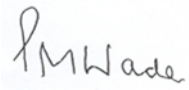
SUNNICA ENERGY FARM

Appendix 8L: Habitats Regulations Assessment Screening Report

Sunnica Ltd

August 2020

Quality information

Prepared by	Checked by	Verified by	Approved by
			
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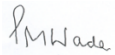
Revision History

Revision	Revision date	Details	Authorized	Name	Position
0	27 August 2020	Legal Review		Max Wade	Technical Director (Ecology)
1	3rd September 2020	Revisions following legal review		James Riley	Technical Director (Ecology)

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1. Introduction

1.1 Overview

1.1.1 This Habitat Regulations Assessment Report – Likely Significant Effects Assessment (HRA) has been prepared on behalf of Sunnica Ltd (the 'Applicant'). It will ultimately form part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that will be submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy, pursuant to 'The Planning Act 2008' (the 'PA 2008').

1.1.2 The Applicant is seeking development consent for the construction, operation and decommissioning of a new solar farm (hereafter referred to as the 'Proposed Development'), comprising ground mounted solar photovoltaic (PV) panel arrays to generate electricity energy from the sun and combine these with a Battery Energy Storage System (BESS). Refer to Chapter 3 of the Preliminary Environmental Information Report (PEI Report) for full details of the proposal.

1.1.3 A DCO is required for the Proposed Development as it falls within the definition and thresholds for a 'Nationally Significant Infrastructure Project' (a 'NSIP') under Sections 14(1)(a) and 15(2) of the PA 2008.

1.1.4 A Preliminary Environmental Information (PEI) Report is being produced in advance of assembling the Application. This version of the HRA report is therefore a preliminary document that discusses potential significant effects on internationally important wildlife sites to the extent possible at this stage of scheme development. As such, a provisional conclusion of Likely Significant Effects is made for a number of impact pathways, pending further analysis that will inform the Application. An updated version of Likely Significant Effects analysis (if required), and a Statement to Inform Appropriate Assessment, will therefore be produced to accompany the formal Application.

1.2 The Scheme

1.2.1 Sunnica Energy Farm is a new solar farm proposal which will generate electricity that would be delivered to the national electricity transmission network. Sunnica intend to use ground mounted solar photovoltaic (PV) panel arrays to generate electricity energy from the sun and combine these with a Battery Energy Storage System (BESS). The Scheme would be connected to the national electricity transmission network by underground cables.

1.2.2 The BESSs would consist of a compound and battery array to allow for the storage, importation and exportation of energy to the National Grid.

1.2.3 Supporting electrical infrastructure would include an on-site substation and on-site cabling between the different electrical elements of the Scheme. The generating equipment of the Scheme would be fenced and be protected via security measures such as CCTV and lighting. Inside the fenced areas, in

addition to the generating equipment, would be internal access tracks, landscaping and habitat management and drainage.

1.2.4 The Scheme would be connected to an extension to the existing Burwell National Grid Substation, using 132kV cables buried underground. The cables would run between Sunnica West and Sunnica East (Grid Connection Route A), and then on from Sunnica West to the Burwell National Grid Substation Extension (Grid Connection Route B).

1.2.5 The current parameters for the Scheme design are set out in chapter 3 of the PEI Report and have been taken into account in the screening process undertaken in this document.

1.2.6 The Scheme qualifies as a Nationally Significant Infrastructure Project (NSIP) and will require a DCO from the Secretary of State for Business, Energy and Industrial Strategy, due to its generating capacity being over 50MW.

1.2.7 The Scheme comprises the following key areas:

- Solar Farm Sites:
  - Sunnica East Site A;
  - Sunnica East Site B;
  - Sunnica West Site A; and
  - Sunnica West Site B.
- associated electrical infrastructure for connection to the national transmission system comprise:
  - Grid Connection Route A (connecting the Sunnica East Site A with the Sunnica East Site B and then connecting to the Sunnica West Site A);
  - Grid Connection Route B (connecting the Sunnica West Site A and Sunnica West Site B and the Burwell National Grid Substation Extension); and
  - Burwell National Grid Substation Extension.

1.2.8 **Figure 8L-1** shows the locations of these key areas.

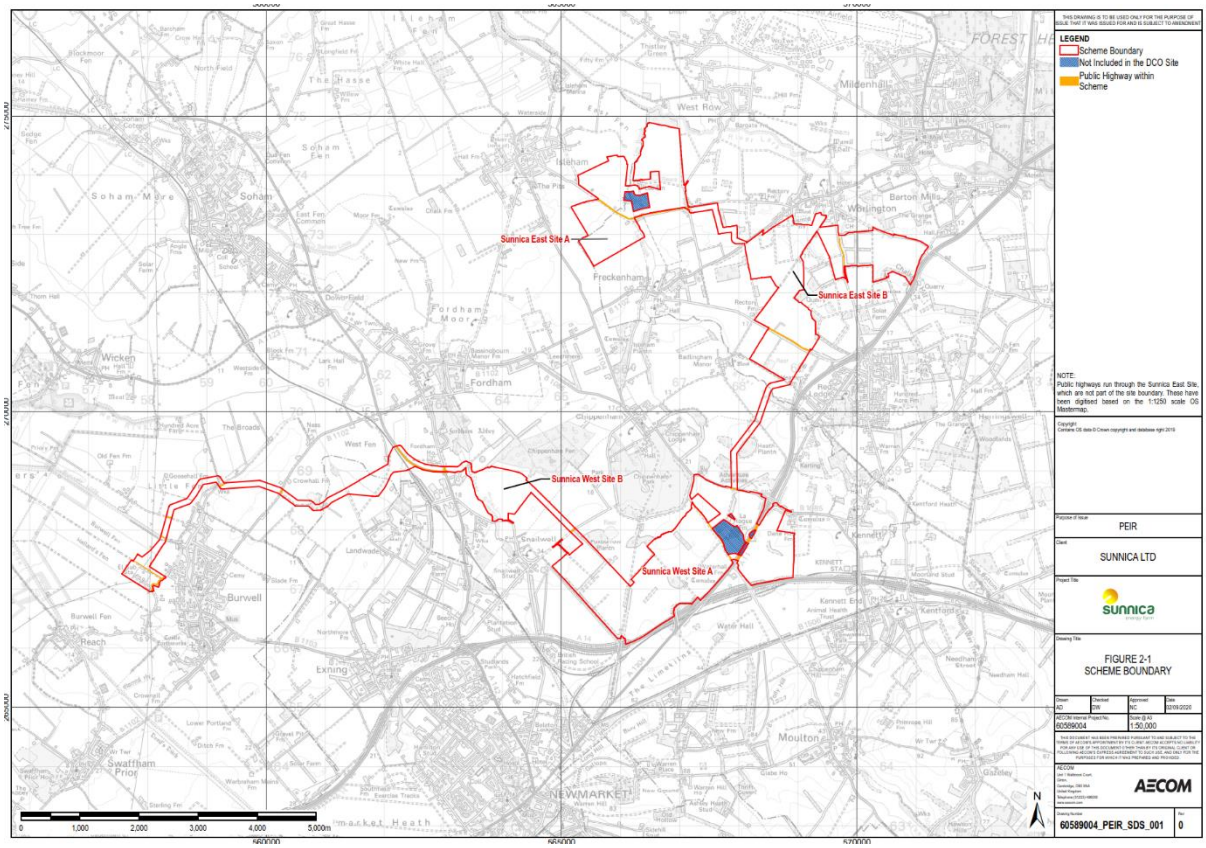

Figure 8L-1 DCO Site and location

1.3 Site Description

Sunnica East Site

1.3.1 The Sunnica East is split into two sub-sites, one to the north of Freckenham (referred to as Sunnica East Site A) and the other to the south of Worlington (referred to as Sunnica East Site B). These two sites are approximately 1 km apart and are separated by agricultural fields. The Sunnica East Site A encompasses an area of approximately 231.7 ha and includes land within the county of Suffolk and Cambridgeshire. Sunnica East Site B lies within Suffolk and encompasses an area of approximately 323.1 ha (**Figure 8L-1**).

1.3.2 The landscape features within the Sunnica East Site A and Sunnica East Site B consist of arable agricultural fields interspersed with individual trees, hedgerows, linear tree belts, small woodland blocks, farm access tracks and local roads.

1.3.3 The landscape features immediately surrounding the Sunnica East Site A and Sunnica East Site B comprise small rural villages, including Worlington to the north, Barton Mills to the north-east, Red Lodge and Freckenham to the south and Isleham to the west. Industrial land uses adjoin the A11 to the south of the Sunnica East Site with an industrial installation of a 7.5 MW solar farm situated adjacent to the south-eastern extent of the Sunnica East Site and an anaerobic digestion (AD) plant located to the south of the Sunnica East Site.

Sunnica West Site

1.3.4 The Sunnica West Site is located within the East Cambridgeshire District Council administrative area, approximately 3 km north east of Newmarket and 6.5 km east of Burwell.

1.3.5 Sunnica West is split into two sub-sites, one to the south-east (referred to as Sunnica West Site A) and the other to the north-west of Snailwell (referred to as Sunnica West Site B). These two sites are approximately 1 km apart, separated by agricultural fields and Chippenham Road. The Sunnica West Site A encompasses an area of approximately 485.5 ha and includes land to the east and west of the A11, consisting of agricultural fields bounded by trees, managed hedgerows, linear tree shelter belts, small woodland and copses and farm access tracks. Sunnica West Site B encompasses an area of approximately 68.8 ha and comprise of agricultural fields, grassland, small woodland and copses, farm access tracks and irrigation ditches fed by the River Snail which runs along the western and northern boundaries of the Site (**Figure 8L-1**).

1.3.6 The surrounding landscape comprises regularly shaped arable fields interspersed with managed hedgerows, tall shelter belts of trees and in the Chippenham Hall area, a parkland landscape with mature individual trees. Much of the area is also characterised by grazed paddocks, horse gallops and exercise tracks.

Cable Route Corridors

1.3.7 The Scheme will connect to an extension to the existing Burwell National Grid Substation via a cable route corridor. The cable route corridors under consideration are Grid Connection Route A, which connects the Sunnica East Site A with the Sunnica East Site B and then runs between the Sunnica West Site A and the Sunnica East Site B; and Grid Connection Route B, between the Sunnica West Site A and Sunnica West Site B and the Burwell National Grid Substation Extension.

Grid Connection Route A

1.3.8 Grid Connection Route A connects the Sunnica East Site A with Sunnica East Site B and crosses two minor roads and arable farmland (**Figure 8L-1**).

1.3.9 Heading south from the Sunnica East Site B, the cable route corridor for Grid Connection Route A crosses the River Kennett, pastoral farmland, the Chippenham footpath 49/7 (a Public Right of Way (PRoW) and B1085 (**Figure 8L-1**).

Grid Connection Route B

1.3.10 Heading east from the Burwell National Grid Substation Extension, the cable route corridor for Grid Connection Route B crosses agricultural fields and a number of roads including the B1102 and A142. Grid Connection Route B also crosses a number of watercourses (*e.g.* ditches or rivers), including the Burwell Lode, New River, and the River Snail, as well as a number of drainage ditches associated with Burwell Fen, Little Fen, the Broads, and agricultural drains (**Figure 8L-1**).

1.3.11 The cable route corridor for Grid Connection Route B crosses a PRoW (footpath 92/19) before crossing the railway line and the A142 Newmarket / Fordham Road. The Route then runs alongside Snailwell Road and across the River Snail into Sunnica West Site B.

Burwell National Grid Substation Extension

1.3.12 The habitat within the Burwell National Grid Substation Extension (surrounding the existing substation) comprises small grassland fields to the east of the existing substation (bordered by hedgerows and mature trees) and arable land to the south and west of the existing substation (**Figure 8L-1**).

1.4 Legislative Context

1.4.1 Further to the Habitats Directive (European Council Directive 92/43/EEC) and the Birds Directive (European Council Directive 2009/147/EEC), as part of the assessment of a proposed scheme it is necessary to consider whether the scheme is likely to have a significant effect on areas that have been designated for nature conservation purposes (i.e. 'European Sites'). This 'first stage' is the assessment that has been conducted and reported in this document. Although Ramsar sites are not part of the network of designated sites, paragraph 176 of the National Planning Policy Framework (NPPF) in England extends Ramsar sites the same level of protection as SPAs and SACs. The Overarching National Policy Statement for Energy Projects (2011) also makes clear that proposed SPAs should be considered as if they had already been classified as SPAs. As such, any reference to the European Sites below should be considered to also include such sites.

1.4.2 Should it be found that significant effects are likely, an 'Appropriate Assessment' should then be carried out in order to further assess those effects. **Figure 8L-2** sets out the legislative basis for an Appropriate Assessment. Consent may only be given for the proposed scheme if, following assessment, it is established that it will not adversely affect the integrity of the designated site.

1.4.3 If adverse effects are identified, alternatives should be considered to avoid those effects. However, where no alternative solution exists and so an adverse effect remains, a further assessment should be made of whether the scheme is required for imperative reasons of overriding public interest (IROPI). If the scheme meets that IROPI test, compensatory measures will be required in order to maintain the overall European Site status.

1.4.4 The Habitats Directive is implemented in English and Welsh law by the Conservation of Habitats and Species Regulations 2017 (as amended) (the 2017 Regulations). One of the aims of the 2017 Regulations is to “maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest” (Article 2(2)). This aim therefore relates to habitats and species, not the European Sites themselves, although the European Sites have a role in delivering favourable conservation status.

The 2017 Regulations also apply the precautionary principle[1] to European Sites.

1.4.5 Over the years, the phrase 'Habitats Regulations Assessment' (HRA) has come into wide currency to describe the overall process set out in the 2017 Regulations, from the screening for Likely Significant Effects through to identification of IROPI. This has arisen in order to distinguish the overall process from the individual stage of "Appropriate Assessment". Throughout this Report the term HRA is used for the overall process and restricts the use of Appropriate Assessment to the specific stage of that name.

Conservation of Habitats and Species Regulations 2017 (as amended)

Regulation 63 of the 2017 Regulations states that:

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … must make an appropriate assessment of the implications for the plan or project in view of that site's conservation objectives… The competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site."*

Figure 8L-2. The legislative basis for Appropriate Assessment

[1] The Precautionary Principle, which is referenced in Article 191 of the Treaty on the Functioning of the European Union, has been defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2005) as: "*When human*
"*When human activities may lead to morally unacceptable harm [to*

2. Method

2.1 Approach

2.1.1 The HRA has been carried out with reference to the general EC guidance on HRA (European Commission, 2001), general guidance on HRA published by the UK government in July 2019 (Ministry of Housing, Communities & Local Government, 2019) and Planning Inspectorate (PINS) Advice Note 10 (The Planning Inspectorate, 2017).

2.1.2 The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 ("the Withdrawal Act"). This established a transition period, which is currently set to end on 31 December 2020, although it can be extended once by either one or two years if both the UK and EU agree to an extension by 1 July 2020. The Withdrawal Act also retains the body of existing EU-derived law within our domestic law. During the transition period EU law applies to and in the UK.

2.1.3 As such this assessment of LSEs takes account of relevant EU case law (for instance, the Holohan and People over Wind cases, discussed below).

2.1.4 **Figure 8L-3** below outlines the stages of HRA according to PINS Advice Note 10. Note that while **Figure 8L-3** shows all the stages of the HRA process, this document only discusses stage 1 in further detail (see below). The stage 2 Appropriate Assessment will be documented as part of the Application.

2.1.5 Whilst the HRA decisions must be taken by the competent authority (the Secretary of State, informed by the recommendations of the appointed Examining Authority), the information needed to undertake the necessary assessments must be provided by the applicant. The information needed for the competent authority to establish whether there are any LSEs from the Proposed Development is therefore provided in this Report.

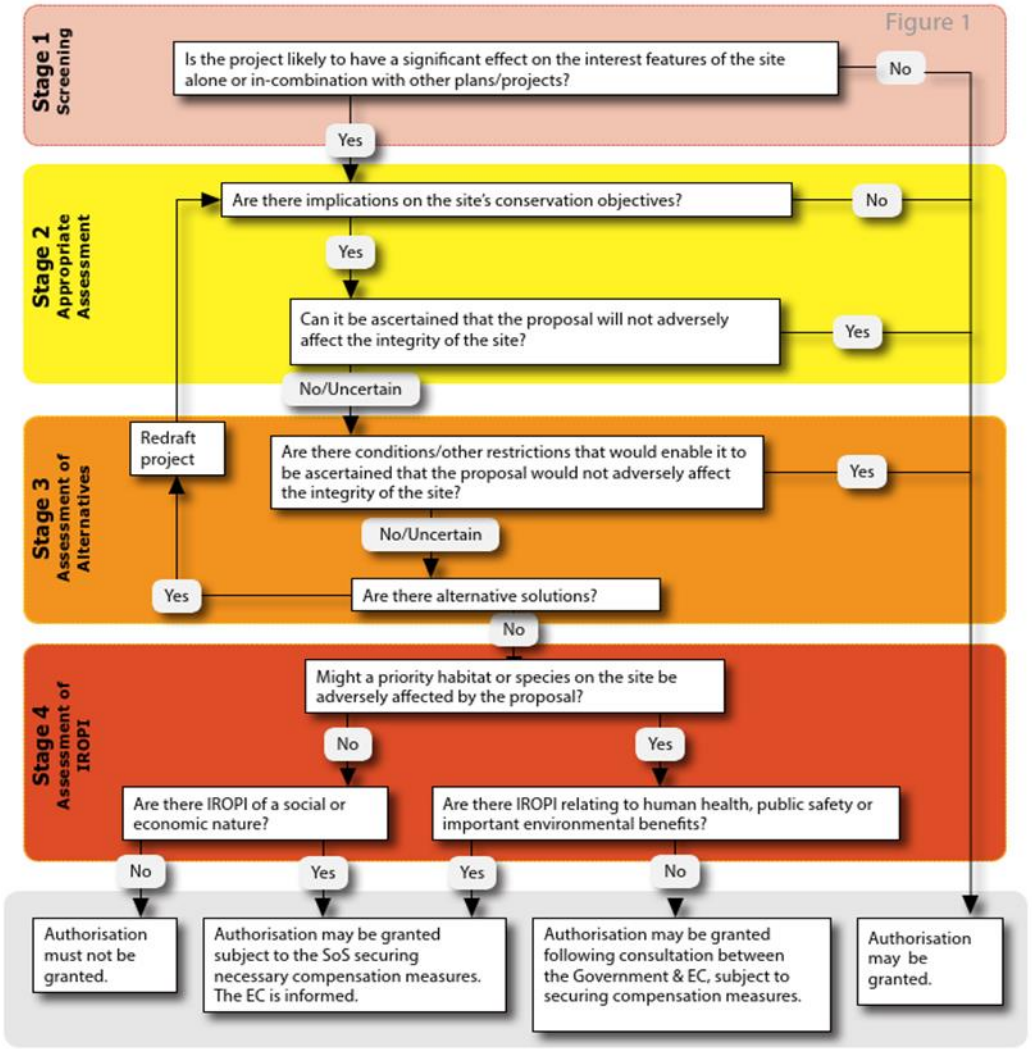

Figure 8L-3. Four Stage Approach to Habitats Regulations Assessments of Projects.

2.2 HRA Stage 1: Screening for Likely Significant Effects

2.2.1 The objective of the LSE test is to 'screen out' those aspects of a project and / or the European sites that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction (i.e. a pathway) with European sites. The remaining aspects are then taken forward to Appropriate Assessment. The assessment must consider the potential for effects 'in combination' with other plans and projects.

2.2.2 This report has been prepared having regard to all relevant case law relating to the 2017 Regulations, the Habitats Directive and Birds Directive. This includes the ruling by the Court of Justice of the European Union (CJEU) in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17).

2.2.3 This case held that; *"it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of*

the plan or project on that site" (paragraph 40). This establishes that 'mitigation measures' which avoid or reduce harmful effects of the project to European Sites (including pathways to those sites) cannot be taken into account at the screening stage, but they can be taken into account in an Appropriate Assessment. This report therefore takes this approach.

2.2.4 In 2018 the Holohan ruling[2] was also handed down by the European Court of Justice. Among other provisions paragraph 40 of the ruling states that ' *'Article 6(3) of the Habitats Directive must be interpreted as meaning that an 'appropriate assessment' must, on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the conservation objectives of the site'* [emphasis added].

[2] Case C-461/17

3. Baseline Evidence Gathering

3.1 Overview

3.1.1 There is no guidance that dictates the general physical scope of an HRA of a Plan document. Therefore, in considering the physical scope of the assessment, this Report has been guided primarily by identified impact pathways (called the source-pathway-receptor model).

3.1.2 Briefly defined, impact pathways are routes by which the implementation of a project can lead to an effect upon a European designated site. For some impact pathways (notably air pollution) there is guidance that sets out distance-based zones required for assessment. For others, a professional judgment must be made based on the best available evidence.

3.2 Designated Sites Scoped into HRA

3.2.1 Guidance published by the Environment Agency (Environment Agency, 2016) recommends that for large power generation developments greater than 50 MW, a radius of search of 15 km should be used when identifying relevant European designated sites which may be affected by the development. The PEI Report has considered a distance of 10km as appropriate based on likely impacts during construction and operation of a solar farm, compared with other large power generation developments, such coal and gas fired power stations. Irrespective of this, there are no additional European Sites within 15km of the Site.

3.2.2 The following European Sites are considered within this assessment:

- Fenland SAC;
- Chippenham Fen Ramsar;
- Breckland SPA;
- Wicken Fen SAC;
- Rex Graham Reserve SAC;
- Breckland SAC; and
- Devil's Dyke SAC.

3.2.3 Fenland SAC is composed of three individual sites: Wicken Fen, Woodwalton Fen and Chippenham Fen, with the latter adjacent to the DCO Site. Chippenham Fen is also designated as a Ramsar site.

3.2.4 There are no other international nature conservation designations within a 10 km radius of the Site. No additional SACs designated for bats are within 30 km of the Site.

3.2.5 Paragraph 4.9 of PINS Advice Note Ten, as well as guidance from the Department for Business, Energy and Industrial Strategy[3] requires an

[3] Guidelines on the assessment of transboundary impacts of energy developments on Natura 2000 sites outside the UK https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/408465/transboundary_guidelines.pdf

evaluation of the potential for the Scheme Project to require other consents which could also require Habitats Regulations Assessment by different competent authorities, and a statement as to whether the Scheme boundary overlaps with devolved administrations or other European Economic Area (EEA) States. It is confirmed that the Scheme boundary; nor its effects overlap with areas of devolved administrations or with those of other EEA States.

3.2.6 A summary of the qualifying features for each of the European Sites and their distance from the Scheme is summarised in **Table 8L-1** below.

Table 8L-1 European Sites Scoped into HRA Screening

Site	Approx. distance from Site	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
Fenland SAC	Directly adjacent to the north of the Sunnica West Site B.	Fenland SAC is composed of three individual sites: Wicken Fen, Woodwalton Fen and Chippenham Fen. Each of these sites hold areas of calcareous fens, with a long and well-documented history of regular management. Some areas have been dug for peat extraction with drainage ditches being currently manged for water levels control particularly in the summer. The three sites that comprise the Fenland SAC are located within the Fens National Character Area in Cambridgeshire, but they are located some 27 miles apart. They all overlie peat soils of varying depth and all are primarily calcareous fen with areas of grassland and woodland. There is a full range from species-poor Great Fen-sedge *Cladium mariscus*-dominated fen to species-rich fen with a lower proportion of great fen-sedge and containing such species as Black Bog-rush (*Schoenus nigricans*), Tormentil (*Potentilla erecta*) and Meadow Thistle (*Cirsium dissectum*). There are good transitions to the tall herb-rich East Anglian type of Purple Moor-grass *Molinia caerulea* – meadow thistle fen meadow and rush pastures, all set within a mosaic of reedbeds and wet pastures. This SAC has a high number of notable species including macroinvertebrates and plants.	Annex I habitats that are a primary reason for selection of this site: • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Calcareous fens with Great Fen-sedge (*Cladium mariscus*) and species of the *Caricion davallianae* Annex II species present as a qualifying feature, but not a primary reason for site selection: • Spined Loach (*Cobitis taenia*) • Great Crested Newt (*Triturus cristatus*)
Chippenham Fen Ramsar	Directly adjacent to the north of the Sunnica West Site B.	A spring-fed calcareous basin mire with a long history of management. The site is notable for its ecological diversity, from characteristic	There are no criteria associated with the Ramsar site.

Site	Approx. distance from Site	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
		sedge fen to fen meadow, chalk grassland, Alnus/Salix carr and ancient woodland (ash, oak and birch) (*Fraxinus*, *Quercus*, *Betula*). More than 300 species of flowering plants have been recorded, including very rare, regionally rare or local species, as have several rare invertebrates (moths). A notable assemblage of breeding birds includes Common snipe (*Gallinago gallinago*), Eurasian Woodcock (*Scolopax rusticola*), Common Nightingale (*Luscinia megarhynchos*), warblers (species of *Acrocephalus*), and Common Grasshopper Warbler (*Locustella naevia*). Scrub is periodically removed, and the fen meadows are mown. The site is comprised of drier areas of old planted woodland and wetter areas resulting from historic peat digging dominated by tall fen communities with Common Reed (*Phragmites australis*), Hemp Agrimony (*Eupatorium cannabinum*), Meadowsweet (*Filipendula ulmaria*) and extensive beds of Great Fen-sedge (*Cladium mariscus*) which are cut and sold for thatching. The fen meadow communities are less wet and have an abundance of grasses.	
Breckland SPA	1.4km north east of the Sunnica East Site B.	The Breckland of Norfolk and Suffolk lies in the heart of East Anglia on largely sandy soils of glacial origin. In the nineteenth century the area was termed a sandy waste, with small patches of arable cultivation that were soon abandoned. The continental climate, with low rainfall and free-draining soils, has led to the development of dry heath and grassland communities. Much of Breckland has been planted with conifers throughout the twentieth century, and in part of the site, arable farming	The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season: • Stone Curlew (*Burhinus oedicnemus*) 115 pairs – breeding 5 year mean (1994 – 98) 60.1% GB

Site	Approx. distance from Site	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
		is the predominant land use. The remnants of dry heath and grassland which have survived these recent changes support heathland breeding birds, where grazing by rabbits and sheep is sufficiently intensive to create short turf and open ground. These breeding birds have also adapted to live in forestry and arable habitats. Woodlark (*Lullula arborea*) and Nightjar (*Caprimulgus europaeus*) breed in clear-fell and open heath areas, whilst Stone Curlews (*Burhinus oedicnemus*) establish nests on open ground provided by arable cultivation in the spring, as well as on Breckland grass-heath.	• Nightjar (*Caprimulgus europaeus*) 415 males – breeding Count as at 1998 12.2% GB • Woodlark (*Lullula arborea*) 430 pairs – breeding Count as at 1997 28.7% GB
Wicken Fen Ramsar	Approximately 2.1km north west of the Grid Connection Route B2 and approximately 2.6km north west of the Burwell National Grid Substation Extension.	The site is characterized by a mosaic of vegetation with all stages of succession represented. This is due to extensive peat cutting and differing systems of crop exploitation with areas subject to frequent cutting with a higher species diversity. This results in a very high biodiversity, including rare fenland plants and invertebrates. The site also supports large numbers of wintering birds including mallard (*Anas* platyrhynchos), teal (*Anas crecca*), wigeon (Mareca penelope), shoveler (*Spatula clypeata*), pochards (*Aythya ferina*) and tufted duck (*Aythya fuligula*). The site acts as a flood catchment area, thus the water level is regulated, and it includes dikes and abandoned clay pits. Vegetation includes various types of rushes, sedges, and marsh orchids with corresponding insect associations. Noteworthy flora includes the presence of a few nationally important higher plant species: *Viola persicifolia*, Fibrous tussock-sedge (*Carex appropinquata*), Marsh Pea *Lathyrus*	The site is designated for: • Ramsar criterion 1 - One of the most outstanding and representative remnants of the East Anglian peat fens. The area is one of the few which has not been drained. Traditional management has created a mosaic of habitats from open water to sedge and litter fields. • Ramsar criterion 2 - The site supports one endangered species of Red Data Book plant, the fen violet *Viola persicifolia*, which survives at only two other sites in Britain. It also contains eight nationally scarce plants and 121 Red Data Book invertebrates.

Site	Approx. distance from Site	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
		palustris, *Myriophyllum verticillatum*, *Oenanthe fluviatilis*, *Peucedanum palustre*, *Potamogeton coloratus*, Flat-stalked-pondweed (*Potamogeton friesii*), *Potamogeton praelongus*. The GB Red Book considers the vascular plant Fen Ragwort (*Senecio paludosus*) as Critically Endangered; while *Myriophyllum verticillatum* and *Peucedanum palustre* are considered Vulnerable.	
Rex Graham Reserve SAC	Approximately 3.0km north east of the Sunnica East Site B.	This site hosts the priority habitat type "orchid rich sites". This is a disused chalk pit with developing dry grassland characterised by False Oat-grass (*Arrhenatherum elatius*). The site has been selected as it supports the largest population of Military Orchid (*Orchis militaris*) in the UK, comprising more than 95% of the current total population.	Annex I habitats that are a primary reason for selection of this site: • Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)
Breckland SAC	Approximately 3.1km east of the Sunnica East Site B.	Inland dunes with open *Corynephorus* and *Agrostis* grasslands for which this is the only known outstanding locality in the United Kingdom, which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation for which this is considered to be one of the best areas in the United Kingdom. European dry heaths for which this is considered to be one of the best areas in the United Kingdom. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) for which this is considered to be one of the best areas in the United Kingdom. Alluvial forests with Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*) *(Alno-Padion, Alnion*	Annex I habitats that are a primary reason for selection of this site: • Inland dunes with open *Corynephorus* and *Agrostis* grasslands • Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation • European dry heaths • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

Site	Approx. distance from Site	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
		incanae, Salicion albae) for which the area is considered to support a significant presence. Great Crested Newt (*Triturus cristatus*) for which the area is considered to support a significant presence.	• Alluvial forests with Alder and Ash *(Alno-Padion, Alnion incanae, Salicion albae)* Annex II species present as a qualifying feature, but not a primary reason for site selection: • Great crested newt *Triturus cristatus*
Devil's Dyke SAC	Approximately 4.5km south west of the Burwell National Grid Substation Extension.	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) for which this is considered to be one of the best areas in the United Kingdom.	Annex I habitats that are a primary reason for selection of this site: • Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

3.2.7 The conservation objectives for each relevant European Site are summarised in **Table 8L-2**.

Table 8L-2 Conservation Objectives for Relevant European Sites

Site	Conservation Objectives	Threats / Pressures to Site Integrity
Fenland SAC	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.	The following threats / pressures to the site integrity of Fenland SAC have been identified in Natural England's Site Improvement Plan: • Water pollution • Hydrological changes • Air Pollution: impact of atmospheric nitrogen deposition
Chippenham Fen Ramsar	There are no specific conservation objectives for the Ramsar site but those set out for Fenland SAC are considered relevant.	The threats / pressures to the Ramsar site are considered the same as for Fenland SAC.
Breckland SPA	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site	The following threats / pressures to the site integrity of Breckland SPA have been identified in Natural England's Site Improvement Plan: • Lack of ground disturbance • Undergrazing • Forestry and woodland management • Water pollution • Changes in species distributions • Stone curlew monitoring and intervention • Planning permission: general • Air Pollution: impact of atmospheric nitrogen deposition • Public access/disturbance • Climate change • Inappropriate scrub control

Site	Conservation Objectives	Threats / Pressures to Site Integrity
		• Inappropriate management practices • Habitat fragmentation • Inappropriate weed control • Inappropriate pest control Inappropriate cutting/mowing
Wicken Fen Ramsar	There are no specific conservation objectives for the Ramsar site but those set out for Fenland SAC are considered relevant.	The threats / pressures to the Ramsar site are considered the same as for Fenland SAC.
Rex Graham Reserve SAC	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats • The structure and function (including typical species) of qualifying natural habitats, and • The supporting processes on which qualifying natural habitats	The following threats / pressures to the site integrity of the Rex Graham Reserve SAC have been identified in Natural England's Site Improvement Plan: • Changes in species distributions • Air Pollution: impact of atmospheric nitrogen deposition • Habitat fragmentation • Deer • Invasive species Public access/disturbance
Breckland SAC	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.	The following threats / pressures to the site integrity of Breckland SPA have been identified in Natural England's Site Improvement Plan: • Lack of ground disturbance • Undergrazing • Forestry and woodland management • Water pollution • Changes in species distributions • Stone curlew monitoring and intervention • Planning permission: general • Air Pollution: impact of atmospheric nitrogen deposition • Public access/disturbance • Climate change • Inappropriate scrub control • Inappropriate management practices • Habitat fragmentation • Inappropriate weed control • Inappropriate pest control

Site	Conservation Objectives	Threats / Pressures to Site Integrity
		Inappropriate cutting/mowing
Devil's Dyke SAC	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats • The structure and function (including typical species) of qualifying natural habitats, and • The supporting processes on which qualifying natural habitats rely	The following threats / pressures to the site integrity of Devil's Dyke SAC have been identified in Natural England's Site Improvement Plan: • Inappropriate scrub control • Air Pollution: impact of atmospheric nitrogen deposition

3.3 Existing On-site Baseline Conditions

Aquatic Ecology

3.3.1 Baseline aquatic surveys were carried out to inform the Preliminary Environmental Information Report. These included aquatic surveys in the River Snail downstream of Fenland SAC (Chippenham Fen site)/Chippenham Fen Ramsar.

Sunnica East Site

3.3.2 Aquatic features within the Sunnica East Site include the Lee Brook, a series of connected ditches in close proximity to the River Lark, two ponds and a ditch.

3.3.3 Records of protected fish species exist in the Lee Brook including Brown/Sea Trout (*Salmo trutta*), Bullhead (*Cottus gobio*), Brook Lamprey (*Lampetra planeri*).

3.3.4 The presence of invasive species has been recorded in several locations in and around the site boundary. This includes Signal Crayfish (*Pacifastacus leniusculus*) (2016) in the Lee Brook approximately 40 m from the Sunnica East Site.

3.3.5 The designated sites of Fenland SPA, Wicken Fen Ramsar and Chippenham Fen Ramsar are not in hydrological or ecological connection with the watercourses in the Sunnica East Site catchment referred to above.

Sunnica West Site

3.3.6 Aquatic features within the Sunnica West Site include a number of agricultural ditches (Sunnica West Site A), the River Snail and two ditches connected to Chippenham Park SSSI (Sunnica West Site B).

3.3.7 The River Snail is a heavily modified 'Main River' and is currently classified by the Environment Agency as having 'Moderate' ecological potential. The waterbody fails to meet 'Good' ecological potential due to physical modifications and sewage discharges. The River Snail flows along the western boundary of Sunnica West Site.

3.3.8 A notable macroinvertebrate species, the caddisfly *Limnephilus nigriceps*, was recorded in River Snail in 2012. One RDB species classed as Vulnerable; Water Violet (*Hottonia palustris*), was recorded in Chippenham Fen in 2009, approximately 1 km from the Sunnica West Site boundary.

Grid Connection Route A and B and Burwell National Grid Substation Extension

3.3.9 Burwell Lode runs adjacent to Wicken Fen Ramsar and Fenland SAC approximately 3 km downstream of the proposed crossing location. The cable route corridor also passes over Catchwater Drain north-east of Burwell. The watercourse is an artificial drainage channel that joins Burwell Lode further downstream. None of the other watercourses are considered to have hydrological or ecological connections to European Sites.

3.3.10 Burwell Lode is a heavily modified 'Main River' and is currently classed by the Environment Agency as having 'Moderate' ecological potential. The waterbody fails to meet 'Good' ecological potential due to physical modifications, sewage discharges, poor livestock management, poor nutrient management, transport drainage and atmospheric deposition of mercury and its compounds.

3.3.11 The proposed cable route corridor crosses Burwell Lode north of Burwell, through arable land and this section is navigable by boat. There are public footpaths along both bank tops and riparian vegetation comprises reeds, grasses and scrub. The channel is relatively wide (approximately 12 m) and deep. Macrophytes and overhanging vegetation would provide suitable habitat for fish and macroinvertebrates.

3.3.12 Spined Loach was recorded in Burwell Lode in 2014.

3.3.13 Several invasive species have been recorded by the Environment Agency in watercourses close or within the site boundary including:

- Nuttall's Waterweed (*Elodea nuttallii*), Burwell Lode 2017
- Canadian Waterweed (*Elodea canadensis*), Wicken Fen, 2010
- Nuttall's Waterweed, Wicken Fen, 2012
- New Zealand Pigmyweed (*Crassula helmsii*), Wicken Fen, 2013

3.3.14 Freshwater shrimp *Crangonyx pseudogracilis/floridanus* have been recorded in both Catchwater Drain in 2009 and Burwell Lode in 2015 by the Environment Agency. *Crangonyx pseudogracilis* is a long-established non-native species, whereas *Crangonyx floridanus* is a highly invasive non-native species, which has only recently been recorded in the UK. Taxonomic distinction between *Crangonyx floridanus* and *Crangonyx pseudogracilis* is extremely difficult so records of *Crangonyx pseudogracilis/floridanus* have been included.

3.3.15 Zebra mussel *Dreissena polymorpha*, demon shrimp *Dikerogammarus haemobaphes*, the shrimp *Gammarus tigrinus* and amphipod *Chelicorophium curvispinum* were also recorded in Burwell Lode, approximately 4.5 km downstream of the proposed cable route crossing.

Terrestrial Ecology and Nature 2000 special features

3.3.16 Baseline ecology surveys were carried out to inform the Preliminary Environmental Information Report. Surveys relevant to the cited features noted in **Table 8L-2** for European Sites are outlined below.

Great Crested Newt

3.3.17 No records of Great Crested Newt were returned from the data search, within 2 km of the Scheme boundary and communication with Natural England reserve managers at Chippenham Fen suggest that Great Crested Newt are not present within Chippenham Fen. The closest record of Great Crested Newt to the Scheme boundary was 2.1 km from the Burwell National Grid Substation Extension, in 2013.

3.3.18 Habitat Suitability Indices (HSIs) were undertaken for 15 waterbodies and watercourses within the Scheme boundary and a 500m buffer. In summary, of the 15 waterbodies surveyed using HSI methods:

- none had ‘excellent’ suitability to support breeding Great Crested Newt;
- five had ‘good’ suitability to support breeding Great Crested Newt;
- none had ‘average’ suitability to support breeding Great Crested Newt;
- five had ‘below average’ to support breeding Great Crested Newt; and
- five had ‘poor’ to support breeding Great Crested Newt.

3.3.19 One waterbody in Sunnica West Site A was surveyed for Great Crested Newt using traditional methods with four survey visits undertaken in May 2020. No Great Crested Newt was recorded.

3.3.20 Water samples were taken from nine waterbodies for subsequent eDNA analysis by the ADAS Laboratory in Helsby.

3.3.21 The results of the Great Crested Newt eDNA survey identified positive eDNA samples for Great Crested Newt in a single waterbody approximately 250m north west of the Sunnica East Site B (see Appendix 08E). No Great Crested Newts were recorded closer to the DCO Site than this waterbody and no other records of Great Crested Newts were returned from within 2km of the DCO Site. Great Crested Newts are absent from Chippenham Fen and the nearest part of Fenland SAC, known to contain the species, is 2.1km away from the DCO Site, at Wicken Fen. There are considered no functional links between Great Crested Newt populations associated with Fenland SAC and the DCO Site.

Avifauna

3.3.22 Breeding bird surveys were undertaken of the DCO Site and appropriate buffers surrounding the Site in 2019 and the only SPA bird species present was Stone Curlew. This species was the focus of surveys in 2019 and 2020.

Details of the surveys and results are provided in Appendix 08H of the PEI Report.

3.3.23 In 2019, up to three pairs of Stone Curlew were recorded within the Site boundary:

- Pair A - in Sunnica East Site A1; and
- Pair B and Pair C in Sunnica East Site B.

3.3.24 Another pair (Pair D) were recorded outside of the site boundary, between Sunnica East Site A and Sunnica East Site B.

3.3.25 Pair A, in Sunnica East Site was present until mid-May 2019, after which they were no longer seen. This pair of Stone Curlews were always recorded within the same field and on one occasion one bird appeared to be incubating. However, no nesting attempt was confirmed in this location.

3.3.26 Pair B and Pair C were regularly recorded through the survey period and both pairs were confirmed as breeding, with young birds recorded from both pairs.

3.3.27 Pair D was present in a potato field and their secretive behaviour in this area strongly suggested that this pair were nesting, although this was not confirmed during surveys.

3.3.28 No other Stone Curlew territories were recorded within 500m of the Site boundary.

3.3.29 It was concluded that in 2019 the breeding population of Stone Curlew present within the Site was between 2-3 pairs, with a further pair breeding within 500m of the Site.

3.3.30 In 2020, up to five pairs of Stone Curlew were recorded within the Site boundary during the course of the surveys:

- Pair E and Pair F in Sunnica East Site A1; and
- Pair G, Pair H and Pair I in Sunnica East Site B.

3.3.31 Pair E and Pair F, in Sunnica East Site, were always recorded within the same fields. The behaviour of Pair F suggested that these birds were potentially incubating, or had a nesting attempt, although this could not be confirmed. The behaviour of the Pair E did not suggest that they were attempting to nest within the Site boundary and no nesting attempt was recorded. It is possible that this pair were either a non-breeding pair or were breeding away from the Site.

3.3.32 Pair G was a confirmed nesting attempt, with a young chick recorded on 21st May 2020.

3.3.33 Pairs H and I were recorded until early June 2020, although neither pair could be confirmed as nesting.

3.3.34 It was concluded that in 2020, the breeding population of Stone Curlew present within the Site was between 1-4 pairs, with a further pair either non-breeding or breeding away from the Site.

3.3.35 Given, that Stone Curlew were recorded breeding within the Proposed Development it is necessary to consider whether these populations are functionally linked to Breckland SPA populations or whether the habitat present within the Proposed Development is considered to be functionally important for populations associated with the Breckland SPA.

3.3.36 The term 'functional linkage' refers to the role or 'function' that land or sea beyond the boundary of a European site might fulfil in terms of ecologically supporting the populations for which the site was designated or classified. Such habitat is therefore 'linked' to the European site in question because it provides an important role in maintaining or restoring the population of qualifying species at favourable conservation status[4]

3.3.37 At its closest point the Proposed Development is 1.44 km from the Breckland SPA, however, this section of the Breckland SPA is forestry and does not support Stone Curlew. Therefore, the Proposed Development is outside the 1.5km primary Stone Curlew buffer defined in the Forest Heath Core Strategy which states: ''*Development proposed within 1,500m of the Breckland SPA components (SSSI sites) which are designated for Stone Curlew (Burhinus oedicnemus) will require a project level Habitats Regulations Assessment (HRA) to determine whether the development will have an impact on Stone Curlew. Where it cannot be concluded that development is not likely to have an adverse effect on the integrity of the SPA the development will not be allowed.*''

3.3.38 This buffer was tested in the high court - Shadwell Estates v Breckland District Council [2013] EWHC 12 (Admin) for the allocation of 5,000 homes beyond 1,500m but within 2,500m. The challenge was dismissed and decision included, *"The 1,500 metre distance was endorsed by Natural England and the RSPB. It was adopted in the Core Strategy, and the Core Strategy is no longer challengeable. No new evidence has been produced which undermines the validity of the 1,500 metre distance."*

3.3.39 However, further work by Liley *et al.* (2017) suggested a maximum range of up to 3km and stated, "*The 3km distance is therefore suggested as the limit to which the mitigation requirements would apply and the limit to which any lower tier plan or project level Habitats Regulations Assessment would need to be undertaken (notwithstanding the need to still assess impacts on stone curlew in order to fulfil other legislative and policy requirements in relation to wild birds)."*

3.3.40 In their review of Stone Curlew buffers for the Breckland Local Plan Liley *et al.* (2017) concluded that '*Stone Curlews are now more widely distributed across East Anglia and clearly at some point there is potential that land is not functionally-linked to the Breckland SPA. The choice of 3km was made because most Stone Curlew activity is with 1km of the nest and evidence indicates that development impacts occur over a 1500m distance, 3km*

[4] Description taken from Chapman, C. & Tyldesley, D. 2016. Functional linkage: How areas that are functionally linked to European sites have been considered when they may be affected by plans and projects - a review of authoritative decisions. Natural England Commissioned Reports, Number 207. Available at: http://publications.naturalengland.org.uk/publication/6087702630891520

should therefore adequately encompass the majority of birds' foraging requirements and absorb any impact of development."

3.3.41 The Proposed Development is outside both the original 1.5 km buffer for likely significant effects and located within the secondary, i.e. 3 km, buffer. These buffers have been defined on the basis of locations of known breeding sites and foraging ranges during the breeding season. The revision of the 1.5 km buffer considered all Stone Curlew nesting attempts recorded up to 3 km outside of the SPA boundary. A 1.5 km buffer was then applied to these. It is suggested that risks beyond these distances would not be significant for the SPA population and should be the limit to which mitigation requirements would apply. At their closest the Stone Curlew present and nesting on the Proposed Development were 4.4 km[5] from the Breckland SPA[6].

3.3.42 The revised Stone Curlew map (Liley *et al.* 2017) is shown in **Figure 8L-4**.

3.3.43 The Proposed Development is not located within this 'secondary buffer'. It should be noted that parts of the Sunnica West Site A are within the orange cells; however, this section of the Proposed Development was found not to support Stone Curlew. It is therefore, concluded that the Stone Curlew present within the Proposed Development are not defined as functionally linked to the Breckland SPA and that the habitat is not consequently functionally important to maintaining the integrity of the Breckland SPA Stone Curlew population.

[5] Distance taken from the closest point of the field where nesting has occurred to the Breckland SPA, not the specific nest location.
[6] Nearest section of the Breckland SPA with suitable Stone Curlew habitat.

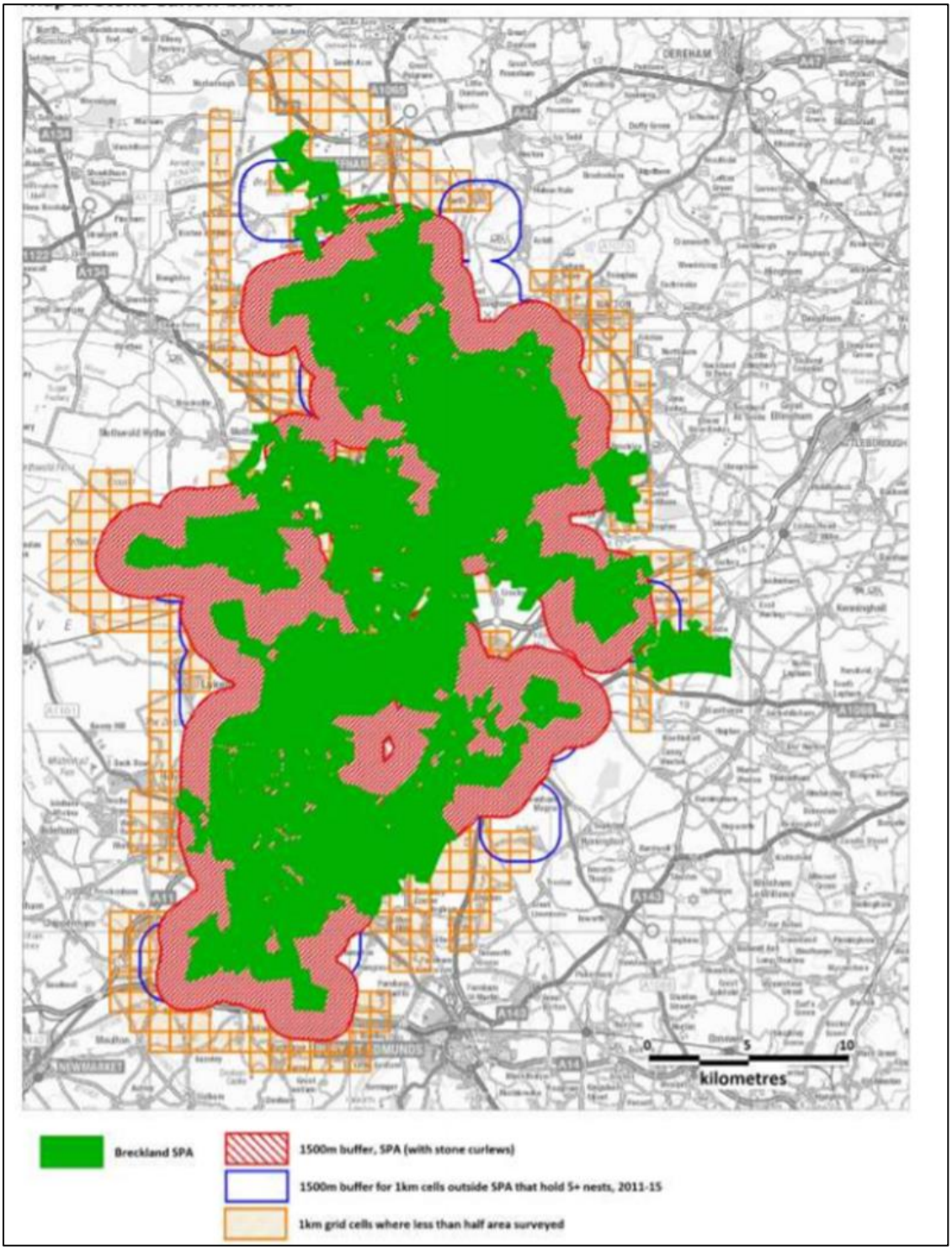

Figure 8L-4. Stone Curlew buffers map (Liley, *et al.* 2017)

Notes on Figure 8L-4. The dark green solid shading shows the SPA and the red hatching around the SPA is the 1500m buffer (the primary buffer). Blue lines reflect the 'secondary' buffer – based on 1km cells that held at least 5 nesting attempts 2011-2015 and relates to cells within 3km of the SPA only. In addition, orange grid cells show areas where there are no or limited (less than half the area) survey data available from the RSPB. As the RSPB data is focussed on the key areas for Stone Curlews, some of these cells may contain unsuitable habitat. Only 1km cells where at least part of the cell is within 1500m of the SPA (with Stone Curlews) are shown. These orange cells therefore are ones where there are data gaps and additional data checks or survey data may be required to check for use by Stone Curlews.

3.3.44 No Nightjar or Woodlark were recorded during any surveys of the Site.

3.4 Atmospheric Pollution

3.4.1 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2) and are summarised in **Table 8L-3**. Ammonia can have a directly toxic effect upon vegetation, particularly at close distances to the source such as near road verges. NOx can also be toxic at very high concentrations (far above the annual average critical level). However, in particular, high levels of NOx and NH_3 are likely to increase the total nitrogen deposition to soils, potentially leading to deleterious knock-on effects in resident ecosystems. For example, an increase in the total nitrogen deposition from the atmosphere is widely known to enhance soil fertility and to lead to eutrophication. This often has adverse effects on the community composition and quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats (Wolseley et al, 2006; Dijk, 2011). The total nitrogen deposition resulting from a plan or project is therefore often assessed as the overarching parameter determining atmospheric pollution.

Table 8L-3 Main sources and effects of air pollutants on habitats and species

Pollutant	Source	Effects on habitats and species
Sulphur Dioxide (SO_2)	The main sources of SO_2 are electricity generation from coal and oil combustion, and industrial and domestic fuel combustion. However, total SO_2 emissions in the UK have decreased substantially since the 1980's. Another origin of sulphur dioxide is the shipping industry and high atmospheric concentrations of SO_2 have been documented in busy ports. In future years shipping is likely to become one of the most important contributors to SO_2 emissions in the UK.	Wet and dry deposition of SO_2 acidifies soils and freshwater and may alter the composition of plant and animal communities. The magnitude of effects depends on levels of deposition, the buffering capacity of soils and the sensitivity of impacted species. However, SO_2 background levels have fallen considerably since the 1970's and are now not regarded a threat to plant communities. For example, decreases in Sulphur dioxide concentrations have been linked to returning lichen species and improved tree health in London.
Acid deposition	Leads to acidification of soils and freshwater via atmospheric deposition of SO_2, NOx, ammonia and hydrochloric acid. Acid deposition from rain has declined by 85% in the last 20 years, which most of this contributed by lower sulphate levels. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, increased N emissions may cancel out any gains produced by reduced S levels.	Gaseous precursors (e.g. SO_2) can cause direct damage to sensitive vegetation, such as lichen, upon deposition. Can affect habitats and species through both wet (acid rain) and dry deposition. The effects of acidification include lowering of soil pH, leaf chlorosis, reduced decomposition rates, and compromised reproduction in birds / plants. Not all sites are equally susceptible to acidification. This varies depending on soil type, bed rock geology, weathering rate and buffering capacity. For example, sites with an underlying geology of granite, gneiss and quartz rich rocks tend to be more susceptible.

Pollutant	Source	Effects on habitats and species
Ammonia (NH_3)	Ammonia is a reactive, soluble alkaline gas that is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but ammonia concentrations are directly related to the distribution of livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+) - containing aerosol. Due to its significantly longer lifetime, NH_4+ may be transferred much longer distances (and can therefore be a significant trans-boundary issue). While ammonia deposition may be estimated from its atmospheric concentration, the deposition rates are strongly influenced by meteorology and ecosystem type.	The negative effect of NH_4+ may occur via direct toxicity, when uptake exceeds detoxification capacity and via N accumulation. Its main adverse effect is eutrophication, leading to species assemblages that are dominated by fast-growing and tall species. For example, a shift in dominance from heath species (lichens, mosses) to grasses is often seen. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides (NO_x)	Nitrogen oxides are mostly produced in combustion processes. Half of NO_X emissions in the UK derive from motor vehicles, one quarter from power stations and the rest from other industrial and domestic combustion processes.	Direct toxicity effects of gaseous nitrates are likely to be important in areas close to the source (e.g. roadside verges). A critical level of NOx for all vegetation types has been set to 30 ug/m^3. Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) contributes to the total nitrogen deposition and may lead to both soil and freshwater acidification. In addition, NO_x contributes to the eutrophication of soils and water, altering the species composition of plant communities at the expense of sensitive species.
Nitrogen deposition	The pollutants that contribute to the total nitrogen deposition derive mainly from oxidized (e.g. NO_X) or reduced (e.g. NH_3) nitrogen emissions (described separately above). While oxidized nitrogen mainly originates from major conurbations or highways, reduced nitrogen mostly derives from farming practices. The N pollutants together are a large contributor to acidification (see above).	All plants require nitrogen compounds to grow, but too much overall N is regarded as the major driver of biodiversity change globally. Species-rich plant communities with high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication. This is because many semi-natural plants cannot assimilate the surplus N as well as many graminoid (grass) species. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions involving NOx, volatile organic compounds (VOCs) and sunlight. These precursors are mainly released by the combustion of fossil fuels (as discussed above).	Concentrations of O_3 above 40 ppb can be toxic to both humans and wildlife and can affect buildings. High O_3 concentrations are widely documented to cause damage to vegetation, including visible leaf damage, reduction in floral biomass,

Pollutant	Source	Effects on habitats and species
	Increasing anthropogenic emissions of ozone precursors in the UK have led to an increased number of days when ozone levels rise above 40 ppb ('episodes' or 'smog'). Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	reduction in crop yield (e.g. cereal grains, tomato, potato), reduction in the number of flowers, decrease in forest production and altered species composition in semi-natural plant communities.

3.4.2 Sulphur dioxide emissions overwhelmingly derive from coal and oil power stations and industrial processes that require the combustion of coal and oil, as well as (particularly on a local scale) shipping (CEH, 2016).

3.4.3 The only pollutant likely to be associated with construction of the Proposed Development is NOx which will be primarily determined by the associated traffic movements (both relating to on-site and commuter traffic) and any diesel plant required for construction.

3.4.4 The Air Pollution Information System (APIS) forms the major source of information regarding the air quality impact pathway. It specifies a critical NOx concentration (critical threshold) for the protection of vegetation of 30 μgm^{-3}. In addition, ecological studies have determined 'critical loads'[7] of atmospheric nitrogen deposition (that is, NOx combined with ammonia NH_3). Air quality is considered further in *Chapter 14: Air Quality* and *Chapter 8: Ecology and Nature Conservation* of the PEI Report.

3.4.5 According to the Department of Transport's Guidance, beyond 200 m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant (**Figure 8L-5**). This is therefore the distance that has been used throughout this HRA to determine whether European sites are likely to be significantly affected by site traffic associated with the Proposed Development.

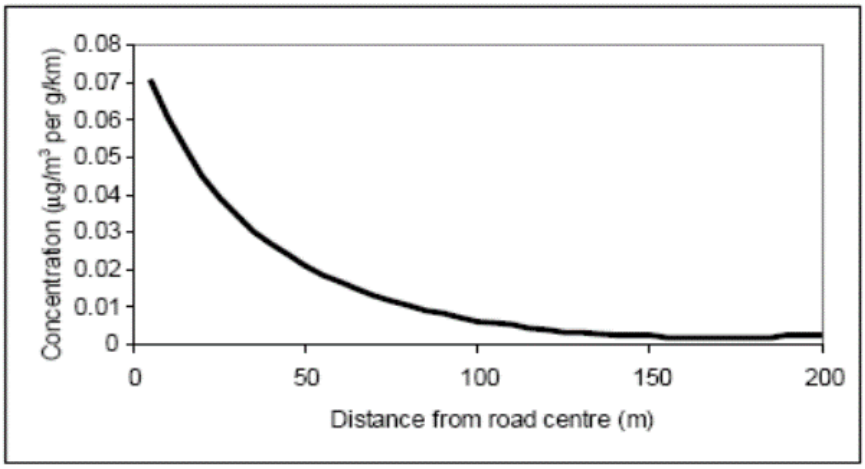

Figure 8L-5. Traffic contribution to concentrations of pollutants at different distances from a road (Department for Transport, 2016)

3.4.6 An initial assessment of the traffic likely to be associated with the project has been conducted. The greatest number of vehicle movements will occur in the construction phase of the development. A preliminary Transport Assessment (TA) has been undertaken to determine the effects of the construction phase on the transport network, which includes a description of current and future baseline conditions, calculates the construction traffic flows and the likely routes to be taken by site traffic and abnormal traffic loads. This is presented in *Chapter 13: Transport and Access - Appendix A* of the PEI Report. The Affected Road Network (ARN) will be considered in the DCO submission of the Environmental Statement and subsequent version of this report.

3.5 Water Environment

3.5.1 The quality of the water that feeds European Sites is an important determinant of the nature of their habitats and the species they support, and therefore integral to meeting a site's conservation objectives. Poor water quality can have a range of environmental impacts. At high concentrations, toxic chemicals and heavy metals can result in the immediate death of aquatic life (both flora and fauna). At lower concentrations, negative impacts may be more subtle and could increase vulnerability to disease or change the behaviour of wildlife. These substances, especially Polychlorinated Biphenyls (PCBs), accumulate in minuscule organisms and then biomagnify as they are passed up the food chain. Furthermore, they are not easily biodegraded over time. Overall, there are two broad types of toxic compounds in aquatic environments, namely synthetic and non-synthetic (i.e. naturally occurring) substances.

3.5.2 Toxic contamination may arise from synthetic toxic compounds, such as pesticides, PCBs (polychlorinated biphenyls) and biocides. Some of these substances are endocrine disrupting chemicals, which have the capacity to mimic animal hormones, prevent their production or breakdown. As discussed above, many of the synthetic compounds tend to accumulate over time and are likely to be present in animal tissue or substrate for long periods of time. Another factor in determining the magnitude of water pollution is the amount of hydrological mixing that a site receives. Non-synthetic compounds, such as fuel oils and heavy metals, occur in the environment naturally at relatively low concentrations, but become toxic at higher concentrations. Water quality is discussed further in *Chapter 9: Water Environment* of the PEI Report. The assessments of water quality will also inform the Water Framework Directive assessment, which will be included as part of the DCO submission.

3.5.3 Requirements for specific water levels are species- and life cycle-specific. A hydrological assessment of the construction and operation of the Proposed Development will form part of the ES which will accompany the DCO Application and inform the version of this document submitted as part of the DCO submission. An assessment of the hydrological connections between the Proposed Development and European Sites, in particular Fenland SAC/Chippenham Fen Ramsar, has been considered further within *Chapter 9: Water Environment* of the PEI Report.

4. Stage 1 - Screening for Likely Significant Effects

4.1 Overview

4.1.1 This section examines the Likely Significant Effects of the Proposed Development. It is structured by development phase (i.e. first by construction period, then by operational period). For the purpose of the decommissioning period Likely Significant Effects are the same as those arising in the construction period and are therefore, not screened separately.

4.1.2 Within each development phase each potential impact pathway is considered separately, covering all European sites to which that impact pathway applies. Impact pathways are summarised in **Appendix A**. Each European site to which an impact pathway potentially applies is considered in **Tables 8L-4** and **8L-5**. The analysis is summarised in the screening matrices **in Appendices B1 to B7**.

4.2 Identification of Potential Construction Impacts

Source-Receptor Pathways Scoped In

4.2.1 The potential source-receptor pathways by which the Scheme could impact the qualifying features of each European Site during construction are summarised in **Table 8L-4**, with potential likely significant effects identified, and are as follows:

- Habitat loss and/or degradation – loss of or degradation to designated habitats;
- Physical displacement of Stone Curlew – loss of nesting and foraging habitat within the Scheme used by species occurring outside the designated site boundary;
- Noise and visual disturbance – disturbance to sensitive species occurring within or outside the designated site boundary;
- Non-physical disturbance – indirect light-pollution on sensitive habitats and species;
- Biological disturbance – risk of invasive non-native species spread; and
- Habitat contamination – Soil and groundwater contamination from surface water pollution, resulting in pollution of surface water entering watercourses hydrologically linked to SAC habitats. Dust deposition resulting in smothering of sensitive SAC/Ramsar habitats.

4.3 Identification of Potential Operational Impacts

Source-Receptor Pathways Scoped In

4.3.1 The potential source-receptor pathways by which the Scheme could impact the qualifying features of each European Site during operation are as follows:

- Noise and visual disturbance – disturbance to sensitive species occurring within or outside the designated site boundary; and
- Non-physical disturbance – indirect light-pollution on sensitive habitats and species.

4.3.2 These are considered in **Table 8L-5** below.

Table 8L-4 Summary of likely significant effects - Construction

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Fenland SAC				
Calcareous fens with Great Fen-sedge *Cladium mariscus* and species of the *Caricion davallianae*. (Calcium-rich fen dominated by great fen sedge (saw sedge))*	Habitat loss and/or degradation	Chippenham Fen is adjacent to the proposed site boundary. No direct habitat loss is anticipated but the site could be affected during construction activities due to airborne pollutants.	This effect can lead to habitat degradation and changes to the structure and function of plant communities by affecting key species.	Yes
	Habitat contamination	Contamination from surface water pollution; soil and groundwater contamination and air pollution. Effects may result during construction activities from operating heavy machinery, increased traffic to the construction site and accidental spills in storage areas.	There is hydrological connectivity between the designated site and watercourses within the site boundary, consequently there is potential for pollutants to reach watercourses within the designated site.	Yes
	Non-physical disturbance	Chippenham Fen is adjacent to the proposed site boundary. The site could be affected by indirect light pollution due to night-time activities during the construction phase.	None – it is unlikely that indirect light pollution will significantly affect the integrity of cited habitats. Existing boundary features (woodland/hedgerows) will also reduce the potential for light spill on sensitive habitats from construction activities.	No
	Biological disturbance	Chippenham Fen is adjacent to the proposed site boundary. There is a risk invasive species could be spread as a result of construction activities.	This site is adjacent to the scheme boundary therefore there is potential for any existing invasive species within the DCO Site boundary or transferred into the site by construction activities to reach Chippenham Fen.	Yes
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion*	Habitat loss and/or deterioration	Chippenham Fen is adjacent to the proposed site boundary. No direct habitat loss is anticipated but the site could be	This effect can lead to habitat degradation and changes to the structure and function of plant communities by affecting key species.	Yes

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
caeruleae). (Purple moor-grass meadows)		affected during construction activities due to airborne pollutants.		
	Habitat contamination	Contamination from water pollution; soil and groundwater contamination and air pollution. Effects may result during construction activities from operating heavy machinery, increased traffic to the construction site, accidental spills in storage areas.	There is hydrological connectivity between the designated site and watercourses within the site boundary, consequently there is potential for pollutants to reach watercourses within the designated site.	Yes
	Non-physical disturbance	Chippenham Fen is adjacent to the proposed site boundary. The site could be affected by indirect light pollution due to night-time activities during the construction phase.	None – it is unlikely that indirect light pollution will significantly affect the integrity of cited habitats. Existing boundary features (woodland/hedgerows) will also reduce the potential for light spill on sensitive habitats from construction activities.	No
	Biological disturbance	Chippenham Fen is adjacent to the proposed site boundary. There is a risk invasive species could be spread as a result of construction activities.	This site is adjacent to the scheme boundary therefore there is potential for any existing invasive species within the DCO Site boundary or transferred into the site by construction activities to reach Chippenham Fen.	Yes
Spined loach *Cobitis taenia*	Habitat contamination	Spined Loach is present in Wicken Fen (not thought to be present in either Chippenham Fen or Woodwalton Fen). Potential effects may result from contamination of watercourses.	Wicken Fen is more than 2km from the scheme; however, Spined Loach is present in Monk's Lode which Burwell Lode which is part of. EA records show the presence of Spined Loach in Burwell Lode in 2014. Given that Burwell Lode is proposed to be crossed by the cable route between Sunnica West and Burwell National Grid Substation Extension, there is a pathway through which the scheme activities during construction may affect Wicken Fen.	Yes

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Great crested newt *Triturus cristatus*	Habitat loss and/or deterioration	This species is present at Woodwalton Fen which is located more than 5km from the scheme boundary. A new population of Great Crested Newt has been established in a few ponds at Wicken Fen. This is site is located more than 2km from the Scheme boundary. Great Crested Newt is not known to be present at Chippenham Fen.	None – due to distance between the designated site and the scheme boundary.	No
	Disturbance	This species is present at Woodwalton Fen which is located more than 5km from the scheme boundary. A new population of Great Crested Newt has been established in a few ponds at Wicken Fen. This is site is located more than 2km from the Scheme boundary. Great Crested Newt is not thought to be present at Chippenham Fen. This species could potentially be affected by disturbance during the construction phase.	None – due to distance between the designated site and the scheme boundary.	No
Chippenham Fen Ramsar				
The site is notable for its ecological diversity: areas of sedge fen, fen meadow, chalk grassland, *Alnus/Salix carr* and taller woodland (*Fraxinus, Quercus, Betula*).	Habitat loss and/or degradation	Chippenham Fen is adjacent to the proposed site boundary. No direct habitat loss is anticipated but the site could be affected during construction activities due to dust deposition and increased air pollution during construction activities. This effect can lead to habitat degradation and changes to communities' structure and function by affecting key species.	This effect can lead to habitat degradation and changes to the structure and function of plant communities by affecting key species.	Yes

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
	Habitat contamination	Contamination from water pollution; soil and groundwater contamination and air pollution. Effects may result during construction activities from operating heavy machinery, increased traffic to the construction site, accidental spills in storage areas.	There is hydrological connectivity between the designated site and watercourses within the site boundary, consequently there is potential for pollutants to reach watercourses within the designated site affecting water dependent habitats.	Yes
	Non-physical disturbance	Chippenham Fen is adjacent to the proposed site boundary. The site could be affected by indirect light pollution due to night-time activities during the construction phase.	None – it is unlikely that indirect light pollution will significantly affect the integrity of cited habitats. Existing boundary features (woodland/hedgerows) will also reduce the potential for light spill on sensitive habitats from construction activities.	No
	Biological disturbance	Chippenham Fen is adjacent to the proposed site boundary. There is a risk invasive species could be spread as a result of construction activities.	This site is adjacent to the scheme boundary therefore there is potential for any existing invasive species within the DCO Site boundary or transferred into the site by construction activities to reach Chippenham Fen	Yes
Breckland SPA				
Woodlark	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is 1.4km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Physical Displacement	Construction activities have the potential to displace birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Woodlark were recorded during site surveys.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
	Noise and visual disturbance	Construction activities have the potential to disturb birds nesting and foraging outside	None, construction activities are unlikely to affect the site directly given distance	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
		the designated site; however, this site is 1.4km from the scheme and no Woodlark were recorded during site surveys.	between the Scheme boundary and the designated site and the absence of the species from the Scheme.	
	Non-physical disturbance	Construction activities leading to light spill have the potential to disturb birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Woodlark were recorded during site surveys.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
	Habitat Contamination	Construction activities leading to contamination of habitats used by Woodlark (both inside and outside the designated site); however, this site is 1.4km from the scheme and no Woodlark were recorded during site surveys.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
Nightjar	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is 1.4km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Physical Displacement	Construction activities have the potential to displace birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Nightjar were recorded during site surveys.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
	Noise and visual disturbance	Construction activities have the potential to disturb birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Nightjar were recorded during site surveys.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
	Non-physical disturbance	Construction activities leading to light spill have the potential to disturb birds nesting and foraging outside the designated site;	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
		however, this site is 1.4km from the scheme and no Nightjar were recorded during site surveys.	designated site and the absence of the species from the Scheme.	
	Habitat Contamination	Construction activities leading to contamination of habitats used by Woodlark (both inside and outside the designated site); however, this site is 1.4km from the scheme and no Nightjar were recorded during site surveys.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
Stone Curlew	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is 1.4km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Physical Displacement	Construction activities have the potential to displace birds nesting and foraging outside the designated site; although, this site is 1.4km from the scheme Stone-curlew were recorded breeding within the Scheme.	As discussed in Section 3.3 of this report the population of Stone Curlew present on the DCO Site is not considered to be functionally linked to Breckland SPA populations. Therefore, construction activities will not displace Stone Curlew associated with the designated site.	No
	Noise and visual disturbance	Construction activities have the potential to disturb birds nesting and foraging outside the designated site; although, this site is 1.4km from the scheme Stone-curlew were recorded breeding within the Scheme.	As discussed in Section 3.3 of this report the population of Stone Curlew present on the DCO Site is not considered to be functionally linked to Breckland SPA populations. Therefore, construction activities will not disturb Stone Curlew associated with the designated site.	No
	Non-physical disturbance	Construction activities leading to light spill have the potential to disturb birds nesting and foraging outside the designated site; although, this site is 1.4km from the scheme Stone-curlew were recorded breeding within the Scheme.	As discussed in Section 3.3 of this report the population of Stone Curlew present on the DCO Site is not considered to be functionally linked to Breckland SPA populations. Therefore, construction	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
			activities will not disturb Stone Curlew associated with the designated site.	
	Habitat Contamination	Construction activities leading to contamination of habitats used by Stone-curlew (both inside and outside the designated site); although, this site is 1.4km from the scheme Stone-curlew were recorded breeding within the Scheme.	As discussed in Section 3.3 of this report the population of Stone Curlew present on the DCO Site is not considered to be functionally linked to Breckland SPA populations. Therefore, construction activities will not lead to contamination of habitats used by Stone Curlew associated with the designated site.	No
Wicken Fen Ramsar				
Ramsar criteria 1[1]	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 2km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from water pollution; soil and groundwater contamination and air pollution. Effects may result during construction activities from operating heavy machinery, increased traffic to the construction site, accidental spills in storage areas.	There is hydrological connectivity between the designated site and watercourses within the site boundary, consequently there is potential for pollutants to reach watercourses within the designated site.	Yes
	Non-physical disturbance	Wicken Fen is located more than 2km from the Scheme boundary.	None – given the distance to the site it is unlikely that non-physical disturbance could affect the designated site.	No
	Biological disturbance	Several aquatic invasive species have been recorded in Burwell Lode which is hydrologically connected with the designated site Construction activities pose risks of invasive species being spread during construction	This site is hydrologically connected with watercourses that are going to be crossed by the Scheme therefore there is potential for any existing invasive species within the Scheme boundary or transferred into the	Yes

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
		activities carried out close to or within watercourses.	DCO Site by construction activities to reach Wicken Fen.	
Ramsar criteria 2[2]	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 2km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from water pollution; soil and groundwater contamination and air pollution. Effects may result during construction activities from operating heavy machinery, increased traffic to the construction site, accidental spills in storage areas.	There is hydrological connectivity between the designated site and watercourses within the site boundary, consequently there is potential for pollutants to reach watercourses within the designated site.	Yes
	Non-physical disturbance	Wicken Fen is located more than 2km from the Scheme boundary.	None – given the distance to the site it is unlikely that non-physical disturbance could affect the designated site.	No
	Biological disturbance	Several aquatic invasive species have been recorded in Burwell Lode which is in hydrological connectivity with the designated site Construction activities pose risks of invasive species being spread during construction activities carried out close to or within watercourses.	This site is hydrologically connected with watercourses that are going to be crossed by the Scheme therefore there is potential for any existing invasive species within the Scheme boundary or transferred into the DCO Site by construction activities to reach Wicken Fen.	Yes
Rex Graham Reserve SAC				
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-*	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Brometalia) (* important orchid sites				
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Breckland SAC				
Inland dunes with open *Corynephorus* and *Agrostis* grasslands	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
European dry heaths	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion,*	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Alnion incanae, Salicion albae)				
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Great crested newt *Triturus cristatus*	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 3km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from air and surface water pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 3km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
			between the Scheme boundary and the designated site.	
Devil's Dyke SAC				
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	Habitat loss and/or degradation	Construction activities have the potential to result in habitat and/habitats degradation; however, this site is more than 4km from the scheme.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Habitat contamination	Contamination from air pollution. Effects during construction activities from operating heavy machinery, dust generation and increased traffic to the construction site.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Non-physical disturbance	The site is located more than 4km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
	Biological disturbance	The site is located more than 4km from the Scheme boundary.	None, construction activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

1- *Ramsar criterion 1 - One of the most outstanding and representative remnants of the East Anglian peat fens. The area is one of the few which has not been drained. Traditional management has created a mosaic of habitats from open water to sedge and litter fields.*

2- *Ramsar criterion 2 - The site supports one endangered species of Red Data Book plant, the fen violet Viola persicifolia, which survives at only two other sites in Britain. It also contains eight nationally scarce plants and 121 Red Data Book invertebrates.*

Table 8L-5 Summary of likely significant effects - Operation

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Fenland SAC				
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*. (Calcium-rich fen dominated by great fen sedge (saw sedge))*	Non-physical disturbance	Chippenham Fen is adjacent to the proposed site boundary. The site could be affected by indirect light pollution due to security lighting during the operational phase.	None – it is unlikely that indirect light pollution will significantly affect the integrity of cited habitats. Existing boundary features (woodland/hedgerows) will also reduce the potential for light spill on sensitive habitats during operation.	No
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). (Purple moor-grass meadows)	Non-physical disturbance	Chippenham Fen is adjacent to the proposed site boundary. The site could be affected by indirect light pollution due to security lighting during the operational phase.	None – it is unlikely that indirect light pollution will significantly affect the integrity of cited habitats. Existing boundary features (woodland/hedgerows) will also reduce the potential for light spill on sensitive habitats during operation.	No
Chippenham Fen Ramsar				
The site is notable for its ecological diversity: areas of sedge fen, fen meadow, chalk grassland, *Alnus/Salix carr* and taller woodland (*Fraxinus, Quercus, Betula*).	Non-physical disturbance	Chippenham Fen is adjacent to the proposed site boundary. The site could be affected by indirect light pollution due to security lighting during the operational phase.	None – it is unlikely that indirect light pollution will significantly affect the integrity of cited habitats. Existing boundary features will also reduce the potential for light spill on sensitive habitats during operation.	No
Breckland SPA				
Woodlark	Noise and visual disturbance	Operational activities have the potential to disturb birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Woodlark were recorded during site surveys.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
	Non-physical disturbance	Operational activities leading to light spill have the potential to disturb birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Woodlark were recorded during site surveys.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
Nightjar	Noise and visual disturbance	Operational activities have the potential to disturb birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Nightjar were recorded during site surveys.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
	Non-physical disturbance	Operational activities leading to light spill have the potential to disturb birds nesting and foraging outside the designated site; however, this site is 1.4km from the scheme and no Nightjar were recorded during site surveys.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site and the absence of the species from the Scheme.	No
Stone-curlew	Noise and visual disturbance	Operational activities have the potential to disturb birds nesting and foraging outside the designated site; although, this site is 1.4km from the scheme Stone-curlew were recorded breeding within the Scheme.	As discussed in Section 3.3 of this report the population of Stone Curlew present on the DCO Site is not considered to be functionally linked to Breckland SPA populations. Therefore, operational activities will not disturb Stone Curlew associated with the designated site.	No
	Non-physical disturbance	Operational activities leading to light spill have the potential to disturb birds nesting and foraging outside the designated site; although, this site is 1.4km from the scheme Stone-curlew were recorded breeding within the Scheme.	As discussed in Section 3.3 of this report the population of Stone Curlew present on the DCO Site is not considered to be functionally linked to Breckland SPA populations. Therefore, operational activities will not disturb Stone Curlew associated with the designated site.	No
Wicken Fen Ramsar				

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Ramsar criteria 1[1]	Non-physical disturbance	Wicken fen is located more than 2km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Ramsar criteria 2[2]	Non-physical disturbance	Wicken fen is located more than 2km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Rex Graham Reserve SAC				
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Breckland SAC				
Inland dunes with open *Corynephorus* and *Agrostis* grasslands	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
European dry heaths	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

Qualifying Feature	Potential Impact	Source	Pathway	Likely Significant Effect?
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Great crested newt *Triturus cristatus*	Non-physical disturbance	The site is located more than 3km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No
Devil's Dyke SAC				
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites	Non-physical disturbance	The site is located more than 4km from the Scheme boundary.	None, operational activities are unlikely to affect the site directly given distance between the Scheme boundary and the designated site.	No

3- Ramsar criterion 1 - One of the most outstanding and representative remnants of the East Anglian peat fens. The area is one of the few which has not been drained. Traditional management has created a mosaic of habitats from open water to sedge and litter fields.

4- Ramsar criterion 2 - The site supports one endangered species of Red Data Book plant, the fen violet Viola persicifolia, which survives at only two other sites in Britain. It also contains eight nationally scarce plants and 121 Red Data Book invertebrates.

4.4 In Combination Effects with other Plans or Projects

4.4.1 As part of the Stage 1 Screening exercise, it is necessary to undertake an assessment of effects in combination with other plans or projects. Relevant projects with potential cumulative effects of relevance to the HRA in-combination assessment are screened and summarised in **Table 8L-4.** Where the potential for in-combination effects are screened in, these projects will be considered further in the final version of this report and if necessary, in the Stage 2 report to be submitted with the Application. Projects screened in **Table 8L-6** have been considered on the basis of their scale, type and location in relation to the DCO Site. This reflects the approach taken in the Ecology Chapter of the PEI Report.

4.4.2 These will be analysed for the DCO Application HRA, particularly with regard to the potential cumulative effect of disturbance, air quality and water quality pathways. However, none are expected to result in impact pathways being 'screened in' that have been 'screened out' in the preceding text. This is due to the precautionary nature of the Likely Significant Effect screening exercise undertaken for this HRA.

Table 8L-6 In Combination Effects Screening with other Plans or Projects

Location	Development Description	Distance from Scheme Boundary	Status	Potential Impacts	Screened in for 'in combination' assessment?
Eriswell and The Rows	Application for erection of 138 dwellings, public open space, and 4.46 hectares of retained agricultural land for potential ecological mitigation	3.5km north of Sunnica East Site	Pending decision (Application submitted 28th October 2014)	Land take. Noise, visual impacts, dust and contamination during construction and operation	Yes
Isleham	Outline planning application for the erection of up to 215 dwelling.	5km north of Sunnica West Site B	Pending consideration (Application submitted 28th Dec 2019)	Land take. Noise, visual impacts, dust and contamination during construction and operation	No
Fordham Villages	Hybrid planning application for demolition, alteration and extension of use Class B1 offices/laboratory, and outline planning permission sought for the erection of mixed use building blocks.	2km north of Sunnica West Site B	Permitted (Decision approved 5th Mar 2019)	Land take. Noise, visual impacts, dust and contamination during construction and operation	No
Fordham Villages	Outline planning application for 150 residential dwellings (Use Class C3), a 75-bed care home (Use Class C2), a local shop (Use Class A1) and an ancillary medical consultation facility (Use Class D1) and associated infrastructure. W	2km north of Sunnica West Site B	Permitted (Decision approved 8th Aug 2018)	Land take. Noise, visual impacts, dust and contamination during construction and operation	No
Burwell	Development of a 49.9MW battery storage facility, bridge and associated infrastructure	50m South of the Burwell sub-station	Permitted (Decision approved 5th Apr 2019)	Land take. Noise, visual impacts, dust and contamination during construction and operation	Yes

Location	Development Description	Distance from Scheme Boundary	Status	Potential Impacts	Screened in for 'in combination' assessment?
Burwell	Application for the construction and operation of a 49.9MW battery storage facility	50m South of the Burwell sub-station	Permitted (Decision approved 29th Apr 2019)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Burwell	Installation and operation of a solar farm and associated infrastructure	500m north of Burwell sub-station	Permitted (Decision approved 5th Jul 2018)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Burwell	Installation and operation of a solar farm and associated infrastructure	800m north of the Burwell sub-station and cable route	Permitted (Decision approved 10th Nov 2015)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Burwell	Redevelopment of land to provide up to 350 dwellings	1km east of Burwell substation and cable route	Permitted (Decision approved 31 October 2019)	Noise, visual impacts, dust and contamination during construction and operation	Yes
Soham South	Extension to Quarry for extraction of limestone	5km north of Burwell substation and cable route	Permitted (Decision approved 20th Jun 2016)	Land take Noise, visual impacts, dust and contamination during construction and operation	No
TBC	North Angle Farm, 37MW Solar park, south west of Soham	TBC	Pre-application stage (Cambridgeshire County Council scheme)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Severals Ward	Residential development of up to 400 dwellings plus associated	5km south-west of Sunnica West Site A	Permitted by SoS (Decision	Land take	No

Location	Development Description	Distance from Scheme Boundary	Status	Potential Impacts	Screened in for 'in combination' assessment?
	open space and associated infrastructure		approved 31st August 2016)	Noise, visual impacts, dust and contamination during construction and operation	
Burwell	Large site for housing allocation (20ha)	1km east of Burwell substation and cable route		Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Fordham Villages	Significant area for employment uses	2km north of Sunnica West Site B		Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Red Lodge	5.5ha - 140 dwellings	2km north of Sunnica West Site A		Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Red Lodge	14.97ha - 382 dwellings	2km north of Sunnica West Site A		Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Red Lodge	Up to 55 dwellings and associated access	2km north of Sunnica West Site A	Pending decision (Application submitted 3 Mar 2017)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Exning	15ha - 205 dwellings	5km south-west of Sunnica West Site A		Land take	No

Location	Development Description	Distance from Scheme Boundary	Status	Potential Impacts	Screened in for 'in combination' assessment?
				Noise, visual impacts, dust and contamination during construction and operation	
Eriswell and The Rows	Planning Application - To allow operational times for motocross circuit.	2.5km North West of Sunnica East site	Pending Decision (Application submitted 12th August 2019)	Land take Noise, visual impacts, dust and contamination during construction and operation	No
Soham South	Proposal for 38 dwellings	2.5km South East of Sunnica West (South) site	Pending Consideration (Application submitted 21st June 2019)	Land take Noise, visual impacts, dust and contamination during construction and operation	No
Soham South	Erection of Solar Farm for up to 37.5mw generating capacity with associated infrastructure and landscaping	2.5km North West of Sunnica West (North) site	Scoping Opinion Issued 29th August 2019	Land take Noise, visual impacts, dust and contamination during construction and operation	No
Soham South	New development including up to 121 residential units, commercial floor space, play area and associated infrastructure	4.5km North West of Sunnica West (North) site	Screening: Environmental Statement Required (Issued 11th October 2019)	Land take Noise, visual impacts, dust and contamination during construction and operation	No
Manor	Installation and use of washing plant for the recycling of inert waste, with associated access onto the highway.	2km North East of Sunnica East site	Permitted (Decision issued 19th September 2019)	Land take Noise, visual impacts, dust and contamination during construction and operation	No
Burwell	SCREENING OPINION - Proposed Solar Farm	1.5km West of Sunnica West site B	Pending Consideration	Land take	Yes

Location	Development Description	Distance from Scheme Boundary	Status	Potential Impacts	Screened in for 'in combination' assessment?
			(Application received 8th November 2019)	Noise, visual impacts, dust and contamination during construction and operation	
Manor	Proposed 130 no. dwellings	<1km East of Sunnica East site	Screening: EIA required (Decision issued 4th February 2016)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
South Soham	Outline application: creation of a 20-box racehorse training establishment	2km South East of Sunnica West site A	Appeal Allowed (Decision issued 23rd January 2015)	Noise, visual impacts, dust and contamination during construction and operation	No
Red Lodge	Extension to existing caravan park	<1km South East of Sunnica East site	EIA required (Decision issued 1st April 2019)	Land take Noise, visual impacts, dust and contamination during construction and operation	Yes
Red Lodge	Demolition of Hundred Acre Farm and the construction of up to 268 dwellings and associated infrastructures.	3.2km South East of Sunnica East site	Permitted (Approved decision 10th June 2016)	Noise, visual impacts, dust and contamination during construction and operation	Yes
Eriswell and The Rows	Up to 52 no. dwellings with open space and vehicular access	7km north-east of Sunnica East Site	Pending consideration (Submitted 24th Aug 2018)	Noise, visual impacts, dust and contamination during construction and operation	Yes
Eriswell and The Rows	Up to 550 dwellings (ii) Primary School (iii) Retail unit (iv) Associated open and play space, allotments, landscaping and infrastructure works, as amended.	7km north-east of Sunnica East Site	Pending consideration (Received 23rd June 2016)		Yes

Location	Development Description	Distance from Scheme Boundary	Status	Potential Impacts	Screened in for 'in combination' assessment?
Eriswell and The Rows	Hybrid Planning Application comprising: Full application for erection of 41 dwellings (including 12 affordable dwellings), creation of new vehicular access onto Beeches Road, an outline application with all matters reserved for the erection of up to 90 dwellings and an outline application with all matters reserved for 7 self-build homes, the provision of 1.91 hectares of public open space, 1.9 hectares of landscaping and 4.46 hectares of retained agricultural land for potential ecological mitigation	3.5km North of Sunnica East Site	Pending decision (Received 28th October 2014)		Yes
Lakenheath	Hybrid planning application - 1) Full application for the creation of a new vehicular access onto Station Road, and entrance to a new primary school, 2) Outline application for up to 375 dwellings (including 112 affordable homes), and the provision of land for a new primary school, land for ecological mitigation and open space and associated infrastructure (as amended).	9km north of Sunnica East Site	Pending decision (Received 6th Nov 2014)		Yes

5. Conclusion

5.1.1 On the basis that the operation of the Scheme will not have any impacts on any European Site, any likely significant effects are limited to the construction phase. These are summarised in **Table 8L-3**. **Table 8L-4** summarises the screening of those other plans or projects which may have a likely significant effect in combination with the construction phase. These will all need to be taken to Stage 2, the Appropriate Assessment. This assessment will be able to take account of the mitigation measures referred to in the PEI Report.

5.1.2 The integrity of a European site is defined by the European Commission guidance as the coherence of the site's ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated. An adverse effect on integrity, therefore, is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of designation. This is the basis for the Appropriate Assessment.

6. References

Ref 8L-1 AECOM. 2020. Sunnica Energy Farm Preliminary Ecological Appraisal.

Ref 8L-2 Anon. 1981. The Wildlife & Countryside Act 1981. HMSO, London.

Ref 8L-3 Anon. 2018. Conservation of Habitats and Species Regulations 2017 (as amended). HMSO, London.

Ref 8L-4 Anon. 2000. Countryside and Rights of Way Act 2000. HMSO, London.

Ref 8L-5 Anon. 2006. The Natural Environment and Rural Communities Act. HMSO, London.

Ref 8L-6 Cambridgeshire and Peterborough Biodiversity Group. 2008. Priority Species and Habitats. Available from: http://www.cpbiodiversity.org.uk/biodiversity-action-plans/priority-species (Accessed July 2020).

Ref 8L-7 Department for Transport (DfT) (2016). Standards for Highways online resources. Available at: http://www.dft.gov.uk/ha/standards/dmrb/vol11/section3/ha20707.pdf (Accessed July 2018)

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Ref 8L-9 EC (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. EC, Brussels.

Ref 8L-10 English Nature. 2001. Great Crested Newt Mitigation Guidelines. English Nature, Peterborough

Ref 8L-11 Environment Agency (2016). Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Ref 8L-12 JNCC, UK Post-2010 Biodiversity Framework. 2012. available at http://jncc.defra.gov.uk/page-6189 (Accessed July 2020)

Ref 8L-13 Liley, D. & Hoskin, R. (2017). Habitat Regulations Assessment of the Breckland Local Plan Part 1 Publication Stage. Footprint Ecology, unpublished report for Breckland Council.

Ref 8L-14 Suffolk biodiversity Information Services. (2015). Priority species and habitats. Available from: http://www.suffolkbis.org.uk/biodiversity/speciesandhabitats#:~:text=The%20Suffolk%20Planning%20Biodiversity%20Action%20Plan%20%282012%29%20is,departments%20to%20meet%20their%20legal%20obligations%20towards%20biodiversity (Accessed July 2020).

Ref 8L-15 Wolseley, P. A.; James, P. W.; Theobald, M. R.; Sutton, M. A. 2006. Detecting changes in epiphytic lichen communities at sites affected by atmospheric ammonia from agricultural sources. Lichenologist 38: 161-176.

Appendix A Relevant Impact Pathways

The European sites included within this screening assessment are:

- Fenland SAC;
- Chippenham Fen Ramsar;
- Breckland SPA;
- Wicken Fen Ramsar;
- Rex Graham Reserve SAC;
- Breckland SAC; and
- Devil's Dyke SAC.

Appendix A-1: The impact pathways considered in this Likely Significant Effects Report, which are referred to in the detailed screening matrices below.

Designation	Impact Pathways identified on the current evidence base
Fenland SAC	Habitat loss and/or degradation during construction. Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction. Non-physical disturbance, such as indirect light spill during construction and operational lighting. Biological disturbance, such as spread of invasive non-native species during construction. Noise and visual disturbance during construction.
Chippenham Fen Ramsar	Habitat loss and/or degradation during construction. Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction. Non-physical disturbance, such as indirect light spill during construction and operational lighting. Biological disturbance, such as spread of invasive non-native species during construction.
Breckland SPA	Habitat loss and/or degradation during construction. Physical displacement of nesting and foraging SPA birds outside the designated site boundary during construction and operation. Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction. Non-physical disturbance, such as indirect light spill during construction and operational lighting. Biological disturbance, such as spread of invasive non-native species during construction. Noise and visual disturbance during construction and operation.
Wicken Fen Ramsar	Habitat loss and/or degradation during construction. Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction. Non-physical disturbance, such as indirect light spill during construction and operational lighting.

	Biological disturbance, such as spread of invasive non-native species during construction.
Rex Graham Reserve SAC	Habitat loss and/or degradation during construction.
	Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction.
	Non-physical disturbance, such as indirect light spill during construction and operational lighting.
	Biological disturbance, such as spread of invasive non-native species during construction.
Breckland SAC	Habitat loss and/or degradation during construction.
	Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction.
	Non-physical disturbance, such as indirect light spill during construction and operational lighting.
	Biological disturbance, such as spread of invasive non-native species during construction.
Devil's Dyke SAC	Habitat loss and/or degradation during construction.
	Habitat contamination from surface water pollution, soil and groundwater contamination and air pollution during construction.
	Non-physical disturbance, such as indirect light spill during construction and operational lighting.
	Biological disturbance, such as spread of invasive non-native species during construction.

Appendix B Screening Matrices

Appendix B-2: Detailed screening matrix assessing the qualifying features of the Fenland SAC against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application. The matrix key is provided below.

General matrix key:

✓ = Likely significant effect **cannot** be excluded

✕ = Likely significant effect **can** be excluded

C = Construction

O = Operation

European Site	Qualifying Features						
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Biological Disturbance	Noise and Visual Disturbance
	Stage of Proposed Development	C	C	C	O	C	C
Fenland SAC	Calcareous fens with Great Fen-sedge *Cladium mariscus* and species of the *Caricion davallianae*. (Calcium-rich fen dominated by great fen sedge (saw sedge))*	✓a	✓b	✕c	✕c	✓d	-
	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion*	✓a	✓b	✕c	✕c	✓d	-

caeruleae). (Purple moor-grass meadows)		
Spined loach *Cobitis taenia*	✓e	-
Great crested Newt *Triturus cristatus*	✗f	✗g

a. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat degradation on sensitive habitats cannot be excluded. This is because the Proposed Development is adjacent Chippenham Fen and the habitat within this site could be affected by airborne pollutants.

b. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat contamination of sensitive habitats cannot be excluded. This is because there are hydrological connections between the Proposed Development and Chippenham Fen and consequently there is the potential for pollutants to reach watercourses within the designated sites.

c. Table 4-1 concludes that non-physical disturbance, such as indirect lighting during construction and operation will not impact on sensitive habitats, particularly given any light spill will be reduced by existing boundary features (woodland/hedgerows). This impact pathway is screened out from Appropriate Assessment.

d. The assessment in Table 4-1 highlights that Likely Significant Effects of biological disturbance on sensitive habitats, such as through the spread of invasive non-native species, cannot be excluded.

e. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat contamination of Spined Loach cannot be excluded. This is because there are hydrological connections between the Proposed Development and Wicken Fen, with the species having been recorded in watercourses connecting into Burwell Lode, which in turn is connected to Wicken Fen. Consequently, there is the potential for pollutants to reach watercourses within the designated sites or watercourses where the species occurs outside the designated site boundary.

f. Table 4-1 concludes that habitat loss and/or degradation, will not impact on Great Crested Newt, as the species is not known to occur within Chippenham Fen or within 2km of the scheme. This impact pathway is screened out from Appropriate Assessment.

g. Table 4-1 concludes that disturbance during construction will not impact on Great Crested Newt, as the species is not known to occur within Chippenham Fen or within 2km of the scheme. This impact pathway is screened out from Appropriate Assessment.

Appendix B-2: Detailed screening matrix assessing the qualifying features of the Chippenham Fen against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application.

European Site	Qualifying Features					
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Biological Disturbance
	Stage of Proposed Development	C	C	C	O	C
Chippenham Fen Ramsar	Sedge fen, fen meadow, chalk grassland, *Alnus/Salix carr* and taller woodland (*Fraxinus, Quercus, Betula*).	✓a	✓b	✗c	✗c	✓d

a. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat degradation on sensitive habitats cannot be excluded. This is because the Proposed Development is adjacent Chippenham Fen and the habitat within this site could be affected by airborne pollutants.

b. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat contamination of sensitive habitats cannot be excluded. This is because there are hydrological connections between the Proposed Development and Chippenham Fen and consequently there is the potential for pollutants to reach watercourses within the designated sites.

c. Table 4-1 concludes that non-physical disturbance, such as indirect lighting during construction and operation will not impact on sensitive habitats, particularly given any light spill will be reduced by existing boundary features (woodland/hedgerows). This impact pathway is screened out from Appropriate Assessment.

d. The assessment in Table 4-1 highlights that Likely Significant Effects of biological disturbance on sensitive habitats, such as through the spread of invasive non-native species, cannot be excluded.

Appendix B-3: Detailed screening matrix assessing the qualifying features of the Breckland SPA against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application.

European Site	Qualifying Features							
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Noise and Visual Disturbance		Physical Displacement
	Stage of Proposed Development	C	C	C	O	C	O	C
Breckland SPA	Woodlark	✕a	✕b	✕c	✕c	✕d	✕d	✕e
	Nightjar	✕f	✕g	✕h	✕h	✕l	✕i	✕j
	Stone Curlew	✕k	✕l	✕m	✕m	✕n	✕n	✕o

a. Table 4-1 concludes that Likely Significant Effects of habitat loss and/or degradation, from construction activities on habitats used by Woodlark are unlikely given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

b. Table 4-1 concludes that Likely Significant Effects of habitat contamination from construction activities, unlikely to affect habitats used by Woodlark given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

c. Table 4-1 concludes that Likely Significant Effects of non-physical disturbance from construction and operational activities, such as light spill is unlikely to disturb Woodlark given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

d. Table 4-1 concludes that Likely Significant Effects of noise and visual disturbance from construction and operational activities are unlikely to disturb Woodlark given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

e. Table 4-1 concludes that Likely Significant Effects of physical displacement of Woodlark nesting and foraging outside the Breckland SPA are unlikely given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

f. Table 4-1 concludes that Likely Significant Effects of habitat loss and/or degradation, from construction activities on habitats used by Nightjar are unlikely given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

g. Table 4-1 concludes that Likely Significant Effects of habitat contamination from construction activities, unlikely to affect habitats used by Nightjar given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

h. Table 4-1 concludes that Likely Significant Effects of non-physical disturbance from construction and operational activities, such as light spill is unlikely to disturb Nightjar given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

i. Table 4-1 concludes that Likely Significant Effects of noise and visual disturbance from construction and operational activities are unlikely to disturb Nightjar given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

j. Table 4-1 concludes that Likely Significant Effects of physical displacement of Nightjar nesting and foraging outside the Breckland SPA are unlikely given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

k. Table 4-1 concludes that Likely Significant Effects of habitat loss and/or degradation, from construction activities on habitats used by Stone Curlew are unlikely given the distance between the Scheme and designated site. This impact pathway is screened out from Appropriate Assessment.

l. Table 4-1 and Section 3.3 concludes that Stone Curlew populations present on the DCO Site are not functionally linked to the Breckland SPA and therefore, Likely Significant Effects of habitat contamination from construction activities, are not considered to affect habitats used by the Breckland SPA Stone Curlew population. This impact pathway is screened out from Appropriate Assessment.

m. Table 4-1 and Section 3.3 concludes that Stone Curlew populations present on the DCO Site are not functionally linked to the Breckland SPA and therefore, Likely Significant Effects of non-physical disturbance from construction and operational activities, are not considered to affect the Breckland SPA Stone Curlew population. This impact pathway is screened out from Appropriate Assessment.

n. Table 4-1 and Section 3.3 concludes that Stone Curlew populations present on the DCO Site are not functionally linked to the Breckland SPA and therefore, Likely Significant Effects of noise and visual disturbance from construction and operational activities, are not considered to affect the Breckland SPA Stone Curlew population. This impact pathway is screened out from Appropriate Assessment.

o. Table 4-1 and Section 3.3 concludes that Stone Curlew populations present on the DCO Site are not functionally linked to the Breckland SPA and therefore, Likely Significant Effects of physical displacement from construction activities, are not considered to affect the Breckland SPA Stone Curlew population. This impact pathway is screened out from Appropriate Assessment.

Appendix B-4: Detailed screening matrix assessing the qualifying features of the Wicken Fen Ramsar against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application.

European Site	Qualifying Features					
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Biological Disturbance
	Stage of Proposed Development	C	C	C	O	C
Wicken Fen Ramsar	East Anglian peat fens	✗a	✓b	✗c	✗c	✓d
	Fen violet *Viola persicifolia* and other nationally scarce plants and Red Data Book invertebrates.	✓a	✓b	✗c	✗c	✓d

a. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat degradation on sensitive habitats and species are unlikely, given the distance of over 2km between the Scheme boundary and Wicken Fen. This impact pathway is screened out from Appropriate Assessment.

b. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat contamination of sensitive habitats and species cannot be excluded. This is because there are hydrological connections between the Proposed Development and Wicken Fen and consequently there is the potential for pollutants to reach watercourses within the designated site.

c. Table 4-1 concludes that non-physical disturbance, such as indirect lighting during construction and operation will not impact on sensitive habitats and species, given the distance of over 2km between the Scheme boundary and Wicken Fen. This impact pathway is screened out from Appropriate Assessment.

d. The assessment in Table 4-1 highlights that Likely Significant Effects of biological disturbance on sensitive habitats and species, such as through the spread of invasive non-native species, cannot be excluded.

Appendix B-5: Detailed screening matrix assessing the qualifying features of the Rex Graham Reserve SAC against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application.

European Site	Qualifying Features					
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Biological Disturbance
	Stage of Proposed Development	C	C	C	O	C
Rex Graham Reserve SAC	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites	✕a	✕b	✕c	✕c	✕d

a. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat degradation on sensitive habitats and species are unlikely, given the distance of over 3km between the Scheme boundary and designated site. This impact pathway is screened out from Appropriate Assessment.

b. Table 4-1 concludes that habitat contamination, will not impact on sensitive habitats and species, given the distance of over 3km between the Scheme boundary and designated site. This impact pathway is screened out from Appropriate Assessment.

c. Table 4-1 concludes that non-physical disturbance, such as indirect lighting during construction and operation will not impact on sensitive habitats and species, given the distance of over 2km between the Scheme boundary and the designated site. This impact pathway is screened out from Appropriate Assessment.

d. Table 4-1 concludes that biological disturbance, such as the spread of invasive non-native species, will not impact on sensitive habitats and species, given the distance of over 3km between the Scheme boundary and the designated site. This impact pathway is screened out from Appropriate Assessment.

Appendix B-6: Detailed screening matrix assessing the qualifying features of the Breckland SAC against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application.

European Site	Qualifying Features					
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Biological Disturbance
	Stage of Proposed Development	C	C	C	O	C
Breckland SAC	Inland dunes with open *Corynephorus* and *Agrostis* grasslands	✕a	✕b	✕c	✕c	✕d
	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation	✕a	✕b	✕c	✕c	✕d
	European dry heaths	✕a	✕b	✕c	✕c	✕d
	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	✕a	✕b	✕c	✕c	✕d
	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*	✕a	✕b	✕c	✕c	✕d

Great crested newt *Triturus cristatus*	✖a	✖b	✖c	✖c	✖d

a. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat degradation on sensitive habitats and species are unlikely, given the distance of over 3km between the Scheme boundary and designated site. This impact pathway is screened out from Appropriate Assessment.

b. Table 4-1 concludes that habitat contamination, will not impact on sensitive habitats and species, given the distance of over 3km between the Scheme boundary and designated site. This impact pathway is screened out from Appropriate Assessment.

c. Table 4-1 concludes that non-physical disturbance, such as indirect lighting during construction and operation will not impact on sensitive habitats and species, given the distance of over 2km between the Scheme boundary and the designated site. This impact pathway is screened out from Appropriate Assessment.

d. Table 4-1 concludes that biological disturbance, such as the spread of invasive non-native species, will not impact on sensitive habitats and species, given the distance of over 3km between the Scheme boundary and the designated site. This impact pathway is screened out from Appropriate Assessment.

Appendix B-7: Detailed screening matrix assessing the qualifying features of the Devil's Dyke SAC against the identified impact pathways during construction (C columns) and operation (O columns). Decommissioning is not represented by a separate column as the effects are included within the consideration of construction. It is to be noted that the screening decisions reflect the currently available evidence base and may be revised for the DCO Application.

European Site	Qualifying Features					
	Effect	Habitat Loss and/or Degradation	Habitat Contamination	Non-physical Disturbance		Biological Disturbance
	Stage of Proposed Development	C	C	C	O	C
Devil's Dyke SAC	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	✖a	✖b	✖c	✖c	✖d

a. The assessment in Table 4-1 highlights that Likely Significant Effects of habitat degradation on sensitive habitats and species are unlikely, given the distance of over 3km between the Scheme boundary and designated site. This impact pathway is screened out from Appropriate Assessment.

b. Table 4-1 concludes that habitat contamination, will not impact on sensitive habitats and species, given the distance of over 3km between the Scheme boundary and designated site. This impact pathway is screened out from Appropriate Assessment.

c. Table 4-1 concludes that non-physical disturbance, such as indirect lighting during construction and operation will not impact on sensitive habitats and species, given the distance of over 2km between the Scheme boundary and the designated site. This impact pathway is screened out from Appropriate Assessment.

d. Table 4-1 concludes that biological disturbance, such as the spread of invasive non-native species, will not impact on sensitive habitats and species, given the distance of over 3km between the Scheme boundary and the designated site. This impact pathway is screened out from Appropriate Assessment.