Environmental Statement
Scoping Report

Proposed Oxfordshire Strategic Rail Freight Interchange

Land west of the B430
East of Upper Heyford Former Airfield, Ardley
Cherwell District

SUBMITTED ON BEHALF of
Oxfordshire Railfreight Interchange Limited

June 2021

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1.0 INTRODUCTION

1.1 Oxfordshire Railfreight Interchange Limited ('the Applicant') is to apply for a Development Consent Order (DCO) for a Strategic Rail Freight Interchange (SRFI) together with associated development on land south of the Chiltern Railway line, and west of the B430, east of Upper Heyford Former Airfield, and south of the village of Ardley in Cherwell District, Oxfordshire. The proposed SRFI site is located west of the M40, with Junction 10 of the M40 located nearby to the north-east. The Proposed Development is located on land entirely within the administrative boundaries of Cherwell District Council and Oxfordshire County Council.

1.2 Applications for certain types of development need to be accompanied by an Environmental Statement ('ES') to comply with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). The Applicant has concluded that the Proposed Development will be EIA Development, meaning that the application should be accompanied by an ES and subject to the EIA process. The ES will contain an assessment of the likely significant environmental effects of the proposed development.

1.3 This Report comprises a request to the Planning Inspectorate, pursuant to Regulation 10 of the EIA Regulations, for a Scoping Opinion, which is to provide an opinion as to the scope, and level of detail, of the information to be provided in the ES to be submitted with the DCO application. The Report has had regard to the guidance contained in the Advice Note 7: EIA: Process, Preliminary Environmental Information, and Environmental Statements (V7) produced by the Planning Inspectorate.

1.4 The proposed rail freight interchange (including the warehousing) is a Nationally Significant Infrastructure Project (NSIP). The Planning Act 2008 defines what projects constitute NSIPs. Under Section 14(1)(l) of the Act an NSIP includes a 'rail freight interchange'. Section 26 of the Act requires that the land on which the proposed 'rail freight interchange' is to be developed

must be in England and must be at least 60 hectares in area. In addition, the rail freight interchange must:

- *be capable of handling consignments of goods from more than one consignor and to more than one consignee;*
- *be capable of handling at least 4 trains per day;*
- *be part of the rail network in England;*
- *include warehouses to which goods can be delivered from the railway network in England either directly or by means of another form of transport.*

1.5 The Proposed Development fulfils all the requirements set out above and, accordingly, is an NSIP which is required to be authorised by a DCO rather than a planning permission.

1.6 A fuller description of the currently Proposed Development is given in Section 3 of this Scoping Report, however, in general terms, the Proposed Development comprises a rail freight terminal and rail served warehousing located to the south of and adjacent to the Chiltern rail line. This is located on what is called the 'Main Site'.

1.7 The rail freight interchange and warehousing, with associated green infrastructure, will be accessed via new highways infrastructure, options in respect of which are currently under discussion with the local highway authority (Oxfordshire County Council) and Highways England. It is expected to comprise:

- an improved and reconfigured Junction 10 of the M40 motorway
- a bypass to the east of Ardley linking J10 and the Main Site and providing the Principal Access to the Main Site
- a relief road to the north east of Middleton Stoney between the B430 and B4030
- a Secondary Access to the Main Site from a new Heyford Park Link between the B430 and Heyford Park.

1.8 As a result of the highways works proposed, and with reference to the Planning Act 2008, it is currently anticipated that the DCO will include a total of two NSIP's (the RFI and a highway NSIP), however this is dependent upon the precise nature and extent of the highway options it is decided to include within the application. Whether or not some of the Highway Works are NSIPs in their own right is relevant for the purposes of the DCO submission but does not affect the EIA process to be undertaken in relation to those works and is, therefore, not relevant to the scoping exercise.

1.9 The draft DCO will, in due course, identify not only the NSIP's included in the DCO but also the Associated Development, being development which is part of the Proposed Development but not an integral part of the NSIP. For the purpose of scoping, it is not necessary to identify which parts of the Proposed Development described are NSIP's and which parts are to be Associated Development. The same EIA process applies to both and it is therefore not relevant to the scoping exercise.

1.10 The remainder of this Scoping Report is structured as follows:

- **Section 2** sets out the context for the Scoping Report and includes a glossary of the terminology used throughout this report in respect of the different components of the Proposed Development;
- **Section 3** describes the Proposed Development;
- **Section 4** sets out the scope of the ES in terms of the technical chapters it is proposed to 'scope in' or 'scope out' of the document, and the structure of the ES;
- **Section 5** describes how the various topics scoped in will be assessed and an explanation given of the anticipated likely significant effects in relation to each topic.

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2.0 SCOPING CONTEXT AND GLOSSARY

2.1 The EIA Regulations set out all the information which is required, as a matter of law, to be included in a request for a Scoping Opinion. This is contained in Reg 10 (3) and is as follows:

a) A plan sufficient to identify the land;

b) A brief description of the nature and purpose of the development, including its location and technical capacity;

c) An explanation of the likely significant effects of the development on the environment; and

d) Such other information or representations as the person making the request may wish to provide or make.

2.2 In compliance with a) above, the plans in the Appendices 1 - 6 identify the land affected by the Proposed Development and the different components of the Proposed Development.

2.3 Section 3 of this Report provides the information required by b) and Section 5 the information required by c). The remainder of the report is information which the Applicant feels would be helpful ((d)) and has had regard to Advice Note 7 referred to above.

2.4 In Insert 2, of Advice Note 7, the Planning Inspectorate suggest that a Scoping Report should include the information which is set out in column 1 of Table 1 below. Column 2 of the table explains how the suggestion has been responded to in this Report.

Table 1 – Insert 2 Advice Note 7

INSERT 2	RESPONSE
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development eg design parameters	The nature of the development, which is required to respond to occupiers changing demands over the lifetime of the development, means that flexibility is required, particularly in respect of plot layout and building configuration, size and design. Accordingly, as described in Section 4 of this Report the Rochdale Envelope approach has been utilised to ensure that, notwithstanding any embedded flexibility, any scheme which comes forward is within the parameters of what has been assessed.
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the development	The plans included within this Report are, it is believed, sufficient to enable an understanding of the different components of the Proposed Development for the purpose of scoping the ES.
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	See paragraphs 4.11 to 4.13 in Section 4
A detailed description of the aspects and matters that are requested to be scoped out of further assessment with justification provided	The items identified as being scoped out are set out in Table 3 in Section 4 of this Report.
Results of desktop and baseline studies where available and where	Any existing survey, and other, baseline information collated thus far is referred

relevant to the decision to scope in or out aspects or matters	to in the different topic sections in Section 5.
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect eg criteria for determining sensitivity and magnitude	No single approach to determine significance and sensitivity will be used. Each topic will use, and explain, methodology best suited to assessment of the topic concerned. The methodology intended to be used for each topic is outlined in the separate topic sections in Section 5.
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	The full mitigation strategy relating to the development will be described and assessed in the ES. Mitigation which is already identified, such as the general extent of the Highway Works and green infrastructure, is referred to in the description of development contained in Section 3 and, where relevant, in the different topic sections in Section 5. Residual effects will be assessed within the ES when the full mitigation strategy has been identified. How mitigation is to be secured will be the subject of a Mitigation Tracker to be submitted as part of the application documentation.
References to any guidance and best practice to be relied upon	This is referred to in the different topic sections in Section 5.
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities)	This is referred to in the different topic sections in Section 5, however, in respect of some topics, discussions with stakeholders are at a relatively early stage and it is anticipated that

	engagement will be aided by this scoping process.
An outline of the structure of the proposed ES	This is contained in Section 4 of this Report.

GLOSSARY

2.5 The different elements of the scheme referred to throughout this Report are set out in Table 2 below and are shown on the plan contained in **Appendix 1.**

Table 2

Development Element	Description
Application Site	the land encompassed within a red line boundary being all the land affected by the proposals to be described as the "Order Limits" in the DCO and shown on the plan in Appendix 1 as such. This is the maximum extent of the land likely to be affected by the Proposed Development and will be reviewed as the scheme proceeds through consultation and engagement with stakeholders.
Ardley Bypass	a bypass to the east of the village of Ardley including the Principal Access to the Main Site.
Heyford Park Link	the length of new road between the B430 and Heyford Park including the Secondary Access.
Highway Works	The J10 Highway Improvements Works, the Ardley Bypass and

	Principal Access, the Middleton Stoney Relief Road, Heyford Park Link and Secondary Access.
J10 Highway Improvements	the highway works to be carried out in connection with the improvement of J10.
Main Site	the area to be occupied principally by the rail terminal and warehousing and incorporating the Heyford Park Link.
Middleton Stoney Relief Road	a relief road around the north east of the village of Middleton Stoney.
Order Limits	This is the maximum extent of the land likely to be affected by the Proposed Development and will be reviewed as the scheme proceeds through consultation and engagement with stakeholders.
Principal Access	the principal access to the Main Site from the Ardley Bypass.
Secondary Access	the secondary access to the Main Site for buses, emergency vehicles and pedestrians/cyclists from the Heyford Park Link.

3.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Introduction

3.1 This section contains a description of the Proposed Development as currently envisaged. Before doing so a summary of the current characteristics of the Application Site is set out below. The plan in **Appendix 2** contains a plan showing the location of some of the features referred to.

Existing site characteristics – Main Site

3.2 The 'Main Site' is located between the B430 and the former Upper Heyford Airfield, which is located to the west of the Main Site. It is immediately south of the Chiltern Railway line. It predominantly consists of agricultural land used for mixed arable and grazing purposes and includes the Ashgrove farmstead ("Ashgrove Farm") which comprises a number of farm buildings and residences. The farmstead includes a listed building.

3.3 The Main Site includes several existing Bridleways (Public Right of Way) routes 109/28, 109/29 and 109/30, with a number of new routes or extensions to existing routes nearby proposed or committed in the vicinity of the Main Site. Some of these new routes are mitigation approved as part of the approved Heyford Park development scheme to the west.

3.4 Also within the Main Site is the Severn Trent Green Power 'In Vessel Composting' (IVC) facility ("Severn Trent Green Power IVC") which is an operational commercial food and garden waste composting facility. This facility comprises a weighbridge, reception building, composting tunnels, office and welfare facility, bio filter and maturation pad. The site receives waste from refuse collection which is turned into bagged compost product.

3.5 The Main Site also contains an underground reservoir in the south east part of the Main Site to the north of the proposed Heyford Park Link which will remain. In connection with the reservoir there are some substantial water mains. It is

likely that some of the water mains will be diverted however the precise extent of diversion is still to be determined.

3.6 To the east of the Main Site and east of the B430 is the Viridor Ardley Energy Recovery Facility ("Viridor ERF") as well as the Ardley Fields Household Waste and Recycling facility and Ardley Landfill Site. Further south of the waste facilities is an active Dewars Farm minerals quarry (limestone and clay) operated by Smiths Bletchington.

3.7 The village of Ardley is located to the north of the Main Site and north of the Chiltern Railway, and separated from the Main Site by intervening agricultural land and established woodland.

3.8 The village of Middleton Stoney is located approximately 1.5km to the south of the Main Site, separated by intervening agricultural land and associated landscape and field boundary features. Within the intervening land lies the farmstead of Manor Farm.

3.9 The M40 motorway runs nearby, to the east of the Main Site, as well as to the east of both Ardley and Middleton Stoney, with the town of Bicester beyond the M40 in a south-easterly direction from the Main Site.

Existing Characteristics – Highway Works

3.10 The Highways Works include land on both the eastern and western sides of M40 Junction 10 which is largely in agricultural use already directly influenced by highways infrastructure. The site of the works includes the Padbury Brook. The Ardley Bypass is on land to the east of Ardley, and crosses a number of existing field hedgerow boundaries, as well as the Chiltern Railway line.

3.11 Similarly, the Middleton Stoney Relief Road alignment options include agricultural land to the north and east of the village and include sections of woodland as well as the Gagle Brook corridor.

Proposed Development

3.12 The Proposed Development involves the provision of a new Strategic Rail Freight Interchange. The different elements of the Proposed Development are identified in Table 2 of Section 2 of this Report. A plan showing different components of the Proposed Development is contained in **Appendix 1**. Those components are described in more detail below.

3.13 The detail of the proposals will be reviewed as the EIA process, and consultation, progresses, with the potential for additional design or mitigation measures to be embedded as the scheme evolves further. However, the following description of development is intended to provide sufficient clarity to enable the ES Scoping process.

<u>The Main Site</u>

3.14 The draft parameters for the Proposed Development on the Main Site are shown on the plan in **Appendix 3** and a draft illustrative layout is shown on the plan in **Appendix 4**. The Main Site comprises a total site area of approximately 287 hectares.

3.15 The rail terminal and associated infrastructure (sidings, storage facilities etc) will be located adjacent to the Chiltern main line in the northern part of the site. This will include a management building, rail reception sidings, container storage area and associated container transfer equipment, and refueling facility. This area is shown as Zone C on the draft Parameters Plan.

3.16 The maximum warehouse development footprint applied for will be 675,000 sq.m. (approx. 7.26 million square feet) with an allowance also made for the provision of additional mezzanine floorspace (up to one third of the total floorspace – approximately 225,000 sq.m.). The Transport Assessment and other associated assessments of potential noise or air quality impacts will be based on that total maximum floorspace (including mezzanines) - the Transport section of this Scoping Report (in Section 5) provides further details

about the proposed Transport Assessment. This area is shown as Zones A1-A4 on the draft Parameters Plan.

3.17 The area shown as Zone B on the draft Parameters Plan may be used for warehousing or used as part of the rail freight interchange depending upon occupier and rail freight requirements.

3.18 The site will include a significant amount of green infrastructure, and new or retained environmental features. Many green spaces or features will be multi-functional, for example providing visual screening of the development from outside view while also providing new or improved habitat connectivity within the site.

3.19 An existing green corridor containing a large pond on-site will be retained, as will the majority of existing trees which run north-south within the Main Site, and these features are proposed to be incorporated into a central corridor including the new on-site spine road.

3.20 Much of the new planting will be within the landscaped buffers around the Main Site edges. These buffers vary in depth around the site, but the current draft plans show many sections 75-125m deep or more (such as along parts of the southern and western boundaries of the site). The landscaping buffer will include earthworks bunds created as part of the 'cut and fill' exercise on-site, and which will form a key part of the landscape and visual mitigation proposed. The details of these bunds will be confirmed as the EIA and further technical work progresses.

3.21 A Parameters Plan will define the key parameters for the development, and be the basis of the assessment during the EIA process. A draft Parameters Plan is enclosed at Appendix 3 – this draft plan may be amended and could evolve further as the EIA process progresses and through dialogue with the LPA and other consultees.

3.22 While the application will not seek approval for details of layout, an illustrative layout will be submitted as part of the application, with the current draft being enclosed at Appendix 4. This will demonstrate one way in which the Proposed Development could be carried out in accordance with the parameters set out on the Parameters Plan. Compliance with the parameters will be secured through the DCO. It is anticipated this will be subject to refinement prior to submission of the application. At the time of the application, the number and detail of buildings on-site will not be known but would be determined post consent and in accordance with the approved parameters and other relevant requirements of the DCO.

3.23 The description of development Chapter in the ES will incorporate a Sustainability Statement which will set out details of how the Proposed Development has been designed whilst considering energy efficiency, low carbon and renewable energy measures, rooted in the 'zero net carbon' policy agenda.

3.24 In summary, the proposed development on the Main Site consists of:

- A rail freight terminal served via new connections to the Chiltern Railway Line (part of the Strategic Rail Freight Network), including container storage and ancillary management/office accommodation;
- Demolition of existing buildings and structures (farmstead buildings and Severn Trent Green Power IVC facility), and new earthworks to create development plateau to accommodate new development, drainage attenuation features, and extensive perimeter earthworks bunding which will form part of the screening (landscape and visual mitigation) of the Proposed Development;
- Up to 675,000 sq.m. (approx. 7.26 million square feet) of distribution and logistics (use class B8) floorspace, including ancillary office accommodation, plus up to 225,000 sq.m. of additional floorspace in the form of mezzanines, with associated yard and parking areas;
- The Principal Access will be from the new Ardley Bypass and off a new roundabout on the B430 in the north-eastern corner of the Main Site,

south of the railway line. This access will serve all HGV traffic accessing the site. The Secondary Access into the site will be via the re-aligned Camp Lane at the southern end of the Main Site off the Heyford Park Link, the use of which will be restricted to bus (public transport) and cycle and pedestrian access only.

- Relocated Seven Trent Green Power IVC Composting facility within the Main Site, the precise location of which is yet to be determined, a potential location under consideration is shown on the draft Parameters Plan – located to the south of the Heyford Park Link;
- Underground reservoir to be retained – extent of water main diversion to be determined.
- Measures to enable and encourage sustainable travel to the site, including improvements and new links to existing Public Rights of Way, and provision of new foot and cycle links to and within the site, as well as connections to enable bus provision to serve the site;
- Retention and re-use of the Grade II listed Threshing Barn at Ashgrove Farm as part of a management suite and shared on-site facilities centred on the current farm complex;
- Retained and new landscaping and planting, including on the proposed earthwork bunds, as part of a comprehensive landscaping and green infrastructure scheme, including habitat creation to deliver biodiversity gain on-site.
- The Main Site will be accessible via a range of modes of transport, with extensive new walking and cycling routes proposed within the green infrastructure and landscaping areas within the site, as well as via the main road infrastructure into the site. The site will incorporate diversions and new connections to a number of surrounding Rights of Way, including links to route 109/26 to the east, and to committed or proposed new routes running north-south and linking the site to Ardley which are being brought forward as part of other developments (including Heyford Park).

<u>Highway Works</u>

3.25 3.20 It is anticipated that the highway strategy will be based on the elements already identified and explained below. However, the highway strategy, and therefore the Highway Works, are in the process of being evaluated, in conjunction with the local highway authority and Highways England. A number of options in relation to some elements remain under consideration. Where options are still under consideration these are referred to below.

Ardley Bypass

3.26 The Main Site is proposed to be accessed via a new Ardley Bypass delivered as part of wider improvements to M40 Junction 10. The Bypass is proposed from the Ardley Roundabout (at the western side of the current Junction 10 of the M40) on an alignment east of the B430, and would also serve as a new Principal Access to the Main Site. It would tie-in with proposed re-located south facing M40 slip roads, via a new junction which currently includes options with and without a highway link to the existing Ardley Road bridge over the M40. The Ardley Bypass road would bridge over the Chiltern Main Line railway to serve the Main Site, and rejoin the existing B430. The Bypass will include drainage and landscaping associated with the new road and junction arrangements. It will include amendments and diversions to PRoW (including routes 109/22 and 109/24). The B430 will be stopped up to the south of Ardley village, north of the new Main Site access roundabout, to prevent vehicular through-traffic.

J10 Highway Improvements

3.27 This package of improvements has several related elements which will see additional capacity created at Junction 10 of the M40, and also enable a new Principal Access to the Main Site off the Ardley Bypass. The proposals include alterations to various existing elements of the motorway junction complex. The proposals under consideration are shown indicatively on the plans contained in **Appendix 5**. The proposed works include:

- Amendments to the Oxfordshire Housing Growth Deal committed highway improvement at the Baynard's Green Roundabout to provide additional capacity at the junction;

- A new free flow link for A43 southbound to the M40 southbound traffic, removing significant traffic flow from the Padbury Roundabout and Cherwell Roundabout;
- Amendments to the Padbury Roundabout to improve the alignment for northbound and southbound traffic and provide a signal controlled T-junction;
- Amendments to the Cherwell Roundabout at the eastern side of the M40 Junction 10, including a new right turn arrangement for the motorway services area, and the removal of the M40 southbound on-slip from this junction;
- Enlargement, repositioning and signalisation of the Ardley Roundabout at the western side of the M40 Junction 10, including the removal of the M40 northbound off-slip from this junction, and the reconfiguration of the M40 northbound on slip (for which two options are being considered);
- Provision a new M40 southbound on-slip and new M40 northbound off-slip to the south of the existing M40 Junction 10 complex that would connect via a new dual carriageway link to the Ardley Roundabout to the north and to a new roundabout on the B430 to the south that would provide access to the Main Site, which, in combination, would form a new bypass to Ardley as described above;
- Drainage and landscaping associated with the new roads and junction arrangements.
- Amendments and diversions to PRoW to maintain or provide additional connectivity.

Middleton Stoney Relief Road

3.28 This is a new single carriageway road around the north-eastern side of Middleton Stoney which will provide a link from the B4030 which crosses the M40 to the east of the village and join the B430 north of Middleton Stoney. The Relief Road will include drainage and landscaping associated with the new road and junction arrangements, and appropriate crossings at existing

PRoW. This ES Scoping is carried out on the basis of a number of route alignment options set out on the plan in **Appendix 6**. A final route will be informed by more detailed environmental and technical assessments, as well as consultation, which will also allow final refinement of the Application Site.

Heyford Park Link

3.29 This is a new single carriageway road which will provide a link from the B430 north of Middleton Stoney to Heyford Park. The road will include drainage and landscaping associated with the new road, junction arrangements and appropriate crossings at existing and new PRoW. Currently there are two route alignments under consideration as shown on the plan in Appendix 6. A final route will be informed by more detailed environmental and technical assessments, and consultation.

3.30 A Secondary Access will be formed off the Heyford Park Link at the southern end of the Main Site. This is envisaged as a bus (public transport) and cycle and pedestrian access only.

4.0 SUGGESTED SCOPE AND STRUCTURE OF THE ENVIRONMENTAL STATEMENT

4.1 This section identifies the scope of the information intended to be included in the ES. It broadly follows the order of the information referred to in Schedule 4 of the EIA Regulations. The section then goes on to outline the proposed structure of the ES.

Scope of ES

Description of Development

4.2 A full description of the Proposed Development will be included within the Environmental Statement. At that stage it is anticipated that options currently under consideration, for example, in respect of the alignment of the Middleton Stoney Relief Road and the J10 Highway Improvements will be reduced to chosen options.

4.3 It is important that flexibility is embedded into the development since a key requirement of the development is that it needs to be able to respond to occupier demand in a logistics industry which continually evolves. Accordingly, the Rochdale Envelope approach has been utilised, in line with the Planning Inspectorate Advice Note 9 (V3).

4.4 To allow for the disposition and size of the warehousing to respond to occupier demand these components of the Proposed Development are not fully prescribed but are instead dealt with by the identification of parameters, with which the form of development brought forward under the DCO must comply. So the overall amount of warehousing and scale on each development zone are identified on a Parameters Plan along with maximum heights. Also embedded within the Parameters Plan will be the location of the rail terminal and disposition of green infrastructure and other essential elements of the Proposed Development.

4.5 The draft Parameters Plan is included in Appendix 3, and a final version will be included within the ES and will form the basis for the assessment of the development of the Main Site. This approach is consistent with the approach taken to assessment in the four SRFI authorised by DCO to date.1

4.6 Some elements of the Highway Works will also have some flexibility applied in the form of limits of deviation which, to comply with the regulations will be shown on the Works Plans to be provided as part of the DCO application. These will provide limited scope within the Order Limits to vary the precise extent of the Highway Works to reflect any detailed consideration of those works at the time of detailed working drawings being approved post DCO consent.

4.7 As indicated in Section 3, the application will be supported by a Sustainability Strategy which will be incorporated into the description of the development in the ES. The Sustainability Statement will include details of how the proposed development has been designed whilst considering energy efficiency, low carbon and renewable energy measures, rooted in the 'zero net carbon' policy agenda.

4.8 The description of development in the ES will include an indicative construction programme identifying an indicative phasing of the construction of the development. The sequence of the earlier phases relating to the provision of infrastructure will be set out. The sequence of the development of the warehousing will however be dependent on occupier requirements during the course of the development and cannot be identified before the DCO is approved.

4.9 Information on construction within the ES will include construction methods associated with each construction phase, siting of construction compounds,,

[1] Daventry International Rail Freight Interchange, East Midlands Gateway, Northampton Gateway and West Midlands Interchange

lighting requirements and number and movement and parking of construction vehicles.

4.10 Where construction methods are relevant to the assessment of a particular topic then information with regard to those construction methods will be contained in the topic chapter in the ES.

Alternatives

4.11 The ES will include a description of reasonable alternatives which have been studied by the Applicant. This will include information regarding the early consideration of alternatives for the design and layout of the site, and the transport strategy, in addition to any potential alternative sites considered. This section of the ES will explain the main reasons for selecting the chosen options including with regard to the comparative likely environmental effects.

4.12 A key issue which underpins the assessment of alternatives is the limited number of suitable alternative locations for an SRFI given the site size and accessibility criteria defined by the Planning Act 2008 and expanded upon in the National Policy Statement for National Networks ('the NPSNN'). There are few sites which can deliver access to the strategic rail freight network as well as to the strategic road network, and which do not contain significant environmental constraints.

4.13 The alternatives section will include reference to alternative approaches to the development of this site, linked directly to the design evolution of the proposals which will also be described in a Design & Access Statement as part of the application in due course.

Baseline

4.14 The ES will include a description of the relevant aspects of the current condition of the site's environment ('baseline' scenario). This is to identify and describe the current environmental conditions against which the proposed development can be measured or predicted. Each topic chapter will set out the baseline relevant to that topic.

4.15 The baseline context for the ES will assume that the environmental conditions at the site are as they exist at the present time. In addition to the existing baseline, where relevant in individual topic assessments, the topic chapters will outline any likely evolution of the baseline without implementation of the development.

Potential for 'Likely Significant Effects'

4.16 Based on the Application Site and the Proposed Development, an assessment has been made regarding which environmental topics, or particular aspects of them, should be 'scoped in' and 'scoped out' of the ES. Topics that are scoped into the ES are judged to have the potential to cause likely significant effects, albeit inclusion of a topic within the ES does not mean potential significant effects are inevitable or cannot be appropriately mitigated.

4.17 Topics that are scoped out of the ES are those which are not anticipated or likely to result in any significant effects. The decision to scope out topics is based upon the nature of the proposed development and the site and its surroundings. As the assessment proceeds, any omitted topics will be reviewed and their significance may be re-evaluated in response to additional information, or changes to the proposed development.

4.18 Table 3 below summarises the potential environmental effects which it is suggested should be the subject of assessment (scoped in) and the topic headings under which they will be assessed. Table 3 also identifies those issues which it is believed do not merit assessment (scoped out).

4.19 Each assessment scoped in will include an identification of the receptors likely to be affected by the effect and a description of the potential likely significant effects.

Table 3

SCOPED IN	
Topic Heading	**Assessment Scope (for detail see Section 5)**
Transport and Access	• Effects of increased, and revised, traffic movements as a result of highway strategy both during construction and operationally. • Impacts on users of PROW • Accessibility of the Proposed Development • Impacts on climate change. • Cumulative impacts and intra project impacts
Air Quality	• Dust and particulate matter (PM_{10} and $PM_{2.5}$) generated by on-site activities during the construction phase; • Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant; • Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once

	occupied, including diversion and re-rerouting of traffic in the wider study area and the impact of any access arrangements; • Increases in pollutant concentrations as a result of emissions from the existing and proposed railway activities; and • The potential impacts of pollutant concentrations on future receptors of proposed developments within the vicinity of the Application Site. • Effects on Odour as a consequence of the relocated IVC composting facility if needed. • Elements of assessment of impacts on human health. • Cumulative impacts
Noise and Vibration	• Effects of noise during construction from construction activities including traffic movements

	• Effect of traffic noise during operation • Effect of activity at the Main Site during operation • Effect of noise in relation to rail operations and associated loading and unloading activities • Effect of any mechanical plant noise • elements of assessment of impact on human health. • Cumulative impacts
Ecology and Biodiversity	• Loss of habitat within locally protected sites • Disturbance to or effect of emissions on locally protected sites • Effects on, Habitats of Principal Importance (HPI), specifically broadleaved woodland and hedgerows • Effects on locally valued habitats due to water quality impacts during construction • Potential spread of invasive, non-native species (INNS) • Disturbance to legally protected species or species prioritised as Species of

	Principal Importance (SPI) nationally or locally • Consideration of Biodiversity Net Gain • Elements of assessment of impacts on climate change. • Cumulative impacts
Landscape and Visual	• Assessment of both landscape and visual effects during construction and operation including - • Effects on landscape features such as landform, woodland and trees, hedgerows and pond and water features • Effects on residents and, users of PROW and roads. • Cumulative impacts
Lighting	• Effect of lighting of the Main Site and Highway Works • Effects of obtrusive light including glare, light spill and upward light. • Consideration of human and ecology receptors • Elements of assessment of impacts on human health. • Cumulative impacts

Water Environment	• Assessment of flood risk • Effects of surface and foul drainage strategy • Effects of required potable water supply on water resource availability • Elements of assessment of impacts on climate change • Cumulative impacts
Cultural Heritage	• Assessment of the value and sensitivity of heritage assets potential affected by the Proposed Development and, where appropriate, their settings • Effects of the Proposed Development on the heritage assets. • Cumulative impacts
Ground Conditions	• Assessment of the potential for soil gas and water contamination during construction and operation • Effects on ground conditions during construction and operation
Socio- Economic Impacts	• Employment requirements of the Proposed development during construction and in operation

	• Assessment of impact on economic conditions – economic activity, unemployment, income, occupation, and deprivation • Assessment of impact on education, skills and qualifications • Assessment of impact on heath and well being • Cumulative impacts
Waste	• Assessment of effects of generation of waste during construction and operation • Cumulative impacts
Agricultural Land	• Assessment of effects on the agricultural land, and associated soil resource.
Climate Change	This will draw together the various climate change impacts and deal with an assessment of Greenhouse Gas emissions.
Cumulative Impacts	Overall conclusions on cumulative impact and intra project impacts will be drawn together and summarised in this Chapter.

SCOPED OUT	
Risks of major accidents and/or disasters	See paragraphs 4.32 to 4.34 below.
Transboundary Effects	See paragraphs 4.25 to 4.26 below
Aspects of Topics Assessed	Each topic area in Section 5 of this Report identifies and justifies any aspects of that topic which are not to be taken forward into the assessment.
Decommissioning	The development will be constructed and occupied over time rather than as a single entity. Unlike many NSIP, it will not be decommissioned as a single point in time and in fact is unlikely to be subject to any decommissioning. The separate elements of the development will at various times by altered or re-developed according to individual occupiers needs at that time.

4.20 Section 5 of this Report sets out scoping information in respect of each of the Topic Areas described above as being scoped in.

4.21 The description of the 'likely significant effects' on the factors specified above will cover the direct effects and any indirect, secondary, cumulative, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development, where relevant to the topic concerned.

4.22 It can be seen from Table 3 above that different aspects of the impact on climate change is proposed to be dealt with in different chapters of the ES.

This is because climate change is a cross cutting issue and to deal with it only in a separate chapter would result in it being artificially separated from other relevant topics. A climate change Chapter is proposed however to draw together those impacts and to deal with an assessment of Greenhouse Gas emissions.

4.23 In any event it is not considered that the Proposed Development would be likely to have any significant adverse impacts on climate change. One of the major drivers behind the positive policy context for expanding the network of SRFI provided by the National Policy Statement for New Networks (NPSNN) is recognition of their role in enabling a shift of freight from road to rail. This represents a significantly more efficient form of transport and delivers significant reductions in carbon dioxide and other greenhouse gases. The NPSNN states that:

"*Tonne for tonne, rail freight produces 70% less CO2 than road freight, up to fifteen times lower NOx emissions and nearly 90% lower PM10 emissions. It also has de-congestion benefits – depending on its load, each freight train can remove between 43 and 77 HGVs from the road*." (NPSNN, paragraph 2.35)

Cumulative Impacts

4.24 In accordance with EIA Regulations, the ES will include an assessment of the cumulation of effects with other existing and/or approved projects. This should identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities.

Transboundary

4.25 It will be necessary for the Planning Inspectorate to determine whether or not the Proposed Development is likely to have significant effects on the environment in an EEA State.

4.26 The Applicant believes it will be apparent from the location and description of the Proposed Development that it is not likely to have significant effects on the environment in an EEA State.

Methodology

4.27 Each chapter of the ES will set out the methodology and/or evidence used to identify and assess the relevant significant effect on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered in compiling the required information and the main uncertainties involved.

4.28 No single standard approach is to be used across the topics. Each topic will be assessed according to the methodology appropriate for that topic which will be explained in the related chapter in the ES and is described in Section 5 below in relation to each topic.

Mitigation and Monitoring

4.29 Each topic chapter of the ES will include a description of the measures envisaged to mitigate any identified significant adverse effects on the environment. This will include reference to features or components which are 'built-in' or designed as part of the Proposed Development, such as green infrastructure, and other additional measures which are recommended as part of the ES process and which form part of the proposed mitigation of specific potential or likely effects.

4.30 The assessment in each topic chapter will explain the extent to which potential significant adverse effects on the environment will be avoided, prevented, reduced or offset, and will cover both the construction and operational phases. Furthermore, the ES will include a description of any proposed monitoring arrangements, where required.

4.31 The DCO application will include, as a separate document, a "Mitigation Tracker" which will set out the elements of specific mitigation identified in the topic chapters in the ES and will explain how such mitigation will be secured, whether by application of the parameters through the Rochdale Envelope, by a requirement in the DCO or by a planning obligation. The Mitigation Tracker

will be a live document through the post application process to ensure it reflects changes to mitigation which might arise post submission, if any.

Major Accidents and Disasters

4.32 It is considered that the risk of a major industrial accident or disaster is low and unlikely given the operations of the site. All risks of the operations on site would be managed through the appropriate health and safety procedures and regulations.

4.33 Any risk from a major accident or disaster has been considered within the design of the proposal. Consequently, it is considered that no likely significant effects with regards to major accidents and disasters (such as flooding and operational accidents) are anticipated. Therefore, Major Accidents and Disasters are therefore proposed to be scoped out of the ES.

4.34 Management of construction related risks, should the application be approved, would be governed by Health and Safety and other associated regulations, as well as through standard practices usually secured through such mechanisms as Construction Management Plans.

Structure of Environmental Statement

4.35 The anticipated content and structure of the ES will be as follows:

Section	
Introduction	• Explanation of the background to the scheme and the context for the production of the ES. • A table identifying where within the ES the information required by the EIA regulations to be provided can be found. • A table will be included identifying how any issues raised in the Scoping Opinion

	provided in response to this Report have been addressed. • Reference to topics scoped out and the justification for so doing
Site Description	• description of the Application Site and surrounding area. • to include any features on or around the site including designated assets or sensitive receptors.
Proposed Development	• a detailed description of the proposed development, including an indicative construction programme relevant known details about the phasing of construction process. • to include a Sustainability Statement and Utilities Report.
Project evolution and alternatives	• details of any alternative sites considered • alternative design and development of the proposals on the Main Site • a summary of the evolution of the options in respect of the Highway Works which were explored as part of the process.
Topic Assessments	• separate chapters for each assessment topic.
Separate Volumes	• containing technical appendices
Non Technical Summary	• containing a summary of the main findings of the ES in accessible, non-technical, language

4.36 Whilst the ES topic assessment chapters would each be in bespoke form as best suits their topic and will set out its own methodology, it is intended that each Chapter broadly follow a standard format utilising the following main

headings. This will not be strictly adhered where a heading is not relevant to the topic concerned:

- Overall scope of topic assessment
- Relevant law, policy and best practice
- Baseline – description, surveys and designations
- Consultations and the response to consultation
- Methodology (including any significance criteria)
- Assessment (based on embedded mitigation and then residual assessment based on any specific mitigation)
- Cumulative and intra project effects
- Summary table of residual effects

4.37 A reference list will be provided as part of each chapter.

Project Team

4.38 The project team is set out below.

Table 4

TOPIC	CONSULTANT
Transport and Access	ADC Infrastructure Ltd
Air Quality	BWB Consulting Ltd
Noise and Vibration	Vanguardia
Ecology and Biodiversity	FPCR
Landscape and Visual Impacts	FPCR
Lighting	Design For Lighting
Water Environment (Flood Risk, Drainage and Water Quality)	BWB Consulting Ltd
Cultural Heritage	RPS
Ground Conditions	BWB Consulting Ltd
Socio-Economic Impacts	Hatch
Waste	BWB Consulting Ltd
Agricultural Land	Land Research Associates
Climate Change	BWB and Oxalis Planning Ltd
Cumulative Impacts	Oxalis Planning Ltd

5.0 TOPICS SCOPED IN

5.1 An ES project team has been instructed in anticipation of agreeing a formal Scope of the assessments to be undertaken and work to further expand the Applicant's understanding of the baseline conditions is ongoing. On the basis of the work undertaken to date to assess the Application Site, and having considered the nature and scale of the Proposed Development, this section sets out those environmental topics proposed to be 'scoped in' to the ES.

5.2 The topics are listed below, and a section on each topic is also presented to provide further details about the scope and methodology for proposed assessments:

- Transport and Access
- Air Quality
- Noise and Vibration
- Ecology and Biodiversity
- Landscape and Visual Impacts
- Lighting
- Water Environment (Flood Risk, Drainage and Water Quality)
- Cultural Heritage
- Ground Conditions
- Socio-Economic Impacts
- Waste
- Agricultural Land
- Climate Change
- Cumulative Impacts

5.3 As described in Section 4, Climate Change will be considered throughout the ES where relevant to the topics listed above (rather than in a stand-alone Chapter).

5.4 The potential environmental effects of the development in relation to the above key topic areas and the scope of the assessments proposed is set out below

as part of describing the proposed scope and methodology of the assessment under each topic heading.

Transport and Access

Overview

5.5 The Transport and Access chapter of the ES will describe the environmental effects that would be created by the changing transport conditions as a consequence of the Proposed Development. The chapter will therefore consider the main modes of travel including the development demands on the existing transportation infrastructure for walking, cycling, public transport usage and vehicular traffic.

5.6 The emerging access strategy includes a package of Highways Works which would be delivered as part of the Proposed Development. The Applicant's approach has evolved from a starting assumption that a new junction on the M40 motorway would be the most appropriate approach. Following initial investigations into this and other options, the access strategy has evolved and is now centred on significant improvements to Junction 10 of the M40 motorway. This approach will not only ensure adequate capacity to accommodate the required access to the Strategic Road Network, but also deliver appropriate new site access infrastructure, and aid delivery of planned growth and development across the wider area.

5.7 The highways proposals will include a new Ardley Bypass which would remove through-traffic from the village, and deliver the Primary Access to the Main Site. Based on early assessment work and an initial understanding of the current baseline conditions, the Highway Works also include a Middleton Stoney Relief Road to remove a proportion of both current and anticipated future traffic from the village centre. The Highways Works include a Secondary Access to the Main Site for public transport, cyclists and pedestrians (and emergency vehicles), which would be taken from the realigned unnamed road that links Camp Road with the B430, which would represent a new Heyford Park Link.

5.8 In combination, this proposed strategy is considered appropriate to ensure both suitable and efficient access to the Main Site, and from the Main Site to

the Strategic Road Network, while mitigating likely future effects and addressing a number of well-known existing local transport issues and challenges. However, a number of options are still being considered with regard to the access strategy, including the route alignment for the Middleton Stoney Relief Road and Heyford Park Link, and the configuration of some detailed elements of the M40 Junction 10 Highway Improvements. The Transport Assessment (TA) process will consider and help refine these proposals, and the process of scoping the TA is underway with Oxfordshire County Council and Highways England.

5.9 A TA and a Framework Travel Plan will be included and appended to the ES. They will be undertaken in accordance with the following:

- National Policy Statement for National Networks (NPS).
- Department for Transport (DfT) Circular 02/2013 'The strategic road network and the delivery of sustainable development'.
- Planning Policy Guidance on 'Travel Plans, Transport Assessments and Statements in decision-taking'.

5.10 The TA and accompanying Framework Travel Plan will examine the accessibility of the site by public transport, cycling and walking, and identify the modal split of person trips associated with the development. The Transport Assessment will evaluate the impact of the development trips on the surrounding transport infrastructure, including an appraisal of heavy goods vehicle movements, to identify the need to provide any additional improvements to accommodate the development and reduce impacts to acceptable levels.

5.11 The Framework Travel Plan will accompany the TA and it will seek to encourage employees and visitors of the site to use healthier and lower carbon transport options in contrast with single occupancy vehicle trips. In this context, the Chapter will consider any interactions and likely impacts on human health.

5.12 The transport and access chapter of the ES will draw upon the findings and conclusions of the TA and Framework Travel Plan. Outputs from the TA and

associated assessment work will directly feed into the assessments of Air Quality, and Noise, including the assessment of the impacts and interactions with regard to climate change.

Baseline Information

5.13 The baseline conditions for the transport infrastructure will be established for all the main modes of transport as part of the Transport Assessment.

5.14 However, an understanding and recognition of identified existing and future constraints at M40 Junction 10, and on local road network through the villages of Ardley and Middleton Stoney, has influenced the strategy regarding the Highway Works proposed to support the Proposed Development, and are therefore set out in more detail at this stage.

Strategic Road Network

5.15 The closest point of access to the Strategic Road Network from the Main Site is at Junction 10 of the M40, approximately 1.6km to the north of the Main Site when accessed via the B430. To access M40 Junction 10 would involve travelling through the village of Ardley.

5.16 At Junction 10 there is also direct access to the A43. The M40 connects to Birmingham (and the M42 and M5) to the north, and the M25 and London to the south. The A43 heads northeast from M40 Junction 10 and connects to the M1 at M1 Junction 15A.

5.17 The current layout of M40 Junction 10 was altered in 2015 as part of works carried out under Highways England's Pinch Point Programme. The works involved the modification of the northern roundabout (Padbury Roundabout) to remove the M40 southbound diverge slip road, with all southbound traffic now joining the M40 at what was previously the slip road from the motorway services. As part of the works the motorway service roundabout (Cherwell Roundabout) was signalised.

5.18 The Pinch Point scheme was not a long-term fix for the junction and assessment work undertaken by Highways England has identified the 2021 to 2026 time period as the tipping point for the Pinch Point improvement scheme at the junction. In addition, Highways England have identified that the A43/B4100 roundabout (Baynard's Green Roundabout), to the north of M40 Junction 10, currently operates over capacity, with the performance deteriorating significant in future years and adversely impacting the operation of M40 Junction 10.

5.19 Highways England have identified an improvement scheme at the Padbury Roundabout at M40 Junction 10 and at the Baynards Green Roundabout, to safeguard the operation of these junctions through to 2031. The scheme will be delivered through a combination of Growth Deal funding and contributions from the Heyford Park development. It is currently expected that the improvement scheme will be delivered in 2023.

5.20 However, assessment undertake by Highways England shows that by 2031 the Cherwell Roundabout and B430/A43/M40 northbound off-slip roundabout (Ardley Roundabout) will also operate overcapacity. The M40 southbound on-slip at the Cherwell Roundabout breaks down due to the merge type, whereas the Ardley Roundabout breaks down because of the demand for right-turners from the M40 northbound off-slip. The break down at the Cherwell Roundabout has a knock-on impact at the Padbury Roundabout.

5.21 Highways England have identified potential improvement schemes at the Cherwell Roundabout and the Ardley Roundabout. However, these are not committed and do not have funding. Even with these additional improvements, the operation of M40 Junction 10 would be at the tipping point by 2031 assessment year, and initial assessment work has indicated these potential improvements would not have sufficient capacity to accommodate the traffic from the Proposed Development.

Local road network

5.22 The village of Ardley is approximately 1km to the north of the Main Site. The B430 runs through the east of the village, with the main village centre to the west of the B430. To access the site from M40 Junction 10 it is necessary to pass through Ardley on the B430 and over the Chiltern Main Line railway bridge, which narrows slightly, potentially making it difficult for two HGVs to pass one another.

5.23 The village of Middleton Stoney is approximately 1.5km south of the Main Site, accessed by the B430 which runs through the village in a north-south direction, connecting to the A34 to the south, and in doing so also passing through the village of Weston-on-the-Green.

5.24 In the centre of Middleton Stoney there is a signalised staggered crossroads junction between the B430 and the B4030. The B4030 runs through the village in an east-west direction connecting to the A44 to the west, and to the east it connects with Bicester and in turn the A41, from where access to M40 Junction 9 can be gained.

5.25 There is a committed highway improvement scheme at the crossroads associated with the 2008 planning approval at the Heyford Park site. The committed highway improvement scheme retains the existing signalised junction, but widens the B430 Oxford Road approach, providing a right turn flare for vehicles turning into the B4030 Bicester Road and provides a short right turn island for vehicles turning into B4030 Heyford Road. However, this scheme has not yet been implemented and the assessment work undertaken to support the Local Plan allocation at Heyford Park concludes that highway impacts at that junction would be severe unless other highway mitigation measures are also implemented.

5.26 The Heyford Park planning application therefore proposed a ‘Middleton Stoney Mitigation Package’, that would comprise the following measures:

- A bus gate on the B4030 to the west of the village, including a change in priority at the junction of the B4030 with the unnamed road running north to Camp Road.
- The introduction of more frequent 15-minute bus services between the Heyford Park development and Bicester via Middleton Stoney during weekdays.
- The introduction of a cycle route between Heyford Park and Middleton Stoney.
- A weight restriction on the B4030 to the east of Middleton Stoney to reduce the number of HGVs passing through the village.
- The preparation of a full Travel Plan setting out measures aimed at reducing journeys by the private car, especially between Heyford Park and Bicester.

5.27 The Heyford Park scheme received a resolution to grant planning permission subject to the S106 Agreement at the 5 November 2020 Planning Committee meeting. Nevertheless, due to the strength of feeling against the bus gate it was agreed that rather than implement the Middleton Stoney Mitigation Package of improvement works, a 'monitor and manage' option will be implemented.

5.28 The Heyford Park developer will provide a financial contribution equivalent to the cost of the proposed Middleton Stoney Mitigation Package and including an additional sum for traffic monitoring. This traffic monitoring will then be carried out by Oxfordshire County Council in the intervening period before the need for a bus gate is required. This period is likely to be several years dependant on the rate of development at Heyford Park. In this way, the monies are available to deliver the Middleton Stoney Mitigation Package, if it is still shown as necessary, or an alternative solution of equivalent benefit (termed 'the Revised Middleton Stoney Mitigation Package') can then be delivered by Oxfordshire County Council within the amount of the financial contribution as specified.

5.29 It is clear from the above that the means of dealing with the Heyford Park traffic impact through Middleton Stoney are not yet fully resolved and that the existing constraints would make it difficult to cater for further traffic impacts associated with the Proposed Development.

Key Receptors

5.30 The access strategy and proposed package of Highway Works have therefore been developed to ensure suitable and efficient access to and from the Main Site, while mitigating likely future effects and addressing the existing and future highway network constraints described above.

5.31 The Proposed Development, including the associated package of Highway Works, will alter the baseline conditions and could change the pattern of movements on the transport infrastructure surrounding the site for existing users.

5.32 The effects of the development will impact on the highway networks of Highways England and Oxfordshire County Council, including specifically the M40 Junction 10, the M40, M40 Junction 9, the A43, the A34, the B430, the B4030, and the local access routes at Ardley, Middleton Stoney, and to and from Heyford Park.

5.33 Drawing ADC1794-DR-011 Rev P4 (Annexed to the Scoping Report) shows the existing and committed PRoW within and close to the Application Site. The development will impact a number of public rights of way (PRoW) including bridleways 109/28, 109/29, and 109/30 that cross the Main Site, footpaths 297/8 and 297/3 to the northeast of Middleton Stoney that would be impacted by the proposed Middleton Stoney Relief Road, and bridleway 109/26 and footpaths 109/22 and 109/24 to the east to Ardley that would be impacted by the proposed Ardley Bypass and M40 Junction 10 Highway Improvements. The impact of the Proposed Development on the affected PRoW routes will be assessed. Other PRoW may be affected by changes in traffic volumes using the road network and will be assessed as required. Other PRoW may be affected by changes in traffic volumes using the road network and will be assessed as required.

5.34 In addition to the above, Oxfordshire County Council have a number of new or upgraded PRoW that are either conditions or obligations related to planning permissions in the area and that meet the aims of the adopted Oxfordshire

County Council Rights of Way Improvement Plan. These are also shown on Drawing ADC1794-DR-011 Rev P4. The impact of the Proposed Development on these routes will also be assessed, and dialogue has begun with Oxfordshire County Council regarding existing and potential improvements to PRoW within and close to the Application Site. Access to and from existing or new PRoW will be of direct relevance to consideration of 'human health'.

Future Baseline

5.35 Given the approach to be taken to the preparation of the TA, the process will explicitly deal with the 'future baseline'. The Applicant will use an agreed and up to date transport model which will represent the planned and committed development and growth, and infrastructure, which already features in Local Plans and other documents or strategies. By modelling the future both with and without the Proposed Development, the assessment will provide an understanding of the likely future baseline, as well as being able to identify the likely additional effects of the Proposed Development.

5.36 Given that outputs from the TA will help underpin the assessment of both Air Quality and Noise effects (see separate sections of this Scoping Report), those sections too will also explicitly consider the future baseline.

Assessment Methodology

5.37 A Transport Working Group has been established comprising representatives from Highways England (who have responsibility for the strategic road network), Aecom (Highways England's term consultant), and Oxfordshire County Council (who have responsibility for the local highway network). In addition, Cherwell District Council, the local planning authority, attend the TWG meetings. The objectives of the Transport Working Group are to:

- provide a forum for consultation with the regulatory stakeholders.
- allow agreement, in a phased and methodical process, of the key components of the transport work that are required to support the DCO submission.

5.38 The Transport Working Group (TWG) have been meeting regularly to discuss and agree key elements of the TA methodology, and this will continue throughout the preparation and agreement of the TA, Framework Travel Plan, ES chapter, and the submission of the DCO application.

5.39 A series of technical notes, reports and drawings will be prepared and submitted to the TWG for review and agreement. In that way key assessment inputs and parameters, and effects and outcomes can be agreed in a step-by-step process.

5.40 As part of that work, technical notes on trip generation and trip distribution have been submitted to the TWG for agreement. The proposed M40 Junction 10 Highway Improvement and Ardley Bypass are the subject of ongoing option assessment work using future baseline traffic data taken from Highways England's approved and validated micro-simulation model of the junction, in combination with the forecast Proposed Development traffic flows. That work will identify the preferred improvement scheme at Junction 10, in combination with Ardley Bypass, for agreement with the TWG and onwards modelling within the Bicester Transport Model (see below). This, along with the modelling of Middleton Stoney Relief Road and Heyford Park Link, will allow the effects of the Proposed Development and highway infrastructure package to be assessed.

5.41 The Bicester Transport Model (BTM) is a SATURN based highway model that also includes a variable demand model. The model includes M40 Junctions 9 and 10 and was used to support the transport work for the recently consented adjacent Heyford Park development. The BTM was developed for Oxfordshire County Council by WYG (now Tetra Tech) in 2016/17 to comply with WebTAG guidance for transport models, in order that it could be used in future year transport forecasting and for the purpose of operational, economic and environment assessment. The BTM was updated and expanded in 2018 to ensure that it was suitable to use to assess the transport impacts of the Heyford Park development. This included the extension of the model simulation

network coding to include the A4260 to the west of the site. The model provides a 2016 base year, and 2021, 2026 and 2031 forecast years.

5.42 It has been agreed with the TWG that the impact of the development trips and associated highway infrastructure package will be examined using the BTM. A further review of the BTM is being undertaken by Tetra Tech to ensure that the model validation is appropriate to assess the changing transport conditions associated with the Proposed Development. Once that work is complete, by modelling the future assessment years both with and without the Proposed Development in place, the effects of the Proposed Development on the highway network can be defined. A study area will be agreed with the TWG based on the outputs of the BTM modelling. Detailed junction modelling using industry standard assessment techniques and software will then be undertaken for the agreed study area using traffic data from the BTM.

5.43 Where required, the TA will identify infrastructure improvements, which, in combination with the Travel Plan, will cater for the increased travel demand.

5.44 The suitability of the proposed M40 Junction 10 Highway Improvements and Ardley Bypass will be demonstrated using micro-simulation modelling. The modelling will consider the operation of the junction with and without the Proposed Development and Junction 10 Highways Improvement in place. The assessment models will be developed from Highways England's existing approved and validated VISSIM model of the junction. The assessment models will be agreed with the TWG.

5.45 The assessment of transport effects within the ES will be based on guidelines contained within:

- 'Guidelines for the Environmental Assessment of Road Traffic', the Institute of Environmental Assessment, 1993 (now the Institute of Environmental Management and Assessment (IEMA)).
- Design Manual Roads and Bridges (DMRB) LA 104 'Environmental assessment and monitoring'.
- DMRB LA 112 'Population and human health'.

5.46 The assessment will determine the impacts of the proposed development trips and associated highway infrastructure package on the future baseline transport infrastructure contained within the study area. This will include assessment of both construction and operational effects.

5.47 In accordance with DfT 'Circular 02/2013' an opening year of 2026 has been agreed with the TWG for the assessment of the transport impacts on the strategic road network. An assessment year of 2031, to coincide with the end of the current Local Plan period, has been agreed for the assessment of the transport impacts on the County road network. The 2031 assessment year will also meet the forward planning year requirement for Highways England. The planned and committed development and growth, and infrastructure, to be included for within each assessment year will be agreed with the TWG.

5.48 The assessment will consider, via the TA, issues such as access arrangements, parking strategy and potential to achieve modal shift to more sustainable modes of transport. The latter of which will be assessed within the Framework Travel Plan. The Framework Travel Plan will work in combination with the Public Transport Strategy (PTS) for the Proposed Development. The PTS will be developed in consultation with Oxfordshire County Council. Initial dialogue has begun to consider the appropriate labour markets on which the PTS will focus.

5.49 An evaluation of the above in the context of National and Local Planning Policy will be included.

5.50 Where necessary, additional mitigation measures will be proposed to reduce the identifiable adverse environmental effects of the Proposed Development to ensure they remain within acceptable parameters. The assessment will include identification of the residual impacts post implementation of the highways works, travel plan, and any other additional mitigation measures identified and recommended.

Potential for Likely Significant Effects

5.51 The ES will focus on environmental issues associated with potential changes to the traffic and transport behaviour resulting from the Proposed Development, in particular changes in traffic flows on the highway network focused on key junctions in the study area, and consequent effects on local communities. The ES will assess the impacts recommended by the IEMA in their Guidelines for the Environmental Assessment of Road Traffic, in combination with guidance contained within DMRB LA 104 and LA 112. These effects include:

- Severance;
- Driver delay;
- Walkers, cyclists and horse-riders (WCH) delay;
- WCH amenity;
- Accidents and safety.

5.52 The IEMA guidance also recommends that environmental effects of transport associated with Noise and Vibration, Visual impact, Air Pollution and Dust and Dirt, Ecological impact, and Heritage and Conservation be examined. These potential effects associated with transport will be assessed within other Chapters of the ES.

5.53 As a matter of course, the development would not give rise to hazardous loads and therefore it is proposed that this is scoped out of the ES.

5.54 The assessment will consider the temporary and permanent effects on the study area, including changes to the highway and PRoW networks due to the proposed access strategy, and/or changes in traffic levels, along with the potential for congestion at junctions. Assessment of the transport effects will be undertaken for both the construction and operational phases of the development.

Cumulative Effects Assessment

5.55 The cumulative environmental effects of the Proposed Development with committed or planned development and transport infrastructure projects will be accounted for in the BTM modelling. For each assessment year (2026 and 2031), the future baseline conditions (planned and committed development growth and infrastructure) to be included within the BTM assessment year scenarios will be agreed with the TWG.

5.56 The BTM traffic flow outputs will therefore include an evaluation of the traffic generated by all pertinent committed and allocated developments in the vicinity of the site that are highly likely to come forward before each of the assessment years. The BTM will also include all pertinent committed and allocated transport infrastructure schemes that are highly likely to come forward before the forecast assessment years. It is expected that this will include appropriate allowances for development and transport infrastructure schemes associated with the adjacent Heyford Park site, and the identified highway improvement schemes at the Baynard's Green Roundabout and the Padbury Roundabout that are to be delivered as part of the Oxfordshire Housing Growth Deal, along with the allocated growth at Bicester.

5.57 The above process will ensure that the ES appropriately evaluates the cumulative impacts of the Proposed Development in conjunction with other potential developments and transport infrastructure schemes. This same data and evidence will underpin the transport component of the assessment of Noise and Air Quality effects that will be assessed within other Chapters of the ES.

Air Quality

5.58 The Air Quality assessment will include consideration of construction and operational effects for the Proposed Development.

5.59 As described in Section 3 of this Scoping Report, the Proposed Development includes a relocated IVC composting facility. As an existing operation on the Main Site this use is not expected to raise any new or significant issues with regard to Air Quality or relating to Odour. However, discussions are ongoing regarding the nature of the operation, and while no Odour Assessment has been commissioned, the Applicant recognises that there may be a need to do so in due course. The ongoing discussions with the IVC operator, and the ES Scoping process, is expected to help clarify whether Odour should be within the Scope of the ES.

Baseline Information

5.60 European (EU) legislation forms the basis of air quality policy and legislation in the UK. The EU 2008 ambient Air Quality Directive[2] sets limits for ambient concentrations of air pollutants including nitrogen dioxide (NO2) and particulate matter (PM10 and PM2.5). The air quality standards and objectives are prescribed through the Air Quality (England) Regulations 2000[3], as amended, for the purposes of the Local Air Quality Management Framework.

5.61 The UK Government are required under the Environment Act 1995[4] to produce a national Air Quality Strategy (AQS)[5]. The AQS provides an overview of the Government's ambient air quality policy and sets out the air quality standards

[2] European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe
[3] HMSO (2000) Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000 (as amended), London: HMSO
[4] HMSO (1995) The Environment Act 1995, London: TSO
[5] Department of the Environment, Food and Rural Affairs (Defra) (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, London: HMSO

and objectives to be achieved and measures to improve air quality. Table A1 summaries the Air Quality Objectives of relevance to this study.

Table A1: National Air Quality Objectives

Pollutant	National Air Quality Objectives (NAQO)	
NO_2	Annual mean	40 µg/m^3
	1 hour mean (18 times per year)	200 µg/m^3
PM_{10}	Annual mean	40 µg/m^3
	24-hour mean (35 times per year)	50 µg/m^3
$PM_{2.5}$	Annual mean	25 µg/m^3
NOx	Annual Mean for ecological receptors	30 µg/m^3

5.62 The main source of existing air pollutants in the vicinity of the Proposed Development is from the surrounding transport network, including the M40 that runs to the east of The Proposed Development, and the Chiltern Railway Line which passes north east of the Proposed Development.

Local Air Quality Management Review

5.63 A review of the latest Annual Status Report published by CDC[6] confirmed that there are four Air Quality Management Areas (AQMA) declared within the Borough for potential exceedance of the nitrogen dioxide (NO2) annual mean objective. The closest AQMA is situated along Kings End, Queens Avenue, Field Street and St Johns Street at Bicester, approximately 5 km south east of the Proposed Development.

Existing Local Air Quality Monitoring Data

5.64 CDC operate a network of automatic monitoring stations and diffusion tube monitoring sites within the borough to monitor concentrations of NO2 and

[6] Cherwell District Council (2020) 2020 Air Quality Annual Status Report

PM10. Three NO2 diffusion tube monitoring sites are located approximately 2km from the Proposed Development and these are presented in Table A2. Results obtained from these monitoring sites were well below the NO2 annual mean air quality objective for the most recent five year period of monitoring data available (2015-2019). Additional local authority monitoring data will be obtained once the highways options have crystalised.

Table A2: CDC Diffusion Tube Monitoring Data

Site ID	Site Location (X,Y)	In AQMA?	Annual mean NO_2 concentration ($\mu g/m^3$)				
			2015	2016	2017	2018	2019
B430 (Ardley)	454301, 227498	No	29.6	28.7	27.2	26.0	24.4
Middleton 2014 (Middleton) Stoney	453397, 223516	No	32.4	33.3	33.6	33.1	31.3
Camp Road 2014 (Upper Heyford)	451448, 451448	No	14.1	14.9	14.6	14.4	13.6

5.65 A scheme specific NO2 diffusion tube monitoring survey is planned for the area of the Proposed Development to enable local pollutant concentrations to be considered. This monitoring will be used within the air quality assessment to perform model verification and will improve the accuracy of the final modelling results. The locations of the proposed monitoring will be discussed with CDC.

Background Pollutant Concentrations

5.66 Defra publishes modelled background air pollutant data[7] for the UK based across a 1km x 1km grid network, which accounts for a range of local emission sources. This includes road vehicles, other transport modes and industrial and domestic sources in addition to regional and imported emissions. The modelled background data is available for years 2018 to 2030. Table A3

[7] DEFRA (2018) Air Pollution Background Maps. Available from: https://uk-air.defra.gov.uk/data/laqm-background-home

presents the Defra background concentrations for the grid squares relevant to the Proposed Development for a base year (i.e. 2020).

Table A3: Defra background concentrations

Defra grid square	2020			
	NOx	NO_2	PM_{10}	$PM_{2.5}$
452500,227500	10.4	8.0	13.8	8.7
453500,227500	11.9	9.1	14.6	8.9
452500,226500	10.3	8.0	13.7	8.7
453500,226500	12.2	9.4	14.1	8.8
454500,226500	19.2	14.3	17.3	10.3
452500,225500	10.3	8.0	14.2	8.8
453500,225500	11.8	9.1	14.7	9.0

5.67 All background concentrations relative to the Proposed Development are well below their respective annual mean health-based air quality objective for NO2, PM10 and PM2.5. Similarly, the annual air quality NOx objective set for the protection of vegetation and ecosystems is well below the air quality objective.

Future Baseline

5.68 The Air Quality Assessment will consider the 'future baseline'. The Applicant will use locally existing data regarding air quality collected by the local authority (as referred to above), as well as collecting scheme specific monitoring data. Consultation will be undertaken with the Environmental Health department at CDC regarding the proposed assessment and methodology.

5.69 As described earlier in this Scoping Report, outputs from the Transport Assessment (TA) will directly underpin some of the assessment of Air Quality effects, and this too helps ensure the assessment will explicitly consider the future baseline. The TA will use an up to date transport model in conjunction

with the relevant highways bodies which will represent the planned and committed development and growth, and infrastructure, which already features in Local Plans and other documents or strategies. By modelling the future both with and without the Proposed Development, the assessment will provide an understanding of the likely future baseline, as well as being able to identify the likely additional effects of the Proposed Development.

Potential for Likely Significant Effects

5.70 The scope of the assessment will include the consideration of the potential for likely significant effects on local air quality resulting from:

- Dust and particulate matter (PM_{10} and $PM_{2.5}$) generated by on-site activities during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant;
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once occupied, including diversion and re-rerouting of traffic in the wider study area and the impact of any access arrangements;
- Increases in pollutant concentrations as a result of emissions from the existing and proposed railway activities; and
- The potential impacts of pollutant concentrations on future receptors of proposed developments within the vicinity of the Application Site.

Assessment Methodology

Construction Phase

5.71 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. A qualitative construction phase dust assessment will be undertaken in accordance with Institute of Air Quality

Management guidance8, to determine the risk of dust emissions from the demolition, earthworks, construction and trackout phases of the development. Mitigation will be recommended as required to minimise dust emissions.

5.72 During the construction phase there is likely to be an increase in Heavy Duty Vehicles (HDVs) delivering and removing materials. Potential impacts from these vehicles will be screened in accordance to DMRB LA105 guidance[9].

Operational Phase

5.73 The assessment of local air quality impacts associated with the operation of the Proposed Development will be informed by the approaches detailed in DMRB LA105[9], with reference to Defra air quality technical guidance[10], IAQM/EPUK guidance[11] and NN NNPS guidance[12].

5.74 The air quality assessment will involve screening of the Do Minimum (i.e. without the Proposed Development) and Do Something (i.e. with the Proposed Development) traffic data to identify any affected road links that meet the following criteria as provided by DMRB LA105[9]:

- Road alignment will change by 5m or more; or
- Daily traffic flows will change by 1,000 Average Daily Traffic (AADT) or more; or
- HDV flows will change by 200 AADT or more; and
- A change in speed band.

5.75 A quantitative assessment of operational phase road traffic emissions will be undertaken using the dispersion model ADMS-Roads. The latest emission factors will be utilised from the Defra Emission Factor Toolkit for the years of assessment. Concentrations of NO2, PM10 and PM2.5 will be predicted at identified sensitive receptor locations. The dispersion modelling will be

[8] Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction
[9] Highways England (2019) Design Manual for Roads and Bridges LA105 Air Quality
[10] Defra (2018) Local Air Quality Management Technical Guidance (TG.16), London: Defra
[11] Institute of Air Quality Management (2017) Guidance on land use planning and development control: Planning for air quality
[12] Department for Transport (2014) National Policy Statement for National Networks, HMSO London

undertaken in accordance with Defra Local Air Quality Management Technical Guidance (LAQM. TG(16))[10].

5.76 Rail movements will be considered in accordance with Defra LAQM TG16. technical guidance[10] and included within the assessment where required.

5.77 The model will be verified and adjusted using scheme specific and local authority monitored data and in accordance with Defra LAQM.TG16 guidance[10].

5.78 The results of the atmospheric dispersion modelling at each sensitive receptor will be compared to the respective air quality objectives to evaluate the potential for exceedances in all scenarios. Changes in pollutant concentrations between Do Nothing and Do Something scenarios will be compared to the relevant IAQM & EPUK[11] guidance to determine the significance of any impacts.

5.79 Nitrogen deposition at identified sensitive ecological designations will be calculated from ambient predictions of NOx and NO2 in accordance with DMRB LA1059 with consideration of the IAQM guidance on the assessment of air quality impacts on designated nature conservation sites[13].

5.80 Consideration of potential emissions from energy plant will be undertaken. If details of the emissions are available detailed stack dispersion modelling will be undertaken using the dispersion model ADMS 5. If detailed information is not available a qualitative assessment will be undertaken. Consideration will also be given to potential mitigation measures which may be required to minimise energy plant emissions.

Selection of Sensitive Receptors

5.81 Sensitive receptors / locations are places where the public or sensitive ecological habitats may be exposed to pollutants from the Proposed

[13] IAQM (2020) A guide to the assessment of air quality impacts on designated nature conservation sites v1.1

Development during the construction and operational phases. These include locations which are sensitive to an increase in dust deposition and particulate matter (PM10) exposure as a result of on-site construction activities, and locations sensitive to exposure to gaseous pollutants emitted during the operation of the Proposed Development.

Construction Phase

5.82 The IAQM guidance8 provides distance banding for the consideration of potential impacts at sensitive receptors associated with the construction of a development. Existing sensitive human receptors and ecological designations will be identified in accordance with IAQM guidance for consideration in the assessment.

Operational Phase

5.83 The extent of the study area will be defined in accordance with the DMRB LA1059 criteria to assess changes in ambient pollutant concentrations in order to determine the potential impact at sensitive human receptor locations. Human receptors in close proximity to affected road links will be identified and representative receptors will be considered within the assessment.

5.84 Existing residential properties and other sensitive land uses where members of the public would spend extended periods of time are located in Middleton Stoney, Heyford Park and Ardley, as well as isolated farmsteads.

5.85 The Proposed development lies adjacent to the Ardley Cutting and Quarry SSSI and the Ardley Wood Ancient and Semi-Natural Woodland which may be sensitive to changes in ambient NOX and nitrogen deposition.

5.86 Rail emissions will be considered in accordance with the criteria set out in Defra LAQM.TG16[10].

5.87 Receptors to be assessed will be discussed with CDC and will include those areas where changes in traffic flows and or dispersion of pollutants are likely

to result in significant impacts on air quality. This will include consideration of AQMAs where affected. It may be appropriate for the assessment to consider receptors within other local authority boundaries if traffic from the Proposed Development might be directed towards them. This will be informed by detailed transport modelling from the Transport Assessment.

Significance Criteria

Construction Phase

5.88 The Construction effects on air quality are temporary, and typical, effective mitigation measures are usually secured through a Construction Environmental Management Plan (CEMP).

5.89 Step four of the IAQM guidance8 examines the residual effects of the Proposed Development and states 'for almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation'.

5.90 The assessment is used to define appropriate mitigation to ensure that there will be no significant effect.

Operational Phase

5.91 Guidance is provided by EPUK & IAQM[11]**Error! Bookmark not defined.** to determine the significance of the impact of development on local air quality.

5.92 The impact descriptors at each receptor location can be described using the matrix detailed in Table A4. These descriptors consider the predicted magnitude of change in pollutant concentrations and the concentration in relation to the relevant air quality objectives.

Table A4: Assessment of Impacts and Significance for Individual Receptors

Long term average concentrations at	% change in concentration relative to National Air Quality Objective (NAQO)

receptor in assessment year	1	2-5	6-10	>10
75% or less of NAQO	Negligible	Negligible	Slight	Moderate
76-94% of NAQO	Negligible	Slight	Moderate	Moderate
95-102% of NAQO	Slight	Moderate	Moderate	Substantial
103-109% of NAQO	Moderate	Moderate	Substantial	Substantial
110% or more of NAQO	Moderate	Substantial	Substantial	Substantial

5.93 DMRB LA 105 guidance[9] includes the assessment of significant effects at representative human receptors for public exposure and ecological designations. Where DMRB LA105 is applied, changes in pollutant concentrations greater than imperceptible (more than 0.4µg.m-3) at each receptor, based on the Do Minimum versus Do Something scenario data are compared with guideline bands that inform the potential significance of the Proposed Development.

5.94 The guideline band ranges as presented in Table A5 set the upper level of likely non significance and the upper level of likely significance. Significant air quality effects are only identified for those receptors where air quality thresholds are exceeded or at risk of being exceeded in either the Do Minimum and/or Do Something scenario.

Table A5 Guideline band for the number of properties informing a judgement of significant air quality effects

Magnitude of change (µg.m^{-3})	Number of Receptors demonstrating	
	Worsening of air quality objective, risk of exceeding objective or creation of a new exceedance	**Improvement of air quality that already exceeds objective, risks of exceeding objective or the removal of existing exceedances**
Large (<4)	1 to 10	1 to 10

Magnitude of change (µg.m^{-3})	Number of Receptors demonstrating	
	Worsening of air quality objective, risk of exceeding objective or creation of a new exceedance	**Improvement of air quality that already exceeds objective, risks of exceeding objective or the removal of existing exceedances**
Medium (<2 to 4)	10 to 30	10 to 30
Small (0.4 to 2)	30 to 60	30 to 60

5.95 Whilst the DMRB LA105[9] approach focuses on receptors already exceeding the annual mean air quality objective, or within 10% of exceeding an objective, guidance for determining the impact of the operational phase of the Proposed Development on individual local air quality sensitive receptors is provided by the IAQM guidance[11] as detailed within Table A4. The air quality assessment will therefore consider both sets of significance criteria guidance.

Temporal Scope

5.96 The assessment of likely air quality effects due to the construction and operation of the Proposed Development will be undertaken for the following scenarios:

- Baseline and model verification.
- If required, Opening Year without construction phase traffic;
- If required, Opening Year with construction phase traffic;
- Opening Year with committed developments, without operational development;
- Opening Year with committed developments and operational development.
- Future Year with committed developments, without operational development; and
- Future Year with committed developments and operational development.

5.97 Construction impacts are considered to be temporary in nature, whereas operational impacts are expected to be permanent.

Limitations & Assumptions

5.98 As referred to above, as the proposed relocated IVC green and food waste facility within the Main Site is an existing local operational facility, it is assumed that the relocation would not raise any additional or new environmental effects. Therefore, with existing mitigation and management measures and processes carried forward, and with the recommended distances from residential receptors satisfied, this ES Scoping does not include an assessment of Odour. However, it is expected that the Scoping process will provide a view on this approach.

5.99 There are uncertainties associated with both measured and predicted pollutant concentrations. The model (ADMS-Roads) used in this assessment relies on input data, which are also subject to uncertainty. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS-Roads model will not take into account.

5.100 The air quality assessment will be based on traffic data provided by the transport consultant for the project. As such, any assumptions made by the transport consultants will also influence the air quality assessment.

5.101 In future years scenario, uncertainty relates to the projection of vehicle emissions and in particular the rate at which emissions per vehicle will improve over time. The assessment will utilise the most recent version of the Defra EFT to provide the most up to date estimate of current and future emissions projections.

Cumulative Effects Assessment

5.102 The potential for significant cumulative effects associated with air quality impacts of other major committed and proposed developments will be assessed using the same agreed assumptions and sites as those assessed in the Transport Assessment.

Noise and Vibration

5.103 The noise and vibration section of the scoping report outlines the proposed approach to the assessment of the likely significant noise and vibration effects of the Proposed Development.

Baseline Conditions

5.104 To the north of the Main Site lies the existing Chiltern railway line and the village of Ardley which contains several potential noise and vibration sensitive 'receptors'. Directly east of the site are two potential receptors, Ashgrove Cottages and Ardley Fields Farm Cottages adjacent to the Ardley Fields Household Waste and Recycling Centre Further east of the B430 lies the M40 motorway. To the south of the Main site are isolated dwellings and then the village of Middleton Stoney. To the west lies the Upper Heyford site, with existing residential dwellings and planning consent for new dwellings in proximity of the Main Site's western boundary.

Baseline Noise Surveys

5.105 To determine the existing levels of noise at noise sensitive receptors surrounding the Main Site, baseline noise surveys will be conducted following the principles set out in BS 7445-2:1991 and BS 4142:2014+A1:2019. These are discussed in more detail below.

5.106 The baseline noise surveys will include measurements at locations considered representative of the closest noise sensitive receptors to the Main Site. It is not practicable to undertake baseline monitoring at every noise sensitive receptor, therefore monitoring locations are selected to be representative of the affected locations and as is well-established common practice. Under this approach a monitoring location will relate to, and aid consideration of, more than one receptor location.

5.107 There will also be some receptors which will be more affected by the proposed highways proposals than by operational noise from the Main Site. The Principal Access to the Proposed Development will be via a reconfigured junction 10 of the M40, as described in Section 3 of this Scoping Report. Proposed monitoring locations have been selected to represent key locations associated with these routes that may be impacted by the changes in road traffic noise and the proposed highway works.

5.108 Noise monitoring will generally be undertaken for a period of at least one week covering both weekdays and weekends under representative conditions i.e. outside of school or bank holidays. This may be supplemented by shorter term measurements to allow for correlations with longer term positions.

5.109 The proposed monitoring positions are shown in Annex A. Positions denoted with an 'N' indicate unattended noise survey locations (long-term) while those with an 'S' indicate short term attended survey locations. Those denoted with V indicate attended vibration measurements will be undertaken at these locations. A weather station will also be installed at one location (which is yet to be confirmed) for the duration of the noise surveys.

5.110 To determine existing vibration environment, it is proposed to undertake attended vibration measurements at Quarry Cottages, Ardley and Cross Roads Farm, which are the closest receptors to the existing rail line. Sample measurements will be undertaken following the principles of BS 6472-1:2008 to determine the levels from passenger and trains at the receptor locations.

5.111 Prior to the commencement of the baseline surveys, the monitoring positions, methodology and duration will be discussed with Cherwell District Council (CDC). Depending on access, the availability of suitable locations to secure the monitoring equipment, and the variability of the noise climate, the positions may be altered or rationalised as the survey progresses. Any necessary changes will be discussed with CDC.

5.112 CDC have been consulted on the proposed survey methodology and positions identified in Annex A and have not raised any concerns. As the scheme evolves and detail of the Highway Works are determined, it will be considered whether any additional monitoring needs to be undertaken. This would then be discussed with CDC.

5.113 The Applicant is conducting some initial indicative baseline assessment work focusing on the potential operational noise impacts from the Proposed Development. Some short-term measurements are being undertaken during the daytime and night-time periods at a number of the proposed monitoring locations adjacent to the Main SRFI site, and the proposed highways corridors close to Ardley and Middleton Stoney.

5.114 The results of these initial measurements will give an indication of the likely level of impact at key receptor locations, and help inform ongoing consideration of any mitigation which may be required. These measurements will be superseded by the full, more comprehensive baseline noise surveys referred to above which will determine the typical background sound levels at each monitoring location and which receptors those levels are applicable to. The full noise assessment surveys will also coincide with the expected national lifting of current Covid-19 related restrictions, and as a result should provide a representative and robust understanding of 'normal' conditions.

Future Baseline

5.115 In the absence of the Proposed Development, the future noise and vibration environment is likely to continue to be governed by changes in the current dominant sources of noise and vibration at the sensitive receptors i.e. road and rail traffic.

5.116 The change in the baseline road traffic conditions would be determined through a review of the change in road traffic forecasts for the future baseline assessment years and the contribution from committed developments such as

the adjacent Upper Heyford scheme. This would be factored into the traffic flows provided for the future baseline assessment years.

5.117 With regard to rail traffic, the likely future changes in rail traffic will be taken into account in the future baseline assessment year forecasts.

Assessment Methodology

5.118 The main 'sensitive receptors' likely to be affected by the Proposed Development are those properties or natural (ecological) features close to the Main Site, as well as receptors close to roads used by traffic accessing the Main Site or in proximity to the proposed highway works. The impacts at other receptors located at greater distances from the site will be lower than at the identified noise sensitive receptors.

5.119 The nearest noise sensitive receptors to the Main Site are:

a) Residential dwellings to the north in the village of Ardley, including Cross Roads Farm.
b) Residential dwellings to the east including Ashgrove Cottages and Ardley Fields Farm Cottages
c) Consented (but not yet delivered) residential dwellings to the west as part of the Upper Heyford Site.
d) Existing residential dwellings further to the west of the Main Site.
e) Scattered residential properties to the south in proximity to the development site.

5.120 All residential receptors are considered to have a high sensitivity to noise.

5.121 For ecological receptors suitable information will be provided to the project ecologist to inform their assessment.

5.122 For the assessment of road traffic noise, representative receptors will be selected on Ardley Road, the B430, the A43 and the closest properties to the east of the M40 which appear to be to the south of Stoke Woods and on Ardley Road. This will include properties in Ardley village where the proposed Bypass will remove through-traffic through the proposed new Bypass to the east. With regard to the proposed Middleton Stoney relief road, it is anticipated that this

will is also result in a change (reduction) in road traffic flows through the centre of Middleton Stoney. As the route/alignment has not yet been fixed this will be reflected by the selection of representative receptor locations along the existing roads and those likely to be affected by the new relief road. Receptor locations will be discussed with CDC as the assessment progresses.

5.123 If any further highway works are determined to be required, once the location of these highway works is identified, consideration will be given to the nearest receptors. This will be discussed with CDC.

5.124 The NPSNN states that applicants should consider opportunities to address existing noise issues associated with 'Important areas' as identified by Defra. The following Important Areas have been identified;

- Properties adjacent to the M40 in the proximity of Foxfield Farm.
- Properties adjacent to the A43 in proximity to the junction with the B4100.

5.125 The locations of these important areas are shown in Annex B.

5.126 The Proposed Development is not considered to be sensitive to noise, therefore no assessment will be made of the suitability of the existing noise environment for the Proposed Development itself.

5.127 The Proposed Development has the potential to generate noise from the following sources:

a) Construction of the SRFI (including warehousing) and the Highway Improvements;
b) The change in road traffic flows on the highway network around the Main Site, including any effects of the proposed M40 improvements, associated new roads, including the Ardley Bypass and Middleton Stoney Relief Road, and any offsite Highway Works;
c) The traffic serving the SRFI on the internal roads within the Main Site;
d) The freight trains serving the SRFI on the Chiltern Railway Line;
e) The freight trains serving the rail terminal moving within the Main Site including the associated loading and unloading activities;

f) Heavy goods vehicles (HGVs) and other operational activity at the Main Site, such as manoeuvring, loading and unloading at the proposed warehouses and freight terminal; and
g) Mechanical services plant associated with the warehousing at the Main Site.

5.128 With reference to vibration, of the construction works that could be required, only piling has been identified as having the potential to generate levels of vibration which could adversely affect nearby receptors. At the time of writing no details are available about the construction methods and whether any piling would be required. In the absence of confirmation that there would be no piling, it is assumed that construction vibration is scoped into the Assessment. It is also possible that the additional freight trains serving the SRFI travelling on the Chiltern Line could lead to an increase in perceptible vibration at receptors in close proximity to the line during the operational phase of the Proposed Development. This will be assessed.

5.129 Although Heavy Goods Vehicles (HGVs) would use the access roads to the proposed development it is not anticipated that there will be any significant vibration effects as the access roads would be newly surfaced and smooth. Therefore, this element of any assessment of vibration is proposed to be scoped out of the assessment.

5.130 In general, the assessment methodology used for each type of source is different in terms of how the potential noise or vibration impact is predicted and how the effect is assessed. The magnitude of the impact and the significance of the effect is dependent upon several factors, including the resulting noise level from the particular activity and the change from the baseline or future baseline (i.e. the 'do minimum' situation), the existing sound environment, and the duration, timing and character of the different noise sources. Also, in some situations, the number of dwellings affected forms part of the assessment of significance. The assessment methodologies and significance criteria anticipated for each element of the assessment are described below.

Construction Traffic

5.131 Noise levels associated with peak construction traffic will be calculated and assessed in accordance with the Calculation of Road Traffic Noise (CRTN, 1988). The significance of construction traffic noise effects would be determined using the thresholds set out in Table N1 Thresholds of potential effects of construction traffic at residential receptors

5.132 1.

Table N1 Thresholds of potential effects of construction traffic at residential receptors

Magnitude of Impact	Increase in noise level (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0
Note: Construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding; *a) 10 or more days or nights in any 15 consecutive days or nights* *b) A total number of days exceeding 40 in any 6 consecutive months.*	

Construction Noise

5.133 In relation to demolition and construction noise impacts, indicative noise levels will be predicted at the nearest receptors using the methodology contained within Annex F of British Standard BS 5228-1:2009+A1:2014[14]. This will be based on informed assumptions about the construction plant and equipment that will be used. The propagation of construction noise will be predicted following the principles of the ISO 9613-2:1996 methodology, assuming moderate downwind propagation between the source and receptors.

5.134 The significance of potentially adverse construction noise effects would be determined using the thresholds set out in Table N2. The values are based on the guidance within Annex E of BS 5228-1:2009+A1:2014 and the effects that construction noise can have on those exposed to it. The thresholds are expressed in terms of current Government policy.

[14] Code of Practice for noise and vibration control on construction and open sites, Part 1: Noise

Table N2 Thresholds of potential effects of construction noise at residential buildings

Effect	Time Period	Threshold Value ($L_{Aeq,T}$)[a]
LOAEL	Day (07:00 – 23:00)	65
	Evening (19.00 – 23.00)	55
	Night (23.00 – 07.00)	45
SOAEL	Day (07:00 – 23:00)	75
	Evening (19.00 – 23.00)	65
	Night (23.00 – 07.00)	55

Notes:
[a] *These effects are expected to occur if the programme of works indicates that the relevant threshold values are likely to be exceeded over a period of at least one month. The values apply to a location one metre from a residential building façade containing a window, ignoring the effect of the acoustic reflection from that façade.*

5.135 Where necessary, measures to avoid any significant adverse effects on health and quality of life, and to mitigate and reduce to a minimum any adverse effects, will be identified. This would include providing information on best practicable means (BPM).

Construction Vibration

5.136 Once further information is available regarding the construction methods, it will be confirmed if piling is required. If this is the case, an assessment will be undertaken regarding the potential vibration impact from piling at the nearest NSRs. This assessment will follow the method set out in BS 5228-2:2009+A1:2014[15].

5.137 Although the concepts regarding LOAEL and SOAEL in Government policy refer only to noise exposure, it is helpful to adopt the same principles when assessing vibration impact and effect. Table N3 sets out the construction vibration exposure thresholds based on the guidance within Annex B of BS 5228-2:2009+A1:2014.

[15] Code of Practice for Noise and Vibration Control Construction and Open Sites, Part 2: Vibration;

Table N3 Thresholds of potential effects of construction vibration at residential buildings

Effect	Threshold Value (PPV, mm/s)[a]
LOAEL	0.5
SOAEL	1.0[b]

Notes:
[a] This is the level at a residential receptor.
[b] Guidance in BS 5228-2:2009+A1:2014 states that this level of exposure can be tolerated by those affected if prior warning and explanation has been given. It goes on to state that a level of 10 mm/s is likely to be intolerable in most building environments for any more than a very brief exposure.

Operational Noise

5.138 The noise emission from operational activities will be predicted, using proprietary noise modelling software IMMI, using the standard UK prediction methodologies.

Road Traffic Noise external to Main Site

5.139 The noise levels associated with changes in road traffic arising as part of the Proposed Development would be predicted using the methodology detailed in the Department for Transport memorandum, Calculation of Road Traffic Noise (CRTN[16]). Using traffic data, supplied by the appointed traffic consultant, that describes the anticipated change in flows from the existing baseline (i.e. without the Proposed Development – 'do minimum') and then with the Proposed Development (i.e. 'do something'), the potential effects of the predicted change in noise levels will be assessed. The approach would draw on, as appropriate, the principles of the Highways England guidance document the Design Manual for Roads and Bridges (DMRB[17]), The Noise Insulation Regulations (as amended 1988)[18] and national policy and guidance.

5.140 The significance of potentially adverse road traffic noise effects will be based on a combination of the change in noise exposure between the do minimum

[16] CRTN, Calculation of Road Traffic Noise, Department of Transport 1988.
[17] DMRB, Design Manual for Roads and Bridges 2020.
[18] SI 1975 No. 1763 Building and Buildings, The Noise Insulation Regulations 1975, SI 1988 No. 2000 Building and Buildings, The Noise Insulation (Amendment) Regulations 1988.

and do something scenarios and the resulting noise exposure. The noise exposure thresholds are set out in Table N4. These have been derived from the effects that road traffic noise can have on those affected[19] and are expressed in terms of Government policy.

Table N4 Threshold of potential effects of road traffic noise (residential receptors)

Time period	Effect	Noise Exposure Threshold Value
Day (06:00-00:00)	LOAEL	50 dB LAeq 16 hour free-field[a,b]
	SOAEL	63 dB LAeq 16 hour free-field[a,c]
Night (23.00-07.00)	LOAEL	40 dB Lnight (free-field)
	SOAEL	55 dB Lnight (free-field)

Notes:
[a] This is the *average daily value (07:00 – 23:00 hours) at a position one metre from a residential building façade containing a window, ignoring the effect of an acoustic reflection from that façade.*
b equivalent to 55 dB $L_{A10,18hr}$ façade
c equivalent 68 dB $L_{A10,18hr}$ façade

5.141 If the daytime LOAEL threshold is exceeded, the data in Table N5 sets out how the magnitude of the impact would be described taking account of the change in daytime noise exposure and the resulting exposure level.

Table N5 Descriptors of impact magnitude of daytime road traffic noise change

Magnitude of Impact	Do Something Noise Exposure	
	Between LOAEL and SOAEL	SOAEL or greater
No Change	0	0
Negligible	Up to 2.9 dB(A)	Up to 0.9 dB(A)
Minor	3.0 – 4.9 dB(A)	**1.0 – 2.9 dB(A)**
Moderate	5.0 – 9.9 dB(A)	**3.0 – 4.9 dB(A)**
Major	10.0 dB(A) and over	**5.0 dB(A) and over**

5.142 Whether or not a significant adverse effect is expected to occur would be determined by comparing the predicted noise level (with the proposed

[19] The evidence for using some these values can be found in guidance from the World Health Organisation. Similar values have been used for the assessment of other schemes such as A14 DCO and Northampton Gateway DCO.

development) with the LOAEL and SOAEL values shown in Table N4, and also considering the increase in noise due to the proposed development. If the result for any property falls in the categories shown by the shaded boxes with text in bold in Table N5 that indicates that the property is regarded as experiencing a significant adverse effect with respect to Government policy due to an increase in road traffic noise during the daytime period.

5.143 If the night-time LOAEL threshold is exceeded, the data in Table N6 sets out how the magnitude of the impact would be described taking account of the change in night-time noise exposure and the resulting exposure level.

Table N6 Descriptors of impact magnitude of night-time road traffic noise change

Magnitude of Impact	Do Something Noise Exposure	
	Between LOAEL and SOAEL	**SOAEL or greater**
No Change	0	0
Negligible	Up to 0.9 dB(A)	Up to 0.9 dB(A)
Minor	1 – 2.9 dB(A)	**1.0 – 2.9 dB(A)**
Moderate	3.0 – 4.9 dB(A)	**3.0 – 4.9 dB(A)**
Major	5.0 dB(A) and over	**5.0 dB(A) and over**

5.144 Whether or not a significant adverse effect is expected to occur is determined by comparing the predicted noise level (with the proposed development) with the LOAEL and SOAEL values shown in Table N4, and also considering the increase in noise due to the proposed development. If the result for any property falls in the categories shown by the shaded boxes with text in bold in Table N6 that indicates that the property is regarded as experiencing a significant adverse effect with respect to Government policy due to an increase in road traffic noise during the night-time period.

Rail Noise external to Main Site

5.145 Changes in rail noise from trains travelling along the Chiltern line in proximity to the Main Site will be predicted in accordance with the methodology in the Calculation of Railway Noise20. Impacts will be considered at receptors within

[20] Calculation of Railway Noise (CRN), 1995.

a distance of 2300m along the track from the proposed connection between the main line and the SRFI. The distance of 2300m is considered appropriate as the trains departing the SRFI will take approximately 2000m to accelerate to full speed. Receptors will be considered within a distance of 300m from the track.

5.146 Predictions would be undertaken for the baseline situation (i.e. do minimum, DM) and then with the Proposed Development (i.e. do something, DS). The assessment would be based on a combination of the change in noise exposure between the do minimum and do something scenarios. The potential effects of the predicted change in noise levels would be assessed in accordance with the relevant policy requirements as referred to throughout this methodology section. The approach would draw on, as appropriate, the principles of the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996[21] and national policy and guidance.

5.147 The significance of potentially adverse railway noise effects would be based on a combination of the change in noise exposure between the do minimum and do something scenarios, and the resulting noise exposure. The noise exposure thresholds are set out in Table N7. These have been derived from the effects that railway noise can have on those affected[22] and are expressed in terms of Government policy.

Table N7 Thresholds of potential effects of railway noise at residential buildings

Effect	Time Period	Threshold Value ($L_{Aeq,T}$)[a,b]
LOAEL	07.00 – 23.00	50
	23.00 – 07.00	40
SOAEL	07.00 – 23.00	65
	23.00 – 07.00	55
Notes:		

[21] SI 1996 No. 428 Building and Buildings, The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996.

[22] The evidence for using some these values can be found in guidance from the World Health Organisation. Similar values have been used for the assessment of other schemes such as HS2 and Northampton Gateway.

[a] *This is the average daily value at a position one metre from a residential building façade containing a window, ignoring the effect of an acoustic reflection from that façade.*
[b] *For the night-time period of 23.00 – 07.00, the relevant noise indicator is L_{night}.*

5.148 If the daytime LOAEL threshold value is exceeded, the data in Table N8 sets out how the magnitude of the impact is described taking account of the change in daytime noise exposure and the resulting exposure.

Table N8 Descriptors of impact magnitude of daytime railway noise change

Magnitude of Impact	Resulting Exposure Level	
	Between LOAEL & SOAEL	**SOAEL or greater**
No Change	0	0
Negligible	Up to 2.9 dB(A)	Up to 0.9 dB(A)
Minor	3.0 – 4.9 dB(A)	**1.0 – 2.9 dB(A)**
Moderate	5.0 – 9.9 dB(A)	**3.0 – 4.9 dB(A)**
Major	10.0 dB(A) and over	**5.0 dB(A) and over**

5.149 Whether or not a significant adverse effect is expected to occur is determined by comparing the predicted noise level (with the Proposed Development) with the LOAEL and SOAEL values shown in Table 5.7, and also considering the increase in noise due to the Proposed Development. If the result for any property falls in the categories shown by the shaded boxes with text in bold in Table N8, that indicates that the property is regarded as experiencing a significant adverse effect with respect to Government policy due to an increase in railway noise during the daytime period.

5.150 If the night-time LOAEL threshold is exceeded, the data in Table N9 sets out how the magnitude of the impact is described taking account of the change in night-time noise exposure and the resulting exposure.

Table N9 Descriptors of magnitude of night-time railway noise change

Magnitude of Impact	Resulting Exposure	
	Between LOAEL & SOAEL	**SOAEL or greater**
No Change	0	0
Negligible	Up to 0.9 dB(A)	Up to 0.9 dB(A)
Minor	1.0 - 2.9 dB(A)	**1.0 – 2.9 dB(A)**

Moderate	3.0 – 4.9 dB(A)	**3.0 – 4.9 dB(A)**
Major	5.0 dB(A) and over	**5.0 dB(A) and over**

5.151 Whether or not a significant adverse effect is expected to occur would be determined by comparing the predicted noise level (with the Proposed Development) with the LOAEL and SOAEL values shown in Table N7, and also considering the increase in noise due to the Proposed Development. If the result for any property falls in the categories shown by the shaded boxes with text in bold in Table N9, that indicates that the property is regarded as experiencing a significant adverse effect with respect to Government policy due to an increase in railway noise during the night-time period.

Operational Noise from Main Site

5.152 With regard to the operation of the proposed SFRI, noise will be generated from the following sources:

- Rail movements inside the SRFI;
- HGV movements inside the SRFI (both from the main highway network and between the rail terminal and the warehouses); and
- Loading, unloading and manoeuvring activities associated with the rail terminal and the warehousing.
- Mechanical services plant serving the warehousing.

5.153 The potential impact of operational noise at the nearest receptors will be assessed with reference to the guidance provided by BS 4142:2014+A1:2019[23]. The standard states that the initial extent of the impact can be determined by subtracting the typical background sound level from the rating level. The greater the difference the greater the magnitude of the initial impact estimate. The standard states that:

- A difference of around +10 dB[24] or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;

[23] BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound
[24] BS 4142 states that: All the measurements and values used throughout this standard are "A"-weighted. Where "A" weighting is not explicit in the descriptor, it is to be assumed in all cases, except where it is clearly stated that it is not applicable, as in the case of tones.

- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact.

5.154 While the difference between the rating level and background sound level provides an initial estimate of the impact, other factors should be considered in terms of the context, such as the resultant absolute noise levels and how the character and level of the specific sound source relates to the existing sound environment.

5.155 Regarding consideration of the absolute levels of sound, the relevant guideline values provided in BS 8233:2014[25] have been referenced. Table 4 of that standard sets out desirable internal levels to be achieved in new dwellings from external sources. Information is also provided regarding desirable levels of sound for external amenity spaces associated with dwellings. The various values from BS 8233:2014 are summarised in Table N10.

Table N10 Summary of guideline sound levels from BS 8233:2014

Location (activity)	Time Period	Desirable Sound Level not to be exceeded
Inside Bedrooms and Living Rooms (resting)	Day (07:00 – 23:00)	35 - 40 dB $L_{Aeq,T}$
Inside Bedrooms (sleeping)	Night (23:00 – 07:00)	30 - 35 dB $L_{Aeq,T}$
Inside Dining Room/area (dining)	Day (07:00 – 23:00)	40 - 45 dB $L_{Aeq,T}$
External Amenity Space	Day (07:00 – 23:00)	50 - 55 dB $L_{Aeq,T}$

5.156 The lower values shown in Table N10 above are generally regarded as the LOAEL for steady external sound, i.e. no adverse effect due to the impact of the sound would be expected. If the sound has certain characteristics, it could be appropriate to consider a lower value as the LOAEL.

[25] BS 8233:2014: Guidance on sound insulation and noise reduction for buildings, BSI (2014)

5.157 The World Health Organisation's Guidelines for Community Noise[26] will be used to consider the potential impact from any maximum short-term noise levels from SRFI operations during the night-time period.

5.158 The guidelines state that, for good sleep, indoor sound pressure levels should not exceed around 45 dB LAFmax more than 10–15 times per night. This is equated to a level at the outside façade of 60 dB LAFmax with a partially open window. It is generally accepted that this criterion is a LOAEL.[27]

5.159 The Institute of Environmental Management and Assessment (IEMA) published their Guidelines for Environmental Noise Impact Assessment in 201428. The document describes a process for undertaking such assessments. It notes that the extent of the effects of noise impact can rarely be determined solely by the difference between current and future noise levels, and that there are other factors to consider when determining potential effects. This principle has been followed in the assessment.

Operational Railway Vibration external to the Main Site

5.160 Similar to noise, a proportionate and appropriate assessment can be carried out by evaluating the potential change in vibration from freight trains on the Chiltern Line at receptors within a distance of 2300m along the track from the proposed connection between the mainline and the SRFI. An assessment will be made for any receptors within 85m[29] of the track using the measurements from the baseline survey and factoring them in accordance with the increased number of freight trains.

[26] Guidelines for Community Noise, WHO (1999)
[27] There is no equivalent research regarding the probability of a noise-induced awakening from sources such as those which would occur at the SRFI. Hence the approach to maximum noise levels is based on WHO guidance.
[28] Guidelines for Environmental Noise Impact Assessment, IEMA (2014)
[29] Derived from the U.S. Department of Transportation and the Federal Railroad Administration (Office of Railroad Development) (2005), High-Speed Ground Transportation Noise and Vibration Impact Assessment, Federal Railroad Administration and 242 U.S. Department of Transportation and the Federal Transport Administration (2006), Transit Noise and Vibration Impact Assessment Guidance Manual, Federal Transit Administration ,and as used on the HS2 phase 1, 2a and 2B ESs.

5.161 Although the concepts regarding LOAEL and SOAEL in Government policy refer only to noise exposure, it is helpful to adopt the same principles when assessing vibration impact and effect. Table N11 sets out the railway vibration exposure thresholds together with the descriptors for magnitude of impact. This has been derived from the guidance in BS 6472:2008[30].

Table N11 Thresholds of potential effects of railway vibration at residential buildings

Effect	Impact Description	Vibration Exposure[a]	
		VDV Daytime ($m/s^{1.75}$)	VDV Night-time ($m/s^{1.75}$)
-	Negligible	< 0.2	< 0.1
LOAEL	Minor	0.2	0.1
-	Moderate	0.21 – 0.79	0.11 – 0.39
SOAEL	Major	0.8	0.4

Notes:
[a] *Usually determined in the centre of a normally loaded floor within the dwelling.*

Limitations and Assumptions

5.162 The following assumptions will be relevant to the noise and vibration assessment:

- The construction methods and equipment likely to be used will be estimated based on experience of other similar developments and information specific to this scheme. These assumptions will be documented in the assessment.
- A number of assumptions will be made in terms of the types, locations and intensity of operational activities at the Main Site (both at the warehousing and the SRFI). These assumptions will be made in combination with the rail consultant and traffic consultant and will be documented in the assessment.
- With regard to noise from mechanical services plant associated with the warehousing, as the details of this plant will not be available at the time of assessment, target levels will be set according to the levels measured during the baseline noise surveys.
- The bunding around the proposed development will be considered as embedded mitigation.

5.163 The following limitations will apply to the assessment:

[30] British Standard 6472: 2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting, BSi

- It is impractical to predict the potential noise impact and effects from the various elements of the Proposed Development at every nearby noise-sensitive property. Instead, as is common practice, representative receptors will be carefully selected based on their location relative to the different sources of noise within the development, and their location with respect to other noise-sensitive properties nearby.
- It is also impractical to measure the existing noise and vibration environment at every receptor location therefore representative noise and vibration monitoring positions have been identified and discussed with CDC.
- The baseline noise surveys will be undertaken for a period of time considered suitable to determine the typical sound levels at the monitoring locations as it is not proportionate to monitor continuously at the identified locations. It is also noted that access to some proposed locations may be restricted, which may result in the use of proxy locations, which are considered to be representative of the locations of interest.

Potential for Likely Significant Effects

5.164 The demolition and construction phase of the Proposed Development has the potential to generate adverse noise and vibration impacts, which would be temporary in nature. These would be mitigated and minimised as appropriate with the use of Best Practicable Means, with construction effects usually controlled and mitigated through a Construction Environmental Management Plan (CEMP).

5.165 It is considered unlikely that there would be any significant adverse construction vibration effects associated with the proposed development given the distances to the offsite receptors.

5.166 Operational noise and vibration arising from the Proposed Development has the potential to generate significant impacts which would have permanent effects.

5.167 It is considered unlikely that there would be adverse operational vibration effects at the nearest offsite receptors due to the distance between the nearest receptors and the rail line.

5.168 There will be an increase in traffic on parts of the highway network around the Main Site. The proposed Ardley Bypass and Junction 10 improvements, accompanied by the proposed closure of the B430 through Ardley, will remove all through-traffic from the centre of the village, and route all traffic away from the village centre to the east. Similarly, the Middleton Stoney Relief Road will remove a notable proportion of traffic from the centre of the village. Therefore, it is considered likely that most receptors would not experience any significant adverse impacts as a result of changes in traffic noise from the Proposed Development. Furthermore, where mitigation is required, measures can be incorporated into the highways design to minimise potentially adverse effects. However, the full extent of the impacts will be determined in due course.

5.169 With regard to operational noise from the Main Site, it is anticipated there may potentially be adverse impacts at some receptors, especially at those in close proximity to the site boundary and where the background sound levels are low. However, it is noted that the scheme design includes inherent mitigation provided by landscape bunds which will help to minimise adverse noise impacts. Where appropriate in response to the findings of the noise assessment further mitigation will also be incorporated into the design of the scheme.

The potential effects on Human Health and Wellbeing

5.170 The criteria regarding the extent of the impact and effects of noise and vibration that will be used in this assessment inherently reflect the potential effects on human health and wellbeing. The greater the adverse effect, the greater the potential impacts on human health and wellbeing. In particular any residual effects will be compared with the relevant criteria, thus enabling any residual adverse effects from the scheme on human health and wellbeing to be considered.

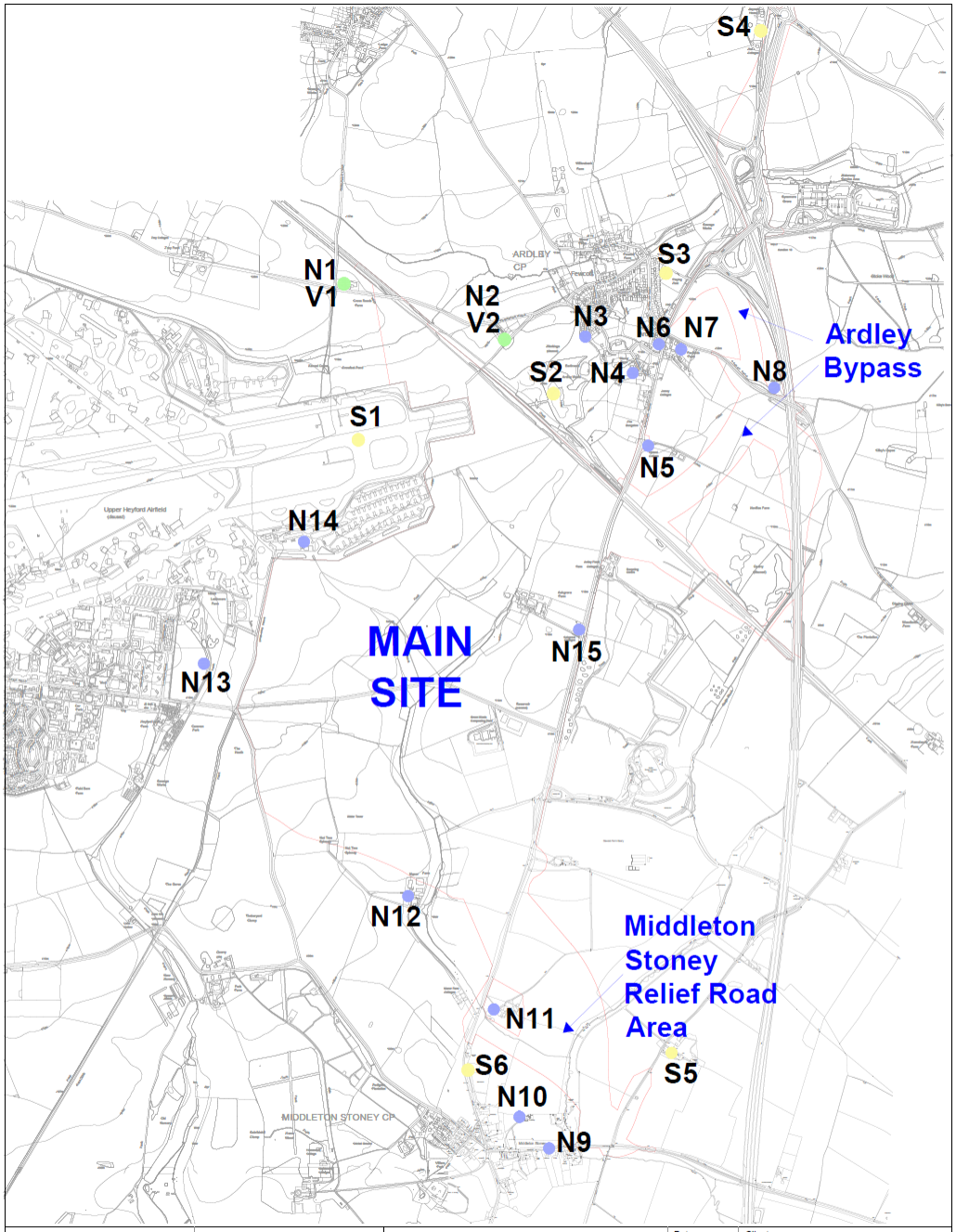
Cumulative Impact Assessment

5.171 The noise assessment will consider and describe any likely, relevant cumulative effects of the Proposed Development with other committed developments.

5.172 Cumulative noise impacts may occur when concurrent construction activities are undertaken at adjacent sites. With regard to cumulative increases in road traffic, the traffic data provided will take account of all cumulative schemes in the vicinity of the proposed development (which will be agreed with the relevant Highways bodies). Therefore, the cumulative traffic effects on noise will inherently be assessed.

Noise Assessment – ANNEXES

Annex A – Noise and Vibration Survey Locations



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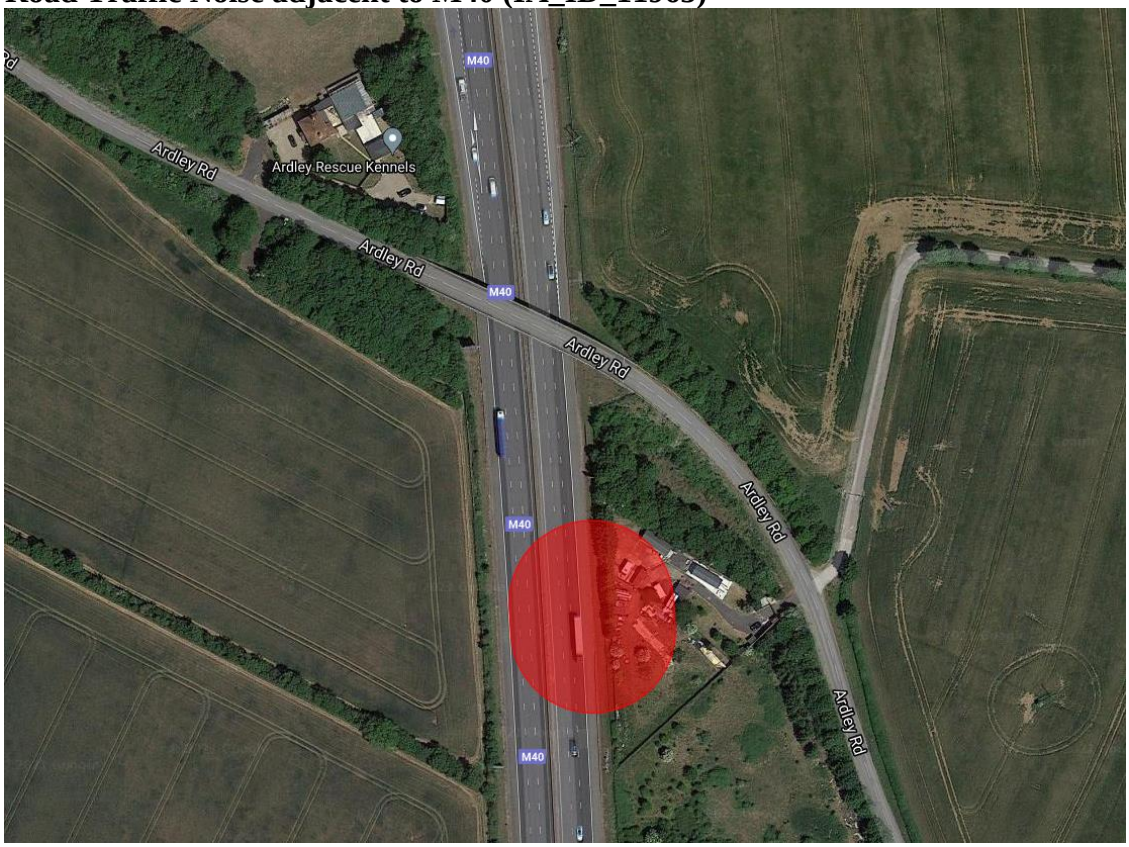
NOTES:
- Unattended Noise Survey Location (long-term)
- Unattended Noise (long-term) & Attended Vibration Survey Location
- Attended Noise Survey Location (short term)

PROJECT: OXFORDSHIRE SRFI	Date: 27/04/2021	Client: OXFORDSHIRE RAILFRIEGHT LIMITED	
	Scale (@ A3): NTS	Project number: 103306	
DRAWING TITLE: PROPOSED NOISE & VIBRATION SURVEY LOCATIONS	Drawn by: AT	Drawing Number: 103306-VAN-DR-0001	REV: 2
	Checked by: DF		

Annex B – Important Areas

Road Traffic Noise adjacent to M40 (IA_ID_11965)



Satellite imagery: © 2021 Google

Ecology and Biodiversity

Baseline Conditions and Information

Statutory Designated Sites

5.173 The designated sites are shown on Figures 1a and 1b annexed to this section. There is a single statutory site of international importance present within 15km of the site. Oxford Meadows SAC lies c.13.6km to the SSW of the Application Site and supports lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*), an Annex I habitat of which it is considered to be one of the best examples in the UK. The SAC furthermore is the only known outstanding locality for the Annex II species creeping marshwort *Apium repens*.

5.174 Ardley Cutting and Quarry Site of Special Scientific Interest (SSSI), a site of national importance, designated for its geological and biological interest lies partly within the Main Site, along the north-eastern site boundary. The geological interest of the SSSI concerns Jurassic rock exposures whereas the biological interest primarily comprises limestone (calcareous) grassland, but also encompasses other habitats, GCN and invertebrate fauna associated with the calcareous grassland.

5.175 There are no other designated statutory sites of national importance within 2km that are designated for their nature conservation value. Ardley Trackways SSSI lies partly within the Application Site at its south-eastern extent however it is notable for its geological interest only, and is not considered further here.

Non-statutory Designated Sites

5.176 The Application Site is located almost entirely within the recently established Ardley and Heyford Conservation Target Area (CTA). The CTA has five targets: i) calcareous grassland, ii) hedgerows, iii) grassland management, iv) great crested newt (GCN) *Triturus cristatus*, and v) geological conservation.

5.177 Ardley Road Verge Nature Reserve District Wildlife Site (DWS) lies mostly adjacent the Main Site to the south east, but where this extends away from the

road verge slightly this encroaches into the Main Site. This verge and associated grassland supports rank grassland, rough calcareous grassland, scrub and hedgerow habitats, and where it extends into the site will be retained and managed sympathetically for biodiversity within the site green infrastructure.

5.178 Statutory and non-statutory sites in close proximity to the Application Site comprise:

- **Upper Heyford Airfield Local Wildlife Site (LWS)** adjacent to the western boundary of the Main Site supports species-rich calcareous grassland and notable species including bee orchid *Ophrys apifera*, dwarf thistle *Cirsium acaule*, GCN and bird species.
- **Ardley Fields Ponds East LWS** located east of the Main Site and c320m south of the proposed railway cutting to the east of the Application Site.
- **Ardley Fields Ponds West LWS** 15m east, on the opposite side of the B430. Both the East and West Ardley Fields Ponds LWSs support breeding GCN populations.
- **Ardley Fields Quarry LWS** coincident with the northern section of Ardley Trackways SSSI comprises a restored quarry which supports species rich grassland, young tree planting, ponds and wet diches.
- **Trow Pool LWS** located c.900m east of the Application Site comprises two pools heavily vegetated by a good diversity of flora, one of which supporting large carp.
- **Stoke Wood LWS** is a good-sized woodland block encompassing ancient woodland as well as more recently established woodland c.200m east of the proposed Junction 40 improvement works. The extent of the woodland is largely co-incident with the boundary of **Tusmore and Shellswell Park CTA**.
- **The Heath** proposed Cherwell District Site (pDWS) comprises mature broadleaved woodland.
- **Trackway adjacent to the Gorse pDWS** a green lane with species-rich hedgerows adjacent and leading south from the western-most corner of the Main Site.
- **Kennel Copse pDWS** a woodland fragment that supports several ancient woodland indicator flora, located to the north of the airport and c.100m west of the Main Site.

Field survey results

Main Site

5.179 Extended Phase-1 habitat survey has confirmed that the Main Site is dominated by arable fields and improved grassland of low ecological value. There are smaller areas of semi-improved grassland, plantation woodland. amenity grassland, scrub and tall ruderal vegetation, as well as a network of native hedgerows within and around the site boundary, a number of scattered, mature trees and a ditch/brook that flows east then south through the central section of the site.

5.180 There are five waterbodies present comprising three ponds, a disused swimming pool associated with the farm buildings, and a sunken concrete lined tank close to the northwest boundary and close to the adjacent airfield (and seemingly unrelated to on-site drainage). There are additionally a number of buildings associated with Ashgrove Farm and cottages to the east of the site, and a covered reservoir and Severn Trent Green Power Ardley Composting Facility towards the southeast.

5.181 Detailed botanical survey of a 2km stretch of the southern cutting within Ardley Cutting and Quarry SSSI, extending from the northwest to northeast of the Main Site, recorded a range of habitats from tall ruderal vegetation, mixed scrub, early successional secondary woodland and species-poor calcareous grassland to areas of species-rich short calcareous grassland. Whilst the National Vegetation Classification (NVC) grassland communities CG3 *Bromus erectus* lowland calcareous grassland and CG5 *Bromus erectus-Brachypodium pinnatum* grassland referred to within the SSSI designation[31] were not evident, other NVC calcicolous grassland communities of nature conservation importance were present within localised areas of short species-rich grassland.

[31] English Nature. 1999. Ardley Cutting and Quarry Site of Special Scientific Interest Citation. Peterborough: English Nature.

5.182 Natural England has been approached and formal engagement is underway to discuss anticipated impacts to the local SSSIs and to agree principles of appropriate mitigation and enhancement measures through habitat creation.

5.183 Targeted faunal surveys are ongoing across the Application Site, with specific attention paid to any potential use of the site by protected species, species listed under Section 41 of the NERC Act as Species of Principle Importance for the purpose of conserving biodiversity, Oxfordshire Biodiversity Action Plan (BAP) species or other notable species.

5.184 **Bat** activity surveys undertaken in 2018 and 2020 recorded relatively low-level use of the Main Site by common and widespread bat species, predominantly common pipistrelle *Pipistrellus pipistrellus*. Low numbers of barbastelle *Barbastella barbastellus* were recorded during the 2020 surveys (but none in 2018). No other Annex II bat species were recorded. Bat foraging and commuting activity was largely associated with areas of woodland plantation and the hedgerow network.

5.185 Nocturnal surveys on trees with the potential to support roosting bats recorded no evidence of bat roosts. The majority of buildings within the Main Site were subject to surveys in 2018/2019, except a single building in the north and those associated with Severn Trent Green Power Ardley Composting Facility. Initial internal/external inspections recorded evidence of roosting bats in two separate buildings, with an additional bat roost confirmed within a separate building by subsequent nocturnal surveys.

5.186 A number of **badger** *Meles meles* setts are present across the Main Site, with other evidence of badger activity noted including several latrines.

5.187 **Breeding bird** surveys undertaken in 2018 and 2020 and wintering bird surveys completed in winter 2018-19 and 2019-20 confirmed the Main Site supports bird assemblages typical of the habitats present.

5.188 Desktop study identified known **Great Crested Newt (GCN)** populations within close proximity to the site. Whilst habitat suitability indices (HSIs) calculated for on-site waterbodies indicated two ponds had 'good' suitability to support GCN (also two had 'average' suitability, and the disused swimming pool had 'below average' suitability), targeted surveys undertaken in 2018 and in 2020 recorded no evidence of the presence of GCN on the Main Site.

5.189 The site offers limited opportunities for **reptiles** in the form of the hedgerow network / narrow field margins (where present). As such, reptile surveys are not considered necessary or appropriate for the Main site, and are to be scoped out for the Main Site. Habitat surveys are to be undertaken to assess suitability of the land affected by Highways Works for reptiles.

Highways Works

5.190 Further to confirmation of the proposed routes of the Ardley Bypass and Middleton Stoney Relief Road and associated M40 junction 10 improvement works including proposed works to deliver new links to and from the A43, a similar suite of ecological surveys to those described above - comprising habitat and protected/notable species surveys - will be undertaken across the relevant areas during the 2021 field season. These will enable the assessment of potential ecological impacts across the whole scheme including the proposed highways improvements, new highway, and associated works, and inform appropriate mitigation and compensation as required.

5.191 Survey methods would follow best practice methods such as those recommended by the Chartered Institute of Ecology and Environment Management (CIEEM), with the resulting reporting appended to the ecology chapter of the ES.

Future Baseline

5.192 It is anticipated that in the absence of development, and assuming current management practices continue, the site would be retained as managed

agricultural land of limited ecological value, with habitats of ecological value including ponds, the brook corridor, woodland, field perimeter hedgerows and associated trees subject to occasional ongoing management. This would maintain them in their current condition and continuing to provide some ecological value and structural diversity across the site.

5.193 It is not considered that the species or habitats identified on site are susceptible to the effects of future climate change hence would not be significantly impacted by or vulnerable to such changes.

5.194 As such, no significant changes to the baseline are anticipated.

Potential for 'Likely Significant Effects'

5.195 The assessment will consider the impacts for significant effects on ecological receptors during the construction and operational phases of the development.

5.196 For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general.

5.197 Potentially significant effects include:

- loss of habitat within locally protected sites;
- disturbance or emissions affecting locally protected sites;
- loss of, or disturbance to, Habitats of Principal Importance (HPI), specifically broadleaved woodland and hedgerows;
- effects on locally-valued habitats due to water quality impacts during construction (a topic which will also be explored in the Water Environment Chapter);
- spread of invasive non-native species (INNS);
- disturbance to species that are legally protected and/or are prioritised as Species of Principal Importance (SPI) nationally or locally.

5.198 Possible beneficial effects include those arising from new landscaping, hedgerow management, additional green spaces and tree planting.

Assessment Methodology

5.199 This chapter will consider the ecological receptors within the site and the wider landscape insofar as it would be affected by the construction and operation of the proposed development. Potential impacts and a high-level indication of associated mitigation measures are outlined below. The assessment criteria and methodology are also outlined below.

5.200 The ecological impact assessment will be undertaken in accordance with the methodology set out in the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater , Coastal and Marine (2018).

5.201 The ES will assess the impact of the proposals on designated sites, habitats and/ or species listed as Habitats and Species of Principal Importance.

5.202 For each receptor, survey findings will be summarised, the probable impact will be assessed, and mitigation proposals will be described. Information will be provided about:

- The designated sites, habitats and species present;
- The status of these sites, habitats and species;
- The direct and indirect effects of development upon these sites, habitats and species; and
- Details of mitigation or compensation that might be required.

5.203 Based upon the existing baseline for the main site the sensitive ecological receptors are considered to be:

- Ardley Cutting and Quarry SSSI and associated notable fauna
- Ardley Trackways SSSI
- Ardley and Heyford CTA

- Ardley Road Verge Nature reserve, Upper Hayfield Airfield LWS, Ardley Fields Ponds East LWS. Ardley Fields Ponds West LWS, Ardley Fields Quarry LWS, Stoke Wood LWS, and Trow Pool LWS
- Woodland habitat, including the adjacent pDWS
- Native hedgerows
- Mature trees
- Running water habitats (ditch/brook)
- Ponds/waterbodies
- Badgers
- Bat roosts
- Bat foraging & commuting habitat
- Farmland bird habitat, including nesting and over-wintering habitats
- GCN terrestrial habitat

5.204 All ecological receptors potentially affected by the proposed development would be assessed in terms of the resultant impacts and the significance of these effects stated.

5.205 In accordance with the CIEEM guidelines the value of each ecological receptor will be determined with reference to the following geographical scale: International and European / National / Regional / County / Local / Site / Negligible.

5.206 This and consideration of any particular sensitivities to damage or disturbance will broadly inform the level of sensitivity to change assigned to each receptor as follows:

- International and European: Very high sensitivity
- National: High sensitivity
- Regional: High-medium sensitivity
- County: Medium sensitivity
- Local: Low sensitivity
- Site level: Very low sensitivity
- Negligible: Negligible sensitivity

Assessment of Significance

5.207 As part of the process of determining whether there is likely to be an effect on the status of an ecological feature, the following questions will be considered:

- Will any site/ecosystem process be removed or changed;
- What will be the effect on the nature, extent, structure, and function of component habitats; and
- What will be the effect on the average population size and viability of the component species?

5.208 Issues that are considered when assessing the degree and type of change comprise:

- Positive or Adverse: Whether the change resulting from an impact or effect improves or reduces the quality of the environment.
- Extent: The area over which the impact or effect occurs.
- Magnitude: The size, amount, intensity or volume of an impact or effect.
- Duration: The time for which the effect is predicted to last prior to recovery or replacement of the resource or feature.
- Frequency and Timing: How often the effect occurs (e.g. repeated noise from piling work) and when it occurs (e.g. vegetation clearance undertaken outside of the bird breeding season).
- Reversibility: Whether the effect is permanent (i.e. irreversible) or temporary (i.e. reversible)

5.209 The significance of an effect is then determined by placing it into one of the five categories below, and the scale of effect will then be assessed with reference to the above geographical context.

- Significant Adverse Effect: Likely to create a significant negative effect, including loss, or long-term or irreversible damage on the status of the ecological feature.

- Not Significant Adverse Effect: Likely to create a negative effect without causing long-term or irreversible damage to the status of ecological feature.
- Neutral: Effects are either absent or such that there is no overall net change to the ecological feature.
- Not Significant Positive Effect: Likely to create a beneficial effect on an ecological feature, or providing a new lower value ecological feature without improving its conservation status.
- Significant Positive Effect: The activity is likely to create a significant beneficial effect, including long-term enhancement and favourable conditions for an existing ecological feature.
- Significant Adverse Effect: Likely to create a significant negative effect, including loss, or long-term or irreversible damage on the status of the ecological feature.

5.210 The assessment will also consider the overall likely net effects on Biodiversity, including consideration of the extent to which a Biodiversity 'net gain' will be delivered through the design of the proposed development and additional measures where required.

5.211 The potential impacts on the valued ecological receptors present will be based on sound professional judgement whilst also drawing on the latest available industry guidance and research.

5.212 Existing data held by local biological recorders, including Thames Valley Environmental Records Centre, will be examined. The results of the Phase 1 habitat, species surveys and ecological assessment will further inform the master planning and mitigation strategy.

5.213 The overarching philosophy of the adopted approach in these publications and the intended ecological assessment of the proposal is (i) to avoid significant reductions in biodiversity; and (ii) to enhance biodiversity where practicable.

Likely Mitigation

5.214 A range of 'best practice' measures would be employed during the construction process to protect local and on-site ecological features. The full detail of these would be set out in Natural England licences for protected species (such as bats, GCN, and/or badger) as appropriate. In addition, a Construction Environmental Management Plan (CEMP) is a standard way to secure measures to limit and manage impacts from construction activity and would be expected on a site such as this.

5.215 Information will be provided to describe the residual ecological impact of the proposed development and demonstrate how the scheme addresses the national and local policy requirement for a net gain in biodiversity.

5.216 Much of the mitigation needed will be ‘embedded’ within the scheme through new planting, landscaping and habitat creation, as well as retention of key existing habitats or features of value. Such measures are incorporated into the emerging development proposals and will be secured via the Parameters Plan (as well as DCO Requirements in due course). Habitat creation will focus on enhancement of the site perimeter habitats and linking green space corridors to form a functional part of Ardley and Heyford CTA and associated ecological networks suitable to benefit local fauna such as GCN, bats, badgers, birds and invertebrates.

Assessment of Cumulative Effects

5.217 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects are particularly important in EcIA as ecological features may be already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline. Cumulative effects can also make habitats and species more vulnerable or sensitive to change. In response to this, a review of other relevant projects and plans will be undertaken.

5.218 Advice on those committed schemes which would have an impact or potential effect on the same ecological receptors as the proposed development is sought through this Scoping process. However, the Applicant's initial view is that the commitments of most relevance are within Heyford Park to the immediate west of the Main Site.

Limitations to the Assessment

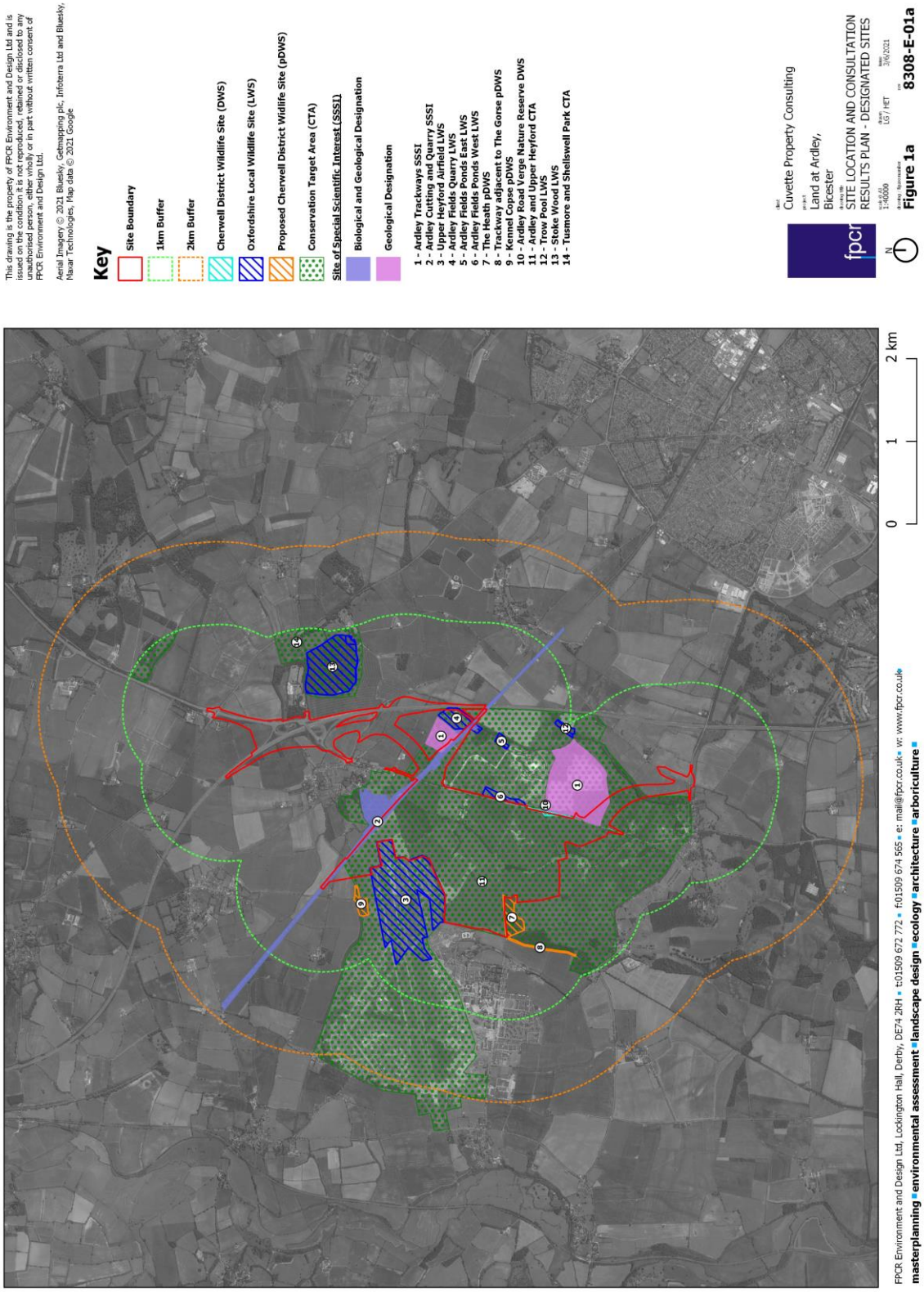
5.219 This assessment will present an overview of the habitats and features present, and identify those notable ecological receptors present, or potentially present locally. Due to the seasonality of some species, as well as the transient and complex nature of ecosystems, this cannot however provide a complete representation or prediction of the natural environment present. Nevertheless it is considered that the results of the suite of ecological surveys undertaken are robust and reliable for the identification of the habitats and the presence or absence of notable ecological receptors at the current time and allow an accurate description of the site following best practice guidance, experience and professional judgement.

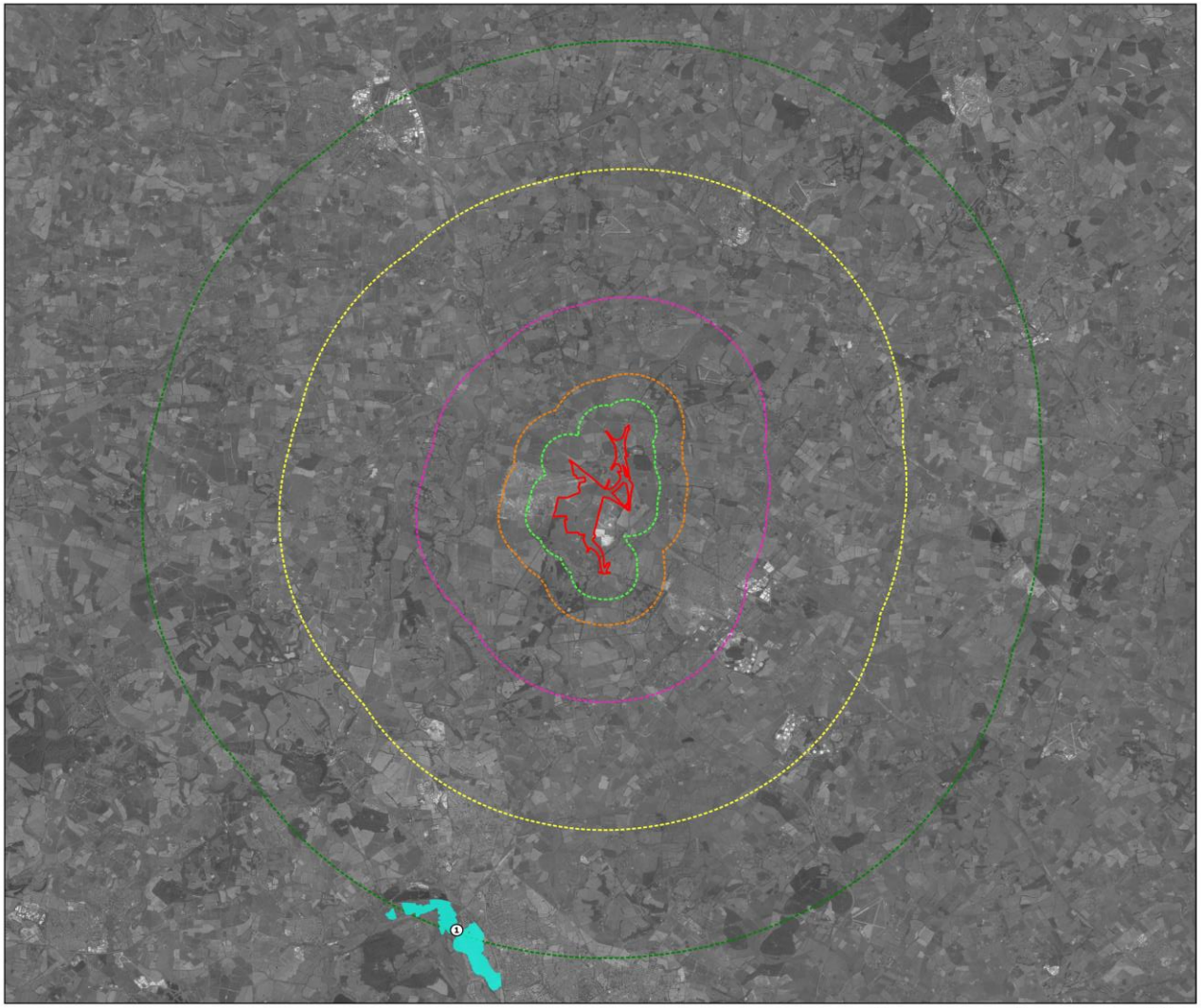
5.220 Data provided by third party sources collated during the desktop study is used as a guide to likely presence of notable ecological receptors but cannot be relied upon to identify species absence.

5.221 Access has not been granted, to date, for a small number of neighbouring ponds therefore these could not be included within the ongoing and planned GCN surveys. Sufficient coverage was however obtained to permit a robust population assessment across the survey area.

5.222 No other constraints or limitations specific to this report have been identified.

Ecology & Biodiversity Annex – Figures 1a and 1b Designated Sites





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Key

- Site Boundary
- 1km Buffer
- 2km Buffer
- 5km Buffer
- 10km Buffer
- 15 km Buffer
- Special Area of Conservation (SAC)

1 - Oxford Meadows SAC

0 5 10 km

client: Cuvette Property Consulting

project: Land at Ardley, Bicester

drawing title: SITE LOCATION AND CONSULTATION RESULTS PLAN - INTERNATIONALLY DESIGNATED SITES

scale @ A3: 1:150000 | drawn: LG / HET | date: 3/6/2021

drawing / figure number: **Figure 1b** | rev: **8308-E-01b**

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Landscape and Visual Impacts

Introduction

5.223 A landscape and visual impact assessment of the Proposed Development will be undertaken following the "Guidelines for Landscape & Visual Impact Assessment" (GLVIA) published by the Landscape Institute and the Institute of Environmental Management and Assessment 2013 (3rd Edition).

5.224 The GLVIA document does not provide a prescriptive methodology to assessment but identifies the general principles and good practice approaches. The assessment will enable the likely significant landscape and visual effects to be determined and a landscape design and mitigation strategy to be put forward as part of the overall development proposals.

Baseline Conditions

Application Site Landscape and Context

5.225 The Main site comprises predominantly farmland with the majority under arable use. The former Upper Heyford Airfield and lies to the west of the Main Site and includes the emerging Heyford Park development. The Chiltern Railway line extends across the northern edge of the Main Site, with the B430 road extending in a north – south direction along part of its eastern edge. An Energy Recovery Facility (Viridor ERF) lies beyond the Main Site and the B430 to the east. To the south of the Main Site lies further farmland and woodland. The Main Site also includes a farm and a small number of properties (accessed off the B430), an underground reservoir and a waste recycling facility. It includes mature wooded areas, mature trees and hedgerows, a small watercourse and other mixed habitats.

5.226 The Main Site generally falls from north to south yet also from its eastern and western sides towards the small watercourse that flows generally north to

south through the central part of the Main Site. Upper Heyford Airfield to the west lies relatively higher and generally elevated to the site.

5.227 The settlements of Ardley and Middleton Stoney lie respectively beyond the Main Site to the north and south of the Main Site, with the town of Bicester more distant to the south east beyond the M40 motorway.

5.228 The Highways Works include land remote from the Main Site, including land on both the eastern and western sides of M40 Junction 10 which is largely agricultural land already directly influenced by highways infrastructure. The Ardley Bypass is on land to the east of Ardley, and crosses a number of existing field hedgerow boundaries, as well as the Chiltern Railway line.

5.229 Similarly, the Middleton Stoney Relief Road alignment options include agricultural land to the north and east of the village, and include sections of woodland as well as the Gagle Brook corridor.

5.230 The Application Site as a whole includes some mature wooded areas, mature trees and hedgerows, and includes parts of existing watercourses (including the Gagle Brook), and other mixed habitats.

Landscape Designations

5.231 There are no designations of landscape value that are applicable to the site or its immediate context, such as National Parks, AONB`s or Special Landscape Areas.

5.232 The presence of natural and cultural heritage designations, such as Sites of Special Scientific Interest (SSSI), Scheduled Monuments (SM), Registered Parks and Gardens, Conservation Areas, and Listed Buildings are referenced under other topic headings. These designations may indicate landscape value and thus will be considered in the evaluation of landscape value.

5.233 Assessment of impacts on any such designations will be addressed separately within the Cultural Heritage and Ecology & Biodiversity chapters of the ES.

Landscape Character

5.234 The Application Site lies within the following Landscape Character Areas or Types based upon the hierarchy of published Landscape Character Assessment studies:

- *Cotswold* National Character Area (NCA) – Natural England.
- *Farmland Plateau* and *Wooded Estatelands* Landscape Types – Oxfordshire Wildlife and Landscape Study (OWLS).
- *Oxfordshire Estate Farmlands* and *Upper Heyford Plateau* Landscape Character Areas – Cherwell Landscape Character Assessment.

5.235 A Landscape Character Assessment of the Former RAF Upper Heyford Airbase (South of the Cold War Zone) was also produced in 2006 and will also be considered where relevant as part of the assessment.

5.236 The assessment will consider all of the relevant published landscape character assessment studies.

Landscape and Visual Receptors

5.237 There will be a number of landscape and visual receptors that could be potentially affected by the Proposed Development. Those identified to date are highlighted below. Further receptors may be identified as part of the ongoing assessment work.

Landscape

- The character of the landscape – on both an Application Site wide and broader contextual basis;
- Landscape features of the Application Site, including:

- Landform
- Woodland and trees
- Hedgerows
- Ponds and water features

Visual

- Residents – including principally those in properties within or surrounding the Application Site (including parts of Ardley and Middleton Stoney).
- Users of Public Rights of Way within and around the Application Site.
- Users of existing roads within and around the Application Site.
- Users of existing commercial/employment facilities within and surrounding the Application Site.

5.238 All of these receptors and any other subsequently identified will be assessed by the impact assessment process in accordance with the proposed methodology detailed below.

Future Baseline

5.239 The assessment will consider the likely future baseline which will continue to evolve given the committed developments on eastern parts of the Upper Heyford former airbase site, and ongoing delivery of already consented development. This includes ongoing quarrying activity, as well as waste management activities, all of which are planned to continue for the foreseeable future, and which will result in some change or evolution of the landscape and visual baseline over time. These uses, as well as the presence of the M40 motorway and Chiltern Railway, will continue to influence the local area.

Assessment Methodology

5.240 The Guidelines for landscape and Visual Impact assessment (3rd Editions) (GLVIA3) states:

"Landscape and Visual impact assessment (LVIA), is a tool used to identify and assess the significance of and the effects of change resulting from development on both landscape as an environmental resource in its own right and on people's views and visual amenity."

5.241 There are two components of LVIA:

- Assessment of landscape effects; assessing effects on the landscape as a resource in its own right;
- Assessment of visual effects: assessing effects on specific views and on the general visual amenity experienced by people.

5.242 The components of the assessment will include baseline studies; description and details of the landscape proposals and mitigation measures to be adopted as part of the Proposed Development; identification and description of likely effects arising from the Proposed Development; and an assessment of the significance of these effects.

5.243 In terms of baseline studies, the assessment will provide an understanding of the landscape in the area to be affected, its constituent elements, character, condition and value. For the visual baseline it will include an understanding of the area within which the development may be visible, the people who may experience views, and the nature of views.

5.244 The Assessment will consider the likely impacts of all elements of the Proposed Development, and while this is likely to concentrate on the proposed built development on the Main Site, consideration will also be given to any likely effects from the Highways Works.

<u>Assessment of Landscape Effects</u>

5.245 GLVIA3 states that "An assessment of landscape effects deals with the effects of change and development on landscape as a resource". The baseline landscape will be described by reference to existing landscape character assessments and by a description of the Application Site and its context.

5.246 A range of landscape effects can arise through development. These can include:

- Change or loss of elements, features, aesthetic or perceptual aspects that contribute to the character and distinctiveness of the landscape.
- Addition of new elements that influence character and distinctiveness of the landscape.
- Combined effects of these changes

5.247 The characteristics of the existing landscape resource will be considered in respect of the susceptibility of the landscape resource to the change arising from this development. The value of the existing landscape is also considered.

5.248 Each effect on landscape receptors will be assessed in terms of size or scale, geographical extent of the area influenced and its duration and reversibility. In terms of size or scale, the judgement will take account of the extent of the existing landscape elements that will be lost or changed, and the degree to which the aesthetic or perceptual aspects or key characteristics of the landscape will be altered by removal or addition of new elements.

5.249 The overall landscape effect will be determined by considering the sensitivity of the landscape receptors and the magnitude of effect on the landscape. Final conclusions on the overall landscape effects will be drawn from the assessment components described.

Assessment of Visual Effects

5.250 An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity.

Mapping Visibility

5.251 The first stage in the assessment will be to map approximate visibility of the Proposed Development. This will be modelled as a computer based Zone of Theoretical Visibility (ZTV). Subsequently this will be refined by field evaluation

to take account of physical features (e.g., buildings and woodlands) that are not included as part of the computer model.

Photo Viewpoints and Visualisations

5.252 A series of representative photo viewpoints will be included in the assessment that are representative of views towards the ProposedDevelopment from surrounding visual receptors. Other photographs of the Application Site may also be included where they support the description and understanding of the site's landscape and visual characteristics. The viewpoints will also typically represent what can be seen from a variety of distances towards the Application Site.

5.253 In addition to the photo viewpoints, a series of photomontages (or visualisations) will be prepared from agreed locations. The photomontages will aim to simulate the likely visual changes that will result from the Proposed Development. The photo viewpoints and photomontages will be prepared in accordance with guidance, as set out in The Landscape Institute Technical Guidance Note on `Visual Representation of Development Proposals' (TGN 06/19).

5.254 The photo viewpoints' will be 'Type 1 Visualisations' or 'Annotated Viewpoint Photographs', as referred to in TGN 06/19 and the photomontages will be prepared as 'Type 3 Visualisations' in TGN 06/19.

5.255 The location of the photo viewpoints and photomontages will be discussed with the relevant consultee(s), with the expectation that Cherwell District Council will directly inform the chosen representative views and receptors.

Visual Receptors

5.256 It is important to remember that visual 'receptors' are all people. The assessment will consider both the susceptibility to change in views and the value attached to views for the identified receptors. The visual 'receptors' most susceptible to change are generally likely to include:

- residents at home
- people engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape or particular views;
- visitors to heritage assets or other attractions, where views of surroundings are an important contributor to the experience;
- communities where views contribute to the landscape setting enjoyed by residents in the area.
- travellers on road, rail or other transport routes tend to fall into an intermediate category of susceptibility to change. Where travel involves recognised scenic routes awareness of views is likely to be particularly high.

5.257 Visual receptors likely to be less sensitive to change include:

- People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape;
- People at their place of work whose attention may be focused on their work or activity, not on their surroundings.

5.258 Each of the visual effects will be evaluated in terms of its size or scale, the geographical extent of the area influenced and its duration or reversibility.

5.259 In terms of size or scale, the magnitude of visual effects will take account of:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including proportion of the view occupied by the Proposed Development;
- The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line height, colour and texture;

- The nature of the view of the Proposed Development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses.

5.260 The geographical extent of the visual effect in each viewpoint is likely to reflect:

- The angle of view in relation to the main activity of the receptor
- The distance of the viewpoint from the Proposed Development
- The extent of the area over which the changes would be visible.

5.261 As with landscape effects, the duration of the effect could be short to long term or permanent and the same definitions will apply.

Assessment of Cumulative Landscape and Visual Effects

5.262 The assessment of likely cumulative landscape and visual effects will be undertaken in accordance with GLVIA3. The assessment will consider the combined effects of the Proposed Development along with the 'other development(s)' on landscape and visual receptors.

5.263 The study area for the assessment of cumulative landscape and visual effects will be based upon the ZTV of the Proposed Development plus any predicted overlapping ZTV for the other relevant identified projects. This will be determined through desk top review of relevant plans and information included as part of the other development projects and/or from the review and use of existing baseline visual studies and fieldwork. It is intended that the list of relevant commitments be identified as part of the Scoping process and/or in dialogue with key local consultees.

Overall Landscape and Visual Effects

5.264 The final conclusions on effects, whether adverse or beneficial, are drawn from the separate judgements on the sensitivity of the receptors and the magnitude of the effects. This overall judgement involves a reasoned professional

overview of the individual judgements against the criteria to make the final overall judgement.

5.265 GLVIA3 notes, at paragraphs 5.56 and 6.44, that there are no hard and fast rules with regard to the level of effects, therefore the following descriptive thresholds will be used for the landscape and visual impact assessment:

- Major;
- Moderate;
- Minor;
- Negligible

5.266 Where it is determined that the assessment falls between or encompasses two of the defined criteria terms, then the judgement may be described as, for example, Major/ Moderate or Moderate/ Minor. This indicates that the effect is assessed to lie between the respective definitions or to encompass aspects of both.

5.267 The detailed methodology and assessment criteria to be used is contained in Appendix A to this section.

Appendix A
Landscape and Visual Impact Assessment – Methodology and Assessment Criteria

Introduction

The methodology for the Landscape and Visual Impact Assessment undertaken for the proposed development is detailed in Chapter X of the Environmental Statement (ES). The following information is provided and should be read in conjunction with the overview methodology outlined in Chapter X of the ES:

As advised in the Guidelines for Landscape and Visual Impact Assessment (3rd Edition) (GLVIA3), the judgements made in respect of both landscape and visual effects are a combination of an assessment of the sensitivity of the receptor and the magnitude of the landscape or visual effect. The following details the definitions used in assessing sensitivity and magnitude for landscape and visual receptors.

Where it is determined that the assessment falls between or encompasses two of the defined criteria terms, then the judgement will be described as High/ Medium or Moderate/ Minor etc. This indicates that the assessment lies between the respective definitions or encompasses aspects of both.

Landscape

Landscape Sensitivity

Landscape receptors are assessed in terms of their 'Landscape Sensitivity'. This combines judgements on the value to be attached to the landscape and the susceptibility to change of the landscape from the type of change or development proposed. The definition and criteria adopted for these contributory factors is detailed below.

There can be complex relationships between the value attached to landscape receptors and their susceptibility to change which can be especially important when considering change within or close to designated landscapes. For example an internationally, nationally or locally valued landscape does not automatically or by definition have a high susceptibility to all types of change. The type of change or development proposed may not compromise the specific basis for the value attached to the landscape.

Landscape Value

Value can apply to a landscape area as a whole, or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape. The following criteria have been used to categorise landscape value. Where there is no clear existing evidence on landscape value, an assessment is made based on the criteria/ factors identified below (based on the guidance in GLVIA3 Box 5.1 Page 84).

- Landscape quality (condition)
- Conservation interest

- Scenic quality
- Rarity
- Representativeness
- Recreation value
- Perceptual aspects
- Associations

Landscape Value	Definition
High	Landscape receptors of high importance based upon factors of quality, rarity, representativeness, conservation interest, recreational value, perceptual qualities and associations.
Medium	Landscape receptors of medium importance based upon factors of quality, rarity, representativeness, conservation interest, recreational value, perceptual qualities and associations.
Low	Landscape receptors of low importance based upon factors of quality, rarity, representativeness, conservation interest, recreational value, perceptual qualities and associations.

Landscape Susceptibility to Change

This means the ability of the landscape receptor (overall character type/ area or individual element/ feature) to accommodate the change (i.e. the proposed development without undue consequences for the maintenance of the baseline position and/ or the achievement of landscape planning policies and strategies. The definition and criteria for the assessment of Landscape Susceptibility to Change is as follows:

Landscape Susceptibility to Change	Definition
High	A highly distinctive and cohesive landscape receptor, with positive characteristics and features with no or very few detracting or intrusive elements. Landscape features intact and in very good condition and/ or rare. Limited capacity to accept the type of change/ development proposed.
Medium	Distinctive and more commonplace landscape receptor, with some positive characteristics/ features and some detracting or intrusive elements. Landscape features in moderate condition. Capacity to accept well planned and designed change/ development of the type proposed.
Low	Landscape receptor of mixed character with a lack of coherence and including detracting or intrusive elements. Landscape features that may be in poor or improving condition and few that could not be replaced. Greater capacity to accept the type of change/ development proposed.

Magnitude of Landscape Effects

The magnitude of landscape effects is the degree of change to the landscape receptor in terms of its size or scale of change, the geographical extent of the area influenced and its duration and reversibility. The table below sets out the categories and criteria adopted in respect of the separate considerations of Scale or Size of the Degree of Change and Reversibility. The geographical extent and duration of change are described where relevant in the assessment.

Scale or Size of the Degree of Landscape Change

Scale or Size of the Degree of Landscape Change	**Definition**
High	Total loss of or major alteration to key characteristics / features and the introduction of new elements totally uncharacteristic to the receiving landscape. Overall landscape receptor will be fundamentally changed.
Medium	Partial loss of or alteration to one or more key characteristics / features and the introduction of new elements that would be evident but not necessarily uncharacteristic to the receiving landscape. Overall landscape receptor will be obviously changed.
Low	Limited loss of, or alteration to one or more key characteristics/ features and the introduction of new elements evident and/ or characteristic to the receiving landscape. Overall landscape receptor will be perceptibly changed.
Negligible	Very minor alteration to one or more key characteristics/ features and the introduction of new elements characteristic to the receiving landscape. Overall landscape receptor will be minimally changed.
None	No loss or alteration to the key characteristics/ features, representing 'no change'.

Reversibility

Reversibility	**Definition**
Irreversible	The development would be permanent and the assessment site could not be returned to its current/ former use.
Reversible	The development could be deconstructed/ demolished and the assessment site could be returned to broadly its current/ historic use (although that may be subject to qualification depending on the nature of the development).

Visual

Sensitivity of Visual Receptors

Visual sensitivity assesses each visual receptor in terms of their susceptibility to change in views and visual amenity and also the value attached to particular views. The definition and criteria adopted for these contributory factors is detailed below.

Visual Susceptibility to Change

The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of; firstly, the occupation or activity of people experiencing the view at particular locations; and secondly, the extent to which their attention or interest may therefore be focussed on the views and visual amenity they experience.

Visual Susceptibility to Change	**Definition**
High	Residents at home with primary views from ground floor/garden and upper floors. Public rights of way/ footways where attention is primarily focussed on the landscape and on particular views. Visitors to heritage assets or other attractions whose attention or interest is likely to be focussed on the landscape and/ or on particular views. Communities where views make an important contribution to the landscape setting enjoyed by residents. Travellers on recognised scenic routes.
Medium	Residents at home with secondary views (primarily from first floor level). Public rights of way/ footways where attention is not primarily focussed on the landscape and/ or particular views. Travellers on road, rail or other transport routes.
Low	Users of outdoor recreational facilities where the view is less important to the activities (e.g. sports pitches). Travellers on road, rail or other transport where views are primarily focussed on the transport route. People at their place of work where views of the landscape are not important to the quality of the working life.

Value of Views

The value attached to a view takes account of any recognition attached to a particular view and/ or any indicators of the value attached to views, for example through guidebooks or defined viewpoints or references in literature or art.

Value of Views	Definition
High	A unique or identified view (eg. shown as such on Ordnance Survey map, guidebook or tourist map) or one noted in literature or art. A view where a heritage asset makes an important contribution to the view.
Medium	A typical and/ or representative view from a particular receptor.
Low	An undistinguished or unremarkable view from a particular receptor.

Magnitude of Visual Effects

Magnitude of Visual Effects evaluates each of the visual effects in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility. The table below sets out the categories and criteria adopted in respect of the Scale or Size (including the degree of contrast) of Visual Change. The distance and nature of the view and whether the view will be permanent or temporary are also detailed in the Visual Effects Table.

Scale or Size of the Degree of Visual Change	Definition
High	The proposal will result in a large and immediately apparent change in the view, being a dominant and new and/ or incongruous feature in the landscape.
Medium	The proposal will result in an obvious and recognisable change in the view and will be readily noticed by the viewer.
Low	The proposal will constitute a minor component of the wider view or a more recognisable component that reflects those apparent in the existing view. Awareness of the proposals will not have a marked effect on the overall nature of the view.
Negligible/ None	Only a very small part of the proposal will be discernible and it will have very little or no effect on the nature of the view.

Level of Effect

The final conclusions on effects, whether adverse or beneficial, are drawn from the separate judgements on the sensitivity of the receptors and the magnitude of the effects. This overall judgement is formed from a reasoned professional overview of the individual judgements against the assessment criteria.

GLVIA3 notes, at paragraphs 5.56 and 6.44, that there are no hard and fast rules with regard to the level of effects, therefore the following descriptive thresholds have been used for this appraisal:

- **Major**;
- **Moderate**;

- **Minor**;
- **Negligible**.

Where it is determined that the assessment falls between or encompasses two of the defined criteria terms, then the judgement may be described as, for example, Major/ Moderate or Moderate/ Minor. This indicates that the effect is assessed to lie between the respective definitions or to encompass aspects of both.

Judging Overall Significance

A judgement is reached, based on the assessment, as to whether an effect is significant or not. Those degrees of effects that are considered to be *significant* by the assessor for *this* LVIA are judged to be effects that are either Major or Major/ Moderate.

GLVIA3 Statement of Clarification 1/13 (2013)[32] notes that:

"Concerning 'significance', it is for the assessor to define what the assessor considers significant…Depending on the means of judgment and terminology (which should be explicitly set out), effects of varying degrees of change (or levels of change), may be derived. The assessor should then establish (and it is for the assessor to decide and explain) the degree or level of change that is considered to be significant." (GLVIA3 Statement of Clarification, § 3.)

Significance of Landscape Effects

GLVIA3 states, at paragraph 5.56, that:

"There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and context and with the type of proposal. At opposite ends of the spectrum it is reasonable to say that:

- *Major loss or irreversible negative effects, over an extensive area, on elements and/ or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance;*
- *Reversible negative effects of short duration, over a restricted area, on elements and/ or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of landscapes of community value are likely to be of the least significance and may, depending on the circumstances, be judged as not significant;*
- *Where assessments of significance place landscape effects between these extremes, judgements must be made about whether or not they are significant, with full explanations of why these conclusions have been reached."* (GLVIA3 paragraph 5.56.)

Significance of Visual Effects

GLVIA3 states, at paragraph 6.44, that:

[32] Landscape Institute and the Institute of Environmental Management (10th June 2013) **GLVIA3 Statement of Clarification 1/13**

"There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and context and with the type of proposal. In making a judgement about the significance of visual effects the following points should be noted:

- *Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant;*
- *Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant;*

  Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present within the view." (GLVIA3 paragraph 6.44.)

Lighting

5.266 The Environmental Statement will include an assessment of the likely effects of the Proposed Development with regard to lighting. This will, where relevant, also make cross-reference to the separate Landscape and Visual Assessment referred to above. The Assessment will consider the potential for lighting associated with the Proposed Development as a whole, including on the Main Site, but also any lit sections of the proposed Highways Works.

Baseline Information

5.267 The desktop assessment of baseline conditions helps to inform the appropriate Environmental Zone classification. Environmental Zone limits are defined by the Commission Internationale de l'Eclairage (CIE: 150 :2017). The purpose of the Environmental Zones is to limit the potential for obtrusive light to occur, relative to the typical district brightness of the area in which the lighting is to be implemented. The Environmental Zone descriptions are provided in Table L1 below.

Table L1 - Environmental Zone descriptions

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5 +)	Astronomical observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness (SQM ~ 15 to 20)	Sparsely inhabited rural areas, Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, Small town centres or suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night time activity

5.268 The Main Site is situated in an area which is rural in character and with little artificial lighting other than isolated instances of amenity lighting associated with agricultural sites and waste facilities.

5.269 Within the vicinity of the application Main Site, the highest lighting levels within the area are likely to be associated with the Viridor Ardley Energy Recovery Facility and Ardley Household Waste and Recycling Centre both to the east of the site and also accessed via the B430 road.

5.270 There is likely to be some security lighting associated with the disused Upper Heyford airfield, although as this is sometimes used for filming and other arts uses, there is potential for high intensity temporary flood lighting to occasionally be attributed to the Airfield site. There is only very sparse and local road lighting within parts of the B430 through Ardley village approaching the motorway junction to the north.

5.271 There is no lighting of the specific stretch on M40 Motorway that runs parallel to the Main Site. Whilst vehicle headlights would be used (and may be visible from parts of the site and nearby receptors during the hours of darkness), only fixed and permanent light sources are considered within a baseline lighting assessment. However, much of Junction 10 of the M40 is lit, including the various roundabouts both east and west of the motorway, and the stretch of the A43 which connects them heading north and west away from Junction 10.

5.272 Street lighting is sparse within the parishes of Ardley, Fewcott and Bucknell with most residential roads unlit. Street lighting appears to be provided for traffic routes (typically roads outside of residential areas) and some residential areas of Heyford Park and Upper Heyford (west of the Main Site), but this is likely to be low in terms of district brightness.

5.273 Bicester is located approximately 5.0 kilometres south-east of the Main Site, where lighting is likely to be attributed to town centres and suburban locations. In suburban and town locations, medium levels of district brightness are

expected. Although this would not necessarily contribute to the baseline conditions upon or within close proximity to the Main Site, there is likely to be some degree of skyglow caused by upward light over Bicester that contributes to the general night time appearance of the nightscape from the direction of Ardley and Bucknell.

Future Baseline

5.274 The future baseline will be assessed, taking into account the nature of the existing uses and neighbouring uses on the Application Site, and committed developments nearby. With the Upper Heyford development to the immediate west of the Main Site, there is scope for a degree of change and increase of ambient light levels as a result of increasing urban development.

5.275 However, assuming the widespread use of modern lighting in future development, there is limited likelihood of any major changes to the current baseline as a result of the committed development which is expected to be delivered over the coming years.

Scope of Assessment

5.276 The assessment will cover all forms of obtrusive light (light pollution) including glare, light spill, and upward light. The lighting assessment will also consider all potentially sensitive human and ecology receptors (including residential, transport, night sky, landscape views and flora / fauna), and will include due regard to human wellbeing/health relating to amenity and safety (also referred to below).

Assessment Methodology

5.277 Reference will be made to Guidance Notes for the Reduction of Obtrusive Light GN01 (Institution of Lighting Professionals, 2020) and national and local planning policies and guidance. The methodology will broadly follow the principles set out in Professional Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments (Institution of Lighting Professionals, 2013).

5.278 The assessment will comprise of desktop and on-site surveys to establish the baseline lighting conditions, which will be undertaken by suitably qualified and competent lighting professionals, holding either an Associate Member (AMILP) or Member (MILP) grade of membership with the ILP. Furthermore, they will be professionally registered with the Engineering Council, holding either Engineering Technician (EngTech), Incorporated Engineer (IEng) or Chartered Engineer (CEng) status on the Engineering Council register.

5.279 The baseline survey will consist of a desk-top and site-based survey of the Application Site, where baseline illuminance will be measured at potentially sensitive receptor locations.

5.280 Baseline illuminance measurements will be undertaken using an industry standard light meter, with valid calibration certificate, operated by a competent lighting professional. Measurement locations will be recorded using a Global Positioning System (GPS) device.

5.281 Following the on-site surveys, baseline survey data will be analysed and compared against the lighting proposed as part of the Proposed Development, the Environmental Zone will be classified through supporting information gathered during the baseline survey, To quantify the likely changes in light levels, industry standard lighting software will be used to model the artificial lighting associated with the Application Site, allowing calculated predictions of any potential increase or decrease in baseline light levels at sensitive receptor locations.

5.282 The significance of an effect from artificial lighting will be based upon the sensitivity of the receptor and the magnitude of change at that receptor due to the altered conditions. The sensitivity of the receptor will be classified as High, medium, or Low according to the descriptions provided in Table L1.

Table L1 Sensitivity Criteria

Sensitivity	Description of Criteria
High	The environment is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible. Human (Amenity) – receptors which are sensitive to a change in lighting such that the quality of life would be affected (i.e. lighting is designated a statutory nuisance) Human (Safety) receptors where a change in the lighting has the potential to either dramatically improve or reduce safety (for pedestrians, drivers or workers). Ecological – where a change in the lighting affects the habitats, breeding or feeding of fauna (e.g. protected habitats or other special areas) or growth patterns of fauna/crops.
Medium	The environment has a degree of adaptability and resilience and is likely to accommodate the changes caused by an impact, although there may still be some residual modification as a result. Human (Amenity) – receptors which are sensitive to a change in lighting however not such that the quality of life would be affected. Human (Safety) receptors where a change in the lighting has the potential to either improve or reduce safety (for pedestrians, drivers or workers). Ecological – where a change in the lighting affects the movement or feeding patterns of fauna but the receptor can adapt.
Low	The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions. Human (Amenity) – receptors which would not noticeably be aware of a change in lighting. (i.e. in areas of medium to high luminance). Human (Safety) receptors where a change in the lighting has limited potential to affect safety (for pedestrians, drivers or workers). Ecological – area with limited wildlife.
Negligible	Receptor has little or no night-time activity

5.283 The magnitude of change relates to the extents of the increase or decrease in lighting levels associated with the Proposed Development and will be determined as High, Medium, Low or Negligible in accordance with Table L2.

Table L2 Criteria for Magnitude of Change

Magnitude of Change	Description of Criteria
High	A large change compared with the natural variations in background levels. A clear breach of limits and standards may occur. For example, levels of obtrusive light in the form of sky glow, light trespass or glare towards a receptor which exceeds the limits set within the ILP guidance for a higher Environmental Zone might classify as a high magnitude of change.
Medium	Change which is noticeable and may be a breach of limits and standards. In terms of the limits set in the ILP guidance this might equate to exceeding the Environmental Zone limits but within the limits set for the next Environmental Zone
Low	Change which, when compared to background levels, is only just noticeable.
Negligible	Change which is not noticeable.

5.284 The significance of the change will be derived through the significance matrix as shown in Table L3, matching the sensitivity of the receptor, with the magnitude of the change.

Table L3 Significance Matrix

		Sensitivity of Receptor			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	Major	Moderate – Major	Minor – Moderate	Negligible
	Medium	Moderate – Major	Moderate	Minor	Negligible
	Low	Minor – Moderate	Minor	Negligible – Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

5.285 The significance criteria will be derived from the combination of the relevant receptor sensitivity and the magnitude of change which that receptor will experience as an effect from the lighting of the Proposed Development. These significance criteria are explained further in Table L4 and can be either beneficial or adverse effects. The effects as per the table will inform the outcome of the lighting chapter, determining whether effects from lighting are deemed significant in EIA terms.

5.286 For the purpose of the assessment of the Proposed Development, it is proposed that impacts that are of moderate or major significance are taken to be significant in EIA terms.

Table L4 Significance of Effect

Significance Criteria	Description of effect
Major beneficial	Substantial reduction in obtrusive light at sensitive receptors and/or users of the Proposed Development such that large scale improvements to visual amenity, human safety or health is delivered. Significantly improves ecological habitats.
Moderate beneficial	Moderate reduction in obtrusive light at sensitive receptors and/or users of the Proposed Development such that noticeable improvements to visual amenity, human safety or health are delivered. Improves ecological habitats.
Minor beneficial	Minor reduction in obtrusive light at sensitive receptors and/or users of the Proposed Development such that perceptible improvements to visual amenity, human safety or health is delivered. Perceptible improvement to ecological habitats.
Neutral/not significant	No appreciable effect on sensitive receptors. Effects are reversible.
Minor adverse	Minor increase in obtrusive light at sensitive receptors and/or users of the Proposed Development such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Effects are reversible or temporary.
Moderate adverse	Moderate increase in obtrusive light at sensitive receptors and / or users of the Proposed Development such as an increase in glare, light trespass to properties, increase in sky glow or effects on flora and fauna. Requires monitoring and local remedial work. For example, lighting which is visible and causes nuisance to a sensitive receptor outside the OMSSD project site.
Major adverse	Major increase in obtrusive light at sensitive receptors and / or users of the Proposed Development such as an increase in glare, light trespass to properties, increase in sky glow or effects on flora and fauna. Requires extensive remedial works. For example, a floodlighting installation which directs light into the eyes of oncoming motorists causing disability glare and potential reduction in visual performance leading to an increased risk of collision.

5.287 Adverse effects will be minimised through embedded and additional mitigation where practicable. This will be reflected in a proposed Lighting Strategy, which will be developed during the assessment process and set out in the ES chapter.

5.288 The Lighting Strategy will be developed in line with the relevant guidance and Environmental Zone criteria to ensure the potential impacts both on residential and ecological receptors are minimised.

5.289 Throughout the assessment process, mitigation measures will be specified as necessary to minimise the impacts of artificial lighting associated with the Proposed Development. It is likely that this will consist of embedded (designed-in) mitigation. Mitigation of lighting effects will feature measures relating to the type and position of new lighting, but also the use of screening (such as earthworks and landscaping) to minimise or eliminate lighting effects on off-site receptors, as well as effects on habitats or other sensitive features on-site.

Cumulative Effects

5.290 Cumulative impacts will also be considered where other schemes are planned in the surrounding area to assess the likely cumulative effects of lighting on the local landscape character at night, including the potential for the cumulative effects of upward light to give rise to sky glow and/or glare.

Water Environment (Flood Risk, Drainage and Water Quality)

Introduction

5.291 An assessment will be undertaken of the likely significant effects of the Proposed Development on the water environment, covering Flood Risk, Drainage and Water Quality. This will relate to surface water drainage issues, and foul drainage, and the management of flood-risk as well as matters associated with water quality.

5.292 The assessment will be supported and informed through consultations with various stakeholders, including the Environment Agency (EA), Oxfordshire County Council (in its role as Lead Local Flood Authority), and Thames Water. Reference will also be made to relevant national and local planning and legislative policy relevant to the water environment.

5.293 In accordance with the guidance provided in paragraphs 5.92 - 5.97 and 5.221 - 5.223 of the National Policy Statement for National Networks (NPSNN) it is proposed that the Water Environment Chapter of the ES will assess the likely significant effects of the Proposed Development on the following receptors:

a) Flood risk: the assessment of flood risk will primarily be presented within the standalone Flood Risk Assessment report, and will be based upon desk-top information and the undertaking of site-specific flood risk modelling to ascertain the existing flood risk posed to the site, the implications of the Proposed Development on flood risk, and the testing of mitigation options, if required.

b) Surface water - quantity: the potential effect of the Proposed Development on the rate and volume of surface water run-off will be determined, and a proposed Surface and Foul Water Drainage Strategy prepared to address any identified adverse impacts.

c) Surface water - quality: the potential risk of pollutants being generated as a result of the construction and operation of the Proposed Development will be determined, along with the assessment of potential impacts, and identification of any necessary mitigation measures.

d) Foul water - quantity: consultation will be sought with Thames Water to identify any potential infrastructure capacity issues. The potential

impact of the Proposed Development on available treatment capacity will then be assessed, and mitigation measures proposed, if necessary.

e) Foul water - quality: the standard of available foul water treatment infrastructure will be confirmed via consultations with Thames Water. The impact of the Proposed Development will then be ascertained, and mitigation measures outlined, if necessary.

f) Potable water supply: the potential demand on potable water supply as a result of the Proposed Development will be identified, along with an assessment of the potential impact of such demand on water resource availability, and in turn management measures recommended, if required.

5.294 In accordance with the DCO Regulations a standalone Flood Risk Assessment report will be prepared, which will include a proposed Surface and Foul Water Drainage Strategy. This will form an appendix to the Environmental Statement (ES).

Baseline Conditions

Hydrology

5.295 The Padbury Brook flows eastwards through the north-western tip of the Main Site, and beneath the M40 in the vicinity of Junction 10 in the north-eastern portion of the Application Site. The Brook discharges to the River Great Ouse downstream of the site, part of the Anglian river basin.

5.296 The Gagle Brook flows in a generally southerly direction within the vicinity of the Main Site, crossing beneath the railway line close to the eastern limit of the Main Site, and flowing south-westwards across the south-eastern corner of the site, to the north-east of Middleton Stoney in the vicinity of the options for the proposed Relief Road, before flowing beneath the M40 to the south of the B4030. The Brook discharges to the River Cherwell downstream of the Main Site, part of the Thames river basin.

5.297 A tributary of the Gagle Brook (known for the purposes of this study as the Ashgrove Brook) issues in the north-western portion of the Main Site close to the boundary with the Upper Heyford Airfield, and is understood to receive inflows from Upper Heyford Airfield. The Brook flows in a generally southerly direction through the site and discharges to the Gagle Brook to the north-east of Middleton Stoney.

5.298 A number of drainage ditches and small ponds are also present within the Main Site and across the Application Site as a whole, which discharge to the Padbury Brook, Gagle Brook and Ashgrove Brook – these are shown on Image 1 below, and key watercourse are also included on the Draft Features Plan at Appendix 2. Existing highways will typically be drained into Highways Authority or Highways England assets before discharging to the local watercourse network.

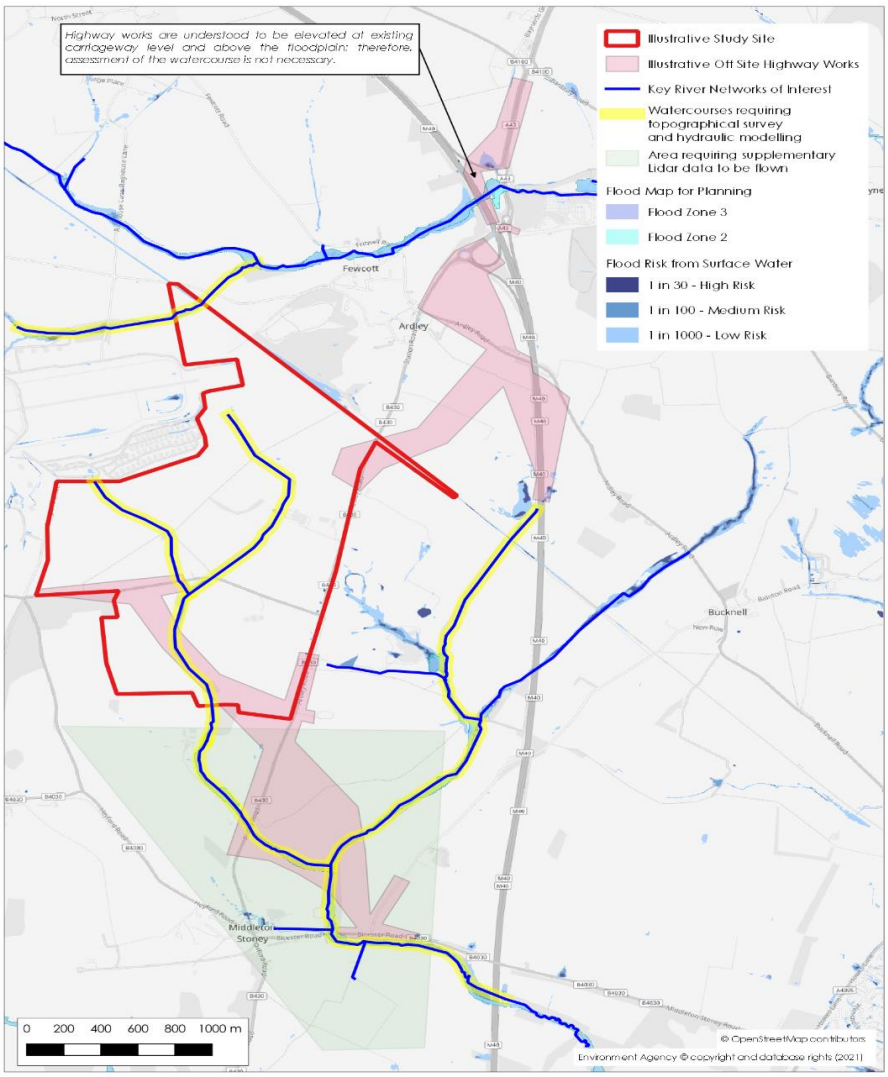
Flood Risk

5.299 The EA's Flood Zone mapping shows the majority of the Main Site to be within Flood Zone 1 (the lowest category of risk), defined as land having a less than 1 in 1,000 annual probability of fluvial flooding). Areas of Flood Zone 3 (defined as land having a 1 in 100 or greater annual probability of fluvial flooding) are shown within the site in the vicinity of Junction 10 of the M40, and to the north-east of Middleton Stoney, relating to the course of Padbury Brook and Gagle Brook respectively.

5.300 Whilst it is acknowledged that the majority of the Main Site is within Flood Zone 1, and therefore indicated to be at low risk of fluvial flooding, the EA's Flood Zone mapping does not take account of watercourses with a catchment area of less than 3km^2, which is the case with the on-site watercourses in this situation. It is accepted therefore that the EA's Flood Zone mapping may not be fully representative of the potential fluvial flood risk at the site in this instance.

5.301 The EA's Flood Risk from Surface Water mapping also shows the majority of the Application Site to be at 'very low' risk of surface water flooding, though various areas of the site are shown to be at 'low', 'medium' and 'high' risk of surface water flooding respectively. Areas indicated to be at potentially higher risk of surface water flooding generally correlate with the location of existing surface watercourses and waterbodies, and is considered a more realistic indication of potential fluvial flood risk, compared with the EA's Flood Zone mapping, on the basis that the EA's Flood Risk from Surface Water mapping encompasses watercourses with a catchment area of less than 3km^2, which is the case with the on-site watercourses in this situation.

Image 1 – The Proposed Development in the context of local Watercourses and Flood Risk areas



Surface Water

5.302 The majority of the Application Site is currently undeveloped and therefore not believed to be served by a positive surface water drainage system, with rainfall currently assumed to infiltrate into the ground where geological and hydrogeological conditions allow, and then run-off at surface level once the infiltration capacity of the ground has been exceeded. Any run-off currently generated will likely be directed to existing on-site and nearby surface waterbodies, and ultimately into the Padbury Brook, Gagle Brook and Ashgrove Brook.

5.303 Existing developments within the Application Site, and the existing highways (specifically the M40, A43, B430, B4030, Ardley Road, Middleton Road, Somerton Road, and other minor unnamed roads), are believed to be served by positive surface water drainage systems, though the nature of such systems is yet to be determined.

Water Quality

5.304 The Padbury Brook catchment has a Water Framework Directive overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'fail' chemical status. The Gagle Brook catchment has a Water Framework Directive overall waterbody quality classification of 'poor', with an ecological status of 'poor' and a 'fail' chemical status. These classifications are from 2019, the most recent date for which data is available.

5.305 Two Site of Special Scientific Interest (SSSI) are located within/immediately adjacent to the MainSite: Ardley Cutting and Quarry, and Ardley Trackways. The SSSI's are located parallel to a portion of the northern boundary of the Main Site along the railway line, and within a portion of the site to the immediate east of the B430 within the neighbouring limestone quarry site. The SSSI's are predominately designated on the basis of geological interest, through the Ardley Cutting and Quarry SSSI is partially designated on the basis of biological interest related, in part, to the presence of wetland habitats. The wetland habitat portion of the Ardley Cutting and Quarry SSSI is located to the

immediate north of the north-western Main Site boundary, beyond the railway line.

Foul Water

5.306 Whilst the Application Site is located within Thames Water's sewerage area, the majority is undeveloped and therefore not believed to be served by a positive foul water drainage system.

5.307 Existing built development within the Main Site are believed to be served by positive foul water drainage systems, though the nature of such systems is yet to be determined.

Potable Water Supply

5.308 Potable water is supplied to the area by Thames Water. The EA classifies the Thames Water region as having a 'serious' degree of 'water stress'.

5.309 The Main Site includes an underground reservoir served by a number of watermain. The Proposed Development will include diversions to some of the existing on-site water infrastructure, and this will be the subject of discussions with Thames Water.

Potential Environmental Effects

5.310 The Proposed Development has the potential to have a variety of impacts on the water environment, both through construction and operational phases, as follows:

Flood Risk

5.311 The Proposed Development could result in the loss of potential floodplain storage, impedance of overland flood flows routes, and loss/disturbance to existing surface waterbodies through the temporary or permanent obstruction of watercourse and ditch channels. Such potential effects could influence the flood risk posed on-site and to the downstream catchment.

Site Discharges - Quantity

5.312 If unmitigated, the rate and volume of surface water run-off from the Proposed Development could significantly increase the likelihood of downstream adverse effects, in terms of increasing flood risk on-site and to the downstream catchment as a result of surcharging waterbodies and/or sewerage systems.

Site Discharges - Quality

5.313 The discharge of additional surface and foul water from the site has the potential to adversely affect downstream water quality, if unmitigated. Surface water discharges have the potential to contain pollutants generated as part of construction and operational activities, whilst foul water discharges could adversely affect water quality in receiving waterbodies if not appropriately treated, both of which could have the potential to affect human health and sites of ecological importance.

Potable Water Supply

5.314 The Proposed Development will involve the use and consumption of potable water, both during construction and operation. This has the potential to adversely affect water resource availability within the region.

5.315 The Assessment will consider any potential for effects as a consequence of the proposed diversion of water mains infrastructure associated with the on-site reservoir.

Proposed Scope of the Assessment

5.316 The study area for this assessment will principally comprise the Application Site, but will extend to the relevant natural and man-made water resource catchments where necessary.

5.317 The assessment will be supported and informed through consultations with various stakeholders, including the EA, Oxfordshire County Council (in its role as the Lead Local Flood Authority) and Thames Water.

5.318 The ES chapter will include a Flood Risk Assessment report which will incorporate a proposed Surface and Foul Water Drainage Strategy and the following key area-specific background reports:

a) Environment Agency ‘Catchment Abstraction Licensing Strategy’.

b) Local Authority ‘Strategic Flood Risk Assessments’ and ‘Water Cycle Study’.

c) Thames Water ‘Water Resources Management Plan’.

d) Thames Water ‘River Basin management Plan’; and

e) Anglian Water 'River Basin management Plan’.

5.319 The assessment will also be undertaken in accordance with national and local planning and legislative policy relevant to the water environment, specifically:

a) ‘National Policy Statement for National Networks’ (NPSNN) - including the requirements to “take into account the potential impacts of climate change” (paragraph 4.42); ensure that “*potential releases can be adequately regulated under the pollution control framework; and, the effects of existing sources of pollution in and around the project are not such that the cumulative effects of pollution when the Proposed Development is added would make that development unacceptable*” (paragraph 4.55); undertake an appropriate assessment of flood risk, in accordance with the requirements of the ‘National Planning Policy Framework’ in order to “*avoid, limit and reduce the risk of flooding to the proposed infrastructure and others*” (paragraph 5.102); and, assess potential impacts on water quality, water resources, physical characteristics of the water environment, and water bodies or protected areas under the Water Framework Directive and Source Protection Zones (paragraph 5.223).

b) ‘National Planning Policy Framework’ and accompanying ‘Flood Risk and Coastal Change Planning Practice Guidance’, which prescribe the required approach to assess, avoid, and manage and mitigate flood risk.

c) The Cherwell Local Plan 2011 - 2031, specifically policies:

- Policy PSD 1: Presumption in Favour of Sustainable Development.

- Policy ESD 1: Mitigating and Adapting to Climate Change.

- Policy ESD 6: Sustainable Flood Risk Management.
- Policy ESD 7: Sustainable Drainage Systems (SuDS).
- Policy ESD 8: Water Resources.

5.320 The significance of potential effects arising from the Proposed Development will be established through a combination of the identification of receptor sensitivity and assessment of the magnitude of potential effects. Assessment thresholds will adhere to best practice by applying those set-out in the Design Manual for Roads and Bridges (namely LA104 – 'Environmental Assessment and Monitoring' LA113 – 'Road Drainage and the Water Environment') and The Environment Agencies 'A handbook for scoping projects'.

5.321 The Tables below present the proposed criteria and thresholds for the assessment of receptor sensitivity and of potential effects and impacts:

Table W1: Sensitivity/Value of Receptors

Sensitivity / Value of Receptor	**Description**	**Example**
High	Attribute with a high quality and rarity, local scale and limited potential for substitution. Attribute with a medium quality and rarity, regional or national scale and limited potential for substitution. Attribute highly sensitive to change.	Examples include: Receiving watercourse classified as High or Good Ecological status / potential under WFD. Site protected under EU or UK wildlife legislation (Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI)). Species protected under EU or UK wildlife legislation. Site located within a Groundwater Source Protection Zone (SPZ) inner or outer protection zone (Zone 1).

		NPPF Flood Risk Vulnerability Classification "Essential Infrastructure" or "Highly Vulnerable". EA current groundwater quantitative and chemical qualities defined as Good. Human receptors (construction workers and future residents).
Medium	Attribute with a medium quality and rarity, local scale and limited potential for substitution. Attribute reasonably tolerant of change.	Examples include: Floodplain providing a moderate volume of storage. Receiving watercourse classified as Good or Moderate Ecological status / potential under WFD. NPPF Flood Risk Vulnerability Classification "More Vulnerable".
Low	Attribute with a low quality and rarity, local scale and limited potential for substitution. Attribute tolerant of modest change.	Examples include: EA current river ecological quality defined as Poor / Bad and chemical quality defined as Fail. Floodplain with limited existing development. Receiving watercourse classified as Poor Ecological status / potential under WFD. NPPF Flood Risk Vulnerability Classification "Less Vulnerable".
Negligible	Attribute of very limited quality and tolerant of substantial change.	Examples include: Floodplain essentially rural in nature, characterised by agricultural land use NPPF Flood Risk Vulnerability Classification "Water Compatible".

Table WT2 Magnitude of impact.

Magnitude of Impact	Description	Example
Large	Results in a loss of attribute and/or quality and integrity of the attribute. Following development, the baseline situation is Fundamentally changed.	Examples include: Change in ecological and/or chemical qualities of the surface water. Loss of flood storage/increased flood risk. Large change in: • water quality of receiving watercourse; • NPPF Flood Risk Vulnerability Classification; • surface water flood risk; • fluvial flood risk; • water supply volume; and • foul drainage volume.
Moderate	Results in impact on integrity of attribute, or loss of part of attribute. Following development, the baseline situation is noticeably changed.	Examples include: Contribution of a significant proportion of the effluent in the receiving river, but insufficient to change its qualities. Moderate change in: • water quality of receiving watercourse; • NPPF Flood Risk Vulnerability • Classification; • surface water flood risk; • fluvial flood risk; • water supply volume; and • foul drainage volume.
Small	Results in some measurable change in attribute's quality or vulnerability. Following development, the baseline situation is largely unchanged with barely discernible differences.	Examples include: Measurable changes in attribute, but of limited extent/duration. Small change in:

		• water quality of receiving watercourse; • NPPF Flood Risk Vulnerability Classification; • surface water flood risk; • fluvial flood risk; • water supply volume; and • foul drainage volume.
Negligible	The impacts are unlikely to be detectable or outside the norms of natural variation.	

5.322 The assessment will consider the construction and operational stages of the Proposed Development over the lifetime of the proposed scheme, i.e. taking account of the potential influence of climate change on the water environment receptors under consideration. Table WT3 below provides the proposed criteria for determining the significance of effects.

Table WT3 - Determining Significance of Effect.

		Sensitivity of Receptor			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Impact	**Large**	Substantial	Major	Moderate	Minor
	Moderate	Major	Moderate	Minor	Negligible
	Small	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

Climate Change

5.323 Climate change is integral to assessing the likely significant effects of a proposed development on the water environment, in terms of potential changes to rainfall, river flows, and water resource demand and availability. In accordance with paragraphs 4.36 - 4.47 of the NPSNN, the Water Environment Chapter of the ES will therefore assess the potential effects of climate change on the Proposed Development, and consider climate change with respect to any recommended mitigation measures. The adoption of climate change

allowances will be based on the EA's latest guidance which utilises the 'UK Climate Projections 2018' (UKCP18).

5.324 In accordance with paragraphs 4.79 - 4.82 and 4.16 - 4.17 of the NPSNN, the Water Environment Chapter of the ES will also consider any interactions between the Proposed Development and human health, and the inter-project and intra-project cumulative effects of the Proposed Development.

5.325 The assessment will consider the construction and operational stages of the Proposed Development over the lifetime of the proposed scheme, i.e. taking account of the potential influence of climate change on the water environment receptors under consideration.

Summary

5.326 It is proposed that an assessment will be undertaken of the likely significant effects of the Proposed Development on the water environment. The above section of this Scoping Report identifies the key receptors and elements of the water environment which will be considered.

5.327 The assessment will be supported and informed through consultations with various stakeholders, reference to relevant national and local planning and legislative policy, assessment of desk-top information, and the undertaking of site-specific flood risk modelling. In addition, a standalone Flood Risk Assessment report which will incorporate a proposed Surface and Foul Water Drainage Strategy.

Cultural Heritage

Baseline Information

5.328 No archaeological or built heritage baseline studies have yet been completed for the Application Site, though work has commenced on the archaeological desk-based assessment and built heritage statement. Consultation of available online sources has confirmed that there is one designated heritage asset, a Grade II listed Barn c.30 metres north of Ashgrove Farmhouse, on the Main Site. The wider farmstead of which this forms a part (Ashgrove Farm) may also warrant consideration as a non-designated heritage asset given the age and nature of some of the other built features. This has yet to be determined.

5.329 A number of Scheduled Monuments, Listed Buildings, Conservation Areas, and a Registered Park and Garden are recorded in the wider local area as noted on the Features Plan attached at Appendix 2.

5.330 The listed buildings in the wider local area are largely clustered in the surrounding villages of Ardley, Fritwell Bucknell, and Middleton Stoney; at Middleton Park; and with a number also situated within RAF Upper Heyford. Other isolated listed buildings within the wider local landscape include Grade II listed Trow Pool Water Tower (NHL 1389392; adjacent to the M40), Grade II Lodge Farmhouse (NHL 1200299, adjacent to the Site boundary along Middleton Road), the Grade II listed barns at Himley Farm (NHL 1046883, c. 1km south-east), the Grade II listed barns at Chesterton Fields Farm (NHL 1046534, c. 400m south), the Grade II listed Lime Kiln near Lower Heyford (NHL 1226033), and Grade II listed Troy Farmhouse (NHL 1225639, c.1km north-west).

5.331 There are Conservation Areas at Ardley, Fritwell, Rousham, and Upper Heyford, with the latter adjoining the Main Site to the north-west. The Grade II Registered Middleton Park (NHL 1101405) lies c.800m south-west of the Main Site.

5.332 The Scheduled Monuments in the wider local area include a moated ringwork (NHL 1015554; c.290m to the north-east), Cold War structures at the former Upper Heyford Airbase (NHL 1021399; c.470m west) and a Saxon barrow (NHL 1015553; 1.4km south-west).

5.333 The baseline studies informing the cultural heritage chapter will include:

- An Archaeological Desk-Based Assessment;
- Archaeological field evaluation (underway)
- A Built Heritage Statement.

5.334 The current baseline scenario has been outlined above. The Application Site currently comprises a number of parcels of agricultural land used for a mix of pasture and arable purposes. The HER records a number of non-designated archaeological receptors within the Application Site boundary.

Future Baseline

5.335 In terms of the future baseline, it is considered that without the implementation of the project the Application Site would remain in use as agricultural land. The likely evolution of the current archaeological environment would include the unrecorded loss of the archaeological receptors on the Application Site through continued agricultural practices.

5.336 With regard to built heritage, this is susceptible from impacts from committed developments (such as Heyford Park), and over time, the potential deterioration of the fabric of the buildings.

Scope of Assessment

5.337 The value of the historic environment and the contribution it makes to our cultural, social and economic life is acknowledged by the Government in their Statement on the Historic Environment for England 2010. The Cultural Heritage chapter for the ES, covering both archaeological and built heritage considerations, will assess the value and sensitivity of heritage assets within

and adjacent to the Proposed Development and consider the effect of the Proposed Development on these assets' value and sensitivity. This will include full consideration of the assets' settings, where relevant. The aim of the assessment will be to identify, as far as is reasonably possible, the nature of the archaeological and built heritage resource within the Application Site and its surroundings, to assess the value and sensitivity of all relevant features or assets. The assessment will include appropriate mitigation measures and provide for the future treatment of any assets or their settings if they are likely to be affected by the Proposed Development.

5.338 This appraisal will be placed in the local, regional and national context, and assessed against appropriate national criteria and in line with relevant guidance.

5.339 The following organisations, databases and documents will be consulted:

- National Policy Statement for National Networks (NPSNN);
- Local studies/archives and other relevant repositories;
- National Planning Policy Framework and Local Planning Policies;
- Heritage setting guidance issued by HE;
- Historic Ordnance Survey Mapping and pre-Ordnance Survey mapping (where available);
- Historic England's National Mapping Programme; and
- Various relevant online resources and catalogues.
- Historic England;
- Local Authority Archaeological Advisor;
- Local Authority Conservation Officer.

Assessment Methodology

5.340 The baseline studies will be carried out in accordance with standards and guidance provided by the relevant bodies, such as Historic England (HE), the Chartered Institute for Archaeologists (CIfA) and the Institute of Historic Building Conservation (IHBC).

5.341 In particular the guidance in the three Good Practice Advice (GPA) documents published by Historic England will be followed. These include GPA1: The Historic Environment in Local Plans (March 2015); GPA2: Managing Significance in Decision-Taking in the Historic Environment (March 2015); GPA3: The Setting of Heritage Assets (2nd Edition December 2017).

- GPA1 – This document sets out information to assist local planning authorities to make well informed and effective local plans
- GPA2 – This document provides guidance on assessing the significance of heritage assets using appropriate expertise, historic environment records, recording and furthering understanding, neglect and unauthorised works, marketing and design and distinctiveness.
- GPA3 – This document provides general advice on understanding setting and how it may contribute to the significance of heritage assets and allow that significance to be appreciated, as well as on how views contribute to setting. The suggested staged approach to taking decisions on setting can also be used to assess the contribution of views to the significance of heritage assets.

5.342 All archaeological and built heritage assets identified will be categorised in terms of their value and sensitivity in accordance with guidelines set out in the Design Manual for Roads and Bridges (updated 2020). This will relate to the Main Site, plus development of the proposed Highway Works, including those at Junction 10, and in the vicinity of both Ardley and Middleton Stoney.

5.343 The assessment will identify and evaluate the nature and likelihood of the impacts of the Proposed Development, both during construction and on completion, on archaeological and built heritage assets against clearly defined

criteria. Significance will be assigned to impacts relative to the sensitivity of the resource and the magnitude of effect in accordance with good practice.

5.344 Archaeological resources are susceptible to a range of impacts during development. These relate to works associated with site preparation as well as construction related activities, including, for example:

- Demolition and site clearance activities;
- Excavation that extends into archaeological sequences, such as deep foundations;
- Piling activities;

5.345 In terms of effects on built heritage resources; these can be direct, for example resulting from loss or damage to historic fabric, or indirect through changes to their settings. The assessment of impact on the setting of heritage assets will be carried out in full accordance with the guidance contained within Historic England's Good Practice Advice Note 3: The Setting of Heritage Assets (2nd ed. 2017).

5.346 Once impacts have been identified, the means by which they can be mitigated through design will be explored and appropriate mitigation measures will be identified and incorporated into the proposals and secured through the DCO. The residual impacts following the implementation of these measures will then be defined and significance criteria applied.

5.347 The magnitude of impact is assessed by taking into consideration the extent/proportion of the asset affected, its type, its existing degree of survival/condition, and its potential amenity value. In considering these factors, the criteria for assessing the magnitude of predicted change on cultural heritage assets will be as follows:

Magnitude	Typical Descriptors
High	*Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).*
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	*Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).*
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	*Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).*
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	*Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).*
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	*No loss or alteration of characteristics, features or elements; no observable impact in either direction.*

5.348 The sensitivity of the receiving environment, together with the magnitude of change, defines the significance of effects. Effects of 'moderate' or 'major/substantial' significance are considered to equate to significant effects highlighted in the context of EIA Regulations. The criteria for assessing significance of effect are outlined below:

Sensitivity	Magnitude of Impact				
	No Change	**Negligible**	**Low**	**Medium**	**High**
Negligible	*No change*	*Negligible*	*Negligible or Minor*	*Negligible or Minor*	*Minor*
Low	*No change*	*Negligible or Minor*	*Negligible or Minor*	*Minor*	*Minor or Moderate*
Medium	*No change*	*Negligible or Minor*	*Minor*	*Moderate*	*Moderate or Major*
High	*No change*	*Minor*	*Minor or Moderate*	*Moderate or Major*	*Major or Substantial*
Very high	*No change*	*Minor*	*Moderate or Major*	*Major or Substantial*	*Substantial*

Cumulative Effects

5.349 Cumulative effects will be measured against an agreed list of developments in the local area which may have potential effects on the same receptors as the Proposed Development. It is anticipated that the committed development of most relevance will be that at Upper Heyford, the former Airbase.

Ground Conditions

5.350 The Ground Conditions chapter will identify the existing ground conditions and associated development constraints, by evaluating the potential for soil, gas and water contamination and the potential effects on ground conditions during both the construction and operational phase.

5.351 A range of potential impacts associated with the construction and operation of the Proposed Development will be considered, including ground contamination, minerals, Sites of Special Scientific Interest (SSSI), ground improvement, earthworks, foundation solutions, slope stability and associated geotechnical issues.

Study Area

5.352 The extent of the Ground Conditions study area is the Application Site and the immediate surrounding area.

5.353 The immediate area is defined for the purposes of the assessment is land within close proximity to, or bordering the Application Site (i.e. less than 250m from the site boundary) which has the potential to be a contaminant source where there is a potential pathway for contaminant migration which may affect the Application Site or be affected by the Application Site.

5.354 The inclusion of a 250m buffer is based on the 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (Environment Agency, 2008). This buffer is a conservative approach due to the lower sensitivity of commercial development relative to housing, but reasonable in the context of the scheme taking into account the distance over which contamination can migrate, and the relatively low density of development in the area of the scheme.

Preliminary Assessment of Baseline Conditions

Existing Baseline Information

5.355 At the current time, and for the purposes of this Scoping Opinion, baseline information is sourced from a preliminary review of publicly available data and a site walkover survey. A Phase 1 Desk Study will be undertaken and will be included as part of the ES baseline data. A Minerals Assessment will also be undertaken and form part of the assessment of Ground Conditions.

5.356 The Main Site currently consists generally of open, tree and hedge lined fields and is currently utilised for agricultural use. The land affected by the proposed Highway Works comprises predominantly open, tree and hedge lined fields with existing infrastructure (including the rail line and existing highways) as well as areas of woodland and local watercourses.

5.357 Historical mapping indicates that the majority of the Main Site has never been developed and has been utilised for agricultural use. However, the site is immediately south-east of the former RAF and USAF Upper Heyford airbase.

5.358 The British Geological Survey (BGS) shows the geology of the area to comprise:

- Alluvium, comprising a mixture of clay, silt, sand and gravel, located in the valleys, associated with the streams; over;
- White Limestone Formation, present at the surface across the majority of the site, comprising a pale grey to off-white or yellowish limestone, interbedded with mudstone; over
- Rutland Formation, present at the surface in the northern valley and below the White Limestone Formation, comprising mudstone, siltstone and sandstone.

5.359 Records from the BGS archive include a borehole drilled to the east of the Main Site. This indicates the ground conditions comprise predominately limestone, with interbedded mudrock and clay.

5.360 The Environment Agency classifies the White Limestone Formation as a Principal Aquifer and the underlying Rutland Formation as a Secondary B Aquifer. The Application Site is not located above a groundwater Source Protection Zone (SPZ).

5.361 There are two SSSIs in close proximity to the Main Site.

- Located to the south-east and north-east of the Main Site is ‘Ardley Trackways’ SSSI, which is of geological interest for the presence of an array of fossilised dinosaur trackways.
- 'Ardley Cutting and Quarry' (associated with the railway cutting and woodland to the north) is located immediately to the north of the Main Site. This SSSI is of geological interest for its exposures of Jurassic rocks and also has biological interest associated with limestone grassland, scrub, ancient woodland and wetland habitats.

5.362 As per the Oxfordshire County Council, Minerals and Waste Core Strategy (September 2017), the site is identified to be within a:

- Mineral Resource Strategic Area (Policy M3), for crushed rock;
- Mineral Safeguarding Area (Policy M8); and
- Mineral Consultation Area.

5.363 The Ardley Landfill is located to the east of the Main Site and another landfill is located to the north of the railway cutting.

5.364 A preliminary Site Investigation (Desk Study and Ground Investigation) will be undertaken to provide supporting baseline data to the ES.

5.365 A site walkover survey will be undertaken by suitably qualified and experienced consultants. Site photographs and descriptions will be incorporated in the Phase 1 Desk Study. The walkover will be undertaken in accordance with

BS5930:2015 and BS 10175:2011+A2:2017 best practice guidance as set out below.

5.366 No ground investigation has been undertaken to date. A preliminary ground investigation will be undertaken in accordance with best practice guidance as set out below.

Consultations

5.367 Preliminary consultations have been undertaken with Natural England with regard to the SSSIs located on and in close proximity to the site, and are ongoing.

5.368 Consultations will also be held with:

- the Environmental Protection Officer at Cherwell District Council with regard to human health risks;
- the Oxfordshire County Council Minerals and Waste team, with regard to minerals;
- the Environment Agency (if necessary) with regards to risks to Controlled Waters.

Phase 1 Desk Study

5.369 The Phase 1 Desk Study will include:

- a field reconnaissance (walkover) to determine the nature of the site and its surroundings including current and former land uses, topography and hydrology;
- acquisition and review of:
  - historical Ordnance Survey maps, to identify former potentially contaminative uses at the site and the area immediately surrounding it, and an assessment of the associated contamination risks;

- a third-party environmental database search to identify flooding warning areas, local landfills, pollution incidents, abstractions, environmental permits etc. which may have had the potential to have environmental impact on the site;
- Historical aerial photographs (Google Earth) and other imagery (third-party environmental database search);
- topographical, geological and hydrogeological maps;
- MAGIC website – (www.natureonthemap.naturalengland.org.uk/magicmap);
- British Geological Survey (BGS) archive records;
- a site-specific specialist UXO Desk Top Study.

Ground Investigation

5.370 The Ground Investigation will be undertaken on the Main site. It is not proposed to undertake Ground Investigation for the Highways Works as part of the ES. The Ground Investigation will provide general coverage across the Main Site and will also target areas of potential contamination identified by the walkover survey and the Phase 1 Desk Study.

5.371 The Ground Investigation will include a combination of the following methods:

- Rotary core / rotary percussion boreholes with recovery of disturbed and 'undisturbed' samples for geotechnical characterisation and chemical analysis, and *in situ* (SPT) testing, to assess deeper ground conditions and allow installation of gas and groundwater monitoring and sampling wells.
- Dynamic 'windowless' sampling, with recovery of disturbed samples for geotechnical characterisation and chemical analysis, and *in situ* (SPT) testing, to a maximum depth of 4.0m bgl, to assess shallow ground conditions and allow

installation of gas and groundwater monitoring and sampling wells.

- Installation of gas and groundwater monitoring wells in rotary core/percussion boreholes a number of the windowless sampler boreholes, to allow gas concentration and groundwater level monitoring and collection of groundwater samples (and if necessary, quality testing).
- Trial pitting by mechanical excavator with recovery of disturbed samples for geotechnical characterisation and chemical analysis, and *in situ* hand shear vane tests, to a maximum depth of 3.5m bgl, to assess shallow ground conditions.
- Trial pitting by hand, undertaken in areas which are not accessible for mechanised plant and in cropped fields (as restricted by farmers), with recovery of disturbed samples for geotechnical characterisation and chemical analysis, and *in situ* hand shear vane tests, to a maximum depth of 1.2m bgl.
- Falling head permeability testing in the boreholes to determine the possibility of infiltration drainage being appropriate for the site.
- Infiltration rate testing undertaken in trial pits to determine the possibility of infiltration drainage being appropriate for the site.
- Analysis of soil chemical and geotechnical samples for analysis at UKAS and MCERTS accredited laboratory (as appropriate).
- Post investigation gas concentration and groundwater level monitoring visits.

5.372 The findings of the baseline assessment will be summarised in the ES Chapter and will include information under the following headings:

- Site History;
- Geology;
- Hydrogeology;

- Hydrology (in the context of ground conditions);
- Mineral resource;
- Unexploded Ordnance;
- Potential Contamination Sources; and
- Potential Geotechnical Risks.

5.373 The above data will be used to collate a conceptual site model to determine the likely contaminant linkages which could give rise to unmitigated environmental effects and the features that could give rise to unmitigated geotechnical effects.

Proposed Method of Assessment

5.374 The baseline study will be used to assess effects as a result of the Proposed Development during the construction and operational phases. Environmental effects and mitigation measures identified by the ES are intended to protect workers on, and end-users of, the Proposed Development. The ES will also contain assessments of potentially significant impacts of wider extent than the Application Site area itself.

5.375 The potential impacts to the environment arising from construction works and the use of the site as a Strategic Rail Freight terminal and warehousing development (including associated development) will be evaluated. If required and appropriate, measures will be proposed to mitigate any unacceptable negative impacts and any residual impacts will be identified.

5.376 The existing soil and groundwater conditions are to be assessed in the baseline study by the Phase 1 assessment (desk study and walk-over survey) and the Ground Investigation, which will use the potential 'source-pathway-receptor contaminant linkage' (S-P-R) concept to assess risk as introduced in the Environmental Protection Act 1990. Potential geotechnical risks will be assessed.

5.377 These potential S-P-R linkages will then be investigated by undertaking ground investigation works. The factual information from the Geo-Environmental Desk study and Ground Investigation will be used to develop the ground model (GM) and a Conceptual Site Model (CSM). This CSM is based on a ground model of the on-site physical conditions and an exposure model of the possible contaminant linkages. The CSM forms the basis for Generic Quantitative Risk Assessment (GQRA), which will be undertaken in accordance with current guidelines. This GQRA may lead to a Detailed Quantitative Risk Assessment (DQRA).

5.378 Environmental issues related to ground contamination are considered by preliminary risk assessment of pollution linkages. A pollution linkage is said to exist where three conditions are satisfied:

1. there is a source contaminant with the potential to cause harm to human health, property (including buildings) or the wider environment;
2. there is a receptor (e.g. people, property, the environment) which might be harmed by the source of contamination; and
3. there is a pathway by which the source can reach the receptor, so that harm can be caused.

5.379 On any particular site, there may be multiple sources, pathways and receptors and each source-pathway-receptor pollution linkage must be examined and the risk assessed. This is usually done in a series of stages or tiers, starting with a general, more conservative approach, but becoming more in-depth and site-specific if a more detailed approach is warranted (usually where the issues are very complex to resolve).

5.380 The stages of assessment are summarised as:

1. hazard identification;
2. generic risk assessment;

3. detailed risk assessment; and

4. risk evaluation.

5.381 The stages of assessment are detailed in Table G1.

Table G1: Risk Assessment Stages

Hazard Identification
• The potential pollution linkages are listed, and judgement is used to determine which of these can be considered plausible, i.e. there is a realistic probability that environmental damage might take place. • Only the plausible linkages need be considered further, in the generic risk assessment.
Generic Risk Assessment
• All the plausible linkages are considered in the light of ground investigation test results. • The concentrations of chemicals in the ground are compared, using specified statistical techniques, with published values (Generic Assessment Criteria), which are deemed indicative of minimal risk, for example to human health, plant life or the water environment.
Detailed Risk Assessment
• Where concentrations exceed the assessment criteria there is a need to carry out mitigation measures. • Mitigation can include more detailed risk assessment using site-specific conditions rather than generic ones. • Mitigation measures can also include engineering work (also known as remediation), such as removal or treatment of the contaminant or severing of the pathway between the contaminant and the potential receptor, thereby breaking the linkage. • It is not always possible to completely remove an environmental impact and a residual impact may remain, or some secondary impacts may be generated. Accepting a secondary or residual impact may often involve a trade-off, which must be judged to be reasonable. An example of a trade-off might be the removal of contaminated soil from a development site, but the secondary impact would be increased lorry traffic and risk of road traffic accidents during the removal.
Risk Evaluation
• Risk Evaluation is used frequently in the decision-making process. • This may involve more in-depth scientific analysis or professional judgement and local experience and can take place at any stage in the assessment process. • The generic criteria are by design very conservative in terms of providing protection to health. Consequently, a moderate exceedance of a criterion does not mean a sudden change from acceptable risk to unacceptable risk. Risk Evaluation takes things like this into account.

Good Practice context

5.382 In accordance with best practice, the following published guidance documents will also be used in the assessment:

- Association of Ground Investigation Specialists. 2006. Guidelines for Good Practice in Site Investigation. Issue 2. AGS, Beckenham.
- Building Research Establishment (BRE). 2001. Concrete in aggressive ground. BRE Special Digest 1, Parts 1 to 4. BRE, Garston.
- Building Research Establishment (BRE) BR211, Radon; Guidance on Protective Measures for New Buildings (2015)
- British Plastic Federation. August 2018. 'Designing Drains and Sewers for Brownfield Sites. Guidance Notes'. BPF Pipes Group (https://www.bpfpipesgroup.com/media/29155/Designing-drains-and-sewers-for-brownfield-sites.pdf)
- British Standards Institution. 2007. Eurocode 7 – Geotechnical design - Part 2: Geotechnical investigation and testing. BS EN 1997-2. BSI, London.
- British Standards Institution. 2009. Code of practice for earthworks. BS 6031 Incorporating Corrigendum No.1:2010. BSI, London.
- British Standards Institution. 2004+A1 2013. Eurocode 7 – Geotechnical design - Part 1: General rules. BS EN 1997-1+A1. Incorporating Corrigendum February 2009. BSI, London.
- British Standards Institution. 2015. Code of Practice for Foundations. BS 8004. BSI, London.
- British Standards Institution. 2015+A1:2020. Code of practice for Site Investigations. BS 5930:2015+A1:2020. BSI, London.

- British Standards Institution. 2015 +A1:2019. Code of practice for the characterization and remediation from ground gas in affected developments. BS 8485:2015 +A1:2019. BSI, London.
- British Standards Institute. 2017. Investigation of potentially contaminated sites, Code of Practice. BS 10175 Incorporating Amendment No. 2:2017. BSI, London.
- Construction Industry Research and Information Association (CIRIA), Report 132, A Guide to Safe working on Contaminated Sites (1996).
- Construction Industry Research and Information Association (CIRIA). 2001, C522 Contaminated land risk assessment, A guide to good practice.
- Construction Industry Research and Information Association (CIRIA). 2007, Report C665, Assessing Risk Posed by on Hazardous Ground Gases to Buildings
- Department for Communities and Local Government (DCLG), 2012, National Planning Policy Framework.
- Department for Environment Food and Rural Affairs (DEFRA), 2012, Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.
- CIEH and CL:AIRE. May 2008. Guidance on comparing soil contamination data with a critical concentration. Chartered Institute of Environmental Health and Contaminated Land: Applications in Real Environments, London.
- CL:AIRE, 2011. Definition of Waste: Development Industry Code of Practice Version 2.
- Construction (Design and Management) Regulations 2015.
- Control of Asbestos Regulations 2012.

- Environment Agency. 2006. Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination. The Environment Agency, Bristol, 123pp.
- Environment Agency, 2004. Model procedures for the management of land contamination. Contaminated Land Report 11, Bristol: The Environment Agency. (Revoked, but referenced in NPS NN).
- Environment Agency, 2008. Guidance for the Safe Development of Housing on Land Affected by Contamination. RDP 66, Bristol: The Environment Agency.
- Environment Agency. 2020. Land Contamination: Risk Management (LCRM). The Environment Agency.
- Stone, K., Murray, A., Cooke, S., Foran, J. And Gooderham, L. 2009. Unexploded ordnance (UXO), a guide to the construction industry. CIRIA Report C681. Contaminated Land: Applications in Real Environments, London.
- The Asbestos (Licensing) Regulations 1998.
- The Control of Asbestos Regulations. Health and Safety Executive, 2012.
- The Health and Safety at Work etc. Act 1974.
- The Highways Agency. 2019. Design Manual for Roads and Bridges. Managing Geotechnical Risk. CD 622 Rev 0. Highway Agency, London.
- Wilson, S., Oliver, S., Mallett, H., Hutchings, H. and Card, G. 2007. Assessing risks posed by hazardous ground gases to buildings. CIRIA Report C665. CIRIA, London. 182pp.

Potential for 'Likely Significant Effects'

5.383 The demolition and construction stages of the Proposed Development could generate some potential significant direct and indirect Geological and Ground Condition impacts, with temporary effects.

5.384 Subject to the findings of further Investigations, the potential impacts could include those set out below:

- Construction workers may come into direct contact with potentially localised contaminated soils and groundwater (to be further defined based on findings of the site investigation) during the redevelopment works.
- As with any historical farmyards and farmland, a potential exists for further (unknown) limited contamination hotspots to be discovered during construction works.
- Hazardous gas emissions generated could present a potential health risk to construction workers, users of other commercials sites or premises off-site, and members of the public.
- Contaminated dust emissions (particularly associated with construction vehicle movement) could present a potential health risk to construction workers, off-site commercial users and members of the public.
- Dust emissions arising from general construction activities could result in impaired visibility on the adjacent highways and rail infrastructures.
- Ground gas and / or residual volatile contaminants (if present) could pose a risk to construction workers within confined spaces.
- Controlled Waters could be affected during demolition and construction by accidental spillage of oil and diesel through infiltration of polluted runoff through the soil and groundwater to the controlled water.

- Generation and temporary stockpiling of potentially surplus materials (depending on final site levels) coupled with inefficient management of stockpiled materials could lead to direct and indirect pollution impacts from silt-laden runoff.
- Site levels constructed below the existing water table could result in periodic flooding of the development unless adequately mitigated.
- Changing in groundwater levels as a result of excavations within the site. This may be a temporary direct or an indirect impact affecting hydrological receptors, the Geological site of special scientific interest (SSSI) and the rail line to the north.
- Uncontrolled dewatering of excavations could create surface water runoff if not adequately mitigated.
- In the absence of mitigation, demolition, excavation and construction works could introduce new contaminant sources and pathways creating a possible link to site workers, visitors and contamination within the soil and groundwater.
- Excavation of temporary cuttings and placement of temporary slopes and over-steepened stockpiles could result in adverse geotechnical performance of infrastructure assets (such as the M40, the B430 and the rail line to the north) unless appropriately designed and mitigated.
- Loss or sterilisation of mineral reserves,.
- Damage to, or loss of geological SSSI, without appropriate mitigation measures and agreement with key bodies about the relative sensitivity of specific receptors, and significance of likely effects.

5.385 The Proposed Development once complete and operational could generate a range of potential significant direct and indirect Ground Condition impacts, with likely permanent effects on a number of receptors. Supplementary assessment

is necessary to further identify the impacts, however, it is considered they could include:

- Future site users and occupiers who may come into contact with residual contaminants (if present) or ground gases.
- Existing soils may not provide a suitable horticultural growth medium to support future planting within areas of soft landscaping.
- Impact to drainage system from changes to the groundwater flow regime, unless appropriately designed and mitigated.
- Excavation of permanent cuttings and placement of permanent slopes could result in adverse geotechnical performance of infrastructure assets (such as the M40, the B430 and the rail line to the north) unless appropriately designed and mitigated.
- Unacceptable heave or settlement beneath structures and infrastructure unless appropriately designed and mitigated.
- Degradation of concrete due to ground conditions, unless appropriately designed and mitigated.

Scope of Assessment

5.386 The assessment will consider the potential environmental impact of the Proposed Development on the geology, soils and groundwater beneath the site and in the local area.

5.387 Three potential impacts exist for any given site, all of which need to be considered in a risk assessment. These are:

- the site impacting upon itself;
- the site impacting on its surroundings; and
- the surroundings, impacting on the site.

5.388 Aside from consideration of receptors with regard to contamination, the ground conditions assessment will also consider the implications for known and potential presence of on-site mineral reserves and how the Proposed Development may affect any such reserves.

5.389 The assessment will involve consideration in terms of the naturally occurring geological conditions and any man-made deposits, known as Made Ground. Consideration will be given to the physical nature of the rocks, soils and Made Ground, together with information on existing chemical or anthropogenic contamination, ground gas and geotechnical features arising from the former and existing uses of the site. The hydrogeological regime, comprising the groundwater in any permeable deposits (rock, soil or Made Ground) beneath the site, and the hydrological regime (surface water), will be described in so much as they interact with land contamination and geotechnical / construction risk.

Assessing Significance of Effect

5.390 The potential impacts on receptors resulting from the construction and operational phases of the proposed scheme will be assessed based on the CSM of geo-environmental site conditions. Potential positive and negative impacts will then be identified and options may then be outlined for mitigating any potential negative impacts from the scheme construction and operation allowing a final residual impact to be identified. Cumulative impacts of the proposed scheme in relation to other known proposed schemes will also be addressed where applicable.

5.391 A qualitative risk assessment will be undertaken to confirm the magnitude of the assessed impacts to identified potential receptors which are likely to include human receptors (e.g. people living and working nearby), as well as controlled waters, structures and ecology.

Magnitude of Effect

5.392 The magnitude of impacts is judged on the consequences of the impact. In terms of contamination, for example, this would be the degree of exceedance of the assessment criteria and whether this takes place in specific areas or across large areas of the application site. Professional judgement is used as to estimate the likely degree of exceedance based on experience from other, similar sites (see Table G2).

Table G2: Impact Magnitude

Impact Type	Major	Moderate	Minor	Negligible
General definition with respect to contamination impacts to human health, new planting and Controlled Waters	Concentration of contaminants is likely to (or is known from previous data to) exceed that indicative of unacceptable intake or contact. i.e. much greater than required for "significant harm or the significant possibility of significant harm" under EPA1990 Part 2A. Concentrations are high enough to cause acute (short-term) effects.	Concentration of contaminants is likely to (or is known from previous data to) exceed that indicative of unacceptable intake or contact. i.e. greater than required for "significant harm or the significant possibility of significant harm" under EPA1990 Part 2A.	Concentration of contaminants is likely to (or is known from previous data to) exceed that indicative of no harm but not unacceptable intake or contact. i.e. greater than the GAC screening value but less than that required for "significant harm or the significant possibility of significant harm" under EPA1990 Part 2A.	Concentration of contaminants is likely to (or is known from previous data to) be less than that indicative of no harm. i.e. less than the GAC screening value.

Impact Type	Major	Moderate	Minor	Negligible
Human health impacts from chemicals in the ground.	Short-term (acute) effects likely to result in significant harm e.g. high concentration of cyanide on the surface of an informal recreational area.	Long-term (chronic) effects likely to result in significant harm e.g. high concentration of contaminants close to the surface of a development site.	Harm but probably not significant harm unless particularly sensitive individual within the receptor group. May be aesthetic/olfactory impacts.	No measurable effects.
New planting impacts from chemicals in the ground.	Complete and rapid die-back of landscaped areas.	Stressed or dead plants in landscaped areas.	Damage to plants in landscaped areas, e.g. stunted growth, discoloration.	No measurable effects.
Controlled Waters impacts from chemicals in the ground.	Short-term pollution, e.g. major spillage into controlled water. Substances leaching from contaminated soil cause receiving waters to exceed surface water and groundwater quality indicators (EQS/DWS) over a large area.	Pollution of sensitive water resources, e.g. leaching into major or minor aquifers or rivers. Substances leaching from contaminated soil cause receiving waters to exceed surface water and groundwater quality indicators (EQS/DWS) in limited areas.	Pollution of non-sensitive water bodies e.g. leaching into non-classified groundwater or minor ditches. Substances leaching from contaminated soil cause receiving waters to slightly exceed surface water and groundwater quality indicators (EQS/DWS) (based on professional judgement).	No measurable effects. Substances leaching from contaminated soil do not cause receiving waters to exceed surface water and groundwater quality indicators (EQS/DWS).

Impact Type	Major	Moderate	Minor	Negligible
Ecosystems impacts from chemicals in the ground.	Short-term risk to a particular ecosystem or organism forming part of that ecosystem in a designated protected area, e.g. by contamination spillage. Damage to a protected area of international significance (e.g. Ramsar site).	Death of species in a particular ecosystem in a designated protected area, e.g. by contamination spillage. Damage to a protected area of national significance (e.g. Site of Special Scientific Interest).	Minor change in a particular ecosystem in a designated protected area, but not significant harm. Damage to a locally important area.	No measurable effects. Plausible pollution linkage but no important or protected area.
Site workers impacts from contaminants in the ground.	Risk assessment required to determine required personal protective equipment (PPE) and this may involve high level of protection similar to USEPA Level A, B or C.	Risk assessment required to determine required personal protective equipment (PPE)and this may involve high level of protection similar to USEPA Level B, C or D.	Risk assessment required to determine required personal protective equipment (PPE) and this may involve moderate level of protection similar to USEPA Level C or D.	No measurable effects, but simple personal protective equipment (PPE) required (similar to USEPA Level D protection, i.e. overalls, boots, goggles, hard hat).
Buildings etc. impacts from flammable ground gas.	Catastrophic damage, e.g. gas explosion causing collapse.	Damage renders unsafe to occupy.	Damage to sensitive buildings etc.	No measurable effects.

Impact Type	Major	Moderate	Minor	Negligible
Damage to building products from chemicals in the ground (e.g. sulphate attack of concrete, organic solvent decay of plastics).	Maximum soil concentration exceeds industry accepted trigger value over a large area.	Maximum soil concentration exceeds industry accepted trigger value in limited areas.	Maximum soil concentration slightly exceeds industry accepted trigger value in limited areas.	Maximum soil concentrati on less than industry accepted trigger value.
Human health impact from ground gases. Such as radon and landfill gas where exceedance of a risk-based trigger indicates the potential for harm.	Pollution linkage identified over a large area.	Pollution linkage identified in limited areas.	Pollution linkage uncertain.	Plausible pollution linkage not established.
Impacts to people, property or infrastructure cause by excessive ground movements.	Major damage involving destruction of buildings or infrastructure, blocking of river courses and major flooding or loss of life.	Significant damage to property or infrastructure, minor damage to river channels, injury to people.	Minor damage to property or infrastructure, minor blocking of river channels.	Minor ground movements but no significant damage to property, infrastructu re, river channels or human health.
Impacts to Geological SSSI	Damage to a protected area of international significance (e.g. Ramsar site).	Damage to a protected area of national significance (e.g. Site of Special Scientific Interest).	Damage to a locally important area.	No measurable effects. Plausible pollution linkage but no important or protected area.

Impact Type	Major	Moderate	Minor	Negligible
Impacts to viable mineral resource	Loss of resource at an operational minerals site, or approved extension of an operational mineral site.	Loss of mineral resource on land allocated in the Minerals and Waste Core Plan.	Loss of potential resource in a Mineral Resource Area.	No loss of resource.

Sensitivity of Receptors

5.393 The following receptors will be considered in the assessment of environmental impacts from ground conditions:

- site preparation and construction workers;
- off-site population;
- the surrounding ecosystem;
- geological SSSI's;
- mineral resources;
- end users of the Site (workers, visitors etc.);
- structures, and the construction materials used, in the development;
- landscape planting in the development;
- the groundwater environment; and
- the surface water environment.

5.394 The sensitivity of these receptors is a matter of professional judgement. With respect to human populations, the methodology of 'Land Contamination: Risk Management' (LCRM, 2020) will be followed, in that the most sensitive receptors within a particular group are required to be protected. It should be noted that the 2014 NPS NN refers to the 'Model Procedures for Management

of Land Contamination (CLR11)', However, this has been replaced and superseded by the LC:RM (2020)

5.395 The sensitivity of the water environment depends on whether it is used for human consumption or provides support for aquatic ecosystems.

5.396 The risks associated with the ground gases methane (CH4) and carbon dioxide (CO2) will be assessed using guidance provided by BS 8485:2015 +A1:2019 which cites the guidelines published in CIRIA C665 (Wilson et al. 2007) and the available desk study and ground investigation information. These guidelines were written so as to be mutually consistent and are based on interpretation of the gas concentrations and the gas flow rates measured in boreholes, amongst other variables. They are compliant with the model procedures of LCRM.

5.397 The risk from radon will be assessed by reference to the radon atlas and other guidance produced by the Health Protection Agency, British Geological Survey and Building Research Establishment.

5.398 The geotechnical risks assessed will relate to any abnormal ground conditions that might exist. For example, particular aspects such as ground improvement, earthworks, historical mining, foundation solutions, and slope stability.

5.399 In this chapter, the sensitivity is taken to be the likelihood that one of the sensitive receptors suffers the impact. These are listed in Table G.3.

Table G3 – Classification of Probability (after Rudland et al 2001)

Classification	Definition
High likelihood	There is a contaminant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.

Classification	Definition
Medium likelihood	There is a contaminant linkage and all elements are present and in the right place, which means that it is possible that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Negligible	There is a contaminant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

5.400 The sensitivity of other geological receptors where the new development has the potential to destroy or deplete the amenity value, such as mineral resources or sites of geological interest, is judged according to the criteria in Table G4.

Table G4 – sensitivity of gegological receptors

Classification	Geological Sites	Mineral Resources
High sensitivity	High quality and rarity on regional or national or international scale. Protected by international or EU legislation (e.g. World Heritage).	Nationally important mineral. Large resource.
Medium sensitivity	High quality and rarity on national or local scale (e.g. SSSI).	Medium resource.
Low sensitivity	Medium quality and rarity on a local scale (e.g. Local Geological Site / RIGS).	Small resource.
Negligible	Little or no geological interest.	No mineral resource.

Duration of Effect

5.401 In this chapter, the duration of the effect will also be taken into consideration. The following definitions of timescales will be used be:

- Short-term: 0 to 5 years including the construction period and on completion;

- Medium-term: 5 to 15 years including establishment of replacement and proposed mitigation planting; and
- Long-term: 15 years onwards for the life of the Proposed Development.

Significance of Effect

5.402 The significance of a potential impact is based on the combination of the magnitude and sensitivity of that impact as given in the matrix in Table G5 and will be based on guidance presented within CIRIA Report C552: Contaminated Land Risk Assessment, A Guide to Good Practice.

Table G5: Impact Significance

		Sensitivity			
		High Likelihood	**Moderate Likelihood**	**Low Likelihood**	**Unlikely**
Magnitude	**Major**	Major significance	Major significance	Moderate significance	Minor significance
	Moderate	Major significance	Moderate significance	Minor significance	Negligible significance
	Minor	Moderate significance	Minor significance	Minor significance	Negligible significance
	Negligible	Minor significance	Negligible significance	Negligible significance	Negligible significance

5.403 Any potential effect rated as 'moderate significance' or higher is considered significant in terms of the ES and will be considered further.

5.404 In addition, beneficial and adverse impacts are judged to be adverse or beneficial and temporary or permanent. Tables will be presented for:

- Potential Significant Effects from Ground and Hazardous Substances (Construction Phase); and

- Potential Significant Effects from Ground and Hazardous Substances (Operational Phase).

5.405 These will include consideration of the likely effects of the present quality of the land on the Proposed Development and its eventual users, and any effects the Proposed Development and new use of this land might have on the contamination and geotechnical status of the Application Site and surrounding area.

5.406 The tables will list all effects, including those which have been assessed to be negligible or of minor significance. This is to demonstrate that they have been considered and discounted in terms of the EIA, although certain actions will be embedded in the design of the Proposed Development and these are mentioned in the tables.

5.407 It should be noted that the term “toxic etc.” is used as shorthand notation to include all likely harmful effects such as toxic, carcinogenic, mutagenic etc.; and the word “artificial” is used to describe the introduction of a substance to the Application Site by site user/construction worker activities.

Cumulative Effects

5.408 There are unlikely to be any cumulative effects from ground conditions as any effect is likely to be localised to the site.

5.409 An assessment of the intra-relationship of effects on individual receptors with other topic areas will be undertaken. Other environmental topic areas which may be affected by the results of this assessment could be: air quality; noise and vibration; ecology; landscape and visual impacts; water environment (flood risk, drainage and water quality); and waste.

Likely Mitigation and Residual Effects

5.410 Having assessed the magnitude of potential impacts against the identified receptors, the chapter will consider whether any mitigation measures are necessary.

5.411 Where possible, mitigation measures will be embedded into the design of the Proposed Development to reduce the environmental effects to an acceptable level. However, where this is not sufficient further mitigation will be specified to reduce, remove or compensate for any significant adverse effects identified.

5.412 The likely residual effects of the Proposed Development taking account of embedded and additional mitigation will be identified in the ES Chapter.

Conclusion

5.413 This chapter will identify the existing soil and geological conditions and development constraints, evaluate the potential for contamination and assess the potential effects on ground conditions during the construction and operational phase.

5.414 A range of impacts associated with the design, construction and operation of the Proposed Development will be considered, including potential ground contamination, mineral resources, ground improvement, earthworks, historical quarrying, foundation solutions, slope stability and associated geotechnical issues.

5.415 The Chapter will be guided by national and local policy, along with recognised best practice published guidance documents.

5.416 The assessment will use a Geo-Environmental Desk Study and a Ground Investigation to form the baseline and will assess the environmental impacts of the proposal in terms of the ground conditions.

5.417 The potential impacts and receptors resulting from the construction and operational phases of the proposed scheme will be assessed based on a Ground Model and a CSM of geo-environmental site conditions.

5.418 A qualitative risk assessment will be undertaken to confirm the magnitude of the assessed impacts to identified potential receptors.

5.419 The potential impacts to the environment arising from construction works (Construction Phase), and the new use of the site as a Strategic Rail Freight terminal (Operational Phase) will be evaluated. Measures will be proposed to mitigate any unacceptable adverse impacts where appropriate and any residual impacts will be considered.

5.420 Effects on receptors arising as a result of the inter-relationship of ground conditions and other effects from the Proposed Development will also be considered.

Socio-economic Impacts

5.421 The socio-economic effects ES chapter will describe the current economic context for the application, with a focus on the existing and future labour market and other relevant indicators of economic activity and/or opportunity. It will consider the likely employment requirements and impacts of the SRFI as it progresses to the stage when the entire scheme is in operation. The net additional employment likely to be generated will be estimated and the potential contribution to the economy that would be derived from the SRFI will be predicted.

5.422 The Proposed Development will be considered with regard to the context provided by the adopted and published economic strategies and policies for the area, including with regard to plans and programmes which emphasis the potential for further economic growth. The stated aims and objectives of a range of bodies to strength and diversify the economy of Oxfordshire will be considered as part of the current context for the proposed SRFI.

Baseline Information

5.423 In order to achieve an understanding of the socio-economic baseline, the assessment will collate information and data from resources including:

- Office of National Statistics (ONS) data, including Census data;
- Cherwell District Local Plan 2011-31 Part 1
- Local Employment Land Supply monitoring data
- Oxfordshire Growth Board 'Strategic Vision for Long-Term Sustainable Development'
- Other relevant County, District and LEP economic strategy documents
- Oxford to Cambridge Arc strategy documents and evidence base;
- Local data compiled or published from established sources (including Cambridgeshire Insight); and
- Industry and Logistics sector based data and evidence.

5.424 The ES will identify and present an understanding of the existing baseline conditions across an appropriate study area, and will also set out a series of indicators and 'receptors' and to be included in the impact assessment section. Data from a range of sources will be used to describe the population within the study area, their qualifications and skills; employment activity; occupations, in particular those associated with distribution and warehousing; with an indication of unemployment and any particular issues arising as a result of deprivation. Importantly, the ES will analyse likely future labour market needs in an area of planned population and housing growth, and expanding participation amongst older workers. Any impacts on local housing demand as a result of the proposed job creation will also be considered.

5.425 An appropriate study area will be used to assess the likely impacts, and it is proposed this will include nearby communities across much of Cherwell District including the growing new community at Heyford Park, as well as Oxford, Banbury and Bicester, as well as other relevant parts of Oxfordshire. The detailed study area will be defined by assessment of the basline economic, including existing functional economic areas such as travel to work areas, and may well extend into parts of neighbouring Northamptonshire.

Potential for 'Likely Significant Effects'

5.426 The site is not allocated in any adopted planning document, but would deliver significant investment in a growth sector currently under-represented in the wider area, and where strong market demand and strategic need for an extension of the national SRFI network has been identified.

5.427 There are likely to be significant positive economic impacts during both construction and operational phases of the development.

5.428 In the short term (construction phase), the Proposed Development would provide economic benefits through the increase in employment as a result of

construction. In the medium to longer term, the Proposed Development would directly lead to the creation of new jobs through the proposed occupation and operation of buildings within the site.

5.429 The Proposed Development will create new employment and investment in the local area and provide job and training opportunities within a growing national sector of the economy.

5.430 The Proposed Development will help build a strong and competitive economy by assisting in the supply of land for employment within a strategic location and the creation of employment opportunities (both during the construction and operational phases).

Assessment Methodology

5.431 During the construction phase, the increase in employment as a result of construction activities will be assessed. The likely gross effect on construction employment will be calculated using recognised methods based on total construction cost and average GVA per construction employee.

5.432 The level of new permanent employment generated during the operational phase will be estimated by applying standard employment density assumptions (defined by the HCA Employment Density Guide) based on the proposed floorspace, and also with regard to industry specific data and evidence regarding employment densities in modern logistics and distribution facilities. As with construction, assumptions will be set out and adjustments will be made to gross figures in relation to leakage, displacement, multipliers and 'deadweight' in order to derive net additional impacts.

5.433 A qualitative and quantitative appraisal of likely socio-economic costs and benefits resulting from the changes likely during operation, will also be set out in the appraisal. This will include consideration of the likely range and nature of new jobs created, with evidence relating to the changing nature of many

logistics operations and the need for a range of skills and specialisms to operate modern, high-quality distribution facilities.

5.434 In addition, indirect economic effects can be estimated for the connections with other businesses that occur with the purchase of goods and services. Such secondary effects and changes in expenditure patterns can result in changes in the income of businesses and their employment requirements, and also generate additional economic benefits and impacts.

Scope of Assessment

5.435 The socio-economic chapter of the ES will consider national and local planning policy, the social and economic baseline, and the likely significant effects of the Proposed Development. This will be achieved by collating information from the sources identified above in the baseline section above.

5.436 The socio-economic chapter of the ES will include consideration of a range of likely indicators and potential impacts, including:

- Economic Conditions:
  - Economic Activity;
  - Unemployment;
  - Income;
  - Occupation; and
  - Deprivation;
- Education, Skills and Qualifications; and
- Health and Wellbeing.

5.437 A qualitative assessment will be carried out to consider the cumulative socio-economic impacts of the Proposed Development in conjunction with any committed developments within the vicinity of the Proposed Development as identified through the Scoping process.

Defining significance

5.438 Quantitative assessment will be used where this is possible, such as the number of jobs likely to be created by the Proposed Development. However, due to the complexity of socio-economic issues and the numerous interactions that can occur it is not possible to predict the precise nature or scale of all types of impact. Qualitative assessment will therefore be used where necessary.

5.439 It is proposed that the assessment assess the impacts as ‘major’, ‘moderate’, ‘minor’ and ‘negligible’, and based upon this qualitative judgement, the assessment of the effect is defined as a combination of the scale of the receptor and the magnitude of the impact.

Waste

Introduction

5.440 This section of the Report describes the scope and methodology that will be used to assess the likely significant environmental effects associated with the management of solid waste arising during the demolition, construction and operation of the Development. Waste is defined in Article 1(a) of the Revised Waste Framework Directive 2008/98/EC as '*any substance or object in the categories set out in Annex I which the holder discards or intends to discard or is required to discard*'. Waste can be further classified as hazardous, non-hazardous or inert.

5.441 The consideration of material resources will comprise maximising the beneficial reuse of materials arising from the demolition of existing buildings and construction of the Development (e.g. excavated material). Only if excavated material is considered surplus to requirements for the Development and/or specified 'receiver sites' as defined by CL:AIRE[33] have not registered interest or are available, will it become 'waste'. The mineral resources located within the Application Site will be considered as part of the assessment of Ground Conditions. Liquid waste such as wastewater from dewatering operations is covered in the 'Water Environment' Chapter. The likely significant environmental effects from the use of materials (e.g. aggregate, concrete, brick and steel) for the construction of the Development will not be addressed in the ES as there is no fixed design to assess against or end-user to define requirements.

5.442 The principal objective of sustainable waste and material resource management is to use material resources more efficiently, thereby preventing and reducing the amount of waste generated as well as minimising the quantity of waste that requires final disposal to landfill. It is proposed that waste and

[33] CL:AIRE is keeping a register of sites that require or can accommodate surplus inert materials. The Development would seek to register as a donor before identifying a suitable destination using the appropriate registry.

materials will be dealt with in line with the Government's waste hierarchy[34], which is a statutory requirement to sustainable waste and material resource management under regulation 15(1) of the Waste (England and Wales) Regulations 2011.

5.443 The latest waste legislation, policy and guidance will be summarised and used to inform the appropriate and proportionate consideration of waste within the ES.

5.444 For many years, EU waste legislation has been central in shifting UK policy from landfill disposal to increased recycling and tighter environmental protections. The vast majority of these principles remain enshrined in UK law following the UK departure from the EU.

5.445 Government policy, including The National Planning Policy for Waste (October 2014) and planning and development documents such as the National Planning Policy Framework, seeks to ensure that no adverse impacts to human health or the environment arise as a result of development. The Government Review of Waste Policy in England 2011 sets out the long-term strategy for the prevention and management of waste, following the waste hierarchy approach set out in the EU Waste Framework Directive. The waste hierarchy generally describes a priority order of what constitutes the best overall environmental option for the management of waste:

[34] Department for Environment Food and Rural Affairs, (June 2011); Guidance on applying the Waste Hierarchy.

Prevention	Using less material in design and manufacture, keeping products for longer, re-use, using less hazardous materials.
Preparing for re-use	The waste is capable of being recycled by existing local or regional waste management facilities without requiring adaptation.
Recycling	Turning waste into a new substance or product, includes composting if it meets quality protocols.
Other Recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat power) and materials from waste.
Disposal	Landfill and incineration without energy recovery.

5.446 In addition, new provisions for the managing of waste and producer responsibility are outlined as one of four key priority areas in Part 3 of the published Environment Bill (Waste and Resource Efficiency). The management of 'recyclable relevant waste' (glass, metal, plastic, paper and card, and food waste) from household, industry and commercial activities will be mandated when the Bill passes through Parliament.

5.447 There is as such, a well-established but evolving legal and regulatory framework for the management and disposal of waste which sits within UK legislation and policy at national, regional and local level. For SRFIs, waste considerations are also set out within NPSNN paragraphs 5.39-5.45.

5.448 The key objectives of the waste and materials resource proposals for the Proposed Development will be to provide assurance that:

- the development will make efficient use of resources (as per paragraph 5.16 of the NPSNN);
- the development will make use of materials that mitigate the environmental impact of the development;
- the development will produce as little waste as possible, and re-use it as a resource where possible (as per paragraph 5.39 of the NPSNN); and
- the development will be subject, as appropriate, to the EA's Environmental Permitting regime for appropriate waste management as set out in paragraphs 4.48 to 4.56 of the NPSNN.

Baseline conditions

5.449 At present, the site is comprised of farmland, small holdings and private dwellings. The site is a source of agricultural and green waste and likely small quantities of commercial waste from Ashdown Farm and the existing Severn Trent Green Power composting facility. The exact quantities of waste generated at the site are currently unknown.

5.450 The local authority provides trade waste collection and disposal services for dry waste to businesses throughout the district. The destination for composting, landfill, recyclables, material recovery facilities and any treatment plant are to be determined.

5.451 The Ardley Energy Recovery Facility (ERF), is located adjacent to the southern part of the Main Site. Operated by Viridor, the Ardley ERF was built next to an existing landfill site which was subsequently closed. The facility, treats about 326,300 tonnes of non-recyclable waste each year and currently diverts at least 95% of Oxfordshire's residual municipal waste away from landfill.

5.452 The greenfield, agricultural nature of the existing Application Site suggests that the site's current/baseline condition will reflect only waste arisings from agriculture and ongoing maintenance of the fields and hedgerows.

5.453 Consultation will be undertaken with County and District councils (focused on the Waste and Minerals Planning Authority) to identify and confirm the following:

- local and regional waste arisings;
- availability of local and regional waste infrastructure;
- planning, development management and waste management policies to be considered during the assessment process; and particularly with respect to defining any mitigation measures required; and
- potential innovation and mitigation to reduce or reuse material and waste arising from the development.

5.454 This information will be used to establish the baseline waste quantities, understand the current and future regional disposal capacity of local/ regional/ national waste infrastructure (including landfill) and to identify opportunities for reuse and recovery of excavation materials from the Proposed Development.

Potential for likely significant environmental effects

5.455 The construction of the Development will generate quantities of excavated material and other aggregate materials mainly associated with the excavation of cuttings, foundations and drainage. In addition, the demolition of existing buildings within the Site will generate demolition materials such as steel, broken concrete, timber, stone and brick. The rebuilding of highways and bridges and the construction of new highways, commercial units and trackside infrastructure will also generate construction waste. Natural, uncontaminated and contaminated excavated material is likely to be generated as a result of construction of the Development. It is likely that the majority of the excavated material will comprise natural and inert soils, as well as limestone (mineral resources).

5.456 Waste may also arise from the interaction with operational landfill sites, removal of fly-tipped waste, and management of contaminated land where present. Excavated material that can be used, in its natural state, for site engineering and restoration purposes will be excluded from the assessment of likely significant environmental effects of construction. This is in accordance with the scope of the Waste Framework Directive and also assumed that such materials will meet the requirements of The Definition of Waste: Development Industry Code of Practice.

5.457 In line with the Waste (England and Wales) Regulations 2011, the Proposed Development will be expected to ensure sustainable waste management is implemented through the waste hierarchy as follows:

- prevention;
- preparing for reuse;
- recycling;

- other recovery, including energy recovery; and
- disposal, only as a last resort.

5.458 The approach being taken to the earthworks 'cut and fill' exercise is focused on seeking to deliver a balance of material across the Proposed Development which would see on-site material re-used as part of the development process.

Likely effects during the Operational phase

5.459 Waste will be generated during the operation of the Development by employees, railway staff, business operations (yet to be defined) and maintenance activities. Environmental effects associated with the management of this waste are likely to be relatively small.

5.460 Based on the Proposed Development's end uses and anticipated waste streams, plus the proactive commitment to waste reduction as part of the site sustainability strategy, it is not anticipated that there would be any significant environmental effects from the future waste generation streams by the proposed uses, save for the environmental effects of the collection of waste and secondary effects of emissions and traffic noise associated with waste vehicles.

Assessment Methodology

Assessment of Waste

5.461 The proposed assessment methodology is based on best practice guidance (IEMA, 2020)[35], EIA practitioners' professional judgement and experience with the application of EIA to rail-related large-scale commercial/industrial infrastructure projects. Best practice guidance notes:

"*Organisations and major developments (particularly those subject to a DCO or Transport Works Act Order) may wish to generate and set their own criteria*

[35] IEMA, (2020): Materials and Waste in Environmental Impact Assessment. Guidance for a proportionate approach.

and thresholds for assessment, based on historical and industry-specific information they feel is appropriate to the particular conditions and requirements of developments under their control"

5.462 The likely significant environmental effects of solid waste management associated with the Development will be assessed with respect to both the construction and operational phases. These effects may be beneficial or adverse dependent on the measures employed to prevent and/or manage the waste generated.

5.463 Assumptions will be required as to the proportion of solid construction and operational waste that would be diverted from landfill via reuse, recycling and recovery. This will be informed by information gathered at the time of the assessment as to any waste management measures proposed to divert waste from landfill.

Spatial scope

5.464 Waste will be assessed on an Application Site wide basis having regard to the local and regional jurisdiction in which the Proposed Development is located.

5.465 The study area for the assessment of waste will principally comprise the Order Limits of the DCO application, known as the Development Study Area. In addition, the relevant local waste infrastructure (waste management facilities up to 10km from the site) and regional mineral resource planning areas (where necessary) will be referred to within the assessment as the Expansive Study Area.

Temporal scope

5.466 The detail of the temporal scope of the assessment will coincide with the expected phasing of the development, once defined.

Construction effects

5.467 Construction effects will address the permanent, indirect impacts of solid waste that will be generated by earthworks, demolition and construction activities and that will require off-site disposal during the proposed construction period. The scope of the assessment of construction effects will also include waste generation and its off-site disposal for recycling and to landfill associated with construction activities. Quantification will be on the basis of survey information or using published waste generation rates.

5.468 Assumptions regarding the type and quantity of waste to be diverted from landfill via reuse, recycling and recovery will be applied. Following this, the type and quantity of demolition materials, excavated material, construction materials and site waste requiring landfill disposal will be assessed in relation to the projected quantity of landfill disposal capacity in the designated local and regional areas throughout the proposed construction period.

Operation effects

5.469 The assessment will identify the types and quantities of solid waste forecast to be generated during the first full year of operation of the Development. This forecast will be based on an assumption of maximum capacity of the Development and any effects will be assumed to be annual. Quantification may be on the basis of existing operational waste management performance data or using published operational waste generation rates for the relevant land use activities.

5.470 Assumptions regarding the type and quantity of waste to be diverted from landfill via reuse, recycling and recovery will be applied. Following this, the type and quantity of station and train waste, track maintenance waste and ancillary infrastructure waste requiring landfill disposal will be assessed in relation to the projected quantity of landfill disposal capacity in the designated local and regional areas throughout the proposed construction period.

5.471 Waste transferred off-site would be handled by a registered waste carrier authorised by the Environment Agency and taken to a permitted or exempt facility authorised to receive and handle that waste under Duty of Care arrangements (i.e. this assessment does not consider the likely significant environmental effects of any illegal waste management and disposal). It has been assumed that all construction and operational activities will be in accordance with the relevant environmental regulatory requirements.

5.472 Waste arising from the preparation, site removal and construction processes will require management. The Development will result in construction and demolition waste being produced. A Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) will be prepared in conjuction with a Construction Environmental Management Plan. This, alongside other construction phase waste management measures, will help to ensure that construction waste is minimised, re-used and recycled wherever possible and will ensure that there are no significant effects on the capacity of the local waste management infrastructure as a result of the development.

Determining the Significance of an Effect

5.473 This section of the guidance describes preferred methods for assessing sensitivity and magnitude of impact from materials and waste, during construction, and operation and maintenance.

Assessing Waste Sensitivity

5.474 The sensitivity of waste relates to availability of regional (and where appropriate, national) landfill void capacity in the absence of the proposed development. Landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste. The following definitions will be to determine the sensitivity of landfill void capacity for both inert and hazardous wastes.

Sensitivity	Description (Inert waste)	Description (Hazardous waste)

Very high	…reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.	.. reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.
High	...reduce considerably: by 6-10% as a result of wastes forecast.	...reduce considerably: by 0.5-1% as a result of wastes forecast.
Medium	...reduce noticeably: by 1-5% as a result of wastes forecast.	...reduce noticeably: by 0.1-0.5% as a result of wastes forecast.
Low	..reduce minimally: by <1% as a result of waste forecasts.	..reduce minimally: by <0.1% as a result of waste forecasts.
Negligible	...remain unchanged, or is expected to increase through a committed change in capacity.	...remain unchanged, or is expected to increase through a committed change in capacity.

Assessing Magnitude of Effect

5.475 There is no single and unified method for assessing the magnitude of impact from the generation and disposal of waste as it is felt to be too restrictive by comparison with the number and variety of development types potentially subject to environmental assessment.

Assessing Significance of Effect

5.476 The Developments baseline and assessment data and forecasts (the magnitude of change on sensitive receptors) will be compared to evaluate the Developments significance of effect. The potential for significant environmental effects is determined by considering the scale and nature of impacts within the context of the sensitivity of receptors affected, as outline in the Table below.

	Magnitude of Effect				
Sensitivity of Receptor		Negligible	Minor	Moderate	Major
	Very High	Slight	Moderate or Large	Large or Very Large	Very Large

	High	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral or Slight	Slight	Slight or Moderate	Moderate or Large
	Low	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral or Slight	Neutral or Slight	Slight

5.477 Where effects result in a Moderate to Very Large effect, they will be deemed 'Significant'.

Cumulative Impacts

5.478 The waste assessment will include an assessment of any cumulative impact in relation to other committed developments.

Summary

5.479 It is proposed that an assessment will be undertaken of the likely significant effects of the Proposed Development on the local waste management infrastructure.

5.480 The assessment will consider how waste is managed during construction and how operational waste management provisions (and access to them) are integrated into the design of the scheme.

5.481 Potential effects upon minerals resource planning as a result of limestone mineral reserves within the site will be addressed within the Chapter for Ground Conditions.

5.482 The assessment will be supported and informed through consultations with various stakeholders, reference to relevant national and local planning and legislative policy, assessment of desk-top information, and the undertaking of a range of supporting documents.

Agricultural Land

Introduction

5.483 This chapter will consider the potential impacts on agricultural land and soils of the Proposed Development as a whole where it relates to agricultural land. The assessment will be undertaken by Land Research Associates and consultations will be made with Natural England (the statutory consultees for soil resources and best and most versatile agricultural land).

Policy Context

5.484 The National Policy Statement (NPS) for National Networks requires the effects of the Proposed Development on soils to be identified, described and assessed (paragraph 4.15). The NPS also states that:

"Applicants should take into account the economic and other benefits of the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification). Where significant development of agricultural land is demonstrated to be necessary, applicants should seek to use areas of poorer quality land in preference to that of a higher quality. Applicants should also identify any effects, and seek to minimise impacts, on soil quality, taking into account any mitigation measures proposed. Where possible, developments should be on previously developed (brownfield) sites provided that it is not of high environmental value." (paragraph 5.168)

"*The decision-maker should take into account the economic and other benefits of the best and most versatile agricultural land. The decisionmaker should give little weight to the loss of agricultural land in grades 3b, 4 and 5, except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy*." (paragraph 5.176)

5.485 The NPS notes at paragraph 5.179 that direct effects of the project on soils can be minimised "by the application of good design principles, including the layout of the project and the protection of soils during construction" as laid out in the Code of Practice for the Sustainable Use of Soils on Construction Sites, Defra.

5.486 The Cherwell Local Plan (2011-2031) notes the role of soil reuse in the protection and enhancement of biodiversity and the natural environment

(Policy ESD 10). The protection of soils and agricultural land are referred to in a number of the Cherwell's Places Policies which require a Soil Management Plan and detailed agricultural land quality survey (to identify best and most versatile land) to be submitted with planning applications.

Baseline

5.487 The study area for the soils and agriculture assessment is defined as the Application Site, being the area of the Main Site and the area affected by the proposed Highways Works around Junction 10 of the M40, as well as the new site access road and Middleton Stoney Relief Road.

5.488 Land within the Application Site is currently extensively in agricultural use and hence agricultural land is a potential impact receptor of the Proposed Development. Soils at the site are also likely to be largely undisturbed and are an important finite resource which may be lost or damaged by built development.

5.489 In the absence of the Proposed Development it is assumed as reasonable that the current uses would continue, and the future baseline would be largely unchanged from the existing.

Assessment methodology

5.490 The baseline conditions of the sites will be assessed by means of a desk study and detailed field survey. The desk study will use the following resources:

- British Geological Survey mapping (1:50,000 scale)
- Published soil maps
- Defra Magic mapping
- Aerial imagery

5.491 Using the information gathered in the desk study, a detailed soil survey will be carried out at a density of 1 observation per ha (in line with Natural England TIN049 guidelines). The soil survey will be used to classify the agricultural land into grades (identifying areas of best and most versatile land) in

accordance with MAFF Agricultural Land Classification guidelines (post 1988). Soil resources and agricultural land quality will be described with maps showing their distribution across the Application Site.

5.492 The significance of the impacts of the Proposed Development on the receptors will then be evaluated to carefully defined criteria as set out below:

Table A1 Magnitude of effects

Magnitude of effect	Agricultural land	Soil resource
Large	Irreversible loss of >80 ha of best and most versatile land	Loss of >80% of topsoil resources and insufficient topsoil protected for on-site uses. Subsoil compaction of >10% of site[1]
Moderate	Irreversible loss of 20-80 ha of best and most versatile land	Loss or irreversible damage to 50-80% of topsoil resources. Compaction of 5-10% of subsoils
Small	Irreversible loss of 5-20 ha of best and most versatile land	Loss or irreversible damage to <50% of topsoil resources. Compaction of <5% of subsoils
Negligible	Irreversible loss of <5 ha of best and most versatile land	Only minor disturbance of soils within the site.

[1]Refers only to areas intended as greenspace, not to soils under built surfaces (the effects of which are covered by flood risk and drainage chapter)

Table A2 Sensitivity of receptors

Sensitivity	Agricultural land in the Northampton area	Soil resource
High	Grades 1 & 2	Permeable coarse loamy[1] and medium loamy soils, or other soils capable of supporting valuable habitats
Medium	Sub-grade 3a	Fine textured or sandy topsoils not capable of supporting valuable habitats Mixed permeable and slowly permeable subsoils.
Low	Sub-grade 3b and grades 4 & 5	Damaged or contaminated soils Slowly permeable subsoils

[1]Includes coarse loamy topsoils over sandy subsoils.

Potential for Likely Significant Effects

5.493 As the development proceeds agricultural use of the land will progressively end. Once the Proposed Development is complete, the majority of the agricultural land within the site will be permanently lost. Therefore, the agricultural land resource will be a potential receptor of any environmental impact of the Proposed Development.

5.494 The soil resources also act as a filter to attenuate and immobilise substances falling on it, regulates rainfall movement to surface water and groundwater and supports ecological habitats and biodiversity. The topsoil and any permeable subsoils of the land are valuable non-renewable resources. The sustainable management of soil is a central pillar in sustainable development and so soil resources will be a potential receptor of impacts arising from the development of the land. Once construction has ceased, land that has been retained and not sealed is expected to continue to function as a filter provided activity has not compacted the area. Soil resources are a potential receptor of the Proposed Development as they can be damaged and lost during the Construction Phase.

Potential mitigation

5.495 There is no potential mitigation for the loss of agricultural land, it will be considered in the context of the wider land resource in the area, and against other sustainability factors associated with locating the development in this location.

5.496 However, valuable soil resources can be protected and damage mitigated by the implementation of a Soil Management Plan which will include detailed methods of soil handling, identification of resources and reduction of compaction damage as a key part of the mitigation proposed.

5.497 Soil protection measures, adopting well-established best practice methods, are likely to feature as part of a Construction Environmental Management Plan (CEMP).

Cumulative Impact

5.498 It is not proposed to undertake a cumulative impact assessment with regard to the likely impacts on agricultural land, as a result of impacts only being relevant to the Application Site.

Climate Change

5.499 The climate change assessment will draw together aspects of the other topic specific assessments relevant to climate change, and will, as a discrete exercise, include an assessment of greenhouse gas emissions, the approach to which is set out below.

Assessment of Greenhouse Gas (GHG) Emissions

5.500 The 'National Policy Statement for National Networks' (NPSNN) (pursuant to Section 9(8) and Section 5(4) of the Planning Act 2008) reaffirms the need for the transfer of freight from road to rail which has an important part to play in a low carbon economy and in helping to address climate change. In particular, it outlines how applicants, and the Secretary of State should take the effects of climate change into account when developing and consenting infrastructure.

5.501 New national networks infrastructure will be typically long-term investments which will need to remain operational over many decades, in the face of a changing climate. Consequently, applicants must consider the impacts of climate change when planning location, design, build and operation. Any accompanying environment statement should set out how the proposal will take account of the projected impacts of climate change.

5.502 The IEMA principles of climate change mitigation and EIA in particular identify climate change as one of the defining environmental policy drivers of the future and that action to address GHG emissions is essential.

5.503 The IEMA guidance takes the stance that all GHG emissions are significant and will contribute to future climate change. For the SRFI this is of particular importance as the NPSNN was published prior to the UK's legally binding zero carbon 2050 commitments.

5.504 A proportionate GHG emissions assessment will be carried out to establish the baseline and future GHG emissions at the site, and as a result of the Proposed Development. The calculated level of GHG emissions will be appraised within

the context of current and future GHG emissions at the local, regional and national levels to determine magnitude and significance. IEMA guidance also states that:

> "*Projects will vary by type and size, and so will GHG emissions. An effective scoping exercise ensures that a balance is struck between the amount of GHG emissions emitted by the project and the effort committed to the actual GHG assessment. For example, if the majority of impacts occur during a project's construction phase and that operational impacts are negligible, then the GHG assessment can reflect this. A high-level or qualitative GHG assessment for certain project elements or activities can be carried out as long as it is justified and agreed during the scoping stage with stakeholders. This will help contribute towards delivering proportional EIAs*.".

5.505 It is therefore proposed to address Greenhouse Gas emissions with a focused quantitative and qualitative approach, proportionate to that equating to 'outline' planning stage without detailed design or end-user information available at this stage. The assessment will draw on recognised climate change projections, existing guidance and emerging good practice as well as being informed by relevant information presented in other chapters of the ES and further documents which form part of the application.

5.506 A quantitative appraisal will be undertaken which identifies causes of, and where possible, limiting the potential for effects from, direct emissions associated with vehicle movements during the construction phase. An indicative assessment for vehicular emissions will be determined for each scenario using applicable traffic data and DEFRAs Emission Factors Toolkit (EFT) v 9.0 (2VC), deemed suitable for large scale and high-level applications. Energy forecasts will draw on relevant planning documents including the Energy Strategy and Design and Access Statement prepared by others. The Applicant believes this to be proportionate to the Proposed Development where the number and size of buildings, and details of end-users of the proposed buildings, are not yet known, and in keeping with the requirements of the guidance.

5.507 Adopting a precautionary approach to the assessment, measures will be proposed and incorporated into the Proposed Development's design to reduce unmitigated emissions where appropriate.

5.508 The site is greenfield and currently contains a small number of existing structures and buildings, although with much of the site currently operational farmland the site will have an existing carbon footprint which will be estimated to form a baseline for the assessment.

5.509 Whilst there will be an increase in traffic, including HGVs during the construction phase of the Proposed Development, the main contractor will develop a Construction Environmental Management Plan (CEMP) which will schedule mitigation measures to manage and minimise GHG emissions from vehicular construction transport. A strategy for traffic management will also be prepared to define local routes to be used by lorries generated by construction activities, this is likely to utilise the proximity of the Junction 10 of the M40.

5.510 The Transport and Air Quality Chapters within the ES are likely to form the focus of the assessment to understand the significance of direct emissions from vehicle traffic, and the effects of modal shift from road to rail freight transport once the SRFI is operational. This will be done for both the Construction and Operation stages. Due to the strategic location and scale, the SRFI will result in a change in the GHG emissions profile of freight in the UK shifting from road to rail. In addition, indirect emissions and proposed measures to reduce energy use will be addressed in the Energy Statement produced in support of the DCO application which will be appended to the ES.

5.511 Consideration will be given to the cumulative effects on the local climate of the proposed development with that of other committed developments agreed with the Local Planning Authority as part of the scoping process and scheduled within the Scoping Opinion.

5.512 Key considerations in developing mitigation measures relating to climate change will feature throughout the ES where relevant, and is likely to include:

- favouring flexible mitigation options over options which are locked and cannot be modified in future (adaptive management);
- allowing for safety margins in developing the project design, or in mitigation designs to ensure resilience of the project or proposed mitigation to climate change – for example through the drainage and surface water strategy which will form part of the Application, and details of proposed landscaping details (types and mix of species, etc).

Cumulative Impacts

5.513 A cumulative impact assessment will form part of the ES, focused on existing, planned or approved developments where there is certainty regarding the likelihood of delivery. Cumulative impacts will be considered in each topic specific chapter of the ES if relevant, so that any such impacts can be outlined and understood. A separate chapter on cumulative impacts will provide an overview summary of the likely interactions of the Proposed Development with relevant committed development and will also draw together any 'intra project' cumulative effects identified. This will identify any examples of relevant receptors likely to experience more than one type of residual effect or impact as a result of the Proposed Development.

5.514 It is currently anticipated that the existing, approved and planned developments in the following categories should be included in such an assessment (subject to available information) for the topics, with exception of Transport, and by association the air quality and noise impact assessments, as referred to below:

- **Approved ongoing projects** – i.e. planning permission granted and development has commenced;
- **Approved but un-commenced projects** – i.e. planning permission granted but development has not commenced. Advice is explicitly sought from the LPA and relevant consultees as part of this Scoping process;
- **Planned major developments under consideration** – i.e. plans and projects for which an application has been made and which are under consideration by the consenting authorities – again, this will require advice, and a judgement regarding status and weight, from the LPA;
- **Planned developments which are reasonably foreseeable** – i.e. plans and projects for which an application has not yet been submitted but, which are likely to progress before completion of the development and where sufficient information is available to assess the likelihood of

the cumulative effects. This may include residential development in nearby communities. LPA advice and input is sought on this category.

5.515 As referred to above, the views of the LPA on the relevant committed developments are specifically sought. In identifying relevant 'commitments', a key consideration will be the extent to which the proposed development and the other sites or proposals would be likely to have impacts on the same receptors, such as local communities, residents or environmental features. Those commitments which would be unlikely to share 'receptors' with the Proposed Development will not be included.

5.516 Given the site's location, it is currently proposed that the ES should consider committed developments at:

- Heyford Park - Mixed Use Allocation for a new settlement of approximately 2,300 dwellings (1,600 dwellings allocated in the Cherwell Local Plan in addition to the 761 dwellings previously permitted), with additional residential development also proposed. Includes employment uses (120k sq.m. expected to generate around 1500 jobs), primary school, and a range of other community facilities.
- Bicester - Mixed Use Allocation on the north-western edge of the town consisting of 6,000 homes, local centre hubs, 4 primary and 1 secondary school and other community facilities, and 10ha (min.) employment uses expected to generate at least 3000 jobs to 2031;
- Chesterton – a new, proposed leisure resort incorporating waterpark and family entertainment centre, hotel, conferencing facilities and restaurants with associated access, parking and landscaping including a 5.7ha park area – this has recently been granted permission after a planning appeal.

5.517 For many topics, it is likely there will be few direct cumulative effects with other sites beyond committed development at Heyford Park adjacent to the Main Site. Examples include Ground Conditions, Archaeology, and Agricultural Land given the highly localised or site specific nature of the resource,

receptors, and/or impacts being assessed. However, likely cumulative environmental effects is considered to be of particular relevance with regards to transport and highways where a wider range of planned and approved development and growth will be relevant. This wider context will also be of relevance to consideration of air quality issues, and to the assessment of noise and vibration. The separate (but related) and ongoing Transport Assessment Scoping process being undertaken with Oxfordshire County Council and Highways England will confirm the planned and committed growth assumptions to be adopted for the Transport Assessment. Outputs from the transport assessment regarding traffic volumes and distribution will then be used in assessing the likely cumulative noise and air quality effects.

5.518 The Cumulative Impacts Assessment will also consider likely 'intra-project' effects – this will focus on different types of impact of the Proposed Development on the same receptor. For example, some ecological receptors could experience impacts from development as a result of dust, lighting and noise. This assessment will consider the most likely intra-project effects using representative receptors to enable judgements to be reached regarding the extent and significance of any such effects.

APPENDICES:

Appendix 1 – Development Components

Appendix 2 – Draft Features Plan

Appendix 3 - Draft Parameters Plan

Appendix 4 – Draft Illustrative Layout

Appendix 5 - J10 Improvement Works Options

Appendix 6 – Middleton Stoney Relief Road Options