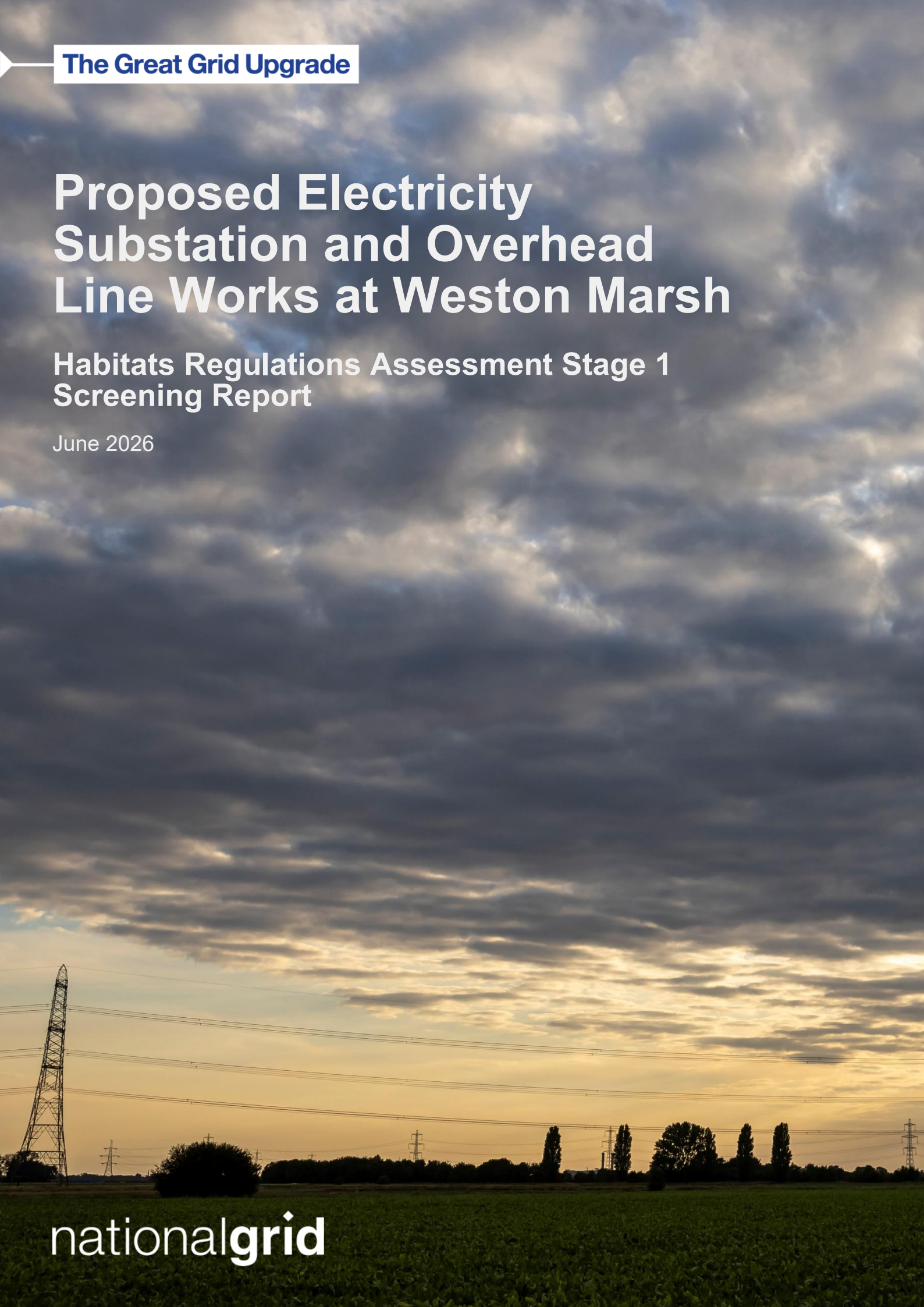
The Great Grid Upgrade

Proposed Electricity Substation and Overhead Line Works at Weston Marsh

Habitats Regulations Assessment Stage 1 Screening Report

June 2026



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Contents

1. Introduction

1.1 Overview

1.1.1 This Habitats Regulations Assessment (HRA) Stage 1 Screening Report has been prepared on behalf of National Grid Electricity Transmission plc (National Grid).

1.1.2 National Grid are proposing to undertake works to construct a new electricity substation, new sections of overhead line and modification of existing overhead lines west of the Spalding Tee-Point in the Weston Marsh area, within the administrative boundary of South Holland District Council (SHDC) in Lincolnshire.

1.2 Summary of the Scheme

1.2.1 In totality, the Scheme consists of four components, each planned to be progressed via separate consenting routes. These are summarised in **Table 1.1**.

Table 1.1 Components of the Scheme

Works Required	Consenting Regime
Construction of the new Air Insulated Substation (AIS) – 400 kV Weston Marsh Substation A, associated landscaping and environmental mitigation works, drainage, highways and other associated works	Town and Country Planning Act 1990 (TCPA) (Ref 2) Component referred to as '**Substation Works'**
Construction of new sections of overhead line to connect the new substation into the existing 4ZM overhead line Removal of a section of the existing 4ZM overhead line Other associated works	Section 37 of the Electricity Act 1989 (Ref 3) and deemed consent pursuant to section 90(2) of the Town and Country Planning Act 1990 Component referred to as '**S37 4ZM Overhead Line Works**'
Construction of a new section of overhead line to connect the existing 2WS overhead line into the new substation. Removal of a section of the existing 2WS overhead line Other associated works	Section 37 of the Electricity Act 1989 and deemed consent pursuant to section 90(2) of the Town and Country Planning Act 1990 Component referred to as '**S37 2WS Overhead Line Works**'
Reconductoring works required on the existing 4ZM overhead line Two spans of temporary overhead lines	Town and Country Planning (General Permitted Development) (England) Order 2015 (Ref 4) and The Overhead Lines (Exemption) (England and Wales) Regulations 2009 (Ref 5). Component referred to as '**Exempt Overhead Line Works'**

1.2.2 The Substation Works will require consent from SHDC under the TCPA.

1.2.3 The S37 4ZM Overhead Line Works and the S37 2WS Overhead Line Works (collectively referred to as the "S37 Overhead Line Works") will require consent from the Secretary of State for Energy Security and Net Zero under Section 37 of the Electricity Act 1989 (Section 37).

1.2.4 The Exempt Overhead Line Works constitute permitted development under Part 15 Class B of the Town and Country Planning (General Permitted Development) (England) Order 2015 and The Overhead Lines (Exemption) (England and Wales) Regulations 2009.

1.2.5 The Scheme Site Boundary, which consists of the land required to construct and operate the Scheme in its entirety, is illustrated on **Figure 1**. The areas of land required to construct and operate each individual component described in **Table 1.1** are also illustrated on **Figure 1**.

1.2.6 The Scheme in its totality is a standalone development to enable connection of the Outer Dowsing Offshore Wind Farm to the national electricity transmission system. Each component stated in **Table 1.1** is required for the Scheme to fully function as part of the National Electricity Transmission System (NETS).

1.3 Purpose of this report

1.3.1 This report has been prepared in support of the required consent applications for the Scheme and has been informed by engagement between National Grid and the relevant consenting authorities. It has been completed to abide by the Conservation of Habitats and Species Regulations 2017 (as amended) (Ref 1), which requires potential impacts of development proposals on Habitats Sites to be assessed.

1.3.2 This report has been produced to support the necessary consent applications required to deliver the Scheme. The assessment considers the Scheme in its entirety. Where the potential impacts and effects of the Scheme are associated with specific components as set out within **Table 1.1**, this is clearly identified within Section 6. This approach enables the relevant consenting authority to readily identify and consider only those impacts and effects that are associated with the application before them, whilst also maintaining a clear understanding of the Scheme in its wider context.

1.3.3 The purpose of this HRA Report is to assess the potential implications of the Scheme on sites designated for their international nature conservation importance. These so-called Habitats Sites encompass Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and, as a matter of Government policy in the National Planning Policy Framework, Ramsar sites. They also include any candidate SACs (cSACs) or proposed SPAs (pSPAs).

1.3.4 Over the years, the term HRA has been used to describe the overall process set out in the Conservation of Habitats and Species Regulations 2017 (as amended), from the screening for Likely Significant Effects (LSEs) through to identification of Imperative Reasons of Overriding Public Interest (IROPI). This has arisen in order to distinguish the overall process from its individual stages. Throughout this HRA Stage 1 Report the term HRA is used for the overall process.

1.3.5 The HRA process can have up to three stages. However, all stages may not need to be completed depending on the outcome of each step. The HRA assessment processes can be summarised as:

1) Screening – to check if the proposal will result in LSEs on a site's conservation objectives, alone or in combination with other plans and projects. If not, it is not necessary to proceed to the subsequent stages;
2) Appropriate Assessment (AA) – to assess any LSEs of the proposal in more detail and identify ways to avoid or minimise any effects (i.e. mitigation measures); and
3) Derogation – to consider if proposals that would have an adverse effect on a Habitats Site qualify for a derogation/exemption.

1.4 Structure

1.4.1 The report is structured as follows:

1) Legislative Framework – This section provides an overview of the legislation and case law of relevance to this report;
2) Assessment Methodology – This section details the scope of the report, study area, data collection that has informed the report, the assessment approach and any assumptions and limitations;
3) Relevant Habitats Sites – This section details the Habitats Sites identified within the zones of influence of the Scheme;
4) Potential Impact Pathways – This section details the potential impact pathways from the Scheme linking to the Habitats Sites detailed in Section 3;
5) Screening for Likely Significant Effects (LSEs) – Each potential impact pathway identified in Section 4 is screened against the identified Habitats Sites to determine any LSEs arising from the construction or operation of the Scheme; and
6) Summary – This section provides a summary of the outcomes of the report.

2. Legislative Framework

2.1 Introduction

2.1.1 The UK left the European Union (EU) on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 (termed the 'Withdrawal Act') (Ref 6). This established a transition period, which ended on 31 December 2020. The Withdrawal Act retains the body of existing EU-derived law within UK domestic law. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 1) amended the Conservation of Habitats and Species Regulations 2017 (as amended) to decouple this legislative framework from the EU Directives, whilst maintaining the protection and processes related to European sites (these amended regulations are hereafter referred to as 'The Habitats Regulations'). The Habitats Regulations enable the protection of sites that host habitats and species of European Importance. Although the UK is no longer bound by EU Directives, the retained case law of the Court of Justice of the European Union (CJEU) remains relevant to the interpretation of the Habitats Regulations by virtue of section 6 of the European Union (Withdrawal) Act 2018 (as amended).

2.1.2 Under Regulation 63 of the Habitats Regulations, before a competent authority decides to undertake, or give any consent, permission or other authorisation for, a plan or project which is likely to have a significant effect on a Habitats Site (either alone or in combination with other plans or projects), and which is not directly connected with or necessary to the management of the site, it must make an appropriate assessment of the implications of the plan or project for the site in view of that site's conservation objectives. Given the different elements of the Scheme, there are several competent authorities that apply (see Section 3.1).

2.1.3 Areas of international importance for nature conservation comprise SACs (designated for their habitats or faunal species other than birds), SPAs (designated for breeding and/or wintering birds) and Ramsar sites (wetlands of international importance). They are collectively referred to as Habitats Sites or European sites, and form part of a network of protected sites across the UK known as the 'National Site Network'. In line with current practice, this document uses the term 'Habitats Sites' to refer to all European sites as well as cSACs and pSPAs.

2.1.4 Should it be determined that LSEs cannot be excluded, an 'Appropriate Assessment' (AA) must be undertaken in order to further assess those effects. Consent may only be given for a project if, following assessment and consideration of mitigation measures, it is established that an adverse effect on the integrity of a Habitat Site can be ruled out either alone or in-combination with other plans or projects.

2.1.5 Where an adverse effect on site integrity cannot be ruled out, a project may be able to go ahead through a derogation under the Habitat Regulations. There are three legal tests which must be met and each needs to be passed for a derogation to be granted. It must be demonstrated that there are no alternatives before the assessment can proceed to the next step of derogation assessment. However, where no alternative solution exists and so an adverse effect remains, a further assessment should be made of whether a project is required for IROPI. If a project meets that IROPI test, compensatory measures will be required.

2.2 Relevant Case Law

2.2.1 Although the UK is no longer part of the EU, a series of rulings of the Court of Justice of the European Union (CJEU) are still relevant. This HRA Report is in accordance with the principles established through these precedence cases. These rulings, and relevant UK Court rulings, and their implications for this HRA Report are summarised in **Table 2.1** and this HRA Report is cognisant of these rulings.

Table 2.1 Case Law relevant to the HRA of the Scheme

Case	Ruling	Relevance to HRA
People Over Wind and Sweetman v Coillte Teoranta (C-323/17)	The ruling of the CJEU in this case requires that any conclusion of 'no likely significant effect' on a Habitats site at the screening stage must be made prior to any consideration of measures to avoid or reduce harm to the Habitats site. The determination of likely significant effects at the screening stage should not, in the opinion of the CJEU, constitute an attempt at detailed technical analyses. This should be conducted as part of the AA.	This ruling clarified that 'mitigation' (i.e., measures that are specifically introduced to avoid or reduce a harmful effect on a Habitats site that would otherwise arise) should not be taken into account when forming a view on likely significant effects at the screening stage. Mitigation should instead only be considered at the AA stage unless it is an integral part of the development design or is required to comply with other legislation unrelated to Habitats sites. This HRA has been cognisant of that ruling.
Langton (2018 EWHC 2190 (Admin))	High Court ruled that conditions on badger cull licences preventing badger culling near a SPA or at certain times of year should not be classed as mitigation measures as described in the People over Wind ruling. The judge ruled that these licence conditions were properly characterised as "integral features of the project" and could therefore be relied on for the purposes of habitats screening. The reasoning was that it would be "contrary to common sense" for Natural England to assume that culling would take place at times and places where the applicants did not propose to do so.	Restrictions on the timing of works which are part of the proponent's proposal can be taken into account in HRA Stage 1 - Screening for Likely Significant Effects.
Waddenzee (C-127/02)	The ruling of the CJEU in this case clarified that AA must be conducted using best scientific knowledge, and that the Competent Authority must be satisfied that there is no	Adopting the precautionary principle, a 'likely' significant effect in this HRA is interpreted as one which is 'possible' and cannot be objectively ruled out.

Case	Ruling	Relevance to HRA
	reasonable doubt as to the absence of adverse effects on the integrity of a Habitats site. The Waddenzee ruling also provided clarity on the definition of 'significant effect', specifically that any effect from a plan or project on the conservation objectives of any Habitats site will be a significant effect.	The test of significance of effects has been conducted with reference to the conservation objectives of relevant Habitats sites.
Holohan and Others v An Bord Pleanála (C-461/17)	The conclusions of the CJEU in this case were that consideration must be given during AA to: Effects on qualifying habitats and/or species of a SAC or SPA, even when occurring outside of the boundary of a Habitats site, if these are relevant to the site meeting its conservation objectives; and Effects on non-qualifying habitats and/or species on which the qualifying habitats and/or species depend and which could result in adverse effects on the integrity of the Habitats site.	This relates to the concept of 'functionally linked habitat' (i.e., areas outside of the boundary of a Habitats site which supports its qualifying feature(s)). In addition, consideration must be given to non-qualifying features upon which qualifying habitats and/or species rely. This HRA has taken the use of functionally linked habitats into account in relation to various mobile species, most notably birds and otter.
T.C Briels and Others v Minister van Infrastructuur en Milieu (C-521/12)	The ruling of the CJEU in this case determined that compensatory measures cannot be used to support a conclusion of no adverse effect on site integrity.	Compensation can only be considered at the IROPI stage of HRA and not during AA. Compensation must be delivered when AA concludes that there will be adverse effects on site integrity.

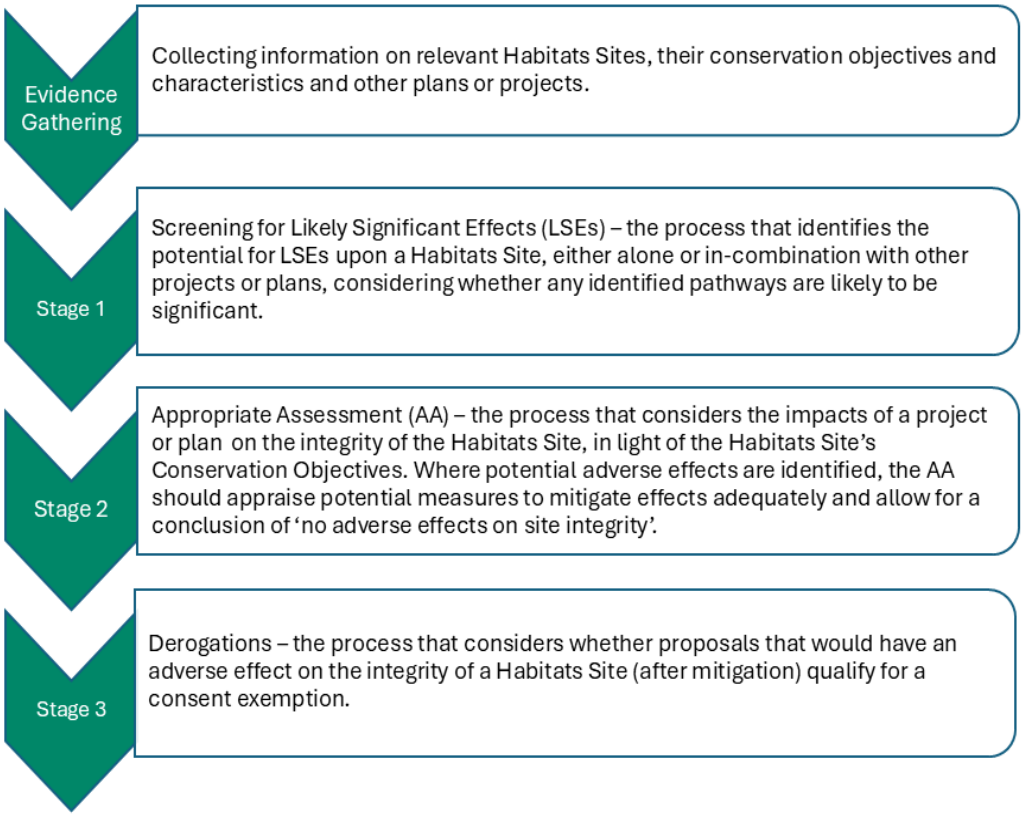
3. Assessment Methodology

3.1 Introduction

3.1.1 This HRA Report has been prepared with reference to general guidance on HRA published by the UK government in 2023, named 'Habitats regulation assessments: protecting a European site (Ref 7). **Image 3.1** below shows the relevant stages of the HRA process.

3.1.2 Whilst the HRA decisions must be taken by the Competent Authority (in this case the local planning authority, SHDC for the Substation Works and the Secretary of State for the Department of Sustainability and Net Zero for the S37 Overhead Line Works), the information needed to support this decision-making must be provided by the applicant. The information needed for the Competent Authority to establish whether there are any LSEs from the Scheme is therefore provided in this HRA Report, which will accompany the planning application.

Image 3.1 Three stage approach to HRA of development projects according to published guidance.



3.2 HRA Stage 1 – Screening for Likely Significant Effects (LSEs)

3.2.1 The objective of the LSE test is to assess whether the Scheme, without any detailed appraisal, is likely to result in a significant effect upon a Habitats Site or its qualifying features in view of the conservation objectives. Where it is deemed unlikely for the Scheme to result in LSEs upon Habitat Sites, usually because there is no mechanism for an adverse interaction (i.e. a pathway), these aspects can be 'screened out'. If the risk of LSEs cannot be ruled out alone on the basis of objective scientific evidence, a precautionary approach is applied, and remaining aspects are taken forward to an AA. This stage must also consider the potential for effects 'in combination' with other plans and projects.

3.2.2 This HRA Report has been prepared in accordance with all principles set out in the Habitats Regulations, the Habitats Directive (Ref 8), the Birds Directive (Ref 9) and the relevant case law as summarised in **Table 2.1**. This includes the ruling by the People Over Wind and Sweetman v Coillte Teoranta (C-323/17) (Ref 10). As set out in **Table 2.1**, this establishes that mitigation measures cannot be considered at the screening stage, but they can be taken into account in an AA. The effect of this is that the screening stage must be undertaken on a precautionary basis with no regard to mitigation measures.

3.2.3 However, this ruling has since been qualified by the UK courts. On 15 August 2018, in the case of Langton (Ref 11) as set out in **Table 2.1**, the High Court ruled that conditions on badger cull licences preventing badger culling near a SPA or at certain times of year should not be classed as mitigation measures as described in the People Over Wind ruling. This illustrates the distinction between integral design characteristics and mitigation. A feature can be considered integral if it exists for reasons other than avoiding or reducing effects on Habitats Sites. Therefore, provided they are integral features of a project and not mitigation, restrictions on the timing of works which are part of the proponent's proposal can be considered in HRA Stage 1 - Screening for LSEs.

3.2.4 In addition, the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (Ref 12) and the Environmental Permitting (England and Wales) Regulations 2016 (Ref 13) make it an offence to pollute watercourses, irrespective of whether they are designated as Habitats sites or not. Therefore, pollution control measures can also be considered at the HRA Stage 1.

3.2.5 Where an HRA Stage 1 Screening Assessment concludes that no LSEs will arise from a project, a HRA Stage 2 AA will not be required.

3.3 In-Combination Scope

3.3.1 It is a requirement of the Habitats Regulations that the impacts and effects of any development proposal being assessed are not only considered in isolation but also in combination with other plans and projects that may also have effects on the Habitats site(s) in question.

3.3.2 When undertaking the Screening for LSEs assessment it is essential to consider the principal intention behind the legislation, i.e., to ensure that those projects or plans (which when considered in isolation may have minor impacts) are not simply

dismissed on that basis but are evaluated for any cumulative contribution they may make to an overall significant effect. In practice, in-combination assessment is therefore of greatest relevance when a project would otherwise be screened out because its individual contribution is inconsequential.

3.3.3 A short list of relevant in-combination developments was compiled, including developments constructed by 2028 (future baseline) and projects that may be progressed at the same time as the Scheme. It is to be noted that minor developments (e.g. residential proposals for under 100 dwellings and small-scale industrial schemes) have been excluded from consideration. The in-combination projects considered in this HRA encompass the following:

1) Meridian Solar Farm (0 km from the Scheme) – construction, operation, maintenance and decommissioning of a solar photovoltaic (PV) and electrical battery storage generating facility with a generation capacity of 750 MW. This will include the associated development and infrastructure required to connect into Weston Marsh Substation A;

2) Outer Dowsing (0 km from the Scheme) – Outer Dowsing offshore wind energy development;

3) Land East of Surfleet Bank and West of Woad Farm Surfleet, Spalding (35 m from the Scheme) – proposed plant based protein extraction facility and anaerobic digestor plant;

4) Weston Marsh to East Leicestershire (WMEL) (52 m from the Scheme) – new 60 km 400 kV overhead line connecting to the Weston Marsh substation infrastructure and running west towards two new 400 kV substations (WMEL-A and WMEL-B) in Lincolnshire and Leicestershire respectively. Upgrades to an existing 400 kV overhead line between WMEL-B Substation and the existing Grendon Substation would also be completed;

5) Land North West of High Road, Weston, Spalding (536 m from the Scheme) – residential development for the erection of 150 dwellings and associated open space and infrastructure;

6) Eastern Green Link 3 (EGL3) and Eastern Green Link 4 (EGL4) (1.1 km from the Scheme) – the onshore element of this development comprises buried high voltage electricity transmission cables, as well as a substation and two converter stations in the Walpole area of Norfolk. Other associated development will also be delivered;

7) Land west of Spalding Road PIN 045 (4.4 km from the Scheme) – policy allocation for 676 dwellings and hybrid planning application seeking full planning permission for 100 new homes, landscaping and infrastructure, and outline planning application for up to 300 new homes, landscaping and infrastructure;

8) Beacon Fen Energy Park (11.2 km from the Scheme) – a 400 MW solar PV farm incorporating up to 600 MVA Battery Energy Storage System (BESS) and on-site substation and electrical connection, including solar PV panels up to 4.5 m in height, single-stacked BESS units up to 4.5 m in height, security perimeter fencing and hedgerow;

9) Boston Alternative Energy Facility (12.4 km from the Scheme) – 102 MW gross (80 MW exportable) energy from waste facility with light weight aggregates facility, wharf, waste reception and storage facility, and grid connection; and

10) Heckington Fen Solar Park (14.9 km from the Scheme) – the Proposed Development comprises the construction, operation and decommissioning of a solar PV electricity generating facility exceeding 50 MW output capacity, together with associated energy storage. Installed capacity is expected to be in the region of 500MW.

3.4 Data Used in this Report

3.4.1 In this HRA Report, the following sources of data have been used:

1) Citations for Habitats Sites available on the Joint Nature Conservation Committee website;

2) Conservation Objectives, Site Improvement Plans, and Supplementary Advice on the Conservation Objectives for Habitats Sites available from Natural England;

3) Guidance documents for specific impact pathways, such as Natural England's guidance on different Impact Risk Zones (IRZs) that are associated with different functional groups of birds (referenced in the report where first used);

4) **Non-breeding Bird Survey Report** (submitted with the Planning Application);

5) **Otter and Water Vole Survey Report** (submitted with the Planning Application); and

6) The Multi-Agency Geographic Information System (MAGIC) website (Ref 15).

3.5 Establishing the Zone of Influence

3.5.1 There is no generic guidance on the spatial scope of HRA in all circumstances and for all impact pathways. When seeking to identify relevant Habitats sites, consideration was therefore given primarily to potential impact pathways and the application of the source-pathway-receptor approach, rather than adopting a purely 'zones'-based approach.

3.5.2 The source-pathway-receptor model is a standard tool in environmental assessment. In order for an impact to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means there is no possibility for an effect to occur. Furthermore, even where an impact is predicted to occur, it may not result in significant effects. It is also important to distinguish between an 'impact' and an 'effect'. An impact is defined as an action resulting in changes to an ecological feature, while an effect is the outcome to an ecological feature arising from an impact (Ref 16). For example, an impact may be the disturbance of a roost of wintering waders as a result of construction activities; the effect would be how the population or conservation status of the species disturbed by the works changes as a consequence.

3.5.3 The likely zone of impact, referred to as the likely 'zone of influence' (ZoI) of a project, is the geographic extent over which ecological effects are likely to occur. The

ZoI of a project will vary depending on the specifics of a particular proposal and must be determined on a case-by-case basis with reference to a variety of criteria, including:

1) the nature, size/scale and location of the plan or project;

2) the connectivity between the plan or project and Habitats sites, for example through hydrological connections or because of the natural movement of qualifying species;

3) the sensitivity of ecological features under consideration; and

4) the potential for in-combination effects.

3.5.4 There is no geographical limit beyond which Habitats Sites need not be considered by the HRA of a project.

3.5.5 The process of determining which (if any) Habitats Sites are within the ZoI of the Scheme, was therefore a progressive appraisal of the potential for each impact source (construction, maintenance and operation) to affect the qualifying features and undermine the conservation objectives of such sites.

Potential Sources of Impact

3.5.6 A number of potential impacts could arise from the construction, maintenance and operation of a project.

3.5.7 A description of each, and their potential relevance to the qualifying features of Habitats Sites, is included in **Table 3.1**.

Table 3.1 Potential sources of impacts that could arise from a project.

Potential sources of impact	Brief description
Direct loss of habitat	The direct loss of habitat from within the boundary of a Habitats Site. This may include the loss of a habitat type which is itself a qualifying feature of a site, or the loss of habitat that is used by qualifying species for commuting, foraging and/or sheltering, which would pose implications for the site conservation objectives.
Loss of functionally linked habitat	The loss of habitat which is outside of the boundary of a Habitats Site, but which is critical to its functioning and achieving its conservation objectives. For example, the loss of habitat outside of a SPA which is used for foraging purposes by qualifying bird species which nest or overwinter within the SPA.
Injury/mortality from overhead line collisions	The direct injury or mortality of a qualifying species, either during the construction or operation of a new development. For example, birds may suffer injury or mortality when colliding with overhead lines.
Disturbance displacement (from visual and aural stimuli)	This could be physical disturbance, for example, due to the movement of vehicles in proximity to qualifying species, or due to noise and/or vibration. Generally, in relation to qualifying birds, it is considered that visual disturbance is likely to occur over greater distances than

Potential sources of impact	Brief description
	disturbance from noise. Disturbance could arise either during the construction or operational phase of a project.
Water quality	Including, for example, suspended sediment or run-off of water containing other pollutants such as hydrocarbons or chemicals. Effluent discharges would also be included in this category.
Water quantity, level and flow	Impacts which alter the hydrological conditions either within a Habitats Site or in an area used by the qualifying species of a Habitats Site. For example, reduced flows in a watercourse due to impoundment, or changes to groundwater flows or volumes due to abstraction. These changes can have multiple effects on habitats and species.
Spread of invasive non-native species (INNS)	INNS can have detrimental impacts on native species and habitats. Their spread can occur during construction and operation of a development, and via multiple pathways (for example via watercourses or on the treads of construction machinery).
Atmospheric pollution	This encompasses both dust (i.e., particles of sufficiently large size to coat vegetation and interfere with photosynthesis) and atmospheric pollutants that can be toxic to vegetation or contribute to nitrogen deposition and, therefore, eutrophication. The latter mainly constitutes oxides of nitrogen (NO_x) associated with combustion such as vehicle exhausts, and ammonia (NH_3) associated particularly with industrial processes and agriculture, but also with vehicle exhaust emissions.
Barriers to movement	Barriers to the movement of qualifying species, which can either be physical (for example, new overhead lines impacting the flightlines of SPA/Ramsar birds) or physiological (for example, the attraction of migratory fish towards the outflow of a hydro-electric scheme).

Potential Impact Pathways

3.5.8 Impact pathways are routes by which the implementation of a project or plan can lead to an effect upon a Habitats Site. In order for an impact to have an effect on a qualifying feature of a Habitats Site, a pathway between the impact source and that feature must exist. An example of this would be visual and noise disturbance arising from the construction work or operational phase associated with a project. If there are sensitive ecological receptors within a nearby Habitats Site (e.g., non-breeding overwintering birds), this could alter their foraging and roosting behaviour and potentially affect the site's integrity. For some impact pathways (notably air pollution) there is guidance that sets out the proposed ZoI required for assessment. These are discussed below where relevant.

Application of impact pathways for the Scheme

3.5.9 For each of the types of impact which could arise (as set out in **Table 3.1**) the maximum distance (ZoI) at which an effect could occur has been assessed based on the pathway(s) by which such impact(s) could reach a Habitats Site or its qualifying feature(s).

3.5.10 The ZoIs are based on published guidance or best available research, wherever possible. For other impact pathways, a professional judgment has been made based on the best available evidence. The adopted ZoIs are set out in **Table 3.2**.

Table 3.2 Impact pathway ZoIs for the Scheme.

Impact category	Zone of Influence (ZoI)
Direct loss of habitat	Within Habitats Site boundary. No works for the Scheme will be undertaken within a Habitats Site and, therefore, this impact pathway is not discussed further.
Loss of functionally linked habitat	Depends on the species in question. NatureScot's (formerly Scottish Natural Heritage [SNH]) guidance on 'Assessing Connectivity with Special Protection Areas (SPA)' (Ref 17) suggests that certain species of geese may forage up to 15-20 km from the boundary of SPAs for which they are qualifying features. Similarly, Natural England have published guidance on how far from designated site boundaries different functional groups of birds can be impacted through supporting habitat loss by various types of developments, including overhead lines (Ref 18). These potential impact zones have been coined as Impact Risk Zones (IRZs). The IRZs are based on the core ranges that most individuals of a given species routinely travel beyond the designated site boundaries. For most species the identified IRZs extend out to 10 km from Habitats Sites. However, given site-specific context and a precautionary approach it is often prudent to consider the maximum foraging ranges, which represent the maximum distance at which functionally linked habitat for a given species may be located from a Habitats Site. For example, since pink footed goose range widely across the hinterland of the Wash, as a precautionary measure, a buffer of 20 km (its maximum reported foraging range) has been used in order to incorporate SPAs/Ramsar's that are designated for this qualifying species. According to precautionary guidance developed for National Highways (Ref 19), bats utilise commuting and foraging habitats up to 30 km from the boundary of Habitats Sites.
Injury/mortality from overhead line collisions	Injury or mortality of qualifying species from overhead line collisions could occur where overhead lines are proposed within a Habitats site boundary. Injury or mortality could also result from collisions with overhead lines outside designated site boundaries where qualifying SPA/Ramsar species move between designated sites and off-site roosting, breeding or foraging sites (functionally linked habitat). Potential areas for this impact pathway are, therefore, similar to the zones considered in relation to functionally-linked habitat loss (see preceding row).
Disturbance displacement	Based on the published guidance referenced below and consultation with Natural England, the following distances were used when considering how far construction and operational activities may disturb qualifying species, both within designated site boundaries and in functionally-linked habitats:

Impact category	Zone of Influence (ZoI)
	Non-breeding waterbirds – various academic references provide species-specific information on the sensitivity of SPA/Ramsar bird species to visual and noise disturbance (Ref 20 and Ref 21). These studies suggest a distance of 300 m to delineate an appropriate buffer zone for bird flight initiation distances. Based on this and applying an additional precautionary buffer (more subtle impacts on bird behaviour may occur at distances beyond 300 m), it is considered that disturbance of non-breeding waterbirds can occur up to distances of 500 m from construction works. The 500 m disturbance zone was also agreed upon with Natural England during pre-submission stakeholder consultation for the wider Grimsby to Walpole National Grid Scheme. Breeding birds – 1 km, this being the maximum distance at which Goodship and Furness (2022) (Ref 22) consider disturbance could occur on the most sensitive species for which SPAs are designated. Marine mammals, including grey seal (*Halichoerus grypus*), harbour seal (*Phoca vitulina*) and harbour porpoise (*Phocoena Phocoena*) can range over very large distances. For example, a search distance of 135 km in relation to SACs designated for grey seal was used in the HRA of National Planning Framework 4 (NPF4) (Ref 23), and 50 km for harbour seal is used based on the maximum typical distance individuals of this species forage around haul-out sites (Ref 24). For cetaceans, such as harbour porpoise, the approach of identifying functionally-linked habitats is based on Management Units (Mus) (Ref 25). All habitats within the same MU as relevant SACs are potentially used by harbour porpoise. Fish – no set ZoI is used. Potential disturbance displacement to fish species due to noise/vibration depend on various factors, such as the qualifying species impacted, the type of construction equipment used and the duration of exposure. Theoretically, any fish species present in hydrologically connected stretches of aquatic habitat (i.e. functionally linked waters) could be impacted.
Water quality	No set ZoI has been used - this relies on there being a hydrological connection to a Habitats site, according to the source-pathway-receptor model.
Water quantity, level and flow	No set ZoI has been used - this relies on there being a hydrological connection to a Habitats site, according to the source-pathway-receptor model.
Introduction and spread of INNS	Generally within 100 m, except where hydrological connectivity could result in spread further afield.
Atmospheric pollution	50 m for dust generation (Ref 26); however, as a precautionary approach 200 m will be used, and 200 m for emissions from road traffic (Ref 27).
Barriers to movement	No set ZoI has been used, as potential zone of impact depends on type and behaviour of species affected. Although otter could be impacted by works in watercourses or waterbodies, this species is readily able to navigate overland. There is the potential for the Scheme to prevent the regular movements of qualifying species including birds and fish.

Impact category	Zone of Influence (ZoI)
	The ZoI for this impact was therefore taken to be any SAC designated for mobile fish species for which a direct hydrological connection to the Scheme exists. SPAs and Ramsar sites designated for qualifying bird species that depend on functionally linked habitats and whose maximum foraging ranges overlap with the Scheme were also scoped into the ZoI (see row on 'loss of functionally-linked habitat').

4. Relevant Habitats Sites

4.1.1 To identify which Habitats Sites should be scoped into the HRA, the ZoIs set out in **Table 3.2** and professional judgment were used. All relevant Habitats Sites were identified using Geographic Information System data from datasets downloaded from the Joint Nature Conservation Committee (JNCC) and the MAGIC website (Ref 15).

4.1.2 It can be seen from **Table 3.2** that the impact which could occur over the largest distance (excluding instances where there is a hydrological connection) is the loss of functionally linked habitat used by foraging non-breeding waterbird species (up to 20 km).

4.1.3 Based on the ZoIs identified in **Table 3.2**, the following Habitats Site search data has been obtained:

1) Both the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar fall within the ZoIs of various impact pathways (they each lie at approximate distances of 5.8 km from the Scheme), and are scoped in for further assessment;

2) There are various SACs designated for harbour porpoise within the North Sea MU, to which the Scheme is connected via the River Welland, the closest one being the Southern North Sea SAC;

3) The Humber Estuary SAC, which lies approximately 65.4 km to the north of the Scheme, is partly designated for grey seal and falls within the 135 km ZoI for this species;

4) There are no Habitats Sites designated for bats within 30 km of the Scheme; and

5) There are no SACs designated for harbour seal within 50 km of the Scheme (other than the Wash and North Norfolk Coast SAC which is already scoped in).

4.1.4 Regarding potential disturbance to harbour seal (Wash and North Norfolk Coast SAC), grey seal (Humber Estuary SAC) and harbour porpoise (Southern North Sea SAC), it should be noted that the Scheme comprises an inland site adjoining the River Welland. Due to the distances to any haul-out sites and the open marine environment, harbour seal, grey seal and harbour porpoise are very unlikely to make significant use of the River Welland in proximity to the Scheme. Furthermore, the construction, maintenance or operation of the Scheme does not involve in-river works or temporary/permanent watercourse crossings that could lead to disturbance within the water column. There is no potential for LSEs from the Scheme to arise on these species and they are scoped out from further assessment in this HRA.

4.1.5 The Greater Wash SPA is designated for several marine bird species, including red-throated diver, little gull, common scoter and breeding tern species. These species are all mobile, and sensitive to the loss of functionally-linked habitat and noise/visual disturbance. However, all qualifying species of the Greater Wash SPA are associated with the open marine environment and do not depend on the inland terrestrial

habitats potentially impacted by the Scheme. Therefore, the Greater Wash SPA is scoped out from further assessment in this HRA.

4.1.6 The Inner Dowsing, Race Bank and North Ridge SAC lies approximately 42 km to the north east of the Scheme and is designated for reefs and sandbanks which are slightly covered by sea water all the time. However, the Scheme will not involve any in-water works that could result in direct damage to the qualifying habitats. Furthermore, any aquatic pollutants deriving from the Scheme would be sufficiently attenuated and/or diluted along their flowpaths through linking freshwater bodies and the open marine environment. Therefore, this Habitats Site has been scoped out from further assessment.

4.1.7 Overall, the following Habitats Sites are considered relevant to the Scheme based on the ZoIs set out in **Table 3.2** and are shown in **Figure 2:**

1) The Wash SPA (UK9008021);
2) The Wash Ramsar (UK11072); and
3) Wash and North Norfolk Coast SAC (UK0017075).

4.1.8 For each of the relevant Habitats Sites identified, the qualifying features were established and the conservation objectives for each feature were obtained. Information was also sought to understand the potential vulnerability of the features to any effects that might arise from the Scheme This information is presented in **Appendix A**.

5. Potential Impact Pathways

5.1 Introduction

5.1.1 This section sets out the potential impact pathways linking to the Habitat Sites listed in **Section 4** above.

5.2 Loss of Functionally Linked Habitat (Construction Phase)

5.2.1 While most Habitats Sites have been geographically defined to encompass the key features that are necessary for coherence of their structure and function, and the support of their qualifying features, this is not necessarily the case. A diverse array of mobile qualifying species including birds, bats and amphibians are not necessarily confined to the boundary of Habitats Sites

5.2.2 Due to the highly mobile nature of waterfowl, it is inevitable that areas of habitat important in supporting the conservation objectives of Habitats Sites lie outside their physical limits. However, despite lying outside the designated site boundary, such areas will still be essential for the maintenance of the qualifying bird populations. Accordingly, land use plans that may affect functionally linked habitat should be subject to further assessment. This has been underlined by a European Court of Justice ruling C-461/17 (paragraphs 37 to 40), known as the Holohan ruling as summarised in **Table 2.1**, which confirms the need for an AA to consider the implications of a plan or project on habitats and species outside Habitats Site boundaries, provided that those implications are likely to impact the conservation objectives of the site.

5.2.3 There is now an abundance of authoritative examples of plans and projects affecting bird populations, where Natural England recognised the importance of functionally linked habitat. These case studies and resulting authoritative decisions have been summarised in a Natural England report (Ref 28). For example, in relation to a development proposal, it was established that approximately 25% of the golden plover population in the Somerset Levels and Moors SPA occurred on potentially impacted functionally linked habitat, and this required the inclusion of mitigation measures in the relevant plan policy wording. Another important case study originates from the Mersey Estuary SPA/Ramsar, where adjacently located functionally linked land had a peak survey count of 108% of the 5-year mean peak population of golden plover. This finding led to considerable amendments in the Frodsham onshore wind farm proposal to ensure that the site integrity was not adversely affected.

5.2.4 As highlighted in the preceding section, Natural England have produced unpublished guidance on Sites of Special Scientific Interest (SSSI) IRZs associated with different types of development on various functional groups of birds (see **Table 5.1**; Ref 18). These IRZs provide a high-level screening tool for assessing the risk of planning applications affecting important habitats outside Habitats Site boundaries. The guidance highlights that functionally linked habitats may extend up to the maximum foraging distances from roost locations, although it also notes that the proportion of designated foraging birds will decrease with distance from the Habitats Site.

Importantly, the IRZ guidance note does not define the required abundance threshold needed or other parameters to meet the criterion of functional habitat linkage.

Table 5.1 Impact Risk Zones for Functional Groups of Birds

Assemblage	Impact Risk Zone (foraging distance)
Wintering birds (except wintering waders and grazing wildfowl; and wigeon (*Anas penelope*) and geese)	Up to 500 m.
Dabbling ducks such as teal, mallard and gadwall	Home ranges could extend beyond site boundaries at coastal sites, but less likely to do so at inland water bodies.
Wintering waders (except golden plover and lapwing), brent goose (*Branta bernicla*) and wigeon	Generally, the maximum foraging distance is 500 m although curlew can forage up to 3.5 km
Wintering lapwing and golden plover	Guidance states 5 km, however it also refers to the maximum foraging distance as 15 km - 20 km. Golden plover can forage up to 15 km from a roost site within a protected site. Lapwing can also forage similar distances. Both species use lowland farmland in winter, and it is difficult to distinguish between designated populations and those present within the wider environment. Developments affecting functionally linked land more than 10 km from the site are unlikely to impact significantly on designated populations.
Wintering white-fronted goose (*Anser albifrons),* greylag goose (*Anser answer*), Bewick's swan (*Cygnus columbianus bewickii*), whooper swan, pink-footed goose and wintering bean goose (*Anser fabalis*)	Maximum foraging distance is 10 km although studies have shown that pink-footed geese will fly 20 km from their roosting site to feed. A bespoke functional land IRZ has replaced the individual Birds 6/7 IRZs for sites supporting the following goose and swan species: pink-footed geese, barnacle goose, Bewick's swan, white-fronted goose and whooper swan. The IRZ is based on GIS distribution records of feeding pink-footed geese from a study undertaken for Natural England by the Wildfowl & Wetlands Trust and the results of work undertaken by the British Trust for Ornithology to identify functionally connected habitat used by barnacle goose, Bewick's swan, white-fronted goose and whooper swan based on Wetland Bird Survey (WeBS) site and BirdTrack data.

5.2.5 The identification of an area as functionally linked habitat is not always a straightforward process. The importance of non-designated land parcels may not be apparent and thus might require the analysis of existing data sources (e.g., Bird

Atlases or data from record centres) to be firmly established. In some instances, data may not be available at all, requiring further survey work.

5.2.6 Some qualifying species of The Wash SPA/Ramsar (e.g. Bewick's swan, pink-footed goose, golden plover, lapwing and whooper swan) are more likely to be present within the Scheme Site Boundary than others, due to their preference for foraging in arable fields. Importantly, these species are also associated with large foraging ranges that overlap with the Scheme.

Definition of important functionally linked habitat

5.2.7 For purposes of analysing the bird survey data collected for the Scheme and defining important functionally linked habitat, the following principles are applied:

1) To distinguish the likely presence of qualifying individuals from birds occurring in the wider landscape, an individual bird record needed to fall within the established IRZ for that species (although it is to be noted that an additional precautionary buffer of 10% on the IRZs was applied to account for the presence of the River Welland, a potential flight commuting route to/from the SPA/Ramsar);

2) For the purposes of assessing functionally linked habitat loss, only bird records on the ground were considered, whereas birds in flight were excluded based on the fact that they are solely transiting through the landscape; and

3) The geographic scope of on-the-ground bird records was extended beyond the boundary of the proposed substation to account for intra- and inter-annual variations in habitat suitability, and the high mobility of SPA/Ramsar birds. For example, the cropping regime of fields under the substation footprint could have been unsuitable at the time of survey or birds may have been absent for other reasons. However, all bird records within 500m of the Scheme Site Boundary were assessed in the context of functional linkage.

5.2.8 Following on from this exercise, the next stage in the assessment is to determine whether the habitats within and 500 m from the Scheme Site Boundary support significant SPA/Ramsar bird populations. Historically, bird numbers approaching or reaching 1% of the relevant designated populations have been used as a threshold to identify important functionally linked habitat. Natural England has advised[1] that parameters other than bird numbers are important in determining functional habitat linkage, including:

1) Assemblage diversity – where more than one SPA/Ramsar species is recorded, functional habitat linkage may be present even if numbers of species are below the 1% threshold;

2) Frequency of usage – land parcels with repeat records of SPA/Ramsar species across survey months may be functionally-linked even if individual species fall below the 1% threshold;

3) Population trends and declines – where species experience existing declines in population levels, any loss of functionally-linked habitat may be more significant;

[1] Letter from Natural England in response to stakeholder consultations for the upcoming Grimsby to Walpole DCO submission. January 2026.

4) Availability of other similar types of functionally-linked habitat – for example, given its more limited distribution, the loss of wet grassland may be associated with higher impact potential compared to much more widely available arable fields;

5) Species with very low population numbers and/or high fidelity to roosting or foraging grounds are likely to warrant special consideration; and

6) In-combination developments – where multiple developments are coming forward in the same geographic area, the in-combination loss of habitat parcels must be considered.

Summary

5.2.9 Overall, the available baseline information suggests that the following Habitats Sites within the ZoI of the Scheme should be considered further in relation to functionally linked habitat loss:

1) The Wash SPA; and

2) The Wash Ramsar.

5.3 Disturbance Displacement (Construction Phase)

5.3.1 Development can result in noise or visual disturbance to qualifying species in Habitats Sites, during the construction and operational (including maintenance) phases. Any prolonged disturbance has the potential to affect the fitness and, ultimately, survival of sensitive qualifying species. For example, noise and visual disturbance arising from construction may result in temporary behavioural changes in otter, such as disturbance in natal dens, holts and resting places (couches), as well as displacement from specific stretches of the river. Furthermore, disturbance from construction may result in temporary behavioural changes in qualifying birds (e.g., interruption or cessation foraging, increased vigilance ('head up') behaviour, minor and major flight responses). Ultimately, the exposure to high noise levels might affect the survival of birds, particularly if other stressors are also present (e.g., cold weather, food scarcity). During the operational period, noise emitted from developments may permanently affect site usage of foraging and roosting birds. Disturbance from site usage by operational site staff, road traffic and operational lighting might also arise. Three of the most important factors determining the magnitude of disturbance from developments on ecological receptors are individual species sensitivity, proximity of the disturbance source and timing/duration of the disturbance.

5.3.2 Noise is a complex disturbance parameter requiring the consideration of multiple factors, including its non-linear scale, non-additive effect and source-receptor distance. Generally, research has shown that above noise levels of 84 dB waterfowl show a flight response, while at levels below 55 dB no behavioural impact is evident (Ref 29). Therefore, these two thresholds are considered useful as defining two extremes. Generally, noise is attenuated by 6 dB with every doubling of distance from the source. Impact piling, one of the noisiest construction activities (approximately

110 dB at 0.67 m from source[2]), will thus reduce to 67 - 68 dB by 100 m away from the source. This implies that even in the absence of mitigation measures, the loudest construction noise should have fallen to below disturbing levels by 100 m, and certainly by 200 m, from the source. Noise levels from less noisy construction activities, such as Horizontal Direct Drilling (HDD) (approximately 85 dB at source), are expected to dissipate over considerably shorter distances. It is to be noted that these are noise decay approximations that do not negate the need for application-level noise modelling.

5.3.3 The following parameters for the assessment of noise disturbance impacts to birds have been identified in discussions with Natural England on other projects[3]:

1) Noise levels below 55 dB are unlikely to be disturbing, regardless of the difference to the baseline;

2) Noise levels between 55 dB and 70 dB may be disturbing depending on the degree of change from the baseline (for example, a change in noise level of 10 dB represents a doubling in loudness and, therefore, likely to be disturbing), nature of the sound (i.e., L_{Amax} or L_{Aeq}), duration of exposure and extent of habitat impacted. Generally, changes of 3 dB in noise level compared to the pre-construction baseline are perceptible by bird receptors (though not necessarily disturbing) and should be screened in for AA; and

3) Noise levels above 70 dB are likely to be disturbing unless qualifying birds are already subject to similarly high noise levels as part of their baseline soundscape.

5.3.4 Since it is possible to be confident no disturbance will occur at 55 dB, and 58 dB (being three decibels higher) is the threshold for a difference to be perceptible (rather than disturbing) this has in practice led to agreement on various projects over using a 60 dB contour as the threshold to determine if adverse effects may arise (taking account of other factors such as whether the noise is percussive and how frequently that exposure is experienced). This is the threshold that is used in this HRA to screen for potential noise disturbance impacts associated with the Scheme.

5.3.5 Generally, visual stimuli are considered to have a higher disturbance potential than noise stimuli as, in most instances, visual stimuli will elicit a disturbance response at much greater distances than noise. For example, a flight response is triggered in most species when they are approached to within 150 m across a mudflat. Visual disturbance can be exacerbated by workers moving across open habitats undertaking sudden movements and using large machinery. Several species are particularly sensitive to visual disturbance including curlew (taking flight at 275 m), redshank (at 250 m), shelduck (at 199 m) and bar-tailed godwit (at 163 m) (Ref 30).

5.3.6 Overall, the available baseline information suggests that the following Habitats Sites within the ZoI of the Scheme should be considered further in relation to disturbance:

1) Wash and North Norfolk Coast SAC;

2) The Wash SPA; and

[2] The at-source noise levels reported in this paragraph derive from feedback provided by AECOM noise specialists on other projects.

[3] Discussions over noise disturbance to SPA/Ramsar took place over several projects, including the Sea Link and Viking CCS Pipeline developments.

3) The Wash Ramsar.

5.4 Injury/Mortality from Overhead Line Collisions (Operational Phase)

5.4.1 Guidance produced by NatureScot (Ref 31) identifies the main sources of potential risk to birds from the presence of transmission overhead lines to be:

1) Mortality or injury through collision with transmission lines (including conductors and, particularly, earth wires) or supporting structures. On power lines, bird collisions are often concentrated along relatively short sections where several factors interact to create a collision problem or 'hotspot'; and

2) Mortality through electrocution on transmission lines is unlikely, due to the large air gaps between lived and earthed components. The 4.5 m air gaps compared to the much smaller wingspan and body size of bird species make it highly unlikely that birds perching or nesting on steel lattice pylons are electrocuted by touching two live wires, or a live and an earthed component, at the same time.

5.4.2 The principal factors affecting the risk of bird mortality through collision and electrocution are:

1) Species-specific morphology, biology. Birds with larger body sizes and high wing loadings, birds flying in flocks and/or in low light, birds with limited visual capacity, birds distracted while engaged in hunting/breeding behaviours, younger and more inexperienced birds and migrants not familiar with the landscape may all be at increased collision risk. For example, swans and other large waterfowl are of particular concern for collisions in the UK;

2) Landscape and topography (e.g., siting of overhead lines near important habitats or flyways) may increase collision risk;

3) Weather affecting flight capability or visibility (strong winds/fog/heavy rain) which may force birds to lower their normal flight heights, affect flight control and reduce visibility, and therefore reduce ability to avoid collisions;

4) Technical aspects of the transmission line (spacing of conductors, creation of perches); and

5) The presence of existing barrier features that already result in changes to bird flight behaviours e.g., an embankment, woodland block, building or existing infrastructure corridor.

5.4.3 Earth wires are thought to be responsible for a much higher rate of collisions than the thicker, often bundled conductor wires. Earth wires are harder for birds to see, being thinner in diameter and typically positioned at the top of the wire array. Birds trying to gain height to avoid the larger more visible conductor wires may fail to see the earth wire (Ref 32).

5.4.4 Generally, new overhead lines can introduce collision risk within and outside Habitats Site boundaries. For example, birds traversing terrestrial habitats or commuting along riverine corridors to reach functionally linked habitats may be at risk of collisions where their flight paths intercept new sections of overhead lines.

5.4.5 Overall, the following Habitats Sites within the ZoI of the Scheme should be considered further in relation to injury or mortality from overhead line collisions:

1) The Wash SPA; and

2) The Wash Ramsar.

5.5 Water Quality (Construction and Operational Phases)

5.5.1 The quality of the water that feeds a Habitats Site is an important determinant of the condition of the habitats and species it supports. Water quality contaminants arising in the construction and operational phases of developments can have a range of environmental impacts:

1) At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour;

2) Construction activities that involve ground excavations and the stripping of topsoil are associated with a high risk of sediment release in surface runoff. Excessive sedimentation can smother aquatic habitats and plants, increase turbidity and accelerate eutrophication;

3) Eutrophication, the enrichment of water with nutrients, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In freshwater ecosystems, plant growth is primarily determined by phosphorus (P) concentrations, which are determined by a wide range of sources, including treated sewage effluent from Wastewater Treatment Works and urban surfaces such as roads; and

4) Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

5.5.2 Potential water quality impacts are relevant to designated sites (SACs, SPAs and Ramsar sites), in this case the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar (which is connected to the Scheme via the River Welland), but also to functionally inked habitats used by mobile qualifying species, including birds and otter. While the passage of water to designated sites via flowpaths may provide natural attenuation services, no such natural buffers exist for aquatic pollutants released in habitats adjoining developments. For example, SPA/Ramsar birds foraging in arable fields or wet grassland adjoining developments can be impacted directly (e.g. through reduced ability to forage in turbid waters) and indirectly (e.g. through reduced availability of invertebrate foraging resources). Similar direct and indirect impacts apply to otter.

5.5.3 Under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 32), it is legally required to maintain and/or improve the ecological and chemical status of the water environment, which includes rivers, lakes, wetlands, groundwater, estuaries and coastal waters. There should be no

deterioration or prevention of future improvement in the status of waterbodies. Water Framework Directive (WFD) assessments are directly linked to HRA in that consideration must also be given when undertaking a WFD assessment to the Conservation Objectives of designated sites, including SACs, SPAs and Ramsar sites.

5.5.4 Overall, the available baseline information suggests that the following Habitats Sites require further consideration in relation to water quality:

1) Wash and North Norfolk Coast SAC;

2) The Wash SPA; and

3) The Wash Ramsar.

5.6 Water Quantity, Level and Flow (Construction and Operational Phases)

5.6.1 The water level, its flow rates and the mixing conditions are important determinants of the conditions present within Habitats Sites and the state of their qualifying features. Hydrological processes are critical in influencing habitat characteristics in coastal waters, including parameters such as current velocity, water depth, dissolved oxygen (DO) concentrations, salinity and water temperature. In turn these parameters determine the short and long-term viability of plant and animal species, as well as overall ecosystem composition. Changes to the water flow rate, both increases and decreases, within an estuary can be associated with a multitude of knock-on impacts, including substratum loss, smothering and changes in wave exposure.

5.6.2 Water quantity, level and flow impacts can arise both in the construction and operational phases of developments. For example, dewatering and abstractions required to facilitate construction activities may result in reduced flows both to Habitats Sites and functionally linked habitats used by qualifying species. The proliferation of impermeable surfaces often associated with the operational phase of developments increases the volume and speed of surface runoff. Traditional drainage systems often cannot cope with the volume of runoff, particularly during intense rainfall events, resulting in downstream flooding of ecological receptor sites.

5.6.3 Both SACs and SPAs/Ramsar's are sensitive to hydrological changes. For example, some SAC habitats in coastal sites (e.g. Atlantic saltmarsh and intertidal sand- and mudflats) depend on the natural interplay between freshwater and seawater. Where freshwater supply falls outside the normal range, this can have cascading impacts on characteristic plant and faunal assemblages (e.g. changes in saltmarsh zonation). Some SAC species (e.g. otter) are also sensitive to hydrological changes in their freshwater habitats. For example, changes in hydrological flows can impact the foraging resources (i.e. fish) of otter. Similar indirect impacts of hydrological changes apply to SPA/Ramsar birds. For example, increased/decreased water levels are known to affect infaunal and epifaunal invertebrate communities, as well as having potential impacts on whether birds can physically reach their prey.

5.6.4 Overall, the available baseline information suggests that the following Habitats Sites require further consideration in relation to water quantity, level and flow:

1) Wash and North Norfolk Coast SAC;

2) The Wash SPA; and

3) The Wash Ramsar.

5.7 Introduction and Spread of Invasive Non-Native Species (INNS; Construction Phase)

5.7.1 An 'invasive species' is a species that is: 1) non-native (or alien) to the ecosystem under consideration; and 2) whose introduction causes or is likely to cause economic or environmental harm, or harm to human health. They can be introduced to an area by, for example, ship ballast water, accidental release, and most often, by people. Invasive species can lead to the extinction of native plants and animals, destroy biodiversity, and permanently alter habitats. Any construction project can introduce INNS if inadequate biosecurity protocols are followed, particularly when working in the riverine environment.

5.7.2 While the typical buffer zone used for the introduction and spread of INNS is 100 m, the risk of INNS contamination is greatly increased where hydrological connections between development works and ecological receptors are present. Given that all Habitats Sites within the ZoI of the Scheme are hydrologically connected to the Scheme Site Boundary via the River Welland, these are all scoped in for further assessment.

5.7.3 Overall, the available baseline information suggests that the following Habitats Sites require further consideration in relation to the introduction and spread of INNS:

1) Wash and North Norfolk Coast SAC;

2) The Wash SPA; and

3) The Wash Ramsar.

5.8 Airborne Pollution (Construction Phase)

Emissions from Road Traffic

5.8.1 Construction of the Scheme has the potential to affect the prevailing local air quality. This is primarily expected due to exhaust emissions from construction vehicles and equipment. Due to the very low number of maintenance/repair vehicle movements, atmospheric pollution does not present an issue in the operational phase of the Scheme.

5.8.2 The main pollutants of concern for Habitats Sites are nitrogen oxides (NO_x), ammonia (NH_3) and sulphur dioxide (SO_2) (see **Table 5.2**). NH_3 can have a directly toxic effect upon vegetation, particularly at close distances to the source such as near road verges (Ref 34). NO_x can also be toxic to vegetation at very high concentrations (far above the annual average Critical Level) (Ref 35). Furthermore, high levels of NO_x and NH_3 are likely to increase the total nitrogen (N) deposition, potentially leading to deleterious knock-on effects in recipient ecosystems. An increase in N deposition from the atmosphere is widely known to enhance soil fertility and to lead to eutrophication. This often has adverse effects on plant community composition and

the overall quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats (Ref 36 and Ref 37).

5.8.3 While atmospheric pollutants often result in direct toxicity impacts to SAC plant species and habitats, impacts on SPA/Ramsar birds are predominantly indirect via changes to foraging resources. For example, elevated nitrogen deposition can lead to the eutrophication of saltmarsh vegetation, with biotope-typical species being replaced by fast-growing and structurally taller graminoids. This can reduce the availability of suitable plant species for herbivorous SPA/Ramsar species (e.g. dark-bellied Brent goose and others). Waders relying on invertebrate prey in mudflats may also experience reducing foraging opportunities, either through a reduction in preferred prey species or by making prey less accessible. Excessive nitrogen deposition can also impact species that nest on bare ground in dune systems or shingle habitats (e.g. little or common tern), which can accelerate graminoid growth and lead to the disappearance of suitable nesting patches.

Table 5.2 Main sources and effects of air pollution on habitats and species

Pollutant	Source	Effects on habitats and species
SO_2	The current main sources of SO_2 are the combustion of coal, heavy fuel oil and petroleum coke within the refinery, industrial and domestic sectors. Total SO_2 emissions in the UK have decreased by 97% since 1990 driven by a reduction in coal use, particularly in the power sector and legislation restricting emissions and the sulphur content of other fuels. Another origin of SO_2 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 impacts 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 1970s and are now not regarded as a threat to plant communities. For example, decreases in SO_2 concentrations have been linked to returning lichen species and improved tree health in the UK.
Acid deposition	Leads to acidification of soils and freshwater via atmospheric deposition of SO_2, NO_x, NH_3 and hydrochloric acid (HCl). Acid deposition from rain has declined by 85% in the last 20 years, with most of this reduction attributable to reductions in SO_2 emissions.	Gaseous precursors (e.g., SO_2) can cause direct damage to sensitive vegetation, such as lichen, upon deposition. Acid 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

Pollutant	Source	Effects on habitats and species
		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.
Ammonia (NH_3)	Ammonia is a reactive, soluble alkaline gas that is released following decomposition and volatilisation of animal wastes and from some chemical processes and vehicle exhausts. 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 NOx 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 transboundary 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.
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 NO_x for all vegetation types has been set to 30 µg/m^3 (micrograms per cubic metre). Deposition of nitrogen compounds (nitrates (NO_3), NO_2 and nitric acid (HNO_3)) contributes to the total N 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.
N deposition	The pollutants that contribute to the total nitrogen deposition derive mainly from oxidized (e.g., NO_X) or reduced (e.g., NH_3) N emissions (described separately above). While oxidized nitrogen mainly originates from major conurbations or highways,	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

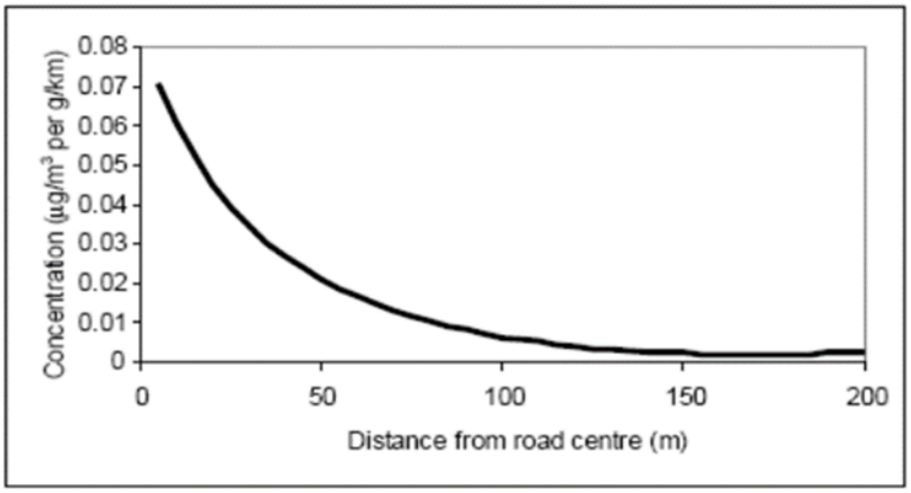
Pollutant	Source	Effects on habitats and species
	reduced nitrogen mostly derives from farming practices. The N pollutants together are a large contributor to acidification (see above).	are most at risk from N eutrophication. This is because many semi-natural plants cannot assimilate the surplus N as 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 NO_x, volatile organic compounds (VOCs) and sunlight. These precursors are mainly released by the combustion of fossil fuels (as discussed above). Increasing anthropogenic emissions of ozone precursors in the UK have led to an increased number of days when ozone levels rise above 40 ppb (parts per billion) ('episodes' or 'smog'). Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	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, 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.

5.8.4 SO_2 emissions overwhelmingly derive from power stations and industrial processes that require the combustion of coal and oil, as well as shipping (particularly on a local scale). There will be no material release of SO_2 in the construction or operation of the Scheme. Therefore, this atmospheric pollutant is not considered further in this HRA.

5.8.5 NO_x emissions are dominated by the output of vehicle exhausts (more than half of all emissions) and some vehicles also emit NH_3. The main air quality impact of the Scheme is likely to occur in the construction phase, when construction traffic will lead to the temporary emission of NO_x, NH_3 and, likely, an overall increase in total N deposition. According to the World Health Organisation (WHO), the Critical Level for NO_x for the protection of vegetation is 30 μgm^{-3} (micrograms per cubic metre) and the Critical Level for NH_3 when lower plants are present is 1 μgm^{-3}. In addition, ecological studies have determined Critical Loads for atmospheric nitrogen deposition (NO_x combined with NH_3).

5.8.6 Natural England guidance (Ref 27) states that beyond 200 m, the contribution of vehicle emissions from the roadside to local pollution levels is insignificant (refer to **Image 5.1**). This is the distance that is used in this HRA to screen for potential atmospheric pollution impacts associated with the Scheme.

Image 5.1 Traffic contribution to concentrations of pollutants at different distances from a road.



Dust Deposition

5.8.7 Construction activities can generate dust emissions from operating machinery that can cause localised smothering of vegetation or potential health issues in fauna. The effects of dust will depend on the prevailing wind direction, and the transport distance is related to particle size. Dust particle size and chemical composition is important as smaller particles can enter or block stomata and thus interfere with gas exchange, while sufficient coverage may prevent light penetration to the chloroplasts. Dust deposition can affect SPA/Ramsar birds both directly and indirectly, such as by increasing turbidity (which reduces the ability of birds to locate prey visually), as well as influencing various water quality parameters that have direct consequences on their foraging resources (e.g. plants, invertebrates and fish).

5.8.8 Fauna is exposed to air pollutants via three pathways:

1) Inhalation of gases or small particles;

2) Ingestion of particles suspended in food or water; or,

3) Absorption of gases through the skin. It is likely that birds are even more susceptible to gaseous pollutant injury than mammals due to their higher respiratory rates.

5.8.9 For the purposes of screening, according to guidance from the Institute of Air Quality Management (IAQM) (Ref 24), with respect to possible effects due to dust:

'*An assessment will normally be required where there is…an 'ecological receptor' within: 50 m of the boundary of the site; or 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).*'

5.8.10 However, as a precautionary approach, the potential for dust impacts has been considered up to 200 m from dust-generating activities.

Summary

5.8.11 Overall, the available baseline information suggests that the following Habitats Sites require further consideration in relation to emissions from road traffic and dust deposition:

1) Wash and North Norfolk Coast SAC;

2) The Wash SPA; and

3) The Wash Ramsar.

5.9 Barriers to Movement (Construction and Operational Phases)

5.9.1 Development, including transmission lines and associated temporary and permanent infrastructure elements, can lead to habitat fragmentation and impede the movement of wildlife. Many species rely on the ability to move throughout the landscape to fulfil their needs for survival or complete their life cycles. Some species move seasonally, following food resources, moving to areas more suitable for raising young, or surviving the winter. New structures, both in terrestrial and adjoining aquatic habitats, can potentially affect the ability of species to move across terrestrial landscapes by adding obstacles and increasing habitat fragmentation.

5.9.2 For example, many developments involve temporary crossings for the movement of construction plant, equipment and operatives across watercourses. Where such temporary crossings are designed inadequately, there is the potential for the severance of riparian commuting corridors (regarding otter) and/or in-water movement corridors (regarding fish).

5.9.3 Overhead lines are also associated with potential permanent barrier impacts. Regarding birds, barrier effects occur where linear infrastructure alters their movement behaviour by causing individuals or flocks to avoid crossing structures or to divert from established flight routes. In the context of overhead lines, barrier effects may arise if birds perceive conductors and supporting structures as obstacles within otherwise open landscapes, potentially influencing connectivity between important habitats such as breeding areas, roost sites and feeding grounds. This issue is particularly relevant for SPAs and Ramsar sites, where qualifying bird populations may rely on movements between designated sites and surrounding functionally linked habitats that provide additional foraging opportunities. Guidance from NatureScot (Ref 31) and reviews undertaken by the International Union for Conservation of Nature (Ref 38) indicate that the magnitude of barrier effects associated with overhead lines varies considerably between species and landscapes, and is influenced by factors such as flight behaviour, flocking dynamics, landscape openness and the spatial relationship between infrastructure and key movement corridors.

5.9.4 The potential sensitivity of SPA/Ramsar birds to barrier effects differs among functional groups. Large waterbirds such as geese and swans often undertake regular commuting flights between roost sites and feeding areas, sometimes following relatively consistent routes across open landscapes. Where overhead lines intersect these commuting pathways, birds may adjust flight height or divert around infrastructure, potentially increasing travel distances between roosting and feeding habitats (Ref 39 and Ref 40). Waders and other species associated with open agricultural or wet grassland habitats may also commute between designated sites and nearby feeding areas. These species frequently travel in cohesive flocks and may exhibit localised avoidance of vertical structures in otherwise open landscapes, which can influence how they move through areas containing overhead lines. Evidence suggests that local avoidance zones extend tens to hundreds of metres

from infrastructure in some open-habitat bird species (Ref 38 and Ref 41), although responses are highly variable and many species readily cross overhead lines during routine movements.

5.9.5 Overall, the available baseline information suggests that there is a potential impact pathway with the following Habitats Sites within the ZoI for barriers to the movement of qualifying species:

1) Wash and North Norfolk Coast SAC;

2) The Wash SPA; and

3) The Wash Ramsar.

5.10 Summary

5.10.1 Based on the outcomes of the scoping and data gathering exercise, **Table 5.3** presents the Habitats Sites (including their proximity to the Scheme), linking impact pathways (as indicated in **Table 3.1** and **Table 3.2**) and relevant qualifying features that are considered further in this HRA.

Table 5.3 Habitats Sites, associated impact pathways and relevant qualifying features.

Habitats Site	Approximate distance from the Scheme Site Boundary	Potential Impact Pathways	Qualifying Features relevant to Impact Pathway
The Wash and North Norfolk Coast SAC	5.8 km to the north of the Scheme Site Boundary	• Disturbance displacement (construction)	• Otter
		• Water quality (construction and operation)	• Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Reefs • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Coastal lagoons • Harbour seal (*Phoca vitulina*)

Habitats Site	Approximate distance from the Scheme Site Boundary	Potential Impact Pathways	Qualifying Features relevant to Impact Pathway
			• Otter (*lutra lutra*)
		• Water quantity, level and flow (construction and operation)	The list of sensitive qualifying features is the same as for 'water quality'.
		• Introduction and spread of INNS (construction)	• Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Reefs • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Mediterranean and thermo-Atlantic halophilous scrubs *(Sarcocornetea fruticosi)* • Coastal lagoons
		• Atmospheric pollution (construction)	• *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Mediterranean and thermo-Atlantic halophilous scrubs *(Sarcocornetea fruticosi)* • Coastal lagoons • Otter (dust deposition only)

Habitats Site	Approximate distance from the Scheme Site Boundary	Potential Impact Pathways	Qualifying Features relevant to Impact Pathway
		• Barriers to movement (construction)	• Otter
The Wash SPA/Ramsar	5.8 km to the north of the Scheme Site Boundary	• Loss of functionally linked habitat (construction)[4]	• Bewick's swan • Pink-footed goose • Golden plover • Lapwing • Whooper swan
		• Disturbance displacement (construction)	• Bewick's swan • Pink-footed goose • Golden plover • Lapwing • Whooper swan
		• Injury/mortality from overhead line collisions (operation)	• Bewick's swan • Pink-footed goose • Golden plover • Lapwing • Whooper swan
		• Water quality (construction and operation)[5]	All qualifying bird species of The Wash SPA/Ramsar.
		• Water quantity, level and flow (construction and operation)	All qualifying bird species of The Wash SPA/Ramsar.
		• Spread of INNS (construction)	All qualifying bird species of The Wash SPA/Ramsar.
		• Atmospheric pollution (construction)	All qualifying bird species of The Wash SPA/Ramsar.
		• Barriers to movement (operation)	• Bewick's swan • Pink-footed goose

[4] For the impact pathways 'loss of functionally linked habitat', 'disturbance displacement', 'injury/mortality from overhead line collisions' and 'barriers to movement', only qualifying species whose maximum foraging ranges overlap with the Scheme and that are likely to occur within and adjoining the Site Boundary are considered further.

[5] For the impact pathways 'water quality', 'water quantity, level and flow', 'spread of INNS' and 'atmospheric pollution', all SPA/Ramsar bird species are considered further because these impacts can extend to the Habitats Site boundary via the River Welland. Potential atmospheric pollution impacts could also extend far from the Scheme Site Boundary, depending on its construction phase Affected Road Network.

Habitats Site	Approximate distance from the Scheme Site Boundary	Potential Impact Pathways	Qualifying Features relevant to Impact Pathway
			• Golden plover • Lapwing • Whooper swan

6. Screening for Likely Significant Effects (LSEs)

6.1 Introduction

6.1.1 This section undertakes the screening for LSEs potentially arising from the Scheme. Each of the impact pathways highlighted in **Section 5** are discussed in turn and in relation to the relevant Habitats Sites.

6.1.2 The Scheme comprises four components, including the **Substation Works**, **S37 4ZM Overhead Line Works**, **S37 2WS Overhead Line Works** and **Exempt Overhead Line Works**. This section has considered all components of the Scheme in relation to each impact pathway, but only discusses those that have the potential to materially contribute to a relevant pathway. For example, the loss of functionally linked habitat would predominantly be associated with the **Substation Works**. In contrast, injury/mortality from overhead line collisions is only a potential pathway associated with the **S37 4ZM Overhead Line Works**, **S37 2WS Overhead Line Works** and **Exempt Overhead Line Works**. Where an impact potentially arises from all components, the assessment focuses on the Scheme as a whole, noting that individual components are still referred to where warranted.

6.2 Loss of Functionally Linked Habitat (Construction Phase)

The Wash SPA/Ramsar

Substation Works

6.2.1 The importance of functionally linked habitat is alluded to in Natural England's Supplementary Advice on Conservation Objectives (SACO) for The Wash SPA, which identifies that the extent, distribution and availability of suitable habitat (either within or outside the site boundary) for various qualifying species should be maintained. Due to their general suitability, the supporting habitats within the Scheme Site Boundary (arable farmland, wet grassland and the River Welland flyway) are considered to be functionally linked habitat for SPA/Ramsar birds. The **Substation Works** are the most important component of the Scheme that could result in the loss of functionally linked habitat, depending on levels of use by SPA birds, since these are associated with the greatest permanent habitat loss of approximately 8.4 ha. Several waterbird species of The Wash SPA/Ramsar (golden plover, lapwing, Bewick's swan, pink-footed goose, whooper swan, barnacle goose, white-fronted goose, greylag goose and bean goose) were scoped in for this impact pathway because their maximum foraging ranges overlap with the Site Boundary, implying that a significant proportion of the relevant qualifying populations could be relying on the affected habitat parcels.

Results of non-breeding bird data

6.2.2 To determine whether the Substation Works area is of importance for populations of SPA birds, surveys were undertaken to establish usage of the area of the Scheme by non-breeding birds, including SPA/Ramsar birds (see accompanying **Non-breeding Bird Survey Report**). This included a study area of 500 m surrounding the Scheme Site Boundary. The types of surveys undertaken include the following:

1) Monthly Vantage Point (VP) surveys at one location between November 2022 and March 2023 (inclusive), and between October 2024 and March 2025 (inclusive);

2) Monthly walked transects of the Site between December 2022 and March 2023 (inclusive), and October 2024 and March 2025 (inclusive);

3) Driven transects following publicly accessible roads in two months of early 2023 (January and March); and monthly between October 2024 and March 2025 (inclusive); and

4) Monthly nocturnal transect surveys between October 2024 and March 2025 (inclusive) to establish usage of the Site by nocturnal bird species (particularly SPA/Ramsar species whose maximum foraging ranges overlap with the Proposed Works, notably lapwing and golden plover).

6.2.3 **Table 6.1** summarises the relevant terrestrial SPA/Ramsar birds that were recorded within 500 m of the Scheme through the various survey types, and which were considered in the identification of functionally linked habitat. It is to be noted that this assessment focuses only on those qualifying species that were recorded within their established IRZs or maximum foraging ranges (in the case of lapwing and golden plover). SPA/Ramsar species were recorded along Transects T2N (lapwing, golden plover), W5 (lapwing, golden plover) and driveover transect WSD (golden plover only). All records of qualifying species were far below the 1% threshold of the relevant designated bird populations (**Table 6.1**) and were recorded infrequently. For example, the highest proportion of a designated population was recorded along transect W5 for golden plover (60 individuals; 0.25% of the population in The Wash SPA/Ramsar). Lapwing was only recorded in one month over winter. Golden plover was recorded in two months, with the second month only having one individual. These rare observations indicate that the fields within and immediately beyond the Scheme Site Boundary are not consistently used throughout the wintering period. It should also be noted that the closest of the bird records (12 lapwing along transect T2N) lie approximately 5.6 km from the SPA/Ramsar, placing these individuals within their foraging range but at the outer edge of the applicable IRZ.

6.2.4 The **Substation Works** of the Scheme will not result in the permanent loss of arable farmland that is considered to be important functionally linked habitat for SPA/Ramsar bird species. Therefore, it is concluded that there will be no LSEs of the Scheme on The Wash SPA/Ramsar regarding permanent functionally linked habitat loss, even in the absence of mitigation measures.

4ZM Overhead Line Works, 2WS Overhead Line Works and Exempt Overhead Line Works

6.2.5 The Scheme also encompasses several components that will involve works to existing or new overhead lines. For the **Exempt Overhead Line Works**, the existing

4ZM overhead line across the River Welland will be restrung. However, these works relate to existing electrical infrastructure and do not require the construction of new pylons. Therefore, the **Exempt Overhead Line Works** are not associated with a potential for functionally linked habitat loss.

6.2.6 While the Scheme will also involve the construction of short new sections of overhead line and associated pylons, this is very unlikely to lead to any significant permanent loss of supporting habitat. The **4ZM Overhead Line Works** and **2WS Overhead Line Works** will not result in LSEs on The Wash SPA/Ramsar regarding the loss of functionally linked habitat for the following reasons:

1) As highlighted above, there is no evidence from non-breeding bird surveys that the habitats encompassed by the Scheme Site Boundary (including the future pylons) support significant populations of SPA/Ramsar bird species;

2) Survey data collected for the Scheme and other National Grid projects show that qualifying birds are present in close proximity to existing overhead lines (and in some instances forage directly beneath them). This indicates that, while an initial temporary displacement effect of new overhead lines cannot be excluded, birds may become habituated to this type of infrastructure and utilise foraging/roosting habitat in close proximity to overhead lines;

3) The seven new pylons constructed to accommodate the new sections of overhead line will lead to a very small loss of potential supporting habitat beneath their footprints. The base width of each pylon will be approximately 20 m, resulting in a habitat loss of 400 m^2 per pylon. Overall, the total net habitat loss under the footprint of pylons is small and is not considered to have the potential for population-level impacts to SPA/Ramsar species, particularly when weighed up against factors (e.g. cropping and ploughing regimes) that will affect local habitat suitability over much larger spatial scales (Ref 45);

4) While the foraging behaviour of some open-habitat specialists (e.g. golden plover, lapwing) is potentially impacted by the presence of pylons, there is no conclusive scientific evidence for a permanent displacement zone surrounding these structures. Any observed avoidance of supporting habitats adjoining pylons is usually very localised (tens of metres), partial (reduced use, but not total abandonment), often temporary and frequently confounded with habitat change (e.g. inter-annual changes in the cropping regime of arable fields); and

5) Similar to natural boundary features alongside arable parcels (e.g. hedgerows, treelines), pylons would only be expected to impact sub-sections of supporting habitats with the remainder of such fields available for continued use.

In-Combination Assessment

6.2.7 Various developments have been short-listed for the in-combination assessment because they could result in cumulative functionally linked habitat losses together with the Scheme. This section discusses the relevant proposals in order to determine whether LSEs could arise in-combination.

Land west of Spalding Road and Land North West of High Road, Spalding

6.2.8 Two residential sites are considered in the in-combination assessment. Land west of Spalding Road was allocated in the South East Lincolnshire Local Plan (SELLP) for a

Sustainable Urban Extension comprising up to 676 dwellings. The site is located approximately 13 km from The Wash SPA/Ramsar and, therefore, falls within the precautionary maximum foraging ranges of golden plover, lapwing, Bewick's swan and pink-footed goose. Habitats present within the Scheme Site Boundary encompass some arable land, shrub and degraded grassland. However, the development parcel is sandwiched between the conurbations of Pinchbeck and Spalding, making it less suitable as supporting habitat for SPA/Ramsar birds. Furthermore, work undertaken for the SELLP determined that this allocation was not functionally linked to any Habitats Sites, including The Wash SPA/Ramsar. Therefore, it is considered that there is no feasible in-combination potential for important functionally linked habitat loss with this development.

6.2.9 Land North West of High Road, Weston, Spalding is a relatively small site approximately 9.9 km to the south east of The Wash SPA/Ramsar. While this falls within the foraging ranges for several SPA/Ramsar species, this site is sandwiched between Weston and the A151. Due to its disturbed setting, it is not deemed that this site provided suitable supporting habitat for SPA/Ramsar prior to the commencement of construction.

Boston Alternative Energy Facility

6.2.10 Boston Alternative Energy Facility is located adjacent to The Haven waterbody in Boston, approximately 3 km from The Wash SPA/Ramsar. The HRA undertaken for the development indicates that some habitat to be lost is functionally linked to The Wash SPA/Ramsar (particularly regarding redshank), but the affected habitat types are intertidal mudflats and saltmarsh. These habitats are different to the arable farmland and grassland to be lost under the Scheme footprint, such that there is no potential for in-combination habitat loss. Furthermore, it is noted that the development will deliver mitigation measures that entirely address its impacts on functionally linked habitat loss.

Beacon Fen Energy Park

6.2.11 The Beacon Fen Energy Park comprises 529 ha of solar arrays, BESS and underground connection to National Grid's Bicker Fen substation. While the development sits approximately 14.2 km from The Wash SPA/Ramsar at its closest, the solar array area, the main component of the development associated with potential bird supporting habitat loss, is situated over 20 km from the SPA/Ramsar. This is beyond the largest IRZ for any qualifying species of The Wash SPA/Ramsar (20km for pink-footed goose), indicating that no qualifying individuals would be using the solar array area. It is also noted that, with the exception of gadwall, bird surveys undertaken for the Shadow HRA of Beacon Fen Energy Park recorded no waterbirds on site. Therefore, no potential for in-combination functionally linked habitat loss will arise from this development.

WMEL

6.2.12 WMEL is a project to reinforce the high voltage transmission network between Lincolnshire and the East Midlands, which involve the construction of 60 km of new 400 kV overhead line between Weston Marsh and two new substations to the west (WMEL-A and WMEL-B). The construction of the two substations will result in the permanent loss of arable farmland, a valuable foraging resource for SPA/Ramsar birds. However, WMEL-A, the closer of the two substations, lies approximately 36.5

km from The Wash SPA/Ramsar. Given that this is far beyond the IRZs and precautionary maximum foraging ranges for any of the SPA/Ramsar birds potentially impacted by the Scheme, it is concluded that there will be no in-combination impacts with WMEL.

Heckington Fen Solar Park

6.2.13 The Heckington Fen Solar Park development comprises an area of 524 ha (largely arable farmland), with a large portion to be lost under the permanent footprint of its solar arrays. The accompanying Shadow HRA notes that the development is located approximately 14.5 km from The Wash SPA/Ramsar and considers the potential implications of supporting habitat loss for golden plover, lapwing and pink-footed goose. Wintering bird surveys undertaken in support of the scheme note that occasional small flocks of golden plover (peak count of 128) and lapwing (peak count of 318) were recorded within the survey area. No pink-footed goose were observed. While occasional use by golden plover and lapwing of this area was evident (irregular in nature and far below the respective 1% population thresholds), the Heckington Fen Solar Park HRA also states that the populations of these SPA/Ramsar species are maintained primarily by foraging resources within the Habitats Sites themselves (where food intake rates are reportedly four times higher). Overall, the surveys undertaken concluded that Heckington Fen Solar Park, which covers a much larger extent than the Scheme, will not result in the loss of functionally linked habitat both alone and in-combination.

Meridian Solar

6.2.14 To the south of the Scheme, Downing Renewables propose a solar farm and a 12-13 km long overhead line (Meridian Solar) that is planned to connect to a substation in the Weston Marsh area. The solar panels and associated BESS would be located in an area comprising approximately 1,100 ha, much of which will encompass arable land. This development is associated with its own potential for the loss of functionally linked habitat. Given the similar nature of the habitats impacted by Meridian Solar and the fact that the development lies even further from the SPA/Ramsar, it is considered that permanent functionally linked habitat loss is equally unlikely. Indeed, wintering bird surveys undertaken in support of that project, which will result in the loss of a much larger extent of arable farmland, indicate that there is no evidence of functional linkage of the wider arable landscape to the south of the Scheme to The Wash SPA/Ramsar.

Outer Dowsing

6.2.15 Outer Dowsing will involve the delivery of one onshore substation containing the electrical components for transforming the power supplied from the windfarm to 400kV. The substation comprises arable farmland to the north of the River Welland adjacent to the A10, approximately 2.7 km to the north west of the Weston Marsh Substation. Given that the permanent farmland loss associated with Outer Dowsing falls within the IRZs and foraging ranges of the SPA/Ramsar bird species discussed in this HRA, there is the potential for cumulative impacts with the Scheme. However, the HRA accompanying the DCO submission indicates that there will be no adverse effects of Outer Dowsing on The Wash SPA/Ramsar regarding habitat loss, both alone and in-combination. This conclusion was reached in relation to both lapwing and golden plover, and no mitigation measures were deemed necessary.

Grimsby to Walpole DCO

6.2.16 The Scheme is a standalone development being brought forward to advance the programme for the construction of the Weston Marsh Substation A and the required overhead line works to connect this new substation to the National Electricity Transmission System (NETS).

6.2.17 The proposed Development Consent Order (DCO) application for the Nationally Significant Infrastructure Project (NSIP) Grimsby to Walpole (GtW), proposes 140 km of new overhead lines and up to six new substations, including two at Weston Marsh. This DCO also includes provision for Weston Marsh Substation A. The DCO application is not anticipated to be submitted until 2027 with an anticipated construction start date of 2029 and completion date of 2033. However, the Outer Dowsing Offshore Wind Farm (ODOW), a 1.5GW wind farm located in the North Sea approximately 54 km off the Lincolnshire Coast, has an anticipated connection date of 2030. In order to meet this connection date, it is necessary for the Scheme to be delivered ahead of the Grimsby to Walpole DCO.

6.2.18 Given the delivery of five new substations, it is anticipated that GtW will result in the permanent loss of arable farmland and wet grassland. Two of GtW's proposed substations (i.e. new Weston Marsh Substation B and Walpole B) also fall within the IRZs of several qualifying bird species in The Wash SPA/Ramsar, most notably golden plover, lapwing and pink-footed goose. Non-breeding bird survey data for the habitats within and adjoining the aforementioned two new substations are being analysed and will inform any mitigation requirements for GtW, a development with a wider geographic extent than the Scheme. Preliminary data suggest that the habitats under the footprint of new Weston Marsh Substation B and Walpole B do not constitute important functionally linked habitat, making material in-combination effects with the Scheme very unlikely.

EGL3 and EGL4

6.2.19 The onshore element of EGL3 and EGL4 comprises buried high voltage electricity cables that run between the Lincolnshire coastline and connect to the electricity network at a new substation in the Walpole area (it is to be noted that this is the Walpole B Substation shared with the GtW Project discussed above). While a large portion of the development will not involve permanent habitat loss, loss of potentially suitable foraging habitat will occur under the footprint of the scheme's Walpole substation, as well as the two proposed converter stations (approximately 350 m by 250 m in extent; 8.8 ha). The closest converter station lies approximately 11.3 km from The Wash SPA/Ramsar, which also falls within the IRZs of the SPA/Ramsar bird species considered relevant to the Scheme (i.e. lapwing and golden plover). Bird survey data for the two proposed converter stations are not yet available, but preliminary data for the anticipated Walpole B substation suggest that it does not constitute important functionally linked habitat alone.

Summary

6.2.20 The spatial separation between these projects given the amount of available farmland outside the SPA/Ramsar is also relevant. These projects are dispersed across a very large area, leaving substantial tracts of unaffected farmland between each one. For example, the distances between the Substation Works (the Scheme component most relevant to functionally linked habitat loss), and Outer Dowsing and Meridian Solar are 2.7 km and 12.8 km respectively. Except for new Weston Marsh

Substation B, all other proposed substations for GtW lie much further away from the Substation Works. The permanent infrastructure elements (substation and two converter stations) associated with EGL3 and EGL4 also lie over 20 km from the Substation Works.

6.2.21 All projects assessed in-combination above fall outside the IRZs/maximum foraging ranges of relevant SPA/Ramsar birds, do not constitute important functionally linked habitat in their own right or deliver measures to mitigate their contribution to any cumulative habitat loss, meaning their contribution to any in combination effect will also be addressed. The following summarises the main conclusions of the in-combination assessment:

1) The populations of SPA/Ramsar birds recorded within and adjoining the Substation Works are very small (a maximum of 0.25% of the golden plover population and much smaller proportions for other species);

2) The records of SPA/Ramsar birds are occasional and not repeated across survey months;

3) The species recorded using the survey area disperse widely across the SPA/Ramsar hinterland, regularly move between agricultural fields and do not exhibit high fidelity to foraging sites;

4) The habitat type (i.e. arable farmland) to be lost is abundant and widespread around the SPA/Ramsar;

5) The extent of habitat loss resulting from the Scheme is small, particularly when compared to that of the other much larger solar farm projects; and

6) The habitat losses from the Scheme and in-combination projects have a wide geographic spread around The Wash SPA/Ramsar, with extensive residual areas of arable farmland available for foraging in the wider landscape.

6.2.22 Therefore, it is concluded that there is no potential for LSEs regarding permanent in-combination habitat loss associated with the Scheme.

Table 6.1 SPA/Ramsar non-breeding bird records for the area within 500 m of the Scheme, comprising the Year 1, 2024/25 wintering and driveover observational survey data.

Habitats Site	Qualifying species	IRZ (km)	Distance of closest bird record across all survey months to SPA / Ramsar boundary	Survey	Transect	Maximum monthly count	Percentage of qualifying population	Number of months with recorded presence	Evidence for functional linkage
The Wash SPA / Ramsar	Lapwing	5	5.6	Nocturnal non-breeding bird surveys Winter 2024/25	T2N	12	0.04	1	No – recorded number far below 1% of the qualifying population; no repeated presence
	Golden plover	5	5.6	Non-breeding bird surveys Winter 2024/25	T2N	1	<0.01	1	No – recorded number far below 1% of the qualifying population; no repeated presence
	Lapwing	5	6.1	Non-breeding bird surveys	W5	25	0.09	1	No – recorded number far below 1% of

Habitats Site	Qualifying species	IRZ (km)	Distance of closest bird record across all survey months to SPA / Ramsar boundary	Survey	Transect	Maximum monthly count	Percentage of qualifying population	Number of months with recorded presence	Evidence for functional linkage
				Winter 2024/25					the qualifying population; no repeated presence
	Golden plover	5	7.6	Non-breeding bird surveys Winter 2024/25	W5	60	0.25	1	No – recorded number far below 1% of the qualifying population; no repeated presence
	Golden plover	5	7.6	Driveover Observations Winter 2024/25	WSD	11	0.05	1	No – recorded number far below 1% of the qualifying population; no repeated presence

6.3 Disturbance Displacement (Construction Phase)

The Wash SPA/Ramsar

6.3.1 The qualifying breeding and wintering bird species in The Wash SPA/Ramsar are all sensitive to disturbance caused by human activities. Depending on the timing, nature, magnitude and duration of human activities, these can all result in the disruption of normal bird behaviours. If the level of disturbance is sufficiently great, the long-term viability of qualifying populations may be impacted. In SPA/Ramsar birds, disturbance can trigger temporary changes in roosting or feeding behaviour, increases in energy expenditure (due to increased flight), abandonment of nest sites and desertion of otherwise suitable supporting habitats. The main noise and visual disturbance impacts arising from the Scheme are anticipated to occur in the construction phase, especially those arising from very noise construction methods (e.g. impact piling) where these are required. The presence of construction personnel, plant and temporary structures in any stage of the construction phase also has the potential to result in visual disturbance to SPA/Ramsar birds utilising the wider landscape within and surrounding the Scheme.

6.3.2 Disturbance to SPA/Ramsar birds is considered to be most important within designated site boundaries (i.e. the geographic areas that are most important in providing key sustenance to the qualifying populations). However, the Scheme is situated far beyond a precautionary 500 m noise and visual disturbance impact zone surrounding The Wash SPA/Ramsar. Therefore, there will be no LSEs of the Scheme regarding visual and noise disturbance to qualifying individuals within this Habitats Site.

6.3.3 However, as highlighted in Natural England's SACO for the SPA, disturbance must also be a key consideration where significant numbers of qualifying birds utilise off-site supporting habitats (or functionally linked habitats). The SACO for The Wash SPA stipulates that '*such disturbing effects can for example result in changes to* [behaviours]… *(both within or outside the designated site boundary where appropriate).* As highlighted in the previous sections, The Wash SPA/Ramsar is designated for mobile waders and waterfowl that routinely use habitats beyond the site boundary, particularly those associated with large off-site travel distances and strong associations with arable farmland/wet grassland such as lapwing, golden plover, geese (e.g. pink-footed goose) and swans.

6.3.4 Clearly, the construction works required for the Scheme will inevitably result in noise and visual disturbance to a band of potentially suitable supporting habitat adjoining the Scheme Site Boundary. However, as highlighted in **Paragraph 6.2.2** and **Table 6.1**, the available non-breeding bird survey data do not support the notion that the habitat out to 500 m from the Scheme Site Boundary is important functionally linked land to The Wash SPA/Ramsar. Therefore, it is concluded that there will be no LSEs of the Scheme on The Wash SPA/Ramsar regarding disturbance displacement, even in the absence of mitigation measures.

In-Combination Assessment

6.3.5 Various other developments within the relevant IRZs and maximum foraging ranges of bird species in The Wash SPA/Ramsar are proposed. For example, Meridian Solar comprises an area of approximately 1,100 ha, much of which will encompass arable land that is suitable to SPA/Ramsar birds. Further large-scale developments

adjoining habitats suitable for SPA/Ramsar birds include Beacon Fen Energy Park and Heckington Fen Solar Park. If these solar farms were to be delivered over the same timeframe as the Scheme, there would be the potential for in-combination disturbance impacts to SPA/Ramsar birds using the wider surrounding arable landscape. Similarly, there is the potential for temporary disturbance to SPA/Ramsar birds using functionally linked habitats adjoining the Outer Dowsing (onshore element only), EGL3/EGL4 and GtW developments, much of which traverse arable farmland and, to a lesser extent, wet grassland. However, where significant abundances or assemblages of qualifying birds are shown to use habitats within a 500 m disturbance zone, these developments will need to deliver adequate measures (e.g. screening or use of noise dampeners on construction machinery) to mitigate disturbance impacts.

6.3.6 As highlighted by the non-breeding bird survey data discussed above, there is no evidence that the habitats adjoining the Scheme have an important functional link to The Wash SPA/Ramsar and, therefore, a contribution to disturbance impacts (even those that are immaterial alone) will not occur. By extension, this implies that there is no potential for in-combination disturbance impacts.

6.3.7 It should also be noted that the potential for in-combination LSEs regarding visual and noise disturbance in supporting habitats not meeting the threshold of important functionally linked habitat individually is inherently limited for the following reasons:

1) Even though multiple developments within the wider area surrounding The Wash SPA/Ramsar will occur, it is unlikely that the construction stages of all these developments will overlap. It is even less likely that construction activities with the highest noise profiles (e.g. piling) for these developments will all occur at the same time. Moreover, construction projects covering large spatial scales are typically phased, such that disturbance only occurs over short sections at any given point in time. As construction proceeds to the next area or phase, previously disturbed areas are no longer affected and become available for foraging again;

2) SPA/Ramsar birds using functionally linked habitats are routinely subject and habituated to visual and noise disturbance. Farming operations and the use of heavy machinery (e.g. tractors) forms an essential part of the fabric of arable farmland. Birds relying on affected fields will either remain despite disturbance or temporarily move to unaffected land parcels. The temporary construction works undertaken for developments are similar in nature and, therefore, will not significantly worsen the existing disturbance patterns experienced by birds; and

3) The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) defines that material disturbance (alone or in-combination) is present where this results in a changed local distribution on a continuing basis, changed local abundance on a sustained basis and/or reduced ability to survive, breed or rear their young. Even if some in-combination disturbance to lapwing, golden plover and pink-footed goose were to occur, this would not meet AEWA's definition of significant disturbance.

The Wash and North Norfolk Coast SAC

6.3.8 The Wash and North Norfolk Coast SAC is partly designated for otter, a predominantly nocturnal and mobile species that relies on shallow, inshore coastal waters and hydrologically connected freshwater tributaries. Indeed, freshwater bodies

in close proximity to coastal areas are crucial to enable them to rid their fur of salt. Furthermore, otter also rely on reedbeds (particularly for raising their young) and freshwater grazing marshes.

6.3.9 Generally, otter are considered to be highly sensitive to noise and visual disturbance, particularly in terrestrial habitats used for resting or breeding (e.g. couches, holts and natal dens). Otter have well developed senses of hearing and smell, making them susceptible to various types of disturbance such as the movement of construction operatives, presence of large vehicles and aural stimuli from noise-generating construction activities. Importantly, compared to humans and birds, otter are less sensitive to low frequency sounds which partly explains their frequent occurrence in the built-up environment. Notwithstanding this, any human activities can disrupt their innate foraging, breeding and resting behaviours. For example, their ability to exploit suitable foraging or breeding grounds may be hindered by high noise levels and visually disturbing elements, effectively displacing them from otherwise suitable habitats.

6.3.10 Due to the low maintenance activities required for overhead lines, disturbance displacement is primarily an impact pathway associated with the construction phase of the Scheme. Potentially significant negative disturbance impacts on qualifying otter populations must be adequately considered by any construction projects, including the Scheme.

6.3.11 The main freshwater bodies in close proximity that are likely to be of relevance to the SAC otter population are the River Welland and River Glen. While the Scheme is traversed by various smaller drainage ditches, these habitat features are unlikely to reliably hold sufficient water volumes to support adequate prey populations for otter. The freshwater bodies in close proximity to the Scheme that will be of highest importance to the SAC otter population are the River Welland and River Glen, which lie relatively far from some of the works elements that are likely to result in prolonged high noise levels (e.g. the Substation Works; the indicative location of the new Weston Marsh Substation A is located approximately 1 km from the River Welland).

6.3.12 Some other elements of the construction works (e.g. conductor stringing) may be undertaken much closer to the riverine corridors, but these will be undertaken at height and are associated with relatively low noise profiles. Therefore, it is considered that a large portion of the construction works are associated with an immaterial disturbance potential to qualifying otter. Depending on the final location and construction methodology chosen for the new pylons (the latter may be pad and column, mini pile or tube pile depending on ground conditions), it was considered that pylon construction is associated with the highest potential for noise disturbance to SAC otter.

6.3.13 Otter surveys of relevant habitat features have been undertaken and are summarised in the **Otter and Water Vole Survey Report**. The data indicate that there was one potential holt in each of the Survey Areas covering the 4ZM Overhead Line Works and 2WS Overhead Line Works respectively. However, internal inspections indicate that both holes have collapsed with rat-sized burrows within. Two potential otter resting places (one a pollarded willow with a large internal cavity and one in an area of reedbed) were recorded in the Survey Area of the Exempt Overhead Line Works. However, more detailed inspections indicated that the cavity in the pollarded willow is too small for otter and no further field signs of otter were present. Two potential resting places within the Survey Area of the Substation Works were also concluded

not be suitable for or used by otter. Overall, it is concluded that otter are not using the watercourses and adjoining habitats present in the Scheme.

6.3.14 Therefore, LSEs of the Scheme on the Wash and North Norfolk Coast SAC regarding disturbance displacement to qualifying otter can be excluded. This impact pathway is screened out from AA.

In-Combination Assessment

6.3.15 The preceding assessment demonstrates that there are no established and/or active otter habitat features within or adjoining the Scheme Site Boundary. Therefore, the Scheme will not result in material disturbance to the Wash and North Norfolk Coast SAC otter population or contribute to any in-combination disturbance effect. Other developments that are hydrologically connected to the SAC and fall within a typical home range of otter, will need to undertake their own otter surveys and deliver disturbance mitigation where this is deemed necessary.

6.4 Injury/Mortality from Overhead Line Collisions (Operational Phase)

The Wash SPA/Ramsar

6.4.1 As highlighted in the previous section, the qualifying bird species in The Wash SPA/Ramsar are all mobile and expected to routinely travel beyond the designated Scheme Site Boundary to access important foraging and roosting habitats. A key prerequisite for mobile bird species is the opportunity for unimpeded commuting corridors between roosting and foraging areas. Natural England's SACO for The Wash SPA identify the connectivity with supporting habitats as a key attribute for all qualifying species, with a target to '*maintain safe passage of birds moving between roosting and feeding areas.*' This is critical to adult fitness and survival, particularly in the context of birds having to replenish nutritional reserves prior to their migration to summer breeding grounds.

6.4.2 High voltage transmission lines, such as the S37 Overhead Line Works delivered for the Scheme, represent well-documented obstacles to bird flights that potentially result in collisions and mortality of birds. While overhead line collisions are generally relatively rare events, due consideration to this impact pathway must be given in relation to potential population-level impacts. Various published research articles indicate that not all bird species are at equal risk of injury/mortality due to collisions. For example, large and less manoeuvrable species such as swans, geese and cranes are most susceptible to negative interactions with powerlines, with 'poor fliers' (e.g. grouse, pheasant and rail) also being at risk. The Wash SPA/Ramsar is designated for large-bodied species (e.g. Bewick's swan, pink-footed goose, dark-bellied brent goose, golden plover and others), such that bird collisions are events with potential negative impacts on this Habitats Site.

6.4.3 Moreover, it should be noted that the Scheme falls within 20 km of The Wash SPA/Ramsar, the IRZ that has been established for pink-footed goose. A portion of the area within which overhead line works will be delivered also falls within 10 km of the SPA/Ramsar, which includes the IRZs for the following additional species: greylag goose, whooper swan, brent goose, golden plover and lapwing.

4ZM and 2WS Overhead Line Works

6.4.4 The 4ZM and 2WS Overhead Line Works both fall well within the IRZs for several qualifying species of The Wash SPA/Ramsar including pink-footed goose, Bewick's swan, whooper swan, golden plover and lapwing. Therefore, the sections of new overhead line, once operational, will encompass additional obstacles within the wider landscape to bird flights to/from The Wash SPA/Ramsar.

6.4.5 There were six species recorded in flight in the area, which are either qualifying features (pink-footed goose and brent goose) and/or an assemblage feature (whooper swan, greylag goose, lapwing and golden plover), with overlapping IRZs. Apart from lapwing and golden plover, the numbers of flights of these species were relatively small with only one flight each for pink-footed goose, brent goose, whooper swan, and greylag goose. No records on the ground or in flight were noted for Bewick's swan, white-fronted goose, or bean goose. Flights for lapwing and golden plover were relatively modest in both wintering periods, with birds seen most months in flight.

6.4.6 The qualifying species identified above differ in their likely susceptibility to overhead line collisions:

1) Whooper swan – Very high sensitivity; their large body size and high wing loading results in limited manoeuvrability that makes it harder to detect and avoid the thin earth wires. Typical flight heights are often at similar altitudes than transmission conductors, resulting in more 'bird seconds' at risk height. Swans often fly in flocks and at low light levels, both of which are risk factors that elevate collision risk.

2) Pink-footed goose, greylag goose and brent goose – High sensitivity; also have large body size, high wing loading and resulting limited aerial manoeuvrability. All species display flocking behaviour, which is particularly pronounced for pink-footed goose. All three species, especially pink-footed goose, also exhibit crepuscular commuting behaviour (i.e. commuting at dusk/dawn when reduced light levels are present). Overall, these species are considered to have high sensitivity, but possibly less than swan species depending on flight behaviour and local context.

3) Golden plover and lapwing – Moderate sensitivity; smaller body size than swan and goose species, resulting in reduced wing loading and increased capacity to avoid flight obstacles. Data from the academic literature indicate that these species may experience occasional collisions, but at much lower expected numbers than geese or swans (Ref 46). Both species exhibit flocking behaviour, a parameter that is a key factor in determining collision risk.

6.4.7 During the Vantage Point (VP) surveys, flights at risk height were recorded for various bird species, most of which were not qualifying species of The Wash SPA/Ramsar or occurred at considerable distances beyond their identified IRZs (and were, therefore, determined to be non-qualifying birds of the wider landscape).

6.4.8 The new sections of overhead line feeding into the substation are under 2 km in length, which is very short particularly when compared to the consented and much longer existing 4ZM and 2WS overhead lines. Moreover, the 4ZM and 2WS Overhead Line Works will also involve the removal of approximately 1.5 km of the existing 4ZM and 2WS overhead lines, implying that the net increase in conductors only equates to approximately 0.5 km. Of the additional length, a proportion is the

downlead to the substation, which is below the recorded flight height for recorded qualifying species in this area. This net increase in overhead lines is so small that the error in any collision risk assessment model undertaken (noting there are no approaches accepted for transmission lines) would 'overshadow' the relative increase in any collision risk predicted for individual SPA/Ramsar bird species.

6.4.9 Furthermore, while qualifying birds are clearly transitioning through the wider arable landscape surrounding the Scheme (see paragraph above), no significant functional linkage for terrestrial habitats was established based on non-breeding bird survey records.

6.4.10 Based on the information presented above, it is considered that no Collision Risk Assessment for the Scheme is needed. It is concluded that the 4ZM and 2WS Overhead Line Works of the Scheme will not result in LSEs on The Wash SPA/Ramsar regarding injury/mortality from bird collisions.

Exempt Overhead Line Works

6.4.11 The closest portion of the Exempt Overhead Line Works crosses the River Welland to the east of Surfleet Sea's End, approximately 6.24 km from The Wash SPA/Ramsar and well within the IRZs of the waterbird species discussed above. However, while regular bird flights along the River Welland corridor were recorded in VP surveys, the Exempt Overhead Line Works only encompass the restringing of existing conductors, such that no net additional collision risk will be introduced here.

6.4.12 Moreover, it should be noted that that double bundles (in this case twin redwood) will be replaced with triple bundles (triple araucaria). Triple conductors represent a larger, more visible obstacle to in-flight birds than double wires, meaning they are associated with lower collision risk. Therefore, if anything, the Scheme is likely to improve the current baseline situation. It is concluded that the Exempt Overhead Line Works of the Scheme will not result in LSEs on The Wash SPA/Ramsar regarding injury/mortality from bird collisions.

In-Combination Assessment

6.4.13 It is noted that there will be other developments, particularly those involving electrical transmission infrastructure, within the IRZs of relevant qualifying species from The Wash SPA/Ramsar. Of particular note are Meridian Solar (to the south of the Scheme) and GtW (a wider overhead line development within which the Scheme is situated), which will connect into the new Weston Marsh Substation A via their own overhead line. However, these development proposals will need to undertake their own collision risk assessment and deliver adequate mitigation where substantial potential impacts have been identified. The assessment undertaken above, concludes that there will be no likely significant effect, even one that is immaterial alone, of the Scheme regarding increased collision risk.

Environmental Measures

6.4.14 While no bespoke mitigation will be needed to address collision risk associated with the Scheme, bird diverters will be delivered as a positive environmental measure. It is well known that the single most effective measure to reduce bird collision risk associated with overhead line is the incorporation of bird diverters at avian commuting hotspots. These will focus on the short existing section of overhead line that traverses the River Welland (approximately 50 m), with an additional

precautionary buffer of 50 m either side of the river. Academic research studies provide robust support for the effectiveness of line markers. For example, a large-scale, long-term experiment demonstrated that line marking resulted in >50% overall collision mortality incidences, and reductions of up to 92% in the mortality rates of some large-bodied species (Ref 47). Furthermore, a study in Slovakia found that the installation of bird diverters resulted in a decrease of up to 94% of mortality events (Ref 48).

6.4.15 The following approach for the delivery of bird diverters across the River Welland will be delivered:

1) Diverters should focus on the static earthwire, which is the thinnest, least visible and most commonly struck element of overhead lines;

2) Diverters should be spaced by about 5 - 10 m to provide sufficient geographic coverage of the identified commuting flyway;

3) Use of alternating colour combinations (e.g. black/white or yellow/black) to maximise the contrast under different light conditions; and

4) Use of FireFly-type markers as these reflect UV and contain passive or low-intensity illumination (including potentially those with glow-in-the-dark natural crystals), both of which outperform standard line markers/spirals in foggy, low light and overcast winter conditions. Glow-in-the-dark measures will help reduce the nocturnal collision risk associated with the existing River Welland crossing.

6.4.16 While there is no baseline data available that would enable a prediction of the net reduction in collision risk, the delivery of bird diverters constitutes an overall positive measure for qualifying birds traversing the wider Weston Marsh area. It is important to note that these bird diverters do not constitute mitigation to reduce a tangible negative impact of the Scheme but are delivered as a wider environmental enhancement to improve the existing baseline conditions for SPA/Ramsar birds. It is important to note that there will be no LSEs of the Scheme regarding injury/mortality from overhead line collisions regardless of this measure.

6.5 Water Quality (Construction and Operational Phases)

Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar

6.5.1 The prevailing water quality is a major determinant of the condition of Habitats Sites, both in relation to qualifying habitats (and associated faunal and floral communities) and bird species. There is one SAC within the ZoI of the Scheme, the Wash and North Norfolk Coast SAC, that is sensitive to changes in ambient water quality. In the case of the Scheme, water quality impacts from construction activities may lead to the release of non-toxic (e.g. sediment) and toxic (e.g. fuels, oils, solvents, lubricants and others) pollutants into freshwater bodies that are hydrologically linked with the SAC.

6.5.2 However, negative water quality impacts are not only relevant to SAC habitats and species, but also to SPA/Ramsar bird species that rely on supporting habitats with hydrological linkages to development proposals. Natural England's SACO for The Wash SPA highlight several water quality parameters that have the potential to

impact supporting habitats and qualifying birds themselves, including turbidity, DO concentration and contaminant level. For example, in relation to aqueous pollutants the target for the SPA is to '*reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels.*' Many of the pollutants for which Environmental Quality Standards (EQS) have been set will not be released in the construction phase of the Scheme, but the SACO nonetheless provide a good overview of the sensitivity of the SAC.

6.5.3 A typical cascade of bottom-up ecological impacts is exemplified by changes in turbidity levels. An increased turbidity can arise from sediment washed into watercourses from land sources, such as construction works. Prolonged changes in turbidity influence the amount of light penetrating the water column, impacting primary production and nutrient levels in resident communities. Turbidity changes can also trigger biological impacts, such as reducing the ability of fauna to forage or breathe. This includes potential impacts to fish health, clogging of filtering organs of suspension feeders and affecting seabed sedimentation rates. For visual predators, such as some SPA/Ramsar birds and SAC otter, high turbidity can reduce the ability to detect and capture prey items. While harbour seal are able to successfully forage in areas of poor visibility, the type and abundance of their typical prey species can be impacted. High turbidity brought about by increased sedimentation rates can in turn lead to a drop in DO concentrations, especially in warmer months. Low DO can result in sub-lethal and lethal impacts on fish, epifauna and infaunal communities, all of which can affect the overall condition of designated habitats.

6.5.4 The Wash and North Norfolk Coast SAC is also sensitive to the episodic or prolonged release of aquatic contaminants, which may impact habitat communities and individual qualifying species directly. Generally, the target for aquatic pollutants is to reduce them to levels equating to High Status according to the WFD. However, this target usually relates to specific contaminants that are unlikely to be released by the Proposed Works, including polybrominated diphenyl ether (PBDE), mercury, benzo(b)fluoranthene, perfluorooctane sulphonate (PFOS), tributylin and others. Typical contaminants released in the construction phase of developments include oils, solvents and paints, for which no specific targets are set in the SACOs of the SPA and SAC. Notwithstanding this, due to their likely impacts on ecological receptors, their accidental release to the aquatic environment must be minimised through the adoption of adequate safeguarding measures.

6.5.5 The qualifying breeding and wintering birds in The Wash SPA/Ramsar are not directly sensitive to water quality impacts. The main impact of a deteriorating water quality would be exerted via indirect effects on the foraging resources of birds. For example, reduced water quality is likely to change the composition of epifaunal and infaunal communities, which may mean that the abundance of preferred prey species is reduced. Furthermore, many waders and seabirds are visual hunters and might find it more difficult to detect/capture prey in turbid conditions.

Construction Phase

6.5.6 For the Scheme the only likely hydrological pathway to the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar is via the River Welland (at a flowpath distance of 6.2 km). When considering all relevant infrastructure elements and associated construction works required for the Scheme, the closest features with the potential for material water quality impacts are the proposed pylon working areas, the closest one located approximately 18 m west of the River Welland. The proposed

substation lies approximately 1 km east of the River Welland, which would require considerable overland flow for construction phase pollutants to reach the river. However, the area of the Scheme is also permeated by various streams, dykes and drainage ditches. These may only be hydrologically connected to the River Welland intermittently in particularly wet conditions, but a hydrological link between all parts of the Scheme and the river is assumed here as a precaution.

6.5.7 Surveys have confirmed evidence of otter presence within drains that are hydrologically connected to the Scheme. For example, two otter holts were recorded along the New Cut Drain to the north of the Scheme Site Boundary. This drain, which will be permanently diverted to accommodate some of the infrastructure, runs in close proximity to several works areas including the new substation. Another otter holt was identified in close proximity to the Environmental Mitigation Area alongside the New Cut Drain, although this is unlikely to be impacted due to the directionality of the prevailing flow and no polluting works required in this area. Notwithstanding this, the available evidence indicates that many of the drains traversing the boundary of the Scheme have the potential to support qualifying otter.

6.5.8 While the Scheme will encompass a wide range of infrastructure elements and construction works, not all will pose an equal threat to the prevailing water quality. The following elements of the construction phase represent the key areas of concern:

1) Topsoil stripping will likely be required to facilitate the construction of bellmouths, access routes, construction compounds and substation/pylon working areas. The excavation of topsoil is associated with a high level of risk of aqueous sedimentation, particularly following intense rainfall events;

2) The foundations of pylons will be installed using pad and column, mini pile or tube pile methods. Regardless of the method used eventually, these will all involve some degree of excavation and concrete pouring. The use of concrete in construction works is one of the highest-risk construction activities for aquatic environments, particularly in relation to alkaline pollution. Wet concrete, cement slurry and wash water have very high pH of 11 - 13, which far exceeds the pH range that most freshwater organisms can tolerate (pH of 6.5 - 8.5). Sudden spikes in pH can kill aquatic invertebrates, damage fish gills and disrupt organismal ion balance. Concrete spills can also result in increased turbidity and the release of toxic chemical constituents (e.g. chromium, lead, zinc and other soluble salts);

3) Earthworks for the construction of permanent site access and the substation platform, including the establishment of temporary soil bunds for storing any excavated material; and

4) All elements of the construction phase listed in the preceding bullet points would involve the use of construction plant/equipment and may encompass the use of other toxic materials as required (e.g. paints, solvents, lubricants and others). The inadequate maintenance and refuelling of construction machinery has the potential to result in leakages and spillages of toxic materials into the environment. Furthermore, poorly controlled storage of hazardous substances could result in contaminated runoff entering receiving watercourses, such as the River Welland.

6.5.9 To limit the potential for water quality impacts in the construction phase (particularly in relation to sedimentation), temporary drainage systems will be delivered to address

issues arising from soil excavation, installation of working areas and compounds. Temporary drainage systems typically encompass the following features:

1) Perimeter cut-off drains – shallow channels around the upslope perimeter of construction compounds to divert clean water and prevent it from becoming contaminated;

2) Internal dirty-water collection drains – shallow channels within the compound (potentially lined with geotextile, stone or proprietary drainage units) to collect contaminated water from hardstanding, plant areas, material storage and concrete works;

3) Silt fencing/check dams – measures used for slowing flow and controlling gross sediment along dirty water drains, often in the form of silt fences, straw bales and stone dams);

4) Settlement ponds and tanks – main treatment element designed to hold contaminated water for long enough to allow for fine sediment to settle. These may include excavated ponds/lagoons, modular settlement tanks or containerised treatment units. Typically, they are lined to prevent ground infiltration, adequately sized to allow for rainfall events and have easy access to enable desilting. The drainage design for the Scheme will also consider Sustainable Drainage Systems (SuDS) measures;

5) Oil interceptors – established means for capturing hydrocarbons and preventing oil sheen from entering aquatic habitats. Often used in combination with settlement tanks where plant is refuelled/parked and at generator compounds; and

6) Controlled discharge point – final pipe or channel outfall for water impacted by construction activities, where discharge is slowed, non-erosive and visually inspectable.

6.5.10 A construction phase **Surface Water Drainage Strategy** for the Scheme has been developed (see following discussion on water quantity, level and flow). Many elements included therein are relevant for mitigating potential water quality impacts. It is important to note that any measures delivered to avoid / minimise water pollution are required to comply with legislative drivers that prevent a deterioration of water quality in the wider environment, irrespective of the presence of Habitats Sites. The required compliance with the Water Environment (Water Framework Directive) Regulations 2017 and Environmental Permitting (England and Wales) Regulations 2016 mean that these measures do not constitute mitigation in the context of HRA and can be taken into account at the Screening stage.

6.5.11 To minimise the risk of aquatic pollutants and sediment reaching surface watercourses (e.g. the River Welland), the construction phase attenuation systems will comprise three sequentially linked basins, including a sediment forebay, main attenuation area and outlet zone. Each basin will be vegetated using a native grass seed mix to promote pollutant adsorption and nutrient uptake. Additionally, intervening stone/earth weirs will promote the settlement of sediment and aquatic pollutants as the water migrates between basins. It is also of note that, where possible, the attenuation basins will be situated outside Environment Agency Flood Zones 2 and 3, as well as historic flooding extents. This will significantly decrease the

likelihood that flooding events within the Scheme would wash aquatic pollutants into the surrounding environment.

6.5.12 SuDS features to improve the water quality of runoff will not be limited to the attenuation basins. It is proposed that swales will be installed alongside the temporary haul roads and access tracks. This will ensure that a portion of water cleaning will occur directly at source, with further treatment then taking place downstream in the attenuation basins.

6.5.13 The **Outline CEMP** identifies further measures that will be delivered in the construction phase of the Scheme to minimise impacts on the water environment. The following are some of the measures with the highest importance for reducing water quality impacts:

1) W02 – For open cut watercourse crossings and installation of vehicle crossing points, good practice measures will include but not be limited to, where practicable:

   a) reducing the working width for open cut crossings of a main or ordinary watercourse as far as practicable whilst still providing sufficient safe working area;

   b) installation of a pollution boom downstream of open cut works;

   c) the use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens as required;

   d) readily available spill kits and straw bales readily at all crossing points for downstream emergency use in the event of a pollution incident;

   e) the use of all static plant, such as pumps, in appropriately sized spill trays;

   f) prevention of refuelling of any plant or vehicle within 15 m of a watercourse;

   g) prevention of storing of soil stockpiles within 15 m of a main river;

   h) inspection of all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and

   i) reinstatement of the riparian vegetation and natural bed of the watercourse, using the material removed when appropriate, on completion of the works and compacting as necessary. If additional material is required, appropriately sized material of similar composition will be used.

2) W03 – Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Natural substrate will be provided through temporary watercourse crossings culverts; and

3) W04 – Where watercourses are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary spanned bridges. Once the temporary culvert is installed, the area above the temporary culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials, and people. Temporary culverts will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions and kept free from debris. Where used, temporary bridges will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross

the bridge. Trenchless methods will be used where feasible, and if open-cut is unavoidable, working width will be minimised, flows isolated with flume pipes or over-pumping, silt controls installed, and works will be scheduled during low-flow periods to reduce sediment disturbance…;

4) W05 – The contractor(s) will comply with all relevant consent conditions regarding de-watering and other discharge activities. This will particularly be with regard not only to volumes and discharge rates, but also to water quality (particularly suspended solids, pH and hydrocarbons) and will include discharges to land, water bodies or third-party drains/sewers. It is assumed that temporary discharges generated from dewatering activities, for example, around pylon bases and in underground cable sections, would be made to ground, rather than to watercourses. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents;

5) W06 – The Scheme will incorporate appropriate surface water drainage measures into its final design for the haul roads, access tracks, works compounds and laydown areas so that they do not lead to a significant increase in flood risk. Access roads (and working areas) in the floodplain are to be as close to ground level as possible (a slight raised surface, relative to the adjacent land, is often required to allow for drainage). This is to minimise the loss of floodplain storage volumes associated with raised structures such as raised access roads, working areas and associated topsoil stockpiles. Cross drainage would be provided as necessary at topographic low points. Stockpiles would be located outside of the undefended floodplain as far as reasonably practicable. Stockpile impacts in the floodplain, where unavoidable, will be mitigated through appropriate positioning (e.g. aligned parallel with flow pathways), leaving gaps and cross-drainage…; and

6) W11 – Appropriate control of runoff from working areas will be achieved through implementation of a Drainage Management Plan (DrMP) for the construction phase. The DrMP will use sustainable urban drainage systems (SuDS) principles, promoting infiltration of runoff wherever possible and specifying appropriate treatment and attenuation storage to ensure any discharges to watercourses are uncontaminated and limited to greenfield rates. The DrMP will cover all aspects of construction works and temporary infrastructure. Drainage measures will be phased to be completed before the commencement of earthwork operations, in a specific area, and will be retained until the drainage system of the Scheme is fully operational, or site restoration works are completed. This will include the temporary diversion of existing agricultural drainage around working areas, if required, followed by reinstatement on completion of works. At this stage of the design process, preliminary work has already been done to identify runoff treatment and attenuation requirements for temporary access tracks and working areas associated with overhead line construction, including defining potential locations of water treatment areas and discharge outfalls. Further work is required to develop drainage strategies for substations, considering arrangements for both construction and operational phases of the Scheme.

Operational Phase

6.5.14 The Scheme will not be permanently manned and is designed for low maintenance, such that the volume of sewage generated in the operational phase will be negligible.

However, a cesspool with a minimum capacity of 9,000 l will be provided to store sewage generated in the Amenity Building. This sewage will be tankered away for emptying at a licensed facility as part of infrequent maintenance operations.

6.5.15 Adequate pollution control measures will be delivered for the diesel generator proposed in the welfare area. The generator will be situated in a reinforced concrete bund and fitted with an intelligent sump pump system (including a full retention oil separator). Both the oil separator and sump pump will be fitted with alarms for the event of a significant oil spill.

Conclusion

6.5.16 As highlighted earlier, it is important to note that the construction phase protection measures will be deployed to protect the water quality in the wider aquatic environment, regardless of the presence of and providing incidental benefit to Habitats Sites. Overall, given that water quality protection measures will be delivered to safeguard the aquatic environment, it is concluded that the Scheme will not result in LSEs on the Wash and North Norfolk Coast SAC, and The Wash SPA/Ramsar regarding water quality in the construction and operational phases. This impact pathway is screened out from AA.

In-Combination Assessment

6.5.17 Moreover, these mitigation measures will also address any contribution of the Scheme to in-combination water quality impacts, ensuring that no residual potential for in-combination effects remains. Other developments that are hydrologically connected to the Wash & North Norfolk Coast SAC and The Wash SPA/Ramsar will also need to address their construction and operational phase water quality impacts through the delivery of adequate mitigation measures.

6.6 Water Quantity, Level and Flow (Construction and Operational Phases)

Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar

6.6.1 Both SAC habitats and SAC/SPA/Ramsar species are sensitive to changes in water quantity, level and flow, both within and outside designated site boundaries. There are two important considerations regarding water level changes in the context of the Habitats Sites that are relevant to the Scheme:

1) Changes in the freshwater levels of supporting habitats used by SPA/Ramsar species have the potential to negatively impact the ability of birds to forage, roost and/or loaf. For example, Natural England's SACO for The Wash SPA specify a target to '*maintain hydrological processes to ensure water availability in feeding sites, with visible areas of standing shallow water*' in relation to qualifying Bewick's swan. Furthermore, the hydrology within potential feeding sites is to continue to fluctuate by 5 - 15% each month; and

2) Alterations in the supply of freshwater to estuarine sites have the potential to impact qualifying habitats and species within designated site boundaries. For example, in qualifying saltmarsh a reduced/increased freshwater input may

trigger altered salinity gradients (potential direct community composition effects where saltmarsh is a qualifying habitat), as well as potential knock-on impacts on various water quality parameters, infaunal/epifaunal communities and the ability of SPA/Ramsar birds to forage adequately.

6.6.2 Generally, the Scheme does not require operational abstraction of process water, nor will it involve the discharge of large volumes of effluent. Such activities are typically associated with the largest magnitude of hydrological changes arising from developments. However, the following smaller scale construction activities and operational features of the Scheme may result in hydrological changes within Habitats Sites or functionally-linked habitats used by SAC/SPA/Ramsar species:

1) Dewatering activities undertaken in the construction phase to enable the safe installation/removal of infrastructure elements (e.g. this may be required prior to the construction of pylons); and

2) Increased runoff rates from impermeable surfaces associated with the Scheme, such as those in the new Weston Marsh Substation A.

6.6.3 Generally, it is considered that the magnitude of any water level changes associated with the Scheme would be minimal with only very localised impacts. Given the relatively long distance of the Scheme to the relevant Habitats Sites, there is no scope for direct water quantity, level and flow impacts within the designated site boundaries through surface runoff. The main linking pathway would be indirect through the River Welland, which feeds into the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar. However, any contributing effect of the Scheme would be exceedingly small when compared to natural variations in hydrological flows (e.g. tidal influences, inter-seasonal flow variability and extreme weather events, such as storms and droughts). Moreover, considering the small flow implications of the Scheme, it is not considered that these could sufficiently impact the abundance of prey species to result in population-level impacts of qualifying harbour seal, otter and birds.

6.6.4 Notwithstanding the above, hydrological impacts of the Scheme are considered further as a precautionary measure. The proposed new Weston Marsh Substation A is particularly relevant to the water quantity, level and flow impact pathway, because it represents the largest area of permanent hardstanding resulting in construction and operational phase surface runoff into the wider environment.

Construction Phase

6.6.5 To address construction phase runoff impacts, a **Surface Water Drainage Strategy** has been developed. As highlighted in relation to water quality impacts, any measures to reduce flow-related impacts are required to comply with general environmental legislation and, therefore, can be considered at the Screening stage of this HRA. The proposed drainage strategy is in accordance with the National Standards for Sustainable Drainage Systems (SuDS) released in July 2025, which promotes a natural approach to managing water that is integrated into development design. The Scheme comprises temporary stone haul roads, pylon working areas and construction compounds, all of which have the potential to increase surface runoff volumes into drains and ditches feeding into the River Welland, and ultimately into The Wash SPA/Ramsar and Wash and North Norfolk Coast SAC. The key risks in relation to surface runoff have been identified as follows:

1) Truncation of natural flow paths;

2) Increase in runoff volume;

3) Increase in runoff rate; and

4) Alteration in catchment area.

6.6.6 To mitigate the above risks and reduce the volume and rate of surface runoff to acceptable levels, several measures will be delivered, including the installation of watercourse crossings, attenuated storage, flow restriction devices and SuDS. For example, the attenuation basins will be delivered according to the following design parameters:

1) Storage capacity – designed to accommodate a 1 in 100 year flooding event (+ 25% climate change event); it should be noted that the storage capacity has been determined on the basis of the full width of the proposed haul road swathes, which is likely to represent an absolute worst-case scenario;

2) Restricted runoff rate – 1.4 l/s/ha or 1 l/s; and

3) Indicative depth – 1 m.

6.6.7 The attenuation basins will also adhere to the drainage hierarchy, which promotes the reuse of water and infiltration to ground over discharge to surface watercourses. Given the fact that the Scheme will not be able to reuse all surface runoff and discharge to ground is unlikely to be viable due to the presence of clay bedrock, discharge to a surface watercourse has been identified as the most likely solution. This will be designed to comprise a restricted flow rate and recessed headwall. Surface runoff will be delivered to the attenuation basins via track-side swales or, where this is unfeasible, drainage pipes.

6.6.8 As highlighted above, another potential flow-related impact pathway associated with the Scheme is the truncation and interruption of watercourses, which can obstruct the natural flow path of water to receptor locations. In practice this could result in the reduction of freshwater flows into rivers supporting SAC otter and SPA/Ramsar birds. To prevent this from occurring, the Scheme will deliver temporary watercourse crossings, such as culverts (watercourse width less than 3 m) and open span bridges (watercourse width greater than 3 m). Given that adequate crossings will be delivered, the Scheme will not impact on the natural flow paths of freshwater in the Weston Marsh area.

6.6.9 The construction of the new Weston Marsh Substation A will require the permanent diversion of the New Cut Drain. Importantly, the New Cut Drain is hydrologically connected to the River Welland and forms an integral part of the catchment that maintains overall flow volumes in the river. If not adequately sited (especially if it were diverted away from the River Welland), a permanent diversion of the drain would have the potential to alter its hydrological regime. The proposal for re-routing is currently under discussion with the South Holland Internal Drainage Board (IDB). IDBs are public bodies with legal powers who are responsible for managing water levels and flood risk in areas of low-lying land where water does not sufficiently drain on its own. Importantly, the South Holland IDB has a duty to balance drainage requirements with wetland and biodiversity objectives (including the Conservation Objectives of Habitats Sites). The involvement of the South Holland IDB will ensure

that the diversion of the New Cut Drain will not result in negative hydrological implications on the River Welland and connected Habitats Sites.

Operational Phase

6.6.10 An operational phase surface water drainage strategy is being prepared for the Scheme. This sets out that a discharge rate of 8 l/s will be delivered across the entire site, with flow being distributed across three main outfall points (diverted New Drain IDB watercourse, IDB watercourse R20 and a LLFA shallow ditch along Marsh Road). Based on its characteristics (namely a roof/paved area of 1.19 ha and remaining area surfaced with gravel), a total water storage requirement of 13,888 m^3 (for a 1 in 100-year event plus 40% climate change allowance). Nearly 50% of the required water storage will be required in the 300 mm free-draining gravel sub-base layer, with the remainder of the storage capacity provided in two SuDS ponds and swales.

6.6.11 Surface runoff will be directed towards the SuDS ponds and swales via a system of filter drains. These drains will contain check dams with orifices to maximise the amount of surface water storage within. Two SuDS ponds, Pond 1 and Pond 2 (located in the north east and south east of the new Weston Marsh Substation A respectively), will provide a storage of approximately 5,860 m^3 of water based on a 800 mm water depth and 300 mm freeboard. The final design of the SuDS ponds is a matter for the detailed design stage and will consider various factors, including cut / fill requirements, depths at the receiving watercourses and groundwater levels. The following two swales will be delivered for the new Weston Marsh Substation A:

1) One along the access track to manage road surface runoff; and

2) One to direct welfare area runoff through the mitigation area into Pond 2.

6.6.12 The design of the second swale will depend on mitigation area requirements and could act as a nature-based solution. On-site swales are important features that provide some of the runoff storage requirements, provided they include check dams to maximise storage capacity and reduce the velocity of flows to the receiving watercourses.

6.6.13 Various other features may be delivered across the Scheme to further reduce runoff rates, including permeable paving systems in the car parking area and geocellular storage tanks to attenuate runoff from gravel-surfaced areas (the latter can provide up to 95% void space for water retention).

Outline Construction Environmental Management Plan (Outline CEMP)

6.6.14 Furthermore, design and control measures will minimise the potential for water level changes and flood risk resulting from impermeable infrastructure elements of the Scheme in the construction and operational phases. The following encompasses a summary of these measures and identifies where these form part of the Outline CEMP:

1) Flood protection measures for the substation will be designed in accordance with National Grid internal guidance on substation flood resilience and consistent with planning policy requirements;

2) The substation will be served by surface water drainage systems that will attenuate runoff from impermeable surfaces to pre-development greenfield rates (this will consider the use of SuDS wherever possible);

3) If watercourse diversions are required to provide sufficient space for substation platforms, these will provide equivalent conveyance capacity to the existing watercourses (morphological features to promote aquatic biodiversity and maintain effective land drainage will also be delivered);

4) W02 – Use of good practice measures for open cut watercourse crossings and installation/removal of vehicle crossing points, such as the use of temporary lagoons/tanks/bunds and adequate reinstatement of the riparian vegetation;

5) W05 – Contractors will comply with all relevant consent conditions regarding dewatering and discharge activities, particularly in relation to discharge volumes and rates;

6) W06 – Appropriate surface water drainage measures will be incorporated into the final design for haul roads, access tracks, works compounds and laydown areas to ensure that there will be no additional surface runoff with the potential to cause flooding elsewhere. For example, temporary infrastructure elements (e.g. access roads and working areas) will be located as close to the ground as possible to minimise the loss of floodplain water storage volumes associated with raised structures;

7) W11 – Production of a Drainage Management Plan (DrMP) prior to commencement of construction works, which will ensure appropriate control of runoff volumes from working areas; and

6.6.15 The DrMP highlighted above will promote infiltration to the ground wherever possible and identify appropriate treatment and attenuation storage in the event of discharge into watercourses. Any drainage measures deployed will be fully operational prior to the commencement of any earthworks for the Scheme. These features will be retained until the permanent drainage system is fully operational or site restoration works are completed (whichever is delivered faster).

Conclusion

6.6.16 Given the long distance in flowpath to the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar, it is not considered that flow-related impacts will occur. Furthermore, standard measures will be deployed in the construction and operational phases to further reduce impacts on water quantity, level and flow. Given that these measures are delivered to protect the condition of the wider water environment, not solely put in place to address water flows (e.g. SuDS are also delivered as water quality solutions) and provide incidental protection to Habitats Sites, it is permissible to consider them at the Screening stage of HRA as they are not deemed to represent 'mitigation' in an HRA-related context. Therefore, given the delivery of the above, it is concluded that there will be no LSEs of the Scheme on the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar regarding changes in water quantity, level and flow in the construction and operational phases.

In-Combination Assessment

6.6.17 As highlighted in the section on the 'in-combination scope', various other development proposals will be coming forward in the hydrological catchment of the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar. The majority of these proposals will involve some degree of earthworks or introduce impermeable surfaces in their construction and operational phases, with the potential to affect hydrological flows within and outside the relevant Habitats Sites. However, as is the case for the Scheme, each of these planning applications will need to deliver their own SuDS approaches and drainage strategies to address flow-related impacts. By addressing its own impact potential, the Scheme will not contribute to any in-combination effects.

6.7 Introduction and Spread of INNS (Construction Phase)

Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar

6.7.1 Invasive species are defined as being non-native to the ecosystem under consideration and whose introduction is likely to cause significant environmental harm. These species can be introduced to or spread from an area with an existing infestation by various means, including the treads of tyres from construction vehicles, clothing/footwear of construction workers, inadequately maintained stockpiles and inadequate disposal of biological waste. All development projects are a potentially potent vector for INNS spread due to the frequent movement of construction vehicles, machinery and operatives across the landscape. In the absence of mitigation measures, INNS can easily be spread promoting their establishment in previously unaffected areas. Any construction project can introduce INNS if inadequate biosecurity protocols are followed, particularly when working within or adjoining rivers.

6.7.2 While the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar all lie considerably further from the Scheme than 100 m (the typical buffer zone used for INNS introduction), INNS spread is a particular concern where hydrological pathways are present. The area of the Scheme is hydrologically connected to these Habitats Sites via a system of dykes, channels, drainage ditches and the River Welland. Therefore, the introduction of INNS is further considered here as a precautionary measure.

6.7.3 There are several legislative drivers that address the harmful environmental impacts associated with INNS introduction, regardless of whether Habitats Sites are present in the vicinity. The purpose of this legislation is to prevent and reduce the negative economic and environmental impacts of these species. Key legislation identifies species for which mitigation is required, specifically:

1) Species listed in Schedule 9 of the WCA (Ref 38); and

2) Species of special concern and Schedule 2 species as per the Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (IASO) (Ref 43).

6.7.4 Taken together, the relevant legislation makes it an offence to plant, or otherwise cause to grow (including allowing to spread) listed species in the wild. If transported

off-site, there is a duty of care with regards to the disposal of any part of the plant that may facilitate establishment in the wild and cause environmental harm (as per the Environmental Protection Act 1990 (Ref 44)). While it is not illegal to have any of the identified INNS on a property, even when growing on managed land, the spread of Schedule 9 WCA species should be kept under control such that any relevant species are not having an appreciable negative ecological impact on habitats and their native biodiversity.

6.7.5 Desk studies and field surveys targeting INNS in the wider area around the Scheme were completed. These surveyed for any plant species, as well as relevant aquatic/terrestrial invertebrate and vertebrate species. The **Ecological Impact Assessment** highlights that various invasive non-native bird and mammal species were returned for the study area, although these are less important from an HRA perspective. The plant and aquatic INNS that were recorded are more important since their spread can be facilitated via hydrological pathways, such as the River Welland. These INNS include New Zealand mud snail (*Potamopygrus antipodatum*), a shrimp (*Gammarus tigrinus*), bladder snail (*Physella acuta*), Chinese mitten crab (*Eriocheir sinensis*), giant hogweed (*Heracleum mantegazzianum*) and Nuttall's waterweed (*Elodea nuttallii*). Field surveys confirmed the presence of New Zealand mud snail and a shrimp species (*Crangonyx pseudogracilis/floridanus*) within the ditches of the Scheme. The Outline CEMP accompanying the Scheme will include specific measures to prevent the spread of INNS.

6.7.6 The referenced legislative instruments make it mandatory for all development proposals to implement adequate biosecurity measures during construction works, irrespective of the presence of Habitats Sites. The following measures that will minimise the risk of INNS introduction/spread are included in the Outline CEMP of the Scheme:

1) B04 – To control the spread of invasive weeds in accordance with the Wildlife and Countryside Act 1981, any plant or machinery that has been used in areas contaminated with invasive species (both terrestrial and aquatic), such as Japanese knotweed and Himalayan balsam, will be thoroughly cleaned. Water used to clean vehicles, when necessary, will be discharged or emptied into the contaminated area to prevent the spread of the plant (through plant propagules, e.g. seeds, rhizomes, fragments). The area will be cordoned off to prevent any inadvertent spreading. Any plant material or soil contaminated with plant propagules if removed from a site is classified as controlled waste and will be disposed of in a suitably licensed landfill site, accompanied by appropriate Waste Transfer documentation, and must comply with Section 34 of the Environmental Protection Act 1990. Further detail will be set out in a Biosecurity Management Plan which would be prepared as part of the final CEMP.

6.7.7 Considering the measures identified in paragraph 6.7.6, which are required irrespective of and provide incidental benefit to Habitats Sites, LSEs of the Scheme on the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar regarding the introduction or spread of INNS can be screened out from AA.

In-Combination Assessment

6.7.8 The introduction and spread of INNS is an impact pathway that applies to all development proposals. Depending on up-to-date survey data, there is the potential of construction plant/operatives to introduce and/or spread INNS to sensitive Habitats Sites, particularly where construction occurs across large spatial scales. While the

Scheme are a relatively small-scale development proposal, several large-scale proposals exist in its vicinity (e.g. Meridian Solar and GtW) that have the potential to introduce or spread INNS to watercourses linking to the Wash & North Norfolk Coast SAC or The Wash SPA/Ramsar. However, each development proposal with linking hydrological pathways to said Habitats Sites will also need to deliver its own bespoke biosecurity measures to comply with general environmental legislation. Therefore, it is considered that there is no potential for in-combination effects to occur regarding the introduction/spread of INNS.

6.8 Atmospheric Pollution (Construction Phase)

Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar

Nitrogen, NO_x and NH_3 from Construction Traffic

6.8.1 The Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar all lie within the ZoI of the Scheme and are sensitive to atmospheric pollution. As a general rule, atmospheric pollution impacts to SAC habitat are direct, typically encompassing a fertilisation effect that may change plant and associated invertebrate community composition. In contrast, air quality impacts to SPA/Ramsar birds are indirect and mediated through changes in foraging resources or breeding habitat.

6.8.2 For example, Natural England's SACO for the Wash and North Norfolk Coast SAC highlight that several of its qualifying habitats are sensitive to air quality changes, including *Salicornia* and other annuals colonising mud and sand, Atlantic salt meadows, and Mediterranean and thermo-Atlantic halophilous scrubs. The target for these habitats is to '*maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System…*'

6.8.3 Air quality considerations in relation to SPAs/Ramsar are particularly important where qualifying species forage in saltmarsh habitat. The sensitivity of saltmarsh vegetation to nitrogen deposition largely depends on where this is located in an estuary or marine basin. Typically, the low-mid saltmarsh (which is subjected to frequent tidal inundation and high nutrient loadings) has much lower sensitivity to nitrogen than the mid-upper marshes. Overall, a nitrogen Critical Load (CL) range of 10-20 kg N/ha/yr has been established. Some SPA/Ramsar are sensitive to increase NOx and nitrogen deposition due to specific habitat requirements. For example, little tern and common tern (both qualifying features of The Wash SPA) depend on areas of bare ground for nesting. Excessive nitrogen deposition can promote the growth of graminoids, leading to a reduction in suitable breeding habitat for these species.

6.8.4 Air quality impacts may arise from various sources in the construction and decommissioning phases of the Scheme, including the movement of Heavy Good Vehicles (HGVs) to/from the Site, site operatives travelling to/from the Site in Light Goods Vehicles (LGVs, e.g. vans and cars) and the use of diesel plant for particular elements of the construction works.

6.8.5 Due to the relatively long distance to the designated site boundaries, construction traffic movements and operational diesel plant within the site of the Scheme will have no bearing on air quality within the SAC and SPA/Ramsar. Instead, any negative effects of vehicle emissions will depend on the location of construction traffic routes

(i.e. whether they fall within 200m of sensitive habitats within the SAC or SPA/Ramsar) and the volume of Heavy Goods Vehicle (HGV) flows on the identified routes.

6.8.6 According to the **Transport Statement**, the peak construction traffic volumes are forecast for the periods between September 2028 to August 2029 (for HGV movements) and February 2029 to January 2030 (for car and LGV movements). The vehicle trips generated by the Scheme were appraised for the HRA. For HGVs, the Annual Average Daily Traffic (AADT) flows generated in the peak period amount to 71 two-way trips. For cars and LGVs, the AADT flows generated in the peak period equate to 220 two-way movements. However, both AADT figures fall considerably below the relevant screening thresholds of 200 AADT for HGVs and 1,000 AADT for cars/LGVs. Furthermore, the AADT figures across the entire construction period will be notably lower than these peak period data, which represent an absolute worst-case scenario that will only apply for the short-term.

6.8.7 Moreover, it should also be noted that the A151, the road most impacted by construction traffic associated with the Scheme, lies far beyond 200 m from any qualifying/supporting habitats within the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar. This conclusion also applies to little tern and common tern, both breeding bird species of The Wash SPA/Ramsar. These species are particularly sensitive to nitrogen deposition, which can promote excessive vegetation growth and lead to the disappearance of bare ground (favoured breeding habitat for terns). However, there are no known breeding colonies of these species within 200 m of the road links potentially impacted by the Scheme.

6.8.8 It is concluded that any emitted air quality pollutants will not result in material negative ecological impacts and no quantitative air quality impact assessment for the Scheme will be needed. There will be no LSEs of the Scheme on the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar regarding construction/decommissioning phase vehicle emissions. This impact pathway is screened out from AA.

Dust Deposition

6.8.9 The construction phase of the Scheme will involve various activities that may generate dust. For example, any activity involving earthworks (e.g. the stripping of topsoil and excavations) can release dust into the air, which may then be deposited onto sensitive habitats and/or species. Dust can also be released from inappropriately stored arisings and construction materials, such as cement. Furthermore, dust may escape from HGVs carrying materials to/from construction sites, thereby potentially extending its zone of impact to ecological receptors further afield. Generally, dust deposition represents a potential risk under varying weather conditions. In dry weather and windy conditions, large clouds of dust may be carried to distant receptors more easily. In wet conditions dust may be washed into and affect the condition of aquatic habitats. For example, dust deposition will increase sedimentation and turbidity, with knock-on effects on water temperature and DO concentration.

6.8.10 Official guidance published by the Institute for Air Quality and Management (IAQM) identifies potential impact zones for dust deposition surrounding development sites. This guidance suggests that a detailed assessment of dust impacts is required where ecological receptors are present within 50 m of a construction site or the routes used by construction vehicles (up to 250 m from site entrances). However, on other

infrastructure developments Natural England have advised that the dust impact zone should be extended to 200 m as a precautionary measure.

6.8.11 There are various Habitats Sites within the ZoI of the Scheme that are sensitive to dust deposition, including the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar. However, all these sites lie considerably further from the Scheme (including any routes used by construction traffic) than 200 m. While parts of the Scheme are hydrologically connected to these Habitats Sites (e.g. there is a hydrological link between the location of the substation and The Wash SPA/Ramsar via the River Welland), it is considered hat no material amounts of dust originating from the Scheme would reach the designated sites via linking watercourses. The long flowpath distances from the Scheme to the relevant Habitats Sites would ensure that dust particles are sufficiently settled/dispersed before reaching the designated site boundaries. Both fine and coarse silts typically settle within a few hundred metres, and certainly at flow distances of over 6 km to the SAC and SPA/Ramsar. It is also noted that River Welland downstream of Spalding is tidal, which provides an oppositional force (including estuarine sediment influx) to any downstream movement of dust particles. Overall, therefore, LSEs of the Scheme on the Wash and North Norfolk Coast SAC and The Wash SPA/Ramsar regarding dust deposition impacts are screened out from AA.

6.8.12 It is noted that the Scheme lies in a rural, largely arable landscape which is likely to be relied upon by qualifying birds of the The Wash SPA/Ramsar. While dust generated in the construction phase of the Scheme could be deposited on adjoining arable fields, it is considered that the quality and suitability of arable farmland to SPA/Ramsar birds will not be impacted by short-term dust deposition. LSEs of the Scheme on the The Wash SPA/Ramsar regarding dust deposition impacts in functionally linked habitats are, therefore, also screened out from AA.

In-Combination Assessment

6.8.13 The above assessment identifies that the Scheme will not exceed the relevant HGV and LGV/car screening thresholds requiring air quality modelling alone. However, potential atmospheric pollution impacts also need to be assessed in-combination with other plans and projects. This requires a detailed understanding of the current baseline traffic scenario, the future baseline traffic scenario (i.e. the one accounting for all other planned developments) and the contribution of the Scheme to the forecast flows under the future baseline. In practice, this approach removes the current traffic volume from the assessment, which represents the traffic baseline and allows for a quantification of the net increase in traffic flows (both from the Scheme alone and the developments planned in the wider geographic area over a similar timescale).

6.8.14 No in-combination traffic modelling for the Scheme was undertaken. Considering in-combination projects and plans in the wider area surrounding the Scheme would certainly increase the anticipated HGV/LGV traffic volumes on the A151 towards the screening thresholds. However, given the relatively limited extent of the Scheme (both across spatial and temporal scales), it is considered that its contribution to any traffic increases will be localised and not involve an extensive Affected Road Network. Furthermore, as highlighted in the preceding sections, there are no identified important functionally linked habitats within 200 m of the A151. Even where significant populations of SPA/Ramsar birds are using arable farmland for foraging, this type of supporting habitat is not known to be sensitive to atmospheric nitrogen

deposition. Therefore, it is considered that there is no potential for in-combination effects to occur regarding atmospheric pollution.

6.9 Barriers to Movement

The Wash SPA/Ramsar (Operational Phase)

6.9.1 While the construction of new overhead lines is potentially associated with barrier impacts to SPA / Ramsar bird species, this impact pathway is typically considered to be of lower importance than collision risk or disturbance displacement. Barrier effects on birds are typically limited for the following reasons:

1) Birds can fly over or under, or entirely circumvent overhead lines;

2) Alternative flight routes (which might involve small deviations in flight trajectory) between designated site boundaries and functionally-linked habitats frequently exist; and

3) Birds are habituated to similar overhead line infrastructure in the wider geographic locale and are anticipated to adapt to new overhead lines.

6.9.2 For example, non-breeding bird surveys undertaken for the Scheme noted flightlines of birds (including SPA/Ramsar species) along the River Welland corridor, which is traversed by the existing 4ZM overhead line. This documents that birds are continuing to use the wider landscape around the Scheme despite the presence of electrical infrastructure. This also corroborated by survey data obtained for various other developments, which frequently report SPA / Ramsar birds foraging beneath or in close proximity to existing overhead lines. If overhead lines represented a material barrier to bird movements, there should be no observable habitat use by relevant species beneath or in habitats beyond overhead lines from SPAs/Ramsars.

6.9.3 Other factors should also be considered in the context of this impact pathway. As highlighted in Section 6.2, non-breeding bird surveys have yielded no evidence that the habitats underneath the footprint of the Scheme are used by significant bird populations of The Wash SPA/Ramsar. Therefore, any potential for barrier impacts to this SPA/Ramsar would be inherently limited. Furthermore, as documented in Section 6.4, the net increase in overhead lines attributable to the 4ZM Overhead Line Works and 2WS Overhead Line Works is approximately 0.5 km. This is an exceedingly small increase and does not have the potential for a material barrier effect. A large portion of the net new overhead lines will be angled to feed into the new Weston Marsh Substation A, an area which any birds traversing the wider arable landscape will be circumventing or overflying in any case.

6.9.4 Given the above, LSEs of the Scheme on The Wash SPA/Ramsar regarding barrier impacts can be excluded. This impact pathway is screened out from AA.

In-Combination Assessment

6.9.5 LSEs were excluded in the previous section because it was deemed that the Scheme will not be associated with a material barrier impact (i.e. it is not entirely absent, but can be considered de minimis even in-combination). Therefore, there is no potential for the Scheme to contribute to any in-combination effects. It should be noted that other developments proposing new overhead lines within the IRZs of relevant bird

species from The Wash SPA/Ramsar (e.g. Meridian Solar, GtW and WMEL) will also be required to undertake their own barrier impact assessment. This will be particularly important where no existing overhead line infrastructure is present (particularly across riverine flight corridors) and/or the net new length of overhead line is extensive.

Wash and North Norfolk Coast SAC (Construction Phase)

6.9.6 Otters are highly mobile and have large home ranges, whereby the boundary of Habitats Sites typically only encompasses a portion of their utilised habitats. As highlighted in Natural England's SACO, otter '*are dependent on the integrity of sections of river channel, riparian areas, freshwater still-waters, floodplains and transitional and marine waters that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet otters may use these areas for feeding and these will be critical for sustaining populations within the site.*' Considering this, it is very likely that watercourses and streams in hydrological connectivity with the Wash and North Norfolk Coast SAC that are traversed by the Proposed Works are routinely used by the designated otter population.

6.9.7 Regarding the connectivity within and to the site, the SACO also state that '*barriers such as roads, weirs, etc can generally increase the risk of harm to animals as they traverse or avoid them. If these barriers are considered a problem then mitigating measures could be taken.*' While watercourse crossings are not specifically mentioned in the document, it is well established that such crossings (particularly inadequately designed culverts) can result in detrimental impacts to otter by blocking commuting routes or forcing the animals to cross roads. In this context, the SACO also mention the increase in reported UK road deaths of otter, which amounted to approximately 1,000 animals between 2000/02-2009/10. Notably, Natural England have set a target to ensure that there are no significant artificial barriers to the safe passage and movement of otter into, within and away from the Wash and North Norfolk Coast SAC.

6.9.8 However, the Scheme will not deliver any temporary watercourse crossings to facilitate the movement of construction plant, equipment and personnel throughout construction areas. Therefore, there will be no LSEs of the Scheme on the Wash and North Norfolk Coast SAC regarding barriers to otter movement. This impact pathway is screened out from AA.

In-Combination Assessment

6.9.9 Given that the Scheme will not deliver any temporary watercourse crossings, it has no potential for contributing to an in-combination barrier effect (even one that is insignificant alone). Development proposals with the potential to reduce the ranging and commuting behaviour of qualifying otter, will need to deliver mitigation measures to address these impacts (e.g. protective buffers around riparian corridors and adequately sized culverted watercourse crossings including mammal ledges).

7. Summary

7.1.1 The Screening Report assessed the potential of the Scheme to result in LSEs and, where these have been identified, adverse effects on the integrity of Habitats Sites, including SACs, SPAs, Ramsar sites, cSACs and pSPAs. The following Habitats Sites were considered to fall within the ZoI of the Scheme based on a source-pathway-receptor approach:

1) The Wash SPA/Ramsar; and

2) Wash and North Norfolk Coast SAC.

7.1.2 Potential negative impacts of the Scheme, including all of its components, on these Habitats Sites were considered in relation to the following impact pathways:

1) Loss of functionally linked habitat (construction phase);

2) Disturbance displacement (construction phase);

3) Injury/mortality from overhead line collisions (operational phase);

4) Water quality (construction and operational phases);

5) Water quantity, level and flow (construction and operational phases);

6) Introduction and spread of INNS (construction phase);

7) Atmospheric pollution (construction phase); and

8) Barriers to movement (construction and operational phases).

7.1.3 However, following an appraisal of the Habitats Sites regarding the relevant impact pathways, it was concluded that LSEs of the Scheme can be excluded in relation to all pathways. Therefore, all elements of the Scheme were screened out from a more detailed AA.

7.1.4 Bird-related impacts, i.e. loss of functionally linked habitat, disturbance displacement and overhead line collisions, were considered to be the most prominent potential issues associated with the Scheme. However, non-breeding bird surveys do not show any evidence that the area within and immediately surrounding the Scheme Site Boundary regularly supports significant populations/assemblages of SPA/Ramsar birds. Therefore, it was also determined that construction phase disturbance in functionally linked habitat is not a material issue. Regarding injury/mortality from overhead line collisions it was determined that the net new lengths of overhead line delivered (0.5 km) will not meaningfully increase collision risk and any implications would not be ‘measurable’ in a collision risk assessment. It is noted that the Scheme will deliver bird diverters across the River Welland as a positive environmental measure (not as mitigation for an actual impact arising from the Scheme, as LSEs regarding injury/mortality from overhead line collisions were excluded). This will result in a net reduction in collision risk for SPA/Ramsar birds navigating the Weston Marsh area compared to the pre-construction baseline.

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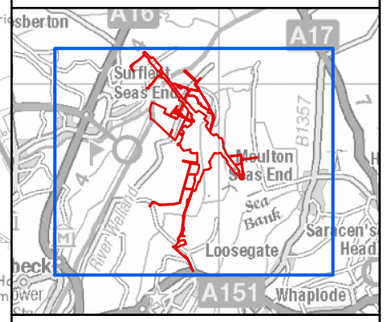
Figures

Figure 1 Scheme Site Boundary

LEGEND



Legend

- Scheme Site Boundary
- Substation Works Site Boundary
- S37 OHL Works Site Boundary
- Exempt Overhead Line Works Site Boundary
- S37 - 4ZM - OHL Works Site Boundary
- S37 - 2WS - OHL Works Site Boundary

Rev	Date	Description	GIS	Chk	App
A	07/05/2026	First Issue	MM	DF	DW

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Purpose: HABITATS REGULATIONS ASSESSMENT

Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

Document Title: FIGURE 1 SCHEME SITE BOUNDARY

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Figure 2 Habitats Sites within the ZoI of the Scheme

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Legend

- Scheme Site Boundary
- The Wash & Norfolk Coast Special Area of Conservation (SAC)
- The Wash Special Protection Area (SPA)
- The Wash Ramsar

Rev	Date	Description	GIS	Chk	App
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Purpose: HABITATS REGULATIONS ASSESSMENT

Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

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Appendices

Appendix A Background on Relevant Habitats Sites

A.1. The Wash SPA/Ramsar

Introduction

A.1.1. The Wash SPA/Ramsar comprises a wide range of habitats, including tidal rivers, estuaries, lagoons, sand- and mudflats, and deep channels surrounded by shallower waters. It is designated for a diverse assemblage of breeding and non-breeding bird species. Saltmarsh, shingle beaches and subtidal sandy sediments are also present. The Atlantic saltmarsh encompasses important foraging habitat for dark-bellied brent goose, wigeon, pintail and dunlin. Shallow coastal waters harbour small fish, which are the primary foraging resource of tern species. The intertidal sand- and mudflats support complex assemblages of polychaete worms and bivalve molluscs (e.g. cockles and mussels), a rich foraging ground for many wintering bird species.

A.1.2. Of note are the agricultural and pasture fields that provide important off-site foraging habitats for pink-footed goose and overspill resources for curlew, oystercatcher, dunlin and black-tailed godwit at high tide.

Qualifying Features

A.1.3. The site qualifies as an SPA (Ref 45) 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:

1) Bar-tailed godwit Limosa lapponica (wintering);
2) Bewick's swan Cygnus columbianus bewickii (wintering);
3) Black-tailed godwit Limosa limosa islandica (wintering);
4) Common scoter Melanitta nigra (wintering);
5) Common tern Sterna hirundo (breeding);
6) Curlew Numenius arquata (wintering);
7) Dark-bellied brent goose Branta bernicla bernicla (wintering);
8) Dunlin Calidris alpina (wintering);
9) Gadwall Anas strepera (wintering);
10) Goldeneye Bucephala clangula (wintering);
11) Grey plover Pluvialis squatarola (wintering);
12) Knot Calidris canutus (wintering);
13) Little tern Sternula albifrons;
14) Oystercatcher Haematopus ostralegus (wintering);
15) Pink-footed goose Anser brachyrhynchus (wintering);
16) Pintail Anas acuta (wintering);

17) Redshank Tringa totanus (wintering);

18) Sanderling Calidris alba (wintering);

19) Shelduck Tadorna tadorna (wintering);

20) Turnstone Arenaria interpres (wintering); and

21) Wigeon Anas Penelope (wintering).

A.1.4. The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season:

Assemblage qualification;

A.1.5. The Wash SPA supports an internationally important assemblage of waterbirds with 203,829 individuals, including avocet *Recurvirostra avosetta*, golden plover *Pluvialis apricaria*, lapwing *Vanellus vanellus*, ringed plover *Charadrius hiaticula*, black-tailed godwit *Limosa limosa islandica*, bar-tailed godwit *Limosa lapponica*, oystercatcher *Haematopus ostralegus*, grey plover *Pluvialis squatarola*, dunlin *Calidris alpina alpina*, knot *Calidris canutus*, sanderling *Calidris alba*, curlew *Numenius arquata*, whimbrel *Numenius phaeopus*, redshank *Tringa totanus*, turnstone *Arenaria interpres*, little grebe *Tachybaptus ruficollis*, cormorant *Phalacrocorax carbo*, whooper swan *Cygnus cygnus*, white-fronted goose *Anser albifrons*, pink-footed goose *Anser brachyrhynchus*, dark-bellied brent goose *Branta bernicla bernicla*, shelduck *Tadorna tadorna*, pintail *Anas acuta*, wigeon *Anas penelope*, teal *Anas crecca*, mallard *Anas platyrhynchos*, eider *Somateria mollissima*, common scoter *Melanitta nigra*, black-headed gull *Larus ridibundus*, lesser black-backed gull *Larus fuscus*, herring gull *Larus argentatus*, greater black-backed gull *Larus marinus*.

A.1.6. The site qualifies as a Ramsar site (Ref 50) for the following reasons:

A.1.7. Ramsar criterion 1 - The Wash is a large shallow bay comprising very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels.

A.1.8. Ramsar criterion 3 - Qualifies because of the inter-relationship between its various components including saltmarshes, intertidal sand and mud flats and the estuarine waters. The saltmarshes and the plankton in the estuarine water provide a primary source of organic material which, together with other organic matter, forms the basis for the high productivity of the estuary.

A.1.9. Ramsar criterion 5 - Assemblages of international importance: 292,541 waterfowl, non-breeding season.

A.1.10. Ramsar criterion 6 - species/populations occurring at levels of international importance:

1) Eurasian oystercatcher *Haematopus ostralegus* (passage);

2) Grey plover *Pluvialis squatarola* (passage);

3) Red knot *Calidris canutus islandica* (passage);

4) Sanderling *Calidris alba* (passage);

5) Eurasian curlew *Numenius arquata* (breeding);

6) Common redshank *Tringa totanus* (passage);

7) Turnstone *Arenaria interpres* (passage);

8) Ringed plover *Charadrius hiaticula* (passage);

9) Black-tailed godwit *Limosa limosa* islandica (passage);

10) Pink-footed goose *Anser brachyrhynchus* (wintering);

11) Dark-bellied brent goose *Branta bernicla bernicla* (wintering);

12) Common shelduck *Tadorna tadorna* (wintering);

13) Northern pintail *Anas acuta* (wintering);

14) Dunlin *Calidris alpina alpina* (wintering);

15) Bar-tailed godwit *Limosa lapponica lapponica* (wintering);

16) European golden plover *Pluvialis apricaria* (wintering); and

17) Northern lapwing *Vanellus vanellus* (wintering).

SPA Conservation Objectives

A.1.11. With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

A.1.12. 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;

1) The extent and distribution of the habitats of the qualifying features;

2) The structure and function of the habitats of the qualifying features;

3) The supporting processes on which the habitats of the qualifying features rely;

4) The population of each of the qualifying features; and

5) The distribution of the qualifying features within the site.

Environmental Vulnerabilities

A.1.13. The Natural England Site Improvement Plan (SIP108; Ref 51) identifies the following threats and pressures linked to the site:

1) Inappropriate water levels;

2) Public access / disturbance;

3) Siltation;

4) Fisheries: Recreational marine and estuarine;

5) Invasive species;

6) Inappropriate coastal management;

7) Fisheries: Commercial marine and estuarine;

8) Predation; and

9) Coastal squeeze.

A.1.14. The 2023 Supplementary Advice to the Conservation Objectives (SACO) goes into more detail on these vulnerabilities.

A.1.15. The Information Sheet on Ramsar Wetlands (RIS) does not identify any factors (past, present or potential) adversely affecting the site's ecological character.

A.2. Wash and North Norfolk Coast SAC

Introduction

A.2.1. The Wash and North Norfolk Coast SAC is a 107,718ha large site, comprising a range of qualifying habitats. For example, the SAC is the second-largest area of intertidal sand- and mudflats in the UK. The sandflats include both extensive fine sands and drying banks of coarse sands, which are home to large numbers of polychaetes, bivalves and crustaceans. Furthermore, the SAC is also designated for its extensive ungrazed and grazed saltmarshes. The Atlantic salt meadows at this site represent the largest single area of this habitat type in the UK, with swards often dominated by sea lavender *Limonium* spp. Typical lower and middle saltmarsh communities are also present, with some transitions into freshwater reed swamp, sand dunes, shingle beaches and mud / sandflats.

A.2.2. Aside from its internationally important habitats, the SAC is also designated for harbour seal and otter. Its extensive intertidal flats provide ideal conditions for harbour seal breeding and hauling-out. This SAC represents the largest colony of this seal species in the UK, with roughly 7% of its total population.

Qualifying Features

A.2.3. The site qualifies (Ref 52) under Article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

1) Sandbanks which are slightly covered by sea water all the time;

2) Mudflats and sandflats not covered by sweater at low tide;

3) Large shallow inlets and bays;

4) Reefs;

5) *Salicornia* and other annuals colonizing mud and sand;

6) Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); and

7) Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticose*).

A.2.4. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

1) Coastal lagoons (*)

A.2.5. Annex I priority habitats are denoted by an asterisk (*).

A.2.6. The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

1) Harbour seal Phoca vitulina

A.2.7. Annex II species present as a qualifying feature, but not a primary reason for site selection:

1) Otter *Lutra lutra*

Conservation Objectives

A.2.8. With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

A.2.9. 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:

1) The extent and distribution of qualifying natural habitats and habitats of qualifying species;

2) The structure and function (including typical species) of qualifying natural habitats;

3) The structure and function of the habitats of qualifying species;

4) The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;

5) The populations of qualifying species; and

6) The distribution of qualifying species within the site.

Environmental Vulnerabilities

A.2.10. The Natural England Site Improvement Plan (SIP108; Ref 51) identifies the following threats and pressures linked to the site:

1) Inappropriate water levels;

2) Public access / disturbance;

3) Siltation;

4) Fisheries: Recreational marine and estuarine;

5) Invasive species;

6) Inappropriate coastal management;

7) Fisheries: Commercial marine and estuarine;

8) Predation; and

9) Coastal squeeze.

A.2.11. The 2023 Supplementary Advice to the Conservation Objectives (SACO) goes into more detail on these vulnerabilities.

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