HABITATS REGULATIONS ASSESSMENT - VOLUME 1 - MAIN TEXT

Drax Bioenergy with Carbon Capture and Storage

The Planning Act 2008 – The Infrastructure Planning (Applications: Prescribed Forms and Procedure) – Regulation 5(1)(2)(g)

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1. INTRODUCTION

1.1. OVERVIEW

PURPOSE OF DOCUMENT

1.1.1. This report provides information to enable an appropriate assessment under the Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) of the Drax Bioenergy with Carbon Capture and Storage (BECCS) project, hereafter referred to as the 'Proposed Scheme'. The information provided is intended to support the Examining Authority (ExA) during their assessment of the implications of the Proposed Scheme for the National Site Network.

1.1.2. The National Site Network comprises a network of protected areas that include Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites. These cover the UK's most valuable and threatened species and habitats. Prior to the UK's departure from the EU, the National Site Network was referred to as Natura 2000. Protected areas within the National Site Network will hereafter be referred to as 'European Sites'.

1.1.3. The Proposed Scheme is located within the Existing Drax Power Station in Selby, North Yorkshire.

1.1.4. The Proposed Scheme is a nationally significant infrastructure project (NSIP), as defined within the Planning Act 2008, Section 14(1)(a) and 15(2). As such, it will be necessary to obtain a Development Consent Order (DCO) in order to construct and operate the Proposed Scheme. In addition, the Proposed Scheme falls under Schedule 1 paragraph 2(1) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as EIA Regulations 2017) – Thermal power stations and other combustion installations with a heat output of 300 megawatts or more. Therefore, the DCO Application is supported by an Environmental Impact Assessment (EIA).

1.1.5. This report cross-references reports, and assessments (and its associated figures and appendices) provided to support the DCO Application. Particular reference is made to ES **Chapter 6 (Air Quality)** (document reference 6.1.6), **Chapter 7 (Noise and Vibration)** (document reference 6.1.7), **Chapter 8 (Ecology)** (document reference 6.1.8), **Chapter 12 (Water Environment)** (document reference 6.1.12), and **Chapter 18 (Cumulative Effects)** (document reference 6.1.18).

STRUCTURE OF DOCUMENT

1.1.6. This report is structured as follows:

1. Section 1 (this section): introduction and overview of the Proposed Scheme and why a HRA Report is required.

2. Section 2: Methodology. This section of the report sets out the methods followed to assess effects of the Proposed Scheme on the National Site Network.
3. Section 3: Findings of HRA Screening. This section of the HRA Report reports the findings of the HRA screening. Any likely significant effects (LSE) predicted to occur to SAC, SPA, and Ramsar sites within the National Site Network are reported. Mitigation measures designed to avoid, reduce, or ameliorate LSE are not considered at the HRA screening stage, in accordance with the People Over Wind ruling (People over Wind and Peter Sweetman v Coillte, 2018).
4. Section 4: Information to Inform appropriate assessment. This section of the HRA report includes a detailed assessment of LSE identified at the HRA screening stage. The potential for adverse effects to the integrity of one or more designated sites within the National Site Network is determined. Where mitigation measures may avoid or reduce identified effects, these are considered at this stage. The potential for adverse effects on integrity is considered both for the Proposed Scheme alone, and for the Proposed Scheme in-combination with other plans and projects.

1.2. PROPOSED SCHEME DESCRIPTION

1.2.1. The Proposed Scheme would involve the installation of post-combustion carbon capture technology to capture carbon dioxide from up to two existing 660 megawatt electrical ('MWe') biomass power generating units at the Drax Power Station (Unit 1 and Unit 2). The installation of this technology constitutes an extension to the biomass Units 1 and 2 and is referred to as post-combustion carbon capture as the carbon dioxide is captured from the flue gas produced during the combustion of biomass in Units 1 and 2. The Proposed Scheme is designed to remove approximately 95% of the carbon dioxide from the flue gas from these two Units.

1.2.2. The carbon dioxide captured will undergo processing and compression before being transported via a proposed new pipeline for storage under the southern North Sea. Transport and storage infrastructure will be consented through separate applications submitted by other parties (not the Applicant) (see further details on the transport and storage infrastructure below).

1.2.3. It is intended that core items of the existing infrastructure at the Drax Power Station are re-used by installing and integrating the Carbon Capture Plant with onto existing infrastructure including existing power generating units (Units 1 and 2) for extraction of steam, re-using the cooling water systems, Main Stack and electrical connections.

1.2.4. The Proposed Scheme is made up of the following:

a. Up to two Carbon Capture Plants (one associated with Unit 1 and one associated with Unit 2) (Work No. 1D as described in Schedule 1 of the draft DCO), each made up of:

b. Flue gas pre-treatment section (Includes flue gas blowers (Work Nos. 1D(v) and (vi)), Gas / Gas Heat Exchangers (Work Nos. 1D(v) and (vi)) and Quench Columns (Work Nos. 1D(i) and (ii)));

c. One Absorber Column (Work Nos. 1D(i) and (ii));

d. Solvent Regeneration System (to include up to two Regenerators) (Work Nos. 1D(iii) and (iv));

e. Rich Solvent / Lean Solvent Heat Exchangers (Work Nos. 1D(iii) and (iv)); and

f. Additional Common Plant infrastructure and modification works to the Drax Power Station that are required to support and integrate with one or both Carbon Capture Plants including:

g. Solvent Storage and Make-up System (comprising up to four bunded solvent storage compounds) (Work No. 1D(vii) in Schedule 1 of the draft DCO);

h. Carbon Capture Wastewater Treatment Plant (Work No. 1D(viii) in Schedule 1 of the draft DCO);

i. Carbon Dioxide Processing and Compression Plant (Work No. 1E in Schedule 1 of the draft DCO);

j. Modification to the existing water pre-treatment plant (Work No. 1A in Schedule 1 of the draft DCO);

k. Modification, upgrade and extension of the existing cooling system and distribution of cooling water to the Proposed Scheme (Work No. 1B in Schedule 1 of the draft DCO);

l. Modifications to existing electrostatic precipitators (Work No. 3 in Schedule 1 of the draft DCO);

m. Modifications, upgrade and extension to existing power generating units' boilers and turbines for steam extraction and new steam processing infrastructure for distribution of process steam and electricity supply to the Proposed Scheme (Work No. 1C and Work No. 1F in Schedule 1 of the **draft DCO**); and

n. Integral electrical connections within the existing generating station and Carbon Capture Plant including upgrades to the existing electrical infrastructure and new electrical infrastructure for the secondary electrical supply to the Proposed Scheme (Work No. 1F in Schedule 1 of the draft DCO);

o. Infrastructure to transport compressed carbon dioxide from the Carbon Dioxide Processing and Compression Plant to storage and transport infrastructure operated by National Grid Carbon Limited (Work No. 2 in Schedule 1 of the draft DCO);

p. Minor vegetation and street furniture management and other works to facilitate access during construction (Work No. 4 in Schedule 1 of the draft DCO);

q. Additional supporting infrastructure and other works for the Proposed Scheme as set out in Section 2.2.49 (Work No. 3 in Schedule 1 of the draft DCO);

r. Temporary construction laydown areas (Drax Power Station Site Construction Laydown Areas and the East Construction Laydown Area) (Work No. 5 in Schedule 1 of the draft DCO); and

s. Habitat Provision Area (Work No. 6 in Schedule 1 of the draft DCO).

1.2.5. A full description of the Proposed Scheme is provided in **Section 2.2** of **Chapter 2 (Site and Project Description)** of the ES (document reference 6.1.2).

1.3. HABITATS REGULATIONS ASSESSMENT REQUIREMENTS

LEGISLATIVE DRIVERS

1.3.1. 'Competent Authorities' must assess plans and projects for their potential to cause Likely Significant Effects (LSE) on the National Site Network. Should Likely Significant Effects (LSE) be identified by the initial screening process it is necessary to further consider the effects by way of an 'appropriate assessment (AA)'. Where the plan or project may lead to LSE it must be subject to an AA to determine whether there will be adverse effects to any such sites. Any plan or project that would lead to adverse effects on the integrity of these site(s) cannot be permitted without meeting strict additional tests.

1.3.2. Overall, this process of assessment is known as Habitats Regulations Assessment and further details of the applicable legislative context are summarised below.

1.3.3. Following the UK's exit from the European Union (EU), The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 has resulted in amendments to the Habitats Regulations. Defra guidance (2021) states that Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in the UK no longer form part of the EU's Natura 2000 ecological network. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 have created a National Site Network on land and at sea, including both the inshore and offshore marine areas in the UK. The National Site Network includes:

a. Existing SACs and SPAs; and

b. New SACs and SPAs designated under these Regulations.

1.3.4. Any references to Natura 2000 in the 2017 Regulations and in guidance now refers to the new National Site Network.

1.3.5. Maintaining a coherent network of protected sites with overarching conservation objectives is still required in order to:

a. Fulfil the commitment made by government to maintain environmental protections; and

b. Continue to meet our international legal obligations, such as the Bern Convention, the Oslo and Paris Conventions (OSPAR), Bonn and Ramsar Conventions.

1.3.6. It is also a matter of government policy that Ramsar sites and potential SACs and SPAs are given the same protection as other European Sites, as described in para

181 of the National Planning Policy Framework. In that context, Ramsar sites have also been considered in this report.

RELEVANT NATIONAL PLANNING POLICY

Extant National Policy Statements

1.3.7. The following national planning policy is relevant to the HRA of the Proposed Scheme:

- **a.** Overarching National Policy Statement for Energy (EN-1); and
- **b.** National Policy Statement for Renewable Energy Infrastructure (EN-3)

1.3.8. The National Policy Statements (NPS) for Energy were first designated and published in 2011. The NPS for Energy are currently under review by the Department for Business, Energy and Industrial Strategy. The following draft NPS that were issued for consultation in September 2021 are relevant to the HRA:

- **a.** Draft Overarching National Policy Statement for Energy (EN-1); and
- **b.** Draft National Policy Statement for Renewable Energy Infrastructure (EN-3).

National Planning Policy Framework

1.3.9. The current version of the National Planning Policy Framework (NPPF) was published in 2021. It includes a variety of provisions and guidance in relation to the HRA process. This includes the provision at Paragraph 182, that '*The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats*[1] *site* unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site …'.

HRA POLICY AND GUIDANCE

1.3.10. The following policy and guidance relevant to the HRA process has been considered in the course of producing this assessment:

- **a.** Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.
- **b.** European Commission (2000b). Communication from the Commission on the Precautionary Principle
- **c.** European Commission (2018). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC

[1] Habitats Site in the NPPF refers to 'European Sites' as defined in this report.

d. Joint Nature Conservation Committee (JNCC) (2016). SAC and SPA Standard Data Forms and Ramsar Information Sheets. Available online: http://www.jncc.gov.uk/. Accessed [27/01/2022]

e. Tyldesley, D. and Chapman, C. (2013) The Habitats Regulations Assessment Handbook (July 2020 Edition) UK DTA Publications Ltd.

f. Department for Housing, Communities and Local Government (DHCLG) (2021). National Planning Policy Framework.

g. Chartered Institute of Ecology and Environmental Management (CIEEM, 2021) Advice on Ecological Assessment of Air Quality Impacts.

h. (Planning Inspectorate, 2017) Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects

STAGES OF HABITATS REGULATIONS ASSESSMENT

1.3.11. Guidance on the Habitats Directive (European Commission, 2000a) sets out the step wise approach which should be followed to enable Competent Authorities to discharge their duties under the Habitats Directive and provides further clarity on the interpretation of Articles 6 (3) and 6 (4). The process used is usually summarised in four distinct stages of assessment:

a. Stage 1: Screening: the process which identifies whether effects upon a European Site(s) of a plan or project are possible, either alone or in combination with other plans or projects, and considers whether these effects are likely to be significant;

b. Stage 2: appropriate assessment: the detailed consideration of the effect on the integrity of European Sites of the plan or project, either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function;

c. Stage 3: Assessment of alternative solutions: the process which examines alternative ways of achieving the objectives of the plan or project that avoid adverse effects on the integrity of the European Site(s); and

d. Stage 4: Assessment where no alternative solutions exist and where adverse effects remain: an assessment of whether the development is necessary for Imperative Reasons of Overriding Public Interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of the National Site Network.

2. METHODOLOGY

2.1. OVERVIEW OF SECTION 2

2.1.1. This section of the report sets out the methodology followed to identify potential LSE on European Sites. It also sets out the methodology followed to assess whether identified LSE, could lead to adverse effects on the integrity of European Sites.

2.1.2. Guidance from the European Commission (European Commission (2001)) recommends that HRA screening should include the following steps:

a. Step 1: Determine whether the plan or project is directly connected with or necessary to the management of the European Site;

b. Step 2: Describe the plan or project and any other plans or projects which, in combination, could result in significant effects on the European Site;

c. Step 3: Identify the potential effects on the European Site both alone and in combination with other plans and projects; and

d. Step 4: Assess the significance of any effects on European Sites.

2.1.3. The approach to each of these four steps is set out below.

2.2. METHODOLOGY FOR SCREENING LIKELY SIGNIFICANT EFFECTS

STEP 1: CAN THE PROJECT BE EXEMPTED FROM ASSESSMENT

2.2.1. Any project that is directly connected with or necessary for the management of any European Site(s) is does not require assessment under the HRA process. This is straightforward to assess, as it is simple to identify whether or not a plan or project is proposed for reasons related to the management of European Sites, or for other reasons.

STEP 2: DESCRIBE THE PLAN OR PROJECT AND ANY OTHER PLANS OR PROJECTS WHICH, IN COMBINATION, COULD RESULT IN SIGNIFICANT EFFECTS ON THE EUROPEAN SITE

2.2.2. During this step, the characteristics of the Proposed Scheme that could lead to biophysical changes to European Sites are described. Any other plans or projects with potential to contribute to in-combination effects are also described. Further detail on the in-combination assessment is provided below.

STEP 3: IDENTIFY THE POTENTIAL EFFECTS ON THE EUROPEAN SITE

2.2.3. During this step, the biophysical changes arising from the Proposed Scheme are examined, to identify how they could lead to change to European Site qualifying features. This impact pathway approach is useful in clearly linking the impacts of the Proposed Scheme to potential effects upon European Sites. Several sources of information will be considered when completing this assessment:

a. Information on the European Site(s) being assessed, including citation information on the qualifying interests;

b. The description of the Proposed Scheme including Primary Mitigation (i.e. measures that are integral to the design of the Proposed Scheme) relevant to avoiding or reducing impacts on any European Site(s) (as set out in **Chapter 2 (Site and Project Description)** of the ES.

c. The spatial extent over which the identified biophysical changes from the Proposed Scheme would occur (hereafter referred to as the 'Zone of Influence' (ZoI);

d. The locations where the boundary of European Sites overlaps with the ZoI of the Proposed Scheme;

e. The locations of any land outside the boundary of European Sites but within the ZoI of the Proposed Scheme, that could support the qualifying interests (habitats and species) of any European Site(s); and

f. Technical assessments presented in the Environmental Statement for the Proposed Scheme (document reference 6.1).

2.2.4. In accordance with the People over Wind Judgment (People over Wind and Peter Sweetman v Coillte, 2018) targeted measures to mitigate effects on European Sites will not be considered at the HRA screening stage. The People Over Wind ruling states that:

> *"…in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site."*

UK government guidance to Competent Authorities carrying out HRA (Department for Environment, Food & Rural Affairs, Natural England, Welsh Government, and Natural Resources Wales, 2021) further confirms this requirement. In relation to HRA screening, this guidance states that:

> *"At this stage, you should not consider any mitigation measures included by the proposer for the purpose of avoiding or minimising risk to a European site. These mitigation measures need to be considered at the appropriate assessment stage."*

STEP 4: ASSESS THE SIGNIFICANCE OF ANY EFFECTS ON EUROPEAN SITES

2.2.5. Potential LSEs will be assessed in relation to two main criteria:

a. Information on the qualifying interests of European Sites within the ZoI of the Proposed Scheme and their sensitivity to the identified impact pathways;

b. The conservation objectives for each qualifying interest, which if compromised would result in LSE to the qualifying interest(s).

2.2.6. Conservation objectives for European Site qualifying interests broadly comprise the following:

a. Maintain or restore the extent and distribution of qualifying habitats and habitats of qualifying species;

b. Maintain or restore the structure and function (including typical species) of qualifying natural habitats;

c. Maintain or restore the structure and function of the habitats of qualifying species;

d. Maintain or restore the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;

e. Maintain or restore the populations of qualifying species; and,

f. Maintain or restore the distribution of qualifying species within the site.

2.2.7. For the purposes of this assessment, Steps 3 and 4 are reported together in **Section 3.5 to 3.6** of this report.

ASSESSING EFFECTS IN-COMBINATION WITH OTHER PLANS AND PROJECTS

2.2.8. During screening, potential LSE on European Sites need to be considered both 'alone' and 'in-combination'. Where LSEs may arise from the Proposed Scheme alone, assessment of in-combination effects can be completed at the appropriate assessment stage. No in-combination assessment is required at the screening stage under this circumstance.

2.2.9. If an effect is identified that is not predicted to lead to LSE on any European Sites alone, it is necessary to undertake an in-combination assessment at the screening stage. This considers whether the non-significant effect from the Proposed Scheme may, in-combination with effects from other plans or projects, result in LSE on the European Site(s) concerned.

2.2.10. The way in which effects from the Proposed Scheme and other plans and projects could increase the risk of LSE to European Sites, are therefore considered in the HRA Screening. In-combination effects may contribute to increased impacts and hence effects on qualifying features relative to the Proposed Scheme alone. It is therefore important to carefully consider how other plans and projects may lead to effects on European Sites.

2.2.11. The in-combination assessment considers the short list of other plans and projects identified in the cumulative assessment (as set out in **Appendix 18.4** of **Chapter 18 (Cumulative Effects)** of the ES (document reference 6.3.18.4). The cumulative assessment of potential ecology impacts, and effects included assessment of the potential for each development to contribute to in-combination impacts on European Sites with the Proposed Scheme. The in-combination assessment draws upon and also informs the ecological assessment of cumulative effects, as set out in **Appendix**

18.4 of **Chapter 18 (Cumulative Effects)** of the ES and **Appendix 18.5** of **Chapter 18 (Cumulative Effects)** of the ES (document reference 6.3.18.5).

2.2.12. Where it can be demonstrated that the Proposed Scheme will have no appreciable impacts or effects on European Sites, in-combination assessment will not be required. This is because if the Proposed Scheme has no effects whatsoever, then there are no effects that could combine with effects from other plans or projects.

2.3. METHODOLOGY FOR COLLATING INFORMATION TO INFORM APPROPRIATE ASSESSMENT

APPROPRIATE ASSESSMENT METHODOLOGY

2.3.1. Where the potential for likely significant effects (LSE) cannot be excluded, it is necessary to complete an appropriate assessment. The purpose of this is to identify if the identified LSE could lead to adverse effects on the integrity of European Sites. As per the HRA screening stage, the potential for adverse effects on integrity must be considered for the Proposed Scheme both alone and in-combination with other plans and projects.

2.3.2. The appropriate assessment will involve a more detailed consideration of how identified LSE could affect the European Site qualifying interests and their conservation objectives. The conservation objectives provide a framework for assessment and information on how qualifying features may be adversely affected.

2.3.3. In England, the conservation objectives should be read in conjunction with the Supplementary Advice on Conservation Objectives ('SACO') published by Natural England. The supplementary advice sets out how the Conservation Objectives for each qualifying interest can be met, in relation to various different criteria. For example, SACO may set out the population size a qualifying interest species needs to reach in order to meet the Conservation Objective "maintain or restore the populations of qualifying interest species".

2.3.4. Where a Conservation Objective is being met, SACO provide advice on how the Conservation Objective can be maintained. Where a Conservation Objective is not being met, SACO provide advice on the steps needed to restore the qualifying interest concerned.

2.3.5. Ramsar sites do not have published conservation objectives. Sites designated as Ramsar Sites often share boundaries with SPAs and/or SACs. Where this occurs, the SAC/SPA conservation objectives for these sites are often relevant and will be referred to during assessment of the Ramsar site.

ASSESSMENT OF POTENTIAL ADVERSE EFFECTS ON INTEGRITY

2.3.6. European Site integrity is defined as 'the coherence of the site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the populations of the species for which the site is, or will be designated'. European Commission guidance (European Commission, 2018) sets out

that the assessment of adverse effect should focus on the achievement or otherwise of a European Site's conservation objectives.

2.3.7. The appropriate assessment section of this report includes an assessment of adverse effects that may arise from the construction, operation, and decommissioning of the Proposed Scheme. The identified LSE are examined in detail, to determine whether or not they could frustrate achievement of the conservation objectives for each qualifying feature.

2.3.8. The assessment of adverse effects will be informed by the wider assessment of the environmental impacts and effects of the Proposed Scheme. These provide useful information about how the receiving environment surrounding the Proposed Scheme is expected to respond to the biophysical changes arising from the Proposed Scheme. In particular, the following chapters of the Environmental Statement have informed the assessment:

a. **Chapter 2 (Site and Project Description)** of the ES;
b. **Chapter 6 (Air Quality)** of the ES;
c. **Chapter 7 (Noise and Vibration)** of the ES;
d. **Chapter 8 (Ecology)** of the ES;
e. **Chapter 12 (Water Environment)** of the ES; and
f. **Chapter 18 (Cumulative Effects)** of the ES, plus underpinning appendices.

KEY CASE LAW

2.3.9. This section of the report identifies key case law that has been considered in this HRA Report. It is not intended to be an exhaustive list, instead it highlights case law that is considered of particular relevance to the HRA of the Proposed Scheme.

People over Wind, Peter Sweetman v Coillte Teoranta (Case C-323/17)

2.3.10. The ''People over Wind'' judgment ruled that any measures added to achieve the purpose of avoiding or reducing harmful effects on a European Site(s) should not be considered at the screening stage. The Competent Authority can only consider such mitigation measures as part of an appropriate assessment.

2.3.11. The key part of the judgment is summarised in Paragraph 40 as "in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of measures intended to avoid or reduce the harmful effects of the plan or project on that site".

2.3.12. UK Government guidance (Department for Environment, Food and Rural Affairs, 2021) clarifies that measures which have been specifically added to achieve the purpose of avoiding or reducing its harmful effects on a habitats site should not be considered at the screening stage. However, features that are integral to the design or physical characteristics of the project that is being assessed, for example, the layout, timing and location of a scheme, may be considered at the screening stage.

2.3.13. In accordance with UK government guidance on the application of the People over Wind ruling, this HRA Report will only consider avoidance or mitigation measures, specifically added to avoid or reduce harmful effects on a European Site(s), during the appropriate assessment stage. Such measures will not be considered at the HRA screening stage.

Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu v College van gedeputeerde staten van Limburg and College van gedeputeerde staten van Gelderland (Cases C-293/17 and C-294/17)

2.3.14. The ‘’Dutch Nitrogen’’ cases established that: (Paragraph 126) “…it is only when it is sufficiently certain that a measure will make an effective contribution to avoiding harm to the integrity of the site concerned, by guaranteeing beyond all reasonable doubt that the plan or project at issue will not adversely affect the integrity of that site, that such a measure may be taken into consideration in the 'appropriate assessment…” and (Paragraph 130) “The appropriate assessment of the implications of a plan or project for the sites concerned is not to taken into account the future benefits of such 'measures' if those benefits are uncertain, inter alia because the procedures needed to accomplish them have not yet been carried out or because the level of scientific knowledge does not allow them to be identified or quantified with certainty”.

2.3.15. The cases established that ‘future benefits’ as referred to above include ‘autonomous measures’ i.e., measures delivered outside the scope of the Proposed Scheme, that would be expected to deliver beneficial outcomes to European Sites (for example strategic national level initiatives to manage nitrogen pollution, or local measures to limit recreational disturbance of European Site qualifying interest species). Such autonomous measures may only be taken into account where their benefits are certain at the time of the assessment.

2.3.16. In light of the above, The HRA Report will therefore consider the existence of conservation and / or autonomous measures only where the benefits are certain at the time of the assessment, and where certainty in their occurrence (beyond reasonable scientific doubt) can be assured. The HRA Report will also consider the effects of the Proposed Scheme on the total load of nitrogen deposition (and other relevant aerial emissions impact pathways) from the Proposed Scheme and other emitting plans and projects.

Compton Parish Council, Julian Cranwell and Ockham Parish Council v Guildford Borough Council, SoS for Housing, Communities and Local Government (2019), High Court of Justice, EWHC 3242 (Admin) CO/2173,2174,2175/2019

2.3.17. In the Compton case, the Court ruled in relation to exceedances of nitrogen deposition critical loads and NOx emissions, that, in arriving at a conclusion during appropriate assessment, that this:

‘could not be answered, one way or the other, by simply considering whether there were exceedances of critical loads or levels, albeit rather lower than currently. What

was required was an assessment of the significance of the exceedances for the SPA birds and their habitats…'.

This HRA Report will therefore, in accordance with the Compton ruling, consider the effects of likely impacts to the extent that it is possible to determine that there would be no adverse effects on the integrity of European Sites on the basis of potential for ecological change to qualifying interests and their associated Conservation Objectives, to arise.

CONSIDERATION OF MEASURES TO ADDRESS ADVERSE EFFECTS

2.3.18. Following the People Over Wind ruling referred to in paragraph 2.3.10, measures intended to avoid or reduce the harmful effects of a project on European Sites should only be considered at the appropriate assessment stage of the HRA process. Where required to address potential adverse effects on integrity, mitigation measures are therefore identified in the appropriate assessment section of this report.

2.3.19. Where mitigation measures are required, the appropriate assessment section of this report identifies how these would be secured. Where appropriate, reference is made to the following documents, which detail mitigation measures for the Proposed Scheme and how these would be secured:

a. Register of Environmental Action and Commitments (document reference 6.5);

b. Outline Landscape and Biodiversity Strategy (document reference 6.6);

c. Draft Lighting Strategy (document reference 6.7); and

d. Draft Development Consent Order (document reference 3.1).

EFFECTS IN-COMBINATION WITH OTHER PLANS AND PROJECTS

2.3.20. Where an in-combination assessment has been taken forward to the appropriate assessment stage following HRA screening, potential adverse effects on European Site(s) integrity must be considered. As for the assessment of the Proposed Scheme alone, this is a more detailed assessment than is carried out at the HRA screening stage.

2.3.21. In addition to considering Proposed Scheme mitigation, any targeted mitigation measures for European Sites being delivered by other plans and projects will be considered.

3. FINDINGS OF HRA SCREENING

3.1. OVERVIEW OF THIS SECTION

3.1.1. This section of the HRA report sets out the findings of the HRA screening. Those aspects of the Proposed Scheme that could trigger LSE on European Sites are described. Where LSE are identified, the impact pathways triggering them are described along with an initial consideration of how European Site qualifying interests and achievement of their conservation objectives could be affected.

3.2. HRA SCREENING STEP 1: CAN THE PROJECT BE EXEMPTED FROM ASSESSMENT

3.2.1. The Proposed Scheme would involve the installation of post-combustion carbon capture technology to capture carbon dioxide from up to two existing 660 megawatt electrical ('MWe') biomass power generating units at the Drax Power Station (Unit 1 and Unit 2). It is clear the Proposed Scheme is not directly connected with or necessary for the management of any European Site. The Proposed Scheme must therefore be subject to HRA under the Habitats Regulations ((SI2017/2012), 2017).

3.3. STEP 2: DESCRIBE THE PLAN OR PROJECT AND ANY OTHER PLANS OR PROJECTS WHICH, IN COMBINATION, COULD RESULT IN SIGNIFICANT EFFECTS ON THE EUROPEAN SITE

3.3.1. A summary description of the Proposed Scheme is provided in **Section 1.2** of this report. A detailed description of the Proposed Scheme is provided in **Section 2.2** of **Chapter 2 (Site and Project Description)** of the ES. The characteristics of the Proposed Scheme that could lead to biophysical changes to European Sites are set out below.

3.3.2. The biophysical changes that could result from the construction and decommissioning phases are considered to be similar, with the decommissioning impacts expected to be no worse than those occurring during the construction phase (as set out in **Section 2.5** of **Chapter 2** (Site and Project Description) of the ES. As such, one sub-section is provided below covering biophysical changes during the construction and decommissioning phases. A further sub-section is then provided which assesses potential biophysical changes arising during the operational phase of the Proposed Scheme.

3.3.3. Step 2 of the HRA screening process concludes with a description of the other plans and projects considered to have potential to contribute to in-combination effects with the Proposed Scheme.

CONSTRUCTION AND DECOMMISSIONING

Description of Key Characteristics

3.3.4. Construction of the Proposed Scheme is anticipated to take place between 2024 and 2029. There are slight differences in the programme of construction depending on whether the Option 1 or Option 2 construction programme (as set out in **Table 2.1** and **Table 2.2** of **Chapter 2 (Site and Project Description)** of the ES) is followed. Construction is predicted to start in quarter one 2024 for both options and finishes in either Quarter four 2029 (Option 1) or Quarter three 2029 (Option 2). Given the very similar programme for construction under either option, with construction activities confined largely to the existing Drax Power Station Site, there is no material difference between the two options in terms of potential effects on European Sites.

3.3.5. The majority of construction activities will be located within the existing Drax Power Station Site. Construction activities in these areas have limited potential to lead to biophysical changes relevant to European Sites. This is because the majority of the affected areas are comprised of hard-standing and existing structures and the distance of the Drax Power Station Site from the sites. Some limited extents of semi-natural habitats are present which would be removed during construction, largely focussed on the north of the Drax Power Station site.

3.3.6. In addition, a number of Construction Laydown Areas are proposed. These would be used to facilitate construction, for example provision of car parking and use for fabrication of construction materials.

3.3.7. The East Construction Laydown Area is located in a field to the east of Drax Power Station. It would be used for laydown of plant, equipment and materials, light fabrication, storage of topsoil from the area and as an overflow car park during construction. The land currently consists of arable fields surrounded by hedgerow and would be reinstated to a mixture of arable use with some habitat enhancements following completion of the construction period for both Units.

3.3.8. The Drax Power Station Site Construction Laydown Areas are made up of the following areas:

a. The existing northern site entrance car park, which would be maintained as car parking for construction workers;
b. A hardstanding area to the west of the car park which would be used for the Contractor Village (designated area for offices and welfare facilities);
c. An area to the north currently characterised as the woodyard. This area would be used for laydown and heavy fabrication;
d. The existing limestone and gypsum storage buildings which following cease of coal operation, would be redundant. These buildings would be used for covered laydown and fabrication; and
e. Six smaller hardstanding areas local to the BECCS construction, which would be used for laydown, fabrication and local construction.

3.3.9. For details of the location of the construction laydown areas, see **Figure 2.3 (Construction Laydown Plan)** (document reference 6.2.2.3)).

3.3.10. Land has been identified in the Order Limits to the north of the Drax Power Station Site for habitat and landscape enhancements; this area is referred to as the Habitat Provision Area. Habitat and landscape enhancements would comprise the provision of new hedgerows and infill planting to strengthen existing hedgerows and the creation/enhancement of habitats including a pond, tree planting, and species-rich grassland and scrub creation. No new infrastructure is proposed on this land and the existing productive agricultural land would not be significantly affected.

3.3.11. In addition to the Habitat Provision Area, which is within the Order Limits, the Proposed Scheme also includes Off-site Habitat Compensation Areas, outside the Order Limits. These are areas of land owned by Drax, that would be used for the purpose of ecological and landscape measures (not related to European Sites) and supporting the delivery of Biodiversity Net Gain. Delivery of these would be secured via S106 agreement, as set out in **Table 1.1** of the **Register of Environmental Actions and Commitments** (REAC) (document reference 6.5).

3.3.12. The **Outline Landscape and Biodiversity Strategy** (document reference 6.6) provided as part of the application details the locations of proposed habitat measures.

3.3.13. Minor works to street furniture and pruning of vegetation on roundabouts and overhanging roads will be required during construction. These works are expected to be required to facilitate delivery of Abnormal Indivisible Loads (AIL), as described in more detail in **Section 2.3** of **Chapter 2 (Site and Project Description)** of the ES. The AIL route is expected to make use of the A161, M62, A614, A645, and New Road to transfer AILs from the Port of Goole to the Site. Construction traffic is not expected to lead to any significant effects to ecological receptors including European Sites, given construction would take place over a maximum six year period. In addition and as set out in **Table 6.3** in **Chapter 6** (Air Quality) of Volume 1 of the ES (document reference 6.1.6.), local air quality impacts from construction traffic have also been scoped out of assessment, with no significant effects on local air quality predicted. None of the proposed construction traffic routes pass within 200m of any European Site, with the exception of a short stretch of the M62 which passes within 200 m of the upstream end of the Humber Estuary SAC, SPA and Ramsar and would likely be used by a proportion of HDV traffic accessing the Site (see **Figure 5.5 (HDV Routing**) in **Volume 2** of the ES (document reference 6.2.5.5)).

3.3.14. Physical interventions for the AIL route would take place along existing heavily trafficked roads and would comprise minor vegetation management equivalent to (but of a much-reduced extent relative to) routine maintenance of the soft estate of those roads. Some road furniture (e.g., road signs and traffic lights) would need to be temporarily moved or relocated. Given the setting and nature of the AIL works, these are not considered to have any potential to contribute to LSE on European Sites, either alone or in-combination with other aspects of the Proposed Scheme or other plans and projects. The AIL works are therefore not considered further in this report.

3.3.15. Specific details of decommissioning are not available at this time. Decommissioning would take place at least 25 years after the Proposed Scheme entered the operational phase. As set out above, decommissioning activities including demolition are not anticipated to lead to any additional or greater impacts than would occur during construction. Potential biophysical changes arising from construction and decommissioning are therefore considered together in the section below.

Biophysical Changes during Construction and Decommissioning

3.3.16. The following potential biophysical changes have been identified, that could lead to effects upon European Sites:

- **a.** Permanent or temporary loss and disturbance of habitats to facilitate construction activities and installation of BECCS and supporting infrastructure;
- **b.** Disturbance of species using habitats lost or disturbed during construction;
- **c.** Emissions of dust from construction activities;
- **d.** Increased sediment loading of aquatic habitats receiving drainage from construction areas;
- **e.** Accidental releases of water-borne pollutants such as hydrocarbons affecting water quality of aquatic habitats receiving drainage from construction areas;
- **f.** Increased noise and vibration levels arising from construction and decommissioning activities, e.g., increased vehicle movements, increased numbers of personnel on site, piling works; and
- **g.** Increased levels of visual disturbance arising from the presence of additional personnel and plant within construction areas.

OPERATION

Description of Key Characteristics

3.3.17. Operation is anticipated to run from 2027 for a period of at least 25 years. During operation, the Proposed Scheme is designed to remove approximately 95% of the carbon dioxide that would otherwise be emitted from flue gas of biomass Units 1 and 2.

3.3.18. This is achieved through the use of amine solvents. Through a series of chemical and heating/cooling processes, these enable the extraction of carbon dioxide from the untreated flue gas from Units 1 and 2. The untreated flue gas would be subject to the following processes to remove carbon dioxide:

- **a.** Flue Gas Pre-treatment – during this step untreated flue gas is cooled by a Gas / Gas Heat Exchanger before being passed through a Quench Column, which removes water vapour and other condensable components. Generated effluent is sent to the Carbon Capture Wastewater Treatment Plant. The remaining flue gas is then sent to the next treatment stage;
- **b.** The cooled untreated flue gas is passed through an Absorber Column. The Absorber Column contains an amine solvent, which reacts with the flue gas and

absorbs the carbon dioxide from it. The result is a carbon dioxide-rich solvent which is separate from the remaining, now treated, flue gas. This process will also generate effluent, which is sent to the Carbon Capture Wastewater Treatment Plant;

c. The treated flue gas is passed through the Gas / Gas Heat Exchanger, where it absorbs heat from pre-treatment flue gas entering the treatment cycle. The treated and re-heated flue gas is then emitted from the Main Stack. The carbon dioxide-rich solvent is then sent to the next stage of treatment;

d. The carbon dioxide-rich solvent solution is then heated and passed through Regenerators, which strips the solvent from the carbon dioxide. The process results in a high purity carbon dioxide stream and a carbon dioxide-lean solvent. The carbon dioxide-lean solvent then passes through the solvent processing system, which removes residual contaminants and replenishes lost solvent;

e. The solvent is then recirculated into the Carbon Capture Plant. The carbon dioxide is treated in the Carbon Dioxide Processing and Compression Plant. This removes any residual contaminants and remaining solvent and compresses the gas prior to it being exported from the Proposed Scheme into the proposed National Grid Carbon Limited low carbon pipeline (the low carbon pipeline does not form part of the Proposed Scheme).

3.3.19. assessment of air quality impacts for the operational phase has focussed on the following two core model scenarios (for the Proposed Scheme alone):

a. Baseline:

i. Operation of existing four biomass units (4 x 660 MW output) from Main Stack (259 m agl);

ii. All units assumed to be running at full load for 4,000 hours per year, representing a reasonable likely operating profile based on a ‘mid-merit’ operating regime;

iii. The two coal-fired units are not included in the Baseline (or Proposed Scheme scenario) because they stopped generating electricity commercially in March 2021 and formal closure of these units is expected before the Proposed Scheme commences operation.

b. With Proposed Scheme:

i. Operation of two biomass units (2 x 660 MW output) with BECCS from the Main Stack (259 m agl), assumed to be running continuously at full load (8,760 hours per year), representing a reasonable worst-case operating profile;

ii. Operation of two biomass units (2 x 660 MW output) without BECCS from the Main Stack (259 m agl) assumed to be running at full load for 4,000 hours per year, representing a reasonable operating profile based on a ‘mid-merit’ operating regime;

3.3.20. Further sensitivity modelling for air quality was undertaken for the same scenarios as above, but assuming that all Biomass Units in the Baseline scenario and the non-BECCS units in the 'With Proposed Scheme' scenario would be operating at full load for all hours (8,760 hours) of the year.

3.3.21. Whilst total process impacts increase in both the Baseline and With Proposed Scheme scenarios under full load operating conditions, the impact on ecological receptors, defined as the difference between the Proposed Scheme and Baseline scenario, is lower than presented for the two core model scenarios described above. As such, the two core model scenarios described above represent a realistic worst-case scenario and have been used in the assessment of potential effects on European Sites.

3.3.22. Drax Power Station currently uses river water abstracted from the River Ouse for existing Power Station cooling towers. This would continue to be used to provide cooling water for the Proposed Scheme.

3.3.23. Water is pumped to the Power Station Site from the River Ouse where it is treated to remove solids and other material. The treated river water is then used for cooling. No changes are expected to be required to existing water abstraction or discharge permits and consents, with no increase in abstraction of river water from the Ouse required or works within the River Ouse itself.

3.3.24. As such, operation of cooling water infrastructure for the Proposed Scheme is not expected to have any potential to contribute to LSE on European Sites, either alone or in-combination with other aspects of the Proposed Scheme or other plans and projects. Operation of the Existing Cooling System for the Proposed Scheme is therefore not considered further in this report.

3.3.25. Additional detail relating to the operation of the Carbon Capture Plant is provided in **Section 2.2** of **Chapter 2** (Site and Project Description) of the ES.

3.3.26. During operation, there will be a requirement to maintain the BECCS plant. It would also be necessary for effluent waste from the carbon capture process to be stored on site (some of this may be hazardous waste). Operational requirements will also include activities which are already established on the site such as chemical deliveries and waste effluent removals to registered waste disposal facilities.

3.3.27. Additional lighting to that already present at the Drax Power Station site is likely to be required. Precise locations and types of new lighting are not yet known. Any new lighting will comply with the requirements set out in the **Draft Lighting Strategy** (document reference 6.7).

3.3.28. During operation, ongoing habitat management and maintenance is expected to be required to support the establishment of new and enhanced habitats and landscape planting. Such activities would be carried out primarily in the Habitat Provision Area and the Off-site Habitat Provision Area. The **Outline Landscape and Biodiversity Strategy** (document reference 6.6) provides details of proposed habitat and landscape management during operation.

Biophysical changes during operation

3.3.29. The following potential biophysical changes have been identified, that could lead to effects upon European Sites:

a. Emissions of treated flue gas to air from the Main Stack in a scenario where BECCS has been applied to Units 1 and 2 ('the with Proposed Scheme Scenario'), leading to increased concentrations or deposition rates of chemical species onto European Sites surrounding the Proposed Scheme;

b. Disturbance of species as a result of noise generated by operation of the Proposed Scheme;

c. Increased levels of visual disturbance arising from the presence of personnel and operational lighting associated with operation of the Proposed Scheme;

d. Accidental releases of water-borne pollutants, for example effluent sludge treated or stored at the Carbon Capture Wastewater Treatment Plant. This could affect water quality of any aquatic habitats affected by such a release; and

OTHER PLANS AND PROJECTS

3.3.30. The potential for interactions between the Proposed Scheme and other plans and projects to increase the risk of LSE has been assessed. This has included assessing the plans and projects in the short-list of developments also assessed in the ES. An initial high-level screening exercise was completed. This determined whether any of the other plans and projects could have any conceivable effects on European Sites that could also be effected by the Proposed Scheme. Developments up to 30 km away from the Proposed Scheme were considered, as this was the maximum distance where there was considered to be any prospect of in-combination effects occurring. This distance was identified in relation to potential for overlapping aerial emissions from the Proposed Scheme and other large industrial / power-generating facilities.

3.3.31. The initial high-level screening exercise was completed in parallel with the initial assessment of cumulative effects for the Ecology Chapter of the ES (document reference 6.1.8). The nature, location, scale, and other key characteristics of other plans and projects were determined by reviewing relevant documents (where available), such as ecological assessments submitted with planning applications. The findings of this exercise are set out in **Table 1.4 (Assessment of Cumulative Effects – Ecology)** in **Appendix 18.4** of the ES (document reference 6.3.18.4). For each plan or project assessed, there were two outcomes from this initial high-level screening exercise in relation to European Sites:

a. The other plan or project could be objectively demonstrated to have negligible potential to contribute to in-combination effects on European Sites and was hence screened out of further in-combination assessment; or

b. The characteristics of the other plan or project meant there was a conceivable risk that it could contribute to in-combination effects on European Sites with the Proposed Scheme and required further consideration.

3.3.32. **Table 3.1** includes the other plans and projects that were identified as having potential to contribute to in-combination effects with the Proposed Scheme. The Short List ID used in **Chapter** 18 (Cumulative Effects) of the ES and accompanying appendices is included for ease of cross referencing.

Table 3.1 - Other Plans and Projects Screened into in-combination Assessment

Short List ID	Plan or Project	Rationale for inclusion in in-combination assessment
1	Eggborough CCGT - The construction and operation of a new CCGT generating station. Located approximately 8 km from the Proposed Scheme.	Emissions from the operation of this project could combine with the emissions from the Main Stack in the with Proposed Scheme scenario. This could cause increased air quality impacts on European Sites relative to either scheme operating alone. No other potential in-combination effects have been identified.
3	SEGL2 (Scotland to England Green Link 2) project - an underground High Voltage Distribution Cable (HVDC) between Peterhead (Aberdeenshire) and Drax (North Yorkshire) which will run into the substation at Drax Power Station. May overlap with eastern limits of Proposed Scheme.	The western limit of the HVDC is at the eastern boundary of the existing Drax Power Station Site, with a convertor station proposed in an agricultural field to the east of New Road. There is a possible overlap with the Order Limits for the Proposed Scheme in the far east of the existing Drax Power Station Site, but this is not possible to confirm on the basis of the available information for Development 3. The HVDC cable would be installed under the River Ouse downstream of the confluence of Carr Dyke (which flows under the existing Power Station Site) with the River Ouse. The convertor station for the HVDC would result in permanent landtake of habitats east of the existing Drax Power Station site and to the south of the Eastern Laydown Area (see Figure 18.2 (Committed Developments) in Volume 2 of Chapter 18 (Cumulative Effects) of the ES. There would also be temporary loss, disturbance, and fragmentation of habitats for the HVDC cable. The permanent landtake for the convertor station and the temporary effects of construction for the HVDC cable could lead to disturbance / loss of habitats for protected and notable species. This could include temporary disturbance of fish, bird, and otter populations associated with European Sites within the ZoI of the Proposed Scheme. Construction is predicted to take place between 2024 – 2031 with operation thereafter. The construction and operation of this project would therefore overlap with construction and operation of the Proposed Scheme.
4	Keadby 3 Low Carbon Gas Power Station Project - A combined cycle gas turbine (CCGT) power station. Located approximately 22 km from the Proposed Scheme	Emissions from the operation of this project could combine with the emissions from the Main Stack in the with Proposed Scheme scenario. This could cause increased air quality impacts on European Sites relative to either scheme operating alone. No other potential in-combination effects have been identified.
5	Ferrybridge D Combined Cycle Gas Turbine (CCGT) Power Station Project - A new CCGT generating station of circa 2000 megawatts output capacity and associated development including a gas supply. Located approximately 10.2 km from the Proposed Scheme	Emissions from the operation of this project could combine with the emissions from the Main Stack in the with Proposed Scheme scenario. This could cause increased air quality impacts on European Sites relative to either scheme operating alone. There is however no air quality information available for this Development, to enable it to be included in the cumulative air quality modelling, and as such in-combination effects cannot be assessed.
6	Barlow Ash Mound - proposed additional recovery of ash resource from Barlow Mound on the western boundary of the Proposed Scheme. Located approximately 100 m from the Proposed Scheme.	Development 6 involves proposals for the reclamation of ash from the ‘Barlow mound’. Barlow Mound has been used and remains in use for the disposal of ash generated by combustion of biomass at the Drax Power Station Site. Following reclamation of ash, the site would be restored. Development 6 is located approximately 100 m west of the Proposed Scheme (and approximately 50m north-east of the Off-Site habitat Provision Area). Barlow Mound is known to support a range of habitats and protected and notable species, having been subject to a long-term programme of ecological monitoring and management by Drax. An EIA Scoping Report has been submitted to SDC, but no assessment of the potential ecological effects of Development 6 is yet available other than identification of potential impact pathways and high-level mitigation principles.

Short List ID	Plan or Project	Rationale for inclusion in in-combination assessment
		Given the proximity of Development 6 to the Proposed Scheme, with habitat connectivity between the two, in-combination effects on European Sites could arise through increased disturbance of qualifying interest species, increased risk of accidental discharges to aquatic habitats, and potentially increased impacts on 'functionally-linked land[2]'.
9	Proposals for the erection and operation of five wind turbines and associated ancillary development. Located approximately 1.9 km from the Proposed Scheme.	Development 9 would involve the erection and subsequent operation of five wind turbines. Development 9 is located approximately 1.9km west of the Proposed Scheme. Development 9 will be located within 2 km of the Proposed Scheme and could affect bird populations associated with European Sites in the ZoI of the Proposed Scheme. It could therefore potentially contribute to in-combination effects on these receptors with the Proposed Scheme, through increased disturbance or displacement of European Site bird populations using functionally linked land outside the boundaries of any European Sites.
10	Development of a ground-mounted solar farm including associated infrastructure. Located approximately 1 km from the Proposed Scheme.	Development 10 involves the construction of a new solar farm across a 112-ha site located approximately 1 km from the Proposed Scheme. There is potential for this development to contribute to increased disturbance and displacement of wintering and breeding birds in-combination with construction and operation of the Proposed Scheme. This could include wintering birds that form part of the populations for which European Sites (SPA and/or Ramsar Sites) have been designated. No other potential in-combination effects have been identified.
12	Demolition of Flue Gas Desulphurisation (FGD) Plant and associated restoration works at Drax Power Station. Located partially within the Order Limits of the Proposed Scheme.	Development 12 involves the demolition of existing flue gas desulphurisation infrastructure within the existing Drax Power Station Site. Demolition activities will overlap spatially with the Proposed Scheme and may be taking place during the early phase of the Construction of the Proposed Scheme (Development 12 is expected to be completed by 2027). As such Development 12 could be being implemented during construction of the Proposed Scheme but is expected to be materially complete by the time the Proposed Scheme enters operation in 2027. Development 12 is located entirely within the Drax Power Station site and will take place in areas that comprise predominantly hard-standing, buildings, and other existing power station infrastructure. Ecological effects of this project will be limited. There will however be some very minor loss of terrestrial habitats and limited potential for increased disturbance of protected and notable's species, potentially including SPA / Ramsar Site bird populations in-combination with the Proposed Scheme.
47	The construction of an energy recovery facility (Kirk Sandall) involving the thermal treatment of residual waste and associated infrastructure including engineering, access, landscape, ground and landscaping works. Located approximately 21 km from the Proposed Scheme.	Emissions from the operation of this project could combine with the emissions from the Main Stack in the with Proposed Scheme scenario. This could cause increased air quality impacts on European Sites relative to either scheme operating alone. No other potential in-combination effects have been identified.
74	Keadby 2 Power Station, an 840MW gas fired power station in North Lincolnshire. Located approximately 22 km from the Proposed Scheme.	Emissions from the operation of this project could combine with the emissions from the Main Stack in the with Proposed Scheme scenario. This could cause increased air quality impacts on European Sites relative to either scheme operating alone.

[2] Functionally-linked land is land that is outside the boundaries of a European Site, but supports the ecological functioning of qualifying interests of that European Site. For example, an area of lowland heathland outside but adjacent to a SAC with lowland heathland as a qualifying interest, could support the ecological functioning of the lowland heathland inside the SAC. Another example would be the habitats outside the boundary of a SPA, that are used by populations of birds that are a qualifying interest of the SPA.

3.4. RELEVANT EUROPEAN SITES

3.4.1. Prior to assessing whether the identified biophysical changes arising from the Proposed Scheme would lead to LSE on European Sites, it is useful to summarise basic data on the European Sites that could be affected. This section of the report provides summary data on the European Sites considered to require inclusion in the HRA screening.

3.4.2. Relevant European Sites have been determined by considering the maximum Zone of Influence (ZoI) over which the Proposed Scheme could cause impacts to European Sites. The impact pathway with the greatest ZoI is emissions of treated flue gas to air. As set out in **Section 6.6** of **Chapter 6** (Air Quality) of Volume 1 of the ES (document reference 6.1.6), the operational phase study area extends 15 km in all directions from the Main Stack of Drax Power Station. As such, all European sites within 15 km of the Main Stack are potentially relevant.

3.4.3. Table 3.1 includes summary data on European Sites within 15 km of the Proposed Scheme. The distance from both the Order Limits and the Main Stack are presented in the table, as each distance can be relevant to the HRA

Table 3.2 - European Sites in potential ZoI of the Proposed Scheme

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
River Derwent SAC	0.7 km to the North	2.2 km to the North	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Rivers with floating vegetation often dominated by water-crowfoot.	River Lamprey Lampetra fluviatilis Sea lamprey Petromyzon marinus Bullhead Cottus gobio Otter Lutra lutra	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 and restoring: ~ The extent and distribution of qualifying natural habitats and habitats of qualifying species ~ The structure and function (including typical species) of qualifying natural habitats ~ The structure and function of the habitats of qualifying species ~ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely on ~ The populations of qualifying species, and ~ The distribution of qualifying species within the site	The Yorkshire Derwent is considered to represent one of the best British examples of the classic river profile. This lowland section, stretching from Ryemouth to the confluence with the Ouse, supports diverse communities of aquatic flora and fauna. Fed from an extensive upland catchment, the lowland course of the Derwent has been considerably diverted and extended as a result of glacial action in the Vale of Pickering. The river supports an aquatic flora uncommon in Northern Britain. Several species, including river water-dropwort *Oenanthe fluviatilis*, flowering rush *Butomus umbellatus*, shining pondweed *Potamogeton lucens*, arrowhead *Sagittaria sagittifolia*, opposite-leaved pondweed *Groenlandia densa* and narrow-leaved water-parsnip *Berula erecta* are more typically found in lowland rivers in southern England	J02 (H) human induced changes in hydraulic conditions I01 (H) Invasive non-native species A02 (H) Modification of cultivation practices H02 (H) Pollution to groundwater (point sources and diffuse sources)
Lower Derwent Valley SAC	4.3 km to the north east	6.4 km to the north east	Lowland hay meadows (Alopecurus pratensis,	Otter Lutra lutra	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site	The Lower Derwent Valley contains a greater area of high-quality examples of lowland hay meadows than	H04 (H) air pollution, air-borne pollutants

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
			Sanguisorba officinalis) Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)		contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining and restoring: ~ The extent and distribution of qualifying natural habitats and habitats of qualifying species ~ The structure and function (including typical species) of qualifying natural habitats ~ The structure and function of the habitats of qualifying species ~ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely on ~ The populations of qualifying species, and ~ The distribution of qualifying species within the site	any other site in the UK. The abundance of the rare narrow-leaved water-dropwort *Oenanhte silaifolia* is a notable feature. Traditional management has ensured that ecological variation is well-developed and in the transition between habitat types including wet and dry grassland, swamp, fen, and damp alder woodland.	G01 (H) outdoor sports and leisure activities, recreational activities I01 (H) Invasive non-native species K02 (H) Biocenotic evolution, succession A04 (H) grazing
Lower Derwent Valley SPA	4.3 km to the north east	6.4 km to the north east	N/A	Qualifying species under article 4.1 (regular use by 1% or more of the GB population): Breeding: Northern shoveler Over winter: Eurasian wigeon *Anas clypeata*	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: ~ The extent and distribution of the habitats	The Lower Derwent Valley is a major flood plain system in east and north Yorkshire. The valley holds a series of neutral alluvial flood meadows, fens, swamps, valley mires, alder woodlands and other fresh water habitats. It is one of the largest and most important examples of	K02 (H) Biocenotic evolution, succession G01 (H) outdoor sports and leisure activities, recreational activities J02 (H) human induced changes in hydraulic conditions

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
				Bewick's swan Cygnus columbianus bewickii Golden plover Pluvialis apricaria Ruff Philomachus pugnax Qualifying species under article 4.2 (regular use by 1% or more of the biogeographical populations): Wintering -Teal *Anas crecca* Wintering bird assemblage of international importance including those listed above and Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, and Wigeon *Anas penelope*	and qualifying features - The structure and function of the habitats of the qualifying features ~ The supporting processes on which the habitats of the qualifying features rely ~ The population of each of the qualifying features, and ~ The distribution of the qualifying features within the site.	traditionally managed flood meadow habitat in the UK. The site is of outstanding importance for a diverse range of waterbirds throughout the year.	I01 (H) Invasive non-native species A04 (H) grazing
Lower Derwent Valley Ramsar	4.3 km to the north east	6.4 km to the north east	Criterion 1 The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK. The river and flood meadows play a substantial role in the	Criterion 2 The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, *Cicadula ornata* for which Lower Derwent Valley is the only known site in Great Britain. Criterion 4	N/A	The Lower Derwent Valley represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK. These grasslands, which were formerly widespread, are now very restricted in distribution due to agricultural improvement. The river and these floodlands play a substantial role in the hydrological and ecological functioning of the	Water diversion for irrigation/domestic/industrial use Reservoir/barrage/dam impact: flooding

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
			hydrological and ecological functioning of the Humber Basin.	The site qualifies as a staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, *Philomachus pugnax* and Whimbrel, *Numenius phaeopus.* Criterion 5 Assemblage of international importance – peak counts in winter: 31,942 waterfowl Criterion 6 Species/populations occurring at levels of international importance – peak counts in winter: Eurasian wigeon *Anas Penelope* 8,350 (2% GB population), Eurasian teal *Anas crecca* 4,200 (1% population)		internationally important Humber basin.	
Humber Estuary SAC	6.3 km to the east	7.2 km to the east	Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by sea water all the time Coastal lagoons	Sea lamprey Petromyzon marinus River lamprey Lampetra fluviatilis Grey seal Halichoerus grypus	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 and restoring: ~ The extent and distribution of qualifying natural habitats and	The Humber is the second largest coastal plain Estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the	J02 (H) human induced changes in hydraulic conditions M01 (H) changes in abiotic conditions M02 (H) changes in biotic conditions E02 (H) Industrial or commercial areas K01 (H) Abiotic (slow) natural processes

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
			Salicornia and other annuals colonising mud and sand Atlantic salt meadows Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* “white dunes” Fixed coastal dunes with herbaceous vegetation “grey dunes” Dunes with Hippopha rhamnoides		habitats of qualifying species ~ The structure and function (including typical species) of qualifying natural habitats ~ The structure and function of the habitats of qualifying species ~ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely on ~ The populations of qualifying species, and ~ The distribution of qualifying species within the site	range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.	
Humber Estuary SPA	6.3 km to the east	7.2 km to the east		Qualifying species under article 4.1 (regular use by 1% or more of the GB population): Avocet Recurvirostra avosetta Bittern Botaurus stellaris, Hen harrier Circus cyaneus, Golden plover Pluvialis apricaria, Bar-tailed godwit Limosa lapponica, Ruff Philomachus pugnax, Marsh harrier Circus aeruginosus, Little tern Sternula albifrons,	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: ~ The extent and distribution of the habitats and qualifying features ~ The structure and function of the habitats of the qualifying features	The Humber Estuary is located on the east coast of England and comprises extensive wetland and coastal habitats covering 37,630.24 ha. The inner estuary supports extensive areas of reedbed, with areas of saltmarsh, grazing marsh, sand dunes, marshy slacks and brackish pools. The estuary supports important numbers of waterbirds throughout the year.	I01 (H) Invasive non-native species M02 (H) changes in biotic conditions M01 (H) changes in abiotic conditions K01 (H) Abiotic (slow) natural processes G01 (H) outdoor sports and leisure activities, recreational activities

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
				Qualifying species under article 4.2 (regular use by 1% or more of the biogeographical populations): Shelduck *Tadorna tadorna*, Knot *Calidris canutus*, Dunlin *Calidris alpina* (passage and wintering), Redshank *Tringa totanus*, Black-tailed godwit *Limosa limosa,* Assemblage qualification under article 4.2 for use of over 20,000 waterbirds in any season.	~ The supporting processes on which the habitats of the qualifying features rely ~ The population of each of the qualifying features, and ~ The distribution of the qualifying features within the site.		
Humber Estuary Ramsar	6.3 km to the east	7.2 km to the east	Criterion 1 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.	Criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita.* Criterion 5 Assemblages of international importance –	N/A	The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the	Disturbance to vegetation through cutting/clearing – reedbeds cleared for angling Vegetation succession – reed bed loss to scrub encroachment Water diversion for irrigations/domestic/industrial use Overfishing – substantial lamprey by-catch in eel nets in River Ouse Pollution – domestic sewage Pollution – agricultural fertilisers Recreational/tourism disturbance (unspecified) – due to illegal access with motorised vehicles and craft

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
				153,934 waterfowl (non-breeding season) Criterion 6 Species/populations occurring at levels of international importance Migratory: Eurasian golden plover *Pluvialis apricaria altifrons* 17,996 (2.2% population) Red knot Calidris *canutus islandica* 18,500 (4.1% population) Dunlin *Caldris alpina* 20,269 (1.5% population) Black-tailed godwit *Limosa limosa islandica* 915 (2.6% population) Redshank *Tringa totanus brittanica* 7,462 (5.7% population) Wintering: Common shelduck *Tadorna tadorna* 4,464 (1.5% population) Eurasian golden plover 30,709 (3.8% population) Red knot 28,165 (6.3% population) Dunlin 22,222 (1.7% population) Black-tailed godwit 1,113 (3.2% population)		saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer.	Other factor – coastal squeeze causing loss of intertidal habitats and saltmarsh due to sea level rise and fixed defences.

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
				Bar-tailed godwit *Limosa lapponica lapponica* 2,752 (2.3% population) Redshank 4,632 (3.6% population) Criterion 8 The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.			
Skipwith Common SAC	7.6 km to the north	9.4 km to the north	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	N/A	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 and restoring: ~ The extent and distribution of qualifying natural habitats ~ The structure and function (including typical species) of qualifying natural habitats, and ~ The supporting processes on which qualifying natural habitats rely	The wet heath at Skipwith Common is the most extensive of its type in the north of England. The *Erica tetralix – Sphagnum compactum* community is dominated by cross-leaved heath *Erica tetralix* and purple moor-grass *Molinia caerulea*. There is a small population of marsh gentian *Gentiana pneumonanthe*. The wet heath is part of transitions from open water, fen, reed and swamp to dry heaths and other habitats. The dry heath element is a representative of *Calluna vulgaris – Deschampsia flexuosa* heath dominated by heather *Calluna vulgaris*.	K02 (H) Biocenotic evolution, succession J02 (H) human induced changes in hydraulic conditions H04 (H) Air pollution, air-borne pollutants G01 (H) Outdoor sports and leisure activities, recreational activities

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
Thorne and Hatfield Moors SPA	9.1 km to the south east	10.1 km to the south east	N/A	Qualifying species under Article 4.1 for regular use of at least 1% of the GB population: Nightjar *Caprimulgus europeaus* 66 breeding pairs (1.9%)	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: ~ The extent and distribution of the habitats and qualifying features ~ The structure and function of the habitats of the qualifying features ~ The supporting processes on which the habitats of the qualifying features rely ~ The population of each of the qualifying features, and ~ The distribution of the qualifying features within the site.	Thorne and Hatfield Moors SPA is an extensive lowland raised mire system adjacent to the Humber estuary on the north-east coast of England and is the largest remaining lowland peatland in England. Despite a long history of extensive peat extraction since the late nineteenth century, the site retains substantial areas of Sphagnum bog, which has been changed by succession to wet scrub woodland dominated by *Birch Betula* sp., sallows and Alder *Alnus glutinosa*. Where the peat surface has been removed, subsequent restoration of active bog has depended upon shallow flooding to allow Sphagnum and other bog plants to re-colonise. The mire communities are dominated by Hare's-tail *Eriophorum vaginatum* and Common Cottongrass *E. angustifolium,* Cross-leaved Heath *Erica tetralix*, Soft-rush *Juncus effusus* and Sphagnum mosses, and include a variety of scarcer bog plants such as Bog-rosemary *Andromeda polifolia* and Cranberry *Vaccinium oxycoccos*. Drier heath is dominated by Heather *Calluna vulgaris*, Bracken *Pteridium aquilinum*	

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
						and Purple Moor-grass *Molinia caerulea.* Birch *Betula sp*. scrub, some of it dense, occurs throughout both moors. The diverse mosaic of habitats contribute greatly to the ornithological interest, which comprises breeding species, notably Nightjar *Caprimulgus europaeus*, hen harrier *Circus cyaneus*, merlin *Falco columbarius* and short-eared owl *Asio flammeus*, and hobby *Falco subbuteo*. Also notable are breeding nightingales *Luscinia megarhynchos*.	
Thorne Moor SAC	9.1 km to the south east	10.1 km to the south east	Degraded raised bogs still capable of natural regeneration	N/A	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 and restoring: ~ The extent and distribution of qualifying natural habitats ~ The structure and function (including typical species) of qualifying natural habitats, and ~ The supporting processes on which qualifying natural habitats rely	Thorne Moor is England's largest area of raised bog, lying a few kilometres from the smaller Hatfield Moors, both within the former floodplain of the rivers feeding the Humber estuary (Humberhead Levels), and includes the sub-components Goole Moors and Crowle Moors. Although management has increased the proportion of active raised bog at Thorne Moors, the inclusion of Goole Moors, where peat-extraction has now ceased, means that the site is still predominantly degraded raised bog. The restored secondary surface is rich in	K02 (H) Biocenotic evolution, succession I01 (H) Invasive non-native species G05 (H) Other human intrusions and disturbances H04 (H) Air pollution, air-borne pollutants J02 (H) Human induced changes in hydraulic conditions

Site	Distance and orientation from Proposed Scheme		Qualifying Features		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	From Order Limits	From Main Stack	Habitats	Species			
						species of bog-mosses Sphagnum spp., common and hare's-tail cotton grasses *Eriophorum angustifolium* and *E. vaginatum*, heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*	

3.5. STEP 3: IDENTIFY THE POTENTIAL FOR LSE ON EUROPEAN SITES

3.5.1. This section of the report examines each of the biophysical changes arising from the Proposed Scheme and considers how they could lead to change to European Site qualifying features. The biophysical changes set out in paragraph 3.3.16 and 3.3.26 of this report will be considered in turn, firstly for the Proposed Scheme alone and then with consideration of other plans and projects. Where the potential for LSE are identified, these are taken forwards for appropriate assessment.

POTENTIAL EFFECTS OF THE PROPOSED SCHEME ALONE – CONSTRUCTION AND DECOMMISSIONING

Loss or Disturbance of Habitats within European Sites

3.5.2. The Proposed Scheme is located 0.7 km from the closest European Site, which is the River Derwent SAC. There would therefore be no loss or disturbance of habitats within any European Site arising from construction or decommissioning of the Proposed Scheme (see **Figure 1 (European Sites within Air Quality Study Area)** ((document reference 6.8.2.1)).

Loss or Physical Disturbance of Functionally-linked Land

3.5.3. Functionally-linked land is land outside the boundary of a European Site, but which supports the qualifying interests for which the European Site has been designated. For example, fields outside the boundary of a European Site may be used for foraging or roosting by birds that are a qualifying interest of a nearby European Site. Although the fields do not fall inside the boundary of the European Site, they may be of importance for sustaining the European Site bird population. There can also be functional linkages for habitats. For example, an area of lowland heathland outside but adjacent to a SAC with lowland heathland as a qualifying interest, could support the ecological functioning of the lowland heathland inside the SAC.

3.5.4. **Table 3.3** summarises which European Sites could potentially be subject to LSE due to loss or disturbance of functionally-linked land, and which could not. A rationale for the decisions made is also included.

Table 3.3 - Potential for Loss or Physical Disturbance of Functionally-linked Land

Site	Potential for impacts on functionally-linked land?	Rationale
River Derwent SAC	Yes	Qualifying interests of the SAC include otter, river and sea lamprey, bullhead, and river habitats. The closest part of the River Derwent SAC is located approximately 0.7 km from the Proposed Scheme. Otter have large home ranges, which may extend along up to 50 km of watercourse (Chanin, 2003). The River Ouse downstream of the River Derwent SAC and to the north of the Order Limits also contains suitable riparian habitat for otter, as does Carr Dyke immediately north of Drax Power Station. Previous survey work for the Drax Repower Scheme recorded evidence of otters along Carr Dyke and adjacent to the River Ouse (WSP, 2018). Carr Dyke is within 50 m of the Habitat Provision Area, where hedgerow planting is proposed. The open channel of Carr Dyke is also within 50 m of the woodyard in the north of the Drax Power Station Site, which would be used for construction laydown and fabrication (see **paragraph 2.3.9** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES. Carr Dyke also passes underneath the Drax Power Station Site in an existing culvert (see **Figure 12.1 (Water Constraints Part 1)** of the ES (document reference 16.2.12.2)). Whilst the open sections of Carr Dyke outside the Power Station Site could be used by otter, it is unlikely otter can access the Carr Dyke culvert under the Drax Power Station Site. This is because there are trash screens at either end of the culvert, which would pose a physical barrier to the movement of otters. Given the above, otters may use riparian habitats adjacent to the Proposed Scheme and may occasionally use terrestrial habitats and the local ditch network within the Habitat Provision Area when moving through the wider landscape. Otters are not expected to use habitats within the Power Station Site, the East Construction Laydown Area, or the Off-Site Habitat Provision Areas, due to a lack of suitable aquatic habitat. As discussed above, otters have large home ranges and may use habitats within the Habitat Provision Area and in proximity to construction and decommissioning activities in the north of the Power Station Site. Otters using these areas may also form part of the River Derwent / Lower Derwent Valley SAC population; there is therefore potential for minor loss of functionally linked land used by otters (terrestrial habitats in the Habitat Provision Area) and hence LSE could occur. There is no potential for loss of functionally-linked habitat used by fish or supporting SAC habitats. This is because there would be no loss of habitat from Carr Dyke or other rivers or streams as a result of the Proposed Scheme. In addition, no SAC river habitats have been recorded within the section of Carr Dyke adjacent to the Proposed Scheme.
Lower Derwent Valley SAC	Yes	The closest part of the Lower Derwent Valley SAC is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the SAC include otter, hay meadow, and woodland habitats. As set out in the row above concerning the River Derwent SAC, otters can have very large home ranges and may use habitats within and adjacent to the Proposed Scheme. Otters using these areas may also form part of the Lower Derwent Valley SAC population; there is therefore potential for minor loss and disturbance of functionally linked land used by otters. None of the habitats which form qualifying interests of the Lower Derwent Valley SAC are present within the Proposed Scheme Order Limits or the Off-site Habitat Provision Areas (see **Figure 8.3 (Phase 1 Habitats)** of the ES (document reference 6.2.8.3)). There is therefore no potential for loss of functionally-linked SAC habitats.
Lower Derwent Valley SPA	Yes	The closest part of the Lower Derwent Valley SPA is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the SPA include several species of wildfowl and wader, as set out in **Table 3.2**. Agricultural habitats within the Habitat Provision Area, the Off-site Habitat Provision Area, and the East Construction Laydown Area could on occasion be used by some of the bird species which are qualifying interests of the SPA.

Site	Potential for impacts on functionally-linked land?	Rationale
		The Off-site Habitat Provision Area includes approximately 2.72 ha of scrub and former arable farmland habitats that could potentially be of some limited value to wintering SPA bird species for foraging and roosting. The woodland in the north of the Off-site Habitat Creation Area does not provide suitable habitat for SPA bird species. The off-site Habitat Provision Area would not be subject to construction activities, rather the habitat present would be enhanced to deliver ecological mitigation and support the delivery of Biodiversity Net Gain (see the **Outline Landscape and Biodiversity Strategy** (document reference 6.6**)**. The Habitat Provision Area and the East Construction Laydown Area provide approximately 5.05 ha of arable cropping and improved grassland, along with limited extents of other habitats such as hedgerows, ditches and blocks of woodland planting. These habitats also have some limited suitability to support SPA bird species for foraging and roosting. Part of the East Construction Laydown Area was included in wintering bird surveys completed between October 2020 and March 2021 (see **Appendix 8.3** of **Chapter 8** (Ecology) of Volume 3 of the ES (document reference 6.3.8.3) including **Figure 8.3** of that report). No SPA bird species were recorded in the vicinity of the East Construction Laydown Area. As such, the East Construction Laydown Area is not considered to be of importance for SPA bird species and is not considered to be functionally-linked land. In addition, the East Construction Laydown Area would be returned to its existing land-use post-construction. The East Construction Laydown Area will not be considered further in relation to loss or disturbance of functionally-linked land. Habitat creation and management activities in the Habitat Provision Area (excluding the section to the north of the East Construction Laydown Area) and Off-site Habitat Provision Area could alter the suitability of those for SPA bird species. Within the Habitat Provision Area, habitat creation and enhancement is limited to hedgerow planting (excluding the section to the north of the East Construction Laydown Area, where grassland, scrub and wetland planting is proposed), as set out in the **Outline Landscape and Biodiversity Strategy** (document reference 6.6). Hedgerow planting will follow existing fencelines or infill existing hedgerow planting and treelines and will result in negligible loss of farmland habitats. Within the Off-site Habitat Provision Area, the former arable habitats and scrub would be managed to enhance the species-richness of areas of scrub and to provide species-rich grassland. These habitats are expected to provide comparable habitat for wintering SPA birds to the baseline situation. Regardless of the habitat present, the Off-site Habitat Provision Area is unlikely to be used regularly by SPA bird species presently or in the future. This is because the area is bisected by a public footpath, which anecdotal observations (evident flattening of vegetation observed during extended Phase 1 habitat survey) and analysis of the STRAVA heat map (Strava Heat Map, 2022) suggest is regularly used. Other land required for the construction and decommissioning of the Proposed Scheme is primarily within the existing Drax Power Station and does not provide suitable habitat for SPA bird species. This cannot therefore be functionally-linked land.
Lower Derwent Valley Ramsar	Yes	The closest part of the Lower Derwent Valley Ramsar is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the Ramsar include several species of wildfowl and wader, as set out in **Table 3.2.** Some of the criteria for designation of the Ramsar Site overlap with the qualifying interests of the Lower Derwent Valley SPA. Qualifying interests of the Ramsar Site also include flood meadow habitats and wetland invertebrate species. These habitats are not present within the Site, and there is no comparable wetland habitat within the Site that could support the wetland invertebrate community associated with the Ramsar Site. The analysis of potential loss or physical disturbance of functionally-linked land for Ramsar bird species is the same as that presented for Lower Derwent Valley SPA in the row above. In relation to Ramsar bird species, there is therefore potential for loss or disturbance of occasionally-used functionally-linked land associated with the habitat Provision Area and the Off-site Habitat Provision Area. There is expected to be no loss or disturbance of functionally-linked land within the remainder of the Site.
Humber Estuary SAC	No	The closest part of the Humber Estuary SAC is located approximately 6.4 km from the Proposed Scheme. None of the qualifying interest habitats occur within the Site (see **Figure 8.3 (Phase 1 Habitats)** of the ES (document reference 6.2.8.3). There are no habitats suitable to support the qualifying interest species (sea and river lamprey, and grey seal) within the Site. As such, the Proposed Scheme would not result in the loss or disturbance of functionally-linked land.

Site	Potential for impacts on functionally-linked land?	Rationale
Humber Estuary SPA	Yes	The closest part of the Humber Estuary SPA is located approximately 6.4 km from the Proposed Scheme. Qualifying interests of the SPA include species of wildfowl and wader, as set out in **Table 3.2**. Agricultural habitats within the Habitat Provision Area, the Off-site Habitat Provision Area, and the East Construction Laydown Area could be used on occasion by some of the bird species which are qualifying interests of the SPA. The off-site Habitat Provision Area includes 2.42 hectares of scrub and former arable farmland habitats that could potentially be of some limited value to wintering SPA bird species for foraging and roosting. The woodland in the north of the Off-site Habitat Creation Area does not provide suitable habitat for SPA bird species. The off-site Habitat Provision Area would not be subject to construction activities, rather the habitat present would be enhanced to deliver ecological mitigation and support the delivery of Biodiversity Net Gain (see the Outline Landscape and Biodiversity Strategy (document reference 6.6). The Habitat Provision Area and the East Construction Laydown Area provide approximately 5.05 ha of arable cropping and improved grassland, along with limited extents of other habitats such as hedgerows, ditches and blocks of woodland planting. These habitats also have some limited suitability to support some of the SPA bird species for foraging and roosting. Part of the East Construction Laydown Area was included in wintering bird surveys completed between October 2020 and March 2021 (see **Appendix 8.3 (Wintering Bird Survey Report)** of the ES (document reference 6.3.8.3) including Figure 8.3 of that report). No SPA bird species were recorded in the vicinity of the East Construction Laydown Area. As such, the East Construction Laydown Area is not considered to be of importance for SPA bird species and is not considered to be functionally-linked land. In addition, the East Construction Laydown Area would be returned to its existing land-use post-construction. The East Construction Laydown Area will not be considered further in relation to loss or disturbance of functionally-linked land. Habitat creation and management activities in the Habitat Provision Area and Off-site Habitat Provision Area could alter the suitability of those for SPA bird species. Within the Habitat Provision Area, habitat creation and enhancement is limited to hedgerow planting, as set out in the **Outline Landscape and Biodiversity Strategy** (document reference 6.6). Hedgerow planting will follow existing fence lines or infill existing hedgerow planting and treelines and will result in negligible loss of farmland habitats. Within the Off-site Habitat Provision Area, the former arable habitats and scrub would be managed to enhance the species-richness of areas of scrub and to provide species-rich grassland. These habitats are expected to provide comparable habitat for wintering SPA birds to the baseline situation. Regardless of the habitat present, the Off-site Habitat Provision Area is unlikely to be used regularly by SPA bird species presently or in the future. This is because the area is bisected by a public footpath, which anecdotal observations (evident flattening of vegetation observed during extended Phase 1 habitat survey) and analysis of the STRAVA heat map (Strava Heat Map, 2022) suggest is regularly used by people. This area is also some distance from the River Ouse, which is likely to act as a flyway with SPA bird species more likely to use habitat in proximity to the river and closer to the SPA. Other land required for the construction and decommissioning of the Proposed Scheme is located almost entirely within the existing Drax Power Station and does not provide suitable habitat for SPA bird species. This is not therefore functionally-linked land.
Humber Estuary Ramsar	Yes	The closest part of the Humber Estuary Ramsar Site is located approximately 6.4 km from the Proposed Scheme. Qualifying interests of the Ramsar Site include marine and intertidal habitats, grey seal, natterjack toad, sea and river lamprey, and species of wildfowl and wader, as set out in **Table 3.2**. None of the qualifying interest habitats occur within the Site (see **Figure 8.3** of **Chapter 8 (Ecology)** in Volume 2 of the ES (document reference 6.2.8.3). There are no habitats suitable to support the qualifying interest species (sea and river lamprey, natterjack toad, and grey seal) within the Site. As such, the Proposed Scheme would not result in the loss or disturbance of functionally-linked land for these habitats and species. The analysis of potential loss or physical disturbance of functionally-linked land for Ramsar bird species is the same as that presented for Humber Estuary SPA in the row above.

Site	Potential for impacts on functionally-linked land?	Rationale
		In relation to Ramsar bird species, there is therefore potential for loss or disturbance of occasionally-used functionally-linked land associated with the habitat Provision Area and the Off-site Habitat Provision Area. There is expected to be no loss or disturbance of functionally-linked land within the remainder of the Site.
Skipwith Common SAC	No	The closest part of Skipwith Common SAC is located approximately 7.2 km from the Proposed Scheme. Qualifying Interests of the SAC include heathland habitats, as set out in **Table 3.2**. None of the qualifying interest habitats occur within or adjacent to the Site (see **Figure 8.3** of **Chapter 8** (Ecology) in Volume 2 of the ES (document reference 6.2.8.3). As such, the Proposed Scheme would not result in the loss or disturbance of functionally-linked land.
Thorne & Hatfield Moors SPA	No	The closest part of Thorne and Hatfield Moors SPA is located approximately 9.1 km from the Proposed Scheme. The only qualifying interest of the SPA is nightjar, as set out in **Table 3.2** This species is strongly associated with heathland, moorland, woodlands with large clearings and recently felled plantations. There are no such habitats within or adjacent to the Site (see **Figure 8.3** of **Chapter 8** (Ecology) in Volume 2 of the ES (document reference 6.2.8.3). As such, the Proposed Scheme would not result in the loss or disturbance of functionally-linked land.
Thorne Moor SAC	No	The closest part of Thorne Moor SAC is located approximately 9.1 km from the Proposed Scheme. The only qualifying interest of the SAC is degraded raised bog, as set out in **Table 3.2**. There is no qualifying interest habitat within or adjacent to the Site (see **Figure 8.3** of **Chapter 8 (Ecology)** in Volume 2 of the ES (document reference 6.2.8.3). As such, the Proposed Scheme would not result in the loss or disturbance of functionally-linked land.

Emissions of Dust

3.5.5. As set out in **paragraph 6.8.2** of **Chapter 6 (Air Quality)** of Volume 1 of the ES (document reference 6.1.6), emissions of dust from construction activities could be relevant to ecological receptors up to 50 m from construction activities. There are no qualifying ecological receptors within 50 m of the construction phase study area (see **Figure 6.1** of **Chapter 6 (Air Quality)** of Volume 2 of the ES (document reference 6.6 and as such no modelling of dust impacts on ecological receptors (including European Sites) has been completed.

3.5.6. The assessment in **Section 6.9** of **Chapter 6 (Air Quality)** identifies that there is some potential for temporary, slight adverse effects from dust soiling and in relation to human health. Effects are identified as being most likely to occur in the eastern, north-eastern and southern areas of the Site.

3.5.7. The Habitat Provision Area and Carr Dyke are located to the north and north-east of the woodyard respectively (see **Figure 3 (Functionality-Linked Land)** (document reference 6.8.2.3)), with a small proportion of these areas within 50 m of the woodyard, where construction and decommissioning activities may take place for the Carbon Dioxide Delivery Terminal Compound if it is built as part of the Proposed Scheme and as part of the wider use of the woodyard as one of the Drax Power Station Construction Laydown Areas. As set out in **Table 3.3** the Habitat Provision Area and Carr Dyke may form functionally-linked land that is used occasionally by European Site qualifying interests. The Habitat Provision Area and Carr Dyke could be used by some of the bird qualifying interests associated with the following European Sites:

a. Lower Derwent Valley SPA;

b. Lower Derwent Valley Ramsar;

c. Humber Estuary SPA; and

d. Humber Estuary Ramsar.

3.5.8. Carr Dyke is likely to be used on occasion by otters. Otters using Carr Dyke could form part of the qualifying interest populations of the following European Sites:

a. River Derwent SAC; and

b. Lower Derwent Valley SAC.

3.5.9. Dust deposition onto the Habitat Provision Area and Carr Dyke within 50m of the woodyard could have minor adverse effects on the habitats present. Dust deposition onto aquatic and terrestrial habitats can lead to soiling of plant surfaces, affecting photosynthesis and ecological functioning. Effects are more pronounced during periods of drought when dust can build up on vegetation and plants are stressed by other factors. For short-lived (e.g., under a year) demolition and construction activities, vegetation usually recovers within a year of activity ceasing (Holman. C., 2014).

3.5.10. Construction and decommissioning activities would last for more than a year and qualifying interest features may occasionally use habitats within 50 m of these activities. As such, there is the potential for LSE on these features due to dust emissions.

Increased Risk of Pollution from Increased Sediment Load

3.5.11. As set out between **paragraph 12.9.3 and 12.9.6** of **Chapter 12 (Water Environment)** in Volume 1 of the ES (document reference 6.1.12), in the absence of mitigation Carr Dyke may be at risk of increased sediment loading during construction and decommissioning. The risk is associated with construction activities for the new Carbon Dioxide Delivery Terminal Compound (if Option 1 is pursued as described in **paragraph 2.2.44** of **Chapter 2 (Project and Site Description)** of Volume 1 of the ES (document reference 6.1.2) and the Drax Power Station Site Construction Laydown Areas.

3.5.12. Increased sediment loading of the Carr Dyke during construction and decommissioning could temporarily reduce the suitability of this for foraging otter, through increased difficulty foraging (due to reduced visibility) and through reduced densities of prey (fish). Any otters using the Carr Dyke may also be part of the qualifying interest populations of the River Derwent SAC and Lower Derwent Valley SAC. Carr Dyke may also be used on occasion by low numbers of wintering birds that are associated with Lower Derwent Valley (SPA and Ramsar) and Humber Estuary (SPA and Ramsar). Reductions in water quality within Carr Dyke could reduce the suitability of this for SPA bird species through effects on the plant communities supported by the watercourse. As such, there is the potential for LSE on these SAC, SPA, and Ramsar Sites.

Accidental Releases of Water-borne Pollutants

3.5.13. As set out between **paragraph 12.9.9 and 12.9.11** of **Chapter 12 (Water Environment)** in Volume 1 of the ES (document reference 6.1.12), in the absence of mitigation Carr Dyke may be at increased risk of pollution from accidental spillages of oils, hydrocarbons, and hazardous substances during construction and decommissioning. **Paragraph 12.9.15** of **Chapter 12 (Water Environment)** also identifies that River Ouse, approximately 1.4 km downstream of option 1 of the Carbon Dioxide Delivery Terminal Compound, is at risk of such pollution events. The river Ouse could potentially receive pollutants via drainage from the Site reaching Carr Dyke, which discharges into the River Ouse. Some drainage from the Site is also discharged into the River Ouse via a piped drainage system from the Site. The risk is associated with construction activities for the new Carbon Dioxide Delivery Terminal Compound (if Option 1 is pursued as described in **paragraph 2.2.44** of **Chapter 2 (Project and Site Description)** of Volume 1 of the ES (document reference 6.1.2) and the Drax Power Station Site Construction Laydown Areas.

3.5.14. In the event of an accidental release of water-borne pollutants into Carr Dyke or River Ouse, this could temporarily reduce the suitability of these watercourses for foraging

otter. In the event of a significant spill vegetation and fish populations could be impacted, reducing the suitability of the watercourse for foraging otter in the short to medium term. Any otters using the Carr Dyke / River Ouse may also be part of the qualifying interest populations of the River Derwent SAC and Lower Derwent Valley SAC.

3.5.15. In addition, the River Ouse is a migratory route for river and sea lamprey including those moving between the Humber Estuary and the River Derwent. Sea and river lamprey using the River Ouse are also likely to be part of the qualifying interest populations for which the River Derwent SAC and Humber Estuary SAC and Ramsar have been designated. Carr Dyke and River Ouse may also be used by wintering birds that are associated with Lower Derwent Valley (SPA and Ramsar) and Humber Estuary (SPA and Ramsar). As such, there is the potential for LSE on these SAC, SPA, and Ramsar Sites.

Disturbance from Noise and Vibration

3.5.16. During construction and decommissioning there would be increased levels of noise and vibration relative to the baseline situation. Noise and Vibration is assessed in detail in **Chapter 7 (Noise and Vibration)** of Volume 1 of the ES (document reference 6.1.7).

3.5.17. The Proposed Scheme is located 0.7 km or more from any European Site. The closest part of the Proposed Scheme to any European Site is the Habitat Provision Area, which is approximately 0.7 km from the River Derwent SAC (See **Figure 2 (European Sites within 5km)** (document reference 6.8.2.2)). Activities in the Habitat Provision Area would be limited to hedgerow planting (see **Figure 2** of **The Outline Landscape and Biodiversity Strategy** (document reference 6.6.2.2). This would be a low impact activity, that would be of a short duration (days or weeks), generate equivalent or less noise than baseline agricultural activities in the Habitat Provision Area, and in addition be screened from the River Derwent by flood defence embankments on the southern bank of the River Ouse. Given this, hedgerow planting in the Habitat Provision Area is also not expected to result in any significant noise and vibration disturbance of functionally-linked land that may be used by European Site Qualifying Interest species. The hedgerow planting works in the Habitat Provision Area are therefore not expected to trigger LSE and will not be considered further in this report.

3.5.18. The Drax Power Station Site and East Construction Laydown Area, where the majority of construction activities would occur, are located more than 1 km from any European Site (see **Figure 2**). The Study Area for the construction and decommissioning noise and vibration assessment is set at 1 km from the Order Limits (see **Section 7.6** of **Chapter 7 (Noise and Vibration)** of the ES (document reference 6.1.7). Given that activities within the Habitat Provision Area would be limited to hedgerow planting, construction and demolition activities would not take place within 1 km of any European Site. As such, there is no prospect of noise and vibration from

the Proposed Scheme affecting land inside the boundary of any European Site. This will not be considered further in this report.

3.5.19. As described in **Table 3.3**, mobile species that are qualifying interests of European Sites may also use habitats outside the boundary of a European Site. This land can be important for sustaining these species, and hence for maintaining the populations for which the European Site has been designated.

3.5.20. **Table 3.4** summarises which European Sites could potentially experience LSE due to noise and vibration disturbance of qualifying features. A rationale for the decisions made is also included.

Table 3.4 - Potential for Noise and Vibration Disturbance on Functionally-linked Land

Site	Potential for noise disturbance on functionally-linked land?	Rationale
River Derwent SAC	No	Qualifying interests of the SAC include otter, river and sea lamprey, bullhead, and river habitats. As set out in **Table 3.3**, otters may use riparian habitats adjacent to the Proposed Scheme, with evidence previously recorded along Carr Dyke. Otter may occasionally also use terrestrial habitats and the local ditch network within the Habitat Provision Area when moving through the wider landscape. Otters are not expected to use habitats within the Power Station Site, within or adjacent to the East Construction Laydown Area, or the Off-Site Habitat Provision Areas, due to a lack of suitable aquatic habitat and/or distance from substantial water bodies. Sea and River lamprey are not expected to use Carr Dyke due to the barrier posed by pumping station infrastructure at the confluence with the River Ouse. Bullhead will not be present in the Stretches of the River Ouse adjacent to the Proposed Scheme, as this species is associated with freshwater habitats and is not tolerant of saline conditions (the River Ouse is tidal adjacent to the Proposed Scheme). Given the above, otters that form part of the River Derwent / Lower Derwent Valley SAC populations could potentially be subject to noise disturbance during construction. No other qualifying interests of this SAC are expected to be subject to noise disturbance during construction, as they are not expected to occur in the 1 km study area for construction noise. The assessment of noise and vibration presented in the ES considered several Biodiversity Receptors. The locations of these are shown on **Figure 7.2** of **Chapter 7** (Noise and Vibration) of the ES (document reference 6.2.7.2). The results of the construction and operational noise modelling for Biodiversity Receptors are set out in **Table 1** of **Appendix 7.6 (Biodiversity Receptors)** of of the ES (document reference 6.3.7.6). The closest Biodiversity Receptors to the Carr Dyke (BR 2 – BR6) are predicted to experience maximum noise levels of 39 LAeq,T dB. Noise levels under 40dB are equivalent or quieter than ‘a quiet office’ (Health and Safety Executive, 2022). Given the low level of predicted noise at Biodiversity Receptors, construction and decommissioning noise is not likely to lead to any changes in behaviour by otters, in the event they were using the Carr Dyke or other habitats within or adjacent to the Habitat Provision Area. As such LSE are not predicted in relation to otter, or any other qualifying interest.
Lower Derwent Valley SAC	No	The closest part of the Lower Derwent Valley SAC is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the SAC include otter, hay meadow, and alluvial woodland habitats. The habitats are absent from the Site and are also not sensitive to visual disturbance. As set out in the row above concerning the River Derwent SAC, otters can have very large home ranges and may use habitats within and adjacent to the Proposed Scheme. Otters that form part of the Lower Derwent Valley SAC population may also use habitats outside the SAC, potentially including Carr Dyke adjacent to the Proposed Scheme. The assessment of potential noise and vibration LSE on otter is the same as presented for the River Derwent SAC in the row above. Noise and vibration levels at the closest sections of Carr Dyke to the Proposed Scheme are not expected to lead to any change in otter behaviour.
Lower Derwent Valley SPA	No	The closest part of the Lower Derwent Valley SPA is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the SPA include several species of wildfowl and wader, as set out in **Table 3.2**. Agricultural habitats within the Habitat Provision Area, Off-site Habitat Provision Area, and the East Construction Laydown Area could be used on occasion by some of the bird species which are qualifying interests of the SPA. The off-site Habitat Provision Area includes 2.72 hectares of scrub and former arable farmland habitats that could potentially be of some limited value to wintering SPA bird species for foraging and roosting. The woodland in the north of the Off-site Habitat Creation Area does not provide suitable habitat for SPA bird species. The off-site Habitat Provision Area would not

Site	Potential for noise disturbance on functionally-linked land?	Rationale
		be subject to construction activities, rather the habitat present would be enhanced to deliver ecological mitigation and support the delivery of Biodiversity Net Gain (see the **Outline Landscape and Biodiversity Strategy** (document reference 6.6). Part of the East Construction Laydown Area and habitats to the east of it were included in wintering bird surveys completed between October 2020 and March 2021 (see **Appendix 8.3** of **Chapter 8 (Ecology)** of Volume 3 of the ES (document reference 6.3.8.3) including **Figure 8.3** of that report). No SPA bird species were recorded in the vicinity of the East Construction Laydown Area. As such, the East Construction Laydown Area is not considered to be of importance for SPA bird species and is not considered to be functionally-linked land. In addition, the East Construction Laydown Area would be returned to its existing land-use post-construction. The East Construction Laydown Area will not be considered further in relation to noise disturbance of functionally-linked land. Noise and vibration from habitat creation and management activities in the Off-site Habitat Provision Area could potentially disturb low numbers of SPA bird species, should any be present at the time that habitat creation activities occurred. If any SPA birds were displaced, it is likely that these would be displaced to other suitable habitat in the surrounding landscape. It should be noted that the Off-site Habitat Provision Area is bisected by a footpath, and as such is already subject to a degree of regular disturbance from human activity such as dog-walking. Initial habitat creation activities in this area would likely take less than six months to complete, with occasional follow-up visits to complete habitat management and check on how vegetation is developing. Such visits would be equivalent to ongoing agricultural activities in the wider landscape and are not considered to trigger LSE. Given the relatively small size of the off-site Habitat Provision Area, its distance from the River Ouse, and the short duration and low intensity of habitat creation, noise and vibration disturbance would be unlikely to affect more than a very small proportion (significantly less than 1% of any qualifying interest population) of SPA bird species. In the event that low numbers of SPA bird species were displaced, there is extensive alternative habitat available in the local area that they could occupy instead. As such, any displacement of SPA bird species that did occur is not expected to materially affect their condition or ability to persist in the environment. The assessment of noise and vibration presented in the ES considered several Biodiversity Receptors. The locations of these are shown on **Figure 7.2 (Biodiversity Noise Sensitive Receptor Locations)** of the ES (document reference 6.2.7.2). The results of the construction and operational noise modelling for Biodiversity Receptors are set out in **Table 1** of **Appendix 7.6 (Biodiversity Receptors)** of the ES (document reference 6.3.7.6). Several Biodiversity Receptors (BR 2 – BR6) are located to the north of Drax Power Station Site, within the Habitat Provision Area. These locations were selected in order to assess potential noise impacts from construction and decommissioning activities. The maximum predicted noise levels are 39 LAeq,T dB. Noise levels under 40dB are equivalent or quieter than 'a quiet office' (Health and Safety Executive, 2022). In addition, research collated to inform assessments of waterbird disturbance identifies that SPA bird species are unlikely to be displaced by noise levels under 55dB (European Union, 2022). In light of the above, no LSE are predicted in relation to noise and vibration disturbance of SPA bird species.
Lower Derwent Valley Ramsar	No	The closest part of the Lower Derwent Valley Ramsar is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the Ramsar include several species of wildfowl and wader, as set out in **Table 3.2.** Some of the criteria for designation of the Ramsar Site overlap with the qualifying interests of the Lower Derwent Valley SPA. Qualifying interests of the Ramsar Site also include flood meadow habitats and wetland invertebrate species. These habitats are not present within the Site, and there is no comparable wetland habitat within the Site that could support the wetland invertebrate community associated with the Ramsar Site. The analysis of potential noise and vibration disturbance of functionally-linked land for Ramsar bird species is the same as that presented for Lower Derwent Valley SPA in the row above. In light of this, no LSE are predicted in relation to noise and vibration disturbance of Ramsar bird species.
Humber Estuary SAC	No	The closest part of the Humber Estuary SAC is located approximately 6.4 km from the Proposed Scheme.

Site	Potential for noise disturbance on functionally-linked land?	Rationale
		None of the qualifying interest habitats occur within the Site (see **Figure 8.3 (Phase 1 Habitats)** of the ES (document reference 6.2.8.3). There are no habitats suitable to support the qualifying interest species (sea and river lamprey, and grey seal) in areas that could be subject to significant noise and vibration. In light of this, no LSE are predicted in relation to noise and vibration disturbance of SAC qualifying interests.
Humber Estuary SPA	No	The closest part of the Humber Estuary SPA is located approximately 6.4 km from the Proposed Scheme. Agricultural habitats within the Off-site Habitat Provision Area, and the East Construction Laydown Area could be used on occasion by some of the bird species which are qualifying interests of the SPA. The off-site Habitat Provision Area includes 2.72 hectares of scrub and former arable farmland habitats that could potentially be of some limited value to wintering SPA bird species for foraging and roosting. The woodland in the north of the Off-site Habitat Creation Area does not provide suitable habitat for SPA bird species. The off-site Habitat Provision Area would not be subject to construction activities, rather the habitat present would be enhanced to deliver ecological mitigation and support the delivery of Biodiversity Net Gain (see the **Outline Landscape and Biodiversity Strategy** (document reference 6.6). Part of the East Construction Laydown Area and habitats to the east of it were included in wintering bird surveys completed between October 2020 and March 2021 (see **Appendix 8.3** of the ES (document reference 6.3.8.3) including **Figure 8.3** of that report). No SPA bird species were recorded in the vicinity of the East Construction Laydown Area. As such, the East Construction Laydown Area is not considered to be of importance for SPA bird species and is not considered to be functionally-linked land. In addition, the East Construction Laydown Area would be returned to its existing land-use post-construction. The East Construction Laydown Area will not be considered further in relation to loss or disturbance of functionally-linked land. Noise and vibration from habitat creation and management activities in the Off-site Habitat Provision Area could potentially disturb low numbers of SPA bird species, should any be present at the time that habitat creation activities occurred. If any SPA birds were displaced, it is likely that these would be displaced to other suitable habitat in the surrounding landscape. It should be noted that the Off-site Habitat Provision Area is bisected by a footpath, and as such is already subject to a degree of regular disturbance from human activity such as dog-walking. Initial habitat creation activities in this area would likely take less than six months to complete, with occasional follow-up visits to complete habitat management and check on how vegetation is developing. Such visits would be equivalent to ongoing agricultural activities in the wider landscape. Given the relatively small size of the off-site Habitat Provision Area, its distance from the River Ouse, and the short duration and low intensity of habitat creation, noise and vibration disturbance would be unlikely to affect more than a very small proportion (significantly less than 1% of any qualifying interest population) of SPA bird species. In the event that low numbers of SPA bird species were displaced, there is extensive alternative habitat available in the local area that they could occupy instead. As such, any displacement of SPA bird species that did occur is not expected to materially affect their condition or ability to persist in the environment. The assessment of noise and vibration presented in the ES considered several Biodiversity Receptors. The locations of these are shown on **Figure 7.2** of the ES (document reference 6.2.7.2). The results of the construction and operational noise modelling for Biodiversity Receptors are set out in **Table 1** of **Appendix 7.6 (Biodiversity Receptors)** the ES (document reference 6.3.7.6). Several Biodiversity Receptors (BR 2 – BR6) are located to the north of Drax Power Station Site, within the Habitat Provision Area. These locations were selected in order to assess potential noise impacts from construction and decommissioning activities. The maximum predicted noise levels are 39 LAeq,T dB. Noise levels under 40dB are equivalent or quieter than ‘a quiet office’ (Health and Safety Executive, 2022). In addition, research collated to inform assessments of waterbird disturbance identifies that SPA bird species are unlikely to be displaced by noise levels under 55dB (European Union, 2022). In light of the above, no LSE are predicted in relation to noise and vibration disturbance of SPA bird species.
Humber Estuary Ramsar	No	The closest part of the Humber Estuary Ramsar Site is located approximately 6.4 km from the Proposed Scheme.

Site	Potential for noise disturbance on functionally-linked land?	Rationale
		Qualifying interests of the Ramsar Site include marine and intertidal habitats, grey seal, natterjack toad, sea and river lamprey, and species of wildfowl and wader, as set out in **Table 3.2**. None of the qualifying interest habitats occur within the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3). There are no habitats suitable to support the non-bird qualifying interest species (sea and river lamprey, natterjack toad, and grey seal) within or adjacent to the Site. As such, the Proposed Scheme would not result in noise or vibration disturbance of these species. The analysis of potential noise and vibration disturbance of functionally-linked land for Ramsar bird species is the same as that presented for Humber Estuary SPA in the row above. In light of this, no LSE are predicted in relation to noise and vibration disturbance of SPA bird species.
Skipwith Common SAC	No	The closest part of Skipwith Common SAC is located approximately 7.2 km from the Proposed Scheme. Qualifying Interests of the SAC include heathland habitats, as set out in **Table 3.2**. None of the qualifying interest habitats occur within or adjacent to the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3) and habitats are not at risk from noise and vibration. As such, noise and vibration is not a relevant impact pathway for this SAC.
Thorne & Hatfield Moors SPA	No	The closest part of Thorne and Hatfield Moors SPA is located approximately 9.1 km from the Proposed Scheme. The only qualifying interest of the SPA is nightjar, as set out in **Table 3.2** This species is strongly associated with heathland, moorland, woodlands with large clearings and recently felled plantations. There are no such habitats within or adjacent to the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3) and nightjar are not expected to use habitats within or adjacent to the Site. In light of this, no LSE are predicted in relation to noise and vibration disturbance of nightjar as the sole qualifying interest of the SPA.
Thorne Moor SAC	No	The closest part of Thorne Moor SAC is located approximately 9.1 km from the Proposed Scheme. The only qualifying interest of the SAC is degraded raised bog, as set out in **Table 3.2**. There is no qualifying interest habitat within or adjacent to the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3) and habitats are not sensitive to noise and vibration impacts. As such, noise and vibration is not a relevant impact pathway for this SAC.

Increased Visual Disturbance from Plant and Personnel

3.5.21. During construction and decommissioning there would be increased levels of human activity relative to the baseline situation. Additional personnel would be present working on the Drax Power Station Site, with a peak of up to 1,000 workers required to construct the Proposed Scheme. Large machinery such as excavators and piling rigs would also be present on the Power Station Site.

3.5.22. Visual disturbance of European Site qualifying interest species could occur from the following activities:

a. Use of the East Construction Laydown Area for laydown of plant, equipment and materials, light fabrication, storage of topsoil from the area and as an overflow car park during construction;

b. Use of the Drax Power Station Site Construction Laydown Area in the woodyard (see Figure 3) for laydown and heavy fabrication;

c. Should option 1 for the Carbon Dioxide Delivery Terminal Compound be chosen (see **paragraph 2.2.44** of **Chapter 2** (Site and Project Description) of Volume 1 of the ES (document reference 6.1.2) construction of this in the woodyard could disturb qualifying interest species using habitats to the north (e.g., Carr Dyke and Habitat Provision Area);

d. Presence of additional people and light vehicles during hedgerow planting and establishment maintenance in the Habitat Provision Area; and

e. Increased human presence and use of farm machinery / construction equipment (e.g., 7.5 tonne excavator) during habitat creation works in the Off-site Habitat Provision Area.

3.5.23. No other construction or decommissioning activities are expected to lead to visual disturbance of European Site qualifying interest species. This is because other construction and decommissioning activities would take place within parts of the Drax Power Station Site that are screened from locations that could be used by European Site qualifying interests.

3.5.24. The Proposed Scheme is located 0.7 km or more from any European Site. The closest part of the Proposed Scheme to any European Site is the Habitat Provision Area, which is approximately 0.7 km from the River Derwent SAC (See **Figure 2 (European Sites within 5km)**). Activities in the Habitat Provision Area would be limited to hedgerow planting (see **Figure 2** of **The Outline Landscape and Biodiversity Strategy** (document reference 6.6.2.2). This would be a low impact activity, that would be of a short duration (days or weeks), be equivalent to baseline agricultural activities in the Habitat Provision Area, and in addition be screened from the River Derwent by flood defence embankments on the southern bank of the River Ouse. Given this, hedgerow planting in the Habitat Provision Area is not expected to result in any significant visual disturbance within any European Site.

3.5.25. The Drax Power Station Site and East Construction Laydown Area, where the majority of construction activities would occur, are located more than 1 km from any

European Site (see **Figure 2 (European Sites within 5km)**). As such, there is no prospect of visual disturbance from the Proposed Scheme affecting land inside the boundary of any European Site.

3.5.26. As described in Table 3.3, mobile species that are qualifying interests of European Sites may also use habitats outside the boundary of a European Site. This land can be important for sustaining these species, and hence for maintaining the populations for which the European Site has been designated.

3.5.27. **Table 3.5** summarises which European Sites could potentially experience LSE due to visual disturbance of qualifying features using such functionally-linked land. A rationale for the decisions made is also included.

Table 3.5 - Potential for Visual Disturbance on Functionally-linked Land

Site	Potential for visual disturbance on functionally-linked land?	Rationale
River Derwent SAC	Yes	Qualifying interests of the SAC include otter, river and sea lamprey, bullhead, and river habitats. As set out in **Table 3.3**, otters may use riparian habitats adjacent to the Proposed Scheme, with evidence previously recorded along Carr Dyke. Otter may occasionally also use terrestrial habitats and the local ditch network within the Habitat Provision Area when moving through the wider landscape. Otters are not expected to use habitats within the Power Station Site, within or adjacent to the East Construction Laydown Area, or the Off-Site Habitat Provision Areas, due to a lack of suitable aquatic habitat and/or distance from substantial water bodies. Given the above, otters that form part of the River Derwent / Lower Derwent Valley SAC populations could potentially be subject to visual disturbance during construction. Hedgerow planting in the Habitat Provision Area would not take place within 7 m of the Carr Dyke or any other streams or rivers. Hedgerow planting would also be completed during daylight hours, would be of short duration (days or weeks) and would be equivalent in terms of levels of human activity to baseline agricultural activities. Given this, hedgerow planting in the Habitat Provision Area is considered to have negligible risk of significantly disturbing otter, and there is no prospect of the hedgerow planting works triggering LSE. The risk arises from the use of the Drax Power Station Site Construction Laydown Area in the woodyard, and if included as part of the Proposed Scheme, construction of the Carbon Dioxide Delivery Terminal Compound in the same location. Otters may be discouraged from using areas of the Carr Dyke in proximity to construction activities in this area. As such, there are potential LSE to the otter qualifying feature arising from works in the woodyard area. No other qualifying interests of this SAC are expected to be subject to visual disturbance, as they are not expected to be present in proximity to construction and decommissioning activities and/or are not sensitive to visual disturbance.
Lower Derwent Valley SAC	Yes	The closest part of the Lower Derwent Valley SAC is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the SAC include otter, hay meadow, and alluvial woodland habitats. The habitats are absent from the Site and are also not sensitive to visual disturbance. Otters that form part of the Lower Derwent Valley SAC population may also use habitats outside the SAC, potentially including Carr Dyke adjacent to the Proposed Scheme. The assessment of potential LSE arising from visual disturbance to otter is the same as presented for the River Derwent SAC in the row above. There are potential LSE to the otter qualifying feature arising from works in the woodyard area.
Lower Derwent Valley SPA	Yes	The closest part of the Lower Derwent Valley SPA is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the SPA include several species of wildfowl and wader, as set out in **Table 3.2**. Agricultural habitats within the Off-site Habitat Provision Area, and the East Construction Laydown Area could be used on occasion by some of the bird species which are qualifying interests of the SPA. The off-site Habitat Provision Area includes 2.72 hectares of scrub and former arable farmland habitats that could potentially be of some limited value to wintering SPA bird species for foraging and roosting. The woodland in the north of the Off-site Habitat Creation Area does not provide suitable habitat for SPA bird species. The off-site Habitat Provision Area would not be subject to construction activities, rather the habitat present would be enhanced to deliver ecological mitigation and support the delivery of Biodiversity Net Gain (see the **Outline Landscape and Biodiversity Strategy** (document reference 6.6**)**.

Site	Potential for visual disturbance on functionally-linked land?	Rationale
		Visual disturbance from habitat creation and management activities in the Off-site Habitat Provision Area could potentially disturb low numbers of SPA bird species, should any be present at the time that habitat creation activities occurred. If any SPA birds were displaced, it is likely that these would be displaced to other suitable habitat in the surrounding landscape. It should be noted that the Off-site Habitat Provision Area is bisected by a footpath, and as such is already subject to a degree of regular disturbance from human activity such as dog-walking. Initial habitat creation activities in this area would likely take less than six months to complete, with occasional follow-up visits to complete habitat management and check on how vegetation is developing. Such visits would be equivalent to ongoing agricultural activities in the wider landscape. Given the relatively small size of the off-site Habitat Provision Area, its distance from the River Ouse, and the short duration and low intensity of habitat creation, visual disturbance would be unlikely to affect more than a very small proportion (<1% of any qualifying interest population) of SPA bird species. In the event that low numbers of SPA bird species were displaced, there is extensive alternative habitat available in the local area that they could occupy instead. As such, any displacement of SPA bird species that did occur is not expected to materially affect their condition or ability to persist in the environment. Part of the East Construction Laydown Area and habitats to the east of it were included in wintering bird surveys completed between October 2020 and March 2021 (see **Appendix 8.3** of the ES (document reference 6.3.8.3) including Figure 8.3 of that report). No SPA bird species were recorded in the vicinity of the East Construction Laydown Area. As such, the East Construction Laydown Area is not considered to be of importance for SPA bird species and is not considered to be functionally-linked land. The East Construction Laydown Area will not be considered further in relation to visual disturbance of qualifying interest bird species using functionally-linked land. SPA qualifying interest bird species may also use land within the Habitat Provision Area. These could potentially be subject to visual disturbance from hedgerow planting and management in this area. Hedgerow planting would be completed during daylight hours, would be of short duration (days or weeks) and would be equivalent in terms of levels of human activity to baseline agricultural activities. In addition, there is abundant comparable habitat in the local area, that could be used by SPA bird species in the unlikely event any were displaced. Given this, hedgerow planting in the Habitat Provision Area is considered to have negligible risk of significantly disturbing SPA Qualifying interest bird species, and there is no prospect of the hedgerow planting works triggering LSE. SPA qualifying interest bird species could potentially be subject to visual disturbance during construction. The risk arises from the use of the Drax Power Station Site Construction Laydown Area in the woodyard, and if included as part of the Proposed Scheme, construction of the Carbon Dioxide Delivery Terminal Compound in the same location. SPA bird species may be displaced from using areas of the Habitat Provision Area adjacent to the woodyard. Visual disturbance could occur up to 300 m from where people are working, but the actual distances at which birds could be significantly disturbed are likely to be much less (European Union, 2022). Visual disturbance could occur intermittently throughout construction and decommissioning activities, with construction expected to run from Q1 2024 to Q3/4 2029, a six year period. As such, there are potential LSE from visual disturbance to SPA qualifying interest bird species arising from construction and decommissioning works in the woodyard area.
Lower Derwent Valley Ramsar	Yes	The closest part of the Lower Derwent Valley Ramsar is located approximately 4.7 km from the Proposed Scheme. Qualifying interests of the Ramsar include several species of wildfowl and wader, as set out in **Table 3.2.** Some of the criteria for designation of the Ramsar Site overlap with the qualifying interests of the Lower Derwent Valley SPA. Qualifying interests of the Ramsar Site also include flood meadow habitats and wetland invertebrate species. These habitats are not present within the Site, and there is no comparable wetland habitat within the Site that could support the wetland invertebrate community associated with the Ramsar Site. The analysis of potential visual disturbance of functionally-linked land for Ramsar bird species is the same as that presented for Lower Derwent Valley SPA in the row above.

Site	Potential for visual disturbance on functionally-linked land?	Rationale
		In summary, there are potential LSE from visual disturbance to SPA qualifying interest bird species arising from construction and decommissioning works in the woodyard area. No other construction or decommissioning activities are expected to lead to significant visual disturbance risk to SPA bird species.
Humber Estuary SAC	No	The closest part of the Humber Estuary SAC is located approximately 6.4 km from the Proposed Scheme. None of the qualifying interest habitats occur within the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3). There are no habitats suitable to support the qualifying interest species (sea and river lamprey, and grey seal) in areas that could be subject to visual disturbance. In addition, lamprey are not considered sensitive to visual disturbance and no activities would take place in or adjacent to any watercourse that might support them. In light of this, no LSE are predicted in relation to visual disturbance of SAC qualifying interests.
Humber Estuary SPA	Yes	The closest part of the Humber Estuary SPA is located approximately 6.4 km from the Proposed Scheme. The analysis of potential visual disturbance of functionally-linked land for Ramsar bird species is the same as that presented for Lower Derwent Valley SPA previously in this table. In summary, there are potential LSE from visual disturbance to SPA qualifying interest bird species arising from construction and decommissioning works in the woodyard area. No other construction or decommissioning activities are expected to lead to significant visual disturbance risk to SPA bird species.
Humber Estuary Ramsar	Yes	The closest part of the Humber Estuary Ramsar Site is located approximately 6.4 km from the Proposed Scheme. Qualifying interests of the Ramsar Site include marine and intertidal habitats, grey seal, natterjack toad, sea and river lamprey, and species of wildfowl and wader, as set out in **Table 3.2**. None of the qualifying interest habitats occur within the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3). There are no habitats suitable to support the non-bird qualifying interest species (sea and river lamprey, natterjack toad, and grey seal) within the Site. In addition, lamprey are not considered sensitive to visual disturbance and no activities would take place in any watercourse that might support them. As such, the Proposed Scheme would not result in visual disturbance of these species. In summary, there are potential LSE from visual disturbance to Ramsar qualifying interest bird species arising from construction and decommissioning works in the woodyard area. No other construction or decommissioning activities are expected to lead to significant visual disturbance risk to Ramsar bird species.
Skipwith Common SAC	No	The closest part of Skipwith Common SAC is located approximately 7.2 km from the Proposed Scheme. Qualifying Interests of the SAC include heathland habitats, as set out in **Table 3.2**. None of the qualifying interest habitats occur within or adjacent to the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3) and habitats are not at risk from visual disturbance. As such, visual disturbance is not a relevant impact pathway for this SAC.
Thorne & Hatfield Moors SPA	No	The closest part of Thorne and Hatfield Moors SPA is located approximately 9.1 km from the Proposed Scheme. The only qualifying interest of the SPA is nightjar, as set out in **Table 3.2** This species is strongly associated with heathland, moorland, woodlands with large clearings and recently felled plantations. There are no such habitats within or adjacent to the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3) and nightjar are not expected to use habitats within or adjacent to the Site. In light of this, no LSE are predicted in relation to visual disturbance of nightjar as the sole qualifying interest of the SPA.
Thorne Moor SAC	No	The closest part of Thorne Moor SAC is located approximately 9.1 km from the Proposed Scheme. The only qualifying interest of the SAC is degraded raised bog, as set out in **Table 3.2**.

Site	Potential for visual disturbance on functionally-linked land?	Rationale
		There is no qualifying interest habitat within or adjacent to the Site (see **Figure 8.3** of the ES (document reference 6.2.8.3) and habitats are not sensitive to visual disturbance impacts. As such, noise and vibration is not a relevant impact pathway for this SAC.

POTENTIAL EFFECTS OF THE PROPOSED SCHEME ALONE – OPERATION

3.5.28. This section of the report considers the potential for operation of the Proposed Scheme to result in LSE to European Sites.

Emissions of Treated Flue Gas to Air

3.5.29. The Main Stack will, in the with Proposed Scheme scenario, emit treated gases from the two BECCS (Proposed Scheme) and non-BECCS (not part of the Proposed Scheme) units. As a result of the carbon capture process, these emissions from the Main Stack will contain a significantly reduced fraction of carbon dioxide. A number of gaseous by-products from the carbon capture process will also be emitted in addition to the current flue gas composition. The carbon capture process utilises waste heat from the combustion of biomass. This means that gases emitted from the Main Stack when BECCS is operational would have a reduced temperature relative to emissions from the Main Stack when BECCS is not operational. This in turn reduces dispersal of the gases emitted from the Main Stack, potentially increasing concentrations and deposition rates over ecological receptors within the study area for operational air quality effects.

3.5.30. Operational emissions from the Main Stack, in a with Proposed Scheme scenario, would reach European Sites some distance from the Site. **Paragraph 6.8.8** of **Chapter 6 (Air Quality)** of Volume 1 of the ES (document reference 6.1.6) identifies a study area for European Sites covering a 15 km radius from the Main Stack.

3.5.31. The air quality modelling (see **Paragraph 6.9.22** to **Paragraph 6.9.33** of **Chapter 6 (Air Quality)** of Volume 1 of the ES (document reference 6.1.6) has identified the following impact pathways that could be relevant to European Sites:

- **a.** Emissions of and therefore increased concentrations of oxides of nitrogen (NOx);
- **b.** Emissions of and therefore increased concentrations of ammonia (NH_3);
- **c.** Emissions of and therefore increased concentrations of sulphur dioxide (SO_2);
- **d.** Emissions of NOx, NH_3, and amines may contribute to increased rates of nitrogen deposition onto European Sites; and
- **e.** Emissions of NOx, NH_3, and amines, but primarily SO_2 may contribute to increased rates of acid deposition onto European Sites.

3.5.32. The Air Quality modelling methodology for ecological receptors has been informed by Environment Agency guidance (Environment Agency, 2021) and is set out in full in **Section 6.5** and **Appendix 6.2** of **Chapter 6 (Air Quality)** of Volume 1 of the ES (document references 6.1.6 and 6.2.2 respectively).

3.5.33. Following the EA guidance, if the change in Process Contribution (PC) in the with Proposed Scheme scenario meets both of the following criteria, impacts are considered to be insignificant and further assessment is not required:

- **a.** The short-term PC is less than 10% of the short-term environmental standard for the ecological receptor; and

b. The long-term PC is less than 1% of the long-term environmental standard for the ecological.

3.5.34. If the above criteria are not met, additional criteria are applied as follows:

a. If the short-term PC exceeds the above screening criteria, significant effects cannot be screened out and further assessment is needed; and

b. If the long-term PC is greater than 1% and the PEC is less than 70% of the long-term environmental standard, the emissions are insignificant, and no further assessment is required; or

c. If the PEC is greater than 70% of the long-term environmental standard, significant effects cannot be screened out and further assessment is needed.

3.5.35. Where it is determined that the with Proposed Scheme scenario 'alone' is sufficiently large that significant effects cannot be screened out, based on the above criteria, further ecological assessment is required. It is also necessary to consider whether the with Proposed Scheme scenario in-combination with other plans and projects would exceed the screening criteria, if the with Proposed Scheme alone scenario would not. Further ecological assessment is also required of in-combination impacts that exceed the screening criteria. This is explored in more detail in **Section 3.7** (in-combination assessment of LSE) in this report.

3.5.36. The screening criteria / standards used for each European Site were informed by the following:

a. Statutory ambient air quality standards for both human and ecological receptors;

b. Non-statutory environmental assessment levels (EALs) set by the EA; and

c. Non-statutory critical levels and critical loads for ecological receptors, taken from the APIS website (Air Pollution Information System, 2022).

3.5.37. The initial air quality modelling results for the with Proposed Scheme scenario alone (see **Paragraph 6.7.28** to **Paragraph 6.7.43** of **Chapter 6 (Air Quality)** of the **Preliminary Environmental Information Report** (WSP, 2021) identified impacts on ecological receptors associated with ammonia emissions to air from the Carbon Capture Wastewater Treatment Plant.

3.5.38. For the ES, the design of the Carbon Capture Wastewater Treatment Plant has been changed to utilise a closed steam stripper system. This eliminates emissions of ammonia to air from the Carbon Capture Wastewater Treatment Plant and is considered Primary Mitigation embedded into the Proposed Scheme design (see **Section 2.2** of **Chapter 2 (Project and Site Description)** of the ES (document reference 6.1.2). With this Primary Mitigation in place, the Carbon Capture Wastewater Treatment Plant would have no air quality impacts on European Sites (or any other designated sites).

3.5.39. Prior to the air quality modelling for the ES being completed, an ecological analysis was carried out of all of the European Sites within 15 km of the Main Stack. The purpose of this exercise was to confirm the following:

a. The sensitivity (or otherwise) of the qualifying interests of each European Site to air quality impacts;

b. The appropriate critical load for nitrogen and acid deposition to apply for each European Site / qualifying interest, (where relevant); and

c. The appropriate Critical Level to apply for each European Site / qualifying interest, (where relevant).

3.5.40. This analysis was completed using the 'Site Relevant Critical Loads Tool' from the APIS website (Air Pollution Information System, 2022) citation information for European Sites, and Priority Habitat mapping[3] from the Multi-Agency Geographic Information for The Countryside (MAGIC) website.

3.5.41. A summary of the outcomes of this exercise is presented below in **Table 3.6**, overleaf with full details provided in **Appendix 5**.

[3] In this case, priority habitat mapping refers to priority habitats as identified via the provisions of Section 41 of the Natural Environment and rural Communities ACT (2006), rather than priority Annex 1 habitats as identified via the EC Habitats Directive (2001)

Table 3.6 - European Site Sensitivity to Air Quality Impacts

Site	Sensitivity and (where required) screening criteria for European Sites				
	NOx Critical Level (annual mean) (µg/m^3)	**NH_3 Critical Level (annual mean) (µg/m^3)**	**SO_2 Critical Level (annual mean) (µg/m^3)**	**Nitrogen Deposition Critical Load (kgN/ha/yr)[4]**	**Acid Deposition Critical Load (Keq/ha/yr)[5]**
River Derwent SAC	30	3	20	None – not sensitive (see Appendix 5 and 6)	None – not sensitive (see Appendices 5 and 6)
Lower Derwent Valley SAC	30	3	20	20	MinCLminN: 0.223 | MaxCLminN: 0.438 MinCLMaxS: 0.42 | MaxCLMaxS: 1.57 MinCLMaxN: 0.643 | MaxCLMaxN: 2.008
Lower Derwent Valley SPA	30	3	20	20	None – not sensitive (see Appendices 5 and 6)
Lower Derwent Valley Ramsar	30	3	20	20	MinCLminN: 0.223 | MaxCLminN: 0.438 MinCLMaxS: 0.42 | MaxCLMaxS: 1.57 MinCLMaxN: 0.643 | MaxCLMaxN: 2.008
Humber Estuary SAC	30	3	20	20	None – not sensitive (see Appendix 5)
Humber Estuary SPA	30	3	20	20	None – not sensitive (see Appendix 5)
Humber Estuary Ramsar	30	3	20	20	None – not sensitive (see Appendix 5)
Skipwith Common SAC	30	1	20	10	MinCLminN: 0.642 | MaxCLminN: 1.035 MinCLMaxS: 0.16 | MaxCLMaxS: 0.81 MinCLMaxN: 0.802 | MaxCLMaxN: 1.524
Thorne & Hatfield Moors SPA	30	3	20	10	None – not sensitive (see Appendix 5)
Thorne Moor SAC	30	1	20	5	Maximum: CLminN:.321 CLmaxN: .467 CLmaxS: .146 Minimum: CLminN: .321 CLmaxN: .462 CLmaxS: .141

[4] – Nitrogen (N) deposition presented as average mass deposition (kgN) per hectare (ha) per year (yr). Critical load represents the lower limit of the respective critical load range for the most sensitive feature within the designated site regardless of if it exists within the operational study area, which represents a precautionary approach with reference to IAQM guidance. However, for Lower Derwent Valley SPA, Humber Estuary SPA, and Derwent Ings SSSI where applicable, an appropriate critical load and/or critical level has been provided by the Project Ecologist based on specialist knowledge of the relevant sensitive features located within the designated site inside the operational study area. This also aligns with IAQM guidance, which states that specialist knowledge can be applied to provide a critical load in place of the precautionary lower limit based on all sensitive features within the designated site.

[5]) – Acidification caused by deposition of nitrogen (N) and sulphur (S) presented as kilo equivalents of H+ ions (keq) per hectare per year. Background and critical load values presented based on sum of N and S. Critical load represents the lower limit of the respective critical load range for the most sensitive feature within the designated site.

3.5.42. Paragraphs 6.9.20 to 6.9.33 of Chapter 6 (Air Quality) of Volume 1 of the ES set out the findings of the air quality modelling for ecological receptors, including European Sites. The air quality dispersion modelling results (as set out in **Table 1.1** to **Table 1.6**) of **Appendix 6.5** of Volume 3 of the ES (document reference 6.3.6.5) show that the PC in the with Proposed Scheme scenario is ≤1% of the critical level for all European Sites for NOx, NH_3, and SO_2. The impacts of the operation of the with Proposed Scheme scenario alone on annual nitrogen deposition rates are also classified as insignificant (≤1% of the critical load) at all European Sites.

3.5.43. Therefore, the with Proposed Scheme scenario alone will not result in LSE to any European Site in relation to these pollutants.

3.5.44. The modelled PC in the with Proposed Scheme scenario for acid deposition is above 1% of the respective critical load at sensitive habitats within the Lower Derwent Valley SAC (2.0%), and Thorne Moor SAC (1.3%). Given that background levels of acid deposition at the relevant sensitive habitats within these designated sites already exceed their respective critical loads, the associated with Proposed Scheme scenario PECs exceed the screening criterion (i.e., PEC >70% of critical level).

3.5.45. Significant effects relating to acid deposition at the aforementioned designated sites cannot therefore be screened out on numerical grounds when considering the impacts of the with Proposed Scheme scenario alone. For acid deposition, contributions attributed to the with Proposed Scheme scenario are a small proportion of the existing background levels of deposition at the affected designated sites. That is to say that the risk of exceedance of critical loads or the level of exceedance of the critical load, is wholly dependent on the existing deposition levels and would not be materially affected by the Proposed Scheme.

3.5.46. Given the above, potential LSE have been identified in relation to acid deposition for Lower Derwent Valley SAC/Ramsar and Thorne Moor SAC in the with Proposed Scheme scenario alone.

Operational Noise Disturbance of European Site Qualifying Features

3.5.47. Modelling has been completed to predict the noise generated by the Proposed Scheme during operation. This noise modelling takes into account a series of acoustic mitigation measures designed to reduce noise resulting from operation of the Carbon Capture Plant. These measures are considered to be embedded into the design, and therefore form part of Primary Mitigation, as set in **Section 2.2** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2). These embedded measures primarily comprise acoustic enclosures and cladding, that would reduce the level of noise otherwise generated by the Carbon Capture Plant. They have been included in the Scheme design to mitigate effects on human receptors, with European Sites not being considered when the measures were developed. They form an integral part of the Proposed Scheme design, and the draft DCO (document reference 3.1) would not allow for the Proposed Scheme to be built without these measures included. As such, these measures are not considered to be

affected by the People Over Wind judgment (People over Wind and Peter Sweetman v Coillte, 2018), and can be considered when screening for LSE on European Sites.

3.5.48. The results of the assessment for Biodiversity Receptors are set out in **Table 2** of **Appendix 7.6** of **Chapter 7 (Noise and Vibration)** of Volume 3 of the ES (document reference 6.3.7.6). The locations of the modelled Biodiversity Receptors are shown on **Figure 7.2** of **Chapter 7 (Noise and Vibration)** in Volume 2 of the ES (document reference 6.2.7.2). The results of the noise modelling predict a maximum level of noise at any Biodiversity Receptor of 51 LAeq,T dB (at the BRS receptor located on the Main Stack, inside the Power Station Site). The maximum noise level at any Biodiversity Receptor considered to provide functionally linked habitat (Biodiversity Receptor 5) is 28 LAeq,T dB. These levels are equivalent to a 'quiet library' (Health and Safety Executive, 2022). Given the very low levels of noise that would arise from operation of the Carbon Capture Plant, no disturbance of any European Site qualifying interests is predicted to arise.

3.5.49. Habitat management activities in the Habitat Provision Area and Off-site Habitat Provision Area may also generate noise during the operational phase. As discussed in Table 3.3, these areas may be used by low numbers of SPA bird species and otter that are also part of the qualifying interest populations of nearby European Sites. Given that these activities would be carried out only occasionally and would be equivalent to baseline agricultural and other activities in the local area, they are not predicted to generate sufficient noise to disturb qualifying features of European Sites.

3.5.50. In light of the above, no LSE to any European Site are predicted in relation to operational noise and vibration disturbance.

Increased Levels of Visual Disturbance during Operation

3.5.51. The following activities during the operational phase have the potential to cause visual disturbance of European Site qualifying interests:

- **a.** Presence of additional personnel within the Power Station site, in order to run and maintain the Carbon Capture Plant and ancillary equipment;
- **b.** Additional lighting required to support safe and effective operation of the Carbon Capture Plant;
- **c.** Habitat management activities in the Habitat Provision Area and Off-site Habitat Provision Area.

3.5.52. During the operational phase of the Proposed Scheme a workforce of 50 full time staff would be required for operation and maintenance activities (see **Section 2.4** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2). The workforce would typically be working on the Carbon Capture Plant, which would be located within the existing Drax Power Station Site, in areas that are currently dominated by hard-standing and existing structures. The Carbon Capture Plant would also be located in excess of 200 m from the identified functionally-linked land to the north of the existing Power Station Site (Carr Dyke and

Habitat Provision Area) that may be used by Qualifying interests (otters and waterfowl) of European Sites.

3.5.53. Some maintenance and monitoring of the Carbon Dioxide Delivery Terminal Compound may also need to be delivered by the Applicant, if this is constructed as part of the Proposed Scheme. Although the exact location would be confirmed through the detailed design process, the approximate location is likely to be approximately 25 m from the downstream end of the culverted section of Carr Dyke and a similar distance from the Habitat Provision Area to the north. As set out in **Table 3.3**, these areas may be used by low numbers of SPA / Ramsar site bird species. Carr Dyke and the Habitat Provision Area are also likely to be used on occasion by otters, which are a qualifying interest of the River Derwent and Lower Derwent Valleys SACs.

3.5.54. As set out above, a relatively low number of personnel would be involved in operation and maintenance of the Proposed Scheme and the majority of their time would be spent in the vicinity of the Carbon Capture Plant. There is considered to be a negligible risk of disturbance of European Site qualifying interests using functionally-linked land adjacent to the Proposed Scheme.

3.5.55. Additional lighting is likely to be required during the operational phase of the Proposed Scheme, to support safe 24/7 working. Lighting will be required primarily in relation to any new infrastructure. As such, the majority of any new lighting is likely to be required in the vicinity of the Carbon Capture Plant. This would be located amongst existing buildings and other infrastructure where there is existing lighting, away from the periphery of the existing Power Station Site. As such, any new lighting required for the Carbon Capture Plant is unlikely to introduce significant illumination into functionally-linked land that could be used by SPA / Ramsar birds or otters. The Carbon Dioxide Delivery Terminal (if delivered as part of the Proposed Scheme) would have minimal lighting requirements (see **paragraph 2.2.43** of **Chapter 2 (Site and Project Description)** of the ES (document reference 6.1.2).

3.5.56. Given the locations where lighting may be required, no significant light spill onto functionally-linked land that may be used by European Site qualifying interests is predicted. No LSE are expected to arise from operational lighting.

3.5.57. In addition, the design of any new lighting would adhere to the principles set out in the **Draft Lighting Strategy** (document reference 6.7), which includes requirements for the ecologically sensitive design of lighting, although this is not considered necessary to avoid LSE.

3.5.58. During the operational phase, habitat establishment, maintenance and management activities will be required intermittently within the Habitat Provision Area (for hedgerow planting) and the Off-Site Habitat Provision Area (for grassland, scrub, and hedgerow habitats). Such activities would take place on an occasional basis and would be relatively non-intrusive. Further details of proposed habitat management and maintenance are set out in the **Outline Landscape and Biodiversity Strategy** (document reference 6.6).

3.5.59. As set out in **Table 3.3,** the Habitat Provision Area and Off-site Habitat Provision Area may be used by low numbers of SPA / Ramsar bird species, and in the case of the Habitat Provision Area and the adjacent Carr Dyke, by otter. Otter is a qualifying interest of the nearby River Derwent SAC and Lower Derwent Valley SAC.

3.5.60. Given the nature of the proposed habitat maintenance and management requirements, with activities equivalent to ongoing baseline agricultural activities, these are not predicted to lead to significant disturbance of European Site qualifying interests using functionally-linked land. As such, no LSE are predicted to arise.

Accidental releases of water-borne pollutants

3.5.61. As set out between **paragraph 12.9.30 and 12.9.32** of **Chapter 12 (Water Environment)** in Volume 1 of the ES (document reference 6.1.12), in the absence of mitigation Carr Dyke and River Ouse may be at increased risk of pollution from accidental spillages of oils, hydrocarbons, and hazardous substances during operation. The assessment presented in the Water Environment chapter of the ES identifies the potential for significant adverse effects to Carr Dyke and the River Ouse.

3.5.62. In the event of an accidental release of water-borne pollutants into Carr Dyke or River Ouse, this could temporarily reduce the suitability of these watercourses for foraging otter. In the event of a significant spill vegetation and fish populations could be impacted, reducing the suitability of the watercourse for foraging otter in the short to medium term. Any otters using the Carr Dyke / River Ouse may also be part of the qualifying interest populations of the River Derwent SAC and Lower Derwent Valley SAC.

3.5.63. In addition, the River Ouse is a migratory route for river and sea lamprey including those moving between the Humber Estuary and the River Derwent. Sea and river lamprey using the River Ouse are also likely to be part of the qualifying interest populations for which the River Derwent SAC and Humber Estuary SAC and Ramsar have been designated. Carr Dyke and River Ouse may also be used by wintering birds that are associated with Lower Derwent Valley (SPA and Ramsar) and Humber Estuary (SPA and Ramsar). As such, there is the potential for LSE on these SAC, SPA, and Ramsar Sites.

SUMMARY OF PROPOSED SCHEME POTENTIAL LSE ALONE

3.5.64. **Table 3.7** summarises the potential LSE that could arise from the Proposed Scheme alone.

Table 3.7 - Summary of Potential LSE from Proposed Scheme alone

Impact Pathway	European Sites with potential LSE
Construction and Decommissioning Phase	
Loss of functionally-linked land	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Emissions of dust	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Increased risk of pollution from sediment load	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Accidental releases of water-borne pollutants	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar.
Disturbance from Noise and Vibration	None
Increased visual disturbance from plant and personnel	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Operation Phase	
Emissions of treated flue gas to air in with Proposed Scheme scenario	Lower Derwent Valley SAC, Lower Derwent Valley Ramsar, Thorne Moor SAC
Operational Noise Disturbance	None
Increased Levels of Visual	None

Impact Pathway	European Sites with potential LSE
Disturbance during operation	
Accidental releases of water-borne pollutants	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar.

IN-COMBINATION IMPACTS AND EFFECTS

3.5.67. This section of the HRA Report identifies effects that may arise from The Proposed Scheme in combination with other plans and projects. Each of the impact pathways that have been identified for the Main Scheme are reassessed, with consideration to how those impacts could be changed by the other plans and projects brought forward for in-combination assessment.

Construction

3.5.68. Consideration is given below to how each of the impact pathways arising from the Proposed Scheme during construction could be influenced by other plans and projects.

Loss of Functionally-linked Land

3.5.69. As set out in **Table 3.3** there is potential for minor loss of functionally-linked land to arise from the Proposed Scheme alone, in relation to the following Sites and qualifying interests:

a. River Derwent SAC (otter);

b. Lower Derwent Valley SAC (otter);

c. Lower Derwent Valley SPA (qualifying interest bird species);

d. Lower Derwent Valley Ramsar (qualifying interest bird species);

e. Humber Estuary SPA (qualifying interest bird species); and

f. Humber Estuary Ramsar (qualifying interest bird species)

3.5.70. Table 3.8 below assesses whether each of the other plans and projects could contribute to losses of functionally-linked land, in-combination with other plans and projects. Further details relating to each of the projects assessed are provided in Appendix 18.3 (Cumulative Assessment Matrix) of Chapter 18 (Cumulative Effects) of the ES (document reference 6.3.18.3).

Table 3.8 - HRA Screening In-combination Assessment: Loss of Functionally-linked Land

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through their operational air quality impacts combining with the with Proposed Scheme scenario for air quality purposes. As such, they could not contribute to in-combination effects during construction.
Development 3: SEGL2	Development 3 is predicted to be constructed between 2024 – 2031. It would have no permanent landtake within the ZoI of the Proposed Scheme other than for a Convertor Station. This would be located in part of an arable field, located to the south of the East Construction Laydown Area (see Figure 18.2 of Chapter 18 (Cumulative Effects) of the ES (document reference 6.2.18.2). This would result in permanent loss of part of the arable land. No other habitats are expected to be permanently lost. It is possible that the field where the Convertor Station will be situated could be used occasionally by birds that also form part of the Lower Derwent Valley SPA and Ramsar and the Humber Estuary SPA and Ramsar. There is therefore potential for minor loss of habitat that may be used by SPA/Ramsar bird species. Installation of the HVDC cable for Development 3 could potentially result in temporary disturbance of functionally-linked habitat used by otters. Detailed information on the proposed location of the cable was not available for assessment. The EIA Scoping Report for Development 3 states that a crossing of the River Ouse downstream of the Proposed Scheme would be required. This would be installed under the River Ouse by Horizontal Directional Drilling (HDD) or similar, so is not expected to physically affect the river itself. Machinery would however need to be used either side of the river, to complete the HDD process. The cable may also be installed across smaller watercourses by open-cut techniques, with these subsequently reinstated. The cable is also likely to be installed across other land by open-cut techniques, which would lead to temporary and short-term loss and disturbance of a narrow footprint of land along the cable route. Installation of the cable could therefore also lead to short-term temporary loss of functionally-linked habitat that may be used by SPA/Ramsar bird species that form part of the Lower Derwent Valley SPA/Ramsar and the Humber Estuary SPA and Ramsar populations. Cable installation could also lead to short-term temporary loss of functionally-linked habitat used by otter that form part of the River Derwent and Lower Derwent Valley SACs. There is therefore potential for Development 3 to contribute to in-combination loss and disturbance of functionally-linked land during construction, worsening the potential LSE from the Proposed Scheme alone.
Development 6 – Barlow Mound Ash reclamation	Development 6 involves proposals for the mining and reclamation of ash from the 'Barlow mound'. Barlow Mound has been used and remains in use for the disposal of ash generated by combustion of biomass at the Drax Power Station Site. Following reclamation of ash, the site would be restored. Development 6 is located approximately 600m west of the Proposed Scheme. Barlow Mound is known to support a range of habitats and protected and notable species, having been subject to a long-term programme of ecological monitoring and management by Drax. An EIA Scoping Report has been submitted to SDC, but no assessment of the potential ecological effects of Development 6 is yet available other than identification of potential impact pathways and high-level mitigation principles. Habitats within Barlow Mound include areas of grassland, that could be used by wintering birds associated with the Lower Derwent Valley SPA and Ramsar and Humber Estuary SPA and Ramsar sites. It is therefore possible that reclamation works for Barlow Mound could result in some loss of habitat that may be used by SPA birds. Whilst Barlow Mound does include suitable areas of open grassland, field units are small and there are also extensive blocks of woodland present. Any use by SPA / Ramsar bird species is therefore likely to be relatively limited but cannot be ruled out in its entirety. There is therefore potential for in-combination LSE with the Proposed Scheme.
Development 9 – erection and operation of five wind turbines	Development 9 would involve the erection and subsequent operation of five wind turbines. Development 9 is located approximately 1.9km west of the Proposed Scheme.

Development ID and Name	Summary of potential in-combination LSE
	An EIA Screening request was issued to SDC in March 2021, with SDC issuing an EIA Screening Opinion in June 2021 confirming an ES is required. The response from the NYCC Planning Ecologist identifies that they consider Development 9 needs to consider potential impacts on bird species associated with designated sites including the Lower Derwent Valley SPA / Ramsar and other SPA sites. The NYCC ecologist identifies that a shadow HRA and bird survey information should be submitted with any planning application for Development 9. No other environmental information was available for Development 9. It is possible that construction and operation of Development 9 could displace SPA bird species, that would otherwise use the habitats present, effectively leading to loss of functionally-linked land. There is therefore an in-combination risk of LSE, although this cannot be assessed with any accuracy without bird survey data for Development 9.
Development 10 – solar farm	Development 10 involves the construction of a new solar farm across a 112ha site located approximately 1 km from the Proposed Scheme. The response from the NYCC Ecologist to the planning application states that significant effects on the River Derwent SAC / SSSI can be ruled out, and that no further assessment under the Conservation of Habitats and Species Regulations (2017, as amended) is needed. On this basis, and given the scale and location of Development 10, there is considered to be no prospect of in-combination effects with the Proposed Scheme.
Development 12 – Flue Gas Demolition	Development 12 involves the demolition of existing flue gas desulphurisation infrastructure within the existing Drax Power Station Site. Demolition activities will overlap spatially with the Proposed Scheme and may be taking place during the early phase of the Construction of the Proposed Scheme (Development 12 is expected to be completed by 2027). As such Development 12 could be being implemented during construction of the Proposed Scheme. Development 12 is located entirely within the existing Drax power Station Site and is more than 100 m from the closest functionally-linked land to the north of the Power Station Site (Carr Dyke and Habitat Provision Area). As such, Development 12 will cause no loss or disturbance of functionally-linked land and cannot contribute to in-combination LSE in relation to this type of impact.

EMISSIONS OF DUST

3.5.73. Table 3.9 below assesses whether each of the other plans and projects could contribute to increased dust deposition in functionally-linked land also affected by the Proposed Scheme.

Table 3.9 - HRA Screening In-combination Assessment: Dust

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through their operational air quality impacts combining with the with Proposed Scheme scenario for air quality purposes. As such, they could not contribute to any in-combination effects during construction.
Development 3: SEGL2	Development 3 is located more than 50 m from any of the functionally-linked land that could be affected by dust deposition from the Proposed Scheme (**see Table 3.3** for description of the Proposed Scheme's effects alone). As such, there is no prospect of any dust generated by Development 3 affecting areas of functionally-linked land that may be affected by dust from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 3 and the Proposed Scheme.

Development ID and Name	Summary of potential in-combination LSE
Development 6 – Barlow Mound Ash reclamation	Development 6 is located more than 50 m from any of the functionally-linked land that could be affected by dust deposition from the Proposed Scheme. As such, there is no prospect of any dust generated by Development 6 affecting areas of functionally-linked land that may be affected by dust from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 6 and the Proposed Scheme.
Development 9 – erection and operation of five wind turbines	Development 9 is located more than 50 m from any of the functionally-linked land that could be affected by dust deposition from the Proposed Scheme. As such, there is no prospect of any dust generated by Development 9 affecting areas of functionally-linked land that may be affected by dust from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 9 and the Proposed Scheme.
Development 10 – solar farm	Development 10 is located more than 50 m from any of the functionally-linked land that could be affected by dust deposition from the Proposed Scheme. As such, there is no prospect of any dust generated by Development 10 affecting areas of functionally-linked land that may be affected by dust from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 10 and the Proposed Scheme.
Development 12 – Flue Gas Demolition	Development 12 is located more than 50 m from any of the functionally-linked land that could be affected by dust deposition from the Proposed Scheme. Beyond 50 m from a dust source, there is no requirement to assess the potential effect of dusts on ecological receptors, as any effects would be negligible and hence *de minimis* (Holman. C., 2014). As such, there is no prospect of any dust generated by Development 12 affecting areas of functionally-linked land that may be affected by dust from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 12 and the Proposed Scheme.

INCREASED RISK OF POLLUTION FROM SEDIMENT LOADING

3.5.76. Table 3.10 below assesses whether each of the other plans and projects could contribute to increased sediment loading in functionally-linked land also affected by the Proposed Scheme.

Table 3.10 - HRA Screening In-combination Assessment: Sediment Loading

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through their operational air quality impacts combining with the with Proposed Scheme scenario for air quality purposes. As such, they could not contribute to any in-combination effects during construction.
Development 3: SEGL2	Development 3 is predicted to be constructed between 2024 – 2031; construction of this Project therefore overlaps with construction of the Proposed Scheme. Installation of the HVDC cable for Development 3 could generate increased sediment-loading of watercourses, as a consequence of excavation works to install and reinstate the cable. Detailed information on the exact location of the proposed cable was not available for assessment. The EIA Scoping Report for Development 3 does identify that a crossing of the River Ouse downstream of the Proposed Scheme would be required. This would be installed under the River Ouse by Horizontal Directional Drilling (HDD) or similar, so is not expected to physically affect the river itself. Machinery would however need to be used either side of the river, to complete the HDD process, and the cable may also be installed in adjacent fields and across smaller watercourses by open-cut techniques, with these subsequently reinstated. The Proposed Scheme alone may lead to increased sediment loading of Carr Dyke (see **paragraphs 3.5.11** to **3.5.12**). No effects whatsoever are predicted for any other functionally-linked land that may be used by European Site qualifying interests. Development 3 would be located to the east of the Proposed

Development ID and Name	Summary of potential in-combination LSE
	Scheme, with the HVDC crossing of the River Ouse downstream of the Proposed Scheme and hence also downstream of Carr Dyke. As such, there is no prospect of in-combination LSE between Development 3 and the Proposed Scheme.
Development 6 – Barlow Mound Ash reclamation	Development 6 involves proposals for the mining and reclamation of ash from the 'Barlow mound'. It is located within 100 m of the Proposed Scheme. The cumulative assessment of effects on the Water Environment (see **Table 1.8** in **Appendix 18.5 (Cumulative Effects Assessment Matrix)** of the ES (document reference 6.3.18.5) identifies no cumulative effects on surface water features between the Proposed Scheme and Development 6. As such, in-combination LSE between Development 6 and the Proposed Scheme are not predicted to arise.
Development 9 – erection and operation of five wind turbines	Development 9 is located approximately 1.9 km from the Proposed Scheme. It has been scoped out of the cumulative assessment of effects on the Water Environment (see **Table 1.8** in **Appendix 18.4 (Justification of Scoping)** in Volume 3 of the ES (document reference 6.3.18.4)). As such, there is no prospect of any sediment-loading generated by Development 9 affecting areas of functionally-linked land that may be affected by sediment-loading from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 9 and the Proposed Scheme.
Development 10 – solar farm	Development 10 involves the construction of a new solar farm across a 112ha site located approximately 1 km from the Proposed Scheme. It has been scoped out of the cumulative assessment of effects on the Water Environment (see **Table 1.8** in **Appendix 18.4 (Justification of Scoping)** of the ES (document reference 6.3.18.4)). As such, there is no prospect of any sediment-loading generated by Development 10 affecting areas of functionally-linked land that may be affected by sediment-loading from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 10 and the Proposed Scheme.
Development 12 – Flue Gas Demolition	As set out in **Paragraph 2.1.8** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2), flue gas demolition works are scheduled to take place between 2022 – 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. As such, it is not possible for construction and decommissioning sediment-loading from the Proposed Scheme to combine with sediment-loading from Development 12. As such, no in-combination LSE are predicted.

ACCIDENTAL RELEASES OF WATER-BORNE POLLUTANTS

3.5.79. Table 3.11 below assesses whether each of the other plans and projects could contribute to increased waterborne pollution in functionally-linked land also affected by the Proposed Scheme.

Table 3.11 - HRA Screening In-combination Assessment: Water-borne Pollutants

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through their operational air quality impacts combining with the with Proposed Scheme scenario for air quality purpose. As such, they could not contribute to any in-combination effects during construction.
Development 3: SEGL2	Development 3 is predicted to be constructed between 2024 – 2031; construction of this Project therefore overlaps with construction of the Proposed Scheme.

Development ID and Name	Summary of potential in-combination LSE
	Installation of the HVDC cable for Development 3 could generate increased risk of water-borne pollutants to receiving watercourses, including the River Ouse. The cumulative assessment of effects on the Water Environment (see **Table 1.1** in **Appendix 18.5 (Cumulative Effects Assessment Matrix)** of Volume 3 of the ES (document reference 6.3.18.5) identifies the potential for cumulative adverse effects There is therefore potential for Development 3 to contribute to in-combination releases of water-borne pollutants, worsening the potential LSE from the Proposed Scheme alone.
Development 6 – Barlow Mound Ash reclamation	Development 6 involves proposals for the mining and reclamation of ash from the 'Barlow mound'. It is located within 100 m of the Proposed Scheme. The cumulative assessment of effects on the Water Environment (see **Table 1.1** in **Appendix 18.5 (Cumulative Effects Assessment Matrix)** of Volume 3 of the ES (document reference 6.3.18.3) identifies no cumulative effects on surface water features between the Proposed Scheme and Development 6. As such, in-combination LSE between Development 6 and the Proposed Scheme are not predicted to arise.
Development 9 – erection and operation of five wind turbines	Development 9 is located approximately 1.9 km from the Proposed Scheme. It has been scoped out of the cumulative assessment of effects on the Water Environment (see **Table 1.8** in **Appendix 18.4 (Justification of Scoping)** in Volume 3 of the ES (document reference 6.3.18.4)). As such, there is no prospect of any water-borne pollutants generated by Development 9 affecting areas of functionally-linked land that may be affected by water-borne pollution from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 9 and the Proposed Scheme.
Development 10 – solar farm	Development 10 involves the construction of a new solar farm across a 112ha site located approximately 1 km from the Proposed Scheme. It has been scoped out of the cumulative assessment of effects on the Water Environment (see **Table 1.8** in **Appendix 18.4 (Justification of Scoping)** in Volume 3 of the ES (document reference 6.3.18.4)). As such, there is no prospect of any water-borne pollution generated by Development 10 affecting areas of functionally-linked land that may be affected by water-borne pollution from the Proposed Scheme. As such, there is no prospect of in-combination LSE between Development 10 and the Proposed Scheme.
Development 12 – Flue Gas Demolition	As set out in **Paragraph 2.1.8** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2), flue gas demolition works are scheduled to take place between 2022 – 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. As such, it is not possible for construction and decommissioning water-borne pollution from the Proposed Scheme to combine with water-borne pollution from Development 12. As such, no in-combination LSE are predicted.

DISTURBANCE FROM NOISE AND VIBRATION

3.5.82. Table 3.12 below assesses whether each of the other plans and projects could contribute to increased noise and vibration disturbance in functionally-linked land also affected by the Proposed Scheme.

Table 3.12 - HRA Screening In-combination Assessment: Noise and Vibration

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47 and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through

Development ID and Name	Summary of potential in-combination LSE
	their operational air quality impacts combining with the with Proposed Scheme scenario for air quality purposes. As such, they could not contribute to any in-combination effects during construction.
Development 3: SEGL2	Development 3 is predicted to be constructed between 2024 – 2031; construction of this Project therefore overlaps with construction of the Proposed Scheme. Construction of the Convertor Station and installation of the HVDC cable for Development 3 would generate noise. Information on the precise noise effects of Development 3 is not currently available. The cumulative assessment of effects from Noise and Vibration (see **Table 1.1** in **Appendix 18.5 (Cumulative Effects Assessment Matrix)** of Volume 3 of the ES (document reference 6.3.18.5) identifies the potential for cumulative adverse effects, and that these will largely be determined by the construction methods and route of the HVDC cable. The HVDC cable would be located to the east of New Road, south and east of the Proposed Scheme. The cable route and convertor station for Development 3 would be located more than 100m from the East Construction Laydown Area to the north, with a buffer of vegetation and Carr Lane between the two. It would not be possible for the Proposed Scheme to contribute to noise and vibration effects at the site of the convertor station, as construction of the convertor station would remove the majority of suitable habitat that could potentially be used by SPA / Ramsar Site bird species. The cable route heads east from the Convertor Station and away from the Proposed Scheme, before crossing the River Ouse and continuing east towards the coast (National Grid, 2022). The cable route is more than 200 m from any of the areas of functionally-linked land identified as being potentially affected by the Proposed Scheme alone (see **Table 3.4** for a description of the Proposed Scheme Noise and Vibration impacts alone). As set out in **Table 3.4**, the noise impacts of the Proposed Scheme alone have been modelled to reach a maximum of 39 LAeq,T dB. Noise levels under 40dB are equivalent or quieter than 'a quiet office' (Health and Safety Executive, 2022). These noise levels are under the conservative threshold for disturbance used in the Waterbird Disturbance Toolkit of 55dB (European Union, 2022) or that would be likely to trigger any behavioural response from otters and would reduce further with increasing distance from the Proposed Scheme. Given the low levels of noise generated by the Proposed Scheme, it is not predicted to contribute to potential noise impacts on ecological receptors that might arise from Development 3. As such, in-combination LSE between Development 3 and the Proposed Scheme are not predicted to arise.
Development 6 – Barlow Mound Ash reclamation	Development 6 involves proposals for the mining and reclamation of ash from the 'Barlow mound'. It is located within 100 m to the west of the Proposed Scheme. The cumulative assessment of effects for Noise and Vibration (see **Table 1.1** in **Appendix 18.5 (Cumulative Effects Assessment Matrix)** of Volume 3 of the ES (document reference 6.3.18.5) identifies the potential for cumulative noise and vibration effects. Development 6 is at an early stage of development, with no detail of the noise and vibration impacts it might generate. Given the location of Development 6, there is potential for this to contribute to in-combination noise and vibration from the Proposed Scheme. The only locations supporting functionally-linked land considered at risk are the Off-Site Habitat Provision Area and potentially the western portion of the Habitat Provision Area (areas in the east of the Habitat Provision Area would be at reduced risk of noise impacts from Development 6, due to the intervening distance (several hundred metres) between the Proposed Scheme and Development 6). Noise and vibration in the Habitat Provision Area and Off-site Habitat Provision Area would be limited to that generated by habitat management activities and construction activities inside Drax Power Station Site (see **Table 3.4** for assessment of the Scheme alone). Given the low levels of noise generated by the Proposed Scheme, it is not predicted to contribute to potential noise impacts on ecological receptors that might arise from Development 6. As such, in-combination LSE between Development 6 and the Proposed Scheme are not predicted to arise.
Development 9 – erection and operation of five wind turbines	Development 9 is located approximately 1.9 km west of the Proposed Scheme

Development ID and Name	Summary of potential in-combination LSE
	It is possible that noise generated during construction and operation of Development 9 could disturb and hence displace SPA bird species that could otherwise use the habitats present. This would reduce the suitability of any functionally-linked land, if indeed land at Development 9 is used by SPA bird species. The cumulative assessment of effects for Noise and Vibration (see **Table 1.1** in **Appendix 18.5 (Cumulative Effects Assessment Matrix)** of Volume 3 of the ES (document reference 6.3.18.5) identifies the potential for low cumulative noise and vibration effects. Given the low levels of noise generated by the Proposed Scheme and the distance between Development 9 and the Proposed Scheme, the Proposed Scheme is not predicted to contribute to potential noise impacts on ecological receptors that might arise from Development 9. As such, in-combination LSE between Development 9 and the Proposed Scheme are not predicted to arise.
Development 10 – solar farm	Development 10 involves the construction of a new solar farm across a 112ha site located approximately 1 km from the Proposed Scheme. The response from the NYCC Ecologist to the planning application states that significant effects on the River Derwent SAC / SSSI can be ruled out, and that no further assessment under the Conservation of Habitats and Species Regulations (2017, as amended) is needed. On this basis, and given the scale and location of Development 10, there is considered to be no prospect of in-combination effects with the Proposed Scheme.
Development 12 – Flue Gas Demolition	As set out in **Paragraph 2.1.8** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2), flue gas demolition works are scheduled to take place between 2022 – 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. As such, it is not possible for construction and decommissioning noise and vibration from the Proposed Scheme to combine with noise and vibration from Development 12. As such, no in-combination LSE are predicted.

INCREASED VISUAL DISTURBANCE FROM PLANT AND PERSONNEL

3.5.85. Table 3.13 below assesses whether each of the other plans and projects could contribute to increased visual disturbance in functionally-linked land also affected by the Proposed Scheme.

Table 3.13 - HRA Screening In-combination Assessment: Visual Disturbance

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47 and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through their operational air quality impacts combining with the with Proposed Scheme scenario for air quality purposes. As such, they could not contribute to any in-combination effects during construction.
Development 3: SEGL2	Development 3 is predicted to be constructed between 2024 – 2031; construction of this Project therefore overlaps with construction and operation of the Proposed Scheme. The HVDC cable would be located to the east of New Road, south and east of the Proposed Scheme. The cable route and convertor station for Development 3 would be located more than 100m from the East Construction Laydown Area to the north, with a buffer of existing vegetation (part of which is within the Order Limits and retained throughout construction) and Carr Lane between the two. It would not be possible for the Proposed Scheme to contribute to visual disturbance impacts at the site of the convertor station or western extent of the HVDC cable, given the screening vegetation between the Proposed Scheme and Development 3 (see **Figure 8.3** of **Chapter 8 (Ecology)** in Volume 2 of the ES (document reference 6.2.8.3). Development 3 is also distant from the areas of functionally-linked land that may be subject to visual disturbance impacts from the Proposed Scheme alone. These are located to

Development ID and Name	Summary of potential in-combination LSE
	the north of the Power Station Site, comprising Carr Dyke and the Habitat Provision Area. See **Table 3.5** for the assessment of visual disturbance effects of the Proposed Scheme alone. As such, in-combination LSE between Development 3 and the Proposed Scheme are not predicted to arise.
Development 6 – Barlow Mound Ash reclamation	Development 6 involves proposals for the mining and reclamation of ash from the 'Barlow mound'. It is located within 100 m to the west of the Proposed Scheme. Given the location of Development 6, there is potential for this to contribute to in-combination visual disturbance from the Proposed Scheme. The locations supporting functionally-linked land considered at risk are the Off-Site Habitat Provision Area and the western portion of the Habitat Provision Area. As such, in-combination LSE are predicted in relation to potential visual disturbance effects.
Development 9 – erection and operation of five wind turbines	Development 9 is located approximately 1.9 km west of the Proposed Scheme It is possible that visual disturbance arising from construction and operation of Development 9 could disturb and hence displace SPA bird species that could otherwise use the habitats present. This would reduce the suitability of any functionally-linked land present, if indeed land at Development 9 is used by SPA bird species. Given the distance between Development 9 and the Proposed Scheme (1.9 km), Development 9 is not predicted to lead to any displacement of SPA birds from areas of land within or adjacent to the Proposed Scheme, and hence effects would be spatially separated. Given this, no in-combination LSE between Development 9 and the Proposed Scheme are predicted to arise.
Development 10 – solar farm	Development 10 involves the construction of a new solar farm across a 112ha site located approximately 1 km from the Proposed Scheme. The response from the NYCC Ecologist to the planning application states that significant effects on the River Derwent SAC / SSSI can be ruled out, and that no further assessment under the Conservation of Habitats and Species Regulations (2017, as amended) is needed. On this basis, and given the scale and location of Development 10, there is considered to be no prospect of in-combination effects with the Proposed Scheme.
Development 12 – Flue Gas Demolition	As set out in **Paragraph 2.1.8** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2), flue gas demolition works are scheduled to take place between 2022 – 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. As such, it is not possible for construction and decommissioning visual disturbance from the Proposed Scheme to combine with visual disturbance from Development 12. In addition, Development 12 is located entirely within the existing footprint of Drax Power Station Site, within areas of existing buildings and hard-standing and in excess of 100 m from the potential functionally-linked land in and adjacent to the Habitat Provision Area. As such, no in-combination LSE are predicted in relation to visual disturbance.

OPERATION

Emissions of treated flue gas to air

3.5.88. Table 3.14 below assesses whether each of the other plans and projects could contribute to increased operational emissions to air affecting European Sites.

Table 3.14 - HRA Screening In-combination Assessment: Operational Emissions to Air

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	Developments 1, 4, 47, and 74 would produce emissions of one or more pollutant that could combine with the emissions to air in the with Proposed Scheme scenario. This could lead to increased impacts relative to operation of the with Proposed Scheme scenario alone. Developments 1, 4, 47, and 74 are not predicted to contribute to any other in-combination effects, due to the nature and location of those developments and the distance (> 5 km in all cases) between them and the Proposed Scheme. The relevant EAL (Environmental Assessment Level) for each European Site are set out in **Table 3.6** of this report. These have been applied when assessing the impacts of the Proposed Scheme alone and are also relevant to the assessment of in-combination air quality effects. The methodology for the air quality modelling of other plans and projects is set out between paragraphs **6.5.27** to **6.5.36** of **Chapter 6 (Air Quality)** in Volume 1 of the ES (document reference 6.1.6). The cumulative air quality modelling considers the combined impacts of all other emitting developments and the Proposed Scheme. The results of the cumulative (in-combination) air quality modelling are presented between **paragraphs 6.12.13** to **6.12.34** and in **Tables 6.20, 6.21, and 6.22** of **Chapter 6 (Air Quality)** of Volume 1 of this ES and summarised below. In-combination impacts in relation to the EALs for annual mean NOx and annual mean SO_2 do not exceed screening criteria. The cumulative operational impacts on annual mean SO_2 are classified as insignificant (≤1% of the critical level) at all designated sites. Similarly, whilst the maximum cumulative NOx PC impacts are predicted to be above 1% of the annual mean critical level, the maximum PECs at all designated sites are below 70% of the critical level. As such, the modelled cumulative impacts are classified as insignificant (see **paragraph 6.12.15 to 6.12.18** of **Chapter 6 (Air Quality)** of Volume 1 of the ES). The cumulative operational impacts on annual mean NH_3 are classified as insignificant (≤1% of the critical level) at all designated sites except for Thorne Moor SAC. At the Thorne Moor designated sites, the modelled maximum cumulative PC impact, which equates to 1.1% of the respective critical level, marginally exceeds the 1% significance screening criterion and the maximum PEC exceeds the critical level (see **Table 6.20** of **Chapter 6 (Air Quality)** of Volume 1 of the ES). As such, in-combination LSE are predicted in relation to Thorne Moor SAC and the annual mean critical level for NH_3. In-combination LSE for NH_3 are not predicted for any other European Site. The cumulative operational impacts on annual nitrogen deposition are classified as insignificant (≤1% of the critical load) at all designated sites except for Thorne Moor SAC. At the Thorne Moor SAC, the modelled maximum cumulative PC impact, which equates to 1.8% of the respective critical load, exceeds the 1% significance screening criterion. The maximum PEC also exceeds the relevant critical load (see **Table 6.21** of **Chapter 6 (Air Quality)** of Volume 1 of the ES). As such, in-combination LSE are predicted in relation to Thorne Moor SAC and the critical load for nitrogen deposition. In-combination LSE for nitrogen deposition are not predicted for any other European Site. The maximum cumulative PC impacts on annual acid deposition, exceed the 1% criterion at Thorne Moor SAC, Lower Derwent Valley SAC, and Skipwith Common SAC. Given the existing levels of acid deposition at these sites, the maximum PEC exceeds the respective critical loads (see **Table 6.22** of **Chapter 6 (Air Quality)** of Volume 1 of the ES). LSE are predicted for those sites identified above that exceed the screening criteria.
Development 3, 6, 9, 10, 12	Developments 3, 6, 9, 10, and 12 would not produce appreciable emissions to air that could combine with those in the with Proposed Scheme scenario. This is due to the nature of these developments, which are not industrial installations or otherwise of a type that would generate significant emissions to air that could impact European Sites and other ecological receptors. As such they could not contribute to cumulative air quality impacts with the Proposed Scheme and no LSE are predicted to arise.

IN-COMBINATION NOISE AND VIBRATION DISTURBANCE

Table 3.15 - HRA Screening In-combination Assessment: Noise and Vibration

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. The only conceivable impact pathway by which they could lead to in-combination LSE with the Proposed Scheme is through their operational air quality impacts combining with the operational air quality impacts of the Proposed Scheme. As such, they could not contribute to any other in-combination effects during operation.
Development 3, 6, 9, 10, 12	The assessment of noise and vibration presented in the ES considered several Biodiversity Receptors. The locations of these are shown on **Figure 7.2** of **Chapter 7 (Noise and Vibration)** of the ES (document reference 6.2.7.2). The results of the construction and operational noise modelling for Biodiversity Receptors are set out in **Table 1.2** of **Appendix 7.6 (Biodiversity Receptors)** of **Chapter 7 (Noise and Vibration)** of the ES (document reference 6.3.7.6). Several Biodiversity Receptors (BR 2 – BR6) are located to the north of Drax Power Station Site, within the Habitat Provision Area. These locations were selected in order to assess potential noise impacts from operation. The maximum predicted noise levels are 28 LAeq,T dB. Noise levels under 30dB are equivalent to or quieter than 'a quiet library' (Health and Safety Executive, 2022) . In addition, research collated to inform assessments of waterbird disturbance identifies that SPA bird species are unlikely to be displaced by noise levels under 55dB (European Union, 2022). Baseline noise levels in the vicinity of the Drax Power Station also regularly exceed 28 dB (see **Tables 7.17 and 7.18** in **Chapter 7** (Noise and Vibration) of Volume 1 of the ES (document reference 6.1.7)), so are comparable or higher to the predicted noise levels arising from operation of the Proposed Scheme. During operation of the Proposed Scheme, habitat management activities in the Habitat Provision Area and Off-site Habitat Provision Area would be intermittent and relatively non-intrusive, limited to use of hand tools and light machinery. These activities are considered to be no more disturbing than baseline agricultural activities in and adjacent to these areas. In light of the above, operational noise and vibration from the Proposed Scheme is considered to be *de minimis* and have negligible potential to appreciably combine with noise and vibration from any other source and affect functionally-linked land. As such, no LSE are predicted to arise.

IN-COMBINATION VISUAL DISTURBANCE

3.5.93. **Table 3.16** below assesses whether each of the other plans and projects could contribute to increased visual disturbance of European Site qualifying interests using functionally-linked land.

Table 3.16 - HRA Screening In-combination Assessment: Visual Disturbance

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 47, and 74	These developments are all located in excess of 5 km from the Proposed Scheme and any other European Site, with the exception of Development 47 and 74 which are located in an industrial site adjacent to the Humber Estuary SAC, SPA and Ramsar. Development 47 and 74 are located approximately 22 km from the Proposed Scheme. As such there would be no in-combination visual disturbance impact in operation.
Development 3: SEGL2	Development 3 is predicted to be constructed between 2024 – 2031; construction and operation of this Project therefore overlaps with operation of the Proposed Scheme. The HVDC cable would be located to the east of New Road, south and east of the Proposed Scheme. The cable route and convertor station for Development 3 would be located more than 100m from the East Construction Laydown Area to the north, with a buffer of vegetation and Carr Lane between the two. The cable would be installed underground, so would have no to negligible above-ground components after construction. In addition, the East Construction Laydown Area would be reinstated to farmland (with some ecological enhancements) at the end of the construction phase of the Proposed

Development ID and Name	Summary of potential in-combination LSE
	Scheme. It would therefore not be possible for the Proposed Scheme to contribute to visual disturbance impacts at the site of the convertor station or western extent of the HVDC cable. As such, in-combination LSE between Development 3 and the Proposed Scheme are not predicted to arise.
Development 6 – Barlow Mound Ash reclamation	Development 6 involves proposals for the mining and reclamation of ash from the 'Barlow mound'. It is located within 100 m to the west of the Proposed Scheme. Given the location of Development 6, there is potential for this to contribute to in-combination visual disturbance from the Proposed Scheme. The locations supporting functionally-linked land considered at risk are the Off-Site Habitat Provision Area and the western portion of the Habitat Provision Area. During operation of the Proposed Scheme, habitat management activities in the Habitat Provision Area and Off-site Habitat Provision Area would be intermittent and relatively non-intrusive, limited to use of hand tools and light machinery. These activities are considered to be no more disturbing than baseline agricultural activities in and adjacent to these areas. Management activities would also lead to slight enhancements of the habitats present for SPA / Ramsar bird species in the medium to long term, although given the setting and location of the Off-Site Habitat Provision Area it is still unlikely to be used by a substantial proportion of any SPA / Ramsar site populations. Other potential sources of visual disturbance from the Proposed Scheme include lighting of the Carbon Capture Plant, presence of additional personnel (~50) to operate the carbon capture plant, and maintenance and monitoring of the Carbon Dioxide Delivery Compound (assuming this is delivered as part of the Proposed Scheme). Given the minimal visual disturbance impacts that could be generated by these aspects of the Proposed Scheme adjacent to functionally-linked land (see **paragraph 3.5.51** to **3.5.59** of this report), these aspects of operation could not make a significant contribution to in-combination visual disturbance effects. In light of the above, operational visual disturbance from the Proposed Scheme is considered to be *de minimis* and hence have negligible potential to appreciably combine with visual disturbance arising from any other source such as Development 6 and affect functionally-linked land. As such, no LSE are predicted to arise.
Development 9 – erection and operation of five wind turbines	Development 9 is located approximately 1.9 km west of the Proposed Scheme During operation of the Proposed Scheme, habitat management activities in the Habitat Provision Area and Off-site Habitat Provision Area would be intermittent and relatively non-intrusive, limited to use of hand tools and light machinery. These activities are considered to be no more disturbing than baseline agricultural activities in and adjacent to these areas. Management activities would also lead to slight enhancements of the habitats present for SPA / Ramsar bird species in the medium to long term, although given the setting and location of the Off-Site Habitat Provision Area it is still unlikely to be used by a substantial proportion of any SPA / Ramsar site populations. Other potential sources of visual disturbance from the Proposed Scheme include lighting of the Carbon Capture Plant, presence of additional personnel (~50) to operate the carbon capture plant, and maintenance and monitoring of the Carbon Dioxide Delivery Compound (assuming this is delivered as part of the Proposed Scheme). Given the minimal visual disturbance impacts that could be generated by these aspects of the Proposed Scheme adjacent to functionally-linked land (see **paragraph 3.5.51** to **3.5.59** of this report), these aspects of operation could not make a significant contribution to in-combination visual disturbance effects. In light of the above, operational visual disturbance from the Proposed Scheme is considered to have negligible potential to appreciably combine with visual disturbance from any other source such as Development 9 and affect functionally-linked land. As such, no LSE are predicted to arise.
Development 10 – solar farm	Development 10 involves the construction of a new solar farm across a 112ha site located approximately 1 km from the Proposed Scheme. During operation of the Proposed Scheme, habitat management activities in the Habitat Provision Area and Off-site Habitat Provision Area would be intermittent and relatively non-intrusive, limited to use of hand tools and light machinery. These activities are considered to be no more disturbing than baseline agricultural activities in and adjacent to these areas. Management activities would also lead to slight enhancements of the habitats present for SPA

Development ID and Name	Summary of potential in-combination LSE
	/ Ramsar bird species in the medium to long term, although given the setting and location of the Off-Site Habitat Provision Area it is still unlikely to be used by a substantial proportion of any SPA / Ramsar site populations. Other potential sources of visual disturbance from the Proposed Scheme include lighting of the Carbon Capture Plant, presence of additional personnel (~50) to operate the carbon capture plant, and maintenance and monitoring of the Carbon Dioxide Delivery Compound (assuming this is delivered as part of the Proposed Scheme). Given the minimal visual disturbance impacts that could be generated by these aspects of the Proposed Scheme adjacent to functionally-linked land (see **paragraph 3.5.51** to **3.5.59** of this report), these aspects of operation could not make a significant contribution to in-combination visual disturbance effects. In light of the above, operational visual disturbance from the Proposed Scheme is considered to have negligible potential to appreciably combine with visual disturbance from any other source such as Development 10 and affect functionally-linked land. As such, no LSE are predicted to arise.
Development 12 – Flue Gas Demolition	As set out in **Paragraph 2.1.8** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2), flue gas demolition works are scheduled to take place between 2022 – 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. As such, demolition of Absorber Units 1, 2, and 3 could overlap with operation of the Proposed Scheme. Development 12 is located entirely within the existing footprint of Drax Power Station Site, within areas of existing buildings and hard-standing and in excess of 100 m from the nearest potential functionally-linked land (this being Carr Dyke and the Habitat Provision Area and surroundings). As such, development 12 is not predicted to lead to any visual disturbance effects and no in-combination LSE are predicted in relation to visual disturbance.

ACCIDENTAL RELEASES OF WATER-BORNE POLLUTANTS

3.5.96. Table 3.17 below assesses whether each of the other plans and projects could contribute to increased waterborne pollution in functionally-linked land also affected by the Proposed Scheme.

Table 3.17 - HRA Screening In-combination Assessment: Water-borne Pollutants

Development ID and Name	Summary of potential in-combination LSE
Developments 1, 4, 5, 9, 10, 47, and 74	All of these developments are outside the ZoI for Water Environment (see **Table 1.8 in Appendix 18.4** (Justification of Scoping) in Volume 3 of Chapter 18 of the ES (document reference 6.3.18.4). As such, they could not contribute to any in-combination effects during operation.
Development 3: SEGL 2	Should there be overlap between construction of SEGL2 and the Proposed Scheme there is potential for adverse cumulative effects in relation to increased sediment load and pollutants released by accidental spillage and leakage of oil, hydrocarbons and hazardous substances. These could impact the quality of the local drains and potentially the River Ouse. As such, in-combination LSE are predicted to arise in relation to qualifying interests of European Sites that are known to or are likely to use the River Ouse (River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar).
Development 6 – Barlow Mound Ash Reclamation	Impacts of the Barlow Ash Mound scheme on the surface water features were scoped out in the Scoping Report prepared for Barlow Ash Mound project (Stantec, 2022). Considering this information, no cumulative effects are envisaged during construction and operational phase on surface water features (see **Table 1.8** in **Appendix 18.4** (Justification of Scoping) in Volume 3 of Chapter 18 of the ES (document reference 6.3.18.4). As such, no in-combination effects are predicted to arise on any European Site.
Development 12 - Flue Gas Demolition	As set out in **Paragraph 2.1.8** of **Chapter 2 (Site and Project Description)** of Volume 1 of the ES (document reference 6.1.2), flue gas demolition works are scheduled to take place between 2022 – 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place

Development ID and Name	Summary of potential in-combination LSE
	prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. As such, demolition of Absorber Units 1, 2, and 3 could overlap with operation of the Proposed Scheme. Should there be overlap between demolition of Units 1, 2, and 3 and operation of the Proposed Scheme there is potential for adverse cumulative effects in relation to increased pollutants released by accidental spillage and leakage of oil, hydrocarbons and hazardous substances. These could impact the quality of the local drains including Carr Dyke and potentially the River Ouse. As such, in-combination LSE are predicted to arise in relation to qualifying interests of European Sites that are known to or are likely to use the River Ouse (River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar).

3.6. STEP 4: ASSESS THE SIGNIFICANCE OF ANY EFFECTS ON EUROPEAN SITES

3.6.1. This section confirms the European Sites which may be subject to LSE from the Proposed Scheme, both alone and in-combination with other Plans or Projects, and therefore require appropriate assessment. This follows from the analysis of potential effects completed in **Section 3.6**, above. **Table 3-18** summarises the European Sites for which LSE have been identified, both alone and in-combination with other Plans and Projects.

Table 3-18 – Summary of LSE from Proposed Scheme, Alone and In-combination with other Plans and Projects

Impact Pathway	European Sites with LSE from Proposed Scheme alone	European Sites with LSE from Proposed Scheme in-combination
Construction and Decommissioning Phase		
Loss and disturbance of functionally-linked land	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Emissions of dust	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Increased risk of pollution from sediment load	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Accidental releases of water-borne pollutants	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar.	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar.
Disturbance from Noise and Vibration	None	None
Increased visual disturbance from plant and personnel	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SPA, Humber Estuary Ramsar.
Operation Phase		
Emissions of treated flue gas to air in the with Proposed Scheme scenario	Lower Derwent Valley SAC, Lower Derwent Valley Ramsar, Thorne Moor SAC.	Lower Derwent Valley SAC, Lower Derwent Valley Ramsar, Thorne Moor SAC, Skipwith Common SAC.
Operational Noise Disturbance	None	None
Increased Levels of Visual Disturbance during operation	None	None
Accidental releases of water-borne pollutants	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar.	River Derwent SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, Lower Derwent Valley Ramsar, Humber Estuary SAC, Humber Estuary SPA, Humber Estuary Ramsar.

4. INFORMATION TO INFORM APPROPRIATE ASSESSMENT

4.1. MEASURES TO ADDRESS LIKELY SIGNIFICANT EFFECTS

4.1.1. Primary Mitigation that forms an integral part of the Proposed Scheme design (see **paragraph 2.2.59** of **Chapter 2 (Site and Project Description)** in Volume 1 of the ES (document reference 6.1.2) has been considered during the HRA screening. As discussed at **paragraph 2.2.4**, following the People Over Wind judgment (People over Wind and Peter Sweetman v Coillte, 2018), it is not appropriate to consider mitigation measures intended to avoid or reduce harmful effects to European Sites at the HRA Screening Stage. These secondary measures have instead been considered when assessing the potential for adverse effects on the integrity of European Sites.

4.1.2. This Section of the HRA Report therefore considers the mitigation measures that have been specifically identified to avoid or lessen potential LSE on European Sites. Mitigation measures for each of the identified impact pathways are set out below, along with identification of how they would be secured through the DCO.

CONSTRUCTION PHASE

Loss and Disturbance of Functionally-linked Land

4.1.3. Loss and disturbance of functionally-linked land is relevant to European Site qualifying interests including otter in relation to the River Derwent and Lower Derwent Valley SAC, and bird species associated with the Lower Derwent Valley SPA and Ramsar, and Humber Estuary SPA and Ramsar.

4.1.4. Mitigation in relation to loss or disturbance of functionally-linked land includes the following:

a. Hedgerow planting will be carried out in March of whichever calendar year(s) it is completed. This would be at the end of the core wintering/passage bird season (which is typically taken to be October to March inclusive), minimising potential effects of loss and disturbance of functionally-linked land on wintering/passage SPA and Ramsar bird species.

Emissions of dust

4.1.5. Emissions of dust onto functionally-linked land are relevant to European Site qualifying interests including otter in relation to the River Derwent and Lower Derwent Valley SAC, and bird species associated with the Lower Derwent Valley SPA and Ramsar, and Humber Estuary SPA and Ramsar.

4.1.6. Mitigation in relation to dust emissions includes the following relevant mitigation (see Section 1.3 of **Appendix 6.2** of Volume 3 of the ES (document reference 6.3.6.2) for additional detail:

a. Dust management measures during preparation and maintenance of the Site;

b. Daily on-site and off-site inspections, including for evidence of dust soiling and dust deposition;

c. Measures to minimise dust generation from operating vehicles and machinery;

d. Measures to minimise and / or supress dust generation from demolition, fabrication, and construction activities; and

e. Specific measures to address dust generation from earthworks impacts.

4.1.7. Mitigation for dust management measures be applied via the implementation of a CEMP, developed from the Register of Environmental Actions and Commitments (REAC) that is submitted in conjunction with the ES.

Increased risk of pollution from increased sediment load

4.1.8. The potential risk of pollution from increased sediment loads onto functionally-linked land is relevant to European Site qualifying interests including otter in relation to the River Derwent and Lower Derwent Valley SAC, and bird species associated with the Lower Derwent Valley SPA and Ramsar, and Humber Estuary SPA and Ramsar.

4.1.9. Mitigation in relation to the potential impact of increased sediment loadings includes a number of measures (see **Section 12.10** of **Chapter 12 (Water Environment)** of Volume 1 of the ES (document reference 6.1.12) for full details.

4.1.10. The Construction Environment Management Plan (CEMP) and Decommissioning Environmental Management Plan (DEMP) (as included in the **Register of Environmental Actions and Commitments (REAC)** (document reference 6.5) which would be secured by a Requirement of the DCO) include a series of measures to avoid and manage the risk of increased pollution from sediment loading, including adherence to good practice guidance, the use of Method Statements for works which may increase sediment loading of Site drainage, and procedures for monitoring and inspections. In particular, measures to address sediment loading risk include the following:

a. Stockpiling of materials would be carried out at a minimum of 10 m from surface water features;

b. Stockpiles would be appropriately managed e. g. by using jute matting to mitigate release of sediment load;

c. No activities would take place in Carr Dyke or within 7 m its open channel or piped section without prior consent from the Selby Area IDB. As this will be secured pursuant to the DCO, no separate Land Drainage consent will be required. This rule also relates to any other ordinary watercourse within the Order Limits;

d. Surface water management plan would be prepared for construction phase to ensure that the runoff is appropriately managed, so it does not increase risk of pollution to the environment;

e. All loose materials would be covered;

f. Construction activities including vegetation clearance, earth moving, storage of materials and equipment and plant movement in the vicinity of any surface water feature or drainage lines would be minimised;

g. Land clearance in the vicinity of surface water features would be minimised. If land clearance in the vicinity of surface water features is unavoidable, the features would be protected with, but not limited to, silt traps, silt fences and filter bunds;

h. Temporary cut-off drains would be used uphill and downhill of the working areas to prevent clean runoff entering and dirty water leaving the working area without appropriate treatment;

i. Vegetation would only be removed when necessary and gradients kept as shallow as possible to prevent large amounts of earth being washed away during periods of heavy rainfall;

j. Areas of ground that have been exposed would be reseeded or surfaced as soon as reasonably practicable;

k. Facilities would be provided for wheel washing to prevent “track out” from vehicles. Wheel wash facilities would be appropriately contained to ensure that silt laden water would not reach surface water features;

l. Cut off ditches, silt fencing or similar measures, would be provided along the perimeter of the Site to capture any runoff from the Site;

m. Surface water run-off and excavation dewatering would be captured and settled out prior to water being discharged through the Purge to the River Ouse. Any contaminants would be removed prior to disposal;

n. Measures to protect drains and surface water features from increased sediment load would be implemented for example by labelling / marking drains, using straw bales, silt fencing or silt traps;

o. All the existing drains and sewers within the Drax Power Station Site would be identified and labelled and measures implemented to prevent polluting substances from entering them; and

p. Soil and stockpiles would not be located within 10 m of water bodies or drainage lines.

Increased Risk of Pollution from Accidental Release of Water-borne Pollutants

4.1.11. The potential risk of pollution from water-borne pollutants onto functionally-linked land is relevant to European Site qualifying interests including otter in relation to the River Derwent and Lower Derwent Valley SAC, and bird species associated with the Lower Derwent Valley SPA and Ramsar, and Humber Estuary SPA and Ramsar.

4.1.12. Mitigation in relation to the potential impact of water-borne pollutants includes a number of measures (see **Section 12.10** of **Chapter 12 (Water Environment)** of Volume 1 of the ES (document reference 6.1.12) for full details.

4.1.13. The Construction Environment Management Plan (CEMP) and Decommissioning Environmental Management Plan (DEMP) (as included in the **Register of**

Environmental Actions and Commitments (REAC) (document reference 6.5) which would be secured by a Requirement of the DCO) include a series of measures to avoid and manage the risk of increased pollution from water-borne pollutants, including adherence to good practice guidance, the use of Method Statements for managing works with potential to generate water-borne pollutants, and procedures for monitoring and inspections. In particular, measures to address water-borne pollutant risk include the following:

a. Appropriate interceptors would be incorporated into on-site drainage systems;

b. Spill containment equipment would be stored on the Site;

c. Hazardous substances, oil and fuel would not be located within 10 m of water bodies or drainage lines and would be stored in bunded areas holding at least 110% of the volume of the container or one quarter of the combined capacity of all containers where there are more than one. Storage and bunded areas would be constructed with impervious floors;

d. Refuelling of machinery would be undertaken in bunded areas, which would not be located within 10 m of water bodies or drainage lines;

e. All refuelling would be supervised and carried out in a designated area with appropriate cut-off drainage and located away from watercourses and drainage lines.

f. Drip trays would be used for diesel pumps and standing plant would be regularly maintained to prevent leaks;

g. Construction materials, such as cement, would be mixed in designated areas located away from water bodies and drainage lines;

h. Concrete wash out would only take place at designated concrete washout areas; and

i. Topsoil and other construction materials would not be stored in the northern and southern parts of East Construction Laydown Area.

Increased Risk of Visual Disturbance

4.1.14. The potential risk of visual disturbance onto functionally-linked land is relevant to European Site qualifying interests including otter in relation to the River Derwent and Lower Derwent Valley SAC, and bird species associated with the Lower Derwent Valley SPA and Ramsar, and Humber Estuary SPA and Ramsar.

4.1.15. The Construction Environment Management Plan (CEMP) and Decommissioning Environmental Management Plan (DEMP) (as included in the **Register of Environmental Actions and Commitments (REAC)** (document reference 6.5) which would be secured by **Requirements 14 and 18** of the **draft DCO** (document reference 3.1) include measures to avoid or minimise potential visual disturbance effects.

4.1.16. Certain construction compounds and laydown and demolition areas will be surrounded by hoardings to reduce visual effects due to the presence of construction traffic, plant and equipment, as well as demolition of existing and construction of built

form. The hoardings will be a minimum of 2.4 m high and will be maintained in good condition for the duration of the relevant construction/decommissioning activity. Solid hoardings will be provided on the eastern, northern, and southern boundaries of the East Construction Laydown Area. They will also be provided around the western, northern, and eastern boundaries of the woodyard Drax Power Station Site Construction Laydown Area (see Figure 3 for location of the woodyard).

4.1.17. If constructed as part of the Proposed Scheme, the construction footprint for the Carbon Dioxide Delivery Terminal Compound would also be fenced using minimum 2.4 m high hoarding, if visual screening of this would not be achieved by the proposed hoarding around the woodyard Drax Power Station Site Construction Laydown Area. The requirement for hoarding is secured via **Action G5** of the **REAC** (document reference 6.5) which would be secured by **Requirement 14 and 18** of the **draft DCO** (document reference 3.2)**.**

4.1.18. A **Draft Lighting Strategy** (Document Reference 6.7) has been produced as part of the Proposed Scheme. Detailed lighting measures substantially in accordance with the **Draft Lighting Strategy** will be secured via **Requirement 8** of the **draft DCO**). The Draft Lighting Strategy includes measures in relation to biodiversity (see **Section 5.3** of the **draft Lighting Strategy**), which are relevant to avoiding or minimising potential increases in illumination of functionally linked land that could be used by European Site qualifying interests.

4.1.19. In addition, the following measures would be completed specifically in relation to otter, and would be in the CEMP/DEMP, production and approval of which is secured by **Requirements 14 and 18** of the **draft DCO** (document reference 3.1):

a. Pre-construction surveys to reconfirm the status of otter habitat usage of the Site and surrounding watercourses up to 250 m from the Proposed Scheme.

b. Avoidance of any obstructions to established otter paths and access to open water.

c. The marking of, and adherence to, 30 m exclusion zones around any holts and shelters identified as a result of updated survey prior to site clearance and construction activities occurring. If otters are known or suspected to be breeding, the exclusion zone could be extended to a 200 m radius. However, it could be reduced to 100 m depending on the nature of the works, topography and natural screening. This will require judgement from an experienced ecologist.

d. If breeding was confirmed and exclusion zones of the size set out above were not possible, works would be undertaken in accordance with a European Protected Species (EPS) Mitigation licence to derogate the legislation protecting otter (except during periods of active breeding). As part of the licence, appropriate compensation would be provided to ensure that alternative habitat is provided in advance of the impact occurring. This would ensure no net loss in available habitat that may be considered to provide functional linkage for the SAC.

e. As a minimum, light spill will be minimised, and dark corridors will be maintained to ensure that otters can continue to commute and forage without undue disturbance during construction. In addition, defined site compounds and access roads with slow speed limits, will limit the risk of otter collisions during construction.

f. The capping of any exposed pipe systems when contractors are off site and providing exit ramps from any exposed trenches or holes (to prevent otters entering and becoming trapped).

OPERATION STAGE MITIGATION

Emissions of Treated Flue Gas to Air

4.1.20. Emissions of treated flue gas to air are relevant in terms of potential effects on the concentrations and deposition rates of pollutants onto European Sites in the with Proposed Scheme scenario, as set out in Section 3.5. The relevant pollutants (for the with Proposed Scheme scenario and the in-combination with other plans and projects) are concentrations of NH3 (Thorne Moor SAC), nitrogen deposition (Thorne Moor SAC), and acid deposition (Thorne Moor SAC, Skipwith Common SAC, Lower Derwent Valley SAC, Lower Derwent Valley SPA, and Lower Derwent Valley Ramsar).

4.1.21. Mitigation measures have been identified to reduce the impact of operational emissions to air. These mitigation measures primarily bring benefits in reducing acidification effects, but also have minor beneficial effects in terms of the with Proposed Scheme scenario's contribution to nitrogen deposition and NH_3 concentrations.

4.1.22. The following operational changes to the Main Stack emissions parameters have been applied relative to the unmitigated impacts from the with Proposed Scheme scenario:

a. Reduce SO2 emissions by 40% compared to the Best Available Technology (BAT) Environmental Assessment Level (EAL), applied to the two BECCS Biomass Units; and

b. Increase exit temperature of flue gases from the BECCS Units from 80ºC to 100ºC.

4.1.23. The purpose of these measures is to increase buoyancy in the flue gases leaving the Main Stack, thereby improving dispersion of all pollutants, and to reduce the concentration of SO_2 being emitted, thus reducing the with Proposed Scheme scenario's contribution to acid deposition at the identified sensitive habitats. The measures will be secured through the permitting process.

Accidental Releases of Water-borne Pollutants

4.1.24. The potential risk of accidental releases of water-borne pollution onto functionally-linked land is relevant to European Site qualifying interests including otter in relation to the River Derwent and Lower Derwent Valley SAC, and bird species associated

with the Lower Derwent Valley SPA and Ramsar, and Humber Estuary SPA and Ramsar.

4.1.25. Mitigation in relation to the potential impact of water-borne pollutants includes a number of measures (see **Section 12.10** of **Chapter 12 (Water Environment)** of Volume 1 of the ES (document reference 6.1.12) for full details. The detail of Mitigation measures would be secured through the detailed drainage design, the production and approval of which would be secured **by Requirement 10** of the **draft DCO** (document reference 3.1). This would require that the detailed drainage design be 'substantially in accordance with the **Surface Water Drainage Strategy (SWDS)**, which forms **Appendix 12.3** of **Chapter 12 (Water Environment)** in Volume 3 of the ES.

4.1.26. Mitigation measures to be delivered via the SWDS include the following:

a. Containment measures to collect potentially contaminated surface water runoff from the Solvent Storage and Make-up System, Carbon Capture Waste Water Treatment Plant, Quench Column, and Absorber Column;

b. Oil Storage for the Flue gas blower, CO2 compressor and air compressor unit would be designed in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001. All potentially oil contaminated storm water in these areas would be collected into the oil water drain pit and transferred to the existing oily wastewater system;

c. Rich Solvent / Lean Solvent Heat Exchangers would be individually bunded; Daily checks would be carried out to inspect for chemical and oil leakage;

d. Drip trays, or similar, would be installed under pumps to capture any potential leaks; and

e. Pans and shrouds will be installed for Plate Heat Exchanger (PHE).

4.2. ADVERSE EFFECTS ON INTEGRITY POST-MITIGATION

4.2.1. This section of the report assesses whether the Proposed Scheme (alone) would lead to adverse effects on the integrity of any of the European Sites for which LSE have been identified. The identified LSE are examined in detail, to determine whether or not they could frustrate achievement of the conservation objectives for each qualifying feature.

LOSS AND DISTURBANCE OF FUNCTIONALLY-LINKED LAND

River Derwent SAC

4.2.2. This impact pathway is only relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the minor loss and disturbance of functionally-linked land that would occur in the Habitat Provision Area (**see Figure 3**).

4.2.3. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2017) relate to supporting habitat: structure and function. These include the targets as summarised below **in Table 4.1**.

Table 4.1 - River Derwent SAC SACO – Functionally-linked Land

Attribute	Targets
Habitat Quality - river	Maintain the quality of supporting river habitat features, based on the advice above for the H3260 feature, to provide a characteristic biotope mosaic required by otters.
Habitat quality - waterways	Maintain the quality of supporting waterway habitat such as associated tributaries of the Derwent.
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).

4.2.4. As described in **Table 3.3**, potential loss and disturbance of functionally-linked habitat for otter, is limited to habitat enhancement measures in the Habitat Provision Area. These habitat enhancements are limited to hedgerow planting only. There would be no loss or modification of aquatic habitats or bankside vegetation, which provide the key functionally-linked land for otters within the Habitat Provision Area. The locations of the proposed hedgerow planting are set out on Figure 1 of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6.1).

4.2.5. The presence of trees or woodland (and by inference, hedgerows) is unlikely to significantly alter usage of an area by otter for commuting or foraging (Chanin, 2003). As such the planting of hedgerows within the Habitat Provision Area is unlikely to have any material effect on the use of this area by otters.

4.2.6. Equally, the planting of hedgerows within the Habitat Provision Area would not alter the quality of 'supporting waterway habitats' such as Carr Dyke and ditches in the Habitat Provision Area. Hedgerow planting may actually have a beneficial effect on water quality in the Carr Dyke, through reducing diffuse agricultural run-off from agricultural activities (Sheng, 2020). Any such benefits cannot be modelled accurately and are not considered significant.

4.2.7. In light of the above, **no adverse effects on the River Derwent SAC** are predicted in relation to loss or disturbance of functionally-linked land.

Lower Derwent Valley SAC

4.2.8. This impact pathway is only relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the minor loss and disturbance of functionally-linked land that would occur in the Habitat Provision Area (**see Figure 3**).

4.2.9. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting habitat: structure and function. These include the targets as summarised below in **Table 4.2**.

Table 4.2 - Lower Derwent Valley SAC SACO – Functionally-linked Land

Attribute	Targets
Habitat Quality - river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.
Habitat quality - waterways	Maintain the quality of supporting waterways habitat features used by the otter population.
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).

4.2.10. As described in **Table 3.3**, potential loss and disturbance of functionally-linked habitat for otter, is limited to habitat enhancement measures in the Habitat Provision Area. These habitat enhancements are limited to hedgerow planting only. There would be no loss or modification of aquatic habitats or bankside vegetation, which provide the key functionally-linked land for otters within the Habitat Provision Area. The locations of the proposed hedgerow planting are set out on Figure **1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6).

4.2.11. The presence of trees or woodland (and by inference, hedgerows) is unlikely to significantly alter usage of an area by otter for commuting or foraging (Chanin, 2003). As such the planting of hedgerows within the Habitat Provision Area is unlikely to have any material effect on the use of this area by otters.

4.2.12. Equally, the planting of hedgerows within the Habitat Provision Area would not alter the quality of ‘supporting waterway habitats’ such as Carr Dyke and ditches in the Habitat Provision Area. Hedgerow planting may actually have a beneficial effect on water quality in the Carr Dyke, through reducing diffuse agricultural run-off from agricultural activities (Sheng, 2020). Any such benefits cannot be modelled accurately and are not considered significant.

4.2.13. In light of the above, **no adverse effects on the Lower Derwent Valley SAC** are predicted in relation to loss or disturbance of functionally-linked land.

Lower Derwent Valley SPA

4.2.14. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. The northern shoveler is the only species identified as a breeding feature (Natural England, 2019). This impact pathway was identified in relation to the minor

loss and disturbance of functionally-linked land that would occur in the Habitat Provision Area (see Figure 3).

4.2.15. Some of the bird species which are qualifying interests of the SPA may use farmland habitats outside the SPA itself foraging and/or roosting as functionally linked land. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.16. Based on their habitat preferences, the following species could use farmland habitats and/or Carr Dyke in and adjacent to the Habitat Provision Area:

a. Bewick swan;

b. Teal;

c. Shoveler;

d. Wigeon; and

e. Golden plover.

4.2.17. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting habitat: structure and function. These include the targets as summarised below in **Table 4.3.** The SACO are the same for each qualifying interest:

Table 4.3 - Lower Derwent Valley SPA SACO – Functionally-linked Land

Attribute	Targets
Extent and distribution of supporting non-breeding habitat	Maintain the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Wet grassland (which will be partially inundated during winter months) c.709ha Inland water bodies (Standing/Running water) c.109ha Fens & associated habitats c.262ha.
Conservation measures	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.

4.2.18. As described in Table 3.3, potentially significant loss and disturbance of functionally-linked habitat, is considered to be limited to habitat enhancement measures in the Habitat Provision Area. These habitat enhancements are limited to hedgerow planting

only, comprising a combination of new hedgerows and infill planting of existing tree-lines and defunct hedgerows. There would be no loss or modification of aquatic habitats or bankside vegetation and negligible loss of farmland habitats, which provide the key functionally-linked land within the Habitat Provision Area. The locations of the proposed hedgerow planting are set out on **Figure 1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6).

4.2.19. Wintering bird surveys were completed for the Drax Repower Project between November 2017 – March 2018. The geographical coverage of these surveys included part of the Habitat Provision Area (see **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13). These reported an assemblage of non-SPA wintering birds across the south-eastern extent of the Habitat Provision Area and the East Construction Laydown Area. In addition to the non-SPA species, a peak count of four teal was recorded, equivalent to approximately 0.1% of the SPA population. Teal are one of the qualifying interests of the SPA. These were all associated with the pond that lies adjacent to one of the hedgerow planting locations adjacent to the Habitat Provision Area (shown at the top right corner on **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13)), which sits adjacent to a series of farm buildings. Teal (and shoveler) are strongly associated with waterbodies and would be unlikely to use farmland habitats away from waterbodies although might use Carr Dyke on occasion. No other SPA bird species were recorded. Whilst the 2017/18 survey did not cover all of the Habitat Provision Area, it does suggest that habitats in and adjacent to the Habitat Provision Area are likely to receive limited use by SPA bird species.

4.2.20. In summary, there will be very minor change in landuse that would occur in the Habitat Provision Area, which is located ~4.7 km from the SPA, and is unlikely to be used by significant numbers of SPA bird species. As such **no adverse effects on the integrity of Lower Derwent Valley SPA** are predicted in relation to loss or disturbance of functionally-linked land.

Lower Derwent Valley Ramsar

4.2.21. This impact pathway is potentially relevant to a number of the Ramsar bird qualifying interest features of the SPA. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. This impact pathway was identified in relation to the minor loss and disturbance of functionally-linked land that would occur in the Habitat Provision Area (see **Figure 3**).

4.2.22. Some of the bird species which are qualifying interests of the Ramsar may use farmland habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~4.3 km), the presence of more suitable

habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.23. Based on their habitat preferences, the following species could use farmland habitats and/or Carr Dyke in and adjacent to the Habitat Provision Area:

a. Teal; and

b. Wigeon.

4.2.24. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Lower Derwent Valley SPA are considered relevant, as set out in **Table 4.3**, above.

4.2.25. As described in **Table 3.3**, potentially significant loss and disturbance of functionally-linked habitat, is considered to be limited to habitat enhancement measures in the Habitat Provision Area. These habitat enhancements are limited to hedgerow planting only, comprising a combination of new hedgerows and infill planting of existing tree-lines and defunct hedgerows. There would be no loss or modification of aquatic habitats or bankside vegetation and negligible loss of farmland habitats, which provide the key functionally-linked land within the Habitat Provision Area. The locations of the proposed hedgerow planting are set out on **Figure 1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6).

4.2.26. Wintering bird surveys were completed for the Drax Repower Project between November 2017 – March 2018. The geographical coverage of these surveys included part of the Habitat Provision Area (see **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13)). These reported an assemblage of non-Ramsar wintering birds across the south-eastern extent of the Habitat Provision Area and the East Construction Laydown Area. In addition to the non-Ramsar species, a peak count of four teal was recorded on one survey, equivalent to approximately 0.1% of the Ramsar population. These were all associated with the pond that lies adjacent to one of the hedgerow planting locations adjacent to the Habitat Provision Area (shown at the top right corner on **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13)), which sits adjacent to a series of farm buildings. Teal (and shoveler) are strongly associated with waterbodies and would be unlikely to use farmland habitats away from waterbodies although might use Carr Dyke on occasion. No other Ramsar bird species were recorded. Whilst the 2017/18 survey did not cover all of the Habitat Provision Area, it does suggest that habitats in and adjacent to the Habitat Provision Area are likely to receive limited use by Ramsar bird species.

4.2.27. In summary, there will be very minor changes in land use that would occur in the Habitat Provision Area, which is located ~4.7 km from the SPA, and is unlikely to be used by significant numbers of SPA bird species. As such **no adverse effects on the integrity of Lower Derwent Valley Ramsar** are predicted in relation to loss or disturbance of functionally-linked land.

Humber Estuary SPA

4.2.28. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. Several of the qualifying interests do comprise breeding populations, including avocet, bittern, little tern, and marsh harrier. This impact pathway was identified in relation to the minor loss and disturbance of functionally-linked land that would occur in the Habitat Provision Area (**see Figure 3**).

4.2.29. Some of the bird species which are qualifying interests of the SPA may use farmland habitats outside the SPA itself foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.30. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Article 4.2 assemblage of waterbirds) could use farmland habitats and/or Carr Dyke in and adjacent to the Habitat Provision Area:

- **a.** Lapwing;
- **b.** Curlew;
- **c.** Shoveler;
- **d.** Mallard;
- **e.** Wigeon;
- **f.** Marsh harrier; and
- **g.** Golden plover.

4.2.31. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting habitat. These include the targets as summarised below in **Table 4.4**:

Table 4.4 - Humber Estuary SPA SACO – Functionally-linked Land

Qualifying Interest	Attribute	Targets
Golden plover, non-breeding	Supporting habitat: extent and distribution of supporting habitat for the non-breeding season.	Restore the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) [to] [an unspecified extent, based on restoring natural estuarine functioning

Qualifying Interest	Attribute	Targets
Waterbird assemblage, Non-breeding	Supporting habitat: extent and distribution of supporting habitat for the non-breeding season.	Restore the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) to an unknown extent, based on restoring natural estuarine functioning.
Waterbird assemblage, Non-breeding	Supporting habitat: quality of supporting non-breeding habitat	Maintain the structure, function and availability of the following habitats (site specific notes) which support the assemblage feature for all stages (moulting, roosting, loafing, feeding) of the non-breeding period. The principal habitats known or likely to support the assemblage feature at this SPA are: Intertidal sand and mudflats Coastal lagoons Saltmarsh Tidal reedbeds Freshwater wetlands Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture) Annual vegetation of drift lines (sand and shingle) Artificial structures such as derelict pier/jetty structures, flood defences; and water column.
Marsh harrier, breeding	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) at: current level. Exact ha not known at this time.
Golden plover (non-breeding)	Supporting habitat: vegetation characteristics for feeding	Maintain the extent and distribution of predominantly short (<10 cm) grassland swards or arable fields in areas used for feeding.

4.2.32. As described in **Table 3.3**, potentially significant loss and disturbance of functionally-linked habitat, is considered to be limited to habitat enhancement measures in the Habitat Provision Area. These habitat enhancements are limited to hedgerow planting only, comprising a combination of new hedgerows and infill planting of existing tree-lines and defunct hedgerows. There would be no loss or modification of aquatic habitats or bankside vegetation and negligible loss of farmland habitats, which provide the key functionally-linked land within the Habitat Provision Area. There will be no change to agricultural management practices arising from the Proposed Scheme. The locations of the proposed hedgerow planting are set out on **Figure 1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6).

4.2.33. Wintering bird surveys were completed for the Drax Repower Project between November 2017 – March 2018. The geographical coverage of these surveys included part of the Habitat Provision Area (see **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13)). These reported an assemblage of non-SPA wintering birds across the south-eastern extent of the Habitat Provision Area and the East Construction Laydown Area. In addition to the non-SPA species, a peak count of three mallard was recorded. Mallard are one of the species mentioned in the description of the wintering bird assemblage qualifying interest of the SPA (Natural England, 2019). These were all associated with the pond that lies adjacent to one of the hedgerow planting locations in the Habitat Provision Area (shown at the top right corner on **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13)), which sits adjacent to a series of farm buildings. No other SPA bird species were recorded. Breeding bird surveys for Drax Repower in 2018 recorded no SPA or Ramsar bird species during four survey visits between April and July (WSP, 2018(c)). Whilst the 2017/18 surveys did not cover all of the Habitat Provision Area, it does suggest that habitats in and adjacent to the Habitat Provision Area are likely to receive limited use by SPA bird species.

4.2.34. In summary, there will be very minor change in landuse that would occur in the Habitat Provision Area, which is located ~4.7 km from the SPA, and is unlikely to be used by significant numbers of SPA bird species. As such **no adverse effects on the integrity of Humber Estuary SPA** are predicted in relation to loss or disturbance of functionally-linked land.

Humber Estuary Ramsar

4.2.35. This impact pathway is potentially relevant to a number of the bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. The Ramsar bird qualifying interests are similar to those for which the Humber Estuary SPA has been designated. This impact pathway was identified in relation to the minor loss and disturbance of functionally-linked land that would occur in the Habitat Provision Area (**see Figure 3**).

4.2.36. Some of the bird species which are qualifying interests of the Ramsar may use farmland habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.37. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Ramsar Criterion 5 assemblage of waterbirds) could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;

b. Curlew;

c. Shoveler;

d. Mallard;

e. Wigeon; and

f. Golden plover.

4.2.38. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Humber Estuary SPA are considered relevant, as set out in **Table 4.4**, above.

4.2.39. As described in Table 3.3, potentially significant loss and disturbance of functionally-linked habitat, is considered to be limited to habitat enhancement measures in the Habitat Provision Area. These habitat enhancements are limited to hedgerow planting only, comprising a combination of new hedgerows and infill planting of existing tree-lines and defunct hedgerows. There would be no loss or modification of aquatic habitats or bankside vegetation and negligible loss of farmland habitats, which provide the key functionally-linked land within the Habitat Provision Area. There will be no change to agricultural management practices arising from the Proposed Scheme. The locations of the proposed hedgerow planting are set out on **Figure 1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6).

4.2.40. Wintering bird surveys were completed for the Drax Repower Project between November 2017 – March 2018. The geographical coverage of these surveys included part of the Habitat Provision Area (see **Figure 2** in **Appendix 8.13 (Drax Repower Wintering Bird Surveys**) in Volume 3 of the ES (document reference 6.3.8.13)in Volume 3 of the ES (document reference 6.3.8.13)). These reported an assemblage of non-Ramsar wintering birds across the south-eastern extent of the Habitat Provision Area and the East Construction Laydown Area. In addition to the non-Ramsar species, a peak count of three mallard was recorded. Mallard are one of the species mentioned in the description of the wintering bird assemblage qualifying interest of the Ramsar (Natural England, 2019). These were all associated with the pond that lies adjacent to one of the hedgerow planting locations adjacent to the

Habitat Provision Area (shown at the top right corner on **Figure 2** in **Appendix 8.13** in Volume 3 of the ES, which sits adjacent to a series of farm buildings. No other Ramsar bird species were recorded. Breeding bird surveys for Drax Repower in 2018 recorded no SPA or Ramsar bird species during four survey visits between April and July (WSP, 2018(c)). Whilst the 2017/18 surveys did not cover all of the Habitat Provision Area, it does suggest that habitats in and adjacent to the Habitat Provision Area are likely to receive limited use by Ramsar bird species.

4.2.41. In summary, there will be very minor change in landuse that would occur in the Habitat Provision Area, which is located ~4.7 km from the SPA, and is unlikely to be used by significant numbers of SPA bird species. As such **no adverse effects on the integrity of Humber Estuary SPA** are predicted in relation to loss or disturbance of functionally-linked land.

EMISSIONS OF DUST

4.2.42. Dust mitigation measures are described above in **Section 4.1** and set out in full in **Section 1.3** of **Appendix 6.2 (Construction Dust Assessment)** of **Chapter 6** (Air Quality) in Volume 3 of the ES (document reference 6.3.6.2).

4.2.43. With application of dust mitigation measures as described, the residual effects of dust are predicted to be negligible (see Section 1.4 of **Appendix 6.2 (Construction Dust Assessment)** of **Chapter 6** (Air Quality) in Volume 3 of the ES (document reference 6.3.6.2).

4.2.44. As such **no adverse effects on the integrity of** any European Site are predicted in relation to dust impacts on functionally-linked land.

INCREASED RISK OF POLLUTION FROM SEDIMENT LOAD

River Derwent SAC

4.2.45. This impact pathway is relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased sediment loading of Carr Dyke during construction of the Proposed Scheme.

4.2.46. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting habitat: structure and function. These include the targets as summarised below in **Table 4.5**.

Table 4.5 - River Derwent SAC SACO – Sediment Loading

Attribute	Targets
Habitat Quality – river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.

Attribute	Targets
Habitat quality – waterways	Maintain the quality of supporting waterways habitat features used by the otter population.
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).
Water quality/quantity	Ensure water quality and quantity is restored to a standard which provides the necessary conditions to support the feature. Flow targets for the H3260 feature should be met.
Water quality: Toxic chemicals	Avoid any increase in the level of pollutants which are potentially toxic to otters.

4.2.47. As described in **paragraph 3.5.11**, increased sediment loading could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of riparian habitats for otter. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.2 to 12.11.3** of **Chapter 12 (Water Environment)** of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke would be negligible.

4.2.48. In light of the above, **no adverse effects on the River Derwent SAC** are predicted in relation to increased pollution risk from sediment-loading.

Lower Derwent Valley SAC

4.2.49. This impact pathway is relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased sediment loading of Carr Dyke during construction of the Proposed Scheme.

4.2.50. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: structure and function', and 'Supporting processes (on which the feature and/or its supporting habitat relies)'. These include the targets as summarised below in **Table 4.6**.

Table 4.6 - Lower Derwent Valley SAC SACO – Sediment Loading

Attribute	Targets
Habitat Quality - river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.
Habitat quality - waterways	Maintain the quality of supporting waterways habitat features used by the otter population

Attribute	Targets
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).
Water quantity/quality	Where the feature or its supporting habitat is dependent on surface water, maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.
Water quality/quantity	Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.
Water quality: Toxic chemicals	Avoid any increase in the level of pollutants affecting the site which are potentially toxic to otters.

4.2.51. As described in **paragraph 3.5.11**, increased sediment loading could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of riparian habitats for otter. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.2 to 12.11.3** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke would be negligible.

4.2.52. In light of the above, **no adverse effects on the Lower Derwent Valley SAC** are predicted in relation to increased pollution risk from sediment-loading.

Lower Derwent Valley SPA

4.2.53. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. The shoveler is the only species identified as a breeding feature (Natural England, 2019). This impact pathway was identified in relation to the potential for increased sediment loading of Carr Dyke during construction of the Proposed Scheme.

4.2.54. Some of the bird species which are qualifying interests of the SPA may use farmland habitats outside the SPA itself foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.55. Based on their habitat preferences, the following species could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Bewick swan;

b. Teal;

c. Shoveler;

d. Wigeon; and

e. Golden plover.

4.2.56. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: water quality'. These include the targets as summarised below in **Table 4.7.** The SACO are the same for each qualifying interest.

Table 4.7 - Lower Derwent Valley SPA SACO – Sediment Loading

Attribute	Targets
Supporting habitat: water quality - contaminants	Restrict 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.
Supporting habitat: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting habitat: water quality - nutrients	Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.
Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g., concentrations of suspended sediment, plankton and other material) across the habitat.

4.2.57. As described in **paragraph 3.5.11**, increased sediment loading could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.2 to 12.11.3** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke would be negligible.

4.2.58. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SPA** are predicted in relation to increased pollution risk from sediment-loading.

Lower Derwent Valley Ramsar

4.2.59. This impact pathway is potentially relevant to a number of the Ramsar bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within

the Ramsar (and surrounding areas where used) over winter and the early spring passage period. This impact pathway was identified in relation to the potential for increased sediment loading of Carr Dyke during construction of the Proposed Scheme.

4.2.60. Some of the bird species which are qualifying interests of the Ramsar may use farmland habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.61. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Teal; and

b. Wigeon.

4.2.62. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Lower Derwent Valley SPA are considered relevant, as set out in **Table 4.7**, above.

4.2.63. As described in **paragraph 3.5.11**, increased sediment loading could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.2 to 12.11.3** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke would be negligible.

4.2.64. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley Ramsar** are predicted in relation to increased pollution risk from sediment-loading.

Humber Estuary SPA

4.2.65. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. Several of the qualifying interests do comprise breeding populations, including avocet, bittern, little tern, and marsh harrier. This impact pathway was identified in relation to the potential for increased sediment loading of Carr Dyke during construction of the Proposed Scheme.

4.2.66. Some of the bird species which are qualifying interests of the SPA may use farmland habitats outside the SPA itself foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the

differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.67. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Article 4.2 assemblage of waterbirds) could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon;
f. Marsh harrier; and
g. Golden plover.

4.2.68. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: water quality'. These include the targets as summarised below in **Table 4.8.** The SACO are the same for each qualifying interest.

Table 4.8 - Humber Estuary SPA SACO – Sediment-loading

Attribute	Targets
Supporting habitat: water quality - contaminants	Restrict 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.
Supporting habitat: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting habitat: water quality - nutrients	Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.
Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

4.2.69. As described in **paragraph 3.5.11**, increased sediment loading could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of

riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.2 to 12.11.3** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that, impacts on the Carr Dyke would be negligible.

4.2.70. In light of the above, **no adverse effects on the integrity of the Humber Estuary SPA** are predicted in relation to increased pollution risk from sediment-loading.

Humber Estuary Ramsar

4.2.71. This impact pathway is potentially relevant to a number of the bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. The Ramsar bird qualifying interests are similar to those for which the Humber Estuary SPA has been designated. This impact pathway was identified in relation to the potential for increased sediment loading of Carr Dyke during construction of the Proposed Scheme.

4.2.72. Some of the bird species which are qualifying interests of the Ramsar may use farmland habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.73. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Ramsar Criterion 5 assemblage of waterbirds) could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon; and
f. Golden plover.

4.2.74. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Humber Estuary SPA are considered relevant, as set out in **Table 4.8**, above.

4.2.75. As described in **paragraph 3.5.11**, increased sediment loading could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.2 to 12.11.3** of **Chapter 12** (Water Environment) of Volume 1 of the

ES (document reference 6.1.12) predicts that, impacts on the Carr Dyke would be negligible.

4.2.76. In light of the above, **no adverse effects on the integrity of the Humber Estuary SPA** are predicted in relation to increased pollution risk from sediment-loading.

INCREASED RISK OF POLLUTION FROM WATER-BORNE POLLUTANTS

River Derwent SAC

4.2.77. This impact pathway is relevant to the otter, sea lamprey, and river lamprey qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased water-borne pollution of Carr Dyke and the River Ouse during construction of the Proposed Scheme.

4.2.78. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting habitat: structure and function. These include the targets as summarised below in **Table 4.9**.

Table 4.9 - River Derwent SAC SACO – Water-borne Pollutants

Attribute	Targets
Habitat Quality – river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.
Habitat quality – waterways	Maintain the quality of supporting waterways habitat features used by the otter population.
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).
Water quality/quantity	Ensure water quality and quantity is restored to a standard which provides the necessary conditions to support the feature.
Water quality: Toxic chemicals	Avoid any increase in the level of pollutants which are potentially toxic to otters.
Water quality – other pollutants	Achieve at least ‘Good’ chemical status (i.e. compliance with relevant Environmental Quality Standards).

4.2.79. As described in **paragraph 3.5.13**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for otter, river lamprey and sea lamprey. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water

Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.80. In light of the above, **no adverse effects on the River Derwent SAC** are predicted in relation to increased pollution risk from water-borne pollutants.

Lower Derwent Valley SAC

4.2.81. This impact pathway is relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased water-borne pollution of Carr Dyke and River Ouse during construction of the Proposed Scheme.

4.2.82. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: structure and function', and 'Supporting processes (on which the feature and/or its supporting habitat relies)'. These include the targets as summarised below in **Table 4.10**.

Table 4.10 - Lower Derwent Valley SAC SACO – Water-borne Pollutants

Attribute	Targets
Habitat Quality - river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.
Habitat quality - waterways	Maintain the quality of supporting waterways habitat features used by the otter population
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).
Water quantity/quality	Where the feature or its supporting habitat is dependent on surface water, maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.
Water quality/quantity	Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.
Water quality: Toxic chemicals	Avoid any increase in the level of pollutants affecting the site which are potentially toxic to otters.

4.2.83. As described in **paragraph 3.5.13**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for otter. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES

(document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.84. In light of the above, **no adverse effects on the Lower Derwent Valley SAC** are predicted in relation to increased pollution risk from water-borne pollutants.

Lower Derwent Valley SPA

4.2.85. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. The shoveler is the only species identified as a breeding feature (Natural England, 2019). This impact pathway was identified in relation to the potential for water-borne pollution of Carr Dyke during construction of the Proposed Scheme.

4.2.86. Some of the bird species which are qualifying interests of the SPA may use farmland and watercourse habitats outside the SPA itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields and Carr Dyke is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.87. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Bewick swan;

b. Teal;

c. Shoveler;

d. Wigeon; and

e. Golden plover.

4.2.88. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to ‘supporting habitat: water quality’. These include the targets as summarised below in **Table 4.11.** The SACO are the same for each qualifying interest.

Table 4.11 - Lower Derwent Valley SPA SACO – Water-borne Pollutants

Attribute	Targets
Supporting habitat: water quality - contaminants	Restrict 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.
Supporting habitat: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 %

Attribute	Targets
	of the year), avoiding deterioration from existing levels.
Supporting habitat: water quality - nutrients	Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.
Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

4.2.89. As described in **paragraph 3.5.13**, increased water-borne pollutants could impact water quality in Carr Dyke, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.90. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SPA** are predicted in relation to increased pollution risk from water-borne pollutants.

Lower Derwent Valley Ramsar

4.2.91. This impact pathway is potentially relevant to a number of the Ramsar bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. This impact pathway was identified in relation to the potential for increased water-borne pollution of Carr Dyke and River Ouse during construction of the Proposed Scheme.

4.2.92. Some of the bird species which are qualifying interests of the Ramsar may use farmland and/or watercourse habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area, Carr Dyke, and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.93. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Teal; and

b. Wigeon.

4.2.94. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Lower Derwent Valley SPA are considered relevant, as set out in **Table 4.11**, above.

4.2.95. As described in **paragraph 3.5.13**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.96. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley Ramsar** are predicted in relation to increased pollution risk from water-borne pollutants.

Humber Estuary SAC

4.2.97. This impact pathway is relevant to the sea lamprey and river lamprey qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased water-borne pollution of the River Ouse during construction of the Proposed Scheme.

4.2.98. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting processes. These include the targets as summarised below in **Table 4.12**.

Table 4.12 - Humber Estuary SAC SACO – Water-borne Pollutants

Attribute	Targets
Supporting processes: physico-chemical properties (species)	Maintain the natural physico-chemical properties of the water.
Supporting processes: water quality - contaminants (species)	Restrict 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.
Supporting processes: water quality - dissolved oxygen (species)	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting processes: water quality - nutrients (species)	Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of

Attribute	Targets
	the site and features [avoiding deterioration from e (SIC)

4.2.99. As described in **paragraph 3.5.13**, increased water-borne pollution could impact water quality in River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for river lamprey and sea lamprey. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.100. In light of the above, **no adverse effects on the Humber Estuary SAC** are predicted in relation to increased pollution risk from water-borne pollutants.

Humber Estuary SPA

4.2.101. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. Several of the qualifying interests do comprise breeding populations, including avocet, bittern, little tern, and marsh harrier. This impact pathway was identified in relation to the potential for increased water-borne pollution of Carr Dyke during construction of the Proposed Scheme.

4.2.102. Some of the bird species which are qualifying interests of the SPA may use farmland and/or watercourse habitats outside the SPA itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.103. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Article 4.2 assemblage of waterbirds) could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon;
f. Marsh harrier; and
g. Golden plover.

4.2.104. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: water quality'. These include the targets as summarised below in **Table 4.13.** The SACO are the same for each qualifying interest.

Table 4.13 - Humber Estuary SPA SACO – Water-borne Pollutants

Attribute	Targets
Supporting habitat: water quality - contaminants	Restrict 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.
Supporting habitat: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting habitat: water quality - nutrients	Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.
Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

4.2.105. As described in **paragraph 3.5.13**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that, impacts on the Carr Dyke and River Ouse would be negligible.

4.2.106. In light of the above, **no adverse effects on the integrity of the Humber Estuary SPA** are predicted in relation to increased pollution risk from water-borne pollution.

Humber Estuary Ramsar

4.2.107. This impact pathway is potentially relevant to a number of the bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. The Ramsar bird qualifying interests are similar to those for which the Humber Estuary SPA has been designated. This impact pathway was identified in relation to the potential for increased water-borne pollution of Carr Dyke and River

Ouse during construction of the Proposed Scheme, and in relation to River and sea lamprey for the River Ouse.

4.2.108. Some of the bird species which are qualifying interests of the Ramsar may use farmland and/or watercourse habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.109. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Ramsar Criterion 5 assemblage of waterbirds) could use farmland and/or watercourse habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon; and
f. Golden plover.

4.2.110. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Humber Estuary SPA are considered relevant, as set out in **Table 4.13**, above.

4.2.111. As described in **paragraph 3.5.13**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species and (in relation to the River Ouse) river and sea lamprey. With mitigation measures in place (see **paragraph 4.1.10**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.112. In light of the above, **no adverse effects on the integrity of the Humber Estuary Ramsar** are predicted in relation to increased pollution risk from water-borne pollution.

INCREASED VISUAL DISTURBANCE FROM PLANT AND PERSONNEL

River Derwent SAC

4.2.113. This impact pathway is only relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to

the potential for visual disturbance of otter that would occur in and around the Habitat Provision Area (**see Figure 3**).

4.2.114. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2017) do not include any objectives that directly relate to the risk of disturbance to otter.

4.2.115. Otters originating from the SAC may utilise the habitats within and adjacent to the Proposed Scheme Habitat Provision Area (both aquatic and associated riparian and bankside areas and terrestrial habitat providing connectivity to such features). Otters may use the ditch network adjacent to the Habitat Provision Area and potentially cross open fields.

4.2.116. Otters may therefore be indirectly impacted as a result of construction lighting and visual disturbance from works in the north of the Power Station Site and from the proposed hedgerow planting in the Habitat Provision Area. Where the Proposed Scheme is located in proximity to occupied habitat, primarily Carr Dyke, disturbance may be prevalent up to 30 m from a holt and up to 200 m from a natal den (Scottish Natural Heritage, 2017).

4.2.117. No holts were recorded within 200 m of the Drax Power Station Site during surveys for the Drax Repower Project in 2018, with evidence within 200m of the Drax Power Station Site including spraints, a slide, and otter prints around Carr Dyke, with the closest evidence recorded approximately 50 m east of the Drax Power Site. In addition, a possible couch (above-ground resting site) was recorded approximately 200m north-east of the Drax Power Station Site, on the southern bank of the Carr Dyke (WSP, 2018). As discussed previously, otters are likely to make at least occasional use of other waterbodies and ditches within and adjacent to the Habitat Provision Area and may also use terrestrial habitats within dense vegetation for couches. They may also cross open farmland to move between other habitat features in the wider landscape.

4.2.118. As discussed in **Table 3.5**, the risk of visual disturbance arises from the use of the woodyard Drax Power Station Site Construction Laydown Area, in the north of the Drax Power Station Site **(see Figure 3**). This area may also be used for construction of the Carbon Dioxide Delivery Terminal Compound, if this is constructed as part of the Proposed Scheme (see **paragraph 2.2.44** of **Chapter 2** (Site and Project Description) of Volume 1 of the ES (document reference 6.1.2).

4.2.119. The above-described mitigation measures between paragraph 4.1.14 to 4.1.19 are appropriate, proven avoidance and mitigation measures and no residual, significant effects are envisaged. The use of 2.4 m construction hoarding will limit visibility of the Proposed Scheme from Carr Dyke such that personnel working at ground level and most machinery would not be visible from the watercourse and adjacent land, limiting visibility to taller plant and activities associated with construction of the Carbon Dioxide Delivery Terminal Compound (if this is constructed as part of the Proposed Scheme).

4.2.120. There may be some very minor residual effects on otters' use of habitats in proximity to the north of the existing Power Station Site adjacent to the Proposed Scheme. Given the abundant habitat available in the wider floodplain of the River Ouse and within the River Derwent SAC and Lower Derwent Valley SAC sites themselves, no perceptible effects on otters are expected to arise.

4.2.121. In light of the above, **no adverse effects on the integrity of the River Derwent SAC** are predicted in relation to visual disturbance during construction.

Lower Derwent Valley SAC

4.2.122. This impact pathway is only relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for visual disturbance of otters, that would occur in and adjacent to the Habitat Provision Area (**see Figure 3**).

4.2.123. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) do not include any objectives that directly relate to the risk of disturbance to otter.

4.2.124. Otters originating from the SAC may utilise the habitats within and adjacent to the Proposed Scheme Habitat Provision Area (both aquatic and associated riparian and bankside areas and terrestrial habitat providing connectivity to such features). Otters may use the ditch network adjacent to the Habitat Provision Area and potentially cross open fields.

4.2.125. Otters may therefore be indirectly impacted as a result of construction lighting and visual disturbance from works in the north of the Power Station Site and from the proposed hedgerow planting in the Habitat Provision Area. Where the Proposed Scheme is located in proximity to occupied habitat, primarily Carr Dyke, disturbance may be prevalent up to 30 m from a holt and up to 200 m from a natal den (Scottish Natural Heritage, 2017).

4.2.126. No holts were recorded within 200 m of the Drax Power Station Site during surveys for the Drax Repower Project in 2018, with evidence within 200m of the Drax Power Station Site including spraints, a slide, and otter prints around Carr Dyke, with the closest evidence recorded approximately 50 m east of the Drax Power Site. In addition, a possible couch (above-ground resting site) was recorded approximately 200m north-east of the Drax Power Station Site, on the southern bank of the Carr Dyke (WSP, 2018). As discussed previously, otters are likely to make at least occasional use of other waterbodies and ditches within and adjacent to the Habitat Provision Area and may also use terrestrial habitats within dense vegetation for couches. They may also cross open farmland to move between other habitat features in the wider landscape.

4.2.127. As discussed in **Table 3.5**, the risk of visual disturbance arises from the use of the woodyard Drax Power Station Site Construction Laydown Area, in the north of the Drax Power Station Site **(see Figure 3**). This area may also be used for construction of the Carbon Dioxide Delivery Terminal Compound, if this is constructed as part of

the Proposed Scheme (see **paragraph 2.2.44** of **Chapter 2** (Site and Project Description) of Volume 1 of the ES (document reference 6.1.2).

4.2.128. The above described mitigation measures between paragraph 4.1.14 to 4.1.19 are appropriate, proven avoidance and mitigation measures and no residual, significant effects are envisaged. The use of 2.4 m construction hoarding will limit visibility of the Proposed Scheme from Carr Dyke such that personnel working at ground level and most machinery would not be visible from the watercourse and adjacent land, limiting visibility to taller plant and activities associated with construction of the Carbon Dioxide Delivery Terminal Compound (if this is constructed as part of the Proposed Scheme).

4.2.129. There may be some very minor residual effects on otters' use of habitats in proximity to the north of the existing Power Station Site adjacent to the Proposed Scheme. Given the abundant habitat available in the wider floodplain of the River Ouse and within the River Derwent SAC and Lower Derwent Valley SAC sites themselves, no perceptible effects on otter populations are expected to arise.

4.2.130. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SAC** are predicted in relation to visual disturbance during construction.

Lower Derwent Valley SPA

4.2.131. As set out in **Table 3.5,** this impact pathway is relevant to several of the SPA qualifying interest features. This impact was identified in relation to the potential for visual disturbance of SPA birds, in the event that they use habitats in and adjacent to the Habitat Provision Area (**see Figure 3**).

4.2.132. Some of the bird species which are qualifying interests of the SPA may use farmland and watercourse habitats outside the SPA itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields and Carr Dyke is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.133. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Bewick swan;

b. Teal;

c. Shoveler;

d. Wigeon; and

e. Golden plover.

4.2.134. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'Supporting habitat (both within and outside

the SPA): minimising disturbance'. These include the targets as summarised below in **Table 4.14.** The SACO are the same for each qualifying interest.

Table 4.14 - Lower Derwent Valley SPA SACO – Visual Disturbance

Attribute	Targets
Minimising disturbance caused by human activity	Restrict the frequency, duration and/or intensity of disturbance affecting moulting, loafing, feeding and/or roosting birds so that the assemblage feature is not significantly disturbed.

4.2.135. Human activity, including visual disturbance by the presence of plant and in particular people, can result in disturbance of birds. Sustained or frequent disturbance at a level which significantly alters their behaviour can impact on the long-term viability of populations.

4.2.136. Such disturbing effects can result in changes to feeding or roosting behaviour, increased energy expenditure due to more frequent flights, and desertion of supporting habitat. Susceptibility alters between species, with some species relatively adaptable to differing levels of disturbance whilst others are more sensitive.

4.2.137. The Waterbird Disturbance Toolkit (European Union, 2022) contains analysis and guidance on the potential disturbance effects that can arise from visual stimuli. This indicates that typically it is the presence of people (and in the case of recreational disturbance, people with dogs) that is likely to trigger the greatest responses to disturbance in waders and wildfowl. For example, the toolkit identifies that disturbance effects of workers operating outside plant are likely to be greater than an operational excavator plant. The toolkit also confirms that disturbance decreases with increasing distance from the source of disturbance. In addition, the breeding bird surveys (completed for Drax Repower) (WSP, 2018(c)) and wintering bird surveys (completed for the Proposed Scheme – document reference 6.2.8.3; and completed for Drax Repower (WSP, 2018b)) have recorded minimal activity by SPA and Ramsar species, including no evidence of breeding.

4.2.138. A series of mitigation measures have been identified in relation to visual disturbance, as set out between paragraphs **4.1.14 and 4.1.18**. These include the use of minimum 2.4 m solid hoarding around the periphery of the woodyard Drax Power Station Construction Laydown Area and, if required, around the construction footprint of the Carbon Dioxide Delivery Terminal Compound. With this solid hoarding in place, intervisibility between habitats in and adjacent to the Habitat Provision Area and construction / decommissioning activities (at ground level) would be blocked. Workers at ground level would not be visible from adjacent habits to the north, which is the greatest potential source of disturbance.

4.2.139. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SPA** are predicted in relation to visual disturbance during construction.

Lower Derwent Valley Ramsar

4.2.140. This impact pathway is potentially relevant to a number of the Ramsar bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. This impact was identified in relation to the potential for visual disturbance of Ramsar birds, in the event that they use habitats in and adjacent to the Habitat Provision Area (**see Figure 3**).

4.2.141. Some of the bird species which are qualifying interests of the Ramsar may use farmland and/or watercourse habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area, Carr Dyke, and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.142. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Teal; and

b. Wigeon.

4.2.143. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Lower Derwent Valley SPA are considered relevant, as set out in **Table 4.14**, above.

4.2.144. Human activity, including visual disturbance by the presence of plant and in particular people, can result in disturbance of birds. Sustained or frequent disturbance at a level which significantly alters their behaviour can impact on the long-term viability of populations.

4.2.145. Such disturbing effects can result in changes to feeding or roosting behaviour, increased energy expenditure due to more frequent flights, and desertion of supporting habitat. Susceptibility alters between species, with some species relatively adaptable to differing levels of disturbance whilst others are more sensitive.

4.2.146. The Waterbird Disturbance Toolkit (European Union, 2022) contains analysis and guidance on the potential disturbance effects that can arise from visual stimuli. This indicates that typically it is the presence of people (and in the case of recreational disturbance, people with dogs) that is likely to trigger the greatest responses to disturbance in waders and wildfowl. For example, the toolkit identifies that disturbance effects of workers operating outside plant are likely to be greater than an operational excavator. The toolkit also confirms that disturbance decreases with increasing distance from the source of disturbance. In addition, the breeding bird surveys (completed for Drax Repower) (WSP, 2018(c)) and wintering bird surveys (completed for the Proposed Scheme – document reference 6.2.8.3; and completed

for Drax Repower (WSP, 2018b)) have recorded minimal activity by SPA and Ramsar species, including no evidence of breeding.

4.2.147. A series of mitigation measures have been identified in relation to visual disturbance, as set out between paragraphs **4.1.14 and 4.1.18**. These include the use of minimum 2.4 m solid hoarding around the periphery of the woodyard Drax Power Station Construction Laydown Area and, if required, around the construction footprint of the Carbon Dioxide Delivery Terminal Compound. With this solid hoarding in place, intervisibility between habitats in and adjacent to the Habitat Provision Area and construction / decommissioning activities (at ground level) would be blocked. Workers at ground level would not be visible from adjacent habitats to the north, which is the greatest potential source of disturbance.

4.2.148. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley Ramsar** are predicted in relation to visual disturbance during construction.

Humber Estuary SPA

4.2.149. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. Several of the qualifying interests do comprise breeding populations, including avocet, bittern, little tern, and marsh harrier. This impact was identified in relation to the potential for visual disturbance of SPA birds, in the event that they use habitats in and adjacent to the Habitat Provision Area (**see Figure 3**).

4.2.150. Some of the bird species which are qualifying interests of the SPA may use farmland and/or watercourse habitats outside the SPA itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.151. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Article 4.2 assemblage of waterbirds) could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon;
f. Marsh harrier; and
g. Golden plover.

4.2.152. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'Disturbance caused by human activity'. These include the targets as summarised below in **Table 4.15.** The SACO are the same for each qualifying interest.

Table 4.15 - Humber Estuary SPA SACO – Visual Disturbance

Attribute	Targets
Minimising disturbance caused by human activity	Restrict the frequency, duration and/or intensity of disturbance affecting moulting, loafing, feeding and/or roosting birds so that the assemblage feature is not significantly disturbed.

4.2.153. Human activity, including visual disturbance by the presence of plant and in particular people, can result in disturbance of birds. Sustained or frequent disturbance at a level which significantly alters their behaviour can impact on the long-term viability of populations.

4.2.154. Such disturbing effects can result in changes to feeding or roosting behaviour, increased energy expenditure due to more frequent flights, and desertion of supporting habitat. Susceptibility alters between species, with some species relatively adaptable to differing levels of disturbance whilst others are more sensitive.

4.2.155. The Waterbird Disturbance Toolkit (European Union, 2022) contains analysis and guidance on the potential disturbance effects that can arise from visual stimuli. This indicates that typically it is the presence of people (and in the case of recreational disturbance, people with dogs) that is likely to trigger the greatest responses to disturbance in waders and wildfowl. For example, the toolkit identifies that disturbance effects of workers operating outside plant are likely to be greater than an operational excavator. The toolkit also confirms that disturbance decreases with increasing distance from the source of disturbance. In addition, the breeding bird surveys (completed for Drax Repower) (WSP, 2018(c)) and wintering bird surveys (completed for the Proposed Scheme – document reference 6.2.8.3; and completed for Drax Repower (WSP, 2018b)) have recorded minimal activity by SPA and Ramsar species, including no evidence of breeding.

4.2.156. A series of mitigation measures have been identified in relation to visual disturbance, as set out between paragraphs **4.1.14 and 4.1.18**. These include the use of minimum 2.4 m solid hoarding around the periphery of the woodyard Drax Power Station Construction Laydown Area and, if required, around the construction footprint of the Carbon Dioxide Delivery Terminal Compound. With this solid hoarding in place, intervisibility between habitats in and adjacent to the Habitat Provision Area and construction / decommissioning activities (at ground level) would be blocked. Workers at ground level would not be visible from adjacent habitats to the north, which is the greatest potential source of disturbance.

4.2.157. In light of the above, **no adverse effects on the integrity of the Humber Estuary SPA** are predicted in relation to visual disturbance during construction.

Humber Estuary Ramsar

4.2.158. This impact pathway is potentially relevant to a number of the bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. The Ramsar bird qualifying interests are similar to those for which the Humber Estuary SPA has been designated. This impact pathway was identified in relation to the potential for visual disturbance of Ramsar birds, in the event that they use habitats in and adjacent to the Habitat Provision Area (**see Figure 3**).

4.2.159. Some of the bird species which are qualifying interests of the Ramsar may use farmland and/or watercourse habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.160. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Ramsar Criterion 5 assemblage of waterbirds) could use farmland and/or watercourse habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon; and
f. Golden plover.

4.2.161. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Humber Estuary SPA are considered relevant, as set out in **Table 4.15**, above.

4.2.162. Human activity, including visual disturbance by the presence of plant and in particular people, can result in disturbance of birds. Sustained or frequent disturbance at a level which significantly alters their behaviour can impact on the long-term viability of populations.

4.2.163. Such disturbing effects can result in changes to feeding or roosting behaviour, increased energy expenditure due to more frequent flights, and desertion of supporting habitat. Susceptibility alters between species, with some species relatively adaptable to differing levels of disturbance whilst others are more sensitive.

4.2.164. The Waterbird Disturbance Toolkit (European Union, 2022) contains analysis and guidance on the potential disturbance effects that can arise from visual stimuli. This indicates that typically it is the presence of people (and in the case of recreational disturbance, people with dogs) that is likely to trigger the greatest responses to disturbance in waders and wildfowl. For example, the toolkit identifies that disturbance effects of workers operating outside plant are likely to be greater than an operational excavator. The toolkit also confirms that disturbance decreases with increasing distance from the source of disturbance. In addition, the breeding bird surveys (completed for Drax Repower) (WSP, 2018(c)) and wintering bird surveys (completed for the Proposed Scheme – document reference 6.2.8.3; and completed for Drax Repower (WSP, 2018b)) have recorded minimal activity by SPA and Ramsar species, including no evidence of breeding.

4.2.165. A series of mitigation measures have been identified in relation to visual disturbance, as set out between paragraphs **4.1.14 and 4.1.18**. These include the use of minimum 2.4 m solid hoarding around the periphery of the woodyard Drax Power Station Construction Laydown Area and, if required, around the construction footprint of the Carbon Dioxide Delivery Terminal Compound. With this solid hoarding in place, intervisibility between habitats in and adjacent to the Habitat Provision Area and construction / decommissioning activities (at ground level) would be blocked. Workers at ground level would not be visible from adjacent habitats to the north, which is the greatest potential source of disturbance.

4.2.166. In light of the above, **no adverse effects on the integrity of the Humber Estuary SPA** are predicted in relation to visual disturbance during construction.

OPERATION

Emissions of treated flue gas to air

4.2.167. The mitigation measures proposed at **paragraph 4.1.22** have two relevant effects on the air quality impacts in the with Proposed Scheme scenario:

a. The dispersion of all emitted pollutants is increased as a result of the increased exit temperature of the flue gases; and

b. The concentration of SO_2 emitted from the Main Stack is reduced, due to the 40% reduction of SO_2 emissions from the BECCS units. This reduces the Proposed Scheme's contribution to acid deposition.

4.2.168. As set out between paragraphs **3.5.42 and 3.5.45**, in the absence of mitigation, operation of the Proposed Scheme would exceed screening criteria for acid deposition at the following Sites:

a. Lower Derwent Valley SAC;

b. Lower Derwent Valley Ramsar; and

c. Thorne Moor SAC.

4.2.169. **Table 4.16** below, summarises the dispersion modelling outputs for acid deposition from the Air Quality Assessment. Figures are presented both pre and post-mitigation

Table 4.16 - Modelled Maximum Operational Phase Impacts at Ecological Receptors for Annual Acid Deposition (Without Versus With Mitigation Applied)

European Site	Critical Load (keq/ha/yr)	Max PC (Impact) – No Mitigation (keq/ha/yr)	Max PC (Impact) – With Mitigation (keq/ha/yr)	Max PC as % of CL – No Mitigation	Max PC as % of CL – With Mitigation
Thorne Moor SAC	0.462	0.01	0.00	1.3%	0.7%
Lower Derwent Valley SAC	0.643	0.01	0.01	2.0%	1.1%
Lower Derwent Valley Ramsar	0.643	0.01	0.01	2.0%	1.1%

Notes: All deposition rates rounded to two decimal places (2 d.p.). Maximum values based on results modelled using five years of meteorological data (2016-2020). Results presented only for the sites that are assigned an acid deposition critical load.

4.2.170. With the mitigation measures applied, the Proposed Scheme's acid deposition maximum impact over Thorne Moor SAC is reduced to be below the 1.0% screening criteria as described in paragraphs **3.5.33 and 3.5.34**. Therefore, with mitigation the Proposed Scheme alone would no longer trigger LSE to Thorne Moor SAC**, and no adverse effects on integrity are predicted**.

4.2.171. With the mitigation measures applied, the Proposed Scheme's acid deposition maximum impact over Lower Derwent Valley SAC and Ramsar Site reduces to 1.1% of the Critical Load.

4.2.172. Acid deposition is relevant to the Lowland hay meadows qualifying interest feature of the Lower Derwent Valley SAC and Ramsar (**see Appendix 5**). The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'Air quality'. These include the targets as summarised below in **Table 4.17.** The SACO include this air quality target for both the hay meadow and otter qualifying interest feature of the SAC. There are however no critical loads or levels for the otter interest feature provided on APIS, and Ramsar sites are not included on APIS.

Table 4.17 - Lower Derwent Valley SAC SACO – Air Quality

Attribute	Targets
Air Quality	Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).

4.2.173. Given the numerical screening thresholds for acid deposition were exceeded pre-mitigation, the HRA screening identified the potential for LSE. Two critical loads are available on the APIS website for this habitat, depending on whether the 'acid grassland' or 'calcareous grassland' acidity class is used. On a precautionary basis, the air quality modelling has been based on the 'acid grassland' acidity class, as this is more sensitive to acidification effects than the 'calcareous grassland' acidity class (Air Pollution Information System, 2022).

4.2.174. In order to ensure it represents a realistic worst-case scenario, the air quality modelling is based on several conservative assumptions. These are described in detail between paragraphs **6.5.15 and 6.5.33** of **Chapter 6** (Air Quality) of Volume 1 of the ES. They comprise the following in relation to the modelling of the with Proposed Scheme scenario alone (i.e., without consideration of other plans and projects):

a. Modelling has been completed using meteorological data from each of five years (2016 – 2020), with the results from the maximum (i.e., worst) year presented;

b. The modelling of the Proposed Scheme assumes that the two BECCS Biomass Units would both operate at continuous full load (8,760 hrs per year), which in reality would be unlikely to occur;

c. Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum (in the case of Lower Derwent Valley, the exceedance of the 1% screening criterion occurs only over the Breighton Meadows SSSI component of the SAC, which supports approximately 18% of the Lower Derwent Valley SAC lowland hay meadow habitat); and

d. Assessment against the lower threshold of the recommended critical loads.

4.2.175. Given these elements of conservatism, the impact on Lower Derwent Valley SAC and Ramsar is considered to be analogous with an impact of 1% of the Critical Load. This is not expected to trigger any perceptible changes in the condition of the lowland hay meadow qualifying interest habitat or the ability of the habitats present to sustain the resident otter population. No significant impediment to the achievement of the Conservation Objective relating to air quality is predicted.

4.2.176. The latest SSSI condition assessment for Breighton Meadows SSSI carried out in 2018 (Natural England, 2022), also identifies that 100% of the SSSI is in 'favourable' condition. This suggests that there is no evidence of substantial air quality effects on the lowland hay meadow habitats (the qualifying interest of the SAC) from the historically higher levels of acid deposition that the site would have received prior to increased emissions control measures across a range of sectors and the phasing out of coal use for energy generation since the 1970's.

4.2.177. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SAC and Ramsar** are predicted in relation to air quality during operation.

INCREASED RISK OF POLLUTION FROM WATER-BORNE POLLUTANTS

River Derwent SAC

4.2.178. This impact pathway is relevant to the otter, sea lamprey, and river lamprey qualifying interests of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased water-borne pollution of Carr Dyke and the River Ouse during operation of the Proposed Scheme.

4.2.179. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting habitat: structure and function. These include the targets as summarised below in **Table 4.18**.

Table 4.18 - River Derwent SAC SACO – Water-borne Pollutants

Attribute	Targets
Habitat Quality – river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.

Attribute	Targets
Habitat quality – waterways	Maintain the quality of supporting waterways habitat features used by the otter population.
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).
Water quality/quantity	Ensure water quality and quantity is restored to a standard which provides the necessary conditions to support the feature.
Water quality: Toxic chemicals	Avoid any increase in the level of pollutants which are potentially toxic to otters.
Water quality – other pollutants	Achieve at least 'Good' chemical status (i.e. compliance with relevant Environmental Quality Standards).

4.2.180. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for otter, river lamprey and sea lamprey. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.181. In light of the above, **no adverse effects on the River Derwent SAC** are predicted in relation to increased pollution risk from water-borne pollutants.

Lower Derwent Valley SAC

4.2.182. This impact pathway is relevant to the otter qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased water-borne pollution of Carr Dyke and River Ouse during operation of the Proposed Scheme.

4.2.183. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: structure and function', and 'Supporting processes (on which the feature and/or its supporting habitat relies)'. These include the targets as summarised below in **Table 4.19**.

Table 4.19 - Lower Derwent Valley SAC SACO – Water-borne Pollutants

Attribute	Targets
Habitat Quality - river	Maintain the quality of supporting river habitat features based on natural river function, which provides a characteristic river-habitat mosaic that caters for otters.

Attribute	Targets
Habitat quality - waterways	Maintain the quality of supporting waterways habitat features used by the otter population
Food availability	Maintain fish biomass at expected natural levels of biomass (subject to natural fluctuations).
Water quantity/quality	Where the feature or its supporting habitat is dependent on surface water, maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.
Water quality/quantity	Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.
Water quality: Toxic chemicals	Avoid any increase in the level of pollutants affecting the site which are potentially toxic to otters.

4.2.184. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for otter, river lamprey and sea lamprey. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.185. In light of the above, **no adverse effects on the Lower Derwent Valley SAC** are predicted in relation to increased pollution risk from water-borne pollutants.

Lower Derwent Valley SPA

4.2.186. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. The shoveler is the only species identified as a breeding feature (Natural England, 2019). This impact pathway was identified in relation to the potential for water-borne pollution of Carr Dyke during operation of the Proposed Scheme.

4.2.187. Some of the bird species which are qualifying interests of the SPA may use farmland and watercourse habitats outside the SPA itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields and Carr Dyke is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.188. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Bewick swan;

b. Teal;

c. Shoveler;

d. Wigeon; and

e. Golden plover.

4.2.189. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: water quality'. These include the targets as summarised below in **Table 4.20.** The SACO are the same for each qualifying interest.

Table 4.20 - Lower Derwent Valley SPA SACO – Water-borne Pollutants

Attribute	Targets
Supporting habitat: water quality - contaminants	Restrict 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.
Supporting habitat: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting habitat: water quality - nutrients	Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.
Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g., concentrations of suspended sediment, plankton and other material) across the habitat.

4.2.190. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.191. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SPA** are predicted in relation to increased pollution risk from water-borne pollutants.

Lower Derwent Valley Ramsar

4.2.192. This impact pathway is potentially relevant to a number of the Ramsar bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. This impact pathway was identified in relation to the potential for increased water-borne pollution of Carr Dyke and River Ouse during operation of the Proposed Scheme.

4.2.193. Some of the bird species which are qualifying interests of the Ramsar may use farmland and/or watercourse habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area, Carr Dyke, and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~4.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar.

4.2.194. Based on their habitat preferences, the following species could use farmland and watercourse habitats in and adjacent to the Habitat Provision Area:

a. Teal; and

b. Wigeon.

4.2.195. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Lower Derwent Valley SPA are considered relevant, as set out in **Table 4.20**, above.

4.2.196. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for Ramsar bird species. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.197. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley Ramsar** are predicted in relation to increased pollution risk from water-borne pollutants.

Humber Estuary SAC

4.2.198. This impact pathway is relevant to the sea lamprey and river lamprey qualifying interest of the SAC, with no LSE predicted for other qualifying interests. This impact was identified in relation to the potential for increased water-borne pollution of the River Ouse during operation of the Proposed Scheme.

4.2.199. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to supporting processes. These include the targets as summarised below in **Table 4.21**.

Table 4.21 - Humber Estuary SAC SACO – Water-borne Pollutants

Attribute	Targets
Supporting processes: physico-chemical properties (species)	Maintain the natural physico-chemical properties of the water.
Supporting processes: water quality - contaminants (species)	Restrict 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.
Supporting processes: water quality - dissolved oxygen (species)	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting processes: water quality - nutrients (species)	Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features [avoiding deterioration from e (SIC)

4.2.200. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for river lamprey and sea lamprey. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the River Ouse would be negligible.

4.2.201. In light of the above, no adverse effects on the Humber Estuary SAC are predicted in relation to increased pollution risk from water-borne pollutants.

Humber Estuary SPA

4.2.202. This impact pathway is potentially relevant to a number of the SPA bird qualifying interest features of the SPA. The qualifying interests are primarily present within the SPA (and surrounding areas where used) over winter and the early spring passage period. Several of the qualifying interests do comprise breeding populations, including avocet, bittern, little tern, and marsh harrier. This impact pathway was identified in relation to the potential for increased water-borne pollution of Carr Dyke during operation of the Proposed Scheme.

4.2.203. Some of the bird species which are qualifying interests of the SPA may use farmland and/or watercourse habitats outside the SPA itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the SPA and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the SPA itself, and the presence of extensive areas of farmland closer to the SPA.

4.2.204. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Article 4.2 assemblage of waterbirds) could use farmland habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;
b. Curlew;
c. Shoveler;
d. Mallard;
e. Wigeon;
f. Marsh harrier; and
g. Golden plover.

4.2.205. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'supporting habitat: water quality'. These include the targets as summarised below in **Table 4.22.** The SACO are the same for each qualifying interest.

Table 4.22 - Humber Estuary SPA SACO – Water-borne Pollutants

Attribute	Targets
Supporting habitat: water quality - contaminants	Restrict 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.
Supporting habitat: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
Supporting habitat: water quality - nutrients	Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.

Attribute	Targets
Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g., concentrations of suspended sediment, plankton and other material) across the habitat.

4.2.206. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for SPA bird species. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.207. In light of the above, **no adverse effects on the integrity of the Humber Estuary SPA** are predicted in relation to increased pollution risk from water-borne pollution.

Humber Estuary Ramsar

4.2.208. This impact pathway is potentially relevant to a number of the bird qualifying interest features of the Ramsar. The qualifying interests are primarily present within the Ramsar (and surrounding areas where used) over winter and the early spring passage period. The Ramsar bird qualifying interests are similar to those for which the Humber Estuary SPA has been designated. This impact pathway was identified in relation to the potential for increased water-borne pollution of Carr Dyke and River Ouse during operation of the Proposed Scheme. This impact pathway is also relevant to the sea lamprey and river lamprey qualifying interests.

4.2.209. Some of the bird species which are qualifying interests of the Ramsar may use farmland and/or watercourse habitats outside the Ramsar itself for foraging and/or roosting. Due to differences in their ecology, the use of farmland habitats varies between the species. Regardless of the differences between the species, any use of the Habitat Provision Area and surrounding fields is likely to be limited. This is due to the distance between the Ramsar and the Habitat Provision Area (~6.3 km), the presence of more suitable habitat within the Ramsar itself, and the presence of extensive areas of farmland closer to the Ramsar. River and sea lamprey are known to use the River Ouse as a migratory route between marine and intertidal habitats including the Humber Estuary and upstream freshwater habitats including the River Derwent.

4.2.210. Based on their habitat preferences, the following species (individual qualifying interest species and species forming part of the Ramsar Criterion 5 assemblage of waterbirds) could use farmland and/or watercourse habitats in and adjacent to the Habitat Provision Area:

a. Lapwing;

b. Curlew;

c. Shoveler;
d. Mallard;
e. Wigeon; and
f. Golden plover.

4.2.211. Ramsar sites do not have published conservation objectives. As such, the SACO identified for Humber Estuary SPA are considered relevant, as set out in **Table 4.22**, above.

4.2.212. As described in **paragraph 3.5.61 to 3.5.63**, increased water-borne pollution could impact water quality in Carr Dyke and River Ouse, potentially leading to LSE through reductions in the suitability of riparian habitats for Ramsar bird species and (in relation to the River Ouse) sea and river lamprey. With mitigation measures in place (see **paragraph 4.1.26**) the assessment of effects on the Water Environment (see **paragraph 12.11.14** of **Chapter 12** (Water Environment) of Volume 1 of the ES (document reference 6.1.12) predicts that impacts on the Carr Dyke and River Ouse would be negligible.

4.2.213. In light of the above, **no adverse effects on the integrity of the Humber Estuary Ramsar** are predicted in relation to increased pollution risk from water-borne pollution.

4.3. IN-COMBINATION EFFECTS WITH OTHER PLANS AND PROJECTS

LOSS OF FUNCTIONALLY-LINKED LAND (CONSTRUCTION AND DECOMMISSIONING)

4.3.1. The in-combination HRA screening assessment identified the potential for combined impacts with other plans and projects to worsen the impacts and hence effects of the Proposed Scheme alone. Potential in-combination effects were identified in relation to Development 3, 6, and 9 (see **Table 3.8**).

4.3.2. Development 3 could lead to the following potential relevant impacts and effects:

a. Temporary loss and/or disturbance of minor watercourses for cable installation, with affected watercourses in the vicinity of the Proposed Scheme potentially used by the population of otters associated with the River Derwent SAC and Lower Derwent Valley SAC; and
b. Loss and disturbance of farmland in the vicinity of the Proposed Scheme that could be used by wintering birds associated with the Lower Derwent Valley SPA and Ramsar and/or the Humber Estuary SPA and Ramsar. The majority of habitat loss would be short term and temporary, associated with installation of the HVDC cable. There would be minor permanent habitat loss from the arable field where the convertor station would be located east of Drax Power Station.

4.3.3. Development 6 could lead to the following potential relevant impacts and effects:

a. Loss and disturbance of habitats on Barlow Mound in the vicinity of the Proposed Scheme that could be used by wintering birds associated with the Lower Derwent Valley SPA and Ramsar and/or the Humber Estuary SPA and Ramsar.

4.3.4. Development 9 could lead to the following potential relevant impacts and effects:

a. Effective loss of farmland habitats that could be used by wintering birds associated with the Lower Derwent Valley SPA and Ramsar and/or the Humber Estuary SPA and Ramsar, due to displacement of those birds in response to the presence of wind turbines.

4.3.5. The effects of the Proposed Scheme itself in terms of functionally-linked land that triggered LSE are very minor, comprising hedgerow planting within the Habitat Provision Area only. There would be no spatial overlap with Development 3, 6, or 9. The hedgerow planting in the Habitat Provision Area is not predicted to lead to any material change in the suitability of this area for otter or SPA/Ramsar bird species.

4.3.6. In addition, mitigation has been proposed for the Proposed Scheme (see **paragraph 4.1.4**) that would require hedgerow planting in the Habitat Provision Area to be timed to be completed at the end of the wintering bird season (March in any calendar year).

4.3.7. Depending on the detailed construction timings for Development 3 and 6 (which are not known, but would likely be between 2024 – 2039) and 9 (which is completely unknown), it is possible that the East Construction Laydown Area of the Proposed Scheme could be in use whilst construction activities for the Development 3 convertor station and adjacent sections of HVDC cable are ongoing / have been completed, and during implementation of Developments 6 and 9. This could increase the cumulative loss of farmland habitats to the east and west of the existing Drax Power Station.

4.3.8. Should this potential overlap occur, it is considered unlikely to significantly worsen the effects of the Proposed Scheme alone on SPA / Ramsar bird species. This is because;

a. The wintering bird surveys completed for the Proposed Scheme recorded no SPA species in the East Construction Laydown Area;

b. The distance between Development 9 and The Proposed Scheme;

c. The East Construction Laydown Area would be reinstated following construction, i.e., 2029 at the latest; and

d. The habitat enhancements proposed to the north of the East Construction Laydown Area (see Figure **1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6.2.1) would increase the potential suitability of this area for SPA / Ramsar bird species.

4.3.9. In relation to otter, the Proposed Scheme will have very minor effects on functionally-linked land, as set out between paragraphs **4.2.3** and **4.2.12.** It is not considered that these would combine appreciably with those of Development 3, particularly given that the majority of Development 3's impacts would be temporary, associated with the HVDC cable route where crossing watercourses and adjoining land. It is assumed that Development 3 will complete appropriate pre-construction surveys for otter as

part of the baseline environmental information gathering for that project. It is also assumed that Development 3 will implement standard good practice environmental mitigation, including the provision of an Ecological Clerk of Works for sensitive water crossings and if required micro-siting of the cable route to avoid key otter habitat features, e.g., holts if present. At present, there is no evidence to suggest that otter habitat would be affected by Development 6 (Stantec, 2022), or Development 9.

4.3.10. In light of the above, **no adverse effects** on the integrity of any European Sites are predicted in relation to loss or disturbance of functionally-linked land.

ACCIDENTAL RELEASES OF WATER-BORNE POLLUTANTS (CONSTRUCTION AND DECOMMISSIONING, AND OPERATION)

4.3.11. The in-combination HRA screening assessment identified the potential for combined impacts with other plans and projects to worsen the impacts and hence effects of the Proposed Scheme alone. Potential in-combination effects were identified in relation to Development 3 (see **Table 3.11).**

4.3.12. There is a potential risk that Development 3 could lead to a worsening of the potential impacts of the Proposed Scheme. Development 3 would involve a watercourse crossing of the River Ouse, downstream of the Proposed Scheme, which would require temporary works either side of the River. In the event of pollution incidents occurring for the Proposed Scheme and Development 3, this could lead to overall increased impacts on the River Ouse. Any such impacts could be relevant to otters, river and sea lamprey associated with the Humber Estuary SAC, River Derwent SAC, and Lower Derwent Valley SAC, and to bird populations associated with the Lower Derwent Valley SPA and Ramsar and Humber Estuary SPA and Ramsar.

4.3.13. The cumulative assessment of effects on the Water Environment is presented in **Table 1** in **Appendix 18.5** (Cumulative Effects Assessment Matrix) in Volume 3 of the ES (document reference 6.3.18.5). This identifies that with mitigation measures in place from the Proposed Scheme (as set out above in **paragraph 4.1.11 to 4.1.14**) and standard good construction practice measures assumed to be delivered from Development 3, effects are expected to be temporary, short-term, with a slight adverse (and hence not significant) effect during construction. Effects during operation are predicted to be neutral on the basis of the mitigation (see **paragraphs 4.1.24 to 4.1.26)** incorporated into the Proposed Scheme.

4.3.14. In light of the above, no adverse effects on the integrity of any European Sites are predicted in relation to accidental releases of water-borne pollution.

INCREASED RISK OF VISUAL DISTURBANCE (CONSTRUCTION AND DECOMMISSIONING ONLY)

4.3.15. The in-combination HRA screening assessment identified the potential for combined impacts with other plans and projects to worsen the impacts and hence effects of the Proposed Scheme alone. Potential in-combination effects were identified in relation to Development 6 (see **Table 3.13).**

4.3.16. Development 6 involves proposals to mine ash from Barlow Mound. Barlow Mound is located to the west of the existing Drax Power Station Site, with the Habitat Provision Area to the east of the northern part of the development (Stantec, 2022). The EIA scoping report for Development 6 indicates that the Off-Site Habitat Provision Area is approximately 50 m to the west of Development 6.

4.3.17. The current red line boundary for Development 6 is shown on Figure 02 of the Development 6 EIA Scoping Report (Stantec, 2022) The proposals for habitat measures in the Off-site Habitat Provision Area are shown on **Figure 1** of the **Outline Landscape and Biodiversity Strategy** (document reference 6.6.2.1). Based on these sources of information an existing band of dense scrub and tree cover would be maintained between the existing/proposed open habitats (i.e., grassland) in the off-site Habitat Provision Area and Development 6. This would provide visual screening between Development 6 and the Off-Site Habitat Provision Area.

4.3.18. In light of the above, no adverse effects on the integrity of any European Sites are predicted in relation to accidental releases of water-borne pollution.

EMISSIONS OF TREATED FLUE GAS TO AIR (OPERATION ONLY)

4.3.19. The in-combination HRA screening assessment identified the potential for combined impacts with other plans and projects to worsen the impacts and hence effects of the with Proposed Scheme scenario alone. Potential in-combination effects could arise via emissions from the Proposed Scheme combining with those from other plans and projects, leading to increased pollutant concentrations and deposition onto designated Sites. Developments 1, 4, 47 and 74 are relevant to the assessment of in-combination air quality effects, as these are industrial/energy-generating installations that would each emit some of the same gasses as the Proposed Scheme. The HRA screening for in-combination air quality (carried out pre-mitigation) is presented in **Table 3.14**.

4.3.20. The relevant other plans and projects that could contribute to in-combination air quality effects are as follows:

- **a.** Development 1 – Eggborough CCGT;
- **b.** Development 4 – Keadby 3 Low Carbon Gas Power Station Project;
- **c.** Development 47 – Sandall Stones Road Energy from Waste Facility; and
- **d.** Development 74 – Keadby 2 Power Station.

4.3.21. The assessment of in-combination effects is made with consideration of the mitigation measures that have been developed in relation to operational emissions from the Proposed Scheme. These are set out in paragraphs **4.1.20** to **4.1.23**.

4.3.22. In summary, mitigation measures include:

- **a.** Reducing SO_2 emissions by 40% relative to the unmitigated scenario, applied to the two BECCS Biomass Units; and
- **b.** Increasing exit temperature of flue gases from the two BECCS Units from 80ºC to 100ºC.

4.3.23. These measures increase buoyancy of the flue gas leaving the Main Stack hence increasing dispersal of all pollutants. The Proposed Scheme's contribution to acidification is also reduced, due to the reduced SO_2 emissions.

4.3.24. The air quality modelling is based on several conservative assumptions, which taken together mean the modelled outcomes presented are highly precautionary. These are described in detail between paragraphs **6.5.15 and 6.5.33** of **Chapter 6** (Air Quality) of Volume 1 of the ES. They comprise the following in relation to the modelling of the with Proposed Scheme scenario, both alone and in-combination with other plans and projects:

a. Modelling has been completed using meteorological data from each of five years (2016 – 2020), with the results from the maximum (i.e., worst) year presented; and

b. The modelling of the Proposed Scheme assumes that the two BECCS Biomass Units would both operate at continuous full load (8,760 hrs per year), which in reality would be unlikely to occur;

c. Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum;

d. Assessment against the lower threshold of the recommended critical loads; and

e. The modelling of the Proposed Scheme assumes that Developments 1, 4, 47, and 74 would all be operational at the same time as the Proposed Scheme and would all operate at continuous full load (i.e., 8,760 hrs per year). In reality this is an extremely unlikely scenario to occur, so represents a conservative worst-case assessment of annual mean impacts. Furthermore, it is noted that there is considerable uncertainty that development 1 and 74 will actually come forward, with development 1's DCO powers shortly due to run out, and in the context of gas-powered power stations starting to be phased out (as evidenced by the Applicant not bringing forward its own Re-power DCO).

Lower Derwent Valley SAC & Ramsar

4.3.25. This impact pathway is relevant to the lowland hay meadow and otter qualifying features of the SAC. The relevant Natural England Supplementary Advice on Conservation Objectives (SACO) (Natural England, 2019) relate to 'Supporting processes (on which the feature and/or its supporting habitat relies)'. These include the target as summarised below in **Table 4.23**.

Table 4.23 - Lower Derwent Valley SAC SACO – Air Quality Targets

Attribute	Targets
Air Quality	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).

4.3.26. The only EAL for which the screening criteria are exceeded in-combination with other plans and projects is acid deposition. There are no in-combination exceedances of the 1% screening criteria for in-combination nitrogen deposition, or for concentrations of any pollutant. With the Proposed Scheme's air quality mitigation measures applied, the maximum in-combination impact for acidification is 1.9% of the critical load for the lowland hay meadow habitat type. The impact varies depending on location within the SAC. For example, the maximum predicted impact of 1.9% occurs over the Breighton Meadows SSSI component of the SAC, whereas the maximum predicted impact over the Derwent Ings SSSI component of the SAC is 1.6% of critical load.

4.3.27. The detailed results of the air quality modelling for acid deposition are presented in **Table 6.22** in **Chapter 6** (Air Quality) of Volume 1 of the ES (document reference 6.1.6).

4.3.28. The exceedance of the 1% screening criterion for acid deposition is minor and occurs only in-combination with other plans and projects. As set out above in paragraph **4.3.22** there are a series of conservative assumptions built into the air quality modelling. In reality mean annual cumulative acid deposition is likely to be below 1.9% of critical load at the point of maximum impact. Total acid deposition in the with Proposed Scheme and other plans and projects scenario is predicted to be a maximum of 376.4% of critical load, against a baseline of 374.5% of critical load.

4.3.29. Due to the magnitude of the modelled in-combination acid deposition, it is not predicted to lead to perceptible ecological change in the condition of the lowland hay meadow qualifying interest, or to present a significant impediment to the achievement of the Conservation Objective relating to air quality. The latest SSSI condition assessment for Breighton Meadows SSSI (one of the underpinning SSSI of the SAC) carried out in 2018 (Natural England, 2022), also identifies that 100% of the SSSI is in 'favourable' condition. This suggests that there is no evidence of substantial air quality effects on the lowland hay meadow habitats (the qualifying interest of the SAC) from the historically higher levels of acid deposition that the site would have received prior to increased emissions control measures across a range of sectors and the phasing out of coal use for energy generation since the 1970's. For the Derwent Ings SSSI (also one of the underpinning SSSI of the SAC, with a partial overlap with the 15 km Study Area for operational air quality impacts), 59.7% of the SSSI is in favourable condition, with 39.94% unfavourable recovering and 0.37% unfavourable declining.

4.3.30. In relation to the otter qualifying interest, there is no critical load assigned on APIS (Air Pollution Information System, 2022). The Natural England SACO state the following in relation to the air quality attribute for otter:

'The supporting habitat of this feature is considered sensitive to changes in air 'quality, especially acidity. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing

supporting habitat quality and population viability of this feature. No critical loads are available for this feature on APIS'.

4.3.31. Otters are also a qualifying feature of the River Derwent SAC. It is considered that the minor in-combination acidification impact would in reality not significantly alter the ability of habitats within (or adjacent) to the Lower Derwent Valley SAC to support the resident otter population. The otter population associated with the SAC uses the river Derwent and other watercourses for foraging. Otters are carnivorous, feeding on a variety of primarily aquatic and amphibious prey. Fish are typically a large component of their diet, but amphibians, small mammals, and waterfowl can also be taken.

4.3.32. In addition to a source of prey, otters also require suitable habitat features that provide shelter. In the context of the Lower Derwent Valley, this is provided by areas of dense bankside vegetation (tree and scrub cover) along the river and it's tributaries. Areas of dense vegetation away from watercourses are also likely to be of importance, particularly for the establishment of natal holts by female otters[6]. The minor cumulative acid deposition arising from the Proposed Scheme and other plans and projects is not predicted to lead to perceptible changes to the structure of vegetation within or adjacent to the Lower Derwent Valley SAC due to the low magnitude of the impact against a backdrop of substantially reduced SO2 emissions from Drax (and other sources) in recent decades. There would be no change in the structure of bankside and other vegetation and therefore no change in the availability of habitat providing sheltering opportunities for otters.

4.3.33. Environment Agency monitoring data for the River Derwent (Environment Agency, 2022) reports that the River Derwent has a high acid buffering capacity. This indicates that the pH of the river water is unlikely to be significantly affected by minor additional acid deposition. In turn, fish populations associated with the River Derwent and its tributaries are unlikely to be subject to any effects as a result of in-combination acid deposition.

4.3.34. There are no additional features of the Lower Derwent Valley Ramsar that are considered more susceptible to air quality effects than the lowland hay meadows feature assessed for the SAC. As such the analysis for Lower Derwent Valley SAC is considered valid for Lower Derwent Valley Ramsar

4.3.35. In light of the above, **no adverse effects on the integrity of the Lower Derwent Valley SAC or Ramsar** are predicted in relation to in-combination air quality impacts.

Thorne Moor SAC

4.3.36. This impact pathway is relevant to the degraded raised bogs qualifying interests of the SAC. The relevant Natural England Supplementary Advice on Conservation

[6] Female otters are particularly sensitive to disturbance whilst rearing young. They will seek out particularly secluded and sheltered locations to establish natal holts, where young are born and reared.

Objectives (SACO) relate to 'Supporting processes (on which the feature and/or its supporting habitat relies)'. These include the target as summarised below in **Table 4.24**.

Table 4.24 - Thorne Moor SAC SACO – Air Quality Targets

Attribute	Targets
Air Quality	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).

4.3.37. The EALs for which the screening criteria are exceeded in-combination with other plans and projects are for concentrations of NH_3, nitrogen deposition, and acid deposition. There are no in-combination exceedances of the 1% screening criteria for other pollutants.

4.3.38. The detailed results of the air quality modelling are presented in **Tables 6.20, 6.21, and 6.22** in **Chapter 6** (Air Quality) of Volume 1 of the ES (document reference 6.1.6).

4.3.39. The maximum predicted cumulative impact of the Proposed Scheme and other plans and projects would be 1.1% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.3% of this. The contribution from the Proposed Scheme to cumulative NH_3 also decreases marginally with increasing distance from the stacks, from 0.3% to 0.2% of Critical Level. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. As set out above in **paragraph 4.3.24** there are a series of conservative assumptions built into the air quality modelling. Given this series of assumptions, in reality the 1% screening threshold for annual mean NH_3 is unlikely to be exceeded in-combination except occasionally, given this would require all developments and the Proposed Scheme to be operating at or near full load for an entire calendar year.

4.3.40. There would be a cumulative impact of up to 1.7% of critical load for nitrogen deposition, with the Proposed Scheme contributing up to 0.4%. The cumulative impact on nitrogen therefore exceeds 1% of critical load.

4.3.41. To support the assessment of the implications of this deposition, published research into the effects of nitrogen deposition on bog habitats was reviewed (CAPORN, 2017). This included a review of existing scientific knowledge covering several studies. This study suggests that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In this study, with background

deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC), adding a further 1 kg N/ha/yr was shown to decrease species richness by 0.9%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined was 32.

4.3.42. Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted in-combination impact of the Proposed Scheme with other plans and projects is 0.09 kgN/ha/yr, equivalent to approximately 2.7% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. As highlighted in **paragraph 4.3.24** the in-combination impact has also been modelled based on several conservative assumptions, and in reality, deposition rates would be lower.

4.3.43. With the Proposed Scheme's air quality mitigation measures applied, the maximum in-combination impact for acidification is 1.9% of the critical load. Again, no perceptible vegetative changes of the SAC degraded raised bog habitat are predicted to arise from this level of deposition, in the context of the baseline deposition levels and the magnitude of the in-combination air quality impacts. There is also evidence from a study completed by the Centre for Ecology and Hydrology (NERC Centre for Ecology & Hydrology, 2015) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

4.3.44. There have been significant reductions in the contribution of SO_2 to acidification across the UK since the 1970's, driven in particular by improvements in (and requirements for) abatement technology and the phasing out of coal as a combustion source. Annual SO_2 emissions from Drax Power Station have fallen substantially over recent years, in line with increasingly stringent Environmental Permit requirements, with a reduction in emissions from approximately 35 kilotonnes in 2012 compared to approximately two kilotonnes in 2021. The in-combination impact therefore reflects a minor impact against a backdrop of substantially reduced SO_2 contributions to acid deposition in the last ten years and beyond.

4.3.45. In light of the above, **no adverse effects on the integrity of the Thorne Moor SAC** are predicted in relation to in-combination air quality impacts.

Skipwith Common SAC

4.3.46. With the application of the mitigation measures described in **paragraph 4.1.22,** the in-combination acid deposition impact reduces from 1.1% of critical load, to 0.8% of critical load (see **Table 6.22** in **Chapter 6** (Air Quality) of Volume 1 of the ES (document reference 6.1.6). Given this reduces the in-combination impact to below the 1% screening criterion threshold, **no adverse effects on the integrity of Skipwith Common SAC** are predicted in relation to in-combination air quality impacts.

5. CONCLUSION

5.1.1. In accordance with the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations), information to inform an appropriate assessment of the Proposed Scheme has been undertaken.

5.1.2. The HRA has been informed by an initial screening for likely significant effects (LSE), which identified LSE on the following European Sites identified within a 15 km zone of influence for potential impacts:

a. Lower Derwent Valley SAC.
b. Lower Derwent Valley SPA.
c. Lower Derwent Valley Ramsar.
d. River Derwent SAC.
e. Humber Estuary SAC.
f. Humber Estuary SPA.
g. Humber Estuary Ramsar site.
h. Skipwith Common SAC.
i. Thorne and Hatfield Moors SPA.
j. Thorne Moor SAC.

5.1.3. The zone of influence for potential impacts on European sites was set at 15 km from the centre of the Main Stack (within the Power Station Site). This was taken to correspond to the maximum extent of perceptible air quality impacts, with air quality impacts predicted to have the largest zone of influence of all potentially identified impacts.

5.1.4. Having identified European sites within the ZoI and assessed their interest features and Conservation Objectives, the Stage 1 screening (undertaken based on an assessment of the unmitigated Proposed Scheme) discounted a number of potential impacts (for example, direct impacts on habitats within European sites). For some European Sites, LSE were identified for a proportion of the qualifying interests. The Stage 1 screening also identified a range of impacts that could arise from the Proposed Scheme, as follows:

a. Loss and/or disturbance of functionally-linked land;
b. Disturbance to qualifying features in functionally-linked habitat (light/noise/vibration/visual);
c. Emissions of dust onto functionally-linked habitats;
d. Hydrological changes to functionally-linked habitat (effects on water quality from sedimentation or water-borne pollutants; and
e. Air quality changes during operation.

5.1.5. These effects were assessed further through the Stage 2 assessment for potential adverse effects on integrity which considered: European Site data including

Supplementary Advice on Conservation Objectives; available environmental condition data; and the potential effects of the Proposed Scheme on its own and in-combination with other plans and projects, taking mitigation proposed for the Proposed Scheme into account.

5.1.6. It was concluded that the Proposed Scheme would not have an adverse effect on the integrity of any of the European Sites assessed. It is intended that this assessment will be passed to Natural England, in order to obtain their advice on the conclusions reached.

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