crossings and facilities for non-motorised users as well as widening of the A3 between junction 10 and the Painshill junction to the north and the Ockham junction to the south. Associated works will include widening of the A245 Byfleet Road between the A3 and Seven Hills Road and modifications to a number of side roads and private access arrangements to improve safety. A comprehensive package of environmental mitigation and compensation measures will be provided as part of the development, including replacement land to offset any impacts on the adjoining Ockham and Wisley Commons. The scheme will be situated within the administrative areas of Elmbridge Borough Council, Guildford Borough Council and Surrey County Council.

In accordance with Regulation 8(1)(b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (“EIA Regulations 2017”), I am writing to notify you that Highways England proposes to provide an environmental statement in respect of the development.

I am also applying for an environmental impact assessment scoping opinion in respect of the development, under Regulation 10(1) of the EIA Regulations 2017. Please find attached electronic copies of our scoping report (both high and low resolution formats optimised for web viewing). I will arrange for two paper copies to be issued to you under separate cover.

Our scoping report contains the information required under Regulation 10(3) of the EIA Regulations 2017, as well as the additional information set out in the Planning Inspectorate's Advice Note 7, including:

1. A plan showing the location of the proposed development and the intended boundary for the scheme, together with general arrangement drawings showing the key features of the scheme;
2. A description of the proposed development and the surrounding environmental context, including whether there are any European designated nature conservation sites likely to be affected, together with a summary of desktop and baseline studies where available;
3. An outline of the main alternatives considered and the reasons for selecting the proposed scheme as Highways England's preferred option;
4. An explanation of the guidance and practice to be applied in the environmental assessment of the scheme, the topics to be considered and the methods to be used to predict impacts and determine the significance of the effects, largely following the agreed and established methodology in the Design Manual for Roads and Bridges together with the relevant Standards for Highways documents;
5. An account of the likely significant environmental effects of the development, including effects resulting from emissions of waste and the use of natural resources, including soil, land, water and biodiversity and the potential for effects on any European designated nature conservation sites;
6. A description of potential mitigation measures that are being considered in the development of the scheme design and which will be taken into account in predicting any residual impacts;
7. An explanation as to how we intend to assess in combination and cumulative development impacts and how we intend to deal with any uncertainty associated with the level of design detail; and
8. An outline structure of the proposed Environmental Impact Assessment Report.

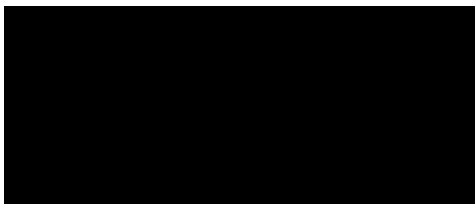
Our Scoping Report also explains how we intend to co-ordinate the EIA and Habitats Regulations Assessments, which is a requirement of Regulation 26 of the EIA

Regulations 2017. We do not anticipate any trans-boundary effects for the proposed scheme.

I trust that the enclosed is sufficient for the Secretary of State to adopt a scoping opinion and to determine the names or bodies that we should notify pursuant to Reg. 11(1)(c). For the purpose of your duties under Regulation 11(1)(a) of the EIA Regulations 2017, I confirm that Highways England will be the Applicant for the Development and my contact details are provided at the beginning of this letter. Should you require any further information or have any queries about the attached scoping application, please contact me.

We would welcome the opportunity to meet with you early in the new year to discuss your feedback, please let me know what dates might be convenient.

Yours sincerely



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Regional Investment Programme M25 Junction 10/A3 Wisley Interchange Environmental Scoping Report

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Chapter 1

1. Introduction

1.1. Overview of project

- 1.1.1. In December 2014 the Department for Transport (DfT) published its Road Investment Strategy (RIS) for 2015-2020. The RIS sets out the list of schemes that are to be delivered by Highways England over the period covered by the RIS (2015 - 2020). The RIS identified improvements to the M25 Junction 10/A3 Wisley Interchange as one of the key investments in the Strategic Road Network (SRN) for the London and South East region.
- 1.1.2. The M25 Junction 10/A3 Wisley Interchange lies in the south-west quadrant of the M25 London Orbital Motorway. At Junction 10 the A3, a key radial route from London to Portsmouth, crosses the M25 motorway. Just to the north of Junction 10 on the A3 is the Painshill Junction with the A245. Together with M25 Junction 10/A3 Wisley Interchange, the junctions in the current configurations restrict traffic flow through the area and a package of options is required to improve junction performance. The location of the M25 Junction 10/A3 junction is shown in Figure 1.1 in Chapter 19.
- 1.1.3. The Scheme proposed provides increased capacity at the M25 roundabout by elongating the existing roundabout, providing additional lanes to provide more circulatory capacity and enabling more traffic to discharge the roundabout whilst providing dedicated free-flowing left turns. The elongated roundabout would use the existing bridges under the A3 and new bridges over the M25, with additional lanes and capacity between the traffic signals and dedicated left-turn filters at the traffic signals. Most of the existing roundabout and slip roads would be broken out and removed, with the existing structures over the M25 remaining in place.
- 1.1.4. The Scheme includes widening the A3 from Ockham to M25 Junction 10 and M25 Junction 10 to Painshill from three lanes to four lanes in both directions to improve the safety and capacity of the A3. Widening of the A245 to three lanes between the Painshill junction and the B365 Seven Hills Road junction will also occur. As the A3 will be widened to four lanes the current access to it from side roads and private properties will need to be closed and alternative arrangements will be put in place to provide access to the road network for the properties affected. Highways England expects to start construction in March 2020.

1.2. Need for Environmental Impact Assessment

- 1.2.1. The requirement for certain projects to report their effects on the environment is derived from EU legislation initially in Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. This legislation has been amended three times, in 1997, in 2003 and in 2009 with the amendments codified by Directive 2011/92/EU of 13 December 2011. The most recent changes being adopted in UK legislation by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the "EIA Regulations (2017)"). which transposes changes made to EU Directive 2011/92/EU1 ("the EIA Directive (2011)") by EU Directive 2014/52/EU2. The related Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ("the IP Regulations (2017)") govern development given planning consent through the nationally significant infrastructure planning regime.

- 1.2.2. The EIA Regulations (2017), in Schedule 1 sets out thresholds for certain types of projects that by their scale or nature require an EIA to be prepared. Where projects do not meet these thresholds Schedule 2 of the Regulations lists projects (including highways projects) for which EIA may still be required if their effects on the environment are deemed to be significant. The process by which this decision is made is known as Screening and a Screening Report for M25 Junction 10/A3 Wisley Interchange was recently made. The Screening Report concluded that because of the likelihood of significant environmental effects a statutory EIA leading to an Environmental Statement (ES) would be required.
- 1.2.3. The Scheme comprises an alteration of a highway lying wholly in England, for which Highways England, being a strategic highways company, will be the highway authority. As the area of development for the alteration works will exceed the 15 hectares limit prescribed in Section 22 (4) (a) of the planning Act 2008 (as amended), the Scheme will be a Nationally Significant Infrastructure Project (NSIP). This means that a Development Consent Order (DCO) application will need to be made to the Secretary of State under Section 37 of the Planning Act 2008 to seek authorisation to build the Scheme.
- 1.2.4. The aim of EIA is to protect the environment by ensuring that the local planning authority and PINS when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision-making process. The aim of EIA is also to ensure that the public are given early and effective opportunities to participate in the decision-making procedures.
- 1.2.5. The EIA will be carried out by a team of specialists working in close collaboration with the design engineers responsible for the preliminary design of the Scheme as part of an iterative design, consultation and assessment process. This will maximise the opportunity to avoid or reduce environmental effects at source and to identify the most effective mitigation of those effects that cannot be avoided.

1.3. Purpose of the Scoping Report

- 1.3.1. Scoping is a precursor to the environmental assessment process that will lead to the preparation of the Environmental Impact Assessment (EIA) which will be reported in an ES. A Preliminary Environmental Information Report (PEIR) will also be prepared which will set out the effects of the Scheme as they are known before the ES is prepared to inform stakeholders and the public during the statutory consultation ahead of the preparation of the ES.
- 1.3.2. This document has been prepared in accordance with the DMRB Volume 11 Environmental Assessment, Section 2 and in particular:
- Part 1 HA 201/08;
 - Part 4 HA 204/08;
 - Part 6 HD 48/08; and
 - Interim Advice Note (IAN) 125/15 and 126/15.
- 1.3.3. It is also in accordance with PINS Advice Note 7: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping. Refer to Table 1-1 below for details on how the PINS Advice Note 7 has informed this Scoping Report.

1.3.4. The objectives of this Scoping Report are to:

- Review existing data, identify sensitive resources and receptors, and scope the work required for the EIA;
- Identify the level of impact of the Scheme;
- Determine the appropriate level of effort that should be applied to the various environmental topics, namely whether a Simple or Detailed assessment as defined in DMRB Volume 11, Section 2, Part 1 HA 201/08, Volume 11, Section 2, Part 4 HA 204/08 and Annex A of IAN 125/15, is required;
- Ensure the scope and depth of any subsequent assessment is both appropriate and proportionate; and
- Provide decision makers and stakeholders with a clear indication of how the project is to be assessed and to set out the scope/content of that assessment, whilst outlining the consultation process.

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

1.4. Structure and contents of the Scoping Report

1.4.1. The EIA Regulations (2017) set out the requirements for an applicant who proposes to request a scoping opinion from PINS. Regulation 10 (3) requires a request for a scoping opinion to include:

- A plan sufficient to identify the land;
- A description of the proposed development, including its location and technical capacity;
- An explanation of the likely significant effects of the development on the environment; and
- Such other information or representations as the person making the request may wish to provide or make.

1.4.2. This Scoping Report will be submitted to the Planning Inspectorate (PINS) to support a request for a Scoping Opinion on the proposals and the information to be supplied within the ES.

1.4.3. This Scoping Report will:

- review existing data;
- present the initial baseline conditions;
- provide a preliminary evaluation of sensitivity on identified resources and receptors;
- identify the topics which significant environmental effects are likely/unlikely to arise as a consequence of the works during construction and operation;
- outline the scope, approach and methodology for each environmental topic ‘scoped in’ to the EIA Report;

- identify mitigation and enhancements measures and residual effects; and
- assess cumulative effects.

1.4.4. PINS Advice Note 7: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping provides advice on the information that should be provided in the Scoping Report. Table 1-1 below lists the information requirements and identifies where they are presented in this Scoping Report.

Table 1-1: Suggested Scoping Report Contents in PINS Advice Note 7

Contents	Chapter in this Scoping Report
<p>A plan showing:</p> <ul style="list-style-type: none"> • The proposed draft DCO site boundary (identified by a red line) including any associated development; • Any permanent land take required for the proposed development; • Any temporary land take required for construction, including construction compounds; • Any existing infrastructure which would be retained or upgraded for use as part of the Scheme; • Proposed development and any existing infrastructure which would be removed; and • Features including planning constraints and designated areas on and around the site such as national parks or historic landscapes. 	Chapter 19
A description of the proposed development including both the NSIP and any of the associated development.	Chapter 2
<p>In dealing with the description of the development and its possible effects on the environment, applicants should:</p> <ul style="list-style-type: none"> • Set out the information using the headings in Schedule to the EIA Regulations, being: <ul style="list-style-type: none"> – Characteristics of the development; – Location of the development; and – Characteristics of the potential impacts. • Ensure that all aspects of the environment likely to be significantly affected by the development are addressed. 	Chapters 5-14
An outline of the main alternatives considered and the reasons for selecting a preferred option.	Chapter 3
Results of desktop and baseline studies where available.	Chapters 5-14
Referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal.	Chapter 19
Guidance and practice to be relied upon, and whether this has been agreed with the relevant bodies together with copies of correspondence to support these agreements.	Chapters 4-14
Methods used or proposed to be used to predict impacts and the significance criteria framework used.	Chapters 4-14
Any mitigation proposed and predicted residual impacts.	Chapters 5-14
Where cumulative development has been identified, how the developer intends to assess these impacts in the ES.	Chapter 15

Contents	Chapter in this Scoping Report
An indication of any European designated nature conservation sites that are likely to be significantly affected by the proposed development and the nature of the likely significant impacts on these sites.	Chapter 7
Where a developer seeks to scope out matters, a full justification for scoping out such matters, preferably supported by evidence of agreement with the relevant bodies.	Chapters 5-14
Key topics covered as part of the developer's scoping exercise.	Chapter 1
An outline of the structure of the proposed ES.	Chapter 4

1.4.5. The structure and content of the Scoping Report is set out in Box 1.1 below. This Scoping Report covers the following DMRB, Volume 11, Section 3 topics:

- Air Quality;
- Noise and Vibration;
- Biodiversity;
- Road Drainage and the Water Environment;
- Landscape;
- Geology and Soils;
- Cultural Heritage;
- Materials; and
- People and Communities.

1.4.6. In addition, it includes a further chapter on Climate as required under the EIA Regulations (2017) noted above. Other topics listed in the new regulations are reported in the DMRB topic chapters noted. An Equality Impact Assessment (EqIA) and a Health Impact Assessment (HIA) will be produced and reported separately to the EIA.

1.4.7. Consultation on the Scheme so far has been informal (non-statutory) but it will also be formal (statutory) during this stage of the project. Further details on the consultation undertaken to date and planned future consultation as part of the DCO process can be found in the Statement of Community Consultation document, produced separately to this Scoping Report.

Box 1.1: Structure of the Scoping Report	
Chapter 1	Introduction
Chapter 2	The Project
Chapter 3	Alternatives
Chapter 4	Scope of the Assessment
Chapters 5 to 14: Air Quality; Noise and Vibration; Biodiversity; Road Drainage and the Water Environment; Landscape; Geology and Soils; Cultural Heritage; Materials and Waste; People and Communities; Climate. All chapter sections are structured as follows:	
<ul style="list-style-type: none"> • Introduction; 	

Box 1.1: Structure of the Scoping Report

- Study area;
- Planning and policy context;
- Baseline conditions;
- Potential impacts;
- Proposed level and scope of assessment;
- Proposed assessment methodology;
- Proposed consultation;
- Potential mitigation measures;
- Assumptions and limitation; and
- Conclusion (inc. identification of aspects scoped out of the assessment).

Chapter 15 Assessment of Cumulative Effects

Chapter 16 Summary

Chapter 17 References

Chapter 18 Abbreviations and Glossary

Chapter 19 Location and Design Plans

Appendix A Air Quality

Appendix B Noise and Vibration Data

Appendix C Ecology Legislation

Appendix D Gazetteer of Heritage Assets

1.5. Responsible organisation

- 1.5.1. The responsible organisation for the Scheme is Highways England. We are a government company charged with operating, maintaining and improving England's motorways and major A roads.

1.6. The designer

- 1.6.1. The designer is Atkins Ltd. We have appointed Atkins under our Project Support Framework to undertake the Preliminary Design of the Scheme for the M25 Junction 10/A3 Wisley Interchange which includes EIA and the preparation of an ES for the Scheme.

1.7. Key legislation and policy

Legislative framework

- 1.7.1. On 12 March 2014, the European Parliament voted to adopt substantive amendments to the EIA Directive 2011/92/EU. These amendments made by EIA Directive 2014/52/EU were transposed into UK legislation in May 2017 as the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and will be relevant to this Scheme and the topic assessments.

Policy overview

- 1.7.2. A summary of what are considered to be the key implications of National, Regional and Local policy documents for the Scheme are shown in Table 1-2. This is followed by a summary of the key messages and implications of each.
- 1.7.3. Both Elmbridge Borough Council and the Borough of Guildford have emerging Local Plans which, subject to an Examinations in Public should be adopted within the next couple of years.

Table 1-2: Policy overview

Scale	Policy Document	Key Implications for the Scheme
National	National Networks National Policy Statement (NN NPS) (2014)	Sets out the Government's policies to deliver Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. The Secretary of State uses the NN NPS as the primary basis for making decisions on development consent application for NSIPs in England.
	Road Investment Strategy: 2015 to 2020 (2014)	Promote safe movement, satisfy users of the network, support efficient movement, can be delivered and operated within environmental constraints, support local access and well-being and be demonstrably cost effective.
	Highways England: Strategic Business Plan 2015 to 2020 (2014)	Support short-term targets as well as long-term aspirations and not significantly impact on network availability.
Regional	Surrey County Council, Surrey Transport Plan (2011)	To help people to meet their transport and travel needs effectively, reliably, safely and sustainably within Surrey; in order to promote economic vibrancy, protect and enhance the environment and improve the quality of life. In the 2017 Problems and Challenges update to the Plan, the Council identified that due to Surrey's location next to London, and the proximity of both Heathrow and Gatwick Airports, there is considerable demand for movement within, to, from, and through the county and the strategic network has evolved to principally serve London, with nationally important routes passing through. The non-strategic network serves to link the settlements. The Wisley Interchange is where these networks meet and cause congestion.
Local	Elmbridge Borough Council Core Strategy (2011)	To deliver additional development and infrastructure which provides benefits across the Borough to a changing population, in a way that does not compromise

Scale	Policy Document	Key Implications for the Scheme
		<p>peoples' quality of life or have a detrimental impact on the environment.</p> <p>Policy CS25 (Travel and Accessibility) states that it will support improvements to transport infrastructure by working in partnership with transport providers and Surrey County Council as the Highway Authority.</p>
	<p>Guildford Borough Council Local Plan 2003</p>	<p>Promote development that meets the needs of the present without compromising the ability of future generations to meet their own needs.</p> <p>The Local Plan identifies that responsibility for transport issues lie mainly with Surrey County Council but land use and transportation planning are directly linked and the Local Plan has an important role to play.</p>

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Chapter 2

2. The Project

2.1. Need for the project

- 2.1.1. The M25 Junction 10/A3 Interchange is positioned on a critical section of the Strategic Road Network (SRN). The M25 forms part of the 'Ten-T' Trans-European Transport Network and is therefore a nationally important link providing access to global markets and connections to the channel ports for much of the UK as well as for the South East region. The A3 is also an important strategic route, linking London with the international port of Portsmouth, as well as Guildford, which is the largest centre of employment in Surrey.
- 2.1.2. This section of the SRN, through Junction 10, carries in excess of 300,000 vehicles per day, making it one of the busiest in the country. About one third of all traffic approaching Junction 10 on both the A3 or the M25 use the roundabout to interchange between the two roads. Given the limited capacity of the existing roundabout to accommodate these large flows, significant delays and congestion occur in most peak periods. The junction is therefore a major impediment to the smooth flow of traffic on the SRN at this point. Journey time reliability is poor, with some journeys taking more than 2.5 times longer than expected in the peak periods. Junction 10 is also ranked as one of the most dangerous junctions nationally. During the period of 2009-2013 (inclusive), Highways England reported accident data include 239 accidents (just under 50 per year on average) on and around the M25 Junction 10 and the A3 between Painshill and Ockham. This is partly attributable to the high levels of congestion at the Junction, but is also due to there being a significant number of side roads and private accesses which connect directly to the A3 between Painshill and Ockham, thus reducing safe weaving distances for traffic. With forecast traffic growth and significant planned housing and economic development in the area, the problems at the junction are expected to deteriorate further, with delays being likely to increase by 40% by 2037 unless an improvement scheme is undertaken. Further detail on the problems at Junction 10 are included in other project reports that are available if necessary.

2.2. Project objectives

- 2.2.1. The improvements to M25 Junction 10 as originally stated in the RIS should deliver: "free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites". The expected cost of the Scheme was in the range from £100m to £250m. For the purposes of this report, this is referred to as the aim of the Scheme.
- 2.2.2. The current challenges at the M25 Junction 10/A3 Wisley Interchange as noted above include:
- Congestion and delay disrupting journeys on the SRN;
 - Poor resilience resulting in frequent disruption and unreliable journey times;
 - Safety concerns; and
 - Congestion causing a barrier to growth. Enterprise M3 Local Enterprise Partnership (LEP) has highlighted the M25 Junction 10/A3 Wisley

Interchange as a part of the transport network where projected increases in traffic would cause further congestion and delays and hinder growth in the area unless addressed.

2.2.3. The Scheme objectives as set out in the Client Scheme Requirements are as follows:

- Route Operation:
 - Support any projected traffic increases from other committed schemes on the strategic road network and avoid or mitigate against causing adverse effects elsewhere on the Local Road Network.
- Capacity:
 - Reduce the average delay (time lost per vehicle per mile) on the mainline A3 and on M25 through junction running.
 - Smooth the flow of traffic by improving journey time reliability (Planning Time Index) on the mainline A3.
- Safety:
 - Reduce annual collision frequency and severity ratio on the mainline A3, slip roads and M25 Junction 10 gyratory.
- Social:
 - Support the projected population and economic growth in the area.
 - Support walking and cycling by incorporating safe, convenient, accessible and attractive routes for pedestrians, cyclists and equestrians and improving crossing facilities.
 - Take account of the concerns of local communities and other key stakeholders raised during consultations.
- Environment:
 - Support compliance with the UK's legally binding limits and targets on air quality and water quality status and support targets to cut greenhouse gas emissions and objectives for local air quality management areas.
 - Avoid, mitigate and compensate for adverse effects on the integrity of the Thames Basin Heaths Special Protection Area and other statutory designated nature conservation sites and promote opportunities.
 - Recognise the significance of designated heritage assets close to the route of the Scheme, including at Painshill Park and at Wisley Gardens through incorporating suitable mitigation and/or design measures to avoid or reduce significant harm.
 - Improve the quality of life for nearby residents, through addressing the effects of noise on people in the declared noise important area's (NIA's) and ensuring that significant noise effects are mitigated.
 - Ensure through good design, that an appropriate balance is achieved between functionality and the Scheme's contribution to the quality of the surrounding environment, addressing existing problems wherever feasible, avoiding, mitigating or compensating for significant adverse impacts and promoting opportunities to deliver positive environmental outcomes.

2.3. Project location

2.3.1. The M25 Junction 10/A3 Wisley Interchange lies in the south-west quadrant of the M25 London Orbital Motorway. At Junction 10, the A3, a key radial route from London to Portsmouth, crosses the M25 motorway. Just to the north of Junction 10 on the A3 is the Painshill Junction with the A245. To the south of Junction 10 on the A3 is the Ockham junction with the B2039 and B2215. The location of the M25 Junction 10/A3 junction is shown in Figure 1.1. The Scheme is located within the County of Surrey and within the Boroughs of Guildford and Elmbridge.

Environmental overview

- 2.3.2. The M25 Junction 10/A3 junction is set within a predominantly wooded area to the south of Cobham and Byfleet and it is an attractive area despite the presence of the A3 and M25. Much of the area around junction is covered by the internationally designated Thames Basin Heaths Special Protection Area (SPA) and nationally designated Ockham and Wisley Commons Site of Special Scientific Interest (SSSI), as well as designations as a Local Nature Reserve (LNR), Site of Nature Conservation Interest (SNCI) and ancient woodland.
- 2.3.3. The RHS's headquarters are located at Wisley gardens to the south-west and Painshill Park is to the north-east of Junction 10; both are designated as Registered Parks and Gardens of Historic Interest. The area immediately round the junction is designated as Common Land and/or Access Land and these areas, along with RHS Wisley and Painshill Park, are well used by the public. There are some facilities for walkers/cyclists along the A3 on the southbound carriageway but they are in a poor state. There are at-grade, controlled pedestrian and equestrian crossings at the junction and a number of Public Rights of Way (PRoW) in the surrounding area.
- 2.3.4. There are a number of Noise Important Areas (NIA) at the M25 Junction 10/A3 Wisley Interchange. No Air Quality Management Areas (AQMA) have been declared by the local authorities for the area immediately around the junction and there are few human health receptors nearby. The nearest AQMA is in Cobham to the north-east of Junction 10.
- 2.3.5. There are four Scheduled Monuments in the area immediately around the junction and a number of Listed Buildings in the study area.
- 2.3.6. There are no Source Protection Zones or groundwater water abstractions near the junction and flooding is not an issue although the River Mole, River Wey and Guileshill Brook are nearby and the Stratford Brook crosses the Scheme at the Ockham Junction.
- 2.3.7. There are a number of disused landfill sites that accepted inert waste in the study area and the sand and gravel geology means that the area is sensitive to pollution incidents.
- 2.3.8. These key environmental constraints are shown on the overall environmental constraints drawing (Figure 2.1) with other detailed environmental constraints drawings in Chapter 19.

2.4. Project description

- 2.4.1. The Scheme drawings are shown in Chapter 19 of this document. The Scheme has been developed over previous project stages and is the result of analysis and assessment of traffic, engineering, buildability and environmental factors as well as consultation with stakeholders and members of the public. Although the layout of the Scheme has been developed to a sufficient level of detail to show the size and location of the various elements that comprise it, further design and assessment will take place during this stage to refine it and provide more certainty on the layout of the Scheme. As such there is some level of uncertainty on the design of the Scheme at this point in the process. The boundary of the works has therefore been drawn with reference to the 'Rochdale Envelope' to allow for design development and the uncertainties that are inevitable at this stage.
- 2.4.2. The Scheme proposed provides increased capacity at the M25 roundabout by elongating the existing roundabout, providing additional lanes to provide more circulatory capacity and enabling more traffic to discharge the roundabout whilst providing dedicated free-flowing left turns. The elongated roundabout would use the existing bridges under the A3 and new bridges over the M25, with additional lanes and capacity between the traffic signals and dedicated left-turn filters at the traffic signals. Most of the existing roundabout and slip roads would be broken out and removed, with the existing structures over the M25 remaining in place. The alterations to junction 10 include the increase from 3 lanes to 4 lanes on the M25 through the junction to enable the introduction of smart motorway arrangements on the junction 10 to 16 section in the future.
- 2.4.3. The Scheme also includes widening the A3 from Ockham to M25 Junction 10 and M25 Junction 10 to Painshill from three lanes to four lanes in both directions to cater for the volumes of traffic expected to use these roads in the future. There would also be widening of the A245 to three lanes between the Painshill junction and the B365 Seven Hills Road junction. As the A3 will be widened to four lanes the current access to it from side roads and private properties will need to be closed and alternative arrangements will be put in place to provide access to the road network for the properties affected. Highways England expects to start construction in March 2020.
- 2.4.4. The Scheme includes provision for new or amended signs and gantries with associated cabling works along the A3 and the M25. On the M25 to the east and west of junction 10, beyond the area where the works to the layout of the highway would take place, alterations to signs and signals on existing gantries would be required but the gantries themselves would not be altered. The Scheme also makes allowance for improved drainage measures to be introduced on the altered sections of the A3 and M25.
- 2.4.5. The widening of the A3 necessitates the closure of the existing direct accesses to it and alternative provisions have been made which include:
- A new 2-way link road directly from the east side of the Ockham interchange roundabout along the north-western edge of the Wisley airfield site before turning northwest to rise and cross over the A3 on a new bridge close to the line of Elm Lane. This access ties into the existing level of Wisley Lane beyond the RHS entrance, which will need to be amended. The existing access to and from Wisley Lane from the northbound A3 will be closed. The new crossing would provide access over the A3 for non-

motorised users and the existing footbridge would be removed. An area of land for flood compensation is included where the structure carrying the road over the Stratford Brook watercourse might reduce the floodzone here;

- Elm Lane and Old Lane would be joined via the existing byway open to all traffic (BOAT). The existing BOAT would be reconstructed as a single lane, two-way local access road providing access from Elm Corner to the A3 via Old Lane and the M25 clockwise to A3 slip road;
- A new two-way access road connecting Birchmere Scout Campsite, Hut Hill Cottage and Park Barn Farm to Old Lane at the Ockham Bites site via a rebuilt Cockrow overbridge would be provided. The bridge would be constructed as a 'multi-use bridge' to provide habitat connectivity between ecologically valuable land on either side of the A3. The existing access to the A3 northbound to M25 clockwise slip road at Junction 10 would be closed off. The existing track along Deers Farm Close and past Park Barn Farm would be retained;
- The connection to Old Lane from the A3 southbound on slip will remain;
- A two-way local access road with passing bays would be provided from Redhill Road to Seven Hills Road, providing access to Long Orchard Farm, Long Orchard House and San Domenico (Euro Garages);
- A new road bridge spanning the widened A3 will be provided just to the south of the end of Redhill Road, linking the access road from Seven Hills Road South to a new two-way local access road running parallel along the south-east side of the A3 as far as Court Close Farm, Heyswood Guides Camp and New Farm. This new link road and bridge will also form part of the NMU network around the Scheme, via a bridleway link to the re-provided NMU route south from Painshill interchange; and
- Widening the A245 from the Painshill Junction to Seven Hills Road Junction to D3AP, with a two-way access road between Old Byfleet Road to Seven Hills Road South for Felton Fleet School. The existing right turn from Old Byfleet Road to the A245 would be closed.

2.4.6. In addition to the Cockrow Bridge noted above there are three other bridges to be replaced that are used for private means of access, all of which also function as parts of the PRow network:

- Reinstatement of Buxton Wood Bridge across the amended M25 as an accommodation/bridleway bridge;
- Reinstatement of Clearmount Bridge across the amended M25 as an accommodation/bridleway bridge; this could have a wider bridge deck to provide multi-functional features, including potentially providing some planted vegetation to allow habitat connectivity across the bridge; and
- Reinstatement of Hatchford Park Bridge across the amended M25 as an accommodation/bridleway bridge.

2.4.7. A further new bridleway bridge would be provided over the M25 just to the east of Junction 10 to link up more conveniently areas of Common Land to the north and south of the motorway and provide better access for users of the publicly accessible land.

- 2.4.8. The Scheme is located within an area of land designated as Common Land or Access Land and is additionally designated for its ecological value as a Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI). Land take from these areas is required to accommodate the Scheme and suitable replacement land is required to compensate for the loss of this land. The Scheme includes areas of replacement land for loss of Common or Access Land and for the loss of SPA land. A greater area of replacement land is provided than is taken by the Scheme in recognition that it is not immediately of a similar quality than that taken. The areas of replacement land are provided in four locations:
- On the holding known as Park Barn Farm to the north-west of the junction;
 - On an area of land off Old Lane to the south-east of the junction;
 - On the holding known as Pond Farm to the west of the junction; and
 - On two adjacent areas of land to the east of the junction, just to the north of the M25.
- 2.4.9. These areas of land have been selected on the basis of a combination of:
- Proximity and linkages to the designated land taken;
 - Similarity of features, character, vegetation or habitat as the land lost or the potential to achieve these either with or without further work;
 - Sufficient size to accommodate the areas lost at the appropriate replacement ratios; and
 - Availability or potential availability for purchase.
- 2.4.10. Further details on the replacement land are given in a separate report that will be included as an Annex to the ES.
- 2.4.11. As part of the Scheme, the following PRoW works will be proposed, to ensure that the Scheme re-provides or enhances existing NMU routes and connectivity and provides suitable rights of access to the remaining areas of existing Registered Common and Access Land and to and through the replacement land areas:
- Upgrading the existing equestrian route in the northern quadrant to bridleway status, to connect NMUs at Redhill Road to the bridleway bridge at Clearmount; this will also provide a basis for bridleway links to Areas N1, N2 and N4;
 - Bridleway connection to this upgraded equestrian route from the local road or bridleway bridge over the A3 by Red Hill;
 - A bridleway/cycleway link connecting the local access road along the east side of the A3 to Painshill interchange and to Pointers Road, with a link to the bridge over the A3 to Redhill Road;
 - A new bridleway bridge across the M25 to the southeast of the Junction 10 roundabout, with bridleway links to Pointers Road and across Ockham Common (by upgrading the existing equestrian route) to Old Lane;
 - A bridleway/cycleway link along the southeast side of the A3 between the above bridge and Ockham interchange, with links to the replacement

Cockrow bridge, Old Lane, Wisley Lane bridge and Footpaths 14, 13 and 13a;

- Connecting the south end of Footpath 9 to the bridleway on Footpath 10 by Hut Hill;
- Provision of Pegasus crossings at Ockham interchange to provide safe access under the A3 to the B2215;
- Upgrading the existing equestrian route from Clearmount bridge to bridleway status and connecting it to the replacement for Cockrow Bridge;
- Upgrading the existing equestrian route across Ockham Common to bridleway status and connect it to the replacement for Cockrow Bridge; and
- Upgrading Footpath 7 to bridleway status to provide appropriate connection between two areas of existing Registered Common Land over the replacement Buxton Wood bridge - this will also entail a small realignment onto the farm track on the south side of Buxton Wood Bridge to avoid the existing set of steps.

2.4.12. These NMU works will also contribute towards achieving the objectives of the Scheme, as set out in section 2.2.

Land take

2.4.13. The permanent land take (i.e. the areas outside the existing highway boundary but within the proposed highway boundary) required for the Scheme is approximately 26 ha. The permanent land take required would include a number of areas covered by environmental designations.

2.4.14. The requirement for and extent of temporary land take is currently being developed but an area of 33 ha is included within the red line in which necessary construction activities might take place. The land taken temporarily will be restored and returned to its original landowners after construction has been completed. As far as possible the land will be returned in the same condition as it was before the works commenced. Where this is not possible measures will be put in place to achieve this including management operations over a long period of time. In some cases it may be possible to return the land in an enhanced condition in agreement with the original landowner.

Construction, operation and long term management

2.4.15. Specific construction, operational and long term management arrangements are not known in detail at this stage of the Scheme. Potential locations of construction compounds for the contractor have been identified and are included within the temporary land take for the Scheme. The assessments of construction effects will assume best practice, based on industry guidance and professional experience. Construction of the Scheme is planned to commence in March 2020, with the Scheme planned to be open for traffic in March 2022.

Decommissioning

- 2.4.16. In view of the indefinite design life of the Scheme, it is not considered appropriate for this to form part of each environmental topic assessment, rather the focus will be upon seeking to minimise disruption and to re-use materials that will also form part of the materials assessment. Decommissioning of the Scheme has therefore been scoped out of any further assessment.

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Chapter 3

3. Alternatives

3.1. Introduction

3.1.1. In December 2014, following a number of studies looking at modal alternatives, a scheme for the M25 Junction 10/A3 Wisley Interchange ‘to allow free-flowing movement in all directions, together with improvements to the neighbouring Painshill Interchange on the A3 to improve safety and congestion across the two sites’ was included in the Government’s RIS. The process by which the alternative proposals were developed, assessed and either discarded or chosen for further consideration is summarised below. Further detail on this process is given in a variety of reports prepared during the project’s development and can be made available if requested.

3.2. Optioneering methodology

3.2.1. A two-stage approach was undertaken in developing options for the Scheme. Firstly a number of high-level, strategic solutions were developed which considered ways to solve the problems identified. Secondly, with the strategic option selected more detailed Scheme options were developed and assessed.

Strategy, Shaping and Prioritisation Stage

3.2.2. A range of strategic options which could potentially be considered to address the key problems at M25 Junction 10 were identified in the Strategy, Shaping and Prioritisation Stage. These strategic options gave high level consideration to a range of alternatives dealing with transport supply and demand, and included options for different modes of travel as well as different scales of highway intervention. Based on assessments undertaken by the project team a strategic option focussing on localised highway improvements at M25 Junction 10 and Painshill interchange was confirmed as the preferred solution and taken forward to the Option Identification Stage.

Option Identification Stage

3.2.3. At the start of the Option Identification Stage, Atkins undertook a high-level modelling exercise to identify a range of options and determine whether they would provide sufficient capacity for a design life of ten to fifteen years was undertaken. The testing considered the scale of intervention required to ensure that the interchange would operate below capacity in ten and fifteen years’ time. It was found that either the existing roundabout would need to be significantly enlarged or at least all left turns and two busy right turns would need to be removed from the Junction 10 roundabout. A long list of twenty-one options that fulfilled these criteria was developed and assessed and which was reduced down to the most suitable ten options. These ten were subject to further assessment and testing to examine their viability to achieve the objectives for the Scheme.

3.2.4. Of the ten options considered the following options were selected for further assessment:

- Option 16 - a large, cyclic arrangement similar to M25 Junction 12 with the M3. This obtained the highest overall assessment score despite being one of the most costly and having the greatest environmental impact;

- Options 9 - which had dedicated left turns plus two free flow right turns from the A3 to M25 anti-clockwise and from the A3 to M25 clockwise. This option achieved the next highest assessment score and was thus selected for further consideration; and
- Option 14 - this option featured an elongated roundabout and dedicated left filters which scored marginally less than the other chosen options. However, it was the most affordable of all options and had the least environmental impact so for that reason it was agreed that it should be taken forward for further evaluation.

3.2.5. Predicted traffic flows on the A3 for the design year of 2037 would require the widening of the A3 carriageway from dual three lane all purpose (D3AP) to dual four lane all purpose (D4AP) between Ockham Junction and Painshill Junction. All three options therefore included widening of the A3 as well as improvements at the Painshill junction. Similar changes to side roads required as a result of the A3 widening were included for all three options.

3.2.6. At the end of the Option Identification Stage and ahead of consultation the cost of Option 16 was reviewed and it was deemed to be too expensive to be supported going forward and was therefore dropped from the consultation and future work.

3.2.7. It was recognised that the statement in the 2015 RIS for the Scheme 'to allow free-flowing movement in all directions' was not compatible with environmentally sensitive nature of the area. For this reason, the Options that did not provide this were not considered suitable to be taken forward to the next stage of the project.

Option Selection Stage

3.2.8. Following Scheme Options Identification, Options 9 and 14 were taken forward for further design and assessment in this stage.

Option 9 - Dedicated left turns plus two free flow right turns A3 to M25 J9 and A3 to M25 Junction 11, Painshill and A3 D4AP

3.2.9. This option was based on providing half of the movements of the standard 4 level free flow interchange. The option consisted of free flow right turns from the A3 Northbound to the M25 anticlockwise and from the A3 southbound to the M25 clockwise. Free flow left turns from the A3 northbound to the M25 clockwise and the A3 southbound to the M25 anticlockwise were also provided. The right turns were provided on a large long span viaduct passing close to the centre of the existing junction with intermediate supports to fit within the constraints of the existing layout. All other vehicle movements would be carried out on the existing roundabout. New segregated non-motorised user (NMU) routes would be required. This option would include widening of the A3 carriageway to four lanes in each direction. The A3 proposals would also include widening of the A245 from two to three lanes between the Painshill Interchange and the junction with Seven Hills Road. The widening would take place symmetrically on the existing line of the A245. The Painshill improvements would also reduce congestion on the A3 northbound.

3.2.10. Although less environmentally damaging than Option 16 this option would have significant adverse effects. The land required to build this option within an area designated for its internationally and nationally important ecological value made

it difficult to support. Similarly, a large area of Common Land or Access Land would be taken and which would need to be replaced. The slip roads necessary to carry the right turning traffic would need to be elevated over the existing three level junction leading to increased visual impacts as well as increased noise effects on local people and bird species in the Special Protection Area (SPA). There would also be very large adverse effects on the setting of the scheduled monuments close to the junction and possible direct effects on the remains as well. For these and for other non-environmental reasons this option was not preferred.

Option 14 - Elongated + dedicated left filters, Painshill and A3 D4AP

- 3.2.11. This option modified the existing roundabout by creating new structures over the M25 and reusing the existing structures under the A3. The circulatory carriageway under the A3 would be widened to four lanes, five lanes of circulatory carriageway would be provided where unconstrained by the existing structures. Right turns would be carried out on the modified roundabout and left turns would use dedicated left filter lanes. Slip roads would be realigned to aid construction sequencing. NMU facilities would remain largely unchanged but minor upgrades would be required. The widening to four lanes would aid weaving and merging on the A3 as well as providing an opportunity to address side road access, lay-by provision and walking and cycling routes. The A3 improvements would also include widening of the A245 from two to three lanes between the Painshill Interchange and the junction with Seven Hills Road. The widening would take place symmetrically on the existing line of the A245. The Painshill improvements would also improve conditions on the A3 northbound.
- 3.2.12. This option would have a much smaller footprint than Option 9 and hence would have a smaller effect on the designated land and habitats around the junction and require less replacement land. As the elongated roundabout would be at the same elevation as the existing gyratory the adverse visual and noise effects associated with Option 9 would also be avoided. The enlarged roundabout would bring the road infrastructure closer to the scheduled monument to the south-west of Junction 10 but it would not have as large an effect as Option 9. For these and other reasons including affordability Option 14 was preferred.
- 3.2.13. Both Options 9 and 14 also required alterations to the side roads currently joining the A3 including Wisley Lane as well as private accesses, bus stops and lay-bys. The side roads options common to both Options 9 and 14 were developed further during the Option Selection Stage and are described below.

Access to Birchmere Scout Campsite and Pond Farm

- 3.2.14. A two-way access road connecting Deers Farm Close to Birchmere Scout Campsite and Pond Farm was proposed with the existing access to Junction 10 slip road to be closed off. The existing track along Deers Farm Close and past Pond Farm would be refurbished to a single-track road with passing places.
- 3.2.15. The alternative to this arrangement during this stage was to retain the existing access to the slip road at the junction but this was not feasible with the free flow left turns proposed.

Elm Lane/Access to Elm Corner

- 3.2.16. This option joins Elm Lane and Old Lane via the existing byway open to all traffic (BOAT). The existing unsurfaced BOAT would be reconstructed to a single-track road providing access to Junction 10 slip road and the A3 via Old Lane.
- 3.2.17. The alternative to this arrangement was to maintain the link to Elm Lane and then on to the Ockham Interchange via a new road link between the Ockham Junction and Wisley Lane but the residents of properties in Elm Corner served by Elm Lane expressed a preference for access to Old Lane via the BOAT.

Access to Long Orchard Farm and Long Orchard House

- 3.2.18. This option proposes a two-way local access road with passing bays from Redhill Road to Seven Hills Road, providing access to Long Orchard Farm, Long Orchard House and San Domenico (Euro Garages).
- 3.2.19. There was no alternative to this arrangement except for providing access to the road network via Redhill Road instead of Seven Hills Road but this was rejected by the residents affected.

A245/Painshill Junction

- 3.2.20. This option consisted of widening the A245 from Painshill Junction to Seven Hills Road Junction to three lanes in each direction and a two-way access road between Old Byfleet Road to Seven Hills Road South for Felton Fleet School. The existing right turn from Old Byfleet Road to the A245 would be closed.
- 3.2.21. No alternative was proposed for this option.

Wisley Lane Options

- 3.2.22. Two options for the re-provision of access to Wisley Lane were proposed. One option consisted of a two-way local access road between Ockham Junction and Wisley Lane parallel and northwest of the A3 located partly within RHS Wisley. The existing access from Mill Lane to the A3 Portsmouth Road would be closed and diverted on to the new access road. This option would have a direct effect on the Registered Park and Garden at RHS Wisley, the loss of screening trees along the boundary and heritage impacts and was rejected in favour of an alternative to the east of the A3.
- 3.2.23. The second option consisted of a two-way link road from Ockham Junction to Wisley Lane, with an overbridge over the A3 carriageways linking Elm Lane to Wisley Lane. This option would affect woodland in the Common Land adjacent to the Wisley Airfield site. The existing Wisley Lane footbridge would be removed with NMU access being provided over the new bridge. Elm Lane running parallel to the A3 would be stopped up. This option was seen to be narrowly preferable to the option to the west of the A3 as it could be partly built on brownfield land on the disused Wisley Airfield, amongst other considerations.

Painshill Options

- 3.2.24. Two options were developed to provide access to properties in Painshill Park that gained access directly off the A3 southbound carriageway. One option consisted of the conversion of the service road to the southeast and parallel to the A3 to a two-way road with passing bays from the Gothic Tower within Painshill Park to the gas compound north of Heyswood campsite. An overbridge

over the A3 carriageways was required to link this road to Redhill Road (and Seven Hills Road South). This option was on the periphery of the Grade I Registered Park and Garden with limited effect on the key features of the park so despite the potential effect on the setting of the Gothic Tower this option was preferred to the alternative.

- 3.2.25. The alternative option consisted of the conversion of the service road to the southeast and parallel to the A3 to a two-way road with passing bays from the Gothic Tower to the A245 in Cobham using the existing roundabout near the Sainsbury's superstore. An overbridge over the River Mole was required to connect this road to the A245. This option would pass through the operational sections of the Grade I Registered Park and Garden and affect the setting of the listed bridge over the River Mole as well as other listed buildings within the park. It was strongly opposed by the residents of the listed buildings affected and would adversely affect the aquatic ecology of the River Mole. Consequently, it was rejected in favour of Option 04.

Legal and Policy Tests

- 3.2.26. Having established options that were viable and could satisfy the Scheme objectives, during the Option Selection Stage the Scheme options were also considered further in relation to the legal and policy tests set out in the National Policy Statement for National Networks. The Scheme was thought likely to be a highway-related Nationally Significant Infrastructure Project (NSIP) on the basis that either of the options currently under consideration would be of a scale large enough to exceed the qualifying area thresholds stipulated in the Planning Act 2008.
- 3.2.27. At the Option Selection Stage, the focus was to identify those tests that could potentially preclude the Secretary of State from being able to grant development consent, if a particular Scheme option could result in a breach of the UK's international obligations or any duty imposed under UK legislation. The tests of most relevance to the consideration of options for the Scheme are as follows:
- The European Directive 2008/50/EC, Ambient Air Quality and Cleaner Air for Europe, transposed in to UK legislation by the Air Quality Standards Regulations 2010, which would prevent consent from being granted for any scheme that would result in non-compliance with legally binding limit values for prescribed pollutants, including nitrogen dioxide (NO₂) and particulates of less than 10 microns (PM₁₀). The annual limit values for both are 40 µg/m³;
 - The European Directive 2000/60/EC, Establishing a Framework for the Community Action in the Field of Water Policy, transposed in to UK legislation by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 and the Water Industry Act 1991 (Amendment) (England) Regulations 2009. This legislation would prevent consent being granted for any scheme likely to cause deterioration in water quality status; or prevent a waterbody from achieving good ecological status; or compromise the achievement of water framework directive objectives in other classified water bodies within the same catchment;
 - The European Directives 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna and 2009/147/EC on the

Conservation of Wild Birds, which are transposed in to UK legislation by the Conservation of Habitats and Species Regulations 2010 (as amended by the Conservation of Habitats and Species (Amendment) Regulations 2012). These directives would prevent development consent from being granted for any scheme that would give rise to an adverse effect on the integrity of a European site (a Special Protection Area or a Special Area of Conservation), either individually or cumulatively, unless there was no less damaging, feasible alternative; that there were Imperative Reasons of Overriding Public Interest and that suitable compensation could be secured;

- The European Habitats Directive 92/43/EEC and Habitats Regulations 2010 as amended would also prevent consent and/or a mitigation licence from being granted for any scheme that would harm or disturb a European Protected Species, unless there were no satisfactory alternatives; that the favourable conservation status of the species would be maintained and that the development would be in the public interest; and
- The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000, which would prevent development consent from being granted for any scheme that would disturb or harm nationally protected species, unless there were no satisfactory alternative solution.

3.2.28. In addition, under Section 104 (7) of the Planning Act 2008, development consent cannot be granted for any scheme if the benefits of that scheme do not outweigh its adverse impacts overall.

3.2.29. The difference in operational performance between the two options was found to be relatively modest, whilst the difference in environmental impact was significant. When the legal tests were also factored in, given the potential for adverse effects on the integrity of the Thames Basin Heaths SPA, there were very real risks attached to Option 9 and the ability to meet the tests required for any derogation from compliance with the Habitats and Wild Birds Directives. On this basis, the assessments pointed towards Option 14 as being the Option most likely to gain consent at examination.

3.2.30. It was recognised that it would be important to demonstrate that the benefits of Option 14 would outweigh its impacts and further work would be required to identify mitigation opportunities and design improvements if this option were taken forward as the preferred route.

3.2.31. The options for local access roads at both Painshill and at Wisley also presented significant challenges. Whilst the assessments appeared to point towards Options PAIN04 and WIS01, the appraisals were finely balanced and furthermore detailed assessments were necessary before a final decision could be made.

3.3. Preferred Option

3.3.1. Although the case for Option 14 over Option 9 became clear during the Option Selection Stage, a number of side road options were investigated that took into account the environmental and engineering constraints of the Scheme. The different options for the side roads included those for Wisley Lane, the access to Pond Farm and access to the properties in Painshill Park with access off the A3. Further design, assessment and consultation was undertaken for these side

roads and variations on the options for these were developed. Following the Option Selection Stage, the preferred option for the M25 Junction 10/A3 Wisley Interchange was announced by Highways England on 29th November 2017. The preferred option is described above in section 2.4 with the revised side road options that were chosen as noted below. The Scheme layout is shown in Chapter 19 of this report.

Side road options

- 3.3.2. Wisley Lane - A variation on the proposal to the east of the A3 - this option does not affect the SPA, Wisley Lane and access to RHS Wisley will remain open during construction and less Common Land is taken. It also includes bridleway links on both sides and a revised entry into RHS Wisley.
- 3.3.3. A variation of the access to Birchmere Scout Camp option which provides access via a replacement Cockrow bridge over the A3. The same standard of replacement bridge over the A3 is required whether either option as this is the route to Pond Farm. This bridge will provide for vehicles and bridleway users, as does the present bridge, and can be provided as a multi-function 'green' bridge for either option. The main difference is that it replaces the long vehicular route created from Pond Farm to Wisley Lane with a short vehicular link from Old Lane to the new bridge and then to the existing track. This option would have less overall effect on the SPA and the Common Land.
- 3.3.4. A variation of the Painshill option which had a bridge over the A3 is being progressed as the preferred option, making it as compact as possible to reduce land take, but with vehicles being routed via Seven Hills Road south to reach it rather than Redhill Road. Bridleway links will be added on both sides. The bridge would make provision for NMU's and do away with the need for a separate bridge to link rights of way on either side of the A3. By keeping this option as close to the A3 as possible loss of screening vegetation will be kept to a minimum and reduce the effect on the Gothic Tower.

Chapter 4

4. Scope of the Assessment

4.1. General Approach

- 4.1.1. EIA is a process and management technique which allows consideration of the likely environmental and impacts of a development prior to it proceeding. This provides an opportunity to ensure that the design is optimised in an integrated manner, minimising negative environmental impacts and maximising positive impacts.
- 4.1.2. This chapter describes the EIA process in conformance with the requirements of the Design Manual for Roads and Bridges (DMRB) requirements. For highways projects the DMRB Volume 11 is recognised as providing an appropriate methodology for the assessment of environmental effects. For some topics the DMRB methodology will be supplemented by separate best practice guidance where it improves the assessment of effects. The 2017 update to the EIA regulations requires consideration of a number of topics that were not previously included or were considered in a different format. These are:
- Biodiversity with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (previously flora and fauna);
 - Population and human health (previously population);
 - Land (not previously included);
 - Vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned;
 - Climate; and
 - Heat and radiation.
- 4.1.3. DMRB Volume 11 already covers Biodiversity, Population and Human Health and Land in existing topics but Vulnerability, Climate and Heat and Radiation are not currently included. Guidance from Highways England suggests that Vulnerability should be included in existing topic chapters. It further recommends that Heat and Radiation are scoped out as not relevant to highways schemes. The Highways England guidance does recommend that Climate is included as a new topic chapter with information from some other topics such as Air Quality which generates information on greenhouse gasses and which are a consideration in the assessment of climate effects.

4.2. The EIA process

The Design Manual for Roads and Bridges

- 4.2.1. DfT DMRB, Volume 11, Section 2, Part 1, General Principles and Guidance on Environmental Impact Assessment outlines the approach to assessment that may be relevant dependent upon the potential environmental effects and the stage of the project. The assessment levels are: scoping, simple assessment or detailed assessment. These levels are not intended to be sequential, but consequential. The assessment levels are defined as follows:

- Scoping - defines the scope of the assessment and is the purpose of this Scoping Report. Establishes the need for further assessment and whether some environmental topics can be 'scoped out' from further assessment;
 - Simple Assessment - typically based on the data and information that is readily available and fulfils one of three functions:
 - To address potential aspects identified at the scoping level;
 - To reach an understanding of the likely environmental effects to inform the final design or assessment; or
 - To reach an understanding of the likely environmental effects that identified the need for a Detailed Assessment.
- 4.2.2. The Simple Assessment would be sufficient if it established confidently that the forecast environmental effect would not be a fundamental issue in the decision-making process.
- Detailed Assessment - Likely to require detailed field surveys and/or quantified modelling techniques. Detailed assessments would be undertaken where there is the potential to cause significant effects on environmental resources and receptors. The objective of this level of assessment is to gain an in-depth appreciation of the beneficial and adverse effects of the project.

Scoping

- 4.2.3. Prior to the commencement of works on the environmental assessment the scope of the environmental assessment will be established. The objective of this is to identify the environmental topics to be taken into account in the design of the Scheme and to set out the methodology for assessment. This assessment will ascertain which environmental topics are to be examined in greater detail i.e. a simple or detailed assessment, and which can be 'scoped out' (basic assessment) in accordance with Annex A of IAN 125/15.
- 4.2.4. The scoping process requires a good understanding of the existing environment and the Proposed Development. A gap analysis is undertaken to identify what further studies are required to gain a detailed understanding of the receiving environment. This could involve consultation with stakeholders to acquire existing data or where this does not exist, surveys can be undertaken.
- 4.2.5. Teams of experts that specialise in specific environmental topics consider the Proposed Development and what impacts are likely to arise. This exercise is completed using professional judgement and experience from similar projects and through consultation with statutory stakeholders who have detailed knowledge of the types of impacts that can arise from projects.
- 4.2.6. For each environmental topic, a list of the impacts that can arise during both construction and operation of the Scheme is produced and a commentary is provided setting out the justification as to why resulting environmental effects are likely to be significant or not. This forms the basis of the proposed scope of the EIA which is confirmed or added to by the Competent Authority (in this case the Planning Inspectorate with reference to other bodies such as Natural England) through the issue of a Scoping Opinion.
- 4.2.7. Volume 11, Section 1, Part 1 of the DMRB supplemented by IAN 125/15 Supplementary guidance for users of DMRB Volume 11 'Environmental

Assessment' identifies the topics the scoping of the EIA should consider. These are:

- Air Quality;
- Noise and Vibration;
- Biodiversity;
- Road Drainage and the Water Environment;
- Landscape;
- Geology and Soils;
- Cultural Heritage;
- Materials and Waste; and
- People and Communities.

4.2.8. For each environmental topic, a different level of assessment may be appropriate. The topic chapters below (chapters 5 to 14) state whether the topic is to be 'scoped in' to the EIA and whether a simple or detailed assessment will be required.

4.2.9. Each of these topics is considered in individual chapters following the same format and structure. For each topic, the current knowledge of the existing environment is summarised and any knowledge gaps are identified.

4.3. Proposed EIA approach for the Scheme

4.3.1. The key stages of the EIA process for the Scheme at this stage are:

- Scoping;
- Defining the study area;
- Establishment of baseline conditions;
- Impact assessment and identification;
- Defining assessment years;
- Development of mitigation measures;
- Prediction of residual environmental effects;
- Cumulative impact assessment;
- Transboundary impacts; and
- Environmental management.

4.3.2. These stages are discussed in more detail in the following sections.

Scoping

4.3.3. Scoping will determine the environmental topics that should be 'scoped out' of the EIA. The appropriate level of assessment, namely whether a Simple or Detailed assessment as defined in DMRB HA 201/08, HA 204/08 and Annex A of IAN 125/15, that should be applied to the environmental topics 'scoped in' will be set out.

Defining the study area

- 4.3.4. Study areas are defined individually for each environmental topic, according to the geographic scope of the potential impacts relevant to that topic or of the information required to assess those impacts. It will also draw on guidance in DMRB where this specifies the extent of study areas. The study areas are defined within each relevant topic chapter of this report.

Establishment of baseline conditions

- 4.3.5. The existing baseline conditions need to be defined to allow the assessment of changes that would be caused by the Scheme. The identification of the baseline requires the description of the existing situation and then a prediction of how it is likely to change in the absence of the Scheme.
- 4.3.6. The description of the baseline conditions should clearly identify receptors that may be affected by the Scheme and also their 'value' or 'sensitivity' to potential change.

Impact assessment and identification

- 4.3.7. Methods and requirements specific to each assessment topic are set out in the relevant topic chapters (chapters 5 to 14), however, the approach set out below is common to all topics and is in accordance with relevant guidance and best practice.
- 4.3.8. With the receptors identified and their sensitivity classified, the potential impacts of the works to these aspects, for construction and operation where appropriate, will be determined and the magnitude of the impact determined.
- 4.3.9. For each topic, the assessment will combine the magnitude (major to no change) of the impacts and the sensitivity (very high to negligible) of the resources/receptors that could be affected in order to classify the effect and to establish their significance (see Table 4.1). These classifications range from negligible to major, on the environmental aspects as set out in Table 4-2.

Table 4-1: Significance of effects

Sensitivity of receptor	Magnitude of impact				
	Major	Moderate	Minor	Negligible	No change
Very high	Very large	Large or very large	Moderate or large	Slight	Neutral
High	Large or very large	Moderate of large	Slight or moderate	Slight	Neutral
Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

Table Source: DMRB, Volume 11, Section 2, Part 5, HA 205/08, Table 2.4

Table 4-2: Effects definitions

Value	Typical descriptors
Very Large	These represent key factors in the decision-making process. These effects are generally associated with sites or features of international or national importance. However, a serious change in a site or feature of district importance may also enter this category. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
Large	These effects are considered to be very important considerations and are likely to be material in the decision-making process
Moderate	These effects may be important at a local level, but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These effects may be raised as local issues. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Negligible	No effects, or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table Source: DMRB, Volume 11, Section 2, Part 5, HA 205/08, Table 2.3

4.3.10. The classification of effects also considers the following descriptors:

- Adverse, neutral or beneficial;
- Permanent or temporary;
- Duration/frequency or likelihood;
- Direct or indirect;
- Secondary; or
- Cumulative.

4.3.11. The duration of the effect will be assessed to be either temporary or permanent where:

- Temporary (e.g. demolition and construction phase):
 - Short term (< 5 years);
 - Medium term (5-10 years); or
 - Long term (> 10 years); and
- Permanent (e.g. once the works are completed and operational).

Defining assessment years

Temporal scope

Scheme phases

4.3.12. The EIA will include consideration of effects arising from the construction and operation of the Scheme. Decommissioning is not relevant for the Scheme as noted above.

Do-minimum and Do-something scenarios

- 4.3.13. The assessment of effects involves comparing a scenario with the Scheme against one without the Scheme over time. The absence and presence of the Scheme are referred to as the 'Do-Minimum' and 'Do-Something' scenarios respectively. Dependent upon the topic, the scenarios will be assessed in the baseline year and a future assessment year or a series of future assessment years (for example 15 years after opening, or the worst year in the first 15 years of operation).
- 4.3.14. The 'Do-Minimum' scenario is defined by DMRB as *"the conditions that would persist in the absence of the implementation of a construction or improvement project, but given that maintenance is ongoing"* (DMRB Volume 11, Section 2, Part 7 HA 218/08). Identification of the baseline therefore requires first the identification of the existing situation, and then the prediction of how it is likely to change between now and implementation of the Scheme.

Dealing with uncertainty

- 4.3.15. EIA is an iterative process, and the Scheme may include somewhat uncertain aspects. At the time that the EIA is submitted, it is proposed that no aspects of design would vary so much as to represent effectively different schemes. The EIA would ensure it addresses the potential for a range of impacts resulting from any undecided parameters.
- 4.3.16. The Rochdale Envelope principle would be applied in accordance with the PINS Advice Note 9 using the Rochdale Envelope. The ES will explain clearly any elements of the Scheme yet to be finalised, with justification. Where flexibility is sought in the Scheme design, the maximum potential adverse impacts of the Scheme will be assessed. The ES will confirm maximum and other dimensions of the Scheme, and that any changes to the development within such parameters would not result in significant impacts not previously identified and assessed.

Development of mitigation measures

- 4.3.17. Proposals for mitigation will follow the mitigation hierarchy of avoid, reduce, remedy and compensate. Incorporated mitigation will include Best Practicable Measures, construction environmental management procedures identified in the Construction Environmental Management Plan (CEMP) and will also describe design features that have been adapted to reduce or prevent impacts, such as noise attenuation measures. Incorporated mitigation is included within the assessment.
- 4.3.18. Mitigation is defined as *"measures intended to avoid, reduce and, where possible, remedy significant adverse environmental effects"* (DMRB Volume 11, Section 2, Part 7 HA 218/08). Enhancement measures are defined as *"measures over and above normal mitigation"* (IAN 125/15).
- 4.3.19. During the Option Selection Stage the need for eliminating or mitigating any adverse environmental impacts were considered. No specific mitigation measures were identified at this stage as they would be developed fully during this Preliminary Design Stage. Where possible, consideration will be given to reducing or avoiding adverse environmental impacts and these will be developed during the Scheme development as an iterative process. Where mitigation measures are required, these will be informed by survey data being collected for

the purposes of the Preliminary Design Stage and developed in consultation with statutory bodies. The Scheme will include all mitigation considered necessary to reduce effects to an acceptable level and the assessment will report on this basis. As well as mitigation the Scheme will also include compensation for adverse effects where necessary and again the assessment will be based on the Scheme with this included.

- 4.3.20. During construction, the responsibility for further environmental mitigation and the adherence to environmentally responsible working practices will fall to the contractor, through a CEMP prepared by the designer (Atkins) and refined as the Scheme progresses.

Prediction of residual environmental effects

- 4.3.21. The residual effect will be assessed using the same system as described above to include the mitigation proposed. The residual effect as classified will be considered for its significance. Generally, effects considered to be moderate or major are deemed significant; and those minor or negligible are deemed to be not significant, based on the described classification (Table 4-2) and professional judgement.

Cumulative impact assessment

- 4.3.22. Cumulative effects are the result of multiple actions on environmental receptors. There are principally two types of cumulative impact:
- The combined action of a number of different environmental topic specific impacts upon a single resource/receptor; and
 - The combined action of a number of different projects, in combination with the project being assessed, on a single resource/receptor.
- 4.3.23. Further details on the scope of the cumulative effects assessment is provided in Chapter 15 Assessment of Cumulative Effects.

Transboundary impacts

- 4.3.24. Regulation 24 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires PINS to notify other European Economic Area (EEA) States and publicise an application for development consent if it is of the view that the proposed development is likely to have significant effects on the environment of another EEA Member State, and where relevant to consult with the EEA State affected. The Scheme is approximately 120 km from France, the closest EEA State.
- 4.3.25. The study areas for the various environmental topics define the extent of effects anticipated and are described fully in chapters 5 to 14 and are summarised below as follows:
- Air Quality: within 200 m of the works;
 - Noise and Vibration: 600 m from the carriageway of the works;
 - Biodiversity: 2 km for statutory and non-statutory designated sites and 30 km for SACs;
 - Road Drainage and the Water Environment: 1 km around the works;

- Landscape: within the zone of visual influence of the works, i.e. areas where the Scheme can be seen from;
- Geology and Soils: 500 m from the extent of the works;
- Cultural heritage: 500 m from the works or within the area considered to be the setting of the asset;
- Materials and Waste: waste arisings within the county of Surrey; and
- People and Communities: 500 m from the works.

4.3.26. The study areas will cover the area where direct effects of the Scheme will be experienced as well as the area where effects on the setting of an asset might be felt, for example the setting of a listed building where the surroundings contribute to its historic value. The works include alterations to signs and signals on existing gantries that would be retained on the M25 to the east and west of the highway improvement works around junction 10. The study area for topics affected by changes in the appearance of these signs and signals may be extended to include the areas where the changed signs and signals are visible and might have a material effect.

4.3.27. For some topics the effects of the Scheme would extend beyond the immediate area of the works. For example, the noise and air quality effects would be experienced in the surrounding area where there would be changes in traffic flows as a result of the Scheme. The method for establishing the extent of study areas in this situation is set out in the topic chapters below.

4.3.28. As none of these distances reach other EEA Member States, no transboundary effects are anticipated for the Scheme.

Habitats Regulations Screening

4.3.29. The nearest European designated site to the Scheme is the Thames Basin Heaths SPA, which is directly adjacent to the south-east and south-west of M25 Junction 10. Further details regarding this site and its qualifying interests are provided in Chapter 7 Biodiversity.

4.3.30. In accordance with the requirements of PINS Advice Note 10: Habitats Regulations Assessment relevant to nationally significant infrastructure projects, screening for likely significant effects will be undertaken (alone or in-combination with other projects). Based on current information and the Options Selection Stage Habitat Regulations Assessment (HRA) Screening Matrix it is considered likely that the Scheme could give rise to impacts on the SPA based on displacement or reduced breeding success of qualifying bird species through habitat loss, changes in habitat quality and disturbance. Further work during the assessment stage will be undertaken to determine the effects of the Scheme including continuing surveys of bird populations, recording of existing noise levels, prediction of noise levels, assessment of likely disturbance and mitigation measures. The Options Selection Stage HRA Screening Matrix indicated an outcome of 'Significant Effects are Likely'. Initial consultation has been undertaken with Natural England, further consultation will be undertaken with Natural England regarding the outcome of the Preliminary Design Stage HRA. The conclusions of the HRA will be reported in the ES in line with normal practice and as required by the 2017 EIA regulations.

Health Impact Assessment and Equalities Impact Assessment

- 4.3.31. The assessment of the effect of the Scheme on Population and Human Health is a requirement under the 2017 EIA regulations. Guidance from Highways England indicates that this assessment is informed by the assessments in existing topics such as Air Quality and Noise. A Health Impact Assessment (HIA) will be produced and reported separately to the EIA. Similarly, an Equalities Impact Assessment (EqIA) which reports the effect of the Scheme on different social groups will also be produced and reported separately.

Major accidents and disasters

- 4.3.32. In line with the new requirements for major accidents and disasters outlined in Article 3(1) of the EIA Directive, the ES will consider:
- Vulnerability of the Scheme to risks of major accidents and/or disasters; and
 - Any consequential changes in the predicted effects of that Scheme on environmental topics.
- 4.3.33. In considering these elements of vulnerability, the ES will:
- apply professional judgement in consultation with the Overseeing Organisation to develop Scheme specific definitions of major events. It should be noted that there is no definition of ‘major’ in this context;
 - identify any ‘major’ events that are relevant to and can affect the Scheme. Major events shall include both man-made and naturally occurring events. Not all events warrant assessment and evidence should be provided to support the view that they should be classified as major events;
 - where Major events are identified, describe the potential for any change in the assessed significance of the Scheme on relevant environmental topics in qualitative terms. Report the conclusions of this assessment within the individual environmental topics; and
 - clearly describe any assumed mitigation measures, to provide an evidence base to support the conclusions and demonstrate that likely effects have been mitigated/managed to an acceptable level.
- 4.3.34. Major events will be reported within the relevant environmental topic chapters.

Environmental management

- 4.3.35. A CEMP will be prepared by the designer (Atkins) in association with Highways England’s contractor delivery partner during this stage and refined as the Scheme progresses from development to construction and handover. The CEMP will detail practices that the contractor is to apply on site that will demonstrate commitments to environmental management. It will detail both generic and specifically targeted practices to enable construction to be undertaken with minimal impact on the environment and will also enable monitoring requirements to be set up. Proposals for monitoring will be developed as part of the topic impact assessments in the ES.

Chapter 5

5. Air Quality

5.1. Introduction

- 5.1.1. This chapter describes the scope of the air quality assessment for the Scheme. The air quality assessment will ascertain the likely potential effects on air quality due to the Scheme during construction and operation.
- 5.1.2. This chapter identifies and presents existing baseline air quality conditions in the Scheme area, identifies the potential impacts on air quality associated with the Scheme on human health and ecosystems both during construction and operation, and discusses mitigation measures that may be applied to mitigate any potentially significant adverse effects.

5.2. Study area

- 5.2.1. The study area for assessing the potential effects of construction dust is defined as the area within 200 m of the construction site boundary, in accordance with the DMRB Volume 11, Section 3, Part 1 HA 207/07 'Air Quality'.
- 5.2.2. The air quality study area for assessment of construction traffic and normal traffic during the operational phase is determined in accordance with traffic change criteria set out in the DMRB HA 207/07 which defines affected road networks (ARN) for local (paragraph 3.11) and regional (paragraph 3.20) air quality assessments.
- 5.2.3. The Scheme is located within the boundaries of Guildford Borough Council (GBC) and Elmbridge Borough Council (EBC). For the purposes of this Scoping Report the air quality study area is based on the ARN that was defined at the Option Selection Stage for the preferred Scheme (Option 14 with WIS10) and which extends into the local authority areas of Runnymede Borough Council (RBC), Woking Borough Council (WBC), Mole Valley District Council (MVDC), and borders the Royal Borough of Kingston upon Thames (RBK). This includes the area within 200 m of the Scheme, including the M25 Junction 10, the M25 between Junction 9 and 11, the A3 between Ockham and Painshill junctions, and other local roads. The ARN will be reviewed and updated on the basis of strategic traffic modelling to be undertaken in this Preliminary Design Stage to inform the assessment in the ES.
- 5.2.4. The study area for local air quality during operation is provided in Figure 5.1, which shows sensitive human health receptors and designated ecological sites within 200 m of the ARN. The study area for construction dust is provided in Figure 5.2.

5.3. Planning and policy context

Air Quality Criteria

- 5.3.1. There are two sets of ambient air quality criteria for the protection of public health: legally binding, mandatory limit values set by the European Union (EU); and objectives set out in the UK National Air Quality Strategy (AQS) which local authorities are required to work towards achieving. Both sets of criteria are implemented in Air Quality Regulations (The Air Quality Standards Regulations

2010 (SI 2010/1001)¹ for EU limit values, and The Air Quality (England) Regulations (SI 2000/928)² as amended by SI 2002/3043³ for AQS objectives). Air quality criteria relevant to the air quality assessment are summarised in Table 5-1, and for nitrogen dioxide (NO₂) and particulate matter (PM₁₀) are the same criteria for both the EU limit values and the AQS objectives.

Table 5-1: Relevant human health air quality criteria

Pollutant	Criteria
NO ₂	1-hour mean concentration should not exceed 200 µg/m ³ more than 18 times a year
	Annual mean concentration should not exceed 40 µg/m ³
PM ₁₀	24-hour mean concentration should not exceed 50 µg/m ³ more than 35 times a year
	Annual mean concentration should not exceed 40 µg/m ³

Ecological Criteria

- 5.3.2. The EU has set a critical level for annual mean concentrations of nitrogen oxides (NO_x) to protect sensitive vegetation. This is included in the Air Quality Standards Regulations (SI 2010/1001). Assessment of compliance with this critical level is undertaken at locations more than 20 km from towns with more than 250,000 inhabitants or more than 5 km from other built-up areas, industrial installations or motorways or major roads with traffic counts of more than 50,000 vehicles per day. UK statutory nature conservation agencies' (Natural England) policy is to apply the limit value of 30 µg/m³, on a precautionary basis, as a benchmark only in all designated conservation sites, including 'Ramsar' sites, Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs).

National Planning Policy

- 5.3.3. The National Planning Policy Framework (NPPF) sets out the Government's requirements of the planning system. The NPPF requires local planning authorities (LPAs) to take account of air quality in plan making, stating at paragraph 124:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

National Policy Statement

- 5.3.4. The National Networks National Policy Statement (NN NPS), prepared by the Department for Transport (DfT), provides policy and guidance relating to the development of nationally significant infrastructure projects. NN NPS requires a judgement to be made as to the risk of a project affecting the UK's ability to

¹ <http://www.legislation.gov.uk/ukSI/2010/1001/contents/made>

² <http://www.legislation.gov.uk/ukSI/2000/928/contents/made>

³ <http://www.legislation.gov.uk/ukSI/2002/3043/contents>

comply with the Air Quality Directive (paragraph 5.11) of the NN NPS, which states:

“Air quality considerations are likely to be particularly relevant where schemes are proposed: within or adjacent to AQMAs; roads identified as being above Limit Values or nature conservation sites; and where changes are sufficient to bring about the need for a new AQMA or change the size of an existing AQMA; or bring about changes to exceedances of the Limit Values, or where they may have the potential to impact on nature conservation sites.”

5.3.5. Furthermore, paragraph 5.13 of the NN NPS, states:

“The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the scheme will: result in a zone/agglomeration which is currently reported as being compliant; or affect the ability of a non-compliant area to achieve compliance with the most recent timescales reported to the European Commission at the time of the decision.”

Road Investment Strategy and Strategic Business Plan

5.3.6. The DfT RIS published in 2015 sets out the DfT’s aspirations for the Strategic Road Network (SRN) over the next 25 years. It states that by 2040 DfT aspires to a network that will be sustainable with *“zero breaches of air quality regulations and major reductions in carbon emissions across the network”*.

5.3.7. The Highways England Delivery Plan 2015-2020 identifies Highways England’s commitment to investing £75m *“in a range of projects to reduce pollution and ensure the air around the network is clean and healthy”*. The Highways England Delivery Plan 2017-2018 sets out indicators that will be used to measure performance, including of relevance to air quality, the number of air quality pilot studies completed.

Local Planning Policy

5.3.8. Appendix A provides details of local planning policies. The following policies are of relevance to air quality:

- Policy CS25 - Travel and Accessibility - within the Elmbridge Core Strategy;
- Policy DM5 - Pollution - within the Elmbridge Local Plan Development Management Plan;
- Policy G1 (3) - Protection of amenities enjoyed by occupants of buildings, and G1 (13) - mixed use of development - within the Guildford Borough Local Plan; and
- Policy DM6 - Air and water quality - within the Woking Development Plan Document.

Local Air Quality Action Plan

5.3.9. Following assessment of air quality in their area, local authorities are required to prepare Air Quality Action Plans (AQAPs) where the authority has declared an Air Quality Management Area (AQMA), describing the pollution reduction measures it will put in place.

- 5.3.10. The EBC AQAP details the council's proposed measures for improvement of air quality within the borough. The AQAP identifies the primary source of air pollution within the borough as road traffic and as such recognises the need to support sustainable travel options and the importance of raising public awareness on the issue of air quality. The AQAP also briefly details other key documents that address the use of air pollutants; these documents include the Surrey County Council Local Transport Plan (LTP3) and Elmbridge's Local Development Framework (LDF).
- 5.3.11. The RBC AQAP recognises road traffic as the major source of air pollution in the borough. The AQAP incorporates a number of measures for improving air quality both within the Air Quality Management Areas (AQMAs) and the wider local authority area from development control, implementation of mitigation, including redesign and compensation/offsetting measures, proposals for continued air quality monitoring, and identification of a number of infrastructure projects to tackle congestion and benefit air quality, supplemented with actions to promote sustainable transport. The AQAP also references local strategies and policies, including Runneymede's LTP3 and LDF (now termed Local Development Scheme).
- 5.3.12. GBC and MVDC do not have an AQAP as there are no AQMAs within their local authority areas. The AQAP for WBC is not currently considered to be relevant to the assessment, given that the AQMAs are not within the study area. Further discussion on AQMAs is provided in section 5.4 below.

5.4. Baseline conditions

- 5.4.1. Information on existing ambient air quality i.e. baseline conditions, and identification of potential air quality constraints to the Scheme have been determined through reference to the following sources:
- AQMA mapping⁴;
 - Department for Environment, Food and Rural Affairs (Defra) Pollution Climate Mapping (PCM) model data for the latest available year (2015)⁵;
 - Local Authority Local Air Quality Management (LAQM) Reports⁶;
 - Highways England project specific nitrogen dioxide (NO₂) diffusion tube survey data^{7,8};
 - Ordnance Survey base mapping to identify locations of sensitive receptors (residential properties, schools, hospitals and elderly care homes); and
 - Natural England (NE) MAGIC website to identify boundaries of designated ecological sites.
- 5.4.2. Figure 5.1 shows the air quality constraints within the Scheme study area.

⁴ <http://uk-air.defra.gov.uk/aqma/maps>

⁵ <http://uk-air.defra.gov.uk/data/gis-mapping>, accessed 04/09/17

⁶ Elmbridge Borough Council (2016) Air Quality Annual Status Report; Woking Borough Council (2016) Air Quality Annual Status Report; Guildford Borough Council (2016) Air Quality Annual Status Report

⁷ Atkins (2015) M25 DBFO Air Quality Monitoring (Quarter 4): Connect Plus Services

⁸ Atkins (2016) M25 DBFO Air Quality Monitoring 2014 - 2015 Annual Report: Connect Plus Services

Pollutants

- 5.4.3. The air pollutants of concern in the context of the local air quality assessment for the Scheme are NO₂ and fine particulate matter (PM₁₀). These pollutants are most likely to be present in ambient air at concentrations close to or above statutory limit values at receptors near to roads, and are hence the focus of the assessment of vehicle emissions associated with the Scheme. In addition, carbon dioxide (CO₂) is included within the regional air quality assessment. Further information on these pollutants is provided in Appendix A. Air quality criteria are provided in Table 5-1 above.
- 5.4.4. National assessments have demonstrated that there is no risk of exceedance of the air quality objectives set for 1,3-butadiene, benzene, carbon monoxide, lead or sulphur dioxide due to emissions from traffic anywhere in the UK. These pollutants are therefore not considered further as there is not considered to be a potential for significant effects associated with these pollutants.
- 5.4.5. Due to the close proximity of ecological sites with statutory designation to the air quality study area, it will be necessary to assess the effects of NO_x on vegetation.
- 5.4.6. In addition to these air pollutants, dust may be generated during the construction phase in areas adjacent to the Scheme. Dust per se is not considered as a local air pollutant but may cause a perceived loss of amenity and can give rise to soiling (dust deposition).

Local Air Quality Management

- 5.4.7. There are no AQMAs declared within the GBC and MVDC areas.
- 5.4.8. EBC has declared seven AQMAs for exceedances of the annual mean AQS objective for NO₂. Of these the Cobham High Street and Esher AQMAs are within 200 m of the ARN as defined at the Option Selection Stage.
- 5.4.9. RBC has declared two AQMAs: one along the M25 corridor within the RBC administrative area; and one in Addlestone Town Centre. The M25 AQMA was declared for exceedances of both the annual and 24-hour mean AQS objectives for PM₁₀ as well as the annual mean AQS objective for NO₂ and is within the air quality study area. At the Option Selection Stage, the Addlestone Town Centre AQMA was not within 200 m of the ARN, although this will be reviewed once traffic data for this Preliminary Design Stage is available, as it could potentially be affected.
- 5.4.10. WBC has declared two AQMAs for exceedances of the annual mean NO₂ AQS objective, neither of which are likely to be affected as they are not within 200 m of the ARN defined at the Option Selection Stage. This will be reviewed once the revised traffic data for the Preliminary Design Stage is available.
- 5.4.11. RBK has declared its entire borough an AQMA for exceeding the annual mean NO₂ AQS objective and the annual mean and daily mean PM₁₀ AQS objectives. This could potentially be affected as it is within 200 m of the ARN defined at Option Selection Stage.
- 5.4.12. The AQMAs noted above are described below in Table 5-2 and those closest to the Scheme illustrated in Figure 5.1.

Table 5-2: Description of AQMAs

Local Authority	Name	Air Quality Criteria Exceeded	Description
EBC	Cobham AQMA	NO ₂ annual mean	An area along the High Street, Cobham.
	Esher AQMA	NO ₂ annual mean	An area extending along the High Street, Church Street and including parts of Esher Green and Lammas Lane.
RBC	M25 AQMA	NO ₂ annual mean PM ₁₀ annual and 24-hour mean	AQMA combining 2 areas. Area 1 extending 70 m east and west of the centre line of the M25 between Junction 11 and the southern boundary of the Borough at New Haw/Byfleet. Area 2 extending 55 m east and west of the centre line of the M25 between Junctions 11 and 13.
RBK	Kingston Upon Thames AQMA	NO ₂ annual mean PM ₁₀ annual and 24-hour mean	The whole borough.

Defra Mapping

Pollution Climate Mapping (PCM)

- 5.4.13. Further information on areas exceeding the EU limit values is available from Defra's PCM model. This model provides estimates of roadside concentrations of pollutants, including annual mean NO₂ and PM₁₀, which are used in annual reporting to the EU regarding compliance with the limit values. The modelled roadside concentration comprises a background component together with a roadside increment.
- 5.4.14. Not all roads are included within the PCM model. In the vicinity of the air quality study area, Defra's PCM only includes parts of the A244, A245, A307 and A318. The PCM mapping shows that for the base year (2015) none of the roadside annual mean PM₁₀ or NO₂ concentrations for these roads exceeded the EU limit values of 40 µg/m³.
- 5.4.15. Defra PCM links are illustrated in Figure 5.1.

Background mapping

- 5.4.16. Estimates of current and future year background pollutant concentrations in the UK are available on the Defra UK Air Quality Information Resource (UK-AIR) website⁹. The background estimates, which are a combination of measured and modelled data, are available for each one kilometre grid square throughout the UK for a base year of 2013, which is the basis for the future year estimates up to 2030. These background estimates include contributions from all source sectors, e.g. road transport, industry, and domestic and commercial heating systems.
- 5.4.17. Estimated annual mean background concentrations for the grid squares covering the M25 Junction 10 air quality study area for the base year used in the Option Selection Stage EAR (2015) for the pollutants NO₂ and PM₁₀ are presented in Appendix A. Mapped background concentrations of NO₂ and PM₁₀ for 2015 were

⁹ <https://uk-air.defra.gov.uk/data/laqm-background-home>

below relevant air quality criteria, and ranged from between 12.4 to 25.9 $\mu\text{g}/\text{m}^3$ for NO_2 and 14.3 to 18.3 for PM_{10} , with higher concentrations for the grid squares covering the M25. This indicates that, as expected, concentrations at background locations near the Scheme and associated ARN are currently likely to meet relevant air quality criteria for these pollutants.

Air Quality Monitoring

- 5.4.18. Air quality monitoring data from continuous monitoring stations (CMS) and passive diffusion tubes in the air quality study area are presented in Table A.1 and Tables A.2 and A.3 in Appendix A and summarised below.

Highways England Monitoring

- 5.4.19. Connect Plus measure NO_2 concentrations using diffusion tubes at a number of sites around the M25 on behalf of Highways England. The three-year survey started in September 2013. Five of the sites (CP4, CP8, CP9, CP10 and CP27) are located in close proximity to the Scheme as shown in Figure 5.1. The annual mean NO_2 concentrations for these monitoring sites between September 2013 and 2016 are tabulated in Appendix A. The results show that there were no recorded exceedances of the NO_2 annual mean air quality criterion at any of these sites over the three-year survey period. Concentrations were highest at site CP4, located to the north-west of M25 Junction 10, and lowest at site CP27, south-east of Junction 10.
- 5.4.20. Highways England has also conducted a six-month diffusion tube survey for the purpose of informing the M25 Junction 10 Improvements for six months in 2016. The survey consisted of 13 diffusion tubes located near to Junction 10 at roadside or kerbside locations. Survey locations are illustrated in Figure 5.1. The results are provided in Table 9.3 in Appendix A. The results show that there were no recorded exceedances of the NO_2 annual mean air quality criterion at any site in 2015, as adjusted. The highest concentration was 33.7 $\mu\text{g}/\text{m}^3$ at a site near the A3 south of Burnt Common (HE_7).

Local Authority Monitoring

- 5.4.21. All of the local authorities undertake air quality monitoring near the air quality study area for the Scheme as defined at Option Selection Stage.

Continuous Monitoring

- 5.4.22. None of the local authorities operate a CMS measuring concentrations of either NO_2 or PM_{10} within the air quality study area. The closest CMS to the study area which measure NO_2 are located at roadside sites in Weybridge and Hampton Court in EBC's area, and at a kerbside site in Dorking in MVDC's area, which operated until 2014. Concentrations at the Weybridge site exceeded the annual mean NO_2 AQS objective between 2012 and 2014, but have been below the AQS objective since. Concentrations at the Hampton Court site have exceeded the AQS objective in all years, while concentrations at the Dorking site were well below the AQS objective in all years. The annual mean NO_2 concentrations at these sites are provided in Table 5-3.

Table 5-3: Annual mean NO₂ concentrations (µg/m³) from CMS near to the Scheme

Site ID	Local Authority	Site Type	X, Y	2011	2012	2013	2014	2015	2016
E1 (Weybridge)	EBC	Roadside	507480, 164923	36	43	43	40	38	38
E2 (Hampton Court)	EBC	Roadside	515338, 168292	51	41	47	47	40	44
Dorking	MVDC	Kerbside	517034, 149803	23	23	22	22	-	-

- = data not available/monitoring not undertaken Data have been sourced from local authority reports
Exceedances of annual mean NO₂ UK AQS objective are highlighted in bold AQS annual mean objective is 40 µg/m³

5.4.23. The Dorking kerbside site also measured PM₁₀ concentrations until 2014. Concentrations were well below both the annual mean and daily mean AQS objectives at this site, as shown in Table 5-4.

Table 5-4: Annual mean PM₁₀ concentrations (µg/m³) at CMS near to the Scheme

Site ID	Local Authority	Site Type	X, Y	2011	2012	2013	2014	2015	2016
Dorking	MVDC	Kerbside	517034, 149803	21	20	21	18	-	-

- = data not available/monitoring not undertaken AQS annual mean objective is 40 µg/m³
Data have been sourced from local authority reports

Table 5-5: Number of exceedances of 24-hour mean PM₁₀ objective and CMS near to the Scheme

Site ID	Local Authority	Site Type	X, Y	2011	2012	2013	2014	2015	2016
Dorking	MVDC	Kerbside	517034, 149803	11	10	2	2	-	-

- = data not available/monitoring not undertaken Data have been sourced from local authority reports
24-hour mean concentration should not exceed 50 µg/m³ more than 35 times a year

Passive Monitoring

5.4.24. Passive monitoring of NO₂ using diffusion tubes has been undertaken by all the local authorities. The monitoring results at sites near to the air quality study area for the period of 2011 to 2016, where available, are provided in Table 5-6. Local authority monitoring locations are also illustrated in Table 5.1, where thematic mapping is applied comparing annual mean measurements for 2015 with the annual mean objective of 40 µg/m³. Key areas and traffic corridors where exceedances of the annual mean AQS objective for NO₂ were measured in recent years within the air quality study area include:

- Near M25 Junction 10 (G_6);
- Near the M25 west of Junction 10 (Wk_3);
- Near the A3 junction with Copsem Lane, north-east of Junction 10 (E_9); and

- Within Cobham and Esher AQMA (E_3, E_4, E_5, and E_7, E_8, E_10, E_11).

Table 5-6: Annual mean NO₂ diffusion tube monitoring results (µg/m³)

Site ID	Site Name	Grid Ref	Site Type	2011	2012	2013	2014	2015	2016
Guildford Borough Council									
G_6	GD5 Wisley	507947, 159099	Kerbside	44.0	44.0	45.0	40.0	46.0	^
G_28	RP1	505243, 156819	Roadside	-	-	-	-	-	32
G_29	RP2	505090, 156777	Kerbside	-	-	-	-	-	27
G_30	WS1	507346, 158005	Semi-rural	-	-	-	-	-	13
Elmbridge Borough Council									
E_3	Cobham 1	510828, 159996	Roadside	42	40	40	42	35	33
E_4	Cobham 6	510814, 160099	Roadside	31	34	33	33	28	29
E_5	Cobham 7	510861, 159906	Roadside	38	42	38	43	36	34
E_6	Downside 3	511429, 157606	Rural background	31	30	32	31	26	21
E_7	Esher 1	513840, 164693	Urban traffic	49	49	52	48	49	45
E_8	Esher 4	514058, 164855	Urban traffic	46	47	45	46	43	40
E_9	Esher 5	514150, 162470	Roadside	49	53	50	52	51	45
E_10	Esher 7	513982, 164750	Urban traffic	54	53	48	53	48	41
E_11	Esher 8	513832, 164684	Urban traffic	53	55	47	51	44	42
E_12	Esher 9	513821, 164712	Urban traffic	34	36	36	37	32	33
E_13	Esher 10	513886, 164767	Urban traffic	33	36	36	36	33	30
E_14	Esher 11	513893, 164607	Urban traffic	39	40	42	39	39	33
E_15	Esher 13	513736, 164489	Urban traffic	44	42	41	38	40	36
Woking Borough Council									
Wk_3	M25	505611, 161180	Roadside	66	50	52	50	61	51

Site ID	Site Name	Grid Ref	Site Type	2011	2012	2013	2014	2015	2016
Wk_4	Church Road	506401, 160504	Urban background	27	41	44	20	25	24
Wk_13	Lincoln Drive	503244, 159659	Roadside	22	22	20	16	21	19
Wk_18	Dartnell Avenue	504926, 161063	Roadside	26	26	27	23	28	26
Wk_29	TC	506731, 161229	Roadside	-	-	-	-	-	28
Runnymede Borough Council									
R_1	RY1	505095, 164623	Roadside	42	40	40	35	39	39
R_3	RY8	504325, 163940	Roadside	24	21	29	26	35	24
R_4	RY14	504993, 164600	Roadside	59	55	54	48	49	45
R_5	RY19	505227, 162701	Roadside	45	37	44	37	34	33
R_15	RY44	504621, 164434	Roadside	-	-	-	15	23	29
R_18	RY53	504959, 164778	Roadside	49	51	49	38	39	41
R_19	RY54	505036, 164554	Roadside	37	38	38	33	36	33
R_20	RY55	505589, 164844	Roadside	35	35	39	36	36	34
R_25	RY60	504966, 164834	Roadside	-	-	-	33	39	36
R_26	RY61	504920, 164564	Roadside	-	-	-	33	34	32
R_27	RY62	505084, 164425	Roadside	-	-	-	29	31	32
R_28	RY63	505247, 164402	Roadside	-	-	-	-	24	22
R_29	RY64	505251, 164519	Roadside	-	-	-	-	23	25
Mole Valley District Council									
MV6	SCC depot	517137, 157240	Kerbside	36	33	39	28	28	26
MV10	Green Lane	517712, 156743	Kerbside	41	32	34	34	31	31
MV11	Green Lane	517871, 156748	Kerbside	36	30	31	25	28	28
MV12	Green Lane	517674, 156840	Kerbside	33	32	30	26	25	25

^Decommissioned end of June 2016 Values in **bold** indicate an exceedance of the relevant AQS objective

Receptors

- 5.4.25. Sensitive human health receptors within 200 m of the Scheme and roads which form the ARN (as determined at the Option Selection Stage) are provided in Table 5-7 below and shown in Figure 5.1. There are no human health receptors within 200 m of M25 Junction 10/A3 Wisley Interchange, however there are several isolated residential properties located within 200 m of the A3 carriageway between Junction 10 to the A245 Painshill Interchange.
- 5.4.26. Adjacent to the northbound on-slip at Painshill Interchange is Feltonfleet School. A number of isolated properties are located within 200 m of the Painshill Interchange and the A245 Portsmouth Road, and on the Seven Hills Road.
- 5.4.27. In addition, designated ecological sites may contain features that are sensitive to air pollutants, whereby vegetation may be adversely affected by elevated pollutant concentrations. DMRB HA 207/07 (paragraph 3.13) requires assessment of air quality effects on sites designated for their ecological value (SACs, SPAs, SSSIs and Ramsar sites) within 200 m of any road affected by the Scheme.
- 5.4.28. The M25 Junction 10/A3 Wisley Interchange is surrounded on all sides by the Ockham and Wisley Commons SSSI designated for its heathland habitat. This SSSI incorporates the Thames Basin Heaths SPA, designated due to the presence of important populations of ground-nesting birds (within this SPA the principal habitats supporting the qualifying species are lowland heathland and rotationally managed coniferous plantation woodland). The Esher Commons SSSI, designated for its rich variety of habitats and importance for invertebrates, is within 200 m of the A3 north of the Painshill junction. In addition, the Papercourt SSSI, designated for its wetland habitats, lies within 200 m of the B367 Newark Lane.
- 5.4.29. Relevant receptors are summarised in Table 5-7 below and illustrated in Figure 5.1.

Table 5-7: Relevant receptors

Affected Road	Receptors
M25 Junction 10/A3 Wisley interchange	Ockham and Wisley Commons SSSI. Thames Basin Heaths SPA.
A3 north of Junction 10	Isolated residential properties between Junction 10 and the Painshill Interchange. Residential properties at the western end of Cobham. Esher Commons SSSI.
A3 south of Junction 10	Residential properties to the east of Ripley village.
A245 Portsmouth Road between the Painshill interchange and Seven Hills Road	Feltonfleet School, St George's Nursing Home and properties on Seven Hills Road and Lingwood.
M25 east of Junction 10	Isolated properties along the M25 corridor including along Ockham Lane, Horsley Road, Bookham Road, Cobham Road, and the A245 Woodlands Road.

Affected Road	Receptors
M25 west of Junction 10	Residential properties at the west and south of Byfleet, including Winern Glebe, Bruce Close, Murray's Lane and Sanway Close, Kings Lodge Care Centre, West Hall Care Home, Anchor Care Home. The easternmost properties within West Byfleet. Residential properties within 200 m of the M25 within Row Town and Addlestone including Jubilee High School.
Wisley Lane	Residential properties in Wisley village.
Lock Lane	Pyrford Place Farm and nearby properties.
B2215 Portsmouth Road/ High Street	Residential properties along the B2215 Portsmouth Road/High Street within Ripley.
B367 Newark Lane/Church Hill	Residential properties off Newark Lane and Church Hill adjacent to the River Wey. Residential properties along Papercourt Lane, Newark Close and Polesden Lane. Residential properties within Ripley village and Pyrford village. Papercourt SSSI.
A320 Guildford Road	Residential properties on Tringham Close, Fox Hills Road, Wilson Drive and Murray Road.
A245 Byfleet Road	Isolated residential properties along Byfleet road and residential properties at the easternmost edge of Byfleet.
Seven Hills Road	Residential properties along the Seven Hills Road corridor in Whitely Village.
A245 Stoke Road	Residential properties in the south of Cobham within 200 m of the A245 Stoke Road corridor and Oasis Child Care Centre and Springfield House Nursing Home.
A307 from Cobham Road to Copsem Lane	Residential properties in the north-east of Cobham as well as Cobham Health Centre, Oasis Family Centre and Cobham Free School.

5.5. Potential impacts

5.5.1. The Scheme has the potential to affect local air quality, both during construction and once in operation in the following ways:

- There could be increased emissions of dust during construction of the Scheme from dust-raising activities on site;
- Air quality could be affected by changes in traffic flows during construction, as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour;
- Once operational, air quality could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition); and
- Operationally, air quality could also be affected by any changes to the distance between sources of emissions and air quality sensitive receptors.

Construction

- 5.5.2. Demolition and construction activities can give rise to dust emissions under particular circumstances, if not effectively managed. Construction of the Scheme has the potential to affect nearby receptors either due to dust from demolition and construction activities, or the tracking out of dust from heavy goods vehicles (HGVs) onto the local road network. Implementation of best practice mitigation measures will generally control construction dust and minimise any short term adverse effects.
- 5.5.3. In addition, the local highway network may experience changes in traffic flows and speeds during construction as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour. However, any effects on air quality would be short term and temporary (i.e. during the period of construction works only).

Operation

- 5.5.4. Once operational, air quality could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition). Air quality could also be affected by any changes to the distance between emission sources and air quality sensitive receptors as a result of a change to road alignment for the operational Scheme.
- 5.5.5. The Option Selection Stage assessment showed that there were expected to be increases in pollutant concentrations with the Scheme at a number of receptors in the wider area including in Cobham, in and near to the M25 AQMA, near the Painshill Interchange, near the A3, and in Ripley. There were also expected to be decreases in pollutant concentrations at receptors near the A307 in Cobham and Esher.
- 5.5.6. There were also expected to be increases in NO_x concentrations and nitrogen deposition rates at the designated ecological sites in the area.

5.6. Proposed level and scope of assessment

- 5.6.1. Construction effects will be assessed qualitatively in accordance with the DMRB (paragraph 3.45). Should information on proposed traffic management measures and/or volumes of construction traffic and a suitable traffic model be available, a quantitative assessment of vehicle emissions during construction could be undertaken in accordance with DMRB.
- 5.6.2. Potential effects on local air quality resulting from operation of the Scheme will be assessed in accordance with relevant guidance outlined in DMRB, associated IANs and where relevant Defra's Local Air Quality Management Technical Guidance (LAQM.TG(16)). Relevant guidance documents are listed in Chapter 17, References.
- 5.6.3. For the assessment of operational effects, DMRB provides methodologies for undertaking simple and/or detailed levels of assessment for local and regional air quality. For this Preliminary Design Stage, detailed dispersion modelling of the Scheme will be used to determine potential effects on NO₂ and PM₁₀ concentrations at human health receptors, given the complex nature of the junction and the presence of AQMAs in the area which are likely to be affected

by the Scheme. Outputs from the detailed dispersion modelling will also be used to determine potential effects of NO_x emissions and nitrogen deposition on identified designated ecological sites.

5.7. Proposed assessment methodology

5.7.1. The Preliminary Design Stage Environmental Assessment Report (EAR) air quality assessment for the Scheme will consist of:

- Discussion of existing baseline conditions;
- Production of constraints maps;
- Qualitative assessment of the likely effect on local air quality during construction;
- Quantitative assessment of the likely effect on local air quality from change in traffic during construction, if suitable information is available;
- Assessment of the likely changes in local air pollutant concentrations and nitrogen deposition rates during operation at a number of receptors;
- Assessment of the likely changes in regional emissions during operation; and
- Vulnerability to major accidents and disasters.

5.7.2. The Transport Analysis Guidance (TAG) assessment will be reported separately. Quantitative outputs for reporting within the Appraisal Summary Table will be generated where provision of suitable traffic data allows. The TAG assessment of regional pollutant emissions will use the local air quality study area, in line with the latest guidance from WebTAG.

Existing Air Quality Information

5.7.3. A summary of existing air quality will be provided based on information collated for the Scoping Report, supplemented with any further data available since that stage.

Additional Constraints Maps

5.7.4. A constraints map for the Scheme air quality study area will be produced, updating the information provided for this Scoping Report. The constraints maps will include: affected roads, 200 m boundary from affected roads, sensitive receptors, AQMA boundaries, designated ecological site boundaries, and exceedance areas of air quality criteria without and with the Scheme where known.

Construction Impacts

5.7.5. A qualitative assessment of impacts on air quality from construction will be undertaken in accordance with the DMRB. The assessment will take into account the nature of any proposed construction activities that have the potential to generate dust and the location of sensitive receptors within 200 m of the Scheme construction works that could be at risk of being affected. Quantitative assessment of vehicle emissions during construction will be undertaken should sufficient information on traffic management measures, construction vehicle numbers and total traffic flows, composition and speeds be available.

Operational Impacts

- 5.7.6. The air quality assessment will be undertaken principally following the guidance given in the DMRB and associated IANs. The air quality assessment will use detailed dispersion modelling software to calculate potential impacts on NO₂ and PM₁₀ concentrations at selected human health receptors, and NO_x concentrations at designated ecological sites in the Scheme opening year. A simple level of assessment will be undertaken for regional emissions of NO_x, PM₁₀ and CO₂ for the opening and design years.
- 5.7.7. The key scenarios for assessment are:
- Base year for model verification purposes (2015);
 - Projected base year (2022);
 - Opening year for both the without (Do-Minimum (DM)) and with Scheme (Do-Something (DS)) (2022); and
 - Design year DM and DS (2037) - regional emissions only.
- 5.7.8. Traffic data will be provided for the Preliminary Design Stage EAR air quality assessment, which will enable the ARN for the Scheme to be determined. Traffic data will be provided from the strategic SATURN traffic model provided by Atkins transport planners.
- 5.7.9. The ARN for the Scheme will be determined for the local air quality assessment and regional assessments. An affected road for the purposes of a local air quality assessment is defined in DMRB HA 207/07 (Para 3.12) as a road that meets any of the following criteria:
- Road alignment will change by 5 m or more; or
 - Daily traffic flows (two way) will change by 1,000 annual average daily traffic (AADT) or more; or
 - Heavy Duty Vehicle (HDV) flows (two way) will change by 200 AADT or more; or
 - Daily average speed (two way) will change by 10 km/hr or more; or
 - Peak hour speed will change by 20 km/hr or more.
- 5.7.10. An affected road for the purposes of a regional air quality assessment is defined in DMRB HA 207/07 (Para 3.20) as a road that meets any of the following criteria:
- A change of more than 10% AADT; or
 - A change of more than 10% to the number of HDVs; or
 - A change in daily average speed of more than 20 km/hr.
- 5.7.11. The changes are applied to roads, rather than links, and so where relevant are determined under two-way traffic conditions.

Local Air Quality

- 5.7.12. The local air quality assessment will be undertaken using the dispersion model *Atmospheric Dispersion Modelling System (ADMS) Roads* software. Representative receptors will be selected for the local air quality assessment and

will include those closest to the ARN. The traffic data required for input into the dispersion model will include: AADT, the percentage of HDV and speeds which will be input as a speed category, as determined in accordance with IAN 185/15 on speed banding.

- 5.7.13. The output from the model will provide estimates of the contribution from road traffic emissions to annual mean concentrations of NO_x and PM₁₀ at discrete receptors. These concentrations will be combined with estimates of background concentrations, to account for other sources of air pollution, to derive total annual mean concentrations. Background concentrations are expected to be derived from Defra's background maps, but these will be checked with monitored data at background sites in the area where available, to ensure the mapped estimated are appropriate.
- 5.7.14. Concentrations of NO₂ will be derived from NO_x concentrations using the most up to date version of Defra's NO_x to NO₂ calculator. The annual mean NO₂ and PM₁₀ concentrations will be verified where possible with comparison against available ratified monitoring data and adjusted where appropriate, with reference to Defra's LAQM.TG(16).
- 5.7.15. In addition, an assessment will be undertaken in accordance with IAN 170/12 v3 on the assessment of future NO_x and NO₂ projections on long term trends, to account for future year uncertainties in emissions.
- 5.7.16. Evaluation of compliance with EU limit values will be undertaken in accordance with IAN 175/13.
- 5.7.17. Assessment of potential effects on NO_x concentrations and nitrogen deposition rates will also be undertaken at identified sensitive ecological designations, in accordance with Annex F of the DMRB HA 207/07. The results will be interpreted by the Project Ecologist.
- 5.7.18. Evaluation of the significance of the effect of the Scheme on local air quality will be undertaken in accordance with IAN 174/13.

Regional Emissions

- 5.7.19. An assessment of regional emissions of NO_x, PM₁₀ and CO₂ will be undertaken in accordance with DMRB HA 207/07 to determine the annual pollutant emissions for the ARN. Emissions calculations will be undertaken using emission rates derived from IAN 185/15 on speed banding. The key scenarios for assessment are:
 - Base year (2015);
 - Opening year (2022), for both the without (DM) and with Scheme (DS) cases; and
 - Design year (2037), for both the DM and DS cases.

Vulnerability to major accidents and disasters

- 5.7.20. Major accidents and disasters which could potentially affect air quality receptors include: events which could affect traffic in the area such as major road traffic accidents, terrorist attacks or plane/rail crashes; and other events such as fires or chemical explosions or releases which emit air pollutants. The potential for change in significance on air quality receptors will be discussed as part of the air quality assessment. However, it should be noted that in relation to the main air

quality metric of concern in England (annual mean AQS objective for nitrogen dioxide) any effect would be temporary and considered unlikely to significantly affect local air quality findings in the context of the determination of significance using IAN 174/13. There is the potential for a more noticeable impact on shorter term air quality metrics (such as the maximum 1-hour mean AQS objective for nitrogen dioxide of 200 µg/m³), where this can be assessed reliably with the Scheme data available, and where the annual mean results suggest the shorter term metrics are of potential concern. Again the impact of accidents and disasters on this metric will depend on the duration of the event (18 exceedances per year are permissible).

5.8. Proposed consultation

- 5.8.1. Consultation with local authorities will be undertaken to obtain relevant air quality monitoring data, supplementary to that presented in this scoping report, and to ensure relevant receptors are included in the assessment.
- 5.8.2. Consultation with Natural England will also be undertaken by the Project Ecologist to discuss the approach to assessing impacts on designated sites.

5.9. Potential mitigation measures

Construction

- 5.9.1. Mitigation measures to control dust emissions during construction would be specified within contract documentation and incorporated in a Construction Environmental Management Plan (CEMP). The precise measures would depend on the intended construction methods and the potential degree of dust generation at each site. Such measures may include but not necessarily be limited to:
 - Regular water-spraying and sweeping of unpaved and paved roads to minimise dust and remove mud and debris;
 - Using wheel washes, shaker bars or rotating bristles for vehicles leaving the site where appropriate to minimise the amount of mud and debris deposited on the roads;
 - Sheeting vehicles carrying dusty materials to prevent materials being blown from the vehicles whilst travelling;
 - Enforcing speed limits for vehicles on unmade surfaces to minimise dust entrainment and dispersion;
 - Ensuring any temporary site roads are no wider than necessary to minimise their surface area;
 - Damping down of surfaces prior to their being worked; and
 - Storing dusty materials away from site boundaries and in appropriate containment (e.g. sheeting, sacks, barrels etc.).

Operation

- 5.9.2. The Option Selection Stage assessment indicated that there are not expected to be any significant adverse effects with the Scheme for the human health receptors. This will be confirmed at this Preliminary Design Stage. Hence

mitigation measures for human health receptors are not thought to be necessary at this stage. However, it is likely that there could be potentially significant adverse effects on the designated ecological sites in the study area due to the Scheme. Further assessment work is required at this stage to investigate this and, if necessary, examine mitigation options.

5.10. Assumptions and limitations

- 5.10.1. Any air quality model has inherent areas of uncertainty, including:
- The traffic data used in the air quality model;
 - The suitability of emissions data;
 - Simplifications in model algorithms and empirical relationships that are used to simulate complex physical and chemical processes in the atmosphere;
 - The suitability of background concentrations; and
 - The suitability of meteorological data.
- 5.10.2. Uncertainty associated with traffic data for this Preliminary Design Stage will be minimised by using a validated traffic model.
- 5.10.3. Uncertainties associated with emissions data will be minimised by using the most up to date speed-band emission factors available and by applying IAN 170/12 v3 for long term trends.
- 5.10.4. Uncertainties associated with model algorithms and empirical relationships will be minimised by using algorithms and relationships that have been independently validated and judged as fit for purpose.
- 5.10.5. Another uncertainty is with using historical meteorological data to estimate future concentrations. The key limiting assumption is that conditions in the future will be the same as in the past; however, in reality no two years are the same. In line with best practice, the base year meteorology (as used in the model verification and adjustment process) will be used in future year modelling to allow any adjustments to be applied in future cases.

5.11. Conclusion

- 5.11.1. An air quality scoping assessment has been undertaken for the Scheme. A review of baseline conditions has indicated that there are three AQMAs within the air quality study area which are likely to be affected by the Scheme. These AQMAs are located on Cobham High Street and in Esher within the EBC administrative area, and on the M25 corridor within RBC administrative area. Air quality monitoring data within the air quality study area has shown that the annual mean NO₂ AQS objective was exceeded in recent years at roadside and kerbside sites along the M25 and A3 corridors, adjacent to Junction 10, as well as within the Cobham and Esher AQMAs. Concentrations at background sites however were found to be below relevant AQS objectives in the study area. There were no PCM links in the study area which were shown to exceed the EU limit value in 2015.
- 5.11.2. During construction, there is the potential for increased emissions of dust, however, with the application of appropriate mitigation significant adverse effects

at nearby receptors would be unlikely. Additional traffic during construction could potentially affect air quality at receptors so cannot be ruled out. During operation, changes in traffic and road alignment have the potential to affect both human health and ecological receptors.

Table 5-8: Air quality topics scoped in and out of further assessment

Effects	Scoped in/out	Comment/Justification
Construction Dust	✓	Receptors within 200 m of potential dust raising activities.
Construction Traffic	✓	Numbers of additional construction vehicles not yet known so cannot rule out.
Operational Traffic	✓	Option Selection Stage assessment showed that local air quality at receptors within 200 m of the Scheme could be affected by changes in traffic.

6. Noise and Vibration

6.1. Introduction

- 6.1.1. This chapter identifies the study area for noise and vibration, and presents the baseline conditions therein. It identifies the potential noise and vibration impacts associated with the Scheme during construction and operation, and discusses mitigation measures that may be applied to mitigate any potentially significant adverse effects.
- 6.1.2. The chapter presents the proposed scope and methodology for the EIA. The noise and vibration assessment will identify the likely potential noise and vibration effects due to the Scheme during construction and operation.

6.2. Study area

- 6.2.1. The study area for the assessment of noise and vibration effects is defined in the DMRB Volume 11, Section 3, Part 7 HD 213/11 Noise and Vibration as 600 m from the carriageway edge of any proposed new routes or existing routes to be bypassed or improved, and 600 m from any other affected routes within 1 km of the proposed new routes or altered existing routes. An affected route is defined as where it is calculated that there is a possibility of a change of 1dB $L_{A10,18h}$ in the short term or 3dB $L_{A10,18h}$ in the long term (assessed between the opening year and the future year).
- 6.2.2. The DMRB 11:3:7 provides the following methodology for identifying the size and extents of the study area:
1. Identify the start and end points of the physical works associated with the road project;
 2. Identify the existing routes that are being bypassed or improved and any proposed new routes between the start and end points (for each option);
 3. Define a boundary 1 km from the carriageway edge of each of the options identified in (2) above;
 4. Define a boundary 600 m from the carriageway edge around each of the options identified in (2) above and also 600 m from any other affected routes within the boundary defined in (3) above. The total area within these 600 m boundaries is termed the 'calculation area';
 5. Identify any affected routes beyond the boundary defined in (3) above; and
 6. Define a boundary 50 m from the carriageway edge of routes identified in (5) above.
- 6.2.3. Based on the above, the detailed noise calculation area (within 600 m of any affected route that is within 1 km of the Scheme) has been determined.
- 6.2.4. Determination of the affected routes, and consequently the study area, may be constrained by the geographical extent, and area of validity, of the traffic modelling made available for the Scheme appraisal. The study area for the noise impact assessment will be determined, once the strategic traffic model has been finalised.

6.3. Planning and policy context

- 6.3.1. Current noise policy in England is based on the Noise Policy Statement for England (NPSE)¹⁰, which through the effective management and control of environmental noise within the context of Government policy on sustainable development, aims to:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise other adverse impacts on health and quality of life; and
 - contribute to improvements to health and quality of life, where possible.
- 6.3.2. These aims are reflective of those contained in the National Planning Policy Framework (NPPF) and are further echoed in the National Policy Statement for National Networks (NPSNN)¹¹ and Planning Practice Guidance concerning noise¹²
- 6.3.3. The Explanatory Note to the NPSE assists in the definition of significant adverse and adverse with the following concepts:
- NOEL - no observed effect level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
 - LOAEL - lowest observed adverse effect level. This is the level above which adverse effects on health and quality of life can be detected; and
 - SOAEL - significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur.
- 6.3.4. In March 2014, the Department for Communities and Local Government (DCLG) released its *Planning Practice Guidance* (PPG) web-based resource to support the *NPPF*.
- 6.3.5. This guidance introduced the concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). NOAEL differs from NOEL in that it represents a situation where the acoustic character of an area can be slightly affected (but not such that there is a perceived change in the quality of life). UAEL represents a situation where noise is 'noticeable', 'very disruptive' and should be 'prevented' (as opposed to SOAEL, which represents a situation where noise is 'noticeable' and 'disruptive', and should be 'avoided').
- 6.3.6. The Government policy and guidance do not state values for the NOEL, LOAEL and SOAEL, rather, it considers that they are different for different noise sources, for different receptors and at different times and should be defined on a strategic or project basis taking into account the specific features of that area, source or project.
- 6.3.7. In line with this, the Department for Transport "Road Investment Strategy for the 2015/16 - 2019/20 Road Period", aspires to the target that by 2040 over 90% fewer people are impacted by noise from the strategic road network. The target for the first Road Period 2015-2020, is to mitigate at least 1,150 noise Important

¹⁰ Defra (2010). Noise policy statement for England (NPSE)

¹¹ Department for Transport (Dec 2014). National Policy Statement for National Networks

¹² Department for Communities and Local Government, Planning Practice Guidance (<http://planningguidance.planningportal.gov.uk/>)

Areas expecting to reduce the number of people severely affected by noise from the strategic road network by at least 250,000.

6.3.8. The legislation and policies considered in undertaking this noise assessment are detailed in Table 6-1 and Table 6-2 for construction and operation respectively.

Table 6-1: Regulatory and policy framework for construction noise and vibration

Regulation/policy	Summary of requirements
NPSE NPPF Planning Practice Guidance Noise to NPPF (PPGN) National Policy Statement for National Networks (NPSNN)	Within the context of Government policy on sustainable development: <ul style="list-style-type: none"> • Avoid significant adverse effects as a result of the Scheme. • Mitigate and minimise adverse effects as a result of the Scheme. • Contribute to the enhancement of the acoustic environment.
Control of Pollution Act 1974 (as amended)	Section 60 - Control of noise on construction sites. Section 61 - Prior consent for work on construction sites. Section 71 - Codes of practice for minimising noise. Section 72 - Best practicable means.
Environmental Protection Act 1990 (as amended)	Section 79 (1) (ga) noise that is prejudicial to health or a nuisance and is emitted from or caused by a vehicle, machinery or equipment in a street is a statutory nuisance; (NB if so should be inspected by the local authority) (9) interpretation of “best practicable means”
The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015	Approves BS 5228:2009+A1:2014 Part 1 Noise and Part 2 Vibration for the purpose of giving guidance on appropriate methods for minimising noise and vibration.
Noise Insulation Regulations 1975 (as amended)	Regulation 5 provides relevant authorities with discretionary powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings with respect to construction noise. This is subject to meeting certain criteria given in the Regulation.

Table 6-2: Regulatory and policy framework for operational noise and vibration

Regulation/policy	Summary of requirements
Environmental Noise (England) Regulations 2006	Take into account Noise Action Plans.
NPSE NPPF PPGN NPSNN	Within the context of Government policy on sustainable development: <ul style="list-style-type: none"> • Avoid significant adverse effects as a result of the Scheme. • Mitigate and minimise adverse effects as a result of the Scheme. • Contribute to the enhancement of the acoustic environment.
Land Compensation Act 1973	Part I Compensation for depreciation caused by use of public works.
Noise Insulation Regulations 1975 (as amended)	Regulation 3 imposes a duty on authorities to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings. This is subject to meeting certain criteria given in the Regulation. Regulation 4 provides authorities with discretionary

Regulation/policy	Summary of requirements
	powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings, subject to meeting certain criteria given in the Regulation.
The Highways Noise Payments and Movable Homes (England) Regulations 2000	Provide highway authorities with a discretionary power to provide a noise payment where new roads are to be constructed or existing ones altered. The relevant Regulations set out the criteria which should be applied in assessing eligibility for making such payments.

6.4. Baseline conditions

6.4.1. Information regarding the existing ambient noise climate i.e. baseline conditions, and identification of potential noise impact constraints to the Scheme has been determined through reference to the following sources:

- Ordnance Survey base mapping to identify locations of residential and non-residential noise sensitive receptors (residential properties, schools, hospitals and elderly care homes);
- Natural England’s MAGIC website¹³ to identify boundaries of designated ecological sites that may be considered as sensitive to noise;
- Extrium Noise Map Viewer showing Defra Noise Important Area (NIA) mapping¹⁴; and
- Extrium Noise Map Viewer showing Defra Strategic Noise Mapping for Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended) (2015)¹⁵.

Noise Sensitive Receptors

6.4.2. The M25 Junction 10/A3 Wisley Interchange is located between the urban areas of Ockham and Cobham in Surrey. The land use within 600 m of the Scheme consists mostly of green space, including Chatley Wood, Ockham Common and Wisley Common. The majority of the noise sensitive receptors are located close to the Painshill Interchange to the north-east of the study area.

6.4.3. The closest buildings to the M25 Junction 10/A3 Wisley Interchange are in proximity to the Painshill Interchange and include Pains Hill Bungalow (45 m), Pains Hill (50 m), and Feltonfleet School (50 m). There is a mixed use development between the A3 and A245 within 300 m of the Painshill Interchange, and further residential buildings located at Seven Hills Road, approximately 430 m from the Painshill Interchange. The land south-west of the Painshill Interchange towards the M25 and beyond, is sparsely populated with few noise sensitive receptors located within 600 m of the Scheme in this area.

6.4.4. A number of other notable noise sensitive receptors have been identified within 600 m of the M25, A3, and A245 Byfleet Road, including: Feltonfleet School, St George’s Nursing Home, Hilton Hotel, Notre Dame Senior School, Notre Dame Preparatory School, Cobham Free School, Painshill Fire Station, Silvermere Equestrian Centre’s Riding School, Elm Corner and RHS Gardens at Wisley.

¹³ <http://magic.defra.gov.uk/>

¹⁴ <http://extrium.co.uk/noiseviewer.html#>

¹⁵ <http://extrium.co.uk/noiseviewer.html#>

- 6.4.5. In addition to the existing noise sensitive receptors located close to the Scheme, it is understood that there are proposals to develop the land occupied by the former Wisley Airfield into residential housing. The planning application for the development was rejected on several grounds in April 2016, a decision which is currently being appealed by the developer. If the appeal is successful and the planning application is approved, the development will include some mitigation as part of its design. The proposed Wisley Airfield development will be included in the traffic model and hence will be within the appraisal of the Scheme.
- 6.4.6. Ecological receptors are also present in proximity to the Scheme. In particular, there are three species of bird, nightjar, woodlark and Dartford warbler, inhabiting the Thames Basin Heath Special Protection Area (SPA) that could be adversely affected by changes to noise levels caused by the Scheme. The SPA partially falls within the Scheme, directly adjacent to the south-east and south-west of M25 Junction 10. The location of the SPA is shown in the Chapter 19 Environmental Constraints Map. More details about the ecological receptors can be found in the Chapter 7, Biodiversity. The locations of the nearest noise sensitive receptors to the Scheme are shown in Figure B.1 and Figure B.2 in Appendix B.

Noise Climate

- 6.4.7. It is expected that road traffic noise from the M25 and the A3 are the main noise sources influencing noise levels in the study area. There is potential for aircraft noise to contribute to the noise climate as the study area is positioned between Heathrow and Gatwick airports. There are no railways or heavy industrial noise sources within 1 km of the Scheme.
- 6.4.8. A noise survey will be undertaken at Preliminary Design Stage to ascertain the baseline noise levels at noise sensitive receptors within the study area of the Scheme. The final design of the Scheme will be used to further inform the production of the Preliminary Design Stage noise model.
- 6.4.9. The measured noise levels obtained during the baseline noise survey will be supplemented with information from publicly available online mapping sources. Strategic noise maps were published during 2015 by Defra for both major road and railways sources to meet the requirements of the Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended). The strategic noise maps for road traffic noise during the daytime (07:00-23:00) and night-time (23:00-07:00) periods are shown in Appendix B Figure B.3 and Figure B.4.
- 6.4.10. The 'Important Areas' for noise (NIAs) were identified to highlight any particular constraints for the Scheme. NIAs are the locations where 1% of the population most affected by the highest noise levels from major roads and railways are located according to the strategic noise mapping undertaken by Defra. The summary of the NIAs are as follows:

Table 6-3: Location and distances of NIAs from the Scheme

NIA ID	Location	Source of noise	Distance in metres	Comment
5859	Pointers Road, Cobham	Road	150	Adjacent to M25
5858	Horsley Road, Cobham	Road	1615	Adjacent to M25

NIA ID	Location	Source of noise	Distance in metres	Comment
5868	Sanway Road, West Byfleet	Road	750	Adjacent to M25
1285	Glen Court, West Byfleet	Road	2260	Adjacent to M25
1015	Parvis Road, West Byfleet	Road	2450	Adjacent to A245
1281	Parvis Road, Byfleet	Road	2150	Adjacent to A245
1008	Byfleet Road, Cobham	Road	1620	Adjacent to A245
1009	Byfleet Road, Cobham	Road	1400	Adjacent to A245
5866	Byfleet Road, Cobham	Road	765	Adjacent to A245
5867	Byfleet Road, Cobham	Road	1100	Adjacent to A245
1004	Byfleet Road, Cobham	Road	65	Adjacent to A245
5864	Portsmouth Road, Cobham	Road	400	Adjacent to A245
13498	High Street, Cobham	Road	1200	Adjacent to A245
5861	Portsmouth Road, Cobham	Road	29	Adjacent to A3
5865	Portsmouth Road, Cobham	Road	7 to 21	Adjacent to A3 and A245
5863	Mossfield, Cobham	Road	730	Adjacent to A3
5862	Near Old Common Road, Cobham	Road	1380	Adjacent to A3
13499	Portsmouth Road, Cobham	Road	2660	Adjacent to A3/Portsmouth Road

6.4.11. The locations of the NIAs in proximity to the Scheme are shown in the Environmental Constraints Map in Chapter 19, and are also shown in Appendix B Figure B.1 and Figure B.2.

6.5. Potential impacts

6.5.1. The Scheme has the potential to affect the local noise climate, both during construction and once in operation, in the following ways:

- There could be a temporary increase in noise levels during construction of the Scheme from activities on site;
- The noise climate could be affected by changes in traffic flows during construction, as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour;
- Once operational, the noise climate could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition) as a result of the Scheme; and
- Operationally, the noise levels could also be affected by any changes to the distance between the carriageways and noise sensitive receptors, caused by changes to the horizontal and vertical alignment of the roads.

Construction

- 6.5.2. Demolition and construction activities can give rise to increases in local noise levels, if not effectively managed. Construction of the Scheme has the potential to affect nearby receptors either due to noise from demolition and construction activities themselves, or from additional construction associated HGVs onto the local road network. Implementation of best practice mitigation measures will generally minimise increases in noise and any short term adverse effects.
- 6.5.3. In addition, the local highway network may experience changes in traffic flows and speeds during construction as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour. It should be noted however that any effects on the noise climate would be short term and temporary (i.e. during the period of construction works only).

Operation

- 6.5.4. Once the Scheme is operational, the noise climate could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition). Additionally, noise levels at nearby receptors could also be affected by any changes to the distance between carriageways and noise sensitive receptors, as a result of changes to the horizontal and vertical road alignment for the operational Scheme.

6.6. Proposed level and scope of assessment

- 6.6.1. Traffic data is to be made available for noise assessment at this Preliminary Design Stage will be based upon the South East regional strategic traffic model (SERTM).
- 6.6.2. The potential for noise impact on nearby residential and non-residential noise sensitive receptors is scoped in for appraisal at this stage.
- 6.6.3. Assessment at this stage will be undertaken broadly in line with a “detailed” level of appraisal as defined within DMRB HD 213/11.

Table 6-4: Noise and vibration topics scoped in and out of further assessment

Effects	Scoped in/out	Comment/Justification
Construction	✓	Information regarding construction methodologies, plant itineraries, activity schedules, activity locations, and construction traffic etc. is expected to become available at this Preliminary Design Stage for the Scheme and this information will be appraised accordingly.
Operational traffic	✓	Simple noise modelling undertaken during the Option Selection Stage identified the requirement for the project to proceed to a “detailed” DMRB assessment during Preliminary Design Stage to confirm the level of impact for the Scheme. The detailed noise modelling will incorporate new traffic data obtained from a strategic traffic model and any new mitigation measures incorporated into the design. A further assessment of the impact significance is also required based on the Preliminary Design Stage results, particularly at locations where the baseline noise levels already exceed the significant adverse effect level.

6.7. Proposed assessment methodology

- 6.7.1. Baseline noise surveys will be undertaken at a number of noise sensitive receptors within the study area to establish the current noise climate. This will include monitoring positions at Painshill, where the majority of residential buildings in the project area are located, as well as sparsely populated locations between Junction 10 and Ockham. The locations for baseline noise monitoring will be confirmed once suitable and accessible sites have been identified.
- 6.7.2. Noise modelling will be undertaken for the baseline conditions and for the Scheme, to permit an assessment in line with a “detailed” level of assessment as defined within the DMRB, which consists of the following elements:
- Prediction of daytime ($L_{A10,18h}$) noise levels in the short-term (Scheme opening) and the long-term (future assessment year);
 - Prediction of night-time noise levels in the long-term;
 - Noise contour plots showing the predicted changes in noise level throughout the study area;
 - Assessment of noise levels at traffic links located in the wider area; and
 - Assessment of traffic nuisance impacts.
- 6.7.3. Ordnance Survey base mapping and Addressbase data will be used to establish the relevant noise sensitive receptors within the appropriate calculation area. This will include residential noise sensitive receptors and non-residential noise sensitive receptors, such as schools, hospitals and places of worship. Prediction points will also be included in the noise modelling to determine how the Scheme will change noise levels with the Thames Basin Heath SPA. The impacts at the Thames Basin Heath SPA will be discussed in more detail in Chapter 7 Biodiversity.
- 6.7.4. The results of this quantitative assessment would then be used to inform the completion of WebTAG worksheets (including calculation of net present value for noise) and Appraisal Summary Tables, and would be reported in accordance with TAG Unit A3 Environmental Impact Appraisal, Chapter 2 Noise Impacts. The Transport Analysis Guidance (TAG) assessment will be reported separately, and quantitative outputs for reporting within the Appraisal Summary Table will be generated where provision of suitable traffic data allows.
- 6.7.5. In terms of road traffic noise, a recognised formal methodology has not yet been developed to establish impact significance. This is recognised in the DMRB 11:3:7 HD 213/11 and an alternate approach is stated:
- 6.7.6. *“In terms of road traffic noise, a methodology has not yet been developed to assign a significance according to both the value of a resource and the magnitude of an impact. However, the magnitude of traffic noise impact from a road project should be classified into levels of impact in order to assist with the interpretation of the road project. Therefore, for the assessment of traffic noise that is covered by this document, a classification is provided for the magnitude of impact.”*
- 6.7.7. In absence of a formal methodology for establishing impact significance, the magnitude of the impact will be reported in accordance with the DMRB, detailing the number of noise sensitive receptors predicted to experience given changes

in noise levels in both the short-term, and long-term periods. The sensitivity of all noise sensitive receptors in the study area will be set out in the ES.

- 6.7.8. Furthermore, the absolute noise levels predicted at noise sensitive receptors in the opening year and future assessment year of the Scheme will be compared with the SOAEL and the LOAEL. The thresholds assigned to the LOAEL and the SOAEL will be set based upon prevailing guidance for environmental noise assessments and noise thresholds associated impacts to human health, including the WHO Community Noise Guidelines, the Department for Transport (DfT) Transport Analysis Guidance (TAG), the Noise Insulation Regulations (NIR) and other appropriate guidance. The assessment of absolute noise levels will establish the following:
- Locations where the LOAEL is exceeded;
 - Locations where the existing road traffic noise levels are below the SOAEL and are predicted to exceed the SOAEL as a result of the Scheme; and
 - Locations where existing road traffic noise levels are above the SOAEL and are increased by at least 1dB $L_{A10,18h}$ due to the Scheme.
- 6.7.9. Potential locations requiring noise mitigation based on the findings of the Option Selection Stage assessment will be reviewed at an early stage in this Preliminary Design Stage to allow mitigation measures to be incorporated in the design of the Scheme. Noise mitigation may be required under the following conditions:
- Noise sensitive receptors which are predicted noise increases as a result of the Scheme;
 - To mitigate noise levels in areas with existing high noise levels, such as NIAs, which is a stated objective of the overarching RIS scheme programme, and
 - To avoid adverse effects at ecologically sensitive areas.
- 6.7.10. Detailed noise modelling will be undertaken with potential noise mitigation in place at this stage, based on traffic projections from appropriate strategic traffic modelling to permit the degree of accuracy as would be required for such detailed mitigation design. This will include any existing noise mitigation measures that will be retained or replaced by the Scheme. The proposed mitigation measures will be reviewed based on the results of the detailed noise modelling.

Vulnerability to major accidents and disasters

- 6.7.11. Man-made incidents requiring the closure of roads within the project area, such as terrorist incidents, plane crashes or road traffic incidents, will cause a reduction of noise levels at properties most influenced by noise from the closed road sections. However, these properties may be subject to noise temporarily from clean-up or repair and rebuilding works. Noise from alternate routes used during the road closure will increase noise levels from these routes during free-flow conditions or cause congestion, leading to lower noise levels. These impacts will last as long as the road closure and/or redirections are in place. Natural events causing road closures and the use of alternate routes, such as flooding or diseases (such as Foot and Mouth) will affect noise in the same way.

- 6.7.12. Road surfaces and noise barriers can be damaged from extreme heat, chemical spills, and seismic events/landslips, and this will affect their acoustic performance. This can lead to higher noise levels, especially if the damage has caused surface irregularities that can increase noise and vibration. Resurfacing the affected section of road would reverse the damage.
- 6.7.13. Noise barriers have the potential to be damaged during severe storms, pest infestations (e.g. rats, woodworm spring, etc.), road traffic accidents, malicious damage, and chemical spills, which will lead to degraded performance. This will cause a temporary noise increase until remedial works have been undertaken.
- 6.7.14. Weather conditions can affect sound propagation and it is possible that extreme conditions or temperature inversions will enable sound from the Scheme to be audible over greater distances.

6.8. Proposed consultation

- 6.8.1. The Local Authority will be contacted with regards to the Scheme in order to discuss the assessment approach, identify areas with existing noise and vibration concerns, and to establish the presence of any further noise sensitive receptors that should be included in the assessment from other proposed or committed developments.

6.9. Potential mitigation measures

- 6.9.1. There are two types of noise mitigation measures that can be used to reduce road traffic noise at noise sensitive receptors, which are:
- Low noise road surfacing; and
 - Noise barriers or earth bunds.
- 6.9.2. It is understood that all new or modified roads proposed by the Scheme will be resurfaced with a low noise road surface. According to the DMRB, usage of a low noise road surface can reduce road traffic noise levels by up to 3.5dB LA_{10,18h}. However, the M25 is a significant contributor to road traffic noise levels in the project area, so the full reduction of noise from low noise surfacing may not be fully realised in some areas unless the M25 is also resurfaced.
- 6.9.3. There are existing noise barriers located close to Junction 10. It is likely that these will be replaced as part of the Scheme to accommodate the new junction layout. Use of further noise barriers will be considered based on the outcomes of the detailed noise modelling. This includes the possible requirement for noise barriers to reduce road traffic noise levels at the SPA for ecological receptors.

6.10. Assumptions and limitations

- 6.10.1. The findings of the Preliminary Design Stage assessment will be based on the following assumptions:
- The noise levels measured during the baseline noise surveys are representative of typical conditions. Any measurement periods known to represent atypical conditions will be excluded from the results;
 - The location of all (human) noise sensitive receptors within the study area can be identified in OS Addressbase, and further informed through consultation with the local authorities;

- Baseline noise monitoring will be undertaken. The monitoring will be undertaken over a number of days to mitigate variations in weather conditions;
- All new or modified roads proposed by the Scheme will be resurfaced with a low noise road surface on Scheme opening. By the future assessment year, the A3 and all new road links will be resurfaced with a low noise road surface, undertaken during routine maintenance works; and
- Information is available regarding the existing noise barriers at the M25 Junction 10, or elsewhere in the study area. If no information is available, suitable assumptions will be made based on Google Streetview images and site visits.

6.10.2. The results from the detailed noise modelling will be affected by limitations of the input data sources. Crucially, the results from the detailed noise modelling will be influenced by information the assumptions used to derive traffic flow, speed, and fleet composition data from the strategic traffic model for the Scheme.

6.10.3. Similarly, the resolution of the ground topography data imported into the road traffic noise model will influence the results as it affects sound propagation. For example, datasets with a 10 m resolution will not take into account small variations in ground level that might be accounted for in datasets with smaller interval spacing.

6.10.4. The construction noise and vibration assessment will be limited by the availability and quality of information provided by the construction contractor. In the absence of detailed enough information for the BS5228 assessment, suitable assumptions will be made based in order to complete the assessment. All assumptions will be clearly stated in the ES.

6.11. Conclusion

6.11.1. In order to meet the requirements for a Preliminary Design Stage noise and vibration assessment, baseline noise surveys will be undertaken at several locations within the study area to establish the prevailing noise climate. A construction noise and vibration assessment, using the BS 5228 methodology, will be completed to identify any impacts arising from the construction phase.

6.11.2. “Simple” noise modelling undertaken during the Option Selection Stage identified the requirement for the project to proceed to a “detailed” DMRB assessment during the Preliminary Design Stage to confirm the level of noise impact for the preferred option during the operation phase. The detailed noise modelling will incorporate new traffic data obtained from a strategic traffic model and any new mitigation measures incorporated into the design.

6.11.3. The results from the detailed noise modelling will be assessed against the impact magnitude thresholds stated in the DMRB, and significance criteria for impacts to human health. Existing noise mitigation measures incorporated into the Scheme design and the need for additional mitigation measures will be reviewed based on these results.

7. Biodiversity

7.1. Introduction

7.1.1. This chapter summarises the baseline ecological data collected for the Scheme to date (between February 2016 and August 2017), outlines the additional ecological surveys to be carried out during this Preliminary Design Stage and also presents the methodology for assessment during this stage.

7.2. Study area

7.2.1. The study area defines the area that will be used to assess the impacts and potential effects of the Scheme on nature conservation features. The study area was defined by determining an Ecological Zone of Influence (EZoI) encompassing all of the predicted adverse ecological effects of the Scheme, including those that would occur as a result of habitat loss, and those that would occur through disturbance, such as noise. The extent of the EZoI was defined during the Option Selection Stage assessment, and is set out in the Option Selection Stage Scoping Report and EAR, for the options proposed at that stage.

7.2.2. For this Preliminary Design Stage, the study area will be revised to take into account the Scheme design, as described in section 2.4 of this report. The revised EZoI will be based on the proposed extent of the Scheme, with assumptions made of the potential construction and operation effects based on available information (using a worst-case scenario to ensure all effects have been incorporated).

7.2.3. The following desk study search areas (from the Scheme footprint) were selected based on current best practice guidance:

- Two kilometres for statutory designated sites of nature conservation importance: Special Areas of Conservation (SACs)¹⁶, SPAs¹⁷, Ramsar sites¹⁸, SSSIs, National Nature Reserves (NNRs) and LNR;
- Two kilometres for non-statutory Sites of Nature Conservation Interest (SNCIs);
- Thirty kilometres for SACs where bats are one of the qualifying species¹⁹;
- Two kilometres for conservation verges;
- One kilometre for notable habitats and notable or legally protected species²⁰;
- Ten kilometres for bats²¹;
- One kilometre for ancient woodlands; and

¹⁶ Including candidate SACs (cSACs)

¹⁷ Including proposed SPAs (pSPAs)

¹⁸ Including proposed Ramsar sites (pRamsars)

¹⁹ DMRB guidance on the Assessment of Implications on European Sites recommends this wide search area due to the mobility of bats

²⁰ Records of bats are for 10 km squares, so observations may not have occurred within 1 km of the Scheme

²¹ For larger projects, a search distance of up to 10 km for bats is recommended (Collins, J (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust. London).

- 50 m for veteran trees²².

7.3. Planning and policy context

7.3.1. This stage will consider the following planning policies:

National Policy Statement for National Networks 2014

- 7.3.2. The National Policy Statement of National Networks (NPSNN) sets out the government policies for nationally significant infrastructure rail and road projects for England. Within Chapter 5 of the NPSNN is a section on 'Biodiversity and ecological conservation'.
- 7.3.3. The relevant paragraphs within the Biodiversity and ecological conservation section are summarised below:
- 7.3.4. The most important sites for biodiversity are those identified through international conventions and European Directives.
- 7.3.5. Where a proposed development is likely to have a significant impact on a Site of Special Scientific Interest (SSSI), development consent should not normally be granted. Where an adverse effect on a site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the wider network of SSSIs. The Secretary of State should ensure that the applicant's proposals to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest, are acceptable.
- 7.3.6. Sites of regional and local biodiversity have a fundamental role to play in meeting overall national biodiversity targets, in contributing to the quality of life and the well-being of the community, and in supporting research and education. The Secretary of State should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent.
- 7.3.7. Ancient woodland once lost cannot be recreated. The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.
- 7.3.8. When considering proposals, the Secretary of State should consider whether the applicant has maximised opportunities for building in beneficial biodiversity features in and around other developments.
- 7.3.9. The Secretary of State should ensure that applicants have taken measures to ensure that statutory protected species, and species and habitats identified as being of principle importance for the conservation of biodiversity in England, are protected from adverse effects of development. The Secretary of State should refuse consent where harm to the habitats or species and their habitats would

²² As taken from the Woodland Trust website
(http://maps.woodlandtrust.org.uk/en/_layouts/woodlandtrust/FullScreenMap.aspx?mode=Wood&wood=&zoom=6&clat=54.502005&clon=-3.625488&ms=hm&layers=422212465066016&LegendGroups=ATH; accessed 06/10/17)

result, unless the benefits of the development (including need) clearly outweigh that harm.

- 7.3.10. Applicants should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured. In particular, the applicant should demonstrate that:
- during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;
 - during construction and operation, best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised (including as a consequence of transport access arrangements);
 - habitats will, where practicable, be restored after construction works have finished;
 - developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where reasonable; and
 - opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals, for example through techniques such as the 'greening' of existing network crossing points, the use of green bridges and the habitat improvement of the network verge.

National Planning Policy Framework 2012

- 7.3.11. The National Planning Policy Framework (NPPF)²³ sets out the Government's planning policies for England and how these are expected to be applied by Local Authorities within their Local Development Frameworks (LDF). Chapter 11 of the NPPF 'Conserving and enhancing the natural environment' sets out the requirements to consider biodiversity in planning decisions.
- 7.3.12. The paragraphs within Chapter 11 relevant are summarised below:
- 7.3.13. The planning system should contribute to and enhance the natural and local environment by:
- Protecting and enhancing valued landscapes, geological conservation interests and soils;
 - Recognising the wider benefits of ecosystem services; and
 - Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
- 7.3.14. Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, so that protection is commensurate with their status and gives appropriate weight to

²³ Department of Communities and Local Government (March 2012). National Planning Policy Framework.

their importance and the contribution that they make to wider ecological networks.

- 7.3.15. Local planning authorities should set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure.
- 7.3.16. To minimise impacts on biodiversity and geodiversity, planning policies should:
- Plan for biodiversity at a landscape-scale across local authority boundaries; identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;
 - Promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify suitable indicators for monitoring biodiversity in the plan; and
 - Aim to prevent harm to geological conservation interests; and where Nature Improvement Areas are identified in Local Plans, consider specifying the types of development that may be appropriate in these Areas.
- 7.3.17. When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:
- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
 - Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
 - Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
 - Opportunities to incorporate biodiversity in and around developments should be encouraged; and
 - Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.
- 7.3.18. The following wildlife sites should be given the same protection as European sites:

- potential Special Protection Areas and possible Special Areas of Conservation;
- listed or proposed Ramsar sites; and
- sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

7.3.19. The presumption in favour of sustainable development (paragraph 14) does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined.

Local Planning Policy

7.3.20. Table 7-1 below provides a summary of relevant local planning policy.

Table 7-1: Summary of relevant local policies

Planning Policies	Summary of Policy Content
Elmbridge Borough Council	Elmbridge Core Strategy (July 2011) and Elmbridge Local Plan - Development Management Plan (April 2015)
CS13 - Thames Basin Heaths Special Protection Area	New residential development which is likely to have a significant effect on the ecological integrity of the Thames Basin Heaths SPA will be required to demonstrate that adequate measures are put in place to avoid or mitigate any potential adverse effects. Further information in relation to zones of influence and provision of Suitable Accessible Natural Greenspace (SANG) is included in the policy.
CS15 - Biodiversity	<p>The council will seek to avoid loss and contribute to a net gain in biodiversity across the region and the objective of the Surrey Biodiversity Action Plan (BAP) by:</p> <ul style="list-style-type: none"> • Protecting and seeking to improve all sites designated for their biodiversity importance, as identified on the proposal map, in accordance to PPS9: Biodiversity and Geological Conservation and CS13-Thames Basin Heaths Special Protection Area (SPA), including those sites considered to be relevant to the integrity of the South West London Waterbodies SPA and Ramsar site. Criteria based policies against which proposals will be judged for any development on, or affecting, sites of regional or local significance will be brought forward through future DPD/s that address Development Management and Site Allocations; • Support the implementation of the Regional Forests and Woodland Framework by: <ul style="list-style-type: none"> – Protecting all woodland, including ancient woodland, as shown on the proposals map, from damaging development and land uses; – Promoting the effective management, and where appropriate, extension and creation of new woodland areas including, in association with areas of major development, where this helps to restore and enhance degraded landscapes, screen noise and pollution, provide recreational opportunities, help mitigate climate change, and contributes to floodplain management; – Replacing woodland unavoidably lost through development with new woodland on at the same scale; – Promoting and encouraging the economic use of woodlands and wood resources, including wood fuels as renewable energy source; and

Planning Policies	Summary of Policy Content
	<ul style="list-style-type: none"> – Promoting the growth and procurement of sustainable timber products. • Protecting and enhancing BAP priority habitats and species and seeking to expand their coverage by supporting the development of the Biodiversity Opportunity Areas; as shown on the proposals map; • Managing and maintaining a mosaic of habitats and rich variety of wildlife across the Council's landholdings in accordance with the Elmbridge Countryside Strategy; • Working in partnership to re-store and enhance: <ul style="list-style-type: none"> – the Thames Basin Heath SPA, in accordance with CS13-Thames Basin Heaths SPA, – which is an area of strategic opportunity for biodiversity improvement; and – Brooklands Community Park and Esher Commons Site of Special Scientific Interest (SSSI) in accordance with the Council's most up-to-date mitigation strategy for the Thames Basin Heath SPA and the Esher Commons SSSI Restoration and Management Plan. • Maximising the contribution of other green spaces and features (15), where appropriate, to the area's biodiversity resources including identifying and developing wildlife corridors to provide ecological 'stepping stones' and form a coherent local and regional biodiversity network in accordance with CS12-The River Thames and its tributaries and CS14-Green Infrastructure; • Directing development to previously developed land in accordance with CS1-Spatial Strategy, taking account of its existing biodiversity value; and • Ensuring new development does not result in a net loss of biodiversity and where feasible contributes to a net gain through the incorporation of biodiversity features.
DM6- Landscape and trees	<p>Development proposals should be designed to include an integral scheme of landscape, tree retention, protection and/or planting that:</p> <ul style="list-style-type: none"> • Reflects, conserves or enhances the existing landscape and integrates the development into its surroundings, adding scale, visual interest and amenity; • Contributes to biodiversity by conserving existing wildlife habitats, creating new habitats and providing links to green infrastructure network; • Encourages adaption to climate change, for instance by incorporating Sustainable Drainage Systems (SuDS), providing areas for flood mitigation, green roofs, green walls, tree planting for shade, shelter and cooling and a balance of hard and soft element; • Does not result in loss of, or damage to, trees and hedgerows that are, or are capable of, making a significant contribution to the character or amenity of the area, unless in exceptional circumstances, the benefits would outweigh the loss; • Adequately protects existing trees including their root systems prior to, during and after construction process; • Would not result in the loss or deterioration of irreplaceable habitats including ancient woodland and ancient or veteran trees, unless in exceptional circumstances the benefits would outweigh the loss, and • Includes proposals for the successful implementation, maintenance and management of landscape and tree planting schemes. <p>To ensure high quality landscape schemes and depending on the scale, nature and location of the development, the Council will seek</p>

Planning Policies	Summary of Policy Content
	<p>appropriate considerations attached to planning permissions to secure various improvements. These may include tree retention and protection, the submission and implementation of a landscape or tree-planting scheme, surface materials, screen walls, fences and planting.</p> <p>Tree Preservation Orders (TPOs).</p> <p>In considering consent for works to trees protected by TPO, the council will:</p> <ul style="list-style-type: none"> • Assess the amenity value of the tree or woodland and the likely impact of the proposal on the amenity of the area; and • In the light of this assessment consider whether or not the proposal is justified, having regards to the reason put forward in support of it.
DM21- Nature conservation and biodiversity	<p>In accordance with Core Strategy policy CS15- Biodiversity, all new development will be expected to preserve, manage and where possible enhance existing habitats, protected species and biodiversity features. The Council will work in partnership to explore new opportunities for habitat creation and restoration.</p> <p>Support will be given to proposal that enhance existing and incorporate new biodiversity features, habitats and links to habitat network into the design of the buildings themselves as well as in appropriate design and landscape schemes of new developments with the aim of attracting wildlife and promoting biodiversity. Conditions will be used to secure the provision of mitigation measures, as appropriate.</p> <p>Development affecting designated international sites of biodiversity importance and compensatory sites will be considered against Core Strategy policies CS13- Thames Basin Heaths Special Protection Area, CS15- Biodiversity, the Framework and relevant legalisation.</p> <p>Development affecting national sites of biodiversity importance will not be permitted if it will have an adverse effect, directly or indirectly, individually or in combination, on the site or its features. IN exceptions circumstances, proposals that have an adverse effect on a national site may be permitted if the benefits of the development clearly outweigh the harm. If a development is approved under these circumstance, appropriate avoidance, mitigation and compensation will be sought wherever possible.</p> <p>Development affecting locally designated sites of biodiversity importance of sites falling outside these that support national priority habitats or priority species will not be permitted if it will result in significant harm to the nature conservation value of the site or feature.</p> <p>Sites identified on Policies Map as having potential to be designated in future as Suitable Accessible Natural Greenspace (SANG) will be protected from development that may compromise tis ability to serve that function, taking into account the level of existing SANG when the development is proposed and any wider benefits of the proposal.</p>
Guildford Borough Council	Guildford Borough Local Plan (2003)
Policy NE1 Potential Special Protection Areas and Candidate Special Areas of Conservation	<p>Planning permission will not be granted for proposals which are likely to destroy or have an adverse effect directly or indirectly on the nature conservation value of potential Special Protection Areas (pSPA) and candidate Special Areas of Conservation (cSAC), as shown the Proposals Map.</p>
Policy NE5 Development affecting trees,	<p>Development will not be permitted if it would damage or destroy trees protected by a Tree Preservation Order or in a conservation area unless the removal would:</p>

Planning Policies	Summary of Policy Content
hedges and woodlands	<ul style="list-style-type: none"> • Be in the interests of good arboriculture practice; or • The need for the development outweighs the amenity value of the protected trees. <p>If the removal of any trees is permitted as part of a development, a condition may require that an equivalent number (or more) of the new locally native trees be planted either on or near the site.</p>
Policy NE6 Undesignated features of nature conservation interest	<p>In considering proposals for development on undesignated sites where there is found to be a significant wildlife interest, the council will seek to preserve and enhance the features of ecological value.</p>
Policy R1 Loss of land and facilities for sport and recreation	<p>The Borough Council will resist the loss of land and buildings used for recreation purposes or with the potential for recreational use unless:</p> <ul style="list-style-type: none"> • A suitable alternative is provided nearby; • There is an excess of recreation land and buildings in the area; and • Sports and recreation facilities can best be retained and enhanced through the redevelopment of a small part of the site.

7.4. Baseline conditions

7.4.1. The following sources have been used to identify ecological baseline conditions for the Scheme:

- Multi-Agency Geographic Information for the Countryside (MAGIC) website²⁴ was used to obtain information on statutory designated sites within 2 km of the Scheme boundary, SACs within 30 km of the Scheme boundary and ancient woodlands within 1 km of the Scheme boundary;
- Desk study records of non-statutory designated SNCIs and conservation verges within 2 km of the Scheme, and notable habitats, notable and legally protected species within 1 km of the Scheme, and bats within 10 km of the Scheme have been obtained from Surrey Biodiversity Information Centre (SBIC);
- Records of reptiles and amphibians within 1 km of the Scheme boundary have been obtained from Surrey Amphibian and Reptile Group (SARG);
- Records of veteran trees within 50 m of the Scheme have been obtained from the Woodland Trust's website;
- Ordnance Survey maps²⁵ and the Where's the Path website²⁶ were used to identify the presence of waterbodies within 500 m of the extent of the Scheme, in order to establish if great crested newts (*Triturus cristatus*) are potentially present on land within and immediately surrounding the Scheme;
- An extended Phase 1 Habitat Survey was undertaken of the publicly accessible land on each of the four quadrants of Junction 10, as well as the Scheme footprint at Wisley Airfield, Elm Corner SNCI and Painshill Park. This survey broadly followed the Phase 1 habitat survey

²⁴ <http://magic.defra.gov.uk>

²⁵ <https://www.ordnancesurvey.co.uk/osmaps/>

²⁶ <http://wtp2.appspot.com/wheresthepath.htm>

methodology as set out in Joint Nature Conservation Committee guidance²⁷ to record information on the habitats within the survey area, and was 'extended' to include a search for evidence of presence, and an assessment of the potential of each habitat to support, notable and protected species, as recommended by the Chartered Institute for Ecology and Environmental Management (CIEEM)²⁸;

- The scoping survey also included a drive-by survey of the A3 between the A3 Ockham Interchange and A3/A245 Painshill Junction. This involved a high-level assessment of broad habitat types present with their potential to support legally protected and notable fauna. This was conducted instead of an Extended Phase 1 habitat survey due to the health and safety risks associated with surveying the verge of a major trunk road;
- A National Vegetation Classification (NVC) survey of notable habitats, and a search for notable plant species was undertaken of the publicly accessible land on each of the four quadrants of Junction 10; and
- Initial species surveys which were commenced in 2016. The majority of these surveys will continue through the Preliminary Design Stage. These include:
 - breeding bird surveys: carried out during the 2016 and 2017 breeding seasons;
 - wintering bird surveys: carried out over winter 2016/17;
 - ground level tree assessments for bats: undertaken during spring and summer 2017;
 - bat activity transect surveys: carried out in autumn 2016, and during spring, summer and autumn 2017;
 - bat trapping surveys: carried out around Junction 10 during summer 2017;
 - dormouse surveys: carried out in 2016 and 2017;
 - invertebrate surveys: carried out within Ockham and Wisley Commons SSSI in summer 2017;
 - great crested newt surveys: carried out in spring 2016 and spring 2017; and
 - reptile surveys: carried out in summer 2017.

7.4.2. The desk study, walkover survey and initial results from the ongoing habitat and species surveys is considered sufficient to identify the types of habitats present and their potential to support notable and protected species in order to give a preliminary assessment of impacts and potential significance, and to identify any further ecology studies that may be required.

Designated Sites

7.4.3. There are five statutory designated sites within 2 km of the Scheme, as summarised in Table 7-2 below and on the Environmental Constraints Map in

²⁷ Joint Nature Conservation Committee (2010) Handbook for Phase 1 habitat survey - a technique for environmental audit

²⁸ Chartered Institute of Ecology and Environmental Management (2012). Guidelines for Preliminary Ecological Assessment

Chapter 19. These statutory sites include one European designated SPA²⁹, three nationally designated SSSIs³⁰ and one LNR³¹ (refer to Appendix C for relevant legislation).

Table 7-2: Summary of statutory designated sites within 2 km of the Scheme

Site name	Approximate distance and direction from the Scheme	Citation description	Area (ha.)	Grid reference
Thames Basin Heaths SPA	Partially falls within the Scheme. Directly adjacent to the south-east and south-west of M25 Junction 10.	Regularly used by 1% or more of the Great Britain populations of the following species listed in Annex 1 of the EU Birds Directive in any season: nightjar (<i>Caprimulgus europaeus</i>); 7.8% GB population, woodlark (<i>Lullula arborea</i>); 9.9% GB population, Dartford warbler (<i>Sylvia undata</i>); 27.8% GB population.	8,275	TQ078590
Ockham and Wisley Commons SSSI	Partially falls within the Scheme. Directly adjacent to the south-east, south-west, north-east and north-west of M25 Junction 10.	The site consists of a large tract of heathland lying between the Mole and Wey rivers near Cobham. The site is contains areas of heath, bog, open water, secondary woodland and scrub. The large variety of habitats allows for a rich community of heathland plants and animals, including a large number of rare and local insects.	269	TQ070585 TQ082585 TQ084592 TQ078595
Ockham and Wisley LNR	Partially falls within the Scheme. Directly adjacent to the south-east, south-west and north-west of M25 Junction 10. 85 m to the north-east of M25 Junction 10.	Declared a LNR in 2005.	332	TQ070585 TQ082585 TQ084592 TQ078595
Papercourt SSSI	1.5 km west of the southern extent of the Scheme.	This site consists of a complex of wetland habitats including unimproved meadows, marshes, streams and flooded gravel pits. These support a number of local plants and a wide variety of breeding and wintering birds.	70	TQ036566
Esher Common SSSI	1.8 km north-east of the northern extent of the Scheme.	Esher Common includes much of Arbrook, Esher, Oxshott, West End and Fairmile Commons and the Ledges, covers a large tract of land between the River Mole, Oxshott and Esher. The site	361	TQ132622

²⁹ Designated under Article 4.1 of EC Directive 79/409 on the Conservation of Wild Birds (the Birds Directive)

³⁰ Sites of Special Scientific Interest (SSSIs) are protected under the Wildlife and Countryside Act 1981 (as amended) and The Countryside and Rights of Way Act 2000

³¹ LNRs are protected under the National Parks and Access to the Countryside Act 1949

Site name	Approximate distance and direction from the Scheme	Citation description	Area (ha.)	Grid reference
		lies partly on acidic soils, and partly on damp, clay soils. Heathland, grassland, scrub, woodland and areas of marsh, bog, and open water, present a rich variety of habitats supporting many species of plants and animals. This site is an important area for invertebrates.		

7.4.4. Two SACs where bats are listed as one of the qualifying features of the designation were identified within 30 km of the Scheme, see Table 7-3.

Table 7-3: Summary of SACs within 30 km of the Scheme

Site name	Approximate distance and direction from the Scheme	Description	Area (ha.)	Grid reference
Mole Gap to Reigate Escarpment SAC	6.9 km, south-east of the Scheme.	The site is situated within the North Downs and extends 13 km from Leatherhead to Reigate. It is designated for its population of Bechstein's bat (<i>Myotis bechsteinii</i>). The site consists of chalk downs supporting the only stable area of box (<i>Buxus sempervirens</i>) scrub in the UK and priority orchid sites. The site also contains some sections of semi-natural woodland and is deemed important for great crested newts, hazel dormouse (<i>Muscardinus avellanarius</i>) and several bat species.	892	TQ199533
Ebernoe Common SAC	29.3 km south of the Scheme.	The site is situated within the South Downs. It is designated for its population of Bechstein's bat and barbastelle bat (<i>Barbastella barbastellus</i>). Ebernoe Common has an extensive block of beech (<i>Fagus sylvatica</i>) high forest and former wood-pasture over dense holly (<i>Ilex aquifolium</i>), and has a very rich epiphytic lichen flora. The beech woodland is associated with other woodland types, open glades and pools, which contribute to a high overall diversity. The woods are important for a number of bat species.	235	SU977273

7.4.5. Seventeen SNCIs were identified within 2 km of the Scheme boundary. Information on these sites is provided in Table 7-4 below.

Table 7-4: Summary of SNCI within 2 km of the Scheme

Site name	Approximate distance and direction from the Scheme	Description	Area (ha.)	Grid reference
Elm Corner Woods SNCI	Partially falls within the Scheme footprint.	The site contains a mixture of woodland with patches of associated wet drainage areas. The site has been identified as important due to its position in reference to other designated sites i.e. Ockham and Wisley Common SSSI, and Wisley Airfield SNCI.	10.2	TQ068579
Wisley Airfield SNCI	Partially falls within the Scheme footprint.	The site consists of a disused airfield surrounded by ancient hedgerows and rough grassland. The west of the site is important for a number of plant species and the east of the site is noted for amphibians and reptiles.	117	TQ076578
Hunts Copse SNCI	Immediately adjacent to the Scheme (proposed road improvements on Elm Lane).	The site is coppiced ancient woodland. Due to its location, the site is considered to act as a buffer to Ockham and Wisley Commons SSSI and an important as an ecological unit within the area.	5.2	TQ080580
River Wey Elmbridge SNCI	Approximately 115 m to the north of the western edge of the Scheme.	Approximately 7.5 km of the River Wey. The river supports a number of fish species including bullhead (<i>Cottus gobio</i>) and potentially brook lamprey (<i>Lampetra planeri</i>).	7.5	TQ074656; TQ072601
Manor Farm and Meadows (including Common Meadows Pond) SNCI	Approximately 120 m to the north of the western edge of the Scheme.	The site consists an area of wet meadow with value for both invertebrates and birds. Common Meadows pond has been identified as important due to its close proximity to other important sites and high diversity of aquatic species.	5.9	TQ068599
Field West of Old Common SNCI	Approximately 300 m to the north-east of the northern edge of the Scheme.	The site consists of rough grassland and an embankment. The site is considered suitable for reptiles and amphibians.	2.2	TQ103609
Ripley Green SNCI	Approximately 320 m to the west of the southern edge of the Scheme.	The site is located within the wider area of Ripley Green which consists of a cricket field, playground and car park. The part of the site designated as a SNCI site is composed of a variety of grassland, scrub and woodland communities and a shallow stream. The site contains over 250 species of plant including locally scarce species.	25	TQ055573

Site name	Approximate distance and direction from the Scheme	Description	Area (ha.)	Grid reference
Manor House SNCI	Approximately 380 m to the north of the western edge of the Scheme.	The site is located within the borough of Woking. The site consists of species-rich flood meadow.	3.2	TQ072602
St George's Hill Golf Course SNCI	Approximately 630 m to the north-west of the northern edge of the Scheme.	The site consists of a large golf course, with a mixture of semi-natural habitats including mixed and coniferous woodland, acid grassland and heath. The site is noted as important for invertebrates.	94	TQ080620
Wisley Bridge SNCI	Approximately 640 m to the west of the western edge of the Scheme.	The site has been selected for its population of vulnerable Copse Bindweed and species listed on the UK biodiversity action plan and principle importance under Section 41 of the NERC Act.	0.11	TQ060695
River Wey-Woking (not including Pyrford Place Lake) SNCI	Approximately 700 m to the north-west of the A3 at its closest point.	Approximately 16.8 km of the River Wey, supporting a wide variety of invertebrate species, amphibians, birds, and a population of water voles (<i>Arvicola amphibius</i>).	17	TQ008532; TQ072614 (TQ051583)
Old Common SNCI	Approximately 790 m to the north-east of the northern edge of the Scheme.	The site contains a mixture of acid grassland, wet and dry woodland, disused allotments and a pond. The site is considered important for several invertebrates including seven nationally scarce species.	9.1	TQ108610
Pyrford Place Lake SNCI (part of River Wey SNCI)	Approximately 1.2 km to the north-west of the southern edge of the Scheme.	No Citation Available	N/A	TQ008532- TQ072614 (TQ051583)
Warren Farm Wood, Hoe Valley SNCI	Approximately 1.5 km to the west of the southern edge of the Scheme.	The site is consists of broadleaved woodland, a species rich marsh for which it is designated for. In addition to this it is also known for its Alder woodland.	5	TQ046575
Clandon Woods SNCI	Approximately 1.5 km to the south of the southern edge of the Scheme.	The site is woodland (mostly semi-natural) and stretches across Clandon and Ripley. The woodland contains a range of community types and regionally important base-enriched Hornbeam.	175	TQ054523, TQ058535, TQ065530, TQ065547, TQ067537, TQ071525, TQ071532

Site name	Approximate distance and direction from the Scheme	Description	Area (ha.)	Grid reference
Wheeler's Meadow (South) SNCI	Approximately 1.8 km to the west of the southern edge of the Scheme.	The site is located beside the River Borune and forms part of the network of meadows along the river course. The site is primarily made up of unimproved wetland which is uncommon in Surrey.	1.1	TQ043579
Wheeler's Fields (Grayshott Fields, Hoe Valley) SNCI	Approximately 1.9 km to the west of the southern edge of the Scheme.	The site is made up of wet tussocky meadows, drains and marshes which are seasonally flooded. The site is considered important for its tall grassland habitat which provide suitable habitat for a variety of invertebrates, mammals and reptiles and birds with a Hobby recorded flying over the site.	3.7	TQ042581

7.4.6. There are four conservation verges within 2 km of the Scheme. Details of these are provided in Table 7-5.

Table 7-5: Summary of non-statutory conservation verges within 2 km of the Scheme

Ref	Site Name	Length (m)	Grid reference	Site description	Nature conservation interest
CV005	Bolder Mere	800	TQ079582	Both verges of Old Lane, approximately 200 m in either direction from central grid reference. Immediately adjacent to the proposed Elm Road improvements.	Significant population within the county of common toad.
CV058	Wisley Lane 2	172	TQ063592	Wisley Lane, Wisley. Southern side of the road opposite Deers Farm from TQ06235932 to TQ06345919. Approximately 500 m to the south-west of the western edge of the Scheme.	Supports County Scarce plants sheep's bit and royal fern.
CV057	Wisley Lane 1	611	TQ059591	Wisley Lane, Wisley. Both sides of the road from TQ05765964 to Wisley bridge (TQ06015945). Approximately 700 m to the west of the western extent of the Scheme.	Supports copse-bindweed (Nationally threatened: vulnerable) and bur chevil (Surrey scarce).
CV007	Bridge Road	804	TQ106595	Both verges of Old Lane, approximately 200 m in either direction from central grid reference. Approximately 1.4 km to the south-east of the	Significant population within the county of common toad.

Ref	Site Name	Length (m)	Grid reference	Site description	Nature conservation interest
				northern extent of the Scheme.	

Ancient Woodland and veteran trees outside of ancient woodland

- 7.4.7. There are 23 parcels of ancient woodland within 1 km of the Scheme. A summary of these is provided in Table 7-6 below.
- 7.4.8. The Woodland Trust website identified no veteran trees within 50 m of the Scheme boundary. However, an arboricultural assessment of the Scheme footprint has not yet been conducted. This survey may identify additional veteran trees.

Table 7-6: Summary of ancient woodland within 1 km of the Scheme

Site name	Approximate distance and direction from the Scheme	Area (ha)	Grid reference
Woodland adjacent to Heyswood Girl guide camp (SRY_6438 and SRY_6439)	Partially within Scheme boundary. Note this woodland is split into two areas and is dissected by a National Grid site.	2.0	TQ089602
Hatchford Wood (SRY_1646)	Partially within Scheme boundary.	14.7	TQ088583
Woodland south of Battleston Hill near Elm Lane (SRY_1649)	Directly adjacent to the Scheme boundary	1.4	TQ065576
Woodland to the east of The Bogs on Pointer's Road (SRY_1645)	10 m north, along Pointer's Road	0.6	TQ094585
Park Wood north of A3 (SRY_4509)	15 m south, near Ripley	4.1	TQ056567
The Bogs (SRY_1837)	25 m north, along Pointer's Road	3.9	TQ091587
Woodland to the east of Hatchford Manor (SRY_1648)	110 m south-east near Hatchford	0.5	TQ095581
Hunt's Copse (SRY_6007)	185 m south-east, near Hatchford End	1.9	TQ080578
Buckingham Lodge Wood (SRY_4503)	215 m east, near Ockham Park	1.4	TQ063570
Woodland adjacent to Hunt's Copse (SRY_6006)	290 m south-east, near Hatchford	0.4	TQ081578
Woodland adjacent to Ockham Mill Stream (SRY_1650)	340 m north-west, north of Ripley	0.4	TQ053577
Bramble Wood (SRY_1903)	415 m east near Pointers Green	4.2	TQ099584
Park Wood south of A3 (SRY_4502)	505 m south near Ripley and Ockham Park	9.3	TQ060563
Queen Anne's Hills West(SRY_2644)	560 m north, near Byfleet	0.6	TQ075601

Site name	Approximate distance and direction from the Scheme	Area (ha)	Grid reference
The Hangers (SRY_4499)	600 m north-west, near Byfleet	6.5	TQ076604
Queen Anne's Hills East(SRY_2643)	650 m north, near Byfleet	0.4	TQ076602
Brickfield Copse north of M25 (SRY_1653)	690 m north-east near Hatchford	1.7	TQ100581
Brickfield Copse south of M25 (SRY_1641b)	700 m south-east near Hatchford	0.1	TQ100579
Brickfield Copse south of M25 (SRY_1904)	775 m south-east near Hatchford	0.6	TQ100577
The Decoy (SRY_6300)	805 m south-west, near Wisely Golf Course	3.2	TQ059590
Woodland adjacent to Pyrford Place (SRY_3380)	955 m north-west, near Wisely Golf Course	0.6	TQ050583
Woodland adjacent to Halfpenny Cross (SRY_1652)	965 m east, near Pointers Green	0.6	TQ104585
Woodland adjacent to The Decoy (SRY_6299)	975 m south-west, near Wisely Golf Course	0.7	TQ058590

Habitats

- 7.4.9. The most abundant habitat within the Scheme, immediately surrounding M25 Junction 10 is mixed woodland with Scot's pine (*Pinus sylvestris*), silver birch (*Betula pendula*) and pedunculate oak (*Quercus robur*) the most frequent species. Some areas of broadleaved woodland are present, such as to the north-west of Junction 10, which is dominated by young silver birch trees. A line of veteran pedunculate oak trees is present in the woodland to the north-west of the Scheme.
- 7.4.10. The southern extent of the Scheme is within an area of lowland heathland on both sides of the A3.
- 7.4.11. Ponds, lakes and ditches are also present in various locations on all sides of the Scheme with Boldermere Lake to the south-east of the Scheme being noted as having reed bed habitat around its margins.
- 7.4.12. There are six Habitats of Principal Importance (HPI)³² within 500 m of the Scheme. These are lowland heathland, lowland mixed deciduous woodland, woodpasture and parkland, rivers, ponds and reedbed.

Notable and Protected Species

Notable Plants

- 7.4.13. The desk study returned records for several notable plant species within 1 km of the Scheme, such as pillwort (*Pilularia globulifera*), lesser water-plantain (*Baldellia ranunculoides*) and many-stalked spike-rush (*Eleocharis multicaulis*), all of which are considered scarce (or near threatened) in Surrey.

³² Habitat of Principal Importance for the Conservation of Biodiversity on the England Biodiversity List, refer to Appendix for further details

- 7.4.14. The notable plant species listed in the desk study (pillwort, lesser water-plantain and multi-stemmed spike-rush) were not recorded during the surveys. However, two notable species: royal fern (*Osmundia regalis*) and cross-leaved heath (*Erica tetralix*) were recorded. Royal fern is scarce in Surrey, and cross-leaved heath is near threatened in England.

Invertebrates

- 7.4.15. The desk study provided records of a number of invertebrate groups within 1 km of the Scheme, including a nationally scarce scavenger water beetle and various species listed as Nationally Notable A³³, including a brown ant and heath potter wasp (*Eumenes coarctatus*).
- 7.4.16. The Ockham Common and Wisley Common SSSI citation indicates that the open water surrounded by heathland presents an ideal habitat for many dragonflies and damselflies (Odonata), and over 20 species have been recorded within the SSSI, which is thus of national importance for this order. The site also supports many other local and rare invertebrates. It is of national importance for true flies (Diptera). A large number of locally scarce beetles (Coleoptera) are also found.
- 7.4.17. Invertebrate surveys have been carried out monthly (June to September) of the SSSI habitat within and adjacent to the Scheme footprint. A mixture of techniques were used, including sweep sampling, spot sampling, suction sampling and pitfall traps.
- 7.4.18. Initial results have identified a number of scarce invertebrates, thought to be present throughout the wider habitats in the SSSI.

Amphibians

- 7.4.19. The desk study returned eight records of great crested newts within 1 km of the Scheme. The desk study also identified aquatic habitat that could potentially be used by breeding great crested newts, including 65 waterbodies and 53 ditches within 500 m of the Scheme (although some of these waterbodies are separated from the Scheme by physical barriers, such as roads or rivers). Suitable terrestrial habitat, particularly woodland habitat, is also present. The terrestrial habitats provide habitat connectivity to nearby ponds and offer suitable foraging and hibernation opportunities for great crested newts.
- 7.4.20. Surrey Wildlife Trust confirmed an environmental DNA (eDNA)³⁴ record of great crested newts within the edge wetland features of Boldermere Lake in 2016.
- 7.4.21. During spring 2017, eDNA surveys were carried out of 13 potentially suitable ponds and ditches, with access permission, within 500 m of the Scheme.). Of the 13 waterbodies assessed, a single pond was confirmed to contain great crested newt eDNA. This waterbody is located within the heathland area in the southwest quadrant, and is approximately 480 m from the western end of the Scheme.
- 7.4.22. In addition, great crested newt population assessment surveys were carried out on Boldermere Lake and two ponds in the southeast quadrant and a large pond in the southwest quadrant.

³³ Taxa estimated to occur within 16-30 10-km squares of the National Grid System

³⁴ Natural England (2014),

(<http://webarchive.nationalarchives.gov.uk/20140605105717/http://www.naturalengland.org.uk/ourwork/regulation/wildlife/gcn-eDNA-feature.aspx>; accessed 12/09/17)

- 7.4.23. Great crested newts were recorded in the two ponds in the southeast quadrant, in low numbers (less than ten individuals), but not in Boldermere Lake.
- 7.4.24. No great crested newts were recorded in the large pond in the southwest quadrant.
- 7.4.25. During a reptile survey on the 19th September 2017, a male great crested newt was recorded within Wisley Airfield, approximately 650 m to the south-west of Boldermere Lake, and on the 28th September 2017 a male great crested newt was recorded at the northern edge of Boldermere Lake (where great crested newts are known to occur).

Reptiles

- 7.4.26. The desk study identified records of common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and sand lizard (*Lacerta agilis*) within 1 km of the Scheme.
- 7.4.27. In addition, Wisley Airfield SNCI is identified in the desk study as being bounded by areas of long grass which is suitable habitat for common foraging reptiles. Grass snake, slow worm and common lizard have all been recorded in the east of this SNCI³⁵.
- 7.4.28. Areas of heathland are present at Ockham Common. This habitat has high suitability for reptiles, and is likely to support the common reptile species as well as sand lizard. Sand lizards were identified in the desk study and have been confirmed by Surrey Wildlife Trust and SARG as having established following a successful re-introduction in 1991 in the mature heathland in the south-east quadrant of Wisley and Ockham Commons Surrey Wildlife Trust nature reserve (i.e. Ockham Common). Sand lizards were only reintroduced to Ockham Common and are considered to be absent from the habitats within the south-west, north-east and north-west quadrants of habitat surrounding M25 Junction 10.
- 7.4.29. The extended Phase 1 Habitat Survey identified that the main habitat within the footprint of the Scheme is woodland. Due to the heavy shading of woodland this habitat has low suitability for reptiles. However, log piles and gaps around tree roots could potentially be used as reptile hibernating sites, particularly where they are on located on the edge of a woodland.
- 7.4.30. Common lizards were recorded in the small heathland glade in the north-west quadrant during surveys undertaken by Atkins in 2016.
- 7.4.31. Reptile presence/likely absence surveys commenced in August 2017 and are currently ongoing until October 2017. Some further surveys will be carried out in spring 2018. A summary of the initial results can be found in

³⁵ Savills (2015) Wisley Airfield: Environmental Statement: Appendix 8.8 Reptile survey results

7.4.32. Table 7-7.

7.4.33. In addition, a single sand lizard was recorded within the open wooded area between Ockham Bites café and the footbridge between the south-east and south-west quadrants during an invertebrate survey on the 19th June 2017.

Table 7-7: Summary of reptile survey results to date

Location	Reptile species recorded
North-west quadrant of Junction 10	Slow worm, common lizard
North-east quadrant of Junction 10	No reptiles recorded
South-west quadrant of Junction 10 (Wisley Common and Wisley Lane)	Slow worm, grass snake, common lizard
South-east quadrant of Junction 10 (Ockham Common)	Slow worm, grass snake, common lizard, adder, sand lizard
Elm Lane (Snakes Field)	Slow worm, grass snake, common lizard
Boldermere Lake	Grass snake
Wisley Airfield	Slow worm, grass snake
Painshill Park and associated areas	Slow worm, grass snake, common lizard

Birds

- 7.4.34. The desk study identified a number of protected and rare species of bird within 1 km of the Scheme, including woodlark, nightjar, Dartford warbler and nightingale.
- 7.4.35. The Thames Basin Heaths SPA supports important breeding populations of a number of birds of lowland heathland, especially nightjar and woodlark, both of which nest on the ground, often at the woodland/heathland edge, and Dartford warbler, which typically nests in gorse. There is potential for direct loss of heathland habitat as a result of the Scheme and there could be indirect impacts on heathland birds through increased noise.
- 7.4.36. The ecological scoping survey and drive-by habitat assessment also identified that the woodland and scrub within the survey area offers suitable nesting opportunities for birds. Swans and ducks were present on the larger waterbodies and the reedbed fringes to Bolder Mere may provide habitat for birds associated with reedbeds, such as reed bunting. The River Mole could provide suitable habitat for kingfisher.
- 7.4.37. An initial breeding bird survey was undertaken in spring/summer 2016. A total of 45 bird species were recorded within the survey area, of which 36 were thought to have bred within the survey area, based on breeding behaviour observed and/or habitats present. Of the 45 species recorded, 12 are notable for their Schedule 1, Annex 1 and/or their Red or Amber List Bird of Conservation Concern status. Breeding was confirmed for seven notable species: common tern, Dartford warbler, dunnoek, mute swan, nightjar, song thrush and spotted flycatcher. It is noted that the optimum survey window for woodlark was missed in 2016.
- 7.4.38. Four wintering bird surveys specifically focused on recording wintering woodlark within the heathland habitats within and adjacent to the Scheme were carried out between November 2016 and February 2017. No woodlarks were recorded.
- 7.4.39. Detailed breeding bird surveys were carried out in 2017, including species-specific surveys for Dartford warbler, nightjar and woodlark. A total of 66 species were recorded during the surveys, of which 53 were thought to probably have bred within or adjacent to the survey area, based on breeding behaviour observed and/or habitats present.

- 7.4.40. Of the 66 species recorded, 24 are notable for their Schedule 1, Annex 1 and/or their Red or Amber List Bird of Conservation Concern status.
- 7.4.41. Breeding was confirmed for 14 notable species: common tern, cuckoo, Dartford warbler, dunnoek, hobby, mallard, mistle thrush, mute swan, nightjar, reed bunting, song thrush, spotted flycatcher, stock dove and woodlark.
- 7.4.42. All three Thames Basin Heaths SPA qualifying bird species were recorded in the south-east and south-west quadrants:
- South-east quadrant (Wisley Common): two nightjar territories, two Dartford warbler territories, one woodlark territory; and
 - South-west quadrant (Ockham Common): four nightjar territories, four Dartford warbler territories, one woodlark territory.
- 7.4.43. In addition, a barn owl was observed hunting over the eastern edge of Ockham Common during a bat survey on the 25th July 2017. Barn owls are a Schedule 1 species and an Amber List BoCC. This isolated sighting on a single occasion does not indicate that barn owls bred within or adjacent to the survey area.

Mammals

Bats

- 7.4.44. The desk study returned 284 records from Surrey Bat Group which identified 12 bat species within 10 km of the Scheme in the past 10 years: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Natterer's (*Myotis nattereri*), brown long-eared (*Plecotus auritus*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), Daubenton's (*Myotis daubentonii*), Leisler's (*Nyctalus leisleri*), whiskered (*Myotis mystacinus*), Bechstein's (*Myotis bechsteinii*) and barbastelle (*Barbastella barbastellus*) bats.
- 7.4.45. Records include Natterer's and brown long eared bats at Hatchford Woods Ice House (presumed to be hibernating bats), soprano pipistrelle and noctule bats roosting in Ockham Common bat boxes and several roosts that are likely to be in houses.
- 7.4.46. In addition, Mole Gap to Reigate Escarpment SAC is located approximately 7.8 km south-east of the Scheme and Ebernoe Common SAC is located approximately 29.5 km south of the Scheme. Both of these SACs include Bechstein's bat as a qualifying species, and Ebernoe Common SAC also include barbastelle as a qualifying species.
- 7.4.47. Trees with features suitable for roosting bats, such as splits and cavities, were noted in the woodlands surrounding Junction 10. Bat activity transect surveys are currently being undertaken in accordance with Bat Conservation Trusts Good Practice Guidelines³⁶, and will be completed in October 2017.
- 7.4.48. In addition, bat trapping surveys³⁷ were carried out within the four quadrants surrounding M25 Junction 10, with two sessions conducted in each quadrant between July and August 2017.

³⁶ Bat Conservation Trust (2016). Bat Surveys for Professional Ecologists. Good Practice Guidelines

³⁷ Harp traps and bat call lures were used to attract and catch bats within the survey areas

- 7.4.49. The surveys to date have recorded nine species: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Daubenton's, noctule, serotine, Leisler's, brown long-eared and whiskered bats.

Dormouse

- 7.4.50. The desk study returned no records of hazel dormice within 1 km of the Scheme. The extended Phase 1 Habitat Survey identified conifer woodland, with occasional broadleaved species, as the main habitat present immediately surrounding Junction 10. Much of the woodland is considered sub-optimal for dormice due to the dominance of conifers and absence of a scrub layer. However, there are patches of more diverse habitat, such as adjacent to the M25 to the south-east of Junction 10, where species such as bramble, honeysuckle, holly, birch, gorse and sweet chestnut are present.
- 7.4.51. Dormouse surveys were undertaken in 2016 and 2017. No dormice were recorded.
- 7.4.52. The woodland at Elm Corner SNCI (including the adjacent ancient woodland), and the ancient woodland at the Girl Guides Camp at Painshill have not been surveyed to date for dormice. Surveys will commence in September 2017, continuing into 2018. Survey methods will consist of the setting up and checking of dormouse tubes, as well as an autumn search of fallen hazelnuts for dormouse teeth marks.

Otter and Water Vole

- 7.4.53. The desk study returned no records of otters (*Lutra lutra*) within 1 km of the M25 Junction 10, and a single record of water vole from the River Wey (Woking) SNCI, located approximately 700 m to the north of the Scheme.
- 7.4.54. A survey of the wet ditch (connected to Ockham Mill Stream) which passes under Stratford Bridge to the east of the Ripley roundabout (central OS grid reference TQ0627957496) was carried out on the 21st September 2017. No evidence of otter or water vole was recorded along the wet ditch up to 500 m from the Ripley roundabout during the survey, and in addition, a mink was observed during the survey, thus reducing the suitability of the area for water voles. The wet ditch to the west of the Ripley roundabout will be surveyed for water vole and otter evidence during this stage, once access permissions have been agreed.

Badger

- 7.4.55. Badgers (*Meles meles*) have been confirmed as present by the desk study and field surveys. There is potential for a main sett to be directly impacted by the Scheme.
- 7.4.56. A detailed update survey of the Scheme footprint and immediate surrounds for badger evidence, will be carried out during this Preliminary Design Stage.

Non-native Invasive Plant Species

- 7.4.57. The desk study did not identify any records of non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)³⁸.

³⁸ It is illegal to plant or otherwise cause these species to grow in the wild

However, the following species listed on Schedule 9 were recorded during the extended Phase 1 Habitat Survey:

- Rhododendron (*Rhododendron ponticum*) was noted as present in several of the woodlands;
- Indian balsam (*Impatiens glandulifera*) was noted as present in July 2016 close to the east end of the Scheme (near the bridge over the M25) to both the north and south of the M25; and
- Four ponds were all noted as supporting the non-native invasive New Zealand pygmy weed (*Crassula helmsii*).

7.4.58. During site visits in 2017, Indian balsam was noted within the wooded area immediately surrounding Ockham Bites café in August 2017. In addition, a small clump of Japanese knotweed was identified as being present within the wooded area of Wisley Common that runs northwards from RHS Wisley towards the M25 in June 2017.

7.5. Potential impacts

7.5.1. The potential impacts of the Scheme are identified for ecological features below prior to mitigation.

Designated sites

7.5.2. The Scheme will involve an approximate permanent land take of 25.7 ha (some land falls under several designations and therefore the following figures do not add up to the total of 25.7 ha) and an additional temporary land take of 32.8 ha.:

- 6.6 ha of the approximate permanent land take is designated as Thames Basin Heaths SPA (the land take from the SPA is also designated as SSSI and LNR). This equates to 0.08 % of the SPA (8,274.72 ha). An additional 6.7 ha of temporary land take is proposed (0.08 % of the SPA);
- 10.9 ha of the approximate permanent land take is designated as Ockham and Wisley Commons SSSI. This equates to 4.0 % of the SSSI (269.6 ha). An additional 11.3 ha of temporary land take is proposed (4.2 % of the SSSI);
- 12.6 ha of the approximate permanent land take is designated as Ockham and Wisley LNR. This equates to 3.8 % of the LNR (332 ha). An additional 11.0 ha of temporary land take is proposed (3.3 % of the LNR);
- 2.0 ha of the approximate permanent land take is designated as Elm Corner SNCI and an additional temporary land take of 0.7 ha is proposed;
- 2.9 ha of the approximate permanent land take is designated as Wisley Airfield SNCI and an additional temporary land take of 1.0 ha is proposed; and,

0.05 ha of the approximate temporary land take is designated as Hunts Copse SNCI. Ancient woodland and veteran trees outside of ancient woodland

7.5.3. The Scheme is adjacent to one ancient woodland and would currently cause the direct loss of habitat of approximately 1.0 ha within three ancient woodlands.

- 7.5.4. 0.71 ha of the approximate permanent land take is designated as ancient woodland, and 0.29 ha of temporary land take is proposed. However, although soils may be retained within temporary land take areas, it is assumed that all loss of trees etc within ancient woodland will count as permanent land take. Therefore, it is assumed that approximately 1.0 ha of ancient woodland will be permanently lost.
- 7.5.5. There were no veteran trees within 50 m of the Scheme on the Woodland Trust website. An arboricultural assessment of the Scheme footprint has not yet been conducted.

Notable habitats

- 7.5.6. The Scheme will cause the direct loss of approximately 22.4 ha of permanent land take of HPI habitat, and an additional 22.4 ha of temporary land take. HPIs were taken from MAGIC.gov and consist of:
- Lowland heathland (approximately 0.5 ha of permanent land take and 0.5 ha of temporary land take);
 - Lowland mixed deciduous woodland (approximately 6.4 ha of permanent land take and 6.2 ha of temporary land take);
 - Woodpasture and parkland (approximately 17.4 ha of permanent land take and 15.7 ha of temporary land take)³⁹.
- 7.5.7. In addition, there are potentially areas of river, pond and reedbed HPIs within the Scheme footprint.

Notable and legally protected species

- 7.5.8. Due to the presence of SPA qualifying species, there may potentially be impacts on populations of these species, as a result of impacts such as habitat loss and increased disturbance.
- 7.5.9. There is potential for the Scheme to have impacts on legally protected species (including European protected species) and notable species, including killing, injury or disturbance during construction; or disturbance, loss of foraging areas, population fragmentation, or disruption of migratory or commuting routes over the long term. Legally protected species that have been identified from the desk study and extended Phase 1 habitat survey within the Scheme boundary include great crested newts, reptiles, bats, breeding birds and badger.

7.6. Proposed level and scope of assessment

- 7.6.1. It is considered that the information being gathered for the nature conservation features will be sufficient to inform the ES.
- 7.6.2. An updated desk study, as well as habitat and protected species surveys conducted during 2016 and 2017 will inform the ES to characterise and assess the impacts of the Scheme on nature conservation features.
- 7.6.3. Consultation with key stakeholders, such as Natural England, Surrey Wildlife Trust, Forestry Commission and the Royal Society for the Protection of Birds, is being carried out in order to determine appropriate mitigation and compensation

³⁹ Much of the lowland mixed deciduous woodland and woodpasture and parkland overlap, so the individual HPI areas do not add up to the total HPI land take area.

measures to counteract any potential impacts on designated sites and ancient woodland. Potential mitigation measures are outlined in section 7.9.

7.6.4. The findings of the assessment will be used to identify appropriate mitigation that will avoid, reduce and/or compensate for significant effects due to the construction and operation phases of the Scheme.

7.6.5. Due to the potential for a likely significant effect on internationally designated sites as a result of the Scheme being identified during the Option Selection Stage, a Preliminary Design Stage Habitat Regulations Assessment (formerly the Assessment of Implications on European Sites) will be required. This would assess the potential for the Scheme to have an adverse effect on the integrity of any internationally designated sites.

Table 7-8: Nature conservation receptors that will be subject to further assessment

Receptors	Scoped in/out	Comment/Justification
Internationally designated statutory sites (SAC, SPA)	✓	Thames Basin Heaths SPA falls partially within the Scheme footprint. In addition, there are two internationally designated sites where bats are one of the qualifying features within 30 km of the Scheme. The Thames Basin Heaths SPA may be subject to impacts from changes in air quality and noise.
Nationally designated statutory sites (SSSI, NNR)	✓	Ockham and Wisley Common SSSI falls partially within the Scheme footprint. In addition, a further two SSSIs falls within 2 km of the Scheme. The Ockham and Wisley Common SSSI may be subject to impacts from changes in air quality.
Locally designated statutory sites (LNR)	✓	Ockham and Wisley LNR falls partially within the Scheme footprint.
Non-statutory designated sites (SNCIs)	✓	Twenty-three SNCIs fall within 2 km of the Scheme.
Ancient woodland	✓	There are three parcels of ancient woodland potentially subject to direct land take, and a parcel of ancient woodland immediately adjacent to the Scheme.
Notable habitats	✓	Lowland heathland, lowland mixed deciduous woodland, woodpasture and parkland, reedbeds, rivers and ponds may be subject to impacts from the Scheme, which are HPI.
Notable invertebrates	✓	There is potential for notable terrestrial invertebrates, such as those listed in the SSSI citations, to be affected by the Scheme. The Scheme may cross some rivers and tributaries. Therefore, there is potential for notable aquatic invertebrates to be affected by the Scheme.
Great crested newt	✓	The Scheme may affect potential suitable terrestrial habitat for great crested newts, a notable species, which is also legally protected.
Reptiles	✓	The Scheme affects potential suitable habitat for reptiles, which are legally protected.

Receptors	Scoped in/out	Comment/Justification
Breeding birds	✓	The Scheme affects potential habitat for notable birds. Nesting birds are also legally protected.
Bats	✓	The Scheme may impact on one or more features suitable for roosting bats, and affect bat foraging habitat and/or disrupt commuting routes. Bats are notable species that are legally protected.
Hazel dormouse	✓	The Scheme affects potential habitat for dormouse, a notable species that is legally protected.
Water vole	✓	The Scheme crosses a wet ditch (connected to Ockham Mill Stream) by Ripley roundabout. Therefore, there is potential for water voles to be affected by the Scheme.
Otter	✓	The Scheme crosses a wet ditch (connected to Ockham Mill Stream) by Ripley roundabout. Therefore, there is potential for otters to be affected by the Scheme.
Badger	✓	There is potential for sett destruction, disturbance or harm to badgers, which are legally protected, during construction.
Invasive plants	✓	There is potential to cause certain invasive plant species under Schedule 9 of the Wildlife and Countryside Act 1981 to spread (which is an offence) during construction if present. While invasive plants are not themselves a receptor of nature conservation value, they will be considered during surveys and assessment to inform working practices.

Value of the environmental resources and receptors

Valuation criteria

- 7.6.6. Nature conservation features have been valued following the framework provided in IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment. This is presented in Table 7-9 below. The evaluation was based on the information available from scoping surveys, and used professional judgement, as well as accepted criteria⁴⁰ (e.g. diversity, rarity and naturalness) for valuing nature conservation features in a geographical context.

Table 7-9: Valuation of nature conservation features⁴¹

Examples of resource valuation based on geographical context
International or European Value
Natura 2000 sites including: Sites of Community Importance (SCIs); Special Protection Areas (SPAs); potential SPAs (pSPAs); Special Areas of Conservation (SACs); candidate or possible SACs (cSACs or pSACs ⁴²); and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves.

⁴⁰ Set out in Ratcliffe (1977) A Nature Conservation Review. Cambridge University Press

⁴¹ <http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian130.pdf>

⁴² pSACs are sites which have been formally advised to the UK government but have not yet been submitted to the European Commission. These sites should be valued at European level on the basis that they meet the relevant selection criteria for a SAC but are not yet designated as such.

Examples of resource valuation based on geographical context

Areas which meet the published selection criteria for those sites listed above but are not themselves designated as such⁴³.

Resident, or regularly occurring, populations of species which may be considered at International or European level⁴⁴ where:

- The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or
- The population forms a critical part⁴⁵ of a wider population at this scale; or
- The species is at a critical phase⁴⁶ of its life cycle at this scale.

UK or National Value

Designated sites including: Sites of Special Scientific Interest (SSSIs); Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs).

Areas which meet the published selection criteria e.g. JNCC (1998) for those sites listed above but which are not themselves designated as such⁴³.

Areas of key/priority habitats identified in the UK Biodiversity Action Plan (BAP); including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principle importance for the conservation of biodiversity⁴⁷.

Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory⁴⁸.

Resident, or regularly occurring, populations of species which may be considered at International, European, UK or National level⁴⁹ where:

- The loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or
- The population forms a critical part⁴² of a wider population at this scale, or
- The species is at a critical phase⁴³ of its life-cycle at this scale.

Regional Value

Areas of key/priority habitats identified in the Regional BAP (where available); areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats (for example South West Nature Map); and areas of key/priority habitat listed within the Highways Agency's BAP.

Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level^{40,41} and key/priority species listed within the HABAP where:

- The loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or
- The population forms a critical part⁴² of a wider population; or
- The species is at a critical phase⁴³ of its life cycle.

⁴³ Valuation to be made in consultation with the SEB.

⁴⁴ Valuation to be made in consultation with the SEB. Such species include those listed within Council Directive 79/409/EEC on the conservation of wild birds or animal/plant species listed within Council Directive 92/43/EEC.

⁴⁵ Valuation to be made in consultation with the SEB. Such population include sub-populations that are essential to maintenance of metapopulation dynamics e.g. critical emigration/immigration links between otherwise discrete populations.

⁴⁶ Seasonal activity or behaviour upon which survival or reproduction depends.

⁴⁷ Valuation to be made in consultation with the SEB as such listings do not in themselves indicate intrinsic value, but instead indicate a conservation priority.

⁴⁸ Valuation to be made in consultation with the SEB, and with use of professional judgement as listing does not in itself indicate intrinsic nature conservation value.

⁴⁹ Valuation to be made in consultation with the SEB as such listings do not in themselves indicate intrinsic value. Such species include those listed within Council Directive 79/409/EEC on the conservation of wild birds or animal/plant species listed within Council Directive 92/43/EEC. Species which may be considered at the UK or National level means: birds, other animals and plants which receive legal protection on the basis of their conservation interest (those listed in the Wildlife and Countryside Act 1981 (as amended), SCH 1, 5 and 8); species listed for their principle importance for biodiversity (in accordance with the Natural Environment and Rural Communities Act 2006 Section 41 [England]; and priority species listed within the UKBAP or species listed within Red Data Books.

Examples of resource valuation based on geographical context

County or Unitary Authority Area Value

Designated sites including: Sites of Nature Conservation Interest (SNCI)s; County Wildlife Sites (CWSs); and Local Nature Reserves (LNRs) designated in the county or unitary authority area context⁵⁰.

Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such⁵¹.

Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent).

Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level^{40,41} where:

- The loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area; or
- The population forms a critical part⁴² of a wider population; or
- The species is at a critical phase⁴³ of its life cycle.

Local Value

Designated sites including Local Nature Reserves (LNRs) designated in the local context⁴⁷.

Trees that are protected by Tree Preservation Orders (TPOs).

Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

Table Source: IAN 130/10, Table 1

Designated sites

- 7.6.7. The Thames Basin Heaths SPA, Mole Gap to Reigate Escarpment SAC and Ebernoe Common SAC have *European* value.
- 7.6.8. Ockham and Wisley Commons SSSI, Esher Common SSSI and Papercourt SSSI have *National* value.
- 7.6.9. There is one LNR and 17 SNCI)s within 2 km of the Scheme. These are considered to be of *County* value.

Ancient woodland

- 7.6.10. There are 23 parcels of Ancient Woodland within 1 km of the Scheme. Ancient woodland is an irreplaceable habitat, which, where not designated, should be valued in consultation with Natural England.

Habitats

- 7.6.11. There are six Habitats of Principal Importance (HPI)⁵² within 500 m of the Scheme. These are lowland heathland, lowland mixed deciduous woodland, woodpasture and parkland, rivers, ponds and reedbed.
- 7.6.12. All lowland heathland falls within a European designated site, but this is designated for its bird populations. The heathland is one of the reasons for

⁵⁰ Valuation to be made in consultation with county ecologist or equivalent, with reference made to the criteria for designation.

⁵¹ Valuation to be made in consultation with county ecologist or equivalent.

⁵² Habitat of Principal Importance for the Conservation of Biodiversity on the England Biodiversity List, refer to Appendix C for further details.

designation of the SSSI, and is therefore of *National* value for nature conservation.

- 7.6.13. Much of the lowland mixed deciduous woodland and woodpasture and parkland within the Scheme boundary falls within European or nationally designated sites. However, these were designated because of the species and heathland habitat they support. Valuation of these HPIs will be made depending on the results of surveys and consultation with Natural England.
- 7.6.14. Rivers, ponds and reedbed where present, and not within a designated site, will be valued depending on the results of surveys and consultation with the Natural England.
- 7.6.15. The habitats within the highway soft estate including semi-improved neutral grassland and species-poor grassland, often forming a mosaic with tall ruderal and scrub vegetation, are not more than of *Local* value for nature conservation.

Notable and legally protected species

- 7.6.16. Qualifying features of the Thames Basin Heaths SPA are known to be present within the heathland habitat surrounding the Scheme (nightjar, Dartford warbler and woodlark).
- 7.6.17. In addition, great crested newt, all reptile species, noctule, soprano pipistrelle, brown long-eared bat, hazel dormice, water vole and otter are Species of Principal Importance⁵³ and may occur within or near the Scheme. Valuation of these species will be made depending on the results of surveys.
- 7.6.18. Protected species that may be present within the Scheme are protected under the Wildlife and Countryside Act 1981 (as amended), Conservation of Habitats and Species Regulations 2010 (as amended) or the Protection of Badgers Act (1992). See Appendix C for details of relevant nature conservation legislation.

7.7. Proposed assessment methodology

- 7.7.1. A detailed assessment⁵⁴ will be undertaken with respect to nature conservation. This will include the assessment of the detailed field survey data being collected, as outlined in section 7.4, and will allow an in-depth appreciation of the beneficial and adverse environmental consequences of the Scheme.
- 7.7.2. Habitat and species surveys will continue into spring 2018, to allow the impacts on notable and legally protected species to be confirmed.
- 7.7.3. The ES will follow guidance from the Guidelines for Ecological Impact Assessment in the UK and Ireland and IAN 130/10, which supplements the earlier DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation.
- 7.7.4. The assessment will characterise potential impacts on important nature conservation features, and take into account both on-site impacts and those that may occur to adjacent and more distant ecological features, including:
- Direct loss of habitats (including temporary loss);
 - Fragmentation or isolation of habitats;

⁵³ Species of Principal Importance for the Conservation of Biological Diversity in England are notified under Section 41 of the NERC Act 2006.

⁵⁴ According to DMRB Volume 11, Section 2, Part 1 General Principles and Guidance of Environmental Impact Assessment.

- Changes to the local hydrology, water quality and/or air quality;
- Direct mortality or injury to wildlife through construction activities, and
- Disturbance to species from noise, light or other visual stimuli.

7.7.5. An effect of impacts on nature conservation features would be determined as significant if those impacts change the structure and functions of designated sites, notable habitats, or ecosystems; or the conservation status of habitats and species.

7.7.6. Effects are identified at the geographic scale at which they become significant dependant on its value. The significance of effects takes into account any mitigation or compensation provided. Effects on nature conservation features are categorised on the five-point scale in line with IAN 130/10 summarised in Table 7-10 below, applied using professional judgement. An effect will be considered to be significant if it falls into the moderate category or above.

Table 7-10: Significance of effects on nature conservation feature

Significance category	Typical descriptors of effect
Very large	An impact on one or more feature(s) of international, European, UK or national value.
Large	An impact on one or more feature(s) of regional value.
Moderate	An impact on one or more feature(s) of county value.
Slight	An impact on one or more feature(s) of local value or features within the survey area.
Neutral	No significant impacts on important nature conservation features.

Table Source: IAN 130/10, Table 3

7.7.7. The significance of effects will be used to identify and determine the features that require mitigation and/or compensation, and to guide the type and scale of mitigation and/or compensation required, in consultation with key stakeholders.

7.7.8. Cumulative impacts will be considered as described in Chapter 15.

Vulnerability to major accidents and disasters

7.7.9. Major accidents and disasters that could potentially affect biodiversity receptors include:

- events that could result in direct damage of habitats, and injury of killing of individual animals or populations supported by those habitats, such as severe storms, spread of new plant diseases, terrorist attacks or plane/rail crashes; and
- other events such as major road traffic accidents, fires or chemical explosions or releases that emit air pollutants.

7.7.10. The potential for change in significance of effects due to direct damage of habitats and harm to species will be discussed as part of the biodiversity assessment. If the assessments for water and noise identify vulnerabilities that could affect valuable biodiversity receptors these will also be discussed as part of the biodiversity assessment. The potential for change in significance of effects

on biodiversity receptors through release of pollutants to the air will be discussed as part of the air quality assessment.

Considerations for Preliminary Design Stage

- 7.7.11. As part of the detailed assessment, it is necessary to undertake desk-based and field-based surveys, in order to gain an understanding of the baseline environmental conditions within the Ezol of the Scheme.
- 7.7.12. A number of surveys have been undertaken to date, and are detailed in section 7.4. However, further survey is required to determine the presence or absence of notable or legally protected species that may be affected by the Scheme.
- 7.7.13. Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Therefore, certain ecological surveys should be appropriately timed to coincide with the optimum survey period for the target species.
- 7.7.14. Surveys are required in order to determine the presence or absence, and population status, of the following species or groups of species in order to provide adequate information to assess the impacts of the Scheme.
- 7.7.15. The following surveys commenced in May 2017 and will continue during the Preliminary Design Stage:
- Extended Phase 1 Habitat survey of all areas of the Scheme footprint that have not already been surveyed;
 - NVC survey to determine the presence of HPI and notable plant species within all areas of the Scheme footprint that have not already been surveyed;
 - An assessment for invasive plants within all areas of the Scheme footprint that have not already been surveyed;
 - A survey of the wet ditch (connected to Ockham Mill Stream) which passes under Stratford Bridge at the Ripley roundabout (central OS grid reference TQ0627957496), will be carried out to identify if otters or water voles are present;
 - Surveys to determine the potential for notable aquatic species within ditches, ponds and rivers affected by the Scheme, including invertebrates and fish;
 - Bat surveys (transect and static detector surveys) are currently being carried out in 2017 to cover any potentially suitable habitat within the Scheme footprint that was not included in the 2016 surveys, or any gaps in the 2016 surveys. These are expected to be completed in October 2017;
 - Further dormouse surveys will be carried out in autumn 2017 and spring 2018 to confirm presence/likely absence within the woodland at Elm Corner SNCI (including the adjacent ancient woodland), and the ancient woodland at the Girl Guides Camp at Painshill that have not been surveyed to date for dormice;
 - An updated badger survey will be carried out of the Scheme footprint, to identify any unrecorded setts; and

- Reptile surveys are currently being carried out of potentially suitable habitat within the Scheme footprint that is not already monitored by SARG. Sand lizards were only reintroduced to Ockham Common and are considered to be absent from the habitats within the south-west, north-east and north-west quadrants of habitat surrounding M25 Junction 10. The heathland habitat within the south-west quadrant will not be impacted by the Scheme and is already monitored by SARG. Therefore, it is not proposed to survey the heathland habitat within the south-west quadrant. However, a single sand lizard was recorded within the open wooded area in the south-east quadrant during an invertebrate survey on the 19th June 2017. Therefore, open sections within this wooded area are being surveyed for sand lizards. Reptile surveys will continue throughout September 2017, and some will be continued in spring 2018.

- 7.7.16. An arboricultural assessment of veteran trees within the Scheme footprint will be carried out during the Preliminary Design stage.
- 7.7.17. A data search will also be requested from West Surrey Badger Group for badger records within 1 km of the Scheme boundary.
- 7.7.18. Data from the above surveys will inform an assessment of the significance of impacts on designated sites, habitats and species, using guidance from the Guidelines for Ecological Impact Assessment in the UK and Ireland and IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment, which supplements the earlier DMRB chapter in Volume 11, Section 3, Part 4 'Ecology and Nature Conservation' (dated 1993).
- 7.7.19. The findings of the assessment will be used to prescribe appropriate mitigation that will avoid, reduce and/or compensate for any significant impacts that have been identified during the construction and operation phases of the Scheme. Any residual impacts and their consequent effects will also be determined.

7.8. Proposed consultation

- 7.8.1. To date the following environmental organisations have been consulted with regards to aspects of the Scheme such as option selection and design, potential mitigation and compensation features, and species survey methodologies:
- Natural England (option selection and design, potential mitigation and compensation features, and species survey methodologies);
 - Environment Agency (option selection and design);
 - Surrey Wildlife Trust (option selection and design, potential mitigation and compensation features);
 - Royal Society for the Protection of Birds (option selection and design, potential mitigation and compensation features);
 - Surrey Amphibian and Reptile Group (species survey methodologies); and
 - Forestry Commission (option selection and design).
- 7.8.2. Consultation will continue with these organisations through this stage, in order to ensure their input is incorporated into the impact assessment, the final design of the Scheme and its associated mitigation and compensation.

7.9. Potential mitigation measures

7.9.1. Based on the current understanding of the nature conservation constraints and opportunities, the following design suggestions have been made, some of which may need to be undertaken in association with adjacent landowners:

- Construction works will be timed to minimise impacts on species, for example, avoiding disturbance of breeding Dartford warblers, woodlark and hobby (all of which are protected against disturbance during breeding under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended));
- A new multi-function 'green' bridge to replace the existing Cockrow bridge (which will need to be demolished to accommodate the A3 widening) linking the south-east (Ockham Common) and south-west (Wisley Common) quadrants. This green bridge will link two heathland areas of the SPA, and will be designed to encourage the movement of heathland species, including sand lizards (which are currently confined to Ockham Common);
- Opening up of the woodland either side of the new Cockrow bridge, in order to encourage heathland regeneration, and create a continuous connected belt of heathland habitat between the two quadrants;
- Restoration of heathland and sandy habitats within temporarily cleared areas of woodland within the SPA/SSSI. Cleared areas will be managed to allow heathland regeneration, and excess sandy soils will be used to create features, such as exposed banks to support key invertebrates, a qualifying feature of the SSSI;
- A multi-functional bridge linking the south-west and north-west quadrants. This bridge could be designed to support vegetation and provide connectivity between Wisley Common and the woodland and heathland within the north-west quadrant. This bridge may contain vegetation, connecting the habitats on either side of the bridge;
- Felling of some wooded areas within the north-west quadrant, in order to encourage heathland regeneration and increase the existing areas of heathland within this quadrant;
- Management of existing areas of Scots pine plantation within the north-east quadrant, in order to encourage a more diverse woodland structure, and enhance biodiversity;
- Purchase of land connected to the north-west quadrant, in order to revert back to mixed heathland and woodland, to increase the areas of continuous heathland and woodland to compensate for loss of habitat within the Thames Basin Heaths SPA, Ockham and Wisley Commons SSSI and Ockham and Wisley Common LNR;
- Provision of improved signage and preferred routes within Ockham Common and Wisley Common, to reduce pressure across the rest of this area of SPA;
- Provision of bird and bat boxes to mitigate for the loss of potential features within cleared areas of woodland;

- Improvement of existing noise barrier fencing around M25 Junction 10, in order to reduce the levels of operational road noise within the SPA and the wider SSSI;
- Soil from any ancient woodland to be lost to be translocated to a compensation area for woodland planting;
- Removal of non-native invasive plant species from within the Scheme footprint; and
- Provision of a Construction Environmental Management Plan (CEMP) to ensure that all environmental objectives are adhered to during the construction phase. This will minimise the impact on ecological features (such as SPA qualifying breeding birds) and ensure that the Scheme does not contribute to the spread of non-native invasive plant species.

7.9.2. This assessment, and consultation with Natural England, will identify requirements for ecological monitoring during and after development. This may include monitoring for individual species, particularly if any European Protected Species licences are required, and will include monitoring of newly created habitats to inform decisions on their maintenance.

7.10. Assumptions and limitations

- 7.10.1. A full set of ecological surveys has not been carried out for the entire footprint of the Scheme. However, further surveys are ongoing and/or will be carried out in spring 2018 to fill gaps in survey coverage (see paragraph 7.7.15 for further surveys to be completed).
- 7.10.2. The scoping survey included a drive-by survey of the A3 between the A3 Ockham Interchange and A3/A245 Painshill Junction. This involved a high-level assessment of broad habitat types present with their potential to support legally protected and notable fauna. This was conducted instead of an Extended Phase 1 habitat survey due to the health and safety risks associated with surveying the verge of a major trunk road. However, it is considered that this is sufficient to establish the broad habitat types present along the verges. This knowledge of the habitat types, and knowledge from surveys of the surrounding area, has enabled the potential for protected species that may occur within the road verges to be identified.
- 7.10.3. Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Therefore, the survey of the Scheme footprint will not have produced a complete list of plants and animals and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.
- 7.10.4. The search for water bodies within 500 m of the site was undertaken by using Ordnance Survey plans and aerial photographs only. These sources may not show all ponds and or water bodies within 500 m of the site boundary (for example, some garden ponds may not be shown on maps or aerial images) and therefore some water bodies may not have been identified. However, it is considered that the vast majority of established water bodies will have been identified as a result of this approach, and this should be sufficient to determine the approximate abundance of great crested newts within the Scheme footprint.

- 7.10.5. The list of invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats, including aquatic habitats. The walkover survey checked for the presence of Japanese knotweed, giant knotweed, hybrid knotweed, giant hogweed, rhododendron, cotoneaster species and Himalayan balsam. Other invasive species, in particular those associated with aquatic habitats may not have been recorded, but it is considered that this survey is sufficient to identify any constraints posed by invasive species.
- 7.10.6. It is considered that a thorough series of ecological surveys have been, or are being conducted for the Scheme, and therefore a sufficient baseline dataset in order to inform the Preliminary Design Stage ES is anticipated.

7.11. Conclusion

- 7.11.1. Much of the ecological baseline data within the Scheme footprint has already been gathered, or is currently ongoing and will be completed in spring 2018.
- 7.11.2. Consultation with key stakeholders is ongoing and will continue throughout this stage.
- 7.11.3. Based on the proposed scope of ecological assessment, it is considered that sufficient information will be gathered in order to inform the PEIR and identify the necessary mitigation and compensation required for the Scheme.

8. Road Drainage and the Water Environment

8.1. Introduction

8.1.1. This chapter scopes the information and activities necessary to complete the preliminary design stage for water and drainage, which includes the completion of surveys, stakeholder consultation and completion of the EIA. An overview of the knowledge on the existing water environment gathered to date, the potential constraints this poses for the Scheme and outlines the methodology for assessment. The following factors are considered:

- The importance of the receiving environment;
- The potential significant effects of the construction and operation of the Scheme and, whether they are permanent or temporary and positive or negative impacts as a result of direct, and indirect effects; and
- The likely scale of change following the implementation of potential mitigation measures.

8.1.2. Previous assessments of the options for a scheme at M25 Junction 10/A3 Wisley Interchange have been undertaken. These include:

- Road Investment Strategy M25 Junction 10/A3 Wisley Interchange Improvements Environmental Study Scoping Report. Highways England. July 2017;
- Road Investment Strategy M25 Junction 10/A3 Wisley Interchange Improvements. Water Framework Directive Assessment (Options Selection Stage) Highways England. May 2017;
- Road Investment Strategy M25 Junction 10/A3 Wisley Interchange Improvements Environmental Assessment Report. Highways England. April 2017; and
- Regional Investment Programme M25 Junction 10/A3 Wisley Interchange Preliminary Sources Study Report. Highways England. April 2017.

8.1.3. These reports provide baseline information on the water environment.

8.2. Study area

8.2.1. The spatial scope of the assessment includes, features of the water environment within 1 km of Scheme. In line with the DMRB Volume 11, Section 3, Part 10 HD 45/09 Road Drainage and the Water Environment, a 1 km study area is also deemed appropriate as for the assessment of soluble pollutants, research indicates that beyond 1 km it is likely any impacts will be sufficiently diluted, thereby reducing any potential impact. Where appropriate, study area and collection of baseline data may be enlarged where potential effects may extend beyond 1 km (e.g. downstream flood risk or hydromorphological change). For groundwater, the potential zone of impact will be assessed on the underlying Water Framework groundwater body.

8.3. Planning and policy context

- 8.3.1. Relevant legislation is summarised in Table 8-1 this will be reviewed as the Scheme progresses in order to determine ongoing relevance.
- 8.3.2. Relevant policies will be assessed by identifying the degree of compliance or conflict with the Scheme.

Table 8-1: Legislation

Legislation	Description
European legislation	
Water Framework Directive (WFD) (2000/60/EC)	The WFD requires that all inland waters within defined river basin districts must reach at least good status by 2015 and defines how this should be achieved through the establishment of environmental objectives and ecological targets for surface waters. Any new scheme must not cause deterioration of the water environment or prevent the future attainment of good status.
Environmental Quality Standards Directive (2008/105/EC)	Lists environmental quality standards (EQS) for priority substances and certain other pollutants as provided for in Article 16 of the Water Framework Directive 2000/60/EC (WFD), with the aim of achieving good surface water chemical status. It includes certain metals that are associated with runoff from highways.
Groundwater Directive (2006/118/EC)	Complements the WFD. It requires measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved.
Habitats Directive (92/43/EEC)	To promote the maintenance of biodiversity by taking measures to maintain or restore natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance. Sites or species that come under this Directive will heighten the importance of water features that sustain them.
Floods Directive (2007/60/EC)	The aim of this Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. It sets the strategic level for flood risk that any development will need to comply with.
National legislation	
Antipollution Works Regulations (1999)	Where pollution occurs, or is likely to occur the Environment Agency can serve a works notice under Section 161A of the Water Resources Act on any person who has caused or knowingly permitted the pollution (or risk of pollution) to a water course, requiring them to carry out anti-pollution/preventative works and operations. The Environment Agency can also recover the costs of any investigation and anti-pollution works carried out. The Anti-Pollution Works Regulations prescribe the content of anti-pollution works notices. They also prescribe the particulars of such matters as are required to be placed on the pollution control registers maintained by the Environment Agency.
Environment Act (1995)	The Act provides for the establishment of a body corporate to be known as the Environment Agency, the key regulator for the water environment.
Environmental Damage (Prevention and Remediation) Regulations (2015)	The emphasis of these Regulations is proactively putting in place appropriate pollution prevention measures to reduce risks to the environment.

Legislation	Description
Environmental Protection Act (1990)	This act brings in a system of integrated pollution control for the disposal of wastes to land, water and air.
Flood Risk Regulations (2009) Amended SI2011/2880 transpose directive 2007/60/EC	The Flood Risk Regulations aim to provide a consistent approach to managing flood risk. The Environment Agency are responsible for managing flood risk from main rivers, the sea and reservoirs. LLFAs are responsible for local sources of flood risk, in particular surface water, groundwater and ordinary watercourses.
Flood and Water Management Act 2010 and Commencement Orders	The key areas covered by this Act are: <ul style="list-style-type: none"> • Roles and responsibilities for flood and coastal erosion risk management; and • Improving reservoir safety.
Groundwater (England and Wales) Regulations (2009)	These transpose of the Groundwater Directive (2006/118/EC) into law in England and Wales. These powers are implemented in though the Environmental Permitting Regulations (2016).
Highways Act 1980 (HA 1980)	The Act deals with the management and operation of the road network in England and Wales including the drainage of highways into environmental waters and sewers.
National Planning Policy Framework (NPPF) (DCLG, 2012)	The NPPF sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. It forms the basis of assessment of flood risk for schemes.
National Planning Practice Guidance (NPPG) 2014 Policy 10: Meeting the challenge of Climate Change, Flooding and Coastal Change Policy 11: Conserving and Enhancing the Natural Environment	In 2014, accompanying the NPPF, the National Planning Practice Guidance (NPPG) (DCLG, 2014) was published. This advises on how Local Planning Authorities can ensure water quality and the delivery of adequate water infrastructure and take account of the risks associated with flooding in the plan-making and the planning application process.
The Environmental Permitting (England and Wales) Regulations 2016	Provide a consolidated system of environmental permitting in England and Wales and transpose provisions of fifteen EU Directives which impose obligations requiring delivery through permits or which are capable of being delivered through permits. Covers Environment Agency permits for flood risk (on Main River) and certain discharges to watercourses.
The Water Resources (Environmental Impact Assessment) (England and Wales) Regulations 2003	Impose procedural requirements in relation to the consideration of applications or proposals for an abstraction or impounding licence under Chapter II of Part II of the Water Resources Act 1991 and require consent in other cases.
Water Act 2003 and Water Act 2014	Aims to improve water conservation, protect public health and the environment, and improve the service offered to consumers. The Act is in three parts relating to water resources, regulation of the water industry and other provisions.
Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015	These Directions set out the environmental standards to be used for the second cycle of river basin plans. They transpose Directive 2013/39/EC on environmental quality standards for priority substances.

Legislation	Description
Water Industry Act (1991) (Amendment) (England and Wales) Regulations (2009)	Sets out the responsibilities of the Environment Agency of England and Wales in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation. The Act regulates discharges to controlled waters, namely rivers, estuaries, coastal waters, lakes and groundwaters.
Water Resources Act 1991	Act to regulate water resources, water quality and pollution, and flood defence. Sets out standards for Controlled Waters.
Water Environment (Water Framework Directive) (England and Wales) Regulations 2003	Outline the duties of regulators (Environment Agency in England) in relation to environmental permitting, abstraction and impoundment of water.
The Land Drainage Act 1991	Requires that a watercourse be maintained by its owner in such a condition that the free flow of water is not impeded. The 1994 Act amends it in relation to the functions of internal drainage boards and local authorities.
The Control of Pollution (Oil Storage) (England) Regulations 2001	Applicable for storage of more than 200 litres of oil above ground at an industrial, commercial or institutional site, then these Regulations affect you. The sites they cover include; factories, shops, offices, hotels, schools, churches, public sector buildings and hospitals. The Regulations apply only in England.

8.4. Baseline conditions

8.4.1. This section sets out the baseline conditions of the water environment. At this stage, a high-level desk-based assessment has been undertaken using publicly available spatial data under the Open Government Licence⁵⁵ and from open sources including the EA⁵⁶. As no new information has become available since the Option Selection Stage, this chapter largely echoes that of the baseline reported in the previous stage. However, the baseline reported in the previous stage has been revisited in order to confirm any updates to baseline/existing conditions. WFD full walkover surveys of the affected watercourses and lakes will be undertaken as part of this stage.

Surface water

8.4.2. Waterbodies within the study area fall within the Thames River Basin District as set out within the River Basin Management Plan⁵⁷.

8.4.3. Four Water Framework Directive (WFD, 2000/60/EC) surface waterbodies have been identified across the study area. The current chemical and ecological status of these surface waterbodies is shown in Table 8-5. The WFD surface waterbodies identified are:

- River Wey - Shalford to River Thames Confluence at Weybridge (GB106039017630);
- Stratford Brook (WFD ID GB106039017890);
- Guilehill Brook (WFD ID GB106039017880); and

⁵⁵ <http://environment.data.gov.uk/ds/catalogue/#/catalogue>

⁵⁶ <http://apps.environment-agency.gov.uk/wiyby/default.aspx>

⁵⁷ <https://www.gov.uk/government/collections/river-basin-management-plans-2015>

- River Mole (Horley to Hersham) (WFD ID GB106039017621).

8.4.4. Table 8-2 provides details of the WFD surface waterbodies potentially impacted by components of the Scheme. Note, when there are no designated WFD reaches within the study area around the specific component, it is denoted as N/A. However, there may be other non-WFD watercourses that are important as they potentially contribute to the WFD water body overall quality and status. These non-WFD watercourses will be identified and assessed as part of the ES.

Table 8-2: Surface waterbodies

Receptor	Distance from receptor waterbodies		Waterbodies
	M25 works	A3 works	
River Wey - Shalford to River Thames Confluence at Weybridge (GB106039017630)	Existing crossing and 400 m north of works near Buxton Wood	N/A	The Scheme falls within the River Wey and River Mole catchments, with Stratford Brook and Guileshill Brook clipping the southern boundary of the works
Stratford Brook (GB106039017890)	N/A	Existing crossing and 260 m south of works near Stratford Bridge	
Guileshill Brook (GB106039017880)	N/A	700 m southwest of works on A3 near Stratford Bridge	
River Mole (Horley to Hersham) (GB106039017621)	320 m north of Hatchford Wood	Existing crossing and 350 m north of works near B365/A245 Cobham interchange	

8.4.5. As highlighted above, there are other surface watercourses that are not classified under the WFD within the study area. The exact number and status is unknown at the time of reporting due to the small-scale of these features and the dependence on only publicly available data for this stage in the assessment.

Lakes and other surface water features

8.4.6. There is one WFD designated lake within the study area, Bolder Mere (WFD ID GB30643218), which is located 840 m south-west from Junction 10, adjacent to the A3.

8.4.7. There are ponds within the study area. The relationship and dependence these have with groundwater is unknown at the time of reporting. The feature will only be scoped in if there are potential affects due to changes in groundwater.

Groundwater

8.4.8. Based on geological open data (1:625k scale), the study area is underlain by sand, silt and clay, with a pocket of clay in the south. The study area is underlain by a Secondary A Superficial Aquifers and there are also Principal Aquifers to the east and west of the study area, adjacent to the courses of the River Wey and River Mole, indicating high groundwater sensitivity. The Principal Aquifer to the east of the study area lies approximately 500 m north-east of Junction 10 and crosses the northern edge of the Scheme. The Principal Aquifer to the west of the study area lies approximately 300 m west of Junction 10 and crosses the western edge of the Scheme. Secondary A Aquifers are 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. Principal Aquifers usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

8.4.9. One WFD groundwater body has been identified across the study area. This is the Cobham Bagshot Beds (WFD ID GB40602G601400).

8.4.10. There are no Source Protection Zones (SPZ) within the study area.

WFD compliance assessment

8.4.11. A WFD compliance assessment is required for new developments and schemes to demonstrate that the Scheme will not result in a deterioration in status (or potential status) of any water body, or prevent the water body from meeting good status (or potential good status) in the future (2017 or 2021).

8.4.12. The Environment Agency is the competent authority for WFD. However, as the Scheme has the potential to also affect other watercourses not designated as Main River, Surrey County Council (the lead local flood authority) also has a duty to ensure the Scheme complies with WFD legislation.

8.4.13. A WFD preliminary assessment was undertaken in May 2017. The preliminary assessment was based on the preliminary option drawings. This assessment has been updated and full details of this scoping WFD assessment are in Appendix D. The scoping WFD assessment concluded that the Scheme can be compliant with the requirements of the WFD. None of the options that make up the Scheme are anticipated to cause deterioration at the water body scale. All should also not prevent future attainment of Good Ecological Status or Good Ecological Potential. However, to achieve compliance with the Directive, the details of mitigation measures will need to be developed as part of future design phases; in particular, careful consideration will need to be given to mitigation needed to avoid deterioration in the Potential of the Boldermere WFD lake water body.

Abstractions and discharges

8.4.14. The EA website⁵⁸ indicates there are numerous surface water abstractions within the study area. Details of these abstractions are being obtained with a site specific Envirocheck report).

8.4.15. Based on the Highways Agency Drainage Data Management System⁵⁹ there are numerous highway outfalls across the Scheme study area. The status of these and the implications for the Scheme will be assessed during this stage.

8.4.16. The site specific Envirocheck report will provide details of discharge consents in the study area. This report is still to be received in full.

Flood risk

8.4.17. Flood zones 2 and 3 are associated with the surface watercourses identified in Table 8-2 which are adjacent to the Scheme. These flood zones refer to the probability of river flooding, ignoring the presence of defences. Flood zone 2 is land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding. Flood zone 3 is land having a 1 in 100 or greater annual probability of

⁵⁸ http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683&y=355134&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=water_abstractions

⁵⁹ <https://data.gov.uk/dataset/highways-agency-drainage-data-management-system-haddms>

river flooding. The location of flood zones in relation to the Scheme are shown on the Environmental Constraints plan in Chapter 19 of this document.

- 8.4.18. Other forms of flooding, including surface water (when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flow over the ground instead) and groundwater flooding (when levels of water in the ground rose above the surface) are unknown at the time of reporting. Surface water flooding issues/hot spots within the study area include Redhill Bottom and Sandpit Hill north and south of the Junction 10 interchange respectively and areas on Wisley Common, Bolder Mere Lake, Stratford Bridge and Guilehill Brook. Surface water flood risk ranges from high to low.
- 8.4.19. The hydrogeological character of the study area means that groundwater flood risk may be an issue.

Aquatic ecology

- 8.4.20. Aquatic ecology has been considered in Chapter 7 Biodiversity.

Designated sites

- 8.4.21. Designated sites within the study area are listed in Table 8-3. The hydraulic connectivity of these sites is unknown at the time of reporting. Potential ecological effects will be considered in Chapter 7 Biodiversity.

Table 8-3: Designated sites

Designated site	Distance (m)
Thames Basin Heaths SPA	Surrounds Junction 10
Ockham and Wisley Commons SSSI	Surrounds Junction 10
Esher Commons SSSI	Located adjacent to the A3 at the northern extent of the study area

8.5. Potential impacts

- 8.5.1. Potential effects during the construction phase (proportionate to the scale of the proposed works) include but are not limited to the following.
- 8.5.2. Risks to the surface water environment due to:
- Excavation, and the subsequent deposition of soils, sediment, or other construction materials to accommodate new watercourse crossings, new bridges, retaining walls, gantries;
 - Spillage of fuels or other contaminating liquids;
 - Mobilisation of contamination following disturbance of contaminated ground or groundwater, or through uncontrolled site runoff; and
 - Risks to groundwater environment (principally associated with cuttings) and potential contamination risks to the underlying Principle Aquifer and subsequent effects on existing abstractions.
- 8.5.3. These risks could result in sediment and/or other contaminants entering watercourses or groundwater affecting the quality of the water which could have implications for abstractions and WFD compliance.

- 8.5.4. Risk of an increase in flood risk both to the Scheme and surrounding land uses, arising from:
- Storage of materials and temporary impermeable areas at site compounds;
 - The construction of the Wisley Lane access bridge over the Stratford Brook flood plain which may impinge on it depending on structure arrangement chosen.
 - Interception of groundwater or changes to groundwater flows;
 - Discharge of abstracted water during construction giving rise to increased flood risk, especially if discharged to smaller watercourses; and
 - Potential effects on water dependent designated sites during construction.
- 8.5.5. Potential effects during the operation phase include:
- Effects on surface water arising from: pollutants (e.g. oils from fuel combustion/accidental spillages and salts or herbicides from road maintenance) and new areas of hard standing that could increase road runoff and affect the water quality in the river;
 - Direct physical impacts of watercourse crossings with potential for direct effects on biological, chemical and physical WFD parameters for both surface waters and WFD groundwater bodies;
 - Any discharges to ground may have implications for groundwater quality;
 - Discharge from new sections of highway has the potential to increase flood risk for receptors downstream; and
 - Any road structures or landscaping features constructed in the floodplain have the potential to alter flood flows and increase flood risk.

8.6. Proposed level and scope of assessment

- 8.6.1. Table 8-4 presents the scope of assessment which has been established using the baseline data, the water resource value and the potential construction and operation implications of the Scheme on the water environment.

Table 8-4: Water topics scoped into further assessment

Effects	Scoped in/out	Comment/Justification
Surface waterbodies	✓	Surface water quality tests to be undertaken using the Highways Agency Water Risk Assessment Tool (HAWRAT). Assessment of pollution impacts on surface waters from accidental spillages in line with HD45/09.
Lakes	✓	The assessment will consider the quality impacts in accordance with the requirements of the WFD. Consideration will be given to the potential changes to quality during both the construction and operation phases. Adequate mitigation needs to be put in place to avoid deterioration in the Potential of Boldermere WFD lake waterbody. This mitigation is necessary to avoid adverse impacts at a waterbody scale associated with the construction of a retaining wall along the western shore of the lake.

Effects	Scoped in/out	Comment/Justification
Groundwater	✓	The assessment will consider both groundwater level and quality impacts in accordance with the requirements of the WFD. Consideration will be given to the potential changes to water flow, volumes and quality during both the construction and operation phases. Further information on licenced and unlicensed private water supplies will be identified in consultation with the Environment Agency and the local authority.
Abstractions and discharges	✓	The assessment will consider the location of the abstraction points and the quality impacts from both the construction and operation phases.
Flood risk	✓	Possible issues with providing flood compensation storage relating to the proposals for the side roads. A Flood Risk Assessment (FRA) will be required in line with the National Planning Policy Framework (NPPF).
WFD detailed assessment	✓	Walkover surveys to record the current ecological and geomorphological assemblages, to understand the sensitivity of those assemblages to the Scheme and to identify the location and type of potential measures to mitigate the local adverse effects of the Scheme. The following data gaps need to be filled to inform future WFD compliance assessment: <ul style="list-style-type: none"> • River Habitat Survey for the affected river reaches (if available); • Fluvial audit of affected river reaches (if available); • Groundwater level data for the Bagshot Formation in the vicinity of the Scheme (this should be scoped into the intrusive ground investigation); and • Further information on measures that the Environment Agency and local catchment partnerships consider may improve WFD status of affected waterbodies.
Water-dependent designated sites	✓	It should be confirmed if there is any/will be any hydraulic connectivity.

Value of the environmental resources and receptors

- 8.6.2. Table 8-5 summaries the environmental receptors and their importance as identified in the baseline above. Should the study area change or more information become available, the baseline and subsequently the receptors may change.
- 8.6.3. To assist with assessment during the subsequent environmental assessment process, the sensitivity/importance criteria may be developed further based on professional judgement and experience. At the time of reporting the method of assessing the importance/value, has been based on the Transport Appraisal Guidance (TAG) Unit A3 (DfT, December 2015) (Chapter 10 Tables 13 - 17).

Table 8-5: Environmental resources, receptors and importance

Resource	Features	Indicator of quality (taken from WebTAG table 13)	Measure (taken from WebTAG table 13)	Importance
Watercourses				
River Wey - Shalford to River Thames Confluence at Weybridge (GB106039017630)	Water supply	Chemical water quality	Current chemical water quality classification - Good	Medium
	Biodiversity	Biological water quality	Current ecological classification - Moderate	Low
Stratford Brook (WFD ID GB106039017890)	Water supply	Chemical water quality	Current chemical water quality classification - Good	Medium
	Biodiversity	Biological water quality	Current ecological classification - Moderate	Low
Guileshill Brook (GB106039017880)	Water supply	Chemical water quality	Current chemical water quality classification - Good	Medium
	Biodiversity	Biological water quality	Current ecological classification - Moderate	Low
River Mole (Horley to Hersham) (GB106039017621)	Water supply	Chemical water quality	Current chemical water quality classification - Good	Medium
	Biodiversity	Biological water quality	Current ecological classification - Moderate	Medium
Tributaries of WFD designated resources as stated in surface water	Water supply	Chemical water quality	On the assumption, these contribute to the WFD designated reaches all have been assigned a medium importance in line with the WFD reaches.	Medium
	Biodiversity	Biological water quality	On the assumption, these contribute to the WFD designated reaches all have been assigned a medium importance in line with the WFD reaches.	Medium
Floodplain				
River Wey - Shalford to River Thames Confluence at Weybridge	Conveyance of flood flow	Presence of flood zones	Existing flood risk. River Wey has flood zone 2 and 3 areas.	Very High

Resource	Features	Indicator of quality (taken from WebTAG table 13)	Measure (taken from WebTAG table 13)	Importance
(GB106039017630) floodplain			Floodplain with more than 100 residential properties.	
Stratford Brook (WFD ID GB106039017890) floodplain			Existing flood risk. Stratford Brook has flood zone 2 and 3 areas. Floodplain with up to 100 residential properties or industrial premises.	High
Guileshill Brook (GB106039017880) floodplain			Existing flood risk. Guileshill Brook has flood zone 2 and 3 areas. Floodplain with up to 100 residential properties or industrial premises.	High
River Mole (Horley to Hersham) (GB106039017621) floodplain			Existing flood risk. River Mole has flood zone 2 and 3 areas. Floodplain with more than 100 residential properties.	Very High
Tributaries (of WFD designated resources as stated in surface water) floodplain			On the assumption, these contribute to the WFD designated reaches all have been assigned an importance in line with the WFD reaches they contribute to.	Medium, High and Very High
Lakes				
Bolder Mere Lake (GB30643218)	Water supply	Chemical water quality	Current chemical water quality classification - Good	Medium
Groundwater				
Cobham Bagshot Beds (WFD ID GB40602G601400)	Water supply	Use of water supply	Agricultural abstraction licences	Medium
	Groundwater vulnerability	Source Protection zones	None	Low
		Classification of aquifer vulnerability	Principal Aquifer	Very High

Resource	Features	Indicator of quality (taken from WebTAG table 13)	Measure (taken from WebTAG table 13)	Importance
		Classification/ status and objective under WFD	Current chemical water quality classification - Good	Medium

Key* Importance is based on WEBTAG

8.7. Proposed assessment methodology

Surface water

- 8.7.1. The Highways Agency DMRB (HD 45/09) (HA, 2009) provides guidance on the assessment of likely significance of effects on the water environment associated with highway schemes. This guidance in conjunction the Department for Transport TAG guidance (WEBTAG) will be for assigning the importance and potential magnitude of impact.
- 8.7.2. The assessment will use drainage information and AADT data to establish potential impacts of the Scheme on the water environment within the study area and the requirement for mitigation measures to adequately reduce the risk.
- 8.7.3. The potential ecological impacts of routine runoff on surface water will be assessed using the water quality model HAWRAT as advised in the DMRB (HD 45/09). Spillage risk tests will also be undertaken in accordance with the DMRB (HD 45/09).

Groundwater

- 8.7.4. At the time of reporting, it is unknown if discharge to ground will be required and the suitability of this method. Once confirmed, the assessment of the potential pollution impacts from runoff to groundwater may be required. This will be in accordance with Method C as outlined in HD45/09.

Flood risk

- 8.7.5. The Flood Risk Assessment (FRA) will be carried out in accordance with the requirements of the NPPF (DCLG, 2012) and its accompanying Technical Guidance (DCLG, 2014), and the Environment Agency's 'Climate change allowances for planners' NPPF supporting guidance (EA, 2013).

WFD

- 8.7.6. The approach to the WFD compliance assessment will follow the Planning Inspectorate's guidance on preparation of WFD assessments for a Nationally Significant Infrastructure Project⁶⁰. It will be based on a format that was originally developed in close consultation with the Environment Agency for a large transport infrastructure scheme⁶¹. This format was subsequently promoted by the Environment Agency as an example of best practice, particularly for large schemes that affect many water bodies. It captures the core requirements of a

⁶⁰ The Planning Inspectorate (2017) Advice Note 18, The Water Framework Directive

⁶¹ HS2, 2016. Water Framework Directive Compliance Assessment Update (C453) Supplementary Information. London: HS2. C454-ATK-EV-REP-000-000001

compliance assessment whilst being transparent and simple to interpret. Assessment can be readily updated, creating a clear audit trail of WFD compliance as a scheme progresses through its lifecycle from options assessment to design and environmental permitting.

- 8.7.7. The WebTAG assessment will be carried out in accordance with TAG UNIT A3 Environmental Impact Appraisal Department for Transport May 2014 Transport Analysis Guidance.

Vulnerability to major accidents and disasters

- 8.7.8. Major accidents and disasters comprise man-made and natural risks which are considered likely, and anticipated to result in substantial harm that the normal functioning of the Scheme is unable to cope with/rectify - i.e. risks with the potential to have a significant effect.
- 8.7.9. Despite the limited nature of natural risks the UK is exposed to, the potential of natural circumstances such as extreme rainfall or major droughts impacting on groundwater for example, are considered to have the potential to have a direct, reductive effect on the future effectiveness of the drainage system of the Scheme and subsequent effects on the water environment. Assessment under this section would therefore consider storm events and the possibilities for extreme drought, the potential consequences for effects of the Scheme on drainage and the water environment.
- 8.7.10. In terms of man-made risks, the most pertinent for water would be the impacts of a major chemical spill and how this would affect the Scheme and pass through to the wider water environment.
- 8.7.11. Further assessment would be informed by other topics, as assessing the adverse effects of a major accident or disaster will require interaction with other sections of the formal ES.
- 8.7.12. The requirement for further baseline information as part of the vulnerability assessment will be reviewed as part of this preliminary design stage to inform the ES.

8.8. Proposed consultation

- 8.8.1. Consultation with regulators, in the form of introductory meetings and follow up specific technical meetings on site (principally with the Environment Agency, plus LLFAs and other interested parties) will continue regularly throughout the design process to ensure that the Scheme is designed to be compliant with the objectives of the WFD and to ensure sustainable drainage mitigation is incorporated into the design so as to not increase surface water flood risk in the areas highlighted.

8.9. Potential mitigation measures

- 8.9.1. Should the assessment undertaken using the above methodology identify any significant adverse effects, mitigation measures would to be implemented. These proposed mitigation measures would be in addition to the embedded mitigation within the project's design, such as sustainable drainage systems (SuDs) pollution control measures on outfalls (if appropriate, such as oil interceptors or

downstream defenders) and measures within the Construction Environmental Management Plan (CEMP) to control and prevent polluted run-off.

8.9.2. Key considerations/principles guiding WFD compliant design include but are not limited to the following:

- Single span bridges are the preferred type of crossing because they minimise impact on the water environment if designed appropriately; and
- Culverts are, however, generally cheaper and easier to build than single span structures because their construction process tends to be less complex. Key considerations in environmentally sensitive culvert design include; minimising the length, adopting an open arc structure that avoids disturbing the natural bed of the river is preferred to a box culvert and incorporating a natural bed substrate.

8.10. Assumptions and limitations

8.10.1. The assumptions and limitations at the time of reporting are as follows:

- Data quality - desk study, using mainly web-based data and previous assessment reports only has been reported;
- Data quantity - as per quality, only open, freely licensed data has been reported at this stage and therefore the amount of detail on certain topics is limited;
- Site visits - no site visits have been undertaken at the time of reporting so site specific, ground truth data is limited (targeted site visits for walkover surveys are planned as part of this stage); and
- Where impacts are uncertain a conservative approach has been adopted.

8.10.2. For this Preliminary Design Stage assessment, assumptions include:

- Environmental data will be up to date and available from accessible sources (mainly web-based);
- Data for the Scheme will be available including traffic and road catchment data to allow water quality modelling assessments to be made and the flood risk and WFD assessments; and
- Access will be acquired to enable site visits to be undertaken.

8.11. Conclusion

8.11.1. In line with the DMRB, an assessment will be required where there is a potential for any road project to adversely affect the water environment.

8.11.2. The Scheme does have this potential and further assessment is required. This will use appropriate methodology to assess the likely effects upon the water environment as a result of the Scheme whilst also proposing appropriate mitigation measures that are proportionate to the likely impacts.

8.11.3. Road drainage and the water environment is scoped in to this stage of assessment and all aspects should be included (flood risk, groundwater and surface water). This is summarised in

8.11.4. Table 8-6 below. In addition standalone Flood Risk Assessment and WFD compliance assessment will be undertaken.

Table 8-6: Value of water resources and their features

Effects	Construction	Operation	Comments
Surface water	✓	✓	To consider the potential effects from construction activities (largely sedimentation and spillage risk) and operational changes to receiving water shape and quality (changes to profile at watercourse crossings and discharge outfalls). Includes assessment against WFD criteria.
Groundwater	✓	✓	To assess potential effects on groundwater levels and quality (from cuttings and infiltration from the drainage system) and whether this would impact other water users local to the Scheme. Includes assessment against WFD criteria.
Flood risk	✓	✓	To assess the potential effects from flood risk, both to the Scheme itself and wider land uses. Flood risk can manifest in many forms, including for example, storage of material in floodplains, intercepting groundwater or permeant alterations of a watercourse and its floodplain from the structure itself. Includes a formal Flood Risk Assessment.

9. Landscape

9.1. Introduction

- 9.1.1. This chapter sets out the approach and methodologies to be used in the assessment of the likely effects upon landscape and visual receptors as a consequence of the Scheme.

9.2. Study area

Landscape

- 9.2.1. The desk top study and site visits undertaken during the Option Identification Stage and the Option Selection Stage informed the extent of the study area for both the landscape and visual effects.
- 9.2.2. It is expected that potentially significant landscape effects would be restricted to the land directly adjacent to the Scheme, however consideration of landscape effects will be given to the wider area within 1.5 km from the perimeter of the Scheme. The boundary of the study area would combine the 1.5 km offset from the perimeter of the Scheme resulting in a study area that extends at least 1.5 km or further from the edge of the Scheme where necessary. Any effects upon landscape receptors located outside the study area are unlikely to be significant and have been scoped out from further assessments.
- 9.2.3. Should the Scheme substantially change during this assessment stage, the extent of the landscape study area will be reviewed to ensure it remains appropriate to the assessment.

Visual

- 9.2.4. The visibility towards the Scheme is restricted predominantly by coniferous and birch woodland that surrounds the junction. Whilst the junction is slightly elevated above the surrounding area, the slopes are relatively shallow which, combined with presence of the existing mature coniferous and birch woodlands, creates a dense screen.
- 9.2.5. When considering the scale of the Scheme in the context of the natural and man-made screening elements present around the junction it is envisaged that a study area of 1.5 km from the edge of the Scheme would be sufficient to identify potentially significant visual effects. For the purpose of the assessment the study area would be combined resulting in an offset of at least 1.5 km from the edge of the Scheme. Any effects on visual receptors beyond the study area are unlikely to be significant and have been scoped out from further assessment.
- 9.2.6. Should the Scheme substantially change during assessment stage, the extent of the study area will be reviewed to ensure it remains appropriate and proportionate to the Scheme.

9.3. Planning and policy context

Landscape Designations

- 9.3.1. There are no statutory designated landscapes within the study area that have the potential to be directly and indirectly affected by the Scheme. However, there are other designations (listed below) within the study area, that will be affected by the Scheme.
- 9.3.2. Painshill Park is a Grade I Registered Park and Gardens which is located approximately 800 m to the north-east of the M25 Junction 10 and immediately adjacent to the A3. The main purpose for designation of Registered Park and Gardens is to “*celebrate designed landscapes of note, and encourage appropriate protection.*”
- 9.3.3. The RHS Wisley Grade II* Registered Park and Gardens is located to the south-west (approximately 1.6 km from the centre of the M25 Junction 10 junction). The designated area includes the RHS Gardens at Wisley, formal and informal decorative gardens, several glasshouses and an extensive arboretum and small scale gardens. The RHS Gardens at Wisley is also a visitor attraction of national importance.
- 9.3.4. This report will report in detail the potential effects to be expected, taking into consideration the environmental design and/or proposed mitigation measures.

National Planning Policy Framework (NPPF) March 2012

- 9.3.5. The NPPF establishes national planning policy to achieve sustainable development, through themes which include promoting sustainable transport, supporting a prosperous rural economy and promoting healthy communities, with a presumption in favour of sustainable development.
- 9.3.6. To support a prosperous rural economy, planning should promote the sustainable growth and expansion of businesses and enterprise in rural areas, the diversification of agricultural and land-based rural businesses, and the retention and development of local services and community facilities (paragraph 28).
- 9.3.7. Paragraph 75 states policies should protect and enhance public rights of way (PRoW) and access. Local authorities should seek opportunities to provide better facilities for users, for example by adding links to existing rights of way networks including National Trails.

Countryside and Rights of Way Act 2000

- 9.3.8. The Countryside and Rights of Way Act 2000 (CRoW) regulates all Public Rights of Way (PRoW) and ensures access to them. It requires local highway authorities to publish a Rights of Way Improvement Plan (RoWIP), which should be reviewed every 10 years. The Act also obliges the highway authority to recognise the needs of the mobility impaired when undertaking improvements.
- 9.3.9. There is guidance within the Surrey County Council Rights of Way Improvement Plan (2014) which sets out how PRoW meet the present and likely needs of the public; the opportunities provided by local rights of way for exercise and other forms of recreation and enjoyment; and the accessibility of local rights of way to blind or partially sighted person and others with mobility issues.

- 9.3.10. The document also identifies that built development can be a threat to the rights of way network but it also offers opportunities for enhancements and creation of new routes. The document also states that high levels of road traffic have had negative impacts on users across RoW across Surrey and that the County Council will use its powers under the Highways Act to create and divert public rights of way to improve connectivity.

The Commons Act 2006

- 9.3.11. The Commons Act 2006 (the Act) protects Common Land and town or village greens. This includes reinforcing existing protections against abuse, encroachment and unauthorised development. It recognises that the protection of Common Land has to be proportionate to the harm caused and that some specified works can be carried out without the need for consent. The Act provides for the release of land providing there is a provision of suitable “replacement land”.

Local Policy

- 9.3.12. Local policy which has indirect relevance for people, community use and enjoyment are set within adopted local planning policy for Elmbridge Borough Council and the Borough of Guildford.

Elmbridge Borough Council

- 9.3.13. The Elmbridge Core Strategy (2011) include spatial policy CS14 ‘Green Infrastructure’ the Council will protect, enhance and manage a diverse network of accessible multi-functional green infrastructure by:

- 2. Ensuring new development protects and enhances local landscape character, strategic views and key landmarks as shown on the proposals map, and takes account of their setting, intrinsic character and amenity value.

- 9.3.14. Green Infrastructure Assets; The following areas can form part of networks of Green Infrastructure:

- Parks and gardens - including urban parks, country parks and formal gardens; and
- Natural and semi-natural urban greenspaces - including woodlands, urban forestry, scrub, grasslands (e.g. downlands, commons and meadows) wetlands, open and running water, wastelands and derelict open land and rock areas (e.g. cliffs, quarries and pits).

- 9.3.15. Spatial policy CS17- Local Character, Density and Design Elmbridge's unique environment is characterised by its green infrastructure, river corridors, historic assets and distinctive town and village settlements. Particular attention should be given to the design of development which could have an effect on heritage assets which include conservation areas, historic buildings, scheduled monuments, and the Borough's three historic parks and gardens.

Borough of Guildford

- 9.3.16. In the Borough of Guildford saved policies Local Plan (2003) policy HE11 scheduled ancient monuments and other sites and monuments of national importance.

- 9.3.17. Policy RE2 development within the Green Belt.
- 2. Essential facilities for outdoor sport and outdoor recreation, cemeteries and other uses of land which preserve the openness of the Green Belt and which do not conflict with the purposes of including land within it.
- 9.3.18. Policy HE12 Historic Parks and Gardens, Planning permission will not be granted for development which would detract from the character or appearance of a park or garden of special historic interest, or its setting. Permission will not be granted for unsympathetic subdivision.

9.4. Baseline conditions

Landscape Features

- 9.4.1. The M25 Junction 10/A3 Wisley Interchange is located within an area of Registered Common Land (Wisley Common and Chatley Heath), between Cobham and Ripley to the south-west of London. The landscape around the junction consists of a large scale coniferous and birch woodland with areas of open heathland incorporating large areas of clearings. Further afield is a mosaic of agricultural fields with linear or dispersed hamlets and isolated properties. These areas contain numerous woodland areas, copses and tree belts and hedgerows forming field boundaries.

Landscape Character

- 9.4.2. The study area is located close to the border of the National Character Area (NCA) No.129 - Thames Basin Heaths and NCA No.115 - Thames Valley. Due to the localised nature and scale of the proposals, the effects on the NCA will not be considered and the assessment will focus on local landscape character areas identified within Landscape Character Assessment at Local Authority level.
- 9.4.3. The Scheme is located on the boundary between Guildford Borough Council (GBC) and Elmbridge Borough Council (EBC).
- 9.4.4. The landscape character of Guildford Borough has been described in Guildford Landscape Character Assessment and Guidance (January 2007), prepared by Land Use Consultants. The Scheme is located wholly within Wisley Wooded and Settled Heath (G2) Landscape Character Area that forms part of Wooded and Settled Heath Landscape Character Type. The key characteristic and attributes of this Landscape character area are summarised below.

Table 9-1: Summary of attributes and key characteristics of relevant landscape character areas within Guildford Borough Council

Guildford Borough Council		
Landscape Character Types	Landscape Character Areas	Key attributes and qualities of landscape character
Woodland and Settled Heath	G2: Wisley Wooded and Settled Heath	<ul style="list-style-type: none"> • A secluded, enclosed landscape of heathland commons lying between the Mole and Wey Rivers, now largely overgrown by secondary woodland; • Substantial areas of mixed woodland and scrub are interspersed with heathland, open water bodies, pasture, parkland and gardens;

Guildford Borough Council		
Landscape Character Types	Landscape Character Areas	Key attributes and qualities of landscape character
		<ul style="list-style-type: none"> • Wisley and Ockham Commons are Open Access Land with a network of footpaths and rides through the woodland; • There are few rural roads but the major transport corridors of the A3 and M25 cross the area fragmenting the Commons and bringing noise and views of moving traffic; • Sparse settlement pattern of a few farmsteads and cottages plus large houses at Wisley and Foxwarren; • Presence of designed landscapes of RHS Gardens at Wisley and Foxwarren Park to the north; • Intermittent views into and through the woodland to pastures, and • Presence of heathland.

9.4.5. The landscape character of EBC is described in the Surrey Landscape Character Assessment (April 2015), prepared by Hankinson Duckett Associates (HDA). As this landscape character assessment covers the entire Surrey County, the boundaries of landscape character areas extend beyond Borough or District Councils boundaries. The assessment distinguishes between landscape types reflecting the dominant influences on landscape character and landscape character areas which are discrete geographic areas that possess the common characteristics described for the landscape type. Three relevant landscape character areas were identified to inform the baseline of landscape character for the Scheme:

- RF10 Lower Mole River Floodplain;
- SS9 Weybridge South Settled and Wooded Sandy Farmland, and
- SW5 Wisley Sandy Woodland.

9.4.6. The key characteristic and attributes of these landscape character areas are summarised below.

Table 9-2: Summary of attributes and key characteristics of relevant landscape character areas within Elmbridge Borough Council

Elmbridge Borough Council	
Landscape Character Areas	Key attributes and qualities of landscape character
RF10 Lower Mole River Floodplain	<ul style="list-style-type: none"> • Flat, low lying flood plain of the River Mole; • River forms wide meanders, and multiple channels. The valley floor also contains small watercourses, streams, lakes and water bodies often linked to the river; • Consists of a mixture of pastoral and arable fields, with riparian vegetation and occasional blocks of woodland. Incorporates occasional remnant parkland, including areas of large individual mature trees within fields; • Limited areas of ancient woodland; • Irregular, medium scale fields, with moderate hedgerow network (particularly to the south), ditches and tree lines;

Elmbridge Borough Council	
Landscape Character Areas	Key attributes and qualities of landscape character
	<ul style="list-style-type: none"> • The sense of enclosure varies along the character area, although vegetation helps reduce views of urban influence from adjacent settlements; • Major roads, including the M25, A3 and A244, the Waterloo to Woking railway line, and the Waterloo to Guildford via Cobham railway line, cut across the character area; • Public access into the character area and to the river are relatively limited, with only a small number of rights of way crossing the character area; • Settlement within the character area is also limited, mainly consisting of the occasional farmstead, and • Limited settlement and public access aid the sense of tranquillity, although the sense of remoteness is reduced by surrounding urban influence to the north.
SS9 Weybridge South Settled and Wooded Sandy Farmland	<ul style="list-style-type: none"> • A largely wooded area, but with significant areas of golf course cut from the woodland to the north-west, north-east, and south-east; • In between the golf courses is a pattern of small, mainly pastoral, rectilinear fields with thick boundary vegetation. A number of these fields are subdivided for paddocks or horticultural uses; • There are a few small areas of ancient woodland, mainly towards the west of the character area, in particular to the north of Foxwarren Park; • Views across this relatively low-lying landscape are highly constrained by woodland and vegetation along boundaries and roads; • The A3 dual carriageway and A245 main road cross through the character area; • Painshill Park is located above the Mole Valley to the south, at the south-eastern end of the character area, and • Limited public access limits opportunity for public appreciation of the intimate landscape.
SW5 Wisley Sandy Woodland	<ul style="list-style-type: none"> • The character area consists of extensive tracts of mixed woodland and scrub, some areas of Common Land, open water bodies, and a pocket of small pastoral fields; • Includes a relatively large block of ancient woodland at the south-east corner of the character area; • The RHS Gardens at Wisley are within the south-west corner of the character area, and Foxwarren Park is to the north; • Tree cover confines views generally, however there are distinctive views through the woodland along tracks, clearings within the woodland and across Bolder Lake; • Views of moving vehicles are possible within the vicinity of road corridors through the woodland; • The M25 motorway and A3 cut through the woodland, and form Junction 10 of the M25 where they meet, towards the centre on the character area; • Wisley and Ockham Commons are Open Access Land, with a number of informal tracks through the woodland connecting to a network of PRow, there are small car parks and other basic facilities for recreational use of the woodlands; • There are a very limited number of isolated dwellings, including a few farmsteads, cottages and large houses at Wisley and Foxwarren, but the character area is mostly unsettled;

Elmbridge Borough Council	
Landscape Character Areas	Key attributes and qualities of landscape character
	<ul style="list-style-type: none"> Large tracts of the character area are registered as Common Land and Wisley is noted as a historic garden and centre of horticulture, and Busy roads, including the M25 motorway, fragment the character area and disturb the peace locally. But away from detracting activity, the majority of the wooded character area is peaceful, intimate, and has a sense of remoteness.

9.4.7. The impact of the Scheme on these characteristics will be considered in the ES.

Visual

9.4.8. Visual receptors are the people who live in or visit the landscape, and who will experience views of the Scheme.

9.4.9. The main receptors include the users of PRoW's and Wisley and Chatley Heath Commons. Other visual receptors include people in Painshill Park and RHS Wisley together with other receptors identified at earlier stages.

9.4.10. The receptors identified in earlier stages will be verified through further site visits during the Preliminary Design Stage. It is expected that most of the receptors will be of high sensitivity. The receptors have been identified having consideration to the elements of the Scheme and the presence of screening elements that could restrict views from the Scheme.

9.4.11. The following groups of people are considered to be visual receptors:

- Local communities (e.g. residents to the north of the A3 between Redhill Road and Seven Hills Road) or isolated residential properties (e.g., Elm Corner or Hut Hill Cottage);
- People using nationally designated or regionally promoted footpaths, cycle routes, bridleways, the local public rights of way network and areas of Open Access Land (e.g. network of footpaths within Commons);
- Visitors of publicly accessible sites including Registered Park and Gardens, historic sites and other visitor attractions (e.g. Painshill Park and RHS Gardens Wisley);
- Schools and other institutional buildings, and their outdoor areas (e.g. Feltonfleet School);
- People engaged in the outdoor sport activity at playing fields or pitches (e.g. Silver Mere Golf Club);
- People in their places of work (e.g. Seven Hills Hotel); and
- Road users (e.g. users of the A3, M25 and local roads).

9.5. Potential impacts

9.5.1. It is likely that the Scheme would cause adverse landscape and visual impacts, due to the extent and scale of proposed changes to the highway and associated infrastructure such as lighting and gantries.

Landscape

- 9.5.2. An assessment of landscape effects deals with the effects of change and development on a landscape resource. The key landscape effects expected as a result of the Scheme are a loss of vegetation, alteration to the landform as well as the introduction of man-made features. The nature of effects on landscape character and landscape designations will be assessed for both construction and operational phase of the Scheme.
- 9.5.3. It is expected that potentially significant landscape effects would be restricted to the land required or directly adjacent to the Scheme. Clearance of vegetation along the existing road corridors is also expected along the A3 will be necessary.
- 9.5.4. The landform around the junction is gently sloping and therefore the introduction of new slip roads would require some earthworks, resulting in alterations to the existing landform as well as an extension to the road network.
- 9.5.5. The Scheme would also affect the existing levels of tranquillity within the wider local area. These changes combined may potentially affect the local landscape character.
- 9.5.6. The introduction of additional gantries and associated road infrastructure will increase the prominence of the road corridor within the wider landscape.
- 9.5.7. It is expected that the relatively small scale of the Scheme would not result in significant effects for landscape character at the national level. The effects of the Scheme on the local landscape character including identified mitigation/environmental design measures will be considered.

Visual

- 9.5.8. Visual effects will occur during both the construction and operational stage. During construction, effects are likely to occur as a result of the introduction of construction machinery, compounds and vegetation removal with the potential to create new sightlines and views of the M25 Junction 10.
- 9.5.9. The visual receptors will also be affected by views of HGVs and other tall machinery used within the construction site. However, the potential effects of construction activities would be temporary, short term and reversible.
- 9.5.10. It is expected that the greatest construction impact will occur close to the M25 Junction 10 as a result of the construction operations associated with the reconfigured junction works. Other improvements are centered on the existing road corridors that currently benefit from a high level of vegetation screening, however during construction activities new gaps in the existing vegetation will be created resulting in increased visibility.
- 9.5.11. Construction operations associated with proposed overbridges would also be prominent. Alteration of views during the construction stage would also occur further away from the junction where despite the main construction works associated with the M25 Junction 10 junction being potentially screened, the views of works along the local access roads will be available.
- 9.5.12. The change in the views during construction is likely to include:
- Earthmoving operations;
 - The formation of temporary spoil areas;

- Road formation/construction;
- The creation of new earthworks;
- Creation of site compounds and
- Proposed overbridges/structures.

9.5.13. The introduction of additional gantries, signs and additional infrastructure would increase the visibility of the road corridor particularly to road users and receptors when using overbridges.

9.5.14. The operational effects will be long term and permanent although it is expected that the proposed mitigation planting will mature gradually following the construction. The Scheme will provide an opportunity to introduce environmental design measures or/and mitigation measures to help reduce the effects and provide landscape and visual enhancements where possible.

9.6. Proposed level and scope of assessment

9.6.1. Detailed assessment of potentially significant effects associated with landscape and visual impacts of the Scheme are anticipated, a Detailed assessment will be carried out at this Preliminary Design Stage.

9.6.2. As a result, further studies are required to assess the significance of effects on landscape and visual receptors. Further detailed desk and fieldwork studies will be undertaken to identify the character of the landscape, including its condition and value, and the nature and sensitivity of the visual receptors that may be affected by the Scheme. The assessment of landscape and visual effects will take into consideration any mitigation/environmental design measures to avoid, reduce or remedy the changes of the Scheme.

9.6.3. The landscape and visual assessment will consist of an introduction outlining the Scheme, context and background, followed by a section outlining the assessment methodology. It will be divided between landscape and visual effects with distinct sections covering policy, baseline, potential magnitude of impact, and significance of effect and mitigation measures.

9.6.4. The assessment at this Preliminary Design Stage will be extended to explain any additional evaluation methodologies with differentiation of construction and operational stages. Winter photographs will also be provided to illustrate key viewpoints.

9.6.5. The nature of effects on each receptor will be assessed for both the construction and operational phase of the Scheme.

9.6.6. The assessment will be accompanied by illustrative plans typically showing:

- Topography (1:25000);
- Landscape Character, Local Designations and Tranquillity (1:25000);
- Public Rights of Way including National Cycle Routes (1:25000);
- Viewpoint location plans (1:25000);
- Representative Photographic Viewpoints (1:25000); and
- Outline Landscape Design Plans including landscape and environmental mitigation measures (1:2500).

Landscape Scope

9.6.7. Main landscape receptors will include:

- Existing coniferous woodland areas around M25 Junction 10;
- Areas of vegetation including semi mature and mature trees, hedgerows along the road corridors approaches to the M25 Junction 10 junction;
- Effects on landscape aspect of the following designations: Ockham Common, Wisley Common, Painshill Park Grade I Registered Park and Garden and RHS Gardens Wisley - Grade II* Registered Park and Garden;
- Landscape designations; and
- Effects on landscape character based on relevant attributes of identified landscape character areas.

9.6.8. Table 9-3 lists landscape resource receptors as proposed for further consideration at the Option Selection Stage assessment (scoped in receptors) or scoped out from further assessment. This was informed by the Option Identification Stage Assessment.

Table 9-3: Landscape resources scoped in and out for further assessment

Resources	Scoped in/out	Comment/Justification
Areas of vegetation including coniferous woodland, semi mature and mature planting.	✓	The Scheme is likely to affect existing vegetation, particularly the coniferous woodland and semi mature and mature planting along the road corridor approaches to M25 Junction 10 and local access roads.
Local landscape character features i.e. landform, landscape pattern.	✓	These landscape features are likely to be affected by the Scheme through introduction of earthworks and loss of landscape links in the form of boundary vegetation and change of land use.
Effects on identified landscape character based on key attributes of identified landscape character areas.	✓	Effects on landscape character requires further assessment. The effects would take into consideration key attributes of landscape character areas and above listed effects on loss of vegetation, land form, land use and landscape pattern.
Effects on Ockham, Wisley and Chatley Heath Common.	✓	Landscape effects on Ockham, Wisley and Chatley Heath Commons will likely be effected as a consequence of the encroachment of the Scheme on the area of Commons and transformation of their character.
Painshill Park Grade I Registered Park and Garden.	✓	Landscape effects on Painshill Grade I Registered Park and Garden require further assessment as some of the Scheme adjoins the A3 and the boundary of Painshill Park.
RHS Gardens Wisley - Grade II* Registered Park and Garden.	✓	Landscape effects on RHS Gardens Wisley - Grade II* Registered Park and Garden require further assessment as the Scheme are located close to the A3 and the entrance road to the RHS Gardens Wisley.
Landscape character at regional and national level.	✗	The Scheme would not give rise to the alteration of key characteristics of landscape character at the regional and national level.

Visual Scope

9.6.9. Table 9-4 lists visual receptors as proposed for further consideration at the Preliminary Design Stage Assessment (scoped in receptors) or scoped out from further assessment. This was informed by the Option Identification Stage Assessment.

Table 9-4: Visual receptors scoped in and out for further assessment

Resources	Scoped in/out	Comment/Justification
Painshill Park Grade I Registered Park and Garden (located within 1500 m)	✓	Visual effects on this receptor require further assessment as some of the Scheme will be located within the environs of Painshill Park.
Wisley and Chatley Heath Common (located within 1500 m)	✓	Commons are frequently used by people for enjoyment of outdoor activities and therefore their views are of high sensitivity.
Views from the network of PRow's within the study area (varied distance)	✓	Views from PRow's are particularly sensitive and the potential effects on their users requires further assessment.
Views from Chatley Farm (located within 1000 m)	✓	Chatley Farm is located at a considerable distance from the Scheme, however partial views of some of the Scheme particularly compounds may be available.
Views from RHS Wisley Grade II* Registered Park and Garden (located within 2000 m)	✓	RHS Gardens Wisley adjoins the Scheme.
Views from Hurt Hill Cottage (located within 1000 m)	✓	Views from Hurt Hill Cottage may be affected by the introduction of some of the Scheme.
Views from San Domenico - restaurant (located within 500 m)	✓	The restaurant adjoins the A3 and therefore the views of users will be affected.
Views from Feltonfleet School (located within 500 m)	✓	The views from the School are likely to be affected by the Scheme, particularly compounds.
Views from residential properties at the junction of Seven Hills Road (South)/B365 and A245	✓	The views from these receptors may be altered by the introduction of some of the Scheme.
Elm Corner, Bridge End, Ockham and Church End (located within 2500 m)	✓	There is a number of residential receptors in the village that could be potentially affected by the introduction of some of the Scheme.
Views from Pond Farm (located within 1000 m)	✓	Views from residential property at Pond Farm may be altered by the Scheme.

Resources	Scoped in/out	Comment/Justification
Bramley Hedge Farm, Long Orchard Farm, Firtree Cottage (located within 1500 m)	✓	Views from these residential properties are likely to be altered by some of the Scheme.
Little Foxwarren, Katz Castle, Queen Annes Cottage (located within 1000 m)	✓	Some views of the Scheme may be available from these receptors.
Views from Sainsbury's site at the junction of Bridge Way and the A245 Portsmouth Road (located within 500 m)	✓	Partial views of some of the Scheme are likely to be available for users of the Sainsbury's.
Views residential properties at Seven Hills Road (located within 500 m)	✓	A change of the view is expected for receptors along the road with partial views of some of the Scheme.
Views from residential properties at the peripheries of Church End and Ockham village (located within 1500 m)	✓	Visual effects on these receptors require further assessment as views of the Scheme along the A3 are likely to be available.
Views from Seven Hills Hotel (located within 500 m)	✗	Views from the Hotel are screened by the existing woodland that wraps around the hotel.

9.7. Proposed assessment methodology

9.7.1. The landscape and visual assessment shall be carried out following published guidance including IAN 135/10 Landscape and Visual Effects Assessment and DMRB Volume 11, Section 2, Part 2 HA 202/08 Environmental Impact Assessment but also with a consideration to the published GLVIA 3rd edition.

9.7.2. The GLVIA 3rd edition state that:

"...landscape and visual considerations may play a part in identifying opportunities and constraints relating to site selection and making comparative assessments of the options in order to identify those with least adverse (or indeed most beneficial) effects and greatest potential for possible mitigation and enhancement. It is then important to:

- *Demonstrate how landscape and visual effects have been taken into consideration.*
- *Explain the reasoning behind any decisions to reject and of the sites selected and alternatives considered in terms of their landscape and visual effects."*

9.7.3. The assessment of significant effects for both landscape and visual effects will be based on a combination of magnitude with sensitivity using assessment

matrix included in the guidance IAN 135/10 Landscape and Visual Effects Assessment and DMRB Volume 11 Environmental Impact Assessment.

- 9.7.4. At the Preliminary Design Stage the Scheme will be compared in the context of landscape and visual effects. The report will follow the format of a detailed assessment, stating the reasons for the decision.

Landscape receptors

- 9.7.5. The sensitivity of landscape resources/receptors combines judgements of their susceptibility to the type of change or development proposed with the value attached to the landscape (as per the Guidelines for Landscape and Visual Impact Assessment (GLVIA) 3rd edition.
- 9.7.6. For the purposes of this assessment, and in accordance with the relevant guidance contained in Highways England IAN 135/10, the landscape sensitivity is divided into three categories: High, Moderate and Low.

Table 9-5: Landscape sensitivity and typical examples

Sensitivity	Typical descriptors and examples
High	<p>Landscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be:</p> <ul style="list-style-type: none"> • Of high quality with distinctive elements and features making a positive contribution to character and sense of place; • Likely to be designated, but the aspects which underpin such value may also be present outside designated areas, especially at the local scale; • Areas of special recognised value through use, perception or historic and cultural associations; and • Likely to contain features and elements that are rare and could not be replaced.
Moderate	<p>Landscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically these would be:</p> <ul style="list-style-type: none"> • Comprised of commonplace elements and features creating generally unremarkable character but with some sense of place. locally designated, or their value may be expressed through non-statutory local publications; • Containing some features of value through use, perception or historic and cultural associations; and • Likely to contain some features and elements that could not be replaced.
Low	<p>Landscapes which by nature of their character would be able to accommodate change of the type proposed. Typically these would be:</p> <ul style="list-style-type: none"> • Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place; • Not designated; • Containing few, if any, features of value through use, perception or historic and cultural associations; and • Likely to contain few, if any, features and elements that could not be replaced.

Table Source: IAN 135/10, Annex 1, Table 2

Visual receptors

- 9.7.7. Visual receptors are the people who live in or visit the landscape, and who will experience views of the Scheme. The sensitivity of the visual receptors (people) combines judgements of their susceptibility to the type of change in views and

visual amenity with the value attached to particular views (as per IAN 135/10 and GLVIA).

9.7.8. The following groups of people are considered to be visual receptors:

- Local communities (e.g. villages and settlements) and isolated residential properties - these receptors are generally considered to be High sensitivity; views of residents are particularly susceptible to changes in visual amenity;
- Visitors at publicly accessible sites including for example registered park and gardens, historic sites, and other visitor attractions - these receptors are generally considered to be High sensitivity; visitors are likely to consider views as part of their experience whilst visiting publicly accessible site. Views are likely also to be associated with historic setting of particular visitor attraction;
- Schools and other institutional buildings, and their outdoor areas - these receptors are generally considered to be Moderate sensitivity; views of pupils and staff are generally focused on indoor activities and therefore are less susceptible to change;
- People engaged in the outdoor sport activity at playing fields or pitches - these receptors are generally considered to be Moderate sensitivity as views of people engaged in outdoor sports activities are usually focused on the sports activity which usually does not depend upon appreciation of views into adjacent landscape;
- People using nationally designated or regionally promoted footpaths, cycle routes, bridleways, the local rights of way network and areas of Open Access Land - these receptors are generally considered to be High sensitivity; the enjoyment of views from these routes is one other key attributes. is one of their key attributes;
- Road users - these receptors are generally considered to be Low sensitivity as their views are focused mainly on the road corridor whilst views into adjacent landscape are usually transient and glimpsed, and
- People in their places of work - these receptors are generally considered to be Low sensitivity as they are orientated primarily on the work activities.

Magnitude and significance of effects

9.7.9. Landscape and visual impact significance will be determined by combining the sensitivity of the landscape and visual receptor, in conjunction with the magnitude of change. The magnitude of impact can be either adverse or beneficial.

9.7.10. The following tables describe the magnitude and significance categories and descriptors for landscape and visual receptors.

Table 9-6: Landscape - magnitude and nature of impact and typical descriptors

Magnitude of impact	Typical criteria descriptors
Major adverse	Total loss or large scale damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features and elements.
Moderate adverse	Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Minor adverse	Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
Negligible adverse	Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
No change	No noticeable loss, damage or alteration to character or features or elements.
Negligible beneficial	Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Minor beneficial	Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Moderate beneficial	Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic features.
Major beneficial	Large scale improvement of character by the restoration of features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

Table Source: IAN 135/10, Annex 1, Table 1

Table 9-7: Landscape and Visual - significance of effects categories

Landscape Value (Sensitivity)	Magnitude of impact (degree of change)				
	Major	Moderate	Minor	Negligible	No change
High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
Moderate	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral

Table Source: adapted from IAN 135/10, Annex 1, Table 3

Table 9-8: Landscape - typical descriptors of significance of effect categories

Significance category	Typical descriptors of effect
Very Large Beneficial (Positive) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Greatly enhance the character (including quality and value) of the landscape; • Create an iconic high quality feature and/or series of elements; and • Enable a sense of place to be created or greatly enhanced.
Large Beneficial (Positive) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Enhance the character (including quality and value) of the landscape; • Enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development; and • Enable a sense of place to be enhanced.
Moderate Beneficial (Positive) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Improve the character (including quality and value) of the landscape; • Enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development; and • Enable a sense of place to be restored.
Slight Beneficial (Positive) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Complement the character (including quality and value) of the landscape; • Maintain or enhance characteristic features and elements; and • Enable some sense of place to be restored.
Neutral Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Maintain the character (including quality and value) of the landscape; • Blend in with characteristic features and elements; and • Enable a sense of place to be retained.
Slight Adverse (Negative) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Not quite fit the character (including quality and value) of the landscape; • Be at variance with characteristic features and elements; and • Detract from a sense of place.
Moderate Adverse (Negative) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Conflict with the character (including quality and value) of the landscape; • Have an adverse impact on characteristic features or elements; and • Diminish a sense of place.
Large Adverse (Negative) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Be at considerable variance with the character (including quality and value) of the landscape; • Degrade or diminish the integrity of a range of characteristic features and elements; and • Damage a sense of place.
Very Large Adverse (Negative) Effect	<p>The project would:</p> <ul style="list-style-type: none"> • Be at complete variance with the character (including quality and value) of the landscape; • Cause the integrity of characteristic features and elements to be lost; and

Significance category	Typical descriptors of effect
	<ul style="list-style-type: none"> • Cause a sense of place to be lost.

Table Source: IAN 135/10, Annex 1, Table 4

Table 9-9: Visual - magnitude of impact and typical descriptors

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

Table Source: IAN 135/10, Annex 2, Table 2

Table 9-10: Typical descriptors of the significance of effect categories

Significance	Typical descriptors of effect
Very large beneficial	The project would create an iconic new feature that would greatly enhance the view.
Large beneficial	The project would lead to a major improvement in a view from a highly sensitive receptor.
Moderate beneficial	The proposals would cause obvious improvement to a view from a moderately sensitive receptor, or perceptible improvement to a view from a more sensitive receptor.
Slight beneficial	The project would cause limited improvement to a view from a receptor of medium sensitivity, or would cause greater improvement to a view from a receptor of low sensitivity.
Neutral	No perceptible change in the view.
Slight adverse	The project would cause limited deterioration to a view from a receptor of medium sensitivity, or cause greater deterioration to a view from a receptor of low sensitivity.
Moderate adverse	The project would cause obvious deterioration to a view from a moderately sensitive receptor, or perceptible damage to a view from a more sensitive receptor.
Large adverse	The project would cause major deterioration to a view from a highly sensitive receptor, and would constitute a major discordant element in the view.
Very large adverse	The project would cause the loss of views from a highly sensitive receptor, and would constitute a dominant discordant feature in the view.

Table Source: IAN 135/10, Annex 2, Table 4

Vulnerability to major accidents and disasters

9.7.11. Major accidents and disasters comprise man-made and natural risks which are considered likely, and anticipated to result in substantial harm that the normal

functioning of the Scheme is unable to cope with/rectify - i.e. risks with the potential to have a significant effect.

- 9.7.12. Natural circumstances such as high winds and/or species-specific diseases (such as Ash Dieback) could have a direct, reductive effect on the future effectiveness of existing planting in screening the Scheme. Climate change could cause additional system stress on vegetation, making it vulnerable to windblow, flooding or disease. Assessment under this section would therefore consider storm events and the spread of plant diseases, and the potential consequences for the effects of the Scheme on landscape character and visual amenity.
- 9.7.13. Further assessment would be informed by other topics, as assessing the adverse effects of a major accident or disaster on landscape and visual amenity will require interaction with other sections of the formal ES.
- 9.7.14. The requirement for further baseline information as part of the vulnerability assessment will be reviewed in this preliminary design stage to inform the ES.

9.8. Proposed consultation

- 9.8.1. Consultation with the appropriate stakeholders will be undertaken throughout the assessment process, this will ensure that the Scheme is designed with appropriate mitigation proposals that reflect the impacts and sensitivities of the respective receptors.

9.9. Potential mitigation measures

- 9.9.1. Should the assessment undertaken using the above methodology identify any significant adverse effects, mitigation measures would to be implemented. These proposed mitigation measures would be in addition to the embedded mitigation within the project's design.
- 9.9.2. Identified monitoring measures at the Option Selection stage will be reviewed to ensure that all relevant methods of reduction of effects in projects lifecycle have been considered and are relevant at this stage. As further information from additional surveys (e.g. arboricultural surveys) becomes available, the methods and techniques of monitoring will be more specific and detailed.
- 9.9.3. Due to the proposed scope of road infrastructure increasing, the siting and size of these proposed components will require careful consideration to minimise the potential impacts.

9.10. Assumptions and limitations

- 9.10.1. The assumptions and limitations at the time of reporting are as follows:
- Data quality - desk study, using mainly web-based data and previous assessment reports has only been reported;
 - Data quantity - only open, freely licensed data has been reported at this stage and therefore the amount of detail on certain topics is limited;
 - Site visits - site visits have been undertaken during the time of assessment periods; and
 - Where impacts are uncertain a conservative approach has been adopted.

9.11. Conclusion

- 9.11.1. The assessment through the use of appropriate methodology will assess the likely effects upon both landscape and visual receptors as a result of the Scheme whilst also proposing appropriate mitigation measures that are proportionate to the likely impacts.

10. Geology and Soils

10.1. Introduction

- 10.1.1. This chapter summarises the identified ground conditions, historical land uses and potential sources of land contamination relevant to the Scheme. It outlines where further assessment is required in order to ensure that the risks and effects associated with the geology and soils are fully understood and appropriately eliminated or mitigated where possible. Where applicable, relevant geological designated sites, active and historical landfill sites, and the quality of soils/agricultural land classification (ALC) within the study area have been identified.
- 10.1.2. A summary of the topics to be included in the ES and those scoped out of further assessment is presented in section 10.11 and Table 10-7.

10.2. Study Area

- 10.2.1. The assessment of geology and soils considers a study area extending 500 m from the extent of the red line boundary for the Scheme (see section 2.4 and Figure 2.1 for details). A study area of 500 m was chosen as it was deemed appropriate for a linear feature such as a highway. 'On site' within this chapter refers to the extent of the Scheme within the red line boundary and off site refers to locations within the study area but not within the extent of the red line boundary.

10.3. Planning and policy context

- 10.3.1. Relevant legislation and guidance documents include:
- The National Planning Policy Framework (NPPF) - states that local planning policies and decisions: should ensure that a site is suitable for its new use and should not be capable of being determined as Contaminated Land as defined under part 2A of the Environmental Protection Act (as amended); and that they take into account the economic and other benefits of best and most versatile (BMV) agricultural land (DCLG, 2012);
 - National Networks National Policy Statement (NN NPS) - sets out policy with regard to assessment of the environmental impacts of nationally significant transport infrastructure (DfT, 2014);
 - Technical Information Note 049 (TIN049), 'Agricultural Land Classification: protecting the best and most versatile agricultural land' - states that, for planning applications, specific consultations with Natural England are required under the Development Management Procedure Order in relation to BMV agricultural land (Natural England, 2012);
 - Borough of Elmbridge Local Plan - establishes planning policies for Elmbridge forward to 2019 including requirements for development on or near to land which is suspected to be contaminated (Borough of Elmbridge, 2016);
 - Borough of Guildford Local Plan - contains policies relating to environmental protection and enhancement. (Borough of Guildford, 2003);

- Surrey County Council – Surrey Mineral Plan 2011 Core Strategy Policy (MC6) contains policies to safeguard against sterilisation of mineral resources (Surrey County Council, 2011).
- Part 2A of the Environmental Protection Act 1990 - provides a statutory regime for the identification and remediation of 'Contaminated Land' (UK Parliament, 1990);
- Contaminated Land Report 11 (CLR11) - provides primary guidance for assessing and managing land contamination and provides a technical framework for the identification and remediation of contamination through the application of a risk management process (Environment Agency, 2004);
- Guiding principles for land contamination (GPLC) - provides primary guidance for assessing and managing land contamination (Environment Agency, 2010);
- Guidance for the Safe Development of Housing on Land Affected by Contamination (R&D66) - provides technical guidance on the identification and assessment of land contamination development and the process of managing such land contamination (National House-Building Council, 2008);
- Environment Agency's approach to groundwater protection - contains position statements on groundwater Source Protection Zones (SPZs), areas identified as drinking water protected areas and aquifer designations (Environment Agency, 2017);
- Water Resources Act (WRA) 1991 (as amended) - regulates water resources, water quality and pollution, and flood defence (UK Government, 1991) Chapter 57 Part III;
- Water Framework Directive (WFD) - the purpose of the WFD is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater (European Parliament, 2000); and
- River Basin Management Plan (RBMP) - designed to protect and improve the quality of the water environment and discusses development proposal considerations, future plans that may affect the infrastructure sector and its obligations, and plans for the protection and improvement of the water environment (DEFRA, 2009).

10.4. Baseline conditions

Geology

- 10.4.1. The study area is located within the geological area known as the London Basin, with the north-east to south-west trending London Basin Syncline located north of the study area. Information taken from the BGS GeoIndex suggests the closest inferred faulting to the study area is approximately 7.5 km to the south-west.
- 10.4.2. BGS mapping suggests that superficial deposits are not expected over the entire study area, however where present superficial deposits consist of Head,

Alluvium, River Terrace Deposits (undifferentiated), Kempton Park Gravel Member, Taplow Gravel Member and Lynch Hill Gravel Member are anticipated. Bedrock geology is expected to comprise the Bagshot Formation, Claygate Member of the London Clay Formation and the London Clay Formation of the Thames Group.

- 10.4.3. Made Ground associated with the original construction of local roads (including the M25, A3, A245 and local side roads), infilled pits, infilled ponds, Wisley Airfield, historical landfill sites and other sites of existing infrastructure is anticipated to be present throughout the Scheme.
- 10.4.4. No geological SSSIs or Local Geological Sites (LGS) (also referred to as Regionally Important Geological Sites) are located within the study area.
- 10.4.5. Made Ground, Alluvium and London Clay Formation are anticipated to have elevated concentrations of pyrite, sulphates and sulphides which can have detrimental impacts on concrete structures.
- 10.4.6. The Scheme is located in an area that is not affected by mining, based upon a review of the Coal Authority Interactive Map viewer and Non-coal Mining Plans. The BGS Mineral Resources Map identifies that the western, southern and northern extents of the Scheme fall within sand and gravel mineral resource zones, associated with the River Wey and the River Mole. Three mineral safeguard zones are located within the study area: one situated to the south east of the M25 Junction 10/A3 Wisley Interchange, within an area of replacement land for the Scheme; and one adjacent to the scheme to the north of the M25 and east of the A3, and one north of the development to the west of the A3.
- 10.4.7. A generalised for potential for ground instability hazards to be present within the study area. A full assessment will be completed within the ES.
- 10.4.8. A review of the Highways Agency Geotechnical Data Management System (HAGDMS) undertaken on 30 November 2017 identified 96 No. earthworks and 21 No. geotechnical defects within the Scheme extents

Hydrogeology

- 10.4.9. The Alluvium, Lynch Hill Gravel Member, and River Terrace Deposits (undifferentiated) are classified as superficial Secondary A Aquifers. The Kempton Park Gravel and Taplow Gravel Formation as both classified as superficial Principal Aquifers.
- 10.4.10. The Bagshot Formation and Claygate Member are classified as bedrock Secondary A Aquifers. London Clay Formation is an unproductive stratum.
- 10.4.11. There are no groundwater abstractions or groundwater Source Protection Zones (SPZ) located within the study area. However, the Environment Agency indicates that sections of the Scheme are located within Groundwater Vulnerability Major Aquifer High, Major Aquifer Intermediate, Minor Aquifer High and Minor Aquifer Intermediate Zones.

Hydrology

- 10.4.12. The River Mole, Stratford Brook, Guileshill Brook, River Wey and Guildford Canal/River Wey Navigation as well as unnamed streams/drains cross the A3 or M25 within the study area.

- 10.4.13. The surface water features which have the greater potential to be impacted by the Scheme are those watercourses within the study area which cross the A3 and M25 carriageways: the River Mole - Horley to Hersham - passes beneath the A3 approximately 2 km northeast of M25 Junction 10; Stratford Brook passes beneath the A3 at Ockham Park Junction; Guilehill Brook passes under the A3 approximately 3.6 km southwest of M25 Junction 10; and the River Wey passes beneath the M25/A3 to the west of the junction and south of Ockham Junction and the Guildford canal/River Wey Navigation passes beneath the M25 at the western extent of the Scheme.
- 10.4.14. Other named surface water features present within the study area Oakham Mill Stream Bolder Mere lake, Pond Farm, Chatley Wood pond, Manor Pond and the Lake. These surface water features could be affected in the event that contaminated shallow groundwater migrates towards them. They could also be affected by surface water transport, such as runoff or flooding events.
- 10.4.15. Recorded water abstraction point (surface water) has been identified within the study area.
- 10.4.16. Further discussion on hydrological water resources is included within Chapter 8, Road Drainage and the Water Environment. The study area lies within a surface water Drinking Water Safeguard Zone. The southern and western extents of the Scheme fall within a surface water Drinking Water Protected Area⁶².

Agricultural soils

- 10.4.17. The land between Ockham Junction and Cobham is shown as Grade 3 (good to moderate quality) and Grade 4 (poor quality); the heaths and woodlands are classed as non-agricultural.

Land Contamination

- 10.4.18. A number of potentially contaminative land uses have previously operated or currently operate within the study area. A full review of potentially contaminated land uses will be completed in the ES.
- 10.4.19. Historical landfill sites and a number of pollution incidents have been reordered within the study area.
- 10.4.20. In addition to the landfill materials deposited in the aforementioned historical landfills, there is potential for Made Ground and any related contamination to be present associated with the infilling of ponds and pits, road construction (including embankments) and the construction of Wisley Airfield.

Unexploded Ordnance

- 10.4.21. A UXO Pre Desk-Study Assessment (PDSA) has been carried out by Zetica. The PDSA identifies a low risk of encountering UXO within the Scheme extents, and suggests a specialist detailed desk study is not required. The Zetica unexploded bomb risk map confirms the low risk of encountering unexploded bombs within the Scheme extents.

⁶² Environment Agency, 2017b

10.5. Potential impacts

- 10.5.1. The environmental impacts are likely to be greatest during construction with reduced impacts likely during operation. Contamination risks identified during the ground investigation surveys will be assessed and where possible reduced during detailed design. Requirement for mitigation measures, should these be required, will be assessed during detailed design after the DCO examination.
- 10.5.2. There is potential that new sources of contamination may be introduced associated with the accidental loss/spillage of fuels and oils as well as the potential to disturb and mobilise existing sources of contamination.
- 10.5.3. There is potential to exacerbate existing areas or to create new areas of ground instability and compressible ground.
- 10.5.4. The Scheme will also introduce additional receptors in the form of construction workers, future site workers and proposed foundations. It is understood that there will be no buildings constructed as part of the Scheme, however there may be confined spaces, such as manholes and service chambers/ducts, within which ground gas has the potential to accumulate.
- 10.5.5. There is a risk that new piling or excavation during construction could create new pathways between any contaminated soils and the underlying groundwater.
- 10.5.6. Additionally, any dewatering activities associated with the construction phase have the potential to mobilise further potentially contaminated groundwater and enhance lateral migration of contamination within the superficial and bedrock aquifers and potentially into surface watercourses.
- 10.5.7. The Scheme will involve the loss of Common and Public Access Land and so exchange land will have to be created in the vicinity. Works to make the replacement land more suitable for habitat creation such as topsoil stripping may be required.

10.6. Proposed level and scope of assessment

- 10.6.1. Limited ground investigation information is currently available for the Scheme and assessment of potential impacts associated with the Scheme to date have been qualitative.
- 10.6.2. Ground investigation is required to characterise ground conditions and inform the Scheme design and determine appropriate mitigation measures. A ground investigation specification has been drafted and, at this stage, it is envisaged that the ground investigation will include:
 - targeting areas of identified potential contamination sources or junction reconfiguration (including but not limited to bridges and earthworks);
 - providing an assessment of geological boundaries and thickness of stratum;
 - providing an assessment of the groundwater regime at the site;
 - determining the extent and nature of fill materials associated with Wisley Airfield and historic landfills/infilling;
 - determining the nature and potential contamination of Made Ground associated with the M25 and A3 carriageways (including embankments), A245 Byfleet Road, local access roads, the construction of Wisley Airfield

and Battleston Hill, RHS Garden Wisley, San Dominico site, Feltonfleet School, the infilling of ponds and the potential infilling of gravel and sand pits within the Scheme extent;

- determining the aggressivity of the ground towards buried concrete; and
- analysing surface water samples from identified potential surface water receptors for hardness, pH, calcium, and dissolved organic carbon concentrations to enable determination of pragmatic environmental quality standards.

10.6.3. The ES will review the soils and geology issues at baseline, albeit based on desk based information only in the absence of ground investigation data which will not be available in time to be reported in the ES. Potential impacts upon the existing ground conditions which construction and operation of the Scheme could bring about and in turn impact upon identified receptors will be identified cognisant of the government's Good Practice Guide to EIA.

10.6.4. Specifically, the following topics have been considered with respect to soils and geology:

- Direct impacts on geology as a valuable resource; i.e. mineral resource sterilisation, damage or loss of special protection areas (SPA) and geological sites of special scientific interest (SSSIs), or revealing new geological exposures of scientific interest;
- Direct impacts on groundwater as a valuable resource, such as the prevention of aquifer recharge or contamination of groundwater which is currently abstracted for potable supplies or act as baseflow for rivers;
- Direct impacts on agricultural soils as a valuable resource, including loss of Best and Most Versatile (BMV) agricultural land (excluding woodland) and deterioration of soil quality;
- Effects associated with pre-existing soil and groundwater contamination; i.e. mobilising contamination, introducing new or changing existing contamination migration pathways, or changing the types of contamination receptors;
- Effects associated with the potential for polluting substances used during the construction or operational phases, to cause new ground contamination issues on site - for example introducing/changing the source of contamination;
- Physical effects such as changes in topography, ground collapse, soil erosion compressible ground, aggressive ground and ground stability; and
- The expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters relevant to the Scheme.

10.6.5. The government good practice guides to EIA specifies that the effects associated with re-use of soils and waste soils is considered within soils and geology. However, the Chapter 12, Materials and Waste considers these effects and therefore this is not covered in this chapter.

10.7. Proposed assessment methodology

10.7.1. The assessment of the potential impacts of the Scheme on soils and geology will be undertaken over two stages, in consultation with the EA:

- Stage 1 - land contamination risk assessment; and
- Stage 2 - impact assessment.

Stage 1 - Land Contamination Risk Assessment

10.7.2. The approach adopted for the land contamination risk assessment is based on the guidance document CLR11 and the Good Practice Guide to EIA. These documents are considered as key guidance in the United Kingdom, and provide a technical framework for the application of a risk management process through the following steps:

- Develop a Preliminary Conceptual Site Model (PCSM). A desk study review of available documentary information will be undertaken to develop the PCSM, which describes the linkages between potential contamination hazards/sources, pathways and receptors relevant to the site. Where all three are present or considered likely to be present, these are described as potential contaminant linkages (PCLs) which can then be subject to the risk assessment process;
- Gather site specific information. Previous ground investigation and limited remediation have been undertaken at the site of the Scheme. The available information will be used to assess the potential for existing contamination at the site. Once these data have been reviewed, recommendations for further ground investigation will be made if required;
- Risk Assessment. Generic quantitative risk assessments (GQRAs) for human health and groundwater receptors to inform a judgement as to whether the concentrations of contaminants in soil, soil leachate and groundwater represent a potential risk to identified receptors. GQRA will be carried out through the comparison of the ground investigation results to appropriate generic assessment criteria (GAC). GAC are concentrations of a contaminant in soil or groundwater, below which the level of risk is considered acceptable. Using the information from the ground investigation and the GQRA, the PCSM will be updated to include an assessment of the level of risk associated with each PCL identified during the baseline, construction and operational phases. Where risks are identified, consideration will be given to whether these would be appropriately mitigated through design and/or the development of a remediation strategy and its subsequent validation, as necessary. The residual risks will be determined and assessed based on estimation of likelihood and consequence; and
- The risk assessment applies the principles given in the National House Building Council (NHBC) and Environment Agency report R&D66, which provides guidance on the development and application of the consequence and probability matrix (as presented in Table 10-1) for contaminated land risk assessment.

Table 10-1: Land Quality Estimation of the Level of Risk by Comparison of Consequence and Probability

Probability	Consequence			
	Severe	Medium	Mild	Minor
High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table Source: NHBC and Environment Agency report R&D66, Table 1.8

- 10.7.3. The potential risk to a receptor is a function of the probability of, and the consequence of a PCL being realised. Probability (likelihood of an event occurring) takes into account both the presence of the hazard and the receptor and the integrity of the exposure pathway. Consequence takes into account both the potential severity of the hazard and the sensitivity of the receptor. Definitions for the classification of probability and consequence are provided in Tables D.1 and D.2 of Appendix D.
- 10.7.4. Based on R&D66, the descriptions of the classified risks are as follows:
- Very high risk: There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term;
 - High risk: Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term;
 - Moderate risk: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term;
 - Low risk: It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited;

- Very low risk: It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor; and
- No potential risk: There is no potential risk if no pollution linkage has been established.

Stage 2 - Impact Assessment

Land Contamination

- 10.7.5. The land contamination impact assessment requires comparison of the baseline with the potential impacts that the development will have during the construction phase and operational phase. This approach enables changes in the impact to receptors during the construction and operational phases to be identified, an assessment of the effect of the scheme to be made and appropriate mitigation measures specified. The changes in contamination status are described as either beneficial or adverse and consideration is made of whether they are major, moderate, minor or negligible, on the basis of the value of the receptor, the area over which the effect may occur, duration (short, medium or long term) and whether the effect is permanent or temporary.
- 10.7.6. A methodology for the assessment of significant effects using sensitivity and magnitude is presented below in Table 10-2 and Table 10-3. However, it should be noted that this assessment is built into the Stage 1 land contamination risk assessment process and the R&D66⁶³ assessment method integrates the sensitivity of the receptor into the assessment of the magnitude (defined as consequence in R&D66) of harm and then compares this against the likelihood of the harm occurring. However, as land contamination cannot be defined as a resource, the magnitude of impact on the resource is not assessed, rather the magnitude of impact on each receptor. Table 10-1 above shows how the interactions of consequence and likelihood associated with the PCLs results in the significance of a potential risk or impact.
- 10.7.7. For the purposes of informing the land contamination impact assessment, land contamination risk assessments need to be undertaken for each development phase.
- 10.7.8. The development phases to be considered include: construction without mitigation; construction with mitigation, based on the identified mitigation measures that would need to be implemented through the design and construction stages of the Scheme (see section 10.8); and operation of the Scheme (including maintenance) assuming all mitigation has been undertaken prior to and during construction.

Geology and Geomorphology

- 10.7.9. An impact assessment of the potential effects of the Scheme on ground conditions and geology as a valuable resource has been undertaken using a qualitative approach considering the effects on topography, soil compaction, soil erosion and ground stability, and loss, destruction or sterilisation of a valuable geological resource.

⁶³ National House-Building Council, 2008

Assessing Effects and Defining Significance

- 10.7.10. The value of a receptor is considered when determining consequence of an effect in the impact assessment. The value and/or sensitivity of each of the receptors is determined using the classifications given in Table 10-2.
- 10.7.11. As mentioned above in section 10.4.12, the below criteria are not utilised in the assessment of land contamination impacts as the value of a receptor is considered when determining consequence of an effect in the risk assessment.

Table 10-2: Criteria for classifying the value and/or sensitivity of environmental resources/receptors

Value/ Sensitivity	Criteria	Examples
High	<p>Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site/receptor.</p> <p>Attribute has a very low capacity to accommodate the proposed change.</p>	<p>Principal Aquifer providing potable water to a large population, within an inner or outer groundwater source protection zone (Source Protection Zone (SPZ) 1 or SPZ 2).</p> <p>WFD high status water body (surface water) providing potable water to a small population.</p> <p>Sensitive human health receptors, e.g. young children.</p> <p>Buildings, including services and foundations but of high historic value or other sensitivity e.g. statutory designations, schools, residential dwellings.</p> <p>Ecological statutory designations with high sensitivity e.g. SSSI, LNR, SPA, RAMSAR etc.</p> <p>Statutory geological sites e.g. Geological SSSIs.</p> <p>Regionally important mineral resource.</p> <p>Major topographic, ground stability, soil compaction or erosion hazards present at the site.</p> <p>High potential for materials re-use.</p>
Medium	<p>Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site/receptor.</p> <p>Attribute has a low capacity to accommodate the proposed change.</p>	<p>Principal Aquifer beyond a SPZ, or secondary aquifer.</p> <p>Secondary aquifer providing abstraction water for agricultural or industrial use.</p> <p>WFD good status water body (surface water).</p> <p>Buildings, including services and foundations.</p> <p>Less sensitive human receptors, e.g. construction workers using PPE.</p> <p>Moderately economically viable mineral resource.</p> <p>Moderate topographic, ground stability, soil compaction or erosion hazards present at the site.</p> <p>Moderate potential for materials re-use.</p>
Low	<p>Attribute only possesses characteristics which are locally significant.</p> <p>Attribute has some tolerance to accommodate the proposed change.</p>	<p>Unproductive strata or Secondary Aquifer without abstraction.</p> <p>WFD moderate - poor status (surface water).</p> <p>Infrastructure (roads, bridges, railways).</p> <p>Non-statutory designated sites of regional importance that are not highly sensitive to damage from coastal change.</p> <p>No economically viable minerals.</p> <p>No sensitive human receptors.</p>

Value/ Sensitivity	Criteria	Examples
		No topographic, ground stability, soil compaction or erosion hazards present at the site. No opportunity for materials re-use.

10.7.12. Following determination of the value of receptors, the magnitude of potential construction phase and operational phase impacts is determined based on the criteria defined in Table 10-3. The magnitude of land contamination impacts is guided by comparison of baseline, construction phase and operational phase risks, determined in the Stage 1 assessment.

10.7.13. Again, as mentioned in section 10.4.12, the below criteria are not utilised in the assessment of land contamination impacts as the assessment of magnitude is considered when determining consequence of an effect in the risk assessment.

Table 10-3: Classification of Magnitude of Effect

Classification of Magnitude	Criteria
High	Total loss of major alterations to one of more of the key elements, features or characteristics of the baseline. The post-development situation will be fundamentally different.
Medium	Partial loss or alteration to one of more of the key elements or characteristics of the baseline. The post-development situation will be partially changed.
Low	Minor loss or alteration to one or more of the key elements, features or characteristics of the baseline. Post-development, the change will be discernible but the underlying situation will remain similar to the baseline.
Negligible	Very minor loss or alteration to one of more of the key elements, features or characteristics of the baseline, such that post-development, the change will be barely discernible, approximating to the “no change” situation.

10.7.14. The overall potential significance of effects is then defined using the matrix presented below in Table 10-4, which describes the relationship between the value of the resource (sensitivity) as defined in Table 10-2 and magnitude of the potential impact as defined in Table 10-3.

Table 10-4: Criterion for determining the impact significance of effects

Value/Sensitivity of receptor	Magnitude of impact			
	High	Medium	High	Negligible
High	Major	High	Major	High
Medium	Moderate/ Major	Medium	Moderate/ Major	Medium
Low	Moderate	Low	Moderate	Low

10.7.15. The classification of significance of effects has been based on the criteria defined in Table 10-5.

Table 10-5: Classification of Significance of Effects

Classification of Significance	Effect
Major adverse	<p>Complete loss or destruction of an important geological site. Significant sterilisation of mineral resources. Complete permanent change in topography which impacts the local community. Significant soil erosion, soil compaction or ground instability that is permanent in nature. An increase in contamination risk from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk. Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part 2A. The generation of significant volumes of hazardous waste requiring off-site disposal to appropriate landfill.</p>
Moderate adverse	<p>Moderate damage of an important geological site. Moderate sterilisation of a mineral resource. Partial long term (> 10 years) change in topography which impacts the local community. Moderate soil erosion, soil compaction, or ground instability that is either permanent or long term in nature. An increase in contamination risk from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk. Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part 2A. The generation of a moderate volume of waste requiring off site disposal</p>
Minor adverse	<p>Minor damage of an important geological site. Minor sterilisation of a mineral resource. Limited medium term (5 to 10 years) change in topography which impacts the local community. Limited medium term soil erosion, soil compaction, or ground instability. An increase in contamination risk from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk. The generation of a minor amount of waste.</p>
Negligible	<p>No change to geological receptors. No measurable impact on topography, soil erosion, soil compaction, or ground instability or impacts that are only temporary in nature (< 5 years). Negligible change in contamination risks. No generation of waste as part of the development, materials are used sustainably.</p>
Minor beneficial	<p>Minor improvement of an important geological site. Minor improvement in access to a mineral resource. Limited medium term (5 to 10 years) change in topography which has a positive impact on the local community. Limited medium term reduction in existing soil erosion, soil compaction, or ground instability issues. A reduction in contamination risk from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk. A minor amount of materials reuse as part of the development limiting the off site disposal of waste.</p>
Moderate beneficial	<p>Moderate improvement of an important geological site. Moderate improvement in access to a mineral resource. Partial long term (> 10 years) change in topography which has a positive impact on the local community. Moderate permanent or long term reduction in existing soil erosion, soil compaction, or ground instability issues.</p>

Classification of Significance	Effect
	<p>A reduction in contamination risk from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.</p> <p>Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part 2A.</p> <p>A moderate amount of materials re-use as part of the development limiting the off site disposal of waste.</p>
Major beneficial	<p>Major improvement of an important geological site.</p> <p>Major improvement in access to a mineral resource.</p> <p>Complete permanent change in topography which has a positive impact on the local community.</p> <p>Significant permanent reduction in existing soil erosion, soil compaction or ground instability issues.</p> <p>A reduction in contamination risk from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.</p> <p>Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part 2A.</p> <p>Sustainable use of material including recycling/reusing on site material. No off site disposal of wastes to landfill.</p>

10.7.16. Following the classification of an effect, as detailed in Table 10-3 and Table 10-5, a clear statement is made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant. However, professional judgement is also applied, where appropriate.

10.7.17. The assessment will consider the effects of the proposed construction and operational phases of the Scheme on the following receptors:

- Potential human health:
 - Associated with nearby residential properties, school, commercial/industrial premises;
 - Construction workers and future site workers;
 - Members of the public using public rights of way (non-motorised users (NMU));
- Potential controlled waters receptors include:
 - Secondary A Aquifers and Principal Aquifers associated with the Superficial Deposits and Bedrock within the study area;
 - Surface water as identified in section 10.4; and
- Potential ecological receptors:
 - Thames Basin Heath SPA, Ockham Common and Wisley Common SSSI, Ockham and Wisley LNR and Ancient Woodland;
- Potential structural receptors:
 - Piles and foundations, underground services, off-site property and off-site historical features.

Agricultural soils assessment methodology

- 10.7.18. The assessment of agricultural soils follows the approach of DMRB, Volume 11, Section 3, Part 6. This identifies six main areas that need to be covered in any assessment of effects on agricultural land. These are agricultural land quality, designated agricultural areas, land take, type of husbandry, severance and major accommodation works for access, water supply and drainage.
- 10.7.19. No fieldwork for agricultural soils have been completed at this stage, and soils and the presence of BMV land are assessed using data from a published soil map.
- 10.7.20. The significance criteria address both magnitude of impact and sensitivity of the resource and consideration of the characteristics of the impact and the receptor, namely:
- Type of impact - direct or indirect;
 - Nature of impact - beneficial, adverse or neutral;
 - Duration of impact - short or long term, reversible or not; and
 - Frequency of impact - continuous or intermittent, changing with time or constant.
- 10.7.21. There is no nationally recognised set of criteria for assessing the impact of infrastructure Schemes on loss of BMV land and so a bespoke system has been developed to reflect the issues significant to this project.
- 10.7.22. Agricultural land in ALC Grades 1, 2 and 3a is considered to be of high sensitivity, agricultural land in ALC Subgrade 3b is considered to be of medium sensitivity and land in ALC Grades 4 and 5 is considered to be of low sensitivity.
- 10.7.23. Magnitude of impact of the Scheme on agricultural soils is assessed on the scale presented in Table 10-6 below, based on likely loss of BMV land.
- 10.7.24. All Scheme effects are considered adverse.

Table 10-6: Assessment of Magnitude of Impact on Agricultural Land

Magnitude of impact	Criteria
Major	The identified impacts are predicted to result in a loss of >20 ha of BMV land
Moderate	The identified impacts are predicted to result in the loss of between 5 ha and 20 ha of BMV land
Minor	The identified impacts are predicted to result in a loss of between 1 ha and 5 ha of BMV land
Negligible	The identified impacts are predicted to result in the loss of <1 ha BMV land

Vulnerability to major accidents and disasters

- 10.7.25. Major accidents and disasters which have the potential to adversely affect human health, property and controlled waters receptors, where existing contamination is identified or where future contamination is introduced, include both man-made and naturally occurring events which may occur during either construction or operation.

- 10.7.26. It is considered that the proposed level and scope of assessment detailed in section 10.5 will be sufficient to assess baseline ground conditions within the study area and no additional baseline surveys will be undertaken as part of the vulnerability assessment.
- 10.7.27. Mitigation with respect to geology and soils will rely on appropriate design and construction and also operational protocols and security measures put in place for the Scheme. Please refer to section 10.9.
- 10.7.28. The baseline assessment has identified potential PCLs and a potential to exacerbate existing areas or to create new areas of ground instability and compressible ground, which require further assessment through ground investigation. Assessment of potential impacts under this section will therefore consider:
- the potential for release of contamination as a result of major accidents and disasters including extreme weather events, flooding, major traffic accidents, major chemical spills or other incidents; and
 - soil erosion or ground collapse/settlement as a result of major accidents and disasters including seismic events, landslip, and earthquakes.
- 10.7.29. Further assessment will be informed by other topics, as assessing the adverse effects of a major accident or disaster will require interaction with other sections of the ES.

10.8. Proposed consultation

- 10.8.1. Consultations with the relevant statutory authorities (notably the Environment Agency Local Authorities, Mineral Planning Authority) are planned. Each relevant body will be consulted separately to discuss specific information, issues and concerns.
- 10.8.2. An initial meeting with the Environment Agency to discuss the scope of their input regarding the Scheme was carried out on the 28 June 2017 and letters have been sent, informing the statutory authorities of planned public consultation meetings.
- 10.8.3. In addition, the Environment Agency will be consulted prior to undertaking the proposed ground investigation and following the development of relevant risk assessments to agree the most appropriate construction method to protect controlled waters.
- 10.8.4. Consultation with Natural England in relation to BMV land is not deemed necessary as the land affected by the Scheme is considered to be of non-BMV quality.

10.9. Potential mitigation measures

- 10.9.1. Beyond completion of the ground investigation and those risk assessments appropriate to the Scheme, such as human health, controlled waters, piling and ground gas risk, mitigation measures to be incorporated into the construction process, include (but are not limited to):
- Health and safety risk assessments, method statements and appropriate Personal Protective Equipment (PPE) for the protection of construction

workers in accordance with the Control of Substances Hazardous to Health Approved Code of Practice and guidance;

- Implementation of appropriate dust suppression measures to prevent migration of potential contaminated dust plus asbestos fibres;
- Working methods during construction to manage groundwater and surface water appropriately and ensure that there is no run-off from the works, any material/waste stockpiles and storage containers into adjacent surface watercourses in accordance with DEFRA and the Environment Agency's Pollution Prevention Guidance;
- Prioritising the reuse of mineral resources (sand and gravel) within the Scheme;
- Implementation of appropriate pollution incident control e.g. plant drip trays and spill kits;
- Implementation of appropriate and safe storage of fuel, oils and equipment during construction;
- If unexpected contamination is encountered during proposed earthworks, further assessment followed by appropriate mitigation will be undertaken. Following assessment further mitigation measures may be required;
- Land occupied or disturbed during the construction process, that is not permanently acquired for engineering and landscaping, should be restored to a condition equivalent to its original;
- If spoil is to be spread on land intended for farming, addition of topsoil will be required and the land will need an aftercare period of at least five years to rectify settlement and compaction;
- The quality and quantity of soil on site should be maintained by implementing appropriate techniques for stripping, stockpiling and reinstatement. Disturbed soils should be reinstated to their original quality using a Soil Handling and Management Strategy; and
- Mitigation measures relating to buried ordnance and munitions.

10.9.2. It has also been assumed that hardstanding will be placed across the majority of the proposed works associated with the carriageway, except for soft landscaping along embankments and cuttings, which post-construction will minimise the generation of dust, direct contact and ingestion pathways and minimise infiltration. If soil contamination is identified, laying of a clean capping layer and importation of suitable clean soils may be required in areas of proposed soft landscaping. Drainage design will consider the risks from any residual contamination and designers may be required to use lined drainage systems in areas of contamination that may be left in situ.

10.9.3. It is assumed that the Scheme will be operated in accordance with the relevant regulations and best practice guidance in applying Best Available Techniques and pollution prevention.

10.9.4. Furthermore, pollution prevention measures incorporated within drainage design will mitigate the risk of contamination to controlled waters. The principles of drainage design for the proposed development are summarised in Chapter 8, Road Drainage and the Water Environment.

10.9.5. As detailed in section 10.6 a ground investigation is required for the Scheme to inform the Scheme design and appropriate mitigation measures. A ground investigation specification has been drafted and this allows for the installation of groundwater and ground gas monitoring wells and a subsequent preliminary monitoring programme to establish baseline conditions. The requirement for further monitoring will be reviewed upon completion of the assessments detailed in section 10.7.

10.10. Assumptions and limitations

10.10.1. Based on information available to date, assessment of baseline conditions within the study area has been largely qualitative, with only limited ground investigation data to assess ground conditions on site.

10.10.2. A phase of ground investigation is to be undertaken to inform the design and to confirm the appropriate mitigation measures. The ground investigation is currently being procured. Again, given the timescales associated with the procurement process and the scale of the ground investigation, which is expected to take five months to complete with a subsequent monitoring programme, laboratory analysis, and assessments and reporting, it is currently envisaged that the ground investigation works and subsequent reporting will not be included within the ES and Development Consent Order (DCO) submission. In light of this, the associated assessments and reporting will subsequently be made available during the examination stage of the DCO process.

10.10.3. It is currently assumed that the red line boundary for the Scheme includes the likely locations of any engineering features, such as construction compounds and engineering features such as attenuation ponds. Further assessment may be required following detailed design should amendments to the red line boundary be necessary.

10.10.4. For agricultural soils assessment, the requirement for exchange land created by the junction improvements may result in the loss of BMV land to farming in the vicinity of the Scheme but this cannot be known until sites of exchanged land have been confirmed.

10.11. Conclusion

10.11.1. Further assessment of geology and soils with respect to the Scheme is required and a phase of ground investigation is to be undertaken to inform the design and to confirm the appropriate mitigation measures.

10.11.2. A summary of the topics to be included in the ES and those scoped out of further assessment is presented in Table 10-7.

Table 10-7: Geology and soils topics scoped in and out of further assessment

Topic	Scoped in/out	Comment/Justification
Geology as a valuable resource	✓	Whilst no Geological SSSIs or LGS have been identified within the study area and will not be considered within the ES, effects on mineral resources will be assessed as the Scheme is situated within sand and gravel mineral resource

Topic	Scoped in/out	Comment/Justification
		zones, associated with the River Wey and River Mole, and mineral safeguard zones have been identified.
Soils and agricultural land	✓	The impact that the scheme has on agricultural land will be assessed.
Land contamination including human health, groundwater and surface water	✓	Potential impacts to human health, groundwater and surface water have been identified. Further assessment should be carried out including, but not limited to, production of a CSM and a ground investigation will be completed to ensure these are appropriately understood and mitigated.
Construction and operational phase pollution effects	✓	The Scheme has the potential to introduce new sources of contamination associated with the accidental loss/spillage of fuels and oils.
Physical effects	✓	Physical effects including ground instability and topography will be assessed.
Major accidents or disasters	✓	Significant effects arising from the vulnerability of the proposed development to major accidents or disasters relevant to the Scheme will be assessed.
Re-use of soils and waste soils	x	Addressed in Chapter 12 Materials and Waste.

11. Cultural Heritage

11.1. Introduction

- 11.1.1. This report presents the scoping for the Preliminary Design Stage. This stage will include the completion of surveys, stakeholder consultation, and completion of the EIA. This chapter scopes the information and activities necessary to complete this stage for cultural heritage.

11.2. Study area

- 11.2.1. For this stage, a 500 m study area around the alignment of the Scheme has been defined. This distance was defined by reference to relevant guidance and professional judgement and is beyond the minimum distance recommended by DMRB Volume 11, Section 3, Part 2 HA 208/07 Cultural Heritage. There is a potential that the Scheme may be developed during this stage, and so the study area may be altered to reflect any changes. This will affect the baseline condition, potential impacts, resulting effects and potential mitigation and will be reflected in the environmental reporting and accompanying Gazetteer and Figures.

11.3. Planning and policy context

National Planning Policy Framework

- 11.3.1. The National Planning Policy Framework (NPPF) (DCLG 2012) sets out 12 Core Planning Principles of which the conservation of historic environment is one. One of the NPPF's core principles is that *"planning should conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations"* (DCLG 2012, Para 17).
- 11.3.2. The DCLG published Planning Practice Guidance online in 2014, to expand upon the NPPF. '18a: Conserving and Enhancing the Historic Environment' was published in April 2014. The Guidance notes that *"conservation is an active process of maintenance and managing change. It requires a flexible and thoughtful approach to get the best out of assets as diverse as listed buildings to as yet undiscovered, undesignated buried remains of archaeological interest"*.
- 11.3.3. The NPPF and the PPG identifies two categories of non-designated sites of archaeological interest:

"Those that are demonstrably of equivalent significance to scheduled monuments and are therefore considered subject to the same policies as those for designated heritage assets" (*PPG citing National Planning Policy Framework Paragraph 139*); and

"Other non-designated heritage assets of archaeological interest. By comparison this is a much larger category of lesser heritage significance, although still subject to the conservation objective. On occasion the understanding of a site may change following assessment and evaluation prior to a planning decision and move it from this category to the first" (*PPG*).

National Policy Statement for National Networks

- 11.3.4. In addition to the overarching regulatory and policy framework discussed above, the impacts and effects of the Scheme have been reviewed in light of relevant historic environment legislation and policy.
- 11.3.5. Policy with regard to assessment of the historic environment effects of nationally significant transport infrastructure is set out in the National Policy Statement for National Networks (NPSNN).
- 11.3.6. Historic Environment Policy is set out in paragraphs 5.120 to 5.142 of the NPSNN. The key aspects which should be addressed are as follows:
- The significance, setting and viability of the heritage assets likely to be affected by the proposed development should be considered;
 - When considering the impact of a proposed development on the significance of a designated heritage asset great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be; and
 - Harm or loss affecting any designated heritage asset should require clear and convincing justification - substantial harm to or loss of a grade II Listed building or grade II Registered Park or Garden should be exceptional; substantial harm to or loss of designated assets of the highest significance should be wholly exceptional.
- 11.3.7. There is no definition of what constitutes 'substantial harm' in the NPSNN or other published policy documents. However, guidance in National Planning Policy Guidance (NPPG), supporting policy advice and case law indicates that whilst clearly a step down from total loss, substantial harm still represents a considerable degree of change to the significance of an asset. This could, for example, be as the result of removal of significant elements of fabric or the degradation/removal of key aspects of an asset's setting that notably contribute to its significance.
- 11.3.8. When considering the consequences of substantial harm there is a strong presumption against development.
- 11.3.9. NPSNN embodies an underlying principle of balancing harm and benefit which places greater weight on the conservation of more important assets. Where less than substantial harm would occur, there is a need to ensure that harm is justified and minimised and that the wider public benefits of the proposed are appropriately articulated.

Local Policy

Guildford Borough Local Plan

- 11.3.10. The western portion, to the west of Painshill Park, of the Scheme boundary area is located within the local administrative area of Guildford Borough Council. The Council is expected to consult on the draft of a new local plan in summer 2017; but until its adoption the Guildford Borough Local Plan (2003) remains current. Policies HE4, HE6, HE10 and HE12 are relevant to this assessment. Policy HE11 Scheduled Ancient Monument and other Sites and Monuments of National Importance has now expired and the NPPF should be considered when assessing impacts upon archaeological remains.

11.3.11. The Local Plan Policies which are relevant to this assessment state:

- Policy HE4: NEW DEVELOPMENT WHICH AFFECTS THE SETTING OF A LISTED BUILDING
 - Planning permission will not be granted for development that adversely affects the setting of a listed building by virtue of design, proximity or impact on significant views.
- Policy HE6: LOCALLY LISTED BUILDINGS
 - In considering applications for development affecting buildings included on the local list the council will have regard to the effects of the development on the architectural or historic interest of the buildings and its setting.
- Policy HE10: DEVELOPMENT WHICH AFFECTS THE SETTING OF A CONSERVATION AREA
 - The Borough Council will not grant permission for development which would harm the setting of conservation area, or views into or out of that area.
- Policy HE12: HISTORIC PARKS AND GARDENS
 - Planning permission will not be granted for development which would detract from the character or appearance of a park or garden of special historic interest, or its setting. Permission will not be granted for unsympathetic subdivision.

Elmbridge Borough Council Local Plan

11.3.12. The north-eastern portion of the Scheme boundary area, to the east of the western boundary of Painshill Park, is located within the administrative area of Elmbridge Borough Council. The Elmbridge Local Plan is made up of the Elmbridge Core Strategy (2011) and the Elmbridge Development Management Plan (2015). The Core Strategy does not provide specific policy for the historic environment, though historic assets are considered under Policy CS17 - Local Character, Density and Design. Policy DM12 - Heritage of the Development Management Plan deals specifically with the historic environment and states:

- Planning permission will be granted for developments that protect, conserve and enhance the Borough's historic environment. This includes the following heritage assets:
 - Listed Buildings and their settings;
 - Conservation Areas and their settings;
 - Parks and Gardens of Special Historic Interest and their settings;
 - Scheduled Monuments and their settings;
 - Areas of High Archaeological Potential and County Sites of Archaeological Importance (CSAIs); and
 - Locally Listed Buildings and other identified or potential assets (including non-designated locally significant assets identified in the local lists compiled by the Council).
- Listed Buildings:

- The Council will encourage appropriate development to maintain and restore Listed Buildings, particularly those identified as being most at risk;
- Development to, or within the curtilage or vicinity of, a listed building or structure should preserve or enhance its setting and any features of special architectural or historical interest which it possesses;
- A change of use of part, or the whole, of a Listed Building will be approved provided that its setting, character and features of special architectural or historic interest would be preserved or enhanced. Consideration will also be given to the long-term preservation that might be secured through a more viable use;
- Development which would cause substantial harm to or loss of a listed building (including curtilage buildings), such as total or partial demolition, will be permitted only in exceptional circumstances. In such cases, consideration will be given to the asset's significance. Applicants will need to clearly demonstrate that either:
 - There are substantial public benefits outweighing any harm or loss; or;
 - All of the following apply:
 - The nature of the listed building prevents all reasonable use of the site;
 - No viable use of the listed building can be found in the medium term through appropriate marketing that will enable its conservation;
 - It can be demonstrated that charitable or public funding/ownership is not available to enable its conservation; and
 - Any harm or loss is outweighed by the benefit of bringing the site back into use.
- Conservation Areas:
 - Proposals for all new development, including alterations and extensions to buildings, their re-use and the incorporation of energy efficiency and renewable energy technologies, must have a sensitive and appropriate response to context and good attention to detail;
 - Development within or affecting the setting of a conservation area, including views in or out, should preserve or enhance the character and appearance of the area, taking account of the streetscape, plot and frontage sizes, materials and relationships between existing buildings and spaces;
 - Open spaces, trees and other hard and soft landscape features important to the character or appearance of the area should be retained or be in keeping with the character of the area; and
 - Proposals to demolish buildings and/or structures will be assessed against their contribution to the significance of the conservation area as a heritage asset. Where substantial harm would be caused to a conservation area's significance, the proposal will be resisted unless exceptional circumstances, including substantial public benefits outweighing any harm to the conservation area, can be demonstrated. Where the harm would be less than substantial, it will be weighed against any public benefits of the proposal, including securing optimum viable use of the heritage asset and

whether it would enhance or better reveal the significance of the conservation area.

- Parks and Gardens of Special Historic Interest:
 - Parks and gardens identified as being of special historic interest, including landscape features and buildings, and their setting, will be protected and their sensitive restoration encouraged; and
 - Any proposed development within or conspicuous from a historic park or garden will be permitted provided that it does not detract from the asset.
- Scheduled Monuments and County Sites of Archaeological Interest (CSAI):
 - Development that adversely affects the physical survival, setting or overall heritage significance of any element of a Scheduled Monument or CSAI will be resisted; and
 - Any new development should be sensitive to these criteria and positively act to enhance the monument or CSAI overall and ensure its continued survival.
- Areas of High Archaeological Potential:
 - Proposals for development should take account of the likelihood of heritage assets with archaeological significance being present on the site, provide for positive measures to assess the significance of any such assets, and enhance understanding of their value.
- Locally Listed Buildings and other non-designated heritage assets:
 - The Council will seek to retain these, where possible, and will assess proposals which would directly or indirectly impact on them in the light of their significance and the degree of harm or loss, if any, which would be caused.

Guidance

11.3.13. This chapter has been prepared has been undertaken with reference to the following standards and guidance:

- Ancient Monuments and Archaeological Areas Act (1979);
- Planning (Listed Buildings and Conservation Areas) Act (1990);
- Standards and guidance for archaeological evaluations and watching briefs: Chartered Institute for Archaeologists (CIfA) (2014);
- Standards and guidance for archaeological desk-based assessment: Chartered Institute for Archaeologists (CIfA) (2014, revised 2017);
- The Setting of Heritage Assets Historic Environment Good Practice Advice in Planning: 3, Historic England 2015; and
- DMRB Volume 11, Section 3, Part 2: Highways Agency (2007).

11.4. Baseline conditions

11.4.1. This report has identified both designated and non-designated heritage assets around the Scheme within the study area which could potentially be affected by

the Scheme (Figure 2.1). Information on heritage assets was sourced in September 2017 from the Historic England National Heritage List for designated assets, and the local authorities for details of Conservation Areas and from Surrey Historic Environment Record (HER) for non-designated assets. This is an update of data which was considered for the Option Selection Stage Scoping Report and EAR. These updates include changes to the side roads elements of the scheme, and the upgrading of signage across the current overhead gantries along the M25. Due to the nature of works within the M25 corridor, new HER data has only been acquired within a 500m buffer of the scheme and side road elements, as no intrusive groundworks are associated with the gantry upgrades. However, designated assets within 500m of the M25 were included, in order to account for any setting impacts associated with this work. The data provides an overview of the historic environment in the area, to set out a suitable scope for more detailed assessment, impact reporting, and the identification of potential mitigation needed.

- 11.4.2. Heritage assets are identified by a unique ID, and these are provided in the gazetteer in Appendix D. Designated assets are referred to by their National Heritage List Entry (NHLE) numbers where relevant. Non-designated assets are referred to by their Surrey HER numbers (MSE), with Areas of High Archaeological Potential referenced by a unique Atkins Archaeological Notification Areas asset ID.
- 11.4.3. The study area contains fifty-five designated heritage assets. These comprise:
- Four Scheduled Monuments;
 - One Grade I registered park and garden;
 - One Grade II* registered park and garden;
 - One Grade I listed building;
 - Five Grade II* listed buildings;
 - Forty-one Grade II listed buildings; and
 - Two Conservation Areas.
- 11.4.4. Following assessment and site visits undertaken during production of the EAR for the Option Selection Stage and the assessment of additional elements associated with the scheme, twelve designated assets within the study area have been scoped out of further assessment. These assets were judged as being of sufficient distance from or with limited or no views of the Scheme and therefore have been scoped out as there will be no impacts on setting. The twelve designated asset which have been scoped out are all listed buildings as follows:
- 1030127 - The Chinese Bridge, Painshill Park, Grade II;
 - 1189122 - Old School House, Grade II;
 - 1029335 - Orchard Cottage, Grade II;
 - 1030210 - Village Pump, Grade II;
 - 1030060 - Chilbrook Farmhouse, Grade II;
 - 1294555 - The Cricketers Inn, Grade II;

- 1030052 - St Matthews Church of England First School, Grade II;
 - 1044723 - Cooper Tomb 20 Yards West of Church of St Mary The Virgin, Grade II;
 - 1264426 – Hoodsfield, Grade II;
 - 1392421 - The Old Fire Station, Grade II;
 - 1236238 - Shrapnell Tomb 20 Yards North West of Church of St Mary The Virgin, Grade II;
- 11.4.5. Assets situated outside the study area, but within Painshill Grade I Park and Garden include:
- 1030124 - The Gothic Temple, Painshill Park, Grade II*;
 - 1030131 - The Vermont Exchange, Grade II;
 - 1030059 - Postboys Row, Grade II;
 - 1192437 - Worlds End Cottage, Grade II;
 - 1191715 - The Gardeners Cottage, Painshill Park, Grade II;
 - 1286935 - The Walled Gardens, Painshill Park, Grade II;
 - 1030128 - The Chapel Ruins, Painshill Park, Grade II;
- 11.4.6. Following assessment and site visits undertaken during production of the EAR for the Option Selection Stage no setting impacts were identified upon these assets, and they have been scoped out from further assessment.
- 11.4.7. Sixty non-designated heritage assets were also identified within the study area during the Option Selection Stage activities. These assets include possible prehistoric earthworks, the London to Winchester Roman Road, medieval or post-medieval enclosures, parish boundaries and earthworks, as well as post-medieval domestic, agricultural and industrial buildings, and post-medieval and modern gardens and parkland.
- 11.4.8. Data obtained from the Surrey HER in September 2017, following the Preliminary Design Stage, identified an additional four non-designated heritage assets within the study area:
- MSE487 - Romano British cremation and associated finds, discovered and excavated in 1911;
 - MSE14773 - Settlement site, Henn's Enclosure, Ockham;
 - MSE14770 - Medieval pond, Wemere; and
 - MSE14772 - Ore Lane Trackway, Ockham medieval Holloway.

11.5. Potential impacts

- 11.5.1. As per the DMRB methodology, potential impacts on the cultural heritage resource are defined as changes to the resource caused by the Scheme.

The Scheme

- 11.5.2. The Scheme would result in direct impacts upon six known non-designated linear features in the vicinity of the junction, comprising: the London to Winchester

Roman Road (SMR4619); Ockham Heath parish boundary bank (MSE14795); Pointer's Road (MSE14791); bank at Chatley Wood (MSE14785); boundary bank at Clearmount (MSE14782) and Red Hill Holloway or ditch feature (MSE14774).

- 11.5.3. These non-designated assets are all considered to be of low value. The Scheme would only impact upon small segments of the long linear features. At most minor adverse impacts are expected.
- 11.5.4. The Scheme also has the potential to impact upon significant hitherto unknown archaeological remains, given the proximity of the required works to a known prehistoric monument of national importance (Scheduled Monuments 1012204 and 1007905) and medieval landscape features. Impacts to these as-yet unknown assets may range from moderate to major adverse; further work would be required to ascertain their significance and therefore determine the significance of effect.
- 11.5.5. In addition to the elongation of the roundabout and the realignment of the slip roads, the Scheme includes other associated improvements. These would include the widening of A3 between Ockham and Painshill; an overbridge linking properties east of the A3 with Red Hill Road; changes to the access roads to the west of the A3, north of Junction 10; the upgrading of the track to gain access to Hut Hill Farm, Park Barn Farm and the Birchmere Scouts campsite via the rebuilt Cockrow bridge; a local access route from the Ockham Road Junction to RHS Wisley; and changes to the access to the BOAT to Elm Corner. Potential impacts resulting from each of these proposals on heritage assets are discussed below.

A3 Widening between Ockham and Painshill

- 11.5.6. The widening of the A3 has the potential to directly impact upon two known heritage assets in the vicinity of Bolder Mere to the west of Junction 10. The Lord King's Ditch (MSE14783) is supposedly the ditch cut by Lord King to drain Wisley Pond c. 1800. It runs south from Wisley to the Bolder Mere and presumably a portion of it was cut previously by the A3, though the HER records it as terminating on the north side of the road. The widening of the A3 will potentially remove further c. 7 m of the ditch. Impacts are expected to be minor to moderate adverse.
- 11.5.7. Bolder Mere Dam (MSE14766) is located to the south of the A3 at Bolder Mere. The dam is located at the south-east edge of the Boldmere itself and at a slight angle to the A3. The earthworks making up the dam appear to have been previously disturbed by work associated with the A3, including cutting across its north-east terminus and inserting drainage channels into its northern side. The widening of the A3 at this point could remove a further c. 15 m of the north-east extent of the dam earthworks, with minor to moderate adverse impacts expected.
- 11.5.8. While the proposals indicate that the widening of the road will not impact upon the Ockham/Wisley Parish Boundary Marker (MSE3464), the proximity of works to the site mean that mitigation measures may be required to ensure there is no inadvertent damage to this asset.
- 11.5.9. There is some potential for the proposals to impact upon significant hitherto unknown archaeological remains, especially given that the areas have been subject to continual land management, since the early medieval period.

Access to Painshill properties

- 11.5.10. The proposal would affect the setting of the Grade II listed Foxwarren Cottage (1030053), and the Grade II* listed Gothic Tower (1191694) within Painshill Park although they would not be physically affected.
- 11.5.11. The setting of Painshill Park (1000125), a Grade I Registered Park and Garden, could also be affected as a result of construction of part of the overbridge within the designated parkland and other changes to its setting.
- 11.5.12. The proposal also has the potential to affect the hengi-form scheduled monument at Red Hill (1007905) as a result of changes to its setting, due to the proximity of the overbridge to the monument, along with the impacts resulting from the general A3 widening.
- 11.5.13. There is also the potential for encountering hitherto unknown buried archaeological remains. Effects may range from moderate to major adverse, and will require further investigations to ascertain their value and the potential for significant effects.

Access to Seven Hills Road, west of the A3

- 11.5.14. There are no known heritage assets within the area of this element and as such no direct impacts upon known heritage assets are expected. The nearest known heritage assets are Painshill Park (1000125), though this is located to the south-east of the existing A3, and a non-designated post-medieval farm at Long Orchard (MSE22158), c. 80 m to the north. The area appears to have been largely agricultural in the post-medieval period when it is shown on the 1872 six inch to the mile Ordnance Survey map (Sheet XVII) to comprise improved fields with mature trees along the Portsmouth Road (now the A3). Given this and the limited land take, the potential for impacts upon significant hitherto unknown archaeological remains is considered to be very limited, with possible impacts being minor to moderate.

Access via Cockrow Bridge

- 11.5.15. There are no known heritage assets within the area of the proposed bridge and access roads and as such no direct impacts upon known heritage assets are expected. There is some potential for impacts upon significant hitherto unknown archaeological remains, possibly of prehistoric date or related to the former post-medieval Oldpond House. Any impacts are expected to be minor to moderate, on low value assets, resulting in no significant effects.

Wisley Lane access

- 11.5.16. The access to Wisley Lane has the potential to impact the Royal Horticultural Society's Garden, Wisley (1000126) which is a Grade II* Registered Park and Garden. While the impacts to RHS Wisley would only be to a part of the asset and will have a limited impact on the overall significance of the Park, this could constitute a moderate significant effect on the asset, due to the Grade II* status of the garden. Further assessment of the Scheme and the asset's setting, including identification of key elements and an assessment of the contribution of setting to the significance of the asset, are necessary to further inform the determination of overall effect, as well as to identify appropriate mitigation design.

Elm Lane access

- 11.5.17. There are no designated heritage assets in the vicinity of the proposals here. The only extant heritage asset is the non-designated boundary bank at Ockham Village Green (MSE14789). As the proposals are only for the upgrade of the existing byway, no impacts upon the setting of the bank are expected and are the anticipated effects are therefore neutral.

11.6. Proposed level and scope of assessment

- 11.6.1. As potential significant effects on the cultural heritage resource are anticipated, further assessment is required in relation to potential effects on designated and non-designated heritage assets during construction and operation of the Scheme. Further assessment will also be required in respect of potential effects in relation to previously undiscovered archaeological remains arising from construction of the Scheme.
- 11.6.2. Table 11-1 contains a summary of what is scoped in and out for the cultural heritage resource in this Preliminary Design Stage.

Table 11-1: Cultural heritage topics scoped in and out

Effects	Scoped in/out	Comment/Justification
Designated heritage asset	✓	Assessment of the potential effects on designated assets due to physical or setting impacts.
Non-designated heritage assets	✓	Assessment of the potential effects on non-designated assets due to physical or setting impacts.
Potential for undiscovered archaeology	✓ construction ✗ operation	Assessment of the potential for effects on previously undiscovered archaeological remains due to the Scheme construction.

- 11.6.3. To achieve a better understanding of the potential for archaeological remains to exist and to more accurately assess the risks posed by the Scheme, further assessment is required to identify and characterise the archaeological resource. Such assessment may take the form of a detailed assessment in accordance with DMRB guidance, and would include:
- Information relating to the results of previous archaeological investigations;
 - Assessments of the settings and significance of known heritage assets which will be suitably detailed for particularly sensitive assets; and
 - Geophysical surveys where appropriate to identify hitherto unknown archaeological assets.
- 11.6.4. Depending on the results of the further detailed assessment set out above, further assessment including intrusive archaeological fieldwork may be required. In addition, the results of the assessment will enable suitable mitigation to be proposed.

11.7. Proposed assessment methodology

- 11.7.1. The methodology outlined below refers to that of the desk-based evaluations made as part of this scoping report. Further archaeological evaluations, beginning with non-invasive geophysical survey and possibly including

evaluation trenching, targeted excavation and additional archival and historic research, may be required to fully characterise the significance of the heritage assets impacted by the Scheme and to mitigate impacts. This would be done following detailed design and by means of an archaeological evaluation and mitigation programme agreed with statutory consultees.

DMRB Methodology

- 11.7.2. The assessment of potential effects on cultural heritage undertaken in the Preliminary Design Stage is outlined in DMRB Volume 11, Section 3, Part 2 HA 208/07 Cultural Heritage.
- 11.7.3. The methodology is essentially a three-step process. The first stage is establishing the value of the heritage assets. The value, or significance, of each heritage asset will be assessed, and determined in accordance with guidance provided in DMRB. This provides a score ranging from Very High to Negligible. Heritage value is determined by professional judgement, grounded in established criteria. These criteria are set out in English Heritage's (now Historic England) Conservation Principles (2008), which sets out four values: evidential, historical, aesthetic and communal. These encapsulate architectural, historic and archaeological interest and are consistent with the DMRB methodology. Table 11-2 sets out the criteria for assessing the value of heritage assets, as identified in the DMRB.

Table 11-2: Determining the value of heritage assets

Value	Description	Example
Very High	Internationally important or significant heritage assets.	World Heritage Sites, or buildings recognised as being of international importance.
High	Nationally important heritage assets generally recognised through designation as being of exceptional interest and value.	Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, Registered Historic Battlefields, Conservation Areas with notable concentrations of heritage assets and undesignated assets of national or international importance.
Medium	Nationally or regionally important heritage assets recognised as being of special interest, generally designated.	Grade II Listed Buildings, Grade II Registered Parks and Gardens, Conservation Areas and undesignated assets of regional or national importance, including archaeological remains, which relate to regional research objectives or can provide important information relating to particular historic events or trends that are of importance to the region.
Low	Assets that are of interest at a local level primarily for the contribution to the local historic environment.	Undesignated heritage assets such as locally listed buildings, undesignated archaeological sites, undesignated historic parks and gardens etc. Can also include degraded designated assets that no longer warrant designation.
Negligible	Elements of the historic environment which are of insufficient significance to merit consideration in planning decisions and	Undesignated features with very limited or no historic interest. Can also include highly degraded designated assets that no longer warrant designation.

Value	Description	Example
	hence be classed as heritage assets.	
Unknown	The importance of an asset has not been ascertained.	

Table Source: DMRB, Volume 11, Section 3, Part 2, HA 208/07, Annex 5, Table 5.1 and Annex 7, Table 7.1

- 11.7.4. Once the value of each asset has been established using the criteria set out in Table 11-2 above, the magnitude of impact to a heritage asset is identified by the degree of change that would be experienced by the asset and its setting, if the Scheme was to be constructed, as compared with a 'do nothing' scenario. Table 11-3 identifies the criteria outlined by the DMRB process for establishing the magnitude of impacts on heritage assets.

Table 11-3: Identifying the magnitude of impact

Magnitude of Impact	Description of Nature of Change
Major Adverse	Substantial harm to, or loss of an asset's significance as a result of changes to its physical form or setting. For example, this would include demolition, removal of physical attributes critical to an asset, loss of all archaeological interest or the transformation of an asset's setting in a way that fundamentally compromises its ability to be understood or appreciated. The scale of change would be such that it could result in a designated asset being undesignated or having its level of designation lowered.
Moderate Adverse	Less than substantial harm to an asset's significance as a result of changes to its physical form or setting. For example, this could include: physical alterations that remove or alter some elements of significance, but do not substantially alter the overall significance of the asset; notable alterations to the setting of an asset that affect our appreciation of it and its significance; or the unrecorded loss of archaeological interest.
Minor Adverse	Limited harm to an asset's significance as a result of changes to its physical form or setting. For example, this could include: physical changes that alter some elements of significance but do not noticeably alter the overall significance of the asset; and small-scale alterations to the setting of an asset that hardly affect its significance.
Negligible	Very minor changes to setting or form of the asset.
No Change/ Neutral	No appreciable change to an asset's significance.
Minor Beneficial	Limited improvement of an asset's significance as a result of changes to its physical form or setting. For example, this could include: physical changes that reveal or conserve some elements of significance but do not noticeably alter the overall significance of the asset; or small-scale alterations to the setting of an asset that improve our ability to appreciate it.
Moderate Beneficial	Notable enhancement of an asset's significance as a result of changes to its physical form or setting. For example, this could include: physical alterations that conserve or restore elements of significance; notable alterations to the setting of an asset that improve our appreciation of it and its significance; or changes in use that help safeguard an asset.

Magnitude of Impact	Description of Nature of Change
Major Beneficial	Substantial enhancement of an asset's significance as a result of changes to its physical form or setting. For example, this could include: major changes that conserve or restore elements of high significance; alterations to the setting of an asset that very substantially improve our appreciation of it and its significance; or changes in use that safeguard an asset, e.g. by taking it off the At Risk Register.

Table Source: DMRB, Volume 11, Section 3, Part 2, HA208/07, Annex 5-7

11.7.5. The significance of effect is expressed in the manner set out in the matrix derived from DMRB (as shown in Table 11-4). The significance of effect is determined by consideration of a combination of the magnitude of impact and the value of each asset.

Table 11-4: Determining the significance of effect

Sensitivity of receptor	Magnitude of impact				
	Major	Moderate	Minor	Negligible	No change
Very high	Very large	Large or very large	Moderate or large	Slight	Neutral
High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

Table Source: DMRB, Volume 11, Section 2, Part 2, HA 208/07, Table 5.1

EIA Methodology

11.7.6. Following the DMRB assessments carried out in the Option Selection Stage further assessments are required at the Preliminary Design Stage to characterise known heritage assets and identify and characterise hitherto unknown archaeological remains, as well as to identify specific impacts of the Scheme and proposed mitigation for those impacts. The following tasks would be undertaken to complete this process:

- An archaeological desk-based assessment (DBA) to review the known archaeology and the results of any archaeological investigations within the study area to fully understand the archaeological potential of the area and guide non-invasive survey recommendations;
- Geophysical survey within the boundary of the Scheme to identify and characterise any previously unknown archaeological remains, and assess the Scheme's impact;
- Evaluation trenching where necessary to further assess the significance of archaeological remains where non-intrusive survey was insufficient to do so;

- Statements of significance for the Registered Parks and Gardens at Wisley and Painshill, to identify significant characteristics of the assets and their settings and assess the impacts of the Scheme on these characteristics; and
- Setting assessments of heritage assets where the Scheme is considered to impact setting.

Vulnerability to major accidents and disasters

- 11.7.7. There is potential for man-made major accidents to affect the Scheme, and thus potentially result in harm to the historic environment resource. Major accident events largely include, but are not restricted to, major road traffic accidents. Other man-made risk may include chemical spillages which could directly affect above ground archaeological remains by damaging their fabric or buried archaeology remains by altering their condition and state of preservation. Due to the nature of archaeological remains within the Study Area, and their distance to the Scheme, the harm as a result of such accidents is considered to be low at this stage.
- 11.7.8. Disasters, which for the purpose of this section are deemed to be 'natural' disasters, e.g. major flooding events, are possible within the Study Areas, and therefore have the potential to pose harm to the Scheme and its historic environment resource. Flooding events, high winds, storm events or extreme drought would be considered to have a direct impact on the Scheme, as these could contribute to the partial or full erosion of archaeological remains, or substantially alter the conditions surrounding it, thus affecting their level of preservation.
- 11.7.9. A more detailed assessment of major accidents and disasters shall be considered in more detail in the following stages in the EIA process. No additional baseline data is required as part of such an assessment.

11.8. Proposed consultation

- 11.8.1. Consultation with the local planning authorities and Historic England has already taken place to discuss the Scheme options at the Option Selection Stage and potential for mitigation and archaeological fieldwork. Now that a preferred option for the Scheme has been identified, the local authority archaeologists will be consulted with regards to understanding known and unknown heritage assets, including assets identified since the original data was requested, the potential for and likely significance of unknown archaeological remains, and recommendations for further evaluation and appropriate mitigation of impacts.
- 11.8.2. Historic England will be consulted regarding the Scheme's impacts to designated heritage assets, including registered parks and gardens, listed buildings, and scheduled monuments.

11.9. Potential mitigation measures

- 11.9.1. Further investigations are necessary to fully inform the nature of mitigation measures necessary for the Scheme. Some mitigation measures may be designed into the final Scheme, including landscaping to screen visual impacts and dampen noise intrusions. Impacts to known and unknown archaeological remains may be mitigated through investigations designed to take into account

the nature of the impacts as well as the character of the archaeological asset. Such investigations may include a programme of strip, map and record, area excavation, and/or watching briefs during construction activities. Additional mitigation measures may be identified during detailed design and consultation activities.

11.10. Assumptions and limitations

11.10.1. For the purposes of scoping, the following assumptions have been made:

- The Scheme will not be substantially altered prior to the production of the EIA;
- Any additional heritage assets identified through an update of HER data will be of local to regional importance, thus having a low to negligible value, per the methodology described above;
- No HER data was acquired as part of the assessment of overhead gantries along the M25 due to the nature of associated works. Should gantry upgrades require sub-surface interventions, new HER data will be acquired;
- Any previously unidentified archaeological remains identified through consultations and/or surveys completed for the EIA will be of local or regional importance, and have a low to negligible value, per the methodology described above; and
- Any construction compounds, soil storage, flood alleviation, habitat mitigation or other auxiliary works necessary for the completion of the Scheme will be restricted to within the study area and will avoid heritage assets of medium to very high value and would have at most a neutral to negligible adverse impact.

11.10.2. Limitations to the EIA scoping include the following:

- The compound locations, as well as areas for ecological mitigation and water management, have not yet been definitively confirmed, but will be located within the red line boundary of the Scheme. These auxiliary works have the potential to have both direct and indirect impacts on heritage assets; and
- The requirements for land identified as being required for replacement Common and SPA land are yet to be fully resolved and are subject to change during Scheme development. At this stage, possible locations within the study area have been included, however as no works are currently proposed, assessing potential impacts arising from the Scheme on the replacement Common and SPA land has not been possible.

11.11. Conclusion

11.11.1. This Scoping Report has identified the planning policy and guidance under which impacts to cultural heritage will be addressed in the EIA. At this stage, impacts to have been scoped out of the assessment are:

- Those operational impacts on archaeological remains, as any archaeological assets impacted by the Scheme are anticipated to be fully removed before operation; and

- The ten listed buildings identified in section 11.4 as these are deemed to have no potential to be affected following the assessment work undertaken at the Option Selection Stage.
- 11.11.2. Previous stages of the PCF process have identified the possibility of significant adverse effects on cultural heritage as a result of the Scheme. Further assessment is required to fully characterise and evaluate the known and potential heritage assets. A complete desk-based assessment, along with geophysical survey to identified archaeological sites, and assessments of setting significance for built heritage should be completed to aid in the assessment of impacts for the EIA.
- 11.11.3. Consultations with the local planning authority and Historic England are necessary to further inform the understanding of the heritage assets and the effects of the Scheme. Once the further assessments and consultation have been completed, a full understanding of the impacts to cultural heritage can be reported and a programme of mitigation developed.

12. Materials and Waste

12.1. Introduction

- 12.1.1. This chapter outlines the methodology that will be used to assess and identify the likely impacts of material resources and waste associated with the Scheme, during construction, demolition and excavation (CD&E) and operation.
- 12.1.2. The Scoping Report has been written in accordance with IAN 153/11 which provides guidance on the identification and assessment of impacts associated with the use of material resources and waste arisings for construction and improvement schemes.

12.2. Study area

- 12.2.1. The Scheme lies to the south-west of the M25 London Orbital motorway, within the county of Surrey.
- 12.2.2. With regards to material resources and waste, the study area extends outside of the Scheme area. For material resources, the study area includes the demand for key construction materials nationally. For waste, the study area includes the waste arisings and waste infrastructure capacity within the county of Surrey (with the exception of hazardous waste which is considered on a national level).

12.3. Planning and policy context

European directives

- 12.3.1. All European directives applicable to the Scheme have been transposed into national legislation. However, a number of legislative proposals on waste have been adopted as part of the Circular Economy Package (as supported by the Circular Action Plan), which focuses on “closing the loop of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy”. Regarding the Scheme, the relevant legislative proposals include:
- Proposed directive on waste;
 - Proposed directive on packaging waste;
 - Proposed directive on landfill; and
 - Proposed directive on electrical and electronic waste, on end-of-life vehicles, and batteries and accumulators and waste batteries and accumulators.
- 12.3.2. The following sections provide a summary of the legislation relevant to material resources and waste for the Scheme.

National legislation and policy

- 12.3.3. It should be noted that The National Planning Policy Framework does not contain specific waste policies and so it is not included below. The Waste Management Plan for England 2013 is summarised below which is considered as most relevant to the Scheme.

Environmental Protection Act 1990 (c. 43)

- 12.3.4. The Environmental Protection Act 1990 (c. 43) as amended in 1996 and 1999 implements integrated pollution control for the disposal of waste to air, land and water, including solid waste disposal.
- 12.3.5. As part of this, under Section 34, the Act imposes Duty of Care on anyone who produces, imports, keeps, stores, transports, treats or disposes of waste.
- 12.3.6. This will mean that Highways England and all contractors must take all reasonably practical steps to ensure that:
- Waste is consigned only to a registered waste carrier, licensed waste contractor, local authority waste collector or person dealing with waste in ways that are exempt from licensing;
 - Waste that is disposed of is accompanied by a detailed written description of the waste to ensure its safe handling, treatment and disposal (waste transfer notes are to be kept for a minimum of two years and hazardous waste consignment notes are to be kept for a minimum of three years);
 - Waste is securely contained to prevent it escaping to the environment;
 - Appropriate measures are taken to ensure that others involved in the handling and disposal of waste do so in accordance with the all applicable Regulations;
 - Copies of registration certificates should be obtained for all waste contractors and waste carriers used as part of the Scheme and it should be ensured that they are on the Environment Agency's 'Public Register of Waste Carriers, Brokers and Dealers'; and
 - Checks should be made on the final destination of each waste, ensuring that each waste disposal facility is licensed to accept the waste. Duty of Care audits of carriers and waste disposal facilities are advisable.
- 12.3.7. The generation of waste from the Scheme shall be managed in accordance with the Environmental Protection Act 1990 (c. 43) as amended in 1996 and 1999 and in accordance with good practice.

Clean Neighbourhoods and Environment Act 2005 (c. 16)

- 12.3.8. Chapter 16 of the Clean Neighbourhoods and Environment Act 2005 (c. 16) prescribes the correct transportation, collection, disposal and management of waste and prohibits fly tipping.

Waste (England and Wales) Regulations 2011 (SI 2011/988)

- 12.3.9. The Regulations 2011 (SI 2011/988), as amended in 2012 (SI 2012/1889) and in 2014 (SI 2014/656), transpose the Revised EU Waste Framework Directive (2008/98/EC) into English law and require organisations to manage waste in alignment with the waste hierarchy (see Figure 12.1), in order to prevent waste going to landfill.
- 12.3.10. Waste management contractors working on the Scheme will be required to provide evidence that the waste hierarchy has been applied. This evidence can be in the form of waste transfer notes and hazardous waste consignment notes, which themselves must be kept for two and three years, respectively.

The Hazardous Waste (England and Wales) Regulations 2005 (SI 2005/894)

- 12.3.11. The Regulations, as amended in 2009 (SI 2009/507), 2015 (SI 2015/1360) and 2016 (SI 2016/336) applies to all wastes listed as hazardous in the European Waste Catalogue (2000/532/EC) and the CLP (Classification, Labelling and Packaging) Regulation (EC 1272/2008). Hazardous waste will be produced throughout all lifecycle stages of the Scheme. Hazardous waste should be disposed of in accordance with the Regulations. including a hazardous waste consignment note.

Waste Electrical and Electronic Equipment (WEEE) Regulations 2013 (SI 2013/3113)

- 12.3.12. The Regulations revoke the previous WEEE Regulations (2006 (SI 2006/3289), 2007 (SI 2007/3454), 2009 (SI 2009/2957) and 2010 (SI 2010/1155)) and have a key objective to reduce the amount of WEEE that goes to landfill. This is to be achieved by making producers responsible for the collection, treatment and recovery of WEEE, including the associated costs.
- 12.3.13. For the Scheme, all WEEE produced in the CD&E and operational phases must be segregated and managed separately from other wastes, with relevant paperwork provided as described above.

The Waste Batteries and Accumulators Regulations 2009 (SI 2009/890)

- 12.3.14. The Regulations, as amended in 2015 (SI 2015/1935), main requirements are that producers of batteries and accumulators must either take back waste batteries and accumulators, or fund the collection and recycling of them. The 2015 amendment removed several additional requirements, inclusive of the provision of operational plans and independent audit reports.
- 12.3.15. For the Scheme, all batteries produced in the CD&E and operational phases must be segregated and managed separately from other wastes.

The CLP (Classification, Labelling and Packaging) Regulation (EC 1272/2008)

- 12.3.16. The CLP Regulation (within the UK and EU) was introduced in a staggered manner between 1999 and 2015. It should be noted that within the UK and EU, the CLP Regulation, has replaced the Dangerous Substances Directive (67/548/EEC) and the Dangerous Preparations Directive (1999/45/EC). To summarise, the Regulation provides guidance on the application of the CLP criteria for hazards (physical, health and environmental). With specific reference to the Scheme, the Regulation should be used to support the classification of both waste and materials. All waste should be classified by a six-digit code, which must be recorded on all waste transfer notes and hazardous waste consignment notes for the movement of waste from the CD&E and operational phases of the Scheme.

Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000 (SI 2000/1043)

- 12.3.17. The Regulations, as amended in 2000 (SI 2000/3359), require the safe disposal or decontamination of all equipment that contains polychlorinated biphenyls

(PCBs). Contaminated equipment containing over 5 litres or more of PCB substance or mixture is also covered by the Regulations. PCBs are often present in areas of historical industrial use.

The Environmental Permitting (England and Wales) Regulations 2016 (SI 2016/1154)

- 12.3.18. The Environmental Permitting Regulations 2016 (SI 2016/1154) replace the 2010 Regulations (SI 2010/675) (as amended in 2011 (SI 2011/2043), 2012 (SI 2012/630) and 2014 (SI 2014/255)). The Regulations put in place requirements to ensure that sites that produce certain materials and undertake certain activities (such as the storage, use or treatment of waste) have a permit or exemption from the regulator (i.e. the Environment Agency).
- 12.3.19. Permit or exemption details of all sites that manage waste from the Scheme will be checked to ensure waste is being managed legally.

Environmental Damage (Prevention and Remediation) Regulations 2009 (SI 2009/153)

- 12.3.20. The Regulations, as amended in 2010 (SI 2010/587), introduce obligations to ensure the polluter pays for any environmental damage caused. The Regulations are applicable to all economic activities and therefore cover businesses. The Regulations require caution to be taken when managing sites in order to prevent damage to water, land and biodiversity. Such damage could be caused by poor waste management practices and as such the generation of waste from the Scheme must be managed in accordance with all applicable legislation and policies and in accordance with good practice.

The Control of Asbestos Regulations 2012 (SI 2012/632)

- 12.3.21. The Regulations require notification to the appropriate authority of all notifiable asbestos works (as specified in the Regulations), the medical surveillance (from April 2015) and health records for employers dealing with asbestos, the provision of the correct equipment and training for working with asbestos; and the documentation of the method, storage and disposal of asbestos waste. Any waste containing asbestos (e.g. insulation or lagging) must be stored and disposed of, in suitable packaging to prevent fibre release, in line with the Regulations. All asbestos must be removed by a licensed contractor who has undergone the appropriate training for the removal of asbestos and must wear the appropriate Personal Protective Equipment (PPE). Written records must be kept of the workers and the likely level of exposure. The asbestos must only be disposed of at an appropriately permitted disposal site.
- 12.3.22. These regulations will be adhered to during the construction of the Scheme in order to minimise harm to human health due to asbestos exposure.

Waste Management Plan for England 2013

- 12.3.23. Defra drew on issues from the previous Waste Strategy for England (WS2000), the Waste Strategy for England (WS2007), European Directives and Legislation to create the Waste Management Plan for England 2013. The Plan continues to focus on the importance of driving waste management up the waste hierarchy (see Figure 12.1) and states the importance of considering the Government's ambition of achieving a zero waste economy. The Plan puts a strong emphasis

on waste prevention through making products using fewer natural resources. The targets outlined in WS2007 remain relevant, including the target to recover 70% of construction and demolition waste by 2020. This target shall be considered a minimum requirement the Scheme.

National Planning Policy for Waste 2014

- 12.3.24. The National Planning Policy for Waste is the formal replacement for Planning Policy Statement 10 (PPS10). It follows the principles set out in PPS10, which states that waste should be managed in line with the principles of the waste hierarchy. It is important to ensure that, where possible, waste production is minimised to reduce environmental impacts and to ensure an assessment is made of the local waste infrastructure type and capacities, to include, but not be limited to, an assessment of the local policies.

Waste Planning Practice Guidance 2015

- 12.3.25. The Planning Practice Guidance website details how to adhere to the National Planning Policy for Waste 2014. The guidance should be followed in order to satisfy the local planning authority that impacts introduced by a proposed development on the existing waste management facilities are acceptable and do not prejudice the implementation of the waste hierarchy (see Figure 12.1).

National Policy Statement for National Networks 2014

- 12.3.26. The National Policy Statement outlines of the importance of managing resources and wastes in order to prevent and minimise environmental impacts. The resource and waste management measures outlined in the 'Waste Management' chapter should be adhered to and considered throughout all stages of the Scheme. Management measures are inclusive of but not limited to, the implementation of the waste hierarchy (see Figure 12.1), the correct management of waste both on-site and off-site and ensuring the appropriate waste infrastructure for waste treatment and disposal.

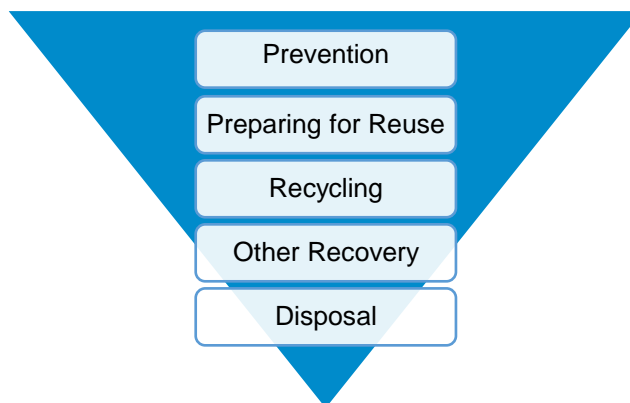
Regional policy

- 12.3.27. There are a number of overarching sustainability policies within the region of Surrey. The Surrey Waste Plan 2008, as amended in 2009, is most applicable to material resources and waste and consists of four development plan documents. The Plan, at the time of preparing this chapter, is being reviewed and updated in accordance with the requirements of the National Planning Policy Framework. The reviewed and updated Plan will cover the period 2018 - 2033.

12.4. Baseline conditions

- 12.4.1. The scoping report has been written in accordance with IAN 153/11 (2011), titled 'Guidance on the Environmental Assessment of Material Resources'. IAN 153/11 (2011) provides guidance on the identification and assessment of impacts associated with the use of material resources and waste arisings for construction and improvement schemes.
- 12.4.2. The Scheme will aim to prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill as per the internationally recognised waste hierarchy, shown below in Figure 12.1.

Figure 12.1: Waste hierarchy



- 12.4.3. Desk based information will/has been gathered from the sources listed in Chapter 17 References in order to identify the existing baselines that may be impacted by the use of material resources and the generation of waste from the Scheme.
- 12.4.4. With regards to material resources associated with construction, demolition and excavation (CD&E), no baseline is available for material resources use on a regional level. As such, national demand for key construction materials has been collated which will be used as part of the PEIR and EIA to assess at a high-level, the impact of the Scheme on the national baseline.
- 12.4.5. With regards to CD&E waste associated with the Scheme, this will be primarily non-hazardous and inert, with small quantities of hazardous waste (e.g. associated with sealants, paints, solvents and contaminated soil). The baseline has been collated from regional data relating to the amount of waste that is produced/is estimated to be produced on a regional level. Surrey County Council issued a Scoping Statement in September 2016 which demonstrates their intent to calculate waste infrastructure capacity. This calculated capacity will be included as part of the baseline, if available at the time of assessment. As hazardous waste is often treated outside of the region within which it is produced (e.g. there are reported cases of hazardous waste produced in the south-east of England which has been transferred to the north-west of the country). The baseline has been collated from data relating to the amount of hazardous waste that is produced/is estimated to be produced and the infrastructure capacity at a national level. Both the baselines for waste that is produced/is estimated to be produced and the baseline for waste infrastructure capacity will be used as part of the PEIR and EIA to assess the impact of the Scheme.
- 12.4.6. Less impact is envisaged during the operational stage of the Scheme due to minimal material resource use (associated with planned/unplanned maintenance) and waste generation (through littering and planned/unplanned maintenance). Most of these wastes would likely be non-hazardous municipal type wastes (e.g. litter (paper, food, packaging, etc.)) and non-hazardous/inert and hazardous wastes from planned/unplanned maintenance (concrete, bituminous materials, waste electrical and electronic equipment (WEEE), oils, etc.). Data related to operational material resource use and waste generated by highway schemes is not readily available and as such will not be assessed quantitatively as part of the PEIR or EIA.
- 12.4.7. The baseline for materials resources and waste are presented in the following sections.

Material resources baseline

- 12.4.8. The national demand (baseline) will be estimated for the key construction materials associated with the development. Both the key construction materials and the national demand are shown below in Table 12-1. The national baseline has been sourced from data published by the Mineral Products Association, UK Steel and the Forestry Commission.
- 12.4.9. The key construction materials identified in the table are based on the main construction materials identified in the Bill of Quantities (or equivalent) from previous road improvement schemes. National demand data is drawn from data for both 2014 and 2015 (most readily available data). Given that the number, type and size of construction developments varies from year to year, the demands for construction materials also fluctuate. As such, this data should be considered representative.

Table 12-1: National Material Resources Baseline

Construction Material	National Baseline
	Tonnes per Annum (tpa)
Aggregate	225,000,000
Asphalt	24,000,000
Cement	13,000,000
Concrete*	81,000,000
Steel	10,448,200
Timber**	3,225,920

*Sum of concrete and other concrete related products.

**Converted from cubic meters (9,488,000 m³) using a conversion rate of 1 m³ to 0.34 tonnes.

Waste baseline

- 12.4.10. The amount of CD&E and hazardous waste arisings for Surrey will fluctuate year on year based on the number, type and size of construction projects underway. This in turn is heavily influenced by factors such as the economic situation, investment levels and legislative and policy variations. Thus, the representative baseline for CD&E waste arisings for the Scheme's construction period (2020 to 2022) has been calculated based on the estimated regional waste arisings for 2015 (most recent available data), as shown in Table 12-2. The estimated regional waste arisings are presented in the Surrey County Council Planning Service: Annual Monitoring Report 2015/16.
- 12.4.11. The national baseline for hazardous waste arisings is taken from the Environment Agency Waste Integrator Tool (2017) filtered by hazardous construction waste. As with the non-hazardous/inert CD&E baseline this will fluctuate year on year based on the number, type and size of construction projects underway.

Table 12-2: Waste Arisings Baseline

Waste Stream	Tonnes per Annum (tpa)
CD&E (regional)	1,972,000
Hazardous (national)	197,710

Waste infrastructure baseline

- 12.4.12. As aforementioned, Surrey County Council have demonstrated their intent to calculate CD&E waste infrastructure capacity within the county. Once issued this will be included as part of the baseline, if available at the time of assessment.
- 12.4.13. The national hazardous waste infrastructure capacity, interpreted from the Environment Agency list of permitted facilities (2015), is presented below. It should be acknowledged that the hazardous waste infrastructure capacity baseline is not specifically for CD&E waste, as the facilities are likely to receive hazardous waste from multiple streams (i.e. municipal, commercial and industrial etc.) and therefore it is not possible to delineate this data further.

Table 12-3: National Hazardous Waste Infrastructure Baseline

Waste Stream	Tonnes per Annum (tpa)
Hazardous	9,521,042*

* Hazardous landfill capacity has been interpreted from the total capacity of permitted hazardous waste facilities nationally.

12.5. Potential impacts

- 12.5.1. Potential impacts are related to the potential impacts on the existing baseline (see section 12.4).
- 12.5.2. Receptors which have the potential to be impacted, with regards to material resources and waste, are defined as:
- The market for key construction materials, which are to be used throughout the Scheme, as shown in Table 12-1;
 - The waste arisings baseline - the amount of waste that is predicted to be produced during the CD&E phases of the Scheme, shown in Table 12-2; and
 - The predicted capacity of waste infrastructure - essentially the capacity of sites receiving, placing, treating, recycling, recovering and/or disposing of waste both regionally (non-hazardous and inert) and nationally (hazardous) which are anticipated to arise from the Scheme during the construction phase. As aforementioned, Surrey County Council issued a Scoping Statement in September 2016 which demonstrates their intent to calculate CD&E waste infrastructure capacity. Once issued this will be included as part of the baseline. The hazardous waste infrastructure capacity is shown in Table 12-3.
- 12.5.3. As aforementioned, less impact is envisaged during the operational stage of the Scheme (see section 12.4).

12.6. Proposed level and scope of assessment

- 12.6.1. A Detailed Assessment, as defined in IAN 153/11, is considered necessary to assess the impacts of material resources and waste arisings from the Scheme.
- 12.6.2. For the purposes of the assessment, material resources are defined as per the IAN 153/11 as *“the materials and construction products required for the construction, improvement and maintenance of the trunk road network. Material resources include primary raw materials such as aggregates and minerals, and*

manufactured construction products. Many material resources will originate off site, purchased as construction products, and some will arise on site such as excavated soils or recycled road planings.” Whilst waste is defined in line with the Waste Framework Directive (2008/98/EC) as “any substance or object which the holder discards or intends or is required to discard.”

12.6.3. The following tasks are proposed to determine the impact of materials and waste from the Scheme:

- Ongoing review of relevant waste legislation, national, regional and local planning policies and guidance;
- Review the proposed construction materials and materials quantities, and estimate the quantities and types wastes to be generated during CD&E. Operational wastes will be limited to ad hoc waste arisings and/or scheduled maintenance which cannot be quantified;
- Identify and evaluate the impacts of the Scheme against the national demand for key construction materials, the regional CD&E waste arisings, the national hazardous waste arisings, the regional waste infrastructure capacity and the national hazardous waste infrastructure capacity; and
- Identify opportunities to reduce, re-use, recover and/or recycle materials and wastes through a review of the proposed development (including proposed building materials, construction methods and design, where available) and in accordance with industry best practice.

12.6.4. Whilst not mandatory, it is best practice to produce a Site Waste Management Plan (SWMP) and a CEMP during each stage of the design. The SWMP should be updated throughout the Scheme development and include the anticipated types and quantities of waste generated on site, and actions undertaken to minimise waste generated on site. A CEMP is an overarching environmental management document. Its purpose is to identify stakeholder requirements, ensure compliance with legislation, and minimise potential adverse environmental impacts during construction via mitigation measures. It is proposed that both a SWMP and a CEMP be produced as part of the EIA.

12.6.5. Table 12-4 contains a summary of what is scoped in and out for materials resources and waste impacts in the EIA.

Table 12-4: Materials resources and waste topics scoped in and out of further assessment

Effects	Scoped in/out	Comment/Justification
Change in demand for key construction materials during the CD&E phases.	✓	Assessment required to identify and evaluate the impacts of the Scheme against the national demand for key construction materials during the CD&E phases.
Change in demand for key construction materials associated planned/unplanned maintenance with during the operational phase.	×	Minimal impact is envisaged during the operational stage of the Scheme due to minimal material resource use (associated with planned/unplanned maintenance). Data related to operational material resource use by highway schemes is not readily available and as such will not be assessed quantitatively.

Effects	Scoped in/out	Comment/Justification
Change in baseline waste arisings during the CD&E phases.	✓	Assessment required to identify and evaluate the impacts of waste arisings from the Scheme against the waste arisings baseline during the CD&E phases. The baseline for CD&E waste will be on a regional level and the baseline for hazardous CD&E will be on a national level.
Change in baseline regional waste arisings during the operational phase.	×	Minimal impact is envisaged during the operational stage of the Scheme due to minimal waste generation (through littering and planned/unplanned maintenance). Most of these wastes would likely be non-hazardous municipal type wastes during normal operation, and non-hazardous/inert and hazardous wastes from planned/unplanned maintenance. Data related to waste generated by highway schemes is not readily available and as such will not be assessed quantitatively.
Change in capacity of waste infrastructure during the CD&E phase.	✓	Assessment required to identify and evaluate the impacts of waste arisings from the Scheme against the regional waste infrastructure baseline during the CD&E phases. The baseline for CD&E waste will be on a regional level and the baseline for hazardous CD&E will be on a national level.
Change in capacity of regional waste infrastructure during the operational phase.	×	Operational waste arisings from the Scheme will not be assessed as it is envisaged that this will be minimal and no data related to waste generated by highway schemes is readily available. Therefore, an assessment will not be made of the potential effect of the operational waste arisings on operational waste infrastructure.

12.7. Proposed assessment methodology

- 12.7.1. The general methodology and criteria described below will be applied during the EIA to determine the significance of the effects associated with material resources and wastes during the construction phase of the Scheme.
- 12.7.2. The magnitude of the anticipated material resources used and waste arisings generated by the Scheme will be determined by assessing the Bill of Quantities (or equivalent). The Bill of Quantities (or equivalent) will include (but is not limited to) information on the removal of excavated materials, and materials/equipment to be installed by sub-contractors.
- 12.7.3. There are a number of assumptions and limitations that will be applicable to the proposed assessment methodology as outlined below.
- 12.7.4. The results of the assessment will be tabulated and presented in the ES, as data will not be available within the timeframes of the PIER submission. Additional detail will be provided in the SWMP which will be prepared as an appendix to the ES, and will contain a breakdown of waste types.
- 12.7.5. The magnitude and sensitivity of the receptors affected by the Scheme based on sensitivity (waste infrastructure capacity) and magnitude (national demand for key construction materials and waste arisings) will be assessed. As noted above, operational material resource use and waste arisings cannot be estimated and as such a quantitative assessment will not be undertaken. Table 12-5 below summarises how magnitude and sensitivity effects have been defined with regard to material resources, waste arisings and infrastructure capacity. The

criteria are based on Atkins' prior experience, given there is no specific industry assessment standard. Sensitivity of key construction materials cannot be assessed due to a lack of publicly available data. As baseline data relating to operational material resource use and waste generated by highway schemes is not readily available, it will not be assessed quantitatively for significance as part of the EIA.

Table 12-5: Criteria for classifying the magnitude of environmental effects

Level	Sensitivity Criteria	Magnitude Criteria
High	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> • High volumes of waste generated such that it may have a high impact on estimated CD&E waste infrastructure within the regional study area (greater than 10% of the regional baseline); and • High volumes of hazardous waste generated such that it may have a high impact on estimated hazardous waste infrastructure within the national study area (greater than 1% of the national baseline). 	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> • Significant volumes of key construction materials required such that it has a high impact on current market demand, greater than 10% of the national baseline (for any one material); • Generation of large volumes of CD&E waste, greater than 10% of the regional baseline; and • Generation of large volumes of hazardous waste, greater than 1% of the national baseline.
Medium	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> • Moderate volumes of waste generated such that it may have a moderate impact on estimated CD&E waste infrastructure within the regional study area (greater than or equal to 5% but less than 10% of the regional baseline); and • Moderate volumes of hazardous waste generated such that it may have a moderate impact on estimated hazardous waste infrastructure within the national study area (greater than or equal to 0.5% but less than 1% of the national baseline). 	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> • Moderate volumes of key construction materials required such that it has a moderate impact on current market demand, greater than or equal to 5% but less than 10% of the national baseline (for any one material); • Generation of medium volumes of CD&E waste, greater than or equal to 5% but less than 10% of the regional baseline; and • Generation of moderate volumes of hazardous waste, greater than or equal to 0.5% but less than 1% of the national baseline.
Low	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> • Low volumes of waste generated such that it may have a low impact on estimated CD&E waste infrastructure within the regional study area (greater than or equal to 1% but less than 5% of the regional baseline); and • Low volumes of hazardous waste generated such that it may have a low impact on estimated hazardous waste infrastructure within the national study area (greater than or 	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> • Low amounts of key construction materials required such that it has a moderate impact on current market demand, greater than or equal to 1% but less than 5% of the national baseline (for any one material); • Generation of low volumes of CD&E waste, greater than or equal to 1% but less than 5% of the regional baseline; and • Generation of low volumes of hazardous waste, greater than or

Level	Sensitivity Criteria	Magnitude Criteria
	equal to 0.1% but less than 0.5% of the national baseline).	equal to 0.1% but less than 0.5% of the national baseline.
Negligible	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> Negligible volumes of waste generated such that it may have a negligible impact on estimated CD&E waste infrastructure within the regional study area (less than 1% of the regional baseline); and Negligible volumes of hazardous waste generated such that it may have a negligible impact on estimated hazardous waste infrastructure within the national study area (less than 0.1% of the national baseline). 	<p>The Scheme meets one of more of the following criteria:</p> <ul style="list-style-type: none"> Negligible amounts of key construction materials required such that it has a negligible impact on current market demand, less than 1% of the national baseline (for any one material); Generation of negligible volumes of CD&E waste, less than 1% of the regional baseline; and Generation of negligible volumes of hazardous waste, less than 0.1% of the national baseline.

12.7.6. The assessment of significance combines the magnitude and sensitivity of the environmental effects to determine whether the effects are major, moderate, minor, negligible or no change, as shown in Table 12-6. Very large to moderate effects are considered to have the potential to be significant, while slight and neutral effects are not considered significant.

12.7.7. Throughout the design process and following the assessment of significance, mitigation measures associated with material use and waste generation will be identified. It is likely that the mitigation measures will incorporate the following themes:

- Management of waste within the context of the waste hierarchy;
- Management of the waste in accordance with local and national policy and legislation and, where applicable, guidance documents;
- Safe management of the waste generated, as determined by its physical and chemical characteristics (e.g. bulky or hazardous wastes);
- Potential environmental effects or human health risks associated with the waste arisings throughout the lifecycle of the Scheme; and
- Use of materials and management of waste in accordance with the Proximity Principle, which promotes the procurement of materials and management of wastes locally.

12.7.8. The overall aim of the process of identifying mitigation measures is to achieve a high reuse, recycling and recovery rate throughout all phases of the Scheme. Achieving this will minimise environmental burdens in terms of:

- Impacts to the environment and human health;
- Energy and carbon impacts;
- The overall sustainability of the Scheme; and
- Reduce costs associated with excessive material procurement and waste storage, collection and disposal.

Vulnerability to major accidents and disasters

- 12.7.9. A review of major accidents and disasters that could affect the Scheme has been undertaken. These are not considered to have a significant effect on material resources and waste. Mitigation measures identified in Section 12.9 would be used to manage any impacts resulting from major accidents and disasters.

12.8. Proposed consultation

- 12.8.1. It proposed that Surrey County Council, as the author/owner of the Surrey Waste Plan 2008 (as amended in 2009) will be consulted on the proposed assessment methodology post submission of the PIER. Consultation is also proposed with the Environment Agency.

12.9. Potential mitigation measures

- 12.9.1. Although every effort will be made (through the design process) to maximise resource efficiency, it is inevitable that waste will be generated during each phase of the Scheme. This will have an impact on the regional waste infrastructure and the regional quantity of waste arisings.
- 12.9.2. The design of the development will ensure that wastage is minimised throughout its lifecycle. During the design stage, the potential effects will be addressed using the following mitigation measures which will then follow through to the construction phase:
- Waste will be designed out where possible;
 - Opportunities to use waste as a resource will be sought where practicable; and
 - Where waste re-use and recovery is not possible, waste will be disposed of in a way that is least damaging to the environment and to human health (i.e. in accordance with the waste hierarchy, shown in Figure 12.1).
- 12.9.3. Further details on mitigation measures will be provided as part of the PIER and the ES.

12.10. Assumptions and limitations

- 12.10.1. There are a number of assumptions that will be applicable to the proposed assessment methodology as outlined below:
- Should a detailed construction programme not be available, it will be assumed that material resource use and waste generation will be spread equally across the construction period;
 - Any new/unused equipment will be fed back into the supply chain for use on alternative schemes and as such will be excluded;
 - All material quantities will be converted into tonnes using industry standard conversion rates;
 - All material resources will be grouped according to main material types, as shown in Table 12-1;
 - Wastage rates, published by the Construction Resources and Waste Platform, will be applied to all material resource tonnages in order to

determine the likely waste arisings (offcuts, damaged and surplus materials);

- An additional 1% will be added to the total waste arisings (excluding soil, aggregate and granular fill) to account for packaging waste, based on experience from previous projects. It will be assumed that 0.01% of all packaging waste arisings will be hazardous in nature (e.g. associated with sealants, paints and solvents); and
- Hazardous waste arisings will comprise of oils, sealants, paints, solvents and contaminated soil. Contaminated soil will be considered separately.

12.10.2. The key limitations that will be applicable to the proposed assessment methodology are outlined below:

- The availability of data within the timeframes of the PIER and ES submission (i.e. the availability of Bill of Quantities (or equivalent); and
- The issue of waste infrastructure capacity by Surrey County Council in advance of the ES submission.

12.11. Conclusion

12.11.1. Table 12-6 below outlines the potential issues likely to occur as a result of the Scheme during the construction and operation phases for each topic. Where potential issues have been identified these have been scoped in.

12.11.2. As noted above, less impact is envisaged during the operational stage of the Scheme due to minimal material resource use (associated with planned/unplanned maintenance) and waste generation (through littering and planned/unplanned maintenance) and as such this has been scoped out and will not be assessed as part of the EIA.

12.11.3. As part of the ES, a Detailed Assessment, as defined in IAN 153/11 (2011), will be undertaken to assess the potential issues which have been scoped in.

Table 12-6: Potential issues

Effects	Construction	Operation	Comments
Waste	✓	✗	Design to ensure wastage is minimised throughout lifecycle. Waste to be used as a resource where practicable and designed out where possible.
Material resources	✓	✗	Assessment to identify and evaluate the impacts of the Scheme against national demand for key construction materials and raw material resources.

Key: ✓ = potential impact likely; ✗ = no potential impact likely

13. People and Communities

13.1. Introduction

13.1.1. As per the guidance set out in IAN 125/15 and in order to promote efficient reporting, DMRB Vol 11, Section 3, Parts 6 (Land Use), 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and 9 (Vehicle Travellers) will be incorporated into this single chapter titled 'People and Communities'. The assessment reported in this chapter will identify the potential effects of the Scheme on:

- Private dwellings;
- Community assets;
- Local businesses;
- Agricultural land;
- Development land;
- Non-motorised users (NMU) - pedestrians, cyclists and equestrians; and
- Vehicle travellers (VT) - drivers and passengers of both public and private vehicles.

13.2. Study area

13.2.1. In the absence of prescriptive guidance for People and Communities assessments, it is proposed to assess likely effects within a study area comprising land within the Scheme's Red Line Boundary plus a 500m buffer extending beyond this boundary. Using professional judgement and knowledge of the scheme, this threshold is considered likely to capture all relevant effects resulting from the scheme. However, the extent of this study area may be increased during the assessment process subject to its findings and the findings of other environmental assessment topics which may inform the People and Communities assessment, such as landscape and visual impact, transport, noise and vibration and air quality.

13.3. Planning and policy context

National Planning Policy

13.3.1. There is no specific legislation or planning policy relating to 'people and communities' assessment, however national and local policy provides direction on relevant issues, particularly transport and land use.

National Policy Statement for National Networks (NPSNN) December 2014

13.3.2. The NPSNN sets out the need for development of road, rail and strategic rail freight interchange projects on the national networks and the policy against which decisions on major road and rail projects will be made.

13.3.3. The Government's vision and strategic objectives for the national networks include improving overall quality of life, journey quality, reliability and safety and linking up communities. Junction improvement is cited as a measure which will

be used to enhance the existing national road network towards this vision (paragraph 2.23).

- 13.3.4. The NPSNN establishes the expectation that delivery of new schemes will improve quality of life and avoid and mitigate environmental and social impacts in line with the principles set out in the NPPF and the Government's planning guidance (paragraph 3.3). Schemes will also be expected to improve accessibility and inclusivity and reduce community severance, to contribute to a network that provides a range of opportunities and choices for people to connect with jobs, services and friends and family (paragraph 3.19).
- 13.3.5. Although it does not provide specific guidance for people and communities impacts, the NPSNN outlines the approach to land use which is of relevance to this assessment. Applicants should identify existing and proposed land uses, including best and most versatile agricultural land, in the vicinity of the Scheme and the likely effects on these (paragraphs 5.165 and 5.168). Access to high quality open spaces, Public Rights of Way, the countryside and opportunities for sport and recreation can be a means of providing mitigation and/or compensation requirements for developments (paragraphs 5.162 and 5.184).

National Planning Policy Framework (NPPF) March 2012

- 13.3.6. The NPPF establishes national planning policy to achieve sustainable development, through themes which include promoting sustainable transport, supporting a prosperous rural economy and promoting healthy communities, with a presumption in favour of sustainable development.
- 13.3.7. To support a prosperous rural economy, planning should promote the sustainable growth and expansion of businesses and enterprise in rural areas, the diversification of agricultural and land-based rural businesses, and the retention and development of local services and community facilities (paragraph 28).
- 13.3.8. The NPPF states that the system needs to be balanced in favour of sustainable transport modes to give people 'a real choice about how they travel' (paragraph 29). Encouragement should also be given to solutions which reduce congestion (paragraph 30). Paragraph 75 includes a requirement that planning policies should protect and enhance Public Rights of Way (PRoWs) and access.
- 13.3.9. The NPPF emphasises the need to manage patterns of growth by making the fullest possible use of sustainable transport modes including public transport, walking and cycling. Chapter 4 of the NPPF sets out how transport should be considered within the context of planning decisions and sustainable development. This policy encourages solutions that seek to reduce congestion, greenhouse gas emissions and serve to facilitate the use of sustainable transport. Furthermore, local planning authorities (LPAs) are required to identify and protect, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice.
- 13.3.10. Chapter 8 'Promoting Healthy Communities' describes how access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities.
- 13.3.11. Social interaction, health and inclusivity are priorities for communities. Planning should thus promote safe, accessible environments and use of public areas and

shared space, and protect valued facilities and services including open space, sports venues, public houses and local shops (Paragraphs 69-70).

- 13.3.12. Paragraph 75 states policies should protect and enhance public rights of way (PRoW) and access. Local authorities should seek opportunities to provide better facilities for users, for example by adding links to existing rights of way networks including National Trails.
- 13.3.13. The National Planning Policy Framework (NPPF)133 and National Planning Practice Guidance (NPPG)134, 2014 do not deal with issues of farm viability, focusing instead on the protection of BMV land.

Planning Act 2008

- 13.3.14. The Planning Act 2008 sets out, inter alia, the DCO process and land acquisition procedures for NSIPs. This M25 project at Junction 10 would require the acquisition of areas of Registered Common Land and other Access Land as defined under the Countryside and Rights of Way Act 2000. Such land is defined as Special Category Land.
- 13.3.15. The compulsory purchase of land is covered in Sections 122-132 of the Planning Act, of which Sections 122 and 131 are relevant to compulsory acquisition of Special Category Land. Section 132 covers the compulsory acquisition of rights over Special Category Land.
- 13.3.16. The identification and selection of appropriate locations for use as Replacement Land must satisfy the definition given in the 2008 Planning Act:

“replacement land” means land which is not less in area than the order land and which is no less advantageous to the persons, if any, entitled to rights of common or other rights, and to the public.”

Countryside and Rights of Way Act 2000

- 13.3.17. The Countryside and Rights of Way Act 2000 (CRoW) regulates all Public Rights of Way (PRoW) and ensures access to them. It requires local highway authorities to publish a Rights of Way Improvement Plan (RoWIP), which should be reviewed every 10 years. The Act also obliges the highway authority to recognise the needs of the mobility impaired when undertaking improvements.
- 13.3.18. There is guidance within the Surrey County Council Rights of Way Improvement Plan (2014) which sets out how PRoW meet the present and likely needs of the public; the opportunities provided by local rights of way for exercise and other forms of recreation and enjoyment; and the accessibility of local rights of way to blind or partially sighted person and others with mobility issues.
- 13.3.19. The document also identifies that built development can be a threat to the rights of way network but it also offers opportunities for enhancements and creation of new routes. The document also states that high levels of road traffic have had negative impacts on users across PRoW across Surrey and that the County Council will use its powers under the Highways Act to create and divert public rights of way to improve connectivity.

The Commons Act 2006

- 13.3.20. The Commons Act 2006 (the Act) protects Common Land and town or village greens. This includes reinforcing existing protections against abuse, encroachment and unauthorised development. It recognises that the protection

of Common Land has to be proportionate to the harm caused and that some specified works can be carried out without the need for consent. The Act provides for the release of land providing there is a provision of suitable “replacement land”.

Local Policy

- 13.3.21. Local policy which has indirect relevance for people, community use and enjoyment are set within adopted local planning policy for Elmbridge Borough Council and the Borough of Guildford.

Elmbridge Borough Council

- 13.3.22. The Elmbridge Core Strategy (2011) include spatial policy CS10 ‘Cobham, Oxshott, Stoke D’Abernon and Downside’ promotes improved access to and within the area for pedestrians and cyclists, public transport users and those with impaired mobility.
- 13.3.23. Policy CS16 ‘Social and Community Infrastructure’ resists the loss of existing social and community facilities or sites.
- 13.3.24. Policy CS25 ‘Travel and Accessibility’ seeks the protection of existing footpaths, cycleways and bridleways; and promotes the delivery of new cycling and walking schemes including development that increases permeability and connectivity within and outside the urban area.
- 13.3.25. The Elmbridge Local Plan Development Management Plan (2015) policy DM19 ‘Horse-related uses and development’ supports proposals to extend and or enhance the recreational value of the bridleway network. Policy DM20 ‘Open Space and views’ promotes the protection of these spaces.
- 13.3.26. Elmbridge have commenced reviewing their Local Plan and a Strategic Options Consultation took place from December 2016 to February 2017. The document set out in para 2.16 that they are aware of ‘hot-spots’ in the road network and at junctions across the Borough and this will be a key issue for any new Local Plan.
- 13.3.27. A Consultation on Preferred approach to Spatial Strategy Policies - including Site Allocations and Designations is expected shortly and it is anticipated that the Local Plan will be adopted in September 2018 after an Examination in Public.

Borough of Guildford

- 13.3.28. In the Borough of Guildford saved policies Local Plan (2003) policy M6 ‘Provision for cyclists and pedestrians’ promotes safe and accessible routes for pedestrians and cyclists and encourage increase use.
- 13.3.29. Policy R1 ‘Loss of Land and Facilities for Sport and Recreation’ resists the loss of land and buildings used for or potential for recreation purposes. Policy R5 ‘Protection of Open Space’ seeks to protect existing open spaces in the borough.
- 13.3.30. Policy CF2 ‘Loss of Community Facilities’ resists the loss of community buildings.
- 13.3.31. A new Local Plan for Guildford has been consulted on and a Proposed Submission Local Plan has been produced. A Proposed Submission Local Plan: strategy and sites 2017 consultation then took place from 9 June to 24 July 2017 and it is anticipated that an Examination in Public will be held between April and July 2018.

13.3.32. Traffic congestion and Junction 10 of the A3/M25 is specifically referenced in the Borough of Guildford Proposed Submission Local Plan: strategy and sites June 2017, in paragraph 2.14a of the Transport and Accessibility section.

Woking Borough Council

- 13.3.33. Woking Borough Council's (WBC) Core Strategy was adopted in October 2012.
- 13.3.34. Policy CS17: 'Open space, green infrastructure, sport and recreation' identifies that development involving the loss of open space will not be permitted unless alternative and equivalent or better provision is made available in the vicinity or the development is directly related to the enhancement of the open space.
- 13.3.35. Policy CS18 'Transport and accessibility' sets out that WBC supports proposals that deliver improvements and increased accessibility to cycle, pedestrian and public transport networks and interchange facilities, ensuring that changes made to transport infrastructure or increase in road vehicle usage will not have an adverse effect on the integrity of an SPA, SAC or Ramsar site.
- 13.3.36. Policy CS19 'Social and community infrastructure' resists the loss of existing social and community facilities or sites unless the Council is satisfied that there is no identified need for its original purpose and that it is not viable for any other social or community use, or adequate alternative facilities will be provided in a location with equal (or greater) accessibility for the community it is intended to serve, there is no requirement from any other public service provider for an alternative facility that could be met through change of use or redevelopment.
- 13.3.37. Policy CS21 'Design' seeks proposals which should be designed in an inclusive way to be accessible to all members of the community, regardless of any disability and to encourage sustainable means of travel.
- 13.3.38. Within the Development Management Policies Development Plan Document (October 2016), Policy DM1 'Green Infrastructure Opportunities' identifies that the Council supports (i) the creation of footpaths and 'cycle greenways' and (ii) the provision of new green infrastructure assets within the Green Belt.
- 13.3.39. Policy DM3 'Facilities for outdoor sport and outdoor recreation' identifies that opportunities should be taken to connect to and enhance the surrounding Green Infrastructure Network.
- 13.3.40. Policy DM5 'Environmental pollution' seeks proposals should ensure that there will be no unacceptable impacts on (i) Air quality; (ii) Surface and ground water quality; (iii) Land quality and condition; and (iv) Health and safety of the public.
- 13.3.41. Policy DM17 'Public realm' seeks development which creates or contribute to a safe, attractive, high quality, inclusive and legible public realm which contributes to local character and which encourages appropriate levels of activity and social interaction.

13.4. Baseline conditions

Private Dwellings

- 13.4.1. In the vicinity of the Scheme, residential properties are found in the main settlement of Cobham and in the smaller hamlets of Elm Corner, Hatchford, Ockham, Ripley and Wisley. In addition, there are a number of isolated

properties and farms within 500m of the Scheme, including within Wisley Common, along Redhill Road, and to either side of the A3 north of the M25.

Community Assets

13.4.2. Within the study area there are community assets, including the following:

- Ockham and Wisley Commons;
- Open Access Land⁶⁴;
- Painshill Park (Grade I Listed);
- RHS Wisley Gardens (Grade II* Listed);
- Heyswood Girl Guide campsite;
- Birchmere Scout campsite; and
- Feltonfleet School.

Local Businesses

13.4.3. Initial desk based research has identified the following potential business receptors. This list is not intended to be exhaustive and will be refined as part of the assessment process:

- Surrey Wildlife Trust, Pond Farm;
- Ockham Bites Café; and
- Silvermere Equestrian Centre.

13.4.4. A range of organisations, institutions or charities with operational nature similar to that of businesses are known to operate in the area around the Scheme, including:

- Heyswood Girl Guide Campsite;
- Birchmere Scout campsite;
- Painshill Park;
- RHS Garden Wisley; and
- Feltonfleet School.

13.4.5. These facilities are in private ownership but are operated as charities. The principle function is to provide a public service and they are not for profit and therefore, they will be considered under the Community Assets assessment section.

13.4.6. It is also recognised that a number of farms which operate as businesses are located in the study area. These will be assessed within the agricultural land assessment section.

⁶⁴ The Countryside and Rights of Way Act 2000 (CROW Act) normally gives a public right of access to land mapped as 'open country' (mountain, moor, heath and down) or Registered Common Land.

Agricultural Land

- 13.4.7. The heaths and woodland around Junction 10 are classified as ‘other land primarily in non-agricultural use’, in accordance with Natural England’s Agricultural Land Classification (ALC)⁶⁵.
- 13.4.8. Land between Ockham Junction and Cobham is shown as Grade 3 (good to moderate quality) and Grade 4 (poor quality).
- 13.4.9. It is considered that none of the affected land is likely to be of Best Most Versatile (BMV) quality.
- 13.4.10. There are a number of farms in the area, including Pond Farm, where the Surrey Wildlife Trust are based. Surrey Wildlife Trust graze cattle on Wisley Common.

Development Land

Borough of Guildford

- 13.4.11. Junction 10 is located within the Borough of Guildford, which extends to the south and west. Within the study area there is a relevant site allocation from the emerging Local Plan (Examination in Public will be held between April and July 2018), a planning consent in the village of Ripley and two planning consents at the RHS Wisley site as part of their Major Investment Programme. Details are provided in Table 13-1.

Table 13-1: Borough of Guildford Development Land

Application location and reference	Description of proposed development
<p>Land at former Wisley Airfield (Site allocation A35 in the Proposed Submission Local Plan: strategy and sites 2016)</p> <p>A planning application was submitted for a development of this size (Planning ref. 15/P/00012) and refused on 8th April 2016. This application is currently at appeal and due to be determined in early 2018.</p>	<p>This is a residential led mixed use development, allocated for: Approximately 2000 homes (C3), including some specialist housing and self-build plots, approximately 100 sheltered/extra care homes (C3 use), 8 Traveller pitches, approximately 1,800 m2 of employment floor space (B1a), approximately 2,500 m2 of employment floor space (B2/B8), approximately 500 m2 of comparison retail (A1), approximately 600 m2 of convenience retail (A1), approximately 550 m2 services in a new local centre (A2 -A5), approximately 500 m2 of community uses in a new local centre (D1), a two form entry primary school (D1), and a secondary school (D1) (four form entry, of which two forms are needed for the housing on the site and two for the wider area).</p>
<p>Land to the East of South Cottage, White Horse Lane, Ripley, GU23 6BB</p> <p>Planning ref. 16/P/00608, refused on 22 June 2016 and appeal allowed subject to conditions 23 Aug 2017</p>	<p>Outline planning application for the demolition of existing petrol filling station, car sales buildings and dilapidated workshops and the construction of up to 26 residential units to the rear and 2 retail/commercial units on the High Street frontage (for flexible A1, A2, A3 or A4 use) and associated car parking and landscaping all matters reserved except access.</p>
<p>Royal Horticultural Society Gardens, Wisley Lane, Wisley, Woking, GU23 6QS</p>	<p>Erection of new part single-storey part two-storey building accommodating retail, entrance and visitor facilities and alterations to the car parking and hard</p>

⁶⁵ NE. 2010. Agricultural Land Classification map London and the South East (ALC007). [ONLINE] Available at: <http://publications.naturalengland.org.uk/publication/141047?category=5954148537204736>. [Accessed 27th January 2016]

Application location and reference	Description of proposed development
Planning ref. 16/P/01080, granted 30 September 2016	and soft landscaping and following the demolition of the existing plant centre, the extensions to the Laboratory building, toilet blocks, Aberconway Cottage and part of Aberconway House.
Royal Horticultural Society Gardens, Wisley Lane, Wisley, Woking, GU23 6QS Planning ref. 16/P/000976, granted 30 September 2016	Demolition of existing buildings and erection of a two-storey building accommodating science, education, research and restaurant facilities, associated landscaping including a landscape bund and other works associated with the development.

Elmbridge Borough Council

- 13.4.12. The area to the north, east and south of Junction 10 is within the Elmbridge Borough Council administrative area. Within Elmbridge there are some relevant planning applications, planning consents and a site identified in a site allocation document in an emerging Local Plan which has not been formally adopted. This adoption is likely to be in September 2018. Details are provided below in Table 13-2.

Table 13-2: Elmbridge Borough Council Development Land

Application location and reference	Description of proposed development
Former San Domenico Restaurant Planning Ref. 2017/0524 (validated 21st March 2017)	Demolition of existing main building and the construction of the new petrol filling station (Sui Generis) with ancillary convenience store (Use A1) and food to go outlet (Use Class A5), 4 no. pump islands, canopy, underground tanks, revisions to vehicular access, parking and circulation arrangements, landscaping and associated works.
Painshill Farm, Portsmouth Road, Cobham Surrey KT11 1DN Planning Ref. 2016/4204 (validated 27th February 2017)	Redevelopment of the site to provide a 70 bed care home with integrated communal and support facilities, landscaped residents' gardens, staff areas, refuse storage and parking following demolition of existing houses.

- 13.4.13. The tables will be updated as part of the assessment and will also include any relevant potential Development Land within Woking Borough Council to the north if applicable.

Non-Motorised Users

- 13.4.14. Non-Motorised Users (NMUs) include pedestrians, cyclists, and equestrians. There are numerous existing PRoW and permissive or informal NMU routes within 1 km radius of Junction 10, some of which cross or interact with the A3 and M25 corridors. In addition, people have the right to roam on the Common Land and Access Land. The impact assessment will, in particular, consider likely effects on formal PRoW identified within the Surrey County Council Rights of Way interactive map.

Community Severance for Non-Motorised Users

13.4.15. Several existing PROW have crossing points via pedestrian overbridges that span the A3 and the M25. However, the A3 and the M25 are barriers to movement for NMUs and local journeys and as a result, severance issues are currently experienced. These include NMU routes on the junction 10 gyratory itself and the crossing of the A3 just to the north of the junction both which are unattractive for users. To the east of the junction the next crossing of the M25 is some way distant which deters people from accessing PROW and land on either side of the motorway.

Vehicle Travellers: View from the road

13.4.16. The M25 Junction 10/A3 Interchange Improvements are located within the Wisley and Ockham Commons, and are located close to the Grade I Listed Painshill and the Grade II* Listed RHS Wisley Registered Parks and Gardens.

13.4.17. The study area contains varying degrees of screening elements along the M25 and A3 that obscure or block the views completely, with Junction 10 surrounded by mature vegetation consisting of heathland, scrub, hedgerows, trees and woodlands.

Vehicle Travellers: Driver stress

13.4.18. There are also two Strategic Roads in the vicinity of the Scheme:

- A3; and
- M25.

13.4.19. The M25 provides a continuous orbital route around Greater London. It carries high volumes of traffic which can cause disruption and delays to the surrounding road network particularly when emergency closures and lane closures are imposed. The south-west quadrant of the M25 is one of the busiest sections of the motorway network and regularly experiences severe congestion.

13.4.20. The probability of experiencing congestion in the peak period is more than 80% in the south-west quadrant of the M25. Average speed at peak times on the M25 is as low as 31-40 mph west of Junction 10 and 41-50 mph to the east. The south-west quadrant is in the top 10 percent nationally in terms of vehicle hour delay.

13.4.21. The A3 also supports a bus route and bus stops. The 715 Stagecoach bus route travels from Kingston to Guildford via Wisley, hourly, Monday–Saturday. On Sundays and public holidays the service run every 90 minutes.

13.4.22. There are a number of local roads in the vicinity of the Scheme, including but not limited to:

- Portsmouth Road;
- Ockham Road;
- Wisley Lane;
- Elm Lane;
- Hatch Lane;
- Old Lane;

- Pointers Road;
- Redhill Road;
- Byfleet Road; and
- A245.

13.5. Potential impacts

Private Dwellings: Land Take and Severance

- 13.5.1. It has been identified that the access to one or more private dwellings (subject to investigation) are within the Scheme boundary. The construction and operation of the Scheme, subject to design, has the potential to directly impact on private dwellings resulting in a land take effect or alterations to access which may result in a severance effect.

Private Dwellings: Amenity

- 13.5.2. The Scheme has the potential to result in nearby residential receptors experiencing a combination of amenity effects such as those relating to traffic, visual, air quality or noise during both construction and operation.

Community Assets: Land Take and Severance

- 13.5.3. Common Land from Ockham Common and Wisley Common and Access Land will be required to implement the Scheme, resulting in land take effects. Some of this land will be required temporarily during construction and then returned to public use. Some land will be required permanently.
- 13.5.4. Temporary and permanent land take will be required from Painshill Park and RHS Gardens Wisley.
- 13.5.5. The Scheme will also affect access arrangements to: RHS Gardens Wisley; Heyswood Girl Guide campsite; Birchmere Scout campsite; and Feltonfleet School, resulting in severance effects. These receptors may experience alteration to severance during construction and operation of the Scheme, due to changes in access arrangements.

Community Assets: Amenity

- 13.5.6. Users of community assets within the study area may experience changes in amenity linked to a combination of visual, noise, vibration, air quality, or traffic effects as a result of the Scheme during construction and operation. This section will report the likely impact on amenity for users of:
- Painshill Park (Grade I Listed);
 - RHS Wisley Gardens (Grade II* Listed);
 - Heyswood Girl Guide campsite;
 - Birchmere Scout campsite; and
 - Feltonfleet School.
- 13.5.7. Users of Painshill Park and Wisley Gardens may be expected to be 'transitory', not exposed to altered amenity for prolonged lengths of time, and may be less

vulnerable to changes in amenity. User groups undertaking activities such as camping in the Heyswood Girl Guide campsite or Birchmere Scout campsite may experience changes in amenity for sustained periods. Schools are likely to be particularly sensitive to some amenity effects, such as noise.

- 13.5.8. The likely receptors for Common Land and Open Access Land community assets are NMUs. In order to avoid potential double counting, the impact of the Scheme on NMUs within the Common Land and Open Access Land will be assessed within the NMU impact assessment only.

Local Businesses

- 13.5.9. A range of business uses have been identified within 500m of the Scheme. Notable examples include the Ockham Bites Café which operates inside the Scheme boundary, which is likely to experience some land take, and Silvermere Equestrian Centre, which makes use of land within the Scheme boundary and study area.
- 13.5.10. Effects on the various not for profit organisations that are identified with the Baseline are considered in the Community Assets section and identified agricultural businesses are considered within the Agricultural Land section.

Agricultural Land

- 13.5.11. Agricultural land is potentially required either temporarily or permanently to enable the construction of the Scheme.
- 13.5.12. Construction and operation of the Scheme, particularly in respect of any replacement land provided and altered access arrangements, has the potential to affect the operation of farm businesses.

Development Land

- 13.5.13. The Scheme has the potential to impact on the pending planning applications at the former San Domenico Restaurant on the A3 and the Painshill Farm site which are within the Scheme boundary.
- 13.5.14. The Scheme has the potential to directly impact on the Guildford strategic proposed site allocation “A35 Land at former Wisley Airfield Ockham” and the associated proposed access, located at Ockham Park Junction. A planning application for the site is currently at appeal.

Non-motorised users: Journey length & Local Travel Patterns

- 13.5.15. The Scheme has potential to temporarily or permanently affect a range of Common Land and Open Access land where members of the public are free to roam, and a number of Public Rights of Way, including existing crossings points over the A3 and M25 and footpaths associated with local roads. Existing routes may be subject to Land Take, resulting in temporary and/or permanent route stopping up or diversion.
- 13.5.16. In the wider study area, construction traffic associated with the Scheme has the potential to increase traffic volume, particularly HGV trip numbers, in the surrounding local highway network. This has potential to make road crossing more difficult, dangerous, intimidating, or time consuming for NMUs.

- 13.5.17. Changes in journey time and journey distance resulting from closure and/or diversion of routes and increased difficulty in road crossing, either temporarily or permanently, may result in changes to travel patterns for NMUs.

Non-motorised users: Changes in Amenity

- 13.5.18. NMUs within the study area may be affected by traffic noise, air quality and the visual intrusion of the road network within the wider environment, giving rise to changes in amenity.

Non-motorised users: Severance

- 13.5.19. Changes in journey length or journey time and changes in amenity for pedestrians and others may be such that they affect the degree to which a locality is subject to 'community severance'.

Vehicle Travellers: View from the road

- 13.5.20. The Scheme is likely to alter the views experienced by users of the Junction 10 junction, slip roads, M25, A3, A245 and local roads due to construction works, removal of vegetation, new structures and embankments.

Vehicle Travellers: Driver Stress

- 13.5.21. Increases in journey time or diversion routes for road users can have a severance effect for vehicle travellers and can result in driver stress. The Scheme has the potential to increase journey times during construction and to effect the existing bus route.
- 13.5.22. Driver stress is anticipated to be temporarily adversely affected by construction of the Scheme, but it is likely to be reduced or potentially beneficial once the Scheme is operational due to the enhanced capacity to cater for traffic, reduced queuing, congestion and risk of conflicts and collisions.

13.6. Proposed level and scope of assessment

- 13.6.1. The assessment will use published guidance provided in DMRB Volume 11 Section 3 to consider the potential effects of the Scheme on People and Communities.
- 13.6.2. There is no relevant guidance with regards to simple and detailed assessments for People and Communities and the assessments will be undertaken in line with the methodology in the DMRB and that identified in section 13.7.

13.7. Proposed assessment methodology

- 13.7.1. The assessment will include of a range of potential impacts. The method of assessment for these potential impacts will vary according to the nature of each impact and receptor type. Assessment criteria is presented below for the assessment of the following receptors:
- Private dwellings;
 - Community assets;
 - Local businesses;

- Agricultural land;
- Development land;
- Non-motorised users (NMU); and
- Vehicle travellers (VT).

13.7.2. In each case, the proposed methodology makes use of guidance provided in DMRB Volume 11 where applicable.

Sensitivity value of receptors

13.7.3. The value of each of the potential receptors varies according to the nature of the receptor. Value shall be considered on a case by case basis as part of the impact assessment process. Factors contributing to perceived value include issues such as level of use and available alternatives.

13.7.4. The proposed method for the assessment of receptor sensitivity is set out below.

Private Dwellings: Land Take and Severance

13.7.5. Advice on assessing impacts from the demolition of private property and associated land-take is provided in DMRB Section 3, Part 6 (Land Use), however this does not include sufficient detail upon which to base assessment criteria beyond approximate number of units that may be lost.

13.7.6. Subject to Scheme design, the Scheme may result in loss of land, or impairment of access to one or more private dwellings. The Scheme is not currently expected to result in demolition of any dwelling.

13.7.7. All dwellings, including their access and curtilage, are considered to be receptors of high sensitivity. Loss of access to a dwelling without the provision of an alternative access will be considered equivalent to demolition; re-provision of access via a longer or otherwise poorer route will be considered equivalent to large loss of curtilage; re-provision of access along a broadly equivalent route will be considered equivalent to small loss of curtilage.

13.7.8. Demolition, loss of land, and alterations to access will be considered as a Land Take effect. Land take effects may either result in temporary impacts during construction, or permanent impacts occurring during construction. No Land Take impact would occur during operation. Impact will be assessed according to the criteria set out in Table 13-3.

Table 13-3: Impact to Private Dwellings Assessment Criteria

Impact Description	Magnitude	Significance
Loss of access or substantially poorer replacement access to 5+ dwellings.	Major (adverse)	Large (adverse): Significant at a community level
Loss of access or substantially poorer replacement access to 1-4 dwellings; small loss of curtilage for 5+ dwellings or large loss of curtilage for 1-4 dwellings.	Moderate (adverse)	Moderate (adverse): Locally significant
Re-provided but less advantageous access for 1-4 dwellings or small loss of curtilage for 1-4 dwellings.	Moderate (adverse)	Moderate (adverse): Not significant

Impact Description	Magnitude	Significance
Negligible loss of curtilage or broadly comparable re-provided access for 1-4 dwellings.	Negligible (adverse)	Neutral adverse: Not significant

Private Dwellings: Amenity

- 13.7.9. Construction of the Scheme has the potential to adversely affect amenity for residents of properties in the vicinity of the Scheme. Amenity effects will be assessed elsewhere in the ES; however, where a property or properties are likely to receive a combination of two or more significant traffic or amenity effects, the People and Communities chapter will consider the likely impact of these effects on residents and the local community. Impact will be assessed according to the criteria set out in Table 13-4.

Table 13-4: In-combination Amenity Effect Impact Assessment Criteria

Impact Description	Magnitude	Significance
Adverse or beneficial alteration in amenity (including two or more significant amenity effects) for 5+ dwellings.	Major (adverse or beneficial)	Large (adverse or beneficial): Locally significant
Adverse or beneficial alteration in amenity (including two or more significant amenity effects) for 1-4 dwellings.	Minor (adverse or beneficial)	Slight (adverse or beneficial): Not significant

Community Assets: Land Take and Severance

- 13.7.10. Advice on assessing impacts from the loss land used by members of the public is included in Section 3 (Environmental Assessment Techniques), Part 6 (Land Use). DMRB guidance requires assessment of the impact of loss of land used by the community. It requires the undertaking of sufficient assessment to identify the location, status and importance of land used by the public.
- 13.7.11. In order to assess this, guidance requires assessors to obtain information about the number of users. It is suggested that in many cases it will be necessary to visit the site and, depending on its importance, either make an estimate of usage or undertake a formal count. The site visit should take place on one or more 'typical' days (for example, a weekday during the school term or at the weekend).
- 13.7.12. The Common Land and Access Land covers a significant area of land surrounding the existing M25/A3 road junction, particularly to the south and south-west of the junction. The public has right of access to all of this land. There are also distinct Public Rights of Way within the area, including Bridleways, a Byway, and Footpaths.
- 13.7.13. There are various potential access points into the Common Land and Access Land, including the Rights of Way and a number of roads.
- 13.7.14. Key highway approaches to the site include Old Lane, Wisley Lane, and Redhill Road. There are three public car parks within the Common Land and Access Land. These are:
- Ockham Common, Boldermere Car Park;
 - Ockham Forest Old Lane Car Park; and

- Wisley Common Car Park.

- 13.7.15. Public usage is expected to vary according to holiday periods, weekdays and weekends. It is expected that there will be greater levels of public use during weekends and public holidays. During typical week days there may be spikes in usage during early mornings and evenings. Weather conditions are also likely to be influential in usage, with inclement weather discouraging weekend use in particular.
- 13.7.16. It is anticipated that the majority of visitors will travel to the area by vehicle and then park within one of the site’s three public car parks. Non-motorised users may also be expected to visit the site from the surrounding settlements, including equestrian users travelling from Silvermere Equestrian Centre and Holly Bush Stables.
- 13.7.17. Given the importance of the land in question (designated Common Land) and the potential for the Scheme to impact upon users of the site, it is proposed to analyse user count data collected to establish typical user numbers and to test the usage assumptions outlined above. This will help to influence the design of the proposed mitigation replacement land. Re-providing replacement Common Land/PRoW is a legal requirement, regardless of the numbers using it.
- 13.7.18. Common Land and Access Land user surveys were undertaken in September 2017, comprising of one mid-week day and one weekend day survey in line with DMRB methodology. The size and nature of the Common Land and Access Land areas makes it difficult to comprehensively and quantitatively survey the entire area. Therefore, the survey were undertaken in a proportionate manner using a quantitative and qualitative approach. Findings of these surveys will inform the assessment of effects on users of the open space and Common Land. Survey teams in pairs visited specific points at set intervals in the day to observe whether anybody was in the areas affected by the Scheme. Interviews were also undertaken with users.
- 13.7.19. The sensitivity or value of land used by the community will be classified as either High, Medium, Low or Negligible. The value is determined by professional judgement and the criteria for assessing receptor value is set out in Table 13-5.

Table 13-5: Criteria for Assessing Receptor Sensitivity / Value

Sensitivity / Value	Criteria
High	Community facility or recreational asset that provides a valuable service to the community, a community group, or individual or is otherwise considered to be of high value to the community. Frequent or continuous use of a resource, no suitable equivalent alternative resources used by the receptor are reasonably available.
Medium	Community facility or recreational asset which is one of several facilities providing the same of similar service to the community, community group, or individual, or is otherwise considered to be of medium value to the community. Moderate or occasional use of a resource, limited equivalent alternative resources used by the receptor are reasonably available.
Low	Community facility or recreational asset which is one of many providing the same of similar service to the community, community group, or individual, or is otherwise considered to be of low value to the community.

Sensitivity / Value	Criteria
	Low or infrequent use of a resource, suitable alternative resources are readily available.
Negligible	Community facility or recreational asset which does not provide an essential service to the community, community group, or individual, or is otherwise considered to be of negligible value to the community. Very infrequent use of resource, multiple equivalent or better alternatives are freely and easily available.

13.7.20. The magnitude of impact will be assessed based upon professional judgement, taking into account any agreed mitigation. The criteria used to determine the magnitude of any change in baseline conditions is presented in Table 13-6 below. The magnitude of change is primarily derived from the following:

- Geographical scale of impact;
- Duration of impact; and
- Whether the impact is reversible or irreversible.

13.7.21. Professional judgement will be used to assign the correct level of impact.

Table 13-6: Criteria for Assessing Magnitude of Impact

Magnitude	Criteria
Major	A substantial part of the receptor will be lost. Loss is long term or irreversible.
Moderate	A substantial part of the receptor will be lost. Loss is short term. Or Some of the receptor will be lost. Loss is long term or irreversible.
Minor	A small part of the receptor will be lost. Loss is long term. Or A very small part of the receptor will be lost. Loss is irreversible.
Negligible	A small part of the receptor will be lost. Loss is short term. Or A very small part of the receptor will be lost. Loss is long term but reversible.

13.7.22. It is acknowledged in the NN NPS that new or enhanced national networks infrastructure can have direct (paragraph 4.79) and indirect impacts (paragraph 4.80) on health, well-being and the quality of life of the population.

13.7.23. The ES will develop and include significance criteria for assessing the effects on community facilities and land used by the community. In compliance with NN NPS paragraphs 4.81 and 4.82, the ES will identify any likely significant adverse impacts and identify measures to reduce or compensate for adverse impacts and consider cumulative impacts.

Community Assets: Amenity

- 13.7.24. The Scheme may result in changes in amenity experienced at community facilities or land used by the community. Amenity and traffic effects (including air quality, noise, vibration, and visual impact caused either directly by the Scheme itself or by changes in traffic flows brought about by the Scheme) will be considered individually in detail elsewhere in the ES. The People and Communities chapter will consider instances where users of a community facility or land used by the community may experience a combination of such effects, leading to a cumulative detriment in amenity.
- 13.7.25. A qualitative assessment of the potential impact of the Scheme on the amenity of community facilities and land used by the community during construction and operation is proposed. This assessment will draw upon the conclusions of the traffic, air quality, noise, vibration and visual impact assessments.
- 13.7.26. The sensitivity or value of land used by the community will be classified as either High, Medium, Low or Negligible. The value is determined by professional judgement and the criteria for assessing receptor value is set out in Table 13-5 above.
- 13.7.27. The method for the assessment of significance is based on a bespoke set of assessment criteria, which have been developed using professional judgement to assign a level of significance to effects arising from the impacts, based on the criteria set out in Table 13-7.

Table 13-7: Community Facilities Assessment Criteria

Impact Description	Magnitude
Substantial and permanent changes in environmental amenity for a large number of people.	Major (adverse or beneficial)
A substantial change to a modest number of people's environmental amenity or a moderate change in many people's environmental amenity. Impacts can be temporary or permanent but do not significantly affect the overall functioning of the land use in the longer term.	Moderate (adverse or beneficial)
A detectable but non-material change to environmental amenity for a small or large number of people. Changes might be noticeable, but the beneficial or adverse impacts fall within the range of normal variation.	Minor (adverse or beneficial)
Changes that are unlikely to be noticeable (i.e. well within the scope of natural variation).	Negligible (adverse or beneficial)

- 13.7.28. Of the effects described in Table 13-7, moderate and major effects will be considered 'significant'.

Local businesses

- 13.7.29. The Scheme has potential to effect existing local businesses. Possible impacts include isolation or disruption to access and changes in local amenity, which may diminish trading conditions. In order to assess possible effects on local businesses, a schedule of properties that could reasonably be affected by the Scheme will be compiled based upon desktop research.
- 13.7.30. Having identified potential receptors, likely impact will be assessed according to a qualitative approach, evaluating the Scheme's potential impact (and the duration of any impact), during both construction and operation, on each

receptor. The assessment will consider the likely effects arising from each impact, the magnitude of any identified effect, and the sensitivity of a receptor to each impact.

- 13.7.31. The relative sensitivity of local business receptors to potential impacts such as demolition, land take, and disruption to access is assessed in line with the definitions provided in Table 13-8 below.

Table 13-8: Sensitivity of Local Businesses

Receptor sensitivity	Definition
High	Business viability likely to be permanently jeopardised by a short disruption to access or worsening of trading conditions.
Medium	Business profitability may be harmed by a short or medium term disruption to access or worsening of trading conditions.
Low	Business could continue to operate without substantial injury if affected by a disruption to access or worsening of trading conditions.

- 13.7.32. Magnitude of impacts on local businesses will be classified as Major, Moderate, Minor, or Negligible, in line with the definitions provided in Table 13-9 below.

Table 13-9: Magnitude of Impact on Local Businesses

Impact magnitude	Definition
Major	The Scheme would have a very adverse/beneficial effect on the function or operation of the business for a prolonged period of time.
Moderate	The Scheme would have a very adverse/beneficial temporary effect on the function or operation of the business for a short period of time (e.g. <3 months during peak construction period); or The Scheme would have a modest adverse/beneficial effect on the function or operation of the business for a prolonged period of time.
Minor	The Scheme would have a modest adverse/beneficial temporary effect on the function or operation of the business for a short period of time (e.g. <3 months during peak construction period); or The Scheme would have a slight adverse/beneficial effect on the function or operation of the business for a prolonged period of time.
Negligible	The Scheme would have little or no adverse/beneficial effect on the function or operation of the business.

- 13.7.33. Significance is the product of and the sensitivity of receptors magnitude of impact. The significance of effects within this assessment is measured according to Table 13-10 below.

Table 13-10: Significance of Impact upon Local Businesses

Significance (sensitivity of receptor)	Impact magnitude		
	Major	Moderate	Minor
High	Large adverse/beneficial - significant	Large adverse/beneficial - significant	Moderate adverse/beneficial - significant
Medium	Large adverse/beneficial - significant	Moderate adverse/beneficial - significant	Slight adverse/beneficial - not significant

Significance (sensitivity of receptor)	Impact magnitude		
	Major	Moderate	Minor
Low	Moderate adverse/ beneficial - significant	Slight adverse/ beneficial - not significant	Negligible - not significant

Agricultural Land

- 13.7.34. Impact on agricultural holdings will be assessed as follows. The sensitivity of agricultural holdings can be assessed as 'High', 'Medium', 'Low' or 'Negligible' are shown in Table 13-11.
- 13.7.35. The magnitude of the predicted impact on agricultural holdings may be assessed as 'Major', 'Moderate', 'Minor' or 'Negligible' following the criteria given in Table 13-12 below. These criteria were used successfully in the EIA of HS2 Phase 1⁶⁶. The column headings/key issues follow the approach of 'other factors' in Annex B of the former Planning Policy Guidance Note 7 (1997)⁶⁷.
- 13.7.36. In general terms, larger farm holdings have a greater capacity to absorb impacts and are less sensitive. However, the scale of the land holding is reflected in the magnitude of impact and the percentage land-take from the farm. For example, the loss of 100 hectares from a 400-hectare (1,000 acre) farm would be a high impact (25%), whereas the same land-take from a 1,000-hectare farm would be low (10%).

Table 13-11: Sensitivity of Receptors - Agricultural Holdings

Value	Receptors
High	<p>Farm types in which the operation of the enterprise is dependent on the spatial relationship of land to key infrastructure, and where there is a requirement for frequent and regular access between the two, or dependent on the existence of the infrastructure itself, e.g.:</p> <ul style="list-style-type: none"> • Dairying, in which milking cows must travel between fields and the parlour at least twice a day; • Irrigated arable cropping and field-scale horticulture, which are dependent on irrigation water supplies; • Intensive livestock or horticultural production which is undertaken primarily within buildings, often in controlled environments; • Marginal agricultural holdings; • Horses; • Fruit crops; • Land in agri-environmental schemes (Higher Level Stewardship); • Land in agri-environmental schemes (Organic Entry Level Stewardship); • Land with organic/organic conversion status; • Land with Notifiable Weeds; • Land with Notifiable Scheduled Diseases; • Land in woodland/forestry grant schemes; and

⁶⁶ HS2 Ltd. Environmental Impact Assessment of HS2 Phase 1 (2013). Available online @ <https://www.gov.uk/government/collections/hs2-phase-one-environmental-statement-documents> Last viewed May 2016

⁶⁷ Planning Policy Guidance Note 7 'Countryside'. Available online @ <http://regulations.completepicture.co.uk/pdf/Planning/Planning%20Policy%20Guidance%207-%20Countryside.pdf> Last viewed May 2016

Value	Receptors
	<ul style="list-style-type: none"> Statutory rural land designations, e.g. Nitrate Vulnerable Zones (re EU Nitrate Directive (91/676/EC)).
Medium	Farm types in which there is a degree of flexibility in the normal course of operations, e.g.: <ul style="list-style-type: none"> Combinable arable farms; Grazing livestock farms (other than dairying); Unimproved pasture; High value crops; and Land in agri-environmental schemes (Entry Level Stewardship).
Low	Large agricultural holdings. Farm types and land uses undertaken on a non-commercial basis. Land farmed on an annual grazing licence or other short-term agreement, i.e. where the long term-tenure of the affected land is not secure.
Negligible	Non-agricultural land, including woodland, access tracks and hard-standing.

Table 13-12: Magnitude of Impact - Agricultural Holdings

Impact magnitude	Key Agricultural Issues			
	Land-take	Severance	Infrastructure	Nuisance (e.g. noise/dust)
Major	>20% of all land farmed.	No access available to severed land.	Direct loss of farm dwelling, building or structure.	Nuisance discontinues land use or enterprise.
Moderate	>10% to 20% of all land farmed.	Access available to severed land via the public highway.	Loss of or damage to infrastructure affecting land use.	Nuisance necessitates change to scale or nature of land use or enterprise.
Minor	> 5% to 10% of all land farmed.	Access available to severed land via private way.	Infrastructure loss/damage does not affect land use.	Nuisance does not affect land use or enterprise.
Negligible	5% or less of all land farmed.	No new severance.	No impact on farm infrastructure.	No nuisance on land use or enterprise.

13.7.37. Significance is the product of the sensitivity of receptors and magnitude of impact. The significance of effects within this assessment is measured according to Table 13-10 above.

Development Land

13.7.38. The Scheme is likely to result in effects on development land. Assessment of the effects of the Scheme on development land will be based upon guidance set out in DMRB, Volume 11, Section 3, Part 6, Chapter 5: Effects on Development Land.

13.7.39. This guidance suggests that the environmental assessment should take account of, as far as is practicable, future changes in land use due to new development which would be likely to occur in the absence of a scheme. This should be done

by considering the impact of a scheme’s land-take on any sites covered by local planning authorities’ land use planning designations.

- 13.7.40. In addition, future changes in land use, for which planning permission has been granted may also be relevant to the assessment of a scheme. For example, where a proposed scheme would run close to an area reserved for housing development it should be recognised that more residences would be affected by noise, visual intrusion, etc. than the current assessment suggests. Alternatively, planned development could reduce the landscape quality of an area, for example.
- 13.7.41. In order to assess potential effects of the Scheme on development land, a desk based review of local planning policy and associated mapping and a search of planning consents will be undertaken in order to identify potential ‘receptors’. The impact of the Scheme will then be assessed using a descriptive approach that considers potential ‘land-take’ from allocated or consented sites and the effect the Scheme may have on allocated or consented sites nearby. This assessment will consider the extent to which the Scheme would support, depart from, or hinder planning policy aims. The significance of impact on development land will be assessed according to Table 13-13 below.

Table 13-13: Development Land Impact Assessment Criteria

Assessment Score	Contribution to Achievement of Policy Objectives
Significant Beneficial	The Scheme substantially contributes to the achievement of or is consistent the intended use of identified development land.
Beneficial	The Scheme partially contributes to the achievement of or is consistent the intended use of identified development land.
Neutral	The Scheme does not affect the intended use of identified development land or equally benefits and hinders achievement of the intended use.
Adverse	The Scheme partially hinders or is inconsistent with the intended use of identified development land.
Significant Adverse	The Scheme substantially hinders or is inconsistent with the intended use of identified development land.

Non-motorised users: Journey length & Local Travel Patterns

- 13.7.42. The assessment for NMU impact will be undertaken in accordance with the guidance for a simple assessment in the Pedestrians, Cyclists and Equestrians component of DMRB Volume 11, Section 3, Part 8.
- 13.7.43. Existing and proposed routes and Rights of Way used by NMUs that may be affected by the Scheme will be identified through a desk based assessment, supported where applicable by the findings of user surveys already undertaken in relation to the assessment of impacts on Community Assets.
- 13.7.44. The way in which the Scheme might affect the duration or distance of pedestrians’ and others’ journeys, existing local travel patterns will be established.
- 13.7.45. The routes likely to be affected and the number of NMUs likely to experience changes in journey times on these routes will be reported. Particular attention will be given to impacts on vulnerable groups.

- 13.7.46. It is considered likely that the majority of NMU trips in the study area are associated with recreation. Recreational trips are generally considered less sensitive to changes in journey length in that users are not necessarily seeking the fastest or most direct route from their location to a specific destination.
- 13.7.47. A schedule will be produced showing changes in typical journey lengths and likely changes in travel patterns, with an estimate of the number of people affected in each case.

Non-motorised users: Changes in Amenity

- 13.7.48. Amenity is defined as the relative pleasantness of a journey. In assessing amenity for the routes used by pedestrians and others, a descriptive approach will be employed which gives an overall indication of the change in amenity and the number of journeys affected. Reasoning behind this judgement will be provided.
- 13.7.49. Other factors will also be taken into account where applicable, such as footpath width and distance from traffic, barriers between pedestrians and traffic, and the quality of street furniture and planting. For ramblers, changes in the quality of landscape or townscape will also be relevant. For cyclists, they include positive factors, such as the clear signage of alternative routes for cyclists, and subways or cycle crossings, and negative factors such as junctions where cyclists and vehicles are not separated. For equestrians, landscape quality will generally be an important factor, as may some of those affecting cyclists, depending on the existing and proposed provision for riders. Safety for equestrians crossing a route is a particularly important consideration.

Non-motorised users: Severance

- 13.7.50. Changes in journey length and journey times and amenity for pedestrians and others may be such that they affect, adversely or beneficially, the degree to which a locality is subject to 'community severance'.
- 13.7.51. Community severance is defined here as the separation of residents travelling by non-motorised means from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows. In addition to changes in community severance caused by changes in pedestrians' and others' ability to travel in the locality of a scheme, severance may sometimes be caused by the demolition of a community facility or the loss of land used by members of the public.
- 13.7.52. In accordance with DMRB Volume 11 Section 3 Part 8, new severance will be described using a three point scale, viz, Slight, Moderate or Severe severance.
- 13.7.53. Generally, in cases of slight severance current journey pattern is likely to be maintained, but there will probably be some hindrance to movement.
- 13.7.54. In cases of moderate severance some residents, particularly children and elderly people, are likely to be dissuaded from making trips. Other trips will be made longer or less attractive.
- 13.7.55. In cases of severe severance, People are likely to be deterred from making trips to an extent sufficient to induce a re-organisation of their habits. This would lead to a change in the location of centres of activity or in some cases to a permanent loss of a particular community. Alternatively, considerable hindrance will be caused to people trying to make their existing journeys.

13.7.56. These descriptions will be coupled with an estimate of the numbers of people affected, their location and the community facilities from which they are severed. On this basis, no prescriptive tables for sensitivity, magnitude, or significance are proposed.

Vehicle Travellers: Views from the road

13.7.57. The assessment of travellers' views will be based on the guidance in DMRB 11.3.9 and TAG Unit 4.1 Social Impact Appraisal (November 2014) in the Department of Transport's TAG Guidance.

13.7.58. 'View from the road' is taken to be the extent to which travellers, including drivers, are exposed to the different types of scenery through which a route passes. Aspects to be considered are:

- The types of scenery or the landscape character;
- The quality of the landscape;
- Features of particular interest or prominence in the view; and
- The extent to which travellers may be able to view the scene.

13.7.59. The extent to which travellers may be able to view landscape shall be considered according to the following categories in defining sensitivity:

- No View: road in steep cutting or contained by earth bunds, environmental barriers or adjacent structures;
- Restricted View: frequent cuttings or structures blocking the view;
- Intermittent View: road generally at ground level with shallow cuttings or barriers at intervals; and
- Open View: view extending over many miles or only restricted by existing landscape features.

13.7.60. The effects of the Scheme on traveller's views from existing routes and from the carriageway of the Scheme itself will be assessed according to the TAG Social Impact Appraisal guidance. The effect on traveller's views shall be categorised in one of the following three ways:

- Neutral: little or no effect for most views from the road or improvements on some views are generally balanced by deterioration in others;
- Beneficial: views from the road would be, on balance, a change for the better; and
- Adverse: views from the road would be, on balance, a change for the worse.

13.7.61. In terms of significance, using the seven-point scale, the significance of effect upon traveller's views will also be assessed according to the TAG Social Impact Appraisal guidance:

- *"the assessment is likely to be slight (beneficial or adverse) where the numbers of travellers affected is low (less than 500 a day, say);*
- *the assessment is likely to be large (beneficial or adverse) where the numbers of travellers affected is high (more than 10,000, say);*

- *the assessment is likely to be moderate (beneficial or adverse) in all other cases.”*

Vehicle Travellers: Driver Stress

- 13.7.62. Driver stress is defined in the DMRB as the adverse mental and psychological effects experienced by a driver traversing a road network. The level of stress experienced by a driver may be affected by a number of factors including; road layout and geometry, surface riding characteristics, junction frequency and speed and flow per lane. Reduction in achievable vehicle speeds resulting from congestion may result in substantially increased journey times, introducing a degree of severance and increasing driver stress.
- 13.7.63. There are three main components of driver stress: frustration; fear of potential accidents; and uncertainty relating to the route being followed:
- Driver frustration - caused by an inability to drive at a speed consistent with the standard of the road, and increases as speed falls in relation to expectations;
 - Driver fear - the main factors are the presence of other vehicles, inadequate sight distances and the likelihood of pedestrians, particularly children, stepping into the road. Fear is highest when speeds, flows and the proportion of heavy vehicles are all high, becoming more important in adverse weather conditions; and
 - Driver uncertainty - caused primarily by signing that is inadequate for the individual’s purposes.
- 13.7.64. The measurable aspect of driver stress is associated with frustration due to delays. The level of driver stress has been determined through a qualitative assessment of the above factors, under a three-point descriptive scale, as recommended under DMRB guidance, as Low, Moderate or High.
- 13.7.65. As per the DMRB guidance, the following tables will be used to guide the assessment of stress in the ES.

Table 13-14: Driver Stress - Motorways

Average peak hourly flow per lane, in flow Units/1 hour	Average Journey Speed Km/hr		
	Under 75	75-95	Over 95
Under 1200	High	Moderate	Low
1200-1600	High	Moderate	Moderate
Over 1600	High	High	High

Table 13-15: Driver Stress - Dual-Carriageway Roads

Average peak hourly flow per lane, in flow Units/1 hour	Average Journey Speed Km/hr		
	Under 60	60-80	Over 80
Under 1200	High*	Moderate	Low
1200-1600	High	Moderate	Moderate
Over 1600	High	High	High

* “Moderate in urban areas”

Table 13-16: Driver Stress – Single Carriageway Roads

Average peak hourly flow per lane, in flow Units/1 hour	Average Journey Speed Km/hr		
	Under 50	50-70	Over 70
Under 600	High*	Moderate	Low
600-800	High	Moderate	Moderate
Over 800	High	High	High

* "Moderate in urban areas"

Vulnerability to major accidents and disasters

- 13.7.66. This section considers the expected effects of the development on people and communities deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.
- 13.7.67. Disasters, accidents and incidents are not clearly quantified or defined by EIA regulations. It is currently a matter for professional judgement as to whether a potential event may be classified as major and therefore whether there is a need for assessment within EIA.
- 13.7.68. Guidance suggests that risk assessment pursuant to EU legislation such as Directive 2012/18/EU or Council Directive 2009/71/Euratom may be appropriate. These directives concern safety of nuclear installations and the prevention of major accidents which involve dangerous substances (such as those that have previously occurred at Seveso, Bhopal, Schweizerhalle, Enschede, Toulouse and Buncefield), and the limitation of their consequences for human health and the environment.
- 13.7.69. Guidance also suggests that further assessment of this topic within EIA could only be justified if the level of risk at the Scoping stage concludes that an event could be major and that there was a reasonable doubt over the likelihood of the event (e.g. greater than 1% probability of occurrence), although it might be concluded that no one threshold, criteria or guidance will address all types of potential accidents or disasters.
- 13.7.70. The probability of a major accident, incident or disaster occurring as a result of the Scheme has been assessed. The proposed development would not include any potentially dangerous operation, such as the use of nuclear or dangerous chemical materials or processes. Some chemicals may be present on site during construction, though risks associated with such materials would be adequately managed using ordinary construction site management practices.
- 13.7.71. There is a risk that the Scheme may increase the likelihood of road traffic accidents during construction. This risk will be mitigated using appropriate traffic management measures. It is assumed that correct design will ensure that the proposed junction revision will not result in any increase in the likelihood of accidents during operation. Traffic incidents are a typical consideration of the operation of any highway. This accident risk is not considered to be of the magnitude targeted by the EIA Regulations. Chemicals and hazardous materials may be transported by road (subject to appropriate licences). The probability of a major accident involving the transportation of such materials occurring as a result of the Scheme is considered sufficiently low to not warrant further assessment.

- 13.7.72. Some types of civil infrastructure may be considered vulnerable to malicious incident. The Scheme comprises an upgrade to existing infrastructure. It is not considered likely to increase the risk or vulnerability of the infrastructure to attack. The probability of any attack on this element of infrastructure occurring is considered to be of sufficiently low probability to not warrant further assessment.
- 13.7.73. No significant adverse effects relating to people and communities deriving from the vulnerability of the development to risks of major accidents and/or disasters are expected and therefore this topic has been scoped out from future assessment.

13.8. Proposed consultation

- 13.8.1. In accordance with DMRB Volume 11 Section 3 guidance, consultation will be undertaken with the Local Authorities (Elmbridge Borough Council, Guildford Borough Council, Woking Borough Council and Surrey County Council), business owners (including agricultural tenants) and managers of community facilities likely to be affected by the Scheme, including RHS Wisley and Painshill Park.
- 13.8.2. Consultation will also be undertaken with the British Horse Society, Open Space Society and NMUs encountered during Common Land and Access Land site surveys and at a workshop targeted to include groups that use this land for leisure or as part of their business or charitable function.
- 13.8.3. The aim of consultation will be to confirm the community and private assets identified within the study area baseline, to ascertain their level of usage by members of the community and obtain more information on anticipated impacts of the Scheme.

13.9. Potential mitigation measures

- 13.9.1. Mitigation will be implemented where significant adverse effects are identified. This will likely involve consultation with landowners and other stakeholders to discuss the Scheme and agree on suitable compensation measures for instances of land take or where business viability is significantly affected.
- 13.9.2. Replacement land will be required and identified. The Common Act 2006 provides for the release of Common Land providing there is a provision of suitable “replacement land”.

13.10. Assumptions and limitations

- 13.10.1. The assessment will provide a broad, high level indication of effects based on best practice and professional judgement. Further details concerning the construction and design of the Scheme will help to inform the subsequent assessment stages.

13.11. Conclusion

- 13.11.1. The likely effects of the Scheme have been identified for the following receptors and all are scoped in to the assessment:
- Private dwellings at Elm Corner, on Wisley Common, Redhill Road and currently accessed via the A3 within the study area will be affected by

alterations to access arrangements and changes to amenity during the construction and operation of the Scheme;

- Community assets including Common Land and Access Lane, RHS Wisley Gardens and Painshill Park will be affected by land take, changes to access arrangements and changes to amenity during the construction and operation of the Scheme;
- Local business Ockham Bites café will be affected by land take and along with Silvermere Equestrian Centre will be affected by changes to access arrangements and changes to amenity during the construction and operation of the Scheme;
- Agricultural land will be affected by land take and changes to access arrangements which will affect the operation of farm businesses;
- Development land at the former San Domenico Restaurant, Painshill Farm and the former Wisley Airfield will be affected by land take and changes to access arrangements during the construction and operation of the Scheme;
- Non-motorised users (NMU) - pedestrians, cyclists and equestrians will be affected by land take, changes to access arrangements and changes to amenity during the construction and operation of the Scheme; and
- Vehicle travellers (VT) - drivers and passengers of both public and private vehicles will be affected by changes to the views from the road during construction and operation of the Scheme and increased driver stress during construction.

13.11.2. Vulnerability to major accidents and disasters as a result of the Scheme is considered to be sufficiently low to not warrant further consideration and has been scoped out of this assessment.

13.11.3. Table 13-17 outlines the receptors to be scoped in/out of further assessment, based on the above identification of potential effects.

13.11.4. The outcome of the Scheme in relation to People and Communities is also likely to be affected by significant effects from other environmental topics as well as the effects from any concurrent development in the study area not identified in the baseline. This will be assessed in the Cumulative Effects chapter.

Table 13-17: People and Communities topics for assessment

Effects	Scoped in/out	Comment/Justification
Private dwellings	✓	Assessment of potential land take. Assessment of access arrangements. Assessment of the potential amenity related effects on residents of private dwellings.
Community assets	✓	Assessment of potential land take. Assessment of access arrangements. Assessment of the potential amenity related effects on community assets.
Local business	✓	Assessment of potential land take. Assessment of access arrangements.

Effects	Scoped in/out	Comment/Justification
		Assessment of the potential effects on other businesses.
Agricultural land	✓	Assessment of potential land take. Assessment of access arrangements. Assessment of the potential effects on agricultural uses.
Development land	✓	Assessment of the potential effects on development land. Assessment of potential land take. Assessment of access arrangements.
Non-motorised users	✓	Assessment of the potential amenity related effects on users of community land and facilities, including Public Rights of Way. The potential for any severance of or between communities, or decreasing access to community services and facilities.
Vehicle travellers	✓	Assessment of the potential effects on views from the road based on landscape and visual impact. Assessment of the potential effects on driver stress due to decreased delays, changes in journey lengths and times or improved road safety.
Vulnerability to major accidents and disasters	✗	Vulnerability to major accidents and disasters as a result of the Scheme is considered to be sufficiently low to not warrant further consideration.

14. Climate

14.1. Introduction

- 14.1.1. This chapter outlines the methodology that will be used to identify and assess the likely effects of the Scheme on climate change, and the vulnerability of the Scheme to climate change, during construction and operation.
- 14.1.2. This chapter has been divided into two sections in order to address the climate change requirements outlined in The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI 2015/517) (herein referred to as the ‘EIA Regulations 2017’), which states that the assessment should consider both:
- the potential effects of the Scheme on climate change, in particular the magnitude of greenhouse gases emitted from the scheme during construction and operation; and
 - the vulnerability of the Scheme to climate change, in particular the impacts of extreme weather scenarios on the Scheme during operation.

14.2. Study area

Effects of the Scheme on climate study area

- 14.2.1. The study area is defined in terms of the lifecycle stages of Section 7 of PAS 2080:2016 Carbon Management in Infrastructure technical standard. This has been considered appropriate as it is the technical standard applicable to infrastructure projects.
- 14.2.2. In summary, the study area will cover:
- Use of materials for construction (including temporary works and permanent structures) (A1-3);
 - Transportation of construction materials to site (A4);
 - Construction plant use (A5);
 - Construction use of mains water (A5);
 - construction waste transportation (A5);
 - Construction waste off-site processing (A-5);
 - Replacement cycles (B2-5);
 - Operational energy (B6); and
 - In-use traffic (B9).
- 14.2.3. Further details of the lifecycle stages that will be included within the assessment are set out in Table 14-1.

Table 14-1: Effect on Climate study area

Lifecycle Scope	Study Area
Temporary and permanent	The study area will cover the use of temporary and permanent construction materials within the construction site boundary, and the supply chain GHG emissions associated with these, as captured in the

Lifecycle Scope	Study Area
construction materials (A1-3):	relevant materials carbon factor values. Consumables are excluded as they are small, and plant is excluded on the basis of shared use across projects.
Materials Transportation (A4):	The study area will cover transportation of the temporary and permanent construction materials and the distances travelled from the primary site of manufacturing, not the supply depot, including international freight transportation, where relevant. The primary site of manufacturing is used because transportation from a local supply depot does not represent the realistic transportation carbon emissions, so can lead to significant under reporting. The GHG emissions scope will consider both the direct vehicle emission, but also the fuel supply chain emissions, as captured in the vehicle emissions carbon factor values covering fuel supply (well-to-tank) and use.
Construction Plant (A5):	The study area for quantification of emissions for construction plant considers the same plant quantities, sizes and operating hours as that to be used for the noise assessment (Chapter 6) for construction of the Scheme only. The emissions scope will consider only the direct plant emission, where only plant specification data is available. If direct fuel consumption data is available, the emissions scope will consider direct plant emissions, but also the fuel supply chain emissions, as captured in the fuel emissions factor values covering fuel supply (well-to-tank) and use.
Construction Water Use (A5):	This study area covers mains water use only within the construction site boundary. The emissions scope will consider emissions from all activities for supply of water, as captured in the water supply carbon factor values.
Construction Waste Transportation (A5):	The study area will cover transportation of bulk construction waste and the distances travelled from the construction site to the primary processing site. The GHG emissions scope will consider both the direct vehicle emission, but also the fuel supply chain emissions, as captured in the vehicle emissions carbon factor values covering fuel supply (well-to-tank) and use.
Construction Waste Off-Site Processing (A5):	The study area will cover primary processing of bulk construction waste as available and quantified and in the waste assessment (Chapter 12). The emissions scope will consider emissions from all activities for waste processing, as captured in the waste management carbon factor values.
Replacement (B2-5):	The study area for replacement includes the inspection works and planned replacement cycles of bulk items, e.g. road surface, over the planned operational life-time of the project, within the original construction site boundary. The emissions scope will consider materials use, transportation, and construction works, as defined by A1 - 5 above.
Operational Energy (B6):	The study area for operational energy will include the electricity and direct fossil fuel consumption for operation of the infrastructure within the original construction site boundary, over the planned operational life-time of the project. The emissions scope will cover direct emissions from consumption of fossil fuels, and supply chain emissions from primary electricity generation, fuel and electricity supply chain (well-to-tank), and transmission and distribution losses, as captured in the carbon factor values for electricity and fuels.
In-use Traffic (B9):	The study area for traffic use of the infrastructure is identical to that for the air quality assessment for operational traffic use. The full definition for the study area is specified in the Air Quality chapter (Chapter 5), on

Lifecycle Scope	Study Area
	the basis it is the source for the data used to quantify greenhouse gas emissions for this life-cycle stage.

14.2.4. Preliminary studies and consultations (A0), direct operational GHG emissions (B1), operational water use (B7), other processes (B8), and end of life (C1-4) will be excluded from the study areas on the basis that either:

- the emissions are likely to be minimal/negligible, or
- the lifecycle stage is not applicable to the Scheme.

14.2.5. The study area, as set out above is dependent upon the availability of design and construction information. If such data is not available, part or all of the affected lifecycles are excluded from the assessment.

14.3. Planning and policy context

Table 14-2: Relevant Legislation, regulation and policies

Scale	Legislation/Regulation	Summary of Requirements
National	National Planning Policy Framework (NPPF) 2012	Chapter 10 Meeting the challenge of climate change, flooding and coastal change considers the role of development in mitigating and increasing resilience to climate change. Where development is being brought forward in a vulnerable area, the NPPF stipulates that suitable adaption measures such as green infrastructure can be used to make the development acceptable in planning terms.
	National Networks National Policy Statement (NN NPS)	In line with the objectives and provisions of the Climate Change Act (2008), the NPPF states that local authorities should adopt proactive strategies to mitigate and adapt to climate change. Paragraph 2.7 notes that network improvements can be used to improve resilience and adapt to climate change and extreme weather events as well as reducing congestion. Paragraph 5.15 reiterates the EIA directive for climate to be considered within the Environmental Statement. Paragraph 4.39 states that “new development should be planned to avoid increased vulnerability to the range of impacts arising from climate change”. Paragraph 4.42 requires the applicant to take into account the potential impacts of climate change using latest UK climate Projections available at that time. The NPS states that, “the annual CO ₂ impacts from delivering a programme of investment on the Strategic Road Network of the scale envisaged in Investing in Britain's Future amount to well below 0.1% of average annual carbon emissions allowed in the fourth carbon budget”. However, the IEMA, Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017), and the NPS requires that an assessment of emissions is carried out and mitigation measures are implemented. The NPS assessment also has to include evidence of

Scale	Legislation/Regulation	Summary of Requirements
		the emissions impacts of a Scheme and comparison of them against Government budgets.
	Town and Country Planning (Environmental Impact Assessment) Regulations 2017	The requirement to consider a project's vulnerability to climate change has resulted from the 2014 amendment to the EIA Directive (2014/52). The Directive has been fully transposed into UK law in the Town and Country Planning (Environmental Impact Assessment) Regulations and came into force in the UK on the 16th May 2017. The Directive requires: "A description of the likely significant effects of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change."
	Road Investment Strategy (RIS) and Strategic Business Plan 2015	The Government's Road Investment Strategy will see £15.2 billion invested in over 100 road schemes between 2015 and 2021 (DfT, 2014b). Of this total, some £300 million has been allocated to address issues including flooding, carbon emissions, landscape and biodiversity.
	Highways Agency Climate Change Adaptation Strategy and Framework (2009)	The Highways Agency Climate Change Adaptation Strategy and Framework has led to modifications in existing standards on the national network. Local roads are maintained by upper tier and unitary local authorities in Great Britain. For local roads, the UK Roads Liaison Group Code of Practice for Well Maintained Highways sets out a regularly updated set of recommendations for dealing with climate change by local authorities.
	Highways Agency Carbon Routemap: opportunities for a national low carbon transportation system (2014)	The Highways Agency Routemap covers the direct and indirect greenhouse gas emissions associated with the Agency's organisational activity, the highway asset base and associated supply chain, and those arising from the use of the network by customers.
	Climate Change Act 2008	The Climate Change Act (2008) strengthened the institutional framework in respect of planning policy and managing the impact of climate change. The Government has established legally binding carbon reduction targets through the Climate Change Act 2008 to drive the reduction requirements required by the Kyoto Protocol. The overall objective is to reduce emissions by at least 80% of the 1990 base level year by 2050 (UK Government, 2008). Additionally, as set out in Table 14-3, total emissions limits (carbon budgets) and interim targets have been specified to drive intermediate emissions reductions, and to enable progress tracking.
	The Carbon Plan (Department of Energy and Climate Change (DECC), 2011)	The Carbon Plan sets out how the UK will achieve the necessary decarbonisation. The Plan advises that emissions from domestic transport and industry (which produces the materials and products for transport infrastructure) make up nearly half of the UK's total emissions.
	Construction 2025 (July 2013) HM Government	Construction 2025 sets out how efficiency improvements for construction and operation of new buildings and

Scale	Legislation/Regulation	Summary of Requirements
		infrastructure will be achieved, including a target to reduce emissions by 50%.
	Infrastructure Carbon Review (2013) HM Treasury	The Infrastructure Carbon Review sets out carbon reduction action required by infrastructure organisations that have formally endorsed the review; this includes Highways England. The Review shows that the infrastructure industry controls 16% of the UK's total carbon emissions, covering construction (A1-5), and operation and maintenance of assets (B1-8). It also highlights that a further 37% of carbon emissions are related to the use of infrastructure assets (B9), over which the industry can have some influence.
Local	Surrey County Council Carbon and Energy Policy 2015 to 2019	1.3.17. The Surrey County Council Carbon and Energy Policy 2015 to 2019 sets out its objectives for Managing energy and carbon emissions across its estate and activities, including for street lighting. It also requires full lifecycle carbon implications of major projects to be considered. 1.3.18. The Scheme should apply the carbon policy requirements relevant to infrastructure schemes, should carbon reduction be required.
	Surrey Transport Plan: Climate Change Strategy	The aim of the Surrey Transport Plan: Climate Change Strategy (April 2011) is to reduce carbon dioxide emissions from transport in Surrey, including street lighting and maintenance activities. The Scheme should apply the carbon policy requirements relevant to infrastructure schemes, should carbon reduction be required.

Table 14-3: UK carbon reduction targets

Carbon Budget	Carbon Budget Level	Reduction Below 1990 Levels
3rd carbon budget (2018 to 2022)	2,544 MtCO ₂ e	37% by 2020
4th carbon budget (2023 to 2027)	1,950 MtCO ₂ e	51% by 2025
5th carbon budget (2028 to 2032)	1,725 MtCO ₂ e	57% by 2030

Table Source: UK Government Carbon Reduction Targets 2008

14.3.1. Relevant information and guidance include:

- Highways England (2016) Major Projects' Instructions: Environmental Impact Assessment: Implementing the Requirements of 2011/92/EU as amended by 2014/52/EU (EIA Directive);
- IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (IEMA, 2015);
- UK Climate Projections 2009 (UKCP09) (Murphy et al., 2009);
- UK Climate Change Risk Assessment (2017) (ASC, 2016a);
- National Adaptation Programme (HM Government, 2013); and

- European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013).

14.3.2. Climate resilience and climate change adaptation is fast becoming an established issue in EIA policy, practice and organisational and planning policies. This is in response to legislative and regulatory drivers, but also in response to the nature of the risks and associated costs presented to projects and programmes. The consideration of climate resilience issues for the Scheme is therefore not only important to demonstrate compliance with these legislative and regulatory requirements, but to also demonstrate and respond to the Scheme's long-term resilience for planning effective and efficient operation.

14.4. Baseline conditions

Effects of the Scheme on climate baseline conditions

14.4.1. The baseline conditions for effects on climate are defined by the national background emissions and informed by emissions estimations for other highways schemes.

National Emissions Baseline

14.4.2. It is acknowledged that total global emissions from all sources amount to approximately 50 billion tonnes of CO₂e. However, it is not considered representative to compare any UK scheme against this, as any scheme will always be negligible. Instead, it is considered most appropriate to use the national baseline for comparison as its magnitude is more relevant, and UK specific. The total background UK emissions for 2015 (the last reported year) is 495.7 million tonnes of CO₂e. The breakdown of this by sector, by final user is shown in Table 14-4.

Table 14-4: National Emissions

Sector (by final user)	GHG Emissions (Million tonnes of CO ₂)	% of total
Business	147	29.66%
Transport	134.9	27.21%
Public	14.6	2.95%
Residential	112.1	22.61%
Agriculture	51.1	10.31%
Industrial processes	13.3	2.68%
Land use, land use change and forestry	-7.4	-1.49%
Waste management	18.2	3.67%
Exports	12.1	2.44%
Grand Total	495.7	n/a

Table Source: www.UK.gov 2017 Final UK greenhouse gas emissions national statistics

Scheme Emissions Baseline

- 14.4.3. Emissions baselines from other highways schemes, as set out in Table 14-5, provides appropriate data to act as both a baseline and a proxy for the M25 Junction 10 Improvement Scheme. These have been obtained from the M4 Corridor around Newport, Environmental Statement (Welsh Government, 2016) as the best available source of such baseline data.

Table 14-5: Scheme Emissions Baseline

	Project/Length and width Component							
	M4CaN	A14	A465	HA project A	HA project B	HA project C	HA project D	HA Project E
Carbon Footprint Lifecycle Stages	23km New relief road	37km improvement scheme	7.8km embankment section	26.6km widening of A road	6.5km single to 2 lane dual carriageway	4km upgrade of existing junction	0.7km Refurbished existing viaduct	22.1km Upgrade from dual to 3 lanes
CapCO₂								
Material	436,600	740,100	44,300	74,500	77,300	36,100	5,800	213,700
Labour + Plant	42,800	243,800	5,800	38,500	27,500	8,200	4,000	20,900
Earthworks	43,200		2,500					
Construction tCO ₂ e/km	21,800	26,600	6,700	4,300	16,100	11,100	13,900	10,600
OpCO₂								
Operation + Maintenance/annum	1,600	2,400	2,600	n/a	n/a	n/a	n/a	n/a
UseCO₂								
Use/annum	2,268,700	4,386,400	882,000	n/a	n/a	n/a	n/a	n/a

Table Source: Welsh Government, M4 Corridor around Newport, Environmental Statement: Volume 3, Appendix 2.4 Carbon Report, March 2016, Table 6: Comparison of the M4CaN carbon with other road infrastructure projects - expressed in tCO₂e

14.5. Potential impacts

Potential impacts of the Scheme on climate

- 14.5.1. As stated in section 14.4, effects on climate is a wide-ranging and complex topic as it covers the whole project life-cycle and emissions from sources that could be on an international scale. In comparison, the receptor and impact of effects on climate are very specific, as follows:
- there is only one receptor, the atmosphere, which is entirely non-site specific; and
 - there is only one impact, global warming, which occurs with the same level of effect per unit of emissions and is also entirely non-site specific.
- 14.5.2. These characteristics place the focus of the potential impacts on the sources and the quantity of emissions that they generate, because it is the magnitude of emissions from each source, and in total, that define the overall impact. Given this, the impacts are taken as the quantities of emissions occurring from each life-cycle or sub-activity thereof, as listed in Table 14-1. Further, the level of impact will be considered by comparison of the Scheme against, the different lifecycle stages, the national baseline and other highways schemes.
- 14.5.3. Overall positive impacts of the Scheme will potentially arise from reductions in emissions resulting from improved energy efficiency, and reduced vehicle idling/ congestion/journey times. The reduced operational energy (B6) and traffic (B9) emissions once operational, relative to the baseline emissions will be calculated based on the data available in the ES.

14.6. Proposed level and scope of assessment

Effects of the Scheme on climate

- 14.6.1. Using DMRB terminology, a 'simple' assessment of the Scheme's effects on climate will be undertaken using a desk based assessment to quantify the magnitude of emissions and determine the significance of effect. The level of detail will be determined by the data available to inform the assessment.
- 14.6.2. The scope of assessment for effects on climate comprises the study area as defined in section 14.2.

14.7. Proposed assessment methodology

Effects of the Scheme on climate

- 14.7.1. The GHG emissions will be quantified according to PAS 2080 and the IEMA guide, Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017).
- 14.7.2. The assessment methodology will use design and construction data available within the timeframes of the assessment. All information will be taken at face-value. If data is not available within the timeframes of the assessment the scope of the assessment will be reduced.

- 14.7.3. It is proposed that emissions estimates and emissions calculations will be undertaken in Atkins Carbon Knowledgebase (CKB) and succinctly presented in tabular format in the ES. The CKB will be structured in accordance with the study area as defined in section 14.2.
- 14.7.4. The CKB is an in-house, web-based carbon calculation and analysis software tool for the building and construction industry that can be used to calculate and assess footprints using an extensive database of emissions data. Using the tool's 'Project Tree' functionality each item, activity, or process for the lifecycle stages will be defined as a line item, in tiers according to the various project areas and lifecycle stages. The associated project data is then entered using pre-defined calculation formulas (defined specifically to enable direct use of project data) and the associated carbon conversions factors, both of which are provided in a library in the tool. The tool then automatically generates the GHG emissions inventory according to the project data entered and the associated carbon conversions factors used.
- 14.7.5. The CKB has a proven track record on infrastructure schemes, including NSIPs (e.g., Thames Tideway Tunnel), and was considered to be the most effective means to undertake the assessment.
- 14.7.6. Once the emissions from the Scheme have been estimated from the baseline traffic data these will be compared against the baseline to determine whether the effects are positive or negative and major, moderate, minor, negligible or no change, as shown in the matrix Table 14-1 and defined in Table 14-2. Very large to moderate effects are considered to have the potential to be significant, while slight and neutral effects are not considered significant.

14.8. Vulnerably to major accident and disasters

Effects of the Scheme on climate

- 14.8.1. Major accidents and disasters which could potentially cause emissions include: events which could affect traffic in the area such as major road traffic accidents, terrorist attacks or plane crashes; and other events such as fires or chemical explosions which cause release of emissions. The potential for change in significance on emissions will be discussed as part of the assessment in the ES. However, it should be noted that any effect would be temporary and considered unlikely to significantly affect total emissions.

14.9. Proposed consultation

Effects of the Scheme on climate

- 14.9.1. Consultation will be undertaken with the project design team, to collect the project specific data necessary to undertake the assessment.
- 14.9.2. Consultation will be undertaken with the following:
- Surrey County Council Air Quality Department; and
 - Surrey County Council.

14.10. Potential mitigation measures

Effects of the Scheme on climate

14.10.1. Strategically, GHG emissions are mitigated by applying the carbon reduction hierarchy specified in PAS 2080, covering:

- Build nothing - challenge the root cause of the need; explore alternative approaches to achieve the desired outcome;
- Build less - maximise the use of existing assets; optimise asset operation and management to reduce the extent of new construction required;
- Build clever - design in the use of low carbon materials, streamline delivery processes, minimise resource consumption; and
- Build efficiently - embrace new construction technologies; eliminate waste.

14.10.2. These are applied at overall scheme and/or the various structures and equipment within it. Interpretation of these measures by life-cycle stage is provided in Table 14-6.

Table 14-6: GHG Emissions Mitigation Measures

Lifecycle Scope	Mitigation Measures
Temporary and permanent construction materials (A1-3):	Reduction of materials use will be carried out as specified for in the Materials and Waste chapter (Chapter 12). In addition, consideration will be given to designing in alternative low carbon (emission) materials, where practicable.
Materials Transportation (A4):	Materials transportation distances will be avoided by minimising the quantity of materials required, as per A1-3. Additionally, where possible designs will be specified to minimise the necessity to source materials from long distances.
Construction Plant (A5):	Construction plant emissions will be minimised by designing for efficient construction processes as part of design development. During construction plant emissions will be inherently managed via the measures outlined in the Construction Environmental Management Plan, which should specify plant operator efficiency requirements.
Construction Water Use (A5):	Construction mains water consumption will be minimised by designing for efficient construction processes as part of design development. During construction, mains water consumption will be inherently managed via the Construction Environmental Management Plan, which should specify reduction and reuse measures, and possibly avoidance through use of water from rain water harvesting.
Construction Waste Transportation (A5):	Reduction of waste will be carried out as specified in the Materials and Waste chapter (Chapter 12).
Construction Waste Off-Site Processing (A5):	Reduction of waste will be carried out as specified in the Materials and Waste chapter (Chapter 12).
Replacement (B2-5):	Replacement cycles will be mitigated through design by designing for long-life and ease of deconstruction and recycling, scheduled maintenance.
Operational Energy (B6):	Subject to practicability, operational energy use will be minimised by designing for use of low energy lighting, and specification on controls that minimise on-time.

Lifecycle Scope	Mitigation Measures
In-use Traffic (B9):	Mitigation of in-use traffic emissions will be as specified in the Air Quality chapter (Chapter 5), where relevant.

14.11. Assumptions and limitations

Effects of the Scheme on climate

14.11.1. The key limitation to the proposed assessment methodology is the availability of data within the timeframes of the assessment. It is assumed:

- For the purposes of consultation, a detailed emissions assessment is not required; and
- Where project specific data is not available, suitable proxy data can be applied, where sufficient engineering and construction expertise can be obtained to generate the such data.

14.12. Conclusion

Effects of the Scheme on climate

14.12.1. Based on the inconclusive determination of the impact of the emissions, and the requirement of the NPS for an emission assessment to be carried out, an assessment is deemed to be required, as set out in Table 14-7 and subject to availability of necessary design and construction information.

Table 14-7: GHG emission scoped in and out of further assessment

Lifecycle Scope	Scoped in/out	Comment/Justification
Temporary and permanent construction materials (A1-3):	✓	Currently no calculated data.
Materials Transportation (A4):	✓	Currently no calculated data.
Construction Plant (A5):	✓	Currently no calculated data.
Construction Water Use (A5):	✓	Currently no calculated data.
Construction Waste Transportation (A5):	✓	Currently no calculated data.
Construction Waste Off-Site Processing (A5):	✓	Currently no calculated data.
Replacement (B2-5):	✓	Currently no calculated data.
Operational Energy (B6):	✓	Currently no calculated data.

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Chapter 15

15. Assessment of Cumulative Effects

15.1. Introduction

- 15.1.1. This chapter of the Scoping Report will bring together the principal findings of each of the above identified topic areas in order to identify and assess the combined effects of the Scheme and the anticipated cumulative effects of the Scheme when considered with other existing or future significant development projects with the study area.
- 15.1.2. In accordance with the DMRB Volume 11, Section 2, Part 5 HA 205/08 Assessment and Management of Environmental Effects requires that Cumulative Effects are assessed as part of the assessment process.
- 15.1.3. Cumulative effects *“result from multiple actions on receptors and resources and over time and are generally additive or interactive (synergistic) in nature. Cumulative impacts can also be considered as impacts resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the project”* (Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interaction, European Commission, May 1999). Cumulative effects are broadly effects that result from the accumulation of a number of individual effects that may also have synergistic aspects.

15.2. Baseline

- 15.2.1. In order to carry out the assessment it is necessary to define the location and timing of nearby potential developments. The ‘study area’ will encompass schemes which are supported by site specific extant planning policy/allocation, benefit from extant but unimplemented planning permission, or are planning applications currently under determination, including (but not necessarily limited to):
- Trunk road and motorway projects which have been confirmed (i.e. gone through the statutory processes);
 - Development projects with valid planning permissions as granted by the Local Planning Authority, and for which formal EIA is a requirement or for which non-statutory EIA has been undertaken;
 - Applications for consent which have been made, but which have not yet been determined (see thresholds below);
 - Allocated sites in emerging or adopted Local Plans; and
 - Other types of application which could have implications for the Scheme.
- 15.2.2. The proposed thresholds and spatial area are as follows:
- Nationally Significant Infrastructure Projects - 10 km from the red line boundary;
 - Regionally Significant Projects - 3 km from the red line boundary;
 - Major development - within and 1.5 km from the red line boundary; and
 - Minor development - within the red line boundary.

- 15.2.3. These thresholds are considered, based upon professional judgement and taking into account the nature and location of the Scheme, appropriate to the Scheme's likely zone of influence. This approach is congruent with guidance provided within PINS Advice Note 17.
- 15.2.4. Although the assessment will primarily include developments that are likely to occur and have some form of planning/land use approval, speculative developments will also be mentioned, specifically when their approval is fairly certain and if they are likely to have significant impacts.

Interaction with other projects

- 15.2.5. The traffic model will take account of the operational effects of major developments in the area and the wider surrounding region.

Trunk Road projects

- 15.2.6. The following Highways England road improvement schemes are also planned close to or within the Scheme area and will be considered in the cumulative effects assessment:
- Junction 10 - 16 Smart Motorway Programme (SMP) - M25 Junction 10 to Junction 16 includes upgrading the M25 between Junction 10 (A3) and Junction 16 (M40) through a mixture of enhancements, including hard shoulder running between Junctions 15 and 16, as well as four-lane through-junction running between Junction 10 and Junction 12; and
 - A3 Guildford - focuses on improving the A3 in Guildford from the A320 to the Hogs Back junction with the A31, with associated safety improvements.

Development projects

- 15.2.7. A major development that could cause cumulative effects is the former Wisley Airfield, which is a 92.8 ha site located to the south of Ockham Park Junction.
- 15.2.8. There is a relevant site allocation for a residential led mixed use development including approximately 2000 new homes on the former airfield (Site allocation A35 in the Proposed Submission Local Plan: strategy and sites 2016).
- 15.2.9. The site was also included in the Guildford Borough Land Availability Assessment (LAA) and 2017 Addendum in the Housing Trajectory as a proposed new settlement, to be delivered between 2021/2022 to 2032/2033. This document forms part of the evidence base of the emerging Local Plan. An Examination in Public of the Local Plan is due to be held between April and July 2018.
- 15.2.10. A planning application was submitted for a major development approximately of this size (Planning ref. 15/P/00012) and refused on 8th April 2016. This application is currently at appeal and an inquiry is being held, with the final decision expected in early 2018.
- 15.2.11. Other provisional developments in Guildford Borough Council for inclusion in the assessment are:
- Land to the East of South Cottage, White Horse Lane, Ripley, GU23 6BB (Planning ref. 16/P/00608, refused on 22 June 2016 and appeal allowed subject to conditions 23 Aug 2017):

- Outline planning application for the demolition of existing petrol filling station, car sales buildings and dilapidated workshops and the construction of up to 26 residential units to the rear and 2 retail/commercial units on the High Street frontage (for flexible A1, A2, A3 or A4 use) and associated car parking and landscaping all matters reserved except access.
- Royal Horticultural Society Gardens, Wisley Lane, Wisley, Woking, GU23 6QS (Planning ref. 16/P/01080, granted 30 September 2016):
 - Erection of new part single-storey part two-storey building accommodating retail, entrance and visitor facilities and alterations to the car parking and hard and soft landscaping and following the demolition of the existing plant centre, the extensions to the Laboratory building, toilet blocks, Aberconway Cottage and part of Aberconway House.
- Horticultural Society Gardens, Wisley Lane, Wisley, Woking, GU23 6QS (Planning ref. 16/P/000976, granted 30 September 2016):
 - Demolition of existing buildings and erection of a two-storey building accommodating science, education, research and restaurant facilities, associated landscaping including a landscape bund and other works associated with the development.

15.2.12. Within Elmbridge Borough Council the following are considered relevant:

- Former San Domenico Restaurant (Planning Ref. 2017/0524) (validated 21st March 2017):
 - Demolition of existing main building and the construction of the new petrol filling station (Sui Generis) with ancillary convenience store (Use A1) and food to go outlet (Use Class A5), 4 no. pump islands, canopy, underground tanks, revisions to vehicular access, parking and circulation arrangements, landscaping and associated works.
- Painshill Farm, Portsmouth Road, Cobham Surrey KT11 1DN (Planning Ref. 2016/4204) (validated 27th February 2017):
 - Redevelopment of the site to provide a 70 bed care home with integrated communal and support facilities, landscaped residents' gardens, staff areas, refuse storage and parking following demolition of existing houses.
- Site of 46 Portsmouth Road, Cobham, Surrey, KT11 1HY (Planning Ref. 2015/1997) (approved 17 September 2015):
 - Redevelopment of the site comprising of 4 two/three storey buildings with rooms in the roofspace, dormer windows and balconies to provide 44 retirement flats; conversion of the White Lion building to provide a further 6 flats; along with associated parking, landscaping and access from Between Streets and Portsmouth Road.
- Holly Parade, High Street, Cobham, Surrey KT11 3EE (Planning Ref. 2016/2185) (approved 19th January 2017):
 - Development comprising 4 units for A1 Shop/A2 Financial use and 1 unit for A1 Shop/A3 Cafe use at ground floor level (790 sqm) and 24 residential units including communal facilities and parking following demolition of existing buildings.

- Land alongside A3 adjacent to Sainsbury Car Park (Site allocation DEV/COB9 in the Draft Settlement Investment and Development (ID) Plans-Cobham, Oxshott, Stoke D'Abernon, Downside) (consulted on between 8 April 2013 and 20 May 2013). The Local Plan is likely to be adopted in September 2018:
- A largely level vacant site between a housing development/supermarket car park and the A3. The site is currently a greenfield site but is not part of the Green Belt. To the south lie the Sainsbury's supermarket and car park and a residential housing estate of two-storey terraced properties. To the north is the A3, which rises on an embankment above the site level and, beyond that, open agricultural Green Belt.

15.3. Proposed level and scope of assessment

- 15.3.1. The DMRB identifies two types of cumulative impact in environmental assessment:
- Cumulative effects from a single scheme (acknowledging the outcomes of each of the environmental topics assessed for the Scheme); and
 - Cumulative effects from different schemes (assessed in combination with the Scheme).
- 15.3.2. The main source of data for the cumulative effects assessment will be the outcomes and information obtained from the individual environmental topic assessments. The assessment of cumulative effects arising from the Scheme in combination with other schemes will primarily constitute a desk-top study of planning documents broadly covering the location of schemes (if any are identified) considered relevant to the assessment.

15.4. Proposed assessment methodology

- 15.4.1. The focus of the desk-top study will be the collection of information relating to the background of relevant projects, their expected timelines and likely environmental impacts.
- 15.4.2. The ES will include an assessment of the potential for cumulative impacts. This assessment will include consideration of the following three dimensions to cumulative effects:
- Multiple effects on a single receptor (e.g. noise, air quality and visual effects on a single property);
 - Multiple effects on a resource distributed throughout the corridor (e.g. multiple losses of ponds); and
 - The interaction of the Scheme with other proposed developments (e.g. the Wisley Airfield development).
- 15.4.3. The potential for cumulation of impacts arising from the Scheme and the above projects will also be considered as part of the assessment within each topic chapter of the ES.
- 15.4.4. The Zone of Influence/Study Area proposed for each of the environmental topic areas is identified in Table 15-1 below. These are subject to change and will be confirmed in the ES.

Table 15-1: Zone of Influence/Study Area

Environmental topic	Zone of influence
Air Quality	Within 200 m of the construction site boundary.
Noise and Vibration	600 m from the carriageway edge of any proposed new routes or existing routes to be bypassed or improved, and 600 m from any other affected routes within 1 km of the proposed new routes or altered existing routes.
Biodiversity	<ul style="list-style-type: none"> • 2 km for statutory designated sites of nature conservation importance: SACs, SPAs, Ramsar sites, SSSIs, and NNRs and LNR; • 2 km for non-statutory SNCIs; • 30 km for SACs where bats are one of the qualifying species; • 5 km for bat records; • 1 km for notable habitats and notable or legally protected species; and • 1 km for ancient woodlands.
Road Drainage and the Water Environment	Within 1 km of the Scheme.
Landscape	<ul style="list-style-type: none"> • Visual effects within 1.5 km from the edge of the Scheme; and • Landscape effects within 1.5 km from the perimeter of the Scheme.
Geology and Soils	500 m from the extent of the red line boundary
Cultural Heritage	500 m around the alignment of the Scheme.
Materials and Waste	<ul style="list-style-type: none"> • Material resources study area includes the demand for key construction materials nationally; and • Waste study area includes the waste arisings and waste infrastructure capacity within the county of Surrey.
People and Communities	<ul style="list-style-type: none"> • Within 500 m of the Scheme.

15.4.5. In line with DMRB Volume 11, Section 2, Part 5, liaison will also be undertaken with the relevant Local Planning Authorities Guildford Borough Council, Elmbridge Borough Council, Woking Borough Council and Mole Valley District Council to determine and agree whether any other schemes in the vicinity of the Scheme should be taken into consideration and when they believe these to be likely to come forward.

15.4.6. Effects will be identified as short term or long term and temporary or permanent. The following categories in Table 15-2, which are presented in the DMRB, Volume 11, Section 2, Chapter 5 will be used as a framework for determining significance of cumulative effects.

Table 15-2: Determining Significance of Cumulative Effects

Significance	Effect
Severe	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.
Major	Effects that may become a key decision-making issue.

Significance	Effect
Moderate	Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance.
Minor	Effects that are locally significant.
Not significant	Effects that are beyond the current forecasting ability or are within the ability to absorb such change.

Table Source: DMRB, Volume 11, Section 2, Part 5, HA 205/08, Table 2.6

15.5. Potential mitigation measures

- 15.5.1. Under each of the topic areas, where significant cumulative effects are identified, beyond those identified as residual effects, additional mitigation measures will be proposed or recommended.
- 15.5.2. The mitigation measures across all topic areas will be presented in this chapter of the ES.

15.6. Assumptions and limitations

- 15.6.1. The list of development projects will be updated as part of the assessment and will also include any potential sites within Woking Borough Council to the north west and Mole Valley District Council to the south east.
- 15.6.2. The updated information will be obtained either by a request to the Local Planning Authorities or by interrogating the planning web pages.
- 15.6.3. A limitation of the assessment is that the development projects list is speculative and whilst the Local Planning Authorities and potentially developers will have been consulted on phasing, the developments may not be delivered in line with the assumptions.

15.7. Conclusion

- 15.7.1. This chapter of the ES will bring together and present the findings of each of the topic chapters to identify and assess the combined effects of the Scheme and the cumulative effects of the Scheme in association with other development projects within the study area, including details of proposed mitigation.
- 15.7.2. It has been reported in this Scoping Report that some receptors have the potential to experience effects from the Scheme relating to multiple environmental assessment areas. In particular, it is acknowledged that effects reported within the Air Quality, Noise and Vibration, Road Drainage and the Water Environment and People and Communities assessments may have cumulative effects on Population and Health. These potential in-combination effects will be identified and reported for all receptors and mitigation proposed.
- 15.7.3. The main developments that could cause combined and cumulative effects are the highway intervention schemes the M25 Junction 10 - 16 Smart Motorway Programme (SMP) and the A3 Guildford scheme, the RHS Wisley improvement works and the former Wisley Airfield site adjacent to the Scheme.

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Chapter 16

16. Summary

- 16.1.1. This Scoping Report represents the first stage in the EIA process and sets out the proposed methodology for the assessment of the environmental impacts which have potential to arise due to construction and operation of the Scheme. This report also sets out the basis for a comprehensive assessment of the environmental impacts of construction and operation of the Scheme, the results of which will be presented in the ES.
- 16.1.2. A summary of the potential impacts for each environmental topic scoped into the ES for further assessment and scoped out are presented in Table 16-1.

Table 16-1: Summary of environmental topics scoped in and out of the EIA and their potential impacts

Effects	Scoped in/out	Potential impacts
Air Quality		
Construction Dust	✓	Increased emissions of dust during construction from dust-raising activities on site.
Construction Traffic	✓	Air quality could be affected by changes in traffic flows during construction, as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour.
Operational Traffic	✓	Air quality could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition) and by any changes to the distance between sources of emissions and air quality sensitive receptors.
Noise and Vibration		
Construction	✓	A temporary increase in noise levels during construction from activities on site. The noise climate could be affected by changes in traffic flows during construction, as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour.
Operational Traffic	✓	The noise climate could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition) and by any changes to the distance between the carriageways and noise sensitive receptors, caused by changes to the horizontal and vertical alignment of the roads.
Biodiversity		
Internationally designated statutory sites (SAC, SPA, Ramsar)	✓	Thames Basin Heaths SPA falls within the Scheme footprint. In addition, there are two internationally designated sites where bats are one of the qualifying features within 30 km of the Scheme. The Thames Basin Heaths SPA may also be subject to impacts from changes in air quality.
Nationally designated statutory sites (SSSI, NNR)	✓	Ockham and Wisley Common SSSI falls within the Scheme footprint. In addition, a further two SSSIs falls within 2 km of the Scheme. The Ockham and Wisley Common SSSI may also be subject to impacts from changes in air quality.
Locally designated statutory sites (LNR)	✓	Ockham and Wisley LNR falls within the Scheme footprint. A further three LNRs also fall within 2 km of the Scheme.
Non-statutory designated sites (SNCIs)	✓	Eight SNCIs fall within 2 km of the Scheme.

Effects	Scoped in/out	Potential impacts
Ancient woodland	✓	There are five parcels of ancient woodland subject to direct land take or immediately adjacent to the Scheme.
Notable habitats	✓	Broadleaved woodland, lowland heathland, rivers and ponds may be subject to impacts from the Scheme, which are HPI.
Notable terrestrial invertebrates	✓	There is potential for notable terrestrial invertebrates, such as those listed in the SSSI citations, to be affected by the Scheme.
Aquatic invertebrates	✓	The Scheme may cross some rivers and tributaries. Therefore, there is potential for notable aquatic invertebrates to be affected by the Scheme.
Great crested-newt	✓	The Scheme may affect potential suitable terrestrial habitat for great crested newts, a notable species, which is also legally protected.
Reptiles	✓	The Scheme affects potential suitable habitat for reptiles, notable species which are legally protected.
Breeding birds	✓	The Scheme affects potential habitat for notable birds. Nesting birds are also legally protected.
Bats	✓	The Scheme may impact on one or more features suitable for roosting bats, and affect bat foraging habitat and/or disrupt commuting routes. Bats are notable species that are legally protected.
Hazel dormouse	✓	The Scheme affects potential dormouse habitat, a notable species that is legally protected.
Water vole	✓	The Scheme may cross some rivers and tributaries. Therefore, there is potential for water voles to be affected by the Scheme.
Otter	✓	The Scheme may cross some rivers and tributaries. Therefore, there is potential for otters to be affected by the Scheme.
Badger	✓	There is potential for sett destruction, disturbance or harm to badgers, which are legally protected, during construction.
Invasive plants	✓	There is potential to cause certain invasive plant species under Schedule 9 of the Wildlife and Countryside Act 1981 to spread (which is an offence) during construction if present.
Road Drainage and the Water Environment		
Surface Water	✓	Risks to the surface water environment could occur from excavation and the subsequent deposition of soils, sediment or other construction materials; spillage of fuels or other contaminating liquids; and mobilisation of contaminated following disturbance of contaminated ground or groundwater.

Effects	Scoped in/out	Potential impacts
		Pollutants and new areas of hard standing could increase road runoff and affect water quality in the river.
Groundwater	✓	Risks to the groundwater environment could occur from cuttings and potential contamination risks to the underlying Principal Aquifer and subsequent effects on existing abstractions.
Flood Risk	✓	The increase in flood risk could occur from the storage of materials; interception of groundwater or changes to groundwater flows; and discharge of abstracted water during construction, especially if discharged to smaller watercourses. Discharge from new sections of the Junction has the potential to increase flood risk for downstream receptors, and any road structures or landscaping features constructed in the floodplain have the potential to alter flood flows and increase flood risk downstream.
WFD detailed assessment	✓	Direct physical impacts of watercourse crossings with the potential for direct effects on biological, chemical and physical WFD parameters for both surface waters and WFD groundwater bodies.
Water-dependent designated sites	✓	Water dependent sites could be affected during construction if there is any hydraulic connectivity.
Landscape		
Areas of vegetation including coniferous woodland, semi mature and mature planting	✓	Likely to affect existing vegetation, particularly the coniferous woodland and semi mature and mature planting along the road corridor approaches to M25 Junction 10 and local access roads.
Local landscape character features i.e. landform, landscape pattern	✓	These landscape features are likely to be affected through introduction of earthworks and loss of landscape links in the form of boundary vegetation and change of land use.
Effects on identified landscape character based on key attributes of identified landscape character areas	✓	Effects on landscape character would take into consideration the key attributes of landscape character areas and effects on the loss of vegetation, land form, land use and landscape pattern.
Landscape character at regional and national level	✗	The Scheme would not give rise to the alteration of key characteristics of landscape character at the regional and national level.
Effects on Ockham, Wisley and Chatley Heath Common	✓	Landscape effects on Ockham, Wisley and Chatley Heath Commons will likely be effected as a consequence of the encroachment of the Scheme on the area of Commons and transformation of their character. The Commons are frequently used by people for enjoyment of outdoor activities and therefore their views are of high sensitivity.

Effects	Scoped in/out	Potential impacts
Painshill Park Grade I Registered Park and Garden	✓	Landscape and visual effects on Painshill Grade I Registered Park and Garden require further assessment as some of the Scheme adjoins the A3 and the boundary of Painshill Park.
RHS Gardens Wisley - Grade II* Registered Park and Garden	✓	Landscape and visual effects on RHS Gardens Wisley - Grade II* Registered Park and Garden require further assessment as the Scheme are located close to the A3 and the entrance road to the RHS Gardens Wisley.
Views from the network of PRow's within the study area	✓	Views from PRow's are particularly sensitive and the potential effects on their users requires further assessment.
Views from residential properties within the study area	✓	Those that are located a considerable distance from the Scheme may experience partial views of some of the Scheme. Those that are located closer to the Scheme or adjacent to the Scheme are likely to be affected by some elements of the Scheme.
Views from commercial properties within the study area	✓	Views of users of commercial properties located within the study area are likely to be affected by the Scheme.
Geology and Soils		
Soils and agricultural land	✓	The Scheme will involve the loss of Common and Public Access Land and so exchange land will have to be created in the vicinity. Works to make the replacement land more suitable for habitat creation such as topsoil stripping may be required.
Land contamination including human health, groundwater and surface water	✓	Contamination risks identified during the ground investigation surveys will be assessed and where possible reduced during detailed design. Requirement for mitigation measures, should these be required, will be assessed during detailed design in PCF Stage 5. New piling or excavation during construction could create new pathways between any contaminated soils and the underlying groundwater. Any dewatering activities associated with the construction phase have the potential to mobilise further potentially contaminated groundwater and enhance lateral migration of contamination within the superficial and bedrock aquifers and potentially into surface watercourses.
Construction and operational phase pollution effects	✓	The Scheme has the potential to introduce new sources of contamination associated with the accidental loss/spillage of fuels and oils as well as the potential to disturb and mobilise existing sources of contamination.
Physical effects	✓	There is potential to exacerbate existing areas or to create new areas of ground instability and compressible ground.

Effects	Scoped in/out	Potential impacts
		Any new confined spaces, such as manholes and service chambers/ducts, within which ground gas has the potential to accumulate, could affect the additional receptors of construction workers, future site workers and proposed foundations.
Major accidents or disasters	✓	Significant effects arising from the vulnerability of the Scheme to major accidents or disasters relevant to the Scheme will be assessed.
Cultural Heritage		
Designated heritage asset	✓	<p>The widening of the A3 has the potential to directly impact upon two known heritage assets in the vicinity of Bolder Mere to the west of Junction 10, with the impacts expected to be minor to moderate adverse.</p> <p>The setting of Painshill Park, a Grade I Registered Park and Garden, could also be affected as a result of construction of part of the overbridge within the designated parkland and other changes to its setting.</p> <p>The Scheme has the potential to affect the hengi-form scheduled monument at Red Hill (1007905) as a result of changes to its setting, due to the proximity of the overbridge to the monument, along with the impacts resulting from the general A3 widening.</p> <p>The access to Wisley Lane has the potential to impact the Royal Horticultural Society's Garden, Wisley which is a Grade II* Registered Park and Garden. While the impacts to RHS Wisley would only be to a part of the asset and will have a limited impact on the overall significance of the Park, this could constitute a moderate to large significant effect on the asset.</p>
Non-designated heritage assets	✓	Likely to result in direct impacts upon six known non-designated linear features in the vicinity of the junction, although as these assets are considered to be of low value, minor adverse impacts are expected.
Potential for undiscovered archaeology	✓	The Scheme has the potential to impact upon significant unknown archaeological remains during construction only, given the proximity of the required works to a known prehistoric monument of national importance and medieval landscape features. Impacts to these as-yet unknown assets may range from moderate to major adverse; further work would be required to ascertain their significance and therefore determine the significance of effect.
Materials and Waste		
Change in demand for key construction materials during the CD&E phases	✓	The impacts of the Scheme against the national demand for key construction materials during the CD&E phases is to be assessed and evaluated.

Effects	Scoped in/out	Potential impacts
Change in demand for key construction materials associated planned/unplanned maintenance with during the operational phase	x	Minimal impact is envisaged during the operational stage of the Scheme due to minimal material resource use (associated with planned/unplanned maintenance).
Change in baseline waste arisings during the CD&E phases	✓	The impacts of waste arisings from the Scheme against the waste arisings baseline during the CD&E phases is to be assessed and evaluated. The baseline for CD&E waste will be on a regional level and the baseline for hazardous CD&E will be on a national level.
Change in baseline regional waste arisings during the operational phase	x	Minimal impact is envisaged during the operational stage of the Scheme due to minimal waste generation (through littering and planned/unplanned maintenance). Most of these wastes would likely be non-hazardous municipal type wastes during normal operation, and non-hazardous/inert and hazardous wastes from planned/unplanned maintenance.
Change in capacity of waste infrastructure during the CD&E phase	✓	The impacts of waste arisings from the Scheme against the regional waste infrastructure baseline during the CD&E phases is to be assessed and evaluated. The baseline for CD&E waste will be on a regional level and the baseline for hazardous CD&E will be on a national level.
Change in capacity of regional waste infrastructure during the operational phase	x	Operational waste arisings from the Scheme will not be assessed as it is envisaged that this will be minimal and no data related to waste generated by highway schemes is readily available. Therefore, an assessment will not be made of the potential effect of the operational waste arisings on operational waste infrastructure.
Waste	✓	The Scheme will be designed to ensure wastage is minimised throughout lifecycle. Waste to be used as a resource where practicable and designed out where possible.
Material resources	✓	The impacts of the Scheme against national demand for key construction materials and raw material resources will be assessed and evaluated.
People and Communities		
Direct effects on Physical Assets, Public and Private	✓	<p>Construction of the Scheme, subject to design, has potential to directly impact on private property through demolition, land take or alterations to access.</p> <p>The Scheme will directly affect Ockham Common, Wisley Common, and other 'Open Access Land' and will also affect Painshill Park and RHS Gardens Wisley.</p> <p>The Scheme has potential to temporarily or permanently affect a number of PRowWs, including existing crossings points over the A3 and M25 and footpaths associated with local roads.</p>

Effects	Scoped in/out	Potential impacts
Amenity effects on Public and Private Receptors	✓	<p>The Scheme has potential to result in nearby residential receptors experiencing a combination of effects such as those relating to traffic, visual, air quality or noise during both construction and operation.</p> <p>The Scheme is likely to noticeably alter the views experienced by users of the Junction 10 junction, slip roads, M25, A3, A245 and local roads. The magnitude of change will depend on final Scheme alignments, elevations, and structure types, but the potential for significant effects on road user amenity is likely to be low.</p> <p>Users of Common Land, Open Access Land, and the various Public Rights of Way in and around the Scheme boundary are likely to experience changes in amenity during construction and operation of the Scheme.</p>
Community severance	✓	<p>Construction of the Scheme has the potential to cause increased delays, increased construction traffic on the road network, which would have a temporary effect.</p> <p>Temporary or permanent closure or diversion of footpaths has the potential to sever communities from services and facilities.</p> <p>During operation, the Scheme is expected to improve the experience of vehicle travellers currently using the M25, particularly Junction 10 and associated slip roads, the A3, the A245, and other areas of the local highway network that currently experience congestion during times of heavy traffic and emergency closures of the motorway.</p>
Local economy and Employment Opportunities	✓	<p>Some BMV agricultural land is potentially required either temporarily or permanently to enable the construction of the Scheme.</p> <p>Construction and operation of the Scheme, particularly in respect of any replacement land provided and altered access arrangements, has potential to affect the operation of farm businesses.</p> <p>Other businesses within and around the limit of land potentially required for the construction or operation of the Scheme may be impacted by altered access arrangements.</p>
Development land	✓	<p>The proposed development sites in Elmbridge at Cobham are unlikely to be directly impacted by the Scheme with the exception of the unallocated land next to Sainsbury's which is adjacent to the A3 north of Painshill Interchange and the former San Domenico Restaurant on the A3.</p> <p>The Scheme has potential to directly impact the Guildford strategic proposed site allocation "A35 Land at former Wisley Airfield Ockham" and the associated proposed access, located at Wisley junction.</p>
Climate		
Road infrastructure, including bridges, embankments and earthworks	✓	<p>These are susceptible to damage or disruption from climate-related hazards, and have the following potential impacts:</p>

Effects	Scoped in/out	Potential impacts
		<ul style="list-style-type: none"> • Increased damage to roads, flooding of infrastructure, road submersion, earthworks failures, landslides, undercutting and bridge scour from increased heavy precipitation; • Poor driving conditions, increased accidents and prevention of road repairs from increased frequency of high precipitation events; • Increased thermal loading on road pavements from increased number of hot days; • Increased subsidence from increased average temperature/decreased rainfall; • Overheating of equipment, more demand for air conditioning, increased heat exhaustion from increased frequency of high or extreme temperature episodes; • Decreased number of cold days could lead to reduced winter maintenance costs for roads and changes to timing for winter maintenance regimes, improved working conditions for personnel, less need for heating on transport, reduced winter protection (gritting), reduction in cold weather disruptions and improved road safety; • Increased road rutting and changes in travel demand from an increase in average summer temperatures; • Impact on maintenance regimes due to degradation, soil shrinkage/subsidence from seasonal temperatures; • A reduction in winter travel problems could lead to inadequate preparation for extreme events; • Winds above 30 knots could lead to increased problems for suspension bridges and high sided vehicles; • High wind speeds and low temperatures could increase the interference to asphaltting and concreting as wind chill cools the surface too quickly; • Increased incidence of fog could change road speeds; and • Changes to insurance premiums as a result of all climates and subsequent risks.
Sea level rise	✘	Scoped out due to geography of the Scheme.

Chapter 17

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Chapter 18

18. Abbreviations and Glossary

18.1. Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ARN	Affected Road Network
bgl	below ground level
BGS	British Geological Survey
BMV	Best and Most Versatile
CD&E	Construction, Demolition and Excavation
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute for Ecology and Environmental Management
CLR11	Contaminated Land Report 11
CMS	Continuous Monitoring Station
COSHH	Control of Substances Hazardous to Health
CPRE	Campaign to Protect Rural England
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
CSR	Client Scheme Requirements
CWS	County Wildlife Site
D3AP	Dual 3 lane All Purpose
D4	Dual 4
D4AP	Dual 4 lane All Purpose
dB	Decibel
DBFO	Design, Build, Finance and Operate
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do-Something

Abbreviation	Definition
EA	Environment Agency
EAR	Environmental Assessment Report
EAST	Early Assessment and Sifting Tool
EBC	Elmbridge Borough Council
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESR	Environmental Study Report
EZoI	Ecological Zone of Influence
GBC	Guildford Borough Council
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HAGDMS	Highways Agency Geotechnical Data Management System
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HPI	Habitats of Principal Importance
HRA	Habitat Regulations Assessment
IAN	Interim Advice Note
IAQM	Institute of Air Quality Management
LAQM.TG	Local Air Quality Management Technical Guidance
LEP	Local Enterprise Partnership
LGS	Local Geological Sites
LNR	Local Nature Reserves
LV	Limit Values
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi-Agency Geographic Information for the Countryside
MCA	Mineral Consultation Area
MP	Member of Parliament
MPI	Major Project Instructions
MSA	Mineral Safeguarding Area
MVDC	Mole Valley District Council
NCA	National Character Area
NE	Natural England
NHLE	National Heritage List Entry
NIA	Noise Important Area
NIR	Noise Insulation Regulations
NMU	Non-Motorised User

Abbreviation	Definition
NNR	National Nature Reserves
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxide
NSIP	Nationally Significant Infrastructure Project
NVC	National Vegetation Classification
PCF	Project Control Framework
PCM	Pollution Climate Mapping
PM ₁₀	Particulate Matter with a diameter of 10 micrometres or less
PPG	Planning Practice Guidance
PRoW	Public Rights of Way
PSSR	Preliminary Sources Study Report
PTS	Professional and Technical Solutions, a directorate within Highways England (formerly NetServ)
RHS	Royal Horticultural Society
RIS	Road Investment Strategy
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SARG	Surrey Amphibian and Reptile Group
SBIC	Surrey Biodiversity Information Centre
SNCI	Sites of Nature Conservation Interest
SPA	Special Protection Areas
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Sites of Special Scientific Interest
SWMP	Site Waste Management Plan
TAG	Transport Analysis Guidance
TPO	Tree Preservation Order
UXO	Unexploded Ordnance
WBC	Woking Borough Council
WFD	Water Framework Directive
WHO	World Health Organisation

18.2. Glossary

Term	Description
Access Land	Open Access Land or Access Land is land you can access in England without having to use paths. Access Land includes mountains, moors, heaths and downs that are privately owned. It also includes Common Land registered with the local council and

Term	Description
	some land around the England Coast Path. Your right to access this land is called the 'right to roam', or 'freedom to roam'. Access Land can be used for walking, running, watching wildlife and climbing.
ADMS Roads	A comprehensive software tool for investigating air pollution problems due to networks of roads that may be in combination with industrial sites
Affected Road Network	The parts of the road network that would be affected by a change in traffic levels as the result of a transport scheme
Agricultural Land Classification	A framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on agricultural use. Agricultural land is classified into five categories according to versatility and suitability for growing crops. The top three grades, Grade 1, 2 and 3a, are referred to as 'Best and Most Versatile' land.
Air Quality Management Area	An area identified where the National Air Quality Objectives are not likely to be achieved. The Local Authority is required to produce a Local Air Quality Action Plan to plan how air quality in the area is to be improved.
Air Quality Strategy	The UK government's Air Quality Strategy sets air pollution standards and objectives to protect people's health and the environment.
Annual Average Daily Traffic	The number of vehicles travelling on a particular stretch of road on an average day.
Appraisal Summary Table	A table that appraises the performance of each option against economic, environmental, social and distributional sub-impacts and is used to directly inform the Value for Money assessment for the Economic Case.
Archaeological Priority Area	An area where there is significant known archaeological interest or potential for new discoveries. They are used to highlight where development may affect heritage assets.
Area of Outstanding Natural Beauty	An area outside a National Park designated for conservation due to its natural beauty.
At grade	On the same level, for example, an at grade junction is two or more roads meeting or crossing on the same level.
Best and Most Versatile	Defined as Grades 1, 2 and 3a of the Agricultural Land Classification as land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals.
Biodiversity Action Plan	An internationally recognized program addressing threatened species and habitats and is designed to protect and restore biological systems. The original impetus for these plans derives from the 1992 Convention on Biological Diversity.
British Geological Survey	A partly publicly-funded body which aims to advance geoscientific knowledge of the United Kingdom landmass and its continental shelf by means of systematic surveying, monitoring and research.
Calculation of Road Traffic Noise	A UK Technical Memorandum for calculating road traffic noise using measurement or prediction methods for the noise index $L_{A10,18\text{hours}}$.

Term	Description
Campaign to Protect Rural England	A national charity dedicated to the protection of rural England, protecting the local countryside where there is threat and enhancing it where there is opportunity. They aim to limit urban sprawl and ribbon development.
Client Scheme Requirements	The objectives of the M25 Junction 10 Improvements Scheme.
Congestion Reference Flow	The maximum achievable hourly throughput of traffic on a particular stretch of road, expressed in terms of AADT.
Conservation Area	An area of special environmental or historic interest or importance, of which the character or appearance is protected by law against undesirable changes (Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990).
Construction Environmental Management Plan	A plan by the contractor describing how the environmental impacts of construction activities of a project will be minimised and mitigated.
Contaminated Land Report 11	The Model Procedures for the Management of Land Contamination (CLR 11) have been developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination. The process involves identifying, making decisions on, and taking appropriate action to deal with land contamination in a way that is consistent with government policies and legislation within the UK.
Continuous Monitoring Station	A monitoring site which measures air pollutant concentrations continuously using automatic analysers.
Control of Substances Hazardous to Health	Under the Control of Substances Hazardous to Health Regulations 2002, employers need to either prevent or reduce their workers' exposure to substances that are hazardous to their health.
County Wildlife Site	A non-statutory conservation designation in the UK which affirms a site's importance and value for wildlife in its county context. The designation is classified by Natural England as being a 'Local Site' designation, though sites can also be of a regional and national importance.
Defence Infrastructure Organisation	The arm of the Ministry of Defence (MoD) responsible for building, maintaining and servicing the MoD estate.
Defra	Defra is the government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the United Kingdom of Great Britain and Northern Ireland. Defra is a ministerial department, supported by 33 agencies and public bodies.
Department for Transport	Government department responsible for the transport network in England, and for aspects of the transport network in the devolved administrations.
Design, Build, Finance and Operate	A single contractor is appointed to design and build a project and then to operate it for a period of time. The contractor finances the project and leases it to the client for an agreed period (perhaps 30 years) after which the development reverts to the client.
Design Manual for Roads and Bridges	A series of 15 volumes that provide standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads, including motorways in the United Kingdom, and, with some amendments, the Republic of Ireland.

Term	Description
Development Consent Order	The means of applying for consent to undertake a Nationally Significant Infrastructure Project (NSIP). NSIPs include, for example, major energy and transport projects.
Early Assessment and Sifting Tool	A decision support tool that has been developed to quickly summarise and present evidence on options in a clear and consistent format. It provides decision makers with relevant, high level, information to help them form an early view of how options perform and compare. The tool itself does not make recommendations and is not intended to be used for making final funding decisions.
Ecological Zone of Influence	The area encompassing all the predicted adverse ecological effects of the Scheme, including those that would occur as a result of habitat loss, increased emissions, and those that would occur through disturbance, such as noise.
English Heritage	Charity that cares for the National Heritage Collection of state-owned historic sites and monuments across England, under licence from Historic England.
Environment Agency	A non-departmental public body with responsibilities relating to the protection and enhancement of the environment in England.
Expressway/Expressway Standard	A road with high quality performance and safety standards, as described in the July 2013 Action for Roads report.
Habitats of Principal Importance	Under Section 41 of the Natural Environment and Rural Communities (NERC) Act, the Secretary of State is required to publish a list of habitats which are of principal importance for the conservation of biodiversity in England. Fifty-six habitats of principal importance are included on the S41 list. These are all the habitats in England that were identified as requiring action in the UK Biodiversity Action Plan and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.
Historic England	Publicly funded body that champions and protects England's historic places, including Stonehenge and Avebury; also known as the Historic Buildings and Monuments Commission for England.
Interim Advice Note	<p>Issued by Highways England and contain specific guidance, which shall only be used in connection with works on motorways and trunk roads in England, subject to any specific implementation instructions contained within an IAN.</p> <p>While IANs must be read together with the DMRB and the Manual of Contract Documents for Highway Works (MCHW) for the above works, and may incorporate amendments or additions to documents in these publications, they are not part of the DMRB or MCHW.</p>
Local Air Quality Management Technical Guidance	A technical guidance document designed to support local authorities in carrying out their duties under the Environment Act 1995 and subsequent Regulations. These duties require local authorities to review and assess air quality in their area from time to time.
Local Geological Site	Formally known as Regionally Important Geological Sites (RIGS). Sites within the county that are considered worthy of protection for their Earth Science or landscape importance, but are not already protected as SSSIs.

Term	Description
Local Nature Reserve	A statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the Natural Environment and Rural Communities Act 2006, by principal local authorities. A Local Nature Reserve must be of importance for wildlife, geology, education or public enjoyment.
Local Enterprise Partnership	A voluntary partnership set up between local authorities and businesses to drive local economic growth and job creation activities. There are 39 LEPs across England.
Mineral Consultation Area	An area identified in order to ensure consultation between the relevant minerals planning authority, the minerals industry and others before certain non-mineral planning applications made within the area are determined.
Mineral Safeguarding Area	An area designated by Minerals Planning Authorities which covers known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development.
Ministry of Agriculture, Fisheries and Food	A UK government department created by the Board of Agriculture Act 1889. The Ministry was dissolved in 2002, at which point its responsibilities were merged into the Department for Environment, Food and Rural Affairs (Defra).
Multi-Agency Geographic Information for the Countryside	A web-based interactive map to bring together information on key environmental schemes and designations in one place. Multi-Agency Geographic Information for the Countryside (MAGIC) is a partnership project involving six government organisations who have responsibilities for rural policy-making and management.
National Character Area	The subdivision of England into 159 distinct natural areas. Each area is defined by a unique combination of landscape, biodiversity, geodiversity, history, and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries.
National Infrastructure Plan	Document published by the UK Government, setting out its strategy for meeting the infrastructure needs of the UK economy.
National Nature Reserve	Reserves established to protect some of the most important habitats, species and geology in the United Kingdom, and to provide 'outdoor laboratories' for research. There are currently 224 NNRs in England with a total area of over 94,400 hectares - approximately 0.7% of the country's land surface. Natural England manages about two thirds of England's NNRs. The remaining reserves are managed by organisations approved by Natural England, for example, the National Trust, Forestry Commission, RSPB, Wildlife Trusts and local authorities.
National Vegetation Classification	The National Vegetation Classification was commissioned in 1975 by the Nature Conservancy Council (NCC) to provide a comprehensive and systematic catalogue and description of the plant communities of Britain. It has now been accepted as a standard, not only by the nature conservation and countryside organisations, but also by forestry, agriculture and water agencies, local authorities, nongovernmental organisations, major industries and universities.
Nationally Significant Infrastructure Project	A project of a type and scale defined under the Planning Act 2008 and by order of the Secretary of State relating to energy, transport, water, waste water and waste generally. These projects require a

Term	Description
	single development consent. Planning permission, listed building consent and scheduled monument consent amongst others are not required for Nationally Significant Infrastructure Projects.
National Trust	Charity that cares for historic houses, gardens, ancient monuments, countryside and other sites across England, Wales and Northern Ireland, including the Stonehenge landscape.
Natural England	Executive non-departmental public body responsible for the natural environment.
Non-Motorised User	Cyclists, pedestrians (including wheelchair users), and equestrians using the public highway.
Noise Important Area	Areas where the 1% of the population that are affected by the highest noise levels from major roads are located according to the results of Defra's strategic noise maps.
Pollution Climate Mapping	A collection of models designed to fulfil part of the United Kingdom's EU Directive (2008/50/EC) on ambient air quality and cleaner air for Europe, requirements to report on the concentrations of particular pollutants in the atmosphere. There is one model per pollutant, each with two parts: a base year model and a projections model. The Pollution Climate Mapping model provides outputs on a 1x1 km grid of background conditions plus around 9,000 representative road side values. The Mapping is also used for scenario assessment and population exposure calculations to assist policy developments and provides model runs to support the writing of Time Extension Notification applications for PM ₁₀ and NO _x .
Project Control Framework	A joint Department for Transport and Highways England approach to managing major projects. The Framework comprises a standard project lifecycle; standard project deliverables; project control processes and governance arrangements.
Public Right of Way	A way over which the public have a right to pass and repass. The route may be used on foot, on (or leading) a horse, on a pedal cycle or with a motor vehicle, depending on its status. Although the land may be owned by a private individual, the public may still gain access across that land along a specific route. Public rights of way are all highways in law.
Publicly Funded Structure	A structure in which the initial capital costs of the scheme are (principally) met through sources from government funding.
Road Investment Strategy	The long-term strategy to improve England's motorways and major A roads. The first RIS (known as RIS1) was published in 2014 and covers the period 2015-2020. A second RIS (RIS2) was published in 2015, and covers the post-2020 period.
Royal Horticultural Society	The UK's leading gardening charity dedicated to advancing horticulture and promoting gardening.
Royal Society for the Protection of Birds	A charitable organisation that works to promote conservation and protection of birds and the wider environment through public awareness campaigns, petitions and through the operation of nature reserves throughout the UK.
Scheduled monument	A 'nationally important' archaeological site or historic building, given protection against unauthorised change and included in the Schedule of Monuments kept by the Secretary of State for Culture, Media and Sport. The protection given to scheduled monuments is

Term	Description
	given under the Ancient Monuments and Archaeological Areas Act 1979.
The Scheme	The M25 Junction 10 Improvements Scheme.
Sites of Nature Conservation Importance	Locally important sites of nature conservation adopted by local authorities for planning purposes.
Site of Special Scientific Interest	A conservation designation denoting to a protected area in the United Kingdom. The Sites are protected by law to conserve their wildlife or geology.
Site Waste Management Plan	A Site Waste Management Plan should describe how materials will be managed efficiently and disposed of legally during the construction of the works, explaining how the re-use and recycling of materials will be maximised. This involves estimating how much of each type of waste is likely to be produced and the proportion of this that will be re-used or recycled on site, or removed from the site for re-use, recycling, recovery or disposal. It is the joint responsibility of the client and the principal contractor to ensure that a Site Waste Management Plan is in place before construction begins and to ensure that it is enforced.
Source Protection Zone	Areas of land around over 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. The zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. There are three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied to a groundwater source. The zones are used in conjunction with the Groundwater Protection Policy to set up pollution prevention measures in areas which are at a higher risk, and to monitor the activities of potential polluters nearby.
Special Area of Conservation	Areas of strictly protected sites designated under the EC Habitats Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).
Special Protection Area	Areas of strictly protected sites classified in accordance with Article 4 of the EC Birds Directive (2009/147/EC) on the conservation of wild birds. They are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.
Strategic Economic Plan	A document produced by a Local Enterprise Partnership setting out its plans for the future and the funding that will be required to deliver these plans.
Strategic Road Network	The network of approximately 4,300 miles of motorways and major 'trunk' A roads across England, managed by Highways England.
Transport Analysis Guidance	Guidance produced by DfT on the process of appraisal of transport interventions.
Tree Preservation Order	A Tree Preservation Order is made by a Local Planning Authority to protect specific trees or a particular area, group or woodland from deliberate damage and destruction. TPOs can prevent the felling, lopping, topping, uprooting or otherwise wilful damaging of trees without the permission of the Local Planning Authority.

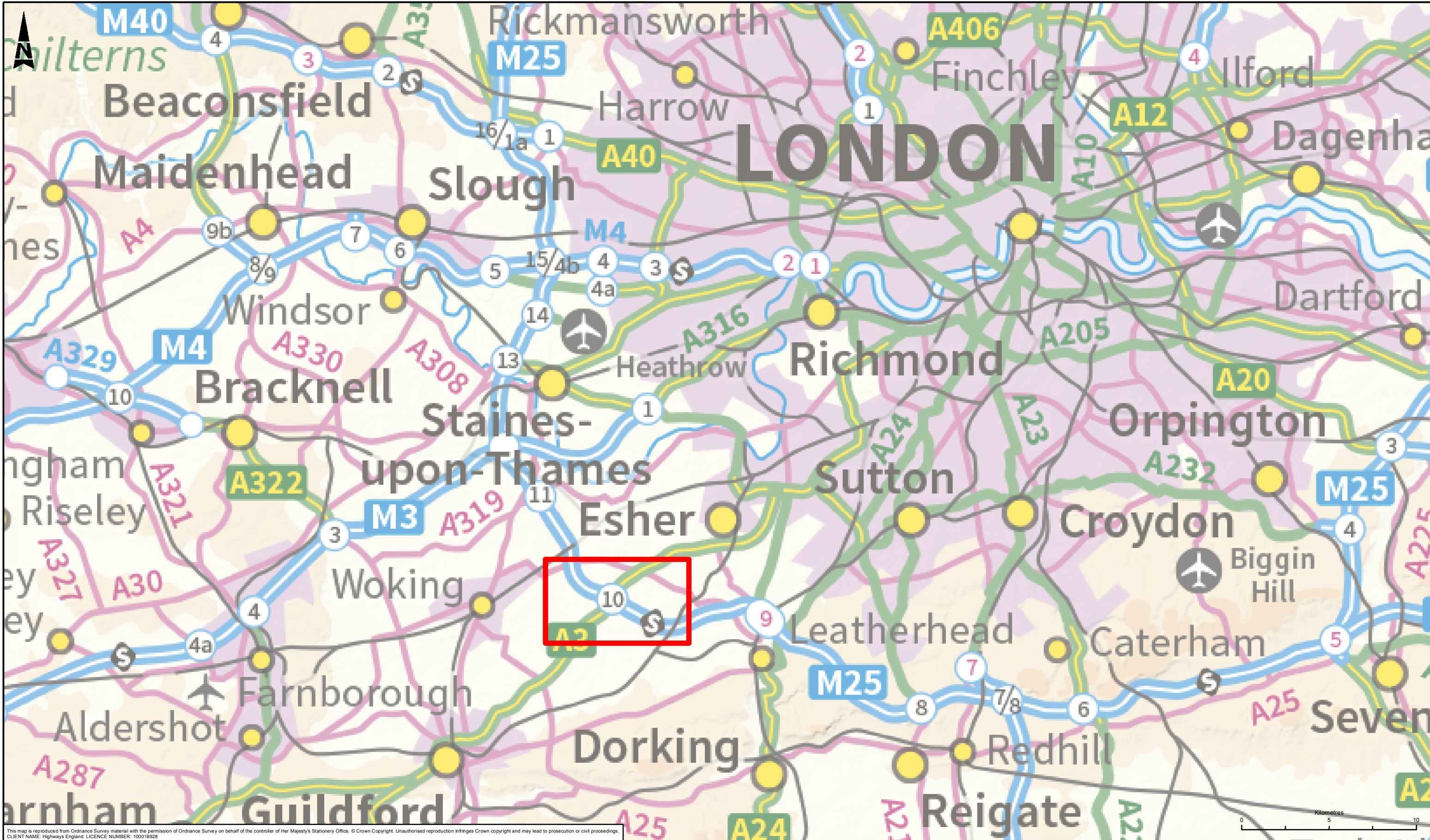
Term	Description
Unexploded Ordnance	An explosive weapon (bombs, shells, grenades, land mines, naval mines, cluster munition, etc.) that did not explode when they were employed and still pose a risk of detonation, sometimes many decades after they were used or discarded.
Water Framework Directive	The Water Framework Directive (2000/60/EC) is a EU directive which aims to achieve good status of all water bodies (surface waters, groundwaters and the sites that depend on them, estuaries and near-shore coastal waters) and the prevent any deterioration. It has introduced a comprehensive river basin management planning system to protect and improve the ecological quality of the water environment. It is underpinned by the use of environmental standards.
World Heritage Site	A site listed by UNESCO because of its special natural or cultural value.
Zone of Theoretical Visibility	A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

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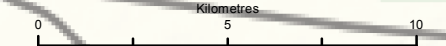
Chapter 19

19. Location and Design Plans (incl. locations plan showing red line boundary)

Figures



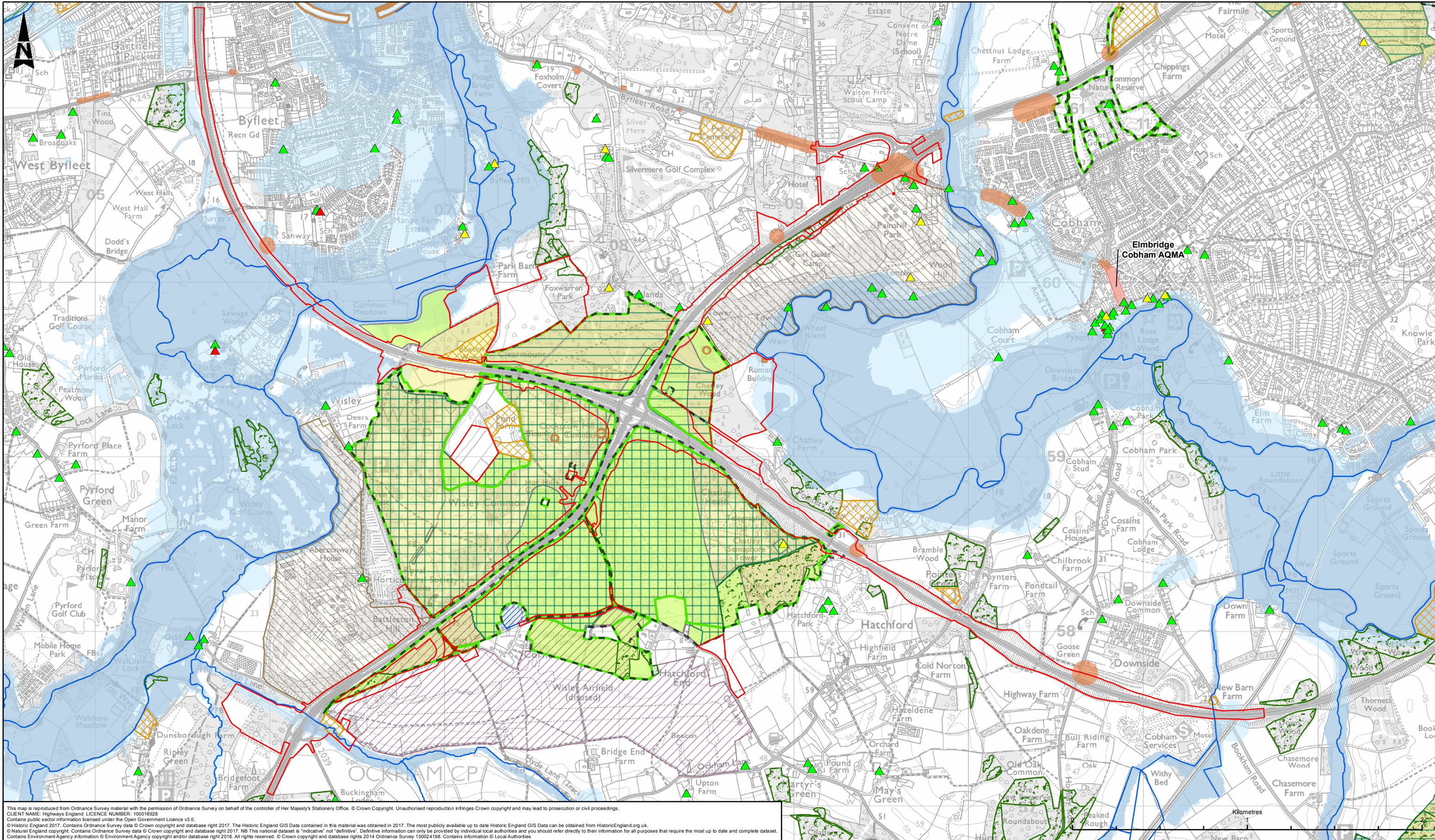
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Rev	Date	Description	By	Chk'd	App'd
C01	05/12/17	PUBLISHED	FM	JB	NW

Drawing Status	PUBLISHED	Subsidiary	A1	Project Title	M25 JUNCTION/A3 WISLEY INTERCHANGE IMPROVEMENT				
		Epsom Gateway Ashley Avenue Epsom Surrey KT18 5AL Tel: +44 (0) 1372 726140 Fax: +44 (0) 1372 740055 www.atkinsglobal.com		Drawing Title FIGURE 1.1 LOCATION PLAN					
Scale	1:200,000	Designed / Drawn	FM	Checked	JB	Approved	NW	Authorised	GB
Original Size	A3	Date	05/12/17	Date	05/12/17	Date	05/12/17	Date	05/12/17
Drawing Number	Project	Originator	Volume	Revision					
	HE551522 - ATK - EGN -								
	XX - GS - GI - 000002								
Location	Type	Role	Number						



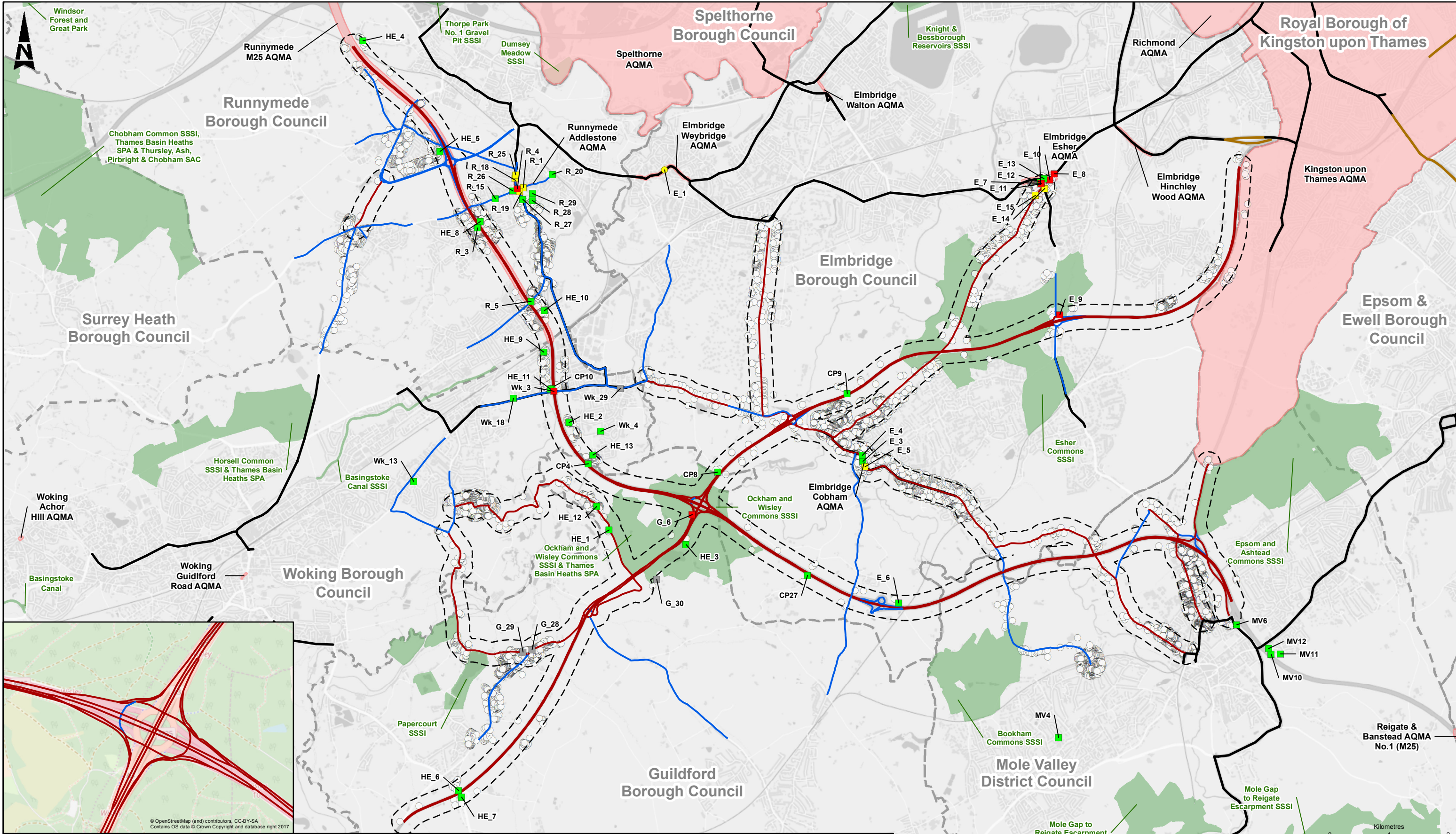


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LEGEND	
	DCO Boundary
	Registered Common Land
	Registered Village Green
	Site of Special Scientific Interest (SSSI)
	Special Protection Area (SPA)
	Local Nature Reserve (LNR)
	Ancient Woodland
	Air Quality Management Area
	Important Area for Noise
	Site of Nature Conservation Importance (SNCI)
	Public Open Space
	Access Land as on 1:25,000 OS Map
	Land Fill Site (Historic)
	Flood Zone 3
	Flood Zone 2
	Watercourses
	Scheduled Monument
	Grade I listed building
	Grade II* listed building
	Grade II listed building

Rev	Date	Description	By	Chk'd	App'd
C01	05/12/17	PUBLISHED	FM	JB	NW

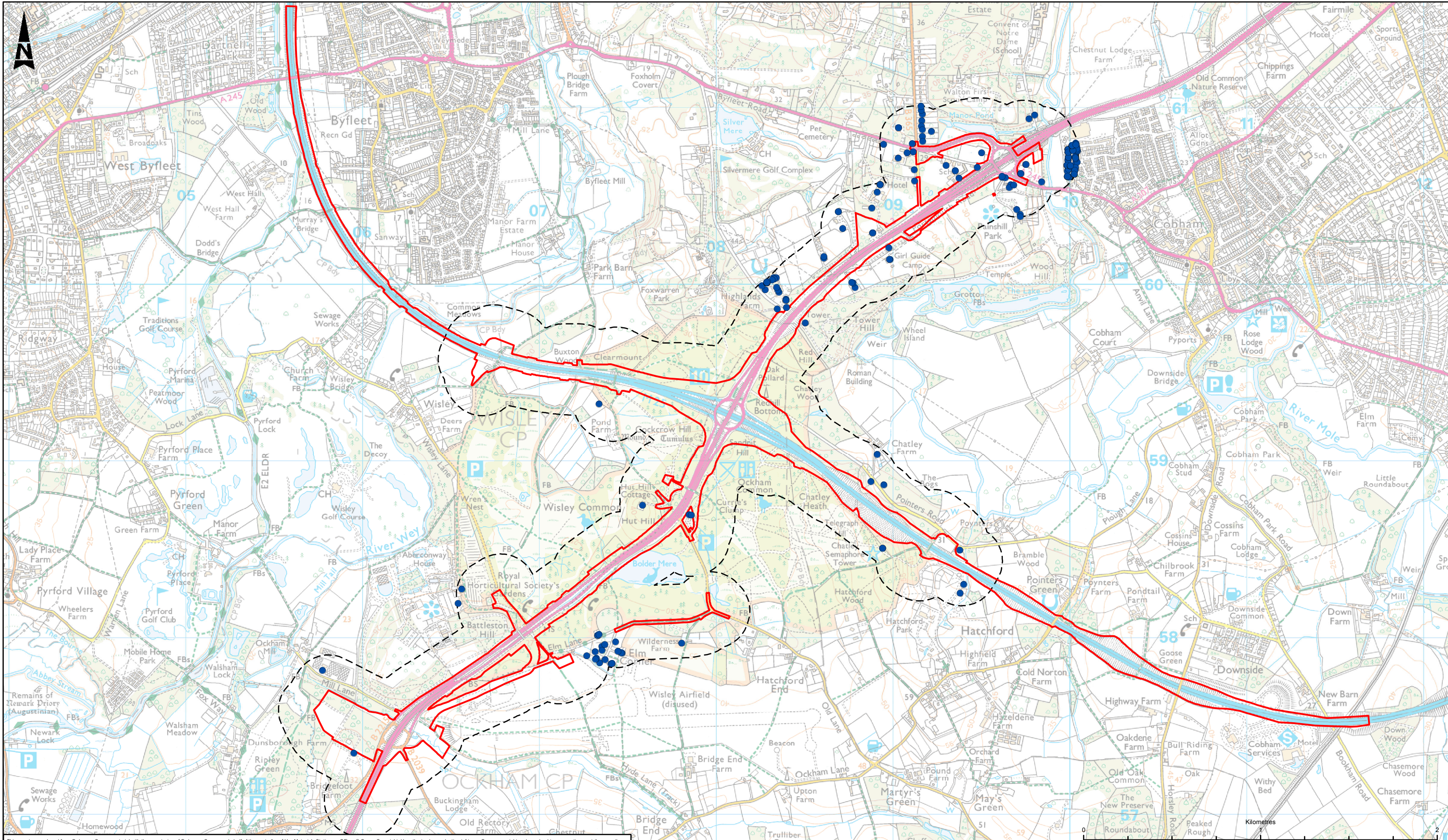
 Epsom Gateway Ashley Avenue Epsom Surrey KT18 5AL Tel: +44 (0) 1372 726140 Fax: +44 (0) 1372 740055 www.atkinsglobal.com	Drawing Status PUBLISHED	Suitability A1	Project Title M25 JUNCTION/A3 WISLEY INTERCHANGE IMPROVEMENT				
	Copyright © Atkins Limited (2017)	Drawing Title FIGURE 2.1 ENVIRONMENTAL CONSTRAINTS PLAN	Scale 1:20,000	Designed / Drawn FM	Checked JB	Approved NW	Authorised GB
Client 	Original Size A3	Date 05/12/17	Date 05/12/17	Date 05/12/17	Date 05/12/17	Drawing Number HE551522 - ATK - EGN - XX - GS - GI - 000001	Revision C01



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LEGEND		
	Local Authority Boundary	
	Designated Ecological Sites	
	Air Quality Management Area	
DEFRA PCM Roadside NO₂ Concentrations (2015)		
	< 40 µg/m ³	
	> 40 µg/m ³	
	200m study area around Affected Road Network	
	Affected Road Network	
	Unaffected Road Network	
	Sensitive Human Health Receptors	
Diffusion Tube Monitoring Sites (2015)		
Annual Mean NO ₂ Concentration		
	No data	
	< 36 µg/m ³	
	36 to 40 µg/m ³	
	> 40 µg/m ³	
Continuous Monitoring Sites (2015)		
Annual Mean NO ₂ Concentration		
	No data	
	< 36 µg/m ³	
	36 to 40 µg/m ³	
	> 40 µg/m ³	

Drawing Status	PUBLISHED	Suitability	A1	Project Title	M25 JUNCTION/A3 WISLEY INTERCHANGE IMPROVEMENT																										
ATKINS				Drawing Title																											
Epsom Gateway Ashley Avenue Epsom Surrey KT18 5AL Tel: +44 (0) 1372 726140 Fax: +44 (0) 1372 740055 www.atkinsglobal.com				FIGURE 5.1 AIR QUALITY CONSTRAINTS																											
Copyright © Atkins Limited (2017)				Scale	1:60,000	Designed / Drawn	SD	Checked	VS	Approved	NW	Authorised	GB																		
Client				Original Size	A3	Date	05/12/17	Date	05/12/17	Date	05/12/17	Date	05/12/17																		
highways england				Drawing Number	HE551522 - ATK - EAQ - XX - GS - GI - 000001			Volume	C01		Revision																				
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Rev	Date	Description	By	Chk'd	App'd																										
C01	05/12/17	PUBLISHED		SD	VS	NW																									
Location	Type	Role	Number																												



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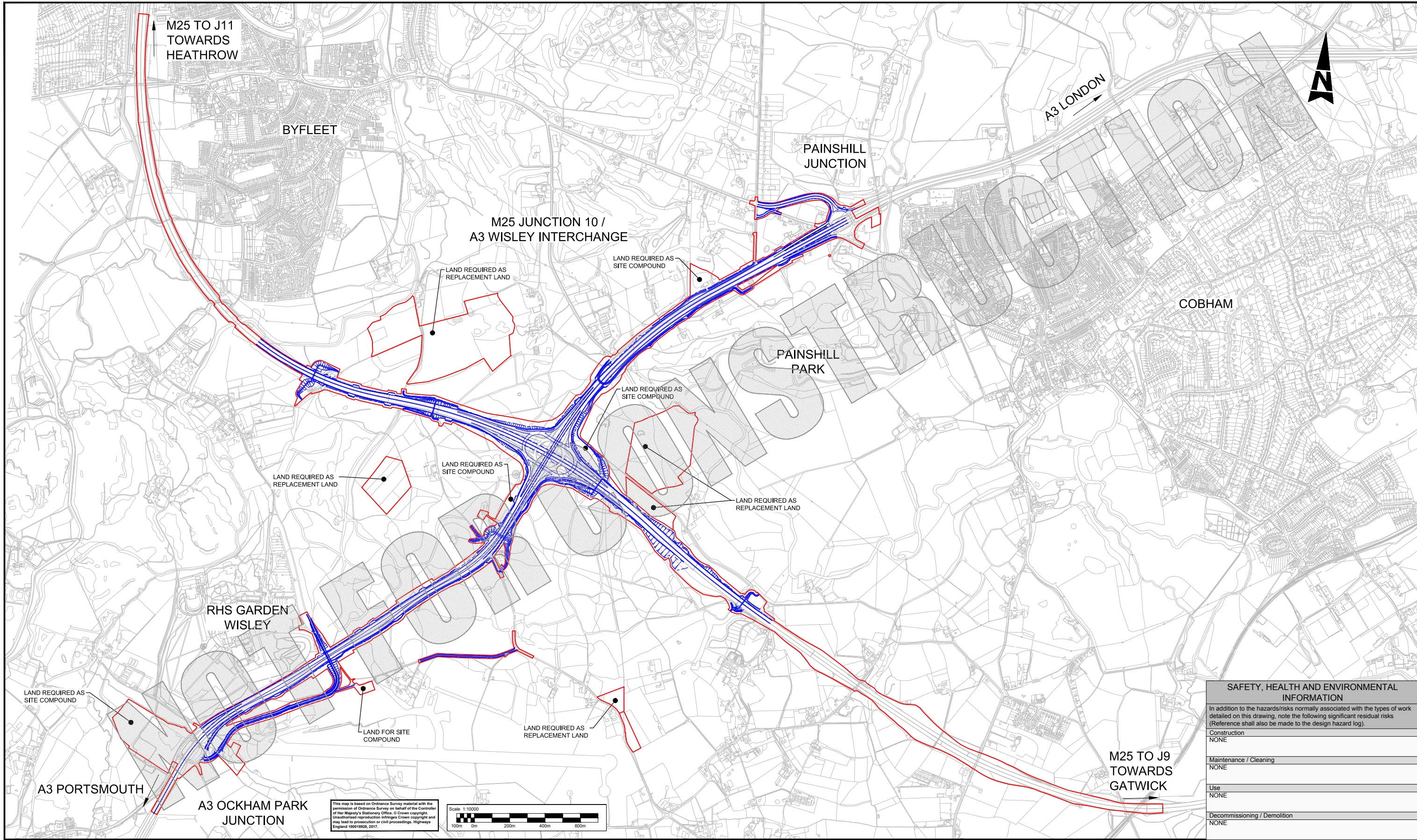
- LEGEND**
- Receptors Sensitive to Construction Dust
 - DCO Boundary
 - Area Potentially Affected by Construction Dust

C01	05/12/17	PUBLISHED	SD	RR	NW
Rev	Date	Description	By	Chk'd	App'd

Drawing Status PUBLISHED		Suitability A1		Project Title M25 JUNCTION/A3 WISLEY INTERCHANGE IMPROVEMENT	
ATKINS Epsom Gateway Ashley Avenue Epsom Surrey KT18 5AL Tel: +44 (0) 1372 726140 Fax: +44 (0) 1372 740055 www.atkinsglobal.com		Drawing Title FIGURE 5.2 STUDY AREA FOR CONSTRUCTION DUST ASSESSMENT			
Scale 1:20,000	Designed / Drawn SD	Checked RR	Approved NW	Authorised GB	
Original Size A3	Date 05/12/17	Date 05/12/17	Date 05/12/17	Date 05/12/17	
Drawing Number Project HE551522 - ATK - EAQ - XX - GS - GI - 000002		Originator Volume		Revision C01	
Location		Type		Number	



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LEGEND:
 — DCO BOUNDARY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	NONE
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	NONE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
ISSUED FOR HABITAT REGULATIONS DOCUMENT	A1	C01	BBM	MV	RM	PJ	27/11/17
ISSUED FOR HABITAT REGULATIONS DOCUMENT	A1	C02	BBM	MV	RM	PJ	28/11/17
ISSUED FOR HABITAT REGULATIONS DOCUMENT	A1	C03	BBM	MV	RM	PJ	01/12/17

Drawing Suitability: Signed off - Publication
 Status: A1

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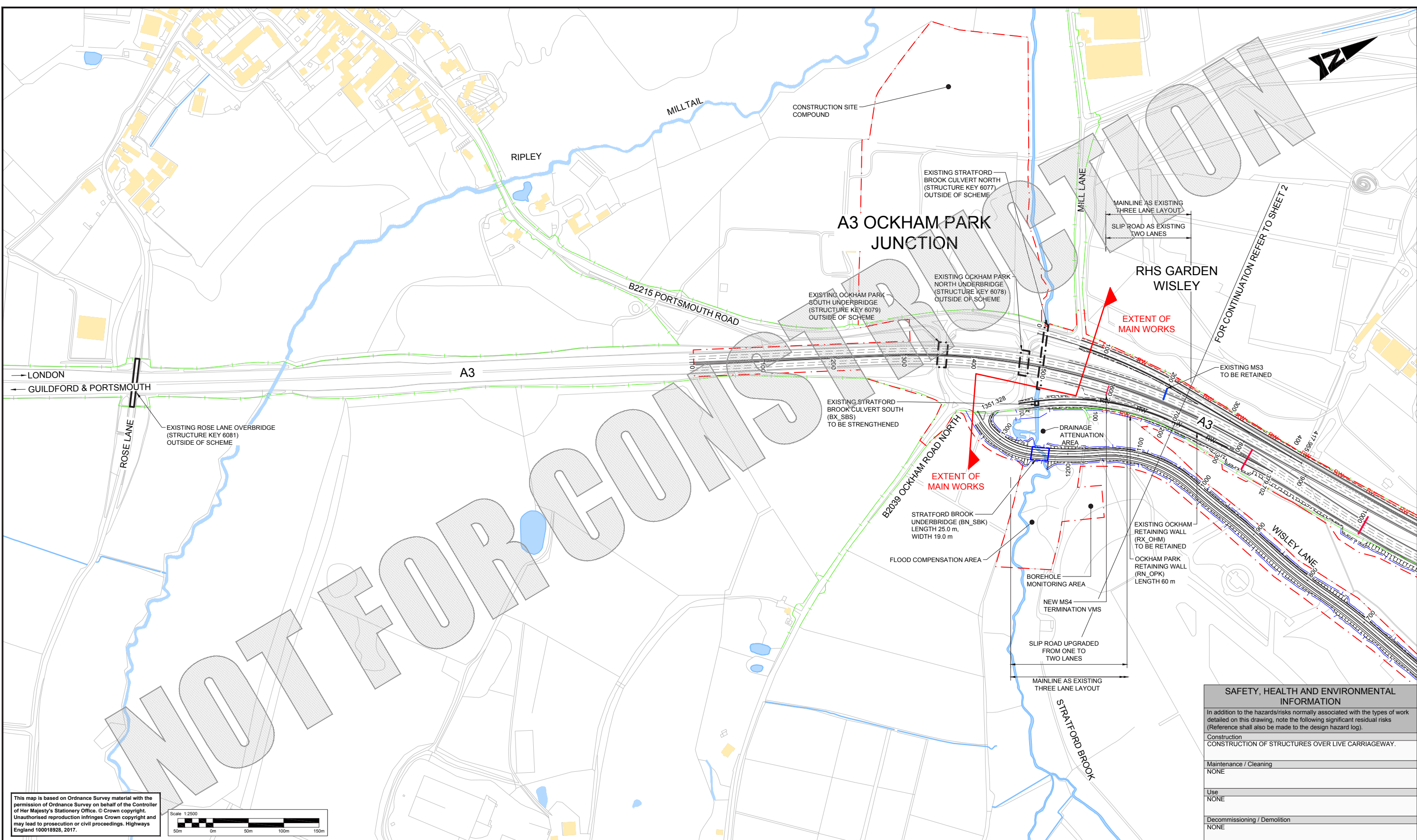
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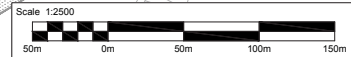
Client: **highways england**

Project Title	M25 Junction10/A3 Wisley Interchange		
Drawing Title	ROUTE PROTECTION PLAN		
Drawing Number	Project	Originator	Volume
HE551522	- ATK	- EAC	-
XX	- DR - LP - 000001		
Location	Type	Role	Number
A1	Scale: 1:10000	Project Ref. No: 5158141	Sheet: 1 of 1 Rev: C03

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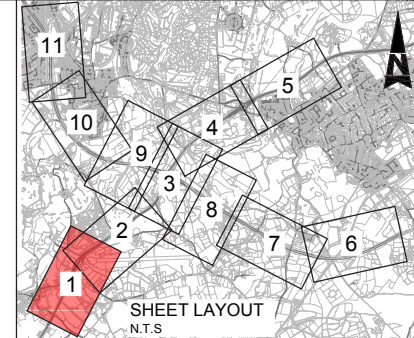
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY.	
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	NONE

- NOTES**
- UNLESS OTHERWISE SPECIFIED, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
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 - EARTHWORKS SLOPE TO BE 1(H) : 4(V) UNLESS OTHERWISE STATED.

KEY			
	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
	S0	P01.1	---	---	---	---	---

Initial non-contractual code

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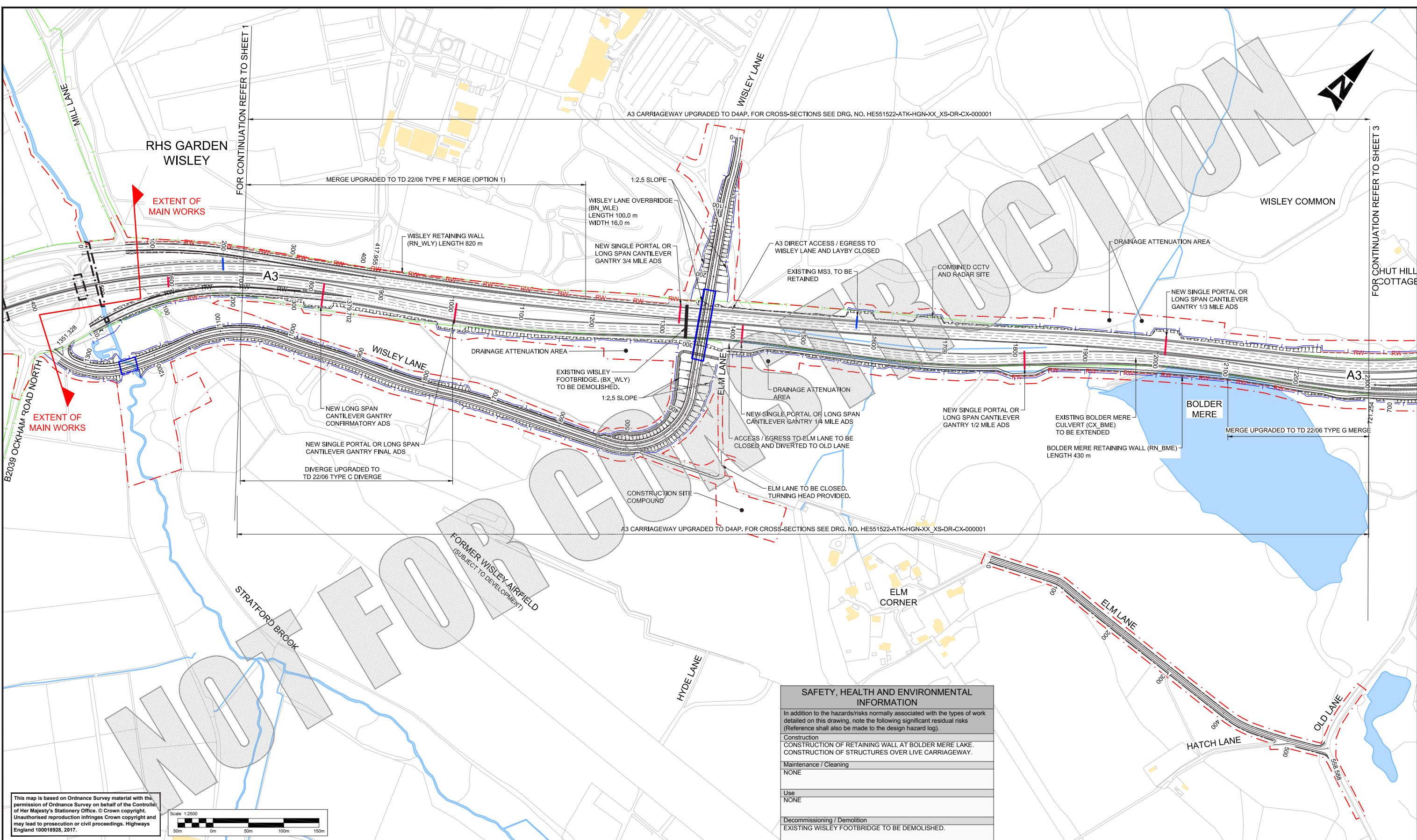
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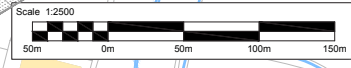
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Project Title	M25 Junction10/A3 Wisley Interchange		
Drawing Title	ENGINEERING GENERAL ARRANGEMENT		
Drawing Number	HE551522	Originator	ATK - HGN
Project	A3_ML	Volume	- DR - CH - 000001
Location	A1	Type	Role
Original Size	Scale: 1:2500	Project Ref. No.	5158141
Sheet	1 of 11	Rev	P01.1

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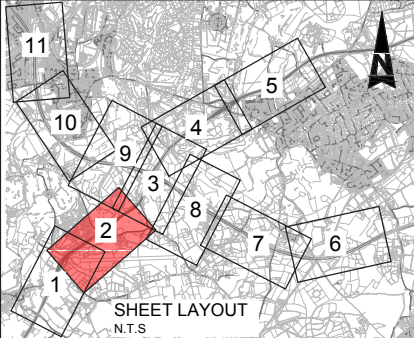
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 - EARTHWORKS SLOPE TO BE 1(H) : 4(V) UNLESS OTHERWISE STATED.

KEY

	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction	CONSTRUCTION OF RETAINING WALL AT BOLDER MERE LAKE. CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY.
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	EXISTING WISLEY FOOTBRIDGE TO BE DEMOLISHED.

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Drawing Suitability: Initial non-contractual code
 Status: SO
 Project Title: M25 Junction 10/A3 Wisley Interchange

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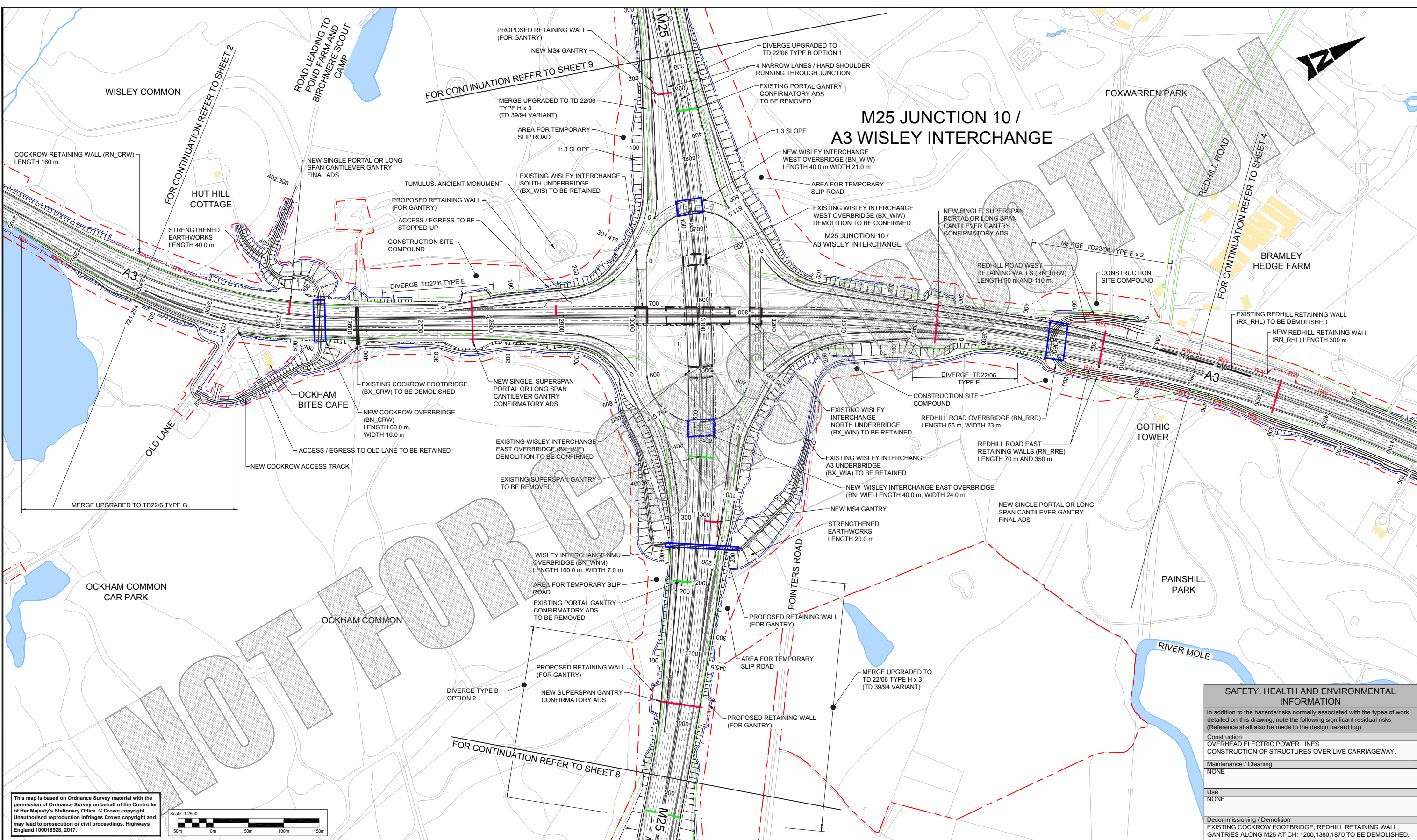
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Drawing Number	HE551522	Originator	ATK	Volume	HGN
Project	A3_ML				
Location	- DR - CH - 000002	Type		Role	
Original Size	A1	Scale	1:2500	Project Ref. No.	5158141
		Sheet	2 of 11	Rev	P01.1

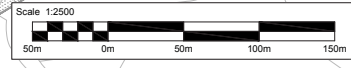
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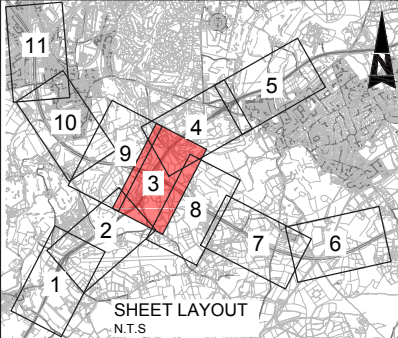
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	OVERHEAD ELECTRIC POWER LINES. CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY.
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	EXISTING COCKROW FOOTBRIDGE, REDHILL RETAINING WALL, GANTRIES ALONG M25 AT CH: 1200,1380,1870 TO BE DEMOLISHED.

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KEY			
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	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
STAGE 3 DESIGN FIX 2	S0	P01.1	---	---	---	---	---

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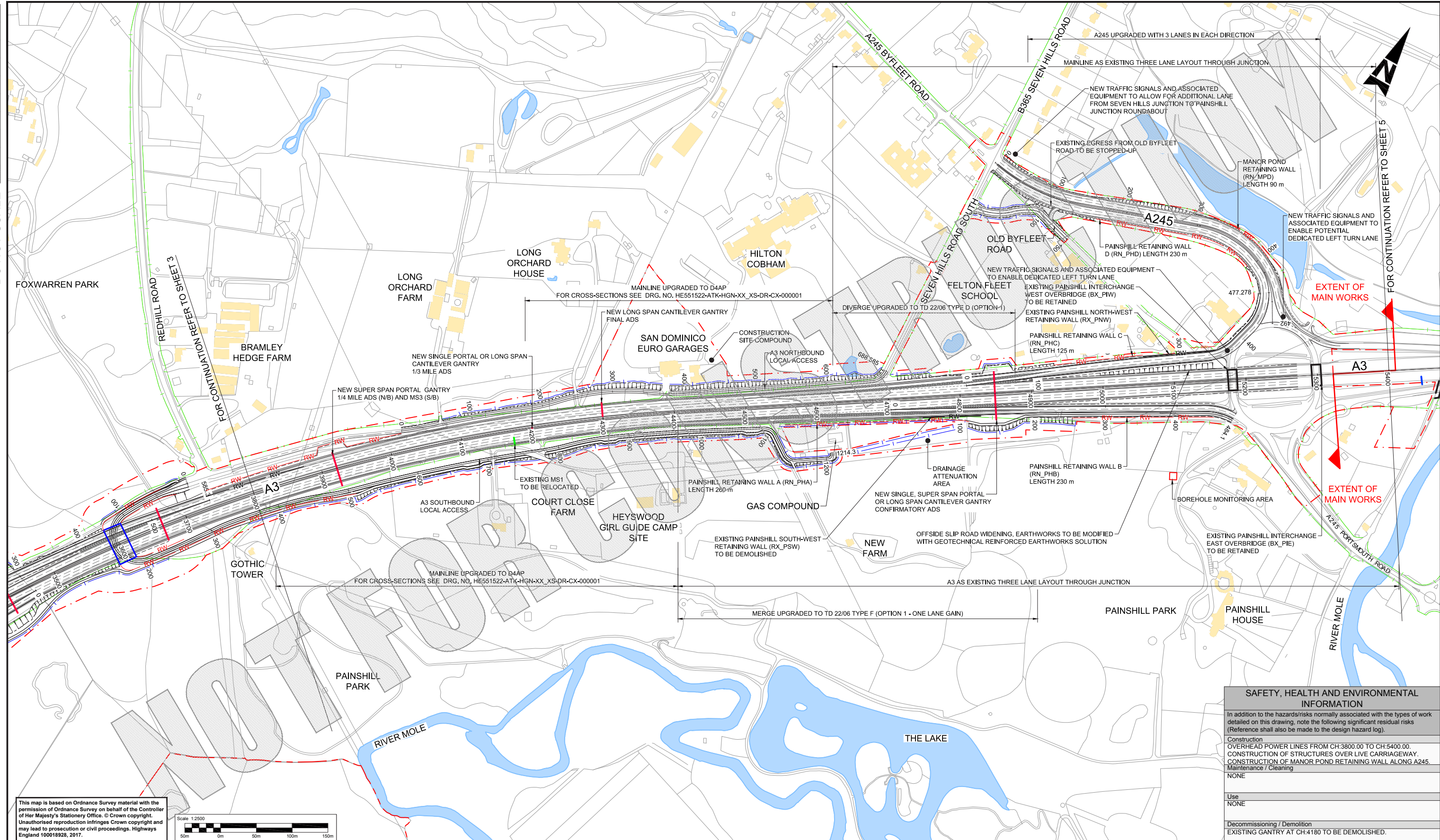
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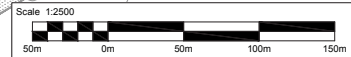
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Project	A3_ML	Role	DR - CH	Number	000003
Location					
Original Size	A1	Scale	1:2500	Project Ref. No.	5158141
Sheet	3 of 11	Rev	P01.1		

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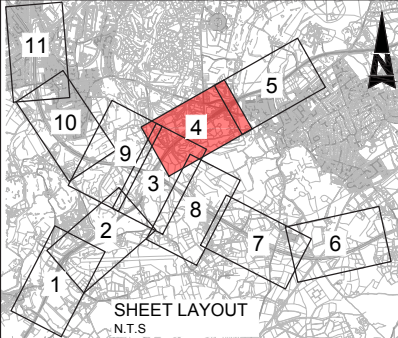
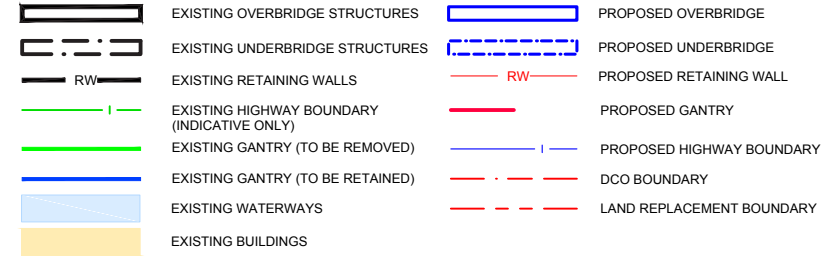
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KEY



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
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Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

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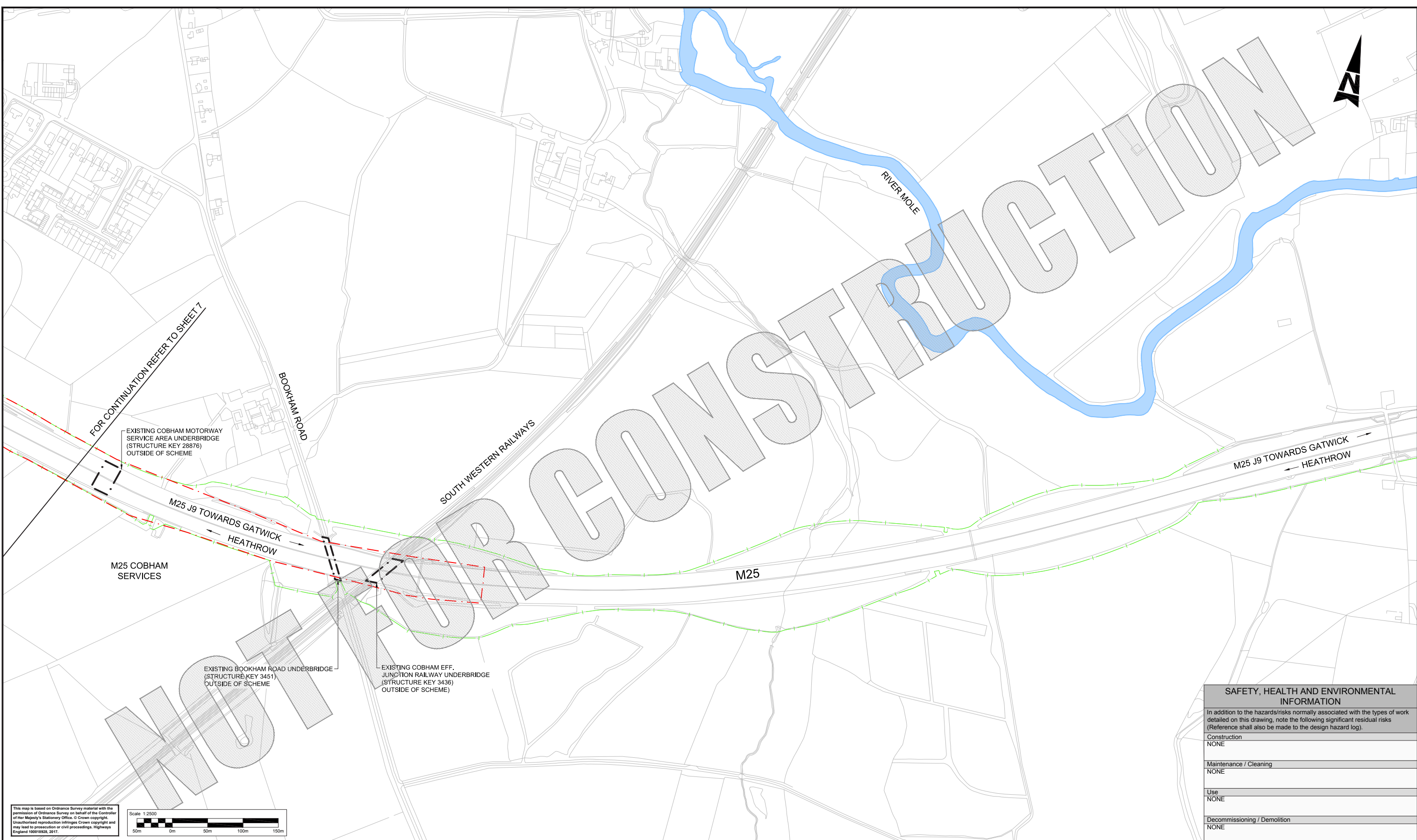
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	OVERHEAD POWER LINES FROM CH:3800.00 TO CH:5400.00. CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY. CONSTRUCTION OF MANOR POND RETAINING WALL ALONG A245. Maintenance / Cleaning
Use	NONE
Decommissioning / Demolition	EXISTING GANTRY AT CH:4180 TO BE DEMOLISHED.

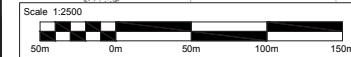
Initial non-contractual code		Status	SO	Project Title	M25 Junction 10/A3 Wisley Interchange
Drawing Title		ENGINEERING GENERAL ARRANGEMENT			
Drawing Number		Project		Originator	Volume
HE551522 - A3 ML		A3_ML - DR - CH - 000004		ATK - HGN -	
Original Size	A1	Scale	1:2500	Project Ref. No.	5158141
Sheet	4 of 11	Rev	P01.1	Copyright	© Atkins Limited (2017)

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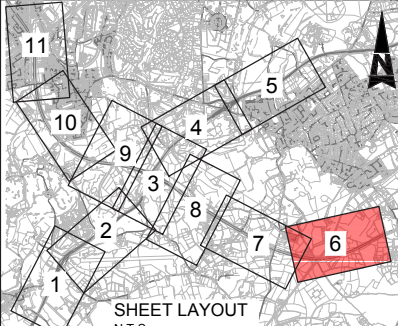


SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction NONE	
Maintenance / Cleaning NONE	
Use NONE	
Decommissioning / Demolition NONE	

- NOTES**
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 - FOR TYPICAL CROSS-SECTIONS REFER TO DRG. NO. HE551522-ATK-HGN-XX_XS-DR-CX-000001 AND HE551522-ATK-HGN-XX_XS-DR-CX-000002
 - EARTHWORKS SLOPE TO BE 1(H) : 4(V) UNLESS OTHERWISE STATED.

KEY

	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



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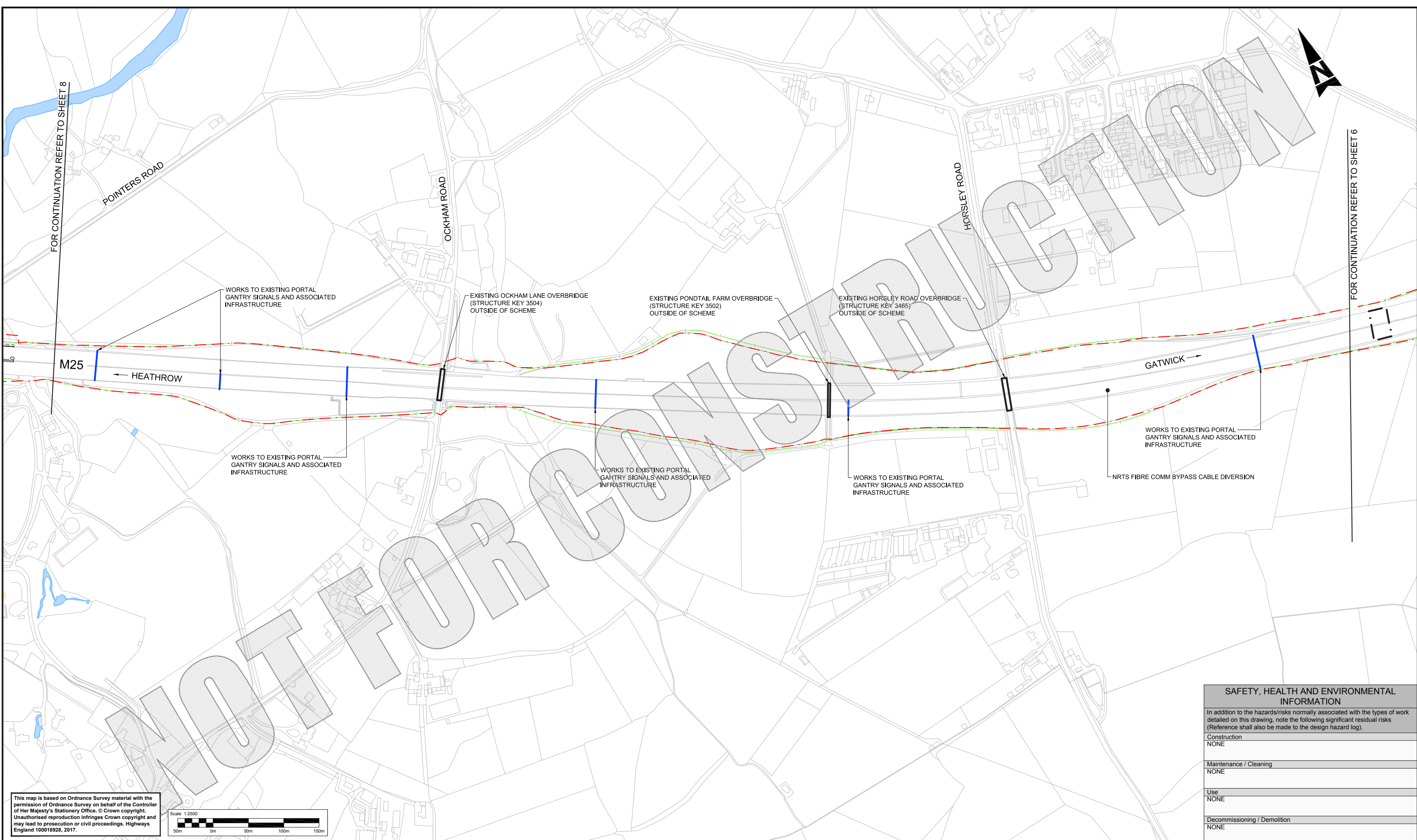
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Initial non-contractual code	S0	M25 Junction 10/A3 Wisley Interchange
Drawing Title		
ENGINEERING GENERAL ARRANGEMENT		
Drawing Number: HE551522 - ATK - HGN -		
Project: M25_ML - DR - CH - 000006		
Location: A1		
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Sheet: 6 of 11	Rev: P01.1	

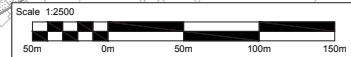
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FOR CONTINUATION REFER TO SHEET 8

FOR CONTINUATION REFER TO SHEET 6

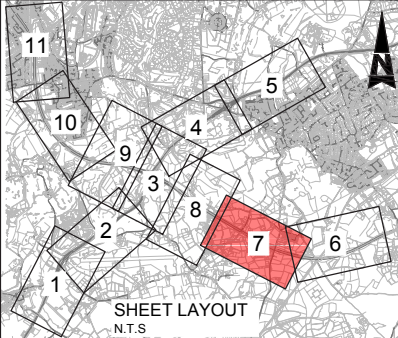
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 - EARTHWORKS SLOPE TO BE 1(H) : 4(V) UNLESS OTHERWISE STATED.

KEY

	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description							
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Drawing Suitability: Initial non-contractual code

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Project Title: M25 Junction10/A3 Wisley Interchange

Drawing Title: ENGINEERING GENERAL ARRANGEMENT

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Drawing Number	Project	Originator	Volume
HE551522	M25_ML	ATK - HGN	-
Location	Type	Role	Number
A1	DR	CH	000007
Original Size	Scale	Project Ref. No.	Sheet
A1	1:2500	5158141	7 of 11
			Rev: P01.1

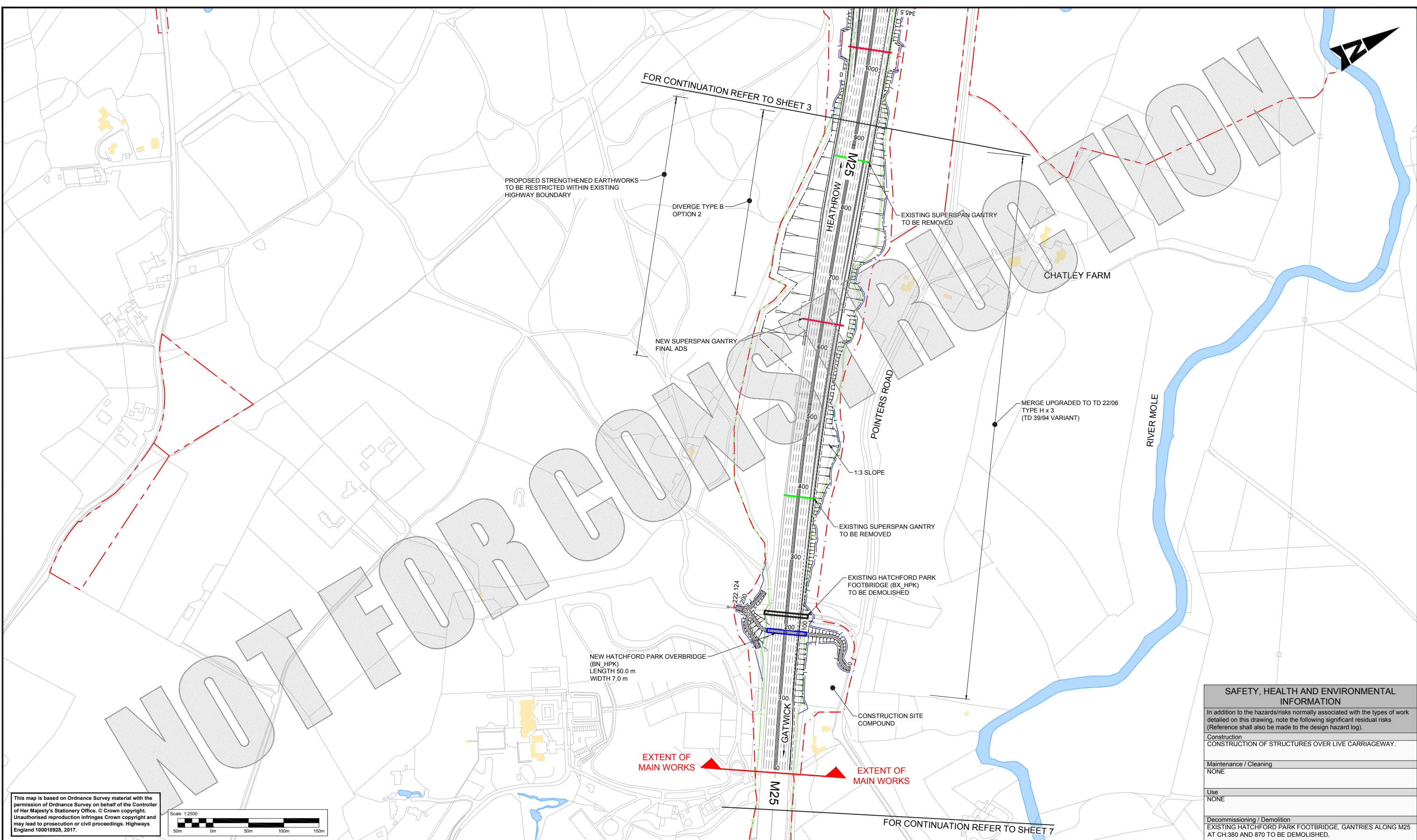
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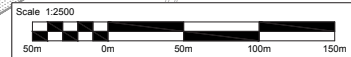
Construction	NONE
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	NONE

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Millimetres



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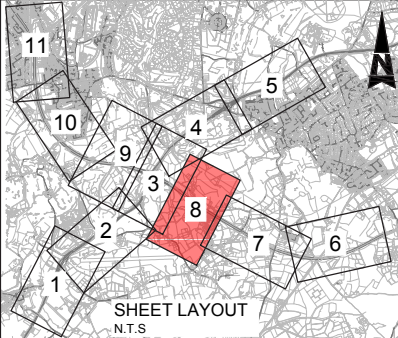


SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY.
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	EXISTING HATCHFORD PARK FOOTBRIDGE, GANTRIES ALONG M25 AT CH.380 AND 870 TO BE DEMOLISHED.

- NOTES**
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KEY

	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



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Initial non-contractual code	SO						
Project Title	M25 Junction10/A3 Wisley Interchange						
Drawing Title	ENGINEERING GENERAL ARRANGEMENT						
Client	Working on behalf of highways england						
Project	HE551522 - ATK - HGN - M25_ML - DR - CH - 000008						
Location	A1						
Original Size	Scale: 1:2500						
Project Ref. No.	5158141						
Sheet	8 of 11						
Rev	P01.1						

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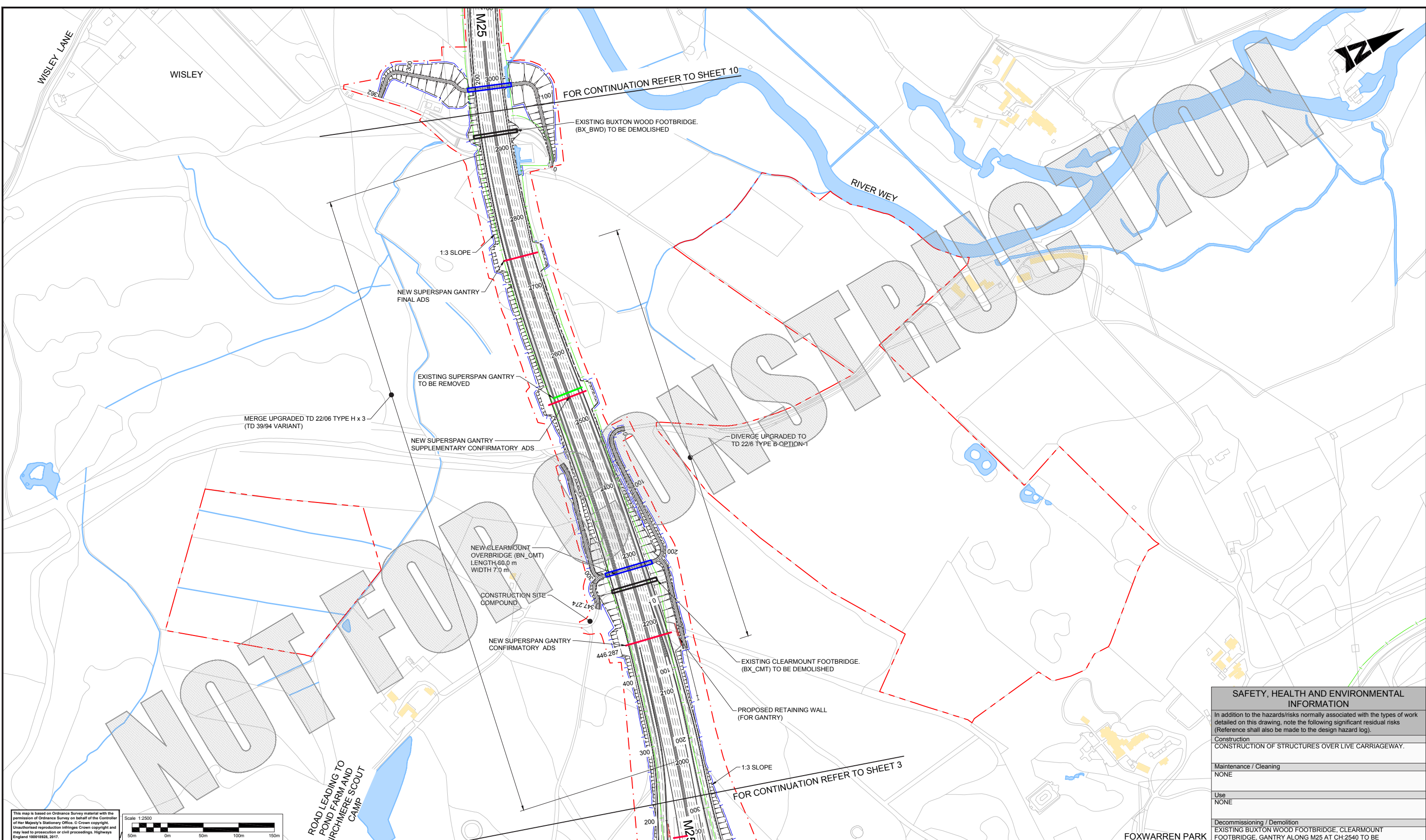
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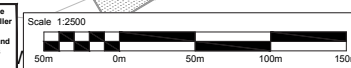
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Project	Originator	Volume
HE551522	ATK	HGN
M25_ML	- DR - CH -	000008
A1	Scale: 1:2500	Project Ref. No: 5158141
Sheet: 8 of 11	Rev: P01.1	

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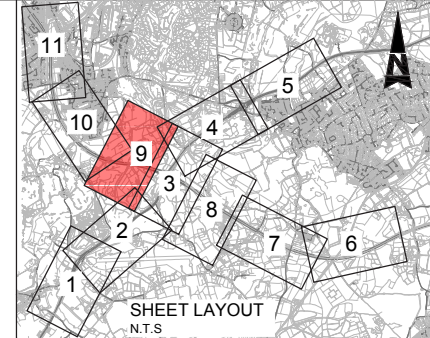


NOTES

1. UNLESS OTHERWISE SPECIFIED, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
2. FOR TYPICAL CROSS-SECTIONS REFER TO DRG. NO. HE551522-ATK-HGN-XX_XS-DR-CX-000001 AND HE551522-ATK-HGN-XX_XS-DR-CX-000002
3. EARTHWORKS SLOPE TO BE 1(H) : 4(V) UNLESS OTHERWISE STATED.

KEY

	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED GANTRY
	EXISTING GANTRY (TO BE REMOVED)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		DCO BOUNDARY
	EXISTING WATERWAYS		LAND REPLACEMENT BOUNDARY
	EXISTING BUILDINGS		



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY.
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	EXISTING BUXTON WOOD FOOTBRIDGE, CLEARMOUNT FOOTBRIDGE, GANTRY ALONG M25 AT CH:2540 TO BE DEMOLISHED.

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

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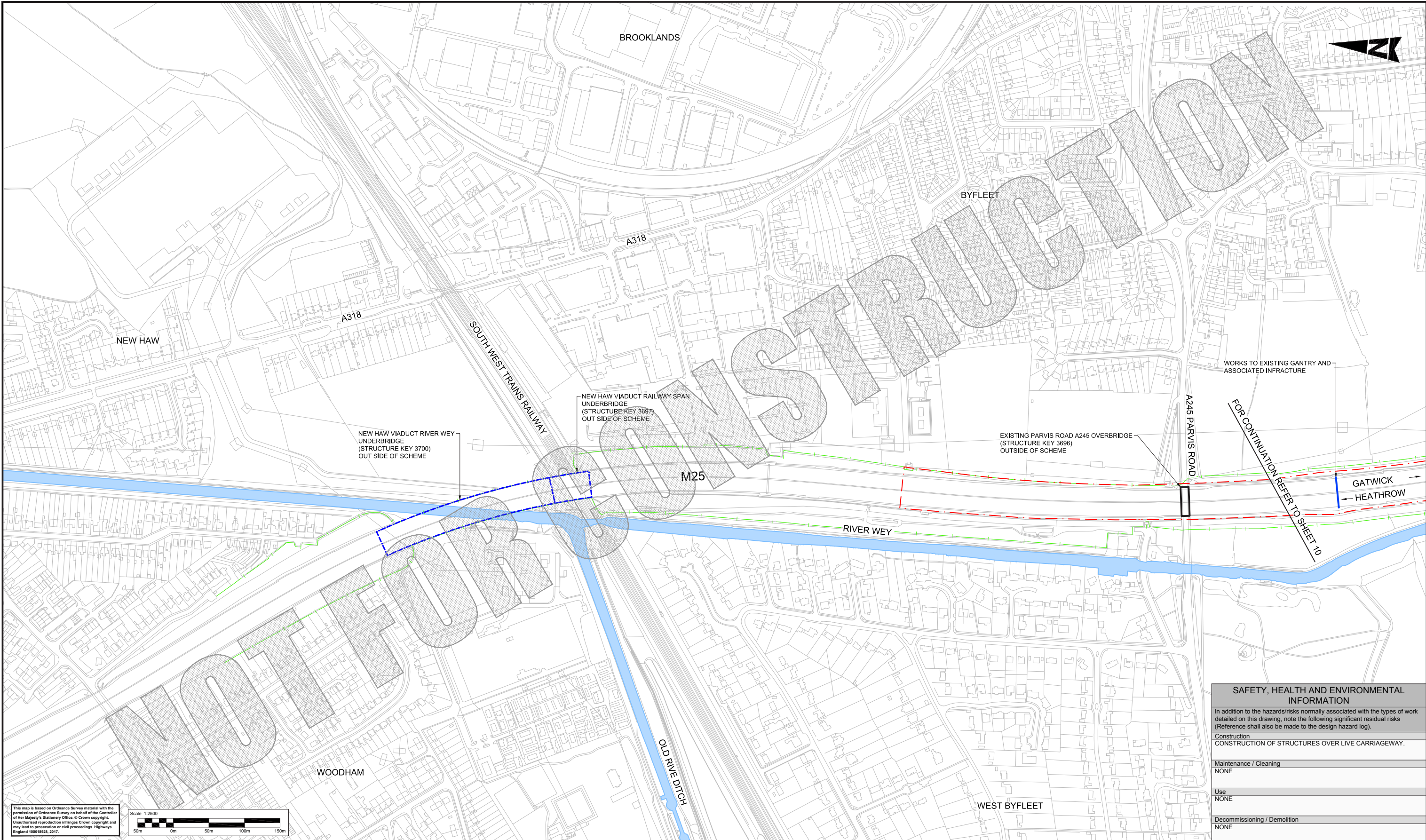
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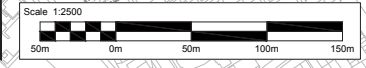
highways england

Project Title: M25 Junction 10/A3 Wisley Interchange	
Drawing Title: ENGINEERING GENERAL ARRANGEMENT	
Drawing Number: HE551522 - ATK - HGN -	Project Ref. No: 5158141
Project: M25_ML - DR - CH - 000009	Sheet: 9 of 11
Location:	Rev: P01.1
Original Size: A1	Scale: 1:2500

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WORKS TO EXISTING GANTRY AND ASSOCIATED INFRASTRUCTURE

FOR CONTINUATION REFER TO SHEET 10

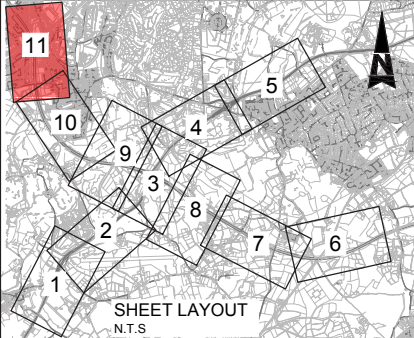
GATWICK
HEATHROW

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	CONSTRUCTION OF STRUCTURES OVER LIVE CARRIAGEWAY.
Maintenance / Cleaning	NONE
Use	NONE
Decommissioning / Demolition	NONE

- NOTES**
- UNLESS OTHERWISE SPECIFIED, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
 - FOR TYPICAL CROSS-SECTIONS REFER TO DRG. NO. HE551522-ATK-HGN-XX_XS-DR-CX-000001 AND HE551522-ATK-HGN-XX_XS-DR-CX-000002
 - EARTHWORKS SLOPE TO BE 1(H) : 4(V) UNLESS OTHERWISE STATED.

KEY

	EXISTING OVERBRIDGE STRUCTURES		PROPOSED OVERBRIDGE
	EXISTING UNDERBRIDGE STRUCTURES		PROPOSED UNDERBRIDGE
	EXISTING RETAINING WALLS		PROPOSED RETAINING WALL
	EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)		PROPOSED HIGHWAY BOUNDARY
	EXISTING GANTRY (TO BE REMOVED)		DCO BOUNDARY
	EXISTING GANTRY (TO BE RETAINED)		LAND REPLACEMENT BOUNDARY
	EXISTING WATERWAYS		
	EXISTING BUILDINGS		



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
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Drawing Title	ENGINEERING GENERAL ARRANGEMENT
Drawing Number	HE551522
Project	M25_ML
Originator	ATK
Volume	HGN
Location	- DR - CH - 000011
Original Size	A1
Scale	1:2500
Project Ref. No.	5158141
Sheet	11 of 11
Rev	P01.1

Appendices

Appendix A. Air Quality

A.1. Local Planning Policy

- A.1.1. The EBC Local Plan Core Strategy⁶⁸ notes that “*air pollution will need to be tackled through a combination of measures to reduce the need to travel; promote walking and cycling; and increase the attraction of travelling by rail in order that their negative effect on the area is reduced over time.*” Core Strategy 25 (CS25 - Travel and Accessibility) also states that the council “*will seek to mitigate the detrimental environmental effects caused by transport, particularly with regards to HGVs, through a variety of measures, which may include...improving air quality...Support will be given to schemes that help to meet the commitments contained in the Elmbridge Air Quality Strategy.*”
- A.1.2. The EBC Air Quality Action Plan (AQAP) details the council’s proposed measures for improvement of air quality within the borough. The AQAP identifies the primary source of air pollution within the borough as road traffic and as such recognises the need to support sustainable travel options and the importance of raising public awareness on the issue of air pollutants; these documents include the Surrey County Council Local Transport Plan (LTP3) and Elmbridge’s Local Development Framework (LDF).
- A.1.3. The GBC Local Plan⁶⁹ was adopted in 2003 as the appropriate planning framework. Similarly to EBC it identifies road traffic as the primary source of air pollution within the borough.
- A.1.4. The Guildford Borough Transport Strategy 2016⁷⁰ recognises the M25 Junction 10/A3 Wisley Interchange as a site of significant, recurrent traffic congestion during peak hours and has committed to its improvement. Within this document the air quality strategy details the borough’s pollutants of concern as particulate matter and NO₂. The Road Investment Strategy is a committed improvement of GBC as well as plans for improvements on the bus and rail networks, GBC also aspires to install a network of electrical vehicle charging points.
- A.1.5. The Woking Core Strategy⁷¹ also recognises in Core Strategy Objective 7, the need to “*maintain and improve air [quality]*”, supported by policies CS1 (spatial strategy) and CS18 (transport). Woking first declared an AQMA in Knaphill in 2014 and a site-specific AQAP was published in July 2015, focussing on upgrading and rephrasing traffic signals at the junction. A second AQMA to the south of Woking town centre was declared in May 2017. Actions to assess air quality in this second AQMA are yet to be published.
- A.1.6. The Woking Local Action 21 (LA21)⁷² is a community-led initiative supported by WBC which has pledged to achieve a “*healthy environment with clean air*” through establishing an air quality information helpline, raising public awareness of air pollution sources and an individual’s responsibility.
- A.1.7. The Surrey Transport Plan (LTP3): Air Quality Strategy⁷³ also identifies road traffic as one of the main contributors to air pollution in Surrey’s AQMAs. This document proposes the identification and enforcement of parking and loading regulations, supporting travel

⁶⁸ Elmbridge Borough Council (2011) Elmbridge Core Strategy. Elmbridge Borough Council: Esher. Retrieved 2017, from <http://www.elmbridge.gov.uk/planning/local-plan/>

⁶⁹ Guildford Borough Council (2013) Local Plan. Retrieved 2017, from <http://www.guildford.gov.uk/newlocalplan/CHttpHandler.ashx?id=1068&p=0>

⁷⁰ Guildford Borough Council (2016) Transport Strategy 2016. Retrieved 2017, from <http://www2.guildford.gov.uk/councilmeetings/documents/s4930/Item%2004%20-%20Guildford%20Borough%20Transport%20Strategy.pdf>

⁷¹ Woking Borough Council (2012) Woking Local Development Framework: Woking Core Strategy. Retrieved 2017, from <http://www.woking2027.info/corestrategy/adoptedcorestrategy.pdf>

⁷² <https://wokingla21.wordpress.com/>

⁷³ Surrey County Council (2011) Surrey Transport Plan: Air Quality Strategy. Retrieved 2017, from https://www.surreycc.gov.uk/__data/assets/pdf_file/0004/29974/Surrey-Transport-Plan-Air-Quality-Strategy.pdf

choices that are beneficial for air quality and the consideration of air quality issues in planning.

A.2. Pollutants

Nitrogen Dioxide

- A.2.1. NO₂ is a secondary pollutant produced by the oxidation of nitric oxide (NO). NO and NO₂ are collectively termed NO_x. Almost a third of the UK NO_x emissions are from road transport. The majority of NO_x emitted from vehicles is in the form of NO, which oxidises rapidly in the presence of ozone (O₃) to form NO₂. In high concentrations, NO₂ can affect the respiratory system and can also enhance the response to allergens in sensitive individuals, whereas NO does not have any observable effect on human health at the range of concentrations found in ambient air. Elevated concentrations of oxides of nitrogen can have an adverse effect on vegetation, including leaf or needle damage and reduced growth. Deposition of pollutants derived from oxides of nitrogen emission contribute to acidification and/or eutrophication of sensitive habitats.

Particulate Matter

- A.2.2. The principal sources of 'primary' polluting particles are combustion processes, which include traffic and industry. Diesel engines produce the majority of particulate emissions from the vehicle fleets. Approximately a fifth of primary PM₁₀ emissions in the UK are derived from road transport. Finer fractions of particulate matter appear to be associated with a range of symptoms of ill health including effects on the respiratory and cardiovascular systems, on asthma and on mortality.

Carbon dioxide

- A.2.3. Carbon dioxide (CO₂) is a greenhouse gas and is used as an indicator of the wider scale, non-local effects of transport schemes. CO₂ does not affect human health at ambient levels and so is not significant as a local pollutant but is important for its national and international role in climate change.

A.3. Defra Background Mapping

- A.3.1. Background concentrations in the study area for 2015 are provided in Table A.1.

Table A.1: Defra background air quality mapping pollutant concentrations for 2015 (µg/m³)

Grid Square x, y	2015	
	NO ₂	PM ₁₀
499500, 162500	14.9	14.4
500500, 163500	15.0	14.4
500500, 162500	15.3	14.8
501500, 163500	16.0	14.8
501500, 162500	15.6	15.0
501500, 161500	16.7	16.7
501500, 160500	15.7	15.0
502500, 166500	25.9	18.2

Grid Square x, y	2015	
	NO ₂	PM ₁₀
502500, 165500	19.3	15.6
502500, 164500	18.6	15.6
502500, 163500	17.5	15.6
502500, 161500	14.6	14.8
502500, 160500	16.0	15.3
502500, 159500	15.7	14.8
503500, 166500	22.6	17.8
503500, 165500	25.5	18.2
503500, 164500	20.4	17.1
503500, 163500	16.4	15.0
503500, 161500	15.8	14.8
503500, 160500	16.1	14.9
503500, 159500	15.0	14.7
503500, 158500	13.1	14.5
503500, 154500	17.3	16.0
504500, 166500	20.7	16.3
504500, 165500	20.0	16.5
504500, 164500	23.1	18.0
504500, 163500	23.7	17.8
504500, 162500	17.5	15.4
504500, 161500	17.2	15.2
504500, 160500	16.3	15.1
504500, 159500	14.2	14.8
504500, 158500	13.0	14.8
504500, 157500	12.4	14.3
504500, 156500	13.9	14.5
504500, 155500	15.7	15.2
505500, 165500	18.6	16.9
505500, 164500	19.1	16.1
505500, 163500	18.2	16.1
505500, 162500	24.7	18.3
505500, 161500	23.9	18.2
505500, 160500	20.8	17.4
505500, 158500	14.0	14.5
505500, 157500	14.0	14.8

Grid Square x, y	2015	
	NO ₂	PM ₁₀
505500, 156500	17.5	16.0
506500, 161500	19.4	16.2
506500, 159500	22.3	17.6
506500, 158500	15.6	14.9
506500, 157500	18.2	16.3
506500, 156500	13.9	15.2
507500, 163500	17.1	15.2
507500, 162500	16.9	15.1
507500, 161500	16.5	15.2
507500, 159500	23.9	18.0
507500, 158500	19.5	16.5
507500, 156500	13.2	15.0
507500, 155500	12.4	14.5
508500, 161500	15.1	14.7
508500, 160500	17.5	16.0
508500, 159500	24.1	17.9
508500, 158500	18.3	16.7
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509500, 162500	14.9	14.5
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509500, 160500	19.4	16.5
509500, 158500	21.4	17.4
510500, 161500	17.3	16.2
510500, 160500	18.4	15.9
510500, 159500	15.3	15.7
510500, 158500	15.6	15.7
510500, 157500	18.7	17.0
510500, 156500	13.5	14.8
511500, 162500	15.0	15.2
511500, 161500	18.3	15.9
511500, 159500	15.2	15.2
511500, 157500	19.4	17.6
512500, 163500	15.8	15.1
512500, 162500	15.4	14.8

Grid Square x, y	2015	
	NO ₂	PM ₁₀
512500, 161500	17.6	15.6
512500, 159500	15.4	15.0
512500, 158500	15.2	15.3
512500, 157500	19.1	17.7
513500, 164500	18.5	15.7
513500, 163500	16.1	14.9
513500, 162500	17.1	15.3
513500, 161500	15.5	14.7
513500, 158500	20.0	17.8
513500, 157500	14.2	15.0
514500, 162500	18.2	15.9
514500, 161500	16.0	14.9
514500, 160500	15.8	14.9
514500, 158500	20.4	17.3
514500, 156500	14.1	14.6
515500, 163500	17.3	15.3
515500, 161500	15.1	14.8
515500, 159500	15.3	14.9
515500, 158500	20.8	17.4
515500, 157500	15.9	15.0
516500, 164500	17.0	15.2
516500, 161500	15.0	14.8
516500, 159500	15.6	15.1
516500, 158500	23.0	18.0
516500, 157500	19.1	16.6
516500, 156500	17.8	15.5

Air Quality Monitoring

Connect Plus Services NO₂ Diffusion Tube Data

- A.3.2. The annual mean NO₂ concentrations for the Connect Plus Services monitoring sites within the air quality study area are shown below in Table A.2.

Table A.2: Connect Plus annual mean diffusion tube monitoring results ($\mu\text{g}/\text{m}^3$)^{74,75}

Site ID	Grid Ref	Sept 2013 - Sept 2014	Sept 2014 - Sept 2015	Sept 2015 - Sept 2016
CP4	506191,159955	32.8	33.4	28.6
CP8	508378,159814	21.3	21.7	28.8
CP9	510561,161143	25.1	28.6	27.3
CP10	505578,161229	22.5	23.9	22.6
CP27	509892,158070	18.5	21.0	20.5

Highways England NO₂ Diffusion Tube Data

A.3.3. Highways England has undertaken a NO₂ diffusion tube survey within the air quality study area over a period of six months, between January and June 2016. The data for the six months in 2016 were annualised for 2015 for use in verification at the Option Selection Stage. The annualisation factor used was 0.97. The annualised mean results were then adjusted using a factor of 0.85 derived from Defra's bias adjustment spreadsheet for diffusion tubes prepared by Gradko using 20% triethanolamine (TEA) in water. The results showed that concentrations were all below the annual mean AQS objective, with the highest concentration of 33.7 $\mu\text{g}/\text{m}^3$ at a site near the A3 south of Burnt Common (HE_7).

Table A.3: Highways England NO₂ Diffusion Tube monitoring data ($\mu\text{g}/\text{m}^3$)

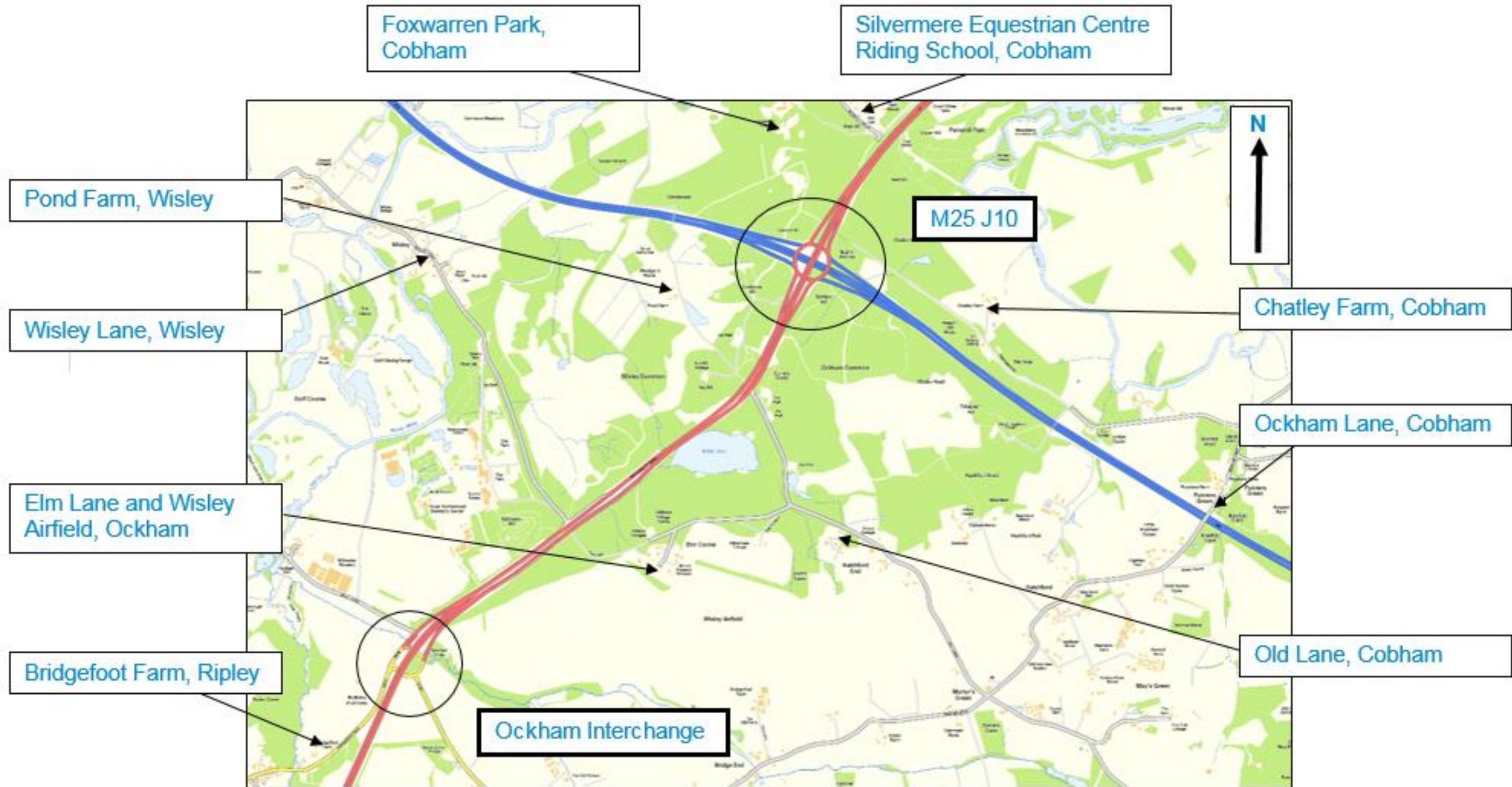
Site ID	HE Site ID	Site Type	X, Y	Unadjusted 2016 average (Jan-Jun)	Adjusted, Annualised 2015
HE_1	M25J10A3_003	Roadside	506541, 158842	19.3	15.9
HE_2	M25J10A3_007	Roadside	505870, 160652	28.8	23.8
HE_3	M25J10A3_002	Kerbside	507841, 158598	37.9	31.3
HE_4	M25J10J16_028	Kerbside	502386, 167101	27.9	23.1
HE_5	M25J10J16_002	Kerbside	503688, 165230	35.0	29.0
HE_6	A3Gui_022	Roadside	504001, 154442	38.0	30.9
HE_7	A3Gui_023	Roadside	504053, 154326	41.4	33.7
HE_8	M25J10J16_001	Roadside	504370, 164047	34.9	28.8
HE_9	M25J10A3_010	Roadside	505442, 161843	24.8	20.5
HE_10	M25J10A3_011	Roadside	505452, 162542	31.5	26.0
HE_11	M25J10A3_008	Roadside	505552, 161219	24.1	19.9
HE_12	M25J10A3_005	Kerbside	506335, 159238	26.7	22.0
HE_13	M25J10A3_006	Kerbside	506271, 160104	27.4	22.6

⁷⁴ Atkins: M25 DBFO: Air Quality Monitoring (Quarter 4). February 2015

⁷⁵ Atkins: M25 DBFO: Air Quality Monitoring, 2014-2015 Annual Report (draft). February 2016

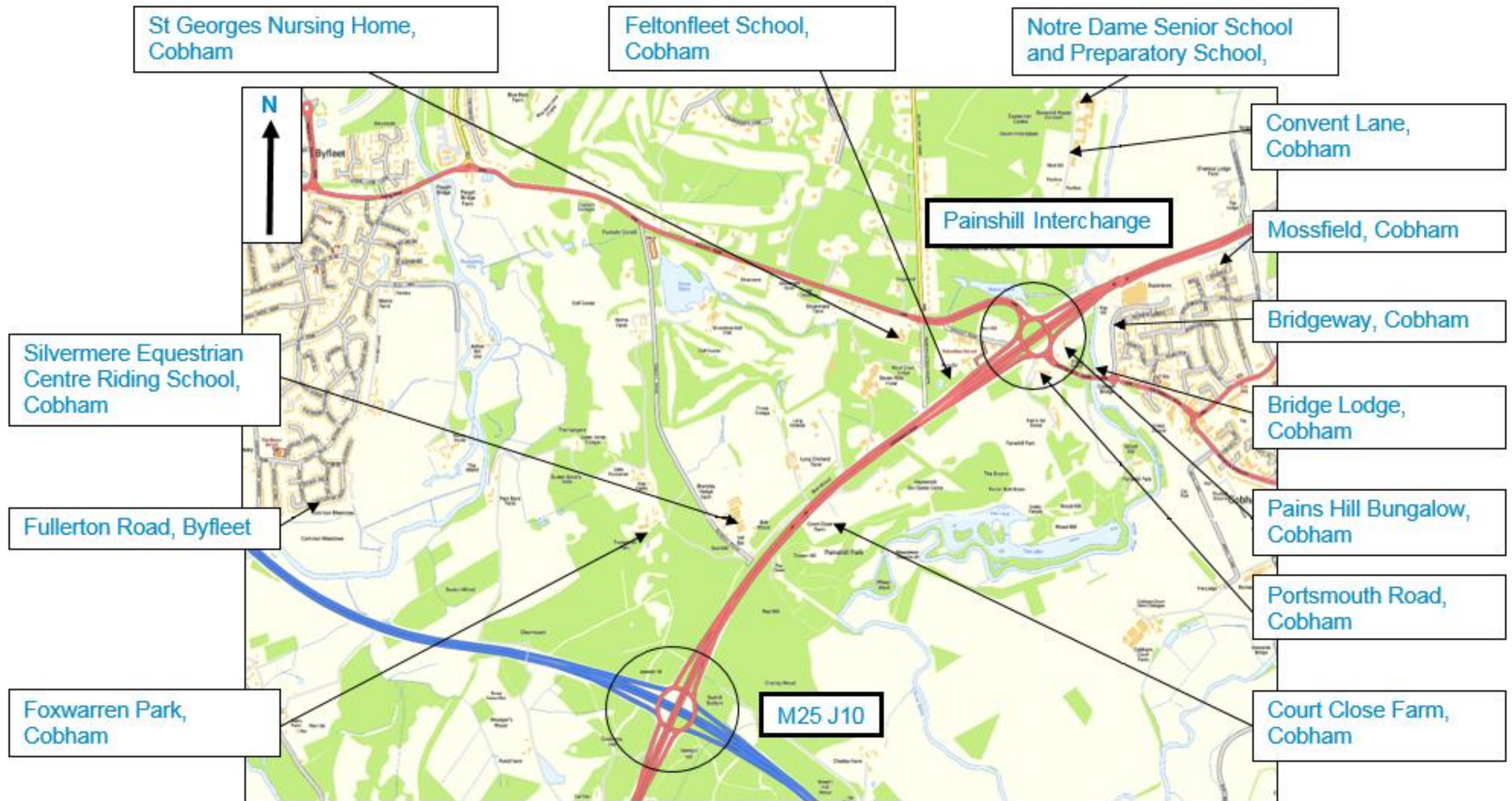
Appendix B. Noise and Vibration Data

Figure B.1: Noise sensitive receptors located south of M25 Junction 10/A3 Wisley Interchange



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Figure B.2: Noise sensitive receptors located north of the M25 Junction 10/A3 Wisley Interchange



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B.1. Baseline Noise Levels

B.1.1. Strategic noise maps were published during 2015 by Defra for both major road and railways sources to meet the requirements of the Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended). The strategic noise maps for road traffic noise during the daytime (07:00-23:00) and night-time (23:00-07:00) periods are shown in below in Figure B.3 and Figure B.4.

Figure B.3: Defra Round 2 Environmental Noise Maps - Road Noise $L_{Aeq,16h}$ (07:00-23:00)

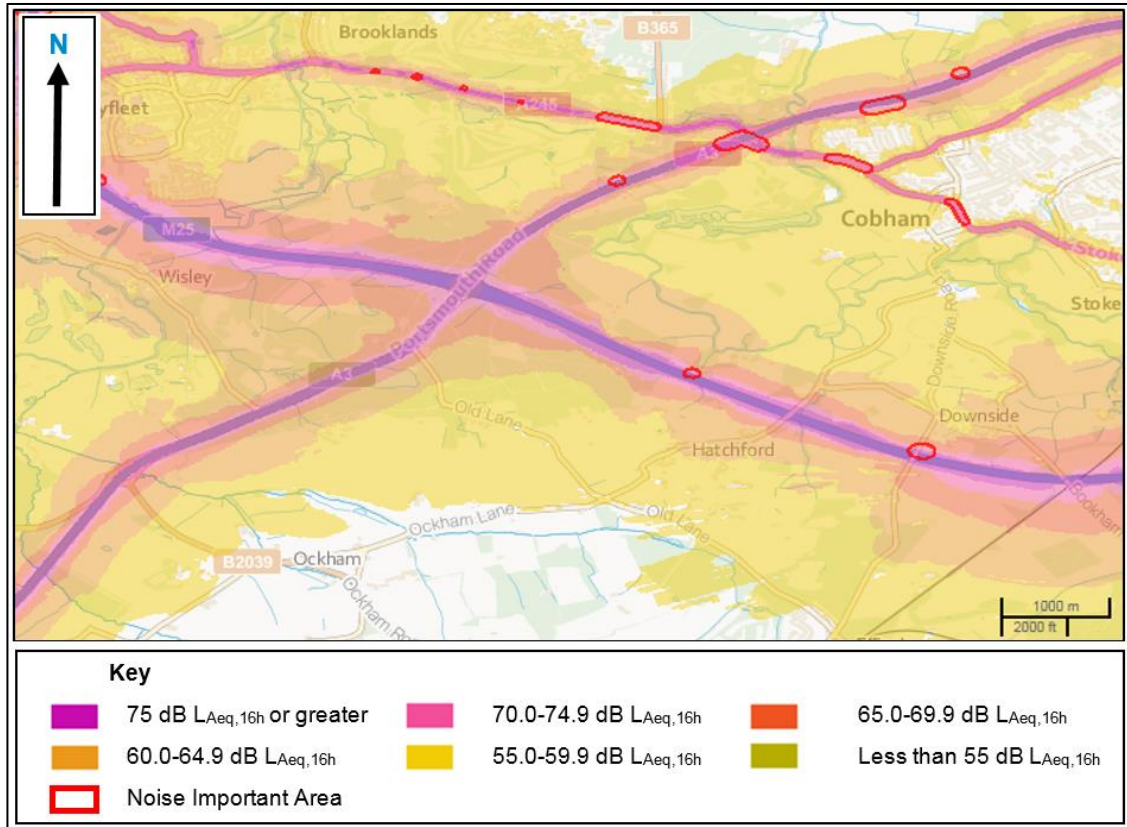
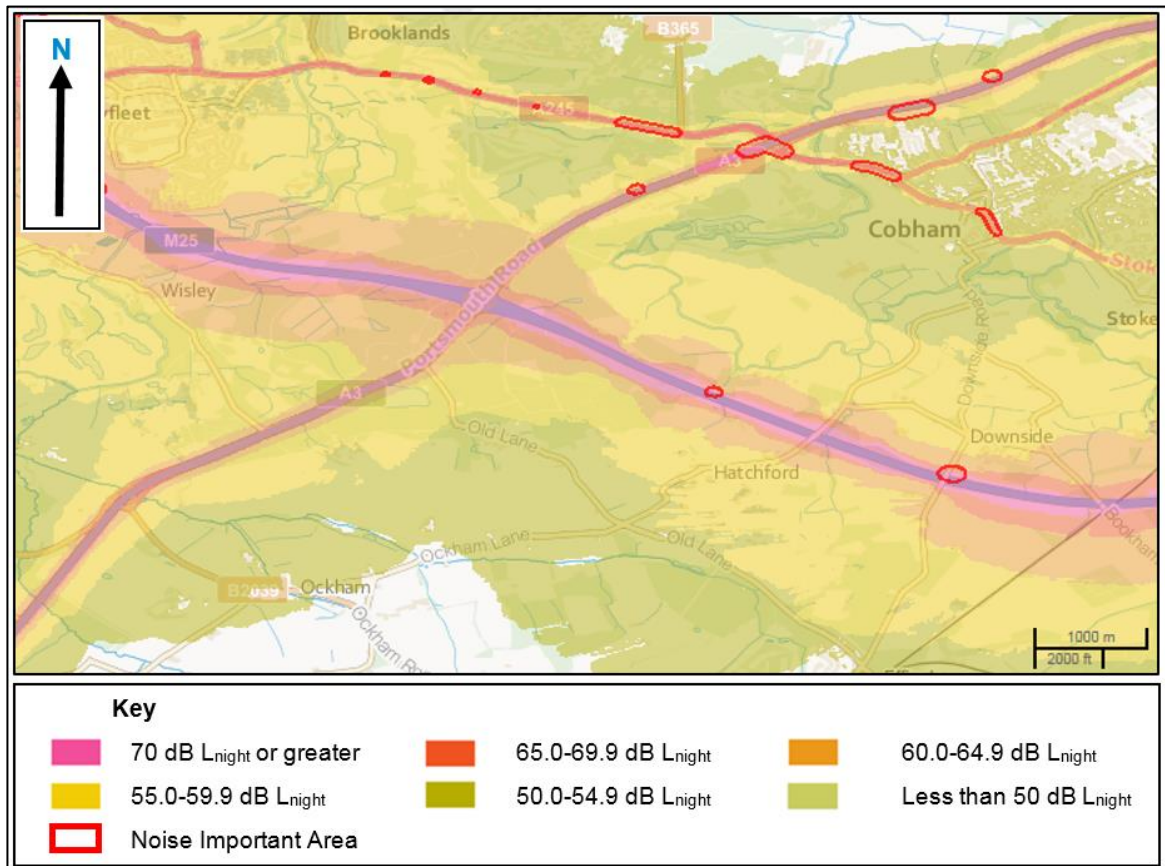


Figure B.4: Defra Round 2 Environmental Noise Maps - Road Noise L_{night} (23:00-07:00)



- B.1.2. The noise levels shown in the strategic noise maps above represent the annual average noise from road sources during 2012 within areas with populations of 100,000 people (agglomerations) and along major traffic routes. The noise levels shown were calculated for a receptor height of 4 m above ground level.
- B.1.3. Important Areas for noise were identified to highlight any particular constraints on the Scheme. Important Areas are the locations where the 1% of the population are affected by the highest noise levels from major roads and railways according to the strategic noise mapping undertaken by Defra.
- B.1.4. The strategic noise maps for road traffic noise indicate that the average noise levels exceed 60 dB $L_{Aeq,16h}$ during the daytime and 55 dB L_{night} at the majority of locations within 600 m of the extents of the Scheme. Areas with higher noise levels are close to the M25 Junction 10/A3 Wisley Interchange, where the land use is mainly rural with isolated buildings.

Appendix C. Ecological Legislation

Table C.1: Summary of relevant nature conservation legislation

Species	Legislation	Offences	Licensing procedures and guidance
Bats European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately ⁷⁶ capture, injure or kill a bat; deliberate disturbance ⁷⁷ of bats; or damage or destroy a breeding site or resting place used by a bat. [The protection of bat roosts is considered to apply regardless of whether bats are present.]	A Natural England (NE) licence in respect of development is required. Guidance documents: <ul style="list-style-type: none"> • NE Standing Advice for protected species 2013; • European Protected Species: Mitigation Licensing- How to get a licence (NE 2013); • Bat Mitigation Guidelines (English Nature 2004); and • Bat Workers Manual (JNCC 2004).
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb ⁷⁸ a bat in such a place.	Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.
Badger	Protection of Badgers Act 1992 (as amended)	Wilfully kill, injure or take a badger; or intentionally or recklessly damage, destroy or obstruct access to a badger sett or disturb a badger in its sett. [It is not illegal to carry out disturbance activities in the vicinity of setts that are not occupied.]	Where required, licences for development activities involving disturbance or sett interference or closure are issued by Natural England (NE). Licences for activities involving watercourse maintenance, drainage works or flood defences are issued under a separate process. Licences are normally not granted from December to June inclusive because cubs may be present within setts. Guidance documents: <ul style="list-style-type: none"> • NE Standing Advice for protected species 2013; and • Badgers and Development (NE 2007).

⁷⁶ Deliberate capture or killing is taken to include “accepting the possibility” of such capture or killing.

⁷⁷ Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong.

⁷⁸ Lower levels of disturbance not covered by the Conservation of Habitats and Species Regulations 2010 remain an offence under the Wildlife and Countryside Act 1981 although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided.

Species	Legislation	Offences	Licensing procedures and guidance
Otter European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately ⁷⁶ capture, injure or kill an otter; deliberate disturbance ⁷⁷ of otters; or damage or destroy a breeding site or resting place used by an otter.	Licences issued for development by Natural England. Guidance documents: <ul style="list-style-type: none"> • NE Standing Advice for protected species 2013; and • European Protected Species: Mitigation Licensing- How to get a licence (NE 2013).
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb ⁷⁸ an otter in such a place.	No licence is required for survey in England. However, a licence would be required if the survey methodology involved disturbance.
Hazel dormouse European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately ⁷⁶ capture, injure or kill a hazel dormouse; deliberate disturbance ⁷⁷ of a hazel dormouse; or damage or destroy a breeding site or resting place used by a hazel dormouse.	A Natural England licence in respect of development is required. Guidance documents: <ul style="list-style-type: none"> • NE Standing Advice for protected species 2013; • European Protected Species: Mitigation Licensing- How to get a licence (NE 2013); and • Dormouse Conservation Handbook (English Nature 2006).
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb ⁷⁸ a hazel dormouse in such a place.	Licence issued for survey and conservation by Natural England.
Water vole	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally kill, injure or take water voles; intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection or disturb a water vole in such a place.	No licence is required for survey in England, unless you are likely to commit an action that is otherwise illegal. There are currently no licensing purposes that explicitly cover development activities or activities associated with the improvement or maintenance of waterways. However when a proposed lawful activity has no opportunity to retain water voles within a development site and their translocation would result in a conservation benefit then a licence from Natural England may be obtained. Guidance documents: <ul style="list-style-type: none"> • NE Standing Advice for protected species 2013;

Species	Legislation	Offences	Licensing procedures and guidance
			<ul style="list-style-type: none"> The Water Vole Conservation Handbook (R. Strachan and T. Moorhouse, Wildlife Conservation Research Unit, 2nd Edition 2006); and Water voles and development licensing policy - NE Technical Information Note TIN042 2008.
Birds	Wildlife and Countryside Act 1981 (as amended) S.1	<p>Intentionally kill, injure or take any wild bird; intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; intentionally take or destroy the nest or eggs of any wild bird.</p> <p>Intentionally or recklessly disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species [e.g. most birds of prey, kingfisher, barn owl, black redstart, little ringed plover].</p>	<p>No licences are available to disturb any birds in regard to development.</p> <p>Licences are available in certain circumstances to damage or destroy nests, but these only apply to the list of licensable activities in the Act and do not cover development.</p> <p>General licences are available in respect of 'pest species' but only for certain very specific purposes e.g. public health, public safety, air safety.</p> <p>Guidance documents:</p> <ul style="list-style-type: none"> NE Standing Advice for protected species 2013.
Great crested newt European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately ⁷⁶ capture, injure or kill a great crested newt; deliberate disturbance ⁷⁷ of a great crested newt; deliberately take or destroy its eggs; or damage or destroy a breeding site or resting place used by a great crested newt.	<p>Licences issued for development by Natural England.</p> <p>Guidance documents:</p> <ul style="list-style-type: none"> NE Standing Advice for protected species 2013; European Protected Species: Mitigation Licensing- How to get a licence (NE 2013); and Great Crested Newt Mitigation Guidelines (English Nature 2001).
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb ⁷⁸ a great crested newt in such a place.	Licences issued for science (survey), education and conservation by Natural England.
Natterjack toad Sand lizard	Conservation of Habitats and Species	Deliberately ⁷⁶ capture, injure or kill it; deliberate disturbance ⁷⁷ of it; deliberately take or destroy its eggs;	<p>Licences issued for development by Natural England.</p> <p>Guidance documents:</p>

Species	Legislation	Offences	Licensing procedures and guidance
Smooth snake European protected species	Regulations 2010 (as amended) Reg 41	or damage or destroy a breeding site or resting place used by it.	<ul style="list-style-type: none"> NE Standing Advice for protected species 2013; and European Protected Species: Mitigation Licensing- How to get a licence (NE 2013).
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb ⁷⁸ it in such a place.	A licence is required from Natural England for surveying and handling.
Adder Common lizard Grass snake Slow worm	Wildlife and Countryside Act 1981 S.9(1) and S.9(5)	Intentionally kill or injure any common reptile species.	<p>No licence is required.</p> <p>However an assessment for the potential of a site to support reptiles should be undertaken prior to any development works which have potential to affect these animals.</p> <p>Guidance documents: NE Standing Advice for protected species 2013.</p>
Rabbits, foxes and other wild mammals	Wild Mammals (Protection) Act 1996	Intentionally inflict unnecessary suffering to any wild mammal.	<p>Natural England provides guidance in relation to rabbits, foxes (which are also protected under the Wildlife and Countryside Act 1981 from live baits and decoys) and other wild mammals, on their website.</p> <p>Lawful and humane pest control of these species is permitted.</p>
Plants Invasive species e.g. Japanese knotweed, giant hogweed, Himalayan balsam	Wildlife and Countryside Act 1981 S.14	It is illegal to plant or otherwise cause these species to grow in the wild.	<p>Any contaminated soil or plant material is classified as controlled waste and should be disposed of in a suitably licensed landfill site, accompanied by appropriate Waste Transfer documentation, and must comply with section 34 of the Environmental Protection Act 1990.</p> <p>Guidance documents:</p> <ul style="list-style-type: none"> The Knotweed Code of Practice (Environment Agency, 2013 version 3); Managing Invasive Non-native Plants (Environment Agency 2010); and Guidance on Section 14 of the Wildlife and Countryside Act, 1981 (Defra 2010).

Site Designation	Legislation	Protection	Guidance
Special Area of Conservation (SAC) Special Protection Area (SPA) Wetland of International Importance (Ramsar site)	Conservation of Habitats and Species Regulations 2010 (as amended). EC Directive on the conservation of natural habitats and of wild fauna and flora (92/42/EEC). EC Directive on the conservation of wild birds (79/409/EEC). Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (the Ramsar Convention).	Assessment of the implications of plans and projects is effected through Part 6 of the Conservation of Habitats and Species Regulations 2010 (in particular Regs 59 - 67). The legislation for the Site of Special Scientific Interest which will underpin each designation also applies. These sites are given protection through policies in the Local Development Plan.	Formal Appropriate Assessment is required to be undertaken by the competent authority before undertaking, or giving consent, permission or other authorisation for a plan or project which is likely to have a significant effect on such a site. Guidance documents: <ul style="list-style-type: none"> The National Planning Policy Framework (DCLG, March 2012), with particular reference to Policy 11. The Government Circular: Biodiversity and Geological Conservation - Statutory Obligations and their Impact within the Planning System (ODPM Circular 6/2005 and Defra Circular 01/2005) (the joint Circular).
Site of Special Scientific Interest (SSSI)	Wildlife and Countryside Act 1981 (as amended)	It is an offence to carry out or permit to be carried out any potentially damaging operation. SSSIs are given protection through policies in the Local Development Plan.	Owners, occupiers, public bodies and statutory undertakers must give notice and obtain the appropriate consent under S.28 before undertaking operations likely to damage a SSSI. S.28G places a duty on all public bodies to further the conservation and enhancement of SSSIs. Guidance documents: <ul style="list-style-type: none"> The National Planning Policy Framework (DCLG, March 2012), with particular reference to Policy 11, and the joint Circular.
Local Nature Reserve (LNR)	National Parks and Access to the Countryside Act 1949 S.21	LNRs are given protection through policies in the Local Development Plan.	LNRs are generally owned and managed by local authorities. Development proposals that would potentially affect a LNR would need to provide a detailed justification for the work, an assessment of likely impacts, together with proposals for mitigation and restoration of habitats lost or damaged. Guidance documents: <ul style="list-style-type: none"> The National Planning Policy Framework (DCLG, March 2012), with particular reference to Policy 11, and the joint Circular.
Local Sites (e.g. Sites of Nature Conservation Interest,	There is no statutory designation for local sites.	Local sites are given protection through policies in the Local Development Plan.	Development proposals that would potentially affect a local site would need to provide a detailed justification for the work, an assessment of likely impacts, together with proposals for mitigation and restoration of habitats lost or damaged. Guidance documents:

Site Designation	Legislation	Protection	Guidance
Conservation Verges)			<ul style="list-style-type: none"> The National Planning Policy Framework (DCLG, March 2012), with particular reference to Policy 11, and the joint Circular.

Habitats and Species	Legislation	Guidance
Species and Habitats of Principal Importance for the Conservation of Biodiversity	Natural Environment and Rural Communities Act 2006 S.40	<p>S.40 of the NERC Act 2006 sets out the duty for public authorities to conserve biodiversity in England. Habitats and species of principal importance for the conservation of biodiversity are identified by the Secretary of State for England, in consultation with Natural England, are referred to in S.41 of the NERC Act for England. The list, known as the 'England Biodiversity List', of habitats and species can be found on the Natural England web site.</p> <p>The 'England Biodiversity List' is used as a guide for decision makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006 to have regard to the conservation of biodiversity in England when carrying out their normal functions.</p> <p>Ecological impact assessments should include an assessment of the likely impacts to these habitats and species.</p>
Biodiversity Action Plan (BAP) Habitats and Species	No specific legislation, unless it is also a species or habitat of principal importance as described above.	<p>The Biodiversity Action Plan (BAP) is the UK's initiative to maintain and enhance biodiversity in response to the Convention on Biological Diversity signed in 1992.</p> <p>The UK BAP was used to draw up the 'England Biodiversity List' and has been succeeded by the UK Post-2010 Biodiversity Framework in 2012, due to a change in government strategy by all UK countries, focussing on managing the environment as a whole rather than dealing with different aspects of biodiversity and environment separately. However, the UK BAP list of priority habitats and species continue to be regarded as conservation priorities in the UK Post-2010 Biodiversity Framework (JNCC and Defra 2012).</p>
Hedgerows	The Hedgerows Regulations 1997	Under the regulations, it is against the law to remove or destroy certain hedgerows without permission from the local planning authority in Wales. In general, permission will be required before removing hedges that are at least 20 m in length, over 30 years old and contain certain species of plant. The local planning authority will assess the importance of the hedgerow using criteria set out in the regulations.

Appendix D. Soils and Geology

Table D.1: Classification of Probability

Classification	Definition of the Probability of Harm/Pollution Occurring
High Likelihood	The contaminant linkage exists and it is very likely to be realised in the short term, and/or will almost inevitably be realised in the long term, and/or there is current evidence of it being realised.
Likely	The source, pathway and receptor exist for the contaminant linkage and it is probable that this linkage will be realised. Circumstances are such that realisation of the linkage is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	The source, pathway and receptor exist and it is possible that it could be realised. Circumstances are such that realisation of the linkage is by no means certain in the long term and less likely in the short term.
Unlikely	The source, pathway and receptor exist for the contaminant linkage but it is improbable that it will be realised even in the long term.

Table D.2: Classification of Consequence

Classification	Definition of Consequence
Human Health Receptors - Site End Users	
Severe	Acute damage to human health based on the potential effects on the critical human health receptor.
Medium	Chronic damage to human health based on the potential effects on the critical human health receptor.
Minor	Minimal short- term effects on human health based on the potential effects on the critical human health receptor.
Negligible	No appreciable impact on human health based on the potential effects on the critical human health receptor.
Controlled Water Receptors	
Severe	Pollution of a principal aquifer within a source protection zone (inner and outer) or potable supply characterised by a breach of drinking water standards. Pollution of a surface water course characterised by a breach of an EQS at a statutory monitoring location or resulting in a change in GQA grade of river reach. Discharge of a List I or List II substance to groundwater.
Medium	Pollution of a principal aquifer outside a source protection zone (inner and outer) or a secondary A aquifer characterised by a breach of drinking water standards. Pollution of an industrial groundwater abstraction or irrigation supply that impairs its function. Substantial pollution but insufficient to result in a change in the GQA grade of river reach.
Minor	Low levels of pollution of a principal aquifer outside a source protection zone or an industrial abstraction, or pollution of a secondary A or B aquifer. Low levels of pollution insufficient to result in a change in the GQA grade of river reach, pollution of a surface water course without a quality classification.
Negligible	No appreciable pollution, or pollution of a low sensitivity receptor such as a secondary (undifferentiated) aquifer or a surface water course without a quality classification.
Ecosystem Receptors	
Severe	For sites with designations as follows - Site of Special Scientific Interest, National Nature Reserve, Special Protection Area (and potential sites), Special Area of Conservation (and candidate sites) or Ramsar. Irreversible adverse change in the

Classification	Definition of Consequence
	functioning of the ecological system or any species of special interest that forms part of that system.
Medium	For sites with designations as follows - Site of Special Scientific Interest, National Nature Reserve, Special Protection Area (and potential sites), Special Area of Conservation (and candidate sites) or Ramsar. Substantial adverse change in the functioning of the ecological system or any species of special interest that forms part of that system.
Minor	Harm to ecosystems of a low sensitivity such as sites of local importance. No appreciable harm to ecosystems with statutory designations.
Negligible	Limited harm to ecosystems of low sensitivity such as sites of local importance.
Property Receptors - Buildings, Foundations and Services including the operational HS2 scheme	
Severe	Collapse of a building or structure including the services infrastructure from explosion.
Medium	Significant damage to a building or structure including the services infrastructure impairing their function.
Minor	Damage to buildings/structures and foundations but not resulting in them being unsafe for occupation. Damage to services but not sufficient to impair their function.
Negligible	No appreciable damage to buildings/structures, foundations and services.
Property Receptors - Grade 1 Agricultural land	
Severe	Substantial loss in the value of crops or domestically-grown produce resulting from disease, death or other physical damage. Death to livestock, domesticated animals or wild animals subject to shooting or fishing rights.
Medium	Substantial diminution in yield of crops or domestically-grown produce resulting from disease, death or other physical damage. Serious disease or other serious physical damage to livestock, domesticated animals or wild animals subject to shooting or fishing rights.
Minor	Harm to crops but not resulting in a substantial loss in value or diminution in yield. Limited harm in terms of disease or other physical damage to livestock, domesticated animals or wild animals subject to shooting or fishing rights.
Negligible	No appreciable harm, or harm to a low sensitivity receptor.

Appendix F. Gazetteer of Heritage Assets

Table F.1: Designated Heritage Assets

Reference (NHLE)	Name	Description
1005923	Late Roman bath house at Chatley Farm	<p>Scheduled Monument. A Roman bath house, on the left bank of the River Mole at Chatley, 360-320 AD.</p> <p>Excavation by S S Frere in 1942 showed four rooms, a stoke hole and furnace. The remainder of the building had been destroyed by river erosion.</p> <p>A subsequent field survey by members of Surrey Archaeological Society revealed concentrations of Roman material originating from the bath house. There was no other indication of further buildings being present, thus confirming earlier conclusions that any villa is likely to have been washed away by the action of the nearby river. Apart from material of the Roman period, there were two concentrations of probable Mesolithic burnt and worked flint, a badly damaged barbed-and-tanged arrowhead, a few sherds of prehistoric pottery, one sherd of medieval pottery, and various post -medieval and modern finds.</p>
1007905	Hengi-form monument at Red Hill	<p>Scheduled Monument. The monument includes an oval enclosure, 40 m long by 35 m across, identified as a hengi-form monument, situated on the crest of a rise in an area of undulating Greensand. The enclosure has a flat interior, which is slightly lower than the surrounding ground level, 19 m long and 15 m wide and defined by a bank and inner ditch. The ditch, although partially infilled, survives 5 m wide and 0.5 m deep while the bank is 4.5 m wide and up to 0.5 m high. The entrance to the enclosure, situated in the north-eastern quadrant, is no longer visible as this area has been disturbed by later quarrying activity. Remote sensing surveys carried out since the 1970s have located a number of anomalies in the interior of the enclosure which have been interpreted as possible graves.</p>
1012204	Bell barrow on Cockcrow Hill	<p>Scheduled Monument. A large bell barrow, 42 m in diameter, 3.3 m high, is situated upon the top of a rise of ground on heathland. The mound is tree covered, and has been eroded away in part by footpaths, but is otherwise in fairly good condition.</p> <p>Excavation in 1911 yielded an unaccompanied cremation two feet below the top of the mound. The excavator reported: "<i>Last excavations at Cockcrow, my nephew and self who got down to 9ft depth, then came upon some charcoal and some disintegrated fragments of bone, were fainthearted after reaching that depth.</i>"</p>
1012205	Bowl barrow west of Cockcrow Hill	<p>Scheduled Monument. A possible round barrow, 30 m in diameter and 1 m in height, is situated upon a slightly elevated position on Wisley Common. Without excavation, there must remain some doubt about this feature as it occurs on sandy heathland, where such mounds are not common.</p>
1029368	Elm Tree House	<p>Grade II Listed Building. House. Late 16th century, extended to rear in 19th century and restored in 20th century. Timber framed clad in whitewashed render, with decorative incising. Plain tiled roof with band of fish scale tiles to eaves courses. 2 storeys and attic in gable to right. Leaded casement fenestration, 4 windows on first floor; and 4 on ground floor left, larger, two glazing bar sashes to ground floor right. Glazed door to right of centre in tent roofed porch, open, on</p>

Reference (NHLE)	Name	Description
		wooden supports. Rear stack rebuilt, to left of centre and corbelled end stack to right. Interior: Substantial amounts of framing visible.
1029369	Ryde House	Grade II Listed Building. House. Circa 1774 extended to right and rear in 19th century. Dun coloured brick with red brick dressings and angle quoins to front, red brick return walling; hipped plain tiled roofs. Two storeys with stone-coped parapet obscuring part of the roof. Two end stacks to left and right. Symmetrical 3 bay façade with 3, 12-pane glazing bar sash windows under gauged brick heads and wooden canopies to first floor. Two ground floor casement doors. Fine central 6-panelled door under ogee tracery fanlight in pedimented porch. Acanthus leaf Adamesque capital to columns with paterae and fluted, dentilled entablature. 19th century extension in similar style set back to right with greenhouse to ground floor front. Right hand return front: dentilled eaves and 3 eaves dormers.
1029370	Foot Bridge House	Grade II Listed Building. House. 17th century with early 19th century extensions. Timber framed exposed to rear left with whitewashed brick infill, whitewashed roughcast cladding to front under plain tiled roofs. Originally Half -H shape house with centre recess filled in early 19th century. Outer gabled bays 2 storeys with attics, that are to the left blocked, false window painted in. Symmetrical façade with central bowed bay, arched glazing bar sashes to outer bays on first floor. Central first floor casement. Outer ground floor 12-pane glazing bar sash windows. Central half-glazed door with flanking casements on sides of bow in moulded wood surround with corner rosettes and flat roof over. End stacks to right set back, rear stacks to left.
1029371	Yew Tree House	Grade II Listed Building. House. Late 18th century, possibly with older core. Brick to rear, some blue headers on right hand return wall, with colour washed, incised stucco to centre of front, colour washed brick to left. Hipped slate roofs to front with hipped and gabled plain tiled roofs to rear. Two storeys on plinth with deep-bracketed eaves. Two end stacks to right and end stack to left at junction with extension. Two, 12- pane glazing bar sash windows in architrave frames to first floor, 2 below. 4-panel door in moulded surround with corner rosettes under braced flat hood. 1 sash window and further door to left hand extension. Single storey extension to right with one large sash window. Range to rear with replacement sash windows.
1029373	Sage Antiques The Green Cottage	Grade II Listed Building. House, now divided and part shop. Mid-18 th century. Colourwashes brick with hipped plain tiled roof. Two storeys with brick modillioned eaves. Larger stack to left on ridge, ridge stack to right of centre. Irregular front with one 19th century glazing bar sash window to first floor left, four 18th century glazing bar sash windows to first floor right. Two round, bowed, glazing bar shop windows to ground floor left and right of centre, casement window to right end. Half glazed door under transom light and flat wooden braces to right (The Green Cottage). Similar half-door under flat hood, in panelled strip surround to left (Sage Antiques).
1029402	Walls and Gates to Ockham Park	Grade II Listed Building. Walls and gates to Ockham Park. Late 19th century. Red and blue brick walls under stone finials and wrought iron gates between. Flanking walls on quadrant, curved, plan with square end piers, decorated with banded rustication under stone. Lion finials. Corbelled coping to walls which stand on offset plinth decorated with terracotta roundel bands, each wall contains a 22 arch, round-arched, arcade. 9ft high, square, piers to centre topped

Reference (NHLE)	Name	Description
		with lions, flanking double iron gates with scroll decorations on standards. Spear decoration to double gates with roundel bands on top and bottom.
1029404	Bridgefoot Farmhouse	Grade II Listed Building. House. Mid-17 th century, extended in 19 th century and 20 th century. Timber core with red brick cladding under plain-tiled roofs. T-shaped plan with wing to rear at right angles to front. 2 storeys and attic under gabled dormer to left of centre, rear ridge stack to left and two diagonal, rear ridge stacks to right. Irregular fenestration with evidence of older, blocked, windows. Two windows to first floor and 3 windows below under cambered heads. Two storey, gabled porch projecting to centre with one first floor casement window and an arched, 4-centre, opening below to planked door. Further doors to right hand return front on rear wing.
1029405	Barn, 30 metres north-east of Bridgefoot Farm House	Grade II Listed Building. Barn. 17 th century, altered and restored in 19 th century and 20 th century. Timber framed on brick plinth with some weatherboard cladding to right and brick cladding to centre and left. Fine, plain-tiled roof, stepped on north side. Two, 3-bay barns end to end under common roof. The Western Barn (to the left) of 3 unequal bays with aisles and wain doors to both sides of centre bay, that to south (road) side, under hipped roof. Interior: Windbracing to end bay of western barn, Queen strut roof to end bay of eastern barn.
1030053	Foxwarren Cottage	Grade II Listed Building. Estate cottage. c. 1860 with late 20 th century additions. By and for Charles Buxton, supervising architect F. Barnes. Red brick in header bond with contrasting black brick headers forming diaper pattern; moulded terracotta dressings. Plain tile roof with decorative bands of pointed and fishscale tiles and crested ridge tiles. In Jacobethan style having chamfered plinth; pointed arched entrance; windows with moulded mullions, segmental-headed lights, vertical glazing bars, some diagonally-leaded lights, and hoodmoulds with decorative stops; brick corbels below coggled eaves; steeply-pitched gables with gabled crowsteps; large central chimney with coggled band below 6 clustered octagonal flues with cornices and replacement terracotta pots. The additions are in matching style. Irregular plan of one storey with attic. Entrance (south) elevation of 2 bays. Left-hand bay has porch on left and 3-light window with 2-light gabled dormer over; the porch and dormer have cusped bargeboards. On right is projecting gabled bay with a 4-light window to ground floor, 2-light window above, and quatrefoil in gable. On right of this projecting bay, in angle with spine range is added porch. Rear: as front, but the "porch" on left instead of a door has a pointed arched recess containing blind, stepped slits. Attached to right end is low single-storey L-shaped range (which returns parallel to the cottage). Right return: 6-light window with 3-light window above and quatrefoil to gable. The added porch has a decorative iron gate Left return: on ground floor, corbelled hipped-roofed 4-light oriel window with 2-light window above and quatrefoil in gable. Late 20 th century single-storey addition adjoins cottage on left.
1030122	Chestnut Lodge	Grade II Listed Building. House. c1830. Rendered with hipped slate roof and end stacks under moulded tops. Rectangular. 3 bays to front and 4 bays deep. Deep eaves with paired brackets and quoined ends. Tripartite sash windows in projecting architrave surrounds with

Reference (NHLE)	Name	Description
		cill brackets to first floor. Ground floor windows under flat hoods on scroll brackets. Central 4 panel door with upper, arched, panels glazed in flat roofed porch with Doric pilaster/piers to either side and gabled parapet above. 20th century flat roofed, 2 storey addition to right hand side with centre arch to ground floor. Left hand return front: 4 bays under pediment hoods to ground floor centre windows, angle bay to right. 20th century extension to rear.
1030125	The Mausoleum	Grade II Listed Building. Mausoleum. Mid-late 18th century. Brick, partly ashlar faced and partly rendered, originally on a triumphal arch design with centre arch, now collapsed, and side arches under round heads. In ruinous condition at time of re-survey.
1030126	The Water Wheel	Grade II Listed Building. Water wheel. c. 1830 by Bramer and Co. Timber frame on brick plinth with weatherboard wall and pentice roof to rear, now collapsed. Cast iron upright water wheel, c20 feet in diameter with spindle and gear wheels to rear including cast iron beams.
1030133	Belfry House Stable Cottage	Grade II Listed Building. Former stable block now divided. Early 19th century. Whitewashed brick with plain tiled roofs, hipped to right end. 2 storeys to the right, 1 storey and attic to the left under 7 hipped eaves dormers to left, projecting range to right. 5 windows across the first floor including 3 glazing bar sash windows to left and 2 20th century bow windows to ground floor left and casement window with flat hood on brackets over to right. 4-centred arched plank door to left side. 7 bay range set back to left with 6 panelled door to right of centre in pedimented porch with 2 Ionic columns. Square clock tower to centre of roof on rusticated podium with open cupola and weathervane above.
1030140	Hatchford Park School	Grade II Listed. House, now school for disabled. Original house of 1850 encased and remodelled in c1890 by Rowland Plumbe. Red brick with tile hanging and half-timbered gables with rendered infill above. Plain tiled roofs with tall star shaped stacks to ends and centre. Rectangular. 2 storeys over basement with 2 attics under hipped roofed, leaded casement dormers. Symmetrical 5 bay front with end and centre bays gabled. Mullioned and transomed leaded fenestration, 8 windows across the first floor with large stepped staircase window to left of centre and angle bay windows to outer bays of first floors. Stone surround to centre half-glazed doors with Jacobean style piers to either side. Large flat wooden hood over centre ground floor with 3 wrought iron hangers. Garden Front: similar but with central bowed bay rising to conical roof. Interior: some panelling remains, a little plasterwork of the older house survives. Large square Jacobean style staircase survives.
1030141	Entrance Wall, Pavilions and Gates to Hatchford Park School	Grade II Listed Building. Entrance walls, gates and pavilions. c. 1890. Rubblestone with dressed stone piers and iron gates. Square single storey end pavilions c40 yards apart under stone square, ogee dome roofs with finial corner Doric pilasters with obelisk finials above. Arched entrances to sides facing house. Stone balustrade on dado wall linking pavilions with central paired gate piers approximately 10 feet high. Square panelled armoured bust finials above with feathered crests on four-legged scroll feet. Central paired C-scroll iron gates c10 feet high.
1030254	Lodge, 15 yards east of Feltonfleet School	Grade II Listed Building. Lodge. Circa 1860 with 20th century extensions. Red and blue diaper pattern brick, plain tiled roof with ridge cresting. Large multiple ridge stack with 3 diagonally placed shafts. 1 storey, curved bargeboard gable-front to right with pentice

Reference (NHLE)	Name	Description
		roof angle bay casement window. Bay set back to left under pentice roof extension of main roof, planked door in right hand wall, similar bay set back to right.
1188416	Millstream House Ockham Mill	Grade II Listed Building. Mill house with mill attached. 19th century, mill, dated 1862, and built in a neo-Norman style. Red and brown brick with yellow brick dressings, glazed brick decorations to mill, brown brick to Millstream House. Slate roof under ridge cresting on mill, plain tiled roof over house.
1188497	Nos 1 and 2 Bridgefoot Farm Cottages	Grade II Listed Building. House, now divided. 17th century. Timber framed, underbuilt in red and blue brickwork in chequer work pattern, part colour washed, on rendered plinth, club pattern tile hanging above. Plain tiled, half -hipped roof. T-shaped plan with wings at right angles to rear. Two storeys with end stacks. Two 3-light casement windows on the first floor, part leaded with two, 2-light ground floor casements below. Central door under hipped hood on curved braces. (No. 2) with further door to right hand return front of rear wing (No. 1). Single storey brick stable wing extending to right of rear wing.
1188506	Gates and Gate Piers/Walls to Ockham Park	Grade II Listed Building. Gates and walls. Late 19th century. Brown brick walls with iron gates on half oval plan. Walls approx. 7-foot-high with plat band and brick corbel coping to top. Gates to centre of flanking rails with open standards approx. 7-foot-high under urn finials. Side gates with roundel band decoration to top and bottom, similar pattern on central, double gates with additional semi -circular pattern bracing. Included for group value.
1188563	Talbot Cottage	Grade II Listed Building. Cottage. Early 17th century (circa 1630) timber framed - exposed to right hand return front, clad in whitewashed brick to front, rendered cladding and infill to left hand return front; plain tiled roof. Two storeys on plinth with plat band over ground floor and brick dentilled eaves. Ridge stack. One 3-light, diamond-pane window on each floor with shutters. Wing at right angles to rear with one casement on each floor. 20th century single storey wing to rear with ribbed door to right on porch recess.
1188574	Barn across rear of The Talbot	Grade II Listed Building. Barn, now store. 17th century. Red brick in rat-trap bond with hipped plain tiled roof. Rectangular. One window to each end with open bay to centre. Wall extending to rear of barn in similar band with D shaped coping. Circa 70ft long.
1189118	Royal Horticultural Society Offices, Wisley Gardens	Grade II Listed Building. Offices. 1914 by Imrie and Angell in picturesque Vernacular style. Brown brick plinths, timber framed above with render infilling, some decorative brick and tile infilling and weatherboard cladding to projecting bays, plain tiled roofs, hipped and stepping down to ends. Two storeys and attics under two, hipped roof, leaded, casement dormers. Massive stacks; one square end stack to left, decorative half- octagonal end stacks flanking central square stack on ridge plinth to left of centre with further stack to centre and a fine front stack to right with offsets to right side and four round shafts under offset tops. One arched panel on shaft of stack. 2 casement windows to first floor right, one either side of stack, and one mullioned and transomed window to ground floor in wooden frame. Large, two storey, hipped roof projecting bay to right of centre with continuous mullioned and transomed glazing on the first and ground floors, the upper lights diamond-paned and continuing on return fronts of the first floor. Similar hipped bay projecting to left. Two first floor and one large, 7-

Reference (NHLE)	Name	Description
		light, ground floor windows between left hand bay and the central, gabled, entrance bay. Mullioned and transomed leaded casement on first floor over arched panelled door on ground floor in splay-sided brick surround under a 5-step, arched head. Lower range to left end with one 6-light and one tall, narrow, 9-light (3 x 3) window to first floor over two, 4-light, ground floor windows.
1191624	Old Cottage Post Boys	Grade II Listed Building. Cottage row. Early 18th century stack to right. 2 storeys with brick band over ground floor and brick dentil eaves. 5 casement windows across the first floor, ground floor windows to right under gauged brick heads, windows to left under cambered heads. Half-glazed door to left (Post Boys) under flat porch hood on scroll brackets. Half glazed double doors to right (Old Cottage) in 20th century gabled brick porch. 2 wing to rear at right angles to front. Wing to left, tile hung with hipped roof. Wing to right 20th century.
1191776	The Old House Vine House	Grade II Listed Building. Office terrace. Late 18th century. Yellow stock brick with plain tiled Mansard roof. End and centre stacks. 2 storeys and attic under flat roofed dormers. 8 bays, outer bay set back to ends, with dentilled eaves. Glazing bar sash windows under gauged brick heads, ground floor bow windows in 2nd, 4th, 5th and 7th bays. 12 panel door and fanlight in 3rd bay to left. (No.39) with deep panelled reveal and open pediment surround on Doric pilasters, approached up a flight of 4 stone steps. Similar 10 panel door with fanlight in 6th bay to right of centre (No.41). Further glazed office window and door to right end.
1191800	The Round House	Grade II Listed Building. Former outbuilding, now house. Late 18th century. Whitewashed brick with hipped slate roof and central ridge stack to front. Built around a near circular courtyard. Single storey with angle bay to left of centre on north side, and bay set back to left end. Six 4-centred arched windows to front with "Gothick" decorative glazing bars. 4-centred arched, planked door to left behind angled porch hood on 2 columns with fluted pilasters to walls. Glazed extension to right end. Around the inside is a veranda on wooden posts.
1191810	Westwood House (east) and West Lodge to Painshill House, including Gate Piers	Grade II Listed Building. Lodges. Circa 1800. Rendered with hipped slate roofs, rendered stacks to centre and front. T-shaped with outer gable front bays on left of east lodge and right of west lodge. 2 storeys with string course over ground floor and deep bracketed eaves. 2 sash windows across first floor of inner faces of lodges, glazing bar sash windows to the rear. Doors to lodges in centre of inner side facing each other in arched recess breaking up into centre of first floor. Street fronts: one arched niche to centre of front of each lodge containing garlanded urn on pedestal, apron moulding above with East and West lodge inscribed on them. Rusticated square gate piers attached and between lodges, c.8 feet high with oval paterae to frieze, cast iron railings and gates between.
1286910	Chatley Farm House	Grade II Listed Building. House. 16th century with 18th century front. Timber framed core, red and blue brick on rendered plinth to front, boarded eaves to plain tiled roof, hipped to left, with ridge stack to right end and multiple ridge stack and end stack to left. Oversailing gable to centre. 2 storeys with plat band over ground floor right, projecting wing to left end. 3 casement windows across the first floor

Reference (NHLE)	Name	Description
		to right, planked door to lobby entrance at right end. Further door under flat leaden porch hood on brackets to right of centre. Single weather boarded extension to right and containing further planked door. 2 gable front wings at right angles to rear. Interior: framing visible in ground floor rooms to left, mainly on the ceilings with stop chamfered centre joist.
1286954	Remains of Grotto and Rockwork Bridge on Grotto Island	Grade II Listed Building. Grotto and bridge. Late 18th century. Brick walls with boulder and shell covering, tufa and Derbyshire spa stone to interior. Circular, originally domed, roof now collapsed with 3 arched entrances to lake front. Tunnel to left leading to arched rockwork bridge over an arm of the lake, landing stage below.
1294963	Feltonfleet School	Grade II Listed Building. House, now school. Circa 1860 possibly designed by Charles Buxton and executed by Frederick Barnes. Red and blue diaper patterned brick, plain tiled roofs with tall multiple star shaped stacks with terracotta chimney pots. In Foxwarren style. 2 storeys and attic in 3 crow-stepped gables to front, diagonal brick string course on brick corbels over ground floor. Mixed fenestration with different window designs: arched casement windows to gables under hood mouldings, 3-light, cusped head windows in gauged and rubbed brick surrounds with flat drip moulds over to first floor, 5 and 4-light windows to ground floor. Arched plank door with strapwork hinges to left of centre in gabled brick porch with moulded bargeboards. Triangular transom light above the door. 20th century gabled bays to left end, arched porch recess to ground floor. Large 20th century wing to rear left with hipped roof dormers. Rear: 3 square and angle bays to ground floor, similar windows to front. 2-storey wing to right.
1365888	Service Courtyard to Hatchford Park School	Grade II Listed Building. Stable court. 1890 by Rowland Plumbe. Red brick and tile hung with plain tiled hipped roofs. Pavilion to right, tall stacks to ridges. Built around a courtyard with a screen wall to front, rear range and end wings. Single storey pavilion to right, 2 storeys to remainder. Leaded casement windows, 5 across the first floor of the rear range. Central door to rear and on side of pavilion. Square clock tower with obelisk roof and crowning weathervane to top of pavilion, two louvred ridge turrets to rear range. Screen wall across the front with quadrant end walls and arched, pedimented centre gateway. 1890 in brick cartouche to pediment.
1377487	Entrance Lodge to Chestnut Lodge	Grade II Listed Building. Entrance lodge. C.1830. Stucco with slate roof, stacks to rear right and to left side. T shaped plan. Single storey with 1 glazing bar sash window to each side. Part glazed door to left in slate roofed gabled porch. 20th century flat roofed additions to rear. Included for group value only.
1377488	Cobham Bridge	Grade II Listed Building. Bridge. 1792, parapets rebuilt in 1914. Red brick with stone coping and pontoons. 9 arches with blue brick edging and roundels in the spandrels. Stone string course above the arches with 2 circular squinches either side of the central arch on tapering supports with sphere corbels. 20th century parapets approximately 4 feet high with inscribed plaque on the south wall
1377829	Former Service Buildings to right of Ripley House and Little Ripley House Little Ripley House	Grade II Listed Building. House, extended and divided. Early 18th century to centre, 19th century extensions to ends; 20th century to left. Original red brick now clad in colour washed roughcast. Hipped main roof obscured by parapet; lower slate roofs, hipped, over extensions. 2 storeys with plinth and plat band over ground floor and

Reference (NHLE)	Name	Description
	Ripley House	end piers; string course to base of parapet on centre, deep eaves to left hand extensions. Rendered stack to left of main block, stacks to rear. 7 bays to centre with outer windows on both floors blocked. 4, 12-pane glazing bar sash windows to first floor with gauged brick aprons below, now painted over. Central, smaller sash to first floor. Three glazing bar, ground floor, sashes. Half-glazed door to right. Central part-glazed door in projecting rendered surround and flat roofed dentilled porch with drum pillars. Former service buildings to right set back, 18th century and 19th century with hipped plain tiled roofs, parallel range. Mixed irregular fenestration of sashes and casements.
1377830	J Hartley Antiques Limited	Grade II Listed Building. House, now shop. Circa 1700 extended to left in late 20th century. Red and blue brick with plain tiled roof, hipped with red brick extensions. Two storeys. 7 "cross" leaded, mullion and transomed casements to first floor, large 19th century angle bay shop window to ground floor left. Smaller angle bay shop front to ground floor right. Half glazed panelled door under transome-light in moulded surround with corner paterae between shop windows. Further half-glazed door to left of centre. 20th century extension projecting to left end with garage doors and four "cross" windows above. Recessed porch to right end and one brick pier with pointed arched door.
1377855	Water Tower in Foxwarren Park	Grade II Listed Building. Water tower. C.1860 by Frederick Barnes of Ipswich for Charles Buxton. Polychrome brickwork, roof low pitched and obscured. Square, c.20 feet high with 3 stages, angle clasping buttressing to lower two stages. Elaborate terracotta string courses between stages and to top with two blind panels on top stage. Round arched door to centre of ground floor in stepped brick and terracotta surround.
1393787	Millwater	Grade II Listed Building. House, formerly farmhouse. Circa 1600 lobby entrance house refronted in 18th century. In the early 20th century after 1917 and before 1925, the architect Leonard Stokes (1858-1925) built a river room to the west and staircase tower for his brother Sir Wilfrid Scott Stokes (1860-1927). 21st century extensions to the north and attached 19th century open-fronted cart shed to the east are not of special interest.
1000125	Painshill Park	Grade I Registered Park and Garden. Landscaped pleasure grounds and park laid out between 1738 and 1773 by the Hon Charles Hamilton.
1000126	Royal Horticultural Society's Gardens, Wisley	Grade II* Registered Park and Garden. Experimental wild gardens laid out by G F Wilson from 1878 to 1902 and acquired by the Royal Horticultural Society in 1903, and further enlarged and developed since then.
N/A	Ockham Mill	Conservation Area.
N/A	Ripley	Conservation Area.

Table F.2: Non-Designated Heritage Assets

Reference (HER)	Name	Description
N/A	Ripley AHAP	AHAP. Ripley Historic Core
N/A	Buckingham Lodge AHAP	AHAP. No information given in HER

Reference (HER)	Name	Description
N/A	Ockham Common AHAP	AHAP. The area surrounds a possible round barrow (MSE495) and is located along the parish boundary.
N/A	Foxwarren AHAP	AHAP. The area surrounds a possible bowl barrow and is located along the possible route of the London to Winchester Roman Road.
N/A	Byfleet Park/Manor Farm Estate AHAP	AHAP. Cropmarks a visible within the area which is located west of the River Mole and downstream from Byfleet Mill.
MSE236	Romano-British Pottery, Cobham	Romano-British Pottery, Cobham.
MSE487	Romano-British cremation	An urned cremation dating to the 1 st century AD, found with empty accessory vessels and nearby four cremation pits. Excavated in 1911.
MSE488	Disputed Bowl Barrow, Foxwarren, Wisley	A probable bowl barrow was investigated in the 1970s, turning out to be a slight mound of modern origins. No evidence of a barrow was found during this archaeological investigation.
MSE494	Probable Natural Mound, Currie's Clump, Ockham Common	This mound could not positively be identified. Around the east side of Currie's Clump are several low mounds of varying size and height. By their very numbers and the fact that this is an area of sands and gravels, the features are without doubt natural. Numerous similar examples occur all over the Commons of Wisley and Ockham.
MSE495	Probable tree Planting Earthbank, Ockham Common	Circular earth ring with outer ditch, cut by a boundary trench of later date. A parish boundary bank obliterates the ditch and merges with the bank on the west side. It is disputably a round barrow, but may also be a fairly recent tree planting earth bank.
MSE496	Mesolithic or Neolithic Quartzite Mace, Wisley Common	Mesolithic or Neolithic Quartzite Mace, Wisley Common.
MSE503	Mesolithic Site, Ockham Common and Chatley Heath	Mesolithic site astride a sandy path on borders of Ockham Common and Chatley Heath. Covering a 2 ft ² area, there was evidence of a primitive flint industry mostly worked from pebbles on the site. There is a resemblance to the Mesolithic material from Ripley.
MSE746	Two Palaeolithic handaxes, Walton-On-Thames	Two Palaeolithic handaxes, Walton-On-Thames.
MSE2109	Early Bronze Age Flanged Axe, Bolder Mere, Ockham	Early Bronze Age Flanged Axe, Bolder Mere, Ockham.
MSE2301	Undated Flakes	Undated Flakes.

Reference (HER)	Name	Description
MSE2451	Possible Late Bronze Age Pot	Possible Late Bronze Age Pot.
MSE2455	Flint Scraper	Flint Scraper.
MSE2456	Undated Flakes	Undated Flakes.
MSE2812	Possible medieval boundary bank, Wisley/Ockham parish boundary	Excavation on Wisley Common for Surrey Archaeological Society and Department of the Environment in 1977, sectioned the parish boundary bank. No finds were made. The site archive (plans and photos) were deposited in Guildford Museum.
MSE3182	Neolithic flint scraper, Cobham	Neolithic flint scraper, Cobham.
MSE3243	Possible field system or mineral extraction site of unknown date, Ockham/Wisley	An extensive system of large earth ridges or banks, often parallel to one another. These are often of exceptional size, being, on average, between 1.5 m and 2.7 m high over large areas near the centre of these earthworks. The intervening 'ditches' or hollows, are about 10 m across from top of bank to top of bank. The ridges appear to lead into a large sub-circular hollow up to 80 m in diameter. This latter feature is clearly a quarry hollow, and the edges seem to radiate out from this quarry, often following well-defined alignments, but sometimes forming different alignments. In some cases, the 'ditches' take on the appearance of trackways leading into and out of the quarry. This is clearly marked, as described above, on the 1881 OS 25" map (sheet xvii.12). However, the extent of the earthworks is greater than that surveyed on to this map.
MSE3269	Prehistoric Pottery Sherds	Prehistoric Pottery Sherds.
MSE3270	Mesolithic Flints	Mesolithic Flints.
MSE3271	Roman Pottery Sherds	Roman Pottery Sherds.
MSE3272	Medieval Pottery Sherds	Medieval Pottery Sherds.
MSE3310	Possible Roman quarrying site	Quarrying at the Red Hill henge-form monument (HER 3309), presumably for ironstone as this occurs in the sand bedrock locally. Suggested to be of Roman date, possibly connected with the occupation site at Chatley Farm.
MSE3463	Milestone, Ockham	Milestone, marked Portsmouth 48, Hyde Park Corner 21, Cobham 4 and Guildford 6 miles.
MSE3464	Parish boundary stone, between Ockham and Wisley	A much weathered boundary stone between Ockham and Wisley parishes.
MSE3502	Mesolithic Flint Cores, Wisley	Mesolithic Flint Cores, Wisley.

Reference (HER)	Name	Description
MSE3575	Milestone	Milestone on the south side of the old A3. The top is illegible, the front marked Hyde Park Corner 17 and the sides Esher 3 and Ripley 4.
MSE3695	Worked flints, River Wey area	Worked flints, River Wey area.
MSE3696	Possible field system or quarrying earthworks, Ockham Common	Ridges and other features revealed in motorway construction. The features probably agricultural in origin.
MSE4133	Two Palaeolithic hand-axes	Two Palaeolithic hand-axes.
MSE4738	Medieval pottery	Medieval pottery.
MSE4739	Prehistoric (Bronze Age?) pottery	Prehistoric (Bronze Age?) pottery.
MSE6886	Anti Aircraft Gun Emplacement	Defence Site: Anti Aircraft Gun Emplacement.
MSE13733	Ashtead and Epsom Commons landscape survey	Survey of the archaeological and historic landscape of the Commons by C Currie of CKC Archaeology for Surrey County Council and the Corporation of London undertaken with reference to them being proposed as Areas of Historic Landscape Value. In the north of Ashtead Common a number of earthworks and other features surround the site of a Roman villa. The villa is a rare type of corridor villa, with considerable evidence that it adjoined a large-scale tile manufactory. Extensive areas of quarries and spoil heaps demonstrate the extent of industrial activity on the site in the Roman period. Nearby are further earthworks associated with a large undated ditched enclosure, and a 17th century medicinal well. There are also a large number of ancient pollarded oaks on the Common. They are a rare survival of an ancient land management type that was mainly superseded in other parts of England in the post-medieval period by overgrazing. Epsom Common has few surviving historic features. The site of Old Wells, a 17th century mineral spring for which Epsom is strongly associated, is covered in housing. Those features that do remain, such as the Stew Ponds, have been much altered, and the historic character of the farmland to the south-west of Ashtead Common has been affected by the evolution of temporary features associated with the pasturing of horses.
MSE13861	Bronze Age pottery and flintwork: Nutberry Farm, Wisley	Evaluation by SLR Archaeology prior to the construction of a composting facility. A single linear feature containing Bronze Age pottery and flintwork was revealed.
MSE14312	Aerial photograph cropmark features, Byfleet Park	An aerial photograph shows a small cluster of linear features south-west of Byfleet Manor House (NAR29). Two that are linear and parallel with a ditch further east could be of drains.

Reference (HER)	Name	Description
MSE14725	Cropmarks caused by aggregates work: non antiquities, Ockham	A prominent pair of parallel linear crop-marks seen in a 1988 set of photographs (TQ 0657/2: NMR 4228: frame 80 and others) of the Stratford Bridge area of Ockham (at TQ 061 575) are now thought from other aerial photographic evidence to be due to a road built to a temporary aggregates plant for the construction of the A3 Ripley by-pass in 1975 - and thus not evidence of any 'missing' Roman road in the area. The parallel crop-marks are not aligned with the expected course of a Roman road between London and Farnham.
MSE14766	Dam, Bolder Mere, Ockham Common	Dam bank for Bolder Mere, a large pond of about 6 hectares on Ockham Common. The bank is shown by a straight stretch of earthwork, at a slight angle to the A3, in the south-east corner of the pond. This bank is about 70 m in length, and about 2 m high at its maximum near where the present outfall sluice leaves the pond. A ditch approaching the pond from the south-west is channelled into the pond side of the dam, and is crossed by a small footbridge. The A3 has cut across the north-east end of the dam, destroying some of its original length. The back of the bank is heavily disturbed by drainage channels that seem to have been put in as a result of the upgrading of the A3. As at Frensham Great and Little Ponds, the siting of the dam has been carefully chosen to allow for a minimum length of bank to enclose the maximum water area, thus making as large a pond as possible from the minimum of effort.
MSE14767	Post-medieval pond, Bolder Mere, Ockham Common	A large pond of about 6 hectares on Ockham Common. The A3 runs along the north-west bank cutting across the north-east end of the dam bank. The pond is shown on Norden's county map of 1594, and other early county maps. Local tradition claims the pond was made to power an iron forge, but there is no evidence to support this. Seller's map of circa 1680 shows two 'iron mills' below Wisley Pond, but this should not be translated to Bolder Mere. Although not entirely discounting the iron mill theory, it is not impossible that the pond began its life as a simple fishpond. Previously known as Hut Pond, after the Hut Public House on the north side of the A3.
MSE14768	Remnant of Purple Pond, Ockham	A marshy pool, heavily overgrown, and much silted up. This pond was originally much larger, described by Bloxam (1963, 58-59) as the shape of a medieval boot. Marshy land to the south and south-east probably marks the original extent of the pond. At the north end of the pond, a car park has been made. This may have destroyed part of the pond. It looks as if the present road (Old Lane) may have been the dam to the pond, but it is not possible to be certain of this. On present evidence, it is not known if this was once a purpose-made pond, a former quarry hollow that has filled with water, or a natural depression into which local water drains.
MSE14769	Mound and bank, possible ornamental tree mound, Currie's Clump, Ockham	A large tree covered mound known as Currie's Clump. It stands about 8 m above the surrounding landscape and has a diameter of about 80 m. It is surmounted by conifers. About 30 m from the base of the mound is a bank with an external ditch surrounding the clump. This has been eroded, and cut through by paths and A3 works in places, but it is shown as an encircling boundary on most historic maps. A cafe, toilet and car park seems to have been built across this boundary on the south side. This is probably a natural mound that was used to plant an eye-catching clump or plantation in the later 18th or early 19th century. Manning and Bray record that the 6th and 7th Lord Kings made a number of plantations on the Commons. It was fashionable to ornament such areas at this time. This clump seems to have been named after the banker, William Currie, who lived at East Horsley Place until he sold it to the 8th Lord King in 1840.

Reference (HER)	Name	Description
MSE14770	Medieval pond, Wemere	Pond mentioned on the 14 th century bounds of Cobham. Partially silted up.
MSE14771	Pond site, Culverlake, Ockham	An old pond site, lying partly across the old Ockham/Cobham boundary. It was mentioned as Culverlake on the 14th century bounds of Cobham, although this may refer only to the stream that later fed the pond. The dam was on the east and north sides, but this is now partly buried under the M25. According to OS maps, the site was largely dried up before work started on the motorway. A lease of 1740 deals with two ponds in “Redhill Bottom”, that may refer to this pond site (SRO 181/15/47).
MSE14772	Ore Lane Trackway	Old trackway mentioned on 14th-century bounds of Cobham as 'Holeweye'. It may have later been mentioned as a 'causeway' (Henn's Causeway) in an indenture of 1783-84 (GMR 53/40). This may refer to the section passing between the “old enclosure” known as Crook's Island and Wemere Pond, where the track crosses the dam of the pond. Once beyond Crook's Island the track follows what is possibly a more recent line across the Common. This does not have a hollow appearance. It seems likely that the original track continued north towards the large quarry shown on the first edition OS 25" map of 1881.
MSE14773	Settlement site, Henn's Enclosure, Ockham	The original enclosure was about four acres, and is variously referred to as the “old enclosure”, “Henn's Enclosure” and “Crock's Island”. The last two names after former tenants in the 17th to early 19th century. In the south-east corner of the land there were four cottages by the early 19th century. A settlement or farmstead/cottage is recorded on the site from the 17th century at least. However, it is possible that there may have been an assert here in the 14th century.
MSE14774	Red Hill Road Holloway or ditch feature, Wisley	Ditch-like feature, possibly a holloway running alongside the former line of Red Hill Road. By the 18th-century, it may have formed the boundary of adjoining Painshill Park. It is shown as a ditch-like feature on early OS maps, and as a track on other early maps. The OS 25 map of 1870 shows the feature as a ditch alongside the road. The present feature varies in size, but is about 1.2-1.8 m deep, and between 4-6 m wide across the top. In places it is only as wide as a footpath. It ascends the hill from Chatley Farm. Before the Enclosure Act of 1793 for Cobham it probably served as a track to Weybridge from Chatley Farm along the edge of the heath. Probably of medieval origin.
MSE14775	Linear earthworks, Foxwarren Park, Wisley	Linear earthworks running approximately north-south across Wisley Common to boundary of Foxwarren Park. Where the park has been landscaped into gardens, some of the earthworks appear to have been reused as garden features. The hollows forming the ponds (now dry) surrounded by Pulamite stone appear to have reused these earthworks. Elsewhere, they continue north beyond the Common. The earthworks on the far west side are low to begin with, being little over 1 m high and about 5 m across each hollow. However, they quickly become much larger. About 80 m west of the first earthworks, there is a very large ridge over 4 m high and many metres wide. It is possible its size is exaggerated because soil has been dumped on top of a natural ridge here. The ridges continue into a narrow valley between Foxwarren Park and Redhill Road, but do not extend beyond the steep east side of this valley. They are nearly all parallel to one another, and average 2-3 m high in the centre of the earthworks.
MSE14776	Dam and pond site, Wisley Pond	Wisley Pond is first mentioned in the 1590s in both documents (GMR LM 348/232) and on Norden's County Map (SRO). On Seller's map of circa 1680, two iron mills are shown on the stream leaving the pond on the north side. Nothing else is known about the pond, its uses or management. In the first years of the 19th century Lord King drained it

Reference (HER)	Name	Description
		and turned it into farmland. The original extent of the pond was about 50 acres.
MSE14777	Bank and ditch feature, Wisley Common	Bank with ditch on east side. Known by local farm as Wisley Common Ditch. This feature runs parallel with the west edge of the former Wisley Pond, being about 100 m further west from the former edge. The feature is not shown on the 1896 OS 25" map (sheet xvii.7), and so may be a relatively recent feature.
MSE14778	Pond site, Chatley Wood, Cobham	The pond is presently dry, and appears to have been for the last two or three years. The pond bed is now rough grassland, with some minor invasion by alder scrub. The stream bed that once fed the pond is traceable, but no longer running. There is evidence that this pond has been artificially created as there are clear traces of a dam at the eastern end. This is a bank about 1.6 m high and between 10-15 m broad. There is a large gap near the centre where the now dry stream channel leaves the pond.
MSE14779	Quarry, Chatley Wood	Quarry hollow, about 70 m by 40 m, on the west side of an enclosure bank thought to have been put up following the 1793 enclosure. The pit stands within the area designated for the poor cottagers of Cobham in 1793. The Court Book of 1805 states that this land was left to the cottagers so they could have rights to grazing, collecting fuel and dig 'sand and gravel' (SRO 181/17/2). The position of the quarry, abutting a 1793 enclosure bank, suggests that this quarry may have been created after 1793.
MSE14780	Farmhouse, Pond Farm, Wisley	Brick farmhouse. Built as a 'cottage' by Lord King between circa 1800-1804. The original building can be seen on the east side of the present house. Extension has been added on from just west of a line through the back door and chimney stack on the ridge. This was probably added later in the 19th century.
MSE14781	Barn, Pond Farm, Wisley	Barn with lean-to on north side. Brick west and south sides, weather boarded on east with tile roof. Roof hipped at north end, half-hipped at south end. Central wagon door. Internal roof, slanted queen post.
MSE14782	Boundary bank, Clearmount, Wisley	The bank itself is about 1 m high, and about 2.5 m wide. It has a slight ditch on the Common side. In places, it has oak trees on the bank of some antiquity. As most of these are beginning to shed branches, and many are stag-headed, they are at least 200-250 years old thereby giving a minimum possible age for the bank. These trees are clearly shown on the 1870 OS 25" map. Clearmount was still farmland at this time.
MSE14783	Lord King's ditch, Pond Farm, Wisley	Deep ditch, up to 1.3 m deep and about 2 m wide with signs of regularly recutting. Local tradition ascribes it as the ditch cut by Lord King to drain Wisley Pond circa 1800.
MSE14784	Ockham sand pit, Red Hill, Ockham	Extensive and deep quarry, listed as over an acre in the 19th century. It is shown as a sand pit on the 19th century enclosure map of Ockham (SASRC M14/OCK/7). OS 25" map of 1870 shows it extending over the Cobham boundary. The access track from Pointers Road still visible as a footpath.
MSE14785	Enclosure bank, Chatley Wood, Cobham	Bank up to 1.2 m high and 2.5 m wide forming boundary between surviving portion of Chatley Heath and private enclosure created by Thomas Page in 1793. The private enclosure turned into plantations by Page and these have subsequently merged into the Common, although a barbed wire fence on the bank still indicates its private nature. Traces of ditch on Common (west) side.

Reference (HER)	Name	Description
MSE14786	Enclosure bank, Red Hill, Wisley	Boundary bank 1 m high and up to 2.5 m wide. It forms the boundary bank between Cobham and Wisley, possibly following the line of the 14th century Cobham bounds (...et inde usque Redehelde et inde usque quondam quercum super cursum aquae de Emble...). On the Wisley tithe map it was the south-east boundary of field number 160, nine acres plus of woodland held in hand by Lord Lovelace. Until the enclosure of part of Chatley Heath in 1793, it adjoined the heath. Afterwards it adjoined a private plantation of Thomas Page.
MSE14787	Enclosure bank, Red Hill, Wisley	Bank running alongside of hill and prone to some hill slip on south-west side. Some old trees on the bank, and traces of a ditch on the south-west side. Bank up to 1 m high in places and 3 m wide. Some severe erosion noted in places. This was formerly an enclosure bank between a piece of private woodland (tithe plot 160) and an enclosed part of Wisley Heath (tithe plot 159).
MSE14788	Holloway, Hatchford Wood, Cobham	Traces of holloway between Mausoleum and Elm Cottage along southern edge of Hatchford Wood. The hollow is very considerable in places, with a bank up to 3 m high on the south side. The hollow section is only about 50 m in length. In 1774 a proposal was made to divert (both?) a highway and a footpath over Breach Hill Common from near Hatchford to Ockham (SRO 181/16/23a). In 1793 Hatchford Wood was detached from Chatley Heath as a private enclosure. It is possible these diversions were a prelude to this enclosure so that old ways over the heath did not continue to go over private lands. It is possible that one of these tracks could be the holloway here under discussion.
MSE14789	Enclosure bank, Ockham Village Green	Semi-circular bank and ditch surrounding "Ockham Village Green". The bank is low, about 0.5 m high and about 1.5 m across. The internal area has been deliberately planted up with firs to form a plantation. It is not thought that the designation "village green" has any great antiquity. The land was enclosed from the Common, circa 1869-76, probably at the time of the Ockham Enclosure Map (SASRC M14/OCK/7). On this map it is marked 'Recreation Ground' at 4-0-6 acres, with an empty plot of 0-1-6 alongside that now contains Fellside Cottage. It is not thought that the enclosure existed before 1869-76.
MSE14790	Site of Hut Public House, Wisley	Site of public house known as the Hut. New buildings were erected in 1884 and leased by Lord Lovelace to James Moscrop, hotel keeper. Prior to this it was thought the original public house was started up by George Bradshaw, a dispossessed royalist minister in 1655. A lease of adjoining Bolder Mere in 1784 refers to it as the "Alehouse called the Hut" (GMR 165/267/2/2). An unnamed building is shown on the site on Rocque's map of 1768 (Ravenhill 1974). The hotel and its adjoining buildings were all destroyed following the widening of the A3 circa 1980.
MSE14791	Road, Pointer's Road, Cobham and Ockham	This road is now a tarmaced road that terminates near the A3/M25 interchange. It once extended west of this point. There are no obviously historic features to this road now that it has been modernised, but it follows an earlier alignment. How old this alignment is cannot be said with certainty, as, in 1782, an application was made to divert it (SRO 181/16/24). It is possible that this was to ensure that it kept out of the proposed new enclosures that were made in part of Chatley Heath following the 1793 enclosure. Rocque's map of 1768 seems to suggest that the old route followed the line of Redhill Road (Ravenhill 1974), but this was abandoned as the thoroughfare from Weybridge to Poynters in 1793. This seems to suggest the current alignment dates from 1782 or alter.

Reference (HER)	Name	Description
MSE14792	Site of Oldpond House, Wisley	Site of house, now overgrown by nettles and scrub, and partly used as dumping site for farm manure. The house is shown on Rocque's map of 1768 (Ravenhill 1974). It was plot 130 on the Wisley Tithe Map, given as 0 -2-10 acres, a cottage, orchard and garden owned by Lord King, and m the tenure of James Woolger. The OS 25" map of 1870 refers to it as Oldpond House, showing a house and a large outbuilding. They had both gone before the M25 was built, the motorway just missing the site by about 50 m.
MSE14793	Linear earthworks, Red Hill, Cobham and Wisley	A series of linear earthworks crossing the various parish boundaries, and surrounding conventional quarries in the area (HER 3310, 14779, 14785). They are similar to earthworks identified on Ockham Common (HER 3243) and south of Foxwarren Park (HER 14775). They are frequently parallel to one another, and cover a considerable area. The estimate of two hectares covers only those areas where the earthworks are clearly visible, and up to 2 m in height. There are also other areas of less distinct earthworks on the fringes. The association of these earthworks with the adjoining quarries suggests they may be connected with this activity. Gardener (1911 115-16) reports a local oral tradition that they were dug as ironstone quarries to supply local iron mills, but this has been questioned by Potter (1982), who has suggested an Iron Age date.
MSE14794	Mound and linear earthworks, possible barrow, Ockham Heath	Large sub-circular mound, about 40 m diameter and up to 3 m high, on north of track on Ockham Heath. This feature has been exposed by clearance of area to regenerate heathland. It has some similarities to other "barrows" in the area, and is here included to pre-empt its later "discovery" as a genuine barrow. This is made all the more possible by what appears to be the remains of a ditch on the west and east sides.
MSE14795	Parish boundary bank, Ockham Heath	Old parish boundary between Ockham and Cobham. It may be related to the early Saxon boundary called Fullingdic (see HER 3195), to which this monument should be cross-referenced, as they may be one and the same). Its survival is intermittent particularly in the north where its line is much disturbed by quarry workings and other earthworks (see HER 3243). In fact it is difficult to find the line shown on the ground in places. However the Cobham/Ockham boundary is mentioned in a boundary document of the 14th century (SASRC 177/40), and the present alignment seems to follow the earlier line fairly closely.
MSE14796	Quarry pit, Chatley Wood Quarry, Cobham	Small quarry pit circa 40 m by 30 m, set in conifer woodland between Wisley/Cobham Boundary and Chatley Wood Pond. Within 80 m of Redhill Quarry (HER 3310), and other quarry sites and linear earthworks (HER 14784, 14793). There are numerous explanations for quarrying in this area most favouring ironstone workings or sand pits. Different sources have suggested dates ranging from Iron Age (Potter 1982), Roman (HER 3310), and post-medieval (Gardner 1921). This pit is set in land that was enclosed from common for a private plantation in 1793. It is shown as a 'sand pit' in 1870 (OS 25" map, sheet XVII.8; 1870 ed.), with an access route leading up from Pointer's Road.
MSE14998	Negative Evidence: Chatley Farm Estate, Pointers Road, Cobham	Watching brief (and associated Historic Building Recording) by Wessex Archaeology during alterations and conversion to Chatley Farmhouse and associated farm buildings. No significant finds or features of archaeological interest were recorded during monitoring of the groundworks involved in the development (see HER 7369 for Historic Building recording).
MSE15844	Ring ditch cropmark	An irregular ring ditch with short lengths of linear ditches.

Reference (HER)	Name	Description
MSE16852	Claygate to Guildford Milestone	Milestone, Wisley Common near RHS Gardens, north-east of footbridge.
MSE16887	Claygate to Guildford Milestone	South of junction with M25 on slip road (old lane).
MSE17075	Cropmarks	A number of small circular and sub-circular cropmarks.
MSE17084	Cropmarks	Cropmarks.
MSE18141	Earthworth bank, Cobham	Earthworth bank of unknown date, at the edge of a copse with a slight ditch and adjacent pathway. Veteran Field Maple adjacent to path.
MSE18143	Post-medieval hollow, Cobham	Hollow about 40 m across. May be associated with flood meadow management.
MSE18144	Woodland edge, Cobham	Woodland edge marked by Field Maple. May indicate edge of copse or walkway.
MSE18181	The Lodge and Lodge Wood, Cobham	This was the Lodge at the north entrance to Hatchford Park, which was severed from the rest of the estate by the construction of the M25. The woodland to the east of the Lodge appears to be secondary. The Lodge was not visited but is presumed to be 19 th century.
MSE18182	The Bogs: semi-ornamental woodland, Cobham	This is a substantial area of semi-ornamental woodland, first labelled as such in 1876. The name on the OS map appears to apply only to the woodland northwest of Pointers Pond. The woodland to the southwest was called Breach Hill Wood. The Bogs appears to have been cultivated land in 1768 and 1793 and was perhaps developed as woodland as part of the landscaping associated with Poynters in the early 19th century. This is certainly almost the case for the woodland on the east side of Pointers Road. Today the woodland is characterised by an understorey of rhododendron, well-spaced Sweet Chestnut and Oak with frequent Ash and patches of Bracken. If there was wet ground here originally it is no longer evident from the vegetation.
MSE19515	SAUCER BROOCH, Wisley	Saucer Brooch, Wisley.
MSE20867	War Memorial, RHS Headquarters, Wisley	War memorial. Bronze panel surrounded by a frame of Hoptonwood stone. Above the panel is the crest of the Royal Horticultural Society. At the upper corner dexter side is a national symbol of the shield bearing the three English lions. On the sinister side is the emblem of the passion cross. The panel is inscribed: in grateful remembrance of the Wisley students who laid down their lives for their country in the Great War 1914-1919 (20 names). It was unveiled on 3rd June 1921 by the President of the Royal Horticultural Society and dedicated by local clergy and dignitaries. The architect was Sir Robert Lorimer and the cost was £235. First World War.
MSE20868	War Memorial, RHS Headquarters, Wisley	Wisley students. War memorial, bronze panel surrounded by a frame of Hoptonwood stone. Second World War.
MSE20871	War Memorial, RHS Headquarters, Wisley	War memorial in the form of a clock with gilded numerals and red hands above the entrance, and a rectangular plaque with a black line border inside the main laboratory building. An inscription reads: The memorial clock erected over the main door of this building was given by the RHS

Reference (HER)	Name	Description
		Gardens Club in grateful memory of the men from Wisley Gardens who lost their lives in the two World Wars. 1914-1918. 1939-1945. First World War. Second World War.
MSE21230	Anti Aircraft Site, Wisley Common	An unarmed Anti Aircraft Site at Wisley Common.
MSE21976	The Hermitage at Painshill Park	Site of an 18th century hermitage created by Charles Hamilton as part of his pleasure grounds at Painshill Park. Reconstructed in 2004 as part of the wider Painshill Park restoration project. The site of the original hermitage was established from archive research and a program of archaeological work undertaken in 1986. The Painshill archives contain contemporary sketches and descriptions by visitors to the park and these were used to inform the reconstruction. There are a number of historical descriptions of the Painshill Hermitage, the building was approached from the north along one of the paths from Alpine Valley.
MSE22004	Chippings Farm	Chippings Farm. Site of an Historic Farmstead. Information on this site is currently being compiled as part of a project researching important historic farmsteads and associated buildings within the current administrative county of Surrey.
MSE22157	Highlands Farm	Building; unknown date.
MSE22158	Long Orchard Farm	Farm; unknown date.
MSE22159	Silvermore Farm Estate	Farm; unknown date.
MSE22160	Pains Hill House Farm	Farm; unknown date.
SMR4619	London to Winchester Roman Road	An East-West Roman Road, presumably London to Winchester, passes through Neatham. The surface has been exposed during excavations at Neatham (summer 1976) and consists of a layer of tightly packed flints with a parallel ditch running along the southern edge. The north edge was not examined. The course of the road can be followed between Alton and Farnham but is elsewhere uncertain.

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