ENVIRONMENTAL IMPACT ASSESSMENT

SCOPING REPORT

OCTOBER 2020

LONGFIELD SOLAR ENERGY FARM LIMITED

www.longfieldsolarfarm.co.uk

Quality information

Prepared by	Checked by	Verified by	Approved by
Various	PD	NT	RL
	Associate Director	Technical Director	Director

Prepared by:

AECOM Limited
3rd Floor,
Portwall Place
Portwall Lane
Bristol
BS1 6NA

T: +44 117 901 7000
aecom.com

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1. Introduction

1.1 Background

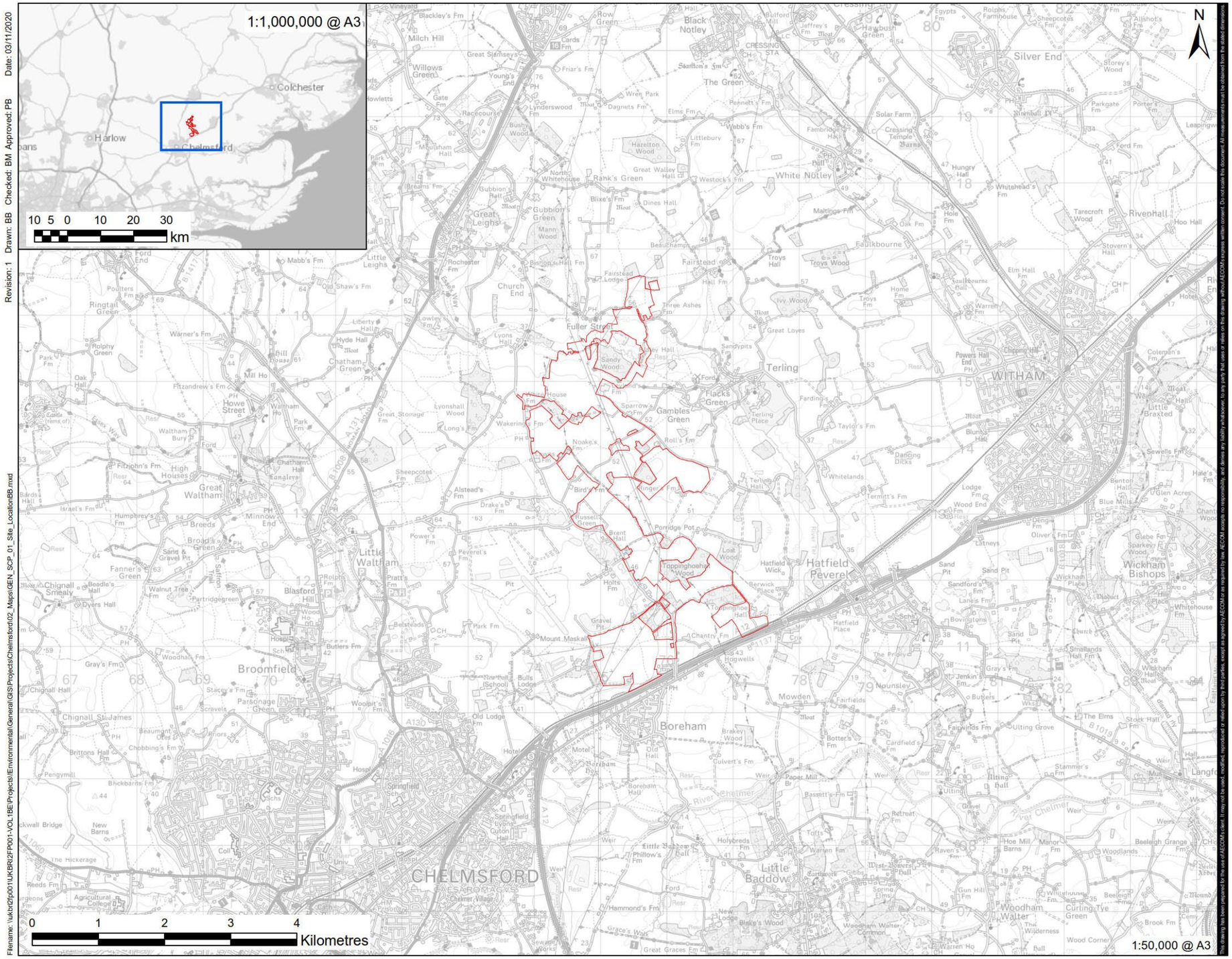
1.1.1 Longfield Solar Energy Farm Ltd (hereafter referred to as 'the Applicant') has commissioned this Environmental Impact Assessment (EIA) Scoping Report for the Longfield Solar Farm (hereafter referred to as the 'Scheme'). The Scheme comprises the installation of solar photovoltaic (PV) generating panels and on-site energy storage facilities across a proposed site in Essex (hereafter referred to as the 'Site') together with grid connection infrastructure. The Scheme would allow for the generation, storage and export of up to 500 megawatts (MW) electrical generation capacity.

1.1.2 The Site is located approximately 6 kilometres (km) north west of Chelmsford and is denoted by the red line on Figure 1-1 and Figure 1-2 The Site is described in *Chapter 2: The Scheme* of this Scoping Report.

1.1.3 It is important to note that at this stage, Figure 1-2 shows the expected maximum extent of land that would be included within the application for a development consent order (DCO), which includes all land being considered for the purposes of the Scheme, and provides a 'plan sufficient to identify the land' for the purposes of this Scoping Report. It should be noted, this represents the likely maximum extent based on all the options for components that have been, and will be, the subject of consultation and is likely to be refined as the Scheme design progresses.

1.1.4 This Scoping Report forms a formal request for a Scoping Opinion under Regulation 10(1) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended in 2018) (the 'EIA Regulations') (Ref. 1).

Figure 1-1: Scheme Location



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AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
Site Boundary

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

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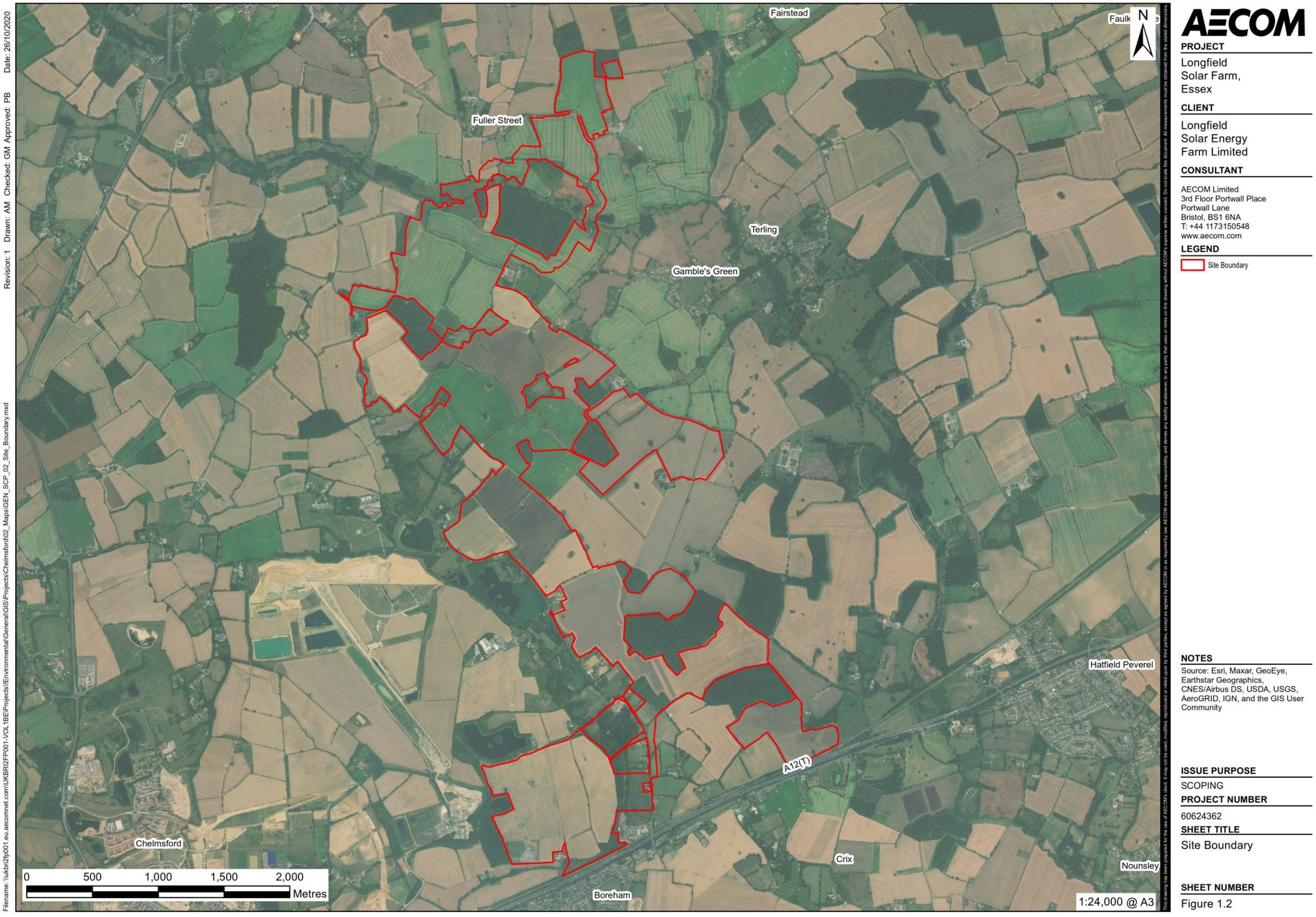
SHEET TITLE
Site Location

SHEET NUMBER
Figure 1-1

Figure 1-2: Site Boundary



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AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
Site Boundary

NOTES
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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SHEET TITLE
Site Boundary

SHEET NUMBER
Figure 1.2

1.2 Legislative Context and Need for Environmental Impact Assessment

1.2.1 The Scheme is defined as a Nationally Significant Infrastructure Project (NSIP) under Sections 14(1)(a) and 15(2) of the Planning Act 2008 (Ref. 2) as an onshore generating station in England, exceeding 50 MW. At this stage, the grid connection infrastructure could comprise of either underground cables or overhead lines. If the latter option is chosen, then the overhead lines may also constitute an NSIP under Sections 14(1)(b) and 16 of the Planning Act 2008.

1.2.2 The EIA requirement for NSIP developments is transposed into law through the EIA Regulations (Ref. 1). The EIA Regulations specify which developments are required to undergo EIA and schemes relevant to the NSIP planning process are listed under either 'Schedule 1' or 'Schedule 2'. Developments listed in Schedule 1 must be subject to EIA, while developments listed in 'Schedule 2' must only be subjected to EIA if they are considered "likely to have significant effects on the environment by virtue of factors such as its nature, size or location". The criteria on which this judgement must be made are set out in Schedule 3.

1.2.3 The Scheme is a 'Schedule 2' development under:

- Paragraph 3(a) of Schedule 2 of the EIA Regulations (Ref. 1) as it constitutes 'Industrial installations for the production of electricity, steam and hot water'; and
- Paragraph 3(b) of Schedule 2 of the EIA Regulations (Ref. 1) as it may also constitute "industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables"

1.2.4 It is considered that due to the Scheme's nature, size or location, it has the potential to have significant effects on the environment. The Applicant therefore wishes to confirm under Regulation 8(1)(b) of the EIA Regulations that an Environmental Statement (ES) will be provided in respect of the application for development consent for the Scheme, as it is considered there is the potential for the Scheme to meet the criteria set out in Schedule 3 of the EIA Regulations (Ref. 1).

1.2.5 Following the completion of the surveys, assessments, and consultation processes outlined in this Scoping Report, an application for a DCO will be made to the Secretary of State (SoS) for determination in accordance with the Planning Act 2008 (Ref. 2). The DCO application will be accompanied by an ES, in accordance with Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 ('APFP Regulations') (Ref. 3). The ES will set out the methods and findings of a comprehensive EIA undertaken in line with the EIA Regulations (Ref. 1).

1.2.6 The Localism Act 2011 (Ref. 4) appointed the Planning Inspectorate as the agency responsible for operating the DCO process for NSIPs. The SoS will appoint an Examining Authority from the Planning Inspectorate, who will examine the application for the Scheme and make a recommendation to the SoS, who will make the decision on whether to grant or to refuse the DCO.

1.2.7 In accordance with Section 104(2) of the Planning Act 2008 (Ref. 2), the SoS is required to have regard to the relevant National Policy Statement (NPS), amongst other matters, when deciding whether or not to grant a DCO. Solar PV and battery storage are not currently covered by an NPS and therefore those elements of the application will be determined under Section 105 of the Planning Act 2008 (Ref. 2). Should the DCO application include overhead lines that meet the tests in section 16 of the Planning Act 2008, then that element of the application would be determined under Section 104, as overhead lines are covered by NPS EN-5 (Electricity Networks Infrastructure) (Ref. 6).

1.2.8 In lieu of a technology specific NPS for Solar PV and battery storage, account will be taken of the following NPS, which is important and relevant to the Scheme: Overarching NPS for Energy (EN-1) (Ref. 5). The EIA approach adopted takes account of both NPS EN-1 and NPS

EN-5. A summary of the relevant considerations for each technical assessment is provided for each environmental topic (Chapters 6 to 13 of this Scoping Report).

1.2.9 The SoS will also consider other important and relevant matters, including national and local planning policy. For example, the revised National Planning Policy Framework (NPPF) published in February 2019 (Ref. 7) is considered relevant national planning policy.

1.2.10 Whilst the NPSs are the primary consideration in deciding applications for DCOs, the local Development Plan can also be an important and relevant matter. The local Development Plan for the land in which the Scheme is located includes the following:

- Chelmsford Local Plan 2013-2036, adopted May 2020 (Ref. 8).
- Braintree District Local Plan Review, adopted 2005 (saved policies only) (Ref. 9).
- Braintree Core Strategy, adopted September 2011 (Ref. 10).
- Essex Minerals Local Plan, adopted July 2014 (Ref. 11).
- Essex and Southend-on-Sea Waste Local Plan, adopted July 2017 (Ref. 12Ref. 15Ref. 10).

1.2.11 The draft Braintree Local Plan, 2017 (Ref. 13), is undergoing examination. Although the likely timetable for completion of the examination is currently unclear, if it is adopted it will replace policies of the Braintree Local Plan Review (Ref. 9) and Braintree Core Strategy (Ref. 10). The draft local plan may also be an important and relevant matter either as the newly adopted Development Plan or as an advanced draft.

1.2.12 The purpose of considering the NPSs and other relevant national and local planning policy referred to above at the scoping stage of the EIA is twofold:

I. To identify policy that could influence the sensitivity of receptors (and therefore the significance of effects) and any requirements for mitigation; and

II. To identify planning policy that could influence the methodology of the EIA. For example, a planning policy may require the assessment of a particular impact or the use of a particular methodology.

1.2.13 A summary of national and local planning policy relevant to each technical assessment is provided for each environmental topic.

Purpose and Structure of the Scoping Report

1.2.14 The EIA Regulations (Ref. 1) set out the requirements for an applicant who proposes to request a scoping opinion from the SoS. Regulation 10(3) of the EIA Regulations (Ref. 1) requires that a Scoping Report includes:

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

1.2.15 The purpose of this EIA Scoping Report is therefore to:

- Provide a summary of the Scheme;
- Set out the proposed scope of work and methods to be applied in carrying out the EIA; and
- Set out the proposed structure and coverage of the ES to be submitted with the DCO application.

1.2.16 This Scoping Report is set out in accordance with guidance provided by the Planning Inspectorate's Advice Note 7 'Screening, Scoping and Preliminary Environmental information' (Ref. 14).

1.2.17

1.2.18 Table 1-1 lists the suggested requirements identified in Advice Note 7 (Ref. 14) and details where they are presented in this Scoping Report. The requirements of the EIA Regulations (Ref. 1) regarding the content of the ES are also covered within the contents tabulated below.

Table 1-1 Contents for the Scoping Report based on Advice Note 7 (Ref. 14)

Suggested Scoping Report Contents	*Location in this Scoping Report*
Transboundary Screening Matrix	Appendix A
The Proposed Development	
• **an explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development eg design parameters**	Chapter 2 (The Scheme)
• **referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development**	Figure 1-1 (Scheme Location) Figure 1-2 (Site Boundary) Figure 2-1 (Environmental Constraints)
EIA Approach and Topic Areas	
• **an outline of the reasonable alternatives considered and the reasons for selecting the preferred option;**	Chapter 3 (Alternatives Considered)
• **a summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues;**	Chapter 16 (Summary and Conclusions)
• **a detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided;**	Chapters 6 to 14 (Technical Topics)
• **results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters**	Chapters 6 to 14 (Technical Topics)
• **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;**	Chapters 6 to 14 (Technical Topics)
• **any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects;**	Chapters 6 to 14 (Technical Topics)
Information Sources	
• **references to any guidance and best practice to be relied upon;**	Chapters 6 to 14 (Technical Topics)

Suggested Scoping Report Contents	*Location in this Scoping Report*
• **evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities); and**	Chapters 6 to 14 (Technical Topics)
• **an outline of the structure of the proposed ES.**	Chapter 15 (Structure of the ES)

1.2.19 A glossary and abbreviation list is presented at the back of this report.

1.3 IEMA Quality Mark

1.3.1 AECOM is an IEMA Registered Impact Assessor and also holds the IEMA EIA Quality Mark as recognition of the quality of our EIA product and continuous training of our environmental consultants. A Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who prepared the ES.

2. The Scheme

2.1 Site Description

Introduction

2.1.1 This chapter presents a description of the Scheme in sufficient detail to inform the approach and scope of the Environmental Impact Assessment.

Site and Surrounding Area

2.1.2 The Scheme is located within the administrative areas of Braintree District Council and Chelmsford City Council. The rationale for selecting the Site is described in *Chapter 3: Alternatives Considered* of this Scoping Report. The maximum extent of land that is expected to be included within the DCO application for the Site, together with the maximum areas of the cable route corridors is shown on Figure 1-2. It should be noted, this represents the current maximum extent of land being considered and will be further refined.

2.1.3 Key environmental planning constraints are shown on Figure 2-1 at the end of this Scoping Section.

2.1.4 The Site is approximately centred on National Grid Reference (NGR) TL 74179 14620 and located approximately 1.1km to the West of the village of Terling (Figure 1). The Site is located within the District Council administrative areas of Chelmsford and Braintree, in the county of Essex.

2.1.5 The Site comprises a single parcel of land separated by several areas of woodland approximately 582ha in size.

2.1.6 The landscape features within the Site consist of agricultural fields mainly under arable production, with some small parcels of pasture, interspersed with individual trees, hedgerows, tree belts (linear) small woodland blocks and farm access tracks. The hedgerows within the Site range between lengths of dense tall vegetation (shrub and tree species) and thin lines of vegetation with sporadic trees present, although the former is a dominant feature. The arable fields are of small to moderate size, some of which are of irregular shape.

2.1.7 The landscape features immediately surrounding the Site comprise a number of villages, including Fuller Street approximately 300m to the north, Gamble's Green and Terling 500m and 1.1km to the East, Boreham 500m to the South-West, Hatfield Peverel 1.5km to the South-East and the large city of Chelmsford 5.7km to the South-West. Boreham Road runs North to South along the Western edge of the Site, with the A12 carriageway abutting and bounding the Southern edge of the Site boundary.

2.1.8 The northern part of the Site and surrounding area consists of undulating and relatively elevated landform, as part of the River Ter valley. The landform rises steeply northwards from the river and Terling Spring, between 35 metres (m) Above Ordnance Datum (AOD) to 50m AOD along parts of Braintree Road. It culminates at a ridgeline at 70m AOD at Rank's Green, in the northern part of the study area. To the south of the River Ter, the landform also rises steeply, across Sandy Wood, to a ridgeline at 55m AOD.

2.1.9 To the west of the Site, the landscape consists of a varied pattern of landform, reflecting past sand and gravel extraction and engineered flat terrain across Boreham airfield, which is situated at 55m AOD approximately 800m to the west of the Site. From the airfield, the landform falls very gradually eastwards to the River Ter, which flows southwards between Terling and the northern part of Hatfield Peverel, at approximately 20m AOD.

2.1.10 The River Chelmer flows across the southern part of the study area, at approximately 15m AOD. There are several large-scale reservoirs and lakes adjacent to the river. From the river, the landform rises consistently northwards, to form a ridgeline around 40m AOD at Boreham, and southwards, across Little Baddow, to an elevated ridgeline at 100m AOD, approximately 3km from the Site boundary.

2.1.11 Most of the southern and central part of the Site is located across flat and low-lying landform at approximately 45m AOD, between Waltham Road / Boreham Road and Terling Road. The northern part of the Site is located within part of the River Ter valley, where there is rising land to the north and south of Terling Spring and adjacent to Braintree Road.

2.1.12 There is an extensive network of public rights of way (PRoW) both within the Site and across the surrounding area (Figure 2-2). The following PRoW cross or are adjacent to the Site boundary:

- PRoW 113_3, Footpath, North of Braintree Road
- PRoW 113_5, Footpath, North of Braintree Road
- PRoW 113_1/PRoW 76_4, Footpaths, North of Hookley Wood adjacent to site boundary
- PRoW 113_11, Footpath, South of Sandy Wood adjacent to site boundary
- PRoW 221_53/PRoW 113_33, Footpaths, Crosses through Scarlett's Wood.
- PRoW 113_25, Footpath, near Noakes Farm
- PRoW 213_1, Footpath, near Birds Farm
- PRoW 113_30/PRoW 213/4/PRoW 113_32, Footpaths, north of Ringers Wood
- PRoW 213_5/PRoW 113_32, Footpaths, east of Stocks Farm
- PRoW 213_18, Footpath, near Kenwood House
- PRoW 213_19. Footpath, through Toppinghoehall Wood adjacent to site boundary
- PRoW 90_35, Footpath, west of Toppinghoe.
- PRoW 231_20 footpath, east of Waltham Road
- PRoW 213_17/PRoW 213_17 footpaths, near Wallace's Farm Cottages
- PRoW 213_48, Bridleway near The Grove
- PRoW 90_36/PRoW 90_35/PRoW 90_44 Footpaths south of Toppinghoehall Wood

2.1.13 Neither the Site nor the immediate surrounding area is covered by any statutory landscape designations, i.e. National Parks, Areas of Outstanding Natural Beauty (AONB). The Dedham Vale AONB is approximately 23km to the north-east of the Site.

2.1.14 There are several ancient woodlands across the Site and surrounding area. Within, or adjacent to the Site boundary, these include:

- Brickhouse Wood, Hookley Wood and Sandy Wood;
- Scarlett's Wood, Ringer's Wood, Toppinghoehall Wood and Porter's Wood; and
- Scrub Wood and Blake's Wood.

2.1.15 There are no designated heritage assets within the Site. There are no World Heritage Sites or Registered Battlefields within 3km of the Site boundary.

2.1.16 There are 275 listed buildings within 3km of the Site, 251 listed grade II, 18 listed grade II* and six listed grade I.

2.1.17 There are three Scheduled Monuments within 3km of the Site. Great Loyes moated site and fishpond (NHLE 1008979) is approximately 1.7km to the east of the Site; Gubbion's Hall moated site (NHLE 1016802) is approximately 2.2km to the north-west; and Hatfield Priory (NHLE 1002150) is approximately 2.25km to the south-east.

2.1.18 There are four registered parks and gardens within 3km of the Site. Terling Place (NHLE 1000745) is approximately 130m to the east; Hatfield Priory (NHLE 1000206) is approximately 2km to the south-east: New Hall, Boreham (NHLE 1000207) is approximately 1.3km to the south-west; and Boreham House (NHLE 1000354) is approximately 1.2km to the south-west.

2.1.19 There are two conservation areas within 3km of the Site. Terling Conservation Area is approximately 650m to the south-east and Boreham Conservation Area is approximately 75m to the south.

2.1.20 The A12 and B1137 lie to the south and south west of the Site, along with the railway line connecting Chelmsford and Witham. The A12 and the railway line also form the southern edge to the Site boundary.

2.1.21 Across the remainder of the surrounding area, Terling Road, Terling Hall Road and Boreham Road are the main north to south transport routes, providing access between the villages. Noakes Road and Waltham Road provide west to east access, with Noakes Road also crossing the Site boundary. Braintree Road is the main road network to the north, extending between Turling and Fuller Street.

2.1.22 Other infrastructure within the Site and surrounding area includes overhead powerlines carried by tall pylons. These extend from the west of Boreham, across most of the Site boundary and to the west of Sandy Wood, where the alignment of the pylons diverts to the west and east of Fuller Street.

The DCO Site Boundary

2.1.23 The expected (at this stage) maximum area of land potentially required for the construction, operation and maintenance of the Scheme, which includes land required for permanent and temporary purposes, is shown on Figure 1-2. It is important to note that this may be subject to change as the design and EIA progress, however Figure 1-2 shows the envisaged current maximum extent of temporary and permanent land take. The proposed land take will be refined as the Scheme design progresses, taking into account environmental and technical factors, and consultation responses.

2.1.24 Together with the description of the Scheme components set out in this chapter, Figure 1-2 represents the current maximum land expected to be required for the full range of possible development options which could form part of the final Scheme. This allows for consideration of the potential environmental effects of the full range of options under consideration, to ensure that the likely significant effects of each of the component options has been scoped into the assessment.

2.1.25 At this stage of the process, there is no known existing infrastructure onsite that will need to be removed.

The Rochdale Envelope

2.1.26 The Planning Inspectorate's Advice Note 9: Using the 'Rochdale Envelope' ('Advice Note 9') (Ref. 15) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008 (Ref. 2). The advice note acknowledges that there may be aspects of the Scheme design that are not yet fixed, and therefore, it may be necessary for the EIA to assess likely worst case variations to ensure that all foreseeable significant environmental effects of the Scheme will be assessed.

2.1.27 The amount of flexibility required will depend upon the progress of the design at the stage that the detailed EIA work is undertaken. It is expected that certain aspects of the Scheme will still require design flexibility when the EIA is being carried out. A degree of flexibility is required at

this stage given there are options being considered with respect to the cable route and location of the substation; this will be informed by ongoing discussions with National Grid and by the EIA as well as consultation. It is necessary that there will be some flexibility built into the design of the Scheme the subject of the DCO application, in order that the detailed design of the Scheme can be informed by environmental and technical considerations, post-consent work and take advantage of innovation in technology. Where such flexibility or optionality is required, this is explained in section 2.3 below.

2.1.28 It is therefore necessary for the technical assessments to assess an 'envelope' within which the works will take place. As such, the application and EIA will be based on maximum and, if relevant, minimum parameters or limits of deviation. To remain in accordance with the EIA Regulations, it will be essential that the parameters are as 'limited' as possible to ensure that the 'likely significant effects' are identified, rather than unrealistically amplified effects, which could be deemed to be unlikely. These parameters will be considered in detail by technical authors in the ES to ensure the realistic worst case effects of the Development are assessed for each potential receptor. This is of particular importance to maintain flexibility due to the rapid pace of change in solar PV and battery storage technology.

2.1.29 The key elements of Advice Note 9 (Ref. 15) in relation to the Scheme are defined below:

- The application should acknowledge the need for details of a project to evolve, within clearly defined parameters;
- The EIA should take account of the need for evolution within those parameters, and reflect the likely significance of such a flexible project in the Environmental Statement;
- Within those defined parameters, the level of detail of the proposals must be such as to enable a proper assessment of the likely significant environmental effects and the identification of mitigation measures, if necessary considering a range of possibilities: "the assessment may conclude that a particular effect may fall within a fairly wide range. In assessing the 'likely' effects, it is entirely consistent with the objectives of the Directive to adopt a 'worst case' approach. Such an approach will then feed through into the mitigation measures envisaged. It is important that these should be adequate to deal with the worst case, to optimise the effects of the development on the environment"; and
- It is for the decision maker in granting consent, to impose requirements to ensure that the process of evolution keeps within the parameters applied for and assessed for the scheme.

Figure 2-1: Environmental and Planning Constraints

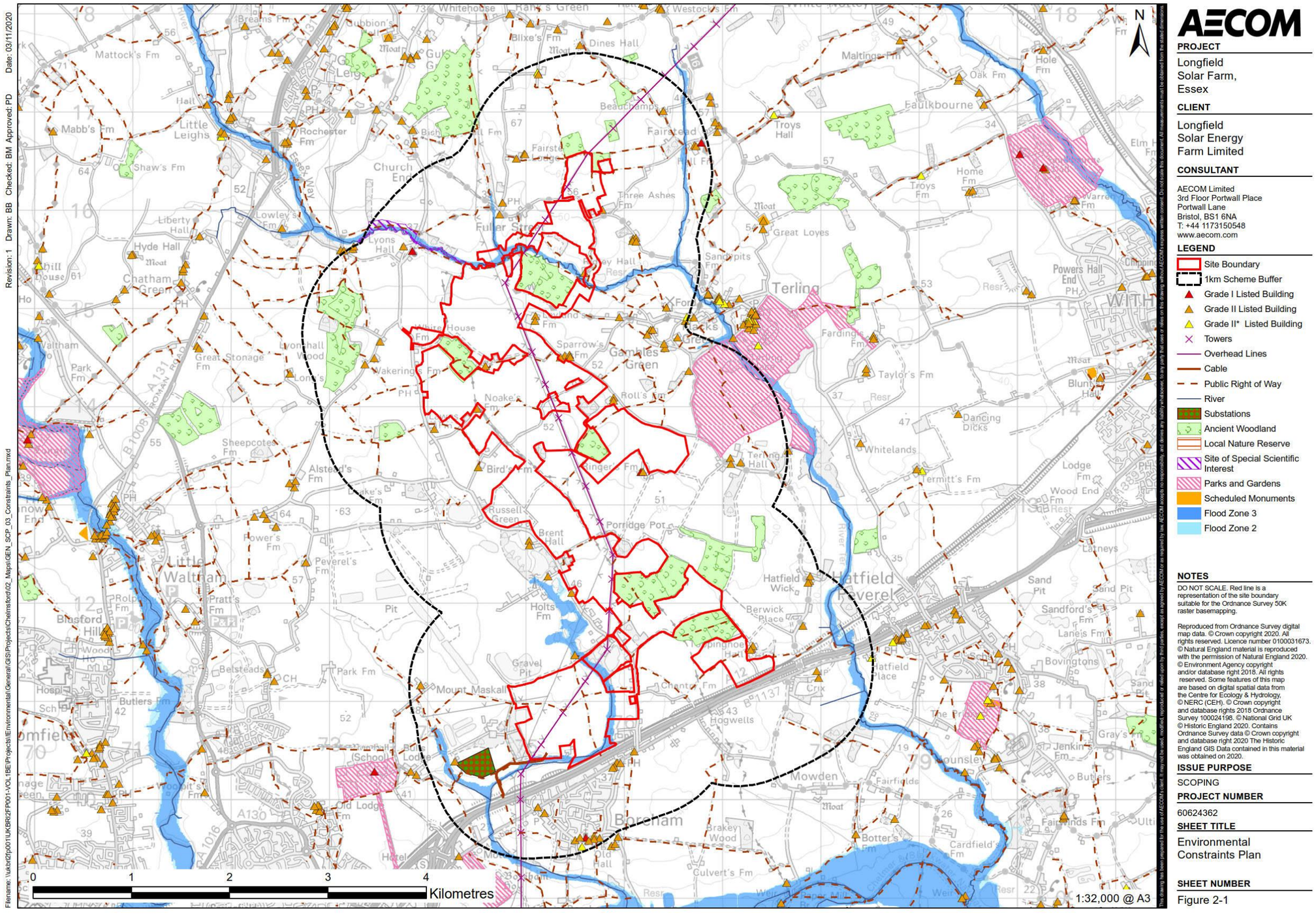
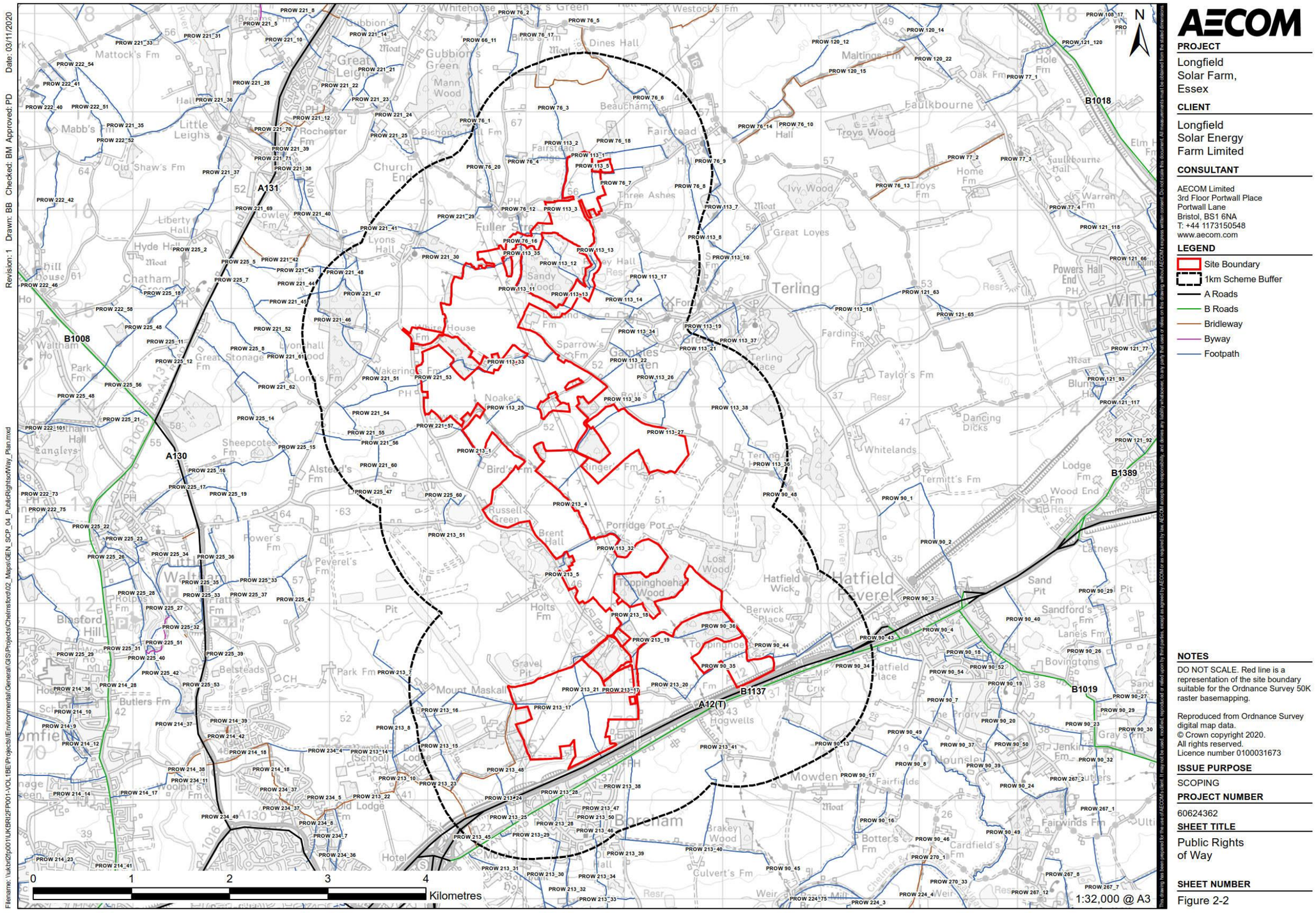


Figure 2-2 Public Rights of Way



AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
- Site Boundary
- 1km Scheme Buffer
- A Roads
- B Roads
- Bridleway
- Byway
- Footpath

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
Public Rights of Way

SHEET NUMBER
Figure 2-2

2.2 Description of the Scheme

Introduction

2.2.1 Solar PV and energy storage technologies are rapidly evolving. As a result, the parameters of the DCO will maintain flexibility to allow the latest technology to be utilised at the time of construction. This chapter provides information on the following:

- Solar and battery infrastructure, grid connection, and other associated and ancillary development needed to operate and maintain the Scheme;
- Construction programme and activities;
- Operational and maintenance activities; and
- Decommissioning.

Overview of Solar and Battery Storage Infrastructure

2.2.2 The principal infrastructure will be as follows:

- Solar PV modules;
- PV module mounting structures;
- Inverters;
- Transformers;
- High voltage (HV) Switchgear and control equipment (housed inside a building);
- Onsite cabling;
- One or more 'Battery Energy Storage System' (battery energy storage system) (expected to be formed of lithium ion batteries storing electrical energy);
- An electrical compound comprising a substation and control building;
- A spare parts storage building or enclosure;
- Fencing and security measures;
- Access tracks; and
- Landscaping and biodiversity enhancement.

2.2.3 During the construction phase, one or more temporary construction compound(s) will be required as well as temporary roadways to facilitate access to all land within the Site. Further information on construction activities is provided in Section 2.4.

2.2.4 In areas around the arrays and on other land within the Site, opportunities for landscaping, biodiversity enhancements and habitat management will be explored.

Solar PV infrastructure

Solar PV modules

2.2.5 Solar PV modules convert sunlight into electrical current (as direct current, DC). Individual panels are typically up to 2m long and up to 1m wide and typically consist of a series of photovoltaic cells beneath a layer of toughened glass (as shown in Photos 2-1 and 2-2). Other

PV technologies are developing rapidly and may be available at the time of construction. The module frame is typically built from anodised aluminium or steel.

2.2.6 Each module could have a DC generating capacity of between 400 and 800 watts (W), or more depending on advances in technology at the time of construction (the latest technology under development is up to 800 W). The modules are fixed to a mounting structure in groups known as 'strings'. Various factors will help to inform the number and arrangement of modules in each string, and it is likely some flexibility will be required to accommodate future technology developments.

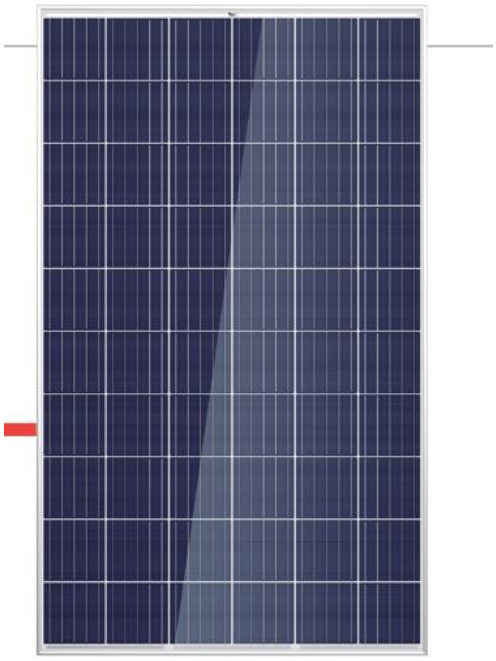


Photo 2-1: 60 cells solar panel

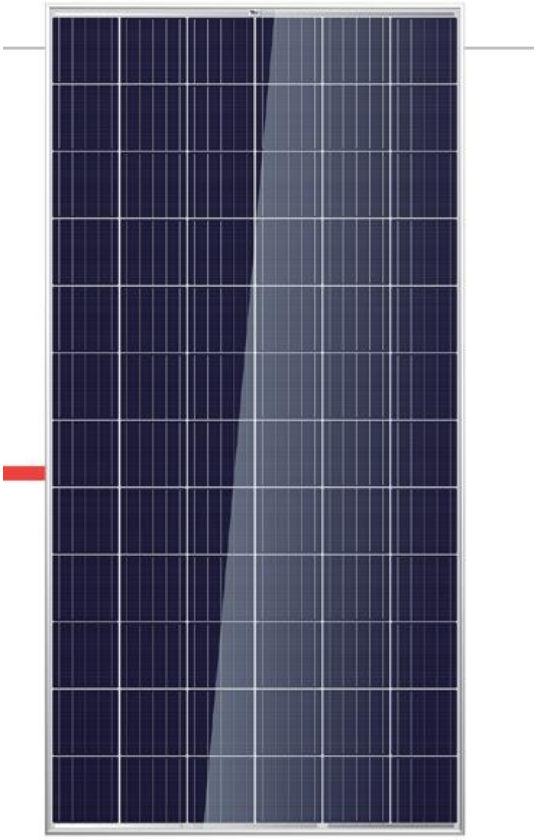


Photo 2-2: 72 cells solar panel

2.2.7 Two options for fixed panel orientation are being considered at this stage. The first option is for the modules to face to the south, which is commonly seen on existing UK solar farms. With this configuration, the modules would be angled towards the south at a slope of 15 to 35 degrees from horizontal (see Photo 2-3). The second option is for modules to be oriented towards the east and west, which is less commonly seen on existing UK solar farms. With this configuration, the modules would be angled towards the east and west at a slope of 5 to 20 degrees from horizontal (see Photo 2-4). Further to the fixed panel options, there is also the option to install the panels on tracking platforms. These may comprise 1-axis or 2-axis trackers. Where relevant, the EIA scoping study has considered the panel orientation which represents the worst case scenario in terms of identifying potential environmental effects. For example, an east-west orientation will result in more Heavy Goods Vehicle (HGV) traffic movements since more panels are required. As the Scheme design develops, the panel orientation (if fixed) or the most favourable tracking technology will be determined based upon environmental and technical factors. A reasonable worst case scenario will be assessed and presented in the ES.

Module Mounting Structures

2.2.8 Each string of modules will be mounted on a metal rack, known as a frame. In all fixed panel options the frames are usually supported by galvanized steel poles typically driven 1m or 1.5m into the ground. This is the most common solution on existing UK solar farms. Solar trackers use more proprietary ground-mounting methods that may vary from solutions very similar to fixed orientation arrays to more complex foundation designs that may involve elaborate foundations.

2.2.9 For a south facing configuration, between each row of frames, the separation distance will be approximately 2 to 11m, dependent upon angle and length of slope, to allow for appropriate maintenance and to minimise inter-row shading.

2.2.10 For an east-west configuration, between each row of frames, the separation distance will be approximately 2.5 to 7m. The 'ridge' of each pair of strings could also include a separation distance of approximately 0.3m to 1m.

2.2.11 The panel modules across the Site are likely to be mounted on structures with a clearance above ground level (agl) of approximately 0.8m, and an upper height of up to 3.6m agl. These dimensions are indicative at this stage as the final elevations of the racks will be influenced by various design factors such as local topography, flood risk and configuration.

Photo 2-3: Solar panels with south facing configuration

Photo 2-4: Solar panels with east-west facing configuration (*image reproduced courtesy of Huawei*)

Supporting Infrastructure (Inverter, transformer and switchgear)

2.2.12 The supporting infrastructure comprises inverters, transformers, and switchgear, which will be mounted on concrete foundations. Two options are under consideration, as described below. As the Scheme design develops, the configuration of the solar station will be determined based upon environmental and technical factors. A reasonable worst case scenario will be assessed and presented in the ES.

Option A: Independent outdoor equipment

2.2.13 As shown in Photo 2-5, with this option, the inverter, transformer, and switchgear are placed outdoors and independent of each other. The approximate footprint for this option is up to 20 x 4m and up to 3.5m in height.

Photo 2-5: Option A – outdoor structure

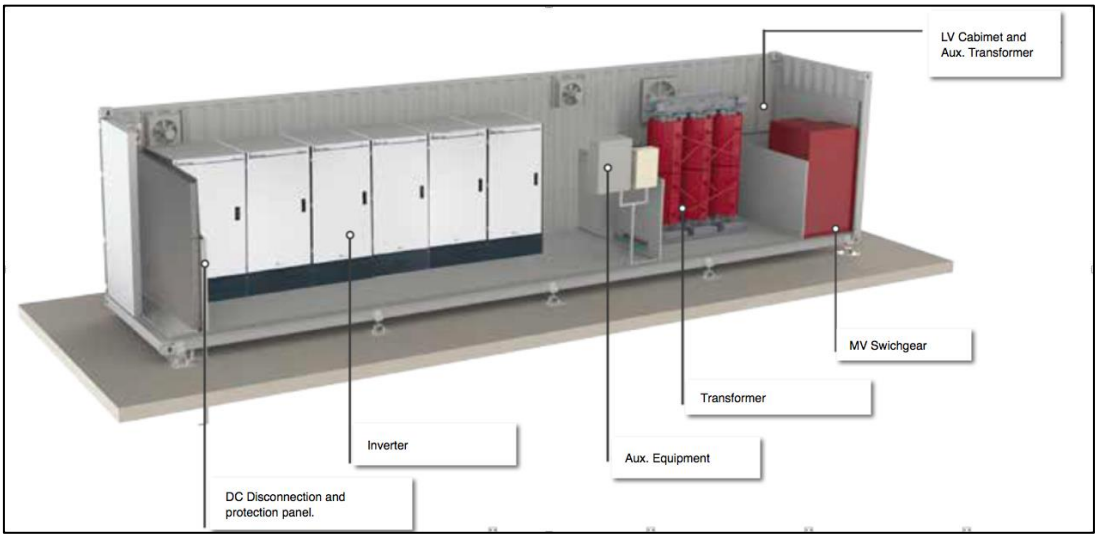


Photo 2-6: Option B – indoor equipment exterior (*image reproduced courtesy of Power Electronics*)

Option B: Indoor equipment in container

2.2.14 As shown in Photos 2-6 and 2-7, with this option, all equipment (inverter, transformer and switchgear) are included within a 40 foot ISO High Cube Container with an approximate footprint of up to 14m x 4m and a height of up to 3.5m (i.e. the equipment is enclosed 'indoors'). The container would be painted in a colour in keeping with the prevailing surrounding environment, often with a green painted finish.

Photo 2-7: Option B – indoor equipment interior (*image reproduced courtesy of Power Electronics*)

2.2.15 The following sections describe inverters, transformers and switchgear in more detail. It is anticipated that plant would be installed on concrete bases.

Inverters

2.2.16 Inverters are required to convert the DC electricity collected by the PV modules into alternating current (AC), which allows the electricity generated to be exported to the National Grid. Inverters are sized to deal with the level of voltage and intensity, which is output from the strings of PV modules.

2.2.17 It is currently expected that either string or central inverters would be used. One single string inverter unit could be utilised, for example, for every 10 to 12 strings. String inverters are small enough to be mounted underneath the modules, as shown on Photo 2-8. Central inverters are

much larger and require their own electrical cabinet enclosures. These are usually located at regular intervals amongst the PV arrays and they occupy an area that depends on such intervals. Typically this area is 6 x 3m and can be up to 3.5m in height.

Photo 2-8: Typical string inverter (*image reproduced courtesy of Huawei*)

2.2.18 Alternatively, centralised inverters may be used, and these could be sited at regular intervals amongst the PV modules. The inverters would be proprietary units up to approximately 5 x 3m in plan and 3.5m in height. This is the most common solution used on existing UK solar PV farms. As shown above in Photos 2-5 and 2-7, centralised inverters could be indoor (i.e. enclosed in a container) or outdoor. Photo 2-9 shows an outdoor inverter.

Photo 2-9: Typical outdoor centralised inverter (as per Supporting Infrastructure Option A)

Transformers

2.2.19 Transformers are required to step up the voltage of the electricity generated across the Site before it reaches the substation. Transformer cabins are therefore likely to be located across the Site at regular intervals. As shown in Photos 2-10 to 2-12, the transformers could be outdoor or indoor.

2.2.20 Photo 2-10 shows an example of an outdoor transformer. The footprint could be around 4 x 3.5m and 3.5m in height.

Photo 2-10: Typical outdoor transformer

2.2.21 Indoor transformers can be installed in a cabin, jointly with indoor switchgears, typically with a footprint of 7 x 4m and with a height of 3.5m, as shown in Photo 2-11. Transformer cabins are typically externally finished in keeping with the prevailing surrounding environment, often with a green painted finish. Alternatively, as described above and shown on Photos 2-6 and 2-7, transformers can be installed in a high cube container together with an inverter and switchgear as part of an indoor solar station. As the Scheme design develops, the likely configuration of equipment will be determined based upon environmental and technical factors. A reasonable worst case scenario will be assessed and presented in the ES.

Photo 2-11: Typical transformer cabin (including switchgears) (alternative option for Solar Station Option A) (*Image reproduced courtesy of Selma*)

Switchgears

2.2.22 Switchgears are the combination of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment. Switchgear is used both to de-energise equipment to allow work to be done and to clear faults downstream.

2.2.23 Switchgears are usually indoor and can be located alone in a cabin (as shown on Photo 2-12), with a typical footprint of 3 x 3.5m and 3.5m in height. As described in Paragraph 2.3.21 and shown on Photo 2-11, switchgears can be also located in a cabin together with the transformer with a typical footprint of 7 x 4m in plan and 3.5m in height. Alternatively, as described in Paragraph 2.2.21 and shown on Photos 2-6 and 2-7, switchgears can be placed in a high cube container, as part of an indoor station. As the Scheme design develops, the likely configuration of equipment will be determined based upon environmental and technical factors. A reasonable worst case scenario will be assessed and presented in the ES.

Photo 2-12: Typical cabin indoor switchgear used in the 'outdoor solution' (as per Supporting Infrastructure Option A)

Energy Storage Facility

2.2.24 The Scheme will include an associated battery energy storage system. The battery energy storage system is designed to provide peak generation and grid balancing services to the electricity grid. It will do this primarily by allowing excess electricity generated from the solar PV panels to be stored in batteries and dispatched when required. It may also import surplus energy from the electricity grid.

2.2.25 There are a number of different designs for the battery energy storage system that will be explored as part of the iterative design process. Maximum parameters for the compound layouts will be defined in the DCO application in order to present and assess a worst case in the EIA.

2.2.26 Batteries will either be in individual enclosures or housed within a larger building or buildings. The precise number of individual battery storage enclosures will depend upon the level of power capacity and duration of energy storage that the Scheme will require; investigations are ongoing to determine this. There needs to be an element of flexibility in this element as both the technology and business models are evolving, as is relevant policy which may affect the business case and support for the systems.

2.2.27 The location of the battery energy storage system, transformers, and dedicated switchgear will be determined in part by whether the battery energy storage system is AC-coupled or DC-

coupled. If the system is AC-coupled they will be located together in one or more 'centralised' areas, which can be installed, operated, and maintained easily. If the systems are DC-coupled they will be spread around the Site and located alongside the centralised inverters.

2.2.28 As mentioned in 2.3.24, the battery storage system provides flexibility and grid reliability. The total size and distribution of the battery stations across the Site will depend largely on the existing grid conditions at the time of construction design. The battery storage system would comprise DC/DC converters to control the charge of the batteries from the PV energy output and/or AC/DC inverters to control their charge using energy drawn from the grid. Depending on the same parameters, the battery storage system may be installed in one or two large battery compound areas of as much as 200m x 120m, which may vary if more and smaller sub-systems are installed instead of one or two larger ones.

2.2.29 Each battery energy storage system will require a heating, ventilation and cooling (HVAC) system to ensure the efficiency of the batteries, which are integrated into the containers. This may involve a HVAC system that is external to the containerised unit located either on the top of the unit or attached to the side of the unit. If this uses air to heat and cool it will have a fan built into it that is powered by auxiliary power.

2.2.30 The Switchgear/Control Room operates, isolates and controls the exported power from the energy storage system. This would comprise a building of similar dimensions to the containers; either an adapted container or built from glass reinforced plastic (GRP), located within the main battery energy storage system compound.

2.2.31 As the Scheme design develops, the likely configuration of equipment will be determined based upon environmental and technical factors. A reasonable worst case scenario will be assessed and presented in the ES.

Photo 2-13: Example Battery Storage facility

On-Site Cabling

2.2.32 Low voltage on-site electrical cabling is required to connect the PV modules and battery energy storage system(s) to inverters (typically via 1.5/1.8 kV cables), and the inverters to the transformers on-site (typically via 0.6/1 kV cables). The dimension of the trenches will vary depending on the number of ducts they contain but could be typically be up to 0.8m in width and 0.8 to 1.2m in depth.

2.2.33 Higher rated cables (around 33 kV) are then required between the transformers and the switchgears and from switchgears to the on-site electrical infrastructure. The dimension of the trenches will vary depending on the number of ducts they contain but could be typically up to 0.8m in width and up to 1.2m in depth.

2.2.34 Cabling between PV modules and the inverters will typically be required to be above ground level (along a row of racks), fixed to the mounting structure, and then underground (between racks and in the inverter's input). All other on-site cabling will be underground wherever possible.

2.2.35 Data cables will also be installed, typically alongside electrical cables in order to allow for the monitoring during operation, such as the collection of solar data from pyranometers.

2.2.36 There are currently two cable route connection options to the Grid under consideration at the northern part of the Site, located to either side of Sandy Wood. The routes lie on the eastern and western edges of Sandy Wood and are necessary to connect the main body of the Site with the parcels to the north of Sandy Wood and south of Hookley Wood, to the east of Fuller Street. It is anticipated that only one of these routes would be required, after further assessment work has taken place to inform the decision.

2.2.37 132 kV cables are likely to be required to export the electricity produced by the Longfield Solar Farm to the National Grid Substation (see paragraphs 2.3.39 below and Section 2.4).

2.2.38 The 132 kV cables may be below ground, requiring trenching typically of 1.2m depth. An alternative to below ground cabling is to use Over Head Lines (OHL) which will typically be 15m in height, and mounted on steel lattice pylons, wooden or composite poles.

2.2.39 The route of the existing power lines will not be altered significantly. There will be a tie in point for the new National Grid Substation which may involve the construction of additional pylons and some temporary diversion works.

Substation

2.2.40 It should be noted that the land to the south west of the Waltham Road containing the existing Bulls Lodge substation, has been included within the Site boundary at this stage as there is a potential route of connection from the Site to the existing substation. The area immediately surrounding Bulls Lodge substation is not anticipated to comprise solar PV development, but is being considered for cable connection to the grid, and potential battery storage areas only, and is subject to further consultation with National Grid.

2.2.41 In the event that the connection to Bulls Lodge is not considered to be suitable, then a new substation would be required to be constructed within the Site. The location of the potential new substation is dependent on further assessment and consultation with National Grid, but at this stage it is anticipated that it would be located either within the northern part of the Site to the immediate south of Hookley Wood, or within the central part of the Site adjacent to Toppinghoehall Wood.

2.2.42 The new substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment required to facilitate the export of electricity from the Site to the National Grid via underground cables or OHL (as referred to above). The new substation is expected to include a control building, which would be approximately up to 20 x 20m in plan, and up to 6m in height. This will include office space and welfare facilities as well as operational monitoring and maintenance equipment. The control building would be a painted block building or of prefabricated construction with external colours and finishes to be confirmed prior to construction. The new substation compound would have an approximate footprint of up to 150m x 100m and up to 10m in height.

2.2.43 These dimensions are highly dependent on the findings of further work and will be refined through the iterative design process. Maximum parameters for the compound will be defined in the DCO application, and a reasonable worst case scenario will be assessed and presented in the ES.

Fencing and Security

2.2.44 A security fence will enclose the operational areas of the Site. The fence is likely to be a 'deer fence' or other mesh security fencing, approximately 2.5-3m in height. Pole mounted internal facing closed circuit television (CCTV) systems are also likely to be deployed around the perimeter of the operational areas of the Site. It is anticipated that these would be 5m high. CCTV cameras would have fixed view sheds and will be aligned to face along the fence.

Photo 2-14: Typical deer security fence

2.2.45 To comply with British Standard (BS) EN 62271-1:2017 (Ref. 16), if outdoor transformers are used, they will be surrounded by a secure wire mesh fence, as shown in Photo 2-14. This fence is likely to be 1.8 to 2.5m in height.

Photo 2-15: Typical transformer compound fencing

2.2.46 It is likely that lighting sensors for security purposes will be deployed around the electrical infrastructure and potentially at other pieces of critical infrastructure. No areas are proposed to be continuously lit.

Site Access and Access Tracks

2.2.47 It is anticipated that construction access will be via the A12, utilising the existing access to Waltham Road, Boreham Road or to A130, Essex Regiment Way and Braintree Road. Operational access will be confirmed as the Scheme design progresses and in consultation with Highways England and the County Highways Authorities.

2.2.48 Access tracks will be constructed across the Site. These would typically be 3.5 to 5m wide compacted stone tracks with 1:2 gradient slopes on either side.

Surface water drainage

2.2.49 The detailed operational drainage design will be carried out pre-construction with the objective of ensuring that drainage of the land to the present level is maintained. It will follow either the design of a new drainage system taking into account the proposed new infrastructure (access tracks, cable trenches, structure foundations) to be constructed, or, if during the construction of any of the infrastructure, there is any interruption to existing schemes of land drainage, then new sections of drainage will be constructed.

2.2.50 The design of new drainage systems will be based on the Flood Risk Assessment (FRA) and hydrological assessment to be undertaken.

2.2.51 Infiltration drainage design will be in accordance with Building Research Establishment (BRE) Digest 365: Soakaway Design and Sewers for Adoption (Ref. 17) and infrastructure will be placed at least 10m away from watercourses.

2.3 Electricity Export Connection to National Grid

2.3.1 The electricity generated by the Scheme is expected to be imported and exported via interface cables to the National Grid, either at the existing Bulls Lodge Substation to the south west of the Site, or into a new substation within the Site itself, which will then tie into existing overhead transmission lines.

2.3.2 There are three areas for connection to the National Grid under consideration currently. Subject to further discussion with National Grid and assessment and consultation, these options and the respective connection routes will be refined, However for the purpose of this Scoping Report, the locations being considered are:

- Within the northern part of the Site to the south of Hookley Wood
- Within the central part of the Site to the north of Toppinghoehall Wood
- An off-Site connection to the existing Bulls Lodge substation to the west of Waltham Road.

2.4 Construction Programme and Activities

Construction Programme

2.4.1 Subject to being granted consent and following a final investment decision, the earliest construction could start is Q1 2024 and construction will require an estimated 24-36 months, with operation therefore anticipated to be around Q1 2026.

Construction Activities

2.4.2 The ES will provide further details of the proposed construction activities, their anticipated duration, along with an indicative programme of each phase of the works. The sections below provide an overview of these activities.

2.4.3 The types of construction activities that may be required include (not necessarily in order):

- Site preparation;
- Import of construction materials, plant and equipment to site;
- The establishment of a construction compound(s);
- Upgrading of existing site tracks / access roads and construction of new tracks;

- The upgrade or construction of crossing points (bridges / culverts) over drainage ditches;
- Marking out the location of the infrastructure.
- Energy farm construction:
- Import of components to site;
- Erection of module mounting structures;
- Mounting of modules;
- Installation of electric cabling;
- Installation of transformer cabins;
- Installation of battery storage units;
- Construction of substation compound;
- Cable installation;
- The establishment of mobilisation areas and running tracks;
- Temporary construction compounds (to be located on or near cable routes, which are yet to be determined);
- Stripping of topsoil in sections;
- Trenching in sections;
- Appropriate storage and capping of soil;
- Appropriate construction drainage with pumping where necessary;
- Sectionalised approach of duct installation;
- Excavation and installation of jointing pits;
- Link box installation;
- Cable pulling;
- Implementation of crossing methodologies for watercourses, infrastructure (including roads and rail), and sensitive habitats (e.g. HDD, cable bridging, etc.);
- Testing and commissioning; and
- Site reinstatement and habitat creation.

Construction Site Access

2.4.4 It is anticipated that the main construction and decommissioning access to the Site will be via road at junction 19 (A130 and B1137) of the A12. It is proposed that any abnormal loads would use these main access points and a swept path analysis will be undertaken to determine if land take or road widening is required. It is anticipated that abnormal loads will be required for the transformers for the on-site electrical infrastructure.

2.4.5 To minimise the construction of internal access roads, it is proposed to use the network of minor roads around the Site for some deliveries, subject to suitability of these roads to carry

HGVs. All construction and decommissioning access will be confirmed as the Scheme design progresses and in consultation with Highways England and the County Highways Authorities.

2.4.6 At this stage, it is anticipated that as a worst case during the peak construction period, there could be up to 42 HGV deliveries per day. This is based upon an east-west configuration of panels (see Paragraph 2.2.7) over a 24-36 month construction programme (see Paragraph 2.4.1). In addition, there will be Light Goods Vehicle (LGV) deliveries vehicle movements associated with construction worker arrivals and departures. Construction traffic predictions will be confirmed in the ES.

Construction Environmental Management

2.4.7 A Framework Construction Environmental Management Plan (CEMP) will accompany the DCO application, which will describe the framework of mitigation measures to be followed, to be carried forward to a detailed CEMP prior to construction. The aim of the CEMP is to reduce nuisance impacts from:

- Use of land for temporary laydown areas, accommodation, etc;
- Construction traffic (including parking and access requirements) and changes to access and temporary road or footpath closure (if required);
- Noise and vibration;
- Utilities diversion;
- Dust generation;
- Soil removal; and
- Waste generation.

2.4.8 The detailed CEMP will be produced by the appointed construction contractor following grant of the DCO and prior to the start of construction (for example, as part of a requirement attached to the DCO) and will identify the procedures to be adhered to and managed by the Principal Contractor throughout construction.

2.4.9 Contracts with companies involved in the construction works will incorporate environmental control, health and safety regulations, and current guidance and will ensure that construction activities are sustainable and that all contractors involved with the construction stages are committed to agreed best practice and meet all relevant environmental legislation including: Control of Pollution Act 1974 (COPA) (Ref. 18), Environment Act 1995 (Ref. 19), Hazardous Waste Regulations 2005 (as amended) (Ref. 20) and the Waste (England and Wales) Regulations 2011 (Ref. 21).

2.4.10 Records will be kept and updated regularly, ensuring that all waste transferred or disposed of has been correctly processed with evidence of signed Waste Transfer Notes (WTNs) that will be kept on-site for inspection whenever requested. Furthermore, all construction works will adhere to the Construction (Design and Management) Regulations 2015 (CDM) (Ref. 22).

Site Reinstatement and Habitat Creation

2.4.11 Following construction, a programme of site reinstatement and habitat creation will commence. A Framework Biodiversity and Landscape Management Plan will be submitted as part of the DCO application, and this document will set out the principles for how the land will be managed throughout the operational phase, following the completion of construction. A detailed Biodiversity and Landscape Management Plan will be produced following grant of the DCO and prior to the start of construction (for example, as part of a requirement attached to the DCO).

2.5 Operational Activities

2.5.1 During the operational phase, activity on the Site will be minimal and would be restricted principally to vegetation management, equipment maintenance and servicing, replacement of any components that fail, and monitoring to ensure the continued effective operation of the Scheme. It is anticipated that there could be between 20 and 40 visits per week with four-wheel drive vehicles or transit vans. On average this is 4 vehicle movements per day. It is anticipated that there will be up to five permanent staff on-site during the operational phase.

2.6 Decommissioning

2.6.1 The design life of the Scheme is expected to be at least 40 years, although the operational life could be much longer than this; the condition of equipment will be reviewed at the end of the design life to determine whether it remains in a viable condition to continue operation after that time.

2.6.2 When the operational phase ends, the Site will require decommissioning. All PV modules, mounting poles, cabling, inverters and transformers would be removed from the Site and recycled or disposed of in accordance with good practice and market conditions at that time. The Site will be returned to its original use after decommissioning. The future of the substation and control building would be agreed with the relevant Local Planning Authority prior to commencement of decommissioning. A Decommissioning Environmental Management Plan, to include timescales and transportation methods, would be agreed in advance with the relevant Local Planning Authority.

2.6.3 Decommissioning is expected to take between 12 and 24 months, and could be undertaken in phases.

2.6.4 The effects of decommissioning are often similar to, or of a lesser magnitude than, construction effects and will be considered in the relevant sections of the ES. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Scheme, and assumptions will therefore be made, where appropriate.

3. Alternatives Considered

3.1 Introduction

3.1.1 The ES is required to outline the alternatives that have been considered as part of the EIA process, along with the environmental and social impacts associated with these.

3.1.2 The alternatives analysis is likely to focus on different scheme layouts, sizing, technologies and design parameters, and site location.

3.1.3 A 'no development' alternative would not deliver the additional electricity generation capacity associated with the Scheme and has therefore not been considered further. The ES will include a description of the alternatives relevant to the Scheme that have been considered, including their specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. This will include alternative site layouts, which will be considered during the design process. A full detailed appraisal of the options considered will be presented as part of the ES, discussing the rationale for the final site layout and design selection, as well as explaining the flexibility sought within the consent in this regard.

3.2 Site Selection

3.2.1 The evaluation process for site selection explored a range of possible alternatives. The reasons for selecting the site will be presented in the ES.

3.2.2 Further refinement will be undertaken as the Scheme design progresses to determine the DCO application boundaries and layout for the Site submitted with the DCO application.

4. Consultation

4.1 Context

4.1.1 Effective stakeholder engagement and consultation is intrinsic to the Planning Act 2008 (Ref. 2) and fundamental to the success of the Scheme.

4.1.2 The process of consultation is critical to the development of a comprehensive and balanced ES. The views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues that require further investigation. Consultation is an ongoing process, which enables mitigation measures to be incorporated into the project design thereby limiting adverse effects and enhancing environmental benefits.

4.1.3 The Scheme has a wide range of stakeholders (including landowners, statutory consultees, local communities and specialist interest groups) with differing interests that will require varied levels of consultation. Specific communication activities therefore need to be focussed to meet the needs of particular individuals and groups. This requires an understanding of the stakeholders and their interests in the Scheme.

4.1.4 Stakeholder engagement for the Scheme is based on the following principles:

- Early and ongoing engagement to inform and influence the design process;
- Seeking an appropriate level of feedback in the iterative design process and ensuring that comments received are taken into consideration;
- Building of long term relationships with key stakeholders throughout the different stages of the Scheme to help better understand their views;
- Where possible and practicable ensuring concerns are addressed; and
- Ensuring appropriate statutory consultation is undertaken in compliance with requirements of the Planning Act 2008 (Ref. 2), EIA Regulations (Ref. 1) and associated guidance.

4.2 DCO Consultation Requirements

4.2.1 The DCO process has a number of statutory requirements regarding consultation. These requirements stipulate that certain stakeholder groups and the community must be consulted as part of the pre-application process, as set out in Sections 42, 47 and 48 of the Planning Act 2008 (Ref. 2) and Regulation 13 of the EIA Regulations (Ref. 1). Further requirements set out how the Scheme must be publicised and specific documents produced, including a Statement of Community Consultation (SoCC), Preliminary Environmental Information Report (PEIR) and a Consultation Report.

4.3 Consultation to Date

4.3.1 A number of meetings with statutory consultees have already taken place to provide an introduction to the proposals, including:

- The Planning Inspectorate;
- Chelmsford City Council;
- Braintree District Council;
- Highways England;
- Historic England;

- Natural England; and
- Essex County Council.

4.3.2 In addition, a project website has been set up to provide up to date information on the project: https://www.longfieldsolarfarm.co.uk/ and information has been provided to local residents and local community groups in advance of the submission of this Scoping Report.

4.4 Scoping Consultation

4.4.1 The Planning Inspectorate (on behalf of the SoS) will consult on this Scoping Report under the EIA Regulations. Views from consultees will be considered and used to inform the Scoping Opinion to be issued by the Planning Inspectorate (on behalf of the SoS).

4.4.2 Under Regulation 10(6) of the EIA Regulations (Ref. 1), the SoS must undertake consultation with statutory consultation bodies, including environmental bodies (such as Natural England, the Environment Agency and Historic England) and relevant planning authorities (Chelmsford Borough Council, Braintree District Council and Essex County Council), before adopting a Scoping Opinion.

4.5 Public Statutory Consultation

4.5.1 In accordance with Section 47(1) of the Planning Act 2008 (Ref. 2) for an NSIP, the Applicant will prepare a SoCC. This will outline how the Applicant intends to consult with the local community about the Scheme, including, in accordance with Regulation 12 of the EIA Regulations (Ref. 1), and how it intends to publicise and consult on the Preliminary Environmental Information (PEI). The Applicant is required to consult the host local authorities (i.e. those local authorities whose administrative area the Scheme is located within) on the draft SoCC and they will have a period of at least 28 days following receipt of the request to comment on a draft SoCC prior to its publication for inspection by the public.

4.5.2 A two stage approach to consultation with the local community and wider public is planned, as follows:

- A first round of non-statutory events in Autumn 2020 to introduce the Scheme and present a preliminary design and the options currently under consideration; and
- A second round of events in Spring 2021, being the statutory consultation pursuant to the Planning Act 2008 (Ref. 2) and EIA Regulations (Ref. 1), including consultation on the Preliminary Environmental Information. The PEI Report will report the outcomes of the preliminary assessment of likely significant environmental effects, to allow consultees to develop an informed view of the Scheme. The full EIA will not have been completed by that time (as is common), and it is likely the PEI Report will not include certain surveys and assessments that are not possible at that time of year, such as protected species surveys that have seasonal restrictions. It is anticipated that a 'chosen' design will be presented based on a consideration of the feedback from the first round of events (as well as other technical and environmental factors). Members of the public will be given an opportunity to comment on the chosen technology and design before proposals are 'fixed' for the DCO application and the ES is finalised.

4.5.3 The approach to public consultation is currently being finalised, but is likely to include (without being limited to):

- Exchanges of correspondence, meetings and workshops with local community groups and businesses (online or in person where possible); and
- Public exhibitions at which members of the community can meet with members of the project team (where possible) and online.

4.5.4 During the statutory consultation, consultation will also be undertaken with prescribed consultation bodies as well as affected landowners, in accordance with Sections 42 and 48 of

the Planning Act 2008 (Ref. 2) and Regulation 13 of the EIA Regulations (Ref. 1). All consultation events will be planned in accordance with the COVID-19 guidance and regulations in place at the time.

4.5.5 All responses received during consultation will be carefully considered and taken into account in the development of the Scheme in accordance with Section 49 of the Planning Act 2008 (Ref. 2). Details of any responses received during consultation and the account taken of those responses will be included in a Consultation Report. This Consultation Report will be submitted with the application for a DCO to the SoS and, if the application is accepted, will be available for public review.

4.5.6 The Consultation Report will demonstrate how the Applicant has complied with the consultation requirements of the Planning Act 2008 (Ref. 2) and EIA Regulations (Ref. 1) and will be considered by the SoS when determining whether to accept the application, and then in examining the application.

5. Environmental Impact Assessment Methodology

5.1 Introduction

5.1.1 The ES will be based on a number of related activities, as follows:

- Establishing existing baseline conditions;
- Consultation with statutory and non-statutory consultees throughout the DCO pre-application process;
- Consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
- Consideration of technical standards for the development of significance criteria;
- Review of secondary information, previous environmental studies and publicly available information and databases;
- Desk-top studies;
- Physical surveys and monitoring;
- Computer modelling (where required); and
- Expert opinion.

5.1.2 The ES will set out the process followed during the EIA including the methods used for the collection of data and for the identification and assessment of impacts. Any assumptions made will be clearly identified.

5.1.3 The EIA process is designed to be capable of, and sensitive to, changes that occur as a result of design development, including any mitigation measures that are incorporated during the EIA. This will be particularly important for this EIA as the design and layout of the Scheme is still being refined, and the design is likely to evolve further following submission of this EIA Scoping Report. It is not, however, anticipated that the Scheme that is the subject of the EIA and DCO application will be materially different from the Scheme that is the subject of this Scoping Report, and it will be within the parameters / options set out in ***Chapter 2: The Scheme***, of this Scoping Report.

5.1.4 Impacts will be considered on the basis of their magnitude, duration, and reversibility. Cumulative and combined effects will also be considered where appropriate. Significance will be evaluated on the basis of the scale of the impact and the importance or sensitivity of the receptors, in accordance with standard assessment methodologies. More information on the assessment methodology is provided in Section 5.5 below.

5.1.5 Where potentially significant adverse environmental effects are identified in the assessment process, measures to mitigate these effects will be put forward in the form of recommendations to be undertaken as part of the project development as far as practicable.

5.2 Determining the Baseline Conditions

5.2.1 In order to predict the potential environmental effects of the Scheme, it will be necessary to determine the environmental conditions that currently exist within the Site boundary and surrounding area, in the absence of the Scheme. These are known as 'baseline conditions'.

5.2.2 Detailed, environmental baseline information will be collected and the methodology for the collection process will be detailed within the ES. The baseline information will be gathered from various sources, including:

- online/digital resources;
- data searches, e.g. GroundSure, Historic Environment Record, etc.;
- baseline site surveys; and
- environmental information submitted in support of other planning applications for developments in the vicinity.

5.2.3 Consideration will also be given to how the baseline conditions would evolve in the absence of the Scheme, known as the 'future baseline'.

5.3 Embedded Measures

5.3.1 Measures will be identified in order to avoid, reduce and, if possible, offset significant adverse effects identified during the EIA process. Where possible, these measures will be incorporated into the form or design of the Scheme.

5.3.2 Once these measures are incorporated into the design, they are termed 'embedded measures'. Embedded measures relevant to the construction phase will be described within a Framework CEMP, and within the 'Environmental Design and Management' section of each technical chapter. For the operational phase, such embedded measures will be represented primarily in the design. Embedded measures are therefore either incorporated into the design from the outset or identified through the assessment process.

5.3.3 The ES assesses effects with embedded measures in place. Where significant adverse effects are identified after considering these embedded measures, 'additional mitigation measures' are proposed.

5.4 Timescales and Assessment Years

Construction Phase Effects

5.4.1 For the assessment, these effects will be taken to be those for which the source begins and ends during the construction stage, and the effects do not endure beyond the completion of the construction phase. This covers sources of effects such as construction traffic, noise and vibration from construction activities, dust generation, site runoff, mud on roads, risk of fuel/oil spillage, and the visual intrusion of plant and machinery on-site. Some aspects of construction related effects will last for longer than others, for example impacts related to earth moving are likely to be relatively short in duration in respect of the whole construction period, whereas the construction of energy infrastructure and landscaping activities are likely to persist throughout the entire construction period.

Operational Phase Effects

5.4.2 For the assessment, these are the effects that, although they may start during construction, are either permanent, endure for a substantial period beyond construction or decommissioning, or represent an extended cumulative effect of construction or decommissioning activity. This includes the effects of the physical presence of the energy infrastructure, and its operation, use and maintenance. Timescales associated with these enduring effects are as follows:

- Short term – endures for up to 12 months after construction or decommissioning;
- Medium term – endures for 1-5 years;
- Long term – endures for more than 5 years;
- Reversible Long Term Effects – long-term effects, which endure throughout the lifetime of the Scheme but which cease once the Scheme has been decommissioned (operational effects will all fall into this category); and
- Permanent Effects – effects which cannot be reversed following decommissioning (e.g. where buried archaeology is permanently removed during construction).

Decommissioning Period Effects

5.4.3 For the assessment, these effects will be taken to be those for which the source begins and ends during the decommissioning stage, and the effects do not endure beyond the completion of the decommissioning phase. This covers sources of effects such as construction traffic, noise and vibration from construction activities, dust generation, site runoff, mud on roads, risk of fuel/oil spillage, and the visual intrusion of plant and machinery on-site, for example. As with construction phase effects, some aspects of decommissioning will endure for longer than others.

Assessment Years

5.4.4 In order to ensure the EIA is robust in considering the likely significant effects of the Scheme, appropriate assessment scenarios and years have been identified and are discussed below.

5.4.5 The peak construction year for the purpose of the EIA is anticipated to be during 2024 and 2025. This is based on the assumption that the Scheme is built out rapidly (over approximately 24 months for example), which is a worst case from a traffic generation point of view because it compresses the trip numbers into a shorter duration. This would therefore also be the worst case in terms of effects on drivers, pedestrians and cyclists, and traffic-related air quality and noise effects.

5.4.6 As described in Paragraph 2.4.1, the Scheme may be built in phases over a period of approximately 36 months, which may be worse, for example, for landscape and visual amenity and the setting of heritage assets, as there will be a longer time over which construction activity could affect receptors.

5.4.7 As described in Section 2.4, the phasing of the Scheme will be subject to a number of factors. Therefore, the peak construction assessment year will be reviewed as the anticipated construction programme is considered in more detail during design development. A full justification for the reasonable worst case scenario that is assessed will be provided in the ES.

5.4.8 The proposed operational assessment year for the purpose of the EIA is 2026 (see Paragraph 2.5.1).

5.4.9 A future year of 2040 will also be considered for specific topics including landscape and visual amenity, in terms of the maturation of vegetation (i.e. 15 years after the operational assessment year).

5.4.10 The decommissioning assessment year for the purpose of the EIA is 2065, based on the design life of the Scheme, recognising that the operational life may extend beyond this date (see Paragraph 2.6.1).

5.5 Effect Significance Criteria

5.5.1 The evaluation of the significance of an effect is important; it is the significance that determines the resources that should be deployed in avoiding or mitigating a significant adverse effect, or conversely, the actual value of a beneficial effect. The overall environmental acceptability of the Scheme is a matter for the SoS to determine, having taken into account, amongst other matters, the environmental information that is set out in the ES, including all likely beneficial

and adverse environmental effects. Where it has not been possible to quantify effects, qualitative assessments will be carried out, based on available knowledge and professional judgment. Where uncertainty exists, this will be noted in the relevant topic chapter.

5.5.2 The significance of residual effects will be determined by reference to criteria for each assessment topic. Specific effect significance criteria for each technical discipline will be developed, giving due regard to the following:

- Extent and magnitude of the impact (described as high, medium, low and very low);
- Effect duration (see Paragraph 5.4.2), and whether effects are temporary, reversible or permanent;
- Effect nature (whether direct or indirect, reversible or irreversible, beneficial or adverse);
- Whether the effect occurs in isolation, is cumulative or interacts with other effects;
- Performance against any relevant environmental quality standards;
- Sensitivity of the receptor (described as high, medium, low and very low); and
- Compatibility with environmental policies.

5.5.3 The significance of residual effects will be evaluated with reference to available definitive standards, accepted criteria and legislation. For issues where definitive quality standards do not exist, significance will be based on the:

- Local, district, regional or national scale or value of the resource affected;
- Number of receptors affected;
- Sensitivity of these receptors; and
- Duration of the effect.

5.5.4 In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental topics, the following terminology will be used in the ES to define residual effects:

- **Adverse** – detrimental or negative effects to an environmental/socio-economic resource or receptor; or
- **Negligible** (also referred to as 'neutral' for some topics) – imperceptible effects to an environmental/socio-economic resource or receptor; or
- **Beneficial** – advantageous or positive effect to an environmental/socio-economic resource or receptor.

5.5.5 Where adverse or beneficial effects are identified, these will be assessed against the following scale:

- **Minor** – slight, very short or highly localised effect of no significant consequence;
- **Moderate** – limited effect (by extent, duration or magnitude) which may be considered significant; and
- **Major** – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards; considered significant.

5.5.6 Each of the technical chapters provides the criteria, including sources and justifications, for quantifying the different categories of effect. Where possible, this will be based upon quantitative and accepted criteria (for example, noise assessment guidelines), together with the use of value judgment and expert interpretation to establish to what extent an effect is environmentally significant.

5.5.7 Table 5-1 illustrates an example of the classification of effects matrix.

Table 5-1 Example matrix to classify environmental effects

Sensitivity or value of resource / receptor	*Magnitude of impact*			
	High	***Medium***	***Low***	***Very low***
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

5.5.8 Following the classification of an effect, clear statements will be made within the topic chapters as to whether that effect is significant or not significant. As a general rule, major and moderate effects are considered to be significant (as shown by the shaded cells in

5.5.9 Table 5-1 above), whilst minor and negligible effects are considered to be not significant. However, professional judgement will be applied, including taking account of whether the effect is permanent or temporary, its duration/frequency, whether it is reversible, and / or its likelihood of occurrence. Generic definitions for the classification of effects are shown in Table 5-2.

Table 5-2 Generic effect descriptions

Effect	*Generic description*
Major	These effects may represent key factors in the decision making process. Potentially associated with sites and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making.
Minor	These effects may be raised as local issues and may be of relevance in the detailed design of the project, but are unlikely to be critical in the decision making process.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.

5.5.10 Where mitigation measures are identified to eliminate, mitigate or reduce adverse impacts, these have either been incorporated into the design of the Scheme; translated into construction commitments; or operational or managerial standards / procedures. The ES will highlight 'residual' effects, which remain following the implementation of suitable mitigation measures, and classify these in accordance with the effect classification terminology given above.

5.5.11 It should be noted that some technical disciplines may utilise different criteria when undertaking assessments due to differences in industry accepted guidelines and specifications. Where this is the case, the technical topic will discuss how the assessment

methodology or classification of effects differs for the general EIA methodology as described in this section and provide justification.

Assessment of Construction and Decommissioning Effects

5.5.12 The identification of construction and decommissioning effects will be made on the basis of existing knowledge, techniques and equipment. A 'reasonable worst-case' scenario will be used with respect to the envisaged construction methods, location (proximity to sensitive receptors), phasing and timing of construction activities.

5.5.13 As described in Section 5.4 above, the assessment of construction and decommissioning effects will assume the implementation of standard good practice measures, for example the use of temporary noise barriers to reduce noise levels as appropriate and, where practicable, control of dust on haul roads, etc. The purpose of this is to focus on the scheme specific effects, rather than generic construction effects that can be easily addressed using generic best practice mitigation measures. Construction and decommissioning assumptions, including what has been assumed in terms of good practice measures, will be set out within the ES, and the Framework CEMP. The ES will identify and assess construction and decommissioning effects that are likely to remain after these mitigation measures are in place.

5.6 Interaction and Accumulation of Effects

5.6.1 In accordance with the EIA Regulations (Ref. 1), 'cumulative effects' will be considered. By definition, these are effects that result from incremental changes caused by other past, present or reasonably foreseeable actions together (i.e. cumulatively) with the Scheme.

5.6.2 For the cumulative impact assessment, two types of impact will be considered:

- The combined effect of individual impacts from the Scheme, for example noise or pollutants on a single receptor (these will be referred to as 'effect interactions'); and
- The combined effects of several development schemes which may, on an individual basis be insignificant but, cumulatively with the Scheme, have a new or different likely significant effect.

Effect Interactions

5.6.3 There is no established EIA methodology for assessing and quantifying effect interactions that lead to combined effects on sensitive receptors, however the European Commission (EC) has produced guidelines for assessing effect interactions *"which are not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project…"* (Ref. 23).

5.6.4 AECOM has reviewed these guidelines and has developed an approach which uses the defined residual effects of the Scheme to determine the potential for effect interactions that lead to combined effects.

5.6.5 The EIA will predict beneficial and adverse effects during construction, operation and decommissioning of the Scheme, which are classified as minor, moderate or major. Several effects on one receptor or receptor group could theoretically interact or combine to produce a combined significant overall effect.

5.6.6 An exercise which tabulates the effects on receptors or receptor groups will be undertaken to determine the potential for effect interactions and therefore any combined effects. Only adverse or beneficial residual effects classified as minor, moderate, or major will be considered in relation to potential effect interactions. Residual effects, which are classified as negligible will be excluded from the assessment of the effect interactions as, by virtue of their definition (see Table 5-2), they are considered to be imperceptible effects to an environmental / socio-economic resource or receptor.

Cumulative Effects with Other Developments

5.6.7 The Planning Inspectorate's Advice Note 17 on the assessment of cumulative effects (Ref. 24) identifies a four stage approach as follows:

Stage 1 – Establish the NSIP's ZOI and identify long list of 'other development'

5.6.8 A review of other developments will be undertaken, initially encompassing a 'zone of influence' defined by the environmental topic specialists to prepare a long list of 'other development'. At this stage, it is anticipated that the long list will be based on up to a 10km area of search.

5.6.9 The long list of 'other development' to be included in the assessment of cumulative effects will be reviewed and developed in consultation with the local planning authorities, statutory consultees and other relevant organisations.

5.6.10 Development will be included in the initial long-list based on the following criteria:

a. development currently under construction;

b. approved applications which have not yet been implemented (covering the past five years and taking account of those that received planning consent over three years ago and are still valid but have not yet been completed);

c. submitted applications not yet determined;

d. refused applications, subject to appeal procedures not yet determined;

e. on the National Infrastructure Planning Programme of Projects;

f. development identified in the relevant Development Plan (and emerging Development Plans); and

g. development identified in other plans and programmes which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

5.6.11 Criteria will be developed and applied to filter development which may be excluded from the initial long list, having regard to the size and spatial influence of each development. These criteria will be documented and set out within the ES.

Stage 2 – Identify shortlist of 'other development' for Cumulative Effects Assessment

5.6.12 At Stage 2, any developments of a nature or scale without the potential to result in cumulative impacts will be excluded, following discussion with the local planning authorities and consideration of the likely zone of influence for each environmental topic. The justification for including or excluding developments from the long list will be provided in a matrix, modelled on the example given within Matrix 1 (Appendix 1) of the Planning Inspectorate's Advice Note 17 (Ref. 24).

Stage 3 – Information gathering

5.6.13 Information relating to other developments will be collected from the appropriate source (which may include the local planning authorities, the Planning Inspectorate or directly from the applicant / developer) and will include, but not be limited to:

a. proposed design and location information;

b. proposed programme of demolition, construction, operation and/or decommissioning; and

c. environmental assessments that set out baseline data and effects arising from 'other development'.

Stage 4 – Assessment

5.6.14 The assessment will include a list of those developments considered to have the potential to generate a cumulative effect together with the Scheme, and this will be documented in a matrix, in line with Matrix 2 (Appendix 2) of the Planning Inspectorate's Advice Note 17 which includes the following:

a. a brief description of the development;

b. an assessment of the cumulative effect with the Scheme;

c. proposed mitigation applicable to the Scheme including any apportionment; and

d. the likely residual cumulative effect.

5.6.15 The criteria for determining the significance of any cumulative effect will be based upon:

a. the duration of effect, i.e. will it be temporary or permanent;

b. the extent of effect, e.g. the geographical area of an effect;

c. the type of effect, e.g. whether additive or synergistic;

d. the frequency of the effect;

e. the 'value' and resilience of the receptor affected; and

f. the likely success of mitigation.

5.7 Proposed topics to be included in the ES

5.7.1 The following chapters present a discussion of the likely or potential significant environmental effects associated with the Scheme that it is proposed will be considered as part of the EIA. The methodology and assessment criteria that will be used to assess the identified effects are also outlined.

5.7.2 The topics described are set out in the following list:

- Climate Change (Chapter 6);
- Cultural Heritage (Chapter 7);
- Ecology (Chapter 8);
- Flood Risk, Drainage and Surface Water (Chapter 9);
- Landscape and Visual Amenity (Chapter 10);
- Noise and Vibration (Chapter 11);
- Socio-Economics and Land Use (Chapter 12); and
- Transport and Access (Chapter 13).

5.7.3 Chapter 14 provides a summary of those environmental topics which have been considered during the preparation of this Scoping Report, and for which standalone chapters are not anticipated to be required in the ES (due to the expected length of text needed to assess these topics). Technical appendices will be provided for these topics with a short summary provided in a single chapter within the ES. These topics include:

- Air Quality;
- Land Quality;
- Glint and Glare;
- Ground Conditions;
- Human Health;
- Major Accidents or Disasters;
- Telecommunications, Television Reception and Utilities; and
- Waste.

5.7.4 Sections 6 – 14 of this Scoping Report provide an outline of the proposed scope of works for the technical topics mentioned above.

6. Climate Change

6.1 Introduction

6.1.1 To align with the requirements of the EIA Regulations (Ref. 1) and IEMA Guidance for assessing climate mitigation (Ref. 25) and adaptation (Ref. 26) in EIAs, consideration has been given within this chapter to three aspects of climate change assessment:

- **Lifecycle greenhouse gas (GHG) impact assessment** - Impact of GHG emissions arising from the Scheme on the climate over its lifetime;
- **In-combination climate change impact (ICCI) assessment** - Combined impact of the Scheme and future climate change on the receiving environment1; and
- **Climate change resilience review** - The resilience of the Scheme to climate change impacts.

6.2 Study Area

GHG impact assessment

6.2.1 The study area for the GHG impact assessment covers all direct GHG emissions arising from activities undertaken on the Site during the construction, operation and maintenance, and decommissioning of the Scheme. It also includes indirect emissions embedded within the construction materials arising as a result of the energy used for their production, as well as emissions arising from the transportation of materials, waste and construction workers.

6.2.2 The study area also includes activities that may be avoided or displaced as a result of the Scheme such as other grid electricity production activities.

6.2.3 The environmental impact associated with GHG emissions is a national and global issue. Consequently, the potential significance of the proposed Scheme's lifecycle GHG emissions will be assessed by comparing the estimated GHG emissions from the Scheme against the reduction targets defined in the Climate Change Act 2008 (Ref. 27) and associated five year, legally binding carbon budgets.

In-combination climate change impact assessment

6.2.4 The study area for the in-combination climate change impact assessment is as defined in each environmental assessment within the ES, and includes all environmental receptors identified within the assessments undertaken by the environmental disciplines.

Climate change resilience review

6.2.5 The study area for the climate change resilience review is the land within the Site boundary, i.e. it covers construction and operation of all assets and infrastructure which constitute the Scheme.

6.3 Planning Policy Context and Guidance

6.3.1 Legislation, planning policy and guidance relating to climate change, and pertinent to the Scheme comprises:

Legislation

- Climate Change Act 2008 (Ref. 27); and
- Carbon Budgets Order 2009 (Ref. 28).

[1] In line with IEMA guidance, this is the combined effect of the impacts of the Scheme and potential climate change impacts on the receiving environment are referred to as 'in-combination impacts' and 'in-combination effects'.

National Planning Policy

- NPS EN-1 (Ref. 5), with particular reference to paragraphs 2.2.9 and 4.8.2 in relation to climate impacts and adaptation; paragraphs 4.1.3 to 4.1.4 in relation to adverse effects and benefits; paragraphs 4.2.1, 4.2.3, 4.2.4, 4.2.8 to 4.2.10 and 5.1.2 in relation to EU Directive and ES requirements; paragraphs 4.5.3 and 4.8.1 to 4.8.12 in relation to adaptation measures in response to climate projections; and paragraphs 5.7.1 to 5.7.2 in relation to climate projections, flood risk and the importance of relevant mitigation.
- NPS EN-5 (Ref. 6) – paragraph 2.4.1 regarding NPS EN-1 and the importance of climate change resilience, and paragraph 2.4.2 in relation to ES requirements regarding climate change resilience.
- NPPF (Ref. 7) – paragraphs 8, 20 and 149 in relation to adaptation, mitigation and climate change resilience; paragraphs 148 and 157 in relation to flood risk and damage to property and people; paragraphs 150 and 153 in relation to reduction of CO2 emissions through design and reduced energy consumption; and paragraphs 155 to 165 in relation to climate projections, associated flood risk and adaptation.

National Guidance

- Planning Practice Guidance, Climate Change (Ref. 29).

Local Planning Policy

- Essex County Council Adapting to Climate Change Action Plan (2011) (Ref. 30), particularly in relation to identifying future climate change risks, assessing their potential impact and delivering adaptation measures where appropriate.
- Essex and Southend-on-Sea Waste Local Plan (adopted July 2017) (Ref. 10), with particular reference to Strategic Objective 6 (SO6) regarding reducing GHG emissions by minimising waste to landfill.
- Chelmsford Local Plan (2020) (Ref. 8), particularly in relation to climate change mitigation and adaption, and:
- Strategic Policy S2 – Addressing Climate Change and Flood Risk, which pledges to encourage new development that provides opportunities for renewable and low carbon energy technologies and schemes, minimises its impact on flooding, and utilises design and construction techniques which contribute to climate change mitigation and adaptation.
- Policy DM19 – Renewable and Low Carbon Energy, which states planning permission will be granted for renewable or low carbon energy developments provided that they “can demonstrate no adverse effect on the natural environment including designated sites”, among other requirements.
- Braintree District Council Local Plan (2017) (Ref. 13), with particular reference to Policy LPP 74 Climate Change, which states “planning permission will only be granted for proposals that demonstrate the principles of climate change mitigation and adaptation into the development”.
- Braintree District Council Climate Local Strategy and Action Plan 2015-2018 (Ref. 31), particularly in relation to the local climate impacts identified - such as increased temperatures, changes in water availability, increased frequency of flooding and extreme weather events – and the key objectives relating to reducing district-wide carbon emissions and adapting to climate change impacts throughout the district.

6.3.2 The national planning policies identify the requirement for consideration of climate change resilience. Climate projections should be analysed, and appropriate climate change adaptation measures considered throughout the design process. Specific climate change risks identified within these policies include flooding, drought, coastal change, rising temperatures and associated damage to property and people.

6.3.3 Local planning policies identify the need to consider and, where appropriate, mitigate GHG emissions associated with new development. New development should aim for reduced or zero carbon development by incorporating renewable or low carbon energy sources and maximising energy efficiency where practicable and should build in resilience to projected climate change impacts.

6.4 Baseline Conditions

GHG impact assessment

6.4.1 The current land use within the Site consists of arable land, managed hedgerows and trees. Trees are present individually in some areas as well as rows of trees and small woodland areas. The abundance of vegetation within the Site suggests a relatively high carbon sink potential. Also, current land use within the Site has minor levels of associated GHG emissions as the land use is largely agricultural. Baseline agricultural GHG emissions are dependent on soil and vegetation types present, and fuel use for the operation of vehicles and machinery.

6.4.2 For the GHG assessment, the baseline is a 'business as usual' scenario whereby the Scheme is not implemented. The baseline comprises existing carbon stock and sources of GHG emissions within the boundary of the existing activities on-site, as well as the emissions that may be avoided as a result of the Scheme, i.e. existing emissions from the generation of grid electricity if the Scheme does not go ahead.

In-combination climate change impact assessment

6.4.3 The receptors for in-combination climate change impact are receptors within the surrounding environment that will be impacted by the Scheme in combination with future climatic conditions. Baseline conditions for the in-combination climate change impact assessment are determined using the climate change projections data.

6.4.4 An initial review of UK Climate Projections 2018 (UKCP18) data (Ref. 32) for the 25km^2 grid square within which the Scheme is located suggests that by the 2050s time period (2040-2069), the region will experience an increase of around 2.4°C in summer mean air temperature at 1.5m and an increase of 1.7°C in winter mean air temperature at 1.5m, compared to a 1981-2010 baseline period. For the same time period, summer mean precipitation is expected to decrease by around 22%, whilst in winter it is expected to increase by 10%.

Climate change resilience review

6.4.5 The receptor for climate change resilience is the Scheme itself including its construction and operation. The climate resilience review will provide a description of how the Scheme will be designed to be more resilient to the climate change impacts identified during the review of the UKCP18 data (Ref. 32).

6.4.6 A more detailed assessment of climate change projections will be conducted for the land within the Site as part of the ES.

6.5 Potential Effects and Mitigation

GHG impact assessment

6.5.1 For the purposes of this assessment, it has been considered that any increase in GHG emissions compared to the baseline has the potential to have an impact, due to the high sensitivity of the receptor (global climate) to increases in GHG emissions. This is in line with the IEMA guidance (Ref. 25), which states that all GHG emissions have the potential to be significant. The application of the standard EIA significance criteria is not considered to be appropriate for climate change mitigation assessments. GHG impacts will be put into context in terms of their impact on the UK's 5-year carbon budgets, including sub-sectoral budgets for energy generation, which set legally binding targets for GHG emissions.

Table 6-1 Potential sources of GHG emissions

Lifecycle stage	*Activity*	*Primary emission sources*
Product Stage	Raw material extraction and manufacturing of products required to build the equipment for the Scheme. Due to the complexity of the equipment, this stage is expected to make a significant contribution to overall GHG emissions. Transportation of materials for manufacturing.	Embodied GHG emissions from energy use in extraction of materials and manufacture of components and equipment. Emissions of GHG from transportation of products and materials.
Construction process stage	On-site construction activity including emissions from construction compounds. Transportation of construction materials (where these are not included in product-stage embodied GHG emissions). Travel of construction workers	Consumption of energy (electricity; other fuels) from plant, vehicles, generators and worker travel. Fuel consumption from transportation of materials to site, where these are not included in product-stage embodied emissions. Due to the nature of the equipment, this could require shipment of certain aspects over significant distances.
	Disposal of waste materials generated by the construction process. Land use change. Water use	GHG emissions from transportation and disposal of waste. GHG emissions from net loss of carbon sink. Provision of clean water, and treatment of wastewater.
Operation stage	Operation and maintenance of the scheme	GHG emissions from energy consumption, provision of clean water and treatment of wastewater. These operational emissions are expected to be negligible in the context of the overall GHG impact. Leakage of potent GHGs, such as SF_6, during operation. GHG emissions from energy consumption, material use and waste generation resulting from ongoing site maintenance. Emissions from routine maintenance are expected to be negligible, but the periodic replacement of components has the potential to have significant impacts given the complexity of the equipment involved.

Lifecycle stage	*Activity*	*Primary emission sources*
Decommissioning stage	On-site decommissioning activity.	Consumption of energy (electricity and other fuels) from plant, vehicles and generators on site.
	Transportation and disposal of waste materials.	Emissions from the disposal and transportation of waste. This has the potential to be significant give the complexity of the equipment.
	Worker travel.	GHG emissions from transportation of workers to site.

6.5.2 The GHG emissions offset through the production of cleaner electricity compared to grid average emissions during the operational phase will be accounted for within the GHG emissions calculations.

6.5.3 A Construction Environmental Management Plan (CEMP) will be prepared and implemented by the selected Principal Contractor to include a range of best practice construction measures, such as:

- Specification of alternative materials with lower embodied GHG emissions; and
- Low carbon design specifications such as energy-efficient lighting and durable construction materials to reduce maintenance and replacement cycles.

6.5.4 The final selection of any mitigation measures, if required, will be detailed as part of the lifecycle GHG impact assessment in the ES. This may include GHG emission mitigation measures concerning construction, operation and decommissioning of the Scheme.

In-combination climate change impact assessment

6.5.5 In-combination climate impact assessment identifies how the resilience of various receptors in the surrounding environment is affected by a combination of future climate conditions and the Scheme. The climate parameters relevant to the Scheme are detailed in Table 6-2 below together with the rationale for scoping. On the basis of the information presented in Table 6-2, an in-combination climate change impact assessment is proposed to be scoped out.

Table 6-2 Climate parameters for the in-combination climate change impact of the Scheme

Parameter	*Scoped In/ Out*	*Rationale for Scoping Conclusion*
Temperature change	Out	While impacts are expected as a result of projected temperature increases, these temperature increases in combination with the Scheme are not expected to have a significant impact upon receptors identified by other environmental disciplines.
Sea level rise	Out	The Scheme is not located in an area that is susceptible to sea level rise.

Parameter	*Scoped In/ Out*	*Rationale for Scoping Conclusion*
Precipitation change (frequency and magnitude of precipitation events and droughts)	Out	Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding or changes to groundwater levels. However, no significant impacts on surface water or groundwater levels are expected as a result of precipitation changes, in combination with the Scheme, as the flow of precipitation to ground will not be significantly hindered. The Scheme, in combination with projected changes in precipitation, is also not expected to have a significant impact upon receptors identified by other environmental disciplines.
Wind	Out	The Scheme, in combination with projected changes in wind patterns, is not expected to have a significant impact upon receptors identified by other environmental disciplines.

Climate change resilience review

6.5.6 Climate parameters relevant to the climate change resilience review are detailed in Table 6-3 below.

Table 6-3 Parameters scoped into the Climate Change Resilience Review

Parameter	*Scoped In/Out*	*Rationale for Scoping Conclusion*
Extreme weather events	In	The Scheme may be vulnerable to extreme weather events such as storm damage to structures and assets.
Increased average temperatures and incidence of heatwaves	In	Extremes in temperatures may result in heat stress of materials and structures.
Increased frequency of heavy precipitation events	In	The Scheme may be vulnerable to changes in precipitation, for example, land subsidence and damage to structures and drainage systems during periods of heavy rainfall.
Increase in strong wind events	In	The Scheme may be vulnerable to changing wind patterns, for example, high winds and falling trees could damage structures and assets.
Sea level rise	Out	The Scheme is not located in an area that is susceptible to sea level rise.

6.5.7 The climate change resilience review will qualitatively assess the Scheme's resilience to climate change. This will be completed in liaison with the project design team and the other EIA technical disciplines by considering the climate projections for the geographical location and timeframe of the Scheme.

6.5.8 A statement will be provided within the ES to describe how the Scheme will be adapted to improve its resilience to future climate conditions.

6.6 Assessment Methodology

GHG impact assessment

6.6.1 The GHG assessment will follow a project lifecycle approach to calculate estimated GHG emissions arising from the construction, operation and decommissioning of the Scheme and to identify GHG 'hot spots' (i.e. emissions sources likely to generate the largest amount of GHG emissions). This will enable the identification of priority areas for mitigation in line with the principles set out in IEMA guidance (Ref. 25).

6.6.2 In line with the World Business Council for Sustainable Development and World Resources Institute GHG Protocol guidelines (Ref. 33), the GHG assessment will be reported as tonnes of carbon dioxide equivalent (tCO_2e) and will consider the seven Kyoto Protocol gases:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Sulphur hexafluoride (SF_6);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen trifluoride (NF_3).

6.6.3 Expected GHG emissions arising from the construction activities, embodied carbon in materials and operational emissions of the Scheme, as well as baseline emissions, will be quantified using a calculation-based methodology as per the following equation, and aligned with the GHG Protocol:

Activity data x GHG emissions factor = GHG emissions

6.6.4 Department for Environment, Food and Rural Affairs (Defra) 2020 emissions factors (Ref. 34) and embodied carbon data from the University of Bath Inventory of Carbon and Energy (ICE) (Ref. 35) will be used as the source data for calculating GHG emissions.

6.6.5 The sensitivity of the receptor (global climate) to increases in GHG emissions is always defined as high as any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future 5-year carbon budgets. Also, the extreme importance of limiting global warming to below 2°C this century is broadly asserted by the International Paris Agreement (Ref. 36) and the climate science community.

6.6.6 Due to the absence of any defined industry guidance for assessing the magnitude of GHG impacts for EIA, standard GHG accounting and reporting principles will be followed to assess impact magnitude. In GHG accounting, it is common practice to consider exclusion of emission sources that are <1% of a given emissions inventory on the basis of a minimal contribution. Both Department of Energy and Climate Change (DECC) guidance (Ref. 37) and the PAS (publicly available specification) 2050 (2011) (Ref. 38) allow emissions sources of <1% contribution to be excluded from emission inventories, and these inventories to still be considered complete for verification purposes. This would therefore suggest that a development with emissions of <1% of the UK inventory and relevant carbon budget would be minimal in its contribution to the wider national GHG emissions.

6.6.7 Where carbon budgets are not available for certain assessment periods[2], a qualitative approach will be taken.

[2] The UK carbon budgets are currently only available to 2032 (5th carbon budget). The 6th carbon budget (2033-2037) is due to be published in December 2020.

Climate change resilience review

6.6.8 The Scheme's resilience to climate change will be considered qualitatively. This will be completed in liaison with the project design team and the other ES technical specialists by considering the climate projections for the geographical location and timeframe of the Scheme. The significance of climate resilience will not be assessed.

6.6.9 A statement will be provided to describe how the Scheme has been designed to be as resilient as is reasonably practicable to future climate change.

6.7 Assumptions, Limitations and Uncertainties

6.7.1 Where detailed information is not available regarding energy use, types and quantities of materials used, or the embodied carbon of key features of the assets, assumptions will be made based on industry approximations and professional best practice.

6.7.2 All assumptions and limitations, including any exclusions, together with assumptions for choices and criteria leading to exclusion of input and output data will be documented as part of the assessment.

7. Cultural Heritage

7.1 Introduction

7.1.1 This chapter sets out the approach to the assessment of the Scheme's impacts on cultural heritage (comprising built heritage, archaeology and the historic landscape). The purpose of the assessment will be to identify and characterise any relevant cultural heritage resources, to consider the nature and scale of potential impacts arising from the Scheme, and to assess the significance of any likely effects.

7.2 Study Area

7.2.1 The study area for archaeological assets will extend to a distance of 1km from the Site and 3km for built heritage assets. This will allow for all cultural heritage assets to be set within their wider context and allow for the assessment of archaeological potential of the Site.

7.2.2 A flexible approach will be taken to the identification of high-value assets on which there may be an impact upon setting, up to 5km beyond the Site. Assets beyond this distance may also be considered, where identified as necessary by the technical team or county archaeologist. This will be guided by the Scheme's Zone of Theoretical Visibility (ZTV) (to be prepared as part of the Landscape and Visual Amenity chapter of the PEIR) but will also consider physical and historical connectivity and relationships with other monuments and the wider landscape.

7.3 Planning Policy Context and Guidance

7.3.1 Legislation, planning policy and guidance relating to cultural heritage and pertinent to the Scheme project comprises:

Legislation

- Infrastructure Planning (Decisions) Regulations 2010 (Ref. 39);
- Planning (Listed Buildings and Conservation Areas) Act 1990 ((Ref. 40) (excluding normal planning procedures, which are disapplied by the DCO, which if granted, would encompass all of the normal consents); and
- Ancient Monuments and Archaeological Areas Act 1979 (Ref. 41) (amended by the National Heritage Act 1983 (Ref. 42) and 2002 (Ref. 43).

National Planning Policy

- NPS EN-1 (Ref. 5) with particular reference to Section 5.8 in relation to the significance, impact and recording of the historic environment;
- NPS EN-5 (Ref. 6) with particular reference to paragraph 2.8.9 in relation to the archaeological consequences of electricity line installation; and
- NPPF (Ref. 7) with particular reference to Section 16: Conserving and Enhancing the Historic Environment.

National Guidance

- Planning Practice Guidance, Conserving and enhancing the historic environment (Ref. 44);
- Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment. Historic England (Ref. 45);
- Historic Environment Good Practice Advice in Planning Note 3. The Setting of Heritage Assets. Historic England (2nd edition, 2017) ((Ref. 46); and
- Historic Environment Statement of Heritage Significance: Analysing Significance in Heritage Assets Historic England Advice Note 12. Historic England (2019) (Ref. 47).

Local Planning Policy

7.3.2 Policies within the Chelmsford Local Plan (Ref. 8) that concern cultural heritage are:

- Strategic Policy S3 – Conserving and Enhancing the Historic Environment. Strategic policy S3 commits specifically to the designation and review of Conservation Areas, the conservation or enhancement of the significance of listed buildings, scheduled monuments, and registered parks and gardens. When assessing applications for development, the Council will place great weight on the preservation or enhancement of designated heritage assets and their setting and will seek to conserve and where appropriate enhance the significance of non-designated heritage assets and their settings.
- Policy DM13 – Designated Heritage Assets, including listed buildings, scheduled monuments, battlefields and registered parks and gardens
- Policy DM14 – Non-designated Heritage Assets
- Policy DM15 – Archaeology

7.3.3 The Braintree District Council Local Development Framework: Core Strategy (adopted September 2011) (Ref. 10) acknowledges that *"many of the towns and villages in the District have historic centres which are protected as conservation areas"* and highlights the importance of historic villages and towns, including Finchingfield, Castle Hedingham and Coggeshall as visitor attractions (ibid.: 23).

7.3.4 The relevant policy for cultural heritage is Policy CS9. The Council will promote and secure the highest possible standards of design and layout in all new development and the protection and enhancement of the historic environment in order to *"…Respect and respond to the local context, especially in the District's historic villages, where development affects the setting of historic or important buildings, conservation areas and areas of highest archaeological and landscape sensitivity…".*

7.3.5 The emerging Braintree District Council Local Plan (Ref. 13) includes the following key polcies relating to cultural heritage:

- Policy LPP 56 - Conservation Areas: The Council will encourage the preservation and enhancement of the character and appearance of designated Conservation Areas and their settings. These include the buildings, open spaces, landscape and historic features and views into, out from and within the constituent parts of designated areas. Planning applications for built or other development within or adjacent to a Conservation Area will be considered in the context of this policy.
- Policy LPP 60 - Heritage Assets and their Settings: Development of internal, or external alterations, or extensions, to a listed building or listed structure (including any structures defined as having equivalent status due to being situated within the curtilage of a listed building and locally listed heritage assets) and changes of use will be considered in the context of specified criteria.
- Policy LPP 63 - Archaeological Evaluation, Excavation and Recording: Where important archaeological remains are thought to be at risk from development, or if the development could impact on a Scheduled Monument or Historic Park and Garden, the developer will be required to arrange for an archaeological evaluation of the site to be undertaken and submitted as part of the planning application.

7.3.6 In addition to the Chelmsford and Braintree Local Plans, the Hatfield Peverel Neighbourhood Development Plan 2015–2033 (Ref. 48), and the Boreham Neighbourhood Plan (Ref. 49) discuss the need to adhere to NPPF and to retain the local character where possible.

7.4 Baseline Conditions

7.4.1 The following paragraphs provide an outline of the baseline. Designated heritage assets are shown on Figure 7-1 and non-designated heritage assets are shown on Figure 7-2.

7.4.2 There are no designated heritage assets within the Site boundary. There are no World Heritage Sites or Registered Battlefields within a 3km Study Area of the Site boundary.

7.4.3 There are 275 listed buildings within the 3km Study Area, 251 listed grade II, 18 listed grade II* and six listed grade I. Those listed buildings closest to the Site boundary include the following assets:

- Ringers Farmhouse (late 13th century, altered in the 16th and 20th centuries; grade I, NHLE 1123406). Approximately 80m from the Site boundary.
- Three Ashes Farmhouse (17th century; grade II, NHLE 1123408). Approximately 20m south-east of the Site.
- Ridley Hall (*c.*1400, altered in the 18th and 20th centuries; NHLE 1337837). On the Site boundary.
- Leylands Farmhouse (17th and 18th century; grade II, NHLE 1337825). On the Site boundary.
- Barn and Stable Range Approximately 15m north of Leylands Farmhouse (17th and 18th century; grade II, NHLE 1308474).
- Scarlett's Farmhouse (17th century; grade II, NHLE 1147570). Approximately 60m to 90m from the Site boundary on three sides and approximately 40m on the fourth side.
- Little Russells (early 18th century; altered 20th century, grade II, NHLE 1337826). Approximately 15m from the Site boundary.
- Sparrows Farmhouse (early 17th century; altered 18th and 20th centuries, grade II, NHLE 1123386). Approximately 35m from the Site boundary.
- Complete Complex of Farm Buildings East of Sparrow's Farmhouse Excluding the Barn, Listed Separately as Item 5/152 (18th and 19th centuries; grade II, NHLE 1123387). Approximately 35m from the Site boundary.
- Barn Approximately 30m east of Sparrows Farmhouse (early 17th century; grade II, NHLE 1308478). Approximately 30m from the Site boundary.
- Rolls Farmhouse (early 17th century; altered in the 19th and 20th centuries; grade II, NHLE 1147574). Approximately 20m from the Site boundary.
- Barn approximately 30m north west of Rolls Farmhouse (18th century; grade II, NHLE 1123388). Approximately 50m from the Site boundary.
- Barn Approximately 5m south east of Ringers Farmhouse (*c.* 1600, extended in the 18th and 19th centuries; grade II, NHLE 1337836). Approximately 30m from the Site boundary.
- Toppinghoe Hall (late 16th century, altered in the 17th and 20th centuries, grade II, NHLE 1147178). Approximately 65m from the Site boundary.
- Part of Former House and Attached Garden Wall, approximately 15m south of Toppinghoe Hall (16th century; grade II, NHLE 1123440). Approximately 60m from the Site boundary.
- Garden Wall (Part Incorporated in a Garage) approximately 30m south west of Toppinghoe Hall (late 16th and 17th century; grade II, NHLE 1308640). Approximately 50m from the Site boundary.
- Little Holts (17th and 18th century; grade II, NHLE 1338424). Approximately 20m from the Site boundary.
- Brent Hall (late 18th century; grade II, NHLE 1122185). Approximately 60m from the Site boundary.

- The Ginn House to the South East of Brent Hall (*c.* 1800; grade II, NHLE 1264128). Approximately 65m from the Site boundary.
- Birds Farmhouse (16th and 17th century; grade II, NHLE 1122184). Approximately 140m from the Site boundary.
- Barn of Noake's Farm (early 14th century, altered in the 16th, 17th and 18th centuries; grade II, NHLE 1123405). Approximately 10m from the Site boundary.
- Lawns Farmhouse (16th and 17th century; grade II, NHLE 1305707). Approximately 110m from the Site boundary.

7.4.4 These listed buildings are mostly farmhouses and farm buildings dating to between the 13th and 19th centuries. They are almost exclusively timber-framed and plastered or weatherboarded and illustrate the agricultural history of the area over a period of seven centuries.

7.4.5 There are three Scheduled Monuments within the 3km Study Area. Great Loyes moated site and fishpond (NHLE 1008979) is approximately 1.7km to the east; Gubbion's Hall moated site (NHLE 1016802) is approximately 2.2km to the north-west; and Hatfield Priory (NHLE 1002150) is approximately 2.25km to the south-east.

7.4.6 There are four registered parks and gardens within the 3km Study Area. Terling Place (NHLE 1000745) is approximately 130m to the east; Hatfield Priory (NHLE 1000206) is approximately 2km to the south-east: New Hall, Boreham (NHLE 1000207) is approximately 1.3km to the south-west; and Boreham House (NHLE 1000354) is approximately 1.2km to the south-west.

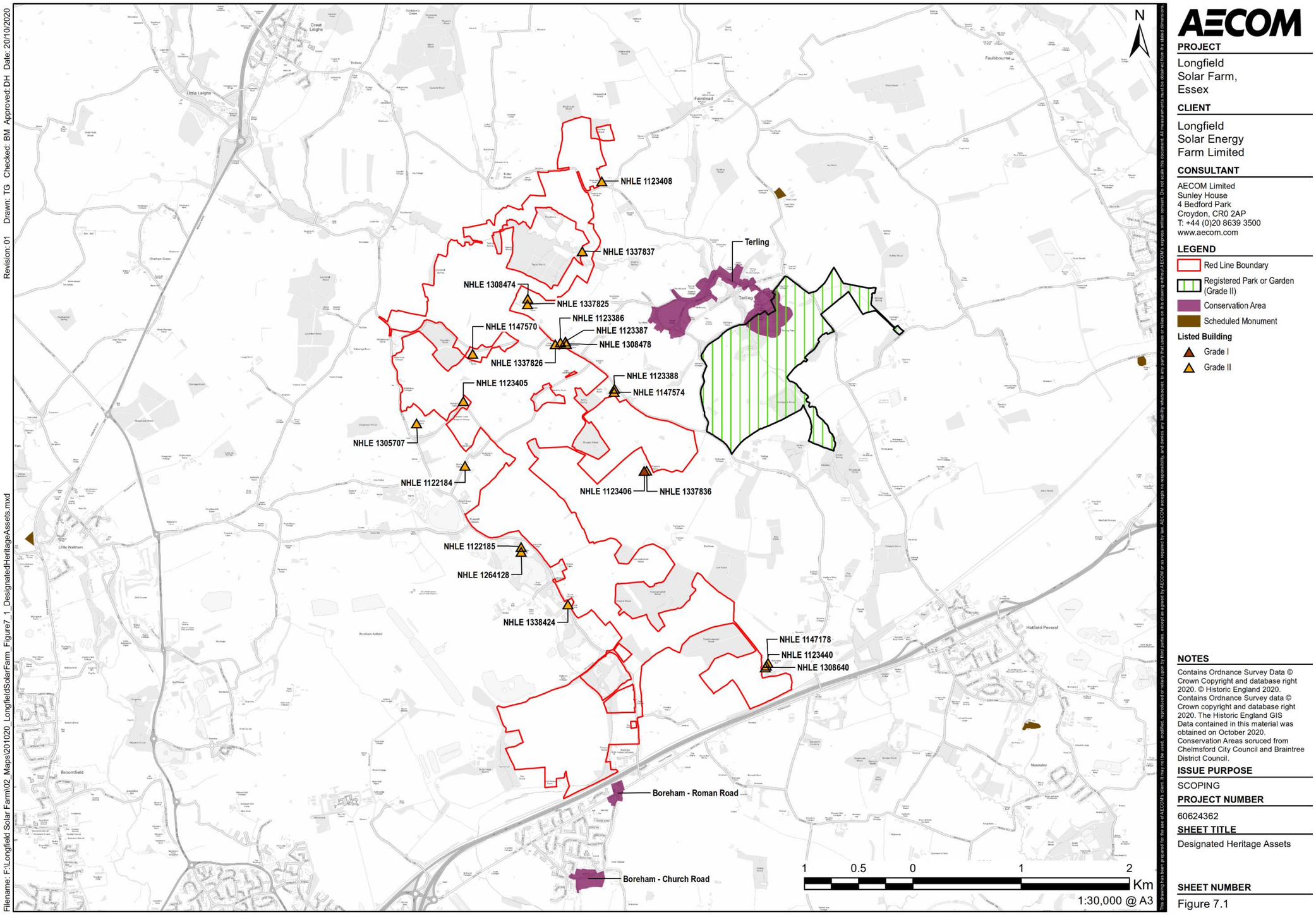
7.4.7 There are two conservation areas within the 3km Study Area. Terling Conservation Area is approximately 650m to the south-east and Boreham Conservation Area is approximately 75m to the south.

7.4.8 Non-designated heritage assets include locally listed buildings, historic parks and gardens, locally designated landmarks and local views as well as local heritage areas and archaeological priority areas as set out by Essex County Council (ECC). There are 117 non-designated archaeological assets within a 1km boundary of the Site.

7.4.9 Within the Site four non-designated archaeological assets have been identified; linear features identified as cropmarks (HER 38533) and linear feature (HER 38537) are recorded in the northern area of the Site, whilst linear features identified as cropmarks (HER 1037295) and a medieval moated site (HER 20611) are recorded towards the western area of the Site.

7.4.10 Several other assets are recorded within the HER data as lying adjacent to the Site and are likely to continue into the limit of the Site. All archaeological assets identified adjacent to the Site are archaeological features (linear ditches, pits etc) that have been recorded through cropmarks observed through aerial photography. These include: HER 38455; HER 38537; HER 38455; HER 28665; HER 28640 and HER 1040715.

Figure 7-1: Designated Heritage Assets



Filename: F:\Longfield Solar Farm\02_Maps\201020_LongfieldSolarFarm_Figure7_1_DesignatedHeritageAssets.mxd
Revision: 01 Drawn: TG Checked: BM Approved:DH Date: 20/10/2020

AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
Sunley House
4 Bedford Park
Croydon, CR0 2AP
T: +44 (0)20 8639 3500
www.aecom.com

LEGEND
- Red Line Boundary
- Registered Park or Garden (Grade II)
- Conservation Area
- Scheduled Monument

Listed Building
- Grade I
- Grade II

NOTES
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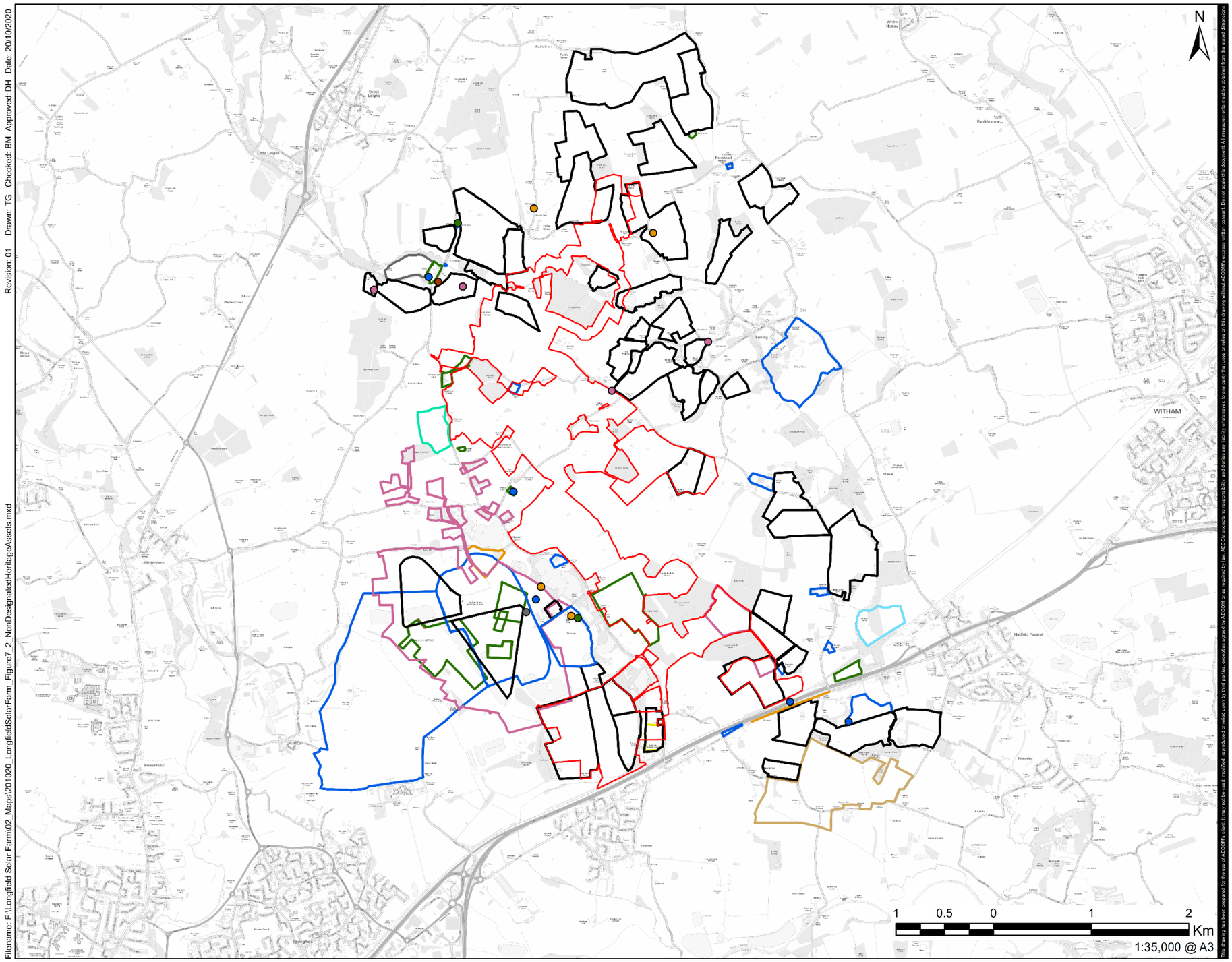
ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
Designated Heritage Assets

SHEET NUMBER
Figure 7.1

Figure 7-2: Non-Designated Heritage Assets



7.5 Potential Effects and Mitigation

7.5.1 Construction and operation of the Scheme have the potential to impact upon the significance and setting of identified heritage assets in the area, notably those assets in close proximity to the Site boundary. A preliminary survey indicates that the Scheme has the potential for significant effects on 12 designated assets including one Registered Park and Garden as a result of impact through changes to their setting.

- Leyland's Farmhouse (grade II, NHLE 1337825) and Barn and Stable Range Approximately 15m north of Leylands Farmhouse (grade II, NHLE 1308474) are bounded by the Site on three sides, the Site boundary being between 50m to 170m distant from the buildings in each case.
- Scarlett's Farmhouse (grade II, NHLE 1147570) lies approximately 40m from the Site boundary.
- Little Russells (grade II, NHLE 1337826) lies approximately 15m from the Site boundary.
- Sparrows Farmhouse (grade II, NHLE 1123386); Complete Complex of Farm Buildings East of Sparrow's Farmhouse Excluding the Barn, Listed Separately as Item 5/152 (grade II, NHLE 1123387); and Barn Approximately 30m east of Sparrows Farmhouse (grade II, NHLE 1308478) are located approximately 35m from the Site boundary across Terling Hall Road.
- Ringers Farmhouse (grade I, NHLE 1123406) and Barn Approximately 5m south east of Ringers Farmhouse (grade II, NHLE 1337836) are located approximately 30m to 80m from the Site boundary. The Site covers the land to the north-east and north-west of the assets.
- Toppinghoe Hall (grade II, NHLE 1147178) is located approximately 65m from the Site boundary. The Site covers land to the west, south-west and south of the asset.
- Barn of Noake's Farm (grade II, NHLE 1123405) is located approximately 10m from the Site boundary. The asset is surrounded by the Site at distances of between 10m and 60m.
- Terling Place (Grade II Registered Park and Garden, NHLE 1000745) is located approximately 130m to the east of the Site boundary. It lies outside the boundary of the Site, but the development may impact upon the setting and view of the garden.

7.5.2 In all cases the Scheme has the potential to change the assets' agricultural setting sufficiently to diminish their significance resulting in a significant effect.

7.5.3 In regard to archaeology, the Scheme requires only a small amount of heavy foundations (for the inverters etc.), with the solar panels themselves requiring less intensive piled foundations limiting the potential for effects on below-ground heritage features. However, a geophysical survey will be undertaken which will provide information about buried archaeological assets and will be used to inform the design.

7.6 Assessment Methodology

7.6.1 The value of a heritage asset (i.e. its heritage significance) is guided by its designated status but is also derived from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary (Ref. 7)). Each identified heritage asset can be assigned a value in accordance with the criteria set out in Table 7-1. Using professional judgement and the results of consultation, heritage assets will be assessed on an individual basis and regional variations and individual qualities are taken into account where applicable.

Table 7-1 Criteria for assessing the value of heritage assets

Asset value	*Description*
High	World Heritage Sites Scheduled Monuments Grade I and II* listed buildings Registered battlefields Grade I and II* registered parks and gardens Conservation areas of demonstrable high value Non-designated heritage assets (archaeological sites, historic buildings, monuments, parks, gardens or landscapes) that can be shown to have demonstrable national or international importance. Well preserved historic landscape character areas, exhibiting considerable coherence, time-depth or other critical factor(s).
Medium	Grade II listed buildings Conservation areas Grade II registered parks and gardens Conservation areas Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable regional importance. Averagely preserved historic landscape character areas, exhibiting reasonable coherence, time-depth or other critical factor(s). Historic townscapes with historic integrity in that the assets that constitute their make-up are clearly legible.
Low	Locally listed buildings Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable local importance. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Historic landscape character areas whose value is limited by poor preservation and/ or poor survival of contextual associations.
Very Low	Assets identified on national or regional databases, but which have no archaeological, architectural, artistic or historic value. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Landscape with no or little significant historical merit.

7.6.2 Having identified the value of the heritage asset, the next stage in the assessment will be to identify the level and degree of impact to an asset arising from the development. Impacts may arise during construction or operation and can be temporary, reversible, or permanent. Impacts can occur to the physical fabric of the asset or affect its setting. The contribution of the setting to the significance of any affected assets will be subject to assessment.

7.6.3 The level and degree of impact (impact rating) will be assigned with reference to a four-point scale as set out in Table 7-2. The assessment of the level and degree of impact will be made in consideration of any scheme design mitigation (embedded mitigation). If no impact is identified, no impact rating will be given and no resulting effect reported.

Table 7-2 Factors influencing the assessment of magnitude of impacts

Magnitude of Impact	*Description of impact*
High	Changes such that the significance of the asset is totally altered or destroyed. Comprehensive change to, or total loss of, elements of setting that would result in harm to the asset and our ability to understand and appreciate its significance.
Medium	Change such that the significance of the asset is significantly altered or modified. Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the significance of the asset.
Low	Changes such that the significance of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the significance of the asset.
Very Low	Changes to the asset that hardly affect significance. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the significance of the asset

7.6.4 An assessment to classify the effect, having taken into consideration any embedded mitigation, is determined using the matrix in Section 5.

7.6.5 Major and moderate effects will be considered significant. Within the NPPF (Ref. 7) and NPS EN-1 (Ref. 5), impacts affecting the value of heritage assets are considered in terms of harm, and there is a requirement to determine whether the level of harm amounts to 'substantial harm' or 'less than substantial harm'. There is no direct correlation between the classification of effect as reported in the ES and the level of harm caused to heritage significance. A major (significant) effect on a heritage asset would, however, more often be the basis by which to determine that the level of harm to the significance of the asset would be substantial. A moderate (significant) effect is unlikely to meet the test of substantial harm and would therefore more often be the basis by which to determine that the level of harm to the significance of the asset would be less than substantial. A minor or negligible (not significant) effect would still amount to a less than substantial harm. However, a neutral effect is classified as no harm.

7.6.6 Pursuant to NPS EN-1 (Ref. 5), any harmful impact to the significance of a designated heritage asset should be weighed against the public benefit of the Scheme, whilst Regulation 3 of the Infrastructure Planning (Decisions) Regulations 2010 (Ref. 39) requires the SoS to have regard to the desirability of preserving a listed building or its setting. In all cases, the determination of the level of harm to the significance of the asset arising from development impact is one of professional judgement.

Sources of information

Desk-based sources

7.6.7 Sources of information that will be consulted include:

- National Heritage List for England (NHLE) database (Ref. 50);
- Essex Historic Environment Record (HER) (Ref. 51) and Historic Landscape Characterisation (HLC) (Ref. 52);
- Various online resources including the British Geological Survey (BGS) Geology of Britain Viewer (Ref. 53) and the local planning portal for the Local Plan and other planning information;

- Published and unpublished literature (including a detailed review of reports for previous fieldwork carried out within the proximity to the Site boundary).
- Existing geotechnical data;
- Available LiDAR and aerial photography;
- Documentary, cartographic and other resources as deposited within the local Archives and Local Studies Library and the National Archives at Kew; and
- Local Planning Authority Plans, Guidance and Lists.

Field walkover

7.6.8 A walkover survey will be undertaken including a survey of known archaeological and built heritage assets within the Site boundary and the immediate vicinity to record their survival, extent, condition, setting and significance.

7.6.9 A site visit will also be undertaken to the study area to assess the setting of assets which could potentially be affected by the Scheme. This visit will establish the key features of the asset's setting, alongside any intervisibility with the Site.

Field Investigation

7.6.10 Field investigation will be undertaken to refine and augment the desk-based data. The scope and specification of the field investigations has been set out in a Written Scheme of Investigation (WSI), which was agreed with the County Advisor at Essex County Council (ECC). As a minimum, it is anticipated that geophysical (magnetometer) survey will be undertaken in areas of interest, and, where required, to be followed by evaluation trenching post-consent.

7.7 Assumptions, Limitations and Uncertainties

7.7.1 It is assumed that there will be access to all required land to undertake both intrusive and non-intrusive archaeological surveys, and that the results of the surveys will be available to incorporate within the ES. In the event that access is not available, professional judgement will be used, based on available research and data, to assess the archaeological potential of the area.

8. Ecology

8.1 Introduction

8.1.1 The ecology chapter in the ES will identify and evaluate relevant ecological features *i.e.* receptors (including nature conservation designations, priority habitats and protected/notable species) within the study area. It will consider the effects that the Scheme is likely to have on their conservation status, inter-relationships, and contribution to local, regional and (if appropriate) national biodiversity.

8.1.2 Avoidance, reduction, mitigation and, if necessary, compensation measures that may be required to enable the Scheme to proceed will be identified, in compliance with relevant nature conservation legislation and planning policy, and that the works have been planned accordingly, to demonstrate that due consideration has been given to ecological features, including recommendations for biodiversity enhancements, where appropriate.

8.1.3 Ecological surveys commenced in January 2020, to gather detailed baseline ecological information. The requirement and extent of these surveys have been informed by desk study data and a Preliminary Ecological Appraisal (PEA), together with AECOM's professional judgement and local knowledge of the geographical area and range of important ecological features.

8.2 Study Area

8.2.1 The study area for ecological surveys includes the land within Site and appropriate buffer zones, is described below.

8.2.2 The boundaries and zones for the ecology study area reflect standard industry good practice and the scoping distances that statutory consultees would typically expect to be considered for identification of features external to the Scheme that could be affected. This is informed by published guidance and professional judgement.

8.2.3 The desk study has included a search for international statutory nature conservation sites (*e.g.* Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites) within 10km of the Site; national statutory nature conservation designations (*e.g.* Sites of Special Scientific Interest (SSSI)) within 5km of the Site (see Figure 8-1); and non-statutory nature conservation designations within 2km (see Figure 8-2). Records of protected and notable species have been identified up to 2km from the Site.

8.2.4 The desk study has enabled determination of an appropriate study area, within which all important ecological features requiring assessment, as well as ecological features that could be directly or indirectly affected by the Scheme, will be subject to field survey. The study area varies according to the spatial characteristics of each species or habitat potentially impacted. A 'zone of potential influence' representing the areas within which effects could occur from the Scheme and associated activities will be identified and detailed in the assessment.

8.3 Planning Policy Context and Guidance

8.3.1 Legislation, planning policy and guidance relating to protected nature conservation sites, significant habitats and protected and, or, notable species pertinent to the Scheme is outlined below.

Legislation

8.3.2 The applicable legislation includes:

- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref. 54);
- Directive 2009/147/EC on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) (Ref. 55) Birds Directive);

- Regulation (EU) 1143/2014 on the introduction and spread of invasive alien species (IAS) (Ref. 56);
- The Wildlife and Countryside Act (WCA) 1981, as amended (Ref. 57);
- The Countryside and Rights of Way Act 2000 (Ref. 58);
- The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 59);
- The Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 60);
- The Protection of Badgers Act 1992 (Ref. 61);
- The Hedgerows Regulations 1997 (Ref. 62);
- Animal Welfare Act 2006 (Ref. 63); and
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 64).

8.3.3 The above legislation will be considered when identifying potential constraints to the Scheme, design options and mitigation. Compliance with the above legislation may require obtaining relevant protected species licences prior to the implementation of the Scheme.

National Planning Policy

8.3.4 *In lieu* of technology specific National Policy Statements (NPS) for solar, the following NPSs which, as far as they are applicable, are considered to be important and relevant to the Scheme:

- Overarching NPS for Energy EN-1 (Ref. 5): Part 5 of this NPS sets out guidance on generic impacts for the Applicant's assessment and decision-making on the application. These generic impacts include Part 5.3, which includes biodiversity, and will be considered in the ES chapter (although the relevant NPSs do not require this).
- NPS EN-5 (Ref. 6): Part 2.7 of EN-5 sets out generic impacts concerning biodiversity. These are most relevant to considerations for birds and overhead lines.

8.3.5 The National Planning Policy Framework (NPPF) (Ref. 7), with particular reference to Sections 170 to 177, states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible.

8.3.6 It specifies the obligations that the Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how this it to be delivered in the planning system. Protected or notable habitats and species can be a material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species, or where impact is unavoidable, compensation may be required.

National Guidance

- Planning Practice Guidance, Natural Environment (Ref. 65) with particular reference to 'Biodiversity, geodiversity and ecosystems'.

Local Planning Policy

8.3.7 Local Planning policies that are relevant to the Scheme are:

- Chelmsford Local Plan (adopted May 2020) (Ref. 8), with particular reference to Policy DM16 -Ecology and Biodiversity; and Policy DM17 – Trees, woodland and landscape features.

- Braintree District Council Local Development Plan (adopted September 2011) (Ref. 13), with particular reference to Policy Cs8 - Natural Environment and Biodiversity.

8.3.8 These policies identify the need for ecological surveys to inform the assessment of how biodiverse an area is and how much of an impact to biodiversity development will have on land within the Site and to areas surrounding the Site. In addition, they require the assessment to consider features of ecological interest and connectivity between habitats. The policies also identify measures to enhance biodiversity and adequately mitigate unavoidable impact on existing biodiversity.

8.3.9 With regards to enhancing and protecting biodiversity and connectivity, the policies require consideration of the impacts on biodiversity by assessing protected species and habitats that could be impacted by the Scheme.

Other Guidance

8.3.10 The UK Biodiversity Action Plan (UKBAP) (Ref. 66) was launched in 1994 and established a framework and criteria for identifying species and habitat types of conservation concern. From this list, action plans for priority habitats and species of conservation concern were published, and have subsequently been succeeded by the UK Post-2010 Biodiversity Framework (July 2012) (Ref. 67). The UK list of priority species and habitats, however, remains an important reference source and has been used to help draw up statutory lists of priority habitats and species in England, Scotland, Wales and Northern Ireland. For the purpose of this assessment, the UKBAP is still used as one of the criteria to assist in assigning national value to an ecological receptor.

8.3.11 The UK Post-2010 Biodiversity Framework (Ref. 67) is relevant within England in the context of Section 40 of the NERC Act 2006 (Ref. 60), meaning that Priority Species and Habitats are material considerations in planning. These habitats and species are identified as those of conservation concern due to their rarity or a declining population trend. This list encompasses 56 habitats and 943 species.

8.3.12 The Essex Biodiversity Action Plan (Ref. 68) sets out action plans for habitats and species in the county.

8.3.13 For further details on any of the above policies and legislation, please refer to the source document.

8.4 Baseline Conditions

8.4.1 The known or predicted ecological baseline conditions are summarised in the following sections.

Statutory Sites

8.4.2 Statutory sites that are designated for nature conservation were identified through a review of the Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref. 69) website within the study area. There are two international designated sites within 10km and four other statutory designated sites within 5km of the Site. These sites are shown on Figure 8-1 and summarised below in Table 8-1.

Table 8-1 Statutorily Designated Sites within 10km (international) and 5km (national) of the Site

Site Name	*Status*	*Description*	*Distance (km) and direction from closest point of the Site*
River Ter	SSSI	The River Ter is a geological site representative of a lowland stream with a distinctive floor regime. It is flashy, draining a low-lying catchment on glacial till, and has a very low base flow discharge but high flood peaks; daily, monthly and annual flow variability are also high. In addition, the site demonstrates characteristic features of a lowland stream including pool-riffle sequences, bank erosion, bedload transport and dimensional adjustments to flooding frequency.	The SSSI boundary is immediately adjacent to the western Site. The River Ter bisects the northern part of the Site.
Blake's Wood & Lingwood Common SSSI	SSSI	Broadleaved, mixed, Yew (*Taxus sp*) woodland and dwarf shrub heath. Species include Hornbeam (*Carpinus betulus*) and Sweet Chestnut (*Castanea sativa*) mature coppice and occasional Oak (*Quercus robur*), with mature Hornbeam and Sweet Chestnut trees, with a transition to dense Hornbeam coppice and Birch (*Betula sp*). There are areas of dwarf shrub heath with a mosaic of woodland, acid grassland and old orchard.	3.6km to the South of the Site.
Woodham Walter Common SSSI	SSSI	Broadleaved, mixed and Yew woodland - Characterised by young and mature sweet chestnut coppice and mature hornbeam coppice. Sycamore (*Acer pseudoplatanus*) becoming invasive. There is also younger sweet chestnut coppice.	4.5km to the South of the Site.
Cuckoo Wood	Local Nature Reserve (LNR)	A 2.5 ha site with amenity grassland, meadows, woods, lakes, ponds, ditches and hedgerows. It has some locally rare species, and is described by Natural England as a very good habitat for fungi, due to a large amount of dead wood	4.6km to the North of the Site.
Essex Estuaries	SAC	This is a large estuarine site in south-east England, and is a typical, undeveloped, coastal plain estuarine system with associated open coast mudflats and sandbanks. Qualifying features comprise Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Estuaries Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonising mud and sand Sandbanks which are slightly covered	8.5km to the South-West of the Site.

Site Name	Status	Description	Distance (km) and direction from closest point of the Site
		by sea water all the time Spartina swards (*Spartinion maritimae*).	
Mid-Essex Coast SPA - Blackwater Estuary (Mid-Essex Coast Phase 4)	SPA, Ramsar	The Mid-Essex Coast SPA comprises an extensive complex of estuaries and intertidal sand and silt flats, including several islands, shingle and shell beaches and extensive areas of saltmarsh. Qualifying features comprise Black-tailed Godwit (*Limosa limosa islandica*), Non-breeding; Dark-bellied Brent Goose (*Branta bernicla bernicla*), Non-breeding; Dunlin (*Calidris alpina alpina*), Non-breeding; Grey Plover (*Pluvialis squatarola*), Non-breeding; Hen Harrier (*Circus cyaneus*), Non-breeding; Little Tern (*Sternula albifrons*), Breeding; Pochard (*Aythya ferina*), Breeding Ringed Plover (*Charadrius hiaticula*), Breeding; Waterbird assemblage, Non-breeding.	8.5km to the South-West of the Site.

Non-statutory Sites

8.4.3 Thirty non-statutory sites designated for nature conservation were identified within 2km of the Site. These sites have been designated as Local Wildlife Sites (LoWS) for their biodiversity value at a local level and are known to have supporting value to a wide variety of protected and ecologically important species and, or habitats. These sites are shown on Figure 8-2 and summarised in Table 8-2.

Table 8-2 Non-Statutory Designated Sites within 2km of the Site

Site Name	Status	Description	Distance and direction from closest point of the Site
Hookley Wood	LoWS	This small ancient wood has a varied canopy and ground flora composition. Whilst Ash (*Fraxinus excelsior)* predominates, there is also much Small-leaved Lime (*Tilia cordata*), Pedunculate Oak (*Quercus robur*), Hazel (*Corylus avellana*), Field Maple (*Acer campestre*) and Hornbeam (*Carpinus betulus*).	Adjacent to Site.(North)
Brickhouse Wood	LoWS	Hornbeam coppice dominates this ancient wood, whilst Ash, Silver Birch (*Betula pendula*) and Field Maple (*Acer campestre*) are also found throughout.	Adjacent to Site. (North)
Sandy Wood	LoWS	This large ancient wood has been somewhat disturbed by storm damage and replanting with both broadleaved and coniferous trees.	Adjacent to Site. (North)

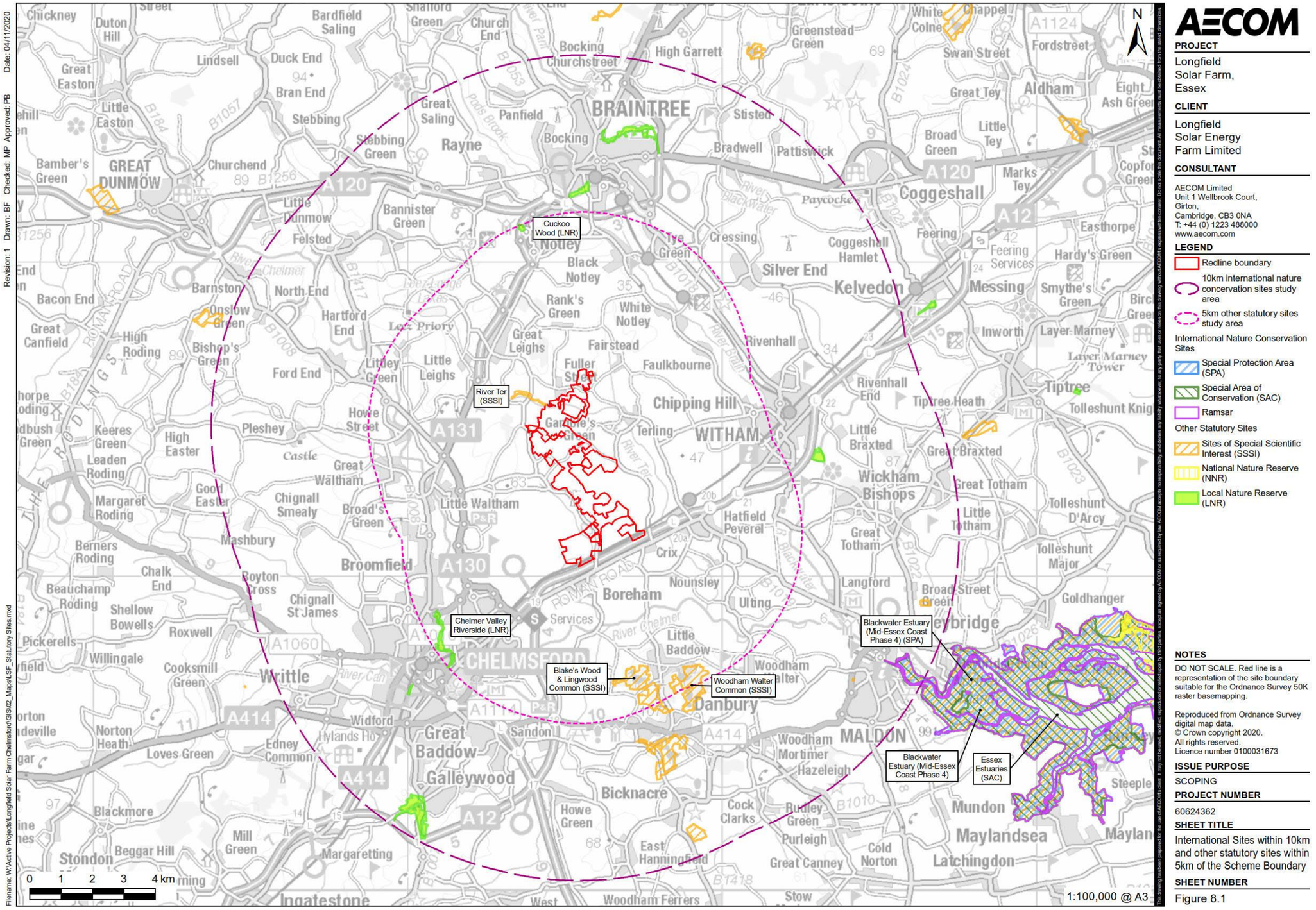
Site Name	*Status*	*Description*	*Distance and direction from closest point of the Site*
Scarlett's Wood	LoWS	The site mainly comprises plantation woodland with Sweet Chestnut (*Castanea sativa*), Wild Cherry (*Prunus avium*) and Sycamore (*Acer pseudoplatanus*), though there is evidence of an old coppice structure to be found particularly in the far south corner where Hornbeam and Small-leaved Lime coppice and Pedunculate Oak standards are found.	Adjacent to Site.(West)
Ringer's Wood	LoWS	Neglected Hornbeam and Small-leaved Lime coppice, Pedunculate Oak and Ash standards are the main canopy components of Ringer's Wood.	Adjacent to Site.(Central)
Toppinghoehall Wood	LoWS	The ancient Toppinghoehall Wood now survives as two separate sections, the north section being contiguous with Porter's Wood straddling the Braintree-Chelmsford boundary. The southern section is an area of mixed woodland - mostly conifer plantation with interspersed Pedunculate Oak, Sweet Chestnut, Beech (*Fagus sylvatica*) and Silver Birch. The ground flora is dominated by Bramble (*Rubus fruticosus agg*) with Bluebell (*Hyacinthoides non-scripta*).	Adjacent to Site.(South-east)
Lost Wood	LoWS	This large ancient wood is being commercially exploited for timber production, with extensive plantations of Beech, Scots Pine (*Pinus sylvestris*), Larch (*Larix sp.)* and Spruce (*Picea sp.*).	Adjacent to Site. (South-east)
Porter's Wood/Toppinghoehall Wood (part of)	LoWS	Porters Wood is an ancient wood contiguous with Toppinghoehall Wood (see description above). Hornbeam coppice and Pedunculate standards characterise this woodland site. Ash is also found in the high canopy, whilst Field Maple is found as a sub-canopy tree. A small area of the woodland on the eastern edge of the site has previously been cleared and replanted with native trees. The ground flora has patches where Bluebell is abundant. Other ancient woodland indicators recorded include Three-nerved Sandwort (*Moehringia trinervia*), Wood Millet (*Milium effusum*), Wood Speedwell (*Veronica montana*) and Climbing Corydalis (*Ceratocapnos claviculata*).	Adjacent to Site. (South-east)

Site Name	*Status*	*Description*	*Distance and direction from closest point of the Site*
Boreham Road Gravel Pits	LoWS	This large site comprises a series of lakes of various sizes surrounded by woodland, with some areas of open, sometimes marshy, ground. The complex geomorphology is the result of former sand and gravel extraction. As a result, the wooded margins to the lakes occupy an undulating terrain which is reflected in varying canopy composition. This includes willows (*Salix sp.*), Ash, Oak and Silver Birch. An area of damp woodland extending to the south of the main area comprises Oak, Ash and Hornbeam, with Meadowsweet (*Filipendula ulmaria)* and Wild Angelica (*Angelica sylvestris*) as ground flora, both of which prefer wetter substrates.	Adjacent to Site (South-west).
Fairsteadhall Wood	LoWS	This wood is one of three remaining fragments of a formerly much larger ancient Galleycable Wood.	Adjacent to Site (North).
Chopping's Wood	LoWS	Chopping's Wood is an ancient wood containing a mix of broadleaved species.	195m West of Site.
Craigments Spring	LoWS	This site comprises a small, possibly ancient woodland fragment and three peripheral ponds.	330m East of Site.
Wade's Spring	LoWS	This small, possibly ancient wood fragment has a canopy of Ash and Pedunculate Oak over neglected Hazel (*Corylus avellana*) and Hornbeam coppice.	310m East of Site.
St Mary the Virgin, Great Leighs	LoWS	The churchyard exhibits a range of grass species including Bent-grasses (*Agrostis sp.),* Red Fescue (*Festuca rubra*) and Meadow grasses (*Poa sp.*).	530m West of Site.
Lyonshall Wood	LoWS	Lyonshall Wood is an ancient wood displaying a wide mix of tree species and stands.	450m West of Site.
Terling Hall Woods	LoWS	These two woods, possibly both ancient, have canopies dominated by Pedunculate Oak, Ash and Hornbeam.	505m East of Site.
Galleycable Wood	LoWS	This ancient woodland remnant is composed of neglected coppice of Small-leaved Lime, Hornbeam and Hazel with Ash and Pedunculate Oak standards.	537m North West of Site.
Long Wood Complex	LoWS	This site comprises Long Wood, Brewhouse Wood, Bishop's Wood and Sandpit Wood.	1.07km South East of Site.

Site Name	*Status*	*Description*	*Distance and direction from closest point of the Site*
Stockley Wood	LoWS	This ancient wood has undergone extensive replanting with Larch (*Larix* sp.) and Scots Pine (*Pinus sylvestris*), with Horse Chestnut (*Aesculus hippocastanum*) also present.	910m West of Site.
Hallhook Row	LoWS	Hallhook Row comprises the northernmost fragment of the formerly more extensive ancient Galleycable Wood.	989m North West of Site.
Mann/Parson's Wood	LoWS	Mann/Parsons Wood contains mature Hornbeam and Small-leaved Lime coppice, with some Silver Birch and Sweet Chestnut.	963m North of Site.
Terling Churchyard and Green	LoWS	The light soil here supports a scarce floral assemblage.	1.21km East of Site.
Titbeech Wood	LoWS	Titbeech wood has been replanted with a variety of broadleaved and coniferous species for commercial timber production	1.35km East of Site.
The Grove	LoWS	Grove Wood is streamside woodland with some substantial earthwork features within its borders and is little changed in outline from that on 19th century Ordnance Survey maps.	Adjacent to Site (West).
Brakey Wood	LoWS	The main canopy structure of this ancient woodland comprises a mix of Hornbeam (*Carpinus betulus*) and Sweet Chestnut (*Castanea sativa*) coppice, with Pedunculate Oak (*Quercus robur*) standards.	1.3km South of Site.
Lowley's Farm Meadow	LoWS	Formerly listed under the name “Osiers”, this site is a small area of horse grazed grassland on the west bank of the River Ter.	1.52km East of Site.
Bulls Lodge Lagoons	LoWS	This series of water management lagoons associated with the adjacent mineral workings epitomises the ecological value of brownfield land, with an intricate mosaic of habitats. Areas of flower-rich, albeit weedy, rough grassland provide good foraging habitat for a wide range of invertebrates and areas of bare ground, including some steep, sandy banks, provides nesting habitat and hunting areas also for invertebrates. Areas of reedbed and scrub are also present.	348m West of Site.
Ivy Wood	LoWS	The main body of Ivy Wood comprises old coppice of Small-leaved Lime, Hornbeam and Hazel, with standards of Field Maple, Pedunculate Oak and Ash.	1.66km East of Site.

Site Name	*Status*	*Description*	*Distance and direction from closest point of the Site*
Hazelton Wood	LoWS	This large ancient wood has a diverse canopy composition, with much Ash, Aspen (*Populus tremula*), Hornbeam, Hazel (*Corylus avellana*) and Pedunculate Oak. Field Maple, Wych Elm (*Ulmus glabra*) and Alder (*Alnus glutinosa*) occur more sparingly.	1.73km North of Site.
Stonage Wood	LoWS	This coppice-with-standards woodland contains several ancient woodland indicators.	1.71km West of Site.

Figure 8-1: Statutory Ecological Sites



Date: 04/11/2020 Checked: MP Approved: PB
Drawn: BF
Revision: 1
Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\LSF_Statutory Sites.mxd

AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
Unit 1 Wellbrook Court,
Girton,
Cambridge, CB3 0NA
T: +44 (0) 1223 488000
www.aecom.com

LEGEND
- Redline boundary
- 10km international nature concervation sites study area
- 5km other statutory sites study area

International Nature Conservation Sites
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar

Other Statutory Sites
- Sites of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- Local Nature Reserve (LNR)

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

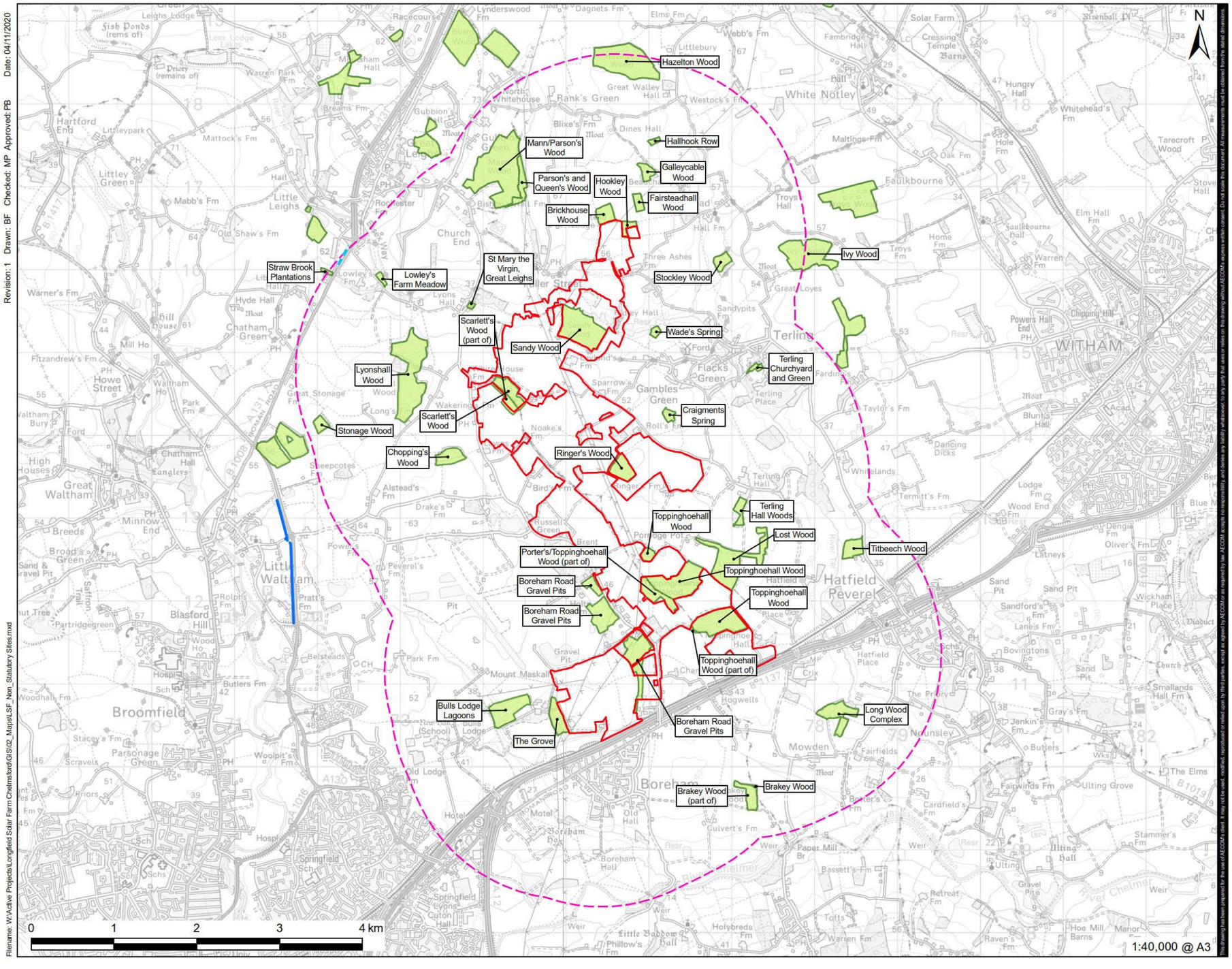
ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
International Sites within 10km and other statutory sites within 5km of the Scheme Boundary

SHEET NUMBER
Figure 8.1

Figure 8-2: Non-Statutory Ecological Sites



Habitats

8.4.4 Priority habitats under Section 41 of the NERC Act 2006 (Ref. 60) present or likely to be present (where determination by further survey is required) on land within the Site include: ancient and/or species rich hedgerows and green lanes, wood pasture and parkland, ancient woodland, rivers, standing water / ponds, arable field margins and lowland mixed deciduous woodland. These habitats have potential to support a range of protected and notable species.

Species

8.4.5 The desk study identified 210 records of protected or notable species of flora and fauna within the study area. These include:

- Five red-data list plant species; Lesser Calamint (Clinopodium calamintha), Common Cudweed (Filago vulgaris), Corn Mint (Mentha arvensis), Hoary Plantain (Plantago media), and one protected under Sch.8 of the WCA 1981; Bluebell (Hyacinthoides non-scripta);
- Two amphibian species; Smooth Newt (Lissotriton vulgaris) and Common Frog (Rana temporaria);
- 23 bird species, including Barn Owl (Tyto alba) and Red Kite (Milvus milvus);
- Two species of notable terrestrial invertebrates: Stag Beetle (Lucanus cervus) and White-Letter Hairstreak butterfly (Satyrium w-album);
- Two reptile species; Common Lizard (Zootoca vivpara), Slow-worm (Anguis fragilis);
- At least four bat species; Brown Long-eared bat (Plecotus auratus), Common Pipistrelle (Pipistrellus pipistrellus), Leisler's bat (Nyctalus leisleri), Serotine (Eptesicus serotinus), and unidentified pipistrelle (Pipistrellus sp.) and long-eared bat (Plecotus sp.);
- Five notable mammal species; Polecat (Mustela putorius), Brown Hare (Lepus europaeus), Badger (Meles meles), European Otter (Lutra lutra) and West European Hedgehog (Erinaceus europaeus); and
- Three invasive species: American Mink (Neovison vison), Chinese muntjac (Muntacus reevesi) and Japanese Knotweed (Reynoutria japonica).

8.4.6 Several of these species are offered full or part protection under the Wildlife and Countryside Act 1981 (Ref. 57). Several species recorded within the study area are also listed on the UK Biodiversity Action Plan (UKBAP) (Ref. 66); on Section 41 of the NERC Act 2006 (Ref. 60) as being of priority conservation concern and listed as a priority habitat or species in Essex. Full details of these species and their legal status and conservation value will be provided in the ES.

Additional Survey Requirements

8.4.7 The PEA, which consists of a Phase 1 Habitat Survey (following the established JNCC methodology (Ref. 70) and Protected Species Scoping Survey, in combination with the desk study, identified the requirements for further surveys to support the ecology, biodiversity and nature conservation impact assessment.

8.4.8 The further surveys that have either been undertaken to date, or will be undertaken, include the following:

- Botanical surveys comprising arable flora, grassland survey and invasive non-native plant species;
- Aquatic species surveys including macrophytes, macroinvertebrates, white clawed crayfish (Austropotamobius pallipes) and any invasive non-native species;
- Reptile presence/ absence surveys;

- Habitat Suitability Index (HSI) assessment with regards to Great Crested Newt within 500m of the proposed Site, (where accessible) and presence/absence surveys at selected ponds identified;
- Great Crested Newt population size surveys (where applicable);
- Breeding bird surveys, including targeted surveys for species listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (Ref. 57);
- Non-breeding (Wintering) bird surveys;
- Preliminary bat roost feature assessment of trees/woodland, buildings and structures;
- Bat activity surveys;
- Badger surveys; and
- Riparian mammal surveys (Otter and Water Vole).

8.4.9 Additional surveys may be required following consultation and development of the Scheme. This may include detailed bat roost presence/absence surveys, hedgerow survey and terrestrial invertebrate survey where habitat features cannot be avoided.

8.4.10 The surveys undertaken will inform any European Protected Species (EPS) mitigation licences (where required) prepared in draft for advisory comment from Natural England, all of which will form part of any DCO application for the Scheme.

8.4.11 A habitat conditions assessment will also be carried out on land within the Site in order to perform a biodiversity net-gain assessment. The baseline information gathered from this, and other surveys, will be used to develop an appropriate strategy in line with the policies identified in Section 8.3 above.

8.4.12 All ecological surveys will be undertaken within the appropriate seasons and will follow best-practice methodologies. Due to the variability of species, the distance at which the Scheme could affect each species can be different and therefore the study areas used for specific ecological surveys will differ dependent on the species and these will be assessed and updated using appropriate guidelines. The study areas that will be used can be found in Table 8-3.

Table 8-3 Study Areas and methods to be used during further ecological surveys

Receptor	*Study Area and Survey methodology reference*
Botanical surveys including invasive non-native plant species.	Within and immediately adjacent to Site Rodwell (1992) (Ref. 71); Stroh *et. al.* (2014) (Ref. 72); Mcleod *et. al.* (Ref. 73); Byfield (2005) (Ref. 74); Buglife (2013) (Ref. 75).
Aquatic species surveys including macrophytes, macroinvertebrates and white clawed crayfish and any invasive non-native species	River Ter and ponds within and immediately adjacent to the Site. Environment Agency, *The River Habitat Survey in Britain and Ireland Field Survey Guidance Manual*. Environment Agency; Peterborough, 2003 (Ref. 76). European Committee for Standardization, BS EN 14184: 2014 Water quality. Guidance for the surveying of aquatic macrophytes in running waters, 2014 (Ref. 77). WFD-UKTAG, River Assessment Method. Macrophytes and Phytobenthos. Macrophytes (River LEAFPACS2), 2014 (Ref. 78). Water Framework Directive – United Kingdom Technical Advisory Group (WFD-UKTAG). River Assessment Method. Benthic Invertebrate Fauna. Invertebrates (General Degradation): Whalley, Hawkes, Paisley & Trigg (WHPT) metric in River Invertebrate Classification Tool (RICT). 2014 (Ref. 79). WFD-UKTAG. Lake Assessment Methods: Benthic Invertebrate Fauna, Chironomid Pupal Exuviae Technique (CPET), 2008 (Ref. 79). CIEEM 2018 Guidelines for Ecological Impact Assessment in the UK and Ireland (Ref. 80). National Fish Populations Database (Ref. 81). Environment Agency, Catchment Data Explorer (Ref. 82).
Reptile presence/ absence surveys	Within and immediately adjacent to Site Professional judgement, based on the habitat and Froglife's Advice Sheet 10 for Reptile Surveys (Ref. 83).
Habitat Suitability Index (HSI) assessment and Great Crested Newt presence/absence surveys and Great Crested Newt population size surveys (where applicable)	Up to 500m from the Site (where accessible) Oldham *et al.,* (2001) (Ref. 84). Biggs *et al.*, (2014) (Ref. 85), English Nature (2001) (Ref. 86).
Breeding bird surveys, including targeted surveys for species listed on Schedule 1 of the Wildlife and Countryside Act (WCA), 1981	100 m from the Site RSPB Information Note (Ref. 87). Bibby *et al.* (2000) (Ref. 88) and Gilbert *et al.* (1998) (Ref. 89). Survey area will be extended out and species—specific methods used, as appropriate, for any species listed on Schedule 1 of the WCA, 1981.
Non-breeding (Wintering) bird surveys	100 m from the Site

Receptor	*Study Area and Survey methodology reference*
	Bibby *et al.* (2000) (Ref. 88) and Gilbert *et al.* (1998) (Ref. 89).
Preliminary bat roost feature assessment of trees/buildings and structures Bat activity surveys	Up to 50 m from the footprint of the Scheme Collins (2016) (Ref. 90).
Badger surveys	50 m from the Site Harris *et al.*, (1989) (Ref. 91); Cresswell *et.al.* (1990) (Ref. 92); and Scottish Badgers, (2018) (Ref. 93).
Riparian mammal surveys (Otter and Water Vole)	River Ter, up to 200 m either side of the Site. Ponds within and immediately adjacent to the Site. Dean, M. *et. al* (2016) (Ref. 94); Strachan *et. al* (2011) (Ref. 95). Chanin, 2003 (Ref. 96).

8.5 Value of ecological resources and receptors

8.5.1 To support focussed ecological impact assessment, there is a need to determine the scale at which the relevant ecological features identified through the desk studies and field surveys undertaken for the Scheme are of value. A hierarchical geographical approach will be used to assign nature conservation resource importance (or value) based upon those within the Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management (CIEEM) (Ref. 80) (hereafter referred to as the CIEEM guidelines) and professional judgement.

8.5.2 It is not necessary in the assessment to address all habitats and species with potential to occur in the study area and instead the focus should be on those that are 'relevant' i.e. ecological features considered important and potentially affected by the proposed Scheme. In its guidance, CIEEM makes clear that there is no need to "*carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*". This does not mean that efforts should not be made to safeguard wider biodiversity, and requirements for this will be considered. National policy documents emphasise the need to achieve net gains for nature and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution.

8.5.3 The frames of reference used for the assessment, based on Section 4.7 in the CIEEM guidelines will be:

- International (generally this is within a European context, reflecting the general availability of good data to allow cross-comparison);
- National (Great Britain, but considering the potential for certain ecological features to be more notable (of higher value) in England, with context relative to Great Britain as a whole);
- Regional (East of England);
- County (Essex);
- District (Chelmsford); and
- Local (has value at the 'Site' level).

8.5.4 Species populations are valued on the basis of their size, recognised status (such as through published lists of species of conservation concern and designation of Biodiversity Action Plan (BAP) status), and legal protection.

8.5.5 In assigning values to species populations, it is important to consider the status of the species in terms of any legal protection. However, it is also important to consider other factors such as its distribution, rarity, population trends and the size of the population which would be affected. For example, whilst the great crested newt is protected under European law, and therefore conservation of the species is of significance at an international level, this does not mean that every population of great crested newt is internationally important. It is important to consider the particular population in its context. Therefore, in assigning values to species, the geographic scale at which they are important will be considered. The assessments of value rely on the professional opinion and judgment of experienced ecologists.

8.5.6 Plant communities will be assessed both in terms of their intrinsic value, and as habitat for protected species whose habitat is also specifically protected, and for species of nature conservation concern which are particularly associated with them.

8.5.7 Due regard will also be paid to the legal protection afforded to species during the development of mitigation and compensation measures to be implemented as part of the Scheme. For European protected species, there is a requirement that the Scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

8.5.8 Assessing the value of features requires consideration of both existing and future predicted baseline conditions. Therefore, the description and valuation of ecological features will take account of any likely changes, such as trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other schemes or land use changes.

8.6 Potential Effects and Mitigation

8.6.1 Biodiversity Net Gain ('BNG') is defined as "development that leaves biodiversity in a better state than before "and involves an approach where developers work with local governments, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation. BNG is achieved when measurable improvements for biodiversity are delivered in association with a development, through the creation of new habitats or enhancement and management of existing habitats either on-site, off-site or through a combination of on-site and off-site measures.

8.6.2 The mitigation hierarchy is fundamental to biodiversity net gain. There are four sequential steps that must be taken throughout the lifecycle of a project in order to achieve BNG:

- Avoidance - actions taken to avoid causing impacts to the environment prior to beginning development (for example, moving the development to a different location).
- Minimisation - measures taken to reduce the duration, intensity, extent and/or likelihood of the unavoidable environmental impacts caused by development (for example, adapting the development design to minimise impacts).
- Restoration or rehabilitation - actions taken to repair environmental degradation or damage following unavoidable impacts caused by development.
- Offsets - measures taken to compensate for any adverse environmental impacts caused by development which cannot be avoided, minimised and/or restored (e.g. including habitat creation to offset losses).

National Policy Statement

8.6.3 Currently, the main policy driver for assessing Nationally Significant Infrastructure Projects is the National Policy Statements (NPS). As required by the NPS EN-1, any likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats and other species identified as being of

principal importance for the conservation of biodiversity should be assessed. Appropriate application of the mitigation hierarchy including consideration of reasonable alternatives should be applied.

8.6.4 Collectively, the NPS make no reference to net gain in biodiversity being a requirement of the determination process and use of biodiversity offsetting to devise compensation proposals is optional. However, the current emerging NPPF guidance in relation to BNG may be an important and relevant matter to the determination of an application for NSIPs.

Local Planning Policy and Guidance

8.6.5 Essex County Council has published a Essex Green Infrastructure Strategy[1]that refers to the national policies and BNG.

8.6.6 Extracts from relevant local policies related to BNG are included in the table below:

Document	*Planning Policy*	*Purpose*
Chelmsford Local Plan (adopted May 2020)	POLICY DM16 – ECOLOGY AND BIODIVERSITY	Conserve and enhance the network of habitats, species and sites (both statutory and non-statutory, including priority habitats and species) of international, national and local importance commensurate with their status and give appropriate weight to their importance; and avoid negative impacts on biodiversity and geodiversity, mitigate unavoidable impacts and as a last resort compensate for residual impacts; and deliver a net gain in biodiversity where possible, by creating, restoring and enhancing habitats, and enhancing them for the benefit of species.
Braintree District Council Local Development Plan	Policy CS8 - Natural Environment and Biodiversity	All development proposals will take account of the potential impacts of climate change and ensure the protection and enhancement of the natural environment, habitats and biodiversity and geo-diversity of the District. This will include where appropriate protection from:- • Air, noise, light and other types of pollution • Excessive use of water and other resources The natural environment of the District, and in particular designated sites of national importance and locally designated sites, which are identified on the Proposals Map, will be protected from adverse effects. Criteria based policies will be set out in the Development Management Document, against which proposals for any development within, or affecting such sites, will be considered. The

		restoration and enhancement of the natural environment will be encouraged through a variety of measures such as; • Maximising opportunities for creation of new green infrastructure and networks in sites allocated for development • Creating green networks to link urban areas to the countryside • Creating and enhancing the biodiversity value of wildlife corridors • Designating and protecting local nature reserves and local wildlife sites • Conservation and enhancement of SSSIs in accordance with the Wildlife and Countryside Act • Development will promote wildlife enhancements which will Environment contribute to the habitat and species restoration targets set out in the Essex Biodiversity Action Plan.

8.6.7 Further assessment will be carried out as the design of the Scheme progresses, and we will undertake:

- A review of local plans and policies
- A retrospective Habitat Condition Assessment following Field survey
- Phase 1 map creation
- Biodiversity Net Gain Metric Calculation
- Technical report

Construction and Decommissioning

8.6.8 There is the potential for the following construction and decommissioning impacts on important ecological features:

- Habitat loss: direct loss, fragmentation and severance of terrestrial habitats through land take, with potential to affect various species;
- Direct disturbance of, and harm to, animals, including the displacement of species from the proximity of the Scheme;
- Spread of invasive species either from or onto the land within the Site; and
- Indirect impacts, such as watercourse pollution, sedimentation and dust deposition, lighting of sensitive habitats and increased human disturbance.

Operation

8.6.9 The operation of the Scheme may result in significant effects on important ecological features and these effects may include:

- Disturbance or displacement of species during operational maintenance;
- Lighting of sensitive habitats (such as through security lighting); and

- Management and maintenance of on-site and adjacent habitats.

8.6.10 Whilst it is considered unlikely, the potential for the Solar panels (during operation) to attract congregations of birds, which may lead to displacement of populations and increase the risk of mortality (through collision), will also be considered.

8.6.11 These effects are concerned with the operation of the Scheme.

8.7 Assessment Methodology

8.7.1 The approach used for the ecological impact assessment (EcIA) will be undertaken in accordance with best practice guidance as published in the CIEEM Guidelines (Ref. 80) and summarised below.

8.7.2 The principal steps involved in the EcIA can be summarised as follows:

- Ecological features that are both present and might be affected by the Scheme are identified (both those likely to be present at the time works begin and those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions;
- The importance of the identified ecological features evaluated, placing their relative biodiversity and nature conservation value into geographic context. This is then used to define the relevant ecological features that need to be considered further within the assessment process;
- The changes or perturbations predicted to result as a consequence of the Scheme (i.e. the potential impacts), and which could potentially affect relevant ecological features are identified and their nature described. Established good-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account;
- The likely effects (beneficial or adverse) on relevant ecological features are then assessed, and where possible quantified;
- Measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines). If necessary, measures to compensate for effects on features of nature conservation importance are also included;
- Any residual effects of the Scheme are reported; and
- Scope for ecological enhancement is considered.

8.7.3 The ecological surveys to be conducted in 2020 to 2021 will confirm or identify the presence or probable absence of any species and habitats.

8.7.4 The ‘zone of influence’ for the Scheme is the area over which ecological features may be affected by changes as a result of the proposed Scheme and associated activities. The zone of influence will be different for each ecological receptor identified, dependent on each receptor’s sensitivity to change and will be determined using the maximum extents for study areas of each identified receptor. Where necessary, these will be appropriately revised as the Scheme evolves.

8.7.5 The ES will include consideration of options to avoid, reduce, mitigate, or, if necessary, compensate for any identified potential significant adverse effects to the point where any residual effects are not considered to be significant. In addition, opportunities will be sought for the enhancement of biodiversity at both on and off-site locations as associated with the Scheme.

8.7.6 In line with Section 1.2. in the CIEEM guidelines (Ref. 80), the terminology used within the EcIA will draw a clear distinction between the terms ‘impact’ and ‘effect’. For the purposes of this EcIA these terms are defined as follows:

- **Impact** – actions resulting in changes to an ecological feature. For example, construction activities of a development removing a hedgerow; and
- **Effect** – outcome resulting from impact acting upon the conservation status or structure and function of an ecological feature. For example, the effects on a population of bats as a result of the loss of a bat roost.

8.7.7 When describing potential impacts (and where relevant the resultant effects) consideration will be given to the following characteristics likely to influence this (Sections 5.11-5.18 in the CIEEM guidelines):

- **Positive / Negative** – i.e. is the change likely to be in accordance with nature conservation objectives and policy:
  - **Positive** – a change that improves the quality of the environment, or halts or slows an existing decline in quality e.g. increasing the extent of a habitat of conservation value; or
  - **Negative** – a change that reduces the quality of the environment, e.g. destruction of habitat.
- **Extent** – the spatial or geographical area or distance over which the impact/effect occurs;
- **Magnitude** – the 'size', 'amount' or 'intensity' and 'volume' of an impact - this is described on a quantitative basis where possible;
- **Duration** – the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. Consideration has been given to how this duration relates to relevant ecological characteristics such as a species' lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact;
- **Timing and frequency** – *i.e.* consideration of the point at which the impact occurs in relation to critical life-stages or seasons; and
- **Reversibility** – *i.e.* is the impact temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable. A permanent effect is one from which recovery is either not possible, or cannot be achieved within a reasonable timescale (in the context of the feature being assessed).

8.7.8 Cumulative effects will be assessed and are those occurring from several sources (also known as inter-relationships) and/or the combined effects of other developments in the area.

8.7.9 For each ecological feature only those characteristics relevant to understanding the ecological effect and determining the significance will be described. The determination of the significance of effects has been made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

- **Not significant** - no effect on structure and function, or conservation status; and
- **Significant** - structure and function, or conservation status is affected.

8.7.10 Sections 5.24 to 5.28 in the CIEEM guidance (Ref. 80) states that effects should be determined as being significant when:

"an effect either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project".

"In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)".

8.7.11 Using this information and judgment, it is determined whether the effects will be significant or not on the integrity (of site / ecosystems) or conservation status (of habitats / species) of each ecological feature and the impact significance is determined at the appropriate geographical scale.

8.7.12 There are a number of approaches for determining the significance of effects on ecological features. Whilst the CIEEM guidelines recommend the avoidance of the use of the matrix approach for categorisation (major, moderate and minor), in order to provide consistency of terminology, the CIEEM assessment will be translated into the classification of effects scale, as outlined in Table 8-4.

Table 8-4 Relating CIEEM assessment terms to those used in other EIA chapters

Effect classification terminology used in other EIA chapters	*Equivalent CIEEM assessment*
Major beneficial (positive)	1) Permanent addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Moderate beneficial (positive)	1) Temporary addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor beneficial (positive)	1) Permanent addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible beneficial (positive)	1) Temporary addition of, improvement to, or restoration of a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible adverse (negative)	1) Temporary/reversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Minor adverse (negative)	1) Permanent/irreversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Moderate adverse (negative)	1) Temporary/reversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.

Effect classification terminology used in other EIA chapters	*Equivalent CIEEM assessment*
Major adverse (negative)	1) Permanent/irreversible damage to a biodiversity resource; and 2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.

Assumptions, Limitations and Uncertainties

8.7.13 The following assumptions and limitations have been noted during the scoping:

- Baseline ecological surveys commenced in January 2020 and will continue through 2020 and 2021 to determine the baseline ecological conditions. The surveys may highlight new important ecological features with potential to be significantly affected which have not been identified (or considered not to be significant) at this stage of the assessment.
- A precautionary approach has been taken at this stage which assumes that all habitats within the footprint of the solar PV modules and associated solar and battery storage infrastructure will be permanently lost during construction.
- It is currently assumed that should there be the requirement for the potential mitigation of ecological features and recommended enhancement measures, suitable on-site areas will be made available to deliver the required outcomes.
- Arboricultural Surveys may be undertaken to inform the detailed design stage of the project.

9. Flood Risk, Drainage and Surface Water

9.1 Introduction

9.1.1 This chapter relates to the potential effects of the Scheme on surface water bodies (e.g. rivers, streams, ditches, canals, lakes and ponds, etc.) including water quality and hydromorphology, flood risk and drainage. This chapter also considers potential effects on hydrogeology, with all land quality and ground condition issues discussed in Chapter 15. The potential for likely significant effects of the Scheme on the water environment, the scope for mitigation, and how it is proposed to assess the significance of these potential effects, is described.

9.2 Study Area

9.2.1 For the purposes of this assessment, a general study area of approximately 1km around the Site has been considered in order to identify water bodies that are hydrologically connected to the Site and potential works associated with the Scheme that could cause direct impacts.

9.2.2 Given that watercourses flow and water quality and flood risk impacts may propagate downstream, where relevant the assessment will also consider a wider study area to as far downstream as a potential impact may influence the quality or quantity of the water body (which in this case is typically for a few kilometres). Professional judgement has been applied to identify the extent to which such features are considered.

9.3 Planning Policy Context and Guidance

9.3.1 A summary of the legislation, planning policy and guidance relevant to the assessment of impacts of the Scheme on the water environment is presented in this section.

Legislation

9.3.2 The main legislation relevant to the Scheme includes the following (please note that details of European Directives are not included, just the national legislation that transposes them):

- Water Act 2014 (Ref. 97);
- Floods and Water Management Act 2010 (Ref. 98);
- Environment Act 1995 (Ref. 19);
- Environment Protection Act 1990 (Ref. 99);
- Land Drainage Act 1991 (as amended) (Ref. 100);
- Water Resources Act 1991 (as amended) (Ref. 101);
- Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref. 102);
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 64);
- Environmental Damage (Prevention and Remediation) Regulations 2017 (Ref. 103);
- Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018) (Ref. 104);
- Groundwater (England and Wales) Regulations 2009 (Ref. 105);
- Eels (England and Wales) Regulation 2009 (Ref. 106);
- Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref. 107).
- The Water Resources Act (Amendment) (England and Wales) Regulations 2009 (Ref. 108);

- The Flood Risk (England and Wales) Regulations 2009 (Ref. 109);
- The Control of Substances Hazardous to Human Health (COSHH) Regulations 2002 (Ref. 110);
- The Anti-Pollution Works Regulations 1999 (Ref. 111); and
- The Water Framework Directive (Standards and Classification) Directions 2015 (Ref. 112).

National Planning Policy

National Planning Policy Framework

9.3.3 The following planning policies from relevant National Policy Statements (NPS) have been taken into account as part of identifying the assessment methodology, receptor selection/sensitivity, potential significant environmental effects, and mitigation:

- NPS EN-1 (Ref. 5) with particular reference to section 5.15 (water quality and resources) paragraphs 5.15.1 to 5.15.10 regarding what an ES should describe which includes: the existing water quality, the existing water resources, and the physical characteristics of the water environment. Additionally, paragraph 4.8.6 states that applicants for new energy infrastructure must take into account the potential impacts of climate change, including the most up to date UK climate change projections, and adopt appropriate mitigation or adaption measures for the lifetime of the propose infrastructure. Paragraphs 5.15.4 – 7 outline the decision making process with regard to water pollution, and more weight is attributed to any impacts that would have an adverse effect on the achievement of environmental objectives under the Water Framework Directive (WFD). Within paragraphs 5.15.8-10 it is stated that the possible requirement for mitigation measures over and above those included within the application should be considered by the examining authority;
- NPS EN-5 (Ref. 6) sets out that applications demonstrate the extent of vulnerability of the proposed development, and how resilient it is, to flooding. This will be provided within an FRA at the impact assessment stage. NPS highlights the importance of considering potential impacts on water quality, water resources and flood risk, taking into account climate change in accordance with EN-1;
- National Planning Policy Framework (NPPF) 2019 (Ref. 7) paragraphs 155 to 165, states that for developments over 1 ha an FRA is required; and paragraph 170 ‘conserving and enhancing the natural environment’ includes a statement that development will be prevented that produces unacceptable levels of water pollution; and
- The National Planning Practice Guidance (Ref. 113) provides planning guidance on a range of topics including flood risk. Planning Policy Guidance (March 2014) for Flood Risk and Coastal Change provides additional guidance in the implementation of NPPF.

9.3.4 Consideration will also be given to:

- The UK Government’s 25 Year Environment Plan (Ref. 114);
- The UK Government’s Future Water Strategy (2011) (Ref. 115);
- The Non-statutory technical standards for Sustainable Drainage Systems (SuDS) (Ref. 116);
- The Building Regulations 2010 Approved Document H Drainage and Waste Disposal (Ref. 117); and
- The BRE Digest 365: Soakaway Design and Sewers for Adoption (7th Edition, 2012) (Ref. 17).

Regional Guidance

9.3.5 At a regional level, water management is coordinated through 10 River Basin Management Plans (RBMPs). River Basin Management Plans (RBMPs) are prepared by the Environment Agency for six-year cycles and set out how organisations, stakeholders and communities will work together to improve the water environment. The most recent plans were published in 2015 (the second cycle) and will remain in place until after 2021. The waterbodies within the study area fall under the Essex Combined management catchment within the Anglian RBMP (Ref. 118).

Local Planning Policy

Essex County Council SuDS Guidance

9.3.6 Essex County Council is the Lead Local Flood Authority (LLFA) covering the Scheme area, and in February 2020 they produced a Supplementary Planning Guidance (SPG) document 'Sustainable Drainage Systems: Design Guide' (Ref. 119). This guide is primarily intended for use by developers, designers and consultants who are seeking guidance on the LLFAs standards for the design of sustainable surface water drainage in Essex.

9.3.7 It provides guidance on the planning, design and delivery of attractive and high-quality SuDS schemes which should offer multiple benefits to the environment. Essex County Council will refer to the Guide when consulted on any application relating to sustainable drainage. The SuDS philosophy and concepts are based upon and derived from the Construction Industry Research and Information Association (CIRIA) SuDS Manual C753 (Ref. 120), and the Design Guide seeks to complement SuDS Manual, and both should be incorporated into any SuDS proposals for the development.

Chelmsford Local Plan 2013-2036

9.3.8 The western extent of the Scheme in a corridor adjacent to Waltham Road / Boreham Road falls within the Chelmsford City Council area. The Chelmsford Local Plan 2013-2036 (Ref. 8) includes the follow planning policies which are relevant to flood risk, drainage and surface water:

- S2: Addressing Climate change and Flood Risk;
- DM18: Flooding/SuDS; and
- DM19: Renewable and Low Carbon energy.

9.3.9 All major developments will be required to incorporate water management measures to reduce surface water runoff and ensure that is does not increase flood risk elsewhere. The principal method to do so should be the use of SuDS. Surface water runoff should be managed to ensure that there is no increase in surface water flow rate run off.

9.3.10 As well as providing water management measures, where possible, SuDS systems should be multifunctional to deliver benefits for the natural environment.

9.3.11 All developments should promote efficient use of natural resources such as water, minimising the impact on flooding and providing opportunities for green infrastructure and new habitat creation.

9.3.12 Surface water connections to the public sewage network should only be made where it can be demonstrated there are no feasible alternatives.

9.3.13 Consent will only be granted for renewable or low carbon energy developments if they can demonstrate no adverse effect on the natural environment, including designated sites.

Chelmsford Surface Water Management Plan (SWMP)

9.3.14 The Chelmsford SWMP (Ref. 121) outlines the preferred surface water management plan for the Chelmsford City Council area. Surface water flooding includes that from sewers, drains, groundwater, and runoff from land, small watercourses and ditches which occurs after heavy rainfall. The report outlines Critical Drainage Areas (CDAs), assesses options and develops a

long term action plan to manage surface water. The Scheme area does not fall within a CDA associated with the Chelmsford SWMP.

Braintree District Council Publication Draft Local Plan (2017)

9.3.15 The emerging Braintree Local Plan (Ref. 13) includes the following policies that are relevant flood risk, drainage and surface water:

- SP1: Presumption in Favour of Sustainable Development;
- LPP 56: Natural Environment;
- LPP 61: Protecting and Enhancing Natural Resources, Minimising Pollution and Safeguarding from Hazards;
- LPP 63: Renewable Energy Schemes;
- LPP 65: Surface Water Management Plan;
- LPP 66: Sustainable Urban Drainage Systems; and
- LPP 67: Runoff Rates.

9.3.16 Sustainable development in North Essex will demonstrably contribute to the strategic and local vision and objectives and will accord with the policies in the Local Plan (and, where relevant, with polices in neighbourhood plans).

9.3.17 Development proposals must take all available measures to ensure the protection, and where possible, the enhancement of the natural environment, habitats, biodiversity and geodiversity of the District. This will include, where appropriate, protection from all types of pollution and the excessive use of water and other resources. Development proposals should take account of the potential impacts of climate change in their design and propose measures to reduce greenhouse gas emissions where necessary.

9.3.18 Proposals for all new developments, including renewable energy schemes, should minimise all emissions and ensure no deterioration to water quality and developments will not be permitted where, individually or cumulatively, there are likely to be unacceptable impacts arising from the development on surface and groundwater quality. In addition, developments must not cause harm to or loss to the natural environment, and not result in pollution to air, land or water.

9.3.19 Developments will need to be in compliance with, and contribute positively towards, delivering the aims and objectives of the Braintree and Witham Surface Water Management Plan.

9.3.20 All new major developments will incorporate SuDS systems appropriate to the nature of the site. Such systems shall provide optimum water run-off rates and volumes taking into account relevant local or national standards and the impact of the Water Framework Directive (WFD) on flood risk issues. SuDS design quality will be expected to conform with standards encompassed in the relevant Building Research Establishment (BRE), CIRIA standards and Essex County Council (ECC) SuDS Design Guide (Ref. 119) to the satisfaction of the LLFA.

9.3.21 Maximum use should be made of low land take drainage measures such as rainwater recycling, green roofs, permeable surfaces and water butts. Appropriate pollution control measures should be incorporated where necessary.

9.3.22 Surface water should be managed as close to its source as possible and on the surface where practicable to do so.

9.3.23 Opportunities shall be taken to integrate sustainable drainage within the development, creating amenity and enhancing biodiversity.

9.3.24 Only where there is a significant risk of pollution to the water environment, inappropriate soil conditions and/or engineering difficulties, should alternative methods of drainage be considered. It will be necessary to demonstrate why it is not achievable. If alternative methods

are to be considered, adequate assessment and justification should be provided, and consideration should still be given to pre and post runoff rates.

9.3.25 Developments on previously developed land of more than one dwelling or commercial building or development of a site greater than 0.1 hectare are required to reduce post development runoff rates for events up to and including the 1 in 100 year return period event, with an allowance for climate change, to that of a greenfield condition. A minimum requirement is for a 50% betterment.

Braintree and Witham SWMP

9.3.26 The Braintree and Witham SWMP was published in 2016 (Ref. 122). The aim of a SWMP is to understand and investigate complex, high risk surface water flooding problems in urbanised areas. The report outlines the predicted risk and preferred surface water management strategy for the settlements. However, this Scheme does not fall into the urban area of Witham that is considered with the SWMP.

9.4 Baseline Conditions

9.4.1 The water environment baseline conditions have been determined by a desk study of available information, and various other online data sources including:

- Online Ordnance Survey (OS) maps viewed to identify any surface water bodies within 1 km of the Scheme as well as general topography and land uses (Ref. 123);
- Online aerial photography (Ref. 124);
- Meteorological Office website for general climate information for the study area (Ref. 125);
- National Rivers Flow Archive website (Ref. 126);
- Part 1: Anglian River Basin District River Basin Management Plan (Ref. 166);
- Environment Agency Catchment Data Explorer tool (Ref. 134);
- Defra's Multi-agency geographical information for the countryside website (MAGIC) map (Ref. 121);
- British Geological Survey (BGS) online Borehole and Geology Mapping (Ref. 105);
- Natural England website for designated sites (Ref. 175);
- Environment Agency Online Interactive Maps (Ref. 176);
- Flood map for planning (rivers and sea);
- Risk of flooding from surface water;
- Risk of flooding from reservoirs; and
- Flood warning areas and risk.

9.4.2 Where relevant, water bodies and their attributes have been presented in a series of figures that support this chapter. Figure 9-1 presents surface and groundwater bodies, Figure 9-2 shows Environment Agency Flood Zones and Figure 9-3 shows Surface Water Flood Risk.

9.4.3 Further review of existing geological plans, hydrogeological data and site investigation data will be carried out at the Preliminary Environmental Information (PEI) stage to provide a preliminary assessment of local ground and groundwater conditions.

9.4.4 In addition, further information and data relevant to the identification of all receptors and their attributes will be obtained from the Environment Agency and local councils and will be presented in the next stages of the assessment (i.e. the PEI Report). This will include water quality, water resources (such as pollution incidents, abstraction licences and water activity

permits (consented discharges)), hydrogeology (e.g. groundwater levels), WFD data and flooding data.

9.4.5 It is also proposed to undertake general walkover and hydromorphological surveys of the site, and the purpose and scope of these are discussed in more detail in Section 0.

Geology, Topography, Climate and Land Use

9.4.6 The bedrock and superficial geology for the area is identified by the BGS GeoIndex online mapping (Ref. 105). The bedrock consists of London Clay Formation – clay, silt and sand of sedimentary origin.

9.4.7 The superficial deposits are a mixture of Lowestoft Formation (diamicton), Brickearth (clay, silt and sand), glaciofluvial deposits (sand and gravel), alluvium (clay, silt, sand and gravel), and head deposits (clay, silt and sand). The glaciofluvial and alluvium deposits are found in bands around the River Ter.

9.4.8 Based on the Meteorological Office website (Ref. 125), the nearest weather station is located at Writtle (TL 68040 06608), approximately 8km south east of the Scheme. Using data from this weather station, it is estimated that the study area experiences an average of approximately 590 mm of rainfall per year, with it raining more than 1 mm on approximately 108 days per year, which are both low in the UK context (i.e. with the west of the UK experiences over 800 mm typically per year). This is relevant to the whole study area.

9.4.9 The topography of the study area is shaped by the River Ter, which flows west to east through the northern extent of the Scheme (see Figure 9-1 and 9-2). The land rises gently from the Ter valley bottom to the north and southwest. The river in the valley bottom within the Scheme area is between approximately 20 m and 30 m above ordnance datum (AOD), rising to around 65 m AOD at the northern boundary and 50 m AOD at the southwestern boundary. To the east of the Scheme the River Ter changes course to flow south towards Hatfield Peverel. As such the land to the southeast of the Scheme area falls in elevation toward the river, with this corner of the Site boundary adjacent to the A12 being at approximately 40 m AOD close to Toppinghoe Hall.

9.4.10 Several small first order tributaries of the River Ter rise from springs within the northern half of the Scheme area and flow north or north-easterly to meet the River Ter. Small, gently sloping valleys have formed around these watercourses towards the Ter. A longer tributary (T1 on Figure 9-1) of approximately 1.4 km length rises immediately east of the Site at Roll's Farm and flows northeast through a gently valley to meet the River Ter downstream of Terling village.

9.4.11 The land use within the area is generally a mosaic of arable fields and woodland with several small ponds and springs scattered across the site with some larger Stillwater water bodies present to the south and south west near Russell Green, beyond the Site boundary and along the curse of the Boreham Tributary (see Figure 9-1). There is a sand and gravel quarry immediately west of the Scheme, west of Waltham Road, where there are several large waterbodies formed from the quarrying activity. Boreham Airfield (disused) is immediately west of the quarry. The A12 and a railway line are located immediately south of the Site, with the villages of Hatfield Peveral and Boreham to the south of the A12. The village of Terling is approximately 1.1 km to the east of the northern extent of the Site. Numerous minor roads and tracks cross the Scheme area including within the Site.

Flood risk from all sources

9.4.12 Flood risk from all sources for the Scheme is summarised in Table 9-6 below, and also see Figure 9-2 and 9-3.

Table 9-1 Flood Risk from All Sources

Flood Risk Source	*Comments*
Fluvial	The Scheme is predominantly in Flood Zone 1 according to the Flood Risk Map for Planning (Ref. 128) (see Figure 9-2). This is land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability (AEP)). There is small corridor of Flood Zone 3 (1 in 100 or greater annual probability of river flooding (>1% AEP)) associated with the River Ter where it passes through the Site.
Surface Water	The risk of surface water flooding is generally very low (annual chance of flooding of less than 0.1% AEP) with isolated patches of low (chance of flooding of between 0.1% and 1% AEP), medium (chance of flooding of between 1% and 3% AEP) and high risk (chance of flooding of greater than 3.3% AEP) generally associated with the River Ter and its tributaries, as well as isolated patches across the Scheme site (See Figure 9-3).
Groundwater	Based on the AStGWF mapping, the scheme is in an area where flooding from groundwater is possible. Predominantly the risk from groundwater flooding is <25%, with a higher risk (upto >75%) in areas close to the River Ter.
Sewers	There are no External or Internal sewer flooding incidents recorded within the site area, based on Anglian Water records.
Reservoirs	The River Ter channel and immediate riparian margin as it passes through the Scheme area is within the area at risk of flooding from a reservoir breach. The remainder of the Site is not at risk from reservoir flooding.

Surface Water Bodies

9.4.13 The Scheme is located within the Essex Combined Management Catchment of the Anglian RBMP (Ref. 118). There are two WFD designated watercourses within the study area, the River Ter and Boreham Tributary.

9.4.14 The River Ter rises at Porter's Hall, some 10 km northwest of the Site as the crow flies. It flows in a generally south-westerly direction to meet the River Chelmer to the south of Hatfield Peveral, approximately 3 km downstream of the Site. Its overall length is 31.3 km and it drains a catchment area of 79.5 km^2. It is a single thread channel that appears to have a meandering planform, although will be modified in places beneath numerous road crossings in the area and around agricultural land.

9.4.15 The nearest gauging station for the River Ter on the National River Flow archive is at Crabb's Bridge (Ref. 126) to the southwest of Hatfield Peveral, and approximately 1.35 km downstream of the Site. The channel has been modified at the monitoring station into a concrete trapezoidal flumed section to enable accurate discharge measurement, and the site has been monitored between 1932 and 2019. Annual mean flow at this station is 0.297 m^3/s, with a maximum daily flow of 7.97 m^3/s registered on 1/2/1979. The flow that is exceed 95% of the time (Q95) is 0.034 m^3/s.

9.4.16 The River Ter designated WFD waterbody (WFD ID: GB105037033940) crosses the Scheme area at its northern extent (see Figure 9-1). This watercourse is at Moderate Ecological Status and Good Chemical Status. It is not achieving Good Status due to macrophytes/phytobenthos and phosphate being at Moderate status. The Environment Agency have identified sewage discharge, poor nutrient management, poor livestock management and transport drainage and the key catchment pressures (Ref. 126).

9.4.17 The western extent of the proposed Scheme area falls within the catchment of the WFD designated Boreham Tributary catchment (WFD ID: GB105037033910). This watercourse rises from in the quarried area at Boreham, 585 m west of the Site, and flows southwest to cross the A14 at which point it becomes designated. It then changes course to flow southeast to meet the River Chelmer adjacent to Church Road. The length of the designated reach is 2.68 km, and it drains a catchment of 18.4 km^2 (Ref. 126). The watercourse is a single thread channel which appears artificially straight in places and so may have been straightened in the past. There are no gauging stations listed for this watercourse on the National River Flow Archive website (Ref. 82). Although the WFD designated waterbody rises southwest of the Scheme area, there would appear to be hydrological connectivity to the watercourse through numerous ditches across the area. The Catchment Data Explorer website (Ref. 126) indicates that the WFD Boreham Tributary watercourse is at Good Ecological Status and Good Chemical Status.

9.4.18 In addition to these two watercourses, there are several undesignated tributaries of the River Ter present within the Scheme area, along with what appear to be ditches and springs on the basis of mapping, that provide connectivity to the River Ter.

9.4.19 There are also numerous ponds and still waters located across the Scheme area along with numerous gravel pits to the west of the Site associated with quarrying activity (see Figure 9-1).

Water Quality

9.4.20 Water quality data for the River Ter has been obtained from the Environment Agency's Water Quality Archive website (Ref. 129) and is summarised in Table 9-2, with WFD standards provided for comparison in Table 9-3. The monitoring location is at Crabb's Bridge TL 78870 10688, approximately 1.35 km downstream of the Scheme.

9.4.21 The data in Table 9-2 is based on 20 samples obtained between June 2019 and March 2020.

Table 9-6 Summary of Water Quality data for the River Ter (based on 20 samples)

Determinands	*Units*	*Average*	*Max*	*Min*	*90th%ile*	*10th%ile*	*Std Dev*
pH	pH Units	8.07	8.19	7.9	8.18	7.90	0.095
Temperature of Water	°C	10.4	17.2	4.6	15.58	4.73	4.134
Conductivity at 25°C	µs/cm	900.2	1069	653	1047.5	688.8	119.476
Biochemical Oxygen Demand (BOD): 5 Day ATU	mg/l	1.71	4	1	2.88	1	0.765
Ammoniacal Nitrogen as N	mg/l	0.086	0.34	0.033	0.322	0.036	0.097
Nitrogen, Total Oxidised as N	mg/l	12.07	18	3.16	17.9	5.55	4.34
Nitrate as N	mg/l	12.05	18	3.15	17.72	5.52	4.34
Nitrite as N	mg/l	0.041	0.21	0.013	0.067	0.015	0.041
Ammonia un-ionised as N	mg/l	0.0017	0.0092	0.0004	0.0067	0.0005	0.0023
Alkalinity to pH 4.5 as $CaCO_3$	mg/l	213.2	270	137	250	151	40.54

Orthophosphate, reactive as P	mg/l	0.891	4.1	0.1	3.28	0.161	1.132
Oxygen, Dissolved, % Saturation	%	83.32	98.7	69.3	97.94	69.98	8.05
Oxygen, Dissolved as O_2	mg/l	9.55	12.3	6.91	12.24	6.98	1.79

Table 9-3 Summary of WFD Standards for Lowland Inland Surface Waters

Determinand	*Unit*	*Statistic*	*High*	*Good*	*Moderate*	*Poor*	*Bad*
BOD	mg/l	90%ile	4	5	6.5	9	>9
Ammonia	mg/l	90%ile	0.3	0.6	1.1	2.5	>2.5
Dissolved Oxygen	% sat	10%ile	70	60	54	45	<45
pH	pH units	High-Good: 5 & 95%ile; Mod-Poor 10%ile	>6 &<9	>6 &<9	4.7	4.2	<4.2
Temperature	Degrees Celsius (ºC)	98%ile (not in salmonid WBs and canals)	25	28	30	32	>32

9.4.22 Table 9-2 indicates the River Ter is slightly alkaline in nature with an average pH of 8.07 but falls within the WFD High classification based on the 20 samples considered here. A 10th percentile dissolved oxygen saturation of 69.98% is on the borderline of the High-Good classification (with 70% being High) which suggests the waterbody is not limited by dissolved oxygen levels. BOD also meets the High WFD classification, suggesting low levels of organic pollution.

9.4.23 Ammonia levels are classified as Good which similarly suggests pollution from organics such as sewage materials are not having a detrimental impact on the waterbody.

9.4.24 Nitrate and orthophosphate values are somewhat elevated and indicate probably pressure from the surrounding agricultural land uses through use of fertilisers and other products which may runoff to the watercourse.

Water Resources

9.4.25 The entire Scheme area is within a Drinking Water Safeguard Zone for surface water (designation SWSGZ1029). Drinking Water Safeguard Zones are established around public water supplies where additional pollution control measures are needed. Here water supplies are at risk from nitrate and pesticides (carbetamide, clopyralid, metaldehyde and propyzamide) (Ref. 69).

9.4.26 There is a surface water Drinking Water Protected Area approximately 220 m south of the Scheme area (south of the A12), which extends south from Hogwells towards Little Baddow. Drinking Water Protected Areas (Surface Water) are where raw water is abstracted from rivers and reservoirs and additional measures are required to protect the raw water supply to reduce the need for additional purification treatment (Ref. 69).

9.4.27 The Scheme area is wholly within the River Chelmer Nitrate Vulnerable Zone (NVZ) (Surface Water designation 428). NVZs are areas designated as being at risk from agricultural nitrate

pollution (Ref. 69). The designations are made in accordance with the Nitrate Pollution Prevention Regulations 2015 (Ref. 130).

9.4.28 Information on pollution incidents, licences and unlicensed water abstractions, and water activity permits (i.e. discharges) will be obtained from the Environment Agency and presented in the PEI Report and ES.

Aquatic Ecology and Nature Conservation Sites

9.4.29 The River Ter Site of Special Scientific Interest (SSSI) is immediately west of the Site near Lyons Hall (see Figure 9-1), and consists of approximately 1.2km of the River Ter upstream of the Scheme (Ref. 127). This is cited by Natural England as a geological SSSI, which is representative of a lowland stream with a distinctive floor regime. It is flashy, draining a low-lying catchment on glacial till, and has a very low base flow discharge but high flood peaks; daily, monthly and annual flow variability are also high. In addition, the SSSI demonstrates characteristic features of a lowland stream including pool-riffle sequences, bank erosion, bedload transport and dimensional adjustments to flooding frequency. The SSSI is at favourable status when last assessed in 2011 (Ref. 127). As the SSSI is a geological site and upstream of the Site, it will not be affected by the development and it is proposed to not consider it any further in the impact assessment process.

Groundwater

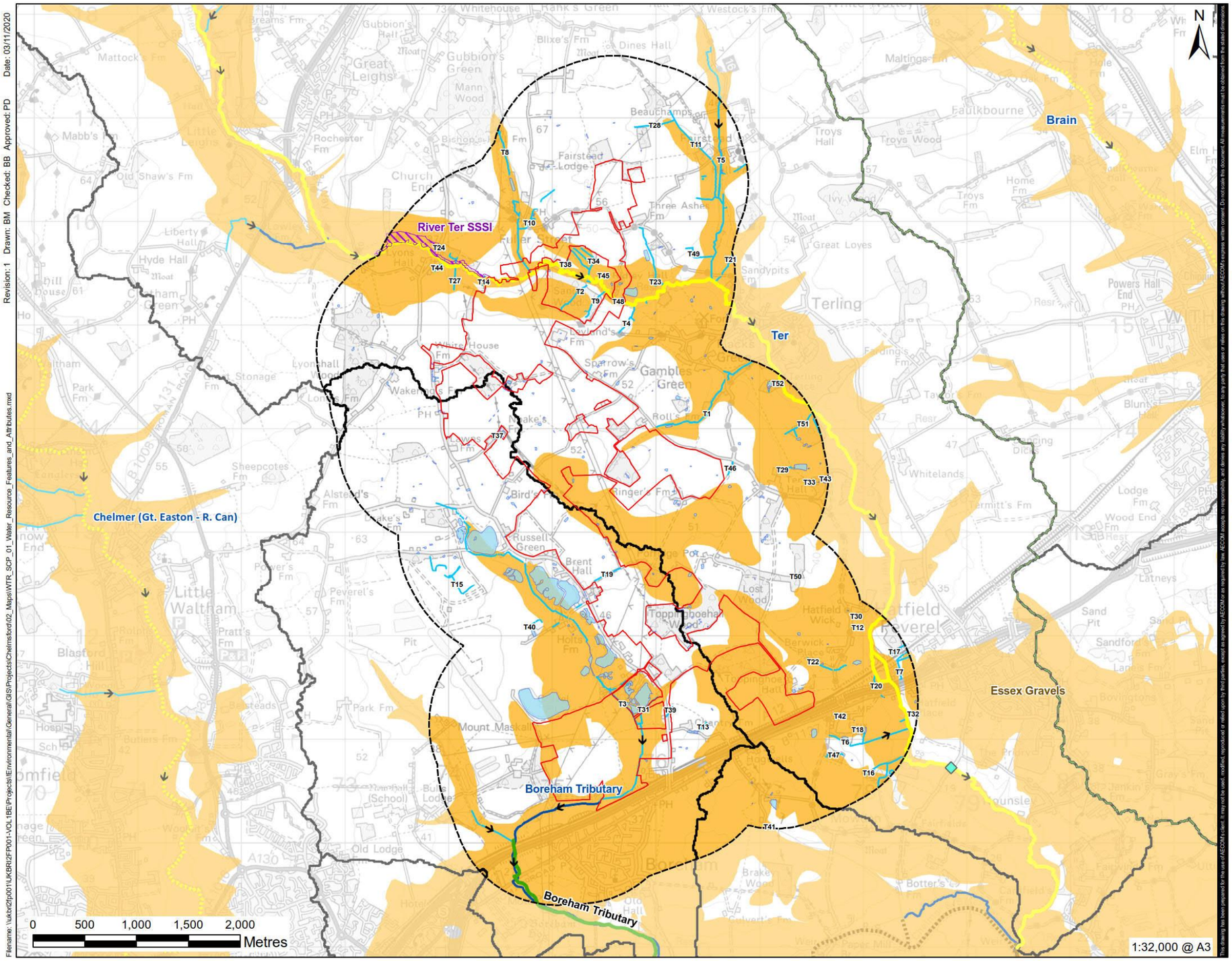
9.4.30 The bedrock beneath the study area is classified as unproductive strata, while the superficial deposits are predominantly Secondary B and Secondary undifferentiated aquifer. Secondary B aquifers are predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers. Secondary undifferentiated aquifer has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

9.4.31 Borehole scans available on the BGS GeoIndex website (Ref. 53) near the Scheme indicate that groundwater levels are not shallow, with the majority of boreholes not striking water. However, there are some sand layers in the upper 5 m of several borehole logs which have the potential to carry water.

9.4.32 The Scheme area is partially underlain by the Essex Gravels WFD groundwater body (GB40503G00400), which is at Poor Status, with Good Quantitative Status and Poor Chemical Status (Ref. 82).

9.4.33 The Scheme area is not in a Source Protection Zone, although there is an area of Zone III – Total Catchment approximately 520 m to the north of the Site. This zone is defined as the total area needed to support the abstraction or discharge from a protected groundwater source (Ref. 69).

Figure 9-1 Water Resource Features and Attributes



AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
- Site Boundary
- 1km Buffer
- Flow Direction
- EA Monitoring Location
- Statutory Main Rivers
- Ordinary Watercourses
- Tributaries
- Drinking Water Safeguard Zones Boundary
- Surface Water
- Site of Special Scientific Interest
- Local Nature Reserve
- WFD River Water Body Catchments (Cycle 2)

WFD River Water Bodies (Cycle 2) - Overall Class
- Good
- Moderate

WFD River Water Bodies (Cycle 2) - Heavily Modified
- Moderate
- Poor

WFD Groundwater Bodies (Cycle 2) - Overall Class
- Poor

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

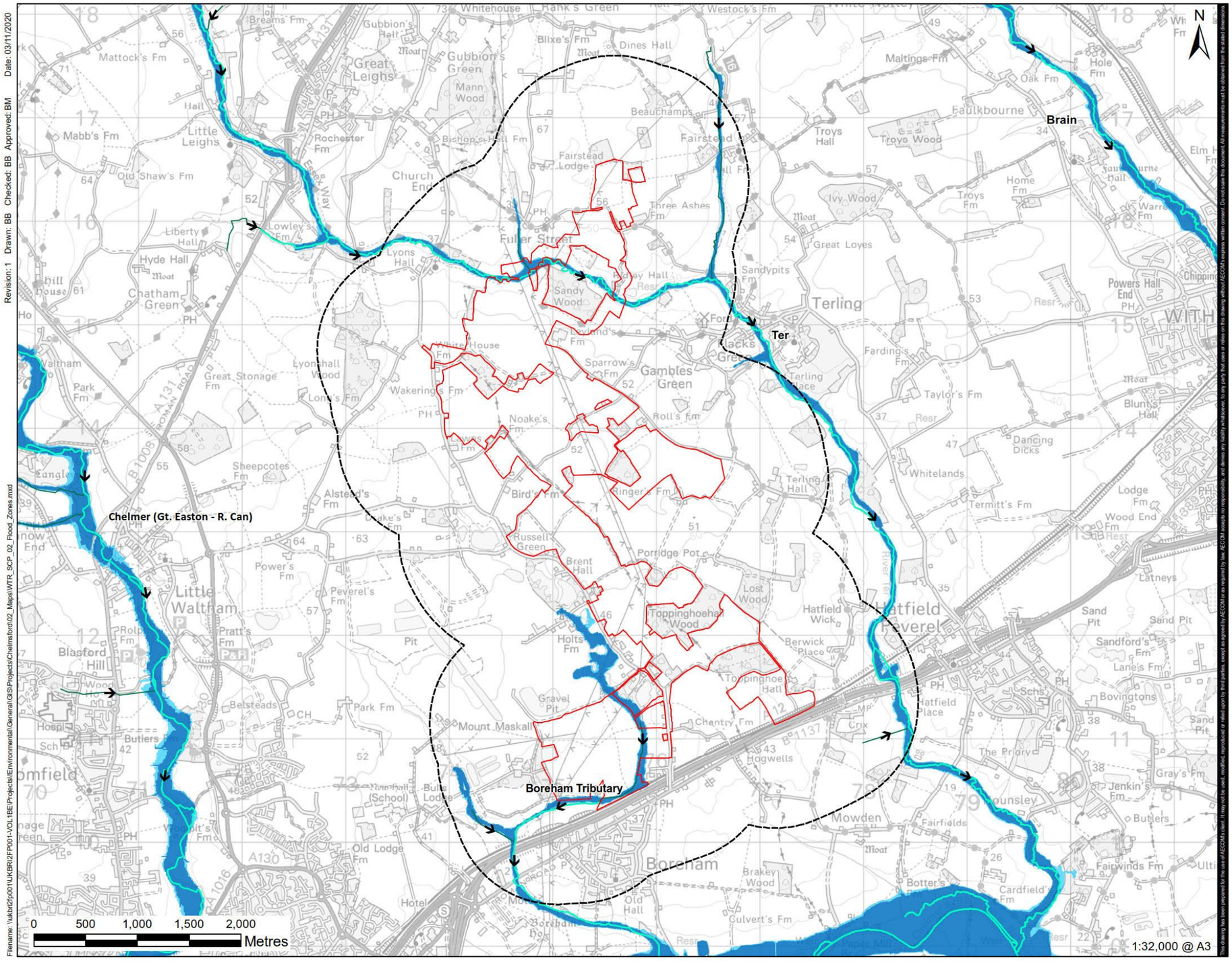
ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
Water Resource Features and Attributes

SHEET NUMBER
Figure 9-1

Figure 9-2 Flood Zones



Filename: \\ukbrl2fp001\UKBRI2FP001-VOL1$\E\Projects\Environmental\General\GIS\Projects\Chelmsford\02_Maps\WTR_SCP_02_Flood_Zones.mxd
Revision: 1 Drawn: BB Checked: BB Approved: BM Date: 03/11/2020

AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
- Site Boundary
- 1km Buffer
- Flow Direction
- Main Rivers
- Ordinary Watercourse
- Flood Zone 3
- Flood Zone 2

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

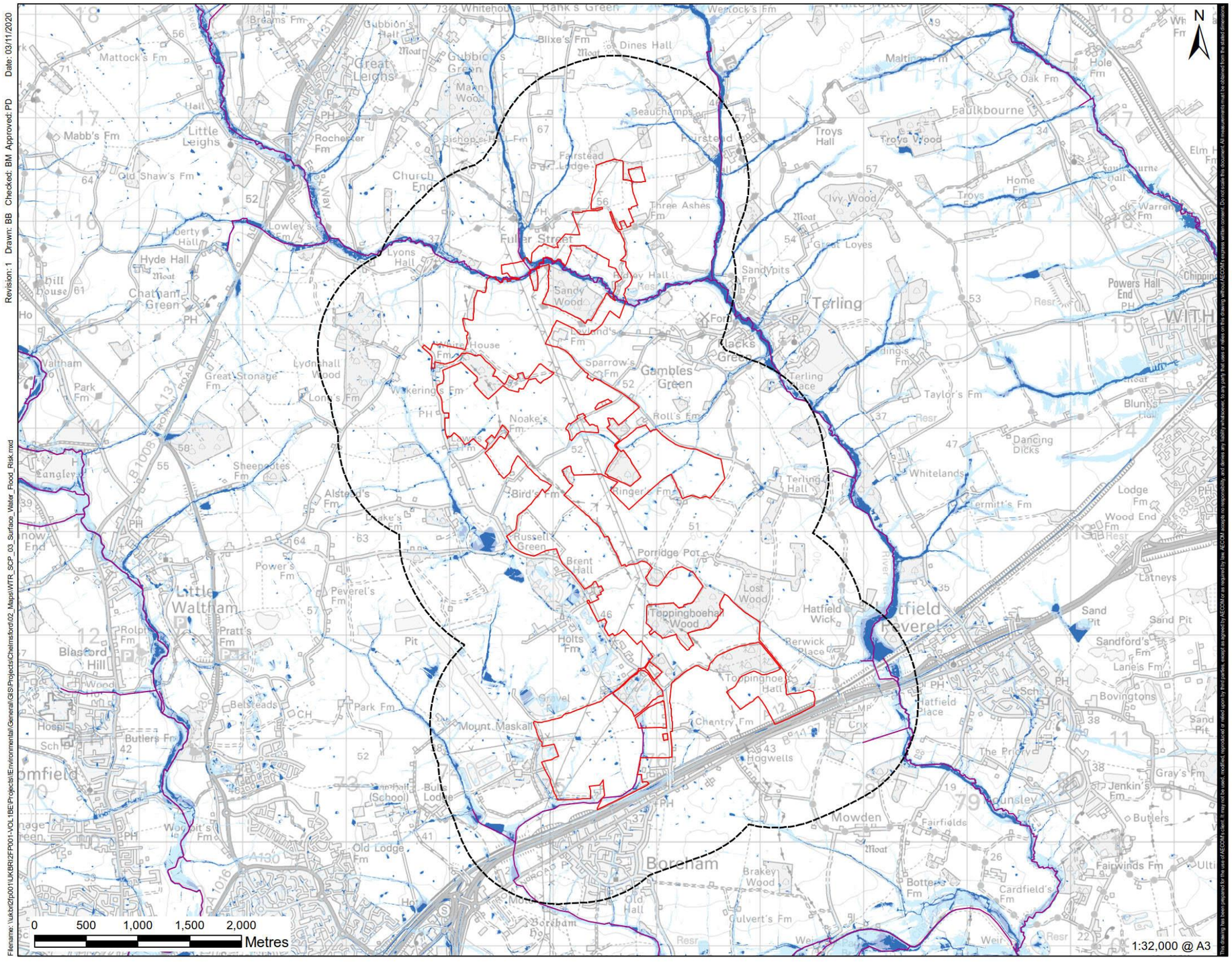
ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
Flood Zones

SHEET NUMBER
Figure 9-2

Figure 9-3 Surface Water Flood Risk



AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
- Site Boundary
- 1km Buffer
- Ordinary Watercourse
- 3.33% Annual Exceedance Probability
- 1% Annual Exceedance Probability
- 0.1% Annual Exceedance Probability

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
Surface Water Flood Risk

SHEET NUMBER
Figure 9-3

9.5 Potential Effects and Mitigation

Construction and Decommissioning

9.5.1 Many activities during construction and decommissioning phases are likely to generate impacts, which have the potential to affect the water environment, if unmitigated.

9.5.2 The greatest risks of adverse impacts during construction and decommissioning are in the vicinity of the River Ter, its tributaries, and the numerous small ponds present in the study area, which may be directly affected by the Scheme (and potentially local groundwater resources noting that information on licenced and unlicensed abstractions has not yet been obtained but will be available for the PEI Report) and the ES.

9.5.3 Overall, during construction and decommissioning phases the following adverse impacts may occur:

- Pollution of surface or groundwater due to deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off;
- Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows during any potential culvert construction works (for access), and exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches;
- Temporary changes in flood risk due to the construction of solar PV panels and site compound and storage facilities, which alter the surface water runoff from the Site; and
- Potential impacts on local water supplies. The potential presence of any known Private Water Supplies (PWS) will be investigated during the impact assessment by requesting records from the environmental health departments for Braintree District Council and Chelmsford City Council. Details of licenced abstractions will be obtained from the Environment Agency.

Operation

9.5.4 During the operational phase, the following adverse impacts may occur:

- Impacts on water quality in affected water bodies that may receive surface water run-off or be at risk of chemical spillages from solar PV panels and supporting infrastructure (e.g. substations, battery stores, solar stations, local site offices and car parking etc.) and maintenance activities;
- Potential for reduced chemical loading of watercourses associated with cessation of nitrate, pesticide, herbicide and insecticide applications on arable fields, which would be beneficial.
- Impacts on flood risk from increased runoff from new impervious areas across the site;
- Potential impacts on hydrology as a result of the Scheme by changing the way water infiltrates into the ground. Potential also for reduced irrigation of crops, if it is confirmed that water is abstracted locally for this purpose; and
- Potential impacts on local groundwater supplies (if it is confirmed that local abstractions are made).

9.6 Assessment Methodology

Water Environment

Level of Assessment

9.6.1 The level of assessment has been determined using the principles of the guidance and criteria set out in the Design Manual for Roads and Bridges (DMRB) LA113 Road Drainage and the Water Environment (Ref. 131). Although these assessment criteria were developed for road infrastructure projects, this method is suitable for use on any development project and it provides a robust and well tested method for scoping the assessment and predicting the significance of effects.

Water Quality Assessment

9.6.2 Relevant data will be requested and obtained from the Environment Agency as the impact assessment is undertaken. A Site Walkover Survey will also be undertaken by a surface water specialist and hydromorphologist. This is to observe surface waterbodies in the study area and to make observations about their current condition and character, the presence of existing risks and any potential pathways for construction, operation, and decommissioning impacts as a result of the Scheme. At this stage, and given the type of development, no water quality monitoring or other field studies are proposed.

9.6.3 A qualitative assessment of potential effects on surface water quality from construction, operation and decommissioning of the Scheme will be undertaken. This will consider the risk to surface water bodies resulting from construction or decommissioning works or future operation activity using a source-pathway-receptor approach. Where there is a risk of pollution, mitigation measures will be described with reference to best practice guidance (e.g. Guidance on Pollution Prevention Notes and CIRIA).

Hydromorphological Assessment

9.6.4 Potential hydromorphological impacts will be assessed qualitatively based on desk study of available information (e.g. historic maps and aerial imagery) and a walkover survey. This will target (where access permits) all locations where watercourses may need to be crossed either for access or by power cables linking land parcels and for the grid connection. The geomorphological walkover will define the baseline catchment characteristics, watercourse typology, flow regime and sediment transport regime of potentially affected watercourses. Consideration will be given to how the Scheme is likely to impact upon these processes and will determine whether the WFD objectives for the watercourses are impacted in a detrimental way as a result of the proposed works. Where appropriate mitigation or enhancement measures will be proposed in consultation with the Environment Agency and LLFA. Effects will be described according to the method for determining effect significance described from paragraph 2.6.15 onwards.

Water Framework Directive Assessment

9.6.5 Due to the potential impacts upon WFD designated water bodies (particularly the River Ter and Essex Gravels WFD waterbodies), a Preliminary WFD Assessment will be undertaken and presented alongside the PEI Report as a technical appendix. The aim of this assessment would be to determine the potential for any non-compliance of the Scheme with WFD objectives for affected water bodies, using readily available information and site observations. This will include an examination of the potential construction, operation and decommissioning phase effects of the Scheme on relevant WFD hydromorphological, biological and physio-chemical parameters. It would be prepared following guidance presented in PINS Note 18 The Water Framework Directive (Ref. 132). Depending on the outcomes of the preliminary assessment, more detailed investigations may be required, which will be determined in consultation with the Environment Agency. If further assessment is required, this would be provided alongside the ES.

Surface Water Drainage Strategy

9.6.6 The design of drainage systems aims to ensure that there will be no significant increases in flood risk downstream, during storms up to and including the 1 in 100 (1%) annual probability design flood, with an allowance for climate change.

9.6.7 A Surface Water Drainage Strategy will be undertaken to ensure the risk of flooding is not increased as a result of the Scheme, and any increased land take for foundations and access roads (i.e. increase in impermeable area) across the Site.

9.6.8 Careful consideration of the SuDS features, in-keeping with local planning policy and through liaison with the LLFA and Environment Agency, will be undertaken to ensure that the Surface Water Drainage Strategy adequately attenuates and treats runoff from the Scheme, whilst minimising flood risk to the Scheme site, and surrounding areas.

9.6.9 In accordance with planning policy and general good practice, mitigation will be provided by restricting surface water discharge rates and providing on-site attenuation.

Flood Risk Assessment

9.6.10 A Flood Risk Assessment (FRA) will be prepared for the Scheme, to review the current and future flood risk to the Site from all sources (including surface water, groundwater and fluvial sources), in-keeping with the NPPF guidance, to inform the Scheme design and set out any proposed mitigation requirements that are to be addressed within the Surface Water Drainage Strategy.

9.6.11 The majority of the development is located outside of areas with a risk of flooding. Where development proposed in flood risk areas there may be a requirement for the construction of flood compensation or mitigation measures to ensure no detrimental effect to flooding potential within or from the affected watercourse in the catchment once the Scheme is operational. The conclusions of this will be referred to within the flood risk, drainage and surface water assessment presented in the Environmental Statement. The FRA will be a technical appendix to the ES.

Assessment of Effect Significance

9.6.12 The impact assessment will be based on a source-pathway-receptor model. For an impact on the water environment to exist the following is required:

- An impact source (such as the release of polluting chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or the loss or damage to all or part of a water body);
- A receptor that is sensitive to that impact (i.e. water bodies and the services they support); and
- A pathway by which the two are linked.

9.6.13 The first stage in applying the Source-Pathway-Receptor model is to identify the causes or ‘sources’ of potential impact from a development. The sources will be identified through a review of the details of the Scheme, including the size and nature of the development, potential construction methodologies and timescales. The next step in the model is to undertake a review of the potential receptors, that is, the water environment receptors that have the potential to be affected. Water bodies including their attributes have been identified through desk study and site surveys. The last stage of the model is, therefore, to determine if there is a viable exposure pathway or a ‘mechanism’ linking the source to the receptor. This is undertaken in the context of local conditions relative to the water receptors within the study area, such as topography, geology, climatic conditions and the nature of the impact (e.g. the mobility of a liquid pollutant or the proximity to works that may physically impact a water body).

9.6.14 The assessment of the likely significant effects is qualitative, and will consider construction, operational and decommissioning phases, as well as cumulative effects with other developments.

Determining the Significance of Effects

9.6.15 The significance of effects will be determined using the principles of the guidance and criteria set out in the DMRB LA113 Road Drainage and the Water Environment (Ref. 131) adapted to take account of hydromorphology. The criteria that will be used to determine receptors importance is presented in Table 9-5.

9.6.16 In accordance with the stages of the methodology, there are three stages to the assessment of effects on water resources, which are as follows:

1. A level of importance (low to very high) is assigned to the water resource receptor based on a combination of attributes (such as water supply, biodiversity, recreation) and on receptors to flood risk based on the vulnerability of the receptor to flooding;
2. The magnitude of potential and residual impact (classed as negligible, minor, moderate or major adverse / beneficial) is determined based on the criteria listed in Table 9-6 and the assessor's knowledge of the Scheme. Embedded or standard mitigation measures are considered in the initial assessment, but any other mitigation is not considered until the assessment of residual effects; and
3. A comparison of the importance of the resource and magnitude of the impact (for both potential and residual impacts) results in an assessment of the overall significance of the effect on the receptor using the matrix presented in Table 9-7. The significance of each identified effect (both potential and residual) is classed as very large, large, moderate, slight or neutral and either beneficial or adverse significance.

Table 9-5 Criteria to Determine Receptor Importance (Adapted from LA113 (Ref. 131))

Importance	General Criteria	Surface Water	Groundwater	Hydromorphology[1]	Flood Risk
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.	EC Designated Salmonid / Cyprinid fishery; Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0 m^3/s; site protected / designated under EC or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar site, Species protected by EC legislation. Critical social or economic uses (e.g. public water supply and navigation).	Source Protection Zone (SPZ) 1; Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK legislation; Groundwater locally supports GWDTE; Water abstraction: >1,000 m^3/day	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.	Floodplain or defence protecting more than 100 residential properties from flooding; Flood Zone 3a and/or 3b; Essential Infrastructure or highly vulnerable development.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.	Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 < 1.0 m^3/s; Major Cyprinid Fishery; Species protected under EC or UK habitat legislation. Critical social or economic uses (e.g. water supply and navigation). Important social or economic uses such as water supply, navigation or mineral extraction.	Principal Aquifer providing locally important source supporting rover ecosystem; SPZ2; Groundwater supports GWDTE; Water abstraction: 500-1,000m3/day.	Conforms closely to natural, unaltered state and will often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/or indirect channel, floodplain, bank modifications and/or catchment development pressures.	Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding; Flood Zone 2; More vulnerable development.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has	Watercourses not having a WFD classification shown in a RBMP and Q95 >0.001m^3/s. May be designated as a local	Secondary Aquifer providing water for agricultural or industrial use with limited connection to surface water	Shows signs of previous alteration and/or minor flow / water level regulation but still retains some natural features,	Floodplain or defence protecting 10 or fewer industrial properties from

[1] Based on the water body 'Reach Conservation Status' presently being adopted for a major infrastructure project (and developed originally by Atkins) and developed from EA conservation status guidance (Environment Agency, 1998a; 1998b (Ref. 15Ref. 133 and Ref. 15Ref. 134) as LA113 (Ref. 15Ref. 1311) does not provide any criteria for morphology.

	some environmental value or is of regional importance.	wildlife site (LWS) and support a small / limited population of protected species. Limited social or economic uses.	SPZ 3; Water abstraction: 50-499 m^3/day.	or may be recovering towards conditions indicative of the higher category.	flooding; Flood Zone 2; Less vulnerable development.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.	Watercourses not having a WFD classification shown in a RBMP and Q95 <0.001m^3/s. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses.	Generally Unproductive strata. Water abstraction: <50m^3/day	Substantially modified by past land use, previous engineering works or flow / water level regulation. Watercourses likely to possess an artificial cross-section (e.g. trapezoidal) and will probably be deficient in bedforms and bankside vegetation. Watercourses may also be realigned or channelized with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water resources use. Could be impacted by navigation, with associated high degree of flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches will fall into this category.	Floodplain with limited constraints and low probability of flooding of residential and industrial properties; Flood Zone 1; Water compatible development.
Negligible	The receptor is resistant to change and is of little environmental value	Not applicable.	Not applicable.	Not applicable.	Not applicable.

9.6.17 The magnitude of impact will be determined based on the criteria in Table 11-6 considering the likelihood of the effect occurring. The likelihood of an effect occurring is based on a scale of certain, likely or unlikely. Likelihood has been considered in the case of water resources only, as likelihood is inherently included within the flood risk assessment.

Table 9-6 Magnitude of Impact Criteria (Adapted from DMRB LA 113 (Ref. 131))

Magnitude of Impact	*Description*	*Examples*
High Adverse	Results in a loss of attribute and/ or quality and integrity of the attribute.	Loss of a fishery; decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Increase in peak flood level (>100 mm)
Medium Adverse	Results in impact on integrity of attribute, or loss of part of attribute.	Partial loss of a fishery; measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Increase in peak flood level (>50 mm)
Low Adverse	Results in some measurable change in attribute's quality or vulnerability.	Measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Increase in peak flood level (>10 mm)
Very Low	Results in impact on attribute, but of insufficient magnitude to affect the use or integrity.	Negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity. Negligible change in peak flood level (≤ +/- 10 mm))
Low Beneficial	Results in some beneficial impact on attribute or a reduced risk of negative impact occurring.	Measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Creation of flood storage and decrease in peak flood level (>10 mm)
Medium Beneficial	Results in moderate improvement of attribute quality.	Measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status. Creation of flood storage and decrease in peak flood level (>50 mm)
Major Beneficial	Creation of new attribute or major improvement of attribute quality.	Increase in productivity or size of fishery; increase in surface water ecological or chemical WFD status; increase in groundwater quantitative or qualitative WFD status. Creation of flood storage and decrease in peak flood level (>100 mm)
No change	No loss or alteration of characteristic, features of elements; no observable impact in either direction.	

9.6.18 The following significance categories will be used for both potential and residual effects:

- **Negligible:** An imperceptible effect or no effect to a water resources receptor;
- **Beneficial**: A beneficial / positive effect on the quality of a water resource receptor; or
- **Adverse:** A detrimental / negative effect on the quality of a water resources receptor.

9.6.19 In the context of this assessment, an effect can be temporary or permanent, with effects quantified temporally as being short-term(endures for up to 12 months after construction or decommissioning); Medium term (endures for 1-5 years); Long term – endures for more than 5 years.

9.6.20 At spatial level, 'local' effects are those affecting the Site and neighbouring receptors, while effects upon receptors beyond the vicinity of the Site are at a 'regional' level. Effects which affect different parts of the country, or England as a whole, are considered being at a 'national' level.

9.6.21 The importance of the receptor (Table 9-5) and the magnitude of impact (Table 9-6) are determined independently from each other and are then used to determine the overall significance of effects (Table 9-7). Options for mitigation will be considered and secured where possible to avoid, minimise and reduce adverse impacts, particularly where significant effects may have otherwise occurred. The residual effects of the Scheme with identified mitigation in place will then be reported. Effects of moderate or greater are considered significant in planning terms.

Table 9-7 Matrix for Assessment of Significance (DMRB LA 104 (Ref. 135))

	High	Medium	Low	Very Low	No Change
Very High	Major	Major	Major	Minor	Neutral
High	Major	Major	Moderate	Minor	Neutral
Medium	Major	Moderate	Minor	Negligible	Neutral
Low	Moderate	Minor	Negligible	Negligible	Neutral
Very Low	Minor	Negligible	Negligible	Neutral	Neutral

9.7 Assumptions, Limitations and Uncertainties

9.7.1 Receptors considered in this assessment in terms of flood risk include the Scheme itself, other existing infrastructure assets, residential buildings, commercial buildings and agricultural land, and property potentially affected by the Scheme.

9.7.2 Requirements for hydraulic modelling of watercourses will be discussed with the Environment Agency / LLFA; any modelling required will be undertaken as part of the PEIR and ES to inform the FRA and Surface Water Drainage Strategy.

9.7.3 Visual surveys will be undertaken of accessible water/drainage features to inform the Surface Water Drainage Strategy. However, it may not be possible to survey all significant locations / structures due to access constraints.

9.7.4 Other than the site walkover survey, the FRA and Drainage Strategy will be based on desktop surveys and best available site layout proposals. Where available, topographical data will be used to support the FRA. In the absence of topographical data, LiDAR data will be used to inform the FRA and the Surface Water Drainage Strategy.

9.7.5 Temporary works will not be assessed unless they are of a potentially significant scale and have the potential to adversely affect flood risk or impact the quality or form of water bodies. The temporary works where such risks are considered significant (for example, excavations

for cable routes), will be identified and assessed within the FRA, Preliminary WFD Assessment and impact assessment.

9.7.6 A ground investigation will be undertaken to inform the full impact assessment ES, and this will provide further information on groundwater levels across the site.

9.7.7 Details on construction methodologies are not yet available. It is assumed that solar PV panels will be off set from watercourses by a minimum of 10 m. The purpose of this buffer reduces the risk of any pollutants entering the watercourse directly, whilst also providing space for mitigation measures (e.g. fabric silt fences) should they be required as identified at the PEI and ES stages.

9.7.8 As part of the full environmental impact assessment, the risk from surface water drainage to surface or groundwater bodies will be assessed according to the Simple Index Approach presented in the C753 The SuDS Manual (Ref 11-31). Given the very low risk the need for treatment measures is expected to be minimal. Given the availability of space it is not anticipated that there would be any issues providing any treatment of diffuse pollutants, should the Simple Index Approach assessment identify a need.

9.7.9 At this point in time it is not confirmed how any wastewater will be managed. Options may include connecting to the nearest available public sewer or a self-contained independent non-mains domestic storage and / or treatment system. The alternative where this is not possible, would be for a self-contained foul drainage system to a septic tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor (Ref. 136).

10. Landscape and Visual Amenity

10.1 Introduction

10.1.1 This chapter sets out the relevant landscape and visual matters which will be addressed within the ES, including the landscape and visual impact assessment (LVIA) methodology.

10.1.2 Landscape effects relate to changes to the landscape as a resource, including physical changes to the fabric or individual elements of the landscape, its aesthetic or perceptual qualities, and landscape character.

10.1.3 Visual effects relate to changes to existing views of identified visual receptors ('people'), from the loss or addition of features within their view due to the Scheme.

10.1.4 The LVIA will be undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013 (GLVIA3) (Ref. 137) and with reference to other environmental topics, including Ecology, Heritage, Arboriculture and Glint and Glare Assessments.

10.2 Study Area

10.2.1 In accordance with GLVIA3 (Ref. 137), the purpose of the landscape study area is to identify the area which the Scheme may influence in a signficant manner. The visual study area is concerned with the area across which the Scheme may be visible and the individuals or groups of people who may be significantly affected by changes in the composition of their views.

10.2.2 GLVIA3 sets out that at the scoping stage, the study area will be defined in a preliminary way and this is likely to be modified as more detailed analysis is undertaken, in combination with discussions with the LPAs.

10.2.3 From the desk-based review and summer fieldwork (August and September 2020) the visibility of the land within the Site boundary varies, due to the landform, woodland, field boundaries and roadside vegetation across the surrounding landscape.

10.2.4 The preliminary LVIA study area extends up to 4km from the Site boundary to cover:

- Rank's Green, Fairstead and Fuller Street between 1km and 1.5km to the north of the Site boundary;
- Flack's Green and Terling approximately 1km to the east of the Site boundary;
- Hatfield Peverel, Hogwells, Boreham and Little Baddow, immediately south to 3km east of the Site boundary; and
- Boreham airfield approximately 1km to the west of the Site boundary.

10.2.5 The extent of the LVIA study area will be reviewed throughout the iterative design process and via fieldwork in winter, when the deciduous vegetation is not in leaf. The extent of LVIA study area will also be consulted upon with the Local Planning Authorities and the justification for its final extent will be set out in the ES.

10.3 Planning Policy Context and Guidance

10.3.1 The following planning policies are relevant to the landscape and visual matters

National Planning Policy

- National Policy Statement (NPS) EN-1 (Ref. 5) – section 1.7, which identifies new energy infrastructure is likely to have some negative effects on landscape and visual amenity;

- paragraphs 4.1 to 4.5.3, which outline the requirements of high-quality design include the aesthetic, functionality, fitness for purpose and sustainability;
- paragraphs 5.9.5 to 5.9.8, which set out the requirements for a landscape and visual impact assessment;
- paragraph 5.9.14 which sets out the importance of landscape character assessments in LVIAs;
- paragraphs 5.9.15 to 5.9.18, which set out that schemes are likely to be visible and have visual effects; and
- paragraph 5.9.22 which outlines methods for minimising adverse effects, including *"siting of infrastructure, colours and materials, landscaping schemes and building design*."

- NPS EN-5 (Ref. 6) - paragraph 2.2.5 in relation to location and landscape considerations and paragraph 2.8.4 in relation to landscape and visual assessment.

- National Planning Policy Framework (NPPF) (Ref. 7)
  - paragraph 98 in respect of protecting and enhancing public rights of way (PRoW);
  - paragraph 127 which requires development to be sympathetic to local character and setting;
  - paragraph 170 in relation to conservation and enhancing the natural environment; and
  - paragraph 180 in relation to siting development that is appropriate for its location taking account of effects and mitigation.

National Guidance

10.3.2 Planning Practice Guidance (PPG), Natural Environment (Landscape) (Ref. 138) sets out the benefits of landscape character assessments and the importance of considering Green Infrastructure in the early stages of schemes.

10.3.3 Planning Practice Guidance, Renewable and Low Carbon Energy (Ref. 139) sets out that planning has an important role in the delivery of new renewable and low carbon energy infrastructure. The PPG identifies several LVIA considerations, including visual impact, mitigation through screening and glint and glare.

District Planning Policy

10.3.4 Relevant Chelmsford District Council (CDC) policies and supporting evidence-base documents which will be reviewed include the:

- Chelmsford Local Plan 2013-36 including Strategic Priority 7 - Protecting and enhancing the Natural and Historic Environment and the Green Belt; Strategic Priority 8 - Creating well designed and attractive places, and promoting healthy Communities and Strategic Policies S1 – Spatial Principles, S3 - Conserving and Enhancing the Historic Environment, S4 – Conserving and Enhancing the Natural Environment (Ref. 8);
- Chelmsford Green Infrastructure Strategic Plan 2018-2036 (Ref. 140);
- Chelmsford Green Infrastructure Strategic Plan Research and Evidence Base Document (Ref. 141);
- Chelmsford City Council (2016) Defining Chelmsford's River Valleys – An Assessment of Green Wedges and Corridors (Ref. 142);
- Chelmsford Local Plan Topic Paper 2: Infrastructure Update, 2018 (Ref. 8); and
- Chelmsford Local Plan Topic Paper 5: Natural Environment and Green Belt, 2018 (Ref. 8).

10.3.5 Relevant Braintree District Council (BDC) policies and supporting evidence-base documents, which will be reviewed include the:

- Saved Policies of the Braintree District Local Plan Review, including chapter 6: Environmental Resources and Protection; Chapter 7: Countryside Nature Conservation and Landscape and Chapter 8: Design and Heritage;
- Examination Publication Local Plan Section 1 and the evidence base (Ref. 9);
- Braintree Core Strategy, 2011, including the Environment Section; (Ref. 10) and
- Relevant Supplementary Planning Documents.

Local and Neighbourhood Planning Policy

10.3.6 Relevant local plans and evidence base documents which will be reviewed include the Terling and Fairstead Parish Council Village Design Statement (2014) (Ref. 143).

10.4 Baseline Conditions

10.4.1 This section provides an overview of the landscape and visual features and characteristics across the preliminary LVIA study area.

Landscape Context

Landform and Hydrology

10.4.2 The northern part of the study area consists of undulating and relatively elevated landform, as part of the River Ter valley. The landform rises steeply northwards from the river and Terling Spring, between 35 metres (m) Above Ordnance Datum (AOD) to 50m AOD along parts of Braintree Road. It culminates at a ridgeline at 70m AOD at Rank's Green, in the northern part of the study area. To the south of the River Ter, the landform also rises steeply, across Sandy Wood, to a ridgeline at 55m AOD.

10.4.3 The central part of the study area consists of a varied pattern of landform, reflecting sand and gravel extraction and engineered flat terrain across Boreham airfield, which is situated at 55m AOD. From the airfield, the landform falls very gradually eastwards to the River Ter, which flows southwards between Terling and the northern part of Hatfield Peverel, at approximately 20m AOD.

10.4.4 The River Chelmer flows across the southern part of the study area, at approximately 15m AOD. There are several large-scale reservoirs and lakes adjacent to the river. From the river, the landform rises consistently northwards, to form a ridgeline around 40m AOD at Boreham, and southwards, across Little Baddow, to an elevated ridgeline at 100m AOD, approximately 4km from the Siteboundary.

10.4.5 Most of the southern and central part of the Site boundary is located across flat and low-lying landform at approximately 45m AOD, between Waltham Road / Boreham Road and Terling Road. The northern part of the Site boundary is located within part of the River Ter valley, where there is rising land to the north and south of Terling Spring and adjacent to Braintree Road.

Settlement, Land Use and Infrastructure

10.4.6 The study area consists of small villages, hamlets and individual properties within the rural landscape, often closely situated adjacent to road networks.

10.4.7 The main land use across the study area is agriculture, characterised by large scale fields which are generally open in character and divided by field boundaries or woodlands. There are several large-scale farms, including Three Ashes Farm and Leyland's Farm in the northern part of the study area, Stock's Farm and Chantry Farm in the central part of the study area and Culvert's Farm in the southern part of the study area.

10.4.8 In the northern part of the study area, Rank's Green, Fairstead and Fuller's Green are small scale linear settlements adjacent to the road networks. There are smaller scale residential and agricultural land uses interspersed between these settlements, including at Three Ashes Farm, at the junction of Braintree Road and Fairstead Hall Road.

10.4.9 Terling is a small settlement, located to the east of the Site boundary and is characterised by a linear settlement pattern either side of the River Ter. Terling Place, All Saints Church and Terling Windmill are notable built features in the eastern part of Terling.

10.4.10 Boreham and Little Baddow, in the southern part of the study area, are larger settlements. Contemporary development in Boreham has extended the settlement pattern southwards, across the valley sides. Little Baddow is a linear settlement pattern, situated across rising landform and with the central part of the village concentrated around the main road junctions.

10.4.11 The A12 and B1137 cross the southern part of the study area, along with the railway line connecting Chelmsford and Witham. The A12 and the railway line also form the southern edge to the Site boundary.

10.4.12 Across the remainder of the study area, Terling Road, Terling Hall Road and Boreham Road are the main north to south transport routes, providing access between the villages. Noakes Road and Waltham Road provide west to east access across the study area, with Noakes Road also crossing the Site boundary. Braintree Road is the main road network in the northern part of the study area, extending between Turling and Fuller Street.

10.4.13 Other infrastructure within the study area includes overhead powerlines carried by tall pylons. These extend from the west of Boreham, across most of the Site boundary and to the west of Sandy Wood, where the alignment of the pylons diverts to the west and east of Fuller Street.

Vegetation Patterns

10.4.14 Whilst the agricultural land use results in an open character to the fields, there are many mature woodlands and extensive tracts of vegetation across the study area.

10.4.15 The River Ter corridor is well vegetated, being bordered by narrow belts of riverside trees and several larger scale woodlands, including Sandy Wood, which is within the Site boundary.

10.4.16 Across the northern part of the study area, there is mature woodland to the north and south of Rank's Green, with smaller woodland blocks situated between Fuller Street and Fairstead.

10.4.17 In the central part of the study area there are woodlands of varying sizes, including Brockspark Wood adjacent to the River Ter and Ringer Wood and Toppinghoehall Wood, which are within the Site boundary.

10.4.18 In the southern part of the study area, the main woodland patterns are to the south of the River Chelmer, across Little Baddow.

10.4.19 Roads and lanes across the study area are generally well vegetated and enclosed, either by hedgerows, scrub or individual trees.

10.4.20 The vegetation patterns across the Site boundary are representative of those across the study area, consisting of woodlands, hedgerows and trees, as well as open field patterns.

Public Rights of Way

10.4.21 With reference to Essex County Council's on-line PRoW mapping, there is an extensive network of routes across the study area.

10.4.22 The following PRoW cross the Site boundary or are adjacent to the Site:

- PRoW 113_3, Footpath, North of Braintree Road
- PRoW 113_5, Footpath, North of Braintree Road
- PRoW 113_1/PRoW 76_4, Footpaths, North of Hookley Wood adjacent to site boundary

- PRoW 113_11, Footpath, South of Sandy Wood adjacent to site boundary
- PRoW 221_53/PRoW 113_33, Footpaths, Crosses through Scarlett's Wood.
- PRoW 113_25, Footpath, near Noakes Farm
- PRoW 213_1, Footpath, near Birds Farm
- PRoW 113_30/PRoW 213/4/PRoW 113_32, Footpaths, north of Ringers Wood
- PRoW 213_5/PRoW 113_32, Footpaths, east of Stocks Farm
- PRoW 213_18, Footpath, near Kenwood House
- PRoW 213_19. Footpath, through Toppinghoehall Wood adjacent to site boundary
- PRoW 90_35, Footpath, west of Toppinghoe.
- PRoW 231_20 footpath, east of Waltham Road
- PRoW 213_17/PRoW 213_17 footpaths, near Wallace's Farm Cottages
- PRoW 213_48, Bridleway near The Grove
- PRoW 90_36/PRoW 90_35/PRoW 90_44 Footpaths south of Toppinghoehall Wood

Tranquillity

10.4.23 From the fieldwork, the tranquillity increases northwards across the Site boundary due to the reduction in audible noise from the A12 and particularly in proximity to the River Ter due to the enclosure by vegetation.

10.4.24 However, there is no sense of remoteness or wildness across the Site boundary, due to the overhead pylons and perception of properties and vehicles on lanes and roads.

Landscape and Relevant Designations

10.4.25 Neither the study area, nor the Site boundary is covered by any statutory landscape designations, i.e. National Parks nor Areas of Outstanding Natural Beauty (AONB). The Dedham Vale AONB is approximately 23km to the north-east of the Site boundary and due to the distance and intervening features an assessment of impacts to the AONB is scoped out of the LVIA.

10.4.26 There are several ancient woodlands across the study area. Within, or adjacent to, the Site boundary these include:

- Brickhouse Wood, Hookley Wood and Sandy Wood in the northern part of the study area;
- Scarlett's Wood, Ringer's Wood, Toppinghoehall Wood and Porter's Wood in the central part of the study area; and
- Scrub Wood and Blake's Wood in the southern part of the study area.

10.4.27 Most of Terling is within a Conservation Area, but there is no Conservation Area Appraisal for Terling.

Published Landscape Character Assessments and Related Studies

10.4.28 The study area and Site boundary are covered by several published character assessments and related studies, which form part of the evidence base for CDC and BDC. These documents will be reviewed as part of the iterative design process and to inform the definition of Landscape Character Areas (LCA) for the assessment.

10.4.29 The following section provides an overview of these publications.

National Landscape Character Assessments

10.4.30 At the national level, the Site boundary is covered by Natural England's National Character Area 86: South Suffolk and North East Clayland (NCA 86), which is characterised as (Ref. 144):

> *"an ancient landscape of wooded arable countryside with a distinct sense of enclosure. The overall character is of a gently undulating, chalky boulder clay plateau, the undulations being caused by the numerous small-scale river valleys that dissect the plateau. There is a complex network of old species-rich hedgerows, ancient woods and parklands, meadows with streams and rivers that flow eastwards."*

10.4.31 Statements of Environmental Opportunity for NCA 86 include enhancing landscape and biodiversity quality, protecting woodland and enhancing rivers. This includes incorporating Green Infrastructure within developments, that provides opportunities for wildlife and public access.

Regional and District Assessments and Studies

10.4.32 The assessments and studies which will be reviewed include:

- The Essex Design Guide (Ref. 145);
- Braintree, Brentwood, Chelmsford, Maldon and Uttlesford Landscape Character Assessment (2006) (Ref. 146), the Site boundary is within Landscape Character Area B17: Terling Farmland Plateau;
- Chelmsford City Council Landscape Sensitivity and Capacity Assessment Report (2017) (Ref. 147);
- Chelmsford Borough Historic Environment Characterisation Report (Ref. 52);
- English Heritage/Essex County Council, The Historic Landscape Characterisation Report for Essex (2011) (Ref. 148);
- Essex Landscape Character Assessment (2003) (Ref. 149), the Site boundary within Landscape Character Area B1 Central Essex Farmlands;
- Chelmsford Green Infrastructure Strategic Plan 2018-2036 (Ref. 140);
- Chelmsford Green Infrastructure Strategic Plan Research and Evidence Base Document (Ref. 141);
- Chelmsford City Council (2016) Defining Chelmsford's River Valleys – An Assessment of Green Wedges and Corridors (Ref. 142);
- Chelmsford Local Plan (Ref. 8) Topic Paper 2: Infrastructure Update, 2018; and
- Chelmsford Local Plan (Ref. 8) Topic Paper 5: Natural Environment and Green Belt, 2018.

Local Landscape Character

10.4.33 Local landscape and townscape character assessments are included within the Terling and Fairstead Parish Council Village Design Statement (Ref. 143) and Hatfield Peverel Settlement Fringe Landscape Character Assessment (Ref. 150). These will be reviewed as part of the LVIA.

10.4.34 The LVIA will also identify local landscape character areas (LLCA).

Visual Amenity

10.4.35 Initial fieldwork also been undertaken across the study area to identify visual receptors ('people') whose views may be impacted by the Scheme.

10.4.36 The fieldwork undertaken during August and September 2020 concludes that the Site boundary is not visible in its entirety due to the variations in landform and the screening from vegetation and that the overall visibility of the Site boundary is localised.

10.4.37 The northern parts of the Site boundary are visible from residential properties in Fuller Street and adjacent to Braintree Road, Fairstead Hall Road and at Three Ashes Farm due to its proximity and position across the River Ter valley sides. These parts of the Site boundary are also visible for motorists on Braintree Road and recreational users on PRoW within the Site boundary. From elevated locations in the northern part of the study area, at Rank's Green, the fields within the Site boundary are not visible, due to the combination of distance, landform and intervening vegetation.

10.4.38 The central parts of the Site boundary are visible for motorists on Noakes Road, parts of Terling Hall Road and Boreham Road, as well as residents adjacent to these roads. The Site boundary is also visible for recreational users on the PRoW within the Site boundary. The composition of these views is predominantly of fields and woodland, which are crossed by overhead pylons. The Site boundary is not visible from Terling due to the distance and intervening vegetation.

10.4.39 The southern parts of the Site boundary are visible from Boreham Road and residential properties adjacent to the road, including Topinghallhoe Farm and for recreational users which cross this part of the Site boundary. The fields within the Site boundary are not visible from Hatfield Peverel, Boreham and elevated parts of Little Baddow, due to the distance, undulating landform and intervening vegetation.

10.4.40 It is acknowledged that the fieldwork has been undertaken during summer conditions, i.e. when the deciduous vegetation is in leaf and the extent of visibility is reduced in comparison to winter months.

10.4.41 Therefore, further fieldwork will be undertaken between December 2020 and March 2021 to review the visibility of the Site boundary and the visual receptors in winter (i.e. the worst-case). The fieldwork will be informed by the generation of Zones of Theoretical Visibility (ZTV), which will model the key structures in relation to the existing landform alone (i.e. bare-earth) and with the addition of existing vegetation and buildings (i.e. with existing visual screening).

10.4.42 The findings of the fieldwork will be presented to the LPAs to seek to agree the visual receptors and visual study area for the assessment.

10.4.43 Photography will also be captured during winter months to provide representative views towards the Site boundary from the identified receptors. This photography will be undertaken in accordance with the methodology for Type 1 photographs as set out in the Landscape Institute's Technical Guidance Note 06/19 Visual Representation of Development Proposals (Ref. 151).

Landscape and Visual Receptors for Assessment

10.4.44 At the scoping stage, the following landscape receptors are proposed to be included in the landscape assessment:

- NCA 86: South Suffolk and North East Clayland;
- The LCAs identified by the Chelmsford Landscape Character Assessment, including LCA B17: Terling Farmland Plateau and which cover the study area;
- The landscape character areas identified by the Essex Landscape Character Assessment (2003), including LCA B1 Central Essex Farmlands and which cover the study area; and

- LLCA across the study area, including villages, their settings and areas of land within the Site boundary.

10.4.45 At the scoping stage, the following visual receptors set out in Table 10-1 are proposed to be assessed within the visual assessment:

Table 10-1: Proposed Visual Receptors for Assessment

Visual Receptor Type	*Visual Receptor or Receptor Groups*
Residents	Residents of Rank's Green, Fuller Street, Fairstead, Three Ashes Farm, Leyland's Farm, Noakes Farm, Scarlett's Farm, Sparrow's Farm, Gamels Green, Flack's Green, Terling, Roll's Farm, Hankin's Farm, Terling Hall Cottages, residents adjacent to Boreham Road, Chantry Farm, Toppinghallhoe Farm, Hatfield Peverel, Boreham and Little Baddow.
Motorists	People travelling on Braintree Road, Waltham Road, Noakes Road, Boreham Road, Terling Hall Road, Terling Road and the A12.
Recreational users	Users of PRoW within the Site boundary and a proportionate number of routes across the study area to provide a representative assessment of views from the north, east, south and west of the Site boundary.

10.4.46 The final selection of landscape and visual receptors will be consulted upon, and agreement sought, with the LPAs.

10.5 Potential Effects and Mitigation

10.5.1 The Scheme has the potential to result in temporary significant adverse landscape effects during the construction phase, due to alterations to surface landform and vegetation, the presence of construction machinery and associated reductions in tranquillity. These aspects of the construction phase also have the potential to result in significant adverse visual effects, due to changes to the composition of views, in comparison to views of fields and general farming activity.

10.5.2 The Scheme has the potential to result in significant adverse landscape effects during operation (assessed at year 1 and year 15) due to the change in land use resulting from the presence and massing of the solar panels and associated structures, although the Scheme is reversible. The Scheme has the potential to result in signficant beneficial landscape and effects in the longer term from changes to land cover and new planting across the Site boundary. The proposed structures also have the potential to result in signficant adverse visual effects due to the changes in the composition of views, in comparison to fields and general farming activity.

10.5.3 The decommissioning phase has the potential to result in significant adverse landscape and visual effects, like the construction phase, due to the presence of machinery and general activity to remove the panels and associated structures.

10.5.4 The LVIA will inform the iterative design process of the Scheme and the mitigation measures, specifically with regards to the siting, layout and colour tones of the solar panels and associated structures to reduce their visibility and perceived scale and mass within the landscape.

10.5.5 The LVIA will also inform the iterative design process via identifying opportunities for new Green Infrastructure (e.g. planting and permissive recreational routes).

10.5.6 The relevant landscape and visual mitigation will be set out in the LVIA.

10.6 LVIA Methodology

Overview

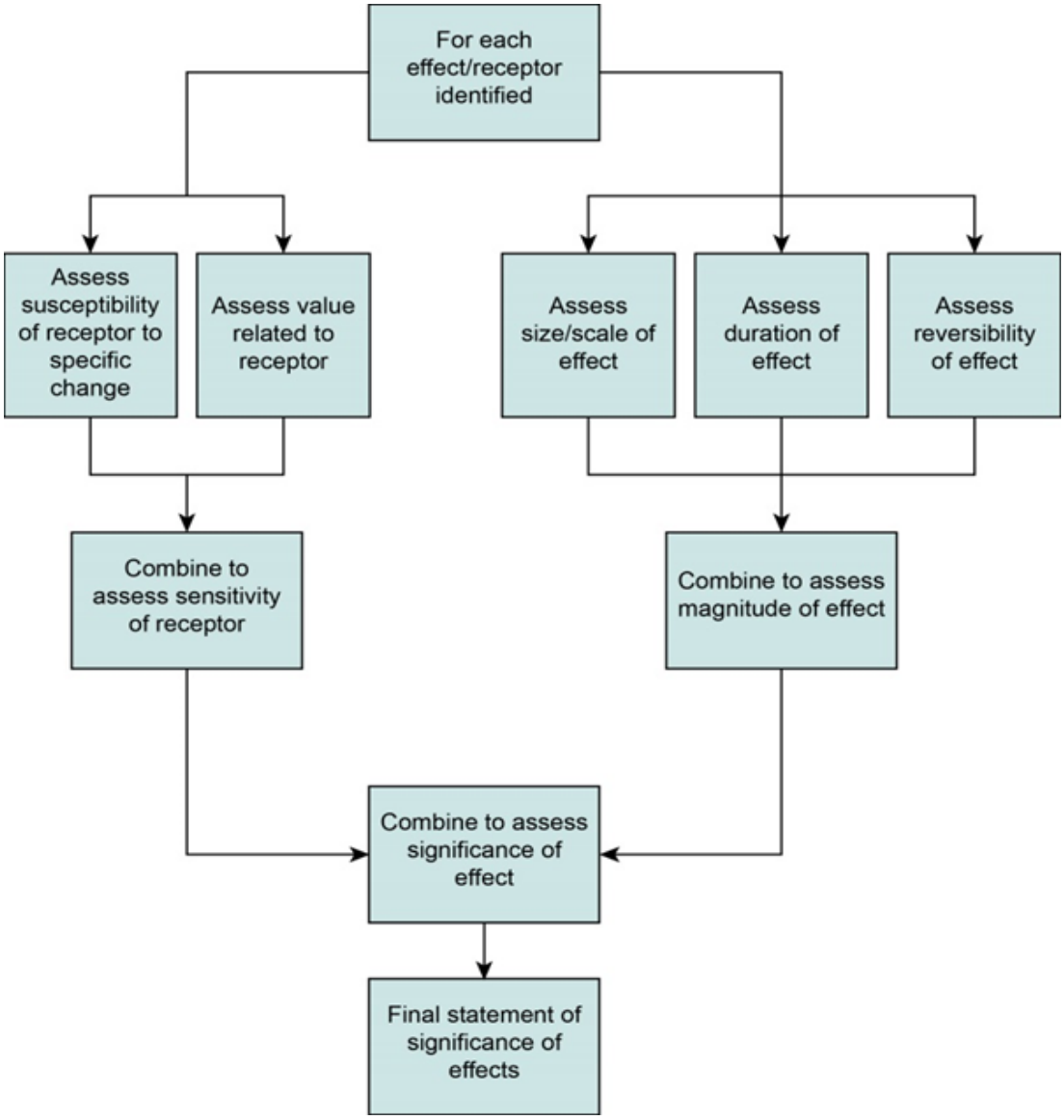
10.6.1 The LVIA will be undertaken in accordance with the following:

- GLVIA3 (Ref. 137); and
- The Landscape Institute's Technical Guidance Note 06/19: Visual Representation of Development Proposals, 2019 (Ref. 151).

10.6.2 These publications form a standard reference for undertaking LVIA for renewable energy schemes in the UK.

10.6.3 The LVIA methodology will reflect the process set out in Figure 3.5 of GLVIA3 (Ref. 137), as shown below in Diagram 10-1.

Diagram 10-1: GLVIA3, Assessing the significance of effects



10.6.4 In accordance with the GLVIA3 process, the LVIA will include the following key stages.

- A baseline review of published landscape assessments, studies, relevant supporting evidence base documents, aerial photography, mapping and fieldwork to identify the

landscape and visual baseline and the landscape and visual receptors. Following the identification of the landscape and visual receptors, these shall be presented to the LPAs to seek agreement, along with the extent of the LVIA study area;

- An assessment of the sensitivity (nature of the receptor) of landscape and visual receptors, via an assessment of their value and susceptibility to change (as set out below);
- An assessment of the magnitude of impact (nature of effect) of the Scheme during the construction, year 1 year 15 and decommissioning phases. The magnitude of impact will be assessed in relation to the size, scale, duration and reversibility of the effect; and
- An assessment of the significance of the effect to the landscape and visual receptors for the above phases of the Scheme.

10.6.5 The assessment of the Scheme will be undertaken for the:

- Peak construction activity and in winter;
- Year 1 of operation, assuming the Scheme is fully built out and in winter;
- Year 15 of the operation, assuming the proposed planting has established, and the season is summer; and
- Decomissioning and in winter.

Methodology for the assessment of receptor sensitivity

Landscape Receptors

10.6.6 In accordance with GLVIA3 (Ref. 137), the landscape receptor's sensitivity will be assessed by combining judgements about its value and susceptibility.

10.6.7 The assessment of the value of each landscape receptor will be informed by the information set out in the baseline, including any relevant landscape designations, geographic criteria and valued features as set out in GLVIA3 Box 5.1, e.g. aesthetic, perceptual or experiential value.

Landscape Value

10.6.8 With reference to GLVIA3 (Ref. 137), landscape value refers to the relative value that is attached to different landscapes by society.

10.6.9 Table 10-2 sets out the criteria for the assessment of landscape value.

Table 10-2 Landscape Value Criteria

Classification	*Criteria*
Very High	A landscape with elements of national or international designation / importance and / or which is characterised by key characteristics and/or rare features.
High	A landscape with elements of national or regional designation / importance and / or which is characterised mainly by key characteristics and/or rare features
Medium	A landscape with elements of local or neighbourhood designation / importance and / or a landscape with some key characteristics and/or distinctive features.
Low	A landscape with elements of community designation / importance and or common place features and few key characteristics.
Very Low	A landscape with no or very few elements of importance / designation, due to weak or discordant characteristics and one which detract from the quality of the area, such that it does not exhibit any key characteristics.

Landscape Susceptibility

10.6.10 GLVIA3 paragraph 5.40 (Ref. 137) defines landscape susceptibility as:

> *"the ability of the landscape receptor (whether it be overall character or condition of a particular landscape type or area, or an individual element and/or features, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies" (paragraph 5.40).*

10.6.11 The criteria for landscape susceptibility is set out in Table 10-3.

Table 10-3 Susceptibility to Change of Landscape Receptors

Susceptibility Classification	*Susceptibility Criteria*
Very High	The landscape receptor largely exhibits key landscape character attributes and there is very limited opportunity for change
High	The landscape receptor largely exhibits key landscape character attributes and there is limited opportunity for change
Medium	The landscape receptor exhibits some key landscape character attributes and there is some opportunity for change;
Low	The landscape receptor exhibits very few key landscape character attributes and there is an opportunity for change;
Very Low	The landscape receptor exhibits none of the key landscape character attributes and there is a high degree of opportunity for change.

Landscape Sensitivity

10.6.12 The assessment of landscape value and landscape susceptibility to define the sensitivity of the landscape receptor, as set out in Table 10-4.

Table 10-4 Landscape Sensitivity

Sensitivity	*Description*
Very High	Landscapes of international or national value with distinctive and rare elements with a very high susceptibility to the Scheme
High	Landscape of national or regional value with distinctive elements and characteristics, with a high susceptibility to the Scheme. Typically these would be landscape receptors: • With distinctive elements and features making a positive contribution to character and sense of place. • Likely to be designated or are adjacent to the designated area but exhibit elements which underpin the designation, especially at the local scale. • Areas of special recognised landscape value through use (e.g. visitors), perception or historic and cultural associations. • Likely to contain features and elements that are rare and could not be replaced.

Sensitivity	*Description*
Medium	Landscape of local or community value, with mostly common elements and characteristics, which by nature of their character would be able to accommodate some change. Typically these would be landscape receptors: • Comprised of mostly common elements and features, creating a generally unremarkable character but with some sense of place. • Locally designated, or value may be expressed through non-statutory local publications. • Containing some features of value through use, perception or historic and cultural associations. • Likely to contain some features and elements that could not be replaced.
Low	Landscape of community or limited value and relatively inconsequential elements and characteristics, the nature of which is potentially tolerant of substantial change of the type proposed. Typically these would be; • Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place. • Not designated. • Containing few, if any, features of value through use, perception or historic and cultural associations. • Likely to contain few, if any, features and elements that could not be replaced.
Very Low	Landscape of very low or limited value, which is damaged, degraded or a substantially modified landscape pattern with few or no natural or original features remaining, such that it is tolerant of change.

Visual Receptors

10.6.13 Visual sensitivity includes a combination of parameters, such as:

- the activity/occupation/ pastime of the receptors at particular locations;
- the extent to which their attention or interest may be focused on the views; and
- the visual amenity they experience.

10.6.14 It will comprise the:

- location, relative focus and orientation of particular views;
- quality or importance of the existing view and its attractiveness / or scenic quality;
- principal or secondary interest in that particular view;
- static or sequential nature of views;
- ability of the view to accommodate the type of development and the frequency; and
- duration of the view.

Visual Value

10.6.15 GLVIA3 (Ref. 137) stresses the importance of considering the value attached to views, for example in relation to heritage assets, or through planning designations. It provides a list of indicators of the value of views in paragraph 6.37, including:

- Appearance in guidebooks our tourist maps;

- Provision of facilities, such as parking places, sign boards and interpretive materials; and
- References in literature or art.

10.6.16 The assessment of the value of views is also informed by the location of the viewing place and the quality or designation of the existing elements in the view, as shown in

10.6.17 Table 10-5 below.

Table 10-5 Visual Value Criteria

Classification	*Value of View*
Very High	Recognised or iconic views within nationally/internationally designated landscapes, such as National Parks, Areas of Outstanding Natural Beauty (AONB) and/or national/international landmarks with views recognised in planning policy and/or management plans.
High	Views or viewing places identified in regional strategies.
Medium	Views across high quality landscape which might include features of interest, such as landmarks, which may be identified in the Local Plan.
Low	Views of relatively common landscape elements, likely to be valued by the communities which experience the view.
Very Low	Views across poor quality landscape with a high degree of detracting or common elements.

Visual Susceptibility

10.6.18 GLVIA3 (Ref. 137) notes that visual receptors "*most susceptible to change*", include residents and visitors engaged in outdoor recreation "*whose attention or interest is likely to be focused on the landscape and on particular views*" (para 6.33).

10.6.19 Table 10-6 sets out the susceptibility criteria of visual receptors.

Table 10-6: Visual Susceptibility

Classification	*Visual Susceptibility*
Very High	People visiting areas where the view is a very important part of the experience and specific to the reason for visiting the location and/or residents with open views from all windows across the façade of the house.
High	People visiting areas where the view is an important part of the experience generally and/or residents with open views from most windows across the façade of the house.
Medium	People passing through the area where views are relevant to the experience of the journey but are not specific to the reasons for visiting and/or residents with filtered views or views from only some windows across the façade of the house.
Low	People passing through the area on secondary roads, where the view is not relevant to the activity and may be softened or filtered and are short in duration.

Very Low	People working in buildings where the view is not relevant to the activity or passing through the area of main road and rail networks, such that views are very short in duration or screened.

Visual Sensitivity

10.6.20 For the LVIA, the following criteria, as set out in Table 10-7 will be used for the sensitivity of visual receptors from the combination of value and susceptibility.

Table 10-7 Sensitivity of visual receptors

Classification	*Sensitivity of visual receptors*
Very High	A designated view or highly promoted view of a designated landscape or international or national feature.
High	Activity resulting in a particular interest or appreciation of the view (e.g. residents with principal private views, or people engaged in outdoor recreation whose attention is focused on the landscape and where people might visit purely to experience the view, such as promoted viewpoints) and/or a view of national value (e.g. within/towards a designated landscape).
Medium	Activity resulting in a general interest or appreciation of the view (e.g. residents or people engaged in outdoor recreation that does not focus on an appreciation of the landscape, outdoor workers, people in schools or other institutional buildings and hotels and people passing through the landscape on defined scenic routes) and/or a view of local or community value (e.g. suburban residential areas, or agricultural land or urban areas).
Low	Activity where interest or appreciation of the view is secondary to the activity or the period of exposure to the view is limited (e.g. people at work, motorists travelling through the area or people engaged in outdoor recreation that does not focus on an appreciation of the landscape) and/or a view of limited value (e.g. featureless agricultural landscape, poor quality urban fringe).
Very Low	Activity where interest or appreciation of the view is inconsequential (e.g. people at work with limited views out, or drivers of vehicles in cutting) and/or very low value of existing view (e.g. industrial areas or derelict land).

Magnitude of Impact

10.6.21 GLVIA3 (Ref. 137) notes that magnitude is informed by combining considerations relating to the "*scale, extent and duration*" of effect (para 3.28). This includes the geographical extent of influence, the spatial extent of the effect, the level of integration of new features with existing elements, its duration and degree to which the effect is reversible.

Magnitude of landscape Effect

10.6.22 The criteria for the landscape magnitude are set out in Table 10-8.

Table 10-8 Magnitude of Landscape Effect

Magnitude	*Typical* Criteria Descriptors
High	Large alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term impacts, permanent or reversible.
Medium	Partial alteration to the landscape receptor or may impact a wide area or characteristics at a local level. May be medium term impacts, permanent or reversible.

Magnitude	*Typical* Criteria Descriptors
Low	Slight alteration to the landscape receptor or may impact a restricted area and few key characteristics. May be short to medium term impacts, permanent or reversible
Very Low	Very slight alteration to the landscape receptor or may impact a limited area or no key characteristics. May be short term impacts, permanent or reversible.
None	No change to the landscape receptor.

Visual Magnitude

10.6.23 The magnitude of visual impact results from changes in the composition of views and or changes to the overall visual amenity. It includes combinations of the degree of change, the extent over which the changes will be visible, the period of exposure to the view and reversibility or permanence of the change and is classified in Table 10-9.

Table 10-9 Magnitude of Visual Effect

Magnitude	*Typical Criteria Descriptors*
High	The Scheme will cause a pronounced change to the composition of the view or may be viewed in the foreground or directly. May be longer term impacts, permanent or reversible and could include glint and glare effects.
Medium	The Scheme will cause a noticeable change to the composition of the view or may be viewed in the middle ground or indirectly. May be medium term impacts, permanent or reversible and could include glint and glare effects.
Low	The Scheme will cause an unobtrusive change in the composition of the view or may be viewed in the background or obliquely. May be short to medium term impacts, permanent or reversible and is not likely to include glint and gare effects.
Very Low	The Scheme will cause a barely perceptible change in the composition of the view or may be viewed in the background and very obliquely. May be short term impacts, permanent or reversible and would not include glint and glare effects.
None	No change to the view.

Significance of Effect

10.6.24 The significance of landscape and visual effects will be determined by considering the relationship between the sensitivity of the receptor and the magnitude of impact. A guide to this relationship is set out in the matrix as shown in

10.6.25 Table 10-10. However, should professional judgement consider that the effect is different to that in the matrix, then a reasoned justification will be presented in the LVIA. Similarly, where the matrix allows for different levels of significance of effect (e.g. major or moderate) a reasoned explanation will be provided in the assessment as to the conclusion. This guide is specific to LVIA and therefore differs from other EIA disciplines.

Table 10-10 Classification of Effects Matrix

Sensitivity or value of resource / receptor	*Magnitude of impact*				
	High	*Medium*	*Low*	*Very Low*	*None*
Very High	Major	Major or Moderate	Moderate or Minor	Minor or Negligible	Neutral
High	Major or Moderate	Moderate	Moderate or Minor	Minor or Negligible	Neutral
Medium	Major or Moderate	Moderate or Minor	Minor or Negligible	Negligible	Neutral
Low	Moderate or Minor	Minor	Minor or Negligible	Negligible	Neutral
Very low	Minor	Minor or Negligible	Negligible	Negligible	Neutral

10.6.26 Following the classification of an effect, clear statements will be made within the LVIA as to whether that effect is significant or not significant.

10.6.27 As a general rule, major and moderate (adverse or beneficial) effects are considered to be significant, whilst minor, negligible and neutral effects are considered not to be significant.

Relationship to the Glint and Glare Assessment

10.6.28 The LVIA will review the conclusions of the Glint and Glare Assessment and consider these within assessment of the magnitude of landscape and visual impacts as set above for the visual magnitude of impact.

Relationship to Residential Visual Amenity

10.6.29 The LVIA will assess the potential visual effects to different types of visual receptor, including residential receptors, i.e. private views.

10.6.30 With reference to the Landscape Institute's Technical Guidance Note 2/19: 'Residential Visual Amenity Assessment' (Ref. 152), the Residential Visual Amenity Threshold is considered as to whether:

> *"the effect of the development on Residential Visual Amenity of such nature and / or magnitude that it potentially affects 'living conditions' or Residential Amenity."*

10.6.31 The guidance is based upon a 'four' stage approach. Stages 1 to 3 accord with the above LVIA methodology, whereby, in line with GLVIA3 (Ref. 137), visual receptors are identified, along with the magnitude of impact and the significance of effect.

10.6.32 The fourth step is a more detailed examination of residential properties, where appropriate, when the highest 'significance of effect' levels are identified via stages 1 to 3. Although, as stated by the guidance, there are no '*hard and fast rules'* as to making a judgement on the Residential Visual Amenity Threshold.

10.6.33 Therefore, if at year 15 of operation, i.e. post the establishment of the proposed mitigation there are residential receptors whom are predicted to experience significant adverse effects, a RVAT shall be undertaken, with the methodology stated in the ES.

10.7 Assumptions, Limitations and Uncertainties

10.7.1 All fieldwork will be undertaken from publicly accessible locations. Professional judgement will be used to assess residents' views, aided by aerial photography and fieldwork observations.

10.7.2 Short term durations are considered to be two years or less; medium term durations are considered to be between two and ten years, and long-term durations are considered to be more than ten years.

10.7.3 Agreement will be sought on viewpoints through consultation with Essex County Council Landscape Advisor, and verified views and photomontages will be prepared from a select number of the agreed viewpoints.

10.7.4 For the construction phase assessment, the assumptions are that construction activity will be undertaken across the Site boundary at the same time and during winter. This assumes that existing deciduous vegetation is not in leaf, thereby representing a worst case assessment scenario. PRoW which cross the Site boundary will be temporarily closed and therefore recreational receptors along these routes will not be assessed for the construction phase.

10.7.5 For the year 1 operation assessment, the assumptions are the Scheme will be operational across all of the Site boundary, the season will be winter, and deciduous vegetation will not be in leaf. This therefore reflects a worst-case assessment scenario;

10.7.6 For the year 15 operation, the assumptions are that the Scheme is operational across all of the Site boundary, the season is summer, such that existing vegetation and proposed planting is in leaf. All new planting would have successfully established, having increased in height by 5 metres since the year 1 assessment (i.e. 1 metre of growth every three years).

10.7.7 For the decommissioning assessment, the assumptions are the Scheme is no longer operational, and the solar panels and associated structures and equipment are being removed in a manner similar to the construction phase, requiring machinery and localised excavation. The proposed Green Infrastructure would remain.

10.7.8 Uncertainties at this stage are the layout, siting and heights of the solar panels, sub-stations and associated structures. The LVIA study area, landscape and visual receptors will be reviewed accordingly in relation to the heights of these features, informed by ZTVs.

10.7.9 A lighting assessment is scoped out of the assessment, as any lighting during the construction phase would be temporary and any lighting during operation will be on temporarily.

11. Noise and Vibration

11.1 Introduction

11.1.1 This section sets out the scope and methodology for the noise and vibration assessment of the Scheme.

11.1.2 Note that the scope of this section considers noise and vibration effects on human receptors and excludes assessment of noise and vibration on ecological or heritage receptors. In-combination effects on local ecological or heritage receptors due to the introduction of the proposed development will be considered in ***Chapter 7: Cultural Heritage*** and ***Chapter 8: Ecology***.

11.2 Study Area

11.2.1 For the purposes of providing an assessment of likely significant noise and vibration effects the Study Area has been determined by receptors within 500m of the Site boundary (including cable routes).

11.2.2 At this stage the nearest sensitive receptors (predominantly residential properties) are identified in Table 11-1 and their locations relative to the Site boundary shown in Figure 11-1. These receptors have been determined by desktop study; a finalised list of assessment receptors will be selected through the scoping process and consultation with key stakeholders including Environmental Health Officers of Braintree District Council, Chelmsford City Council, and Essex County Council.

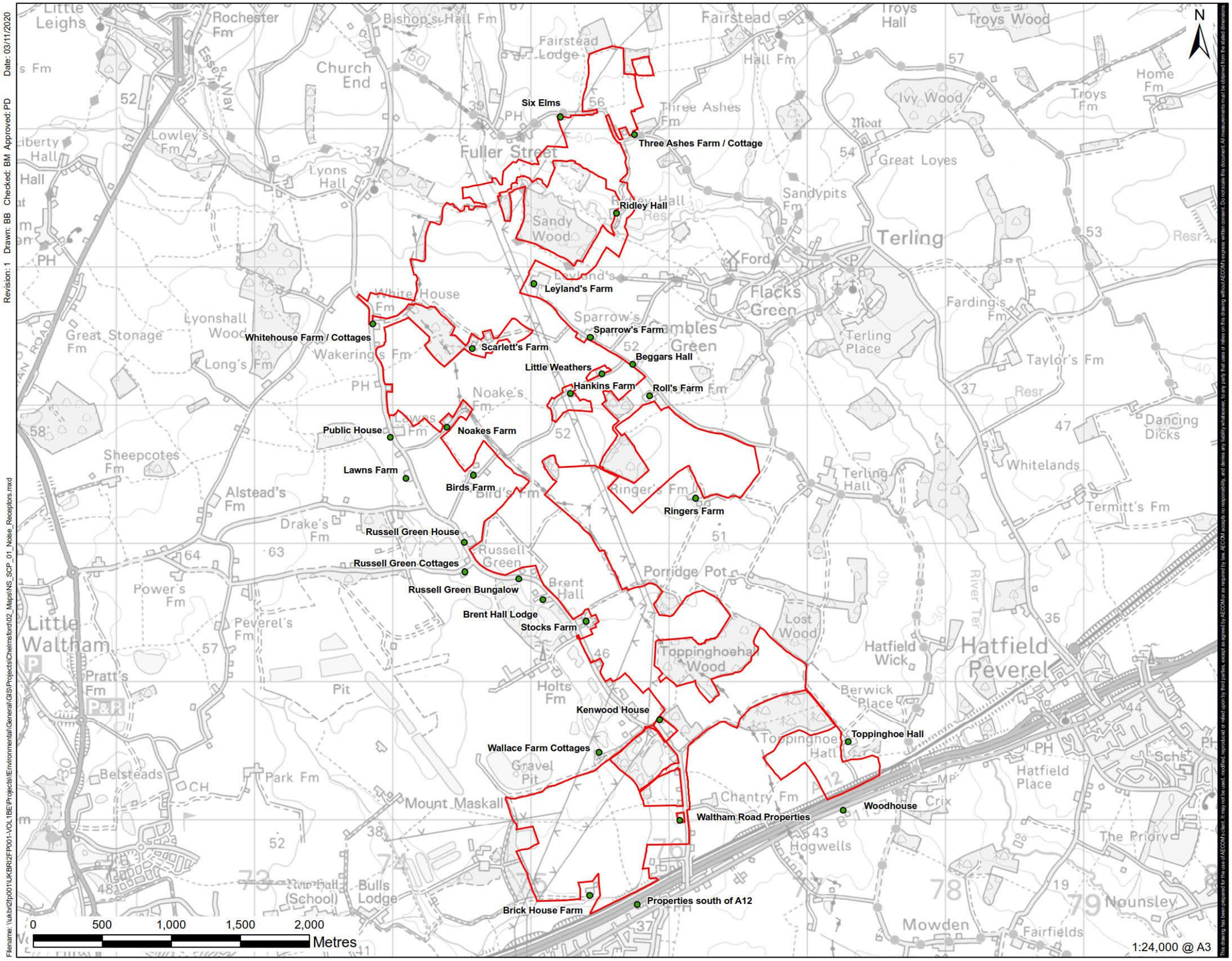
Table 11-1 Sensitive Receptor Locations

Name	*Approximate Co-ordinates (Latitude – Longitude)*
Beggars Hall	51°47'58.81"N 0°32'50.19"E
Birds Farm	51°47'34.16"N 0°31'48.66"E
Brent Hall Lodge	51°47'4.51"N 0°32'13.21"E
Hankins Farm	51°47'52.47"N 0°32'26.33"E
Kenwood House	51°46'35.37"N 0°32'55.75"E
Lawns Farm	51°47'33.91"N 0°31'23.12"E
Leyland's Farm	51°48'18.49"N 0°32'13.93"E
Little Weathers	51°47'56.83"N 0°32'38.58"E
Noakes Farm	51°47'45.52"N 0°31'39.29"E
Public House	51°47'43.68"N 0°31'17.77"E
Ridley Hall	51°48'34.27"N 0°32'46.10"E
Ringers Farm	51°47'26.94"N 0°33'12.27"E
Roll's Farm	51°47'51.26"N 0°32'56.24"E
Russell Green Bungalow	51°47'9.53"N 0°32'4.40"E
Russell Green Cottages	51°47'11.61"N 0°31'44.10"E

Name	*Approximate Co-ordinates (Latitude – Longitude)*
Russell Green House	51°47'18.55"N 0°31'44.34"E
Scarlett's Farm	51°48'3.79"N 0°31'49.89"E
Six Elms	51°48'57.27"N 0°32'26.27"E
Sparrow's Farm	51°48'5.44"N 0°32'34.60"E
Stocks Farm	51°46'59.08"N 0°32'29.25"E
Three Ashes Farm / Cottage	51°48'52.51"N 0°32'54.02"E
Toppinghoe Hall	51°46'28.66"N 0°34'6.62"E
Whitehouse Farm / Cottages	51°48'10.30"N 0°31'12.67"E
Wallace Farm Cottages	51°46'28.29"N 0°32'32.45"E
Waltham Road Properties	51°46'11.73"N 0°33'1.96"E
Brick House Farm	51°45'54.87"N 0°32'27.03"E
Properties south of A12	51°45'52.44"N 0°32'44.88"E
Woodhouse	51°46'12.65"N 0°34'3.73"E

11.2.3 Note that, as discussed in section 11.1.2, the assessment of noise effects on ecological or built heritage receptors is outside the scope of this chapter.

Figure 11-1 Noise Receptors



AECOM

PROJECT
Longfield Solar Farm, Essex

CLIENT
Longfield Solar Energy Farm Limited

CONSULTANT
AECOM Limited
3rd Floor Portwall Place
Portwall Lane
Bristol, BS1 6NA
T: +44 1173150548
www.aecom.com

LEGEND
Site Boundary
Noise Receptors

NOTES
DO NOT SCALE. Red line is a representation of the site boundary suitable for the Ordnance Survey 50K raster basemapping.

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ISSUE PURPOSE
SCOPING

PROJECT NUMBER
60624362

SHEET TITLE
Noise Receptors

SHEET NUMBER
Figure 11-1

Date: 03/11/2020 Checked: BM Approved: PD
Drawn: BB
Revision: 1
Filename: \\ukbr02fp001\UKBR\2FP001-VOL-1\BE\Projects\Environmental\General\GIS\Projects\Chelmsford\02_Maps\NS_SCP_01_Noise_Receptors.mxd

11.3 Planning Policy Context and Guidance

11.3.1 Legislation, planning policy and guidance relating to noise and pertinent to the Scheme comprises:

Legislation

- Control of Pollution Act 1974 (Ref. 18); and
- Environmental Protection Act 1990 (Ref. 99).

National Planning Policy

- The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref. 5) sets out national policy for energy and will be an 'important and relevant consideration' in the Secretary of State's ('SoS') determination of consent in respect of the Scheme. Reference will be made to Section 5.11 and Paragraphs 5.11.4 to 5.11.7, in relation to the assessment of noise;
- The NPS for Electricity Networks Infrastructure (Ref. 6), taken together with NPS EN-1, provides the primary basis for decisions taken by the SoS on applications it receives for the categories of nationally significant electricity networks infrastructure included within it. Reference will be made to Section 2.9 and Paragraphs 2.9.7 which relates to noise from substation equipment;
- The NPPF (Ref. 7) contains the government's planning policies relating to noise in Paragraph 170 and 180; and
- The Noise Policy Statement for England (NPSE) (2010) (Ref. 153) sets out the long-term vision of the government's noise policy.

National Guidance

- Planning Practice Guidance: Noise (Ref. 154) provides guidelines that are designed to assist with the implementation of the noise requirements set out in the NPPF.

Local Planning Policy

- Braintree District Council Core Strategy (2011) (Ref. 10): with particular reference to Policy CS9, which states "Renewable energy proposals will be supported where impacts on amenity, wildlife, heritage assets and landscape are acceptable";
- Braintree District Council Draft Local Plan (2017) (Ref. 13), with particular reference to:
  - Policy LPP61, which states "Proposals for all new developments should minimise all emissions and other forms of pollution (including light and noise pollution)…"; and
  - Policy LPP63, which states "Renewable energy schemes will also need to demonstrate that they will not result in unacceptable impacts on residential amenity including visual impact, noise, shadow flicker, reflection, odour, fumes and traffic generation".
- Chelmsford City Council Core Strategy and Development Control Policies (2008) (Ref. 155) with particular reference to:
  - Policy DC4, which states "All development proposals should safeguard the amenities of the occupiers of any nearby properties by ensuring that development would not result in excessive noise, activity or vehicle movements, overlooking or visual intrusion and the built form would not adversely prejudice outlook, privacy, or light enjoyed by the occupiers of nearby properties"; and
  - Policy DC29, which states "Planning permission will be refused for development, including changes of use, which will or could potentially give rise to polluting

emissions to land, air, and water by reason of noise, light, smell, fumes, vibration or other (including smoke, soot, ash, dust and grit) unless appropriate mitigation measures can be put in place and permanently maintained".

- Chelmsford City Council Focussed Review – Core Strategy and Development Control Policies (2013) (Ref. 156) with particular reference to Policy DC23, which states "Planning permission will be granted for renewable and low carbon energy generating projects provided they: […] i) do not cause demonstrable harm to local wildlife and their habitats or residential amenities through pollution, noise generation, vibration or shadow flicker…"; and
- Chelmsford Local Plan Full Council Version (2020) (Ref. 157), with particular reference to:
  - Policy DM19, which states "Planning permission will be granted for renewable or low carbon energy developments provided that they […] do not cause demonstrable harm to residential living environment"; and
  - Policy DM29, which states "Planning permission will be granted for development proposals provided […] The development shall also not result in excessive noise…".

11.4 Baseline Conditions

11.4.1 The land use in the Site is primarily agricultural. The surrounding land use is also arable farming, woodland, residential and quarries. There are individual and clusters of residential properties located within and adjacent to the site boundary.

11.4.2 The dominant sources of sound in the area are considered to be road traffic on the A12 to the south and Waltham Road to the west; train movements to/from Hatfield Peveral station to the south; and operational activity noise associated with the Hanson Bulls Lodge Quarry to the west.

11.5 Potential Effects and Mitigation

Construction and decommissioning noise and vibration (temporary effects)

11.5.1 Potential noise and vibration effects during the construction and decommissioning phases are likely to include works activities associated with site preparation, plant installation, substation construction, cable laying, and construction-related vehicle movements within the Site boundary and along access routes.

11.5.2 Measures to control noise as defined in Annex B of BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise' (Ref. 158) and measures to control vibration as defined in Section 8 of BS 5228:2009+A1:2014 'Part 2: Vibration' (Ref. 158). will be adopted where reasonably practicable.

11.5.3 These measures represent 'Best Practicable Means' (BPM) (as defined by section 72 of the Control of Pollution Act 1974) (Ref. 18) to manage noise and vibration emissions from construction activities. Examples of BPM that may be implemented during construction works are presented below:

- Unnecessary revving of engines will be avoided, and equipment will be switched off when not in use;
- Appropriate routing of construction traffic on public roads and along access tracks;
- Drop heights of materials will be minimised;
- Plant and vehicles will be sequentially started up rather than all together;
- Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be carried out away from such areas; and

- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturer's specifications.

11.5.4 Embedded measures relevant to the construction phase will be described within a Framework CEMP.

Operational noise (reversible long-term effects)

11.5.5 The potential noise effects during operation of the Scheme are likely to include noise from solar farm plant (e.g. inverters, transformers, switchgears) and associated battery storage plant (e.g. cooling units, transformers), the on-site substation (e.g. transformers), and any associated vehicle movements.

11.5.6 Plant items such as solar PV modules, PV module mounting structures, and cabling (both onsite and via the cable route) will not produce any operational noise emissions.

11.5.7 No major vibration sources are envisaged to be introduced as part of the Scheme and as such there will be no associated operational vibration effects. It is proposed that operational vibration is scoped out of any further assessment.

11.5.8 At this stage no specific noise mitigation measures have been included for operational plant. However, based on the proposed plant installations it is assumed that plant will be designed to have no tonal, impulsive or intermittent features.

11.5.9 As the plant design is progressed, the specification of plant and machinery with low noise emission and properly attenuated supply and extract terminations will help to minimise noise emissions. The use of enclosures, local screening, mufflers, and silencers will also be used as appropriate.

11.6 Assessment Methodology

11.6.1 The criteria presented in ***Chapter 5: EIA Methodology***, of this Scoping Report, will be followed in assigning categories to construction and operational phase noise and vibration impacts, and determining if the effects are significant.

11.6.2 Baseline noise monitoring will be carried out to establish the noise environment around the Site and representative of surrounding noise sensitive receptors. Monitoring will be undertaken at selected locations representative of noise-sensitive receptors around the Site. The monitoring procedures will follow guidance from BS 7445-1:2003 'Description and environment of environmental noise – Part 1: Guide to quantities and procedures' (Ref. 159) and BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (Ref. 160). A combination of long-term unattended and short-term attended measurements will be used. A weather station will also be installed for the duration of the noise surveys so any periods of adverse weather conditions could be identified and omitted from noise data.

11.6.3 Baseline noise surveys will be carried out post-scoping, and the scope and methodology will be sought to be agreed in consultation with the Environmental Health Officers of Braintree District Council, Chelmsford City Council, and Essex County Council, where possible, prior to commencent of surveys.

11.6.4 Noise and vibration levels associated with construction and decommissioning works will be assessed (at chosen sensitive receptors, intended to be agreed with the Environmental Health Officers at Braintree District Council, Chelmsford City Council, and Essex County Council) using the data and procedures given in BS 5228:2009+A1:2014 Part 1: Noise and Part 2: Noise (Ref. 158).

11.6.5 The temporary changes in road traffic noise levels along the local road network due to construction traffic will be assessed based on guidance from the Institute of Environmental Management and Assessment (IEMA) Guidelines for environmental noise impact assessment (2014) (Ref. 161).

11.6.6 The impact of the proposed operational plant will be assessed following guidance from BS 4142:2014 (Ref. 160), based on available information on the operating conditions and the levels of noise generated by the plant.

Assumptions, Limitations and Uncertainties

11.6.7 Noise effects during the decommissioning phase of the Scheme will be similar or less than noise effects during the construction phase. The noise assessment presented for the construction phase will therefore be considered representative (or an overestimate) of the decommissioning phase. As such a separate assessment for noise from the decommissioning phase is not proposed.

11.6.8 Predictions of sound levels have an associated degree of uncertainty. Modelling and measurement processes have been carried out in such a way to reduce such uncertainty; however, it is unavoidable that some degree of prediction uncertainty remains.

11.6.9 Construction works noise levels will be predicted following guidance from BS 5228:2009+A1:2014 (Ref. 158) which provides a realistic estimate of sound propagation from construction plant. The predictions will use representative noise levels, sourced from industry standard guidance documents such as BS 5228:2009+A1:2014 (Ref. 158), for typical items of plant that are used in such developments as advised by the Applicant.

11.6.10 Construction phase vibration will be assessed based on historic vibration measurement data from relevant guidance documents including BS 5228:2009+A1:2014 (Ref. 158) and TRL Report 429 (Ref. 162). No predictions of ground-borne vibration propagation are proposed.

11.6.11 Predictions of operational plant and activities sound pressure levels will be undertaken following guidance to ISO 9613 ‘Attenuation of sound during propagation outdoors’ (Ref. 163), which are based on an assumption of moderate downwind propagation, and hence could be considered as a worst-case calculation. However, the standard also indicates an estimated accuracy of ±3 dB(A) in predicted levels.

11.6.12 Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort will be made to ensure that measurements are undertaken in such a way as to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions, and school holiday periods (which are often considered to result in atypical sound levels). However, a small degree of uncertainty will always remain in the values taken from such a measurement survey.

12. Socio-Economics and Land Use

12.1 Introduction

12.1.1 This section sets out the scope and methodology for the socio-economics and land use assessment of the Scheme.

12.2 Study Area

12.2.1 Impacts on potentially sensitive socio-economic receptors will be assessed by various geographical impact areas. Impact areas will depend on the nature and type of receptor being assessed and will be set out in the ES.

12.3 Planning Policy Context and Guidance

12.3.1 There is no applicable legislation specific to the assessment of socio-economics. Planning policy and guidance relating to socio-economics and pertinent to the Scheme comprises:

National Planning Policy

- NPS EN-1 (Ref. 5) with particular reference to and 4.1.4 in relation to adverse effects and benefits, paragraph 4.2.1 in relation to EU directive requirements, paragraph 4.2.2 in relation to socioeconomics, paragraph 5.10.8 in relation to impacts on best and most versatile agricultural land, and paragraph 5.12.2 in relation to socio-economics; and
- NPPF (Ref. 7) with particular reference to Section 6: Building a strong, competitive economy (paragraphs 80, 82-83), Section 12: Achieving well designed places (paragraphs 127-128) and Section 15: Conserving and enhancing the natural environment (paragraph 170b, in relation to impacts on best and most versatile agricultural land) and Section 17 (Facilitating the sustainable use of minerals).
- National Economic Development Policy (Ref. 164) with particular reference to the Government's Industrial Strategy White Paper ambitions to increase productivity and drive growth, one way that is highlighted is through Clean Growth to lead the world in the development, manufacture and use of low carbon technologies.
- Planning Practice Guidance (2016) (Ref. 165) with particular reference to guidance on planning and the economy and the potential future needs of the population in terms of economic development, jobs and employment opportunities.

Local Planning Policy

- Braintree District Council Draft Local Plan (2017) (Ref. 13) with particular reference to Policy LPP 8 (Rural Enterprise), Policy LPP 73 (Protecting and Enhancing Natural Resources, minimising pollution and Safeguarding from Hazards) and Policy LPP 76 (Renewable Energy Schemes).
- Braintree District Council Core Strategy (2011) (Ref. 10) with particular reference to Policy CS4 (Provision of Employment), Policy CS5 (The Countryside) and Policy CS11 (Infrastructure services and facilities).
- Chelmsford Local Plan 2013-2036 (2020) (Ref. 8) with particular reference to Policy DM4 (Employment areas and rural employment areas), Policy S11 (The role of the countryside) and Policy S2 (Addessing climate change and sustainable development).
- Chelmsford Climate Action Plan (2020) (Ref. 166) with particular reference to Policy 5a (Increase electricity usage from renewable energy sources) and Policy 5c (Investing in green technology including solar farms).

12.4 Baseline Conditions

12.4.1 The potential impacts arising from the Scheme are assessed relative to the baseline conditions and benchmarked against regional and national standards where appropriate. The key indicators and measures of the areas will be established for:

- population and deprivation;
- an overview of the local economies;
- the local labour markets; and
- land use.

12.4.2 A high level summary of baseline conditions has been presented in the following paragraphs, based upon review of the following documents:

- 2001 and 2011 Census Data (Ref. 167);
- ONS (2019); Mid-Year Population Estimates (2018) (Ref. 168);
- English Indices of Deprivation (2019) (Ref. 169);
- ONS (2019); UK Business Register and Employment Survey (Ref. 170);
- ONS (2017); Gross Value Added (Income Approach) (2016) (Ref. 171);
- ONS (2020); Annual Population Survey (January 2019 to December 2019) (Ref. 172);
- ONS (2020); Claimant Count: K02000001 UK: People: SA: Thousands (Ref. 173);
- ONS (2019); Local statistics (Ref. 174).
- Natural England (2010); Agricultural Land Classification map Eastern Region (ALC008) (Ref. 175).

12.4.3 The site is located within the areas administered by Braintree District Council and Chelmsford City Council. This section will establish the baseline conditions in both local authorities.

12.4.4 The population of Braintree has grown from 143,890 in 2008 to 151,560 in 2018. This represents an increase of 5%. In Chelmsford the population has grown from 165,040 in 2008 to 177,070 in 2018, representing an increase of 7% (Ref. 168).

12.4.5 Braintree district council is the 211th most deprived out of the 326 national boroughs (as defined by the indices of multiple deprivation) (Ref. 169). None of the LSOAs in the borough are within the top 10% deprived boroughs in the country. Chelmsford is however slightly more deprived ranked 253rd out of the 326 national boroughs, but with none of the LSOAs in the borough are within the the top 10% deprived boroughs in the country.

12.4.6 The Braintree economy performs worse than the regional (East of England) economy in a number of measures. In Braintree, Gross Value Added (GVA) per head is £20,574 compared to the East of England average of £24,116 and the England and Wales average of £25,722 (Ref. 171). The Distribution sector, the Real Estate Acitivties sector, Manufacturing sector and Construction sector make up the greatest percentages of gross value added to the Braintree economy.

12.4.7 GVA per head is slightly higher in Chelsmford in 2016 (£24,848) compared to the average for the East of England (£24,166) and slightly below the average for Great Britain (£25,722) (Ref. 171). The sectors which contribute the most towards GVA in Chelmsford are the Public Administration sector, Distribution, Construction and the Real Estate activities sector.

12.4.8 In 2019, the Annual Population Survey showed that 31.3% of working age residents in Braintree have a degree level qualification or higher (National Vocational Qualification [NVQ] Level 4+), significantly lower to the rate in Chelmsford (36.7%), the East of England (36.8%) and England and Wales (40.0%). Similarly, the proportion of residents in Braintree with no qualifications is 8%, which is significantly higher than 4.3% recorded for Chelmsford and

similar to the rates recorded for East of England (7.2%) and England and Wales (7.5%) (Ref. 172).

12.4.9 The broad industrial groups which employ the most people in Braintree are the manufacturing sector (12% of total employment), the health sector (10.9%) and retail sector (9%). These industrial groups are also prominent within Chelmsford with 16.7% of total employment within the health sector and 10.6% in the retail sector. However, the manufacturing sector only contributes towards 4.5% of employment in Chelmsford significantly lower than Braintree and the entirety of the East of England (7.4%) (Ref. 170).

12.4.10 In addition, the mining, quarrying and utilities broad industrial group (which includes employment from the generation of energy) is the same in Braintree and Chelmsford with only 1.3% of total employment allocated to energy related industries. This is the same rate represented in the region of East of England (1.3%) and national levels (1.2%) (Ref. 170).

12.4.11 In 2019, approximately 74,000 people were employed in Braintree and 87,500 employed in Chelmsford. The economic activity rate of 16-64 year olds in Braintree was 80.4%, 80.8% in Chelmsford both of which very similar to the East of England rate (80.6%) and above the national rate (78.9%) (Ref. 172). In 2019, the unemployment rate for 16-64 year olds in Braintree was 3.1% slightly higher than in Chelmsford (2.6%) and significantly lower than than the regional (3.9%) and national (4.9%) rate. Braintree also has a lower proportion of working age residents (60.7%) compared to Chelmsford (61.8%) and the regional (61.3%) and national (62.9%) averages.

12.5 Potential Effects and Mitigation

12.5.1 The Scheme may generate a range of socio-economic effects, some of which would be temporary, whilst others would be permanent. For the purposes of this ES, due consideration will be given to the Scheme in terms of the following:

- temporary employment during the construction and decommissioning phases of the Scheme;
- gross value added during the construction and decommissioning phases of the Scheme;
- creation of long-term employment opportunities once the Scheme is operational including consideration of any existing employment uses on-site (principally related agricultural land uses): and
- the change of land use within the Site boundary and any impacts that occur due to this. Likely impacts are anticipated to arise from the displacement of agricultural land uses for the duration of the Scheme. Consideration will also be given to impacts experienced by users or recreational facilities, open space (including PRoW), community facilities and development land.

12.6 Assessment Methodology

Baseline

12.6.1 Relevant policy will be reviewed at the local, regional and national levels to identify the key issues of relevance to the Scheme. This will include Local Plans, and any relevant SPG, NPS and NPPF measures.

12.6.2 A baseline assessment will be undertaken using a range of sources to provide a description of the socio-economic conditions within the local area and at borough level, including employment and the economy. This will be done using established statistical sources, such as:

- 2001 and 2011 Census Data (Ref. 167);
- Business Register and Employment Survey (BRES) (2019) (Ref. 170);
- Claimant Count Data (2020) (Ref. 173); and

- Labour Force and Neighbourhood Statistics (2018/19) (Ref. 174).

12.6.3 As described in Section 12.8, Agricultural Land Classification (ALC) soil surveys will be undertaken for the land parcels at the Site.

Assessment of effects (including significance)

12.6.4 An assessment of effects will be undertaken to assess the impact of the Scheme on the baseline socio-economic conditions. The methodology for assessing socio-economic impacts will follow standard EIA guidance and will entail:

- Assessment of the likely scale, permanence and significance of effects associated with socio-economic receptors; and
- An assessment of the potential cumulative effects with other schemes within the surrounding area.

12.6.5 The assessment of potential socio-economic effects will use policy thresholds and expert judgment to assess the scale and nature of the effects of the Scheme against baseline conditions. For socio-economics there is no accepted definition of what constitutes a significant (or not significant) socio-economic effect. It is however recognised that effects are categorised based upon the relationship between the scale (or magnitude) of effect and the sensitivity (or value) of the affected resource or receptor.

12.6.6 As such, the socio-economic effects will be assessed on the basis of:

- Consideration of sensitivity to effects: specific values in terms of sensitivity are not attributed to socio-economic resources/receptors due to their diverse nature and scale, however the assessment takes account of the qualitative (rather than quantitative) 'sensitivity' of each receptor and, in particular, their ability to respond to change based on recent rates of change and turnover (if appropriate);
- Scale of effect: this entails consideration of the size of the effect on people or business in the context of the area in which effects will be experienced; and
- Scope for adjustment or mitigation: the socio-economic study is concerned in part with economies. These adjust themselves continually to changes in supply and demand, and the scope for the changes brought about by the Scheme to be accommodated by market adjustment will therefore be a criterion in assessing significance.

12.6.7 The assessment aims to be objective and quantifies effects as far as possible. However, some effects can only be evaluated on a qualitative basis. Effects are defined as follows:

- Beneficial classifications of effect indicate an advantageous or beneficial effect on an area, which may be minor, moderate, or major in effect;
- Negligible classifications of effect indicate imperceptible effects on an area;
- Adverse classifications of effect indicate a disadvantageous or adverse effect on an area, which may be minor, moderate or major in effect; and
- No effect classifications indicate that there are no effects on an area.

12.6.8 Based on consideration of the above, where an effect is assessed as being beneficial or adverse, the scale of the effect has been assigned using the below criteria:

- Minor: a small number of receptors are beneficially or adversely affected. The effect will make a small measurable positive or negative difference on receptors at the relevant area(s) of effect;
- Moderate: a noticeable number of receptors are beneficially or adversely affected. The effect will make a measurable positive or negative difference on receptors at the relevant area(s) of effect; and

- Major: all or a large number of receptors are beneficially or adversely affected. The effect will make a measurable positive or negative difference on receptors at the relevant area(s) of effect.

12.6.9 Those effects which are found to be moderate or major are considered to be 'significant' and those which are minor or negligible are 'not significant'.

12.6.10 Duration of effect is also considered, with more weight given to reversible long-term or permanent changes than to temporary ones. Temporary effects are considered to be those associated with the construction works. Long-term reversible effects are generally those associated with the completed and operational development. For the purposes of this assessment, short term effects are considered to be of one year or less, medium term effects of one to four years and long-term effects for five or more years.

12.6.11 There are no defined thresholds for assessing the effects of non-agricultural development on agricultural assets. The NPPF states that *"planning policies and decisions should contribute to and enhance the natural and local environment by … recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland"*. BMV land is defined in Annex 2 of the NPPF as land in Grades 1, 2 and 3a of the Agricultural Land Classification (ALC). Identification and consideration of BMV agricultural land is therefore necessary and the loss of BMV is a measure of the effect of the Scheme.

12.6.12 There is no definition of 'significance' either within EIA guidance or in the NPPF regarding the loss of agricultural land. However, the alternative use of 20 ha or more of BMV agricultural land for predominantly non-agricultural purposes, requires consultation with Natural England. Based on this threshold and on professional experience, the alternative use of 20 ha or more of BMV agricultural land would be identified as a potential significant adverse effect.

12.7 Assumptions, Limitations and Uncertainties

12.7.1 Information on current land use from landowners on the Site will be required to determine existing employment generated within the existing Site. In the absence of this information, good practice guidance and professional judgement will be applied.

13. Transport and Access

13.1 Introduction

13.1.1 This section outlines the anticipated traffic and transport scope of assessment for the Scheme. A Transport Scoping Note / Access Strategy will also be prepared, which will set out the proposed scope specific to the future Transport Assessment, which will be fully consistent with the approach set out below. Highways England and the County Highway Authority will be consulted on the Transport Scoping Note and Access Strategy to determine, and seek agreement on, the scope and approach.

13.2 Study Area

13.2.1 Due to the nature of the Scheme, consideration will need to be given to a number of locations within the surrounding highway network which could potentially be impacted. Junctions likely to require consideration include:

- Waltham Road junction with B1137 Main Road, Boreham;
- B1137 Main Road junction with A130 Colchester Road, A138 Chelmer Road and A12 Junction 19 Slip Roads, Chelmsford (the 'Boreham Interchange');
- Boreham Road junction with Cranham Road, Russell Green;
- Wheelers Hill junction with A130 Essex Regiment Way, Chelmsford.

13.2.2 The extent of the study area for assessment in terms of highway impact will be subject to discussion, and agreement will be sought, with Highways England and Essex County Council as Highway Authorities for the Strategic Road Network (SRN) and Local Road Network (LRN) respectively.

13.3 Planning Policy Context and Guidance

13.3.1 Planning policy and guidance relating to transport and pertinent to the Scheme comprises:

National Planning Policy

- NPS EN-1 (Ref. 5), section 5.13, with particular reference to paragraphs 5.13.3, 5.13.4 and 5.13.5, which state that if a project is likely to have significant transport implications, a Transport Assessment, Travel Plan and, if necessary, additional transport infrastructure should be provided to mitigate the impacts of the proposed development; and
- NPPF (Ref. 7), with particular reference to Paragraph 108 Part C, which states that any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

National Guidance

- Planning Practice Guidance, Travel Plans, Transport Assessments and Statements in Decision Taking (Ref. 176).

Local Planning Policy

- Essex County Council Essex Transport Strategy: the Local Transport Plan for Essex (June 2011) (Ref. 177), with particular reference to Policy 6 Freight Movement which seeks to ensure that heavy goods vehicles and other freight traffic uses the most appropriate routes;
- Essex County Council Development Management Policies adopted (February 2011) (Ref. 178), with particular reference to Policies DM1 General Policy, DM13 Transport

Assessments, DM19 HGV Movement and DM20 Construction Management which highlight the requirement for safe and efficient movement of people and goods by all modes of travel and that proposals which will generate a significant number of HGV movements are well connected to strategic routes and, where appropriate, subject to routing / construction management plans and supported by a Transport Assessment;

- Chelmsford City Council Chelmsford Local Plan 2013-2036 (adopted May 2020) (Ref. 8), with particular reference to Policies DM19 Renewable and Low Carbon Energy, which identifies that proposals should not have a detrimental impact on highway safety;
- Braintree District Council Local Development Framework Core Strategy (adopted September 2011) (Ref. 10); and
- Braintree District Council Local Plan Publication Draft for Consultation (June 2017) (Ref. 13).

13.3.2 The policies set out above relate to how traffic and transport related impacts should be dealt with, in terms of identifying the level of impact, as well as mitigation, which might be necessary. Therefore, in accordance with the policies and guidance set out above, a Transport Assessment will be prepared (scope and approach to be confirmed with Highways England and Essex County Council Highway Authorities), which identifies the impact of the Scheme, and what, if any, mitigation is required.

Industry Guidance

13.3.3 Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Road Traffic (1993) (Ref. 179), provides guidance on examining the environmental impacts of developments in terms of traffic and transportation.

13.4 Baseline Conditions

13.4.1 Baseline conditions for the land within the Site will be described in detail in the ES, however for the purposes of this scoping study, they have been summarised below.

Existing Local Highway Network

13.4.2 The existing local highway network which surrounds the Site is described below:

- The area of land encompassed within the Site is located to the north of the A12, a dual carriageway road which forms part of the Strategic Road Network (SRN) managed by Highways England. The A12 can be accessed via the B1137 Main Road, Boreham at Junction 19, the Boreham Interchange, for southbound traffic and/or the B1137 The Street, Hatfield Peverel at Junction 20B, the Hatfield Peverel Interchange (North), for northbound traffic. The B1137 is a single carriageway road with footways along the majority of its length and street lighting provision within the villages of Boreham and Hatfield Peverel. The extant speed restrictions applicable on the B1137 vary along its route, comprising the National Speed Limit (60mph) between Boreham Interchange and the village of Boreham, 40mph in Boreham itself, a section of National Speed Limit (60mph) east of Boreham, a section of 50mph speed restriction west of Hatfield Peverel and 30mph in Hatfield Peverel itself.
- The Scheme encompasses an area of agricultural land located east of Waltham Road and Boreham Road, a single carriageway route connecting Boreham to the south with Great Leighs to the north. Waltham Road and Boreham Road are rural single carriageway roads, serving a mixture of localised residential, leisure, agricultural, commercial and industrial land uses, subject to the National Speed Limit (i.e. 60mph) and, commensurate with their rural character, without pedestrian footway or street lighting provsion. Waltham Road and Boreham Road directly abut the Site at various locations en-route and it is anticipated that access will be taken directly from Waltham Road or Boreham Road via a new access located in the approximate vicinity of Stocks Farm and Holts Lane.

- Boreham Road forms a priority junction with Cranham Road, a rural single carriageway route connecting to the A130 Essex Regiment Way at Chelmsford via Wheelers Hill. Cranham Road and Wheelers Hill are subject to the National Speed Limit (i.e. 60mph) and, commensurate with their rural character, without pedestrian footway or street lighting provision.
- The Site also abuts small sections of Braintree Road, which is a rural single carriageway road, accessed from Boreham Road and serving the village of Terling. Braintree Road is rural in character, subject to the National Speed Limit (60mph) and without pedestrian footway or street lighting provision.
- Other routes crossing the Site include Terling Hall Road, a narrow rural single carriageway road, principally serving agricultural properties, which can be accessed from either the B1137 Main Road (comprising a 12'6" height restriction) or via Boreham Road (although this route is signed as 'Unsuitable for HGVs').

Existing Walking Facilities

13.4.3 Due to the location of the Scheme in rural Essex, no footways are provided alongside the carriageways in the vicinity. There are a number of Public Rights of Way (PRoW) passing through the site or running adjacent to the Site boundary as follows;

- PRoW 113_3, Footpath, North of Braintree Road
- PRoW 113_5, Footpath, North of Braintree Road
- PRoW 113_1/PRoW 76_4, Footpaths, North of Hookley Wood adjacent to site boundary
- PRoW 113_11, Footpath, South of Sandy Wood adjacent to site boundary
- PRoW 221_53/PRoW 113_33, Footpaths, Crosses through Scarlett's Wood.
- PRoW 113_25, Footpath, near Noakes Farm
- PRoW 213_1, Footpath, near Birds Farm
- PRoW 113_30/PRoW 213/4/PRoW 113_32, Footpaths, north of Ringers Wood
- PRoW 213_5/PRoW 113_32, Footpaths, east of Stocks Farm
- PRoW 213_18, Footpath, near Kenwood House
- PRoW 213_19. Footpath, through Toppinghoehall Wood adjacent to site boundary
- PRoW 90_35, Footpath, west of Toppinghoe.
- PRoW 231_20 Footpath, east of Waltham Road
- PRoW 213_17/PRoW 213_17 footpaths, near Wallace's Farm Cottages
- PRoW 213_48, Bridleway near The Grove
- PRoW 90_36/PRoW 90_35/PRoW 90_44 Footpaths south of Toppinghoehall Wood.

13.4.4 The detail of the PRoWs has been obtained from Essex County Council (Ref. 180).

13.4.5 These PRoW routes will be reviewed to establish use where possible, and to identify if routes need to be temporarily diverted to ensure safe access for members of the public during construction, otherwise PRoWs may need to be either temporarily or permanently diverted/closed.

Existing Cycling Facilities

13.4.6 There are no on or off-road cycling facilities within the immediate vicinity of the Site; however, the roads surrounding the Site are generally lightly trafficked and therefore would not deter cyclists. Further detail on the provision of cycle routes and facilities and any deficiencies which exist will be detailed within the Transport Assessment.

Existing Equestrian Facilities

13.4.7 There are no formal equestrian facilities (i.e. Bridleways) in the vicinity of the Site: however, the roads surrounding the Site are generally lightly trafficked and therefore would not necessarily deter equestrians.

Existing Public Transport Facilities

13.4.8 At present, there are no public transport services or bus stops located on Waltham Road or Boreham Road. The nearest served bus stops are located on the B1137 Main Road in the village of Boreham. These stops provide a half-hourly service on weekdays and hourly service on Saturdays between Chelmsford and Colchester via Witham and a roughly two-hour frequency service between Chelmsford and Maldon.

13.5 Potential Effects and Mitigation

13.5.1 The nature of the Scheme is such that the greatest impact is likely to occur during the construction and decommissioning phases and this will be the focus of the assessment of transport effects presented in the ES.

13.5.2 The potential effects as a result of the Scheme during the construction and decommissioning phases are:

- Increase in HGV movements;
- Increase in abnormal loads;
- Travel to and from site by construction employees; and
- Increase in delay to vehicles, pedestrians, cyclists and equestrians due to increase in HGV movements.

13.5.3 Although the Scheme is located near to a number of settlements including Chelmsford, Braintree, Witham, Boreham, Great Leighs and Hatfield Peverel in the vicinity, it is not considered likely that visitors, be it during the construction, operational or decommissioning phases, will do so by foot, bicycle or public transport. Therefore, this has not been detailed in this Scoping Report although for completeness these modes will be reviewed within the Transport Assessment.

13.5.4 Consideration will also be given to those users of local facilities which could be impacted by the Scheme.

13.5.5 Vehicular access during construction, operation and decommissioning is anticipated to be taken from the following locations:

- To/From the A12 (i.e. access to/from the South of the Scheme) via the B1137 Main Road, Boreham and Waltham Road / Boreham Road.
- To/From the A130 Essex Regiment Way (i.e. access to/from the North of the Scheme) via Wheelers Hill, Cranham Road and Boreham Road.

13.5.6 Further detail on proposed access to the Scheme will be included within the ES, the Transport Assessment and an Access Strategy, which will be submitted with the DCO application.

13.5.7 At this stage it is anticipated that, as a worst case during the peak construction period, there could be up to 42 HGV deliveries per day. In addition, there will be Light Goods Vehicle (LGV) deliveries and vehicle movements associated with construction worker arrivals and departures. Construction traffic forecasts will be confirmed in the ES and TA.

13.5.8 The potential mitigation measures, which could be implemented during the construction and decommissioning phases, include:

- Restriction of HGV movements to certain routes, days of the week and times of the day; and

- Upgrading of routes where considered necessary to cater for the additional vehicles.

13.5.9 Potential impacts during the construction and decommissioning phases are typically considered as short term, as defined in ***Chapter 5: EIA Methodology***, as enduring for up to 12 months after construction.

13.5.10 The Transport Assessment and Access Strategy will consider the impact of the proposed Highways England A12 Widening Scheme, anticipated to start in 2023/24 and end in 2027/28, upon the Scheme and construction traffic peak assessment. The preferred route of the A12 Widening in the vicinity of the Scheme is predominantly on-line (i.e. upgrading of existing carriageway) and comprises potential improvements to J19 (Boreham Interchange) and the removal of the existing J20A and J20B to be replaced by a new J21 east of Hatfield Peverel.

13.5.11 During the operational phase, the Scheme will be manned by up to five people working across the site. Staff vehicles and those used for maintenance are primarily four wheeled drive vehicles and vans, with heavy good vehicles rarely accessing the site. Therefore, due to the low level of trips likely to be generated within the network peak hours (i.e. 5 arrivals and 5 departures daily), it is proposed to exclude operational phase transport effects from the EIA. Further detail of the operational stage transport arrangements will be set out in the ES and Transport Assessment to support this approach.

13.6 Assessment Methodology

Sources of Baseline Information and Consultation

13.6.1 To inform the assessment of the Scheme, information from a number of sources will be collected. The sources which will be used are set out below:

- Local travel information will be gathered from various sources including local bus operators and the local council;
- Personal Injury Accident (PIA) data obtained from Essex County Council;
- OS / Architectural Base Mapping will be used to ascertain an accurate geographical representation of the areas in the vicinity of the Scheme; and
- Mode share data from the 2011 Census.

13.6.2 Peak hour traffic counts will be identified from historic data or WebTRIS information obtained from Highways England. Traffic counts will be undertaken, if considered necessary and subject to Covid-19 Pandemic restrictions, at a number of locations in the vicinity of the Scheme to determine the baseline traffic conditions of the surrounding highway network. The extent of the traffic data and scope for any traffic surveys that may be required will be agreed with the County Highways Authorities, as statutory consultees, where possible.

13.6.3 To determine the impact of the Scheme, a number of scenarios will be assessed using the information collated above. The scenarios considered appropriate for assessment are:

- Baseline (2021) – AM, PM and Daily;
- Peak Construction Year (2024) Without Development – AM, PM and Daily; and
- Peak Construction Year (2024) With Development – AM, PM and Daily.

13.6.4 The peak construction year of 2024 is considered appropriate at this stage as it corresponds with the anticipated peak construction year for the purpose of the EIA, as described in ***Chapter 5: EIA Methodology***, of this Scoping Report.

13.6.5 For the purposes of the EIA, the decommissioning assessment year is considered to be 2065. This year will not be considered in the Transport Assessment in terms of junction assessments as it is considered too far into the future to be able to accurately predict traffic flows or junction forms.

13.6.6 The Transport Scoping Note will be formally presented to Highways England and Essex County Council as statutory consultees in order to seek to agree the scope of the transport related assessment. At this stage, it is not considered that junction capacity analysis will be required. This will be discussed and agreed with Highways England and Essex County Council, where possible.

Impact Assessment Methodology

13.6.7 In accordance with the IEMA guidance for assessing the environmental impacts of road traffic (Ref. 179), the following criteria will be considered in this assessment.

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian and cyclist amenity;
- Fear and Intimidation;
- Accidents and safety; and
- Hazardous loads.

13.6.8 The significance of effect is determined through consideration of two elements; the magnitude of the impact and the sensitivity of the receptor. The following sections outline the approach that would be used to determine these factors.

13.6.9 The overall effect will be determined by measuring the magnitude of the impact following mitigation measures (where applicable) against criteria including; the number of activities of the population affected; the type and sensitivity of the receptor; and the type of impact. Effects are defined as beneficial or adverse, with effects further defined using the following classifications:

- **Minor** – slight, very short, or highly localised impact of no significant consequence;
- **Moderate** – limited impact (by extent, duration or magnitude) which may be considered significant; and
- **Major** – considerable impact by extent, duration or magnitude) of more than local significance, or in breach of recognised acceptability, legislation, policy or standards.

13.6.10 The IEMA guidelines (Ref. 179) state that the magnitude of each impact should be determined as the predicted deviation from the baseline conditions. This will be done for the construction and decommissioning phases.

13.6.11 IEMA (Ref. 179) sets out a number of criteria by which the magnitude of impact can be measured. These are outlined below. Many of the criteria do not provide specific thresholds by which such impacts can be measured, and as a result will be measured qualitatively where necessary. These are described below.

13.6.12 **Severance** is defined in the IEMA guidelines (Ref. 179) as the *"perceived division that can occur with a community when it becomes separated by a major traffic artery"*. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impeded pedestrian access to essential facilities. IEMA guidelines suggest that a 30%, 60% and 90% increase in traffic flows will result in a low, medium, and high change in severance respectively.

13.6.13 **Driver Delay** will be determined through the analysis of junction capacity assessments, contained within the Transport Assessment, which will be measured in terms of change in delay per vehicle (in seconds) from the baseline situation. This criterion is considered to be

applicable to all modes of transport using the public highway, namely cars, motorcycles, pedal cycles and buses.

13.6.14 **Pedestrian Delay** is considered to be affected by the changes in volume, composition or speed of traffic, in terms of their respective impacts on the ability of pedestrians to cross roads. In general, increases in traffic levels and/or traffic speeds are likely to lead to greater increases in pedestrian delay.

13.6.15 **Pedestrian and Cycle Amenity** is broadly defined as *"the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic"*. The guidance suggests that a tentative threshold for judging the significance of changes in pedestrian and cycle amenity would be where the traffic flow is halved or doubled.

13.6.16 **Fear and Intimidation** is *"dependent on the volume of traffic, its HGV composition, and its proximity to people or the lack of protection caused by such factors as narrow pavement widths"*.

13.6.17 A detailed assessment of **Accidents and Safety** will be carried out by examination of road traffic accident data for the most recent five-year period available. This analysis will be included in the Transport Assessment and undertaken to highlight if there are any existing safety issues on the local road network which may be exacerbated by the Scheme. The outcome of the assessment will be presented in the ES.

13.6.18 With regard to **Hazardous and Dangerous Loads**, the guidance indicates that *"the Statement should include a risk or catastrophe analysis to illustrate the potential for an accident to happen and the likely effect of such an event."* Analysis of the road network within the study area indicates that there are no particular features, such as a significant vertical drop immediately beyond the carriageway, which would suggest that the transfer of materials poses a particular risk beyond that which would be expected on the general highway network. It is concluded that the impacts of Hazardous and Dangerous Loads do not warrant further consideration in the preparation of the ES. The projected impacts of the Scheme will be measured separately, dependent upon the receptor, for the construction and decommissioning periods of the Scheme.

13.6.19 In terms of **Severance**, **Pedestrian Delay**, **Pedestrian / Cycle Amenity** and **Fear and Intimidation**, the links within easy walking / cycling distance of the Site will be used as receptors. For the construction impacts, the sensitivity of pedestrian routes and cycle routes is based on a qualitative assessment of the 2021 baseline scenario, taking into consideration the importance and attractiveness of the route and the destinations served. The thresholds are defined as:

- **Neutral Sensitivity:**

  Rural road with no pedestrian / cycle facilities provided;

- **Low Sensitivity:**

  Strategic vehicular route in a rural setting with pedestrian / cycle facilities;

- **Medium Sensitivity:**

  Main vehicular route with pedestrian / cycle facilities provided in built up area; and

- **High Sensitivity:**

  Lightly trafficked route provided in town centre setting.

13.6.20 In terms of **Driver Delay, Accidents and Safety and Hazardous Loads**, the impacts of the Scheme, both construction and decommissioning will be assessed at junction level. The sensitivity of these receptors will be expressed in terms of Ratio to Flow Capacity (RFC) or Degree of Saturation (DoS). The worst-case peak hour assessments from the 2024 Without Scheme scenario junction modelling from the Transport Assessment for the junctions agreed with the County Highway Authorities will be assessed.

13.6.21 The thresholds for sensitivity of junctions have been defined as:

- Low Sensitivity: RFC / DoS below 90%
- Medium Sensitivity: RFC / DoS between 90% and 95%
- High Sensitivity: RFC / DoS above 95%

13.6.22 In order to determine the effect on specific receptors, both the sensitivity of receptors and the magnitude of impact, as outlined above, are considered. Table 13-1 below shows the matrix that has been used to determine the effect category. Effects which are classified as major or moderate are considered to be significant.

Table 13-1 Matrix for Determining Effect Category

Impact Magnitude	*Receptor Sensitivity*			
	High	*Medium*	*Low*	*Neutral*
Major Adverse	**Major Adverse**	**Major Adverse**	**Moderate Adverse**	Neutral
Moderate Adverse	**Major Adverse**	**Moderate Adverse**	Minor Adverse	Neutral
Minor Adverse	**Moderate Adverse**	Minor Adverse	Minor Adverse	Neutral
Neutral	Neutral	Neutral	Neutral	Neutral
Minor Beneficial	Moderate Beneficial	Minor Beneficial	Minor Beneficial	Neutral
Moderate Beneficial	Major Beneficial	Moderate Beneficial	Minor Beneficial	Neutral
Major Beneficial	Major Beneficial	Major Beneficial	Moderate Beneficial	Neutral

13.7 Assumptions, Limitations and Uncertainties

13.7.1 At this stage the exact extent of the study area cannot be confirmed in terms of traffic and transport as detailed discussions have not yet taken place with Highways England or Essex County Council as Highway Authorities for the SRN and LRN respectively. The area proposed as part of this Scoping Report is determined by AECOM's understanding of the road network and where the likely impacts will be; however, it is anticipated that this will be formally agreed with Highways England and Essex County Council. Any additional junctions requested by the Highway Authorities will be assessed as part of both the Transport Assessment and the EIA.

14. Other Environmental Topics

14.1.1 The aim of the scoping stage is to focus the EIA on those environmental aspects that may be significantly affected by the Scheme. The following section provides a summary of other environmental topics which have been considered during the preparation of this Scoping Report. It is proposed that these topics can be addressed relatively briefly and qualitatively, without requiring modelling, detailed assessment, or standalone chapters. The Other Environmental Issues chapter of the ES will include a brief assessment of each of the topics mentioned below, supported by a technical note that will be appended to the ES where supplementary information is helpful. The generic EIA methodology set out in ***Chapter 5: EIA Methodology***, of this Scoping Report, will not apply to this chapter; it may not be necessary for example to outline an assessment methodology or baseline conditions if it is quickly obvious that the impacts will be none or negligible.

14.2 Air Quality

14.2.1 Chelmsford City Council and Braintree District Council, which are the respective councils for the Site, undertake routine ongoing monitoring of ambient air quality monitoring as part of their Local Air Quality Management responsibilities under Part IV of the Environment Act (1995) (Ref. 19).

14.2.2 There are no Air Quality Management Areas (AQMAs) within the vicinity of the Site. This infers that the Site is not located in an area where the concentrations of nitrogen dioxide (NO_2) or fine particulate matter (PM_{10}) exceed their annual mean air quality objective. The nearest AQMAs are within Chelmsford City Council's jurisdiction and are located in Danbury and Chelmsford, approximately 6km south and 5.8km southwest of the Site, respectively (Ref. 181). There are no AQMAs declared within Braintree District (Ref. 182). Chelmsford City Council's AQMAs are not anticipated to be affected by the Scheme.

14.2.3 In 2018, three of the 12 NO_2 diffusion tube monitoring sites operated by Braintree District Council recorded concentrations above the objective value of 40 $\mu g/m^3$. The closest of these diffusion tubes to the Site is situated 5.75km east of the Site (Ref. 182).

14.2.4 In 2018, four of the 55 NO_2 diffusion tube sites operated by Chelmsford City Council recorded concentrations above the objective value of 40 $\mu g/m^3$; these monitoring sites are located in Chelmsford and Danbury, approximately 5.8km and 6km from the Site, respectively. The Council's particulate monitoring sites did not record any exceedances of the relevant objectives during 2018, and have been compliant with legislative limit values for the past 5 years (Ref. 181).

14.2.5 The potential air quality impacts of the Scheme are considered to be:

- Impacts of dust arising during the construction and decommissioning phases of the Scheme; and
- Impacts of vehicle and plant emissions during the construction and decommissioning phases of the Scheme.

14.2.6 No effects are anticipated during operation due to the low number of anticipated vehicle movements and the nature of the Scheme.

14.2.7 Following construction, the Scheme is expected to result in minimal alteration to the baseline situation in respect of air quality. No emissions are anticipated from the on-site infrastructure, and, as described in Paragraph 2.4.6, there will be minimal vehicle movements to and from the Site. Therefore, consideration of air quality impacts during the operational phase is proposed to be scoped out of the EIA.

14.2.8 The potential impacts from dust emissions arising from activities during the construction and decommissioning phases of the Scheme will be considered using an approach based on the Institute of Air Quality Management's (IAQM) guidance (2014) (Ref. 183) for assessing impacts from such activities. This is a screening assessment and a risk-based qualitative assessment approach and is applied for air quality assessments throughout the UK. Mitigation measures will be identified and incorporated into the Framework CEMP. Through the use of a CEMP, no significant air quality impacts from dust generation are envisaged.

14.2.9 As part of this assessment, potential sensitive receptors will be identified for the construction and decommissioning of the Scheme based on a review of aerial photography, construction and decommissioning phasing plans and OS mapping, and with consideration to current guidance, including:

- Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction (Ref. 183); and
- Defra (2018) Local Air Quality Management Technical Guidance (TG16) (Ref. 184).

14.2.10 Construction and decommissioning related plant emissions are anticipated to represent a small source of emissions relative to ambient local conditions in the vicinity of the Site based on the scale of construction that will occur and the number of plant vehicles that will be required. However, suitable mitigation measures for plant and motorised equipment will be recommended based on advice prescribed in in the IAQM (2014) (Ref. 183) guidance, and incorporated into the Framework CEMP.

14.2.11 The anticipated number of vehicles that will be in operation during the construction and decommissioning phases of the Scheme have been considered in the context of the guidance published by Environmental Protection UK (EPUK) / IAQM (2017) (Ref. 185), IAQM (2014) (Ref. 183) and EPUK (2010) (Ref. 186). The latter sets out the criteria to establish the need for an air quality assessment for the construction phase of a development as being *"Large, long-term construction sites that would generate large HGV flows (>200 movements per day) over a period of a year or more."*

14.2.12 It is therefore anticipated that incorporating air quality mitigation measures into the Framework CEMP will negate the need for a specific air quality chapter in the ES.

14.3 Land Quality

14.3.1 This section will consider the likely effects on land-use that could result from the construction and operation of the Scheme. It is generally accepted that where ground-mounted solar PV developments are proposed to be sited on agricultural land, it should be demonstrated that poorer quality land is used in preference to higher quality, and that options are explored for continued agriculture use.

14.3.2 An Agricultural Land Classification (ALC) survey of the Site boundary will be undertaken in October 2020 with reference to the Ministry of Agriculture, Fisheries and Food guidelines.

14.3.3 The Development will result in a change to the dominant land-use within the Site, from its current use for arable cultivation, to that of energy generation using solar PV.

14.3.4 It is not currently confirmed how the land will be managed under and around the solar PV modules. There is potential for continued agricultural use of the land through grazing and the proposals relating to this will be presented in the ES to inform the assessment.

14.3.5 The physical effects of the Scheme on existing land-use patterns are assessed by considering the effect of the Scheme on the current land-use of the Site. The assessment of the sensitivity of land-use receptors would be undertaken with reference to the ALC survey results and the subsequent status of the land as not best and most versatile (BMV) agricultural land. Significant effects in terms of the EIA Regulations would be those which resulted in a moderate or major change affecting a sensitive or valuable landuse resource.

14.4 Glint and Glare

14.4.1 Glint and glare in this context is the effect of reflected sunlight causing harm or discomfort to a sensitive receptor. A glint can be defined as the momentary receipt of a bright light and a glare can be defined as the receipt of a bright light over an extended or continuous period of time (Ref. 187).

14.4.2 Glint and glare assessments are sometimes required to accompany planning applications for solar developments, depending on the determining authority's judgement of their need. There are no guidelines setting out a particular methodological approach, but the receptors of interest are specified in the NPPF (Ref. 7) as well as guidance issued by the DCLG (Ref. 139) which states:

"Particular factors a local planning authority will need to consider include… the effect on landscape of glint and glare and on neighbouring uses and aircraft safety."

14.4.3 As described in Section 10.6, the effect of glint and glare on landscape will be considered in the EIA, and presented within the LVIA chapter of the ES.

14.4.4 There are several aviation receptors identified in the wider area as listed below:

- Approximately 7.5km north of the Site is Rayne Hall Farm Airfield.
- Approximately 13.5km north east of the Site is Earls Colne Airfield.
- Approximately 21km north west of the site is London Stanstead Airport.

14.4.5 Other potential receptors include nearby motorists using the A12, and local PRoW.

14.4.6 Construction and decommissioning activities are expected to be undertaken in accordance with a CEMP. This will include information on how reflective surfaces are to be treated during construction and decommissioning phases with a view toward their final placement across the Site. It is expected that avoidance of the effects of glint and glare will be considered as part of construction and decommissioning planning. Further, the scale of the Site is such that the full areas will not be occupied for the duration of these phase activities and the movement of reflective surfaces will be temporarily localised to smaller areas on a rolling basis until works are complete. Based on the nature of the activities, the distances to receptors and the use of a CEMP, construction and decommissioning effects are proposed to be scoped out of the assessment.

14.4.7 Operational effects are considered to be fixed and will last for the duration of the Scheme. The interaction of solar PV panels with sensitive locations, such as vehicular junctions or pedestrian crossings on roads is primarily influenced by their siting, as solar PV panels require orientation toward the sunpath, and the choice of materials, where more reflective, or specular surfaces create a higher chance of creating distraction through discomfort or disability glare.

14.4.8 As described in Paragraph 2.2.7, two possible options for panel orientation are being considered at this stage. The first option is for the modules to face to the south, which is commonly seen on existing UK solar farms. With this configuration, the modules are expected to be angled towards the south at a slope of 15 to 35 degrees from horizontal. The second option is for modules to be oriented towards the east and west, which is less commonly seen on existing UK solar farms. With this configuration, the modules are expected to be angled towards the east and west at a slope of 5 to 20 degrees from horizontal. This option removes the potential for the creation of mid-day glare toward the south from high sun in summer and sun at a lower elevation during winter months. This limits potential effects by panels to morning and afternoon hours where the sun sits lower in the sky.

14.4.9 The setback mounting of the solar PV panels within the Site from its boundaries combined with the distance to potential receptors, limited orientation for angling of solar panels to west / east and angling of the panels from horizontal could help to limit how and where potential occurrences of glare could be created by the Site.

14.4.10 Further, the dark colour and a matt material finish of the solar PV panels could minimise potential occurrences of reflected light, reducing the likelihood that glare conditions could be created from the panels themselves.

14.4.11 Based on the expected design, screening and distance to sensitive receptors, significant effects are not considered likely. Nevertheless, as the design develops, consideration will be given to the potential for solar reflections to impact on sensitive receptors. This will include undertaking calculations to determine whether the solar PV panels will be visible from sensitive locations and if a solar reflection could occur, whether it is likely to be a significant nuisance or hazard. If it is likely to be a nuisance or hazard, mitigation will be proposed.

14.4.12 As appropriate, the results and recommendations of any glint and glare calculations will be incorporated into the Scheme design and presented as a technical appendix to the ES. It is considered that this will negate the need for a specific glint and glare chapter in the ES.

14.5 Ground Conditions

14.5.1 The Model Procedures for the Management of Land Contamination[4] (Ref. 188) indicates that the first step in evaluating land contamination risks is a Preliminary Risk Assessment (PRA). The objective of the PRA is to identify and evaluate potential land quality risks and development constraints associated with the Scheme and to construct an initial conceptual site model that can be used to inform future decision making and the design future ground investigation.

14.5.2 A Phase 1 PRA report is being prepared, covering land within the Site. The Phase 1 PRA will be presented as a technical appendix to the ES.

14.5.3 The Phase 1 PRA will include the following:

- Details of land within the Site and surrounding land including development history, geology, hydrogeology, hydrology, soil and groundwater quality and environmental setting;
- Details of land designated for Mineral Safeguarding;
- Details of any available site investigation reports for land within the Site;
- Details from a site walkover documenting:
  - The existing layout, current operations and condition of land within the Site, the property boundaries and immediately surrounding land;
  - The visual inspection of any accessible site storm-water, foul and offsite effluent discharges;
  - A visual inspection (non-intrusive) of the external building fabric of potential structures and inspection of an asbestos register (if available);
- A conceptual site model (CSM) and an evaluation of potential contamination linkages; and
- Conclusions and recommendations based on the findings.

14.5.4 Based upon the phase 1 PRA, a number of environmental design and management measures will be employed as standard best practice to minimise impacts to both human health and controlled waters during the construction and decommissioning phase of the Scheme, including those listed in Table 14-1 below. These will be incorporated into the Framework CEMP which will be provided alongside the ES as part of the DCO application.

14.5.5 Potential environmental impacts that will be avoided, prevented, reduced or offset through the implementation of these mitigation measures include:

[4] Due to be replaced by online guidance “Land Contamination: Risk Management” (https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks) during 2020.

- Human exposure through direct contact / inhalation / dermal uptake of contaminants;
- Creation of preferential pathways and mobilisation of contamination;
- Contamination of natural soils, driving of contamination into an aquifer during piling, contamination of groundwater with concrete, paste or grout;
- Pollution and degradation of water quality of any underlying aquifer;
- Infiltration and / or runoff into the local drainage / sewerage network - pollution of drainage and sewerage network and any adjacent surface water features;
- Run-off and infiltration of contaminants from material stockpiles;
- Contamination of drainage and sewerage network and/or groundwater; and
- Spread of nuisance dusts and soils to the wider environment and local roads.

Table 14-1 Environmental Design and Management Measures to be included in the CEMP

Environmental Design and Management Measures
Regulatory / Guidance
1. Work will be carried out in accordance with relevant Construction Design Management Regulations 2015 (Ref. 22), details of these measures will be presented within the Health and Safety Plan (H&SP), and the CEMP.
2. The CEMP will be prepared prior to commencement of works, setting out the management, monitoring, auditing and training procedures, and the mitigation measures that will be put in place during enabling works and construction, to maintain compliance with the applicable regulations. In order to reduce the likelihood of contamination and protect human health and controlled waters from effects related to ground conditions, the CEMP will include mitigation measures such as those presented here.
3. A Pollution Response Plan will be drafted prior to the commencement of works on-site. The plan will outline key pollution mitigation measures including a Control of Substances Hazardous to Health (COSHH) / fuel inventory and key contacts to be notified in the event of a significant pollution incident, which may subsequently lead to the contamination of controlled waters. Any fuel and COSHH chemicals will be stored in accordance with the relevant Environment Agency Pollution Prevention Guidance (PPG) notes (while these guidance notes have been withdrawn they are still considered to provide a useful data source). Tanks and dispensing pumps will be locked when not in use to prevent unauthorised access. Information regarding spill prevention and disposal of COSHH items will be provided as part of the standard site induction presentations and during regular toolbox talks and the works progress.
4. Piling will be carried out in accordance with Environment Agency Guidance Note on Piling / Penetrative Ground Improvement Methods on Land Affected by Contamination (Ref. 189) and ground investigations will inform the Foundation / Piling Works Risk Assessment which will define the appropriate piling methods and foundation design to mitigate risk.
5. Specification of concrete used in foundations and building structures will be selected based on the results of the chemical composition of the site soil and groundwater. Guidance is provided by the BRE series 'Concrete in Aggressive Ground' (Ref. 190).
Waste
6. Waste materials will be disposed of by the contractor(s) to appropriate recycling facilities or appropriately licensed landfills in line with a Construction Resource Management Plan (equivalent to a Site Waste Management Plan). The appropriate landfill for the disposal of any contaminated soil off-site will depend on the waste classification determined from the chemical analysis or Waste Acceptance Criteria testing as necessary.
7. Waste effluent will be tested for appropriate physical and chemical parameters and, where necessary, disposed of at the correctly licensed facility by a licensed specialist contractor(s).
Construction Related
8. Oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, include the siting of storage area away from surface water drains, on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected

Environmental Design and Management Measures

from vandalism and kept locked up when not in use. Details of appropriate storage and handling measures will be presented within the CEMP.

9. Vehicles will be well maintained to prevent accidental pollution from leaks. Static machinery and plant will include drip trays beneath oil tanks / engines / gearboxes / hydraulics, which will be checked and emptied regularly via a licensed waste disposal operator.
10. The Lead Flood Authority (LFA) and the appropriate utility company will be consulted on the potential requirement for an oil interceptor and sediment trap at the point where site surface water runoff enters any sewerage network.
11. A spillage Emergency Response Plan (ERP) will be produced (and could form part of the CEMP), which site staff will be required to have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material.
12. Appropriate handling and disposal of pile arisings, concrete, pastes and/or grouts during the laying of foundations.
13. During the enabling and construction stage of work, the contractor(s) will employ dust suppression measures when necessary to prevent the potential mobilisation of contaminated dust particles and their migration off-site.
14. Stockpiles and material handling areas will be kept as clean as practicable to avoid nuisance from dust. Dusty materials will be dampened down using water sprays in dry weather or covered.
15. The length of time materials are stockpiled on-site before being removed for re-use, recycling or disposal is to be kept to a minimum and stockpiles are to be covered with tarpaulins prior to disposal.
16. Dust generating equipment (e.g. mobile crushing) and screening equipment will be located to minimise potential nuisance impacts to receptors, as far as practicable.
17. Complaints about dust will be investigated at the earliest opportunity and appropriate action taken to control the source or remedy the impact as appropriate.
18. Access roads will be regularly cleaned and damped down with water.
19. All vehicles entering and leaving the site during the construction period will pass through a wheel washing facility. Vehicles used to transport materials and aggregates will be enclosed or covered in a tarpaulin. Vehicle movements will be kept to a minimum and vehicle speeds within the site will be limited.
20. Appropriate use of personal protective equipment (PPE) and implementation and adherence to Health & Safety Protocols, Plans and Procedures. Construction workers will remain vigilant of ground conditions at all times and will report to the Principal Contractor any suspect areas of potential contamination.
21. Potentially contaminated made ground will be removed from excavations.
22. Advice should be sought by an environmental specialist should materials suspected of being contaminated be uncovered.

14.5.6 On-site activities when the development is complete and operational will be limited to the maintenance of the infrastructure. During maintenance activities there may be the need to use oils, grease, fuels, lubricants or cleaning agents on-site. There is a small risk of chemical pollution arising from accidental spillages during these operations. An Operational Environmental Management Plan will be prepared following grant of DCO to address all operational related issues. This will include a spillage Emergency Response Plan (ERP), which maintenance staff will be required to have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material. Operational activities are proposed to be scoped out of the assessment.

14.5.7 It is anticipated that the results and recommendations of the Phase 1 PRA, once incorporated into the Framework CEMP, along with the environmental design and management measures above, for the construction, operation and decommissioning phases, will negate the need for a specific ground conditions chapter in the ES.

14.6 Human Health

14.6.1 The design, including in-built buffers from sensitive receptors, will minimise any risk to human health resulting from the operation of the Scheme. Limited interactions with human health during construction, operational and decommissioning are possible, and will be covered elsewhere in the ES including:

- Air Quality (see Section 14.2 of this Scoping Report);
- Land Quality (see Section 14.3 of this Scoping Report);
- Noise (see Chapter 11 of this Scoping Report);
- Transport and Access (see Chapter 12 of this Scoping Report); and
- Visual Amenity (See Chapter 10 of this Scoping Report).

14.6.2 Power frequency electric, magnetic and electromagnetic fields (EMFs) arise from generation, transmission, distribution and use of electricity and occur around power lines and electric cables and around domestic, office or industrial equipment that uses electricity and electric fields are the result of voltages applied to electrical conductors and equipment.

14.6.3 Fences, shrubs and buildings can block electric fields. Magnetic fields are produced by the flow of electric current; however most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source.

14.6.4 Electric fields depend on the operating voltage of the equipment. Magnetic fields depend on the electrical currents flowing and are not significantly limited by most common materials. Typically, ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line, but can be higher at small distances from the cable.

14.6.5 There is no direct statutory provision in the planning system relating to protection from EMFs. Guidance published by DECC in 2012 (Ref. 191) suggests that guidelines for both public and occupational exposure published by the International Commission on Non – Ionizing Radiation Protection (ICNIRP) in 1998 (Ref. 192) should be taken into account.

14.6.6 The DECC guidance (Ref. 191) states that *"overhead power lines at voltages up to and including 132 kV, underground cables at voltages up to and including 132 kV and substations at and beyond the publicly accessible perimeter"* are not capable of exceeding the ICNIRP exposure guidelines and therefore no assessment is required for these and other types of infrastructure listed on the Energy Networks Association website (Ref. 193).

14.6.7 Therefore, since the assessment of EMFs is proposed to be scoped out of the ES, and other aspects will be covered elsewhere in the ES, it is not proposed to provide a specific chapter on Human Health. Nevertheless there will be appropriate signposting of health impacts in the ES to enable these to be identified.

14.7 Major Accidents or Disasters

14.7.1 The EIA Regulations (Ref. 1) have introduced a requirement to consider major accidents or disasters. It is considered likely that the original changes to the EIA Directive (Ref. 194) to consider major accidents or disasters were made in order to bring certain other statutory requirements, mainly other EU Directives, within the overall 'wrapper' of EIA and the ES. The Directive and domestic Regulations cite two specific directives as examples of risk assessments to be brought within EIA, these are Directive 2012/18/EU of the European Parliament and of the European Council (which deals with major accident hazard registered sites) (Ref. 195) and Council Directive 2009/71/Euratom (which deals with nuclear sites) (Ref. 196). Neither of these Directives is relevant to the Scheme.

14.7.2 'Accidents' are considered to be an occurrence resulting from uncontrolled developments in the course of construction and operation of a development (e.g. major emission, fire or

explosion). 'Disasters' are considered to be naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake).

14.7.3 In the absence of established guidance on this topic, the following methodology has been adopted. In general, major accidents or disasters, as they relate to the Scheme, fall into three categories:

a. Events that could not realistically occur, due to the nature of the Scheme or its location;

b. Events that could realistically occur, but for which the Scheme, and associated receptors, are no more vulnerable than any other development; and

c. Events that could occur, and to which the Scheme is particularly vulnerable, or which the Scheme has a particular capacity to exacerbate.

14.7.4 An initial scoping exercise was undertaken to identify all possible major accidents or disasters that could be relevant to the Scheme. This list was drawn from a number of sources, including the UK Government's Risk Register of Civil Emergencies (Ref. 197). Major accidents or disasters with little relevance in the UK were not included. The long list of major accidents or disasters is presented in Appendix B.

14.7.5 This long list was then screened to identify the third group of major accidents or disasters listed above, to form a shortlist of events to be taken forward for further consideration.

14.7.6 Although the majority of the major accidents or disasters on the long list are already considered under other legislative or design requirements, this is not considered to be sufficient reason to automatically eliminate the major accident or disaster from any further consideration. This is consistent with the approach for other topics, for example that the need to comply with nature conservation legislation does not mean that ecology and nature conservation do not need to be considered in EIA. However, where it is concluded that the need for compliance is so fundamental, and the risk of any receptors being affected differently so remote, major accidents or disasters on the long list are not included on the shortlist.

14.7.7 Likewise, it is considered reasonable and proportionate to exclude certain receptor groups from the outset. Construction workers, as a receptor, can be excluded from the assessment, because existing legal protection is considered to be sufficient to minimise any risk from major accidents or disasters to a reasonable level. Legislation in force to ensure the protection of workers in the workplace includes:

- Health and Safety at Work etc. Act 1974 (Ref. 198);
- The Management of Health and Safety at Work Regulations 1999 (Ref. 199);
- The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref. 200); and
- Construction (Design and Management) (CDM) 2015 Regulations (Ref. 22).

14.7.8 Table 14-1 presents a short list of major accidents or disasters that are considered to need further consideration. Where the major accidents and disasters identified are not already being considered within the scope of existing technical assessments, they will continue to be reviewed with the design team to ensure the risks are understood and addressed through design as necessary. However, it is considered highly likely that as the design of the Scheme evolves in preparation of the DCO application, it will become clear that there is no real risk or serious possibility of the event interacting with the Scheme. In that eventuality, we would propose to scope out from the ES the assessment of such major accidents or disasters. The ES would note and explain where this approach has been taken.

Table 14-1 Major Accidents or Disasters Shortlisted for Further Consideration

Major accident or disaster	*Potential receptor*	*Comments*
Floods	Property and people in areas of increased flood risk.	Both the vulnerability of the Scheme to flooding, and its potential to exacerbate flooding, will be covered in the Flood Risk Assessment, and also reported in ES, both in terms of the risk to the Scheme and increased risk caused by the Scheme.
Fire	Local residents, habitats and species.	There may be some potential for fire as a result of the battery storage element of the Scheme. However, the battery energy storage system will include cooling systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire.
Road accidents	Aquatic environment	The risk of road collisions and accidents will be addressed in the Transport Assessment.
	Road users	The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or decommissioning will be considered in the Flood Risk, Drainage and Water Resources chapter of the ES.
		The potential for glint and glare to affect road users will be considered within a technical appendix to the ES if any risks are identified. Mitigation will be considered and, where necessary, incorporated into the Scheme design.
Rail accidents	Rail users	The site is located adjacent to the railway line connecting Chelmsford to Colchester. The potential for glint and glare to affect trains will be considered within a technical appendix to the ES if any risks are identified. Mitigation will be considered and, where necessary, incorporated into the Scheme design.
Aircraft disasters	Pilots and aircraft	The potential for glint and glare to affect aircraft will be considered within a technical appendix to the ES if any risks are identified. Mitigation will be considered and, where necessary, incorporated into the Scheme design.
Flood Defence Failure	Employees	This will be covered in the Flood Risk Assessment and will also be reported in ES, both in terms of the risk to the Scheme and increased risk caused by the Scheme.
Utilities failure (gas, electricity, water, sewage, oil, communications)	Employees and local residents	The Scheme has the potential to affect existing utility infrastructure above and below ground. To identify any existing infrastructure constraints, both consultation and a desk based study will be undertaken. It is known that there is an overhead electricity line located within the Site.
Mining / Extractive Industry	Employees	There is the potential for current or past quarrying activity in the vicinity to lead to unstable ground conditions due to nearby active quarries. However, the risk will be considered as part of the geotechnical design, ensuring that the risk is designed out.
Plant disease	Habitats and species	New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change. The planting design will take

Major accident or disaster	Potential receptor	Comments
		account of biosecurity risks through a wider mix of species including some non-natives.

14.7.9 Where further design mitigation is unable to remove the potential interaction between a major accident or disaster and a particular topic, the relevant ES chapter will identify the potential consequence for receptors covered by the topic, and give a qualitative evaluation of the potential for the significance of the reported effect to be increased as result of a major accident or disaster.

14.7.10 The potential receptors of effects resulting from major accidents or disasters will be reported in the relevant topic chapter, and as such it is considered that this will negate the need for a specific major accidents or disasters topic chapter in the ES. Nevertheless, there will be appropriate signposting of major accident or disaster impacts in the ES to enable these to be identified.

14.8 Telecommunications, Television Reception and Utilities

14.8.1 To identify any existing infrastructure constraints, both consultation and a desk-based study will be undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of development and consultees will include water, gas and electricity utilities providers and telecommunications providers as appropriate. Information obtained from consultation will be used to inform the Scheme design and appropriate protective provisions will be included in the DCO to ensure the protection of apparatus wherever any existing infrastructure has the potential to be affected by the Scheme.

14.8.2 Taking the above into account, it is considered unnecessary that a separate utilities chapter should be produced as part of the ES.

14.9 Waste

14.9.1 A description of the potential streams of construction waste and estimated volumes will be described within the description of development chapter of the ES. In addition to this, the CEMP, which would be produced following receipt of a DCO, will set out how waste will be managed on-site, and opportunities to recycle waste will be explored.

14.9.2 For the operational Scheme, an analysis of the main waste streams will be provided. There will be relatively little waste produced from the operation of the Scheme. It is also not intended to remove significant quantities of material from site during construction (there is no demolition works for example) and there is relatively little waste associated with solar PV and battery storage, except for general waste associated with office/administrative activities. There may however be a need to remove some soils from the Site for treatment or disposal, if found to be contaminated and it is not practical to treat this on-site. However, where possible, soil arisings will be balanced through a cut and fill exercise to retain volumes on site.

14.9.3 As described in Paragraph 2.6.2, during decommissioning site infrastructure will be removed and recycled or disposed of in accordance with good practice and market conditions at that time.

14.9.4 Taking the above into account, it is not proposed to prepare a separate waste chapter as part of the ES.

15. Structure of the Environmental Statement

15.1.1 The ES will consist of two volumes and a Non-Technical Summary (NTS). This section provides a summary of each document that will form the ES.

15.1.2 **ES Volume 1: Main Report** – this will form the main body of the ES, detailing the results of the environmental assessment, likely significant effects arising from the Scheme, and the proposed mitigation measures. The ES will also identify opportunities for social and economic benefits and environmental enhancement. The ES is divided into a number of background and technical chapters, each being supported with figures and tabular information. ES Volume 1 will consider the environmental effects associated with a number of identified topics, which may receive significant environmental effects. Each topic will be assigned a separate technical chapter in the ES as follows:

- Chapter 6: Climate Change;
- Chapter 7: Cultural Heritage;
- Chapter 8: Ecology;
- Chapter 9: Flood Risk, Drainage and Surface Water;
- Chapter 10: Landscape and Visual Amenity;
- Chapter 11: Noise and Vibration;
- Chapter 12: Socio-Economics and Land Use;
- Chapter 13: Transport and Access; and
- Chapter 14: Other Environmental Topics.

15.1.3 In addition to the above, the following chapters will be provided as part of the ES:

- Chapter 1: Introduction;
- Chapter 2: The Scheme;
- Chapter 3: Alternatives and Design Evolution;
- Chapter 4: Consultation;
- Chapter 5: Environmental Impact Assessment Methodology;
- Chapter 15: Effect Interactions; and
- Chapter 16: Summary of Environmental Effects.

15.1.4 **ES Volume 2: Technical Appendices** – A complete set of appendices will be provided for reference. These comprise of background data, technical reports, tables, figures and surveys which support the assessments in ES Volume 1.

15.1.5 **ES Non-Technical Summary (NTS)** – The NTS will be presented in a separate document and provides a concise description of the Scheme, the considered alternatives, baseline, assessment methodology, potential environmental effects and mitigation measures. The NTS will be designed to provide information on the Scheme in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the project.

16. Summary and Conclusions

16.1.1 This Scoping Report represents notification under Regulation 8(1)(b) of the EIA Regulations that the Applicant will undertake an EIA in respect of the Scheme and produce an ES to report the findings of the EIA.

16.1.2 It also represents a formal application to PINS under Regulation 10 of the EIA Regulations for a 'Scoping Opinion' as to the information to be provided within the ES that will form part of the DCO application. This report has identified the environmental effects that are considered to have the potential to be significant and proposes the approach to be used in assessments that will be undertaken for the EIA to characterise and understand the significance of these effects. The prescribed consultees are invited to consider the contents of this report and comment accordingly within the statutory 42 day time period.

16.1.3 For clarity, Table 16-1 presents a summary of the proposed scope of the technical topics as well as which elements of these topics that are to be scoped out and the rationale behind this decision.

Table 16-1 Scope of Technical Topics and Elements to be Scoped Out

Environmental Topic	*Proposed Scope of Assessment*	*Element Proposed to be Scoped Out*	*Rationale for Scoping Out*
Climate Change	Assessment of GHG emissions during construction, operation, and decommissioning. A statement on resilience of the Scheme to future climate changes will be provided.	In-combination impacts of temperature, sea level rise, precipitation change, and changes in wind patterns are proposed to be scoped out of the in-combination climate impact assessment. Sea level rise is proposed to be scoped out of the climate change resilience review.	The Site is not located in an area that is susceptible to sea level change, and no on combination effects with other environmental disciplines is predicted.
Cultural Heritage	It is proposed to undertake an assessment of impact on both physical effects on heritage assets, and effects on their setting including changes to visual intrusion, noise, air quality, severance, access and amenity. Further archaeological work may be required, the extent and scope of which will be determined following completion of a cultural heritage archaeological desk-based assessment, and in consultation with Historic England and the County Archaeologist for Essex. Effects of connection to the National Grid on the setting of heritage assets	None	
Ecology	The EcIA will include consideration of designated sites and protected and/or notable habitats and species. Effects considered include habitat loss, disturbance and indirect impacts such as watercourse pollution during	None	

Environmental Topic	*Proposed Scope of Assessment*	*Element Proposed to be Scoped Out*	*Rationale for Scoping Out*
	construction. Operational effects include disturbance during maintenance, security lighting and management of on-site and adjacent habitats. A Preliminary Ecological Appraisal (PEA) has been undertaken, and further surveys will be undertaken as follows: botanical surveys, aquatic species, reptiles, Great Crested Newt, breeding and wintering birds, bats, badgers and riparian mammals (water vole and otter). A habitat conditions assessment will also be carried out on land within the Site in order to perform a biodiversity net-gain assessment. Effects of connection to the National Grid on ecological receptors during operation will also be assessed should an over-ground option be taken forward.		
Flood Risk, Drainage and Surface Water	Qualitative assessment of the effects of the Scheme, considering the risk to surface and groundwater bodies resulting from construction or decommissioning works or future operation activity using a source-pathway-receptor approach and development of mitigation to control potential effects. The assessment criteria will follow those outlined in the Design Manual for Roads and Bridges (DMRB) LA113 Road Drainage and the Water Environment, as a robust and well tested method for scoping the assessment and predicting the significance of effects of development projects. A Preliminary WFD assessment will be undertaken. A Surface Water Drainage Strategy and FRA will be prepared.	None	
Landscape and Visual Amenity	Assessment of likely effects on landscape features and character, and views and visual amenity during construction, operation and decommissioning. Photomontages from key viewpoints will be prepared for both year 1 and year 15 of operation.	Lighting Assessment	Any lighting during the construction phase would be temporary and lighting during operation will also be on temporarily.
		Dedham Vale AONB	The AONB is approximately 23km north-east of the Site and is scoped out due to the distance and

Environmental Topic	*Proposed Scope of Assessment*	*Element Proposed to be Scoped Out*	*Rationale for Scoping Out*
			intervening features.
Noise and Vibration	Baseline noise monitoring will be undertaken at locations representative of surrounding noise-sensitive receptors. An assessment of construction and decommissioning plant noise, and operational plant will be undertaken. Road traffic noise during the construction and operational phases of the Scheme.	Ground-borne vibration from the construction, operation and decommissioning of the Scheme.	No major vibration sources are envisaged to be introduced as part of the Scheme and as such there will be no associated vibration effects. It is proposed that ground-borne vibration is scoped out of any further assessment
		Operational noise effects associated with the Grid Connection	It is not anticipated that the cabling will produce any operational noise emissions.
Socio-Economics and Land Use	Assessment of effects including temporary employment during construction and decommissioning and gross value added, creation of long term employment opportunities during the operational phase including consideration of any existing uses on-site, and change of land use including displacement of agricultural land and impacts on recreation, open space (including PRoW) and community facilities.	Effects on Mineral Safeguarding Areas, Waste Consultation Areas and Transport Safeguarding Areas.	Scoped out as the only part of the Site within a Mineral Safeguarding Zone would be for potential cable route to the existing Bulls Lodge Substation. Therefore, no impacts upon socio-economic receptors are anticipated to arise.
Transport and Access	Construction vehicle movements associated with the Scheme will be established and assessed in terms of impact on the local highway network. This will include an assessment of the impact on severance, driver delay, pedestrian delay, pedestrian and cyclist amenity, fear and intimidation and road safety. Criteria/ requirements for the above assessments to be considered and discussed with the LHA given these will be temporary construction impacts. Any mitigation measures to be recommended.	Operational vehicle movements due to low numbers of vehicles.	Scoped out due to low vehicle numbers
		Hazardous loads	There are no nearby road features which suggest that the transfer of materials poses a risk beyond that which would be expected on the general highway network.
		Assessments for the decommissioning phase due to uncertainties in relation to future traffic flows and transport infrastructure.	Scoped out due to uncertainties in relation to future traffic flows and transport

16.1.4 Table 16-2 summarises the approach taken to the topics discussed in ***Chapter 14: Other Environmental Topics***, of this Scoping Report.

Table 16-2 Scope of Approach to Other Environmental Topics

Environmental Topic	*Proposed Approach*
Air Quality	Qualitative dust assessment to identify measures to be included in a Framework CEMP. Suitable mitigation measures for construction and decommissioning plant and motorised equipment will be included in the Framework CEMP. Effect of Scheme operation and operational traffic on air quality is proposed to be scoped out.
Land Quality	An Agricultural Land Classification (ALC) survey of the Site boundary will be undertaken in October 2020 with reference to the Ministry of Agriculture, Fisheries and Food guidelines.
Glint and Glare	An assessment will be undertaken to identify the potential for solar reflections to impact on sensitive receptors for both orientation options to inform design development.
Ground Conditions	A PRA will be included in the ES and the results and recommendations of this will be incorporated into the Framework CEMP. Maintenance activities during the operational phase will be managed through an Operational Environmental Management Plan and are proposed to be scoped out of the assessment.
Human Health	Human health (including air quality, land quality, noise, transport and access and visual amenity) will be covered elsewhere in the ES with appropriate signposting in the ES to enable these to be identified; EMFs are proposed to be scoped out.
Major Accidents and Disasters	Where the major accidents and disasters identified are not already being considered within the scope of existing technical assessments, they will continue to be reviewed with the design team to ensure the risks are understood and addressed through design as necessary. However, it is considered highly likely that as the design of the Scheme evolves in preparation of the DCO application, it will become clear that there is no real risk or serious possibility of the event interacting with the Scheme. In that eventuality, we would propose to scope out from the ES the assessment of such major accidents or disasters. The ES would note and explain where this approach has been taken.
Telecommunications	Consultation and a desk based study to identify any existing infrastructure constraints and this information will be used to inform the Scheme design.
Waste	Description of the potential streams of construction, operation and decommissioning waste and estimated volumes will be described within the description of development chapter of the ES.

17. References

Ref. 1 Her Majesty's Stationery Office (HMSO) (2011) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended by The Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018). Available at: http://www.legislation.gov.uk/uksi/2017/572/pdfs/uksi_20170572_en.pdf and http://www.legislation.gov.uk/uksi/2018/695/pdfs/uksi_20180695_en.pdf [Date Accessed: 07/10/2020].

Ref. 2 HMSO (2008) The Planning Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Date Accessed: 07/10/2020].

Ref. 3 HMSO (2009) Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009. Available at: http://www.legislation.gov.uk/uksi/2009/2264/pdfs/uksi_20092264_en.pdf [Date Accessed: 07/10/2020].

Ref. 4 HMSO (2011) The Localism Act 2011. Available at: http://www.legislation.gov.uk/ukpga/2011/20/pdfs/ukpga_20110020_en.pdf [Date Accessed: 07/10/2020].

Ref. 5 Department of Energy and Climate Change (DECC) (2011) National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Date Accessed: 07/10/2020].

Ref. 6 DECC (2011) National Policy Statement for Electricity Networks Infrastructure (EN-5). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942-national-policy-statement-electricity-networks.pdf [Date Accessed: 07/10/2020].

Ref. 7 Ministry of Housing, Communities and Local Government (MHCLG) (2019) National Planning Policy Framework (NPPF). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf [Date Accessed: 07/10/2020].

Ref. 8 Chelmsford City Council (2020) Chelmsford Local Plan. Available at: https://www.chelmsford.gov.uk/_resources/assets/inline/full/0/4260959.pdf [Date Accessed: 07/10/2020].

Ref. 9 Braintree District Council (2005) Local Plan Review. Available at: http://www.planvu.co.uk/bdc/plan_index.htm [Date Accessed: 09/10/2020].

Ref. 10 Braintree District Council (2011) Braintree District Council Local Development Framework: Core Strategy (adopted September 2011). Available at: https://www.braintree.gov.uk/info/200230/ldf_and_planning_policy/250/core_strategy_and_proposals_map [Date Accessed: 07/10/2020].

Ref. 11 Essex County Council (2014) Essex Minerals Local Plan. Available at: https://assets.ctfassets.net/knkzaf64jx5x/5UZuVtnjZbJ81olvZoZKVX/90acfc65df6fa8ee8ab20df3f0cda1c8/essex-minerals-local-plan-adopted-july-2014.pdf [Date Accessed: 09/10/2020].

Ref. 12 Essex County Council and Southend-on-Sea Borough Council (2017) Essex and Southend-on-Sea Waste Local Plan. Available at: https://www.southend.gov.uk/downloads/file/5194/adopted-waste-local-plan [Date Accessed: 07/10/2020].

Ref. 13 Braintree District Council (2017) Braintree District Council Local Plan. Available at: https://www.braintree.gov.uk/info/200230/planning_policy/701/new_local_plan/2 [Date Accessed: 07/10/2020].

Ref. 14 Planning Inspectorate (2020) Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/12/Advice-note-7.pdf [Date Accessed: 07/10/2020].

Ref. 15 Planning Inspectorate (2018) Advice Note 9: Using the Rochdale Envelope. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/05/Advice-note-9.-Rochdale-envelope-web.pdf [Date Accessed: 07/10/2020].

Ref. 16 British Standards Institute (BSI) (2017) BS EN 62271-1:2017 High-voltage switchgear and controlgear. Common specifications for alternating current switchgear and controlgear. Brussels: BSI.

Ref. 17 Building Research Establishment (BRE) (2012) Digest 365: Soakaway Design and Sewers for Adoption (7th Edition). Watford: BRE.

Ref. 18 HMSO (1974) Control of Pollution Act 1974. Available at: https://www.legislation.gov.uk/ukpga/1974/40/pdfs/ukpga_19740040_en.pdf [Date Accessed: 14/09/2020].

Ref. 19 HMSO (1995) Environment Act 1995. Available at: https://www.legislation.gov.uk/ukpga/1995/25/pdfs/ukpga_19950025_en.pdf [Date Accessed: 14/09/2020].

Ref. 20 HMSO (2005) Hazardous Waste Regulations 2005. Available at: http://www.legislation.gov.uk/uksi/2005/894/pdfs/uksi_20050894_en.pdf [Date Accessed: 14/09/2020].

Ref. 21 HMSO (2011) Waste (England and Wales) Regulations 2011. Available at: http://www.legislation.gov.uk/uksi/2011/988/pdfs/uksi_20110988_en.pdf [Date Accessed: 14/09/2020].

Ref. 22 HMSO (2015) Construction (Design and Management) Regulations 2015. Available at: http://www.legislation.gov.uk/uksi/2015/51/pdfs/uksi_20150051_en.pdf [Date Accessed: 14/09/2020].

Ref. 23 European Commission (EC) (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. Available at: http://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf [Date Accessed: 07/10/2020].

Ref. 24 Planning Inspectorate (2019) Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf [Date Accessed: 07/10/2020].

Ref. 25 IEMA (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available at: https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf [Date Accessed: 07/10/2020].

Ref. 26 IEMA (2020) Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020 [Date Accessed: 07/10/2020].

Ref. 27 HMSO (2008) Climate Change Act 2008. Available at: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf [Date Accessed: 07/10/2020].

Ref. 28 HMSO (2009) The Carbon Budgets Order 2009. Available at: http://www.legislation.gov.uk/uksi/2009/1259/pdfs/uksi_20091259_en.pdf [Date Accessed: 07/10/2020].

Ref. 29 MHCLG (2014) National Planning Practice Guidance: Climate Change. Available at: https://www.gov.uk/guidance/climate-change [Date Accessed: 07/10/2020].

Ref. 30 Essex County Council (2011) Adapting to Climate Change Action Plan. Available at: https://www.essex.gov.uk/adapting-climate-change [Date Accessed: 07/10/2020].

Ref. 31 Braintree District Council (2014) Braintree District Council Climate Local Strategy and Action Plan 2015-2018. Available at: https://www.braintree.gov.uk/download/downloads/id/5322/climate_local_strategy_and_action_plan_2014-18.pdf [Date Accessed: 07/10/2020].

Ref. 32 UK Climate Impacts programme (UKCIP) (2018) UK Climate Projections 2018 (UKCP18). Available at: https://www.metoffice.gov.uk/research/collaboration/ukcp [Date Accessed: 07/10/2020].

Ref. 33 World Business Council for Sustainable Development and World Resources Institute (2001) The GHG Protocol, A Corporate Accounting and Reporting Standard. Available at: https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf [Accessed 07/10/2020].

Ref. 34 Department for Environment, Food and Rural Affairs (Defra) (2018) Conversion Factors Database (2018). Available at: https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting [Date Accessed: 07/10/2020].

Ref. 35 Inventory of Carbon and Energy Database (2011). Available at: http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html#.XDR322nFJhF [Date Accessed: 07/10/2020].

Ref. 36 United Nations (2015) Paris Agreement. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf [Date Accessed 07/10/2020].

Ref. 37 DECC (2012) Guidance on Annual Verification for emissions from stationary installations emitted before 1 January 2013. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48280/annverifguide.pdf [Date Accessed: 07/10/2020].

Ref. 38 PAS 2050:2011, Specification for the assessment of the life cycle greenhouse gas emissions of goods and services. Available at: https://shop.bsigroup.com/upload/Shop/Download/PAS/PAS2050.pdf [Date Accessed: 14/10/2020].

Ref. 39 HMSO (2010) Infrastructure Planning (Decisions) Regulations 2010. Available at: http://www.legislation.gov.uk/uksi/2010/305/pdfs/uksi_20100305_en.pdf [Date Accessed: 07/10/2020].

Ref. 40 HMSO (1990) Planning (Listed Buildings and Conservation Areas) Act 1990. Available at: https://www.legislation.gov.uk/ukpga/1990/9/pdfs/ukpga_19900009_en.pdf [Date Accessed: 07/10/2020].

Ref. 41 HMSO (1979) Ancient Monuments and Archaeological Areas Act (1979) (as amended). Available at: http://www.legislation.gov.uk/ukpga/1979/46 [Date Accessed: 07/10/2020].

Ref. 42 HMSO (1983) National Heritage Act 1983. Available at: https://www.legislation.gov.uk/ukpga/1983/47/pdfs/ukpga_19830047_en.pdf [Date Accessed: 14/10/2020].

Ref. 43 HMSO (2002) National Heritage Act 2002. Available at: http://www.legislation.gov.uk/ukpga/2002/14/contents [Date Accessed: 07/10/2020].

Ref. 44 MHCLG (2019) NPPF Planning Practice Guidance (PPG). Conserving and enhancing the historic environment. Available at: https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment [Date Accessed: 07/10/2020].

Ref. 45 Historic England (2015) Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment. Available at: https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/ [Date Accessed: 07/10/2020].

Ref. 46 Historic England (2017) Historic Environment Good Practice Advice in Planning Note 3. 2nd edition. The Setting of Heritage Assets. Available at: https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets/ [Date Accessed: 07/10/2020].

Ref. 47 Historic England (2019) Statements of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12. Available at: https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance/ [Date Accessed: 07/10/2020].

Ref. 48 Braintree District Council (2019) Hatfield Peverel Neighbourhood Plan. Available at: https://www.braintree.gov.uk/downloads/file/9016/hpndp_adopted_version_-_16th_december_2019 [Date Accessed: 07/10/2020].

Ref. 49 Chelmsford City Council (2017) Boreham Neighbourhood Plan. Available at: http://www.borehamparishcouncil.co.uk/organisation/neighbourhood-plan/ [Date Accessed: 07/10/2020].

Ref. 50 Historic England (2020) National Heritage List for England (NHLE). Available at: https://historicengland.org.uk/listing/the-list [Date Accessed: 09/10/2020].

Ref. 51 Heritage Gateway (2012) Essex Historic Environment Record. Available at: https://www.heritagegateway.org.uk/gateway/CHR/herdetail.aspx?crit=&ctid=95&id=4761 [Date Accessed: 09/10/2020].

Ref. 52 Archaeology Data Service (2013) Essex Historic Landscape Characterisation Project. Available at: https://archaeologydataservice.ac.uk/archives/view/essex_hlc_2013/ [Date Accessed: 09/10/2020].

Ref. 53 British Geology Survey (2018) Geoindex viewer. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Date Accessed: 14/09/2020].

Ref. 54 Official Journal of the European Union (OJEU) (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN [Date Accessed: 14/10/2020].

Ref. 55 OJEU (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN [Date Accessed: 14/10/2020].

Ref. 56 OJEU (2014) Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN [Date Accessed: 14/10/2020].

Ref. 57 HMSO (1981) The Wildlife & Countryside Act 1981. Available at: https://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf [Date Accessed: 14/10/2020].

Ref. 58 HMSO (2000) Countryside and Rights of Way Act 2000. Available at: https://www.legislation.gov.uk/ukpga/2000/37/pdfs/ukpga_20000037_en.pdf [Date Accessed: 14/10/2020].

Ref. 59 HMSO (2018) Conservation of Habitats and Species Regulations 2017 (as amended). Available at: https://www.legislation.gov.uk/uksi/2017/1012/pdfs/uksi_20171012_en.pdf [Date Accessed: 14/10/2020].

Ref. 60 HMSO (2006) The Natural Environment and Rural Communities Act. Available at: https://www.legislation.gov.uk/ukpga/2006/16/pdfs/ukpga_20060016_en.pdf [Date Accessed: 14/10/2020].

Ref. 61 HMSO (1992) Protection of Badgers Act 1992. Available at: https://www.legislation.gov.uk/ukpga/1992/51/pdfs/ukpga_19920051_en.pdf [Date Accessed: 14/10/2020].

Ref. 62 HMSO (1997) Hedgerow Regulations 1997. Available at: https://www.legislation.gov.uk/uksi/1997/1160/body/made/data.pdf [Date Accessed: 14/10/2020].

Ref. 63 HMSO (2006) Animal Welfare Act 2006. Available at: https://www.legislation.gov.uk/ukpga/2006/45/pdfs/ukpga_20060045_en.pdf [Date Accessed: 14/10/2020].

Ref. 64 HMSO (2017) Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/407/pdfs/uksi_20170407_en.pdf [Date Accessed: 14/10/2020].

Ref. 65 MHCLG (2016) Planning Practice Guidance: Natural environment. Available at: https://www.gov.uk/guidance/natural-environment [Date Accessed: 15/09/2020].

Ref. 66 HMSO (1994) Biodiversity The UK Action Plan. Available at: http://data.jncc.gov.uk/data/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd/UKBAP-BiodiversityActionPlan-1994.pdf [Date Accessed: 15/09/2020].

Ref. 67 Joint Nature Conservation Council (JNCC) (2012) UK Post-2010 Biodiversity Framework. Available at: http://jncc.defra.gov.uk/page-6189 [Date Accessed: 15/09/2020].

Ref. 68 Defra (2011) A Wild Future For Essex - Essex Biodiversity Action Plan. Available at: http://adlib.everysite.co.uk/adlib/defra/content.aspx?id=000IL3890W.16NTBX9C44814A [Date Accessed: 15/09/2020].

Ref. 69 Defra (2020) Multi-Agency Geographic Information for the Countryside (MAGIC) map. Available at: https://magic.defra.gov.uk/MagicMap.aspx [Date Accessed: 14/09/2020].

Ref. 70 JNCC (2010) Handbook for phase 1 habitat survey – a technique for environmental audit. Available at: http://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf [Date Accessed: 14/10/2020].

Ref. 71 Rodwell, J.S. (1992) British Plant Communities, Volume 3. Grasslands and montane communities. Cambridge: Cambridge University Press.

Ref. 72 Stroh, P.A, S.J. Leach, T.A. August, K.J. Walker, D.A. Pearman, F.J. Rumsey, C.A. Harrower, M.F. Fay, J.P. Martin, T. Pankhurst, C.D. Preston, I. Taylor (2014) A Vascular Plant Red List for England. Durham: Botanical Society of Britain and Ireland.

Ref. 73 Mcleod, C.R., Yeo, M., Brown, A.E., Burn, A.J., Hopkins, J.J. & Way, S.F. (2005) The Habitats Directive: selection of Special Areas of Conservation in the UK. Available at: http://jncc.defra.gov.uk/SACselection [Date Accessed: 01/07/2020].

Ref. 74 Byfield, A.J. & Wilson, P.J. (2005) Important Arable Plant Areas: identifying priority sites for arable plant conservation in the United Kingdom. Available at: https://lantlife.love-wildflowers.org.uk/uploads/documents/Important_Arable_Plant_Areas.pdf [Date Accessed: 14/10/2020].

Ref. 75 Buglife (2013) A Manual for the Survey and Evaluation of the Aquatic Plant and invertebrate Assemblages of Grazing Marsh Ditch Systems Version 6. Available at: https://cdn.buglife.org.uk/2019/08/2013Manual_0.pdf [Date Accessed: 14/10/2020].

Ref. 76 Environment Agency (2003) River Habitat Survey in Britain and Ireland. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/311579/LIT_1758.pdf [Date Accessed: 14/09/2020].

Ref. 77 European Committee for Standardization (2014) BS EN 14184: 2014 Water quality. Guidance for the surveying of aquatic macrophytes in running waters. Brussels: BSI.

Ref. 78 Water Framework Directive – United Kingdom Technical Advisory Group (WFD-UKTAG) (2014) UKTAG River Assessment Method Macrophytes and Phytobenthos. Available at: https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/River%20Macrophytes%20UKTAG%20Method%20Statement.pdf [Date Accessed: 14/09/2020].

Ref. 79 WFD-UKTAG (2014) UKTAG River Assessment Method Benthic Invertebrate Fauna. Available at: https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/River%20Invertebrates%20WHPT%20UKTAG%20Method%20Statement.pdf [Date Accessed: 14/09/2020].

Ref. 80 Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal. Second Edition. Available at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1Update.pdf [Date Accessed: 14/10/2020].

Ref. 81 National Fish Populations Database (NFPD) Freshwater Fish Counts for all Species for all Areas and all years. Available at: https://data.gov.uk/dataset/f49b8e4b-8673-498e-bead-98e6847831c6/freshwater-fish-counts-for-all-species-all-areas-and-all-years [Date Accessed: 14/10/2020].

Ref. 82 Environment Agency (2019) Catchment data explorer. Available at: https://environment.data.gov.uk/catchment-planning/ [Date Accessed: 01/07/2020].

Ref. 83 Froglife (1999) Froglife Advice Sheet 10: Reptile survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Available at: http://bailey.persona-pi.com/Public-Inquiries/M4-Newport/C%20-%20Core%20Documents/11.%20Ecology%20and%20Nature%20Conservation/11.3.3%20-%20Froglife%20Froglife%20Advice%20Sheet%2010%20reptile%20survey.%20Froglife%2C%20London.%201999.pdf [Date Accessed: 14/10/2020].

Ref. 84 Oldham, R.S., Keeble, J., Swan, M.J.S., and Jeffcote, M. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (Triturus cristatus). *Herpetological Journal*, Vol. 10, pp. 143-155.

Ref. 85 Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., Foster J., Wilkinson J., Arnett A., Williams P. and Dunn F. (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Available at: http://randd.defra.gov.uk/Document.aspx?Document=11973_WC1067_FinalReport.pdf [Date Accessed: 14/10/2020].

Ref. 86 English Nature (2001) Great Crested Newt Mitigation Guidelines. Available at: http://mokrady.wbs.cz/literatura_ke_stazeni/great_crested_newt_mitigation_guidelines.pdf [Date Accessed: 14/10/2020].

Ref. 87 Royal Society for the Protection of Birds (RSPB) (n.d.) Information note: Managing nest plots for stone-curlews. Available at: https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/guidance-on-plot-management-in-the-brecks.pdf [Date Accessed: 14/10/2020].

Ref. 88 Bibby, C.J., Burgess, N.D. & Hill, D.A. (1992) Bird Census Techniques. Cambridge: The University Press.

Ref. 89 Gilbert G., Gibbons D.W., and Evans J. (1998) Bird Monitoring Methods: A manual of techniques for key UK species. Bedfordshire: RSPB.

Ref. 90 Collins (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines. Third Edition. London: The Bat Conservation Trust.

Ref. 91 Harris S., Cresswell P., and Jefferies D. (1989) Surveying Badgers. London: The Mammal Society.

Ref. 92 Cresswell, P., Harris, S. and Jefferies D.J. (1990). The history, distribution, status and habitat requirements of the badger in Britain. Peterborough: Nature Conservancy Council.

Ref. 93 Scottish Badgers (2018) Surveying for Badgers: Good Practice Guidelines. Available at: https://www.scottishbadgers.org.uk/userfiles/file/planning_guidelines/Surveying-for-Badgers-Good-Practice-Guidelines_V1.pdf [Date Accessed: 14/09/2020].

Ref. 94 Dean, M., Strachan, R. Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). London: The Mammal Society.

Ref. 95 Strachan, R., Moorhouse, T., Gelling, M. (2011) Water Vole Conservation Handbook. Third Edition. University of Oxford: WildCRU.

Ref. 96 Chanin, P. (2003) Ecology of European Otter, Conserving Natura 2000 Rivers Ecology Series No.10 English Nature. Available at: https://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=SMURF_otter.pdf [Date Accessed: 14/10/2020].

Ref. 97 HMSO (2014) Water Act 2014. Available at: http://www.legislation.gov.uk/ukpga/2014/21/pdfs/ukpga_20140021_en.pdf [Date Accessed: 14/10/2020].

Ref. 98 HMSO (2010) Floods and Water Management Act 2010. Available at: https://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf [Date Accessed: 14/10/2020].

Ref. 99 HMSO (1990) Environmental Protection Act 1990. Available at: https://www.legislation.gov.uk/ukpga/1990/43/pdfs/ukpga_19900043_en.pdf [Date Accessed: 14/10/2020].

Ref. 100 HMSO (1991) Land Drainage Act 1991. Available at: https://www.legislation.gov.uk/ukpga/1991/59/pdfs/ukpga_19910059_en.pdf [Date Accessed: 14/10/2020].

Ref. 101 HMSO (1991) Water Resources Act 1991. Available at: https://www.legislation.gov.uk/ukpga/1991/57/pdfs/ukpga_19910057_en.pdf [Date Accessed: 14/10/2020].

Ref. 102 HMSO (1975) Salmon and Freshwater Fisheries Act 1975. Available at: https://www.legislation.gov.uk/ukpga/1975/51/pdfs/ukpga_19750051_en.pdf [Date Accessed: 14/10/2020].

Ref. 103 HMSO (2015) The Environmental Damage (Prevention and Remediation) (England) Regulations 2015. Available at: https://www.legislation.gov.uk/uksi/2015/810/pdfs/uksi_20150810_en.pdf [Date Accessed: 14/10/2020].

Ref. 104 HMSO (2016) The Environmental Permitting (England and Wales) Regulations 2016. Available at: http://www.legislation.gov.uk/uksi/2016/1154/pdfs/uksi_20161154_en.pdf [Date Accessed: 14/10/2020].

Ref. 105 HMSO (2009) The Groundwater (England and Wales) Regulations 2009. Available at: https://www.legislation.gov.uk/ukdsi/2009/9780111480816/pdfs/ukdsi_9780111480816_en.pdf [Date Accessed: 14/10/2020].

Ref. 106 HMSO (2009) The Eels (England and Wales) Regulation 2009. Available at: http://www.legislation.gov.uk/uksi/2009/3344/pdfs/uksi_20093344_en.pdf [Date Accessed: 14/10/2020].

Ref. 107 HMSO (2001) The Control of Pollution (Oil Storage) (England) Regulations 2001. Available at: http://www.legislation.gov.uk/uksi/2001/2954/pdfs/uksi_20012954_en.pdf [Date Accessed: 14/10/2020].

Ref. 108 HMSO (2009) The Water Resources Act (Amendment) (England and Wales) Regulations 2009. Available at: https://www.legislation.gov.uk/uksi/2009/3104/pdfs/uksi_20093104_en.pdf [Date Accessed: 14/10/2020].

Ref. 109 HMSO (2009) The Flood Risk (England and Wales) Regulations 2009. Available at: https://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksi_20093042_en.pdf [Date Accessed: 14/10/2020].

Ref. 110 HMSO (2002) The Control of Substances Hazardous to Human Health (COSHH) Regulations 2002. Available at: https://www.legislation.gov.uk/uksi/2002/2677/pdfs/uksi_20022677_en.pdf [Date Accessed: 14/10/2020].

Ref. 111 HMSO (1999) The Anti-Pollution Works Regulations 1999. Available at: https://www.legislation.gov.uk/uksi/1999/1006/pdfs/uksi_19991006_en.pdf [Date Accessed: 14/10/2020].

Ref. 112 HMSO (2015) The Water Framework Directive (Standards and Classification) Directions 2015. Available at: https://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod_20151623_en_003.pdf [Date Accessed: 14/10/2020].

Ref. 113 MHCLG (2014) Planning Practice Guidance: Flood Risk and Coastal Change. Available at: https://www.gov.uk/guidance/flood-risk-and-coastal-change [Date Accessed: 14/10/2020].

Ref. 114 Defra (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf [Date Accessed: 14/10/2020].

Ref. 115 Defra (2011) Future Water: The Government's water strategy for England. Available at: https://www.gov.uk/government/publications/future-water-the-government-s-water-strategy-for-england [Date Accessed: 14/10/2020].

Ref. 116 Defra (2015) Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf [Date Accessed: 14/10/2020].

Ref. 117 HM Government (2015) The Building Regulations 2010, Approved Document H: Drainage and waste disposal. Available at: https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h [Date Accessed: 14/10/2020].

Ref. 118 Environment Agency (2016) Part 1: Anglian river basin district river basin management plan. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718327/Anglian_RBD_Part_1_river_basin_management_plan.pdf [Date Accessed: 14/10/2020].

Ref. 119 Essex County Council (2016) Sustainable Drainage Systems – Design Guide. Available at: https://www.essexdesignguide.co.uk/media/1608/essex_suds_design_guide.pdf [Date Accessed: 14/10/2020].

Ref. 120 Construction Industry Research and Information Association (CIRIA) (2016) Report C753 The SuDS Manual 2nd Edition. Available at: https://ciria.sharefile.com/d-s14e5f48d09a44c7a [Date Accessed: 14/10/2020].

Ref. 121 Essex County Council and Chelmsford City Council (2014) Chelmsford Surface Water Management Plan. Available at: https://www.essexdesignguide.co.uk/media/1523/chelmsford-surface-water-management-plan-2014.pdf [Date Accessed: 14/10/2020].

Ref. 122 Essex County Council (2016) Braintree and Witham Surface Water Management Plan. Available at: http://www.braintree.gov.uk/download/downloads/id/7175/bdc051_braintree_witham_surface_water_management_plan_with_appendices_dec_2016.pdf [Date Accessed: 14/10/2020].

Ref. 123 Ordnance Survey (2018) Open Data. Available at: https://www.ordnancesurvey.co.uk/opendata/viewer/ [Date Accessed: 14/10/2020].

Ref. 124 Bing (2020) Aerial Photographic maps. Available at: https://www.bing.com/maps [Date Accessed: 14/10/2020].

Ref. 125 The Meterological (Met) Office (2020). Observations map. Available at: https://www.metoffice.gov.uk/public/weather/observation/map/u10q3cdwd#?map=WeatherCode&zoom=8&lon=-0.19&lat=51.73&fcTime=1600041600 [Date Accessed: 14/09/2020].

Ref. 126 UK Centre for Ecology and Hydrology (2020) National River Flow Archive. Available at: https://nrfa.ceh.ac.uk/data/station/info/37003 [Date Accessed: 14/09/2020].

Ref. 127 Natural England (2020) Designated Sites View. Available at: https://designatedsites.naturalengland.org.uk/SiteSearch.aspx [Date Accessed: 14/09/2020].

Ref. 128 Environment Agency (2010) Flood map for planning. Available at: https://flood-map-for-planning.service.gov.uk/ [Date Accessed: 14/09/2020].

Ref. 129 Environment Agency (2020) Water Quality Archive. Available at: https://environment.data.gov.uk/water-quality/view/landing [Date Accessed: 14/09/2020].

Ref. 130 HMSO (2015) Nitrate Pollution Prevention Regulations 2015. Available at: https://www.legislation.gov.uk/uksi/2015/668/pdfs/uksi_20150668_en.pdf [Date Accessed: 14/10/2020].

Ref. 131 Highways England (2009) Design Manual for Roads and Bridges (DMRB): Volume 11, Section 3, Part 10, HD45/09: Road Drainage and Water Environment. Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/hd4509.pdf [Date Accessed: 14/10/2020].

Ref. 132 The Planning Inspectorate (2017) Advice Note 18: The Water Framework Directive. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf [Date Accessed: 14/10/2020].

Ref. 133 Environment Agency (1998a) River Geomorphology: a practical guide. Bristol: Environment Agency.

Ref. 134 Environment Agency (1998b) Geomorphological approaches to river management. Project record W5A/i661/1, prepared by Thorne, C., Downs, P.W., Newson, M.D., Clarke, M.J., and Sear, D.A. Bristol: Environment Agency.

Ref. 135 DMRB (2020) LA104 Environmental Assessment and Monitoring. Available at: http://www.ihsti.com/cis/cislogon.asp?accessionno=330238NBS [Date Accessed: 14/10/2020].

Ref. 136 Water UK (2019) Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England. Available at: https://www.water.org.uk/wp-content/uploads/2020/02/Sewerage-Sector-Guidance-v1-251019.pdf [Date Accessed: 14/10/2020].

Ref. 137 Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition. London: Landscape Institute.

Ref. 138 MHCLG (2019) Planning Practice Guidance: Natural Environment (Landscape). Available at: https://www.gov.uk/guidance/natural-environment#landscape [Date Accessed: 09/10/2020].

Ref. 139 MHCLG (2015) Planning Practice Guidance: Renewable and low carbon energy. Available at: https://www.gov.uk/guidance/renewable-and-low-carbon-energy [Date Accessed: 09/10/2020].

Ref. 140 Chelmsford City Council (2018) Chelmsford Green Infrastructure Strategic Plan 2018 – 2036. Available at: https://www.chelmsford.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=1124104 [Date Accessed: 09/10/2020].

Ref. 141 Chelmsford City Council (2018) Chelmsford Green Infrastructure Strategic Plan Research and Evidence Base Document. Available at: https://www.chelmsford.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=1399108 [Date Accessed: 09/10/2020].

Ref. 142 Chelmsford City Council (2016) Defining Chelmsford's River Valleys – An Assessment of Green Wedges and Corridors. Chelmsford: Chelmsford City Council.

Ref. 143 Terling and Fairstead Parish Councils (2014) Terling and Fairstead Parish Councils Village Design Statement. Available at: http://btckstorage.blob.core.windows.net/site16166/Parish%20Council/VDS%20FINAL%20%28inc%20BDC%20and%20RD%29September%20web.pdf [Date Accessed: 09/10/2020].

Ref. 144 Natural England (2014) National Character Area (NCA) Profile 86: South Suffolk and North Essex Clayland. Available at: http://publications.naturalengland.org.uk/publication/5095677797335040 [Date Accessed: 09/10/2020].

Ref. 145 Essex County Council (2020) Essex Design Guide. Available at: https://www.essexdesignguide.co.uk/ [Date Accessed: 09/10/2020].

Ref. 146 Chelmsford City Council (2006) Braintree, Brentwood, Chelmsford, Maldon and Uttlesford Landscape Character Assessment. Available at: https://www.chelmsford.gov.uk/_resources/assets/attachment/full/0/46395.pdf [Date Accessed: 09/10/2020].

Ref. 147 Chelmsford City Council (2017) Landscape Sensitivity and Capacity Assessment Report. Available at: https://www.chelmsford.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=1124098 [Date Accessed: 09/10/2020].

Ref. 148 Historic England (2004) Historic Environment Characterisation Report. Available at: https://historicengland.org.uk/images-books/publications/thames-gateway-historic-environment-characterisation-project-final-report/finalreporttextonly/ [Date Accessed: 09/10/2020].

Ref. 149 Essex County Council and Southend-on-Sea Borough Council (2003) Essex Landscape Character Assessment. Available at: https://www.rochford.gov.uk/sites/default/files/evibase_EB6_essex_landscape_character_assess2003pt1.pdf [Date Accessed: 09/10/2020].

Ref. 150 Braintree District Council (2007) Hatfield Peverel Settlement Fringe Landscape Character Assessment. Available at: https://www.braintree.gov.uk/download/downloads/id/674/e41_settlement_fringe_landscape_capacity_study_-_hatfield_peverel_november_2007.pdf [Date Accessed: 09/10/2020].

Ref. 151 Landscape Institute (2019) Technical Guidance Note 06/19: Visual representation of development proposals. Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf [Date Accessed: 09/10/2020].

Ref. 152 Landscape Institute (2019) Technical Guidance Note 02/19: Residential Visual Amenity Assessment (RVAA). Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf [Date Accessed: 09/10/2020].

Ref. 153 Defra (2010) Noise Policy Statement for England (NPSE). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf [Date Accessed: 14/10/2020].

Ref. 154 MHCLG (2014) Planning Practice Guidance: Noise. Available at: https://www.gov.uk/guidance/noise--2 [Date Accessed: 14/10/2020].

Ref. 155 Chelmsford City Council (2008) Core Strategy and Development Control Policies. Available at: https://www.chelmsford.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=32039 [Date Accessed: 14/10/2020].

Ref. 156 Chelmsford City Council (2013) Focussed Review – Core Strategy and Development Control Policies. Available at: https://www.chelmsford.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=32038 [Date Accessed: 14/10/2020].

Ref. 157 Chelmsford City Council (2020) Full Council Version. Available at: https://www.chelmsford.gov.uk/_resources/assets/inline/full/0/4260959.pdf [Date Accessed: 27/10/2020].

Ref. 158 British Standards Institute (2014) BS 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. London: BSI.

Ref. 159 British Standards Institute (2003) BS 7445 – Description and environment of environmental noise – Part 1: Guide to quantities and procedures. London: BSI.

Ref. 160 British Standards Institute (2014) BS 4142 – Methods for rating and assessing industrial and commercial sound. London: BSI.

Ref. 161 Institute of Environmental Management and Assessment (2014) Guidelines for environmental noise impact assessment. Available at: http://programmeofficers.co.uk/Preston/CoreDocuments/LCC393.pdf [Date Accessed: 14/10/2020].

Ref. 162 Hiller, D.M. and G.I., Crabb (2000) Groundborne Vibration Caused by Mechanised Construction Works. TRL Report 429. Available at: https://www.scribd.com/document/441482855/Groundborne-vibration-caused-by-mechanised-construction-works [Date Accessed: 14/10/2020].

Ref. 163 International Organisation for Standardisation (ISO) (1996) ISO 9613 Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation. Switzerland: ISO.

Ref. 164 HM Government (2017) Industrial Strategy: building a Britain fit for the future. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf [Date Accessed: 16/10/2020].

Ref. 165 MHCLG (2016) Draft Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planning-practice-guidance [Date Accessed: 16/10/2020].

Ref. 166 Chemsford City Council (2020) Climate Action Plan. Available at: https://www.chelmsford.gov.uk/_resources/assets/inline/full/0/3649750.pdf [Date Accessed: 15/10/2020].

Ref. 167 Office of National Statistics (ONS) (2015) Census 2011. ONS. Available at: https://www.ons.gov.uk/census/2011census [Date Accessed: 15/10/2020].

Ref. 168 ONS (2019) Mid-Year Population Estimates 2018. ONS. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates [Date Accessed: 15/10/2020].

Ref. 169 DCLG (2019) Indices of Multiple Deprivation. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019 [Date Accessed: 15/10/2020].

Ref. 170 ONS (2019) Business Register and Employment Survey. Available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/businessregisterandemploymentsurveybresprovisionalresults/previousReleases [Date Accessed: 15/10/2020].

Ref. 171 ONS (2017) Gross Value Added (Income Approach) 2016. Available at: https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/regionalgrossvalueaddedincomeapproach [Date Accessed: 15/10/2020].

Ref. 172 ONS (2020) Annual Population Survey (January 2019-December 2019). Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates [Date Accessed: 15/10/2020].

Ref. 173 ONS (2020) Claimant Count. Available at: https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/unemployment/datasets/claimantcountandvacanciesdataset [Date Accessed: 15/09/2020].

Ref. 174 ONS (2019) Local Statistics. Available at: https://www.ons.gov.uk/help/localstatistics [Date Accessed: 15/09/2020].

Ref. 175 Natural England (2010) Agricultural Land Classification Map Eastern Region. Available at: http://publications.naturalengland.org.uk/publication/127056 [Date Accessed: 15/09/2020]

Ref. 176 MHCLG (2014) Planning Practice Guidance: Travel plans transport assessments and statements. Available at: https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements [Date Accessed: 07/10/2020].

Ref. 177 Essex County Council (2011) Essex Transport Strategy: The Local Transport Plan for Essex. Available at: https://www.essexhighways.org/uploads/files/essex_ltp.pdf [Date Accessed: 07/10/2020].

Ref. 178 Essex County Council (2011) Development Management Policies. Available at : https://assets.ctfassets.net/knkzaf64jx5x/71Tt0crmRtih5IsUiI0EyA/58b10a0398cc92793425f23666f584b8/development_management_policies-highways-transportation.pdf [Date Accessed: 07/10/2020].

Ref. 179 Institute of Environmental Management and Assessment (IEMA) (1993) Guidelines for Environmental Assessment of Road Traffic. Lincoln: IEMA.

Ref. 180 Essex County Council (2020) PRoW Interactive Map. Available at: https://www.essexhighways.org/transport-and-roads/getting-around/public-rights-of-way/prow-interactive-map.aspx [Date Accessed: 09/10/2020].

Ref. 181 Chelmsford City Council (2019) Air Quality Annual Status Report for 2018. Available at: https://essexair.org.uk/AQInEssex/LA/Chelmsford.aspx?View=reports&ReportType=Chelmsford&ReportID=Chelmsfordasr2019&StartIndex=1&EndIndex=7 [Date Accessed: 14/09/2020].

Ref. 182 Braintree District Council (2019) Air Quality Annual Status Report for 2018. Available at: https://www.braintree.gov.uk/downloads/download/975/air_quality_report [Date Accessed: 14/09/2020].

Ref. 183 Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction. Available at: http://iaqm.co.uk/wp-content/uploads/guidance/iaqm_guidance_report_draft1.4.pdf [Date Accessed: 09/10/2020].

Ref. 184 Defra (2018) Local Air Quality Management Technical guidance (TG16). Available at: https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf [Date Accessed: 09/10/2020].

Ref. 185 IAQM / Environmental Protection UK (2017) Land-Use Planning & Development Control: Planning For Air Quality. Available at: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf [Date Accessed: 09/10/2020].

Ref. 186 EPUK (2010) Development Control: Planning for Air Quality (2010 Update). Available at: http://www.iaqm.co.uk/text/guidance/epuk/aq_guidance.pdf [Date Accessed: 09/10/2020].

Ref. 187 Federal Aviation Administration (2010) Technical Guidance for Evaluating Selected Solar Technologies on Airports. Available at: http://www.caaf.org.fj/attachments/article/339/1%20FAA%20airport%20solar%20evaluation%20tech%20guide.pdf [Date Accessed: 09/10/2020].

Ref. 188 Environment Agency (2004) Model Procedures for the Management of Land Contamination. Contaminated Land Report 11. Available at: http://www.tunbridgewells.gov.uk/__data/assets/pdf_file/0019/52039/CRL11_EA_model_procedures_881483.pdf [Date Accessed: 09/10/2020].

Ref. 189 Environment Agency (2001) Piling into contaminated sites. Available at: https://webarchive.nationalarchives.gov.uk/20140329082414/http://cdn.environment-agency.gov.uk/scho0202bisw-e-e.pdf [Date Accessed: 09/10/2020].

Ref. 190 BRE (2005) Concrete in aggressive ground. BRE Special Digest 1 (SD1:2005). Brussels: BRE.

Ref. 191 DECC (2012) Power Lines: Demonstrating compliance with EMF public exposure guidelines: A voluntary Code of Practice. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48308/1256-code-practice-emf-public-exp-guidelines.pdf [Date Accessed: 09/10/2020].

Ref. 192 International Commission on Non-Ionizing Radiation Protection (ICNIRP) (1998) ICNIRP Guidelines: For limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300GHz), Health Physics 74 (4): 494-522; 1998. Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf [Date Accessed: 09/10/2020].

Ref. 193 Energy Networks Association (2017) Electric and Magnetic Fields. Available at: http://www.energynetworks.org/electricity/she/emfs.html [Date Accessed: 09/10/2020].

Ref. 194 Official Journal of the European Communities (1985) Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31985L0337 [Date Accessed: 09/10/2020].

Ref. 195 OJEU (2012) Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012L0018&from=en [Date Accessed: 09/10/2020].

Ref. 196 OJEU (2009) Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0071&from=EN [Date Accessed: 09/10/2020].

Ref. 197 Cabinet Office (2017) National Risk Register Of Civil Emergencies – 2017 Edition. Available at: https://www.gov.uk/government/publications/national-risk-register-of-civil-emergencies-2017-edition [Date Accessed: 09/10/2020].

Ref. 198 HMSO (1974) Health and Safety at Work Act 1974. Available at: https://www.legislation.gov.uk/ukpga/1974/37/pdfs/ukpga_19740037_en.pdf [Date Accessed: 09/10/2020].

Ref. 199 HMSO (1999) The Management of Health and Safety at Work Regulations 1999. Available at: http://www.legislation.gov.uk/uksi/1999/3242/pdfs/uksi_19993242_en.pdf [Date Accessed: 09/10/2020].

Ref. 200 HMSO (1992) The Workplace (Health, Safety and Welfare) Regulations 1992. Available at: http://www.legislation.gov.uk/uksi/1992/3004/made/data.pdf [Date Accessed: 09/10/2020].

Glossary

Air Quality Management Area (AQMA)	Places where air quality objectives are not likely to be achieved. Where an AQMA is declared, the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.
Baseline conditions	The conditions against which potential effects arising from the Scheme are identified and evaluated.
Battery energy storage system	Proposed development of a battery storage installation and associated development to allow for the storage, importation and exportation of energy to the National Grid.
Cables	The cables, which transmit electricity from the transformers to the onshore project substation.
Cable Route Corridor	Approximately 200m wide corridor, which represents the maximum extent of land within which the cable route would be located.
Construction Environmental Management Plan (CEMP)	A site specific plan developed to ensure that appropriate environmental management practices are followed during the construction phase of a project.
Cumulative Effects	Effects upon the environment that result from the incremental impact of an action when added to other past, present or reasonably foreseeable actions. Each impact by itself may not be significant but can become a significant effect when combined with other impacts.
Environmental Impact Assessment (EIA)	A process by which information about environmental effects of a proposed development is collected, assessed and used to inform decision making. For certain projects, EIA is a statutory requirement.
Environmental effect	The consequence of an action (impact) upon the environment such as the decline of a breeding bird population as a result of the removal of hedgerows and trees.
Environmental impact	The change in the environment from a development such as the removal of a hedgerow.
Environmental Statement	A document produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations to report the results of an EIA.
Preliminary Ecological Appraisal (PEA)	Comprises a desk study, Phase 1 Habitat Survey (which categorises habitats to a broad level using the methodologies set out by JNCC (1993 as amended) guidelines) and Protected Species Scoping survey (which

	includes preliminary survey work to identify the presence or potential presence of legally protected species).
Flood Zone 3	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 2	This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
Flood Zone 1	This is land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability (AEP)).
Geophysical survey	Geophysical survey is a non-intrusive pre-construction archaeological evaluation technique that exploits a variety of physical or chemical characteristics of rocks and soils etc, in an attempt to locate underground features of archaeological interest. Types of geophysical survey include magnetometer survey, magnetic susceptibility survey and resistivity survey.
Heavy Goods Vehicle (HGV)	Vehicles with 3 axles (articulated) or 4 or more axles (rigid and articulated).
Historic Environment Record	The record of archaeological and built heritage features in a county or district, usually held and maintained by the relevant County Council.
Interface cables	Buried high-voltage cables linking the on-site electrical infrastructure to the National Grid.
Inverter	Inverters convert the direct current (DC) electricity collected by the PV modules into alternating current (AC), which allows the electricity generated to be exported to the National Grid. BESS also use inverters to convert between DC and AC. The batteries function in DC and electricity must be converted to AC to pass into or from the grid.
Jointing pit	Underground structures constructed at regular intervals along the cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Mitigation	Measures including any process, activity, or design to avoid, prevent, reduce, or, if possible, offset any identified significant adverse effects on the environment.
NPS	National Policy Statement. National Policy Statements are produced by government. They comprise the government's central policy documents for the development of nationally significant infrastructure.
Nationally Significant	NSIPs are large scale developments such as certain new harbours, power generating stations (including wind farms),

Infrastructure Projects (NSIP)	highways developments and electricity transmission lines, which require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008 (and amended by the Localism Act 2011).
On-site substation	A compound containing electrical equipment to enable connection to the national grid. We are currently thinking that the system would be HVAC (high voltage alternating current) at 132kV but this needs research to be final decision.
Preliminary Environmental Information (PEI)	PEI is defined in the EIA Regulations as: *"information referred to in Regulation 14(2) which –* *(a) has been compiled by the applicant; and* *(b) is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)."*
Preliminary Risk Assessment	Report that presents a summary of readily-available information on the geotechnical and/or geo-environmental characteristics of the site and provides a qualitative assessment of geo-environmental and/or geotechnical risks in relation to the proposed development.
Principal Aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Receptor	A component of the natural or man-made environment that is affected by an impact, including people.
Scheme	The Longfield Solar Farm comprising solar PV and battery storage and associated development for connection to the national transmission system via Grid Connection, for which options are to be assessed and determined.
Setting	The surroundings within which a heritage asset is experienced and any element, which contributes to the understanding of its significance.
Site Boundary	The maximum extent of land potentially required temporarily and/or permanently for the construction, operation and maintenance of the Scheme.
Solar Farm	Proposed generating station comprised of solar PV modules mounted on racks and connected via associated infrastructure to the national grid.
Source Protection Zone (SPZ)	SPZs show the risk of contamination from any activities that might cause pollution to groundwater sources such as wells, boreholes and springs used for public water supplies. The

	closer the activity, the greater the risk. SPZs can comprise of up to three main zones (inner, outer and total catchment). A fourth zone of special interest can also occasionally be applied to a groundwater source.
Sustainable drainage systems (SUDS)	Surface water drainage systems developed in line with the ideals of sustainable development (e.g. swales, ponds, basins, filtration flow control, etc).
Transformers	Transformers control the voltage of the electricity generated across the site before it reaches the electrical infrastructure.
Visual receptors	People with views of the development or associated activities. These are located within the visual envelope and are typically residents, motorists, pedestrians, recreational users in residential areas on publicly accessible roads, footpaths and open spaces.
Water Framework Directive	The Water Framework Directive ("WFD") introduced a new system for monitoring and classifying the quality of surface and ground waters. The Directive requires that Environmental Objectives be set for all surface waters and groundwater to enable them to achieve Good Ecological Potential/Status by a defined date.
Zone of Theoretical Visibility	The zone within which views of a proposed development may be experienced, as determined by analysis of OS data and field survey. It is influenced by many factors including topography and intermediate visual intrusions, such as blocks of woodland and buildings.

Abbreviations

AC	Alternating current
agl	Above ground level
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
BAP	Biodiversity Action Plan
BRE	Building Research Establishment
BS	British Standard
BGS	British Geological Survey
CCTV	Closed circuit television
CDM	Construction Design Management
CEMP	Construction Environmental Management Plan
CH_4	Methane
CIEEM	Chartered Institute of Ecology and Environmental Management
COPA	Control of Pollution Act 1974
COSHH	Control of Substances Hazardous to Health
CSM	Conceptual site model
DC	Direct current
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DoS	Degree of Saturation
EcIA	Ecological Impact Assessment

EIA	Environmental Impact Assessment
EMF	Electromagnetic fields
EPS	European Protected Species
EPUK	Environmental Protection UK
ERP	Emergency Response Plan
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
GHG	Greenhouse gas
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
GRP	Glass reinforced plastic
GVA	Gross Value Added
GWDTE	Groundwater Dependent Terrestrial Ecosystem
H&SP	Health and Safety Plan
HDD	Horizontal Directional Drilling
HER	Historic Environmental Record
HFCs	Sulphur hexafluoride
HGV	Heavy goods vehicle
HSI	Habitat Suitability Index
HMSO	Her Majesty's Stationery Office
HRA	Habitat Regulation Assessment
HVAC	Heating, ventilation and cooling
IAQM	Institute of Air Quality Management
ICE	Inventory of Carbon and Energy
ICNIRP	International Commission on Non – Ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment

INNS	Invasive Non-Native Species
IAQM	Institute of Air Quality Management
kV	Kilovolt
LCA	Landscape Character Area
LFA	Lead Flood Authority
LGV	Light Goods Vehicle
LLFA	Lead Local Flood Authority
LSOA	Lower Layer Super Output Area
LVIA	Landscape and Visual Impact Assessment
MAGIC	Multi-Agency Geographical Information for the Countryside
MHCLG	Ministry of Housing, Communities and Local Government
MW	Megawatts
N_2O	Nitrous oxide
NCA	National Character Area
NERC	The Natural Environmental and Rural Communities
NF_3	Nitrogen trifluoride
NGR	National Grid Reference
NHLE	National Heritage List for England
NO_2	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
ONS	Office for National Statistics
OS	Ordnance Survey

PEA	Preliminary Ecological Appraisal
PEI	Preliminary Environmental Information
PFCs	Perfluorocarbons
PIA	Personal Injury Accident
PM_{10}	Particulate matter
PPE	Personal protective equipment
PPG	Pollution Prevention Guidance
PRA	Preliminary Risk Assessment
PRoW	Public Right of Way
PV	Photovoltaic
PWS	Private Water Supplies
RBMP	River Basin Management Plan
RFC	Ratio to Flow Capacity
RPG	Registered Park and Garden
SAC	Special Area of Conservation
SF_6	Sulphur hexafluoride
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
tCO2e	Tonnes of carbon dioxide equivalent
UK	United Kingdom
UKBAP	UK Biodiversity Action Plan

UKCP18	UK Climate Projections 2018
UKCIP	UK Climate Impacts Programme
W	Watts
WFD	Water Framework Directive
WSI	Written Scheme of Investigation
WTN	Waste Transfer Note
ZTV	Zone of Theoretical Visibility

Appendix A Transboundary Effects Screening Matrix

A.1 Regulation 32 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires the consideration of any likely significant effects on the environment of another European Economic Association (EEA) State.

A.2 Guidance upon the consideration of transboundary effects is provided in the Planning Inspectorate's Advice Note 12: Development with significant transboundary impacts consultation[5].

A.3 The following screening matrix provides the consideration of transboundary effects for the proposed scheme, taking guidance from Advice Note 12 (Annex).

Table A1 Screening Matrix for Possible Substantial Effects on the Environment of Another EEA State

Criteria and Relevant Considerations	*Commentary with Regard to Proposed Scheme*
Characteristics of the development • **Size of the development** • **Use of natural resources** • **Production of waste** • **Pollution and nuisance** • **Risk of accidents** • **Use of technologies**	The resources required for the construction of the Scheme are likely to be obtained from the global market but it is envisaged that materials would be obtained locally wherever possible. No waste, nuisances or accidents are likely to extend beyond the border of the UK. No novel technologies are proposed that have potential for transboundary effects.
Location of development (including existing use) and Geographical area • **What is the existing use?** • **What is the distance to another EEA state? (Name EEA state)?** • **What is the extent of the area of a likely impact under the jurisdiction of another EEA state?**	The Scheme's closest EEA boundary is France, located approximately 130km to the south-east. No impacts are likely to extend beyond the jurisdiction of the UK, with the exception of potential greenhouse gas emissions. The latter is expected to be minimal given the nature of the Scheme, which will not emit GHG emissions during its operation (except for any emissions associated with maintenance vehicles and repair works).
Environmental importance • **Are particular environmental values (e.g. protected areas – name them) likely to be affected?** • **Capacity of the natural environment.** • **Wetlands, coastal zones, mountain and forest areas, nature reserves and parks, Natura 2000 sites, areas where environmental quality standards already exceeded, densely populated areas,**	There are a number of European statutory designated nature conservation sites within 10km of the Scheme. The potential for significant effects relating to these designated sites will be accounted for in the EIA. However, it is not anticipated that there is potential for transboundary effects (and therefore any effects on important environmental receptors beyond the UK).

[5] https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/04/Advice-note-12v2.pdf

Criteria and Relevant Considerations	*Commentary with Regard to Proposed Scheme*
landscapes of historical, cultural or archaeological significance.	
Potential impacts and carrier • **By what means could impacts be spread (i.e. what pathways)?**	The only potential transboundary environmental impact which is considered likely is from greenhouse gas (GHG) emissions. These emissions would be spread by atmospheric processes and are anticipated to be minimal given the nature of the Scheme. The Scheme is expected to offset GHG emissions through the generation of clean electricity, that otherwise would have been generated from a typical fuel mix comprising technologies such as gas fired power stations for example.
Extent • **What is the likely extent of the impact (geographical area and size of the affected population)?**	The only potential transboundary environmental impact which is considered likely is from greenhouse gas emissions, which are known to contribute to changes on climate on a global scale. The impact of GHG emissions is considered irreversible within human lifetimes, however as above, the emissions are expected to be minimal during construction and decommissioning (in the order of 1 to 3 years) and is expected to lead to a beneficial contribution to UK GHG emissions during operation (assumed to be 40 years). The temporal pattern of GHG emissions is likely to be relatively constant during the construction and decommissioning phases. It is proposed to calculate the likely greenhouse gas emissions as part of the EIA. Greenhouse gas impacts will be put into context in terms of their impact on the UK's 5 year carbon budgets which set legally binding targets for greenhouse gas emissions. The greenhouse gas emissions offset through the production of cleaner electricity during the operational phase will be accounted for within the greenhouse gas emissions calculations. In any event, the global nature of GHG impacts means that it is not possible to apportion or identify any impact in GHG emissions in terms of environmental effects on any particular country or state. It follows that there is no potential for significant effects on the environment of any EEA State or group of EEA States resulting from GHG emissions from the Scheme, as the environmental receptor in this regard is the global atmosphere, rather than the environment of any country or state or group of countries or states. The GHG emissions are considered at a global level, and so are captured by the assessment in any event.
Magnitude • **What will the likely magnitude of the change in relevant variables relative to the status quo, taking into account the sensitivity of the variable?**	
Probability • **What is the degree of probability of the impact?** • **Is the impact likely to occur as a consequence of normal conditions or exceptional situations, such as accidents?**	
Duration • **Is the impact likely to be temporary, short-term or long-term?** • **Is the impact likely to relate to the construction, operation or decommissioning phase of the activity?**	
Frequency • **What is likely to be the temporal pattern of the impact?**	
Reversibility • **Is the impact likely to be reversible or irreversible?**	
Cumulative impacts • **Are other major developments close by?**	Proposed developments within 10km of the Scheme will be taken into consideration in the Environmental Impact Assessment (EIA). However, it is not anticipated

Criteria and Relevant Considerations	Commentary with Regard to Proposed Scheme
	that there is potential for significant cumulative transboundary effects.

Appendix B Long List of Major Accidents or Disasters

	Major accident or disaster	*Relevant for long list?*	*Why? (note if risk to the project, or project exacerbates risk)*	*Potential Receptors*	*Covered already in proposed ES? If so, where?*
1	**Geological disasters**				
1.1	Landslides	No	The risk of landslides will be considered as part of the geotechnical design, ensuring that the risk is designed out, both in terms of the vulnerability of the Scheme to these types of event; however given the flat nature of the land this risk is considered minimal. The Scheme is not anticipated to increase the risk of landslip happening onsite or elsewhere; it will not significantly change the erosion potential of the soil or stability of the land.	N/A	N/A
1.2	Earthquakes	No	The Scheme is not located in a geologically active area and as such earthquakes are not considered to be a real risk or serious possibility.	N/A	N/A
1.3	Sinkholes	No	The risk of sinkholes will be considered as part of the geotechnical design, ensuring that the risk is designed out, both in terms of the vulnerability of the Scheme to these types of event, and also in terms of the potential for the Scheme to increase the risk of such an event happening.	N/A	N/A
2	**Hydrological disasters**				
2.1	Floods	Yes	Both the vulnerability of the Scheme to flooding, and its potential to exacerbate flooding, will be covered in the Flood Risk Assessment, and also reported in the ES (both in terms of the risk to the Scheme and increased risk caused by the Scheme).	Property and people in areas of increased flood risk.	Chapter 8: Flood Risk, Drainage and Surface Water (including Flood Risk Assessment). Mitigation will be considered and, where necessary, incorporated into the Scheme design.
2.2	Limnic eruptions	No	Not applicable as there are no lakes nearby.	N/A	N/A
2.3	Tsunami/Storm surge	No	Not applicable as the Scheme is not in a coastal location.	N/A	N/A
3	**Meteorological disasters**				
3.1	Blizzards	No	The Scheme is considered to be no more vulnerable than any other development.	N/A	N/A
3.2	Cyclonic storms	No	Although there are storms in the UK, their destructive force tends to be much less than in other parts of the world and the Scheme is not particularly vulnerable to any potential effects.	N/A	N/A
3.3	Droughts	No	Droughts are only considered as a disaster due to water shortages for essential services and where there are indirect impacts on food production, loss of soils etc. The Scheme is not considered to be vulnerable to drought.	N/A	N/A

	Major accident or disaster	*Relevant for long list?*	*Why? (note if risk to the project, or project exacerbates risk)*	*Potential Receptors*	*Covered already in proposed ES? If so, where?*
3.4	Thunderstorms	No	As the Scheme includes metal components, there is a risk of lightning strikes. However, these risks will be removed or reduced through inbuilt control systems and can be scoped out at this stage.	N/A	N/A
3.5	Hailstorms	No	The Scheme is considered to be no more vulnerable than any other development.	N/A	N/A
3.6	Heat waves	No	While impacts are expected as a result of projected temperature increases (due to climate change), these temperature increases are not expected to have a significant impact on the Scheme. It is anticipated that the cooling systems for the battery energy storage systems, will regulate temperatures to within safe conditions.	N/A	No
3.7	Tornadoes	No	Although there are tornadoes in the UK, their destructive force tends to be much less than in other parts of the world and the Scheme is not particularly vulnerable to any potential effects.	N/A	No
3.8	Fires	Yes	There may be some potential for fire as a result of the battery storage element of the Scheme. However, the battery energy storage system will include cooling systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. In addition, the Scheme design will include adequate separation between battery banks to ensure that an isolated fire would not become widespread and lead to a major incident. Fire detection and suppression features would be installed to detect (e.g. multispectrum infrared flame detectors) and suppress fire (e.g. water base suppression systems) to minimise the effect of any fire.	Local residents, habitats and species.	Chapter 2: The Scheme
3.9	Air Quality Events	No	The Scheme is not located within any Air Quality Management Areas (AQMA). The nearest AQMA is in Danbury, approximately 6km to the south of the Site. This AQMA will not be affected by the Scheme. Although there are likely to be emissions during construction and decommissioning of the Scheme, it is considered that these can be managed through the implementation of a Construction Environmental Management Plan. Good practice measures will be set out in a Framework Construction Environmental Management Plan to be appended to the ES.	N/A	N/A
4	**Transport**				

	Major accident or disaster	*Relevant for long list?*	*Why? (note if risk to the project, or project exacerbates risk)*	*Potential Receptors*	*Covered already in proposed ES? If so, where?*
4.1	Road Accidents	Yes	The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or decommissioning will be considered in the Flood Risk, Drainage and Water Resources chapter of the ES. The potential for glint and glare to affect road users will be considered within a technical appendix to the ES if any risks are identified.	Aquatic environment Road users	Chapter 8: Flood Risk, Drainage and Surface Water Glint and Glare Study Mitigation will be considered and, where necessary, incorporated into the Scheme design.
4.2	Rail Accidents	Yes	The site is located adjacent to the railway line connecting Chelmsford to Colchester. The potential for glint and glare to affect trains will be considered within a technical appendix to the ES if any risks are identified.	Rail users	Glint and Glare Study Mitigation will be considered and, where necessary, incorporated into the Scheme design.
4.3	Aircraft Disasters	Yes	The potential for glint and glare to affect aircraft will be considered within a technical appendix to the ES if any risks are identified, including the potential to exacerbate 'birdstrike' (collision between a bird and an aircraft).	Pilots and aircraft	Ecology Glint and Glare Study Mitigation will be considered and, where necessary, incorporated into the Scheme design.
5	**Engineering Accidents/Failures**				
5.1	Bridge Failure	No	Not applicable as no bridges used or constructed as part of Scheme.	N/A	N/A
5.2	Tunnel Failure or Fire	No	None nearby.	N/A	N/A
5.3	Dam Failure	Yes	The River Ter channel and immediate riparian margin as it passes through the Scheme area is within the area at risk of flooding from a reservoir breach. The remainder of the Site is not at risk from reservoir flooding. This will be covered within the Flood Risk Assessment and will be reported in the ES, both in terms of the risks to the Scheme and increased risk to third parties caused by the Scheme.	Property and people in areas of increased flood risk.	Chapter 8: Flood Risk, Drainage and Surface Water (including Flood Risk Assessment). Mitigation will be considered and, where necessary, incorporated into the Scheme design.
5.4	Flood Defence Failure	Yes	This will be covered in the Flood Risk Assessment and will also be reported in ES, both in terms of the risk to the Scheme and increased risk caused by the Scheme.	Property and people in areas of increased flood risk.	Chapter 8: Flood Risk, Drainage and Surface Water (including Flood Risk Assessment). Mitigation will be considered and, where necessary, incorporated into the Scheme design.
5.5	Mast and Tower Collapse	No	Not applicable as there are no masts or towers nearby.	N/A	N/A
5.6	Building failure or fire	No	No buildings are close enough to the Scheme for it to be affected by building failure or fire.	N/A	N/A
5.7	Utilities failure (gas, electricity, water, sewage, oil, communications)	Yes	The Scheme has the potential to affect existing utility infrastructure above and below ground. To identify any existing infrastructure constraints, both consultation and a desk based study will be undertaken. It is known that there is an overhead electricity line located within the Site.	Employees and local residents	No, however, consultation with relevant utilities providers is a routine part of solar development and consultees will include water, gas and electricity utilities providers and telecommunications providers as appropriate. Information obtained from consultation will be used to inform the layout design.

	Major accident or disaster	*Relevant for long list?*	*Why? (note if risk to the project, or project exacerbates risk)*	*Potential Receptors*	*Covered already in proposed ES? If so, where?*
6	**Industrial Accidents**				
6.1	Defence industry	No	Not applicable as there is no defence manufacturing nearby.	N/A	N/A
6.2	Energy Industry (fossil fuel)	No	Not applicable as there is no energy industry (fossil fuel) nearby.	N/A	N/A
6.3	Nuclear Power	No	Not applicable as there are no nuclear power stations nearby.	N/A	N/A
6.4	Oil and gas refinery/storage	No	Not applicable as there is no relevant industry nearby.	N/A	N/A
6.5	Food Industry	No	Not applicable as there is no relevant industry nearby.	N/A	N/A
6.6	Chemical Industry	No	Not applicable as there no relevant industry nearby.	N/A	N/A
6.7	Manufacturing Industry	No	Not applicable as there no relevant industry nearby.	N/A	N/A
6.8	Mining / Extractive Industry	No	There is the potential for current or past quarrying activity in the vicinity to lead to unstable ground conditions due to nearby active quarries. However, the risk will be considered as part of the geotechnical design, ensuring that the risk is designed out.	N/A	N/A
7	**Terrorism/Crime/Civil unrest**	No	The Scheme is unlikely to be more of a target for these types of incident due to its rural location and low number of exposed targets.	N/A	N/A
8	**War**	No	The Scheme is no more vulnerable than any other infrastructure.	N/A	N/A
9	**Disease**				
9.1	Human disease	No	The Scheme is considered no more vulnerable than any other infrastructure.	N/A	N/A
9.2	Animal disease	No	The Scheme is considered no more vulnerable than any other infrastructure.	N/A	N/A
9.3	Plant disease	Yes	New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change.	Habitats and species	Chapter 9: Landscape and Visual Amenity (including Biodiversity and Landscape Management Plan) The planting design will take account of biosecurity risks through a wider mix of species including some non-natives.